

An aerial photograph of a two-lane coastal road. A red car is driving away from the viewer, and a dark car is driving towards the viewer. The road is bordered by a rocky coastline and the ocean on the right, and a grassy hillside on the left. The text "WE DRIVE THE CHANGE" is overlaid in large white letters.

WE DRIVE THE CHANGE

Visiting Lecture - DevOps Course / TUNI

Tero Haataja / Unikie Oy
2021-11-30

Introduction



Tero Haataja

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MSc - TUT 1996

Work history

- Unikie 2019 -
- Intel 2012-2019
- Nokia 1995-2012



Agenda

- Presenting Unikie
- DevOps in general - Venn
- Cloud-Edge-Device paradigm
 - Blurring with form-factors
 - Continuous-Delivery <-> Release Based
- DevOps Process Target (3 parts)
 - Development into Master branch
 - QA in a non-continuous-delivery case
 - Development-Staging-Production
 - Operations
 - Monitor with aino.io (Cloud)
 - Config Management: Branch for Products
- (SDL and SWLC - DevOps input)
- Harbours and Ports - case example

UNIKIE PRESENTATION – Key Figures

Automotive & Mobility



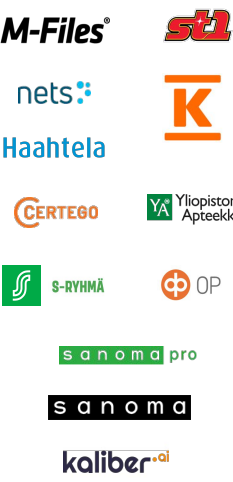
Intelligent Machines, Industrial Systems



Secure Communications



Information and Web Technology

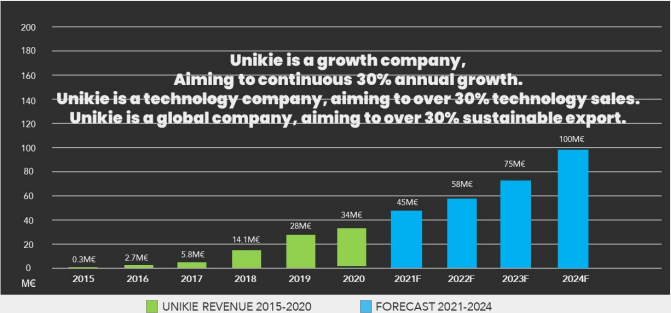


Total personnel 400+

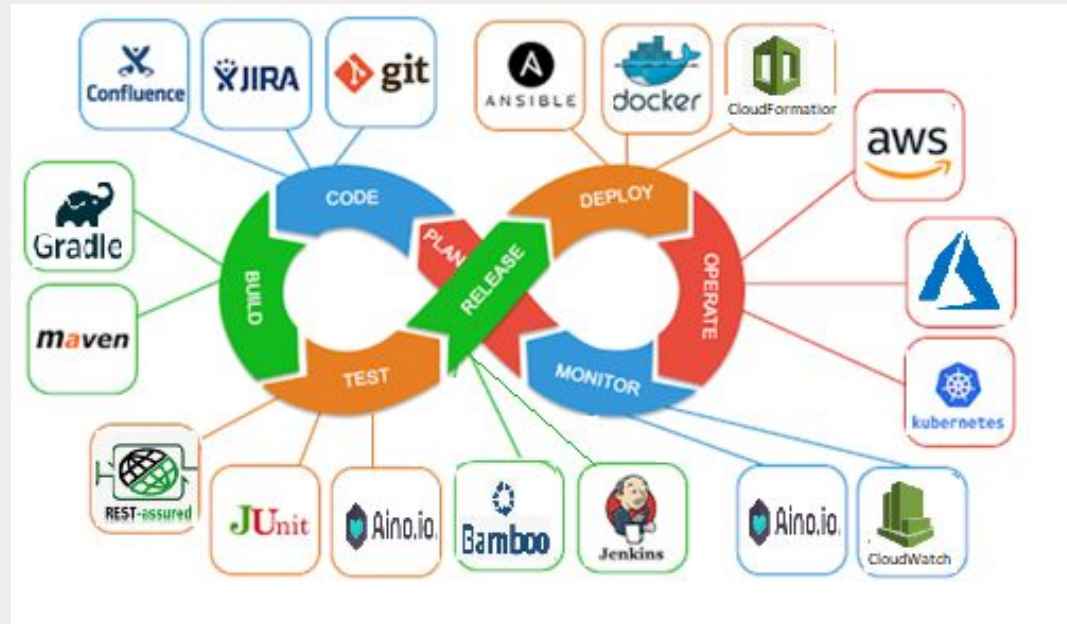
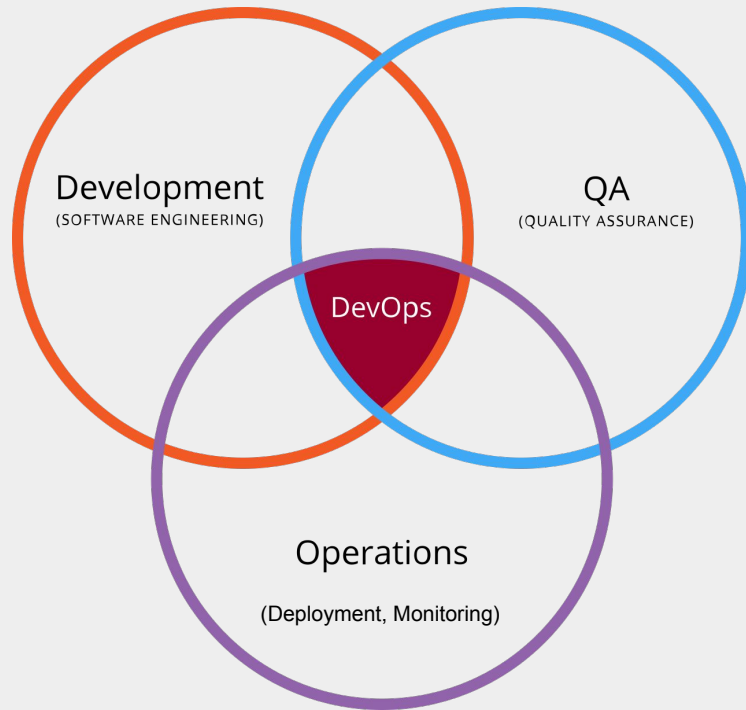
OUR SITES



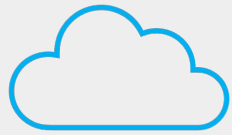
- Finland
 - Tampere
 - Helsinki
 - Oulu
 - Turku
 - Kuopio
 - Kokkola
- USA
- Germany
- Sweden
- Poland



DevOps



Background – when automation is limited in DevOps: Cloud-Edge-Device paradigm – form factors blurring



Amazon



Azure

Microsoft



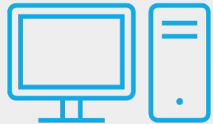
Google

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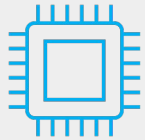
Cloud

- Continuous Deployment



Edge

- Gateway
- Server
- Release or package version based deployment



Device

- data gathering
- release based, system package or system image (flash)

GPS/GNSS

Lidar

Radar

Gyroscope

LTE & 5G

Compass

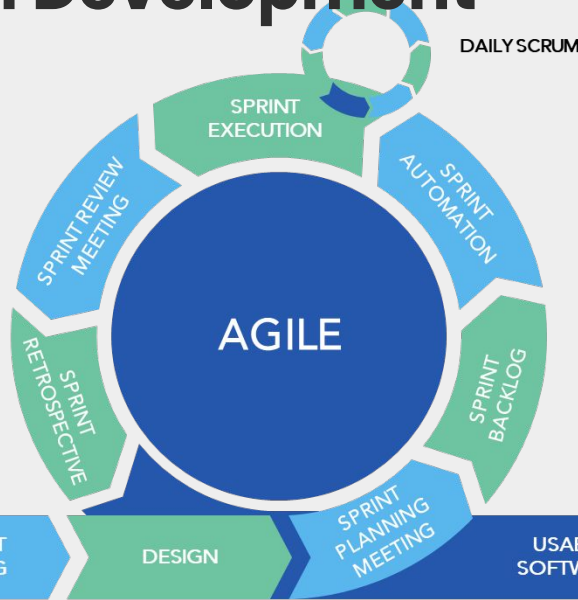
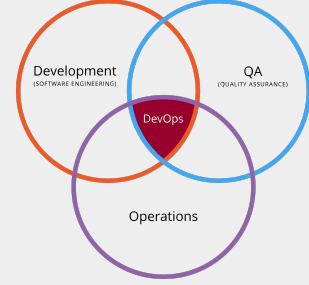
Camera

Accelerometer

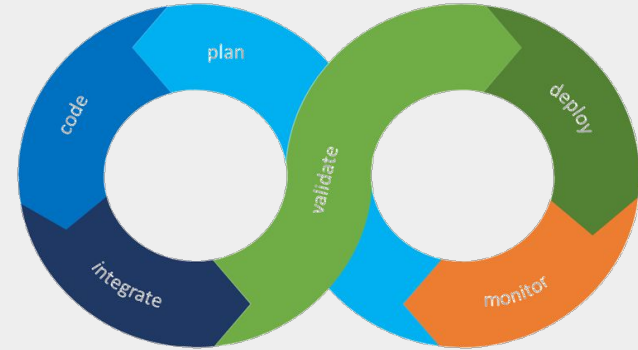
IMU

DEVOPS Process – Development

Scrum Development



DevOps



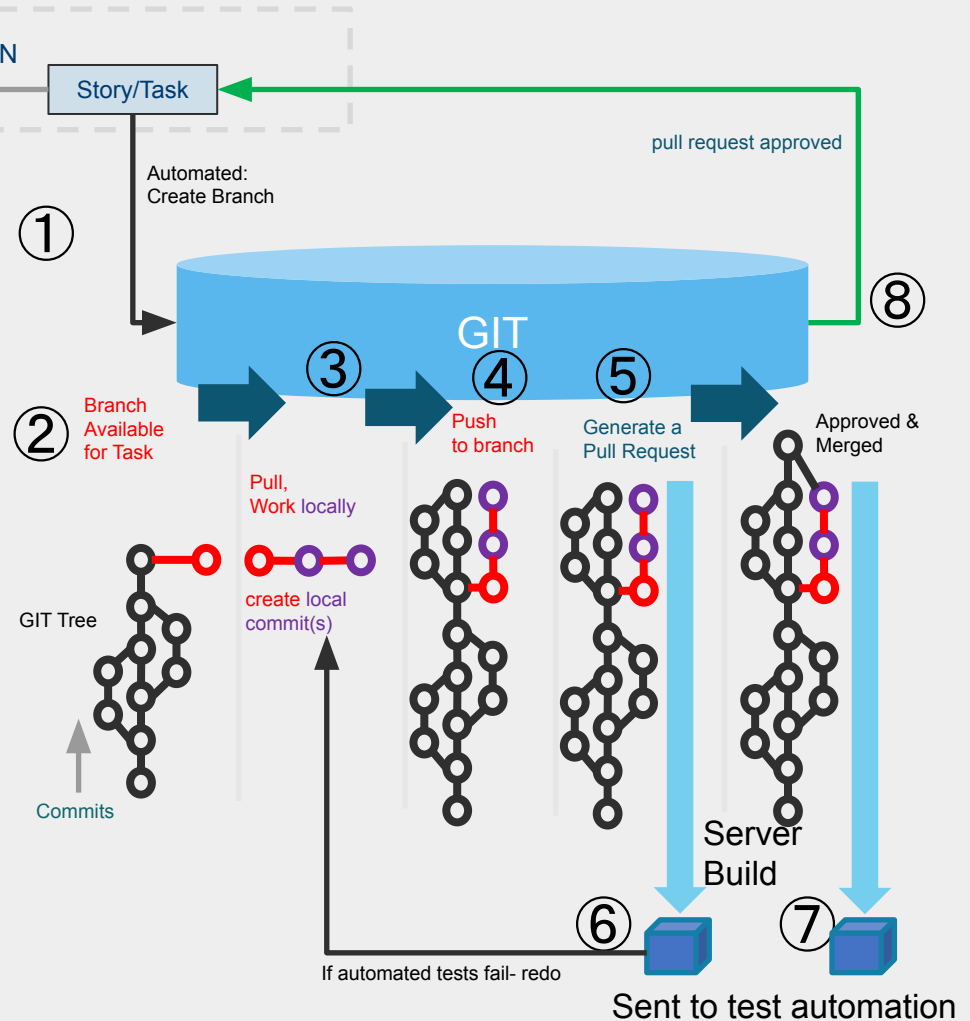
Part of Sprint - Backlog process - New Features & Issues Reported

Plan -> Dev -> Integration -> Testing cycle -> Deploy, Monitor and Replan

(Edge) Development – into Master branch

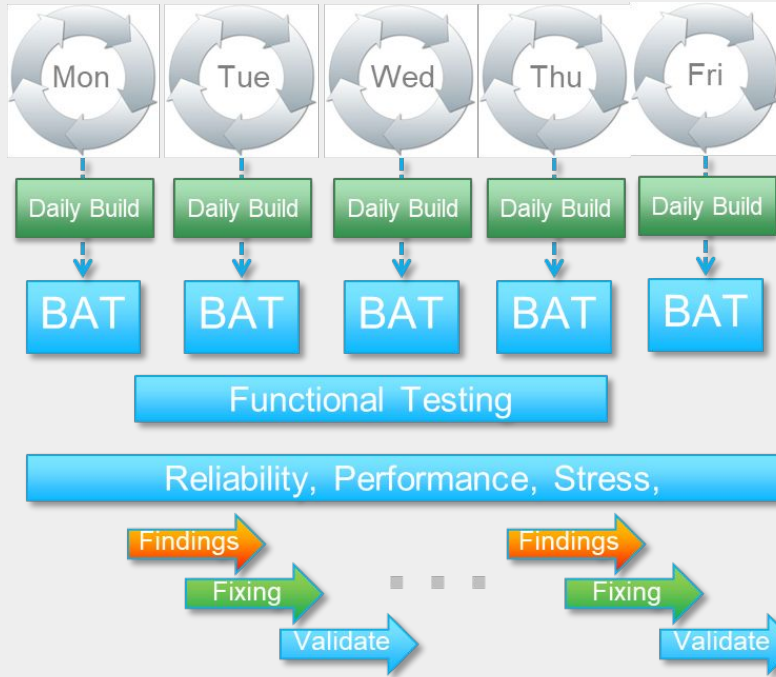
An issue from Task management system provides a task for the developer to mutate the code. Figure on the right illustrates the normal flow:

1. Issue (Task/Story) is used to automatically create a branch in Git
2. Git generates a branch available for task
3. Developer pulls the branch (from remote) and works locally for feature or fix
4. Developer pushes the branch to remote Git
5. Developer creates *Pull Request* for the maintainer
6. Server automatically builds based on the pull request content, this build is available for the developer
7. Server builds automatically a merge snapshot, new master build is available.
8. As the *pull request* is approved the Task management system Issue is put to verified state => closed

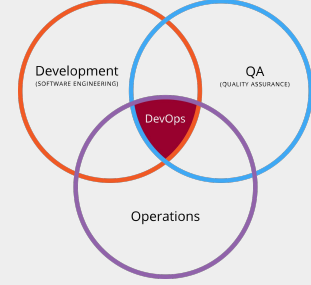


DEVOPS Process – Testing

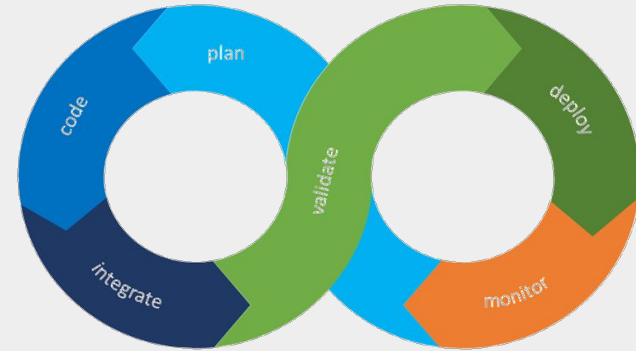
Non-Continuous Deployment



automated?



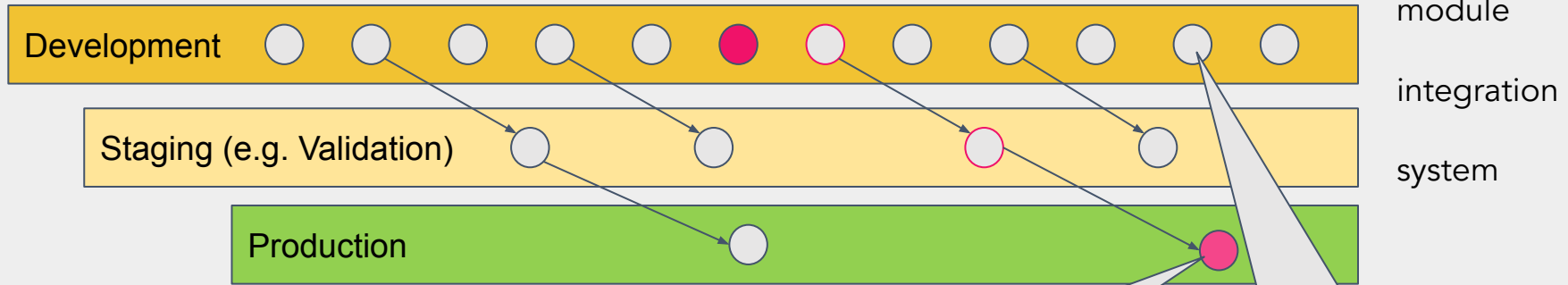
DevOps



Testing cycle -> Deploy, Monitor and Replan cycle -> Dev -> Integration
test automation (limited) -> release based: candidate build testing

Validation Findings – Fixing Issues

Pipeline: Development–Staging–Production



Which branch was used?

Which version was used?

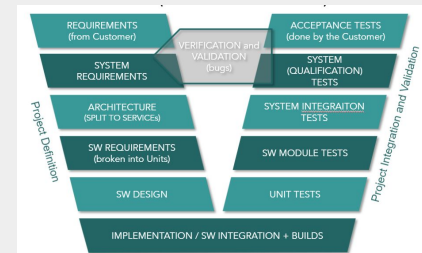
How we checked before delivery?

What was the test set, test asset? How did we get leakage?

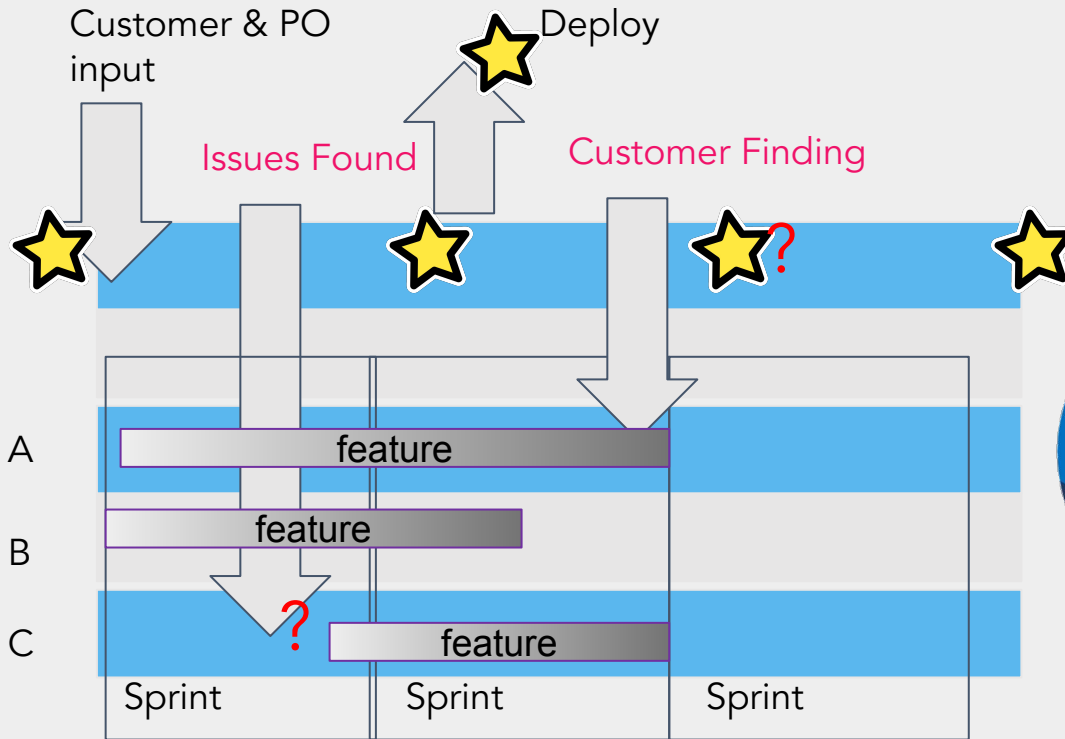
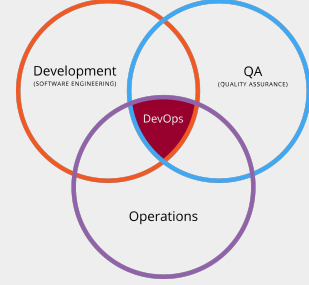
- + Challenge with dependencies
- + Challenge with re-do impact to release plans.

QA & OPS:
I have a problem

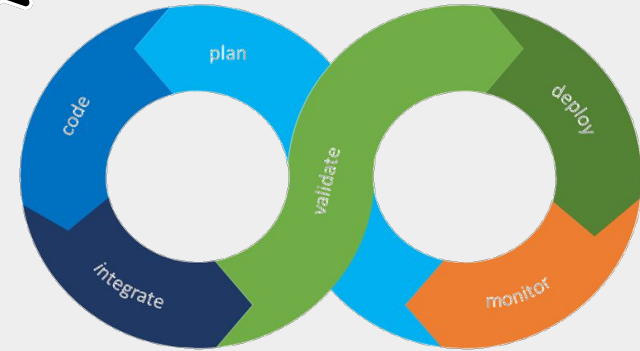
DEV:
We have fixed that
already. (or Cannot
reproduce anymore)



Target DEVOPS Process - Operations & Re-Plan



DevOps

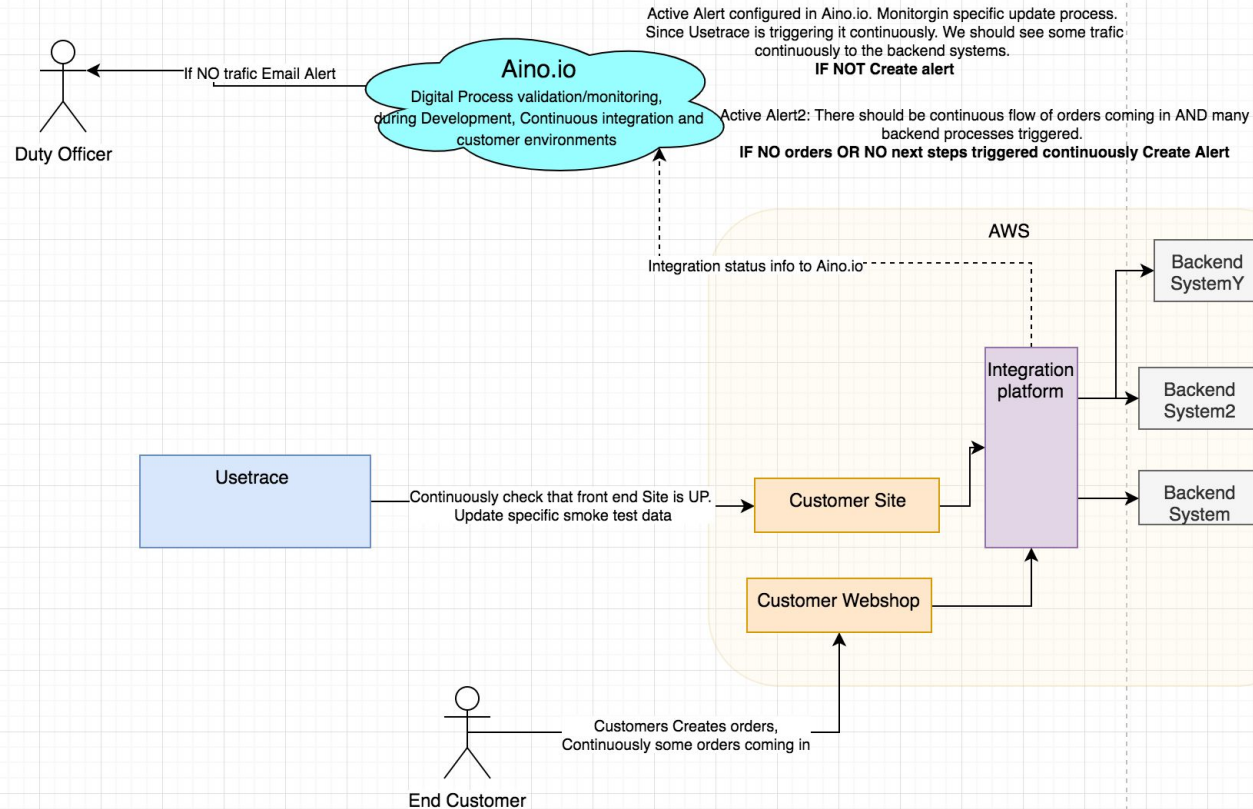


Backlog process - New Features Requested & Issues Reported
Deploy, Monitor and Replan -> Dev -> Integration -> Testing cycle

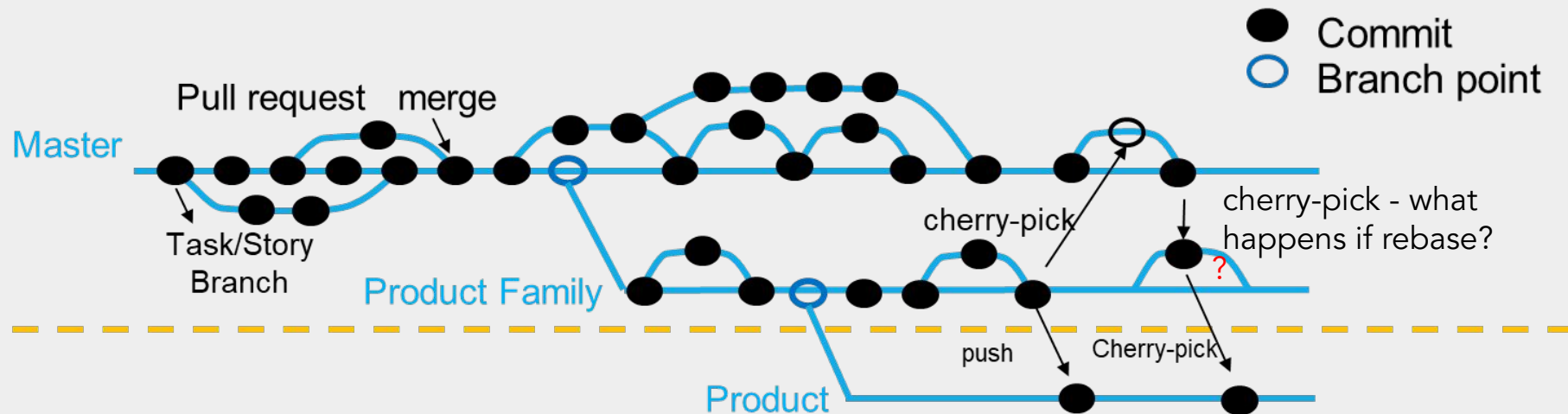
Monitor Tool – aino.io Cloud monitoring

Digital Process uptime monitoring with Aino.io

<https://aino.io/>



Operations – Deployment – Release Based: Configuration Management – Branching for Products



External visibility

Feature leak vs. one fix to all branches

- product flags in code
- support for all in the same end-package (size?)

Plan of backward compatibility / forward compatibility

Release versioning known

Cloud components in serverless - versioning with external releases

System updates - partial updates

Secure Development Lifecycle (SDL) and SW Legal Compliance (SWLC)

SDL

Threats and mitigations - modularity and capabilities

- Continuous Integration - Trusted (?) packages

- Whitelisting - Blacklisting

- Dependencies

Code Analysis

Post-release Security Patches

SWLC

Open Source Module scans - license incompatibility

- Re-work on copyleft, or posting changes to Open-Source

- Contradictory licence requirements

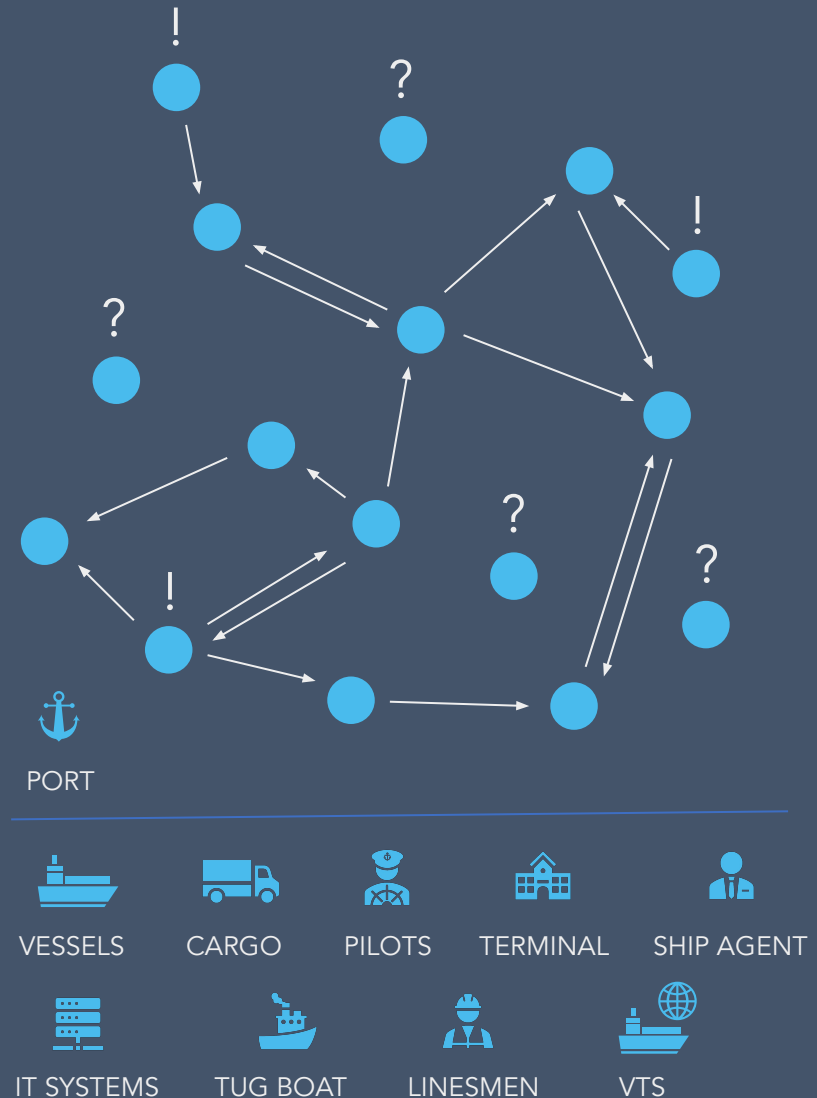


Harbours & Ports Case:

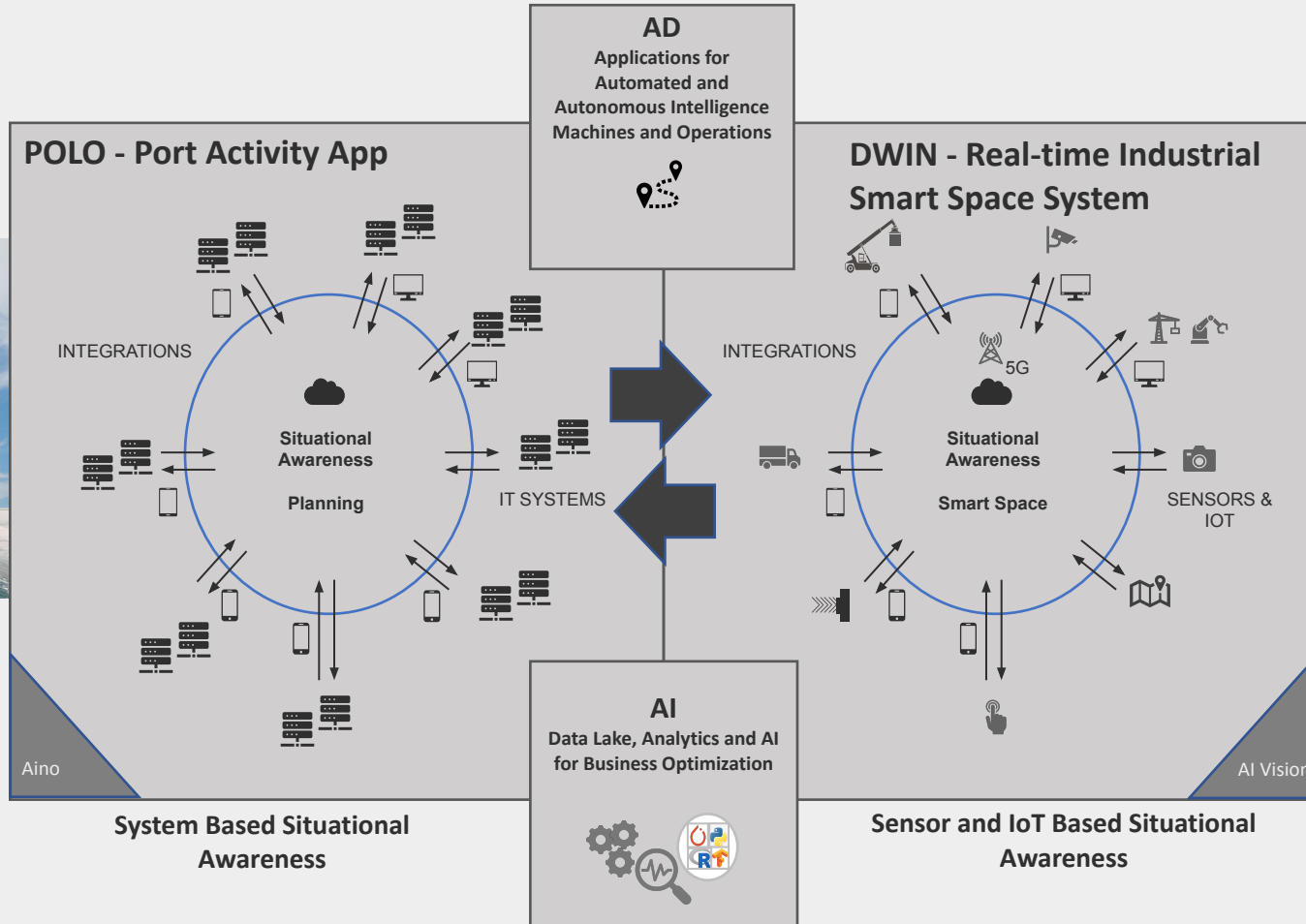
Back-end Cloud - iOS and Android

THE CHALLENGE IN PORT FLOW

- Various IT systems used, multiple points of unaligned information with no or limited data transfer
 - Vast amount of information and communications back and forth between different actors
 - No centralized place or accessibility to reliable information
 - No working warning system and ability to react to unexpected events, limited planning horizon
- Inefficient port flow

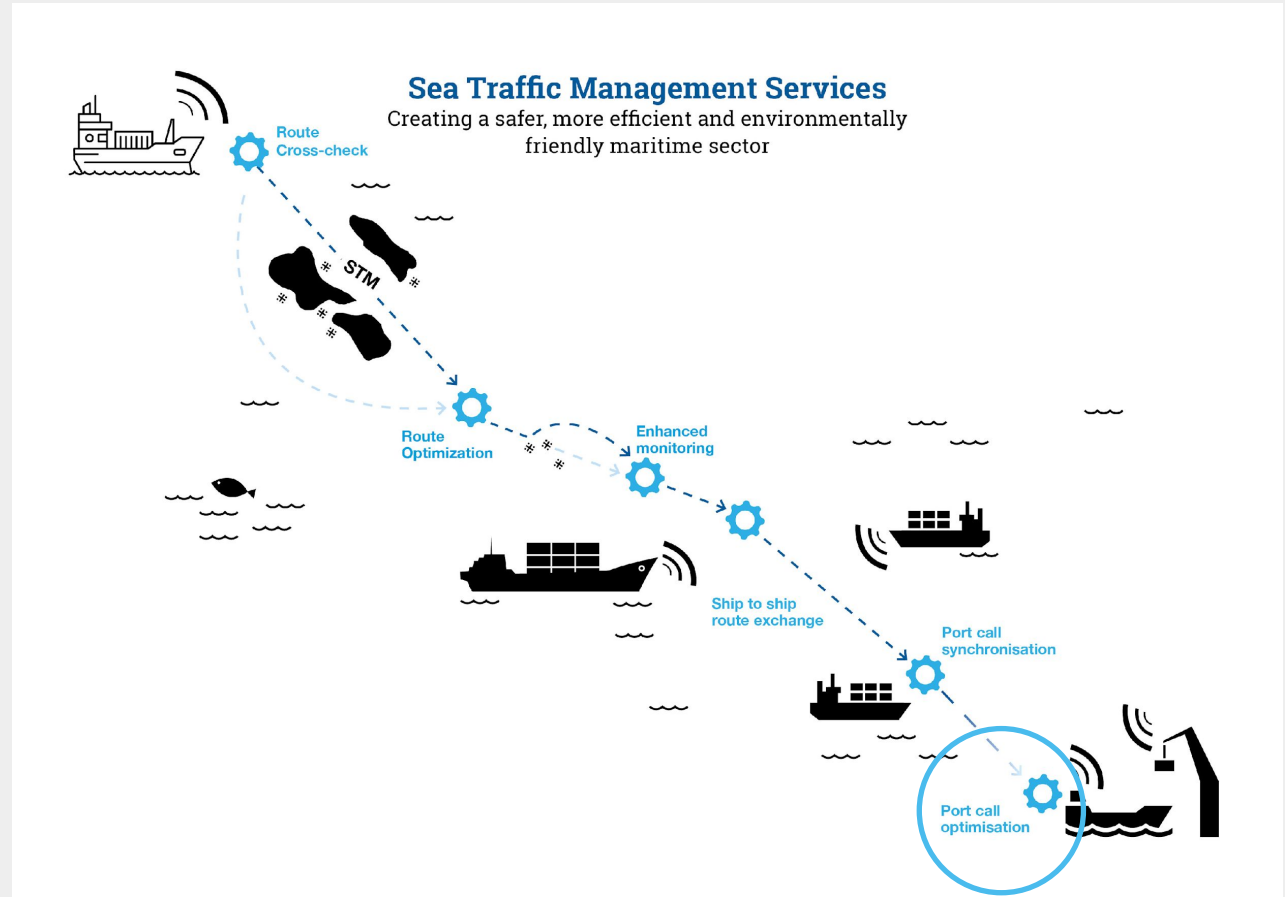


Situational Awareness Solution Portfolio for Industrial Use Cases



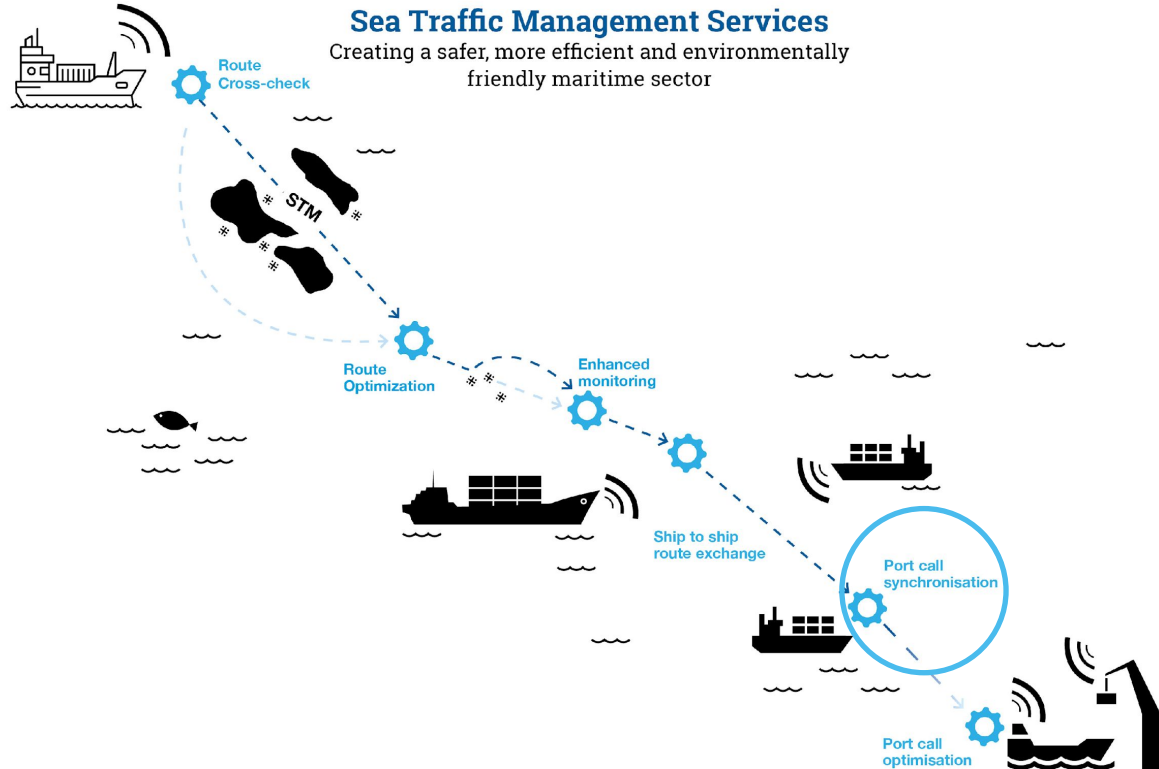
STM CONCEPT (PORT FLOW OPTIMIZATION)

Through Port Call Optimization tool (Unikie Smart Port) the key actors within a port will make their operations transparent.



STM CONCEPT (PORT FLOW OPTIMIZATION)

Through the Port Call Optimization tool (Unikie Smart Port) the ship will not arrive before the port is ready.

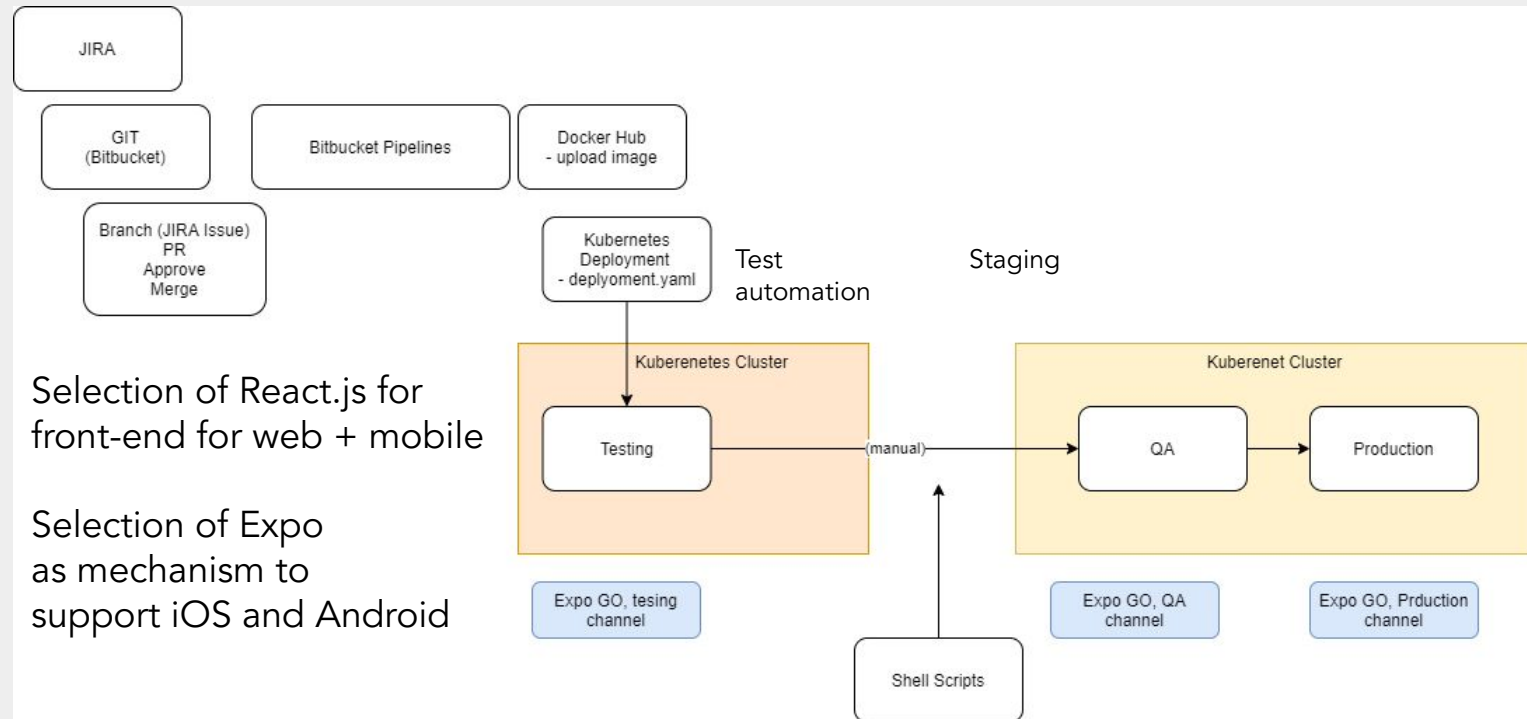
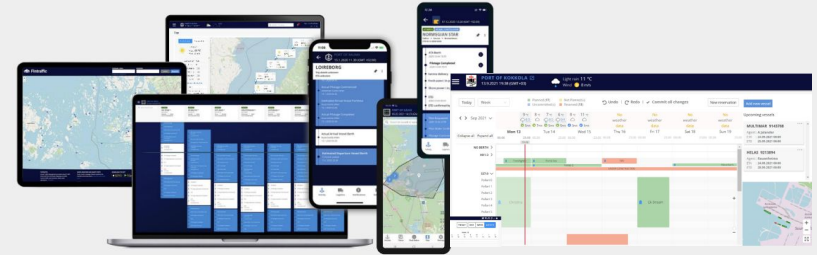
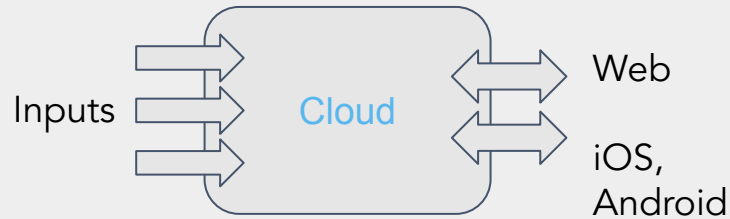




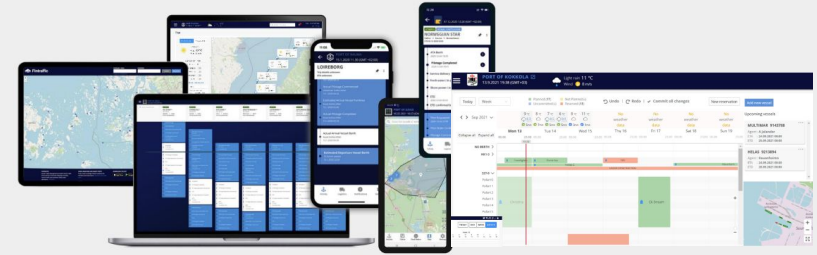
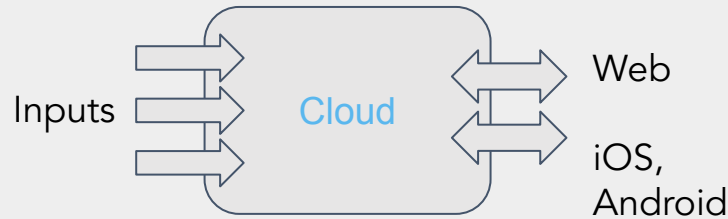
POLO – DevOps

Back-end Cloud - iOS and Android

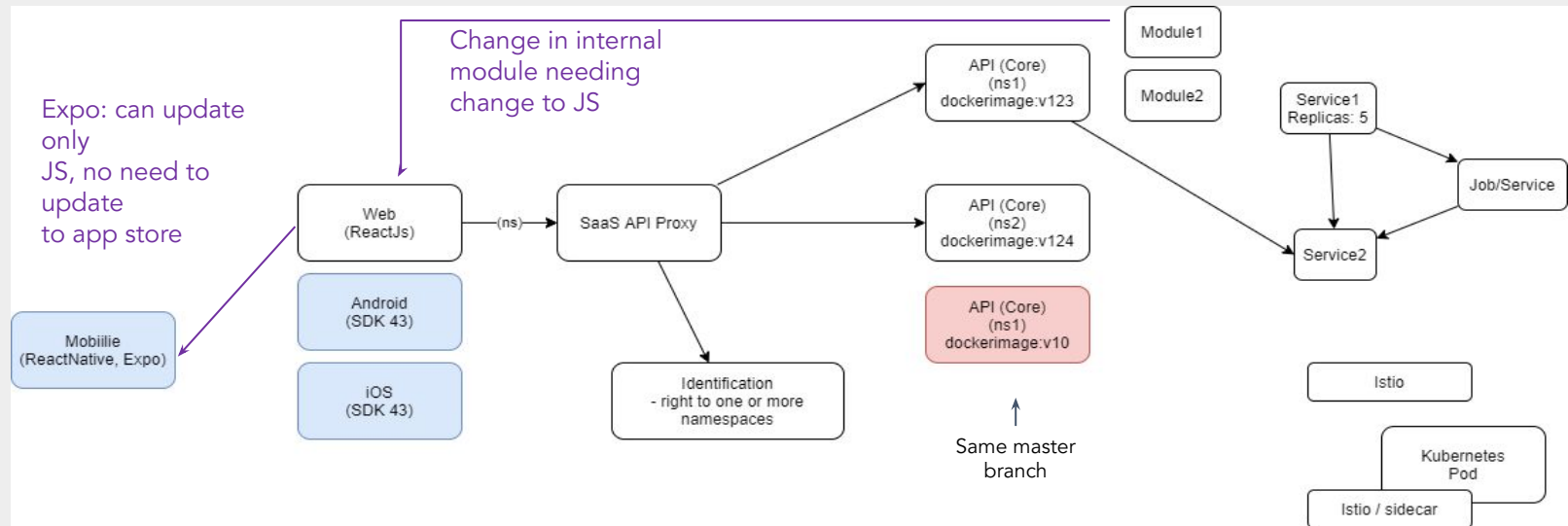
Simplified Architecture+UI and DevOps



Propagating Change Through the System



- 1) Git change on docker cont.
 - 2) Git change on ReactJS
 - 3) Git change on ReactNative
- => integration, tests => 4) Deploy the Cloud and Deploy ReactNative through Expo
- 5) iOS & Android Version Change => Store re-deployment needed



THANK YOU!

<https://www.unikie.com/en/send-cv/>

Q & A