
Software Engineering -1

Objectives

- To understand the Automobile industry
- To understand process of Scrum with the help of real life examples.
- Importance of scrum in software development process.

Topics covered

- ✓ Automotive Software Engineering
- ✓ Scrum's Three Roles
- ✓ Scrum Artifacts
- ✓ Scrum Process
- ✓ Task Boards

Automotive Software Engineering

- For almost any industrial site motor vehicles, airplanes and machinery are core fields of application.
- The design of control systems in these areas relies on methods of computer science and software engineering.
- Specific aspects of the development of these hardware/ software systems are the main focus of this area.

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Automotive Software Engineering

Skills required

- Automotive Software Technology
- Embedded Systems
- Real-Time and Communication Systems

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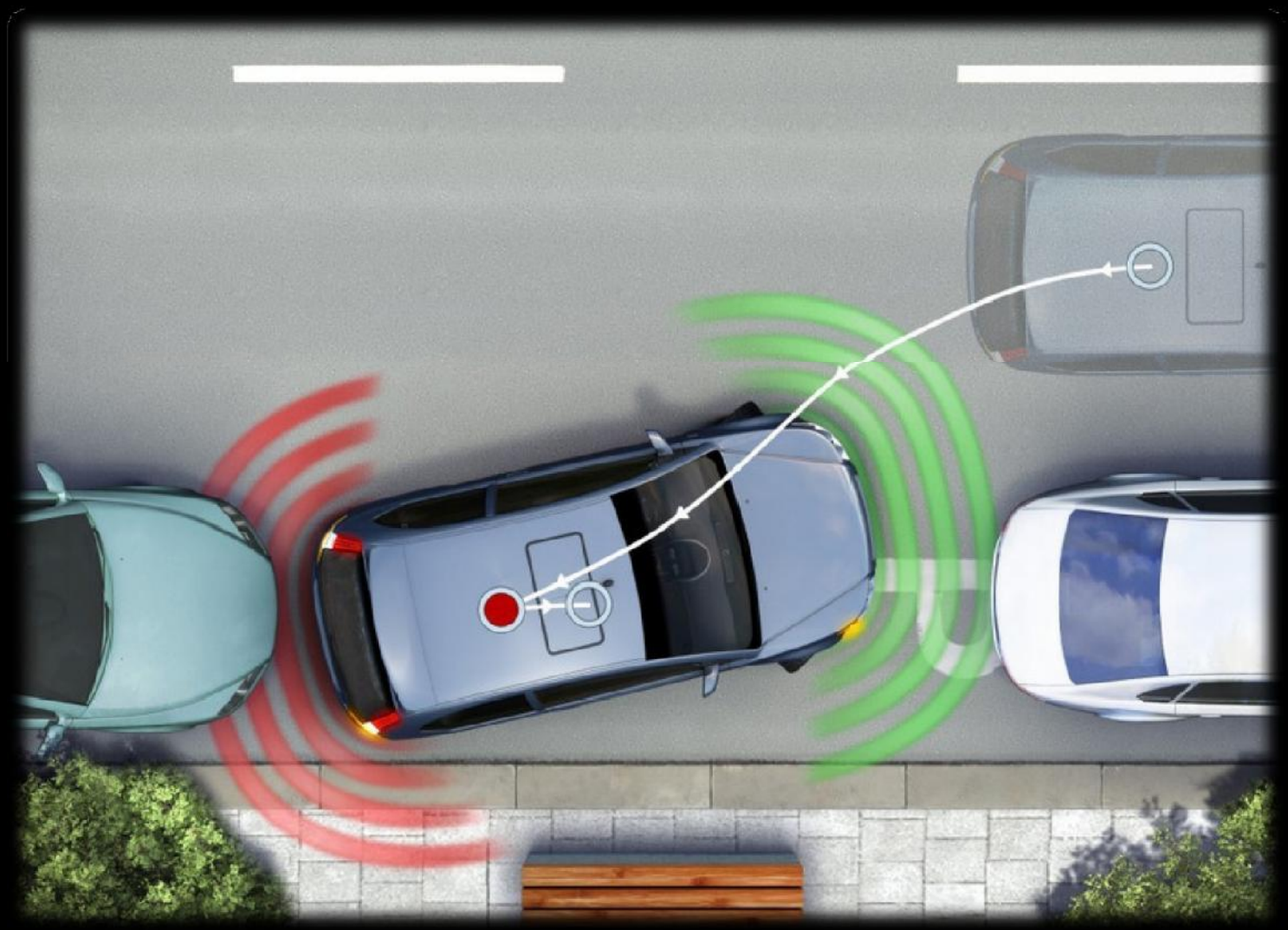
Automotive Software Engineering



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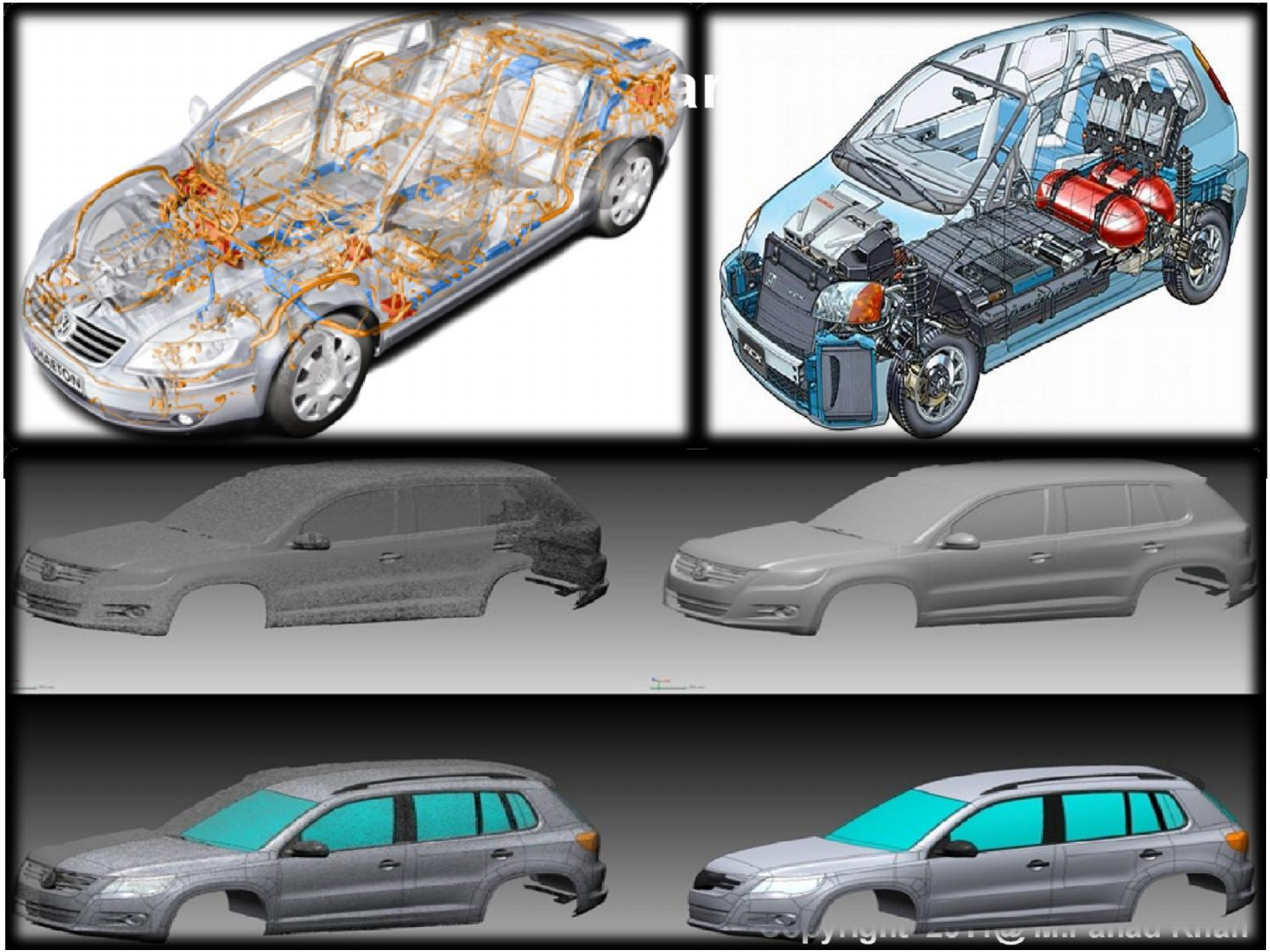
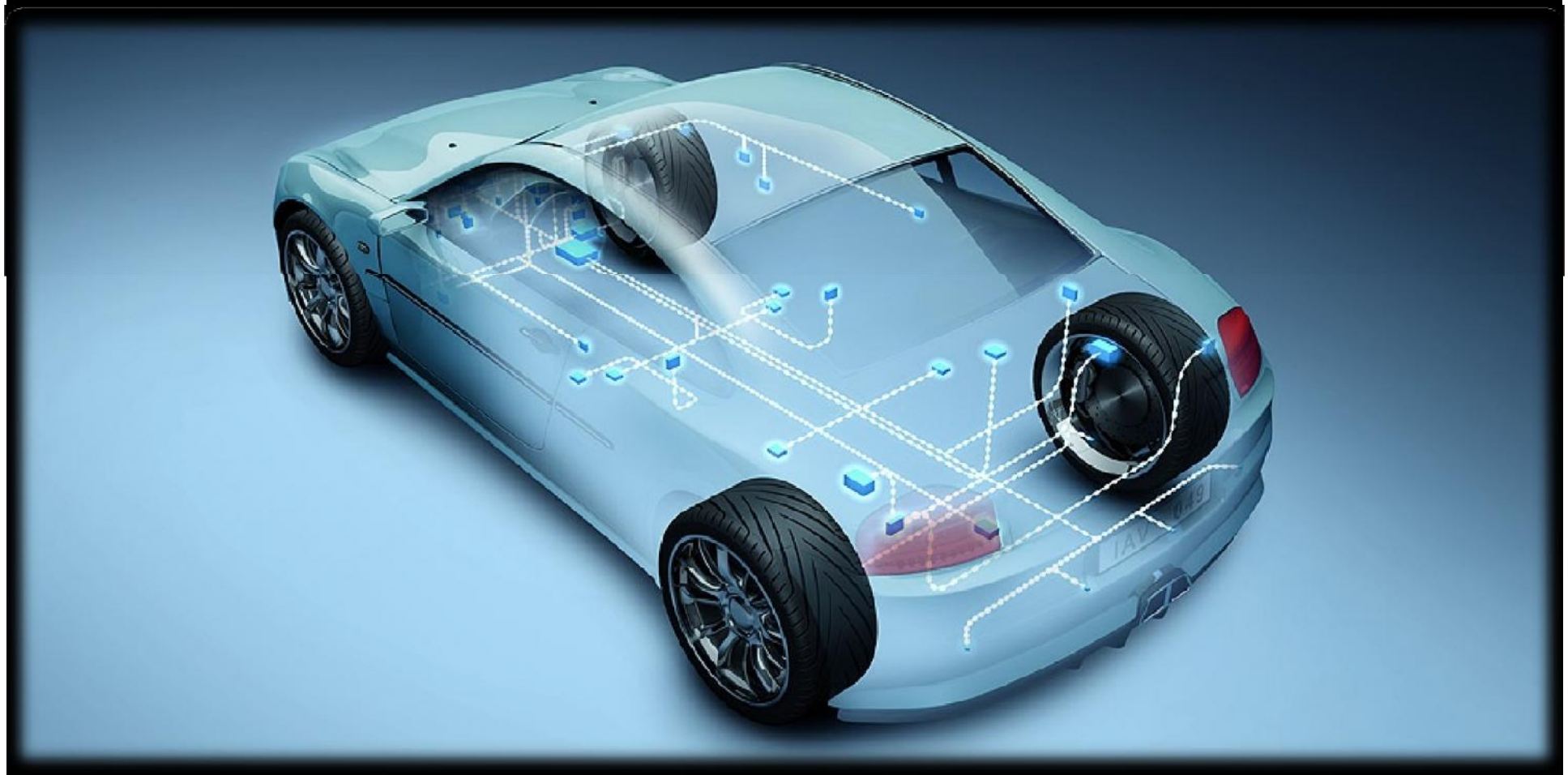


Automotive Software Engineering



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Career Opportunities

Companies of the automobile and airplane industry are very keen to take specialists of this field.

Employment opportunities include:

- Product Development for Control Systems
- Application Research
- Quality Assurance

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Top automobile universities in the world

USA

1) Kettering university
2) Lawrence technological university
3)university of Michigan
4)Ohio state university
5) Wayne state
6)Detroit mercy
7) Oakland university

2) UK

1) Loughborough university
2) Cranfield university
3)university of Leeds
4) Sussex
5) Brigton
6) University of central England

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Top automobile universities in the world

- Europe
  1) Chalmers university – Sweden
  3) Rwth aachen - Germany
  4) Esslingen - germany
  5) Hamburg - germany
  6) Offenburg university - Germany
  7) Kolen university - Germany
  8) Hingolstadth – Germany

Asia
1) Tsinghua University - china
2) Tsonghi university- china
3) Thai Germany school - Korea.

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Top automobile companies in the world

- Ferrari
- B.M.W
- Ford
- Mercedes
- Chevrolet
- Volkswagen
- Rolls-Royce
- Porsche
- Audi
- Toyota

Automotive Software Engineering

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Software Engineers can Change the life

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Scrum

Scrum is an iterative, incremental framework for project management often seen in agile software development, a type of software engineering.

(rugby) the method of beginning play in which the forwards of each team crouch side by side with locked arms; play starts when the ball thrown in between them and the two sides compete for possession .

Scrum is a lightweight agile method for software development. Scrum is named after the Scrum in rugby, which is a way to restart the game after an accidental infringement or change.

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Scrum

Scrum assumes that the software development process is complicated and unpredictable and treats it as a controlled black box instead of a theoretical, fully-defined process. This is one of the biggest differences between Scrum and the Waterfall and Spiral methodologies, which view the software development process as a fully defined process. Most problems encountered when using these older, formal types of methodologies are:

- ✓ Requirements are not fully understood at the beginning of the process.
- ✓ Requirements change during the process.
- ✓ The process becomes unpredictable when new tools and technologies are used.
- ✓ Another characteristic of Scrum is that the software development process isn't treated as a linear process, unlike the Waterfall, Spiral and Iterative methodologies.

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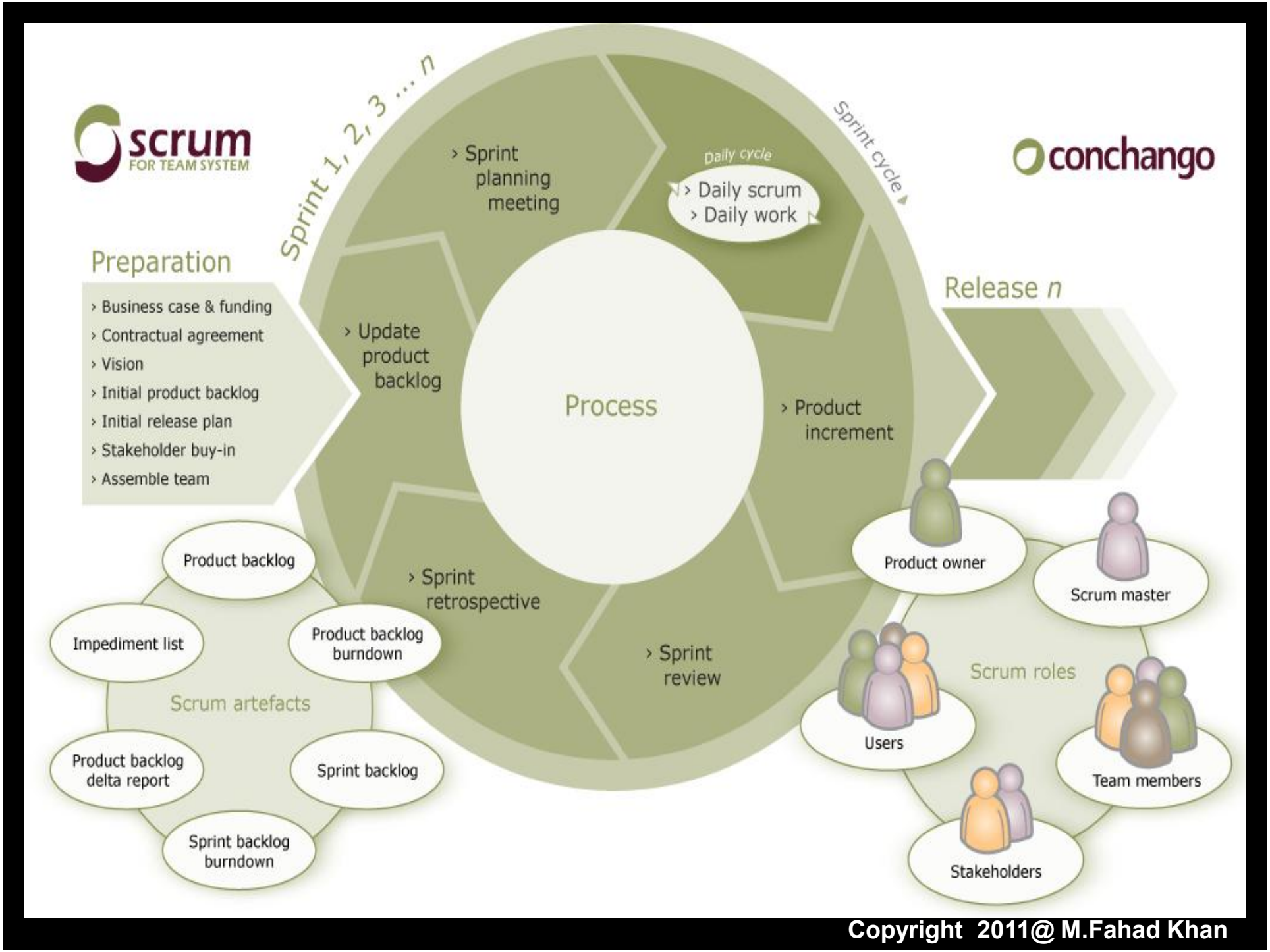

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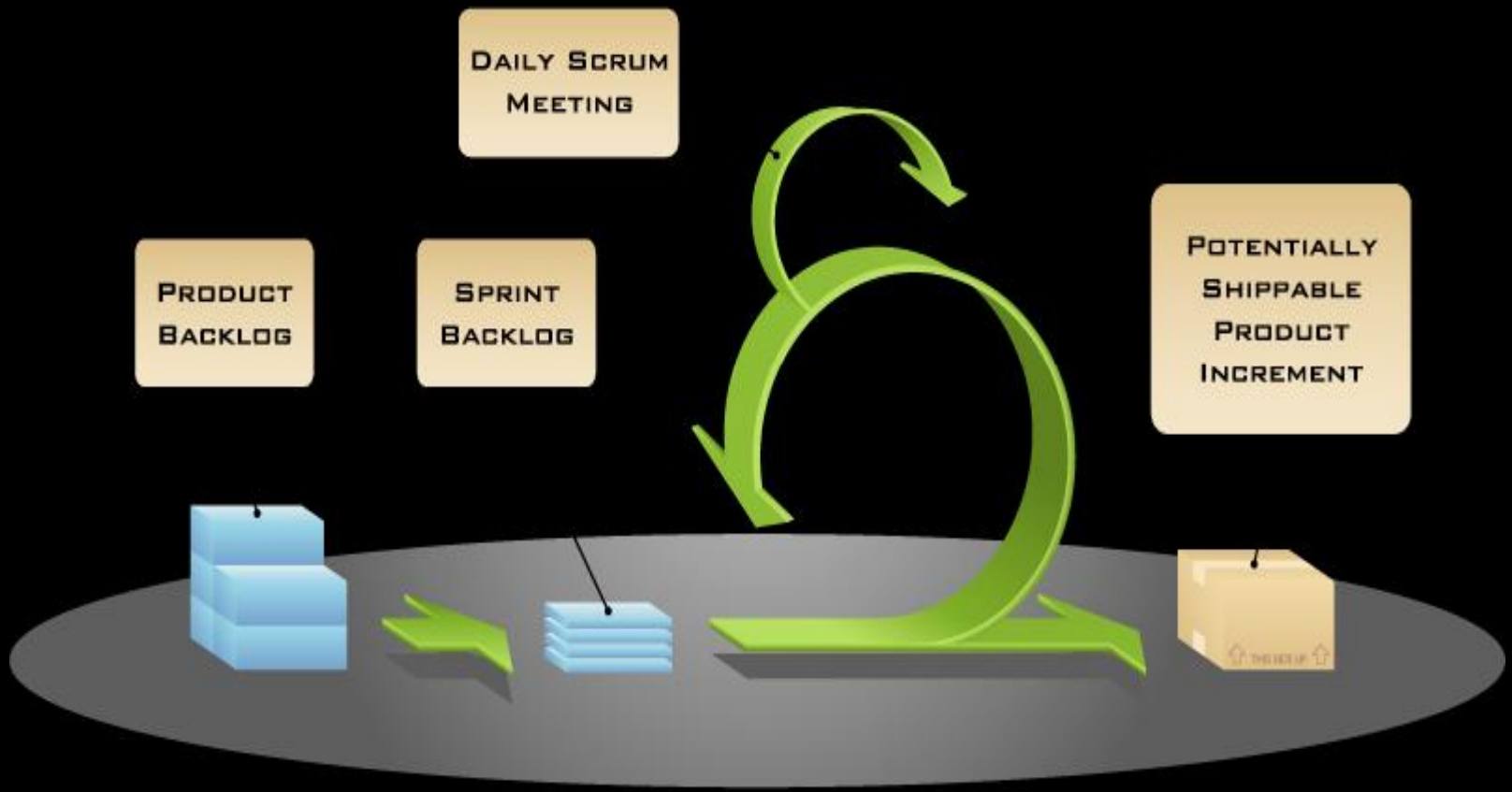
Scrum



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Scrum

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Preparation

- ✓ Business case & Funding
- ✓ Contractual Agreement
- ✓ Vision
- ✓ Initial Product Backlog
- ✓ Initial Release Plan
- ✓ Stakeholder Buy-in
- ✓ Assemble Team

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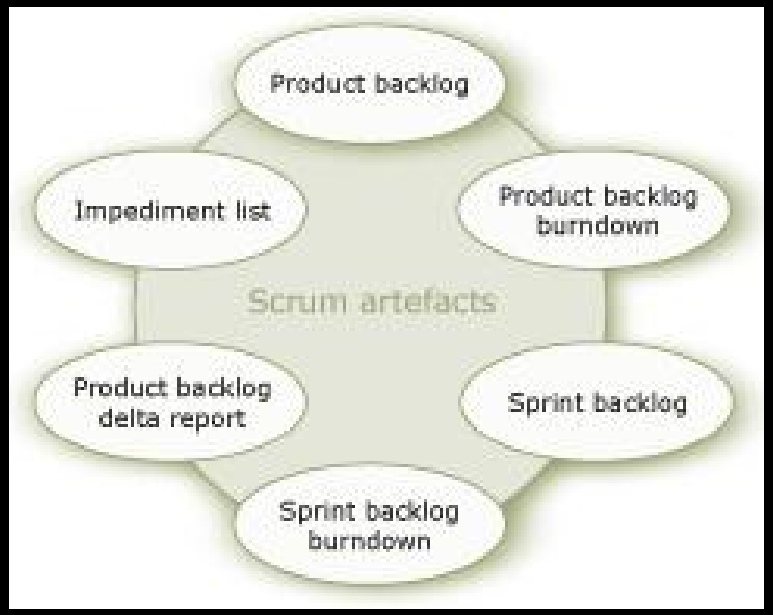
Scrum Artefacts



This section explains the Scrum specific artefacts and reports supported by Scrum for Team System:

- Product Backlog
- Sprint Backlog
- Product Burndown Chart by Day
- Product Burndown Chart by Sprint
- Sprint Burndown Chart
- Sprint Task Board View
- Impediments

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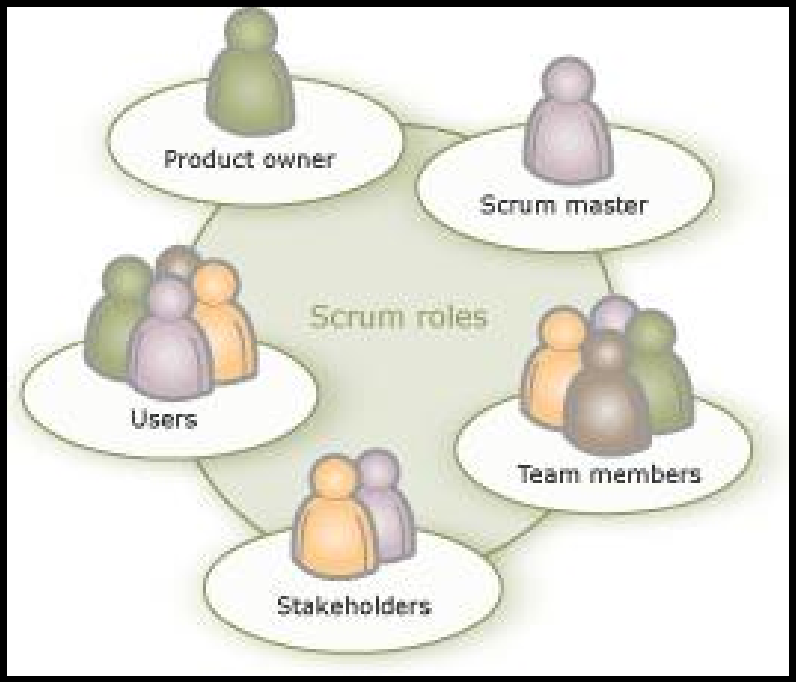
Scrum's Three Roles

Scrum has three fundamental roles: Product Owner, Scrum Master, and team member.



- Product Owner
- Scrum Master
- Team Members
- Team Members
- Stakeholders
- Users

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Product Owner

- **Product Owner:**

  In Scrum, the Product Owner is responsible for communicating the vision of the product to the development team. He or she must also represent the customer's interests through requirements and prioritization. Because the Product Owner has the most authority of the three roles, it's also the role with the most responsibility. In other words, the Product Owner is the single individual who must face the music when a project goes awry.

  The tension between authority and responsibility means that it's hard for Product Owners to strike the right balance of involvement. Because Scrum values self-organization among teams, a Product Owner must fight the urge to micro-manage. At the same time, Product Owners must be available to answer questions from the team.

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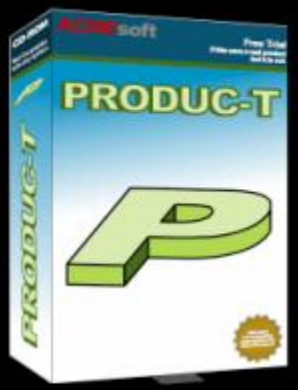
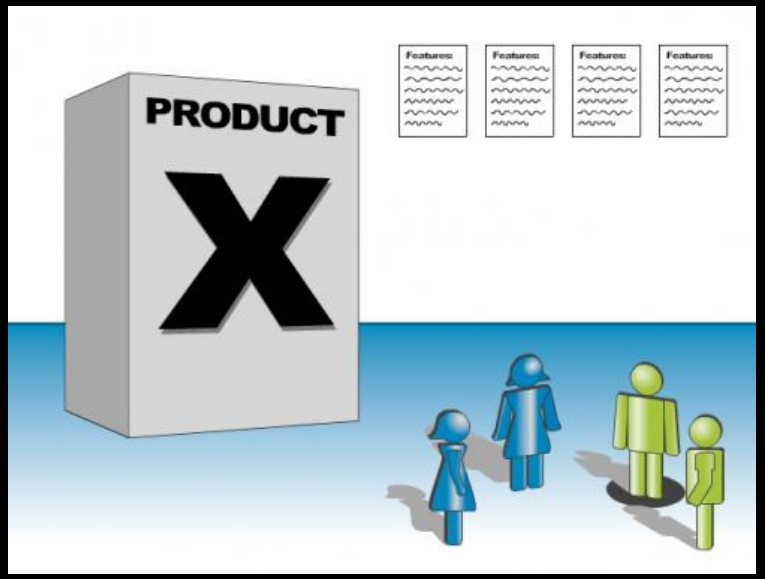
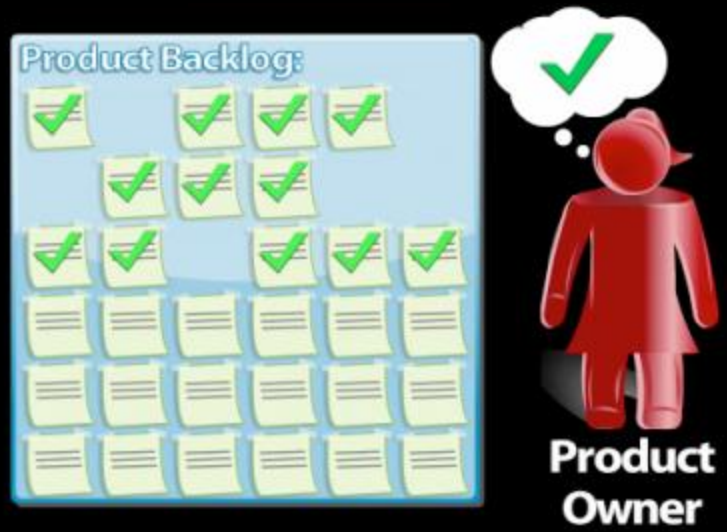
Product Owner







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Product Owner

- The **product owner** decides what will be built and in which order
- Defines the features of the product or desired outcomes of the project
- Chooses release date and content
- >Ensures profitability (ROI)
- Prioritizes features/outcomes according to market value
- Adjusts features/outcomes and priority as needed
- Accepts or rejects work results
- Facilitates scrum planning ceremony

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Scrum Master

- **Scrum Master:**

  The Scrum Master acts as a liaison between the Product Owner and the team. The Scrum Master does not manage the team. Instead, he or she works to remove any impediments that are obstructing the team from achieving its sprint goals. In short, this role helps the team remain creative and productive, while making sure its successes are visible to the Product Owner. The Scrum Master also works to advise the Product Owner about how to maximize ROI for the team.

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Scrum Master

- The **Scrum Master** is a facilitative team leader who ensures that the team adheres to its chosen process and removes blocking issues.
- Ensures that the team is fully functional and productive
- Enables close cooperation across all roles and functions
- Removes barriers
- Shields the team from external interferences
- Ensures that the process is followed, including issuing invitations to daily scrums, sprint reviews, and sprint planning
- Facilitates the daily scrums

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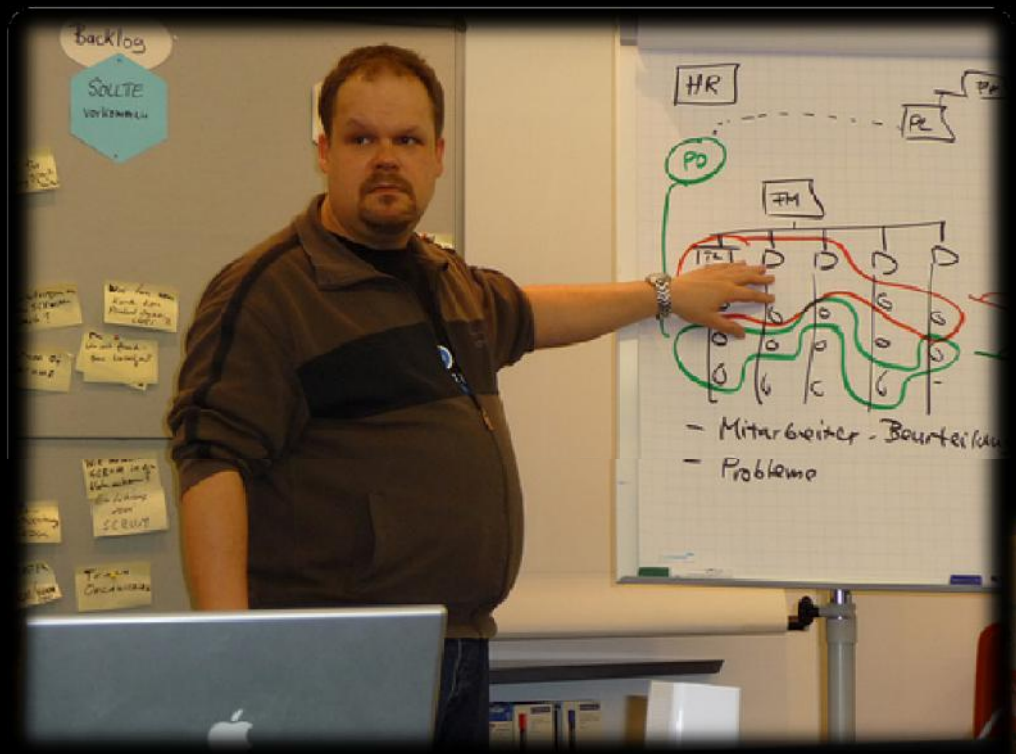
Scrum Master



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Team Member

- **Team Member:**

  In the Scrum methodology, the team is responsible for completing work. Ideally, teams consist of seven cross-functional members, plus or minus two individuals. For software projects, a typical team includes a mix of software engineers, architects, programmers, analysts, QA experts, testers, and UI designers. Each sprint, the team is responsible for determining how it will accomplish the work to be completed. This grants teams a great deal of autonomy, but, similar to the Product Owner's situation, that freedom is accompanied by a responsibility to meet the goals of the sprint.

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Team Member

- Is cross-functional
- Is right-sized (the ideal size is seven -- plus/minus two -- members)
- Selects the sprint goal and specifies work results
- Has the right to do everything within the boundaries of the project guidelines to reach the sprint goal
- Organizes itself and its work
- Demos work results to the product owner and any other interested parties.

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Team Member

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Team Member

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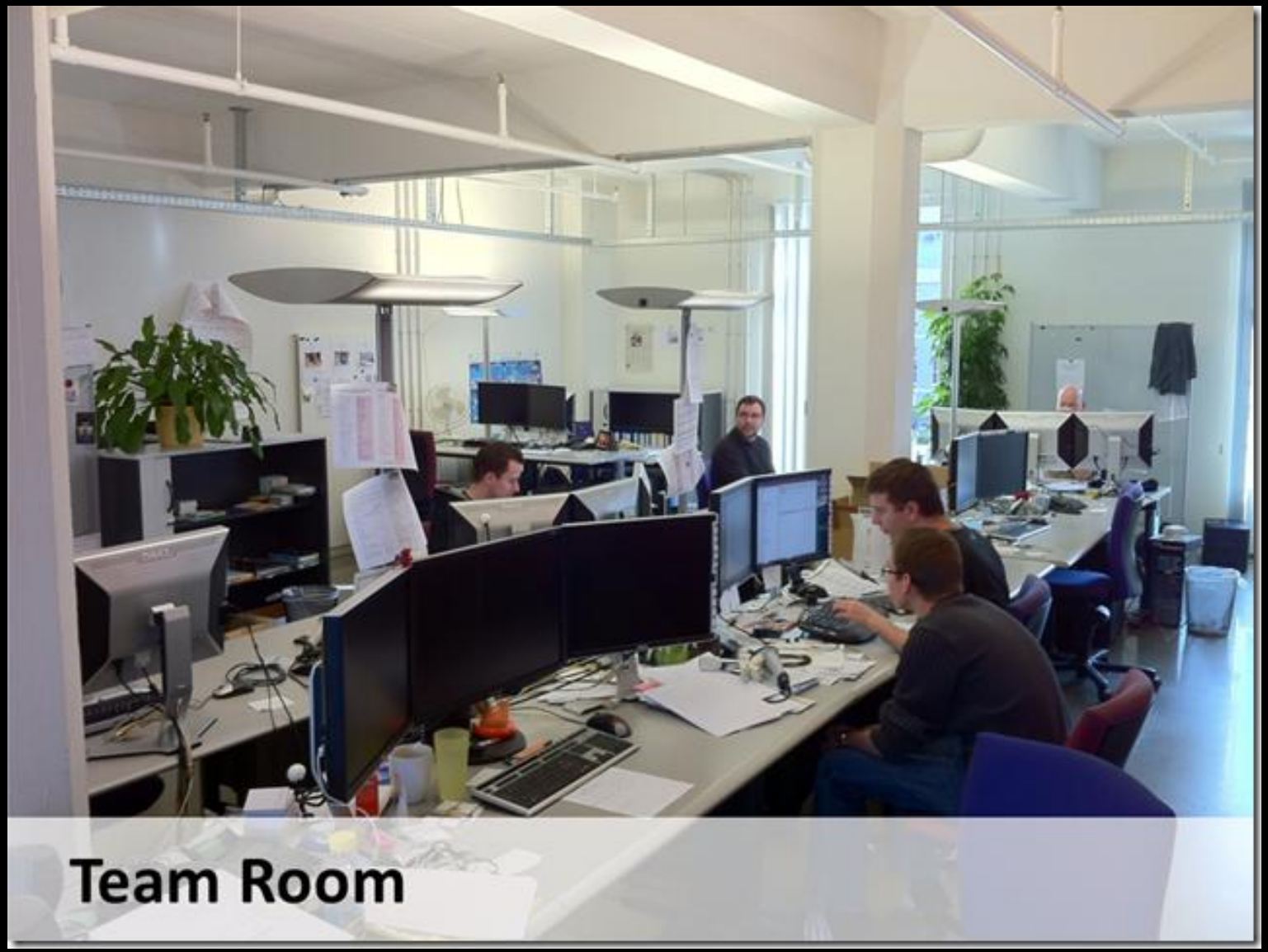
Team Room



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Stakeholders

- Stakeholders (customers, vendors) These are the people who enable the project and for whom the project will produce the agreed-upon benefit[s], which justify its production. They are only directly involved in the process during the sprint reviews.

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Stakeholders

- Arguably, the most important role involved in scrum is the Stakeholder, as the **Stakeholders** are the ones who have desires, wants, and needs, and are the reason the Team is developing the software in the first place. Often, there is a special stakeholder called the Business Owner, who actually controls the budget for the Team. The Business Owner is often the one who called or asked the team to form.

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Stakeholders

- While the **Stakeholders** are the most important source of validation for the project, the most important person on the Scrum Team is the Product Owner (PO). The Product Owner works with the Stakeholders, represents their interests to the Team, and is the sole Team Member held accountable for the product the Team builds. The Product Owner must find a result that will satisfy the Stakeholders needs and desires. The Product Owner provides direction and goals for the Team, and prioritizes what will be done. The Product Owner connects the team with the purpose.

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MANAGERS (INCLUDING PROJECT MANAGERS)

- People who will set up the environment for product development.

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Scrum Process

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Sprint Planning Meeting

- Preparation for a Scrum sprint begins when the Product Owner develops a plan for a product or a project. The Product Owner can be a customer representative or a customer proxy. For product companies, the customer is a market, and the Product Owner serves as a proxy for the market. A Product Owner needs a vision for the product that frames its ultimate purpose, a business plan that shows what revenue streams can be anticipated from the product in which timeframes, and a road map that plans out several releases, with features ordered by contribution to return on investment (ROI). S/he prepares a list of customer requirements prioritized by business value. This list is the Product Backlog , a single list of features prioritized by value delivered to the customer.

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Planning Meeting

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Daily Scrum Meeting

- Once planning is complete, the Sprint begins its thirty-day cycle. Each day the Scrum Master leads the team in the Daily Scrum Meeting. This is a fifteen-minute meeting designed to clarify the state of the Scrum. Each team member speaks to three questions: what did I do yesterday, what did I do today, and what impediments got in my way? While anyone can attend this meeting, only team members who have committed to deliver work to the Scrum are allowed to speak. The goal is to get a global snapshot of the project, discover any new dependencies, address any personal needs of committed individuals, and adjust the work plan in real time to the needs of the day.

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Daily Scrum

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Sprint Review Meeting

- At the end of a sprint, a Sprint Review Meeting is held. This meeting is time-boxed to a maximum of four hours. The first half of the meeting is set aside to demonstrate to the Product Owner the potentially shippable code that has been developed during the sprint. The Product Owner leads this part of the meeting and invites all interested stakeholders to attend. The state of the business, the market, and the technology are reviewed. The Product Owner determines which items on the Product Backlog have been completed in the Sprint, and discusses with the Scrum team and stakeholders how best to reprioritize the Product Backlog for the next sprint. The goal for the next sprint is defined.

- The second half of the Sprint Review Meeting is a retrospective for the Scrum team that is led by the Scrum Master. The team assesses the way they worked together in the sprint and identifies positive ways of working together that can be encouraged as future practice. the team also identifies the things that could work better and develops strategies for improvement.

- After the Scrum Review Meeting, the process begins again. Iterations proceed until enough features have been done to complete or release a product.

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Product Backlog

- At the beginning of the project, the product owner prepares a list of customer requirements prioritized by business value. This list is the Product Backlog, a single list of features prioritized by value delivered to the customer. The Scrum Team contributes to the product backlog by estimating the cost of developing features.
- The Product Backlog should include all features visible to the customer, as well as the technical requirements needed to build the product. The highest priority items in the Product Backlog need to be broken down into small enough chunks to be estimable and testable. About ten developer-days of work is a good size for a Product Backlog item that can be ready for implementation in the next iteration. Features that will be implemented further out in time can be less detailed.

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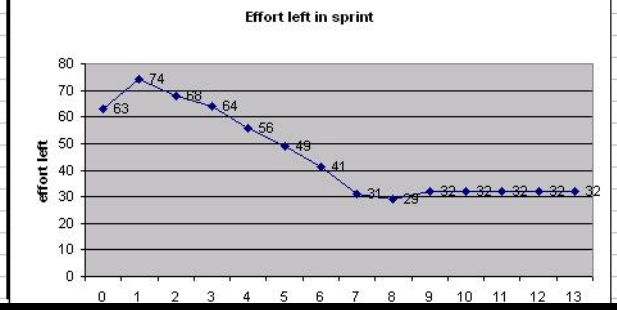
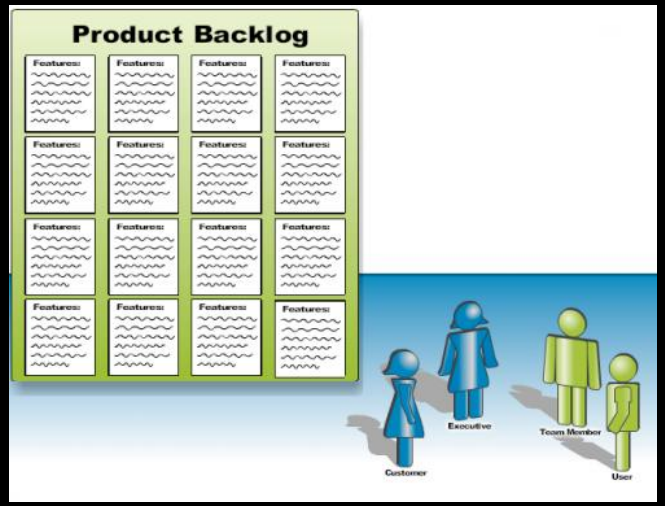
Product Backlog

Sprint 3. Plug in the Real Weather

Story ID	Story/task	days in sprint / effort left												
		0	1	2	3	4	5	6	7	8	9	10	11	12	13
		63	74	68	64	56	49	41	31	29	32	32	32	32	32
10	**Fetch one day temperature data from the weather provider system**														
	Make our server connect and authenticate to the provider system	4										3	3	3	3
	Read provider's data directory	8	7									0	0	0	0
	Parse the current temperature out of the data	6	6									1	1	1	1
	Push the temperature data to the client	16	16									0	0	0	0
11	**Fetch rain, snow, etc details from the provider**														
	Parse snow/rain data from the provider's data	4	4									0	0	0	0
	Push the snow/rain data to the client	4	4									0	0	0	0
	Redesign client screen a bit											3	3	3	3
	Refactor the server code										4	4	4	4	4
12	**Fetch several days data from the provider**														
	Parse the weather data in day packs	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Push several days data to the client	3	3	3	3	3	3	3	3	3	3	3	3	3	3
13	**Auto-refresh feature**														
	Make the client ping server once per 4 hours	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Make the server update the client	2	2	2	2	2	2	2	2	2	2	2	2	2	2

The team underestimated the difficulties of connecting to the provider's CORBA server. Even though some work has been already done, the remaining amount is much bigger, than the original estimation for the whole task





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Sprint Backlog

- The Sprint Backlog is an artifact of the Sprint Planning Meeting. When the Scrum Team has selected and committed to deliver a set of top priority features from the Product Backlog, the Product Backlog's features are broken down into a Sprint Backlog: a list of the specific development tasks required to implement a feature. These tasks are broken down into pieces that will require less than two days (or sixteen developer-hours) of work. When the Sprint Backlog is complete, the total work estimated is compared with original estimates from the Product Backlog. If there is a significant difference, the team negotiates with the Product Owner to get the right amount of work to take into the Sprint with a high probability of success.

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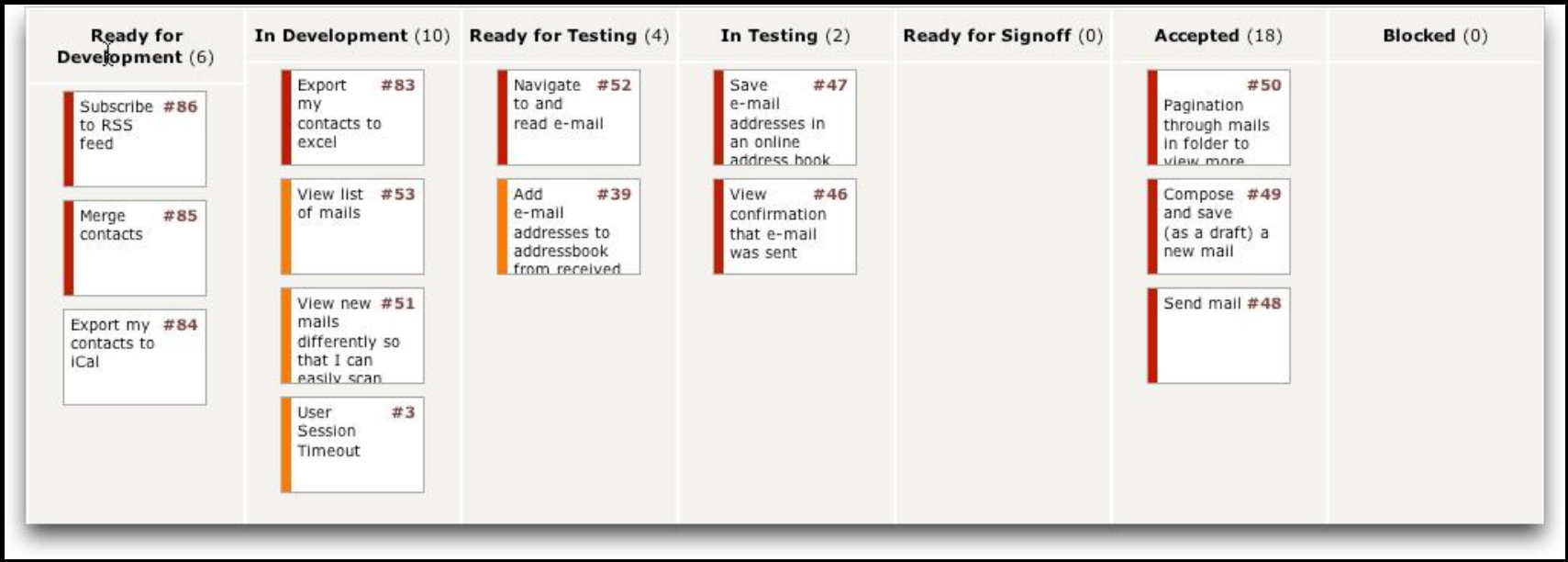
Sprint Backlog

Tasks	Mon	Tues	Wed	Thurs	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	4	
Test the middle tier	8	16	16	11	8
Write online help	12				
Write the foo class	8	8	8	8	8
Add error logging			8	4	



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Burndown Chart

- The Burndown Chart shows the cumulative work remaining in a Sprint, day-by-day.
- At the Sprint Planning Meeting the Scrum Team identifies and estimates specific tasks that must be completed for the Sprint to be successful. The total of all Sprint Backlog estimates of work remaining to be completed is the cumulative backlog. When tasks are completed as the Sprint proceeds, the Scrum Master recalculates the remaining work to be done and the Sprint Backlog decreases, or burns down over time. If the cumulative Sprint Backlog is zero at the end of the Sprint, the Sprint is successful.
- The Product Backlog items brought into the Sprint are fixed for the duration of the Sprint. However, the Sprint Backlog may change for several reasons:
- The development team gains a better understanding of work to be done as time progresses and may find that they need to add new tasks to the Sprint Backlog to complete the Product Backlog items selected.
- Defects may be identified and logged as additional tasks. While these are viewed primarily as unfinished work on committed tasks, it may be necessary to keep track of them separately.
- The Product Owner may work with the team during the Sprint to help refine team understanding of the Sprint goal. The Scrum Master and Team may decide that minor adjustments that do not lengthen the Sprint are appropriate to optimize customer value.

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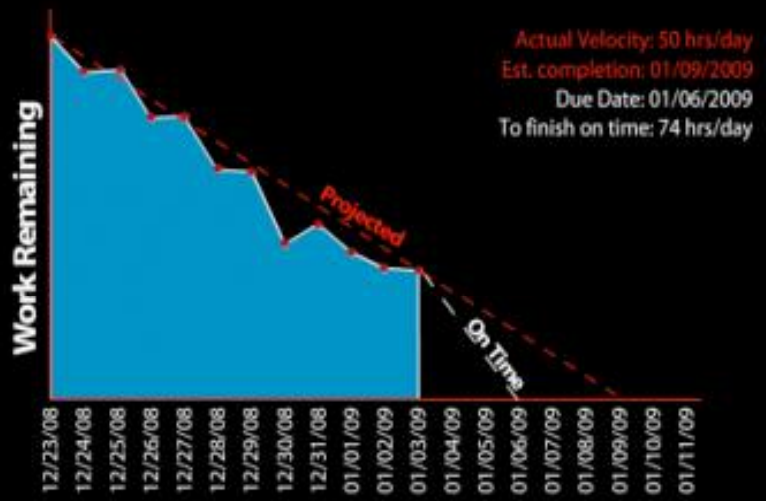
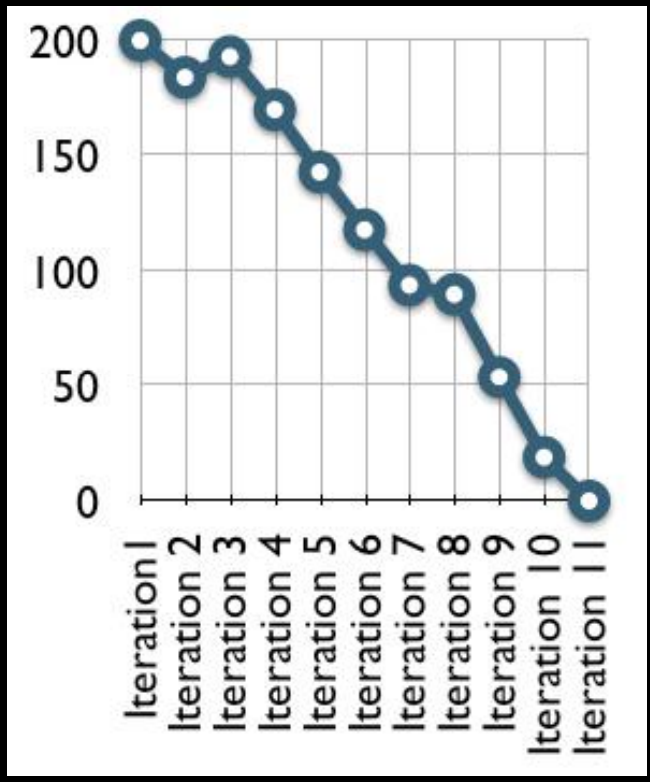
Burndown Chart





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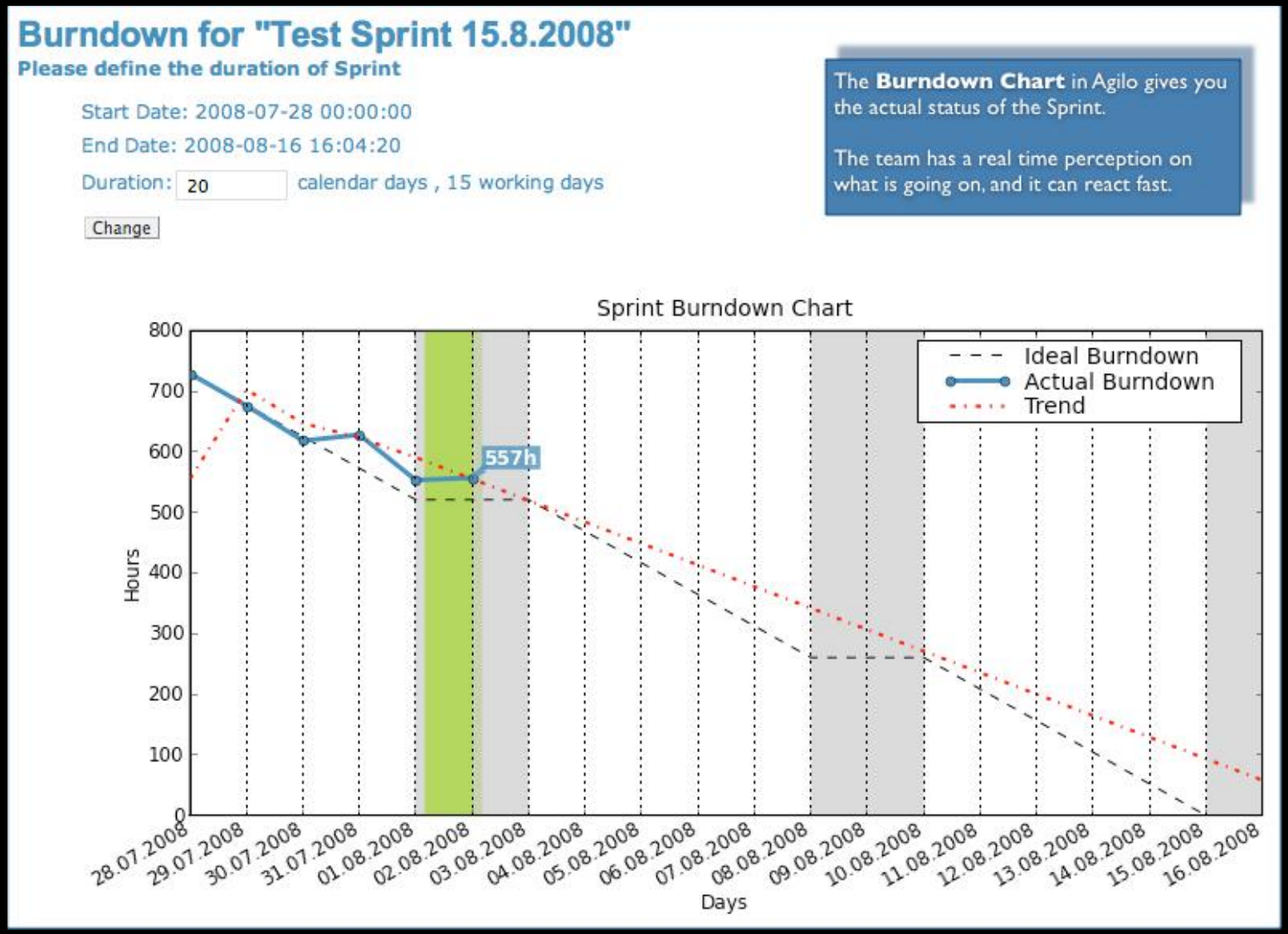
Burndown Chart Real Life Example



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Sprint Retrospective

- All team members reflect on the past sprint
- Make continuous process improvements
- Two main questions are asked in the sprint retrospective: What went well during the sprint? What could be improved in the next sprint?
- Three hour time limit

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Sprint Retrospective

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Sprint Retrospective

Retrospective Actions Kanban Board

Retrospective Board

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Scrum Demo

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Scrum Desk

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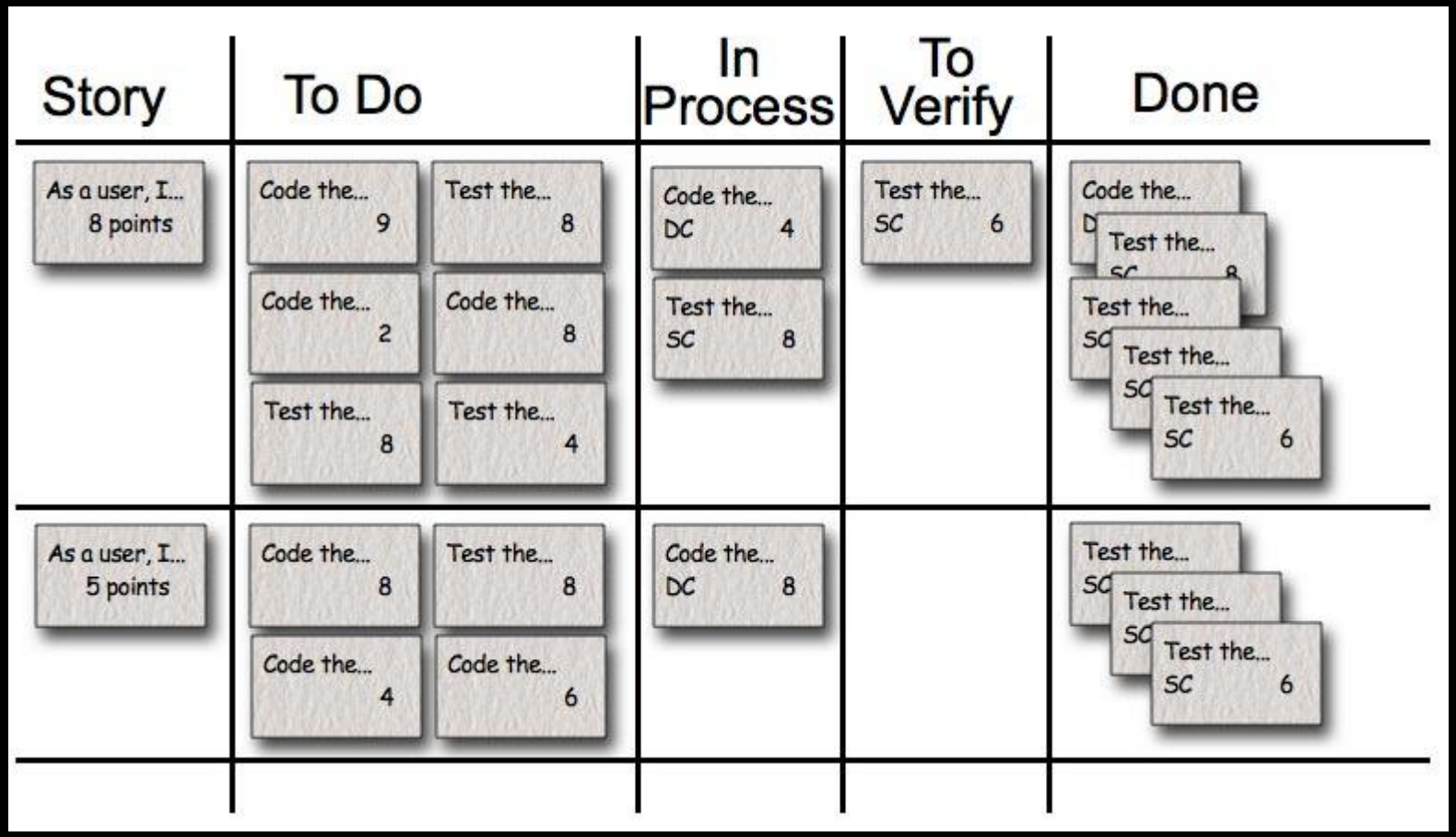
Task Boards



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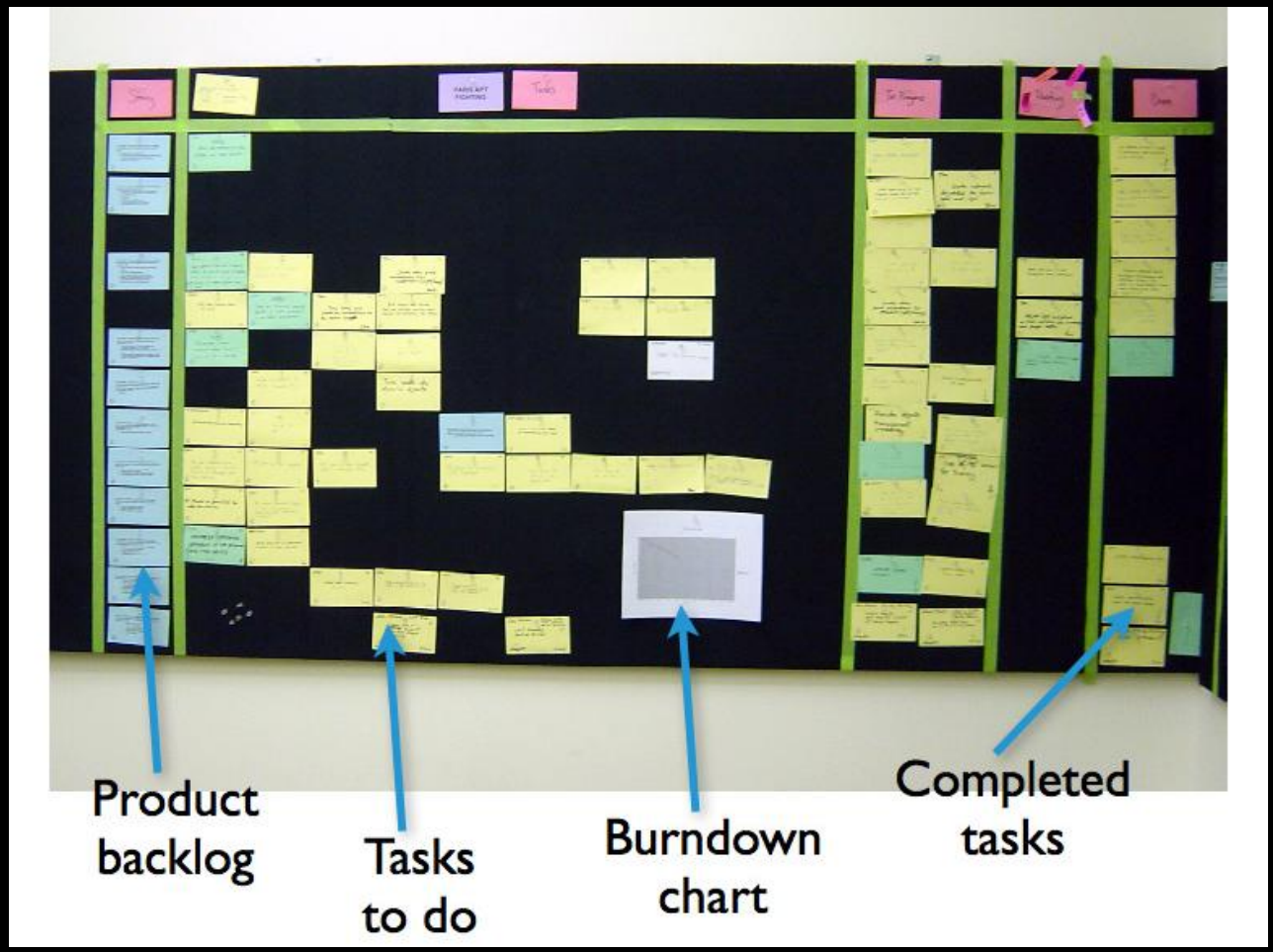
Task Boards



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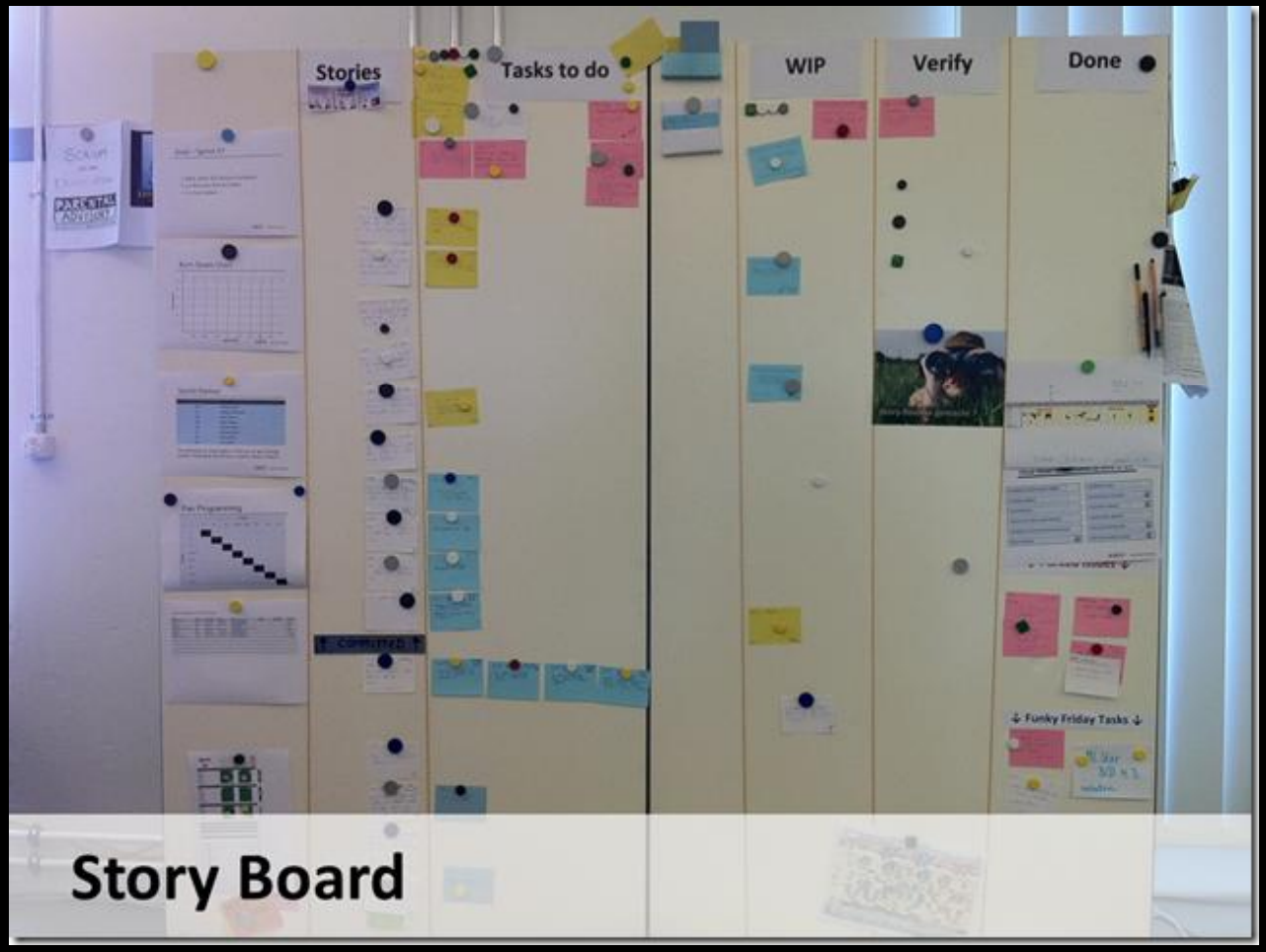
Story Board



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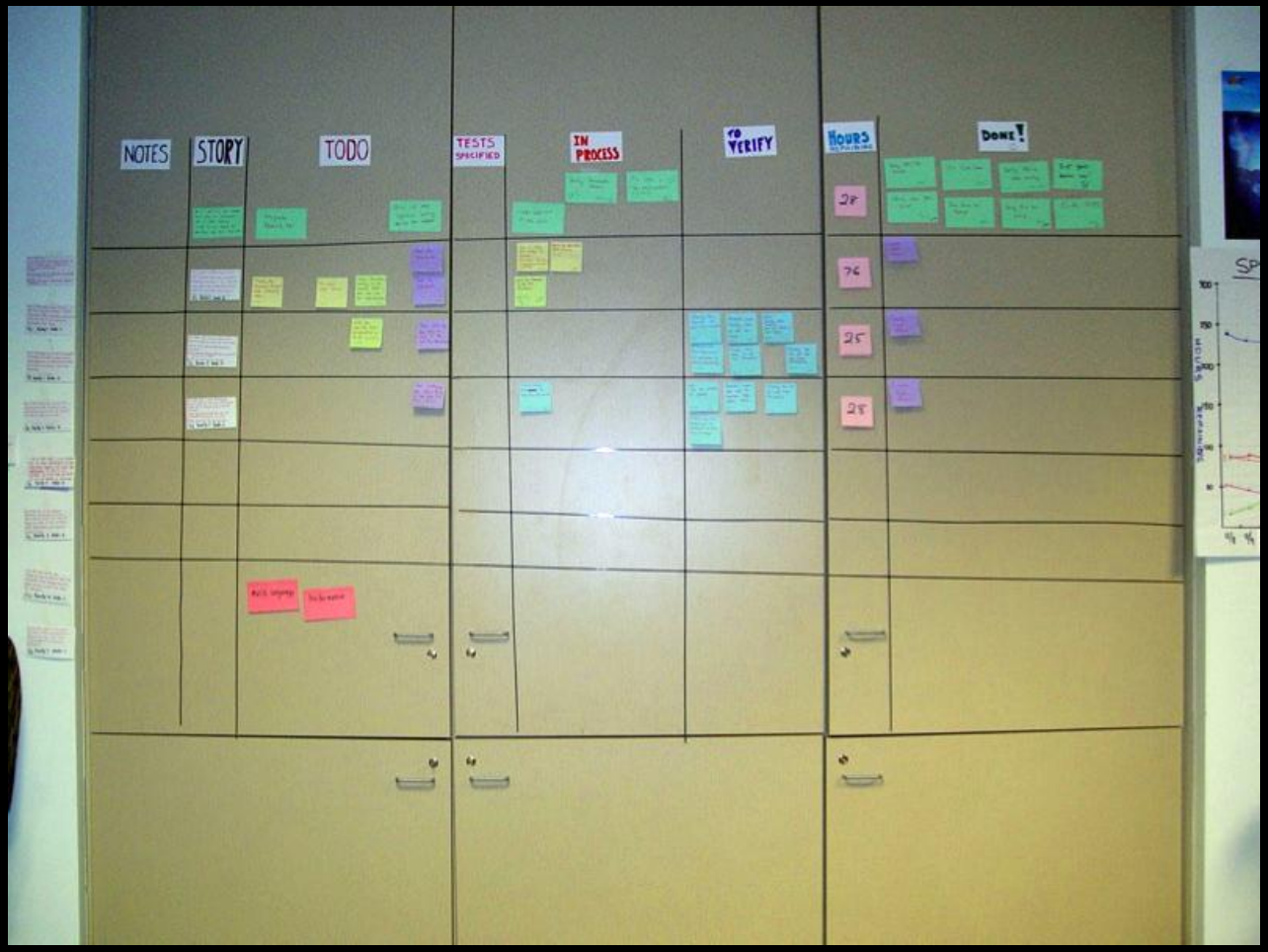

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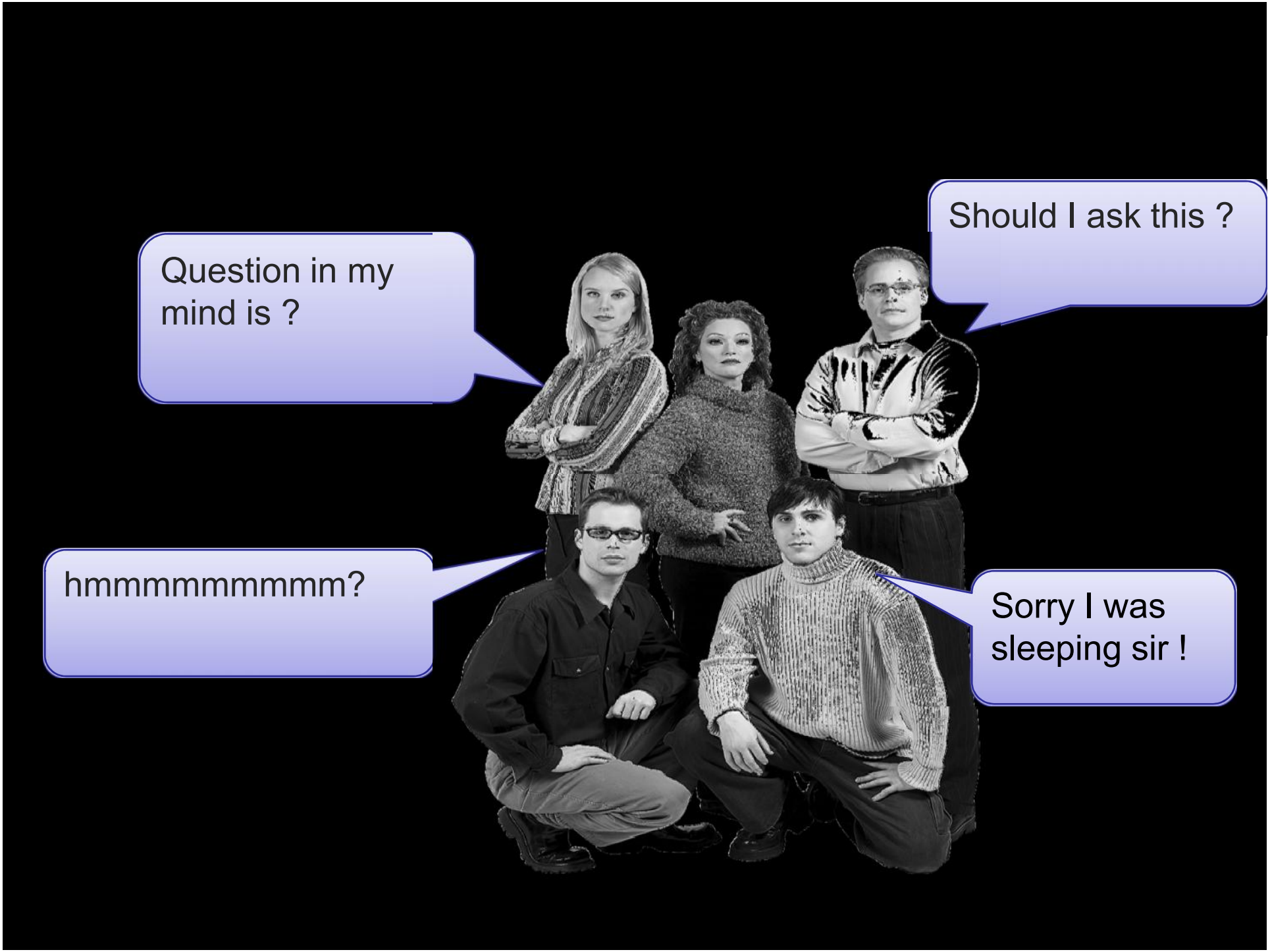
Should I ask this ?
Question in my mind is ?
hmmmmmmmmm?
Sorry I was sleeping sir !

If you have any query please feel free to ask

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