

Vertically Slicing the CMMI®

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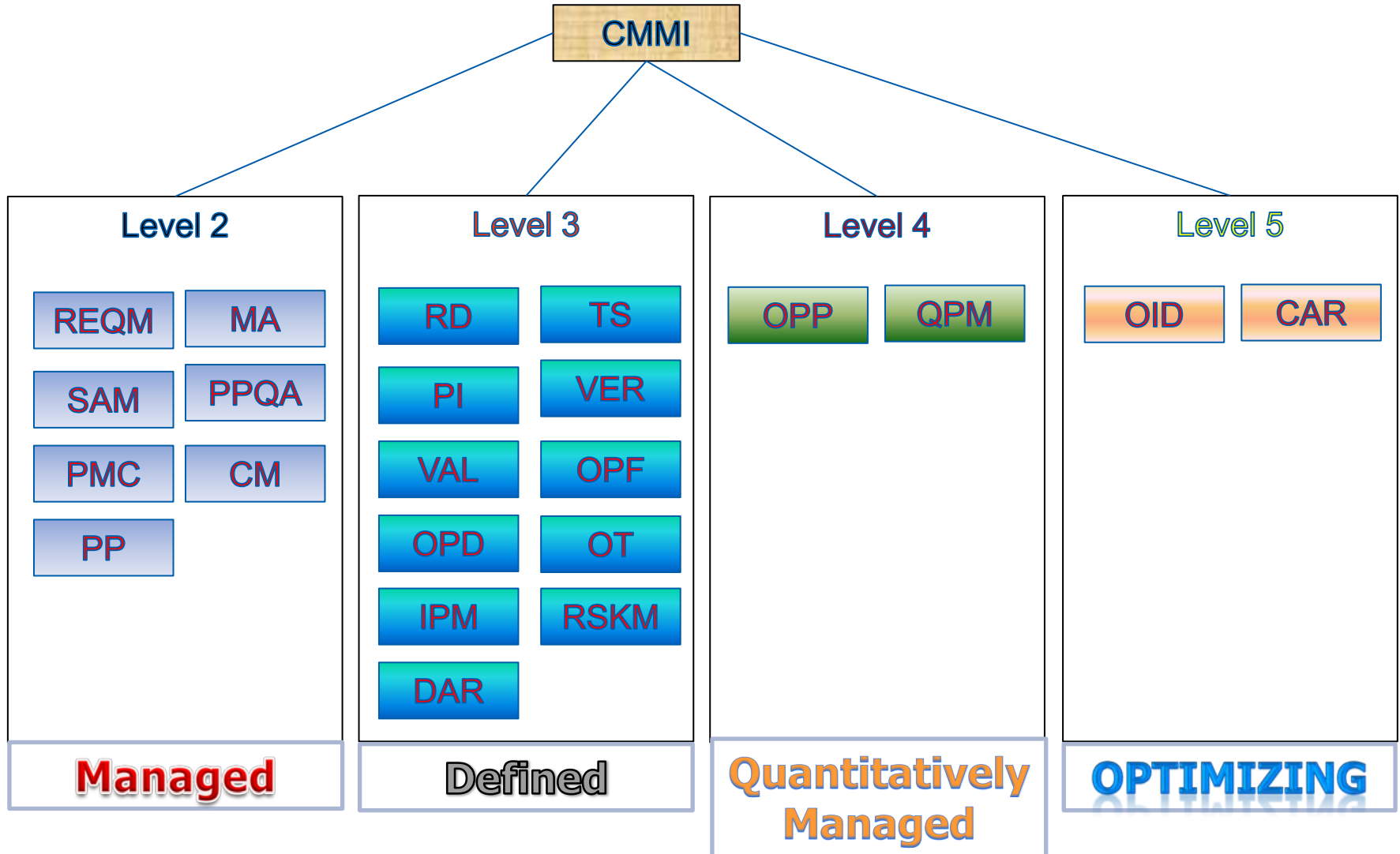


- Joe Process wants to build a building:
 - How many stories (levels) in this building?
 - How many levels initially? 2 Levels or Stories
 - Does he have enough information to build the maximum number of levels (Say 5 levels is the maximum)?
- What is his implementation plan to minimize re-work if after building initially, Joe chooses to add additional levels to the building?
 - What are the plumbing requirements for a 5 story building?
 - Should all of these requirements be considered for the initial 2 story building?

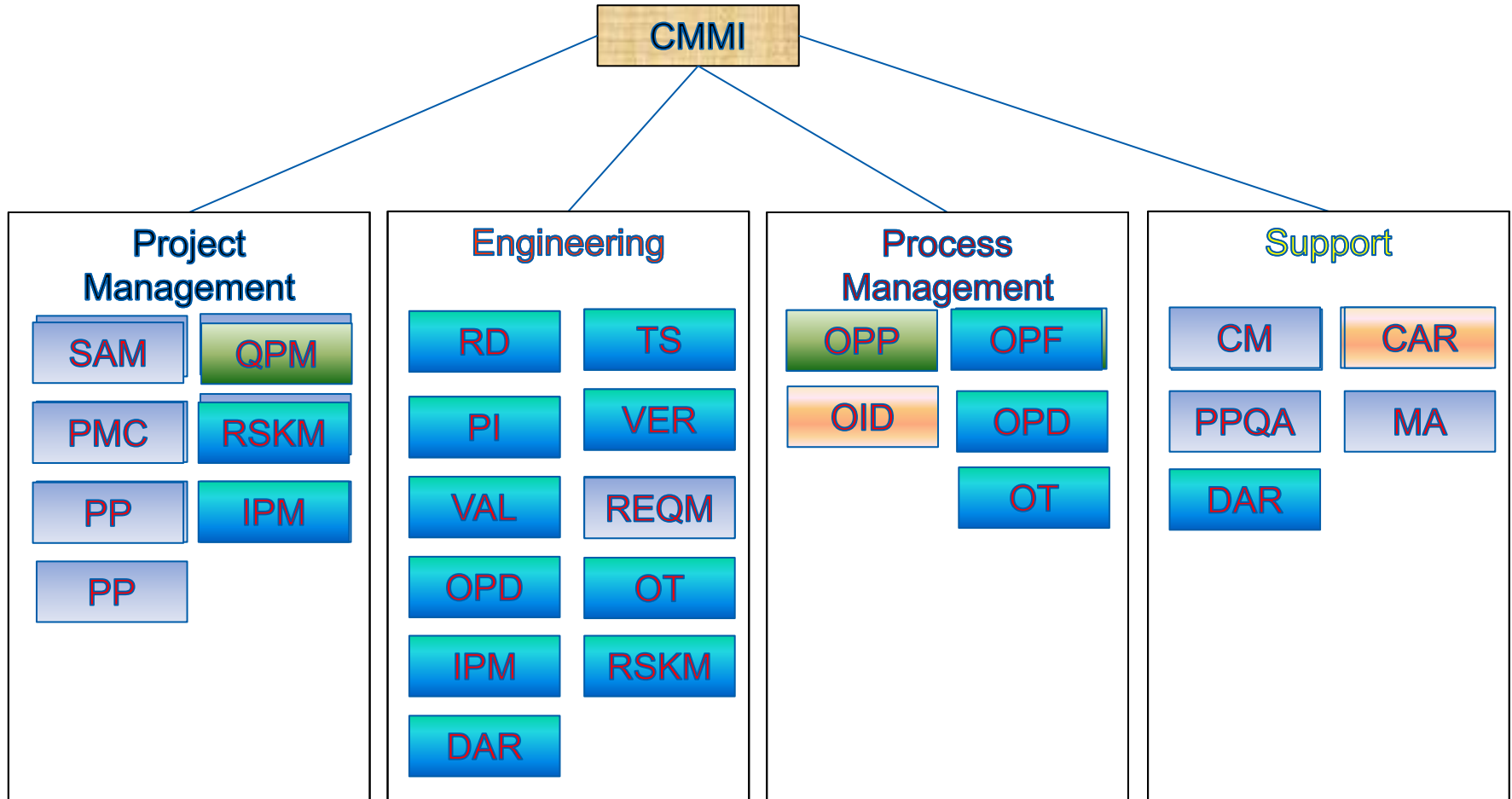
**If all requirements are not initially considered,
there may be significant re-work**

- How do YOU implement a Process System using the CMMI (and other process standards and requirements)
 - Lots of folks take it one level at a time
 - Advantage – a very methodical approach, it allows you to focus on immediate process needs, helps build confidence in implementation
 - Disadvantage – as you progress to higher levels, you may discover that a lower level implementation needs some rework or may not be robust enough to support the higher level implementation
 - However, a systems approach would suggest that decision analysis be used to select the best implementation
 - The CMMI practices (requirements) for ALL levels are known in advance
 - Analyze all requirements, and develop a concurrent (and phased) approach to optimize implementation cost by minimizing re-work
 - This is done by making a trade off of re-work vs. upfront costs

Viewing CMMI Requirements by Levels



Viewing CMMI Requirements by Categories

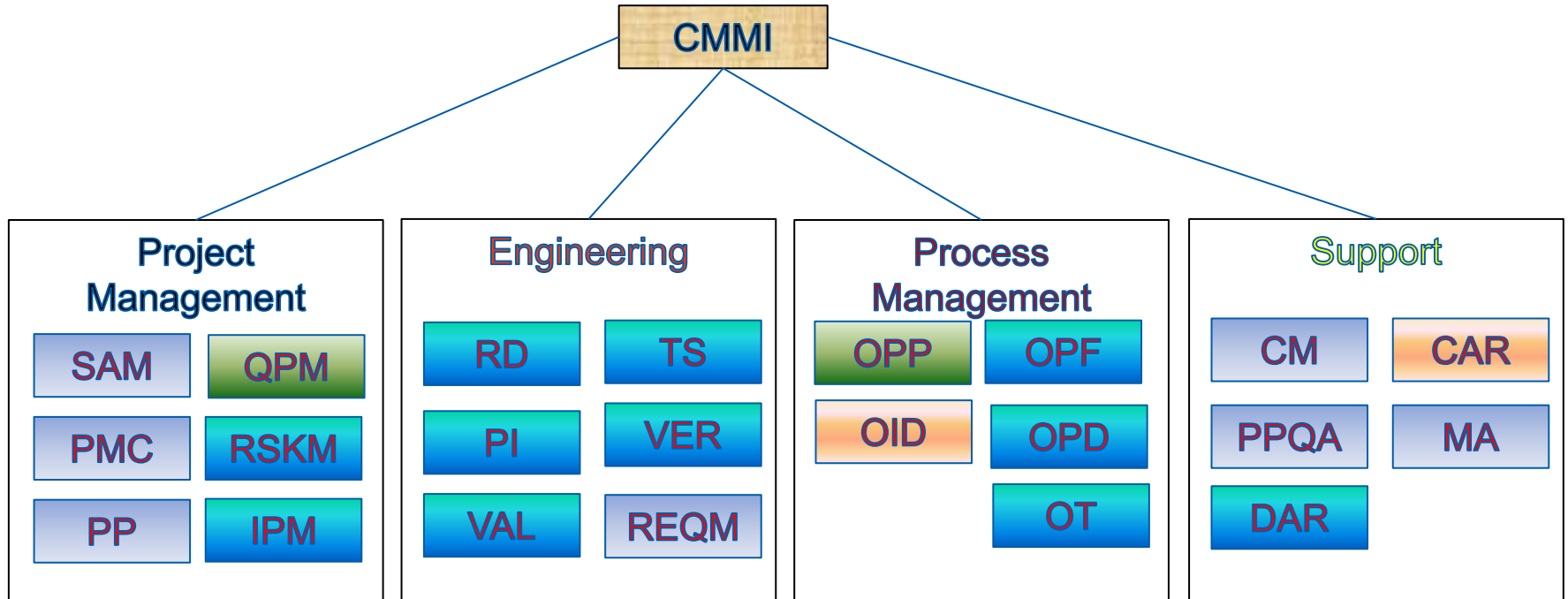


Analyze CMMI Requirements (Practices) to determine basic functions

- Measure
- Analyze
- Reporting
- Evaluation
- Develop
- Review
- Document
- Maintain
- Gain Commitment
- Plan
- Report
- Select
- Establish Teams
- Communicate
- Monitor
- Deploy
- Train
- Achieve Traceability
- Control
- Etc

Perform Basic Functional Analysis and Allocation of CMMI Requirements

Viewing CMMI Requirements by Functions



- Analyze
- Gain Commitment
- Achieve Traceability

- Analyze
- Measure
- Develop
- Review
- ..

Functional Analysis and Allocation

Plan

IPM SP 1.4-1 Integrate other plans that affect the project with the project plan.
OPF SP 1.2-4 Plan, schedule, and prepare for the process appraisal.
OID SP 1.3-1 Plan the pilots.
...

Gain Commitment

PMC SP 2.2-3 Negotiate changes to internal and external commitments.
REQM SP 1.2-4 Negotiate and record commitments.
OPF SP 2.2-2 Negotiate and document commitments among the process action teams and revise their process action plans as necessary.
...

Measure

CAR SP 2.2-1 Measure the change in the performance of the project's defined process as appropriate.
DAR SP 1.4-3 Determine the measures needed to support the evaluation method.
OPD SP 1.4-6 Enter the specified measures into the repository.
...

Monitor

SAM SP 2.1-6 Monitor risks involving the supplier and take corrective action as necessary.
RSKM SP 3.2-1 Monitor risk status..
QPM SP 2.3-2 Monitor changes in quality and process-performance objectives and selected subprocess' process capability.
...

Analyze

QPM SP 2.2-5 Analyze the special cause of process variation to determine the reasons the anomaly occurred.
REQM SP 1.1-3 Analyze requirements to ensure that the established criteria are met.
OPD SP 1.4-1 Determine the organization's needs for storing, retrieving, and analyzing measurements.
...

Report

MA SP 1.4-4 Review and update the proposed content and format of the specified analyses and reports.
VER SP 3.2-4 Record all results of the analysis in a report.
CM SP 1.2-6 Create configuration management reports from the configuration management system.
...

Maintain

PI SP 1.2-5 Maintain the product integration environment throughout the project.
REQM SP 1.3-2 Maintain the requirements change history with the rationale for the changes.
IPM SP 1.3-3 Maintain the qualification of the components of the project's work environment.
...

Document

CM SP 1.3-3 Document the set of configuration items that are contained in a baseline.
DAR SP 1.2-6 Document the rationale for the selection and rejection of evaluation criteria.
MA SP 1.1-1 Document information needs and objectives.
...

Measure

CAR SP 2.2-1 Measure the change in the performance of the project's defined process as appropriate.
DAR SP 1.4-3 Determine the measures needed to support the evaluation method.
OPD SP 1.4-6 Enter the specified measures into the repository.
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Analyze

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...

Measurement Function

- Establish measures and objectives for determining the value of each process and technology improvement with respect to the organization's quality and process-performance objectives.
- Measure the value of each process and technology improvement.
- Measure the change in the performance of the project's defined process as appropriate.
- Identify how process performance is to be measured
- Identify the measures that are appropriate for statistical management.
- Revise the measures and statistical analysis techniques as necessary.
- Store process and product measures in the organization's measurement repository.
- Define a common set of process and product measures for the organization's set of standard processes.
- Collect performance measures on the risk-handling activities.
- Update measures and measurement objectives as necessary.
- Obtain the data for base measures.
- Review the results of collecting and analyzing measures for controlling the project.

OID SP 2.1-4

OID SP 2.2-1

CAR SP 2.2-1

QPM SP 1.1-3

QPM SP 2.1-3

QPM SP 2.1-8

IPM SP 1.6-2

OPD SP 1.4-2

RSKM SP 3.2-6

MA SP 2.1-1

MA SP 1.4-5

PMC SP 1.6-2

Analyze Function

- Analyze the costs and benefits of potential innovative improvements. **OID SP 1.2-4**
- Analyze selected defects and other problems to determine their root causes. **CAR SP 1.2-2**
- Establish and maintain the organization's process-performance baselines from the collected measurements and analyses. **OPP SP 1.4-2**
- Analyze the interaction of subprocesses to understand the relationships among the subprocesses and the measured attributes of the subprocesses. **QPM SP 1.2-3**
- Analyze the special cause of process variation to determine the reasons the anomaly occurred. **QPM SP 2.2-5**
- Select the methods based on the purpose for analyzing a decision and on the availability of the information used to support the method. **DAR SP 1.4-1**
- Analyze the organization's common set of measures. **OPF SP 3.4-5**
- Analyze issues to determine need for corrective action. **PMC SP 2.1-2**
- Analyze the impact of changes and fixes proposed in the change requests. **CM SP 2.1-2**
- Specify and prioritize the analyses that will be conducted and the reports that will be prepared **MA SP 1.4-1**
- Analyze requirements to ensure that the established criteria are met. **REQM SP 1.1-3**

Analyze Defects or other issues for preventive action

- Analyze selected defects and other problems to determine their root causes.
- Analyze the special cause of process variation to determine the reasons the anomaly occurred.

CAR SP 1.2-2

QPM SP 2.2-5

Analyze Defects or other issues for corrective action

- Analyze issues to determine need for corrective action.
- Analyze the impact of changes and fixes proposed in the change requests.

IPM SP 2.1-2

CM SP 2.1-2

In Implementing the Analyze Defect function we can now decide whether to address this function for corrective only or for both corrective and preventive action with full knowledge of all the requirements

Summary: “Vertically Slicing the CMMI®”

Since all CMMI requirements are known beforehand the following holistic approach can be employed to proactively build the foundation for all levels:

- Analyze the CMMI practices across all maturity levels,
- Understand their interrelationships
- Decompose the CMMI into functions with allocated requirements otherwise known as Functional Analysis and Allocation (FAA)
- Plan for a time phased optimal implementation by making decisions about what requirements will be implemented in each phase

Therefore, “Vertical Slicing the CMMI” really equates to using good system engineering principles to enable good decisions on what requirements are addressed in each phase of implementation so that re-work is minimized as progressively higher CMMI levels are implemented

NORTHROP GRUMMAN

