

5G Access Gateway Function for wireless-wireline convergence networks and high-tech

Providing AAA subscriber services, plus traffic shaping and policing for fixed network and 5G residential gateways

Client: World's leading provider of cloud-native/agnostic software products for fixed, mobile and unified communications services

Industry: Telecommunications

Project Type: 5G networks

Overview

1 Challenge:

Our client is a cloud-native pioneer in telecom and network software. They partnered with one of the largest service providers in Europe to trial Wireless Wireline Convergence (WWC) architecture. Subsequently, the client engaged DXC Luxoft to develop a 5G Access Gateway Function (AGF) solution component to provide AAA subscriber services, plus traffic shaping and policing for fixed network and 5G residential gateways.

2 Solution:

We built the component from scratch as a true cloud-native solution, using microservices methodologies and an entirely containerized deployment. Our expert team covered the whole development cycle, from project planning and solution architecture, through development and testing to deployment and validation. We created the required cloud infrastructure and CI/CD pipelines, as well as cloud-based simulations for solution testing.

3 Result:

Our team helped achieve a successful trial for the **world's first implementation** of the 5G WWC AGF standard. This included the demonstration of a seamless integration of fixed and 5G core services that helped simplify service provider offerings. Another important achievement was a reduction in the overall complexity of subscriber and service management, and the promotion of always-on services through converged connectivity.

Challenge

Authentication. Authorization. Accounting.

Our client is one of the cloud-native pioneers in the telecom and network software space. The company is the leading supplier of mobile, fixed and unified communications solutions for service providers, equipment manufacturers and large enterprises. As part of a wider 5G / IoT implementation, our client partnered with one of the largest service providers in Europe to trial Wireless Wireline Convergence (WWC) architecture. The aim of the WWC project was to create and test a common-core infrastructure, supporting both fixed and wireless broadband access from a single technology stack.

The client engaged DXC Luxoft to develop the 5G Access Gateway Function (AGF) solution component that provides subscriber authentication, authorization and accounting (AAA) services, plus hierarchical traffic shaping and policing for fixed network and 5G residential gateways. This enabled the use of common credentials, authentication and a unified approach to applying network policy.

Solution

Built from scratch

DXC Luxoft assembled a team of highly skilled specialists with deep 5G domain expertise to deliver this complex R&D project. Working closely with in-house decision makers, our experienced team delivered an outstanding solution to the client's AGF challenge.

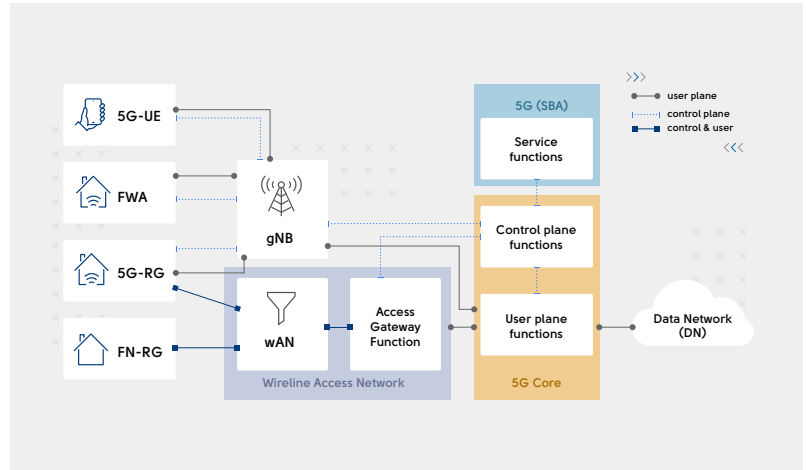
We built the component from scratch as a true cloud-native solution, using microservices methodologies and an entirely containerized deployment. It's fully integrated with the core 5G architecture, including N1 interfacing to the access and mobility management function (AMF), and N3 interfacing to the user plane function (UPF).

Our expert team covered the whole development cycle, from project planning and solution architecture, through development and testing to deployment and validation. We created the required cloud infrastructure and CI/CD pipelines, as well as cloud-based simulations for solution testing. In addition, DXC Luxoft assisted the remote, live deployment of the solution to our client's service-provider-partner's UK lab, using Kubernetes and Helm.

A third-generation partnership project (3GPP) UPF in a 5G core (5GC) facilitates the AGF. Current wireline broadband networks regard policy and subscriber databases as individual components. With a 5G service-based architecture (SBA) aspects such as the policy control function (PCF) and authentication server function (AUSF) can be aligned with mobile, fixed wireless and wireline access networks. This enables common support infrastructures (e.g., the IP multimedia subsystem [IMS]) for the delivery of rich multimedia.

Technologies

- Third-generation partnership project (3GPP) standards
- 4G/5G packet core technologies
 - Session management function (SMF), access and mobility management function (AMF), NF repository function (NRF), unified data management (UDM)
 - N1, N2, N3, N7
- Rust and C++17 for core module development
- TDD approach; Python for automated testing framework
- CI/CD: Gitflow and GIT-based way of work, MS Azure, Kubernetes, Helm, Docker



Result

World-class benefits

Together with the client, we achieved a successful trial for the **world's first implementation** of the 5G Wireless Wireline Convergence AGF standard. This included the demonstration of a seamless integration of fixed and 5G core services that helped simplify service provider offerings. Another important achievement was a reduction in the overall complexity of subscriber and service management, and the promotion of always-on services through converged connectivity.

In addition, and bearing in mind the various types of access, this method ensures that standardized services and service level agreements (SLAs) can be used for all subscribers, as well as for individuals using other technologies to connect.

Employing an accepted core infrastructure that supports both fixed and wireless connection adds value for most operators; companies eagerly benefitting from the resources of these formerly diverse networks. Also, the 5G new radio (5G NR), fixed wireless access (FWA) will progressively align with, or perhaps take over from copper for the last mile.

Implementing fixed mobile core convergence significantly lessens the constituent parts and technologies needed for broadband support, cutting both CAPEX and OPEX while streamlining supply and management.

If you're interested in learning more about our 5G core engineering capabilities

Contact Us