Using CMMI to Dig Out from Ad Hoc Practices

10-15-05
Overview

- SW Project Overview
  - Deployed Quickly
  - Not enough testing
  - A lot of unhappy customers

- Result
  - 20 SW Splinters
  - Overwhelmed with maintenance
  - Created more problems
Recovery Plan

- It was clear there was a problem
  - Gain support to use process
- Define Processes and Procedures to Recover
  - SW Helpdesk
- Train the Organization on the new processes
Recovery Plan

- Establish a method to review, prioritize and approve SW issues
  - Helpdesk Review Team
- Make sure each Issue is clearly defined
  - Consistent bug Reporting
- Plan the releases for approved issues
  - Assigned a Project Manager
- Monitor the execution to the Plan
  - Weekly Meetings
Recovery Plan

• Design and Implement the solutions
  – Developed a streamlined process
• Integrate solutions into a SW Release
  – SW Group Leader coordinated integration
• Verify the solution works
  – Test Report Required
• Configuration Management
  – SW Release was controlled with CM SW
Recovery Plan

• Validate the SW Release
  – SQA Group
    • Performed audits and system testing on CM Controlled Release
    • Performed audits of the process
    • Conducted Lessons Learned
    • Collected metrics monthly
Organization Process Focus

- SP1.1-1 Establish Organization Process Needs
  - Better methods to collect SW issues
  - Review the issues received
  - Track and close issues being worked on
  - Better development methods
Organization Process Focus

- SP1.1-2 Appraise Organization’ Processes
  - Strengths
    - Good Skills. Well trained on the development environment/tools
    - Consistently used CM system. All splinters were controlled
  - Weaknesses
    - Bug reporting system was difficult to use
    - Bug reporting system was not being used
Organization Process Focus

• SP1.3-1 Identify the Organization Process Improvements
  – Web based SW Helpdesk
  – The Helpdesk Database was tied to the CM System
  – Rotated SW Engineers through Helpdesk
  – Instituted a Review Team
  – Developed an escalation procedure
  – Project Manager coordinated customers and SW team
Organization Process Focus

- SP2.1-1 Establish Process Action Plans
- SP2.2-1 Implement Process Action Plans
- SP2.3-1 Deploy Organizational Process Assets
  - SW Helpdesk Procedure
  - SW Escalation Procedure
  - SW Planning and Numbering Procedure
  - SW Installation Procedure
Organization Definition

• Establish Standard Processes
  – SW Helpdesk Procedure
    • Defined Helpdesk as a repository not an escalation path
    • Defined the CM system as the repository. All issues and revisions were controlled. Also had a web interface.
    • Defined the role of the Helpdesk. Verify Information is complete, assign CR number.
    • Defined the role of the Expert. Verify that the report was technically complete
    • Defined the role of the Review Team. Set priority and defined the scope of work.
Organization Definition

- Establish Standard Processes
  - SW Helpdesk Procedure
    - Defined the role of the Project Manager. Plan SW Releases based on priorities and customer needs.
    - Defined the role of the SW Group Leader. Assign issues to developers with the right skill set.
    - Defined the methods used to track the issue through the development process.
    - Defined the steps to enter an issue via the web site.
Organization Definition

- Establish Standard Processes
  - SW Escalation Procedure
    - Defined what an escalation is: Safety or Severe
    - Defined a single point contact
    - Defined the methods to report an escalation
  - SW Planning and Numbering Process
    - Defined the numbering scheme. New scheme required to support fast releases while merging splinters
    - X.XXX A1

Alpha Releases used to Beta SW to a specific customer before merging into the trunk
Organization Definition

• Establish Standard Processes
  – SW Installation Procedure
    • Lessons Learned revealed that many of the reported issues were due to installation problems.
      – Incorrect Installation
      – Couldn’t back out the software
    • Defined how to Back up Files
    • Defined How to Install new SW
    • Defined Trouble Shooting methods and work-arounds
    • Defined how to Back out the SW
    • Defined metrics to track successful installations and escalations
Organizational Training

- SG1 Establish Organization Training
- SG2 Provide Necessary Training
  - Training provided to the Rotating Helpdesk members, the Experts, and the Developers
  - Training on the website interface was provided to the users who will be reporting issues to helpdesk
  - Training records were maintained
Project Planning

• SP1.1-1 Establish the Scope of the Project
  – The Project Manager…
    • Used the severity rating assigned by the Review Team to identify which issues would be addressed in each release
    • Communicated the plan to the customers
    • Negotiate scope if necessary
Project Planning

- SP1.2-1 Establish Estimates
  - The Review Team used three categories to size the effort
    - Category 1: Bug Fix
    - Category 2: Small Feature
    - Category 3: Large Feature
  - The Project Manager used 5, 20 and 40 days to estimate the effort
    - Avoids interrupting the SW Developers for estimates
Project Planning

- SP1.3-1 Define Project Life Cycle
  - The Helpdesk Procedure defined the Life Cycle:
    - Open – Initial Setting
    - In Expert Review - Helpdesk
    - In Issue Review - Expert
    - In Planning – Review Team
    - In Development – Project Manager
    - Ready to Merge – SW Developer
    - In SQA – SW Group Leader
    - Complete – SQA Group Leader
Project Planning

• SG2 Develop Project Plan
  – The Project Manager is responsible for compiling plan.
  – Main risk was that the category selected was incorrect. Issues were re-estimated when assigned for correction.
  – All work products were linked to the Helpdesk entry.
  – Resources were reviewed on a monthly basis
  – Skill sets were reviewed monthly.
  – Stakeholders reviewed the plan and Project Manager acquired necessary approvals.
Project Monitor and Control

- SG1 Monitor Project Against Plan
  - Project Manager conducted weekly meetings to monitor progress.
  - Problems identified.
    - Resource limitations: People or Equipment
- SG2 Manage Corrective Action to Closure
  - Resources were addressed
  - Customer was notified in advance when a delay was likely.
Requirements Management

• SG1 Manage Requirements
  – All software issues are entered into helpdesk with a standardized report form.
  – The Review Team verified the information was complete and accurate before committing.
  – All changes were made through Helpdesk and were under CM control.
  – Project Manager tracked that each issue was assigned.
  – SQA tracked that each issue in the plan was included and closed.
Requirements Development

- SG1 Develop Customer Requirements
  - Helpdesk entries were used as the customer requirements

- SG2 Develop Product Requirements
  - SW Requirements were developed for CAT2 and 3 projects

- SG3 Analyze and Validate Requirements
  - Analysis was performed by the expert prior to submission to the Review Team.
  - Review Team was the final validation step.
Technical Solution

• SG1 Select Product Components Solution
  – Primarily applied to Category 3 projects

• SG2 Develop Design
  – Designs were develop for Category 2 and 3

• Implement the Product Design
  – SW code
  – SW Test Results
  – SW Release Notes
Product Integration

• SG1 Prepare for Product Integration
  – The SW Group Leader developed the Integration Plan.
  – The Project Manager track progress.

• SG2 Ensure Interface Compatibility
  – The SW Group Leader was responsible for reviewing SW deliverables and interface compatibility.

• SG3 Assemble Product Components and Deliver Product
  – The SW Group Leader coordinated build machines for the final build and SW delivery.
Verification

• SG1 Prepare for Verification
  – The SW Engineers are required to develop a Test Plan for all three category projects

• SG2 Perform Peer Reviews
  – Peer Reviews are conducted for Category 3
  – SW Group Leaders review work products for Category 1 and 2 projects

• SG3 Verify Selected Work Products
  – Software Engineers are responsible for verifying work products and documenting Test Results
Validation

• The SQA is responsible for validating the SW Release
  – Validate all issues promised are included in the release
  – Auditing Test Results
  – Validating general software performance
  – Burning and validating the SW Installation CD and procedure
  – Writing the ECR to release the SW to Production
Configuration Management

- All work products are maintained under SW Configuration Control.
- All SW changes are tracked using SW Configuration Management
- Configuration Management records are maintained by SQA.
Results

• Escalations
  – SW Metrics identified SW Installation was a major problem
  – Creation and Improving the SW Installation procedure reduced escalations drastically
Results

- SW Helpdesk
  - Metrics showed more issues were being closed than new reports
  - New Reports continued as Operators used features that they didn’t dare try before.

- SW Deliveries
  - Release that were 1 to 2 months late were now delivered on time.
Conclusions

• Using process to recover from ad hoc development:
  – Increased Quality
  – On-time Delivery
  – Improved Customer Satisfication
  – Improved Team Morale
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