Team Software Process and Personal Software Process

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Calidad = T P³

Fuente: Ing. Rafael Salazar
Improving Software Practice

CMMI – Model of organizational capability

TSP – Instance of high-maturity practice for teams

PSP – Instance of high-maturity practice for individuals
Software Process Quality

Software is the only modern technology that ignores quality until test.

Most software defects are found in or after test when defect removal is the most expensive and least effective.

This strategy results in buggy products and unnecessary rework, inflating development costs.

Software defects are also a principal cause of software security vulnerabilities.
Successful projects delivered on time, on budget, with required features and functions. Challenged projects estimated a 43% average cost overrun, time overruns of 83%, and delivered only 52% of required features and functions (in 2002). Failed projects were cancelled prior to completion or delivered and never used.

(This chart represents over 50,000 IT projects in large, medium, and small cross-industry world-wide companies tested by The Standish Group since 1994.)
The Team Software Process (TSP) is a software development process for engineering teams.

TSP is a process-based solution to common software engineering and management issues.
- cost and schedule predictability
- productivity and product quality
- process improvement

Unlike other methods, TSP
- combines discipline and agility
- improves team and individual performance
- provides immediate, measurable business benefits
Building High-Performance Teams

TSP builds high-performance teams from the bottom-up.

- **Team Software Process**
  - Personal Software Process
  - Team Building
    - Goal setting
    - Role assignment
    - Tailored team process
    - Detailed balanced plans
  - Team Management
    - Team communication
    - Team coordination
    - Project tracking
    - Risk analysis
  - Team Member Skills
    - Process discipline
    - Performance measures
    - Estimating & planning skills
    - Quality management skills
Personal Software Process
Personal Software Process

The PSP is a process designed for individual use that applies to structured personal tasks.

With PSP, developers use defined and measured personal processes.

They gather size, time, and defect data as they work.

They use the data to
• plan and track their work
• manage the quality of the products they produce
• measurably improve performance
PSP Changes Software Practice

Software work is planned.

Plans are based on processes and estimates.

Estimates are based on historical process data.

Software work is measured and tracked.

Status is based on the data.

Software quality is also planned, estimated, tracked, and managed.
What is a Process?

A process is a defined set of steps for doing a job.

A process guides your work.

A process is usually defined for a job that is done multiple times.

A process provides a foundation for planning.
• A process is a template, a generic set of steps.
• A plan is a set of steps for a specific job, plus other things such as effort, costs, and dates.
What is a Personal Process?

When you use a process for your personal work, it is called a personal process.

It is usually developed from your personal experience.

• You may start with a proven process that was developed by someone else.
• You modify and improve the process to suit your needs.
Elements of a process

In documenting a process, it is common to specify the
• required inputs to the process
• steps of the process
• exit criteria for the process

The steps are described only with enough detail to guide
the user of the process; they are not a set of training
instructions.

The next slide shows an example of a process for
balancing a checkbook.
## Example Personal Process

| Inputs required                                                                 | • Checkbook register balance is current and is reconciled with previous account statement  |
|                                                                               | • New statement                                                                 |
|                                                                               | • Notepad and calculator                                                        |
| **Verify checks phase**                                                       | For each check on new statement, verify with checkbook register and mark as cleared |
| **Update register phase**                                                     | • Record ATM and EFT transactions in checkbook register, mark as cleared, and update register balance |
|                                                                               | • Add interest to register balance                                               |
|                                                                               | • Subtract service charges from register balance                                 |
| **Reconcile register phase**                                                  | • On notepad, subtract all checks not marked as cleared from the new statement balance and compare to new register balance |
|                                                                               | • If the two balances don’t agree, find error in register and correct            |
| **Exit criteria**                                                             | Checkbook register reconciled with new account statement                         |
Why Define and Use a Personal Process?

Benefits of a personal process include
- consistency
- efficiency
- basis for improvement

The next slides will discuss these points.
Consistency

Using a defined personal process helps you to achieve consistent results.

- Your results are more likely to be similar each time that you use the process.
- Your work becomes more predictable.
Efficiency

Using a defined personal process helps you to be more efficient.

• It structures and guides your work.
  - orders the steps
  - avoids rework
• It keeps you focused on what needs to be done.
  - fewer restarts
  - manage interrupts

You can accomplish your work in less time.
Basis for Improvement

By gathering data on your work, you can determine which steps
• take the most time
• cause you the most trouble
• are least effective

With this information, you can identify opportunities for improving your results by making changes to your process.
The Need for Personal Discipline

Building successful high-performance teams requires more than technical ability; team members must be committed to the concept of personal discipline.

Personal discipline means that all team members understand their own abilities and can make realistic commitments to each other and to management.

Team members develop personal discipline by learning the principles of the Personal Software Process (PSP).
The PSP Process Elements

**Scripts**

Document the process entry criteria, phases/steps, and exit criteria. The purpose is to guide you as you use the process.

**Measures**

Measure the process and the product. They provide insight into how the process is working and the status of the work.

**Forms**

Provide a convenient and consistent framework for gathering and retaining data.

**Standards**

Provide consistent definitions that guide the work and gathering of data.
Putting the Elements Together

Inputs

Process scripts and standards

Checkbook process
- Planning
- Enter data
- Clear transactions
- Update register
- Update bank statement
- Compare balances
- Postmortem

Balanced checkbook

Time and defect logs

Project plan summary

Project and process data summary report
PSP Base Measures

Size

Effort

Quality

Schedule

Source: CMU/SEI-92-TR-019
TSP/PSP Results
PSP Improves Performance

Estimation accuracy
• fewer underestimates
• more accurate estimates
• estimates balanced around zero

Quality
• yield improves by 2X to 3X
• fewer defects in unit test, integration test, system test
• COQ is flat or reduced
TSP Improves Predictability

Effort and schedule deviation are dramatically improved.

**Schedule Performance**

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<tbody>
<tr>
<td>Typical Industry</td>
<td>100%+</td>
</tr>
<tr>
<td>Study baseline</td>
<td>27% to 112%</td>
</tr>
<tr>
<td>TSP</td>
<td>&lt; 10%</td>
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**Effort/Cost Performance**

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<table>
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<tr>
<td>Typical Industry</td>
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</tr>
<tr>
<td>TSP</td>
<td>&lt; 5%</td>
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</tbody>
</table>

Source: CMU/SEI-2000-TR-015
TSP Improves Quality

An analysis of 20 projects in 13 organizations showed TSP teams averaged 0.06 defects per thousand lines of new or modified code.

Approximately 1/3 of these projects were defect-free.

Source: CMU/SEI-2003-TR-014
TSP Accelerates CMMI Improvement

The chart illustrates the percentage of SPs at different CMMI maturity levels. The x-axis represents the CMMI Maturity Level, ranging from Level 2 to Level 5. The y-axis shows the percentage of SPs, ranging from 0% to 100%. The legend explains the color coding:
- Unrated
- Not Addressed
- Partially Addressed
- Supported
- Directly Addressed
Team Software Process

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Successful teams are both satisfying and rare.

Although many teams come close to meeting their product and business goals, they often do so at the expense of the team members.

We describe a team that works together smoothly and efficiently as being a “jelled team.”

“A jelled team is…greater than the sum of its parts… and the enjoyment people derive from the work is greater than you would expect.”

- Peopleware, DeMarco and Lister
Building Jelled Teams

Artificially-jelled teams can be built quickly through “team-building” exercises.

- retreats, seminars, workshops
- games (paintball, laser tag, etc.)
- contrived challenges (e.g., blind obstacle courses)

Team-building activities are unlikely to produce long-term team success unless they address real workplace issues.

- common understanding of roles, goals, products
- management support of team needs

The TSP is a proven-effective way of building jelled teams quickly.
Accelerating Team-building

The TSP was developed to address the need for
- software engineering teams who can build quality products within cost and schedule constraints
- building teams quickly and reliably
- optimizing team performance throughout a project
- accelerating software process improvement
- making use of mature processes normal and expected

If you are familiar with the SEI Capability Maturity Model or the Capability Maturity Model Integration, think of TSP as a CMM/CMMI maturity level 5 process for teams.
TSP Teams are Self-directed

Traditional team
The leader plans, directs, and tracks the team’s work.

Self-directed team
The team members participate in planning, managing, and tracking their own work.
The TSP Process Elements

- **Launch**
  - Requirements
  - Inspection
  - Postmortem

- **Relaunch**
  - High-Level Design
  - Inspection
  - Postmortem

- **Relaunch**
  - Detail Design (PSP)
  - Review (PSP)
  - Inspection
  - Code (PSP)
  - Review (PSP)
  - Compile (PSP)

- **Relaunch**
  - Unit Test (PSP)
  - Inspection
  - Postmortem

- **Relaunch**
  - Integration Test
  - System Test
  - Postmortem

**Requirements**

**High-Level Design**

**Implementation**

**Integration & System Test**
Summary

TSP gives teams a significantly greater measure of project ownership.

It makes them responsible for the outcome, but provides the tools to be successful.

The results demonstrate that this works.
- high-maturity performance
- predictable and improved cost and schedule
- near defect-free quality
- satisfied developers, managers, and customers
For More Information

Visit the Software Engineering Institute web site at www.sei.cmu.edu

Visit the TSP web site at www.sei.cmu.edu/tsp

Contact SEI Customer Relations at 412-268-5800