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# Overview of the Team Software Process<sup>SM</sup> & Personal Software Process<sup>SM</sup>

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Capability Maturity Model<sup>SM</sup>, CMM<sup>SM</sup>, PSP<sup>SM</sup>, Personal Software Process<sup>SM</sup>, TSP<sup>SM</sup>, and Team Software Process<sup>SM</sup> are service marks of Carnegie Mellon University.

# What is Software Process

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Detailed scripts

Forms and templates

Checklists

Data and information

- Measures
- Metrics

Supporting tools

- Only after the process is understood

# TSP/PSP Measures

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There are four fundamental measures used...

**Time**

**Size**

**Defects**

**Task  
Completion  
Date**

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

# TSP/PSP Metrics

**COQ**

**Productivity (Loc/Hr)**

**Earned Value**

**% Reused Planned Value**

**Failure Time**

**Cumulative Earned Value**

**Cumulative Planned Value**

**Yield**

**Total Defects/KLOC**

**Defect Removal Efficiency**

**Test Defects/KLOC**

**% Failure COQ**

**Adjusted Earned Value**

**UPI & LPI**

**DRL**

**Defects/Hour (Injected and removed)**

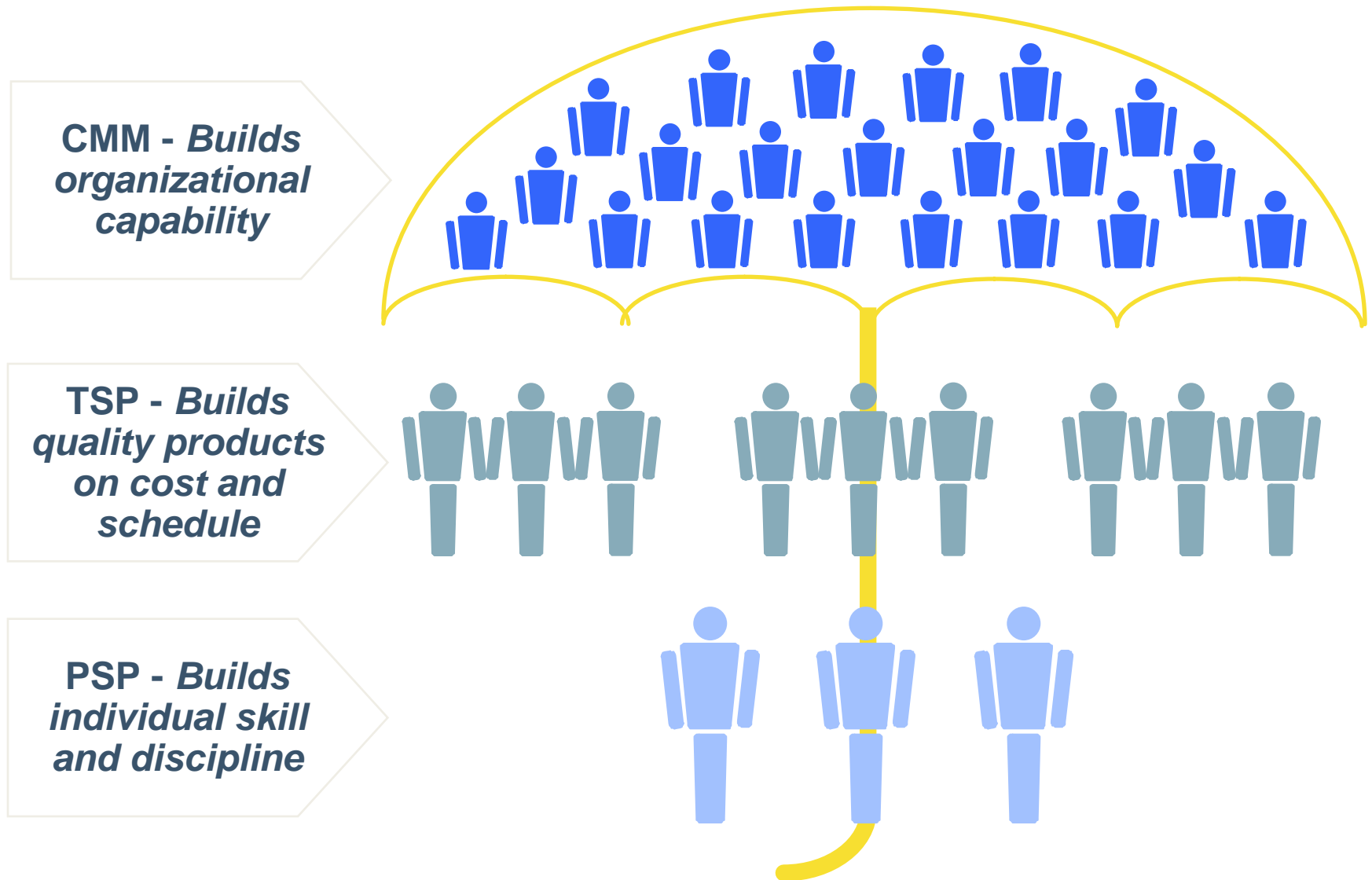
**A/F R**

**% Appraisal COQ**

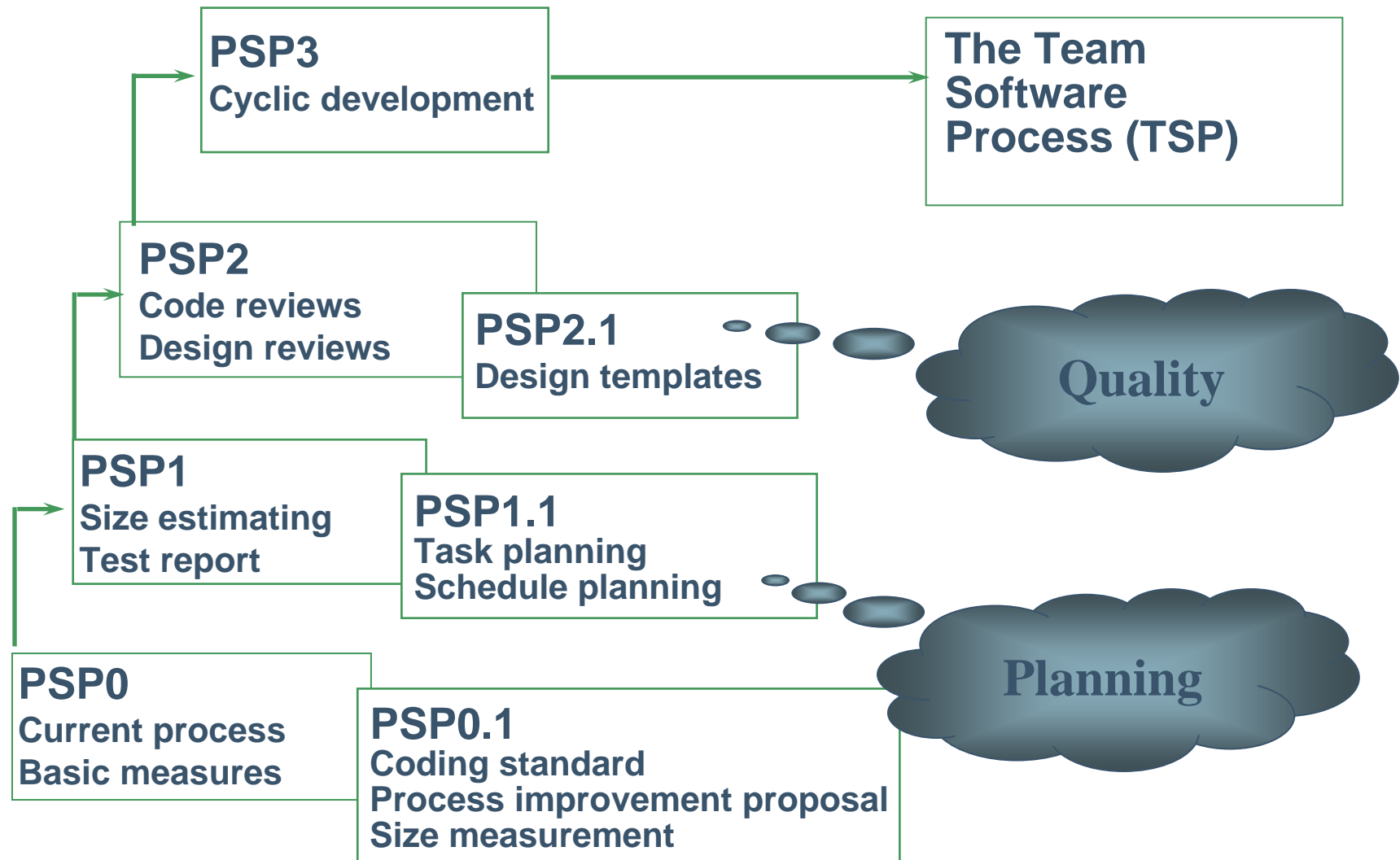
**CPI**

**Appraisal Time**

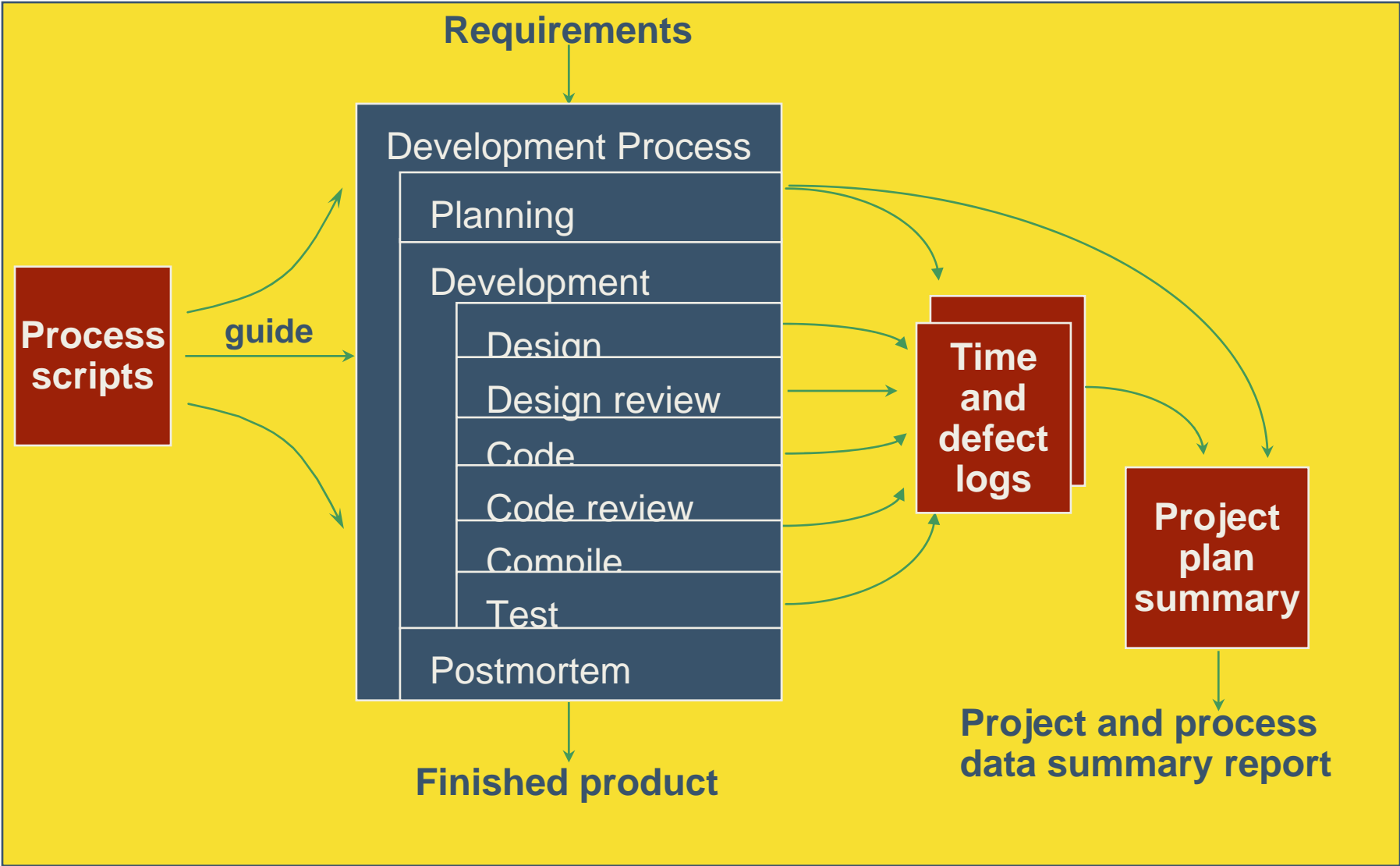
# CMM, TSP & PSP Relationship



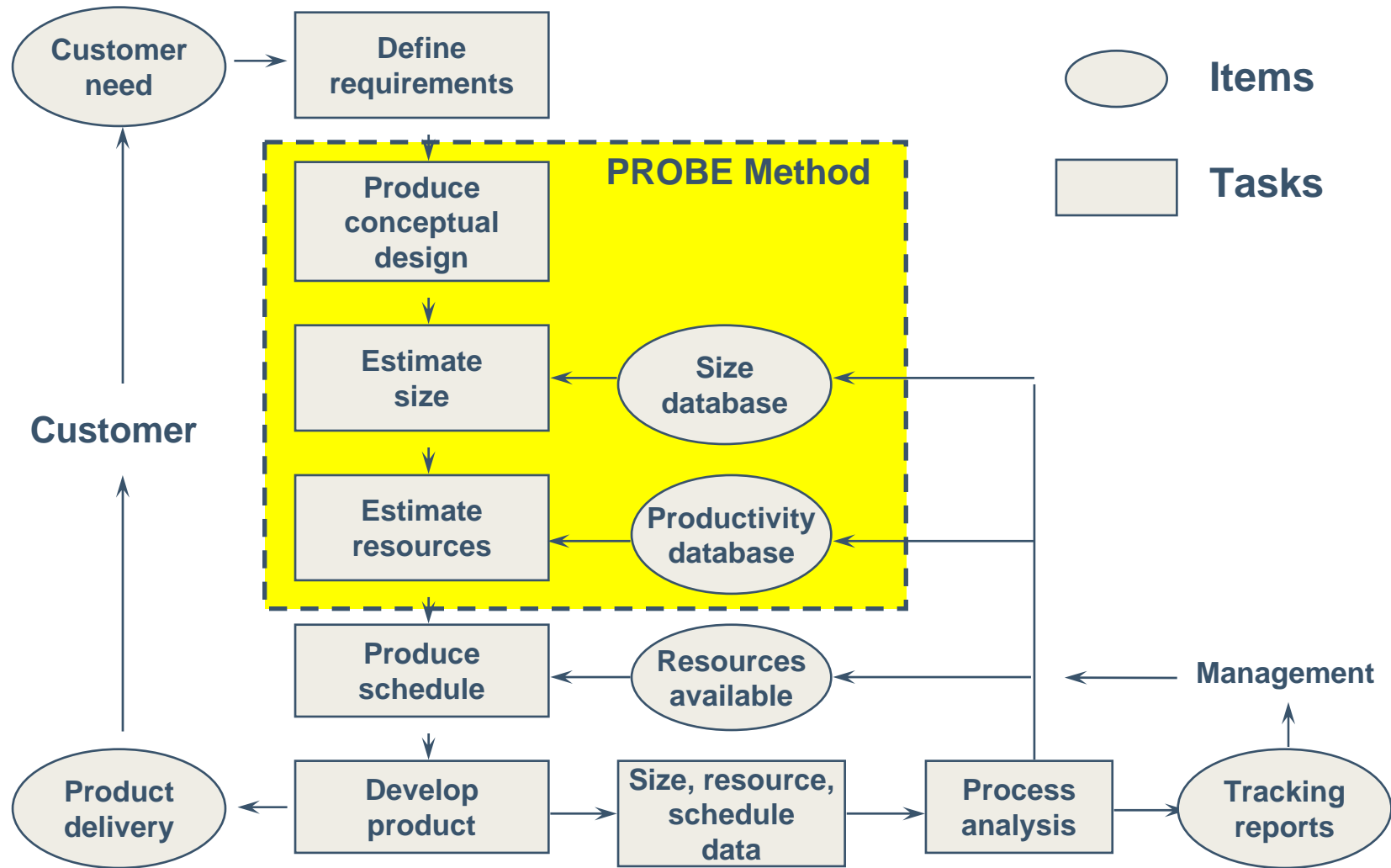
# PSP Process Levels



# Process Flow

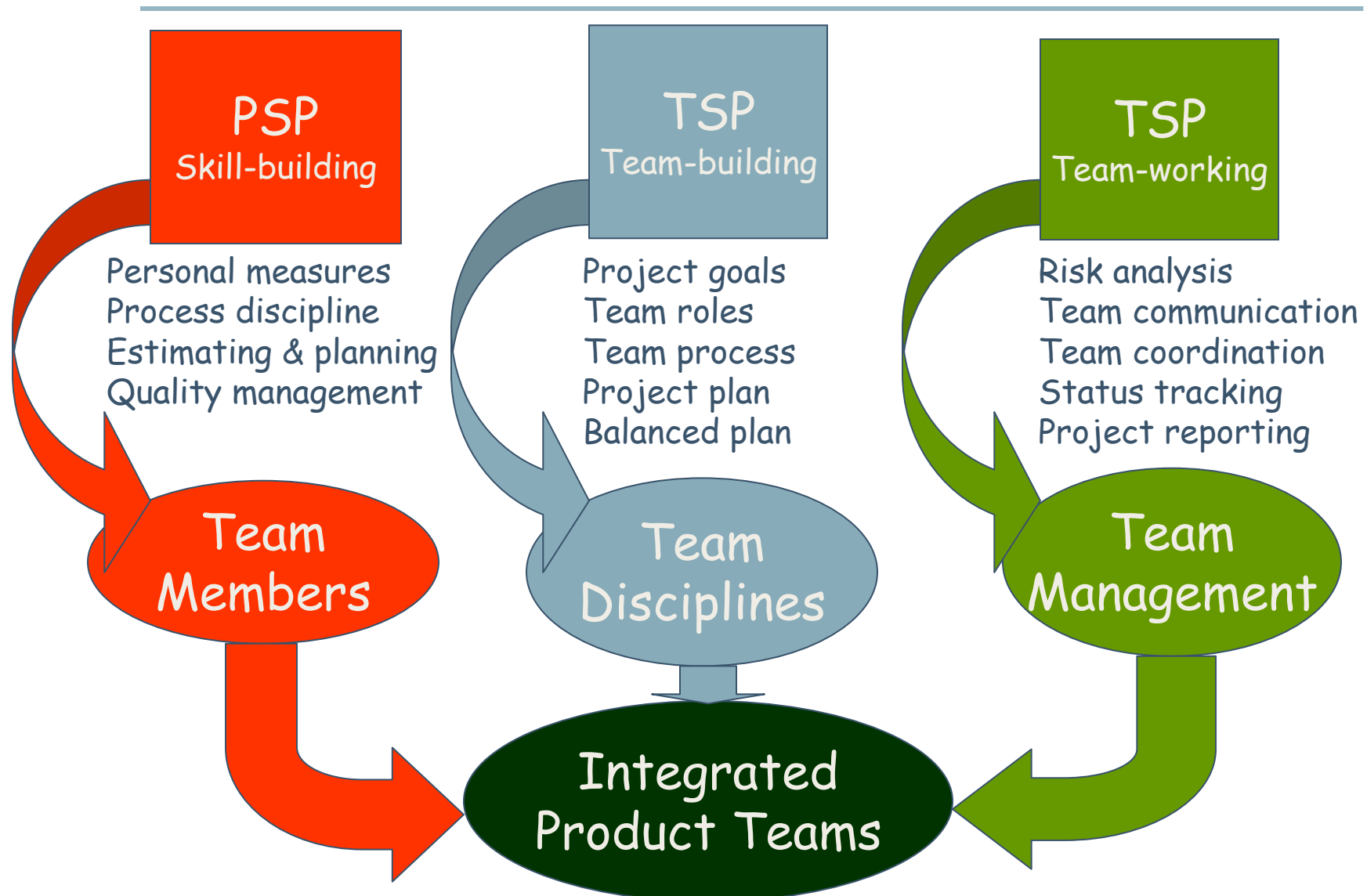


# The Planning Framework

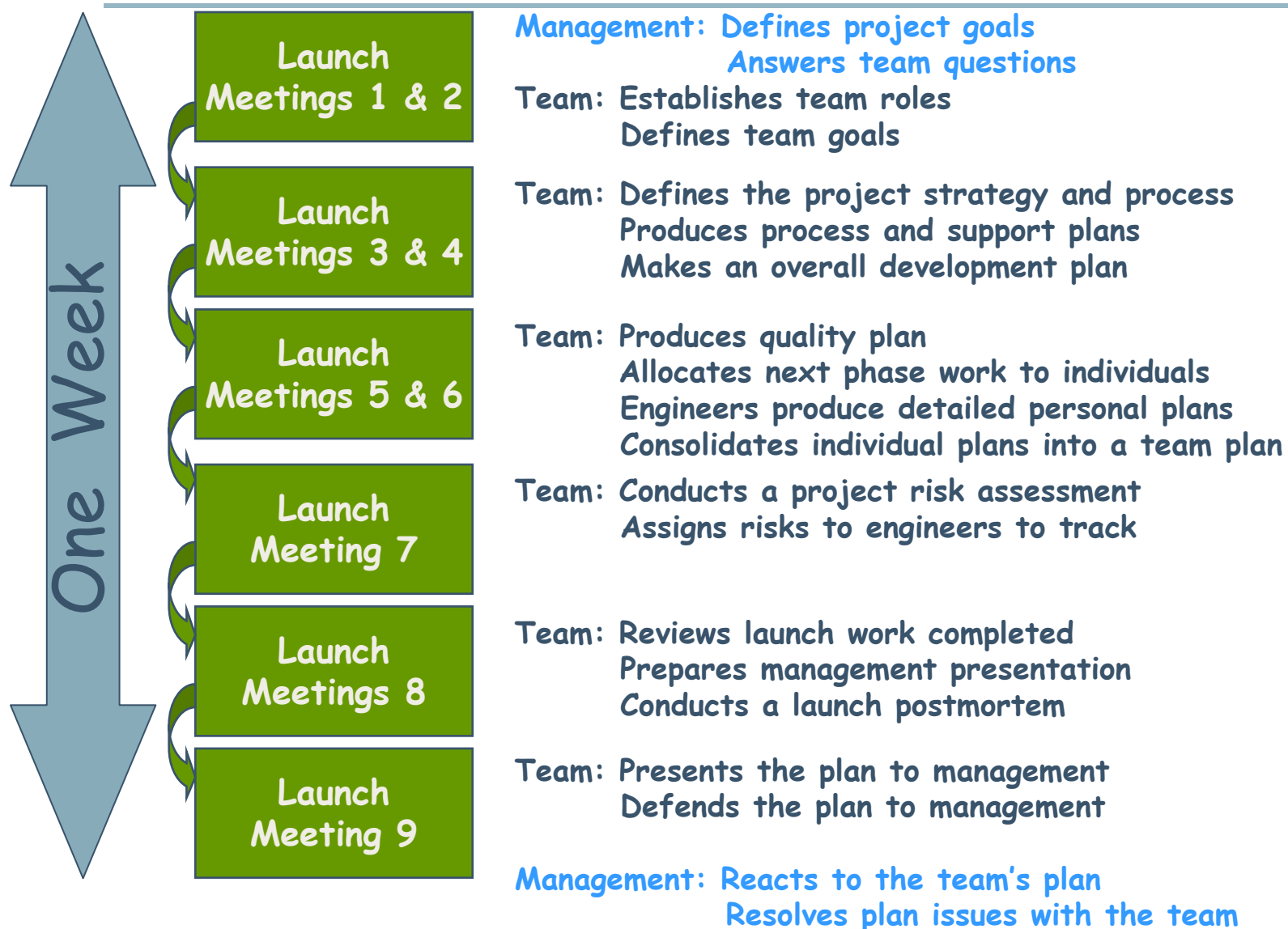




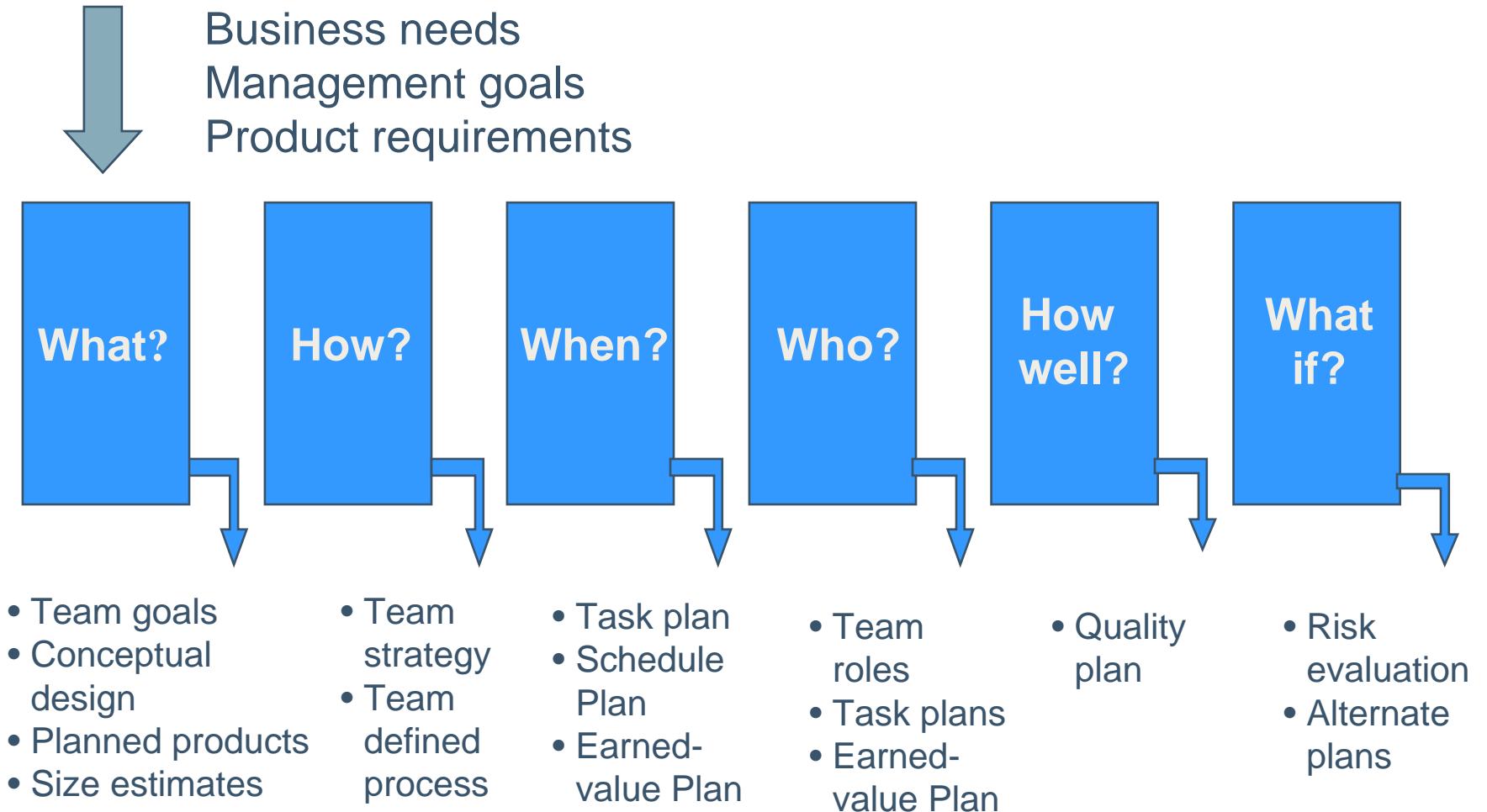
# TSP Builds Effective Project Teams



# The TSP Launch Process



# The TSP Launch Products



# The Team-working Framework

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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.

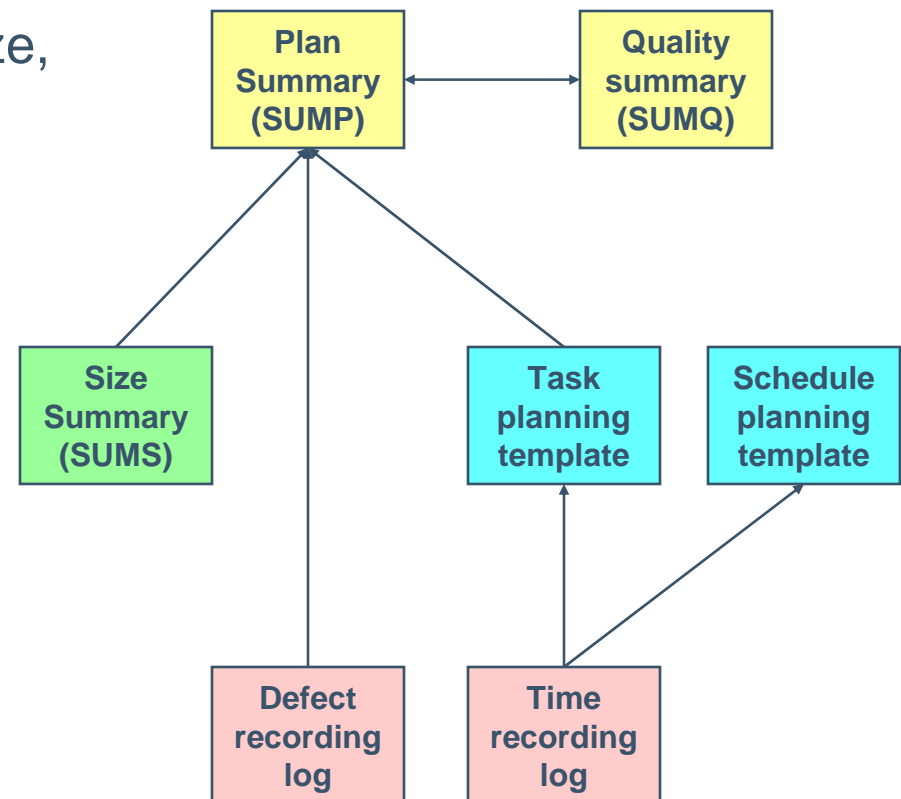
- each team member tracks his/her own work
- the team tracks progress at the weekly meeting
- management tracks progress at a monthly management review

# 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

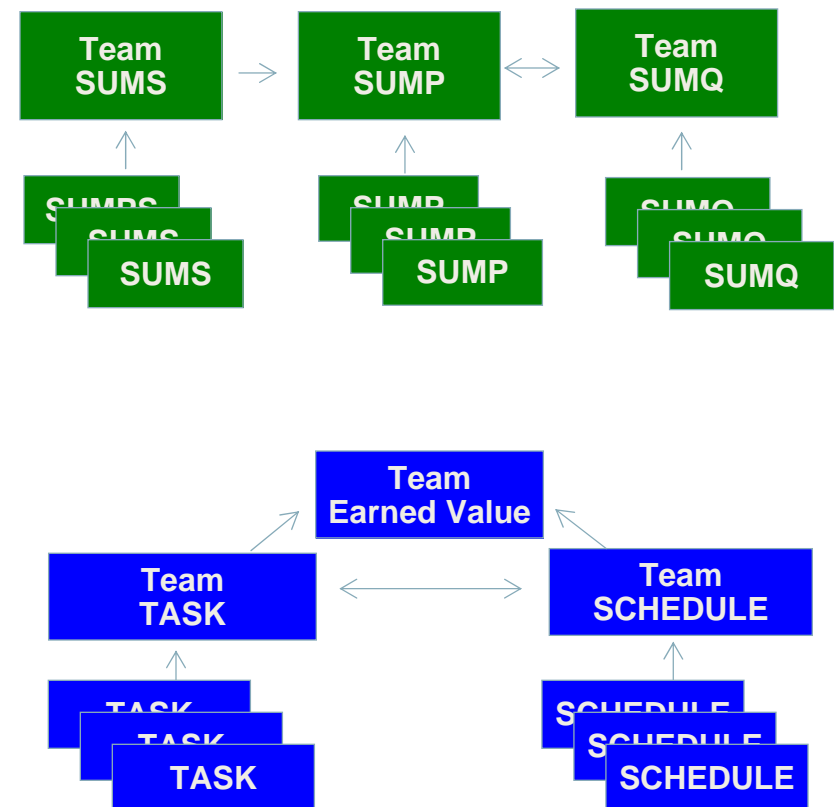


# Team Tracking

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

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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

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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

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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

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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

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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

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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

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| Category  | Without TSP          | With TSP            |
|---|----------------------|---------------------|
| <b>Effort deviation</b><br>(% average, range)                   | 17%<br>-60% to +100% | -4%<br>-25% to +25% |
| Schedule deviation (%<br>average, range)                        | 41%<br>-50% to +150% | 5%<br>-8% to 20%    |
| System test defect density<br>(defect/KLOC)                     | 1 to 8               | 0 to 0.9            |
| Acceptance test and<br>release defect density<br>(defects/KLOC) | 0.55 to 0.75         | 0 to 0.35           |
| Duration of system test<br>(days/KLOC)                          | 1 to 7               | 0.1 to 1.1          |

McAndrews *The Team Software Process: An Overview and Preliminary Results of Using Disciplined Practice* (CMU/SEI-2000-TR-015 )

# NAVAIR TSP Status

| Organization                  | Completed | Using     | Preparing |
|-------------------------------|-----------|-----------|-----------|
| AV-8B                         | 2         | 2         | 1         |
| Depots                        |           |           | 1         |
| E-2C Hawkeye                  | 3         | 6         | 2+        |
| EA-6B                         |           |           | 1         |
| F/A-18                        |           | 2         |           |
| F-14                          | 1         |           |           |
| H-1 Cobra                     | 1         |           |           |
| HARM                          |           |           | 1         |
| P3-C                          | 1         | 2         | 1         |
| Software Engineering Branches |           | 1         | 2+        |
| Weapons                       |           | 1         |           |
| <b>Totals</b>                 | <b>8</b>  | <b>14</b> | <b>9+</b> |

# Message to Remember

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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