iLink New Technologies

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Co-Founder & CEO

ITS Hellas BoD member, HBH member

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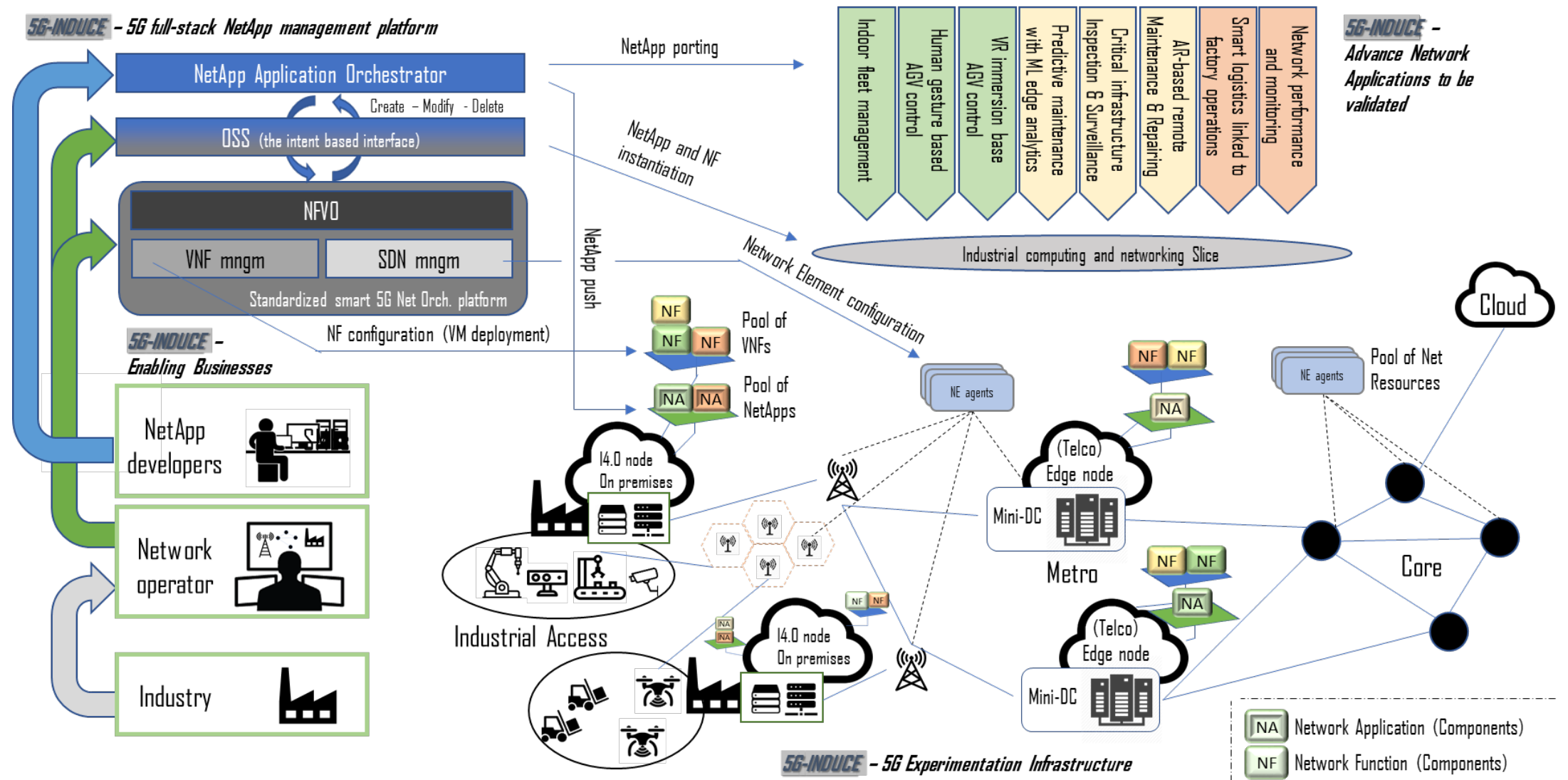
iLINK NEW TECHNOLOGIES

Innovative Business Solutions
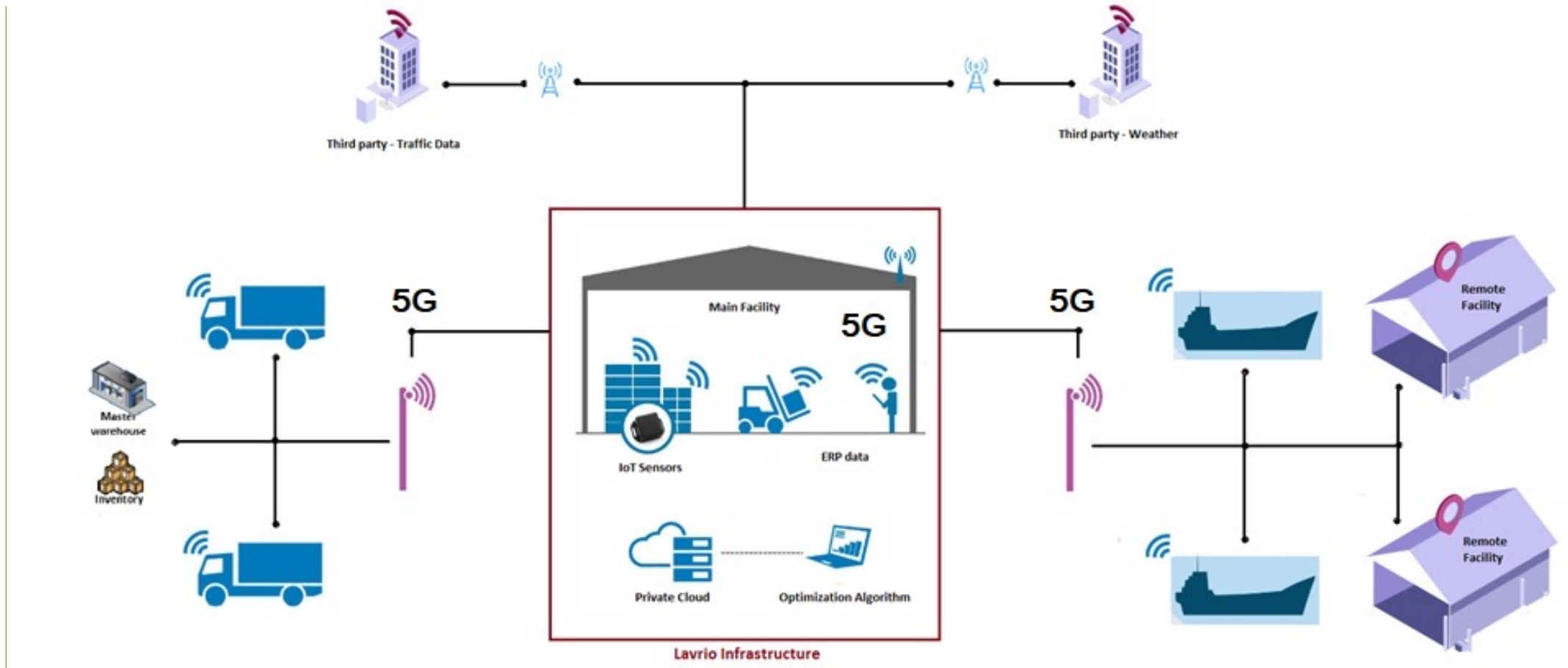
Innovation
Digital Transformation

- Fleet Management & Route Optimization

- Mobile Workforce Management

- Blockchain initiatives

- Member of ITS Hellas, ILME, HBH, ΣΕΚΕΕ
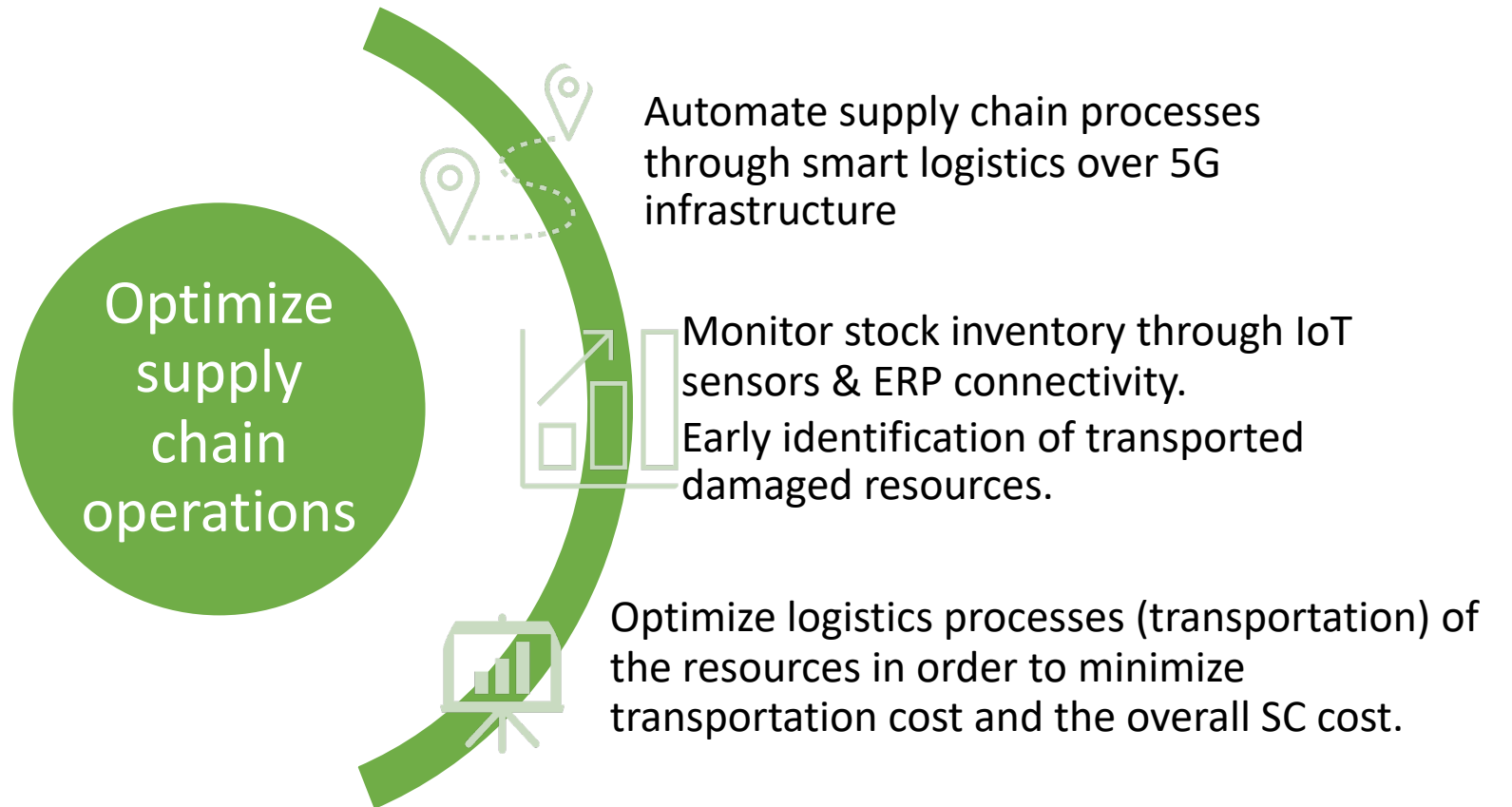
- 5G-Induce European project participation

ISO 9001   ISO 27001

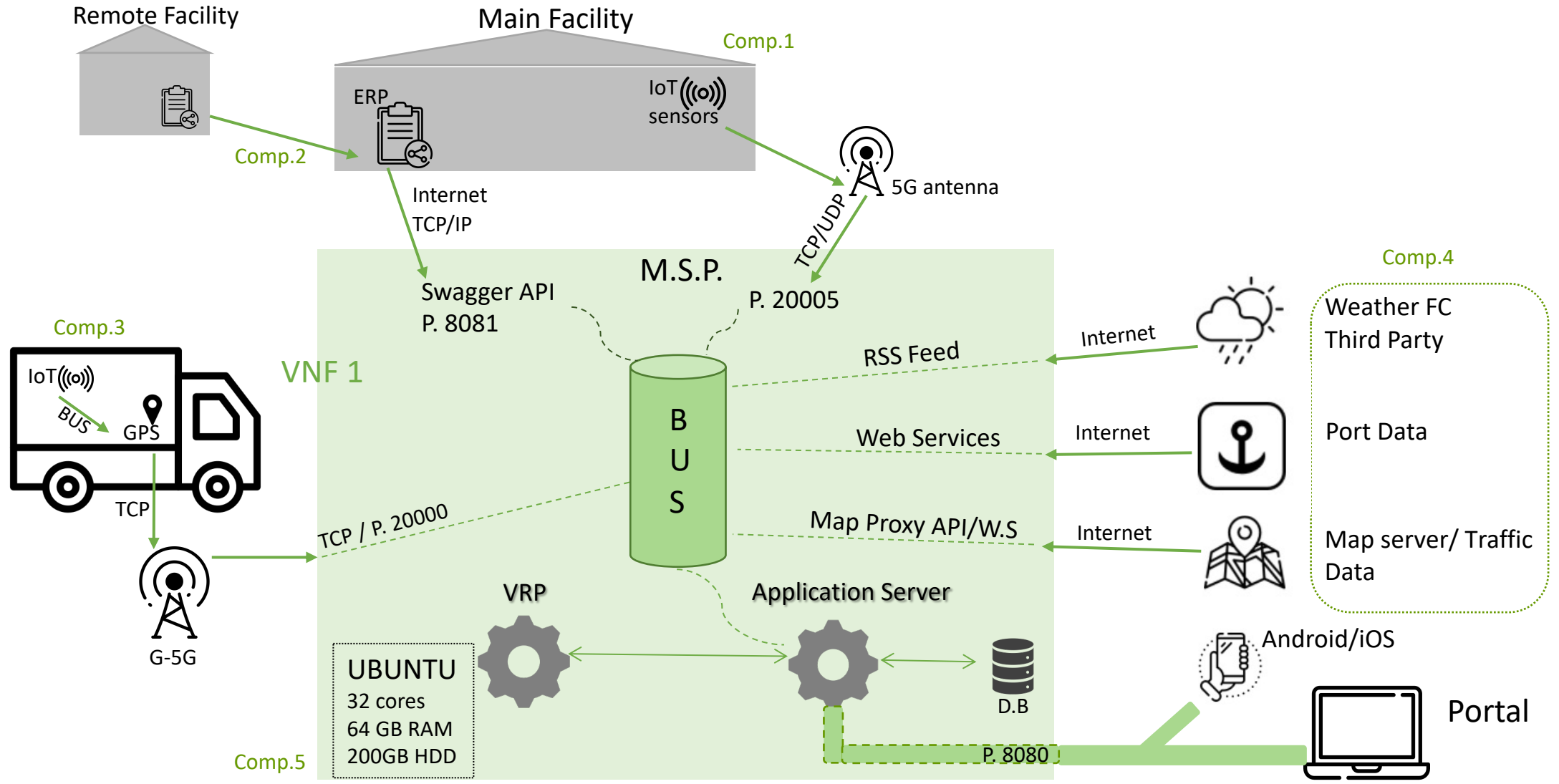www.ilink.gr

5G-INDUCE

5G-INDUCE – 5G full-stack NetApp management platform

NetApp Application Orchestrator

Create – Modify - Delete

OSS (the intent based interface)

NFVO

VNF mngm | SDN mngm

Standardized smart 5G Net Orch. platform

NF configuration (VM deployment)

5G-INDUCE – Enabling Businesses

NetApp developers

Network operator

Industry

NetApp porting

NetApp and NF instantiation

NetApp push

Network Element configuration

Pool of VNFs

Pool of NetApps

NF

NF NF

NA NA

I4.0 node On premises

Industrial Access

I4.0 node On premises

NE agents

(Telco) Edge node

Mini-DC

Metro

NF NF

NA

NF NF

NA

(Telco) Edge node

Mini-DC

Indoor fleet management

Human gesture based AGV control

VR immersion base AGV control

Predictive maintenance with ML edge analytics

Critical infrastructure Inspection & Surveillance

AR-based remote Maintenance & Repairing

Smart logistics linked to factory operations

Network performance and monitoring

5G-INDUCE – Advance Network Applications to be validated

Industrial computing and networking Slice

Cloud

NE agents

Pool of Net Resources

Core

NF NF

NA

5G-INDUCE – 5G Experimentation Infrastructure

NA Network Application (Components)

NF Network Function (Components)

PROPOSED TOPOLOGY

Third party - Traffic Data

Third party - Weather

5G

5G

5G

Main Facility

5G

IoT Sensors

ERP data

Private Cloud

Optimization Algorithm

Lavrio Infrastructure

Master warehouse

Inventory

Remote Facility

Remote Facility

Smart Logistics & Smart Supply Chain

GOAL

Optimize supply chain operations

Automate supply chain processes through smart logistics over 5G infrastructure

Monitor stock inventory through IoT sensors & ERP connectivity.
Early identification of transported damaged resources.

Optimize logistics processes (transportation) of the resources in order to minimize transportation cost and the overall SC cost.

NetApp System Diagram

Crossroad control for safety - Whirlpool

5G INDUCE

Safety considerations

- Some crucial statistics:
  - Forklifts account for around 85 deaths every year – a 28% Increase since 2011
  - Forklift accidents that result in serious injury total 34,900 annually.
  - Non-serious injuries related to forklift accidents reach 61,800 each year.
  - A forklift overturning is the most common incident, accounting for 24% of all forklift accidents.
  - On average 95 people are seriously injured in a forklift accident every day and 1 person is killed in a forklift accident every 4 days in the European Union.
  - 36% of forklift-related deaths are pedestrians
  - Approximately 11% of forklifts in the EU will be involved in an accident each year. Meaning if a facility has 10 or more – something is going to happen this year.
    - source: https://www.mccue.com/blog/forklift-accident-statistics & https://www.bigrentz.com/blog/forklift-statistics
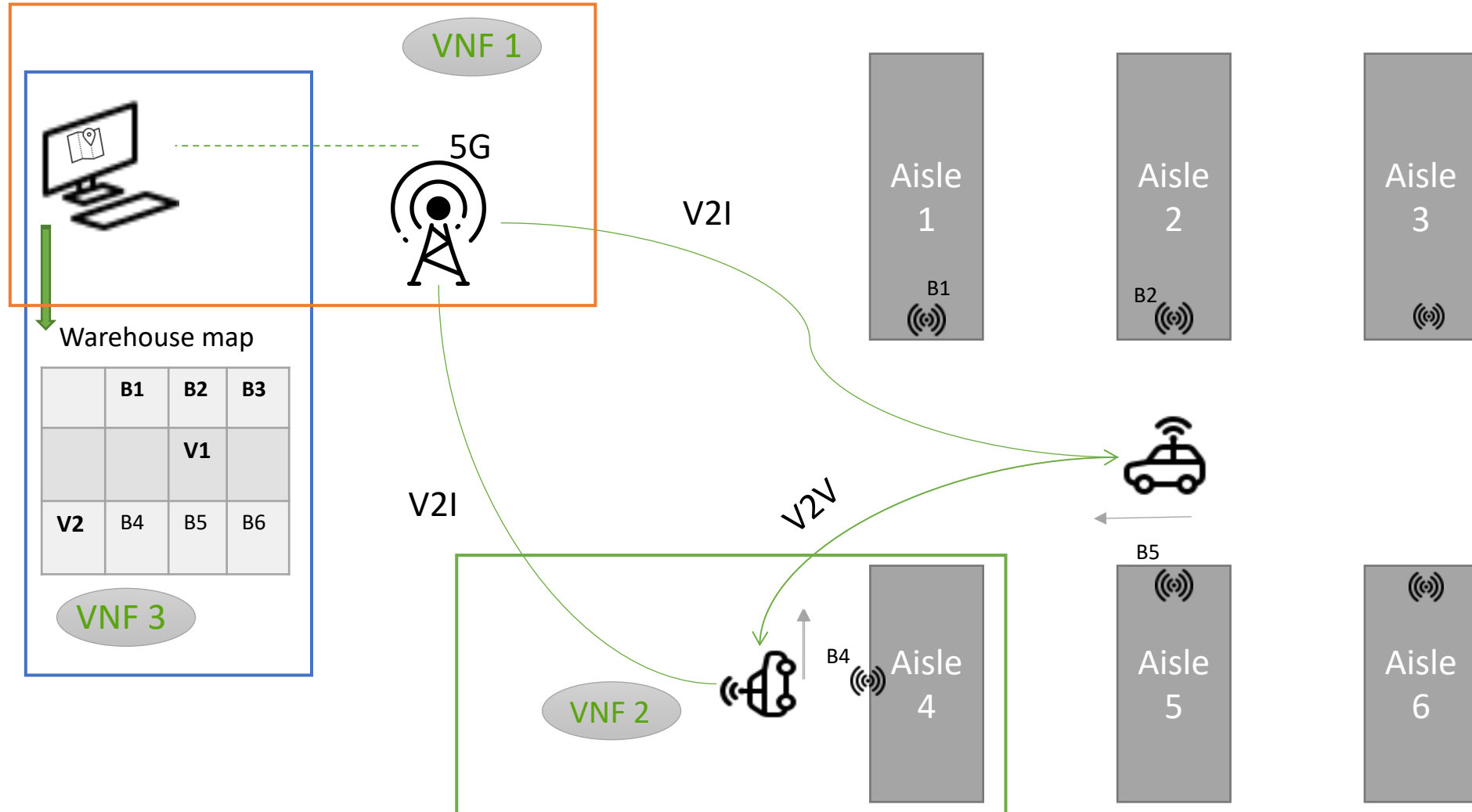
Business requirements

Connectivity to onboard forklifts and humans mobile devices

Connectivity to positioning "indicators" (BT beacons), due to the indoor limitations (GPS prohibited due to location and accuracy)

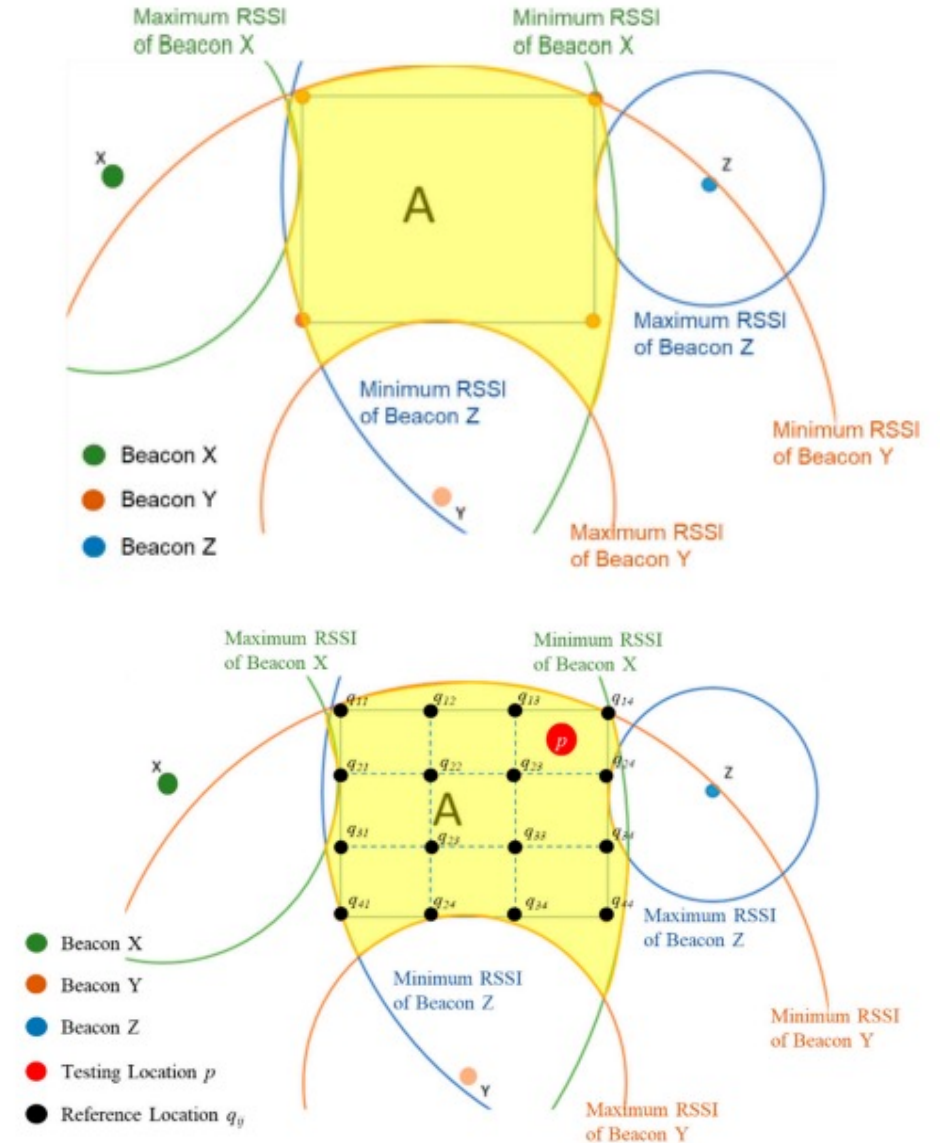NetApp through mobile devices (both for forklifts & humans)

Anti collision alerting mechanism leveraging several methods and devices (visual, acoustic, sw push notifications, vibration)

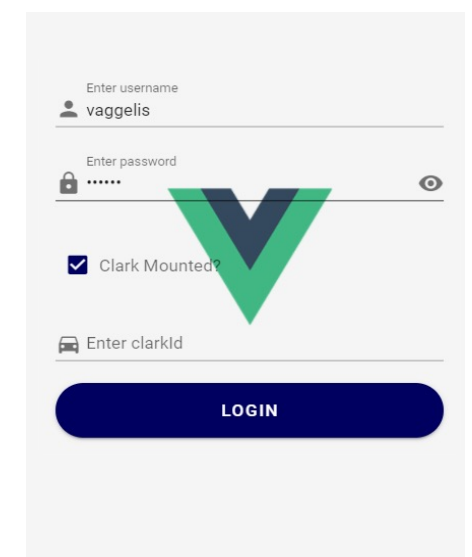User friendly human interface for data visibility and configuration
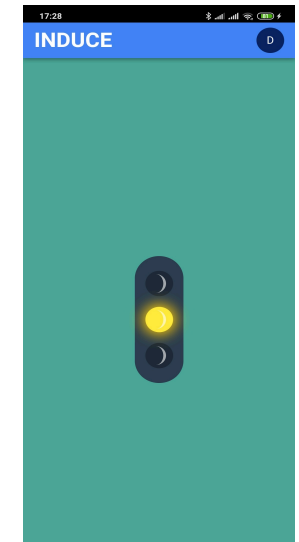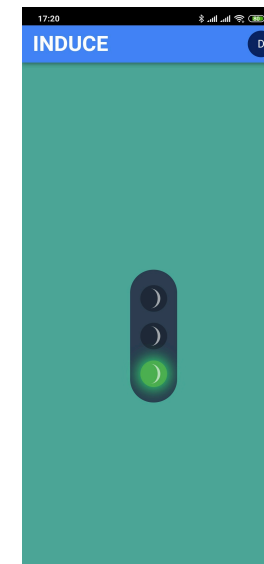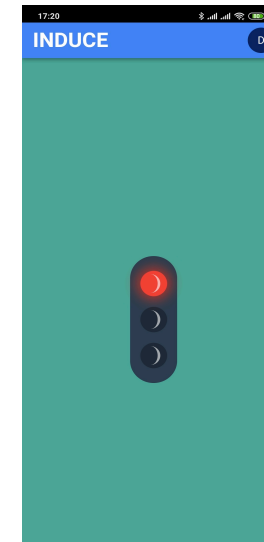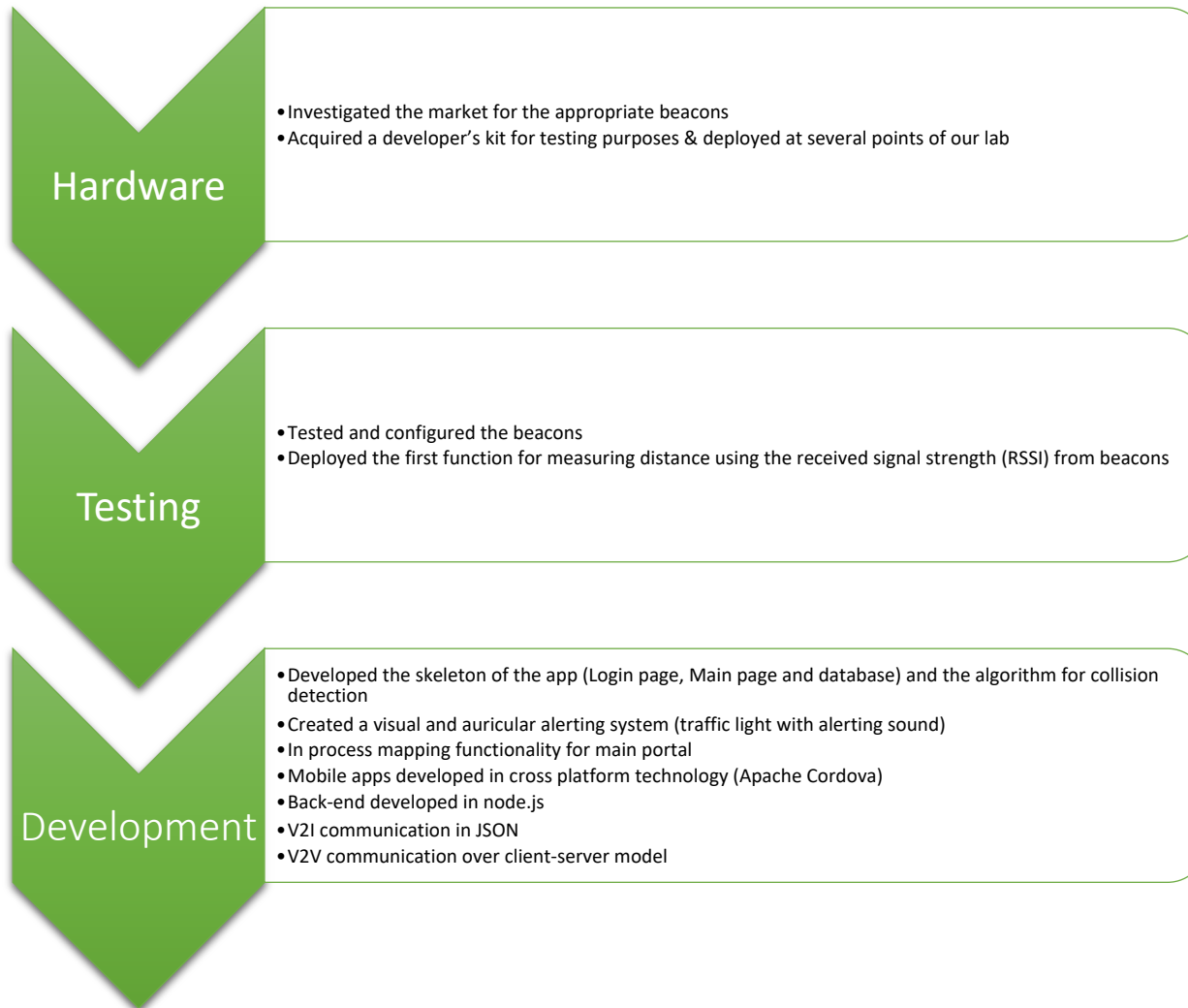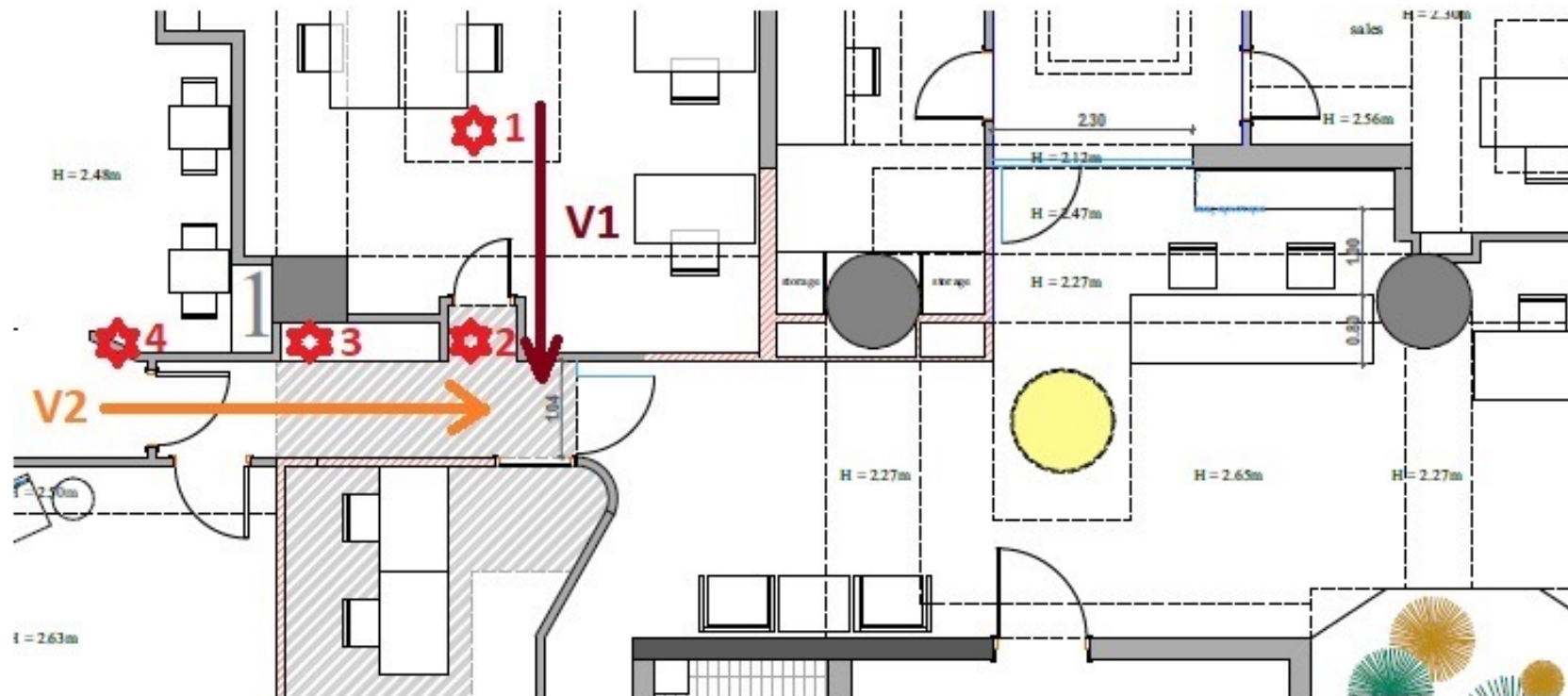
Indoor location awareness algorithm

- Our server will deploy the location fingerprint positioning algorithm.

- The algorithm is generally implemented in two phases, namely the sampling phase and the positioning phase.

- The purpose of the sampling phase is to establish a location fingerprint database, and to design a reasonable sampling distribution map according to the positioning environment. The location fingerprint database collects and records the information of all sampling points in the positioning area, and the strength of all BLE Beacon signals in the point. The position of the collection point is recorded based on the triangulation method. BLE Beacons are installed at some fixed positions to establish a coordinate system. The maximum and minimum RSSI values of each BLE Beacon are collected in an area A and stored in the database for example, BLE Beacon x, y and z, as shown in Figure 1. Then the RSSI values from various q points (reference points) are collected and stored at the database.

- In the positioning phase, the BLE Beacon signal is received by the mobile device's Bluetooth function, and then, the matching algorithm is used to search the location fingerprint database for the data matching the closest reference point and to estimate the actual location of the user according to the Weighted K-Nearest Neighbors (WKNN) positioning method.

Reference: Developing a BLE Beacon-Based Location System Using Location Fingerprint Positioning for Smart Home Power Management

NetApp Progress

Hardware
- Investigated the market for the appropriate beacons
- Acquired a developer's kit for testing purposes & deployed at several points of our lab

Testing
- Tested and configured the beacons
- Deployed the first function for measuring distance using the received signal strength (RSSI) from beacons

Development
- Developed the skeleton of the app (Login page, Main page and database) and the algorithm for collision detection
- Created a visual and auricular alerting system (traffic light with alerting sound)
- In process mapping functionality for main portal
- Mobile apps developed in cross platform technology (Apache Cordova)
- Back-end developed in node.js
- V2I communication in JSON
- V2V communication over client-server model

- 4 beacons installed at crossroad (marked with red star)
- 2 entities moving as the 2 arrows indicate
- location recorded and direction of movement identidied
- alert highlighted and notifications dispatched

iLink test lab

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