OBJECTIVES OF 5G-VINNI

Design an advanced and accessible 5G end to end facility.

Build several **interworking** sites of the 5G-VINNI end to end facility.

Provide user friendly **zero-touch orchestration**, operations and management systems for the 5G-VINNI facility.

Validate the 5G KPIs and support the execution of E2E trial of vertical use cases to prove the 5G-VINNI capabilities.

Develop a viable **business and ecosystem model** to support the life of the 5G-VINNI facility during and beyond the span of the project.

Demonstrate the value of 5G solutions to the 5G community particularly to relevant standards and open source communities with a view to securing widespread adoption of these solutions.

5G-VINNI FACILITY SITES

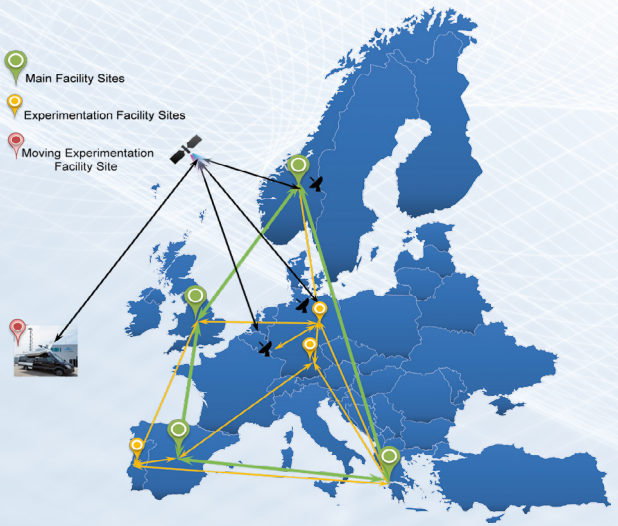
Main sites: E2E 5G-VINNI facility that offers services with well-defined Service Level Agreements.

Norway (Oslo, Kongsberg), UK (Martlesham), Spain (Leganés), Greece (Patras)

Experimentation sites: provide environments for advanced focused experimentation and testing.

Portugal (Aveiro), Germany (Berlin), Germany (Munich)

Moving Experimentation site: Satellite connected vehicle.



CAPABILITIES AND SERVICES

Capabilities

- 5G NR RAN in 26GHz, 3.5GHz and other bands
- 5G Core
  - NSA in 2019, SA in 2021
  - Rel'15 in 2019, SA in 2021
- Slice types supported;
  - eMBB
  - URLLC
  - mMTC (NB-IOT and LTE-M)
- End-to-end Service Orchestration
- Network Function Virtualization (NFV)
- Multi-Access Edge Computing (MEC)
- Satellite backhaul options
- Interconnection and interworking among main facility sites

Services

- Device Connection (eMBB, mMTC)
- Network Slice as a Service (eMBB, URLLC, mMTC)
- Customized Network Slice
- Hosting of third party VNF in Slice
- Distributed IoT Data Fabric Service in Slice
- Integration of new non-5G-VINNI gNB
- Integration of new non-5G-VINNI MEC node
- Interworking with non-5G-VINNI facility sites
- Testing services (KPIs)

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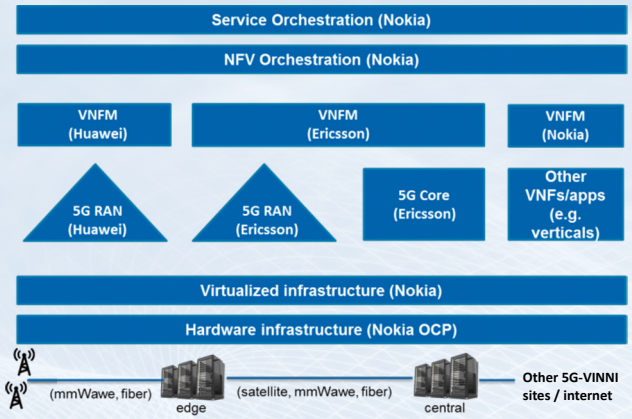
5G-VINNI

5G VERTICALS INNOVATION INFRASTRUCTURE

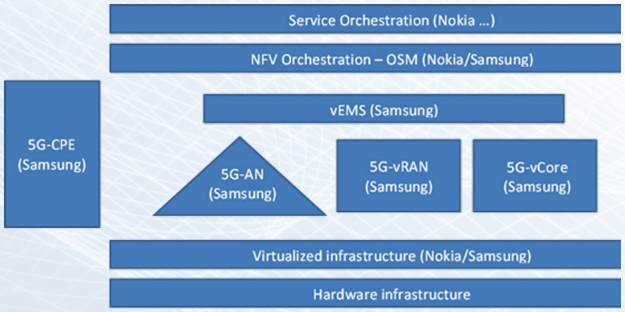
www.5g-vinni.eu

NORWAY (OSLO, KONGSBERG) provided by Telenor



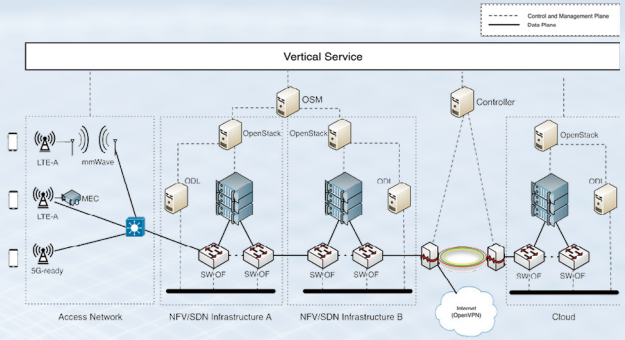
- Slicing (eMMB, URLLC, mMTC)
- E2E Service Orchestration (Nokia)
- NFVI (OpenStack), MANO (Nokia), Edge Cloud (Nokia)
- Four 5G gNBs (Ericsson, Huawei):
  3.5 GHz (90 MHz BW), 26 GHz (800 MHz BW)
- 5G Core (Ericsson)
- Satellite backhaul option (GEO, Telenor)
- 3GPP compliance Rel15 in 2019, Rel16 in 2021
  NSA in 2019, SA in 2020

UK (MARTLESHAM) provided by BT



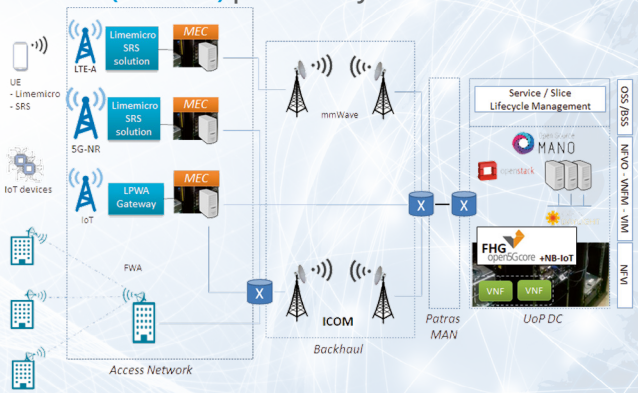
- Slicing (eMMB, URLLC, mMTC)
- Service Orchestration (Nokia)
- NFV MANO, NFVI and vEMS (Samsung)
- 5G RAN incl. 3.5 GHz and 26 GHz (Samsung)
- 5G Core (Samsung)
- 3GPP compliance Rel15 in 2019, Rel16 in 2021
  NSA in 2019, SA in 2020

SPAIN (LEGANÉS) provided by Telefonica



- Slicing (eMMB, URLLC, mMTC)
- Service Orchestration (OSM NBI)
- MANO (OSM), NFVI (OpenStack) and SDN (ODL/ONOS)
- Support for micro-VNFs
- 5G RAN (Ericsson + SDR), 3.5 GHz, band C
- Model-based telemetry for monitoring and analytics
- Edge computing
- 5G Core (Ericsson)
- GÉANT connectivity

GREECE (PATRAS) provided by Univ. of Patras



- Slicing (eMMB, URLLC, mMTC via OSM)
- Service Orchestration (via OSM NBI services)
- NFV MANO (OSM) and NFVI (OpenStack) + DPDK
- 5G RAN open source radio (Lime, SRS)
  700-800 MHz, 3.5 - 3.8 GHz
- 5G Core (Open5GCore)
- NB-IoT, LTE-M (Fraunhofer NB-IoT core)
- mmWave backhaul (Intracom)
- GÉANT connectivity

PORTUGAL (AVEIRO) provided by AlticeLabs

- NG-PON2-based 5G front/backhaul (AlticeLabs)
- MANO (SONATA), NFVI (OpenStack), SDN (ODL)
- 5G Core (Open5GCore)
- Cloud RAN
- Edge Computing
- Slicing (eMMB, URLLC, mMTC)

GERMANY (BERLIN) provided by Fraunhofer FOKUS

- 5G RAN prototype(s)
- 5G Core (Open5GCore)
- Edge cloud/e2e Orchestration (OpenBaton, OSM)
- mmWave backhaul
- Interconnection with remote islands in Betzdorf and Tokyo
- Large scale events, Nomadic networks, Disaster Relief

GERMANY (MUNICH) provided by Huawei Germany

- 5G NR SA RAN (Huawei) 3.5 GHz
- 5G Core (Huawei)
- MANO and NFVI (Huawei)
- SDN (Floodlight)
- V2I, V2P
- MEC, Edge Computing
- URLLC targeting Rel16/17
- Sensor fusion enabled by 5G

SATELLITE CONNECTED VEHICLE provided by SES

- 5G Edge Node on-board satellite-connected moving van
- GEO/MEO satellite backhauling
- 5G Core (Open5GCore)
- NFVI (OpenStack), MANO (OSM)
- Edge Computing
- Network Slicing (eMBB, mMTC)
- Interconnection with Berlin site