Capability Maturity Model Integrated (CMMI)

Configuration Management Considerations

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Agenda

- SEI Overview
- Capability Maturity Models In General
- CMMI Overview
- Configuration Management Elements of:
  - Project Management
  - Engineering
  - Support
  - Process Management
- Conclusion
Software Engineering Institute (SEI)

- Established in 1984 by Congress as a federally funded research and development center
- Sponsored by the U.S. Department of Defense (DoD) Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics
- Trusted partner with industry organizations and government agencies in the development, acquisition, and support of software-intensive systems.
- Mission: Advance the practice of software engineering
- Long Range Goal: Make the acquisition, development, and sustainment of software-intensive systems predictably better, faster, and cheaper for the DoD.
Capability Maturity Models

• The SEI has developed six Capability Maturity Model products. They are:
  • CMMI® (Capability Maturity Model Integration)
  • P-CMM (People Capability Maturity Model)
  • SA-CMM (Software Acquisition Capability Maturity Model)
  • Legacy CMMs
    – Capability Maturity Model for Software (SW-CMM)
    – Systems Engineering Capability Maturity Model (SE-CMM)
    – Integrated Product Development Capability Maturity Model (IPD-CMM)
Capability Maturity Models (Continued)

- Address software development and maintenance
- Provide integrated process improvement reference models
- Build broad community consensus
- Harmonize with related standards
- Enable efficient improvement across disciplines
How Does Configuration Management Fit In?

• The CMMI states that purpose of Configuration Management is to establish and maintain the integrity of work products using:
  – configuration identification
  – configuration control
  – configuration status accounting, and
  – configuration audits

• Configuration Management
  – is an overhead activity, But.....
  – the cost of not doing CM is higher then the cost of doing CM

• CM is discrete discipline, yet......

• It is a critical component of the overall project success
The CMMI® Model

Productivity and Quality

Total Organization Involvement

Quantifiable Predictability

Consistency

Disciplined

Chaos

when the outcome matters…

Managed - Level 2

Initial - Level 1

Defined - Level 3

Quantitatively Managed - Level 4

Optimizing - Level 5

Organizational Innovation and Deployment
Causal Analysis and Resolution

Organizational Process Performance
Quantitative Project 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

requirements Mgt.
Project Planning
Proj. Monitoring & Control
Supplier Agreement Mgt.

Measurement and Analysis
Process & Product Quality Assurance
Configuration Management

when the outcome matters…

Capability Maturity Model – Integration SM Version 1.1
Continuous Representation of CMMI®

Level 5
Level 4
Level 3
Level 2
Level 1

RM | RD | TS | VER | VAL | PPQA | CM

when the outcome matters...

CMMI  CM Focus V1.0
when the outcome matters…

Project Mgt. (CM) Perspective

Scope
Project

Estimate
Project

Obtain
Commitments

Project
Plan(s)

Predict
Outcome

Take Corrective Action

Deliver
Commitments

Attributes
Schedule
Budget Skills
Cost Stakeholder
Effort Involvement
Lifecycle Resources
Supplier Agreement Mgt

Size, Effort, Schedule, Cost

when the outcome matters…

CMMI CM Focus V1.0
Engineering (CM) Perspective

- Requirements Management
- Development
- Technical Solutions
- Integration
- Verification
- Validation
Support (CM) Perspective

Configuration Management
- Establishing Baselines
- Managing Changes to Baselines

Quality Assurance
- Product Quality
- Process Quality
- Corrective / Preventive Actions

Measurement Program
- Measurement Strategy
- Measurement Plan
- Measurement Infrastructure

when the outcome matters…
Process Management (CM) Perspective

- Project Activity
- Historical Database
- Process Asset Library
- Solution Engineering Process Group
- Organizational Training Program

when the outcome matters…

CMMI CM Focus V1.0

perotsystems®
Government Services
Attributes

What needs to be performed or built

• Configuration Items
  – System Components
  – Documentation
  – Hardware

• CM Tasks
  – CM Infrastructure
  – Builds
  – Releases
Resources

- Personnel
  - CM Manager
  - CM Coordinator
  - CM Administrator

- Tools
  - Version Control
  - Ticket Management
  - Code Control
  - Requirements Management

- May involve Supplier Agreement Management (SAM)

• Project Mgt
• Engineering
• Support
• Process Mgt
Configuration Management Plan

- Organization
- Responsibilities
- Activities
  - Configuration Identification
  - Configuration Control
  - Configuration Status Accounting
  - Configuration Auditing
- CM Milestones
- Training
- Subcontractor/Vendor Support

For CM Plan guidance, see [http://www.sei.cmu.edu/legacy/scm/papers/CM_Plans/CMPsMasterToC.html](http://www.sei.cmu.edu/legacy/scm/papers/CM_Plans/CMPsMasterToC.html)
Data Management

- Deliverable and non-deliverable data items (information, documents) in any format or medium need to be identified
- They should be created based on specified requirements for format and content
- The reason for collecting each document should be clear
- Establish requirements and procedures to ensure privacy and security of the data.
- Access to data
- Archive data
- Retrievable (and useable)
- Determine the project data to be identified, collected, and distributed.
Data Management (Continued)

• Typical work products may include:
  – Data management plan
  – Master list of managed data
  – Data content and format description
  – Data requirements lists for acquirers and for suppliers
  – Privacy requirements
  – Security requirements
  – Security procedures
  – Mechanism for data retrieval, reproduction, and distribution
  – Schedule for collection of project data
  – Listing of project data to be collected
Data Management (Continued)

• Important Considerations
  – Virus Protection
  – Windows Critical Updates
  – Disaster Recovery
  – Backup and Restore

• Plan & Monitor !

• Responsibility
  – System Admin
  – Configuration Manager
  – Project Manager
  – CIO
Configuration Management

- Identifying the configuration of work products that compose the baselines at given points in time
- Controlling changes to configuration items
- Building or providing specifications to build work products from the configuration management system
- Maintaining the integrity of baselines
- Providing accurate status and current configuration data to developers, end users, and customers
- The work products placed under configuration management include the products that are delivered to the customer, designated internal work products, acquired products, tools, and other items that are used in creating and describing these work products.
Configuration Management Goals

- Establish Baselines
- Track and Control Changes
- Establish Integrity
- Institutionalize a Managed Process
- Institutionalize a Defined Process

when the outcome matters...
Institutionalization  
*Laying the foundation*

- Establish an Organizational Policy
- Plan the Process
- Provide Resources
- Assign Responsibility
- Train People
- **Manage Configurations**
- Identify and Involve Relevant Stakeholders
- Monitor and Control the Process
- Objectively Evaluate Adherence
- Review Status with Higher Level Management
- Establish a Defined Process
- Collect Improvement Information
Conclusion

Just focus on doing CM right at the
– project
– process and
– organizational level
and you will satisfy the CMMI expectations