CMMI Model Quick Reference Guide

CMMI V3.0

An overview of the Capability Maturity Model Integration (CMMI)® Model

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INTRODUCTION: BEST PRACTICES

CMMI Model: What Is It?

The Capability Maturity Model Integration (CMMI) is a proven set of global best practices that drives business performance through building and benchmarking key capabilities.

CMMI best practices focus on improving performance and aligning operations to business goals. Designed to be understandable, accessible and flexible for any business or industry, and integrates with and enables other standards and methodologies such as ISO, NIST, agile, DevSecOps, and AI, CMMI helps organizations understand their current level of capability and performance and offers a guide to optimize business results.

Whether your organization wants to build a new capability or improve and mature an existing one, CMMI provides the best practices for doing so across a broad spectrum of industries, disciplines, and domains to continue to help organizations improve their performance effectively and efficiently. The eight domains in the CMMI model include:

Over 14,000 appraised organizations report performance results achieved by leveraging CMMI to set, meet, and exceed organizational business goals.

The CMMI Model is available for subscription purchase at: CMMIinstitute.com/model-viewer

DOMAIN	CAPABILITY DESCRIPTION
Data (DATA)	Governing and managing data and data quality
Development (DEV)	Creating products or solutions, including hardware, software, and related components
People (PPL)	Developing, retaining, and enabling the workforce to accomplish objectives
Safety (SAF)	Providing and maintaining safe products, services, and other solutions
Security (SEC)	Identifying and strengthening critical defenses, increasing resilience against threats
Services (SVC)	Building and delivering an intangible solution comprised of activities or work
Suppliers (SPM)	Managing a company, organization, or person that supplies or provides products, services, or other solutions
Virtual (VRT)	Delivering products, services, or other solutions from remote locations

NOTICE: This Quick Reference Guide is designed to be a summary quick reference. It is not intended for use as a substitute for the CMMI Model. Per CMMI Policies, this document is NOT to be used as a replacement of the full Model for appraisals or courses. Refer to the CMMI Model for additional required information, explanatory information, example activities, example work products, and context-specific information needed to accurately and consistently understand and adopt each Practice and Practice Group levels for adoption, appraisal, and training purposes.

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CMMI Model Architecture

The CMMI Model architecture consists of multiple components from categories of larger logical groupings of Capability Areas that address common problems encountered by businesses when producing or delivering solutions to Practice Areas, down to individual practices. The table below is shown for each Practice Area to provide context information on which Category, Capability Area, and Domain it belongs to, additional detailed information on CMMI Model architecture can be found in the Appendix.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Ensuring Quality	ENQ	Core	Process Quality Assurance	PQA	1	1

Practice Areas

A Practice Area is a collection of similar practices that together achieve the defined intent, value, and required information described in it. This Quick Reference Guide includes all CMMI Practice Areas and practice group level summaries.

Practice Group and Maturity Levels

Within a Practice Area, **practice group levels** are evolutionary and sequential. Practice Group Level 2 practices subsume entirely all Practice Group Level 1 practices, and then Practice Groups 3-5 build upon each other, requiring that the lower levels are in place to have the higher practice group levels fully addressed. **Maturity level ratings** describe the degree to which processes in an Organizational Unit (OU) meet the intents and values of a predefined set of Practice Areas of a specified set of practice group levels.

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Practice Group Level Descriptions



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Practice Area Summaries

CAUSAL ANALYSIS AND RESOLUTION



Intent: Identifies causes of selected outcomes and takes action to either prevent recurrence of undesirable outcomes or ensure recurrence of positive outcomes.

Value: Addresses causes of issues, eliminating rework and directly improving quality and productivity.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Supporting Implementation	SI	Core	Causal Analysis and Resolution	CAR	1	1
						2	2
						3	5
						4	2
						5	1

Practice Group (PG) Level Summary: This PA contains a total of 11 practices.

- **Level 1:** Select outcomes and addressing their causes.
- **Level 2:** Select outcomes for analysis and address their causes.
- **Level 3:** Requires an organizational approach to determine causes using organizational processes, proposing and implementing actions, recording resolution data, and submitting improvement proposals.
- **Level 4:** Perform root cause analysis and evaluate the effects of actions using statistical techniques.
- **Level 5:** Uses statistical techniques to evaluate solutions and processes for optimizing performance across the organization.

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CONFIGURATION MANAGEMENT



Intent: Manages the integrity of work products using configuration identification, version control, change control, and audits.

Value: Reduces loss of work and increases the ability to deliver the correct version of the solution to the customer.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Supporting Implementation	SI	Core	Configuration Management	CM	1	1
						2	6

Practice Group (PG) Level Summary: This PA contains a total of 7 practices.

- **Level 1:** Perform basic version control.
- **Level 2:** Manage and control identified items and placing those items under configuration control. Use a configuration and change management system to develop and release baselines, manage changes, and describe versions. Perform configuration audits to maintain configuration integrity.

CONTINUITY



Intent: Anticipates and addresses disruptions to critical business operations so work can continue or resume as soon as possible.

Value: Enables continued operation when serious disruptions or catastrophic events occur.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Managing Business Resilience	MBR	SVC	Continuity	CONT	1	1
						2	3
						3	3

Practice Group (PG) Level Summary: This PA contains a total of 7 practices.

- **Level 1:** Develop contingency approaches for managing significant disruptions to operations
- **Level 2:** Identify and prioritize functions and resources essential for continuity and develop and follow continuity plans to resume operations.
- **Level 3:** Requires an organizational approach for developing, providing, and evaluating continuity training and analyzing results from verifying and validating the continuity plans.

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DATA MANAGEMENT



Intent: Identifies, implements, and controls the approach and activities for managing data.

Value: Maximizes operational efficiency by prioritizing critical data activities to meet performance needs.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Managing Data	MD	DATA	Data Management	DM	1	2
						2	2
						3	2

Practice Group (PG) Level Summary: This PA contains a total of 6 practices.

- **Level 1:** Identify objectives and use metadata to manage data.
- **Level 2:** Develop and follow a data management architecture and approach.
- **Level 3:** Requires an organizational approach to establish and deploy an organizational data management capability, and performing reviews of the organization's data management capability and acting on results.

DATA QUALITY



Intent: Develops, follows, and keeps updated an approach for implementing data quality standards.

Value: Maximizes the value and accuracy of data for effective business operations and consistent decision-making.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Managing Data	MD	DATA	Data Quality	DQ	1	2
						2	3
						3	2

Practice Group (PG) Level Summary: This PA contains a total of 7 practices.

- **Level 1:** Identify data quality parameters and perform data cleansing activities.
- **Level 2:** Define criteria for data cleansing, and develop and follow a data quality approach.
- **Level 3:** Requires an organizational approach to conducting data quality assessments and reviewing the effectiveness of the organization's data quality activities and acting on results.

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DECISION ANALYSIS AND RESOLUTION



Intent: Makes and records decisions using a recorded process that analyzes alternatives.

Value: Increases the objectivity of decision-making and the probability of selecting the optimal solution.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Supporting Implementation	SI	Core	Decision Analysis and Resolution	DAR	1	2
						2	5
						3	1

Practice Group (PG) Level Summary: This PA contains a total of 8 practices.

- **Level 1:** Identify alternatives and make decisions.
- **Level 2:** Develop rules and criteria for making and evaluating decisions, identifying alternatives, evaluation methods, and using them to select solutions.
- **Level 3:** Requires an organizational approach to role-based decision-making.

ENABLING SAFETY



Intent: Minimizes and mitigates safety risks within the tolerance parameters and constraints of operational effectiveness, time, and cost.

Value: Reduces the residual safety hazard risk to an acceptable tolerance level.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Managing Security and Safety	MSS	SAF	Enabling Safety	ESAF	1	2
						2	3
						3	3

Practice Group (PG) Level Summary: This PA contains a total of 8 practices.

- **Level 1:** Identify and address prioritized safety needs and hazards.
- **Level 2:** Identify critical safety needs, constraints and objectives and approaches to address workplace environment safety and functional safety.
- **Level 3:** Establish an organizational safety capability, perform safety evaluations and act on results, and follow organizational safety control strategies.

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ENABLING SECURITY



Intent: Develops and keeps updated the security approach that includes anticipating, identifying, and taking actions to avoid or minimize the impacts of security issues on an organization or solution.

Value: Reduces the impact of security threats and vulnerabilities on business performance.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Managing Security and Safety	MSS	SEC	Enabling Security	ESEC	1	2
						2	4
						3	3

Practice Group (PG) Level Summary: This PA contains a total of 9 practices.

- **Level 1:** Identify, address, and prioritize security needs and issues.
- **Level 2:** Identify, address, and prioritize security needs and issues to develop a security approach and objectives to address physical, mission, personnel, process-related and cybersecurity needs.
- **Level 3:** Requires an organizational security operations capability to implement an organizational security strategy, approach, and architecture. Perform security reviews and evaluations and act on their results.

ENABLING VIRTUAL WORK



Intent: Defines and manages an approach for effective virtual work and operations.

Value: Maximizes delivery effectiveness and efficiency while reducing the impact and expense from travel and in-person activities.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Managing the Workforce	MWF	VRT	Enabling Virtual Work	EVW	1	2
						2	2
						3	2

Practice Group (PG) Level Summary: This PA contains a total of 6 practices.

- **Level 1:** Identify virtual work needs and constraints and performing virtual work.
- **Level 2:** Develop an approach to consistently perform virtual work, manage a virtual work approach, and take corrective action when needed.
- **Level 3:** Develop and use an organizational strategy, approach, and functional capability for performing virtual work, periodically review the effectiveness of that approach, and act on results.

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ESTIMATING



Intent: Estimates the size, effort, duration, and cost of the work and resources needed to develop, acquire, or deliver the solution.

Value: It provides a basis for making commitments, planning, and reducing uncertainty, which allows for early corrective actions and increases the likelihood of meeting objectives.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Planning and Managing Work	PMW	Core	Estimating	EST	1	1
						2	3
						3	2

Practice Group (PG) Level Summary: This PA contains a total of 6 practices.

- **Level 1:** Develop estimates to perform work.
- **Level 2:** Develop the scope of what is being estimated, including size and then related effort, duration, and cost and their rationale.
- **Level 3:** Use an organizational approach for estimation method(s) and use an organizational measurement repository and process assets for estimating.

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GOVERNANCE



Intent: Provides guidance to senior management on their role in the sponsorship and governance of performance, processes, and related activities.

Value: Minimizes the cost of process implementation, increases the likelihood of meeting objectives, and verifies that the implemented processes support and contribute to the success of the business.

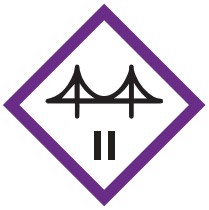
CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Improving	Sustaining Habit and Persistence	SHP	Core	Governance	GOV	1	1
						2	4
						3	3
						4	1

Practice Group (PG) Level Summary: This PA contains a total of 8 practices.

- **Level 1:** Senior management identifies what is important and defines an approach to accomplish the objectives of the organization.
- **Level 2:** Senior management define and communicate organization objectives for performance improvement and requires they provide function, resources and training for following processes. Senior management identifies their information needs and use the collected information to provide governance and oversight of performance improvement. Senior Management holds people accountable for following processes and meeting performance objectives.
- **Level 3:** Senior management directs that measures are collected analyzed and used to support business objectives and confirms that competencies and processes are aligned with organization objectives.
- **Level 4:** Senior management makes selected decisions driven by statistical and quantitative analysis related to performance and achievement of Quality and Process Performance Objectives (QPPOs).

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IMPLEMENTATION INFRASTRUCTURE



Intent: Ensures that the processes and assets important to an organization's performance are habitually and persistently followed, used, and improved.

Value: Sustains the ability to consistently achieve goals and objectives efficiently and effectively.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Improving	Sustaining Habit and Persistence	SHP	Core	Implementation Infrastructure	II	1	1
						2	2
						3	3
						4	1

Practice Group (PG) Level Summary: This PA contains a total of 7 practices.

- **Level 1:** Performing processes to address the Level 1 practices in scope.
- **Level 2:** Allocating adequate resources, funding, and training to develop and implement processes. Additionally, these processes should be regularly updated and verified to ensure they are being properly followed.
- **Level 3:** Utilizing organizational processes and assets to plan, manage, and execute work. Assessing the adherence to these processes and their effectiveness, while also contributing relevant process-related information or assets back to the organization.
- **Level 4:** Requires an organizational capability to understand and apply statistical and other quantitative techniques to accomplish the work.

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INCIDENT RESOLUTION AND PREVENTION



Intent: Resolves and prevents disruptions promptly to sustain service delivery levels.

Value: Minimizes the impact of disruptions to meet objectives and customer commitments more effectively.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Managing Business Resilience	MBR	SVC	Incident Resolution and Prevention	IRP	1	1
						2	3
						3	2

Practice Group (PG) Level Summary: This PA contains a total of 6 practices.

- **Level 1:** Record and resolve incidents.
- **Level 2:** Create and follow a plan for incident resolution and prevention. Ensure that each incident is monitored, resolved to closure, and the status communicated effectively.
- **Level 3:** Use an organizational incident management system for processing and tracking incidents and their resolution and analyzing selected incident and resolution data for prevention of future incidents.

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MANAGING PERFORMANCE AND MEASUREMENT



Intent: Manages performance using measurement and analysis to achieve business objectives.

Value: Maximizes business return on investment by focusing management and improvement efforts on cost, schedule, and quality performance.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Improving	Improving Performance	IMP	Core	Managing Performance and Measurement	MPM	1	2
						2	6
						3	6
						4	5
						5	3

Practice Group (PG) Level Summary: This PA contains a total of 22 practices.

- **Level 1:** Collect measures and identify and address performance issues.
- **Level 2:** Set and update measurement and performance objectives based on business needs. Develop and maintain operational definitions for these measures, then collect, analyze, and store the relevant data accordingly and taking actions to address any issues.
- **Level 3:** Requires an organizational approach to develop, maintain, and utilize measurement and performance objectives that align with business goals. Follow organizational processes to develop and update operational definitions for these measures, and establish a data quality process. The organization uses and updates the organization's measurement repository, analyzes performance data to identify and address improvement needs, and periodically communicates performance results to the organization.
- **Level 4:** Apply statistical and quantitative methods to develop, update, and communicate quality and performance objectives that align with business goals and choosing appropriate measures and analytical techniques to manage performance and achieve these objectives. These methods are then used to establish and update performance baselines and models, and to predict or determine the achievement of quality and performance goals.
- **Level 5:** Utilize statistical and quantitative techniques to align business objectives with strategy and optimize performance, analyzes performance data to assess the organization's ability to meet business objectives and identify areas for improvement, and selecting and implement improvement proposals based on the analysis of their potential impact on achieving and enhancing business, quality, and performance objectives.

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MANAGING SECURITY THREATS & VULNERABILITIES



Intent: Identifies the security threats and vulnerabilities that could compromise the organization or solution, analyzes the potential impacts, and defines and takes actions to address and mitigate them.

Value: Increases an organization's capability and resilience to identify, mitigate, and recover from threats and vulnerabilities.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Enabling	Managing Security and Safety	MSS	SEC	Managing Security Threats and Vulnerabilities	MST	1	2
						2	4
						3	3
						4	1

Practice Group (PG) Level Summary: This PA contains a total of 10 practices.

- **Level 1:** Identify and record security threats and vulnerabilities, and take appropriate actions to address them.
- **Level 2:** Create and maintain a method for managing security threats and vulnerabilities, including up-to-date criteria for evaluation. Use these criteria to prioritize, monitor, and address critical threats and vulnerabilities. Assess and report on the effectiveness of the approach and actions taken to manage these issues.
- **Level 3:** Create, update, and follow an organizational security strategy, approach, and architecture for evaluating, managing, and verifying threats and vulnerabilities. Analyze security verification and validation results to ensure accuracy and consistency across the organization. Assess the effectiveness of the security strategy, approach, and architecture in addressing these threats and vulnerabilities.
- **Level 4:** Use threat intelligence analysis, along with statistical and quantitative techniques, to enhance the security approach and architecture. Select security solutions to address threats and vulnerabilities based on this analysis.

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MONITOR AND CONTROL



Intent: Provides an understanding of the project progress so appropriate corrective actions can be taken when performance deviates significantly from plans.

Value: Increases the probability of meeting objectives by taking early actions to adjust for significant performance deviations.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Planning and Managing Work	PMW	Core	Monitor and Control	MC	1	2
						2	4
						3	4

Practice Group (PG) Level Summary: This PA contains a total of 10 practices.

- **Level 1:** Record task completions and identify and resolve issues.
- **Level 2:** Monitor actual results compared to estimates for size, effort, schedule, resources, knowledge, skills, and budget. Track stakeholder involvement and commitments, oversee the transition to operations and support, and take corrective actions if actual results deviate significantly from plans, managing these issues to resolution.
- **Level 3:** Use an organizational approach to manage the project according to the project plan and process, handle critical dependencies and activities, and monitor the work environment for issues. Address and resolve any issues in collaboration with affected stakeholders.

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ORGANIZATIONAL TRAINING



Intent: Develops the skills and knowledge of personnel so they perform their roles efficiently and effectively.

Value: Enhances individuals' skills and knowledge to improve organizational work performance.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Managing the Workforce	MWF	Core	Organizational Training	OT	1	1
						2	2
						3	6

Practice Group (PG) Level Summary: This PA contains a total of 9 practices.

- **Level 1:** Train people.
- **Level 2:** Identify training needs, provide training to personnel, and maintain records of the training.
- **Level 3:** Create and update both strategic and short-term training plans for the organization. Coordinate training needs and delivery between projects and the organization and use a training capability to address these needs. Evaluate and report on the effectiveness of the training program and maintain accurate training records.

PEER REVIEWS



Intent: Identifies and addresses process performance and work product issues through reviews by the producer's peers or Subject Matter Experts (SMEs).

Value: Reduces cost and rework by uncovering issues or defects early.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Ensuring Quality	ENQ	Core	Peer Reviews	PR	1	1
						2	4
						3	1

Practice Group (PG) Level Summary: This PA contains a total of 6 practices.

- **Level 1:** Perform reviews of work products and record issues
- **Level 2:** Create and update procedures and materials for conducting peer reviews, select work products for review, and perform reviews using established procedures. Address and resolve any issues identified during the peer reviews.
- **Level 3:** Use an organizational approach to analyze results and data from peer reviews.

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PLANNING



Intent: Develops plans to describe what is needed to accomplish the work within the standards and constraints of the organization.

Value: Optimizes cost, functionality, and quality to increase the likelihood of meeting objectives.

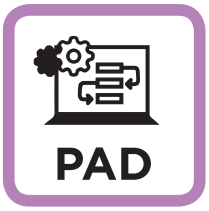
CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Planning and Managing Work	PMW	Core	Planning	PLAN	1	2
						2	8
						3	4
						4	1

Practice Group (PG) Level Summary: This PA contains a total of 15 practices.

- **Level 1:** Develop a list of tasks and assign people to them.
- **Level 2:** Create and continuously update the approach for completing the work, including planning for necessary knowledge and skills. Develop and maintain the budget and schedule based on estimates, plan stakeholder involvement, and prepare for the transition to operations and support. Ensure plans are realistic by reconciling estimates with resource capacity and availability, develop and update the project plan, ensure consistency among its components, and review plans to secure commitments from stakeholders.
- **Level 3:** Utilize the organization's standard processes and tailoring guidelines to develop, update, and follow the project process. Develop and maintain a plan using these processes, organizational assets, and the measurement repository. Identify and negotiate critical dependencies, and plan for the project environment in accordance with organizational standards.
- **Level 4:** Apply statistical and quantitative techniques to develop and continuously update project processes, ensuring they support the achievement of quality and performance objectives.

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PROCESS ASSET DEVELOPMENT



Intent: Develops the process assets necessary to perform the work and keeps them updated.

Value: Provides a capability to understand and repeat successful performance.

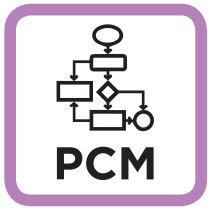
CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Improving	Improving Performance	IMP	Core	Process Asset Development	PAD	1	1
						2	3
						3	6

Practice Group (PG) Level Summary: This PA contains a total of 10 practices.

- **Level 1:** Develop process assets to perform the work.
- **Level 2:** Identify the process assets required for the work, and develop, purchase, or reuse these assets as needed. Ensure that the processes and assets are accessible.
- **Level 3:** Create and maintain a strategy for building and updating organizational process assets. Develop and update a process architecture that outlines the organization's processes and assets. Make these processes and assets available in a process asset library. Develop and update criteria and guidelines for tailoring standard processes and assets, as well as work environment and organizational measurement and analysis standards, and ensure they are accessible for use.

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PROCESS MANAGEMENT



Intent: Manages and implements the continuous performance improvement of processes and infrastructure to meet business objectives by identifying and implementing the most beneficial process improvements and making performance results visible, accessible, and sustainable.

Value: Ensures that processes, infrastructure, and their improvement contribute to successfully meeting business objectives.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Improving	Improving Performance	IMP	Core	Process Management	PCM	1	3
						2	2
						3	6
						4	1

Practice Group (PG) Level Summary: This PA contains a total of 12 practices.

- **Level 1:** Establish a support structure to offer process guidance, resolve process problems, and drive continuous improvement. Evaluate the current process implementation to identify strengths and weaknesses, and address opportunities for improvement or process issues.
- **Level 2:** Identify potential improvements for processes and process assets, then develop, update, and follow plans to implement the selected improvements.
- **Level 3:** Create and maintain process improvement objectives aligned with business goals. Identify key processes that significantly contribute to these objectives. Explore and assess new processes, techniques, methods, and tools to find improvement opportunities. Support the implementation, deployment, and maintenance of process improvements, and deploy organizational standard processes and assets. Evaluate and report on the effectiveness of these improvements in meeting process improvement objectives.
- **Level 4:** Apply statistical and quantitative techniques to validate performance improvements, ensuring they meet proposed expectations, business objectives, or quality and process performance goals.

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PROCESS QUALITY ASSURANCE



Intent: Verifies and enables improvement of the quality of the processes performed and resulting work products.

Value: Increases the consistent use and improvement of the processes to maximize business benefit and customer satisfaction.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Ensuring Quality	ENQ	Core	Process Quality Assurance	PQA	1	1
						2	4
						3	1

Practice Group (PG) Level Summary: This PA contains a total of 6 practices.

- **Level 1:** Identify and address process and work product issues.
- **Level 2:** Create and maintain a quality assurance approach and plan based on historical quality data. Objectively evaluate processes and work products against recorded standards. Communicate quality issues and non-compliance, ensuring they are resolved. Record and utilize the results of quality assurance activities.
- **Level 3:** Identify and record opportunities for improvement discovered during quality assurance activities.

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PRODUCT INTEGRATION



Intent: Integrates and delivers the solution that addresses functionality, performance, and quality requirements.

Value: Increases customers' satisfaction by giving them a solution that meets or exceeds their functionality and quality requirements.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Engineering and Developing Products	EDP	DEV	Product Integration	PI	1	1
						2	6
						3	3

Practice Group (PG) Level Summary: This PA contains a total of 10 practices.

- **Level 1:** Assemble solutions and deliver to the customer.
- **Level 2:** Create and maintain an integration strategy, along with an integration environment. Develop and update procedures and criteria for integrating solutions and components. Ensure that each component is properly identified, and functions as required before integration. Evaluate integrated components to confirm they meet the solution's requirements and design. Integrate solutions and components following the established strategy.
- **Level 3:** Regularly review and update interface or connection descriptions to ensure they are comprehensive and consistent throughout the solution's lifecycle. Before integration, confirm that component interfaces or connections adhere to these descriptions. Assess integrated components for compatibility with the interfaces or connections.

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REQUIREMENTS DEVELOPMENT & MANAGEMENT



Intent: Elicits requirements, confirms common understanding by stakeholders, and aligns requirements, plans, and work products.

Value: Increases likelihood that the solution meets or exceeds customer expectations and needs.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Ensuring Quality	ENQ	Core	Requirements Development and Management	RDM	1	1
						2	5
						3	7

Practice Group (PG) Level Summary: This PA contains a total of 13 practices.

- **Level 1:** Record requirements.
- **Level 2:** Gather and confirm stakeholder needs, expectations, constraints, and interfaces, and ensure understanding of the requirements. Translate these into prioritized customer requirements and secure commitment from project participants for their implementation. Develop and maintain bidirectional traceability between requirements and related activities or work products, ensuring that plans and outputs stay consistent with the requirements.
- **Level 3:** Create and maintain updated requirements for the solution and its components. Develop operational concepts and scenarios and allocate requirements for implementation. Identify and update interface or connection requirements, ensuring they are necessary and sufficient. Balance stakeholder needs and constraints and validate requirements to ensure the solution will perform as intended in its target environment.

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RISK AND OPPORTUNITY MANAGEMENT



Intent: Identifies, records, analyzes, and manages potential risks or opportunities.

Value: Mitigates adverse impacts or capitalizes on positive impacts to increase the likelihood of meeting objectives.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Managing Business Resilience	MBR	Core	Risk and Opportunity Management	RSK	1	1
						2	2
						3	5

Practice Group (PG) Level Summary: This PA contains a total of 8 practices.

- **Level 1:** Identify, record, and continuously update risks and opportunities.
- **Level 2:** Analyze identified risks and opportunities, monitor their status, and communicate updates to affected stakeholders.
- **Level 3:** Identify and utilize categories for risks and opportunities, define parameters for their analysis and handling, and develop and maintain a management strategy and plans for both using an organizational approach. Implement the planned management activities to address the identified risks or opportunities.

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SERVICE DELIVERY MANAGEMENT



Intent: Delivers services and manages the service delivery system.

Value: Increases customer satisfaction by delivering services that meet or exceed customer expectations.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Delivering and Managing Services	DMS	SVC	Service Delivery Management	SDM	1	1
						2	6
						3	1

Practice Group (PG) Level Summary: This PA contains a total of 8 practices.

- **Level 1:** Utilize the service system to provide and manage services.
- **Level 2:** Create, record, and maintain service agreements, and ensure they are followed. Process service requests and deliver services according to these agreements. Analyze existing agreements and service data to prepare for updates or new agreements. Develop and follow procedures for operating and modifying the service system, and verify that the system is ready to support service delivery.
- **Level 3:** Create, record, and maintain organizational standard service systems and agreements, and ensure they are actively used.

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STRATEGIC SERVICE MANAGEMENT



Intent: Develops and deploys standard services that are compatible with strategic business needs and plans.

Value: Increases likelihood of meeting business objectives by aligning standard services with customer needs.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Delivering and Managing Services	DMS	SVC	Strategic Service Management	STSM	1	1
						2	3
						3	1

Practice Group (PG) Level Summary: This PA contains a total of 5 practices.

- **Level 1:** Create a list of the services currently offered.
- **Level 2:** Create and maintain descriptions of current services and use them effectively. Collect, record, and analyze data on strategic needs and capabilities for service delivery. Develop and follow a method for providing new or modified services based on these strategic needs and capabilities.
- **Level 3:** Develop, keep updated, and use the set of organizational standard service descriptions and service levels.

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SUPPLIER AGREEMENT MANAGEMENT



Intent: Selects qualified suppliers, establishes agreements, and manages the resulting supplier and acquirer activities over the term of the agreement.

Value: Maximizes the probability of mutual success for acquirers and suppliers.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Selecting and Managing Suppliers	SMS	SPM	Supplier Agreement Management	SAM	1	4
						2	5
						3	2
						4	1

Practice Group (PG) Level Summary: This PA contains a total of 12 practices.

- **Level 1:** Identify, evaluate, and choose suppliers, then develop and record the supplier agreement. Accept or reject the deliverables from suppliers and process their invoices.
- **Level 2:** Identify evaluation criteria and potential suppliers, and distribute requests to them. Evaluate supplier responses based on the criteria and select suppliers. Manage supplier activities as outlined in the agreement, keeping it updated, and verify that the agreement is met before accepting deliverables. Handle supplier invoices according to the terms of the agreement.
- **Level 3:** Conduct technical reviews of supplier performance and deliverables, and manage supplier performance and processes according to the criteria outlined in the supplier agreement.
- **Level 4:** Choose appropriate measures and use analytical techniques to quantitatively manage suppliers, verifying that they meet their performance targets.

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TECHNICAL SOLUTION



Intent: Designs and builds solutions that meet requirements.

Value: Provides a cost-effective design and solution that meets customer requirements and reduces rework.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Engineering and Developing Products	EDP	DEV	Technical Solution	TS	1	1
						2	3
						3	6

Practice Group (PG) Level Summary: This PA contains a total of 10 practices.

- **Level 1:** Develop a solution that satisfies the specified requirements.
- **Level 2:** Design and construct a solution to meet the requirements, evaluate the design to address any issues, and provide guidance on how to use the solution effectively.
- **Level 3:** Create criteria for making design decisions and develop alternative solutions for selected components. Conduct a build, buy, or reuse analysis to determine the best approach. Choose solutions based on the design criteria, and develop, update, and use the necessary information for implementation. Design solution interfaces or connections using established criteria.

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VERIFICATION AND VALIDATION



Intent: Confirms selected solutions and components meet their requirements, and demonstrates selected solutions and components fulfill their intended use in their target environment.

Value: Increases the likelihood that the solution will satisfy the customer.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Doing	Ensuring Quality	ENQ	Core	Verification and Validation	VV	1	2
						2	3
						3	2

Practice Group (PG) Level Summary: This PA contains a total of 7 practices.

- **Level 1:** Conduct verification to ensure requirements are implemented correctly, recording and communicating the results. Perform validation to confirm that the solution functions as intended in its target environment, and record and communicate these results as well.
- **Level 2:** Choose components and methods for verification and validation. Develop and maintain the necessary environment for these processes, and develop, update, and follow procedures for verification and validation.
- **Level 3:** Create and maintain criteria for verification and validation, and use them consistently, then analyze and communicate the results of these verification and validation activities.

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WORKFORCE EMPOWERMENT



Intent: Aligns the workforce to the organization's business objectives and empowers individuals and workgroups to perform their roles efficiently and effectively.

Value: Enhances the capability of the workforce to contribute to the success of the business.

CATEGORY	CAPABILITY AREA (CA)	CA	CORE/ DOMAIN	PRACTICE AREA (PA)	PA	PG LEVEL	PRACTICE COUNT
Managing	Managing the Workforce	MWF	PPL	Workforce Empowerment	WE	1	1
						2	3
						3	3

Practice Group (PG) Level Summary: This PA contains a total of 7 practices.

- **Level 1:** Identify and assign commitments to the relevant workgroups.
- **Level 2:** Record and assign work assignments, updating them based on qualifications, skills, and other criteria. Manage transitions of individuals in and out of roles and workgroups. Develop and maintain communication and coordination mechanisms both within and between workgroups.
- **Level 3:** Create and maintain workforce competencies to enhance organizational capabilities and meet objectives. Develop and update an organizational structure and approach to empower workgroups. Establish and regularly update organizational compensation strategies and mechanisms.

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Sample Practice Area: PQA

Below is an excerpt from a Practice Area in the CMMI Model to demonstrate the differences between it and the Practice Area summaries in this Quick Reference Guide. This provides a small glimpse into the type of depth and richness of content available across each of the Practice Areas.

Process Quality Assurance (PQA)

PQA Overview

Required PA Information

Intent

Verifies and enables improvement of the quality of the processes performed and resulting work products.

Value

Increases the consistent use and improvement of the processes to maximize business benefit and customer satisfaction.

Additional Required PA Information

This section left blank for future content.

Explanatory PA Information

Practice Summary

Level 1

PQA 1.1	Identify and address process and work product issues.

Level 2

PQA 2.1	Develop, keep updated, and follow a quality assurance approach and plan based on historical quality data.
PQA 2.2	Objectively evaluate selected performed processes and work products against the recorded process and applicable standards.
PQA 2.3	Communicate quality and non-compliance issues and ensure their resolution.
PQA 2.4	Record and use results of quality assurance activities.

Level 3

PQA 3.1	Identify and record opportunities for improvement during quality assurance activities.

Additional PA Explanatory Information

Objectivity in process quality assurance evaluations is critical to the success of the project. Evaluators should not evaluate their own work. Personnel independent from the project typically perform objective evaluations using defined criteria and a set of methods. These evaluations are a check of the performed processes and resulting work products against applicable process descriptions, standards, and procedures. Senior management takes an active role in process quality assurance by regularly reviewing results and taking action as needed.

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A typical project applying quality assurance will:

- Demonstrate more consistent process implementation
- Have better insight into the project's results and issues
- Have better visibility into the project performance

Quality assurance verifies compliance with implementation to address issues such as:

- Incorrect and incomplete requirements
- Insufficient release planning
- Unresolved defects

Often, the verification and validation processes evaluate the same work products as quality assurance. Quality assurance focuses on determining that the verification and validation activities are done by following their recorded processes. Verification focuses on satisfaction of requirements. Validation confirms that the product works as intended in its target environment.

Promote an environment that encourages personnel to participate in identifying and reporting quality issues.

Related Practice Areas

Verification and Validation (VV)

Context Specific

Agile Development

Context Tag:	Agile Development
Context:	Integrate agile techniques and ceremonies with other processes.

Ensure that objective evaluations are integrated into the team's techniques or rhythms, e.g., as part of daily standups, story point estimation, code reviews, use of tools, continuous integration, and retrospectives.

An agile project has many opportunities to objectively evaluate ceremonies and work products, such as when:

- User stories are examined in the backlog grooming ceremony
- The Scrum Master coaches the team during scrum ceremonies
- Feedback on what was built is obtained in the Sprint review
- The retrospective ceremony reviews prior accomplishments and identifies opportunities for improvement for the next iteration
- Management or peers observe agile ceremonies being performed using techniques such as a gemba walk

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Explore the many ways organizations can get started with CMMI by browsing the resources at: CMMIinstitute.com and CMMI Performance Solutions on isaca.org.

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