

# Selecting a Development Process

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## Agenda



- The processes
- Team Software Process
- Scrum
- Extreme Programming
- The Unified Process
- CMMI



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# Ceremony

- The amount of formalism in a process
  - Documentation, method weight, reviews

Few documents  
Few steps

Many documents  
Formal steps



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# Cycles

- Number and length of iterations

Few documents  
Few steps

Many documents  
Formal steps

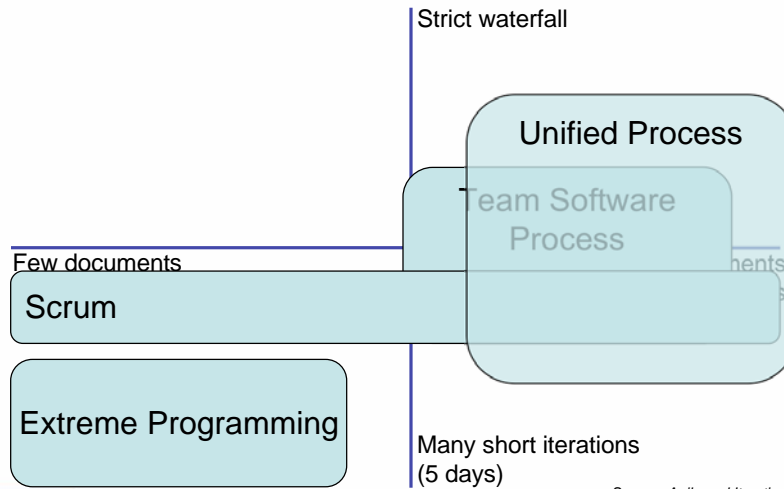
Strict waterfall

Many short iterations  
(5 days)



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# Placing the processes



Source: *Agile and Iterative Development: A Manager's Guide* by Craig Larman.

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## Team Software Process (TSP)

- Created by Watts Humphrey
  - Of Software Engineering Institute and Capability Maturity Model (CMM)
  - Builds on his Personal Software Process
- High discipline, highly defined
- A “cyclic development strategy”
  - Another way of saying “iterative and incremental”



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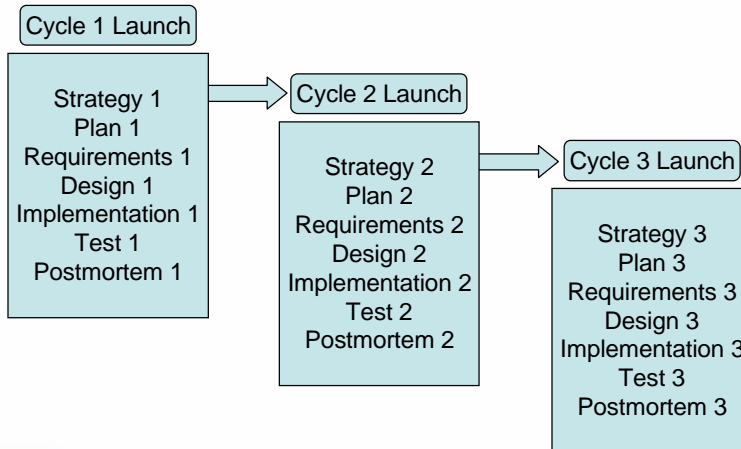
## Goals of the TSP

1. Build on the Personal Software Process
2. Develop products in cycles
3. Establish standard measures for quality and performance
4. Provide precise measures
5. Use role and team evaluations
6. Require process discipline
7. Provide guidance on teamwork problems



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# Team Software Process (TSP)



## Cyclic development

- A **testable version** is produced at the end of each cycle
  - Purpose of testing is to assess the product, not fix it
  - Defects should be removed during the cycle

## Designed to solve team problems

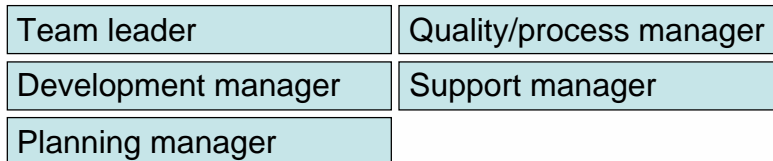
- “The success or failure of a project is seldom due to technical issues. You almost never find yourself asking ‘has the state of the art advanced far enough so that this program can be written?’ Of course it has. If the project goes down the tubes, it will be non-technical, human interaction problems that do it in. The team will fail to bond, or the developers will fail to gain rapport with the users, or people will fight interminably over meaningless methodological issues.”  
– Tom DeMarco



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## Teams, members, roles and goals

- A team has one or more members
- Each member fills one or more roles



- Goals are assigned throughout this hierarchy  
–Team, member, role



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# Goals, goals and goals

## Team Goals

- Produce a quality product
- Run a productive and well-managed project
- Finish on time

## Team Member Goals effective team member

- Do consistently disciplined personal work
- Plan and track all your personal work
- Produce quality products

## Dev Manager Goals

- Produce a superior product
- Fully use the team members' skills and abilities



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# Scripts and forms

- TSP uses scripts to define the steps of building a software system
  - 21 activity scripts
  - 10 role scripts
- Often quite detailed
- Scripts prescribe completing 21 supporting forms



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## The inspection script

Purpose		To help engineers produce quality products
Entry criteria		A completed and reviewed product with available materials
Step	Activities	Description
1	Plan the inspection	The developer <ul style="list-style-type: none"><li>• Arranges with the quality/process manager or some other qualified team member to be the moderator</li><li>• Handles the mechanics of setting up and running...</li></ul>
2	Hold the inspection meeting	The moderator describes the inspection process The producer familiar the inspection team with the product.
...	...	...
Exit criteria		INS and LOGD forms completed and filed in the ...

## Choose TSP if...

- ...you have the discipline to follow all of its specific steps
- ...are already using the complementary Personal Software Process (PSP)
- ...team members need this level of guidance
- ...you do not have emergent requirements



# Agenda

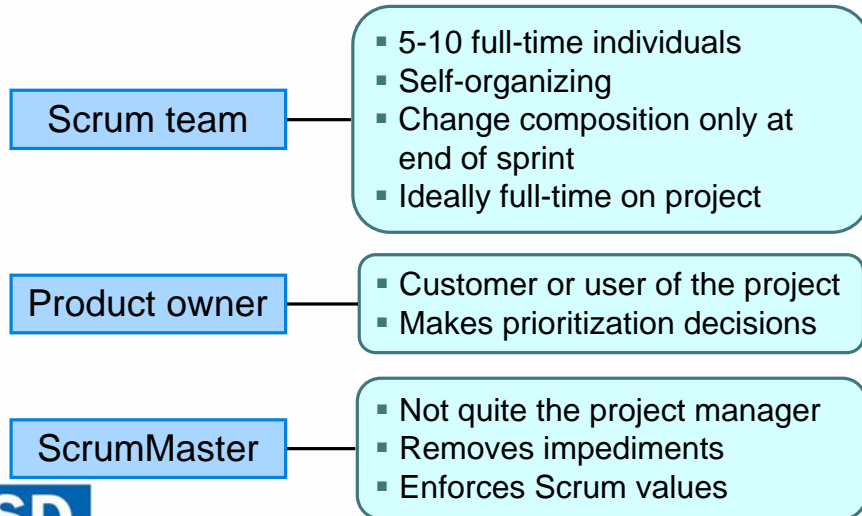


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## Scrum characteristics

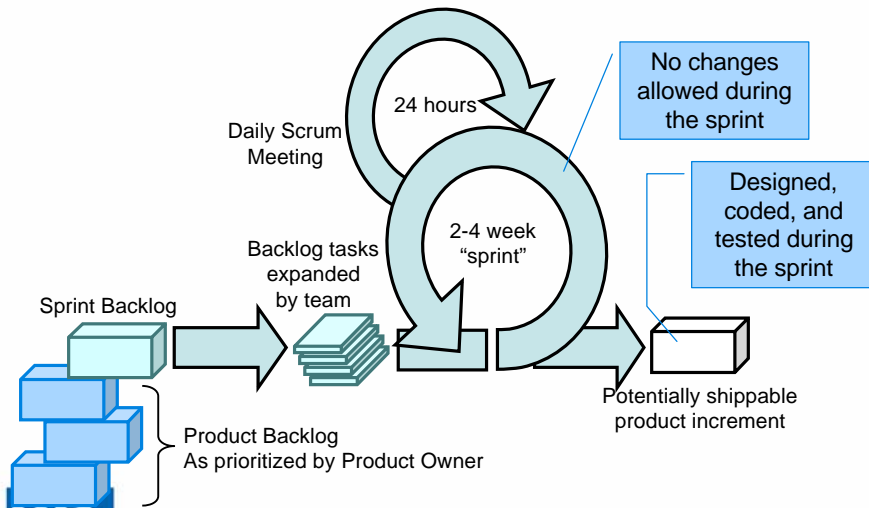
- 30-day iterations called “sprints”
- Self-organizing teams
- No specific engineering practices prescribed
  - But many Scrum teams are adopting much of XP
- Uses generative rules to create an agile environment for delivering projects

# Scrum roles



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# Scrum graphically



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## Sample product backlog

Backlog item	Estimate (person-days)
Allow a guest to make a reservation	3
As a guest, I want to cancel a reservation	5
Guest can change reservation dates	3
Hotel employee can see future reservations for her hotel	8
Improve exception handling	5
...	30
...	50



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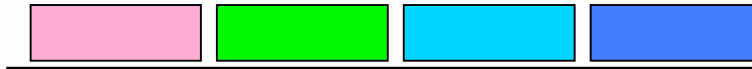
## A sprint backlog

Task	Mon.	Tues.	Wed.	Thurs.
Code the UI	8	4	8	
Code the middle-tier	16	12	10	4
Test middle tier	8	16	16	11
Write user's guide	12			
Write the ABC class	8	8	8	8
Add error logging			8	4



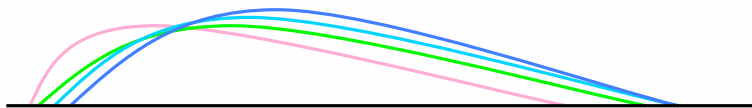
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## Sequential vs. overlapping development



Rather than doing all of one thing at a time

Scrum teams do a little of everything all the time



Source: "The New New Product Development Game", Hirotaka Takeuchi and Ikujiro Nonaka, *Harvard Business Review*, January 1986.

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## Scrum meetings

Sprint planning

- First half includes Product Owner who explains high priority needs
- Second half is team only
- Create sprint backlog

Daily scrum

- What did you do yesterday?
- What will you do today?
- What's in your way?

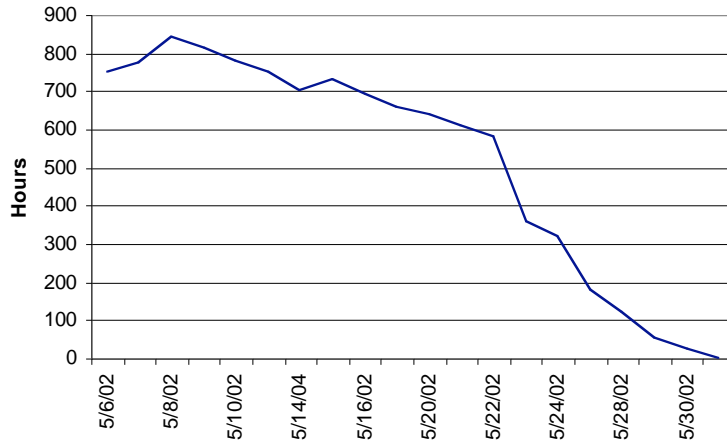
Sprint review

- Team demos what was accomplished
- 2-hour prep time rule
- No PowerPoint!
- Anyone can attend

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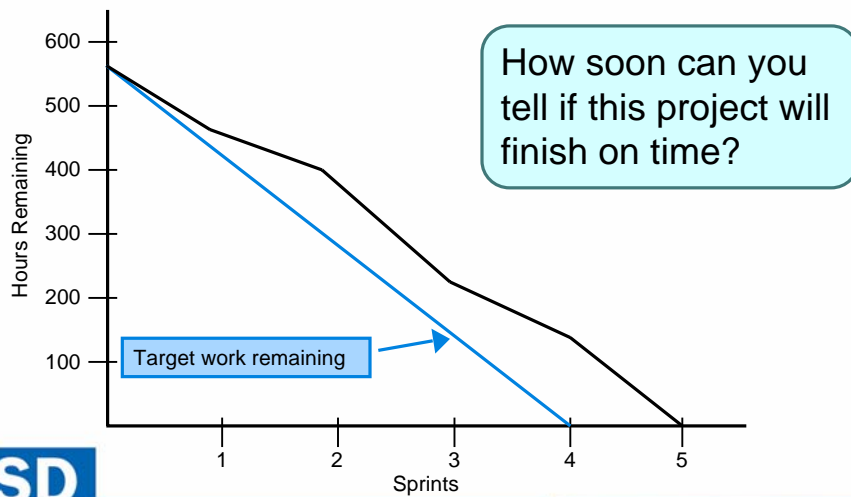
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# Sprint burndown chart



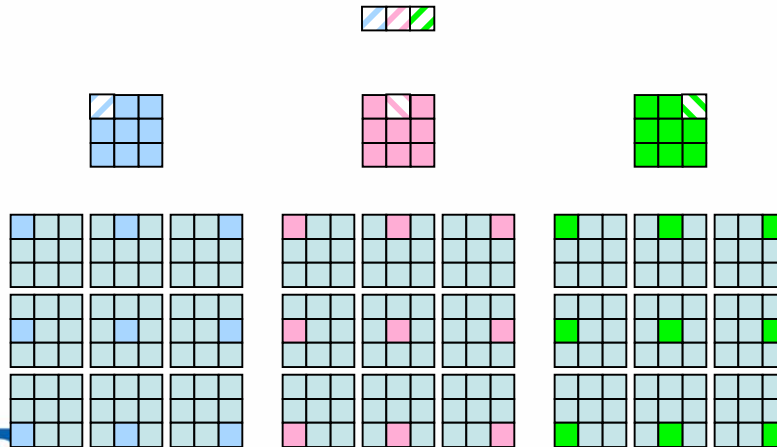
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# Release burndown



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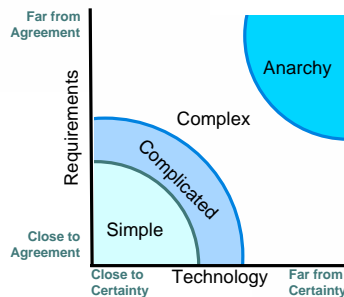
# Scrum of Scrums / Meta-Scrum



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## Choose Scrum if...



Source: *Strategic Management and Organizational Dynamics*  
by Ralph Stacey in *Agile Software Development with Scrum*  
by Ken Schwaber and Mike Beedle.

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- ...requirements are changing or emergent
- ...you're willing to let the team self-organize
- ...you need a management framework more than a set of engineering practices
- ...you want to better manage risk
- ...you need a proven, scalable agile process

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# Extreme Programming

- Adds specific engineering practices to Scrum's project management approach
- A tough target to hit but highly productive if you do



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## XP's customer practices

On-site customer

Small releases



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## XP's quality practices

Metaphor

Testing

Simple design

Refactoring

Pair programming



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## XP's project management practices

The Planning Game

Sustainable pace

Collective ownership

Coding standards

Continuous integration



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## Choose Extreme Programming if...

- ...you have loosely-defined or volatile requirements
- ...you have or can develop strong engineering skills and practices
- ...customers can be involved on a daily (hourly) basis
- ...it's important you hit the bulls eye right off and you think you can



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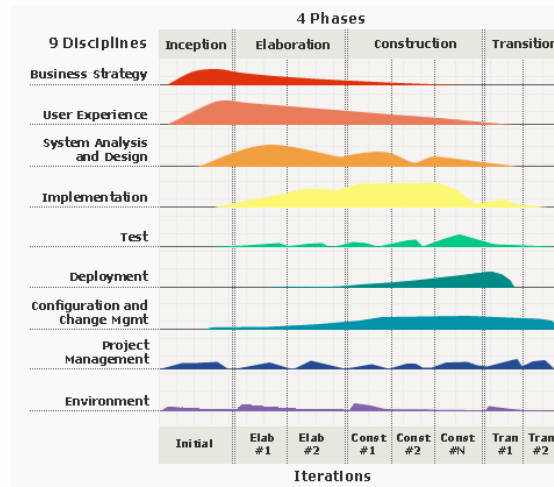


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# The Unified Process

- Use case-driven
- Architecture-centric
- Iterative and incremental
- Lots of role, task and artifact guidance
- Strongly oriented toward OO languages

# Phases and disciplines



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## Some common UP challenges

- It's meant to be a cookbook but is often used like a buffet
- Phases are mistakenly treated like a waterfall
- Over-modeling is common
- Iterations should be weeks not months

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## Choose the Unified Process if...

- ...you need a process framework that has everything ever possible already in it
- ...you can resist the temptation to adopt too much of it
- ...you want well-defined roles
- ...it's important to have a well-documented process that new hires may be familiar with
- ...you do not have emergent requirements



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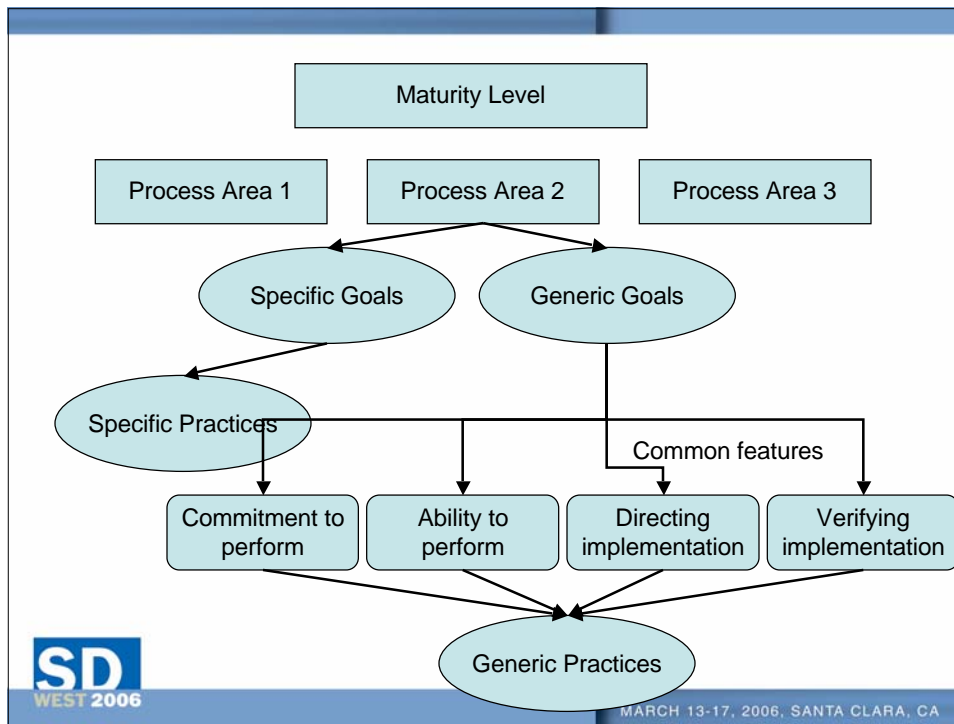
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## The five levels

### Level 2

“Addresses both project and organizational issues, as the organization establishes an infrastructure that institutionalizes effective software engineering and management processes across all projects.”

### Level 3

“Focus on the software project’s concerns related to establishing basic project management controls.”

Source: *CMMI Distilled* by Dennis M. Ahern, Aaron Clouse and Richard Turner.

# The five levels

## Level 4

“Focus on establishing a quantitative understanding of both the software process and the software work products being built.”

## Level 5

“Covers the issues that both the organization and the projects must address to implement continual, measurable software process improvement.”



Source: *CMMI Distilled* by Dennis M. Ahern, Aaron Clouse and Richard Turner.

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## Level 2

- Requirements management
- Project planning
- Project monitoring and control
- Supplier agreement management
- Measurement and analysis
- Process and product quality assurance
- Configuration management



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### Level 3

- Requirements development
- Technical solution
- Product integration
- Verification
- Validation
- Organizational process focus
- Organizational process definition
- Organizational training
- Integrated project management
- Risk management
- Integrated testing
- Integrated supplier management
- Decision analysis and resolution
- Organizational environment for integration



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### Level 4

- Organizational process improvement
- Quantitative project management

### Level 5

- Organizational innovation and deployment
- Causal analysis and resolution



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## Staged vs. continuous

- Staged representation
  - Focuses on the staged groupings of process areas
- Continuous
  - Process areas combined into four groupings
    - Process management, Project management, Engineering, and Support
  - Each process area (and grouping) is assessed on its own



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## How to use CMMI

- “The purpose of CMM Integration is to provide guidance for improving your organization’s processes and your ability to manage the development, acquisition, and maintenance of products or services.”<sup>†</sup>
- CMMI is orthogonal to your process
  - Use to assess where you are and as a pointer to places where you **may** want to improve
- Do not let a level become your goal!



<sup>†</sup>Capability Maturity Model Integration (CMMI), Version 1.1”, 2002, p. 1.

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## Where to go next

### Team Software Process

- *Introduction to the Team Software Process* by Watts S. Humphrey

### Scrum

- [www.mountangoatsoftware.com/scrum](http://www.mountangoatsoftware.com/scrum)
- [www.controlchaos.com](http://www.controlchaos.com)
- [scrumdevelopment@yahoogroups.com](mailto:scrumdevelopment@yahoogroups.com)

### XP

- [www.xprogramming.com](http://www.xprogramming.com)
- [c2.com/cgi/wiki?ExtremeProgrammingRoadmap](http://c2.com/cgi/wiki?ExtremeProgrammingRoadmap)
- [extremeprogramming@yahoogroups.com](mailto:extremeprogramming@yahoogroups.com)



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## Where to go next

### Unified Process

- [www.rational.com/products/rup](http://www.rational.com/products/rup)
- *The Unified Software Development Process* by Ivar Jacobson, Grady Booch, and Jim Rumbaugh

### CMMI

- [www.sei.cmu.edu](http://www.sei.cmu.edu)
- *CMMI Distilled* by Dennis Ahern, Aaron Clouse, and Richard Turner

### Agile in General

- [www.agilealliance.com](http://www.agilealliance.com)
  - especially Articles and Roadmap sections
- [www.mountangoatsoftware.com](http://www.mountangoatsoftware.com)



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