

SAMSUNG

Introducing Samsung 5G Core

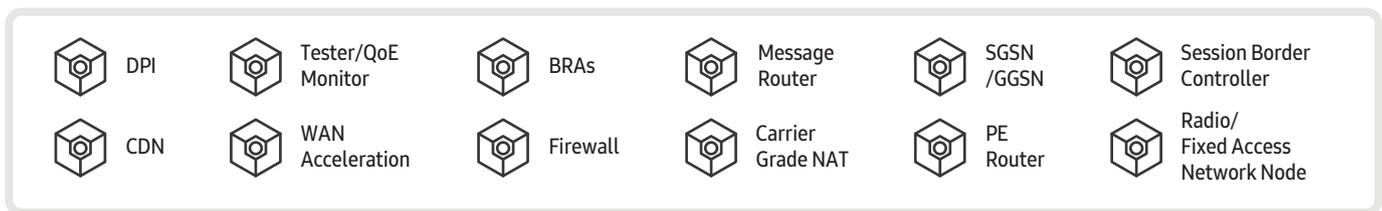
**Unlock 5G's True Potential
with Proven 5G Core**

Transforming Core Network for True 5G

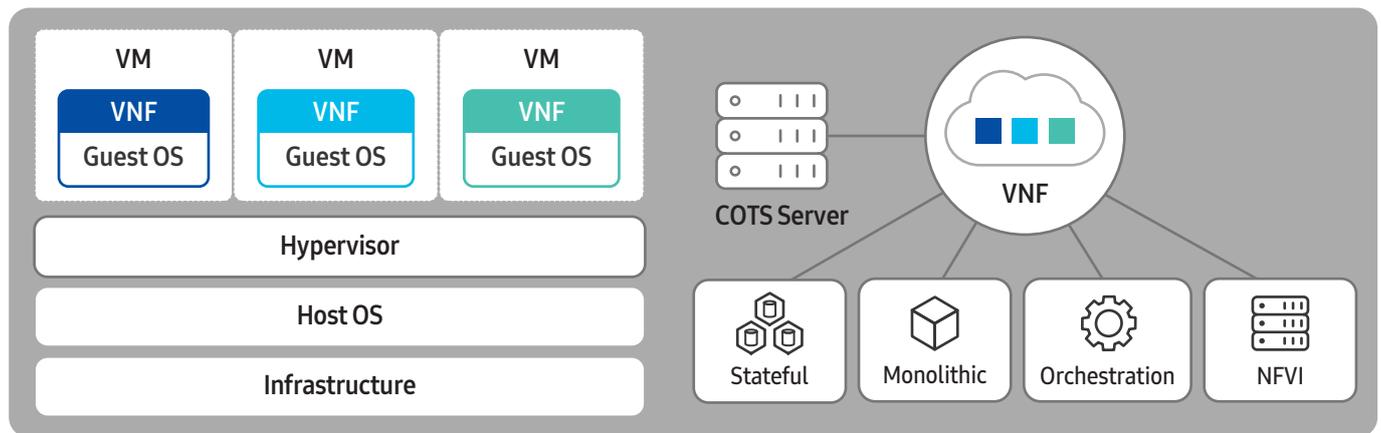
Today's telco infrastructure is evolving to create more efficient systems by replacing purpose-built hardware with software-based network functions (NFs). With the adoption of NFV, these architectures are shifting to virtualized cloud infrastructure where network services are created automatically on a general-purpose server at a low cost.

Furthermore, the infrastructure is evolving into a cloud native architecture as virtualization technology moves away from heavyweight virtual machine (VM) to lightweight containers. In a cloud native architecture, automatic creation and deployment of network services provide more efficient network operation and management. 3GPP incorporated the IT strengths available in cloud computing to establish a new service-based architecture that optimizes and automates creating, distributing, monitoring, and managing the 5G resources that enable these new network capabilities. This cloud-native architecture is an essential component to the new services provided in 5G.

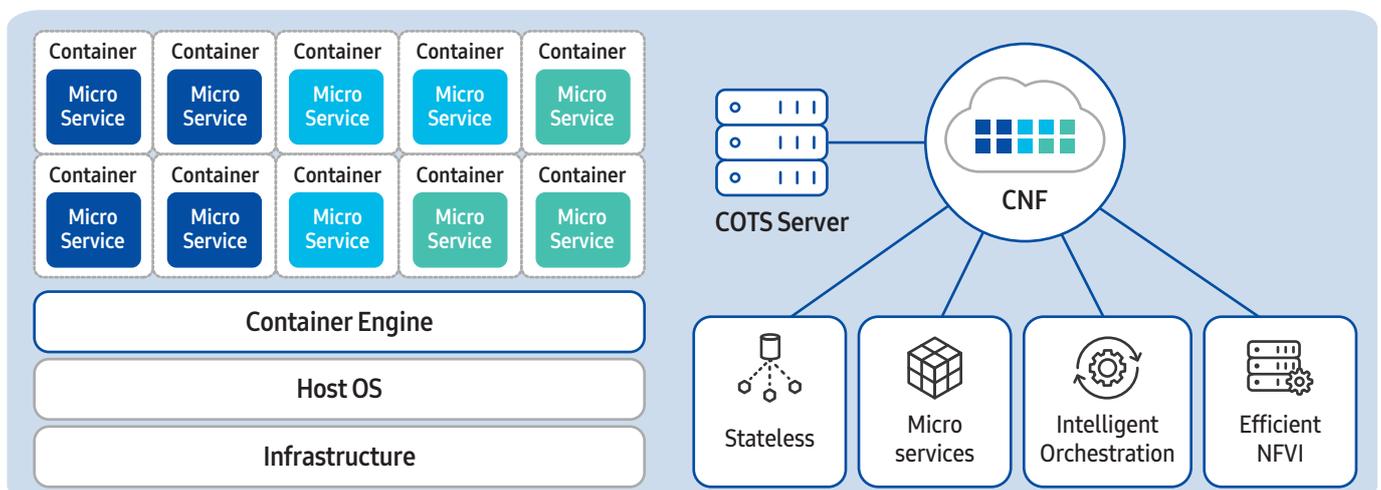
Network functions on dedicated H/W



NFV (Network Function Virtualization)



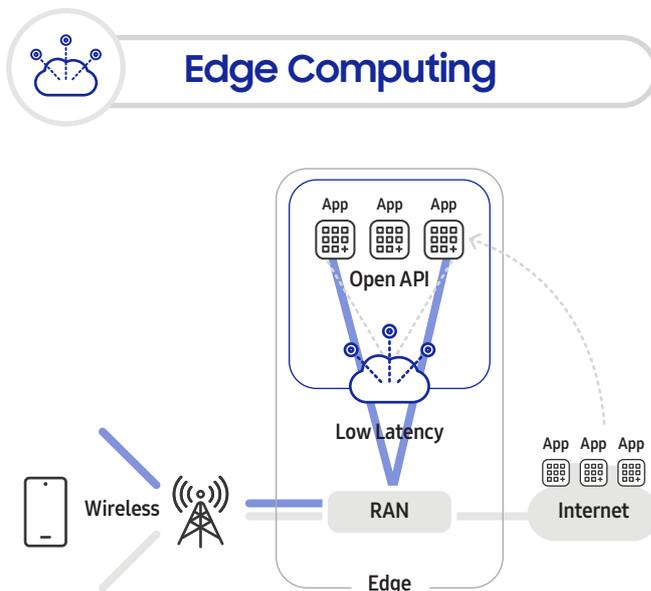
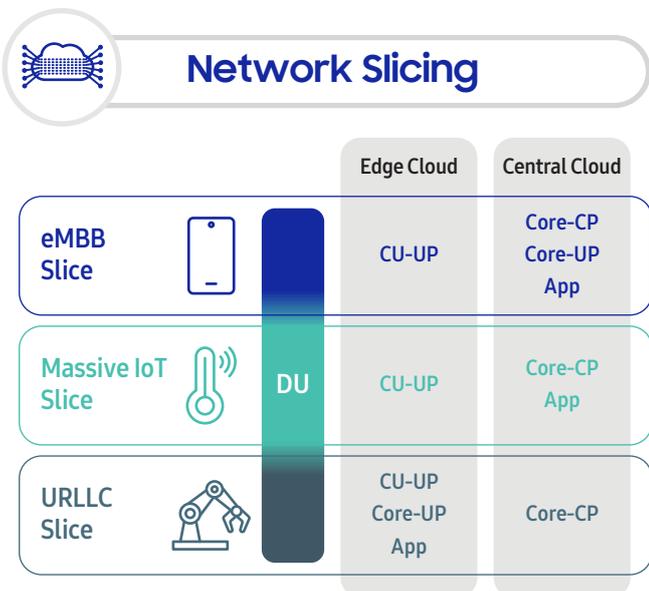
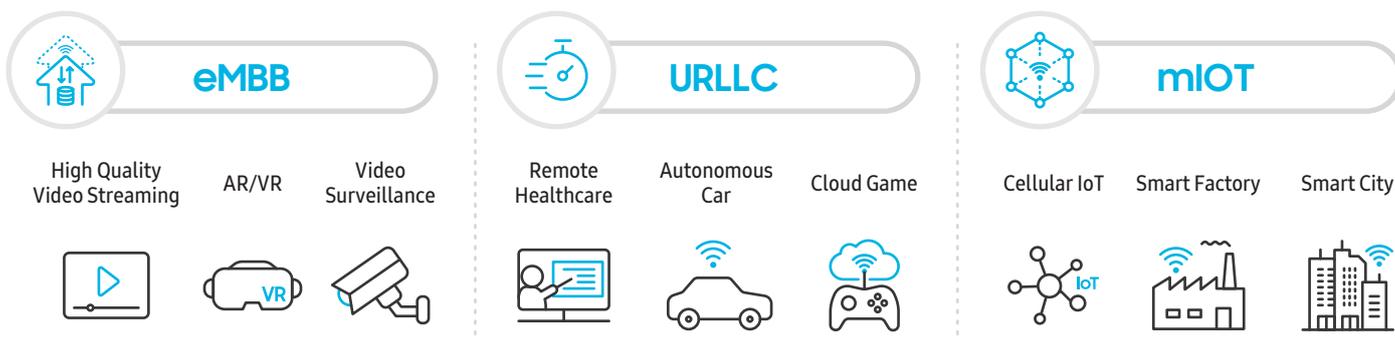
Cloud-Native



With the continued worldwide commercialization of 5G, users are enjoying faster speeds that prior technologies could not provide. While 5G means high speed service, it also provides new important services that leverage 5G's low latency and massive IoT. For example, remote healthcare service and cloud gaming require ultra-low latency. Cellular IoT, Smart Factory and Smart City, which require synchronization with massive IoT devices, are currently limited to services in the existing EPC network architecture. In order to provide these services, new network capabilities like network slicing and edge computing technologies need to be done in the 5G Core (5GC).

The 5G network needs to efficiently process the increasing amount of data quickly and reliably from the large number of users who are connected to the much higher number of base stations. 3GPP incorporated the benefits of cloud native development to optimize and automate the network services needed to process 5G sessions. This cloud-native architecture is an essential component to the new services provided in 5G. To fully accommodate the higher volumes of data generated by the greater number of users who expect quick responses provided by low latency communications, the 5G network is shifting to a new paradigm for the core network.

Samsung is helping 5G carriers and service providers expand their business and create new revenue by providing a core network that accepts these market needs with innovative technologies and architectures.



Experience New Business Opportunities with Samsung Common Core

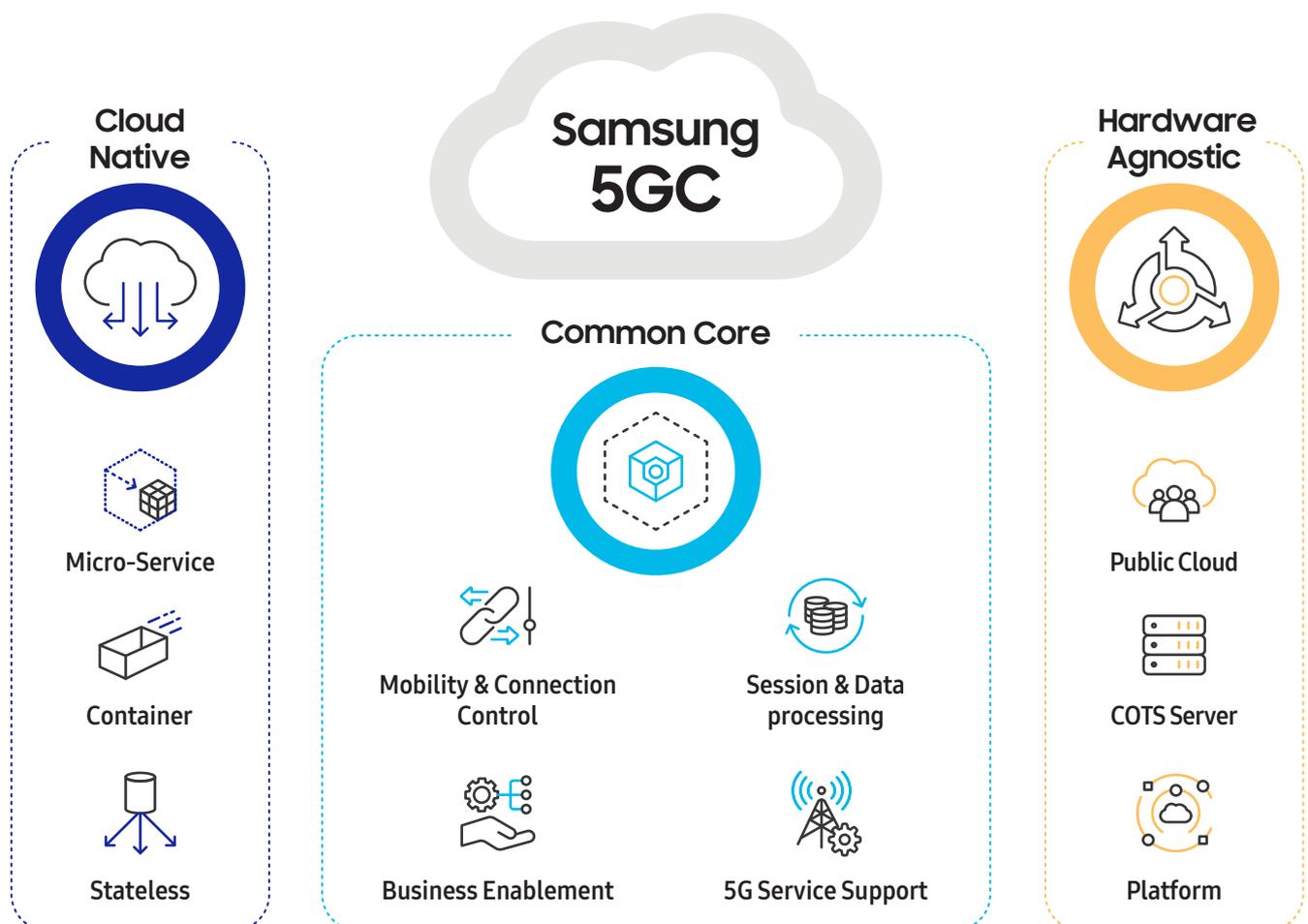
Samsung's 5G-enabled core network resides on a cloud native common core and operate on any commercially available hardware platform. Cloud-native means that the system uses network orchestration to automatically manage all resources involved in a service using micro-services, or small instances of that service. When a service is reaching its level of capacity, the orchestrator instantly and automatically creates a new micro-service by allocating and linking all resources needed for the new micro-service instance. It boosts the efficiency of development and verification of 5G Core NF, and facilitates service upgrades and deployments yielding better operational efficiency.

Samsung's Common Core supports both 4G and 5G functions, meaning that operators can easily support both RAN technologies as they migrate from 4G to 5G. Samsung Common core portfolio constitutes four 5G solutions. Each solution supports tightly-coupled feature sets and telco-grade reliability.

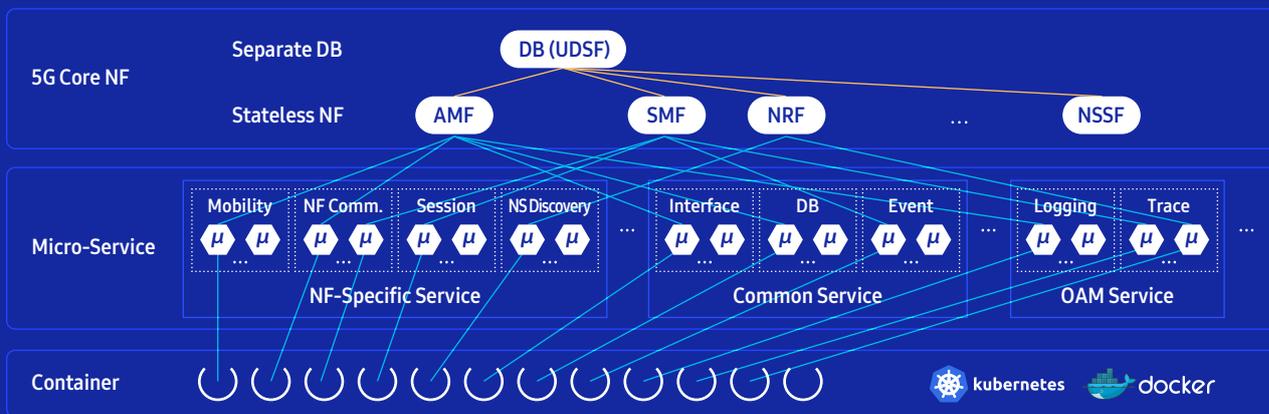
- **5G Business Enablement Solution** - supports NFs that fuels charging, policy and network slicing
- **5G Service Support Solution** - supports NFs that convey network information and exposure
- **Mobility & Connection Control Solution** - supports NFs that provide authentication, database and signaling processing
- **Session & Data Processing Solution** - supports NFs that power session control and data traffic processing with embedded DPI functions

All Samsung Common Core components are designed to run in the cloud native environment. The cloud native environment provides the abstraction for the Samsung Core software to run in a variety of configurations, ranging from Operator's private cloud to a public cloud. Samsung Common Core can be managed by an orchestrator seamlessly across private and public clouds. The Samsung cloud native core additionally helps operators by optimizing the deployment and management costs of their mobile networks.

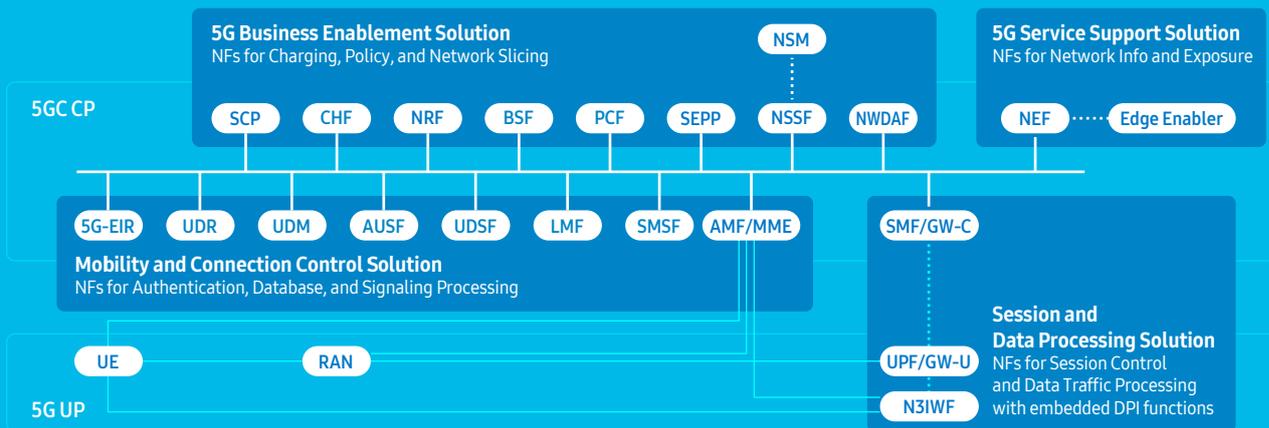
Samsung Core Portfolio



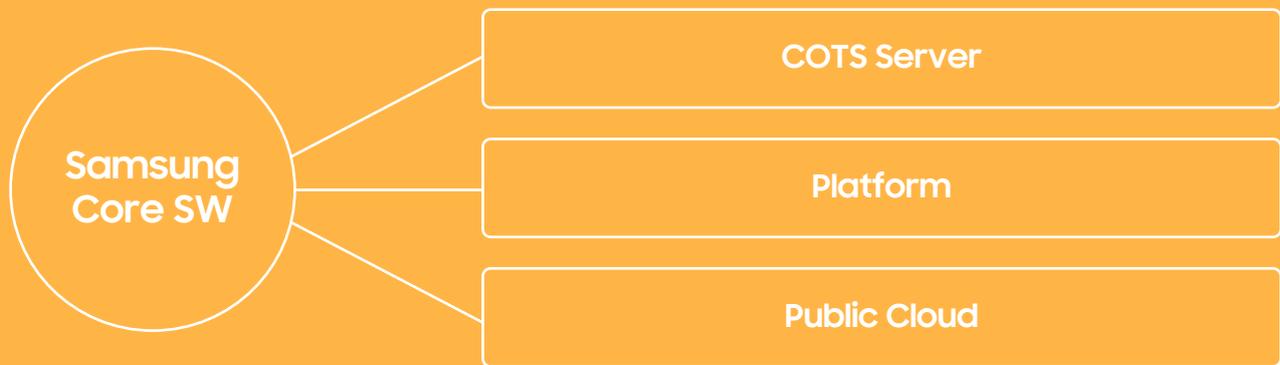
Cloud Native



Common Core



Hardware Agnostic



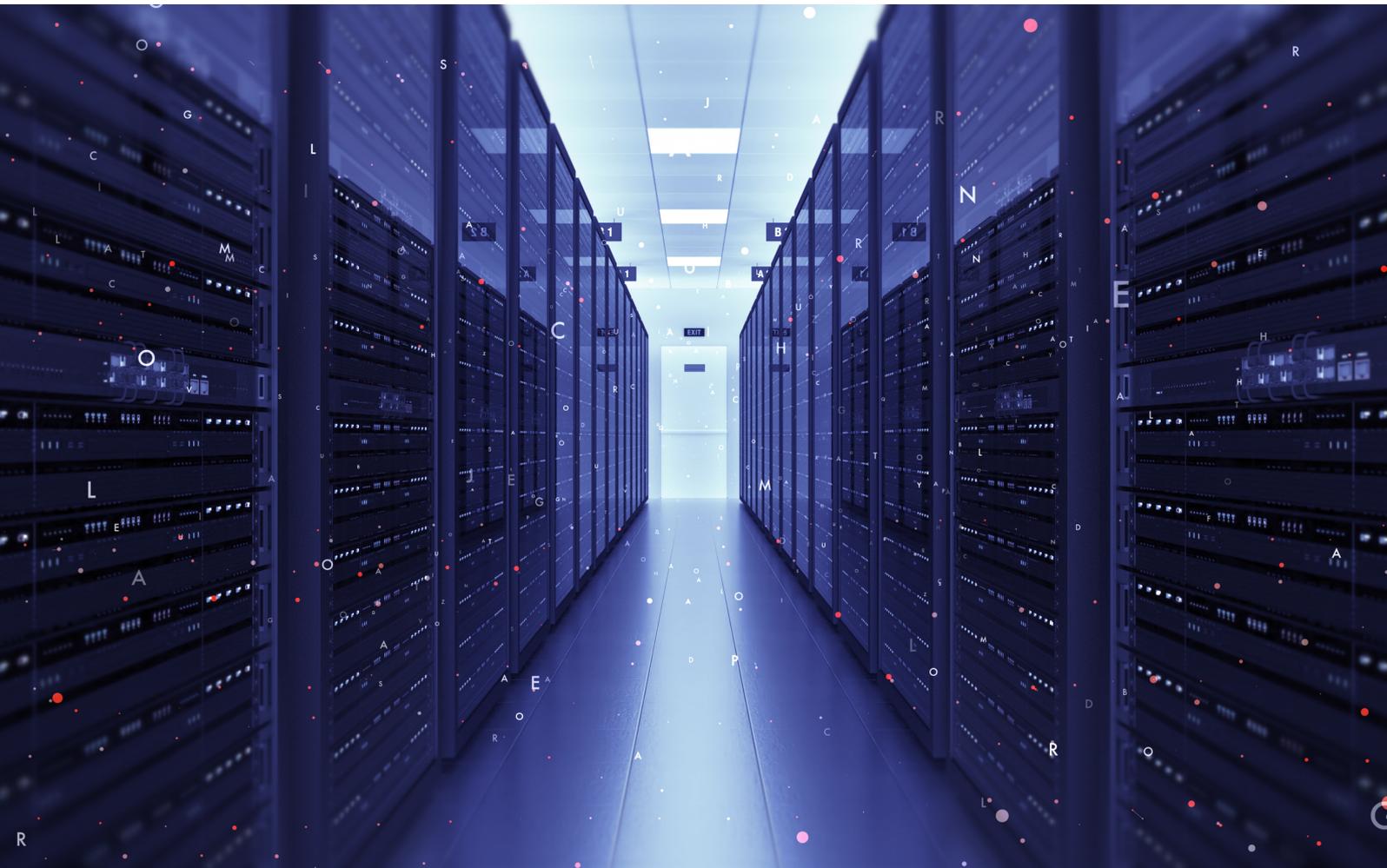
High Capacity and Reliable 'Macro Core'

* What Samsung's 5GC provides:

- Telco-grade UPF Capacity
- Reliability features for stable service and risk management
- Expanding network slicing and edge enabling
- Integrated UPF for value-added service

Samsung 5G Core provides scalable high packet data performance to cover any size of mobile network. Common Core architecture with the Control and User Plane Separation (CUPS) structure integrates the control plane between EPC GW-C and 5GC SMF and integrates the user plane function between the EPC GW-U and the 5GC UPF to manage the resources efficiently. Samsung's Common Core uses in-service Software (SW) upgrades and local/geo-redundancy at the NF level. Furthermore, Mobile Network Operators using the Common Core leverage the system's load balancing and overload controls to mitigate risks. By enabling new 5G services such as network slicing and edge computing, Samsung 5GC allows with the UE and RAN to establish the user data plane so that it can provide and manage the resources suitable for ultra-low latency services.

Network Automation is one of the key 5G factors that provides the flexibility and high volume of network configurations that use these new services. Samsung 5GC includes the 3GPP-defined Network Data Analytics Function (NWDAF) to identify and optimize the use of network resources. In addition, Samsung's 5G core integrates Firewalls, Network Address Transition (NAT) and vProbe can be integrated with UPF to help operators reduce additional investment costs.



Network-in-a-Box "Compact Core"

* What Samsung's 5GC provides:

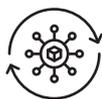
- Dedicated compact system for a private network
- Network-in-a-Box for TCO savings
- Ready to integrate vRAN(CU)
- Specialized features for enterprise operations

It's no secret that 5G expects to transform both B2C and B2B industries. Our Compact Core provides user traffic processing capacity, quickness and scalability for any size enterprise network. This compact system implements all essential core functions like session management and data processing as well as authentication and charging in a single server to help reduce customer costs.

The Compact Core can also integrate the CU software component of the vRAN, helping network operators reduce hardware CAPEX and minimize data processing and transmission time between RAN and Core.

Samsung Compact Core supports specialized features for the enterprise, including the ability to support multiple tenants and to have remote management. With the multi-tenant capabilities, the system can allocate individual management options such as network function provisioning, functional state information and charging rules per each tenant. With remote management, the Operating Expenses (OPEX) are reduced by remotely assessing and troubleshooting problems without the physical need to visit a data center.

Compact Core Network-in-a-Box



4G EPC/5GC



Policy & Charging



Authentication



Management



vRAN (CU)

Enabling Fast Service Launch with 'Public Cloud Core'

* What Samsung's 5GC provides:

- Geographic redundancy across data centers for the core network
- Deployment on any public cloud environments
- Easy-to-build a private enterprise network
- Preserves data integrity during an emergency disaster situation

The Common Core network is evolving into a container-based architecture that uses micro-services to create a lightweight, efficient virtual system. The implementation of Samsung's 5GC allows mobile network operators to deploy the core software on their public cloud of choice: AWS, Azure, GCP and IBM Cloud. By deploying Samsung 5GC on public cloud, mobile operators and enterprises save on the capital costs of hardware by leveraging cloud resources.

This public cloud option can also ease the deployment for a new private network. This approach also supports a hybrid cloud architecture that works with edge solutions provided by public cloud companies contingent on interworking with the multi-cloud support of the provider.



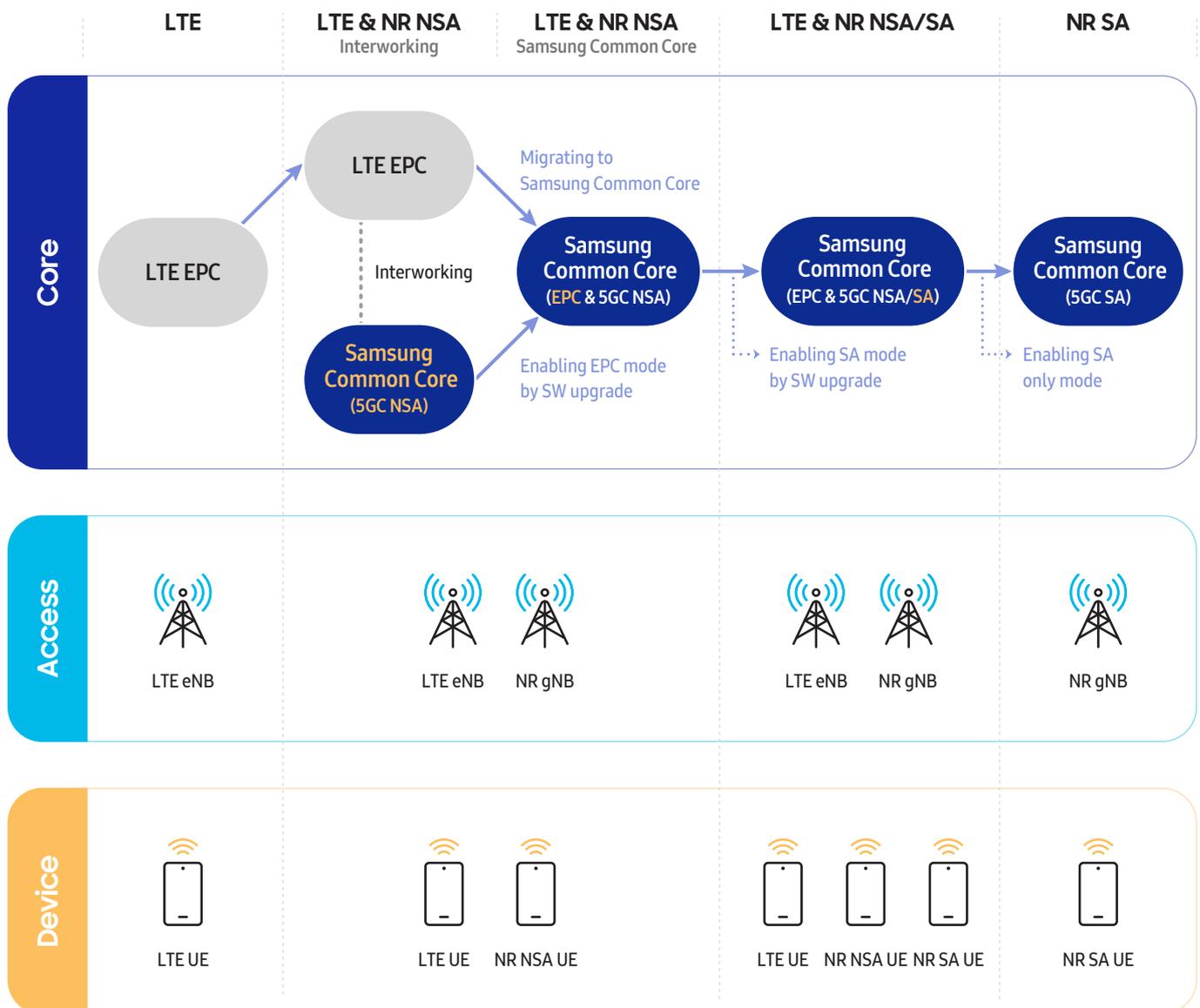
Public Cloud
Core

Evolution Path from EPC to 5GC

An LTE network operator has various migration paths from which to choose to reach 5G. A number of variables helps that decision come to light: the current 4G network configuration, the services targeted for 5G, 5G subscriber penetration and growth, and device deployment, just to name a few. This figure shows an examples several of the considerations that operators will consider as they migrate from 4G LTE to 5G, and the Samsung Common Core facilitates these migration paths.

Most MNOs choose to deploy the 5G NSA architecture, which allows them to deploy their new 5G gNBs with their existing LTE network. The legacy EPC is supporting the original 4G subscriber base and the new 5G subscribers, but the growth of 5G traffic can pose challenges for the legacy core. Deploying the Samsung Common Core can mitigate these challenges.

Basically, Samsung's Common Core is ready to support both 4G and 5G functions. Hence, at the initial stage of 5G network, deployment, the Samsung Common Core is an optimal choice for deployment as the NSA core as it supports 4G and 5G traffic. When Samsung common core has proven its functionality and reliability, 4G EPC functionality can be migrated to Samsung Common Core. At this point, the network operator can turn down the legacy EPC to reduce management and maintenance costs. And when the MNO launches 5G SA devices and services, a software upgrade to the current Samsung Common Core provides support for SA mode - all without any service impact.



5G Open Lab Ensures the Openness of Samsung 5GC

The 5G network is well on its way to bringing unprecedented mobile experience to users around the world. A key enabler behind these innovative 5G services is the use of a Service-Based Architecture (SBA), which is a set of interconnected Network Functions (NFs) where various components from different vendors can be easily integrated using a uniform interface. This architecture has become especially meaningful today because NFs are being developed not only by network solution vendors like Samsung, but also by various companies that specialize in their respective fields.

In order to verify the functionality and performance of NFs in mobile networks, Samsung created the 5G Open Lab. At the lab, Samsung and its partners can conduct tests together to confirm the interoperability between their NFs. This includes testing under different conditions to verify that the 5G features can successfully deliver expected capabilities to the network operators. Through collaboration at the 5G Open Lab, Samsung and its partners can identify the best combination of NFs for the wireless operators' SBA, ensuring high quality mobile experiences for users.

The 5G Open Lab is driving the innovation of 3GPP standards-compliant architectures, while ensuring the openness of networks with various NFs, which enables swift deployment of infrastructure-agnostic and cloud-native networks. Through this innovative approach, Samsung and its partners can verify the performance of various NFs by integrating them to Samsung's commercially proven, cloud-native 5G Core.

Samsung has been conducting interoperability tests with around 10 vendors at 5G Open Lab.



Going Beyond Imagination, Samsung's Core Network is Commercially Proven

5G NR SA is key to offering innovative 5G services and has the potential to enhance a business by quickly addressing emerging market demands. 5G SA architecture is the best choice for operators that want to tap new 5G opportunities.

5G allows operators to provide unprecedented communication and services for end-users and to explore innovative business use cases that can generate new revenue streams.

Samsung's commercial 5G NSA and SA common core networks are commercially proven in the Korean market and we are ready to support any operator's 5G core needs.

At Samsung, we continue to work with our customers to provide the true 5G innovation that starts with the core network.

If you want to learn more about Samsung's core offering and examples of our core in various markets, please see the links below:



- **Samsung and SK Telecom Develop Next Gen. 5G Core, Based on 3GPP Rel. 16**

https://www.samsung.com/global/business/networks/insights/press-release/1123_samsung-and-sk-telecom-develop-next-gen-5g-core-based-on-3gpp-rel-16/



- **Samsung and KT Complete Korea's First 5G SA and NSA Common Core Network Deployment**

<https://www.samsung.com/global/business/networks/insights/press-release/samsung-and-kt-complete-koreas-first-5g-sa-and-nsa-common-core-network-deployment/>



- **Samsung Unveils Compact Core to Spur Private 5G Network Evolution**

<https://www.samsung.com/global/business/networks/insights/press-release/samsung-unveils-compact-core-to-spur-private-5g-network-evolution/>



- **Samsung Completes Multivendor Interoperability of Cloud-Native 5G Standalone Core with HPE & Openet**

<https://www.samsung.com/global/business/networks/insights/press-release/samsung-completes-multivendor-interoperability-of-cloud-native-5g-standalone-core-with-hpe-and-openet/>

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Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

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