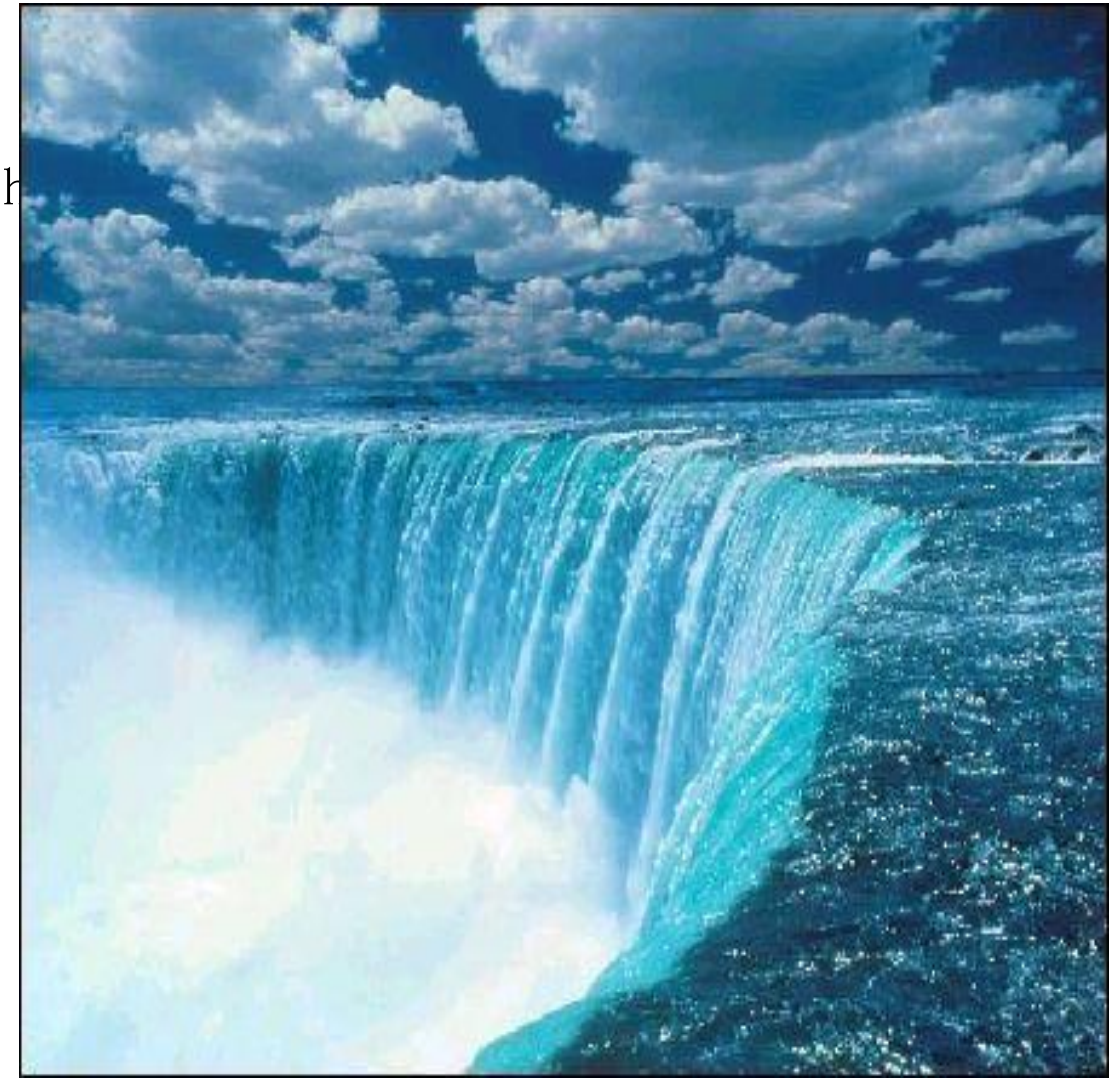
AGILE DEVELOPMENT WITH SCRUM

Rex Suresh

SEPTEMBER 2011

Traditional approach

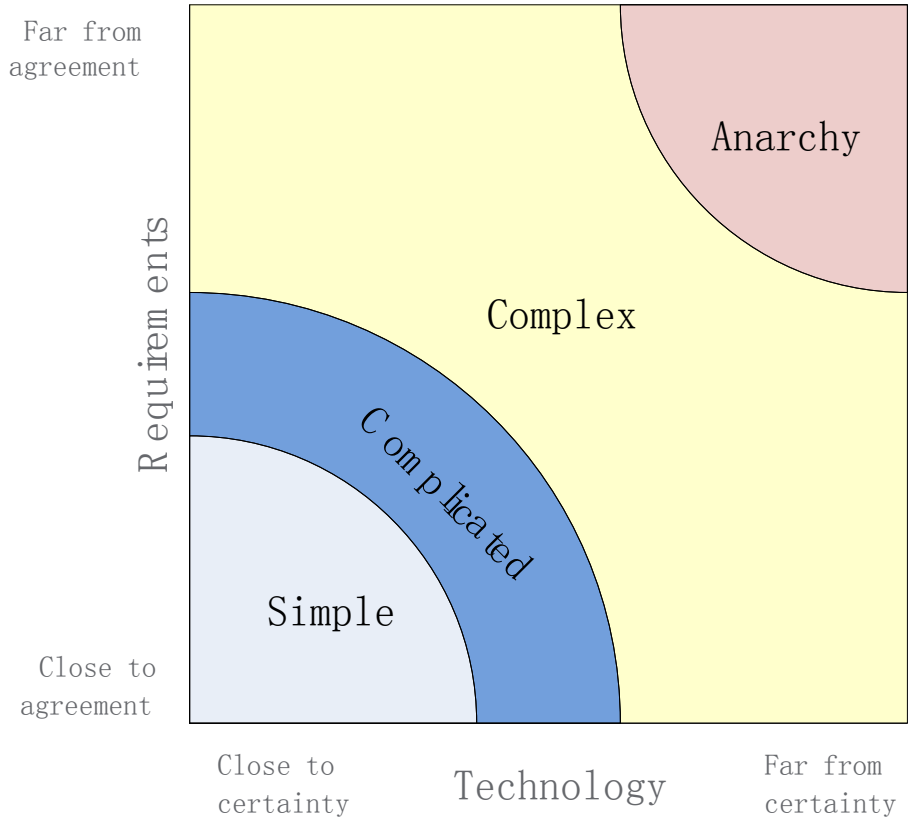
- What are the risks with th approach?
  - Waterfall approach delivered all features at the end of the project
    - Cause bottleneck
  - Produce delays
  - Reduced Testing Time for all parties



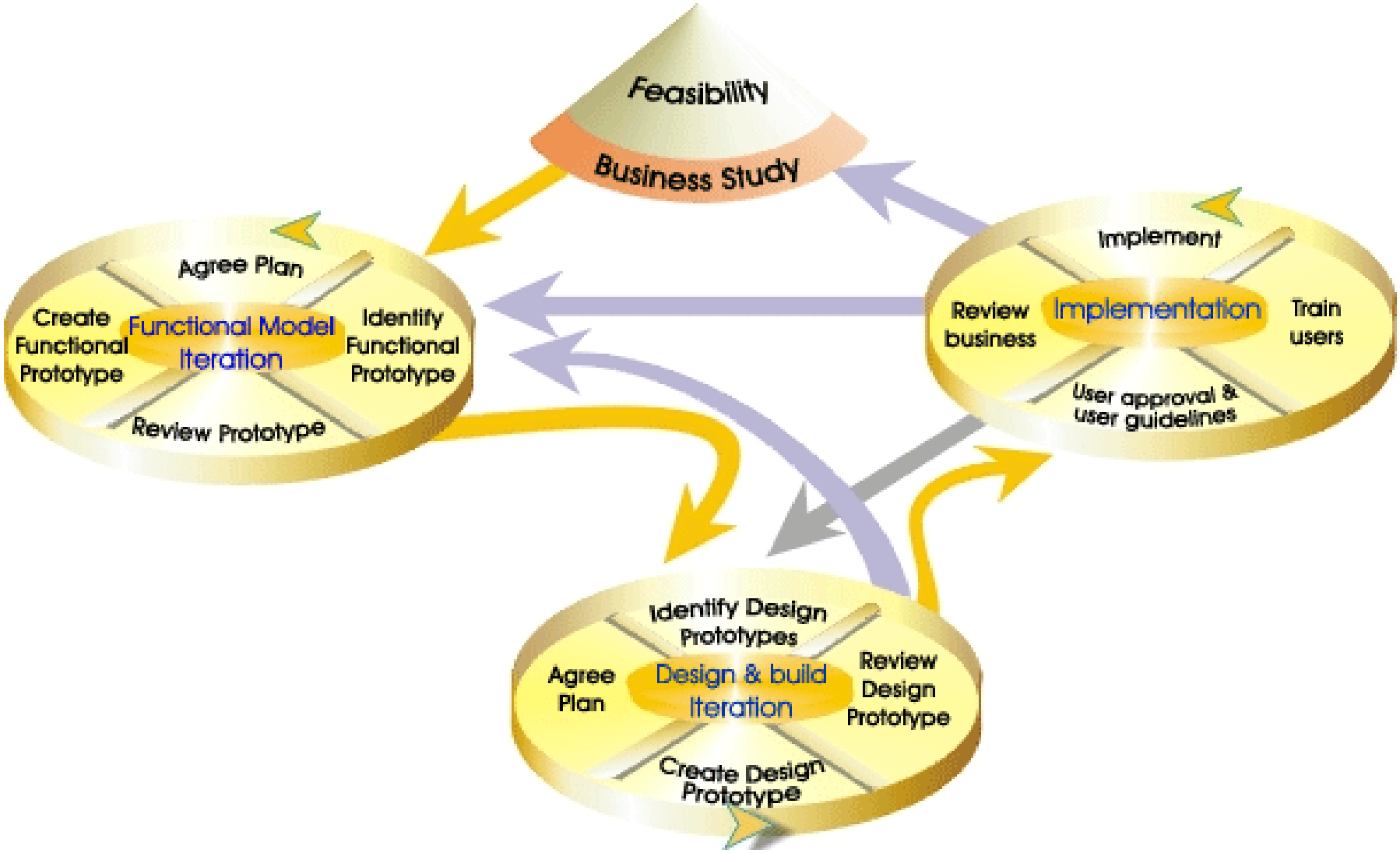
About Scrum

- Is an agile process
- Products developed in a series of iterations or “sprints”
- Requirements are captured as a list of items on a product backlog
- Teams are self organizing
- No engineering practices specified

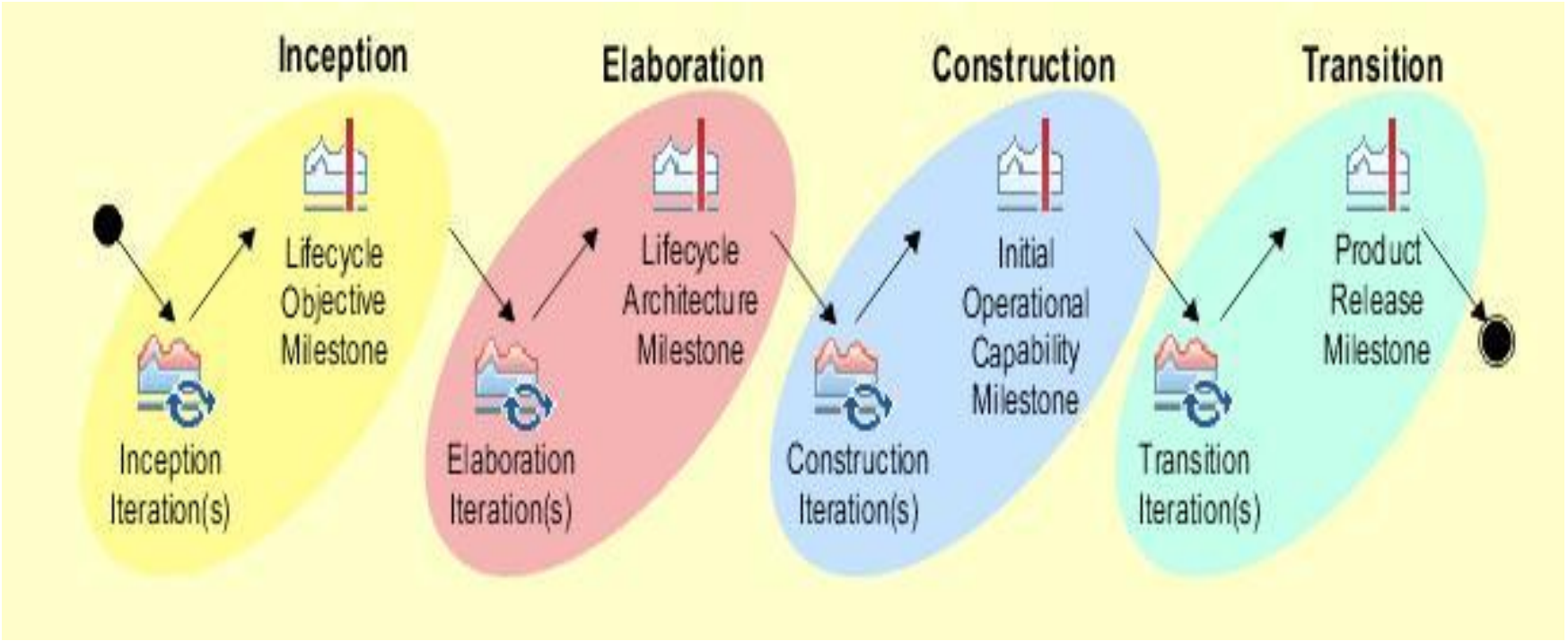
Project Complexity

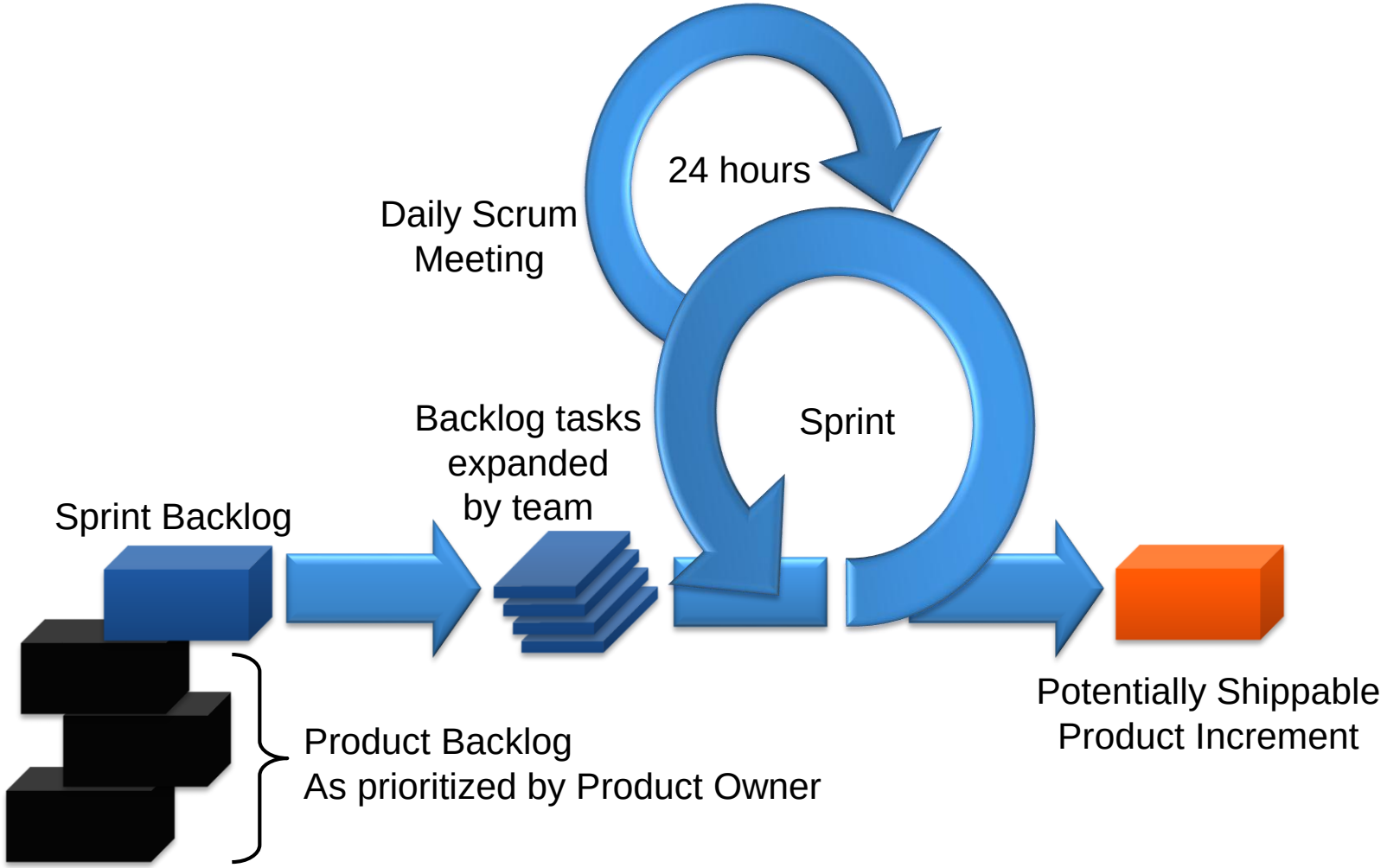


Agile iterative approach



Iterative


Inception
Elaboration
Construction
Transition
Lifecycle Objective Milestone
Lifecycle Architecture Milestone
Initial Operational Capability Milestone
Product Release Milestone
Inception Iteration(s)
Elaboration Iteration(s)
Construction Iteration(s)
Transition Iteration(s)


24 hours
Daily Scrum
Meeting
Backlog tasks
expanded
by team
Sprint
Sprint Backlog
Potentially Shippable
Product Increment
Product Backlog
As prioritized by Product Owner

About Scrum

- SCRUM is an agile, lightweight process that can be used to manage and control software and product development using iterative, incremental practices

- Applied to software development, it refers to the organisation and management technique used to successfully deliver software in a chaotic environment

- The term comes from the sport of rugby, where it refers to the process used to get the ball back into play. Everybody in the pack acts together with everyone else to move the ball down the field

Benefits Of Scrum

At its core, Scrum is an iterative, incremental process for developing any product or managing any work that produces a potentially shippable set of functionality at the end of each iteration

Scrum's benefits are:

- Scrum is an agile process to manage and control development work.
- Scrum is a wrapper for existing engineering practices.
- Scrum is a team-based approach to developing systems when requirements are changing rapidly.
- Scrum controls the chaos of conflicting interests and needs.
- Scrum improves communication and maximises cooperation.
- Scrum detects and removes anything that gets in the way of developing and delivering products.
- Scrum is a way to maximise productivity.
- Scrum scales from single projects to entire organisations, and has managed development for multiple interrelated products and projects with over a thousand team members.
- Scrum is a way for everyone to feel good about their job, their contributions, and know they have done the very best they possibly could.

- The simple rules of Scrum allow for continual inspection, adaptation, self-organisation, and emergence of innovation.

- It can produce an exciting product for the customer, foster great team spirit and satisfying work, and yield high productivity and customer satisfaction, and achieve the company financial goals.

- At the end of the day, Scrum is being widely adopted worldwide in companies large and small, localised or distributed, open source or proprietary, for virtually any type or size of project.

Roles

- Product Owner
- Scrum Master
- Scrum Team

Product Owner

- Manages the vision of the product
  - Establishes, nurtures and communicates the product vision. Achieves initial and on-going funding for the project by creating initial release plans and the initial Product Backlog
- Manages the ROI
  - Monitors the project against ROI and prioritizes the product backlog accordingly
- Decides when to schedule a release

The Scrum Master

- Represents management to the project
- Typically filled by a Project Manager or Team Leader
- Responsible for enacting Scrum values and practices
- Main job is to remove impediments

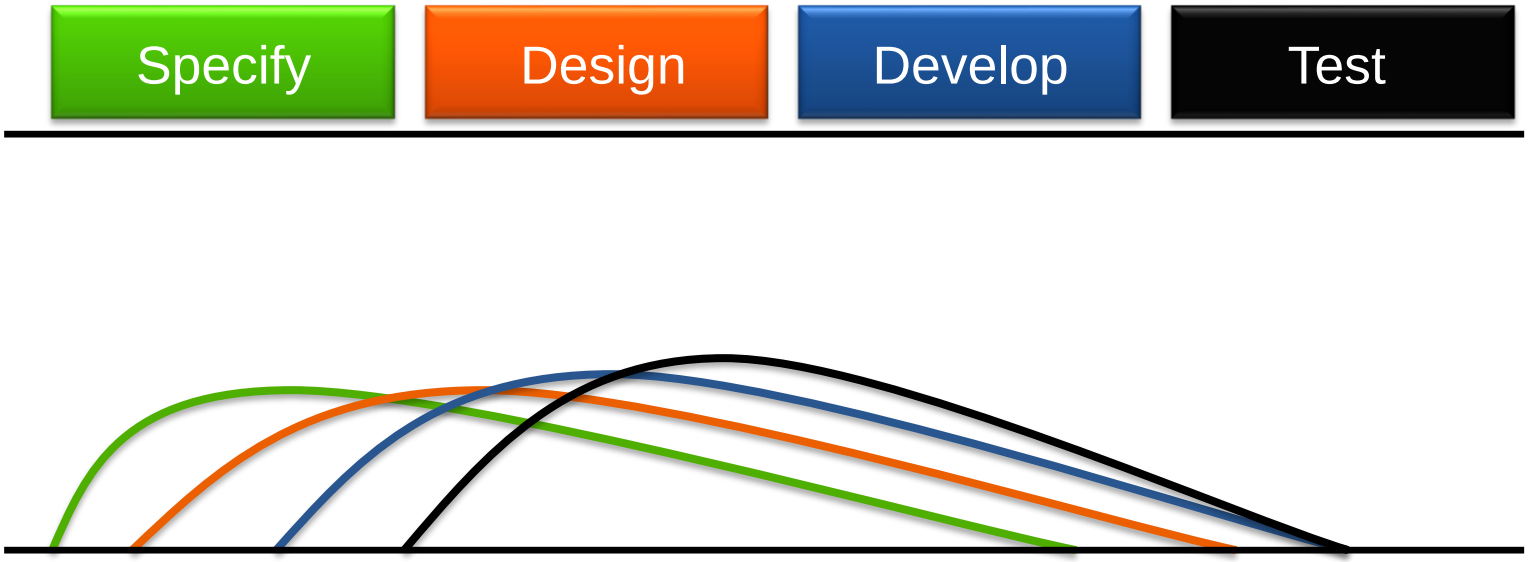
The Scrum Team

- Typically 5-10 people
- Cross-functional
  - QA, Programmers, UI Designers, etc.
- Members should be full-time
  - May be exceptions (e.g., System Admin, etc.)
- Teams are self-organizing
  - Ideally, no titles but rarely a possibility
- Membership can change only between sprints

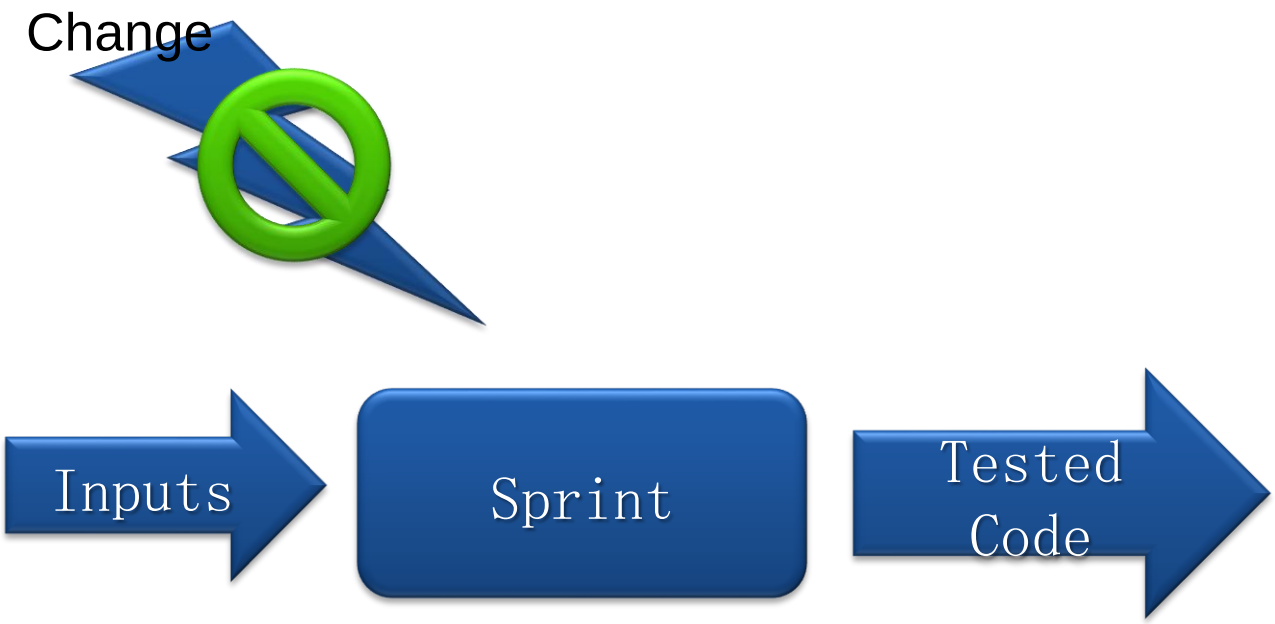
Sprints

- Scrum projects make progress in a series of “sprints”
  - Analogous to XP iterations
- Target duration is one month
  - +/- a week or two
    - But, a constant duration leads to a better rhythm
- Product is designed, coded, and tested during the sprint

Sequential vs. Overlapping Development



No changes during the sprint



- Plan sprint durations around how long you can commit to keeping change out of the sprint

Done

- What does “Done” mean for the project?
  - Spec written
  - Code checked in
  - Builds
  - Unit tests complete successfully
  - 80% code coverage on unit tests
  - Accepted by testers
  - Within acceptable defect levels
  - Etc.

Product Backlog

- A list of all desired work on the project
  - Usually a combination of
    - story-based work (“let user search and replace”)
    - task-based work (“improve exception handling”)
    - bugs
- List is prioritized by the Product Owner
  - Typically a Product Manager, Marketing, Internal Customer, etc.

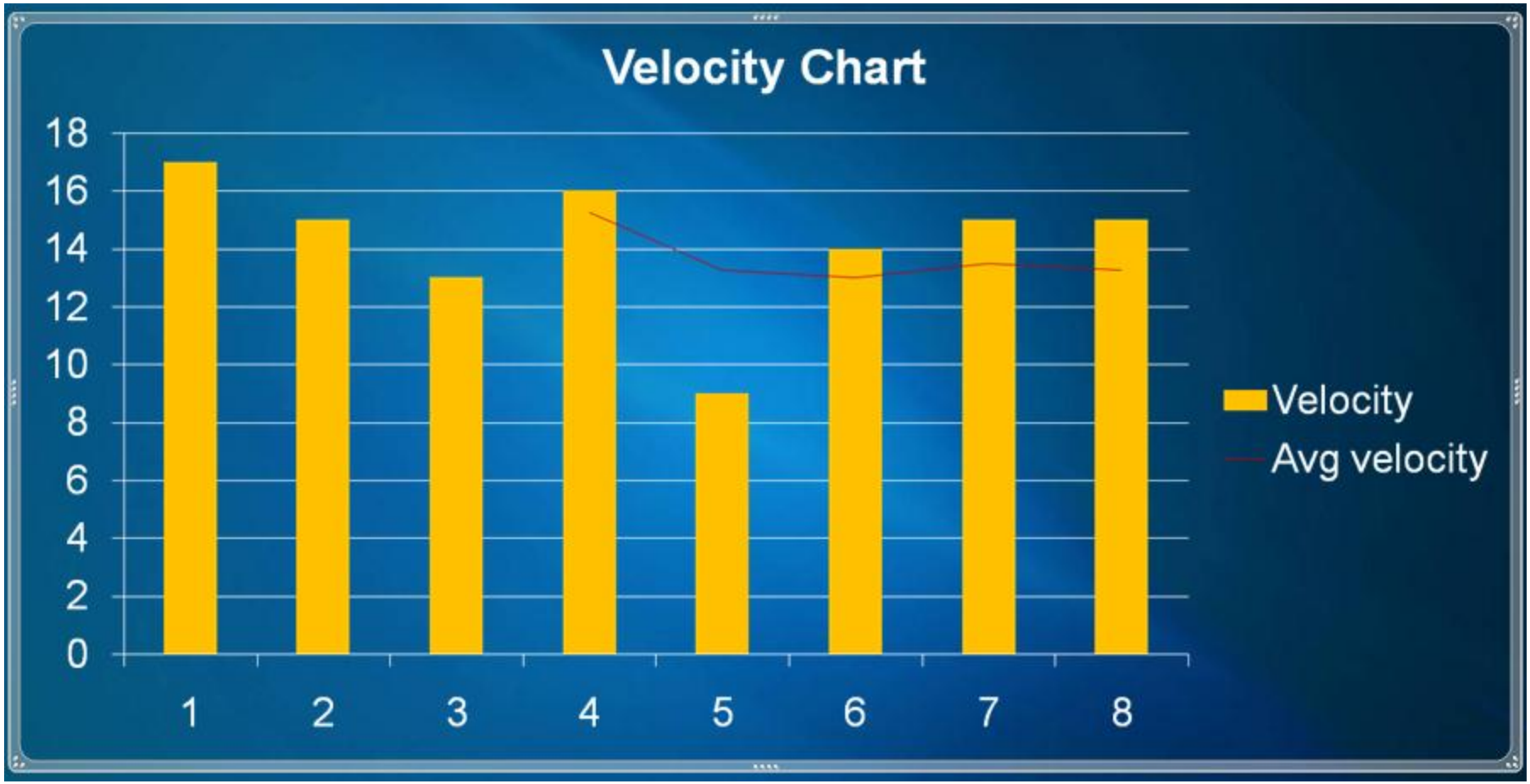
Estimating

- Accuracy is better than precision
  - People typically prefer precision
- Hard to estimate precisely and accurately
  - Relative estimation is easier
  - Prefer accuracy over precision
- Estimate relative size not time for PBI
  - Use arbitrary units, e.g. Story points (SP)
- Planning poker
  - Use sequences such as the Fibonacci Sequence

Project Velocity

- The velocity for a sprint is the number of SP completed in that sprint
- Usually calculate average (from top 3 over last n sprints)
- Used to
  - Convert SP cost to real time
  - Estimate completion of product backlog

Example Velocity Chart



Sample Product Backlog

Item	Description	Est
4	Users should see the EULA at start-up	1
1	Users must authenticate to use the application	1
5	Users can change the email address associated with their profile	5
3	Administrators can prevent users from logging on	8
6	Users see a “fortune cookie” after authenticating	2
2	Operations can monitor how many users are currently using the system	3

Average velocity = 9

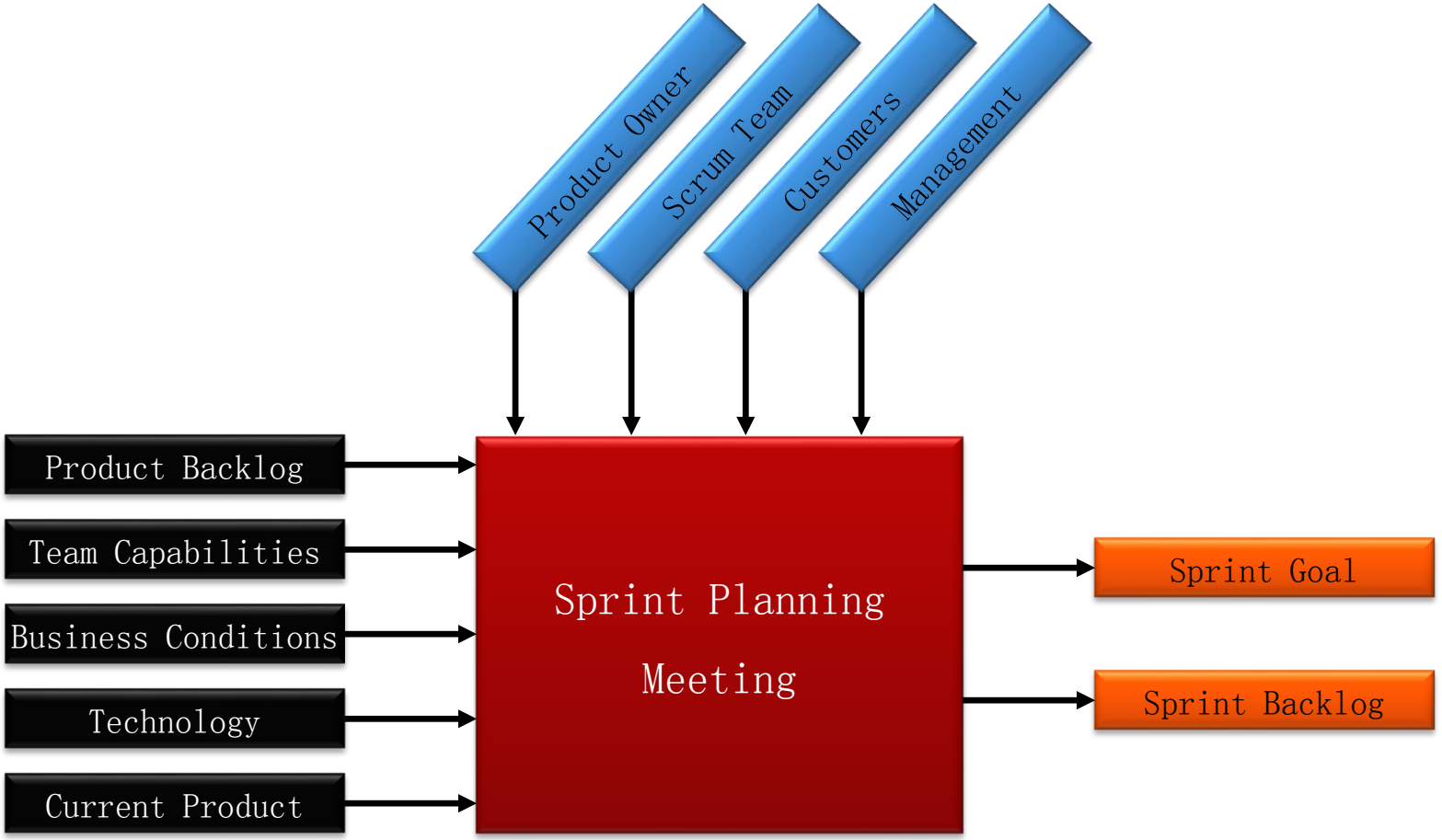
Min velocity = 8

Project length = 2 sprints

Will complete (min)

Should complete (avg)

Sprint Planning Meeting



The Sprint Goal

- A short "theme" for the sprint:

Life Sciences

"Support features necessary for population genetics studies."

Database Application

"Make the application run on SQL Server in addition to Oracle."

Financial Services

"Support more technical indicators than company ABC with real-time, streaming data."

From Sprint Goal to Sprint Backlog

- Scrum team takes the Sprint Goal and decides what tasks are necessary
- Team self-organizes around how they'll meet the Sprint Goal
  - Manager doesn't assign tasks to individuals
- Managers don't make decisions for the team
- Sprint Backlog is created

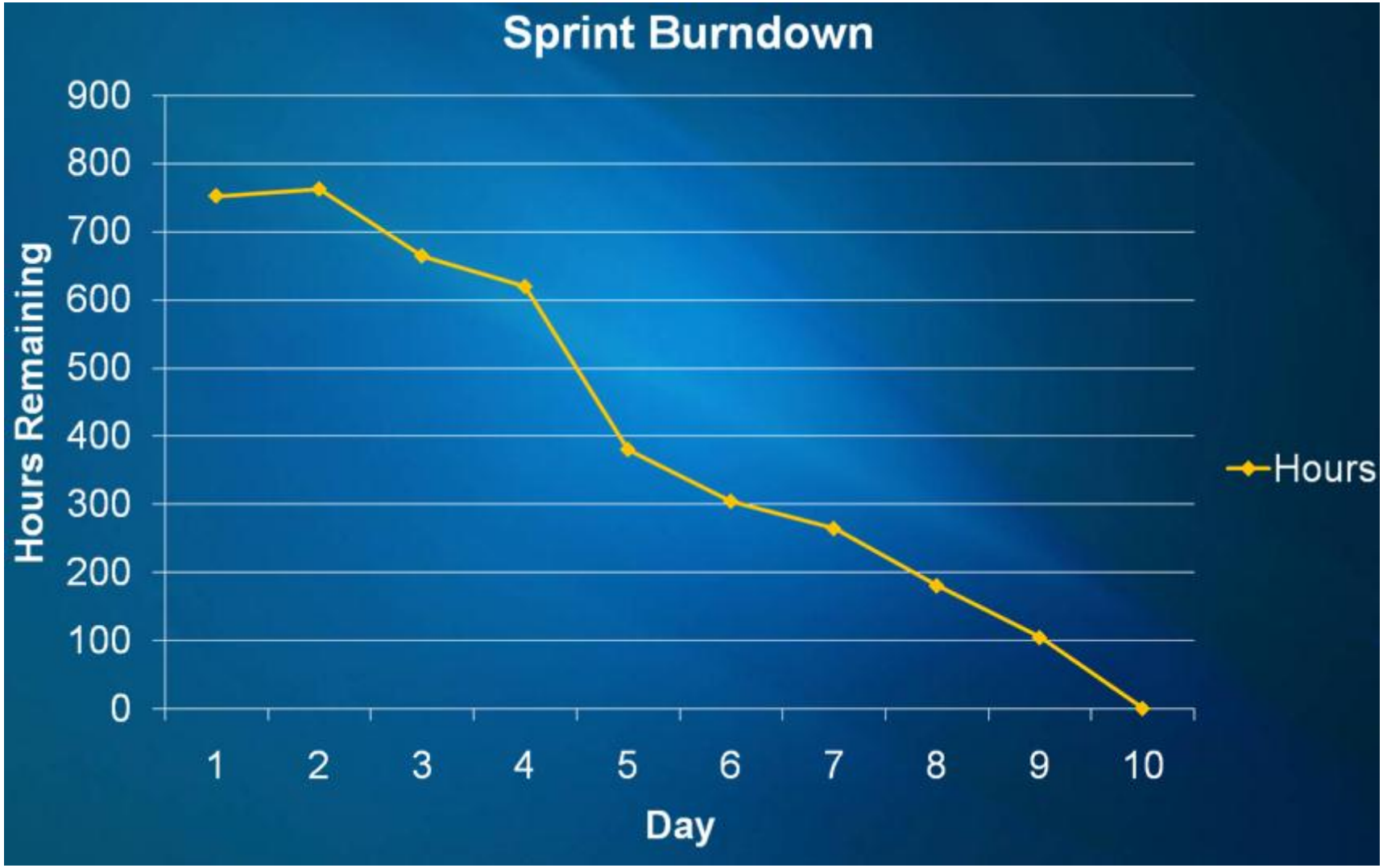
Sample Sprint Backlog

		Days Left in Sprint	15	13	10	8	
Who	Description		7/22/2002	7/24/2002	7/26/2002	7/31/2002	
		Total Estimated Hours:	**554**	**458**	**362**	**270**	**0**
-	**User's Guide**		-	-	-	-	-
SM	Start on Study Variable chapter first draft		16	16	16	16	
SM	Import chapter first draft		40	24	6	6	
SM	Export chapter first draft		24	24	24	6	
	Misc. Small Bugs						
JM	Fix connection leak		40				
JM	Delete queries		8	8			
JM	Delete analysis		8	8			
TG	Fix tear-off messaging bug		8	8			
JM	View pedigree for kindred column in a result set		2	2	2	2	
AM	Derived kindred validation		8				
	Environment						
TG	Install CVS		16	16			
TBD	Move code into CVS		40	40	40	40	
TBD	Move to JDK 1.4		8	8	8	8	
	Database						
KH	Killing Oracle sessions		8	8	8	8	
KH	Finish 2.206 database patch		8	2			
KH	Make a 2.207 database patch		8	8	8	8	
KH	Figure out why 461 indexes are created		4				

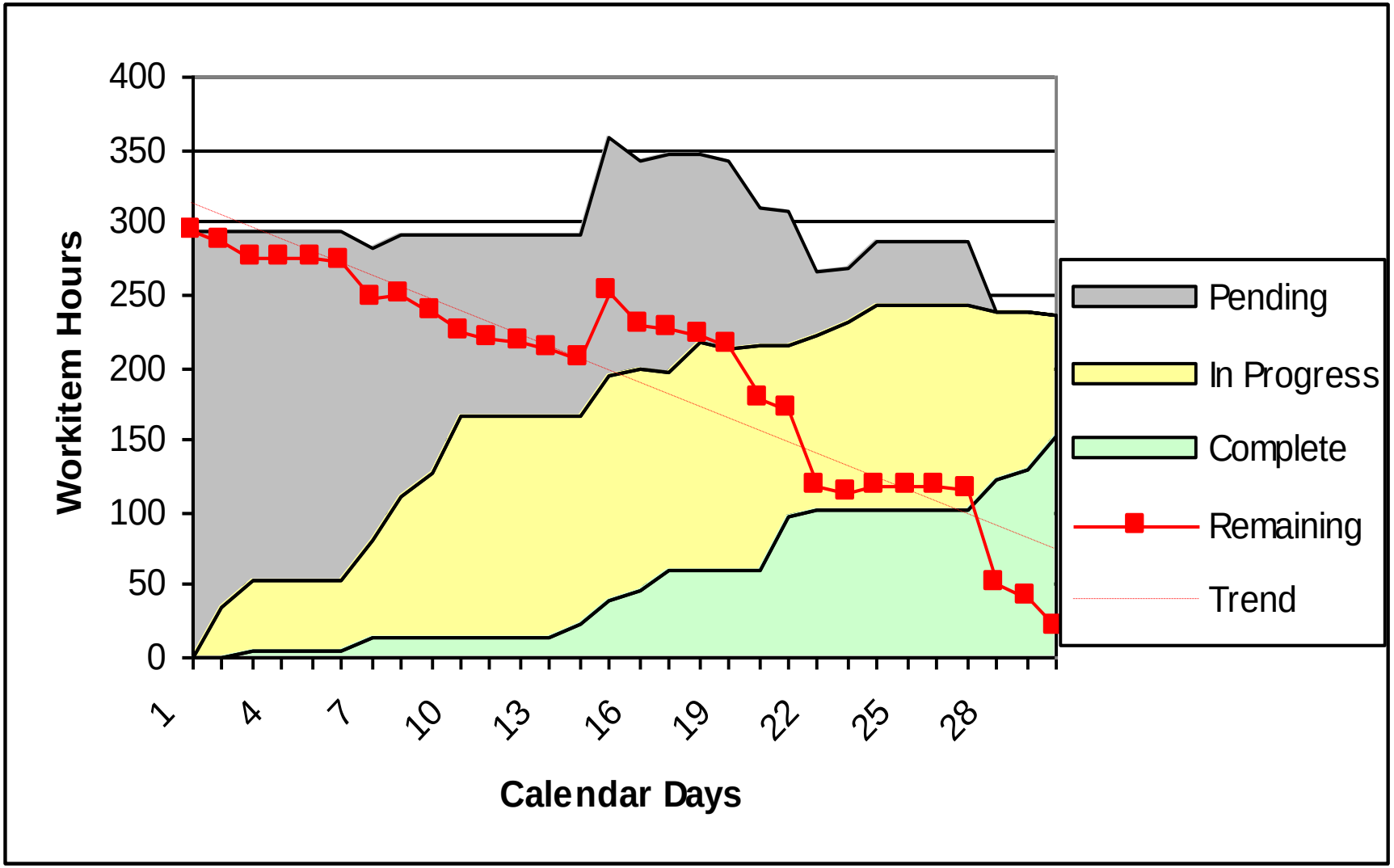
Sprint Backlog during the Sprint

- Changes
  - Team adds new tasks whenever they need to in order to meet the Sprint Goal
  - Team can remove unnecessary tasks
  - But: Sprint Backlog can only be updated by the team
- Estimates are updated whenever there’s new information

Sprint Burndown Chart



Cumulative Flow



Daily Scrum meetings

- Parameters
  - Daily
  - 15-minutes
  - Stand-up
  - Not for problem solving
- Three questions:
  - What did you do yesterday
  - What will you do today?
  - What obstacles are in your way?
- Chickens and pigs are invited
  - Help avoid other unnecessary meetings
- Only pigs can talk

Questions about Scrum meetings?

- Why daily?
  - “How does a project get to be a year late?”
    - “One day at a time.”
      - Fred Brooks, The Mythical Man-Month.
- Can Scrum meetings be replaced by emailed status reports?
  - No
    - Entire team sees the whole picture every day
    - Create peer pressure to do what you say you’ll do

Sprint Review Meeting

- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features or underlying architecture
- Informal
  - 2-hour prep time rule
- Participants
  - Customers
  - Management
  - Product Owner
  - Other engineers

Sprint Retrospective

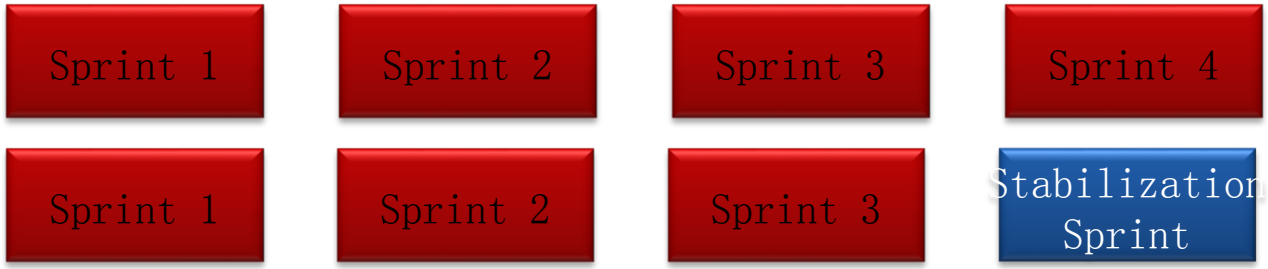
- Asks 3 questions
  - What should we start doing?
  - What should we stop doing?
  - What should we continue doing?

- Apply the answers in future sprints

Dependencies

- Don’t have them
  - Dependencies introduce waste
- Try to break them where possible
- Sharing information and synchronizing often are the best defense
- Delay taking them until the last possible moment
  - Develop the bare minimum solution yourself

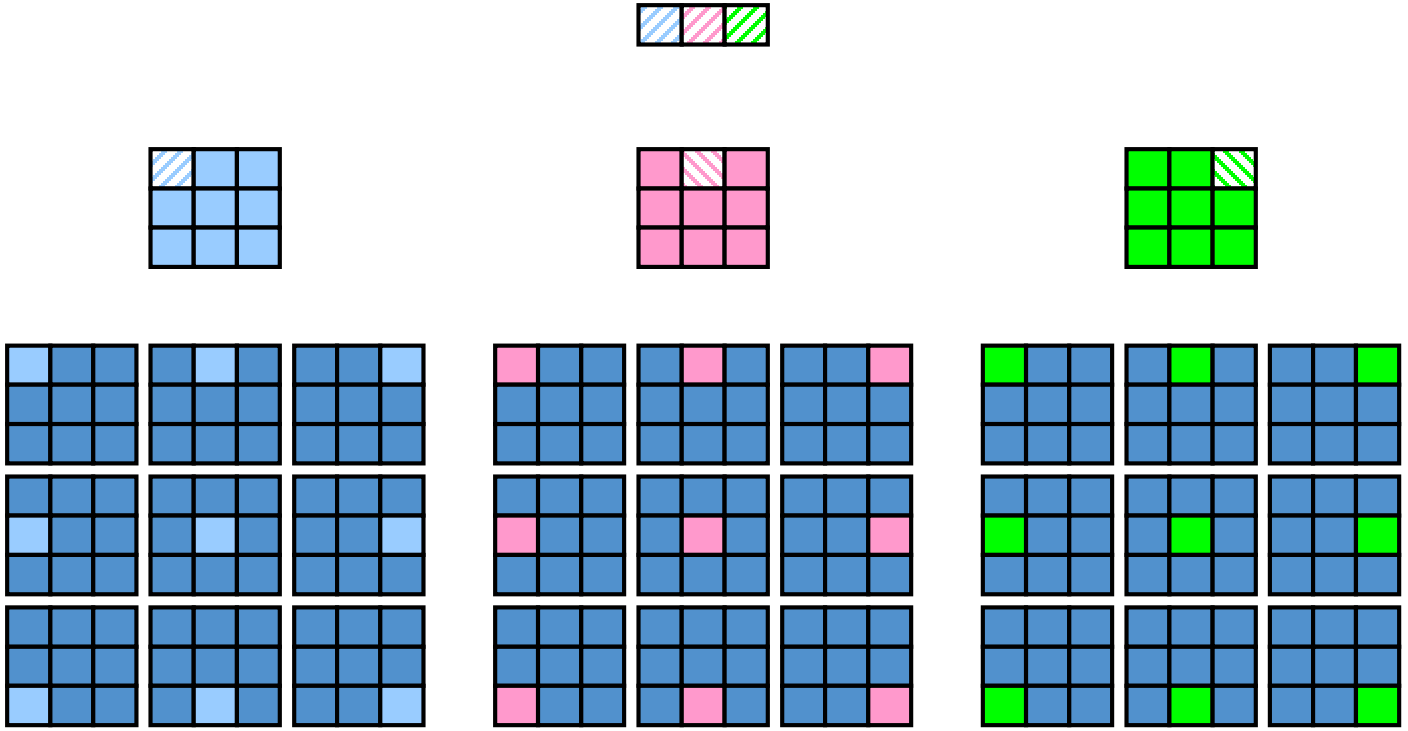
Stabilization Sprints



- During "regular" sprints target friendly first use
  - Beta customers and similar can use immediately after sprint
- During "stabilization sprints"
  - Team prepares a product for release
  - Useful during
    - active beta periods
    - when transitioning a team to Scrum
    - if quality isn't quite where it should be on an initial release
- Not a standard part of Scrum, but something that may be useful

Scalability of Scrum

- Typical Scrum team is 5-10 people
- Sutherland used Scrum in groups of 600+



Scrum Cheat Sheet

Roles

Scrum Team

- Team is cross-functional and consists of 5-9 people
- There are no set project roles within the team
- Team defines tasks and assignments
- Team is self-organizing and self-managing
- Maintains the Sprint Backlog
- Conducts the Sprint Review

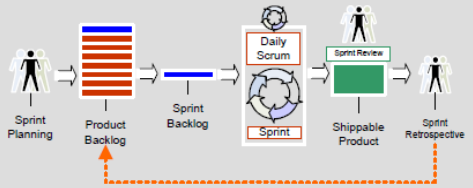
Product Owner (PO)

- Accountable for product success
- Defines all product features
- Responsible for prioritizing product features
- Maintains the Product Backlog
- Insures team working on highest valued features

Scrum Master (SM)

- Holds daily 15 minute team meeting (Daily Scrum)
- Removes obstacles
- Shields the team from external interference
- Maintains the Sprint Burndown Chart
- Conducts Sprint Retrospective at the end of a Sprint
- Is a facilitator not a manager

Process



Tools

Task Board

- White Board containing teams Sprint goals, backlog items, tasks, tasks in progress, "DONE" items and the daily Sprint Burndown chart.
- Scrum meeting best held around task board
- Visible to everyone

Artifacts

Product Backlog - (PB)

- List of all desired product features
- List can contain bugs, and non-functional items
- Product Owner responsible for prioritizing
- Items can be added by anyone at anytime
- Each item should have a business value assigned
- Maintained by the Product Owner

Sprint Backlog – (SB)

- To-do list (also known as Backlog item) for the Sprint
- Created by the Scrum Team
- Product Owner has defined as highest priority

Burndown Chart – (BC)

- Chart showing how much work remaining in a Sprint
- Calculated in hours remaining
- Maintained by the Scrum Master daily

Release Backlog – (RB)

- Same as the Product Backlog. May involve one or more sprints dependent on determined Release date

"DONE"= Potentially Shippable!

FAQ

- ***Who decides when a Release happens?*** At the end of any given Sprint the PO can initiate a Release.
- ***Who is responsible for managing the teams?*** The teams are responsible for managing themselves.
- ***What is the length of a task?*** Tasks should take no longer than 16 hours. If longer then the task should be broken down further.
- ***Who manages obstacles?*** Primary responsibility is on the Scrum Master. However, teams must learn to resolve their own issues. If not able then escalated to SM.
- ***What are two of the biggest challenges in Scrum?*** Teams not self-managing, Scrum Master managing not leading.

Meetings

Sprint Planning – Day 1 / First Half

- Product backlog prepared prior to meeting
- First half – Team selects items committing to complete
- Additional discussion of PB occurs during actual Sprint

Sprint Planning – Day 1 / Second Half

- Occurs after first half done – PO available for questions
- Team solely responsible for deciding how to build
- Tasks created / assigned – Sprint Backlog produced

Daily Scrum

- Held every day during a Sprint
- Lasts 15 minutes
- Team members report to each other not Scrum Master
- Asks 3 questions during meeting
- *"What have you done since last daily scrum?"*
- *"What will you do before the next daily scrum?"*
- *"What obstacles are impeding your work?"*
- Opportunity for team members to synchronize their work

Sprint Review

- Team presents "done" code to PO and stakeholders
- Functionality not "done" is not shown
- Feedback generated - PB maybe reprioritized
- Scrum Master sets next Sprint Review

Sprint Retrospective

- Attendees – SM and Team. PO is optional
- Questions – What went well and what can be improved?
- SM helps team in discovery – not provide answers

Visibility + Flexibility = Scrum

Glossary of Terms

- **Time Box** - A period of time to finish a task. The end date is set and can not be changed
- **Chickens** – People that are not committed to the project and are not accountable for deliverables
- **Pigs** – People who are accountable for the project's success
- **Single Wringable Neck** – This is the Product Owner!

SCRUM CHEAT SHEET

Estimating

User Stories

- A very high level definition of what the customer wants the system to do.
- Each story is captured as a separate item on the Product Backlog
- User stories are NOT dependent on other stories
- **Story Template**:
- "As a <User> I want <function> So that <desired result>
- **Story Example**:
- As a user, I want to print a recipe so that I can cook it.

Story Points

- A simple way to initially estimate level of effort expected to develop
- Story points are a relative measure of feature difficulty
- Usually scored on a scale of 1-10. 1=very easy through 10=very difficult
- **Example**:
- "Send to a Friend" Story Points = 2
- "Shopping Cart" Story Points = 9

Business Value

- Each User Story in the Product Backlog should have a corresponding business value assigned.
- Typically assign (L,M,H) Low, Medium, High
- PO prioritizes Backlog items by highest value

Estimate Team Capacity

- Capacity = # Teammates (Productive Hrs x Sprint Days)
- Example – Team size is 4, Productive Hrs are 5, Sprint length is 30 days.
- Capacity = 4 (5 x30) = 600 hours
- **NOTE**: Account for vacation time during the Sprint!

Velocity

- The rate at which team converts items to "DONE" in a single Sprint – Usually calculated in Story Points.

Scrum and CMMI

- Scrum has been used at CMMI Level 5
  - “Because Scrum reduced by almost 50% every category of work (defects, rework, total work required, and process overhead), it substantially cut the ongoing cost of maintaining CMMI Level 5 certification. We assert that Scrum and CMMI together bring a more powerful combination of adaptability and predictability to the marketplace than either one...”

Source: Scrum supports CMMI Level 5 – *Dr Jeff Sutherland, http://jeffsutherland.com/scrum/2006/11/scrum-supports-cmmi-level-5.html*

References

- www.scrumalliance.com
- www.controlchaos.com
- www.mountaingoatsoftware.com/scrum
- jeffsutherland.com
- www.agilealliance.com