SSW-555: Agile Methods for Software Development

Scrum

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Acknowledgements

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:

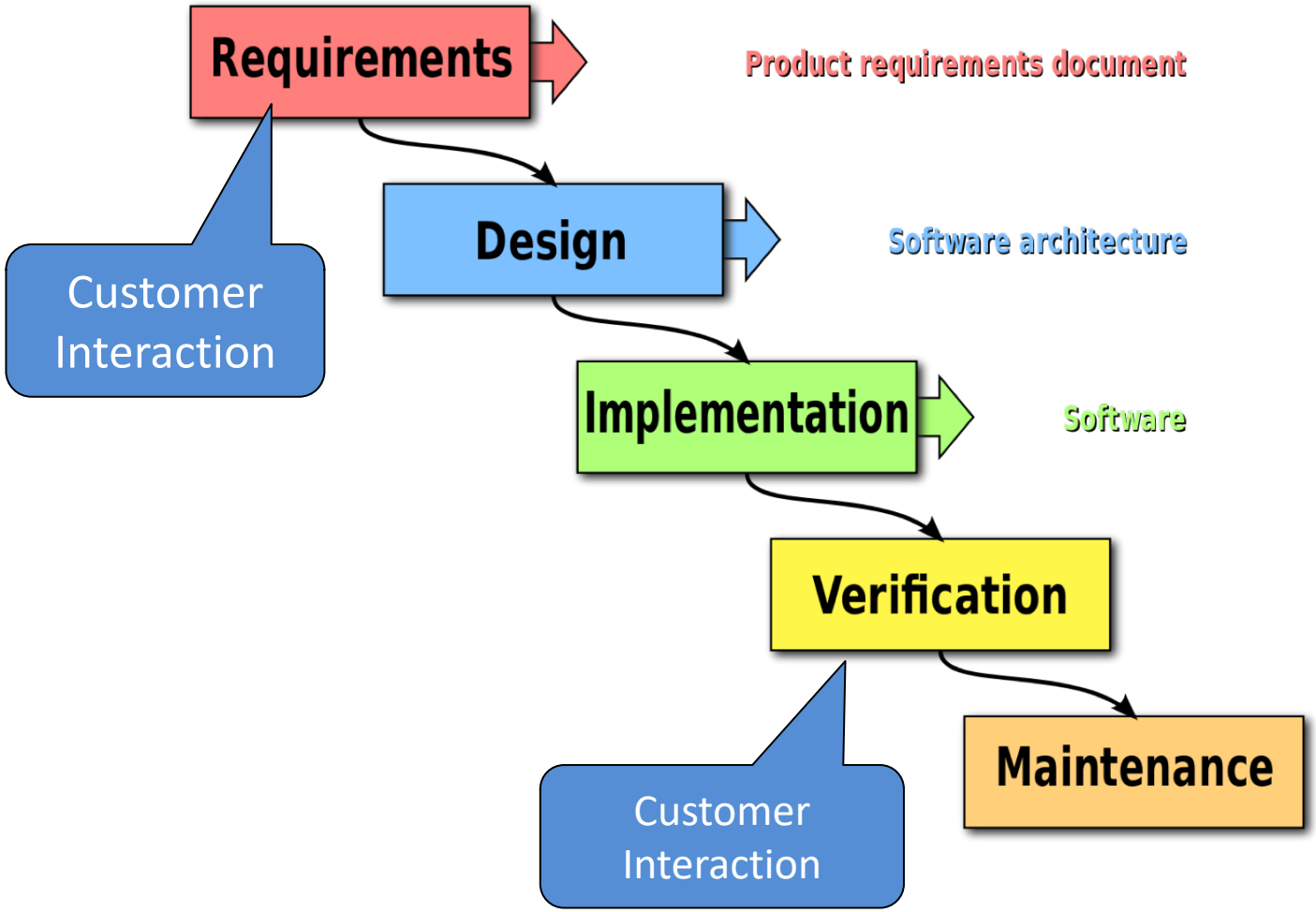
may be predicted from the task

may be measured in the environment

Management consists of controlling and/or measuring the variables

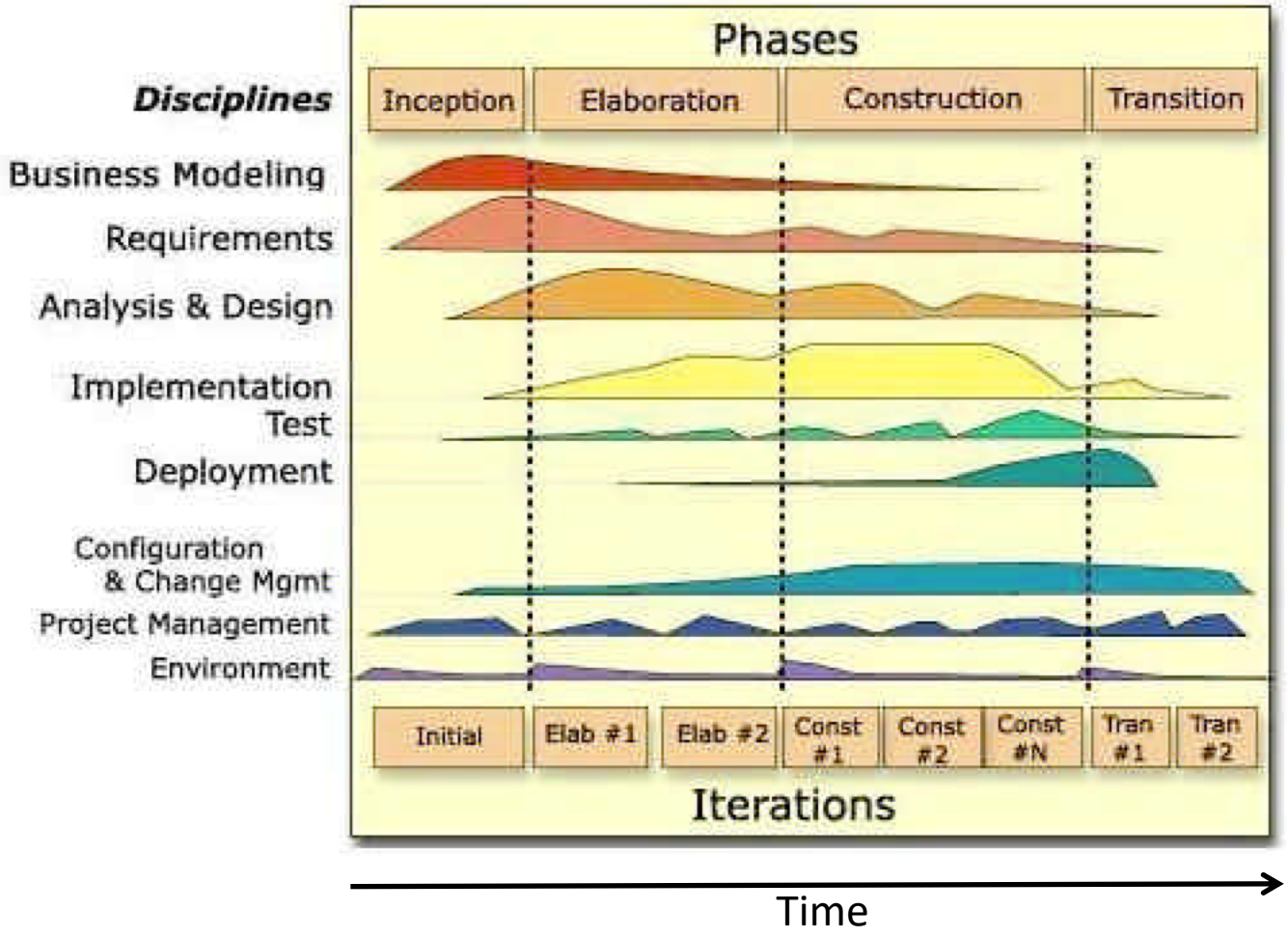
Unfortunately, software projects don't always work that way…

Waterfall model



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

RUP phases, iterations and disciplines



RUP®
Rational Unified Process®

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

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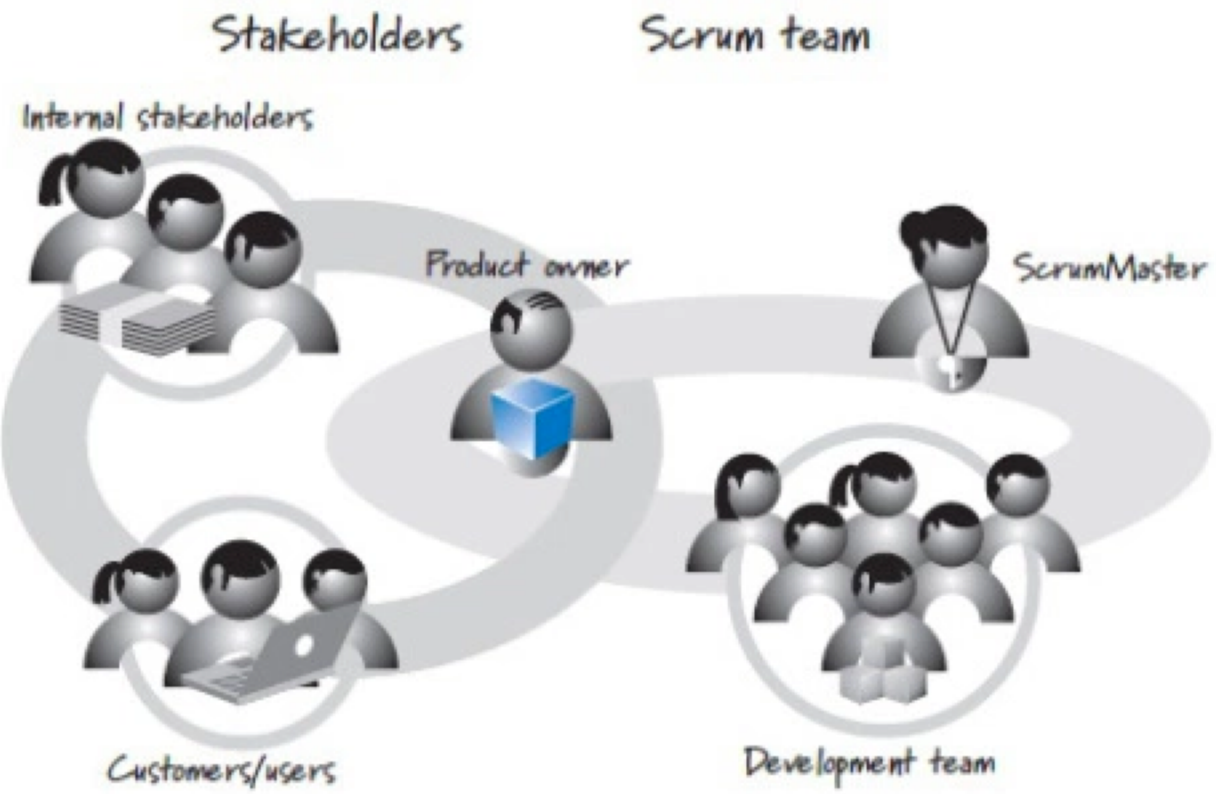
http://www.innolution.com/essential-scrum/table-of-contents/chapter-2-scrum-framework

Scrum roles



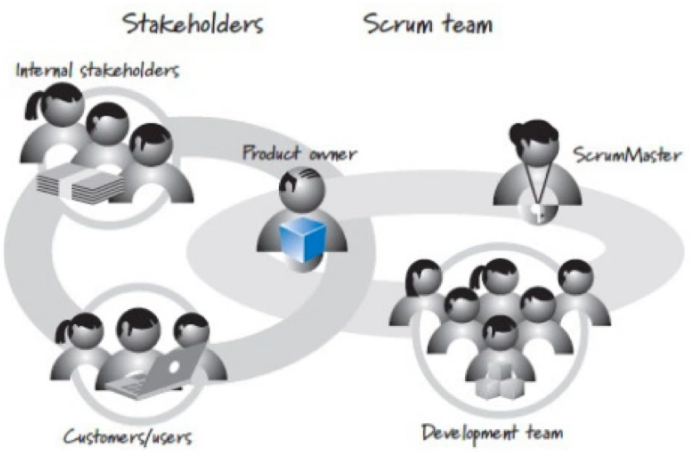
Source: https://chintanjariwala.files.wordpress.com/2016/05/po.jpg?w=507&h=322

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)

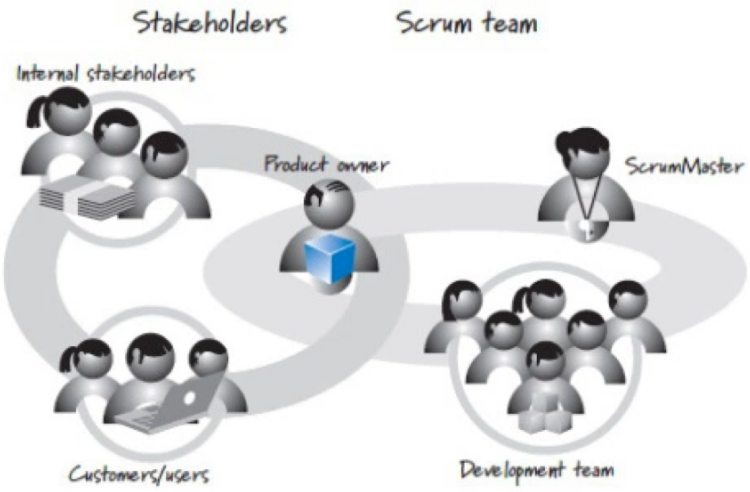
- Communicates with stakeholders/investors

Product Owner

Has final say over the product and releases

Manages and maintains the Product Backlog of desired features

- Sets priorities for sprints so developers are always working on most important features



Decides whether to release increments to customers/users

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

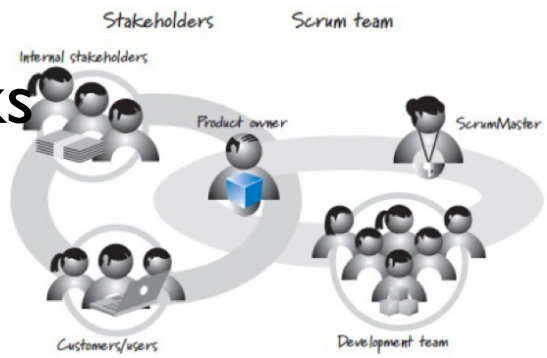
Small, cross-functional, self-sufficient group

- 3-10 software developers
- Possess all needed skills: development, test, specialists

Self-organizing team

- ***Team*** chooses process, roles, and tasks
  - Not the "boss"

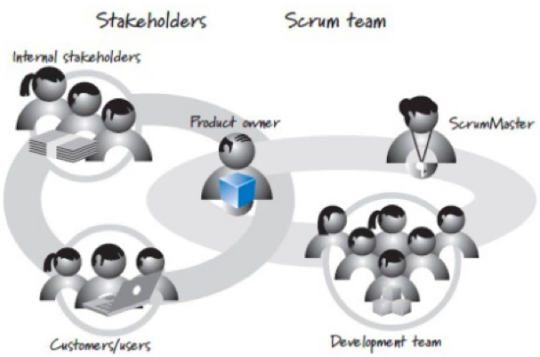
Ideally, co-located in one location



Scrum Master

Helps development team practice Scrum

- Helps team with Best Practices
- Manages the Scrum artifacts
  - Burn Down charts
  - Kanban Boards

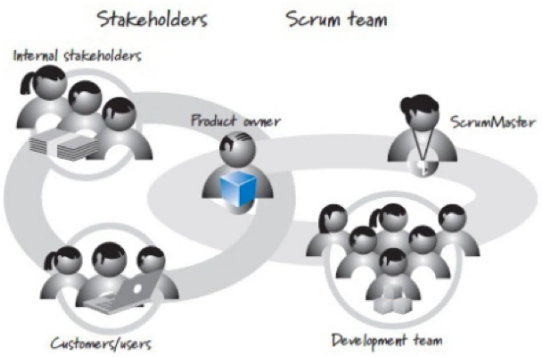


Has no authority over the team (not the boss)

- Does not make technical or business decisions
- Developers "report" to the team, not to the Scrum Master

Protects the development team from outside interference

Scrum Master



Manages interactions outside the team
- Protects the team from interference
- Clears any roadblocks

Minimize surprises by maximizing communication

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 One scrum team One project	Mid-sized company Multiple scrum teams Independent projects	Large Multi-national Many scrum teams single project
One Scrum Team One project	Multiple scrum teams Multiple projects	Many Scrum teams One large project
Roles: • Product Owner: Marketing/Sales Director • Dev Team: 3 developers, 1 tester, multiple roles • Scrum Master: developer	Roles: • Stakeholders: Sales/Account managers • Product Owner: Product owner • Dev Team: 10-12 developers, 4 testers dedicated roles • Scrum Master: Dedicated Scrum Master	Roles: • Stakeholders: CIO, CTO, CFO, VPs • Product Owner: Product Manager for each part • Dev Teams: Multiple teams of 10-12 developers, 4 testers dedicated roles • Scrum Master: Dedicated Scrum Masters

Backlogs – what must be accomplished

Product Backlog

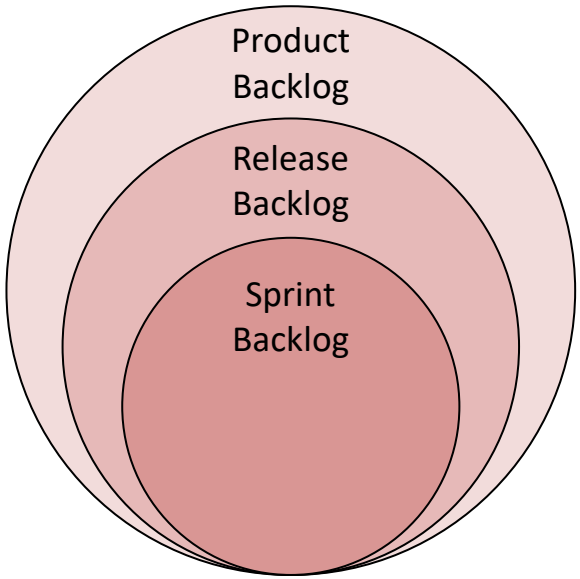
- all features needed in product or service
- any stakeholder can add items, including development team
- may include non-visible features, like underlying technology

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

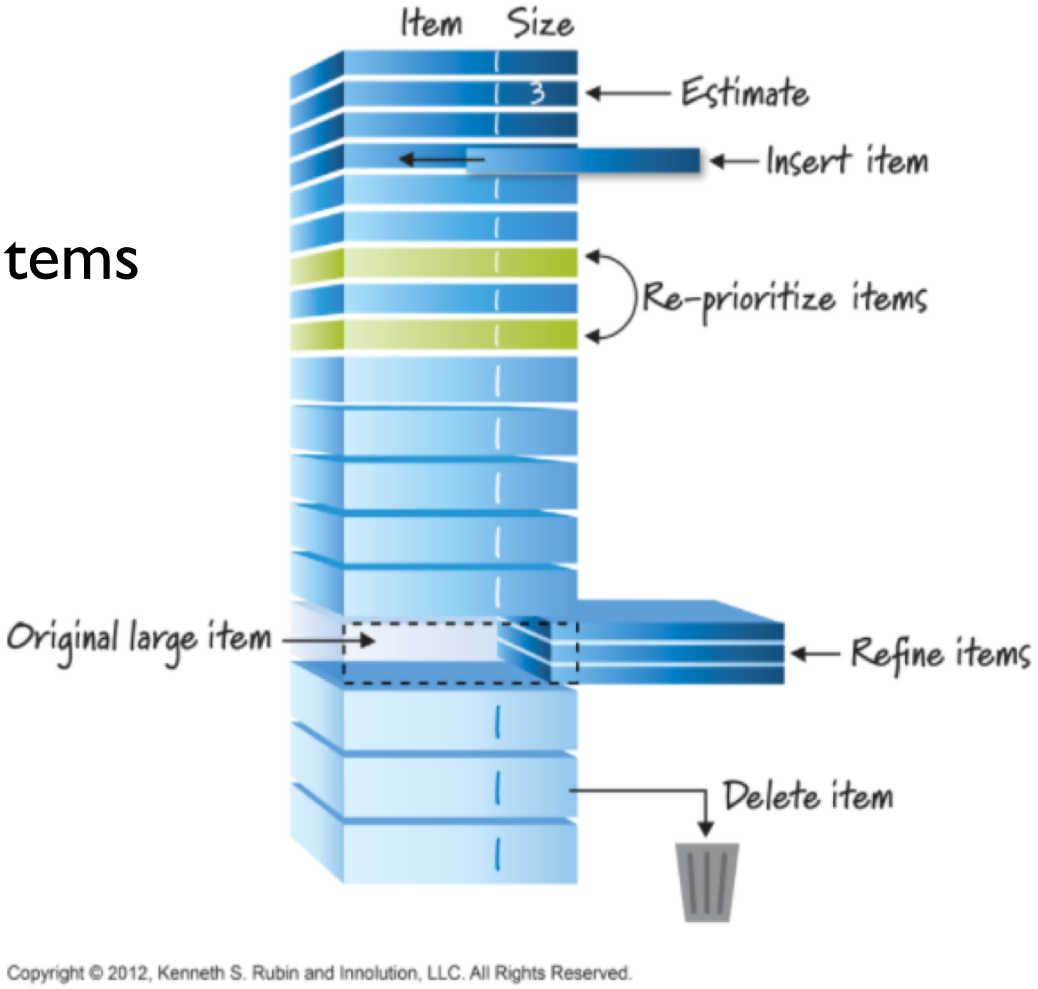
- **D** • **Detailed Appropriately:** High priority items have more detail
- **E** • **Emergent:** Allows **f**requent changes to meet changing needs
- **E** • **Estimated:** Effort is estimated by developers
- **P** • **Prioritized:** Current priority assigned by Product Owner

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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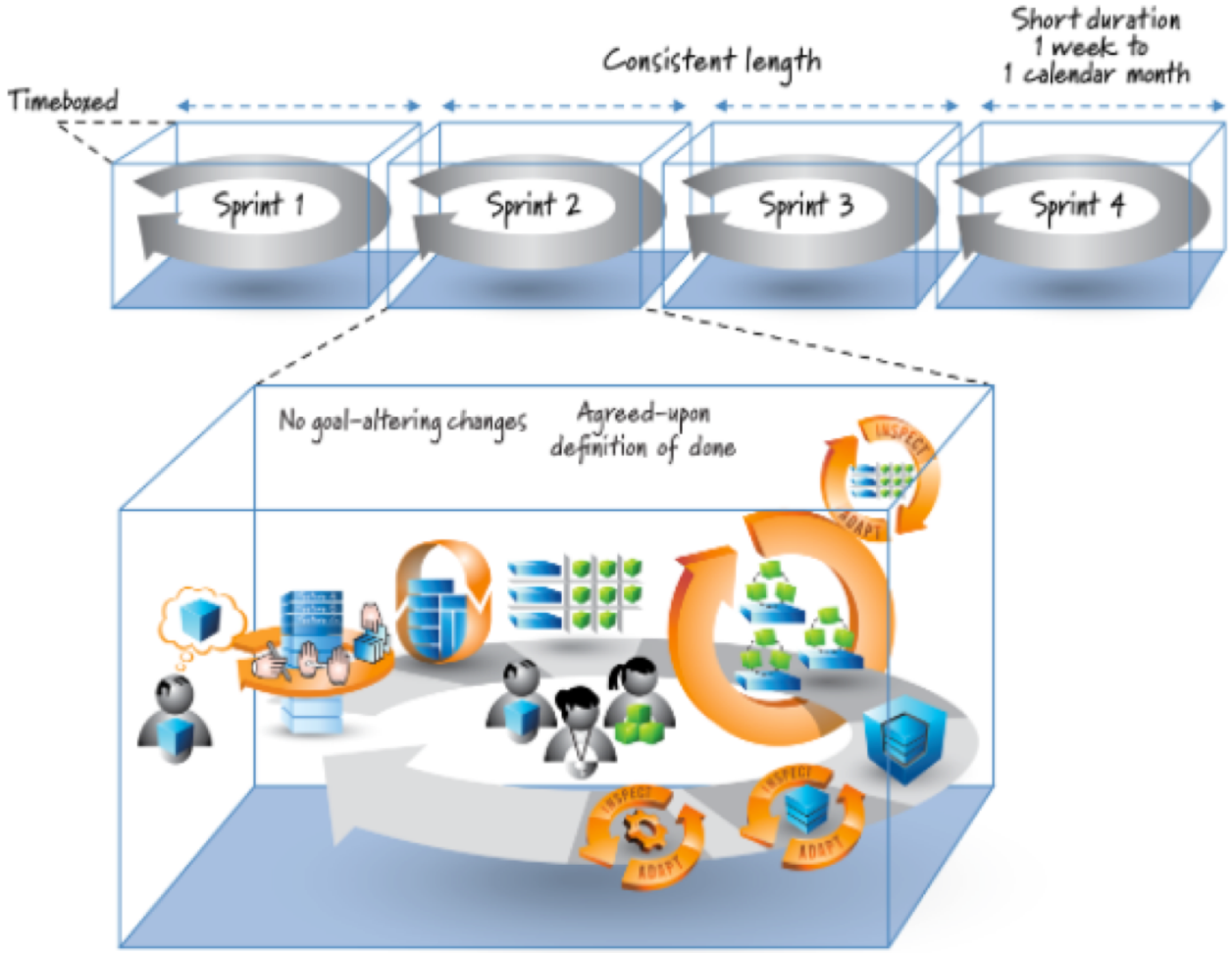
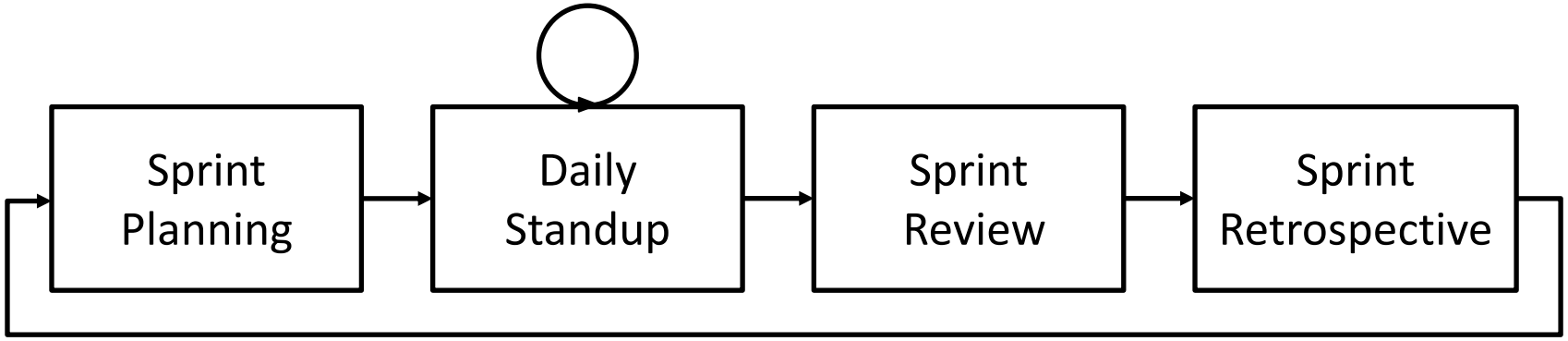
Sprints



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

Scrum Meetings



	Sprint Planning	Daily Standup	Sprint Review	Sprint Retrospective
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?

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

Define 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?

Daily Standup Meeting

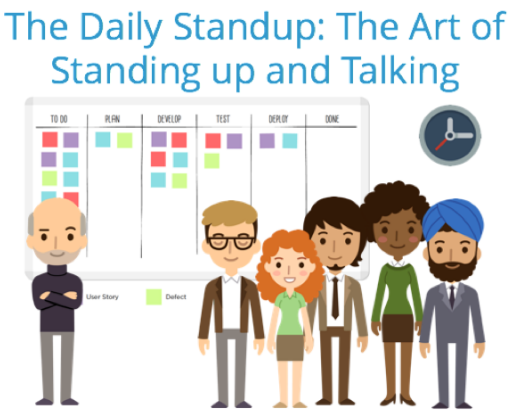
Who: Dev Team, Scrum Master, [Product Owner optional]

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
- Managers may observe but do not participate



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?

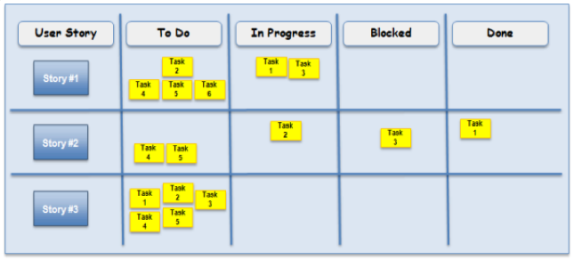
Improve the process for the next sprint

Next: start Sprint Planning for next Sprint

Which features needed most?

Revise the Product/Release back log

Sprint Artifacts

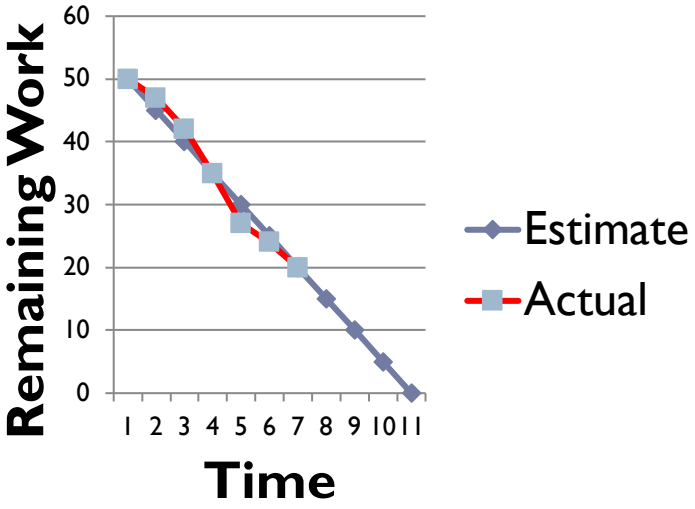


Product/Release/Sprint backlog

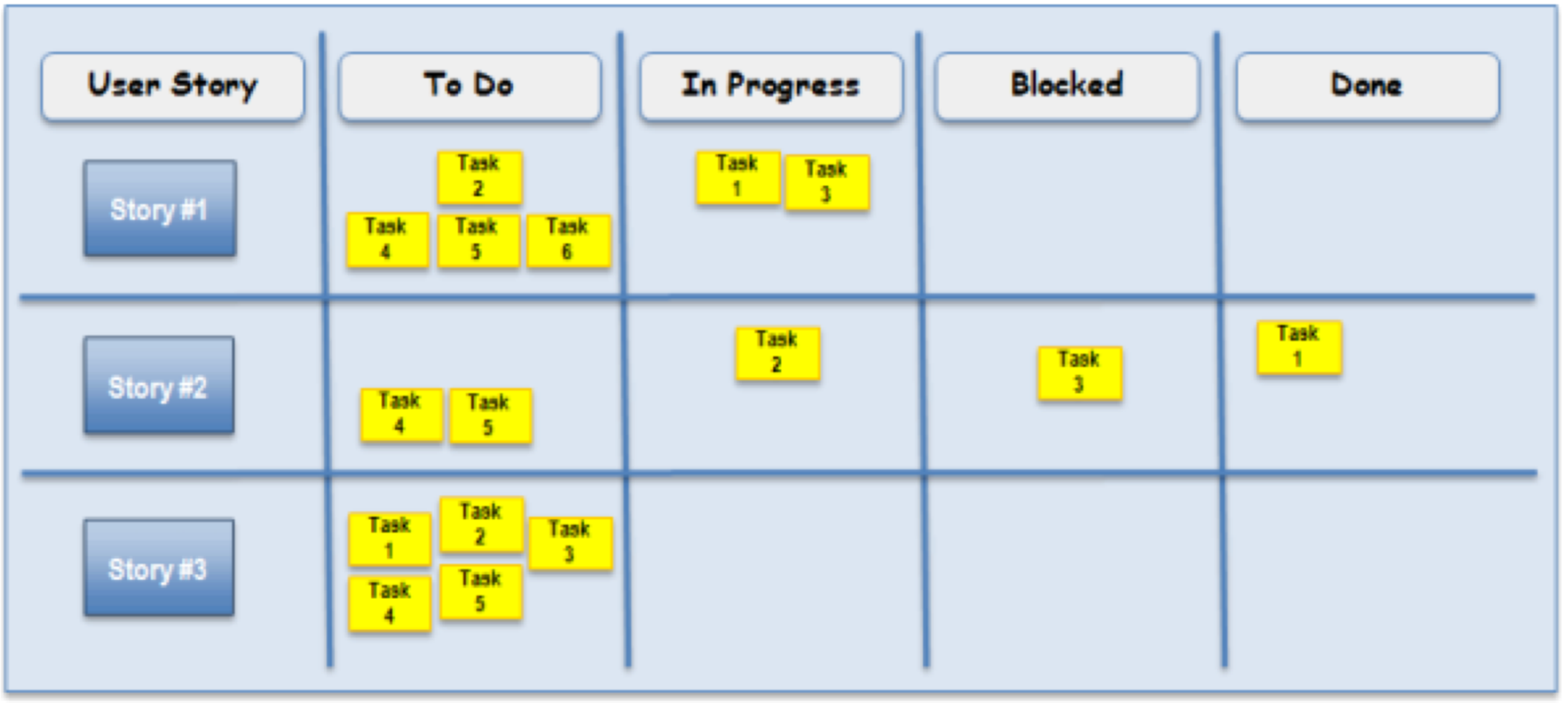
- Prioritized lists of desired features

Burn Down Charts

- Track project status

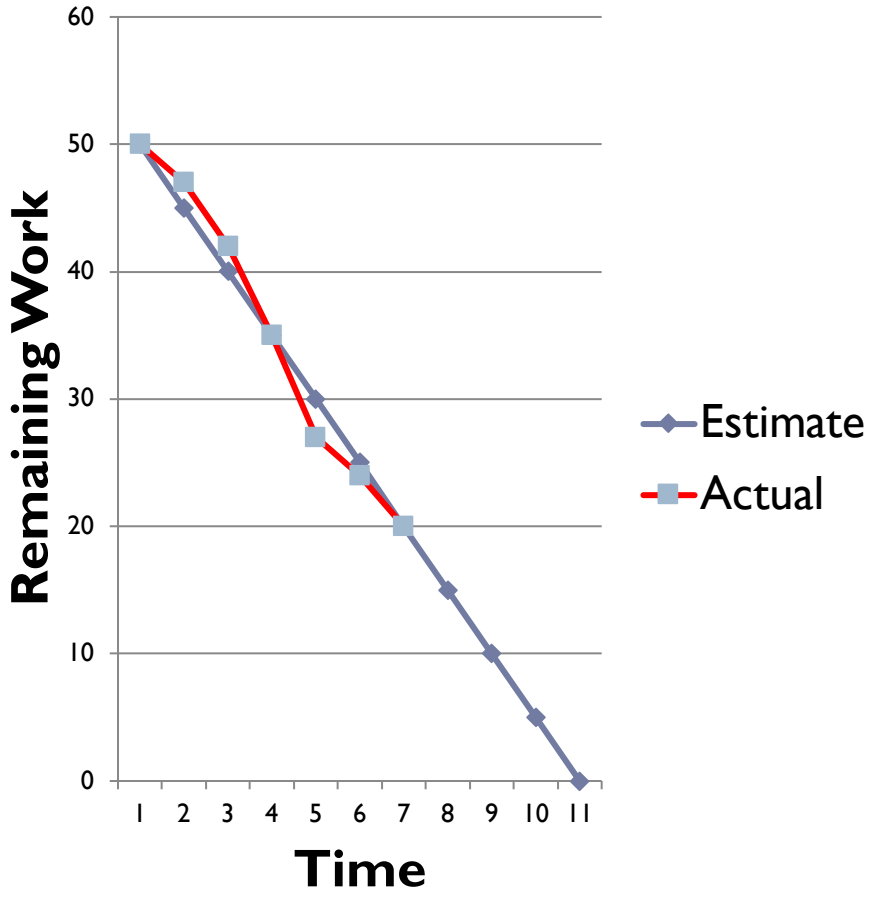


Backlogs – Tracking Progress



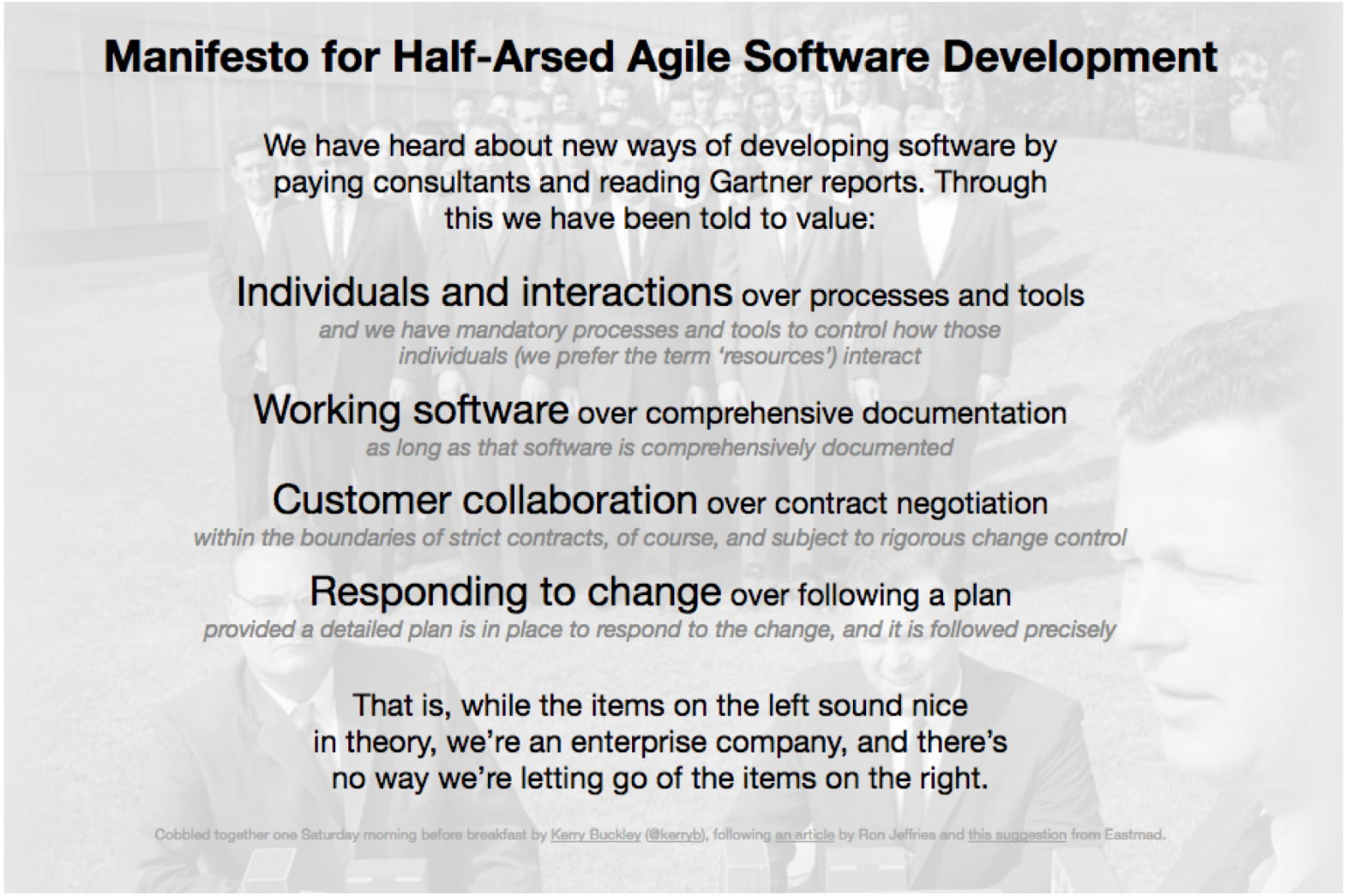
Source: https://entwickler.de/webandphp/daily-scrums-explained-125851.html

Burn down chart



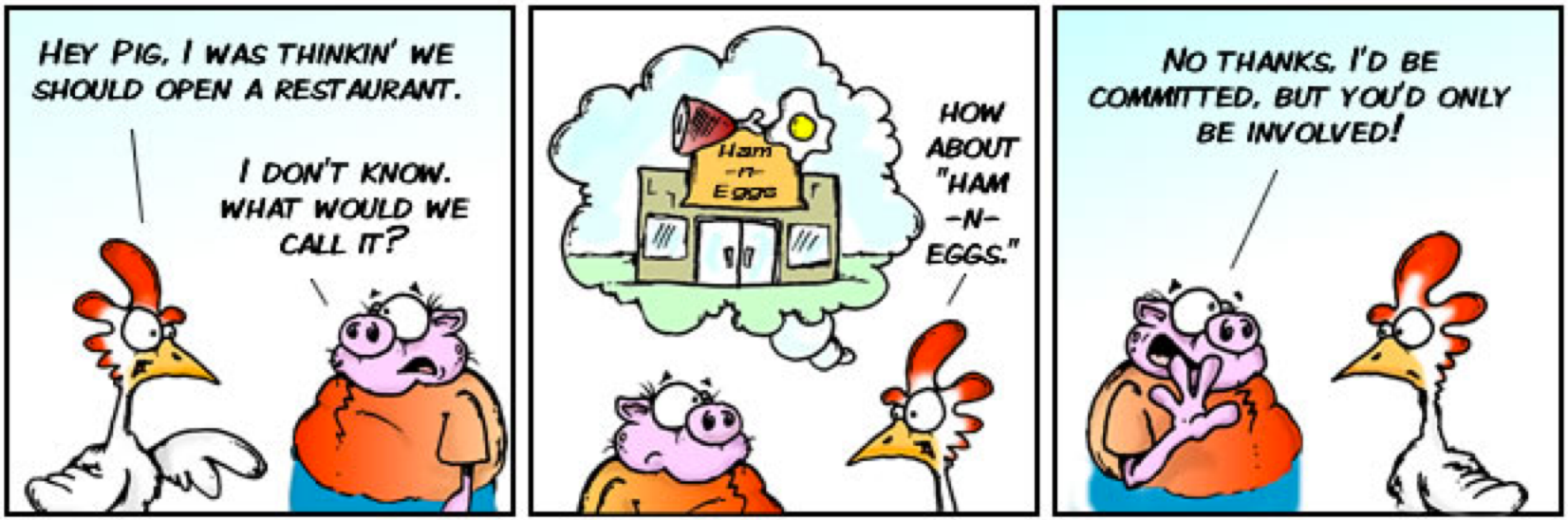
- Graphical view of accomplishments and remaining work
- Maintained by Development Team
- May show estimated and actual values
- Slope of line is Velocity
  - Used to predict the end of project
  - Estimate when all features will be complete

What could possibly go wrong?



http://www.halfarsedagilemanifesto.org/

Chickens and Pigs



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 from sprint to sprint	Estimates should improve as the team has more experience working together. Learn from your experience and mistakes

https://www.mountaingoatsoftware.com/articles/toward-a-catalog-of-scrum-smells

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.

https://www.mountaingoatsoftware.com/articles/toward-a-catalog-of-scrum-smells

Scrum Process

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

Questions?