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REPORT

of the

JTC 1 Technology Watch

Nara, Japan,

2008-11-11

**This report has been produced
and endorsed by the JTC 1
SWG on Planning**

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Workshop Co-Chair

History

- Concept developed and initial work done during the Business Planning Activity of 2001-2002
- Special Working Group (SWG) was put in place at the Sophia Antipolis JTC 1 Plenary in 2002 (resolution 23)
- Responsibility assigned to SWG on planning at the 2007 Australian Plenary

Objectives

To provide to JTC 1 National Bodies and SCs a yearly status on the future evolution of ICT technology within the Scope of JTC 1 Terms of Reference, as well as information on organisations working on those technologies.

Why Technology Watch

- ICT is evolving constantly
- ICT field is wider than the coverage of all of JTC 1 SCs
- JTC 1, its Members and its SCs need a consolidated assessment of ICT evolution to make their business decisions

Workshop Expectations

- Get inputs from outside of the community
 - Practitioners
 - Academics
 - Government
 - Other parties
- Learn from this outputs:
 - We are doing OK
 - We need to assess/investigate further
 - We need to do something

General Comments

Common issues from the presentations:

- (Near) Future trends in ICT
 - Green IT and sustainability in order to reduce natural environmental resources
 - Consumer electronics
 - Robot technologies
 - Sensor networks
 - Natural language supports
 - Education

General Comments

JTC 1 should:

- Consider the other people who are not always familiar with JTC1 activities

Possible points to explore:

- Reduction of natural resources
- Hardware technologies with de facto and de jour standards
- Natural language treatment with other activities like United Nations
- Education of ICT standards

Agenda

| | |
|------------------------------|---|
| 09.15 | Environment and IT standards - Green IT |
| | Prof. Kazuhiko Kato, Japan, University of Tsukuba Green IT, its trends and problems |
| | Dr. Kazushi Kuse, Japan, VP of Strategic Value Creation Team, IBM Japan Green Initiative in IBM |
| | Dr. Satoshi Itoh, Dr. Hiroshi Nakamura, Dr. Satoshi Sekiguchi, Japan, Research Institute of Information Technology (AIST), and Prof. Mitsuhisa Sato, Japan, University of Tsukuba Standardization topics on Green IT |
| 10.15 | Q&A / Panel Discussion |
| 10.30 10.45 | Break - Morning tea |

Notes

Kato

- Good introduction/positioning
- IT is a significant contributor to global energy consumption
- Can increase even more if nothing is done
- Solutions:
 - Power management
 - Cloud computing
 - Need de jure standards instead of de facto standards?

Notes

Kuse

- Cases studies on Green IT
- Transport, energy utilities/home or business power management, carbon management, IT, water management
- Shown how IT can be used to increase sustainability and efficiency
- Need standardized business processes, data collection methods and middleware

Notes

Itoh

- Data Center Management
- Virtualisation technology can contribute to energy saving - Scenario can be scaled up
- Need live migration of services between machine – and between sites
- Need an SLA for power efficiency

Q&A

- To IBM – Do we have standardization issues?
 - Yes – notably on Transport – many country dependent particularities.
- Cloud computing – does it consume a lot of energy through communications?
 - Savings are larger in the datacenter than any increase in consumption in communications.

Agenda

| | |
|--------------------------|--|
| 10.45 | Environment and IT standards - IT contributions to sustainability |
| | Dr. Yoshiro Owadano, Japan, Research Coordinator for Environmental and Energy Technology, AIST Energy and Network Technology |
| | Prof. Atsushi Inaba, Japan, Research into Artifacts, Centre for Engineering, The University of Tokyo Sustainable Consumption using the ICT technologies |
| 11.25 | Q&A / Panel Discussion – key points for JTC1 – wrap up |
| 12.00 - 14.00 | Break - Lunch |

NOTES

Owadano

- Energy Flow Change – Toward greener and sustainable sources through new sources of energy and more efficient consumption
- Integrated, intelligent energy network, with energy storage and switching supported by and information network is necessary.

NOTES

Inaba

- Need way to assess impact of ICT on efficiency

Conclusions

- Using IT to be more efficient in the usage of energy
 - Impact measurement
 - Systems wide optimisation
- Making ICT more energy efficient
 - Data center management
 - Green SLA / Metrics
 - Systems wide optimisation

Talk to: ITU-T, ECMA, IEEE, IEC, ISO, CEN,
other fora, etc..

Going Forward

- SWG on Planning will explore further
- If it judges that there is sufficient work for an SG, it will present to JTC 1 a letter ballot to establish such an SG

Agenda

| | |
|----------------------|---|
| 14.00 | IT in consumer electronics |
| | Mr. Yoshio Tanaka, Japan, Emeritus Councillor, AIST and Mr. Kazuo Kajimoto, Japan, Director, System Engineering Centre, Panasonic Standard in Consumer Electronics |
| 14.30 | Robot technologies |
| | Dr. Takashi Suehiro, Japan, principal research scientist of Intelligent Systems Research Institute, AIST OpenRTM (Open Robot Technology Middleware) |
| 14.50 | Sensor Networks |
| | Prof. Hideyuki Tokuda, Japan, Keio University Creation of Ubiquitous Services with Sensor Networks |
| 15.10 | Q&A / Discussion – key points for JTC1 – wrap up |
| 15.20 – 15.30 | Break – Afternoon Tea |

NOTES

Tanaka

- Dependability
- Accountability: the gap between what is expected and how it works based on how it is defined.

NOTES

Kajimoto

- Digital access enabled Consumer Electronics
- Importance of de jure standards to define content

NOTES

Suhehiro

- Japan produce large quantity of robots
- Expanding of robot usage from industry to consumer – to support elderly population
- Need ‘killer application’
- Modular design to cut costs – include software – need middleware – supported by standards – OpenRTM

NOTES

Tokuda

- Ubiquitous Networks, PAN, Sensors Networks
- Privacy management
- Challenges:
 - Integrating real and cyberspace
 - Connecting non-IT and IT objects
 - Creating new services by integrating non-IT and IT services
- Note: access to video...

QUESTIONS/COMMENTS

- Banff – PAN for medical applications
- Middleware....
- Components ... Interfaces
- Moving from traditional IT to Consumer electronics, robotics, distributed services

CONCLUSIONS

Consumer Electronics

- No action at this point in time

Robotics

- Work in OMG?
- Potential – but not yet

Sensor Network

- Inputs to SGSN? SC6?
- Activities related to Middleware, Privacy

Going forward

Consumer Electronics

- No action at this point in time

Robotics

- No action

Sensor Network

- Resolution noting that presentation is transferred to SGSN with mandate to explore issues related to Middleware, Privacy – and relay to appropriate SCs if required

Agenda

| | |
|--------------|---|
| 15.30 | Natural Language Support |
| | Prof. Yoshiki Mikami, Japan, Nagaoka University of Technology On the International Year of Languages |
| | Dr. Marcel Diki-Kiri, France, Laboratoire Langage Langues et Culture d'Afrique noire (LLACAN), CNRS Writing African Languages: The Keyboard Issue |
| 16.00 | IT standards and education |
| | Mr. Kazunori Saito, Japan, Deputy Director, Technical Regulations, Standards and Conformity Assessment Policy Division, Industrial Science and Technology and Environmental Bureau, Ministry of Economy, Trade and Industry (METI) Human resource development and a prospective scheme for qualification on international standard |
| 16.20 | Q&A / Discussion – key points for JTC1 – wrap up |
| 17.40 | Plenary Workshop session – Extended Discussion of Outcomes |
| 17.45 | Close |

NOTES

Mikami

- Year of the language
- Protection of endangered languages

NOTES

Saito:

- Training on standards for various stakeholders
- Standards writers, business users, ‘general population’

CONCLUSIONS

- African Languages:
 - Should flow into existing activities in JTC 1
 - SC35 - WG1
 - Check that character set is covered by encoding standards (SC2)
- Standards education
 - Not a new work area for JTC 1
 - Tied to findings of chair meetings
 - Could it be shared among NB's? ISO and IEC?

Presentation Abstracts

Green IT, its trends and problems

Prof. Kazuhiko Kato, Japan, University of Tsukuba

- In early days, information technology is expected to bring resource-saving society, for example, paper-less society that is also effective in use of natural energy and resources. After dozen of years, unfortunately, people recognized that it is not so easy to reduce the consumption of natural resources and rather IT may increase consumption of those. The situation seems to be serious since IT continues to pervade various fields of the human society and even developing countries.
- IT has two major issues for the environmental problems. Firstly, the energy and natural resources of itself have to be restrained, but simultaneously its efficiency is expected to be improved. Secondly, it is expected to be effectively applied to reduction of energy consumption and natural resource usage in many engineering or industry fields. For the first issue, I believe, in addition to the current effort of IT equipment vendors, promotion of service-oriented technologies such as SOA, SaaS and cloud computing with the help of virtual machine technology will contribute to give solutions. The second issue requires broad collaboration among engineers of computers and various fields, virtually every field of engineering.
- I have an intuition that Green IT is a complicated and deep problem to tackle than the first glance, like security or privacy issues of IT, and will contribute to cultivate a new technology field. I also have an intuition that Green IT would become a common sense of even ordinary people, like security or privacy, in near future.

Green Initiative in IBM

Dr. Kazushi Kuse, Japan, IBM Japan

- IBM focus five key areas in Energy and Environment initiative; Intelligent Transportation System, Intelligent Utility Network, Carbon Management Solutions, Energy Efficiency Technologies and Services, and Advanced Water Management. Several case studies for the each area will be introduced.
- Through these case studies, we explain several common problems of these green projects, in terms of technologies as well as business models. We also describe key success factors to realize "A Better Planet. »

Standardization topics on Green IT

Dr. Satoshi Itoh, Dr. Hiroshi Nakamura, Dr. Satoshi Sekiguchi, Japan, Information Technology Research Institute (AIST), and Prof. Mitsuhsa Sato, Japan, University of Tsukuba

- Recently, many information systems of business domain are being and tend to be operated in data centres. Energy consumption and heat became big issues of data centres. Many activities for energy saving in data centre are performed so far, such as improvement of electric power supply and Computer Room Air Conditioner (CRAC), decreasing energy consumption of servers and routers, and NSF GreenLight at CAL-IT2. PUE (power Usage Effectiveness) and DCD (Data Centre Density) are possible metrics for data centre, however, these are macroscopical metrics for whole of data centre and the performance produced by the consuming energy is not taken into consideration into these metrics.
- From now, new metrics for individual service are needed instead of the metrics for data centre. New metrics should be defined by combining performance and energy consumption. SLA between provider and consumer will need to include not only performance, reliability, security but also energy consumption for the service. The metrics and SLA for Green IT would be new standardization topics.

Energy and Network Technology

Dr. Yoshiro Owadano, Japan, Research Coordinator
for Environmental and Energy Technology, AIST

- Energy network and information network are complementary, supporting each other. Information network requires dependable energy network, and energy network, especially electric power grid, requires dependable information network. In the future energy system, various types of distributed power sources (fuel cells, wind power generators, solar cells etc.) are going to be installed on a large scale in order to increase energy efficiency and to decrease CO2 emission.
- These energy sources must be properly integrated and intelligently controlled, because output of these sources and power demand are both intermittent. Semi-independent local area integrated system is called “micro- grid” or “energy network”. Some results of micro-grid project will be presented, and future requirements for information system, data collection, fast processing and control, will be discussed.

Sustainable Consumption using the ICT technologies

Prof. Atsushi Inaba, Japan, Research into Artifacts,
Centre for Engineering, The University of Tokyo

- It is expected that the spread of the ICT technologies leads our life to “Sustainable Consumption” that means the life with less environmental impacts. For example, the TV meeting and the purchasing using the internet are expected to reduce an opportunity to move by a car and the train, and, as a result, they lead to reduce the CO2 emission in our life. In this report, the case studies of the evaluation of the effect of the ICT technologies on the reduction of the CO2 emission used by "life cycle assessment (LCA)" are introduced. Furthermore, an evaluation method of "rebound effect" of the spread of the ICT technologies is introduced.
- The ICT technologies tend to bring us temporal and economical convenience. However, we may spend surplus time and money on an action with much CO2 emission more. It is significantly important toward “Sustainable Consumption” to know the change of the usage of time and the money in our life by the introduction of the ICT technologies. “Carbon Footprint” showing the CO2 emission on the products and services must be helpful for us to know the activities with less CO2 emission in our life.

Standard in Consumer Electronics

Mr. Yoshio Tanaka, Japan, Emeritus Councillor,
AIST and Mr. Kazuo Kajimoto, Japan, Director,
System Engineering Centre, Panasonic

- Consumer electronics is one of the most important business for Japan. Japanese electronics manufacturers have long history to introduce many of innovative products for consumers as worldwide basis. Some of the products are also used for enterprise. New products, such as DVD, PC, flat Panel Display, Audio, and so on, are introduced by technology invention and innovation.
- The nature of consumer products is very price sensitive and long life time (over 10years), Hardware/Software quality, interoperability and standard (not only de jure but de facto), are very important to maintain market and protect customer asset.
- The speech will explain history of consumer electronics industry, consideration for de jure and de facto, Consumer electronics products development process. Finally, expectation to de jure process from development perspective will be addressed.

OpenRTM (Open Robot Technology Middleware)

Dr. Takashi Suehiro, Japan, principal research scientist
of Intelligent Systems Research Institute, AIST

- This presentation gives a brief introduction to the OpenRTM and its standardization. The OpenRTM is a middleware for component based software development in robot domains, especially in the service robot domain. We have been developing the middleware since 2002. The core element of the middleware is RTC (Robot Technology Component).
- Functions of robot technology are wrapped into RTCs in interoperable and reusable manner. Using those components, we can develop a variety of robot systems easily, not only standalone robots but also distributed and ubiquitous intelligent systems.
- The specification of RTC is standardized in OMG (Object Management Group) in 2007. Now the OpenRTM is used in many national robot projects in Japan, to make their technical results open to the public and reusable.

Creation of Ubiquitous Services with Sensor Networks

Prof. Hideyuki Tokuda, Japan, Keio University

- In ubiquitous network environment, many embedded computers, sensors, devices, and networks are connected for creating context-aware ubiquitous services. Towards realizing such ubiquitous network environment in Japan, we have started several Japanese R&D projects including Ubiquitous Networks project, RFID project, Network Robots project, Sensor Network project, and Ubiquitous Platform project under the Ministry of Internal Affairs and Communications.
- In this talk, we will discuss the issues and challenges in creating various ubiquitous services using sensor networks. We first introduce the overview of the national R&D efforts. Then we describe ubiquitous platforms using sensor nodes and discuss several types of ubiquitous services such as a real-time ranking system for consumers, a secure library checkout system, and an environmental monitoring system for a city park. Finally, we summarize the issues and future challenges in providing context-awareness, real-time adaptability, time-space coordination for embedded ubiquitous services with smart sensor nodes.

On the International Year of Languages

Prof. Yoshiki Mikami, Japan, Nagaoka University of Technology

- The General Assembly of United Nations proclaimed 2008 International Year of Languages in effort to promote unity in diversity and global understanding. My presentation briefly overviews international initiatives relating to this issue.

Writing African Languages: The Keyboard Issue

Dr. Marcel Diki-Kiri, France, Laboratoire Langage Langues
et Culture d'Afrique noire (LLACAN), CNRS

- African writing systems can be classified in three sets: an indigenous set, an Arabic based set and a Latin based set. Among the indigenous set only three out of twenty are extensively used at a very large scale or at a national level: Ethiopic, tifinagh, and n'ko. All the rest are no more used but in very small communities for some of them. Arabic based writing system has been used more extensively in Muslim areas in the past. Therefore they are still important for the study of ancient documents in those areas.
- The majority of African Languages are nowadays written with a Latin based alphabet, completed as needed with some phonetic characters, nasality and tone markers. Depending on the languages and local habits, some orthographic conventions do not use diacritics nor special characters at all, whereas others make a more or less a heavy use of them. So, the keyboard issue in Africa is definitely linked to a multilingual issue. Nevertheless, only the issue of Latin based writing system for many groups of languages will be addressed here.

Human resource development and a prospective scheme for qualification on international standard

Mr. Kazunori Saito, Japan,

Deputy Director, Technical Regulations, Standards and Conformity Assessment Policy Division,
Industrial Science and Technology and Environmental Bureau, Ministry of Economy, Trade and Industry
(METI)

- JISC has provided opportunities of human resource development (HRD) for experts of international standards in each technical area, so that experts could acquire knowledge of rule of drafting international standards, such as ISO/IEC Directives. However, it has changed environment around HRD of standardization, such as economic globalization makes one huge world market, obligation of using international standards by WTO/TBT agreement, increasing international standards including intellectual property rights and widening scope of standards such as new management system standards.
- JISC established Special Committee of Human resource development in this year for the purpose of investigation and discussion of new policy of human resource development on standardization. The committee concluded that it was necessary of educating on standardization knowledge, not only for technical experts but also for whole staffs in the enterprises. And it indicated that building qualification scheme of knowledge on international standard would be effective as a tool of collection of knowledge on standards.

Speakers' Biography

Dr. Kazushi Kuse, Japan, IBM Japan

Dr. Kazushi Kuse has the responsibility of Vice President of Strategic Value Creation Team in IBM Japan. Before the current job, he has been working in IBM R&D as Director of IBM Tokyo Research, Director of System Development Lab. and Director of Service Innovation Lab. He joined IBM in 1987 to join IBM Tokyo Research as a senior researcher. His major research areas are programming languages, software engineering, application framework and software development environment. He graduated from Tsukuba University in 1982 and the Ph.D. course (Computer Science) of Tsukuba University in 1985.

Dr. Satoshi Itoh

1987, Ph.D in Physics, University of Tsukuba, 1987- 2002, Central Research Laboratory, Hitachi, Ltd., 2002-present (Science and Technology)

Dr. Yoshiro Owadano, Japan, Research Coordinator for Environmental and Energy Technology, AIST

Graduated University of Tokyo, Electric Engineering. PhD in 1979. Director of Energy Technology Research Institute (ETRI), AIST, 2004-2008. Research Coordinator for Environmental & Energy Technology, AIST, 2008-. Research field: Distributed eneetc.). Plasma and laser physics, pulsed power technology.

Prof. Atsushi Inaba, Japan, Research into Artifacts, Centre for Engineering, The University of Tokyo

Atsushi Inaba joined AIST in 1981 and started the study of the development of coal liquefaction technology. He has been in charge of the evaluation study of CO2 mitigation technologies since 1986 and Life Cycle Assessment since 1993. He has research experience at National Bureau of Standards, MD. USA (1984-1986) and at International Institute for Applied Systems Analysis, Vienna, Austria.(1990-1992). He has led the activities related to LCA in Japan as the director of Research Centre of LCA, AIST since 2001 to the end of March 2008, which is continued in the Research Institute of Science for Safety and Sustainability, AIST. He is also a Professor of the University of Tokyo since 2005. He was one of co-chairs of ISO/TC207/SC5-WG6 (Re-edition of ISO-14040 series) in 2005-2007, and has been a vice director of the International Life Cycle Panel of UNEP/SETAC Life Cycle Initiative since 2002. He is the recipient of the awards for innovative research of the Japan Petroleum Institute (1992) , the award of innovative research of the Japan Institute of Energy (1994), the award by the director general of the Science and Technology Agency(1998), and the award of the Japan Institute of Energy (2005) .

Dr. Takashi Suehiro, Japan, principal research scientist of Intelligent Systems Research Institute, AIST

Dr Takashi Suehiro received the B.E. degree (1978), the M.E. degree (1980) and the D.E. degree (1990) in electronic engineering from the University of Tokyo. He was with the Electrotechnical Laboratory (ETL) from 1980 to 2001. He was a Visiting Research Scientist at the Robotics Institute, Carnegie-Mellon University from 1990 to 1991. He was on loan to Real World Computing Partnership, as the chief of Active Intelligence Laboratory from 1993 to 1997. ETL was reorganized in 2001. Since then, he has been with Intelligent Systems Research Institute (ISRI), Advanced Industrial Science and Technology (AIST). He is now the principal research scientist of ISRI. His research interests include skilful motion of manipulator, fine motion planning, robot system architecture and RTmiddleware. He is a member of the Robotics Society of Japan and the Society of Instrument and Control Engineers.

Prof. Hideyuki Tokuda, Japan, Keio University

Hideyuki Tokuda, Ph.D. in Computer Science. Dean, Faculty of Environment and Information Studies Professor, Graduate School of Media and Governance. Hideyuki Tokuda received his B.S. and M.S. degrees from Keio University, Japan in 1975 and 1977, respectively; a Ph.D. degree in Computer Science from the University of Waterloo in 1983. He joined the School of Computer Science at Carnegie Mellon University in 1983, and was a Senior Research Computer Scientist. In 1990, he joined the Faculty of Environment and Information Studies at Keio University. He is currently a Dean of the Faculty of Environment and Information Studies and a Professor in the Graduate School of Media and Governance, Keio University, Japan. His research interests include ubiquitous computing systems, distributed real-time operating systems, multimedia systems, embedded systems, information appliances, sensor networks, and smart spaces. He has created many distributed operating systems and software tools such as Real-Time Mach, the ARTS Kernel, Shoshin, Scheduler 1-2-3, and ARM (Advanced Real-Time Monitor). He also created many ubiquitous platforms such as Smart Space Lab., Smart Furniture, uPhoto, uTexture and uPlatea. Because of his research and educational contributions, he was awarded the Motorola Foundation Award, the IBM Faculty Award, the Ministry of Economy, Trade and Industry Award and the Ministry of Internal Affairs and Communication Award in Japan. He is a corresponding member of Science Council of Japan, IPSJ Fellow and a member of the IEEE, ACM, IPSJ, IEICE. He was a general chair of UbiComp2005, a founding chair of IPSJ's SIG on Ubiquitous Computing Systems. He is currently a chair of IPSJ's IT Forum, a chair of IEICE's SIG on Network Robots, a general chair of the Network Robot Forum and a technical chair of the Ubiquitous Networking Forum respectively.

Prof. Yoshiki Mikami, Japan, Nagaoka University of Technology

Yoshiki Mikami, Ph.D, Professor, Department of Management and Information Systems Science, Nagaoka University of Technology. [Born in Tokyo 1952, received B. Eng from the University of Tokyo and Ph.D from the Graduate School of Media and Governance, Keio University.] He has initiated several publicly-funded international projects, such as Language Observatory Project, Asian Language Resource Network Project and Country Domain Governance Project. He is Vice Secretary General of MAAYA (World Network for Linguistic Diversity).

Mr. Kazunori Saito, Japan,

Deputy Director, Technical Regulations, Standards and Conformity Assessment Policy Division,
Industrial Science and Technology and Environmental Bureau, Ministry of Economy, Trade and Industry
(METI)

April 1988; Joined METI (Material standards Division, the old AIST) May 2000;
Assistant Section Chief, Conformity Assessment Division, Industrial Science and
Technology and Environmental Bureau, METI June 2004; Deputy Director, Personnel
Division, Minister's Secretariat, METI June 2006; Deputy Director, Management Planning
Office, PI2008- present title