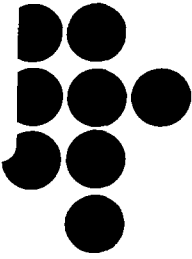


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COMMUNICATIONS
FORUM

Dewey,

**"Cooperative/Competitive Standards-Making:
Information Infrastructure and the New Reality"**

November 4, 1993

Bartos Theatre

20 Ames Street

4:00 to 6:00 pm.

**Massachusetts Institute of Technology
Cambridge, Massachusetts**

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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**Massachusetts Institute of Technology
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**Suzanne Neil, Associate Director
Digital Open High Resolution Systems
M.I.T.**

**Arthur Reilly, Chairman
Committee T 1
Bellcore**

**Robert Smith, Director of International Standards Strategies
NYNEX**

**Anthony Rutkowski, Director of Technology Assessment
Sprint International**

**Lee McKnight, Moderator
Digital Open High Resolution Systems Program
M.I.T.**

**Kelly M. Greenhill, Rapporteur
Graduate Student, Dept. of Political Science
M.I.T.**

Moderator LEE McKNIGHT (LM): Welcome to today's Communications Forum, entitled "Cooperative/Competitive Standards Making: Information Infrastructure and the New Reality." Today we are very pleased to have with us, Arthur Reilly of Committee T1 and Bellcore. Tony Rutkowski will be joining us via video conference from Virginia, and will be speaking as a representative of the Internet society. Bob Smith of NYNEX, an active participant in the international standards setting arena, is also with us. And finally, our own Suzanne Neil of the DOHRS program at M.I.T. is with us. She will be providing a broader perspective on standards setting and its theoretical and practical direction.

We continue to hold forums on the topic of standard setting because it is an ongoing topic of theoretical and practical concern, as the distribution and use of audio/video graphics and text continues to grow in both the variety and types of services and applications available. At the same time, the number of standards continue to grow all around us. Standards-making is a particularly timely topic as discussion of the National Information Infrastructure (NII), what it is, what its boundaries are, how it should be structured moves ahead, both in Washington and in the rest of the community. As the NII develops, many questions arise about how standards should be set, what kinds of standards are needed, and whether the existing bodies are doing all that needs to be done. Are there, perhaps, new tasks that need to be assigned and carried out? Conversely, are there also perhaps many things that these institutions should not be doing, things that should be left to the marketplace to sort out?

We are pleased to have Suzanne Neil of the Digital Open High Resolution Systems Program (DOHRS) at M.I.T. as our first speaker. Suzanne is associate director of the DOHRS program, and coordinates a team that is analyzing and supporting development of technical interfaces for open communications systems. She is responsible for ongoing meetings held with members of Congress, Executive branch representatives, and members of industry, on electronic information technology developments. She has also been active as a DOHRS program representative at international standards setting meetings. She has also worked as a consultant to the World Bank, with the Media Lab here, and in other capacities over the years. Suzanne. . .

SUZANNE NEIL (SN): I had fun thinking of titles for what I wanted to say today. I came up with many, but stuck with three. The general title I gave for my remarks today is "Bridge-Building in Uncharted Water" because I think that really gets at the essence of what is happening in the environment which we are trying to standardize today. The academic version of that title is "Institutional Malaise and Communications Standardization," and the title that may help us remember on a daily, mundane basis why we have headaches and can't sleep is "The Dog That Didn't Bark." What I want to talk about today is the nature of technical standardization and the environment in which these activities are happening.

I am going to try not to use more than three acronyms today, though I may not succeed. That is an important point because standardization is primarily an activity of details. The details involve so much passion that sometimes it is difficult to draw back and say, "What is the meaning of all of this?" I will just try to scratch the surface of these issues this afternoon.

Within the last month I have been to two separate standards groups meetings, both of which dealt with interoperability and advanced television systems. One was the Federal Communications Interoperability Joint Review Committee, where people talked about interoperability as a national information infrastructure issue. They talked about the compatibility of advanced television with education, health, national security issues, computers, and multimedia. Several days later, there was an International Telecommunication Union meeting on advanced television. There we also looked at questions of interoperability, but at this meeting we talked about them in terms of the compatibility of over the air broadcasting almost entirely with cable and satellite transmissions. We focused a little bit on computers, but only marginally. By and large,

both groups used the same term but employed different meanings. This problem with language is typical of current standardization efforts. The confusion over definition is symptomatic of a fundamental institutional malaise that pervades technical standardization today.

But before I talk about that malaise, I want to look at one more question, "Why standardize?" There are lots of benefits that accrue from standardization. Fundamentally, one standardizes to encourage the development of goods and services that work together to benefit makers/manufacturers of goods and services, users of these goods and services, and presumably, the economy as a whole. Flowing from that are two other statements: no standard is neutral and no standard benefits everyone equally. That being so, we need to ask of any standardization process, "Who does the process benefit?" and "Who is not included?" We often forget, in the exhaustion of trying to create standards, that the universe of those directly involved in standards formulation is smaller than the universe of people in related technologies. The central point is that we need to harmonize standards across standards bodies and across industries.

Turning to the question of standardization itself, why is the issue important and what can we do about it? Technical standardization is a highly institutionalized process, which is to say that there is discrete subject matter that is or is not appropriate within any one standardization activity. The arrangements are unique to specific organizations and institutions and are very often incomprehensible across standards bodies. The second point about technical standardization, which is seldom discussed, is that it is far easier to stop it than to get it going. It is far easier to derail the process than to build consensus, and get the new standard going.

Why is harmonization particularly important (and difficult) today? We are experiencing a fundamental shift in our technological-economic system. But our current standards processes still reflect the old technological-economic system. Given that this is a highly institutionalized process, it stands to reason that since the foundation is fundamentally changing, then, of course, the institutions that stand on top of that foundation will themselves be under real stress, if not crumbling. What we need are new arrangements to reflect the emerging technologies.

We need to focus on harmonization issues within standards, increase information sharing among standards groups, focus on interface standards, and include end-users on an on-going basis. These factors are equally important, and we should concentrate on accomplishing them all. We need to encourage greater cooperation and communication within standards groups. Likewise, it is important that we put people who have credibility in their own organizations into cooperative bridges and communities between bodies. Moreover, as we at DOHRS have been saying for a long time, we should focus on interface standards, not by describing the internal workings of a technology, but by specifying where they come together at the interface. In addition, we need to include end-users on an on-going basis because standards get made over the long haul, not through sporadic intrusions into standards meetings.

In summary, I would like to say that every standard has its own distribution of benefits. In addition, standardization today is especially hard because the fundamental building blocks on which the process rests are themselves changing. We need to recombine elements of existing standards processes with brand new elements to reflect the changing technological-economic environment. This recombination should consist both of individuals and parts of existing groups, as well as new groups and organizations. We need to be aware of the dogs that do not bark (i.e., Who is absent from the considerations, and what issues, what users, and what technologies are absent?) Good standardization now, within existing institutions, would include new faces, new issue areas, and new processes. Conversely, good standardization in new organizations should include some old faces and some old processes. We are not trying to invent the new world; we are trying to move from where we are now (within an existing base) to someplace new.

Communications technologies are developing so rapidly at this point that all processes are going to be messy and terribly frustrating for the foreseeable future.

My closing line for today is, "if it seems easy, it is probably wrong." Remember having new faces, new ideas, new organizations all working together is inherently difficult and problematic. So, on that cheery note, I will hand over the floor. . .

LM: Our next speaker is Art Reilly, chairman of Committee T1, Telecommunications. Mr. Reilly is director of Network Performance Requirements and Applications at Bellcore. In 1992, he was elected chairman of the ANSI Accredited, Committee T1, which is sponsored by the Alliance for Telecommunications Industry Solutions (ATIS). Formerly, ATIS was known as the Exchange Carriers Association (ECSA). As chairman of Committee T1, Mr. Reilly has focused on meeting goals to improve its organizational efficiency and effectiveness, build liaisons with other organizations, domestically and globally, and to increase awareness of telecommunications standards and their significance. Mr. Reilly. . .

ART REILLY (AR): As Lee indicated, there are a number of things we have been focusing on in T1, such as 1) increasing efficiency and effectiveness to meet user needs and the needs of industry, 2) building liaisons, and 3) working to increase awareness of the role of standards. Some of the same thought processes that Suzanne covered in her talk will be evident in my presentation as well. For instance, when I recently called my secretary from a telecommunications conference, she told me that she had two messages for me, one with good news and one with very good news. When I found out that the good news was that an article had been published in "Communications Week" about Committee T1, I said that was great, and wondered what the very good news could be. She then told me that the very good news was that there would be a retraction next week! So I believe some of the same thought processes sometimes creep into my work. This afternoon I hope to share with you some of what we are doing to build bridges and increase our efficiency within the U.S., while making people more aware of what we are doing.

As standards bodies go, Committee T1 is a very young organization. Born in the pre-divestiture of 1983, it has grown up in an era in which the telecommunications and standardization process in the U.S. has been quite dynamic. Just prior to the AT&T divestiture, a number of people realized that we were faced with a situation in which the Bell System would no longer be the de facto U.S. telecommunications standards developer, which had previously been the case. The need for some mechanism to deal with this was recognized, and the FCC sought to establish an internal group to deal with these issues. Instead of yielding to the FCC proposal, a large industry contingent--in fact, 160 exchange carriers--got together and formed the Exchange Carriers Standards Association. ECSA's sole purpose has been to sponsor an industry open committee, "open" meaning that anyone who is interested in participating in the process can, in fact, be part of the Committee T1 process at whatever level and capacity they feel comfortable. Another requirement was that it be balanced; no segment of the industry would dominate. So four distinct interest groups were created, manufacturers, exchange carriers, interexchange carriers, and users/general interest carriers.

The requirement of "due process" was considered equally important. Every issue that comes to T1 has to be disposed of. Every comment we receive in the course of our work has to be addressed, dealt with, and documented. They further indicated that the ECSA would be willing to sponsor our activities, and they suggested that we seek ANSI (the American National Standards Institute) accreditation. The industry overwhelmingly accepted these proposals, so in February 1984, Committee T1 was formed.

As Lee mentioned, one of the new items of interest is that the ECSA has changed its name, and broadened its membership. This membership broadening means that anyone who provides a communications service in the U.S., and owns either transport or switching equipment, can become a member of ATIS. That means all telecommunications service providers, and all of the providers who own facilities, can be a part of the sponsor.

The sponsor simply provides us with a permanent headquarters location and provides a secretariat for us.

Of the areas that we are focusing on (approximately 150 projects are going on presently), BISDN/ATM, SONET, and PERSONAL COMMUNICATIONS are of particular interest. All of these are forward-looking technologies. Within each of them, instead of looking at individual projects, we have been looking at the collective whole, the capability set created by these project. As mentioned above, we have been looking at how we can be extraordinarily efficient in these areas, how we can build bridges and liaisons, and how can we make the industry more aware of what we are doing. We also seek to increase industry awareness of the fact that we are working on these issues, and draw additional participation to our process. I should mention that, in addition, two particular projects have become very hot recently: one is the multimedia communications forum, and the other is the Asymmetrical Digital Subscriber Line (ADSL). ADSL is a capability that would provide up to six megabits towards the consumer and a lower speed digital channel coming back, which would allow for interactive video.

Under Committee T1, we have six technical subcommittees; two date back to our inception in 1984, while the other four have been developed on the basis of mergers, which are important to get the synergies we need. For instance, in the case of T1P1, a few years ago we recognized that some of our programs were becoming very complex, involving many of our groups as well as many groups outside of T1. There was a recognized need to have some process of systems engineering and program management, so we established T1P1 to establish some process that we could use to that end. To provide a pilot for them, we gave them personal communications.

In this venture, they have been working with the Telecommunications Industry Association (TIA). There is a joint committee on the interface between T1 and TIA, so this one working group reports to both of our organizations. Its objective is to develop a common standard on what is called "a common air interface" for personal communications. Rather than having two competing organizations, we have a joint group in which documents flow through our joint processes for approval by all parties. T1P1 is an example of cooperation in systems in action. In fact, the group has generated a rather lengthy program management plan for personal communications that describes about 75 standards that we are working on towards. The goal is to have standards set up throughout 1994 to support first service in the first half of 1995, on personal communications.

Timing is critical here. The U.S. is counting on \$10 billion from the auction of the spectrum to support this, and the industry wants to have the standards in position so they can implement the results of the standards process as soon as possible. Each of these six technical subcommittees has working groups under it, sub-working groups, ad hoc groups, etc. Each of those subcommittees meets four times a year, which means we have only got 24 weeks to accomplish this, especially when you consider that many of these groups feed into activities internationally. Essentially every week of the year is taken up with an activity of some sort in Committee T1.

What we are looking to do within Committee T1 is to be a focal point within the telecommunications industry, to provide linkages into other organizations. The ADSL and some of the PCS working groups, unlike the technical subcommittees, meet on a monthly basis, so the output rate is rapid. When one looks at the whole hierarchy of Committee T1, we have about 1,500 people who are participating at one level or another within Committee T1, not counting those people we interact with through electronic mechanisms. One of our outputs is the development of American National Standards. The membership of T1 approved them. We are sponsored by ATIS now, but they have no approval function within our process; only our membership collectively, and other interested parties can comment. And as mentioned previously, all of the comments have to be dealt with. Once standards are developed, ANSI then does the publication for Committee T1.

In addition, the globalization of telecommunications has made our membership interested in having harmonization between our work and international work in the ITU. We have a process in which Committee T1 technical subcommittees act as the technical focal point, the forum in the U.S. to develop technical positions. The subcommittees are then authorized to send those positions to the ITU study groups, which are sponsored by the U.S. Department of State. The State Department is the actual member of the International Telecommunications Union because it is a United Nations treaty organization. So we send contributions to the State Department, which they approve through their process and forward to Geneva. Over the last four or five years, we have produced over 500 to 1,000 contributions per year to this process.

This is the accepted formal process, but the informal processes provide additional communications paths. What really happens is that participants from various companies in the U.S. participate in T1 and in our various subcommittees. Then they may go to the State Department's national committee, and present the contribution, where it gets approved. They then carry the contribution (as a member of the U.S. delegation) to Geneva, and negotiate to have those ideas incorporated into the base ITU documents there. After that meeting, the representatives return to one of our technical subcommittees and close the loop by providing feedback. So the work we have going on towards an American national standard is in coordination with the activities within the ITU. The organizations' outputs may have some differences, but the interworking is the issue we are looking towards having accomplished in this process.

One of the things I should mention is the emphasis we have placed on speeding up the process. Typically, for example, when approving a document, we had to have a letter ballot to approve it at the technical subcommittee level, followed by another ballot at the T1 level. We have now instituted a process by which we can simultaneously letter ballot at both levels, to expedite this process. We are also working with a number of forums to increase user involvement. We are working with each of them to identify user requirements at every level, and develop a schedule to meet those needs. Many of these groups have articulated that their intention is to base their work on the standards developed by T1.

With regard to international harmonization, I have talked about the international organizations. Within the Americas, we have the IEEE, where I serve as a member of the standards board. In addition, I talked about TIA and our joint activities there. We are working with X3 in a number of areas to ensure that we have harmonization of our activities. Also the Canadian Standards Association uses T1 standards as the basis for their own standards. Where necessary, they do a French translation to meet their bi-lingual requirements. Within the Organization of American States (OAS), we have been asked to work with the countries of South and Central America to make them aware of what is going on in TI and internationally, and to develop a working group to progress standards harmonization in support of privatization in the Americas.

Finally, in February 1990 Committee T1 hosted the leaders from Europe and other countries around the world, to bring together the regional bodies that had been formed in the 1980s so that communications paths could be established early in the process, before we get to the ITU in Geneva. These collaborative activities are ongoing, and we now refer to that group as the Global Standards Collaboration. With regard to the technical subject areas I showed you before, we have established people who serve as points of contact to share information. We have held workshops, and we have held leaders' meetings to make progress in these areas.

The last thing I want to share with you is a chart of our T1 electronic bulletin board system (TIBBS), which is now in production phase. It allows for access on a dial-in and Internet basis anywhere in the world, and is open to anyone who would like to interact with it. There is no authorization required to access DDD (Direct Distance Dial-in) connection, connections to Internet allow file transfer using FTP, and also allow Telnet access to all of our files. In addition, we have groups, such as the one on personal communications, which provide about 90 to 95 percent of their contributions in electronic form. One of our

companies, Northern Telecom has indicated their intention to have all their contributions provided electronically. To reinforce this trend, at every T1 meeting, we present an award to that individual, organization, or group who has done the most to advance electronic document handling in the interim.

LM: Our next speaker is Robert Smith, Director of International Standards Strategies for NYNEX Science and Technology. Mr. Smith has worked in the telecommunications industry for the past 23 years, beginning his career with New England Telephone in 1970 in the Boston area. He spent sixteen years in a number of management positions in switching, transmission, operations, installation and maintenance, and in the corporate marketing department. He has been with NYNEX Science and Technology laboratories for the past seven years as Director of International Standardization Activities. Mr. Smith is currently vice-chairman of the ITU telecommunication standardization sector. He is also chairman of Working Party 1-2, responsible for ISDN, VISDN, and audio-visual multimedia services. I will now turn the floor over to Bob. . .

ROBERT (BOB) SMITH (RS): I would like to set the stage a little bit. Suzanne showed you Tony Rutkowski's chart of standardization bodies, which is often referred to as the Rosetta Stone. That slide (with all of its lines and circles) makes it appear that standardization activities are chaotic, and that there is a competitive aspect. But I think what that chart really shows is that the whole standardization process is complex and interactive. The notion of the competition and complexity developed because the standardization activities are held within various communities of interest. For instance, in the past telecom operators formed Committee T1, formed the ITU, and worked on various telecom issues. Similarly, the electronic and electrical manufacturers had a need for standardization and formed their own groups. Likewise, as was mentioned by Suzanne, computer manufacturers and TV broadcast and network people got together and formed their own standards organizations.

As the technologies converged, there were a number of barriers to concomitant convergence in the standardization organizations. One was the language and terminology; you will find the same language being used in two different forums meaning two very different things. This fact became quite evident to me when we tried to bring together people interested in developing network multimedia service descriptions. We brought a very disparate group of people, including network operators and users, together to discuss some very simple issues about the definition of multimedia. We actually spent an entire week, using flip charts, circles, pictures, and drawing. Though everybody was talking about the same thing, they were using very different terminology. Other times they used the same terms to describe very different things. So terminology has been a barrier to convergence in the telecommunications standardization activities.

Similarly the competitive aspects of standards make people a bit hesitant to give up turf, so we have got areas of competition versus past monopoly that are inhibiting some cooperation and convergence in the standards arena. Lastly, there are just cultural differences between the various industry groups. Different people are used to doing things in different ways. Even within the ITU, if you have ever seen the difference between the radio communications section and the telecommunications section, you know that there are varying degrees of formality within the same organization.

During the last seven or eight years, we have undergone a revolution in standardization. Previously, standardization activity was basically post-implementation documentation. We have now swung the development of standards, in relation to new technology, to a pre-competitive research and development activity. We now start the standardization directly in line with the R & D. We refer to this activity as a strategic sandbox, where we can all get together and play in a pre-competitive mode, to decide how we want to develop the technologies and the standards to go with them. On the bright side, most of the standardization activities seem to be moving into an electronic environment.

Another hat that I wear is as chairman of the working party within the Telecommunications Standardization Advisory Group (TSAG) that is developing electronic document handling. The objective there is to bring the ITU into the 21st century. TSAG was formed in June 1993 in order to permit access to the documents of the ITU electronically, and to move the standardization development process into an electronic environment. This process will allow us to transmit relevant documents before standardization meetings, such that participants are not greeted with a pile of documents upon arrival at the meetings. Participants then usually have only seven to ten hours to read and develop positions on before the meeting commences. Hopefully the use of electronic transmission will give us a little more lead time to absorb contributions from other countries.

With this, we have now moved into the development of a new ITU tie system. On the 11th of October of this year, at the ITU meeting, there was an Internet gopher installed. The documentation was installed within two days (in record time), and now the gopher assists us in accessing a number of the documents and publications on-line. Similarly, the ITU Telecom Information Exchange Services (TIES) allows us to access a great deal of information including, ITU databases, the ITU Document Store (ITUDOC), information about the United Nations and Agencies, Worldwide Library Services, etc. Currently there is an open public interface on the ITUDOC because we are running a trial in the ITU, where the recommendations and publications will be freely accessible. There are approximately 150 documents on-line at present.

To give you a bit of a preview of the kinds of information one can get out of the ITU, the information that is fostering the cooperation and harmonization of standardization activities, I shall show you some of the screens one encounters when one accesses the TIES system. Registered users have the ability to access options such as "What is New?", Internet tools, External Information Services, and VTX Services (including Telecom Terminology). If one clicks on "External Information Services," one can access a variety of standards organizations and bodies, including the European Telecommunications Standards Institute, and the Telecommunication Technology Committee Bulletin Board (TTC), which is the standards body for Japan.

In summary, we live in a very complex world, and we are trying to harmonize the activities. With new tools, like the Internet gopher, we should be able to manage a great deal of the information and provide easier access to information on standardization, and a lot of the mystique will go away. I think that openness is on the horizon, and tremendous progress has been made in sorting out the standardization activities over the last few years. With that, I thank you . . .

LM: Our final speaker is Tony Rutkowski. Tony assumed his position as Director of Technology Assessment in the Strategic Planning Group of Sprint International in February 1992. His principal responsibilities are business planning and development of inter-networking technologies, advanced technologies and applications, and coordination of standards activities. He is also a member of the Board of Trustees of the Internet society, and is vice-president of the society. The society is the world's professional organization for advancing and standardizing Internet technologies and applications. He also remains a research associate with the Massachusetts Institute of Technology, and is a member of the 21st Century Fund Task Force on the Global Information Economy. Previously he was advisor to the Secretary General of the ITU in Geneva. He came to the ITU in 1988 as head of its Telecommunications Regulation and Relations between Members Division. He is an electrical engineer and a lawyer, and has had past positions with the Apollo program, as well as the FCC, and has been active in IEEE and other bodies. Tony . . .

ANTHONY (TONY) RUTKOWSKI (TR): I am going to start with an overview of a number of useful points. The first point worth making is that today's global "architecture" of information and telecommunications standards bodies is highly diverse, dynamic, and

cooperative-competitive. The second point is that (as is becoming ever more evident) standards bodies are largely homes for particular industries, players, or individuals. The notion that any particular standards body is altruistically serving some large public interest is a myth that is long past. Also, standards bodies differ dramatically in terms of the people who are attracted to them and the processes that are used. Standards can be beneficial, but they can also be detrimental to competition, to the introduction of new technology, to user needs, and to cost effective solutions. So, there are very definite down sides to specific activities and specific standards processes.

Several of the speakers have mentioned my chart of "Today's Telecommunication-Information Standards Making Architecture." For my purposes today, I do not want to focus on the details of the chart, but on the traditional national teleco bodies. The new teleco bodies (the computer network and radio bodies) are like different constellations in the universe, and to some extent they are just beginning to discover each other. The noteworthy point here is that there is an enormous amount of standards activity going on, ranging from activity going on in formal bodies to increasing activity going on in groups within the industry. We have witnessed a shift between reliance on the formal bodies to the faster, more dynamic ad-hoc bodies. I think this is a trend we are likely to see increasingly in the future.

I also want to point out that industry sectors (and the accompanying technologies and provisioning environment) have evolved very differently over the last twenty years or so. In particular, there have been three different lines of evolution, and three different kinds of industries that have relationships within themselves (telecom, computer/networking, and mass media). These distinct groups are to some extent converging, but still remain very definitely apart, particularly in mindset. For example, several of the speakers noted that what is happening with HDTV in the ITU, is very much a mass media dominated process. That is because it is essentially a home for mass media interests, and always has been. Similarly, ITUT has its origins as the standardization arms for the monopoly PTTs. That heritage, like it or not, and those mindsets continue with their organizations. But as the boundaries increasingly overlap, there is really a need for cross-fertilization (which is, to a certain extent, certainly taking place).

We should also pay attention to today's standards marketplace requirements. The key point worth noting is that time to market today is critical. One of the best examples of this is Inter-Op, which is a trade show that actually requires everyone to demonstrate interoperability. It has grown in its own right into a kind of paradigm, where it is now so large that the city of San Francisco cannot host it; the meeting has been broken into subsets held around the world. Providers and users turn to these standards bodies, forums, and coalitions because these are the bodies that produce results and meet their real needs. This choice of fora is one that is being played out and expanded upon as the process becomes more cooperative-competitive.

What has been learned about the standards process over the last decade or so? I think there are many useful lessons about what works and what does not work. For instance, several billion dollars was spent on standards development during the 1980s. It has become clear that much of this money was wasted on standards of little ultimate use to anyone. These traditional standards processes and products have not done well in the marketplace. If we examine why that has been the case, it is generally because standards are flawed or very sub-optimal, they have come far too late, and are usually produced by a top-down orientation. They also tend to involve parties with no real interests, and tend to be highly manipulated and compromised. I would venture to say that software standards, generally, probably cannot be successfully developed by traditional processes. Moreover, direct government involvement almost always makes things worse, of which OSI is a classic example.

I will not go into details, but it should be noted that traditional standards-making processes are very different from the processes employed by the IETF. The traditional process really involves a number of separate, concatenated, isolated activities that can take a

relatively long period of time to traverse. In contrast, the IETF standards process (like many of the new consortium-related processes) tend to do things very, very differently. They tend to create and tear down standards activity very quickly by emphasizing standards that work, and by developing standards that are openly available.

There are a number of reasons why the IETF environment works so well. It is composed of people with hands-on, substantive knowledge of the subject matter, who are explicitly attracted to the organization. It has a very open global notice, discovery, and participation that is facilitated by every possible means. No representation of "interests" is allowed. Innovation is constantly encouraged, expression of views is frank and robust, things move quickly, and there is no institutional permanence. Further, everything done through working groups that are set up fast and torn down automatically, standards must be independently implemented and demonstrated at an early stage, and usually the standards and the beta code are made publicly available.

In closing I would like to present some general goals and lay out some general rules for the Federal government vis-à-vis the standards-making process. As a general goal, I think we should work to maintain a globally open, competitive-cooperative standards market, to discourage the use of standards as non-tariff trade barriers, to encourage standards that enhance competition, and to leverage our ability to develop the best standards in the shortest length of time. At the same time, we need to maximize the benefits of a standards marketplace. In order to do this, we should recognize that the IT standards making process has become very competitive-cooperative. In fact, we want to encourage this competitive-cooperative IT standards making environment. Because we have found it to be the best mechanism for optimizing standards development, we would rather encourage a competitive-cooperative environment than to decide to have any one particular standards body as the one and only body for doing these things.

As far as laying out specific roles for the Federal Government, in order to minimize Federal intrusion into the standards marketplace, there are a couple of key points worth noting. We should broaden GOSIP to include generic open systems, not the standards of some specific standards organization. We ought to remove government agencies from involvement in the standards making process, including the ITU. We should also discourage intergovernmental, federal or state intrusion in the standards marketplace. We also need to foster open network architectures for regulated monopoly environments--domestically and internationally. This is a real role for the government to play. Though the government should not be involved in the details, they should get involved in processes needed to encourage Open Network Architectures.

Moreover, we need to open up and reform the standards process. Here again, there is a real role for government. Most standards bodies maintain explicit or de facto barriers to substantive participation. The IETF model is the only one that provides real, effective openness. We identify the necessary conditions as the ability to know all ongoing standards making activities and their schedules, to easily, quickly, and inexpensively discover and obtain all relevant documents, and to easily and inexpensively participate in any phase of the standards making process. This model also has the ability to easily and inexpensively obtain automatic notice of all activities and actions associated with any level of the standards making activities. The bottom line is that the IETF model should be the adopted norm worldwide.

Lastly, with respect to opening up access to standards, there is a role for government in maintaining policies and processes that encourage, if not compel, standards bodies worldwide to make all standards globally electronically accessible in a timely and easy fashion. That is, in fact, already beginning to happen due to market demand, and because of a change of culture. One thing that may prevent this change from being fully implemented is what I refer to as "the dubious assertions of copyright" by "public" or "quasi-public" standards bodies. This unfortunate aspect gets played out as a background process in standards-making, and will, at some point, have to be dealt with. It must be

recognized that, in the greater public interest, all copyright claims should be foregone. Thank you, and I look forward to a robust discussion of these issues.

QUESTION 1: I want to ask the entire panel whether they feel that technology should drive standards, or whether standards should drive technology?

RS: I think that neither should technology drive standards, nor should standards drive technology. I think that user needs should drive both technology and standards. As I mentioned earlier, I think that the development of technology and the development of standardization are working hand-in-hand [they are parallel efforts], but that the sole driver should be user needs.

TR: Just to add a few points to what Bob has said. Bob made a useful point, but I think one needs to distinguish between technologies, many of which will evolve in directions that have nothing to do with potential applications for users. By and large, the kinds of standards we are dealing with here are applications level standards or enabling technologies, in which user involvement can be important. But as Bob and others have pointed out, this kind of involvement has not existed in typical standards bodies. What you usually have, instead, is providers and manufacturers simply guessing. Alternatively, they often shape standards that create larger markets (if not monopolies) for themselves. Unfortunately, I do not see a way out of this for traditional standards bodies. I think that a real immediate solution would be a market, not a user, driven process. One caveat, however. We recognize that this is not always possible; some relationships, for example, exist only between users and providers.

SN: I think that this is an iterative process, and clearly a multi-step process. But one of the major influences is the interests of the people who actually make the standards. I refer to my comments about the difficulty of involving end users. One way around that difficulty may well be to make the process more accessible via electronic means. By doing that we can get some of those with longer term interests into the process, and that really is important.

AR: We have our own base standards development, in which Committee T1 is very active. But as was suggested, it has become popular in the industry to form user groups that develop user application profiles. When we develop standards, they are particular technology standards. Users, on the other hand, want inter-operability and an application. So within Committee T1, we are developing particular infrastructural foundation technologies that a whole host of applications will ride over. User groups develop application profiles and a standards agreement. The standards are describing technologies, and the forums are using them to meet a particular demonstration capability. This process continues through deployment, so we are able to get a good deal of user input. This process also allows us to get things to market faster, while still getting user feedback.

QUESTION 2: I am going to do some software development for the new full-service network. And it seems that most of these standards bodies will be irrelevant to me because they are too slow. At the very end, I heard that the IETF model may be the only one that has any hope of going ahead of these rampant mergers and collisions of TCI and Time Warner. I wonder if anyone has any comments about any standards bodies that exist, or are about to be formed that could straddle the cable, teleco, and computer worlds at least long enough to get some standards started.

AR: Suzanne and I were at a IEEE forum back in May about the National Information Infrastructure. The vice-president of the National Cable TV Association [NCTA] talked about the cable TV network of the future. He proposed a network that included ATM

technology, synchronous optical networks [SONET], etc. I later met with the NCTA Engineering group, and we talked about what Committee T1 was doing with respect to these technologies. They were very interested in these and also asked what we were doing with respect to multimedia, video coding, and ADSL. So I think that the Cable TV Association is interested in taking advantage of developing technologies, and they recognize that they need to stay on top of these technologies and work towards a harmonization of equipment.

QUESTION 3: I have been involved in the development of standards for a number of years--standards to which nobody came. Tony mentioned this problem. A big thing that he mentioned was OSI, which seemed on the surface to be a good way of doing things. A top-down architecture, full analysis of where standards should go, a bunch of committees studying just what should be there, and yet, in the end it failed. How can we prevent that from happening again? A lot of time and money went into that process.

AR: I think that our motivation is not to develop documents, but to create products that are deployed. And while there are standards groups that do not look towards the user forums that I mentioned, (they view them as competitors), we think that there is a real synergy to be found there. In these forums, we find a group of people who are looking to market products, and get them out into the field. That is why we view these forums as a good way for us to make sure we are working on the right issues, so that problems like that which occurred with OSI can be avoided. Cooperation between our groups has allowed us to identify time schedules and priorities, and then work towards meeting them. This process actually creates a sense of urgency and a feeling of accomplishment, in terms of implementation. So, I think this synergy has been a motivator, which has allowed us to develop standards much more rapidly.

TR: I want to say that I think there is much more involved here than just time to the marketplace. We also have to look the fact that the processes seem to attract different kinds of people. In going to the IETF meetings for the first time last year, I was struck by how utterly differently people worked--how they interacted, the kinds of innovations going on, the ideas being shared. That makes an enormous difference. When the standards are put out fast, the innovators constantly tweaking it, putting on beta codes, all at hyper speed, we see a process that works. That is just a harbinger of the future, and reflects the directions in which we have got to head.

QUESTION 4: I am an Internet dabbler and an interactive video producer. Here is a dog that wants to bark. This may not be the proper forum for this, but my own vision has been totally ignored from what I can see in the media's frenzy over the TCI/Bell Atlantic merger. They talk about 500 channels coming at me, but what I want is to go out. My vision of the future would allow me to create my own videos, and send them out to a chosen market. I also have a vision of a multimedia use net news group, and I do not see that being discussed in the media. I just wanted to put this out there. That is what I, as a user, see as a need and a want. I hope that the standards you people develop will allow that to happen as quickly as possible.

AR: I think the vision we have for the infrastructure of the future would support the multimedia services that you describe via the network. Much of what is being described in the press right now with regard to multimedia is downstream-type capabilities. While some multimedia capabilities exist, I think it is a bit early right now for the full set of networked multimedia services. While certain infrastructure standards exist, the industry is only in the infancy stages of developing the upper layer standards and the applications. So we need help in the standards area with ideas for applications.

TR: Of course, I should like to point out that the concept you raised is consistent with the direction of the Internet. That is, in fact, one of the intrinsic values of the Internet, the fact that any one device or process can reach any other device or process anywhere throughout a mesh of four billion addresses is perhaps the ultimate power of the network. You are already beginning to see some interesting experimental implementation. Certainly Karl Malmud's weekly radio Internet program is an example. The broadcasting of standards meetings on the Internet is an example. The global school house is another example. All of these things, and many more, are available now. . . (TRANSMISSION ENDS)

LM: That marks the rather abrupt end of Tony's commercial.

AR: With respect to the question, I would like to go back to a point that Suzanne raised. At Committee T1, what we favor are interface standards, not to say that this is the structure, the architecture, the approach, but rather to develop interface standards that allow a minimum set of requirements. But then we should get out of the way, and allow entrepreneurs to put together the building blocks of video capabilities., multimedia, together with transport technologies.

LM: I would to thank all of our speakers, Art, Bob, Suzanne, and Tony. And thank you all for coming.

Cooperative-Competitive Standards-Making: Information Infrastructure and the New Reality

A.-M. Rutkowski

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Vice-President, Internet Society <amr@nri.reston.va.us>

The views expressed are personal and represent neither those of
the Sprint Corporation nor the Internet Society

Nov 1993

A.M. Rutkowski

Overview

2

- Today's global "architecture" of information and telecommunication standards bodies is highly diverse, dynamic and cooperative-competitive
- Standards bodies are largely homes for particular industries or players or individuals
- Standards bodies differ dramatically in terms of the people who are attracted and the processes they use
- Standards can be beneficial. They can also be detrimental to competition, to introduction of new technology, to user needs, and to cost effective solutions.
- We have learned a lot over the past decade about what works and what doesn't
- Government involvement generally makes things much worse; but there is a role in facilitating openness to standards activities and standards

See Last PAGE

Industry Sectors Have Evolved Very Differently

	<u>Telecom</u>	<u>Computer/Networking</u>	<u>Mass Media</u>
1975 & Before	Monopoly Carriers; POTS; Leased Lines; ISDN	Mainframes; Minis; Remote terminals	Television; Radio; CATV; LP Records
1980	FTT Network Disaggregation; Competition; Cost-based provisioning Interexchange fiber; Digital CO Switches; Cellular Phone; SONET/SDH; SS7; FTT Messaging; Intelligent Network International Fiber ONA, ONP, OND...	VANs VAN Messaging LANs; Workstations, Routers Enterprise Networks; Internet Divestiture Object-Oriented Interfaces, Client-Server Information Systems	VCRs, Satellite TV, Compact Discs
1985	Global Leased Line Deregulation PCS CO Disaggregation Local Loop Fiber; Microcellular Local Access	K-Mart Local Networks; Networked Information Resources; Bandwidth Pricing; Intelligent Agents "Cray" Desktops; Advanced Universal Internetworking; Multimedia Workstations	Digitization of Mass Media at the Studio
1990	Global Competition; Global Carriers	ATM	Digital TV; HDTV Awareness
1995			CATV Data Carriage; Digitization of Mass Media in the Home

Today's Standards Marketplace Requirements

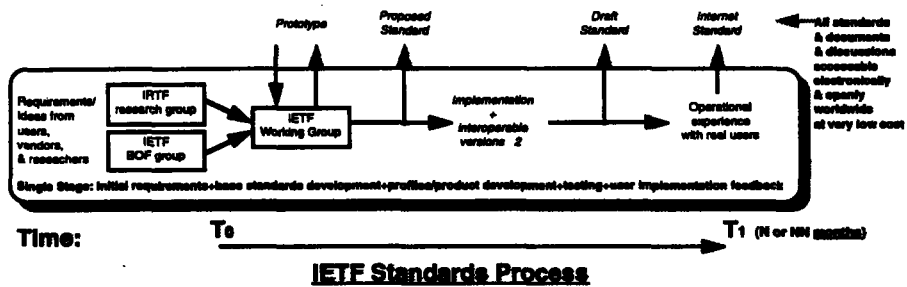
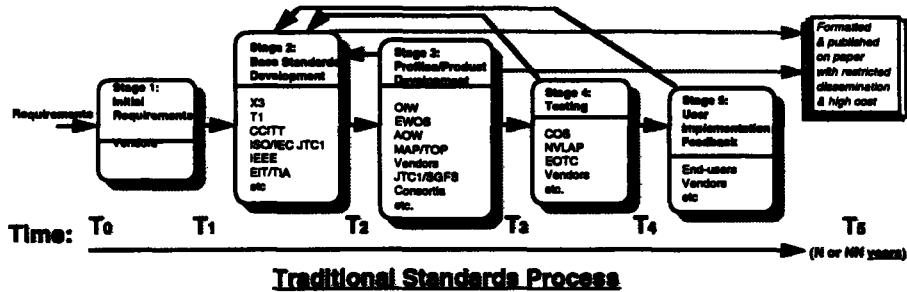
- Time to market today is critical
- The marketplace has forced providers (hardware, software, services) to make available open, functional products to users. ref. Interop
- Providers and users turn to those standards bodies, forums, coalitions and processes that produce results that meet their real needs

What Has Been Learned About Standards Processes

What seems to work and what does not

- Several billion dollars was spent on standards developments during the 1980s
- Much of this money was wasted on standards of little ultimate value to anyone
- Traditional standards processes and products have not done well in the marketplace
 - Standards are flawed or very sub-optimal
 - Far too late
 - Usually produced by a "top-down" orientation
 - Tend to involve parties with no real interests
 - Tend to be highly manipulated and compromised
- Software standards probably cannot be successfully developed by traditional processes
- Direct government involvement almost always makes things worse

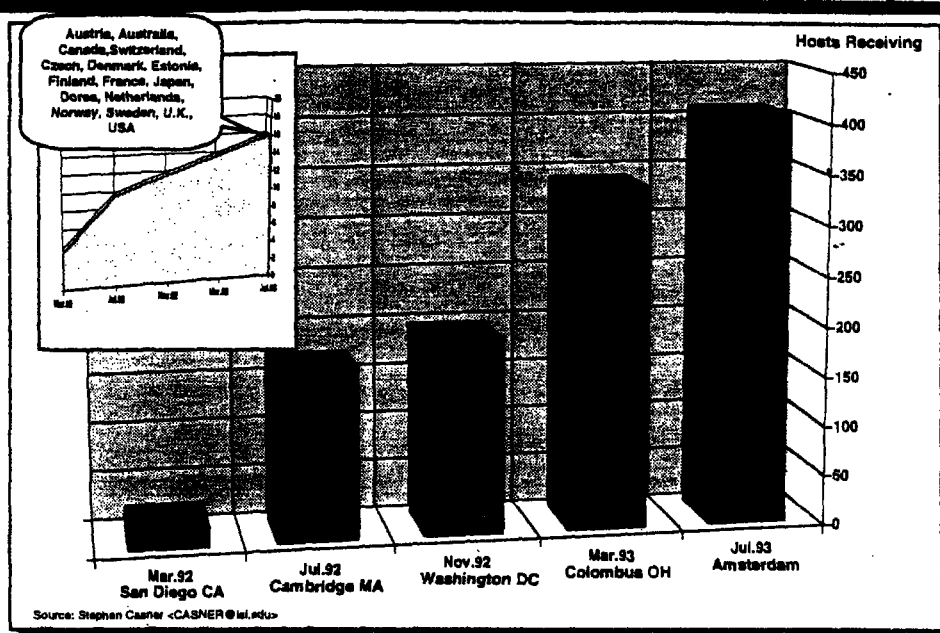
Standards Making Processes: Major Differences



The IETF Environment: Why it Works

- People with hands-on, substantive knowledge of the subject matter are explicitly attracted
- Open global notice, discovery, and participation is facilitated by every possible means
- No representation of "interests" allowed
- Innovation is constantly encouraged
- Expression of views is frank and robust
- Things move quickly
- No institutional permanence: everything done through working groups that are set up fast and are torn down automatically
- Standards must be independently implemented and demonstrated at early stage
- Standards and usually beta code are made publicly available

Live Multicasting of IETF Standards Meetings



General Goals

- Maintain a globally open, competitive-cooperative standards market
- Discourage use of standards as non-tariff trade barriers
- Encourage standards that enhance competition
- Leverage ability to develop the best standards in the shortest length of time

Roles of the Federal Government

Maximize the benefits of a standards marketplace

- **Recognize that the IT standards making process has become competitive-cooperative**
- **Encourage a robust, competitive-cooperative IT standards making environment as the best mechanism for optimizing standards development**

Roles of the Federal Government

Minimizing intrusion into the "standards marketplace"

- **Broaden GOSIP to include generic open systems, not the standards of some specific standards "vendor"**
- **Remove government agencies from involvement in standards making process, including ITU**
- **Discourage intergovernmental, federal or state intrusion in the standards marketplace**

Roles of the Federal Government

Foster open network architectures for regulated monopoly environments - domestically and internationally

- **Encourage Open Network Architecture developments domestically**
- **Encourage ONA clones overseas**
 - **In GATT-GNS settings**
 - **In Regional and National settings**

Roles of the Federal Government

Open up and reform standards processes

- **Most standards bodies maintain explicit or de facto barriers to substantive participation**
- **The IETF "Model" is the only one that provides real, effective openness**
 - **Ability to know all ongoing standards making activities and their schedules**
 - **Ability to easily, quickly, and inexpensively discover and obtain all relevant documents**
 - **Ability to easily and inexpensively participate in any phase of the standards making process**
 - **Ability to easily and inexpensively obtain automatic notice of all activities and actions associated with any level of the standards making activities**
- **The IETF model should be the norm worldwide**

Roles of the Federal Government

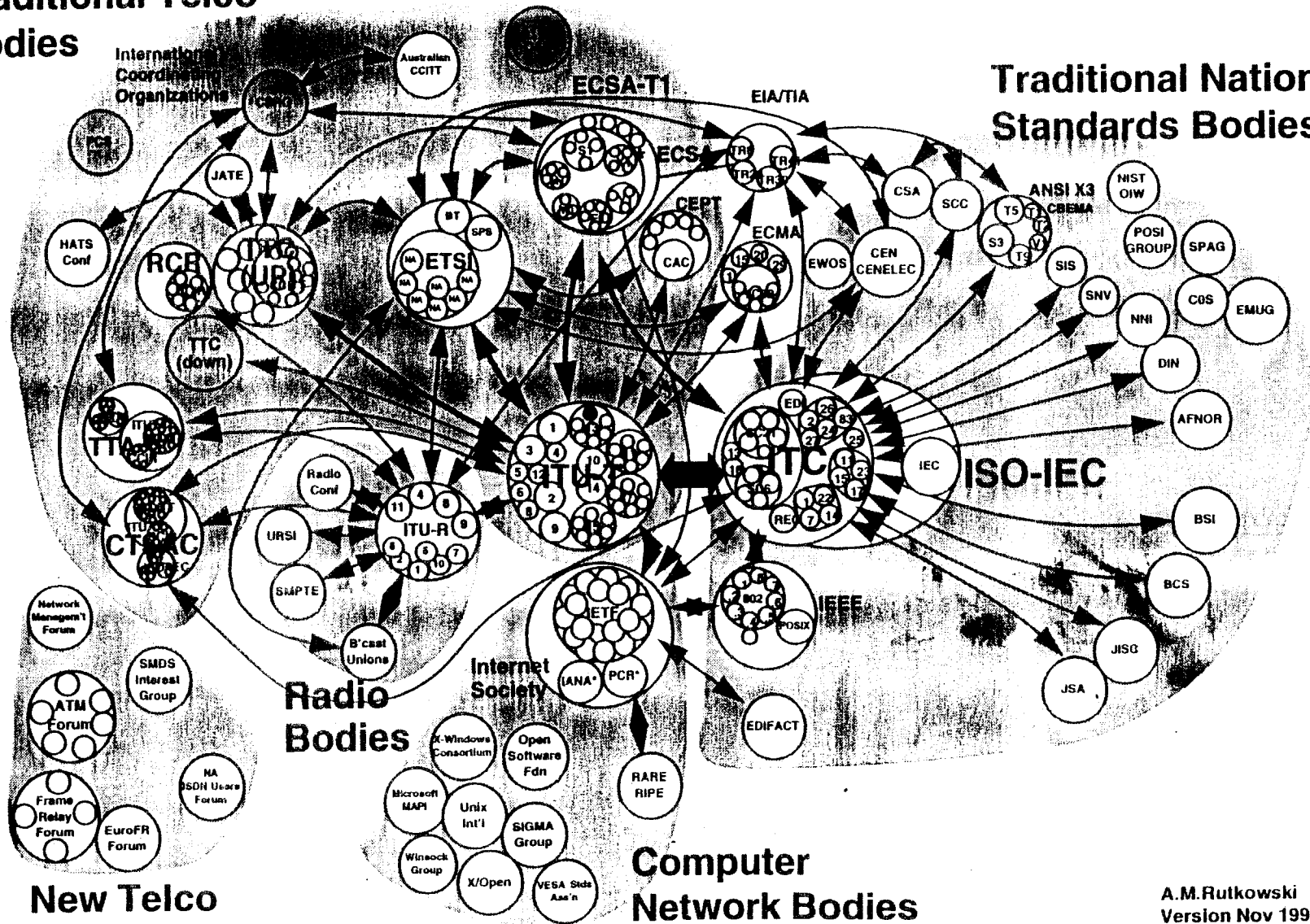
Open up access to standards

- **Maintain policies and processes that encourage if not compel standards bodies worldwide to make all standards globally electronically accessible and discoverable via the Internet in a timely and easy fashion**
- **Discourage dubious assertions of copyright by "public" or "quasi-public" standards bodies**

Today's Telecommunication-Information Standards Making Architecture

Traditional Telco Bodies

Traditional National Standards Bodies



New Telco Bodies

Computer Network Bodies

Competitive/Cooperative Standards-Making: Information Infrastructure And The New Reality

Arthur K. Reilly
Chairman, Committee T1



MIT Seminar
November 4, 1993

Committee T1

- Pre-divestiture - Bell System was primary U.S. telecommunications standards developer
- August 1983 - Exchange Carriers Standards Association (ECSA) proposed an alternative approach:
 - An industry committee to address industry concerns
 - Open
 - Balanced
 - Due process
 - Sponsored by ECSA and accredited by the American National Standards Institute (ANSI)
- Industry Overwhelmingly supported ECSA proposal
- February 1984, T1 Committee formed
- October 1984, T1 Committee accredited
- March 1985, FCC approval of Committee T1 granted
- October 1993, ECSA was renamed the Alliance for Telecommunications Industry Solutions (ATIS) and membership expanded

Technical Priorities

Broadband
ISDN

Intelligent Network/
Switched Computer
Application Interface

Personal
Communications

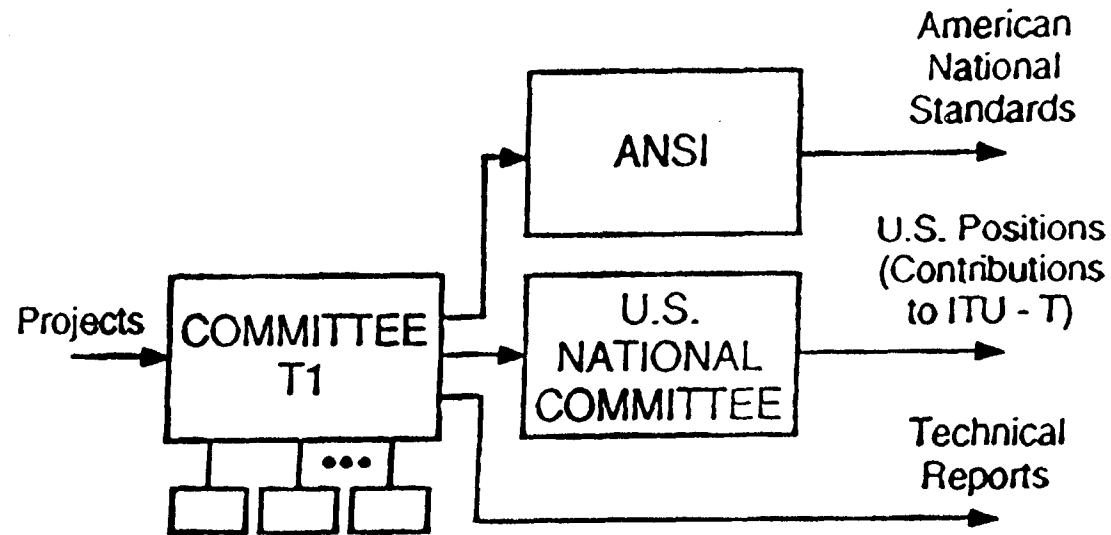
Network
Management

Network
Survivability

SONET

SS7/Interconnection

Committee T1



6 Subcommittees

- T1A1 - Performance and Signal Processing
- T1E1 - Network Interfaces and Environmental Considerations
- T1M1 - Internetwork OAM & P
- T1P1 - Systems Engineering, Standards Planning and Program Management
- T1S1 - Services, Architectures and Signaling
- T1X1 - Digital Hierarchy and Synchronization

Industry Forums

- North American ISDN Users
- Network Management
- ATM
- Frame Relay
- Internet Engineering Task Force
- Telocator (Personal Communications)
- Multimedia

Committee T1

Global Harmonization

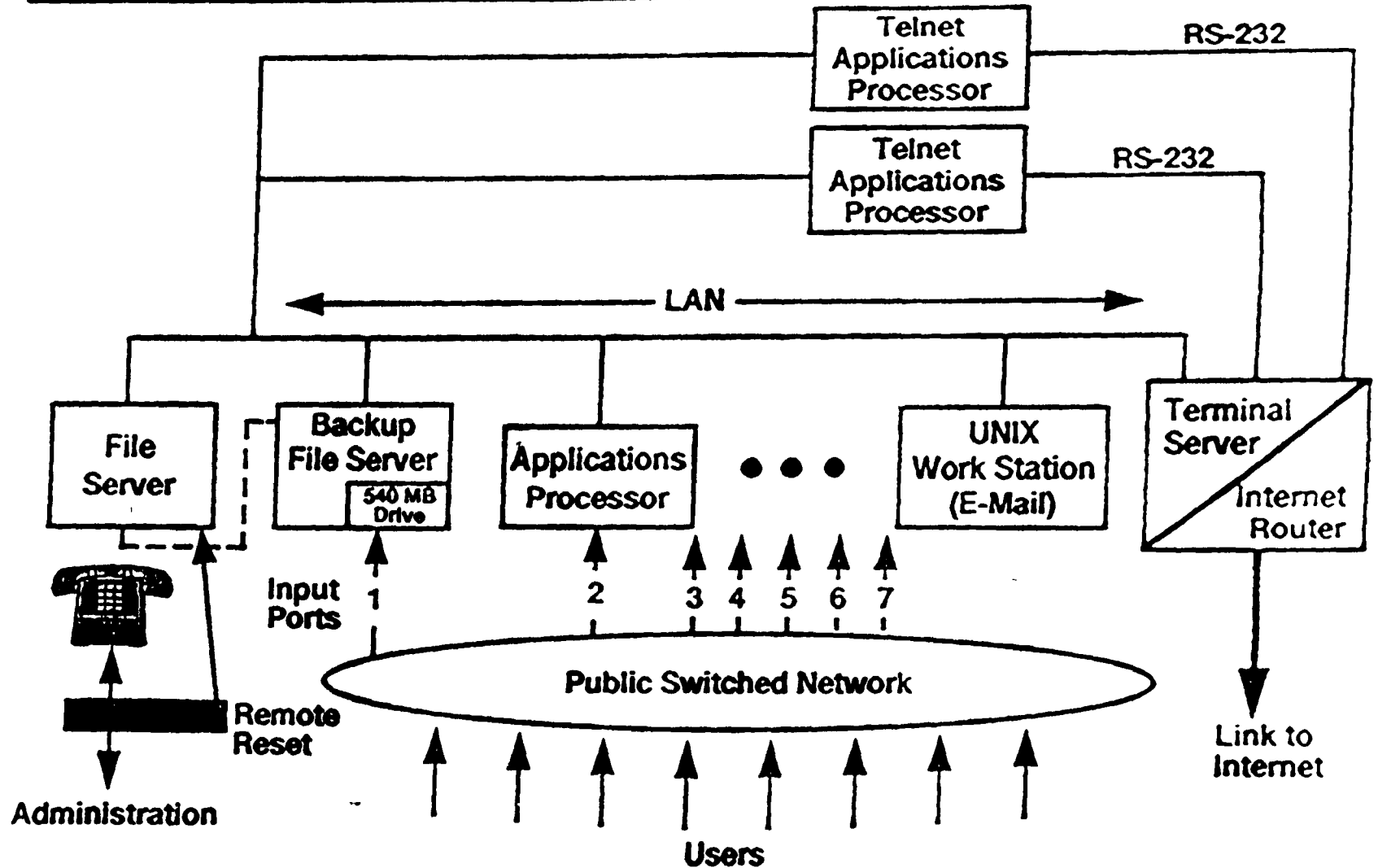
- International Organizations
 - International Telecommunications Union (US State Dept)
 - International Standards Organization
- Americas Organizations
 - Canadian Standards Association
 - OAS' CITELE/T1 Ad Hoc Group
 - Americas Telecommunications Standards Symposium
- Other National and Regional Organizations
 - Global Standards Collaboration Group - ACC, ETSI, TSACC, TTA, TTC with the ITU
 - Liaison Representatives, Workshops, Leaders Meetings, etc.

Committee T1

Global Harmonization Results

- Spirit of Cooperation
 - Network of Organizations and Contacts
 - Areas of Mutual, Continuing High Interest
 - Openness
- Increased Efficiency
 - Early Interactions to Facilitate Agreements
 - Principle of “Adoption of Work”
 - Interconnected Electronic Document Handling Systems

T1 Bulletin Board System (TIBBS)



Challenges and Trends

- Increased communications with emerging national and regional standards bodies and other groups
- Process acceleration and streamlining
- Forward-looking activities - Systems Engineering
- Major project orientation
- Need for increased Senior Management interest
- Including electronic document handling

**COOPERATIVE/COMPETITIVE STANDARDS-MAKING:
INFORMATION INFRASTRUCTURE AND THE NEW REALITY**

ROBERT SMITH

DIRECTOR - INTERNATIONAL STANDARDS

NYNEX SCIENCE & TECHNOLOGY

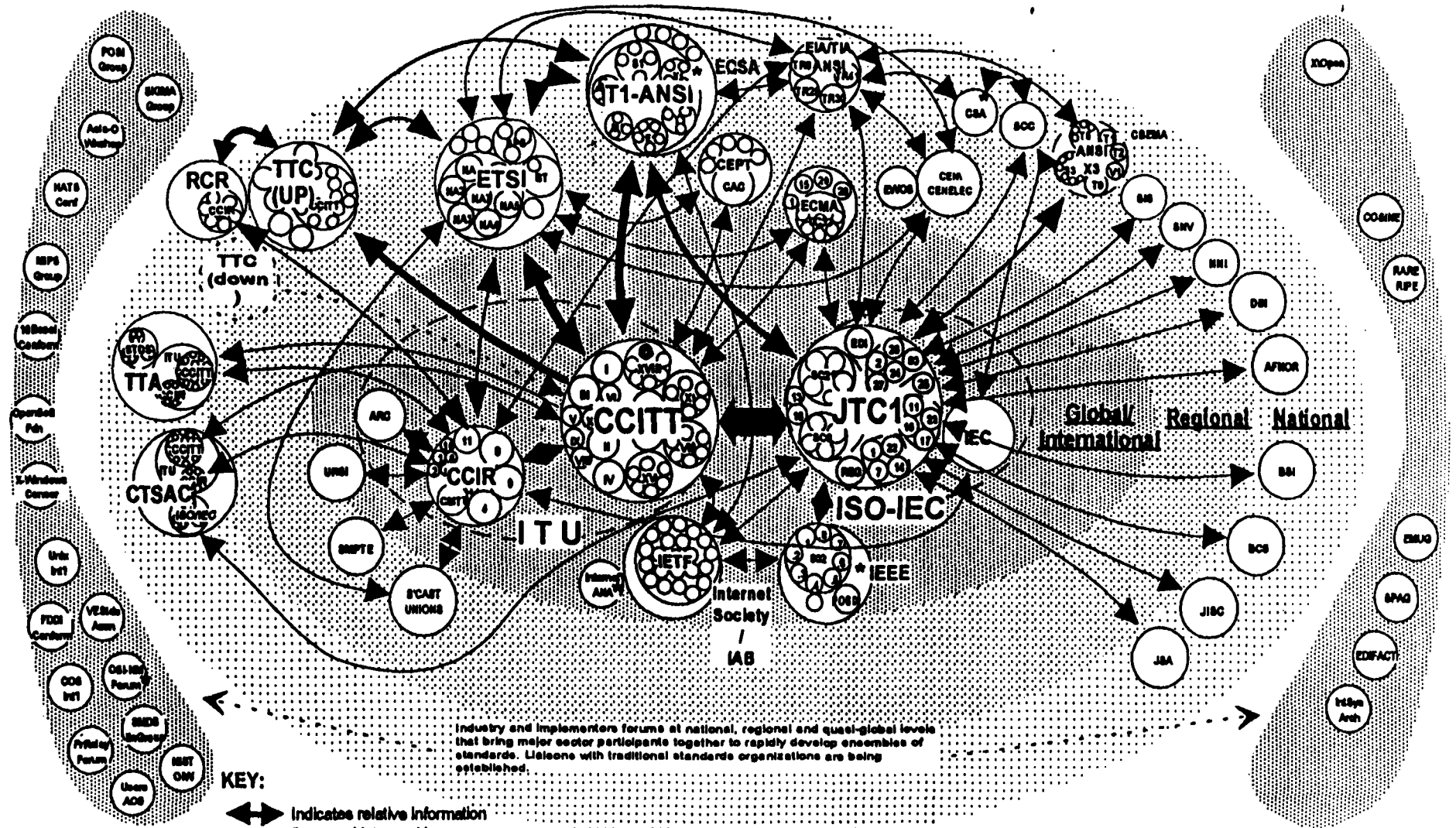
STANDARDS DEVELOPMENT ACTIVITIES

APPEAR CHAOTIC & COMPETITIVE

ARE

COMPLEX AND INTERACTIVE

Today's Information-Telecommunications Standards Making Architecture



Industry and implementers forums at national, regional and quasi-global levels that bring major sector participants together to rapidly develop ensembles of standards. Liaisons with traditional standards organizations are being established.

- KEY:**
- ↔ Indicates relative information flows and interworking
 - * Standards Information Object Registration Authority

DEVELOPED WITHIN COMMUNITIES OF INTEREST

- **TELECOM OPERATORS**
- **ELECTRICAL; ELECTRONIC MANUFACTURERS**
- **COMPUTER MANUFACTURERS/USERS**
- **TV BROADCAST/NETWORKS**

BARRIERS TO CONVERGENCE

- **LANGUAGE/TERMINOLOGY**
- **COMPETITION/MONOPOLY**
- **CULTURAL**

EVOLUTION OF STANDARDIZATION

- **FROM POST IMPLEMENTATION DOCUMENTATION TO PRECOMPETITIVE R&D - STRATEGIC SANDBOX**
- **CONVERGENCE OF LINES OF BUSINESS IN THE INFORMATION INDUSTRY**
- **MOVING TOWARD AN ELECTRONIC ENVIRONMENT**

THE ITU TIES SYSTEM

INSTALLED AN INTERNET GOPHER OCT 11

DOCUMENTS AND PUBLICATIONS ON LINE

ITUDOC Interfaces

Two ITUDOC interfaces are available: an interactive and an electronic mail interface.

ITUDOC Interactive Interface

Interactive access to ITUDOC is available as one of ITU's 'Open Services' available in TIES (Telecom Information Exchange Services). The interactive interface uses Gopher: a menu-based document browsing system that allows you to navigate through hierarchies of electronic information resources. You can either use your own Gopher client or access one at the ITU. In the latter case, you will require at least VT100 terminal capability. Here's how to get connected:

GOPHER CLIENT

Pointer to the ITU Gopher Server is

Name=International Telecommunication Union (ITU)

Host=info.itu.ch

Port=70

TELNET

Telnet: ties.itu.ch or info.itu.ch (login name 'gopher')

X.25

Call the X.25 DTE address, on TELEPAC, the Swiss PSPDN:

#228468111112

where # is local prefix for international routing, login name 'gopher'

DIAL-UP

+41 22 733 7575 (Swiss telephone number, login name 'gopher')

Lon Name: 156.106.4.16 1

ITU Telecom Information Exchange Services (TIES)

International Telecommunication Union (ITU)

1. About ITU TIES, ITUDOC, Gopher and Internet/
2. About the ITU/
3. ITU Infobases/
4. ITU Document Store (ITUDOC)/
5. Phone, E-mail, X.400, X.500 Directories/
6. United Nations and Agencies/
7. Worldwide Gopher and Information Servers/
8. Worldwide Library Services/
9. Press Releases, News, Weather, .../
10. Information Search/
11. TIES Services for Registered Users/

n Name: 156.106.4.16 1

ITU Telecom Information Exchange Services (TIES)

External Information Services

1. European Telecommunications Standards Institute (ETSI)
2. European Commission Host Organization (ECHO)
3. European Conference of Post and Telecom Administration (CEP)
4. International Labour Information System (ILO/ILIS)
5. COSINE Network's Central Information Service
6. Annuaire TÈLÈphonique Electronique (ATE) des PTT Suisse
7. APTEL Information System
8. Telecommunication Technology Committee Bulletin Board (TTC)
9. Access to ICC

ITU Telecom Information Exchange Services (TIES)

TIES Services for Registered Users

- > 1. What is New ?.
- 2. ALL-IN-1 IOS (Email, WP, Notes and Document Transfer)
- 3. DEC MailWorks, MCI Mail/
- 4. Personal Directory
- 5. Internet Tools (FTP, Telnet) /
- 6. ITU Databases/
- 7. External Information Services/
- 8. VTX Services (including Telecom Terminology)
- 9. Change Password, Connect T: Drive, etc./

Bridge-Building in Uncharted Waters

Institutional Malaise and Communications Standardization

or

The Dog That Didn't Bark

**Suzanne Neil
DOHRS Program
MIT
November 4, 1993**

Same terms

different meanings

typical of current standardization efforts

Why Standardize?

**To encourage the development of goods and services
that work together
to benefit**

**makers/manufacturers
users
the economy**

No standard is neutral

No standard benefits everyone equally

- **Who does the process benefit?**
- **Who is not there?**

Central Point: We need to harmonize

ACROSS standards bodies

ACROSS industries

Why is this issue important?

What can we do about it?

Technical standardization as a process

- **highly institutionalized**
 - **subject matter**
 - **institutional arrangements**
 - **participants' professions**
 - **language**
- **easier to derail than to build consensus**

Why is harmonization important today?

- **Our technological-economic system is fundamentally changing**
- **Current standards processes reflect the old technological - economic system**
 - **subject matter**
 - **institutional arrangements**
 - **participants' professions**
 - **language**
- **We need to new arrangements to reflect emerging technologies**

How to harmonize new technologies?

- **Focus on harmonization issues per se *within* standards**
- **Increase information sharing *among* standards groups**
- **Focus on interface standards**
- **Include end-users on an on-going basis**

How does all this relate to Advanced Television?

- **The standardization process remains heavily weighted towards traditional OTA broadcasting, eg:
spectrum crowding
interference issues
hardware design**
- **Virtually no recognition of non-broadcasting video issues - eg:
text and graphic display
interactivity**

summary

- Any standard has its own distribution of benefits
- Standardization today is especially hard, because the fundamental building blocks on which the process rests are themselves changing
- We need to recombine elements of existing standards processes with brand new elements to reflect the changing technological-economic environment

recombination of
individuals
parts of existing groups

- We need to be aware of the dogs that don't bark
Who is absent from the considerations?

What issues
users
technologies

- Good standardization within existing institutions should include
 - new faces
 - new issue areas
 - new processes
- Conversely, good standardization in new organizations should include
 - old faces
 - old process

Communications technologies are developing so rapidly that all processes themselves are going to be messy and terribly frustrating for the foreseeable future.

If it seems easy, it's probably wrong

Role for government

- **To safeguard national security interests**
economic
military
- **To represent diffuse end users such as**
education community
small entrepreneurs
- **Assist in information exchange**
publish meeting information
document repository

