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Standards and Best Practices for Process Improvement

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- Standards and the IT Market context
- Practical use of Standards for process improvement in IT
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IT Standardization – an overview

What is a Standard?

Guideline documentation that reflects agreements on products, practices, or operations by nationally or internationally recognized industrial, professional, trade associations or governmental bodies

or

is accepted as a de facto standard by industry or society.

Types of Standards

- Organization Standards
  - Such as internal company standards (CMMI?)
- Market Standards (De Facto)
  - Such as Microsoft Windows, or the CMMI
- Professional Standards
  - Developed by Professional organizations (such as IEEE)
- Industry Standards
  - Developed by industrial consortia (such as the OMG)
- National Standards
  - Developed by national standards organization
- International Standards
  - Developed by formal international standard organization

Normal (ISO) Standardization Process

The normal process for international standardization is:

- Stage 0 (preliminary stage): A study period is underway.
- Stage 1 (proposal stage): An New Project is under consideration.
- Stage 2 (preparatory stage): A Working Draft is under consideration.
- Stage 3 (committee stage): A Committee Draft /Final Committee Draft is under consideration.
- Stage 4 (approval stage): An Final Draft International Standard is under consideration.
- Stage 5 (publication stage): An International Standard is being prepared for publication.

Available Processes

International standards can come into being through different processes:

- as a proposal that is then developed in working groups (3-5 years);
- as a proposal with a base document which can be internally *fast-tracked,* e.g. processed through a compressed schedule (about 2 years);
- as a proposal with a complete document that can be fast-tracked by JTC 1 (one four months ballot) (< 1 year);
- as a proposal with a complete document that can be proposed by external (but recognised) organisations and fast-tracked as a 4 month ballot - known as the PAS process (1-2 years).

Internationalization of Standards

Consensus

- Key concept in the development of International standards
- ISO defines consensus as:

  General agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments.

Consensus

In a nutshell, this means:

- That all the parties involved were able to voice their views.
- That the best effort was made to take into account all of the above views and resolve all issues (meaning all comments tabled during a ballot).
- That nearly all or (ideally) all the parties involved can at least live with the final result.

Value add of International Stds

In addition to the Brand:

- They represent an international consensus attained through a very rigorous and uniform process
- International standards usually represent set of conventions and/or technical requirements or practices that are relatively stable
- The development process makes it relatively difficult and costly for special interests to take over a given standardization project, especially if the topic is controversial.

International Standardization

(Technical standards)

- International Telecommunication Union (ITU)
  - Founded: 17 May 1865
  - Scope: international organization within the United Nations System where governments and the private sector coordinate global telecom networks and services.
- International Electromechanical Commission (IEC)
  - Founded: June 1906
  - Scope: the leading global organization that prepares and publishes international standards for all electrical, electronic and related technologies.
- International Organization for Standardization (ISO)
  - Founded: 1947
  - Scope: The mission of ISO is to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity.

ICT Standardization

In 1988, ISO and IEC created a Joint Technical Committee, Joint Technical Committee 1 (JTC 1) with the following mandate:

Standardization in the field of Information Technology.

Information Technology includes the specification, design and development of systems and tools dealing with the capture, representation, processing, security, transfer, interchange, presentation, management, organization, storage and retrieval of information

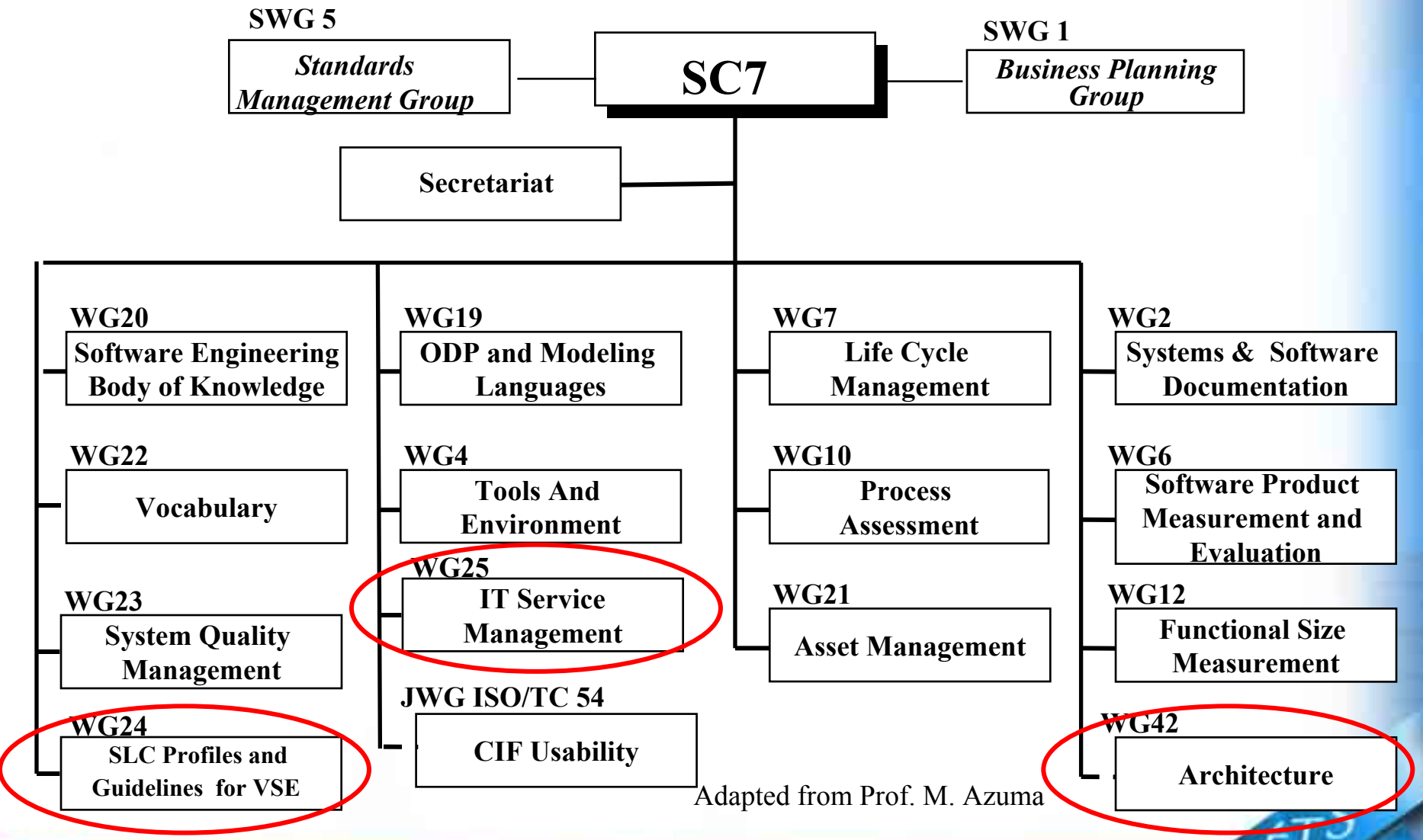
JTC 1

Technical Areas	JTC1 Subcommittees and Working Groups
Application Technologies	SC 36 - Learning Technology
Cultural and Linguistic Adaptability and User Interfaces	SC 02 - Coded Character Sets SC 22/WG 20 – Internationalization SC 35 - User Interfaces
Data Capture land Identification Systems	SC 17 - Cards and Personal Identification SC 31 - Automatic Identification and Data Capture Techniques
Data Management Services	SC 32 - Data Management and Interchange
Document Description Languages	SC 34 - Document Description and Processing Languages
Information Interchange Media	SC 11 - Flexible Magnetic Media for Digital Data Interchange SC 23 - Optical Disk Cartridges for Information Interchange
Multimedia and Representation	SC 24 - Computer Graphics and Image Processing SC 29 - Coding of Audio, Picture, and Multimedia and Hypermedia Information
Networking and Interconnects	SC 06 - Telecommunications and Information Exchange Between Systems SC 25 - Interconnection of Information Technology Equipment
Office Equipment	SC 28 - Office Equipment
Programming Languages and Software Interfaces	SC 22 - Programming Languages, their Environments and Systems Software Interfaces
Security	SC 27 - IT Security Techniques SC 37 - Biometrics
Software and Systems Engineering	SC 07 - Software and System Engineering

SC7 Terms of Reference

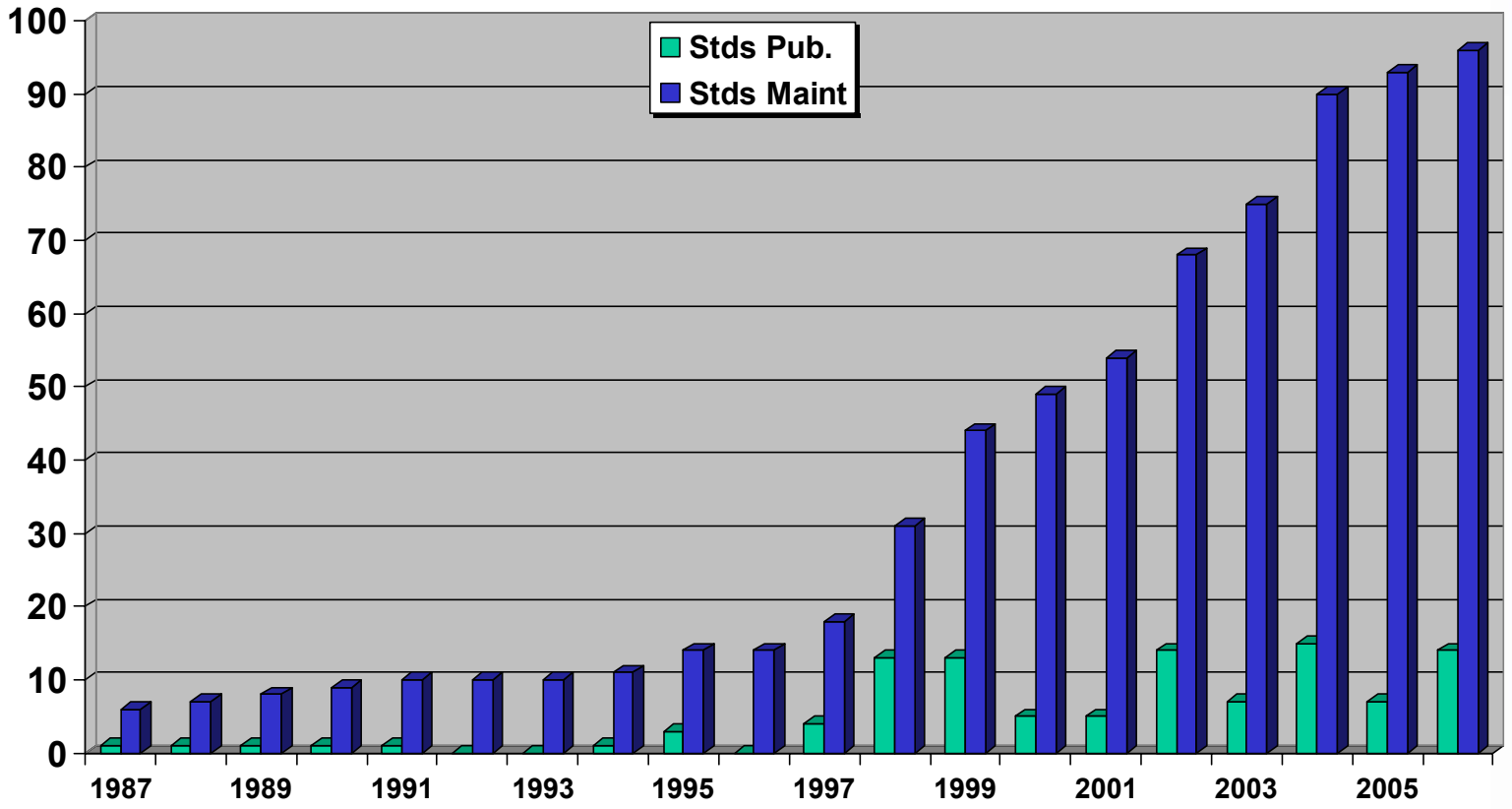
Standardization of processes, supporting tools and supporting technologies for the engineering of software products and systems

SC7 Structure

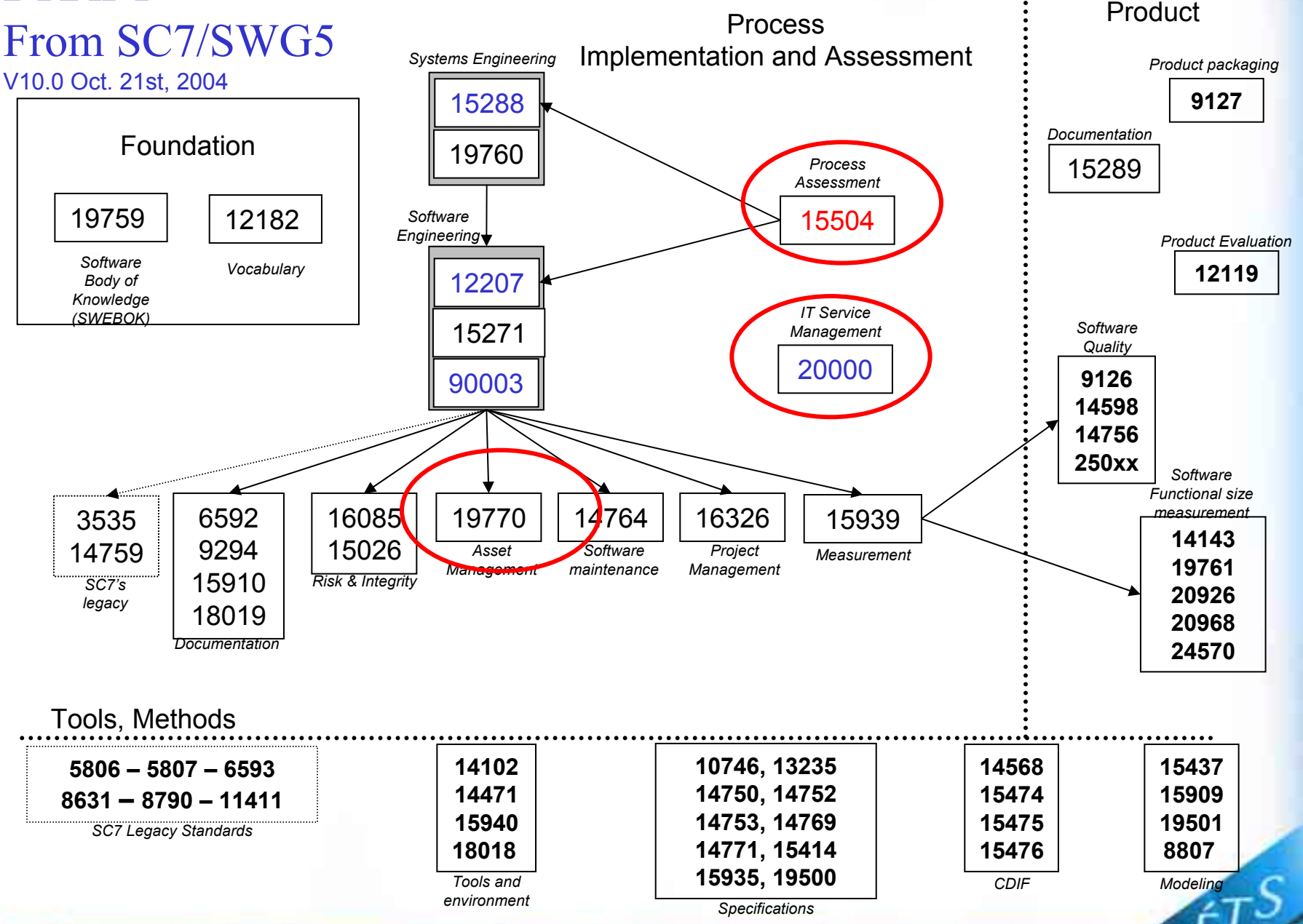


Adapted from Prof. M. Azuma

Standards Produced and Maintained by SC7



DRAFT
From SC7/SWG5
V10.0 Oct. 21st, 2004



Selected New Projects

- ISO/IEC NP 25062 Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Common Industry Format (CIF) for usability test reports
- ISO/IEC NP 20000-1 Information technology -- Service management -- Part 1: Specification
- ISO/IEC NP 20000-2 Information technology -- Service management -- Part 2: Code of practice
- ISO/IEC NP 25961 Recommended Practice for Architectural Description of Software-Intensive Systems
- ISO/IEC NP xxxxx Information Technology — Tools and Methods of requirements engineering and management for product lines
- ISO/IEC NP 19761 Software engineering -- COSMIC-FFP -- A functional size measurement method
- ISO/IEC NP xxxxx Software and Systems Engineering - Life Cycle Processes - Requirements Engineering

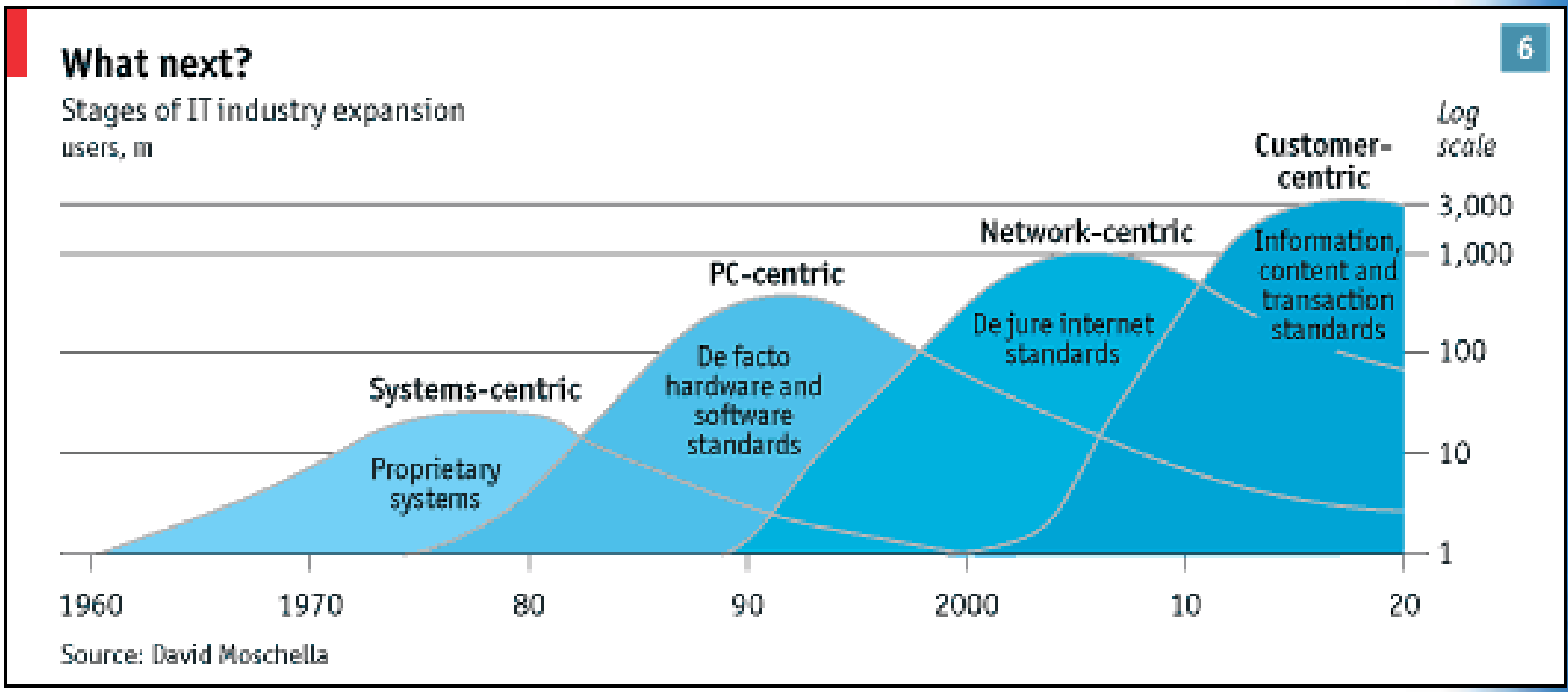
Actives SC7 Study Groups

- Study Group on ITC Governance
- Study Group on Software and Systems Benchmarking and Measurement
- Study Group on Software Product Quality Evaluation Module
- Study Group on Review of TR 14143-5 – Functional Size Measurement

Standards and the IT Market context

IT Evolution

(technology waves and social impacts)



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

Markets Size (10^9 US $)

ICT Vendor 2002

Telecommunications equipment	380
Computer Systems Hardware	240
Software Licenses	70
Project Oriented IT Services	250
Semiconductors	150
Support/Management IT Services	350
TOTAL	**1 440**

Reference: R.Fulton, COM-15-1667, Predicts 2002 – What's Ahead for the IT Industry, Gartner Research, Research Note, 2002-01-08 http://www.adabasnatural4ever.com/industry_news/media/predicts_2002_whats_ahead_for_the_it_industry.pdf

IT Globalization: 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*

Why are standards important in IT?

One perspective – Global interoperability:

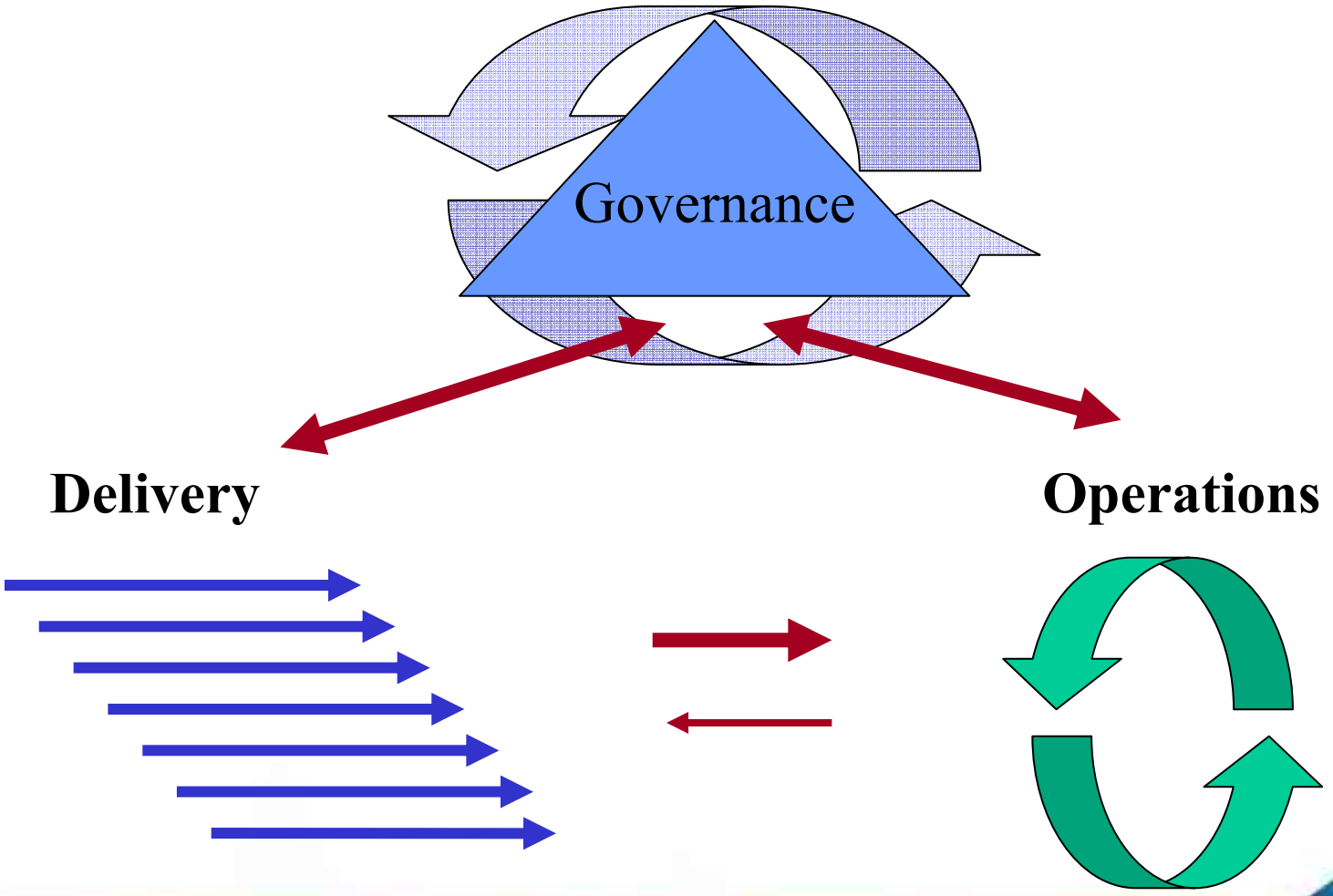
- Between machines/components
- Between people
- Between organizations

SC7 Contributions

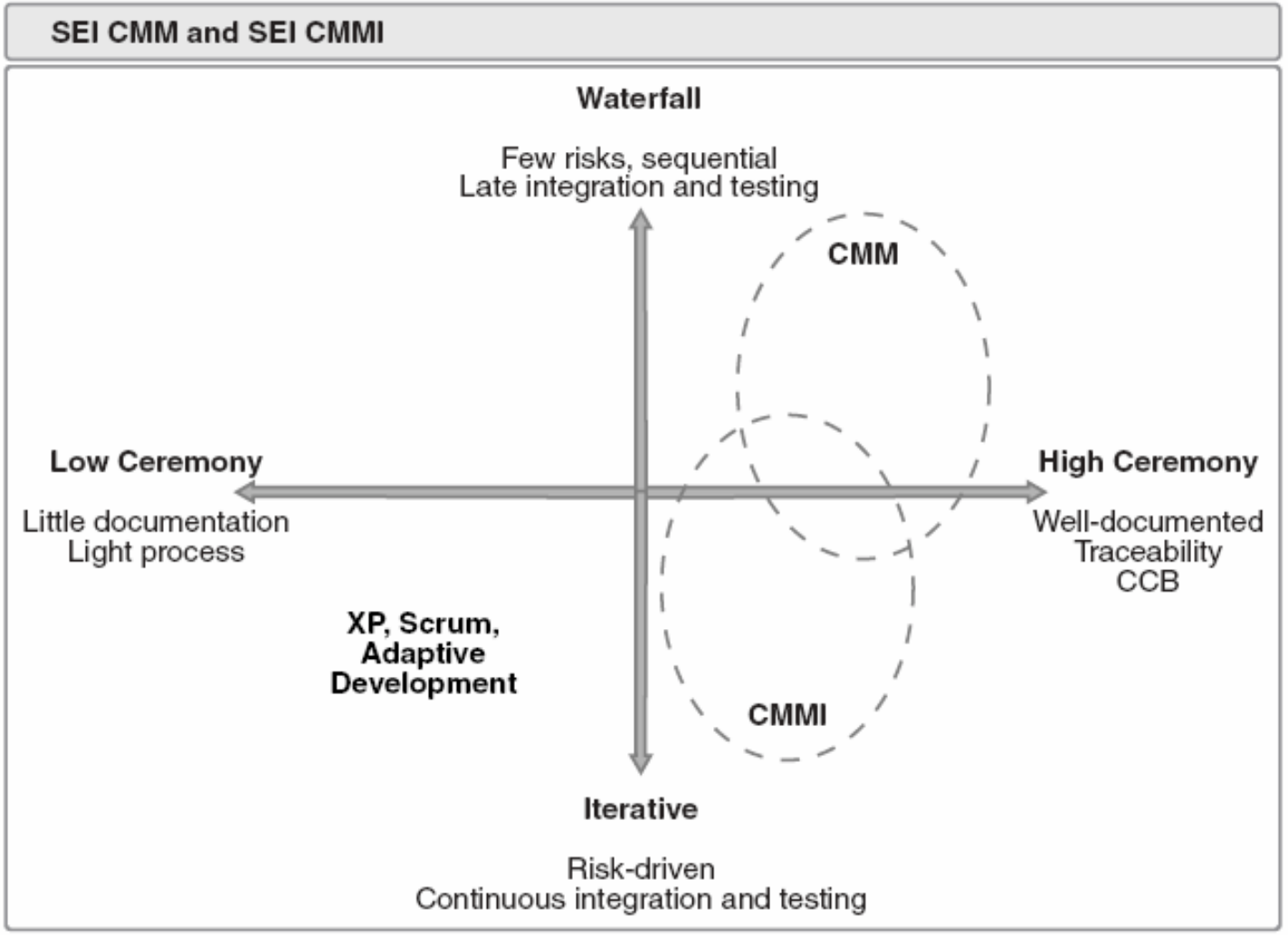
-> Enable the creation of markets
-> Enable commercial activities
-> Enable functional products
-> Enable functional infrastructures
-> Enable the perinity of digital information
->.....

Practical use of Standards for process improvement in IT

Enterprise IT Processes



Development approaches



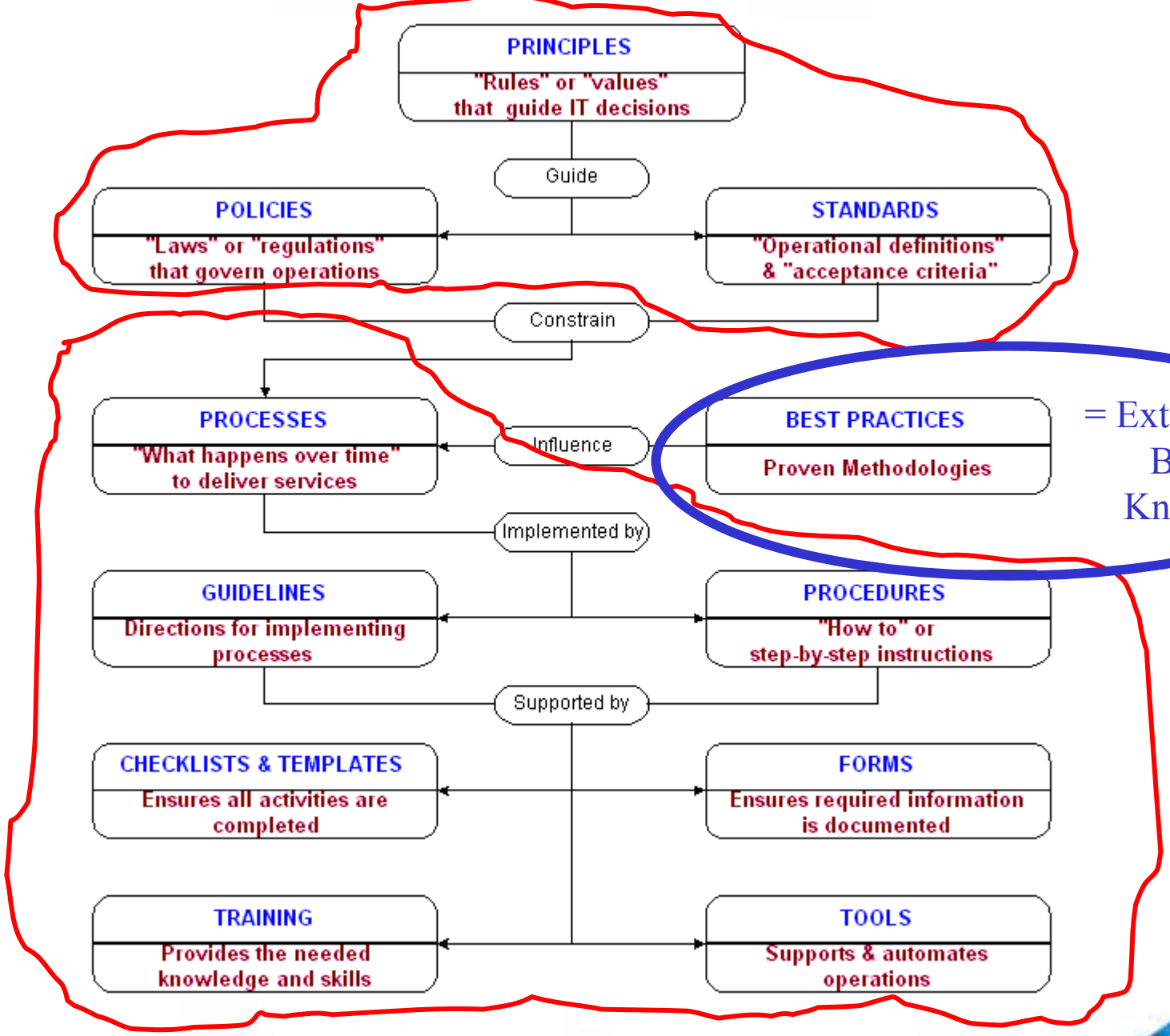
Kroll, P.; Kruchten, P.; *The Rational Unified Process Made Easy – A Practionner's Guide to the RUP.*; Addison-Wesley, 2003, ISBN0-321-16609-4

Process standards

- Document recognised good practices
- Document known process patterns

But..

- Do not document all good practices
- Do not document all known process patterns
- Are not necessarily state of the art



http://www.ewita.com/ at about 2003-06

The Quagmire - 1997

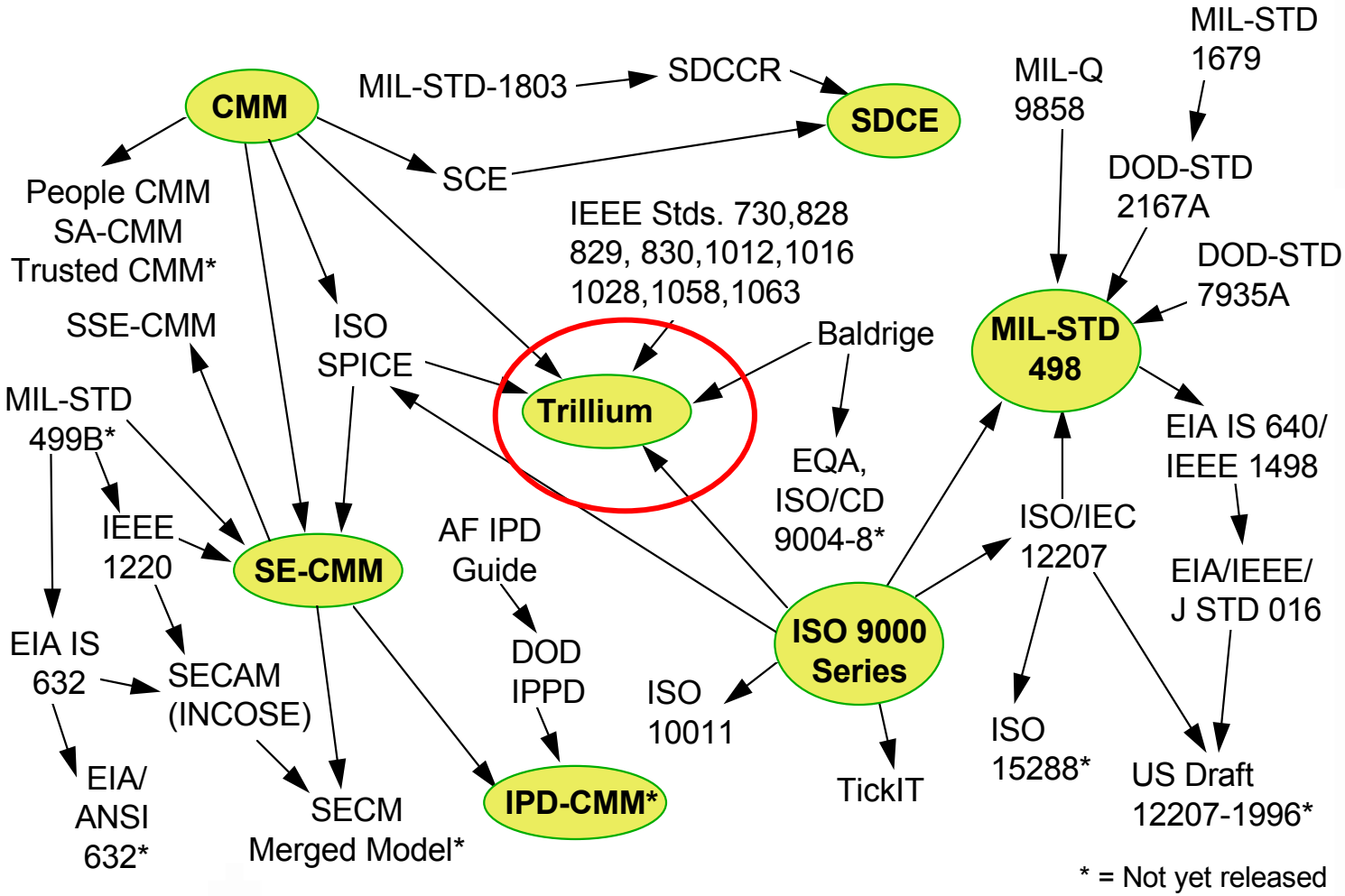


Figure 1. The Frameworks Quagmire

Sheard, S., *The Frameworks Quagmire*. Crosstalk, 1997

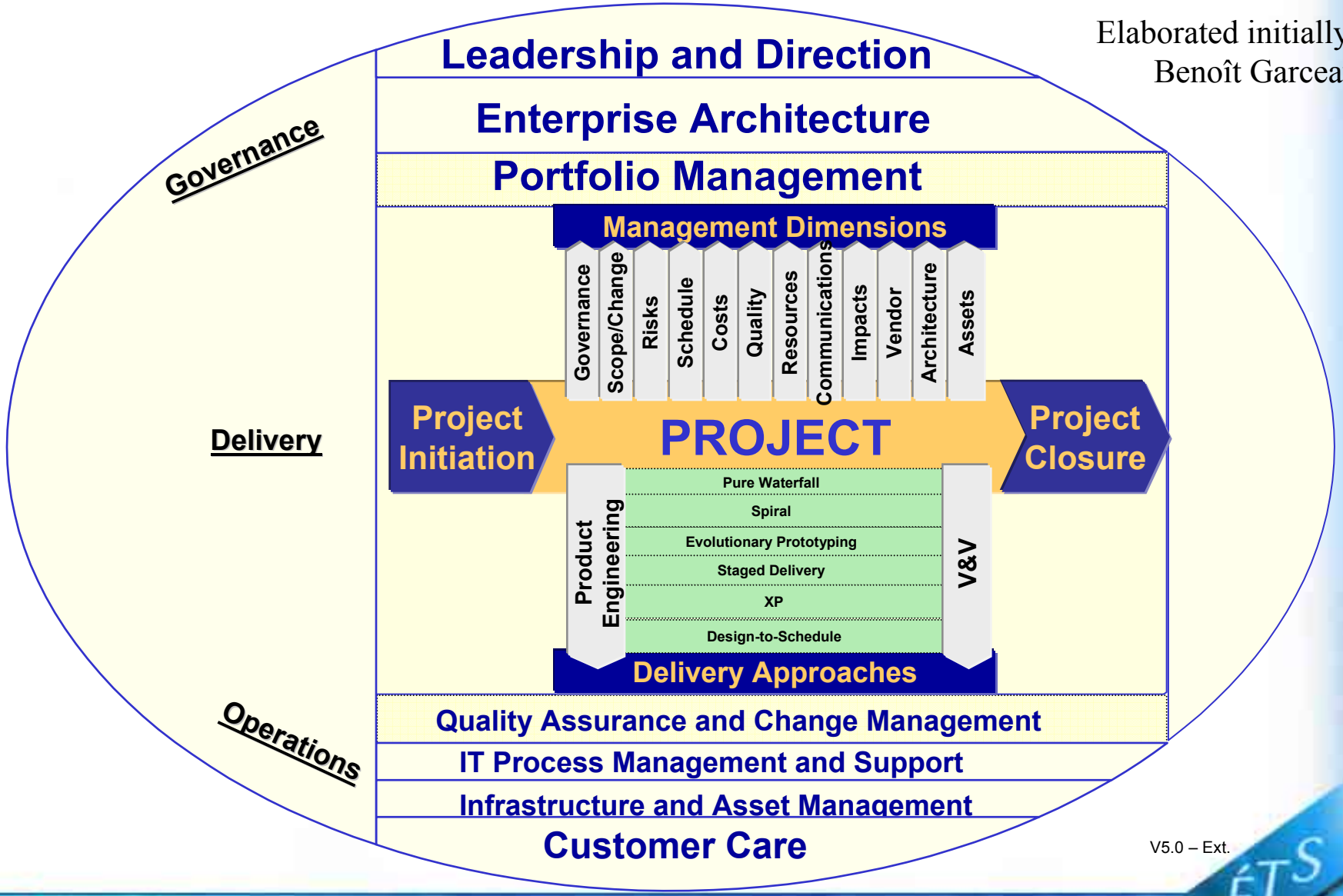
The eIT-CM

- Capstone Model
- Covers the field of enterprise IT
- Built around the CMMI and ITIL
- 'Clean' integration of CMMI and ITIL
- ISO/IEC 15504 compatible

Enterprise IT Capability Model (eIT-CM)

(nicknamed the Egg Model)

Elaborated initially with Benoît Garceau

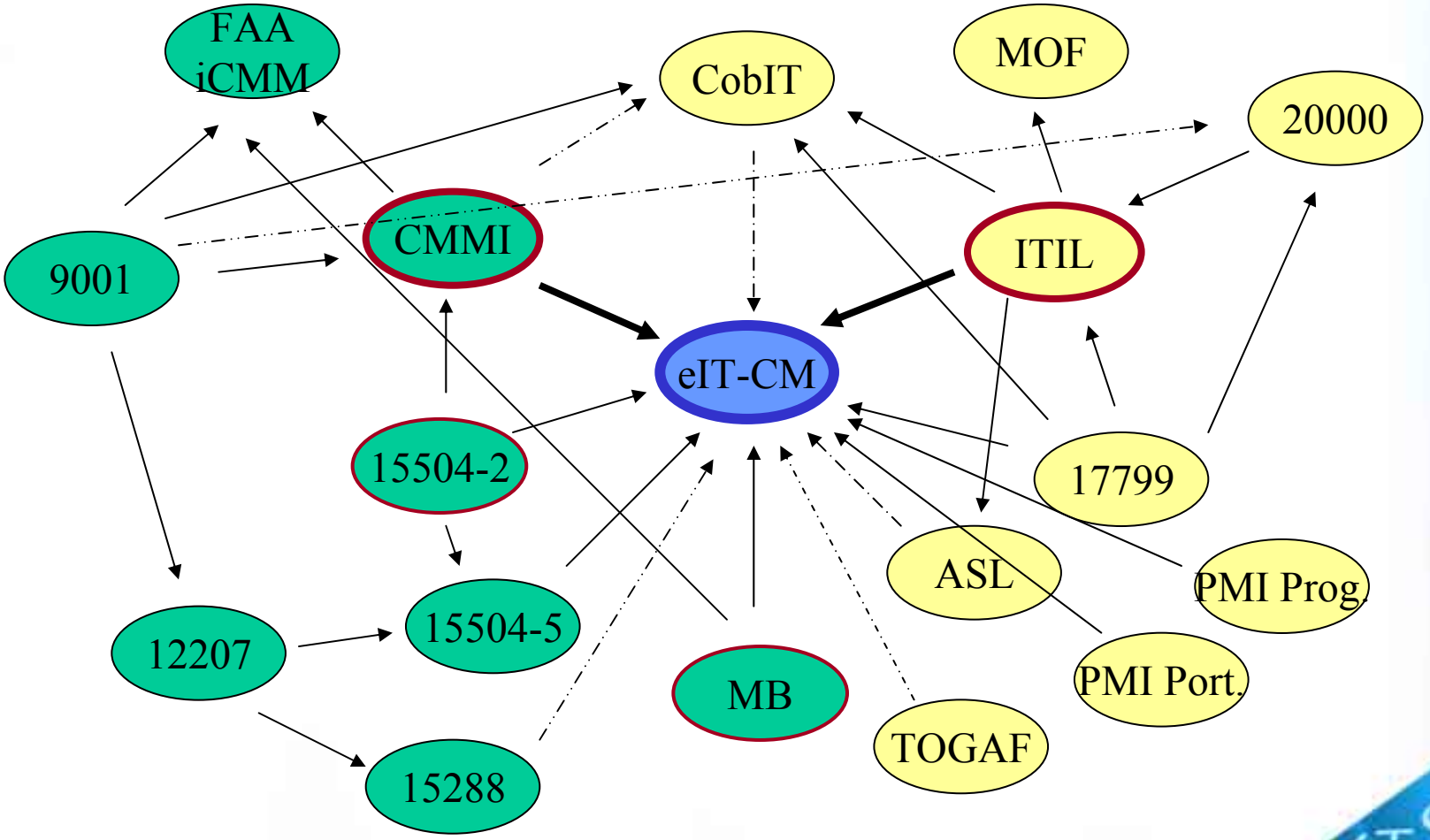


V5.0 – Ext.

Reference Models

Process Groups	Primary	Secondary
Leadership and Direct.	MB, BK	ITIL, CobIT
Enterprise Arch.	BK,	ITIL, ISO/IEC 17799
Portfolio Mngt.	BK	PMI Port., ITIL
DELIVERY Practice Domain	CMMI, BK	PMI Prog., ISO/IEC 17799
QA and Ch. Mngt.	CMMI, ITIL	
IT Process Mngt.	CMMI	
Infra. Asset Mngt.	ITIL, BK	ISO/IEC 17799
Customer Care	ITIL	

eIT-CM as a Capstone Model



Conclusion

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- Standards are a good source of good practices and process patterns
- Standards do not documents all good practices and process patterns
- There is no perfect standard covering all required practices and process patterns
- Good process and business patterns need to be instantiated in an organization

About the author

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François Coallier is chair the Department of Software and IT engineering at the École de technologie supérieure (ÉTS), one of Canada's leading engineering school, affiliated to the Université du Québec network. He has nearly twenty-two years of industrial experience in one of Canada's largest companies, where he held various engineering and managerial positions in engineering, quality engineering, IT procurement, IT infrastructure deployment and operation and IT Enterprise Architecture Management.

Dr. Coallier has been continuously involved in software and systems engineering standards development since 1984, being the international Chairman of the Joint ISO and IEC subcommittee responsible for the elaboration of Software and Systems Engineering Standards (ISO/IEC JTC1/SC7) since 1997. He is also the convener of the ISO/IEC JTC 1 Special Working Group for Technology Watch on international IT standardization since 2002. François Coallier has a B.Sc. in Biology from McGill University, a B. Eng. in Engineering Physics and an M.A.Sc. and Ph.D. in Electrical Engineering from Montréal's École Polytechnique. He is a Fellow of the American Association for the Advancement of Science (AAAS), a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and the American Society for Quality (ASQ).

http://profs.logti.etsmtl.ca/fcoallier/English/index.html