Into the Future Part 1: Process Definition on Steroids

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OUTLINE

- Process Goals
- Proven Approach
- Process Improvement Infrastructure
- Process Execution
- Applying Techniques
- Questions

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Process Goals

- Build a process that is
  - *Adaptable* to changing user needs
  - *Maintainable* to implement changes rapidly
  - *Flexible* to support a solid architectural framework
    - Modularized components
    - Reusable components
Process Goals Continued

- Build a process that is NOT
  - Cumbersome to understand (shelfware, big honkin’ binder)
  - Circumvented when schedule and cost pressures affect a program
  - Difficult to maintain
    - Changes require redesign
    - Fixing one error propagates more errors
    - No programmer wants to be assigned to the team
Process Goals Continued

- Build a process that supports
  - Daily needs of the engineers and managers
  - Various levels of expertise
  - Multiple disciplines with a unified process
  - Ownership by the engineers
Proven Approach – Overview

- Define the Level of Detail
  - Establish an approach that meets user experience levels

- Define the Design Components
  - Cartography, Step Action Table (SATs) and Decision Tables (DTs)
  - Artifacts

- Define the Environment
  - Processes
  - Tools
  - Analysis Methods
Cartography is a graphical representation designed for highly experienced engineers that

- Improves the business objectives
- Teaches others how to apply the organization’s processes
- Designs and implements innovative technical solutions
Step Action Table (SAT) is a textual representation designed for moderately experienced engineers that

- **Applies** the business objectives
- **Executes** the organization’s processes
- Designs and implements *proven* technical solutions
Decision Table (DT) is a tabular representation with tailoring options to include templates and checklists designed for inexperienced engineers that are

- **Understanding** the business objectives
- **Learning** the organization’s processes
- **Assisting** with the design and implementation of technical solutions
Approach – Design Components
Cartography

- Represents high-level overview of process activities to include a link to process-related information such as policy, training, frequently asked questions, Quality Assurance (QA) tips and Best Practices

- Supports point and click process navigation using web pages

- Requires Microsoft Visio to implement to create the graphical symbols
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Approach – Design

Sample Cartography Component

Requirements Management
Approach – Design Components
Step Action Table (SAT)

- Defines step-by-step details of the process activities
- Supports point and click process navigation using web pages
- Requires HTML and Java languages to implement web pages and the automatic numbering for process steps
## Requirements Management Step Action Table

(as of April 2006)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Verify Entry Criteria</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Verify that Project initiation has been completed or system requirements allocated to software have been modified</td>
<td>Project Leader(PL)</td>
</tr>
<tr>
<td>2</td>
<td>Record/review the project purpose and for Standard Software Process (SSP) projects, Scope, Goals, and Objectives in the Project Tracking Form (PTF) Description section, as needed</td>
<td>PL</td>
</tr>
<tr>
<td>3</td>
<td>Acquire the Software Requirements Specification (SRS) Package ? and record initial data and remaining data as tasks below are completed using the Requirements Checklist or an approved group-specific Requirements Checklist, and referencing the Requirements Compliance Checklist</td>
<td>PL</td>
</tr>
</tbody>
</table>
| 4    | Record/review the following data in the PTF Schedule Breakdown section for the Requirements Management and Project Planning phases:  
- Requirements as a critical milestone or not  
- Actual start date  
- Adjusted effort and date estimates (may use calculate button in PDB to acquire adjusted estimate date based on the actual start date)  
- Development Team Members | PL |

**Measurements**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Referencing the SRS Package, record the total number of initial requirements in the Requirement Volatility Metric in the Project Metrics sheet of the Automated Metric Analysis Tool (AMAT)</td>
<td>PL</td>
</tr>
<tr>
<td>31</td>
<td>Verify/record actual hours in SERTS under the Requirements lifecycle activity, tailoring decisions in the PTF and requirements completion date in the Schedule Breakdown section of the PTF</td>
<td>PL</td>
</tr>
</tbody>
</table>

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Approach – Design Components

Decision Table (DT)

- Defines criteria and action for each critical process decision (i.e., *when* y exists *then* perform x) to identify tailoring options that meet the unique needs of each process user.

- Supports point and click process navigation using web pages.

- Requires HTML to implement web pages.

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# Software Requirements Specification Package Decision Table

(as of April 2006)

<table>
<thead>
<tr>
<th>When</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Requirements Specification (SRS) Package exists</td>
<td>Acquire and modify SRS Package, as applicable</td>
</tr>
<tr>
<td>SRS Package does not exist, and Customer or First Level Supervisor (FLS) / Group Leader (GL) does not require a formal requirements document</td>
<td>Acquire one of the following to complete the SRS Package:</td>
</tr>
<tr>
<td></td>
<td>• The <a href="https://example.com">Software Requirements Specification Form (SRSF)</a>, or</td>
</tr>
<tr>
<td></td>
<td>• An approved SRS Database that captures all data items listed in the SRSF</td>
</tr>
<tr>
<td>SRS Package does not exist, and Customer or FLS/GL requires a formal requirements document</td>
<td>Acquire the <a href="https://example.com">Requirements Traceability Matrix (RTM) Template</a> and one of the following to complete the SRS Package:</td>
</tr>
<tr>
<td></td>
<td>• The <a href="https://example.com">Condensed SRS (CSRS) Template</a>, or</td>
</tr>
<tr>
<td></td>
<td>• The <a href="https://example.com">SRS Template</a></td>
</tr>
</tbody>
</table>
Approach – Design Artifacts Definitions/Checklists

- Definitions
  - Clarify terminology based on the organization’s processes

- Checklists
  - Derived from a template
  - Identify detailed questions to enhance the effectiveness of the process
  - Focus on product and process quality

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Approach – Design Artifacts

Forms

- Provides a unified method to collect data consistently
- Identifies minimum data requirements
- Focuses on capturing the right data to measure progress and quality
Approach – Design Artifacts

Plans

- Plans are
  - Derived from a specific template
    (Requirements Specification, Test Plan)
  - Utilized to identify formal information required by the customer
- Focus on product quality

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## Process Overview

<table>
<thead>
<tr>
<th>Process</th>
<th>Policy</th>
<th>Training</th>
<th>FAQ</th>
<th>QA Tips</th>
<th>Best Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>-</td>
<td>-</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>None</td>
</tr>
<tr>
<td>Acceptance Test</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>None</td>
</tr>
<tr>
<td>Integration Test</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>None</td>
</tr>
<tr>
<td>Peer Review</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>None</td>
</tr>
<tr>
<td>Process Development</td>
<td>Policy</td>
<td>Training</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Project Tracking and Oversight</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>None</td>
</tr>
<tr>
<td>Rapid Implementation Process</td>
<td>Policy</td>
<td>Training</td>
<td>None</td>
<td>QA Tips</td>
<td>None</td>
</tr>
<tr>
<td>Requirements Management</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>Best Practices</td>
</tr>
<tr>
<td>System Test</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>QA Tips</td>
<td>Best Practices</td>
</tr>
<tr>
<td>Technology Change Management</td>
<td>Policy</td>
<td>Training</td>
<td>FAQ</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
Requirements Management Process Best Practices

1. OSP v5.0

Artifact Type: Software Requirements Specification Form

Description:
This artifact is a good example of a completed SRSF with clearly defined requirements.

Link: Artifact
Requirements Management Process FAQ

1. OSP v5.0 4/24/2005
As a new project leader in the requirements phase of the project, I wasn't sure if I had to do this step or not. Is it only if you are in the Project Planning phase or later?

The PMF is required during Requirements to capture your initial requirements, your estimated/actual effort, and peer review defects.

2. OSP v5.0+ 9/18/2006
In the Training Requirements section of the PTF, can the PL modify or remove a skill from the team skill set?

Yes you can modify or remove a skill from the team skill set. To delete a skill select the skill you wish to modify, this should highlight that skill, and click the delete button to remove.
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Approach – Environment
Processes

- Web-based Processes
  - HTML Processes
    - Allows for centralized access and easy navigation
  - XML Configuration Files
    - Allows for easy modifications of changing data and implementation of business rules
Approach – Environment

Tools

- Development of In-House Tools

  - Standard Engineering Request Tracking System (SERTS) – tracks change requests as well as estimated and actual hours expended.
  - Process Database Tool (PDB) – centralizes data, captures information to track progress and provides real-time insight into status.
  - Automated Metric Analysis (AMAT) – extracts data from PDB and SERTS to provide a means to track project goals against organizational goals and perform quantitative analysis on performance.
  - Shared Knowledge Provider (SKP) – provides access to process improvement tools and project data via a centralized web page.

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Statistical Analysis Methods

- Statistical Process Control with moving range to allow for analysis to determine if the processes are stable and under control

- Mini tab tool provides numerous charts and graphs to aide in data analysis

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Approach – Environment

People

- Produce Process Champions

  - Believe their individual words and actions ultimately improve the project performance and build a more positive work environment

  - Display a constant willingness to help others understand, utilize and improve the processes by effectively communicating the direct benefits to the project

  - Transform the engineer’s frustrations into positive energy and focus towards building a better organization

  - Seek to continually add value by improving disciplined processes
Process Management Infrastructure - Overview

- Executive Steering Committee (ESC)
- Senior Management (SM)
- Standard Enterprise Process Group (SEPG)
- Project Support Office (PSO)
- Technical Work Group (TWG)
- User Group (UG)
- Target Group (TG)
Executive Steering Committee (ESC)

- Membership includes 3 Senior Executives and 5 Senior Managers

- Identifies process improvement approach and allocates funding and resources

- Provides oversight to the Organization Standard Process (OSP), policies, charters, Process Improvement Plan (PIP), and budget

- Supports ESC Meetings bimonthly to review progress of planned versus actual tasks
Process Management Infrastructure - SM

- Senior Management (SM)
  - Membership includes 5 Senior Managers
  - Guides and directs activities to achieve the strategic goals
  - Supports SM Meetings bimonthly review SEPG status
  - Addresses resource, budget, and training issues
Standard Enterprise Process Group (SEPG)

- Membership includes 7 to 10 Group Leaders and the Organization Quality Assurance (QA) Manager
- Facilitates the definition, execution, and improvement of policies and processes
- Represents each target group's interests, processes change requests and addresses action plans
Standard Enterprise Process Group (SEPG)

- Oversees Technical Work Group, Project Support Office, User Group and Training activities
- Performs Causal Analysis and Resolution, Organizational Process Performance, Quantitative Project Management, and Organization Innovation and Deployment activities
- Provides training courses to engineers and all levels of management
- Reports status to ESC and SM
Project Support Office (PSO)

- Composed of 6 permanent and 1 rotating position
- Performs QA activities, training management, and process maintenance
- Maintains and creates applications supporting process improvement
- Provides support to the SEPG
Technical Work Groups (TWG)

- Composed of engineers representing each target group
- Develops processes and accompanying artifacts as defined by a charter

User Group (UG)

- Composed of representatives from all groups
- Resolves process issues at the engineering level

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Target Group (TG)

- Adheres to Organization Standard Process
- Addresses Compliance Issues
- Submits Change Requests
- Reports Project Status
- Attends User Group Meetings
- Supports Technical Work Groups
Process Execution – Overview

Process Development Process

- Cartography
- Step Action Table
- Artifacts
- Supporting Processes
- Evaluating Processes
Process Execution – Cartography

Process Development

Process Overview

New Process required

Analyze Process Requirements

Requirements List
[initial]

Schedule
[initial]

Develop/Update Process Components

Process Artifacts
[initial]

Verify Work Products

Process Artifacts
[reviewed]

Lesson Learned Form
[draft]

Pilot Process

Execute Training

Training Database
[updated]

Feedback
[draft]

Measurements

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Cartography symbols

- **Entry Criteria** defines conditions that must be met to initiate the process.
- **Activity Box** defines action that results in the creation/modification of an artifact to the next higher state.
- **Artifact** is the direct result of an activity taking place and displays an associated state as the artifact progresses within the development cycle.
- **Process measurements** are collection points for process data.
- **Dashed lines** indicate the component is optional. Activity boxes, artifact boxes and measurement components can be optional.
Process Execution – Cartography Guidelines

- Use predefined cartography symbols
- Include entry criteria, activity box, artifact box and measurement at a minimum
- Include no more than 7 activity boxes per process
- Start Activity Boxes with a verb in the description
- Display optional components with dashed lines
- Link to process-related information (policy, training, best practices, frequently asked questions and QA tips)
- Must have a last updated date
Process Execution – Step Action Table

- Process Development Process Steps
  - Verify Entry Criteria
  - Analyze Process Requirements
  - Develop/Update Process Components
  - Verify Work Products
  - Pilot Process
  - Execute Training
  - Measurements

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Verify Entry Criteria

- Project Leader (PL) verifies a Standard Engineering Request Form (SERF) is received stating a new process must be developed

Analyze Process Requirements

- PL reviews existing process artifacts based upon current requirements
- PL reviews the Lessons Learned Forms (LLFs) to gain insight on process and management lessons learned for process development
- PL identifies resources required (i.e., tools, person hours, hardware, etc.) and provides estimated hours for updating/developing the process to the applicable Configuration Control Board (CCB) and the First Level Supervisor (FLS)/Group Leader (GL)
Develop/Update Process Components

- PL develops/updates the following process artifacts according to the Process Development section of the Standards and Style Guide:
  - Cartography
  - Step Action Table (SATs)
  - Forms
  - Checklists, as required
  - Decision Tables (DTs), as required
  - Templates, as required

- PL updates the Standard Definitions, as required
Verify Work Products

- PL verifies the process artifacts are complete and correct
- PL provides the process artifacts to the CCB and FLS/GL for review
- PL updates the process artifacts based on the CCB and FLS/GL feedback
- PL submits the process artifacts to CCB for piloting
Pilot Process

- Configuration Control Board (CCB) selects project/group to pilot the process artifacts
- CCB defines the piloting period start date and completion date
- CCB trains the Project Leaders (PLs) and Development Team Members (DTMs) on the process being piloted
- CCB solicits feedback from piloting project/group after the piloting period has ended and provides to the PL
Pilot Process

- PL updates the process artifacts based on the piloting feedback and generates lessons learned

- PL submits the final process artifacts and the lessons learned to CCB for baseline approval

- CCB submits finalized process artifacts and lessons learned to the SEPG and the QA Managers, if the process needs to be incorporated into the OSP
Process Execution –
Step Action Table Continued

- Execute Training
  - CCB executes the Training Process with affected individuals

- Measurements
  - PL, CCB verifies/records actual hours in Standard Engineering Request Tracking System (SERTS) under the Implementation lifecycle activity to develop, review, update and train the process

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Process Execution – Artifacts

- Requirements List
- Schedule
- Process Artifacts
- Feedback
- Lessons Learned Form
- Updated Training Database

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Process Execution – Supporting Processes

Training Process

- Executed by the Organization Training Manager to
  - Identify training needs
  - Schedule classes
  - Track attendance
  - Acquire feedback on training effectiveness
Process Execution – Evaluating Processes

- Capture the estimated and actual effort expended to define, implement, review and test the new process.

- Capture the estimated and actual start and completion dates for the new process.

- Capture the resources (number of people, tools, training, etc.) utilized on the new process.

- Capture number of post release defects associated with the new process.

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Capture the number of compliance issues encountered while executing the Process Development Process.
Applying Techniques
Demonstrate Shared Knowledge Provider (SKP) Functionality

- Show links to applications
- Show structure of the menu bar
- Show process assets
- Show point and click navigation of the processes
Applying Techniques

- Execute Process Definition Exercise
  - Apply process and techniques learned to create a process as a group
  - Expand process to address the enterprise level
Acronyms

- AMAT – Automated Metric Analysis Tool
- CCB – Configuration Control Board
- CG – Communications Group
- CM – Configuration Management
- DT – Decision Table
- DTM – Development Team Member
- ESC – Executive Steering Committee
- FLS – First Level Supervisor
- GL – Group Leader
- LLF – Lessons Learned Form
- OSP – Organization Standard Process
- PDB – Process Database
Acronyms

- PIP – Process Improvement Plan
- PL – Project Leader
- PSO – Project Support Office
- QA – Quality Assurance
- SAT – Step Action Table
- SEPG – Standard Enterprise Process Group
- SERTS – Standard Engineering Request Tracking System
- SKP – Shared Knowledge Provider
- SM – Senior Management
- TG – Target Group
- TWG – Technical Work Group
- UG – User Group

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References