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Software and Systems Engineering
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Address reply to: ISO/IEC JTC1/SC7 Secretariat
École de technologie supérieure – Département de génie électrique
1100 Notre Dame Ouest, Montréal, Québec Canada H3C 1K3
secretariat@jtc1-sc7.org

www.jtc1-sc7.org

ISO/IEC JTC 1/SC7

OPENING PLENARY

Brisbane, 2004-05-10

SC7 Chairman Presentation

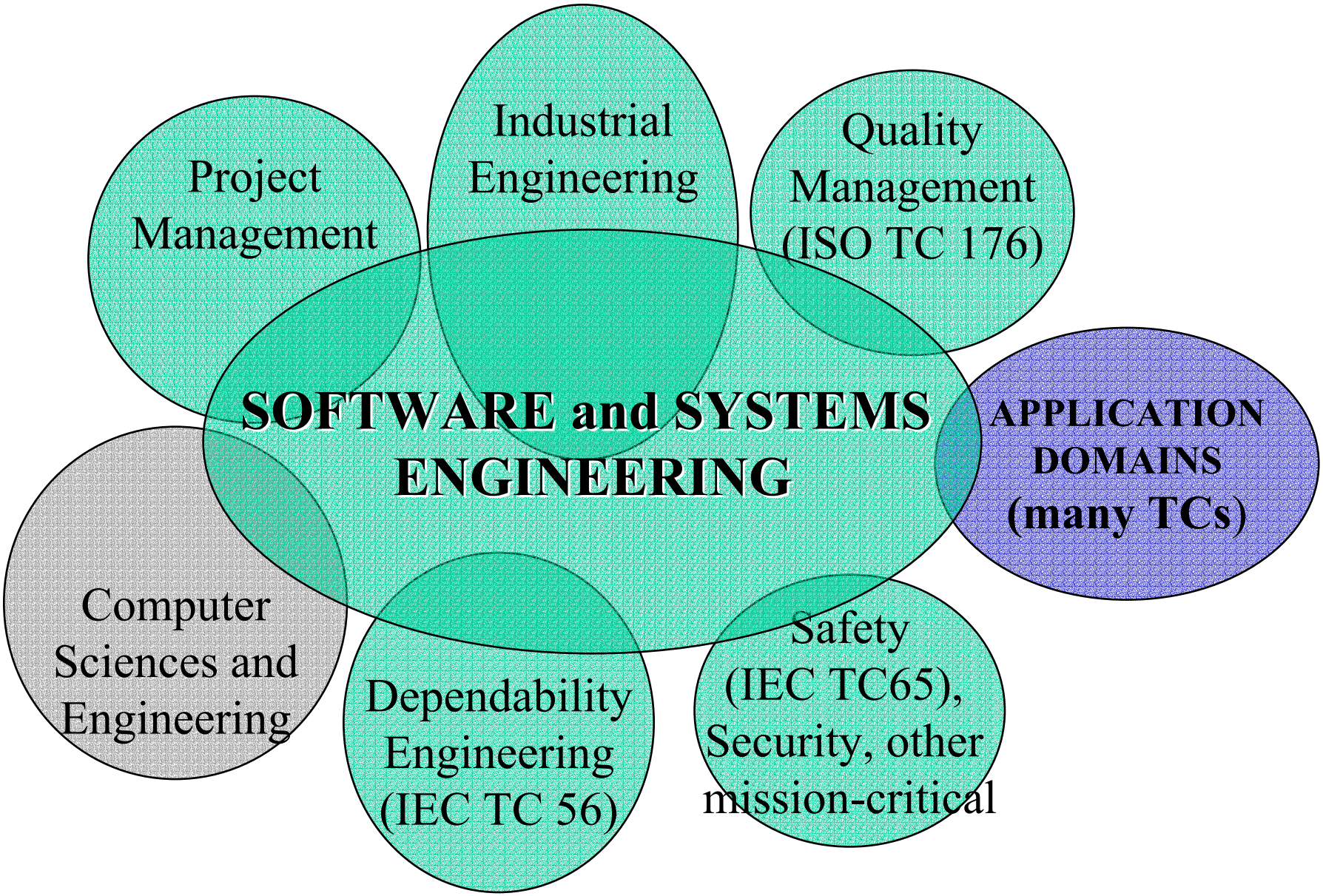
François Coallier
fcoallier @ele.etsmtl.ca

SC7 History

- **1987 - Formation of JTC1/ SC7**
- **1990 - First Business Plan published**
- **1991:**
  - **Name changed to Software Engineering**
  - **Publication of ISO/IEC 9126**
- **1994 - The concept of product plan was proposed to SC7**
- **1995 - Publication of ISO/IEC 12207**
- **1996 - Publication of the first edition of the SC7 Product Plan**
- **1997:**
  - **Terms of references broadened to Software Systems**
  - **First Business Planning Workshop**
  - **Vocabulary and BPG SWG established**
- **1998:**
  - **Transfer of ODP and E-LOTOS projects from SC33**
  - **Process architecture**
- **2000 - Name changed to *Software and Systems Engineering***

SC7 TERMS OF REFERENCE

Standardization of processes, supporting tools and supporting technologies for the engineering of software products and systems


Project Management
Industrial Engineering
Quality Management (ISO TC 176)
SOFTWARE and SYSTEMS ENGINEERING
APPLICATION DOMAINS (many TCs)
Computer Sciences and Engineering
Dependability Engineering (IEC TC 56)
Safety (IEC TC65), Security, other mission-critical

Challenges – Tabled at Busan Plenary

- Complete ongoing work √
- Close on ongoing planning activities √
- Come with a system integrator strategy to work with other organizations in the development and maintenance of our standard set √
- Have a structured maintenance plan – in progress
  - > process block of standards ?
- Have a consistent architecture – in progress
- Need to ensure that what we are producing is used - in progress

Open Planning Activities

- Study group on Systems Quality Management (Resolution 728).
- Study group on user documentation Standards (Resolution 729).
- Study group to review IS 14143-1:1998 Information Technology – Software Measurement - Functional size measurement – Definition of Concepts (Resolution 730).
- Study Group to gather requirements for the revision of ITU-T Rec. X.901-4|ISO/IEC 10746 Reference Model of Open Distributed Processing (Resolution 731).
- Study group on System Life Cycle Process Assessment Model (Resolution 732).
- Study group on the content of system and software life cycle process information products (documentation) (Resolution 733).

Open Planning Activities

- Software System Dependability
  - Transfer of IEC/TC56 project 61720
  - Relationship with IEC/TC56 negotiate with IEC TC56 a coordinated program of work
- Explore possible joint-work with JTC 1/SC27

SC 7's Major Strategies for the Period 2003-2008

- **S1** - Ensure that its standards are as consistent and coherent as possible. – in progress
- **S2** – Become more a systems integrator by focusing its development activities on integration standards and adopting and integrating standards developed by other organizations. √
- **S3** - Develop and manage key strategic partnerships with international professional and standardization organizations that operate in its mandated area. In 2002 these were the IEEE-CS, INCOSE and OMG. – in progress

SC 7's Major Strategies for the Period 2003-2008

- **S4** - Communicate efficiently to its intended customers about its program of work and market its accomplishments. – in progress
- **S5** - Proactively assess the relevance of its standards to the state of software and systems engineering technology and markets, and initiate maintenance or new development activities if required. √
- **S6** - Increase its market share in the area of systems engineering – in progress
- **S7** - Ensure that its standards are as compatible and coherent as possible. – in progress

SC7 Major Implementation Activities for the Period 2003-2008

- **A1** – Operationalize a Business Planning function by putting in place a SWG on Business Planning √
- **A2** – Operationalize architecture planning and management function by putting in place a SWG on Architecture Management √
- **A3** – Negotiate cooperation agreements with key partners. – in progress

SC7 Major Implementation Activities for the Period 2003-2008

- **A4** – Initiate study groups to explore new areas or assess market coverage √
- **A5** – Use all the tools available to reduce the time to market of standards development and adoption projects. √
- **A6** – Initiate Study Groups to address harmonization and consistency issues √
- **A7** – Redesign the SC7 Web site to make it a marketing tool √

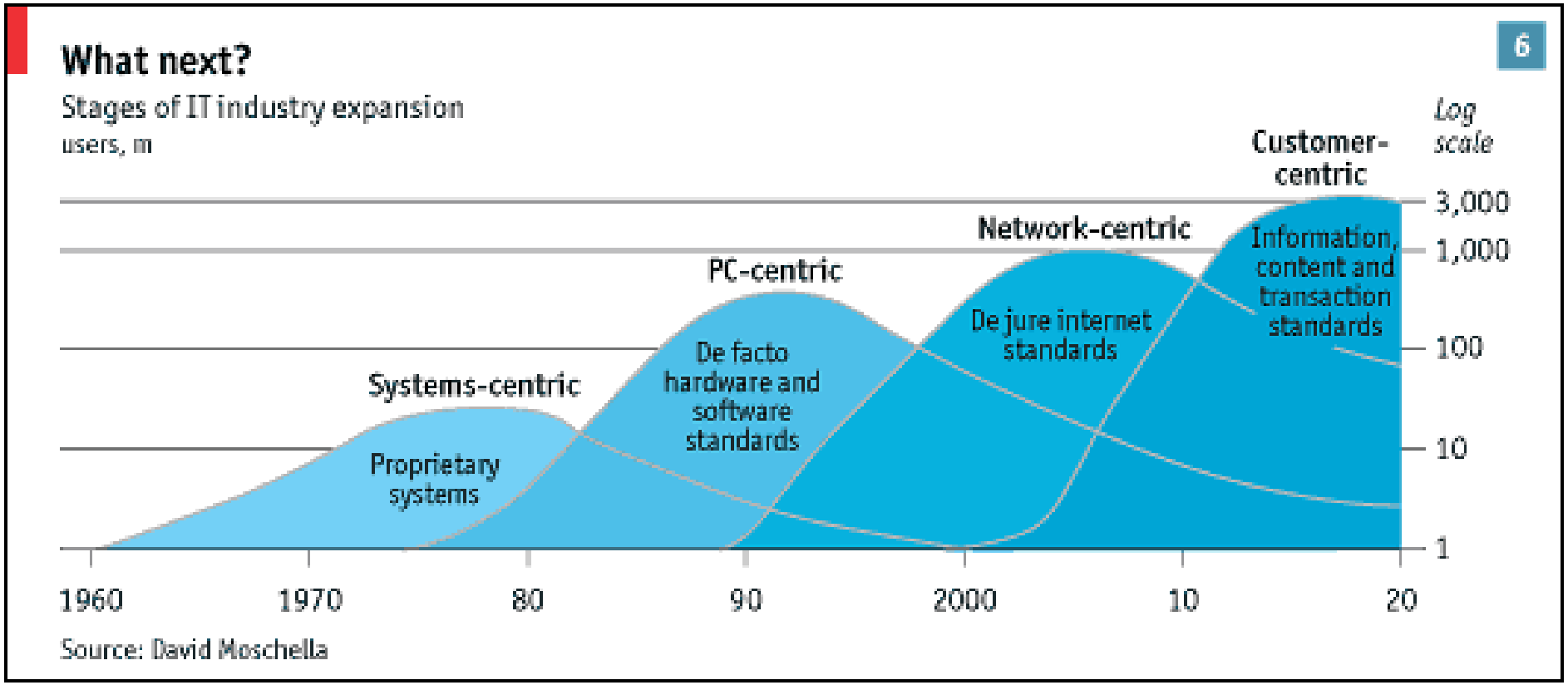
IT Evolution and Software and Systems Engineering Standards

Overall Technological Trends

The Information and Communication Technology (ICT) sector has been going through phases of technological changes and expansions in the last 40 years. As illustrated on the next page, 3 of these phases occurred in the past and we are now entering a fourth one.

- **The first phase was when the industry was dominated with large mainframe and minicomputers based systems located in centralized data centers and operated by elite groups of people. This was the time of proprietary hardware dominated systems.**

- **The second phase came with the microprocessor and the personal computer. Suddenly, computing moved from the small data center elite to end-users. It also started to become mass-market phenomena. A de-facto market set of standards quickly dominated this market: the so-called Wintel (Windows operating systems and Intel processor) standard.**



From: *The fortune of the commons.* In *Coming of Age - A Survey of the IT Industry.* The Economist, May 8th 2003

Overall Technological Trends

- **The third phase became visible when, in 1993, a group of students from the University of Illinois developed the first Internet browser, Mosaic[1]. Quite suddenly, the Internet moved from a network for a small elite of researchers to a mass market phenomena. At about the same time, Microsoft introduced direct support for networking in its operating systems. PCs, as well as the data centres computers, started to evolve from islands of automations to nodes of a network. This evidently had a significant impact on the design of computer applications.**

- **The fourth phase will be focused on an open transactional environment dominated by machine to machine (M2M) communications and supported by open middleware and other open standards.**

[1] **Legacy: A brave new World Wide Web , By Mike Yamamoto, CNET News, April 14, 2003, 4:00 AM PT** http://news.com.com/2009-1032-995680.html

How much information ?

Table 1.2: Worldwide production of original information, if stored digitally, in terabytes circa 2002. Upper estimates assume information is digitally scanned, lower estimates assume digital content has been compressed.

Storage Medium	2002 Terabytes Upper Estimate	2002 Terabytes Lower Estimate	1999-2000 Upper Estimate	1999-2000 Lower Estimate	% Change Upper Estimates
Paper	1,634	327	1,200	240	36%
Film	420,254	76,69	431,690	58,209	-3%
Magnetic	4,999,230	3,416,230	2,779,760	2,073,760	80%
Optical	103	51	81	29	28%
TOTAL:	5,421,221	3,416,281	3,212,731	2,132,238	69%

Source: How much information 2003
http://www.sims.berkeley.edu/research/projects/how-much-info-2003/execsum.htm#summary

How much information ?

Table 1.13: The size of the Internet in terabytes.	
Medium	**2002 Terabytes**
Surface Web	167
Deep Web	91,850
Email (originals)	440,606
Instant messaging	274
TOTAL	**532,897**

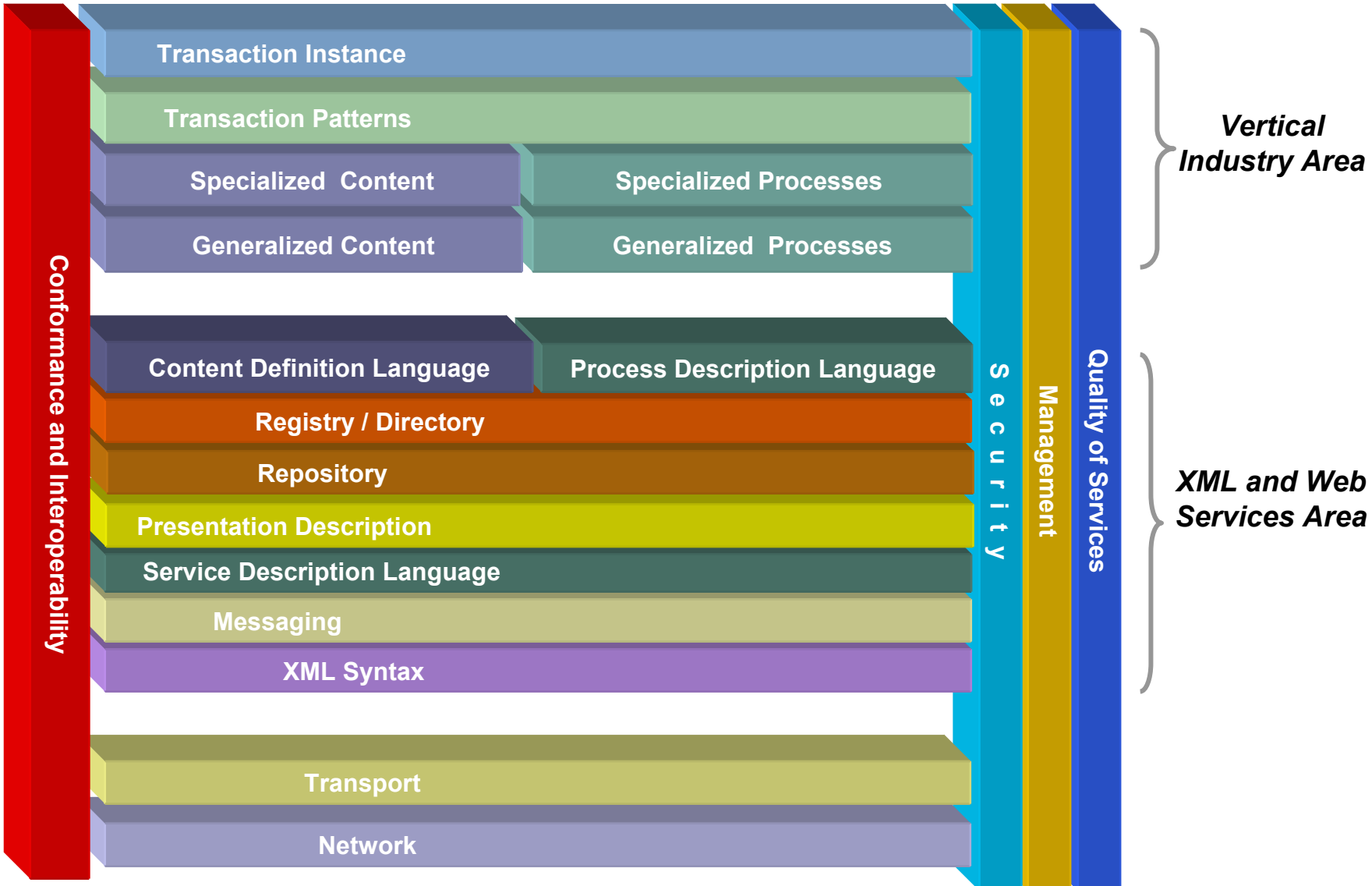
Source: How much information 2003
http://www.sims.berkeley.edu/research/projects/how-much-info-2003/execsum.htm#summary

Software Systems Engineering Globalisation – '*Offshoring*'

LEADER	**India**
CHALLENGERS	**Canada, China, Czech Republic, Hungary, Ireland, Israel, Mexico, Northern Ireland, Philippines, Poland, Russia, South Africa**
UP-AND-COMERS	**Belarus, Brazil, Caribbean, Egypt, Estonia, Latvia, Lithuania, New Zealand, Singapore, Ukraine, Venezuela**
BEGINNERS	**Bangladesh, Cuba, Ghana, Korea, Malaysia, Mauritius, Nepal, Senegal, Sri Lanka, Taiwan, Thailand, Vietnam**

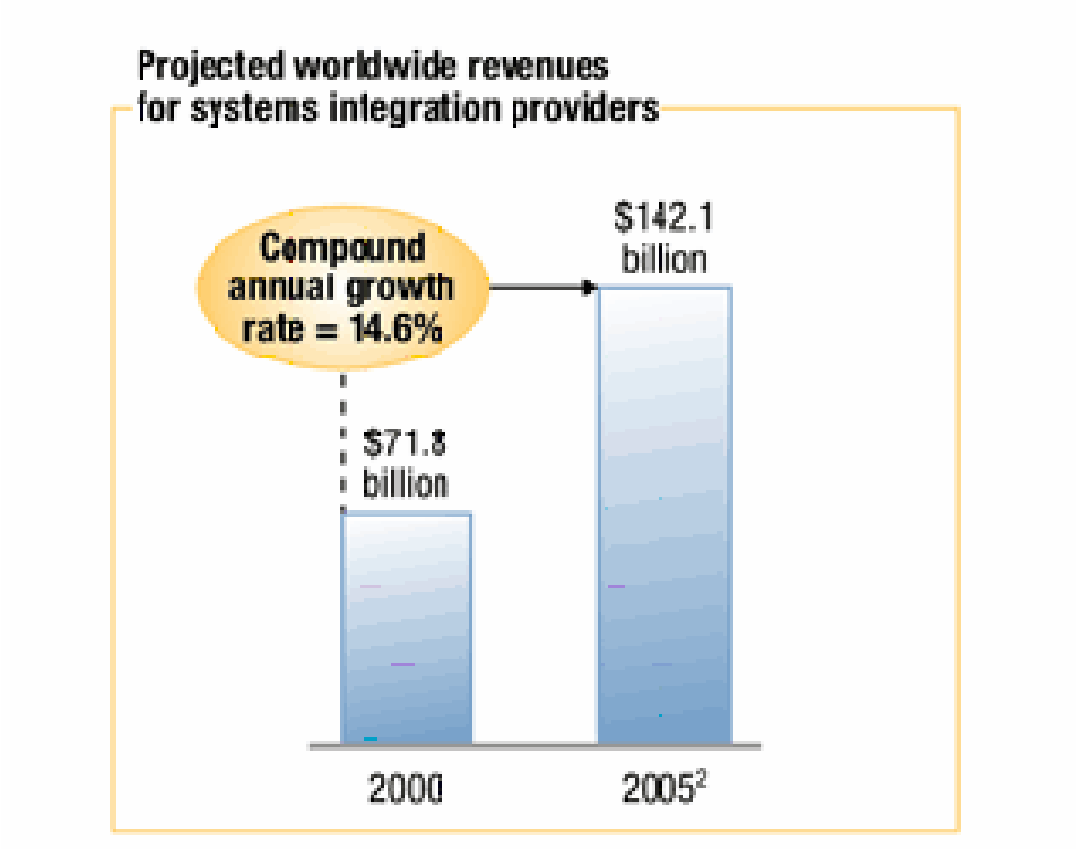
The offshore IT race. *SOURCE: CARTNER INC as quoted by the Globe and Mail in IT jobs contracted from far and wide , North American companies are saving money by 'offshoring', John Saunders, The Globe and Mail, 2003-10-14, http://www.theglobeandmail.com/servlet/story/RTGAM.20031014.gtrjobs14/BNStory/einsider*

OASIS B2B Conceptual Model (2003)



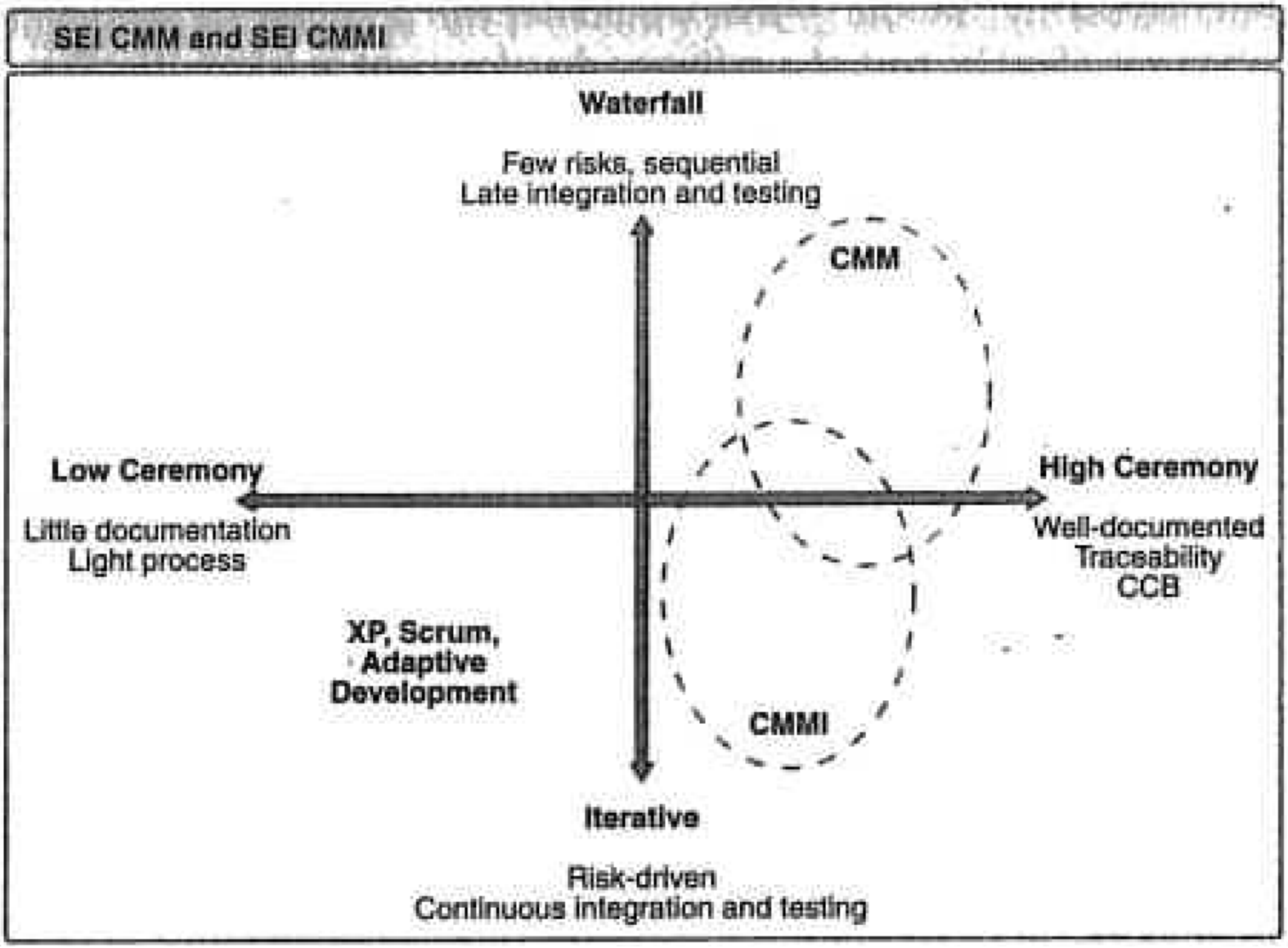
Reference: OASIS http://www.oasis-open.org/presentations/ws_forum_conceptual_model.ppt

The Increased Importance of Systems Integration



From « When computers learn to talk: A Web services primer », S. Patil et S. Saigal, The McKinsey Quarterly, no 1, 2002, Web exclusive

A Perspective on Development Approaches



Kroll, P.; Kruchten, P.; *The Rational Unified Process Made Easy – A Practionner's Guide to the RUP.*; Addison-Wesley, 2003, ISBN0-321-16609-4

A Perspective on Software and Systems Engineering Trends

- Technology
  - IT is getting more ubiquitous, especially with the spread of direct machine to machine (M2M) communications.
  - Software engineering is getting more mature, but still evolving.
  - Software is more than classical (procedural or OO) high level language programs.
  - In some cases, the difference between software and data is blurring.
- Markets
  - A lot of software is brought, as a product or a service – not developed
  - Open source software is taking hold in many markets
  - Some Software Systems development and maintenance services are becoming commodities, other remain high value add
  - The Internet is making geography less relevant for some Software Systems engineering and maintenance services
- Standards
  - A growing international consensus on software and systems engineering good practices is formalized.

SC7 Standards Strengths

- Represent broad international consensus
- Documents recognized as ‘Good Practices”

SC7 Standards Coverage

STRENGTHS

- Life-Cycle Processes
- Product Metrics
- Process Metrics
- Formalisms
- Software Engineering Body of Knowledge
- Tools environment

OPPORTUNITIES

- Systems Engineering
- Software and Systems Assurance
- Systems Architecting
- IT Operations and Services
- Re-use
- Agile Processes
- Open Source Software (OSS)
- Curricula and Certification
- Application Domains Acceptance
- Data ?

Action items for the plenary

ITEM	ACTIONNEE(S)
Prepare updated resolution on meeting fees	Secretariat
Prepare SC7 position on IEC CD 61610.2 Design Review	WG7
Prepare SC7 position on ISO 14258 - Industrial automation systems -- Concepts and rules for enterprise models	WG19
Resolve comments on SC7 Direction Statement	BPG

Action items for the plenary

ITEM	ACTIONNEE(S)
Prepare SC7 position on ISO IEC/ISO 62304 "Medical Device Software - Software Life Cycle Processes"	SWG5
Consult with WGs and NBs on comments formatting and vote and come back to AG on Thursday	Secretariat
Re-affirm resolution on WG Convener certification of documents sent to Secretariat	Drafting Committee

Action items for the plenary

ITEM	ACTIONNEE(S)
Prepare resolutions on WG 2, 12, 21 and 22 convernerships	Drafting Committee
Prepare resolution on SC7 Chair renewal	Drafting Committee
Discussion on Agility / SME support in SC7 life-cycle standards	Canada, Australia
SC7 position on BS 15000 Fast Track	Ad Hoc: WG7, 10

Action items for the plenary

ITEM	ACTIONNEE(S)
Prepare resolutions on circulation of NWI on Systems Quality Management	Drafting Committee
Prepare resolution on extension of User Documentation Standards Study Group.	Drafting Committee
Prepare resolution on extension of SG on revision of ITU-T Rec. X.901-4|ISO/IEC 10746 Reference Model of Open Distributed Processing	Drafting Committee

Action items for the plenary

ITEM	ACTIONNEE(S)
Prepare resolution on IS 14143-1:1998 Information Technology – Software Measurement - Functional size measurement – Definition of Concepts – SC7 N2993R SG report.	Drafting Committee
Prepare resolution to extend Study Group on System Life Cycle Process Assessment Model if no consensus is reached by Thursday AG meeting.	Drafting Committee

Action items for the plenary

ITEM	ACTIONNEE(S)
Study group on the content of system and software life cycle process information products (documentation) to meet with WG10.	WG2, WG 10, SG
Assess how SC7 standards address architecture and architecture management issues and come with recommendations	SWG5

Action items for the plenary

ITEM	ACTIONNEE(S)
WGs to consider IEEE report and come back to AG with recommendations, if applicable.	WG Conveners
Assess how SC7 standards address Open Source Software and come with recommendations	SWG5
WG to come with a recommendation to the AG on standards coming under maintenance.	WG Conveners, SC7 Secretariat

Action items for the plenary

ITEM	ACTIONNEE(S)
Creation of a SG on IEEE offer on Certified Software Development Professional ?	BPG to consult and come back at AG
Refresh liaison officers appointments, including ISO TC120	Secretariat
Re-activate C liaison with NATO	WG7 &10 Conveners