SEI CMMI - KEY PROCESS AREAS

A Process Area is a cluster of related practices in an area that, when implemented collectively, satisfy a set of goals considered important for making significant improvement in that area. All CMMI process areas are common to both continuous and staged representations.

The continuous representation enables the organization to choose the focus of its process improvement efforts by choosing those process areas, or sets of interrelated process areas, that best benefit the organization and its business objectives. Although there are some limits on what an organization can choose because of the dependencies among process areas, the organization has considerable freedom in its selection.

Once you select the process areas, you must also select how much you would like to improve the processes associated with those process areas $i.e., select the appropriate capability level$. Capability levels, and generic goals and practices, support the improvement of processes in individual process areas.

Conversely, you will see that the staged representation encourages you to always look at process areas in the context of the maturity level to which they belong. The process areas are organized by maturity levels to reinforce this concept. When you use a process area, you use the entire process area i.e, all goals and all practices.

The CMMI Process Areas PAs can be grouped into the following four categories to understand their interactions and links with one another regardless of their defined levels:

- Process Management
- Project Management
- Engineering
- Support

Each process area is defined by a set of goals and practices. There are two categories of goals and practices:

- **Generic goals and practices** : They are a part of every process area.
- **Specific goals and practices** : They are specific to a given process area.

A process area is satisfied when the processes of a company cover all of the generic and specific goals and practices for that process area.

Generic Goals and Practices

Generic goals and practices are a part of every process area.

NOTATIONS : GG --> Generic Goals and GP --> Generic Practice

- GG 1 Achieve Specific Goals
    - GP 1.1 Perform Specific Practices
- GG 2 Institutionalize a Managed Process
    - GP 2.1 Establish an Organizational Policy
    - GP 2.2 Plan the Process
    - GP 2.3 Provide Resources
    - GP 2.4 Assign Responsibility
    - GP 2.5 Train People
    - GP 2.6 Manage Configurations

- GP 2.7 Identify and Involve Relevant Stakeholders
        - GP 2.8 Monitor and Control the Process
        - GP 2.9 Objectively Evaluate Adherence
        - GP 2.10 Review Status with Higher Level Management
    - GG 3 Institutionalize a Defined Process
        - GP 3.1 Establish a Defined Process
        - GP 3.2 Collect Improvement Information
    - GG 4 Institutionalize a Quantitatively Managed Process
        - GP 4.1 Establish Quantitative Objectives for the Process
        - GP 4.2 Stabilize Sub process Performance
    - GG 5 Institutionalize an Optimizing Process
        - GP 5.1 Ensure Continuous Process Improvement
        - GP 5.2 Correct Root Causes of Problems

Common Features

The common features are attributes that indicate whether the implementation and institutionalization of a key process area is effective, repeatable, and lasting. The five common features are listed below:

- **Commitment to Perform** : Commitment to Perform describes the actions, the organization must take to ensure that the process is established and will endure. Commitment to Perform typically involves establishing organizational policies and senior management sponsorship.

- **Ability to Perform** : Ability to Perform describes the preconditions that must exist in the project or organization to implement the software process competently. Ability to Perform typically involves resources, organizational structures, and training.

- **Activities Performed** : Activities Performed describes the roles and procedures necessary to implement a key process area. Activities Performed typically involve establishing plans and procedures, performing the work, tracking it, and taking corrective actions as necessary.

- **Measurement and Analysis** : Measurement and Analysis describes the need to measure the process and analyze the measurements. Measurement and Analysis typically includes examples of the measurements that could be taken to determine the status and effectiveness of the Activities Performed.

- **Verifying Implementation** : Verifying Implementation describes the steps to ensure that the activities are performed in compliance with the process that has been established. Verification typically encompasses reviews and audits by management and software quality assurance.

The practices in the common feature Activities Performed describe what must be implemented to establish a process capability. The other practices, taken as a whole, form the basis by which an organization can institutionalize the practices described in the Activities Performed common feature.

Process Areas in Detail

The CMMI contains 22 process areas indicating the aspects of product development that are to be covered by company processes.

Causal Analysis and Resolution

- It is a support process area at Maturity Level 5.

Purpose

The purpose of **Causal Analysis and Resolution** *CAR* is to identify causes of defects and other problems and take action to prevent them from occurring in the future.

Specific Practices by Goal

- SG 1 Determine Causes of Defects
    - SP 1.1 Select Defect Data for Analysis
    - SP 1.2 Analyze Causes
- SG 2 Address Causes of Defects
    - SP 2.1 Implement the Action Proposals
    - SP 2.2 Evaluate the Effect of Changes
    - SP 2.3 Record Data

Configuration Management

- It is a support process area at Maturity Level 2.

Purpose

The purpose of **Configuration Management** *CM* is to establish and maintain the integrity of work products using configuration identification, configuration control, configuration status accounting, and configuration audits.

Specific Practices by Goal

- SG 1 Establish Baselines
    - SP 1.1 Identify Configuration Items
    - SP 1.2 Establish a Configuration Management System
    - SP 1.3 Create or Release Baselines
- SG 2 Track and Control Changes
    - SP 2.1 Track Change Requests
    - SP 2.2 Control Configuration Items
- SG 3 Establish Integrity
    - SP 3.1 Establish Configuration Management Records
    - SP 3.2 Perform Configuration Audits

Decision Analysis and Resolution

- It is a support process area at Maturity Level 3.

Purpose

The purpose of **Decision Analysis and Resolution** *DAR* is to analyze possible decisions using a formal evaluation process that evaluates identified alternatives against established criteria.

Specific Practices by Goal

- SG 1 Evaluate Alternatives
    - SP 1.1 Establish Guidelines for Decision Analysis
    - SP 1.2 Establish Evaluation Criteria
    - SP 1.3 Identify Alternative Solutions
    - SP 1.4 Select Evaluation Methods

- SP 1.5 Evaluate Alternatives
- SP 1.6 Select Solutions

Integrated Project Management + IPPD

- It is a Project Management process area at Maturity Level 3.

Purpose

The purpose of **Integrated Project Management + IPPD** *IPM* is to establish and manage the project and the involvement of the relevant stakeholders according to an integrated and defined process that is tailored from the organization's set of standard processes.

Specific Practices by Goal

- SG 1 Use the Project's Defined Process
  - SP 1.1 Establish the Project's Defined Process
  - SP 1.2 Use Organizational Process Assets for Planning Project Activities
  - SP 1.3 Establish the Project's Work Environment
  - SP 1.4 Integrate Plans
  - SP 1.5 Manage the Project Using the Integrated Plans
  - SP 1.6 Contribute to the Organizational Process Assets
- SG 2 Coordinate and Collaborate with Relevant Stakeholders
  - SP 2.1 Manage Stakeholder Involvement
  - SP 2.2 Manage Dependencies
  - SP 2.3 Resolve Coordination Issues

IPPD Addition:

- SG 3 Apply IPPD Principles
  - SP 3.1 Establish the Project's Shared Vision
  - SP 3.2 Establish the Integrated Team Structure
  - SP 3.3 Allocate Requirements to Integrated Teams
  - SP 3.4 Establish Integrated Teams
  - SP 3.5 Ensure Collaboration among Interfacing Teams

Measurement and Analysis

- It is a support process area at Maturity Level 2.

Purpose

The purpose of **Measurement and Analysis** *MA* is to develop and sustain a measurement capability that is used to support management information needs.

Specific Practices by Goal

- SG 1 Align Measurement and Analysis Activities
  - SP 1.1 Establish Measurement Objectives
  - SP 1.2 Specify Measures
  - SP 1.3 Specify Data Collection and Storage Procedures
  - SP 1.4 Specify Analysis Procedures
- SG 2 Provide Measurement Results

- SP 2.1 Collect Measurement Data

- SP 2.2 Analyze Measurement Data

- SP 2.3 Store Data and Results

- SP 2.4 Communicate Results

Organizational Innovation and Deployment

- It is a Process Management process area at Maturity Level 5.

Purpose

The purpose of **Organizational Innovation and Deployment** *OID* is to select and deploy incremental and innovative improvements that measurably improve the organization's processes and technologies. The improvements support the organization's quality and process-performance objectives as derived from the organization's business objectives.

Specific Practices by Goal

- SG 1 Select Improvements
    - SP 1.1 Collect and Analyze Improvement Proposals
    - SP 1.2 Identify and Analyze Innovations
    - SP 1.3 Pilot Improvements
    - SP 1.4 Select Improvements for Deployment
- SG 2 Deploy Improvements
    - SP 2.1 Plan the Deployment areas
    - SP 2.2 Manage the Deployment
    - SP 2.3 Measure Improvement Effects

Organizational Process Definition + IPPD

- It is a Process Management process area at Maturity Level 3.

Purpose

The purpose of **Organizational Process Definition + IPPD** *OPD* is to establish and maintain a usable set of organizational process assets.

Specific Practices by Goal

- SG 1 Establish Organizational Process Assets
    - SP 1.1 Establish Standard Processes
    - SP 1.2 Establish Life-Cycle Model Descriptions
    - SP 1.3 Establish Tailoring Criteria and Guidelines
    - SP 1.4 Establish the Organization's Measurement Repository
    - SP 1.5 Establish the Organization's Process Asset Library

IPPD Addition:

- SG 2 Enable IPPD Management
    - SP 2.1 Establish Empowerment Mechanisms
    - SP 2.2 Establish Rules and Guidelines for Integrated Teams
    - SP 2.3 Balance Team and Home Organization Responsibilities

Organizational Process Focus

- It is a Process Management process area at Maturity Level 3.

Purpose

The purpose of **Organizational Process Focus** *OPF* is to plan and implement organizational process improvement based on a thorough understanding of the current strengths and weaknesses of the organization's processes and process assets.

Specific Practices by Goal

- SG 1 Determine Process Improvement Opportunities
  - SP 1.1 Establish Organizational Process Needs
  - SP 1.2 Appraise the Organization's Processes
  - SP 1.3 Identify the Organization's Process Improvements
- SG 2 Plan and Implement Process Improvement Activities
  - SP 2.1 Establish Process Action Plans
  - SP 2.2 Implement Process Action Plans
- SG 3 Deploy Organizational Process Assets and Incorporate Lessons Learned
  - SP 3.1 Deploy Organizational Process Assets
  - SP 3.2 Deploy Standard Processes
  - SP 3.3 Monitor Implementation
  - SP 3.4 Incorporate Process-Related Experiences into the Organizational Process Assets

Organizational Process Performance

- It is a Process Management process area at Maturity Level 4.

Purpose

The purpose of **Organizational Process Performance** *OPP* is to establish and maintain a quantitative understanding of the performance of the organization's set of standard processes in support of quality and process-performance objectives, and to provide the process performance data, baselines, and models to quantitatively manage the organization's projects.

Specific Practices by Goal

- SG 1 Establish Performance Baselines and Models
  - SP 1.1 Select Processes
  - SP 1.2 Establish Process Performance Measures
  - SP 1.3 Establish Quality and Process Performance Objectives
  - SP 1.4 Establish Process Performance Baselines
  - SP 1.5 Establish Process Performance Models

Organizational Training

- It is a Process Management process area at Maturity Level 3.

Purpose

The purpose of **Organizational Training** *OT* is to develop the skills and knowledge of people so they can perform their roles effectively and efficiently.

Specific Practices by Goal

- SG 1 Establish an Organizational Training Capability
    - SP 1.1 Establish the Strategic Training Needs
    - SP 1.2 Determine Which Training Needs Are the Responsibility of the Organization
    - SP 1.3 Establish an Organizational Training Tactical Plan
    - SP 1.4 Establish Training Capability
- SG 2 Provide Necessary Training
    - SP 2.1 Deliver Training
    - SP 2.2 Establish Training Records
    - SP 2.3 Assess Training Effectiveness

Product Integration

- It is an Engineering process area at Maturity Level 3.

Purpose

The purpose of **Product Integration** PI is to assemble the product from the product components, ensure that the product, as integrated, functions properly, and deliver the product.

Specific Practices by Goal

- SG 1 Prepare for Product Integration
    - SP 1.1 Determine Integration Sequence
    - SP 1.2 Establish the Product Integration Environment
    - SP 1.3 Establish Product Integration Procedures and Criteria
- SG 2 Ensure Interface Compatibility
    - SP 2.1 Review Interface Descriptions for Completeness
    - SP 2.2 Manage Interfaces
- SG 3 Assemble Product Components and Deliver the Product
    - SP 3.1 Confirm Readiness of Product Components for Integration
    - SP 3.2 Assemble Product Components
    - SP 3.3 Evaluate Assembled Product Components
    - SP 3.4 Package and Deliver the Product or Product Component

Project Monitoring and Control

- It is a Project Management process area at Maturity Level 2.

Purpose

The purpose of **Project Monitoring and Control** PMC is to provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan.

Specific Practices by Goal

- SG 1 Monitor Project Against Plan
    - SP 1.1 Monitor Project Planning Parameters
    - SP 1.2 Monitor Commitments
    - SP 1.3 Monitor Project Risks
    - SP 1.4 Monitor Data Management

- SP 1.5 Monitor Stakeholder Involvement
- SP 1.6 Conduct Progress Reviews
- SP 1.7 Conduct Milestone Reviews
- SG 2 Manage Corrective Action to Closure
  - SP 2.1 Analyze Issues
  - SP 2.2 Take Corrective Action
  - SP 2.3 Manage Corrective Action

Project Planning

- It is a Project Management process area at Maturity Level 2.

Purpose

The purpose of **Project Planning** PP is to establish and maintain plans that define project activities.

Specific Practices by Goal

- SG 1 Establish Estimates
  - SP 1.1 Estimate the Scope of the Project
  - SP 1.2 Establish Estimates of Work Product and Task Attributes
  - SP 1.3 Define Project Life Cycle
  - SP 1.4 Determine Estimates of Effort and Cost
- SG 2 Develop a Project Plan
  - SP 2.1 Establish the Budget and Schedule
  - SP 2.2 Identify Project Risks
  - SP 2.3 Plan for Data Management
  - SP 2.4 Plan for Project Resources
  - SP 2.5 Plan for Needed Knowledge and Skills
  - SP 2.6 Plan Stakeholder Involvement
  - SP 2.7 Establish the Project Plan
- SG 3 Obtain Commitment to the Plan
  - SP 3.1 Review Plans that Affect the Project
  - SP 3.2 Reconcile Work and Resource Levels
  - SP 3.3 Obtain Plan Commitment

Process and Product Quality Assurance

- It is a support process area at Maturity Level 2.

Purpose

The purpose of **Process and Product Quality Assurance** $PPQA$ is to provide staff and management with objective insight into processes and associated work products.

Specific Practices by Goal

- SG 1 Objectively Evaluate Processes and Work Products
  - SP 1.1 Objectively Evaluate Processes

- - SP 1.2 Objectively Evaluate Work Products and Services
- SG 2 Provide Objective Insight
  - SP 2.1 Communicate and Ensure Resolution of Noncompliance Issues
  - SP 2.2 Establish Records

Quantitative Project Management

- It is a Project Management process area at Maturity Level 4.

Purpose

The purpose of the **Quantitative Project Management** QPM process area is to quantitatively manage the project's defined process to achieve the project's established quality and process-performance objectives.

Specific Practices by Goal

- SG 1 Quantitatively Manage the Project
  - SP 1.1 Establish the Project's Objectives
  - SP 1.2 Compose the Defined Processes
  - SP 1.3 Select the Sub-processes that Will Be Statistically Managed
  - SP 1.4 Manage Project Performance
- SG 2 Statistically Manage Sub-process Performance
  - SP 2.1 Select Measures and Analytic Techniques
  - SP 2.2 Apply Statistical Methods to Understand Variation
  - SP 2.3 Monitor Performance of the Selected Sub-processes
  - SP 2.4 Record Statistical Management Data

Requirements Development

- It is an Engineering process area at Maturity Level 3.

Purpose

The purpose of **Requirements Development** RD is to produce and analyze customer, product, and product-component requirements.

Specific Practices by Goal

- SG 1 Develop Customer Requirements
  - SP 1.1 Elicit Needs
  - SP 1.2 Develop the Customer Requirements
- SG 2 Develop Product Requirements
  - SP 2.1 Establish Product and Product-Component Requirements
  - SP 2.2 Allocate Product-Component Requirements
  - SP 2.3 Identify Interface Requirements
- SG 3 Analyze and Validate Requirements
  - SP 3.1 Establish Operational Concepts and Scenarios
  - SP 3.2 Establish a Definition of Required Functionality
  - SP 3.3 Analyze Requirements
  - SP 3.4 Analyze Requirements to Achieve Balance

- SP 3.5 Validate Requirements

Requirements Management

- It is an Engineering process area at Maturity Level 2.

Purpose

The purpose of **Requirements Management** *REQM* is to manage the requirements of the project's products and product components and to identify inconsistencies between those requirements and the project's plans and work products.

Specific Practices by Goal

- SG 1 Manage Requirements
    - SP 1.1 Obtain an Understanding of Requirements
    - SP 1.2 Obtain Commitment to Requirements
    - SP 1.3 Manage Requirements Changes
    - SP 1.4 Maintain Bidirectional Traceability of Requirements
    - SP 1.5 Identify Inconsistencies between Project Work and Requirements

Risk Management

- It is a Project Management process area at Maturity Level 3.

Purpose

The purpose of **Risk Management** *RSKM* is to identify potential problems before they occur so that risk-handling activities can be planned and invoked as needed across the life of the product or project to mitigate adverse impacts on achieving objectives.

Specific Practices by Goal

- SG 1 Prepare for Risk Management
    - SP 1.1 Determine Risk Sources and Categories
    - SP 1.2 Define Risk Parameters
    - SP 1.3 Establish a Risk Management Strategy
- SG 2 Identify and Analyze Risks
    - SP 2.1 Identify Risks
    - SP 2.2 Evaluate, Categorize, and Prioritize Risks
- SG 3 Mitigate Risks
    - SP 3.1 Develop Risk Mitigation Plans
    - SP 3.2 Implement Risk Mitigation Plans

Supplier Agreement Management

- It is a Project Management process area at Maturity Level 2.

Purpose

The purpose of **Supplier Agreement Management** *SAM* is to manage the acquisition of products from suppliers for which there exists a formal agreement.

Specific Practices by Goal

- SG 1 Establish Supplier Agreements

- - SP 1.1 Determine Acquisition Type
    - SP 1.2 Select Suppliers
    - SP 1.3 Establish Supplier Agreements
  - SG 2 Satisfy Supplier Agreements
    - SP 2.1 Execute the Supplier Agreement
    - SP 2.2 Monitor Selected Supplier Processes
    - SP 2.3 Evaluate Selected Supplier Work Products
    - SP 2.4 Accept the Acquired Product
    - SP 2.5 Transition Products

Technical Solution

- It is an Engineering process area at Maturity Level 3.

Purpose

The purpose of **Technical Solution** *TS* is to design, develop, and implement solutions to requirements. Solutions, designs, and implementations encompass products, product components, and product-related life-cycle processes either single or in combination as appropriate.

Specific Practices by Goal

- SG 1 Select Product-Component Solutions
  - SP 1.1 Develop Alternative Solutions and Selection Criteria
  - SP 1.2 Select Product Component Solutions
- SG 2 Develop the Design
  - SP 2.1 Design the Product or Product Component
  - SP 2.2 Establish a Technical Data Package
  - SP 2.3 Design Interfaces Using Criteria
  - SP 2.4 Perform Make, Buy, or Reuse Analysis
- SG 3 Implement the Product Design
  - SP 3.1 Implement the Design
  - SP 3.2 Develop Product Support Documentation

Validation

- It is an Engineering process area at Maturity Level 3.

Purpose

The purpose of **Validation** *VAL* is to demonstrate that a product or product component fulfills its intended use when placed in its intended environment.

Specific Practices by Goal

- SG 1 Prepare for Validation
  - SP 1.1 Select Products for Validation
  - SP 1.2 Establish the Validation Environment
  - SP 1.3 Establish Validation Procedures and Criteria
- SG 2 Validate Product or Product Components
  - SP 2.1 Perform Validation

- SP 2.2 Analyze Validation Results.

Verification

- It is an Engineering process area at Maturity Level 3.

Purpose

The purpose of **Verification** *VER* is to ensure that selected work products meet their specified requirements.

Specific Practices by Goal

- SG 1 Prepare for Verification
    - SP 1.1 Select Work Products for Verification
    - SP 1.2 Establish the Verification Environment
    - SP 1.3 Establish Verification Procedures and Criteria
- SG 2 Perform Peer Reviews
    - SP 2.1 Prepare for Peer Reviews
    - SP 2.2 Conduct Peer Reviews
    - SP 2.3 Analyze Peer Review Data
- SG 3 Verify Selected Work Products
    - SP 3.1 Perform Verification
    - SP 3.2 Analyze Verification Results

Changes Made into Version 1.2

Only those changes that are made to the set of Process Areas are considered here. For a comprehensive detail, visit the [SEI homepage](#).

- The following Process Areas have been removed *allonMaturityLevel3*:
    - Organizational Environment for Integration *OEI*
    - Integrated Teaming *IT*
    - Integrated Supplier Management *ISM*
- The following additions have been made within existing Process Areas:
    - IPM . SG3 and SG4 were eliminated, new SG3 was added *allIPPDPAs*
    - OPD . SG was added, turning it in an IPPD PA
    - OPF . two SPs were extracted from SG and created SG3 together with two new SPs
    - REQD . SP3.5 was renamed Validate Requirements
    - SAM . SP2.1 was eliminated, two new SPs added in SG2
    - TS . SP1.2 was eliminated
    - VER . SP3.2 was renamed Analyze Verification Results

Processing math: 100%