Software Process Improvement and CMM

Peter Dolog
dolog [at] cs [dot] aau [dot] dk
5.2.47
Information Systems
April 3, 2008
Topics

This overview covers the following topics:

- Common Process Problems
- Process Improvement Basics
- Maturity Models
- The CMMI Concept
- The Benefits of Using CMMI
- More About CMMI
- CMMI Adoption
- The Bottom Line
CMMI Expected Business Benefits

Substantial reduction in systems integration and test time with greater probability of success

Cause integration of, and interaction among, the various engineering functions

Extend SW-CMM benefits to the total project & organization

Employ systems engineering principles in software development

Increase & improve SE content in programs

Leverage previous process improvement investments
CMMI Expected Technical Benefits

Increased focus and consistency in

- requirements development and management
- systems design and development
- systems integration
- risk management
- measurement & analysis
- other engineering-related activities
Enterprise-Wide Improvement

Organizations that want to pursue process improvement in multiple functional areas can use CMMI to do so with less additional investment for each additional function.

- CMMI enables process integration and product improvement.
- CMMI integrates multiple disciplines.
- CMMI provides a framework for integrating new disciplines as needs arise.

For detailed information about CMMI benefits, see the Performance Results Web page, http://www.sei.cmu.edu/cmmi/results.html.
Real World Benefits: Lockheed Martin M&DS


Results

• captured a greater percentage of available award fees; now receiving 55 percent more compared to the baseline that remained unrealized at SW-CMM level 2

1996 - 2002

• increased software productivity by 30%
• decreased unit software cost by 20%
• decreased defect find and fix costs by 15%

(From proprietary sources with permission; August 2003.)
Real World Benefits:
General Motors Corporation

CMMI Focus 2001
Goal is Integration of Supplier Work and GM Project Execution

Results: Improved schedule—projects met milestones and were fewer days late

(From Camping on a Seesaw: GM's IS&S Process Improvement Approach. Hoffman, Moore & Schatz, SEPG 2003.)
Real World Benefits: Thales ATM

**CMMI** Level 4 helps THALES meet their business objectives:
- Ability to see into the future with a known level of confidence
- Increasing number of processes under statistical control
- Measurement-based process improvement

**Return on investment due to**
- earlier defect detection
- improved risk management
- better control of projects

(From CMMI Level 4 Preparation: The Story of the Chicken and the Egg. Anne De Goeyse and Anne Sophie Luce, Thales ATM; and Annie Kuntzmann-Combelles, Q-Labs France, ESEPG 2003.)
Real World Benefits: Bosch Gasoline Systems

CMM-based improvements

- **Predictability** – internal on-time delivery improved by 15%
- **Less Rework** – first pass yield improved by 10%
- **Product Quality** – reduction in error cases in the factory by one order of magnitude

Next Steps include

- move to CMMI and applying it to software, system, and hardware
- expand process improvement program to include sales, hardware, and component development

Real World Benefits: J.P. Morgan Chase & Co.

1st CMM success 2001 – today, 28 teams at CMM Level 2
CMMI success – 1st team ML3 in 2003
Investment in Process Improvement = $4 million

Results
- Improved predictability of delivery schedule
- Reduction of post-release defects
- Reduced severity of post-release defects

And, from CMMI specifically
- Increased throughput = more releases per year

Goal to achieve CMMI throughout organization

(With permission from presentation to the SEI, September 2003.)
Topics

This overview covers the following topics:

- Common Process Problems
- Process Improvement Basics
- Maturity Models
- The CMMI Concept
- The Benefits of Using CMMI
- More About CMMI
- CMMI Adoption
- The Bottom Line
# Organizations Using CMMI

<table>
<thead>
<tr>
<th>Accenture</th>
<th>Bank of America</th>
<th>BMW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing</td>
<td>Bosch</td>
<td>Ericsson</td>
</tr>
<tr>
<td>Dyncorp</td>
<td>EDS</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>FAA</td>
<td>Fannie Mae</td>
<td>Hitachi</td>
</tr>
<tr>
<td>General Dynamics</td>
<td>General Motors</td>
<td>Infosys</td>
</tr>
<tr>
<td>Honeywell</td>
<td>IBM Global Services</td>
<td>KPMG</td>
</tr>
<tr>
<td>Intel</td>
<td>J. P. Morgan</td>
<td>Motorola</td>
</tr>
<tr>
<td>L3 Communications</td>
<td>Lockheed Martin</td>
<td>NEC</td>
</tr>
<tr>
<td>NASA</td>
<td>NDIA</td>
<td>NRO</td>
</tr>
<tr>
<td>Nokia</td>
<td>Northrop Grumman</td>
<td>Polaris</td>
</tr>
<tr>
<td>NTT Data</td>
<td>OUSD (AT&amp;L)</td>
<td>SAIC</td>
</tr>
<tr>
<td>Raytheon</td>
<td>Reuters</td>
<td>TRW</td>
</tr>
<tr>
<td>Samsung</td>
<td>Social Security Administration</td>
<td>U.S. Navy</td>
</tr>
<tr>
<td>U.S. Air Force</td>
<td>U.S. Army</td>
<td>Zurich Financial Services</td>
</tr>
<tr>
<td>U.S. Treasury Department</td>
<td>Wipro</td>
<td></td>
</tr>
</tbody>
</table>
CMMI Products Available

Version 1.1 of the CMMI Product Suite was released in December, 2001.

The disciplines available in CMMI models include systems engineering, software engineering, integrated product and process development, and supplier sourcing.

The SCAMPI appraisal method combines internal assessment and external evaluation methods into one.

An implementation guide for government evaluation was published in April, 2002.

A module for interpreting CMMI for acquisition organizations was published in February 2004.
CMMI Acquisition Module

Provides concise guidance for establishing and strengthening acquisition practices
- Not another model—used in conjunction with CMMI
- Excerpts from CMMI with additions and amplifications pertinent to an acquisition environment

Helps to establish a common language and framework for process improvement across the supply chain

Can be used on less formal appraisals for gap analysis; identification of strengths, weaknesses, and risks; and identification of improvement opportunities

Cannot be used for formal appraisals yielding maturity level ratings
CMMI Service Providers (as of 2/28/05)

SEI Partners are consultants licensed by the SEI to provide appraisal services and/or training services.
- There are 134 SEI Partners that can offer the *Introduction to CMMI* training course.
- There are 179 SEI Partners that can offer SCAMPI appraisal services.

Instructors and appraisers are authorized by the SEI. There are currently 253 SEI-authorized *Introduction to CMMI* V1.1 Instructors and 364 SEI-authorized Lead Appraisers.

Since the release of CMMI in 2000, there have been many people trained in CMMI:
- *Introduction to CMMI*: 30,009
- *CMMI Instructor Training*: 318
The following data shows the number of SCAMPI V1.1 Class A appraisals that were conducted since the April 2002 release through August 2004 and reported to the SEI by September 2004:

424 appraisals
385 organizations
206 participating companies
33 reappraised organizations
1,704 projects
50.6% non-USA organizations
Maturity Levels by Reporting Organizations (9/28/04)

Based on most recent appraisal of 340 organizations reporting a maturity level rating.
Categories of Reporting Organizations (9/28/04)

- Commercial/In-house: 59.0% (2004) - 47.3% (2003)

© 2005 by Carnegie Mellon University

CMMI Overview Page 52
Topics

This overview covers the following topics:

• Common Process Problems
• Process Improvement Basics
• Maturity Models
• The CMMI Concept
• The Benefits of Using CMMI
• More About CMMI
• CMMI Adoption
• The Bottom Line
The Bottom Line

Process improvement should be done to help the business—not for its own sake.

“In God we trust, all others bring data.”
- W. Edwards Deming
CMMI Can Benefit You

CMMI provides

• a common, integrated vision of improvement for all elements of an organization

• efficient, effective improvement and appraisal across multiple disciplines

• improvements to best practices incorporated from the Software CMM, EIA 731, IPD-CMM and others

• a means of representing new discipline-specific information in a standard, proven process-improvement context
CMMI Benefits

CMMI-based process improvement benefits include:

- improved schedule and budget predictability
- improved cycle time
- increased productivity
- improved quality (as measured by defects)
- increased customer satisfaction
- improved employee morale
- increased return on investment
- decreased cost of quality
Improve Your Bottom Line

Improvement means different things to different organizations.

• What are your business goals?
• How do you measure progress?

Improvement is a long-term, strategic effort.

• What is the expected impact on the bottom line?
• How will impact be measured?
For More Information About CMMI

Go to CMMI Web site:

http://www.sei.cmu.edu/cmmi
http://seir.sei.cmu.edu

Contact SEI Customer Relations:

Customer Relations
Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213-3890
FAX: (412) 268-5800
customer-relations@sei.cmu.edu