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Strategies for Transitioning from SW-CMM to CMMI

Software Engineering Process Group Conference

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Agenda

- **Introduction: Transitioning from SW-CMM to CMMI**
  - Introduction to the Transition Process 15 min.
  - Exercise: In the Zone 15 min.
  - Strategies 15 min.

- **Train Track Strategy** 45 min.
  - Break 30 min.

- **Maturity for Dummies Strategy** 30 min.
  - Exercise: Process Review Practice 15 min.
  - Discussion and Blended Strategy 15 min.

- **Transition Risk Management**
  - Misconceptions and Misunderstandings 15 min.
  - Summary and Q&A 15 min.
Terms: CMM, SW-CMM, CMMI

- **Capability Maturity Model:**
  A reference model of mature practices in a specified discipline, used to assess a group’s capability to perform that discipline
  - Examples: SW-CMM, SE_CMM, SECM, FAA-iCMM, etc.

- **SW-CMM was created to provide guidelines for improving the software process**

- **CMMI was created to recast the existing CMMs into a common, integrated framework:**
  - Reduce differences in terminology, scope, structure, appraisals
  - Combine the best features of each model
  - Drive disciplines to be engineered and managed more similarly
  - Provide a standard structure for developers on new models to follow

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Transitioning from SW-CMM to CMMI

- **SW-CMM is being “sunsetted”**
  - SEI will not offer the SW-CMM training after 2003, still available from other vendors
  - Lead Assessor (LA) and Lead Evaluator (LE) authorizations expire in 2005

- **What does that mean?**
  - Organizations can continue to conduct SW-CMM appraisals until 2006
  - Organizations can continue to use the SW-CMM and conduct “un-authorized” appraisals indefinitely, assuming it has value for them
  - The value of a SW-CMM rating will diminish over time
  - Most customers are starting to express interest in the CMMI

- **Companies should consider their strategy for transitioning to CMMI**
Transition Paths

- How (whether and when) to transition, depends upon your starting point and your final goal

- Four starting point possibilities
  - Transitioning from SW-CMM
  - Transitioning from SE-CMM
  - Transitioning from ISO 9001
  - New adopter

- Two final goal possibilities
  - Achieving a maturity level
  - Achieving measurable improvement
Transition Options

A. Transition now
   – Appropriate if you haven’t made much progress to date
   – Avoids having to transition later

B. Transition after achieving your SW-CMM goal
   – Appropriate if you’re close to your goal
   – Provides a sense of closure and accomplishment
   – Everything needed for SW-CMM is also needed for CMMI

C. Never transition
   – Appropriate if you don’t care about the maturity level
   – You will be able to conduct unauthorized appraisals indefinitely
Transition Process Steps

Process Review → Action Planning → Improvement Actions

feedback loop

Process Review → Action Planning → Improvement Actions

feedback loop

"Improving the Way We Improve", Kim Caputo, 2001 Serena Global User Conference
Keeping “In the Zone”

Too Much

Management Pressure

Effort for Results

Effort-Results Connection

Too Little

“In the Zone” Worksheet Exercise

- **Management Pressure**
  - Too much: They can’t be serious, ignore it
  - Too little: They aren’t serious, ignore it
  - Just right: They are serious, put effort into getting results

- **Effort for Results**
  - Too much: It takes too much effort to sustain, stop it
  - Too little: Not enough effort to get results, stop it
  - Just right: We’re getting results, is it worth continuing the effort?

- **Effort-Results Connection**
  - Too much emphasis: It’s not believable, stop it
  - Too little emphasis: Maybe it’s not connected, stop it
  - Just right: the results are based on appropriate effort, it’s worth continuing.
Strategies

1. **Train Track Strategy**
   - CMM is ingrained in your company (one extreme)
   - Analogous to an upgrade

2. **Maturity for Dummies Strategy**
   - ISO-based or CMM Level 1 starting point (the other extreme)
   - Analogous to a new installation

3. **Blended Strategy**
   - Blended cultures, acquisitions, or subcontracts (between the 2 extremes)
   - You pick and choose strategy elements based on needs
Train Track Strategy

- **Train...**
  - Train to understand the differences
    - Between SW-CMM and CMMI
    - Between actual practices and CMMI practices

- **Track...**
  - Track progress towards achieving implementation of required practices

- **“Train Track”**
  - With CMM already ingrained in the organization, the train is already moving, on the right track, so just get everyone on board...
The High Level View

- **Start by determining the scope of the long-term improvement effort**
  - Define “organizational unit” (which part of the enterprise)
  - Decide which disciplines will participate, and what level you will seek
    - Note: If you have achieved SW-CMM levels, you may need lesser goals for SE
    - Re-achieving the same level you are at is a reasonable short-term goal

- **Decide whether pilots will be done**
  - Short-term scope of improvement effort
  - What will you learn by piloting? Will you actually learn that in the pilot? Could you learn it (cheaper, faster) some other way?
  - How will you transition to the long-term scope of the improvement effort?

- **Communicate the objectives and approach**

  “Process improvement is about changing the processes you are currently using”

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Some Details

- **Map what you have to the CMMI practices**
  - Everything you’re already doing is needed for CMMI
  - Policies, processes, procedures, training, planning, tracking, etc.

- **Fill generic practice gaps**
  - GP 2.6 Manage Configurations
  - GP 2.7 Identify and Involve Relevant Stakeholders
  - GP 3.1 Establish a Defined Process (*explicit guidelines in OPD*)
  - GP 3.2 Collect Improvement Information

- **Define project strategies for the engineering process areas**
  - Requirements Development, Product Integration, Verification, Validation

- **Fill process areas gaps**
  - Measurement & Analysis, Decision Analysis & Resolution
Mapping

- **CMMI Context**
  - What is included in CMMI?

- **CMMI Structure**
  - Disciplines
  - Process Areas
  - Generic Practices
  - Representations
  - Terminology

- **Transition Options, Strategies, and Resources**
  - Transitioning from SW-CMM
  - Transitioning from Other Quality Models
  - Managing Your Risks in Achieving a Target Level
What’s Included in the CMMI?

- **Maturity model documents**
  - Modules for Engineering (SW/SE), Integrated Product/Process Development (IPPD), Acquisition
  - Two different representations (staged, continuous)

- **Appraisal documents**
  - Appraisal Requirements for CMMI (ARC) – guides appraisal method developers

- **Training modules**
  - 3 day Introduction to CMMI (staged, continuous versions)
  - 5 day Intermediate CMMI
  - 1 ½ day SCAMPI Appraisal Team Member (ATM)
  - 5 day SCAMPI Lead Appraiser

- **Appraiser program**
What’s Different? – Conceptually (1 of 2)

- **CMMI is more explicit about identifying how process areas and generic practices apply**
  - Identify which work products will be placed under configuration/data management and what levels of CM/DM
  - Identify relevant stakeholders and level of involvement
  - Identify strategy for risk management

- **CMMI encompasses more engineering activities**
  - Adds requirements development, validation
  - Identify strategy for verification -- which work products will be verified and how (e.g., peer review, testing)
  - Identify strategy for validation -- which work products will be validated and how (e.g., user involvement in requirements review, operational testing)

- **The hard part is defining and documenting your approach**
What’s Different? – Conceptually (2 of 2)

- Supplier Agreement Management includes any component acquired from outside the product for integration into the product delivered to the customer
  - E.g., COTS components, GOTS components

- Content of a process definition is more explicit

- Less focus on “documented procedures”
  - Only called out where procedures and criteria are critical to the effectiveness of the process

**Process Elements**

- Process roles
- Applicable process and product standards
- Applicable procedures, methods, tools, and resources
- Process performance objectives
- Entry criteria
- Inputs
- Product and process measures to be collected and used
- Verification points (e.g., peer reviews)
- Outputs
- Interfaces
- Exit criteria

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### Disciplines

- **CMMI model encompasses the software and systems engineering disciplines**
  - Stated generically as engineering activities
  - Amplifications used to discuss SW/SE differences

- **Additional disciplines are included as add-on process areas**
  - Integrated Product/Process Development (IPPD)*
  - Acquisition**

<table>
<thead>
<tr>
<th>Level</th>
<th>Process Areas</th>
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</thead>
<tbody>
<tr>
<td>5 Optimizing</td>
<td>Causal Analysis and Resolution Organizational Innovation and Deployment</td>
</tr>
<tr>
<td>4 Quantitatively Managed</td>
<td>Quantitative Project Management Organizational Process Performance</td>
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<tr>
<td>3 Defined</td>
<td>Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Risk Management Integrated Project Management (for IPPD*) Integrated Teaming* Integrated Supplier Management** Decision Analysis and Resolution Organizational Environment for Integration*</td>
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<tr>
<td>2 Managed</td>
<td>Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management</td>
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<td>1 Performed</td>
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Selecting a Discipline to Use

- Different model versions exist
  - CMMI-SW
  - CMMI-SE/SW
  - CMMI-SE/SW/IPPD
  - CMMI-SE/SW/IPPD/SS

- You select which disciplines you wish to use, based on where you are trying to improve

- **Example** – A company which engineers and builds computer systems, by acquisition of COTS hardware and development of custom software, using integrated teams
  - Use CMMI-SW applied only to the software development
  - Use CMMI-SE/SW applied to the computer system and the software
  - Use CMMI-SE/SW/IPPD applied to the system, software, and use of teams
  - Use CMMI-SE/SW/IPPD/SS applied to the system, software, teams, and COTS acquisition
What’s Different – Process Areas (1 of 2)

Organization process focus
Organization process definition
Training program
Integrated software mgmt

Software product engineering
Intergroup coordination
Peer reviews

Requirements management
Software project planning
Software project tracking & oversight
Software subcontract mgmt
Software quality assurance
Software configuration mgmt

Organization process focus
Organization process definition
Organizational training
Integrated project management
Risk management
Requirements development
Technical solution
Product integration
Verification
Validation
Decision analysis and resolution

Requirements management
Project planning
Project Monitoring and Control
Supplier Agreement Management
Product & Process Quality Assurance
Configuration Management
Measurement and Analysis

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What’s Different – Process Areas (2 of 2)

- Levels 4 and 5 are more straightforward and easier to implement
  - Clarified that Statistical Process Control is expected at Level 4

**LEVEL 5  OPTIMIZING**
- Defect prevention
- Technology change mgmt
- Process change mgmt

**LEVEL 4  MANAGED**
- Quantitative process mgmt
- Software quality mgmt

- Causal Analysis and Resolution
- Org. Process Technology Innovation
- Process Innovation Deployment
- Org. Process Performance
- Quantitative Mgmt of Quality & Process
Process Areas Organized by Category

**Process Management**
- Organizational Process Focus
- Organizational Process Definition
- Organizational Training
- Organizational Process Performance
- Organizational Innovation and Deployment

**Project Management**
- Project Planning
- Project Monitoring and Control
- Supplier Agreement Management
- Integrated Project Management (for IPPD*)
- Risk Management
- Integrated Teaming*
- Integrated Supplier Management**
- Quantitative Project Management

**Engineering**
- Requirements Development
- Requirements Management
- Technical Solution
- Product Integration
- Verification
- Validation

**Support**
- Configuration Management
- Process and Product Quality Assurance
- Measurement and Analysis
- Organizational Environment for Integration*
- Decision Analysis and Resolution
- Causal Analysis and Resolution

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Components within a Process Area

Process Area

Implementation

Specific Goals
- Activities Performed
- Specific Practices
  - Subpractices
    - Amplifications
    - Elaborations

Common Features

Generic Goals
- Commitment to Perform
- Ability to Perform
- Directing Implementation
- Verification

Subpractices Amplifications Elaborations

Institutionalization

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Required, Expected, and Informative Components

- **Specific Goals**
  - Activities Performed
  - Specific Practices
    - Subpractices
    - Amplifications
    - Elaborations

- **Generic Goals**
  - Commitment to Perform
  - Ability to Perform
  - Directing Implementation
  - Activities Performed
  - Generic Practices
    - Subpractices
    - Amplifications
    - Elaborations

**Common Features**

- Required
  - Needed to satisfy CMMI

- Expected
  - Typical practices to meet goals; Used as a starting point in assessments

- Informative
  - Ideas to consider
# Common Feature Comparison

<table>
<thead>
<tr>
<th>SW-CMM v1.1 Common Features</th>
<th>CMMI Common Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment to Perform</td>
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</tr>
<tr>
<td>Establish an Organizational Policy</td>
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<tr>
<td>Ability to Perform</td>
<td>Ability to Perform</td>
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<tr>
<td>Plan the Process</td>
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<tr>
<td>Provide Resources</td>
<td>Provide Resources</td>
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<tr>
<td>Assign Responsibility</td>
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<tr>
<td>Train People</td>
<td>Train People</td>
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<tr>
<td>Establish a Defined Process</td>
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<td>Directing Implementation</td>
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<tr>
<td>Collect Improvement Information</td>
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<tr>
<td>Activities Performed</td>
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<tr>
<td>Plan the Process</td>
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<tr>
<td>Perform the Process</td>
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<tr>
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<tr>
<td>Measurement &amp; Analysis</td>
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<tr>
<td>Measure the Process</td>
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<tr>
<td>Analyze the Measurements</td>
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<tr>
<td>Verifying Implementation</td>
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</tr>
<tr>
<td>Objectively Verify Adherence</td>
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<tr>
<td>Review with Project Management</td>
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Practices

- Practices are the building blocks of the process areas

**Example** - Project Planning Process Area

*Specific Practice 1.1 - Establish a top-level work breakdown structure (WBS) to estimate the scope of the project.*

- To satisfy the required goals, you are **expected** to perform the practices
  - Most commercial and defense projects/organizations will implement as written

- **You may perform equivalent practices if they have an equivalent effect toward satisfying the generic or specific goal**
  - These are termed “alternative practices”
  - Less prevalent in CMMI than in SW-CMM, because the CMMI practices are at a slightly higher level of abstraction
  - “Equivalent” is a judgment call – discuss with your appraiser

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Specific Practices vs. Generic Practices

- **Apply to a single process area**
- **Describe activities that implement the process area**

**Example – Requirements Mgmt.**

<table>
<thead>
<tr>
<th>SG 1 Manage Requirements</th>
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</thead>
<tbody>
<tr>
<td>SP 1.1 Obtain an Understanding of Requirements</td>
</tr>
<tr>
<td>SP 1.2 Obtain Commitment to Requirements</td>
</tr>
<tr>
<td>SP 1.3 Manage Requirements Changes</td>
</tr>
<tr>
<td>SP 1.4 Maintain Bidirectional Traceability of Requirements</td>
</tr>
<tr>
<td>SP 1.5 Identify Inconsistencies between Project Work and Requirements</td>
</tr>
</tbody>
</table>

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**Generic Practices**

- **Apply to all process areas**
- **Describe activities that institutionalize the process areas**

**GG 2 Institutionalize a Managed Process**
- GP 2.1 Establish an Organizational Policy
- GP 2.2 Plan the Process
- GP 2.3 Provide Resources
- GP 2.4 Assign Responsibility
- GP 2.5 Train People
- GP 2.6 Manage Configurations
- GP 2.7 Identify and Involve Relevant Stakeholders
- GP 2.8 Monitor and Control the Process
- GP 2.9 Objectively Evaluate Adherence
- GP 2.10 Review Status with Higher Level Management

**GG 3 Institutionalize a Defined Process**
- GP 3.1 Establish a Defined Process
- GP 3.2 Collect Improvement Information
Staged Representation

- Provides a defined roadmap for organizational improvement
  - Lower level processes are more critical to repeatable success
  - Higher level processes build on the lower level processes

Level 1 Performed
Requirements Management
Project Planning
Project Monitoring and Control
Supplier Agreement Management
Measurement and Analysis
Process and Product Quality Assurance
Configuration Management

Level 2 Managed
Requirements Development
Technical Solution
Product Integration
Verification
Validation
Organizational Process Focus
Organizational Process Definition
Organizational Training
Risk Management
Integrated Project Management (for IPPD*)
Integrated Teaming*
Integrated Supplier Management**
Decision Analysis and Resolution
Organizational Environment for Integration*

Level 3 Defined
Level 4 Quantitatively Managed
Causal Analysis and Resolution
Organizational Innovation and Deployment
Quantitative Project Management
Organizational Process Performance

Level 5 Optimizing
Continuous Representation

- Measures maturity (capability level) of each process area
- Permits maturing of selected processes

<table>
<thead>
<tr>
<th>GG 1 Achieve Specific Goals</th>
<th>GP 1.1 Perform Base Practices</th>
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<tr>
<td>GG 4 Institutionalize a Quantitatively Managed Process</td>
<td>GP 4.1 Establish Quantitative Objectives for the Process</td>
</tr>
<tr>
<td>GP 4.2 Stabilize Subprocess Performance</td>
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<tr>
<td>GG 5 Institutionalize an Optimizing Process</td>
<td>GP 5.1 Ensure Continuous Process Improvement</td>
</tr>
<tr>
<td>GP 5.2 Correct Root Causes of Problems</td>
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Which Representation Should We Use?

- If you’re starting out on model-based improvements, use the staged representation
  - You need guidance on which process areas to improve first

- If you want to communicate your maturity to your customer, use the staged representation
  - Maturity Levels are easier to communicate than maturity profiles

- Don’t use the continuous representation until you have reached Maturity Level 3, and then, only if the other 2 conditions don’t apply
  - At lower maturity levels, all processes are important
CMMI Appraisals

**SCAMPI (Standard CMMI Appraisal Method for Process Improvement)**
- Industry standard for benchmarking (i.e., publicly declaring maturity level)
- Typically used to verify; evidence compiled and mapped to model
- Can appraise any organization unit, any portion of model
- Rates each practice for each project within appraisal scope
- Emphasis on direct evidence
- 1-3 weeks: interviews, evidence reviews
- Conducted by 4-12 trained appraisal team member; led by an SEI-authorized Lead Appraiser
- *Method Description Document*

**Informal Appraisal Methods**
- Cannot be used for publicly declaring a maturity level
- Typically used for discovery
- Typically includes evidence review; may include interviews
- Conducted by anyone; value is dependent on their skill and experience
- *Appraisal Requirements for CMMI* describes potential requirements for “good” appraisals
  - Class A, B, C
  - Vendor self-declares how their method relates to ARC
What’s Different? - Terminology

**SW-CMM**
- Key Process Area
- KPA Goal (Implementation)
- Key Practice from Activities Performed
- KPA Goal (Institutionalization)
- Key Practice from other Common Features

**CMMI**
- Process Area
- Specific Goal
- Specific Practices
- Generic Goal
- Generic Practices
Terminology - 1

- **Organization** – An administrative structure in which people collectively manage one or more projects as a whole, and whose projects share a senior manager and operate under the same policies.
  - An organization may contain (lower-level) organizations, with infrastructure (policies, etc.) split among the various levels
  - Sometimes used to refer to a functional group (e.g., the CM organization)

- **Organizational Unit** –
  That part of an organization that is the subject of an appraisal (also known as the organizational scope of the appraisal).
  - E.g., a site, a domain, all software projects
Terminology - 2

- **Project** - A managed set of interrelated resources that delivers one or more products to a customer or end user. This set of resources has a definite beginning and end.
  - A project can be composed of projects

  *The point of improving an organization’s capability is to reduce risk on the next project (as well as current projects).*

- **Senior Manager** – A management role at a high enough level in an organization that the primary focus of the person filling the role is the long-term vitality of the organization, rather than short-term project and contractual concerns and pressures.
  - Above a project manager
Terminology - 3

- **Customer** - The party (individual, project, or organization) responsible for accepting the product or for authorizing payment. The customer is external to the project, but not necessarily external to the organization.

- **Stakeholder** - A group or individual that is affected by or in some way accountable for the outcome of an undertaking. Stakeholders may include project members, suppliers, customers, end users, and others.

- **Relevant Stakeholder** - Used to designate a stakeholder that is identified for involvement in specified activities.
  - Projects and functional organizations must identify their relevant stakeholders, and define their level of involvement.
**Terminology - 4**

- **Product** - Any tangible output or service that is a result of a process and that is intended for delivery to a customer or end user. A product is a work product that is delivered to the customer.
  - Could be a system, a software item, or a service
  - *Critical for determining how process areas are applied*

- **Product Component** - Lower level components of the product; product components are integrated to “build” the product.

- **Work Product** - Any artifact produced by a process.
  - E.g., deliverable documents, non-deliverable documents, meeting minutes, personal notes, etc.
  - Projects and functional organizations must identify their work products and the level of configuration control applied to each
Terminology - 5

- **Adequate, Appropriate, As Needed** – Used to signify that certain activities may not be done all of the time.
  - E.g., “corrective action, as needed”

- **Establish and Maintain** - Includes documentation and usage.
  - E.g., “Establish and maintain an organizational policy” means that not only must a policy be formulated, but it also must be documented and it must be used throughout the organization.

- **Alternative practice** - A substitute for one or more generic or specific practices contained in CMMI models that achieves an equivalent effect toward satisfying the generic or specific goal.
  - Not necessarily a one-for-one replacement for the CMMI practice
  - “Equivalent” is a judgment call -- ensure your appraiser agrees on your interpretation
  - Less prevalent in the CMMI than in SW-CMM
Strategic Plan Checklist

1. Determine the appropriate scope -- organization and model
2. Review each CMMI practice, within the projects and the organizational groups, to identify and document any interpretation issues
3. Select a Lead Appraiser, based on how they interpret those same issues
   - Do they agree on scope?
   - Which projects will need to be assessed?
   - Are any process areas not applicable, given your scope of work? How will that be worded in the final “certification”?
4. Document your agreement on how the issues will be handled
   - What evidence is sufficient to satisfy the practice?
5. Have the projects and organizational groups start putting together the evidence notebooks immediately
6. Track progress towards filling the gaps – have the evidence reviewed by a qualified appraiser (preferably the chosen Lead)
7. 1-2 months before the appraisal, do a final check
8. Ensure the appraisal team has sufficient experience
Maturity for Dummies Strategy

- Maturity is the subject matter
  - Process improvement is the method
  - Improved results is the goal

- Dummies are not dumb
  - Dummies learn fast because they have to
  - Dummies don’t want the elaborate details

- “Maturity for Dummies”
  - Simple, direct, straight-line approach
  - If making changes throws you a curve, straighten it out by taking the derivative.

*Do the Math: Straighten curves by taking the derivative*

*The derivative of $x^2 = 2x$*
Transition Process View (Straightening the Curve)

"Improving the Way We Improve", Kim Caputo, 2001 Serena Global User Conference
The High Level View

- **Process Review**
  - Start by determining what people think about where they are and where they want to be
  - Don’t introduce CMMI terminology until they are ready
  - Win acceptance of the need to improve

- **Action Plan**
  - Plan in 3-month segments
  - Address documentation, training, records, reviews, progress measures

- **Improvement Actions**
  - Define, Make, and Track progress of improvements
  - Make results visible with a Progress Review monthly and a Process Review every 6 months
Maturity for Dummies Process Review

- The Derivative
  - The questions are derived from a cross-section of all Process Areas for CMMI Level 2 and Level 3, without using specific CMMI terminology
  - The questions are not as accurate but are more straightforward
  - The answers are not Yes/No, but describe/measure the Gap.

- Data Collection Spreadsheet format:

<table>
<thead>
<tr>
<th>Category: Question</th>
<th>Today What we do today</th>
<th>Tomorrow What we’d like to be doing</th>
<th>Effort Rating Rate each item given for Tomorrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

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Effort Ratings and Strategy

- **Get a Baseline Measurement**
  - Rate the effort for each “Tomorrow” item response and save the numbers for later comparison

- **Effort Ratings**
  0 = No change necessary
  1 = needs a few tweaks (include it)
  2 = needs some changes (include it)
  3 = needs major changes, but not today
  4 = needs major changes, soon
  5 = needs major changes, now (include it)

- **Strategy**
  - Include in Action Plan if rated 1, 2, or 5
  - Don’t let the curve throw you off, smooth it

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Process Review – Communication Questions

1. How frequently do the developers meet for status/learning?
2. How frequently do the cross-functional project teams meet?
3. What is the agenda for these meetings?
4. How are requirements and requirements changes communicated?
5. How is release status, readiness, and delivery approval communicated?
6. How does management conduct Project Reviews?
7. How does management conduct Phase or Stage-Gate Reviews?
8. How often does sr. management review the organization against goals?
9. How are issues, risks, and action items tracked to closure?

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Process Review – Estimation Questions

1. Are the development tasks to perform known?
2. Are the tasks documented?
3. Is there an estimated range of time it takes to complete known tasks?
4. How do the developers and managers adjust the estimates when the task assignment is made?
5. How much of the developers day is spent on known tasks vs. “crisis of the day”?
6. Do the known tasks include planning and evaluation tasks?
7. Is the risk estimated for unknown tasks?
Process Review – Project Measures Questions

1. Is the project scope documented?
2. How is the scope managed and changed?
3. How is the scope reviewed to determine the tasks?
4. Are the tasks, estimated duration, and staffing assignments documented as a schedule?
5. How is the schedule managed and changed?
6. Is the target quality level documented?
7. How is the quality level tracked and managed?
8. How are defect removal tasks assigned/added to the project?
9. Is the target cost level documented?
10. How is the cost level tracked and managed?
11. How are the risks to meeting planned targets identified and managed?

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Process Review – Engineering Questions

1. How are requirements gathered, defined, and managed?
2. How is analysis and design done to determine what to build or modify?
3. How is implementation/coding done?
4. How is the code tested?
5. What kinds of reviews or inspections are done?
6. How is the code managed for version and configuration control?
7. How are test plans developed?
8. How is satisfaction of the requirements tested or determined?
9. How is product content and test status tracked?
10. How are defects tracked?
11. Are there any checklists for reviews/inspections?
12. Are there any templates for designs, code, test plans, or tests?

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Process Review – Processes Questions

1. Are policies, processes, procedures, checklists, and templates documented?
2. How do people get access to the current versions of these documents? (Website?)
3. How do you know whether people are using these documents? (Reviews or audits?)
4. How are these processes evaluated for effectiveness?
5. How frequently are the processes evaluated for effectiveness?
6. How are these processes changed or improved?
7. How do the current projects consider their specific factors for tailoring the standard processes, checklists, and templates for their use?
8. How does management handle waivers or deviations from standard processes?

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## Results Table Example

<table>
<thead>
<tr>
<th>Category</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total Items</th>
<th>Average</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td></td>
<td></td>
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<tr>
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<tr>
<td>Project Measures</td>
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<td>Engineering</td>
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<td>Processes</td>
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</tr>
</tbody>
</table>

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Action Plan according to Generic Practices

- What strategy will be applied generically in all areas that will institutionalize any process areas

<table>
<thead>
<tr>
<th>GG 2 Institutionalize a Managed Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Organizational Policy</td>
</tr>
<tr>
<td>2. Plan</td>
</tr>
<tr>
<td>3. Resources</td>
</tr>
<tr>
<td>4. Responsibility</td>
</tr>
<tr>
<td>5. Training</td>
</tr>
<tr>
<td>6. Configurations</td>
</tr>
<tr>
<td>7. Stakeholders</td>
</tr>
<tr>
<td>8. Measurements</td>
</tr>
<tr>
<td>9. Audits</td>
</tr>
<tr>
<td>10. Reviews</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GG 3 Institutionalize a Defined Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Process Definition</td>
</tr>
<tr>
<td>12. Improvement Data</td>
</tr>
</tbody>
</table>
Process Review Worksheet Exercise

- **In pairs or groups, practice interviewing each other**
  - Choose one of the five categories
  - Ask the first three questions for a sample
  - Answer “Today” and “Tomorrow” first,
    Then for each “Tomorrow” item response, give an effort rating from 0-5.

- **Discussion questions**
  - How do you compare? Same or different challenges?
  - Any improvement suggestions?
  - How do you think people in your organization will react to a Process Review?

- **Blended Strategy**
  - If your organization is a blend,
    not one extreme (CMM-ingrained) or the other (CMM Level 1),
    then how can you blend the 2 strategies for an appropriate strategy for you?
Blended Strategies Account for Zoning Out

Too Much

Management Pressure

Effort for Results

Effort-Results Connection

Too Little

Just Right

Blended Strategy 1: Incrementerfall

- Incrementerfall = Incremental + Waterfall

- **Start with Train-Track**
  - Fall *(due to reorg, new management not convinced)*
  - Do Maturity for Dummies

- **Continue with Train-Track**
  - Fall *(due to low effort, or performance bar raised)*
  - Do Maturity for Dummies

- **Continue with Train-Track**
  - Fall *(due to not seeing effort-results connection)*
  - Do Maturity for Dummies

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Blended Strategy 2: Watermental

- Watermental = Waterfall + Incremental

- Start with Maturity for Dummies
  - Action Plan and Improvements with good progress
  - Start Train-Track

- When Mentally Frozen
  Re-Start with Maturity for Dummies
  - Continue with Train-Track

- When Mentally Frozen (Again)
  Re-Start with Maturity for Dummies
  - Continue with Train-Track

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Transition Risk Management

- Identify potential risks

- If (this happens)
  Then (this might happen)
  - Quantify schedule delays
  - Quantify cost in dollars over budget
  - Quantify defects or cost to quality

- Identify mitigation actions
  - What to do to prevent occurrence, or reduce impact

- Identify contingencies and triggers
  - What to do if the risk event occurs
Risks Sound Like This…

“I didn’t think Validation applied to our project.”

“I thought the organization did that.”

“Our customer won’t let us do that.”

“I thought this was a software assessment.”

“Why aren’t these projects included in the appraisal?”

“I want to do CMMI – I just don’t want to change our process.”
Risks Look Like This…

Senior management wants to adopt industry best practices (or wants the CMMI rating), but may not understand…

...implied costs
- Process improvement staff
- Policies, processes, procedures
- Training
- Quality assurance
- Measurement repository
- Learning curve
- Hiring expertise
- Appraisals

...improvement concepts
- Near-term investment, long-term benefits
- Bureaucracy vs. discipline
- Standardization vs. institutionalization
- Discipline makes the organizations less agile (initially)
- The need to enforce less popular practices

“Aligning CMMI Strategies with Individual, Project, and Organizational Perspectives”, Rick Hefner, 2003 Software Technology Conference
Risks Can Be Phrased Like This…

- If the CMMI Level Goal does not seem realistic, then people assume it’s not serious and they won’t engage in the effort, causing a schedule delay.

- If you start with a formal appraisal, and the results are less than what managers are expecting, then management might not respond with an appropriate degree of management pressure (too much or too little), causing a schedule delay.

- If you and your appraiser interpret practices in different ways for your organization’s context, then obtaining recognition at the target maturity level is at risk, causing defects in the quality of the appraisal process.
Transition Risk Mitigation Actions

- Timelines are appropriate for communicating expectations of urgency, but they must be realistic

- **Identify your appraiser up-front**
  - Significant differences exist among appraisers, especially on their interpretations of the CMMI practices
  - Get their up-front agreement that you have interpreted correctly for your context

- **Do not start with a formal appraisal**
  - If you want help identifying the gaps and strategy, have an experienced CMMI appraiser do an informal appraisal
  - Results should focus on what the right strategy is, given where you are

- **Once you have your strategy defined, seek CMMI experienced help (not just SW-CMM experience)**
  - Does our strategy make sense? Are there better options? Are out timelines reasonable?
Key Questions for Transitioning

- What does “sunsetting the SW-CMM” mean?
- Can we still do SW-CMM assessments? For how long?
- What are the advantages/disadvantages in adopting the CMMI?
- We only develop software – does adopting the CMMI make sense?
- What are our transition options?
- We’re working on our next maturity level – should we transition now or wait?
- What does it mean to be keeping “in the zone”?
- SW-CMM is ingrained in our organization – what strategy should we use?
- We’re still trying to move up from Level 1 - what strategy should we use?
- We have a blended team – what strategy should we use?
- What are some of the risks we need to beware of during transition?
Summary

- The CMMI can provide valuable guidance for improving your engineering processes
- Your strategy for adopting the CMMI is key to success
- Depending on whether your organization is at one extreme or the other, there are 2 strategies to choose from (or blend)
  - Train Track Strategy
  - Maturity for Dummies Strategy
- Learning from experience and careful planning can reduce risk and ensure success
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