



# **Quality Systems Overview**

**ITIL / ISO / CMM & Malcolm Baldrige**

**Touch Points and Synergies**

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For IT organizations currently striving to improve how they do business throughout the organization. A number of quality initiatives be underway at different levels with the aid of different models and frameworks, including:

- SEI CMM
- IT Infrastructure Library (ITIL)
- ISO 9000
- Malcolm Baldrige National Quality Award

As the organization looks to fund and staff these different initiatives, the following questions are routinely being asked:

Is their overlap or redundancy?

- Are their contradictions?
- How do they relate?
- How do we get the highest return on investment from our efforts?

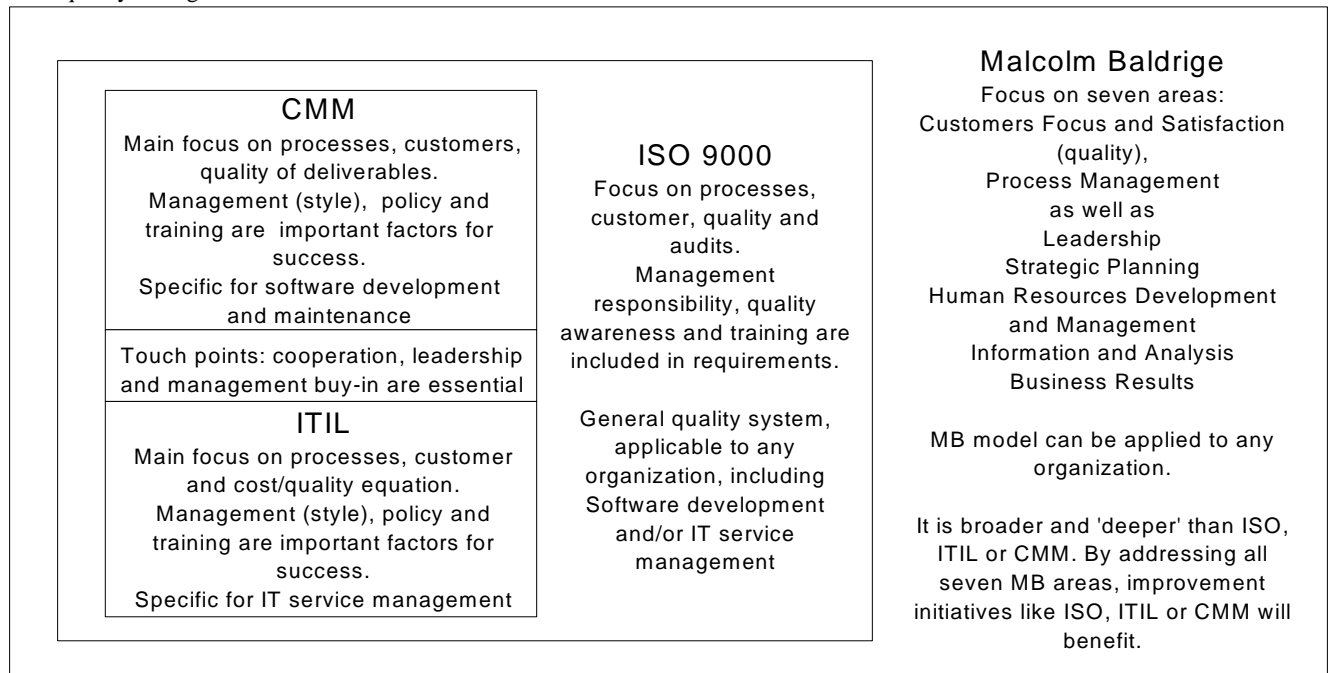
The following table compares the four models in relation to:

- Level of abstraction
- Audience
- Approach
- Granularity

	<b>Level of Abstraction</b>	<b>Audience</b>	<b>Approach</b>	<b>Granularity (perceived view)</b>
<b>CMM</b>	Collection of best practices for software development and maintenance, ordered along a <i>maturity model</i>	Specifically developed for software development and maintenance organizations	Provides quantifiable goals and an approach for 'what' to do without being prescriptive. Assessments are conducted to determine if a maturity level has been attained	18 Key Process Areas <b>Specific</b>
<b>ITIL</b>	A framework of best practices documented in an abstract fashion to be applicable to any IT organization. Process maturity was measured through PinkScan, a maturity model for ITIL processes developed by Pink Elephant	Specifically developed for IT Service Management and Operations	Provides service objectives and some key activities and key indicators for review. Maturity measurements based on Pink Elephant maturity model.	48 modules/ processes <b>Specific</b>
<b>ISO 9000</b>	A generic quality management model with emphasis on auditing	Originally developed for manufacturing, but generic enough to be applied to any product/service organization	Provides high level auditable requirements without 'how to' guidance to prepare for an audit. Organizations either pass or fail the audit.	20 high level requirements <b>General</b>
<b>Malcolm Baldrige</b>	Provides the broadest model of a total quality management system. Less concerned with identifying specific details of a given process.	Developed to raise the awareness and importance of quality in the US. Can be used by any organization	High level holistic model for improving the quality of your entire organization. The approach is self-improvement towards top performance focusing on 7 key areas.	7 criteria <b>Holistic</b>



## Total quality management



## Important observations:

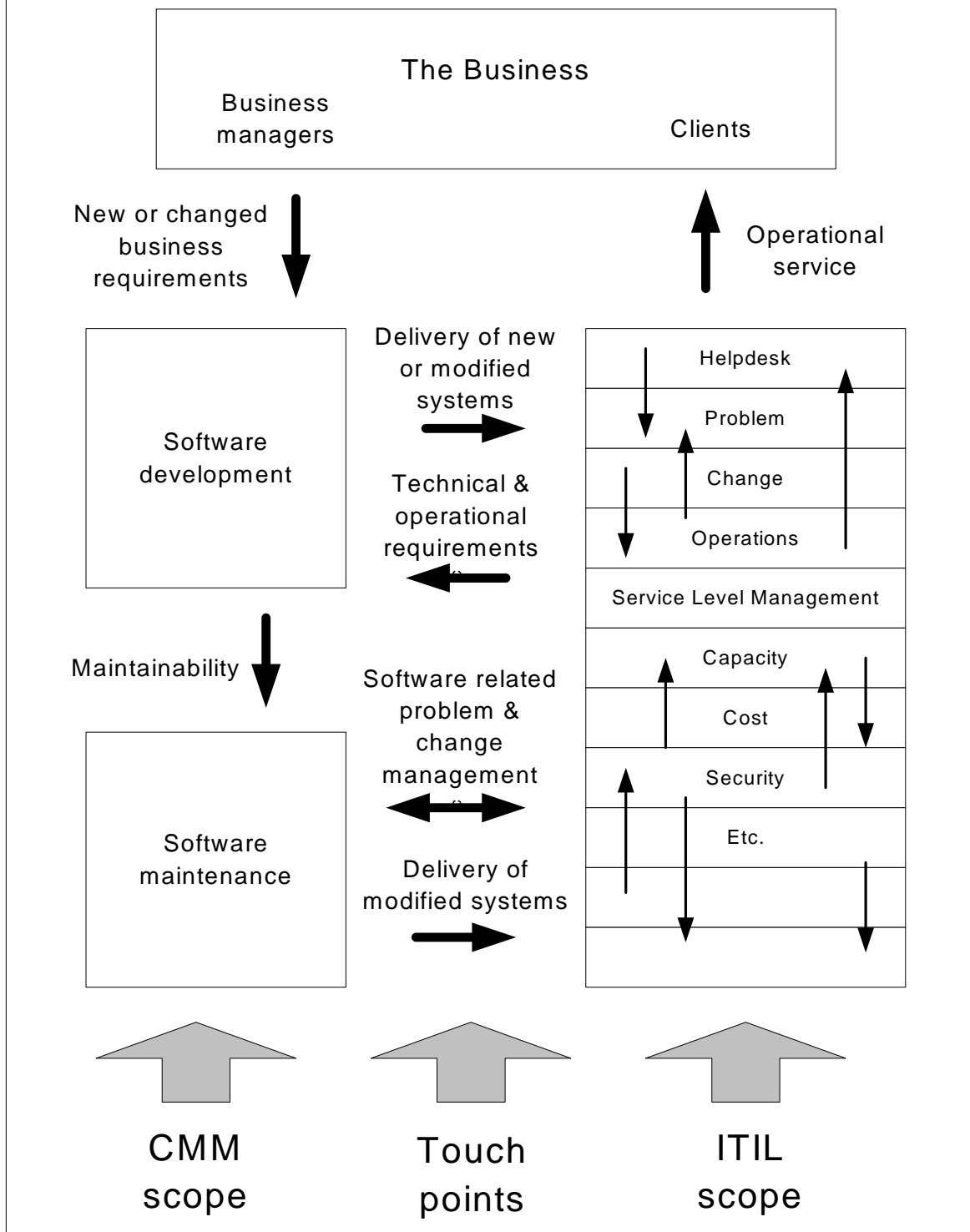
- The focus for CMM is software development and maintenance, while the focus for ITIL is service management/operations. In reviewing the touch points between the two (see graph and the tables in appendix), the amount of duplication is small in comparison to the number of interfaces and touch points. This suggests the need for:
  - strongly synchronized work efforts
  - clear definition of interfaces, roles, and responsibilities
  - participation from both efforts at a level appropriate to the density of the touch points (e.g., joint process action team membership, subject matter expert guidance, and/or process reviewer)
- By identifying the touch points between development and production, and promoting best practices using the CMM and ITIL in their respective areas, the organization can leverage expertise and experience from within (e.g., employee experiences and documented practices) and from without (e.g., industry best practices).
- The densest touch point between production and development, documented in the graph below, is in the area of Configuration and Change Management. The question is not one or the other, but how to implement a single process that satisfies the requirements of both departments. There is no contradiction between the two models (CMM and ITIL), so the teams should develop a unified process ('the what'), with targeted procedures ('the how').
- To improve the client's perception of IT, it is important to improve both groups in unison, as the viewpoint of the client is the IT service as a whole. Additionally, improvements in one group will positively impact the aspects of quality in the other group (e.g., interfaces, deliverables, and responsibilities between the two groups will be clearly defined and understood).
- For organizations in the software industry, it is often difficult to interpret the requirements of ISO 9001, since it was written with a 'hardware' orientation. Even though every requirement



is ISO 9001 does have a corollary in software, it can be a daunting task due to the compact wording.

- Malcolm Baldrige does not delve into the details of the quality management system in the same way as CMM, ITIL, or ISO.
- In CMM the Key Practices are ordered along a Maturity Model with maturity levels. The ITIL processes are ordered in sets. The PinkScan maturity measurement for production was mainly focussed on the “Service Support” and “Service Delivery” sets of ITIL, fourteen processes in total.

## CMM, ITIL and Touch Points





## **Appendix**

The focus of both CMM and ITIL initiatives should be on improvement within the respective development and production organizations, as well as on improved cooperation between the two organizations.

The most practical approach to this is addressing issues and problems in a collaborative way.

For those with an appetite for more theoretical and academic insights, the following cross-reference tables are provided.

### ITIL to CMM Touch Points

These are the main touch points for ITIL processes and the development function in the production environment. In this environment, development can be seen as a supplier and as an extension of the support organization.

In the development and test environments, development can be seen as a user / client, if that is how the roles and responsibilities are defined and agreed to.

ITIL Process	Output TO development	Input FROM development	CMM Level and key practice
Helpdesk / Incident Management	Escalation of Application related incidents	Documentation regarding Application support (1 <sup>st</sup> line)	L2: SCM Activity 5
Problem Management	Application related problems	Application related solutions, work-arounds.	L2: SCM Activity 5 L2: SPTO Activity 9
Change Management	Application related Requests for Change (functional changes) Change schedules and windows Support requirements for Change implementation and aftercare	Requests for Change initiated by development Status of planned Changes New releases, updates, actual Changes. Instructions for Change implementation	L2: RM Activity 3, L2: SCM Ability 1, Activity 5, Activity 6, L2: SPTO Activity 2, L3: SPE Activity 10
Configuration Management	Information regarding IT infrastructure: components, relationships, versions, status, etc. Naming conventions	Information on Applications: versions, relationships, status	L2: SCM Activity 3, Activity 4, Activity 8
Software Control & Distribution	Hardware configuration, system software versions, release schedules,	Application versions, planned releases, release notes, documentation, training requirements	L2: SCM Activity 2, Activity 7 L3: SPE Activity 8
Computer / Network Operations	Batch-online times Back-up mechanisms Run schedules Documentation requirements	Run times, file transfer, dependencies. Back-up requirements. Documentation for operations, error codes etc.	L2: SPP Activity 11, L2: SCM Activity 3, L3: SPE Activity 8
Customer Relationship Management	Contacts regarding operations etc	Contacts regarding Applications	L3: SPE Activity 2, L3: IC Activity 1
Service Level Management	Functional requirements, constraints	Advise regarding solutions, constraints	L2 RM: Activity 1, L3 SPE: Activity 2 L3 IC: Activity 7
Capacity Management	Performance requirements, storage specifications, processing specifications Hardware specifications, Testing (performance/ capacity) requirements	Hardware specifications, Capacity, storage and processing requirements, testing results	L2 SPP Activity 11, Activity 14
Availability Management	Availability requirements (hours, critical time frames, etc.)	Availability (constraints)	L2: RM Activity 1
Security Management	Security requirements Data classification Authorization tables	Application authorizations, possible incompatibilities	L2: SCM Activity 3, Ability 2
Contingency Planning	Business criticality of data and application DR requirements for development functions	Participation in risk assessment development contacts regarding DR team	L2: SPP Activity 13, L2: SPTO Activity 10, L3: SPE Activity 10
Planning and Control	IT Goals, objectives, calendar, scheduled activities and projects, resources required, budgets, etc.	development goals, objectives, calendar, scheduled activities and projects, resources, etc.	L2: SPP and SPTO KPAs L3: ISM KPA
Business IT Alignment	Business requirements regarding IT	Advise regarding IT solutions, possibilities and constraints	L3: SPE Activity 2, L3: ISM Activity 11

## CMM to ITIL Touch Points

**Table 1: Level 2 - Repeatable**

CMM Common Feature(s)	Brief Description of CMM Key Practice	Production Involvement	Mapping to ITIL
<b>KPA: Requirements Management</b>			
AB1, AB2	Allocation of system requirements to software and documentation of software requirements.	Participate in identifying the Technical Service Requirements for the project.	Config., SC&D Operations Capacity
AB4	Requirements Mgt. training	Attend training. Training should identify how production is involved in the Requirements Management process.	Operations Helpdesk
AC1, AC3, VE1, VE2	Review of allocated requirements, changes to requirements, and project reviews with management.	Participate in peer reviews, Software Configuration Control Board, and project management reviews as appropriate.	SC&D Change Mgmt.
<b>KPA: Software Project Planning</b>			
CO2	The software project follows a written organizational policy for planning a software project.	The policy should specify that production participates in software project planning estimates, etc.	Change Mgmt. Planning & Control
AB1	A documented and approved statement of work exists for the software project.	The SOW should state any dependencies between software and production.	Change Mgmt.
AB4	Project Planning training.	Attend training. Training should identify how production is involved in the Project Planning process.	Planning & Control
AC1	The software engineering group participates on the project proposal team.	Production involved in scoping the project (preparation and/or review) as appropriate	Change Mgmt.
AC3, AC4	The software engineering group participates with other affected groups. Software project commitments external to the organization are reviewed with senior management.	Production reviews the software project plans. Production commitments to the software project are identified in the plan.	Change Mgmt.
AC5	A software life cycle (SLC) with predefined stages of manageable size is identified or defined.	Production roles and responsibilities are identified in the SLC, along with the specific tasks where they are involved.	Change Mgmt. Operations Helpdesk
AC9, AC10	Estimates for the software project's size, effort, and costs are derived according to a documented procedure.	Production participates in estimating tasks, especially where they are involved.	Change Mgmt. Capacity, Cost
AC11	Estimates for the project's critical computer resources (CCR) are derived according to a documented procedure.	Production should be <b>heavily</b> involved in estimating the software projects CCRs.	Change Mgmt. Capacity SLM
AC13	The software risks associated with the cost, resource, schedule, and technical aspects of the project are identified, assessed and documented.	Production identifies their risks associated with the overall software project.	Change Mgmt.
AC14	Plans for the project's software engineering facilities and support tools are prepared.	Production should be <b>heavily</b> involved in planning for the host computers and peripherals for software development, software test computers and peripherals, target computer environment software, etc., for the software project.	Change Mgmt. Config. Mgmt. Capacity Operations
VE1, VE2	Management reviews.	Production attends the software project reviews as appropriate.	Change Mgmt.





CMM Common Feature(s)	Brief Description of CMM Key Practice	Production Involvement	Mapping to ITIL
<b>KPA: Software Project Tracking and Oversight</b>			
CO2	The project follows a written organizational policy for managing the software project.	The policy should specify that production is involved when changes to the software commitments are made.	Change Mgnt.
AB1	A software development plan for the software project is documented and approved.	Production approves the software project plan for projects they have commitments.	Change Mgnt.
AC2, AC3, AC4	The project's software development plan is revised according to a documented procedure. Software project commitments and changes to commitments are reviewed according to a documented procedure.	Production reviews the software project plans. Production commitments to the software project are identified in the plan.	Change Mgnt. SC&D
AC5, AC6, AC8	The project's software size, effort, costs, and schedule are tracked, and corrective actions are taken as necessary.	Production provides input of actuals for their tasks and is involved in negotiations if changes and re-planning required.	Change Mgnt. Config. Mgnt. Capacity SLM
AC7	The project's critical computer resources (CCR) are tracked, and corrective actions are taken as necessary.	Production provides input of actuals for the project's CCR and is involved in negotiations if changes and corrective action is necessary.	Capacity
AC10	The software risks associated with cost, resource, schedule, and technical aspects of the project are tracked.	Production helps manage their risks associated with the software project.	Change Mgnt.
AC13, VE1, VE2	Formal reviews to address the accomplishments and results of the software project are conducted at selected project milestones according to a documented procedure. Project management reviews are conducted.	Production attends the software project reviews as appropriate.	Change Mgnt.
<b>KPA: Software Subcontract Management</b>			
AB3	Software Subcontract Management (SSM) training.	Attend orientation. Orientation should identify how production is involved in the SSM process.	Change Mgnt. SLM
AC2	The software subcontractor is selected, based on an evaluation of the subcontract bidders' ability to perform the work, according to a documented procedure.	Production may wish to be involved, depending on the software work to be subcontracted, in the selection of the sub.	Change Mgnt. SLM Availability
VE1, VE2	Activities for managing the software subcontract are reviewed.	Production attends the software project reviews as appropriate.	SLM
<b>KPA: Software Quality Assurance</b>			
	No significant touch points with production for this Key Process Area (KPA).		
<b>KPA: Software Configuration Management</b>			
AB1	A board having the authority for managing the project's software baselines (i.e., a software configuration control board – SCCB) exists or is established.	Production is represented on the SCCB.	SC&D Config. Mgnt
AB3	Adequate resources and funding are provided for performing the SCM activities.	Production is <b>heavily</b> in providing and supporting SCM Tools to support the software development and maintenance activities.	Config. Mgnt. SC&D Change Mgnt.
AB4, AB5	SCM training and orientation.	Production should assist in development of SCM training and orientation. Attend training and orientation as appropriate.	Change Mgnt.
AC1, AC2	A documented and approved SCM plan is used as the basis for performing the SCM activities.	Production reviews the software project's SCM Plan.	Change Mgnt. Planning & Control



<b>CMM Common Feature(s)</b>	<b>Brief Description of CMM Key Practice</b>	<b>Production Involvement</b>	<b>Mapping to ITIL</b>
AC3	A configuration management library system is established as a repository for the software baselines.	Production is <b>heavily</b> involved in establishing the CM library for the software project.	Config.Mgmt. SC&D
AC6, AC7	Changes to baselines are controlled according to a documented procedure. Products from the software baseline library are created and their release is controlled according to a documented procedure.	Production participates on SCCB and helps ensure integrity of the software baseline library.	Change Mgmt. Config. Mgmt. SC&D
AC9	Standard reports documenting the SCM activities and the contents of the software baseline are developed and made available to affected groups and individuals.	Production on distribution list of reports and possibly even generate some reports.	Change Mgmt.
AC10, VE3	Software baseline audits are conducted according to a documented procedure.	Production will be involved in baseline audits.	Change Mgmt
VE1, VE2	Management reviews SCM activities.	Production attends the software project reviews as appropriate.	Change Mgmt.

**Table 2: Level 3 – Defined**

<b>CMM Common Feature(s)</b>	<b>Brief Description of CMM Key Practice</b>	<b>Production Involvement</b>	<b>Mapping to ITIL</b>
<b>KPA: Organizational Process Definition</b>			
CO1, CO2, CO3	The organization follows a written organizational policy for coordinating software process development and improvement activities across the organization. Senior management sponsors and oversees the organization's SPI activities.	Production should be involved in the development of a common policy for SPI. Production management should share in the sponsorship and oversight of SPI.	Change Mgmt. Planning & Control
AB1	A group that is responsible for the organization's software process activities exists.	Production should be represented on the Steering Committee,	Change Mgmt. Planning & Control
AB2	Adequate resources and funding are provided for the organization's software process activities.	Production may be involved in supporting tools required for the software process improvement activities (e.g., process modeling, desktop publishing, database management, and statistical analysis)	Capacity Cost
AB3	Members of the group responsible for the organization's software process activities receive required training to perform these activities.	Production staff should also receive appropriate training on process improvement (organizational change management, technology transition, and process definition).	Change Mgmt. SC&D
AB4	Members of the software engineering group and other software- related groups receive orientation on the organization's software process activities and their roles in those activities.	ITIL and SPI should identify and provide orientation on their respective, and coordinated, process improvement activities.	Change Mgmt. SC&D
AC1, AC2, AC3	The software process is assessed periodically, and action plans are developed to address the assessment findings.	Production and SEPG should coordinate action plans that resulted from their respective assessments.	Change Mgmt.
AC4	The use of the organization's software process database is coordinated at the organizational level.	Production and SEPG need to share, not duplicate, data, where applicable.	SC&D Config Mgmt
AC5	New processes, methods, and tools in limited use in the organization are monitored, evaluated, and, where appropriate, transferred to other parts of the organization.	Production should be <b>heavily</b> involved in evaluating tools and transferring them into the organization.	Change Mgmt. Operations
AC6	Training for the organization and projects' software processes is coordinated across the organization.	Production should participate in developing training and training plans, especially associated with the software development and maintenance infrastructure they support.	Change Mgmt. SC&D
AC7	The groups involved in implementing the software processes are informed of the organization's and projects' activities for software process development and improvement.	Production needs to participate in project advisory groups and process improvement related meetings.	Change Mgmt. SC&D
ME1	Measurements are made and used to determine the status of the organization's process development and improvement activities.	Production data (e.g., defect density, system test defectiveness, system delivery rate, and client satisfaction) feeds the measures to demonstrate the impact of SPI.	SLM Problem Mgmt.
VE1	The activities for software process development and improvement are reviewed	Production should be involved in management reviews of process	Change Mgmt. Problem Mgmt.



CMM Common Feature(s)	Brief Description of CMM Key Practice	Production Involvement	Mapping to ITIL
	with senior management on a periodic basis.	development and improvement activities.	
<b>KPA: Organizational Process Definition</b>			
CO1	The organization follows a written policy for developing and maintaining a standard software process and related process assets.	Production should be involved in the development of a common policy for maintaining a common process and related process assets.	SC&D Config. Mgnt.
AB1	Adequate resources and funding are provided for developing and maintaining the organization's standard software process and related process assets.	Production may be involved in supporting tools required for the software process improvement activities (e.g., process modeling, desktop publishing, database management)	Change Mgnt.
AB2	The individuals who develop and maintain the organization's standard software process and related process assets receive required training to perform these activities.	Production staff should also receive appropriate training on process improvement (organizational change management, technology transition, and process definition).	Change Mgnt. Planning & Control
AC1, AC2	The organization's standard software process is developed and maintained according to a documented procedure and established standards.	Production should be involved in the developing the documented procedure for developing and maintaining standard processes.	SC&D Change Mgnt.
AC3	Descriptions of software life cycles that are approved for use by the projects are documented and maintained.	Production should review the SLC for approval of their involvement the SLC.	Change Mgnt.
AC4, AC5	The organization's software process database is established and maintained. A library of software process-related documentation is established and maintained.	Production should be involved in the establishment and support of a database and process asset library.	Config. Mgnt SC&D
<b>KPA: Training Program</b>			
CO1	The organization follows a written policy for meeting its training needs.	Production should be involved in the development an organizational training policy, and adherence to that policy.	SC&D Change Mgnt CRM/SLM.
AB1, AB2	A group responsible for fulfilling the training needs of the organization exists and is funded.	The training group may be comprised of individuals from different departments, of which production is one.	Change Mgnt. CRM / SLM
AC2, AC3	The organization's training plan is developed and revised according to a documented procedure.	Production should participate in the development/revision of the organizations training plan, and follow that plan.	CRM/SLM Change Mgnt.
AC5	A waiver procedure for required training is established and used to determine whether individuals already possess the knowledge and skills required to perform in their designated roles.	Production should adhere to the waiver procedure.	SLM
AC6	Records of training are maintained.	Production should supply training data as appropriate.	CRM
VE1	The training program activities are reviewed with senior management on a periodic basis.	Production should participate in reviews of the training program.	SLM
<b>KPA: Integrated Software Management</b>			
AC8	The project's critical computer resources are managed according to a documented procedure.	Production should be <b>heavily</b> involved in managing the software projects CCRs.	Capacity Operations
AC9	The critical dependencies and critical paths of the project's software schedule are managed according to a documented procedure.	Production should be made of aware if they are on the critical path, and then manage accordingly.	Change Mgnt.



<b>CMM Common Feature(s)</b>	<b>Brief Description of CMM Key Practice</b>	<b>Production Involvement</b>	<b>Mapping to ITIL</b>
AC10	The project's software risks are identified, assessed, documented, and managed according to a documented procedure.	Production should manage any risks associated with their participation on the project.	Change Mgmt. Planning & Control
AC11, VE1, VE2	Reviews of the software project are periodically performed to determine the actions needed to bring the software project's performance and results in line with the current and projected needs of the business, customer, and end users, as appropriate.	Production should participate in project management reviews as appropriate.	Change Mgmt. Planning & Control CRM/SLM
<b>KPA: Software Product Engineering</b>			
CO1, AB1	The project follows a written organizational policy for performing the software engineering activities.	Production should participate in integration of software tools and have adequate resources to provide those tools.	Change Mgmt. SC&D
AB4	The project manager and all software managers receive orientation in the technical aspects of the software project.	Production should provide orientation to the software project managers on production's involvement in the software process.	Change Mgmt.
AC1	Appropriate software engineering methods and tools are integrated into the project's defined software process.	Production should be involved in integrating appropriate tools for the project (e.g., CM tools)	Change Mgmt. SC&D Config. Mgmt.
AC2	The software requirements are developed, maintained, documented, and verified by systematically analyzing the allocated requirements according to the project's defined software process.	Participate in identifying the Technical Service Requirements for the project.	Change Mgmt. Availability
AC5, AC6, AC7	Software testing (e.g., unit, integration, and system) is performed according to the project's defined software process.	Production supports testing.	Change Mgmt.
AC8	The documentation that will be used to operate and maintain the software is developed and maintained according to the project's defined software process.	Production involved in development of operator's manual, maintenance manual, etc., and/or peer review of those manuals.	Change Mgmt Operations Helpdesk
AC9	Data on defects identified in peer reviews and testing are collected and analyzed according to the project's defined software process.	Production involved in collection of defect data during testing.	Problem Mgmt Helpdesk
AC10	Consistency is maintained across software work products, including the software plans, process descriptions, allocated requirements, software requirements, software design, code, test plans, and test procedures.	Production should be involved in helping to keep the software work products current, or made aware of changes that may affect their work products for the project.	Change Mgmt.
VE1, VE2	Formal reviews to address the accomplishments and results of the software project are conducted at selected project milestones according to a documented procedure. Project management reviews are conducted.	Production attends the software project reviews as appropriate.	Change Mgmt
<b>KPA: Intergroup Coordination</b>			
CO1	The project follows a written organizational policy for establishing interdisciplinary engineering teams.	Production should participate in the development of interdisciplinary engineering teams.	Change Mgmt.
AB2	The support tools used by the different engineering groups are compatible to enable effective communication and coordination.	Production should be <b>heavily</b> involved in the selection of support tools to be used by the different groups to ensure they are compatible.	Change Mgmt Operations



<b>CMM Common Feature(s)</b>	<b>Brief Description of CMM Key Practice</b>	<b>Production Involvement</b>	<b>Mapping to ITIL</b>
AB3, AB5	All managers in the organization receive required training and/or orientation in teamwork.	Production managers should participate in team building activities with software and other related groups.	
AB4	All task leaders in each engineering group receive orientation in the processes, methods, and standards used by the other engineering groups.	Production task leaders should both present and attend presentations on processes, methods, and standards being used in the organization.	
AC1	The software engineering group and the other engineering groups participate with the customer and end users, as appropriate, to establish the system requirements.	Participate in identifying the Technical Service Requirements for the project.	SLM Helpdesk
AC2, AC7	Representatives of the project's software engineering group work with representatives of the other engineering groups to monitor and coordinate technical activities and resolve technical issues.	Production needs to attend software technical reviews and/or work with the software group to manage technical activities and issues.	Change Mgnt.
AC3	A documented plan is used to communicate intergroup commitments and to coordinate and track the work performed.	Production should be involved in the development of the communications plan for the project.	Change Mgnt.
AC4	Critical dependencies between engineering groups are identified, negotiated, and tracked according to a documented procedure.	Production should be made of aware if they are on the critical path, and then manage accordingly.	Change Mgnt.
AC5	Work products produced as input to other engineering groups are reviewed by representatives of the receiving groups to ensure that the work products meet their needs.	Production should understand their inputs and outputs to the SLC, and ensure reviews of those deliverables occur.	Change Mgnt.
VE1, VE2	The activities for inter-group coordination are reviewed with senior management on a periodic basis.	Production should participate in management reviews to discuss inter-group coordination issues.	Planning & Control
<b>KPA: Peer Reviews</b>			
AB3	Reviewers who participate in peer reviews receive required training in the objectives, principles, and methods of peer reviews.	Production should be trained on how to participate in software peer reviews.	
AC1	Peer reviews are planned, and the plans are documented.	Production needs to agree to the software peer reviews that are scheduled and they are participating.	