Accelerating CMMI Implementation with PSP and TSP in a Small Organization

Karina Cedillo
QuarkSoft, S.C.

SEPG 2005
March 8, 2005
Agenda

Introduction
CMM Implementation Status
Approach to CMMI
Lessons Learned

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Introduction

The Company

- Small start up company
- Core business: Outsourcing software development
- Committed to quality software development
- Created with PSP/TSP principles

Focus on creating an organizational culture based on quality
- Management sponsorship and commitment since the creation of the company
- Strong interest on improvement not just for a CMM/CMMI rating
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## CMM Implementation Status

### PSP/TSP and SW-CMM

<table>
<thead>
<tr>
<th>Level</th>
<th>Focus</th>
<th>Key Process Areas (KPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Optimizing</td>
<td>Continuous process improvement</td>
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<td>Defect prevention</td>
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<td>Managed</td>
<td>Product and process quality</td>
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<td>Quantitative process management</td>
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<td>Software quality management</td>
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<td>Training program</td>
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<td>Integrated software management</td>
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<td>Intergroup coordination</td>
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<td>Peer reviews</td>
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<td>Project management</td>
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<td>Requirements management</td>
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<td>Software configuration management</td>
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<td>Software subcontract management</td>
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</tbody>
</table>

√ indicates CMM key process areas that are fully or partially addressed at the personal level in the PSP

1 Adapted from Carnegie Mellon Software Engineering Institute (SEI)
Motivation

- Maintain a strong competitive position based on the ability to follow a mature process and produce quality products
- Consolidate PSP/TSP implementation

Based on results from report: CMU/SEI-2002-TR-008
- Consolidate as a level 5 organization

2 Relating the Team Software Process (TSP) to the Capability Maturity Model for Software® (SW-CMM®), Davis, Noopur and McHale, Jim, CMU/SEI-2002-TR-008, ESC-TR-2002-008, June 2002
CMM Implementation Status

How we did it?

• Initially SW-CMM was the model chosen for SPI
• SEI’s IDEAL™ model used for planning and implementing SPI program
• PSP and TSP used for CMM implementation

• SEPG team: Two full-time persons
• TWG participation

CMM Implementation Status

How we did it?

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## SPI Timeline

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<tr>
<th>Year</th>
<th>PSP-TSP</th>
<th>CMM</th>
<th>SEI TR-008</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>05/01 First PSP trained group</td>
<td>04/02 SEPG officially started</td>
<td>06/02 SEI-TR-008 Release</td>
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<td>2002</td>
<td>06/01 TSP Project Launch</td>
<td>05/02 Initial self-assessment</td>
<td>06/02 SEI-TR-008 Release</td>
</tr>
<tr>
<td>2003</td>
<td>08/02 Executing action plan for CMM L2 gaps and TSP improvements</td>
<td>02/03 Final adjustments to CMM L2 Processes</td>
<td>11/03 Final adjustments to CMM L3</td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td>02/03 Executing action plan for CMM L3 gaps</td>
<td>03/04 CMM Level 3 Self-assessment</td>
</tr>
</tbody>
</table>
CMM Implementation Status

SPI Implementation - Initiating

- IDEAL - Initiating
  - Inherent management sponsorship, support and commitment
  - TSP widely used
  - SEPG formed
  - TSP selected for planning and monitoring the SPI project
  - SPI high-level plan
CMM Implementation Status

SPI Implementation – Diagnosing

- IDEAL - Diagnosing
  - Self-assessment completed
  - CMU/SEI-2002-TR-008 results considered
  - SPI plan refined
  - QuarkSoft’s diagnostic recommendations and results
CMM Implementation Status

SPI Implementation – Establishing

• IDEAL – Establishing
  – Baseline findings and recommendations integrated into SPI plan
  – Implementation Strategy approved
  – Set priorities
  – SPI launch (TSP tailoring)
  – New SEPG members
    • SQA person (part-time)
    • Technical Working Groups (TWG) participation
SPI Implementation - Acting

- IDEAL – Acting
  - Executing detailed plan obtained from SPI launch
    - Build up existing PSP/TSP processes
  - TWG’s work coordinated by SEPG
  - Support from other organizational departments:
    - Human Resources person (HR)
    - Finance and accounting
  - Piloting of potential solutions on available SW projects
  - TSP help us identify a set of SPI standard tasks
• IDEAL – Learning
  – Postmortems (TSP) were made on each SPI cycle
  – SPI estimation adjustment based on previous cycle results
  – Adjustments on TWG’s plans and SPI task definitions
  – Requirements from different clients and small projects modified improvement plan
CMM Implementation Status

Implementation Issues

- TWGs
  - Participation facilitates process improvement adoption and acceptance
  - Different levels of experience
  - Management and coordination effort
- Planning of new process piloting is critical
- Tailoring of organizational practices for a small company is required
CMU/SEI-2002-TR-008 was an invaluable tool to define SPI strategy and action plan.

Most CMM implementation was at organizational level.

Adjustments and improvements on TSP implementation were required.
CMM Implementation Status

Results and TSP coverage - 2

• SW-CMM Level 2
  – On practice, TSP provided strong coverage of the practices required for SPP and SPTO KPAs
  – SPP KPA:
    • Due to business needs and project characteristics we allocate more effort to improve SPP practices
  – SQA KPA:
    • QS reinforced SQA practices with an organizational SQA but most of the SQA project activities are performed by TSP Quality Manager role
  – SCM KPA:
    • CCB was already implemented by TSP
    • TSP Support Manager role help to perform most SCM project practices
  – RM KPA:
    • Due to business needs and project characteristics we allocate more effort to improve RM practices
    • Customer Interface role helped with RM responsibilities

• SW-CMM Level 3
  – TSP facilitates the creation of the organization’s software process database
  – Due to the organizational focus of L3 more work was required to achieve this level
  – PR KPA was strongly supported by TSP practices
  – TP KPA required considerable effort
  – IC KPA required practices from TSPm (multi-team)
**CMM Implementation Status**

**Results and TSP Coverage - 1**

**SPI Effort for CMM-L2**

- **SPTO**: 10%
- **RM**: 22%
- **SQA**: 28%
- **SPP**: 18%
- **SCM**: 22%

* No need to develop **SSM**

* Based on TSP implementation and Organization Business needs

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**Project Key Practices Profile at Level 2**

* From **CMU/SEI-2002-TR-008 report**
CMM Implementation Status

Results and TSP Coverage - 2

SPI Effort for CMM-L3

* Based on TSP implementation and Organization Business needs

Project Key Practices Profile at Level 3 *

* From CMU/SEI-2002-TR-008 report
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**SW-CMM vs. CMMI**

<table>
<thead>
<tr>
<th>LEVEL 5</th>
<th>Defect Prevention</th>
<th>Technology Change Mgmt</th>
<th>Process Change Management</th>
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<tr>
<td><strong>OPTIMIZING</strong></td>
<td>Causal Analysis and Resolution</td>
<td>Organizational Innovation &amp; Deployment</td>
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<thead>
<tr>
<th>LEVEL 4</th>
<th>Quantitative Process Mgmt</th>
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<td><strong>MANAGED</strong></td>
<td>Organizational Process Performance</td>
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<tr>
<th>LEVEL 3</th>
<th>Organization Process Focus</th>
<th>Organization Process Definition</th>
<th>Training Program</th>
<th>Integrated Software Mgmt</th>
<th>Software Product Engr</th>
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<tr>
<td><strong>DEFINED</strong></td>
<td>Organization Process Focus</td>
<td>Organization Process Definition</td>
<td>Organizational Training</td>
<td>Integrated Project Management</td>
<td>Risk Management</td>
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<td>Decision Analysis and Resolution</td>
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<th>Software Project Tracking &amp; Oversight</th>
<th>Software Subcontract Mgmt</th>
<th>Software Quality Assurance</th>
<th>Software Configuration Mgmt</th>
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<td>Measurement and Analysis</td>
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Adapted from Carnegie Mellon Software Engineering Institute (SEI) M. Phillips

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SEPG-2005
Approach to CMMI

SPI Direction Change

- SPI project had completed CMM L2 and L3 processes improvements
- Some L3 improvements still required to be piloted
- Strategic Business needs
- SW-CMM sunset (2005)
- Limited resources for appraisals/assessments
Strategy from CMM to CMMI

- QuarkSoft (QS) used SW-CMM L3 processes
- QS had an improved and a stronger TSP implementation
- Therefore, thinking on CMMI-L3 (staged representation) was natural
- But, CMMI training was required and as well as a detailed gap analysis between CMM-CMMI and TSP-CMMI
- SCAMPI B before a SCAMPI A
Approach to CMMI

TSP and CMMI Findings

Estimated SPI Effort for CMMI – L2 & L3

- CMMI-L2
  - 33%
  - 18%
  - 17%
  - 11%
  - 7%
  - 1%

- CMMI-L3
  - 25%
  - 18%
  - 13%
  - 12%
  - 11%

* No need to develop SAM

* No need to develop IPPD

* Based on TSP implementation and Organization Business needs
## Approach to CMMI

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<td>2003</td>
<td>02/03 Analyses and Evaluation to move from CMM to CMMI</td>
<td>05/04 Decision to move from CMM to CMMI, 07/04 CMMI strategy, 10/04 - 11/04 SCAMPI B &amp; C released</td>
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<tr>
<td>2004</td>
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What did PSP/TSP provide?

- PSP and TSP help to build organizational quality culture
- TSP was the base of the organizational standard software process (QSSDP)
- Most processes at level 2
- Framework to guide and control SPI project
- TSP project roles fit very well with CMM/CMMI roles
Lessons Learned - 1

- TSP is an important foundation to build OSSP
- PSP for engineers training was fundamental for CMM/CMMI implementation
- PSP/TSP training refreshments are required to maintain improvements
- TSP reduces change resistance
- TSP is useful to run any type of project, including an SPI project
- A better TSP tool is needed
- Pilot planning is essential to maintain the SPI initiative on time
Lessons Learned - 2

- CMM and CMMI can be applied on small organizations but roles need to be tailored
- TSP has a good coverage of CMM/CMMI at project level
- Moving from CMM to CMMI seemed easy but has required considerable effort
- This experience shows that TSP actually accelerates CMM/CMMI implementation in a small setting