



# CMU|UC Professional Master of Software Engineering

Agile Software Development  
with SCRUM

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Marco Vieira  
Departamento de Eng. Informática  
Universidade de Coimbra  
mvieira@dei.uc.pt

Carnegie Mellon

# Small Test

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# Did You Pay Attention?

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- How many times was the ball passed between people wearing white T-Shirt?
- My answer:
  - I don't know! 😊
  - What I care is about the monkey!?
- What is going on?
  - Haven't you seen the monkey?
  - Let see it again...
  - Why???



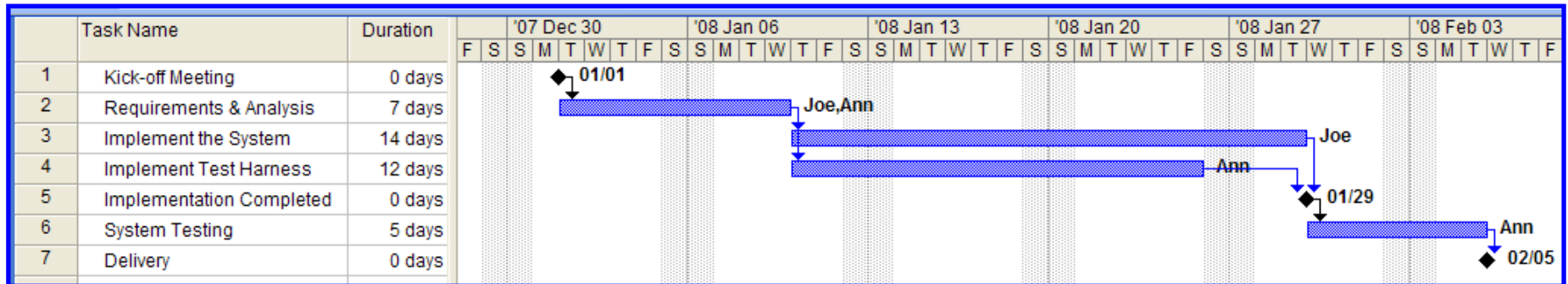
# SCRUM?

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<http://www.youtube.com/watch?v=PMz9KHg1vZ0>

# Traditional Project Management



What is wrong with Gantt Charts?



# What's the alternative?

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## ■ Empirical Process Control

- **Visibility**: those aspects of the process that affect the outcome must be visible to those controlling the process
- **Inspection**: those aspects of the process that affect the outcome must be inspected frequently enough that unacceptable variances in the process can be detected
- **Adaptation**: If one or more aspects of the process are outside acceptable limits and that the resulting product will be unacceptable, the process or the material being processed must be adjusted

## ■ SCRUM is based on these principles

- With the objective of increase the probability of a project succeeding given large uncertainty and risk

# SCRUM is a form of Risk Management



**“RISK is the possibility of suffering loss”**

*Webster's Third New International Dictionary. Springfield, Ma.: Merriam-Webster, 1981.*

# Characteristics of SCRUM

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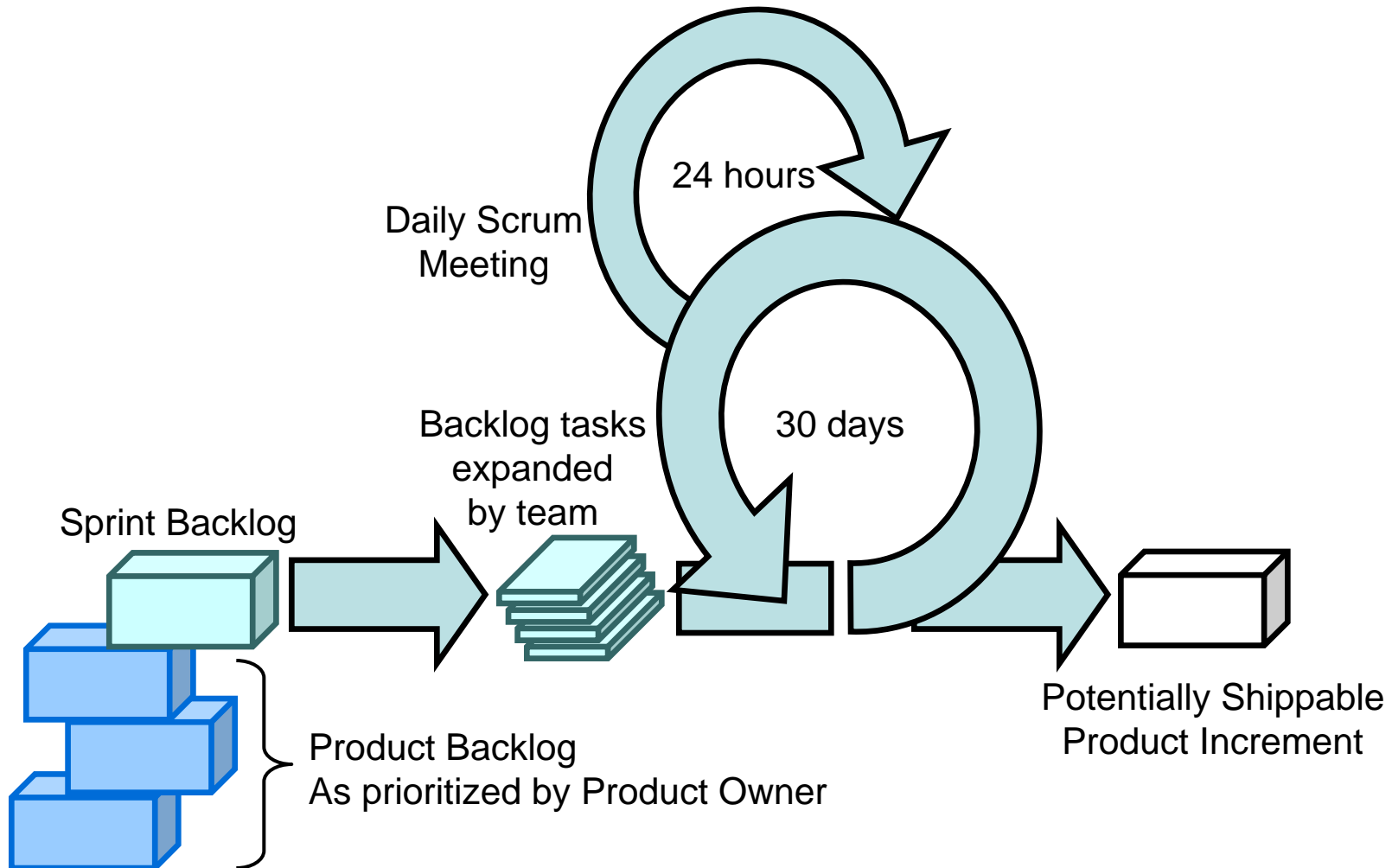
- Traditional project management seems to revolve around the creation of often unnecessary artifacts that deliver little or no value to the project
  - Focus on Process and not on Product
  - “Not my responsibility” syndrome
- Philosophy behind SCRUM
  - No “big bang” adoption → Continuous shippable increments
  - Strict focus on always deliver the Highest business value
  - Empowered teams responsible for product delivery
  - Strict separation of authority and roles

# SCRUM Practices and Roles

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- Product Backlog
- Sprint
- Sprint Planning Meeting
- Sprint Backlog
- Daily Scrum Meeting
- Sprint Review Meeting
  
- Roles
  - Product Owner, Scrum Master, Scrum Team

# SCRUM in a nutshell

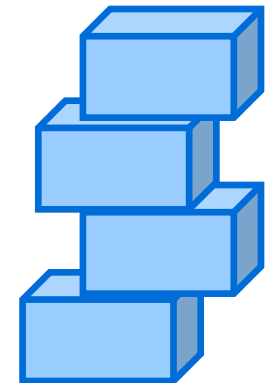


Adapted from *Agile Software Development with Scrum* by Ken Schwaber and Mike Beedle.

# Product Backlog

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- **Prioritized list of work to be performed on a product**
  - Typically is “requirements oriented”
  - In many cases, it’s based on “**user stories**”
  - New tasks can be added or removed
- **Anyone can contribute to the product backlog**
  - Product Owner is overall responsible for it
- **Product owner prioritizes the backlog**
  - Focus on **Business Value**:  
Most value comes from a small set of functionality
  - Product Owner is given the opportunity to set the **orientation of the project every 30 days**



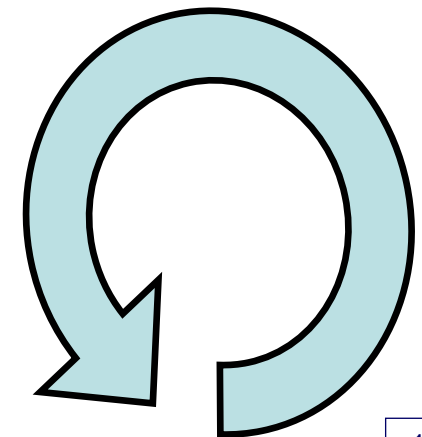
# A Product Backlog

	Item #	Description	Est	By
<b>Very High</b>				
	1	<b>Finish database versioning</b>	16	KH
	2	<b>Get rid of unneeded shared Java in database</b>	8	KH
		- <b>Add licensing</b>	-	-
	3	Concurrent user licensing	16	TG
	4	Demo / Eval licensing	16	TG
		<b>Analysis Manager</b>		
	5	File formats we support are out of date	160	TG
	6	Round-trip Analyses	250	MC
<b>High</b>				
		- <b>Enforce unique names</b>	-	-
	7	In main application	24	KH
	8	In import	24	AM
		- <b>Admin Program</b>	-	-
	9	Delete users	4	JM
		- <b>Analysis Manager</b>	-	-
	10	When items are removed from an analysis, they should show up again in the pick list in lower 1/2 of the analysis tab	8	TG
		- <b>Query</b>	-	-
	11	Support for wildcards when searching	16	T&A
	12	Sorting of number attributes to handle negative numbers	16	T&A
	13	Horizontal scrolling	12	T&A
		- <b>Population Genetics</b>	-	-
	14	Frequency Manager	400	T&M
	15	Query Tool	400	T&M
	16	Additional Editors (which ones)	240	T&M
	17	Study Variable Manager	240	T&M
	18	Haplotypes	320	T&M
	19	<b>Add icons for v1.1 or 2.0</b>	-	-
		- <b>Pedigree Manager</b>	-	-
	20	Validate Derived kindred	4	KH
<b>Medium</b>				
		- <b>Explorer</b>	-	-
	21	Launch tab synchronization (only show queries/analyses for logged in users)	8	T&A
	22	Delete settings (?)	4	T&A

# Sprint

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- A fixed period of 30 days to develop a shippable increment
- The Sprint includes, as needed: design, coding, testing, and documentation
- During a Sprint the team is fully responsible for the work
  - No external interference is allowed
  - Once a Sprint has started only the Scrum Team can add or remove items to the sprint backlog
- Abnormal termination of Sprint is called for when the Sprint Goal no longer makes sense



# Sprint Planning – “A One Day Activity”

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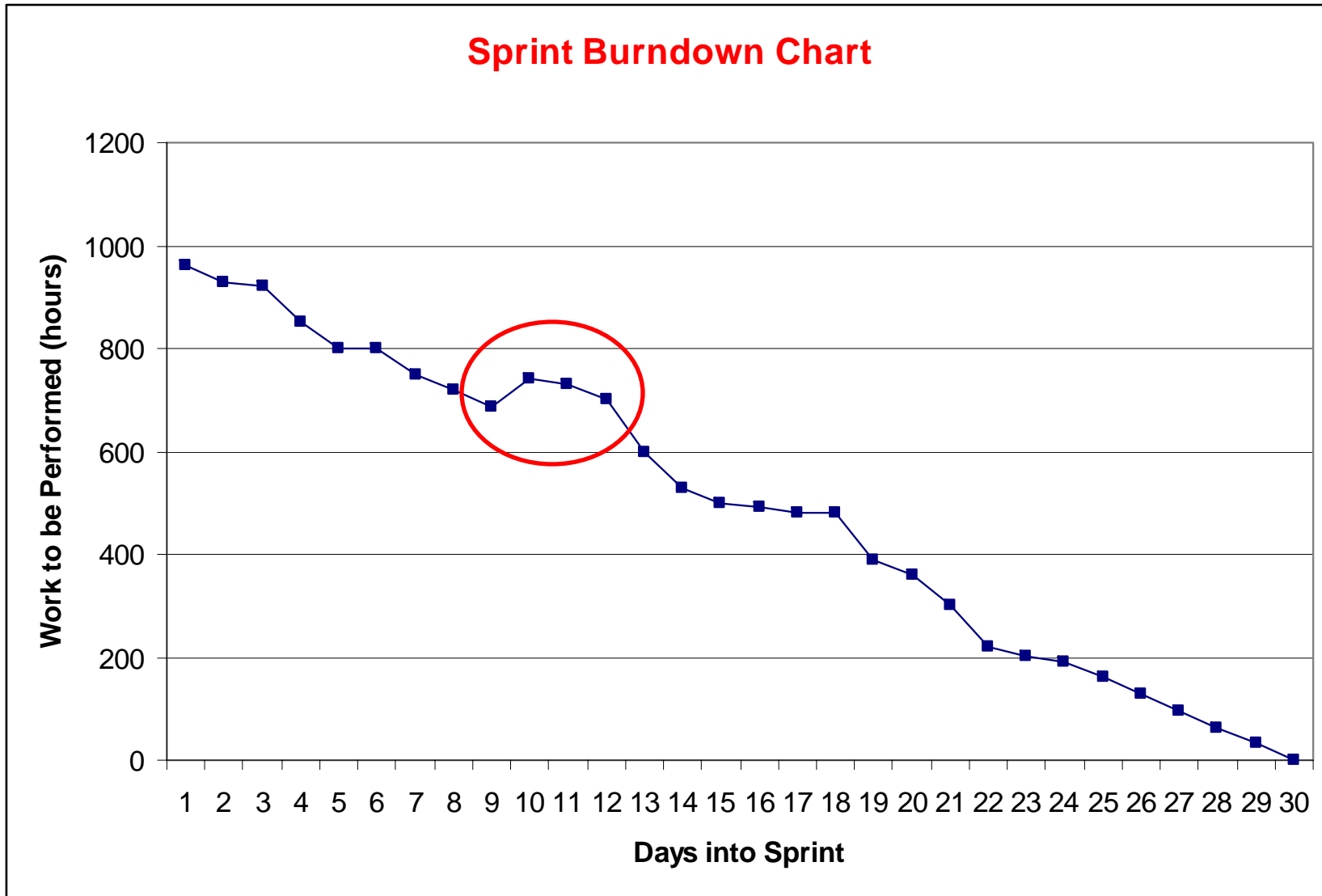
- Sets the Objectives of the Sprint
  - Product Owner, SCRUM team (and stakeholders)
- Sprint Goal and Sprint Backlog is defined using:
  - Product Backlog
  - Team’s capabilities
  - Business conditions
  - Technology Stability and Know-How
- Sprint Goal (4 hours):
  - Product Owner explains highest priority items to team
  - Team asks questions until is able to select as much functionality as it believes it’s possible to implement during the sprint
- Sprint Backlog (4 hours):
  - The team tentatively plans the sprint

# Sprint Backlog

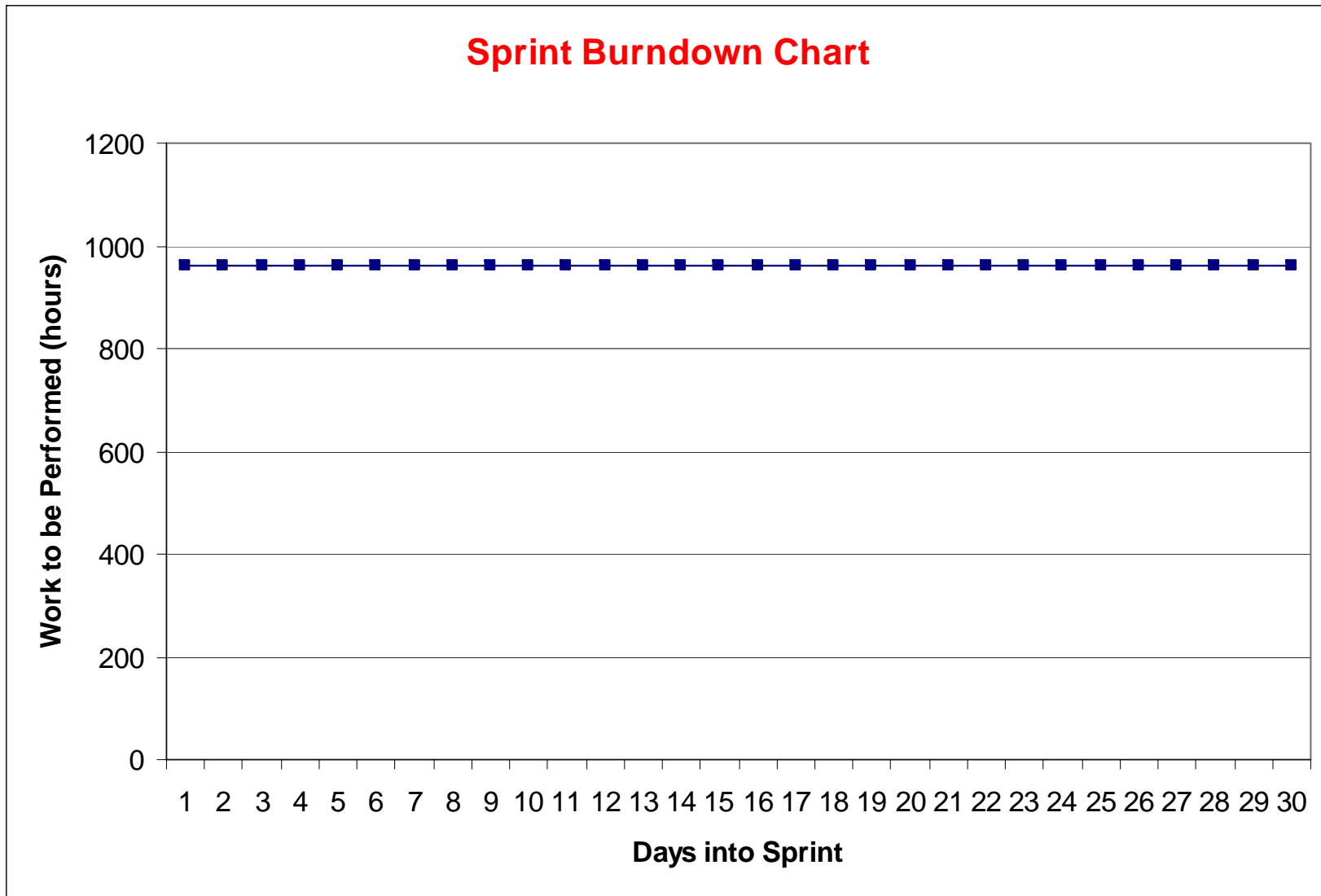
- Lists tasks, days remaining in sprint and estimated number of hours needed for each task.
- It allows creating the sprint burn-down chart
- Visibility is paramount!

SPRINT 3				Days of work into the Sprint						
Task Description	Originator	Responsible	Status	1	2	3	4	5	6	7
Assignment - locking	Mike	Allen	Completed	20	20	10	0			
Full policy rollback/import	Sue	Chris	Completed	2	0	0	0			
Transform Sets Building Blocks	Sue	Tom	In progress	10	10	4	2			
Address Translation Pool Objects and Groups BBs	Sue	Tom	Not Started	10	10	10	10			
Performance benchmarks and caching	Allen	Allen	Not Started	5	5	5	5			
Predefined BBs - Services, Interface Roles, default ports	Jacquie	Allen	In progress			20	18			

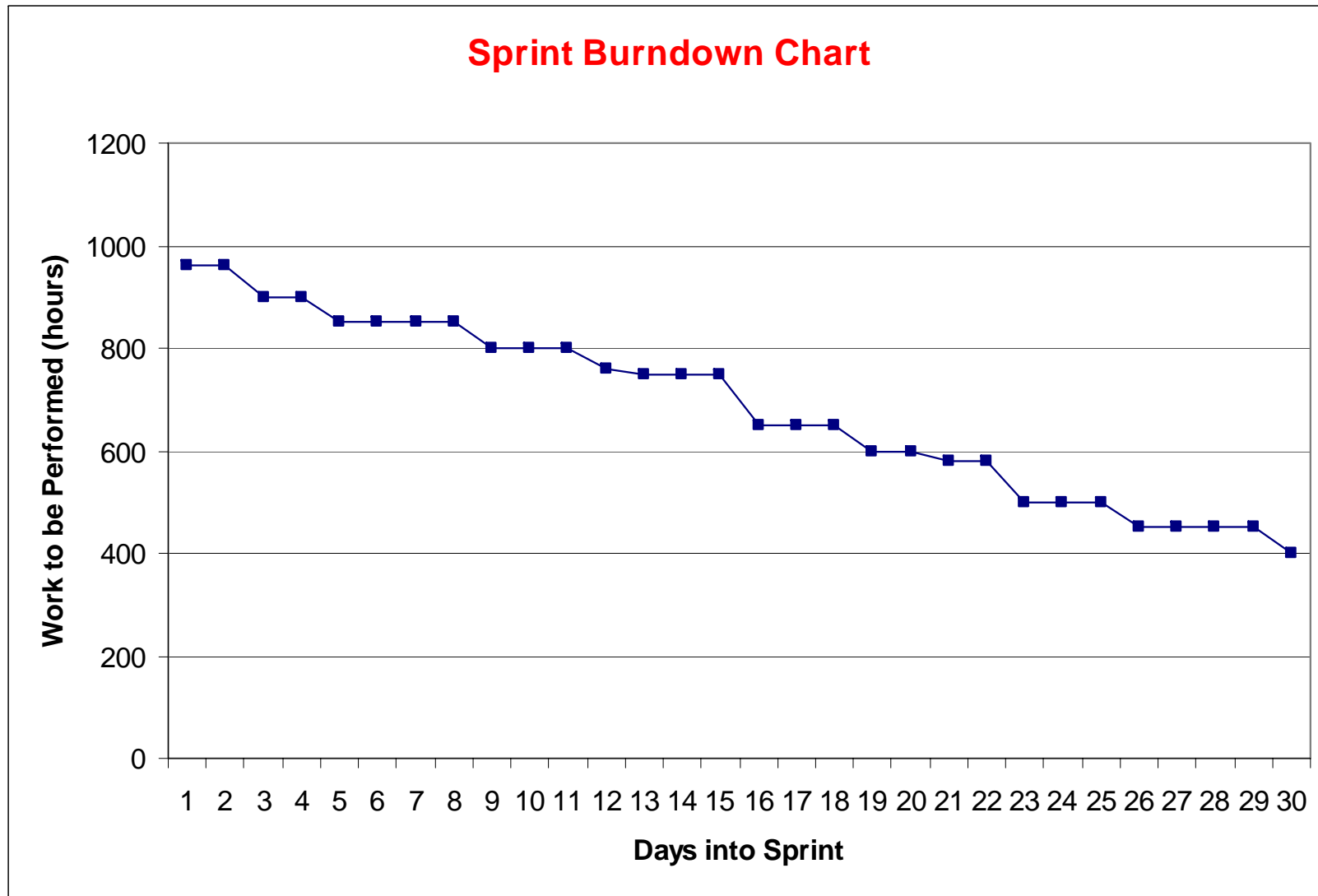
# Burn-down Chart



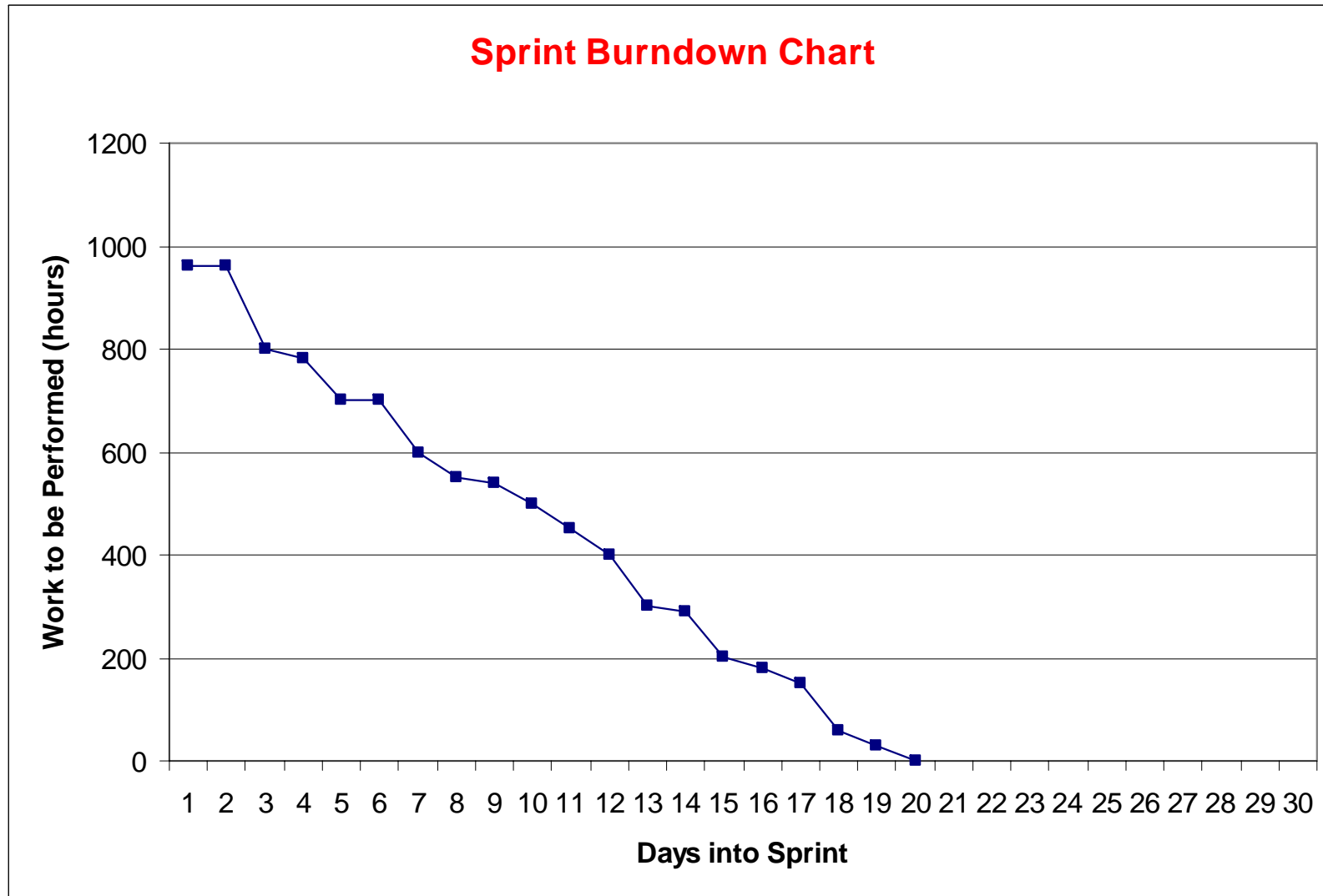
# Work not being performed



# Work being performed, but not fast enough



# Work being performed – Too Fast



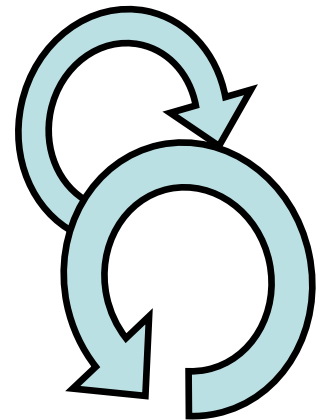
# Keeping things visible



# Daily SCRUM

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- Daily 15 minute status meeting
  - Same place and time every day  
(Normally in the beginning of the day)
- Team stands in a circle facing each other
- Each team member answers 3 questions:
  - What have you done since the last Scrum?
  - What will you do between now and the next Scrum?
  - What is preventing you from making progress?
- For synchronization, not problem solving!
  - Other follow-up meetings can be held



# Sprint Review and Sprint Retrospective

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- The **Sprint Review** is held at the end of the Sprint
  - 4-hour time-boxed meeting
- The team **presents** to stakeholders and Project Owner the **product increment that has been built**
- The objectives are:
  - To show what has been built
  - To help determine what should be build next
- **General approach**
  - What is the potentially shippable increment (Demo)?
  - What did we complete of our Sprint Backlog?
  - What is the feedback from our Product Owner?

# Sprint Retrospective

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- The **Sprint Retrospective** is also held at the end of the scrum sprint
  - **3-hour** time-boxed meeting
- It aims at **improving the processes** being used in the Scrum.
  
- **Key questions:**
  - **What went wrong, what when right, what can be done better?**
  - **What tools, processes, practices can be used to make it better, more productive and enjoyable?**

# SCRUM Team

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- Self-organizing
  - Team decides how to plan, design, build, integrate
- Cross-functional
  - No predetermined fixed roles
- Seven plus or minus two
- Responsible for committing to work
- Authority to do whatever is needed to meet commitment



# Product Owner

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- Responsible for the Backlog
- Sets development schedule by prioritizing backlog
- Only ONE person
  - Ensures that only one set of requirements drives development
  - Can be influenced by committees, management, customers, sales people, but is the only person that prioritizes
  - Eliminates confusion of multiple bosses, different opinions, and interference
- Has the authority to abort a sprint if business needs change
  - Should only be done if something is very wrong
- Can influence the direction of the project every 30-days
  - Adequate for most projects

# SCRUM Master

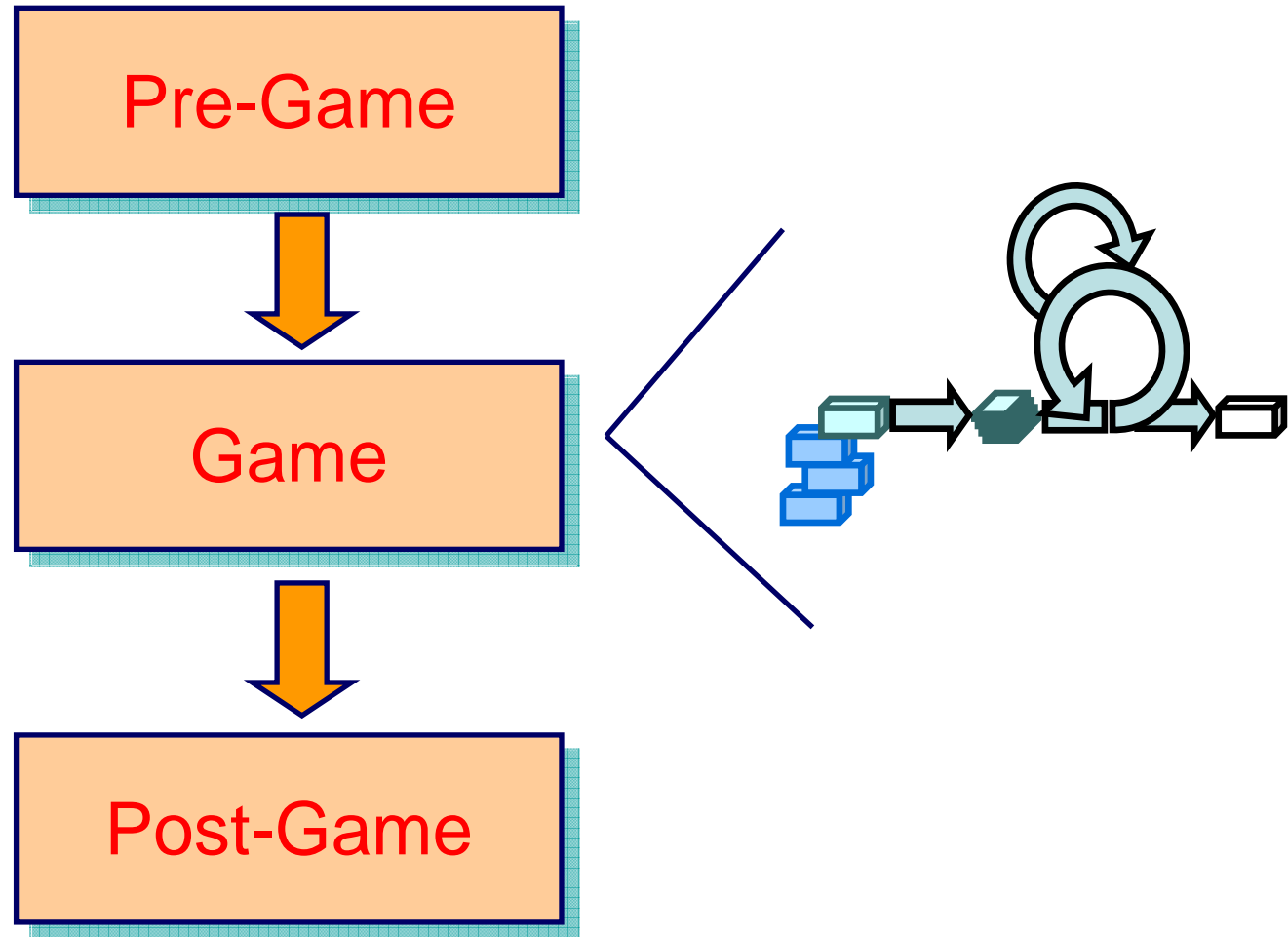
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- It's responsible for the success of SCRUM
- Establishing SCRUM practices and rules, mentoring the team
- Also represents management in the project
  
- It's main responsibilities are:
  - Shielding the team from interference
  - Removing whatever obstacles are in the team's way for achieving the goals of the sprints
  
- It's not a "classic Project Manager" nor responsible for planning and attributing tasks to team members



# What's missing?

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In order for SCRUM to work, some structure is needed!

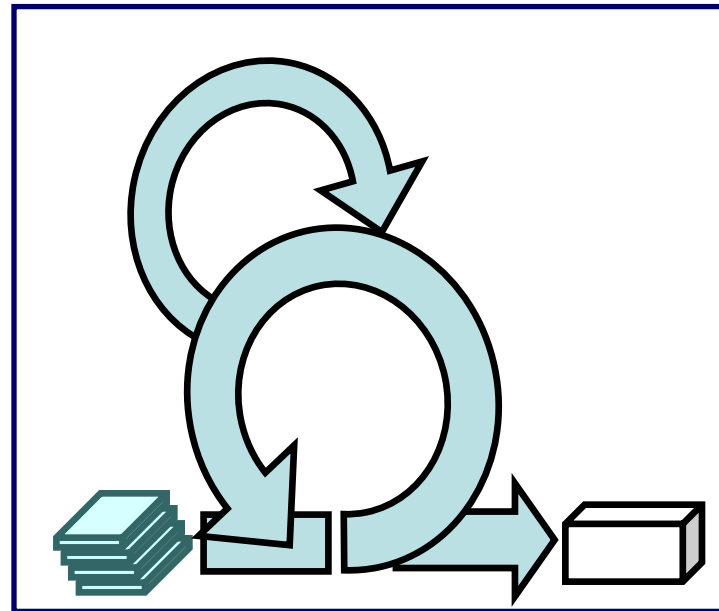
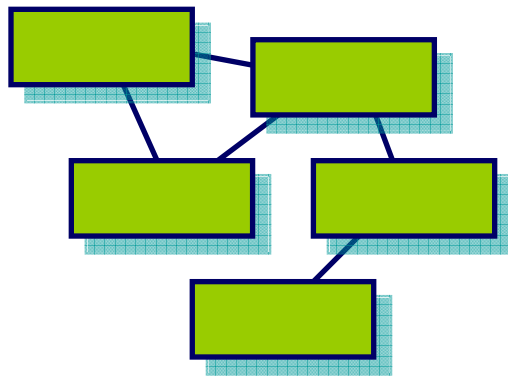
# The Pre-Game and Post-Game

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- In order for the team to be productive **some structure is needed**
  - The Scrums (Sprints) only address the **uncertainty during development** and make the **team more effective** (i.e. **GAME**)
- **Pre-Game:**
  - Some up-front requirements / “product vision”
  - **Planning:** Definition of a **Release Plan** based on the **known backlog**, along with an **estimate of its schedule and cost**
  - **Architecture:** **System architecture** and **High-Level Design**
- **Post-Game:**
  - **Closure:** Preparation for release, including **final documentation**, **pre-release staged testing**, and **release**

# Overall SCRUM

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## ■ Pre-Game

- Release plan
- Architecture

## ■ Game

- Sprints

## ■ Post-Game

- Closure

## Some companies using SCRUM

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Google™

IBM

  
Adobe

**Microsoft®**

BT 

SIEMENS

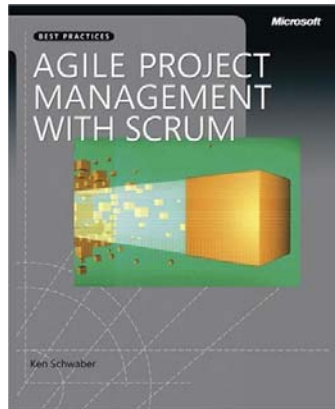
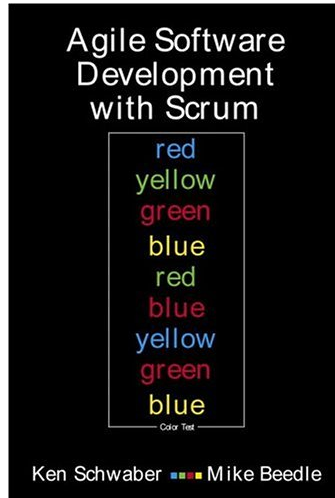
YAHOO!

# Some common implementation problems

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- The team is not shielded from external interference
- The Product Owner does not have the necessary authority to be able to prioritize the backlog
- The product backlog is insufficiently defined
- SCRUM is not understood by Management (or the team)
- The Scrum Master acts as Project Manager, telling the team what to do and when
- The team does not communicate enough or is not jelled enough
- Implementing Scrum on a Fixed-\* project (Fixed-Priced, Fix-date & Fix-functionality)
- Implementing Scrum on a distributed environment
- The team is too inexperienced in the project domain
- Not setting up the “other” necessary support mechanisms

# Where to find more information



- **Agile Software Development with SCRUM**
  - Ken Schwaber and Mike Beedle, Prentice Hall, ISBN 0130676349, 2001
  
- **Agile Project Management with Scrum**
  - Ken Schwaber, Microsoft Press, ISBN 073561993X, 2004
  
- **Websites:**
  - <http://www.scrumalliance.org/>
  - <http://www.agilealliance.com/>
  - <http://www.controlchaos.com/>

# Disclaimer

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- These slides are largely based on two information sources directly available on the internet:
  - Rachel Davies, Giovanni Asproni, “59-Minute Scrum”, XPDAY’05, London, UK, November 2005
  - Craig Murphy, “Managing Iterative Development Using Scrum”, <http://www.craigmurphy.com/>
- The details regarding SCRUM, along some of the examples of this presentation can be found on [Schwaber04] and [Schwaber+01]