

CMMI Implementation with Digité Enterprise

Abstract

In an increasingly competitive world, software organizations must implement effective processes to deliver useful and reliable software in time and within budget. IT organizations are adapting CMMI models to help them streamline their software development activities. Digité Enterprise platform has successfully supported corporate clients over the past two years to manage more than a billion dollars worth of software projects. Digité Enterprise now supports organizations implementing CMMI by providing support for CMMI process areas and key practices implementation. To understand how Digité can help your organization in its CMMI implementation roadmap, read on...

Introduction

In an increasingly competitive world, software organizations must implement effective processes to deliver useful and reliable software in time and within budget. CMM Integration models define key elements of effective processes and provide guidance for improving organization's processes. CMM Integration (CMMI for short) places proven approaches into a structure that helps an organization appraise its organizational maturity or process area capability, establish priorities for improvement, and implement these improvements.

Digité provides a web-based, integrated, workflow-driven collaborative platform for process and program management for IT organizations. With a comprehensive set of software project management and development lifecycle management features, Digité Enterprise has helped corporate clients to manage over a billion dollars worth of software projects. Through successive refinements and product enhancements, Digité version 4.x now supports successful implementation and monitoring of CMMI practices across the enterprise. This whitepaper describes how organizations implementing CMMI can benefit from deploying Digité Enterprise.

CMMI A Brief Overview

CMMI models define several *Process Areas* that indicate where an organization should focus to improve its software process. These Process Areas are further classified under four categories, namely Process Management, Project Management, Engineering and Support. The Process Areas defined by CMMI models are listed below:

Process Management	Project Management	Engineering	Support
Organizational Process Focus	Project Planning	Requirements Development	Configuration Management
Organizational Process Definition	Project Monitoring and Control	Requirements Management	Process and Product Quality Assurance
Organizational Training	Supplier Agreement Management	Technical Solution	Measurement and Analysis
Organizational Process Performance	Integrated Project Management	Product Integration	Organizational Environment for Integration
Organizational Innovation and Deployment	Risk Management	Verification	Decision Analysis and Resolution
-	Integrated Teaming	Validation	Causal Analysis and Resolution
-	Quantitative Project Management	-	-

For each Process Area, CMMI models define:

- a) Specific and general goals to achieve maturity in the process area
- b) A set of specific and generic practices to achieve the goals
- c) A capability level associated with each specific and generic practice

Further, CMMI defines five maturity levels to support and guide process improvement. The so-called *Staged Representation* of CMMI groups Process Areas

CMMI Implementation with Digité Enterprise

For organizations already implementing CMMI and looking for a tool to manage the implementation, Digité provides configurable templates, SDLC process maps and customizable metrics components for automating the standard organization software processes. It is possible that such organizations employ a number of different tools that implement one or more CMMI practices. Using industry-standard web services protocol or custom protocols, Digité can integrate with these other tools as required in the CMMI implementation context.

For organizations planning CMMI implementation for the first time, Digité helps reduce cycle time by providing a set of factory-shipped templates, SDLC process maps and metrics components that comply with CMMI practices. However, Digité would recommend that organizations seek suitable expert help in ensuring that the processes implemented on Digité are appropriate and adequate for meeting their CMMI implementation objectives.

Process Management

Key Process Areas

- ❖ Organization Process Focus (Level 3)
- ❖ Organization Process Definition (Level 3)
- ❖ Organizational Training (Level 3)
- ❖ Organizational Process Performance (Level 4)
- ❖ Organizational Innovation & Deployment (Level 5)

Using Digité, an organization can define Process Templates for their standard software processes. Process Templates can be defined by a special group in the organization (say, the Software Engineering Process Group) and deployed across the organization. When required, Project Managers can create a process template specific to the project they execute. A process template typically defines the following elements:

1. Phase Tree defining the lifecycle of the Process
2. Project Roles and their Access Privileges
3. Standard Workflow Definitions
4. Standard Business Process Map and Process Steps
5. Entry/Exit Criteria for each phase
6. Standard Activities for each phase
7. Standard Deliverables
8. Standard Documents
9. Standard (MS Project/AutoPlan) Task Template
10. Standard Dashboard Components

Each process template contains embedded in it, the Tailoring Guidelines that define the extent of customization permitted for the template. Different process templates may be created for different types of projects and made available to all projects within the organization. The organizations process templates and related assets are therefore centrally managed.

Each Digité process template has Process Capability Baseline (PCB) metrics associated with it. The PCB contains mean, LCL & UCL values for all applicable metrics associated with the process. Members of the process management group can monitor performance metrics of organization-wide projects implementing a given process and perform analysis both online and offline on the process metrics.

Process Improvement opportunities are identified based on process performance

identified opportunities, Process Improvement Plans are formulated by the process management group and tracked using Digité task management utilities. Standard processes are defined using Digité process management framework to plan, pilot, deploy and measure process improvements and innovations.

Taken together, these features help Digité satisfy goals and practices of the Organization Process Focus, Organization Process Definition, Organizational Process Performance and Organizational Innovation & Deployment process areas.

Digité provides support for tracking training goals and fulfillment status of all organizational members. The training responsibilities are also defined and implemented using appropriate workflow processes. Project Managers and organization heads can initiate training requests and monitor fulfillment status using this workflow. This feature realizes the goals and practices defined for the Organizational Training process area.

Project Management

Key Process Areas

- ❖ Project Planning (Level 2)
- ❖ Project Monitoring and Control (Level 2)
- ❖ Supplier Agreement Management (Level 2)
- ❖ Integrated Project Management (Level 3)
- ❖ Risk Management (Level 3)
- ❖ Quantitative Project Management (Level 4)

Digité supports the goals and practices of Project Planning, Project Monitoring & Control, Supplier Agreement Management and Integrated Project Management by providing the following:

- ❖ Facility to define and implement appropriate project initiation, execution and closure workflows based on pre-defined approval criteria
- ❖ Tight integration with MS Project and proprietary AutoPlan tool to define project schedule and work breakdown structure
- ❖ Timesheet management utility to capture effort, schedule and progress data from project team members, automatic update of project plan and computation of effort and schedule related metrics at individual task level and summarize data at phase, project, program or an arbitrary organization level to track and oversee projects
- ❖ Facility to deploy standard process templates and tailor them for individual projects using appropriate guidelines defined by the process management group
- ❖ Ability to capture data from supplier organization through internet and set up workflow processes for supplier performance tracking and to deal with supplier contractual procedures
- ❖ Facility to define project goals based on standard process capability baselines and track project's performance with relation to defined goals

Digité Enterprise includes Risk Management functions to identify project risks, associate risk probability and impact, and track risk index through the project lifecycle.

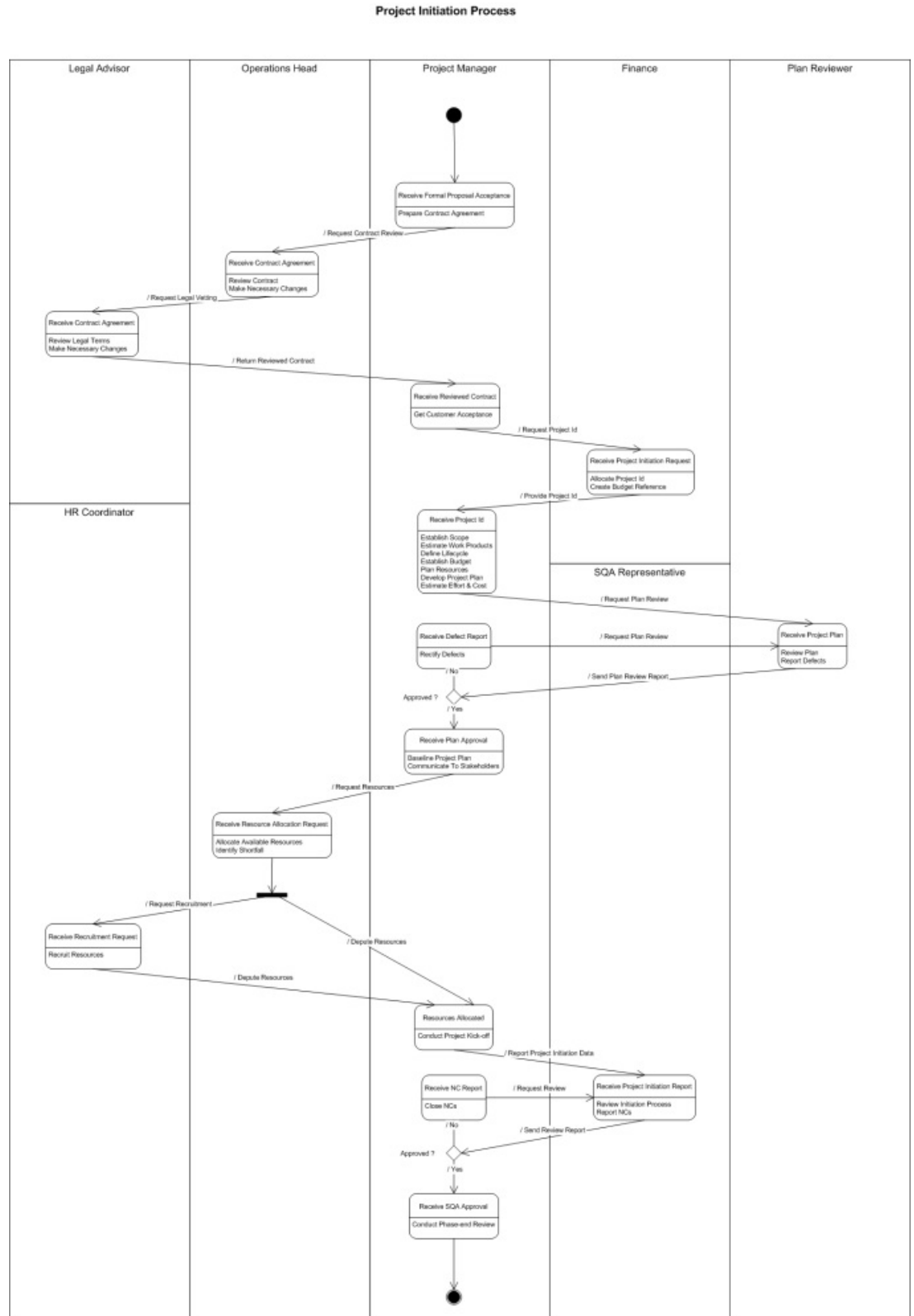


Figure 1 - A Typical Project Initiation Process

Engineering

Key Process Areas

- ❖ Requirements Management (Level 2)
 - ❖ Requirements Development (Level 3)
 - ❖ Technical Solution (Level 3)
 - ❖ Product Integration (Level 3)
 - ❖ Verification (Level 3)
 - ❖ Validation (Level 3)

Using Digité Requirements Development & Management functions, project teams can collect stakeholder needs and collaboratively develop customer requirements, product requirements, component requirements and interface requirements. Operational concepts can be explored and documented using Document Management functionality. Using appropriate workflows and processes commitments to requirements can be obtained from various stakeholders and changes to requirements managed using a standard procedure. Using Traceability Management, bidirectional traceability between requirements and other work products can be maintained. Digité provides a limited built-in functionality to import and export requirements from and to third-party Requirements Management tools.

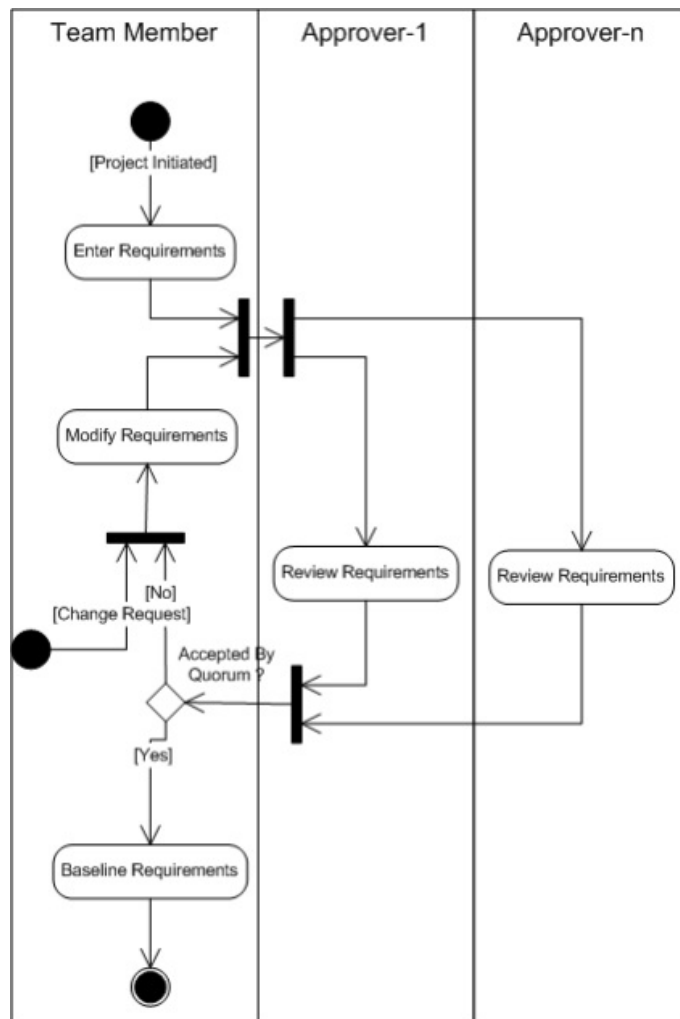


Figure 1 - A Typical Project Initiation Process

CMMI Implementation with Digité Enterprise

Organizations need to employ platform-specific development tools to design and implement technical solution and product integration. Digité provides Deliverables Management utility to define and track size, effort and defect metrics of design and implementation work products and their different versions. While size metrics must be updated manually, the utility can track and compute other metrics based on initial definitions automatically. Where needed, a custom adapter can be developed and deployed to interface with the development tools to obtain size and other relevant configuration information. Hierarchical relationship between deliverables can be set up to the level of granularity required for effective Traceability Management.

Digité has customizable, workflow-driven and checklist-assisted review functionality to support Verification & Validation Goals and Practices. Test Management utility provides means to define and execute tests, capture and analyze test results. Defects, issues and non-conformances identified during the course of verification and validation activities are tracked to deliverables, specific tasks and lifecycle phases, and reported on dashboards. Workflow-driven utilities track Defects, Issues & NC's status and compute the effort spent in resolving them. Digité provides a limited built-in functionality to import and export defects from and to third-party defect tools. Where needed, a custom adapter can be developed and deployed to interface with the external tool to import or export required data.

Support

Key Process Areas

- ❖ Configuration Management (Level 2)
- ❖ Process and Product Quality Assurance (Level 2)
- ❖ Measurement and Analysis (Level 2)
- ❖ Decision Analysis and Resolution (Level 3)
- ❖ Causal Analysis and Resolution (Level 5)

Digité provides a shared, configuration-controlled project repository for project work products. The access to the repository is controlled by check-in, check-out operations. Using Deliverables Management utility it would be possible to define and manage baselines for software configuration items. Workflow-driven procedures enable management of change requests and performance of periodic configuration audits. It is possible that organizations might wish to employ SCM tools to manage Software Configurations activity. If needed, a custom adapter can be developed and deployed to interface with the external tool to import or export required data.

Digité has customizable, workflow-driven and checklist-assisted review functionality to support Process & Product Quality Assurance procedures. Dashboards defined for QA services facilitate centralized tracking of organizational QA activity and conformance of various projects to established QA objectives. Non-Conformances (NC's) are tracked through various workflow steps and efforts are monitored through completion.

Digité system tracks and reports various metrics. The list of metrics includes, but is not limited to the following:

- ❖ Schedule Variance for Deliverables
- ❖ Effort Variance for Deliverables
- ❖ Schedule Variance for project phase
- ❖ Size Variance for Deliverables
- ❖ Effort Variance for project phase
- ❖ Document Review Defect Density
- ❖ Code Review Defect Density
- ❖ Test Defect Density (Pre-delivery)
- ❖ Acceptance Defect Density
- ❖ Document Review Coverage Rate
- ❖ Code Review Coverage Rate
- ❖ Test Coverage Rate
- ❖ Defect Injection Rate
- ❖ Document Review Effectiveness
- ❖ Code Review Effectiveness
- ❖ Test Effectiveness
- ❖ Productivity
- ❖ Cost of Quality %
- ❖ % SLA Adherence of Support Projects (overall)
- ❖ % SLA Adherence of Support Projects (priority-wise)
- ❖ % Deliveries on time
- ❖ % Deliveries within estimated efforts
- ❖ % Deliveries within the acceptance defect targets
- ❖ Project-end Feedback - Rating by customer

Customizable dashboards and reports provide a rich functionality to analyze metrics data using mathematical or statistical functions.

Through a structured issue tracking and resolution framework, Digité provides a foundation for Decision Analysis & Resolution. An organization can define and maintain a classification system for issues and issue resolution rationale. Decisions are analyzed and ranked based on their effectiveness in resolving issues of a similar nature. Decisions are thus driven by knowledge gathered from previous decisions to issues belonging to the same category and their effectiveness in resolving the underlying issue.

The Defect Management System provides means for tracking root causes for each defect. Defect prevention activities utilize the root cause data for defects at an organization level. Using formal workflow-driven procedures defined by the organization, the defect prevention action plans are implemented and results are captured and analyzed for effectiveness. Results of successful defect prevention activities are either implemented as process improvements or shared across the using the centralized repository of best practices.

Conclusion

IT organizations, irrespective of their size have greatly benefited from deploying Digité enterprise to manage their software development. Now with CMMI-related enhancements, Digité platform provides even more compelling reasons to be the Prime Orchestrator of your organization's software development activities.