



ISO 9001:2000 – Its Impact on Software

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Presented to American Society for Quality
Washington D.C. Section 0509, Software Special Interest Group

April 11, 2001



Presentation Outline

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

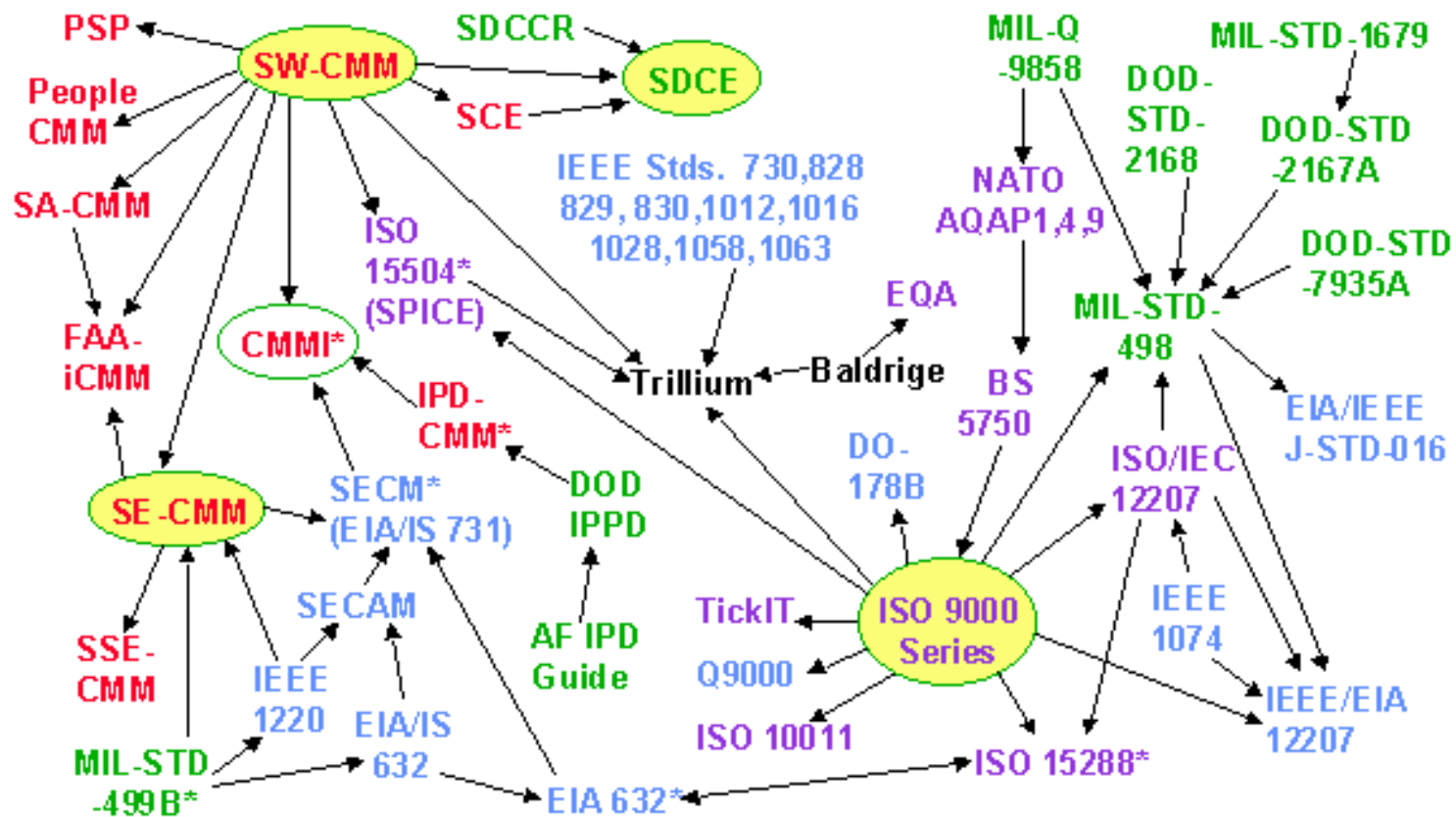


Introduction

- 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

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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



Performance Excellence - Baldrige

TQM/QMS – ISO 9001:2000

Continuous Quality Improvement

Quality Assurance – ISO 9000 '87 & '94

Quality Control – Military Standards

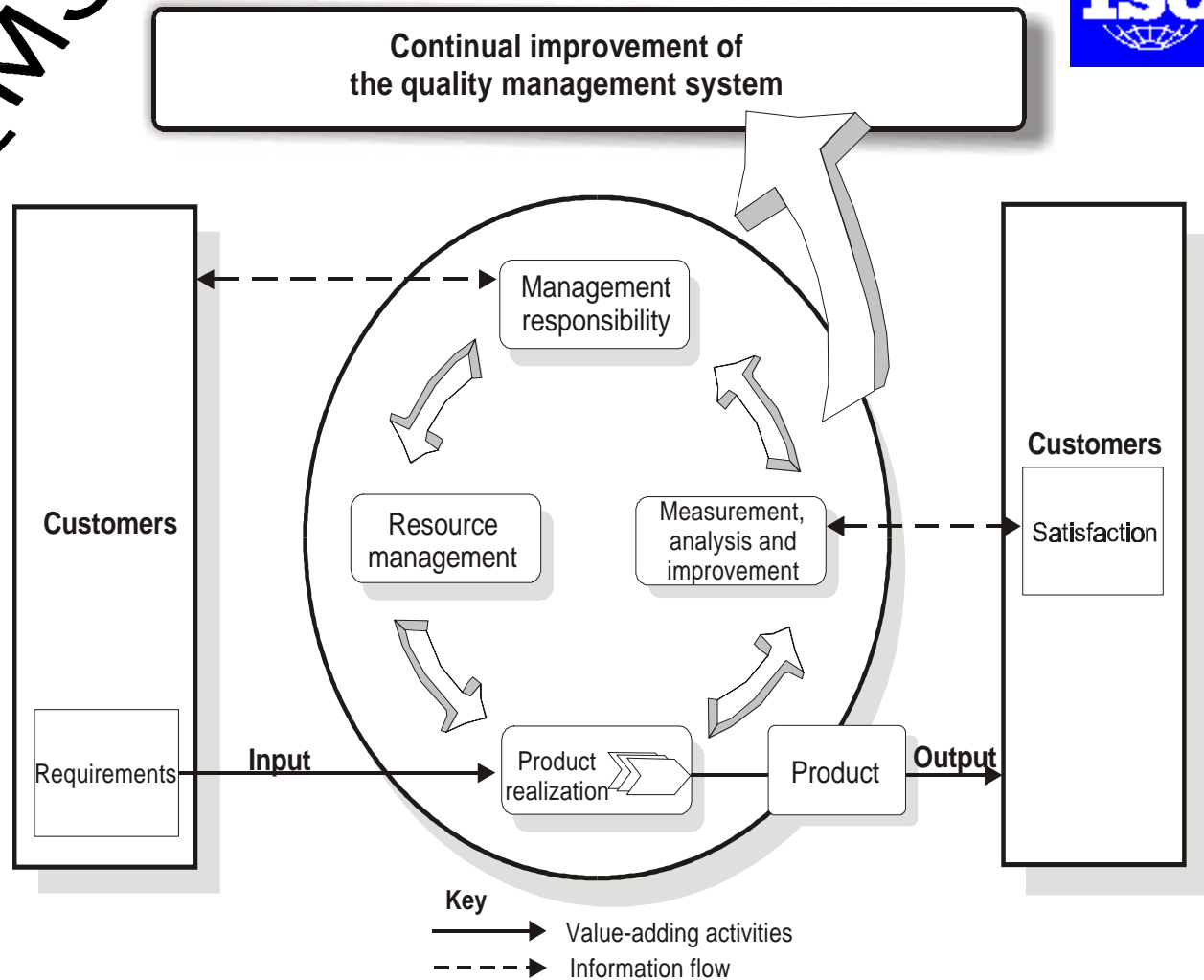
ISO 9001:2000 – Changes



- 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 service-sector 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

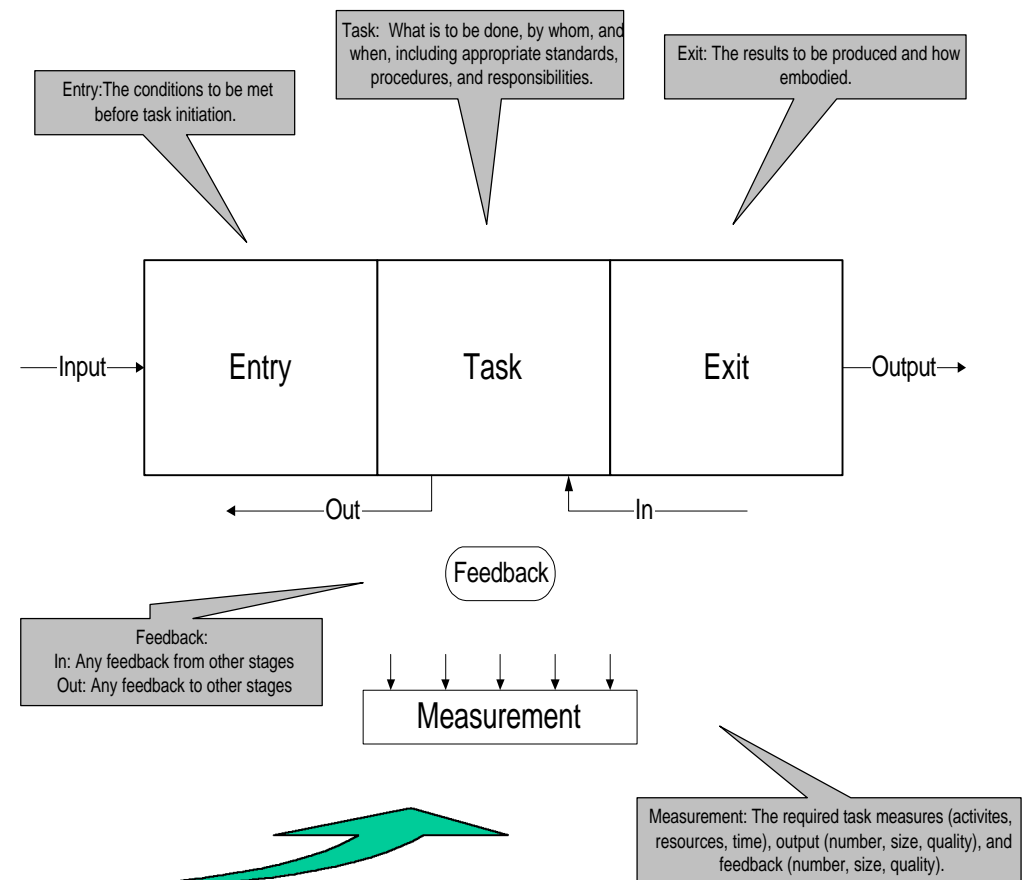
Process Based Approach to QMS





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

ISO 9001:2000 - Implementation

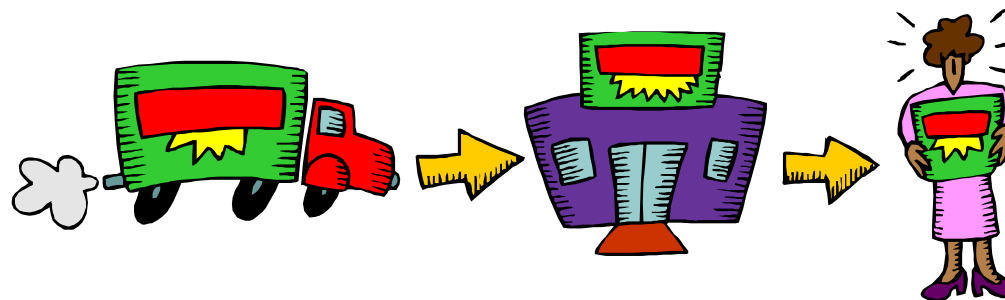


- Gap analysis
- What corrective action is needed to conform
- Prepare an implementation plan
- Define processes and documents
- Prepare a quality manual
- Train on new system
- Implement new management systems and procedures
- Conduct internal audits and management reviews
- Pre-assessment “Do you do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





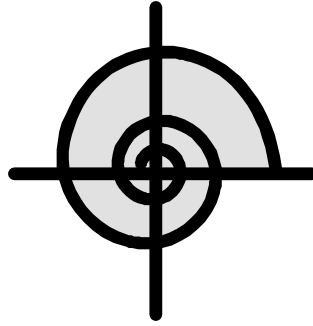
Applying ISO 9001:2000 in a Software Development Environment



Software Development Models



- 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)



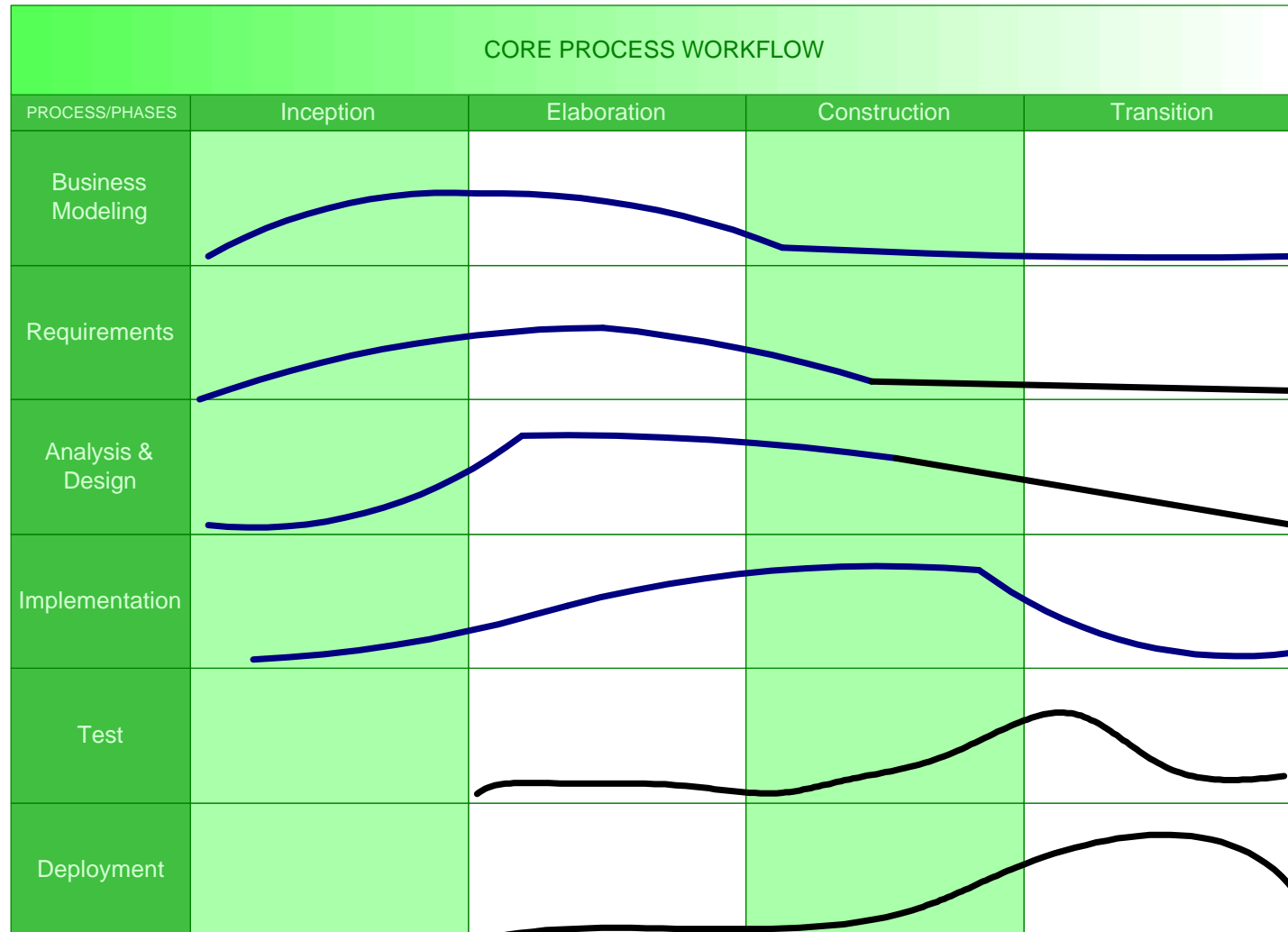
Note: Reference to specific vendors in this presentation is for sole purpose of illustrating how ISO can be used in a software development environment. Theseus Professional Services and its affiliates do not endorse, recommend or make any claims on the products referred to in this presentation.

Software Development Model Rational Unified Process (RUP)



- 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

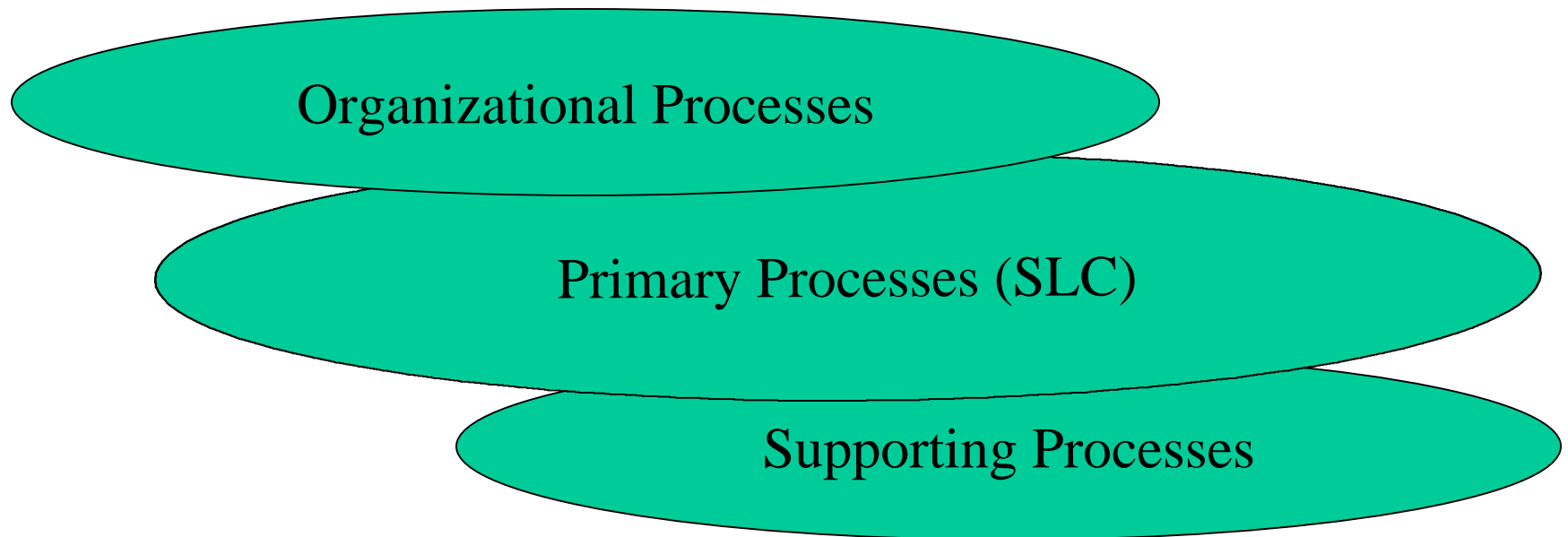


CORE SUPPORTING WORKFLOWS				
PROCESS/PHASES	Inception	Elaboration	Construction	Transition
Configuration & Change Mgmt.	[Line graph showing activity across phases]			
Project Mgmt.	[Line graph showing activity across phases]			
Environment	[Line graph showing activity across phases]			

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

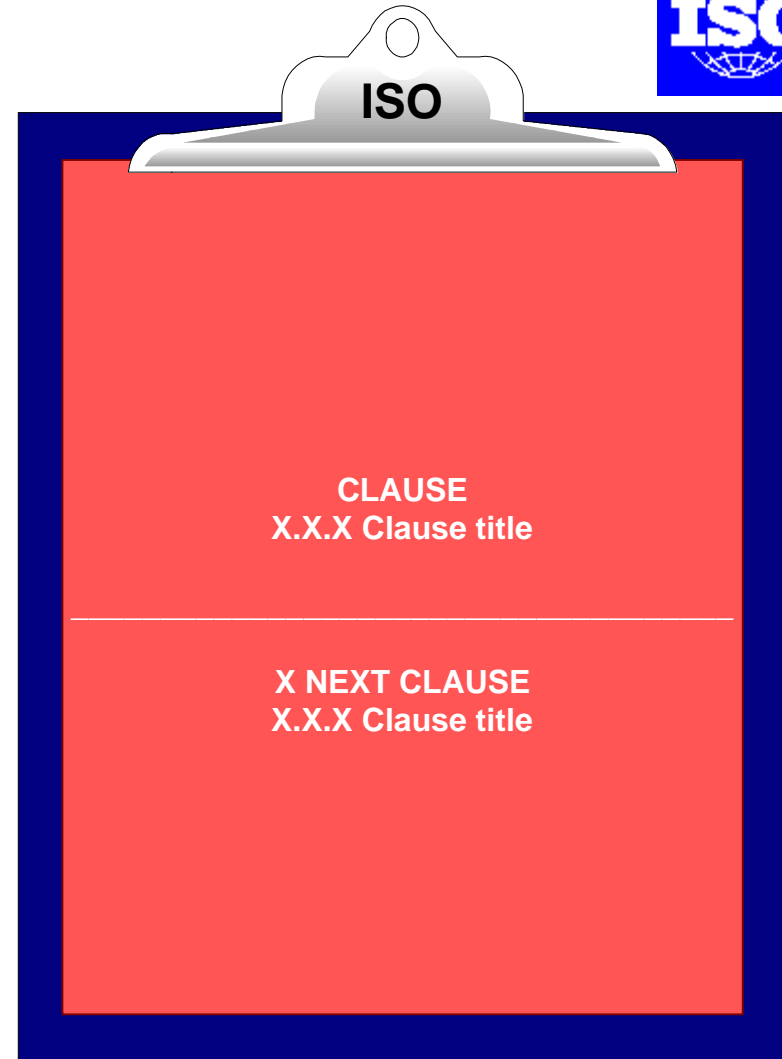
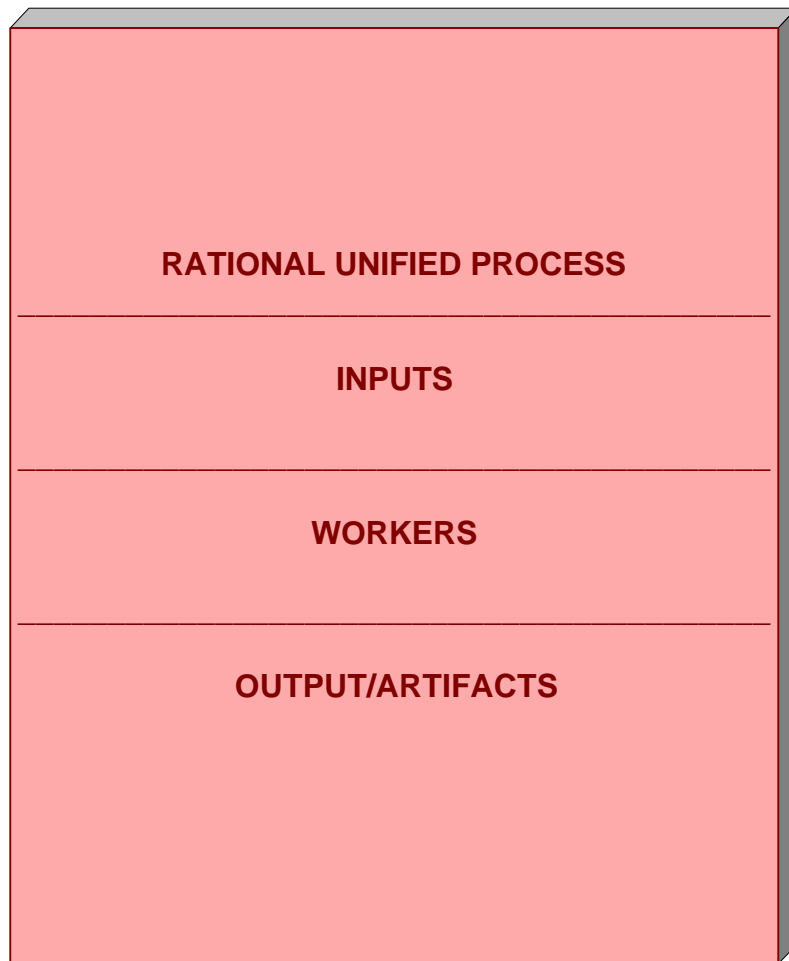


Software Life Cycle Processes

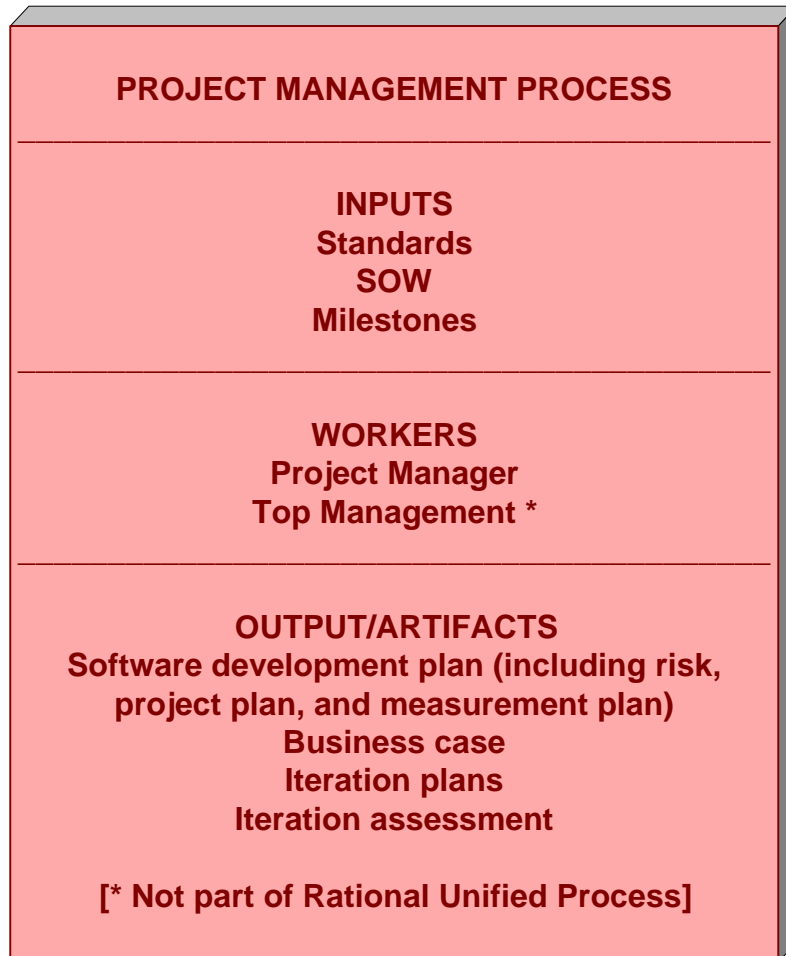


Source: ISO 12207 Software Life Cycle Processes

Mapping RUP Against ISO 9001:2000



Organizational Processes



Primary Processes

BUSINESS MODELING PROCESS

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



ISO

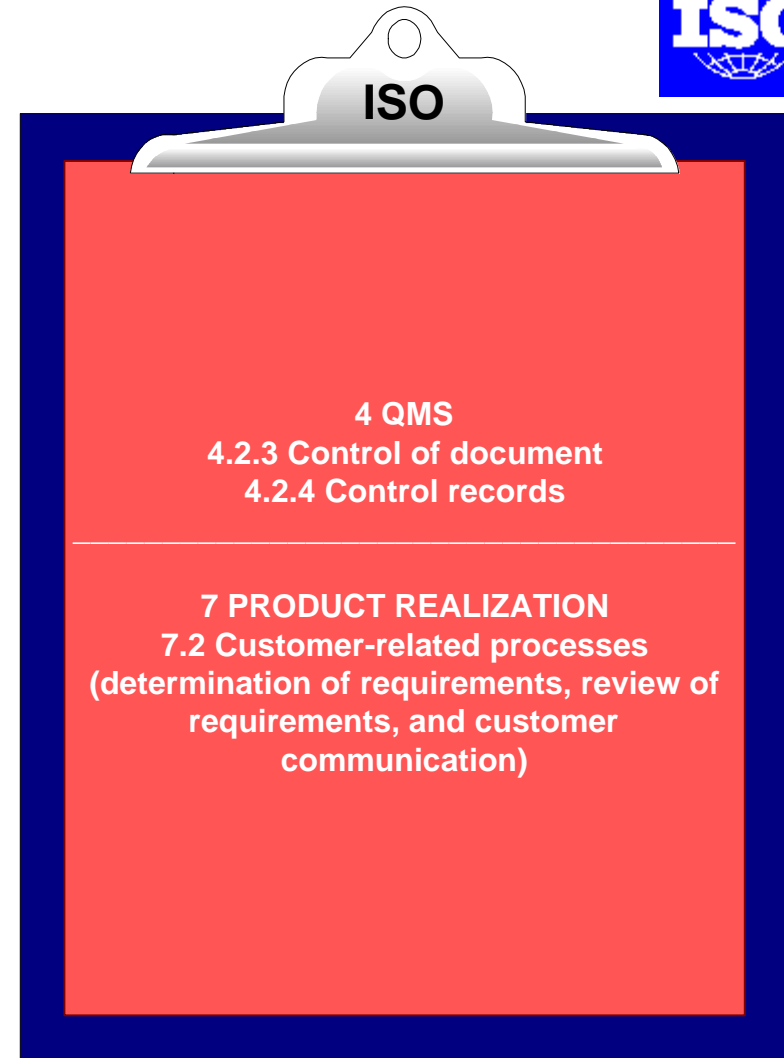
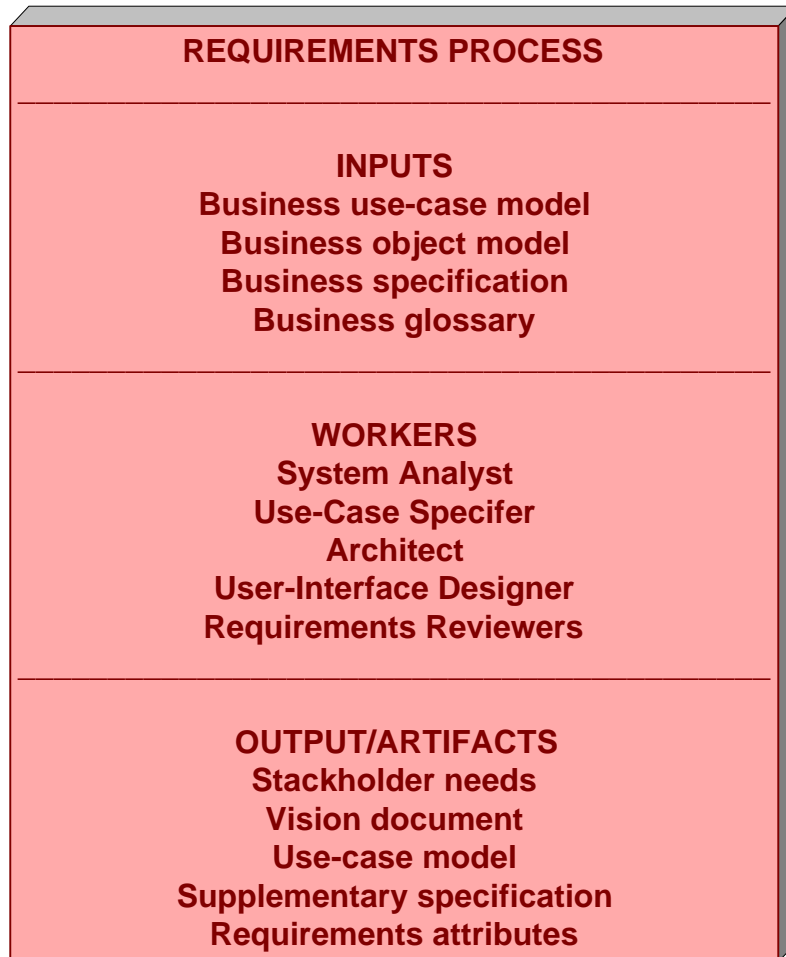
4 QUALITY MANAGEMENT SYSTEM (QMS)

4.2.3 Control of document
4.2.4 Control records

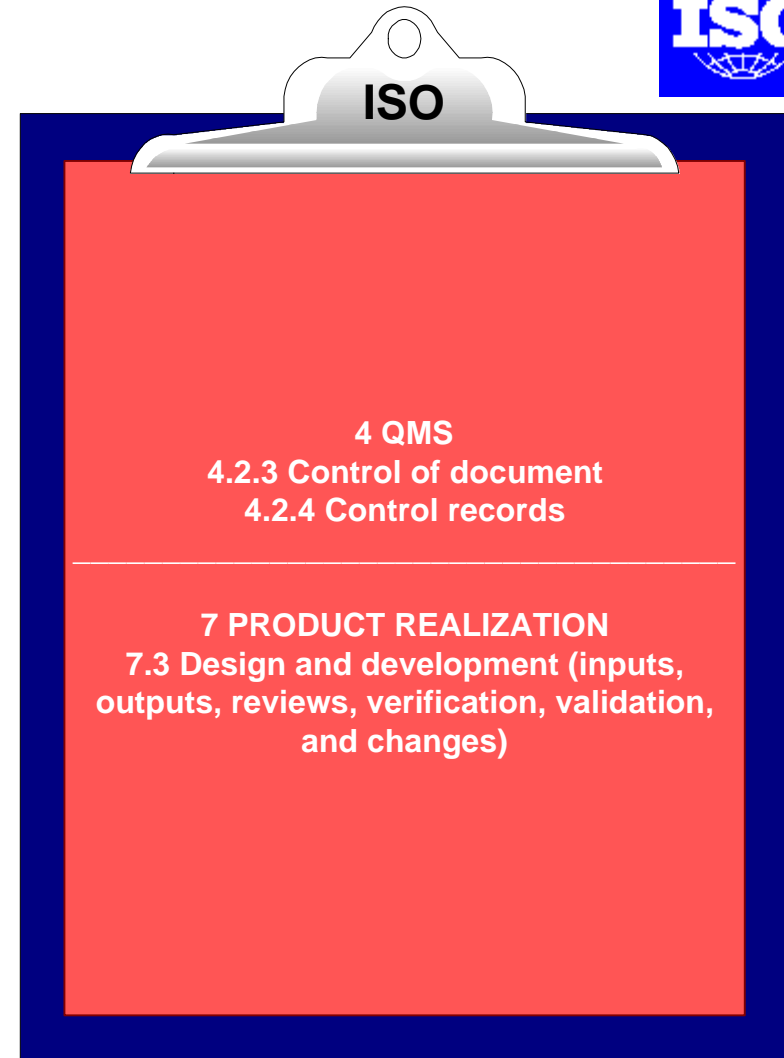
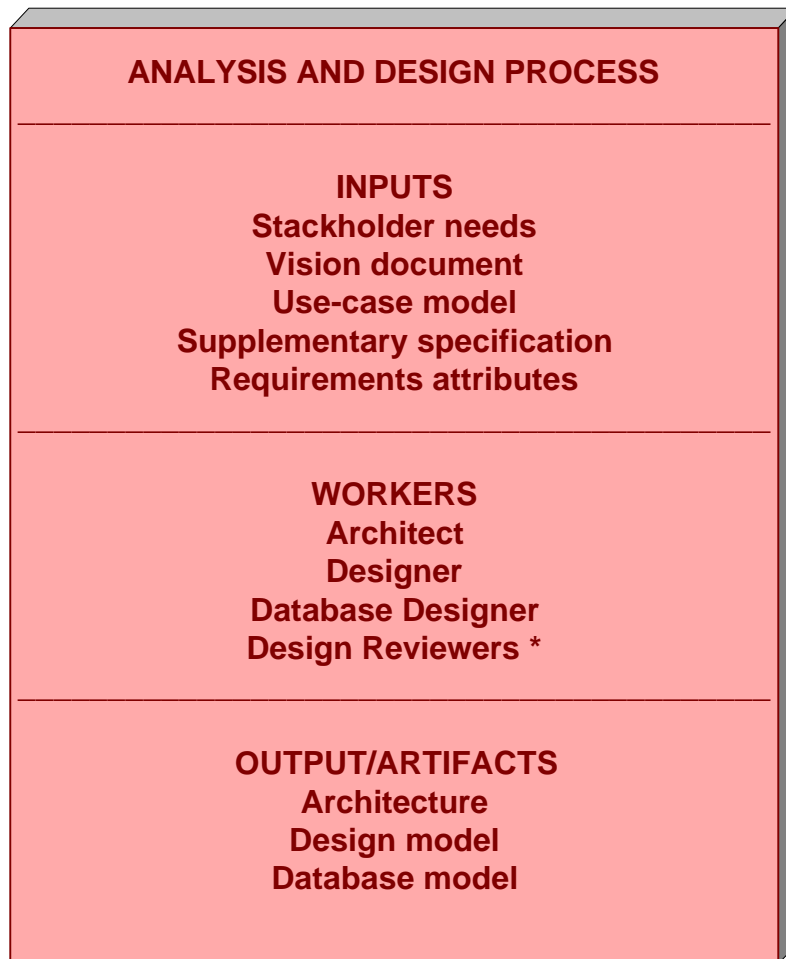
7 PRODUCT REALIZATION

7.2 Customer-related processes
(determination of requirements, review of requirements, and customer communication)

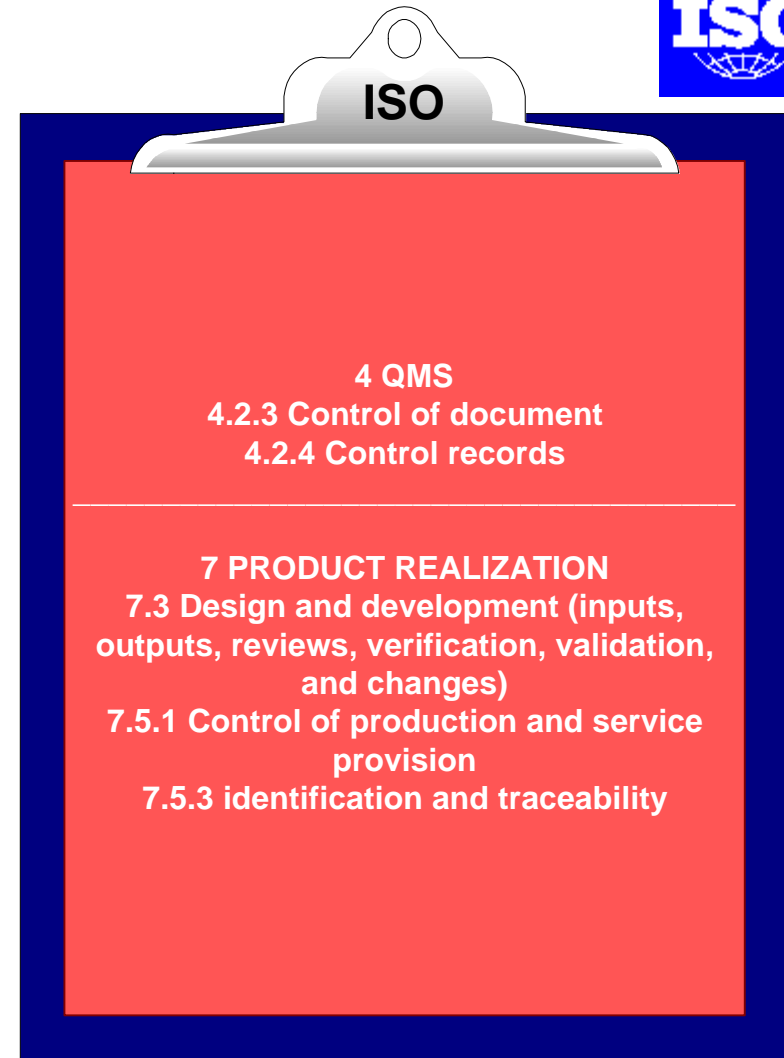
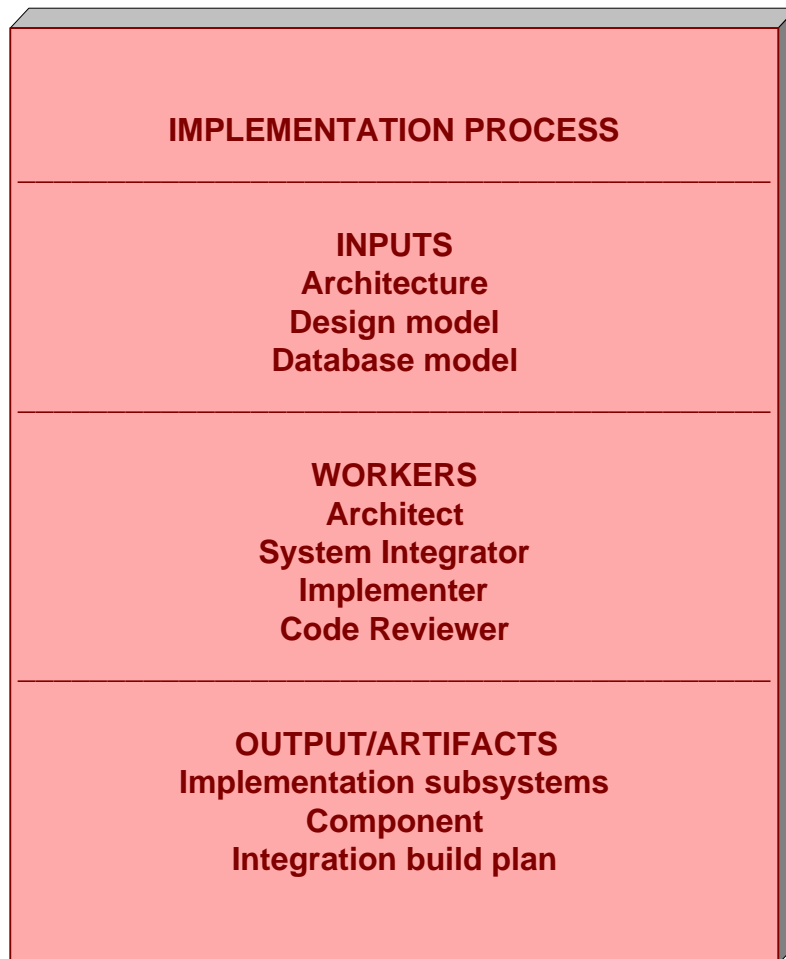
Primary Processes



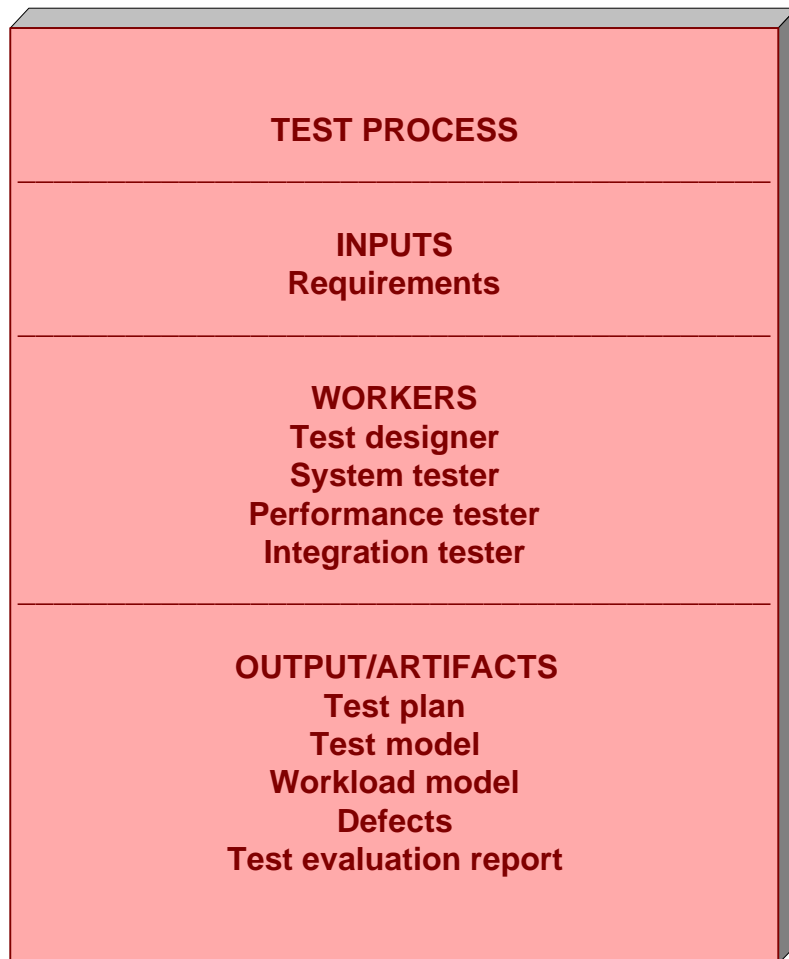
Primary Processes



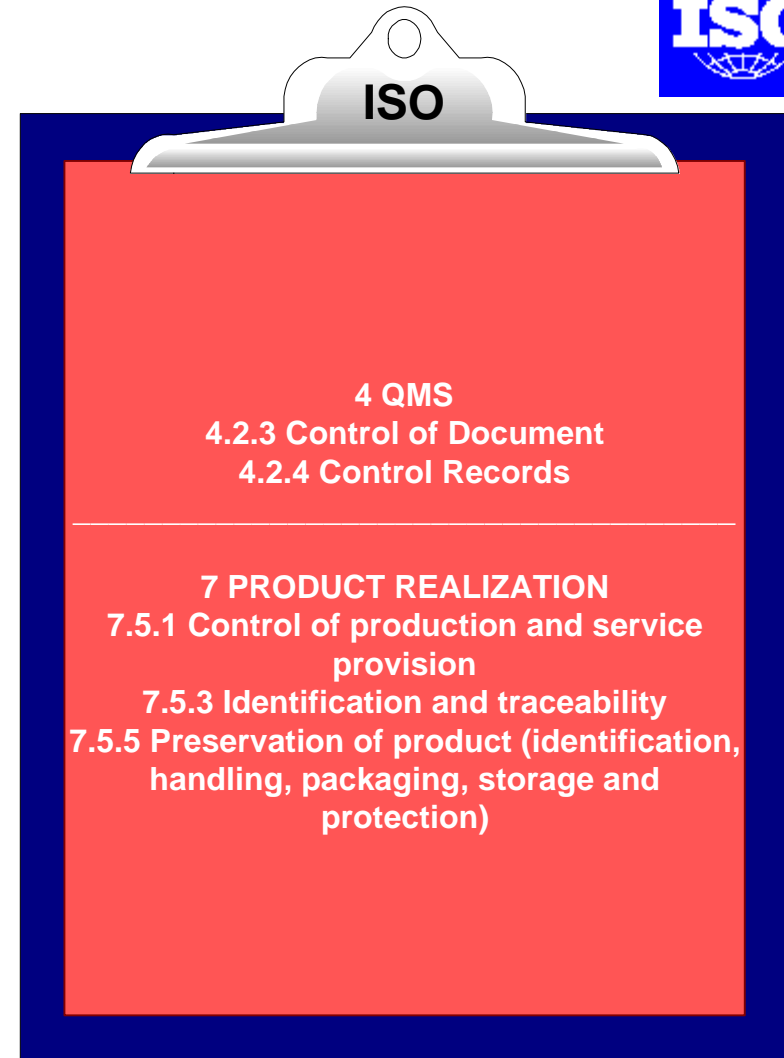
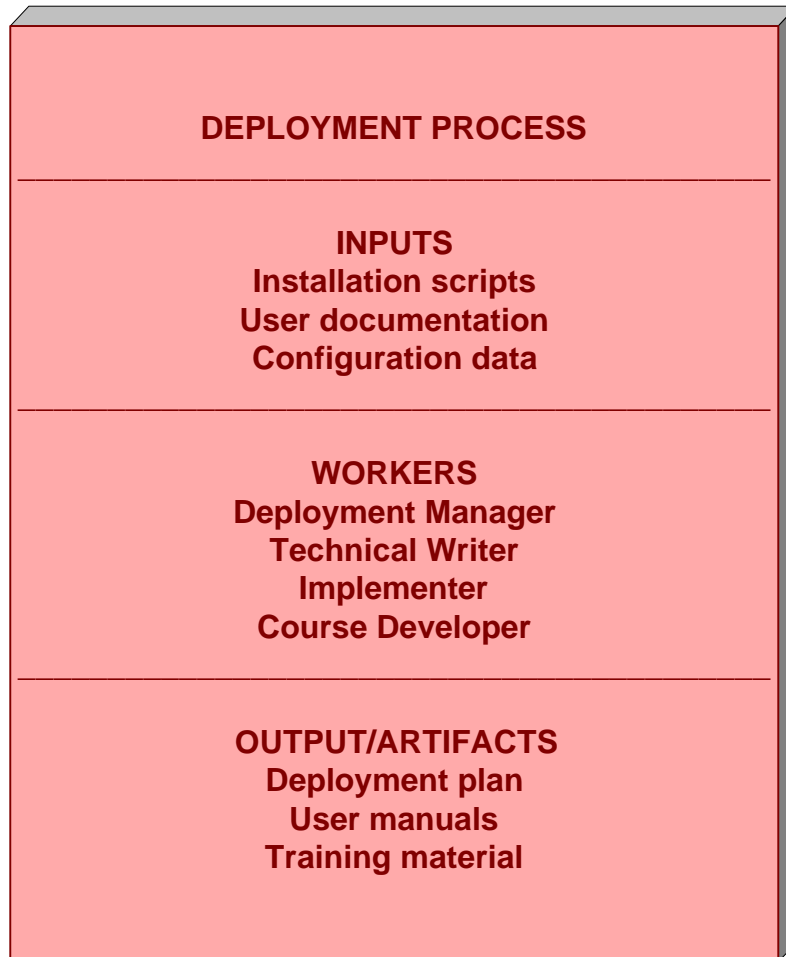
Primary Processes



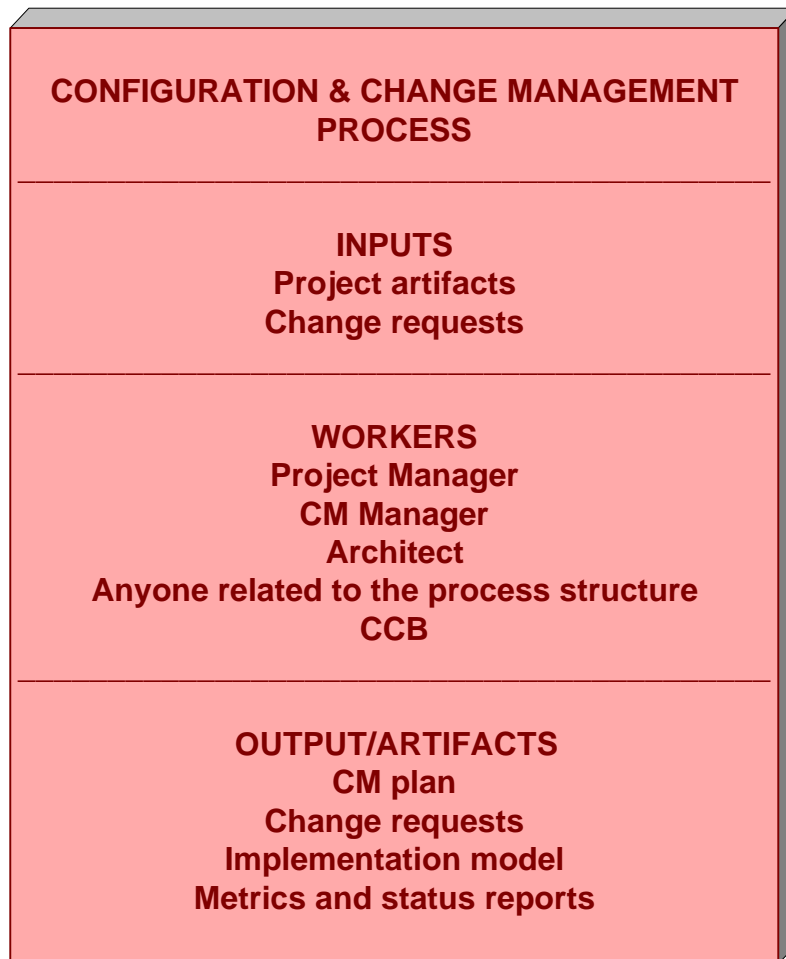
Primary Processes



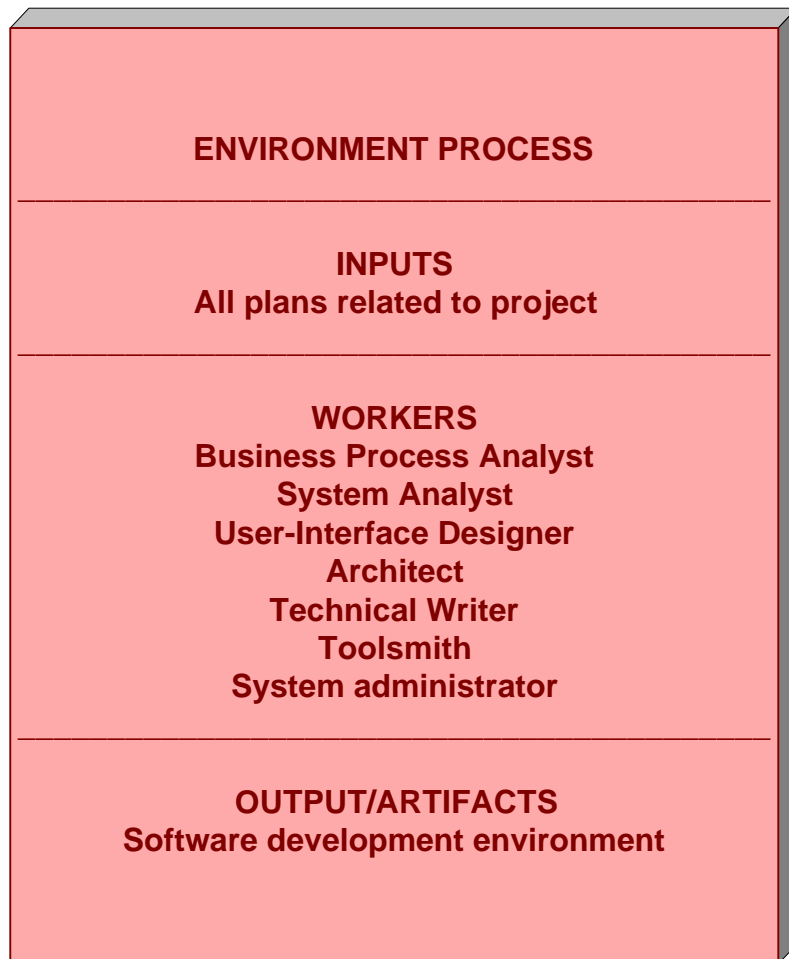
Primary Processes



Supporting Processes



Supporting Processes



Organizational Processes

Primary Processes

Supporting Processes



ISO

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 satisfaction

8.2.2 Internal audit

8.5.1 Continual improvement

8.5.3 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

