

Overview of Changes Introduced in CMMI[®] v1.3

**ASEE Annual Meeting
February 19, 2011**

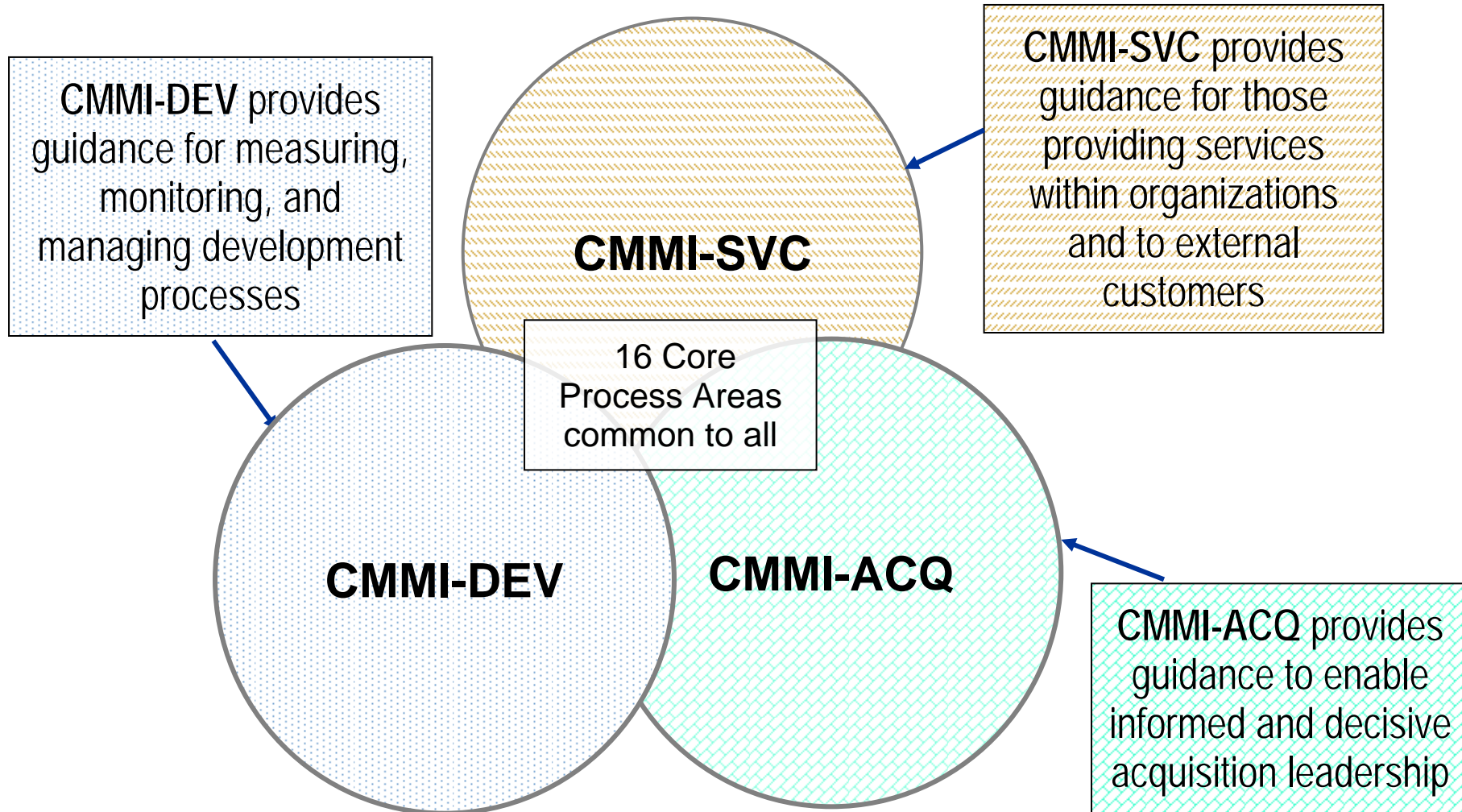
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Multi-Dimensional Maturity

Based on presentations provided by:
[Software Engineering Institute,](#)
[Carnegie Mellon University](#)

Objectives

- ▶ Acquaint you with the major changes in CMMI V 1.3
- ▶ Explore the implications of those changes for:
 - Process implementers
 - Appraisers

Three Complementary Constellations



- ▶ V1.3 changes focus primarily on:
 - High maturity
 - Appraisal efficiency
 - Consistency across constellations
 - Simplifying the generic practices
- ▶ V1.3 upgrade was change request driven.
- ▶ Clarified that CMMI models are not processes or process descriptions
- ▶ Removed any biases favoring maturity levels or capability levels.

CMMI v1.3 Criteria (Highlights)

- ▶ Correct identified model, training material, or appraisal method defects or provide enhancements
- ▶ Decrease overall model size in if possible; increases, if any, must not be greater than absolutely necessary
- ▶ Model changes should avoid adversely impacting legacy investment of adopting companies and organizations
- ▶ Changes may only be initiated by CRs or the CMMI Steering Group
- ▶ Changes must not cause retraining of the nearly 100,000 personnel already trained in CMMI; upgrade training may be needed, especially for:
 - Instructors
 - Lead Appraisers
 - Appraisal team members.

Transition...

- ▶ SEI provides on-line upgrade course as they did with CMMI v1.2: (price is \$200)
<http://www.sei.cmu.edu/training/p97.cfm>
- ▶ During the one year transition period, organizations may use either CMMI v1.2 or v1.3 models for their appraisals
 - One year period ends November 30, 2011
 - All appraisals using v1.2 models will be valid for 3 years.

Model Architecture

Typical Work Products

- “Typical work product” changed to “example work product”

Amplifications

- Removed the “amplification” model component

IPPD/Teaming

- Removed the IPPD addition from CMMI-DEV and added “teaming practices” in its place

CMMI-DEV

- Moved REQM from the Engineering category to the Project Management category. This is consistent with the other two constellations.

Many of the changes are in the informative material.

- ▶ Generic Practices
- ▶ Project Management PA's
- ▶ Support PA's
- ▶ Organization Process PA's
- ▶ Engineering PA's
- ▶ Acquisition PA's
- ▶ Service Delivery PA's
- ▶ High Maturity PA's

Generic Practices

- ▶ Generic Goals, Generic Practices, and GP elaborations are in one central location, rather than grouped with each PA
- ▶ Simplified GG1 to make it more readable
- ▶ Renamed GP 2.6 from “Manage Configurations” to “Control Work Products”
- ▶ Added “selected work products” to GP 2.9
- ▶ Simplified the GP 3.2 statement:
 - From: “Collect work products, measures, measurement results, and improvement information...”
 - To: “Collect process-related experiences...”
- ▶ Eliminated GG4 and GG5.

Project Management PA's

- ▶ Requirements Management – Changed the focus of SP 1.5 so that it now reads: “Ensure that project plans and work products remain aligned with the requirements.”
- ▶ Project Planning – added guidance on the suitability of the Specific Practices to endeavors *other than projects* (CMMI-ACQ and CMMI-SVC have SP 1.1 addressing *strategy*)
- ▶ Project Monitoring and Control – Minor changes only
- ▶ Integrated Project Management –
 - Added SP1.6 to address teams (IPPD was eliminated)
- ▶ Risk Management – Minor changes only
- ▶ Supplier Agreement Management –
 - Demoted SP 2.2, Monitor Selected Supplier Processes and SP 2.3, Evaluate Selected Supplier Work Products to subpractices of SP 2.1, Execute the Supplier Agreement
 - Clarified the scope of SAM practice applicability

Support PA's

- ▶ Configuration Management – Clarified that CM can apply to HW, equipment, and other tangible assets, as well as Agile environments
- ▶ Measurement and Analysis –
 - Clarified the relationship among information needs and objectives, measurement objectives, and business/project objectives
 - Added a table providing some common examples of measures, measurement information categories, base measures, derived measures, and measurement relationships
- ▶ Process and Product Quality Assurance – Clarified that PPQA applies to both project and organization level activities and work products.
- ▶ Decision Analysis and Resolution – Added guidance on preparing to use DAR practices and communicating their results

Organization PA's

- ▶ Organizational Process Focus – Simplified SP 3.4 compound statement to “collecting process-related experiences” (similar change to GP 3.2)
- ▶ Organizational Process Definition
 - Added SP1.7 to address teams (IPPD was eliminated)
- ▶ Organizational Training – Minor changes only

Engineering PA's

- ▶ Requirements Development – Added informative material to acknowledge the importance of customer satisfaction and the requirements critical to satisfaction
- ▶ RD, Technical Solution, Verification – Added material to incorporate current engineering practices, such as quality attributes, product lines, system of systems, architecture-centric practices, etc.
- ▶ TS, VER – Added information about how the PA's work with Agile methodologies
- ▶ Product Integration – Changed emphasis from “integration sequence” to “integration strategy”;
 - changed SP 1.1 to “Establish and maintain a product integration strategy,” a similar change was made to SP3.2
- ▶ Validation – Reinforced as to when validation occurs in the product lifecycle
 - Provided methods of validation for incremental development

Acquisition PA's

- ▶ Agreement Management
- ▶ Acquisition Requirements Development
- ▶ Acquisition Technical Management
- ▶ Acquisition Verification
- ▶ Acquisition Validation
- ▶ Solicitation and Supplier Agreement Development

no changes

Service Delivery PA's

- ▶ Capacity and Availability Management – no changes
- ▶ Incident Resolution and Prevention – restructured slightly to provide better focus on immediate fixes of incidents as compared with developing workarounds for future use
- ▶ Service Continuity – no changes
- ▶ Service Delivery – no changes
- ▶ Service System Development – no changes
- ▶ Service System Transition – no changes
- ▶ Strategic Service Management – no changes
- ▶ The term “project” is changed to “work” throughout

High Maturity PA Restructuring

- ▶ ML4 includes:
 - Organizational Process Performance (OPP)
 - Quantitative Project Management (QPM)

- ▶ ML5 now includes:
 - Causal Analysis and Resolution (CAR)
 - Organizational Performance Management (OPM), which replaces
 - Organizational Innovation and Development (OID)

- ▶ Revised QPM Specific Practices to reflect a connection between CAR and QPM.

High Maturity PA's

- ▶ Organizational Process Performance – emphasizes traceability of quality/process objectives to business objectives
- ▶ Quantitative Project Management – restructured to focus more on using statistical/quantitative methods to determine whether objectives will be met
- ▶ Organizational Performance Management – emphasizes traceability of quality/process objectives to business objectives
- ▶ OPM replaces OID and adds a Goal to place greater emphasis on the tie-in between business objectives and process improvement
- ▶ CAR – minor changes

SG1 Manage Business Performance

SP1.1 Maintain Business Objectives

SP1.2 Analyze Process Performance Data

SP1.3 Identify Potential Areas for Improvement

SG2 Select Improvements

SP2.1 Elicit Suggested Improvements

SP2.2 Analyze Suggested Improvements

SP2.3 Validate Improvements

SP2.4 Select and Implement Improvements for
Deployment

SG3 Deploy Improvements

SP3.1 Plan the Deployment

SP3.2 Manage the Deployment

SP3.3 Evaluate Improvement Effects.

SCAMPI 1.3 Appraisal Method Updates

SCAMPI Upgrade Team Goals

- ▶ Goal 1. Increase Efficiency of the Appraisal Process
 - Consider entire lifecycle of cost/value (not just 'onsite')
 - Decrease cost while maintaining accuracy and utility
 - Increase value returned per cost incurred

- ▶ Goal 2. Remove Barriers to Broader Usage (e.g., other constellations)
 - Remove terminology that uniquely applies to CMMI-DEV
 - Enhance the capability of current set of practitioners (LAs & ATMs)
 - Clarify skill/experience requirements for all users

- ▶ Goal 3. Assure Synchronization with V1.3 CMMI Product Suite
 - Manage level of change within specified Steering Group guidance
 - Enhance consistency of usage and fidelity to method requirements
 - Evolution of methods and techniques based on change requests

Summary of Changes to SCAMPI Activities

- ▶ The following activities were *added*
 - 1.1.2 Determine Data Collection Strategy
 - 1.2.3 Develop Data Collection Plan
 - 1.3.3 Document and Manage Conflicts of Interest

- ▶ The following activities were *substantially revised*
 - 1.1.4 Determine Appraisal Scope
 - 1.2.1 Tailor Method
 - 1.3.2 Select Team Members
 - 2.2.1 Examine Objective Evidence from Artifacts
 - 2.2.2 Examine Objective Evidence from Affirmations
 - 2.4.1 Verify Objective Evidence
 - 2.4.2 Characterize the Implementation of Model Practices and Generate Preliminary Findings

- ▶ Multiple constellation appraisals are allowed

Scoping Appraisals and Sampling from the Organizational Unit

SCAMPI V1.2

- ▶ Primarily oriented to use of CMMI-DEV & “projects”
- ▶ Required documentation and examination of “critical factors”
- ▶ Arbitrary minimum number of instantiations set to 3
- ▶ No verifiable criteria for establishing a representative sample

SCAMPI V1.3

- ▶ Accommodates all CMMI constellations & People CMM
- ▶ Replaced the concept of “critical factors” and elaborated it with “sampling factors”
- ▶ No specific arbitrary minimum number of instantiations (but see “Minimum Sampling for a Representative Sample”)
- ▶ Quantitative basis for documenting a representative sample using **sampling factors**

Professional Judgment and Due Diligence Required

Standard Sampling Factors

- ▶ **Location:** if work is performed in more than one location, basic units or support functions in different locations may face different challenges to implementation or institutionalization.
- ▶ **Customer:** if different customers are served by basic units, customer-specific needs or requirements may lead to implementation differences.
- ▶ **Funding Source:** if different sources of funding support the work of different basic units or support functions, there may be obligations unique to a given funding source which are not present for others.
- ▶ **Management Structure:** if oversight of the work in the organization is accomplished through different lines of management, different management styles or performance goals may affect practice implementation.
- ▶ **Type of work:** if there is more than one distinct type of work done in the organization, different technical demands may exist. The term “type of work” itself can take on MANY different meanings.

Terminology

- ▶ **Sampling Factors** divide the
 - **Organizational Unit** into
 - **Subgroups** that include
 - **Basic Units**, which are sampled along with
 - **Support Functions**, to form the
 - **Organizational Scope** – and must meet
 - **Data Sufficiency Rules** by supplying
 - **Artifacts** and
 - **Affirmations** as described in the
 - **Data Collection Plan.**

- ▶ **Direct** and **Indirect Artifacts** are no longer required from
 - **Focus** and
 - **Non-Focus Projects**

Example Sampling Factors

▶ Identify subgroups based on sampling factors:

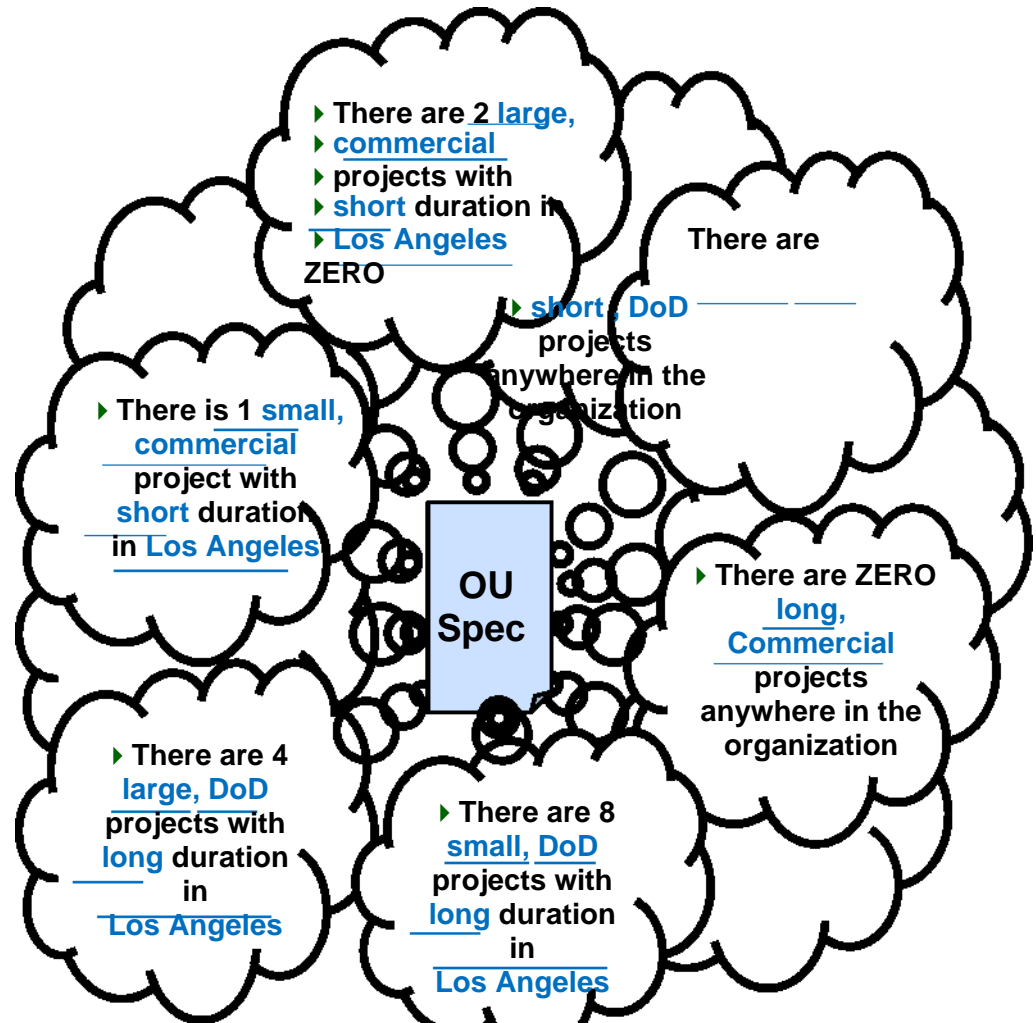
- DOD/commercial
- Large/small
- Long/short

▶ Basic Units are projects (in this example)

▶ *The set of units from which the sample will be drawn is partitioned using sampling factors.*

▶ *This identifies clusters of units that are more similar to each other.*

▶ *The level of diversity can then be objectively documented.*



Minimum Sampling for Representative Sample

$$\begin{array}{c}
 \text{Minimum number} \\
 \text{of Basic Units to} \\
 \text{be selected from} \\
 \text{a given subgroup}
 \end{array}
 =
 \frac{
 \begin{array}{c}
 \text{Number of} \\
 \text{subgroups}
 \end{array}
 \times
 \begin{array}{c}
 \text{Number of} \\
 \text{basic units in the} \\
 \text{given subgroup}
 \end{array}
 }{
 \begin{array}{c}
 \text{Total number} \\
 \text{of basic units}
 \end{array}
 }$$

for x = small, long, DoD projects

$$x = \frac{4 \times 8}{15}$$

$$x = 2$$

Data Sufficiency

- ▶ Every sampled unit included within the Organizational Scope of the appraisal shall provide data (either artifacts or affirmations) for at least one process area that is applicable to that unit.
- ▶ **Corroboration - 1:** At least 50% of the sampled units *within an identified subgroup* shall provide both artifacts and affirmations for at least one process area that is applicable to those units.
- ▶ **Corroboration - 2:** At least one of the sampled units *within an identified subgroup* shall provide both artifacts and affirmations for any and all process areas that are applicable to units within that subgroup.
- ▶ **Corroboration - 3:** All other sampled units (not included in 1 or 2 above) shall provide either artifacts or affirmations for at least one process area applicable to units in the subgroup to which they belong.

Questions ???

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If you want a copy of the detailed comparison of V 1.2/V 1.3 send me an email.