



SSW-555: Agile Methods for Software Development

Scrum
Week 3





Acknowledge

- Material for this lecture comes from a variety of sources including:
 - Agile Software Development with Scrum, Schwaber and Beedle, 2002
 - Introduction to Agile Methods, Ashmore and Runyan, 2015
 - <http://www.innolution.com/essential-scrum>
 - <https://www.mountaingoatsoftware.com/articles/toward-a-catalog-of-scrum-smells>



Today's Topics

- Origin of Scrum
 - Defined vs Empirical processes
- Compare Plan Driven to Chaos to Scrum
- Scrum practices
 - Process
 - Roles
 - Meetings
 - Artifacts

Origin of Scrum

- Software managers needed a process to control software projects
- Plan-based methods assumed that the development process was *predictable*
 - Any problem could be solved with a little more planning
- BUT, some projects required more *adaptation* than expected
 - React to *changing* customer requirements
- Defined vs Empirical processes

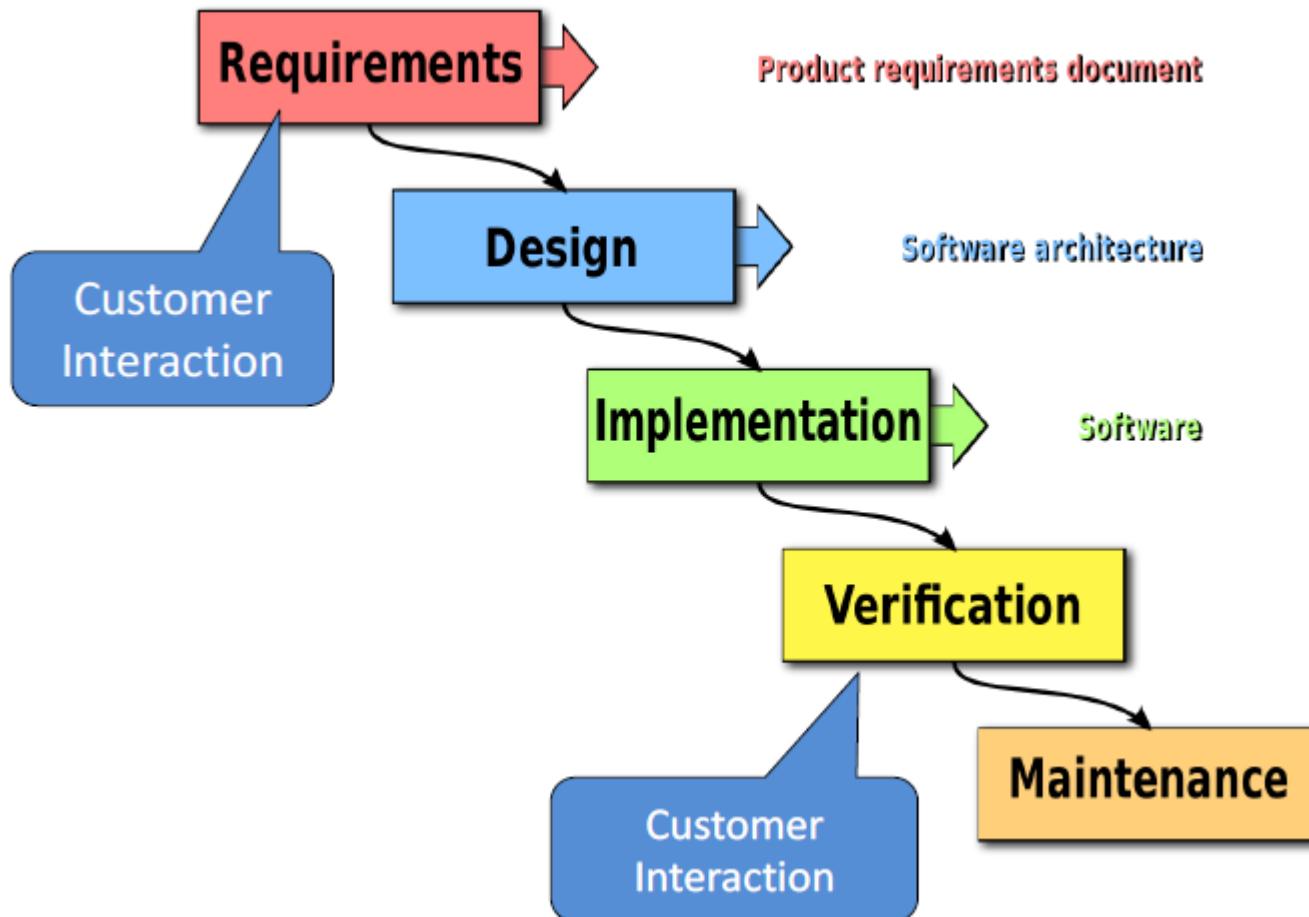




Assumptions of defined processes (used by Plan driven approaches)

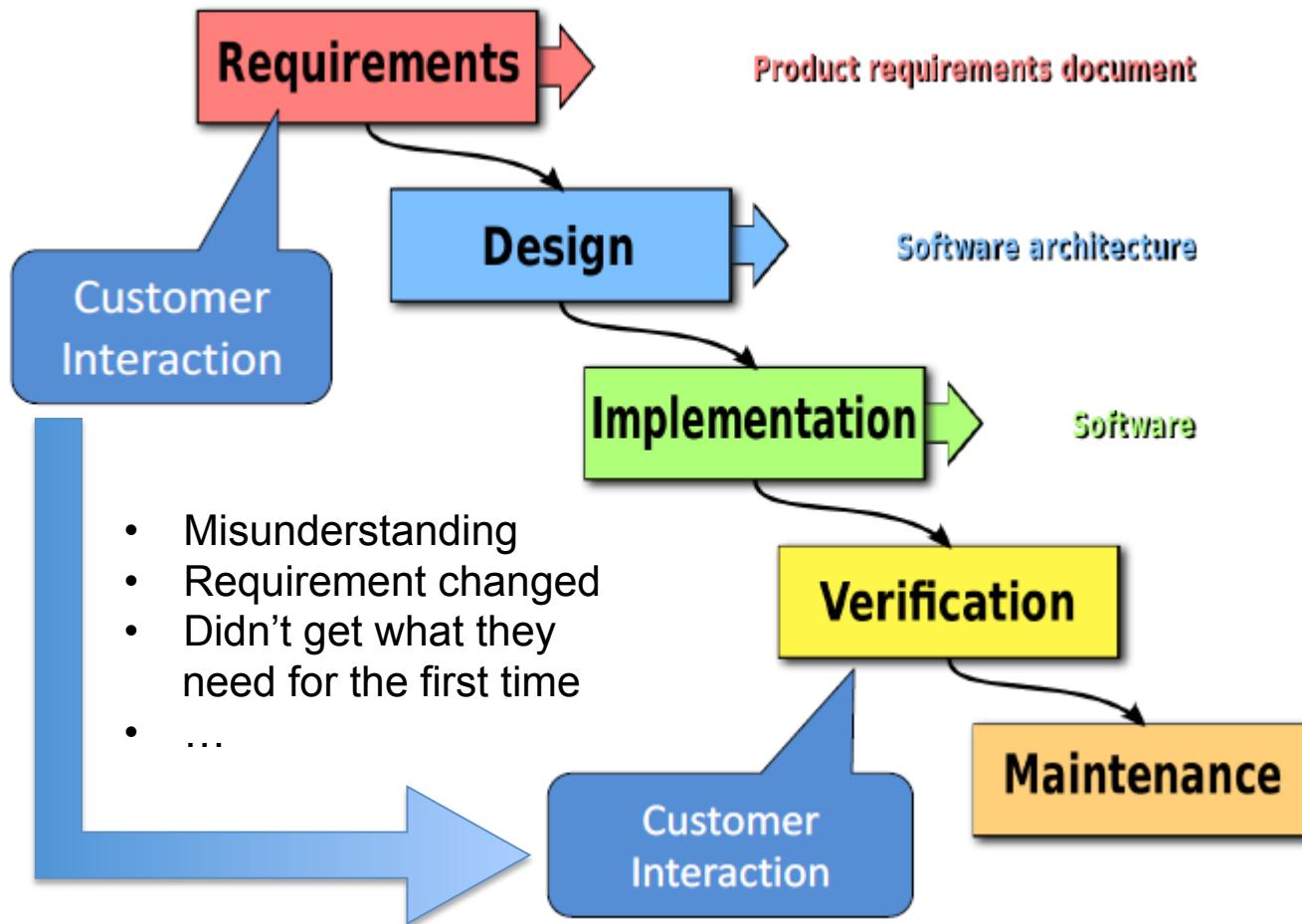
- System may be described by equations that predict response to stimulus or input (UML Diagrams)
 - E.g. given input X should produce output Y
 - It works for manufacturing, so it should work for software, right?
- Variables that influence the process are well-understood:
 - may be predicted from the task
 - may be measured in the environment
- Management consists of controlling and/or measuring the variables
- Unfortunately, software projects don't always work that way...

Waterfall Model



Source: https://en.wikipedia.org/wiki/Waterfall_model

Waterfall Model



Source: https://en.wikipedia.org/wiki/Waterfall_model

RUP phases, iterations and disciplines

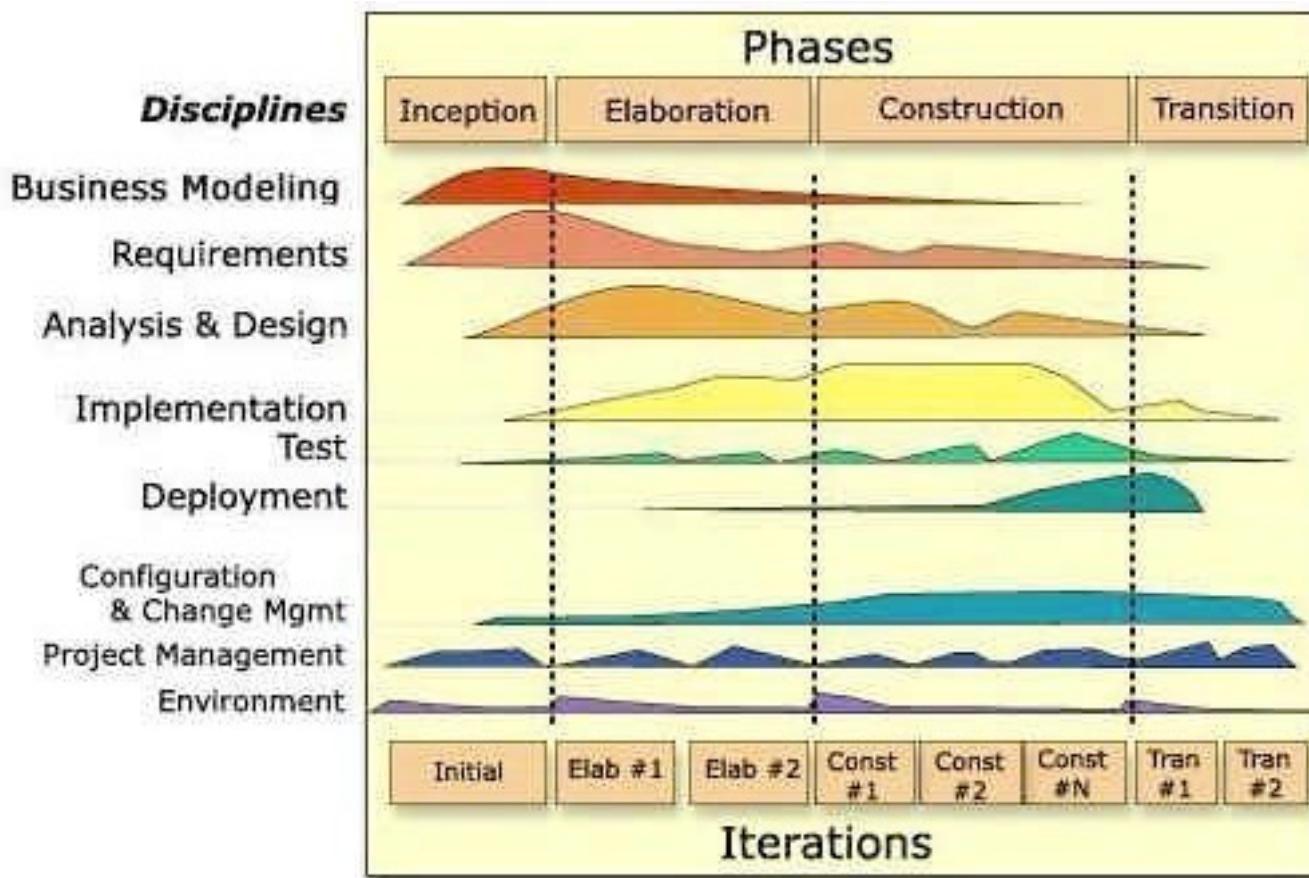


Diagram Copyright 1999-2005 IBM

Customer Chaos Model

- Many customers asking developers for many features
- Developers try to accommodate “loudest” voices (or biggest bosses)
- Leads to chaos and low moral and low productivity





Assumptions of *empirical methods* (used in Agile approaches)

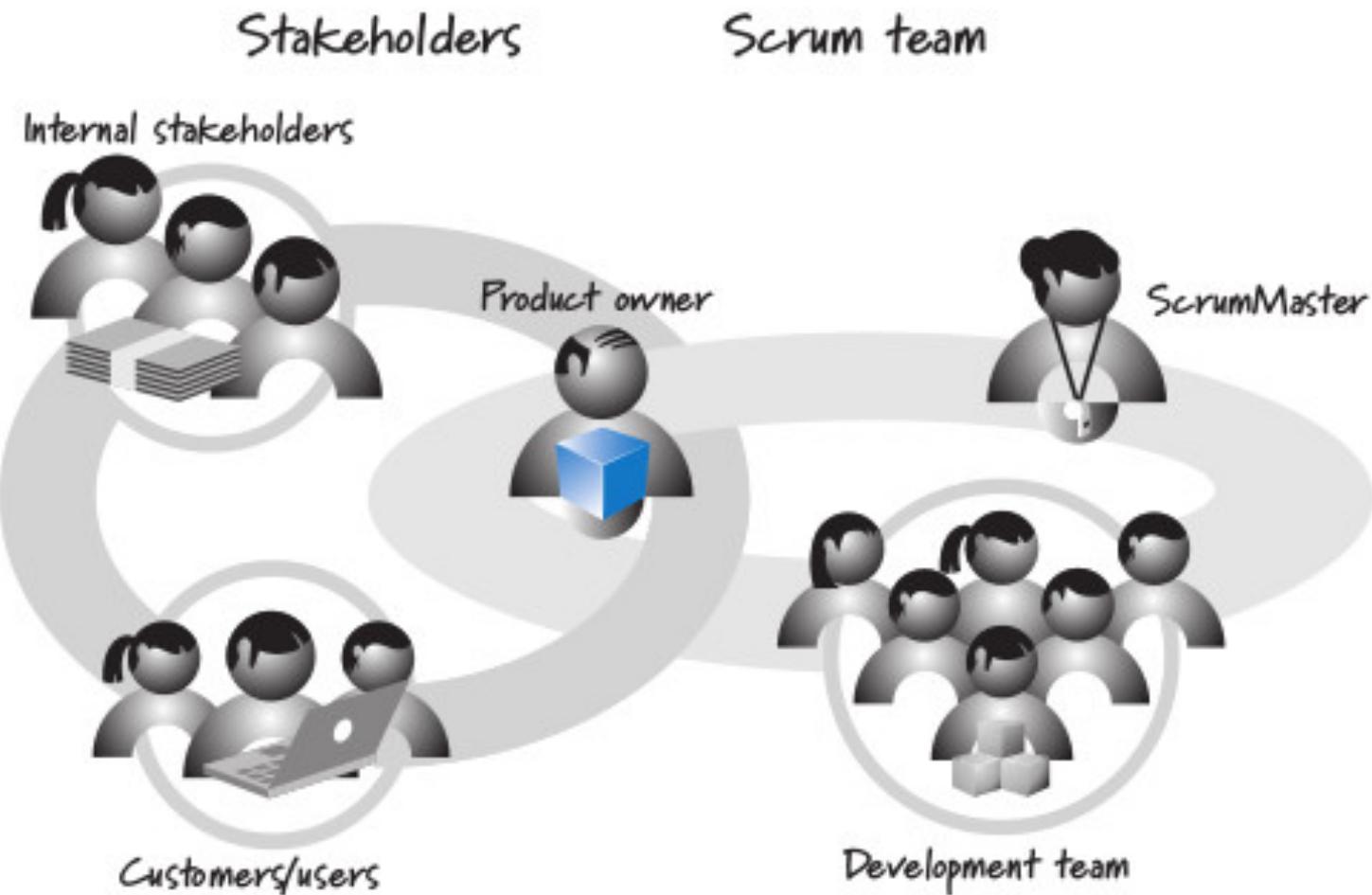
- System cannot be described with simple equations
 - transformation from input to output is complex
 - some aspects of transformation may have no science
- Cannot easily repeat the process from input to output
 - variables that influence the process are not all known
 - noise in environment is too difficult to avoid or predict
- Management consists of constantly monitoring and adapting

Scrum Process



<http://www.innolution.com/essential-scrum/table-of-contents/chapter-2-scrum-framework>

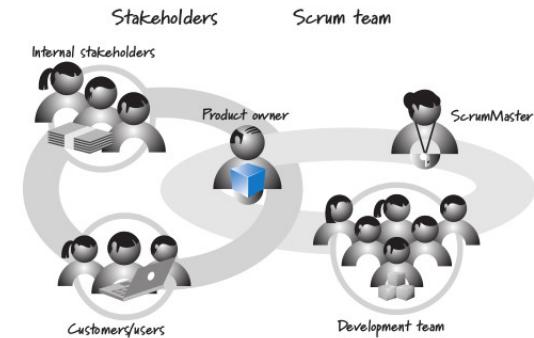
Scrum Roles



Source: <https://chintanjariwala.files.wordpress.com/2016/05/po.jpg?w=507&h=322>

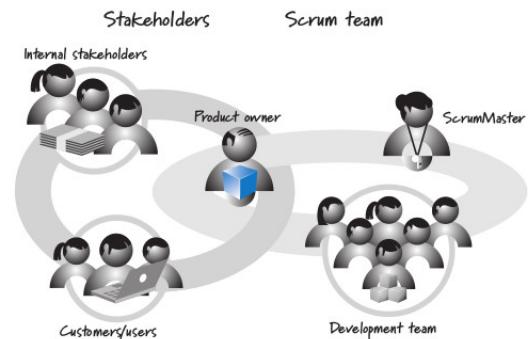
Product Owner

- Represents the customer and the customer's needs
- Agile principle #4: “Business people and developers must work together daily throughout the project”
- Product visionary
 - What should the product do?
 - What are the features?
 - Provides user stories
- Responsible for Return On Investment (ROI)
 - Communicates with stakeholders/investors



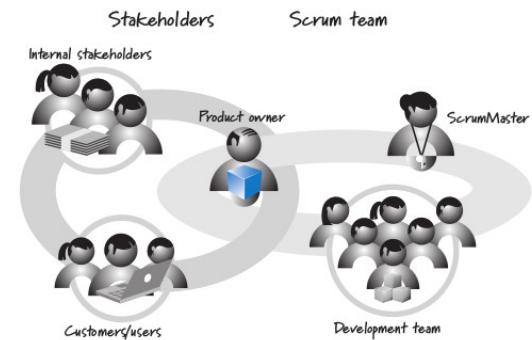
Product Owner

- Has final say over the product and **releases**
 - Decides whether to release increments to customers/users
- Manages and maintains the **Product Backlog** of desired features
 - Sets priorities for sprints so developers are always working on most important features
- Is an **active member** of the Scrum Team
 - Ideally co-located with the developers
 - Available to developers to answer questions about features and priorities



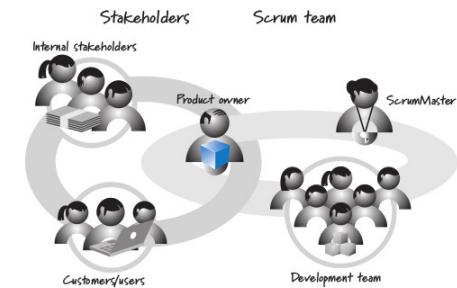
Development Team

- **Small:** 3-10 software developers
 - < 3: may encounter skill constraints
 - > 10: too much coordination
 - Ideally, **co-located** in one location
- **Cross-functional**
 - Possess all needed skills: development, test, specialists
- **Self-organizing**
 - **Team** chooses process, roles, and tasks; not the “boss”



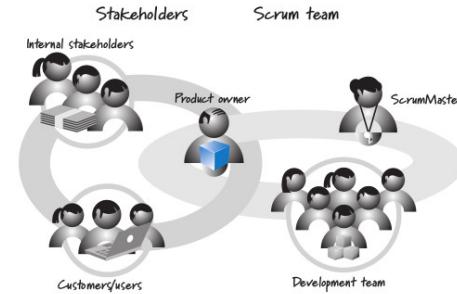
Scrum Master

- Helps **development team** practice Scrum with Best Practices
 - Manages the Scrum artifacts
 - E.g. Burn Down charts and Kanban Boards
 - Facilitates Scrum events
 - E.g Daily Stand-up meetings
 - Remove impediments
 - Protects the development team from outside interference
- Helps **product owner** in several ways:
 - Finding techniques for Product Backlog management
 - Understand project planning
 - Facilitate Scrum events as requested or needed



Scrum Master

- Scrum Master is a **servant-leader** (not the boss)
 - Does not make technical or business decisions
 - Developers “report” to the team, not to the Scrum Master
- Different from Plan Driven Project Manager (PM)
 - PM responsible for accountability and enforcement
 - Scrum Master is a coach and collaborator
- Different from Plan Driven IT Manager
 - IT Managers make all the decisions and direct the team
 - Scrum teams are self organizing





Scrum Examples

Scrum can be applied to different sized projects and teams

Small Start-up	Mid-sized company	Large Multi-national
One Scrum Team One project	Multiple scrum teams Independent projects	Many scrum teams One large project
Roles: <ul style="list-style-type: none">Product Owner: Marketing/Sales DirectorDev Team: 3 developers, 1 tester, multiple rolesScrum Master: developer	Roles: <ul style="list-style-type: none">Stakeholders: Sales/ Account managersProduct Owner: Product ownerDev Team: 10-12 developers, 4 testers dedicated rolesScrum Master: Dedicated Scrum Master	Roles: <ul style="list-style-type: none">Stakeholders: CIO, CTO, CFO, VPsProduct Owner: Product Manager for each partDev Teams: Multiple teams of 10-12 developers, 4 testers dedicated rolesScrum Master: Dedicated Scrum Masters

Introduction to Agile Methods: Ashmore and Runyan, 2015

Backlogs – what must be accomplished

Product Backlog

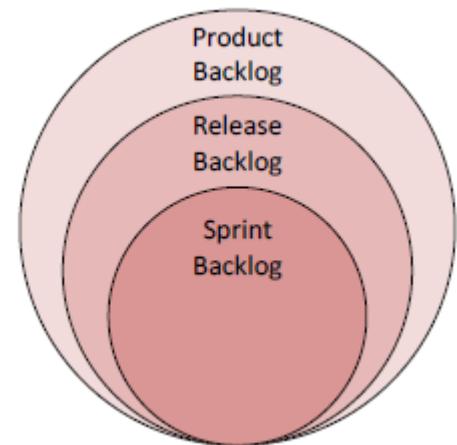
- all features needed in product or service
- any stakeholder can add items, including development team
- may include non-visible features, like underlying technology

Release Backlog

- subset of Product Backlog
- features needed in next product release
- defined by the Product Owner

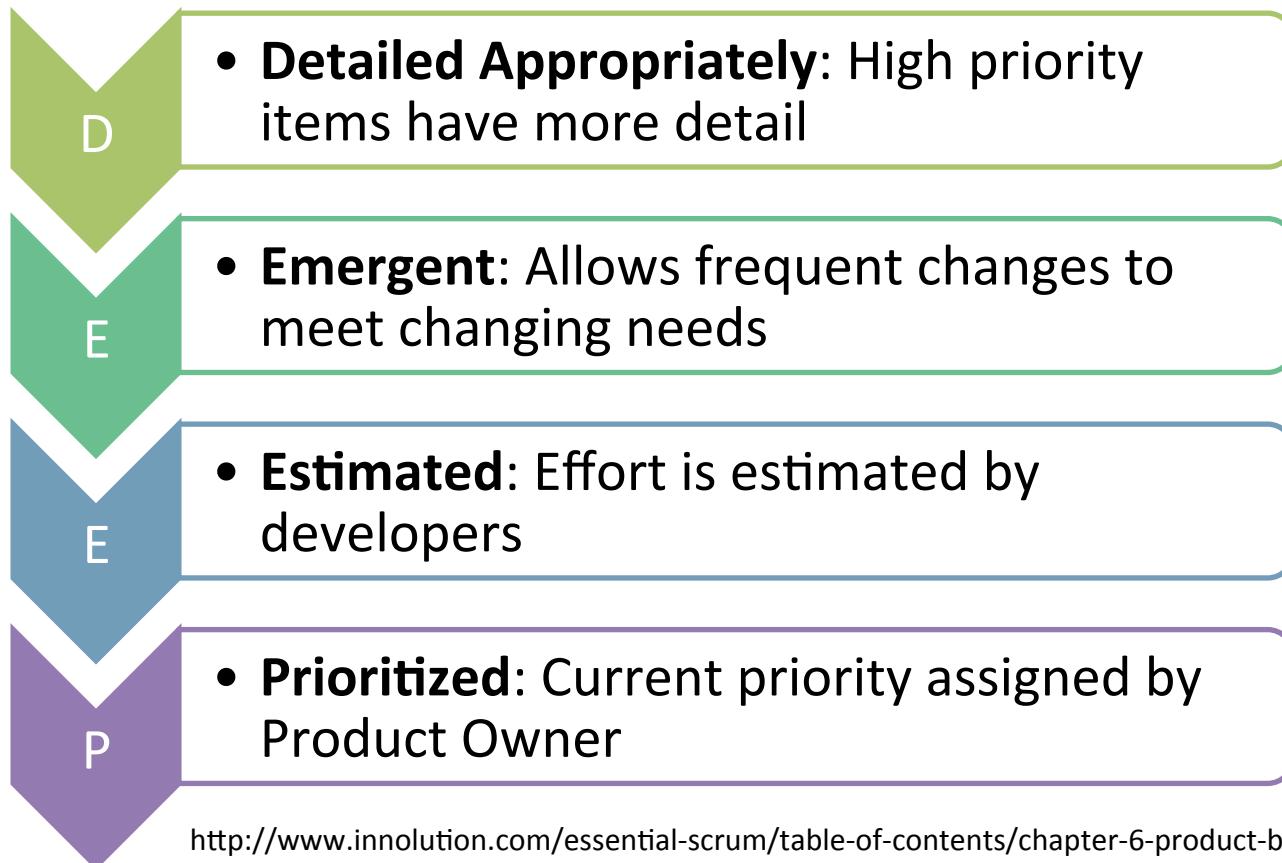
Sprint Backlog

- subset of Release Backlog
- features to be completed in next sprint



Managing the Product Backlog

- Product backlog drives the Scrum process
 - Developers should deliver the highest priority items in the next sprint
- User stories should be **DEEP**

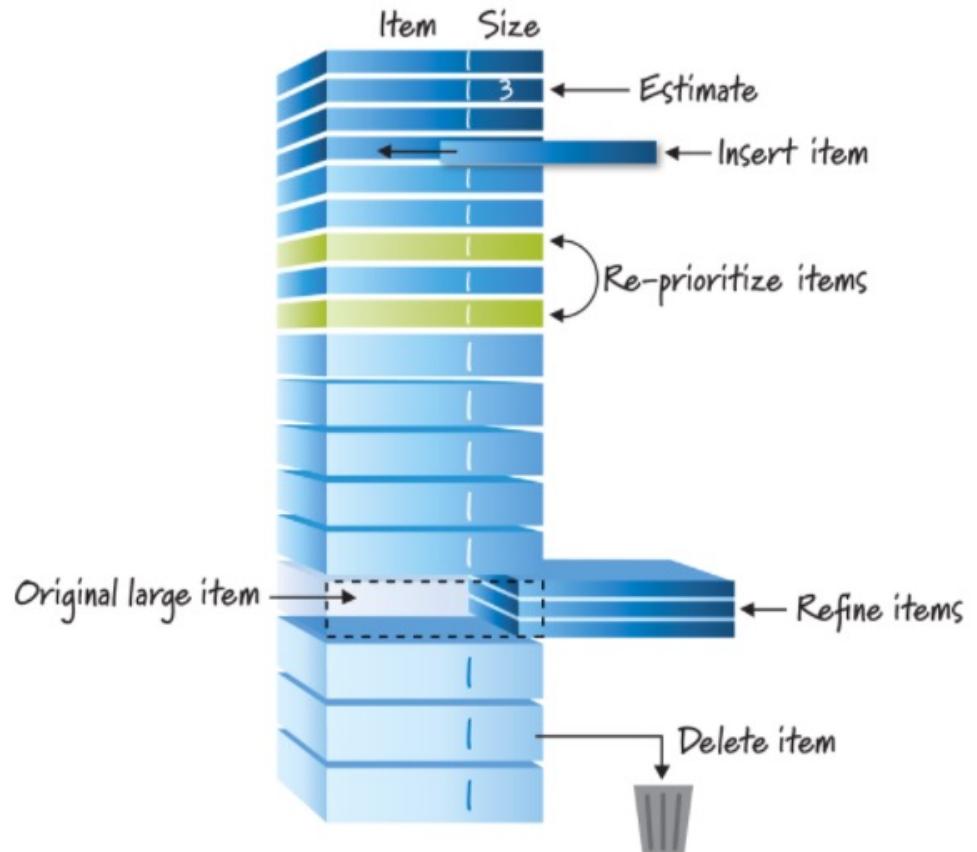


<http://www.innolution.com/essential-scrum/table-of-contents/chapter-6-product-backlog>

Grooming the Product Backlog

3 tasks

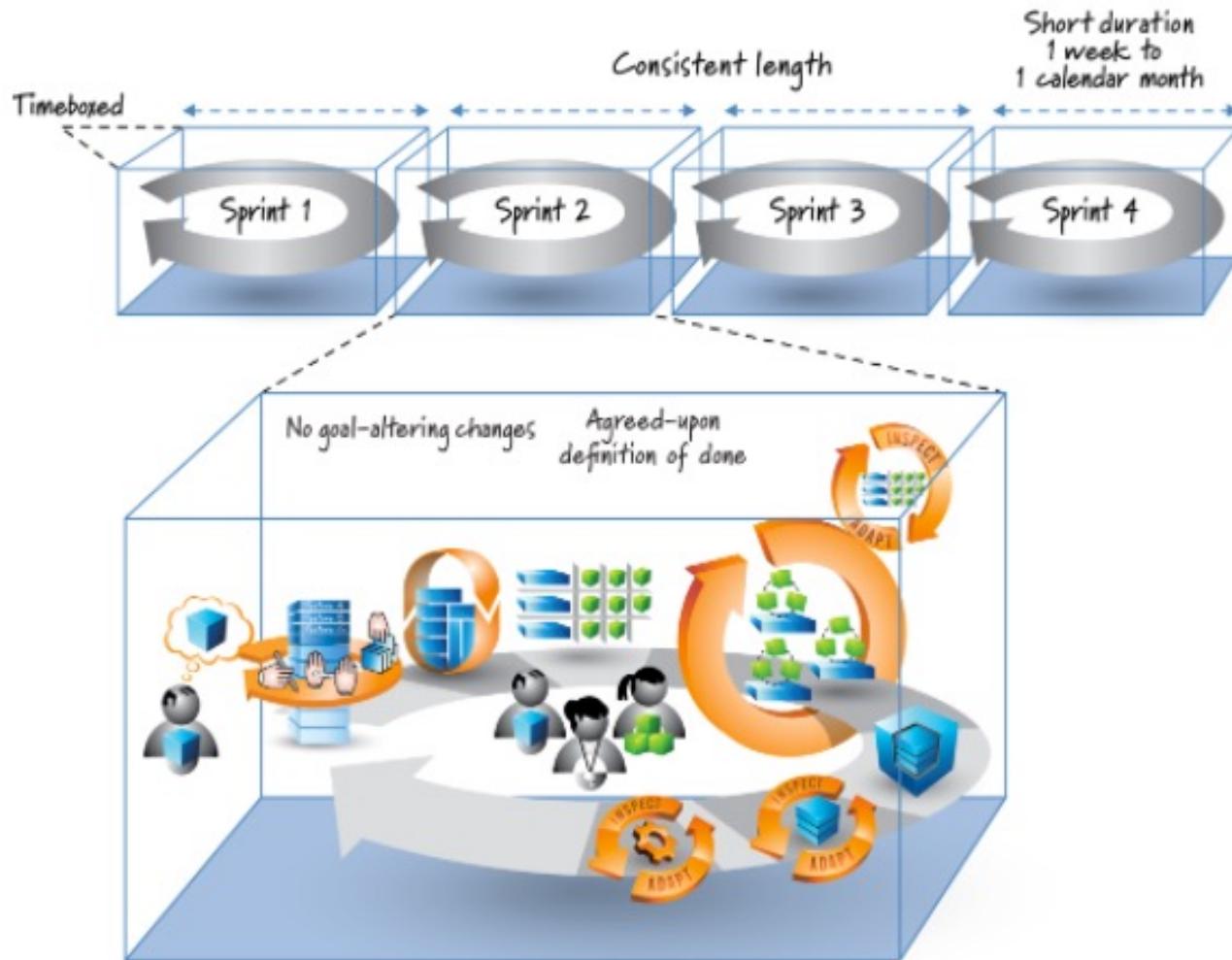
1. Creating and refining
 - Anyone can suggest items
2. Prioritizing items
 - Product Owner
3. Estimating items
 - Developers



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<http://www.innolution.com/essential-scrum/table-of-contents/chapter-6-product-backlog>

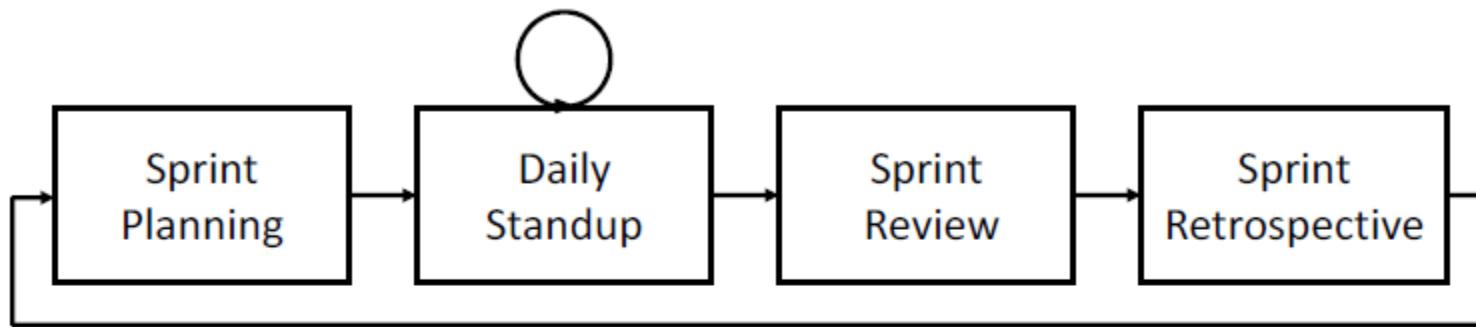
Sprints



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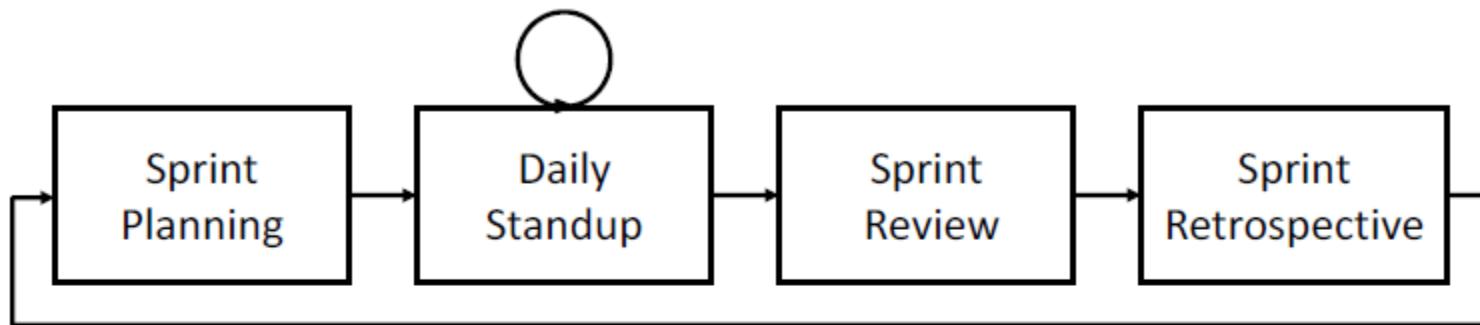
<http://www.innolution.com/essential-scrum/table-of-contents/chapter-4-sprints>

Scrum Meetings



Who	Product Owner Scrum Master Dev Team	Dev Team Scrum Master	Product Owner Stakeholders Scrum Master Dev Team	Dev Team Scrum Master
Purpose	Which features?	Where are we? Any problems? Any questions?	Review Sprint results with Product Owner	How to improve the process?

Scrum Meetings



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Sprint Planning

- Who: Product Owner, Development Team, Scrum Master
- Define sprint backlog

Do **1. Product Owner** identifies needed features

2. Developers identify tasks required to deliver features

3. Developers develop a task list

4. Developers compute time needed to complete task list

until development time < sprint duration (2-4 weeks)

- Define sprint goal: business purpose for tasks in this sprint
 - e.g. define and implement the UI
- Create “Definition of Done”





How do we know it's “done”?

- Definition of Done
 - Everyone (Product Owner and Development Team) must agree on what it means for a backlog item to be "Done"
- This might depend on what the larger organization expects of items for delivery
- This might depend on what the team chooses for standards, e.g.
 - Code passes separate QA process?
 - Code reviews?
 - Documentation available

**ARE WE
DONE
YET?**

Daily Standup Meeting

- Who: Dev Team, Scrum Master, [Product Owner optional]
- Features and priorities are "**"locked" (or frozen)** for duration of sprint
 - Provides stability for developers during the sprint
- Team meets daily to discuss progress – daily standup meeting
 - Need to monitor progress and adapt to changes
 - Each developer reports:
 - what they did since last Scrum
 - what they will do before next Scrum
 - what impediments require action
- Developers create a new build at least once per day



Daily Standup Meeting

Creative ways to limit the length of the daily standup



<https://www.linkedin.com/pulse/daily-plank-meeting-going-agile-literally-jeyaraj-nagarajan>



Sprint Review Meeting

Who: Product Owner, **Stakeholders**, Dev Team, Scrum Master

Demonstrate features implemented during the sprint to the customer

Review progress

- compare planned features to actual features
- re-estimate incomplete features and add to product backlog
- collect new features as user stories
- update product architecture if needed



Reflect on sprint –What went well? What must improve?

Brainstorm and plan for next sprint

Informal---no PowerPoint allowed

Sprint Retrospective Meeting

- Who: Development Team, Scrum Master
- **Reflect** on process
 - What are we doing well?
 - What can we improve?
 - What surprised us?
- **Improve** the process for the next sprint
- **Next**: start Sprint Planning for next Sprint
 - Which features needed most?
 - Revise the Product/Release back log

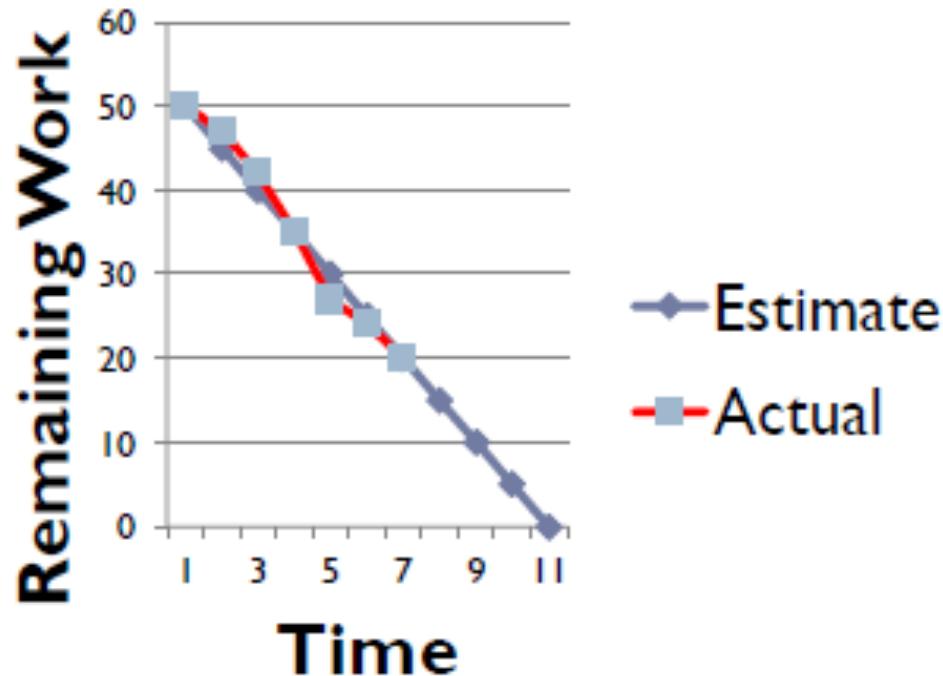
SPRINT RETROSPECTIVE



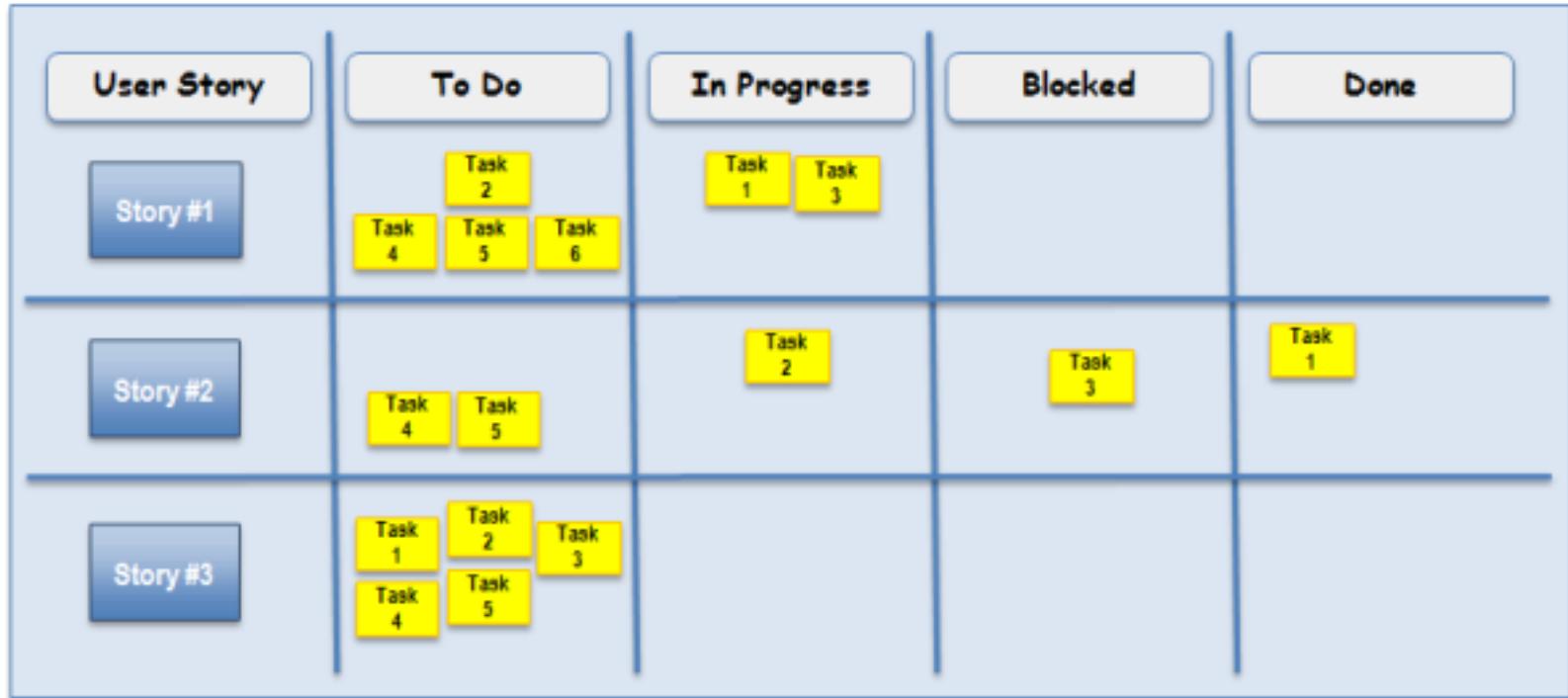
Sprint Artifacts

- Product/Release/Sprint backlog
 - Prioritized lists of desired features
- Burn Down Charts
 - Track project status

User Story	To Do	In Progress	Blocked	Done
Story #1	Task 2 Task 4 Task 5 Task 6	Task 1 Task 3		
Story #2	Task 4 Task 5	Task 2	Task 3	Task 1
Story #3	Task 1 Task 2 Task 3 Task 4 Task 5			



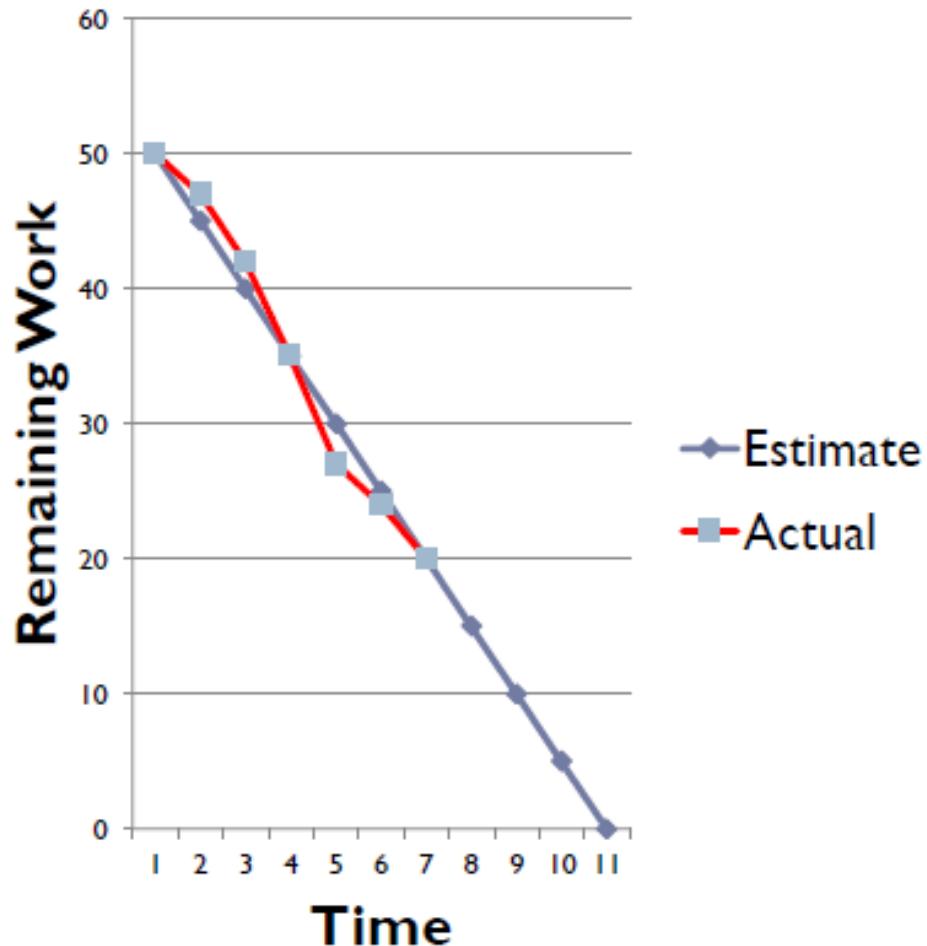
Backlogs – Tracking Progress



Source: <https://entwickler.de/webandphp/daily-scrums-explained-125851.html>

Burn Down Chart

- Graphical view of **accomplishments** and **remaining work**
- Maintained by Development Team
- May show estimated and actual values
- Slope of line is **Velocity**
 - Used to predict the end of project
 - Estimate when all features will be complete





What could possibly go wrong?

Manifesto for Half-Arsed Agile Software Development

We have heard about new ways of developing software by paying consultants and reading Gartner reports. Through this we have been told to value:

Individuals and interactions over processes and tools

and we have mandatory processes and tools to control how those individuals (we prefer the term 'resources') interact

Working software over comprehensive documentation

as long as that software is comprehensively documented

Customer collaboration over contract negotiation

within the boundaries of strict contracts, of course, and subject to rigorous change control

Responding to change over following a plan

provided a detailed plan is in place to respond to the change, and it is followed precisely

That is, while the items on the left sound nice in theory, we're an enterprise company, and there's no way we're letting go of the items on the right.

Cobbled together one Saturday morning before breakfast by Kerry Buckley (@kerryb), following [an article](#) by Ron Jeffries and [this suggestion](#) from Eastmad.

<http://www.halfarsedagilemanifesto.org/>

Committed, not just *Involved*



Product Owner, Scrum Master, and developers must be **committed** for success, not just **involved**.



Scrum Bad Smells

Bad Smell	Symptom	Solution
Loss of Rhythm	Sprints with various lengths	Fixed length sprints to encourage rhythm
Talking Chickens	Daily standup meetings lose effectiveness when non-developers ask questions	Managers may listen during daily standup meetings, but only developers may ask questions
Missing Pigs	Critical people missing from the daily standup meeting	Schedule the daily standup at the same time every day and insist that all critical people attend
Unrealistic estimates	The velocity on burn down charts doesn't change from sprint to sprint	Estimates should improve as the team has more experience working together. Learn from your experience and mistakes

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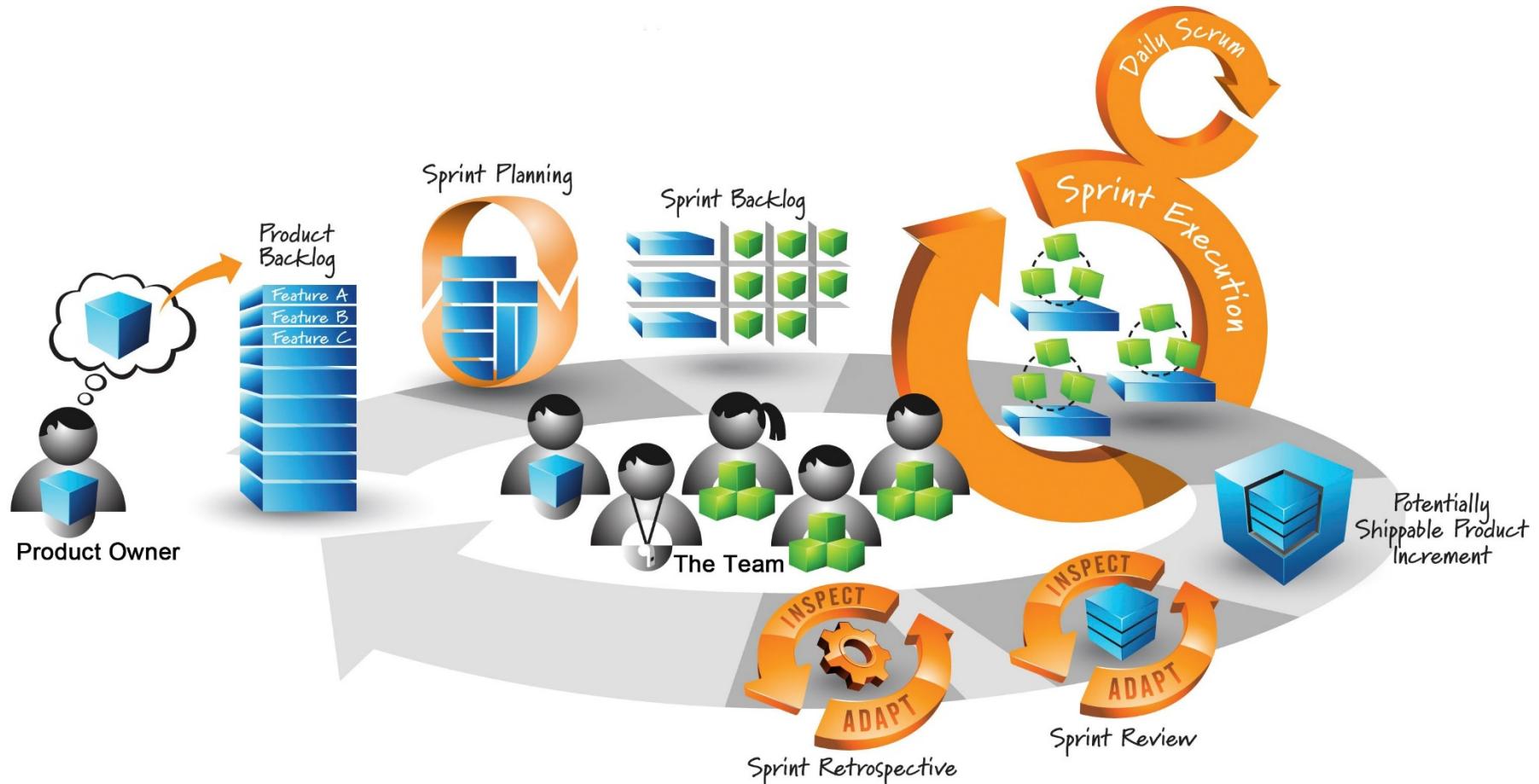


Scrum Bad Smells

Bad Smell	Symptom	Solution
Scrum master assigns work	Scrum master assigns tasks, rather than the developers sign up	Developers are responsible for self organization
Daily standup meeting is for the scrum master	Developers are not engaged in the standup meeting and the scrum master only tracks progress	Focus on discussion of progress and issues. Each developer should commit to team. Use guilt as a positive tool!
Specialized roles	Team members assume specialized roles, e.g. architect, tester, ...	The team is responsible for overall success of the project. Everyone should do whatever is needed.

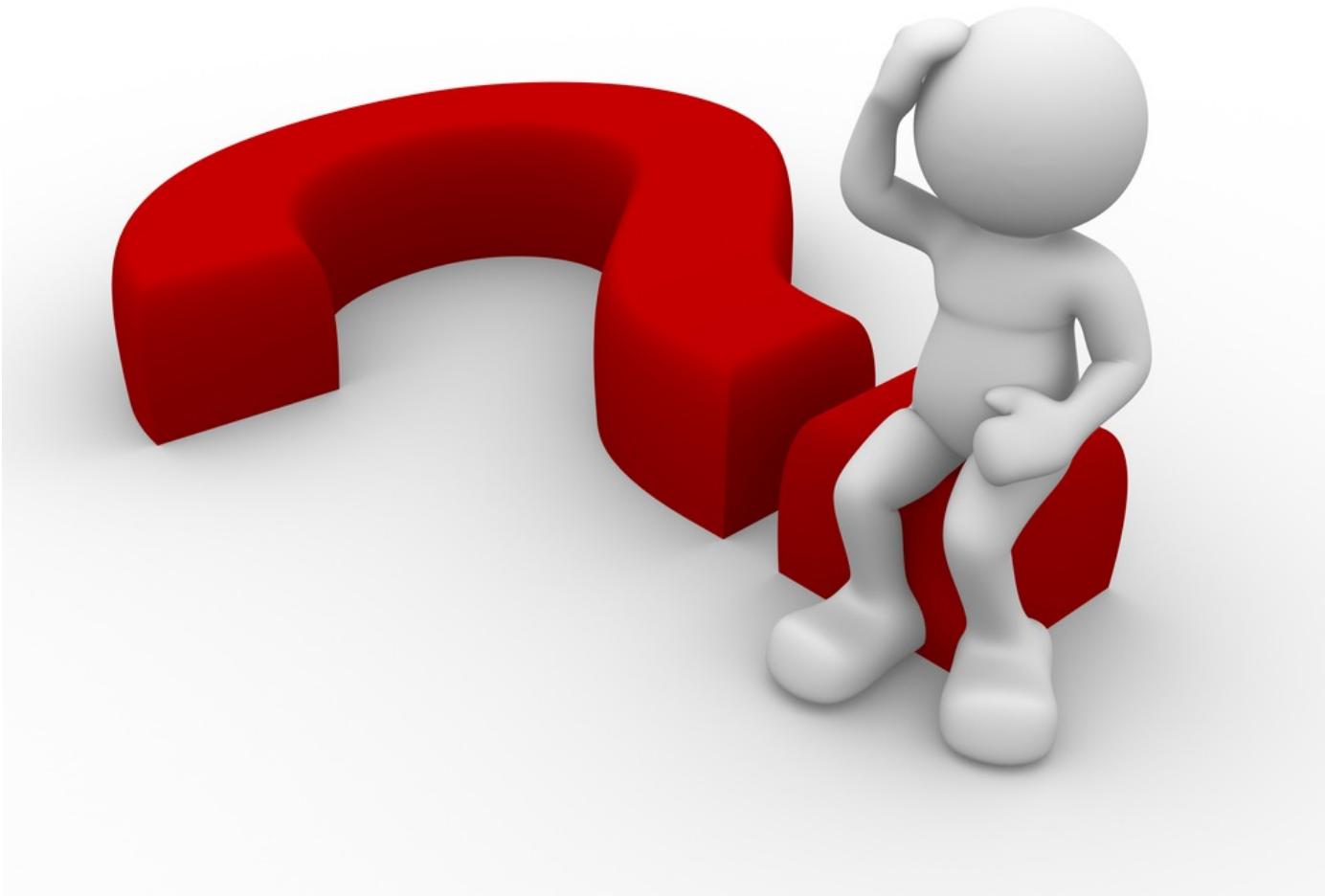
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Scrum Process



<http://www.innolution.com/essential-scrum/table-of-contents/chapter-2-scrum-framework>

Questions?





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Thank You