

ISO 9001:2000 – Its Impact on Software

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Presentation Outline

- Introduction
- Standards Quagmire
- ISO 9000 History
- ISO 9000:2000 The Basics
- Applying ISO 9001:2000 in a Software Development Environment
- Audit Etiquette

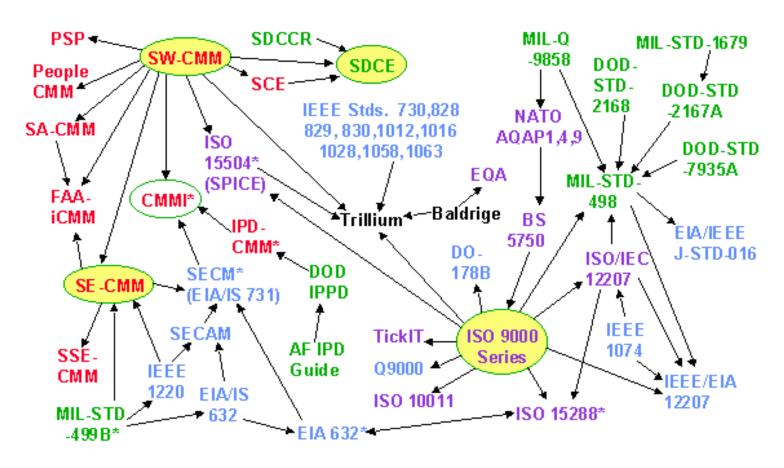
ISO

Introduction

- Theseus Professional Services, LLC
 - Consulting firm providing organizational development and quality assurance services
 - Please visit our web site, http://theseuspro.com
- Norm Moreau
 - 30 years of project management, quality, and administrative experience
 - Specializing in software quality since 1989
 - Worked with ISO 9000 since first issued in 1984
 - Practicing ISO 9000 Lead Auditor



The Standards Quagmire



^{*} Not yet released



ISO 9000 - History

- World War II problems with welds on boats Solution QC inspectors in factories
- 1959 US developed Mil-Q-9858a "Quality Program Requirements"
- 1962 the NASA space program developed its "quality system requirements"
- 1979 BS 5750 "Guidelines for Quality Assurance"
- 1987 BS 5750 became ISO 9000-1987
- 1994 ISO 9000-1987 revised
- 2000 ISO 9000-1994 revised



ISO 9000 - History

- "Promote a theory of control, not a better theory of management"
- ISO 9000 '87 & '94 a way of managing for conformance
- "You comply or we won't buy"
- ISO 9001:2000 "aims to enhance customer satisfaction"



Quality Journey



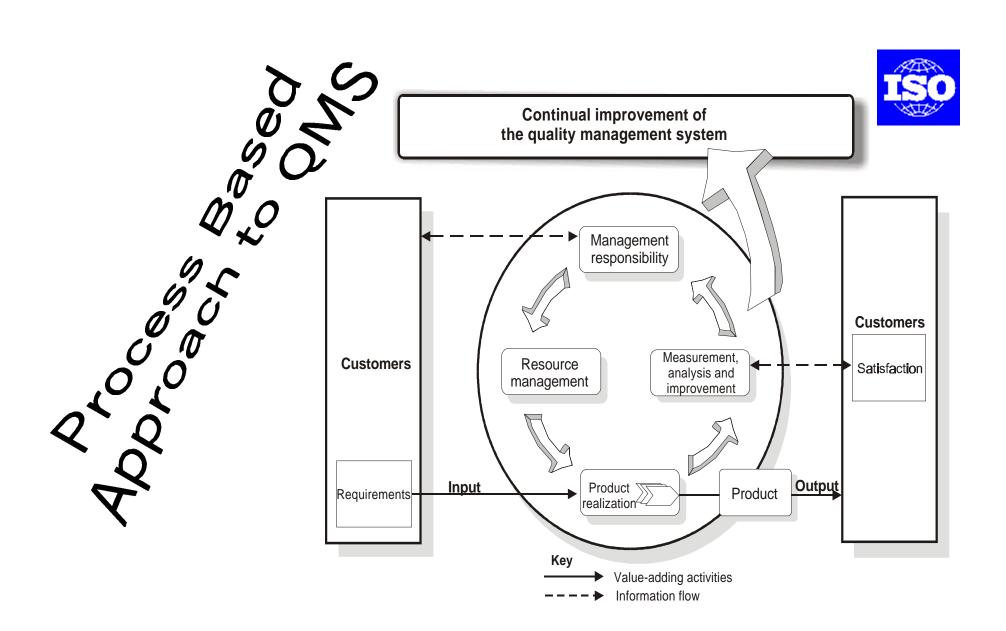


ISO 9001:2000 – Changes

- Reduced number of standards
- Explicit requirements for achieving customer satisfaction and continual improvement
- More logical structure
- An approach based on managing organizational processes
- Easier use by servicesector and small businesses

- Built on eight universal quality management principles
- Possibility for going beyond certification to achieving satisfaction not just of customers, but of all interested parties, such as employees, shareholders and society as a whole.

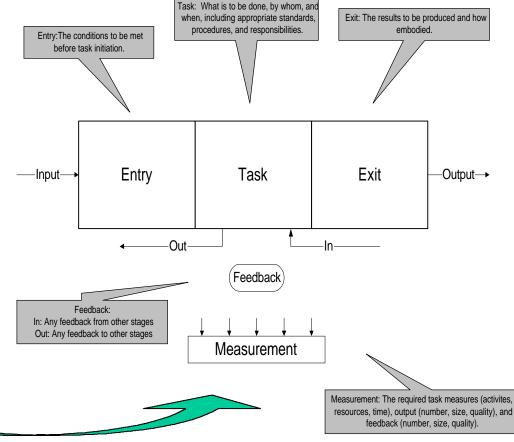
Source: http://www.iso.ch/presse/iso9000_2000.htm





Clause 0.2 – Process Approach

- "...The application of a system of processes within an organization, together with the identification and interactions of these processes, and their management, can be referred to as the process approach"
- Basic Element of a Process Architecture





ISO 9001:2000 Clauses

- 4.0 Quality Management System
- 5.0 Management Responsibility
- 6.0 Resource Management
- 7.0 Product Realization
- 8.0 Measurement, Analysis and Improvement

See handout for section by section detail



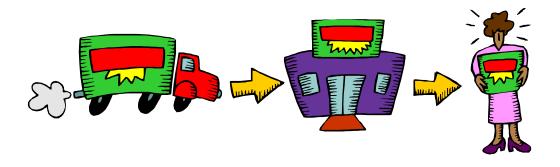


- Gap analysis
- What corrective action is needed to conform
- Prepare an implementation plan
- Define processes and documents
 - Prepare a quality manual
 - Train on new system
 - Implement new management systems and procedures
 - Conduct internal audits and management reviews
 - Pre-assessment "Do you do as you say you do?"
 - Registration
 - Celebrate





Applying ISO 9001:2000 in a Software Development Environment



Software Development Models

ISO

- Code & Fix
- Waterfall
- Spiral
- Evolutionary
- RAD (Rapid Application Development)
- JAD (Joint Application Development)
- Adaptive Software Development (Highsmith)
- RUP (Rational Unified Process)
- MS Solutions Framework
- ISO 12207 Software Life Cycle Processes
- ISO 9000-3 (Guide for software users of ISO 9001)

Note: Reference to specific vendors in this presentation is for sole purpose of illustrating how ISO can be used in a software development environment. Theseus Professional Services and its affiliates do not endorse, recommend or make any claims on the products referred to in this presentation.



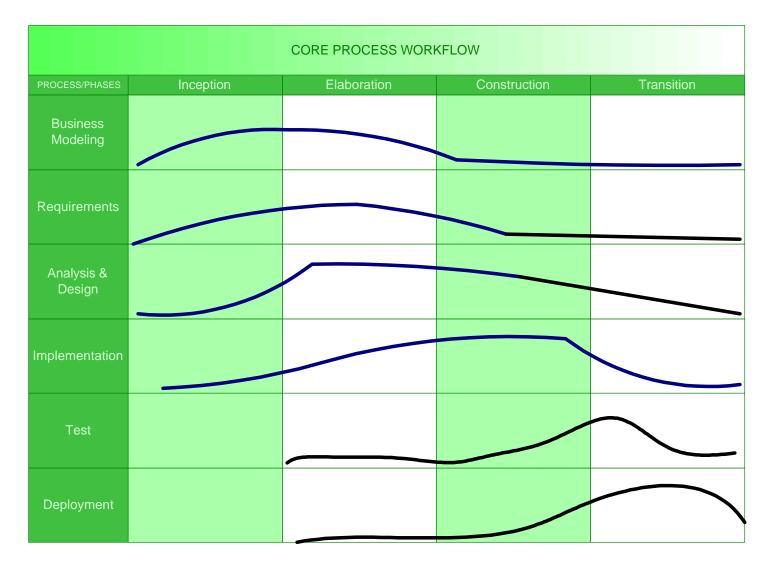


- Phases
 - Inception
 - Seed idea or RFP
 - Elaboration
 - Product vision & architecture defined
 - Construction
 - Executable architectural baseline
 - Transition
 - Software turned over to user community

- Core Processes
 - Business Modeling
 - Requirements
 - Analysis & Design
 - Implementation
 - Test
 - Deployment

Rational Unified Process







Rational Unified Process

CORE SUPPORTING WORKFLOWS				
PROCESS/PHASES	Inception	Elaboration	Construction	Transition
Configuration & Change Mgmt.				
Project Mgmt.				
Environment				

Source: The Rational Unified Process – An Introduction, Kruchten, P., Addison Wesley, 1998 http://www.rational.com/index.jsp



Software Life Cycle Processes

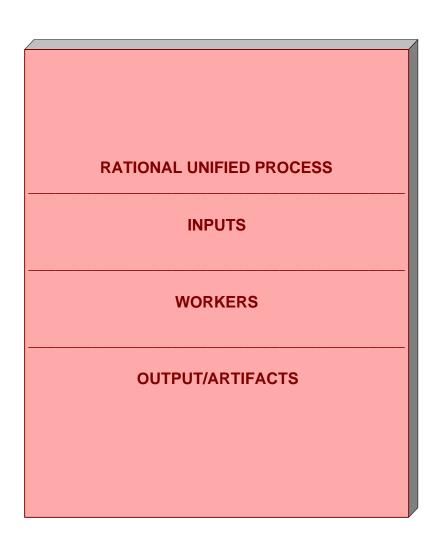
Organizational Processes

Primary Processes (SLC)

Supporting Processes

Source: ISO 12207 Software Life Cycle Processes

Mapping RUP Against ISO 9001:2000





Organizational Processes



ISO

PROJECT MANAGEMENT PROCESS

INPUTS Standards SOW Milestones

WORKERS
Project Manager
Top Management *

OUTPUT/ARTIFACTS
Software development plan (including risk, project plan, and measurement plan)
Business case
Iteration plans
Iteration assessment

[* Not part of Rational Unified Process]

5 MANAGEMENT RESPONSIBILITY

5.4 Planning (objectives and QMS planning)5.5 Responsibility, authority and communication

6 RESOURCES
6.3 Infrastructure
6.4 Work environment

7 PRODUCT REALIZATION

7.1 Planning for produce realization7.3.1 Design and development planning

8 MEASUREMENT, ANALYSIS AND IMPROVEMENT

8.2.3 Monitoring and measurement of processes 8.2.4 Monitoring and measurement of product 8.4 Analysis of data



INPUTS

Business needs
Market Needs/Vision/Concept
Fixes *

WORKERS

Business Analyst
Business Designer
Business Model Reviewer

OUTPUT/ARTIFACTS

Business use-case model Business object model Business specification Business glossary



REQUIREMENTS PROCESS

INPUTS

Business use-case model Business object model Business specification Business glossary

WORKERS

System Analyst
Use-Case Specifer
Architect
User-Interface Designer
Requirements Reviewers

OUTPUT/ARTIFACTS

Stackholder needs
Vision document
Use-case model
Supplementary specification
Requirements attributes



ANALYSIS AND DESIGN PROCESS

INPUTS

Stackholder needs
Vision document
Use-case model
Supplementary specification
Requirements attributes

WORKERS
Architect
Designer
Database Designer
Design Reviewers *

OUTPUT/ARTIFACTS
Architecture
Design model
Database model



ISO

ISO

IMPLEMENTATION PROCESS

INPUTS
Architecture
Design model
Database model

WORKERS
Architect
System Integrator
Implementer
Code Reviewer

OUTPUT/ARTIFACTS
Implementation subsystems
Component
Integration build plan

4 QMS
4.2.3 Control of document
4.2.4 Control records

7 PRODUCT REALIZATION

7.3 Design and development (inputs, outputs, reviews, verification, validation, and changes)

7.5.1 Control of production and service provision
7.5.3 identification and traceability

ISO

ISO

TEST PROCESS

INPUTS Requirements

WORKERS
Test designer
System tester
Performance tester
Integration tester

OUTPUT/ARTIFACTS
Test plan
Test model

Workload model
Defects
Test evaluation report

4 QMS
4.2.3 Control of document
4.2.4 Control records

7 PRODUCT REALIZATION

7.3.5 Design and development verification 7.3.6 Design and development validation

8 MEASUREMENT, ANALYSIS AND IMPROVEMENT

8.2.4 Monitoring and measurement of product

8.3 Control of nonconforming product 8.5.2 Corrective action

DEPLOYMENT PROCESS

INPUTS

Installation scripts
User documentation
Configuration data

WORKERS

Deployment Manager
Technical Writer
Implementer
Course Developer

OUTPUT/ARTIFACTS

Deployment plan
User manuals
Training material



Supporting Processes



CONFIGURATION & CHANGE MANAGEMENT PROCESS

INPUTS
Project artifacts
Change requests

WORKERS
Project Manager
CM Manager
Architect
Anyone related to the process structure
CCB

OUTPUT/ARTIFACTS
CM plan
Change requests
Implementation model
Metrics and status reports

4 QMS
4.2.3 Control of document
4.2.4 Control records

ISO

7 PRODUCT REALIZATION
7.3.6 Control of design and development changes
7.5.3 Identification and traceability
7.5.5 Preservation of product

8 MEASUREMENT, ANALYSIS AND IMPROVEMENT
8.3 Control of nonconforming product
8.5.2 Corrective action

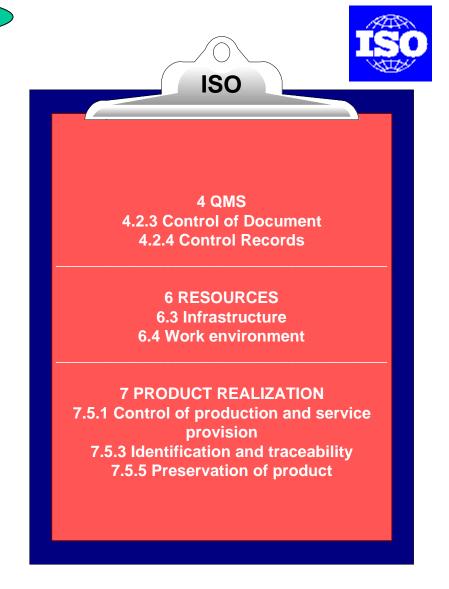
Supporting Processes

ENVIRONMENT PROCESS

INPUTS
All plans related to project

WORKERS
Business Process Analyst
System Analyst
User-Interface Designer
Architect
Technical Writer
Toolsmith
System administrator

OUTPUT/ARTIFACTS
Software development environment



Organizational Processes

Primary Processes

Supporting Processes



RATIONAL UNIFIED PROCESS

MISSING



4 QMS

4.1 General requirements (QMS)
4.2.2 Quality Manual

5 MANAGEMENT RESPONSIBILITY

5.2 Customer focus
5.3 Quality policy
5.6 Management review

6 RESOURCES

6.2.2 Competence, awareness and training

7 PRODUCT REALIZATION

7.4 Purchasing
7.5.4 Customer property
7.6 Control of monitoring and measuring devices

8 MEASUREMENT, ANALYSIS AND IMPROVEMENT

8.2.1 Customer satisfaction8.2.2 Internal audit8.5.1 Continual improvement8.5.3 Preventive action



Summary

- ISO 9001:2000 has raised the bar on quality
- Can be applied to Software Development Environment
- Will require additional processes, particularly for clauses on QMS and Management Responsibility