

IT Standards Overview

When considering the applicability of capability models, and IT industry standards, it is important to understand the nature of application support, and the objectives that a support organization is tasked to achieve.

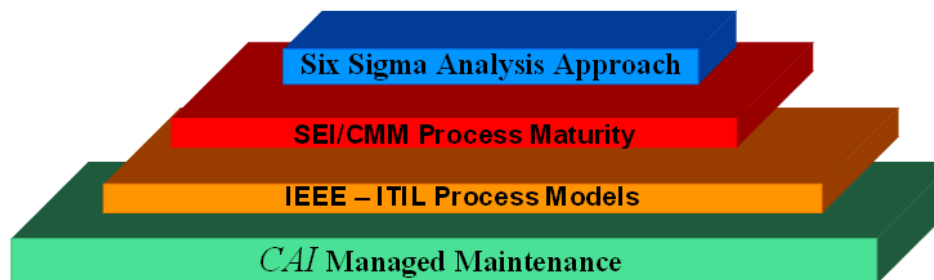
Software maintenance is defined as (IEEE, 1990): “The process of modifying a software system or component after delivery to correct faults, improve performance or other attributes, or adapt to a changed environment”. The four types of maintenance are:

1. **Corrective maintenance** deals with the repair of faults found.
2. **Adaptive maintenance** deals with adapting the software to changes in the environment.
3. **Perfective maintenance** mainly deals with accommodating new or changed user requirements.
4. **Preventive maintenance** concerns activities aimed at increasing the system’s maintainability.

All these types of maintenance are concerned with activities aimed at keeping the system usable and valuable for the organization. So, software maintenance has service-like aspects as well as software development. Six Sigma is specifically focused in continuous improvement by eliminating defects from software maintenance or services being delivered. As seen below each of the prominent IT industry standards build upon each other with Six Sigma focusing on the operational improvement aspects of service delivery.

Standards and Process Models Build On Each Other

- Standards and Best Practices Provide Execution Framework
- SEI Provides Maturity Progress Framework
- Six Sigma Provides a Continuous Improvement framework



- *CAI's* Methodology and Tools Provide a Foundation for These Frameworks to Actually WORK in the Real World

Six Sigma Background

Six Sigma at many organizations simply means a measure of quality that strives for near perfection. Six Sigma is a disciplined, data-driven approach and methodology for eliminating defects in any process -- from manufacturing to transactional and from product to service, strictly speaking, fewer than 3.4 defects per million opportunities. A Six Sigma defect is defined as anything outside of customer specifications.

The fundamental objective of the Six Sigma methodology is the implementation of a measurement-based strategy that focuses on process improvement and variation reduction through the application of Six Sigma improvement projects. This is accomplished through the use of two Six Sigma sub-methodologies: DMAIC and DMADV. The Six Sigma DMAIC process (define, measure, analyze, improve, control) is an improvement system for existing processes falling below specification and looking for incremental improvement. Both this Six Sigma process and another focusing on new processes (DMADV) are executed by Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

Application Support and Six Sigma

Within the application maintenance and support function it is necessary to focus on quantitative measurement for the dynamic event-based environment of IT service delivery, which strongly supports the operational implementation of Six Sigma techniques. CAI has a number of corporate product specialists and product managers who are Black Belts, and who provide guidance to maximize the conformance of Application Support to Six Sigma.

A review of the table below will highlight the similarities in high level approach between Six Sigma and Application Support. The table also provides a more detailed analysis in a number of areas that equate Six Sigma to Application Support. Overall, the compliance of CAI's approach to application maintenance and support to Six Sigma is very high.

*Note: In the following document the "Six Sigma Characteristics" are referenced from **What is Six Sigma?** By Pete Pande and Larry Holpp, McGraw-Hill, 20*

CAI Application Support – Six Sigma Approach to Continual Service Improvement

| Dimension | Six Sigma Characteristics | Page # | CAI Methodology Characteristics | Alignment (H, M, L) |
|--|---|-----------------|---|-----------------------|
| Impact on Enterprise | Business Initiative Transformational in Nature Process & Metrics Focus | 3 3 14-15 | Business Initiative Transformational in Nature Process & Metrics Focus | H |
| Focus | Focuses on the customer using facts and data to drive better solutions -Improves Customer Satisfaction -Reduces Cycle Time -Reduces Defects Provides consistent way to measure and to compare different processes | 2-3 | Focuses on the customer using facts and data to improve operational performance -Improves Customer Satisfaction -Improves Cycle time to complete work -Improves Quality Provides consistent way to measure application support processes at the individual, team, and organizational level | H |
| Six Themes of Six Sigma (see page 4 for more details) | 1. Genuine Focus on Customer 2. Data-and-Fact-Driven Management 3. Process Focus 4. Proactive Management 5. Boundaryless Collaboration 6. Drive for Perfection | 14-16 | 1. <u>Start Up Phase</u> - Focuses on customer requirements 2. <u>Work Management Phase</u> - Focuses on identifying and analyzing metrics to improve process 3. <u>Work Management-Implementation</u> & consistent use of Processes 4. <u>Work Management & Optimization Phase</u> - Implementing processes and conducting root cause analysis to proactively improve metrics 5/6. <u>Optimization Phase</u> - Working with IT and User teams to communicate progress and continuously improve process and performance | H H H H H |
| Three Approaches to Implement Six Sigma | 1. Business Transformation Driven 2. Strategic Improvement-Strategic & Competitive Advantage Initiatives 3. Problem Solving- Nagging and Persistent Problems | 17-20 | 1. Business Driven – Requires IT organization to be more responsive to business needs 2. Strategic Projects-Requires more time from IT that they don't have or hire expensive 3 rd party consultants 3. Business unsure of value of IT—ever increasing backlogs, few or no metrics to measure impact on business, etc. | H |
| Roles (see page 5 for more details) | 1. Black Belt 2. Master Black Belt 3. Green Belt 4. Champion/Sponsor 5. Implementation Leader | 21-24 | 1. Project Leader 2. Coach/Mentor 3. Client Team Leader 4. Champion/Sponsor 5. Program Manager | H |
| Six Sigma Problem Solving Process (see page 6 for more detail) | <u>DMAIC Model</u> 1. Measure the Problem 2. Focus on Customer 3. Verify Root Cause 4. Break old Habits 5. Manage Risks 6. Measure Results 7. Sustain Change | 31-41 | <u>CAI Application Support Process</u> 1. Measure the Problem- Start Up 2. Focus on Customer- Start Up 3. Verify Root Cause- Work Management & Optimization Phase 4. Break old Habits- Work Management & Optimization Phase 5. Manage Risks- Work Management & Optimization Process 6. Measure Results- Work Management & Optimization Process 7. Sustain Change- Optimization Phase | H |

Six Sigma Themes for Service Improvement

| Dimension | Six Sigma Characteristics | Page # | CAI Methodology Characteristics | Alignment (H, M, L) |
|---|--|--------|---|------------------------|
| Six Themes of Six Sigma | 1. Genuine Focus on Customer - Defining project improvements and their impact to the business | 14 | 1. <u>Start-up Phase</u> ; Getting buy-in at IT and business level to understand benefit to company and its business of Application Support improvements and how it will help company work on more strategic projects | H |
| | 2. Data and Fact Driven Management - Starts with identifying key measures to improve business a) identifies information is really needed b) How to use data/information to maximize benefit | 14 | 2. <u>Work Management Phase</u> a) Identifying success criteria of the project that will improve support and help the business achieve its goals b) Document and articulate how the achievement of these objectives will benefit IT and the business | H |
| | 3. Processes - Process is the key to success a) Mastering processes builds competitive advantage in delivering value to customers | 15 | 3. <u>Work Management Phase</u> – Implementation of support processes which are consistently used across support organization | H |
| | 4. Proactive Management a) Defining ambitious goals and reviewing them frequently b) setting clear priorities c) focusing on problem prevention rather than firefighting d) questioning why we do things instead of blindly defending them | 15 | 4. <u>Work Management Phase</u> <u>Optimization Phase</u> a) Define metrics teams will measure b) Setting clear priorities by assigning roles and responsibilities c) Following support processes and working as a team to improve performance d) Analyze work, measure trends, and identify improvement paths | H |
| | 5. Boundaryless Collaboration a) Break down barriers b) Improve teamwork up, down, and across organization | 15 | 5. <u>Optimization Phase</u> : a) Work with teams and business users to communicate progress and work together to improve business performance b) IT support teams work together to continuously improve the process | H |
| | 6. Drive for Perfection – Tolerate Failure a) Recognize and encourage the need to identify new ideas and approaches b) Push for improvement and be willing to accept – and manage-occasional setbacks | 16 | 6. <u>Optimization Phase</u> a) Work with teams to identify root cause of problems and identify solutions within Support Methodology or other methods that will improve work and achieve goals b) Encourages communication and new ideas among teams to improve process | H |

Roles

| Dimension | Six Sigma Characteristics | Page # | CAI Methodology Characteristics | Alignment (H, M, L) |
|-----------|---|--------|---|------------------------|
| Roles | <p><u>Black Belt</u> – Expert in process and inspires team & management to be motivated and stay the course</p> <ol style="list-style-type: none"> 1. Responsible for getting team started 2. Building confidence 3. Keeping project moving to successful results | 21 | <p><u>CAI Project Manager</u>-Expert in CAI support methodology and motivates, inspires, trains team to perform</p> <ol style="list-style-type: none"> 1. Bring latest support methodology concepts and tools to day--to-day activities of business 2. Builds confidence in teams 3. Keeps project moving to successful results | H |
| | <p><u>Master Black Belt</u> – Serves as coach, mentor or consultant to Black Belts</p> <ol style="list-style-type: none"> 1. Organizational Change Agent 2. Trainer for Black Belts 3. Involved in special six sigma projects | 22 | <p><u>CAI Coach/Mentor/Team Leader</u>-Trained in CAI Support Methodology and serves.</p> <ol style="list-style-type: none"> 1. Bring latest support methodology concepts and tools to day--to-day activities of business 2. Trains other “coaches” on CAI or Client side 3. Continually improves process through learning | H |
| | <p><u>Green Belt</u> – Trained in Six sigma skills and serves as team member or part time team leader</p> <ol style="list-style-type: none"> 1. Bring new concepts and tools of six sigma to day--to-day activities of business | 23 | <p><u>Client Team Leader</u>-Trained in CAI Support Methodology</p> <ol style="list-style-type: none"> 1. Bring latest support methodology concepts and tools to day--to-day activities of business | |
| | <p><u>Champion/Sponsor</u>- Key manager or executive who initiates and supports a Black Belt or a team project</p> <ol style="list-style-type: none"> 1. Ensures projects stay aligned with overall business goals 2. keeps other members of leadership team informed on progress of projects 3. Provide needed resources, such as time, money and help from others, for the team 4. Conduct tollgate reviews Negotiate conflicts, overlaps, and linkages with other Six Sigma Projects | 24 | <p><u>Champion/Sponsor</u>- Key CAI executive of interest who initiates and supports the CAI Project Leader</p> <ol style="list-style-type: none"> 1. Ensures support project stay aligned with overall business goals 2. Maintains executive contact and keeps other members of client leadership team informed on progress of projects 3. Provides needed CAI resources for the team 4. May participate in tollgate reviews Negotiate conflicts and overlaps, and linkages with other client projects | H |
| | <p><u>Implementation Leader</u> – Orchestrates entire Six Sigma Effort</p> <ol style="list-style-type: none"> 1. Usually a corporate vice president level, reporting to CEO, president, or other top executive 2. Drives Six Sigma thinking, tools, and habits across the organization 3. Executes implementation Plan 3. Conscience of top-management team, helping its members keep Six Sigma practices and priorities high on their agenda | 25 | <p><u>CAI Practice Leaders</u> – Develops MM/TI support processes in concert with CAI implementation team leaders</p> <ol style="list-style-type: none"> 1. Reports to president of CAI 2. Drives new thinking, tools, and habits across the organization 3. Executes practice implementation plan with help from MM/TI geography leadership | H |

Six Sigma DMAIC Model Overview & Advantages of DMAIC Process

(See following pages for more detail)

| Dimension | Six Sigma Characteristics | Page # | CAI Methodology Characteristics | Alignment (H, M, L) |
|---------------------------------------|--|--|---|---------------------|
| Six Sigma DMAIC Process | <ol style="list-style-type: none"> 1. <u>Define</u> the Problem-Document the problem, business case, success criteria, etc 2. <u>Measure</u>-Gather data to quantify problem 3. <u>Analyze</u>-Delve into details to better understand the problem using root cause analysis 4. <u>Improve</u>-Develop new behaviors and analyze data rigorously; create new ideas and improvements to process resulting in increased performance 5. <u>Control</u> – Achieving sustainable results | <p>31-32</p> <p>33-35</p> <p>36-38</p> <p>39-40</p> <p>40-41</p> | <ol style="list-style-type: none"> 1. <u>Define</u> the problem in the <i>Start-Up Phase</i>-Project Plan that outlines the goals of the project 2. <u>Measure</u> is accomplished in the <i>Work Management Phase</i> when support processes are implemented and people start following the process and report their time 3. <u>Analyze</u> is accomplished in the <i>Work Management/Document Management Phase</i> where work is reviewed and data is analyzed to determine improvement opportunity areas 4. <u>Improve</u> is accomplished in the <i>Optimization Phase</i> where teamwork is used to institutionalize the changes in process necessary to achieve breakthrough results 5. <u>Control</u> is achieved in the <i>Optimization Phase</i> where continuous improvement uses learnings and organizational change components to achieve sustainable improvements in process and behavior | H |
| Advantages of DMAIC Six Sigma Process | 1. <u>Measures the Problem</u> - Doesn't assume you understand what the problem is...you have to prove it with facts and data | 30 | <u>Start-Up Phase</u> – Identifies the problems and define it in terms of measurable metrics using data | H |
| | 1. <u>Focuses on Customer</u> a) Don't loose sight of overall goal of improving service to the customer | 30 | 2. <u>Start-Up Phase & Work Management Phase</u> – Identifies the customer and IT problems-develops with the IT and business user the customer service level agreements(SLA's) required for success | H |
| | 3. <u>Verifies Root Cause</u> a) Prove root cause with data | 31 | 3. <u>Work Management & Optimization Phase</u> – Root cause analysis techniques are learned in this phase and linked to hard data for confirmation and linkages | H |
| | 4. <u>Breaks old Habits</u> a) Incremental change is not the answer, dramatic change requires creative new solutions | 32 | 4. <u>Optimization Phase</u> – Sustainable change in behaviors are the object of this phase as part of the continuous improvement process | H |
| | 5. <u>Manages Risks</u> a)Testing and perfecting solutions by working out the bugs is an essential part of Six Sigma discipline and good common sense | 33 | 5. <u>Optimization Phase</u> – Continuous improvement is encouraged through teamwork and learning. Data is used to reflect results of new ideas, thus helping to ensure data-driven results, behavior change, and institutionalized learning | H |
| | 6. <u>Measure Results</u> a) The test to any solution is verifying the real impact with data and facts | 33 | 6. <u>Work Management & Optimization Phase</u> – Data is gathered, measured, and analyzed as part of the Application Support Processes | H |
| | 7. <u>Sustainable Change</u> - Needs to be nurtured and supported making change last over the long run | 33 | 7. <u>Optimization Phase</u> – Continuous improvement is encouraged through teamwork/learning. Data is used to reflect results of new ideas, helping to ensure data-driven results, behavior change, and institutionalized learning | H |

Six Sigma DMAIC Model

| Dimension | Six Sigma Characteristics | Page # | CAI Methodology Characteristics | Alignment (H, M, L) |
|-----------|---|--------|--|------------------------|
| Six Sigma | 1. <u>Define the Problem</u> - a) Develop Project Charter to focus the project on the right efforts - Business Case, Problem Opportunity Statement, Constraints and Assumptions, Scope, Players and Roles, Preliminary Plan | 31-32 | 1. <u>Define the Problem</u> - The <i>Start-Up Phase</i> of the project identifies the problem and organizes the project for success as part of the Master Project Plan -Develop Project Plan: Business Case, Problem Opportunity Statement, Constraints and Assumptions, Scope, Players and Roles, Preliminary Plan | H |
| DMAIC | 2. <u>Measure</u> : a) Gather data to validate and quantify the problem/opportunity b) Begin extracting facts and numbers that offer clues about the causes of the problem. | 33-35 | 2. <u>Measure</u> : The <i>Work Management Phase</i> begins to capture data that develops a baseline to be used to measure improvements and also begin to capture data that offer clues about the cause of the time spent on incidents, calls, and work requests that offer clues about the causes of the problem. | H |
| Process | 3. <u>Analyze</u> : a) Delve into details to better understand the process and problem b) Uncover the root cause | 36-38 | 3. <u>Analyze</u> - The <i>Work Management Phase</i> begins to look at the data using techniques to determine the root cause of the problems; the cause, extent, and quantity of activity that is deemed to be opportunities for improvement | H |
| | 4. <u>Improve</u> - focuses on solution and action | 39-40 | 4. <u>Improve</u> - <i>The Optimization Phase</i> takes the data derived in the Work Management Phase and focuses on solutions to eliminate or dramatically reduce the problem | H |
| | 5. <u>Control</u> – Sustainable Change a) Develop monitoring process to keep track of the changes the teams have set out b) Create response plan for dealing with problems that may arise c) Help focus management’s attention on the few critical measures that provide them current information on the project | 40-41 | 5. <u>Control</u> – Sustainable Change is achieved in the <i>Optimization Phase</i> where continuous improvement occurs a) Develop monitoring process to keep track of the changes the teams have set out b) Create response plan for dealing with problems that may arise (Issues List) c) Help focus management’s attention on the few critical measures that provide them current information on the project | H |