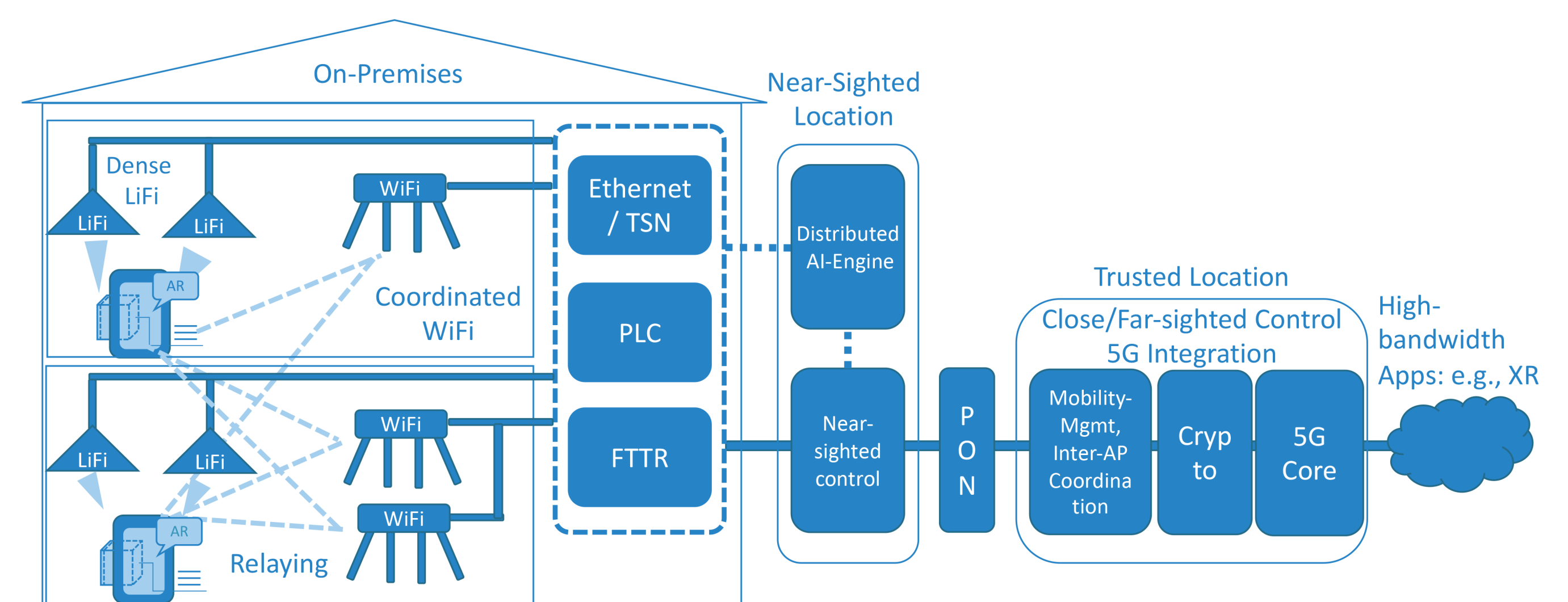


5G-COMPASS

Convergent Open Mobile and secure Provider-ASSisted 5G indoor and hotspot network

5G-COMPASS is developing a heterogeneous indoor radio access network (i-RAN), based on cost-effective, newly and further developed LAN and WLAN components, which integrates into the 5G core network in the same way as the conventional 5G RAN. Other goals are open interfaces and AI/ML control for high quality of service in the industrial internet of things (IIoT).

Today, more than 80% of wireless data is generated or consumed in buildings, with increasing tendency. For the IIoT, higher quality of service is required. 5G is mainly designed for outdoor use and is unrivalled there. Solutions in buildings require additional 5G infrastructure, which is very expensive.



5G-COMPASS addresses these challenges by

- developing Fibre-to-the-Room (FttR) and light fidelity (LiFi), Powerline Communication (PLC) and WLAN further, to meet higher requirements in terms of data rate, reliability, energy efficiency, latency and user-friendliness.
- aiming at a disaggregated architecture (Open RAN) with open interfaces and advanced control, use the available network resources efficiently and ensure a higher quality of service.
- targeting seamless roaming between technologies in- and outside buildings.
- creating a functioning innovation ecosystem for in-building networks, contributing to standardisation, driving implementation forward and testing the technology in various scenarios.

Project information

- 15 partners, coordinated by Fraunhofer Heinrich Hertz Institute
- InnoNT (innovative net technologies) program by the Federal Ministry for Digital and Transport (BMDV)
- Project volume 13.8 Mio.€; project duration Feb. 2023 – Dec. 2024



5G-COMPASS is addressing different topics of building networks:

- **System Concept, Architecture, Interfaces and Standardisation** aims to develop a system concept for a variety of in-building networks:
 - Analysing applications in medical, industrial, office and home scenarios
 - Development of reference architectures
 - Interfacing to international standardization bodies (ITU, Homegrid Forum, Broadband Forum, IEEE 802, Wi-Fi Alliance, IGNB, 3GPP)
- **Transmission and Physical Layer (PHY)** develops technology components for FttR, WLAN and LAN:
 - Coordinated WLAN or LiFi, with several Gbits/s per device with novel optical frontends for optical wireless communication (LiFi)
 - Development of a 50 Gbit/s fibre optic PON with respect to complexity, costs and feasibility
 - Investigate the potential of PLC for coordinated transmission at access points
- **Media Access (MAC)** develops protocols and algorithms for coordinated multiple access in WLAN and LiFi over PON and PLC:
 - Coexistence between WLAN and LiFi access points enabling resilience and dynamic handover in mobile scenarios
 - Coordination of multiple access by sharing information between different network nodes
- **Security and Network Management** works on securely integrating the 5G core network and end-to-end applications:
 - Investigation of post-quantum-safe approaches for connectivity
 - Support of real-time applications through time synchronisation across local network boundaries
 - Introduction of robust mechanisms for end-to-end delivery over multiple alternative paths
- **Demonstration** provides four test fields in industrial, medical care, office and home networking domains to implement and test the developed features.

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