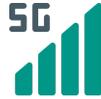TELCOMA Global Whitepaper

# *Hybrid core network - 4G to 5G Core Interconnection*

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Hybrid core network

The Hybrid 4G/5G core is a way for operators to migrate investment in the EPC (Evolved Packet Core) to the new core network as 5G subscribers and traffic is increasing continuously. The physical and virtualized 4G core functions operate together in a hybrid mode. With the separation of the control plane and the user plane and introduction of network slicing at various stages of implementation in commercial networks. Network slicing for the creation of dedicated logical networks over a single physical network infrastructure, deployed in the production core network for 4G or as a dedicated 5G EPC, aggregation of traffic from both mobile and fixed wireless access, the distribution of core network functions closer to radio networks and end-customers, the introduction of the service-based target architecture and the introduction of open APIs for third-party applications.

Simplification of the core network evolution journey, from EPC (Evolved Packet Core) to 5G Core. Fragmented hybrid core networks can slow down 5G introductions, decrease the agility of the network. The 5G Core differs from the 5G EPC in three main ways. The adoption of a service-based architecture (SBA) for agile service creation. The introduction of new interfaces and different functional splits between network functions.

Virtualization, digital transformation, and 5G are taking on a hybrid network path, in which there is convergence, integration, and co-existence. The future networks are going to be hybrid because the infrastructure is going to play an important role.

Similarities between 4G and 5G core
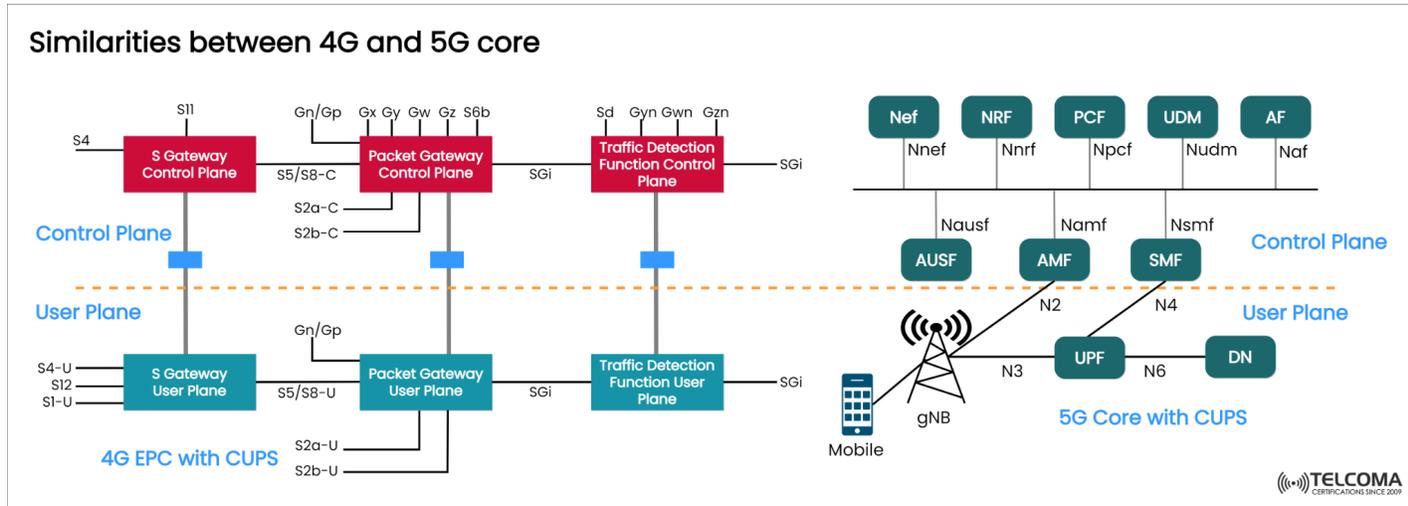
Co-existence

The need for coexistence is because of the wider role of the wireless connectivity that depends on the multiple devices which could be at the home, office, or which are mobile. Enterprise IoT expands the range of devices and services that wireless networks must support. These new devices and services increase the value and relevance of wireless connectivity. They are contributing to support with hybrid networks.

Complexity

The complexity of the networks is growing with the evolution of technology. Newly introduced technologies are deployed in networks that continue to operate, thus creating hybrid networks in which multiple technologies and layers old and new layer. It increases the complexity of wireless networks beyond the initial transition, with hybrid networks becoming the new normal.

More than one dimension

There is a wide agreement that is moving towards hybrid networks, there are different views of what hybrid networks are. There are multiple access interfaces which are there are to provide coverage and capacity that operators need for services across. For 5G deployments, 2G and 3G networks still operate, 4G will continue to carry most of the traffic. With SD-WANs, operators can go further and create hybrid networks in which MPLS is integrated with LTE now.

In the core, NFV and SDN create networks in which physical and virtualized components co-exist. The transition to virtualized networks is gradual in nature. Virtualization encourages a transition from centralized architectures to distributed architectures that rely on edge and cloud infrastructures. In the RAN, the transition to virtualized, cloud RANs will be gradual and include different types of RAN topologies, with varying degrees of functionality located at the antenna site and remotely. In the transport network, wireline, and wireless will continue to co-exist to meet the traffic demands cost-effectively.

Orchestration

If the different network components function in isolation from each other, operators cannot effectively optimize the use of available resources. Orchestration is the key to managing hybrid networks and optimizing the use of available resources for different use cases. Networks are becoming hybrid, orchestration must cover the end-to-end network to ensure that the customer experience is the best that the network can provide.

Agility

It is a crucial feature of good orchestration in hybrid networks. A combination of real-time analytics, closed-loop AI and machine learning, and automation provides the foundation of orchestration. It empowers operators to manage network traffic through time and location.

In multi-domain hybrid networks, multi-layer, virtualized, and distributed, going deeper into the network means exploring in multiple directions and at multiple levels. A parallel and related change towards a multi-dimensional, multi-level approach in service assurance is required to retain security - across the hybrid networks. Hybrid networks operators the opportunity to continue to benefit from the existing infrastructure while they transition to 5G. With hybrid networks, there is an evolution to new technologies.

This Hybrid 4G/5G Core is a way for operators to migrate investment in the EPC (Evolved Packet Core) to the new Core network as 5G subscribers and the traffic grows. It requires the operator to continue to invest in advanced EPC shortly, which is a roadmap to a full standalone 5G core. Mobile operators with LTE-A,

LTE-Pro networks will be launching Gigabit LTE, NB-IoT, and other services which demand high capacity and performance.