



AGILE IN PRACTICE

HOW TO FULLY UTILIZE AGILE FOR A SUCCESSFUL PROJECT



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*Southern Denmark University,
29th September 2017*



COMBITECH



ERICSSON



COMBITECH IN NUMBERS



Nr. 1 in Nordic for
Cyber Security
– 220 experts



1 company in Nordic
3 countries
30 offices
Development center in India



Subsidiary to Saab AB

1900 Consultants

3

Core Values

- Competence
- Relation
- Results



1.825.000.000

Revenue 2011-2016

77

Courses in our
competence catalogs

14

Best Employer in
Sweden



COMBITECH

BRANCHES

VEHICLE



BANK & FINANCE



SWEDISH BANKS



DEFENSE INDUSTRY



SAAB



INDUSTRY



Valmet
KOMPAKTSWINGE



PUBLIC SECTOR



- LFV
- VIDS
- LFV

INCREASE FLIGHT SAFETY
WITHOUT INTERFERENCES



DEFENSE



A collage of various logos and names from the Financial Services industry, including FMV, Finastra, Datasift, FinTech, Forces, DNS, and LSEG.



TELCO

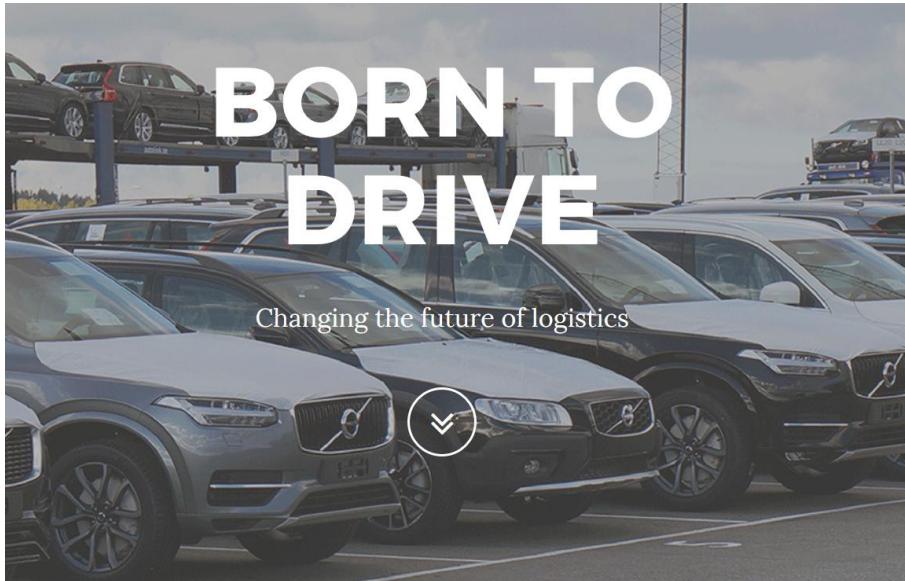


A horizontal banner with a blue and white checkered background. The text "BY A ONE-TEAM EFFORT ERICSSON" is printed across it in a bold, sans-serif font. The word "ERICSSON" is larger and bolder than the other words.



EXAMPLES OF PROJECTS

- Born to Drive (Volvo)
- Augmented Reality (Securitas)
[Augmented Reality Combitech and Securitas](#)



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WORKING IN CONSULTING COMPANY

- Try many different things
- Gain professional networks
- A lot to learn
- More opportunities to grow

THEORY OF AGILE

AND HOW IT IS APPLIED IN THE INDUSTRY





INTRODUCTION TO AGILE



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FLOW OF SOFTWARE PROJECT



Customer
Requirement

Systemization

SW Design &
Code

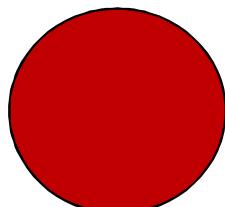
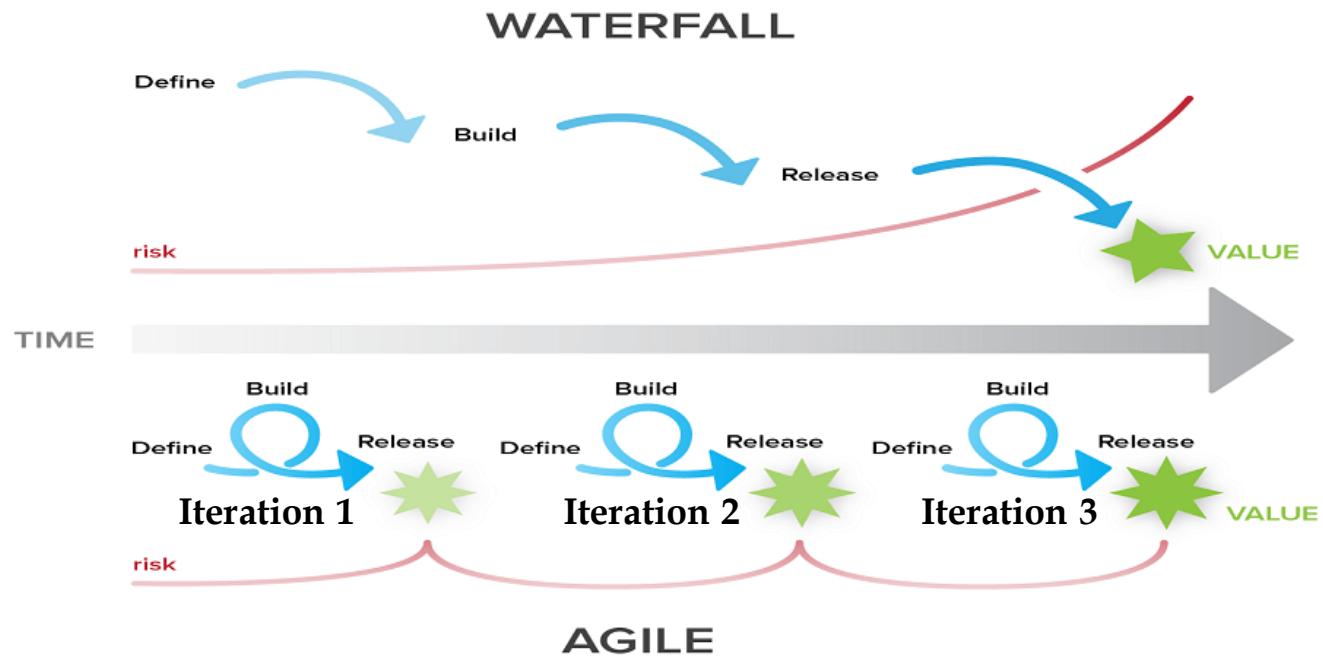
Test &
Verification

Release



COMBITECH

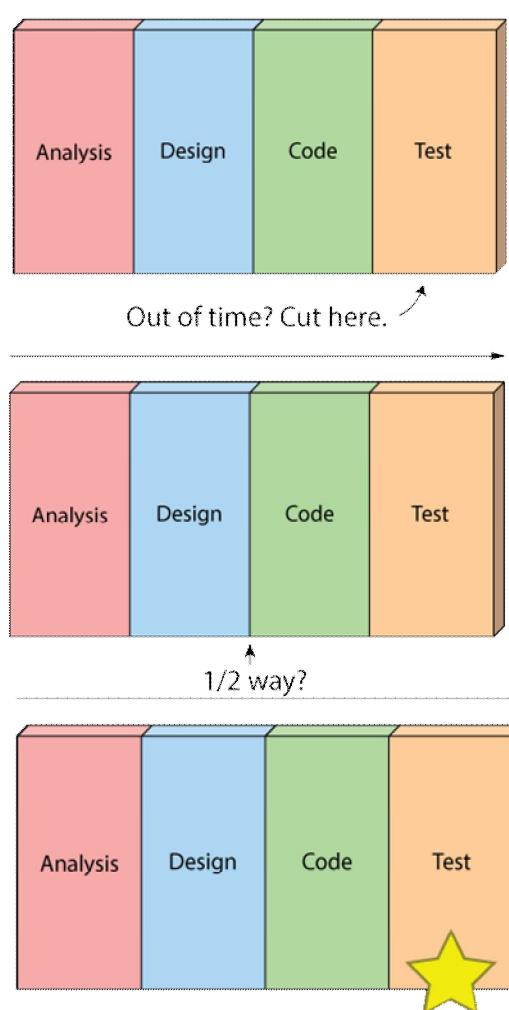
WAY OF WORKING IN SOFTWARE PROJECT



What kind of risks and problems will you have in Waterfall method?

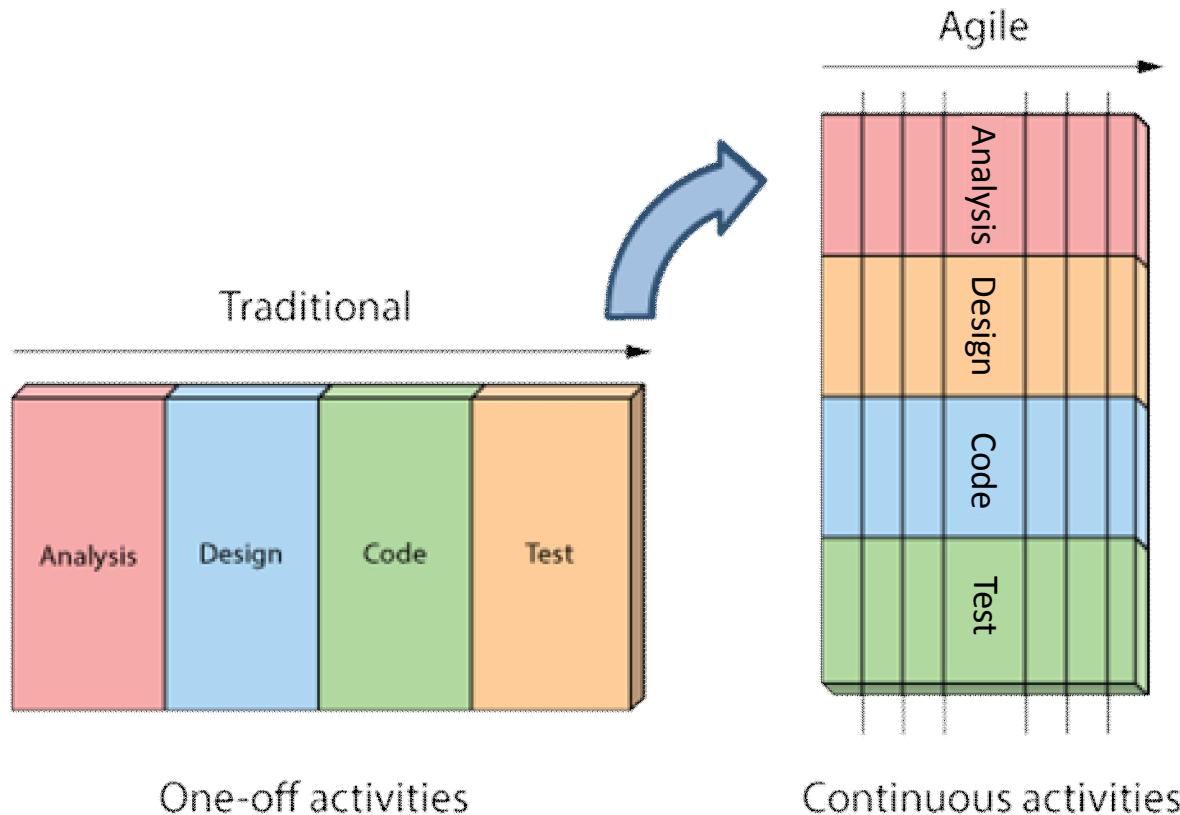
WHY? WHAT'S THE PROBLEM WITH WATERFALL?

- Risking quality
 - Project is run out of time and money
- Poor visibility of end product
 - Working software isn't produced until end of project
- Can't handle change
 - Customer might introduce change anytime



- Poor communication
- No transparency
- Long lead time

HOW TO MAKE IT BETTER?

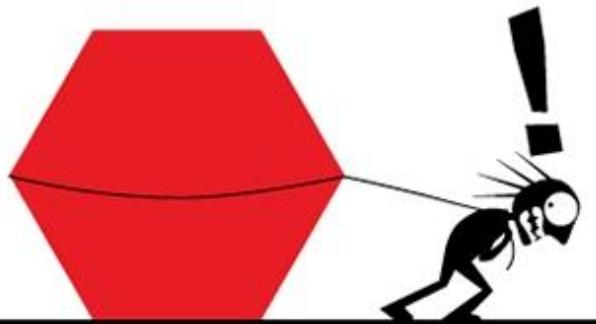


- Quality is tested from beginning
- Visibility improves because you know exactly where you are in the project in each iterations
- Risk is reduced due to early feedback
- Flexible to changes in case customer wants to introduce changes in the product



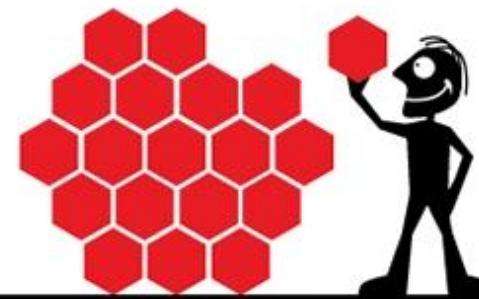
WATERFALL VS AGILE

THE WATERFALL PROCESS



*'This project has got so big,
I'm not sure I'll be able to deliver it!'*

THE AGILE PROCESS



*'It's so much better delivering this
project in bite-sized sections'*

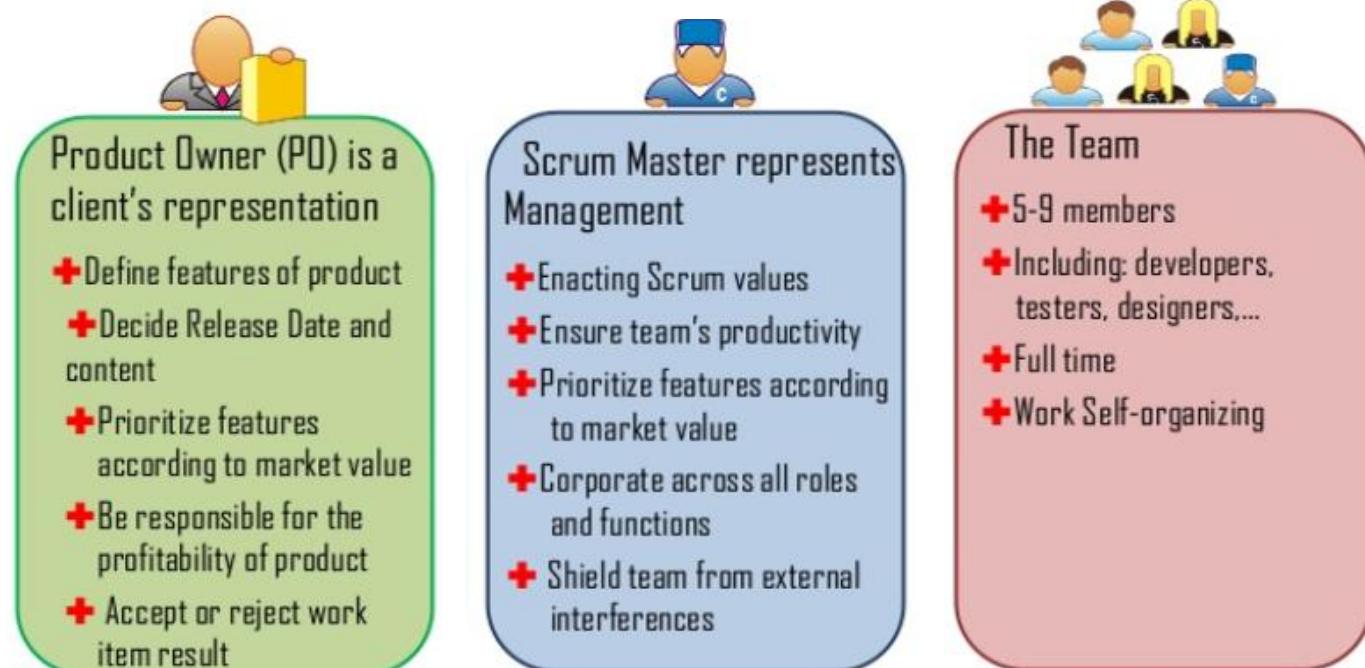
WHAT IS AGILE?



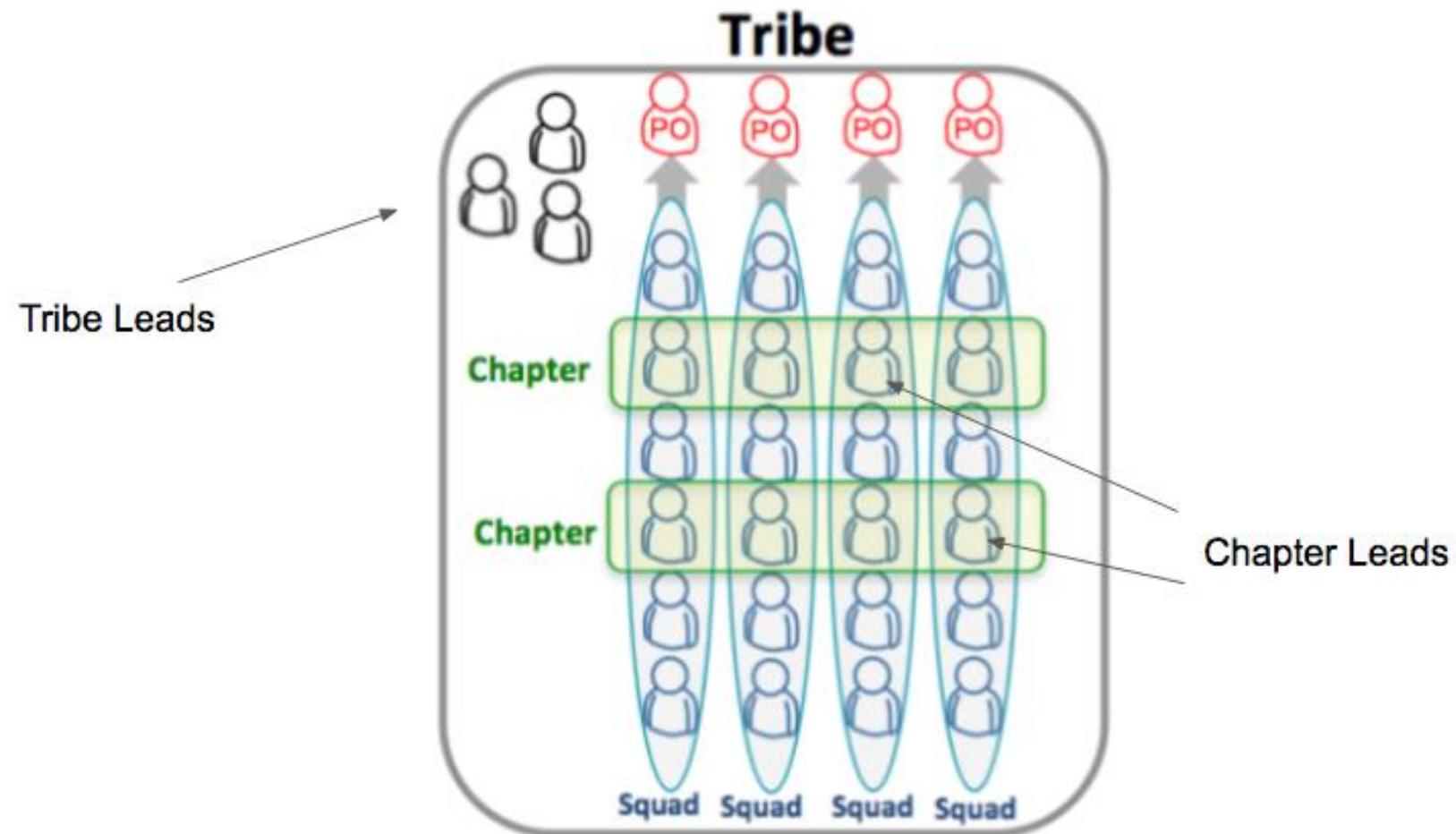
Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

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

ROLES IN AGILE



AGILE TRIBE CONCEPT



ITERATIONS

DEFINITION OF EPIC, USER STORY, TASK

- Epic: big chunk of work that has one common objective.
 - It can be a feature, customer request or business requirement.
 - Usually takes more than one sprint to complete
 - The format is usually:

As a customer, I want to <some goal>
- User Story (story): very high-level definition of requirement
 - Functionality that will be visible to end users
 - Usually told from the perspective of the person who desires the new capability

As a <type of user>, I want <some goal> so that <some reason>
- Task(sub task): something that needs to be done to complete a user story
 - Software design, coding implementation, test, etc

EXAMPLES

Wishlist

Theme

Epic

User Stories

Tasks

As a customer, I want to be able to have wishlists so that I can come back to buy products later

As a customer I want to be able to save a product in my wishlist so that I can view it again later

As a customer I want to be able to view my wishlist so that I can buy items from it

Put "Add to wishlist" button on each product page

Create new database to store wishlist items

Create page to display user's wishlist

Add "view wishlist" link to homepage



FLAVOURS OF AGILE

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WHAT IS KANBAN?

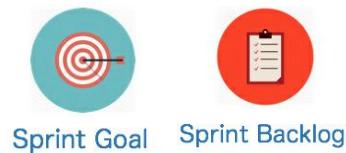
- Visualize the workflow
 - Split the work into pieces
- No sprints. Limit Work In Progress (WIP): Assign explicit limits on how many items may be in progress at each workflow state.
- Measure the lead time (average time to complete one item)
- Optimize the process to make lead time as small and predictable as possible (continuous improvement).

WHAT IS SCRUM?

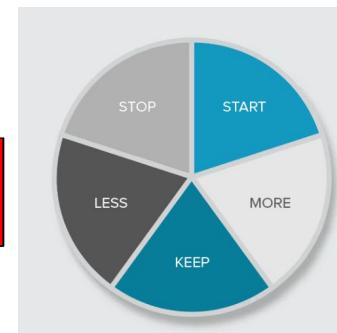


- Split the organizations into cross-functional teams
- Split the work into a list of small, concrete deliverables (iterations)
- Split time into short fixed-length iterations (sprints)
- Based on insights of each iteration, optimize the release plan and update priorities (continuous improvement)
- Optimize the process by having a retrospective after each iteration (continuous improvement)

SCRUM CEREMONIES

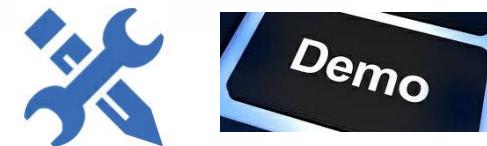


45 mins/week
of sprint length



15 minutes

Yesterday I did..
Today I will..
I have problem at..

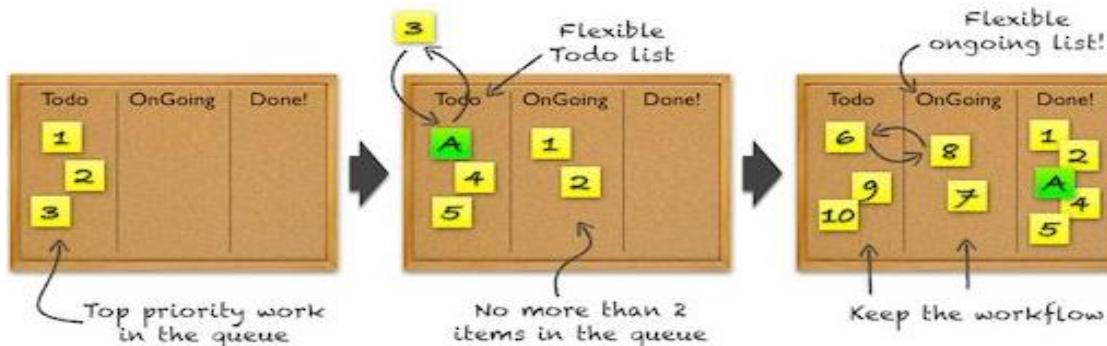


1 hour/week of
sprint length



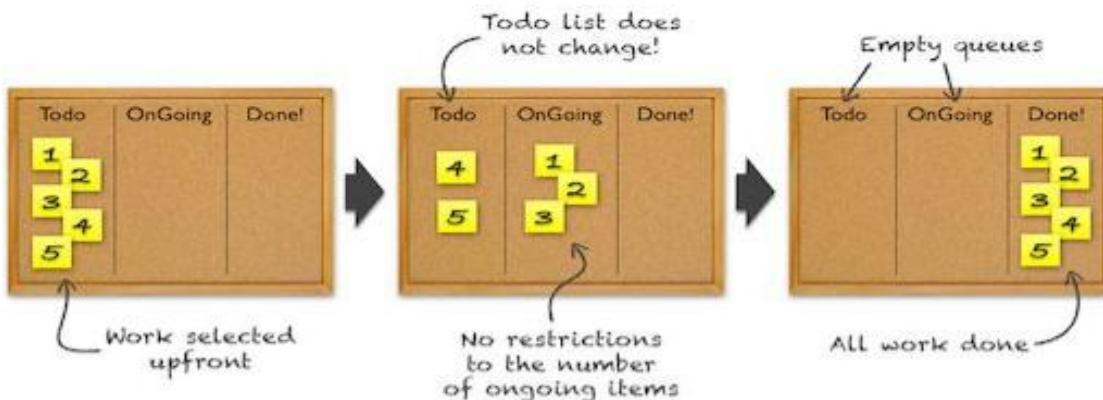
SCRUM BOARD VS KANBAN BOARD

KANBAN BOARD



Continuous flow

SCRUM BOARD



Reset between sprint

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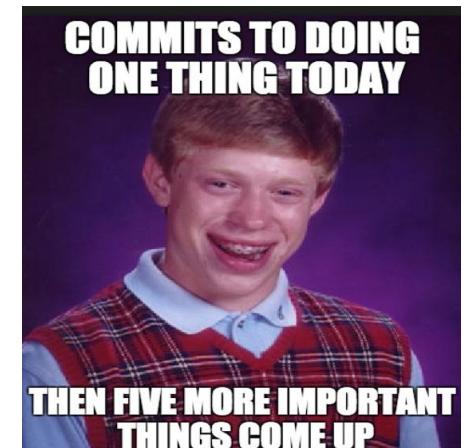
WHEN TO USE SCRUM OR KANBAN

■ Scrum

- Can plan the work ahead
- More prescriptive (rules to follow)
- Product development

■ Kanban

- Can't plan the work ahead (very abstract or urgent things always popped up)
- No iterations
- Concept Studies, Support and Maintenance



Scrum and Kanban are just tools to help you work more effectively

SCRUMBAN

- Mix of Scrum and Kanban
- Use the prescriptive nature of Scrum to be Agile.
- Use the process improvement of Kanban to allow the team to continually improve its process.

SCRUM VS KANBAN VS SCRUMBAN

	Kanban	Scrum	Scrumban	My Tribe
Board/artifacts	Board only	Board, backlogs, burn-downs	Board only	Boards
Ceremonies	No daily meeting	Daily meeting, sprint planning, review, retrospectives	Daily meeting, the rest is done as needed	Daily meeting, sprint planning, review, retrospectives
Iterations	No (continuous flow)	Yes (sprints)	No (Continuous flow)	No
Estimations	No	Yes	No	Somewhat
Teams	No prescribed role	Cross-functional	Can be specialized	Yes
WIP	Controlled by workflow state	Controls by sprint content	Controlled by workflow state	Not really
Changes	Added as needed to the board	Should wait for next sprint	Added as needed to the board	Added the whole time

WHERE TO START?



Velocity



Lead Time



Quality

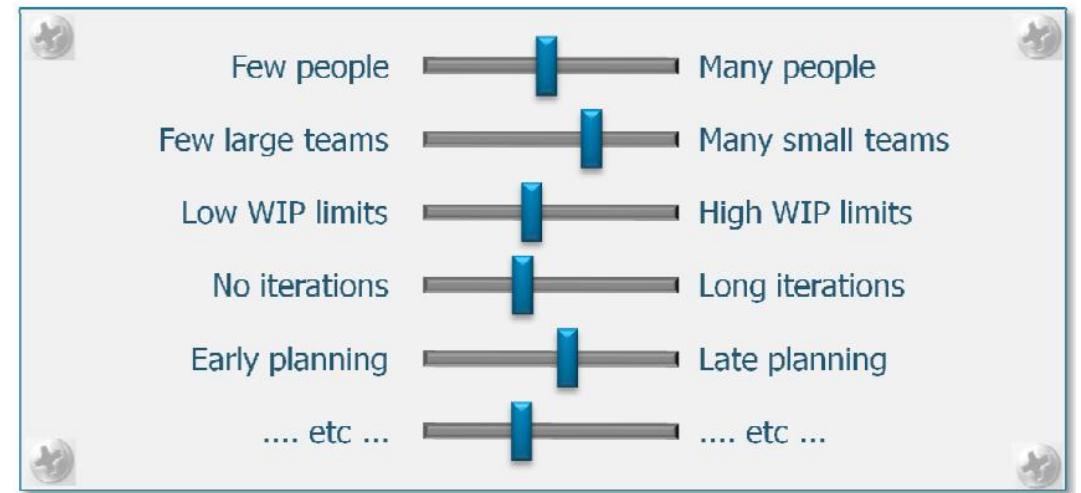
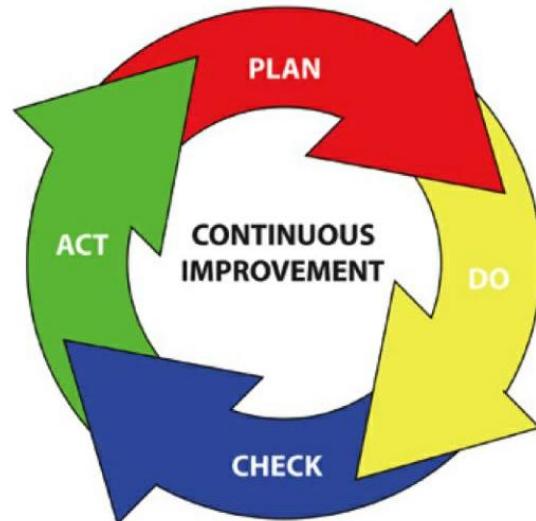
▪ Experiments!

- How many people should be in the team?
- Who should be in the cross-functional teams?
- What roles do we need?
- How many points should a team take in a sprint?
- How many work-in-progress items should a team take?

Less is more!

CONTINUOUS IMPROVEMENT

- Retrospectives and Kaizen (Continuous Improvement)!



A man in a dark suit and tie is sitting on a set of wide stone steps, cheering with his mouth open and a fist raised. He is looking at a white smartphone held in his other hand. The background is dark, showing some architectural details like a large arrow-shaped graphic on the right.

HOW TO ACHIEVE SUCCESSFUL PROJECT
USING AGILE

THE DREAMS VS REALITY



HOW AGILE TACKLES IT?

- Improve team collaboration

- People with different competences (short loop)
- Pair programming (communication & min risk)
- Testing in the team (short loop)
- Shorter cycle time



- Increase software quality and customer satisfaction

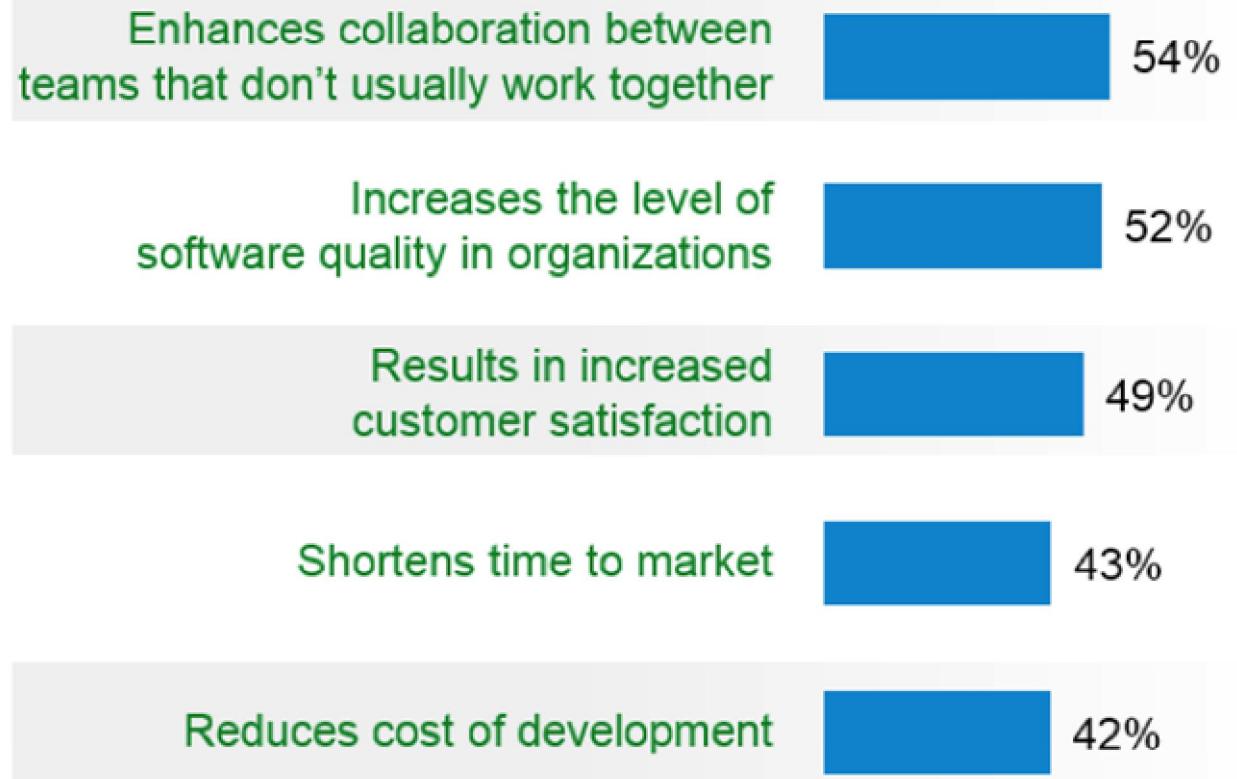
- Smaller deliveries to the customers (sell smaller part)
- Early detection of misunderstanding with customers
- Flexible to changes



RESEARCH FROM HP

601 development and IT professionals

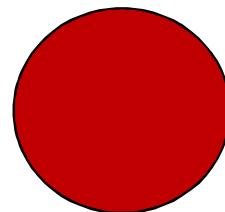
- 32% small organizations (10-99 employees)
- 31% medium organizations (100-999 employees)
- 37% large organizations (1000+ employees)



Source: <https://techbeacon.com/survey-agile-new-norm>



In your opinion, what are important factors to achieve a successful project?



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KEY TO SUCCESSFUL PROJECTS USING AGILE PRACTICES

- Same vision (goals communicated early)
- Communication and transparency
- Flexibility of Agile implementation
- Structured, but don't kill creativity
- Short feedback loop (can be a challenge in large companies)
- There is no "ONE RULE FITS IT ALL"

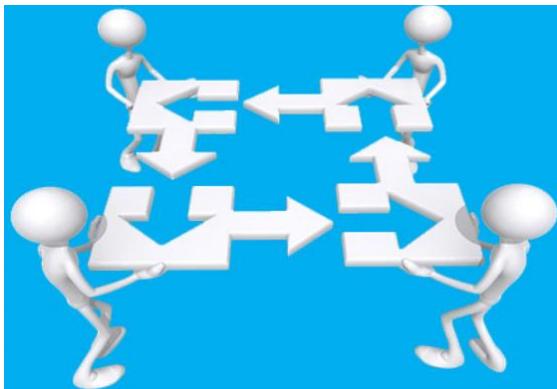


TEAM

MAIN KEY OF SUCCESSFUL PROJECTS



Engagement & Atmosphere



Diversity



Self-Organized



Communications & Transparency



Flexible

CHALLENGES

- Too many meetings
- Too many paperworks
- Fear of "not being unique" anymore
- Not flexible
- Still not "closer to customer"
- Long lead time in big companies
- Micro-manage instead of self-organized



AGILE TESTING



IMPORTANCE OF SW TESTING

- Ariane 5 Launch:
[Ariane 5 Launch](#)



00000 10011101 10010110 00010100 11010000 11011100 10000000 011
11101 10110011 10101101 10111110 01101000 00010100 00101101 101
10000 10010000 11100011 00100011 00110101 10011110 01111101 101
11100 11001101 00100010 10010010 000000110 00111101 10011100 110
00101 00010011 01111001 01000000 01111001 10000100 10111011 000
10110 11011000 10101111 01001010 10001000 10100001 00001101 111
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01101 10110010 00100011 000000110 11110000 00001111 00101010 111
00010 01101101 01000000 10011110 01101100 10010000 00011101 100
11000 11101100 11000101 10100001 00000100 01011101 00001101 010

SYSTEM FAILURE

“It turned out that the cause of the failure was a software error in the inertial reference system. Specifically a 64 bit floating point number relating to the horizontal velocity of the rocket with respect to the platform was converted to a 16 bit signed integer. The number was larger than 32,767, the largest integer storeable in a 16 bit signed integer, and thus the conversion failed.”

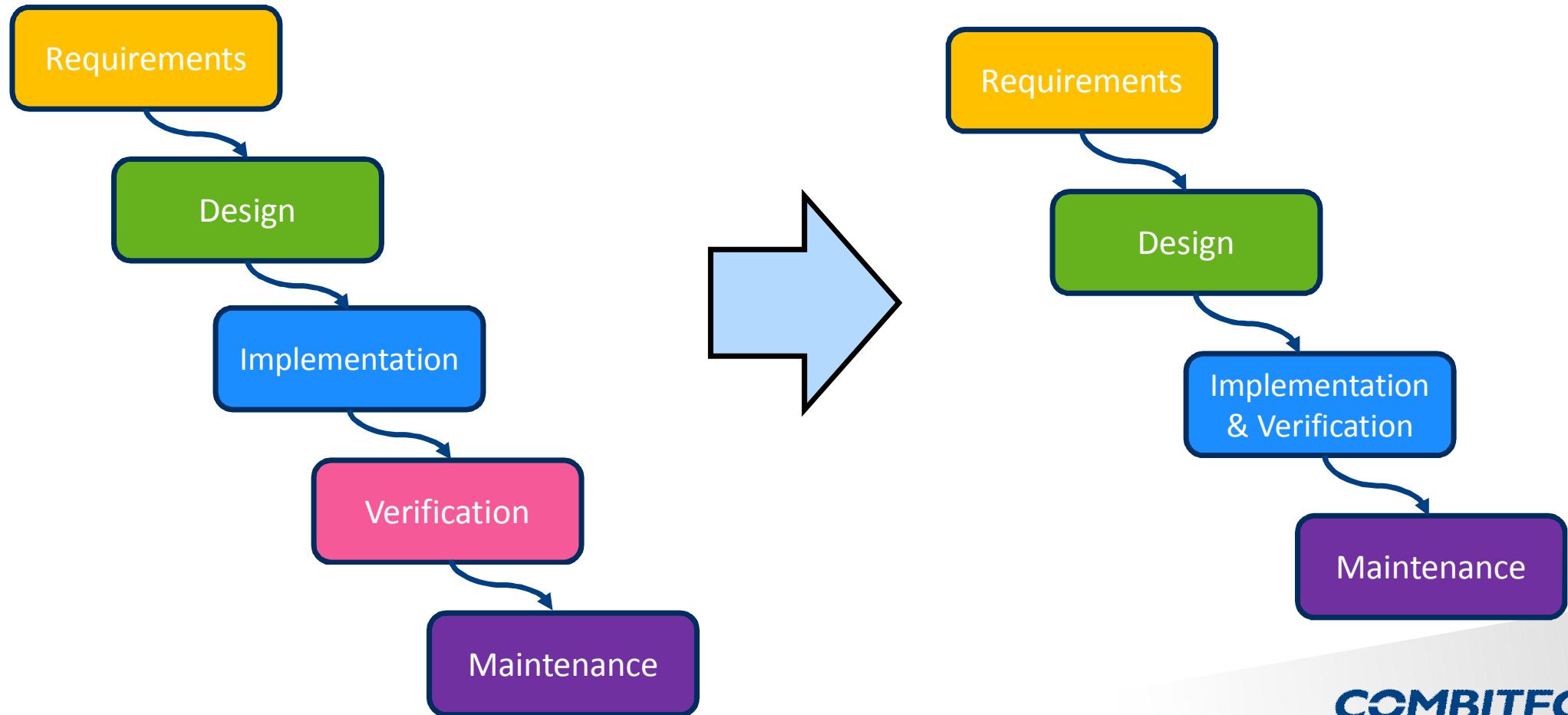
“The rocket was on its first voyage, after a decade of development costing \$7 billion. The destroyed rocket and its cargo were valued at \$500 million.”



WATERFALL VS AGILE TESTING

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AGILE FLOW



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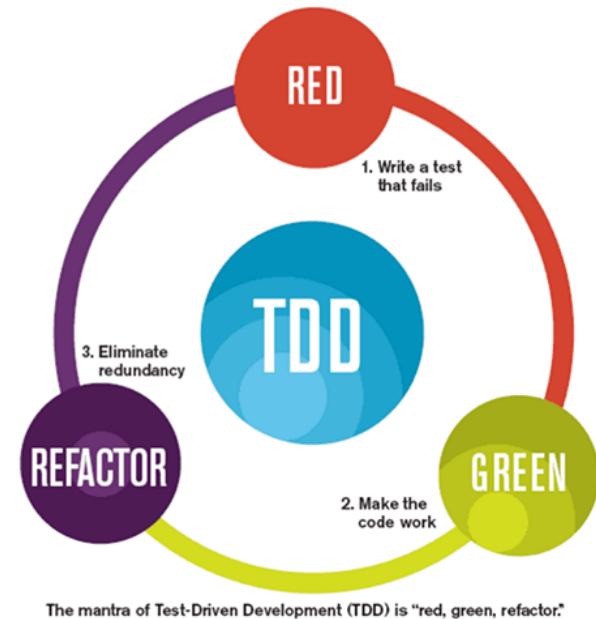
WATERFALL VS AGILE TESTING

	Waterfall	Agile
Test Planning	<ul style="list-style-type: none">• Before testing phase• Rarely reviewed	<ul style="list-style-type: none">• Before and during project• Reviewed each sprint
Requirement	Set before the project start and aren't changed	Set and changed development phase
Test Design	Test cases for whole functionalities	Test cases for the developed functionalities
Acceptance Testing	Performed by customer, after release	Performed before delivery by test team and after delivery by customer
Interactions	<ul style="list-style-type: none">• Separate team• Formal communication between departments	<ul style="list-style-type: none">• In the development team• Communication in the team

TEST DRIVEN DEVELOPMENT

QUESTION

- How:
 - write one single unit test, testing an aspect of the program
 - run the test → fail
 - write "just enough" code, to make the test pass
 - refactor the code until it conforms to the criteria
 - repeat, accumulating unit tests over time
- Expected Benefits
 - Focus on what to write in the code
 - Improved design qualities in the code
 - Improved technical quality



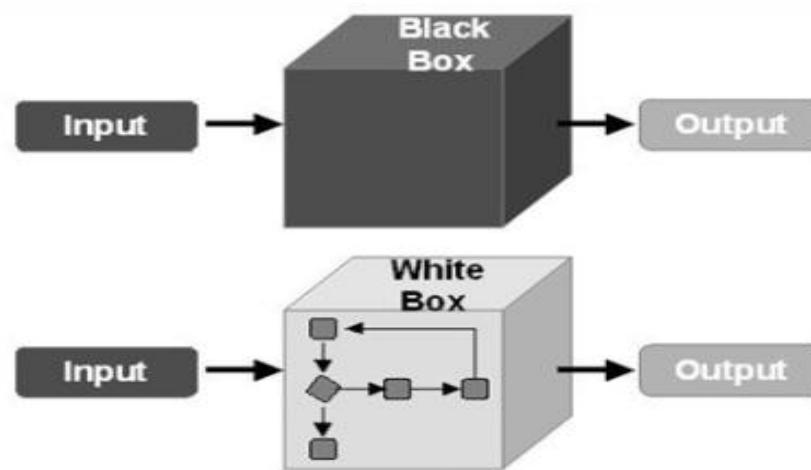


MANUAL VS AUTOMATION TESTING

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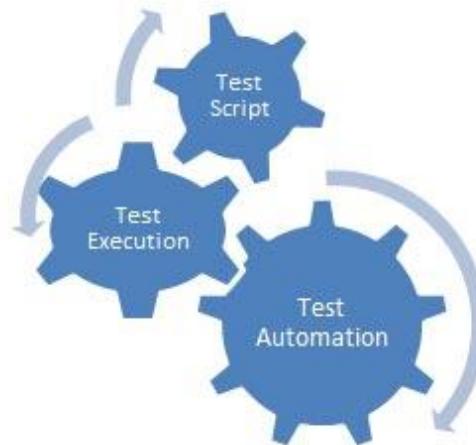
MANUAL TESTING

- **Manual test:** process through which developers run tests manually by human actions comparing program expectations and actual outcomes to find software defects.
- Type of testing in manual test:
 - **Black Box Testing:** test functionalities and requirements of the system. Ex: system testing and acceptance testing
 - **White Box Testing:** test method based on information of the internal logic of an application's code. Ex: unit testing and integration testing



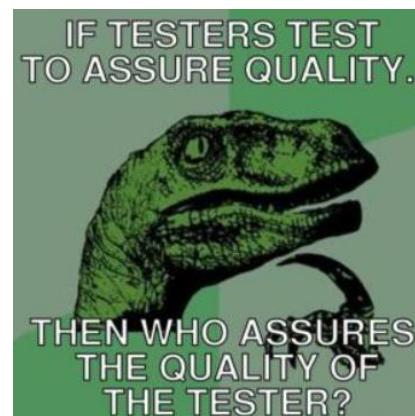
AUTOMATION TESTING

- **Automation test:** test is done by assistance of automation tools, scripts and software by repeating pre-defined actions, to match the developed program's probable and real results.
- **Continuous integration(CI):** the practice of routinely integrating code changes into legacy codes and testing the changes, as early and often as possible. Ideally, developers will integrate their code daily, if not multiple times a day.
- CI usually has built in automation to check the validity of the code that was checked in. Ex: static code analysis, unit test, integration test.



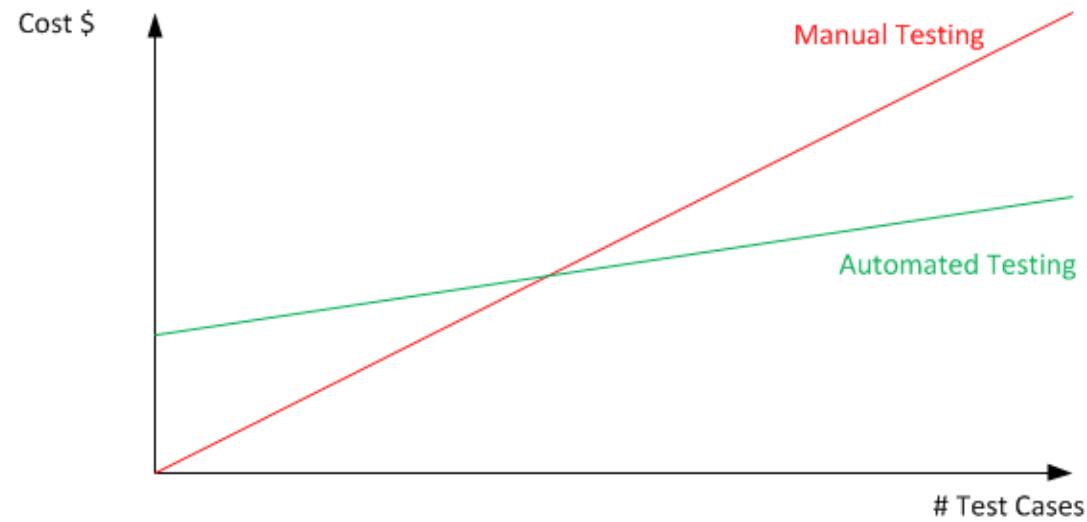
MANUAL TEST VS AUTOMATION TEST

	Manual Test	Automated Test
Test tools	HW/SW tools is purchased and ready to used	Building the CI engine takes time and costly
Duration of test	Take long time to setup different scenarios	Test runs quickly
Visibility of result	Documentation	Visible for everyone
Test coverage	More flexible and more likely to find end user's issue	Limitation on test cases
Cost	Cost effective in short term	Cost effective in long term (reuse pre-defined test cases)



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MANUAL TEST VS AUTOMATED TEST



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ABOUT BORN TO DRIVE

This project is the first of a planned series of projects, where the long term objective is to let production vehicles autonomously drive the entire path from factory to ship/train/truck for further transportation throughout the world.

In this first project, the aim is to demonstrate the possibility of manoeuvring self-driving production cars from the factory to the factory parking lot for further transport by train and truck.

This includes both prototypes of vehicles, control system as well as rules and regulations for implementation.

In the acceptance test, what kind of test cases you want to perform before delivering the product to customer?



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LAB ELEPHANT CARPACCIO



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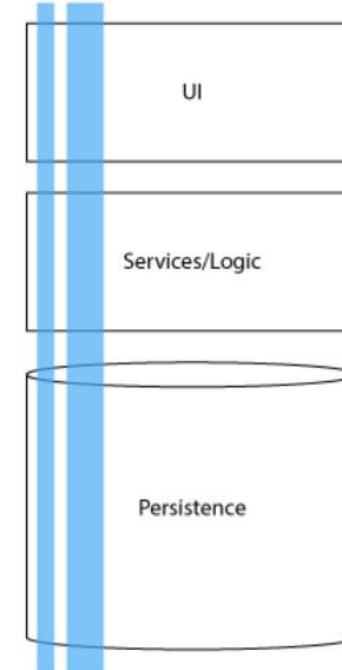
HOW TO BREAK DOWN EPICS INTO USER STORIES

- User comes first
 - Describe how customer or user employs the product
 - It is written from the user's perspective
- Start with epic
 - Capture specific epics (functionalities)
 - Think about different functionalities, each functionalities can create at least 1 user story
- Keep the user stories to be simple and concise
 - It should be easy to understand
 - Avoid ambiguous terms and use active voice
 - As a<user>, I want <what> so that <why>
 - The template is just a help tool, don't feel obliged to always apply it
- Once you have the user stories, break each user story into smaller task
 - The tasks should be clear, feasible and testable

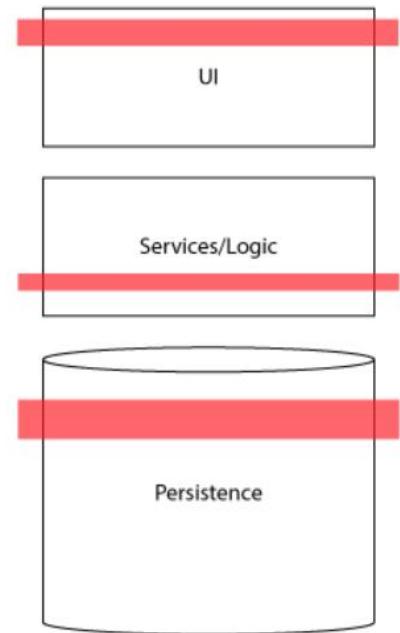
VERTICAL SLICES VS HORIZONTAL SLICES

- Horizontal slice: involves breaking down stories by the kind of work that needs to be done, or the layers or components that are involved.
 - Work that has to be done for the UI, the database, some component, a front-end and testing are split up into technical items on the Backlog.
- This doesn't work well in Scrum, because:
 - Individual items do not result in working, demonstrable, software.
 - Example: A team works on an order process for a webshop in a sprint. If they would split up the user story horizontally, they would end up with work for design, database, front-end and testing. Although the items are certainly smaller, they don't deliver working software on their own. After all, a new bit of functionality can't go live when only the UI is finished, or when only the database was modified. It is also a bad idea to go live without sufficient testing.
- Vertical slice: break down of work item that delivers a valuable change in system behavior
 - multiple architectural layers need to be done to implement the change.
 - When a "slice" is done, the system is observably more valuable to a user.

Vertical Slices
include changes to each architectural layer sufficient to deliver an increment of value



Horizontal Slices
multiple slices must be completed to deliver an increment of value



EXAMPLES

Wishlist

Theme

As a customer, I want to be able to have wishlists so that I can come back to buy products later

Epic

As a customer I want to be able to save a product in my wishlist so that I can view it again later

As a customer I want to be able to view my wishlist so that I can buy items from it

User Stories

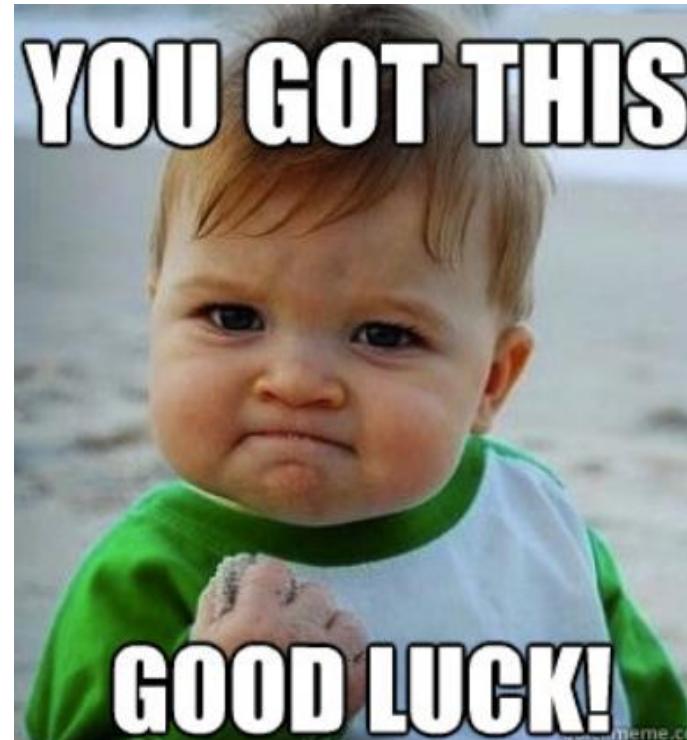
Put "Add to wishlist" button on each product page

Create new database to store wishlist items

Create page to display user's wishlist

Add "view wishlist" link to homepage

Tasks





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