Today's Cooperative Competitive Standards Environment for Open Information and Telecommunication Networks and the Internet Standards Making Model

by Anthony M. Rutkowski[1]

Today's Standards Making Architecture

The architecture of standards-making organizations in the telecommunication and information fields has undergone fundamental change over the past decade. The old architecture was simple and well- bounded around a handful of bodies with explicit international, regional, national, and subject matter jurisdictions. These standards-making bodies were virtual sovereign, following slow, deliberate, time-honored processes that remained essentially unchanged for the preceding 130 years since the first multilateral telecom standards conference, and engaged legions of standards professionals whose careers often began and ended in a single committee.

Over the past ten years, that old architecture has been fundamentally altered. Constellations of new bodies now exist with diverse new constituencies and boundaries, and all are competing in a global standards marketplace. Even the form of these new bodies differs dramatically from traditional organizations. Their range includes: 1) industry aggregations around a vendor specification, 2) ad hoc global initiatives around a specific technology, 3) national or regional bodies created to bring about a competitive marketplace, 4) global hyperdynamic developmental and technology transfer "engines" like the Internet Engineering Task Force. Meanwhile, the traditional bodies struggle to evolve within a standards marketplace that finds their products largely unacceptable, yet still running processes that incur collective costs of tens of millions of dollars per year.

This transition hasn't been simple or easy. The notion of competition in standards making-like competition in a rigid monopoly provisioning environment or socialist economy-is not accomplished without considerable angst and difficult accommodation by those relinquishing power centers and jobs.

The chart depicting the Standards Making Universe-popularly known as the Rosetta Stone-seeks to provide perspective and portray relationships within this new architecture. The chart was originally prepared for the first Standards Summit in 1990 and has been revised continually since that time to reflect the changing architecture.

----

[1]Email: amr@isoc.org The author is Executive Director of the Internet Society. However, these remarks are personal views and do not necessarily represent positions of the Society. Mr. Rutkowski has participated in, studied, and managed standards making bodies and process for twenty years in the U.S. government, private-sector companies, academic institutions, and international organizations. This presentation is on the World Wide Web at URL http://www.isoc.org/amr-on-standards.html

Why is this rapid transition occuring?

The reasons fall into several categories:

- Moore's Law (i.e., electronic technologies are changing dramatically on an average of every two years). Furthermore, in the highly dynamic environment of the Internet, fundamental rates of change measured in months. (Rutkowski's Law)

- Most telecommunication and information markets are very competitive. The marketplace, not institutions and government, decides winners and losers. The most classic current example is Open Systems Interconnection (OSI). The publisher of *Communications Week International,* at a recent industry forum of CEOs, chided European Union leaders about "...effectively killing advanced data networks in Europe through single-minded pursuit of OSI solutions."[2]

- Most of the information infrastructure has passed from being a public good to now being a private commodity. Millions of individuals and organizations now own and design a collective national and global infrastructure. The Interop trade shows, for example, now the largest industry events in the world, are a manifestation of this transition. They are also an example of a new kind of industry-based institution that implements interoperable solutions far more effectively than government mandates.

- An increasingly global competitive environment effectively precludes solutions favoring a particular country or market segment. Attempts by governments to mandate specific directions that are at odds with the global marketplace will likely only disadvantage that nation or market by limiting both the quality and performance of available products and services to users, and the scale of the market available to vendors.

- The requisite manner in which standards are developed, promulgated, and implemented for computer network environments is fundamentally different from hardware-oriented fields. Although not quantifiable, the development of computer software appears to require a rather different "culture"-a handy reference that captures the kinds of individuals, institutions, and processes necessary for success in this environment.

- Time-to-market has become the single most compelling factor for both service providers and product vendors. This concern is a byproduct of rapid technology change, a robust competitive marketplace, and a globally competitive environment. Time-to-market encompasses not only rapid development of standards, but also implementability and meeting real user needs.

- The last twenty years have been an expensive collective learning experience about "bottom up" versus "top down" initiatives. Top down initiatives are characterized by grand

[2]D. Gilhooley, The Networked Economy Conference, Washington DC USA, 20-21 Oct 1993.

telecommunication and information infrastructure standards programmes begun through traditional international organizations. In these organizations, long-term concepts and plans are developed after years of deliberation and then pursued and implemented at regional, national, and local levels. This process can sometimes take decades. Meanwhile, the real revolutions in the telecommunication and information fields have occurred from the bottom up. Personal computers and workstations, local area networks, cost-oriented leased lines, routers, network operating systems, the Internet, and other capabilities have empowered individuals and organizations to develop their own infrastructures, and control their own information destiny.

These factors have produced a very different standards making architecture. Today, direct government involvement in picking winners and losers is likely to be the kiss of death for the unlucky recipient. With few exceptions, every direct governmental intrusion into the standards marketplace over the past decade has had major adverse consequences. On the other hand, minimal government involvement, designed primarily to foster research, collaboration and technology transfer among developers and rapid dissemination of standards, appear to work well.

Stature of Standards Making Organizations

Recently, many attempts have been made to aggrandize some organizations and their products by referring to them as *de jure*. This term is usually in contrast with other organizations and their products that they charactere as *de facto*. It is not clear how this *de jure* versus *de facto* notion was started, but the terms have fairly specific meanings in law that are wholly inapplicable to our voluntary systems of standards. *De jure* means legitimate, just, or imposed as a matter of law. *De facto* is a contrasting condition characterized as illegitimate, condoned, or accepted for practical purposes.

In a world of heterogeneous, voluntary standards making bodies, no organization has a right to claim its standards are more legitimate or legally binding or even "preeminent" than those produced by any others, including individual corporations that have obtained adoption of their standards in an open marketplace. The ISO, for example, is a private, not a treaty organization. Even the ITU-T -which is an international body under a public intergovernmental organization-does not produce legally binding standards. Indeed, at decades of formal international conferences, great care has been taken to assure that standards remain purely voluntary-on a par with all other organizations.

Internet Standards Making as a Model

The Internet standards development process is by far the best in the business. More than just a standards process, it is a distributed collaboration and innovation engine that has produced a thriving new

field of electronic communication and a ten-billion dollar global marketplace growing faster than any communications technology yet devised. Its very uniqueness, however, suggests that it may not be easily applied to existing standards making organizations and their proceedings.

 It's worth examining the attributes of the Internet standards and the associated processes.

- **Individual participation**. From the outset, the Internet standards process was based on individual as opposed to organizational participation. In fact, organizational views are not introduced or discussed. This significantly alters behavior at meetings emphasizes substantive issues.

- **Direct open participation by experts and innovators**. Anyone may immediately access all relevant information and standards, or may participate in any Internet standards-making activity. This may be done via the global Internet at no cost, or by attending any of the triannual meetings at nominal cost. These meetings are also multicasted live on two audio and video channels to more than 500 sites in nearly 20 countries. This exceptional accessibility has proven a magnet for experts and enthusiastic innovators, who freely share their ideas, expertise, and even their computer code. Many students and low-level researchers-who freely invent, criticize, and produce concepts and products-are also drawn into the activity. Much of the work itself progresses on the Internet-day and night.

- **Output consists of demonstrated working standards**. Before Internet standards reach a certain point, at least two independent implementations must have been completed. This emphasis on working code and demonstrated interoperability is considered central to the process.

- **Emphasis on meeting real user needs.** The use of preliminary interest groups to initiate a standards making activity, combined with participants who actually use the technology and the development of real implementations, produces products that generally meet actual user needs. This occurs predominantly through "bottom up" rather than "top down" standards-making.

- **A well-managed development process**. Standards-making is closely followed by Area Chairs and forced to proceed rapidly or face termination.

- **Minimum institutional ossification**. Working groups are created easily and terminated quickly upon completion of their specific tasks. This constant turnover prevents permanent committees, rigid institutional infrastructure, or semi-permanent individual roles.

- **Standards are approved via a robust expert review process**. Internet standards must be accepted by both the Internet Engineering Steering Group and the Internet Architecture Board. This peer consensus is reached by people who are intimately familiar with

the technology and have one principal motivation-making sure the standard will work. All formal standards actions are published electronically and on paper by the Internet Society-which also takes international responsibility for the standards and peer liaison with other international organizations.

- **Standards and related materials are universally and instantly accessible and browsable.** Internet standards (and frequently the associated code) are distributed and made available instantly on international Internet servers by mail-based and ftp services. Recently, the IETF Secretariat has advanced the state-of-the-art in standards making support by providing Gopher-based and WWW-Mosaic hypertext browsing capabilities.

- **Activities are network-based.** Standards-making on the network also involves rather considerable support requirements. For each Internet Standards meeting, this support includes constructing a rather substantial enterprise internet, obtaining scores of computers, providing docking stations, and assembling a multicasting facility. However, this allows attendees not only to accomplish their work, but also continue their personal professional endeavors.

- **Creating the right culture**. Having the right institutional ambiance is very important to attract the best and the brightest in computer programming and networking. The right ambiance includes informality, network access, and the presence of a large peer group. Culture is also an occasionally troublesome as programmers and networkers have low thresholds of tolerance controls and influences perceived as unnecessary. Nevertheless, culture is often a critical factor in determining productivity and innovation.

 The Internet standards process-although close to an ideal development model-is quite different from most existing standards making bodies. While it might be possible to adopt many of these Internet practices for a new organization, it is quite different to make over existing organizations to assume all of these attributes.

 Standards bodies are more often homes for specialized industry or government constituents than they are neutral technological forums. As a result, even purportedly open governmental standards forums are usually effectively closed with no incentives to admit outsiders. All of these factors limit propagation of the Internet model-even though its adoption would clearly be beneficial.

The Government Role

 The appropriate successful role of government in standards-making is one which encourages generic open information systems platforms and processes, promotes open technology transfers among the broadest possible range of innovators, developers, and users, and allows a robust competitive marketplace to determine winners and

losers. An appropriate international role is to assure that these same values are applied to multilateral and national forums.

 How government accomplishes these goals is critical to their success. Fortunately, we have nearly 20 years of benchmarks to gauge what works and what doesn't. Avoiding picking winners and losers extends to forums as well-although providing support to open up the processes does seem to produce significant benefits.

 Perhaps one of the principal roles of government in this environment is simply to follow and understand what is occurring both domestically and worldwide. This information can be made publicly available and used to enhance another important role-effecting the open "technology transfer" noted above. A great deal can be done to encourage more open standards processes throughout the world, which will become increasingly important as a robust global marketplace emerges and WTO trade rules apply to the information infrastructure.

✹✹✹