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Fraunhofer Institute for Open Communication Systems FOKUS

Business Unit Software-based Networks

Beyond 5G: On the way to organic 6G networks

"Organic Networks": For every situation the appropriate communication network

With a view to the 5G evolution towards 6G, we are working on flexible, highly reliable software-based communication platforms for the realization, for example, campus networks for industry and nomadic networks for disaster services and large-scale events.

Prof. Dr. Thomas Magedanz, Director Business Unit Software-based Networks

5G is not just a new mobile communications standard. For the first time, the core network here is virtual, i.e., software-based. The control programs for communication, such as authentication and connection control of devices and services, run in the core network. Whether streaming video on the move, controlling factory robots or coordinating rescue forces during a forest fire, virtualization allows a demand-specific communications network that can be put together like a construction kit depending on latency requirements, the number of devices to be connected, and the security level.

Dr.-Eng. Marius Corici, Deputy Director Business Unit Software-based Networks

Software-based core network: Open5GCore

The Open5GCore represents a vendor-independent software-based core network and is already available in around 95 test environments at well-known network operators, manufacturers, companies, and research institutions worldwide. With its 5G standalone operation, the Open5GCore can exploit the full 5G potential and thus provide the necessary flexibility for campus networks and offer the evolution towards 6G. It is therefore also ideal for on-site test environments.

Offer

— Contract research for the industry for manufacturers, operators, equipment suppliers, and verticals in the fields of:
  – 5G campus networks
  – nomadic 5G networks
  – 6G evolution
— Development of standards-based tools:
  – 5G core network
  – automated and intelligent network management
— setup and operation of 5G testbeds worldwide

Temporary 5G networks

Whether it's a disaster operation, sporting event, or festival: With 5G, temporary networks can be set up to connect many devices and/ or provide high bandwidth for video transmissions.
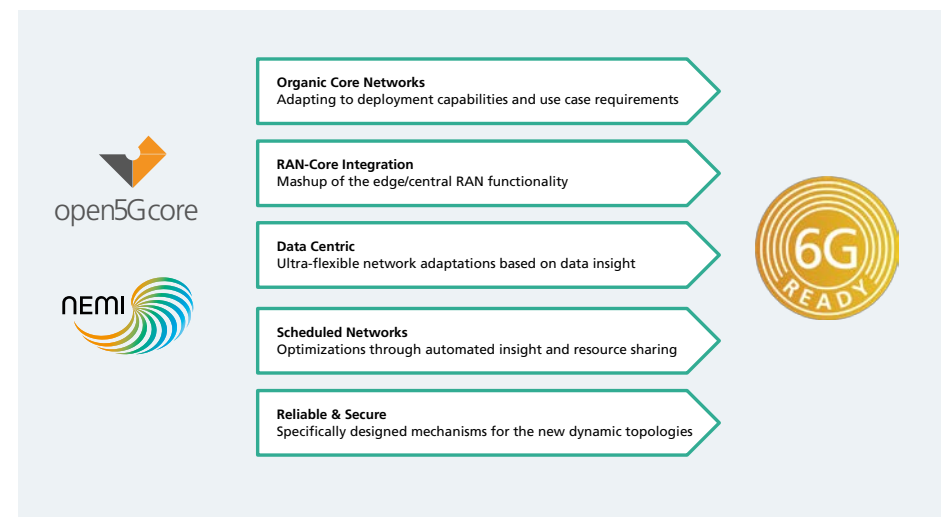
Nomadic networks

The Open5GCore is also predestined for portable, temporary – nomadic – networks, for example, for festivals or in the event of a disaster, whereby satellite networks ("non-terrestrial networks") are particularly suitable for flexible connectivity in this case. An initial field test took place, for example, at the Festival of Lights 2019 in Berlin. In the ALADIN project, the Open5GCore is being used to set up a nomadic network in Brandenburg to fight forest fires.

On the way to 6G

With a view to the development towards 6G and associated new topics such as edge computing, satellite networks, Open-RAN management, RAN core convergence, ultra-adaptable core networks, and secure and reliable distributed networks, we are working on the further development of our tools. For example, a test environment for data-oriented projects in the NEMI project combines artificial intelligence and edge computing with a fit communication infrastructure. We are participating in large national research projects such as 6G hubs and the Fraunhofer lighthouse project SENTINEL.

5G Playground

The Open5GCore software forms the basis for the test environment "5G-Playground" of Fraunhofer FOKUS, in which various terminals and access network technologies for different application areas with regard to interoperability and performance are evaluated. The comprehensive end-to-end test environment is used, for example, in national and European research projects and by the European Space Agency (ESA). Fraunhofer FOKUS uses the 5G playground in the institutes building to develop and test applications before they are deployed at the customer site.

Campus networks as drivers of innovation

Germany was the first country to make frequencies in the range of 3.7 GHz to 3.8 GHz available for local applications through the Federal Network Agency, thus paving the way for a fast, secure and cost-effective deployment of 5G networks on factory premises, so-called campus networks. The Open5GCore can also be used for building and testing campus networks. The software-based implementation allows network functions to be combined dynamically to form an individual, virtual campus network.

Technologies that are being further developed by Fraunhofer FOKUS towards 6G

Organic Core Networks
Adapting to deployment capabilities and use case requirements

RAN-Core Integration
Mashup of the edge/central RAN functionality

Data Centric
Ultra-flexible network adaptations based on data insight

Scheduled Networks
Optimizations through automated insight and resource sharing

Reliable & Secure
Specifically designed mechanisms for the new dynamic topologies

New!
FOKUS-APP

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