

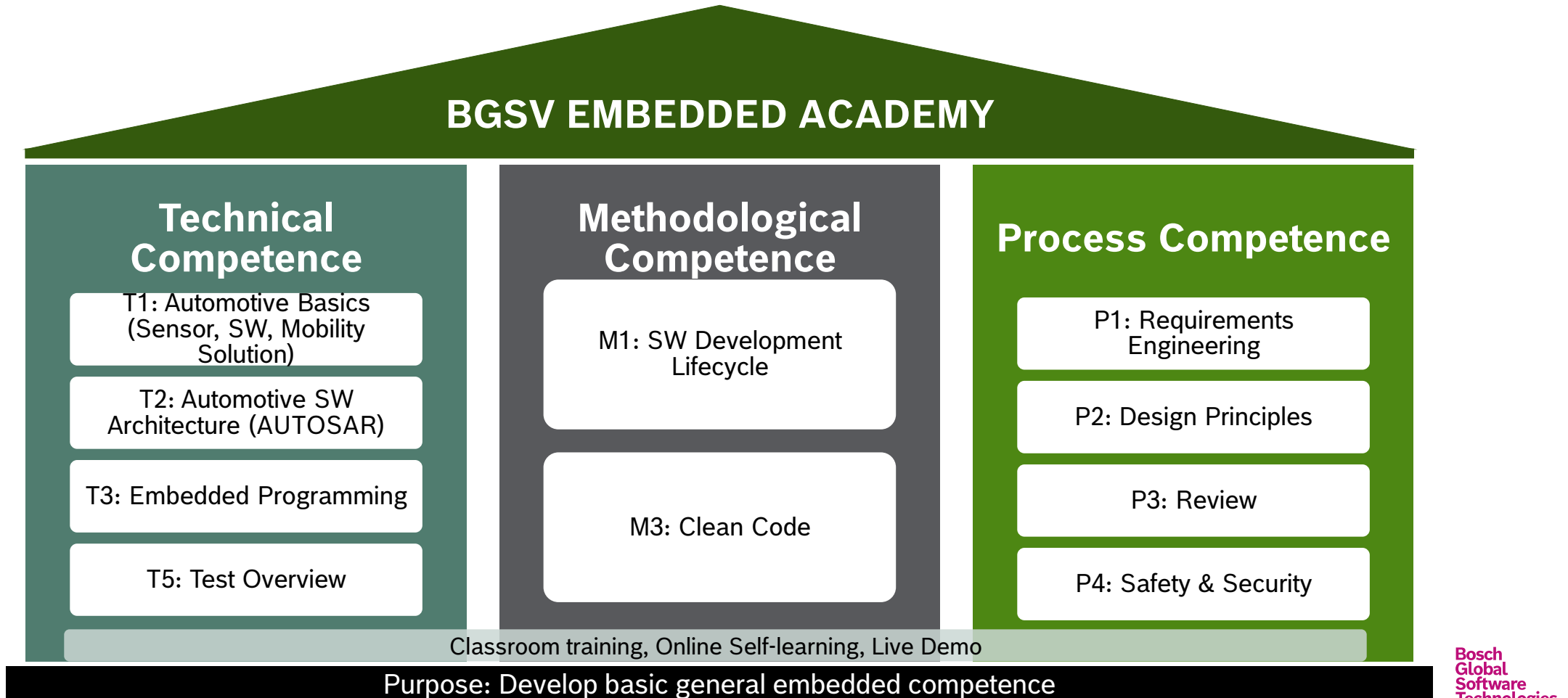
EMBEDDED ACADEMY

★ PEDAL TO THE MEDAL ★



BGSV Embedded Academy (BEA)

Focused Program to Develop Embedded Competence



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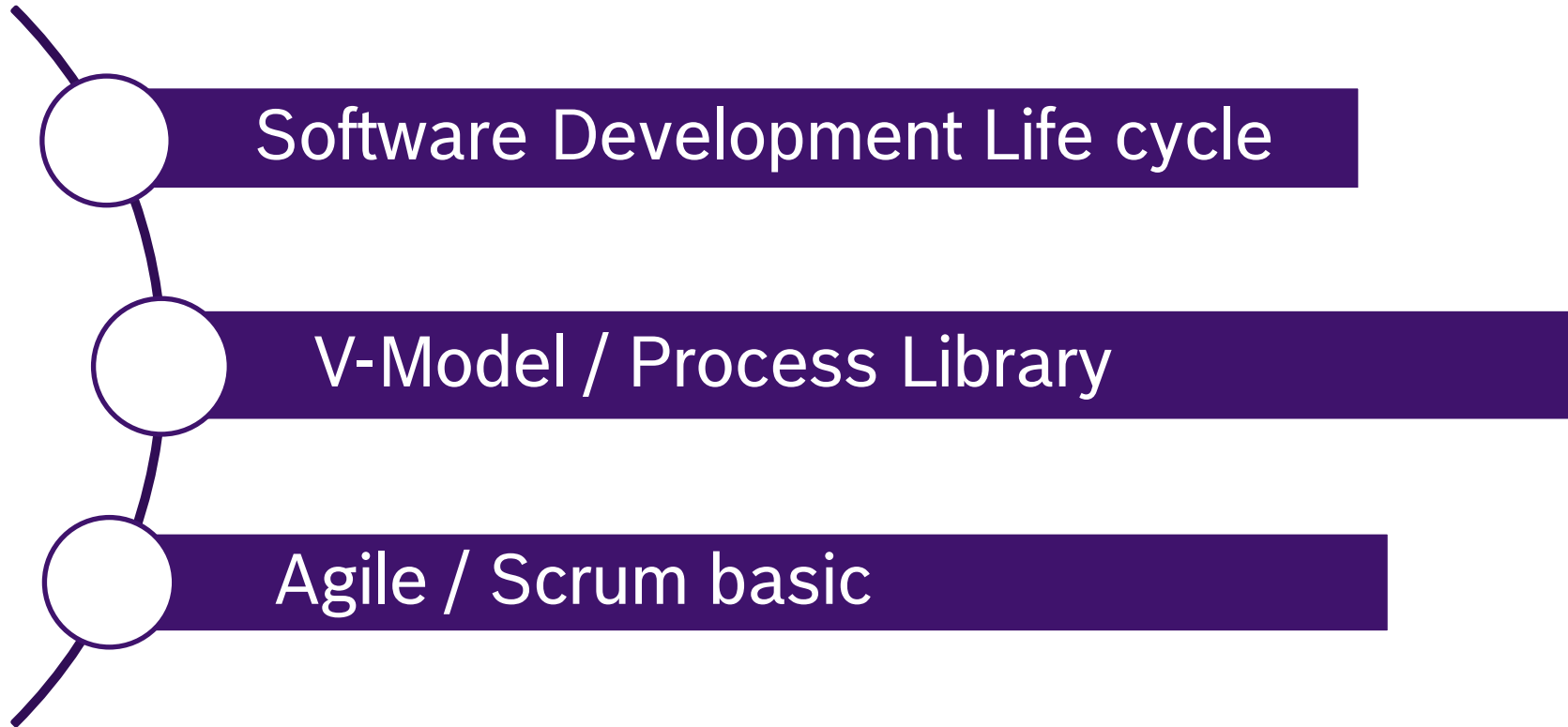


M1

Software Development Life Cycle

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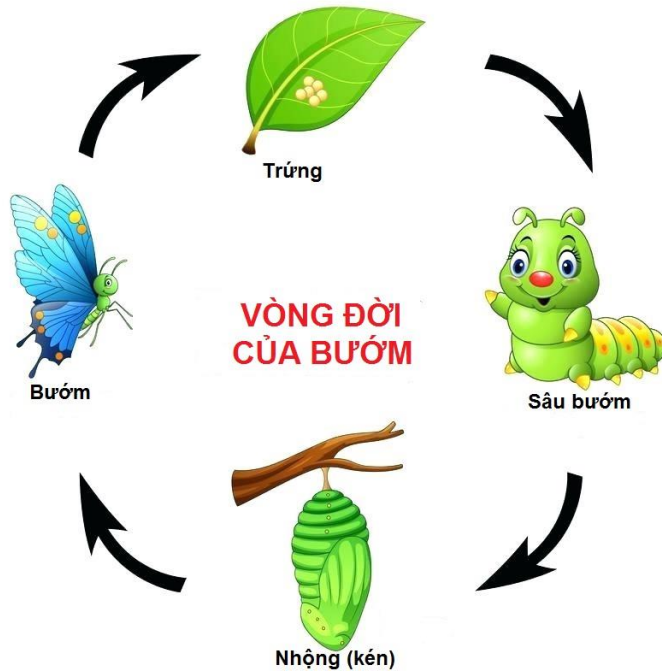
AGENDA



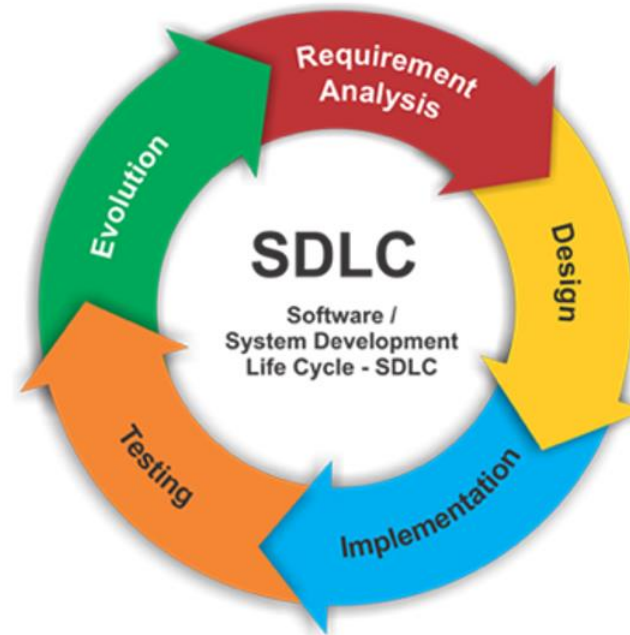
Software Development Life cycle

Life Cycle

► What is life cycle?



► Software Development has its own cycle



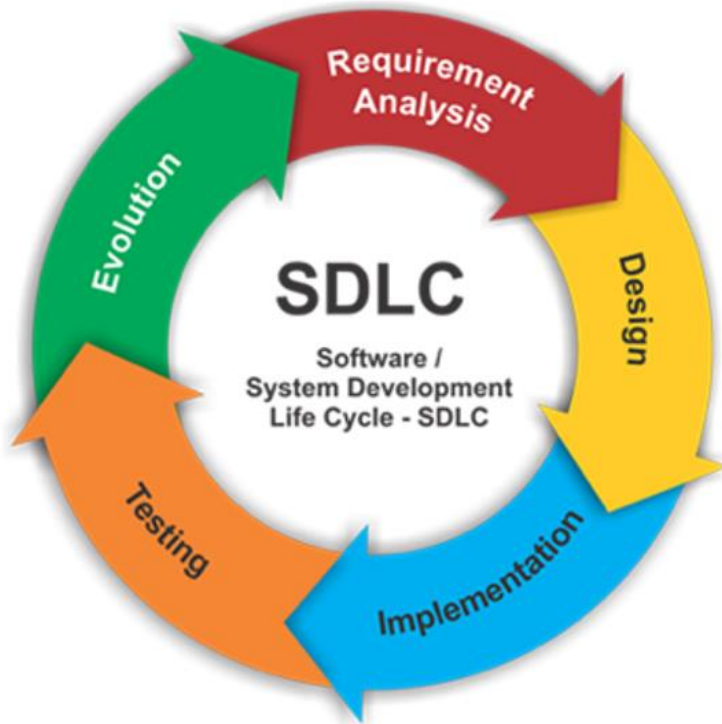
Software Development Life cycle

Is Process / Model important?

Process / Model is defined to follow up Software Development Life Cycle with :

- No Assume
- No Misunderstanding Customer Need
- No Skip level
- Ensure Verification and Validation

...



Software Development Life cycle

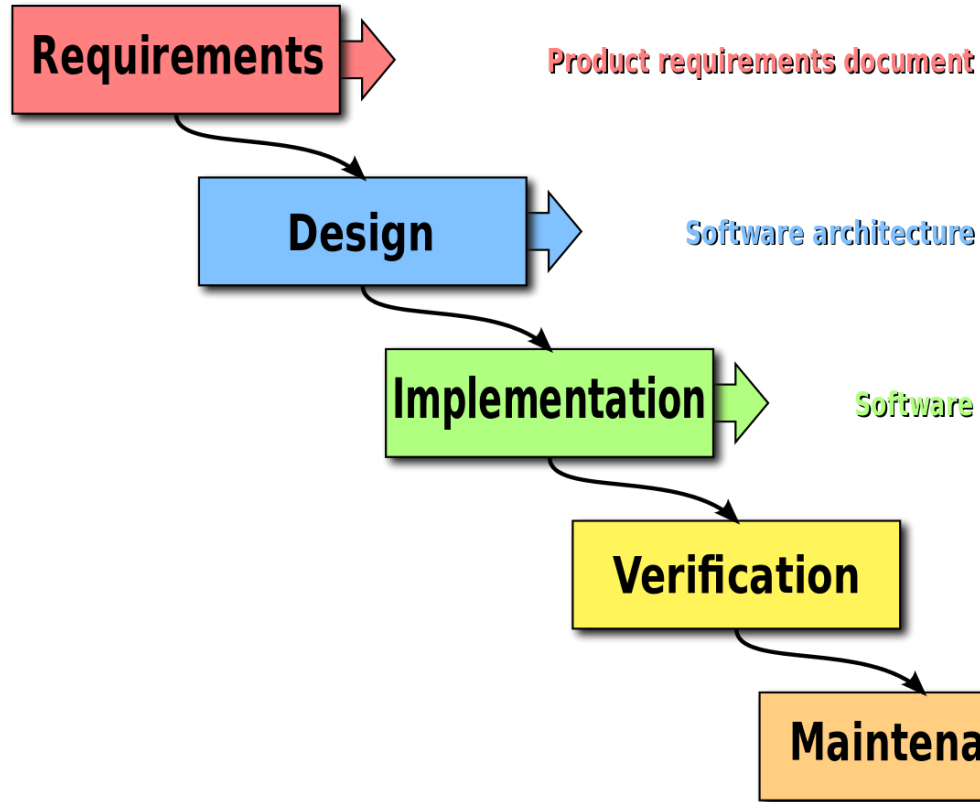
Do they have a good design?



or they miss something
during development phase?

Software Development Life cycle

Waterfall Model & Agile Model in software development model



Agile Method

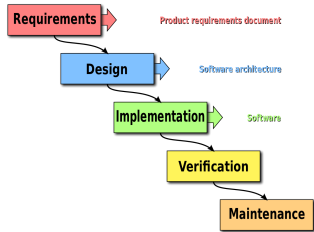
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Software Development Life cycle

Waterfall Model & Agile Model – Use cases

Waterfall

Develop Active Braking Product (ABS,ESP,...)



Requirements is analyzed and clarified, clear scope with customer at the beginning

Baseline is planned to fulfill every requirement, and each baseline take around 1-2 months

Customer only can test on released software of baseline with well scopes define in this baseline

Requirement change during current baseline is not applicable

Agile use case



Projects to develop HMI for Smart Home

Requirements needs to fit market trend and cannot be fixed from the start

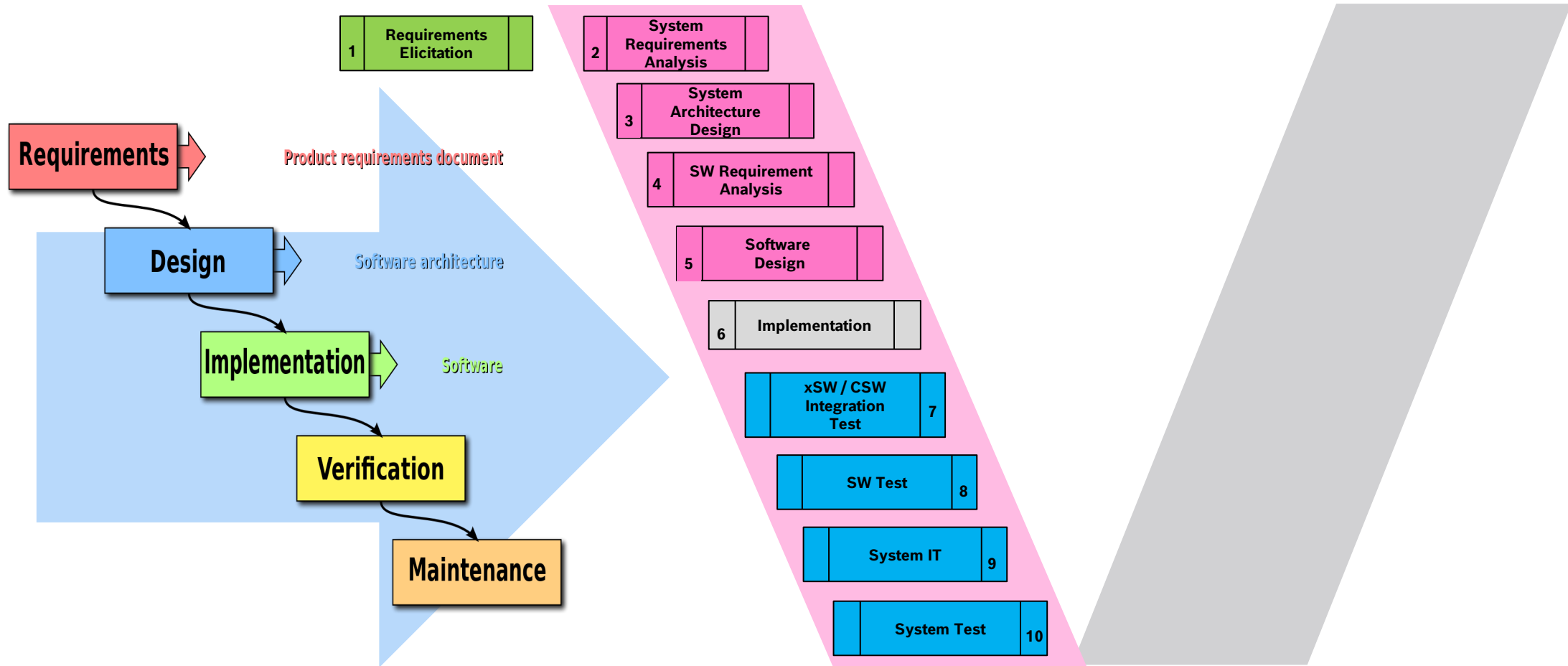
Marketing department needs working UI soon to get feedback from end Users

Software Team and Customer shall have regular meeting to check the delivery status (2,3 week depend on project)

Requirement change and updated frequently to reflect market needs

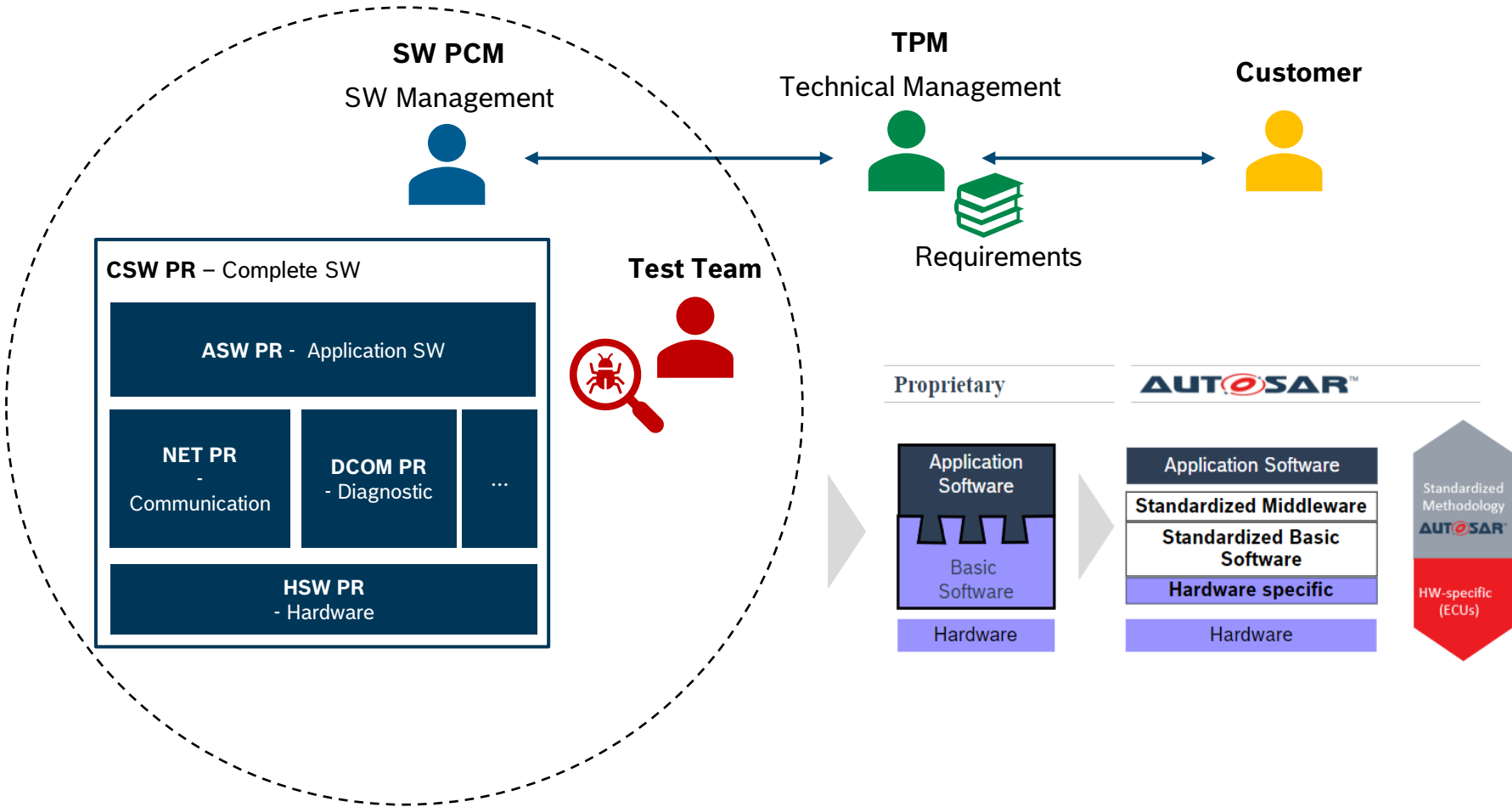
V-Model / Process Library

Waterfall Model : Overview V-Model



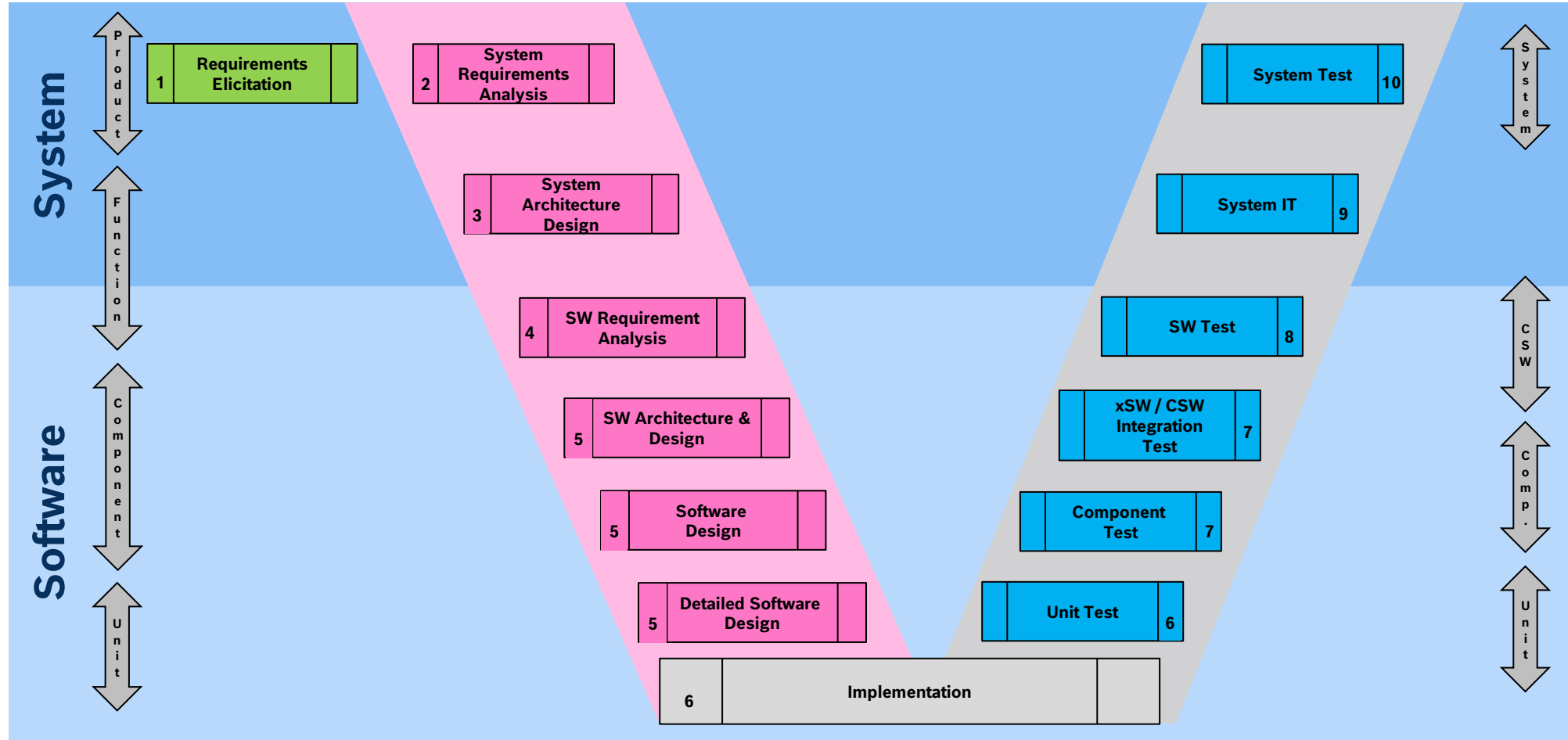
V-Model / Process Library

SW roles



V-Model / Process Library

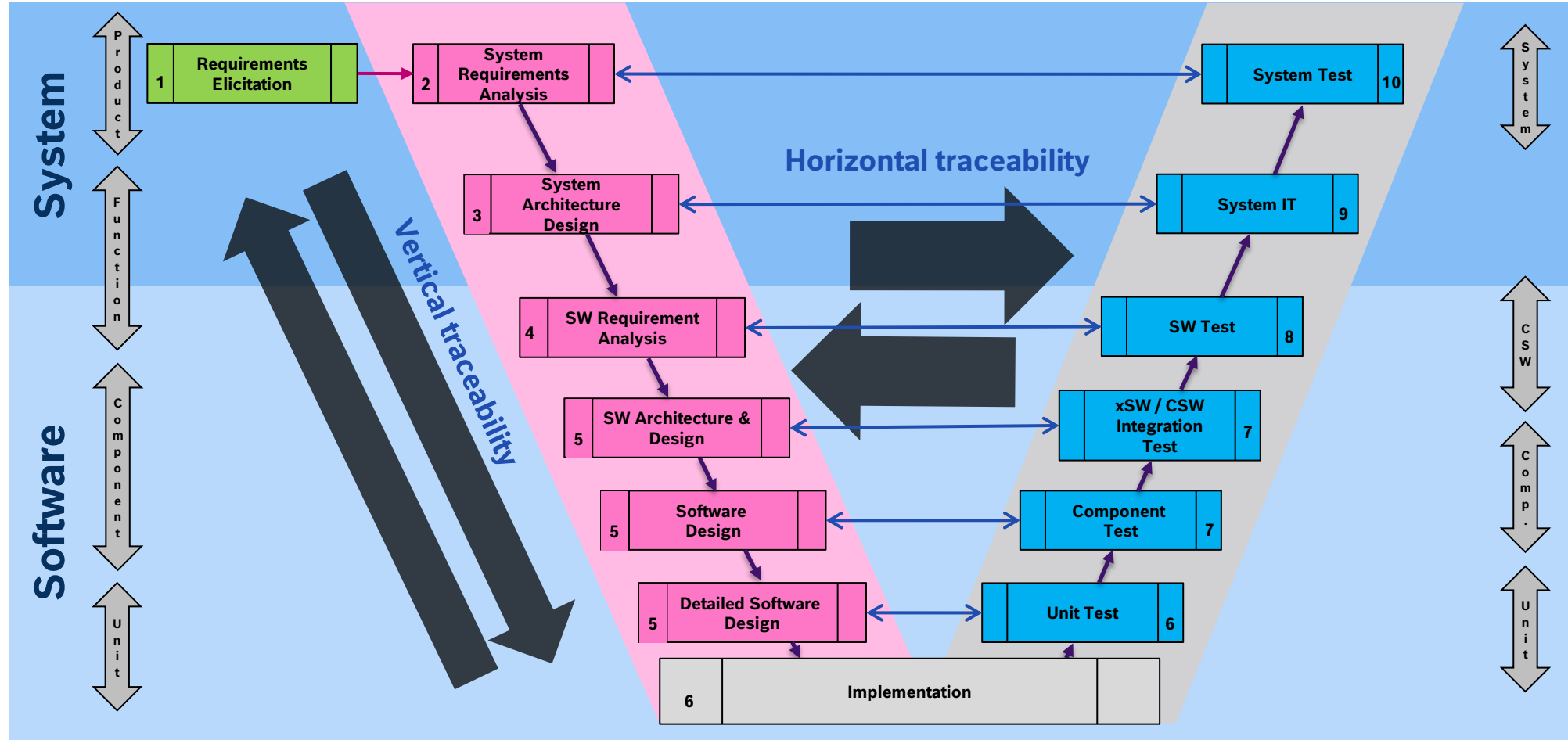
Waterfall Model : Overview V-Model



V-Model / Process Library

Traceability

"Reliable Solutions are based on requirements traceability"
Bi-directional traceability is explicitly demanded



V-Model / Process Library

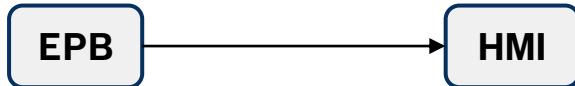
Example process missing

➤ Customer reported issue :

Dashboard displays around 3s “Please Release EPB” every time after Ignition on



➤ How it happen

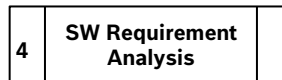
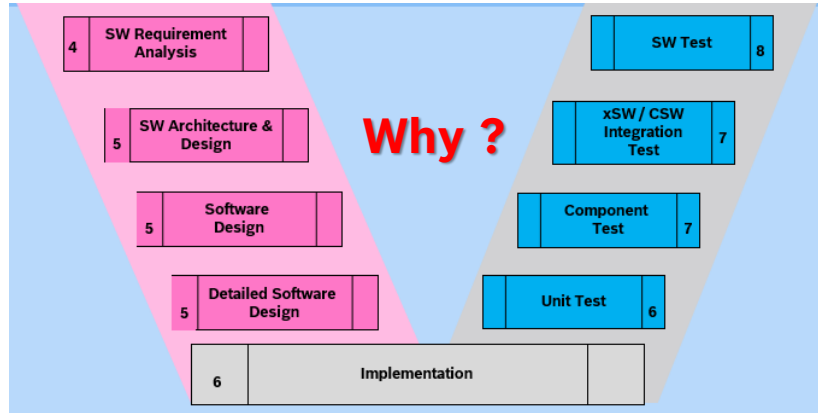


EPB always send status CAN signal with value : 0x7 - “Please Release EPB ” after ignition on

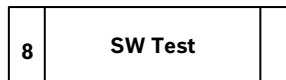
```
0x1:Gradient_Too_High
0x2:Park_Brake_Force_Not_Enough
0x3:Park_Brake_System_Overheated
0x5:Park_Brake_Maintenance_Mode
0x6:Roller_Bench_Mode
0x4:Remind_Driver_To_Apply_Safety_Belt
0x9:Switch_To_Non_P_and_Release_The_Parking
0xA:Please_Quit_TAB
0x7:Please_Release_EPB
0x8:Please_Release_Rear_ELD
0x0:No_Display
```

Requirement come from 2 place:

- HMI specification for EPB – ASW PR responsible
- CAN matrix to add new value 0x7– NET PR responsible



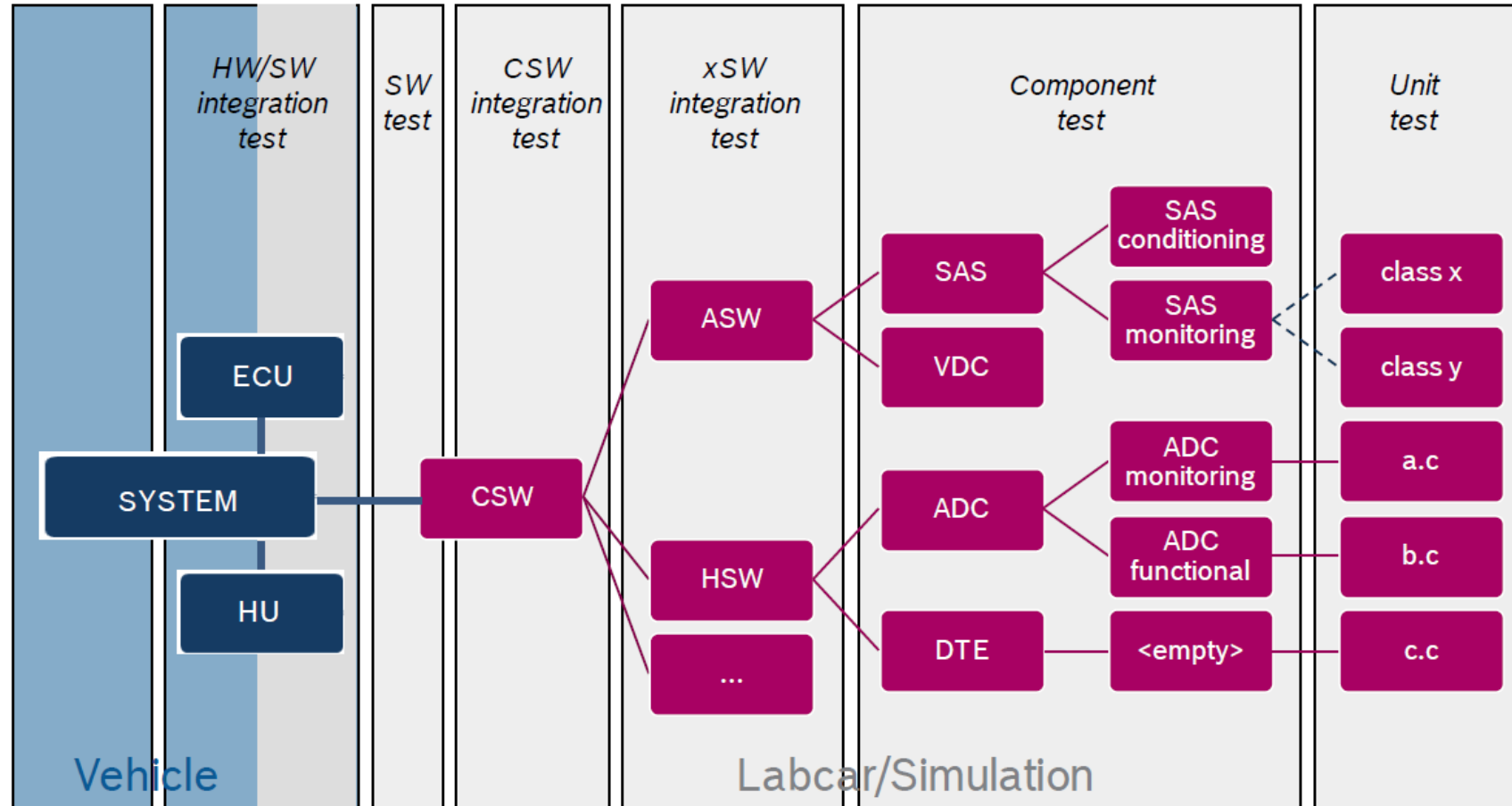
Latest specification from customer was not analyzed, because mismatch information between scope of baseline and specification maintenance



Tester perform the test for other HMI EPB value on each scenario but did not aware value 0x7 sent within 3s after ignition on

V-Model / Process Library

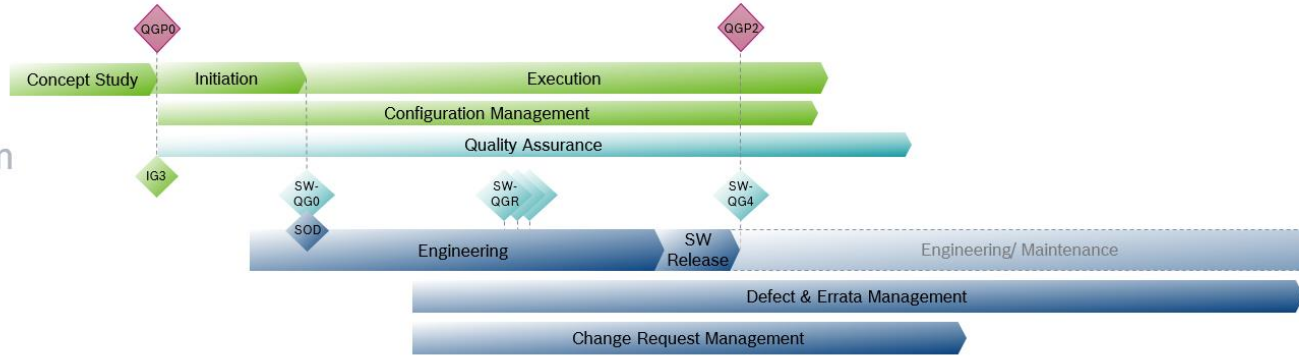
Testing Concept with example



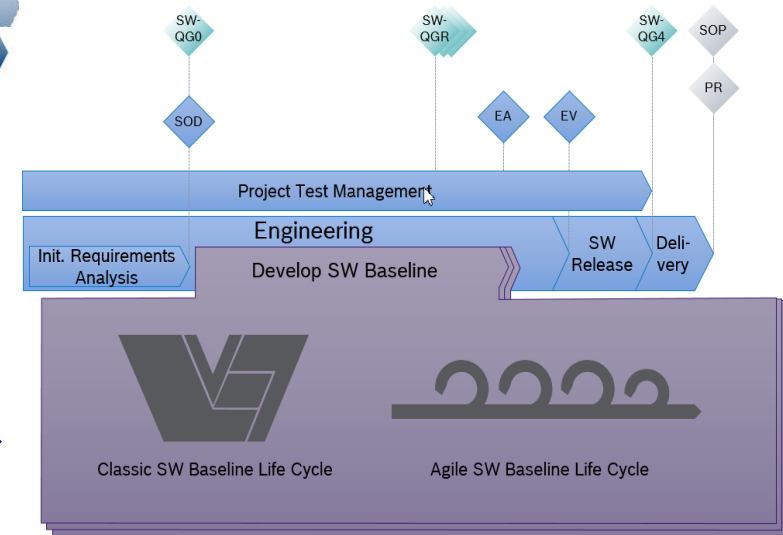
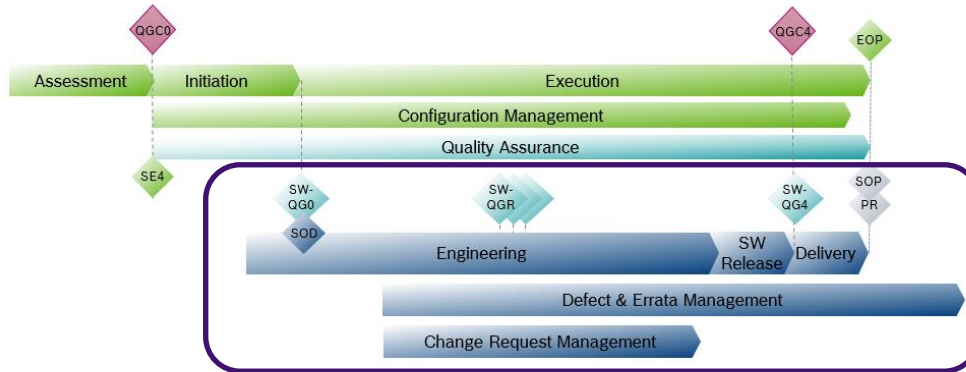
V-Model / Process Library

Product Engineering

Platform Project

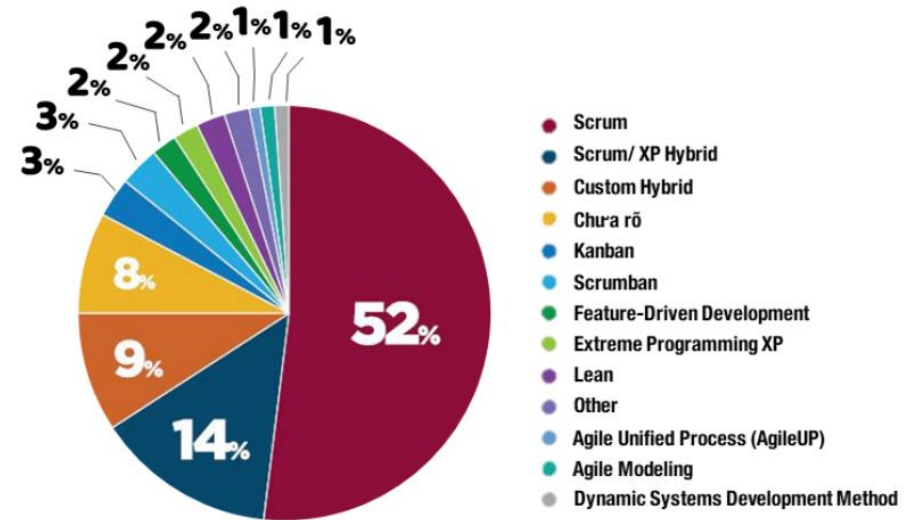
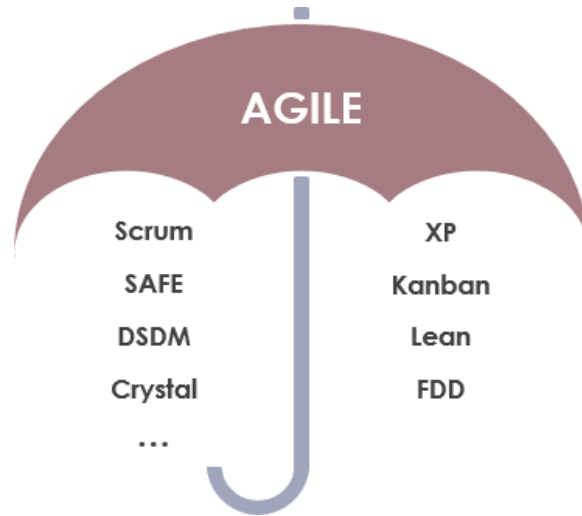


Customer Project



Agile / Scrum basic

Agile Overview

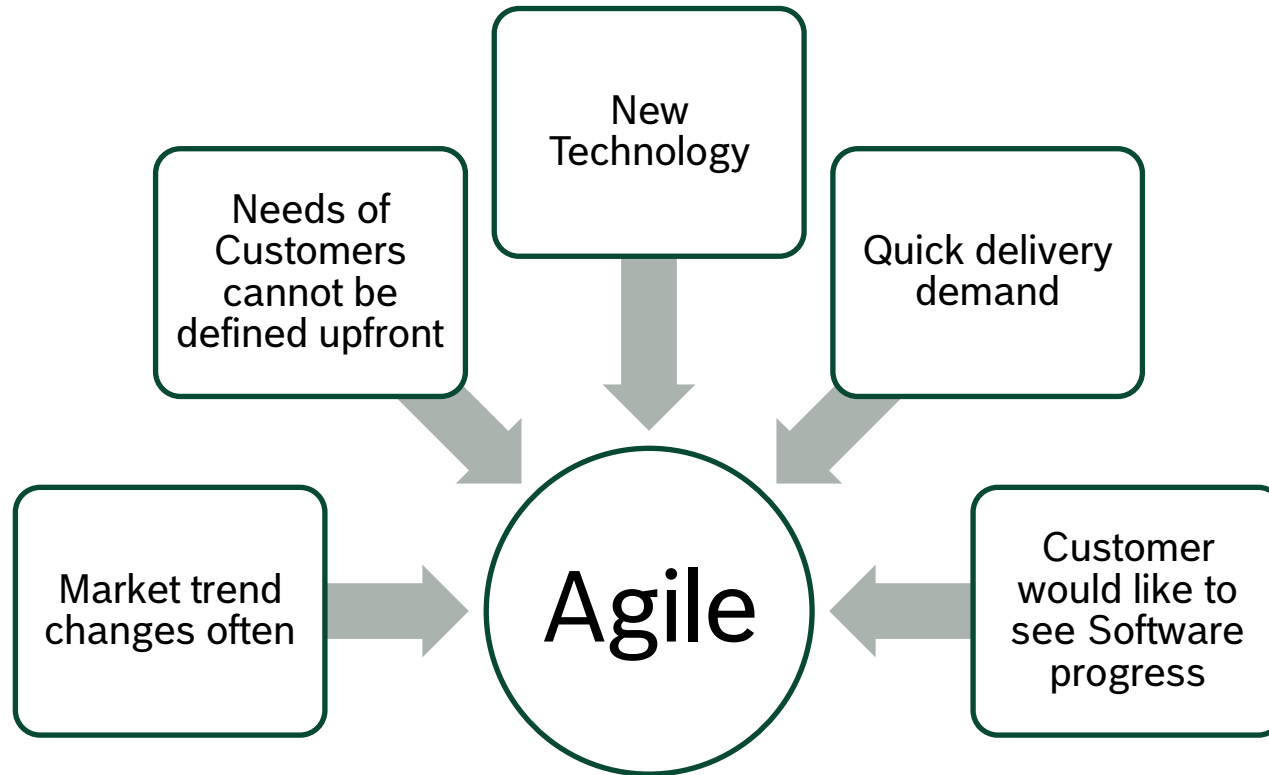


- Agile software development is a group of software development method based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams.
- Among various development methods following Agile, Scrum is the most widely used.

Agile / Scrum basic

Agile Overview

Use case:



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The Agile Manifesto

We are uncovering better ways of developing software by doing it and helping others do it.
Through this work we have come to value:

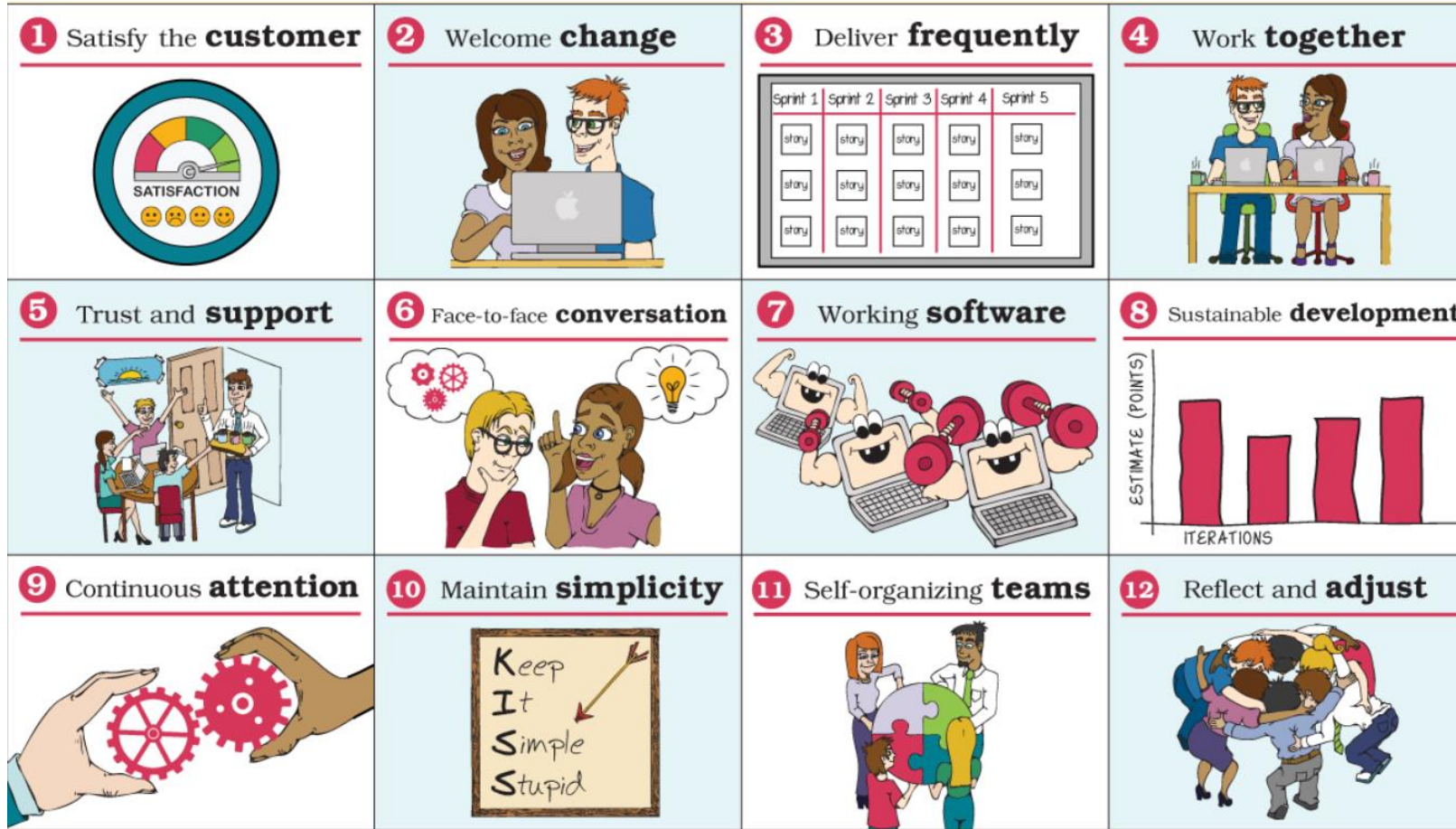
| | | |
|--|------|-----------------------------|
| 1. Individuals & interactions | over | Processes and tools |
| 2. Working software | over | Comprehensive documentation |
| 3. Customer collaboration | over | Contract negotiation |
| 4. Responding to change | over | Following a plan |



That is, while there is value in the items on the right, we value the items on the left more.

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The Agile Principles (1/3)



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The Agile Principles (2/3)

| # | Principle | Description |
|---|---------------------------------|--|
| 1 | Deliver value | Our highest priority is to satisfy the customer through early and continuous delivery of valuable software |
| 2 | Welcome change | Welcome changing requirements , even late in development. Agile processes harness change for the customer's competitive advantage |
| 3 | Deliver early | Deliver working software frequently , from a couple of weeks to a couple of months, with a preference to the shorter timescale |
| 4 | Collaborate | Business people and developers must work together daily throughout the project |
| 5 | Motivated team | Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done |
| 6 | Communicate face to face | The most efficient and effective method of conveying information to and within a development team is face-to-face conversation |

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The Agile Principles (3/3)

| # | Principle | Description |
|----|------------------------------|--|
| 7 | Working software | Working software is the primary measure of progress |
| 8 | Constant pace | Agile processes promote sustainable development . The sponsors, developers, and users should be able to maintain a constant pace indefinitely |
| 9 | Technical Excellence | Continuous attention to technical excellence and good design enhances agility |
| 10 | Simplicity | Simplicity , the art of maximizing the amount of work not done, is essential |
| 11 | Self-organizing teams | The best architectures, requirements, and designs emerge from self-organizing teams |
| 12 | Retrospect | At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly |

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Scrum Methodology



A SCRUM Team

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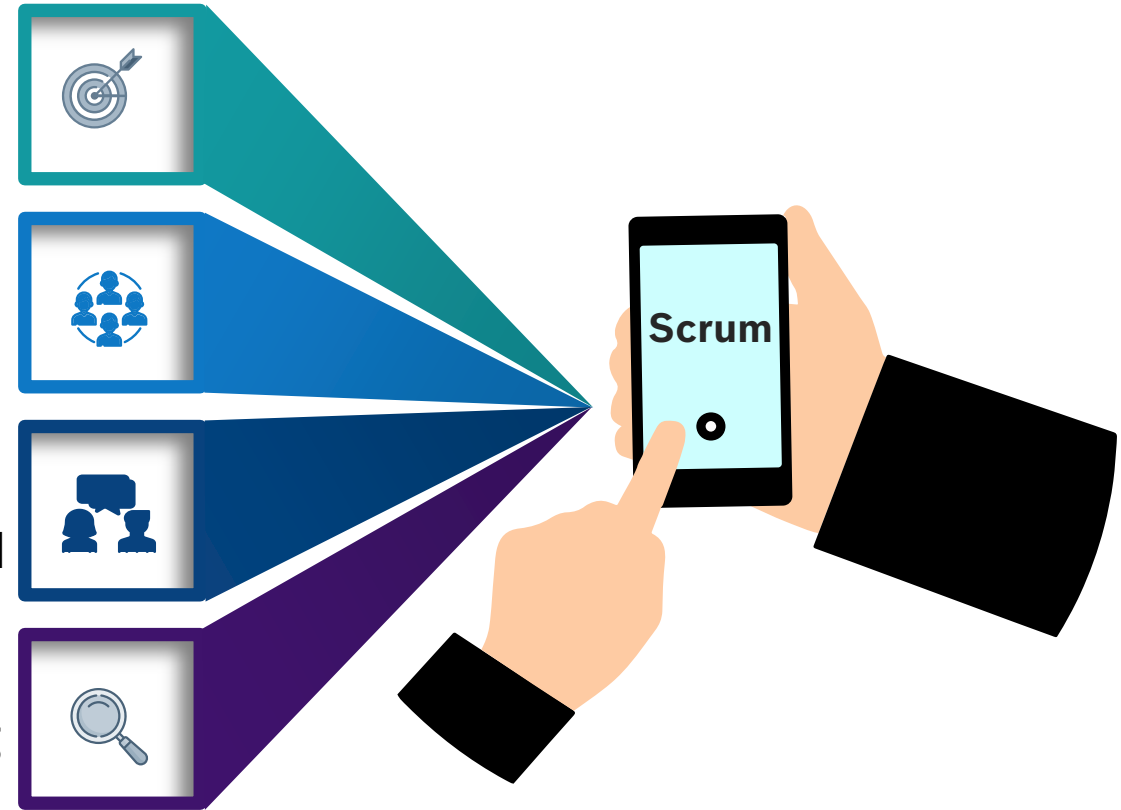
What is the SCRUM?

Focuses on delivering the highest priority business value to the customer

Team is self-organized, self-direct and cross-functional

Shortens feedback loop between customer and developer

Tests early and often to see if the system being developed will deliver value



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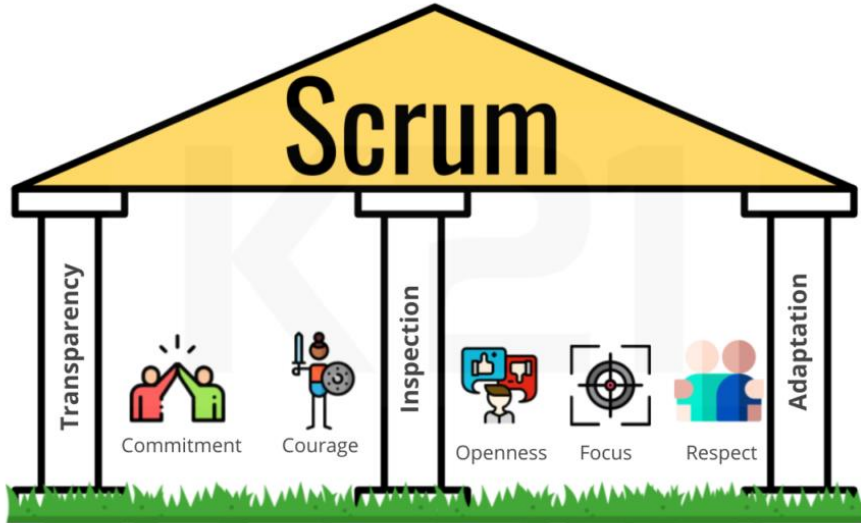
What is the SCRUM?



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SCRUM Pillars



Transparency

- ▶ Giving visibility to the significant aspects to process to those responsible for the outcome.

Inspection

- ▶ Timely checks on the progress toward a sprint goal to detect undesirable variances

Adaptation

- ▶ Adjusting a process as soon as possible to minimize any further deviation or issues

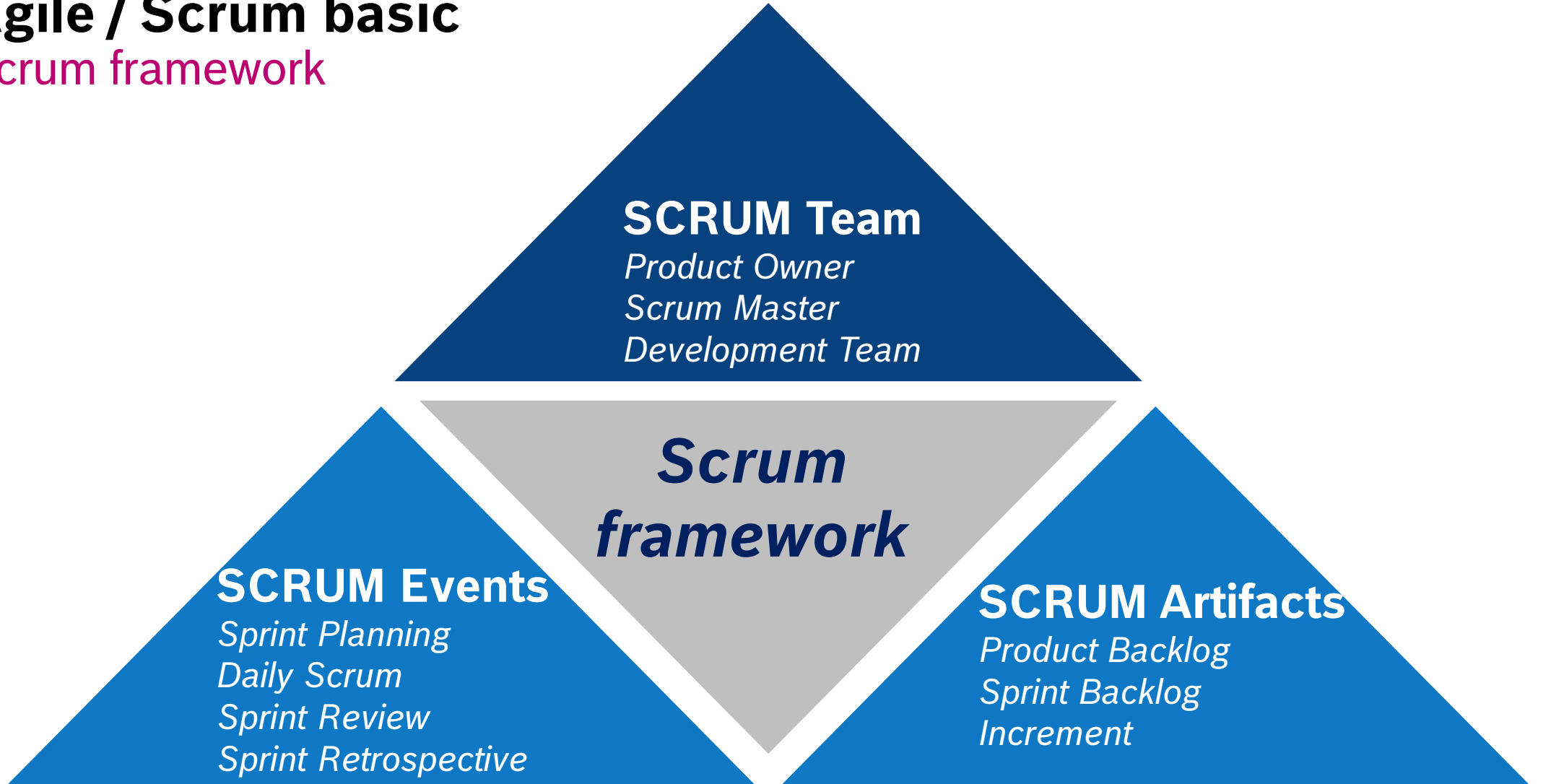
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SCRUM Values



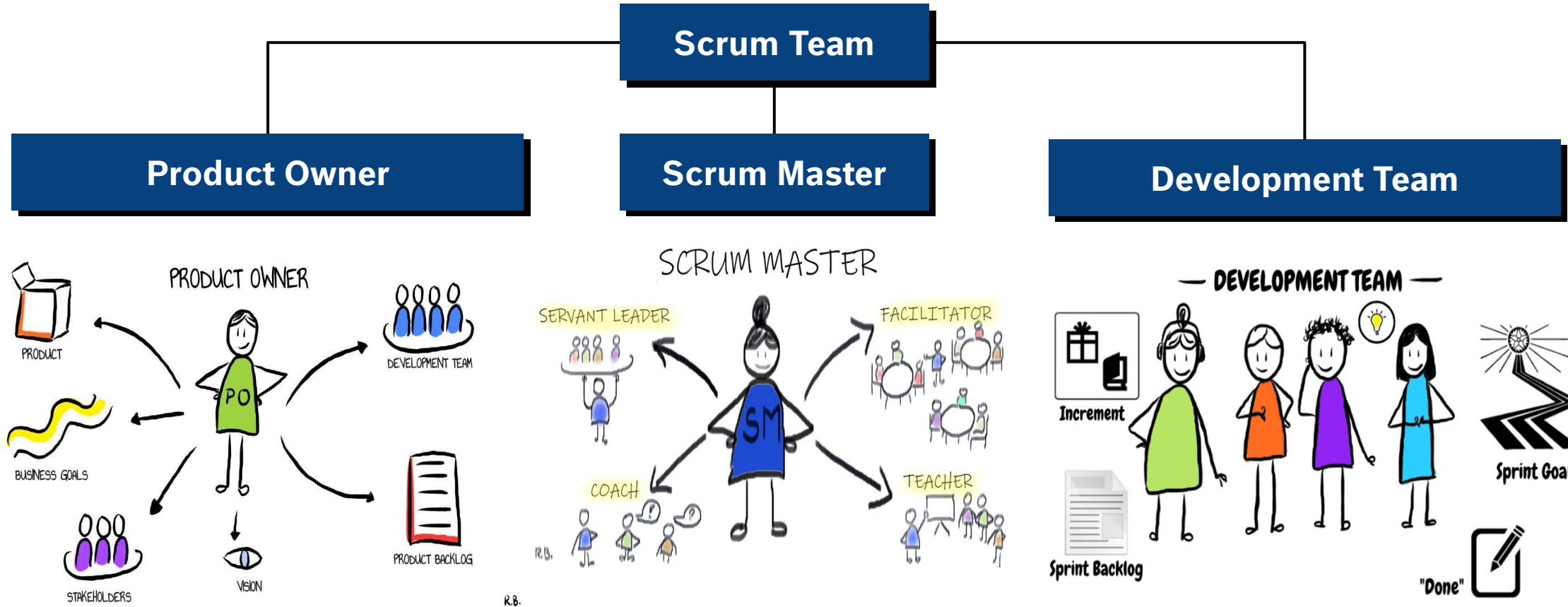
Agile / Scrum basic

Scrum framework



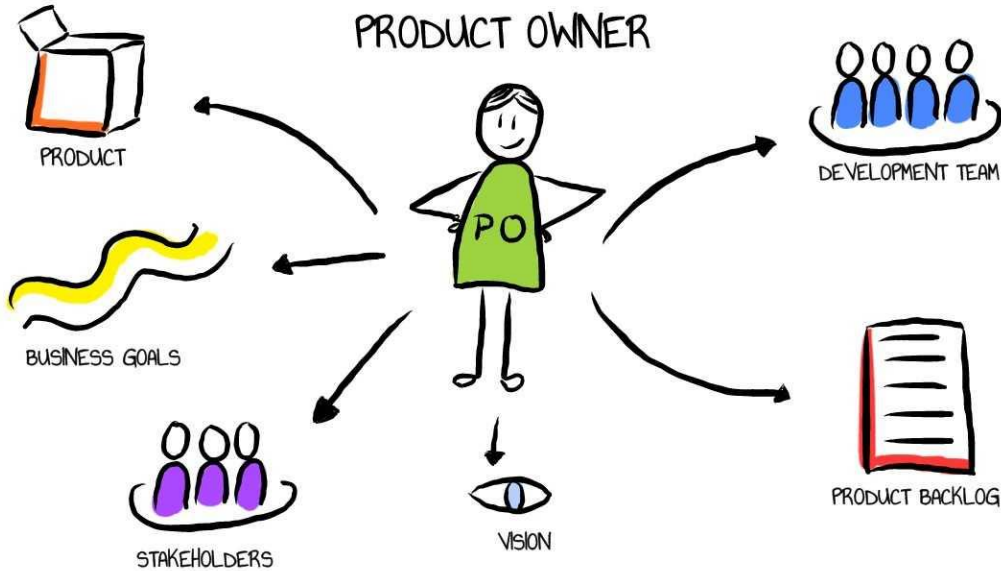
Agile / Scrum basic

Scrum framework



Agile / Scrum basic

Scrum framework



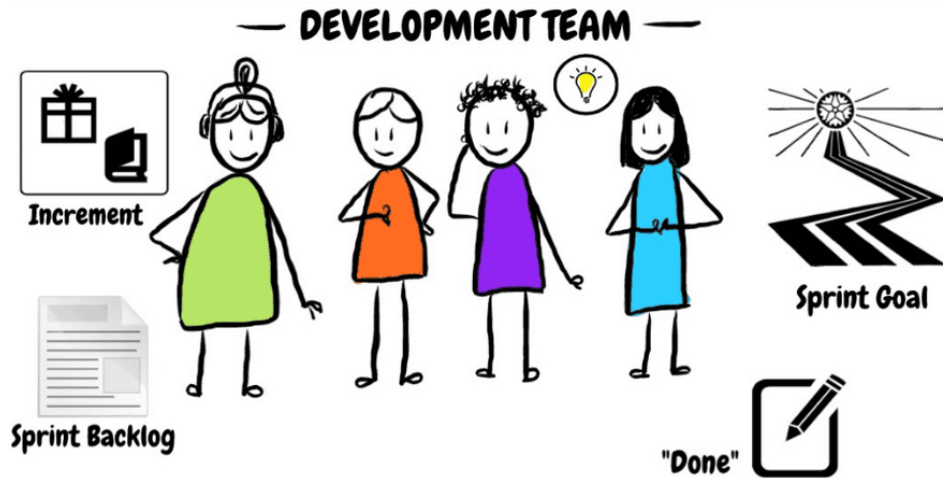
Product Owner

- ✓ Decides which features are going to be built and in what order based on the value of the functionality
- ✓ Defines and manages the feature set of the product
- ✓ Identifies the release date
- ✓ Responsible to ensure ROI (or profitability) for the work done
- ✓ Accepts or rejects work done
- ✓ Assists in the planning sessions and develops release plans
- ✓ Arranges for funding

R.B.

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Scrum framework

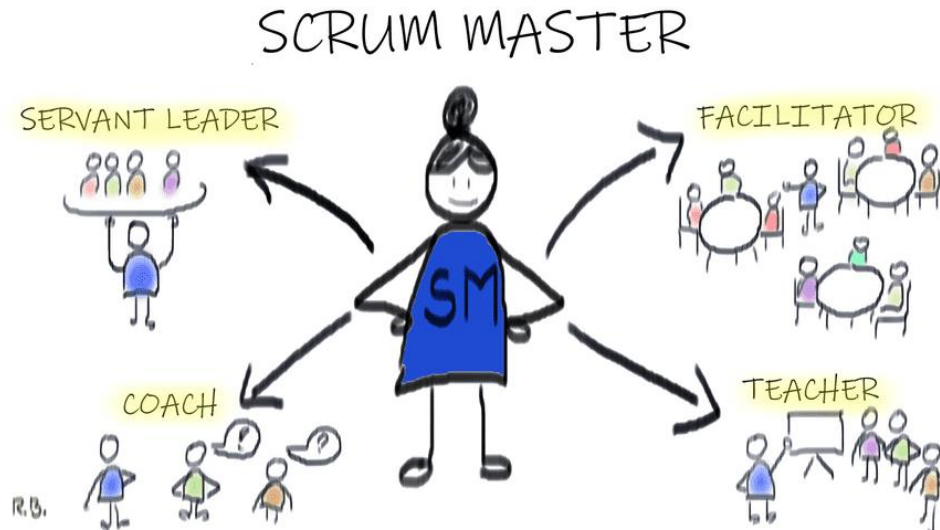


Development Team

- ✓ Set of generalizing specialists who are cross-functional in nature
- ✓ Collaborate and self-organize
- ✓ Commit to work for each iteration as a team
- ✓ Perform estimations, development and testing
- ✓ Demonstrate work done
- ✓ Provide lessons learned
- ✓ Development team size is from 3 -> 9 members

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Scrum framework



Scrum Master

- ✓ Facilitates project work and enforces scrum theory, practices and rules
- ✓ Enables team collaboration and shows personal interest in the team
- ✓ Removes barriers to work
- ✓ Conducts release and iteration planning sessions
- ✓ Responsible for daily stand-up meetings
- ✓ Conducts retrospectives
- ✓ Serves the Product Owner, Development Team and the Organization as a servant leader
- ✓ Also called as Project Manager, but should be more a facilitator and not a controller

Agile / Scrum basic

Scrum framework

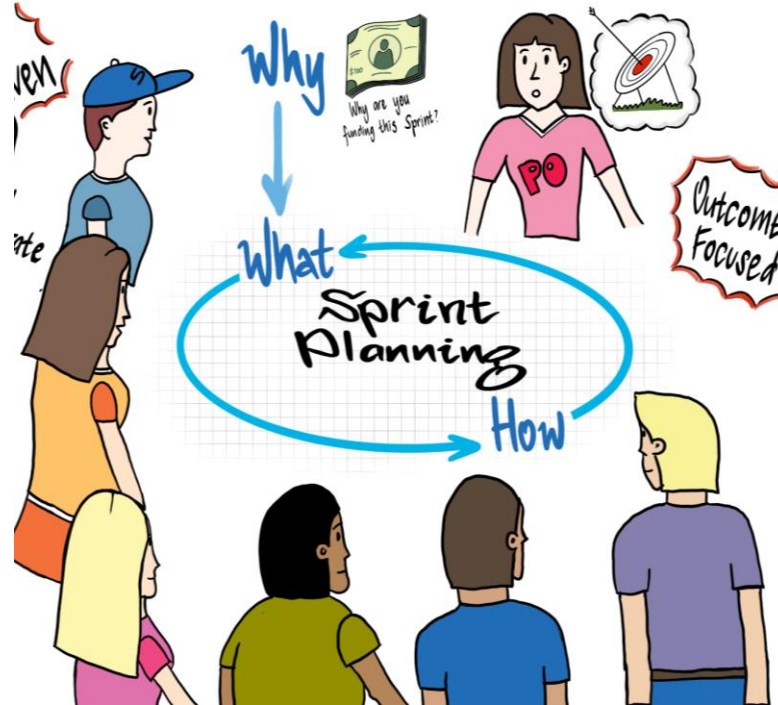
Scrum Events

Sprint Planning

Daily Scrum

Sprint Review

Sprint Retrospective



Sprint goal

Product Owner presents ordered high priority product backlog

What will be delivered in the current sprint?

Team selects work that can be done

eight hours for a one-month Sprint

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Scrum framework

Scrum Events

Sprint Planning

Daily Scrum

Sprint Review

Sprint Retrospective



What was done since last meeting?

What will be done until next meeting?

Any impediments?

Time-
boxed

15-minute

Q1

Q2

Q3

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Scrum framework

Scrum Events

Sprint Planning

Daily Scrum

Sprint Review

Sprint Retrospective



- ✓ end of a sprint
- ✓ Development team demonstrates work done
- ✓ Product owner identifies 'done' and not 'done' work and feedback
- ✓ 4-hour meeting for one-month Sprints

Agile / Scrum basic

Scrum framework

Scrum Events

Sprint Planning

Daily Scrum

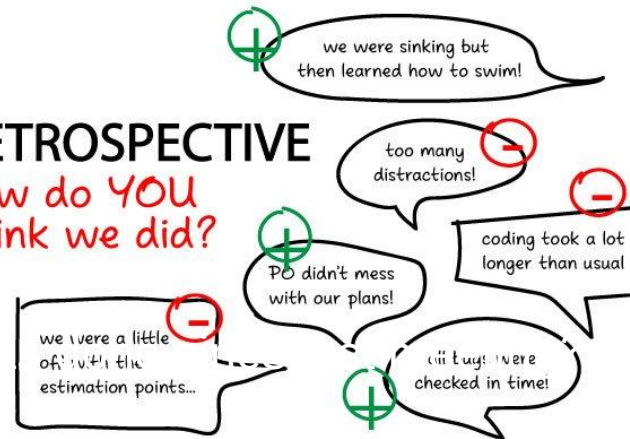
Sprint Review

Sprint Retrospective



RETROSPECTIVE

how do YOU think we did?



- ✓ Inspect the last sprint
- ✓ Identify and order major items that went well and potential improvements
- ✓ Create a plan for implementing improvements
- ✓ 3-hour meeting for one-month Sprints

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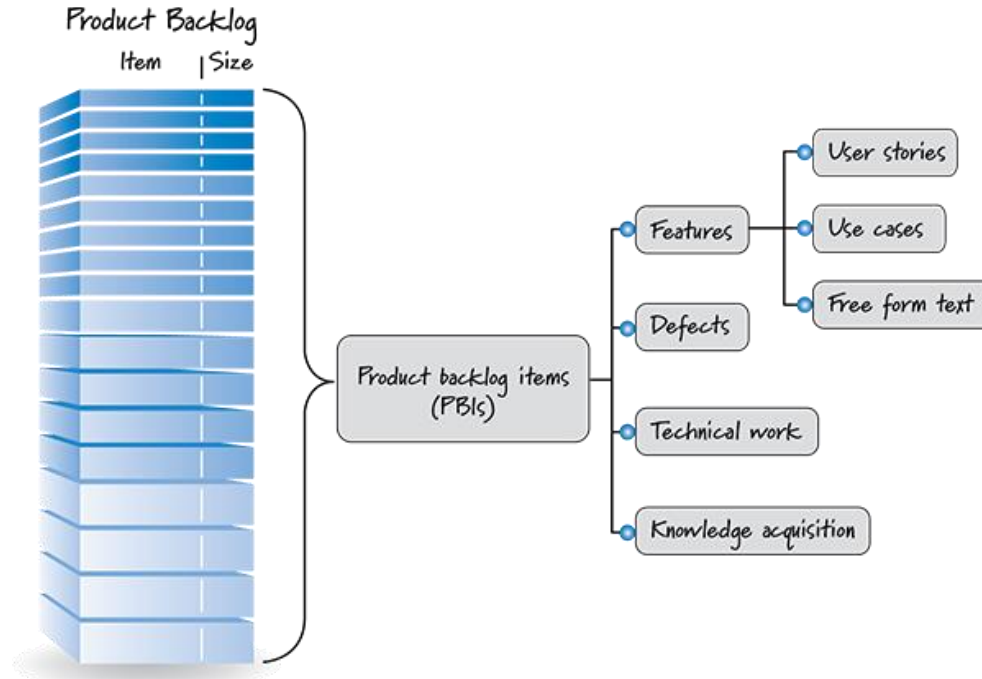
Scrum framework

Scrum Artifacts

Product Backlog

Sprint Backlog

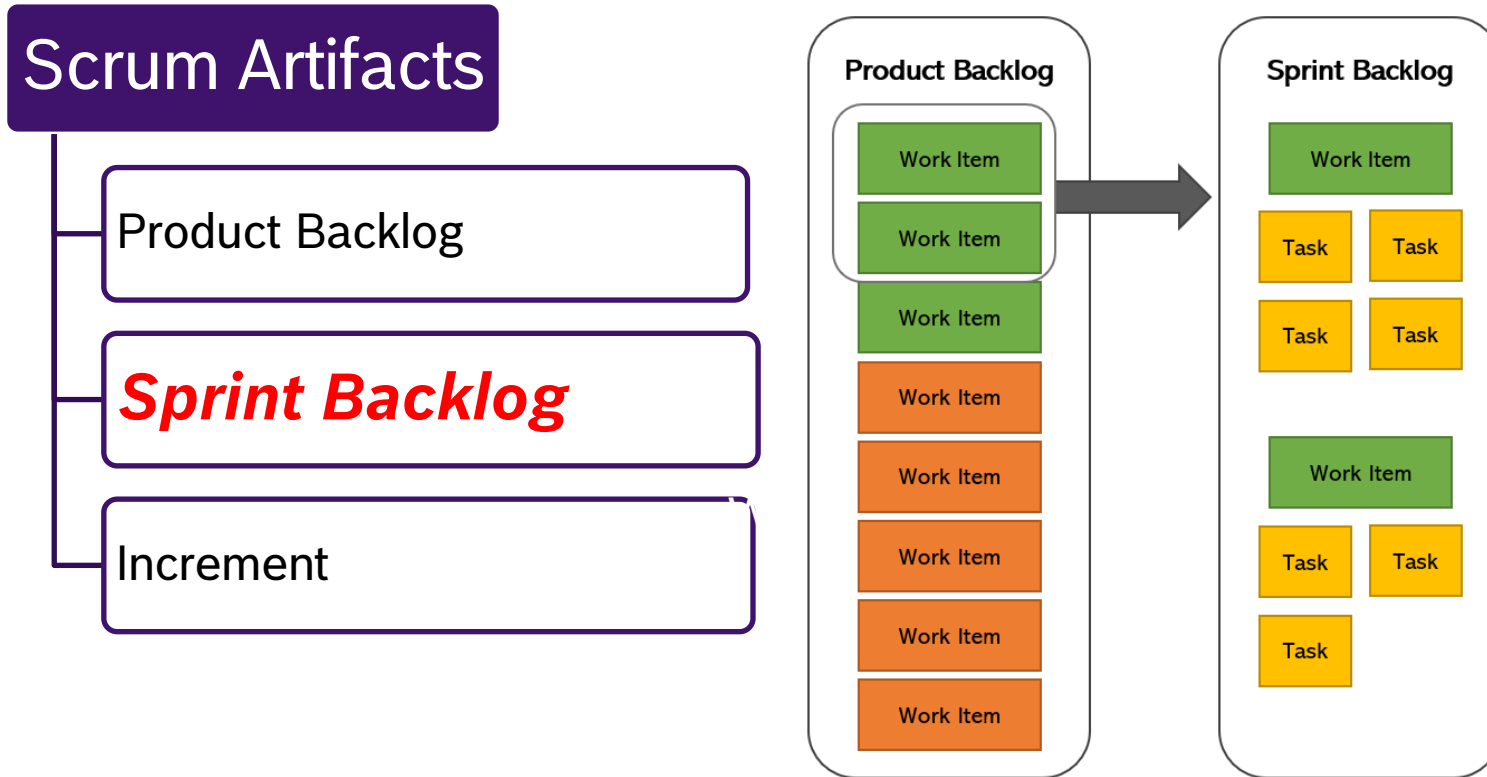
Increment



Product Owner maintains and orders list of requirements, will be prioritized by the customer and Backlog top will be the most appreciated important features.

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Scrum framework



- ✓ Sprint Backlog is a work list
- ✓ Created by the Development Team during Sprint Planning and updated throughout the Sprint
- ✓ Provide details of all the tasks and work that the development team needs to complete

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Scrum framework

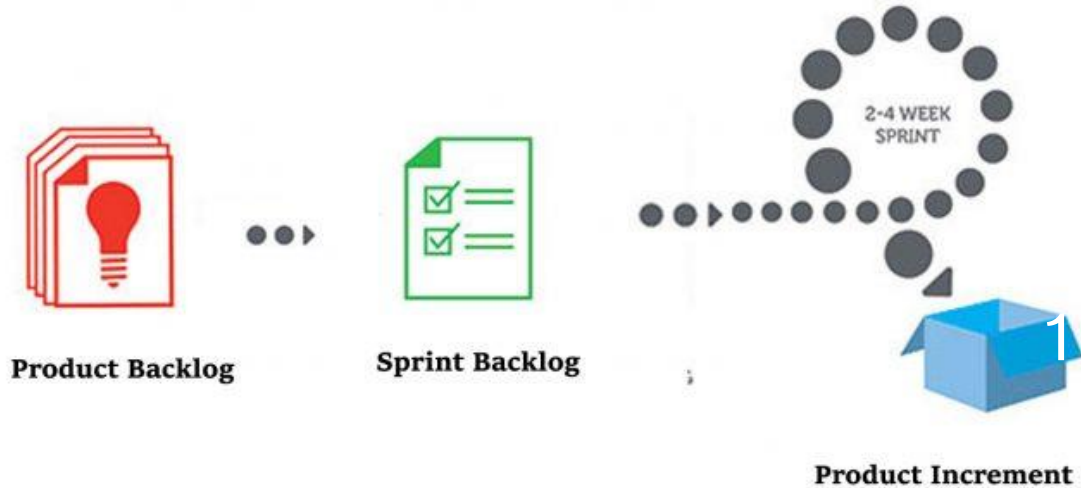
Scrum Artifacts

Product Backlog

Sprint Backlog

Increment

Scrum Artifacts



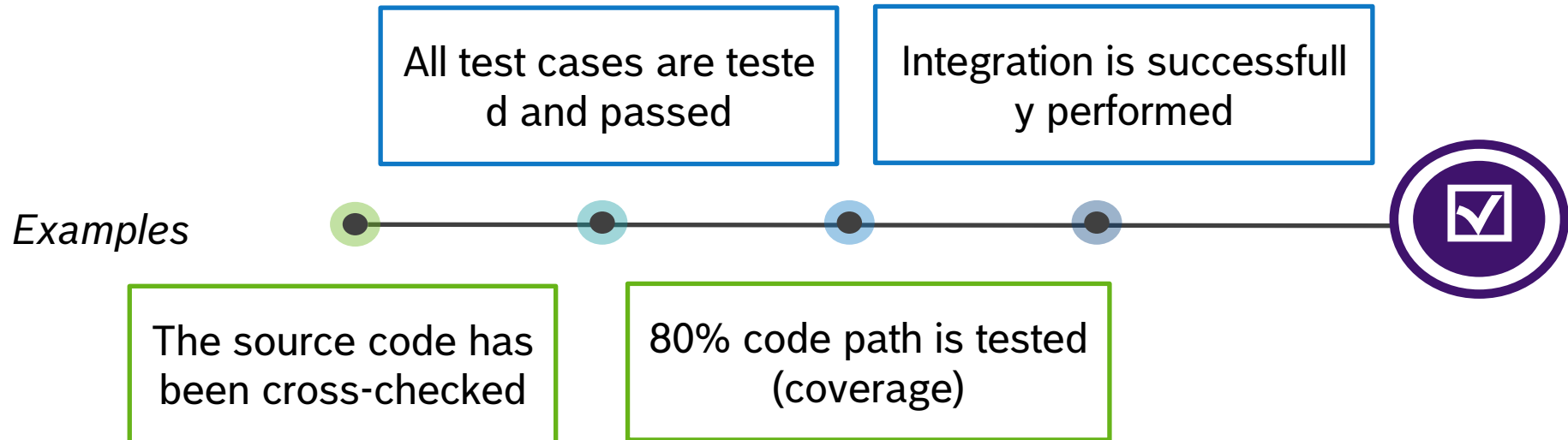
- ✓ Sum of all product backlog items completed to date
- ✓ Must always be in a readily releasable ('done') state

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Scrum framework

Definition of Done (DoD)

The Scrum Guide™ describes the Definition of Done (DoD) as a tool for bringing transparency to the work a Scrum Team is performing. It is related more to the quality of a product, rather than its functionality. “Done” that is a standard for any work done on it. It can be done from the beginning of the project, can be adjusted in sprint planning.



Agile / Scrum basic

Scrum framework

Kanban Board

- Agile project management tool designed to help visualize work, limit work-in-progress, and maximize efficiency (or flow).
- Visible, transparent and easy to discuss activities of the team members
- Easy to track progress and status of team's activities
- Detect current efficiency of team/member
- Improve productivity by limiting the number of “In progress” activities



Agile / Scrum basic

Scrum framework

Kanban Board (Actual)

The screenshot displays a Jira Kanban board interface. The top navigation bar includes a search bar, a 'Create' button, and a user profile icon. The left sidebar contains a navigation menu with options like 'Releases', 'Reports', 'Issues', 'Components', 'Project Specific', 'Xray Reports', 'Xray Test Repository', 'Xray Test Plan Board', 'Automated Steps Library', and 'Add-ons'. The main area is titled 'Kanban board' and shows a 'Sprint 16' filter. The board is organized into columns representing different stages of the workflow: 'OPEN 19 OF 269', 'READY FOR DEV 7 OF 19', 'IN PROGRESS 22 OF 83', 'IN REVIEW 2 OF 14', 'READY FOR TESTING 14 OF 25', and 'TESTING 1 OF 2'. Each column contains task cards with details such as issue ID, description, assignee, and status. For example, in the 'IN PROGRESS' column, there are tasks like 'SEAV2-2938 [Adapt] Common Adapt from Premium Sprint16' assigned to 'NgoQuoc-ext, Duy (GED-...)' and 'SEAV2-2893 [SW-HW] (Re)Initializing SW-HW test activity' assigned to 'NgoQuoc-ext, Duy (GED-...)'.

Kanban board

QUICK FILTERS: Impediment Sprint 16 Sprint 15 Sprint 14 Sprint 13 Sprint 12 Dependency QnA Only My Issues

OPEN 19 OF 269 READY FOR DEV 7 OF 19 IN PROGRESS 22 OF 83 IN REVIEW 2 OF 14 READY FOR TESTING 14 OF 25 TESTING 1 OF 2

Everything Else 27 issues

Task Cards:

- SEAV2-1308** (N): Instruction about Easy Clean (Or base clean OR aqua clean), Select a Cleaning ... NgoQuoc-ext, Duy (GED-...)
- SEAV2-2047** (N): Layout for Home Connect Assistant, Home Connect Co..., NgoQuoc-ext, Duy (GED-...)
- SEAV2-2938** (N): [Adapt] Common Adapt from Premium Sprint16, NgoQuoc-ext, Duy (GED-...)
- SEAV2-2755** (P): Update integration test case, Pham Van Cong-ext, Hau ...
- SEAV2-755** (P): Setting of oven temperature with num pad, Select a Heating M..., Pham Van Cong-ext, Hau ...
- SEAV2-514** (N): Display the running Alarm Timer at Stand-by, Stand-by Screen (...), NgoQuoc-ext, Duy (GED-...)
- SEAV2-827** (H): Decision for disconnecting from home connect, N152, Home Connect Ge..., Hoang Huu-ext, Lam (GE...)
- SEAV2-2893** (N): [SW-HW] (Re)Initializing SW-HW test activity, NgoQuoc-ext, Duy (GED-...)
- SEAV2-743** (T): Meat Probe Temperature Setting deactivated, N110, Select a Heating M..., Tong Anh-ext, Quan (GED...)
- SEAV2-754** (P): Setting of meat probe temperature with num pad, Select a Heating M..., Pham Van Cong-ext, Hau ...
- SEAV2-2539** (H): AV2 unit test preparation, Hoang Huu-ext, Lam (GE...)
- SEAV2-752** (T): Setting of end time with num pad
- SEAV2-749** (P): Notification upon start of slow cooking

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Collaborative Team



Co-location Team
vs.
Distributed Teams

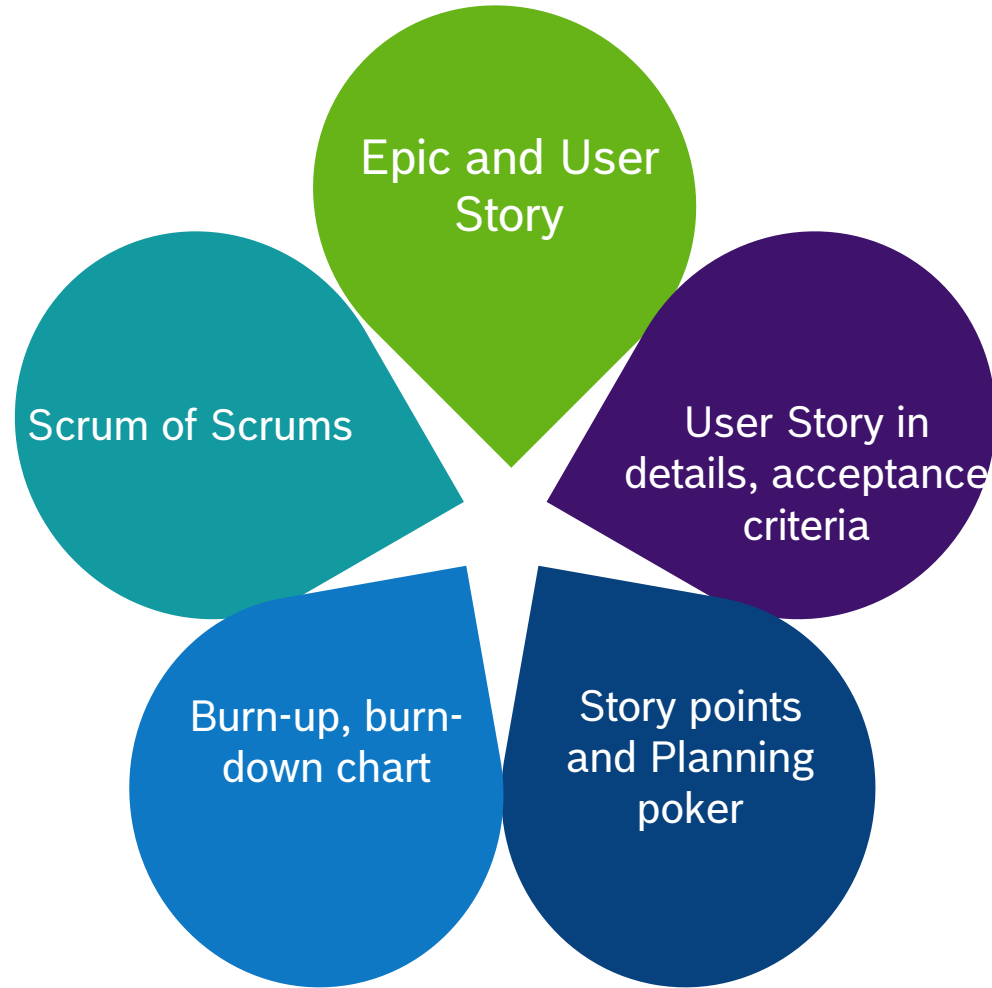


- ✓ Face-to-face interaction.
Without any physical barriers such as walls or doorways between them
- ✓ Whiteboards and task boards, Sticky notes, sticky paper, flip charts

- ✓ Apply frequent communications. When team members aren't in close proximity to each Other
- ✓ Intensify facilitation
- ✓ Videoconferencing, live chat, Skype, Interactive whiteboards, Web-based meeting facilitators

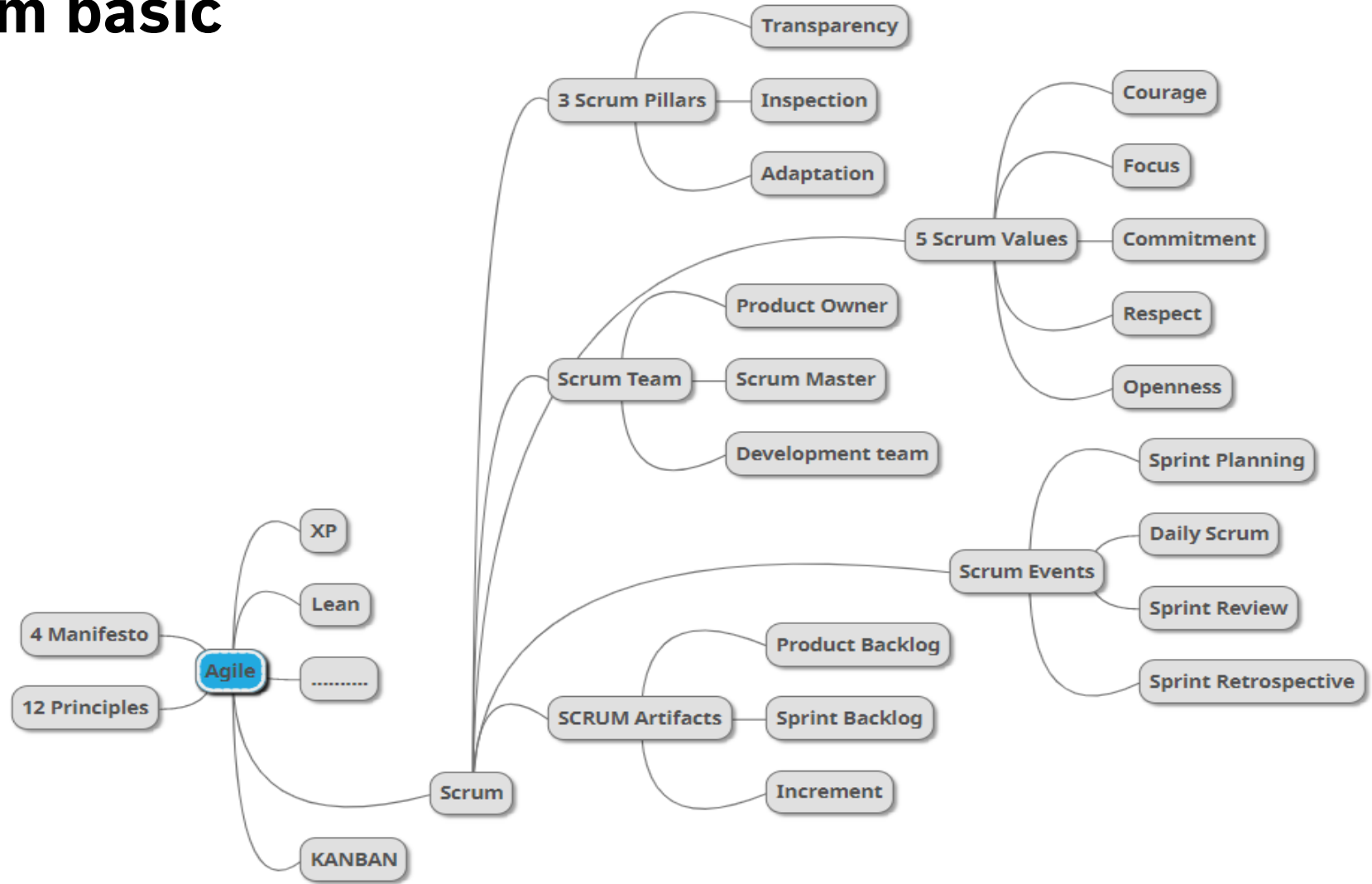
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More topics



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Summary



Thank you!

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