CMMI®

Improving and Integrating

Mike Phillips
Mary Beth Chrissis
Mike Konrad
Sandy Shrum

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Standard Form 298 (Rev. 8-98)
Prepared by ANSI Std Z39-18
This Presentation

Provides an overview of CMMI

The Past—where we’ve been and what has influenced us

The Present—where we are

The Future—where we are going and how you can help
The Past era of “manufacturing in quality”

The premise of “manufacturing in quality”
• Implies a focus on processes as well as on products
• Is a long-established premise in manufacturing
• Is based on Total Quality Management principles as taught by Shewhart, Juran, Deming, and Humphrey

“It costs a lot of money to build bad products.”
Augustine’s 12th Law

“The quality of a system is highly influenced by the quality of the process used to acquire, develop, and maintain it.”
Phillip Crosby “Quality is Free: The Art of Making Quality Certain”
# Quality Management Maturity Grid

<table>
<thead>
<tr>
<th>Management Categories</th>
<th>Stage 1: Uncertainty</th>
<th>Stage 2: Awakening</th>
<th>Stage 3: Enlightenment</th>
<th>Stage 4: Wisdom</th>
<th>Stage 5: Certainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of quality as % of sales</td>
<td>Reported: unknown Actual: 20%</td>
<td>Reported: 5% Actual: 18%</td>
<td>Reported: 8% Actual: 12%</td>
<td>Reported: 6.5% Actual: 8%</td>
<td>Reported: 2.5% Actual: 2.5%</td>
</tr>
<tr>
<td>Summation of company quality posture</td>
<td>“We don’t know why we have quality problems.”</td>
<td>“Must we always have quality problems?”</td>
<td>“We are identifying and resolving our quality problems.”</td>
<td>“We routinely prevent defects from occurring.”</td>
<td>“We know why we don’t have quality problems.”</td>
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The Present

era of “engineering in quality”

CMMs focus on
- Process and product quality
- Business results
- Engineering in quality

CMMs continue to be adopted and used

Companies in key markets are adopting CMMs
- Defense
- Aerospace
- Automotive
- Entertainment
- Telecommunications
- Finance
Multiple Process Models

Success of the Software CMM® caused development of other CMMs, but they

- Have different structures, formats, terms, ways of measuring maturity
- Cause confusion, especially when more than one are used
- Are difficult to integrate into a combined improvement program
- Are difficult to use in supplier selection
Sunsetting of SW-CMM

Introduction to SW-CMM training course

• Last public offering from SEI is December 2003
• Continued availability from transition partners

CBA-IPI Assessments and SCE Evaluations

• Last Lead Assessor (LA) training is December 2003; last Lead Evaluator (LE) training is October 2003
• LA and LE authorizations expire December 31, 2005; LAs and LEs must upgrade to SCAMPI to continue providing SEI-Authorized appraisal services

For more information: See the Sunset FAQ at http://www.sei.cmu.edu/cmmi/adoption/sunset-faq.html
The Future

*era of “innovating in quality”*

We face unprecedented engineering challenges.
Customers demand quality products faster and cheaper.
Management expects higher productivity.
Engineering fields continually evolve and merge.
Organizations are dynamic; there is much more partnering.
Our knowledge and experience must be shared.

The future is now!
CMMI is our knowledge infrastructure
A House in Four Hours

Start at $t_0$  

$t_0 + 2$hrs 45 min


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Process Observations

Building the four-hour house as it parallels product development processes:

- Plan the work
- Monitor and measure the work
- Design before building the product
- Analyze and commit to the design
- Integrate the product
- Create team experience before, not during, the build
- Reuse knowledge of past designs and builds
- Utilize highly skilled staff
CMMI is Integration and Improvement

CMMI supports process integration and product improvement.

CMMI integrates multiple disciplines into one process-improvement framework that eliminates inconsistencies and reduces duplication.

CMMI provides a framework for introducing new disciplines as needs arise and therefore reduces the cost of implementing model-based improvement.

CMMI is designed to minimize the impact on legacy process improvement efforts and investment.
CMMI Models

Source Models

- Capability Maturity Model for Software V2, draft C (SW-CMM V2C)
- EIA 731, System Engineering Capability Model (SECM)
- Integrated Product Development Capability Maturity Model, draft V0.98 (IPD-CMM)

CMMI

- Meets the needs of software organizations
- Is an upgrade of SW-CMM
- Benefits from best practices contributed from all three source models
Improving on the Software CMM

CMMI Models improve on SW-CMM Version 2.0 Draft C:

- Incorporate additional years of learning
- More explicitly link best practices to business objectives
- Expand the scope of and visibility into the product life cycle and engineering activities
- Add more best practices, (e.g., measurement, risk management, product integration, decision analysis and resolution, and supplier management)
- Capture more robust high-maturity practices
- Address additional generic practices needed for institutionalization
- More fully comply with relevant ISO standards
Understanding CMMI Representations

A representation allows an organization to pursue different improvement objectives and presents model components differently. The content is nearly identical in both representations.

So why both?

- The representation of each source model was different
  - Software CMM—Staged
  - SE-CMM, SECM—Continuous
- Ease adoption by legacy communities.
- Both representations provide inherent benefits.
## Advantages of Each Representation

<table>
<thead>
<tr>
<th>Continuous Representation</th>
<th>Staged Representation</th>
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<tbody>
<tr>
<td>Provides maximum flexibility for order of process improvement</td>
<td>Predefined and proven path with case study and ROI data</td>
</tr>
<tr>
<td>High visibility of improvement within process areas</td>
<td>Focuses on organizational improvement</td>
</tr>
<tr>
<td>Easy upgrade from EIA 731</td>
<td>Easy upgrade from SW-CMM</td>
</tr>
<tr>
<td>Easy comparison to ISO 15504</td>
<td>Provides familiar benchmarking capability</td>
</tr>
<tr>
<td>Improvement of process areas can occur at different rates</td>
<td>Overall results summarized in a maturity level</td>
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CMMI in a Nutshell

A CMMI model provides a structured view of process improvement across an organization.

CMMI can help
- set process improvement goals and priorities
- provide guidance for quality processes
- provide a yardstick for appraising current practices
CMMI Today

Stable Version 1.1 CMMI Product Suite was released January 2002.

CMMI models will not change until 2005 at earliest.

Many defense, aerospace, and commercial organizations are upgrading to CMMI.

One appraisal method, SCAMPI, covers
• internal process improvement
• supplier source selection
• contract process monitoring
Discoveries in Use

Ease of upgrade to CMMI reported by:
- Multiple SW-CMM level 5 organizations that upgraded and maintained their maturity level
- Multiple organizations that upgraded from EIA/IS 731 systems engineering assessments
- Numerous European companies in group discussion of CMMI adoption at recent SEI-Europe quarterly meeting

Appraisal times reflect excellent learning curves
- Australian group reported 40% reduction in appraisal time over five appraisals

Mappings and gap analyses confirm evolutionary expansion from predecessor models
- Government and contractors agree on CMMI’s improved engineering coverage in contract monitoring
- ISO/CMMI compatibility appears favorable
Where We’re Going

Adoption activities
• Transition Partner data
• Early adoptors
• Workshops, technical notes, and book publication
• Interpretive Guidance project

Appraisal enhancement activities
• SCAMPI appraisal data
• CMMI adoption worldwide
• SCAMPI enhancements

Training activities
• CMMI training data
• Training course upgrades
Transition Partner Status

Transition Partners
• 50 for CMMI introduction training
• 86 for SCAMPI appraisal services

Authorization
• Introduction to CMMI Instructors – 103
• SCAMPI Lead Appraisers<sup>SM</sup> – 162

As of 1/22/03
Currently there are 30 early adopters.

Are you an early adopter? Send email to cmmi-comments@sei.cmu.edu to be listed.

See Early Adopter list at http://www.sei.cmu.edu/cmi/adoption/early-adopters.html
Adoption – What’s Happening Now

Events related to CMMI adoption:
- Quarterly transition workshops
- Annual NDIA/SEI CMMI User Workshop
- Interpretive Guidance project

Technical notes and special reports:
- CMMI and Product Line Practices
- CMMI and Earned Value Management
- Interpreting CMMI for Operational Organizations
- Interpreting CMMI for Service Organizations (in progress)
- CMMI Mappings
- Specific interests (e.g., safety, security)

Publication of SEI Series Book with Addison-Wesley
The Interpretive Guidance project is investigating whether there is information in CMMI models that may be more easily used by software, IT, and IS organizations if special guidance or interpretation is provided.

This project is collecting information in the following ways:
- Birds-of-a-feather sessions at conferences
- Workshops at SPIN meetings
- Expert group meetings
- Detailed interviews with select software organizations
- Feedback from SCAMPI appraisals
- Web-based questionnaire
Interpretive Guidance on the Web

To understand and address the issues that software organizations have when using CMMI

To allow current SW-CMM users to more easily upgrade to CMMI

To eliminate as many perceived barriers to CMMI adoption as possible

To make CMMI adoption easy
SCAMPI Appraisals

SCAMPI appraisals conducted since 1999 and reported to the SEI by October 2002:

- 40 appraisals
- 30 organizations
- 24 participating companies
- 6 reappraised organizations
- 141 projects
- 54.5% offshore organizations

CMMI is being adopted!
CMMI Appraisals Around the World

Australia  Denmark  France  India  Japan
Russia  South Korea  Switzerland  Taiwan  United Kingdom  United States

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CMMI Appraisals— What’s Happening?

SCAMPI Class B & Class C appraisal methods and training will be piloted; public release is planned for 2004.

Information about upgrading to CMMI/SCAMPI is being added to CBA-IPI Lead Assessor training.

Additional information on upgrading from CBA-IPI will be available. (Check your SEPG program for more information.)

SCAMPI for SW-CMM and other models will be announced.
Status of CMMI Training

Introduction to CMMI – 7,043 trained
Intermediate CMMI – 461 trained
Introduction to CMMI Instructors – 140 trained
SCAMPI\textsuperscript{SM} Lead Appraisers – 210 trained

As of 1/22/03
CMMI Training - What’s Happening?

CMMI Training course materials will be improved based on change requests submitted by students and instructors.

- Introduction to CMMI, Staged Representation
- Introduction to CMMI, Continuous Representation
- Intermediate Concepts of CMMI
- CMMI Instructor Training
CMMI & SEPG – What’s Happening

CMMI Track all four days
CMM/CMMI presentations in other tracks by topic

Birds-of-a-Feather Sessions
  • CMMI Interpretive Guidance
  • SEI Lead Appraiser Program

SEI Booth Offerings
  • CMMI poster
  • CMMI reference cards
  • CMMI FAQ
  • CD of CMMI Product Suite work products
  • Interpretive Guidance project general announcement
  • Call for nominations for Interpretive Guidance Expert Group

Book signing events, including the new SEI Series book, *CMMI: Guidelines for Process Integration and Product Improvement*
In Summary

CMMI aids organizations to …

- Improve delivery of performance, cost, and schedule
- Collaborate with external stakeholders and integrate their expectations into day-to-day activities
- Provide competitive world-class products and services
- Implement an integrated enterprise business and engineering perspective
- Use common, integrated, and improving processes for systems and software

We hope you choose to use CMMI for improving and integrating the processes in your organization.
For More Information…

You can find this presentation on the SEI Web site at http://jo.sei.cmu.edu/pub/english.cgi/0/323123.

For more information about CMMI, see http://www.sei.cmu.edu/cmmi/

Or, contact
SEI Customer Relations
Phone: 412 / 268-5800
Email: customer-relations@sei.cmu.edu