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In accordance with JTC 1 Hawaii resolution 28, this document is forwarded to JTC 1 National Bodies, Liaison Organizations and Subcommittees for comment. In addition, contributions are invited related to JTC 1 structure, scope and future work items.

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JTC 1 N 6602

JTC 1 Future: Output of brainstorming

This document is the output of some brainstorming exercise on the occasion of the JTC 1 Plenary, about the JTC 1 future. It contains two distinct elements

- Current and future state of technology and market;
- Dealing with societal aspects of International ICT standardization.

JTC 1 offers this document to its NBLOs and SCs to solicit comments and additional thoughts about the JTC 1 future. Responses will be considered by the JTC 1 SGSP to establish a Long-Term Business Plan for JTC 1.

JTC 1 BUSINESS PLANNING

CURRENT AND FUTURE STATE OF TECHNOLOGY AND MARKET

Purpose

The purpose of this document is to assist JTC 1 in its business planning process, specifically in the elaboration of its evolution in response to the continuous changes in the IT technology and market.

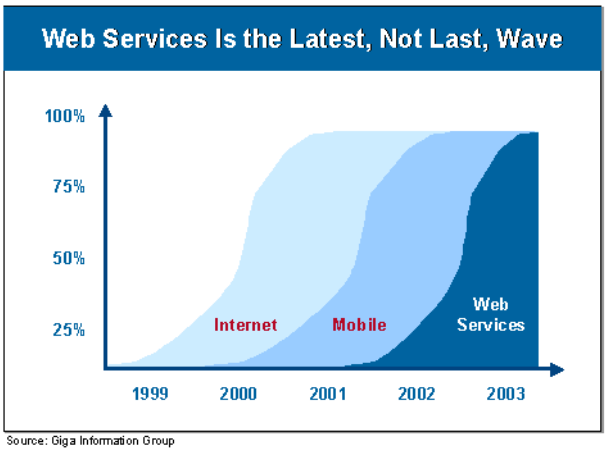
Current State

The IT market went through considerable changes since the mass introduction of the personal computer twenty years ago.

As new technologies are introduced, new companies are created and ride a market wave until it crests. This is then followed by a consolidation of the market, with the disappearance of the weaker players. The cycle then restarts when a new disrupting technology reaches market maturity.

Computing is now ubiquitous in industrialized society. It is also a key enabler in many field of sciences, to the point that some author wrote that *All science is computer science*[1].

From a technology perspective, the classical internet is now mainstream: in 1994, web search engines were indexing around three million pages. Presently, the best web engines index around 1.5 billion pages (http://notess.com/search/features/) out of a possible total of six billion. According to the Giga Information Group[2], the current enterprise technology wave is Mobile and Web services (see figure).



The development of Web Services implies the elaboration of comprehensive protocol stacks (UDDI, XMLP, BTP, ebXML, OAGIS and SAML for instance). This vindicate the OSI vision.

As the Internet got mainstream, the world economies experienced an economic slowdown. In the ICT industries, this slowdown is made more acute by overcapacity (telecom) and too many companies going after a limited market. We are presently at the beginning of a consolidation phase that should last until the end of 2002.

[1] *All Science Is Computer Science* by George Johnson, New York Times, March 25, 2001
[2] *Web Services vs. Enterprise Architecture: Paradigms Shift, Agile Architecture Is Forever*, by Carl Zetie and Mike Gilpin, Giga Information Group, September 25, 2001

The ability to design and implement ICT systems and products has greatly improved in the last ten years. A recognized core body of knowledge in Software Engineering now exists and it is now maturing into a recognized profession. Challenges still abound because of the pressure to build more complex applications and products in ever shorter time-frame (a *Web Year* is 3 months).

Future State

It is expected that Moore's Law, which can be generalised as the doubling of computing power every 18 months, will hold until at least 2012. This means that the corresponding lowering of prices will continue.

Computing will become more pervasive in our society, thus even more critical. The pervasiveness will increase with the introduction of mobile internet services and wireless technologies. This means that the following associated issues will be exacerbated:

- Applications, such as intelligent systems
- Authentication
- Bandwidth/connection management
- Content format and management
- Cultural, linguistic, localization and internationalization issues
- Data management
- Management of intellectual property rights
- Security
- Service protocols
- Storage

New industries that make intensive use of IT, such a biotechnology, will drive the development of new techniques and products.

Disruptive technologies that cause a sudden dynamic change in a market, such as peer to peer networking, will move into the mainstream. This is already driving innovations in content and copyright management and changing forever the content industry.

The challenge of developing ever more complex information systems under short schedule will remain. Additionally, many of these software intensive systems will perform critical tasks in our society. All of this will not only drive the formalization of the software and system engineering discipline, but also the market for re-usable components.

The market environment will continue to evolve at a fast pace. Most analysts expect the ICT market to rebound in 2003. Many companies will fail or be acquired by competitors.

Market characteristics will continue to change. Already, more ICT workers are working for mainstream companies than ICT companies.

Globalization is here to stay. The open global market, deregulation and ubiquitous Internet assure its continuation. Globalization will spur the development of means to deal with a diverse world, such as automated translation.

JTC 1 Future Directions

JTC 1 will be challenged to keep up with such a dynamic environment.

IT is presently a wide and complex field. It will become even more complex and diversified. This means that different approaches will have to be used to properly respond to the needs of business, industry and end users in the international community. A possible set of criteria for the selection of technology fields suited for standardization within the scope of JTC 1 is in the annex of this document.

JTC 1 needs to position itself so that it can address new areas in an efficient and value-added way while maintaining required standards activities in less glamorous areas that are necessary for the global IT community.

JTC 1 should seriously consider positioning itself as a system integrator to complement its current program of work, especially in areas of standardization were many consortia are active. Areas to properly address with proactive planning and coordination include:

- Web services/ Application and Service protocols
- Content and copyright management

Annex: Assessment/evaluation of technical fields concerning their suitability for formal standardization in the scope of JTC 1

Technology

- Age
  matured (1) ... just discovered (10)
- Speed of development
  Product cycle > 5 years Product cycle < 1/2 year (10)
- Complexity
  simple (1) very complex (10)

Application

- Mode of Application
  individual, isolated (1) highly connected, network (10)

Quality requirements

- Need for certification
  no (1) ... highly requested (10)

Security/trustworhyness requirements

- Need for certification
  no (1) ... highly requested (10)

Public interest

- Environmental aspects, sustainability
  no (1) ... highly requested (10)
- Multiple vendors, competition, interoperability
  no request (1) highly requested (10)

Dealing with societal aspects of International ICT Standardization

Statement of facts:

1.Institutions no longer want to spend money in a traditional way:

-on one hand in centralized ICT standardization (while they spend considerable amounts of money for specific products)

-on the other hand there is much money spent in a decentralized way

2. Return on investment in standardization may not be calculated only in financial terms but also in social and economic utility terms (which at the end may also have positive financial effects on the long run, in contributing to world peace).

3. Two-dimensional convergence:

- **There is technology convergence in the sense that communication technology and media are converging: this is what we call horizontal convergence;**
- **Now the usage of ICT in all aspects of life (industry, home, administration, education, charity, etc.) is called vertical convergence.**
- **JTC1 has to recognize this process and incorporate it into its objectives.**
- **The current structuring in vertical TCs and SCs is ill-suited for coping with this two-dimensional paradigm. There lacks a balanced matrix approach for efficient coordination.**

Requirement:

Taking into account economic and social impact of ICT Standardization: the aim is to favor universal use of ICT and to maximize number of users in the interest of economic growth, liberalization of trade and in consequence to optimize market outcomes.

To achieve this:

1. JTC1 has to focus on its specific duty to provide adequate coordination in order to fulfill the 3 general strategic principles of JTC1:

- **Interoperability**
- **Usability**
- **Cultural and linguistic adaptability**

2. It is of utmost importance to find ways to:

- **attract more countries, more world regions, to commit to International ICT Standardization in their own interest (less than 30 P-members now compared to roughly 140+ countries member of WTO and ISO)**
- **attract consumers and users groups on a permanent basis to make vendors meet users on neutral, non directly commercial ground**
- **make standardization objects evolve more and more toward societal aspects, after having dealt with low-end objectives (convergence with high-end objectives)**

Doing so will help reaching WTO goals toward balance in ICT worldwide trade.

Note concerning the links between societal aspects and market analysis:

- **On one hand, the world of the Internet, combined with the multi-generation progress of communication (2G, 3G, 4G) have created a new horizontal circumstance in which many different standards for the same object can exist side by side and the market decides who wins.**
- **On the other hand, in some very specialized domains, a few companies or even a single one create a product and no standard is required. And in other areas, the whole public at large has an interest in a mutual standard and ultimately it has to become an international standard (examples: access for people with special needs [elderly and disabled] is the best example of the latter; cultural and linguistic adaptability is another good case in point).**

Methodology concerns to develop a matrix approach:

- **Use a more sophisticated analysis of terms like "the industry" (big and small companies, national and international, etc.), "the users" (consumers, end-users, institutions, etc.), "the market" (buyers and vendors), "the consortia" (big and small, open or closed, based on paying or free participation, permanent or not) to avoid confusing general assessments.**

- **Avoid to put in the same category International Standards (open, de jure worldwide-wise standards) and Private Consortium Standards (closed-circuit, specific, de facto or by-private-agreement standards)**

Preliminary conclusions

-Develop a matrix approach to make sure that there is a balanced representation in JTC1 and to deal with horizontal technological issues that cross vertical ones;

-Develop a more thorough way to identify technologies or systems that require timely standardization;

-Develop education programs in JTC1 for the outside world;

-Look into appropriate approaches (such as workshops, electronic forums, etc.) to produce results along those lines;

-Call for comments from national bodies on how to achieve this.