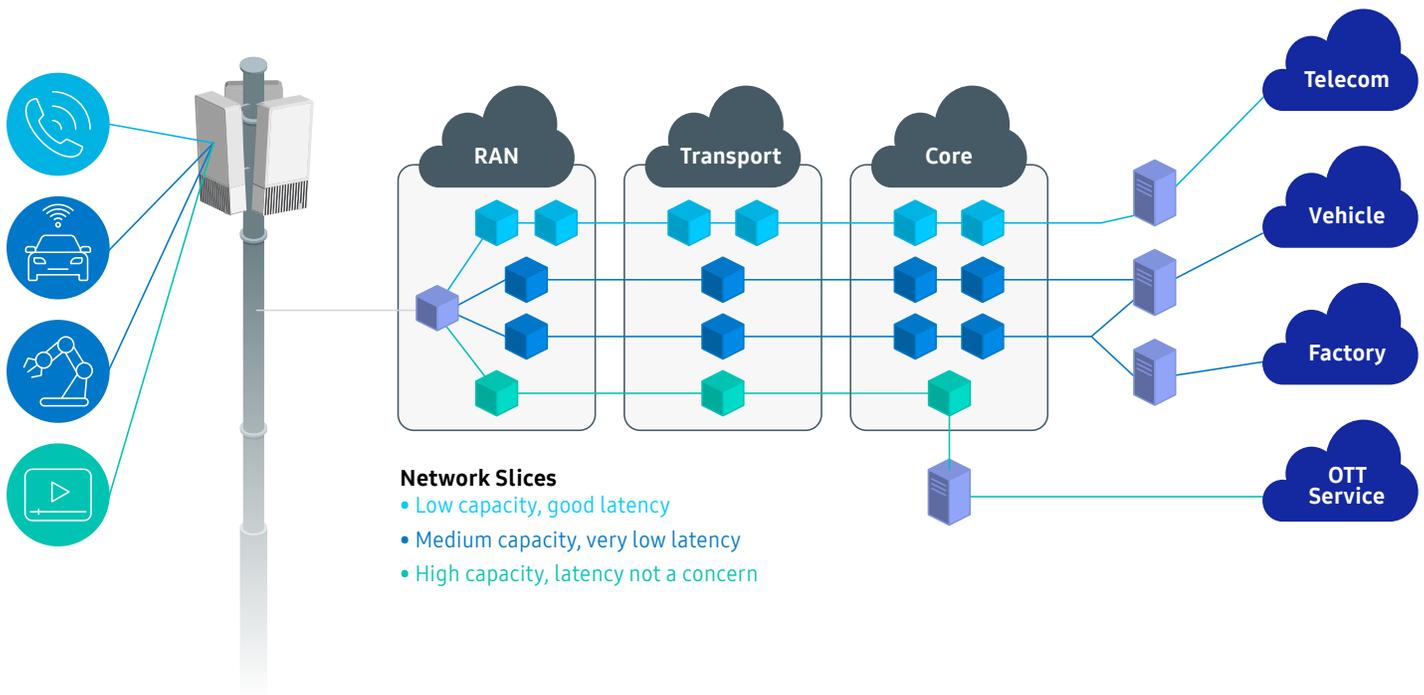


**SAMSUNG**

**Samsung's Network Slicing  
Powers Profitable 5G**

Mobile Network Operators (MNOs) are using 5G technologies to build networks that can help businesses and enterprises innovate and grow. Network slicing facilitates these new revenue opportunities by offering MNOs the ability to efficiently create user-to-application connections using logical networks built on shared physical infrastructure. Automating the system using slices helps MNOs contain infrastructure and operational costs as their complex, virtualized 5G networks grow. Samsung worked with leading network operators to ensure network slicing meets operational, business and revenue needs for MNOs.



## Samsung Simplifies Network Slice Management and Orchestration Across the 5G Network

The network slicing solution is a collection of systems, customer delivery mechanisms and a well-designed architecture that orchestrates both individual resource allocation and end-to-end (E2E) connectivity services. The foundation of network slicing uses the same real-time management capabilities that control the virtualized and containerized functions in the 5G RAN, Transport, and Core networks. The Domain Resource Orchestration layer provides management across different network domains to complete the communication path, using the RAN Slice Controller, the Transport Slice Controller, and the Core Slice Controller. Each of these controllers has access to Software Defined Networking (SDN) and Network Function Virtualization (NFV) orchestrators that establish network resources and functions for use in their respective domains.

For service level orchestration, the Samsung Cloud Orchestration layer manages the end-to-end service. Using information from the analytics module that collects, analyzes, and optimizes the services, service and E2E orchestrators provide service fulfillment and assurance by providing resource components to the Communication Service Management Function (CSMF) and Network Slice Management Function (NSMF.)

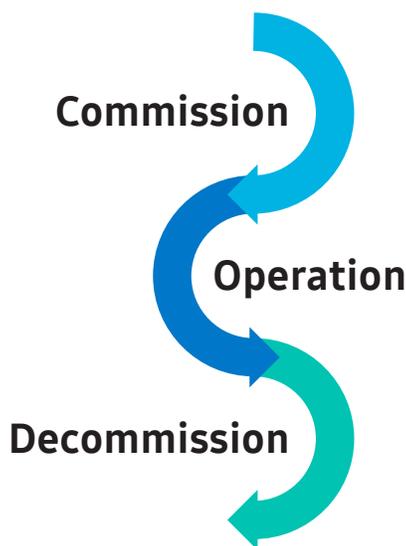
# Automating Lifecycle Management of Slices in the 5G Network

Samsung has a two-phased approach that efficiently implements network slices across the 5G RAN, Transport, and Core networks. First, the MNO prepares for network slicing by analyzing the needs of the new services and organizing resources for the network slice options offered for those services. In this preparation phase, the MNO builds templates that contain the sets of policies and other parameters associated with each of the various services. These templates identify the cell, the expected bandwidth and required latency, and the QoS, among more settings, that comprise each slice.

Since accuracy is critical in this preparation phase of network slices, Samsung provides predefined templates for established 5G services that can help MNOs expedite service template creation. MNOs can implement these templates without any changes with the single click of a button, or they can customize the templates with updates to support that slice's specific needs. These guides increase the operational convenience for the MNO and help reduce the possibility of human error that can lead to unexpected low performance.

Phase two of network slicing occurs when the MNO loads the templates to start network slicing. Samsung Cloud Orchestration uses closed-loop automation across E2E Service Orchestration functions – Inventory, Policy, and Network Slice Manager, with performance information from the analytics module – to manage the lifecycle of the network slice instances in three steps.

**Samsung's predefined network slicing template for established 5G services helps MNOs expedite service creation.**



**Commissioning** is the first step and establishes the network slice using the parameters provided in the templates to allocate and configure the slice's resources. Once configured, the network slice is ready for activation.

**Operation** is the second phase and represents when the network is using the slice. The system first activates the slice for use, then supervises and reports on how the slice is tracking to the Service Level Agreement (SLA). While monitoring activities, the system can modify the resources and components to ensure the slice continues meeting the terms of the SLA. When a slice is not being used, the system may deactivate it to improve system efficiency and quickly reinstate it when needed.

**Decommissioning** is the final management step. It releases the slice's resources when the system no longer needs them.

Network slicing by Samsung provides dynamic, automated network slice operations giving MNOs virtually zero-touch control of the slices that help optimize the operations of their 5G network.

# Samsung's End-to-End Network Slice Control & Optimization Powers New Business Opportunities

Network slicing on Samsung's 5G network provides MNOs with the controls and abilities to create new revenue opportunities by supporting high-value, low-latency connectivity. The Core and RAN each leverage standards-based interfaces and protocols to provide the network access and user controls to guarantee the service level agreements (SLAs) established for each slice.

## 5G Core Network Slicing Enables New Services Backed with SLA

The core network not only controls user access to the network slices, but it also tracks and provides the metrics across the slice to describe how the system is handling the user data streams. Network slicing in the core provides the information to prove that MNOs are meeting the end-to-end SLAs. The ability to define and enforce unique slices for a multitude of different services makes network slicing a vital differentiator for MNOs. Samsung's 5G Core can support and manage a variety of slices, which allows the MNO to establish relationships with different partners in multiple vertical markets and ensure SLAs tailored to needs.

These value-based network slices allow MNOs to establish multi-tier value-based pricing models. New opportunities can come from smart manufacturing, smart logistics, autonomous driving, AI-powered automated security systems, and IoT, to name a few.

With the growth of to-be-determined services in the future, the ability to allocate network slices that can limit control of features to specific geographic regions provides another important 5G Core network slicing capability. MNOs can now partner with new application development teams or enterprises to set up sand-box areas that allow the validation of new services and shed light on the impact of these new features without impacting the rest of the network.

Network operators using Samsung's 5G solution are equipped with the information and controls to foster new business relationships that can increase revenue-generating opportunities.

## Differentiated Controls in RAN Slicing Reduces Operations Costs

Network slicing on Samsung's 5G system also optimizes the use of resources that result in CAPEX and operational savings. Network slicing, especially in the RAN, is critical for enabling the controls that enforce SLAs for differentiated services and for automating the operations of the slices to reduce costs.

### Intelligently Selecting the Right Network Resources

One of the vital control differentiators of network slicing by Samsung is the ability to select the Core network's Access and Mobility Function (AMF) and RAN's centralized unit user plane (CU-UP) function intelligently and efficiently. The user equipment (UE) facilitates this selection by sending information known as "network slice selection assistance information." This information quickly identifies the correct AMF and CU-UP pair for the service the UE is requesting. With this optimized approach, the identification of the network slice is very efficient for connecting the user to the network.

## AI/ML Based Dynamic Radio Resource Allocation

Another key Samsung network slicing differentiator is the RAN control that provides flexible physical resource block allocation. Samsung offers two approaches to this allocation that provides radio resources to the slice. The first option, called static resource allocations, allows the MNO to “configure” the distribution of the radio resource for the slices on the site. The second option automates the use by leveraging Artificial Intelligence and Machine Learning (AI/ML) techniques to allocate resources dynamically. This implementation provides the MNO with the controls that allow them to optimize their physical resource block (PRB) allocation or to enable the system to use MNO-defined PRB allocation procedures.

## Prioritizing Network Slice Traffic to Meet Business SLAs

A third Samsung differentiator is the ability to control the scheduling priorities for UEs across slices. Samsung network slicing implements the priority control capability to allow an operator to regulate how the radio schedules use of different network slices. With this control, Samsung gives MNOs the ability to direct their networks to deliver higher priority traffic in areas where business relationships dictate the need to prioritize slices.

## Samsung's 5G Network Slicing Is Ready!

The network slicing solution allows an MNO to establish a broad range of service requirements to support an ever-expanding set of use cases. Using predefined network slice templates that span various network domains that can be backed with SLAs, Samsung's End-to-End (E2E) orchestrator can provide a one-click network slice setup – the ultimate in quick configuration.

By utilizing Samsung network slicing, MNOs can start taking on new services without affecting the existing network services and without over-investing. Network slicing is a complete E2E solution that embraces diverse service requirements and can provide MNOs with dedicated network resources that allow prototyping and exploration of new applications without impacting commercial services.



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