Integrated System Diagnostics

Appraisal Report

Deloitte Consulting/AOC

August 30, 2011
***Revision:* v1.1**

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Revision History

Ver	Date	Author	SCAMPI Lead Appraiser	Summary of Changes
1.0	08/30/11	Appraisal Team Lead	J. Courtney-Clark	Final Version

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1 Executive Summary

1.1 Introduction

The purpose of this appraisal was to document the current process maturity baseline of the CCMS Project in Santa Ana, CA against the CMMI-DEV (Capability Maturity Model Integration) Staged representation v1.2. This was a benchmarking appraisal of process capability. It is performed in accordance with established organizational policies and procedures, and will result in an independent ML3 rating.

1.2 Context

The sponsor for this appraisal is Mark Moore. His affiliation with the Project being appraised is Executive Director of the CCMS Program Management Office. The AOC Point of Contact (POC) acting as the appraisal site coordinator is David Corral, IS Manager, Information Services. The Deloitte Consulting POC is Paul Nugent.

Deloitte Consulting, LLP, CCMS Project has functioned since its initiation in June, 2007 according to a process infrastructure based on the CMMI-DEV v1.2 and Deloitte Consulting organization methods.

The California Court Case Management System (CCMS) V4 project is a software development effort intended to create and deploy a single statewide case management system to support California's trial courts. This development effort is being performed by a systems integration firm and sponsored by the Administrative Office of the Courts (AOC).

The project combines code from CCMS V3 and concepts from CCMS V2 and expands upon the services and functionality provided by those systems. The CCMS V4 development effort began in 2007 and is presently in product acceptance testing. The system is currently comprised of approximately 6 million lines of Java code.

In December 2009/January 2010 significant quality issues were discovered in the system as it prepared to enter acceptance testing in the spring of 2010. As a result, the project was delayed approximately one year to address identified issues.

The AOC and the State of California are interested in assuring that quality issues have been successfully dealt with prior to exiting acceptance testing and beginning deployment to three early adopter courts. To support that effort, the AOC is seeking an independent review of CCMS to determine whether significant quality or maintainability problems remain.

AOC desires an objective appraisal of the process capability of the CCMS. The usage mode for this appraisal is internal process improvement.

1.3 Appraisal Purpose

1.3.1 Business Objectives

1.3.1.1 Obtain an independent assessment as to whether the appropriate software development processes were used to develop the system.

1.3.2 Appraisal Objectives

1.3.2.1 Provide a valid, ARC (Appraisal Requirements for CMMI) compliant SCAMPI A appraisal.

1.3.2.2 Obtain an accurate reflection of current process maturity relative to the CMMI-DEV v1.2.

1.3.2.3 Conduct the appraisal within 5 calendar work days to minimize cost and disruptions to site operations.

1.3.2.4 Produce a detailed report with more insight into findings and recommended actions inclusive of the Final Briefing and appraisal database that will include all findings.

1.4 Organizational and Model Scope

The organizational scope of this appraisal is defined by the following characteristics

Company	Deloitte Consulting
Organizational Unit	CCMS Project
Model Scope	All ML2 and ML3 Process Areas except Supplier Agreement Management
Location	Santa Ana, CA
On-Site Dates	August 15-19, 2011

1.5 Appraisal Team

Team Member	Systems and Software Experience (years)	Process Improvement (years)	Model Based Process Appraisal (number)
Jeanine Courtney-Clark (High Maturity Lead)	32	15	55+
Paul Byrnes (High Maturity Lead)	27	21	70+
Tim Grealy	18	13	15
Van Phillips (Lead Appraiser)	25	25	30

1.6 Process Area Business Risk Rating

A roll up of the lower level ratings, seen in Appendix A, was done to provide AOC and Deloitte with a quick look at areas to focus on. While many individual issues were identified during the appraisal, when these are rolled up to the highest Business Risk level the influence of the individual issues was reduced. Each Process Area discussion below in Section 4 provides a summary of how the risk assessment was reached.

Criteria used to determine Business Risk:

- High – process issues are likely to have a negative impact on some aspect of project performance and/or product quality in subsequent phases of the project
- Medium – process issues may require additional corrective actions to avoid negatively impacting project cost and schedule attributes in subsequent phases of the project.
- Low – process capability is not likely to negatively impact cost, schedule, or quality in subsequent phases of the project

Process Area	Business Risk	Description of Rating
Requirements Management		
Project Planning		
Project Monitoring and Control		
Measurement and Analysis (MA)		Priority #1 - MA should be addressed as a top priority. There is little demonstrated evidence at this time of fundamental measurement tasks (project objectives, and associated qualitative triggers and thresholds) being implemented. Going forward, the metrics plan should be revised to better fit the activities of maintenance versus development, including adjustment of objectives, and associated triggers and thresholds for performance management.
Process and Product Quality Assurance (PPQA)		Priority #4 - The project can easily start to address that area just by adding more resources and implementing the plan they have been developing. This could be a higher risk if not addressed in the near future.
Configuration Management		
Requirements Development		
Technical Solution		
Product Integration		
Verification		
Validation		
Organizational Process Focus		
Organizational Process Definition (OPD)		Priority #2 - The measurement data from the Deloitte level is expected to be able to assess the project during project startup and then during replanning activities. The evidence provided did not show that the repository was robust enough to assist CCMS. Additional data analysis and communication from the Organizational level to the project team may be required
Organizational Training		

Integrated Project Management (IPM)		Priority #3 – Weaknesses found in MA and OPD are directly correlated to this Process Area and they will have to be addressed first. IPM uses the data from the other two processes area to actively manage the project, know where and how to identify trends that need to be addressed before they even become issues. Defining the projects objectives, gathering and analyzing the data from MA allows the project to see how the project is progressing on many fronts not just the high risk ones at the moment. Project metrics should be provided to the OPD repository so that task estimates can be continually be refined and then provided back to the project as replanning is needed.
Risk Management		
Decision Analysis and Resolution		

1.7 Key Issues - Global Findings

Global findings represent issues, which are pervasive across multiple process areas, provide a summation of several findings in one process area, or are sufficiently significant so as to merit special attention. The following Global findings were developed:

WEAKNESSES

Project progress data indicate that thresholds/triggers defined in the measurement plan are not being actively used to drive corrective actions. Reports that are generated often do not include contextual information about the data to support corrective actions by the users of the data (e.g., when schedule variances are identified, comments about the variances don't always show analysis to facilitate follow on actions). [Generic Practice 2.8]

There does not appear to be systems in place to routinely collect, submit, and act on improvement information across the CCMS organization, either at the Deloitte CCMS PMO or Enterprise levels (as it relates to CCMS). [Generic Practice 3.2]

IMPROVEMENT ACTIVITIES

The Deloitte CCMS PMO has recently begun to re-institutionalize regular process and work product audits. Recent reviews have focused so far only on management processes and work products. A 2011 schedule exists to perform more audits. [Generic Practice 2.9]

DISCUSSION

Generic Practices (GPs) in the CMMI model are used to highlight activities that cross all Process Areas. These GPs provide insight into the "institutionalization" of using the processes by the project team. If the GPs are being implemented successfully then it provides confidence that the processes will continue to be followed and short cuts will not be taken during times of stress.

There were three Generic Practices in particular that were seen as Partially Implemented. By definition, Partially Implemented means that there are gaps in the implementation, not all the processes are being followed or that the processes are not be followed all the time. Either of these cases may introduce risk to the project success.

Generic Practice 2.8 - The intent of this practice is to perform direct day to day monitoring of the process, not just the project cost and schedule. Monitoring can be done in many ways but needs to be done consistently so issues can be identified early enough so that corrective actions can take place. For example, monitoring the number of requests being reviewed by the Change Control Board (GP 2.8 of Requirements Management and Configuration Management) over the life of the project may show trends that would indicate action may need to be taken in the design processes, development processes or management processes.

Generic Practice 2.9 - The intent of this practice is to routinely evaluate the implementation of the Playbook processes and the use of the Playbook work products to implement the processes. Without routine evaluation it is very common for projects to sidestep expected processes when pushed to achieve a deadline. QA audits are often the first place where management will see the indication that processes are not working for the project. If identified soon enough, the process coaches can be brought in to work with the project and get them back on track.

Generic Practice 3.2 -The intent of this practice is to build an ability to record and learn from best practices and lessons learned throughout Deloitte and the project. This can be done two ways. One way

is to submit project team experiences (good and bad) back to the Service Quality organization so that other project teams can benefit from those experiences. Another way is to create a repository of project team experience for the CCMS project itself. This would provide the ability to review past project results, history, risks, tools, decisions made to help guide the ongoing planning and execution of the project.

RECOMMENDATIONS

Recommend strengthening the Guiding Principles statements in all of the Playbook processes to indicate that the projects "shall" follow the Playbook processes tailored to their own project needs. Policy appears to be "The project will utilize the organizational standards and methods to" in Guiding Principles.

Recommend providing sufficient resources focused on evaluating the implementation of process and work products. The current resources do not have sufficient time to conduct all the appropriate evaluations. This will provide ongoing and leading indicators of issues that may be developing.

Recommend building project specific repositories for best practices, tools, lessons learned, risks, and issues so potentially during a long running project it is possible that recurring problems can be mitigated.

2 Process Area Specific Findings

2.1 Requirements Management

DESCRIPTION

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.

COMPLAINT/NORMATIVE

Requirements were provided from the client. JAD sessions and various other qualification activities were then held with the client to ensure understanding and complete definition. Requirements were traced to the Final Design document and then put into QC to trace to test cases.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

None identified.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

The CCMS project worked closely with the client (AOC) to determine and define the requirements. Any changes to the definitions or designs of those requirements are tracked in Quality Center and managed by a Control Board.

RECOMMENDATIONS

None identified.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- However, as the project moves into the maintenance phase, revisions to the project's planning and change management documentation should be made to more accurately describe the maintenance life cycle that will be followed. The current phase approach to finding and fixing defects from test is a good approximation for what will be in place to handle errors that will be reported from the field after deployment. That existing process is working fine and can be adjusted easily to reflect maintenance phase changes.

2.2 Project Planning

DESCRIPTION

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

COMPLAINT/NORMATIVE

The CCMS project has developed and is maintaining a top level work breakdown structure (WBS). Estimates of work products and task attributes have been established, and effort and cost estimates have been derived. The phases for the execution of the project throughout its lifecycle were defined. From all of this, an overall budget and schedule were established and are being monitored. Resources and capable personnel to perform project activities were provided.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

Although estimates of work products and task attributes have been established for the CCMS project, it is not always evident how the effort estimates were developed. Also, how and when project activities were systematically reconciled with available resources was not apparent.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

The CCMS project performed many of the planning activities associated with a successful project. There were some areas, especially associated with the listed weaknesses, in which the activities could not be referenced according to a documented procedure. Since planning activities are the foundation on which project execution rests, inability to validate estimates or to repeat activities consistently elevates the risk level of the project.

RECOMMENDATIONS

Recommend creating additional procedures and/or work instructions to address the undocumented activities, such as how the Widget Tracker is used in conjunction with the Pricing Model, interfacing with the Costing Department, to establish and maintain not just estimates, but the basis of estimates for future efforts. This may prevent a repeat of circumstances that result in a major re-planning effort.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- However, as the project moves into the maintenance phase, revisions to the project's planning and change management documentation should be made to more accurately describe the maintenance

life cycle that will be followed. As a maturity level 2 process area, basic estimating processes and assets are in place to perform planning. Higher risk has been assigned to the Measurement and Analysis and Integrated Project Management process areas because they are foundational for improving how CCMS performs the estimating and tracking processes using their own historical data

2.3 Project Monitoring and Control

DESCRIPTION

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.

COMPLAINT/NORMATIVE

The CCMS project has demonstrated that it monitors many parameters of the project, such as cost, effort, and risks. Stakeholders are kept informed and remain appropriately involved.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

There were instances noted in which project planning documents contained revision histories that indicated gaps in maintaining the documents.

There apparently were not routine formal milestone reviews conducted as the project progressed through its phases.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

The CCMS project regularly performs weekly and monthly reviews to track progress and identify variances from planned parameters. The project also embeds milestone reviews in its periodic reviews since the re-plan began. The lack of formal milestone reviews during the early execution of the project increased the instances of issues and other problems "leaking" into subsequent phases rather than being dealt with in a timely manner. These problems became more complex and costly to rectify as time went on and contributed to the need for the re-plan efforts. The re-plan resulted in the identification of activity-based milestones, along with associated exit criteria.

The gaps in the revision histories of the planning documents indicate that the formal document control system was abandoned sometime during project execution. This appears to have been rectified since the re-plan.

RECOMMENDATIONS

Recommend instituting separate, formal reviews in the project's standard processes as the project advances through its phases (requirements, design, coding, test, etc.).

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- As a maturity level 2 process area, basic plan vs. actual tracking is in place and regular monitoring of schedule and quality attributes is accomplished. Higher risk has been assigned to the Measurement and Analysis and Integrated Project Management process areas because they are foundational for improving how CCMS performs the monitoring and tracking processes using more sophisticated variance analysis and other triggers and thresholds to help management monitor the project's performance more effectively.

2.4 Measurement and Analysis

DESCRIPTION

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

COMPLIANT/NORMATIVE

The Deloitte CCMS Measurement Plan is a combination of the Playbook driven enterprise plan with business objectives, and a program specific measurement plan (spreadsheet of defined measures).

The project measurement plan defines schedule, effort, and test/defect related metrics.

The metrics plan defines storage locations. Also, attributes related to who reviews which metrics are captured in the stakeholder/communications plan.

The Quality Center tool stores test and defect data and is used to generate reports of test results. Schedule and effort data are also collected and used. Cost data is maintained separately.

Schedule and unit progress and test data is monitored and when actuals indicate issues, they are followed up on.

Quality Center is used to store technical testing and defect data. eRooms are used to store other types of metrics data and analysis reports (e.g., weekly status).

Measurement data is being reported in internal and external weekly status meetings.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

(minor weakness) Most documented measurement objectives in the metrics plan (column A) are not objectives consistent with industry standard measurement performance objectives (e.g., Objective to reduce the quantity of fielded defects in the delivered product).

In the program management area, Cost/Budget metrics are not specified in the Metrics Plan. Support metrics are not specified in the metrics plan other than QA audit metrics (e.g., M&A, CM). Full lifecycle engineering metrics are not specified other than testing related metrics (i.e., requirements, design, code, peer reviews).

The measures specified in the CCMS metrics plan do not define the data collector role, the actual collection procedure (not source), and in most cases no analysis procedure is defined.

Some key metrics in the workbook don't have metrics objectives, analysis procedures, thresholds, or analysis tools noted (example: SI testing # defects/severity).

Some CCMS metrics that are defined in the metrics plan are not being collected and analyzed currently (e.g., summary QA audit metrics).

Project progress data indicate that thresholds/triggers defined in the measurement plan are not being actively used to drive corrective actions. Reports that are generated often do not include contextual

information about the data to support corrective actions by the users of the data (e.g., when schedule variances are identified, comments about the variances don't always show analysis to facilitate follow on actions).

For some data that is collected, there is limited evidence of analysis/actions being taken (e.g., metrics from individual deliverable reviews, summary metrics about deliverables status, audit data).

Analysis of metrics reports that are generated, in accordance with the metrics plan, and corrective actions resulting from the analysis, are not always supported by the evidence provided (see Weekly status minutes and charts and thread to issues log).

Evidence was not observed of monitoring or auditing the measurement and analysis processes and work products.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

There were many areas of concern in the Measurement and Analysis area. In some cases, important metrics that were being collected by management to help manage the program were not defined in their metrics plan. In some cases, metrics that were defined were not being followed as written. In most cases, analysis procedures necessary to interpret and use the data did not exist, and there was little evidence of analysis occurring. In most cases, triggers and thresholds for use in supporting data analysis and management corrective action were either not defined, or followed if defined.

At the current time, there are significant, almost constant monitoring activities on going in the program, clearly done in part as a result of past issues on the program. While this is supporting keeping the project on track now, it is taking many resources to maintain this level of monitoring. In the CMMI, a core concept of being maturity level 3 is to evolve management practices towards using triggers and thresholds to help identify when issues are truly required to be acted on. Use of the triggers helps management avoid chasing any and all “problems” resulting from “being off” on a project management attribute such as cost or schedule. Active use of the triggers, such as schedule variance thresholds, helps to keep management focused on the most important issues impacting overall program performance. They become an aid in prioritizing where management attention is focused. The lack of use of such triggers and thresholds on the project as a routine management practice is a major issue area in attaining maturity level 3 capability.

Because of the size, scope, and duration of this project, current activities being performed at the Deloitte organizational level regarding metrics analysis have not had a direct impact on CCMS, either in the original estimates or use of data from the repository to support improvements in CCMS. The capability to provide metrics data to an organizational repository, subsequently use data from the organizational repository to improve future estimates, and to do this repeatedly, is one of the core concepts in being CMMI Maturity Level 3. Because of the long history of the CCMS program, it is reasonable to assume that much of the project’s data can be mined for use in meeting this purpose. The overall data in the Deloitte repository tends to have less utility because of the CCMS history. However, there is no “repository” or set of repositories of measurement data maintained at the CCMS project level (other than test data in Quality Center). Hence, a significant effort is always required to plan and re-plan project activities as there is no readily available repository to use to gain insights for improving estimates. This is a major issue for attaining maturity level 3 capability.

However, it is clear from the evidence that Deloitte is spending significant resources measuring, analyzing, and acting on test data relevant to the current phase they are in. The tools available to support finding and fixing defects are good, and these points help to mitigate risks of fielded errors in the delivered product.

RECOMMENDATIONS

Recommend creating and maintaining project level work instructions (procedures) that supplement the data in the Metrics Plan (spec) and Playbook processes to fully describe the process for storing, analyzing, and using the defined metrics.

Recommend creating a metrics planning and procedural document which records the strategy, approach, and details about the measurement program (similar to a PMP). The current metrics plan then becomes an attachment with detailed specifications about each metric.

Strongly consider adding a formal role or group focused on ensuring the project measurement program is implemented, managed, and improved.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

High

- The positive part of this area is that as the CCMS program moves into maintenance, existing Deloitte processes and performance indicate that a system for fixing defects found is in place. The problem is that significant resources need to be expended to control the overall program, and this impacts the efficiency with which the program operates financially. Further, as the program moves forward, the metrics plan should be revised to better fit the activities of maintenance versus development, including adjustment of objectives, and associated triggers and thresholds for performance management. There is little demonstrated evidence at this time of these fundamental measurement tasks being implemented, which increases risk. Fixing the gaps identified also usually takes significant effort and time to institutionalize, which also increases risk. This area should definitely be addressed as part of an improvement plan.

2.5 Process and Product Quality Assurance

DESCRIPTION

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

COMPLIANT/NORMATIVE

QA audits that are (or were) performed are maintained in the eRoom. However, there are not currently a lot of assets from performing internal QA activities to show control of work products at the current time.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

Internal audits were done in the past (circa 2008) but were not performed at all from a project level for multiple years.

Evidence provided indicates that there are insufficient project resources assigned to performing process and product audits as a routine organizational function.

Other than a 2010 CMMI compliance review - basically another gap analysis, there is no evidence of regularly scheduled and conducted audits of the quality assurance function or processes or work products.

No evidence was observed of recent meetings, decks, minutes, etc. that are conducted with management to review status of quality assurance activities, tasks, results, and issues.

IMPROVEMENT ACTIVITIES

The Deloitte CCMS PMO has recently begun to re-institutionalize regular process and work product audits. Recent reviews have focused so far only on management processes and work products. A 2011 schedule exists to perform more audits.

DISCUSSION

When the program started, Deloitte had a much more rigorous process and product audit activity across the project. The process for doing audits and the associated templates for use in conducting and recording results from these audits is ok. For whatever reason, there was a long period of time where these kinds of audits were not occurring on the project. This has negatively impacted the overall ability to take appropriate process corrective actions to reduce future defects, or improve efficiency in implementing tasks.

Although there is some relevant data related to this process area in performing Deloitte enterprise level and IV&V contractor assessments on CCMS, these are secondary types of reviews. The project's own internal capability to perform routine process and product audits is expected.

However, the Deloitte CCMS PMO has recently (2011) re-introduced performing process and product audits as part of its functions. The recent audits have shown use of the prior Quality Assurance (QA) assets, but many more audits across all activities of the program, and use of the resulting data, needs to be seen to re-institutionalize the QA area. This should be encouraged and acted on as part of an improvement plan, as the outcomes from acting on these audits will improve overall program performance and quality.

Unfortunately, the current size of the Deloitte CCMS PMO limits that amount of time that can be spent on this area. Standard industry norms, for comparison, tend to indicate that roughly 5% of a project's resources be applied to PPQA activities. In a program the size of CCMS, even now at roughly 350 people, that would mean the equivalent of 17.5 resources. For the current phase and in relation to other quality management activities also ongoing, this might be adjusted to 2.5%, still resulting in 8.75 FTE. There are ways to further optimize the actual resources required, and this is an overall number, not necessarily meaning requiring resources in the Deloitte CCMS PMO itself. But this normative data is listed to demonstrate that the current level of resources applied does not adequately support re-institutionalizing this area.

RECOMMENDATIONS

Recommend creating a database, often called a Corrective Action and Resolution (CAR) system, to record, follow up, analyze, and act on all audit data. Particularly from a summary and management level, this type of system facilitates reaching timely closure on issues found, and supports trend analysis for making improvements across the organization.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Medium

- The systems and skills of people available to perform the PPQA activities are fine. Given time and sufficient resources, you can expect that the audit activity will function as intended and support future positive product quality. The biggest issue impacting the risk is the current resource limitation.

2.6 Configuration Management

DESCRIPTION

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.

COMPLIANT/NORMATIVE

Configuration items are identified in the CM Plan and associated CM data sets, Tool configurations (such as Quality Center and Clear Case) also identify the configuration items. Client data, environments, and documents are treated as CIs in addition to code.

Tools such as BART, ClearCase, and Quality Center are used as a system to manage and control work products. An eRoom repository system is also maintained to manage work products, including one that is shared with the client.

The CM tool suite is used to support daily and weekly management meetings where code baselines are approved for release. These tools include BART (nightly source code builder), Cruise Control (automated source code build tool), Requisite Pro (requirements management tool), Clear Case (source code management tool) and Quality Center (tool to store all defects and test cases and results). ClearCase and BART are also used to manage moves of work products from the development environment into the test environment.

Quality Center is used to track details of changes (defects). Dev Tracker is used to manage the details of defects through the lifecycle. Reports are generated from QC and used by management to monitor project progress, risks, issues, and track changes to closure.

Quality Center, Clear Case, Req Pro and other tools are used to facilitate control of configuration items. Management meetings are held daily and weekly to track details of changes and authorize changes and deployments.

A CM plan, in conjunction with the Project Plan and schedule, is used to plan CM activities. Detailed guidelines and/or plans are used to support use of CM tools and build and release processes.

CM resources are assigned - several different teams exist which perform CM related functions (e.g., Infrastructure team).

There are several weekly and daily meetings happening on the ground that show senior management stakeholder involvement in monitoring work products.

Status on configuration work products is in weekly/monthly reports. Deliverables log tracks details of each deliverable. Risks/Issues logs are maintained. QA summary reports discuss status of configuration items.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

Limited evidence was provided of routinely auditing key CM processes (e.g., audits of release process, build process, change control process).

IMPROVEMENT ACTIVITIES

Several types of CM audits have recently been conducted on: 1) components, 2) code, and architecture. All of these have happened from two weeks to several months ago. (e.g., discrepancy reports, actions).]

DISCUSSION

Configuration management activities were generally performed well on the project. There is a significant tool set in place to manage and control work products. And there are many management meetings occurring at very regular intervals to ensure accurate knowledge of the state of work products and approve movements of product.

Continued execution of configuration management audits of the CM libraries and repositories, coupled with implementation of two generic practices associated with performing more routine audits of the CM processes and collection of improvement information (such as process metrics, audits, lessons learned, and best practices), should result in this process area being satisfied relatively quickly (potentially during 2011).

RECOMMENDATIONS

None identified.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team. There was a lot of data received by the team very late in the SCAMPI process that impacted this area. Better advance preparation by Deloitte could have improved overall SCAMPI performance in this area.

BUSINESS RISK

Low

- The systems and skills of the current people available to perform the configuration management activities are fine for the current phase of the project. Given time to continue executing, and resources put on auditing and documenting ideas for future improvement, you can expect adequate continuing or improved results.

2.7 Requirements Development

DESCRIPTION

Requirements are the basis for Design. The development of requirements includes the following activities:

- Elicitation, analysis, validation, and communication of customer needs, expectations, and constraints to obtain customer requirements
- Collection and coordination of stakeholder needs
- Development of the lifecycle requirements of the product
- Establishment of the customer requirements
- Establishment of initial product and product component requirements consistent with customer requirements

COMPLAINT/NORMATIVE

Requirements were provided by the client based primarily on v3.They were reviewed and clarified in the comments column as a way of refining the requirements. Additional non-functional requirements were identified. This became the set of customer requirements.

Requirements for product component were established by functional area via scenarios and use cases including those for interfaces.

Use cases and scenarios evolved via JAD sessions into a Final Functional Design that was jointly reviewed and approved as the basis for further work.

WEAKNESSES

Project progress data indicate that thresholds/triggers defined in the measurement plan are not being actively used to drive corrective actions. Reports that are generated often do not include contextual information about the data to support corrective actions by the users of the data (e.g., when schedule variances are identified, comments about the variances don't always show analysis to facilitate follow on actions).

DISCUSSION

An expectation in CMMI is, early in the planning of a project, measures are defined that will be used to monitor the progress of the project and the processes used by the project team. These measures can provide critical insight into the quality of the product as well as development progress. As an example, thresholds can be established as triggers for initiation of corrective actions based on rework effort on requirements or number of issues raised against requirements.

RECOMMENDATIONS

Consider documenting, in the metrics plan, the measures that will be used during the maintenance phase to provide insight into how well the processes are being executed and the effectiveness of the processes. Establish thresholds that can be used to trigger actions. As an example, you might monitor incident resolution time and have triggers for average incident resolution time. When the average resolution time exceeds the trigger, actions are taken to further analyze the process and address possible underlying problems with the process.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- However, as the project moves into the maintenance phase, revisions to the project's planning and change management documentation should be made to more accurately describe the maintenance life cycle that will be followed. In this scenario, errors found in the field that are reported to Deloitte to fix become the "change requests" that in effect are the "requirements" from a CMMI perspective. The original requirements development activities performed during the development phase will be far less relevant than processes for handling sets of trouble reports, prioritization of fixes through formal change boards, etc.

2.8 Technical Solution

DESCRIPTION

Technical solution is the design, development and implementation of solutions to requirements. It involves:

- Evaluating and selecting solutions that potentially satisfy requirements
- Developing detailed designs for the selected solution
- Implementing the designs as product or product components

COMPLAINT/NORMATIVE

Alternate solutions were developed and covered in architecture meetings with AOC and Deloitte architects with AOC approving the selected solutions.

An analysis of classes from v3 to determine if they should be reused as APIs was performed by Technical Architects. New component and interface designs were created where needed. The designs were reviewed with Data Architects and documented in Development Packets as technical information for developers.

Designs have been implemented and code is moving through multiple verification and validation environments along with supporting documentation.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- Processes and tools in place for handling design and code and changes to existing design and code based on defects found is adequate for performing during the maintenance phase up coming.

2.9 Product Integration

DESCRIPTION

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

COMPLAINT/NORMATIVE

Integration environments were established. Integration scripts are run in a defined sequence to build the system. Tools such as Cruise Control and BART are used to manage the build.

Interface descriptions were reviewed for completeness by Deloitte and AOC and are maintained by Configuration Management.

During the re-planned test phase, components go through a unit test as well as a review by the lead developer. Code is analyzed for standards using a mechanized code analyzer. Code is assembled in the pre-build server prior to moving into the test environment. Upon completion of verification activities, the product is delivered to the Product Acceptance Test (PAT) environment.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- However, tasks related to performing configuration audits on the baselines to ensure both physical and functional integrity are new to the project (see improvement activity documented in CM). For the deployed system, where maintenance activities related to changing fielded product are the primary tasks, integrity checks on the baseline even more critical. So focus must be kept on institutionalizing these newer Deloitte CCMS processes so the benefits can continue to accrue during maintenance.

2.10 Verification

DESCRIPTION

The verification process area involves the following: verification preparation, verification performance, and identification of corrective action. Verification is inherently an incremental process because it occurs throughout the development of the product and work products, beginning with verification of the requirements, progressing through the verification of the evolving work products, and culmination in the verification of the completed product. Peer review is an important and effective verification method

WEAKNESSES

Analysis of peer review data is limited to correcting individual findings. No evidence was observed of analysis performed on collective issues identified during peer reviews to determine underlying issues with groups of work products or with the peer review process.

DISCUSSION

Analysis of the data across multiple peer reviews provides insights into problem areas both in the work products and in the processes used to create the work products. Defect density by functional area in requirements, as an example, highlights areas that may not be well understood and likely to produce additional defects later in the process if not addressed early. There was no evidence observed of this type of analysis.

RECOMMENDATIONS

Implement processes to perform periodic analysis of peer review results including action to be taken when results vary from expected. An example in the maintenance environment is capturing the effort spent performing peer reviews compared to the number of recurring defects to gain visibility into the effectiveness of the peer reviews.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- However, the weakness related to analyzing peer review data impacts the ability to look for trends in issues found, which in turn impacts the ability to implement corrective actions which may prevent future issues from occurring. Analysis of and use of data analysis is a central concept of maturity level 3, and is correlated to the weaknesses found in the measurement and analysis process area. While this is a low Business Risk it would need to be addressed to reach CMMI Maturity Level 3.

2.11 Validation

DESCRIPTION

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

COMPLAINT/NORMATIVE

Joint Application Design sessions and prototyping were used to develop scenarios and validate the required functionality. A product acceptance test (PAT) environment was established to perform user acceptance testing.

Final validation of the product is performed through script execution in the Product Acceptance Test environment and approval by the client. Any defects identified are analyzed for impact and a determination is made to fix, prior to the final product acceptance, or defer. Defects to be fixed follow a process for fix and re-test through multiple environments and finally again in PAT.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- There are extensive internal, external, and joint validation activities on-going for the CCMS project. Improvements in the measurement and analysis area and related project management tracking activities may lead to improvement opportunities in how validation activities are performed, leading to more efficiencies in project performance overall.

2.12 Organizational Process Focus

DESCRIPTION

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

COMPLAINT/NORMATIVE

Process needs are identified and tracked with the Advisory Board in PMC. These process needs are identified through gap analysis, appraisals, improvement requests from projects, and tailoring requests. The requests are passed to the Services Quality group through the project mentors.

Process improvements are tracked in PMC, assigned, given due dates and tracked to closure. Schedules and activities for implementing the improvement were provided. Improvements are assigned to Playbook releases.

Updates to Playbook are deployed through the Deloitte site along with emails and announcements. The current version of Playbook is deployed to the project at startup and only critical changes to Playbook are rolled out during the duration of the project. Project tailoring activities and process mentoring by the coaches monitor the implementation of the processes.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

None identified.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

There is a Services Quality organization identifies process needs, evaluates suggestions from project teams, prioritizes Process Improvement activities, and tries out new enhancements. Services Quality then deploys those processes out to the project teams.

RECOMMENDATIONS

Recommend having external PPQA audits of the Services Quality organization. Current audits are being done by internal staff. This may provide additional objective analysis of the processes and activities.

The enablement process should be updated to allow for process updates during the life of the project. Current criteria for deployment should be analyzed.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Medium

- Resource issues; need for more focus on collecting and acting on improvement information from a Deloitte CCMS PMO perspective.

2.13 Organization Process Definition

DESCRIPTION

The purpose of Organizational Process Definition (OPD) is to establish and maintain a usable set of organizational process assets and work environment standards.

COMPLIANT/NORMATIVE

Organizational processes and standards are defined and maintained in Playbook by the Services Quality group. The processes and standards include guidelines and templates. Tailoring guidelines are available to assist the project in implementing the processes. The organizational measurement data is collected and maintained.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

The metrics repository at Organization level (Global) has effort and defect data primarily. The repository doesn't yet have sufficient peer review data to do summary analysis. Peer Review data is not being collected, analyzed, or used from a local CCMS repository either.

The CCMS metrics repository (eRoom) has not been populated with measurement data for years (with exception of weekly/monthly status).

(minor)The Playbook Metrics Guidelines (GD003) document does not address how to collect and store metrics data in the organizational repository.

Evidence provided of organizational defect data collected shows charting of the data but no analysis conducted. Identification of issues, causes of defects, and process changes based on the analysis were not observed.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

The Organizational Repository at the Deloitte level should be available to the project teams to assist them in estimating tasks, learning from mistakes other projects made, and improving by using the corporate data. Data for limited project activities is currently available and was not available to the CCMS project when it started or when the replan was done in 2010. This requires the project to use best guesses instead of historical data to do estimating.

The CCMS project had begun its own measurement repository (eRoom) but did not keep it up to date during the life of the project.

RECOMMENDATIONS

Recommend reviewing the organizational measurement objectives and broaden them so that more projects can benefit from the cumulative knowledge collected from all the Deloitte projects.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

High

- The current disconnect, due principally to timing, regarding the inability of CCMS to have used the Deloitte organizational metrics repository for initial estimating and re-planning, and the lack of an equivalent repository (with exception of Quality Center metrics) maintained at the CCMS level, causes likely risks of future estimating and planning issues, or minimally, a lot of resource needing to be expended to mine data for the purpose of generating accurate new estimates. This is an area that needs attention in the near term and is more difficult to implement. The choices also have high impact, so using more formal decision analysis may be warranted before making any changes to the approach to collecting, storing, analyzing, and using measurement data.

2.14 Organizational Training

DESCRIPTION

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

COMPLIANT/NORMATIVE

Enterprise level training resources do strategic needs assessment and planning for a whole set of resources whose skills are applied to the CCMS project (SI technology consultants).

The Deloitte SIT organization level training plan indicates what training is done by Learning and Talent Development (LTD) resources and what local regional office and project level organizations are responsible for (e.g., vendor provided tool training, local process training).

The enterprise organization maintains a training schedule. The CCMS project has generated as needed schedules for training when large amounts of personnel have been on-boarded.

Organizational resources are assigned to deliver training. A web-based training database and associated assets exist at the organizational level to support the training program, including recording training records. There are many classes offered and scheduled.

Organizational training is delivered to personnel based on their defined roles and as planned in the annual performance reviews. Local project training has been delivered in tools when large amounts of new personnel have been on-boarded.

Progress of the training activities is monitored and controlled by training resources at the enterprise level. Corrective actions are identified and tracked to closure when issues arise.

Audits of the training program have occurred at the enterprise level.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

Some evidence of reporting training statistics was observed of local CCMS training status, metrics, issues, and actions reported to program management, but this is not routine, systematic, or controlled over time against a defined training plan.

There is no evidence of auditing the training capabilities of the CCMS project other than CMMI based external or internal appraisals.

The Deloitte CCMS project does not have a systematic training program overall that repeatedly delivers skills and knowledge needed by personnel in all roles.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

As an organization, the majority of training is delivered from an enterprise level based on individual's roles. Required training is set up based on roles, such as a Systems Integration Technology (SIT) consultant. There are courses that people in such roles must complete before they are even assigned to a project like CCMS. From that standpoint, there is a good infrastructure at the enterprise level for planning, delivering, recording, monitoring, and improving training. Deloitte uses their individual annual performance evaluation process as a mechanism to reinforce what is required and how it will be delivered and tracking that it is delivered.

When individuals are assigned to a project or geography, the local office or project is required to provide specific training to the person so they can perform in the role they have been assigned.

As a very large project, with a large amount of people on-boarding through the life of the project, CCMS has many important training needs. A large effort was placed on training immediately following the re-plan activity in early 2010, when a significant amount of new people came on board. There was clearly management commitment to spend resources to make this transition happen. People did get specific process-based tool training for things like Quality Center which has benefited the project in its current phase.

However, the CMMI expects certain generic practices to also be in place, building a lasting infrastructure that lives on after original people have moved on. Because CCMS is very large, it is reasonable to expect that an on-going local training capability might be maintained at the project level to augment what the enterprise level provides. It is in these infrastructure areas, including local training planning, management of training work products, monitoring training status, auditing training processes, and collecting training improvement information where issues were documented. These are areas that need to be improved for Deloitte to satisfy this process area. All of these items can be corrected relatively quickly (2011).

RECOMMENDATIONS

Recommend improving how records of local project training are recorded to ensure it is tracked and that individuals total training records maintained at the enterprise level are accurate and complete.

Recommend re-creating a larger dedicated process and training group within the Deloitte CCMS PMO to perform local process management and training functions (just a process coach from the enterprise level assigned who is not assigned full time to CCMS.

Recommend having external PPQA audits of the Services Quality organization. Current audits are being done by internal staff. This may provide additional objective analysis of the processes and activities.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team. The difference in how Deloitte implements training organizationally, in large part using enterprise resources augmented by local training, makes it difficult for an appraisal team to see all the training that has occurred.

BUSINESS RISK

Low

- Despite issues documented regarding the CCMS program level training system, it was clear that when necessary, resources were applied to train people in their tasks at the local level. This

somewhat mitigates the overall training process gaps identified. Further, there are significant training resources applied at the Deloitte enterprise level which also mitigates future risk on this project.

2.15 Integrated Project Management

DESCRIPTION

The purpose of Integrated Project Management (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.

COMPLAINT/NORMATIVE

The CCMS project uses the Project Management Plan to perform activities. It conducts regular reviews with project stakeholders to monitor performance of activities and to manage project dependencies and coordination issues.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

No evidence was observed of using an organizational measurement repository to facilitate doing either original or re-plan estimates for the project.

Recording and archiving of the basis of estimates in initial planning and replanning was not apparent. Maintenance of estimates and basis of estimates appear to be maintained primarily in MS PowerPoint files.

There is insufficient evidence that the entire set of actual project parameters during plan and re-plan activities are monitored against planned values.

Analysis of metrics reports that are generated, in accordance with the metrics plan, and corrective actions resulting from the analysis, are not always supported by the evidence provided (see Weekly status minutes and charts and thread to issues log)

For some data that is collected, there is limited evidence of analysis/actions being taken (e.g., metrics from individual deliverable reviews, summary metrics about deliverables status, audit data).

Little evidence was observed of actively measuring and using data during the requirements and design phases to manage the project (other than cost and schedule and use cases).

Project progress data indicate that thresholds/triggers defined in the measurement plan are not being actively used to drive corrective actions. Reports that are generated often do not include contextual information about the data to support corrective actions by the users of the data (e.g., when schedule variances are identified, comments about the variances don't always show analysis to facilitate follow on actions).

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

The CCMS project monitors project parameters against the planned values (e.g., test case execution). It appears that not all parameters are being monitored against the plans. If the project has determined that it

cannot effectively monitor all parameters in the current environment and instead identified certain key parameters that monitor, there is no evidence to indicate this. While the impact on the overall project cannot be determined with certainty, it does increase the risk that some project parameters may vary from planned values and remain undetected which would negatively affect the project.

As previously stated in section 2.4, a core concept of being maturity level 3 is to evolve management practices towards using triggers and thresholds to help identify when issues are truly required to be acted on. Use of the triggers helps management avoid chasing any and all "problems" resulting from "being off" on a project management attribute such as cost or schedule. Active use of the triggers, such as schedule variance thresholds, helps to keep management focused on the most important issues impacting overall program performance. They become an aid in prioritizing where management attention is focused. The lack of use of such triggers and thresholds on the project as a routine management practice is a major issue area in attaining maturity level 3 capability.

Also stated in section 2.4, current activities being performed at the Deloitte organizational level regarding metrics analysis have not had a direct impact on CCMS, either in the original estimates or use of data from the repository to support improvements in CCMS. The capability to provide metrics data to an organizational repository, subsequently use data from the organizational repository to improve future estimates, and to do this repeatedly, is one of the core concepts in being CMMI Maturity Level 3. Because of the long history of the CCMS program, it is reasonable to assume that much of the project's data can be mined for use in meeting this purpose. The overall data in the Deloitte repository tends to have less utility because of the CCMS history. However, there is no "repository" or set of repositories of measurement data maintained at the CCMS project level (other than test data in Quality Center). Hence, significant effort is always required to plan and re-plan project activities as there is no readily available repository to use to gain insights for improving estimates. This is a major issue for attaining maturity level 3 capability.

RECOMMENDATIONS

Recommend that if the project selects to monitor a subset of planning parameters, and ignore others due to overriding considerations, that the project do so according to an established set of criteria and record the decision in the project's repository.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

High

- As the maturity level 3 Project Management process area, there is an expectation that the project is being managed proactively using data that is available from the Organizational (Deloitte) level and from the CCMS project activities. This data is continually gathered, analyzed and used to make decisions and resolve issues. All of the weaknesses identified in Measurement and Analysis (MA) and Organizational Process Definition (OPD) also affect this process area and the management of the project. The evidence provided indicated that a reactive approach was being used indicative of ML2 organizational behavior.

2.16 Risk Management

DESCRIPTION

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.

COMPLAINT/NORMATIVE

The CCMS project identifies sources and categories of risks, defines risk parameters, and has a developed a strategy to track and address risks since the re-plan. The project identifies risks, and categorizes and prioritizes them. Risk mitigations are identified and implemented.

ALTERNATE PRACTICES

None identified.

WEAKNESSES

There is no evidence that project personnel are trained in how to identify and categorize risks.

Although risks are monitored, categorized, and tracked, risk metrics are not summarized and used to manage the risk process.

Risk activities were not audited for multiple years during project execution to ensure that risk management processes were being followed appropriately.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

Proper risk management is critical to identifying potential issues and dealing with them before they can negatively impact the project. The CCMS project was identifying and discussing risks since the start, but the relatively small number of risks identified and the long amount of time that many of them were open during initial project execution probably indicate an insufficient risk management program. It is likely that some of the risks became issues prior to their being closed.

The risk log indicates that, since the re-plan, identified risks are being addressed and mitigated in a much timelier manner.

RECOMMENDATIONS

None identified.

APPRAISAL RISK

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

BUSINESS RISK

Low

- Although Weaknesses were identified for Risk Management, it is clear that risks are identified, monitored and tracked throughout the project.

2.17 Decision Analysis and Resolution

DESCRIPTION

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.

COMPLAINT/NORMATIVE

The Project Management Plan identifies the guidelines that are to be used by CCMS to determine when to use the DAR process. When used, there are detailed evaluations of various solutions against predefined criteria. Solutions were selected based on the evaluations.

ALTERNATE PRACTICES

None identified.

MINOR WEAKNESS

Evidence observed did not show the DAR process activities being monitored at the project level or reviewed with Management.

IMPROVEMENT ACTIVITIES

None identified.

DISCUSSION

While weaknesses were identified against the implementation of DAR they are consistent with the Global Weaknesses noted above. Any corrective actions taken to address the Global Weaknesses will have a positive impact on this Process Area. In general, the evidence provided were good, thorough examples of how this process area was used to select the best solution to meet design and requirements criteria.

RECOMMENDATIONS

Work through corrective actions on the Global Weaknesses

Appraisal Risk

Low

- A similarly experienced team reviewing similar data would very likely document the same issues as this team.

Business Risk

Low

- There are guidelines for using a formal decision process and those have been used according to the guidelines.

3 Appendix A

There are very specific rules that must be followed to determine ratings for a Standard CMMI Appraisal for Process Improvement (SCAMPI). Practice Characterizations must be determined for each practice for each of the 17 Maturity Level 3 Process Areas. Those characterizations are used to determine the Process Rating and finally the Maturity Level Rating.

3.1 Practice Characterizations Rules for Implementation

In summary, Fully Implemented and Largely Implemented will allow the associated Process Area to be Rated as Satisfied.

Fully Implemented (FI)	One or more direct artifacts are present and judged to be adequate; and At least one indirect artifact and/or affirmation exists to confirm the implementation; and No weaknesses are noted.
Largely Implemented (LI)	One or more direct artifacts are present and judged to be adequate; and At least one indirect artifact and/or affirmation exists to confirm the implementation and; One or more weaknesses are noted.
Partially Implemented (PI)	Direct artifacts are absent or are judged to be inadequate; and One or more indirect artifacts or affirmations suggest that some aspects of the practice are implemented; and One or more weaknesses are noted; - OR - One or more direct artifacts are present and judged to be adequate; and No other evidence (indirect artifacts, affirmations) supports the direct artifact(s); and One or more weaknesses are noted.
Not Implemented (NI)	Direct artifacts are absent or judged to be inadequate; and No other evidence (indirect artifacts, affirmations) supports the practice implementation; and One or more weaknesses are noted.
Not Yet (NY)	The project or support group has not yet reached the stage in the lifecycle to have implemented the practice.

GP = Generic Practices - Generic practices are called “generic” because the same statement applies to all Process Areas. The collection of generic practices describe the characteristics that must be present to institutionalize processes that implement a process area. Each Process Area has the same number of Generic Practices.

SP = Specific Practices – Specific practices are only found in one Process Area. Each Process Area has a different number of specific practices.

	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6	SP 1.7	SP 2.1	SP 2.2	SP 2.3	SP 2.4	SP 2.5	SP 2.6	SP 2.7	SP 3.1	SP 3.2	SP 3.3	SP 3.4	SP 3.5
REQM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5														
PP	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4				SP 2.1	SP 2.2	SP 2.3	SP 2.4	SP 2.5	SP 2.6	SP 2.7	SP 3.1	SP 3.2	SP 3.3		
PMC	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6	SP 1.7	SP 2.1	SP 2.2	SP 2.3									
MA	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4				SP 2.1	SP 2.2	SP 2.3	SP 2.4								
PPQA	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2						SP 2.1	SP 2.2										
CM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2			
RD	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2						SP 2.1	SP 2.2	SP 2.3					SP 3.1	SP 3.2	SP 3.3	SP 3.4	SP 3.5
TS	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2						SP 2.1	SP 2.2	SP 2.3	SP 2.4				SP 3.1	SP 3.2			
PI	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2	SP 3.3	SP 3.4	
VER	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2	SP 2.3					SP 3.1	SP 3.2			
VAL	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2										
OPF	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2	SP 3.3	SP 3.4	
OPD	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6													
OT	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4				SP 2.1	SP 2.2	SP 2.3									
IPM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6		SP 2.1	SP 2.2	SP 2.3									
RSKM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2			
DAR	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6													

	Fully Implemented [255 / 75.9%]
	Largely Implemented [27 / 8.0%]
	Partially Implemented [54 / 16.1%]
	Not Implemented [0 / 0.0%]

None of the practices were determined to be Not Implemented but several were considered Partially Implemented. These practices are directly related to the Weaknesses that are listed below in each of the Process Areas. Many of the weaknesses affect several related practices in the CMMI model. You will see between the Partially Implemented Practices and the Risks listed below.

3.2 Risk Rating

The criteria used for determining the Business Risk Ratings:

- If the findings are not addressed:
  - High – There will likely be problems executing the activities associated with the practice or the activities may not be successful
  - Medium – The activities associated with the practice may be executed but the results will likely be less predictable
  - Low – There are no findings or the activities associated with the practice will not likely be impacted

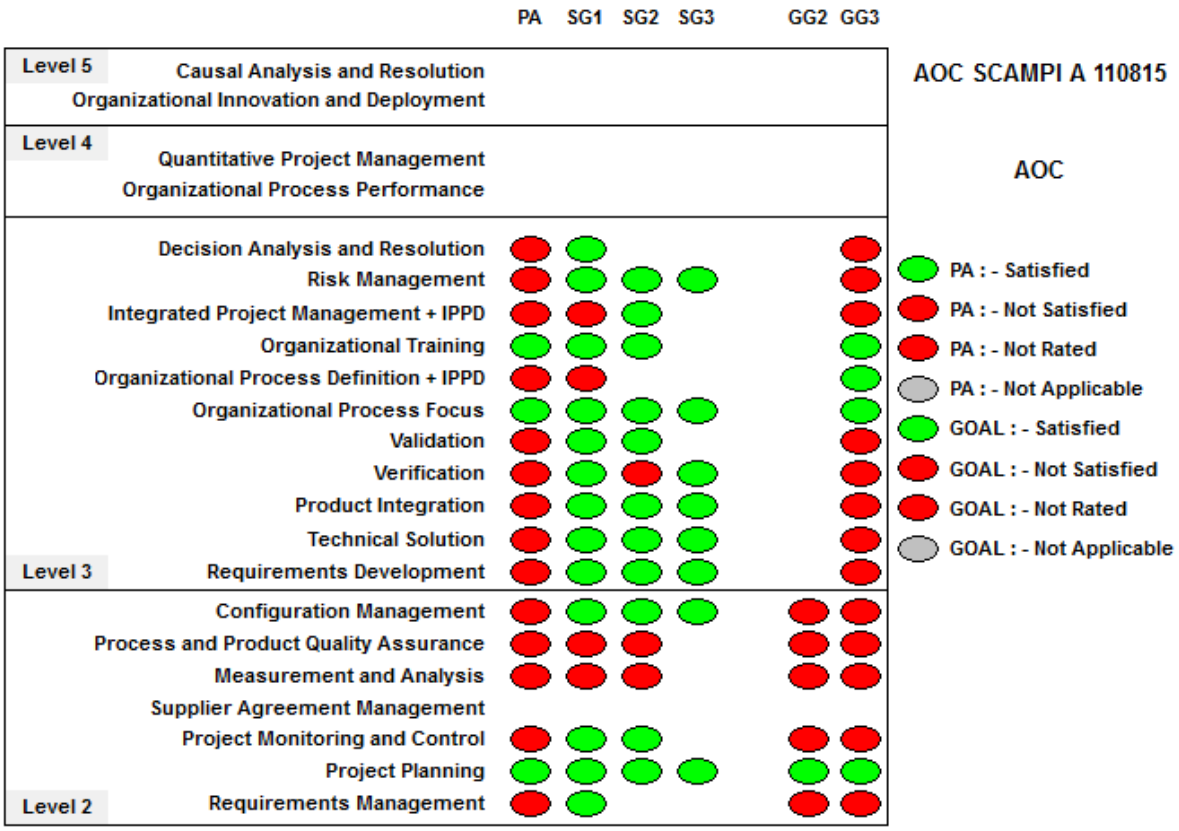
Risk ratings were determined for every Practice in all 17 CMMI Maturity Level 3 Process Areas. The High Risk practices should be reviewed and action plans put in place to address the associated weaknesses. Please see the Discussions and Recommendations in each of the Process Areas listed below.

	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6	SP 1.7	SP 2.1	SP 2.2	SP 2.3	SP 2.4	SP 2.5	SP 2.6	SP 2.7	SP 3.1	SP 3.2	SP 3.3	SP 3.4	SP 3.5
REQM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5														
PP	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4				SP 2.1	SP 2.2	SP 2.3	SP 2.4	SP 2.5	SP 2.6	SP 2.7	SP 3.1	SP 3.2	SP 3.3		
PMC	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6	SP 1.7	SP 2.1	SP 2.2	SP 2.3								
MA	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4				SP 2.1	SP 2.2	SP 2.3	SP 2.4								
PPQA	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2						SP 2.1	SP 2.2										
CM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2			
RD	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2						SP 2.1	SP 2.2	SP 2.3					SP 3.1	SP 3.2	SP 3.3	SP 3.4	SP 3.5
TS	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2						SP 2.1	SP 2.2	SP 2.3	SP 2.4				SP 3.1	SP 3.2			
PI	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2	SP 3.3	SP 3.4	
VER	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2	SP 2.3					SP 3.1	SP 3.2			
VAL	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2										
OPF	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2	SP 3.3	SP 3.4	
OPD	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6													
OT	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4				SP 2.1	SP 2.2	SP 2.3									
IPM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6		SP 2.1	SP 2.2	SP 2.3									
RSKM	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3					SP 2.1	SP 2.2						SP 3.1	SP 3.2			
DAR	GP 2.1	GP 2.2	GP 2.3	GP 2.4	GP 2.5	GP 2.6	GP 2.7	GP 2.8	GP 2.9	GP 2.10	GP 3.1	GP 3.2	SP 1.1	SP 1.2	SP 1.3	SP 1.4	SP 1.5	SP 1.6													

High [14 / 4.2%]
Medium [55 / 16.4%]
Low [267 / 79.5%]

3.3 Maturity Level Ratings

Some of the Process Areas have been rated as Satisfied but the Maturity Level 3 was not achieved.



If the Key Issues – Global Findings identified in section 1.6 are addressed then the red will disappear from the last two columns. At that point 12 Process Areas will be satisfied and most of this chart will be green.

3.4 Model Scope

Target Process Maturity	Rating Baseline	Rating Elements
CMMI-DEV Staged representation v1.2	Full Scope, Full Coverage with formal ratings of all Level 3 CMMI Process Areas (except Supplier Agreement Management) External ISD team	♦ Practice Characterizations ♦ Goals ♦ Process Areas ♦ Maturity Level
Scope	Category	Process Area Name
	Process Management	
X	(OPF)	Organizational Process Focus
X	(OPD)	Organizational Process Definition
X	(OT)	Organizational Training
	Project Management	
X	(PP)	Project Planning
X	(PMC)	Project Monitoring and Control
X	(IPM)	Integrated Project Management
X	(RSKM)	Risk Management
	Engineering	
X	(REQM)	Requirements Management
X	(RD)	Requirements Development
X	(TS)	Technical Solution
X	(PI)	Product Integration
X	(VER)	Verification
X	(VAL)	Validation
	Support	
X	(CM)	Configuration Management
X	(PPQA)	Process and Product Quality Assurance
X	(MA)	Measurement and Analysis
X	(DAR)	Decision Analysis and Resolution