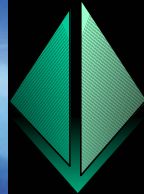# NORTHROP GRUMMAN DEFINING THE FUTURE

Mission Systems

DELTA
Business Solutions

11 March 2004

Strategies for Transitioning from SW-CMM to CMMI
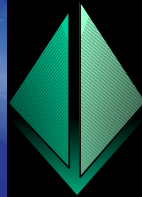
Software Engineering Process Group Conference

Kim Caputo
kim.caputo@deltabus.com

Rick Hefner
rick.hefner@ngc.com

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.
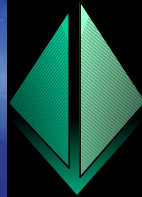 - Break   30 min.

- **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
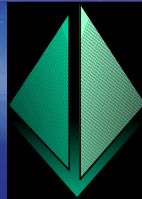 - Examples: SW-CMM, SE_CMM, SECM, FAA-iCMM, etc.

- **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

Transitioning from SW-CMM to CMMI

- **_SW-CMM is being "sunsetted"_**

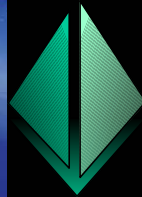 **http://www.sei.cmu.edu/cmmi/adoption/sunset-faq.html**

  - 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 <u>indefinitely</u>, 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
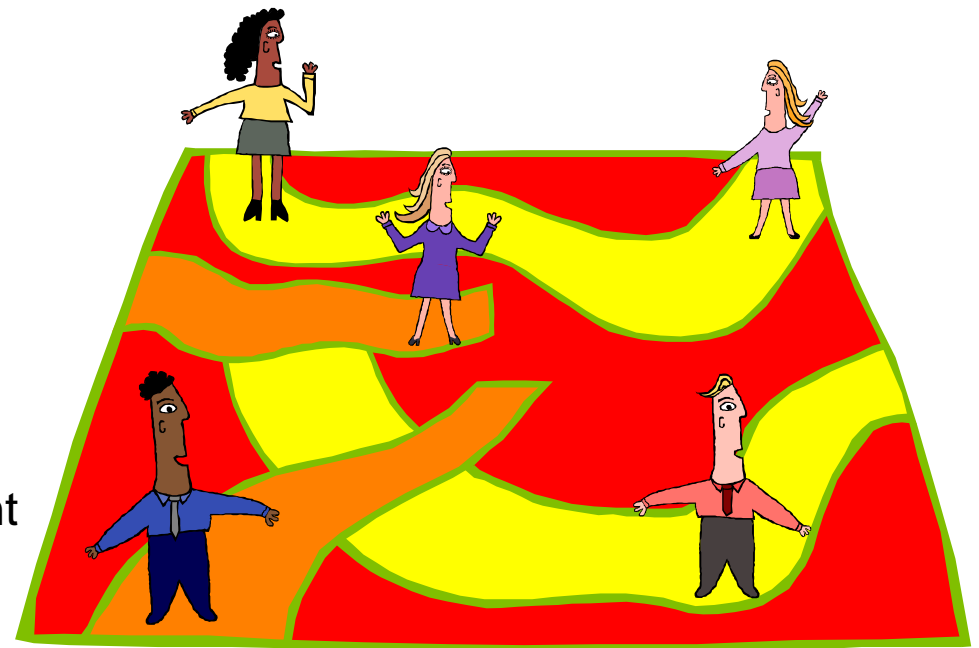
Transition Options

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
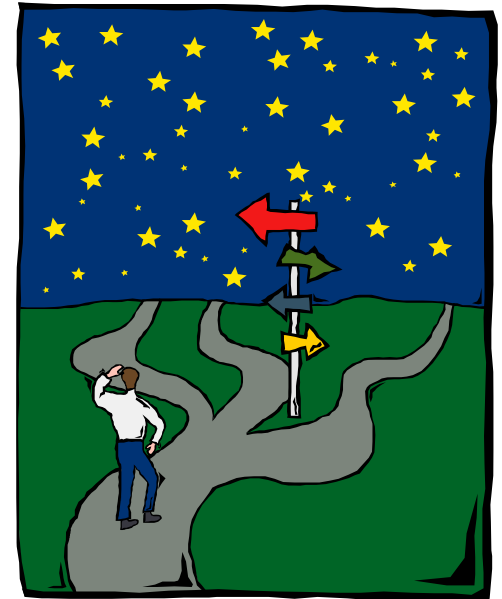
Transition Process Steps

| Process Review | → | Action Planning | → | Improvement Actions |

feedback loop

| Process Review | → | Action Planning | → | Improvement Actions |

feedback loop
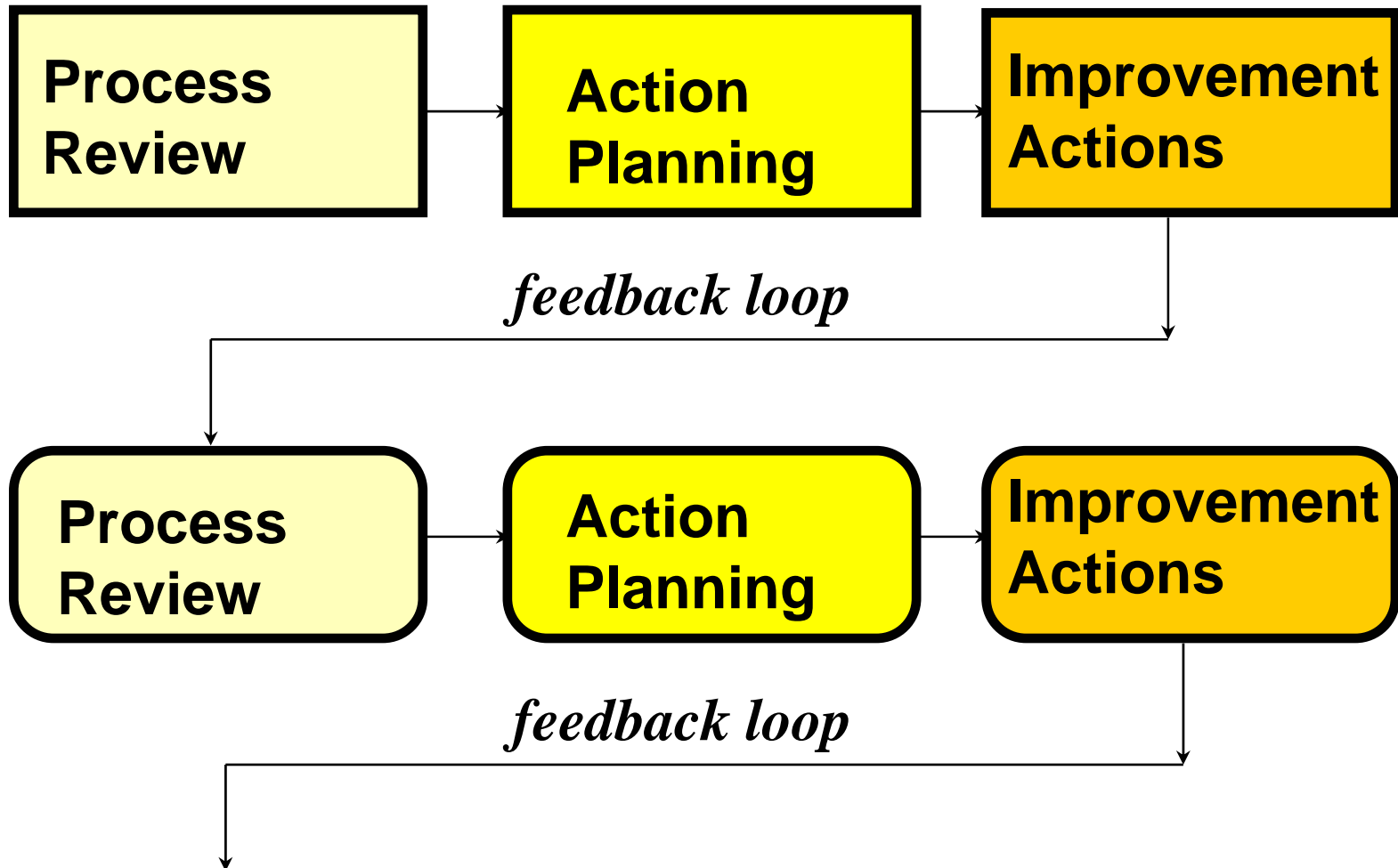
"**Improving the Way We Improve**", **Kim Caputo, 2001 Serena Global User Conference**

Keeping "In the Zone"
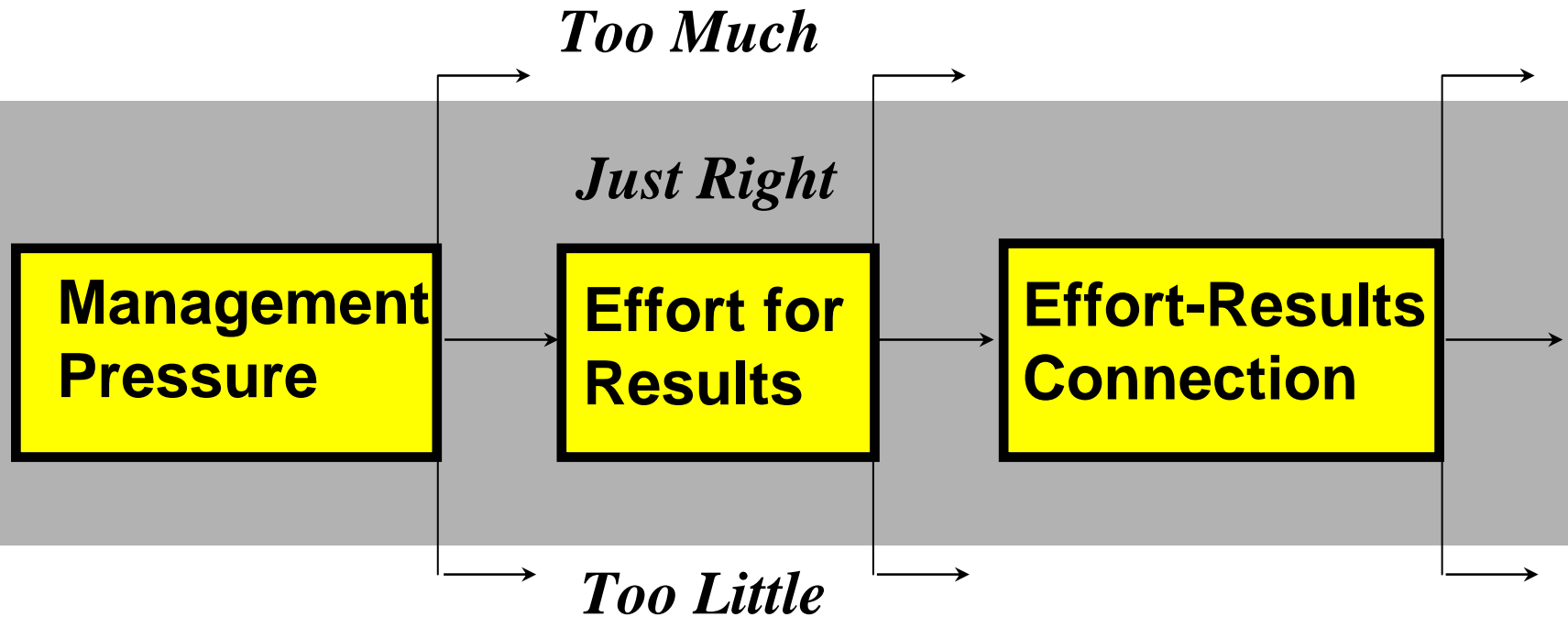
Too Much

Just Right

Management Pressure	→	Effort for Results	→	Effort-Results Connection

Too Little

Adapted and simplified by Kim Caputo from N. P. Repenning, a simulation-based approach to understanding the dynamics of innovation implementation. Organization Science, 13(2) March-April 2002.

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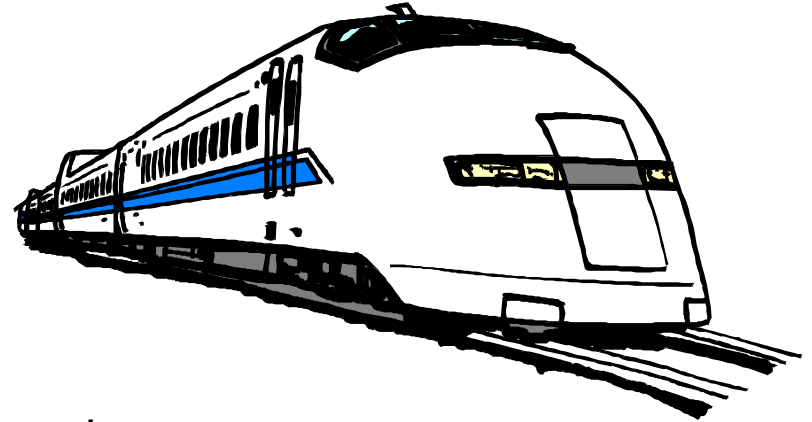
- **Train…**
  - Train to understand the differences
    - Between SW-CMM and CMMI
    - Between actual practices and CMMI practices

- **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
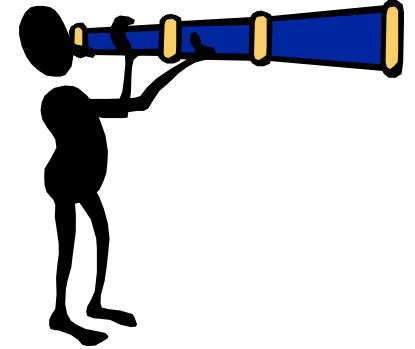
- **Start by determining the scope of the long-term improvement effort**
  - Define "organizational unit" (which part of the enterprise)
  - Decide which disciplines will participate, and what level you will seek
    - Note: If you have achieved SW-CMM levels, you may need lesser goals for SE
    - Re-achieving 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?
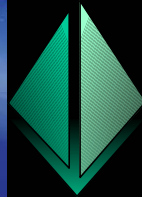 - How will you transition to the long-term scope of the improvement effort?

- **Communicate the objectives and approach**

"Process improvement is about changing the processes you are currently using"

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
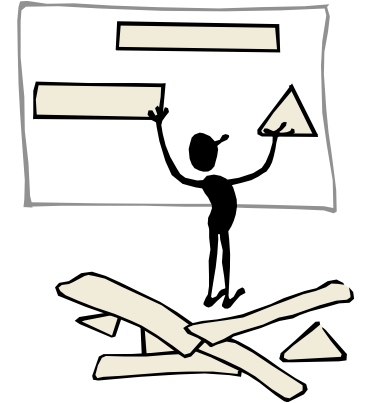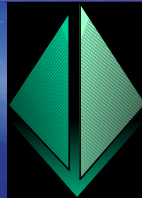
Mapping

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

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

Landmarks

Paths

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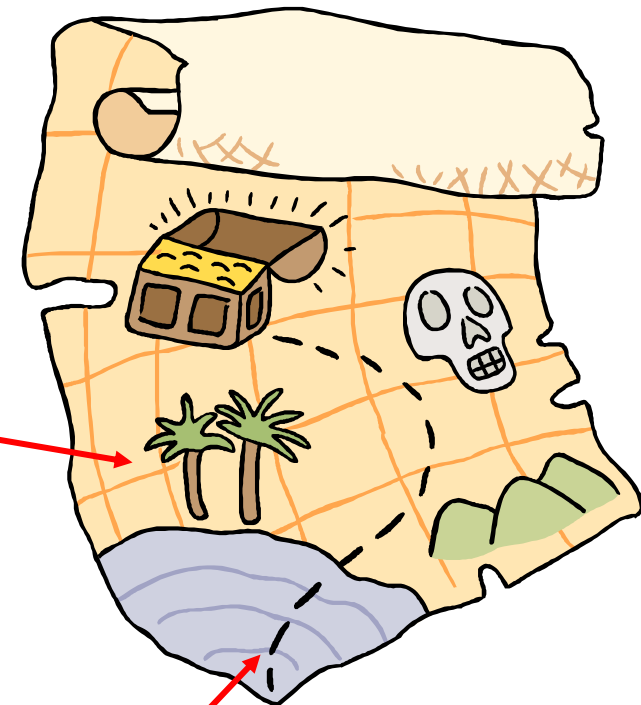
What's Included in the CMMI?

- **Maturity model documents**
  - Modules for Engineering (SW/SE), Integrated Product/Process Development (IPPD), Acquisition
  - Two different representations (staged, continuous)
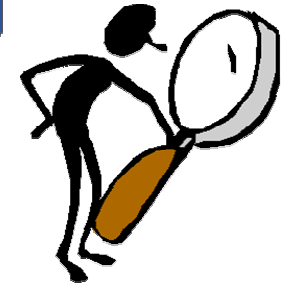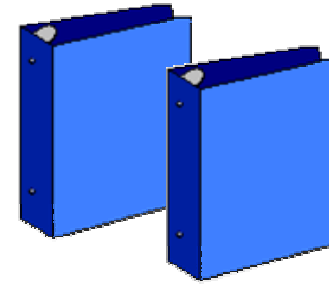
- **Appraisal documents**
  - Appraisal Requirements for CMMI (ARC) – guides appraisal method developers
  - Standard CMMI Appraisal Method for Process Improvement (SCAMPI) Method Description Document (MDD) – high fidelity benchmarking appraisal method

- **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
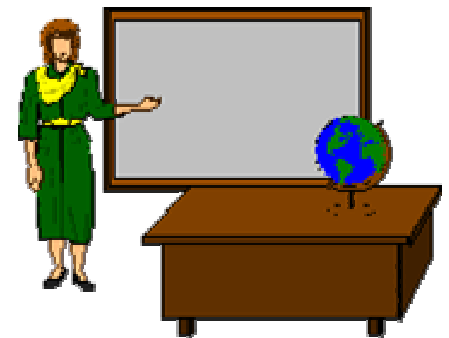
- **Appraiser program**

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**
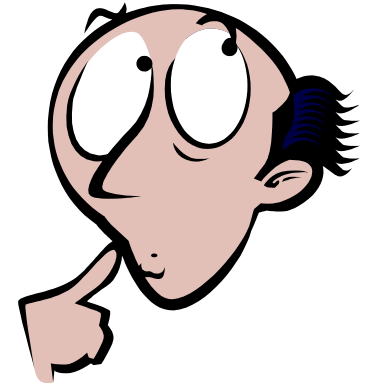
What's Different? – Conceptually (2 of 2)

- **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**
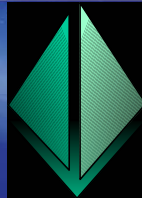
Disciplines

- **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**

Level	Process Areas
5 Optimizing	Causal Analysis and Resolution Organizational Innovation and Deployment
4 Quantitatively Managed	Quantitative Project Management Organizational Process Performance
3 Defined	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*
2 Managed	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management
1 Performed	
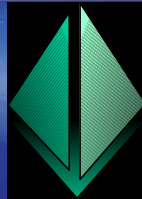
Selecting a Discipline to Use

- **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 focus
Organization process definition	Organization process definition
Training program	Organizational training
Integrated software mgmt	Integrated project management
	Risk management
Software product engineering	**Requirements development**
	Technical solution
	Product integration
Intergroup coordination	Verification
Peer reviews	**Validation**
	Decision analysis and resolution

LEVEL 3 DEFINED

Requirements management	Requirements management
Software project planning	Project planning
Software project tracking & oversight	Project Monitoring and Control
Software subcontract mgmt	Supplier Agreement Management
Software quality assurance	Product & Process Quality Assurance
Software configuration mgmt	Configuration Management
	Measurement and Analysis

LEVEL 2 REPEATABLE

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

Causal Analysis and Resolution
Org. Process Technology Innovation
Process Innovation Deployment

LEVEL 4
MANAGED

Quantitative process mgmt
Software quality mgmt

Org. Process Performance
Quantitative Mgmt of Quality & Process

Detailed comparison at http://www.sei.cmu.edu/cmmi/

Process Areas Organized by Category

Process Management

Organizational Process Focus
Organizational Process Definition
Organizational Training
Organizational Process Performance
Organizational Innovation and Deployment

empower

analyze

standardize processes

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

analyze

Support

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

employ

Engineering

Requirements Development
Requirements Management
Technical Solution
Product Integration
Verification
Validation

measure & assist

Components within a Process Area

24

Required, Expected, and Informative Components

Process Area

Specific Goals

Generic Goals

Common Features

Activities Performed

Commitment to Perform

Ability to Perform

Directin Implementa

Specific Practices

Generic Practices

Subpractices
Amplifications
Elaborations

Subpractices
Amplifications
Elaborations

Required
Needed to satisfy CMMI

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

Informative
Ideas to consider

25

Common Feature Comparison

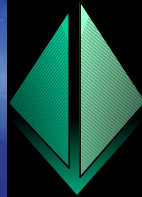| SW-CMM v1.1 Common Features	CMMI Common Features
Commitment to Perform	**Commitment to Perform**
Establish an Organizational Policy	Establish an Organizational Policy
Ability to Perform	**Ability to Perform**
	Plan the Process
Provide Resources	Provide Resources
Assign Responsibility	Assign Responsibility
Train People	Train People
	Establish a Defined Process
	Directing Implementation
	Manage Configurations
	Identify and Involve Relevant Stakeholders
	Monitor and Control the Process
	Collect Improvement Information
Activities Performed	**Activities Performed**
Plan the Process	
Perform the Process	Perform the Process
Monitor and Control the Process	
Measurement & Analysis	
Measure the Process	
Analyze the Measurements	
Verifying Implementation	**Verifying Implementation**
Objectively Verify Adherence	Objectively Verify Adherence
Review with Org. Management	Review Status with Higher Level Management
Review with Project Management	

Practices

- **Practices are the building blocks of the process areas**
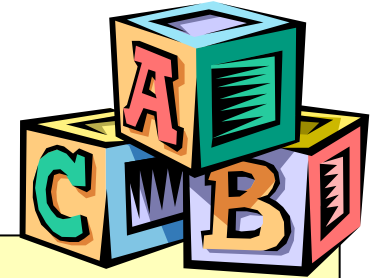
> **Example - Project Planning Process Area**
>
> *Specific Practice 1.1 - Establish a top-level work breakdown structure (WBS) to estimate the scope of the project.*

- **To satisfy the required goals, you are <u>expected</u> 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

Specific Practices   vs.   Generic Practices

- **Apply to a single process area**

- **Describe activities that implement the process area**

Example – Requirements Mgmt.

SG 1 Manage Requirements

SP 1.1   Obtain an Understanding of Requirements

SP 1.2   Obtain Commitment to Requirements

SP 1.3   Manage Requirements Changes

SP 1.4   Maintain Bidirectional Traceability of Requirements

SP 1.5   Identify Inconsistencies between Project Work and Requirements
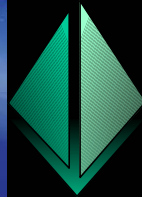
- **Apply to all process areas**

- **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 5 Optimizing
- Causal Analysis and Resolution
- Organizational Innovation and Deployment

Level 4 Quantitatively Managed
- Quantitative Project Management
- Organizational Process Performance

Level 3 Defined
- 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
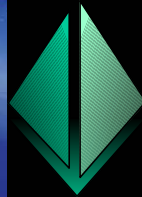- Organizational Environment for Integration*

Level 2 Managed
- Requirements Management
- Project Planning
- Project Monitoring and Control
- Supplier Agreement Management
- Measurement and Analysis
- Process and Product Quality Assurance
- Configuration Management

Level 1 Performed

Continuous Representation

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

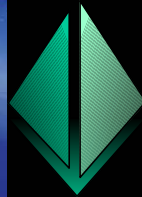|	Requirements Management	Project Planning	Project Monitoring and Control	Supplier Agreement Management	Measurement and Analysis	Process and Product Quality Assurance	Configuration Management	Requirements Development	Technical Solution	Product Integration	Verification	Validation	Organization Process Focus	Organization process definition	Organizational Training	Integrated Project Management	Risk Management	Decision Analysis and Resolution	Organizational Process Performance	Quantitative Project Management	Organizational Innovation and Deployment	Causal Analysis and Resolution
GG 5 Institutionalize an Optimizing Process																						
GP 5.1 Ensure Continuous Process Improvement																						
GP 5.2 Correct Root Causes of Problems																						
GG 4 Institutionalize a Quantitatively Managed Process																						
GP 4.1 Establish Quantitative Objectives for the Process																						
GP 4.2 Stabilize Subprocess Performance																						
GG 3 Institutionalize a Defined Process																						
GP 3.1 Establish a Defined Process					■																	
GP 3.2 Collect Improvement Information																						
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 1 Achieve Specific Goals																						
GP 1.1 Perform Base Practices	■				■		■		■			■					■					

30

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, <u>all</u> 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

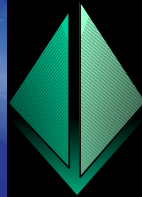| SW-CMM	CMMI
Key Process Area	Process Area
KPA Goal (Implementation)	Specific Goal
Key Practice from Activities Performed	Specific Practices
KPA Goal (Institutionalization)	Generic Goal
Key Practice from other Common Features	Generic Practices
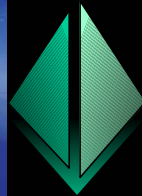
Terminology - 1

- **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
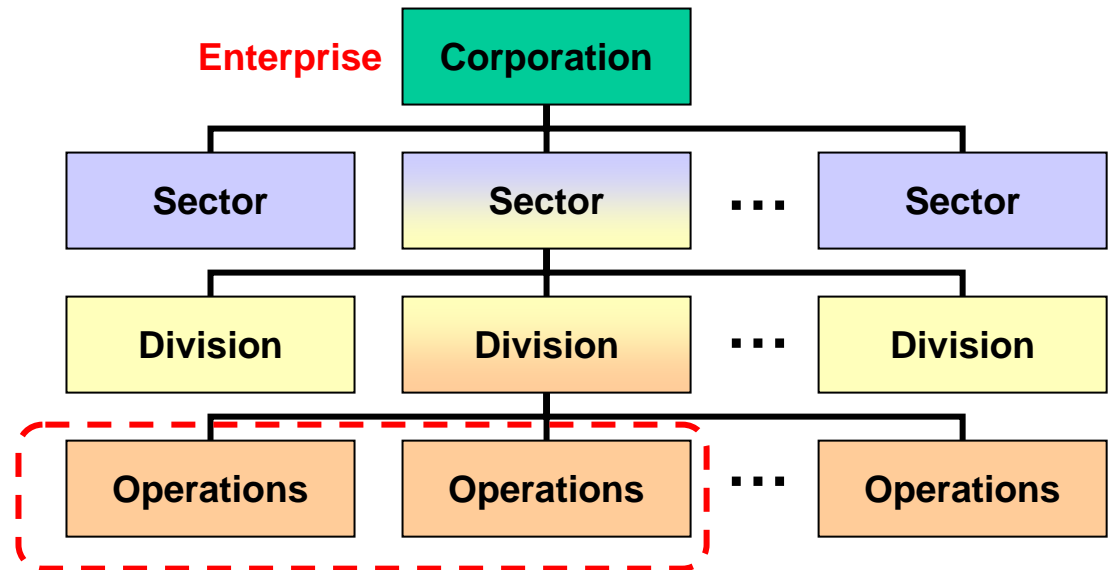
Terminology - 2

- **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
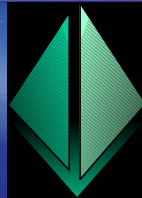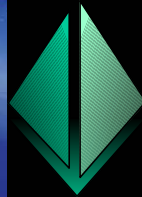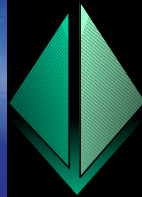
Terminology - 4

- **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
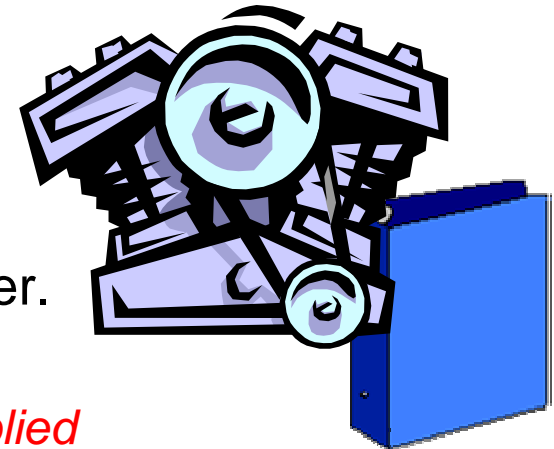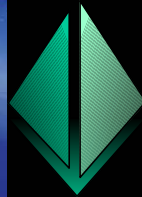
Terminology - 5

- **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
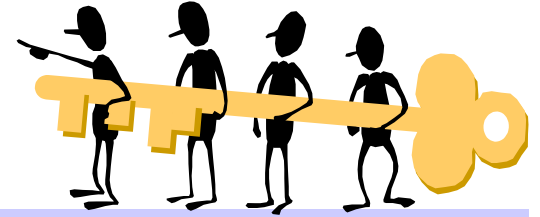
1. Determine the appropriate scope -- organization and model
2. Review each CMMI practice, within the projects and the organizational groups, to identify and document any interpretation issues
3. Select a Lead Appraiser, based on how they interpret those same issues
   - Do they agree on scope?
   - 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
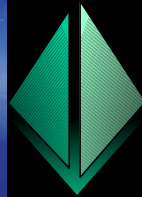8. Ensure the appraisal team has sufficient experience
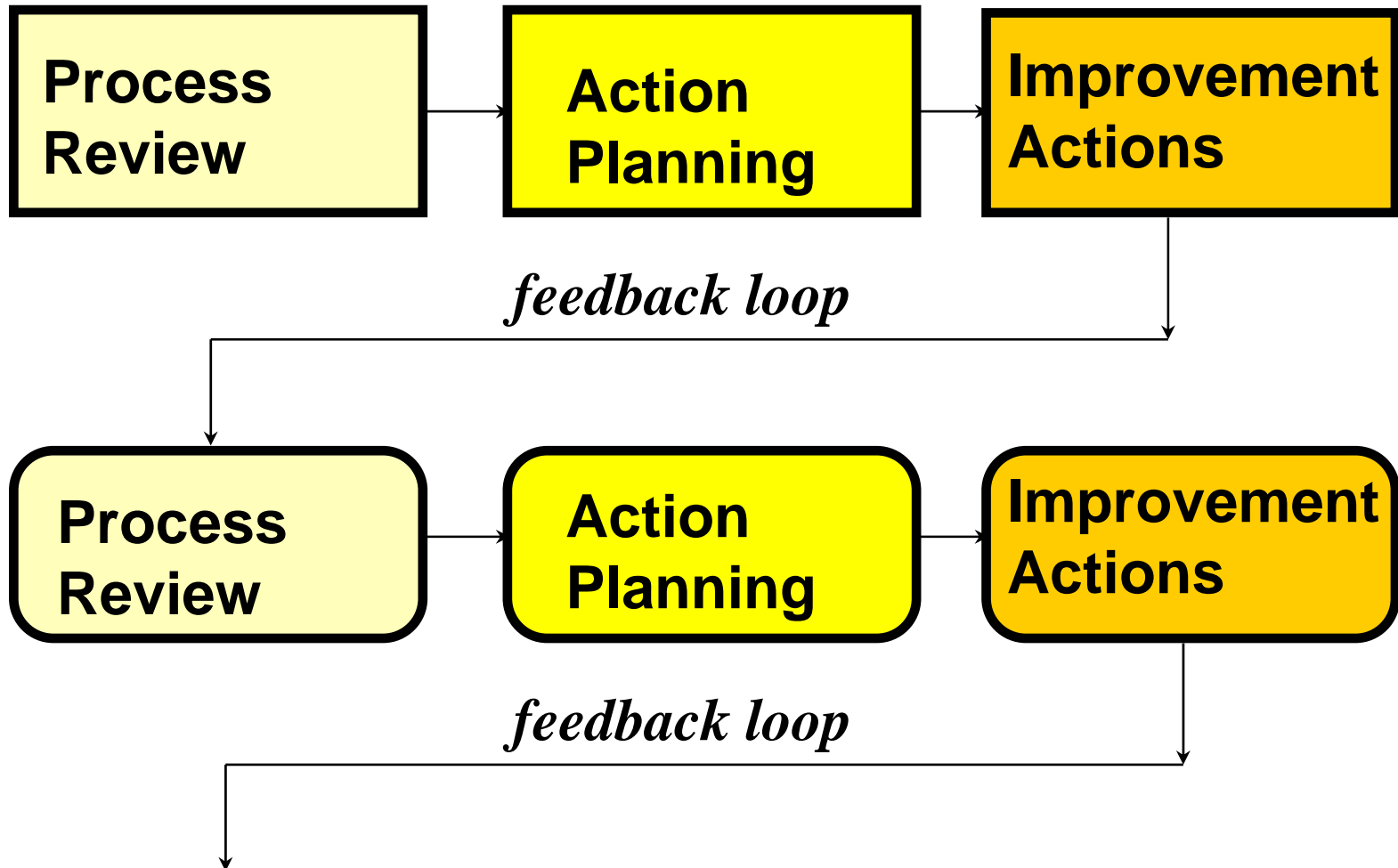
Maturity for Dummies Strategy

- **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.
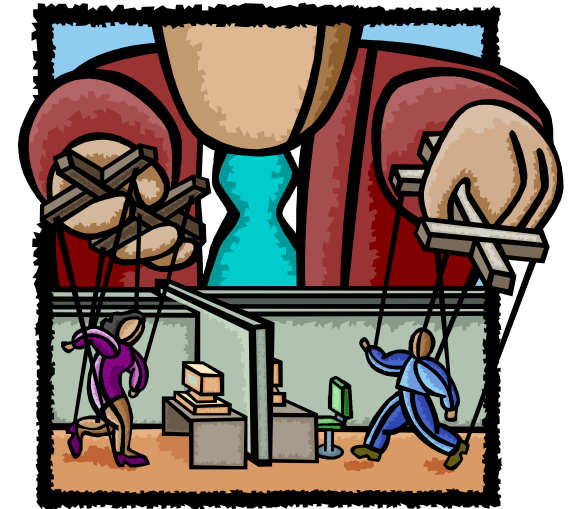
Do the Math: Straighten curves by taking the derivative
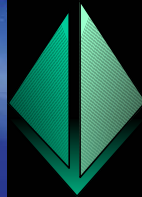*The derivative of $x^2 = 2x$*

Transition Process View (Straightening the Curve)

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

# 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
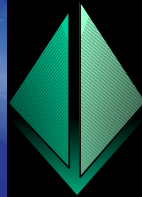 - Win acceptance of the need to improve

- **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
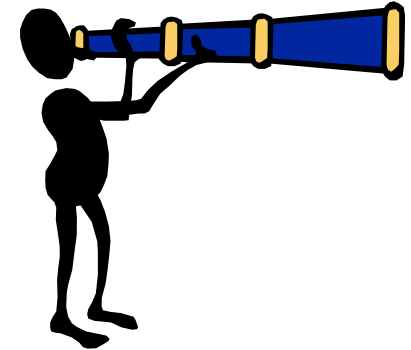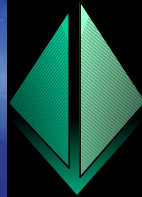
Maturity for Dummies Process Review

- **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.
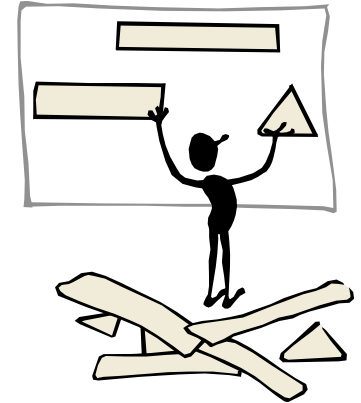
- **Data Collection Spreadsheet format:**

Category: Question	Today What we do today	Tomorrow What we'd like to be doing	Effort Rating Rate each item given for **Tomorrow**
1.	●	● ●	● ●

2002, Kim Caputo, Delta Business Solutions

# Effort Ratings and Strategy

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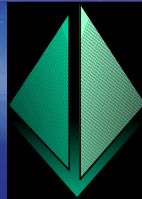 - Rate the effort for each "Tomorrow" item response and save the numbers for later comparison

- **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

Need Now

Can wait

5

4

2

1

3

0   *Minor*   *Major*
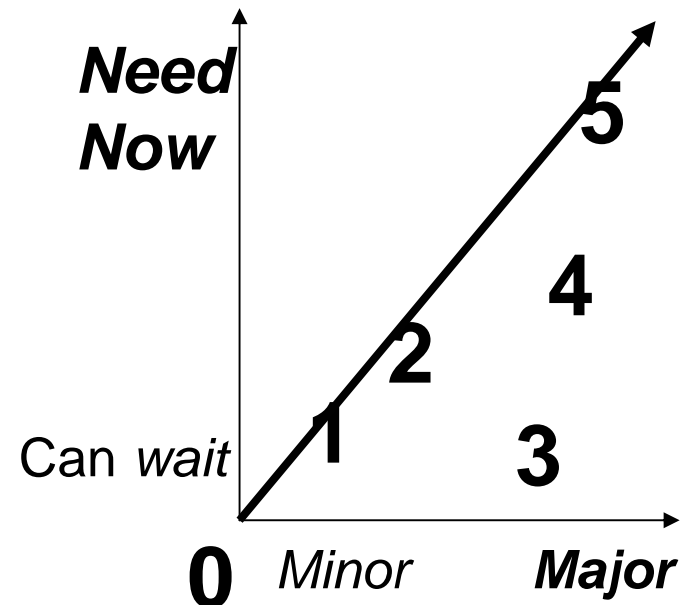
Process Review – Communication Questions

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?

2002, Kim Caputo, Delta Business Solutions
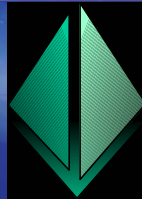
Process Review – Estimation Questions

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?

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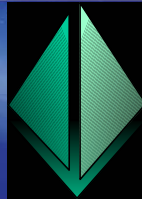
Process Review – Project Measures Questions

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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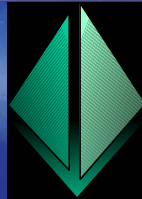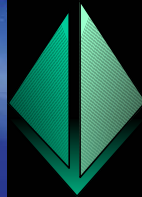
Process Review – Engineering Questions

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?

2002, Kim Caputo, Delta Business Solutions
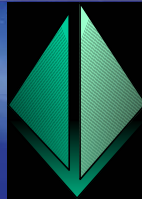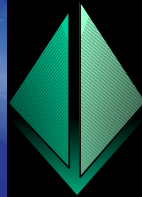
Process Review – Processes Questions

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?

2002, Kim Caputo, Delta Business Solutions

Results Table Example

Category	0	1	2	3	4	5	Total Items	Average	Mode
Communications									
Estimation									
Project Measures									
Engineering									
Processes									
Total									

2002, Kim Caputo, Delta Business Solutions

Action Plan according to Generic Practices

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

GG 2 Institutionalize a Managed Process
1. Organizational Policy
2. Plan
3. Resources
4. Responsibility
5. Training
6. Configurations
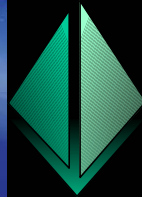7. Stakeholders
8. Measurements
9. Audits
10. Reviews

GG 3 Institutionalize a Defined Process
11. Process Definition
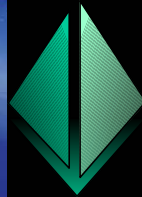12. Improvement Data
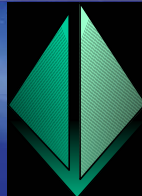
Process Review Worksheet Exercise

- **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
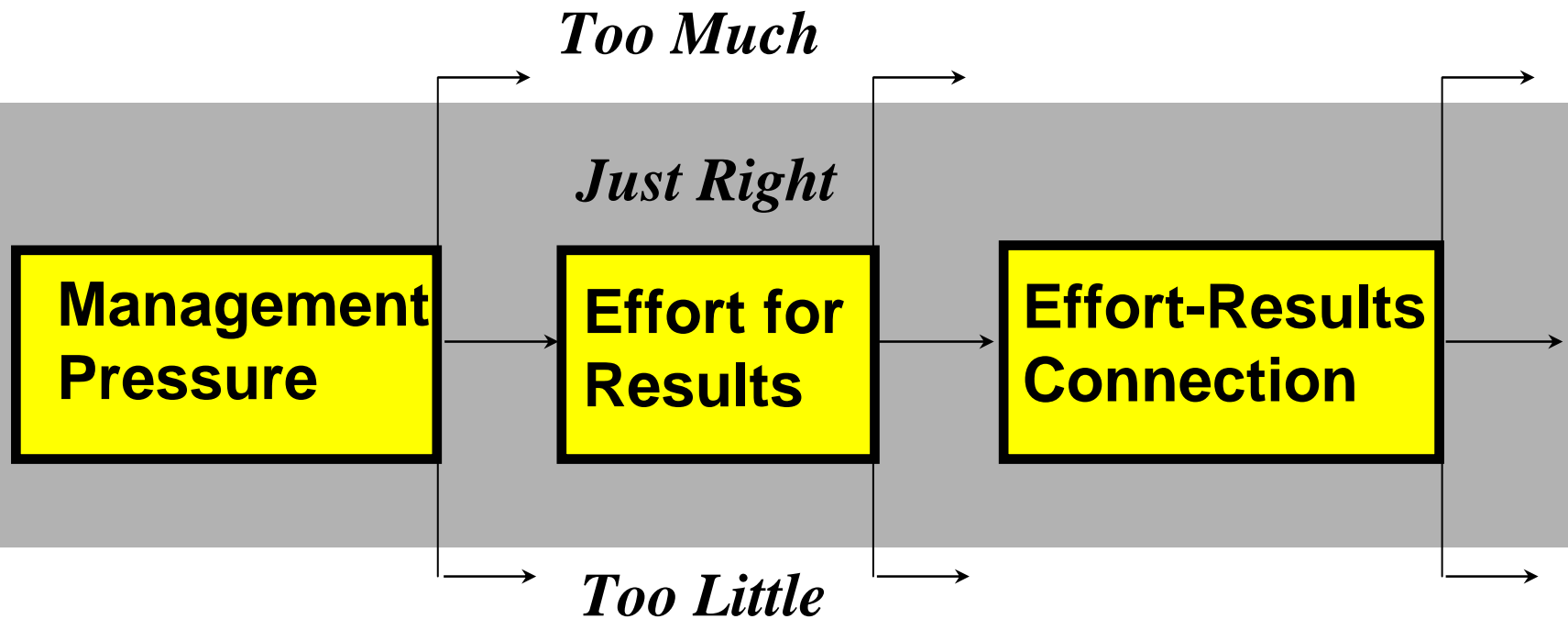
Too Much

Just Right

| Management Pressure | Effort for Results | Effort-Results Connection |

Too Little

Adapted and simplified by Kim Caputo from N. P. Repenning, a simulation-based approach to understanding the dynamics of innovation implementation. Organization Science, 13(2) March-April 2002.

Blended Strategy 1: Incrementerfall

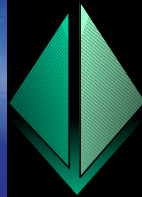- Incrementerfall = Incremental + Waterfall

- 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*
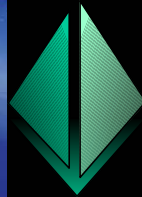 - **Start Train-Track**

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

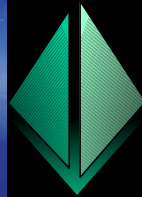 - *When Mentally Frozen (Again)*
    Re-Start with Maturity for Dummies
    - **Continue with Train-Track**

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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."

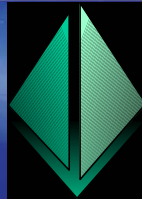"I thought the organization did that."

"Our customer won't let us do that."

"I thought this was a software assessment."

"Why aren't these projects included in the appraisal?"

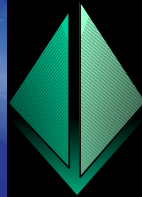"I want to do CMMI – I just don't want to change our process."

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**
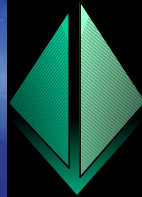
…improvement concepts

- **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

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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,
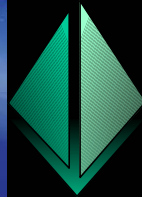 causing defects in the quality of the appraisal process**
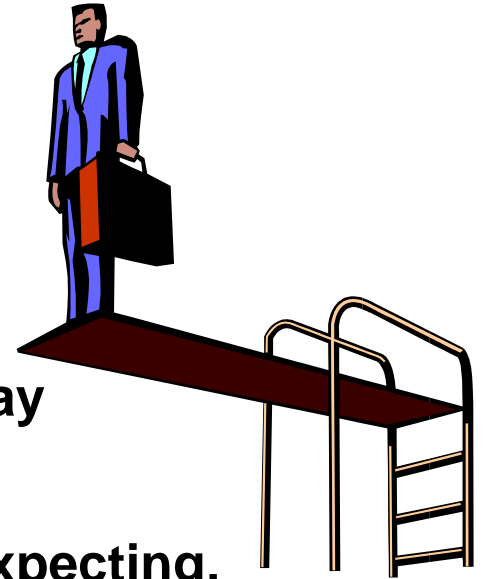
Transition Risk Mitigation Actions

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

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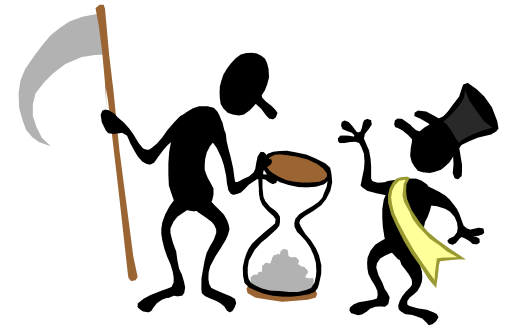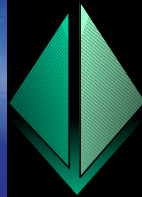
Key Questions for Transitioning

- **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?**
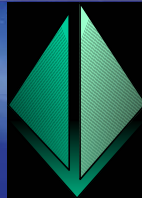
Summary

- **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**

Contact Information

- **Kim Caputo, Delta Business Solutions**
  Visiting Scientist, Software Engineering Institute
  11 Alato Drive
  Mission Viejo, CA 92693 USA
  (949)837-3048
  (949)837-3082 FAX
  kim.caputo@deltabus.com
  www.deltabus.com

- **Rick Hefner, Northrop Grumman**
  One Space Park R2/1136
  Redondo Beach, CA 90278
  (310) 812-7290
  rick.hefner@ngc.com