Overview of the Team Software Process℠ & Personal Software Process℠

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Capability Maturity Model℠, CMM℠, PSP℠, Personal Software Process℠, TSP℠, and Team Software Process℠ are service marks of Carnegie Mellon University.
What is Software Process

- Detailed scripts
- Forms and templates
- Checklists
- Data and information
  - Measures
  - Metrics
- Supporting tools
  - Only after the process is understood
TSP/PSP Measures

There are four fundamental measures used...

* Planned  **Actual  ***To Date  ****To Date %

Time  Size  Defects  Task Completion Date
TSP/PSP Metrics

- COQ
- Earned Value
- Failure Time
- % Reused
- Cumulative Earned Value
- Planned Value
- Cumulative Planned Value
- Defect Removal Efficiency
- Yield
- Total Defects/KLOC
- Test Defects/KLOC
- % Failure COQ
- Adjusted Earned Value
- DRL
- UPI & LPI
- Defects/Hour (injected and removed)
- % Appraisal COQ
- AFR
- CPI
- Appraisal Time
CMM, TSP & PSP Relationship

CMM - Builds organizational capability

TSP - Builds quality products on cost and schedule

PSP - Builds individual skill and discipline
PSP Process Levels

- **PSP0**
  - Current process
  - Basic measures

- **PSP1**
  - Size estimating
  - Test report

- **PSP2**
  - Code reviews
  - Design reviews
  - PSP2.1
    - Design templates

- **PSP3**
  - Cyclic development

- **PSP0.1**
  - Coding standard
  - Process improvement proposal
  - Size measurement

- **The Team Software Process (TSP)**

- **Planning**

- **Quality**

NAVAIR July 2004 PSM Presentation – Slide 6
Process Flow

Requirements

Development Process
- Planning
- Development
  - Design
  - Design review
  - Code
  - Code review
  - Compile
  - Test
- Postmortem

Finished product

Process scripts

guide

Time and defect logs

Project plan summary

Project and process data summary report
The Planning Framework

**PROBE Method**

- **Define requirements**
- **Produce conceptual design**
- **Estimate size**
- **Estimate resources**
- **Produce schedule**
- **Develop product**
- **Size, resource, schedule data**
- **Process analysis**
- **Track reports**

**Customer**

- **Customer need**
- **Product delivery**

**Items**

- **Tasks**

- **Size database**
- **Productivity database**
- **Resources available**
- **Process analysis**
- **Management**
TSP Builds Effective Project Teams

- **PSP**: Skill-building
  - Personal measures
  - Process discipline
  - Estimating & planning
  - Quality management

- **TSP**: Team-building
  - Project goals
  - Team roles
  - Team process
  - Project plan
  - Balanced plan

- **TSP**: Team-working
  - Risk analysis
  - Team communication
  - Team coordination
  - Status tracking
  - Project reporting

**Team Members**

**Team Disciplines**

**Team Management**

**Integrated Product Teams**
The TSP Launch Process

Launch Meetings 1 & 2
- Management: Defines project goals
  Answers team questions
- Team: Establishes team roles
  Defines team goals

Launch Meetings 3 & 4
- Team: Defines the project strategy and process
  Produces process and support plans
  Makes an overall development plan
- Team: Produces quality plan
  Allocates next phase work to individuals
  Engineers produce detailed personal plans
  Consolidates individual plans into a team plan

Launch Meetings 5 & 6
- Team: Conducts a project risk assessment
  Assigns risks to engineers to track

Launch Meeting 7
- Team: Reviews launch work completed
  Prepares management presentation
  Conducts a launch postmortem

Launch Meetings 8
- Team: Presents the plan to management
  Defends the plan to management

Launch Meeting 9
- Management: Reacts to the team's plan
  Resolves plan issues with the team
The TSP Launch Products

Business needs
Management goals
Product requirements

What?
- Team goals
- Conceptual design
- Planned products
- Size estimates

How?
- Team strategy
- Team defined process

When?
- Task plan
- Schedule Plan
- Earned-value Plan

Who?
- Team roles
- Task plans
- Earned-value Plan

How well?
- Quality plan

What if?
- Risk evaluation
- Alternate plans
The Team-working Framework

The TSP team-working framework helps the project move forward.

Each engineer collects data on product size, development resources, defects, and schedule.

These data are summarized and tracked.
- each team member tracks his/her own work
- the team tracks progress at the weekly meeting
- management tracks progress at a monthly management review
Personal Tracking

Each team member gathers data on size, time, defects and schedule.

These data are used for tracking at the personal level.
- plan vs. actual hours
- plan vs. actual earned value
- predicted earned value
- plan vs. actual product size
- plan vs. actual product and process quality
Team Tracking

Summary data from team members is rolled-up to produce team status.

The team reviews status at the weekly team meeting.

• plan vs. actual hours
• plan vs. actual earned value
• predicted earned value
• plan vs. actual product size
• plan vs. actual product and process quality
• risks and issues
The Weekly Team Meeting

The weekly team meeting is a principal means of communicating and tracking team status.

The meeting objective is to ensure that all team members

• understand current project status
• know what tasks are next
• are aware of everyone’s status and progress
• understand the key issues and risks
• participate in key team decisions

All team members attend.

The team meeting follows a defined weekly meeting process.

• prepare and distribute the meeting planning form in advance
• assign meeting roles
• prepare a meeting report
• distribute the report to all attendees

Concentrates on the data and key issues.

Most important, the meeting is brief.
The Management Meeting

This meeting is needed to
- update management on project status and progress
- describe outstanding risks or exposures
- ask for management help where needed
- build and maintain management confidence that the team is managing itself

The meeting should be held regularly.

The team leader conducts the meeting.

The principal topics to cover are composite team data on
- schedule and earned value status
- schedule projections
- hours spend versus planned
- status against quality goals
- key issues and risks

Concentrate on the data and key issues.
TSP Executive Seminar

A one day TSP seminar for program executives and project middle managers

Describes the TSP from a business perspective

Builds support for introducing TSP

Topics
TSP Executive Seminar
- The software business
- The Personal Software Process
- Building Self-directed Teams
- Managing with Facts and Data
- Building Quality Products
- Putting the TSP into Place
Managing TSP Teams

Two day course for project managers

PSP from a project perspective

Builds knowledge and skills for managing engineers that are PSP trained and using the TSP

Topics

Managing TSP Teams

- Leading and Coaching TSP Teams
- PSP Planning: PROBE Part I
- PSP Planning: PROBE Part II
- PSP Planning: Quality
- PSP Planning: Schedule
- Maintaining the Team
- Tracking and Maintaining the TSP Plan
- TSP Quality Strategy
Introduction to Personal Process

Two day course for software support staff and other engineers

PSP principles from a software project perspective

Builds knowledge and skills for working with engineers that are PSP trained

Topics
Introduction to Personal Process
- PSP and the software business
- Introduction to the PSP
- Measurement in the PSP
- Estimating and planning methods in the PSP
- Defect management methods in the PSP
- Project cost, schedule, and quality management with the PSP
- Managing and coaching PSP-trained engineers
PSP for Engineers Part I & II

Builds the discipline and skills to use and adopt PSP

Various delivery formats available
- Three one-week sessions
- Four three/four-day sessions

Topics

Part I: Planning
- Introduction to personal process
- Size measurement
- Size estimating
- Proxy-based estimating
- Resource estimating
- Process measurement

Part II: Quality
- Defect management
- The design process
- Design verification
- Scaling up the PSP
- Process development
- Using the PSP
## Summary Results of Using TSP

<table>
<thead>
<tr>
<th>Category</th>
<th>Without TSP</th>
<th>With TSP</th>
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<tbody>
<tr>
<td><strong>Effort deviation</strong> (% average, range)</td>
<td>17%</td>
<td>-4%</td>
</tr>
<tr>
<td></td>
<td>-60% to +100%</td>
<td>-25% to +25%</td>
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<tr>
<td><strong>Schedule deviation</strong> (% average, range)</td>
<td>41%</td>
<td>5%</td>
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<tr>
<td></td>
<td>-50% to +150%</td>
<td>-8% to 20%</td>
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<tr>
<td><strong>System test defect density</strong> (defect/KLOC)</td>
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<td>0 to 0.9</td>
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<tr>
<td><strong>Acceptance test and release defect density</strong> (defects/KLOC)</td>
<td>0.55 to 0.75</td>
<td>0 to 0.35</td>
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<tr>
<td><strong>Duration of system test</strong> (days/KLOC)</td>
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<td>0.1 to 1.1</td>
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## NAVAIR TSP Status

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<th>Organization</th>
<th>Completed</th>
<th>Using</th>
<th>Preparing</th>
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<td><strong>Totals</strong></td>
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<td><strong>14</strong></td>
<td><strong>9+</strong></td>
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Message to Remember

Effective measures and metrics require established goals and engineering processes
  • TSP starts with four measures and 20+ metrics
  • These can/should be evolved

The CMM builds management capability

The PSP develops software engineering skills and disciplines

The TSP shows PSP-trained teams how to use quality processes to build superior systems.

Metrics collection and feedback is essential to process improvement