Recursion in the CMMI Project Management Process Areas

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Agenda

- Goal of the Presentation
- Recursion and Iteration: Defined
- Practicality in Project Management Processes
- Variations in Organizations
- The CMMI Perspective
- Process Consultant Considerations
- Appraisal Considerations
- Summary

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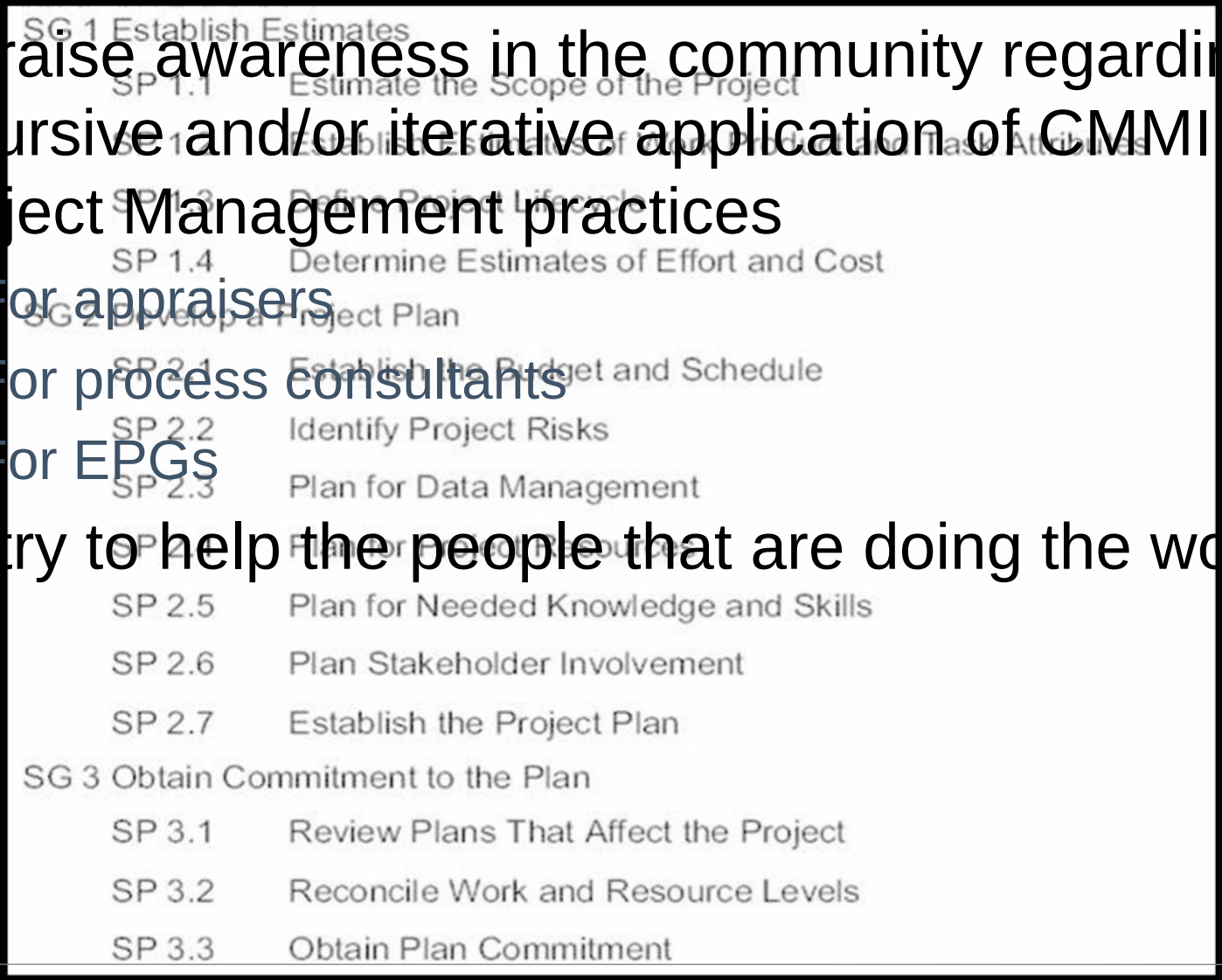
raise awareness in the community regardi
ursive and/or iterative application of CMMI
ject Management practices

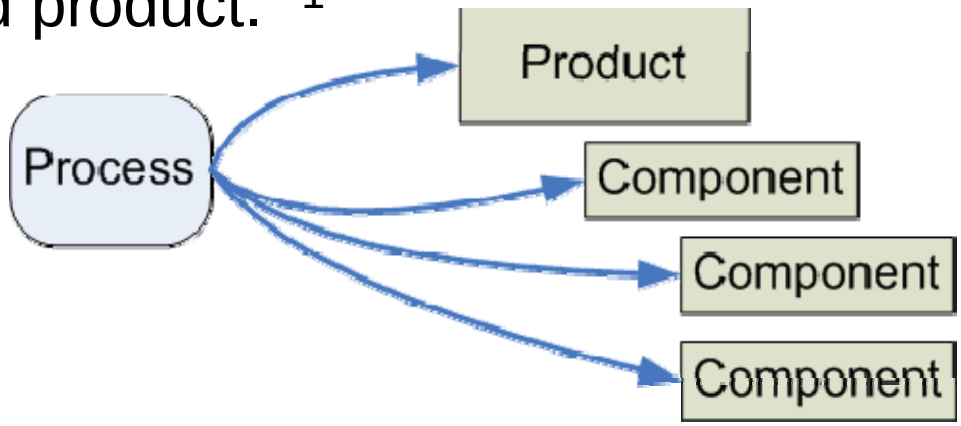
- For appraisers
- For process consultants
- For EPGs

try to help the people that are doing the wo



Recursion Defined

"Recursion occurs when a process is applied to successive levels of system elements within a system structure. The outcomes of one application are used as inputs to the next level in the system structure. For example, the verification process is designed to apply to the entire assembled product, the major product components, and even components of components. How far into the product you apply the verification process depends entirely on the size and complexity of the end product." [1]



1. Chrissis, Konrad, Schrum . CMMI® 2nd Edition, 2006, p. 84

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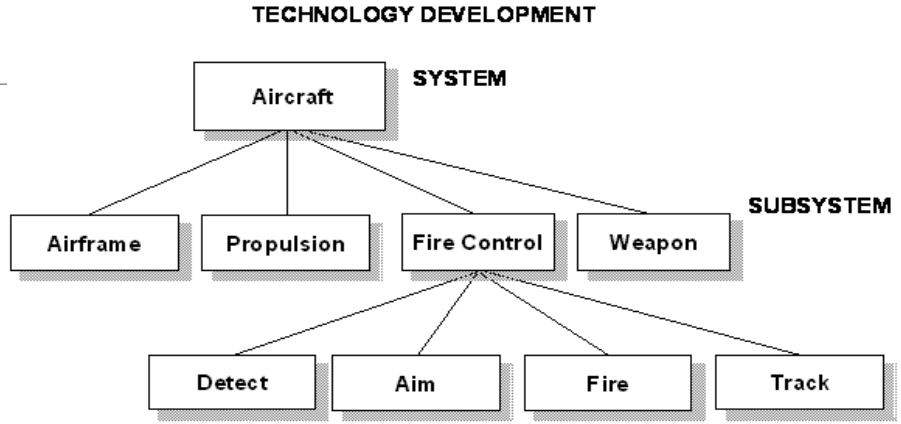
Recursion – An Example

- A project develops a system, with multiple subsystems and components
- How would the practices of Technical Solutions apply?



Aircraft System

SG 1 Select Product Component Sc
- SP 1.1 Develop Alternative Solutic Selection Criteria
- SP 1.2 Select Product Component Solutions

SG 2 Develop the Design
- SP 2.1 Design the Product or Produ Component
- SP 2.2 Establish a Technical Data P
- SP 2.3 Design Interfaces Using Crite
- SP 2.4 Perform Make, Buy, or Reus Analyses

SG 3 Implement the Product Design
- SP 3.1 Implement the Design
- SP 3.2 Develop Product Support Documentation

Fire Control Subsystem

SG 1 Select Product Component Sc
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Track Software

SG 1 Select Product Component Solutions
- SP 1.1 Develop Alternative Solutions and Selection Criteria
- SP 1.2 Select Product Component Solutions

SG 2 Develop the Design
- SP 2.1 Design the Product or Product Component
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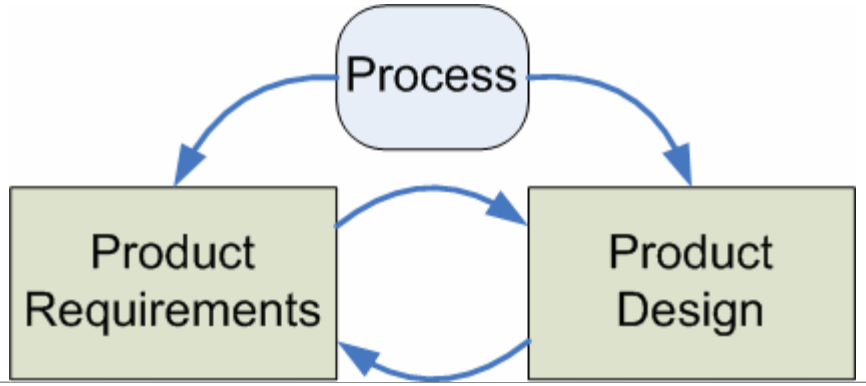
Iteration Defined

"Iteration occurs when processes are repeated at the same system level. New information is created by the implementation of one process that feeds back into a related process. This new information typically raises questions that must be resolved before completing the processes. For example, iteration will most likely occur between requirements development and technical solution. Reapplication of the processes can resolve the questions that are raised. Iteration can ensure quality prior to applying the next process." [1]



1. Chrissis, Konrad, Schrum . CMMI® 2nd Edition, 2006, p. 85

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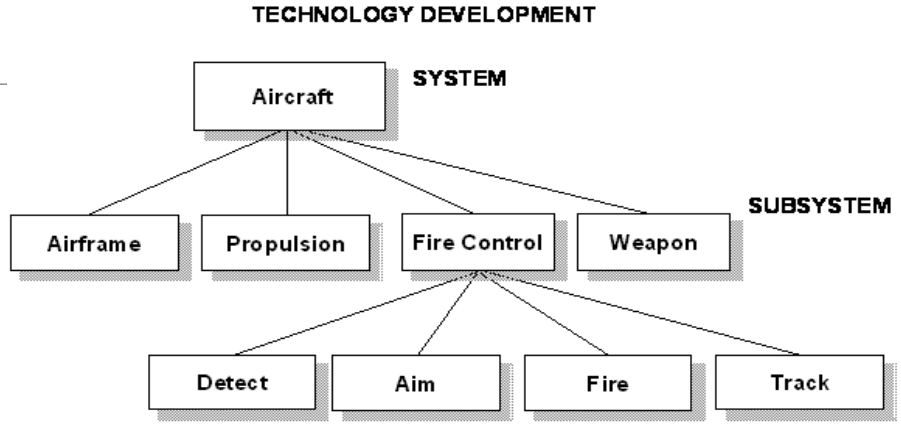
Iteration – An Example

- The Track software is built, but undergoes bug fixes and enhancements



Track Software

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Bug Fix

SG 1 Select Product Component Sc
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Enhancement

SG 1 Select Product Component Solutions
- SP 1.1 Develop Alternative Solutions and Selection Criteria
- SP 1.2 Select Product Component Solutions

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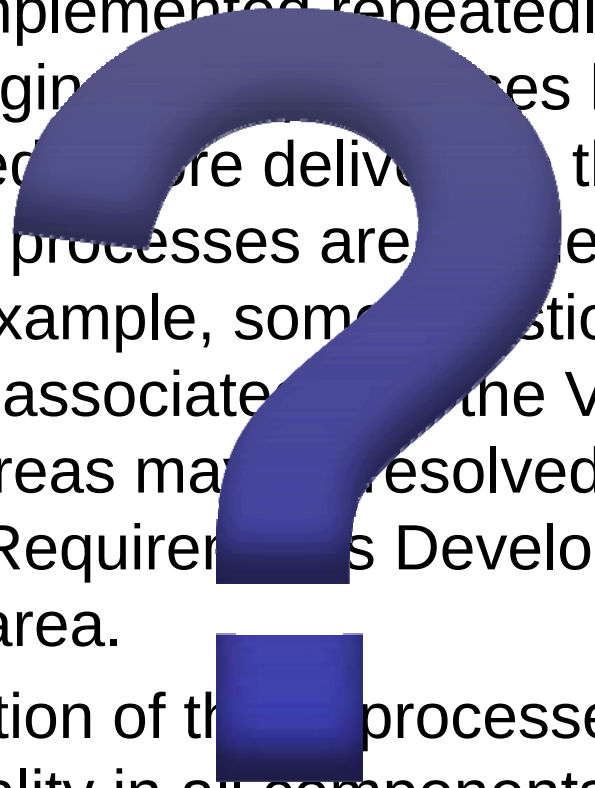
Applies Just to Engineering?

"Engineering processes (e.g., requirements development or verification) are implemented repeatedly on a product to ensure that these engin[illegible]es have been adequately addressed [illegible]re deliv[illegible] the customer. Further, engineering processes are [illegible]ed to components of the product. For example, som[illegible]stions that are raised by processes associate[illegible] the Verification and Validation process areas ma[illegible]resolved by processes associated with the Requirer[illegible]s Development or Product Integration process area.



"Recursion and iteration of th[illegible] processes enable the project to ensure quality in all components of the product before it is delivered to the Customer." [1]

1. Chrissis, Konrad, Schrum . CMMI® 2nd Edition, 2006, p. 85

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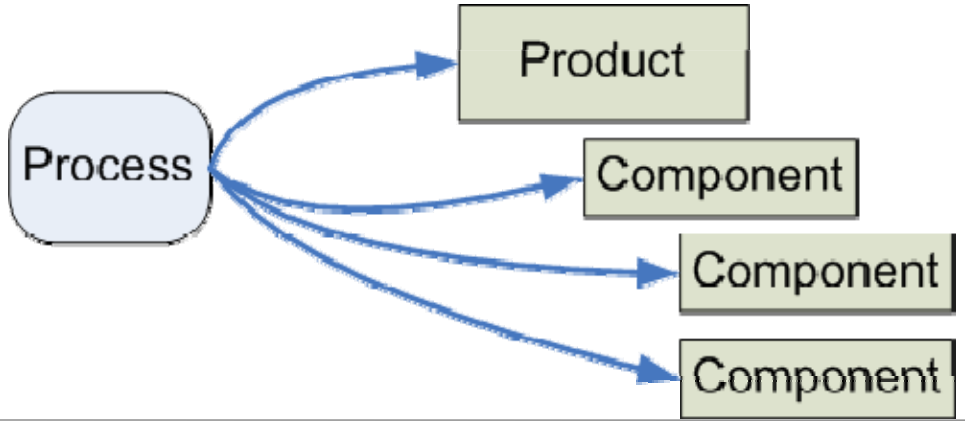
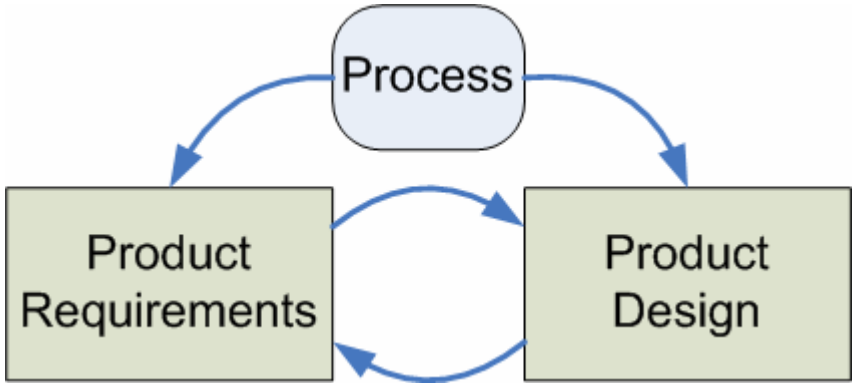
What about Project Management?

- Do PM processes apply recursively? Iteratively?
  - Does it depend on project size?
  - Do you have IPTs or Functional groups that support your projects? Do you consider the IPT leads or Functional Managers as “Project Managers,” or Cost Account Managers? Do these folks follow the same PM processes as the “Project”?
  - Do you require your project management practices to be applied at this level?





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What does Common Sense Say?

- We need to plan what the people that do the work are doing
- We need to report status at the “Project” level and at each level down in the project until we get to the people that are doing the work
- We need to know that the people doing the work are doing the right things

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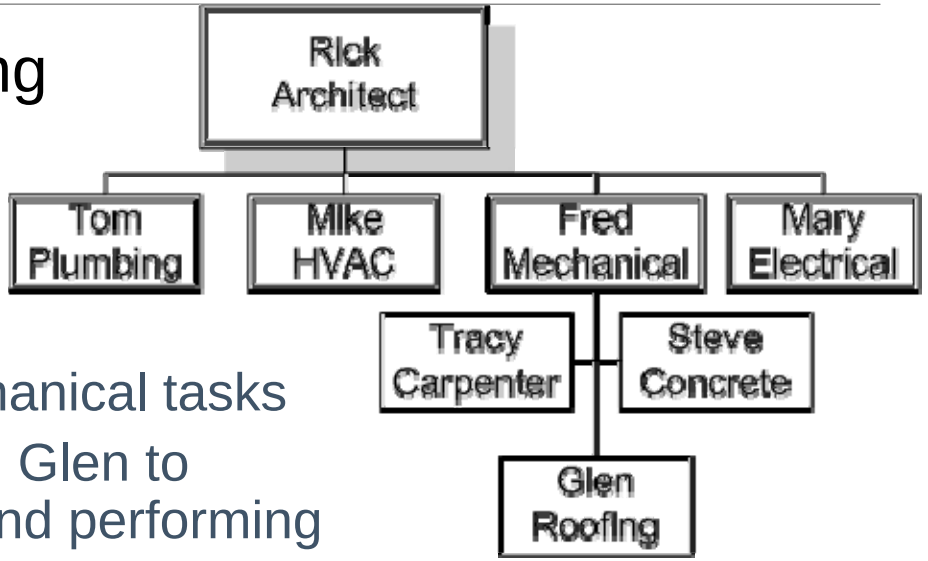
Scenario – Building a Home

- Planning and Status Reporting
  - We expect Rick to have a process for managing the home project
  - Rick expects Fred to have a process for managing the Mechanical tasks
  - Fred expects Tracy, Steve, and Glen to have a process for managing and performing their work



- Rick's PM role for the home is significantly more complicated than Steve's or Tracy's
  - Dependency issues
  - Steve or Tracy may have to support multiple "Rick"s
  - In the end, they are all accountable

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Organizational Constructs

- **Functional** Organizations
  - Departments or Divisions by *type* of work, e.g. Requirements, Development, Engineering, Test
  - Characterized by strong Functional managers, who control the resource allocation
  - Work flows from Functional group to Functional group until completed
  - Project managers establish priorities for the Functional managers, but are not in direct control of the work
- **Project** Organizations
  - Cross-functional teams are established (sometimes called IPTs) to develop and build the product
  - Characterized by strong Project managers (sometimes called IPT Leads) who control resource allocation
  - Work is performed in the context of the team. Teams are made of resources that come from “weak” functional organizations
  - Functional managers are responsible for their function’s process

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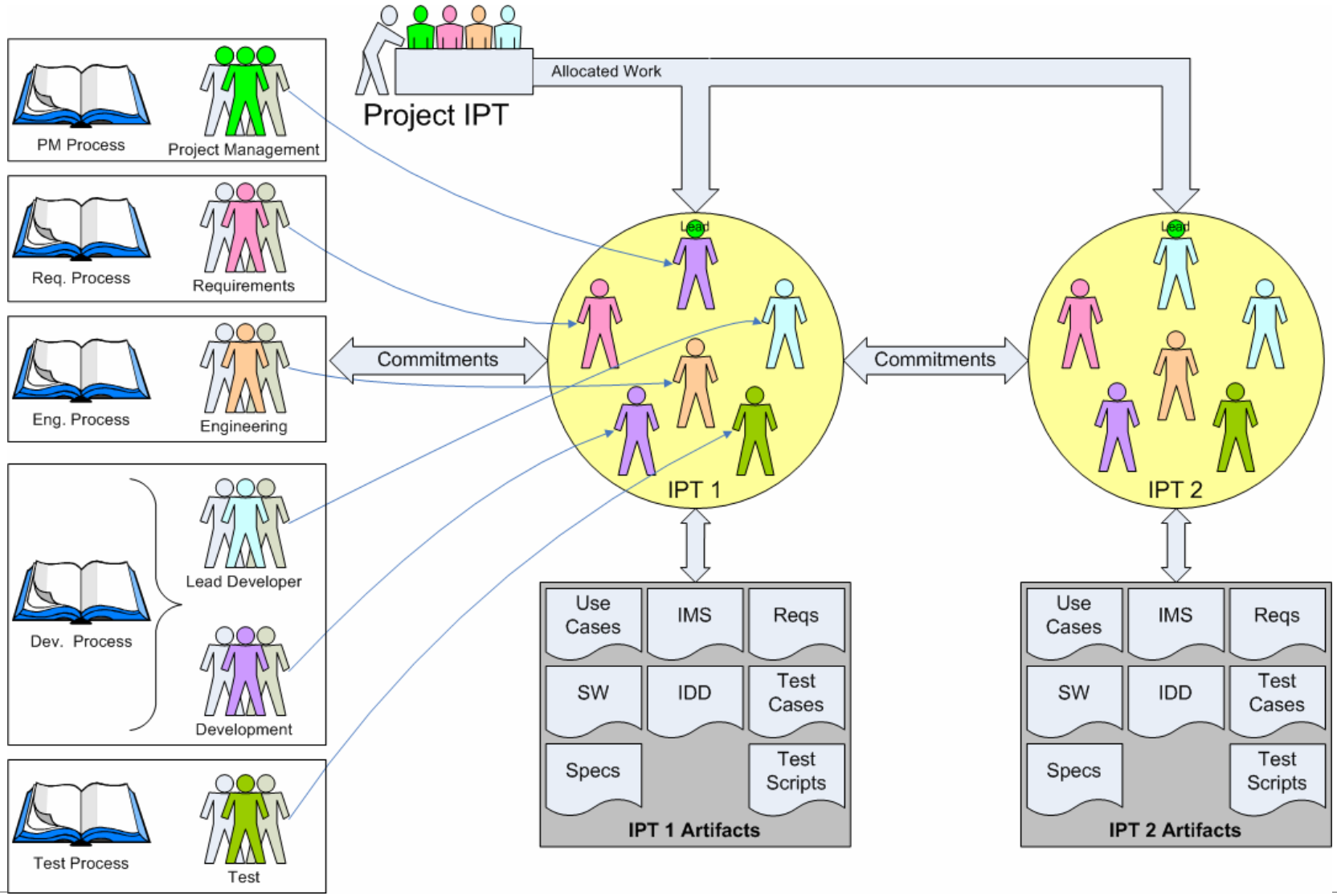
Project IPT Organization



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CMMI Requirements

- What are typical artifacts that one would expect for a CMMI PM process?

WBS	"Lifecycle"	Risks
Basis of Estimates	Data Management Plan	Commitments
Budget	List of Stakeholders	Meeting Minutes
Milestone Review Results	Inventory of Knowledge/Skills	Resource Management Plan
Action Items	Schedule	EVMS

- Which of these artifacts would be appropriate for a project of any size?
- Do we need all of these artifacts at every level of the project? NO!

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What is Appropriate?

- Unfortunately, it depends on your organization's context
- The point is that you should not feel constrained by the CMMI as you apply Project Management processes within your structure

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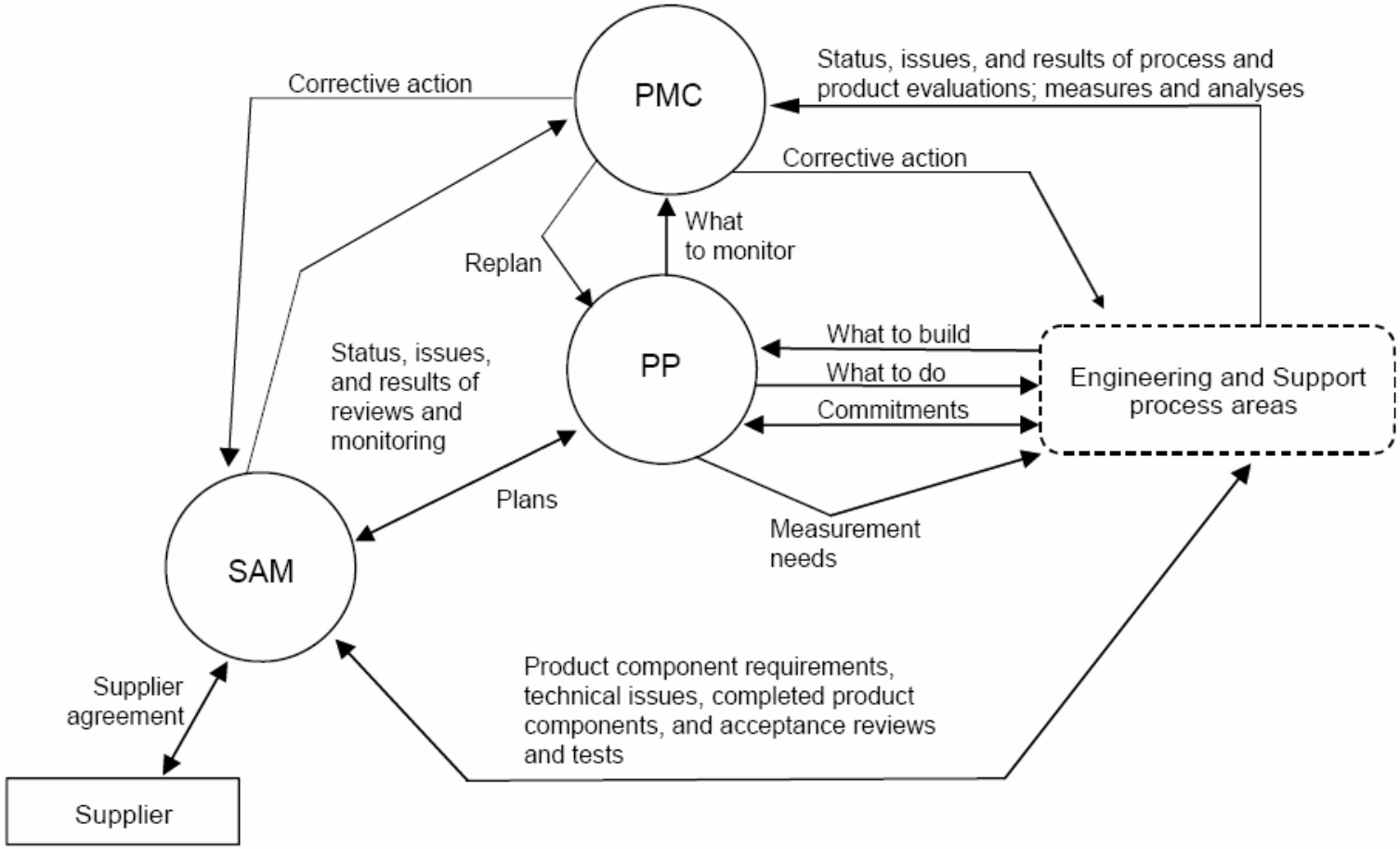
CMMI – Basic PM Process Areas



PMC = Project Monitoring and Control
PP = Project Planning
SAM = Supplier Agreement Management

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Process Consultant Considerations

- Recognize the level where the work gets done, and develop a “project” process that is in line with the existing “work products”
- At this (lowest) level of the organization, use the CMMI as a guide, but don’t over-apply the CMMI requirements… allow the overarching project to assume the balance of the CMMI requirements
- …in effect, allocate the CMMI requirement to the level of the organization where it is appropriate
- Don’t worry about consistency between groups… focus on making the groups internally consistent

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Appraiser Considerations

- Expect some form of project management at the “worker” level
- Make an effort to understand the organization type during the appraisal planning
  - This will guide your knowledge of how work is managed
  - This may affect the way that the organization is defined
  - Don’t be afraid to limit the scope of the appraisal
- Be prepared for the organization to push back
  - “We have a WBS”
  - “That’s too much process!” “We can’t afford that!”
  - If it’s in scope, you should expect to see it

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Summary

- CMMI only defines “what” to do, not “how” to do it
  - CMMI is a process model, not a process description
  - Use the CMMI as a guide to ensure you are doing all the right things
  - Plan the process implementation so that you are taking advantage of the CMMI
- Project Management process deployment is more complicated than you think
  - For the process consultant to help the organization define the process
  - For the process appraiser in determining the organization is following the process

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