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

- SP1.3-1Identify 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 ~~~~~~~~~~~eme. New scheme required ~~~~~~~~~~~s while merging splinters
    - X.XXX A1

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

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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 the which issues would be addressed in each release
    - Communicated the plan to the customers
    - Negotiate scope if necessary

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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 fro 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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