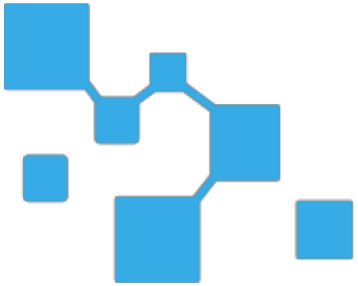


5G-VINNI

(Horizon 2020 ICT-17 project)

Vertical industry use cases and requirements in 5G-VINNI

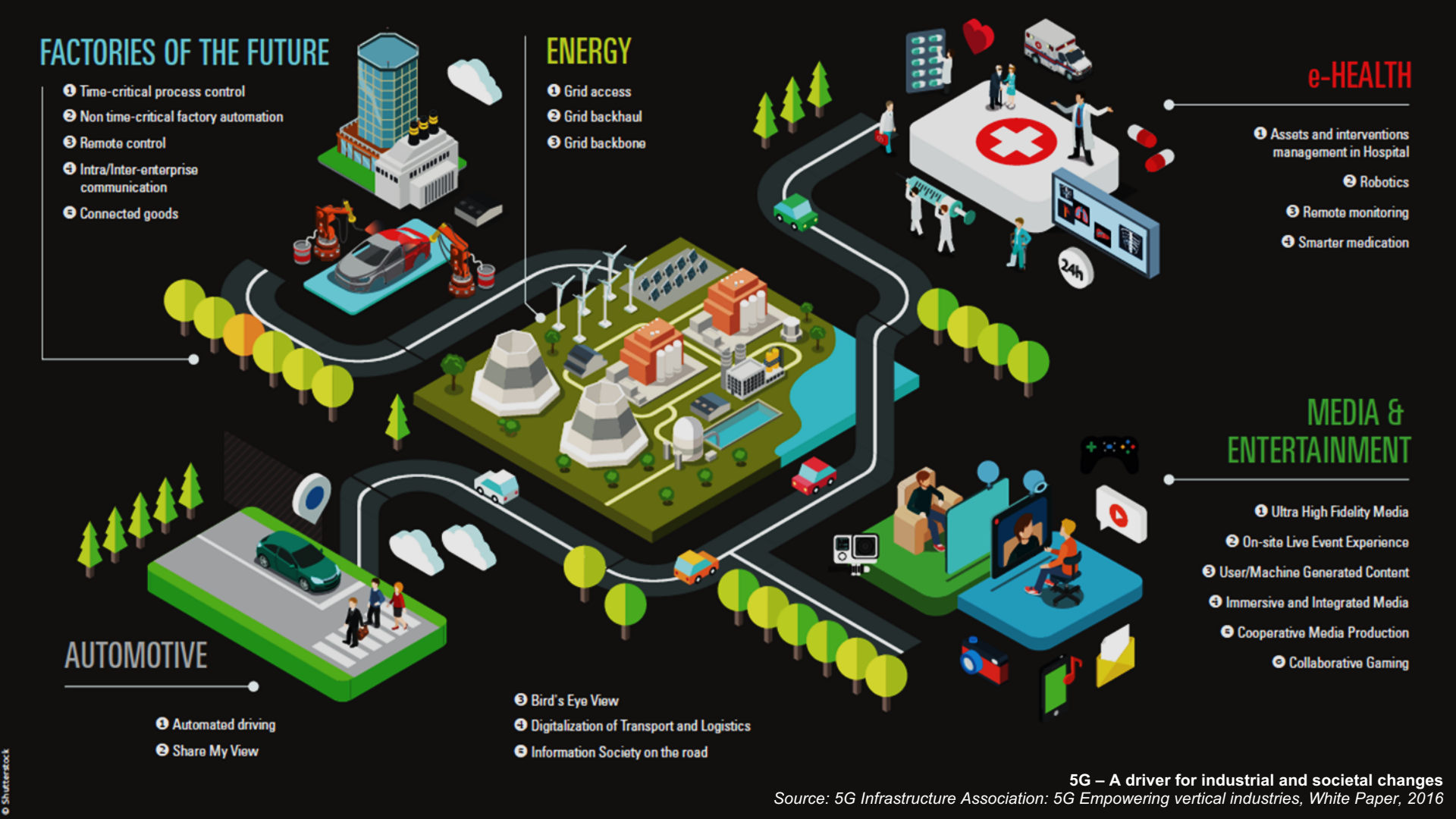
Dr. Pål Grønsund, Telenor Research

25.March 2019, 6G Wireless Summit, Levi – Lapland - Finland

5G PPP

This project has received funding from the EU's Horizon 2020 research and innovation programme under grant agreement No 815279.

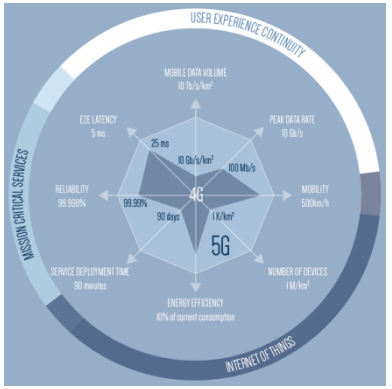
5G-VINNI



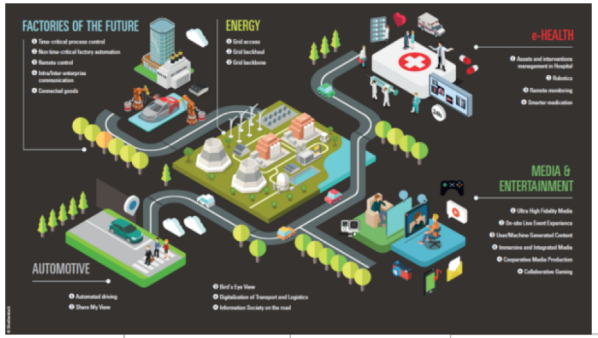
5G – A driver for industrial and societal changes

Source: 5G Infrastructure Association: 5G Empowering vertical industries, White Paper, 2016

5G-VINNI (**5G V**erticals **INN**ovation **I**nfrastructure)



- Build an open large scale 5G End-to-End facility that can
  - demonstrate that key 5G network KPIs can be met
  - be validated, accessed and used by vertical industries (e.g. in ICT-19 projects) to test use cases and validate 5G KPIs.
- Duration: 1.July 2018 – 1.July 2021
- Consortium: 23 partners (operators, vendors, academics, SMEs)
- External Stakeholder Board: Vertical industry



telenor BT SAMSUNG ERICSSON CISCO INTRACOM TELECOM KEYSIGHT TECHNOLOGIES altice labs simula uc3m Universidad Carlos III de Madrid EURESCOM

Telefónica SES NOKIA HUAWEI SRS SOFTWARE RADIO SYSTEMS Lime microsystems EANTC EUROPEAN ADVANCED NETWORKING TEST CENTER ENGINEERING Fraunhofer FOKUS

5G-VINNI

5G-VINNI Facility Sites

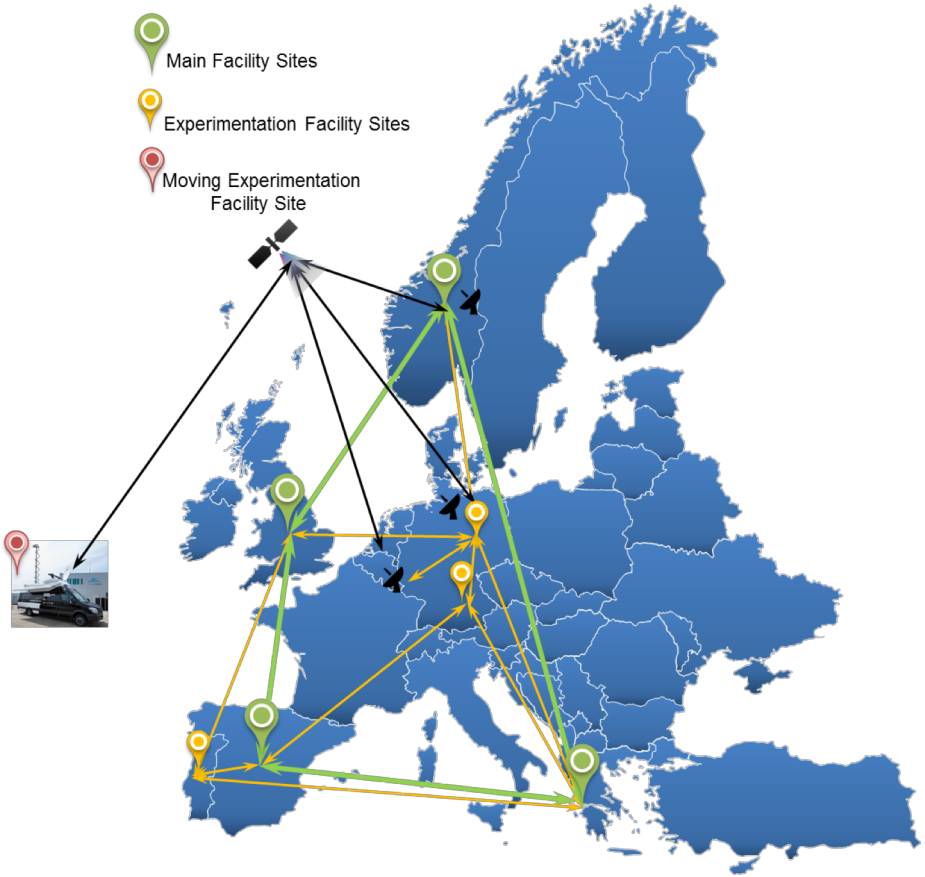
Main Facility sites: E2E 5G-VINNI facility that offers services to ICT-18-19-22 projects with well-defined Service Level Agreements.

- Norway (Oslo, Kongsberg)
- UK (Martlesham)
- Spain (Madrid)
- Greece (Patras)

Experimentation Facility sites: provide environments for advanced focused experimentation and testing possibilities on elements and combinations of elements of the E2E model.

- Portugal (Aveiro)
- Germany (Berlin)
- Germany (Munich)

Moving Experimentation Facility site: satellite connected vehicle.



Some Selected Use Cases and Requirements

Fish Farming

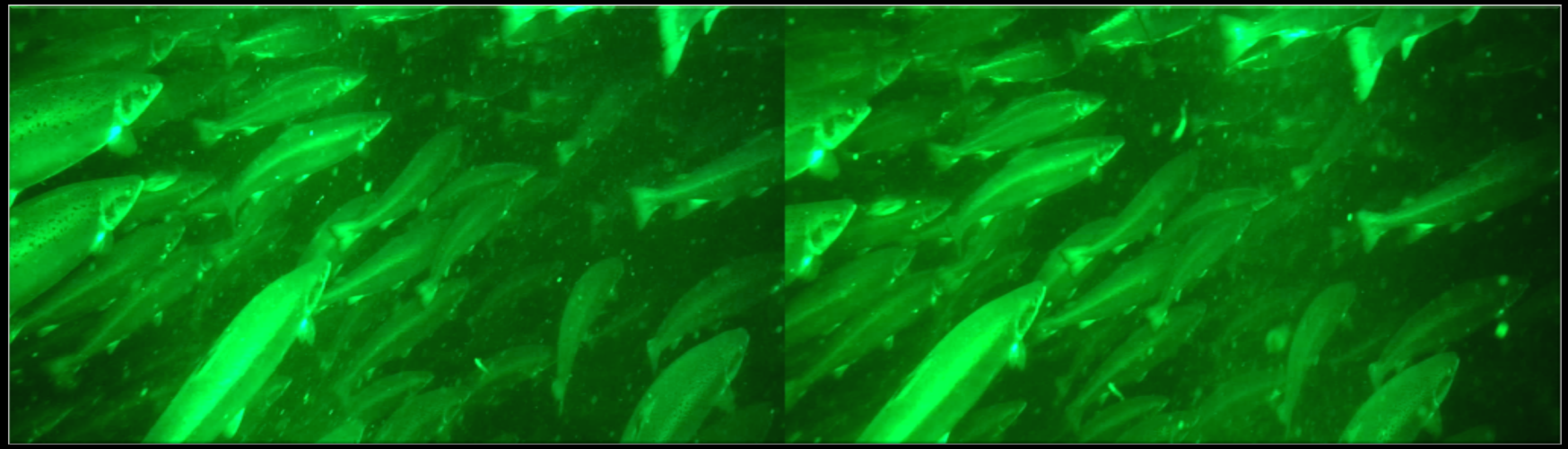
Video analytics, e.g.

- measure size of fish
- count fish population
- detect disease
- detect over-feeding
- detect break-in

Sensors

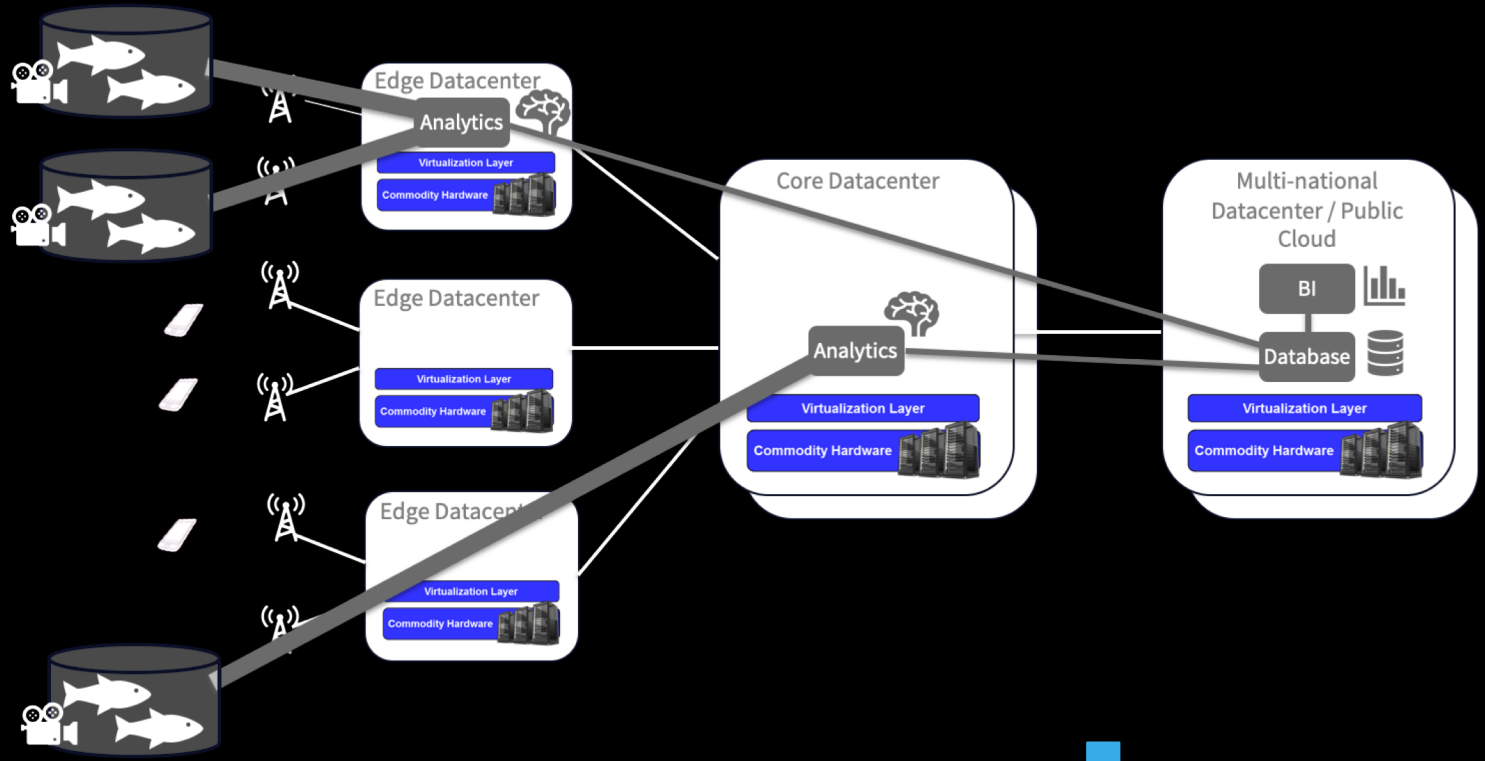
- e.g. water quality, temperature

Video Analytics for Fish Farming

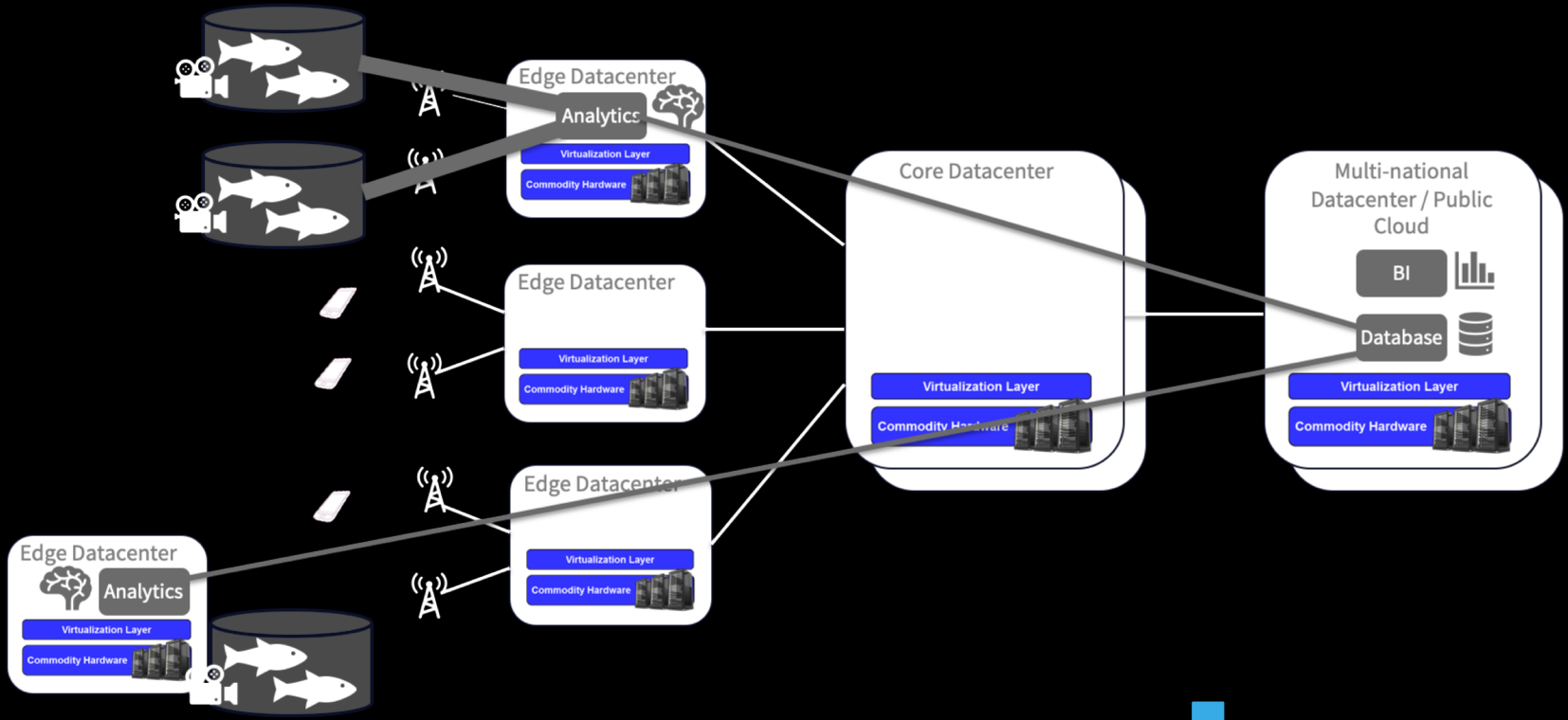


Assisted Demo (BIO3000)

Uplink capacity is the main challenge for sending video data from fish farms to centralized Analytics apps



Distributed Edge Clouds for local processing, either in the camera or in computes nodes at the fish farm



Defense will in future increasingly make use of commercial technology and commercial infrastructure

Goals for defense:

- High security
- High availability
- Required functionality

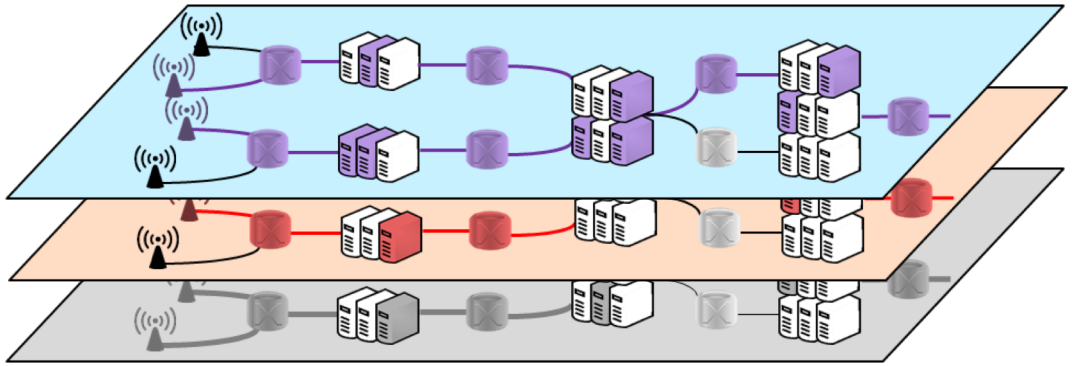
Use cases of interest:

- Autonomous edge sites
- Connectivity on demand
- Prioritization – QoS/QCI
- Radio jamming robustness
- Drone control
- Voice (secure, e2e encryption)
- Flexible backhaul (satellite)
- SON, mixing use of public and private frequencies

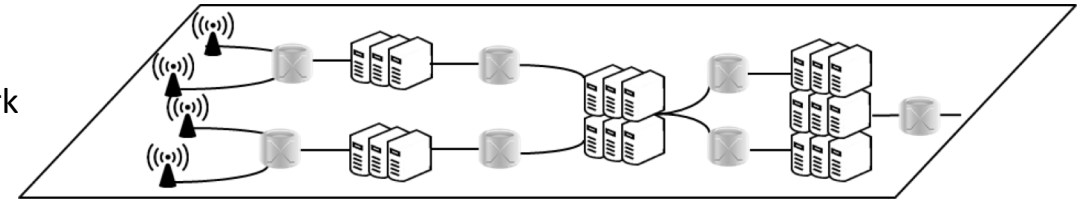
Foto: Forsvaret

Access to **Isolated Private Slice** for internal comms in addition to **Public Internet Slice** with same device

Network Slices
(logical networks)

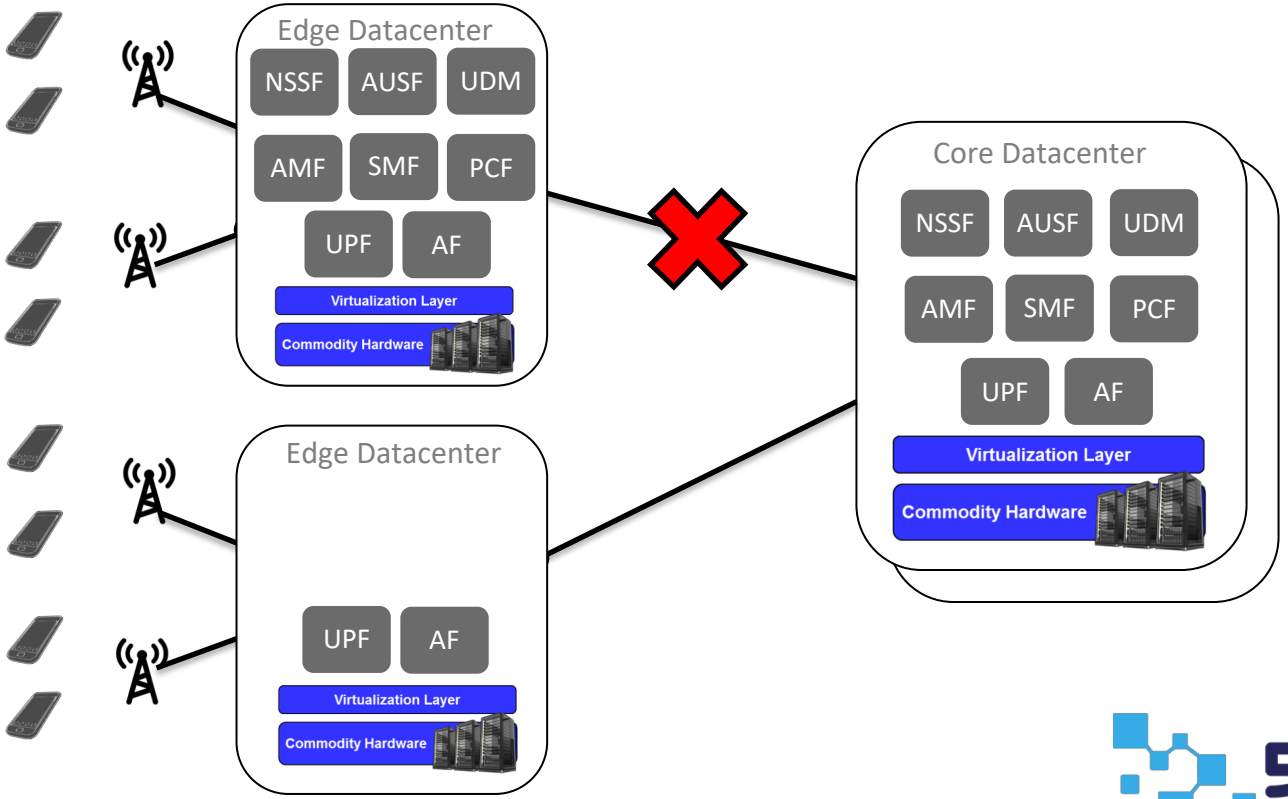


Physical 5G Network
Infrastructure



5G-VINNI

Autonomous edge sites enabling a fully operational network in a local area, e.g. in case of backhaul failure



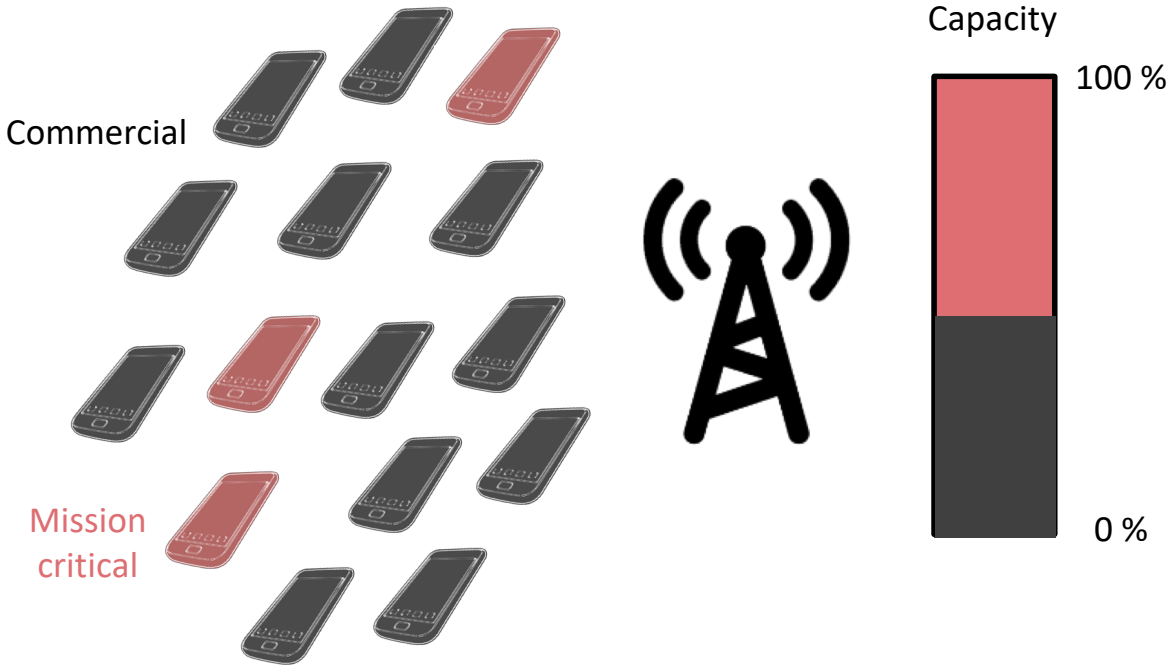
5G-VINNI

Connectivity on demand is required in cases such as disaster events (e.g. natural disaster, war)

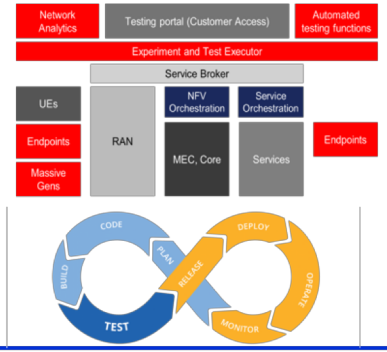
Flying Base-station
(on demand)

Driving Base-station
(on demand)

Prioritization is required if life critical services are to use the commercial networks

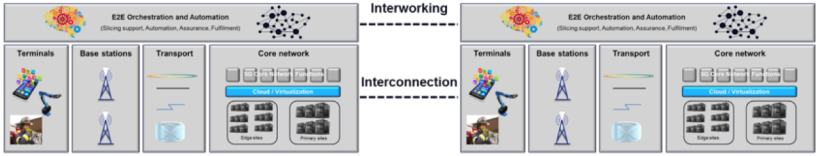


Some concepts in 5G-VINNI

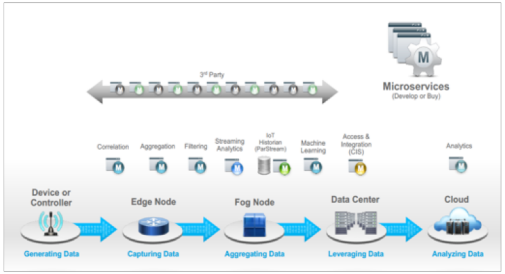


Continuous Integration, Continuous Deployment and Automated Testing.

"Certification-as-a-Service"



Interworking across operators gives the possibility to deliver services using other network infrastructures



Distributed Data Fabric Service to extract, compute and move data across the distributed network facility

Security-as-a-Service for vertical industries and Automated infrastructure security
(e.g. app security, content security, user security, behavioral analytics)

Please contact 5G-VINNI for further information, discussion and interest

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Supplementary

Key objectives of 5G-VINNI

1. Design an advanced and accessible 5G end to end facility for verticals and ICT-19.
2. Build several **interworking** sites of the 5G-VINNI end to end facility.
3. Provide user friendly **zero-touch orchestration**, operations and management systems for the 5G-VINNI facility.
4. **Validate the 5G KPIs** and support the execution of E2E trial of vertical use cases for ICT-19 projects.
5. Develop a viable **business and ecosystem model** to support the life of the 5G-VINNI facility during and beyond the span of the project for verticals and ICT-19.
6. **Demonstrate the value of 5G solutions to the 5G community**.