The Digital Twin of the future

For Telecom providers

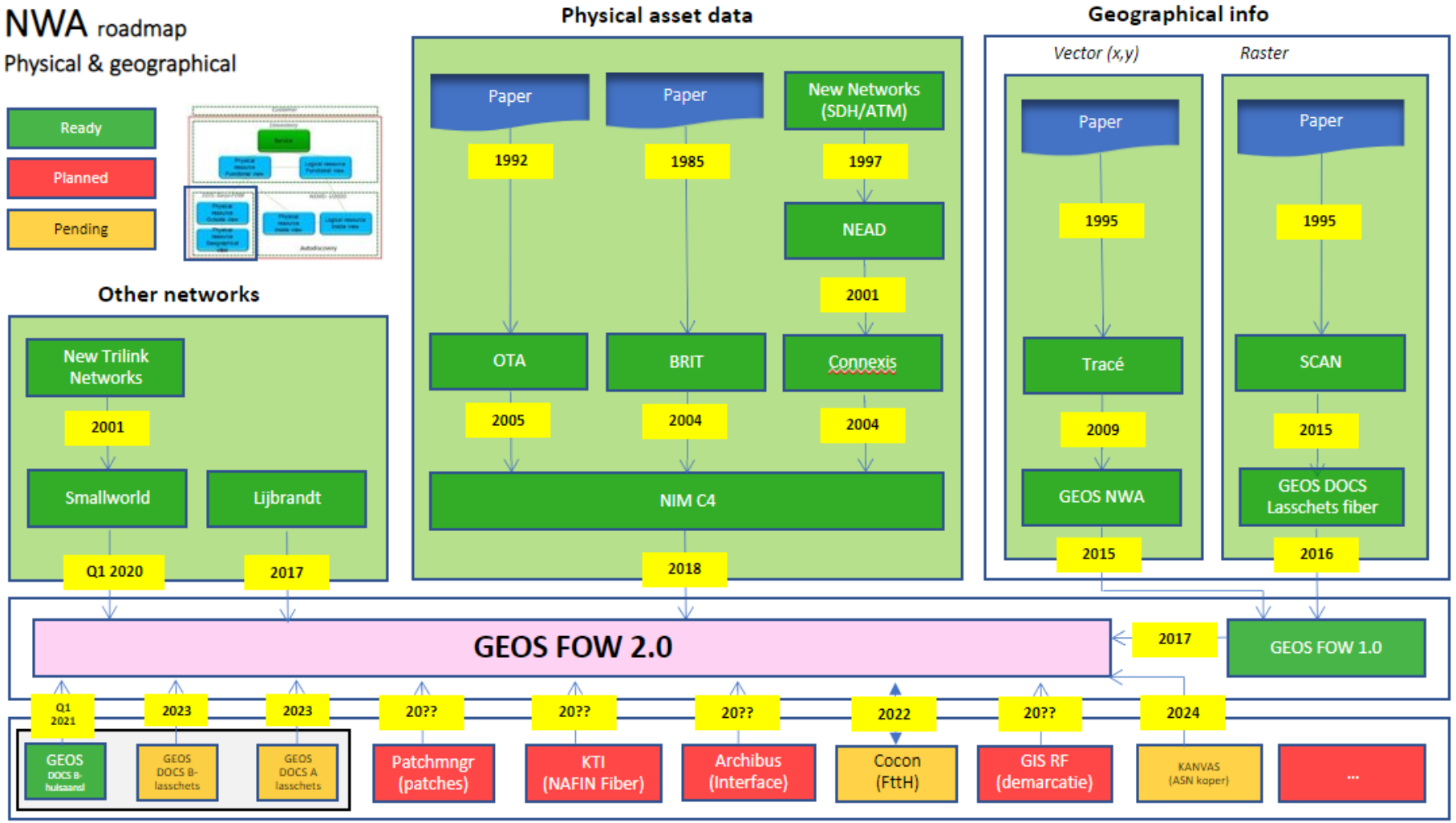
John van Luijk
IT Architect OSS GIS
KPN NW PTDC CTN Arrange
Date: October 21st
Time: 15.30h

Table of Contents

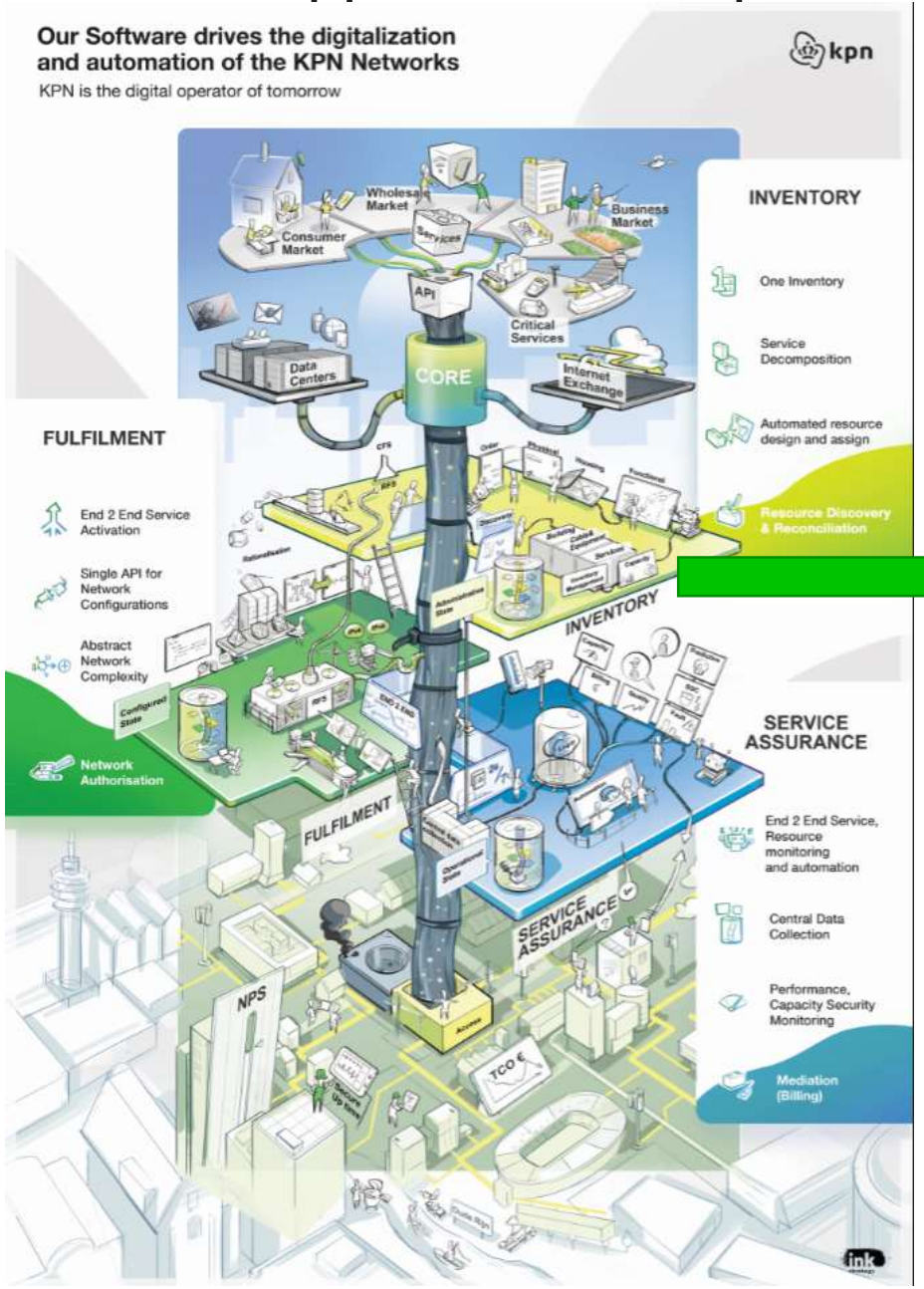
Who/what is KPN

- Incumbent Telco of the Netherlands
- Tier 1 telecom operator
- Employees: 12.248 (fte, 2019)
- Provider of nation-wide telecommunications and ICT solutions
- Provider of worldwide wholesale network services
- KPN stands for ‘Royal PTT Netherlands’

Inventory Management with and without GIS



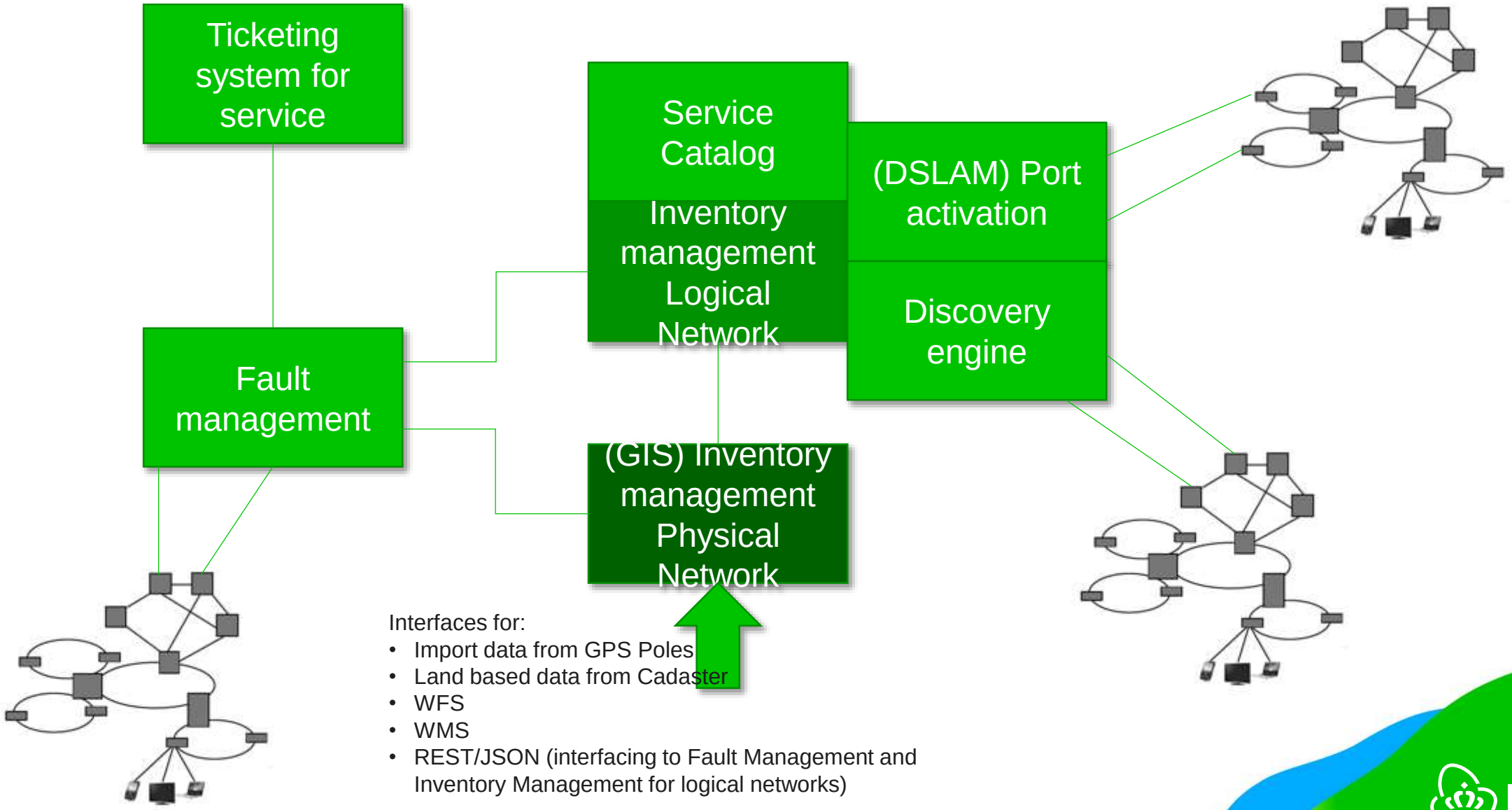
Software to support the main processes in a telco provider



Main telco processes to support with **O**perational **S**upport **S**ystems:

- Delivery management
- Service and performance management
- Capacity management

Operational Support Systems (OSS)



Interfaces for:

- Import data from GPS Poles
- Land based data from Cadaster
- WFS
- WMS
- REST/JSON (interfacing to Fault Management and Inventory Management for logical networks)

Why a digital twin for a telecommunications network

1. Rapid expansion of telecommunication infrastructure
2. Need for effective and efficient management of the infrastructure
3. Minimize downtime resulting from cable damage and equipment failure
4. Increased market competition
5. Support of main processes like service management, delivery management and capacity management

What must a GIS digital twin do

1. **Represent all network features in the form of maps or detail windows**
   - Fiber features (ducts, cables, splice enclosures, PON splitters, ODF, etc.) OSP and ISP
   - Copper features (coax, ethernet and twisted pair cable, MDF, etc.) OSP and ISP
   - Microwave paths
   - Mobile features (antenna's, towers, mobile sites, etc.)
2. **Captures all relevant data of the features**
   - If data is not used in a process, it's not relevant
3. **Fault localization**
   - To determine the location of a cable cut
4. **Required information is easy and fast accessible**
5. **Report generation**
   - Cable usage
   - Fiber/wire End to End reporting
   - Overview of port capacity in ODF
   - Etc.
6. **Standard interfaces available (WFS/WMS, REST/JSON)**
   - Interfaces for exchanging data with other (OSS) information systems

What **should** a future GIS digital twin support

Functionalit

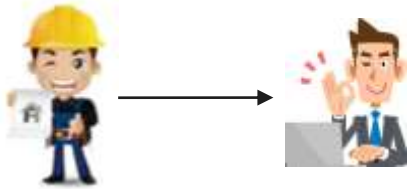
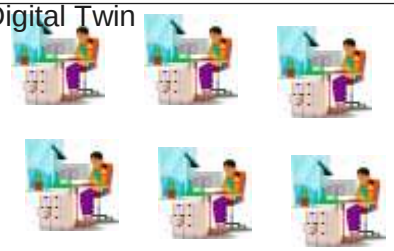
1. Import possibilities for GPS routes/points
2. Import functionality for data from third parties (CAD data, MS ACCESS, Excel, etc.)
3. Auto import of land-based data
4. Auto routing functionality over fibers
5. Auto routing functionality for new (FTTH) networks based on land-based data
6. Auto detection of data pollution
7. Auto reporting of lack of fiber capacity between two PoP's
8. 100% Web technology, accessible with WMS/WFS
9. Data available on tablet and smart phone
10. Augmented reality
12. 3D building data

Auto routing functionality for new (FTTH) networks based on land-based data

System generates automatically an FTTH network.

Place PoP (Streetcabinet)

Import data directly from GPS source

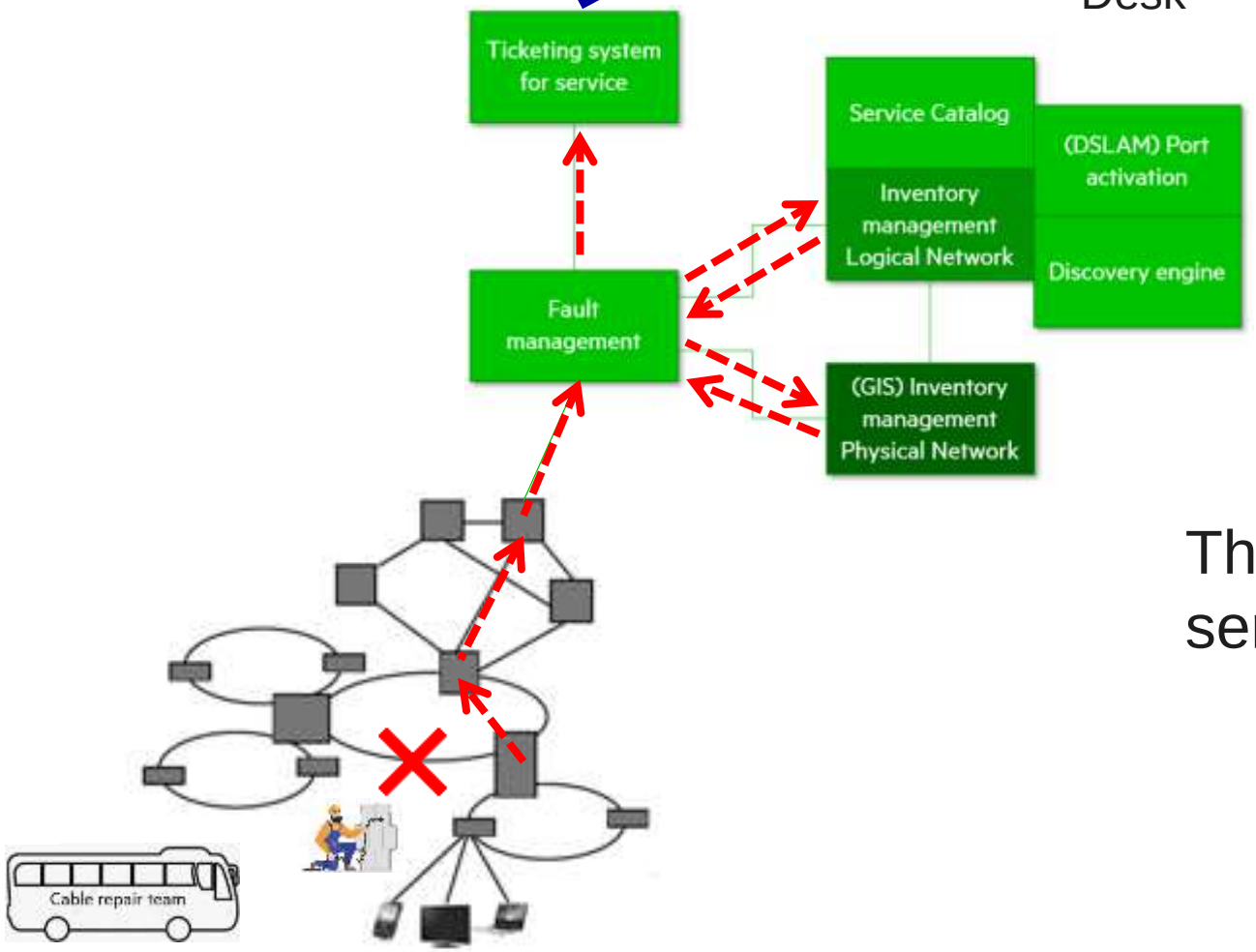
An engineer gets an assignment to put a new cable in the ground	He and his team are getting a high-level plan for the location of the new cable. They achieve to get the cable in the ground.	The engineer makes some notes where the cable is been buried. Then he sends the new drawing to the back office	The back office sends the drawing to the location where the information will be registered in the Digital Twin
			

Old way

New way

An engineer gets an assignment to put a new cable in the ground	He and his team are getting a high-level plan for the location of the new cable. They achieve to get the cable in the ground.	The engineer uses his GPS pole to measure the GPS coordinates of the cable. This data is directly loaded into the Digital Twin
		

Service Desk

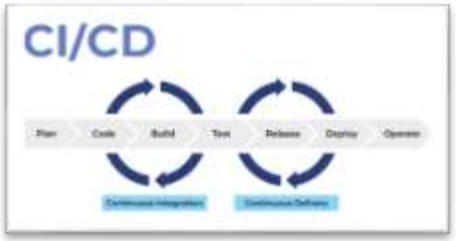


The Digital Twin robot for service

What **should** a GIS digital twin also support

Application Maintenance

1. Support for automatic (regression) testing
2. CI/CD support
3. SAAS
4. Application dashboard
5. New releases automatically upgrad
6. Extended user management
7. Optimal performance
8. Single Sign On



Conclusion

Most important for a future Digital Twin for Telco's:

1. **Reliable data**
   As less involvement of humans as possible.

2. **Automation, automation, automation**
   Automation of network design, automation of landbase data updates, automation of testing, automation of capacity reporting etc.

3. **Standardized interfaces to other OSS**
   Standard interfacing to the most used OSS in the telecom industry like Amdocs , Granite,
   ZSmart, NetCool.

This is **NOT**

The End

of this presentation but (hopefully) the start of a new generation of Digital Twin systems for Telcom Providers