



# 50 Years of IFIP

**Developments and Visions**

*Edited by:*  
*Klaus Brunnstein*  
*Heinz Zemanek*



ifip

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# 50 Years of IFIP

Developments and Visions



The International Federation  
for Information Processing

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## **IFIP – The International Federation for Information Processing**

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

## IFIP 50<sup>th</sup> Birthday

A “round birthday” of a federation is a good reason to celebrate; but even more it is an opportunity to consider the past and the future, to study the circumstances under which the federation was created/started and in which way the different aspects and situations have changed so that new perspectives are to be considered, new efforts and “tools” are to be created. In order to immediately switch from generalities to our subject, so close to our hearts, I choose the biggest change in those 50 years, a change which we have created ourselves: the change from the isolated computer to the computer network, the creation of World Wide Webs. The computer user is no longer forced to concentrate his attention to his machine – he is invited to use his processing machine for communication, to make use of any application from partners all over the world and of the stored information available in all the storage units connected over all continents.

This situation asks us, for instance, whether the IFIP Congress shall be continued in its traditional form. By the way: to my regret organizers have often renamed the IFIP Congress as “World Computer Congress” as if IFIP was no longer the main supporter of the event. No, we have not given up the responsibility for it, we vote for the place and the organizer. But is the get-together in our days in the same nature as ICIP 1959 or IFIP Congress 1962?

Fifty years ago the congress could cover the subject “computer” and could attract almost all of the great magicians of the new field. You could, as a participant, talk to each of them in the corridors, you heard their contributions and you soon had those contributions in your hands: the proceedings were the best documentation of the international, global progress of information processing, of its history.

Today you can call up all of the authors on the screen of you computer, not just the one paper they would read before the congress. You have their life work at your disposal and your problem now is the quantity of authors and papers, to find what you are looking for or to discover the new line of development which might help you.

I just called the cream of our field “magicians.” This is justified. Which other field can present a progress of the essential parameters with a factor of a thousand every 20 years? We have done that – admittedly with the help of our colleagues in the field of electrophysics – three times already and I can see no reason why this should not happen again more than once. If the present chip cannot keep up with this triumph, we will turn from the wire (that got too thin) to light and quantum physics.

My first computer had a poor 15 storage cells. Today you can get four megabytes for 8€ or 8\$. Storage is no problem except to find what you search for. Parallel processing increases the power of our system and if you need more, you let computers run in parallel, maybe half of them on a different continent.

Because we have included teleprocessing in our systems and our limitation there is speed of light.

We are magicians. But even magicians remain human beings, limited and error-prone, not always realizing that they have lost orientation. Their achievements depend also on the quality of their language. And language, in the world of today, is underestimated on all levels, from children to public speakers.

My first transistorized computer in the mid-1950s was built and run by a team of seven people. The team knew everything about our machine. Today, if you want to have all the people together who know everything about your laptop, you had better hire one of the top sport arenas. And the discussions between the groups of specialists suffer from both the isolating differences of the group languages and the diminishing mastering of the general language. Sure, our language is English and many English terms are used in all other languages. But many of our ultimate customers are not specialists and the culture of high-language explanations is as important as 50 years ago. Moreover, our field is guilty of a good part of the flooding of other languages with English words.

Which consequences does this flood of developments have for IFIP and the IFIP Congress? Are we watchful enough to recognize changes and to transfer them into new ideas on how to run IFIP? How do we attract the key scientists of our field? How do we get 5,000 participants as I had in Stockholm 1974?

Indeed, we have many reasons to consider new perspectives, not merely as a side effect but as a main task – realization included.

December 2010

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# Preface

The mission of this book is to report where IFIP stand in the 50<sup>th</sup> year of its existence, and how IFIP developed until 2010. This is the fourth book in a series of status reports which have so far been edited by Heinz Zemanek, IFIP Historian and Honorary Member, published at specific intervals:

- Reporting the status after 10 years, Heinz Zemanek edited the book *The Skyline of Information Processing*, published in 1972 by North Holland
- Reporting the status after 25 years, Heinz Zemanek edited the book *A Quarter Century of IFIP: The IFIP Silver Summary*, covering the proceedings of the 25<sup>th</sup> Anniversary Celebration of IFIP in Munich, March 1985, published 1986 by North Holland
- Reporting the status after 36 years, Heinz Zemanek edited the book *36 Years of IFIP*, published 1996 by IFIP Secretariat (IFIP Press)

This fourth report stands on the shoulders of its predecessors and summarizes where IFIP stands in the 50th year of its existence, how the IFIP Organizing and Technical Committees developed in the last few years, including some arguments about successes and problems. A special part is dedicated to the 21st IFIP World Computer Congress 2010 which was the major event to commemorate IFIP's 50<sup>th</sup> anniversary. Future plans and "visions" are described by Leon Strous, who took over the presidency in 2010 and who will lead IFIP in the next few years.

In the age of the Global Information Society, IFIP strongly supports open availability of scientific and technical information. Consequently, this book is available both in printed form (published by IFIP press at IFIP secretariat in Laxenburg, Austria) AND from IFIP's Digital Library (available from the IFIP website).

Finally, the editors wish to thank all those who have contributed to this book, especially present and past IFIP office holders, present and past chairs of IFIP Technical Committees and Working Group chairs. In addition, we wish to express our gratitude to Augusto Casaca, Chair of the International Program Committee, and Nick Tate, Chair of the Organizing Committee of the IFIP World Computer Congress 2010 in Brisbane. And last but not least, the editors wish to thank Eduard Dundler, IFIP Secretary General, for his strong support.

December 2010

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# IFIP Development 1960–2010

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**Abstract.** In the 50<sup>th</sup> year after IFIPs foundation in 1960, IFIPs achievements and work on several levels are described in detail. This includes the development of membership and world-wide coverage, as well as Technical Committees and major events, esp. including IFIP World Computer Congresses (IFIP WCC) and World IT Forum (WITFOR).

**Keywords:** IFIP, IFIP History, Heinz Zemanek, Member Societies, Technical Committees, IFIP World Computer Congress, WITFOR.

## 1 IFIP Development 1960–2010

As countries and organizations became growingly aware of the importance of properly using Information and Communication Technologies (ICTs) for their development, the membership of IFIP developed rapidly, as the following list of present member societies shows:

Australia, Poland, Argentina and Italy (1961), Norway (1962), Brazil and Austria (1964), Bulgaria (1965), Hungary (1966), South Africa (1971), India (1973), New Zealand and Ireland (1974), Korea (1978), PR China (1979), Nigeria, Portugal and Syria (1981), Greece (1983), Zimbabwe and Singapore (1987), Thailand and Slovakia (1993), Slovenia (1998), Lithuania (2001), CLEI (representing South America), Croatia and Cyprus (2002), Botswana (2003), Sri Lanka (2004), Ethiopia (2005), Serbia and Kenya (2007), and Bosnia-Herzegovina (2008).

In addition, Iceland (since 1986), Malaysia (since 2003) and Serbia (since 2007) are corresponding members. Moreover, affiliate members include SEARCC (representing several societies in South-East Asia, full member 1981-1992, affiliated since 1992), IMIA (since 1989) and CEPIS (representing several societies in Europe, affiliated since 2002).

Moreover, due to changes in the political system, membership of Czechoslovakia, changed to Czech Republic, with Slovakia becoming member 1993, and membership of Soviet Union changed to Russia (1993). The membership of German Democratic Republic finished naturally when Germany was re-united. Following the development of Yugoslavia (membership 1977-1986), several independent members became full member of IFIP, esp. including Slovenia, Croatia and Bosnia-Herzegovina. In 1999, the former representation of several societies in USA (from the association “AFIPS”

to the last joint membership “Focus”) changed to include both The Association of Computing Machinery (ACM) and IEEE Computer Society, an exclusive decision based on the large size and international membership of both societies; consequently, USA is the only country with two member societies).

Because of political developments as well as various internal reasons (e. g. financial resources esp. relevant for smaller and developing countries), some member societies changed their membership to “corresponding member” (and sometimes back to full) or left IFIP. Finally, when the South American Organization of Informatics Societies (CLEI) joined IFIP as full member, Chile ended its full membership. The following countries had been represented, in IFIP for some time:

Israel (1964-2005), Mexiko (1964-1977), Cuba (1977-1991), Chile (1960-2008), Germany (GDR) (1970-1990), Algeria (1970-1983), Ghana (1970-1976), Egypt (1977-2007), Iraq (1978-1993), Tunisia (1978-2002), Marocco (1979-1982), Andorra (1991-2009), Malaysia (1991-2002), Albania (1992-2001), Belorussia (1993-1998), Armenia (1994-2002), Turkey (1999-2004), Oman (2001-2009), Mauretania (2005-2008) and Zambia (2005-2007).

In its 50<sup>th</sup> years, IFIP membership has developed from 14 founding member societies (1960) to 48 full members, 3 corresponding and 3 affiliate members (2010), with 20 more societies which had been members for some time.

Since 1960, representatives of IFIP member societies met at 100 official meetings (with the meeting in Brisbane at IFIPs 50<sup>th</sup> anniversary counting as number 100), including annual General Assemblies (usually in August/September) and Councils, now renamed Board meetings (usually in February/March). Related meetings, invited by a member society and in several cases associated with IFIP World Computer Congresses and WITFOR), have been organized in almost all parts of the world (organized by continents, and in cities/countries according to meeting dates):

- Africa(6):** Cape Town/South Africa (1984/2004), Harare/Zimbabwe (1991), Johannesburg/South Africa (1996), Gaborone/Botswana (2005), Addis Ababa/Ethiopia (2007)
- Asia (17):** Jerusalem/Israel (1966/1990), Tokyo/Japan (1975/1980/1985/1993), Tashkent/Soviet Union (1976), Goa/India (1999), Petaling Jaya/Malaysia (1999), Bombay/India (1978), Beijing/China (1983/2000), Singapore (1987), New Delhi/India (1988/2009), Pohang/Korea (2005), Hanoi/Vietnam 2009),
- Australia, New Zealand (4):** Melbourne/Australia (1980), Auckland/New Zealand (1988), Canberra/Australia (1996), Brisbane/Australia (2010)
- Europe(60):** Paris/France (1959/1983), Rome/Italy (1960/1964/1982), Darmstadt/Germany (1961), Copenhagen/Denmark (1961), Munich/Germany (1962/1973/1985), Gola/Norway (1963), Prague/Czechoslovakia (1964/1969), Nice/France (1965), London/UK (1966/2007), Madrid/Spain (1967/1992), Tbilisi/Georgia (1968), Edinburgh/UK (1968), Brussels/Belgium (1969/1994), Amsterdam/Netherlands (1970/2008), Bled/Yugoslavia (1971), Ljubljana/Yugoslavia (1971), Vienna/Austria (1972/1993/1998),

Sofia/Bulgaria (1972/1980/2010), Helsinki/Finland (1974/1982), Stockholm/Sweden (1974), Dresden/Germany (1976), London/UK (1977/1979), Oslo/Norway (1978), Bratislava/Czechoslovakia (1979), Bratislava/Slovakia (1996), Dublin/Ireland (1981/1986), Varna/Bulgaria (1984), Lisbon/Portugal (1986), Budapest/Hungary (1987/1998), Geneva/Switzerland (1989), Barcelona/Spain (1991), Trondheim/Norway (1992), Toledo/Spain (1992), Hamburg/Germany (1994), Manchester/UK (1998), Capri/Italy (2001), Bled/Slovenia (2002), Bilbao/Spain (2003), Vilnius/Lithuania (2003), Toulouse/France (2004), Palma de Mallorca/Spain (2006), Milano/Italy (2008)

**Middle and South America (6):** Mexiko City/Mexiko (1967),

Rio de Janeiro (1975), Buenos Aires/Argentina (1990), Canela/Brazil (1997), Natal/Brazil (2001), Santiago de Chile/Chile (2006),

**North America (10):** New York/USA (1965), Atlantic City/USA (1970),

Toronto/Canada (1973/1977), Anaheim (1981), San Francisco/USA (1989), New York/USA (1995), Calgary/Canada (1995), Washington/USA (2000), Montreal/Canada (2002)

The number of sites of IFIP meetings, so evidently with major focus on the Northern Hemisphere (esp. on Europe), reflects the number of member societies in the respective region:

Africa:	6 official meetings - 6 Member Societies
Asia:	17 official meetings - 7 Member Societies
Australia/New Zealand:	4 official meetings - 2 Member Societies
Europe:	60 official meetings - 30 Member Societies
Middle/South America:	6 official meetings - 5 Member Societies
North America:	10 official meetings - 3 Member Societies

Evidently, IFIPs mission to address questions how Information and Communication Technologies relate to problems in various parts of the world and how ICT can contribute to related solutions, strongly requests that significant efforts be made to win membership in Africa, Asia (where the largest countries are represented) as well as in Middle and South America: this will also enable IFIP to organize more events in the related areas.

The development of IFIP has been associated with the team of officers which have been elected for 3 year terms each (with the possibility of one re-election, except for the honorary secretary and treasurer, whose terms are not limited, for good reasons to ensure continuous work in these areas). For the technical work, Technical Committees and Working Groups elect their officers from among the community, whereas IFIP officers (president, vice presidents, trustees and recently councilors) are elected at General Assembly by representatives of Member Societies.

With the 16<sup>th</sup> president just having taken over his office, the list of presidents includes the following persons:

01	Isaac L. Auerbach, USA (1962-1968)
02	A. Speiser, Switzerland (1968-1971)
03	Anatoly Dorodnicyn, Soviet Union (1971-1974)

04	Heinz Zemanek, Austria (1974-1977)
05	Richard Tanaka, USA (1977-1980)
06	Pierre Bobillier, Switzerland (1980-1986)
07	K. Ando, Japan (1986-1989)
08	Ashley Goldsworthy, Australia (1989-1992)
09	Blagovest Sendov, Bulgaria (1992-1995)
10	Kurt Bauknecht, Switzerland (1995-1998)
11	Peter Bollerslev, Denmark (1998-2001)
12	Robert Aiken, USA (2001)
13	Walter Grafendorfer, Austria (2001-2002)
14	Klaus Brunnstein, Germany (2002-2007)
15	Sebastian "Basie" von Solms, South Africa (2007-2010)
16	Leon Strous, Netherland (2010- )

In the exceptional case of Robert Aiken (who has been a very active TC-6 chair and representative of USA before) who resigned because of health reasons, the oldest vice president – then Walter Grafendorfer/Austria – took over to guarantee continuous operations (fortunately, he lives in Vienna and could consequently work closely with IFIP secretariat in Laxenburg, near Vienna).

## 1.2 Development of IFIP Technical Committees and Working Groups

With Isaac L. Auerbach as IFIPs first president – after whom IFIPs Auerbach Award is named, which is given for important work for IFIP – the federation began to establish Technical Committees covering important fields of developments of Informatics, with Working Groups dedicated to specific topics of in the fields of the related Technical Committee.

This approach to structure the work in tree-like (hierarchical) manner followed the then established patterns of science, research and education; in the following years, this hierarchical approach was very successful to cover, in fast sequence of new TCs and WGs, many important areas of Informatics and Computing.

As the related fields expended and also changed their focus, TCs and WGs also developed to adress new trends, e. g. by changing and adapting their mission (which is traditionally described as “Aims and Scopes”). The development of Technical Committees (by years of their establishment, though with today’s names) demonstrates how IFIP reacted to the development of new important topics

TC-01 “Foundations of Computer Science” (established 1959, confirmed 1960),

TC-02 “Software: Theory and Practice” (prepared 1960, established 1962),

TC-03 “Education” (established 1962),

TC-05 “Information Technology Applications” (established 1971),

TC-06 “Communication Systems”(established 1971),

TC-07 “System Modeling and Optimization”(established 1974),

TC-08 “Information Systems”(established 1974),

TC-09 “ICT and Society” (established 1977),

TC-10 “Computer Systems Technology”(established 1977),

TC-11 “Security and Protection in Information Processing Systems”

(established 1983),

- TC-12 “Artificial Intelligence”(established 1989),  
 TC-13 “Human-Computer Interaction”(established 1989),  
 TC-14 “Entertainment Computing”(established 2002).

Within Technical Committees, (presently in total 125) Working Groups specialize on specific topics within the subject area of their Technical Committee. Both TCs and WGs organize regular events, from workshops and symposia to International Conferences and – in some cases – World Congresses in their subject area, such as the reputed “World Congress on Computers in Education” (WCCE). In addition, few Working Groups establish cooperation and joint work with Working Groups of other TCs with related subjects, and they co-organize events on subject matters, such as Working Groups in TC-6, TC-8 and TC-11 on “e-Business and E-Government”. Moreover, many events are organized by Technical Committees and Working Groups in cooperation and jointly with working bodies of IFIP Member Societies, often also addressing issues related to the respective host country. Conferences organized by Technical Committees and Working Groups are usually published by the official IFIP publisher (in early years: Elsevier, after some transitions presently: Springer).

In this sequence, TC-4 “Medical Informatics” established in 1968 played a special role. As the subject area – Methods and Applications of Informatics in Medicine – developed rapidly into a highly complex organization, experts began (1977) to develop “The International Medical Informatics Association” (IMIA), recognized by IFIP as separate organization with world-wide membership (formally established in 1979). Since its foundation, IMIA and IFIP work together as “affiliate organizations”, as in the joint IFIP-IMIA conference “e-Health” in Brisbane, part of IFIP World Computer Congress 2010. It is worthwhile to mention that IFIP also had close links with other international organizations with world-wide coverage, such as IFORS (International Federation of Operational Research Studies) and IFAC (International Federation of Automatic Control, founded in 1957).

### 1.3 Development of IFIP World Computer Congress and World IT Forum

Starting with the initial Congress (1959 in Paris, organized under the auspices of UNESCO UNESCO), a series of important Congresses presented the knowledge collected in the IFIP community and esp. in Technical Committees and Working Groups. The list of IFIP World Computer Congresses, initially organized at 3-year intervals, includes:

- 1<sup>st</sup> World Computer Congress (ICIP) 1959 in Paris/France (preparing IFIP)
- 2<sup>nd</sup> IFIP WCC-1962 in Munich/Germany
- 3<sup>rd</sup> IFIP WCC-1965 in New York/USA
- 4<sup>th</sup> IFIP WCC-1968 in Edinburgh/UK
- 5<sup>th</sup> IFIP WCC-1971 in Ljubljana/Yugoslavia
- 6<sup>th</sup> IFIP WCC-1974 in Stockholm/Sweden
- 7<sup>th</sup> IFIP WCC-1977 in Toronto/Canada
- 8<sup>th</sup> IFIP WCC-1980 in Tokyo/Japan (1<sup>st</sup> part)  
and Melbourne/Australia (2<sup>nd</sup> part)
- 9<sup>th</sup> IFIP WCC-1983 in Paris/France
- 10<sup>th</sup> IFIP WCC-1986 in Dublin/Ireland

- 11<sup>th</sup> IFIP WCC-1989 in San Francisco/USA
- 12<sup>th</sup> IFIP WCC-1992 in Madrid/Spain
- 13<sup>th</sup> IFIP WCC-1994 in Hamburg/Germany
- 14<sup>th</sup> IFIP WCC-1996 in Canberra/Australia
- 15<sup>th</sup> IFIP WCC-1998 in Vienna/Austria (1<sup>st</sup> part)  
and Budapest/Hungary (2<sup>nd</sup> part)
- 16<sup>th</sup> IFIP WCC-2000 in Beijing/China
- 17<sup>th</sup> IFIP WCC-2002 in Montreal/Canada
- 18<sup>th</sup> IFIP WCC-2004 in Toulouse/France
- 19<sup>th</sup> IFIP WCC-2006 in Santiago de Chile/Chile
- 20<sup>th</sup> IFIP WCC-2008 in Milan/Italy
- 21<sup>st</sup> IFIP WCC-2010 in Brisbane/Australia

Papers accepted for presentation at IFIP World Computer Congresses (selected by an International Program Committee, engaging experts from Technical Committees) have been published by reputed publishers, starting with Elsevier until – presently – Springer. At the 21<sup>st</sup> IFIP World Computer Congress (Brisbane, September 2010), 17 parallel conferences were held, with papers printed in 13 volumes.

As roles and methods of ICT in Developing Countries become growingly important, a dedicated series of conferences “World IT Forum” (WITFOR), to be held exclusively in a Developing Country in close cooperation with the government, was suggested by Dipak Khakhar, then chair of Developing Countries Support Committee. Starting in 2003, the following 4 conferences have been held (so far at 2 year intervals):

- WITFOR 2003 in Vilnius/Lithuania
- WITFOR 2005 in Gaborone/Botswana,
- WITFOR 2007 in Addis Ababa/Ethiopia
- WITFOR 2009 in Hanoi/Vietnam

Both the organization and the conference format are rather different from IFIP WCCs. The events are organized in close cooperation between IFIP (with Dipak Khakhar chairing the events in Vilnius and Gaborone, and Leon Strous as chair of the following events) and the respective government. Conference themes are discussed in “commissions” addressing topics of interest esp. for the host country and region, such as (examples from the 1<sup>st</sup> WITFOR):

- Preparing the ground for ICT
- Building the infrastructure
- Economic opportunity
- Empowerment and participation
- Health
- Education
- Environment
- Social and ethical aspects

Due to the support of governments, WITFOR events offer the opportunity for discussions between scientists, educators and politicians including ministers responsible for developing ICT in the host countries.

## 1.4 Development of IFIP Secretariat

In its early years, IFIP secretariat was located in Amsterdam/Netherlands. After moving to Geneva (organized by long-term chair of secretariat Gwyneth Roberts, named “IFIPs good soul”), IFIP secretariat is presently located in Laxenburg, Austria, near Vienna, in the vicinity of important International organizations such as IFAC. This site had been developed during the Cold War between East and West as important meeting place where scientists from both hemispheres could meet and discuss outside any political controversy.

Since its start, IFIP has always worked with a small team of very friendly women and men in the secretariat. Presently, the secretariat is organized by Secretary General Eduard Dundler, supported by Brigitte Brauneis and Marion Smith. This small team very effectively organizes and coordinates IFIPs operations and publications esp. including IFIP website. Moreover, Eduard and his team organize the official events, esp. the Board (former Council) meetings and General Assemblies.

## 2 IFIP “History” Website

As IFIP supports fast global distribution of information, material related to work of IFIP, its Technical Committees and Working Groups is available from related websites, esp. including IFIP website. Concerning this book, which is available as print version published by IFIP secretariat under IFIP Press, chapters of the book are available from IFIP website under “IFIP History”. In addition, details of IFIP developments (including charts describing the development of membership and events) as well as documents related to official IFIP meetings – Council and Board, General Assembly – are available under the same address. Details of the work of Technical Committees and Working Groups are either available from IFIP website or, when related groups host their own websites at other locations, links to such websites are available.

As IFIP supports the idea to improve the speed and quality of distribution of material related to developments of Information and Communications Technologies, IFIP intends to publish all relevant material preferably by its website and, if published in the form of books, via IFIP Digital Library. As far as IFIP books are printed and distributed by IFIPs publisher, presently Springer, the related books (which have all been prepared in digital form) are available from the publisher’s Digital Library.

# President's Report 1998–2001

Peter Bollerslev, Past President

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**Keywords:** IFIP, President, Peter Bollerslev.

I was elected as President-elect at the GA in Canela, Brazil in September 1997. I had been with IFIP 25 years and my IFIP background was made up of six years as WG chairman, six years as TC chairman and some years as Danish IT Society representative to the IFIP GA. But I had never worked at such a high level in the organization as the Executive Board. Thus I had no experience as “Administrative Officer”. However, the support I received from EB colleagues, TC chairs, GA representatives and not least the IFIP Secretariat in Laxenburg made it easy for me to meet this interesting and challenging task.

In September 1998 at the end of the GA following the Congress 98 in Vienna-Budapest I took over as President. The next three years became very busy years for me with much work for IFIP at my desk at home, in mailing, talking in telephones, participate in meetings and related to that much travelling. I had a very understanding and supporting employer! Having said that, I will add that the position as President of IFIP gave me wonderful experiences and I met so many interesting people I would not have met otherwise. It was worth all the efforts!

My years as President of IFIP (September 1998 – September 2001) were in many ways very calm years. The Executive Board functioned well, the Secretariat likewise, the GA operated well and very important the TCs flourished. The IFIP economy was stable, in fact we increased our assets during the years with more than 30 %.

I will go through the three years and comment on certain issues and pick out highlights for further comments.

## 1 Membership

When I took over in September 1998 IFIP had 38 full members with voting rights. This developed through the three years like this: September 1999 – 40 members; August 2000 – 41 members; September 2001 – 40 members.

These figures seem to show a kind of stability. And they really do, because there was a stable group of members with app. 35 members who were there whatever happened. However, I remember that we had many problems with members failing to pay their dues, being in arrears or being suspended. And some members shifted between full and corresponding membership.

These IN&OUT- members were: Albania, Argentina, Armenia, Belarus, Belgium, Brazil, France, Greece, Ireland, New Zealand, Nigeria, Philippines, Russia, Syria, Tunisia and Zimbabwe.

Many of us, active in the GA, in the TCs, in the WGs and in the Secretariat, found that 40 nations out of 193 in the World was not satisfactory, if we aimed at representing the IT-community as such in relation to international organizations, NGOs etc. We tried therefore through correspondence and visits to national societies to make them interested in IFIP membership. For me personally it meant a lot to get more members, and especially from the less IT-developed countries, when the negotiations with e.g. UNESCO on IFIPs engagement there was brought forward.

However, we did not succeed in getting more stable members than the app. 40 who still forms the kernel of IFIP. When I now (2010) look at the figures I am happy to learn, that the membership rate has grown with about 25 %.

Nevertheless, we should aim at getting a Member Society from each of the nearly 200 nations in the World as a member of IFIP. We are a truly international federation, but we should have a greater coverage.

Some argue that IFIP is too much European based. However, the newcomers to IFIP in my presidential period showed that we were on our way to change. The new full members came from Latin America, Africa and the Arab World. We should aim at getting more young people involved in the work of IFIP (GA, TCs, WGs) and we should also address the gender issue.

## **2 Member Society Forum**

In order to invalidate the statement that “IFIP is often the best kept secret in a Member Society” we innovated the so-called Member Society Forum to take place at the GA. It was our hope that we could contribute to overcome the lack of knowledge about what IFIP does and can do for Members and their members. The Forum provided representatives of IFIP Member Societies with an opportunity to explore matters of common concern, to profit from one another's experience, and to facilitate inter-Member cooperation. We urged the TCs and WGs to disseminate the information generated during their activities more widely, and especially to Member Societies, that IFIP could make itself better known throughout the World. The idea behind was that IFIP consciously should act as a “broker” of relationships (bringing people together with like interests) in the same way as a broker of technical information. We were looking forward to the internet as an effective help in this matter.

## **3 Economy**

Financially the period 1998 – 2001 was very successful. Surplus from conferences and royalties from booksales, often due to hard work in the TCs and WGs, brought in a lot of money for the money box in IFIP. The assets grew during the three years from 1.591.00 Euro in 1998 to 2.087.000 Euro in 2001. IFIP was already at the end of 2001 a fairly affluent organization. The results during 1998 – 2001 were all positive varying from 61.000 Euro to 345.000 Euro. This variation can be explained by the fact that in years with an IFIP Congress (in this case the year 2000) no large TC conferences bringing income are being arranged.

## 4 Publication

Publication was heavily discussed during my presidential period. Let me take 1999 as an example. Kluwer Academic Publishers was the IFIP Publisher. In 1999 we published 24 books with KAP which brought royalties to IFIP at around 100.000 USD. However, the pricing policy was the main topic of discussion with the TCs. The bulk sale prices were much higher than many of the TCs would wish. It was not easy to find a balance fitting all parts in the discussions.

A success story was the official journal of TC 3 “Education and Information Technologies”. The journal became incorporated into Kluwer Online. There the electronic journal service gave licensed institutions access to the full text of the journals. This became a major success. The IFIP discussions on electronic publishing had started, but no conclusions were made in the period.

## 5 Developing Countries

One of the things I look back on with great pleasure is the efforts we in IFIP put in in order to assist the developing countries as much as possible. The so-called Developing Countries Support Committee (DCSC) under the leadership of Professor Dipak Khakhar (the IFIP Treasurer) played an important role. The funds administrated by DCSC supported financially people from developing countries when they attended IFIP conferences. But the support came also when IFIP events were organized in developing countries. Such meetings frequently brought IFIP experts into the host countries, often to give seminars. In 1999 and 2000 such IFIP events were held in several developing countries and Eastern European countries: Brazil, China, Hungary, India, New Zealand, Poland, South Africa, Thailand, Russia, Romania, Slovakia.

## 6 IFIP Newsletter

The IFIP Newsletter went through the sixteenth to the nineteenth year of its publication. It was well edited by Dr. Jack Rosenfeld and provided comprehensive and timely information on what was happening in IFIP. The Newsletter reported on GA, Council, WCC and major IFIP conferences. It also contained interviews with IFIP people and brought articles written by IFIP-persons as well as nonIFIP-persons.

## 7 The IT STAR

Shortly after Slovenian Society “Informatika” joined IFIP as a full member we held some meetings in Slovenia and the neighbouring countries and assisted them in establishing a regional group of countries called IT STANDING Regional committee (IT STAR) in April 2001. The founding members were the societies from Austria, Hungary, Italy and Slovenia.

The idea was to foster cooperation of the participating societies, to assess the current contacts and monitor the development of bilateral and regional programs for

scientific and technical cooperation. During the last half year of my presidency, IT STAR was very effective, and it was a pleasure to participate in their conferences and meetings. However, it is my feeling, that not long after IT STAR fell apart.

## 8 IFIP WCC 2000

The Flagship event in IFIP is truly the WCC. And the WCC in 2000 was no exception.

Professor Benjamin Wah had been appointed by my predecessor as chair of the International Program Committee. He was born in Hong Kong, had studied in the USA and was at present Professor at the University of Illinois at Urbana-Champaign. This proved to be a perfect choice. Professor Wah had a sensible feeling for both the Chinese and the European/American wishes. As theme for the Congress was chosen “Information Processing: Beyond Year 2000”.

The Congress was planned with keynote speeches, panels, workshops and eight federated conferences: International Conference on

- Communication Technologies
- Signal Processing
- Chip Design Automation
- Intelligent Information Processing
- Educational Use of Technologies
- Information Technology for Business Management
- Software – Theory and Practice
- Information Security

2219 papers were submitted from 72 countries. About half of the papers came from China. Finally, not to forget, a very large exhibition was linked to the Congress.

The Congress Co-Chair, the President of Chinese Institute of Electronics, Hu Qili stated: Our government would like to take this opportunity to promote the development of the information industry and give strong support to make the Congress a success.

The Congress took place from 21 August to 25 August. 1567 participated in the Congress, still at the Opening Ceremony there were 2067 attendees. There were participants from 70 countries. Nearly 50 % of all participants came from China, but there was a significant attendance from Japan, USA and Germany. 1367 papers were presented at the Congress.

In my mind this 16<sup>th</sup> World Computer Congress can only be described as a major success with many many high level presentations, all of them presented in a friendly atmosphere and Chinese hospitality and friendliness. And shortly after the Congress had ended the Chinese organizers paid the guaranteed surplus to IFIP: USD 65.387.

## 9 WCCE 2001

Out of the many TC- and WG-organized conferences during the three years I pick WCCE 2001 for extra comments. As former WG 3.1 chair and former TC 3 chair I had attended many “Education and IT”-conferences and in many cases had “a leading

role” to play. Now it was my turn to invite to a World Conference in my home town Copenhagen.

I am happy to look back and realize: WCCE 2001 became a success.

The conference ran from 29<sup>th</sup> July to 3<sup>rd</sup> August and attracted about 1200 participants from 66 countries. 250 papers from 38 different countries were presented and many workshops and discussion groups had been organized.

At the Opening Ceremony the Danish Minister for Education talked about the Danish experience, and the Deputy ADG of UNESCO, Mrs. Aicha Bah Diallo addressed the conference and underlined the strategic importance UNESCO assigns to its partnership with IFIP. During the ceremony also a Danish trio disguised in Scottish attire played the bagpipes. This puzzled everyone and I had to say, that this was in order to test the shrewdness of the attendees. (The truth: one of the organizers was married to one of the musicians).

Many social arrangements took place during the conference days. One of them was a reception at the Town Hall of Copenhagen where all participants were invited to a buffet which included the famous “Town Hall Pancakes”. And as the IFIP Executive Director wrote: Finally, when the meetings were over and the evening was expectant, the TC 3 community was hosted by the local organizers in splendid style. The hunger was subdued and the thirst was quenched and on this front as on the educational front, TC 3 proved to be a Healthy Baby ... and as you know, healthy babies always demand a little more!

## 10 Conclusion

Looking back I consider the following activities from my three years as the most important:

Enhanced information to Member Societies, the increased cooperation with UNESCO, the successful IFIP publications, the start of a closer cooperation with industry, and the establishment of the IT STAR.

Eventwise the IFIP World Computer Congress in Beijing in August 2000 once again proved that the WCC is the IFIP Flagship. Of course I personally from that WCC especially remember meeting the President of PRC, Jiang Zemin who addressed the Congress in the opening session. Another meeting at the highest level to be remembered is the meeting with the Director General of UNESCO in Paris in January 2001.

We also started discussions on some new events and formed the basis of WITFOR (the World IT FORum) and GLITS (GLobal IT Skills). WITFOR was planned as a biannual series of international conferences addressing IT issues in developing countries. The first WITFOR took place in Vilnius, Lithuania in August 2003.

The endeavours to establish a closer cooperation with industry started in my presidential period, mainly thanks to Vice President T. Miura’s initiative, and GLITS was an important factor. GLITS was like WITFOR planned as a series of conferences on “The Role of IT Professionalism”. The first conference took place in 2002 supported by several international organizations like ACM, BCS, CEPIS, CIPS. IEEE-CS, OECD, SEARCC and WITSA.

The successful cooperation with UNESCO led to the representation of IFIP in the UNESCO-NGO Liaison Committee and in the Advisory Group, which advises UNESCO and the UN on issues related to ICT.

In collaboration UNESCO and IFIP (especially TC 3) developed a number of curricula and took care of regular updating of the documents.

It was my fate in the year 2000 to commemorate IFIP's 40<sup>th</sup> Anniversary, the Ruby Jubilee. This was done in a federation, which was supported by a well-functioning secretariat. A secretariat which had developed a perfect homepage providing on-line timely updated information and documents and a useful Power point presentation for the benefit of GA representatives and TC chairs. The attractive pamphlet "This is IFIP" was also developed in this period.

In relation to GA/Council meetings we succeeded in changing the structure of the meetings in order to avoid too much repetition (redundancy!) and rather than just reporting then focussing on strategic issues.

Finally I would with my own professional background with great satisfaction like to note that "Education" over the years in this period came more and more into focus in IFIP.

# President's Report 2001–2002

Walter Grafendorfer, Acting President 2001–2002

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**Keywords:** IFIP, President, Walter Grafendorfer.

## 1 Office

I was from 1991 to 2008 the Representative of the Austrian Computer Society in IFIP, five years Trustee, Marketing Committee and Activity Management Board Chair, three years Vice President. Due to health and personal reasons president Robert Aiken resigned in November 2001. According to the rules I as the longest serving Vice President served as Acting President until General Assembly (GA) 2002.

On my initiative the IFIP secretariat was transferred in 1995 from Geneva, Switzerland, to Laxenburg, Austria, and at the same time a Cooperation Contract between IFIP and the Austrian Government has been signed. I was Co Chair (together with Maria Toth from the Hungarian John von Neumann Computer Society) of the Organizing Committee for the successful IFIP World Computer Congress 1998 in Vienna and Budapest. During my presidency the IFIP World Computer Congress 2002 in Montreal, Canada, was in final preparation.

## 2 IFIP Career

**1991-2008 Austrian Representative in the IFIP General Assembly**

**1993-1998 Trustee**

**1994-1995 Marketing Committee Chair:** Development of **marketing strategies** for congresses, conferences and other events. Creation and updates of **IFIP Folders** a.o.

**1995 Initiator of a Cooperation Contract** between **IFIP** and the **Austrian Government** and transfer of the **IFIP Secretariat** to **Laxenburg, Austria**.

**1995 Bestowal of the IFIP Silver Core.**

**1995-1997 Activity Management Board Chair:** Development of **Standard Accounting Systems** for Congresses, Conferences, Workshops and other events. Revision of **Event Approval Guidelines**

**1998 IFIP World Computer Congress:** I was **Co Chairman** - together with **Maria Toth** from the **Hungarian Computer Society** - of the **Organizing Committee** for this congress. With this congress we striked out in **new directions:**

First the congress was held successively in **two different countries** but in contrast to the WCC 1980 which took place successively in Melbourne, Australia and Tokyo, Japan, far away from each other, the WCC 1998 took place in **neighboring countries** in the **centre of Europe**, connected by the **River Danube**. Therefore the participants of the congress were transferred by **three ships** connected together on the picturesque **Danube to Budapest** for the second half of the congress. Lectures and meetings were held also during the ride on the Danube so that the congress was actually held on **three places**.

The second innovation concerned the structure of the congress. It was no “Universal Congress” like the earlier but a “**Federated Congress**” consisting of seven component conferences in which **Technical Committees** and **Working Groups** of IFIP have been stronger involved than in the past. Furthermore **established international conferences** have been integrated into the congress. All this together made the congress very successful. **Jack Rosenfeld** wrote in the IFIP Newsletter from December 1998: “It is a pleasure to report that virtually everyone we spoke to enjoyed IFIP Congress '98. The organizers were successful in making the Congress a delight for all.”

The seven component conferences of the congress were:

- **SEC'98** -14<sup>th</sup> International Information Security Conference (Annual Conference of TC 11). Program Chairs: **Reinhard Posch, György Papp**
- **ICCHP'98** - 6<sup>th</sup> International Conference on Computers Helping People with Special Needs (Biennial Conference sponsored by the Austrian Computer Society and IFIP WG 13.3). Program Chair: **Alistair Edwards**
- **KnowRight'98** - 2<sup>nd</sup> International Conference on Intellectual Property Rights and Free Flow of Information (Sponsored by the Austrian Computer Society and IFIP WG 9.6). Program Chair: **Klaus Brunstein**
- **Telecooperation'98** - The global Office, Teleworking, and Communication Tools (IFIP TC 8), Program Chair: **Roland Traummüller**
- **Fundamentals** – Foundations of Computer Science (IFIP TC 1), Program Chair: **Kurt Mehlhorn**
- **IT & KNOWS** – Information Technology and Knowledge Systems, Program Chair: **José Cuena**
- **Teleteaching'98** – Distance Learning, Training and Education (IFIP TC 3), Program Chair: **Jan Wibe**

Also the first time in the history of the congresses, a **Youth Summit** had been organized by **Peter Pfannes** with 37 young people from 13 countries.

Each Congress day started with a **keynote presentation** by renowned speakers: **Dr. Gordon E. Moore**, Chairman Emeritus of INTEL Corporation; **Prof. Yunhe Pan**, Zhejiang University, China; **Dr. George Metakides**, director of Research and Development in Information Technologies of **ESPRIT** and **Prof. Andries van Dam**, Brown University, USA.

Congress Chair: **Kurt Bauknecht**, IFIP President  
 Advisory Board Co Chairs: **Veith Risak, Dezsö Sima**  
 Organizing Committee Co Chairs: **Walter Grafendorfer, Maria Toth**  
 International Program Committee Chair: **Egon Hörbst**

Modern technology was used effectively in the organization. Over half of the delegates registered already via the Internet. Furthermore, the majority of the papers were available in advance on the Web. After their registration fees had been paid, delegates received, via e-mail, passwords to use in order to access the proceedings. After the congress proceedings were available on CD and in printed form.

For the benefit of the **hearing impaired** attending the Congress, a **signer** worked at all plenary sessions.

Some **1232 participants** from **71 countries** attended. Only three congresses before (Tokyo/Melbourne in '80, Paris in '83 and San Francisco in '89) and 1 after (Beijing in 2000) this congress had more participants.

The opening ceremony, moderated by **Günter Haring**, was held in the **Vienna Musikverein**, familiar to many of us because of the New Year's concerts broadcast worldwide from there.

The music was provided by the 12-woman **Wiener Walzertraum orchestra**. Among the selections they played was **Alegretto IFIPiense**, composed with a computer especially for the Congress by **Erich Neuwirth** and **Darryl Burrows**.

The **Isaac Auerbach Award** was presented to **Prof. Heinz Zemanek** (A), who has already been active in IFIP for 40 years at that time.

A special award was presented to **Dr. William Olle** (GB), the only person who attended **all 15 IFIP Congresses** at that time.

Another Innovation was the payment of the contribution to IFIP. Maria Toth and I presented the check to President Kurt Bauknecht during the General Assembly immediately after the congress. I think this was the only time in the history of IFIP congresses that this happened so fast.

**1998–2001 Vice President**

**1998–2000 Marketing Committee Chair** again

### 3 Acting President (2001–2002)

**Robert Aiken** who took over the presidency in September 2001 resigned in November 2001 due to health and personal reasons. According to the rules I as the longest serving Vice President served as **Acting President until General Assembly (GA) 2002** but I did not stand for election as next President.

### 4 Membership

New Members from **Croatia** and **Cyprus** were admitted as full members, summing up to **50 Full, 3 Corresponding and 11 Affiliate IFIP Members**.

A new Standing Committee "Member Society Relations Committee" has been established to intensify the cooperation and interaction with the Member Societies e.g. to evaluate and utilize the MSs reports.

### 5 Business Meetings

Council: March 2002 in Bled, Slovenia

General Assembly: September 2002 in Montreal, Canada, after the congress

13 C meetings, 41 WG meetings

New Specialist Groups and Task forces **have been established:**

- Specialist Group on “**Entertainment Computing**” with a first workshop on that topic in Japan
- Task Force on “**IT and Sports**”
- Task Force on “**Life Long Learning**” to be converted later into a WG

TC 9 distributed a **Statement concerning the inadvisability of National Identification Schemes (NIDS) as an anti-terrorism security measure** (see Appendix 1).

## 6 Events

There were **78 registered events with IFIP involvement**, an increase of 25 % to the year before. The increase in proceeds from the events was 60 %.

The major event was the **17th IFIP WCC 2002 “Information Technology for our times: Ideas, Research, and Applications in an Inclusive World”** in Montreal, Canada. It had a good program and some excellent keynote speakers such as **K.Tachikawa**, President of NTT DoCoMo, **A.W. Khan**, UNESCO Assistant Director-General and **M.Lazaridis**, President of Research in Motion.

International Program Committee Chair: **Jan Wibe**, Norway

Organizing Committee Chair: **George Boynton**, Canada

IFIP Technical Committees were involved in the Congress organization and streams as follows:

Stream	TC	Title	Chair
1	1	IT Foundations in the Era of Network and Mobile Computing	<b>Nicola Santoro</b> , US
2	2	Software Architecture	<b>Christine Hofmeister</b> , US
3	3	Tele-Learning	<b>Raymond Morel</b> , CH
4	6	Communication Systems: The State of the Art.	<b>Lyman Chapin</b> , US
5	8	Information Systems: The e-Business Challenge	<b>Roland Traummüller</b> , AT
6	9	Human Choice and Computers: Issues of Choice and Quality of Life in the Information Society	<b>Klaus Brunnstein</b> , DE
7	10	Distributed and Parallel Embedded Systems	<b>Bernd Kleinjohann</b> , DE
8	12	Intelligent Information Processing	<b>Bernd Neumann</b> , DE
9	13	Usability: Gaining a Competitive Edge	<b>Judy Hammond</b> , AU
10	11	Security	<b>Leon Strous</b> , NL
11		Industry	<b>George Boynton</b> , CA

Two special sessions were held on August 27 - **A global view on developments in ICT**, chaired by **P. Bollerslev**, DK and a **Panel on Entertainment Computing**, chaired by Ryohei Nakatsu, JP.

A highlight was the **UNESCO-IFIP WCC 2002 Youth Declaration** (see Appendix 2) which raised a lot of interest in the medias and helped to promote IFIP's visibility internationally.

## 7 Preparation of Important Forthcoming Events

- The **“Second IFIP TC6/TC8/TC11 I3E Conference”** (E-commerce, E-business & E-government) 2002 in Lisbon, Portugal.
- The IFIP Conference on **“Global IT Skills Needs – The Role of IT Professionalism”** 2002 near London.
- **“WITFOR 2003”** in Vilnius, Lithuania with UNESCO involvement.
- **18<sup>th</sup> IFIP WCC 2004 in Toulouse, France “On the way towards a global information society”**.

A new Ad Hoc Committee **“Congress Steering Committee”** has been established to assist future WCC organizers and utilize the experience of former congress organizers.

**Congress and event guidelines** with **check lists** and standardized **budget plans** have been developed.

## 8 Publications

**30 Books** were published with Kluwer during the year 2002, nine of that are proceedings of WCC 2002. Development of a **consistent IFIP publications policy** for both printed and electronic conference proceedings.

Actions related to the **IFIP Digital Library project**, the main one being to synchronize and fully integrate the guiding principles of the DL into the IFIP general publications policy and mechanism for dealing with its publications output.

## 9 Marketing

Issue of a new Folder **“This is IFIP”** in January 2002 in printed and electronic version and a **template** with IFIP general information on one side and a possibility for TCs to include TC specific information on the other.

Development of **Marketing Guidelines** intended for use by the IFIP volunteers especially GA and TC representatives to market IFIP congresses, conferences and other activities within the IFIP network and the IT community

During the General Assembly 2002 in Montreal, **Klaus Brunnstein** has been elected as **President** with immediate effect. After my presidency I was for some time in the **Congress Steering Committee**

It was a big pleasure and a challenge for me to serve in different functions and areas of IFIP for such a long time. I made so many friends all around the world and I thank everybody who supported my work in IFIP.

# **Appendix 1**

## **IFIP-TC9 Statement Concerning the Inadvisability of National Identification Schemes (NIDS) as an Anti-terrorism Security Measure**

The terrorist attacks of September 11, 2001 have led governments to consider various security measures to avoid a re-occurrence of such an atrocity. National Identification Schemes (NIDS) incorporating biometric security features are prominent among the proposed measures.

The Technical Committee 9 (Relationship between Computers and Society) of the International Federation for Information Processing (IFIP) wishes to caution governments, the IFIP member societies, and the international community more generally of the inadvisability of this approach. Quite apart from the merits or drawbacks of NIDS for other purposes, they do not offer protection against sophisticated terrorist attack. This is because they cannot be used to detect the intention to commit a terrorist act, and depend instead on a prior record of suspicious activity to achieve preventive interception of a prospective attacker. Individuals with a ‘clean’ record, like most of those who committed the 9/11 attacks, will pass through the most robust identity screening process.

In addition, developing such a security-oriented NIDS in response to these attacks would inevitably undermine privacy and other civil liberties that are the foundations of democratic societies, thereby further amplifying the long term destructive impacts of the 9/11 attacks themselves. By relying on an ineffective technique, a NIDS may actually contribute to a false sense of security that leaves us more vulnerable than before. We therefore risk impairing vital civil liberties with nothing gained in return.

### **For Information Only**

#### **Recent positions by related information processing societies**

##### **1. USACM – Association for Computer Machinery:**

Respected HCI expert Ben Shneiderman testified against the adoption of national identification cards on behalf of USACM at the Congressional Hearings on National Identification Card Systems. He noted that:

**“[T]he positive identification of individuals does not equate to trustworthiness or lack of criminal intent.”** (emphasis in original)

See: Shneiderman, Ben, “National Identification Card Systems,” Testimony to the House Committee on Government Reform Subcommittee on Government Efficiency, Financial Management, and Intergovernmental Relations, November 16, 2001,

**2. IEEE-USA The Institute of Electrical and Electronics Engineers – USA**

The IEEE-USA has strongly recommended that the use of a universal identifier (UID) be explicitly rejected.

See: Against Use Of Universal Identifiers (UIDs) IEEE-USA Position Statement, February 15, 2001,

[http://www.ieee.org/organizations/pubs/newsletters/nps/0601/against\\_UID.htm](http://www.ieee.org/organizations/pubs/newsletters/nps/0601/against_UID.htm).

**3. For further background, see**

Computer Professionals for Social Responsibility (CPSR) National ID Frequently Asked Questions (FAQ)

<http://www.cpsr.org>

Clement, A., Guerra, R., Johnson, J. and Stalder, F. National Identification Schemes (NIDS): A Remedy Against Terrorist Attack?,  
in Brunnstein, K. & Berleur, J. (editors) *Human Choice and Computers: Issues of Choice and Quality of Life in the Information Society*,  
IFIP 17th World Computer Congress, Kluwer Academic Publishers,  
Boston, 2002, pp 195-205.

## Appendix 2

# UNESCO – IFIP World Computer Congress 2002 Youth Declaration

Montreal, 29 August 2002

We, participants in the **IFIP World Computer Congress 2002 “Information Technology for our Times: ideas, research and application in an inclusive world”**, held from 25 to 29 August 2002, in Montreal, Canada,

Having examined the theme of “Youth and Information and Communication Technologies - Policies and Challenges in the Information Age”, have adopted the present Declaration:

- **Taking into account** UNESCO’s commitment to enhancing the participation of all in the global information society, and IFIP’s role in analysing and shaping future development of Information and Communication Technologies (ICTs);
- **Noting** the substantial impact of ICTs in today’s world and **convinced** that ICTs are central to bolstering the emerging global knowledge information society;
- **Considering** that, beyond their role in economic development, ICTs can contribute significantly to building new partnerships and interactions and spreading innovative lifelong learning opportunities;
- **Further considering** that the universal access to information and human interaction, by means of ICTs is essential for achieving goals of social cohesion, and economic and cultural empowerment;
- **Recognizing** the need to promote digital inclusion in an environment preserving cultural diversity and heritage and promoting the respect for democratic values, human rights and tolerance;
- **Realizing** that some young people are at the forefront of technological innovation and development;
- **Concerned** about the continued deterioration of the status of youth worldwide (particularly of young women and youth with disabilities), who are among the most vulnerable and affected by difficult social and economic conditions, and who face, among others, a growing rate of functional illiteracy and unemployment, poverty and conflicts, epidemic diseases, substance abuse and HIV/AIDS pandemic, etc.;
- **Highlight** the importance to sensitize governmental authorities, national and International institutions, the private sector and the civil society about the necessity to include the development of information and communication technology infrastructures and the ICT skills for young people as a high priority in their national ICT policies and respective agendas, as well

as to take proactive measures in order to encourage the formulation of policies and regulatory frameworks determining the future of the information society,

- **Affirm** our commitment to contribute to ensuring a youth oriented *digital inclusion* specifically in the fields of education, science, culture and communication,

- **Strongly recommend** the following measures for empowering youth in the information age:

- ***promote*** the global access to information and knowledge sources of young people as a prerequisite to their competent social choice, behaviour and participation; disseminate information about issues having a practical impact on the everyday life of young people;
- ***improve*** access to education and train young people in ICT skills enabling them to enter empowered into the information and knowledge society; improve network access at affordable cost, especially in underdeveloped urban, rural and remote areas, and expand information infrastructure for human development through the establishment of vocational schools at a community level, the creation of internet access points, distance learning and community multimedia centres, etc.;
- ***provide*** for the equitable expansion of the information society by promoting ethics in cyberspace through the involvement of young people in the elaboration of guidelines for the activities of information and content producers, users and service providers;
- ***strengthen*** the capacity to generate knowledge and indigenous production of freely accessible contents, while using local languages and thus expanding the existing information accumulated in the public domain;
- ***facilitate*** the production and dissemination of high quality free and open source software for education and training as well as scientific and cultural purposes;
- ***enhance*** the co-ordination of youth information related programmes and resource mobilising efforts of governments, specialised agencies, inter-governmental and nongovernmental organisations, and invite international and national institutions and the private sector to design and implement specific funding schemes and programmes such as fellowships, competitions and contests, that would help improving the meaningful access of young people to ICTs especially in the developing countries;
- ***promote*** through the use of ICTs, specific measures and modules for enabling disabled and handicapped youth to participate more actively in society;
- ***cultivate*** creativity, open life-long learning opportunities for young people and promote their access to careers dealing with ICTs;
- **support** the efforts of youth to foster a culture of peace, tolerance, sustainable development and quality of life by using global information and communication means;

and

- **Commit ourselves** to strive according to the spirit and letter of this declaration for the implementation of the above recommendations.

# Report of the 14th IFIP President: August 2002 to August 2007

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**Abstract.** This paper contains an overview of essential developments and activities which had been started and partially finished during the term of the 14th IFIP president. It also analyses some problems which had still to be solved at the end of this term.

**Keywords:** IFIP, President, Klaus Brunnstein.

## 1 Introduction

As Informatics continuously spreads into new areas, as new methods and applications develop and thereby other disciplines are reshaped as well as new areas of science and technologies begin to develop, a major focus of the development of IFIP in this president's term (2002 to 2007) concentrated on discussion, communication and distribution of information about new developments, the support of expert communication on a broad international level was a major mission of 2 IFIP World Computer Congresses: IFIP WCC 2004 in Toulouse/France and IFIP WCC 2006 in Santiago de Chile. As the traditional format of IFIP WCCs – offering many sessions with expert presentations addressing many different topics, thus presenting a platform for learning about new developments in many areas of Information and Communication Technologies – seemed to fail attracting participants with diverse background and from all parts of the world, new forms of organizing IFIP World Congresses were developed, esp. including co-located international conferences dedicated to areas, organized by Technical Committees, as well as parallel streams addressing topics covering more than one working area.

As IFIP World Computer Congresses primarily attracted experts from so-called “developed countries” concentrating in the Northern hemisphere and organized by IFIP member societies in related countries, a new mission – essentially lead by Dipak Khakhar – was developed to address issues of special interest for “developing countries”. In a format differing from IFIP World Computer Congresses, both concerning the type of content organization and the joint support of the government of the host country and IFIP, World IT Forum (WITFOR) was organized in Vilnius/Lithuania (WITFOR 2003), Gaborone/Botswana (WITFOR 2005) and Addis Ababa/Ethiopia (WITFOR-2007). Interestingly, this concept was very successful both concerning diversity of content, and it attracted even more participants than traditional IFIP WCCs.

Other important developments during the term of the 14th president included:

- development of relations to IFIP member societies
- new publication contract with Springer as new publisher
- discussion about digital publications, and preparation of IFIP Digital Library, and
- discussions about new ideas for IFIPs future development, esp. including the preparation of a “New IFIP Strategy” – the “Goodenough process and papers”.

## 2 Schedule of the Term of 14th IFIP Presidency

Following Walter Grafendorfer, acting as IFIPs 13<sup>th</sup> president, the author was elected at IFIP’s 84<sup>th</sup> official meeting at the General Assembly 2002 in Montreal, Canada (immediately following IFIP World Computer Congress 2002). Following IFIP rules, this president stepped into the term of the 12<sup>th</sup> president, Robert Aiken, elected for the term 2001-2004, who had regrettably resigned because of health reasons, and whose office had been taken over by Walter Grafendorfer (previously vice president). Again following IFIP rules, this president was subsequently elected for his (formally first) term in IFIP General Assembly 2003 in Vilnius/ Lithuania (following WITFOR 2003). After 5 years in office, the author decided (at next election date in 2006) not to run for his (formally) 2<sup>nd</sup> term, and he had the honor and privilege to hand-over the office as 15<sup>th</sup> IFIP to Sebastiaan (Basie) van Solms, representing South Africa and consequently the first IFIP president representing a “developing country”.

Major meetings during this period:

- IFIP Council 2003: Bilbao, Spain
- IFIP GA 2003: Vilnius, Lithuania
- IFIP Council 2004: Cape Town, South Africa
- IFIP GA 2004: Toulouse, France
- IFIP Council 2005: Pohang, Korea
- IFIP GA 2005: Gaborone, Botswana
- IFIP Council 2006: Palma de Mallorca, Spain
- IFIP GA 2006: Santiago de Chile, Chile
- IFIP Council 2007: London, UK
- IFIP GA 2007: Addis Ababa, Ethiopia

## 3 Membership Development

From 2002, with 49 members (plus 3 corresponding members and 4 affiliated members, including CEPIS and SEARCC as regional members representing themselves more than 30 member societies), membership in IFIP developed to 53 members (plus 3 corresponding members and 3 affiliated organizations) in 2007. More precisely, 3 member societies left IFIP (for various reasons), whereas 7 new member societies joined. All (7) new members represented Developing Countries.

Traditionally, IFIP – having been founded by 13 member societies from Europe - including the Soviet Union which until the 1990s reached out far into Asia and North America and having soon expanded also to Australia and South America – has tried to invite and welcome new member societies also from Asia and Africa, with special focus on Developing Countries. During presidency 2002-2007, the newly established World IT Forum (WITFOR) addressing developments in Information and Communication Technologies in Developing Countries gave also countries such as Botswana, Sri Lanka, Ethiopia, Mauritius, Zambia and Kenya an opportunity to present their status and development and to join the international network of IT related societies which IFIP offers. On the less positive side, attempts to invite countries from Northern Africa, esp. addressing the Arab hemisphere, were less successful.

Regular meetings of representatives of IFIP member societies were held as “Member Society Relations Committee” (MSRC) during IFIP GA meetings. As these meetings were held in parallel to other important committee meetings (engaging national representatives of several Member Societies), only a minor part of GA members could participate (usually 10-15 of more than 30 attending GA), MSRC meetings were very informative as recent developments were reported, but these meetings had hardly a strong impact on the improvement of the relation between IFIP and its member societies. The need to improve relations between IFIP and its member societies survived the end of this presidents term.

Among various opportunities to visit IFIP Member Societies, esp. including major IFIP events such as IFIP WCCs and WITFORs, , e. g. in Vilnius/Lithuania and in Santiago de Chile. In addition, some special occasions are worthwhile to remember:

In October 2003, the John von Neuman Society, representing Hungary in IFIP, organized a symposium to commemorate the 100<sup>th</sup> anniversary of Neuman Janos, the famous Hungarian mathematician and important pioneer in several areas of Informatics. This event was headed by the President of Hungary who thereby showed how highly ICT and the John von Neumann Society are regarded in his country.

In January 2005, the president visited – during the process of preparation of IFIP World Computer Congress 2006 - the Chilean Computer Society and contributed, together with Ramon Puigjaner, IPC chair for IFIP WCC 2006, to a special seminar on ICT development organized for enterprises and organizations in Chile.

In March 2005, a meeting was arranged between members of IFIP Board and representatives of SEARCC including also the Computer Society of Sri Lanka (CSSL). In this meeting, some opportunities for improved activities of IFIP in SEARCC were prepared. In August 2005, the president visited the Computer Society of Sri Lanka at the occasion of the national conference of this society. At this occasion, he also gave a seminar on ICT security (esp. teaching counteractions against malicious software, with a certificate for participants).

In addition, the relation between IFIP and its affiliated society IMIA – the International Medical Informatics Organisation, which had developed from the former IFIP TC-4 Medical Informatics – was significantly improved, and IMIA agreed to organize a dedicated conference at IFIP WCC-2010 in Brisbane/Australia.

Finally, IFIP Board members including the president met with presidents and representatives from many Member Societies at various occasions, esp. including IFIP World Computer Congresses.

## 4 Development of Technical Committees

Until 2002, IFIP had developed its structure of organizing work on developments in Information and Communication Technologies in 12 Technical Committees with more than 100 Working Groups. After a preparatory phase (as Specialist Group SG 16), a new Technical Committee TC-14 was established in 2002 addressing “Entertainment Computing”. As this area had developed in companies with focus on economic aspects, it seemed advisable to complement the scope with scientific methods and knowledge. Consequently, TC-14 was started with the mission “to encourage computer applications for entertainment and to enhance computer utilization in the home.

During the period 2002-2007, TC-14 was very successful to establish 7 Working Groups, addressing among others such aspects as Digital Storytelling (WG 14.1), Theoretical Foundations (WG 14.3), Games (WG 14.4), Social and Ethical Issues (WG 14.5) and Art and Entertainment (WG 14.7). TC-14 and its Working Groups also developed successful international events and related publications.

Those Technical Committees established before 2002 were also very successful in addressing newly developing technical fields by either revising their Aims and Scopes or by establishing new Working Groups and Special Interest Groups, as well as offering new events (from workshops to international conferences) and publications. Among others, the following aspects were introduced into the agenda of IFIP technical work: Concurrency Theory (WG 1.8), Open Source Software (WG 2.13), Lifelong Learning (WG 3.8), Computer Aided Innovation (5.4), Enterprise Interoperability (WG 5.8), Communication Systems for Developing Countries (WG 6.9), Enterprise Information Systems (WG 8.9), ICT and Sustainable Development (WG 9.9), Digital Forensics (WG 11.9), Critical Infrastructure Protection (WG 11.10), Trust Management (WG 11.11), Intelligent Agents (WG 12.3), Human Work Interaction Design (WG 13.6), and Human-Computer Interaction and Visualization (WG 13.7).

As the scope of technical work growingly requested a cooperation of several TCs, cooperation of experts from related TCs became growingly important. Among others, several joint events on e-Business and e-Government were organised by TC-6, TC-8 and TC-11. Moreover, TC-2 (Software: Theory and Practice) and TC-12 “Artificial Intelligence” jointly organised the new Working Group on Web Semantics (WG 2.12/12.4).

## 5 Development of IFIP Strategy Plan: Meetings at Goodenough College

Following the visible impact with which ICTs change economic, government and social realities on a global scenery, many representatives of IFIP member societies as well as chairs and members of IFIP Technical Committees and Working Groups suggested that IFIP adapts its traditional strategy to modern requirements. After discussions in IFIP Council 2005 (Pohang/Korea) and IFIP General Assembly 2005 (Gaborone/Botswana), a Task Force (chaired by Raymond Morel) was commissioned to develop an “*IFIP Strategy Plan*” to be discussed at IFIP GA 2006. Upon invitation of the British Computer Society, Roger Johnson organized a joint meeting of IFIP Executive Board and the Task Force at Goodenough College (named after Frederic C. Goodenough who, with others, established the college in 1930 “to provide able young men coming to London from the Dominions and Colonies, future leaders of what was then a large Empire, with a collegiate life along Oxbridge lines in London”) in London (December 2005), to discuss *a first Draft IFIP Strategy Plan*. This paper concentrated on the analysis of changes as observed between IFIP’s foundation in 1960 and the (then) presence. While the market of players in the IT marketplace has changed significantly and developed more complex relationships, IFIP’s general statements about its “Mission” as well as “Aims and Scopes” are still valid although needing some enhancements.

After discussion of the *Draft IFIP Strategy Plan* at IFIP Council-2006 (Palma de Mallorca/Spain) and a final meeting of the Task Force (June 2006 in Goodenough College, London), IFIP General Assembly 2006 discussed and approved this *IFIP Strategy Plan*. During his presentation as candidate for the election of the 15<sup>th</sup> IFIP president, Basie van Solms emphasized the importance of implementing significant elements of the new strategy, and he also announced that he would devote a major part of his workforce to adapt the traditional IFIP structure to more timely working structures; his election showed that strong support of IFFIP General Assembly for the new plan. In addition, Leon Strous (then vice president and in 2009 elected as 16<sup>th</sup> IFIP president) accepted the task to further develop the new Strategy Plan in more details.

## 6 Positioning IFIP in the International World

As IFIP had been established with strong support of UNESCO, relation with this UN organization has always been very good. Among other activities, IFIP TC-3 Education worked very closely with different institutions of UNESCO, esp. including UNESCOs Institute for Education (IITE), to advance curricula and courses on Informatics in various countries. IFIP president and various representatives participated in UNESCO events, and the president contributed to UNESCO General Conference (October 2003) on matters related to the “Digital Divide”.

New impulses for IFIPs visibility on the scene of international organisations were generated when Dipak Khakhar developed the concept of “World IT Forum” (WIT-FOR) events. Indeed, he succeeded to establish relations with several more UN organizations, esp. including ITU (International Telecommunication Union), FAO

(Food and Agriculture Organization), UNDP (United Nations Development Programme), UNECE (United Nations Economic Commission for Europe) and the World Bank. With support of these organisations, and sponsored and co-organized by governments of dedicated Developing Countries – Lithuania in 2003, Botswana in 2005 and Ethiopia in 2007 -, the related WITFORs including their final “declarations” were essential contributions to position IFIP globally on aspects related to Development. As an example, the “Vilnius Declaration”, developed and accepted at WITFOR-2003, was presented at UNESCO General Assembly 2003 by the conference participant (and speaker) H.E. Adamkus (formerly President of Lithuania and UNESCO Goodwill Ambassador) to the UNESCO Assembly (this declaration was also presented at a plenary session during WSIS-2003 in Geneva).

An important opportunity to present IFIP to a large international audience was given at the two United Nations “World Summits on Information Society” (Phase I: WSIS-2003 in Geneva, December 2003, and Phase II: WSIS-2005 in Tunis, November 2005). During WSIS-2003, Raymond Morel organized a 2-day workshop addressing “Engineering in the Knowledge Society” (IFIP proceedings published by Kluwer Academic Publishers). In WSIS-2005, IFIP president and the World Federation of Engineering Organisations (WFEO) organized a 3-day conference “Past, Present and Future of Research in the Information Society”, with broad support of ICSU (the International Council for Science) and FAO as well as the National Science Foundations of USA (NSF), China (NNSF) and South Africa, several well-reputed universities (British Columbia, Columbia-U, Ghana, Nairobi, Michigan, Santa Clara and Stanford) and INTEL. During this event, IFIPs contributions related to themes such as Ethics, Education, Security, Development as well as the Gaborone Declaration (which was also presented at a plenary session by the delegation of Botswana).

Both the WITFOR and WSIS conference series gave IFIP good opportunities to present its technical expertise about manifold aspects from “The Information Society” (as UN describes it) and “The Knowledge Society” (as UNESCO prefers to refer to the future society) to United Nation organisations. The positioning of IFIP as THE leading international body of technical expertise including both academia AND ICT-related enterprises needs complementary actions by IFIP member societies which IFIP regard as best placed to advise national governments on ways for their countries to join the Information/Knowledge Society.

## 7 Major Events and Plans

**17<sup>th</sup> IFIP World Computer Congress 2002 in Montreal, Canada:** organized under the guidance of president Walter Grafendorfer, this event suffered from the heavy shadow of the terrorist “9/11” attacks in New York, which reduced significantly the willingness of many people to international (airborne) travels, also leading to significant financial problems for the member society (CIPS) representing Canada. As a consequence of the rather low attendance, a discussion started about whether IFIP World Computer Congresses were still timely and adequate, at least under the established patterns (organised by a member society, multiple parallel sessions on 4-5 days, problems of sponsorship). These discussions lead to some innovations in the subsequent IFIP World Computer Congresses (2004, 2006 until 2010).

**1<sup>st</sup> World IT Forum 2003 in Vilnius, Lithuania:** prepared and organized by Dipak Khakhar and Peter Bollerslev in close cooperation with the government of Lithuania (the main sponsor), this first WITFOR established the structure and procedures for this kind of event. Different from IFIP WCCs, WITFOR-2003 organized its discussions in 8 commissions, addressing topics in Agriculture, Building the Infrastructure, Economic Opportunities, Education, Empowerment and Participation, Environment, Health, and Social, Ethical and Legal Aspects. About 700 delegates had come from 68 countries, including a number of government ministers, director generals of international bodies and other important policy makers. Essential results from these discussions are documented in a White Book (edited by Dipak Khakhar) and the “Vilnius Declaration” which has been repeatedly quoted at different occasions. Against some initial doubts about the feasibility of a second major IFIP event esp. addressing Developing Countries, this first WITFOR was a real success, which significantly stimulated the development of the next WITFORs.

**18<sup>th</sup> IFIP World Computer Congress 2004 in Toulouse:** With more than 1.000 participants, engaged in a rich program of 9 conferences, 14 topical days, 11 workshops, 12 tutorials and a rich student forum with 9 sessions, IFIP WCC-2004, organized and lead by Jean-Claude Laprie (Congress chair) and Reino Kurki-Suonio (Program chair), was a really big success. With excellent support from the French government, authorities and a wide range of sponsors, embedded into the well-known French hospitality, enriched with visits at important sites (such as the Airbus factories), cultural events and culminating in an impressive evening in the beautiful courtyard and park of the chateau de Pibrac, the World Computer Congress 2004 instantiated “the spirit of Toulouse” in WCC’s participants and accompanying persons. Proceedings (21 books) of the related conferences have been published by Kluwer Academic Publishers (editor: Leon Strous).

**2<sup>nd</sup> World IT Forum 2005 in Gaborone, Botswana:** prepared and organized by Marianne Nganunu (Botswana government) and Dipak Khakhar with major support from Mr Dewald Roode (on the IFIP site), WITFOR-2005 attracted 933 registered participants (345 international and 588 Botswana participants). 70 countries were represented and about 19 foreign ministers and most of Botswana ministers, lead by the Prime Minister of Namibia and Honorable Minister Venson from Botswana, many government officials, members of the diplomatic corps in Gaborone attended. The opening address was given by H.E. Festus Mogae, President of the Republic of Botswana. As in WITFOR-2003, discussions were in several plenary sessions and in 8 commissions (same topics as in WITFOR-2003), with a final plenary sessions presenting results and accepting the “Gaborone Declaration”. The stimulus which developed from WITFOR-2005 immediately yielded significant interest by IFIP member societies and experts from more than 10 African countries, esp. lead by Botswana, Mauritius, South Africa and Zimbabwe, and supported by Egypt, Ethiopia and Zambia to establish an African ICT initiative.

**19<sup>th</sup> IFIP World Computer Congress 2006 in Santiago de Chile:** This first IFIP World Computer Congress in South America was a surprising success, esp. when one remembers that the originally intended site of IFIP WCC-2006, the Diego Portales Congress Centre, burnt down few months before the event. With very strong

engagement of Mauricio Solar, organising chair, supported by Ramon Puigjaner, chair of the International Program Committee, the Congress site was moved to nearby university grounds, and the Congress budget had also to be adjusted in very few weeks to this unforeseen situation. Under these very difficult preconditions, IFIP WCC-2006 2006 was a really surprising success, technically, organisationally and financially. Participants from 43 countries attending WCC-2006 and the CLEI conferences - with Brazil leading (62) before Germany (31) and Chile (29) – enjoyed a highly convivial and friendly atmosphere on the site of the University of Santiago de Chile (USACH). The organisation of the Computer Science Society of Chile (CSSC) jointly with Centro Latino Americano de Estudios Informatica (CLEI), both active IFIP members in Latin America, were the essential base without which this successful Congress would not have been possible.

**3<sup>rd</sup> World IT Forum 2007 in Addis Ababa, Ethiopia:** with 1275 participants and 140 speakers from all over the world, this 2<sup>nd</sup> WITFOR in Africa worked with the same concept and organisational structure established in the two previous events. The conference was organised under the chairmanship of Bogale Demissie, representative of Ethiopia in IFIP, and his active team, including Kibework Lemma, and Leon Strous, (then IFIP vice president), who had taken over the role and duties from Dipak Khakhar, founder of WITFOR.

Concerning **plans for “future events”** esp. of IFIP World Computer Congresses, which in IFIPs tradition require a rather long preparatory phase of 3 years from application, submission of proposals and selection the next Congress site, usually 2 years ahead of the event, many partially controversial discussions during the 14<sup>th</sup> presidents term addressed problems and potential new concepts for IFIP WCCs. After the decision for IFIP WCC-2008 in Milan, with suggestions for a new format including industry participation, there was general agreement that a detailed analysis of IFIP WCC concepts and organization was needed. As IFIP would approach its 50<sup>th</sup> anniversary in 2010, the general agreement in 2006 was that an IFIP World Computer Congress 2010 should be organized to document what IFIP had achieved in its past 50 years, and to discuss new ways for future work and events.

Preparation of IFIP “Golden Jubilee” in 2010 were started in Council and General Assembly 2007. In 2007, the mission for this project was:

“IFIP is well aware of its past, especially including advances and experiences. Consequently, some reflections on history of IFIP, TCs and WGs in related events are suggested. Based on its historical background, IFIP will continue to look into the future and address technical developments of Information and Communication Technologies and how these may shape economy, government and organisations, society and the life of individuals.

IFIP Golden Jubilee could best be promoted in four directions:

- o The **book “IFIP 50 years”** follows the pattern of “IFIP 36 years” written by IFIP Historian Heinz Zemanek, who has agreed to support the new book,

- o **Major events of IFIP TCs and WGs** may devote some part to historic developments (possibly IFIP contributions) in their area.
- o **IFIP World Computer Congress 2010** will devote some slot to IFIP 50 years (details to be discussed with WCC-2010 organiser and IPC-2010).
- o **IFIP Member Societies** are invited to host IFIP events with special reference to IFIP 50 Years, or to include some IFIP related part (“IFIP Day”) in some MS event.”

At the end of 2010, this mission has been realized in some parts, and the discussion about the “future of IFIP World Computer Congresses” has been supported with interesting proposals.

## 8 IFIP Publications and IFIP Digital Library

During its long history, IFIP publications – usually more than 30 books annually presenting results from events of IFIP Technical Committees and Working Groups as well as IFIP World Computer Congresses - had publication contracts with international publishers of scientific and technical books, including North Holland, Elsevier, Chapman and Hall followed by Kluwer Academic Publishers (KAP). The contract with Kluwer – which shortly before merged with Springer and Bertelsmann which finally developed to Springer Science and Business Media (SSBM) - expired on Dec.31, 2004. As follow-up, 6 international publishers submitted an application (“tender”) for IFIPs future publications. After detailed analysis and many intense discussions, finally lead by (then vice president) Leon Strous, a contract with Springer was signed for publications starting January 1<sup>st</sup>, 2005.

During discussions about “future publications”, the need for additional, fast distribution channels for technical and innovative publications was a major topic. In IFIP General Assembly, related discussions about new forms of “digital publications” started in 1998, when Roger Johnson (then Honorary Treasurer) and the author were asked to analyse whether and how some digital distribution channel could be organized; one special aspect was that a major part of IFIPs financial resources – relying on income from printed books – should also be supported in production and distribution of digital documents. This Task Force developed some suggestions, including concepts how articles could be distributed (with “micro-payment”), or how “books on demand” could be produced under specific requirements and distributed. But at that early time, mechanisms for paid distribution of digital publications was not well enough developed.

During discussions of the new IFIP publication contract, requirements for the availability of digital articles and books were a major topic with all publishers. Fortunately, the “new” IFIP publisher Springer – although itself in a process of reorganization – was open for discussions, which finally were realized in Springer Digital Library (an essential new channel of digital distribution of publications). As not all IFIP materials are published in printed form, IFIP General Assembly 2006 also requested that an “IFIP Digital Library” be established for other publications. In IFIP GA-2007, discussions with the Australian Computer Society (ACS) were tabled and

accepted to host IFIP Digital Library. Indeed, the mission to establish “IFIP Digital Library” was followed and suitably realized under the 15<sup>th</sup> president Basie van Solms.

Finally, IFIP GA 2006 also suggested that an “IFIP Digital Archive” be established. As this book is finished, some parts have been realized during IFIP Golden Jubilee. Among others, Eduard Dundler and the secretariat have made the minutes of all IFIP Councils and General Assemblies available from IFIP website.

## 9 Development of IFIP Secretariat

Since IFIPs foundation in 1960, IFIP secretariat has, with very small personell engaged for rather long periods, always been THE key resource to guarantee lean and friendly operations between active IFIP people and with the “rest of the world”. In the early days (when IFIP resided in Amsterdam and subsequently in Geneva, before it moved to Laxenburg, Austria), Gwyneth Roberts worked as “the good spirit of IFIP secretariat”, followed by Plamen Nedkov and Dorothy Hayden.

In 2002, some discussions between the head of IFIP secretariat and the newly elected Executive Board regarded the distribution of duties and responsibilities between elected members and the secretariat, esp. concerning the representation of IFIP in international organizations such as UNESCO (which so far had been maintained mostly by the head of secretariat). As a consequence of these discussions, IFIP was lucky to win Eduard Dundler as new head of secretariat, and Brigitte Brauneis and Marion Smith in his support. Both contributed significantly to operate IFIP secretariat in a very efficient manner. For the 14<sup>th</sup> president, the support of IFIP secretariat and esp. of Eduard Dundler and Brigitte Brauneis was a key reason for IFIPs successful operations during his term.

## 10 Resume

Summary of his experiences in IFIP during his term as 14<sup>th</sup> president (quotation for GA-2007 minutes):

- “**Mr Brunnstein** reported on the achievement during his presidency (2002 – 2007) concerning IFIP’s development:
- IFIP secretariat was reorganised and now has a highly motivated and qualified though small team.
- Under a new contract (Springer), publications continue in good numbers and at a high level of quality.
- Last three IFIP World Computer Congresses (Montreal, Toulouse and Santiago de Chile) had very good technical content, although only Santiago was also financially successful, despite unexpected problems (Congress Centre fire).
- IFIP has enriched its scope and visibility by development and successful organisation of WITFOR conference series.
- IFIP has improved its position as adviser to UNESCO in aspects related to ICTs, by presenting results of WITFOR 2003 / 2005 to UN World Summits on Information Society 2003 (Geneva) / 2005 (Tunis) and to UNESCO General Conference 2003 (Paris)

On the other side, **the President** addressed several problems still waiting for being solved:

- Communication with Member Societies remained insufficient.
- Activities of IFIP bodies were often only sporadic with peaks of action before/after Council and GA.
- Cooperation between TCs/WGs and Member Societies concerning joint events and projects needs improvement.
- IFIP reacts too slowly (if at all) upon advent of new themes (e.g. e-voting, multiple aspects of privacy in Internet)
- Cooperation between TCs and WGs concerning multifaceted themes must be improved.
- Management (e.g. scheduling, quality assurance) of projects and tasks needs improvement.”

# Reflections on My Term as President of IFIP: August 2007 to September 2010

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**Abstract.** This paper contains a brief overview of my experiences and challenges during my term as President of IFIP. It reviews some of the important activities I have tried during my Presidency, and evaluates the success and failures of these activities.

**Keywords:** IFIP, President, Basie von Solms.

## 1 Background

When I made a short speech to support my candidacy for the presidential election in Santiago, Chile in August 2006, I clearly stated that if I was to be elected, I will propose certain changes in IFIP, and that I will then expect the support of the GA for such proposed changes.

I was elected, and immediately started to formulate some changes and identify areas where I thought change and investigations were needed. These areas covered the following areas:

- The governance structure of IFIP
- The membership categories and financial future of IFIP
- The international footprint of IFIP

The changes proposed and the present status in each of these 3 areas will briefly be addressed below.

## 2 The Governance Structure of IFIP

During my 6 years as a TC chair, the one thing which always worried me was the fact that in most cases, after a TC Chair's term ended after 3 or 6 years, the expertise and knowledge of that person was totally lost to IFIP – there were very few, if any, ways to retain that expertise and knowledge in IFIP. Basically this was only possible if the TC Chair had also been a national GA representative, allowing him/her to continue in IFIP – something that was quite rare. This problem prevented TC Chairs from being involved in the governance of IFIP like chairing Standing Committees etc, and I was committed to change that.

My first challenge was to do precisely that - it is retain and leverage such expertise and knowledge in a wider sense within IFIP during and after TC Chairs' terms ended. This could only be done by changing the governance structure of IFIP.

My second challenge was to change the big and unwieldy Council, consisting of at least 25 -30 people into a smaller more agile body which would have a more quick and direct role in the governance of IFIP.

The proposal submitted to the GA in August 2007 in Addis Ababa, consisted basically of changing the constituency of the then Council into a smaller body, called the Board of IFIP.

Proposed changes included

- Renaming the Council to be known as the Board
- Discontinuing the baggage loaded position of Trustees, and instituting the position of Councilor, where a Councilor is an elected member to the new Board, and every Councilor has a direct responsibility and accountability
- Establishing the possibility of TC Chairs to be elected as Councilors
- Allowing any Councilor to chair an IFIP Standing Committee
- Allowing the President to appoint two Councilors to the Board.

For obvious reasons the Executive Board (EB) was renamed to the Executive Committee (EC).

These proposals were approved by the GA in Addis Ababa, and some sitting TC Chairs were immediately elected and appointed to the new Board. At GA 2008 and GA 2009 more TC Chairs were elected, and at the moment (November 2010) 4 active TC Chairs, who are not National representatives, are Councilors and therefore members of the Board. Some of them are chairing some Standing Committees, while others are chairing special Task Forces. Without the changes, that would not have been possible.

The changes also included the elimination of the requirement of all TC Chairs to attend the annual February/March Board meeting (as was the case with the old Council). This satisfied the complaint of many TC Chairs that this extra meeting every year was not necessary.

All these changes resulted in a much smaller body that could react much faster on matters requiring attention. Furthermore every Board member (Councilor) had a specific responsibility, making performance management much easier, and finally TC chairs had direct involvement in the real governance of IFIP, sharing their rich experience to the benefit of IFIP.

The last 3 years have proved that these changes definitely benefited IFIP. The value added by these TC chairs on the Board was substantial.

### **3 The Membership Categories and Financial Future of IFIP**

Even before my election as President, it was clear that the existing membership categories of IFIP were outdated, and had to change. Indications were the fact that several bodies enquired about membership, but could not be accommodated in any of the existing membership categories.

A Membership Task Force was created to totally revisit IFIP's membership categories, and provide new options providing a wider option for membership. This Task Force reported to GA 2010, and will make a final proposal to GA 2011.

A second Task force was created to totally review the financial future of IFIP, and identify new streams of income. This Task Force presented their final report to GA 2010. The results were very well received, and have provided much needed input into IFIP's financial structure and management.

Expanding our membership to become more representational, and securing our financial streams, will be crucial for the relevancy of IFIP in the future.

#### **4 The International Footprint of IFIP**

It was also clear to me that IFIP should improve its international footprint by making closer contact with international bodies and agencies. IFIP has the possibility to add significant value to many projects of such bodies and agencies, and better coordination and cooperation could only be mutually beneficial.

An International Liaison Committee was created to pursue this avenue. Personal discussions took place with the Secretary General of the ITU and with Commissioners of the EU. I also arranged a meeting with Mr Janis Karklins, the new UNESCO Assistant Director-General for Communication and Information. I could not attend personally, but Leon Strous stood in for me and had a very productive discussion with Mr Karklins.

I see these initiatives as very important for IFIP in future.

#### **5 Evaluation of My Term as President**

It was my privilege to serve as President of IFIP during the last 3 years leading up to IFIP's 50<sup>th</sup> Anniversary.

I am convinced that during my term, I have initiated a number of changes which provide a good platform to guide IFIP into its next 50 years. That many more aspects of IFIP will have to change in the next few years to expand the role and position of IFIP is of course true, but I have full confidence that Leon Strous, the new President, will build on some of the changes and initiatives I have initiated, and will introduce several new ones himself.

I wish IFIP a very successful next 50 years!

# Reflections and Prognostications

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**Abstract.** In this paper the author looks back over his eleven years as IFIP Honorary Secretary (1999-2010) and, in reflecting on the growth of IFIP over that period, to draw some ideas on how to prepare the organisation for the next half century. Key challenges identified include the rapidly changing nature of the contemporary ICT industry, how to make efficient use of volunteer time and resources in a global organisation and how to evolve IFIP's original role as the global meeting place for ICT societies as some of these organisations grow into multi-million euro enterprises operating worldwide.

**Keywords:** IFIP, Honorary Secretary, Roger Johnson, International Professional Practice Partnership, IP3, World IT Forum, WITFOR.

## 1 Introduction

Klaus Brunnstein invited me to take on the mantle of the Roman God Janus, the god of doorways, the god of beginnings and ends, often portrayed with two heads – one looking back and one looking forward.

I have responded to the invitation by looking at a series of key aspects of IFIP's environment and how I have seen them evolving. I do this having had the privilege to serve in many capacities in the British Computer Society and, through IFIP and CEPIS, to watch the development of many other societies around the world.

I took over as IFIP's Honorary Secretary from my esteemed fellow countryman, Graham Morris at the close of GA1999 in Malaysia and handed on the baton to the youthful and enthusiastic Maria Raffai at the close of GA 2010 in Brisbane. So these reflections come from 11 years of sitting metaphorically and often physically at successive IFIP President's elbows.

The first decade of the 21<sup>st</sup> century has posed significant challenges for IFIP. In this paper I will try to capture the essence of this period and to show that IFIP moves into the second decade of the new century much stronger than it began the first decade. However, IFIP exists in a rapidly changing environment which gives opportunities but also poses challenges.

## 2 The External Environment 1960–2010

To understand the challenges facing IFIP today it is worthwhile to remember how the ICT environment has changed since IFIP's formation in 1960. The computer has

transformed forever the lives of billions of people. Unsurprisingly IFIP has had to respond to this evolving world just as many of its member societies are doing.

#### *Technology – mainframe to PC to nano*

In 1960 a computer was a large machine running in an air-conditioned machine room overseen by skilled operators. Valves were just giving way to transistors in commercial computers. In the early 1980s microcomputers and later the Personal Computer transformed the office workplace and were introduced into schools and the home. The 1990s have been the era of the Internet. At the start of the 21<sup>st</sup> century we see early applications of nanotechnologies and ubiquitous computing.

For large scale scientific and commercial users, powerful computer systems remain a major investment whose successful utilization remains critical to the organisation's success. However, for billions of individuals worldwide the computer is just a retail product along with all the other domestic electronic appliances.

Today we can have more computing power in our pocket or in our car than filled a large computer room in 1960. Mobile devices are beginning to blur the lines between the computer, telephone, and television. Technological advance has facilitated previously undreamt of applications on machines readily available to individuals in developed countries and increasingly in less developed countries.

#### *International relations – Cold War*

In 1960 international relations were dominated by two great superpowers and their allies. IFIP provided a meeting place where scientists from all over the world could meet to exchange their latest ideas. Faint echoes of the underlying suspicions from that era can still be seen in IFIP's Statutes and Bylaws to ensure even handed treatment of membership and elections. The changes that occurred in Europe at the end of the 1980s overturned that model of international relations. Since then, various new international, mainly economic, groupings have emerged around the world, perhaps most notably the European Union. New global economic powers are emerging. Within ICT, offshoring of work from Europe and USA to the Indian sub-continent and the Far East is a major phenomenon.

ICT is a uniquely global industry and it operates in a world with fewer constraints on the movement of people and ideas than at any time in the past.

#### *Workforce – boffins to mass users*

The ICT workforce since 1960 has changed from programmers, analysts and operators numbering a few tens of thousands worldwide into the highly diverse multi-million strong body we see today. While there are still software developers and operations staff – now concerned with networking as much as computers – the workforce has diversified to include new activities such as the creation and maintenance of web sites.

For the end user, no longer are there levels of intermediaries – analysts and programmers to create your software and operators to run your programs – but users have direct access to their PC or mobile device providing access via the internet to applications undreamt of in 1960.

The changing workforce has been mirrored in the growth of the number and size of IFIP's Member Societies and also in the evolving areas of interest. Most have an active involvement in technological development, often through national Special Interest Groups, but many also have a variety of interests in the development and

recognition of practitioner skills. Others, initially in Europe and subsequently around the world, have supported user skills certification, especially the ECDL and ICDL.

### *Impact of ICT on Global Society – ICT is more than T*

The relatively few computers installed in 1960 played a useful role for their organisations but had only a limited impact on national economies. With the advent of online systems, ICT began to become essential to any developed economy. As key applications, such as the Automated Teller Machine (ATM), air traffic control, credit cards and more recently e-commerce, proliferated so the economic impact grew.

However it is all too easy to think that ICT is just technology. Most IFIP Full Members are also active in a range of related areas. Because of its economic impact, there is interest in ensuring an adequate supply of trained practitioners from school and university and increasingly with programmes of lifelong learning to sustain practitioners' technological competence throughout their working lives. In addition, governments and inter-governmental organisations recognize the importance of regulating the industry and its activities. Areas of key concern include topics such as privacy and security. Given the global nature of ICT today, it is vital that these issues are considered at an international level as well as at national levels.

## **3 IFIP's Changing Membership**

IFIP today is built on a partnership between some thousands of individual volunteers through IFIP's network of Technical Committees (TC) and Working Groups (WG) and IFIP's numerous Full Members, mainly but not exclusively membership bodies historically organised on a geographical basis.

IFIP was founded in 1960 with just ten Full Members. Many of those founding members were themselves only recently founded and often had just a few thousand members serviced by a very small number of staff. Those member societies' annual budgets were measured in at most the equivalent today of ten of thousands of euros or dollars.

IFIP Membership today has grown to over 50 Full Members, with many more linked through IFIP's regional Affiliate Members in Europe and South East Asia. Many of IFIP's newer members come from less economically developed areas of the globe in Africa, South America and Asia. However this welcome growth is not without its challenges. Many new Full Members lack the financial strength of the older and, in many cases, bigger societies and struggle to meet the cost of their IFIP dues and sending a representative to GA.

One aspect which IFIP has not systematically considered are the major geographic regions. Some have regional bodies, such as CEPIS in Europe, CLEI in Central and South America and SEARCC in South-East Asia, which are either in full or affiliate membership of IFIP. A more formal relationship with these, possibly combined with initiatives to establish others, might provide an intermediate regional level of activities which could reach out to individuals and organisations who find participation at a global level a major resource challenge.

Looking back over the past decade the TCs and WGs have enjoyed varying success as one would expect as personalities come and go and interest in different topics rise and fall. I have been surprised that the rate of change is not quicker. Indeed, we have

to ask ourselves why areas of major activity in the ICT community have not come within the IFIP umbrella. Is this possibly because IFIP does not actively invite outside individuals to initiate new groups but rather relies on growth from within which, given that most volunteers are already committed to specific interest research areas, only occasionally initiate new areas when their personal interests change?

This might explain the near absence of activity within IFIP on professionalism in ICT until a group of Full Members started the IP3 programme and the very limited presence in areas such as intellectual property and IT law despite their vital importance with large scale national and international activities under other umbrellas.

Almost every Full Member has a collection of Special Interest Groups but few TCs or WGs have systematically developed links to this rich resource which might contribute significantly to building IFIP's capacity and also strengthen the national groupings which can act as advocates for participation in IFIP by their Full Member.

Collating the data is difficult but the current aggregate membership of the IFIP Full Members appears to be around 700,000 individuals. Yet this impressive total represents only a few percent of those working in ICT as defined by official employment statistics.

Possibly very significantly for the future of IFIP, at least four of the Full Members now see themselves as "global societies". Increasingly the world's leading societies are substantial businesses with hundreds of staff and budgets measured in the equivalent of millions of euros or dollars. These societies' business activities originated in the learned society area of events and research publishing but the past decade has seen some societies building substantial businesses out of products supporting employers of ICT professionals and also end users.

These societies sell their products – intellectual or professional – across the globe either directly or via partnerships with other organisations. They are run by staff and members who are used to the disciplines of business rather than of academia.

In reviewing its membership model IFIP will need to think carefully about what it offers these very large societies while also seeking to strengthen participation from less well resourced regions. Without having a good answer to these questions, we risk these societies feeling that IFIP no longer assists them fulfil their missions.

## 4 IFIP's Changing Mission

In 2007 IFIP after lengthy discussion adopted a new set of five aims. Some of the headings reflected both IFIP's traditional strengths but also some new areas. These were:

- 1 Advance technologies for information and knowledge societies
- 2 Disseminate high quality open access information
- 3 Advance professionalism in ICT
- 4 Promote social responsibility in the application of ICT
- 5 Promote digital equity

Briefly the first aim covered the continuing work of many of the TCs and WGs. The second includes the IFIP Digital Library project. The third aim reflects the International Professional Practice Partnership (IP3) whose ultimate aim is to build a global

ICT profession similar to the older professions. The fourth covers the areas of social responsibility and public understanding which seem to grow daily in importance as a global concern. Finally, the fifth reflects IFIP's longstanding commitment to promoting the responsible use of ICT in areas with less advanced economies.

Progress towards meeting these aims has varied as I will now briefly summarise from my viewpoint and then I will suggest that IFIP faces a challenge through having ambitions beyond its current capacity to deliver.

The series of WITFOR conferences have been major successes which has done much to advance the understanding of the practical contribution of ICT in developing regions with an array of national leaders and government ministers from around the globe. Attendances have been between 1000 and 1500 delegates. However, the organisational burden imposed on a tiny number of IFIP shoulders is not sustainable. Perhaps as a result, the objective of leaving legacy projects in the host countries and their neighbours has had very limited success.

The Digital Library (DL) project has been a technical success insofar as having a simple working digital library providing leading edge technical material on a free to read basis. However, the speed with which it has moved forward has been disappointing. The initial target of moving all IFIP TC publications to the IFIP DL by the time of the latest (2009) publications contract renewal has not been achieved. Also the process of putting both new material and backlist material into the DL has not become sufficiently polished that it has been possible to achieve the goal, identified in Klaus Brunstein and my report at the start of the decade, of offering digital library facilities to IFIP Member Societies and possibly others to help cover the DL's running costs.

The International Professional Practice Partnership (IP3) was founded in 2007 as a partnership of a number of IFIP Full Members who set as their goal the creation of a global ICT profession held in the same respect as the older professions. As a global profession this included the ultimate goal of providing mobility of professionals which is guaranteed by WTO agreement. This project is growing slowly and continues to attract new members. Of particular note in looking at its progress is to note to the substantial initial investment made by the founding member societies and IFIP of around €400,000 and also the substantial support in kind from the member societies and from corporates. However, IP3 is now having to address difficult resource questions as it seeks to consolidate its initial success and move on to its next goals.

## **5 Building Capacity**

I have been involved in different ways with all these projects. The lesson which I take away from them is the vital importance of building capacity quickly to support them. An essential component in the success of each WITFOR conference has been the fact that each host was the national government. They have provided substantial human and material resources – not least the world class conference facilities. However, IFIP's essential contribution has been delivered by a small handful of people. The Digital Library project has been outsourced to a member society and its implementation overseen again by a very small group of individuals.

If IFIP is to "make a difference" on the global stage then it must develop skills at capacity building. Over the years I have witnessed good ideas not taken up because

GA assessed their feasibility against the resources under its direct control – the IFIP secretariat, IFIP finances and the time and talent of the volunteers that make up GA. Perhaps not surprisingly, these resources, especially busy volunteers, provide very limited capacity for further innovation.

For its future wellbeing it is vital from my perspective that IFIP discovers an ability for capacity building for new ventures. IFIP's Member Societies employ in total many hundreds of staff. Their aggregate annual budgets are many times that of IFIP itself. Corporate bodies can provide very substantial support if a project aligns with their corporate objectives. For other projects, national governments and inter-governmental and non-governmental can all make substantial resources available. However, over the years volunteers in IFIP, while bemoaning its lack of collective impact, have not taken the opportunity to build consortia to resource major activities.

IP3 has demonstrated that member societies will deploy significant resources including finance and skilled staff members if a project is seen to be of sufficient importance to them. Corporate bodies have also provided significant in-kind support both of materials and staff. Experience from CEPIS of starting ECDL shows how the European Commission provided funding at a critical point in its creation and launch.

IFIP needs to build capacity. IFIP's GA has guarded its independence very carefully. However, if it is to become a major player on the ICT world stage it needs to leverage more resources. To find them it needs partners and it will need to find models for sharing management responsibilities for these activities with partners such as corporate and governmental bodies who may not be eligible for IFIP membership.

IFIP does not lack ideas but its track record suggests that it has difficulty building lasting partnerships to implement them.

## 6 IFIP's Changing Structure

GA 2007 agreed to the first major change to IFIP governance for some years. It created the IFIP Board to replace the old Council. The Board included representatives from the TCs in contrast to the previous Council which was formed only of the elected officers and a subset of the GA representatives, although TC Chairs attended latterly as observers.

The 2007 reforms continued a positive trend of increasing the rights and responsibilities of TC Chairs to match those of the representatives of Full Members. GA 2010 will consider a proposal that any member of the IFIP Board will be able to stand for election as an Officer thereby providing a route for the first time for a TC Chair, whose is also a member of the Board, to become IFIP President.

As outlined in the previous section IFIP is a very self-sufficient organisation which has a long record of relying on its own resources. As a result of careful management IFIP today is well resourced financially relative to its current activities. This is partly by having a very small but highly dedicated secretariat and by matching the work it asks them to do to the human resources available. A consequence of this philosophy of having a very lean organisation is that IFIP has always relied on the hard work of its many volunteers. Firstly, the officers of the TCs and WGs work enthusiastically to promote their own research disciplines at the world level. Secondly, IFIP has benefited from the commitment of many individual members of GA who have served in a

variety of elected positions especially those who have taken on the ultimate responsibility by becoming President.

However, this very heavy reliance on volunteers imposes serious limitations on IFIP. Unlike employees, volunteers cannot be instructed. Some have more tolerant employers than others. Consequently, human nature being what it is, it can be very frustrating for everyone involved to find that actions agreed at a previous IFIP Board or GA have not been carried out by the time of the next meeting six months later.

I know that I work best when confronted by a hard deadline. My experience is that most volunteers are the same. However, if that deadline is a gathering every six months the pace of progress can be very slow. For an organisation that has committed itself to particular projects or entered into agreements with partners such progress is not likely to be acceptable.

If IFIP is to fulfil the ambitions of the 2007 Strategic Aims then I believe IFIP will need to substantially “up its game”. We will need to progress matters much more quickly. I do not pretend this is easy and is probably best done over several years. While many national computer societies or regional groupings can meet face to face every month or so, such a demand on the health and time of an IFIP volunteer would not be feasible, not to mention IFIP’s finances. However, technology is coming to our aid. Straightforward monthly telephone conferences have been successfully used over several years by IP3 to ensure momentum is maintained and all participants can share in decision making. Video conferences and document sharing technologies open up new opportunities.

Based on my experience as IFIP Secretary I am amazed that the IFIP of the early years achieved so much relying on mail and fax services and occasional meetings. The use of email for the past 20 years has transformed communication but the tempo of our basic business processes appears to have changed very little.

Today’s IFIP leadership expressed a clear ambition in 2007 to change the organisation and its impact on the ICT community worldwide. Since then projects have progressed but the results disappoint me as one of their co-authors. Looking back we needed to give more thought to managing the implementation and delivery of those projects much more actively. Project management meetings by teleconference would do much to create and maintain morale and also achieve deadlines. Involving more partners, who could provide additional financial and human resources, would significantly increase capacity. Finally, working with corporate partners always imposes a discipline of deliverables and milestones which can only help fulfil our aims in a timely way.

## 7 Epilogue

The global ICT community needs a meeting place where the national and international stakeholder bodies can discuss shared interests and plan joint activities. IFIP continues to play that role for many parts of the research community although “global” member bodies increasingly compete vigorously for the same space. Where IFIP is unique is in its ability to speak for the millions of individuals in the wider ICT community – including ICT practitioners of all types as well as researchers, and academics.

ICT has changed the world. Everyone now depends to a greater or lesser extent on ICT to sustain the standards of living we have come to expect. As stakeholders in ICT we owe it to our fellow citizens around the globe to strive to provide the best ICT applications that we can. IFIP can have a key role in delivering this. Firstly, through our TCs and our other programmes, we can advance the technology and, secondly, we can ensure that the technology is deployed by suitably skilled ICT professionals.

To achieve our aims, IFIP needs to equip itself to reach out to potential partners from the whole range of stakeholders in ICT – governmental, professional, scientific, corporate. To do that IFIP will need to become a more agile organisation to enable us to offer leadership and partnership in our dynamic and vital field of ICT.

# Instruments to Achieve IFIP Goals

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**Keywords:** IFIP, Honorary Treasurer, Dipak Khakhar.

Like any nonprofit organization, the finance policy of IFIP is governed by its mission, aims and scope. Treasurer's role is to together with IFIP Board and Finance Committee try to achieve goals that are set by our founders. We are very proud to celebrate today IFIP's 50<sup>th</sup> anniversary as long lasting volunteer organization, worldwide renown. However, the world has changed since founding of IFIP. The challenge is to prepare the "Future IFIP" that will proudly celebrate the 100th Anniversary of our Organization in 2060. We should continuously study aims and goals while modernizing IFIP. This chapter reflects IFIP-business from view of not only my experience as Treasurer and a member of Executive Committee, but also as my terms as member of different committees.

## 1 Financial Management

IFIP is financed by Membership Dues, by royalties from publications, interest on funds, contributions, and surpluses from events such as congresses, conferences and symposia, including funds arising from activities of subordinate bodies. The General Assembly shall decide on the scale of annual dues. It may accept donations and subsidies (IFIP Status and bylaws).

IFIP Standing Orders states further that:

The General Assembly has established the Finance Committee whose responsibilities include:

- Formulating policies for the sound management of IFIP finances and to propose such policies to the appropriate IFIP body for approval;
- issuing guidelines and/or to establish procedures as necessary to carry out approved policies;
- analyzing and evaluating IFIP's financial situation to ensure that policies are being followed, and to propose policy changes when appropriate.

The Treasurer monitors that adequate and accurate accounts are kept by the Secretariat, that dues and other sums are duly collected, that all properly approved bills are paid, and that financial reports, statements, balances and budgets are prepared in agreement with adopted policies and submitted as requested by General Assembly.

Within restrictions determined by the Executive Committee, the Treasurer shall ensure that

- adequate and accurate accounts are opened and maintained,
- dues and other sums are duly collected,
- all properly approved bills are paid, and
- financial reports, statements, balances and budgets are prepared in agreement with adopted policies and submitted as requested by General Assembly

and has the authority to

- open bank accounts in the name of IFIP,
- sign orders to withdraw or transfer amounts from such accounts,
- instruct the General Secretary of procedures for financial and accounting operations to be performed by the Secretariat.

The Secretariat is the permanent, full-time organization of the Federation, charged with executing the secretarial, administrative, communication and accounting work of IFIP. Among its other responsibilities, the Secretariat has responsibility for the financial and accounting operations of IFIP as follow:

- Budget proposals for the Secretariat are prepared
- Approved budgets are communicated to the relevant budget holders
- Annual dues are invoiced, recorded and monitored with adequate reminders
- Portfolio transactions are received and recorded
- Royalty statements are received and recorded
- Proceeds from events are received and recorded
- Adequate forms for payment requests are designed and applied
- Support and expense approvals by competent officers are duly received and recorded
- Expense requests are paid when duly approved (according to Expense Approval Guidelines) and within budget limits
- All recorded payments and other financial transactions are accounted
- Requests for account specifications and other financial information are processed

Further the secretariat has the following financial authorities:

- Maintain euro cash funds under proper security up to €720 for local expenses
- Sign orders to withdraw or transfer amounts from bank accounts within defined limits
- Allocate financial operations among available Secretariat staff.

The books and accounts of IFIP are audited annually by a certified public accountant, appointed by General Assembly.

## 2 Financial Goals

IFIP's income is mainly from three sources: membership dues, return on proceeds from events and publications; and return on assets. Finance Committee has set the

goals that IFIP must make efforts to keep the goals of balancing the Income and Expenses in the following way:

1. **Membership Dues** – cover all Administrative Costs;
2. **Return on Proceeds and Publications** – support all *normal* Technical Activities and Projects;
3. **Return on Assets** – support *exceptional* Technical Activities and Projects and preserve our Assets' value.

The IFIP membership dues categorization of its Member Societies is based on the scale of assessment of the apportionment of the United Nations expenses. Depending on UN assessment, the fee for a full member of IFIP varies from €800 to €12,800 per year, making total income to IFIP per year to approx. €170,000. This covers administrative costs of IFIP, which includes operation of IFIP Secretariat in Laxenburg, Austria with 2½ administrative staff.

Currently, IFIP has 13 Technical Committees (TCs). Their main income sources are revenue from organization of conferences, workshops and symposia and production of relevant publications. Most of the revenue generated by a TC is available to the TC in TC Fund. Each technical committee has its own fund. A TC may use this fund to initiate activities, generally as projects, to stimulate theoretical work on fundamental issues and to foster fundamental research which will underpin future development, to give special regards for the needs of developing countries and seek practicable ways of working with them, and to encourage communication and to promote interaction between users, practitioners and researchers. The committees also foster interdisciplinary work and collaborate with other TCs.

IFIP asset consists of fund which is invested in discretionary portfolios. Return on assets is used to support exceptional projects similar to projects mentioned above.

### 3 Achieving IFIP's Aims and Scope

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of Information Technology for the benefit of all people.

#### 3.1 Principal Elements

1. To stimulate, encourage and participate in research, development and application of Information Technology (IT) and to foster international co-operation in these activities.
2. To provide a meeting place where national IT Societies can discuss and plan courses of action on issues in our field which are of international significance and thereby to forge increasingly strong links between them and with IFIP.
3. To promote international co-operation directly and through national IT Societies in a free environment between individuals, national and international governmental bodies and kindred scientific and professional organizations.
4. To pay special attention to the needs of developing countries and to assist them in appropriate ways to secure the optimum benefit from the application of IT.

5. To promote professionalism, incorporating high standards of ethics and conduct, among all IT practitioners.
6. To provide a forum for assessing the social consequences of IT applications; to campaign for the safe and beneficial development and use of IT and the protection of people from abuse through its improper application.
7. To foster and facilitate co-operation between academics, the IT industry and governmental bodies and to seek to represent the interest of users.
8. To provide a vehicle for work on the international aspects of IT development and application including the necessary preparatory work for the generation of international standards.
9. To contribute to the formulation of the education and training needed by IT practitioners, users and the public at large.

It is important that financial instruments are used to achieve IFIP goals. Some of these instruments are described in the following sections.

## 4 Technical Committees

All budget holders are requested to submit budget for the following year before 1 July in the current year. The budget should follow the guidelines that are approved by General Assembly and documented in Standing Orders. For Technical Committees, for example, in addition to the approval by the respective TCs, the Technical Assembly (TA) has a budget oversight role. TA will review the budgets of all TCs and Special Groups in order to assess whether the best practices concerning the use of TC funds are adhered to, in particular TA will see to it that exceptions made in any year will not become a general rule. The budget will show explicitly the budgeted expenses that fall within the category of exceptions. The timing of the review process will be such that the budgets can be submitted to the treasurer within the agreed timelines. The Treasurer will include the TC budgets in his overall budget for approval by GA.

In order to encourage TCs to use their funds to achieve IFIP goals and not to accumulate fund there is a cap on the fund. TC's with a fund balance above € 15,000 in year n, will use in year n+1 20% of the amount above € 15,000 for activities that serve the goal of IFIP and the respective TC. The amount is meant to be used for activities such as:

- Tutorials in developing countries;
- Grants for speakers at conferences in developing countries;
- Grants for speakers from developing countries;
- Student grants;
- Best paper award grants.

If the 20% is not (fully) used for such activities, the amount not used (of this 20%) will be transferred to IFIP general funds at the end of fiscal year n+1.

## 5 IFIP Members

IFIP want it to be an active federation. It encourages members to participate actively in its activities. There are about 20 full member societies within IFIP, which according

to the IFIP classification are termed “developing countries’ and most of these fall within category paying an annual subscription of 800 EURO. Unfortunately these countries find it difficult to supplement these funds to partake in IFIP activities and to gain full benefit from their IFIP membership. Some developing countries are financially unable to send their national representative to Technical Committee meetings and often find it difficult to support even one delegate per year at an IFIP conference. As a result IFIP’s name is not getting the publicity and exposure that it deserves particularly in light of the time and effort it allocates to supporting developing countries.

In order to encourage developing countries (who are full members of IFIP) to support their own persons the Developing Countries Support Committee offers a “matching grant” up to a maximum figure of 800 EURO per year. Allowable expenditures are participation in IFIP technical committees’ meetings, participation in IFIP events, and, purchase of IFIP publications and IFIP journal subscriptions.

## **6 Sustainable Development Programme**

Sustainable Development Programme (SDP) is an IFIP funded programme. The aim is to offer young IT professionals and students the opportunity of building up their knowledge of developing countries and development issues. The programme aims at promoting internationalization of education by providing young people with the opportunity of establishing contacts with institutions and organizations. The programme is intended to help build south-south linkages by encouraging young IT professionals from developing countries to build peer networks to help build understanding on their varying country contexts. At the same time it will also help young IT professionals from the ‘north’ to establish contact with institutions and organisations in developing countries

By working on an IT project, the young person gets the opportunity of studying an issue related to the development process in a developing country over a period of three months. This involves working on different issues raised within the information technology of relevance for these countries’ development in different areas, for example:

1. Co-operating in an existing and on-going IT project aimed at development by providing specialized expertise.
2. Teaching at university or a specialist tertiary education programme and special topics.

## **7 IFIP Academy**

IFIP Academy is a collective name to “collect” different “school” initiatives organized by different TCs under an uniform umbrella. The academy targets the 9<sup>th</sup> Principal Elements of IFIP’s mission. It is also proposed as one of the revenue generating activities of IFIP. IFIP Academy is proposed to have the following activities:

1. Propose course curriculum and content. This can be used by different educational organisation to courses leading to degree or certificates.

2. Organize intensive courses of about 2 weeks. Courses may be introductory courses or in-depth courses.
3. Courses may be delivered by “local” university under the name of IFIP or by TCs and WGs members.
4. The course developer team of a TC may wish to produce course delivery material.
5. Participants are awarded “university” credits.
6. Participants get a certificate. IFIP administers certificate “production”. Certificate is thought to be of a credit card format having photograph of the participant, course name, content, credits, date, etc.

## 8 World IT Forum

The overall goal of WITFOR is to cooperate with developing countries in developing and implementing sustainable strategies for the application of ICT and to share experiences that will help to bridge the digital divide and improve the quality of life. The specific goals are:

- To share and discuss experiences in drafting and implementing ICT policies;
- To share and discuss experiences in initiating and implementing ICT projects;
- To present and discuss research concerning the overall goal.

Although there has been almost 9 years since WITFOR is initiated; it is merely in initial stage. We need to have more projects for sustainable development under WITFOR umbrella. Budget of bi-annual main WITFOR conference is about a million euros. The organization of a WITFOR conference relies heavily on sponsorship. More resources are necessary in order to initiate and support ICT projects. It is important that IFIP finds a structured solution for funding WITFOR. Unless these resources, there is a danger of stagnation.

## 9 Towards 100 Years Anniversary

IFIP has made some remarkable progress. WITFOR has become an established event with a global impact. We have achieved global alliances with a number of United Nations Organisations including the UN headquarters in New York. We have also started a significant co-operation with the European Union. EU has supported not only WITFOR but also a number of projects initiated by WITFOR. We have started or revived a number of initiatives such as the Sustainable Development Programme, the Digital Library, and the Lectureship programme. The IFIP secretariat has been rationalised and has become more effective. IFIP has enrolled a number of new members.

Although these are significant achievements, there are still many issues that must be addressed.

In recent years a number of members, have either become inactive, left IFIP, or downgraded themselves to corresponding members. Many of these members have hosted WCC, WITFOR, GA and Council meetings. Some are founding members of IFIP. One may find a number of reasons why these members have become inactive. In some cases it is a financial situation but in many cases work done by the member

societies or their GA representatives is not recognized or appreciated within IFIP. In some cases members did not understand statements made by some prominent members of IFIP. However, in most of the cases it may just be that the members do not perceive a real benefit by being a member of IFIP.

In recent years, IFIP has increased its membership with a number of new members. Most of these new members are from developing countries. IFIP must improve its activities and services to meet the expectations of these new members.

Another aspect that IFIP must urgently deal with concerns our Technical Committees. Some TCs have already implemented new activities whereas others are very seriously planning for new activities. We have to consolidate such new activities within IFIP and must establish a suitable business model. As revenue from publications is diminishing we also have to find means for strengthening the financial stream for TCs. The relative financial strength of most of the TCs can be attributed to a strict financial policy, which is one of my major responsibilities. While this has in many cases not been entirely popular, the results cannot be denied. Through WITFOR a number of TCs are participating in a number of projects and collaborating with different UN organizations, but we also have to promote partnerships with our members, industry and international organizations. At the same time, IFIP's major issue of high quality events and publications must also be examined and strengthened.

*It has been my pleasure to serve IFIP for over 30 years as one more officer that tried to help to carry forward the dream of some IT pioneers. Role of IT has changed since establishment of IFIP. Our duty today, more than to celebrate and congratulate our achievements, is to prepare the "Future IFIP" that will proudly celebrate the 100th Anniversary of our Organization in 2060. This new IFIP must broaden its Open Forum and gladly welcome all the young Promising Scientists and High Skilled Professionals. They will be the new blood that will deeply discuss the challenges and achievements of the new IT World and make them knowledgeable to all the relevant parties.*

# IFIP World Computer Congress 2010

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**Abstract.** At the occasion of the 50<sup>th</sup> anniversary of the foundation of the International Federation for Information Processing (IFIP), the Australian Computer Society (ACS) hosted the 21<sup>st</sup> IFIP World Computer Congress 2010, held in Brisbane, Australia (September 20-23, 2010). More than 1,250 participants had a rich choice of 17 dedicated IFIP conferences and 8 industrial conferences, with more than 400 speakers, among them world-renown keynote speakers.

**Keywords:** Australian Computer Society (ACS), IFIP, IFIP World Computer Congress 2010, Brisbane, IFIP WCC 2010 Springer publication, exhibition, Gunyah exhibition.

## 1 The Venue

Following a decision of IFIP General Assembly in 2007, the 21<sup>st</sup> IFIP World Computer Congress was held in Brisbane, capital of Queensland, Australia (September 20-23, 2010). Situated in the Brisbane Congress and Convention Center, one of the worlds most reputed Congress sites, IFIP World Computer Congress 2010 offered more than 24 parallel events, including 17 IFIP conferences and 8 industrial events, organized by the Australian Computer Society. Moreover, more than 35 exhibitors presented their products, and universities and research institutes presented their programs, related to Information and Communication Technologies. A special exhibition, modeled after the aboriginal Australian meeting place Gunyah and organized by a committee of the Australian Computer Society, was dedicated to historical documents and artifacts, including components of ancient computers, thus highlighting important steps of the development of Computers in Australia.

## 2 The International (IFIP) Program: IPC Chair Augusto Casaca

The Congress, on the whole, provided to the ICT community an update on the state-of-the-art and research directions in the distinct ICT areas, from basic technologies to

advanced applications. 330 papers, which have been strictly reviewed by experts from all around the world, and selected by the International Program Committee from among all the submitted papers, have been presented in the seventeen co-located IFIP conferences and published in the congress proceedings. Some of these conferences were established conferences that the IFIP Technical Committees run every year and were held, in 2010, during the World Computer Congress and some others were new conferences, representing emerging areas of information technology.

The events were organised in 8 “streams”, grouping 17 established international conferences of related content, with the “9<sup>th</sup> Human Choice and Computers” International Conference contributing to 4 different streams.

**Deliver IT** including the 3<sup>rd</sup> International TC 12 Conference on “Artificial Intelligence” (AI-2010), (BICC-2010), the 7<sup>th</sup> IFIP Conference on “Distributed and Parallel Embedded Systems (DIPES-2010), IFIP TC 5 International Conference on “Enterprise Architecture, Integration and Interoperability” (EAI2N), IFIP TC 6 International Conference “Networks of the Future” (NF), the 3<sup>rd</sup> International TC-6 Conference on “Wireless Communications and Information technologies for Developing Countries” (WCITD-2010), and “Virtual Technologies & Social Shaping” (HCC-9/2)

**Govern IT** including the Joint TC 8 / TC 6 International Conference on “e-Government, e-Services and Global Processes” (EGES), and “Ethics and ICT Governance” (HCC-9/1)

**Learn IT** including “IFIP TC 3 international Conference on Key Competences in the Knowledge Society” (KCKS), and “History of Computing” (HC)

**Play IT** including the 2<sup>nd</sup> TC 14 “Entertainment Computing Symposium” (ECS 2010)

**Sustain IT** including “ICT and Sustainable Development” (HCC-9/4)

**Treat IT** including “e-Health”, jointly organised with the International Medical Informatics Association (IMIA, formerly IFIP TC-4)

**Trust IT** including the 25<sup>th</sup> IFIP TC 11 “IFIP SEC-2010” addressing ICT security, “Critical Infrastructure Protection” (CIP), and “Surveillance and Privacy” (HCC-9/3)

**Value IT** including the 2<sup>nd</sup> TC-13 Symposium “Human-Computer Interaction” (HCIS 2010), and the “6<sup>th</sup> IFIP TC 1/WG 2.2 International Conference on “Theoretical Computer Science” (TCS 2010)

The 330 papers presented in the 17 IFIP conferences have been published, under the editorial responsibility of Mike Hinchey, by Springer in the series IFIP Advances in Information and Communication Technology (AICT).

Also a strong track of ICT industry sessions was part of the program. Additionally, the Congress had six keynote speakers, who are prominent personalities in the areas of computers and communications, and they gave their speeches in plenary sessions.

### **3 Congress Organisation: OC Chair Nick Tate**

The conference was very successful, overall. It attracted over 400 speakers, in 16 parallel streams, and in excess of 1,250 delegates from more than 48 countries. Key-note speakers included world renowned authors and leaders in ICT. Stream keynotes likewise included a plethora of well-known personalities in ICT, and the general speakers covered an extremely wide range of ICT activities, academic and industry. As an international conference, run every 2 years, it attracted worldwide interest, and brought Australia, in particular Brisbane and Queensland generally, to the attention of the ICT industry and academia in almost every country of the world.

This was a unique event in a number of respects. It comprised a total of 16 parallel streams, populated by 17 IFIP Technical Committee conferences, melded into 8 Industry Steams whose details are given below. While complex, it proved possible by clever programming to ensure that all sessions for any particular stream were held in the same room. In addition, to celebrate the 21<sup>st</sup> anniversary, within the Trade Show (which attracted a total of 27 sponsors and 9 exhibitors, all of whom exhibited at the Trade Show) there was one special display – the Gunyah, which displayed historic computing hardware and software and was staffed by volunteers, all long-time members of the Queensland ICT industry. There were, in addition, two included conferences – the Young IT Conference, which ran for two days and the SEARCC (South East Asian Regional Computing Confederation) conference. Finally, meetings were also held of IP3 (the International Professional Practice Partnership), ACDICT (Australian Council of Deans of ICT), CoMICTA (Committee for Marketing of ICT Australia) and NICTIA (the National ICT Industry Alliance). The Play IT stream also included a number of very successful three hour workshops on different aspects of computer gaming software together with some well attended room based displays.

In addition, immediately following the Congress, the IFIP General Assembly met in Annual Meeting.

### **4 The Gunyah Exhibition of Historical Computer Artifacts**

In remembering the history of ICT with special focus on Australian developments, a committee of the Australian Computer Society led by Ashley Goldsworthy, past president of ACS and IFIP collected a significant number of historical artifacts and documents which were partly on public display for the first time. The exhibits were

displayed in a room called a Gunyah: an Australian aboriginal dwelling, assembled from local stones and branches, leaves and bark of trees.

Exhibits included

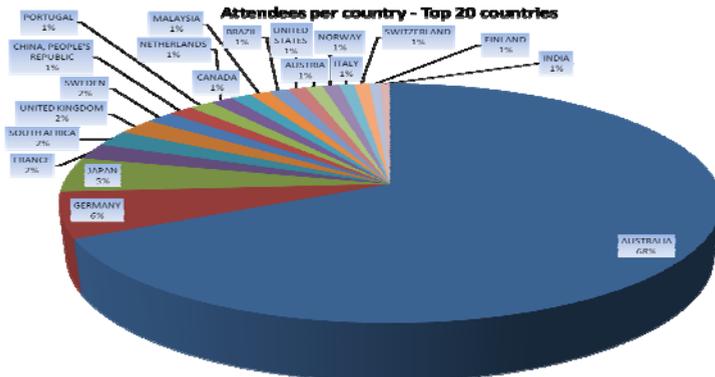
- the 1<sup>st</sup> Australian computer CSIRAC, built and operated in Sydney 1949
- the transistorized CIRRUS computer, built in Adelaide in 1960,
- the Australian Intergraphic computer, built in New South Wales in 1968,
- several computers used in Australian offices, universities and research institutes as early as 1960, such as General Electric GE 225, several models of Digital Equipment such as PDP-8 and KA-10, with related equipment.

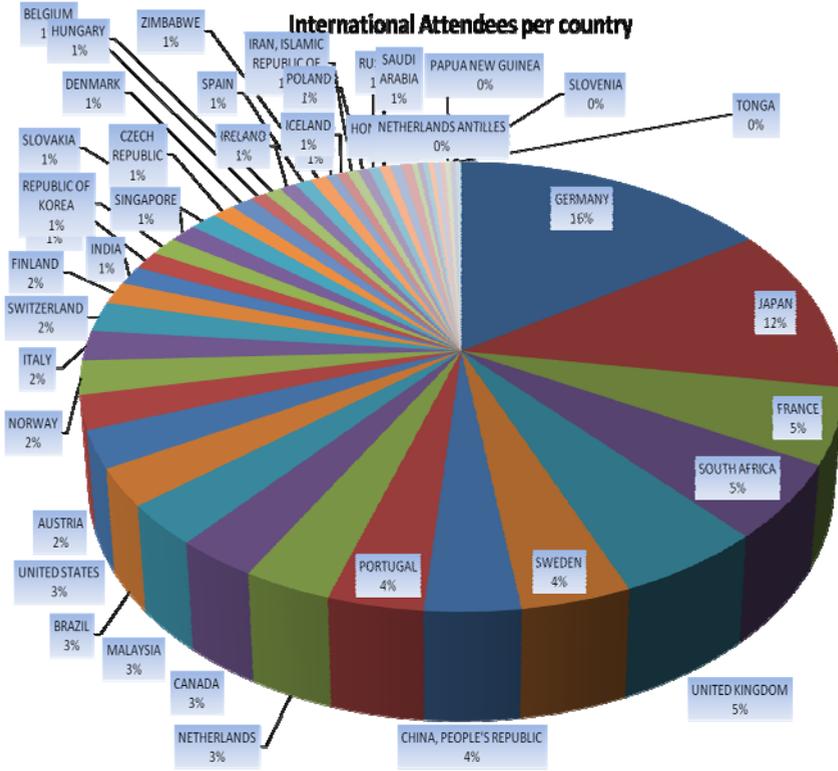
Among the physical artifacts, the “Payen Arithmometer” built around 1880, was the earliest example of a hand-driven computing device. The “ATL totalisator”, based on a patent of George Julius (909), was used in horse race bets, and it was a very successful product also exported to other countries. Gunyah exhibits were well described in detail in a booklet “Gunyah of Historical Artefacts: Handbook of Exhibits“ (see Appendix).

## 5 Statistics

Registered participants of the 16 IFIP conferences came from 48 countries. Not surprisingly, the vast majority - 64% of participants - came from the hemisphere of the hosting continent – Australia, New Zealand and nearby regions. Concerning the other continents, Europe contributed 20%, followed by Asian participants (9,3%). Regrettably, North America (including Canada and USA) contributed 2,1%, even less than Africa with 2,5%.

Concerning participation from different countries, 635 Australian participants (63,2%) lead the country scale, followed by 58 Germans (5,8%), 44 Japanese (4,4%) and 20 participants each from France, South Africa and United Kingdom (2,0%).





Special registrations for the 8 industrial conferences attracted almost 300 participants, most of which (45%) came – not surprisingly – from Queensland, but New South Wales (23%) and Victoria (16%) were also well represented (New Territories trailed the list with 1%).

## 6 Resume

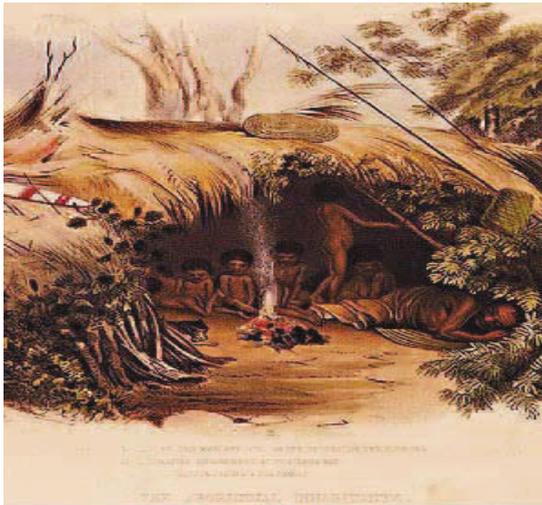
In summary, IFIP World Computer Congress 2010 and the associated events, well organized by the Australian Computer Society was very successful. Regrettably, some parts of the world – esp. including North America – were less engaged.

## Appendix



### **Gunyah of Historical Artefacts, Handbook of Exhibits**

This *Handbook of Exhibits* details photographs and artefacts dating from 1916 displayed in the “Gunyah” at the 2010 IFIP World Computer Congress 2010.



The *Gunyah* was an Australian aboriginal dwelling, or collection of dwellings, assembled from local stones and the branches, leaves and bark of trees. At WCC 2010, the term is used in recognition of Australia’s first accommodation and simply refers to the enclosure for photographs and artefacts which illustrate the development of computer technology with an emphasis on development and uptake in Australia. The artefacts remind us of the outstanding rate of innovation in computer technology and invoke our respect for the pioneers who made it happen and for the professional societies which facilitated research and development and the promulgation of information.

### **Acknowledgements**

The display of historical artefacts was compiled from early 2009 by the following Committee:

Professor Ashley Goldsworthy (Chairman) – IFIP Past President and Honorary Member; Australian Computer Society (ACS) Fellow, Honorary Life Member and Past National President.

Max Burnet – Collector extraordinaire of Australia's early computing artefacts.

Emeritus Professor William Caelli – ACS Fellow; TC 11 Past Chairman.

Alan Coulter- ACS Fellow, Honorary Life Member and Past National President; Past TC 6 Member.

Graham Rees – Past Director, University of Queensland Computer Centre.

Emeritus Professor Gordon Rose – Inaugural Professor of Computer Science, University of Queensland; ACS Fellow.

Wilber Williams – Associate Director for Internet Services, University of Queensland.

Also acknowledged are Judy Hammond, IFIP Silver Core awardee, who supplied valuable material on early IT education in Australian schools, and the volunteers who contributed to the Gunyah project.

## **Gunyah Committee Members Also Pioneers**

Many of the Pioneer Committee members are also pioneers in the Australian context.

*Max Burnet* joined Digital Equipment Corporation Australia in 1967 and rose to become its Managing Director. During this time, he collected a museum of all early DEC computers. In 1993 he was one of 15 pioneers featured in Computerworld's "Pioneers of Australian Computing" publication. Max Supplied many of the displayed artefacts.

*Bill Caelli* has extensive business, education and R&D experience in ICT, particularly in large computer systems and data/telecommunications networks. He co-founded ERACOM Pty Ltd in 1979, which developed, manufactured and internationally marketed advanced, integrated cryptographic systems, security products and services. ERACOM also manufactured early workstations.

*Alan Coulter* completed a programming course in 1959 on Silliac, built by the University of Sydney the University by adaptation of the *Illiac* computer. He pioneered computer systems in Australia's National telecom provider rising to become its Assistant Deputy Director General. Alan was a member of TC6 throughout the 1970's. In 1989, he joined the group which established the Australian Academic Research Network (AARNet), the genesis of the Internet in Australia.

*Ashley Goldsworthy* completed the first programming course offered by the University of Queensland using it's recently-installed first computer, the GE225. He contributed to the establishment of the Bureau of Census and Statistics computer centres, establishing the centre in Brisbane with a CDC 3200. A founding member of the ACS, Ashley played a significant role in its development as National President, Executive Director and member of the National Council for 27 years.

*Graham Rees* has extensive experience in data communication networks commencing with his contribution to establishing QANTAS Airways first data communication system. Graham was also instrumental in developing AusCERT, the Australian Computer Emergency Response Team. In the early 1980s he contributed to the development of the national data network for universities (AARNet) and in 1981 was involved in establishing the first Ethernet in Australia. *Gordon Rose* co-designed the CIRRUS computer in the late 1950s and later designed Intergraphic. He was an invited speaker at IFIP Congress 68 on Computer Graphics Communication Systems. Gordon was appointed inaugural Professor of Computer Science at the University of

Queensland in 1969. He participated in MIT's project MAC and was responsible for Object-Z, a formal object-oriented specification language. Gordon contributed to Protocol Specification and Verification within IFIP WG6.1.

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- The MicroBee

### Continuous Presentations

Continuously running videos, some historical others recent, including interviews with Professor Maurice Wilkes, FRS, and Prof. Dr. Heinz Zemanek.

### IFIP Presidents— Brief Biographies

Brief Biographies of IFIP Presidents either personally submitted or extracted in good faith from the internet.

## Annotated Photographs

### IFIP Presidents

At WCC2010, IFIP celebrates its fiftieth anniversary. IFIP is a dynamic organization which has responded to, and greatly facilitated, the incredible rate of technological development in information processing and related fields. IFIP, as part of modern society, is based on the cumulative efforts of several generations, guided by the wisdom and experience of its Officers. In particular, IFIP is indebted to its sixteen Presidents who have led the Federation since its establishment. (For brief biographies, see final pages.)



Mr. Isaac Auerbach  
(1960-65) USA



Prof. Ambros Speiser  
(1965-68) Switzerland



Acad. Anatol Dorodnicyn  
(1968-71) Soviet Union



Prof. Dr. Heinz Zemanek  
(1971-74) Austria



Dr. Richard Tanaka  
(1974-77) USA



Prof. Pierre Bobillier  
(1977-83) Switzerland



Dr. Kaoru Ando  
(1983-86) Japan



Prof. Ashley Goldsworthy  
(1986-89) Australia



acad. Blagovest Sendov  
(1989-92) Bulgaria



Prof Asbjørn Rolstadås  
(1992-95) Norway



Prof Kurt Bauknecht  
(1995-98) Switzerland



Dir. Peter Bollerslev  
(1998-2001) Denmark



Prof. Robert Aiken  
(2001) USA



Mr. Walter Grafendorfer  
(2001-2) Austria

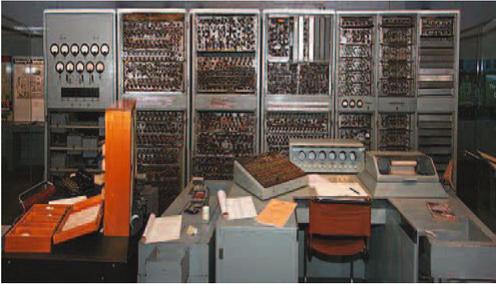


Dr. Klaus Brunnstein  
(2002-7) Germany



Prof. Sebastiaan von Solms  
(2007-10) South Africa

## CSIRAC, Australia's first digital computer (1949)



**CSIRAC** (*Council for Scientific and Industrial Research Automatic Computer*) was Australia's first digital computer and the fourth stored-program computer in the world. It is one of only two surviving first-generation computers, the other is Zuse Z4. CSIRAC was designed and built at the Radiophysics Laboratory at CSIR (later named CSIRO) in Sydney. CSIRAC ran its first test program in November 1949. Its circuits used some 2000 vacuum-tubes. Memory

comprised a mercury acoustic delay-line memory of 768 20-bit words supplemented by a disk of 1K-words with 10msec access time. Instructions had a 2msec cycle time and supported basic arithmetic and logical operations and conditional and relative jumps, making it possible to write a subroutine library. CSIRAC was controlled via a console which allowed single-step operation and included a CRT display of register contents. Input was from punched tape and output was via teleprinter or punched tape. The machine, like all machines of the era, had no operating system. CSIRAC is housed in the Melbourne Museum.

## CIRRUS, a Transistorised, Multi-Program, Digital Computer (1960)



The Australian **CIRRUS** computer, designed and built within the Electrical Engineering Department of the University of Adelaide, illustrates the progression from CSIRAC's vacuum-tube technology to discrete transistors. Physically, it could be opened out like a book for servicing. It comprised two core stores (main and register-buffer), a register set, an 18-bit arithmetic/logic unit and a read-only, micro-program control store for instruction decoding.



CIRRUS pre-dated integrated circuits – it used some 3000 discrete transistors in 400 modules in which transistors, resistors, etc., were inserted through an insulating card and hand wired. Each binary unit had an indicator light so that in slow or single-shot mode each operational step could be followed.



The read-only microprogram store was based on a 20 x 8 array of ferrite rods over which were placed eight planes containing hard-wired patterns. The store comprised 4K, 38-bit words, parity checked with a cycle time of 1μsec. The read-only patterns were hand-threaded by passing a drive wire to the left or right-hand side of the rods according to the required bit – a tedious and time-consuming task.

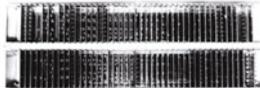
### Intergraphic – A Graphical-Interface Computer (1968)



The Australian Intergraphic computer designed and built within the Electrical Engineering Department of the University of New South Wales, illustrates the progression from discrete transistors to early integrated circuits.

Microprograms encoded conventional digital operations and also the rapid generation of line drawings comprised of linked linear and elliptic elements using Digital Differential Analyser (DDA) techniques.

Modules consisted of the newly-available integrated circuits mounted on printed circuit boards. A typical integrated circuit contained eight



logic gates. Five rows of mounting racks, two of which are shown could accommodate 200 modules. The packing density was significant at the time.



Intergraphic also encoded microcode in a hand-wired, read-only memory. The micro-instructions were woven with miniature wire-pair transmission lines transposed at the rod locations according to the required bit. The memory comprised 4K 32-bit words with cycle time 100 nano-secs; one-tenth of the CIRRUS ROM cycle time.

### The General Electric GE225 Computer (1960)



The first computer in Queensland was a General Electric GE225 installed at the University of Queensland in 1962 at a cost of £100,000. It was used regularly by the University and a number of Public Utilities from 1962 until 1977 when it was presented to the Queensland Museum. The GE225 was one of the first commercially available fully-

transistorised computers and comprised about 10,000 transistors and 20,000 diodes. The memory comprised 8K 20-bit words with access time 18  $\mu$ sec. Addition took 36  $\mu$ sec, multiplication 288  $\mu$ sec and division 495  $\mu$ sec. The system also had an Auxiliary Arithmetic Unit for 40-bit floating point operations. Power consumption was around 15 KW. A typical GE225 circuit card is included in the displayed artefacts.

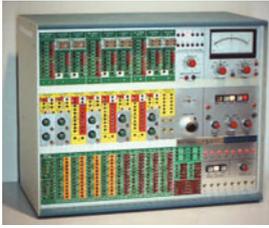
### The DEC PDP KA-10 Computer (1966-)



The PDP-10 was a large mainframe computer manufactured by DEC from 1966. The PDP-10 was an expandable, 36 bit computer system designed for on-line, real-time and time-sharing applications with notable installations in prestigious US university computing facilities and research labs. It was also a popular choice in Australian Universities. The KA10 was the original PDP-10 processor. It was introduced in 1968 and used discrete transistors packaged in DEC's Flip-Chip technology. Backpanes were wire-wrapped via a semi-automated manufacturing process. The

KA10 processor had a 1 $\mu$ sec cycle time, a 2.1 $\mu$ sec add time and transfer rates up to 7.2Mbps. Memory could be expanded to 256K 36-bit words. The PDP-10 typically supported 32 on-line teletype terminals.

### The EAI 180 Analog Computer (1970)



The EAI 180 analog computers were designed and built in Australia by EAI Electronic Associates Pty Ltd, Sydney. Analog computers manipulate voltages that are proportional to the magnitudes of quantities in the physical problem being solved. Components include precision potentiometers, numerous operational amplifiers which perform analog summation, integration, multiplication and generate nonlinear functions. The accuracy of an electronic analog computer is limited by the precision and stability of its components. The EAI 180 contained some early integrated-circuits and so was a hybrid machine.

### The IE33 Terminal (1972)



The **IE33 terminal** was produced for Ansett Airlines by Information Electronics of Canberra which was established in 1968. Ansett was a major Australian airline until its collapse in 2002 after 66 years of flying. The Australian manufacture of this somewhat bulky terminal gave reason for a duty to be imposed on all imported terminals for years to come.

## Physical Artefacts

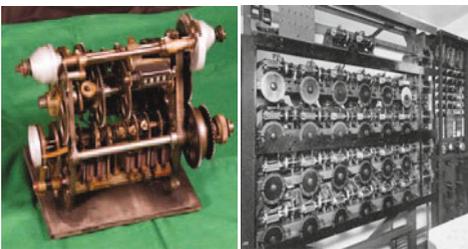
### The Payen Arithmometer (c.1890)



The first arithmometer, the Thomas Arithmometer, was produced by Charles Xavier Thomas de Colmar about 1820. L. Payen took over the company when de Colmar died in 1870. The Payen Arithmometer exhibited (dated 1916, but the model dates back to c.1890) can add, subtract, multiply and divide two 6 digit numbers to produce a 12 digit result. Although a number of other calculating devices were produced prior to the Thomas Arithmometer, it appears to be the first to be produced in any quantity. Estimates of the number of machines produced up to 1890 and up to the end of production in the 1920s are 1,500 and 8000 respectively.

machines produced up to 1890 and up to the end of production in the 1920s are 1,500 and 8000 respectively.

### The ATL Totalisator (c.1913)



George Julius patented his totalisator machinery in 1909 and founded Automatic Totalisators Limited (ATL) in 1917. ATL was one of Australia's most successful companies in the first half of the twentieth century, dominating the international Totalisator industry for 65 years. His ideas were first implemented as a totally mechanical machine in New Zealand in 1913. A totalisator displays in large readable figures and in real time the betting statistics for the current race. A

typical totalisator included an array of 50 adding units like the one exhibited.

### The Brunsviga Nova 13Z/18 (c.1930)



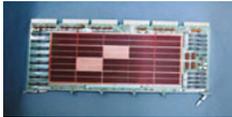
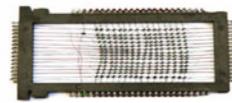
The **Brunsviga** calculator was a very successful mechanical calculator. It was named after Braunschweig in Germany where Grimme, Natalis and Co. manufactured the machines from the late 1800s to the early 1970s. The Brunsviga uses pin-wheels invented by Willgodt T Odhner of St Petersburg in 1874. The Nova13 could add, subtract, multiply and divide 10 digit numbers to produce an 18 digit result. Numerous mechanical calculators were manufactured in the 1900's but were displaced from the 1960s by cheap electronic calculators.

### Ready Reckoners (1900-)



In the first half of the 20<sup>th</sup> Century, when calculators were expensive, both printed and mechanical Ready Reckoners were widely used. Three examples are: the Collins Handy Ready Reckoner (1910), a book containing monetary tables expressed in farthings and pounds; the Perpetual Calendar (1937) containing many computational tables and the Wrenn Ready Reckoner (1962). The knobs on the right of the Wren are used to scroll through paper rolls of tables. Typical tables are a Rapid Wages Calculator and a Commonwealth of Australia Tax Table.

### Magnetic Core Memory (1950-)



Magnetic core memory is based on the ability to switch the magnetic polarity of ferrite material between two possible permanent states thereby achieving reliable binary storage. The ferrite is in the form of numerous tiny rings (cores) arranged in a rectangular array through which four fine wires are passed: X and Y coordinate wires, and Read and Inhibit wires diagonally woven through all cores. Core storage became commercially available in the 1950s and became widely used until superseded by solid-state RAMs and compact disks. Various memory arrays (planes ) are exhibited.

### The PDP-8 Computer (1965)



The PDP-8 (Programmed Data Processor-8) is widely considered to be the first successful minicomputer. Launched by DEC in 1965 and sold for a fiftieth of the cost of mainframe computers it became very popular, especially in research laboratories and education. The PDP-8 had a cycle time of 1.5 $\mu$ sec, 4K 12-bit words and only 8 instructions. The first PDP-8's incorporated discrete transistors; from 1968, integrated circuit versions were developed. The early PDP-8 exhibited was a communications front-end for a DEC KA10 system and initially supported 16 teletype terminals operating at 110 bps, later upgraded to 64 terminals with an Australian-designed, integrated-circuit multiplexer to support asynchronous communications up to 9.6Kbps. The PDP-8 was the precursor of the PDP-11 and VAX series computers.

### The TTY 33 ASR Machine (1963)



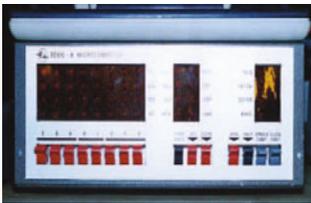
The TTY33(Teletype) ASR (Auto-Send-Receive) exhibited was used with the PDP-8; it incorporated a paper-tape reader/punch operating at 10cps.

### The KA-10 Console (1968)



The console exhibited belonged to the University of Queensland's PDP KA-10 computer installation. The DEctape units provided 250KB of storage for individual users; they preceded floppy disks. Other peripherals included 2 swapping disks, 2 magnetic tape units, a line-printer (1,000 lines per minute) and a card reader.

### The EDUC-8 Microcomputer (1974)



The **EDUC-8** was an early microcomputer kit published by Electronics Australia in a series of articles starting in August 1974 and continuing to August 1975. The design assembled a number of inexpensive individual transistor–transistor logic (TTL) packages thereby avoiding the purchase of an expensive microprocessor chip. The design was 8-bit serial with 256 bytes of RAM. The clock speed was 500 kHz, with an instruction time of 100µsec, due to the bit-serial implementation. The instruction set was based on

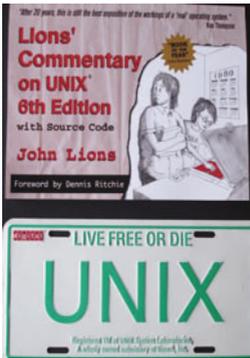
the DEC PDP-8. The EDUC-8 later included a variety of peripherals: a keyboard, paper-tape reader and punch, printer, music player, teleprinter, etc.

### The MONECS Operating System (1974)



**MONECS** (Monash University Educational Computing System) was a computer operating system with BASIC, COBOL, FORTRAN and Pascal compilers plus a machine-language facility originally released in 1974. It was specifically designed for computer science education in Australia. Student programs were typically submitted as a deck of mark-sensed or punched cards and, due to limited memory, individual programs were processed serially. A typical MONECS installation was based on a DEC PDP-11 series computer. MONECS systems were supported by the Monash University Computer Centre.

## Unix Documentation 1975



The earliest version of UNIX was developed on a DEC PDP-7 computer by Ritchie and Thompson at Bell Laboratories during 1969-1970 using the C language. The Unix timesharing system offered features seldom found even in larger operating systems of the time. It was available freely to educational institutions and eventually became the operating system of choice for start up vendors. By the mid 80's a new generation of vendors was selling UNIX as an "Open System".

At the University of NSW in 1975, Professor John Lions was running UNIX on a PDP-11. Impressed by the elegance of Unix he wrote a definitive work entitled "Source Code and Commentary on Unix Level 6" describing the operating system and the source code for his students. A detailed and witty discussion. It was only available as lecture notes to students of Unix V6, and when seventh edition Unix came out, it was banned by the licensee.

## The Exidy Sorcerer (1978)



The **Exidy Sorcerer** was released by Exidy, the videogame company, in 1978 as a home computer. It was comparatively advanced given competition from Commodore PET and TRS-80. The Sorcerer only had commands to access memory and to read and write via tape interfaces; other programs and languages were loaded from a cassette tape or ROM-Pac. A ROM-Pac emulated an 8-track tape cassette by substituting a circuit-board for the tape. The Sorcerer was the first computer to use ROM-Pacs. Although the Sorcerer was not an international success, it became very popular in Australia through promotion by Dick Smith Electronics.

Computer Science students at the University of Queensland used ROM-Pacs to load languages such as COBOL and Fortran. The Sorcerer specification included a Zilog Z80 CPU (2 then 4 MHz); 4 to 48 KB of RAM and 4 to 16KB ROM-Pacs.

## Acoustic Modems & Line Drivers (1979)



In Australia, the Post Master General's Department (PMG) controlled all telephone services. In 1973 it consolidated its monopoly by becoming the sole supplier of directly-connected modems over its copper network. This had a major impact on the University of Queensland by forcing it to use PMG modems for on-campus services. Further, only PMG approved devices could be connected to their modems and approval times were long. By 1979 the cost impost of using Telecom modems on campus was becoming exorbitant. One solution was to use Acoustic Modems to provide

dial-up access over the PMG Network at 300 bps. Acoustic coupling avoided electrical coupling to PMG property.

As an alternative and preferable solution, in 1979 the university developed short-distance, voltage-differential line drivers and installed a considerable amount of its own copper. In time, the university's line drivers were approved for use on cables that were also used for telephone services. This effectively broke the Telecom (PMG renamed) monopoly on campus. By the late 1980s the university had installed over 1,500 services using its line drivers.

## Ethernet Cable, 3COM Qbus & Unibus Boards (c.1980)



The first Ethernet in Australia was installed at the University of Queensland in 1981. Ethernet controllers for DEC Unibus computers were obtained with the assistance of Bob Metcalf, the co-inventor of Ethernet. Initially the connection was between PDP 11/34s and a VAX 780 over the thick yellow Ethernet coaxial cable. The 3COM UE Controller is one of the original DEC Unibus modules and the smaller 3 board set is a later version for the DEC Qbus machines. The original Ethernet specification included a data-rate of 10 Mbps over 50 ohm coaxial cable in 500 meter segments with repeaters to a maximum length of 2,500 meters.

## The Dulmont Magnum (1980-)



The **Dulmont Magnum** was arguably the world's first laptop computer. It was the only Australian laptop produced but did not survive once HP, Sharp and Sanyo entered the market. It was designed and marketed in Australia by Dulmison Pty Ltd from 1979 and marketed internationally as the "Kookaburra" in 1985,6. It included a 16-bit Intel 80186 processor, 96 to 256Kb of RAM and an inbuilt LCD screen of 8x80 to 25x80 characters. It supported a word processor and spreadsheet and telecommunications, file management and appointment programs. The Magnum laptop was similar to, but predated, the HP-110 and the Sharp 5000.

## IT Education for School Children (1980-)



The National Computer Education Program actively encouraged students to learn about computers. They attended exhibitions of IT in communications, government, education, business, health, travel, etc. at corresponding locations. Topics included directory assistance, inventory control, facsimile scanning, telecom services, livestock marketing, weather forecasting, traffic control, travel and accommodation, international data transfer and land-title registration. Notable speakers, such as the Minister for Science and Technology, discussed the economic and social impact of IT or officially opened various promotional events. Students saw demonstrations of laser surveying instruments, telex systems, micrographic equipment, optical fibre transmission and models of the US space shuttle. Wherever possible, students enjoyed "hands-on" experience.

Exhibits include:

- **Early Educational Software:** 'The First Fleet' and 'Birds of Antarctica' (for Apple 2 or Microbee).

**Reports & Information Booklets:** 'Teaching, Learning and Computers', Commonwealth Schools Commission, 1983; 'Commonwealth Computer Education Program in NSW' - Introduction of the Commonwealth Computer Education Program in Government Schools, 1985 and 1st Australian Computer Show highlights (brochure), 1983.

**National Information Technology Council (NITC) Publicity:** Programs for the years 1980-84, posters for various NITC events, IT Media Kit and Education items in IT Week publications.

**Information Technology Month, 1984:** Teacher's Guide, Children's Work Book and Parents and Friends Presentation Kit.



### The IBM Personal Computer (1981)



The **IBM Personal Computer** (IBM PC) was introduced following developments from 1975 within IBM’s strategy to enter the small computer market. In Australia, IBM manufactured PCs at Wangaratta, Victoria from 1983 in a plant originally established in the mid-1970s to manufacture typewriters. It was one of only three plants worldwide manufacturing IBM PCs, Wangaratta focusing on the Australian and Asian-Pacific markets.



### The Harris 6120 CPU (1981)

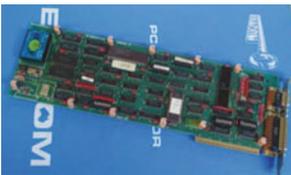
The Harris 6120, based on the Intersil 6100 microprocessor, emulated the PDP-8 and so was also referred to as “the PDP-8 on a chip”. It operated up to 10 MHz with 32K 12-bit words of memory. It was widely used by DEC in their range of DECmate word-processing desktop

### The Telecom Computerphone (c.1982)



In the early 1980s Australia’s Telecom entered the data communications and PC market with a re-labelled ICL One-per-Desk computer system, itself based on the UK Sinclair QL computer. The Computerphone incorporated a Motorola 68000 processor with 128KB of memory, two Mobius Strip magnetic cassette drives and a 1200/75 bps modem and access to the “Viatel” bulletin-board.

### ERACOM PC-Encryptor (c.1982)



The ERACOM Pty Ltd PC-Encryptor card and supporting software system was one of the first such sub-systems for the new IBM and IBM-compatible PCs in the early 1980s aimed at providing a full hardware and software based security scheme. It enabled encryption and decryption of data to/from memory and disc as required and featured advanced cryptographic key storage and management facilities. It originally used the DES algorithm as well as public key schemes and was evaluated under the “Common Criteria”.

### The MicroBee (1982)



The **MicroBee** was produced by Applied Technology (Australia). The original MicroBee (1982) was a kit with assembly instructions included in *Your Computer* magazine then later sold pre-built. It was based on a Zilog Z80 and supported Microworld Australia Basic, word-processor and telecommunications software and a TV display of 16 lines of 64 characters. The range was extended and several hundred thousand were made during the 1980s. It was sold to Australian schools and exported to Sweden and Russia. In 1985, a *Premium Series* was introduced comprising 8 KB of screen RAM, 8 KB of “attribute” RAM, 8 KB of colour RAM and up to 32 KB of PCG RAM. 16 KB

PCG RAM supported 512 x 256 bit-mapped displays.

## Continuous Presentations

In addition to artefacts and photographs, the Gunyah includes continuously running videos, some historical others recent, including interviews with Professor Maurice Wilkes, FRS, and Prof. Dr. Heinz Zemanek.

Professor Wilkes was President of British Computer Society (BCS) during IFIPs foundation and actively participated in the first IFIP Congress in Paris (1959) which, organised by UNESCO, prepared the establishment of IFIP in 1960. He also represented BCS in IFIP Council from 1960 until 1964. Professor Wilkes holds many prestigious awards and is notable for his original achievements in the computer field, in both engineering and software, and for his contributions to the growth of professional society activities and international cooperation among computer professionals.

Prof. Dr. Heinz Zemanek initiated the foundation of IFIP TC-2 "Software: Theory and Practice" in 1960. TC-2 was formally established in 1962, under his chairmanship. TC-2 cooperated in developing the "Algol 60" report, which significantly influenced the development of Programming Languages.

Prof. Dr. Zemanek was IFIP President from 1971 to 1974 and made significant contributions in IFIPs initial years. He designed the Vienna Definition Language and the transistorised computer *Mailufterl* (1955) at the Vienna University of Technology.

Other presentations include the TV documentary 'Women in Science and Technology' (1989) and three *Computer Education in Schools* videos—'Get With IT' (1982), 'Equal Bytes - Your Future's in Computing' (1984) and 'Questioning the Future' (1987).

There will also be *Pioneer Conversations*: periods of one hour in which IFIP Pioneers attending the Congress will make themselves available in the Gunyah to converse with delegates and visitors.

## IFIP Presidents— Brief Biographies

The following brief Biographies of IFIP Presidents were either personally submitted or extracted in good faith from the internet. We apologise if any extract is inaccurate or inappropriate.

1960-1965: Isaac Auerbach (USA)

Foundation President IFIP; Contributed significantly to real-time guidance, airline reservation and early-warning systems and inter-computer communication. Burroughs Corporation, Head of Defense, Space and Special Projects Division. Founder and Chief Executive, Auerbach Corporation for Science and Technology. Elected Member National Academy of Engineers.

1965-1968: Prof. Ambros Speiser (Switzerland)

Construction of the first Swiss computer (ERMETH); Director IBM Research Laboratory, Rüschlikon; Research Director Brown Boveri, Dättwil; Honorary Member Swiss Academy of Engineering Sciences; Trustee Swiss National Science Foundation.

1968-1971: Acad. Anatol Dorodnicyn (Russia)

U.S.S.R. (later, Russian) delegate to IFIP from its foundation in 1960 and regular attendee of IFIP Council and General Assembly meetings; IFIP Trustee for many years; Silver Core awardee. Facilitated the establishment of TC-5 and instrumental in the establishment of TC-7. Acad. Dorodnicyn gave substantial support to the Eastern computing community. Director Computation Centre U.S.S.R Academy of Sciences in Moscow.

1971-1974: Prof. Dr. Heinz Zemanek (Austria)

Please see previous page (Continuous Presentations)

1974-1977: Dr. Richard Tanaka (USA)

CEO and Board Chair of four computer-related corporations in the fields of broadband communications, high-resolution optical lithography, software services and Internet-driven company management.

1977-1983: Prof. Pierre Bobillier (Switzerland)

Significant events during Prof. Bobillier's Presidency: Establishment of IMIA (International Medical Informatics Association) which replaced IFIP TC-4; Euro IFIP'79; establishment of ICID (Informatics for Development) following UNESCO-IFIP cooperation; first "Two-Continents Congress (IFIP Congress' 80 held in both Tokyo and Melbourne); first IFIP International Conference on Governmental and Municipal Data Processing; CAPE'83; SEC'83 and establishment of TC-11.

1983-1985: Dr. Kaoru Ando (Japan)

Director, Information Processing Society of Japan (IPSJ) and Chair IPSJ International Committee; Executive Director, Fujitsu Limited and President, Fujitsu FACOM Information Processing Corporation. An Executive Director of IBM Asia Ltd. Awarded Japanese Government Medal for contributions to industrial computerization in Japan. Established Japan-America Institute of Management Science (JAIMS).

1986-1989: Prof. Ashley Goldsworthy (Australia)

Congress Committee Chair 1980 WCC 1974-1981. GA representative Australia 1980-1998. Trustee 1980-1983. Chairman, Activity Planning Committee 1981-1986. Vice-President 1983-1985 & 1991-94. Awarded Silver Core 1986. Established the Technical Assembly, two TC's and 17 WG's. Congress Committee Chair 1996 WCC 1991-1996. Elected Honorary Member 1999.

1989-1992: Acad. Blagovest Sendov (Bulgaria)

Acad. Sendov served IFIP with the vision that the East and West could resolve their differences. IFIP was uniquely positioned to provide a common meeting ground for East and West and had the satisfaction that during his term as President the Cold War ended.

1992-1995: Asbjørn Rolstadås (Norway)

Chair TC 5 and WG 5.7. During his Presidency he continued IFIP changes initiated by Ashley Goldsworthy by focusing on the relationship with member societies and improving the position of the TC chairs in the GA. IFIP Silver Core and Auerbach Award recipient.

1995-1998: Prof. Dr. Kurt Bauknecht (Switzerland)

Head, Department of Informatics and the Information and Communication Management Research Group, University of Zurich; President, Swiss Informatics Society; honorary doctorate, Johannes Kepler University Linz, Austria. During Prof. Dr. Bauknecht's presidency: IFIP established in Luxemburg; proactive IFIP involvement in UNESCO; Congress '98 in Budapest; IFIP Secretariat demonstrated the advantages of the Internet in management.

1998-2001: Peter Bollerslev (Denmark)

Advocated a global view of the development of ICT in Education, particularly Teacher Education. Contributed to the development of many conferences and global networks. Initiated the first World IT Forum (WITFOR) and participated in UNESCO-IFIP joint activities. Past TC 3 Chair.

2001: Prof. Robert Aiken (USA)

Chair, Research Committee Computer and Information Sciences Department, Temple University. ACM Fellow and ACM Outstanding Contribution Award recipient; ACM Special Interest Group on Computer Science Education (SIGCSE) Lifetime Service Award and award for outstanding contributions to Computer Science Education; IEEE Computer Society Golden Core and IFIP Silver Core awardee.

2001-2002: Walter Grafendorfer (Austria)

Organization Committee Chair WCC 1998, Congress Committee Chair WCC 2002, Vice President 1998-2001, Trustee 1993-1998, Marketing Committee Chair 1994-1995 and 1998-2000. Development of marketing and accounting systems for congresses, conferences, etc. AMB Chair 1996. GA Representative Austria 1991-2008. Silver Core recipient. Initiated transfer of IFIP office to Austria.

2002-2007: Prof. Klaus Brunnstein (Germany)

Professor Emeritus of Informatic Applications, University of Hamburg. Significant contributions to the fields of data security, computer viruses, safety and security risk analysis and related fields, contributions to TC11, Kristian Bechman awardee.

2007-2010: Prof. Sebastian von Solms (South Africa)

Research Professor, Academy for Information Technology, University of Johannesburg. Contributions to Information Security and Governance, Cyber Security and Critical Information Infrastructure Protection. South African Academy for Science and Arts MT Steyn Medal awardee.

# History of TC 1: Foundations of Computer Science

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**Abstract.** In the first part of the paper the overall situation concerning theoretical computer science in the world and within IFIP is summarized and steps are described that led to the establishment of the technical committee TC01 - Foundations of Computer Science in 1996. In the second part of the paper the history of the TC 01 is briefly described and some steps for future are suggested.

**Keywords:** Specialist Group on Foundations of Computing - SG 14, Technical committee TC 01, history of theory in IFIP, Working Group on Continuous Algorithms and Complexity, Working Group on Descriptive Complexity, Working Group on Foundations of System specifications, Working Group on Computational Learning Theory, Working Group on Cellular Automata and Discrete Complex Systems, Working Group on Term Rewriting, Working Group on Theoretical Foundations of Security analysis and Designs, Working Group on Concurrency Theory.

## 1 Pre-Pre-History

The story concerning the establishment of TC-01 is of some special interest because it reflects in some way the development of the views, and not only in IFIP, on the whole field - as a collection of many deep and broad insights on the field and its potentials, but mixed with some too narrow views of the field, of its fundamentals, potential and expectations.

The founders of the IFIP had already remarkable wisdom and courage to take a broad, information-processing based, perception of the field and not, so much dominated at that time, its computer-centered vision. This has been surely a very positive step. On the other hand, they did not seem to be yet fully aware of the potential, deepness and broadness of the field (who were at that time?) - otherwise one of the most natural steps would be to create, as one of the first TC, the one on foundations, what did not happen. And not only that. There has been a strong opposition in IFIP, especially within already established TCs, for 34 years, to do a so obvious step. All that happened in spite of the fact that in the area of foundations there have already been, and for quite a long time, not only very many remarkable outcomes, of the key importance for the field, but some of them even already before the first really powerful electronic computers were designed.

It is interesting, and even instructive, to try to see why such things happened. The main reason behind was the computer-centered view of the field and to be more precise, the hardware- and software-centered view of the field. That was the ground of

the argument that the only special theory behind the field is the one behind programming and software design, what was covered by the TC-02, the technical committee that was for many years far the most successful technical committee, with many excellent scientists in, as well as the outcomes, and therefore this technical committee was much influential within the IFIP. Related to that was a belief, a position of some of the leaders at least, that theory that does not fit the aims and scope of TC-02 should be seen as mathematics or belongs to the scientific base of electrical engineering. The second reason, actually a standpoint, was that it is better for the whole development of so applied field if theory and applications are not separated, and therefore each technical committee was expected to cover also all needed theoretical aspects closely related to its aims and scope. Situation has started to change after B. Sendov, the former president of the Bulgarian Academy of Science, with a strong theory inclinations and with a very broad view and understanding of science, technology and their needs, was elected to be the next president of IFIP in 1989 at the IFIP Congress in San Francisco. This congress was very successful, by any standard, and one of the 10 of its tracks, the one on Fundamental tools, was the most successful, if huge attendance at its invited talks. All that, combined with the political skill of Sendov (as the president elect at that time), and also of Dines Bjørner and Wilfried Brauer, led to an "innocent" proposal to establish a provisional Special Interest Group on Foundations of Computer Science - SGFCS SG'14. That was also much supported by the Program committee chair of that IFIP Congress, Hervé Gallaire, on the bases of the outcomes theory was able to demonstrate at the congress. Such a proposal, with strong emphasis on the "provisional" character of SG'14, was hard to turn down and so it got through - that was, likely the maximum what could be achieved at that moment. Jozef Gruska, responsible also for the so successful track "Fundamental tools" of the congress, was appointed as the first chair of SG'14.

It is perhaps also of interest to mention that at that time theoretical computer science has been already at the excellent stage. For one of the meeting of the Program committee for San Francisco Congress, J. Gruska came with a proposal of 36 invited talks, to choose from, that could be given at the congress by theoreticians and could be of large interest for people outside of the theory. Also for several other tracks of the congress actually theory people were chosen as invited speakers.

Success at the IFIP'89 Congress was not without an important pre-history. IFIP'86 Congress, with Dines Bjørner as the Program Committee chair, had an excellent program and one of its most successful parts was the one devoted to theory, prepared by Vadim Kotov.

It is perhaps worth to illustrate in more details that in 1989 theoretical computer science and its community were already firmly established, worldwide, and were striving internationally, in spite of having no proper IFIP representation. Indeed, several theoretical computer science associations were already well established. For example, the European Association for Theoretical Computer Science (EATCS - established in 1972), the Special Interest Group on Theory at Gesellschaft für Informatik in Germany (established in 1972), the ACM Specialist Group for Automata and Computability Theory (SIGACT - established in 1968) and the IEEE Technical Committee on Mathematical Foundations of Computing (established in 1961). Furthermore, there were active theoretical computer science groups also in India and Japan.

In addition, at that time there were already established several respectable journals for theoretical computer science. For example, *Theoretical computer science*,

*Information and Control* (currently *Information and computation*), *Mathematical systems theory* and so on.

One can therefore say that in 1989 the international theoretical computer science community was already backed by several associations and informal working groups centered around conferences and journals or acting within their mother organizations. In addition, the Basic Action Esprit Program provided another forum for unification and focusing all efforts. All that brought another dimension into theory life, especially in Europe. Theoretical computer science was also well established and its outcomes disseminated in university curricula all over the world.

It is also of importance to realize that contributions of theory for the overall development of the field had already been fully appreciated by the community in large in 1989. This is in the best way reflected by the relatively large number of theoreticians who had won Turing awards before 1989: E. D. Knuth, M. Rabin, D. S. Scott, R. Floyd, A. C. Cook, R. M. Karp, J. Hopcroft, R. Tarjan and T. Hoare.

In addition, a myriad of annual and bi-annual conferences, workshops and summer schools were already established. The main North America STOC and FOCS conferences were already in their 29-th or 21-st year and experienced steady growth of attendance. The main European annual conferences ICALP and MFCS were at that time in their 16-th and 14-th year. In India, the annual conference "Foundations of Software Technology & Theoretical Computer Science" had its 9th annual conference in 1989.

In spite of all that a heated debate, within theoretical computer science community, about having such a new world wide theory group continued still for a while after SG'14 was established but that slowly cooled down.

## 2 Pre-History

The first task, after SGFCS was established, was to form its initial membership and to formulate proper aims and a scope. Since it has been a privilege of a specialist group that the UN-principle, which used to be applied to all TCs - to have one representative for a country - did not have to be followed, after many consultations a policy was adopted to create SG'14 membership from scientists that have already gained noteworthy reputation in the international theoretical computer science community. This policy has been successful and resulted to the following initial membership:

G. Ausiello (I), G. Berry (F), A. Bertoni (I), W. Brauer (D), J. Brzozowski (CND), R. G. Bukharajev (Russia - Tatarstan), L. Budach (D), R. M. Burstal (SC), S. A. Cook (CDN), J. de Baker (NI), J. Diaz (E), F. Gecseg (H), J. Gruska (SK), J. Hartmanis (USA), J. Heintz (AR), C. A. Hoare (UK), J. Hopcroft (USA), G. Hotz (D), T. Ito (J), D. S. Johnson (USA), H. Ju'rgensen (CND), R. M. Karp (USA), M. Klawe (CND), V. E. Kotov (RUS), R. Milner (UK), U. Montanari (I), M. Nivat (F), A. Paz (IL), G. Rozenberg (NL), J. Sakarovitch (F), A. Salomaa (SF), B. Sendov (BG), E. Shamir (IL), I. Simon (BR), J. Staples (AUS), T. Toffoli (USA), J. Traub (USA), E. Tyugu (S), L. G. Valiant (USA), P. van Emde Boas (NL), J. van Leeuwen (NL), S. Winograd (USA), D. Wood (CND). - Observe that 7 of them won already Turing award.

Specialist Group on Foundations of Computing, SG'14, at first as provisional and since 1992 as "permanent" (with J. Gruska reelected as the chair in 1993), existed till 1996 and at the General Assembly meeting during the IFIP'96 Congress in Canberra, SG'14 was turned into TC-01 on Foundations of computer science. The proposal to

establish such a TC and as TC-01, got through without any opposition, in spite of the fact that even some very experienced members of GA gave it small chance few minutes before voting. SGFCS'14 has clearly demonstrated well, during 6 years of its existence, the importance of its establishment and so to turn it into a regular TC-01 was actually a very natural step for IFIP.

Very prominent membership was likely the main reason that SG'14 was taken with respect from its very beginning.

The second reason for its success was that very soon several working, and well working, groups have been established. Namely, the following working groups:

WG 14-01 Continuous algorithms and complexity: Established in 1990 and chaired by Joseph F. Traub. Aims and scope: design and analysis of continuous algorithms and complexity of computational problems of continuous mathematics.

WG 14-02 Descriptive complexity: Established in 1990 and chaired by Edwin Pednault. Aims and scope: Kolmogorov-Chaitin complexity. Minimal length description. Complexity of descriptive systems.

WG 14-03 Foundations of systems specifications: Established in 1992 and chaired by Hans-Jörg Kreowski. Aims and scope: Theory of data and systems specifications.

WG 14-04 Computational learning theory: Established in 1995 and chaired by Carl Smith. Aims and scope: Computational and complexity theoretic aspects of learning. Investigation of formal models of learning.

WG 14-05 Cellular automata: Established in 1994 and chaired by Roland Vollmar. Aims and scope: Cellular automata as computing, dynamical complex and chaotic systems.

Activities of these working groups concentrated mainly on workshops. Active participation at the IFIP congresses were another of the major goals - especially through invited talks.

As a very significant impact of SG'14 one can see an initiative to establish a regular theoretical computer science conference in South America - LATIN. The first two such conferences, in 1992 in Brasil (100 participants) and in 1995 in Chile (135 participants), were much supported by SG'14. As a bi-annual conference now, LATIN keep being very successful.

### 3 History

The history of TC-01 can be divided into three periods. In the first one, 1996-2002 TC1-0 was chaired by Giorgio Ausiello and TC-01 and all its working groups worked fine and the position of TC-01 in IFIP and within TCS community has got well established. In the second period, 2002-2005, TC-01 was chaired by Takayashu Ito and the development was quite turbulent. WG 14-05 was suspended, but during the third, current period, 2005- with TC-01 chaired by Michael G. Hinchey situation normalised and WG 1-05 is again active, taken a broader view of its field.

During these periods the number of working groups has increased to 8 and old working groups adjusted their aims and scopes. New working groups are:

WG 1-06 Term rewriting: Established in 1998 with Jieh Hsiang as a chair. Aims and scope: To develop theory of rewriting for computing and reasoning.

WG 1-07 Theoretical foundations of security analysis and designs: Established in 1999 with Roberto Gorrieri as a chair. Aims and scope: Foundations of security analysis and designs.

WG 1-08 Concurrency theory: Established in 2005 with Luca Aceto as a chair. Aims and scope: Theory of concurrent systems. One of the most remarkable initiatives taken by TC 01 has been to start the Theoretical Computer Science (TCS) conference as a biennial worldwide event devoted to all aspects of foundations of computer science. In the first edition TCS 2000 took place in Sendai back to back with the IFIP World Computer Congress that was being held in Beijing. Since 2002 in Montreal and subsequently in Toulouse (2004), Santiago de Chile (2006), Milan (2008) and Brisbane (2010), TCS was held as the official theory track of the IFIP World Computer Congress. In all cases the scientific program of the conference and the attendance has made TCS a very successful event.

## 4 Future

During the whole period of the existence of SG'14 and TC1, It has been getting increasingly more and more clear that the scientific base of the informatics is much broader and has deeper goals than just to serve information storing, processing, transmission, and imaging technologies and their applications. For a recent position on this issues see the position paper "A perception of informatics", [http://www.AE-Info.org/ae/User/Gruska Jozef](http://www.AE-Info.org/ae/User/Gruska%20Jozef), on the server of the Informatics Section of the Academia Europaea, of the chair of SG'14, much based also on his IFIP experience.

Theoretical informatics community in general, and TC1 in particular, has therefore to do its best to broaden and deepen the scope of the whole field as well as its aims. In order to do it, it will be necessary to open concentrate on new fields of research as well as to work on multidisciplinary problems with other areas of science and technology, all that through proper working groups mainly and also through workshops, especially workshops that would try to explore potential to open new area of research in such a way. The recent theoretical informatics involvements in several areas of information processing inspired by nature, as quantum information processing and so-called molecular computing are excellent examples what should and could be done. TC1 should be active in promoting, worldwide, such orientations and developments.

It is also getting increasingly clear that in order to facilitate progress that information processing technology and methodology offer, it is necessary to embed more or less sophisticated features of these technologies and methodologies into all levels of education - in a proper form, it is one of the main tasks of theory to be active by that and to try to take a lead.

Orientation on new areas of research, on multidisciplinary research, through working groups and conferences, as well as handbooks, is one of the big tasks for future for TC1. Development of theoretical informatics in less developed parts of the world is another task that could TC-01 handle using their international membership. Perhaps time came to establish a regular theoretical informatics conference in Africa and/or in Asia.

# TC 2: Software: Theory and Practice (Status Report)

Klaus Brunnstein

**Keywords:** IFIP, TC-2, Software, Theory and Practice.

**Editorial notice:** Members of TC-2, esp. including chairpersons, were regrettably not able, due to professional duties which requested priority over their voluntary work, to write a chapter for this book. Consequently, the editors decided to include a short report about the present status of TC-2 at IFIPs 50<sup>th</sup> anniversary.

## 1 Technical Committee TC-2

During the International Conference on Information Processing (ICIP), organised by UNESCO in 1959, a strong request was made to establish a Technical Committee on Programming Languages. Consequently, Heinz Zemanek was asked to prepare the establishment of TC-2 which was formally established at IFIP General Assembly in 1972, with Heinz Zemanek as founding chairman.. In IFIPs early days, concepts and design, development and implementation of programming languages were one major topic to be discussed in universities, research institutes as well as in IT-related industry laboratories. Consequently, TC-2 concentrated its work as well as its contributions to conferences in this area, with WG 2.1 still active in this area. Among TC-2's (and WG 2.1s) contributions, its work at the Algol 60 report was historically very significant. In later phases of TC-2s developments, more general issues of software engineering were included, as reflected in the development of new working groups.

TC-2s aims (quoted from IFIP website): “The aim of TC2 is to obtain a deeper understanding of programming and improve the quality of software by studying the software development process, both theoretical and practical.”

Presently, TC-2 has 24 members representing 23 member societies. Chaired by Bertrand Meyer (Switzerland), with Michael Goedicke (Germany) as vice-chair and Jerzy Nawrocki (Poland) as secretary, TC-2 has 13 Working Groups with almost 400 members; with this diversity of areas covered, TC-2 is the largest TC in the IFIP community. In order to honour outstanding contributions in the fields of TC-2s work, TC-2 gives (usually bi-annual) the “Manfred Paul award”, named after its chair (1977-1986) and founder of WGs 2.1 and 2.2.

## 2 Working Groups of TC-2

### 2.1 WG 2.1 – Algorithmic Languages and Calculi

Prepared in 1959 and formally established in 1962, WG 2.1s aims is “To explore and evaluate new ideas in the field of programming, possibly leading to the design of new

languages”. Among others, WG 2.1 has “continuing responsibility for ALGOL 60 and ALGOL 68”. With presently 36 members, WG 2.1 is chaired by Jeremy Gibbons, Oxford/UK, with Johan Jeuring, Utrecht/Netherlands as secretary.

## **2.2 WG 2.2 – Formal Description of Programming Concepts**

Established in 1965, the aim of this Working Group is “to explain programming concepts through the development, examination and comparison of various formal models of these concepts”. With presently 32 members, WG 2.2 is chaired by Davide Sangiorgi, Bologna/Italy, with Igor Walukiewicz, Bordeaux/France as vice-chair and Philippe Darodneau, Rennes/France as secretary.

## **2.3 WG 2.3 – Programming Methodology**

Established in 1969, the aim of this Working Group is “to increase programmers' ability to compose programs”. With presently 35 members, WG 2.3 is chaired by Pamela Zave, Florham Park/USA, with Michael Butler, Southampton/UK as co-chair and Rustan M. Leiko, Redmond/USA as secretary.

## **2.4 WG 2.4 – Software Implementation Technology**

Established in 1973, the aim of this Working Group is “to work on software implementation technologies” With presently 36 members, WG 2.4 is chaired by John Gough, Brisbane/Australia, with Thomas Gwchwind, Zuerich/Switzerland as secretary.

## **2.5 WG 2.5 – Numerical Software**

Established in 1974, the aim of this Working Group is “to improve the quality of scientific computation by promoting the development and availability of sound numerical software”. With presently more than 30 members, WG 2.5 is chaired by Ronald F. Boisvert, Gaithersburg/USA, with Michael Thune, Uppsala/Sweden as vice-chair and Wayne Enright, Toronto/Canada as secretary.

## **2.6 WG 2.6 – Database**

Established in 1974, the aim of this Working Group is to “provide an international forum for the exchange of information on technical, economic, and social impacts and experiences with databases and database applications”. With presently 28 members, WG 2.6 is chaired by Ernesto Damiani, Milan/Italy, with Mohand-Said Hacid, Villeurbanne/France as vice-chair and Paolo Ceravolo, Milan/Italy as secretary.

## **2.7 WG 2.7/13.4 – User Interface Engineering**

Established in 1975 and jointly working with WG 13.4, the aim of this joint Working Group is, among others, the “development of reference models for interactive systems”. With presently 24 members, WG 2.7 is chaired by Nicholas Graham,

Kingston/Canada, with Philip Gray, Glasgow/UK as vice-chair and Gaelle Calvary, Grenoble/France as secretary.

## **2.8 WG 2.8 – Functional Programming**

Established in 1987, the aim of this Working Group is to “study the design, implementation, and use of functional (applicative) languages”. With presently 43 members, WG 2.8 is chaired by Simon Peyton Jones, Cambridge/UK, with Ralf Hinze, Oxford/UK as secretary.

## **2.9 WG 2.9 – Software Requirements Engineering**

Established in 1993, the aim of this Working Group is “to develop a better understanding of: the elicitation, specification, analysis and management of the requirements for large and complex software intensive systems”, as well as of “the interpretation and documentation of those requirements in such a way as to permit the developer to construct a system which will satisfy them”. With presently 33 members, WG 2.9 is chaired by Bashar Nuseibeh, Milton Keynes/UK, with Joanne M. Atlee, Waterloo/Canada as vice-chair and Robert J. Hall, Florham Park/USA as secretary.

## **2.10 WG 2.10 – Software Architecture**

Established in 2000, the aim of this Working Group is “to further the practice of software architecture by integrating software architecture research and practice”. With presently 18 members, WG 2.10 is chaired by Tomi Maennistoe, Aalto/Finland, with Philippe Kruchten, Vancouver/Canada as vice-chair and John Klein, Pittsburgh/USA as secretary.

## **2.11 WG 2.11 – Program Generation**

Established in 2003, this Working Group describes its mission as: “Generative approaches have the potential to revolutionize software development as automation and components revolutionized manufacturing. At the same time, the abundance of current research in this area indicates that there is a host of technical problems both at the foundational and engineering levels. As such, the aim of this Working Group of researchers and practitioners is to promote progress in this area. With presently 32 members, WG2.11 is chaired by Christian Lengauer, Passau/Germany, with Julia Lawall, Copenhagen /Denmark as vice chair.

## **2.12 WG 2.12/12.4 – Web Semantics**

Established in 2004 and jointly working with WG 12.4, the aim of this Working Group is “to obtain a deeper understanding of the semantic web, and help in the development of its theoretical foundations and technological underpinning, as well as its impact on computing in general”. With presently 43 members, WG 2.12/12.4 is chaired by Tharam Dillon, Perth/Australia, with Elizabeth Chang, Perth/Australia and Ernesto Damiani, Crema/Italy as joint vice-chairs and Elizabeth Chang, Perth/Australia also as secretary.

### **2.13 WG 2.13 – Open Source Software**

Established in 2006, the aim of this Working Group is “to enable a diverse community of researchers and practitioners to rigorously investigate the technology, work practices, development processes, community dynamics within free, libre and open source software (OSS) systems, complementing appropriately other IFIP Working Groups where OSS is increasingly relevant”. With presently 27 members, WG2.13 is chaired by Giancarlo Succi, Bolzano/Italy, with Ernesto Damiani, Crema/Italy as vice-chair and Scott Hissam, Pittsburgh/USA as secretary.

# Computers and Education – A Landscape

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**Abstract.** This history of Technical Committee 3 is an exploration of the shifting landscape of the relationship between computers and education. Analysis focuses on its characteristics of context, structure, themes and society, and uses four time periods to frame the landscape of innovation and change. These characteristics have acted as a bedrock for scientific debates to flourish and attract the engagement of the significant stakeholders of practitioners, researchers and decision-makers.

**Keywords:** Stakeholders, Research, Professional development, Communities of practice.

## 1 Introduction

In essence this paper is a history of the exploration by IFIP's Technical Committee on Education (TC3) of the relationship between computers and education. It is an updated version of the address I gave to the WCC congress in Santiago, Chile 2006 [1]. I characterise this history as a journey, starting with the establishment TC3 in 1963, through to 2010 celebrating the Golden Jubilee of IFIP. As all history is more than a sequence of dates or facts, the analysis will identify characteristics - contextual, structural, thematic and social - that shape the journey. This has been exciting heady time; the direction and speed of change in information technologies and their relationship with education have been substantial.

For historical evidence, I have analysed the structure and activities of Technical Committee 3, explored how directions have shifted, and interviewed some members. A complete bibliography of publications has been probed; a rich source of evidence lies in the nine Proceedings of World Conferences on Computers in Education (WCCE) and the official TC3 international journal, Education and Information Technologies (EAIT), currently in its fifteenth volume. A Bibliography Appendix it will be located in IFIP/TC3 archives. From the first, TC3 has identified and addressed the dual concerns of our field, that is *education about computers, and using computers in education*. Any history is but an interpretation of events, and this one reflects my analysis of the data and selection of issues. Some large themes, such as developing countries, may be missing because they deserve a separate analysis. This history is presented as periods of change, from initial dominance of higher education to the

broad scope of an educational community and lifelong learning agenda of the early 21<sup>st</sup> century. The landscape of this journey starts with mountains, moves into hills where progress is eased, into large plains offering tracks in multiple directions.

## 2 Technology and Educational Change

It is obvious that there have been substantial changes in computing power over the last forty years. This section will not include technical details, such as the shift from K to GB of memory, but focuses on contextual issues affecting the relationship with education. Six shifts in four periods are clear: the ever increasing level of computing power, a reduction of physical size, the development of graphical user interfaces, reduction in cost, common applications packages, and the growth of the internet, world wide web and ‘explosion’ into a digital world.

### 2.1 1963–1979

TC3 was established when computers were physically large. Huge cabinets in computer rooms, with air-conditioning for relatively dust free environment, were the norm. Expensive, they were located in universities, major businesses or establishments where automatic computation was a growing necessity. Their computing power was minute compared to today, but substantial compared with the world before computers, that is, of the manual calculator. Data was encoded and input in punched paper format. And with computers grew demands for those who understood the science of computers, data processing and programming. For education, this power remained in the hands of very few – computer science or mathematics departments in universities and a few schools. And then in the late 70s, this landscape changed dramatically.

### 2.2 1980–1989

The advent of silicon technology, ‘the chip’, was a bench mark. By the start of the 1980s micro-computers had emerged, although usually in the hands of the specialist few. By the end of the decade, computing power was available for a range of school disciplines and administration, and was penetrating elementary and vocational education. It was still a relatively fixed resource, whether as stand-alone or a networked room. Networks opened the vista for distance education, via phone lines, rapidly taken up by countries with remote populations such as the Inuit in Canada and out-back in North Australia. Additional devices to keyboards were developed - floor turtles, robots and science laboratory controls. With the Apple Macintosh, a graphical user interface emerged; the development of specialist authoring languages contrasted with general purpose business applications for word processing, spreadsheets and data handling. By the end of this decade, we had laptops and mobility.

Thus for education the availability of computing power became a reality, mountains had been replaced by hills negotiated with relative ease. Governments promoted the development of national computer industries, but by the end of the decade, such machines became clones of international companies with a few standard application packages. Computer science flourished, the term sometimes replaced by Informatics. Educational computing, computer assisted instruction and learning, and computer

managed learning declined with the rise of the more general purpose term IT; and computer or IT awareness moved to the centre ground. Nevertheless the eighties were a heady time for curriculum development using computers, with attention to issues such as interactivity in the classroom. Once micros with graphical interfaces arrived, the possibility of incremental steps for geography, the humanities and languages became apparent. The landscape provided greater choice of direction; TC3 flourished.

### **2.3 1990–2005**

This period is characterised by the flowering of global communications with the internet and world wide web. Satellite availability provided shifts from local and national to international and global networks. Now communications technologies impinged upon the perception of networks, and the nature and availability of information. In the late 1990s small mobile phones swept the world. The term Computer was coined to reflect to its original calculation function; it now changed to ICT to reflect the dominant function of providing Information and Communications. And a change occurred with which education still grapples, that is the penetration of computers into the social world. Personal computers (PCs) came within the reach of many households and students. Society was attracted by the availability of global personal communication, accessible information, and universal applications. Commercial organisations for shopping, financial services, travel and entertainment readily adapted. ICT, common in educational institutions, was also in community centres, libraries and internet cafés

ICT in education was no longer specialist or unique; the challenge for education was to use the technologies for learning and teaching, within this different inclusive environment. So how much is it used in communities, classrooms, lecture rooms, or online to teach and learn the concepts and knowledge that still lie at the heart of education, and to support process and styles of learning such as collaboration and debate? Now the landscape of computing power has become the equivalent of a flat plain, with no difficult terrain of accessibility to negotiate. Flowing across this plain however is a wide river, which affects developing countries and those who are socially and economically deprived anywhere. Bridging this river, or overcoming the digital divide, became a cause of substantial concern that TC3 among others sought to address.

### **2.4 2006–2010**

These last five years has seen a further name shift to Digital Technologies, now embedded into everyday life – mobile/cell phones and laptops are ubiquitous, global positioning systems are routine, and integrated digital technology has changed the photographic, art, music and communication environment. Large multiple display devices in business, education and entertainment have strengthened the role of live and graphical images as a means of presentation. The advent of wifi has released the technology train from any sense of fixed track, and iPhones lead the way providing mobile integrated functionality for personal digital environments, encompassing simple graphics representing ‘Apps’. Devices are small, light weight and relatively inex-

pensive. Society is still enjoying the impact of such intergated and instantaneous communication, with access to almost unlimited information, available in graphical, visual and vocal forms as well as numerical and written. In roughly fifty years, the world has experienced a technology revolution similar in impact as the shift from a small propellor driven aircraft to the development of the jet engine, wide bodied aeroplanes and universal flight.

However this ubiquity of the global digital technology has implications. First, a new language and style of communication has developed. Does its instantaneous communication mask the educational role of considered thought, reflection and the development of knowledge? Secondly, this is the world of the young; it dominates their culture, interests, aspirations, and increasingly employment. Their landscape may not include conventions and norms of the recent past. And finally, because of the open nature of the global web, the river current is dangerous but this may not be apparent on the surface. Society needs education to grasp the complex social and political issues about veracity, security, protection, surveillance, legality, responsibility and ethics now posed. As, unlike previous waves of technology, it is not embedded in institutions and established professions where the power of understanding the technology and its use dominated. It has shifted to society; it is as if the population that has been persuaded by innovators to come along for the ride, then suddenly embarks on their own journey into an entirely different valley.

### 3 Technical Committee 3 – Its Evolution and Structures

#### 3.1 A New IFIP Technical Committee

In 1963, three years after its foundation, IFIP Council formally established a new Technical Committee for Education (TC3) . “It was inevitable that education should come to the fore early in the development of IFIP” avowed the first TC3 chair, Richard Buckingham [2]. He reported that in the early 1960s most educational efforts focused on using computers for numerical computation in university mathematics departments, teaching programming and developing high level languages. Little education concerned with information processing was a significant issue for business and administration. At the first TC3 meeting in Paris in 1964, supported by UNESCO, 14 members were appointed from 10 countries, many from higher education but others in the computer hardware and software industry. In effect *these individuals formed a committed club of innovators*. Membership grew to 23 by the early seventies, meeting in a circuit of locations. They often represented their national associations that formed the bedrock of the subscribing membership of IFIP.

At the first meeting, TC3 [2] agreed the following aims:

- a) to establish guidelines for comprehensive training programmes and curricula in the science of information processing, with special consideration for the needs of developing countries and to encourage the implementation of these programmes;
- b) to generate material to acquaint the general public with the computer and its impact on various aspects of society;

- c) to serve as a central clearing house for all educational material pertaining to the science of information processing.

Compare these with the current aims of TC3 (2009) [3]:

- to provide an international forum for educators to discuss research and practice in
  - teaching informatics
  - educational uses of communication and information technologies;
- to establish models for informatics curricula, training programs and teaching methodologies;
- to consider the relationship of informatics and other curriculum areas;
- to promote on-going education of ICT professionals and those in the workforce whose employment involves the use of information and communication technologies;
- to examine the impact of information and communication technologies on the whole educational environment
  - teaching and learning
  - administration and management of the educational enterprise
  - local, national and regional policy-making and collaboration.

Understanding the growth and scope of this TC3 journey, requires an exploration of its working structures.

## 3.2 The Growth and Activities of Working Groups

This analysis is inevitably entwined with the four distinct phases of technological change.

### 3.2.1 The Early Period – 1966–1979

Working Groups (WGs) are designed *to take forward specific areas of interest* within a Technical Committee. Working Group 3.1 was established in 1966 to explore how best to extend education about computers into secondary schools. Imaginatively, the remit considered the use of computers in all aspects of secondary education, not just the teaching of programming. Thus both Computer Assisted Instruction/Learning in the disciplines and teacher training became concerns that endure to this day. Some members were nominated by the pioneering IFIP countries. Others were ‘known’ about; at that time a few individuals were pioneering using computers in schools. For instance David Tinsley [4] reports that around 1967/8 he was invited by Dick Buckingham to attend a WG 3.1 meeting in Paris in 1979. “The idea was simple really, the most sensible thing in the current climate of what’s it all about was to sit down and write advice for schools. So that’s what we did.” He also stated that anyone who dared to publish anything (such as David Johnson in Minnesota or Hank Wolbers from the Netherlands) was perceived to have ‘put their head’ above the parapet, and be invited to join.

Meeting regularly, WG 3.1 members wrote advisory guidelines. The first, ‘Computer Education in secondary school – an outline guide for teachers’ [5] (known as the

Red Book), was available at WCCE Amsterdam in 1970. The revised version, translated into various languages, and three further topic books established the primacy of producing guidelines for the profession. Devising and running professional training seminars in ADP for system designers, was devolved to a new Working Group 3.2 [6], later, called Informatics and ICT in Higher Education. Bob Aiken [7] attended the first WCCE on hearing of their work on the computer science curriculum. Through Bernard Levrat he became “drawn into the debate – well arguments - between mathematicians and electrical engineers about the foundations of the science of computing” on both sides of the Atlantic.

Two further working groups were established in 1971. WG 3.3, Instructional Uses of Computers, later turned into Research on Educational Applications of Information Technologies. And in a logical extension of 3.2, but to distinguish it from higher education, WG 3.4 covered IT-Professional and Vocational Education in Information Technology, and focused on curriculum and related accreditation. Indeed discussing and *producing curricula and guidance for professionals* in the workplace of the computing industry, business, universities and schools dominated the activities of these initial working groups. By 1979 and after 16 years, four working groups had been established, and two World conferences (Amsterdam, The Netherlands 1970 and Marseilles, France, 1975) held. WGs 3.1, 3.2 and 3.4 had each held their own first individual conferences from which 3 books were published.

### **3.2.2 An Established Pattern – 1980–1989**

In the 1980s the number and scale of activities increased. The third and fourth WCCes were held in Lausanne, Switzerland in 1981 and Norfolk, Virginia USA in 1985. A feature of these world conferences of 1981 and 1985 (and later that in 1990) was the substantial exhibitions of hardware and software manufacturers, and the level of computer business sponsorship that underpinned these events. Two more working groups were set up, in 1983 WG 3.5 on Informatics in Elementary Education and in 1987 WG 3.6 on Distance Learning, reflecting the broadening educational base and concerns of members. Working groups conferences attracted new membership. In addition in the 1980s, TC3 held two regional conferences, one in Japan (1986) and one in Europe that coincided with celebrating 25 years of TC3 (1988).

Twenty books of selected Proceedings were published in this nine year period, but no guidelines were produced. In the 1980s the focus shifted to mounting international conferences to support the flowering of activity in schools, further and higher education – and that of governments. *These conferences reflected a different mutual relationship with the professional community and interested stakeholders* and workshops and discussions became a substantial part of conference structures. In this first decade of micros, the journey of exploration was fast, multi-faceted and optimistic. Staff from university computer science departments, faculties of education and teacher training colleges, education boards and government departments attended to explore and discuss using this new, small and flexible resource. Some conferences were open with an international call for papers, others were working meetings with attendance by invitation of around a 100. Many insiders consider this latter the ideal means of generating real debate, exploring change in perceptions, and a defining characteristic of working group membership.

### 3.2.3 A Shift in Profile – 1990–2005

In the 1990s, two further world conferences, the fifth and sixth WCCEs were held in Sydney, Australia in 1990, and Birmingham, UK in 1995. WG 3.7 on Information Technology and Educational Management was formed in 1996. And then continuing into the new century the seventh and eighth WCCEs were held in Copenhagen, Denmark in 1991 and Stellenbosch, South Africa in 2005. The *established pattern* of WG conferences thrived, with 37 books produced. In one sense, the 1990s were a continuation of the successful TC3 pattern of activities.

There are however two developments to note. First, was the revival of working meetings to produce Guidelines for Good Practice; Working Groups produced seven between 1992 and 2002 covering informatics education, secondary education, computer science elementary curriculum and teacher development [8-14]. These were funded by UNESCO, reviving a relationship with IFIP's founding organisation. Second, a new form of publication emerged – the international Declaration. TC3 took an active part in two UNESCO/IFIP events, first at Montreal, Canada resulting in a Youth Declaration [15], followed by a 2003 world forum on IT for developing nations resulting in the Vilnius Declaration [16]. And TC3 was active, through UNESCO and the Swiss Academy of Technical Sciences and Raymond Morel, in the UN World Symposium on the Information Society, Geneva 2003. Then at WCCE in Stellenbosch all participants contributed their views on 'what works' for ICT and education; Post conference these were collated to form The Stellenbosch Declaration [17] by the IFIP TC3 community, entitled 'ICT in education – make it work'. These Guidelines and *Declarations are designed to reach a different audience of national and international stakeholders*, acting as 'Position papers' for those, such as governments who are less likely to read conference books.

Unfortunately in parallel, conference exhibitions and sponsorship were in sharp decline; during the third technological phase the educational market was less significant and relatively indistinguishable from that of society in general. The impact is substantial. First, in the absence of computer industry sponsorship, mounting conferences carried an *increased financial concern* for the host institution and TC3/WGs. And secondly the overall financial climate in educational institutions made it harder for individuals to get support to attend, particularly the young. This problem was affecting the ability of TC3 and WGs to mount events.

### 3.2.4 2006–2010

The most recent WCCE was held in 2009 in Brazil, and other WG events have been held across the world. But in this most recent phase *the momentum of change has increased*. Two new special interest groups (SIGs) or working groups have been formed, Life Long Learning (2005) and Digital Literacy (2008). Both are devised around an overarching theme rather than a specific topic or constituency. Thus they tend not to mount separate events but contribute streams to other TC/WG meetings, such as WCCE 2009. Unfortunately in parallel the activities of WG 3.2 have been in flux; there has been a divergence of interest between Education and University Computing/Informatics departments, which appears in part to be a reflection of different perspectives in Europe and America, though there was useful collaboration between WG 3.2 and WG 3.4. in The Netherlands 2009. As with all WGs, a corpus of keen individuals is needed of maintain momentum.

Nevertheless most working groups have a similar sense of purpose. Thus WG 3.1 “tries to identify problems, to document experiences and to find solutions. It does not strive to offer a unique solution to problems, as it is aware that specific circumstances of people and countries must in general be taken into account,” Pieter Hogenbirk. WG 3.2 notes that “in most of the world the enrolment in Informatics is getting smaller, despite the career opportunities that remain significant. ...The international community is struggling with the apparent obsolescence of their curriculum,” Deepak Kumar. WG 3.3, following concerns over a perceived lack of theoretical base for research into ICT and Education, has recently published a synthesis of perspectives [18] enabling them to state that the “diverse nature of developments in ICT in education and their far-reaching effects and potential for change mean that whilst it is important for the research community to achieve coherence and identity it is also crucial to draw on research development in other areas”, Mary Webb. WG 3.4, after some years of concerns over diverse computing curricula in education, is now addressing how to make the study of ICT as an academic subject more attractive and how should the ICT sector be addressing the area of global warming?” Barrie Thompson. WG 3.5 aims “to provide an international forum where ideas, practical educational experiences, research and project orientated work can be discussed in a professional way, and .....add new insights for individuals and networks for future research and practice,” Marta Turcsanyi-Szabo. For WG 3.6 “The emphasis on distance education, while still a focus, is shifting towards blended and distributed forms of learning. As technology advances the notion of distance is challenged and re-evaluated, and attention is drawn to multi-user virtual learning environments, collaborative learning spaces and social/psychological perspectives....as well as cultural contexts,” Steve Wheeler. And in WG 3.7, although the nature of information systems change, “our focus remains under which conditions these systems and the information they provide will be utilized fully for improving performance, and which effects utilization has on the organization using the systems” Adrie Visscher. SIG LLL continues to relate to the interactive role of informatics and resulting technologies on lifelong learning (Mike Kendall), while for the new SIG Digital Literacies, “its mission is to provide an international forum for understanding and endorsing research, promoting policy development and improving practice in the challenging area of Digital Literacy and e-inclusion,” Lampros Stergioulas.

The above recent statements of intent show common features - an international perspective, combining research and practice, engaging in debate, and looking to the future. They all represent a reflective perspective. And the most recent 2009 Bento Gonçalves Declaration for Action [19], following up the Stellenbosch declaration, provides incentives and recommendations for putting the principles of Stellenbosch into action. This reinforces further the attention placed on providing direct links between policy makers and practitioners.

### **3.2.5 Camaraderie**

The initial membership of TC3 and its WGs was of committed individuals with common interests. Meetings were mainly internal working events often of no more than 10-12 people where guidelines were produced and two world conferences planned. This intensive activity clearly fostered camaraderie. The sense of a collaborative team, with common interests and concerns is an enduring trait of the TC3 working

groups frequently mentioned, both formally and informally by its members. As Tinsley [4] said “really we were just a group of friends – but a powerhouse too”. The sense of a working collective of individuals from diverse contexts and countries has underpinned the growth of activities. When asked why they continued to be involved after their first contact, Tinsley [4], Aiken [7], Bollerslev [20] and Cornu [21] all commented on *the friendship embedded within the community*. Each returned to this point. Aiken [7] called it a “nice confluence of the professional and personal aspects” of life. Bernard Cornu [21] invited to a WG 3.1 conference on ICT and mathematics in secondary school, on behalf of ICME, then stayed. “First the international context of IFIP – many, many different countries; then I wanted the topic computers in education, ICME was more about the didactics of mathematics; and of course I met good friends there....this is important, not a detail...it’s a friendly way we work in IFIP.” Scrutiny of working group chairs and book editorship shows how the initial group of individuals were active in establishing subsequent working groups. So their style of operating, the social agenda, and establishment of a camaraderie was perpetuated.

A feature of WGs is that members are invited to join on the basis of their activity and personal interest. Indeed they may be from a country that has no formal affiliation with IFIP. WGs rarely have more than a few members from any one country, and individuals are nominated on how they have interacted with that community. Thus both the international and working nature of the community has been maintained.

### 3.3 TC3 and Its Place in IFIP

The place of TC3 within IFIP is worth exploring to explain the shift and expansion of TC3s activities.

#### 3.3.1 The Role of TC3

Members of TC3 represent the educational interest of IFIP national member organisations, and thus the structure of IFIP and the General Assembly (GA). There can be overlap as some individuals are members of both, as National Member representatives on TC3 and members of working groups. From early on, GA mounted a biennial World Computer Congress (WCC), which helped cohesion for the community of enthusiastic pioneers developing the new Federation. Only very occasionally was a paper presented at Congress on an educational topic. Indeed Peter Bollerslev [20] is of the opinion that TC3 became strong because “there was no competition from Congresses”, which may also explain how *TC3 was able to establish in the 1980s such a strong pattern of its own quinquennial WCCEs and sense of community*. In 1992 however, a substantial shift occurred when TC3 was invited to take part in the Madrid Congress, and TC3 has been involved in most Congresses since 1996. This has been significant politically, raising the profile of TC3 and its educational themes within IFIP. Hitherto Education, though active within its own frame, had a lower profile overall within the GA.

Johnson [22] noted TC chairs hold a unique position in the structure between the GA and working groups. The hierarchical pattern of representation and structures is interesting. WG chairs were not formal members of TC3 unless were national representatives. They were invited to attend TC3 AGMs, but traditionally sat at the rear of the room, only taking part when asked a specific point [20]. This pattern changed in

the third period 1990-2005; WG chairs became full members, encouraged to take part in TC3 discussions. Later, an executive was formed of TC3 officers and WG chairs. It was intriguing to realise that a similar structure operated in the General Assembly. GA consists of national member association representatives who embody of the federal structure. Chairs of the TCs were invited to attend, but had no formal constitutional role. Indeed, they sat at a separate table removed from the main body. And yet it was their activities through working groups that made the Federation function. In the early 1990s, by a combination of strong leadership of TC chairs [20] and the IFIP President [22], Technical Committee chairs became active participants of the GA. They now form a Technical Committee, and as a collective provide a powerful voice within the whole [20,22].

It is now clear that the timing of the invitation for TC3 to take part in Congress in 1992 was no accident, but part of a *political shift in the roles of TC chairs within GA*. Some WG chairs dislike their pattern of events being disrupted by the intervention of biennial WCCs, though all themes from TC3 have been successful. It is equally clear that no TC chair would willingly dilute their influence by refusing to contribute to WCCs. This conundrum was actually debated in TC3 AGM in 2003 in Pori, Finland with the President of IFIP, Klaus Brunnstein, who was attending the TC3 fortieth birthday celebrations. Johnson [22] told me in 2006 that that the role of Congress was also under discussion in GA.

A greater intertwining of *the relationships between the various stakeholders in the Federation* is obviously beneficial. One anomaly remains; direct links between active members of a working group and national member organisation may be few – yet the former is central to continuing activities while the latter pays the IFIP fee. “One of the issues under discussion is the links, existing or broken, between the various stakeholders and structures of the organisation” [22]. Equally significant is the relationship between IFIP and other international organisations such as UNESCO. Bollerslev [20] asserted that the strengthening relationship between IFIP and UNESCO has benefited IFIP by raising its profile. There is now a signed Memorandum of Understanding between IFIP TC3 and UNESCO’s Institute for Information Technology in Education, where many IFIP TC3/WG experts have participated in seminars and projects. TC3/WG members also have a strong presence in European funded projects.

### 3.3.2 Collaboration across Working Groups and TC3

Since 1990 WGs have collaborated to mount joint conferences, for example 3.1 and 3.2 on informatics teaching, cognition and social and ethical issues. There are practical advantages with cost structures and organisation, and they reinforce the sense of community between groups. But it also illustrates the relative arbitrariness of the identities of working groups, that is the mix of sectors and activities, based on their historical development previously outlined.

Since the turn of the century, TC3 began discussing the strengths and limitations of WG structure. The debates have centred on cross-cutting themes. Research is one example. WG 3.3 found it less easy to sustain a regular and coherent series of events; research is the basis for many conference debates in the other WGs, and individuals were often committed to reporting research in their contexts, e.g. elementary education. Other themes illustrate the cross-cutting matrix whereby working groups operate. Thus under the aegis of WG 3.6 Distance Learning, tele-learning/teaching

conferences were mounted throughout the 1990s. On the other hand, WG 3.7 has operated very effectively since its inception as a relatively closed community. In effect WGs operate in a number of dimensions, but *a co-operative matrix of activities*, between the contexts and themes reflects collaborative working. And importantly for many, the WG is the primary locus of their interests and loyalty. The last five years is notable for further increased collaboration across three or more WGs. For instance, the next calendar event in June 2010 at Amiens is a working conference on ‘New development in ICT and Education’, involving WGs 3.1, 3.3, 3.5, 3.8 and 3.9. This may reflect a maturity of identity with the ability of the broader matrix to explore major cross-cutting themes. In essence, after decades of development within the separately defined roles and structures of TC3 and its Working Groups, *the constituent parts have become a blended community through their common interests*.

Inevitably there are areas for concern. How to integrate and use the national reports from the 37 members countries presented annually to TC3? How to attract students to Computer Science and Informatics? As the era of Congresses and Proceedings is ending, how to find new and effective ways of working? How better to disseminate our outcomes and ourselves use the digital technologies more effectively? How to engage with the young? For Bernard Cornu, the current chair of TC3, to identify such concerns illustrates *the strength and resilience of this organisation*. What has always made TC3 outstanding is that it is a truly international, closely linked with research and practice in many countries of all continents. TC3 is primarily identified by the activity of its working groups. But the recent years have indicated much commonality; the Declarations have reinforced the dominant trend to link research and practice with decision making and policy making. Thus TC3 now serves a stakeholder community both broad and multi-faceted. This is reflected by the new group activity called AGORA –a market place.

### 3.3.3 AGORA

The Agora initiative, part of a revitalisation strategy of IFIP, intends to reflect the move *from an informatics society to an information and knowledge society*. Transversal themes are emerging such as Lifelong Learning, Security and Trust, Ethics and Citizen Education – themes all discussed at the UN Summits on the Information Society (Geneva 2003 and Tunis 2005). Agora engages with multiple agencies - other international bodies and institutions, industry and business, key decision makers and IFIP member societies - to explore issues and reflect on different perspectives. Lampros Stergioulas reports on the 2008 discussions focussed on digital divides and cultural understanding, drawing attention to social spaces that can enhance communication between the young, but might endanger culture through homogenisation. Agora could be a powerful resource for various stakeholders, so the TC3 community by drawing on its bedrock of strengths can now present a corpus of expert opinion for engagement at all levels.

I would argue that it is the combined efforts of individuals and the style of operating as an active community of practice, which characterises the dynamic nature of Technical Committee 3.

As part of the IFIP Golden Jubilee celebrations, an IFIP Computer Pioneer has been identified as “one who, through active participation in IFIP Technical Committees or related IFIP groups, has made outstanding contributions to the theoretical,

technical, commercial or professional aspects of computing." On behalf of TC3, the executive committee has proposed 5 names, which have been submitted to the IFIP Committee for Pioneer experience. The 5 names are: Jacques Hebenstreit (France), Tom van Weert (The Netherlands), Deryn Watson (UK), Peter Bollerslev (Denmark), Raymond Morel (Switzerland). The next milestone for TC3 will be its own birthday celebrations in 2013.

## 4 Significant Scientific Debates

The relationship of TC3 with UNESCO, the sales and digital downloads of its publications, and the citation status of its journal, all attest to the scientific status of TC3 within the international community of ICT and Education.

### 4.1 Themes of Debate

Perusal of the titles of TC3 publications indicates the spread and shift of interests. Thus from 'Large information systems' to the 'Virtual campus' via 'Interactive multimedia in university education'; from 'Computer assisted learning: scope progress and limits', to 'Quality education @ a distance', and 'Lifelong learning in the Digital Age'. In 1988 TC3 published a book celebrating 25 years of TC3 [22] organised in sections including information technology literacy, the impact of computers on the curriculum, the role of programming and the provision of hardware resources. Compare these with the preamble to the 2005 'The Stellenbosch Declaration - ICT in education; make it work' [17]:

Having reflected on many aspects of Education, and the influence of ICT on education, we recommend that stakeholders and decision-makers in ICT in education focus on 6 major areas that will shape a beneficial use of ICT in education.

- Digital solidarity
- Learners and lifelong learning
- Decision-making strategies
- Networking
- Research
- Teachers

For each of these 6 areas we formulate recommendations and we propose a set of possible actions in order to put the recommendations in place. These actions address three main levels

- L1 Societal Level
- L2 Learning and teaching level
- L3 Technological and infrastructure level

In effect over the last twenty-five years, the technology itself has receded to be replaced by a more educational structure, that now embraces a societal level. An understanding of this shift in foci may be provided by analysis of themes that have occupied this community. Taking as a main source the proceedings of the nine world con-

ferences [23 - 32], and some special issues of the Journal of Education and Information Technologies [33-36], I highlight issues to illustrate to characteristics of the journeys undertaken. Perusal of other content slices of WCCE proceedings, such as distance education, developing countries, elearning or national policies would be equally valid.

*Computer science, programming and data processing* dominated the papers in the early period. Programming was considered the second literacy, and Ershov [26] claimed that it would enhance the intellectual power of mankind. Indeed Sharp [24] starkly stated that all educators must be concerned about computers, must learn about them, and must teach about them. By 1988 however Hebenstreit [23] questions the assumptions that programming teaches people to think logically, formulate solutions and handle detail with care. He says that in truth we should like future programmers to have these qualities, but that experience tells us that the teaching of programming, even intensively, has been unable to develop those qualities for people who did not already have them beforehand. Many papers [24,25] replicated their whole course structures and acted as a collective information base where none previously existed. One of the problems underlying the first developments of a computer science curriculum was the competing claims of the electrical engineering and mathematics perspectives. Overall the work at this time reflected the need to establish the science of information and ensure students and professionals have a thorough grounding in its principles and methodologies.

The computer science curriculum developed from a timetable for an undergraduate course identifying the disputed core components of the nature of computer science, to debates about the inherent concepts underlying computer science, or Informatics, and whether these concepts are best learnt theoretically or through an examination of their application. This suggests there has been a substantial shift in the articulation on the conceptual of nature of Informatics, in which the role of algorithms has played a part. The role of programming appears to have taken two further branches. One route combined with software development and debates about software production and design. As authoring languages and tools emerged, this stream is appears to have progressed towards *object oriented modelling, html, XML and virtuality*.

Another route programming took led to *Logo* [37], a programming language with associated claims that the learning of 'turtle' geometry and programming protocols together were tools for cognitive development of young children. This received substantial attention, but subsequent research into its use in the classroom indicated some major flaws in this proposition; young children were often not yet at the stage of cognitive development to cope with a notion of recursion, they also did not take to these tools without intervention of their teachers, who were themselves not necessarily familiar with the language, and who often later recorded little conviction that this was really helping with mathematical understanding. After a spate of interest fostered by some hype for over a decade, it suddenly disappeared. Nevertheless, Cornu [21] on Logo thinks "it was an important step for the teaching of mathematics as it was a time when you could not use the computer in a deep way without programming or a style of programming to think about what an algorithm is". But he considers that this was but a phase, as "we now have sophisticated tools for mathematics, with the capacity to experiment things." In the similar way to Logo, *artificial intelligence in education* flourished then died when it became apparent that it was an exercise in programming

logic that used educational exercises as a mere context for the experiments, and ones that bore little relationship to real learning tasks. But it is equally valid to propose that they lost significance because the nature of technological developments with applications to suit learning in mathematics and science. Indeed, Bentley suggested in 1990 [28] that the use of a computer as a communicating device creates a more powerful educational tool than its functions as a delivery mechanism.

The computer science and programming papers in the earlier years and especially in higher education, exposed a poor understanding of the nature of educational thinking about teaching and learning. It was some time before the didactics of instruction were replaced by a more active problem solving style of learning activity. In 2005, Cornu [21] noted that there continues a debate in Informatics about the whether we should teach it, or simply ensure we can use it. These debates have more recently come to a head – note current interests or divisions with 3.2 and 3.4. Problems also emerged with the inadequacy of trying to evaluate what was happening in educational settings without taking sufficient account of the new technological settings. Vissher and Wild [33] made a strong case for re-thinking the evaluation of computers that included a new taxonomy for IT supporting teachers and educational managers. Passey [34] used evidence to indicate that *past evaluation practices are simply not comprehensive enough* to cover the mix of issues raised when technology is introduced into schools.

The rise of Logo did however have one notable effect, that is *increasingly serious attention was paid to the theories of learning* and how they may be supported by ICT. This attention to learning theory was not new; previous attention had been paid to active learning and constructivism. For instance, Bewley, Holznagel and Klassen [24] proposed a cognitive development rationale to underpin the instructional use of computer simulations. A shift in perspective emerged that instead of learning from the use of software, students learned with it, and the computer was referred to as a ‘mindtool’ [38] in its own right. Applications became categorised by the nature of constructive learning they enabled. Thus for instance applications could be categorised as semantic organisers, dynamic modelling tools and knowledge construction tools. Such tools would represent cognitive scaffolds, engaging learners in critical thinking. *Active, constructive, internal and authentic learning theories* provided fertile grounds to analyse the potential of the technologies not simply to support learning, but even led to suggestions that applications could possibly reorganise how students think. More attention was paid to this than the actual subject concepts and knowledge as the contexts for learning. This focus on the nature of learning shifted attention towards individual learning, self-directed and independent learning.

Problems have arisen with attempts to confirm the efficacy of such an approach. Further results often neither isolate the specific effects of a package, nor confirm that that any effect was sustainable. Attention has returned *to the situation in which such learning occurs*, in essence the context of both the problem being considered, whether mathematical, geographical or music, and also the role of the teaching and fellow students in the totality of the learning environment. As Erling [28] stated with respect to elementary school, it is essential that pupils are given real tasks. *Situated cognition, collaborative learning, and activity theory* have increasingly entered the language to support the use of ICT for learning. Despite many studies undertaken it is not clear what learning gains can be explicitly associated with using ICT, and for some such

lack of clarity remains problematic. The first is that an increasing number of voices are emerging probing the nature of the research undertaken. Broderick, as early as 1970 [24], suggested that the study of the effectiveness of simulation in the classroom is usually difficult to conduct in a scientific manner. And with respect to learning, Cox and Marshall [31] state clearly that despite a plethora of studies on the effects of ICT in education, methodological problems mean that results are not reliable, and those which are tend to be inconclusive. They report that the most robust evidence of ICT use to enhance students' learning comes from studies that focussed only on specific uses of ICT. As Leiblum noted [26] there have been many disappointments due partially to unfulfilled expectations about the development of learning theories to support the medium. And the most recent challenge has been an exploration of the nature of student learning and collaboration on-line. Studies by Stacey [30] on issues such as the development and maintenance of a social presence online, by Furr and Ragsdale [30] on incidental learning and learner frustration with desk top video conferencing, and Yip [30] on the way students favour web-based learning but still fail to use the system's full potential for problem based learning – all suggest the exploration of learning with, by or though the technology remains problematic. More recently however, it has become clear that there is a large body of evidence using a range of research methods that has resulted in some common understandings of *the affordances*, which different types of ICT can provide for students' learning [22].

Throughout *teacher education* for the use of the computer has been a consistent theme. Teachers have been directed to courses to learn basic programming in order to be able to write their own software packages, provided with an armoury of subject specific software packages, and encouraged to undertake computer awareness/literacy courses. But with respect to awareness courses Ragsdale [39] noted that knowledge of IT skills do not mean that these skills are always applied. Indeed *acquiring IT tool skills may be relatively easy, but gaining wisdom to use them effectively is not*. General-purpose applications are current, though often designed for business practices, but still the actual use of computers in classrooms to support the curriculum has remained disappointing, even by new teachers who have used ICT in their training. Teachers have been categorised as traditional, conservative, barriers to innovation and reluctant to change, and some teacher education initiatives have been designed on this premise.

Yet, Jones Preece and Wood [27] recommended that teacher education should be based on a question raising technique – so that a balance was found between introducing and discussing educational perspectives (theory) and building on teachers' own experiences (practice). *Teachers are returning to the centre stage* in the agenda with an acknowledgement that they are both the key to the educational enterprise, and thus to educational change [36]. Thus a dichotomy is apparent whereby teachers are perceived as both the problem and the key to the solution. Recent studies are acknowledging that the using ICT can be part of the personal and professional expertise and judgement of the teachers, but only when it is embraced within the complex pedagogic model that acknowledges subject expertise, experience of teaching, understanding of learning, and the organisational context. Teachers can be represented as communities of practice. Indeed some recent papers [35] focussed on the Art of of practice, of schooling and of emergence to reinforce a less mechanistic perspective of such communities. And throughout sits the conundrum that using ICT to support

existing professional understanding, knowledge and expertise could reinforce practices and styles that have been fixed and the opposite of intentions. As Argues pointed out [23], the educational advantages of the new information technology can be turned into disadvantages if it is not used according to an explicit and well defined educational philosophy. For this to happen, he asserts that our schools must be turned from 'auditoriums' of isolated listeners into laboratories of active collaboration. And Knezek and Christensen [30], reporting on a range of studies undertaken over a ten-year period, confirm that the highest stage of integration involves a change in perception of teaching with technology rather than additional training or resources. But they also report that in almost all studies research is far from conclusive. More recently it has become apparent that the role of teachers, and thus teacher education, in ICT and education represents a multi-faceted and complex relationship, with attention on how teachers negotiate organisational barriers [36].

There have been a number of sociological studies on the identification of stages in the *process of innovation in education*, and in particular of planned innovation during times of curriculum innovation or changes in government policy. Some take a top-down management approach; others focus on the role of a change agent as a catalyst within the innovation process. And the anthropologist Katz [40], as early as 1961, discussed the social itinerary of technical change. Using studies of technology change in medicine and farming, he advocated the notion of studying the process of diffusion by tracing a) the movement of a given new practice, b) over time, c) through specific channels of communication and d) within a social structure. Using such method provided the opportunity to understand the social characteristics of innovators, how they adopt the change, and the strong interpersonal influence in the diffusion process within communities of practice.

And research, such as that done by Gross et al [41] indicated that there was no resistance to planned change, on the part of teachers. On the contrary, they were receptive to educational innovation, but the strategies for implementation were deficient in two respects – failure to identify and bring into the open various difficulties teachers were liable to encounter in their implementation effects, and failure to establish and use feedback mechanisms to uncover barriers that arose during the period of attempted implementation. Some more recent papers [29-32] use the notion of *affordances, activity and transformation theories as means to explain and explore how teachers may negotiate organisational barriers*.

Indeed the *implementation of organisational change in education* is central to our concerns. Kozma [42] reports from the substantial SITES2 study of 174 cases across the world, many involving TC3 people, that a number of the positive messages about what can happen are true – but these depend on a complex set of variables being a necessary pre-condition. In particular, coordinated strategies for change and more models of technology intensive learning are needed. He indicates that all forms of societal institutions even schools are altering slowly but radically. Yet he asserts we are already inhabiting a profoundly interconnected, knowledge based, global market place. A further conundrum is posed when he argues that the complexity of this innovation has been seriously underestimated. It is clear from this study, and a seeming increasing consensus in 2005 [31] noted by Cornu [21] that the role of pedagogy is a third critical variable. Erstad [36] explores how policy makers have used the terms information society or knowledge society to argue for implementing new technologies in education

for improving learning. He suggests these views have been highly problematic, in part because they do not take into consideration how new technologies are used by young people, or how schools work as social practices. And Krumsvik [36] suggests the implementation of ICT has been more strongly anchored rhetorically than in practice.

On the whole this is a community committed to the innovation and concerned to explore how to get it used, convinced change will happen. Many would say this is a problem, suggesting that unabashed enthusiasm of authors such as Papert [37] and Gates [43] has presented an imagery of new positive change and renewal for learning. This presents *confused notions of a technocentric society* [44,45,46]. Evaluation studies by Cuban [47] suggest that unreflective and unabashed enthusiasm about the necessarily transformative nature of new information technologies is both naïve and historically unfounded. He has written that in the battle between classrooms and computers, the classroom wins. Indeed Miller and Olson [48] have pointed out that “the history of innovation in education should teach us to be cautious about predictions associated with new technologies. However there is something about computers that negate this caution. Whenever computers are discussed, words such as revolution, powerful ideas, microworlds, and student empowerment occur frequently”. The work of TC3 has increasingly exposed and explored these contradictions.

Has the classic curve of innovation [40] taken off? There is no doubt that change continues, but mainly in the rapid advances of the technology, thus in the shape, character and attributes of the innovation itself. Indeed Baron and Bruillard [31] suggest that one of the problems is that educational technology appears to be under a curse of cyclical unfinished business. And I propose that this cycle could be characterised as a headlong journey from the didactics of certainty to an the uncertainty of complexity. Nevertheless two final points are worth noting. First, education is defined as a social science and after producing the Stellenbosch declaration, Cornu [21] suggested “that future conferences must include the social dimension”. The more recent concerns of working groups acknowledge the social and cultural dimensions of digital environments. And secondly, technological penetration is now such that the digital world could be recast as a tool to re-think education, with its past constructs and canon of disciplines [49]. Moran has identified new knowledges for the 21<sup>st</sup> century; his multi-disciplinary approach, focusing on relevant knowledge, teaching comprehension, understanding complexity, and recognising local and global identities will suit education for a digital society. Indeed, TC3 will be well placed to contribute to a re-thinking of our current construct of disciplines, and repositon our sense of the ‘known’ to consider relevent knowledge in times of change and uncertainty in our digital world.

## 5 Reflections

I have no intention to summarize or repeat argument here. This paper could be unpicked to form a SWOT (strength, weaknesses, opportunities, costs) analysis of TC3. But I will leave that to others. My intention, ever the geographer, has been to explore rather than conclude, as there are always further places to go. Indeed I could describe in greater detail the landscape of the last forty-seven years, to include where analogous deserts and ice, weather systems, or modes of transport from canals and railways, to motorways and Concorde. Instead I will simply record my expectation our

current pre-occupations suggest that the future will be as full of excitement, change, dichotomies and the unexpected, as the past.

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# TC 5: Computer Applications in Technology: A Short History

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**Abstract.** Originally, when TC 5 was created in 1970 it was oriented to the subject areas of Programming Languages for Machine Tools and for Process Control Systems but finally received the much wider designation “Computer Applications in Technology”. Over the time of its existence, 13 Working Groups were established, most of them still very active. In 2006 the name of TC 5 was changed to “Information Technology Application” to better reflect the domain of its interest.

**Keywords:** IFIP TC5, Process control, Process Engineering, Information Technology Applications, Enterprise Interoperability.

## 1 Introduction and Early History

In the late 1960s, the International Federation for Information Processing (IFIP) found itself with two sets of on-going conferences or symposia co-sponsored with its companion federation, the International Federation of Automatic Control (IFAC). These were concerned with Programming Languages for Machine Tools (known as PROLAMAT) and Digital Computer Applications to Process Control. IFIP at that time had no internal organization for managing these conferences and other similar ones which might arise in the future.

Accordingly, Dr. Edward L. Harder of Westinghouse Electric Company, a former President of the American member society, AFIPS, and then serving as Treasurer of IFIP, proposed that IFIP organize a Technical Committee for this task. Dr. Harder recruited Professor Theodore J. Williams of Purdue University, with whom he had worked, both in AFIPS and in projects between Westinghouse and the Monsanto Chemical Company, Professor Williams’s earlier employer. Williams was already heavily involved in the computer control conference program through his own IFAC activities.

The plans of Drs. Harder and Williams for the new TC were accepted at the Atlantic City Council Meeting in May 1970 as IFIP TC-5, Computer Applications in Technology. Since then, TC-5 has been one of the most active and productive of the IFIP TCs.

Through the mediation of FIACC, suitable arrangements were developed for managing the many joint conferences organized with IFAC. This involved one or the other of the Federations assuming primary sponsorship for each separate series of these Conferences with the other Federation as permanent co-sponsor. The primary sponsor would then be responsible for managing each separate presentation of that Conference Series, handled its publications and received all royalties. An appropriate division of these several series between the two Federations soothed any competition problems involved and assured a healthy cooperation which still exists today. As examples, IFIP became responsible for PROLAMAT and IFAC controlled the digital computer control series.

While the title of TC-5 is very general and its approved scope would allow work in almost any field of application, the sheer vastness of the numbers of potential applications, along with the personal interests of the early members, resulted in a major emphasis on computer-implemented industrial control and related topics. Although major initiatives were made in many industries, much of the effort has involved the discrete manufacturing and transportation industries along with studies of the technology related to digital computer-based control systems themselves. In this period this is reflected in the titles of the Working Groups.

IFIP President Peter Bollerslev, on 15 June 2001, appointed Dr Gustav Olling as the new Chair of TC 5. TC5 began to reevaluate and update its organization, Aims and Scope. This resulted into a title change of the Technical Committee to “Information Technology Application” (ITA) in order to better reflect the domain of the Technical Committee. During Dr Ollings chairmanship the Technical Committee added and dissolved numerous Working Groups and merged Working Groups 5.2 and 5.3 into Working Group 5.1 as currently reflected in the IFIP literature.

In 2006, under the chairmanship of Gus Olling, the title of the TC changed: the new name was “Information Technology Application” (ITA) in order to better reflect the domain of the Technical Committee.

## 2 The Working Groups

**Working Group 5.1**, formed in 1972 under the chairmanship of Professor Johnson Y.S. Luh of Purdue University, was responsible for the series of Conferences on Traffic Control and Transportation Systems. Early very active, this Working Group failed the transition to a new chairman in the late 1970s and was disbanded in 1980.

In 2006, WG 5.1 was recreated by amalgamating the work of WG5.2 Computer-aided Design and WG5.3 Computer-aided Manufacture. The title of the new WG was “Information Technology in the Product Realization Process”, and the WG aimed to provide a broader, more integrated and more modern perspective of the field. The WG, which was then chaired by Michael Wozny, sought to promote and encourage the advancement of computer methodologies and information technologies, by means of research and practice, for the purpose of designing and developing products, and

for the purpose of designing, constructing and operating the processes that produce those products. The scope includes such topics as design theory, geometric modeling, digital design, manufacturing and verification, design for the life-cycle and related standards and integration issues.

In 2006 WG5.1 took the lead in organizing the tri-annual PROLAMAT Conference, held in June 2006 in Shanghai, China. The proceedings were published by Springer under the title “Knowledge Enterprise: Intelligent Strategies in Product Design, Manufacturing and Management”, edited by Kesheng Wang, George Kovács, Michael Wozny and Minlun Fang.

In 2009 the direction of WG5.1 changed somewhat to reflect a stronger interest in life cycle issues. Following a meeting in Bath, England during the Product Lifecycle Management (PLM09) conference the title “Global Product Development for the whole life cycle” was adopted. While maintaining an interest in product realization, the WG focus also includes support for through-life and end-of-life issues, especially reflecting the strong interest in sustainable development. The WG, now co-chaired by Alain Bernard of Ecole Centrale, Nantes and Chris McMahon of the University of Bath, coordinates its meetings with the PLM series of conferences, with the next in the series being held in 2010 in Bremen, Germany, then in 2011 in Eindhoven, the Netherlands.

**Working Group 5.2**, formed also in 1972 under the chairmanship of Ing. Jakob Vlietstra of The Netherlands covers the area of computer-aided design (CAD). It was very active, under the Chairmanship of Dr. Michael Wozny of the U.S. National Institute of Science and Technology (NIST). The topics picked up in the many conferences of this Working Group have concentrated on design in the discrete manufacturing and electronics areas. The Working Group terminated its activities in 2009 and was merged into the new WG 5.1.

**Working Group 5.3**, again part of the 1972 activities and organized by Dr. Jozsef Hatvany of Hungary, also originator of the PROLAMAT series of conferences, has concentrated on computer-aided manufacturing (CAM) and the computer technologies, software and hardware required for it. The ninth PROLAMAT Conference developed by WG5.3 was held in Berlin in October 1995. The last chairman was Dr. Laszlo Nemes, also a native of Hungary, now residing in Australia. The Working Group terminated its activities in 2009 and was merged in the new WG 5.1.

**Working Group 5.4**, the last of the 1972 group, was formed as a result of a request by the members of the European Workshop on Industrial Control Systems for affiliation with a recognized international scientific or engineering body. This Workshop was part of the International Purdue Workshop on Industrial Control Systems, based at Purdue University and also chaired by Professor Williams. Upon approval by the IFIP Council and General Assembly, the Purdue Workshop was designated Working Group 5.4, Common and/or Standardized Hardware and Software Techniques. Professor Williams continued to chair the Working Group. This was a very active group, holding many meetings with voluminous Minutes of each, all available to IFIP constituencies. This Working Group has since changed its theme and title to Software Quality and Safety. It manages the SAFECOMP and other continuing conferences in this area under the direction of Dr. Sandro Bologna of Italy.

More recently a newly constituted WG5.4 has been dedicated to “Computer Aided Innovation”. This initiative, promoted by Prof. Noel Leon Rovira, started in 2004 through the organization of a topical session at the 2004 IFIP World Computer Congress dedicated to “Computer-Aided Inventing” and the constitution of a Special Interest Group on Computer-Aided Innovation. The active participation of several researchers from academia and industry brought to the organization of the 1st Working Conference of the SIG at the DaimlerChrysler Research Center in Ulm, Germany, on November 2005. During the conference it was proposed the constitution of an IFIP Working Group, which has been approved in 2006.

WG5.4 aims at covering all the topics related to the development and integration of Computer-Aided systems supporting the innovation pipelines, from the fuzzy front-end of concept definition to the embodiment design stage. The WG is currently Chaired by Dr. Gaetano Cascini from Politecnico di Milano, Italy.

**Working Group 5.5**, Continuous Process Industries, was our one unfortunate experience. It was formed in 1975. Unlike the others, it was organized for the purpose of developing a program within its scoped area of endeavor. All the others were formed to manage an area already underway with conferences or other programs. WG5.5 unfortunately was not able to succeed in this task in the face of massive programs by other groups in the continuous process control area. It was disbanded in 1978 due to inactivity and lack of progress in its assignment.

**Working Group 5.6**, Maritime Industries, formed in 1974 under the chairmanship of Ing. K. Lind of Norway is another important success story. It has fielded an extensive, continuing series of conferences on ships operation automation, shipbuilding and shipyard automation, and maritime safety. The last Chairman was Dr. Malvin Vil-labo of Norway. The WG was disbanded at the beginning of 21<sup>st</sup> century

**Working Group 5.7** was established under the direction of Professor Asbjorn Rolstadas of Norway in 1978 with the title, Computer-Aided Production Management. Professor Rolstadas has since served as TC-5 Chairman and is currently the Past President of IFIP.

WG5.7 has prospered under the succeeding chairmanships of Professors Rolstadas, Peter Falster (Denmark) Guy Doumeingts (France), Eero Eloranta (Finland), Umit Bittici (UK) and recently Marco Taish (Italy).

**Working Group 5.8** on the subject of Product Specification and Documentation, organized by Professor G. Musgrove of England in 1982, faltered in recent years, was revitalized under the chairmanship of Dr. Andras Markers of Hungary, but was disbanded at the beginning of 21<sup>st</sup> century.

A new Working Group theme called “Enterprise Interoperability” was created in 2007 by Professor Guy Doumeingts (University Bordeaux 1). WG 5.8 now has round 50 members and follows a good development

**Working Group 5.9** on Computers in Food Production and Agriculture, was organized by Dr. E.A. Warman of England in 1986 to fill an obvious need. Dr. Warman had been a long-time Vice Chairman and Chairman of WG 5.2. Dr. Fred Robson, also of England, was the last Chairman, the Group was disbanded at the beginning of the 21<sup>st</sup> century.

**Working Group 5.10** on Computer Graphics, an important topic in its own right but closely tied to both WG 5.2 and WG 5.3, was established as a separate working group in 1987 under Professor Jose Encarnacao of Germany. In accordance with the importance of this field to all computer system applications, it was very active with many conferences and publications of its own to its credit. Prof Nadia Magnenat Thalman succeed to Prof Encarnacao and the present Chairman is Dr Rae Earnshaw.

**Working Group 5.11** on Computers and Environment in its most recent form of the name was established in 1991 under the Chairmanship of Dr. Giorgio Gueriso of Italy and developed rapidly. The next Chairman was Ralph Denzer and is now chaired by Prof. David Swayne.

**Working Group 5.12** on Enterprise Integration is the newest of the TC-5 Working Groups. It represents the IFIP share of the IFAC/IFIP Joint Task Force of the same title formed in 1990 to study this area. WG5.12 was formally approved in 1995 with Dr. Peter Bernus of Australia as Chairman. Dr. Bernus also served as Vice Chairman of the Task Force which is chaired by Professor Williams. The Working Group has a very extensive program and is becoming a major spokesman for the field of Enterprise Integration, a rapidly developing area of endeavor applicable to all areas of human activity today.

**New Activities** TC 5 is currently involved in establishing a new Working Group on “Bioinformatics and its Applications” (approved by the IFIP General Assembly, September 2010 as WG 5.13) and two Special Interest Groups one on “Advanced Information Processing for Agriculture” (approved by TC 5 October 2010 as SIG 5.1) and the other on ” Application of Information Technology to e-Government”.

### 3 Administration – The Chairmen

TC-5 has now had nine different chairmen since its formation in 1970. They are:

1. **Professor Theodore J. Williams**, Purdue University, USA (1970-1977) Initial organization of program of TC-5. Establishment of Working Groups WG5.1-5.6.
2. **Ing. Jakob Vlietstra**, Phillips Industries, The Netherlands (1977-1983) Establishment of the journal *Computers in Industry* with North Holland, a unique activity within IFIP and a major achievement of TC-5. Ms. Gloria Karlmark served as the able Editor of the journal throughout its direct association with IFIP. Establishment of the CAPE series of conference (*Computer Applications in Production and Engineering*). In contrast to other TC-5 conferences managed by a specific working group, this conference is for the whole of TC-5 and coordinates the interaction of the working groups. It is held each three years and has been very successful. Personally developed WG5.2. Working Groups 5.7 and 5.8 established under his administration.
3. **Professor Asbjorn Rolstadas**, Norwegian Technical University, Norway (1983-1989) Personally developed WG5.7. Responsible for the first major review of the programs of each of the existing Working Groups. Working groups

5.9 and 5.10 established under his administration. Professor Rolstadas is Past President of IFIP.

4. **Ing. Marco Tomljanovich**, Italdad, Italy (1988-1993) Working Group 5.11 established under his administration. A major activity of his administration was handling the renegotiation of the status of the journal Computers in Industry with North Holland.
5. **Dr. Toru Mikami**, NEC, Japan (1993-1995) Working group 5.12 has been established under his administration.
6. **Professor Guy Doumeingts**, University of Bordeaux 1 (1995-2000)
7. **Dr Gus Olling**, Chrysler corp (2000-2005)
8. **Dr. Ronald Waxman**, IBM Corporation (2005-2009)
9. **Professor Erich Neuhold**, University of Vienna (2009- )

## 4 The Future

The fields of computer system development and computer applications are developing so fast today that no one can clearly predict the future even a few months ahead. Nevertheless, TC-5, as the industrial computer control system and their applications arm of IFIP, is poised and ready to continue its major impact on its scope field as it has over the past 25 years.

The work of the TC-5 members through the programs of TC-5 and its Working Groups have been an active and lasting force in initiating, explaining, promoting, standardizing, and applying most of the new and continuing aspects of the industrial computer field which have appeared in the past 25 years. We fully expect to be able to make a similar statement at the end of the next twenty-five.

## 5 TC-5 Pioneers

1. **Professor. Dr. Jozsef HATVANY ( 1926 -1988 )**: For six years he served as chairman of the IFIP Working Group on Discrete Manufacturing (WG 5.3). He was chairman and member of many International Program Committees and delivered over 20 invited keynote and survey papers at international conferences. In 1977 he received the IFIP Silver Core award. Prof. Hatvany was born in Hungary in 1926, was educated primarily in Great Britain, and studied physics at Trinity College, Cambridge. In 1947 he returned to Hungary. He published 169 scientific papers, primarily in the design and implementation of CAD/CAM systems, worked in institutions around the world, and received numerous awards.
2. **Mr. Ronald Waxman** He has served as the TC 5 Chair for the last five years and has made a large number of contributions to TC 5 in various capacities. Ronald Waxman received the B.S. in Electrical Engineering from The New Jersey Institute of Technology in 1955 and the M.S. in Electrical Engineering from Syracuse University in 1963. He played a leading role in the development of the VHSIC Hardware Description Language (VHDL), an IEEE Standard. Mr. Waxman is a Fellow of the IEEE, and a member of Sigma Xi, Eta Kappa

Nu, Phi Eta Sigma, the American Association for the Advancement of Science, the ACM and the IEEE Computer Society.

3. **Prof. José L. Encarnacao:** He was founder and then Chairman of WG 5.10 from 1987 to 1994 and contributed the IFIP graphics activities considerably with conferences and workshops. Among many other things he is a Fellow of ACM and has received many honorary awards for his pioneering work in Computer Graphics.
4. **Ing. Jakob Vliestra:** Establishment of the journal Computers in Industry with North Holland, a unique activity within IFIP and a major achievement of TC-5. Ms. Gloria Karlmark served as the able Editor of the journal throughout its direct association with IFIP. Establishment of the CAPE series of conference (Computer Applications in Production and Engineering). In contrast to other TC-5 conferences managed by a specific working group, this conference is for the whole of TC-5 and coordinates the interaction of the working groups.

# Reports of TC 6 Working Groups

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**Editorial notice:** Members of TC-6, esp. including chairpersons, were regrettably not able, due to professional duties which requested priority over their voluntary work, to write a chapter for this book. But 5 Working Group chairs sent contributions which represent an essential part of the development of TC-6 and its work in recent years.

## 1 WG 6.1: Architectures and Protocols for Distributed Systems: History, Achievements and Objectives *WG 6.1 chair: Elie Najm, Paris/France*

The history of the Working Group 6.1 spans over the last forty years with an evolution in the activities and focus in each of the successive decades.

**The seventies.** The first nucleus of what will become WG 6.1 was set up in October 1972, during the International Conference on Computer Communications, where a group of experts, chaired by Vint Cerf, founded the International Network Working Group (INWG) with the aim to study *International Packet Switching for Computer Sharing*. It is within this group that a first draft of the TCP protocol was submitted by Vint Cerf for review. In 1974, the group became the first official working group of TC6 and took its name as WG6.1. Its focus was on “designing protocols for the internet and on ensuring internetworking between first trial implementations”. The group was run as an international team of networking researchers and experts, proposing and reviewing technical specifications and working out and evaluating experimental solutions. In 1978 an in-depth symposium on computer network protocols was organized by André Danthine in Liège and with the high involvement of WG 6.1 members. The symposium brought up many of the topics that became major research areas within

WG 6.1 and TC6, such as Formal definition and Verification of Protocols and performance evaluation of Protocols.

**The eighties.** In 1981, the investigative research of the Working Group was turned to the follow-on work of the international standards bodies. Also, with the chairmanship of Harry Rudin, the focus within WG 6.1 moved to the formal design and verification of protocols. WG6.1 continued however to bear the more general title of “architecture and protocols for networks” and hence allowing to accommodate wider concerns. 1981 is also the year where Dave Rayner organized in Teddington the first Protocol Specification Testing & Verification Conference - PSTV’81. PSTV became quickly the principal conference of its domain and attracted many influential contributions, e.g., Gerard Holzmann first papers about the now popular Spin-Promela verification tool. PSTV was also instrumental in developing an active and energetic community of researchers. In 1988, the PSTV community spawned two events focusing on two of WG 6.1 themes. Ken Turner hosted FORTE’88 in Sterling. FORTE is a conference series which concentrates more on Formal Description Techniques and their tools and practical applications to Networked and Distributed Systems. Also, acknowledging the growing interest of both academia and industry for Testing, Sam T Chanson and Son Vuong initiated in Vancouver the International Workshop for Protocol Test Systems - IWPTS’88.

**The nineties.** In the early 90s, data networking reached a degree of maturity that enabled for another track of research and standardization to emerge with a focus on Distributed Systems. In order to cover this new emerging area, Jan de Meer initiated in Berlin ICODP’91, an International Conference on Open Distributed Processing. In the second half of the 90s, two new series of conferences were launched focusing on special themes in the domain of Distributed Systems. FMOODS’96, organized by Elie Najm and Jean-Bernard Stefani in Paris, was concerned with Formal Methods and their application to Open, Object-Based and Distributed Systems – FMOODS managed to form an active community concerned with formally relating object orientation and distribution.

DAIS’97, organized in Cottbus by Kurt Geihs, Hartmut Koenig and Thomas Preuss in order to deal with the strongly emerging field of distributed computing applications in heterogeneous computing environments. DAIS emphasized the need for the integration and interoperability of different platforms, services and applications. When Guy Leduc became WG6.1 chair in 1998, the scope of the working group was redefined and it took the new title: “Architectures and Protocols for Distributed Systems” thus reflecting the subject matter covered by its conferences. This same year, Gordon Blair organized Middleware’98 as a follow up to of ICODP. The appealing new name of Middleware emphasized the central role of this major feature of distributed systems, and hence attracted a wide and dynamic audience. Middleware became a flagship conference of WG 6.1.

**The last decade.** With the chairmanship of Elie Najm started in 2005 came a consolidation period which gave rise to three strong events organized by the working group: ICTSS, Middleware and DisCoTec. ICTSS – the International Conference on Testing Software and Systems is the outcome of a multistage evolution from the early IWPTS

workshop which first grew to become a conference (Testcom) which then later merged with FATES, an international workshop on Formal Approaches to Testing of Software. In 2010, the 22<sup>nd</sup> edition of the ICTSS series will be held in Natal. The enlargement of the scope of ICTSS to encompass software, systems and model-based testing is attracting a growing number of submissions from all over the world, indicating that the conference is now one of the leading events in its field. Middleware received the joint sponsorship of ACM in 2000 when it was held in New York. This gave the event a new impulse. It moved its pace from 18 months to annual. Middleware celebrated its 10<sup>th</sup> edition in 2009 in Urbana-Champaign with a very solid program and a very large audience. The 2010 edition will be held in November in Bangalore with a promising great success. Starting in 2006 in Bologna, Gianluigi Zavattaro hosted the first edition of DisCoTec, an IFIP annual event dedicated to Distributed Computing Techniques and gathering the three independent conferences COORDINATION, DAIS and FMOODS&FORTE (the two conferences are now joined) and a number of well focused workshops. This arrangement has created a scientific forum which addresses distributed computing technologies from several perspectives, i.e. applications and interoperability, formal description techniques, as well as algorithmic foundations. The 5<sup>th</sup> edition of DisCoTec was held in Amsterdam and attracted some 160 delegates. During this event, the PSTV-FORTE-FMOODS series celebrated its 30<sup>th</sup> edition with 5 distinguished invited talks. In 2011, DisCoTec will move to Reykjavik (Iceland), and we are looking forward to an exciting and high-quality event at this very special location.

## **2 WG 6.3: Performance of Communication Systems: History, Achievements and Objectives**

### *WG 6.3 chair Marco Conti, Pisa/Italy*

The group on “Performance of Communication Systems” started, as a Task Force, in 1993 at the Fifth International Conference on *Data Communication Systems and their Performance* (Raleigh, NC, USA, 26-28 October, 1993), after an in-depth discussion in TC6 about the need of a working group on the performance of communication systems. Indeed the performance evaluation has a relevant role in communication systems design and configuration by providing effective tools for investigating the quality of service provided by a communication system. Therefore, the history of communication systems research is tightly coupled with the performance evaluation. Brilliant examples range from A.K. Erlang queuing-system studies applied to dimensioning the telephone network, to L. Kleinrock works applying queuing theory to investigate the packet switching technology, which is the foundation of the Internet.

WG 6.3 was formalized as a Working Group in 1994. Harry Perros (who led the Task Force) was the first chairmen, and Yutaka Takahashi was the co-chairman. The WG activities started with the first WG 6.3 workshop in St Thomas, Virgin Islands (January 1995). The WG 6.3 flagship conference “Performance of Communication Systems” was organized three times: Raleigh<sup>1</sup> (NC, USA, October 1993), Istanbul,

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<sup>1</sup> In reality WG 6.4 sponsored the event, but it was decided to include it as first event in the WG 6.3 conference series since it was the time the Task Force promoting WG 6.3 was created.

(Turkey, October 1995), and Lund (Sweden, May 25-28, 1998). In-between the flagship conferences, the working group organized the WG 6.3 workshops at St. Thomas (January 1995) and Crete (September 1999). In year 2000, for the initiative of Harry Perros and Guy Pujolle, the WG 6.3 flagship conference was combined with the flagship conferences of WGs 6.2 and 6.4 to form a stronger conference series: the bi-annual Networking conference series. Networking 2000 (Paris, May 2000) was the first event in this series followed by Networking 2002 (Pisa, May 2002), when WG 6.8 started its co-sponsorship, and Networking 2004 (Athens, May 2004). Since 2005 the Networking conference is organized on an annual basis.

In 2003, Ioannis Stavrakakis became the second chairman of the working group, and Marco Conti replaced him in 2009.

Today, the working group has more than 50 members worldwide, covering different aspects in the performance evaluation of communication systems. Networking is the flagship conference of the working group. In addition, WG 6.3 supports several other workshops and conferences related to the performance evaluation of communications systems. Details on the WG 6.3 members, current and past activities can be found in the working group website: <http://cnd.iit.cnr.it/ifipwg63>.

The WG is aimed at promoting the development and use of performance evaluation techniques and methods for studying and optimizing existing and emerging computer communication systems. Both measurement and modelling techniques are within the scope of the working group. The former are directly applied to a real communication system, or a system prototype. The advantage of measurement techniques is that real-system estimates are obtained. However, measurement techniques do have their disadvantages; the major one is the need of a functioning system, and this is generally very expensive. Using a model on the other hand allows us to study the system in each phase of its life cycle (design, development, and modifications) to verify the effectiveness of a solution before it is implemented thus reducing the deployment costs and/or the risks to have performance problems into an operational system. Depending on the problem complexity and the required accuracy of the study, analytical or simulation models can be applied. Analytical models, generally, provide exact and effective solutions for simple model, but only approximate solutions are possible for complex systems. When analytical models are mathematically un-tractable (or too approximate), simulation modelling constitutes a valid, but expensive alternative. Hybrid approaches, involving both analytical and simulation techniques are therefore a possible compromise. Since its creation, the WG has promoted the use of the above performance evaluation techniques to studying existing and emerging communication technologies (from broadband wired networks of early nineties to pervasive and mobile social networks of today), and to investigating how the technological evolution has changed the structure and organization of communication systems and services -- from circuit switched networks tailored on voice traffic, to highly decentralized, IP-based, multi-service networks.

### **3 Working Group 6.9 Communication Systems for Developing Countries**

*WG 6.9 chair : Ana Pont, Valencia/Spain*

The first contacts of TC6 with Development Countries started in 1998 when Augusto Casaca, chairman of TC6, obtained a grant to send a speaker to the Conferencia

Latinamericana de Informática, CLEI 98 held in Quito (Ecuador). Ramon Puigjaner (Spanish delegate) attended the conference in Quito and gave the tutorial.

This fact was the starting point for the creation in TC6 of a Task Force oriented to create a Working Group on Communications for Developing Countries. The first activities of the TF, between 1999 and 2004, were centered in an active participation of TC6 speakers in Latin American events like CLEI or conferences organized by the Sociedad Argentina de Informática e Investigación Operativa (SADIO). André Dantine (Belgium), Lorne Mason (Canada), Ramon Puigjaner (Spain), Harry Perros (USA), Guy Pujolle (France), Dipak Khakhar (Sweden), Raouf Boutaba (Canada), Koos Koen (South Africa) and Ana Pont (Spain) were the TC6 members involved in giving tutorials in different cities of Latin America, like Asunción (Paraguay), Buenos Aires (Argentina), Mexico DF (Mexico), Merida (Venezuela), Arequipa (Peru) and La Paz (Bolivia).

In 2001 ACM SIGCOMM organized in San José (Costa Rica) a Latin America and Caribbean SIGCOMM Conference promoted by Julio Escobar (Panamá). The TF of TC6 offered its cooperation to this event and Ramon Puigjaner (Spain) was sent to present a tutorial. This fact marked the beginning of the cooperation with ACM SIGCOMM to promote networking research in Latin America.

In 2002, after the IFIP General Assembly, the TF become in the IFIP WG 6.9 *Communications Systems for Developing Countries* and Ramon Puigjaner was appointed as WG chair. That year the WG made its first attempt to organize its own conference in conjunction with the annual event of SADIO in Santa Fe (Argentina). Nevertheless, the dramatic economic situation of Argentina in 2002 negatively affected the organization of the event that was finally postponed.

The efforts of Julio Escobar (Panamá) and Ramon Puigjaner (Spain) permitted that ACM SIGCOMM and IFIP WG6.9 cooperated in the organization of a common biannual event whose name would be Latin American Networking Conference LANC, organized in conjunction with CLEI, and aimed to encourage networking research in L.A.

The 2<sup>nd</sup> LANC (the first one was the ACM conference of San Jose in 2001) was held in La Paz (Bolivia) in 2003 and was the starting point of a series of conferences: Cali (Colombia) in 2005, San José (Costa Rica) in 2007, Pelotas (Brazil) in 2009. During those years, the IFIP-ACM Latin American Networking Conference has been consolidated as one of the most prestigious conferences in networks in L.A. To increase the participation Latin American researchers and to concentrate efforts LANC and the IEEE/IFIP Latin American Network Operations and Management Symposium (LANOMS) agreed to be held together in 2011 in Quito, Ecuador. This important fact could be the base for a single and strong conference in Networks that bring together the best research activity in the region.

In 2004 Ramon Puigjaner, who in the mean time became TC6 Vice-Chair and Spanish representative to IFIP GA, resigned as WG6.9 chair and called for the election of a new chair. Ana Pont (Spain) was elected and started her first term in 2005.

Since 2005, the WG has oriented its efforts in consolidating the existing activities and adding new ones. While important work has been addressed to promote and add prestige to LANC, a new conference bounded to the WG was started. In 2006 with the IFIP World Computer Conference in Santiago (Chile), Mieso Denko, a very active member of WG 6.9, proposed to organize a conference with the both aims of

presenting innovative technical research in communication systems and information technology and, delivering practical technical solutions in often harsh environments. The conference was named Wireless Communications and Information Technology for Developing Countries (WCITD). After that first edition, WCITD has been held each two years in Pretoria (South Africa, 2008) and in 2010 in Brisbane (Australia) jointly with the IFIP WCC. Step by step, the conference is increasing its visibility and the number of attendees.

The participation of WG 6.9 in the World Computer Conference in Santiago (2006) also included the workshop organized jointly Hewlett Packard “Women in the Information Society: A Global Context and Tools for Ensuring Full Participation of Women in Latin America” that was a great success of participation.

While the cooperation with CLEI has been maintained during the last years under the usual formula of tutorials or invited talks given by TC members, the WG 6.9 teaching activities has been re-organized into schools and has surpassed the Latin American countries. Therefore, the visibility of IFIP-TC6 in developing countries has been increased and the tutorial offer is much more coherent and helps to improve the academic training of different universities. The first school was organized in Maputo (Mozambique) in 2007 with the name of “IFIP-UNU Advanced Course on Networking and Security” and offering five modules of fifteen hours each given by Otto Spaniol, Pedro Cuenca, Ramon Puigjaner, Siraj Shaikh and Augusto Casaca, to a total of 42 students.

In 2008, the teaching activities were organized in Pretoria (South Africa) after the WCTID. This time called “IFIP Summer School in Wireless Computing” and offering five modules with a total of 30 hours to 40 students. In this school exams were done after the course as a request of the Petroria University. The chair of the school was Pieter Kritzinger and the speakers Pedro Cuenca, Pietro Manzoni, Ramon Puigjaner, Antonio Cerone and Rodrigo Santos.

Finally, in 2009, the WG not only supported the tutorials organized by CLEI and LANC in Pelotas (Brazil) contributing with speakers as Edmundo Monteiro (Portugal), Benjamín Baran (Paraguay) and Jussara M. Almeida (Brazil) but also organized a small teaching workshop on “QoS Modeling, Control Engineering and Security of Communication Networks” in the University of Amman (Jordan). In this workshop three modules of five hours each given by Ramon Puigjaner, Siraj Shaikh and Mohammed Salem Elmusrati were offered to a total of 25 students.

Just to mention that in all the teaching activities organized until now a quality control based on surveys filled by the students have been done. The overall evaluation of these activities shows that they were strongly appreciated by the students and local organizers. In all courses TC6 has issued certificates for the students.

None of these activities could be performed without the support of TC6, not only from the funds received by this technical committee but also from the personal support of all their members. Also with grateful thanks to the IFIP Developing Countries Support Committee that has contributed to our activities in the last two years.

Many members of WG 6.9 has also take an active role in the IFIP World Information Technology Forum (WITFOR) and have participated in its four editions identifying and selecting the best projects and initiatives to help to bridge the digital divide and improve the quality of life of thousands of people.

During the organization of the WCC 2010, and more specifically during the selection process of the best technical program and speakers for the WCITD last month of April, our friend and colleague Mieso Denko, that was at that moment vice chair of WG 6.9 and general chair of the conference, passed away at age of 42. This unexpected and sad new shocked all the people that were working with him. Mieso was a very active member of the WG. It can be said that Mieso died with his boots on, working on what he loved the best: promoting research activities and encouraging cross-fertilization of ideas, techniques and concepts among countries from different regions in the world.

At the end of this year WG 6.9 should elect a new chair person. Despite the seed has been planted there are still many challenges for the future.

I would like to thank all the people that have taken part on these initiatives during all this time consolidating the working group. Special thanks to Ramon Puigjaner because we always can rely on him and has helped to write this lines searching carefully in his memory the beginning of the WG. And, in memoriam of Mieso.

## **4 Working Group 6.10 Photonic Networking: Visions, Results, Positioning**

*WG 6.10 Chair: Josep Sole-Pareta, Barcelona/Spain*

The history of the IFIP-WG6.10 on “Photonic Networking” starts with the appearance of the working conference on Optical Network Design and Modelling (ONDM), for which IFIP-TC6 has been the main sponsor since the beginning. ONDM first edition took place in Vienna (Austria) on February 24-25, 1997. Next year, on February 8 - 01, 2011, it will held ONDM’s 15<sup>th</sup> edition in Bologna (Italy). ONDM appeared with the age of networked information, when, more than ever in the history of a technological progress, society started to relay on communication networks for health care, education, scientific data transfer, commerce and many other endeavours dominants in the human’s everyday life. In this context Optical Networks were certainly the first of the networking technologies to be revealed. Since their commercial arrival in the nineties, Optical Networks have fundamentally changed the way of dealing with traffic engineering by removing bandwidth bottlenecks and eliminating delays.

From the beginning and as of today, a group of prominent researchers, the core members of the IFIP-WG6.10, have been behind ONDM with the objective of making it became the major European event in the rapidly growing area of Optical Networking by always addressing recent advances in the design, modelling and implementation of Optical Networks, including novel switching schemes and paradigms, network optimisation and design, new concepts for link and control layer protocols, and network inter-working schemes. Among this group of researchers it is worth mentioning Harmen R. van As (Vienna University of Technology), Marco Ajmone Marsan (Politecnico di Torino), Geert Morthier (Ghent University), Fabio Neri (Politecnico di Torino), Andrea Fumagalli (UT Dallas), Roberto Sabella, (Ericsson Lab Italy), Maurice Gagnaire (ENST Paris), Achille Pattavina (Politecnico di Milano), Biswanath Mukherjee (University of California), Ken-ichi Kitayama (Osaka University), etc.

Now a days ONDM, the flagship of the IFIP-WG6.10, is a well-reputed conference, which receives, in average, about 50 paper submissions, accepts between 40 and

50% of them (20 – 24 papers accepted) that pass a peer reviewed (3 reviewers per paper) process. And the number of attendees goes from 80 to 100.

Harry Perros (North Carolina State University) was the first elected IFIP-WG6.10 Chair. He gave consistency and identity to the working group beyond the organization of ONDM. After him, Ioannis Tomkos (Athens Institute of Technology) chaired this group for two years. During this period the agreement with IEEE that allows the publication of ONDM proceeding in the IEEE Xplore was promoted. Currently, since 2009, the IFIP-WG6.10 Chair is Josep Solé-Pareta (Technical University of Catalonia). Lately IFIP-WG6.10 is sponsoring other conferences/workshops like the International Workshop on Reliable Networks Design and Modelling (RNDM).

## **5 WG 6.11 Electronic Commerce – Communication Systems: Communication Aspects of the e-World**

***WG 6.11 Co-chair: Winfried Lamersdorf, Hamburg/Germany***

Working Group 6.11 – as one of the newer working groups of IFIP TC6 – addresses application-oriented issues of open systems communication in general, and e-Business, e-Services and e-Society specifically.

Initiative to set up this working group grew out of the International IFIP conference on “Trends in Electronic Commerce” (TREC) organised in Hamburg in 1998 which started to address technical as well as economical and social aspects of e-Business applications of communication systems in a common context. A first proposal to engage in “communication aspects of e-Commerce” was made by Volker Tschammer to TC6 at its meeting 1998-1 in Ladenburg, Germany. Subsequently, a special interest group was set up which led to the new TC6 Working Group 6.11 on “Communication Aspects on e-Commerce, e-Business and e-Government” as officially established in 2000 with Volker Tschammer as its first chair.

Also supported by former IFIP president Kurt Bauknecht, as member of WG 6.11, and Winfried Lamersdorf, he established the WG’s flagship conference series on “e-Commerce, e-Business, and e-Government” (I3E) in fall 2001 as a – still ongoing – successful series of yearly I3E events in all parts of the world. (For instance, TC6 meetings 2001-2 in Zurich and 2002-2 in Lisboa were held in close connection with respective I3E conferences.) In 2007, this conference series was renamed to “e-Business, e-Services, and e-Society” (in brief: I3E as well) in order to adapt to more recent developments in the area.

Main motivation of IFIP Working Group 6.11 is to organise and promote the exchange of information on information, communication, and security aspects of Electronic Business, Electronic Services and Electronic Society, with increased co-operation of both technical areas (like communication and co-operation) as well as related economic areas (like e-Business and information systems) and also social aspects or combinations thereof (like security) – also based on co-operation with related IFIP TCs 6, 8 and 11. The goal of the Working Group is to foster research, development, standardisation, and applications for communication and middleware platforms, service-oriented software architectures, and application frameworks, applications, and services for electronic business and other (similar) applications – including service

management and organisational aspects like, e.g., virtual enterprises – as well as social aspects of open service environments.

Since 2006, WG 6.11 is jointly co-chaired by Wojciech Cellary (for e-Business), Winfried Lamersdorf (for e-Services) and Reima Suomi (for e-Society). As accepted by the IFIP TA in 2010, the Aims & Scope of WG 6.11 were renewed in 2008 and the WG name was changed to “Communication Aspects of the e-World”.

Other conferences or conference series co-sponsored by WG 6.11 include “Virtual Goods” (Europe), “Well-being in the Information Society” (Finland) or “E-Government and E-Services” (Brisbane, Australia, as part of the IFIP WCC 2010).

# **50 Years of IFIP: A Very Personal and Highly Subjective View by a Past TC 6 Chairman**

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**Keywords:** IFIP, TC-6, Communication Systems.

## **1 Preface**

Books entitled “History of ....” are typically very boring. They contain a lot of bureaucratic material, they have plenty of lists which are of absolutely no interest to anyone. Moreover, they are full of some old photos whose colour quality is typically very limited at best. And those who detect their face on one of these photos will only comment, with a hopeless and depressed sigh, “how much nicer I looked when I was young”. As a consequence, nobody wants to read, let alone buy such books.

To make things even worse: it is extremely time-consuming to put together the necessary statistical material. And the authors will inevitably omit some details. This will give the reviewers a field day. On the other hand, if completeness were achievable there would hardly be any sign of applause for this Sisyphean struggle; but only some grumbling comments along the lines of “I could have made that much better in far less time”.

That is why practically nobody wants to commit herself or himself to such a work. Things are even more complicated if the number of usual suspects who might be qualified to do the work (i. e. the number of committee members in the case of an IFIP Technical Committee) is comparatively high. In such a case each possible candidate will believe that there are so many others who could do the job. Consequently, the job will not be done at all. This is a natural consequence of Parkinson’s law which says that “deliberative bodies become decreasingly effective after they pass five to eight members“. But IFIP TC6 has some 40 members ;-). You will understand what I mean.

## **2 A Major Reason Behind the Creation of IFIP and of TC6 in Particular**

You might believe that IFIP was supposed to foster progress in R&D in Computer Science, deploying its strong scientific basis. This glorious interpretation, however, is partly true at best. A major reason for the establishment of IFIP 50 years ago was a strong desire of the second and the third world to have a “window to the west”. Back

then, the experts from the socialist world were hardly allowed to have contacts to Westerners, for political reasons. As a citizen of former Western Germany I remember very well the enormous difficulties we had to discuss with people from the former German Democratic Republic. As a typical sign of German perfectionism their delegations were composed of the strictest hardliners, even more so than those of the former Soviet union. Contacts with the Western world were – and still are – very limited for experts from developing countries due to financial reasons.

Thus, the “invention” of IFIP looked like a very good move especially for the socialist world since establishing contacts with US based societies, such as ACM or IEEE, was next to impossible. At the end of the day, however, it turned out that they had shot themselves in the foot. The improved contacts between East and West contributed considerably to the collapse of the socialist system in Eastern Europe.

IFIP TC6 (“Data Communication”; later relabelled “Communication Systems”) was established comparatively early (in 1972, i.e. 38 years ago) due to the increasing importance of all kind of communication networks. With respect to the socialist system shooting itself in the foot the field of data communication was a particularly effective one. The Soviet Union never had a national TC6 delegate (because they were very suspicious of, and hostile against, every kind of improved and communication). However, other countries from Eastern Europe were more than happy to make use of the opportunities provided by IFIP. Therefore, IFIP TC6 got delegates from Czechoslovakia (and, of course, later on from the Czech Republic and from Slovakia), Poland, Hungary, and from Bulgaria. The delegates from these countries established successful conferences to which Western experts were invited, and where many co-operations and even friendships emerged.

Two countries from the former socialist hemisphere were particularly visible in that respect:

- a) Hungary, where Tibor Szentivanyi was very successful with the NETCOM conference series that was regularly held in Budapest. Tibor was one of the most active delegates TC6 ever had. Most unfortunately, he died prematurely from an illness contracted at a TC6 meeting in a foreign country.
- b) Bulgaria. In this country, academician Kiril Boyanov has been extremely active. He organised lots of very successful conferences such as NIPS (Network Information Processing Systems) and quite a number of TC6 meetings. His great hospitality always attracted numerous delegates, many of whom (including, of course, myself) became very good friends. This was not least supported by the freely flowing considerable quantities of Pliska (the Bulgarian version of Cognac) and of Vodka.

### **3 IFIP TC6 and Its Impact on the Evolution of Communication Systems**

TC6 has initiated, and contributed to, many developments that led to improved communication systems. This happened primarily in the early years of the committee when the number of participating delegates was comparatively small and when,

therefore, the number of hours spent on more or less futile discussions was much lower. Among the pioneers of these days, and among the active contributors to TC6's work were many world-famous experts including, for example, André Danthine, Don Davies, Bob Metcalfe, Louis Pouzin, Harry Rudin, Ron Uhlig, Einar Stefferud, and Carl Sunshine – to mention just a few in alphabetical order. It is safe to say that the establishment of packet oriented communication networks and the associated standardisation issues were heavily influenced by the work of these people. For example, ITU's X.400 series of Recommendations is rooted in the work of the Working Group (WG) 6.5 on „Message Handling Systems” (which is now disbanded).

Unfortunately, it has to be said that these days such pioneering progress of a Working Group is hardly possible anymore. This is mostly due to the fact that truly groundbreaking progress is only possible through the work of large teams. IFIP members are pure volunteers, and its TCs and WGs simply don't have the means for such co-ordinated efforts. Moreover, standardisation today has become extremely tedious, time-consuming, and costly (you have to attend the meetings to be taken serious, and you need to find supporters and to forge coalitions). As a consequence, TC6 almost exclusively concentrates on the organisation of high quality workshops, working conferences, conferences, and symposia. That is to say, IFIP TC6 now focuses on information exchange (by presentation of recent results in research and development) and to information dissemination. The latter aspect is a particular aim of WG 6.9 (DC for DC; Data Communication for Developing Countries), where TC6 uses part of its still considerable surplus from conferences for the organisation of state-of-the art tutorials in Latin America, Africa, and in other less developed parts of the world.

#### **4 IFIP TC6 and the Competition with IEEE**

Many prospective event organisers ask: “What do I get from IFIP for my requested transfer of conference surplus – if any – to IFIP? Why does IFIP take my surplus but will not cover a possible deficit?”. IFIP doesn't really have good answers to such questions. Typical examples might include "the good name of IFIP" or "the refereeing procedure" and the like. But then the prospective organiser will reply that IEEE offers much better services and a better financial perspective. As a consequence, IFIP and in particular TC6 are loosing more and more profitable events to IEEE. Sometimes this happens in several steps: first, a former IFIP conference is organised in conjunction with IEEE, with IFIP leadership; then IEEE moves to a 50:50 scheme; and finally IEEE takes over the full event. This is a very serious and dangerous development for IFIP, and one that has gained momentum during the past years.

Another reason for that trend is the fact the proceedings of all IEEE conferences are available online (in their Xplore data base), and thus accessible to everyone with a browser and a subscription (i.e., to most university people, as opposed to those who attended the conference). And that's why many prospective authors tend to ignore IFIP events since they believe that the corresponding publications will not contribute enough to their career and their visibility. As a consequence, IFIP conferences are no longer considered the prime outlet for (short lived) research results.

## 5 IFIP TC6 as a “Seismic” Indicator of New and Upcoming Trends

The evolution of communication systems is almost perfectly reflected in the creation (and in the dissolution!) of IFIP TC6 Working Groups.

It all started with WG 6.1 on “Architectures and Protocols for Networked and Distributed Systems”. This is still the most active working group, judging by the number of events organised per year. Of course, this topic is a never-ending story that will always be relevant. Eventually, WG 6.1b on satellite communication was added (and the original WG was renamed to WG 6.1a). It turned out that this new subgroup, focussing on satellite based communication (e.g. TV via geostationary satellites), was rather short-lived. And its rather quick suspension highlights the “indicator principle” of IFIP TC6 WGs: they are established when they are needed, and they are dissolved when it is obvious that there won’t be any more significant new trends and research questions in that particular area in the foreseeable future.

The original WGs 6.2 and 6.3 had already been dissolved before I joined TC6 in 1983. During my chairmanship the numbers were reused, respectively, for the topics “Network and Internetwork Architecture” and “Performance of Communication Systems”. WG 6.4 was then on “High-Speed Networking”. It had a quite considerable overlap with WG 6.2, and primarily concentrated on the co-operation with the WWW conference series. Therefore, the WG was eventually re-named to “Internet Applications Engineering”, but there has not been any major real activity of the group since at least 2007.

Together with WG 6.3 and WG 6.8 working group 6.2 organises what is probably TC6’s most important annual conference – “Networking 20xx”. This conference series is the result of the merger of three formerly separate streams of events. And this combination has proved to be a very good move to counter the tendency towards way too many tiny events. Meanwhile, it has become quite obvious that the average number of participants of almost any given conference is shrinking (there are too many of them, the registration fees are becoming too high, and fewer and fewer people have an adequate travel budget). I dare to utter another reason for the shrinking participation: more and more conference presentations owe their very existence to the “publish or perish” syndrome. Most of them do not offer too much insight; in many cases they are little more than practically useless reports on unfinished master or PhD theses.

WG 6.5, entitled “Message Handling Systems” was hugely successful during its early days. Yet, despite this enormous success it was eventually felt that the width and depth of new developments in the field was too limited. Therefore, the group was disbanded and is now a task force group (TG 6.5). But plans are afoot to turn it into a working group again, to focus on Secure Networking.

For a long period of time WG 6.6 on Network Management has been one of the most powerful groups – at least financially. This comfortable situation came almost to an end when the formerly TC6-based conference series ISINM – International Symposium on Integrated Network Management; now renamed to IM (Integrated Network Management) – was practically lost to IEEE CNOM for a number of reasons. WG 6.6 is still comparatively big, though, with events such as NOMS (Network Operations and Management Symposium) or DSOM (Distributed Systems Operation and Management), and maybe half a dozen other annual or bi-annual events.

WG 6.7 (“Smart Networks”) deals with topics such as home networking, ad-hoc and sensor networking, broadband wireless networks, signal processing, and network control. Several new “hype topics” such as “active networking” or “autonomic communication” and the like have been proposed but no final decision has yet been reached. The events that are organised by this group are typically relatively small. In the future the group might concentrate more on sensor networks.

WG 6.8 (“Wireless and Mobile Networking”) has been an obvious – but admittedly relatively late – reaction to the dramatic increase of radio based communication. However, the events organised by the group, such as “Mobile and Wireless Communication Networks”, “Personal Wireless Communications” and “Wireless Sensor and Actor Networks” are quite small, even too small to be financially and scientifically promising. It has to be admitted that the group suffers from a totally insufficient base in North America and in East Asia, and is thus not yet really accepted outside Europe.

WG 6.9 (“Communication Systems for Developing Countries”) organises conferences such as WCITD (Wireless Communications and Information Technology in Developing Countries). As already mentioned, it is very successful with state-of-the-art tutorials in countries like Paraguay or Mozambique. But if you use a “source and sink” analogy for financial aspects, WG 6.9 is clearly the sink.

WG 6.10 (Optical Networking) is so inactive that I don’t want to comment on it here.

On the brighter side, WG 6.11 (Communication aspects of e-World) reflects a real new trend in the area of communication systems. It organises conferences such as I3E (IFIP Conference on e-Business, e-Services, and e-Society), “Virtual Goods”, and even “Well-being in the Information Society”. It’s organisation is greatly alleviated by the fact that the “burden” of the chairmanship is allocated to a triumvirate of three experts who co-operate very well.

## **6 IFIP TC6 and the TC (the “Travelling Circus”)**

Technical Committee 6 is (or was, rather) the only IFIP TC that could afford the luxury of two meetings per year; all other IFIP TCs restrict themselves to just one (or even less). Moreover, while other TCs concentrate on places which are relatively easy to reach, TC6 quite frequently combines its events with conferences in nice and sometimes even exotic places. Meetings have been held from Saariselkæ to Thirivananthapuram, from Lake Tahoe to Sun City, from Sousse to Borovez, from Middelgrundsfortet to Madeira, from White Plains to Venice, and from Muscat to Nyanga (to name just a few places where some of the 75 TC6 meetings took place until 2010). The reader of the present report is cordially invited to find out the countries of the named meeting places – and he will be congratulated if he knows them all without support from Google.

Such locations make it quite attractive for communication experts to become a TC6 delegate or a WG chairperson. But the downside (which becomes more and more dominant) are the enormous amounts of money it takes to attend a meeting – even if it is “only” required to attend one out of three consecutive meetings. Therefore, from 2009 onwards TC6 does not any longer require participation in each meeting. Rather, the first meeting each year (regularly combined with the conference Networking

20xx) is for all delegates, whereas the second one is mainly for WG chairs. Of course, “normal” delegates are also invited to attend the second meeting.

## **7 IFIP TC6: A Final Conclusion and Some Kind of Consolation**

Everything has its pros and its cons. It is typical, however, that the good aspects are easily forgotten while the negative aspects stick for much longer. Thus, very easily an overall recollection tends to be negative even if it’s actually a good thing. My gut feeling is that my report may create the same all too bleak impression. This, however, is not exactly what I want. IFIP TC6 is still an excellent and very successful committee – and IFIP would be much worse off without it.

TC6 wishes IFIP (and also itself) 50 more successful years to come.

# IFIP TC 7 Report: System Modelling and Optimization

## Reporting Period: August 2007–August 2009

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**Keywords:** IFIP, TC7, System Modeling and Optimization.

## 1 TC-7 Meetings Held and Scheduled: General TC7 Conferences and TC7 Meetings

### 1.1 24th TC7 Conference in 2007

The 24th TC7 Conference on System, Modeling and Optimization took place in Buenos Aires, Argentina July 27-31, 2009. It was organized. Prof. Hugo Scolnik, the National Representative of Argentina.

International Program Committee, co-chaired by I. Lasiecka and J. Henry, consists of 20 members, some of which representing TC7 and its Working Groups. The format of the conference consisted of 9 plenary lectures and a round table. There were 23 Special Invited Sessions and 13 Regular (Contributed) Sessions. Plenary lectures and all sessions were hosted in a modern and very spacious conference hall, the “Palais Rouge”.

The main themes represented during the meeting included:

- optimization theory
- algorithms of nonlinear optimization
- discrete optimization
- stochastic optimization
- distributed parameter systems: modeling and optimization
- optimal control of ODEs
- stochastic control and financial mathematics
- structural design
- stability and sensitivity analysis in optimal control
- complex systems

The Conference attendance was of 119 registered participants. A large part of the attendance came from Latin American countries (51). There were 98 paid registration. The usual attendance of the conference from Europe and North America was under represented. The swine flue epidemics had also a negative influence on the participation. Even an invited plenary speaker declined the invitation at the last moment.

The funding for the Conference was provided primarily by Secretary of State for Science and Technology, National Council for Scientific and Technological Research, University of Buenos Aires, Chamber for information Technology Companies in Argentina. According to the proposal, the Proceedings of the 24-th Conference will be published with the official Ifip Publisher, Springer Verlag –B Business Media. The selection process is still under way. The URL for the website of the 24th IFIP TC7 Conference is the following: <http://www.ifip2009.org/>

## **1.2 The 25th TC7 Conference**

During the TC7 Meeting in Buenos Aires it has been decided that the next 25-th TC7 conference will be held in Berlin, Germany, September 12-16 2011. Professor Fredi Troeltzch, German National Representative will be the main organizer for the Conference. The organization of the conference will be done jointly with Pr Dietmar Hoemberg of WIAS, Institut fur Mathematik , TU Berlin. The proposed venue for running the conference is the math building of Technische Universität Berlin. It is envisioned that special funds will be solicited in order to support seizable number of junior researchers. According to the proposal, the Proceedings of the 25-th Conference should be published with the official IFIP Publisher, Springer Verlag –Business Media. URL <http://www.ifip2011.de/>

## **1.3 TC7 Meeting**

TC7 Meeting took place during the 24<sup>th</sup> TC7 Conference, July 29, 2009, Buenos Aires, Argentina. The next TC7 meeting is scheduled in Berlin during the 24-th TC7 General Conference.

## **1.4 TC7 Co-sponsored Events**

TC7 has co-sponsored the 13rd IFAC Symposium INCOM-2009 on information control problems in manufacturing held in Moscow, June 3-9, 2009. URL: <http://www.incom09.org/>

TC7 will co-sponsor the 14<sup>th</sup> IFAC Symposium INCOM-2012 on information control problems in manufacturing to be held Bucharest, Romania, May 23-25 2012. URL: <http://incom12.org>

## **1.5 Publications**

The proceedings of the 23rd IFIP TC 7 Conference, Cracow, Poland, July 23-27, 2007, “System Modeling and Optimization” have been published by Springer in the Series: IFIP Advances in Information and Communication Technology, Vol. 312 . (I SBN: 978-3-642-04801-2).

## **1.6 Changes in Membership and Officers:**

1. The representative of Japan to TC 7 is Pr Hisao KAMEDA from Tsukuba university.
2. The representative of Slovenia is Pr Lidija Zadnik Stirn from Ljubljana university. She is replacing Pr Prof. Janez Grad.

3. As of present, TC7 has no representatives of the following IFIP members: Andorra, Australia, Botswana, Canada, Chile, Croatia, Cyprus, Egypt, Ethiopia, Germany, Ireland, Rep. de Korea, Lithuania, Malaysia, Mauritius, Nigeria, Norway, Oman, South Africa, Sri Lanka, Sweden, Syria, Thailand, Zambia, Zimbabwe. The GA members of these countries will be contacted in order to secure representation in TC7.
4. Change of Chairmanship. Prof. Irena Lasiiecka stepped down from the Chairmanship position in December 2007. Dr Jacques Henry, former V-Chair of TC7, became Chair of TC7 effective January 2008. The process of selection of V-Chair has started. So far no candidate has been identified for the position. Until the new V-Chair is appointed, it has been agreed that Irena Lasiiecka will act as an interim V-Chair.

## 2 TC-7 Working Groups

### 2.1 Changes of Membership in WG's

**WG 7.1:** The Chair of the Group is Prof. Arun Bagchi.

The following new members have been added to the group:

Prof. Shin-Ichi Aihara, Tokyo University of Science, Suwa

Professor Ruppa K. Thulasiram, University of Manitoba, Winnipeg, CANADA

**WG 7.5:** Professor Luis Esteva resigned from the Chairmanship position in WG 7.5.

The incoming Chair is Professor Michael H Faber, ETH, Zurich, Switzerland, with Vice-chairman: Professor Daniel Straub, TUM, Munich, Germany

**WG 7.6:** New member: Mokhtar Beldjehem, Associate Professor of Computer Science and Software Engineering, Ecole Polytechnique de Montreal, Qc, Canada

### 2.2 Working Group Activities

#### 2.2.1 WG 7.1–Modeling and Simulation

This group is chaired by Professor Arun Bagchi from the University of Twente, Enschede, NL. Pr Baghi is mainly trying to renew the membership of the group.

**Past and Future Events:** The group is still in the process of reorganization with the aim to increase and broaden the spectrum of activities linking stochastic simulation (the primary aim of the group) with a more trendy now financial engineering, including aspects of risk modeling in engineering. Two sessions covering the activities of 7.1 were held during the 24th TC7 Conference on System, Modeling and Optimization in Buenos Aires, Argentina July 27-31 2009: Stochastic Control and Mathematical Finance with organizers: A. Palczewski and Ł. Stettner; Aerospace organized by A. V. Balakrishnan (bal@ee.ucla.edu).

#### 2.2.2 WG 7.2–Computational Techniques in Distributed Parameter Systems

The Group is chaired by Prof. Jean Paul Zolesio from INRIA, Sophia Antipolis, France with Prof F. Troltzsch from Technical University of Berlin acting as V-Chair. Dr John Cagnol, from the Pole Universitaire L. Da Vinci, Paris, is the Secretary of WG 7.2.

**Past and Future Events:** The WG 7.2 organized the workshop „Boundary Control and Optimization“, in Mathematical Institute (Czech Acad. Sci.), Prague 2, Žitná 25, April 7-8, 2008. The organizers were J. Outrata, E. Feireisel and J.P. Zolesio. During the 24th TC7 Conference in Buenos Aires, Argentina July 27-31 2009: Several sessions were organized by WG 7.2:

1. Stability, Sensitivity and Error Analysis for Optimal Control Problems Roland Griesse (Chemnitz), Arnd Roesch (Duisburg) Fredi Troeltzsch, Berlin
2. Recent Advances in the Control of PDEs" organized by Irena Lasiecka (il2v@virginia.edu), John Cagnol (john@cagnol.com) and George Avalos
3. Factorization of boundary value problems and applications Organized by J. Henry

### 2.2.3 WG 7.3–Computer System

Modeling The chair of the Group is Professor Edmundo de SOUZA e SILVA Fed. Univ. of Rio de Janeiro, Brazil. The Vice-Chair is Dr. Philippe NAIN, INRIA Sophia Antipolis, France. Activities of the Working Group continue to focus on fostering research and training in performance evaluation.

**Past and Future Events:** The WG organized the workshop “Performance 2007”, Koeln Germany, October 2-5 2007.

### 2.2.4 WG 7.4–Discrete Optimization

Since the death of Professor Peter Hammer the search for a new Chair of WG 7.4 is still underway.

### 2.2.5 WG 7.5–Reliability and Optimization of Structural Systems

Prof. Luis Esteva , from the National University of Mexico is WG 7.5 Chair, and since 2010 Professor Michael H Faber, ETH, Zurich, Switzerland, succeeded L. Esteva.

**Past and Future activities:** The working conference of IFIP WG7.5 2010, was held from April 7 to 10, at Munich Technical University. List of the main conference themes includes: Reliability of structural systems, time variant systems, Strength and load modeling, Structural safety, Optimization of structural systems, failure modes for structural systems, Reliability based optimization.

During the 24<sup>th</sup> TC7 conference in Buenos Aires a session on “Structural Optimization and Robust Design under Uncertainties” was organized by G.I.Schueller (G.I.Schueller@uibk.ac.at) and H.Jensen (hector.jensen@usm.cl)

### 2.2.6 WG 7.6–Optimization–Based Computer Aided Modeling and Design

Prof. Janusz Granat, from Technical University of Warsaw, Poland is Chair of WG.7.5. The group is in the process of reorganization with the aim to increase and broaden the spectrum of activities.

IFIP Working Group 7.6 meeting, September 1-3, 2008, Warsaw, Poland

- i. Goals: discuss future aims and scope of the WG, changes in membership, discussion the next WG activities.

- ii. Participants: A.Beulens, D.Dolk, J.Granat, M.Makowski, Y.Nakamori, H.J. Sebastian, A.P. Wierzbicki

**Past and Future activities:** A Working Group 7.6 Workshop on Modelling and decision support for network-based services was held in Warsaw, Poland, September 1-3, 2008. Topics for Workshop:

- Modelling of services
- Service-based support of modelling
- Network-based decision support
- Knowledge science and engineering
- Application areas: supply chain management, traffic and transportation, telecommunications, health care, sustainable environments, emergency response, homeland security

DSTIS 2008, Decision Support for Telecommunications and Information Society. The conference have been organized by A.Wierzbicki and J.Granat.

**Publications:** The group is working on the book: MODELLING AND DECISION SUPPORT FOR NETWORK-BASED SERVICES. In this book, there are papers which realize the confluence of computational / analytical modelling, network science, and knowledge engineering as applied to this emerging area of services science, management and engineering (SSME). Specifically, we focus on modelling from two distinct, yet complementary, perspectives:

I. Modelling of services: Topics with this focus include:

- Service modelling, optimization and analysis
- Agent-based modelling and game theory
- Operations Research modelling such as optimization, multi-criteria decision analysis, simulation and uncertainty-based approaches in designing service-specific IT Systems

II. Service-based support of modelling: The delivery of modelling support and associated environments using Web service-based principles.

- Web Services for Modelling and Optimization-based Problem Solving
- Model composability
- The management of software as a service
- Service-oriented architectures for modelling environments
- Application Areas, In general, papers should demonstrate the application of science to business processes resulting in realapplications with real impacts. Areas of interest include, but are not limited to, supply chain management, sustainable environments, emergency response, homeland security, health care, traffic and transportation, and telecommunications.

### 2.2.7 WG 7.7–Stochastic Optimization

The Group is chaired by Professor Kurt Marti from Federal Armed Forces University, Munich, Germany.

**Past and Future Events:** 4th IIASA/GAMM-Workshop on "Coping with Uncertainty (CwU09): Managing Safety of Heterogeneous Systems", IIASA Laxenburg,

Laxenburg/Vienna, Austria, 14-16 December 2009. Organizers: K. Marti, Federal Armed Forces University Munich, Prof. Y. Ermoliev and Dr. M. Makowski, IIASA Laxenburg

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A main part of the work of WG7.7 was devoted to the completion of the LaTeX-file of the conference volume. The bibliographical information about the book appearing in December 2009 reads: "Coping with Uncertainty: Robust Solutions"

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# TC 8 Report: Information Systems: Yesterday, Today and Tomorrow

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**Abstract.** In 1975 IFIP Technical Committee 8 held its first meeting in Amsterdam. Since this initiation TC 8 has grown into a very active group with many working groups. Each year TC 8 working groups organise 8-12 events, from full-blown conferences to smaller workshops. This chapter tells the story about initiation, the first 35 years and the working groups initiated. The information systems field in the same period. Important achievements and contributions of TC 8 the working groups are next. Finally we take a look into the future based on recent developments.

**Keywords:** Information Systems, IFIP Technical Committee, History, Contributions, Future.

## 1 Birth of Technical Committee 8 in 1975

Information Systems (IS) emerged as an independent field in the 1960's based on an interest in organizations and people using computers (*the term IT did not appear until much later*) as a basis for the business process – as opposed to making the computing in it self more efficient – which was not handled by traditional Computer Science.

The concept of an information system frequently called for an integration of several business processes which were collectively referred to as an information system. However,, an information system was not simply but frequently included a different approach to activities to be performed by the individuals involved.

Within IFIP itself, a Dutch organization called the IFIP Administrative Data Processing Group (IAG) had been established in Amsterdam (prior to 1975) and was arranging courses and seminars at its own premises and in other European countries.

A British publisher, namely Pergamon Press launched a monthly journal known simply as “Information Systems” under the editorship of a German professor, Hans-Jochen Schneider. In fact it was Jochen Schneider who first approached the IFIP hierarchy with a view to establishing a Technical Committee 8 with the same name as the journal. It should be noted that since the foundation in 1959 of IFIP (or IFIPS as it was initially designated), no less than seven Technical Committees (TCs) had already been inaugurated.

Based on a proposal from Börje Langefors, the IFIP General Assembly in Stockholm in 1974 approved to set up of an eighth Technical Committee. Börje Langefors agreed to serve as ad-hoc Chairman. The various national societies comprising IFIPS (International Federation for Information Processing Societies) were invited to send a delegate to the first meeting which was held on 14 and 15 November 1975 in Amsterdam at the premises of IAG (which were shared with the Dutch data processing society.) Börje Langefors, a Swedish professor from Stockholm, chaired the meeting.

## 2 The Development of TC 8 and the Working Groups

The Amsterdam meeting recognized the need to establish what were already referred to in IFIP as Working Groups. One WG would have been at best pointless and at least inadequate, so two groups were identified. One was designated as more technically oriented and the other as more people oriented. The IFIP procedures required each group to produce a title and a statement of what they intended to do.

The IFIP Information Bulletin number 9 dated July 1975 identifies the two working groups as:

- WG8.1 Analysis of Organizational Needs for Information
- WG8.2 Utilization of Information within Organizations

These titles were tentative input to the November 1975 meeting at IAG. However, in the meeting the title of the working groups was changed to:

- WG8.1 Design and Evaluation of Information Systems
- WG8.2 Interaction of Information Systems and the Organization

The founder chair of WG8.1 was Hans-Jochen Schneider from Germany. The founder chair of WG8.2 was Hank Lucas from the USA.

Following on two meetings in Amsterdam, the next TC 8 meeting was held in conjunction with the IFIP Congress in Toronto, Canada in August 1977. Börje Langefors was unable to attend this meeting and the number of National Representatives to TC8 was modest. Alex Verrijn-Stuart agreed to serve as chair for the meeting. Ria Lucas from the IFIP Foundation in Amsterdam served as Secretary at this meeting as she had done at the two prior meetings in Amsterdam.

The two initial working groups were the only ones in TC8 until the 1981 TC8 National Representatives meeting in Budapest when a proposal was approved to inaugurate a third group namely:

- WG8.3 Decision Support Systems:  
The founder chair of this group was Leif Methlie of Norway. The next development in TC8 working group structure was the approval at the Helsinki meeting in 1985 of TC8 National Representatives.
- WG8.4 Office Systems:  
The founder chair of this group was Alex Verrijn-Stuart of the Netherlands who had also served as Chair of TC8 National Representatives from

1977 to 1983. In 2001-02 this group changed aims and scope as well as name to:

- WG 8.4 - E-Business Information Systems

The next TC8 working group to be inaugurated was

- WG8.5 Information Systems in Public Administration.

This group was approved at the TC8 meeting of National Representatives held in conjunction with the IFIP Conference in San Francisco in August 1989. The founder chair was Petr Kovacs from Hungary.

The sixth TC8 working group was

- WG8.6 Transfer and Diffusion of Information Technology  
The founder chair was Priscilla Fowler of the USA. After considerable discussion, this group was approved by the TC8 meeting in May 1995 at the Gold Coast in Australia.

Working Group 8.7 became something of a non-starter. TC8 had been approached in 1996 by an organization in New York City which clearly seeking some kind of international recognition from IFIP and wished to form a Working Group 8.7 which would have the title "Informatics in International Business Enterprises". The group never reported in any way to TC8 National Representatives and were subsequently deleted from the list of TC8's working groups.

At its 1998 meeting in Vienna, TC8 National Representatives approved an extant body concerned with professional people working on Smart Cards. This had the title

- WG 8.8 Smart Cards  
The founder chairman was Prof. V. Cordonnier. The main activity of the group is the holding of a biannual conference entitled CARDIS which address the role of smart cards.

Finally at its meeting in Santiago in Chile in 2006, TC8 approved its most recent Working Group:

- WG 8.9 Enterprise Information Systems

A TC 8 conference had been held in Vienna on this subject prior to the approval of the working group.

### **3 The Information Systems Field from 1975–2010**

In the beginning most IS research was quite management oriented and dominated by quantitative research methods. The first major journal focusing on IS was launched in March 1977; Management Information Systems Quarterly (MISQ) was born. Today it is one of the most influential research outlets among all Computer Science / Information Systems journals in the world. The Information Systems research seminar in Scandinavia (IRIS) began in 1978 and is today the oldest IS conference in the world still running every year. IRIS became part of a special Scandinavian IS tradition

where research on democracy and IT system work in the late 70s and 80s put Scandinavia on the world map. The first international conference on Information Systems - ICIS - was held in Philadelphia, USA, in 1981.

Up through the '80s the IS field was characterized by a tremendous growth. Many universities around the world created an institute or a department of IS. In USA and UK, the majority of IS research located at Business Schools. In Europe IS was often located together with natural sciences or the humanities.

Already in 1975 the first conference on system work was taken the first sod for a special Scandinavian tradition. A series of research on democracy and system work set in the late 70s and 80s put Scandinavia on the world map.

In the 1980s, and especially after the introduction of the personal computer (PC), Human-Computer Interaction came on the agenda. Many studied the correlation between user friendly IT systems and satisfaction with the same systems. One of the most cited models was the Technology Acceptance Model (TAM) [1] that says that acceptance of new IT depends on the perceived usefulness, the perceived ease of use, and the user acceptance.

Another issue which came to focus in the 1990s was the proliferation and deployment of new IT. Lots of IT systems had ended up as very expensive dust collectors without having the real purpose - to get some people to do something different - realized.

The 1990s brought increased awareness about IT systems for collaborative support and knowledge management. In 1994, the Association for Information Systems (AIS) was founded as an organization for academics specializing in information systems. AIS did not seek to interfere with or replace IFIP. "Rather, our goal is to work with and support them" [5]. In the late 1990s, a wave of internet and web applications led to much interest and research in these areas.

## 4 Important Achievements and Contributions

In April 1979 **WG8.1 - Design and Evaluation of Information Systems** - organised the first working conference in its own right called "Formal Models and Practical Tools for Information Systems Design". Three main themes emerged at this conference [4]:

- Requirements definition, including formal models and languages
- Requirements and software systems, with a focus on methods
- Experimental evaluation of methods and tools of the systems analyst and designer

Already in the 70s, many IT projects became much more expensive than anticipated. There was talk of a software crisis. This led many researchers to focus on methodology development (better system development methods) and action research projects involving researchers and practitioners. A major contribution by IFIP Working Group 8.1 in dealing with the crisis was a series of conferences widely recognized by the acronym CRIS (Comparative Review of Information Systems Design Methodologies).

The first conference held in 1982 in The Netherlands. The structure of the conference was as follows. A case study was formulated well in advance which was based

on the organization of a technical conference. Submissions to the conference were invited, each of which was required to present a methodology which could be used to design a computerized system for managing the various activities involved in organizing a technical conference.

The success of the conference was indicated by the fact that some 17 different submissions were accepted for presentation at the conference. All of these were included in the proceedings of the conference plus a further eight submission. The title of the proceedings was “Information Systems Design Methodologies: A Comparative Review”.

Three further conferences were held by Working Group 8.1 each examining a specific aspect of information system design methodologies (ISDM). These three aspects were entitled:

1983 ISDM: Feature Analysis

1986 ISDM; Improving the Practice

1988 Computerized Assistance during the information systems life cycle

In addition to these conferences and their associated proceedings, a task group was formed of seven WG8.1 members who worked on information systems methodologies and in 1991 published a report entitled “Information Systems Methodologies : A Framework for Understanding”.

It took a few years for **WG8.2 - Interaction of Information Systems and the Organization** - to establish itself and start working. The first working conference was held in Bonn in June 1979. The Conference Theme was “The Information System Environment”. This first conference was followed by others every other year. Five years later in 1984 a landmark conference was held in Manchester. The theme of this conference was research methods. Here qualitative research methods was presented as an alternative to more commonly used quantitative methods used with a positivist perspective. Enid Mumford, one of conference chairs [2] talked about a socio-technical perspective to IS in organization. In an essay on Enid Mumford [3] it is stated that she at this conference in Manchester created “... a starting point for critical research in IS because many of the ideas that still dominate critical work in IS were first articulated there”. Research methods became a recurrent theme in WG8.2 as the 1984 Manchester conference was followed by a 1990 Copenhagen and a 1997 Philadelphia conference, which also addressed research methods. And 20 years after the first Manchester conference WG8.2 returned to Manchester. Together these WG8.2 conferences marked a growing legitimacy for more qualitative, critical and even philosophical ways of doing research in Information Systems. It is fair to claim that WG8.2 in organizing these conferences played a key role in making qualitative methods a respected part of IS research.

**WG 8.3 - Decision Support Systems** - brought together a really multi-disciplinary group for its first conference on “Processes and Tools for Decision Support” at Schloss Laxenburg in Austria in July 1982. The multi-disciplinarity included information technology, artificial intelligence, cognitive psychology, decision theory, organisational theory, operations research and modeling. The conference was chaired by Henk Sol and he suggested using simulation as a tool for decision support. Since then decision support has been studied from many perspectives. In 2010 the theme is

“Bridging the socio-technical gap in DSS - Challenges for the next decade”. In 2006 it was “Creativity and Innovation in Decision Making and Decision Support”. In 2004 the theme was “Decision support in an uncertain world”. In 2002 it was “Decision Making and Decision Support in the Internet Age”, and in 1998 it was “Context Sensitive Decision Support Systems”. A core group of people have been meeting nearly every time that WG8.3 has called for a conference. And the quality of the conferences and the many contributions have led to high number of journal publications based on the conference papers.

**WG 8.4 - Office Systems** – became known for a series of three conferences that put the international office of the future on the agenda. The first event, called “A Problem Analysis” took place in 1994. The second event called “Design Options and Solution Strategies” took place in 1996. And the third event was called “Working Apart Together” and it was a globally distributed conference that emulated the office of the future thereby pointing out solutions to organisations in a globalised world.

Interest in office automation died out in the late 1990s and WG 8.4 was refreshed with a new name and a new aims and scope in 2001-02. This newly coined group - E-Business Information Systems - provides a focus for multi-disciplinary research and practice. The intention is to extend the IFIP community's focus on E-Business to recognize, acknowledge and facilitate research and practice as it crosses the boundaries of IS, organization, users, communities and nations.

At the same time as WG8.4 was re-inventing itself TC 8 joined TC 6 and TC 11 in organizing the first “I3E” conference on “E-Commerce, E-Business and E-Government”. The first I3E conference took place in Zürich with Kurt Bauknecht as General Chair. Kurt Bauknecht was well-known to IFIP TC 8 as the National Representative from Switzerland, and he also became IFIP President. The I3E conferences continued in Lisbon, Sao Paulo, Toulouse and so on. In 2009 it was held in Nancy in France. And in 2010 it will be held in Buenos Aires.

**WG8.5 - Information Systems in Public Administration** – is a small but lively group. Until this year they organised a conference inside the conference cluster DEXA. But in 2010 they decided to organise their own conference.

**WG 8.6 - Transfer and Diffusion of Information Technology** – had its inaugural conference in Seven Springs, PA, USA in 1993. The group grew fast to one of the largest WG within TC 8. Today it is considered a prime venue and publishing outlet for researchers focusing on the adoption and diffusion of IS. It shares with WG8.2 a preference for qualitative and action research studies. Also many interesting case studies on organisational impact, technology transfer and software engineering have been published. Further, WG 8.6 have been very good a linking conferences to special issues of very good journals.

## 5 The Future of Information Systems

A significant development in the world of information systems has been the emergence of what TC8 recognizes as “Enterprise Information Systems” which is the topic of TC's newest Working Group 8.9.

Whereas in the era of Information Systems Design Methodologies, a computerized tool could be obtained to assist in the design of a computerized system, it is now recognized that a computerized system can be purchased which handles the mainstream business processes and which only needs to be tailored to handle the specific needs of an organization.

Furthermore, information systems have become now a part of everyone's daily life, both in terms of systems and processes. Every day one can read about new IT-based developments. At the same time, users have become more critical. Such users will hopefully help to determine whether these systems are able to support the daily lives they must live in and the products they have to live with.

Much of IT innovation and development today is characterized by very rapid changes in the environment and unpredictable product and system complexity. Insufficient processes and skills have contributed to delays and cost overruns. Process improvement is now more topical than ever, and many talk of increased agility ("agility"), understood as flexibility and ability to change direction and requirements under way or about lean development ("lean").

Traditional development of a requirements specification followed by design, coding and testing have failed so many times that there is a crying need for a better way to develop. A software crisis is still evident as one can ascertain by reading the trade press in any advanced country. Meanwhile, the problem of efficient distribution and service is not resolved. It will get even more focus in the future.

Similarly also expected increased focus - both in research and in practice - some linkage between IT design, which establishes a vision for a global change in an activity involving both the IT system as business and skills, and measuring the effects achieved in subsequent development projects.

The public sector in many countries is working in these years to modernize IT. Within the administrative area happens a lot in terms of electronic case and document management: here is talking about very complex cooperate to IT-supported. Within the health sector is also a lot in the coming years, e.g. with electronic patient records

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# IFIP TC 9 Report: 1995–2010 – A Personal Account

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**Abstract.** This is a personal account of the history of TC9, the IFIP Technical Committee on ICT and Society. My story follows the major events and developments of TC9 from 1996, when I joined the Committee as WG9.4 chair, till 2010, when I completed my term as TC9 chair. Amidst the descriptions of events, Working Groups and personalities I reflect on the significance of the work of TC9 as a learned community dedicated to the critical assessment of the relationship of ICT and society.

**Keywords:** Technical Committee 9, Computers and Society, Human Choice and Computers.

## 1 Introduction

The proceedings of the first two Human Choice and Computers (HCC) conferences (Mowshowitz 1980; Mumford and Sackman 1974) were among the most important readings during my PhD years in the mid-1980s. They had a long lasting influence on my academic research career. I found in them an intense problematization about the way the spread of computer technology might be affecting the world place and more broadly the social world we live in. There was neither much social theory in the papers of those volumes, nor much methodology – which are a central concern for a PhD study. But the powerful, often passionate, writing of authors who cared about the values of industrial democracy and were struggling with scientific ‘objectivity’ while they were engaged in the critical discourse of defending them, helped me crystallize what research I liked to do.

I wished I was at those first HCC conferences where the debate on ICT and society started taking shape. I missed them, but I got into the habit of watching the IFIP TC9 space. And sure enough, I was present at the conference that launched the working group on the social implications of computers in developing countries (WG9.4) in New Delhi, in 1988 (Bhatnagar and Bjørn-Andersen 1990). As ICT and development became my main research area, the series of WG9.4 conferences became a regular source of ideas and case studies, and later concepts and theories. Moreover, they gave me an international research community I could engage with. But until the mid-1990s, beyond the conferences I had little understanding of IFIP and its TCs as an organization.

## 2 My First Encounter with the TC9

My first participation in a TC9 meeting was in 1996, when I started chairing the WG9.4. The meeting was in a kibbutz, somewhere in between Jerusalem and Tel Aviv, following a conference of computers in education, co-organized by TC9 and TC3. I did not have a clue what to expect from a ‘TC9 meeting’. I did not know who else would be there and what was the significance of the ‘business’ agenda. A couple of months before the meeting I had received a polite message from the TC9 chairman Pertii Jarvinnen, welcoming me to the TC9 as a new WG chairperson, and informing me that I was expected to attend the Jerusalem meeting and report on the WG9.4 activities.

My first two-day-long TC9 business meeting was a memorable experience. It impressed me as a peculiar mix of semi-formal rituals of ‘reporting’ and ‘approving’, punctuated by spontaneous, often heated, debates on what appeared to be *ad hoc* cropping up substantive issues on IT and society. An IFIP TC has two categories of members: the national ‘reps’ (representing the member computer societies of IFIP) and the WG chairs<sup>1</sup>. WG chairs reported about their WG activities - mainly conferences and publications - and sought approval for new officers’ appointments, membership, and planned events. National reps also reported, but I could not detect any pattern of what they reported about and they did not ask for approval. It seemed to me that they were the ones doing the approving<sup>2</sup>.

I felt welcome from the very beginning of this peculiar gathering and I was quickly taken by, although only slowly I started making sense of what was happening. Klaus Brunnstein, chair of WG9.6 on IT misuse and the law and German rep, Jacques Berleur, WG9.2 chair and Belgian rep, and Dick Sizer, the British rep, stood out: deeply knowledgeable on computer technology, and passionate about ethics, democracy and privacy; alert about all sorts of technological and social risks; and gossipy about all kinds of IFIP events, facts, and people past and present, as if they were born and grew up in IFIP. Jon Lee, Simone Hübner, Ingela Larsson, and others contributed to the discussion of the randomly emerging contentious issues with the enviable confidence of a TC9 insider. The chair, Pertii Jarvinnen, had included in the agenda the discussion of an issue of general concern – on appropriate research methods, if I remember correctly – but this was somewhat rushed and almost lost amidst so many other issues that emerged and attracted vibrant discussion. Overall, though, he was quite effective in steering the meeting through the agenda and making us finish all the reporting and the approving that had to be done.

## 3 Becoming a TC9 Insider

After the Jerusalem meeting, going to TC9 meetings became an annual regularity in my life. Corfu in 1997, Stockholm in 1999, CapeTown in 2000, Namur in 2001,

<sup>1</sup> At that time TC9 had the following WGs: WG9.1 – WG 9.7.

<sup>2</sup> Ten years later, when I started attending the IFIP Council and General Assembly as TC chair, I found the same ritual of ‘reporting’ by TCs and ‘approving’ by the IFIP member societies representatives. This became increasingly contentious as TC chairs demanded equal rights within IFIP and indeed, in the last five years the TC reporting has been reduced and TC chairs can stand for election for office in the IFIP Board.

Montreal in 2002, Athens in 2003, Farnham in 2004. I missed only the 1998 meeting in Geneva. Jacques Berleur succeeded Pertti Jarvinen as TC9 chair in 1999 and asked me to act as vice chair. I accepted, of course.

### 3.1 The Working Groups (WGs)

I came to appreciate how important the leadership of working groups was for focusing attention and debate on critical issues of ICT and society. By 2005 TC9 had 8 working groups and a very active Specialist Interest Group (SIG):

- WG 9.1 on Computers and Work
- WG 9.2 on Social Accountability
- WG 9.3 on Home-oriented Informatics and Telematics (HOIT)
- WG 9.4 on Social Implications of Computers in Developing Countries
- WG 9.5 on Social Applications of Artificial Intelligence, and later named Applications and Social Implications of Virtual Worlds
- WG 9.6/11.7<sup>3</sup> on Information Technology: Mis-Use and the Law
- WG 9.7 on History of Computing, often co-organizing events with TC3 on computers in Education
- WG 9.8 on Women and Information Technology<sup>4</sup>.

It also had the Specialist Interest Group SIG 9.2.2, Framework on Ethics of Computing, which was at least as active as the WGs<sup>5</sup>.

With the exception of WG9.2 on Social Accountability and the SIG on Ethics which held regular meetings with substantive work resulting in publications such as on national codes of Ethics (Berleur and Brunnstein 1996; Berleur et al. 1999), the main task of the working groups was the organization of conferences. Most conferences had an academic character, with few practitioners participating. WG9.2 run regularly an event they call ‘Summer School’, a forum that brought together PhD students and senior researchers in stimulating debates.

The frequency, size, and sophistication of conferences and the publications produced by the WG conferences varied significantly. WG9.3 on Home Informatics and WG9.7 on History were prolific, while conferences from WG9.5 on the social implications of Artificial Intelligence and virtual worlds and WG9.1 on computers and work became increasingly infrequent. WG9.4, WG9.6 held successful conferences roughly every second year. It was more difficult to know how good the WG conferences and their publications were. Were they attracting high quality research papers at the frontier of their mainstream subject areas? Were they fostering particular schools of thought, or creating niches? Did they have particular epistemological biases? I could say, for example, that WG9.4 developed gradually a particular intellectual identity for qualitative theory-driven case study research on the information systems

<sup>3</sup> In 2000 WG9.6 was joined with WG11.7 of TC11 on Security and Privacy Protection in Information Systems.

<sup>4</sup> This Group was created in 2001 after a series of successful conferences on IT and Women organized by WG 9.1.

<sup>5</sup> For a few years there was also SIG 9.2.1 on Computers and Disabilities, but it became increasingly inactive and was discontinued in 2006.

experience of organizations in developing countries. They were fostering a critical socio-theoretical discourse, against a background of prevailing techno-economistic rhetoric and ICT policy interventions. WG9.1 on computers and work had historically developed a niche in participatory systems development and became quite entrenched in this narrow focus, while the nature of employment was changing in the wake of the so-called 'information society'. I found it more difficult to understand from the reports of other Working Groups what their strengths and weaknesses were.

By 2005 it was clear that a number of WGs had problems:

- WG 9.1 had difficulty organizing events and its chairman was complaining that the members of the Group saw no benefit from organizing or participating in IFIP WG9.1 events. They felt they could achieve more in rival organizations, mainly the participatory design conferences of Computers Professionals for Social Responsibility (CISP). Many TC9 members were unhappy with the narrow focus of the Group and its unwillingness to address broader issues of ICT and work.

- WG 9.5 was completely inactive; it had never established an adequate number of members that could re-generate it. Yet, developments on the various forms of 'virtuality' were considered to pose particularly important challenges for society and therefore meriting TC9 research attention. Jacques Berleur asked Wolfgang Coy, the German representative to act as interim WG chair and look for experts in this area to lead its revival.

- WG 9.8, although it had its origin in an active core of members which had organized very successful conferences as a specialist group of WG9.1, did not manage to organize any events since its establishment as a Working Group in 2001.

- WG 9.3, although very active, raised concern in TC9 because it was seen to lose its critical edge towards the multiple challenges ICT presented in the domestic sphere. It was also poorly connected with the socio-theoretical developments of its research domain.

- WG 9.7, although with a growing list of members and conference participation, tended to attract 'pioneers' of computing while it continued to organize conferences on 'history'. There was concern by a number of people in TC9, as well as in the IFIP Board about the lack of clarity on the nature of its membership and its events, which may have compromised its 'history of technology' research.

### **3.2 HCC5, HCC6, WITFOR 2003, and a Book on Information Society Policy**

In the 1996-2005 period TC9 organized two Human Choice and Computers conferences: HCC5 took place in Geneva in 1998. Bloch Rasmussen and Jacques Berleur were the conference chairs, Colin Beardon the international programme committee chair, and Silvio Munari the local organizer (Rasmussen et al. 2000). HCC6, chaired by Klaus Brunnstein, was included in the programme of IFIP's World Computer

Congress in Montreal, in 2002. This decision was a response to IFIP's decision to organize the Congress as a set of TC conferences. There was reluctance within TC9 to place its flagship conference in the WCC. Klaus Brunnstein, with the support of Jacques Berleur, made a huge effort to attract papers from the Working Groups. In the end the HCC6 conference was quite successful and attracted a great deal of interest within the WCC (Brunnstein and Berleur 2002), though the WCC itself did not have an adequate numbers of participants, and the local organizers did not break even. There was increasing concern about the viability of the World Computer Congress, though views within the TC9 as to whether the Congresses should be discontinued were divided. But it was unanimously decided after HCC6 that TC9 will not contribute conferences in future WCCs and will work on independently organized HCC conferences. With Jacques Berleur's initiative, in 2004, following the untimely death of Rob Kling, TC9 started organizing a conference to his memory on Social Informatics. Individual WGs could of course participate in WCCs, and WG9.7 on History co-organized conferences with TC3 in all subsequent WCCs.

In 2003 IFIP launched its first World IT Forum in collaboration with the Government of Lithuania and UNESCO. WITFOR was a major innovation for IFIP, aiming to set its mark in the international socio-economic development policy circles. It was structured in 'commissions', with each commission responsible for preparing a report on a particular theme of ICT and development. Jacques Berleur, leading the commission on Ethics, mobilized the TC9 WGs to allocate representatives and co-author its report. The event was quite successful in terms of participation and international interest. The Lithuanians were efficient hosts and gave a lot of publicity to the event. A contentious issue was the 'Vilnius declaration' that was drafted during the event by UNESCO officials without much input from the commissions. The justification for this was that the declaration was a political document, of the kind UNESCO knows how to write without causing offence to potential stakeholders. Indeed the declaration was seen by the IFIP TC representatives who took part in the WITFOR commissions as a vacuous text, with which they did not wish to be associated. They were, though, disappointed that the commissions' work, which had technical merit and, in the case of TC9, drew from the work of the Working Groups, was sidelined.

Jacques Berleur was even more disappointed that he was not invited to contribute his TC's expertise to the following WITFOR in Botswana, in 2005. The extent to which WITFOR would draw from the TCs was still uncertain in 2004. Later WITFOR took a clearer form as an event that draws more from NGOs, industry professional and development activists, rather than academics. As most TCs do mainly academic research, they are not the central players in the Forum. WITFOR has been the most important development in IFIP in the last twenty years and I have been following its progress with great interest because it is addressing development policy issues. Although initially sceptical about the credibility of its content, I came to think that it should be celebrated as an event distinct from the work of the TCs, which attracts non-academic audiences (policy makers, NGOs and IT industry). Its success lifts from TCs the burden of being the sole bearers of the responsibility of showcasing IFIP; they can thus concentrate on what they are – or should be – good at, high quality research. I was, however, glad that the WITFORs 'declarations' were discontinued – though unfortunately UNESCO's contribution too became less visible in recent Forums.

Finally, a major project TC9 undertook in the early 2000s was the production of a volume on Policies for the Information Society. The book was a brainchild of Jacques Berleur. At the TC9 meeting in Stockholm, in 1999, he started a critical discussion on the shaping of the 'Information Society'. He felt that it was right time for TC9 to delve into the meaning of the emerging 'information' or 'knowledge' society and to critique the technocratic policies that were giving rise to. Jacques himself was particularly sceptical about the European Information Society policies, which he saw as overwhelmingly technology driven, without due consideration to social issues. The Stockholm meeting responded quite enthusiastically to Jacques' challenge. It sustained a vibrant discussion on various aspects of the information society and closed with the commitment to produce a publication. Both national reps and WG chairs were invited to contribute chapters: the former to a section containing case studies of national and regional policies and initiatives, the latter to the section elaborating on issues and major concerns regarding the 'information society'. It proved more difficult to complete this task than we expected at that time. The contents of this book were a major topic of discussion in consecutive TC meetings in the early 2000s. Disagreements and frustrating discussions over draft chapters and book structure were frequent. An exchange of arguments between Jacques and me proved too unpleasant for Ingela Larsson who raised her voice expressing her dismay with the squabbling between chair and vice-chair. Reflecting on those meetings I think it must have been frustrating for other members too, particularly those who attended the meetings with a quietly polite predisposition. The book was eventually published, six years after the Stockholm meeting (Berleur and Avgerou 2005).

#### **4 Chairing TC9: 2005–2010**

The period of my chairmanship has not been TC9's golden era, as I would have ideally liked it to be. When I took on my chairing duties I was well aware of the challenges facing the TC9 and, I suspected, IFIP as a whole. In addition to WG weaknesses that I mention above, the participation of national reps was hardly representative of IFIP's country membership. About 13 national representatives have attended relatively regularly. Moreover, we were facing external pressures and adversities. The TC9 WGs were no longer the only forums for presenting research on issues of the ICT and society relationship. TC9 was, and continues perhaps to be, one of very few international umbrella forums where the whole range of social issues can be discussed, but there are many learned centres studying and organizing conferences on particular issues, such as democracy, privacy, gender, development, and they compete with the conferences of the WGs. For example, the ETHICOMP series of conferences has become the major forum on ICT ethics, and there are at least two other series on academic conferences on ICT and development which compete for participants with WG9.4<sup>6</sup>. On top of that, in the increasingly competitive academic sector, at least in Anglo-Saxon countries, conference publications and book chapters bear diminishing weight on the CVs of social science scholars, with emphasis shifting overwhelmingly

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<sup>6</sup> These are: the IEEE/ACM international conferences on ICT and Development, and the AIS SIG on Global Development (<http://www.globdev.org/>)

to journal articles. Furthermore, the recent financial crisis reduced university travel budgets and has had a crippling effect on conferences.

Business meetings took place in Warsaw in 2005, Maribor in 2006, London in 2007, Pretoria in 2008, London in 2009. We plan the 2010 meeting for Brisbane, before the HCC9 conference of the WCC2010, but if only few members can travel to Brisbane we will have to reschedule for another location. Attendance to meetings cannot be taken for granted. Location and time of the year need to be negotiated carefully. Meetings in Europe gathered between 15 and 20 members. But the meeting in Pretoria was a disaster, with only five members attending, despite the fact that it followed the HCC8 conference at the same place. Non-attendance of WG chairs can be debilitating; TC meetings is the only mechanism that link the plans and activities of the Working Groups with the unfolding strategies of IFIP.

One main issue frequently discussed in the meetings was IFIP's support to TC and WG events – or rather the lack of it. To begin with, until very recently, IFIP's publication strategy looked as if it was designed to make our conferences expensive and inhibit the dissemination of their proceedings. Conference organizers were obliged to make bulk purchase of expensive proceedings. Prices were outrageously high until the mid-2000s, then dropped considerably, but still, an average conference had to pay 50 Euros per participant. We knew that this arrangement with the publishers was so because publications generate an income for IFIP, and a proportion of IT came to the TC, but our conferences were never massive and conference organizers were struggling to keep conference fees at a reasonable level. It was with great relief that I heard the new contractual arrangements with Springer, which for all practical purposes lift this burden. Other issues of discontent continue to exist. Conference organizers cannot expect any support from IFIP – just the logo – though they are responsible for paying IFIP a small fee per participant. Local organizers bear the full legal and financial responsibility. They cannot even expect to be provided with an electronic management system, as conference chairs in all international conference organizing institutions are.

But let me describe the working groups at this period, the strengthening of which took much of my chairmanship effort.

#### **4.1 The WGs**

A new working group, WG 9.9 on ICT and Sustainable Development was spontaneously created at the Warsaw meeting in 2005. It was proposed by the Swiss rep, Lorenz Hilty, who became its first chair and organized its first conference in 2006. This Group aims to promote ICT's role in supporting global environmentally sustainable development, as well as to assess the impact of ICT itself on the environment. Despite initial enthusiasm the Group fell in inactivity for three years. There are good signs that this was a temporary problem due to officers overburdened with other commitments. In 2009 the Group started gathering new momentum and is organizing a stream of papers in the HCC9.

The activities of WG9.1 on Computers and Work came to a complete halt by 2005, when the Group failed to identify a chair to succeed Peter Mambrey. The appointment of Working Group chairs is TC chair duty and I started searching for an appropriate person to lead the revival of this group. I was delighted when Roberta Lamb accepted

my invitation to take this role. She started putting in place a capable team of scholars, some from the old core of WG9.1 members others completely new to IFIP, and she made plans for events that would put WG9.1 on the map of international research on ICT and work. Roberta Lamb's untimely sudden death in 2007 was a major blow. Steve Sawyer accepted the difficult task to continue Roberta's work and the Group is slowly making a comeback with small events co-organized with other organizations, such as the International Conference on Information Systems (ICIS) and Hawaii International Conferences on Systems Sciences (HICSS). The strategy of joint events with other established organizations is very prudent at present and has been adopted by a number of Working Groups.

The revival of WG9.5, entrusted to Niki Panteli and Martin Warnke (Niki as chair and Martin as vice-chair for the first three years, with Martin becoming subsequently chair), has been impressive. The re-launched Group determined its scope and research perspective regarding phenomena of virtuality in business, arts, and society at large. Just in four years it organized two workshops and a conference, produced a book (Panteli and Chiasson 2008) and journal special issues, and has a stream in the HCC9 conference.

The revival of WG 9.8 on Women and IT was more protracted. The TC's communication with the Group's chairperson was completely broken by 2006 and I invited one of the WG members that I knew to be particularly keen on the cause of IT and women to re-launch the Group. Unfortunately she too was overburdened with her academic duties and unable to devote time to this task; she resigned two years later without making progress. I then approached Marja Vehviläinen, who agreed to organize a WG9.8 meeting at the 5th European Symposium on Gender & ICT in Bremen, in March 2009. The meeting proved successful; not one, but a team of women undertook the task of re-launching WG9.8., with Cecile Crutzen acting at present as chair. This collective responsibility is a welcome innovation in the TC, breaking the hierarchical officers' structure. The Group change its name to ICT and Gender Diversity and redrew its aims and scope accordingly. They have a similar policy to WG9.1, of joint conferences with other established IT and women conferences.

With a change of chair in 2005, WG 9.3 stopped being prolific. In fact, it held only one conference in India in 2007, which was more on development rather than on Home Informatics. There has been little sign of any other activity since.

WG 9.6/11.7 seems to continue to organize successful Summer Schools despite a breakdown of leadership in 2008. The positioning of this Group within the structures of two TCs makes interventions for its revival tricky. Despite having good relations with the TC11 chair, my view is that this dual TC sponsorship has not done this Group much good and I have suggested the re-creation of WG 9.6 dedicated purely to the social aspects of security and privacy. I'm hopeful that there is enough momentum among its existing members to find new leadership and step up its activities. Security, surveillance and privacy are increasingly crucial issues and TC9 should do its best to address them adequately with the scholarly care they deserve.

WG 9.2 has continued to operate as a debate forum with an almost exclusively European participation. In addition to their regular meetings they organize regular events (such as the Summer Schools, in collaboration with WG 9.6/11.7). I believe, though, that this Group could open up its membership and broaden its activities to address new emerging issues, such as the way ICT changes the nature of warfare.

I hope that the newly elected chair, Diane Whitehouse, will be receptive to such ideas. SIG 9.2.2 continues its activities on professional ethics and is well recognised for its work on national and international codes of practice for ICT professionals. WG 9.4 continued their roughly biannual cycle of conferences and have established a reputation of a forum of critical research on ICT and development. WG9.7 has somewhat slowed down when John Impagliazzo passed the chairmanship to Artur Tatnall. This is not necessarily a bad thing, if it reflects a more selective process for conference papers.

## 4.2 HCC7, HCC8, HCC 9

HCC7 in Maribor, in 2006, chaired by Jacques Berleur and Markku Nurminen, and hosted by Franci Pivec as local organizer, was a big success (Berleur et al. 2006). Dedicated to Rob Kling, and designed to highlight the Social Informatics interdisciplinary research that he had pioneered, the conference - unusually for the HCCs I have attended - attracted many scholars from the USA. At the TC meeting that followed the conference we decided to start planning for a conference on ICT policy in 2008.

We decided to take the HCC8 conference to a venue outside Europe and received a convincing organization and budget plan from Carina de Villiers from Pretoria University, South Africa. HCC8, chaired by me and Peter van den Besselaar, and Carina as the local chair, was considerably smaller than HCC6 (Avgerou et al. 2008). Importantly, we had only few papers from the regular attendees of the earlier HCCs and the conferences of the Working Groups – with the exception of WG9.4. But there was a significance presence of African participants and the conference had a decisive focus on ICT and development issues. In the concluding panel discussion, several African scholars expressed their frustration that emphasis on methodological rigor excludes from established academic forums African experiences and reflection on social changes associated with ICT. As I have been concerned about the sparsity of African contributions in international journals, I promised to explore the possibility for an event that will provide a chance to debate African research perspectives. With the help of Walter Brown from South Africa, the conference *Voices from Africa* was organized in Makerere, in March 2010, chaired by Gianluca Miscione, Walter de Vries, and Jude Lubega. I was not able to attend, but I was delighted to hear that it went well, with a mix European and African list of participants.

At the TC9 meeting in Pretoria we decided to start preparing the next HCC to take place in the 2010 World Computer Congress in Brisbane, Australia. There were two reasons for changing our long policy of non-participation in the WCCs. First, WCC2010 is a celebratory event for IFIP, marking its 50<sup>th</sup> anniversary, and it was felt that TC9 should be present. Second, the plans of the local organizers of WCC2010 had a thematic structure which matched the subject area of a number of TC9 Working Groups. As a result, we mobilized the Groups on Social Accountability, Virtuality, Sustainability and Security to form a four-stream conference, each with their own chairs, under the overall chairing and editorial support of Jacques Berleur and Magda Hercheui. WG9.7 on History is organizing its own conference in WCC2010, independently from HCC9. At the time of writing, the organization of TC9's contribution to the 2010 World Computer Congress is in full swing.

### 4.3 Some General Observations

The most valuable work of a TC takes place in its Groups. It must be obvious from my descriptions above that I have been concerned about the ups and downs of the level of activity and quality of the research fostered in the TC9 Working Groups. I tried repeatedly to open a discussion on these issues at the TC9 meetings, and each time I only managed to alarm WG chairs that another assessment, of those academics everywhere are subjected to, was looming. The message I got was loud and clear: WG officers and conference organizers are volunteers and IFIP cannot expect any different or more than they, voluntarily, offer. I was never convinced with this argument. We are all volunteers in the IFIP TCs and WGs, but our motivation stems from professional interests, in particular for the academics among us. A volunteer organization ought to have sound procedures of knowing its strengths and weaknesses, and should strive for high standards. Otherwise, if quality lapses occur, it alienates those who may be willing to and capable of serving its mission. As I see it, problems arise when Working Groups become insular and self-perpetuating and do not fully engage with the latest major research developments of their domain. The formalistic WG reporting in TC9 does not make an effective mechanism to identify, let alone to remedy, such problems. In the 1980s the TC9 set up review committees to evaluate WGs that were seen as faltering (Sackman 1986). Until now the idea of any effort to assess strengths and weaknesses – even as self-assessment – has been considered unacceptable by TC9 members.

The work of TC9 has to be seen in a context of growing level of scholarship in its domain of knowledge. The relationship of ICT with social change in general, and particular relevant questions - such as the way ICT contributes to changes in employment and democracy, the role of ICT in socio-economic development, the increasing surveillance and concomitant threats to privacy - are studied extensively by many academic disciplines in the social sciences. This is not any more an area of debate of well meaning engineers, computer scientists, or information managers with moral sensitivities. There is a great deal of theoretical knowledge, backed by empirical evidence that is collected and analysed with methodological skill.

As a result TC9 members tend now to be academic social scientists. Contributions to TC9 conferences study, analyse, explain, and occasionally predict, but rarely undertake to resolve the social issues they uncover in their empirical cases. There are some action research contributions, but not too many.

TC9 remains Eurocentric. With the exception of the Working Group on developing countries, a disproportionate number of WG members are from Europe, and most of their meetings and conferences take place in Europe. When we organize events in other continents they are noticeably less well attended by our members. I think this is a significant shortcoming for an organization like TC9 which addresses contemporary social issues related with a globalizing technology. But as university travel budgets become tighter it is unrealistic to expect European scholars to reach out to other conferences. Virtual meetings may be an option, but they are difficult to sustain for long hours with participants scattered around different time zones of the globe.

## 5 Concluding Remarks

Given the controversial beginning of TC9 within IFIP (Sackman 1986), it must be particularly reassuring for those who worked hard to establish it to know that, as the Committee is approaching 35 years of operations, it is highly respected and valued by the various IFIP constituents parts: the Technical Assembly, the Board, the member societies representatives at the General Assembly. The activities of the Committee expanded dramatically, from the original two to nine working groups, and produced a long list of publications and nine conferences on the original theme of Human Choice and Computers, which continues to capture its motivating idea. There have been difficult times of controversy. Klaus Brunnstein remembers:

‘TC-9’s 1st phase (1976-1984) was a very successful start with 2 then very active WGs: WG 9.1 "Computers and Work" as long as Ulrich Briefs was chair, and WG 9.2 "Social Accountability" with Louise, Jacques and me as "original team" starting discussions on "Ethics", which became later SIG 9.2.1. The controversy about "IFIP Code of Ethics", driven by Harold in his 2nd term (1985-1989), was indeed "difficult" but this helped Jacques and colleagues to convince IFIP (WCC panel in Madrid!) that a universal IFIP Code of Ethics cannot be developed! While Harold’s chair time was overshadowed by controversial disputes, this helped to sharpen TC-9s focus. Moreover, subsequent TC chairs (including me, Pertii and Jacques) owed Harold a first initiative to give TC chairs more weight in General Assembly (in my first year, TC chairs were observers, sitting in row 2, and were only allowed to present 5 minute reports of their TCs, and to answer questions from IFIP president.’<sup>7</sup>

At this point of time TC9 is distinct within IFIP for covering three levels of analysis regarding ICT - individual, organizational and society – with the required methodological and theoretical breadth<sup>8</sup>. Naturally with time some Working Groups get tired or become complacent and their activities decline in frequency or quality. It takes hard work from many people to secure the continuity of the volunteer communities of the Committee’s Working Groups at a level of performance that does justice to the complex issues they research.

Occasionally, during the day-long TC9 meetings I have attended some people got frustrated - and there has been a lot to be frustrated about - and wondered whether it will make any difference in the world if TC9 and its working groups disappear. Well, what TC9 is contributing and it shouldn’t be lost is a sustained collective effort of critical thinking on a whole range of concerns about the way society is changing with the relentless ICT innovation. It is true that TC9 is now one among many learned organizations that foster such thinking, but unlike the physical sciences which create knowledge more or less cumulatively, social studies need multiple perspectives and streams of thought, and TC9 makes valuable contributions to that end. It is worth all its members’ effort to keep it going and striving for high research standards.

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<sup>7</sup> From a conversation by email.

<sup>8</sup> I’m grateful to Pertii Jarvinnen for this point.

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# IFIP TC 10 Report: Computer Systems Technology

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**Abstract.** TC 10 was established in 1976 to deal with all technology aspects of computer systems, including hardware and firmware that computer applications are based on. There is a need for concepts, methodologies and tools in all life cycle stages of a computer system, from concept design through development and operation to retirement. TC 10's working groups have been instrumental in developing technologies for concurrent systems, embedded systems, dependable systems and the design of electronic systems. These topics being still important, there needs to be an evolution of new technologies that contribute to an even more widespread and ubiquitous use of computer systems in the future.

**Keywords:** Computer systems, embedded systems, concurrent systems, parallelism, dependable systems, fault tolerance, electronics, CAD.

Computer systems besides software also include firmware and hardware that applications run on. The technology for computer systems is based on concepts, methodologies and tools. This is relevant for all the stages in the life cycle of a computer system, from concept work through development and operation to retirement. The aims of the technical committee are the promotion of the state of the art and the worldwide coordination of information exchange on such technology for computer systems.

The scope of TC10 covers such areas as

- system and component concepts, architecture and organisation
- specification, design and fabrication verification methodologies of computer systems
- logical design and fabrication of components and systems
- evaluation of the parameters of computer systems and components
- reliability
- assessment of emerging technologies
- application of specific computer systems and components including peripherals.

TC 10 has been established in 1976. It sponsors a bi-annual conference (BICC – biologically inspired collaborative computing) held together with the IFIP world computer congresses. However, the bulk of technical work is done in its working groups. TC 10 today consists of four active working groups: 10.2 – Embedded Systems, 10.3 – Concurrent Systems, 10.4 - Dependable Computing and Fault Tolerance, 10.5 - Design and Engineering of Electronic Systems.

WG 10.2 is the newest working group, which has been established in 2006 out of a special interest group in WG 10.5. WG 10.5 itself was the result of a merger of two earlier working groups 10.2 and 10.5 in 1994. Apart from that, the TC had a working group 10.1 on computer-aided systems theory, which looked at fundamental systems aspects from a theory perspective, which was dissolved in 2007.

Areas that TC 10 is evaluating for its future work are “wearable computing” (computing devices to carry around, posing specific questions related to input/output devices, size, weight and power consumption), sensor networks, “green computing” (larger computer systems like server farms consume significant amounts of electrical power, which should be reduced) or “grid computing” (where both data and algorithms might not be local to a particular computer, but might be distributed over the internet).

## 1 WG 10.2 on Embedded Systems

The working group was established in 2006 and emerged from the IFIP Special Interest Group on Embedded Systems, SIG-ES that was run as a SIG of WG 10.5 before. In spite of its recent creation, the working group has already grown to 57 members, with most members coming from Europe and North America (and a smaller number from South America and Asia).

WG 10.2 aims

- to be the internationally open reference group for all aspects of embedded system design promoted and sponsored by the sponsoring organizations of the WG10.2;
- to further the dissemination and exchange of information and experience on research and applications in the area of embedded systems;
- to address ES designers and (especially young) researchers from both, industry and academia;
- to encourage education in all areas of embedded systems;
- to further the interdisciplinary character of embedded systems, that encompasses hardware (system on a chip), real-time software, real-time operating systems, control theory, intelligent features, dependability issues;

Embedded systems are gaining increasing importance in all aspects of engineering. It is expected that in the near future roughly no technical artifact will exist without embedded information technology. There is a tendency to software oriented embedded and/or dependable systems, based on standardized micro-controller cores. This implies that the design of embedded real-time software and real-time operating systems will play a dominant role in this field. As more and more networks of micro-controllers are applied, real-time communication systems and in general the design of distributed embedded systems will gain importance. As high-performance embedded computing components have become available, the challenges of designing embedded systems have become more acute.

The scope of WG10.2 comprises in detail to:

1. organize events in the area of ES (e.g. DIPES (Distributed and Parallel Embedded Systems));
2. seek co-operation with user and interest groups as well as with ES-oriented groups within IFIP and other societies;
3. discuss, disseminate and exchange information on ES-related standardization activities;
4. study and encourage curricula on ES design;
5. initiate and organize new ES-related activities.

## 2 WG 10.3 on Concurrent Systems

The working group was established in 1978. It has 59 members (North America: 20 members, South America: 1, Europe: 26, Middle East/Africa: 3, Asia/Pacific: 9). Its aims are

- The study of computer systems, having several computing elements, with the goal of improving the quality of attributes such as cost, performance, programmability, extensibility and functionality.
- The study includes the interrelation software/firmware/hardware in specification, design and implementation.

The scope of IFIP WG 10.3 includes the

- Exploration of problem areas and solutions pertaining to the interrelation between the hardware functions and the software functions in systems such as supervisors, data management, language translators, I/O systems and user interfaces.
- Evaluation of the implementation of trends in computer systems technology on the interrelation of software, firmware and hardware.
- Evaluation of the implication of this interrelation on the trends in computer systems technology.

Activities sponsored by WG 10.3 include conferences like Euro-Par, PACT (Parallel Architectures and Compilation Techniques) or NPC (Int. Conf. on Network and Parallel Computing).

## 3 WG 10.4 on Dependable Computing and Fault Tolerance

WG 10.4 was established by the IFIP General Assembly in October 1980. The background of its work is that increasingly, individuals and organizations are developing or procuring sophisticated computing systems on whose services they need to place great reliance. In differing circumstances, the focus will be on differing properties of such services -- e.g., continuity, performance, real-time response, ability to avoid catastrophic failures, prevention of deliberate privacy intrusions. The notion of

dependability, defined as the trustworthiness of a computing system which allows reliance to be justifiably placed on the service it delivers, enables these various concerns to be subsumed within a single conceptual framework. Dependability thus includes as special cases such attributes as reliability, availability, safety, security. The Working Group is aimed at identifying and integrating approaches, methods and techniques for specifying, designing, building, assessing, validating, operating and maintaining computer systems which should exhibit some or all of these attributes.

Specifically, the Working Group is concerned with progress in:

- Understanding of faults (accidental faults, be physical, design-induced, originating from human interaction; intentional faults) and their effects.
- Specification and design methods for dependability.
- Methods for error detection and processing, and for fault treatment.
- Validation (testing, verification, evaluation) and design for testability and verifiability.
- Assessing dependability through modeling and measurement.

The first meeting of the WG 10.4 was held in Portland, Maine, USA from June 22-23, 1981, and was attended by the 29 founding members. Since then, the membership has grown to 68 members (including 12 Emeritus members) from 12 countries. Fifty-two WG 10.4 meetings have been held in various locations, including USA (24 meetings), France (9), Japan (3), Canada, Germany, Italy, and UK (2 each), and Australia, Austria, Brazil, Cape Verde, India, South Africa, Sweden, and Tunisia (1 each).

Workshops. The main goal of WG 10.4 meetings is to conduct in-depth discussions of important technical topics in the form of workshops focusing on selected key topics. A principal theme since the first meeting has been the understanding and exposition of the fundamental concepts of dependable computing. Other major topics that have been the subject of workshops include the following:

Distributed computing, parallel computing, real-time systems, certification of dependable systems, specification methods, design diversity, specification and validation of hard dependability requirements, methodologies for experiments, VLSI testing and fault tolerance, hardware- and software testing and validation, fault tolerance in new architectures, communication networks, algorithms for distributed agreement, cars and computers, accidental vs. intentional faults, robotics and dependability, limits in dependability, avionics and dependability, dependability issues in medical computing, security and dependability, tools for dependable system design and evaluation, railway safety, safety cases, dependability in automotive electronics, computer systems benchmarking with applications to dependability, time and dependability, dependability, survivability, and integrity in e-commerce transactions and infrastructure, dependability benchmarking, utilization of formal methods in dependable systems, challenges and directions for dependable computing, dependability and survivability, middleware for adaptivity and dependability, measuring assurance in cyberspace + hardware design and dependability, open source and dependability, human computer interaction and dependability, autonomic web computing, grid

computing and dependability + nomadic computing and dependability, dependability in robotics and autonomous systems, infrastructure security and operational challenges of service provider networks, critical infrastructure protection, and achieving and assessing safety with computing systems.

**Conference Activities:** In addition to the group meetings, seven IFIP Working Conferences on Dependable Computing for Critical Applications (DCCA) were organized by WG 10.4 between 1989 and 1999. IFIP WG 10.4 has had a long involvement with what is now the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN). Beginning in 1982, the WG began serving as a cooperating sponsor of one of DSN's predecessor conferences, the annual IEEE International Symposium on Fault-Tolerant Computing (FTCS) organized by the IEEE Computer Society Technical Committee on Fault-Tolerant Computing, now called the TC on Dependable Computing and Fault Tolerance (TC-DCFT). This was continued until 2000, when DSN was formed by combining FTCS and DCCA into a single conference. At this point, the WG became a co-sponsor of the event in conjunction with the IEEE CS TC-DCFT.

**Publications:** In 1987, the WG initiated the book series Dependable Computing and Fault-Tolerant Systems. Initially published by Springer-Verlag, this series is now published by the IEEE Computer Society Press. Twelve volumes have been published, including a five-language volume (English, French, German, Italian and Japanese) on the Basic Concepts of Dependability and the associated terminology, and a thirteenth book is in preparation. The WG also actively supports together with the IEEE CS TC-DCFT the IEEE Transactions on Dependable and Secure Computing (TDSC). Of particular note is that a paper giving an update on conceptual issues and terminology entitled "Basic Concepts and Taxonomy of Dependable and Secure Computing" appeared in the first issue in 2004.

**Special Interest Group.** In addition to its regular activities, the WG established in 1999 a Special Interest Group (SIG) focusing on Dependability Benchmarking (SIG-DeB). In 2009 it added two additional SIGs on a) Dependability Concepts and Ontologies and b) Education in Resilient Computing.

## 4 WG 10.5 on Design and Engineering of Electronic Systems

The working group was established in 1994 by merging the old 10.2 and 10.5 working groups. Today it has 62 members (North America: 16, Europe: 35, Asia/Pacific: 9, South America: 2).

Electronic system design demands a tight integration on a very large profile of knowledge and skills ranging from hardware and software system architecture to semiconductor physics. The functionality of complex embedded or stand-alone systems to be applied in areas such as general-purpose computing, telecommunications, automotive, entertainment, and multimedia, may be realized by various combinations of analog and digital hardware and software parts. Systems can be implemented by single or multiple integrated circuits and software modules that can be either of special purpose, programmable, or reconfigurable. The working group aims at

providing a forum amongst creative experts to explore problem areas and solutions for the design of such complex electronic systems and also disseminating the solutions to a broader industrial and educational sphere.

The Working Group is interested in a broad range of topics related to the design and engineering of heterogeneous systems, containing hardware, software, and even mechanical parts:

- System Design Methods
- Embedded Systems
- Modeling and Specification
- Design Validation
- Formal Methods in Design
- Synthesis
- Design Environments
- Reconfigurable Computing
- VLSI Systems and Applications
- Physical Design
- Test and Testability
- Power-aware Design
- Analog and Mixed-Signal Systems
- Fundamental CAD Algorithms

Its major yearly events are the VLSI-SoC (Int. Conf. on VLSI and System-on-Chip) and DATE (Design, Automation and Test in Europe) conferences.

# IFIP Technical Committee 11: Security and Privacy Protection in Information Processing Systems

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**Abstract.** IFIP Technical Committee 11 (TC-11) on Security and Privacy Protection in Information Processing Systems was created in 1983 under the chairship of the late Kristian Beckman of Sweden. Representatives from more than 30 IFIP member societies are members of TC-11 and meet at least once a year at the IFIP/Sec conferences that are held in different member countries.

**Keywords:** Security, Privacy, Protection, Information Processing Systems, IT Systems, ICT Systems, IFIP, IFIP Technical Committee 11.

## 1 TC-11 – A Snapshot

TC-11 can to some degree be recognized by its aims, scope, and last but not least its working groups, which are introduced in the following sections. All three underwent some significant changes over the past 27 years, which are documented in the remainder of this article.

### 1.1 TC-11 Aims

To increase the trustworthiness and general confidence in information processing and to act as a forum for security and privacy protection experts and others professionally active in the field.

### 1.2 TC-11 Scope

Work towards:

- the establishment of a common frame of reference for security and privacy protection in organizations, professions and the public domain;
- the exchange of practical experience;
- the dissemination of information on and the evaluation of current and future protective techniques;

- the promotion of security and privacy protection as essential elements of information processing systems;
- the clarification of the relation between security and privacy protection.

### 1.3 TC-11 Working Groups

Already in 1985 TC-11 established its first working groups. Since then number and activity of TC-11's WGs underwent a non-linear but steady growth with two new WGs being established in 2010 driving the number of TC-11s WGs up to twelve, of which two WGs are shared with fellow TCs. The current WG list reads as follows:

1. WG 11.1: Information Security Management (established 1985)
2. WG 11.2: Pervasive Systems Security (established 1985 as the WG on Office Automation and from 1992 until 2009 named Small System Security)
3. WG 11.3: Data and Application Security (established 1987 under the name of Database Security and renamed 2001)
4. WG 11.4: Network & Distributed Systems Security (established 1985 under the name of Crypto Management and from 1992 until 2003 named Network Security)
5. WG 11.6: Identity Management (established 2006)
6. WG 9.6 / 11.7: IT Misuse and The Law (established 1990)
7. WG 11.8: Information Security Education (established 1991)
8. WG 11.9: Digital Forensics (established 2004)
9. WG 11.10: Critical Infrastructure Protection (established 2006)
10. WG 11.11: Trust Management (established 2006)
11. WG 11.12: Human Aspects of Information Security and Assurance (established 2010)
12. WG 8.11 / 11.13: Information Systems Security Research (established 2010)

## 2 The Historical Background of TC-11 and Its Flagship Conference

In May 1983, the 1st International Conference on Information Security, IFIP/Sec '83, took place in Stockholm, Sweden. This conference was organized by members of the Swedish Special Interest Group on Information Security, as well as a number of further people, including some from existing IFIP Committees. The organization was under the chairman-ship of Kristian Beckman of Sweden. A proposal was submitted to IFIP's General Assembly (GA), and at its meeting in September 1983 in Paris, TC-11 was formally established. Kristian Beckman was appointed as the first Chairman of TC-11.

The 2nd International Conference on Information Security, IFIP/Sec '84, took place in May 1984 in Toronto with the motto "Computer security: a global challenge". During this conference, the first official meeting of TC-11 was held. Unfortunately, because of ill health, Kristian Beckman could not attend that meeting. He asked Per Hoving from Sweden to act as Chairman, but during the conference, the sad news that Kristian Beckman passed away, reached TC-11.

The next TC-11 meeting took place in Dublin during IFIP/Sec 85, which had the motto “Computer security: The practical issues in a troubled world”. Per Hoving was elected as Chairman for a three year term, with Willis Ware from the USA as Vice-Chairman.

Subsequent IFIP/Sec Conferences took place as follows and show the real global approach of TC-11 both with regards to its flagship conference as well as its management teams:

- IFIP/Sec 86 Monte Carlo: “Security and protection in information systems”
- 1987: No IFIP/Sec Conference took place, but a TC-11 meeting was held in Vienna (Austria) in conjunction with a TC-11 Working Group conference.
- IFIP/Sec 88 Gold Coast, Australia: “Computer security in the age of information“. At the corresponding TC-11 meeting Bill Caelli from Australia was elected as new Chair, Willis Ware re-elected as Vice-Chair, and David Lindsay from the UK as Secretary.
- 1989: No IFIP/Sec conference was held, and efforts were combined with the IFIP Congress which took place in San Francisco, USA.
- IFIP/Sec 90 Helsinki, Finland: “Computer security and information integrity”
- IFIP/Sec 91 Brighton, England: “Information security”
- IFIP/Sec 92 Singapore: “IT security: the need for international cooperation”
- IFIP/Sec 93 Toronto, Canada: “Computer security”. Unfortunately David Lindsay died before IFIP/Sec 93. Bertil Fortrie from the Netherlands took over as Secretary.
- IFIP/Sec 94 Curaçao: At the TC-11 meeting during this conference Sebastiaan von Solms from South Africa was elected as Vice-Chair and David Bachelor from Canada as Secretary. Later that year Sebastiaan von Solms was appointed as acting Chair of TC-11 by the IFIP President.
- IFIP/Sec 95 Cape Town, South Africa: “Information security - the next decade”. At the TC-11 meeting preceding the conference Sebastiaan von Solms was elected as new Chair with Reinhard Posch from Austria as Vice-Chair.
- IFIP/Sec 96 Samos Island, Greece: “Information systems security: facing the information society of the 21st century”
- IFIP/Sec 97 Copenhagen, Denmark: “IT Security in Research and Business”
- IFIP/Sec 98 Vienna/Budapest, Austria/Hungary with the motto “Global IT security “ and as part of the IFIP World Computer Congress
- 1999: No IFIP/Sec Conference took place, but a TC-11 meeting was held in Amsterdam (Netherlands) in conjunction with a TC-11 Working Group conference.
- IFIP/Sec 2000 Beijing, China with the motto “Information Security for global information infrastructures “as part of the IFIP World Computer Congress: Geoff Fairall from Zimbabwe was appointed as new Secretary of TC-11.
- IFIP/Sec 2001 Paris, France: “Trusted information: the new decade challenge“. At the TC-11 meeting preceding the conference Leon Strous from the Netherlands was elected as new Chair with Kai Rannenberg from Germany as Vice-Chair. Rossouw von Solms from South Africa was appointed as WG coordinator.
- IFIP/Sec 2002 Cairo, Egypt: “Security in the information society: visions and perspectives”
- IFIP/Sec 2003 Athens, Greece: “Security and privacy in the age of uncertainty”

- IFIP/Sec 2004 Toulouse, France with the motto “Security and protection in information processing systems “ as part of the IFIP World Computer Congress
- IFIP/Sec 2005 Tokyo-Chiba, Japan: “Security and privacy in the age of ubiquitous computing“. Lech Janczewski from New Zealand, representing SEARCC, was appointed as Secretary.
- IFIP/Sec 2006 Karlstad, Sweden: “Security and privacy in dynamic environments”
- IFIP/Sec 2007 Johannesburg-Sandton, South Africa: “New approaches for security, privacy and trust in complex environments”. At the TC-11 meeting preceding the conference Kai Rannenberg from Germany was elected as new Chair with Rossouw von Solms from South Africa as Vice-Chair.
- IFIP/Sec 2008 Milano, Italy as part of the IFIP World Computer Congress: At the TC-11 meeting preceding the conference Yuko Murayama from Japan was appointed as WG Coordinator.
- IFIP/Sec 2009 Pafos, Cyprus: “Emerging Challenges for Security, Privacy and Trust”
- IFIP/Sec 2010 Brisbane, Australia with the motto “Security & Privacy – Silver Linings in the Cloud“ as part of the IFIP World Computer Congress: At the TC-11 meeting preceding the conference Yuko Murayama from Japan was appointed as Vice Chair in addition to Rossouw von Solms from South Africa.
- IFIP/Sec 2011 scheduled for Lucerne, Switzerland with the motto “Future Challenges in Security and Privacy for Academia and Industry”
- IFIP/Sec 2012 scheduled for Greece

TC-11's annual IFIP/Sec conferences are established as an integral and well-reputed part of the international Information Security conference scene. The same holds for many Working Group conferences.

### 3 Main Development Trends in the Field of TC-11

#### 3.1 The 80es

The early eighties were the years when personal computers started to invade people's lives. One saw an increasing concern about several issues like privacy and witnessed the “birth” of computer viruses. The attention for security started to evolve from the closed defence and mainframe environments to business and small computer environments, from confidentiality towards integrity, from technical security to managerial issues. This was clearly an era where establishing a TC dedicated to security was an obvious thing to do. The founders made it clear by the name and aims and scope of TC-11 that security is not limited to computers but encompasses computers, applications, data and the organization. That was more or less a visionary view because in those days the term computer security was more common than the term information security.

#### 3.2 The 90es

The increasing trend towards distributed systems, and the associated use of communication networks, as well as the tendency to use such systems and networks for more

and more highly sensitive applications like electronic commerce and medical applications, catapulted the absolute importance of the securing and protecting of electronic information during storage, processing and transmission right into the forefront of Information Technology research and implementation.

It became clear that a very large number of such systems would not be acceptable if proper solutions would not exist for the security and protection of such systems. Developments in cryptography showed to be essential to provide non-reputability and proof of origin in electronic messages. Without digital signatures, provided by cryptography, electronic purchasing was deemed to be not possible.

Security in distributed systems became known to be much more difficult and complex than in centralized systems. Authentication and Authorization in distributed systems are of extreme importance, and must be given the necessary attention.

New techniques to implement and to specifically manage Information Security were constantly needed, and with the growing complexity of IT systems, the internal control of the systems became ever more important. The same held for the growing role, importance and commitment of senior management of companies, up to Board level, towards the security of their companies' IT systems. Special efforts were needed to provide skilled people to be able to evaluate, address and manage security risks involved in IT systems, and to ensure that such systems are operated within the necessary secure environment.

With the fact that computers became so much more user friendly than before, and so much more were being used by the public in general, a serious effort showed up as being needed to make these people aware of the importance of Information Security on their systems, and to show them the risks if such security measures were ignored.

In the application field, Information Security became ever more essential for the growing use of systems in medical applications. Standardization efforts and cryptology policies in different countries also required attention. All in all, Information Security had never before been a more important and essential part of IT systems and networks.

These developments were reflected in TC-11's work mainly by the expanding activities in the respective TC-11's Working Groups, but also by public statements from TC-11. One statement concerns IFIP's position on crypto policies and was drafted in the second half of the nineties. It reflected that cryptography was a hot topic from a policy point of view and discussions concentrated on questions such as whether governments should have access to the keys in encryption systems used by companies and individuals. A second statement concerned information security assessment and certification and addressed TC-11's opinion that the information security status of IT systems and the information security management of such systems should be assessed against specified standards related to information security management and that members of IFIP should be instrumental to ensure that such standards, for systems and individuals, be harmonized on an international level.

### **3.3 The Beginning of the New Millennium**

The early beginning of the new Millennium was driven by the Internet and mobile Communication becoming more and more mainstream. "E-words" such as "E-Commerce" and "E-Business" became and more popular. While many of them

were just buzzwords, as almost everything from the “old” world became e-d there was little doubt that some of these areas would have significant impact on business and society as a whole. Following this it stepwise became clear that trust and confidence in the security and reliability of all those “e-words” was necessary for them to become the success that everybody was hoping (and waiting) for. So many topics within the scope of TC-11 were influential in that respect, e.g. identification and authentication means (biometrics and smart(er) cards), integrity of messages, secure business transactions and payments.

The events of September 11, 2001 pointed strongly to further aspects of security such as cyber terrorism and (critical) infrastructure protection (CIP). Not only did these issues require new technologies or larger scale use of known technologies (biometrics and smart(er) cards again?) they also shed a different light on privacy issues and human aspects.

To address these issues in an effective way even more cooperation between the different IFIP disciplines was required. Topics of most of the TC's became relevant such as topics like software quality (TC-2), training people (TC-3), safety-critical systems (TC-10), and social aspects and human-computer interaction (TC-9 and TC-13). And although those issues may have seemed to be of a technical nature, one could not hide from the fact that cultural and political aspects also do play a role. IFIP had to consider this when addressing the issues and trying to find a way to deal with them in an as “neutral” as possible fashion. New successful WGs such as WG 11.9 Digital Forensics (established 2004) and the trio of WG 11.6: Identity Management, WG 11.10 Critical Infrastructure Protection, and WG 11.11 Trust Management (all three established 2006) reflected these developments.

A related achievement concerned the objective to promote security and protection as essential elements of information processing systems. TC-11 had been successful in this area, which can be measured directly within the IFIP community by the fact that more and more TC's and working groups were including security in their aims and scopes. This also resulted in an increasing cooperation between TC's and working groups on security topics such as the Communications and Multimedia Security (CMS) conferences of TC-6 and TC-11 and the E-Commerce, E-Government and E-Business (I3E) conferences of TC-6, TC-8 and TC-11, and last but not least the joint WG with TC-9 on legal, privacy and social issues (WG 9.6/11.7 IT Misuse and the Law), a very successful example of an active cooperation.

At the same time some “old” issues did not disappear and one did not succeed in eliminating them. Although their “hot” days were over and they were no longer in the focus of attention (with the exception of an occasional short hype), these activities still had and continued to have a significant impact. Hackers and viruses continued to cost society a lot of money and the security professionals kept trying to find ways to limit the effects as much as possible.

Another important issue was attention for developing countries. While IFIP as a whole supported the work of the Developing Countries Support Committee (DCSC) and the World IT Forum (WITFOR) TC-11 was one of the TCs actively participating in these initiatives by e.g. actively strengthening its activities in developing countries and encouraging participation from the respective member societies to also review and revise traditional (maybe “northern” or “western”) views.

Moreover in 2002 TC-11 agreed on another statement which contains a request to all member societies of IFIP to urge their relevant government and education bodies to ensure that proper education and certification requirements are set for those people who intend to become information technology security professionals and including those who audit the security of IT systems.

### **3.4 Current Challenges**

Especially the Internet but also other Information and Communication Technology (ICT) systems such as Mobile Communication systems have moved even further on: From popular and established mainstream technologies to the information and communication backbones for many societies and countries and moreover as the essential infrastructures for global and international cooperation.

The rapid and radical movement towards new and Internet based ICT systems was partially supported by the decline of some established technologies, but also by the changing habits of users. It has raised major questions of trust in to the ICT systems and into information security as such and demonstrated the importance of protection of citizens, consumers and their privacy. TC-11 reflected this development in more and more IFIP/Sec mottos since 2003 and moreover with its first TC name change since its inception: In 2007 the term “Privacy” was added to TC-11’s name and subsequently the aims and scope were adapted accordingly. This was preferred to simply establishing a new WG on Privacy as the deep and delicate relations between security and privacy were considered where information security sometimes supports privacy and sometimes endangers it. These delicate relations affect the work of most WGs in IFIP TC-11.

The further miniaturisation and the pervasive use of ICT lead WG 11.2 to changing its name from “Small System Security” to “Pervasive Systems Security” reflecting the fact, that almost every aspect of (human) life is now exposed to ICT. This trend also led to the founding of WG 11.12 “Human Aspects of Information Security and Assurance”. At the same time it became clear, that Information Security is also important for researchers and in the information systems field leading to a new WG 8.11 / 11.13 “Information Systems Security Research” together with TC-8.

## **4 The Kristian Beckman Award**

TC-11 established the Kristian Beckman Award in 1992 to commemorate the first chair of the committee, Kristian Beckman from Sweden, who had also been responsible for promoting the founding of TC-11 in 1983. This award is granted not more than annually to a successful nominee and is usually presented at IFIP/Sec. The objective of the award is to publicly recognise an individual, not a group or organisation, who has significantly contributed to the development of information security, especially from an international perspective. However this particular requirement will not necessarily preclude nominations of those whose main achievements have been made on a national level. Many of the awardees can be considered IFIP (TC-11) Pioneers.

TC-11 was honoured to award the Kristian Beckman Award to:

- Harold Highland (USA) in 1993, presented in Toronto (Canada)
- Per Hoving (Sweden) in 1995, presented in Cape Town (South Africa)
- Sushil Jajodia (USA) in 1996, presented in Samos (Greece)
- Donald Davies (UK) in 1997, presented in Copenhagen (Denmark)
- Richard Sizer (UK) in 1998, presented in Vienna and Budapest (Austria and Hungary)
- Willis W. Ware (USA) in 1999, presented in Amsterdam (Netherlands)
- William Caelli (Australia) in 2002, presented in Cairo (Egypt)
- Roger Needham (UK) in 2003, presented in Athens (Greece)
- Jean-Jacques Quisquater (Belgium) in 2004, presented in Toulouse (France)
- William List (UK) in 2005, presented in Tokyo-Chiba (Japan)
- Butler W. Lampson (USA) in 2006, presented in Karlstad (Sweden)
- Pierangela Samarati (Italy) in 2008, presented in Milano (Italy)
- Klaus Brunnstein (Germany) in 2009, presented in Pafos (Cyprus)
- Sebastiaan von Solms (South Africa) in 2010, presented in Brisbane (Australia)

## 5 The Future Role of TC-11

With the rising importance of ICT systems and society's dependability on these systems, the role of TC-11 and its topics has risen significantly over the last years, and is still rising. TC-11 has taken up this challenge and is active on several fronts through its Working Groups, its special conferences to discuss research developments, and other dissemination services to member societies of IFIP and to the international community in general. However a number of challenges remain and are even growing:

- Still relevant security and privacy issues are only considered relatively late in system development processes – and often still too late.
- Security and privacy are “horizontal” subjects and orthogonal to many topics that are cared for by other IFIP TCs.
- In many cases appropriate decisions with regard to security and privacy can only be taken, if the respective (application) context is considered.

Therefore TC-11 is encouraging the inclusion of security and privacy topics in all areas and actively cooperates with other TCs. This will hopefully contribute to a situation, where relevant security and privacy considerations and measures are embedded as a natural topic in all domains rather than coming in late.

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# TC 11: Security and Privacy Protection in Information Processing Systems: Visions from the IT Engine Room

Leon Strous

Interview with Leon Strous, TC-11 Chair (May 2001 - May 2004)

**Keywords:** IFIP, TC11, Visions.

**Leon Strous** is senior IT-auditor in the Payment Systems Policy Department of De Nederlandsche Bank (DNB), the central bank of the Netherlands in Amsterdam. Together with his colleagues he assesses the security and reliability of payment systems and payment products. He is also involved in work in this area done by the European System of Central Banks (ESCB). Prior to joining DNB in 1993 he has worked for Philips Electronics since 1985 in the areas of internal control, administrative organization and information security. His education is in business administration and business informatics (both equivalent to a bachelor's degree) and postgraduate IT-audit at the Vrije Universiteit Amsterdam. He is a registered IT-auditor (RE) in the Netherlands and a Certified Information Systems Auditor (CISA).

His IFIP involvement started in 1993 as the vice-chair of the organizing committee for IFIP SEC'94. He is the Dutch TC-11 representative since 1994 and the chair of this committee since May 2001. He has been the chair of working group 11.5 from 1996 until 2001. He is also the GA member for the Netherlands since 2001 and a member of the WITFOR Steering Committee.

His other activities include the vice-presidency of the Dutch Computer Society (NGI) since 2000 and the membership of standards committee 381.27 Security techniques of NEN (the Dutch national standards body) since 1993. Besides information security, due to a lack of time his hobbies are limited to an occasional game of squash and billiards.

## **The Delivery Co: In your opinion, which are the most significant developments and activities of your TC since its foundation?**

**L. Strous:** although according to the records TC-11 was formally established in 1984, the first IFIP SEC conference (TC-11's flagship conference) already took place in May 1983 in Stockholm, Sweden. The early eighties were the years when personal computers started to invade people's lives. We saw an increasing concern about several issues like privacy and we witnessed the "birth" of computer viruses. The attention for security started to evolve from the closed defense and mainframe environments to business and small computer environments, from confidentiality towards integrity, from technical security to managerial issues. This was clearly an era where establishing a TC dedicated to security was an obvious thing to do. The founders made it clear by the name and aims and scope of TC-11 that security is not

limited to computers but encompasses computers, applications, data and the organization. That was more or less a visionary view because in those days the term computer security was more common than the term information security.

The activities of TC-11 have always followed the developments in our field and it has been a contribution of TC-11 that all aspects of security have been broadly covered at its SEC conferences, with attention for new developments and new concerns. The working groups address a wide area of more focused topics in their working conferences: information security management, small systems security, data and applications security (previously database security), communication and network security, integrity and internal control in information systems, IT misuse and the law and security education. Through its conferences and working groups, TC-11 has succeeded in pursuing its aims and scope to increase the reliability and general confidence in information processing, to act as a forum for security managers and other professionally active in the field of information processing security, to disseminate information and exchange practical experience in security work and to promote security and protection as essential elements of information processing systems.

An important achievement of TC-11 has been the drafting of two statements that have been adopted by IFIP. The first statement concerns IFIP's position on cryptopolicies and this was drafted in the second half of the nineties when cryptography was a hot topic from a policy point of view and discussions concentrated on questions such as whether governments should have access to the keys in encryption systems used by companies and individuals. A second statement concerned information security assessment and certification and addressed TC-11's opinion that the information security status of IT systems and the information security management of such systems should be assessed against specified standards related to information security management and that members of IFIP should be instrumental to ensure that such standards, for systems and individuals, be harmonized on an international level. Last year, TC-11 agreed on another statement which contains a request to all member societies of IFIP to urge their relevant government and education bodies to ensure that proper education and certification requirements are set for those people who intend to become information technology security professionals and including those who audit the security of IT systems.

In my view such statements are important contributions to the information society and IFIP should issue such statements timely whenever there is an opportunity.

Another achievement concerns the objective to promote security and protection as essential elements of information processing systems. TC-11 has been successful in this area, which can be measured directly within the IFIP community by the fact that more and more TC's and working groups are including security in their aims and scopes. I am particularly pleased with the increasing cooperation between TC's and working groups on security topics. Good examples of this are the Communications and Multimedia Security (CMS) conferences of TC-6 and TC-11 and the E-Commerce, E-Government and E-Business (I3E) conferences of TC-6, TC-8 and TC-11. And of course I must mention the joint working group with TC-9 on legal, privacy and social issues (Wg 9.6/11.7 IT: Misuse and the Law), a very successful example of an active cooperation. I am confident that such cooperation will only increase in the near future.

**The Delivery Co: Are there any current technical activities within the scope of your TC, which you feel could have a significant societal/economic impact in the future?**

**L. Strous:** The most obvious issues that already have a significant impact are cyberterrorism and (critical) infrastructure protection. Not only do these issues require new technologies or larger scale use of known technologies such as biometrics and smart(er) cards, but they also shed a different light on privacy issues and human aspects as was already mentioned by Jacques Berleur in his TC-9 vision. To address these issues in an effective way requires even more cooperation between the different IFIP disciplines than I described previously. Probably most of the TC's will or should be involved, just think of topics like software quality (TC-2), training people (TC-3), safety-critical systems (TC-10), social aspects and human-computer interaction (TC-9 and TC-13). It will be a challenge for the IFIP community to define projects that result in meaningful statements, guidelines and tools that can be used by many interested parties, rather than only discuss research results and business practices between the professionals within our own community.

Trust and confidence in the security and reliability of all the “e-words” is something that is necessary for all these e-words to become the success that everybody is hoping (and waiting) for. In my view many of these e-words are just buzzwords, it seems like everything from our “old” world is being e-d. However, there is no doubt that some of these areas already have or most certainly will have a significant impact on our society. This means that many topics within the scope of TC-11 are influential in that respect. Just think of identification and authentication means (biometrics and smarter cards again?), integrity of messages, secure business transactions and payments, and so on.

Another remarkable observation is the fact that some old issues have not disappeared and that we have not succeeded in eliminating them. Although their “hot” days are over and they are no longer in the focus of attention (with the exception of an occasional short hype), these activities still have and will undoubtedly remain to have a significant impact. Hackers and viruses continue to cost our society a lot of money and the security professionals must keep trying to find ways to limit the effects as much as possible.

**The Delivery Co: Are there any specific technical issues you find important for IFIP as a whole to address?**

**L. Strous:** As said before, issues like cyberterrorism and critical infrastructure protection may require a broad IFIP involvement. And although these issues may seem to be of a technical nature, we cannot hide from the fact that cultural and political aspects also do play a role. IFIP must take this into consideration when addressing these issues and must try to find a way to deal with it as “neutral” as possible.

Another important issue is attention for developing countries, a view shared with many of my fellow TC-chairs. It is good to see that IFIP fully supports the work of the Developing Countries Support Committee (DCSC) and the World IT Forum (WITFOR). Discussions during the preparation of the first WITFOR conference (to take place in August 2003) have shown that IFIP should evaluate the approach

towards developing countries and should address the questions whether the old (western) attitude is still valid and whether the old approach is still the most effective.

A final issue I would like to mention concerns fundamental research. In economic downturns, there is a tendency in industry to only spend money on work that shows immediate practical results / products. I guess that this is not only the case for security research but for all IT aspects and areas. IFIP should make it clear to industry and perhaps also to governments that (theoretical / fundamental) research is necessary and often lead to discoveries of useful tools and means, that perhaps would not have been discovered had research only been driven by direct (industry) needs.

# IFIP Technical Committee 12 –Artificial Intelligence

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**Keywords:** IFIP, TC-12, Artificial Intelligence.

At the height of the Artificial Intelligence boom, which was scientifically as well as commercially motivated, IFIP decided to set the Technical Committee 12 on Artificial Intelligence to co-ordinate and drive its activities. AI is one of the oldest and most exciting subfields of computing, covering such areas as intelligent robotics, intelligent planning and scheduling, model-based reasoning, fault diagnosis, natural language processing, machine translation, knowledge representation and reasoning, knowledge-based systems, knowledge engineering, intelligent agents, machine learning, neural nets, genetic algorithms and knowledge management.

TC12 was formed back in 1989. It now has members representing 33 national computer societies, together with representatives of the ACM and the IEEE, and has six working groups covering major topics in AI. Its current chair is Tharam Dillon.

The Aims of TC12 are:

- To foster the development and understanding of Artificial Intelligence and its applications worldwide.
- To promote interdisciplinary exchanges between Artificial Intelligence and other fields of information processing.
- To contribute to the overall aims and objectives and further development of IFIP as the international body for Information Processing.

The work of technical work of TC12 is carried through its six working groups and their current chairs and aims are:

**WG12.1. Knowledge Representation and Reasoning:** Timo HONKELA, Helsinki University. The aims of WG12.1 are to study and develop theory, formalisms, algorithms and techniques for representation and reasoning with knowledge.

**WG12.2 Machine Learning and Data Mining:** Zhongzhi SHI, Chinese Academy of Sciences. The aims of WG12.2 are to study and develop theory and techniques for machine learning and data mining. Machine learning is the automated acquisition of knowledge. Learning here encompasses both symbolic structures such as rules, decision trees concept hierarchies and sub-symbolic structures such as neural nets.

**WG 12.3. Intelligent Agents:** Helder COELHO, Universidade de Lisboa. The aims of WG12.3 are to study and develop the theory, modelling, architectures and

techniques for intelligent agents. It includes multi agents and mobile agents and the software engineering if these.

**WG12.4/2.12. Web Semantics:** Tharam Dillon, Curtin University. The aims of WG12.4 are to study and develop theory and techniques for representation and reasoning about web semantics including ontologies, linked data, content based information retrieval and metadata and mashups.

**WG 12.5 Artificial Intelligence Applications:** Max Bramer, University of Portsmouth. The aims of WG12.5 are to explore the use of Artificial Intelligence techniques for applications development including conceptual frameworks for specification and design, user interface design and integration with conventional software systems.

**WG12.6 Knowledge Management:** HDR Eunika MERCIER-LAURENT, Management and IAE Lyon University. The aims of WG12.6 are to develop advanced methods for organizing, accessing and exploiting multidisciplinary knowledge within organisations and enterprises including intelligent support for knowledge cultivators.

In recent years TC12 and its Working Groups have sponsored or co-sponsored a range of events worldwide. Details of some of these are given on this website. It has also made major contributions to recent IFIP World Computer Congresses.

The Founding Chair of the TC12 was Professor Robert Meersman (1989 -1995) who provided a strong vitality to the activities of the TC. During this period, the initial five working groups of Knowledge Representation, Machine Learning, Reasoning Techniques, Natural Language Processing, and Knowledge Development for Applications. The next chair was Luigia Carlucci-Aiello (1996-1997). Bernd Neumann was the third chair from 1997 to 2002. A further working group was also formed during this period on Computer vision. In subsequent years, the TC also faced strong competition from other bodies such as AAAI and IJCAI. Max Bramer, the immediately previous Chair of TC12 (2003-2009) and John Debenham, the immediately previous secretary of the TC both played an important role in revitalizing the TC and positioning it to pick up new topics and supporting them with Working Groups (WG). Thus they formed WGs on Knowledge Management, Data Mining, and together with TC2 (then led by Robert Meersman) a WG on Web Semantics. This led to the creation of the current six working groups. The working group on Computer Vision was also closed down in 2003. In addition, they initiated the Artificial Intelligence Conference to run in conjunction with the WCC, since 2004.

This period also saw two other flagship conferences organized by TC12 namely:

1. The Artificial Intelligence and Applications (AIAI) which started in Toulouse and held recently in Greece
2. The Intelligent Information Processing Conference started in China by Professor Shi from the Chinese Academy of Sciences in 2000. It moved round the world with the most recent being held in the United Kingdom.

In addition, an annual workshop beginning in 2005 was organized under the umbrella of WG 2.12/12.4 on Web Semantics under the chairmanship of Tharam Dillon in conjunction with the On The Move conferences (OTM).

For his contributions not only to TC12 but also WG2.6 on Database and chairmanship of TC 2 for 5 years, Robert Meersman was recognized with the award of "IFIP Pioneer" with the following citation "Robert Meersman initiated the field of Data Semantics through the successful series of IFIP Data Semantics Conferences (nos. 1-10), starting from 1985 organised by WG2.6 (Database) which helped to establish the community that was influential in the later development of scalable web semantics."

A full list of past events organised over the last twelve years is given below:

## 2010

Sixth IFIP International Workshop on Web Semantics (SWWS 2010) Crete, Greece, October 25th - October 29th 2010

23rd IEEE International Symposium on Computer-Based Medical Systems (CBMS 2010), Perth, Australia, October 12-15 2010 (IFIP TC12 is the Technical Co-sponsor)

"Sixth IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI-2010)" Ayia Napa, Cyprus, from October 5 to October 7, 2010

"IFIP Conference on "Artificial Intelligence" (IFIP AI 2010)" as part of the IFIP World Computer Congress WCC 2010, Brisbane, Australia, from September 20 to September 23, 2010

## 2009

Fifth IFIP International Workshop on Web Semantics (SWWS 2009) Vilamoura, Portugal, November 1st - November 6th 2009

"Third International Conference on Computer and Computing Technologies in Agriculture (CCTA2009)" Beijing, China, from October 14 to October 17, 2009.

4th Special Track on Ontologies for Biomedical Systems with 22nd IEEE International Symposium on Computer-Based Medical Systems (CBMS 2009) New Mexico, USA, August 3-4 2009

5'th IFIP International Conference on Artificial Intelligence Applications & Innovations (AIAI 2009), Thessaloniki, Greece, from April 23 to April 25, 2009

Knowledge 2009 (Znalosti 2009), Brno, Czech Republic, from February 4 to February 6, 2009

## 2008

Fourth IFIP International Workshop on Web Semantics (SWWS 2008) Monterrey, Mexico, November 9th - November 14th 2008

Fifth IFIP International Conference on Intelligent Information Processing (IIP2008), Beijing, China, from October 19 to October 22, 2008

Second IFIP International Conference on Computer and Computing Technologies in Agriculture (CCTA2008), Beijing, China, from October 18 to October 20, 2008

IFIP AI 2008: Artificial Intelligence in Theory and Practice, Milano, Italy, from September 7 to September 10, 2008

3rd Special Track on Ontologies for Biomedical Systems with 21st IEEE International Symposium on Computer-Based Medical Systems (CBMS 2008)  
Jyväskylä, Finland June 17-19 2008

Knowledge 2008 (Znalosti 2008), Bratislava, from February 13 to February 15, 2008

## 2007

Third IFIP International Workshop on Web Semantics (SWWS 2007)  
Vilamoura, Algarve, Portugal, November 29th - November 30th 2007

Fourth IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI 2007), Athens, Greece, from September 19 to September 21, 2007

2nd Special Track on Ontologies for Biomedical Systems with 20th IEEE International Symposium on Computer-Based Medical Systems (CBMS 2007)  
Maribor, Slovenia 20-22 June 2007

## 2006

Second IFIP International Workshop on Web Semantics (SWWS 2006)  
Montpellier, France, November 1st - November 3rd 2006

Third IFIP International Conference on Intelligent Information Processing ICIP2006, Adelaide, Australia, September 20 - 23, 2006

IFIP Conference on "Artificial Intelligence" (IFIP AI 2006) as part of the World Computer Congress WCC 2006, Santiago, Chile, August 12 - 24, 2006

1st Special Track on Ontologies for Biomedical Systems with 19th IEEE International Symposium on Computer-Based Medical Systems (CBMS 2006)  
Salt Lake City, Utah 22–23 June 2006

Third IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI 2006) Athens, Greece from June 7 to June 9, 2006.

## 2005

First IFIP International Workshop on Web Semantics (SWWS 2005) Agia Napa, Cyprus, October 31st - November 4th 2005

Second IFIP Conference on “Artificial Intelligence Applications and Innovations” Beijing, China, September 7-9, 2005

First International IFIP/WG12.5 Working Conference on Industrial Applications of Semantic Web University of Jyväskylä, Jyväskylä, Finland, August 25-28, 2005

Seventh Agent Systems Summer School, Utrecht, the Netherlands, 18 - 22 July 2005

International Conference on Data Mining and Machine Learning MLDM'2005 July, 9-11, 2005 Leipzig, Germany

International and Interdisciplinary Conference on Adaptive Knowledge Representation and Reasoning AKRR'05 June 15-17, Espoo, Finland

UK KDD Colloquium, Wednesday 6 April 2005 The University of Liverpool, UK

**2004**

“AIAI 2004 First IFIP Conference on Artificial Intelligence Applications and Innovations” within IFIP World Computer Congress (WCC2004) Toulouse France August, 22-27, 2004.

“NeuKnow’2003 The 2003 Neurocomputing Colloquium and Workshop” 20 and 21 November, 2003, AUT Technology Park, Auckland, New Zealand

**2003**

“8th UK CBR Workshop” A workshop as part of The Twenty-third SGAI International Conference on Innovative Techniques and Applications of Artificial Intelligence Peterhouse College, Cambridge, UK 15th-17th December 2003.

Smart eBusiness Workshop within IICAI 2003 (Hyderabad, India)

**2002**

IIP-2002 within IFIP WCC 2002 (Montreal)

**2000**

KBCS2000 : December 18-19, 2000 : Mumbai, India

IIP-2000 within IFIP WCC 2000 (Beijing)

**1998**

IT&KNOWS within IFIP WCC 1998 (Vienna and Budapest)

In addition to the events TC12 has had a strong publication program with more than 23 publications:

Dillon, T.; Chang, E.; Meersman, R.; Sycara, K. (Eds.) (2009) “Advances in Web Semantics I”. Springer. ISBN 978-3-540-89783-5

Lavaros Iliadis, Ioannis Vlahavas and Max Bramer (Eds.) (2009) “Artificial Intelligence and Innovations III”. Springer. ISBN 978-1-4419-0200-7

Václav Snášel (Ed.) (2008) “Knowledge 2009 (Znalosti 2009)”. Springer. ISBN 978-80-227-2827-0

Zhongzhi Shi, E.Mercier-Laurent and D. Leake (Eds) (2008). “Intelligent Information Processing IV.”. Springer. ISBN 978-0-387-87684-9

Max Bramer (ed.) (2008). “Artificial Intelligence in Theory and Practice II”. Springer. ISBN 978-0-387-09694-0

Daoliang Li (ed.) (2008). “Computer And Computing Technologies In Agriculture”. Springer. ISBN 978-0-387-77250-9

C.Boukris, A.Pnevmatikakis, L.Polymenakos (eds) (2007). “Artificial Intelligence and Innovations 2007: From Theory to Applications”. Springer. ISBN 978-0-387-74160-4

M.A.Bramer (ed.) (2007). Special Issue of the International Journal of Applied Intelligence on “Emerging Artificial Intelligence Applications and Innovations”. Springer. ISSN: 0924-669X

Zhongzhi Shi, K. Shimohara and D. Feng (Eds) (2007). “Intelligent Information Processing III.”. Springer. ISBN 978-0-387-44639-4

M.A.Bramer (ed.) (2006). “Artificial Intelligence in Theory and Practice”. Springer. ISBN 0-387-34654-6

I.Maglogiannis, K.Karpouzis and M.Bramer (eds.) (2006). “Artificial Intelligence Applications and Innovations: the third IFIP Conference on Artificial Intelligence Applications and Innovations”. Springer. ISBN 0-387-34223-0

J.K.Debenham (ed.). “Professional Practice in Artificial Intelligence”. Springer. ISBN 0-387-34655-4

Z.Shi, K.Shimohara, D.Deng (eds.) (2006). “Intelligent Information Processing III”. Springer. ISBN 978-0-387-44639-4

M.Bramer and V.Terziyan (2005). “Industrial Applications of Semantic Web”. Springer. ISBN 0-387-28568-7

Daoliang Li and Baoji Wang (2005). “Artificial Intelligence Applications and Innovations”. Springer. ISBN 978-0-387-28318-0

M.A. Bramer and V. Devedzic (eds.) (2004). “Artificial Intelligence Applications and Innovations”. Kluwer Academic Publishers. ISBN 1-4020-8150-2

Shi, Z., He, Q. (eds.) (2004). “Intelligent Information Processing II”. Springer. ISBN 978-0-387-23151-8

J.Debenham (ed.) (2004). “Professional Practice in Artificial Intelligence”. WCC. ISBN 2-907801-05-8

J.Debenham, S.Kameshwaran (eds.) (2003). “Smart eBusiness”. eMarkets Research. ISBN: 0-646-42936-1

Musen, Mark A., Neumann, B and Studer R. (Eds), “Intelligent Information Processing”, ISBN: 140207171X, Kluwer, 2002. ISBN 978-1-4020-7171-3

M. Sasikumar, Durgesh Rao, P. Ravi Prakash (Eds), “Knowledge Based Computer Systems”, ISBN: 81 7764 110 7, NCP, 2000

J. Cuena (Ed), “Knowledge Oriented Software Design (A-27)”, ISBN: 0 444 81541 4, Elsevier, 1993

P.A. Flach, R.A. Meersman (Eds), “Future Directions in Artificial Intelligence”, ISBN: 0 444 89048 3, North-Holland, 1991

The full list of TC12 publications can be found on the IFIP web site.

TC12 also has links with a number of International bodies and these include:

General Artificial Intelligence International Links in alphabetical order

[ACM Special Interest Group on Artificial Intelligence \(SIGART\)](#)

[AI International](#)

[European Coordinating Committee for Artificial Intelligence \(ECCAI\)](#)

[International Joint Conference on Artificial Intelligence \(IJCAI\)](#)

[International Society of Applied Intelligence \(ISAI\)](#)

[Society for the Study of Artificial Intelligence and the Simulation of Behaviour \(SSAISB\)](#)

Specialised Artificial Intelligence International Links in alphabetical order

[Asia Pacific Neural Network Assembly \(APNNA\)](#)

[IEEE Neural Networks Society \(IEEE-NNS\)](#)

[International Fuzzy Systems Association \(IFSA\)](#)

[International Neural Network Society \(INNS\)](#)

[Society for Neuroscience \(SFN\)](#)

TC12 also has links to National AI Societies, Groups or Committees that play a coordinating role which are in alphabetical order by country as follows—

Argentina

[Grupo de Interés en Inteligencia Artificial \(SADIO\)](#)

Australia

[Australian Computer Society Committee for Artificial Intelligence \(ACS\)](#)

Austria

[Österreichische Gesellschaft für Artificial Intelligence \(ÖGAI\)](#)

Belgium

[Belgisch-Nederlandse Vereniging voor Kunstmatige Intelligentie \(BNVKI\)](#)

Brazil

[Sociedade Brasileira de Computação](#)

Bulgaria

[Bulgarian Artificial Intelligence Association -- BAIA](#)

Canada

[Canadian Society For Computational Studies Of Intelligence \(CSCSI\)](#)

Chile

[Sociedad Chilena de Ciencia de la Computación](#)

- Croatia  
no society at present — Inteligentni Sustavi at University of Zagreb
- Czech Republic  
Ceská společnost pro kybernetiku a informatiku (CSKI)
- Denmark  
Danish Artificial Intelligence Society
- Finland  
Finnish Artificial Intelligence Society
- France  
Association Française d'Intelligence Artificielle (AFIA)
- Germany  
Gesellschaft für Informatik; Sektion KI e.V. (GI/KI) Künstliche Intelligenz
- Greece  
Hellenic Artificial Intelligence Society (EETN)
- Hungary  
Neumann János Számítógép-tudományi Társaság (NJSZT)
- Iran  
no society at present —Intelligent Systems Research Institute
- Ireland  
Artificial Intelligence Association of Ireland (AIAD)
- Israel  
Israeli Association for Artificial Intelligence (IAAI)
- Italy  
Associazione Italiana per l'Intelligenza Artificiale (AI\*IA)  
Società Italiana Reti Neuroniche (SIREN)
- Japan  
Japanese Society for AI (JSAI)
- Korea  
Korea Intelligent Information Systems Society  
International Center for Electronic Commerce
- Latvia  
Latvian National Organisation of Automatics (Latvijas Automatikas Nacionala Organizacija) (LANO)
- Lithuania  
Lietuvos Kompiuterininku Sajunga — Artificial Intelligence Section (LIKS-AIS)
- Mexico  
Sociedad Mexicana de Inteligencia Artificial (SMIA)
- Montenegro  
see: Serbia and Montenegro
- Netherlands  
Belgisch-Nederlandse Vereniging voor Kunstmatige Intelligentie (BNVKI)  
Stichting Neurale Netwerken (SNN)
- Norway  
Norwegian Artificial Intelligence Society (NAIS)

Portugal

Portuguese Association for Artificial Intelligence

Romania

no society at present — contact Dr Mihaela Oprea

Russia

Russian Association for Artificial Intelligence (RAAI) Russian Federation AI Links

St. Petersburg Division of Russian Association for Artificial Intelligence

Serbia and Montenegro

no society at present — Group for Object-Oriented Design and Object Linking and Distribution for Artificial Intelligence (GOOD-OLD-AI), University of Belgrade

Singapore

no society at present — contact Professor Tan Chew Lim

Slovak Republic

Slovak Artificial Intelligence Society (Slovenská spoločnosť pre umelú inteligenciu) (SAIS)

Slovenia

Slovensko drustvo za umetno inteligenco (SLAIS)

Spain

Associació Catalana d'Intelligència Artificial (ACIA)

Asociación Española de Intelligència Artificial (AEPIA)

Asociación Española De Tecnología y Lógica Fuzzy (FLAT)

Sweden

Swedish Artificial Intelligence Society (SAIS)

Swedish Learning Systems Society (SLS)

Switzerland

Schweizer Informatiker Gesellschaft (SGAICO)

Ukraine

Association of Developers and Users of Intelligent Systems (ADUIS)

United Kingdom

British Computer Society Specialist Group on Artificial Intelligence (BCS-SGAI)

United States

American Association for Artificial Intelligence (AAAI)

Florida AI Research Society (FLAIRS)

North American Fuzzy Information Processing Society (NAFIPS)

Since the early days, Intelligence in computing has evolved a long way. In addition to Web Semantics , other growing areas are Computational Intelligence including such topics as Fuzzy, Neural, Genetic and Swarm Intelligence. As well the development of new techniques, intelligent computing work has evolved into development of intelligence techniques specialized to particular application areas. This will lead to the sponsorship of four new Working Groups namely: 1. Intelligent Bioinformatics and Biomedical Systems, 2. Computational Intelligence, 3. Ubiquitous Intelligent Computing 4. Social Computing and Collective Intelligence.

# Human-Computer Interactions (IFIP TC 13): The First Twelve Years (1989–2001)

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**Abstract.** Human-Computer Interaction first emerged as an area for research in IFIP WG6.3. Rapid growth in the field of HCI and two highly successful IFIP INTERACT conferences during the 1980s, led to IFIP establishing TC13 in 1989, with Brian Shackel as inaugural Chairman. The first six years of TC13 created a solid foundation for further development. The second Chairman, Judy Hammond, developed this work further as the number of TC13 members more than doubled and Working Groups expanded. This paper describes major achievements of TC13's first twelve years, focusing on TC and WG activities, the INTERACT conference series, support for regional HCI events and for researchers and students in developing countries to participate in TC13 events. In 1998, the IFIP General Assembly approved the Brian Shackel Award as an IFIP Award in recognition of the enormous contribution of TC13's inaugural Chairman. This Award is now presented at each INTERACT conference.

**Keywords:** Human-Computer Interaction, history, IFIP TC13, HCI, INTERACT, Brian Shackel.

## 1 Introduction

Established in 1989, TC13 is one of the younger IFIP Technical Committees. Brian Shackel (UK), the inaugural Chairman, laid excellent foundations for developing the Technical Committee and Working Groups into active and focal areas of both HCI research and industrial application, and undertaking a range of international HCI events and activities.

A full account of the first six years of the Technical Committee on Human-Computer Interaction (IFIP TC13) from 1989 to 1995, and developments leading to the establishment of TC13 (prior to 1989) is published online at: <http://www.ifip.org/36years/36years.html> [1].

Judy Hammond (Australia) was elected as the second TC13 Chair. She is the first woman to hold the position of Chair of a Technical Committee in IFIP.

One of the first actions in this second period of TC13's development, was for Brian Shackel and Judy Hammond to prepare a Review Report. This was presented to the IFIP General Assembly, in Brazil, 1997 [2]. The report covered TC13's first six years, documenting achievements and providing guidance for the major future areas of TC13 planning and publications, including its major flagship conference, INTERACT.

During the 1990s, there were major changes in computer hardware, software and packaged programs, resulting in significant growth of interest and research in HCI, including the areas of usability, accessibility, user satisfaction and suitability for the needs of individual users and organisations. These areas were particularly the province of experts in Human-Computer Interaction. The second six years of TC13 development focused on expanding TC13 activities to meet the challenges of the new technologies for the benefit of users and consumers world-wide.

## **2 TC13 Membership**

TC13 membership increased from 14 national representatives in 1990 to 36 members (30 national representatives, 5 Working Group Chairs and 1 affiliate member) in 2001. In general, the geographical balance in TC13 representation improved, but IFIP European member societies still dominated.

TC13 held annual meetings in a different country each year. Meetings often included workshops for TC13 members and Working Group office bearers to deliberate about the past and future visions of HCI and develop strategies for future IFIP TC13 activities. The first two-day workshop was held in London in 1996, followed by a two-day meeting in Eindhoven, Netherlands in 1998, and later in San Sebastian, Spain in 2000. Shorter meetings were also held at INTERACT conferences.

## **3 TC13 Working Groups**

TC13 has a high level of expertise in its Working Groups. Their most visible activities have been Working Conferences and Workshops, often in cooperation with other organisations and HCI groups. They have also participated in the INTERACT series of conferences in a variety of ways, running workshops and conference sessions highlighting their own areas of study. These often resulted in publications that raised awareness of WG work and increased their visibility.

## **4 Major TC13 Developments**

Major TC13 work developed in the first twelve years, are as follows:

### **4.1 Documenting TC13 Policies and Procedures for Members**

Many of the new TC and WG members had little understanding of IFIP policies and bylaws. It was important to write our own handbook to provide general guidance and to support those leading the work of TC13.

Brian Shackel developed the first versions of the TC13 Handbook, acknowledging similar work completed in 1993 by John G Beatson (TC11 WG Co-ordinator). Judy Hammond wrote a third version (published 2002), as the work of TC13 had expanded substantially by the end of her term as Chair. IFIP policies and procedures had been amended and TC13 had developed more understanding of what its office-bearers and members needed to know to participate in TC13 and WG work successfully. In

particular, it was essential for planning TC13 activities within an IFIP framework, especially INTERACT, working conferences and the like.

## **4.2 Increasing Working Groups and Their Activities**

A new Working Group was established in 1998 on Human Error, Safety and System Development (WG13.5). It aims to support practitioners, regulators and researchers to develop leading edge techniques in hazard analysis and the safety engineering of computer-based systems. Emphasis is on the role of human error in the development and operation of complex processes, and on techniques that can be easily integrated into existing system engineering practices.

All Working Groups were encouraged to increase the number and range of activities in line with TC13 and WG objectives. These activities supported research and applications being implemented during this period of rapid development of HCI, as well as the growth of IFIP TC13 itself. To this end, TC13 approved the introduction of a scheme to support Working Groups by providing some seed-funding for new initiatives.

## **4.3 Supporting Regional HCI Activities and Developing Countries**

One of TC13's aims is to assist developing countries acquire HCI knowledge through conferences, information exchange, via the internet and whatever other possible means of available communication and information dissemination.

Attention was given to finding ways of supporting researchers and practitioners in developing countries to be included in TC13 events and activities, particularly INTERACT, so they could attend and present papers in what was often their first experience of an international HCI conference. This led to TC13 creating a Developing Countries Support Plan, to provide some financial support so that researchers in developing countries could afford to travel to TC13 events. This was very successful and much appreciated by the recipients.

With financial support from UNESCO, 18 Eastern European scientists participated in INTERACT'95. Similarly, researchers from developing countries, particularly Asia, Africa and South America, participated in later INTERACTs with financial help from IFIP Developing Countries Support grants, and some INTERACT sponsors. In addition, Working Groups were encouraged to locate their activities and events in developing countries.

During this period, TC13 supported cooperative links with regional conferences eg Asia-Pacific HCI conference (APCHI) and the Nordic Conference on Human-Computer Interaction (NORDICHI). It was expected that such ongoing regional activity would lead to more cooperation, increasing IFIP TC13's support for and encouragement of HCI activities world-wide.

## **4.4 Communicating Electronically**

The introduction of email was a most welcome advance that enabled TC13 members and Working Groups to arrange meetings, facilitate discussions and disseminate information world-wide in real time. In particular, it enabled greater participation by those members of the committee (especially outside Europe, and in developing

countries) who have difficulty in attending meetings for lack of funds. Lars Oestreicher (Sweden) accepted the position of Head of TC13 Information Services to direct these important new aspects of TC13 activity.

A public-access web site ([www.ifip-hci.org](http://www.ifip-hci.org)) was implemented in 1998 to support TC13 and WG activities and disseminate information about HCI events, activities and resources to the community at large, as well as coordinating HCI knowledge and increasing TC13's visibility in the community. An experimental TC13 meeting (in a virtual meeting format) was held over three weeks in November, 1998. The meeting was set up by Lars Oestreicher, Brian Shackel (TC13 Secretary) and Judy Hammond (TC13 Chair) and took much experimentation before it could be implemented. However, the experiment was found to be more time-consuming and challenging than expected, and needed more appropriate online meeting packages to be developed before it could become a regular vehicle for TC13 meetings.

#### **4.5 Planning for the INTERACT Conference Series**

INTERACT became well established as a high quality international scientific HCI conference hosted by an IFIP member society, with TC13 being involved in the processes needed to create the Technical Programme. Cooperative links were encouraged with all IFIP member countries and their HCI Groups, and aligned professional international societies, such as the European Association of Cognitive Ergonomics (EACE), the European Association for Computer Graphics (Eurographics), the British Psychological Society, and the International Ergonomics Association (IEA).

For the first time, INTERACT was held outside Europe in Sydney, Australia, in 1997, hosted by the Australian Computer Society. Taking advantage of its location, INTERACT'97 incorporated the biennial Asia-Pacific HCI conference (APCHI) and the annual Australian national HCI conference (OZCHI) into its programme. This enabled many local researchers, students and business organisations to participate in an international HCI conference for the first time.

Together with the British HCI annual conference, INTERACT'99 was held in Edinburgh, Scotland. This was highly successful, particularly in terms of its wide-ranging programme, numbers of participants and financially. The considerable expertise of the UK committee organising this INTERACT provided a welcome boost to long-term INTERACT planning.

Hosted by the Information Processing Society of Japan and the Human Interface Society, Japan organised INTERACT'01 in Tokyo. It was the first time TC13 had held its flagship conference in a non-European language country. This required careful consideration of new strategies to ensure that the organisation, publicity and proceedings retained the essence of the INTERACT series, whilst allowing for conference expectations within Japan. The resulting conference was most successful.

Throughout this period, substantial work was undertaken by many members of the three INTERACT organising committees, along with Brian Shackel and Judy Hammond, in order to develop long-term plans for planning and organising INTERACTs. This was essential to ensure that IFIP TC13 objectives and standards continued to meet expectations and to maintain the high quality of INTERACT conferences and its proceedings.

This work produced policy and planning documents, developing a structure for INTERACT conference planning, and guidelines for Authors, including both Microsoft Word and LaTeX templates that conformed to publication guidelines. The INTERACT proceedings cover was also carefully standardised to ensure that the INTERACT series publications would always be easily and uniquely identified as the quality scientific international conference proceedings they had become.

For the list of all INTERACT conferences: see appendix.

#### **4.6 Establishing the Brian Shackel Award**

In 1998, the TC13 committee unanimously approved the establishment of an Award to be given at INTERACT conferences in recognition of the enormous contribution of Brian Shackel, as TC13's inaugural Chairman and founder of the INTERACT series of international HCI conferences and for his significant scientific work establishing Human-Computer Interaction as an international discipline. The purpose of the Award is as follows:

“The BRIAN SHACKEL AWARD is associated with each INTERACT Conference, usually biennial, and is to recognise the most outstanding contribution in the form of a refereed paper submitted to and delivered at the Conference. The purpose is to draw attention to the need for a comprehensive human-centred approach in the design and use of information technology in which the human and social implications have been taken into account. The BRIAN SHACKEL AWARD consists of a commemorative plaque and a certificate.”

In 1998, the IFIP General Assembly accepted TC13's recommendation and the Brian Shackel Award was established as an IFIP Award. It has been awarded at every INTERACT conference starting at INTERACT'99.

## **5 Conclusion**

When looking back on the era documented in this chapter, it is hard to recall how different communications used to be. Progress of TC13's initial work was rather slow when compared to today. All information, notices, discussions and decisions consisted of paper documents and letters sent to TC13 members around the world by post or fax - sometimes augmented by telephone conversations. With English being the language of IFIP, recognition had to be made of the diverse languages and cultural expectations of the growing number of IFIP TC13 representatives.

It was a much slower (and more orderly) process than using email and web communications today. Nevertheless, much significant work was done in the first twelve years. Advances and decisions were developed in discreet chunks, after TC members had reflected on the topic and responded accordingly. TC13 meetings and workshops were essential for making final decisions, updating actions taken and planning further work.

In his keynote paper for INTERACT'99, Brian Gaines presented a perspective of HCI developments in the next millennium, and how HCI might support the development of the “world mind” [3]. He concluded that “we are still at a very early stage in the development of HCI, and the major impact of the technology on our societies is

yet to come. To understand the issues involved we will need greater understanding of the operation of our societies, their economies, politics and cultures, and how these evolve under the influence of environmental factors including advances in information technologies.” If one agrees that the scenario described by Gaines will become reality, the long-term continuation and expansion of future work in TC13 is assured.

The result of the first twelve years of TC13’s work created a basis for ensuring that the IFIP Technical Committee on Human-Computer Interaction is capable of upholding its aims to encourage development towards a science and technology of human-computer interaction. This should be especially oriented towards users and non-computer-professional users, and how to improve the human-computer relationship for them.

Working within the context of IFIP’s mission “to provide a forum.... to campaign for the safe and beneficial development and use of IT” and “to foster and facilitate cooperation between academics, the IT industry and governmental bodies and to seek to represent the interest of users” is certainly achievable.

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# Technical Committee 13 on Human-Computer Interaction

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**Abstract.** TC13 on HCI provides a global platform for internationalization and collaboration in Human-Computer Interaction research. A better understanding of how and why people interact with technology leads to innovative designs and experimental evaluation tests leads to high quality IT products. Two past chairs of the TC, Dr. John Karat and Professor Annelise Mark Pejtersen, provide a view of developments and initiatives as they reflect on the Committee's position in HCI research worldwide and on its new ways of working. [www.ifip-hci.org/](http://www.ifip-hci.org/)

**Keywords:** IFIP, TC13, Human Computer Interactions.

## 1 Introduction

IFIP TC13 provides a global platform for highly skilled academic collaboration and internationalization of professional networks in the field of Human-Computer Interaction (HCI). Human-Computer Interaction is a multidisciplinary research field, which includes computer sciences, human sciences, social sciences, engineering and design. It aims to promote the use of knowledge, concepts, methods and techniques that enable studies of humans' variegated interaction with technology and the complex interplay between individual, social, cultural and organizational contexts. A better understanding of how and why people interact with technology in the ways that they do, followed by experimental designs and evaluation tests, leads to high quality IT products. HCI became a crucial issue as academics, businesses and later the general public became computer users. A major reason for the establishment of our Committee 21 years ago was a strong desire to seriously have an impact on the way computer interfaces were designed.

The committee was founded by Prof. Brian Shackel, who organized the first IFIP INTERACT conference in HCI in 1984, and chaired the committee from its official establishment in 1989 through 1995. Judy Hammond, chair from 1996 through 2001, worked closely with Brian to expand the committee and grow the work of the TC within IFIP's structures and rules with a successful result. Dr. John Karat, USA (2002-2004) used his active position in several national HCI communities to promote TC13's position and to bring the TC13 events into new audiences. Prof. Annelise

Mark Pejtersen, Denmark (2005-2010) reorganized the Committee's work to involve its members actively in decision making and in the development of new initiatives and products.

## 2 Examining TC13's Place in the HCI World (2002–2004)

TC13 had solid growth during its first 12 years. But the growth of the HCI field was not limited to IFIP in this period. The British Computer Society held its 24<sup>th</sup> Human-Computer Interaction conference, and the ACM Special Interest Group in HCI held its 28<sup>th</sup> SIGCHI conference the same year. Both of these events serve large, diverse, international communities and have long had the involvement of representatives from TC13. John Karat became chair of TC13 in 2002, while also serving on the SIGCHI Executive Committee. His stated goal during his tenure was to bring about a better relationship between major HCI communities that had emerged during the 80's and 90's, and to find a way forward for TC13 within this dynamic landscape.

Formally, TC13 had held joint conferences with BCS (e.g., INTERACT 90 and 99) and ACM SIGCHI (INTERCHI 93 in Amsterdam), but in the long run it was difficult to reconcile the desires of large member organizations like ACM and BCS to hold annual events for their members with the emerging goals of TC13 to bring HCI to new audiences. As his term developed, TC13 encouraged the organization of HCI specialist workshops to coincide with TC13 meetings, and also encouraged members from developing countries to host the INTERACT conference and Working Group events. This strategy resulted in the spread of the HCI community, since it offered many members of the community the opportunity to take part in an international HCI event for the first time, but also created a challenge in essentially "reinventing" the conference every two years. Balancing "local flavor" with "INTERACT conference tradition" proved to be difficult but rewarding for TC13.

In many ways it is fair to say that "not much new happened" in the 2002-2004 period. Things set in motion in the first 12 years continued to evolve. The size of the TC13 committee grew in number of members, in worldwide participation, and in depth of HCI experience in the membership. Working groups sustained themselves well through potentially difficult times of leadership transition. The committee managed the process of INTERACT site selection well in an environment where there were always multiple parties offering to host the conference. The INTERACT conference itself held its own in troubling economic times. TC13 took new steps to become more integrated within IFIP through contributions to the WCC e.g., by Judy Hammond's organizing a stream on Usability gaining a Competitive Edge, which focused particularly on industry as well as the research community at the 2002 WCC and later efforts.

As a minor side note, Dr Karat did not continue the pattern of two-term chairmanship and did not seek a second term. Just prior to his seeking the chairmanship, he was pleasantly surprised to learn he was becoming a father as he approached the tender age of 50, and left the steering of TC13 to more energetic hands. In 2010, he still serves as US-ACM representative, because he is proud of the accomplishments of TC13 and values the friendships he has made through the committee.

### 3 New Ways of Working (2005–2010)

Since its foundation, the world has changed in many respects of importance for the Committee's future work. Having its origin in the emerging information society a move took place after the 90's towards the knowledge society with focus on knowledge sharing as the predominant way of work, well enabled by the widespread ICT networks. As HCI became a well established research field, it became clear that an interdisciplinary approach was required to address the increasing complexity of HCI research in new mobile, integrated, digital ICT products embedded into everyday life. Knowledge sharing and collaboration among HCI researchers from different disciplines emerged quickly.

TC13 is a committee with a positive tradition for a large audience of representatives at the annual meetings and at the meeting following INTERACT conferences every second year. However, the hierarchical IFIP structure with the chair informing the audience about activities since the last meeting during two full work days did not seem very productive. A calculation of the man hours spent by around 25 professors at each of the 9 two days meetings during a six year period of chairmanship convincingly shows the high figure of 3.000 expert hours, which could be utilized to involve the experts actively in TC13 work. In order to benefit from the members' differentiated expertise, five collaborative task forces were established in 2005 to deal with strategic issues, each having an agenda formulated by the new chair, who previously established and chaired WG13.6.

The first task force was on *Proactive Developments and Future Missions*. The second worked on *Developing Countries and the Global HCI Society*. A third task force focussed on *Public Relations, Visibility and News*. The fourth addressed the development of *Strategy and Guidelines for INTERACT Conferences*. The fifth task force looked at *New Working Groups and Emerging HCI Disciplines*. Task forces should deliver a report at the next meeting, but only a couple of task forces succeeded. This approach to the creation of new visions was too ambitious, the ties of mutual commitment among members were not strong enough. The topics on the agenda of each task force gradually became relevant during the following years and appeared as single items on the agenda of TC13 meetings.

#### 3.1 New Ways of Management and Organization of Work

The first action was to break the hierarchical structure and establish a management board with collective responsibility for the new visions of TC13 work. Three vice chairs were appointed: Gilbert Cockton, UK, Gitte Lindgaard, (also secretary), Canada and Janet Wesson (also treasurer), South Africa. During the next years three more vice chairs were appointed, each responsible for an important task, the philosophy being that merits are necessary to encourage volunteer work.

The involvement of the Committee's members in collaborative work required a common tool to support their knowledge sharing. We developed a new and then more ambitious website during 2006-07 using a content management system. Chair was Janet Wesson, SA. Having an effective internal website made it possible to organize the annual TC13 meetings in a new way. Ahead of a meeting the TC13 chair selects about a dozen important tasks, appoints team members and a responsible team chair

of each task. In order to make the teamwork successful, the TC13 chair collects all the documents relevant for each task, writes aims and expected outcome and relates each task, its documents and its team to the agenda of the meeting. This is mailed to all TC13 members in due time before the meeting and uploaded on the website. The chair of each team writes a common document based on their team discussions, uploads it on the TC13 website, and presents it at the meeting. The outcome of each task is discussed, decisions are made and actions taken during the meeting. The original assumption was to have a steady workflow during the year, which, however, over time developed into a less resource demanding, but concentrated and focused work effort before, during and after each annual meeting. The agenda covers a variety of issues ranging from reports of Working groups and SIGs, who have a separate meeting, IFIP initiatives and current and new TC13 activities.

A new edition of the TC13 Handbook (originally written by Judy Hammond, now chaired by G. Lindgaard, and A. M. Pejtersen) covers this new work approach. TC13's annual report has also become a joint collaborative effort by introducing a new uniform structure, which integrates all TC13 activities, and into which WG- and SIG chairs can insert their contributions. The result is a synthesis of the otherwise distributed presentation of events.

These new ways of working increased the members' involvement, their productivity and the quality of work. The emphasis on continuity was motivating for both their volunteer work and their regular participation in meetings. The TC chair's work load increased significantly, but it has been a rewarding experience. Our contributions are not lost, they can be found at our website. A major future challenge is to include Wikipedia media.

### 3.2 HCI Specialist Workshops and Videoconferencing

When I organized the annual TC13 meeting in 2003 at Risoe, Roskilde, Denmark, I decided to organize a specialist workshop in conjunction with the meeting, and to argue for the use of this model in future meetings in different countries, if the outcome was successful. The idea was to exploit this unique opportunity to introduce: 1. the diversity of TC13's worldwide known HCI researchers to Danish HCI researchers, and 2. the internationally well known Danish HCI researchers' methods and in depth analysis of users' work activities to TC13 members. The mutual benefit of this event was very well recognized among all researchers with a number of workshop participants close to 100. It has now become a tradition to organize such HCI specialist workshops the day before each TC13 meeting. Hence, a guideline for HCI specialist workshops has been developed. Specialist workshops and TC13 meetings have been well organized by Monique Noirhomme, Belgium, Horst Oberquelle, Germany, Julio Abascal, Spain, John Karat/ACMSIGCHI conference in Florence, Italy and Nikos Avouris, Greece. Anirudha Joshi, India, successfully extended the usual one day specialist workshop to a successful 5 day HCI International conference before the TC13 meeting in Mumbai, 2010, with the usual combination of TC13 speakers and talks by Indian HCI researchers.

*Videoconferencing at TC13 Meetings:* Since members, especially from developing countries, cannot participate regularly in the annual meetings, we have investigated how to turn TC13 meetings into visual collaboration with absent participants. The

application of video teleconferencing was investigated from two perspectives: technological solutions covering a set of interactive telecommunication technologies, and organizational solutions for meetings that should take place without interruptions for those in attendance. This requires anticipation of the interaction among participants at the meta level of people's interactions during meetings. This work began in 2009 with a proposal and several planning meetings. The first videoconferencing was conducted at the TC13 meeting, Mumbai, India, 2010. Though technical problems were encountered remote video participation will continue to be exploited and applied. Chair is Achim Ebert, Germany.

### **3.3 New Working Groups and Emerging HCI Disciplines**

It is well recognized within IFIP and much appreciated in TC13 that the continuity and visibility of TC13 is secured by Working Groups' annual Working Conferences and numerous workshops at international conferences worldwide. They contribute regularly to the growth of HCI disciplines, publications in IFIP and to the visibility of TC13. Our 7 WGs and 2 SIGs have been very active since they were established, although some groups have had dormant periods with less activity, mainly due to shift of chairs. In addition, most of the chairs of the WGs and SIGs participate actively in every annual TC13 meeting and its work. Two new Working Groups have been set up during this period.

#### **3.3.1 Human-Work Interaction Design (HWID)**

IT design mediates the interaction between humans and their work taking into account both the human capabilities and the work content. In 2005, Working Group 13.6 on Human-Work Interaction Design began its cross disciplinary, empirical and theoretical research. A core activity is to understand and conceptualize the complexity of work and to design and evaluate technology, which support humans in their work context. This WG has successfully organized 2 days annual Working Conferences in Europe and Asia with international speakers and participants together with workshops at INTERACT conferences. This WG has been particularly good at attracting academic researchers from India. Chair is Torkil Clemmensen, Denmark.

#### **3.3.2 HCI and Visualization (HCIV)**

The Working Group 13.7 on HCI and Visualization was established in 2008. HCI and Visualization has been a still growing research discipline steadily posing new challenges for visual theories and techniques as the physical formats of technology changes and new constraints for visual representation appear, while other constraints disappear and allow new visual possibilities. This WG has successfully organized six 2 days annual high quality HCIV Working Conferences and an INTERACT workshop in 2009, both with a high number of invited international speakers and expert participants. Chair is Achim Ebert, Germany.

TC 13 on HCI is actively committed to increase its number of young researchers through the *INTERACT Doctoral Consortia* and *Students' Design Competition* and WG conferences. For the first time TC13 has established Special Interest Groups-for two reasons: Dynamic adoption of new HCI research areas and engagement of the next generation of HCI researchers in TC13 and IFIP. A SIG is an informal group of

young and experienced researchers usually established to try out emerging research topics. Two SIGs have been set up and gained much respect. Vice Chair Phil D.Gray UK is chair of SIGs. The next step is to develop and agree on a SIG policy.

### 3.3.3 Interaction Design and International Development (IDID)

The first SIG established in 2008 points at the need for an agenda of capacity-building to facilitate HCI research in the developing world, and to support emerging HCI capacity. It has successfully arranged workshops at INTERACT and at many international CHI conferences. It has obtained funding from the NSF to bring people from developing countries to participate. Lately, it has organized an IDID seminar in conjunction with the conference *HCI International* in India. It is under consideration to turn this competent SIG into a Working Group. Chair is Andy Dearden, UK.

### 3.3.4 Interaction Design and Children (IDC)

The second SIG was established in 2009. The objectives are to develop the interaction research and design for children and to promote applications and education to address the needs, desires and aspirations of children. It is actively involved in organizing the annual conference series on *Interaction Design and Children* established in 2000, and it has successfully organized a workshop at INTERACT'09. Chair is Panos Markopoulos, the Netherlands, who has not yet participated in a TC13 meeting.

## 3.4 Strategy and Guidelines for INTERACT Conferences

Every evaluation of INTERACT Conferences by participants have demonstrated that they enjoyed the speakers' quality, the diversity of well organized scientific programs and events, the technological exhibitions, and the social events. However, during the last decade a large number of specialized and general international HCI conferences have appeared. This has increased the competition among HCI conferences tremendously. What should TC13 do to maintain its academic position as a competitive, international, high quality conference aiming to attract the very best in academic papers - aside from maintaining the acceptance rate of submitted papers to be strictly kept around 30%?. For example: To ensure the optimal quality of *award papers*, the procedures for election of members of the B.S Award Committee was changed in 2009 giving better accordance of the expertise of the Committee members with the HCI topics of the reviewed papers nominated for the B.S Award. John Karat, USA, has successfully chaired the B.S. Committees. To encourage quality papers with international impact from a somewhat neglected research community and its users, an *Accessibility Award for Disabled Users* together with Guidelines have been introduced, It was awarded for the first time at INTERACT '07 for outstanding contributions in assistive technology specifically for elderly and disabled people. Chairs were Julio Abascal, Spain, and Monique Noirhomme, Belgium.

Likewise, a special track on "*HCI and Industry*" is now mandatory, since HCI experts in industry face interesting problems, which are complementary to academic research, and also raise very different challenges when reaching out for a global market trying to meet local needs. At INTERACT 2011 *The Student Design Competition* allows students to exchange their innovative ideas when faced with a design challenge while competing for prizes, which encourages interactions among students from

different parts of the world and dialogues among students and professional researchers. Both tracks encourage dialogue between different research cultures and nationalities. Steadily, TC13's secretary Gitte Lindgaard has encouraged to help progress of the *INTERACT guidelines*, but elicitation of tacit knowledge from previous organizers is difficult and time consuming. However, Janet Wesson and Paula Kotze from South Africa have created new hopes by giving feed back to the guidelines while using them for planning INTERACT'13. Since 2007 sharing of *lessons learned* is mandatory among previous, present and future organizers of INTERACT during and outside our meetings.

**INTERACT'03** Zurich, Switzerland, hosted by the Swiss Informatics Society, 1 - 5 September 2003. Proceedings (1126 pp.), 82 full, 64 short papers published, as well as abstracts relating to accepted submissions in other categories. There were 472 attendees from 34 countries. Conference chairs were Matthias Rauterberg, the Netherlands and Helmut Krueger, Switzerland.

**INTERACT'05** Rome, Italy, organised by the University of Bari, the University of Roma "La Sapienza", and the Italian ISTI-CNR HIIS Lab, 12-16 September 2005 Proceedings (1158 pp.), 70 full, 53 short papers published, 423 participants from 33 countries. Celebrating the tenth anniversary of the INTERACT conferences with the theme Communicating naturally with computers. It highlighted the visions and challenges as computers will have increasingly natural communication capabilities. Conference Chairs were Fabio Paterno and Maria Francesca Costabile, both Italy.

**INTERACT'07** Rio de Janeiro, Brazil, hosted by The Special Commission for HCI of the Brazilian Computer Society (CE-HCI), 10-14 September, 2007. Proceedings (637 pp.) 76 full, 35 short papers published, 297 participants from 30 countries. The theme of the conference was Socially Responsible Interaction, which motivated many interesting discussions. In spite of economical constraints, it was a successful conference. Conference Chairs were Simone Barbosa and Cecilia C. Baranauskas, both Brazil, and Julio Abascal, Spain.

**INTERACT'09** Uppsala, Sweden, hosted by Swedish Interdisciplinary Interest Group for Human Computer Interaction (STIMDI), 24–28 August, 2009. Proceedings published electronically (CD) and in book form. Proceedings (980 pp.), 104 full, 79 short papers published, 461 participants from 33 countries, in spite of the financial crisis. The theme: HCI, Research and Practice was successfully implemented by recruiting speakers from industry to present their HCI work. Conference Chairs were Jan Gulliksen and Lars Oestreicher, both Sweden.

**INTERACT'11**, Lisbon, Portugal, 5–9 September, 2011. The theme is "Building Bridges" among disciplines, cultures and societies. Conference Chairs are Joaquim Jorge, Spain, and Phillipe Palanque, France.

**INTERACT'13** Cape Town, South Africa, 2–6 September, 2013. Conference Chairs are Janet Wesson and Paula Kotze, both South Africa.

### 3.5 Public Relation and Visibility

To ensure TC13's international exposure and its strong professional reputation, marketing and visibility have also been in focus. A journalist from the British Computer Society was employed by TC13 to write about INTERACT'05 in the international HCI media to create awareness and attract submission of papers. In 2007 a new TC13 website replaced the old as a tool for marketing TC13 to a broader audience: 1. *Experts Directory*. An important topic is the kind of core expertise of TC13 members and the service which these experts can offer, and how this expertise can become visible. An Expert Directory is now available at the Website with both internal and external access to the profile of each TC13 member. Professional keywords are assigned to each person and these can be searched, and photos aligned with individual core competences and web contact information is displayed. Chair is Ute Klotz, Switzerland. 2. *Digital Newsletter*: Since 2008, TC 13 distributes an electronic Newsletter worldwide twice a year to encourage the international HCI community to become involved by keeping it informed about future INTERACT conferences, WG/SIG events and new research initiatives in member countries. A team chaired by Janet Wesson suggested comprehensive additional features of the Newsletter. Cecilia Sik Lanyi, Hungary is editor. 3. *New TC13 Brochure*: A visually attractive brochure has been distributed at INTERACT'09, and a digital version will be produced for download and distribution worldwide. Chairs are Gerrit v.d.Veer, The Netherlands and Cecilia Sik Lanyi, Hungary. TC13 is also introduced in a bright new *IFIP Brochure* published in 2009. Most WGs and SIGs have been equally enthusiastic in (re)designing their websites, WG13.1 using the Wiki technology.

### 3.6 Developing Countries and the Global HCI Society

Although a convincing consensus exists in the Committee on bringing events to developing countries as well as to include their researchers in our activities, there is still a long way to go. Requirements to a special section for developing countries in our new website have been developed, but it was never implemented, it was too demanding in terms of time and money. TC13's proposal for a HCI summer school at IFIP's visionary WITFOR in 2007 became irrelevant as it was decided to discontinue summer schools. Nevertheless, HCI summer schools on "state of the art" and other themes have taken place in South Africa. To encourage participants from developing countries to engage in HCI research, INTERACT conferences will increasingly be embedded in developing countries: INTERACT'07 took place in Brazil and INTERACT'13 will take place in South Africa. When INTERACT takes place in Western countries, a special track on "*HCI in Developing Countries*" is organised, for the first time at INTERACT'11. Focus is on users, contexts, and applications, which are different in these countries' very resource constrained environments.

Likewise, Working Groups and SIG's have also increased their number of conferences and workshops taking place in countries such as South Africa, India and Brazil. New models such as videos of keynote talks and remote participation will be introduced at INTERACT to enlarge the audiences and also include researchers from developing countries, who cannot afford participation in INTERACT. A business model for INTERACT conferences will be developed to ensure economic success and

investigate the possibility of budgeting with travel support to students and researchers from Developing Countries, who submit papers.

### 3.7 Growth of TC13 Membership Countries

Many approaches have worked well to increase the membership of our Committee, one has turned out to be particularly effective: To contact national representatives personally at IFIP's General Assembly meetings and ask them to suggest acknowledged HCI representatives from their country. From 2005 to 2010 TC13 membership has increased with 8 new national representatives from countries which have been dormant in the past: Bulgaria, Hungary, Cyprus, Iceland, Ireland, Kenya, Malaysia and Nigeria. Currently, TC13 has grown to 47 members, among these 35 are national representatives, 7 are Working Group chairs, 2 are SIG chairs and 3 are expert members. Likewise, TC13 decided to approve expert members after having agreed on rights and duties of invited expert members. We are committed to still increase active participation from all IFIP's country memberships.

### 3.8 TC13 Relationship with IFIP

IFIP's President in 2006 Klaus Brunnstein, Germany, was invited to our annual meeting to inform about the progress of IFIP's work on its new strategy. The president's excellent talk on IFIP was much appreciated, and the fruitful discussions laid the foundation for the Committee's upcoming discussions of strategies. TC13 conducted a brainstorming the day before this meeting to identify what initiatives/problems we would like IFIP to focus on. We raised questions to the president such as: What does/can IFIP offer in terms of globalization? What can/does IFIP offer to encourage the next generation into IFIP? What does/can IFIP offer to improve IFIP conferences and WG activities, and to create new activities? What does/can IFIP offer to recruit members other than IT societies? What does/can IFIP offer to improve IFIP's and TC's websites? These questions were also presented at IFIP's General Assembly without causing much discussion, except for the IFIP Website issues, which were pursued by the IFIP Secretariat. Gitte Lindgaard submitted a fine report on the evaluation and design recommendations of IFIP's website. Having contacted the Danish IT Society, it became clear, that it would be very beneficial for both IFIP and its member societies, if IFIP conducted interviews in a small number of representative societies to learn about their needs and to identify possible, fruitful relationships. IFIP *Silver Core Awards* were given in 2007 to five chairs of Working Groups, who were honored by IFIP for their outstanding contributions to international HCI research. TC13's secretary received the IFIP *OSA Award* in 2008 for her outstanding service. Names are listed at [www.ifip.org/](http://www.ifip.org/). TC13 has begun its work on a policy for TC13 awards, since a Committee's recognition of well performed work only can be expressed in this symbolic way. At *IFIP World Computer Congresses*, The Human-Computer Interaction Symposium (HCIS) brings the various fields of HCI together to highlight its recent breakthroughs. It was successfully held in 2008, Milano, Italy and in 2010, Brisbane, Australia. Conferences and proceedings have been organized by P. Forbrig, Germany, F. Paterno, Italy, and A. M. Pejtersen, Denmark. All members of TC13 served in the Program Committee. Collaboration with IFIP, Klaus Brunnstein,

Basie von Solms, Eduard Dundler, Brigitte Brauneis and TC chairs has been smooth and very interesting.

### **3.9 IFIP TC13 and HCI Pioneer: Professor Brian Shackel**

Brian Shackel was Professor of Ergonomics at Loughborough University, England, where he also served as Department Head and Dean. His lifetime dedication and immense scientific impact was the need for a comprehensive, human-centered research approach in the design and use of information technology, in which human and social implications have been taken into account. His most important achievement in the emerging areas of HCI as a new discipline was to establish HUSAT (the Human Sciences and Advanced Technology) Research Centre in 1970, which during his superior leadership became the most influential research institute in Europe in the field of Human-Computer Interaction during more than twenty years. Bryan was the founder of TC.13 on HCI in 1889 after having successfully organised the first IFIP INTERACT conference. His association with IFIP covered more than 30 years. He also served in professional societies, and he was a Fellow of the British Psychological Society, the Ergonomics Society and the Human Factors Society (USA). His publications had a significant scientific impact on international HCI research, and he received many awards, including the IFIP Silver Core Award in 1992. TC13 honored Brian Shackel by creating an Award commemorating his immense scientific contribution to IFIP and to TC.13 as inaugural Chairman, “The Brian Shackel Award” to be given for an outstanding contribution at INTERACT Conferences.

### **3.10 IFIP HCI Pioneer: Professor Liam Bannon**

Liam Bannon was a Director of the Interaction Design Centre, and a Professor in the Department of Computer Science and Information Systems at the University of Limerick, Ireland. He has had a profound influence on the development of the HCI discipline in Computer Supported Co-operative Work (CSCW). He has established the first European CSCW conference in 1989 together with Kjeld Schmidt, Denmark. Liam was a founding editor of CSCW: The Journal of Collaborative Computing in 1992. He has set out a detailed understanding of the field of CSCW together with co-author Kjeld Schmidt. Equally important for TC13, he has build up HCI as a research discipline in India and contributed significantly to their HCI education. At the University of Limerick he has successfully introduced HCI studies for developing countries. He has worked on many international HCI research initiatives in Europe, and he has influenced the move “From Human Factors to Human Actors” in Participatory Design, advocating a change away from treating users as passive subjects towards an approach that sees users as active and individual partners in driving HCI design. He has served/serves on the editorial boards of many journals and international conferences. Liam Bannon is a Fellow of the Irish Ergonomics Society.

## **4 Conclusion**

Today, most TC13 meetings are quite similar to a workshop with commitment to, (sometimes very hard) volunteer work, which thrives on individual and collaborative

responsibility to decision making and progress. Members have expressed that this has “revitalized” the group. Volunteer work does not possess the negative aspects of academic life such as competition, unconstructive criticism and evaluation measurements/schemes. However, the scarcity of resources in terms of time and money is a major problem in volunteer work, which makes priorities a crucial issue for each individual. It is frustrating, when a member continues her/his work after a meeting and receives no answers, and it is unsatisfying to give up promised work and good ideas.

For example, I gave up our Committee’s collaboration with AGORA (TC3) in spite of relevant discussions. I found experts willing to establish new WGs on “HCI in Mobile Computing” and “HCI in Digital Libraries”, but gave up, although we need a dozen more WGs to cover important/new HCI research. Will a tighter collaboration among all partners be more cost-effective, or will it require more resources? A couple of Working Groups co-organize events once in a while. Collaboration among a few TCs exists. Could it be beneficial for IFIP to subsidize an analysis during a month or so of how -if- IFIP’s work can be organized/performed differently to improve the problems involved in volunteer work with scarce time- and money resources? Conducted by an expert from a company, which specializes in organizations and effective/satisfying work?

In spite of this problem, substantial work has been undertaken by TC13/WG/SIG members, which has been essential to ensure valuable contributions and the rationale for TC13’s existence. In particular, the conference chairs, organizers and program committee chairs have all worked very hard, and they have done an excellent job.

Three significant areas require continuing leadership and attention from TC13 and its new chair prof. Jan Gulliksen, Sweden: 1. The Committee’s volunteer work including WGs/SIGs to accomplish international success with scientific events. Increased sharing of experiences among WG/SIG and TC members with WG experience will no doubt increase innovation. 2. The Committee’s position within the IFIP Consortium. 3. The Committee’s international position within HCI bodies worldwide. Dr. John Karat’s continuing examination of TC13 within national HCI communities has led to many initiatives, which have involved TC13 members from France, Belgium, South Africa and China. The latter initiative explores the status of HCI research in Asia as a venture sponsored by ACM SIGCHI and jointly organized by John Karat and Prof. Zhengjie Liu, China, who are members of both TC13 and ACM SIGCHI. Hopefully, IFIP TC13 is determined to organize purposive explorations of selective HCI Communities worldwide in collaboration with other international HCI bodies like for example ACM SIGCHI and IEEE.

Obviously, many new human research issues have emerged since the origin of the Committee, and many complex issues will emerge in the future, involving new disciplines. For example, as the computer is integrated into life via sensors, bio-feedback etc., the need for a new understanding of interaction and quality of life will become even more important. “TC.13 on HCI is likely to become one of the most important TCs in IFIP in the future”. Quote: Klaus Brunnstein, former IFIP president.

## Appendix: TC 13 INTERACT Conference Series

The INTERACT series of international conferences is TC13's flagship conference and major activity, hosted by an IFIP member country society. In this way, TC13 provides an excellent HCI activity of an international nature that helps to heighten awareness of HCI in the host country, brings many eminent international HCI experts into the local region to share knowledge about state-of-the-art HCI research and practice, and supports and encourages the local HCI community. TC13 relies heavily on INTERACT for meeting many of its IFIP objectives and to provide the funds to maintain the viability of TC13. The following INTERACT conferences have been held:

**INTERACT'84**, Imperial College, London, UK, organised by volunteers, with support contracted from the conference office of the Institution of Electrical Engineers, 4-7 September 1984 (Conference Chair - Brian Shackel). Proceedings (983 pp.), 152 papers published, 568 participants from 20 countries.

**INTERACT'87** Stuttgart University, Germany, organised by the Fraunhofer Institut für Arbeitswirtschaft und Organisation, 1 - 4 September 1987 (Conference Chair - Brian Shackel). Proceedings (1138 pp.), 163 papers published, 560 participants from 23 countries.

**INTERACT'90**, Cambridge University, UK, organised by the British Computer Society and the BCS HCI Specialist Group, 27-31 August 1990 (Conference Chair - Brian Shackel). Proceedings (1078 pp.), 153 papers published, 572 participants from 30 countries.

**INTERACT'93** named INTERCHI'93, Amsterdam, The Netherlands, organised by the Netherlands Society for Informatics and its Man-Machine Systems Group in conjunction with IFIP TC13 and ACM SIGCHI for a joint INTERACT and CHI conferences, 24-29 April, 1993 (Conference Chairs – Gerrit van der Veer?). Proceedings (547 pp.), 62 full and 40 short papers published, 1580 participants from 32 countries.

**INTERACT'95**, Lillehammer, Norway, hosted by the Norwegian Computer Society, 25-29 June 1995 (Conference Chair - Svein Arnesen). Proceedings (436 pp.), 75 papers published, 220 participants from 29 countries.

**INTERACT'97**, Sydney, Australia, hosted by the Australian Computer Society, and incorporating the second Asia-Pacific Conference on HCI (APCHI'97) and the annual Australian HCI conference, (OZCHI'97), 14-18 July 1997 (Conference Chair - Judy Hammond). Proceedings (713 pp.), 140 (full and short) papers published, 366 participants from 23 countries (including 8 countries from the Asia-Pacific region).

**INTERACT'99**, Edinburgh, Scotland, UK, organised by the British Computer Society through its BCS HCI Specialist Group, 30 August-3 September, 1999 (Conference Chair - Alistair Kilgour). Proceedings (Vol.1, 707pp. and Vol.2, 236pp.), 80 full, 49 short papers, 13 interactive experience papers published, 549 participants from 33 countries.

**INTERACT '01** Tokyo, Japan, organised by the Information Processing Society of Japan, Human Interface Society, 9 – 13 July, 2001 (Conference Chair - Masaaki Kurosu). Proceedings (896 pp.), 76 full, 35 short papers published, 387 participants from 25 countries.

**INTERACT'03** Zurich, Switzerland, hosted by the Swiss Informatics Society, 1 - 5 September 2003 (Conference Chairs - Matthias Rauterberg, Helmut Krueger) Proceedings (1126 pp.), 82 full, 64 short papers published, 472 attendees from 34 countries.

**INTERACT'05** Rome, Italy, organised by the University of Bari, the University of Roma "La Sapienza", and the Italian ISTI-CNR HIIS Lab, 12-16 September 2005 (Conference Chairs - Maria Francesca Costabile, Fabio Paterno). Proceedings (1158 pp.), 70 full, 53 short papers published, 423 participants from 33 countries.

**INTERACT'07** Rio de Janeiro, Brazil, hosted by The Special Commission for HCI of the Brazilian Computer Society (CE-HCI), 10-14 September, 2007 (Conference Chairs - Julio Abascal, Spain, Simone Barbosa, Brazil). Proceedings (637 pp.) 76 full, 35 short papers published, 297 participants from 30 countries.

**INTERACT'09** Uppsala, Sweden, hosted by Swedish Interdisciplinary Interest Group for Human Computer Interaction (STIMDI), 24 – 28 August, 2009 (Conference Chairs - Jan Gulliksen, Lars Oestreicher). Proceedings published electronically (CD) and in book form. Proceedings (928 pp.), 104 full, 79 short papers published, 461 participants from 33 countries.

Future plans for the INTERACT series:

**INTERACT'11**, Lisbon, Portugal, 5-9 September, 2011 (Conference Chairs - Joaquim Jorge, Phillipe Palanque).

**INTERACT '13**, Cape Town, South Africa, 2-6 September, 2013 (Conference Chairs - Janet Wesson, Paula Kotze).

# The History of TC 14 on Entertainment Computing

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**Abstract.** Entertainment computing is on its way getting an established research arena in industry and academia as well. To bring all the different contributing research communities together shared resources (e.g. email distribution list, conference series, and journals), organizational structures (e.g. special interests groups, technical committees, etc.) and unifying ideas are helpful. One unifying idea in this diverse community of entertainment researchers and developers might be a normative position to enhance human living through social transformation by entertainment technology.

**Keywords:** IFIP, TC14, Entertainment Computing.

## 1 Introduction

The advancement of information and communication technologies (ICT) has enabled broad use of ICT and facilitated the use of ICT in the private and personal domain. ICT related industries are directing their business targets to home applications. Among these applications, entertainment will differentiate ICT applications in the private and personal market from the office. Comprehensive research and development on ICT applications for entertainment will be of utmost importance for the promotion of ICT use in the home and other places for leisure. So far engineering research and development on entertainment has never been really established on large scale in academic communities. On the other hand entertainment related industries such as video and computer game industries have been growing rapidly in the past, and today the entertainment computing business does outperform the turnover of the movie industry. E.g., entertainment robots are drawing attention of young people; the event called Robo-Cup has been increasing the number of participants year by year. Entertainment technologies cover a broad range of products and services: movie, music, television TV (including upcoming interactive TV), video player, voice on demand VOD (including music on demand), computer game, game console, arcade, gambling machine, internet (e.g. chat room, board and card games, multi-user dungeon MUD), intelligent toy, edutainment, simulation, sport, theme parks, virtual reality, and upcoming service robots.

The field of entertainment computing focuses on users' growing use of entertainment technologies at work, in school and at home, and the impact of this technology on their behaviour. Nearly every working and living place has computers, and the

great majority of children in industrialized countries have computers in their homes as well. All of us would probably agree that children need to become competent users to be prepared for life and work in the future. Especially children's increasing use of entertainment technologies brings with it both the risk of possible harm [1] and the promise of enriched learning, well-being and positive development [2].

The scope of the research and development arena 'entertainment computing' is obviously quite broad: computer, video, console and internet games; digital new media for entertainment; entertainment robots; entertainment technology, applications, application program interfaces, and entertainment system architectures; human factors of entertainment technology; impact of entertainment technology on users and society; integration of interaction and multimedia capabilities in entertainment systems; interactive television and broadcasting; methodologies, paradigms, tools, and software/hardware architectures for supporting entertainment applications; new genres of entertainment technology; simulation/gaming methodologies used in education, training, and research. A remaining question is how to bring these diverse communities together based on shared and hopefully unifying ideas? In [3] [4], [5] and [6] [7] we started to sketch the scene.

## 2 Entertainment Computing and IFIP

To address and bring up this new area of entertainment technologies it is important to build a good relationship among researchers and between academia and industries. Takahiko Kamae (Japan) initiated setting up a task force group for entertainment computing. The activities of this task force group had as a first and important result that in August 2000 the General Assembly of the International Federation for Information Processing (IFIP) and their Committee for Cooperation with Industries (CCI) approved of setting up a Specialist Group (SG16) on Entertainment Computing.

First of all, the major efforts of SG16 activities were directed toward demonstrating that the subject could be mature enough to attract the broad interest of ICT community. For this purpose a technical event, the first 'International Workshop on Entertainment Computing' (IWEC), was planned and IWEC Steering Committee members were appointed (Bruce Blumberg from MIT Media Lab, USA; Marc Cavazza from University of Teesside, UK; Jaap van den Herik from Universiteit Maastricht, Netherlands; Tak Kamae from Laboratories of Image Science and Technology, Japan; Donald Marinelli from Carnegie Mellon University, USA; Ryohei Nakatsu from ATR, Japan; Matthias Rauterberg from Eindhoven University of Technology, Netherlands; Demetri Terzopoulos from University of Toronto, Canada).

A first important opportunity came when IFIP Technical Committee on "Human-Computer Interaction" (TC13) kindly offered a time slot for an international panel on entertainment computing at the prestigious INTERACT 2001 conference held in Japan (Tokyo, July 2001). The IWEC Steering Committee decided to accept this kind offer to increase the presence of SG16 and IWEC. At the panel many conference participants showed interests in entertainment computing.

## 2.1 Conference Series

In the year 2002 the first international workshop on entertainment computing (IWEC) was launched. IWEC 2002 was successfully held at Makuhari (Japan) on May 14-17, 2002. This workshop attracted over 100 participants and over 60 papers were published in the proceedings by Kluwer [8]. At IWEC 2002 were many high quality papers and several interesting technical demonstrations. In other words, evidences that entertainment computing is already an important technical area. At IWEC 2002 we had an extended SG16 meeting, and it was agreed unanimously that the formation of a new technical committee (TC) on Entertainment Computing should be proposed formally to IFIP at the General Assembly at Montreal in 2002.

Based on the success of IWEC 2002, SG16 organised the next event by upscale from workshop to conference: the ‘International Conference on Entertainment Computing’ (ICEC 2003), that was held on May 8-10, 2003 at the Entertainment Technology Centre at Carnegie Mellon University, Pittsburgh (USA). ICEC 2003 was also successful with more than 100 attendees, 20 highly selected papers, several prestigious keynote talks and invited panels. All the papers for ICEC 2003 have been accepted by ACM for inclusion in their ACM online digital library [9]. To complete the first around the world cycle “Japan-USA-Europe”, the third International Conference on Entertainment Computing (ICEC 2004) was held in Europe at the Eindhoven University of Technology in September 1-3, 2004 [10]. This conference attracted 114 submissions of which 62 full papers. Around 150 attendees from academia and industry participated in this successful conference. Full papers, short papers, posters, system demonstrations, and exhibitions from industry were presented in several parallel sessions. The program included three well received keynote talks, three specially invited topic talks, and an outstanding super-chess contest organized by Jaap van den Herik (The Netherlands). ICEC 2005 was successfully organized at the Kwasei Gakuin University in Sanda (Japan) [11], ICEC 2006 at Microsoft Research and University of Cambridge in Cambridge (UK) [12], ICEC 2007 at Shanghai Jiao Tong University in Shanghai (China) [13], ICEC 2008 again at Carnegie Mellon University, Pittsburgh (USA) [14], and most recently ICEC 2009 at Conservatoire National des Arts et Métiers in Paris (France) [15].

Over the last years several conferences on similar topics are initiated by affiliated communities: ACM Singapore Chapter started the conference series “Advances in Computer Entertainment technology” (ACE), and the conference series on Digital Interactive Media in Entertainment and Arts (DIMEA); the Center for REsearch And Telecommunication Experimentation for NETworked communities started the international conference series on “Intelligent Technologies for Interactive Entertainment” (INTETAIN); other related conference series are Conference on E-learning and Games (EDUTAINMENT), European Interactive TV Conference (EuroITV), Conference on designing user experiences for TV, iTV and Internet TV (UXTV), and Fun and Games (FNG). Every year new events are coming up of which some getting established.

## 2.2 Email Distribution List

Having established successfully the conference series ICEC, we started an email distribution list to keep the community informed. The list has grown to about 2500 list

members, tendency still growing [16]. The worldwide distribution of list members is about 20% America, 25% Asia, 35% Europe, and 20% industry and other organizations from all over the world. The community is actively using this list to post the latest news and announcements in the field of entertainment computing. In 2009 on average 15 postings are done per month [17]. This initiative is next to the IFIP ICEC Conference series another successful service to build up this new community. To support this aim in addition, a new technical committee started in the International Federation for Information Processing (IFIP).

### 2.3 Technical Committee and Working Groups

In 2002 IFIP approved establishing a specialist group on entertainment computing (SG16). Showing success and sufficient potential for growth, IFIP approved in August 2006 the upgrade from specialist group to a full-fledge technical committee [18, 19]. It was a major achievement to get the official recognition and support of IFIP for this upcoming area of Entertainment Computing. TC14 has by now 24 national representatives of IFIP member countries around the globe, and is organized in seven different working groups active which are shortly described below.



**Fig. 1.** The birthday picture of TC14 (from left to right: Prof. Mikio AOYAMA, IPSJ representative; Dr. Benjamin SALEM, TC14 Secretary; Prof. Ryohei NAKATSU, TC14 chair; Prof. Tadao SAITO, IFIP GA Member Japan; Prof. Klaus BRUNNSTEIN, former IFIP President)

*Digital Storytelling:* Storytelling is one of the core technologies of entertainment [20]. Especially with the advancement of ICT, new type of entertainment called video games has been developed where interactive story development is the key that makes those games really entertaining. At the same time, it has not been studied well what is

the difference between the interactive storytelling and the conventional storytelling. Also as the development of interactive storytelling need a lot of time and human power, it is crucial to develop technologies for automatic or semiautomatic story development. The objective of this working group is to study and discuss these issues.

*Entertainment Robot:* Robot is becoming one of the most appealing entertainment technologies [21, 22]. New entertainment robot and/or pet robot are becoming popular [23]. Also, from a theoretical point of view, compared with computer graphics based characters and animations, robots are an interesting research object as they have a physical entity [24-26]. Taking these into considerations, at the SG16 annual meeting in 2004 it was decided that a new working group on entertainment robot has to be established.

*Theoretical Basis of Entertainment:* Although there are huge entertainment industries already such as video games, toys, robots, etc., little academic interest has been paid on such questions as what is the core of entertainment, what is the technologies that would create new entertainment [27], and how the core technologies of entertainment can be applied to other areas such as education, learning and so on. The main objective of this working group is to study these issues [4, 28-30].

*Games and Entertainment Computing:* This working group focus on the research and development of computing techniques for the improvement of computer games and other forms of computer entertainment [31, 32]. The scope of this working group includes, but is not limited to the following applications, technologies and activities. Applications are: Analytical games (e.g., chess, Go, poker [33]); Consumer games (e.g., action games, role-playing games, strategy games; mobile games (e.g., mobile phones, PDA's) [34]; interactive multimedia (e.g., virtual reality, simulations); and technologies: Search techniques, machine learning, reasoning, agent technology [35], and Human-Computer Interaction [36, 37].

*Social and Ethical Issues in Entertainment Computing:* The aims of this working group are to foster the ethical design, development, implementation, applications and use of entertainment computing [38, 39]; to encourage surveys and studies on social, ethical and cultural aspects of entertainment computing [1, 2, 40, 41]; to develop methodologies for studying social, ethical and cultural implications of entertainment technology; and to establish a global platform for interaction, exchange, joint initiatives and co-operation between such groups as: The end users of entertainment computing, industrial developers and designers of entertainment computing, policy, decision making, social and consultative bodies, academics and scientists. This working group explicitly cares about the position of and the potentials for, vulnerable groups such as children, the less-educated, disabled, elderly and non-employed people, cultural minorities, unaware users and others [42].

*Interactive TeleVision (ITV):* The aims of this working group are promoting visibility and increasing the impact of research and development in the ITV field [43, 44]; to bring together interdisciplinary approaches to ITV research and development issues (e.g. content production, computer science, media studies); to encourage cooperation

between researchers and other established bodies and organizations, through the development of joint project proposals; and to facilitate the development of suitable academic and practical teaching programs. Research fields cover alternative content distribution (mobile TV, peer-to-peer TV, IPTV); interactive storytelling, user contributed content; interactive and personalized advertising systems; applications for t-commerce, t-learning, t-health, entertainment; ethical, regulatory and policy issues; interoperability of middleware, standards, multimedia metadata; authoring, production and virtual reality systems; content management, digital rights management; multimedia, graphics, broadcast and video technology; content enriched communication services, video conferencing; personalization, user modeling, intelligent user interfaces; and usability, accessibility, universal access, multimodal interaction.

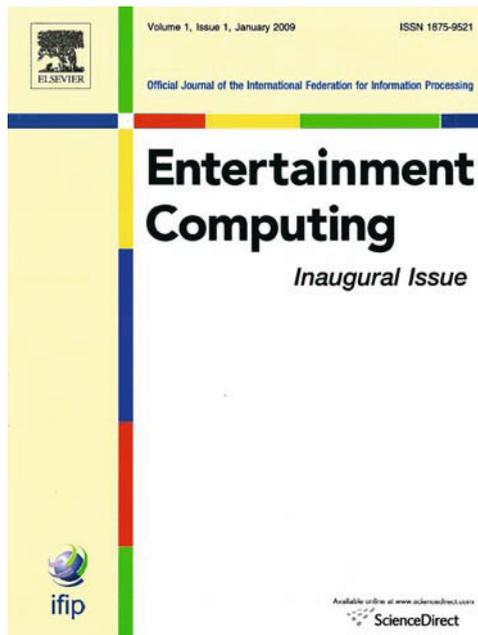
*Art and Entertainment:* The influence of technology and scientific innovation is profoundly changing how we express ourselves [45]. Arts and Entertainment is a new field that represents the exciting convergence of technology with the established design discipline [46, 47]. The Media Arts and Cinema offers a comprehensive approach to design that encourages innovation by media artists, scientists and engineers [48]. This working group will pursue the following activities: To explore the way art and cinema aesthetics can play a role in different areas of computer science ; one of its goals is to modify computer science by the application of the wide range of definitions and categories normally associated by making art and cinema [49]; to go beyond the usual definition of art and cinema aesthetics in computing, which most often refers to the formal, abstract qualities of such structures in the context of computer science: a beautiful proof, or an elegant diagram; to research the broader spectrum of aesthetics [50], from abstract qualities of symmetry and form to ideas of creative expression and pleasure [51]; and to prove the assumption behind art and cinema aesthetic computing that the field of computing will be enriched if it embraces all of aesthetics [52].

## 2.4 A Peer Reviewed Scientific Journal

One of the most important initiatives for supporting entertainment computing was launching this scientific journal on ‘Entertainment Computing’ with Elsevier. This journal has us (Ryohei Nakatsu and Matthias Rauterberg) as founding editors in chief. In addition we have an editorial board of 28 distinguished colleagues from all over the world acting as associate editors, and in addition a growing list of high level experts for the most important task of thorough and rigorous peer reviewing. For the editorial board we have balanced regions (America, Asia, and Europe), as well as academia and industry. Fortunately we could also get the support from IFIP to run this journal as an ‘official journal of IFIP’. With the keen interests and kind support from the community we will do our utmost to establish this journal as the premium publication and communication channel for our field of entertainment computing. This might help to achieve a high quality of life by social transformations through entertainment technology.

Entertainment Computing publishes original, peer-reviewed research articles and serves as a forum for stimulating and disseminating innovative research ideas, emerging technologies, empirical investigations, state-of-the-art methods and tools in all

aspects of digital entertainment, new media, entertainment computing, gaming, robotics, toys and applications among researchers, engineers, social scientists, artists and practitioners. Theoretical, technical, empirical, survey articles and case studies are all appropriate to the journal. Specific areas of interest include: Computer, video, console and internet games; Digital new media for entertainment; Entertainment robots; Entertainment technology, applications, application program interfaces and entertainment system architectures; Human factors of entertainment technology; Impact of entertainment technology on users and society; Integration of interaction and multimedia capabilities in entertainment systems; Interactive television and broadcasting; Methodologies, paradigms, tools, and software/hardware architectures for supporting entertainment applications; New genres of entertainment technology; Simulation/gaming methodologies used in education, training, and research. In the area of empirical and experimental studies contributions are invited which are very well documented, innovative, and tested or evaluated in a particular entertainment domain.



**Fig. 2.** Layout of the new IFIP journal on Entertainment Computing published by Elsevier

## 2.5 TC14 Pioneer

Takahiko Kamae (PhD Electrical Engineering 1966; male) was director of research and development, Laboratories of Image Science and Technology (LIST), Tokyo, Japan, responsible for such projects as networked appliance architecture and IT-supported healthcare management. His past R&D work includes a facsimile communication system, digital videotex, and sketchphone. He received the Medal with Purple Ribbon from the Japanese Government in 2000 for his achievements of

facsimile communication system. He organized the first International Workshop on Networked Appliances (IWNA) in November 1998 in Kyoto and served as its general chair. He was chair of the Multimedia Communications Technical Committee, IEEE ComSoc (1999-2001), and was chair of the IFIP Entertainment Computing Task Force. He received his B.S. and M.S. in electronics from Kyoto University and his Ph.D. in electrical engineering from the University of Illinois at Champaign-Urbana. He worked for NTT for 26 years, and was vice president and executive manager of its Human Interface Laboratories from 1990 to 1993. After NTT he joined Hewlett-Packard and was director of its Japan Laboratories from 1993 to 1999. He was member of the advisory board of the Faculty of Advanced Techno-Surgery -Institute of Advanced Biomedical Engineering & Science at Tokyo Women's Medical University.

He retired from NTT, a Japanese telecommunication carrier and started a new career with Hewlett-Packard in 1993. After he took a PhD in 1966, his career began as a research engineer with NTT in 1967. The biggest project he was involved in was the development of a facsimile communication network, which is now nicknamed F-net. From 1990 to 1993 he led NTT's Human Interface (HI) Laboratories as the executive manager. R&D work at NTT's HI Labs includes video compression/ decompression, video and image processing, speech recognition/ synthesis, multimedia human interfaces, and human factors. Based on the discussions held at the labs, he organized the International Workshop on Networked Reality in May, 1994, in Tokyo. The workshop was very successful with good participants from many countries and very stimulating discussions. Multimedia, virtual reality and the information superhighway were really attracting attention in many countries.



**Fig. 3.** The TC14 pioneer Takahiko Kamae among his peers at ICEC 2005 in Sanda, Japan (from left to right: Dr. Benjamin SALEM, secretary; Prof. Dr. Zhigeng PAN, representative from CHINA; Prof. Dr. Takahiko KAMAE, IFIP Pioneer; Prof. Dr. Sidney FELLS, representative from CANADA; Prof. Dr. Matthias RAUTERBERG, representative from The Netherlands)

In April, 1994, he joined Hewlett-Packard (HP) and began a computer science research laboratory for HP in Tokyo. His organization was called Hewlett-Packard Laboratories Japan (HPLJ) and is located in Kawasaki City, a southwest neighbor of Tokyo. His experiences at Champaign-Urbana helped him a lot to adapt to a U.S.-based company culture. He met people from different countries as well as many Americans on the campus. Such globalism in U.S. universities made his student life at Urbana enjoyable and also stimulating. HP is also cherishing such globalism. It is one of the reasons he liked HP.

For his lifetime achievements and his visionary role in setting up and chairing the taskforce group for 'Entertainment Computing' he is recognized and honored as IFIP TC14 pioneer.

### 3 Future Directions

Over the last decades the rapid innovation in ICT has offered ever faster and more versatile access to ever more data, knowledge and information. Although this is of much practical value, the transformative social power of the technology is based on its opening and closing of opportunities for us to have control over shaping and re-shaping our electronic and physical access and the terms of access to the knowledge and other resources we need to enable us to earn a living, learn, engage in political debate and action, meet people, choose our sources of news, information, and entertainment, and many other activities essential to determining our quality of life.

Between now and the near future, digital technologies will become even more powerful and affordable for all users and at every level, in digital networks and in product offerings. An increasing number of people will be able to compile, program, edit, create and share content; as a result, they will gain more control and become more immersed in media experiences. But more than technical challenges, the social implications on human behaviour will be of most importance. We need a media ecology movement to heighten consciousness to fight the waste and pollution that media can produce. It is indeed a challenge for the mental environment of our children and future generations. The questions we must ask ourselves are: Do we give them a world that is challenging, stimulating, inspiring, and really entertaining? Do we encourage their intelligence, creativity and curiosity?

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# 50 Years of IFIP: A Contribution to the Review

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The volumes for 10 years, 25 years and 35 years of IFIP I have edited represent an account of the activities our federation has contributed to the development of our field. When I took these three volumes a few weeks ago in my hands and started reading, I found that the last two volumes contain a lot of recognized changes and proposed reactions and I first of all want to invite all IFIP officers to do the same, to read the two books and to consider what is written there, how to continue and what to change.

I have not been at the founding meeting in Rome in 1960, but I was at the ICIP 1959 in Paris where the ideas for the foundation were substantiated and prepared. And from 1961 on, when I had accepted to chair IFIP TC 2, I was at all IFIP General Assemblies and Council meetings, continuing as Council Member, Vice President, President and Past President until 1975.

Indeed the last 15 years have brought more substantial developments than the first 35. The latter were primarily a period of maturing of the information technology, while now we are confronted with the domination of most human activities by the computer. Alone the intensive extension of the networking with the internet as a worldwide machine and monument in one – I was close to say “in one person”, because many users seem to think of it as an ever- and omni-present person – open the question: what should still be printed in our days? Our friends, the physicists, have provided us with a parameter multiplication of one thousand every 20 years, miniaturization and speed, number of computers and number of their parts as well as reliability, a miracle that no other field of technology has ever experienced – it is sufficient to imagine such a miracle in auto car development to get our uniqueness fully in our consciousness. It is evident that such a growth of the fruits must produce a similar growth of dangers, difficulties and even crimes as a consequence. We have helped mankind to incredible achievements, but we are also on the way to create an incredible amount of problems. Many of them would not exist without the millions of computers in science and technology, in administration, business and in the homes.

We computer specialists are busy enough to keep up ourselves with the development, we can hardly moreover educate all the groups of people around the computers to talk to each other – *how to talk to each other*. These groups are those who design, construct and program the computers and their networks, those who use the computers and those who receive the computer outputs, directly and indirectly.

There is no more shortage of storage space. You buy the Megabytes you need in the storage on the next corner and you will soon buy Terabytes for the same price.

Storing is no more the problem. The problem is to find what you look for in your collection of sticks. Did you think out an appropriate system and did you invent proper names for what you search? And if you search in a material which others have stored, one can only wish good luck. And that immediately a second time, namely for the truth, correctness and quality of the information you pick.

Another slogan for my students was: the computer is a model for storing models. We are constructing a universe of models, much too small in spatial size to imagine it, much too big in information content to remember it. You might say that the book-keepers pages were of different material, but of the same structure. That is right. But the computer brings the data and the texts out of human dimensions, into sizes and speeds nobody can really imagine.

Is not IFIP the appropriate institution to study what happens, to properly describe it and to inform and warn the user community? Should we not keep up a list of teaching literature (TC3)? And when everything is available on-line: Who needs to travel anymore?

One serious question: Has the all embracing IFIP Congress not become an illusion? Yes, we have the English language as a world wide communication instrument. But are we not contaminating this language with an uncountable number of new words, many of them hidden behind abbreviations, so that we soon will need a two level encyclopaedia, the first level telling what the abbreviation means and the second what the second what is hidden behind the word?

Should we turn the IFIP Congress into a set of specialised conferences, maybe in one place, maybe in several cities? Or is it worthwhile to develop a congress philosophy which helps to shape the congress? I like to say to my students that a computer man must become a “universalist”, but in order to be able to do so he first must become a specialist and one human life is not sufficient for both. In order to become a universally interested expert, meeting of the leading scientists from different areas of Computing at a general event – an IFIP Congress, embracing important contributions from related fields on a general level and not too specialised – may be really worthwhile.

A typical example for such changes are the foundation and closing of the “Five International Associations Coordinating Committee” (FIACC) initiated by Victor Broida (IFAC) and me. Besides IFIP, FIACC included, among others, IFAC (the International Federation of Automatic Control) and IFORS (the International Federation of Operational Research Societies). It was dissolved because after some years the sub-bodies of the five federations had learned how useful coordination is and how to do it – without FIACC, but via their own channels. In times where many projects need different qualifications and knowledge from very diverse disciplines, it is worthwhile to think about how to support more cooperation with related disciplines and their international organizations.

One final suggestion: Establishing a “Who is who in IT”: I had proposed – more than once – a “Who is Who”-Volume including the names IT-related communities, national and international – scientific and economic, and including the names of the members. I did not succeed. As the world of IT continues to expand, people tend to forget about past achievements and those on whose shoulders they continue. As in other disciplines, Information and Communication Technologies will become a mature discipline if their experts are aware of the roots how their methods and models of thinking. This will require an adequate collection and presentation of the development and achievements.

# **An Analysis of Some IFIP Developments and Structures: Some Personal Comments**

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The background of these thoughts are a long-time active involvement in various IFIP groups and in several positions:

- as member, representing German Informatics society (GI) in IFIP TC-9 “Relationship between Computers and Society” from its foundation (1976) until 200, and as TC-9 chair (1990-1995), including the representation of TC-9 in IFIP General Assembly (1989-1995),
- as member of Working Group 9.2 “Social Accountability” from its foundation (1977) until 2002, and as its founding chair (1977-1982),
- as German representative in IFIP General Assembly (starting 1998), actively involved in several committees, as vice president (2001-2002) and as president (2002-2007),
- and finally as participants in several IFIP events, esp. including IFIP TC-9s “Human Choice and Computers” conferences and IFIP World Computer Congresses, finally as General Conference Chair in IFIP WCC-2010 in Brisbane.

The first experience which is worth to share is that IFIP can rely on so many different characters, expertise and good-will which is an excellent basis for gaining insights, learning from colleagues and being stimulated to make one’s best contributions even under difficult conditions, esp. in competition with one’s personal and professional duties. It is always worth to remember that people actively involved in IFIP hold professional offices in universities, research institutes, enterprises and governments, and that they voluntarily contribute to IFIP work in addition to and besides their professional and personal duties. Consequently, time problems of people engaged in special projects and tasks may sometimes inhibit timely delivery of promised studies, papers and results.

The second experience which is also important is that IFIP offers a huge network of expertise, offering communication and learning from people with backgrounds in different countries and cultures, various education and professional careers. This is both an opportunity for learning from diverse backgrounds, as it may be a problem in mutual understanding. But working together in IFIP is a very good to avoid misunderstandings and to overcome cultural and political gaps, as experienced in IFIPs first 30 years: IFIP was one of the few institutions which allowed experts to meet and work together in times of the Cold War. After the end of Cold War, there are still so many

conflicts, where mutual understanding and possibly mutual solutions can be mitigated by world-wide cooperation of ICT experts, esp. as ICT is THE universal platform for information processing and communication.

A third experience is that you import your professional expertise and personal devotion into IFIP working bodies, but you should be aware that some of your contributions are not always accepted. As a example of good acceptance, let me mention the work which Jacques Berleur, Belgian representative in IFIP TC-9, very active chair of WG 9.2 and TC-9 and founder of the Namur award (with which TC-9 honors outstanding contributions in fields of Social Impact of Computing), who has developed important contributions of IFIP in the field of “Ethics of Computing”, which has been discussed in various conferences. On the other side, a counter example was a joint work of Bill Caelli, then chair of IFIP TC-11 “Security” and myself as incoming TC-9 chair, when we tabled a “Proposal to ban writing and distributing computer viruses” at IFIP General Assembly 1989 in San Francisco; although this proposal had been accepted unanimously by GA, it was never duly published. Imagine that - if this very early warning had been duly distributed to important players in our fields – we might have avoided a portion of today’s zillions of computer viruses and Trojans which do so much damage to computers and services of so many customers.

As conditions in ICT have changed significantly and are further changing with growing speed and impact, the conditions under which IFIP works has also changed dramatically. During the first 25 years of IFIPs work, development of ICT was concentrated in some areas such as hardware and software development, data bases and information systems, communication, and theoretical models. In those times, professional events such as IFIP World Computer Congresses (e. g. in Stockholm in 1974, with more than 4.000 participants) attracted many leading experts actively engaged in all related areas of Informatics. Starting with growing numbers of ICT devices and Personal Computers, and with the explosive development of systems and applications for business, governments and individual usage, the number of technical fields also grew significantly.

With the diversification of ICT into many more different fields, the numbers of experts grew significantly, but the ongoing specialization lead to less interoperation of different areas. Consequently, the different “fractions” preferred to work together very closely, and specialized events developed where they met. Also due to professional pressure, experts were less able to meet at large Congresses which addressed a universe of ICT related themes – consequently, the “fractionalization” of Informatics lead to a steady reduction of the numbers of participants at IFIP World Computer Congresses. Although IFIP World Computer Congresses have been organized in all continents at sites which hosted well-reputed ICT institutions and which were culturally and environmentally attractive (as reflected in the term “IFIP as traveling circus”), the by far largest part (60-70% of participants) came just from the neighborhood of the organizing country (see the report about IFIP WCC-2010).

As the IFIP working bodies, esp. experts in Technical Committees and Working Groups, were aware that the growing dependability of so many applications from well-designed and well-implemented, growingly complex ICT systems required a much better mutual understanding and interaction of experts from the various areas in

ICT, organizers of IFIP World Computer Congresses tried to develop more inter-operative structures for IFIP World Computer Congresses. From “collocated” conferences, where experts from different technical areas could both discuss new issues in their fields, but at the same time meet colleagues from other fields for discussing themes of overlapping interest, until “streams” of areas with similar topics and problems, as in the 21<sup>st</sup> IFIP World Computer Congress in Brisbane (September 2009), scientific results were excellent but the numbers of participants never reached the previous levels.

Indeed, observing both the growing numbers of fields which can be related to developing and applying methods of Informatics, and also looking at the explosive number of experts working in related areas, the relative number both of technical fields and the relative number of participants decreased continuously. Presently, with further diversification of technical fields and with the still growing number of experts on worldwide scale, only few areas in the world as well as only a small part of technical areas in Informatics are “somehow” represented in IFIP World Computer Congresses, which hardly represent “the world of computing” (not to forget the world of “digital communication”). Rather than following the traditional pattern of “IFIP World Computer Congresses”, it may be wise to think about new ways how to support an improved information exchange between experts in and between different technical areas.

Another aspect, closely related to the diversification and fractionalization of technical fields in ICT is related to the established structure of IFIP work. As IFIP was established primarily from experts with academic background, and with UNESCO as patronizing organization, the traditional hierarchical organization of academic and political organizations was also applied to IFIP working bodies. On the side of IFIP technical work, a growing number of “Technical Committees” – presently 13 - were established, each subject to devoted “Aims and Scopes” which provided both directives for work AND separation from other areas. Under the umbrella of a Technical Committee, Working Groups – each also donated with Aims and Scopes – were responsible for covering specific sub-areas (presently 125 Working Groups including some Special Interest Groups). With growing differentiation, the number of Working Groups grew equally, and in some cases, Working Groups adapted their agenda to changing issues within their subject area.

Although the overlap between different technical areas grew significantly (at least since the 1980s), it is interesting to observe that only very few attempts were made to establish cooperation between different Working Groups working on related subjects. Different from developments both in academic and industrial organizations where networks of experts from different fields which may contribute to a specific project work together, IFIP working bodies only very rarely cooperate even when discussing issues with related content. Indeed, with joint Working Groups on “User Interface Engineering” (addressing both a subject of “Software” – TC-2 - and “Human-Computer Interaction” – TC-13), “Web Semantics” (addressing a subject of “Software” and “Artificial Intelligence” – TC-12) and “Information Technology: Misuse and the Law” (addressing a subject of “ICT and Society” – TC-9 – and “Security” – TC-11), just 3 out of 125 Working Groups (<3%) form cooperative bodies. In addition, 3 Technical Committees work together in organizing conferences on “e-Business and e-Government”. Although the scenery of scientific cooperation looks more

developed concerning events jointly organized by Working Groups of different TCs, there is still much room for development of organizational cooperation and networking, esp. in areas such as education (where each TC can work together and get supported by TC-3 “Education”), as well as concerning “Social Impact” (supported by TC-9 “ICT and Society”) of applications of methods and products in the respective TCs subject areas.

One of IFIPs important aims is that members of IT societies find a meeting place for sharing experience, and discussing challenges and opportunities”. From this mission, IFIP has 2 important tasks to pursue: further developing the dissemination of information AND to maintain close relationships and communication channels with IFIP member societies.

Concerning the dissemination of information, IFIP still prefers the traditional channels to distribute its results from workshops, conferences and World Computer Congresses in printed form. While the established relationship with world-class publishers, from Elsevier in IFIPs early years to Springer presently, guarantees a high quality of printed publications, with IFIPs Program Committees guaranteeing the quality of the technical content, the “broadband” of this traditional distribution channel is very limited (to hundreds and few thousand copies each), compared to the mass (millions) of possibly interested readers. While the Internet would offer a possibility to reach significantly more readers, this channel is not well developed, esp. because these are “pay channels”. IFIPs own attempt to establish a Digital Library, free of charge, is developing at very slow pace, despite significant investment.

The other basic task which IFIP must pursue addresses the relation between IFIP and its member societies. Historically, member societies (or more exactly: their representatives) dominated IFIP decisions, although the major technical and scientific work was contributed by Technical Committees and Working. In those ancient times, TC chairs were regarded as “observers” sitting at tables in the background of IFIP General Assemblies and being allowed, to present their TC reports in a 5 minutes slot, possibly enhanced with the permission to answer questions from the floor of GA members. As IFIP became aware (starting in the late 1980s) about the importance of the work of TCs and WGs, TC chairs were promoted to become “real” members of IFIP General Assembly and Council (today: Board), and TC chairs also got significant voting rights.

But IFIP lives equally from the support of member societies (not only financially) AND the support from Technical Committees and Working Groups. Consequently, it was a good development that the background of many IFIP officers – presidents and vice presidents, treasurer and secretary, chairs of committees – was based BOTH on the good relation to member societies which they represented AND their experience in TC and WG work. Not surprisingly, 11 (out of 17) IFIP presidents have served as TC chairs before their election to IFIP president (which is usually the end of an IFIP career ☺).

Although the representatives of Member Societies play an important role in IFIP, this does NOT guarantee that all member societies feel well represented in and informed about IFIP developments. Recent examples – such as questions concerning future developments of IFIP structure and membership, or divergent opinions about projects addressing professionalism which has very different meanings in different

countries – indicate that IFIP should develop mechanisms to more intensely communicate and interoperate with member societies directly, e.g. by regular meetings (not only at World Computer Congresses) with presidents and CEOs of member society.

One final thought: many – if not all – people working in IFIP are aware of the fact that Information and Communication technologies change the world not only in technical and economic directions. By shaping the world, these technologies also have strong impact on social and legal structure, as on everyone's daily life. Consequently, discussions about consequences of ICT developments, esp. including The Internet, should also address the responsibility of ICT experts for communicating consequences and options of their work should take a broader room in IFIP discussions. Related discussions require improved networking between the many valuable, though often isolated ICT communities within IFIP. Therefore, the development of IFIPs internal channels for information exchange and mutual discussions will be a major task for the next (say: 10) years.

# The Next Decade

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## 1 "Beam Me Up, Scotty!"

Who doesn't know these words. It is a command to transport persons from one place to another by dissolving the person into a collection of molecules in one place and rebuilding that person molecule by molecule in another. At least that is what it looked like to me when watching the science fiction series Star Trek in the late sixties, the early days of IFIP. This kind of transport of a person is not (yet) possible, therefore real science fiction. But many things that were science fiction when they were first described by novelists, visionaries and scientists have become reality, just think about the books of Jules Verne, the work of Leonardo da Vinci and many others. Although it is not physically possible, virtually we have even gone further already. Not only can we be "transported" bit by bit to another place anywhere in the world (provided technology is available) but we can also be multiplied.

In this contribution to the IFIP 50<sup>th</sup> anniversary jubilee book I will give you my personal view on the challenges and opportunities for IFIP in the next decade. I have started the chapter with a science fiction series. Not because IFIP is science fiction but because IFIP's basis is science and because the unimaginable features and possibilities of fiction often become reality much quicker than one can imagine. And also because it raises questions that need to be addressed.

## 2 Advancement of Technology

We have all seen and experienced that since the early days of computing, and the above described era of the sixties is part of these early days, technological developments take place in an ever increasing pace. IFIP is pre-eminently an organization that is not only keeping up with these developments but is on the leading edge of them, as a federation and through its member societies. I am not worried that this will change in the next ten years. A strong point of IFIP is the technical quality of the work done by its volunteers in the Technical Committees and Working Groups. Therefore, meeting the first strategic aim that "*IFIP provides a global platform to advance technologies for information and knowledge societies*" will continue to be achieved. That does not mean that we can lean back contented and stop looking for improvements. There

should be a natural attitude and motivation to periodically evaluate whether the goals and quality levels that we want to achieve are still achieved. Before you know it you are too late in reversing a negative trend and as we all know, reputation arrives on foot but departs on horseback. And we cannot afford that, our reputation is one of our major assets.

### 3 Dissemination of Information

The second strategic aim that “*IFIP provides a global platform to disseminate high quality information*” is a more difficult one if we look at the ambition and the trends. We are disseminating a lot of knowledge by means of the proceedings of our events. And we should continue to do so. But we want to achieve more. The ambition to make the knowledge gathered in the many IFIP events available at least at an affordable price or perhaps even free to read for a wide audience is facing hurdles such as the financial model for achieving this and mechanisms for guaranteeing the quality of the content. Also the constraints of the academic system worldwide that requires students and scientists to publish their work in journals and proceedings of a certain standing (measured in a number of ways) is not helping quick steps forward. It would be a brave step of those with accepted conference papers but also with journal type papers and white papers to help IFIP in adding actual content to the digital library. And it would be a major accomplishment if this content could be made available free to read for the individual members of all IFIP member societies. It will take a change in the cost and income model but I believe this can be achieved in the next ten years and consider this as a big opportunity for IFIP to make a difference. This strategic aim of IFIP has also a very strong relation with the aim to bridge the digital divide.

### 4 Professionalism

Our personal and business lives heavily depend on computer based systems and therefore on the competence and professionalism of those who design, build, implement and manage those systems. How can IFIP with its background and solid basis in the academic world contribute to the advancement of professionalism in ICT? With the International Professional Practice Partnership (IP3) a major step has been taken towards the goal that “*IFIP provides a global platform to advance professionalism in ICT*”. The following are often mentioned as the elements of a professional: - demonstrated mastery of a core body of specialized knowledge; - demonstrated competence; - commitment to life long learning; - high level of responsibility and autonomy; - code for ethical behaviour; - personal integrity; - accountability. Because of the differences in background, history, culture and legal environments, it is not easy to create a common view and approach with the IFIP member societies and to achieve a globally accepted standard that allows stakeholders to recognize and acknowledge a minimum level of professionalism. A lot has been accomplished already by what has been done so far. IP3 accredits the certification that is achieved as doing what it says

it does. This is already useful to employers. Nevertheless more steps need to be taken and this topic is a typical example of a “two steps forward, one step back” process. The challenge for the next decade will be to continue taking enough steps forward.

## 5 Social Responsibility

The ever faster technological developments raise new questions and challenges, more of a non-technical nature than of technical nature. Although IFIP is already addressing many of these questions, I would like to see even more attention for the consequences of ICT developments and a more prominent role in addressing policy makers with our analyses and position statements. Promoting social responsibility in the development and use of information and communication technologies is an activity society expects from a body like ours and that is why we added this to our strategic aims: “*IFIP provides a global platform to promote social responsibility in the application of ICT*” . This requires an effort to go beyond national interests and established practices because these are often sensitive issues. Think about international legal frameworks with regards to data protection, freedom of information and privacy. IFIP can also contribute more to promoting awareness of ethical issues, of public understanding of ICT and of accessibility of ICT. I hope we can manage this, it would mean that IFIP can add great value to the work already done in the technological areas.

## 6 Digital Equity

In the previous decade (2001 – 2010) IFIP has strongly increased its attention and contribution to digital equity by starting more activities aimed at emerging and developing countries. An obvious example is the World IT Forum (WITFOR) but there are definitely also other activities that have contributed to successfully achieving the goal that “*IFIP provides a global platform to promote digital equity*”. In these activities we have seen a strong participation of governments, policy makers and industry which has a good public relations effect on the other activities of IFIP as well. And these other, scientific activities are a pre-condition to be able to contribute to achieving digital equity. Also the involvement of larger UN bodies such as UNESCO and ITU are beneficial to the exposure of IFIP and the possibilities for stronger cooperation between IFIP and these bodies to achieve a number of goals. I am convinced that IFIP can further build upon and expand the success of these activities in the next decade and have a visible, strong contribution to achieving the Millennium Development Goals as set by the United Nations to be achieved in 2015. Besides emerging and developing countries, digital equity issues in developed countries can be problems that should not be overlooked and these deserve our attention as well. The major factor that limits IFIPs possibilities are the resources that are necessary to continue all these activities. Resources not only in terms of money, which is always an important element, but even more in terms of the number of volunteers having the time and motivation to contribute to these achievements.

## 7 Opportunities and Challenges

In the previous chapters I have addressed some opportunities for IFIP along the lines of the strategic aims. In summary the major opportunities are:

- Organizing top class scientific events that nobody wants to miss;
- Providing easy and cheap access to the knowledge of these and other events in a digital library;
- Contributing to increasing the professionalism of the ICT professions;
- Analysing and providing policy statements on social responsibility;
- Having an acknowledged contribution to achieving the Millennium Development Goals.

IFIP faces some challenges in order to take full benefit from these opportunities. I will highlight a few of these.

The still increasing speed of technological developments has also resulted in a tremendous change in the social behaviour of people and in the way of communicating with each other. In order not to be outdated, surpassed and ignored by the younger generations, this requires a change in attitude towards accepting / adopting technology and behaviour. One obvious example of both elements is the use of mobile phones. As a train commuter since nearly two decades now, I have personally experienced the birth, childhood and maturity (?) of the use of a mobile phone in a public space. From very few, very cautious, almost non-disturbing conversations to a situation where discussing openly and loudly (very) private matters is no longer considered impolite (at least by most) and tolerated (by the rest).

How does this relate to IFIP? Not only persons but also organizations have to accept, adapt and adopt such changes. In the early years of IFIPs existence meeting physically was the best way to build up a professional network. Adapting to changes in technology could be done at a moderate pace since these changes took place in a moderate pace. Changes in the organization of IFIP therefore could also take some time. Nowadays many other means of communication such as e-mail, twitter and facebook exist to build up professional (and social) networks. Technology changes go much faster than 50 years ago. In order to survive in the next decade, IFIP has to become faster and more flexible in its responding to developments and its ways of communicating.

IFIPs ambitious strategic objectives could be perceived as competitive with the activities of its member societies and therefore conflicting with their interests. It is by no means IFIP's intention to start a competition or to harm the interests of its members. Achieving a strong brand name is in the interest of IFIP itself and of its members. This can only be accomplished in cooperation between the technical bodies and the member societies and between the member societies. The concern that I have for the next decade is that this cooperation will suffer from the many problems IFIP and most of the member societies face: increasingly difficult market circumstances, competition by other organizations (for instance in the conference market), membership issues (decrease in numbers, change in attitude and expectations), lack of volunteers. IFIP should seek to further increase the cooperation and try to improve the mechanisms to

get active representatives and volunteers in order to stimulate a greater involvement in its activities.

These are two of the major challenges. I will not elaborate on some others but include them in the following summary. The list of challenges that affect all opportunities in the next decade includes:

- Reacting quicker to both technological and social developments, among others with respect to the organizational structure;
  - Realizing a greater flexibility with respect to stopping / starting activities;
  - Promoting a positive attitude towards changes: seizing opportunities rather than defending old habits and memories from the past;
  - Crossing boundaries between technical areas and finding a way to address application areas;
- Encouraging more active participation by representatives and volunteers.

## 8 “ICT: The Final Frontier”

I started this reflection on IFIP in the next decade with Star Trek and I will finish with it. To paraphrase Captain Kirk on the purpose of his starship, I would like to set the purpose of IFIP for the next decade as follows:

*ICT: the final frontier. These are the voyages of IFIP. Its ten-year mission: to explore strange new technologies, to seek out new applications and new contributions to improve quality of life, to boldly realize what no man has realized ever before.*

I look forward to continue being part of the IFIP community that will make every effort to fulfil its mission.

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