SNS JU Brokerage Presentation – Aalto University

Udayanto Dwi Atmojo, PhD – Staff Scientist / R&D Project Manager at Aalto University, Finland
(Udayanto.Atmojo@aalto.fi)

Aalto University

Aalto University is a public research university located in *Espoo*, in the Helsinki metropolitan area, Finland.

Established in 2010 as a merger of three major Finnish universities: the Helsinki University of Technology, the Helsinki School of Economics and the University of Art and Design Helsinki.

The close collaboration between the scientific, business and arts communities is intended to foster multi-disciplinary education and research.

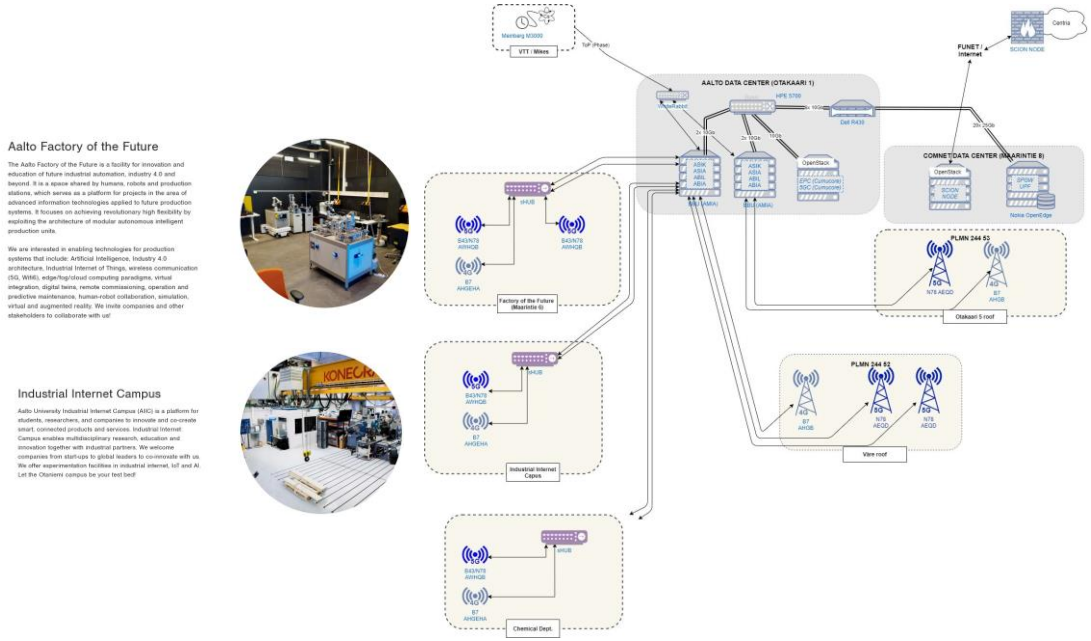
Aalto University - test network for 5G and beyond

Aalto University has a test network which has been evolving to include new capabilities and prototype services based on ongoing projects and the 3GPP standardization development

The test network allows connectivity for OUTDOOR AND INDOOR use cases or demonstrations

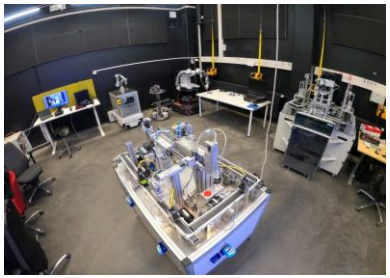
The test network Indoor deployment covers industrial test facilities, outdoor covers our campus area

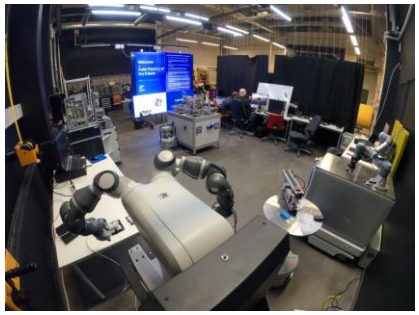
- **Nokia donated** 2x NR Radio heads to cover main road in the campus for several research projects
- Own license 3.5GHz (3640-3700 MHz with 60Mhz bandwidth
- Several 5Gs core (Cumucore now, Nokia 2H) both NSA and SA, own SIM with PLMN 50-59

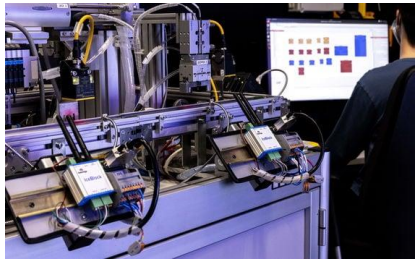


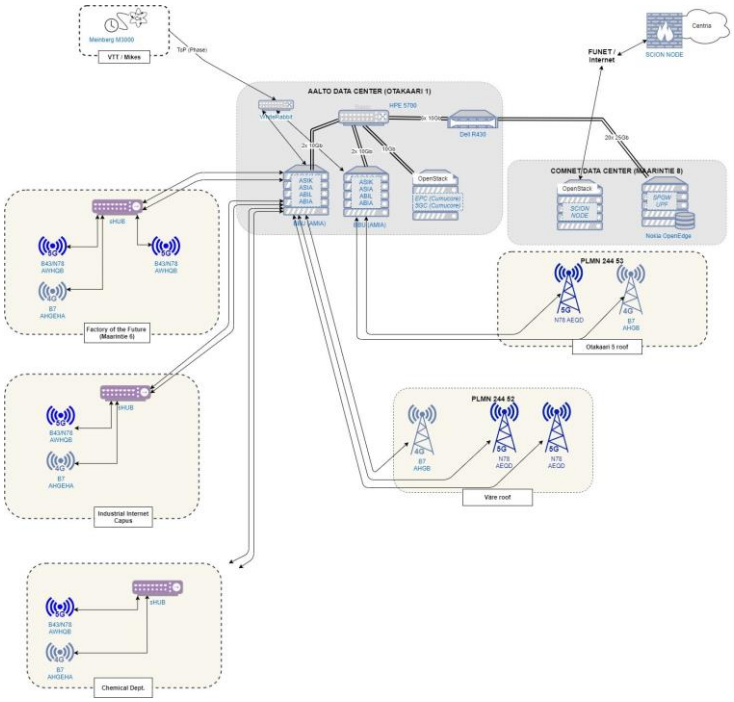
Innovative Projects on connectivity and demonstration in various industry verticals

Test network provisioning Indoor coverage - Aalto Factory of the Future









Industrial test facility with comprehensive IT & OT systems resembling real industrial systems connected to physical industrial equipments

- Cloud and edge computing infrastructure

- ABB Yumi collaborative robot

- Autonomous guided vehicle/AGVs

- Assembly systems with complete automation system and industrial PLCs – IEC 61499 distributed automation international standard

- Machine vision, immersive AR & VR systems

Aalto Factory of the Future -
https://www.aalto.fi/en/futurefactory

(Non - exhaustive) relevant topics, angles, ideas of contributions in SNS JU proposals

- Energy optimization of distributed edge : improve and find out the best intelligent approach to optimize energy consumption and management of assets enabling 5g/6g services (edge compute infrastructure, connectivity), how they can be operated to align with electrical grid stability circumstances in the energy market landscape.
- Guaranteeing trustworthy and Reliable AI through formal approach: We are approaching this problem based on our expertise in working in projects on highly safety critical system to assure the trustworthiness of the system. similar approaches will be investigated here to guarantee the trustworthiness & reliability of AI used to enable 5g/6g services
- AI for zero-touch system (network-vertical application) management : New functions or services, APIs which can verticals and network op to align and manage both the network and also (vertical) application layer, rather than siloed management of each layer, e.g., the application level system can adapt when the network is dropping in quality of service (like relaxing the cycle time of physical process and thus the communication with the other parties), or the network can prioritize certain packets to be served when the application level system demands it).
- AI to optimize network operation in light of demand-side energy management → energy management that aligns with the real electricity/energy market.
  - Equipments can consume more energy when the energy grid supply exceeds demand (compensated by the grid operator).
  - MNO/base station operator gets paid by the grid operator for using more energy, boost the network's quality of service in certain time for customers → premium connectivity service (prediction on when this could happen)
- Enabling Self-updating or self -learning Digital twin : Responsible DTOps (digital twin OPS) framework for self-update of digital twin models to sync with the real assets in the real world.
- Cybersecurity : adaptive security access control, security rule assessment, anomaly detection, provenance and integrity assurance based on DLT (or "blockchain") , formal methods, online monitors, …
- Sustainability – Frameworks and enablers for trusted digital passport for 5g/6g services, telecom data space – evidence of sustainability
- Large-scale trials : system integration & test facility involving intelligent automation (manufacturing, indoor farming, intelligent buildings, smart port/maritime logistics , …), human factors in industrial systems and environments, …

(Non - exhaustive) relevant calls in SNS JU

HORIZON-JU-SNS-2024-STREAM-B-01-04

HORIZON-JU-SNS-2024-STREAM-B-01-05

HORIZON-JU-SNS-2024-STREAM-B-01-06

HORIZON-JU-SNS-2024-STREAM-B-01-07

HORIZON-JU-SNS-2024-STREAM-B-01-08

HORIZON-JU-SNS-2024-STREAM-C-01-01

HORIZON-JU-SNS-2024-STREAM-D-01-01

HORIZON-ER-JU-2024-FA2-SNS: EU-RAIL – SNS SYNERGY

Note : if you see other calls where our contributions could fit, don't hesitate to reach!

Let’s discuss if we can work together

Contact us:

Udayanto Dwi Atmojo

Staff Scientist

udayanto.atmojo(at)aalto.fi

Valeriy Vyatkin

Professor, IEEE Fellow

valeriy.vyatkin(at)aalto.fi