Judicial Council of California
ADMINISTRATIVE OFFICE OF THE COURTS

455 Golden Gate Avenue • San Francisco, California 94102-3688
Telephone 415-865-4200 • Fax 415-865-4205 • TDD 415-865-4272

TANI CANTIL-SAKAUYE
Chief Justice of California
Chair of the Judicial Council

RONALD G. OVERHOLT
Interim Administrative Director of the Courts

September 9, 2011

Hon. Mark Leno, Chair
Senate Committee on Budget and
Fiscal Review
State Capitol, Room 5100
Sacramento, California 95814

Hon. Bob Blumenfield, Chair
Assembly Budget Committee
State Capitol, Room 6026
Sacramento, California 95814

Hon. Bob Huff, Vice-Chair
Senate Committee on Budget and
Fiscal Review
State Capitol, Room 5097
Sacramento, California 95814

Hon. Jim Nielsen, Vice-Chair
Assembly Budget Committee
State Capitol, Room 6031
Sacramento, California 95814

Re: CCMS Independent Third Party Quality Assurance Reports

Dear Senator Leno, Senator Huff, Assembly Member Blumenfield, and Assembly Member Nielsen:

Attached are the independent assessments of the California Court Case Management System (CCMS) prepared for the Judicial Council consistent with the requirements of Government Code section 68511.8(d)–(e). Consistent with the recommendations of the California Technology Agency and the Bureau of State Audits, the statement of work and the vendor contracts were divided into two general areas: (1) a review of the development process employed by the CCMS development vendor, Deloitte Consulting, and (2) an evaluation of the system itself. The contract for review of the development

process was awarded to Integrated Systems Diagnostics (ISD). The contract for evaluation of the system was awarded to K3 Solutions, LLC (K3). The evaluations carried out by these two vendors examined project documents related to over 2,700 items and 250 practices. The final reports were received on August 31, 2011, and were reviewed and accepted by the CCMS Executive Committee on September 8, 2011.

The significant findings in the enclosed reports are:

- The CCMS architecture is scalable and has a solid foundation.
- Testing of CCMS has been well planned and comprehensive.
- All CCMS artifacts are under proper configuration management control.

In summary, based on the results of the combined assessments, we expect that CCMS will perform as designed once it is deployed into the production environment.

In March and April 2011 the CCMS Program Management Office (PMO) met with personnel from the CTA and the BSA to secure their recommendations and expectations for the independent assessment of the system. K3 and ISD were the vendors selected through the Administrative Office of the Courts' competitive bid process. The work of both vendors began in late June and was completed in August.

The review by ISD was intended to assess whether the appropriate software development process was used to create the system and to benchmark Deloitte's development methodology against Capability and Maturity Model Integration Level 3 (CMMI L3), an industry standard established by the Software Engineering Institute (SEI). The review was conducted using the Standard CMMI Appraisal Method for Process Improvement (SCAPMI), an SEI-approved process. The most rigorous evaluation methodology available, SCAMPI A, was employed.

K3 conducted an independent code quality assessment (ICQA), focusing on an overall evaluation of the system. The scope of work included a random review of CCMS development deliverables and artifacts, exploratory testing of various CCMS components, and a focused review of CCMS project elements highlighted during the SCAMPI appraisal conducted by ISD.

In addition to the findings noted above, K3 has identified opportunities for improvement as the judicial branch prepares for the deployment of CCMS and has offered recommendations to mitigate possible risks to maintainability and sustainability of CCMS. The CCMS PMO will prepare an action plan for implementation of the K3

recommendations, and the plan will be submitted to the CCMS Executive Committee and the Judicial Council for approval.

The ISD report also identifies both strengths and weaknesses in Deloitte's internal processes and notes where there are still gaps with the CMMI benchmarks for best practices. The report concludes that Deloitte is largely, but not entirely, compliant with CMMI Level 3 standards on this project. ISD recommends that the Deloitte metrics plan be revised to better fit the activities of maintenance versus development. As the report itself notes, an appraisal of this type is intended to be used for internal process improvement, and Deloitte will be required to submit an action plan to address the identified deficiencies as we move into the next phases of the project.

The CCMS Executive Committee will propose that the Judicial Council adopt the recommendations in the enclosed reports. Both reports have been provided to the BSA and the CTA, and both will be posted on the California Courts web site **http://www.courts.ca.gov/**.

We will be contacting your staff to set up a time to walk you through the reports in detail. Should you have questions or need further clarification, please contact Mark Moore, Executive Director, CCMS Program Management Office, at 415-865-4010 or at mark.moore@jud.ca.gov.

Sincerely,

Ronald G. Overholt
Interim Administrative Director of the Courts

RGO/MM/ja

cc: Hon. Tani Cantil-Sakauye, Chief Justice of California and Chair of the Judicial Council
Members of the Judicial Council
Hon. Terence L. Bruiniers, Chair, CCMS Executive Committee
Hon. James Herman, Chair, Judicial Council Internal CCMS Committee
Ms. Kiyomi Burchill, Policy Consultant, Office of Senate President pro Tempore Steinberg
Ms. Fredericka McGee, General Counsel, Office of Assembly Speaker Pérez
Mr. Joe Stephenshaw, Consultant, Senate Budget and Fiscal Review Committee
Mr. Matt Osterli, Consultant, Senate Republican Fiscal Office
Ms. Christian Griffith, Chief Consultant, Assembly Budget Committee
Ms. Diane F. Boyer-Vine, Legislative Counsel
Mr. E. Dotson Wilson, Chief Clerk of the Assembly
Mr. Allan Cooper, Consultant, Assembly Republican Fiscal Office
Mr. Carlos Ramos, CIO, California Technology Agency
Mr. John Baier, Audit Principal, California Bureau of State Audits
Mr. Scott Davidson, PMP, Principal, California Technology Agency
AOC Regional Administrative Directors
Mr. Curtis L. Child, Director, AOC Office of Governmental Affairs
Ms. Donna Hershkowitz, Assistant Director, AOC Office of Governmental Affairs
Mr. Mark Dusman, Director/CIO, AOC Information Services Division
Mr. Mark Moore, Executive Director, AOC CCMS Program Management Office
Ms. Tina Carroll, Executive Office Liaison, AOC Executive Office
Ms. Eunice Lee, Secretary, AOC Executive Office
Office of Communications, AOC Executive Office
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ADMINISTRATIVE OFFICE OF THE COURTS

455 Golden Gate Avenue • San Francisco, California 94102-3688
Telephone 415-865-4200 • Fax 415-865-4205 • TDD 415-865-4272

TANI CANTIL-SAKAUYE
Chief Justice of California
Chair of the Judicial Council

RONALD G. OVERHOLT
Interim Administrative Director of the Courts

Title of Report: Independent Consultant Review and Written Assessment of the California Court Case Management System

Statutory Citation: Government Code section 68511.8 (e)

Date of Report: August 2011

The Judicial Council has submitted a report to the Legislature in accordance with Government Code section 68511.8 (e) regarding the independent assessment of the California Court Case Management System (CCMS). The following summary of the report is provided under the requirements of Government Code section 9795. The Judicial Council has received the independent quality review of the CCMS product conducted pursuant to Government Code section 68511.8(d). Consistent with the recommendations of the state's California Technology Agency and the Bureau of State Audits, the independent assessment was divided into two general areas. One contract was awarded to Integrated Systems Diagnostics (ISD) and focused on a review of the development process employed by the CCMS development vendor (Deloitte Consulting). The review performed by K3 Solutions LLC (K3) focused on an evaluation of the system itself. These evaluations examined project documents related to over 2,700 items and 250 practices.

K3 conducted an independent code quality assessment (ICQA) that included random reviews of CCMS development deliverables and artifact records, assessment of select CCMS components, and independent exploratory testing of CCMS components. The report concluded the CCMS architecture is scalable and solid, the CCMS testing was well planned and comprehensive, and the proper configuration management control was used for the documentation. The report identified opportunities for improvement as preparations for deployment are made and offered recommendations to mitigate any risks to maintainability and sustainability of CCMS once it is deployed. The report ultimately concludes that CCMS will perform as designed.

The review by ISD assessed whether the appropriate software development processes were used to create the system and to benchmark Deloitte's development methodology against an industry standard established by Software Engineering Institute (SEI) known as CMMI (Capability and Maturity Model Integration) Level 3. The ISD report also identifies strengths and weaknesses in Deloitte's internal process, and notes where there are still gaps with the CMMI benchmarks for best practices.

The full report is available at: http://www.courts.ca.gov/7466.htm.
A printed copy of the report may be obtained by calling 818-558-3103.

Judicial Council Members

As of August 23, 2011

Hon. Tani Cantil-Sakauye
Chief Justice of California and
Chair of the Judicial Council
350 McAllister Street
San Francisco, CA 94102-4797
(415) 865-7060
Fax (415) 865-7181
tani.cantil-sakauye@jud.ca.gov

Hon. Judith Ashmann-Gerst
Associate Justice of the Court of Appeal
Second Appellate District, Division Two
300 South Spring Street
Los Angeles, CA 90013
(213) 830-7323
Fax (213) 830-9005
judith.ashmann-gerst@jud.ca.gov

Hon. Stephen H. Baker
Judge of the Superior Court of California,
County of Shasta
1500 Court Street
Redding, CA 96001-1685
(530) 245-6761
Fax (530) 225-5339
sbaker@shastacourts.com

Hon. Marvin R. Baxter
Associate Justice of the Supreme Court
350 McAllister Street
San Francisco, CA 94102-4797
(415) 865-7080
Fax (415) 355-5429
marvin.baxter@jud.ca.gov

Hon. Noreen Evans
Member of the California State Senate
1303 10th Street
Sacramento, CA 95814
(916) 651-4002
Fax (916) 323-6958
noreen.evans@sen.ca.gov

Hon. Mike Feuer
Member of the California State Assembly
9200 Sunset Blvd., Ph 15
West Hollywood, CA 90069
(310) 285-5490
Fax (310) 285-5499
assemblymember.feuer@assembly.ca.gov

Hon. James E. Herman
Judge of the Superior Court of California,
County of Santa Barbara
312-C East Cook Street, Dept. 4
Santa Maria, CA 93456
(805) 614-6434
Fax (805) 614-6616
jherman@sbcourts.org

Hon. Harry E. Hull, Jr.
Associate Justice of the Court of Appeal
Third Appellate District
621 Capitol Mall, 10th Floor
Sacramento, CA 95814-4869
(916) 654-0209
Fax (916) 653-0317
harry.hull@jud.ca.gov

Judicial Council Members

As of August 23, 2011

Hon. Ira R. Kaufman
Assistant Presiding Judge of the
Superior Court of California,
County of Plumas
520 Main Street, Room 104
Quincy, CA 95971
(530) 283-6233
Fax (530) 283-6415
Ira.Kaufman@plumas.courts.ca.gov

Ms. Miriam Aroni Krinsky
UCLA School of Public Affairs
(Lecturer)
4266 Irvine Avenue
Studio City, CA 91604
(818) 416-5218
Fax (818) 762-1030
krinskym@yahoo.com

Ms. Edith R. Matthai
Attorney at Law
Robie & Matthai
500 South Grand Avenue, #1500
Los Angeles, CA 90071-2609
(213) 706-8000
Fax (213) 706-9913
ematthai@romalaw.com

Mr. Joel S. Miliband
Attorney at Law
Rus, Miliband & Smith
A Professional Corporation
2211 Michelson Drive, Suite 700
Irvine, CA 92612
(949) 752-7100
Fax (949) 252-1514
jmiliband@rusmiliband.com

Hon. Douglas P. Miller
Associate Justice of the Court of Appeal
Fourth Appellate District, Division Two
3389 Twelfth Street
Riverside, CA 92501
(951) 248-0325
Fax (951) 248-0346
douglasp.miller@jud.ca.gov

Hon. Mary Ann O'Malley
Judge of the Superior Court of California,
County of Contra Costa
1020 Ward Street, Dept. 4
Martinez, CA 94553
(925) 957-5704
Fax (925) 957-5684
momal@contracosta.courts.ca.gov

Mr. James N. Penrod
Attorney at Law
Morgan, Lewis & Bockius
1 Market Street, Spear Street Tower
San Francisco, CA 94105
(415) 442-1535
Fax (415) 442-1001
jpenrod@morganlewis.com

Hon. Burt Pines
Judge of the Superior Court of California,
County of Los Angeles
9425 Penfield Avenue, Dept. F46
Chatsworth, CA 91311
(818) 576-8430
Fax (818) 576-8680
BPines@LASuperiorCourt.org

Judicial Council Members

As of August 23, 2011

Hon. Winifred Younge Smith
Judge of the Superior Court of California,
County of Alameda
1221 Oak Street, Dept. 23
Oakland, CA 94612
(510) 267-6939
Fax (510) 891-5359
wsmith@alameda.courts.ca.gov

Hon. Kenneth K. So
Judge of the Superior Court of California,
County of San Diego
220 West Broadway
San Diego, CA 92101
(619) 450-5055
Fax (619) 450-5716
kenneth.so@sdcourt.ca.gov

Hon. Sharon J. Waters
Judge of the Superior Court of California,
County of Riverside
4050 Main Street, Dept. 10
Riverside, CA 92501
(951) 777-3073
(951) 777-3119 (Chambers)
Fax (951) 777-3110
Sharon.Waters@riverside.courts.ca.gov

Hon. David S. Wesley
Assistant Presiding Judge of the
Superior Court of California,
County of Los Angeles
111 North Hill Street, Room 204
Los Angeles, CA 90012
(213) 974-5550
Fax (213) 680-1263
DWesley@LASuperiorCourt.org

Hon. Erica R. Yew
Judge of the Superior Court of California,
County of Santa Clara
191 North First Street, Dept. 70
San Jose, CA 95113
(408) 491-4760
Fax (408) 491-4762
eyew@scscourt.org

ADVISORY MEMBERS

Hon. Sue Alexander
Commissioner of the
Superior Court of California,
County of Alameda
24405 Amador Street, Dept. 508
Hayward, CA 94544
(510) 690-2828
Fax (510) 690-2824
salexander@alameda.courts.ca.gov

Mr. Alan Carlson
Chief Executive Officer
Superior Court of California,
County of Orange
700 Civic Center Drive West
Santa Ana, CA 92701
(657) 622-7017
Fax (657) 622-8235
acarlson@occourts.org

Hon. Keith D. Davis
Judge of the Superior Court of California,
County of San Bernardino
8303 North Haven Avenue
Rancho Cucamonga, CA 91730
(909) 285-3666
(909) 285-3800 (Chambers)
Fax (909) 285-3761
kddavis@sb-court.org

Judicial Council Members

As of August 23, 2011

Hon. Kevin A. Enright
Presiding Judge of the
Superior Court of California,
County of San Diego
220 West Broadway
San Diego, CA 92101
(619) 450-5284
Fax (619) 450-5716
kevin.enright@sdcourt.ca.gov

Hon. Terry B. Friedman (Ret.)
AOC/Office of the Secretariat
455 Golden Gate Avenue
San Francisco, CA 94102
(415) 865-7915
Judicial_Council@jud.ca.gov

Hon. Teri L. Jackson
Judge of the Superior Court of California,
County of San Francisco
400 McAllister Street, Room 205
San Francisco, CA 94102-4514
(415) 551-2829
Fax (415) 551-8085
tjackson@sftc.org

Hon. Robert James Moss
Judge of the Superior Court of California,
County of Orange
700 Civic Center Drive West
Santa Ana, CA 92701
(657) 622-5223
Fax (714) 834-6171
rmoss@occourts.org

Mr. Frederick K. Ohlrich
Clerk of the California Supreme Court
350 McAllister Street
San Francisco, CA 94102-4797
(415) 865-7015
Fax (415) 865-7196
frederick.ohlrich@jud.ca.gov

Mr. Michael M. Roddy
Court Executive Officer
Superior Court of California,
County of San Diego
220 West Broadway
San Diego, CA 92101
(619) 450-5478
Fax (619) 450-5716
mike.roddy@sdcourt.ca.gov

Ms. Kim Turner
Court Executive Officer
Superior Court of California,
County of Marin
3501 Civic Center Drive, Room 116
San Rafael, CA 94903
(415) 444-7398
Fax (415) 444-7021
kim_turner@marincourt.org

Final CCMS Application Assessment Report

(Document Version 1.3)

August 31, 2011

REVISION HISTORY

Version	Date	Name of Author	Summary of Changes
v1.0	8/12/2011	K3 Solutions	Initial Draft.
v1.1	8/25/2011	K3 Solutions	Updated to include Task 3 findings, initial review comments, and finalized Executive Summary.
v1.2	8/30/2011	K3 Solutions	Updated to address comments received from final findings briefing and review feedback.
v1.3	8/31/2011	K3 Solutions	Updated to address additional comments

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EXHIBITS

EXECUTIVE SUMMARY

The California Court Case Management System (CCMS) is a large complex system that has over 5,000 requirements, 6,000,000 lines of code, and 19,000 test scripts. As a result of this complexity, the Independent Code Quality Assessment (ICQA) team performed a Criticality Analysis and Risk Assessment (CARA) to identify a strategy to optimally review the CCMS system across the five tasks as defined in the Statement of Work (SOW). The ICQA team performed an unbiased comprehensive assessment of key CCMS areas to gain an understanding of potential areas of risk. Overall, the ICQA team reviewed 154 requirements, 65 document artifacts, 32 code components comprised of hundreds of code modules, and 33 test scripts. In addition, ICQA tested 82 scripts, witnessed the execution of 22 scripts, and analyzed the regression test results of 2112 scripts. Throughout the project, the ICQA team worked closely yet (technically, managerially, and financially) independent of the Administrative Office of the Courts (AOC) Project Management Office (PMO), the Deloitte development team, the Product Acceptance Test (PAT) testers, and the Integrated System Diagnostics (ISD) Standard CMMI Appraisal Method for Process Improvement (SCAMPI) team to gain an understanding of the CCMS system and validate the assessment findings at the conclusion of each task.

Throughout the ICQA project, the ICQA team identified numerous strengths as well as opportunities for improvement. Based on their review and analysis, the most significant recommendations are noted below:

Strengths

- The CCMS architecture is scalable and has a solid foundation. The design artifacts are well written system artifacts that are complete with comprehensive architecture diagrams and accompanying descriptions and specifications of each component, consistent with industry best practices. In addition, the use of the established National Information Exchange Model (NIEM) standard as a foundation is an industry best practice. NIEM is used by federal, state, and local government agencies as data exchange standards that enable information sharing.
- Testing of CCMS has been well planned and comprehensive. All test scripts and corresponding defects are centrally stored in a test repository, which allows for easy management of test artifacts and provides a clear history of all system issues identified through the testing effort. PAT testers are comprised of experienced court SMEs with significant knowledge of CCMS functionality, as well as professional testers who have extensive knowledge of testing best practices and use of the HP QC tool. In addition, testers are using the HP Quality Center (HPQC) tool in the correct manner to plan, execute the various test scenarios/scripts and report defects using industry best practices. CCMS testing results have shown an extraordinary high pass rate.
    - Previous PAT test results, from test events prior to ICQA involvement, have shown an extraordinary high pass rate (~97%) of over 20,000 test scripts executed.
    - Exploratory Test had a 100% pass rate (out of 82 test scripts)
    - Test Witness of PAT resulted in a 86.4% pass rate (out of 22 test scripts)
    - Regression Test Analysis had a 99.8% pass rate (out of 2112 test scripts)
- All CCMS artifacts are under proper configuration management control. Tools such as BART, HPQC, Rational Clear Case, and Rational Requisite Pro to manage the

Requirements, Design, Code, and Test data. Deliverables data is also maintained in eRoom with appropriate security measures.

Opportunities for Improvement

Exhibit 1 highlights the opportunities for improvement identified by the ICQA team. Although these opportunities for improvement are not CCMS problems, they should be resolved through application of the suggested recommendations before they become real CCMS issues. Each finding includes a risk assessment as defined below:

- ***Low*** - Insignificant Risk to CCMS maintainability or sustainability
- ***Medium*** - Moderate Risk to CCMS maintainability or sustainability and may require leadership approval for risk mitigation, may impact schedule, cost and performance
- ***High*** - Significant Risk to CCMS maintainability or sustainability with impacts to schedule, cost and performance for risk mitigation and requires leadership approval for risk mitigation

Exhibit 1 ICQA Identified CCMS Improvement Opportunities

#	Opportunity for Improvement	Risk	Recommendation
1	The CCMS Quality Assurance program needs an increase in rigor and efficiency to effectively determine the quality of CCMS artifacts.	Medium - This weakness poses a risk to the process for maintaining CCMS, as a mechanism needs to be established to properly review and audit all CCMS artifacts to ensure its quality and compliance.	Empower the IV&V or Quality Assurance team to perform comprehensive milestone "gate" reviews throughout the Software Development Lifecycle, which culminates in approval certifications and stakeholder sign-off.
2	CCMS project needs an increase in rigor and efficiency for their Measurement and Analysis program that quantifies CCMS performance.	Medium - This weakness poses a risk to the process for maintaining CCMS as there is currently no mechanism in place to effectively monitor the performance of the project across the engineering areas.	Enhancing the metrics plan to cover the engineering process areas would also alleviate several weaknesses identified in Integrated Project Management.
3	A global finding of the CCMS SCAMPI across different process areas focused on the project's inconsistency in routinely collecting, submitting, and acting on improvement information across the CCMS organization, either at the Deloitte PMO or Enterprise levels (as it relates to CCMS).	Medium – This weakness poses a risk to the process for maintaining CCMS as there is currently no mechanism to implement improvement opportunities and prevent previous issues from reoccurring.	Establish a mechanism to properly collect lessons learned or improvement opportunities in order to prevent quality issues and project delays from re-occurring post-deployment.

#	Opportunity for Improvement	Risk	Recommendation
4	There is limited unit testing throughout the CCMS code.	Medium – Maintainability of CCMS is decreased as manual unit testing is inefficient and can severely hinder emergency releases when required.	When CCMS is deployed in Production, the development team should begin creating automated JUnit tests for key code modules and adding these tests to continuous integration build scripts.
5	Backwards traceability in the code and design is minimal.	Medium – Maintainability of CCMS is decreased as backwards traceability helps developers understand the system dependencies when future changes are introduced into the system.	When CCMS is deployed in Production, the development team should continue adding code comments to key code modules and adding backwards traceability references to design artifacts. .
6	Some CCMS code modules are not adequately documented, and there are minimal descriptions of the processing, data, and interfaces of the functions. .	Low – Maintainability of CCMS is decreased because code comments provide developers/reviewers a clear description of the functionality of the module. Comments can also provide a record of the changes that occurred within the module as well as the developer's identity in the event questions arise about the code itself.	When CCMS is deployed in Production, the development team should continue adding code comments to key code modules and adding backwards traceability references to design artifacts.
7	There is no Master Document List for the project that would allow stakeholders to review the vast amount of CCMS documentation that is appropriately stored in their corresponding repositories.	Low – Maintainability of CCMS is decreased because the volume of documents can be a challenge to understand. A system overview guide would help ensure system knowledge is readily shared across all personnel.	A system guide for developers should be developed. This guide would serve as a training guide for new project personnel to help them understand all the existing system features and artifacts.

#	Opportunity for Improvement	Risk	Recommendation
8	The use of a Waterfall SDLC may produce CCMS enhancements for future releases at a slow pace.	Low – Maintainability of CCMS is decreased as manual unit testing is inefficient and can severely hinder emergency releases when required.	Introduction of an Agile development approach into future enhancements would increase the extensibility of CCMS while also reducing risk. Agile development breaks tasks into small increments with minimal planning. Agile methods emphasize face-to-face communication and works closely with the customer/product owner to ensure features are developed correctly. Iterations are short time frames that typically last from one to four weeks. Each iteration involves a team working through a full software development cycle including planning, requirements, design, development, and test while allowing for the incorporation of quality assurance throughout the iteration. During the test stage a working product is demonstrated to stakeholders. This minimizes overall risk and allows the project to adapt to changes quickly as they arise.

Upon compiling all the risks from Exhibit 1, ICQA assessed the overall CCMS risk rating in accordance with the SOW objectives.

Exhibit 2 ICQA Overall CCMS Risk Ratings

ICQA Objective	Risk
Quality of the processes used to create the CCMS software	Medium
Appropriateness of the processes used to create the CCMS software	Low
Quality of CCMS software	Low
Consistency of CCMS software	Low
Maintainability of CCMS software	Medium

Increased rigor of program performance to plan and more IV&V quality built in methodology would bring the program in alignment and mitigate the maintainability and sustainability risks/findings as noted in this assessment. ***In summary, based on the results of our combined assessments, we expect that CCMS will perform as designed once it is deployed into the Production environment***.

1 INTRODUCTION

The Judicial Council of California, chaired by the Chief Justice of California, is the chief policy making agency of the California judicial system. The California Constitution directs the Council to improve the administration of justice by surveying judicial business, recommending improvements to the Courts, and making recommendations annually to the Governor and the Legislature. The Council also adopts rules for Court administration, practice, and procedure, and performs other functions prescribed by law. The AOC is the staff agency for the Council and assists both the Council and its chair in performing their duties.

The 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. The CCMS project combines code from the AOC's CCMS V3 and concepts from the AOC's CCMS V2 and expands upon the services and functionality provided by those systems. The CCMS V4 development effort began in 2007, but experienced significant quality issues in December 2009/January 2010. As a result, the CCMS project was delayed approximately one year to address identified issues, and recently re-entered acceptance testing for core system functionality.

In order to assure the AOC and the State of California that quality issues have been successfully dealt with prior to exiting acceptance testing and beginning deployment to three early adopter courts, the ICQA project performed an independent review of CCMS to determine whether significant quality or maintainability problems remain. During the period of June 2011 through August 2011, the ICQA team conducted independent assessments of the CCMS by reviewing system documents, plans, processes, and configuration components as well as conducting exploratory testing and test witnessing. The ICQA Project was broken down into five Task Areas, which are described in greater detail in the following section:

- **Task 1 -** Independent CCMS Application Assessment Strategy and Plan
- **Task 2 -** Independent Random CCMS Development Deliverables and Artifacts Review
- **Task 3 -** Independent CCMS Application Assessment of Select CCMS components based on reported SCAMPI process issues
- **Task 4 -** Independent Exploratory Testing of CCMS Components
- **Task 5 -** Produce CCMS Application Assessment Report

This document provides the final CCMS Application Assessment Report which documents assessment work performed by the ICQA team.

2 DOCUMENT REFERENCES

The following subsections highlight the CCMS documents that were referenced in preparation of this final report.

2.1 Task 1 - Independent CCMS Application Assessment Strategy and Plan

Exhibit 3 highlights the documents that were referenced in preparation of the Independent CCMS Application Assessment Strategy and Plan.

Exhibit 3 CCMS Artifacts Referenced

Document Name	File Name	Version	Version Date
State of California Agreement 1023314	K3 Solutions (CCMS Code Quality Assessment) 1023314-signed.pdf	1.0	6/17/2011
Software Development Life Cycle Standard	AOC Software Development Life Cycle _V2-Draft.pdf	N/A	11/5/2010

2.2 Task 2 - Independent Random CCMS Development Deliverables and Artifacts Review

Exhibits 4 - 7 highlight the documents and artifacts that were assessed in preparation of the CCMS Development Deliverables and Artifacts Review Assessment.

Exhibit 4 Requirements Documents/Artifacts Assessed

Document Name	File Name	Version	Version Date
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Interpreter Management (21 of 215 requirements)	V4FFD_Section36_submitted_v1.xls	1.0	9/7/2008
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Data Exchanges (34 of 240 requirements)	V4FFD_Section36_submitted_v1.xls	1.0	9/7/2008
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Courtroom/Hearings (16 of 357 requirements)	V4FFD_Section36_submitted_v1.xls	1.0	9/7/2008
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Case Management (34 of 579 requirements)	V4FFD_Section36_submitted_v1.xls	1.0	9/7/2008
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Calendaring Scheduling (24 of 252 requirements)	V4FFD_Section36_submitted_v1.xls	1.0	9/7/2008

Document Name	File Name	Version	Version Date
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Nonfunctional Requirements (25 of 760 requirements)	V4FFD_Section36_submitted_v1.xls	1.0	9/7/2008
Intermediate Functional Design Traceability Matrix	Intermediate Functional Design Traceability Matrix_submitted.xls		2/10/2008
Framework Design Traceability Matrix	Framework Design Traceability Matrix_submitted_2.xls		10/23/2007
HP Quality Center Requirements	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
State of California Agreement 1004701, Exhibit A4.59.01, Revision 3	N/A	0.19	2/3/2011

Exhibit 5 Design Documents/Artifacts Assessed

Document Name	File Name	Version	Version Date
CCMS-V4 Core Product Final Functional Design Section 1-35	V4FFD_Section X.X_submitted_v1.pdf	1.0	9/7/2008
Framework Model Architecture	Framework Model Architecture_baseline_v1.pdf	1.0	10/19/2007
CCMS-V4 Development and Test Infrastructure Design	Development%20and%20Test%20Infrastructure%20Design_baseline_v2.1.pdf	2.1	5/1/2009
CCMS-V4 Security Design	CCMS-V4_Security_Design_Submitted_v5.pdf	2.0	3/13/2009
CCMS-V4 Final Data Dictionary – Columns	CCMS-V4 Final Data Dictionary - Columns.xls	N/A	4/15/2009
CCMS Conversion – Migration Utility Design	CCMS Conversion - Migration Utility Design_submitted_v3.pdf	3.0	1/15/2010
Functional Design for CCMS-V4 Data Exchanges	V4FDDX_Section 4.X_submitted_v1.pdf	1.0	9/7/2008

Exhibit 6 Code Documents/Artifacts Assessed

Document Name	File Name	Version	Version Date
CCMS Portal - build_scripts/	/Portal-CP2-INT/PortalDevelopment/CCMS/build_scripts/	N/A	N/A
CCMS Portal – ccms_jpa_entity/	/Portal-CP2-INT/PortalDevelopment/CCMS/ccms_jpa_entity/	N/A	N/A
CCMS Portal – ccms_test/	/Portal-CP2-INT/PortalDevelopment/CCMS/ccms_test /	N/A	N/A
CCMS Portal – ccms_webservice/	/Portal-CP2-INT/PortalDevelopment/CCMS/ccms_webservice/	N/A	N/A
CCMS Portal – ccms_webservice_client/	/Portal-CP2-INT/PortalDevelopment/CCMS/ccms_webservice_client/	N/A	N/A
CCMS Portal – ccms_webservice_client_test/	/Portal-CP2-INT/PortalDevelopment/CCMS/ccms_webservice_client_test/	N/A	N/A
CCMS Portal – ccms_webservice_test/	/Portal-CP2-INT/PortalDevelopment/CCMS/ccms_webservice_test/	N/A	N/A
OIM Portal –	/Portal-CP2-	N/A	N/A

Document Name	File Name	Version	Version Date
ccms_portal_oim_web/	INT/PortalDevelopment/OIMApplications/ ccms_portal_oim_web/		
CCMS Core – build_scripts/	/CP2-INT/V3Project/V3/build_scripts/	N/A	N/A
CCMS Core – ccms_diagnostics_web/	/CP2-INT/V3Project/V3/ ccms_diagnostics_web/	N/A	N/A
CCMS Core – ccms_fa_test	/CP2-INT/V3Project/V3/ ccms_fa_test/	N/A	N/A
CCMS Core – ccms_jpa_entity	/CP2-INT/V3Project/V3/ ccms_jpa_entity/	N/A	N/A
CCMS Core – ccms_mbean	/CP2-INT/V3Project/V3/ ccms_mbean/	N/A	N/A
CCMS Core – ccms_test	/CP2-INT/V3Project/V3/ccms_ test/	N/A	N/A
CCMS Core – ccms_webservice	/CP2-INT/V3Project/V3/ ccms_webservice/	N/A	N/A
CCMS Core – ccms_webservice_client	/CP2-INT/V3Project/V3/ ccms_webservice_client/	N/A	N/A
CCMS Core – ccms_xml	/CP2-INT/V3Project/V3/ ccms_xml/	N/A	N/A
CCMS Core – dms_web	/CP2-INT/V3Project/V3/ dms_web/	N/A	N/A
CCMS Core – framework_app	/CP2-INT/V3Project/V3/ framework_app/	N/A	N/A
CCMS Core – framework_ejb	/CP2-INT/V3Project/V3/ framework_ejb/	N/A	N/A
CCMS Core – framework_web	/CP2-INT/V3Project/V3/ framework_web /	N/A	N/A
CCMS Core – framework_xml	/CP2-INT/V3Project/V3/ framework_xml /	N/A	N/A
CCMS Core – v3_app	/CP2-INT/V3Project/V3/ v3_app/	N/A	N/A
CCMS Core – v3_app_ext	/CP2-INT/V3Project/V3/ v3_app_ext/	N/A	N/A
CCMS Core – v3_batch_app	/CP2-INT/V3Project/V3/ v3_batch_app/	N/A	N/A
CCMS Core – v3_batch_ejb	/CP2-INT/V3Project/V3/ v3_batch_ejb/	N/A	N/A
CCMS Core – v3_common_app	/CP2-INT/V3Project/V3/ v3_common_app/	N/A	N/A
CCMS Core – v3_common_ejb	/CP2-INT/V3Project/V3/ v3_common_ejb/	N/A	N/A
CCMS Core – v3_ejb	/CP2-INT/V3Project/V3/ v3_ejb/	N/A	N/A
CCMS Core – v3_uber_app	/CP2-INT/V3Project/V3/ v3_uber_app/	N/A	N/A
CCMS Core – v3_uber_ejb	/CP2-INT/V3Project/V3/ v3_uber_ejb/	N/A	N/A
CCMS Core – v3_web	/CP2-INT/V3Project/V3/ v3_web/	N/A	N/A
CCMS-V4 Design and Coding Standards	CCMS-V4 Design And Coding Standards_1.1.pdf	1.1	3/7/2008
PMD and Findbugs Reports	Static Code Analysis Report (Core) 07.07.2011.xls Static Code Analysis Report (Portal) 07.07.2011.xls	N/A	7/7/2011
Fortify Scan Reports	Portal_Framework-Fortify_Security_Report.pdf Portal_NonFramework_Fortify_Security_Report.pdf	N/A	7/7/2011

Exhibit 7 Test Documents/Artifacts Assessed

Document Name	File Name	Version	Version Date
CCMS-V4 Core Product Acceptance Test Plan	CCMS-V4 Core Product Acceptance Test Plan_submitted_v1.5.doc	1.5	10/22/2010
HP Quality Center - CORE – MH001 (Mental Health: Conservatorship) Scenario (4 of 27 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/ start_a.htm	N/A	N/A

Document Name	File Name	Version	Version Date
HP Quality Center - CORE – FIS_008 (Fiscal) Scenario (3 of 8 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – PEF-001 (P/E/Fam, Venue Transactions) Scenario (2 of 6 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – SP_INT_005 (Interpreter Management) Scenario (2 of 7 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – JUV_007 (Juvenile) Scenario (3 of 12 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center – NON-CORE – FEL-PR004 (Felony) Scenario (8 of 38 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – APL-015 (Appeals) Scenario (3 of 12 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – SP_REP_002 (Court Reporter Management) Scenario (4 of 4 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – Initiate Case - Maintain reserved Case Numbers Scenario (2 of 3 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
HP Quality Center - CORE – Hearing on Multiple Cases (Courtroom) Scenario (2 of 5 scripts)	http://ccmsv4qc.glbsnet.com/qcbin/start_a.htm	N/A	N/A
CCMS-V4 Core Product Integration Test and Product Acceptance Test Scripts	CCMS-V4_Product_Int_and Acceptance_Test_Scripts_Submitted_v2.pdf	2.0	8/14/2009
CCMS-V4 Stress Test, Training-Documentation, and Product Acceptance Test Infrastructure Design	CCMS-V4 Stress Test, Training, and Product Acceptance Test Infrastructure Design_submitted_v1.5.docx	2.0	3/13/2009
CCMS-V4 Core Software Product PAT Test Results	CCMS-V4 Core PAT Test Results_v2.pdf	2.0	5/2/2011

2.3 Task 3 - Independent CCMS Application Assessment of Select CCMS components based on reported SCAMPI process issues

Exhibit 8 highlights the documents that were referenced in preparation of the Independent CCMS Application Assessment based on SCAMPI results.

Exhibit 8 CCMS SCAMPI Artifacts Referenced

Document Name	File Name	Version	Version Date
Appraisal Plan	Appraisal Plan v3.0 Final.pdf	3.0	7/21/2011
SCAMPI Appraisal Preparation Checklist	ISD SCAMPI Appraisal Preparation Checklist 110727.xls	N/A	7/27/2011
AOC / Deloitte CCMS SCAMPI Readiness Review Report	SCAMPI Readiness Review Report v5-final.pdf	5.0	7/20/2011
Information Needs	Information Needs 110722	N/A	7/22/2011
SCAMPI PIID	ISD Document Import AOC v12.xls	12.0	8/18/2011
Final Findings Brief - DRAFT	Final Findings Briefing 110819 v3 Draft.ppt	3.0	8/19/2011

Administrative Office of the Courts SCAMPI Appraisal			
Final Findings Supporting Material	FF v1.ppt	1.0	8/19/2011

2.4 Task 4 - Independent Exploratory Testing of CCMS Components

Exhibit 9 highlights the documents that were referenced in preparation of the Independent CCMS Exploratory Test Analysis Report.

Exhibit 9 Test Artifacts Referenced

Document Name	File Name	Version	Version Date
CCMS-V4 Core Product Acceptance Test Plan	CCMS-V4 Core Product Acceptance Test Plan_submitted_v1.5.doc	1.5	10/22/2010
CORE PAT Final Regression Execution Report	CORE_PAT_Final_Regression_Execution_Report Image001 - image009.jpg	N/A	4/26/2011
CCMS-V4 Core Software Product PAT Test Results	CCMS-V4 Core PAT Test Results_v2.pdf	2.0	5/2/2011
HP Quality Center	http://ccmsv4qc.glbsnet.com/qcbin/ start_a.htm	N/A	N/A

2.5 Task 5 - Produce CCMS Application Assessment Report

Exhibit 10 highlights the documents that were referenced in preparation of this Final CCMS Application Assessment.

Exhibit 10 ICQA Documents Referenced

Document Name	File Name	Version	Version Date
Independent CCMS Application Assessment Strategy and Plan	CCMS-V4 Core Product Acceptance Test Plan_submitted_v1.5.doc	1.4	6/28/2011
CCMS Development Deliverables and Artifacts Review Assessment	CORE_PAT_Final_Regression_Execution_Report Image001 - image009.jpg	1.3	7/22/2011
Independent CCMS Application Assessment based on CMMI SCAMPI	CCMS-V4 Core PAT Test Results_v2.pdf	1.0	8/22/2011
Independent CCMS Exploratory Test Analysis Report	http://ccmsv4qc.glbsnet.com/qcbin/ start_a.htm	1.2	8/11/2011

3 METHODOLOGY

For each project task, the ICQA applied a specific methodology approach to the execution of the assessments based on our well-defined independent verification and validation methodology and industry standards and best practices presented in Exhibit 11.

Exhibit 11 Industry Standards and Best Practices used in the ICQA Methodology

Application	Standard
Task 1 - Independent CCMS Application Assessment Strategy and Plan	PMI Project Management Body of Knowledge, Fourth Edition
Task 1 - Independent CCMS Application Assessment Strategy and Plan	IEEE 1012-2004 – Standard for Software Verification and Validation Plans
Task 2 - Conduct Random CCMS Development Deliverables and Artifacts Review	IEEE 12207.0 – Software Life Cycle Processes
Task 2 - Conduct Random CCMS Development Deliverables and Artifacts Review	International Organization of Standardization (ISO) 9001:2008 Standards and Guidelines
Task 3 - Independent CCMS Application Assessment of Select CCMS components based on reported SCAMPI process issues	CMMI for Development, v1.2
Task 4 - Independent Exploratory Testing of CCMS Components	IEEE 829-2008 – Standard for Software Test Documentation
Task 5 - Produce CCMS Application Assessment Report	IEEE 610.12-1990 – Standard Glossary of Software Engineering Terminology

3.1 Task 1 - Independent CCMS Application Assessment Strategy and Plan

3.1.1 Develop a Strategy Outlining a Detailed Approach for the CCMS Application Assessment

The ICQA team analyzed the Statement of Work, and then leveraged our ICQA methodology, and our expertise in technologies relevant to AOC. We conducted a CARA, and interviewed key CCMS stakeholders to discuss key system features and the most critical areas of risk. The CARA allowed the ICQA team to customize our approach and prioritize efforts, mitigating system and program risks.

3.1.2 Include a Plan Detailing Required Resources

The CARA results provided input to the creation the Project Schedule plan. The ICQA team worked with AOC and Deloitte CCMS project managers to develop the application assessment schedule to identify dependencies, and to the extent possible, avoid negative impact to the CCMS product acceptance schedule. The Project Schedule plan activities integrate with the existing CCMS project schedules and can be seen in Section 3.2 of the Independent CCMS Application Assessment Strategy and Plan.

3.1.3 Identify CCMS Required Environment and Tools

The results of the CARA and analysis of the Statement of Work allowed the ICQA team to understand the CCMS environment and the tools that are readily available to conduct the ICQA tasks. A list of the environment requirements can be found in Section 3.4.1 and the tools required are found in Section 3.5.1 of the Independent CCMS Application Assessment Strategy and Plan.

3.1.4 Develop and Propose a Timeline that includes Milestones

The Project Schedule includes a timeline that highlights the milestones that were defined in the Statement of Work. This schedule can be found in Section 3.2 of the Independent CCMS Application Assessment Strategy and Plan.

3.1.5 Include Project Assumptions and Requirements

Project assumptions were based on the results of the CARA and the analysis of the Statement of Work. A list of all identified project assumptions can be found in Section 1.4 of the Independent CCMS Application Assessment Strategy and Plan.

3.2 Task 2 – Independent Random CCMS Development Deliverables and Artifacts Review

The ICQA team selected and identified a random sampling of twenty-five CCMS requirements, twenty-five CCMS designs, twenty-five CCMS code modules, and twenty-five CCMS test scripts to review.

3.2.1 Assessment Approach

The CCMS documents and artifacts were assessed on several criteria discussed in the following subsections, which were used to determine if the system meets AOC standards and is consistent with the overall CCMS architecture. Not all evaluation categories apply to all CCMS deliverables/artifacts.

3.2.1.1 Requirements Review

The requirements review activity assessed system requirements, including functional and performance requirements, external interfaces, security requirements, data definitions, installation and acceptance requirements, user operation and execution requirements, and user maintenance requirements. The objectives were to ensure the correctness, completeness, clarity, testability, and consistency of the CCMS requirements. The evaluation categories used to assess CCMS documentation for Requirements include the following:

- **Correctness** – Each requirement accurately describes the functionality to be delivered.
- **Unambiguous** – Requirements only have one interpretation.
- **Verifiability/Testability** – Requirements can be validated through testing or other verification methods.
- **Traceability -** Product fulfills and is mapped to its allocated requirements.
- **General Completeness** - Product is complete and includes the appropriate level of detail.

- **Standardization -** Requirement statements are achievable, necessary, verifiable, unambiguous, complete, implementation independent, ranked for importance, concise, and traceable and have unique identifiers, as defined by Institute of Electrical and Electronic Engineers (IEEE) standards.
- **Consistency –** Requirements are internally and externally consistent.
- **Data Usage –** Requirements address how the data will be used by the system.
- **Functionality -** Requirements address the various business scenarios that exist for the system.
- **Interface -** Interfaces are organized separately and address each direction of the interface.
- **Maintainability –** Requirements address the ability to maintain the system to correct defects or enhance the system.
- **Performance –** Requirements address the response times, throughputs, and concurrency for the system.
- **Reliability/Security –** Requirements address the ability to protect the system components and data.
- **Feasibility** – Requirements can be developed into a system within the known capabilities and limitations of the system and its environment.

3.2.1.2 Design Review

In the design review activity, the ICQA team determined whether the design is a correct, accurate, and complete transformation of the requirements and that no unintended features were introduced. The evaluation categories used to assess CCMS documentation for Design include the following:

- **General** – Product is complete and includes the appropriate level of detail. Product meets applicable standards and requirements. Designed components comply with supported standards. Product fulfills and is mapped to its allocated requirements.
- **System Architecture** – The inventory of hardware, software, network, and other infrastructure components (whether commercial off-the-shelf [COTS] or custom-built) are comprehensive. Software components are clearly tied to the hardware and network components on which they are installed and run. Supported architectural and design patterns are leveraged. Applicable technical reference models are adhered to.
- **Front-end Interface** – Human machine interfaces, interface descriptions, and screen layouts are comprehensive.
- **Detailed Design** – Designs are decomposed with increasing levels of detail. Product is internally and externally consistent. Additionally, design descriptions must be consistent with documented data flows, interface descriptions, and requirements.
- **External Interfaces** – Interfaces are organized separately and address each direction of the interface.

3.2.1.3 Code Review

The code review activity verified and validated that the CCMS design to code, database structures, and related machine-executable representations transformations are correct, compliant, and complete. During this activity, ICQA analyzed the source code and unit test cases using validation tools and code inspection techniques. The evaluation categories used to assess CCMS documentation for Code include:

- **Quality Attributes** – Product meets CCMS-V4 Design and Coding Standards. Supported design and coding patterns shall be leveraged. Applicable technical reference models shall be adhered to.

3.2.1.4 Test Review

The test review activity ensured that the unit, subsystem, and system requirements are satisfied by execution of development and integration/system testing and that the system satisfied the needs of the users as demonstrated by the execution of acceptance testing. The evaluation categories used to assess CCMS documentation for Test include:

- **Completeness** – Testing addresses the various system scenarios.
- **Test Management –** Test planning and coordination is conducted in an efficient manner.
- **Approval/Revision Process** - Test change and configuration management processes have been detailed and implemented.
- **Objective/Scope** – Test objectives and scope have been adequately defined.
- **System Overview –** The system that the test is conducted on has been described adequately.
- **Environment Management** – Test environment has been detailed sufficiently. Test data specifications have been included.
- **Requirements Management –** Requirements traceability has been included within test cases.
- **Defect Management** – Defect Management has been planned and coordinated in sufficient detail.
- **Test Strategy** – Testing processes and approach has been defined and implemented.

3.2.2 Traceability

The ICQA team verified that each of the artifacts selected has an acceptable level of traceability from requirements through design, development and test cases. The best practices approach to requirements management is to create an end-to-end traceability between requirements and the related artifacts and documentation that supports the design, configuration, development and testing of these requirements. The traceability ensures that requirements drive the project and that requirements are directly traceable to test cases and to solutions and work products. Bi-directional traceability, both forward and backward traceability and a key foundation to requirements management were performed and verified.

- Forward traceability ensures proper direction of the evolving product (that we are building the right product) and indicates the completeness of the subsequent implementation. (i.e., requirements → design → code → test scenario → test script)
- Backwards traceability helps ensure that the evolving product remains on the correct track with regard to the original and/or evolving requirements (that we are building the product right). (i.e., code → design → requirements)

Traceability prevents loss of legacy system functionality and prevents system "overreach". The ICQA team verified that CCMS code samplings can be traced backward to requirements and design components and forward to test scenarios, test scripts and test results. Exhibit 12 shows the traceability threads performed for this assessment.

Exhibit 12 Traceable CCMS Artifacts Assessed by ICQA

Requirements	Design Component	Code	Test Scenario
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Interpreter Management (21 of 215 requirements)	CCMS-V4 Core Product Final Functional Design Section 25: Interpreter Management	CCMS Core – v3_app	HP Quality Center - CORE – SP_INT_005 (Interpreter Management) Scenario
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Courtroom/Hearings (16 of 357 requirements)	CCMS-V4 Core Product Final Functional Design Section 8: Courtroom	CCMS Core – v3_app CCMS Core – v3_common_app	HP Quality Center - CORE – Hearing on Multiple Cases (Courtroom) Scenario
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Case Management (34 of 579 requirements)	CCMS-V4 Core Product Final Functional Design Section 18: Case Management	CCMS Core – v3_app	HP Quality Center - CORE – Initiate Case - Maintain reserved Case Numbers Scenario CCMS-V4-APP04 Perform Search
CCMS-V4 Core Product Final Functional Design Section 36 - Updated Requirements Traceability Matrix, Calendaring Scheduling (24 of 252 requirements)	CCMS-V4 Core Product Final Functional Design Section 24: Calendaring/Scheduling	CCMS Core – v3_app CCMS Core – v3_common_app	HP Quality Center - CORE - CCMS-V4-CAL06 Finalize Calendar Event Scenario

3.2.3 Severity Classifications

Severity ratings were consistent across all document/artifact assessments and are defined as follows:

- **Low** – Applies to issues that do not have a direct impact on the reader's ability to understand the item but are inconsistent with standards.
- **Medium** – Applies to issues that detract from the reader's ability to comprehend the item and how the project will address it.
- **High** – Applies to issues that impact the scope of the project.

3.3 Task 3 - Independent CCMS Application Assessment of Select CCMS components based on reported SCAMPI process issues

Concurrent with the ICQA project, the AOC sponsored a project focused SCAMPI Class A appraisal of the CCMS development project to obtain an independent opinion about quality and appropriateness of the processes used to create the software as well as an assessment of the quality, consistency and maintainability of the software itself. The CCMS SCAMPI appraisal documented the current process maturity baseline of the CCMS project against the CMMI Staged representation v1.2. This was a benchmarking appraisal of process capability that was performed in accordance with established organizational policies and procedures to determine whether the project was performed in accordance with CMMI Level 3 standards.

Our approach to performing this ICQA task focused on three main activities, which are discussed in the subsections below. The ICQA team used the following severity ratings defined below to assess the CCMS SCAMPI findings:

The ICQA team used the following severity ratings defined below:

- **Low** – Applies to issues that do not have a direct or immediate impact on the project's scope or success and risk to maintainability and sustainability is low
- **Medium** – Applies to issues that have a more long term impact on the project's scope or success and risk to maintainability and sustainability is moderate
- **High** – Applies to issues that have an immediate impact to the scope of the project or require management approval for corrective action and have significant risk to maintainability and sustainability.

3.3.1 Review the Preliminary SCAMPI Assessment Report

The ICQA team reviewed the Appraisal Plan to understand the scope and approach the CCMS SCAMPI team followed throughout the Readiness Review to the on-site appraisal. The ICQA team monitored the updated SCAMPI Appraisal Preparation Checklist, which documented SCAMPI preparations. At the conclusion of the Readiness Review, the ICQA team reviewed the AOC/Deloitte CCMS SCAMPI Readiness Review Report produced by the SCAMPI vendor.

3.3.2 Verify a Sample of CCMS Work Products to assess quality and consistency

During the Readiness Review, the CCMS SCAMPI team used the CCMS Process Implementation Indicator Descriptions (PIID) to review relevant CCMS project artifacts that are representative of CMMI process area practices. The ICQA team compared the worksheets to ascertain that the CCMS SCAMPI team assessed the same version of each CCMS artifact and ensure the integrity of the ICQA findings.

3.3.3 Work with the SCAMPI team to clarify questions

In addition to reviewing the CCMS SCAMPI artifacts, the ICQA team worked closely with CCMS SCAMPI team to understand their appraisal approach and asked clarification questions as needed. The ICQA team participated in most of the weekly CCMS SCAMPI planning meetings with the AOC and ISD team, and attended the Final Briefing at the conclusion of the CCMS SCAMPI project.

3.4 Task 4 - Independent Exploratory Testing of CCMS Components

As part of our comprehensive verification and validation approach, the ICQA team conducted exploratory testing of CCMS in the Product Acceptance Test (PAT) environment. The Exploratory Testing task was focused on determining whether both verification and validation had sufficiently been performed. Verification and Validation are defined as:

- **Verification** – ***Is the system built right***? The verification process provides objective evidence that all life cycle processes have been properly and adequately performed.
- **Validation** – ***Is the right system built***? The validation process provides objective evidence of product compliance with both the system's functional requirements and the users' needs. Does the system meet the users' requirements?

The ICQA team's goal towards this task was to determine how the CCMS V4 system handles the most challenging and critical test scenarios, as determined by the CARA conducted by the ICQA team with CCMS stakeholders. The CARA consisted of a series of meetings with CCMS stakeholders to discuss key system features and the most critical areas of risk. The results of the CARA allowed the ICQA to customize our approach, by focusing our efforts on conducting Exploratory Testing on CCMS Core components, Test Witnessing PAT execution of CCMS External components, and Analyzing the latest Regression Test Results conducted on CCMS in the PAT environment, which are discussed in the subsections below.

The ICQA team used the following severity ratings defined below:

- **Low** – Applies to issues that do not have a direct impact on the tester's ability to understand the item but are inconsistent with testing standards.
- **Medium** – Applies to issues that detract from the tester's ability to comprehend the item and how the project will address it.
- **High** – Applies to issues that impact the scope of the project.

3.4.1 Exploratory Testing

As CCMS is currently undergoing PAT on the External components, the ICQA team was constrained on the types of test scenarios that could be executed in the PAT environment. In order to preserve the integrity of the PAT results and minimize disruption to the PAT testers, the ICQA team worked with AOC and Deloitte test managers to identify approximately 100 test scripts across eight (8) scenarios focusing on the CCMS Core component. In addition, the ICQA team conducted *off-script testing*, varying from the test script by branching to execute additional test paths, which verified the robustness of CCMS. This also included *negative testing*; (testing for the purpose of causing the system to error and then ensuring proper recovery after error). Any defects discovered were documented and reported using the methodology defined by Deloitte in Section 5 of the CCMS Product Acceptance Test Plan and Exhibit 13 below.

Exhibit 13 CCMS Test Defect Severity Definition

Severity	Definition
1	A critical component or the entire Application has stopped or is so severely impacted that the Application or component cannot reasonably continue to operate and there is no workaround available. Data is corrupted or data integrity issues related to security/confidentiality lead to noncompliance with legal requirements or regulations.
2	A critical component of the Application is unavailable or does not work but a workaround is available. A non-critical component of the Application is unavailable or does not work and there is no workaround.
3	A non-critical component result is not as expected but a work around is available and there is no significant impact to an end-user.
4	All Defects other than Severity Level 1 Defect, Severity Level 2 Defect, Severity Level 3 Defect (e.g., minor or cosmetic defects).

3.4.2 Test Witnessing

In order to validate the results of the CCMS External components, the ICQA team worked alongside the PAT testers to witness their execution of assigned test scripts. Test witnessing allowed ICQA to monitor the fidelity of test execution to the approved test procedures. In addition, ICQA sampled the defect tracking process to ensure defect resolutions were properly documented and to trace any documentation and/or code changes required as a result of the defect. Finally, test witnessing also allowed ICQA to determine whether end-to-end test scenarios were executed.

3.4.3 Regression Test Review

Although Product Acceptance Test uses the same test plans as the Integration Test, the test execution results may not have produced the same outcome as they may have involved different versions of the CCMS code, or varying test environment configurations. The ICQA team assessed the automated regression test of CCMS that was executed using AOC's HP QuickTest Professional. In addition, the ICQA team analyzed the defects that occurred in the Integration Test and Product Acceptance test to identify potential problem areas that may have occurred during regression test execution.

3.5 Task 5 - Produce CCMS Application Assessment Report

At the conclusion of the project, the ICQA team consolidated our observations, findings and recommendations as discussed in the subsections below.

3.5.1 Consolidate Assessment Findings and Comments

As discussed in the previous sections, at the conclusion of each task, the ICQA team generated an assessment report, which contained the findings and comments relevant to the task activities performed. The ICQA team reviewed each report with the AOC and relevant stakeholders to ensure clarity on the findings and recommendations. Using the feedback provided by the AOC

and stakeholders, the ICQA team updated the reports accordingly and consolidated them in Section 4 below.

3.5.2 Create Executive CCMS Application Assessment Summary

The Executive Summary report, which is included at the beginning of this document, provides an independent assessment of the overall technical state of the CCMS implementation at that milestone. This summary includes a recap of tasks conducted during the Activity, identified discrepancies and their disposition, unresolved issues, and recommendations and observations.

3.5.3 Update the Description of Assessment Approach

Section 3 contains a summary of the assessment approach task activities. It is important to note that no deviations to the CCMS Application Assessment Strategy and Plan occurred throughout the ICQA project.

3.5.4 Identify each CCMS Component, Subsystem, and File reviewed

As the ICQA team performed the task activities described in the previous sections, an account of all the CCMS components, subsystems and files that were reviewed was documented in each assessment report. Section 3 contains a list of all the documents and artifacts that were referenced for each ICQA task.

3.5.5 Include Completed Assessment Checklists

The ICQA team performed the task activities assessments using the checklists described in the previous sections. As each CCMS artifact or component is assessed, the checklists will be populated with observation findings and comments. These completed assessment checklists will be included within the corresponding sections of Section 4.

3.5.6 Summarize the Overall Assessment Results

Section 4 summarizes the activities, tasks, and results, including the status and disposition of all findings or Test Problem Reports (TPRs) encountered throughout the project. It provides an assessment of the overall system quality and provides recommendations and observations regarding product and process.

4 FINDINGS

4.1 Task 2 - Independent Random CCMS Development Deliverables and Artifacts Review

During the assessment period the ICQA provided several findings reports for each Task Area (Tasks 2 - 4) performed. Findings with a rating of Medium or higher are depicted in Exhibit 14 below and included as a part of this report.

Exhibit 14 CCMS Review Comments

Design Review Comments			
#	**Comment**	**Severity**	**Recommendation**
1	There is no backwards traceability to the requirements in each section of the CCMS core functional design, so it is difficult to map specific CCMS design components to the source requirements.	Medium	Backwards traceability helps ensure that the evolving CCMS components remain on the correct track with regards to the original and/or evolving requirements (that we are building the product right). The objective is to ensure that we are not expanding the scope of the project by adding design elements, code, tests or other work products that are not called out in the requirements (i.e., “gold plating”). If there is a change needed in the implementation or if the developers come up with a creative, new technical solution, that change or solution should be traced backwards to the requirements and the business needs to ensure that it is within the scope of the desired product.
2	Some of the CCMS detailed design components do not provide a description of the mechanism and implementation of the application’s functionality within the system.	Medium	Although there is a general architecture "framework" and high level functional designs, the design artifacts do not show the interconnections between specific application components nor the interfacing of the components to external systems. Design models should be created so that a developer with a typical coding capacity can implement and follow through the architecture. Design models should capture information flows among major architectural component of the application (e.g., from Web Tier to ISB to DBs etc).
Code Review Comments			
#	**Comment**	**Severity**	**Recommendation**
3	There is no backwards traceability to the requirements in any of the reviewed CCMS code modules, so it is difficult to map specific CCMS components to the source requirements.	Medium	As mentioned previously, backwards traceability is important for several reasons. Another benefit of backward traceability comes when a defect is identified in one of the work products. For example, if a piece of code has a defect, the traceability matrix can be used to help determine the root cause of that defect.
4	There is limited unit testing throughout the CCMS code.	Medium	JUnit is a regression-testing framework that developers can use to write unit tests as they develop systems. Eliminating defects early in the process usually avoids lengthy and tedious debugging later in the project.

Test Review Comments			
#	**Comment**	**Severity**	**Recommendation**
5	There is limited validation of the specific requirements in the test scripts and some test scripts map to several requirements or compound requirements without sufficient detail. Use of verification points is inconsistent and limited.	Medium	Validation of requirements within the test scripts is critical in determining if the system meets the intended functionality.

Exhibit 15 shows the completed checklists that the ICQA team used for this task.

Exhibit 15 Completed Checklists

Checklist Name	Checklist Description	Attachment
Requirements Review Checklist	This checklist was used to determine whether the requirements are correct, unambiguous, testable, traceable, complete, standardized, consistent and maintainable.	Requirements_Checklist-complete v1.2.do
Design Review Checklist	This checklist was used to determine whether the CCMS design is a correct, accurate, and complete transformation of the requirements and that no unintended features are introduced.	Design_Checklist-complete v1.2.doc
Code Review Checklist	This checklist was used to review source code to determine whether CCMS code was implemented using AOC coding standards.	Code_Checklist-complete v1.2.doc
Test Plan Review Checklist	This checklist was used to determine whether the Test Plans meet the requirements to support all testing events for CCMS and satisfies its specified acceptance requirements.	Test_Plan_Checklist-complete v1.2.doc

4.2 Task 3 - Independent CCMS Application Assessment of Select CCMS components based on reported SCAMPI process issues

ISD used the SCAMPI v1.2 Method in performing their appraisal on the Deloitte Consulting organization for the CCMS Project. The SCAMPI v1.2 method has the following characteristics:

- uses CMMI v1.2 for Development
- is Assessment Requirements for CMMI compliant
- consists of a defined and structured set of team activities: interviews, document reviews, presentations

The results of the SCAMPI v1.2 method produced findings against the targeted Process Area Practices which are discussed in the following subsections. Exhibit 16 highlights the findings associated with this process area.

Exhibit 16 CCMS SCAMPI Findings

Requirements Management		
#	**Finding**	**Recommendation**
1	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).	Measurement data regarding requirements should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.
Project Planning		
#	**Finding**	**Recommendation**
2	The document histories of the evidence provided indicate version and date gaps (e.g., version jumps from V4.0 to V7.0 and there is a 2-year history gap in the Communications plan).	Provide a summarized line item to the change history logs where gaps exist highlighting the key items that changed in each document during the gap period and the source of the change to bring the document to current state.
Project Monitoring and Control		
#	**Finding**	**Recommendation**
3	Milestone reviews occurred during 2010, but were not observed to be routinely implemented in the project's process.	Create a more formal gate review process for moving forward with a template to capture any notes or risks from each milestone review. Provide a signature block for leadership/stakeholder and Independent Verification & Validation (IV&V) sign-off.
Measurement and Analysis (M&A)		
#	**Finding**	**Recommendation**
4	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).	Measurement objectives should be consistent with the stated project goals documented within the CCMS Metrics Plan. Review metrics to ensure currency and cite rationale as to why the metrics were tailored to this project to ensure that history is documented.
5	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 CCMS Metrics Plan should account for all types of measures that will help evaluate the performance of the project. This should include project management metrics, engineering metrics, and configuration management.

6	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.	For each identified measure to be collected, the CCMS Metrics Plan should also include corresponding roles, collection techniques, and analysis methods for each measure.
7	Some key metrics in the workbook don't have metrics objectives, analysis procedures, thresholds, or analysis tools noted (example: SI testing # defects/severity).	The measurement repository should contain a traceability matrix that associates each measure with the measurement objective, analysis technique, and appropriate thresholds.
8	Some CCMS metrics that are defined in the metrics plan are not being collected and analyzed currently (e.g., summary QA audit metrics)	Assign a task owner and incorporate metrics analysis in to general status reporting (weekly or monthly). The IV&V or Quality Assurance team should periodically review the measurement repository against the CCMS Metrics Plan.
9	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).	Measurement data regarding requirements should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.
10	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).	Assign a task owner and incorporate metrics analysis in to general status reporting (weekly or monthly).
Process and Product Quality Assurance		
#	**Finding**	**Recommendation**
11	Audits were done in the past (circa 2008) but were not performed at all from a project level for multiple years.	Task IV&V or Quality Assurance with performing a ***sample*** audit of high risk areas to ensure process efficiency and artifact completeness, correctness, and consistency.
12	Evidence provided indicates that there are insufficient project resources assigned to performing process and product audits as a routine organizational function.	Task IV&V or Quality Assurance with performing a ***sample*** audit of high risk areas to ensure process efficiency and artifact completeness , correctness, and consistency.
13	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.	Task IV&V or Quality Assurance with performing a ***sample*** audit of high risk areas to ensure process efficiency and artifact completeness , correctness, and consistency.

14	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.	Task IV&V or Quality Assurance with performing a ***sample*** audit of high risk areas to ensure process efficiency and artifact completeness , correctness, and consistency.
Configuration Management		
#	**Finding**	**Recommendation**
15	Limited evidence was provided of routinely auditing key CM processes (e.g., audits of release process, build process, change control process).	Task IV&V or Quality Assurance with performing a ***sample*** audit of high risk areas to ensure process efficiency and artifact completeness , correctness, and consistency.
Requirements Development		
#	**Finding**	**Recommendation**
16	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).	Measurement data regarding requirements should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.
Technical Solution		
#	**Finding**	**Recommendation**
17	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).	Measurement data regarding CCMS design should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.

Product Integration		
#	**Finding**	**Recommendation**
18	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).	Measurement data regarding CCMS code should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.
Verification		
#	**Finding**	**Recommendation**
19	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.	Measurement data regarding peer reviews should be analyzed at regular intervals and corrective actions should be created when issues are identified. Assign owners to ensure action is taken to resolve the group issues and improve the peer review process as needed.
Organizational Process Definition		
#	**Finding**	**Recommendation**
20	Metrics repository at Org level (Global) has effort and defect data primarily. Org repository doesn't yet have sufficient peer review data to do summary analysis. PR data is not being collected, analyzed, or used from a local CCMS repository. Metrics data from the projects are only provided to the Org level at project close out. CCMS metrics data is not in the Org repository. The CCMS metrics repository (eRoom) has not been populated with measurement data for years (with exception of weekly/monthly status).	Assign a task owner and incorporate metrics collection for each measure identified in the CCMS metrics plan. The IV&V or Quality Assurance team should periodically review the measurement repository against the CCMS Metrics Plan.
21	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).	Measurement data should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.

22	The Playbook Metrics Guidelines (GD003) document does not address how to collect and store metrics data in the organizational repository.	Update the Playbook Metrics Guidelines to include specific guidance on how to collect and store metrics data in the organizational repository.
23	Evidence provided of organizational defect data collected shows charting of the data but no analysis. Identification of issues, causes of defects, and process changes based on the analysis was not observed.	Defect data should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Perform a root cause analysis on 10% of the high severity organizational defects and create a corrective action plan with process improvements.
Organizational Training		
#	**Finding**	**Recommendation**
24	The CCMS project does not have a systematic training program overall that repeatedly delivers skills and knowledge needed by personnel in all roles.	Organize project planning and management documentation and provide a Master Document List (MDL), with key documents highlighted, that team members can review and use as informal training. Having an MDL will also assist with on-boarding new team members moving forward.
25	Some evidence of reporting training statistics was observed of local CCMS training status, metrics, issues, and actions being reported to program management, but this is not routine, systematic, or controlled over time against a defined training plan.	Training data should be analyzed at regular intervals and the training summary and analysis should be reported to management stakeholders.
26	There is no evidence of auditing the training capabilities of the CCMS project other than CMMI based external or internal appraisals.	Task IV&V or Quality Assurance with performing a ***sample*** audit of high risk areas to ensure process efficiency and artifact completeness , correctness, and consistency.
Integrated Project Management		
#	**Finding**	**Recommendation**
27	Recording and archiving of the basis of estimates in initial planning and re-planning was not apparent. Maintenance of estimates and basis of estimates appear to be maintained primarily in .ppt files.	Project planning estimates should be reviewed and updated by the Project Management Office (PMO) after each CCMS milestone or when the project scope has been changed.
28	No evidence was observed of using an organizational measurement repository to facilitate doing either original or re-plan estimates for the project.	Project planning estimates should be reviewed and updated by the PMO after each CCMS milestone or when the project scope has been changed. Project data should be stored within the measurement repository and used to calculate updated project estimates.
29	There is limited evidence that the entire set of project parameters used to plan and re-plan the project are monitored against plan (e.g., actual widgets such as screens, forms, reports).	Project planning estimates should be based on engineering calculations of the projected CCMS system.

30	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).	Measurement data should be analyzed at regular intervals and corrective actions should be created when threshold triggers have been reached. Update the Project Schedule to include corrective action milestone dates and data to support each item for improvement.
31	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 planning estimates should be reviewed and updated by the PMO after each CCMS milestone or when the project scope has been changed. Project data should be stored within the measurement repository and used to calculate updated project estimates.
32	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).	Perform a one-time re-sync of the status reports to the metrics reports and cite rationale for any gaps or inconsistencies. Verify the source of the metrics which are being provided in the status to identify any errors in collection.
33	All lessons learned reports provided are dated - nothing recent in the last two years has been done.	Lessons learned should be collected at the conclusion of each project milestone phase. Create a centrally located spreadsheet with detailed fields to capture lessons learned items from project members that they can update at their convenience. Sample spreadsheet fields include (Lessons Learned ID, Category, Description, Impact & Recurrence (high, medium, low), owner or champion, implementation time (short, medium, long), and Lessons Learned Actions.)
Risk Management		
#	**Finding**	**Recommendation**
34	Evidence was not observed of risk management training delivered, or training records it was received.	Update the project management training to include risk management. Maintain training records for all project personnel in a central location.
35	Although risks are monitored and statused, evidence was not observed of summary risk metrics being used to manage the risk management process.	Incorporate metrics capture and analysis moving forward during the risk management meetings.
Decision Analysis and Resolution (DAR)		
#	**Finding**	**Recommendation**
36	Evidence observed did not show the DAR process activities being monitored at the project level or reviewed with Management.	All project DARs should be submitted to management stakeholders for review and approval.

4.3 Task 4 - Independent Exploratory Testing of CCMS Components

The ICQA team executed 82 test scripts across 8 scenarios resulting in 100% pass rate. In addition, ICQA conducted ad-hoc and negative testing, which triggered the appropriate responses from the CCMS Core component. Exhibit 17 shows a detailed summary of the test scripts that were executed.

Exhibit 17 CCMS Exploratory Test Results

Number	Test Script Name	Date	Status
1	PEF_005_01 Create Profile, Name only and Mark as Frequent Filer	7/12/2011	Passed
2	PEF_005_02 Add Profile to Vexatious Litigant List	7/12/2011	Passed
3	PEF_005_03 Manage Vexatious Litigant List_Remove From List	7/12/2011	Passed
4	PEF_023_001_Add General Info	7/12/2011	Passed
5	PEF_023_002_Add Physical Info	7/12/2011	Passed
6	PEF_023_003_Add Additional Info	7/12/2011	Passed
7	PEF_023_004_Add Court Officer Position	7/12/2011	Passed
8	PEF_023_005_Search for Professional	7/12/2011	Passed
9	PEF_023_006_Remove Position and Add Another	7/12/2011	Passed
10	PEF_023_007_Search for Court Officer	7/12/2011	Passed
11	PEF_023_008_Search for Professional	7/12/2011	Passed
12	PEF_023_009_Search for Non-Professional	7/12/2011	Passed
13	PEF_023_010_Search All Person Entity	7/12/2011	Passed
14	JUV_007_001_ Initiate a Juvenile 300 case	7/13/2011	Passed
15	JUV_007_002 Record minutes for Detention hearing	7/13/2011	Passed
16	JUV_007_003 Add filing JV-505 Statement Regarding Parentage	7/13/2011	Passed
17	JUV_007_004.DX_Send notification to attorney_WORK AROUND	7/13/2011	Passed
18	JUV_007_006 Print calendar	7/13/2011	Passed
19	JUV_007_007_Print outcards	7/13/2011	Passed
20	JUV_007_008_Print pull list	7/13/2011	Passed
21	JUV_007_009.DX Record minute for Jurisdictional Hearing	7/13/2011	Passed
22	JUV_007_010 Record minutes for Dispositional Hearing	7/13/2011	Passed
23	JUV_007_011 Record minutes for 6 Month Review Hearing (In Home)	7/13/2011	Passed
24	JUV_007_012_Record minutes for the Permanency Hearing (12 Month Review)	7/13/2011	Passed
25	AC39_01a_Add Department	7/13/2011	Passed
26	AC39_01b_Update Department	7/13/2011	Passed
27	AC39_02a_Add Place	7/13/2011	Passed
28	AC39_02b_Update Place	7/13/2011	Passed
29	AC39_03a_Add Division	7/13/2011	Passed
30	AC39_03b_Update Division	7/13/2011	Passed
31	FIS_102_001_Initiate Traffic Case	7/14/2011	Passed
32	FIS_102_002.DX_Retrieve DMV Priors_DX WORKAROUND	7/14/2011	Passed
33	FIS_102_003_Calculate bail	7/14/2011	Passed
34	FIS_102_004_Record Payment on Case	7/14/2011	Passed
35	FIS_102_006_Distribute Payment	7/14/2011	Passed
36	FIS_102_007_Verify Disposition Information	7/14/2011	Passed
37	WQ01_01_Initiate Civil Limited, Unlawful Detainer Case_Task1	7/19/2011	Passed

Number	Test Script Name	Date	Status
38	WQ01_02_Initiate Civil Limited, Unlawful Detainer Case_Task2	7/19/2011	Passed
39	WQ01_03_View WQ Tasks	7/19/2011	Passed
40	WQ01_04_Manage WQ Users	7/19/2011	Passed
41	WQ01_04a_Assign Tasks En Masse	7/19/2011	Passed
42	WQ01_04b_Remove Task	7/19/2011	Passed
43	WQ01_05_Add Volume to Case File_Complete	7/19/2011	Passed
44	WQ01_06_Update Case Track_Canceling	7/19/2011	Passed
45	WQ01_07_Select In Progress Task	7/19/2011	Passed
46	WQ01_11_Print WQ	7/19/2011	Passed
47	FIS_COLL101_002_Calculate Bail	7/19/2011	Passed
48	FIS_COLL101_003_Search Partially Paid FFA	7/19/2011	Passed
49	FIS_COLL101_004_Verify Payment History	7/19/2011	Passed
50	FIS_COLL101_005_Switch Case in Context	7/19/2011	Passed
51	FIS_COLL101_007_Pay Full Case Balance on Both Cases	7/19/2011	Passed
52	FIS_COLL101_008_Update Count Disposition	7/19/2011	Passed
53	ADR01_Configure ADR Program Offices	7/20/2011	Passed
54	ADR02_Designate ADR Contacts	7/20/2011	Passed
55	ADR03_Configure ADR Location	7/20/2011	Passed
56	ADR04_Configure ADR Program Officer	7/20/2011	Passed
57	ADR05a_Configure Local Program - Judicial Arbitration	7/20/2011	Passed
58	ADR05b_Configure ADR Clocks - Judicial Arbitration	7/20/2011	Passed
59	ADR05c_Configure Local Program - Civil Action Mediation	7/20/2011	Passed
60	ADR05d_Configure ADR Clocks - Civil Action Mediation	7/20/2011	Passed
61	ADR05e_Configure Local Program - Generic Mediation	7/20/2011	Passed
62	ADR05f_Configure ADR Clocks - Generic Mediation	7/20/2011	Passed
63	ADR05g_Configure Local Program - Neutral Evaluation	7/20/2011	Passed
64	ADR05h_Configure ADR Clocks - Neutral Evaluation	7/20/2011	Passed
65	ADR05i_Configure Local Program - Settlement Conference	7/20/2011	Passed
66	ADR05j_Configure ADR Clocks - Settlement Conference	7/20/2011	Passed
67	ADR05k_Configure Local Program - Early Settlement Conference	7/20/2011	Passed
68	ADR05l_Configure ADR Clocks - Early Settlement Conference	7/20/2011	Passed
69	ADR06a_Configure ADR WQ - At Issue	7/20/2011	Passed
70	ADR06b_Configure ADR WQ - Agree to ADR	7/20/2011	Passed
71	ADR06c_Configure ADR WQ - All Parties File CMC	7/20/2011	Passed
72	ADR07_Configure Static Form Text	7/20/2011	Passed
73	FAM_019_001 Initiate family law Approval of Childs contract	7/21/2011	Passed
74	FAM_019_003 Scanned - initial filing documents	7/21/2011	Passed
75	FAM_019_004 Delivered - case file to research attorney	7/21/2011	Passed
76	FAM_019_005 Create Case note	7/21/2011	Passed
77	FAM_019_006 Delivered - case file to Judicial Officer	7/21/2011	Passed
78	FAM_019_007 Ordered - JO grants the request	7/21/2011	Passed
79	FAM_019_007b Update the Filing Status	7/21/2011	Passed
80	FAM_019_009 Dispose - case is disposed	7/21/2011	Passed
81	FAM_019_010 Filed - MC-357_358	7/21/2011	Passed

Number	Test Script Name	Date	Status
82	FAM_019_012 Scanned - subsequent filing documents	7/21/2011	Passed

4.3.1 Test Witnessing

The ICQA team witnessed 22 test scripts across 3 scenarios resulting in 86% pass rate. Exhibit 18 shows a detailed summary of the test scripts that were witnessed alongside the PAT testers.

Exhibit 18 CCMS Test Witnessing Results

Number	Test Script Name	Date	Status
1	FEL-PR004_034_File Petition for Continued Commitment (Mental Health Case)	7/12/2011	Passed
2	FEL-PR004_030_Record Minutes for Violation of Probation Event	7/11/2011	Passed
3	FEL-PR004_031_Schedule Placement Review (Mental Health Case)	7/12/2011	Passed
4	FEL-PR004_032.1.DX_Send Modified Disposition Notification	7/11/2011	Passed
5	FEL-PR004_032_Check In Participants and Capture and Finalize Minutes for Placement Hearing (Mental Health Case)	7/11/2011	Passed
6	FEL-PR004_033_Generate Order of Commitment	7/12/2011	Passed
7	FEL-PR004_034_File Petition for Continued Commitment (Mental Health Case)	7/12/2011	Passed
8	FEL-PR004_035_File Progress Report (Mental Health Case)	7/11/2011	Passed
9	FEL-PR004_036_Run Felony Weekly Pleas Report	7/11/2011	Failed
10	FEL-PR004_037_Run No Pending Activity Report	7/11/2011	Failed
11	FEL-PR004_038_Run Minute Code Execution Report	7/12/2011	Passed
12	SP_EFL_087_01.DX_Receive case amendment	7/11/2011	Passed
13	SP_EFL_087_02_Select E-Filing Transaction - Case Amendment FMI	7/11/2011	Passed
14	SP_EFL_087_03_E-Filing Review Screen Display Verification	7/11/2011	Passed
15	SP_EFL_087_09_Review submitted enhancements information	7/11/2011	Passed
16	SP_EFL_087_10_Review and edit submitted priors information	7/11/2011	Passed
17	SP_EFL_087_11_Proceed to Endorse-Accept	7/11/2011	Passed
18	MSD-TRF002_001_Initiate Case	7/19/2011	Passed
19	MSD-TRF002_002_Search Case	7/19/2011	Passed
20	MSD-TRF002_003.DX_Schedule Arraignment Event-Send Calendar Event Notification	7/19/2011	Passed
21	MSD-TRF002_004_Search for Arraignment Event	7/19/2011	Passed
22	MSD-TRF002_005.DX_Record Minutes for Arraignment Event-Send Minute Order Notification-Send Public Defender Case Assignment Notification	7/19/2011	Failed

The ICQA team worked with the PAT testers to open defects on those test scripts that failed. Additional details on the execution of each test script along with the traceability to each open defect can be found within HPQC.

In addition, Exhibit 19 lists the defects that were opened during test witnessing. When defects occurred, the ICQA team worked in conjunction with the PAT testers to communicate risks and errors immediately to the Deloitte team. The following test defects were identified/verified during the exploratory testing of the Product Acceptance Test. As of August 25th, all defects have been resolved and are closed. Additional details of each defect can be found in HPQC.

Exhibit 19 Defects Captured in HPQC

Defect	Name	Date	Severity
170330	INT2_CC14_SME1_14	04/21/2011	3
171219	SME1_11_PAT_CC11	04/27/2011	3
179136	FEL-PR004_032.1.DX_Send Modified Disposition Notification	7/11/2011	3
179185	FEL-PR004_036_Run Felony Weekly Pleas Report	7/11/2011	2
179112	FEL-PR004_031_Schedule Placement Review (Mental Health Case)	7/11/2011	3
179407	FEL-PR004_037_Run No Pending Activity Report	7/12/2011	2
180211	MSD-TRF002_005.DX_Record Minutes for Arraignment Event-Send Minute Order	7/19/2011	2

Attached is the completed Test Witness Review checklist providing details regarding the ICQA review criteria and findings.

Test_Witness_Checkl
ist-complete v1.2.doc

4.3.2 Regression Test Review

The regression test suite was comprised of existing test scripts (~2000), and was executed in the Product Acceptance Test environment. This generated an extensive sampling of test results, which is seen in Exhibit 20.

Exhibit 20 CCMS Regression Test Results

Test Group	Total Passed	Total Failed	Total Executed	Pass %
FAM	193	0	193	100.00%
FIS	329	1	330	99.70%
FMI	610	0	610	100.00%
FOC	65	0	65	100.00%
JUV	76	0	76	100.00%
SPC	361	3	364	99.18%
V3	474	0	474	100.00%
Grand Total	**2108**	**4**	**2112**	**99.81%**

The ICQA team verified that Defects #170330 & #171219 were opened as a result of the regression test scripts that failed. As indicated previously, all defects reported in Exhibit 18 have been resolved and closed.

Exhibit 21 details identified issues/findings with regards to the overall quality and robustness of the testing process and regression test review assessment.

Exhibit 21 Testing Process Issues/Comments

#	Issue/Comment	Severity	Recommendation
1	New Test Cases are being introduced during the PAT that were not executed during Integration Testing. While this was planned at an acceptable 10% allotment rate, there was a high level of script errors recorded. As a result, some Test Cases are being re-written during PAT which causes risk to the integrity and quality of the testing as well as the testing schedule.	Medium	Review existing testing/quality assurance process for test scripts and Deloitte must ensure any new test scripts that are introduced still go through the appropriate testing/quality assurance processes.
2	During the PAT execution and subsequent verification of the test cases in HPQC, it was unclear in the test scripts that all branches of requirements were tested.	Medium	Recommend these test scripts are reviewed for level of completeness and traceability for more thorough branch testing.
3	Some test script gaps existed during PAT to validate all of the business process. For example, test scripts had to be added during PAT to account for all processing related to criminal protective orders and DOJ/CLETS data exchanges. As similarly noted in Issue 1 the script gap was planned at an acceptable 10% allotment rate.	Medium	Include the IV&V team as well as court subject matter experts (SMEs) with significant court experience during the test planning phase. ICQA recommends these test scripts are reviewed by the IV&V and SMEs to identify gaps and proper courtroom scenarios as needed. As a best practice, a script gap allotment should be intended for a sporadically missed script here or there throughout the test suite, not recommended for all processing for a particular area of functionality.

Appendix A: Acronyms

The below table provides a list of acronyms and respective definitions that are used throughout this document:

Acronym	Definition
AOC	Administrative Office of the Courts
CARA	Criticality Analysis and Risk Assessment
CCMS	California Court Case Management System
CM	Configuration Management
CMMI	Capability Maturity Model Integration
COTS	Commercial Off-The-Shelf
CR	Change Request
DAR	Decision Analysis and Resolution
DB	Database
FFD	Final Functional Design
HP QC	Hewlett Packard Quality Center
ICQA	Independent Code Quality Assessment
IEEE	Institute of Electrical and Electronics Engineers
ISB	Integration Services Backbone
ISD	Integrated System Diagnostics
IV&V	Independent Verification and Validation
M&A	Measurement & Analysis
NIEM	National Information Exchange Model
PIID	Process Implementation Indicator Descriptions
PM	Project Manager
PMO	Project Management Office
QA	Quality Assurance
RM	Risk Management
PAT	Product Acceptance Test
SCAMPI	Standard CMMI Appraisal Method for Process Improvement
SDLC	Software Development Lifecycle
SI	Systems Integrator
TPR	Test Problem Reports

Integrated System Diagnostics

Appraisal Report

Deloitte Consulting/AOC

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

889 Shore Road
PO Box 3440
Pocasset, MA 02559-3440

Revision History

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

Table of Contents

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

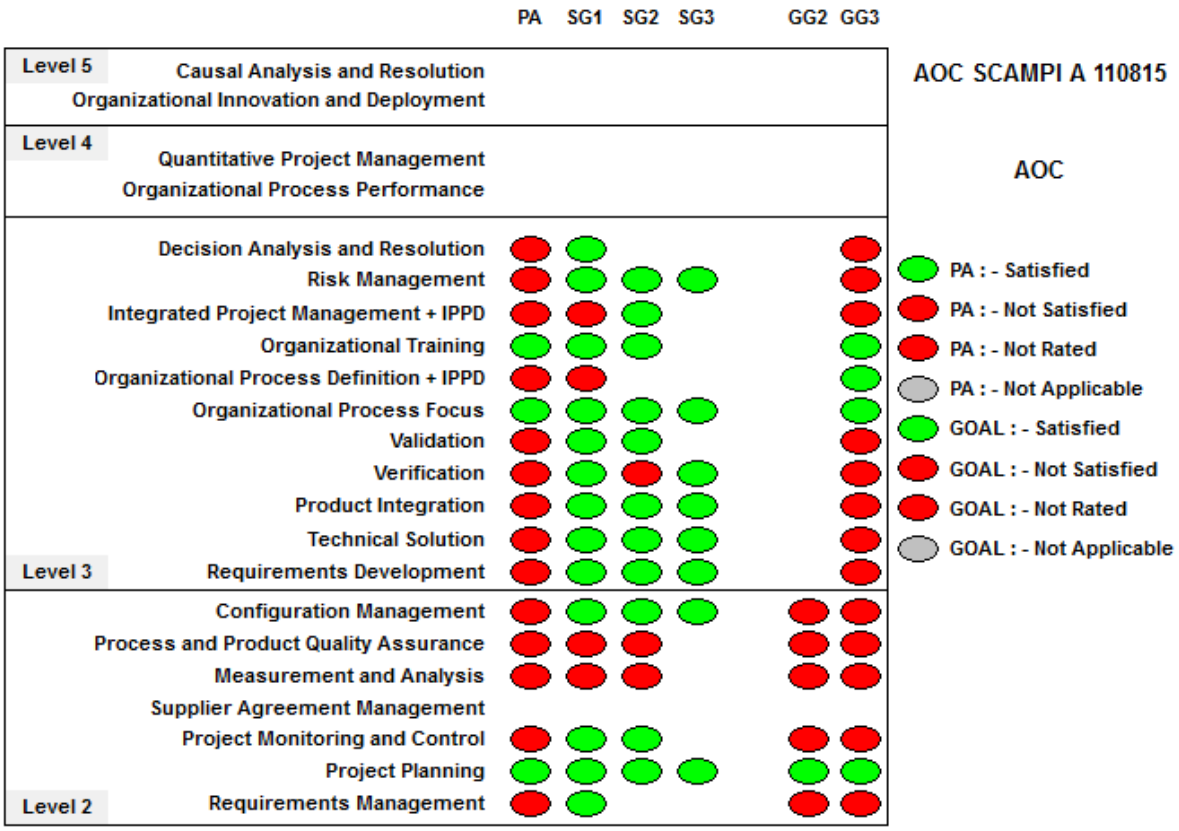
Risk ratings were determined for every Practice in all 17 CMMI Maturity Level 3 Process Areas. The High Risk practices should be reviewed and action plans put in place to address the associated weaknesses. Please see the Discussions and Recommendations in each of the Process Areas listed below.

	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