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DEFINING THE FUTURE

Project Implementation Strategies in the CMMI

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Background

- **An underlying principle of the CMMI model is the concept of conscious choices about how each process area will be implemented**
- **For example, in implementing Configuration Management, the project planner must decide:**
  - Which work products to place under configuration control (e.g., deliverables, designated internal work products, acquired products, tools)
  - What levels of configuration control (e.g., author, informal, formal) are appropriate for each work product
- **This presentation will study the strategic implications of the CMMI on planning and implementing project processes**

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Topics

- **The Concept of Conscious Choices**
- **Key Choices in CMMI**
  - Configuration management
  - Process and products audits
  - Verification, peer review, and validation
  - Others
- **Implications**
  - Project planning
  - CMMI appraisals

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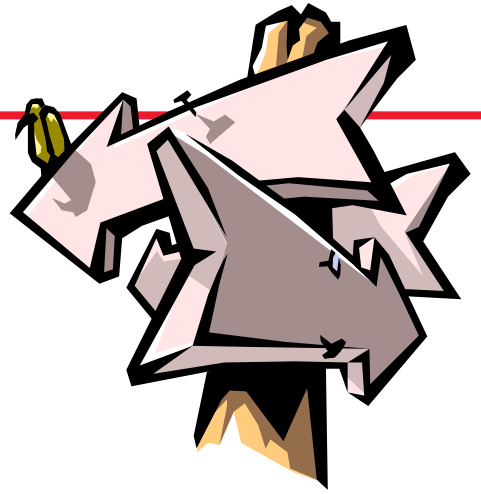
The Concept of Conscious Choices



- **The CMMI was written to apply to a variety of project environments**
  - Defense, commercial
  - Development, maintenance, services
  - Small to large project teams
- **The CMMI authors wrote the practices, expecting that different choices would be made concerning how they were applied**
  - E.g., “adequate”, “as appropriate”, “as needed”, “selected”, “identify” …
- **You must the interpret goals and practices in light of your organization’s business objectives**
  - BUT, you need to understand the intent behind the practice

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Conscious Choices in CMMI Process Areas

Level	Focus	Process Areas
5 Optimizing	*Continuous process improvement*	Causal Analysis and Resolution Organizational Innovation and Deployment
4 Quantitatively Managed	*Quantitative management*	Quantitative Project Management Organizational Process Performance
3 Defined	*Process standardization*	Organizational Process Focus Organizational Process Definition Organizational Training Integrated Project Management (for IPPD) Risk Management Decision Analysis and Resolution Requirements Development Technical Solution Product Integration Verification Validation
2 Managed	*Basic project management*	Requirements Management Project Planning Project Monitoring and Control Supplier Agreement Management Measurement and Analysis Process and Product Quality Assurance Configuration Management
1 Performed		

Levels 4 and 5 have similar choices

Verification and Validation require strategies

The Support process areas have several implied choices

Conscious Choices in CMMI Generic Practices

GP 1.1 Perform Base Practices

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

GP 3.1 Establish a Defined Process
GP 3.2 Collect Improvement Information

GP 4.1 Establish Quantitative Objectives for the Process
GP 4.2 Stabilize Subprocess Performance

GP 5.1 Ensure Continuous Process Improvement
GP 5.2 Correct Root Causes of Problems

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Configuration Management

SP 1.1 Identify Configuration Items
Identify the configuration items, components, and related work products that will be placed under configuration management.

- **Must identify ALL the products that will be controlled – not just CDRLs or delivered products**
- **Possible levels of control**
  - Control board authorizes and controls changes
  - Designated authority controls changes
  - Author controls changes
  - Anyone can make changes

Any artifact produced by a process.

Examples of work products that may be placed under CM include the following:

- Plans
- Process descriptions
- Requirements
- Design data
- Drawings
- Product specifications
- Code
- Compilers
- Product data files
- Technical publications

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GP 2.6 Manage Configurations

Must decide which work products are controlled and which are not

Any work products:
Specs, designs, code, test documents, CDRLs, plans, reports, minutes, action items, etc.

GP 2.6 Manage Configurations

Place designated work products of the process under appropriate levels of control.

Must decide the appropriate level of control for each work product:
Control board, management authority, author

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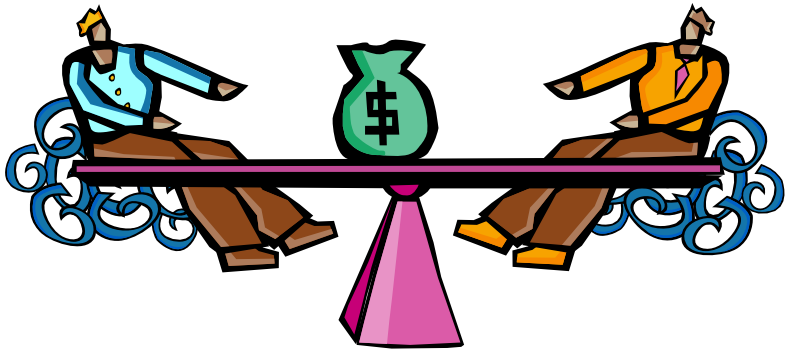
Sizing the Amount of CM/DM Needed

- **In the program management strategy, the project must decide which products to control, and what level of control**
  - Trade-off between the cost of more formal control and the risk of unauthorized changes
- **Must understand where the CM leverage points are**
  - Where does an unauthorized change cause significant problems?
- **Must understand the CM environment**
  - How much change is anticipated, and at what times?
  - Do the team members need more/less control?



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Process and Product Quality Assurance

SP 1.1 Objectively Evaluate Processes
Objectively evaluate the designated performed processes against the applicable process descriptions, standards, and procedures.

SP 1.2 Objectively Evaluate Work Products and Services
Objectively evaluate the designated work products and services against the applicable process descriptions, standards, and procedures.

- **Must select the processes, work products, and services to be evaluated (audited)**
- **Must decide what quality standards will be defined (e.g., coding standards)**
  - Organization sets standards based on market needs and "brand image"
  - Project sets standards based on customer needs
- **Project process descriptions describe the process to be followed**
  - Procedures are detailed process descriptions
- **Not all work products will have standards (e.g., coding standards)**

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Generic Practice for Quality Assurance

Could be interpreted to include both work products and processes

GP 2.9 Objectively Evaluate Adherence

Objectively evaluate adherence of the process against its process description, standards, and procedures, and address noncompliance.

Must define "minimal acceptable" quality

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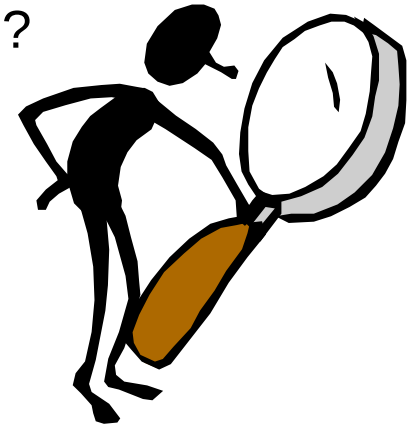
Sizing the Amount of QA Needed

- **In the program management strategy, the project must decide which work products and processes to define standards for, and how often to audit them**
  - Trade-off between the cost of more quality and the risk of re-work
- **Must understand where the QA leverage points are**
  - Where does poor quality cause significant problems?
- **Must understand the QA environment**
  - How much quality is expected, and of what type?
  - Do the team members need more/less auditing?



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Verification

Ensure selected work products meet their specified requirements

SG 1 Prepare for Verification

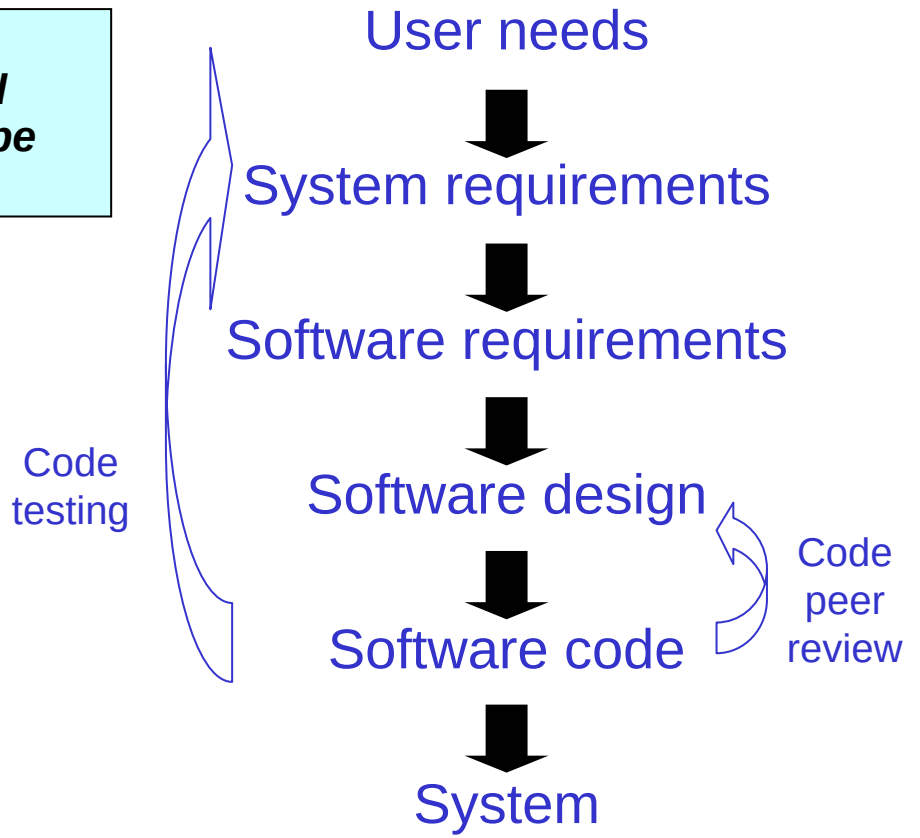
Preparation for verification is conducted.

SP 1.1 Select Work Products for Verification

Select the work products to be verified and the verification methods that will be used for each.

- **Which work products offer the greatest leverage?**
  - Impact of errors, visibility
- **How should the work product be verified?**
  - Peer review vs. testing vs. inspection
  - Efficiency, effectiveness

- **"Prepare" goal suggests a strategy (conscious choice)**
  - Integration, Verification, Validation



Validation

Demonstrate that a product or product component fulfills its intended use when placed in its intended environment

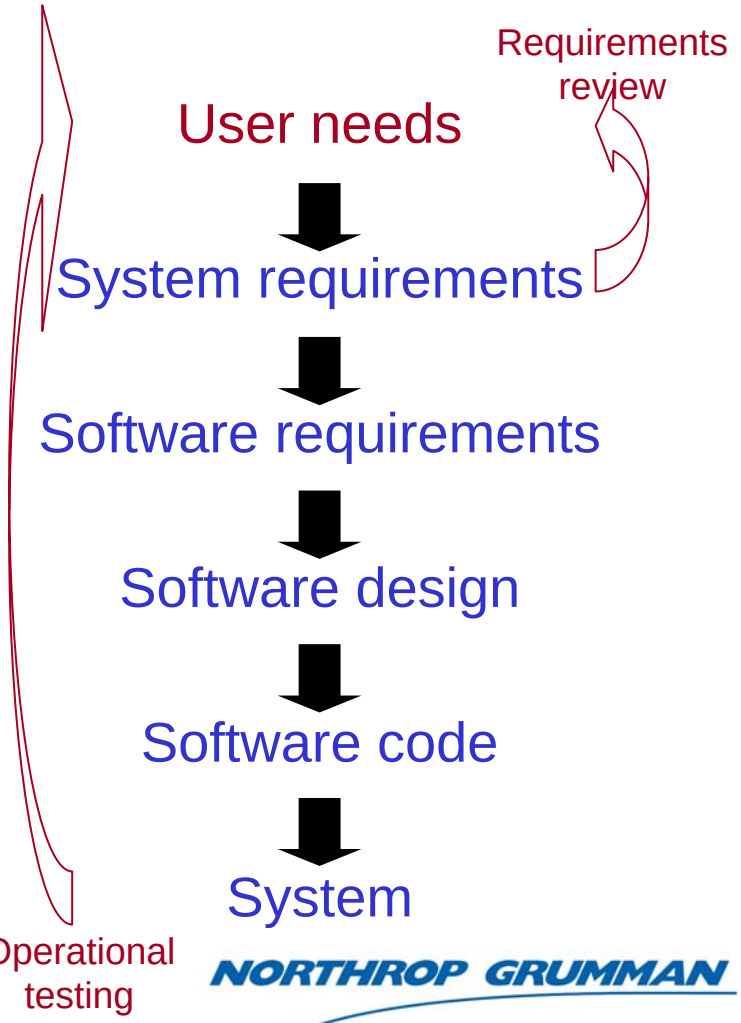
SG 1 Prepare for Validation

Preparation for validation is conducted.

SP 1.1 Select Products for Validation

Select products and product components to be validated and the validation methods that will be used for each.

- **Which work products offer the greatest leverage?**
  - Impact of issues, visibility
- **How should the work product be validated?**
  - E.g., user surveys, prototypes, milestone reviews, demonstrations, formal testing



Other Conscious Choices

Choice	Considerations
Which measurements to make (M&A)	Cost, insight, information needs, measurement objectives
Which measurements to monitor, how often, what format (PMC, GP 2.8)	Cost, insight
Which decisions should be subject to a formal decision process (DAR)	Cost, risk of making the wrong decision
Integration sequence (PI)	Cost, incremental confidence, testing insight
Which stakeholders to involve, in what way (IPM, GP 2.7)	Cost, buy-in
How detailed to make policies (GP 2.1), processes (GP 3.1)	Cost, standardization, enforcement
What training to provide - organizational and project (GP 2.5)	Cost, knowledge transfer, competence
What improvement information to collect (GP 3.2)	Cost, knowledge transfer
Which process elements to quantitatively control (SPM, GP 4.2)	Cost, insight business value, ability to stabilize processes

Implications

- **In planning, the project manager must consciously make these choices**
  - Project defined process (tailored from the organizational standard process) identifies the processes to be used
  - Project plans identifies the choices made on how to implement these process
- **For example, the organization can develop planning templates involving fill-in tables to capture the choices**
  - E.g., a stakeholder table (who, how, how often, etc.)
- **These choices must be clearly explained to appraisers**

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Summary

- An underlying principle of the CMMI model is the concept of conscious choices about how each process area will be implemented
- Recognizing the choices helps properly adapt the CMMI practices to fit the context of the organization and its projects

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