

**Brief Summary
CMMI® Model
(from a Measurement & Level 4-5 Perspective)**

for INCOSE Crossroads of America

Chapter Meeting

October 25, 2007

Dennis Brink

The Software Engineering Institute (SEI) is the CMMI[®] Custodian

This work is sponsored by the U.S. Department of Defense. The Software Engineering Institute is a federally funded research and development center sponsored by the U.S. Department of Defense.

Copyright 2006 by Carnegie Mellon University.

NO WARRANTY

THIS CARNEGIE MELLON[®] UNIVERSITY AND SOFTWARE ENGINEERING INSTITUTE MATERIAL IS FURNISHED ON AN “AS-IS” BASIS. CARNEGIE MELLON UNIVERSITY MAKES NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, AS TO ANY MATTER INCLUDING, BUT NOT LIMITED TO, WARRANTY OF FITNESS FOR PURPOSE OR MERCHANTABILITY, EXCLUSIVITY, OR RESULTS OBTAINED FROM USE OF THE MATERIAL. CARNEGIE MELLON UNIVERSITY DOES NOT MAKE ANY WARRANTY OF ANY KIND WITH RESPECT TO FREEDOM FROM PATENT, TRADEMARK, OR COPYRIGHT INFRINGEMENT.

Use of any trademarks in this report is not intended in any way to infringe on the rights of the trademark holder.

Internal use. Permission to reproduce this document and to prepare derivative works from this document for internal use is granted, provided the copyright and “No Warranty” statements are included with all reproductions and derivative works.

External use. Requests for permission to reproduce this document or prepare derivative works of this document for external and commercial use should be addressed to the SEI Licensing Agent.

This work was created in the performance of Federal Government Contract Number FA8721-05-C-0003 with Carnegie Mellon University for the operation of the Software Engineering Institute, a federally funded research and development center. The Government of the United States has a royalty-free government-purpose license to use, duplicate, or disclose the work, in whole or in part and in any manner, and to have or permit others to do so, for government purposes pursuant to the copyright license under the clause at 252.227-7013.

For information about purchasing paper copies of SEI reports, please visit the publications portion of our Web site (<http://www.sei.cmu.edu/publications/pubweb.html>).

The following service marks and registered marks are used in this document:

Capability Maturity Model[®]

CMM[®]

CMM IntegrationSM

CMMI[®]

IDEALSM

SCAMPISM

CMMI, CMM, and Capability Maturity Model are registered in the U.S. Patent and Trademark Office. CMM Integration, SCAMPI, and IDEAL are service marks of Carnegie Mellon University.

The following summary slides contain information extracted from CMMI[®] model materials.

The CMMI® (Capability Maturity Model® Integration) Is

- Guidance for developing your processes;
- Guidance for improving your processes;
- Guidance for improving abilities to manage products and services; and
- Structure of proven practices to:
 - Establish improvement priorities;
 - Implement planned improvement; and
 - Assess process maturity and capability



The CMMI® Model Is Not

- A set of processes;
- A set of process descriptions;

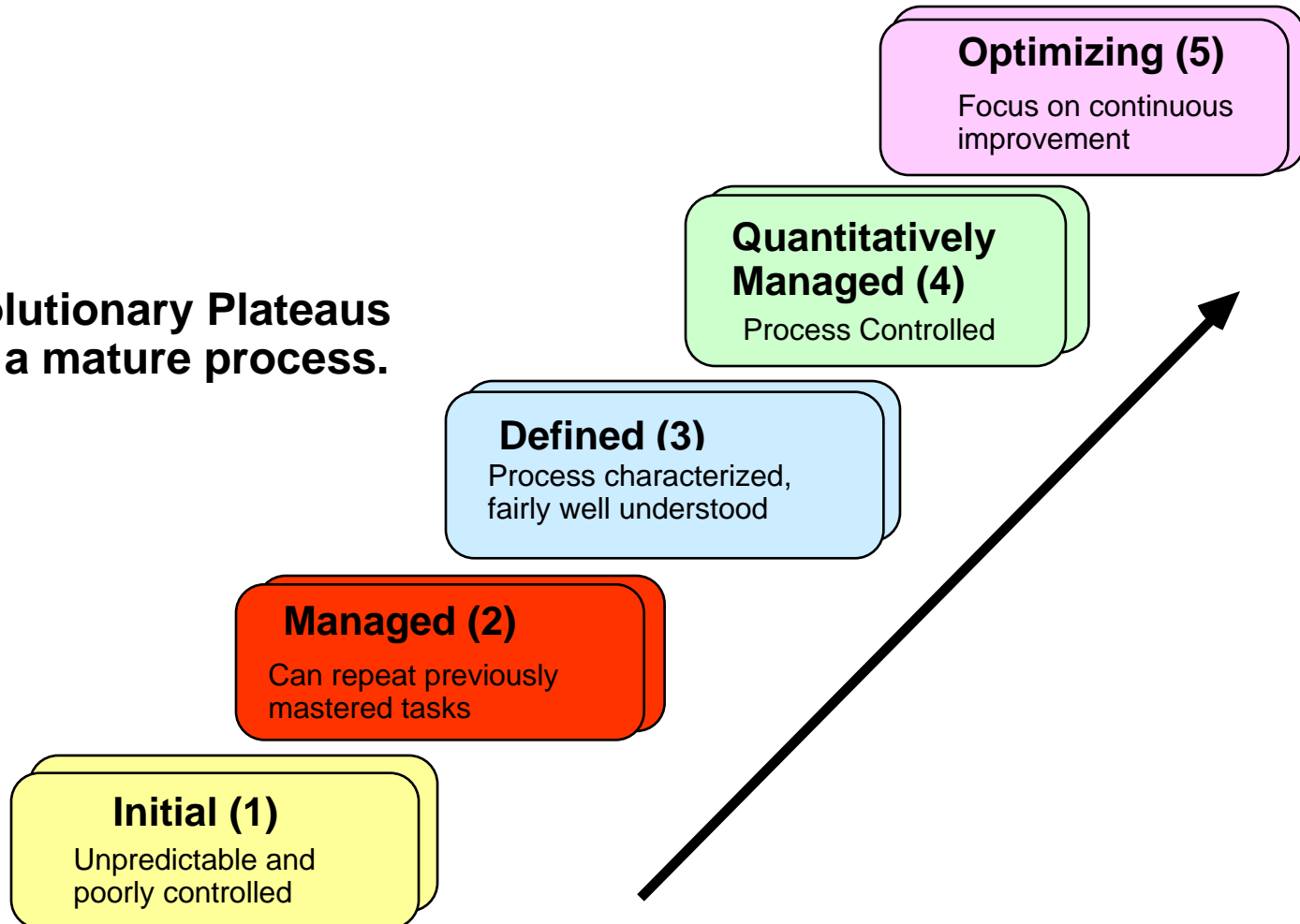
NOR

- A substitute for defining and building your processes for process, product, and project management.



The CMMI[®] Maturity Levels (Staged Representation)

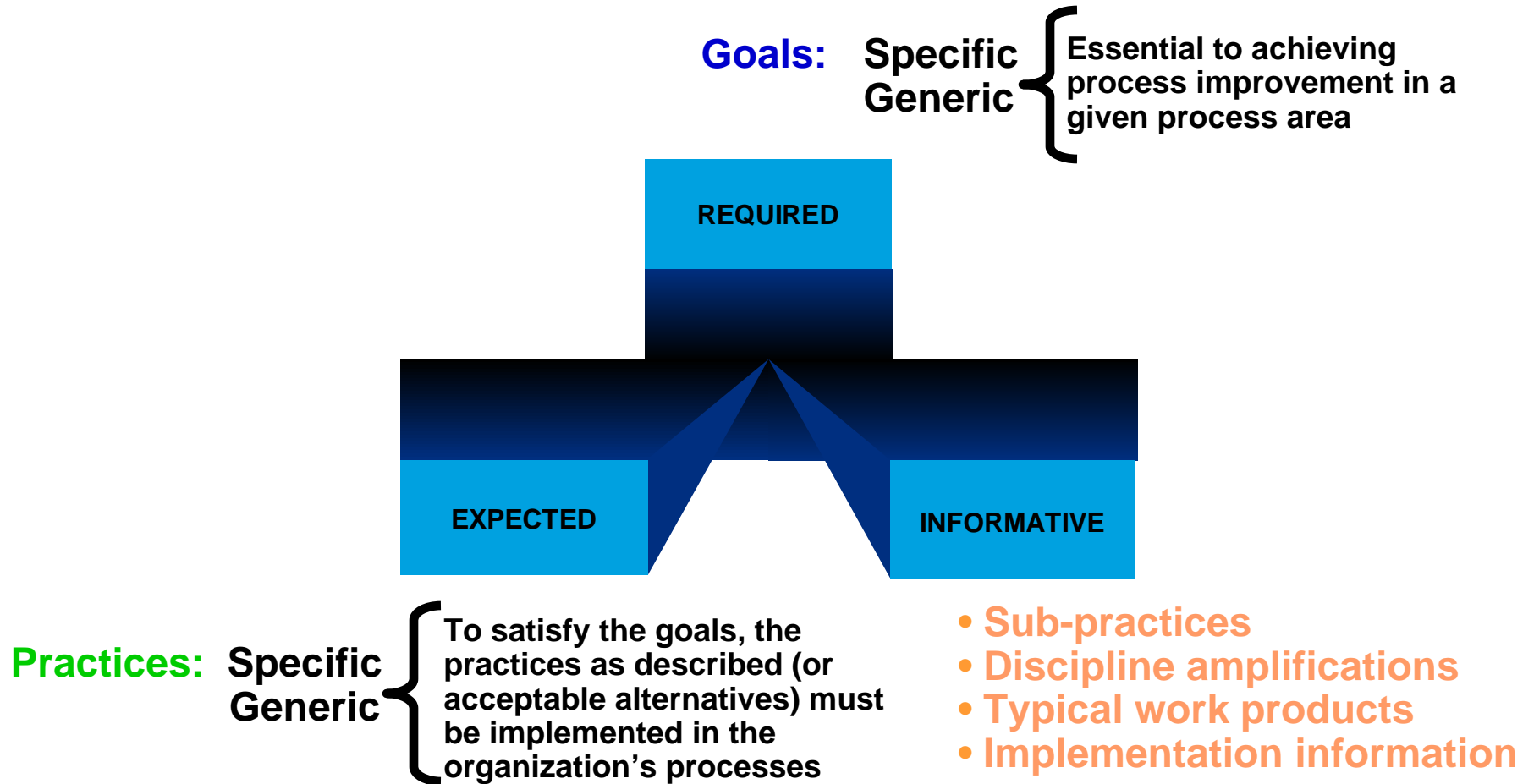
Five Evolutionary Plateaus towards a mature process.



The CMMI® Process Areas

Level	Focus	Process Area (PA)	Category	Discipline
5 Optimizing	Continuous Process Improvement	Organizational Innovation and Deployment Causal Analysis and Resolution	Advanced Process Mgt. Advanced Support	SE/SW/HW SE/SW/HW
4 Quantitatively Managed	Quantitative Management	Organizational Process Performance Quantitative Project Management	Advanced Process Mgt. Advanced Project Mgt.	SE/SW/HW SE/SW/HW
3 Defined	Process Standardization	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Project Management for IPPD Risk Management Integrated Teaming Integrated Supplier Management Decision Analysis and Resolution Organizational Environment for Integration	Engineering Engineering Engineering Engineering Engineering Process Mgt. Process Mgt. Process Mgt. Advanced Project Mgt. Advanced Project Mgt. Advanced Project Mgt. Advanced Project Mgt. Advanced Project Mgt. Advanced Support Advanced Support	SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/IPP SE/SW/HW SE/SW/HW IPP SS SE/SW/HW IPP
2 Managed	Basic Project Management	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management	Engineering Project Mgt. Project Mgt. Project Mgt. Support Support Support	SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW SE/SW/HW

Each Process Area Contains



Measurement and Analysis (Level 2 Process Area)

Goal	Practice
Align Measurement and Analysis Activities	Establish Measurement Objectives
	Specify Measures
	Specify Data Collection and Storage Procedures
	Specify Analysis Procedures
Provide Measurement Results	Collect Measurement Data
	Analyze Measurement Data
	Store Data and Results
	Communicate Results
Institutionalize a Managed Process	Establish an Organizational Policy
	Plan the Process
	Provide Resources
	Assign Responsibility
	Train People
	Manage Configurations
	Identify and Involve Relevant Stakeholders
	Monitor and Control the Process
	Objectively Evaluate Adherence
	Review Status with Higher Level Management
Institutionalize a Defined Process	Establish a Defined Process
	Collect Improvement Information

Quantitative Project Management (Level 4 Process Area)

Goal	Practice
Quantitatively Manage the Project	Establish the Project's Objectives
	Compose the Defined Process
	Select the Subprocesses that will be Statistically Managed
	Manage Quantitative Performance
Statistically Manage Subprocess Performance	Select Measures and Analytic Techniques
	Apply Statistical Methods to Understand Variation
	Monitor Performance of the Selected Subprocesses
	Record Statistical Management Data
Institutionalize a Managed Process	Establish an Organizational Policy
	Plan the Process
	Provide Resources
	Assign Responsibility
	Train People
	Manage Configurations
	Identify and Involve Relevant Stakeholders
	Monitor and Control the Process
	Objectively Evaluate Adherence
	Review Status with Higher Level Management
Institutionalize a Defined Process	Establish a Defined Process
	Collect Improvement Information

Organizational Process Performance (Level 4 Process Area)

Goal	Practice
Establish Performance Baselines and Models	Select Processes
	Establish Process Performance Measures
	Establish Quality and Process Performance Objectives
	Establish Process Performance Baselines
	Establish Process Performance Models
Institutionalize a Managed Process	Establish an Organizational Policy
	Plan the Process
	Provide Resources
	Assign Responsibility
	Train People
	Manage Configurations
	Identify and Involve Relevant Stakeholders
	Monitor and Control the Process
	Objectively Evaluate Adherence
Review Status with Higher Level Management	
Institutionalize a Defined Process	Establish a Defined Process
	Collect Improvement Information

Causal Analysis and Resolution (Level 5 Process Area)

Goal	Practice
Determine Causes of Defects	Select Defect Data for Analysis
	Analyze Causes
Address Causes of Defects	Implement the Action Proposals
	Evaluate the Effect of Changes
	Record Data
Institutionalize a Managed Process	Establish an Organizational Policy
	Plan the Process
	Provide Resources
	Assign Responsibility
	Train People
	Manage Configurations
	Identify and Involve Relevant Stakeholders
	Monitor and Control the Process
	Objectively Evaluate Adherence
Institutionalize a Defined Process	Establish a Defined Process
	Collect Improvement Information

Organizational Innovation and Deployment (Level 5 Process Area)

Goal	Practice
Select Improvements	Collect and Analyze Improvement Proposals
	Identify and Analyze Innovations
	Pilot Improvements
	Select Improvements for Deployment
Deploy Improvements	Plan the Deployment
	Manage the Deployment
	Measure Improvement Effects
Institutionalize a Managed Process	Establish an Organizational Policy
	Plan the Process
	Provide Resources
	Assign Responsibility
	Train People
	Manage Configurations
	Identify and Involve Relevant Stakeholders
	Monitor and Control the Process
	Objectively Evaluate Adherence
Review Status with Higher Level Management	
Institutionalize a Defined Process	Establish a Defined Process
	Collect Improvement Information

CMMI® References

- SEI CMMI® website <http://www.sei.cmu.edu/cmami/>
 - Models <http://www.sei.cmu.edu/cmami/models/index.html>
 - Appraisals <http://www.sei.cmu.edu/cmami/appraisals/index.html>
 - Training <http://www.sei.cmu.edu/cmami/training/index.html>
 - Recent presentation focusing on Level 4-5
 - Mike Konrad presentation from SEPG 07 Conference - “High Maturity! How do we Know?”
<http://www.sei.cmu.edu/cmami/presentations/sepg07.presentations/konrad.pdf>