

Presentation to Ottawa Software Quality Association

Standards Overview, Benefits of Rigorous Adoption and their Practical Usage: a Personal View

By

Larry F. Jones, M.M., CQA, CSQE, CPSA
LFJ Group Inc.

Introduction

- What standards – primarily IT & SE?
- What can we learn in the adoption approach and their practical use?
- To begin –
 - What is your focus area?
 - What is your awareness and usage level of Standards & Guidelines (S&Gs)?

Topic Areas

- Some philosophy
- Why
- Types of Standards – primary focus
- Identification of some Key S&Gs for use
- Big Picture Overview – the attempt!
- Key S&Gs - Brief History, Purpose & relationships
- Approaches for Adoption
- Benefits derived from Usage - the Sell & the Reality

A philosophical perspective on S&Gs and their application

"The art of progress is to preserve order amid change and to preserve change amid order."

– Alfred North Whitehead

Why Standards and Guidelines?

- Ideal medium to communication
 - terminology
 - Models (understanding, elements, relationships)
 - Processes, procedures, guides
 - Benchmarks
- Can excite / provoke leadership and action at **all** levels
- Links to Business goals at each level

Types of Standards & Guidelines

- Organizational - e.g. company
- market - e.g. MS Windows API, VHS
- professional - e.g. IEEE, ASQ, PMI, QAI, ...
- industrial - lead by industry area; e.g. CDIF CASE tool interface standard, QS9000, TL9000
- international - lead by international standards bodies (see end of slides)

Key S&Gs for Use

- ISO/IEC 12207 - Information Technology: Software Life Cycle Processes
- ISO/IEC TR - 15271 - Information Technology: Guide for ISO/IEC 12207 (Software Life Cycle Processes)
- ISO-IEC TR15504 Information Technology - Software Process Assessment

Key S&Gs for Use (Cont'd.)

- IEEE Software Engineering Standards
- ANSI/ISO/ASQ 10006 - Guidelines to Quality in Project Management

Key S&Gs – for Use (Cont'd.)

- ISO 9001 - Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation, and Servicing
- ISO 9000 family of standards & guidelines as needed, including ISO 9004-2 - Quality Management and Quality System elements - part 2: Guidelines for services

Key S&Gs – Why?

- Provide a spectrum coverage for IT / Software
- Integrated and connected
- Improved common views and terms
- Contribution from array of recognized practitioners from many countries
- **Some pitfalls** – not created here, strange vocabulary, we're different, no perceived 'proof of value' – no 'self-evident' recognition

Benefits of Standards Adoption and Rigorous Usage

- Consistent and comprehensive roadmap of what and how to management to meet the business needs
- scalable and built to tailor
- common language
- disciplined structure (pictures!) and processes (diagrams), documentation

Benefits of Standards Adoption and Rigorous Usage

- International acceptance
- built by expert practitioner with world-wide consensus
- ISO/IEC 12207 is the foundation of Treasury Board's Enhanced Management Framework for IT Projects and Organizations (means TB funding continuity for large IT initiatives)

Benefits of Standards Adoption and Rigorous Usage

- Facilitates doing the right thing at the right time, first time - saves \$, effective resource utilization, meet real business needs
- permits reusability and process improvement
- independent of any proprietary methodology
- processes, practices remain intact

Benefits of Standards Adoption and Rigorous Usage

- Disciplined processes, practices remain intact and fully operational during of any re-organizations and management changes or departures
- criteria set and assessment framework for supplier evaluation and ongoing assessments (performance to service level agreements, etc.)

ISO 9001-2000

- Essential elements for effective and efficient organizational management & operations – Quality Management System
- Foundation of Guiding Principles

Customer focus	Leadership
Involvement of people	Process approach
System approach to management	Continual improvement
Factual approach to decision making	Mutually beneficial supplier relationships

ISO 9001-2000

- Three Core Standards
- ISO 9000:2000 QMS Fundamentals and Vocabulary
- ISO 9001:2000 QMS Requirements (replaces ISO 9001 / 2 & /3)
- ISO 9004:2000 QMS Guidance for Performance Improvement (replaces ISO 9004:1994 and consistent with ISO 9001:2000)

ISO 9000-3 (1996)

- Guide for the application of ISO 9001 in a Software Development environment
- Changes or replacement work is underway

Related ISO 9000 Sector Specific Standards

- TL 9000 - telecommunications
- AS 9000 – aerospace
- Others
- Why pay attention? – ‘outside’ view, get outside the box, examine other models of world for adoptable value & elements; e.g. TL 9000 for metrics and measurement

ANSI/ISO/ASQ 10006 (1997)

- Quality management – Guidelines to quality in Project management
- Built in cooperation with and referencing the Project Management Institute's Project Management Professional (PMP) Body of Knowledge (BOK)

ISO/IEC 12207

Standard for Information Technology -
Software Life Cycle Processes - 1995

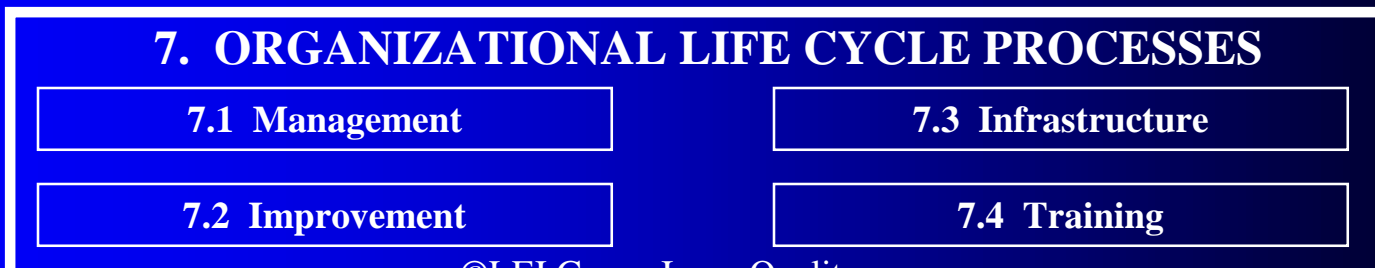
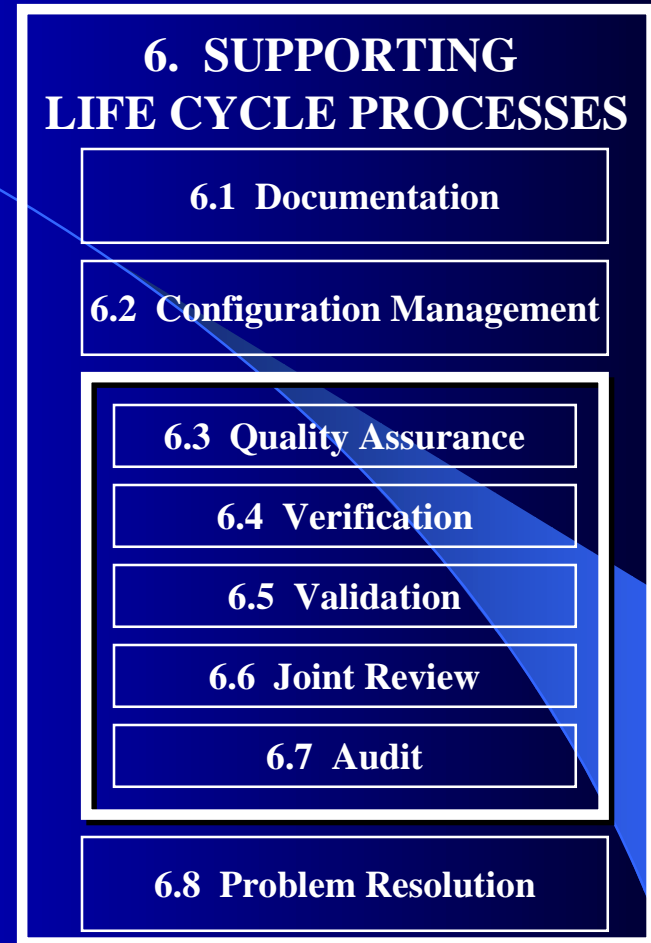
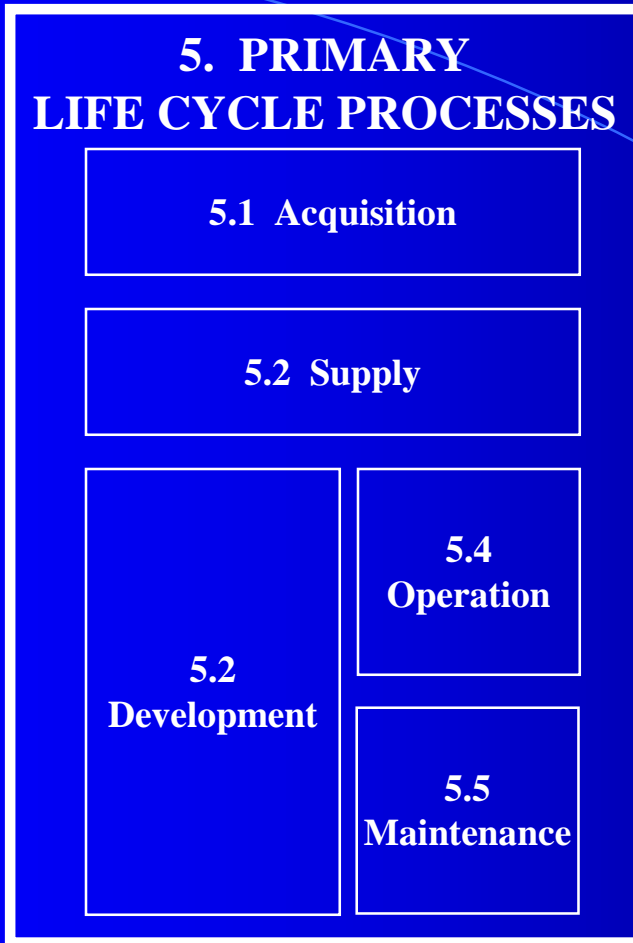
Purpose of the Standard – ISO/IEC 12207

- Establishes a framework for Software Life Cycle processes
- Processes, activities, tasks that can be applied during the application of:
 - A system that contains software
 - A stand-alone software product
 - A software serviceduring the supply, development, operation, maintenance of the software product

Philosophy – ISO/IEC 12207

- Software development and maintenance should be conducted in a manner which exhibits engineering discipline.
- Following this approach allows the establishment of a framework which has clear linkages to the system engineering environment (*i.e., one which includes software, hardware, people and business practices.*)

ISO / IEC 12207 – the Model



ISO/IEC 15271

- Information Technology – Guide for ISO/IEC 12207 (Software Life Cycle Processes) – application
- Guidance with respect to Risks and Opportunities for the 3 main life cycle models:
 - Waterfall
 - Incremental
 - Evolutionary

(Software) Generic Life Cycle Flow Diagram

Based on ISO/IEC 12207
processes model – references
applicable processes for each life
cycle stage

ISO/IEC 15271 Generic Life Cycle



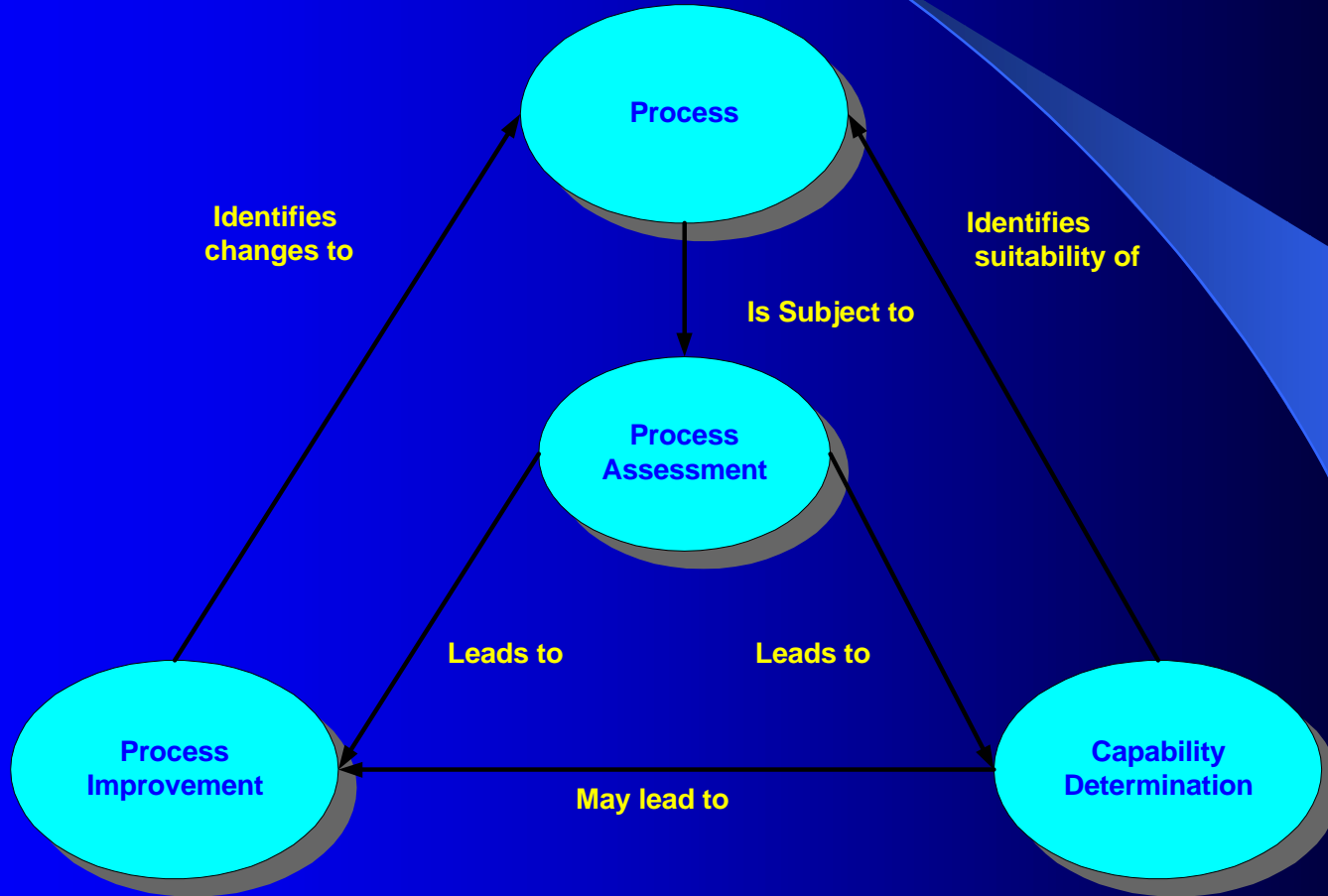
ISO/IEC TR 15504

- SPICE stands for
 - Software Process Improvement Capability d'ETERmination
- SPICE provides a framework for the assessment of software processes.
 - This framework can be used by organizations involved in planning, managing, monitoring, controlling, and improving the acquisition, supply, development, operation, evolution and support of software.
- Also known as ISO/IEC 15504

Software Process Assessment (ISO/IEC TR 15504)

- Process Assessment involves a disciplined examination of the software process within an organization
- Process assessment as the basis for: process improvement and capability determination
- Flexibility: applications, sectors, size, projects and organizations
- Coverage: process, people and technology
- Output: as profiles

Contexts for Process Assessment



SPICE Objective and Scope

- A software process assessment standard for:
 - Continuous improvement
 - Capability determination
- Scope: plan, manage, execute, audit, improve
 - Acquisition
 - Supply
 - Development
 - Operation
 - Maintenance
 - Support

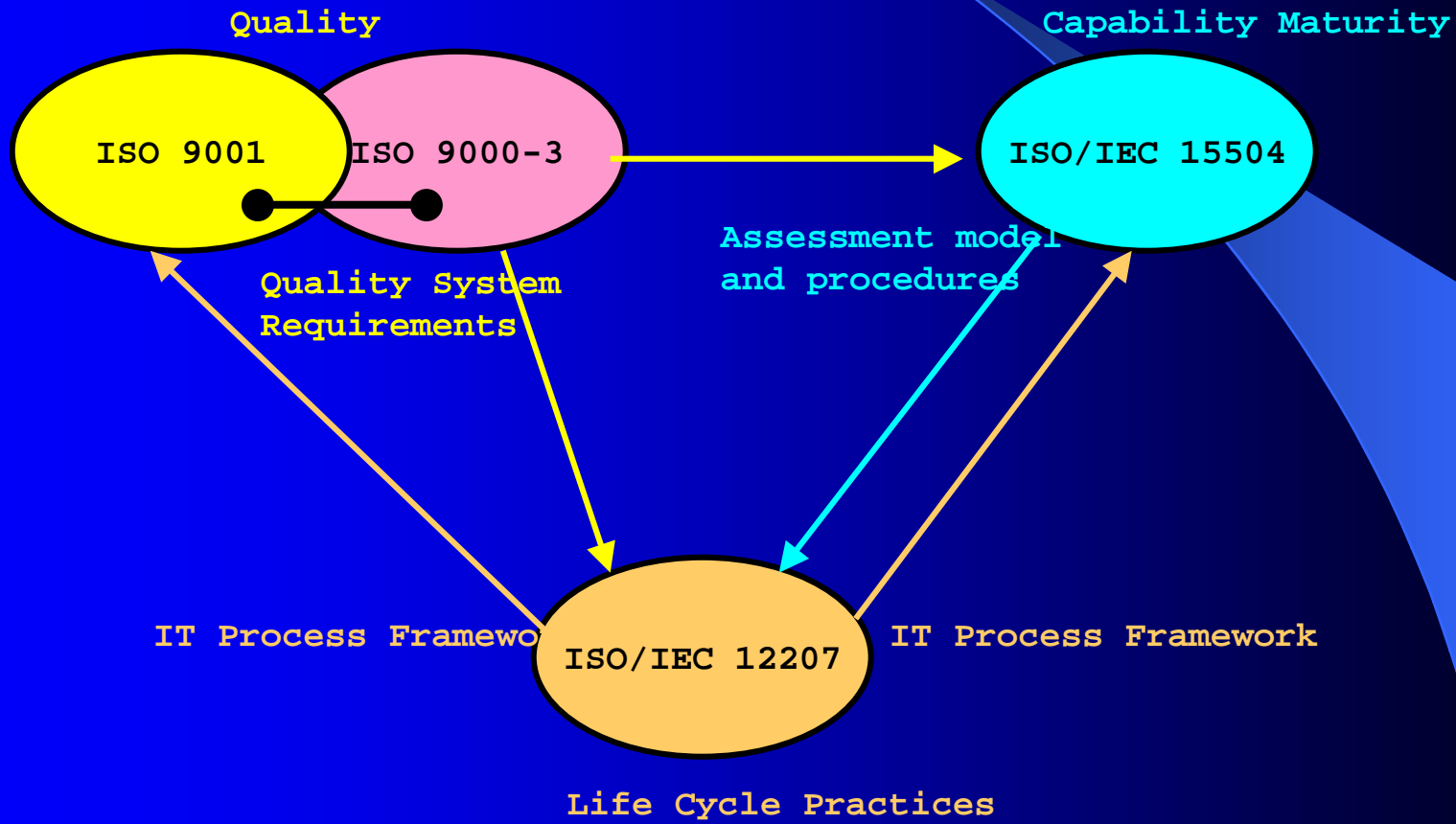
What SPICE has to Offer

- Common framework, approach and language based on international consensus
- Industry wide applicability
- Tailoring
- Criteria for assessor qualification

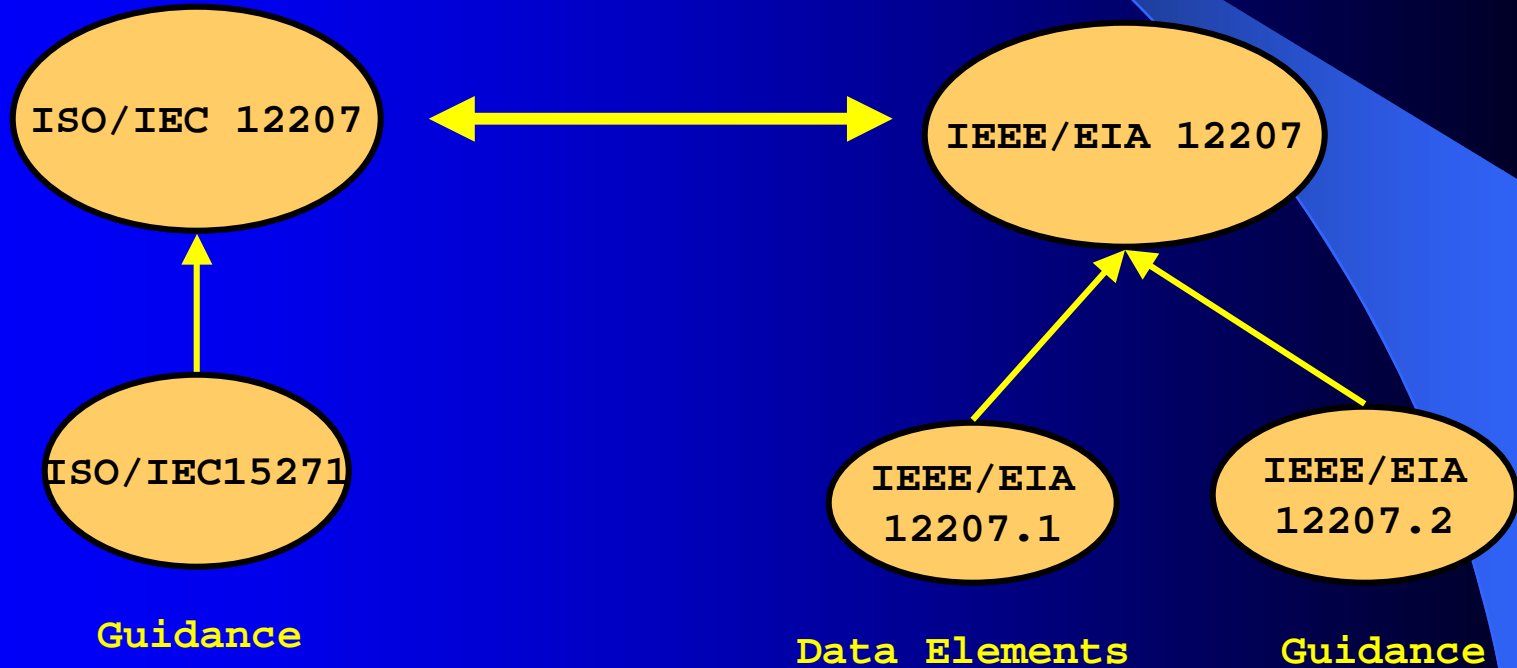
Relationship to Other Standards

- ISO/IEC 15504 is complementary to several other international standards
- ISO 9001 – Model for quality assurance in design, development, production, installation and servicing
 - ISO 15504 incorporates the intent of the ISO 9001 series to provide confidence in a supplier's quality management while providing acquirers with a framework for assessing whether potential suppliers have the capability to meet their needs.
- ISO/IEC 12207 – Software Life Cycle Processes
 - ISO 12207 provides an overall contextual framework for software life cycle processes, and the process dimension of the reference model is closely mapped to this framework
 - ISO/IEC 15504-2 is closely mapped to this framework

ISO/IEC TR 15504 Relationship with Other ISO Standards



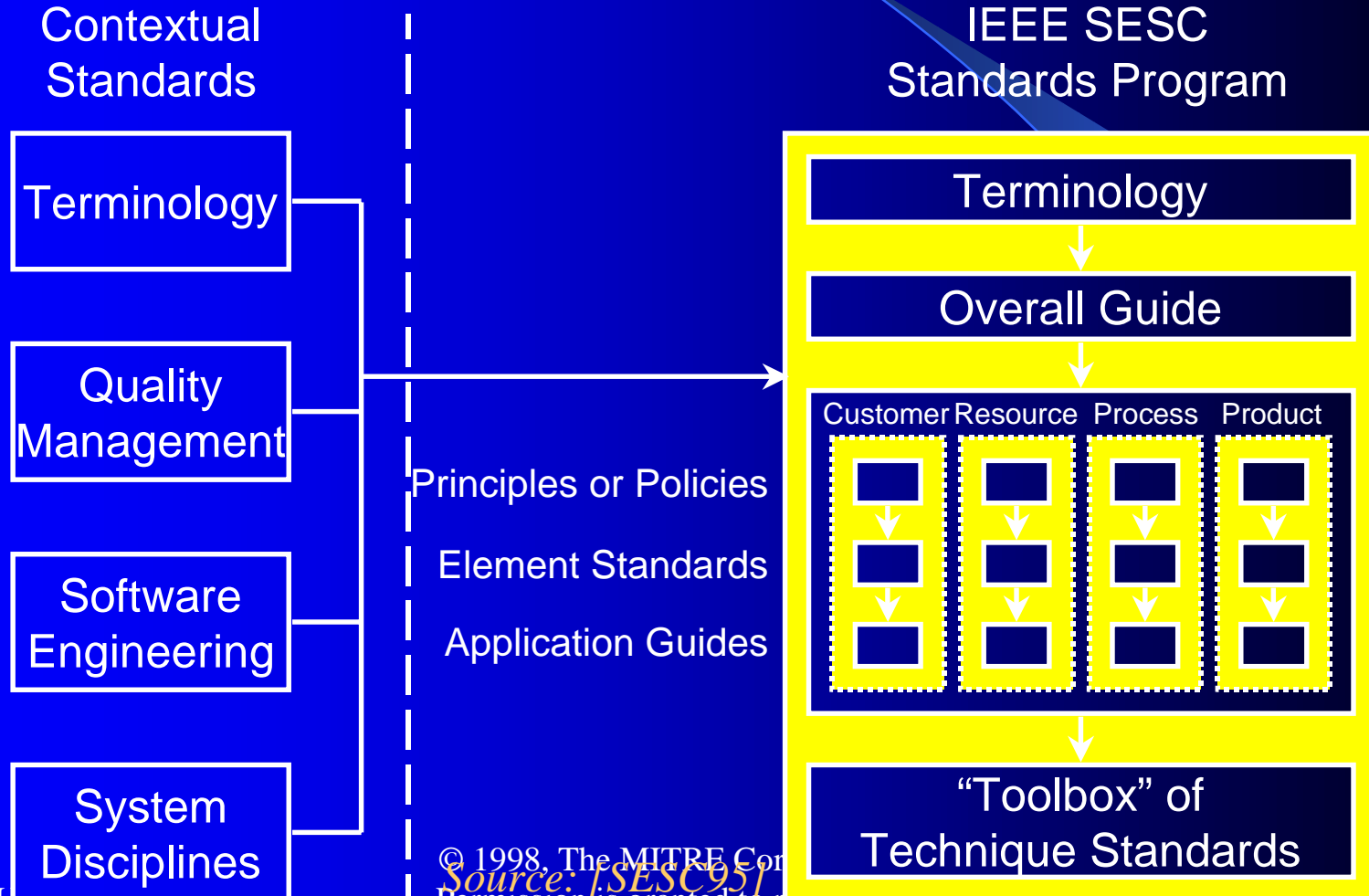
Relationship with IEEE/EIA 12207



IEEE Software Engineering Standards Collection (SESC)

- They concern the *responsible practice* of software engineering.
- They usually deal with *process* rather than product ... although they sometimes deal with *generic product characteristics* or *supporting resources*.
- They deal with subjects like *Configuration Management, Quality Assurance, Verification, and Validation*.

Organization of SESC Collection



© 1998, The MITRE Corporation
 Source: [SESC95]
 Permission is granted to reproduce

SESC Relationship to other Standards

- IEEE SESC has adopted policy designating 12207 as a *strategic, integrating* standard for its collection.
- IEEE SESC will revise its other standards to improve their fit with 12207.
- Many of the other standards will detail the processes of 12207.

12207 Integrates the IEEE Collection (1 of 3)

Class	Process	Applicable IEEE standards
Primary	Acquisition	1062, SW Acquisition 1362, Concept of Operations Document 1220, Systems Engineering Process 1233, System Requirements Specs
	Supply	
	Development	1074, Developing SWLC Processes 830, Software Requirements Specs 1016 and 1016.1, SW Design Descriptions 829 and 1008, SW Testing 1228, Software Safety Plans
	Operation	
	Maintenance	

12207 Integrates the IEEE Collection (2 of 3)

Class	Process	Applicable IEEE standards
Supporting	Documentation	
	Quality Assurance	730 and 730.1, SW Quality Assurance Plans 1061, SW Quality Metrics Methodology
	Configuration Management	828 and 1042, SW CM Plans
	Verification	1012, Verification and Validation
	Validation	1012, Verification and Validation
	Joint Review	1028, SW Reviews and Audits
	Audit	1028, SW Reviews and Audits
	Problem Resolution	1044 and 1044.1, Classification for SW Anomalies

12207 Integrates the IEEE Collection (3 of 3)

Class	Process	Applicable IEEE standards
Organi- zational	Management	1058, SW Project Management Plans 982.1 and 982.2, Measures to Produce Reliable SW 1045, SW Productivity Metrics
	Infrastructure	1209, CASE Tool Evaluation and Selection 1348, CASE Tool Adoption 1420 and 1430, Reuse Library Interchange
	Training	
	Improvement	

Practical Perspectives

- Plant seeds at multiple levels
- Focus on project value – delivery to customer
- Look for reusability opportunities
- Use the S&Gs as structural and elements guides – maintain the structure, tailor the degree of element implementation to give value to project goals & objectives

Key S&Gs – Some Pitfalls

- not created here
- strange vocabulary
- we're different
- no perceived 'proof of value'
- no 'self-evident' recognition

Where to Get More Information

- Contact the standards organizations (see next slide)
- professional organizations – ASQ and ASQ Software Division, IEEE-Computer Society, Association of Computing Machinery (ACM), PMI, QAI,
- See various BOKs for list of supporting reference material
- Other information events or training sessions:
ASQ Software Division 11th ICSQ Oct 2001

Pittsburgh

Friday, June 01, 2001

Standards Organizations

- ISO - International Organization of Standardization (1947)
- IEC - International Electrotechnical Commission (1906)
- IEEE - Institute of Electrical and Electronics Engineers (1945?), IEEE CS
- ESI - European Software Institute
- ASQ - American Society for Quality (1946)

National Standards Organizations

- SCC - Standards Council of Canada
- CGSB - Canadian General Standards Board
- CSA - Canadian Standards Association
- ANSI - American (U.S.) National Standards Institute

Where to Now?

- Immediate feedback
- Want more? of what ?
- What venues? ... presentations, workshops, panel discussions,