



ISO/IEC JTC 1 N6923

2002-11-05

Replaces:

**ISO/IEC JTC 1
Information Technology**

Document Type: Business Plan

Document Title: JTC 1 Long Term Business Plan (LTBP)

Document Source: JTC 1

Project Number:

Document Status: As per JTC 1 Sophia resolution 3, JTC 1 approves this document as its LTBP and encourages its SCs to actively participate in its implementation.

Action ID: ACT

Due Date:

Distribution:

Medium:

Disk Serial No:

No. of Pages: 10

ISO/IEC JTC 1:

Long Term Business Plan Version 1.0

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Management summary

This document establishes a long-term business plan for ISO/IEC JTC 1 (LTBP) for a three year planning period.

Based on an analysis of the history of JTC 1 and recent developments, the vision and overall strategic orientation of JTC 1 are established. Essential elements are:

- A pro-active and forward-looking approach for new work;
- Establishment of alliances with other organizations, to improve cross-sectorial cooperation in ICT standardization and to provide other organizations a smooth route to bring in their work results;
- Overall technical orientation of work on three key domains:
 - core technologies,
 - system integration,
 - areas of societal concern.

The implementation of the LTBP will be the highest priority of JTC 1 managerial work in the near future. Details of the plan to implement the strategic orientations of this LTBP are provided in a separate document.

1 Purpose of the document

The purpose of this document is to establish a long-term business plan (LTBP) for ISO/IEC JTC 1 and to identify the essential implementation steps which are needed to bring it about. Long-term in the sense of this document means a three year planning period.

LTBP serves as an orientation for and complements the traditional JTC 1 business plan which covers a JTC 1 Plenary cycle.

LTBP will become an integral part of the JTC 1 Business Plan and, hence, will be revised by JTC 1 yearly and systematically.

2 Historical background, recent developments and analysis

In 1987, the Joint Technical Committee 1 of ISO and IEC (ISO/IEC JTC 1) was formed as a merger between ISO/TC 97 and IEC/TC 83, with IEC//SC 47B joining later, with the intent to bring together in a single Committee the then Information Technology standardization activities of the two parent organizations. At that time, the most ambitious Information and Communications Technology (ICT) standardization effort on Open Systems Interconnection (OSI) was underway which enjoyed significant support from major market players (governments, major customers and computer systems manufacturers).

Since that time, however, major changes have occurred in the market place:

- Governments have changed their views on the purposes of ICT standardization and the role of ICT standards in procurement;
- Major customer have changed their methods of systems development and specification;
- Market conditions have changed due to compressed product life cycles;
- Technology capabilities continue to evolve; technology becomes increasingly complex;
- Technologies converge;
- Customers want integrated solutions that are interoperable.
- The computer systems companies have evolved radically and been supplemented by the independent PC hardware manufacturers (the so called box manufacturers) and joined by a group of major software companies.

Simultaneous with this overall change of the ICT industry and certainly not unrelated with it, changes also occurred in the ICT standardization domain:

- As a consequence of the restructuring of ICT (and other) companies in the late 80s and early 90s, drastic reductions took place in corporate standards units within many companies as part of the movement of profit and loss responsibility to discrete units in the companies. Such corporate standards units had generally coordinated and facilitated participation by their company's experts in formal standardization activities.
- Virtually simultaneously with this development, the Internet and World Wide Web took off, essentially banishing to the history books the work that JTC 1 and ITU had been doing on Open Systems Interconnection, leaving just a few useful remnants applicable to the Internet environment.
- Then in the early 1990s, stimulated by a change in US antitrust law, industry consortia started to emerge as fora for addressing particular standardization issues within the ICT industry. This trend has ever increased since, and estimates exist that currently in the order of 400 consortia / fora exist each addressing particular standardization needs in different corners of the ICT field.
- Product life cycles are becoming briefer and related standards are needed much earlier than before. Technology capabilities continue to evolve and address the increasingly complex customer environment. As complexity increases and resources vary, e.g. today are decreasing, JTC 1 must consider ICT problems from a customer's standpoint. It is therefore becoming important to allow JTC 1 customers to refocus on the essential, e.g., integration tools and critical interfaces.

In the past fourteen years of existence, JTC 1 has brought about a number of very successful and relevant ICT standards in the fields of multimedia (in particular, MPEG), IC cards ("smart cards"), ICT security, database query and programming languages as well as character sets, to name just a few.

The advent of the information age poses a new challenge to JTC 1: Computing is now ubiquitous in industrialized society. It is also a key enabler in many fields of science, to the point that some author wrote that *All science is computer science*¹. ICT spreads into virtually all spheres of life, including different cultural and social environments, and economy.

Traditional boundaries between providers no longer dominate the ICT Environment. Many providers operate in multiple countries and have to provide products whose properties vary by nationality, culture and legal setting, as demanded by customers. Convergence, globalization and cultural and linguistic adaptability are ways to refer to this challenge.

The ever changing environment within which JTC 1 operates demands continuous adaptations. JTC 1 must react and demonstrate its ongoing relevance, but also recognize that there is room both for consortia and formal standardization, such as JTC 1.

JTC 1, in its continuing efforts to establish and maintain itself as the global center for international ICT standardization, has already undertaken major steps to address this changing environment:

- Streamlining its rules and working methodologies in order to reduce overall standardization time from an average 58 months in 1990 to 34 months in 2001. Over the past two years, JTC 1 Strategic Planning activities have spawned 5 process improvements.
- Improving co-operation with consortia/fora by opening new paths for their contributions to be recognized as International ICT Standards;
- Through house-keeping and re-engineering efforts: focussing on those standardization projects which bear the highest market relevance.

In sum, JTC 1 is faced with the following challenges:

- Improve its market relevance as a key provider of leading basic technology standards;
- Establish itself as a strong partner for other ICT standards developing organizations, including consortia/fora, to jointly develop standards of a cross-sectorial nature;
- Establish new working methodologies to meet the needs of the market and its constituency.

3 Trends anticipated

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.

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 areas, such as the following, will increase in importance and will present opportunities for future standardization in JTC 1:

- Applications, such as intelligent systems,
- Security and authentication,
- Bandwidth/connection management,
- Content format and management,
- Storage and data management,
- Management of intellectual property rights,
- Service protocols,
- Portable computing devices and all needs related to nomadicity,
- Societal aspects, such as e-accessibility, data protection, cultural and linguistic adaptability, localization and internationalization.

New industries that make intensive use of ICT, such as biotechnology, will drive the development of requirements for new techniques and products.

Convergence is occurring in two dimensions:

- The basic technologies IT, telecommunications and consumer electronics converge in the sense that the same fundamental technologies are applied in all three areas. This can be termed horizontal convergence; the resulting technology is nowadays often called ICT. The advent of ICT

¹ *All Science Is Computer Science* by George Johnson, New York Times, March 25, 2001

demands a closer overall cooperation, in the standardization arena, among the international protagonists of these technologies, ISO, IEC and ITU.

- Simultaneously, ICT progresses into all aspects of life (economy, home, administration, education, charity, etc.), with conventional processes and applications now exploiting the capabilities offered by ICT. This may be termed vertical convergence. New ICT applications are characterized by the involvement of different technologies and high complexity; in general, they cannot be covered by a single standard, but are of an interdisciplinary nature. This demands a closer cooperation between technology-oriented and application-oriented experts, both in product and in standards development. With the progressing of ICT into all domains of life, societal aspects become an element additional to technology to be given due consideration.

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.

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.

Product life cycles have become shorter and, hence, product standards are needed much quicker than before. Therefore, two distinct categories of standards are needed:

1. those where stability and ongoing maintenance are not an issue;
2. and those which establish a longer-term system and interface concept to achieve interoperability and to secure investment into individual products and where, hence, stability and maintenance are of great importance.

JTC 1 standards fall into the second category while other specifications, e.g., IWAs or specifications from consortia/fora, may be better suited to satisfy short-term needs. Both categories are needed by the market; in other words: the implementation of the Global Information Society requires standards and specifications of different qualities and different level of consensus. Therefore, the future infrastructure for ICT standardization will be a network of cooperating standardization bodies, consortia/fora and other specification developing organizations. Organizations like the Internet Engineering Task Force (IETF), the World Wide Web Consortium (W3C), etc. will continue to exist and even grow, new organizations may be founded; consortia/fora will come and go. It is in this environment where JTC 1 has to position itself in a pro-active rather than passive way.

Companies seem to prefer focussing their resources into standardization areas via organizations that are deemed to give them more control over what is developed and is appropriate to their business needs, and they are prepared to provide the resources and finances to achieve results. However, there are some indications that ICT companies are becoming more sensitive to the high costs of participating in a multiplicity of consortia/fora. In spite of these indications, a change in the level of consortia participation is not anticipated.

These trends represent major risks, but also opportunities for JTC 1. If JTC 1 does not recognize the trends and respond to them, it may lose relevance and, hence, market share. On the other hand, through complementing its current portfolio and processes, JTC 1 can exploit new opportunities meeting the expectations of its constituency, of the market and of its parent organizations ISO and IEC.

4 JTC 1 Future Directions

JTC 1's future orientation is governed by the following principles:

- JTC 1 is the organization from which approval for formal worldwide standards, developed both within and external to JTC 1, is obtained.
- JTC 1 must be more progressive and forward-looking in its thinking.
- JTC 1 needs to improve its image.
- JTC 1 will actively pursue new work and alliances with other organizations.
- JTC 1 will actively seek to increase its share in ICT standard/specification development.

4.1 Overall positioning of JTC 1

Using different approaches to properly respond to the needs of the market place, JTC 1 will position itself so that it can address new areas in an efficient and value-added way while maintaining required standards activities also in traditional areas that are necessary for the global ICT community.

JTC 1 must continue to clearly define its market, with each of its market segments approached optimally.

4.1.1 JTC 1's vision and scope statements

JTC 1 endorses the following vision statement:

JTC 1 is the standards development environment where experts come together to develop worldwide ICT standards for business and consumer applications. Additionally, JTC 1 provides the standards approval environment for integrating diverse and complex ICT technologies. These standards rely upon the core infrastructure technologies developed by JTC 1 centers of expertise complemented by specifications developed in other organizations.

In order to capture the growing relevance of ICT in society, JTC 1's scope statement should be revised to address "standardization in the field of ICT".

ICT includes the specification, design, development, integration and interoperability of systems, tools, and applications dealing with the capture, representation, accessibility, processing, security, transfer, interchange, presentation, management, organization, storage and retrieval of information, and their related cultural and linguistic adaptability and societal aspects.

JTC 1 standards

- are globally recognized,
- provide global interoperability,
- provide sustained development and retention of investment.

4.1.2 JTC 1's position relative to other organizations

As already stated earlier, JTC 1 was created by ISO and IEC to provide a single, comprehensive organization in which to address all aspects of international ICT standardization. As a joint technical committee of ISO and IEC, JTC 1 has the qualities and strengths of ISO and IEC standardization. JTC 1 has developed and successfully implemented additional processes and methodologies to address the specific needs of the ICT community. JTC 1 National Body participation includes representatives from producers, governmental and public agencies, businesses and users, ensuring broad-based, open and balanced representation in the standards development process.

JTC 1 was established by ISO and IEC at the junction of overlapping activities of its parent organizations, to focus development of ICT standards in one international organization. However, since the establishment of JTC 1, separate TCs have been organized to develop standards which may be regarded to fall under JTC 1's scope. ISO and IEC, therefore, are requested

- to recognize and fully endorse the mandate of their joint technical committee JTC 1;
- to establish the appropriate mechanisms to prevent the creation of duplicating ICT standards development activities; and
- to fully exploit the benefits of a coordinated approach with ISO/TCs, IEC/TCs, ITU-T and consortia/fora to ICT standardization rather than to create new, competing organizations.

Further, ISO and IEC are invited to consider how existing ICT related standardization work within their organizations can best be coordinated across organizational boundaries.

Also, JTC 1 expresses the view that additional steps should be taken by ISO and IEC to improve coordination with ITU-T, and offers its assistance in bringing this about.

JTC 1 itself has a long-standing cooperation with ITU-T which led to a number of successful joint projects. JTC 1 expresses its strong intention to maintain and further develop this cooperation.

JTC 1 recognizes the existence of consortia/fora and the valuable contribution they can make to establish the information society. JTC 1 has already taken significant steps to co-operate with consortia / fora and will pro-actively seek to further improve this co-operation.

JTC 1, however, has its own unique strengths

- in infra-structural domains, to ensure global interoperability;
- where a fairly heterogeneous community of interested parties exists;
- where the public interest is affected, i.e., where actors other than business should be directly involved, such as governmental agencies, consumers;
- where cultural differences have to be taken into account,

and will put great emphasis on standards-oriented activities in such domains (see also 4.1.3).

As a conclusion, JTC 1 recognizes that the future infra-structure for ICT standardization will be a network of cooperating standards bodies, consortia/fora and other specification developing organizations. Therefore, JTC 1 will establish itself as the moderator of this network with the objectives:

- to establish transparency of the ongoing work,
- to avoid, to the maximum extent possible, overlapping or competing activities,
- to smoothly transpose consortia/fora work into International Standards.

4.1.3 Orientation of work

The market which JTC 1 addresses is no longer as homogeneous as it used to be. Hence, JTC 1 has to take stronger account of the needs of the various market segments and offer tailored solutions for each of the segments:

JTC 1's current strength lies in core technologies, providing the foundation for ICT applications and services: coded character sets, cultural and linguistic adaptability, IC cards, security, multimedia, databases interface, etc. The work of JTC 1 in these field also includes proper maintenance of its previous existing standards to secure the investment into related products.

JTC 1 is the place where basic building blocks of new technologies are defined and where the foundations of important ICT infrastructures are laid. JTC 1, in a number of technology areas, can be regarded as a renowned source of innovation, though it should be recognized that its related market share has decreased.

In addition to this well-established focus of work, JTC 1 positions itself as a system integrator to complement its current program of work, especially in areas of standardization where many consortia/fora are active. Areas to properly address with proactive planning and coordination include:

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

Integrating technology components from various sources into a single system will provide significant added value to the work of such sources. It will assist to fully exploit such technologies, and will contribute to furthering both horizontal and vertical convergence as outlined in 3.

While technology-oriented work should remain an essential element of JTC 1's portfolio, JTC 1 should also strengthen its role in areas of societal concern where the public interest is affected, such as e-accessibility or security, even if technological aspects are less glamorous.

4.1.4 Other aspects

In its efforts to contribute significantly to the formation of the information society, JTC 1 will pro-actively seek areas of new work. Therefore, JTC 1 will establish a systematic, ongoing technology watch component the purpose of which is to identify, at an early stage, technological trends and the impact standardization may have in those. This watch function will also take into account relevant societal aspects as they may be affected by future technologies. TR (Technical Reports) are particularly suited to capture the findings of such monitoring and their development is encouraged. Likewise, JTC 1 requests its SCs to establish similar activities.

4.2 Deliverables / JTC 1 Products

International Standards (IS) are the product of JTC 1 which differentiate JTC 1 from any other specification provider. International Standards are unique through their quality and level of consensus based on a public inquiry. JTC 1 has to investigate the fields and scopes where International Standards are essential. For other fields, JTC 1 may adopt the workshop mode of operation with its IWAs, as the appropriate route to achieve the objective.

As JTC 1 increases its efforts on prospective work and adds a systematic technological watch component to its activities, Technical Reports (TR) will also be used to reflect the findings of such activities.

JTC 1 is keen to see its products as widely promoted and easily accessible as possible. Therefore, JTC 1, in co-operation with ISO and IEC, explores way to improve the marketing of its products.

4.3 Methodologies

For the development and/or ratification of standards and other specifications, the rules under which JTC 1 operates offer a large spectrum of possibilities to meet diverse requirements of its constituency:

- The conventional 5-stage process (proposal stage (1) - preparatory stage (2) - committee stage (3) - enquiry stage (4) - approval stage (5)) offers a systematic approach to the development of standards within the technical structure of JTC 1, with the possibility of an abbreviated process through a combination of stages 1 through 3.
- In order to handle specifications from outside of JTC 1 in an expeditious way, JTC 1 offers a Fast Track process (for usage by its National Bodies and A-Liaison organizations) and a PAS Transposition process (for usage by other recognized organizations).
- JTC 1 offers its workshop mode of operation where interested organizations can work in a very flexible way, following their specific needs, to develop IWAs which may later be transposed into International Standards.

JTC 1 will make long-term planning an integral part of its operation. It will be a normal activity at each JTC 1 Plenary and will be conducted in a systematic way. Also, JTC 1 encourages its JTC 1 SC's to proactively seek new market-relevant work which could effectively integrate these areas into their current programs.

In addition to existing coordination within JTC 1, cross-sectorial coordination

- across TC-boundaries in ISO and IEC,
- as well as with other organizations,

in the field of ICT is increasingly important. Inter-TC coordination between ISO and IEC TCs and JTC 1 is a forward-looking task which, in particular, ISO/TMB, IEC/SMB and JTAB should assume in addition to their current role. JTC 1 will work with ISO and IEC to clearly define the representation of JTC 1's interests in these. Joint Working Groups between JTC 1 and ISO/IEC TCs may be a useful instrument to jointly progress cross-sectorial work.

Coordination with other organizations, with the objective to avoid unnecessary duplication of work, is an increasingly important aspect for JTC 1 to address. Therefore, JTC 1 will establish an information sharing network where relevant specification developing organizations can exchange views and coordinate their activities. Partners in this network should include ISO, IEC, ITU-T and JTC 1 itself as well as, at the same level, other interested specification developing organizations, including existing A-liaison organizations, PAS submitters and other consortia/fora. The implementation of the network may be based on a web site identifying the participating organizations, the areas of information sharing and the strategic objectives of this partnership.

System integration typically requires expertise from different technical areas. To bring such interdisciplinary expertise together in a flexible manner, the JTC 1 workshop mode of operation will preferably be used. No need is seen, at the moment, to introduce additional methodologies in JTC 1 to handle systems integration projects.

The workshop mode is also an appropriate methodology for JTC 1 to invite new participants to JTC 1. It can be preferably chosen for the following reasons:

- The considered technology is at an early stage of its development;

- Interested parties want to express themselves in the name of a company, a consortium, or an organization;
- The need for the final deliverable to be an International Standard is not yet obvious.

In order to early identify potential new areas of work, JTC 1 will establish a systematic technology watch function. The results of such activities will be made available through internal JTC 1 reports, or, if appropriate, through Technical Reports.

4.4 Topic Areas

The future orientation of JTC 1's work will show three distinct directions:

1. Technology-oriented work will remain a high priority item for JTC 1 and represents its core business. This is where JTC 1 has its broadest global recognition and substantial expertise to build on. The future evolution of this segment will be characterized by a pro-active, systematic technology watch function within JTC 1: New technology areas will be identified with the perspective to initiate early work and to attract new actors by meeting their requirements. Candidate areas for inclusion into the JTC 1 work program are currently:
 - Biometrics,
 - Applications, such as intelligent systems,
 - Security and authentication,
 - Bandwidth/connection management,
 - Content format and management,
 - Cultural, linguistic, localization and internationalization issues,
 - Storage and data management,
 - Management of intellectual property rights,
 - Service protocols,
 - Portable computing devices and requirements related to nomadism,
 - Frameworks, architectures and protocols for trading across communication networks,
 - Content interoperability,
 - Voice APIs,
 - Web Data Structure for Global Information Retrieval and Annotation.
2. While technology-oriented work will remain the core element of JTC 1's portfolio, JTC 1 will also strengthen its role in areas of societal concern where the public interest is affected, such as e-accessibility or security. This orientation is not meant as the advocacy of increased government regulation in fields of societal concern, but rather, as JTC 1's offer to initiate work if need exists and a clear orientation of the work is given from the outset.
3. System integration work will be established as an additional business in JTC 1. It complements the current activities by bringing standards and other specifications from potentially different sources together and establishing a broader system view by specifying how such specific specifications can be integrated.

4.5 Working practices

JTC 1 has already made substantial efforts in applying state-of-the-art working practices, in order to reduce the standards development time and resources needed. However, JTC 1 also recognizes that this is an ongoing management activity which will need continuous JTC 1 attention. Therefore, JTC 1 will explore additional measures, such as web based development methodologies and project management tools used throughout JTC 1 and its SCs.

5 Implementation

The implementation of the Long-Term Business Plan of JTC 1 will be the highest priority of JTC 1 managerial work in the near future. The objective is to implement the plan as rapidly as possible in order to bring about the necessary changes required to cope with the changing environment as outlined in 3. Though the availability of resources is a limiting factor, JTC 1 will do the utmost possible to overcome any internal obstacles. As some of the proposed measures may also require support and/or approval by ISO and IEC, JTC 1 requests that a dialogue be established with ISO and IEC to seek their consent with the proposed directions without any undue delay.

Details of the plan to implement the strategic orientations of this LTBP are provided in a separate document (JTC 1 N 6780 and its future versions).