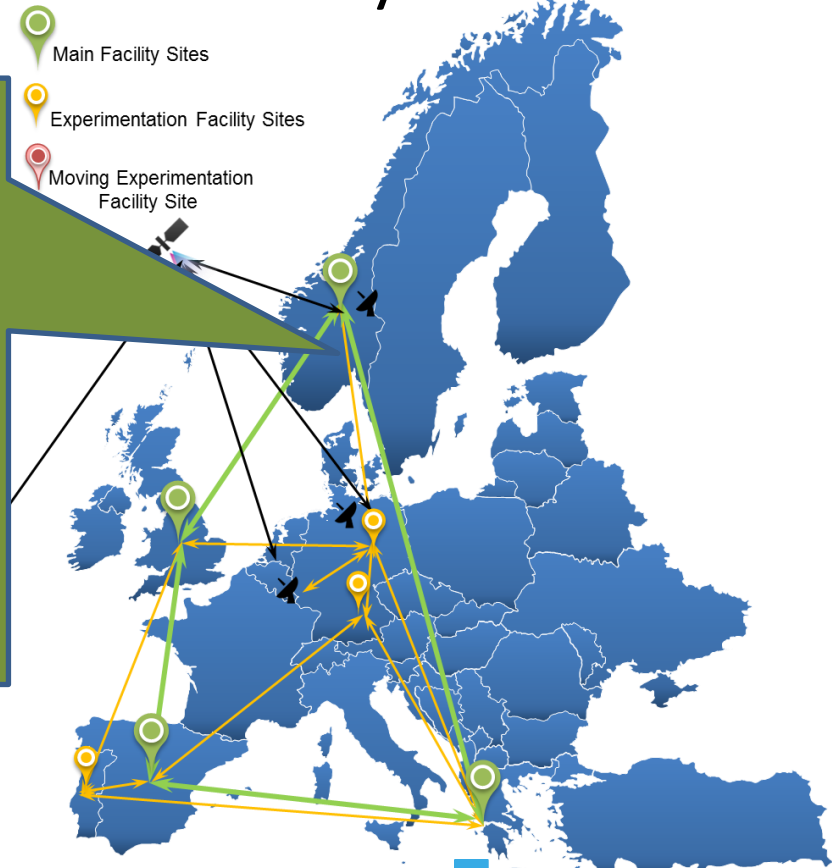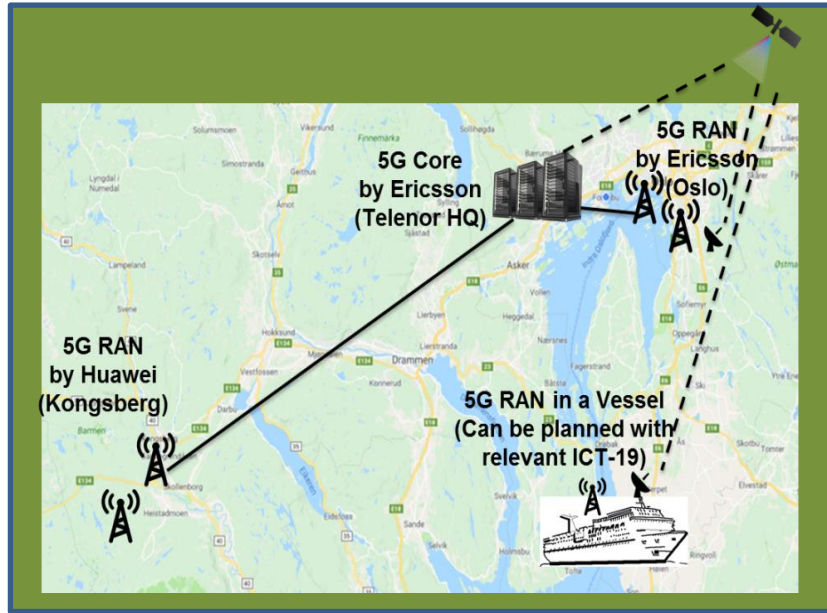# Norway Facility @5GVINNI

5G-VINNI Sites in Norway

3 sites planned so far with the possibility to be extended.

1. Kongsberg (5G Trail city in Norway)
2. Oslo Downtown
3. Oslo University Hospital (Rikshospitalet)

Target Capabilities and Services

- E2E network slicing (eMMB, URLLC, mMTC) with the option of customized network slice.
- E2E Service Orchestration by **Nokia**
- NFVI (OCP*) and MANO (Openstack) by **Nokia**
- 5G RAN (Four 5G gNBs) by **Ericsson (2)** and **Huawei (2)**
  - 3.5GHz, Up to 80MHz BW
  - 26GHz, Up to 800MHz BW
- Non Stand Alone (NSA) in 2019, Stand Alone (SA) in 2021.
- 3GPP compliance and facility update every six months.
  - Rel-15 in 2019, Rel-16 in 2021
- 5G EPC and later 5G Core by **Ericsson**
  - Network "slicing" in the NSA setup based on DÉCOR. CUPS** architecture for maximum topology flexibility.
- Next Generation Firewall as a service by **Palo Alto Networks***** with features such as Intrusion prevention, Data leakage protection, Application and protocol decoding, encrypted traffic inspection, Signaling storm mitigation
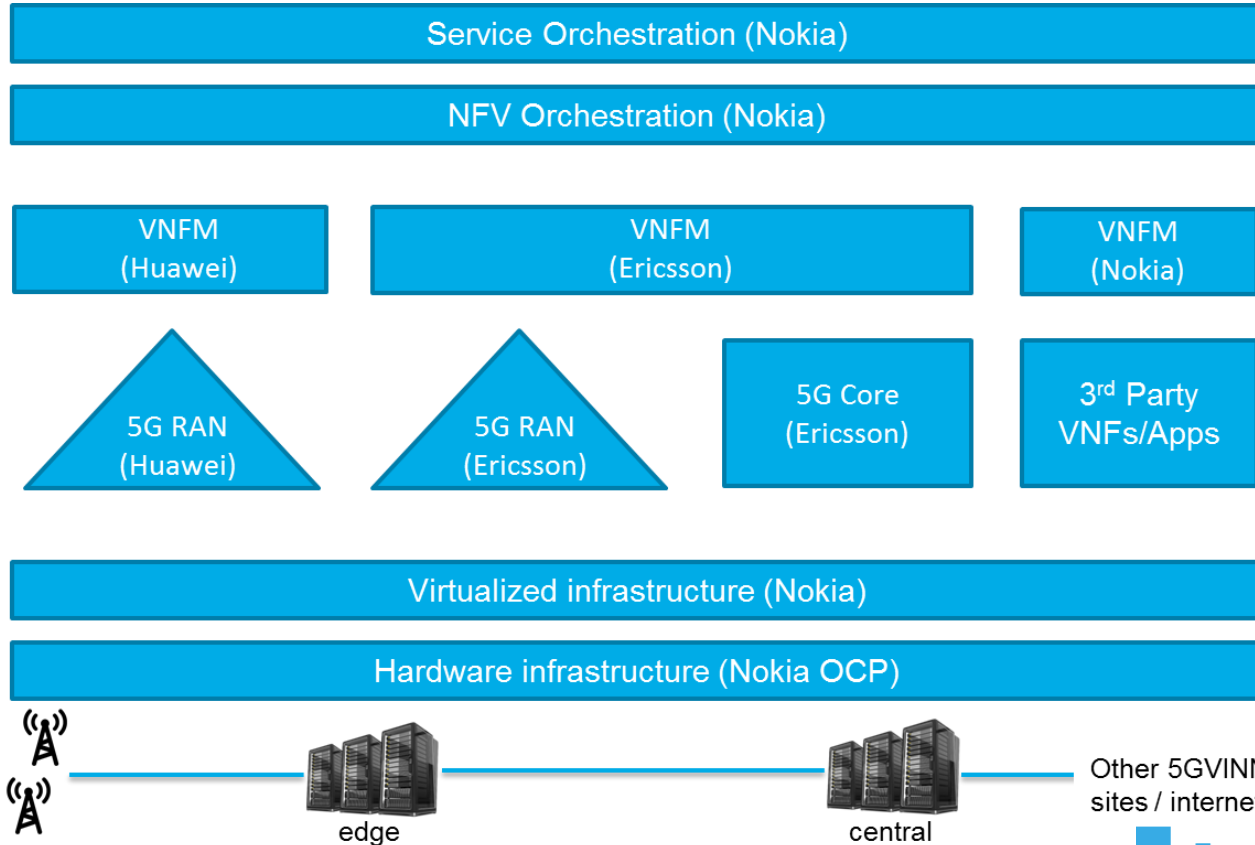
*Open Compute Project
** Control user plane separation
***Palo Alto Networks is not an official partner of 5GVINNI and provides its services as in kind contribution to Norway Facility.

Target Capabilities and Services

- Test and KPI validation framework by **Keysight**
- Low power wide area networks (NB-IoT , LTE-M) for IoT.
- Distributed Data Fabric Service as part of Slice by **CISCO**.
    - micro-services (correlation, aggregation, analytics) distributed throughout the infra.
- Satellite backhaul option by **Telenor Satellite** (Fixed and maritime mobility) and **SES** (terrestrial emergency vehicle).
- Open for integration of additional gNBs and edge sites that might come from other initiatives and projects such as ICT-19 projects.
- Interconnection between other 5G-VINNI sites using Telenor's dedicated connection (Work in progress and subject to need)

5G-VINNI

High Level Architecture

Service Orchestration (Nokia)

NFV Orchestration (Nokia)

VNFM (Huawei)

VNFM (Ericsson)

VNFM (Nokia)

5G RAN (Huawei)

5G RAN (Ericsson)

5G Core (Ericsson)

3rd Party VNFs/Apps

Virtualized infrastructure (Nokia)

Hardware infrastructure (Nokia OCP)

edge

central

Other 5GVINNI sites / internet

5G-VINNI

Potential UseCases

- Remote ultrasound

- Telemedicine using Hololens

- Media broadcast

- Fish Farming

- Transportation (automated boats, Buses)

- Smart cities

- Industry 4.0 Use cases

- Drones Related UseCases

- +++

UseCases will be planned after discussion with ICT-19 and other relevant verticals

5G-VINNI

Please contact 5G-VINNI-Norwegian Facility for further information and discussion

- Web page: http://www.5g-vinni.eu/norway-main-facility-site/
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