



HPE Telco Service Orchestrator Value Pack for 5G NSMF



Introduction

Network slicing is a key feature of 5G networks and enables to build dedicated logical networks on a shared infrastructure. Each network slice is a self-contained, end-to-end network that can be configured to meet the unique demands of a particular customer.

Figure 1 illustrates the concept of 5G network slicing by the segmentation of the 5G network in multiple logical virtualized networks using the same physical network infrastructure to satisfy specific use cases.

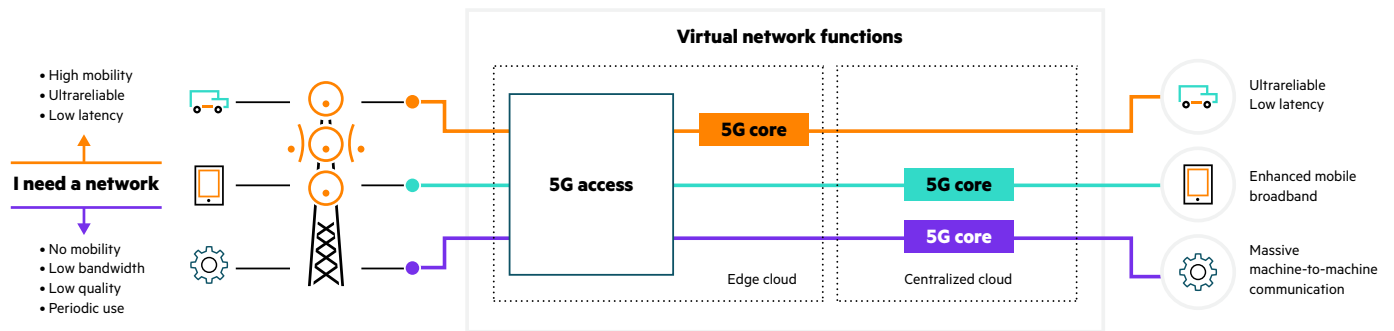


Figure 1. 5G network slices

The Network Slice Management Function (NSMF) is a crucial component in the 5G network slicing architecture. It is responsible for the end-to-end management and orchestration of network slices across various network domains, including the radio access network (RAN), 5G core network, and transport network.

Figure 2 shows the hierarchy for the various 3GPP components with specific roles (CSMF, NSMF, NSSMF) to understand how they interact between them and where NSMF is placed.

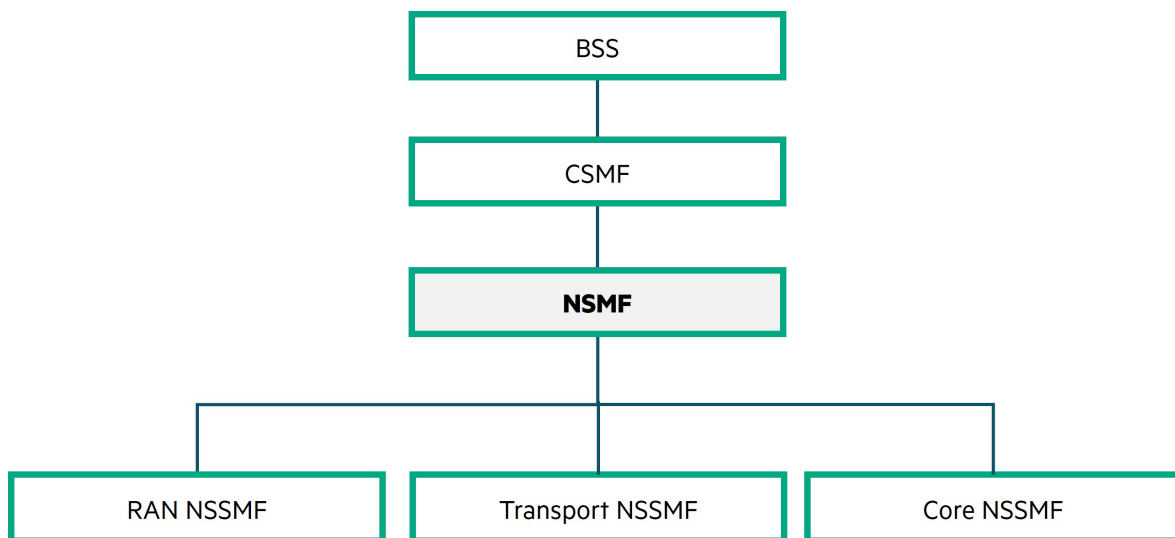


Figure 2. NSMF in the 5G slicing architecture

These are the key functions of the NSMF:

- Network slice management: The NSMF receives requests for the creation, modification, or deletion of network slices from Communication Service Management Functions (CSMFs).
- Network slice decomposition: Based on the received network slice requirements, the NSMF identifies and defines the network slice subnets that will constitute the network slice across the different network domains, including the RAN, core network, and transport network.
- Network slice subnet allocation: The NSMF interacts with different Network Slice Subnet Management Functions (NSSMFs) to allocate each of the constituent network slice subnets into which the network slice is decomposed, within the different network domains.



HPE Telco Service Orchestrator Value Pack for 5G NSMF

The NSMF value pack is an add-on capability for HPE Telco Service Orchestrator that enables the allocation and management of 5G network slices in compliance with the 3GPP standard. It is responsible for coordinating the allocation, configuration, and management of the constituent network slice subnets within each network domain, including the RAN, 5G core network, and transport network.

Being compliant with the 3GPP specification, the solution seamlessly interacts with other 3GPP systems, such as CSMFs and NSSMFs, responsible for allocating the constituent network slice subnets within each network domain. Based on a declarative model approach, the solution can also be rapidly extended to integrate non-3GPP vendor-specific NSSMFs.

The solution enables the allocation of network slices based on requirements specified in 3GPP service profiles. It includes predefined use case samples for common slice types such as enhanced mobile broadband (eMBB), ultrareliable and low-latency communications (URLLC), and massive Internet of Things (mIoT). This base catalog can be quickly extended to include new specific use cases.

Table 1. Feature summary

Feature	Description
Management of tracking areas	Definition of the tracking areas provided by the operators, optionally including geographical information
Registry of NSSMFs	Registry of the NSSMFs in charge of allocating the constituent network slice subnets within the different network domains Loading of the capabilities provided by the NSSMFs in terms of the network slice subnets they can provide
Feasibility check and reservation of Network Slice Instances (NSIs)	Feasibility check and reservation of resources for potential network slices based on requirements expressed as 3GPP service profiles Decomposition and coordination of the internal feasibility processes for each of the constituent network slice subnets within the corresponding network domains
Allocation of NSIs	Allocation of network slices based on requirements expressed as 3GPP service profiles Decomposition and coordination of the internal allocation processes for each of the constituent network slice subnets within the corresponding network domains Modification and termination of the network slice allocations
NSI and Network Slice Subnet Instance (NSSI) Inventory	Inventory of the allocated network slices in 3GPP format Inventory of the constituent network slice subnets in 3GPP format
User interface	Intuitive user interface Advanced visualization in maps High-level view and decomposition of the network slices Seamless integration with the HPE Telco Service Orchestrator Value Pack for 5G NSSMF user interface
3GPP compliance	Compliant with the TS-28541 Rel-17 3GPP specification 3GPP northbound interface (NBI) exposes the available functionality integrated into the solution
Telemanagement Forum (TMF) compliance	Compliant with TMF-641 TMF NBI exposes the available functionality integrated into the solution



The value pack encapsulates an NSMF prebuilt service model, a UI designed to be easy to use and intuitive, the business logic associated with the NSMF services, and the concrete northbound and southbound interfaces to interact with the CSMFs and NSSMFs.

Figure 3 illustrates the high-level architecture for the HPE Telco Service Orchestrator Value Pack for 5G NSMF solution.

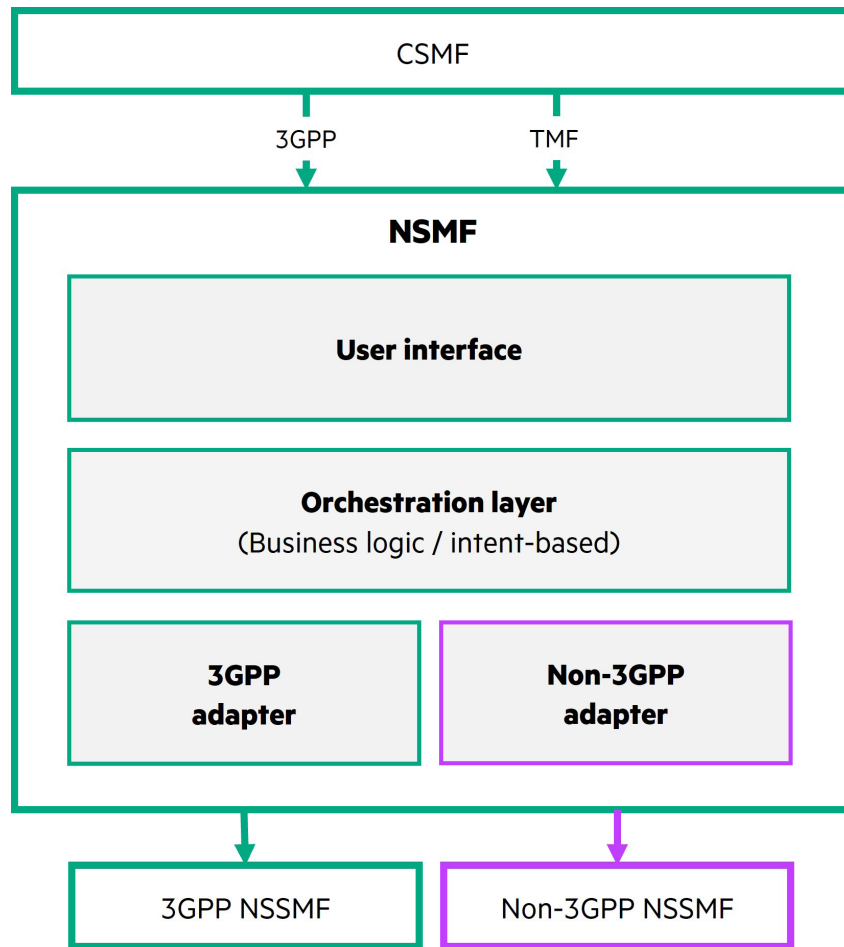


Figure 3. HPE Telco Service Orchestrator Value Pack for 5G NSMF solution components

Table 2. Solution components

Component	Description
User interface	<ul style="list-style-type: none"> Designed to be easy to use and intuitive Advanced visualization in maps, featuring detailed views of tracking areas, subnet capabilities, and network slice allocations Extensible catalog of network slice allocation use cases Visual assistance to the user during the network slice allocation process Overview of the network slices into their constituent network slice subnets Seamless integration with the HPE Telco Service Orchestrator Value Pack for 5G NSSMF, enabling users to directly access detailed resource views of the constituent network slice subnets View of the 3GPP specifications for the allocated network slices and constituent network slice subnets



Table 2. Solution components (continued)

Component	Description
Orchestration layer	Provides a prebuilt service model for NSMF Uses intent-based modeling, from simple to very complex use cases, to help reduce time to market Easy to be extended
Integration layer	Rapid integration of non-3GPP NSSMFs Adapters development by the adapter factory

Intuitive self-service portal

The HPE Telco Service Orchestrator Value Pack for 5G NSMF gives customers a comprehensive self-service portal for allocating and managing network slice subnets.

Figure 4 represents a graphical example of the user interface application form to create a new network slice instance.

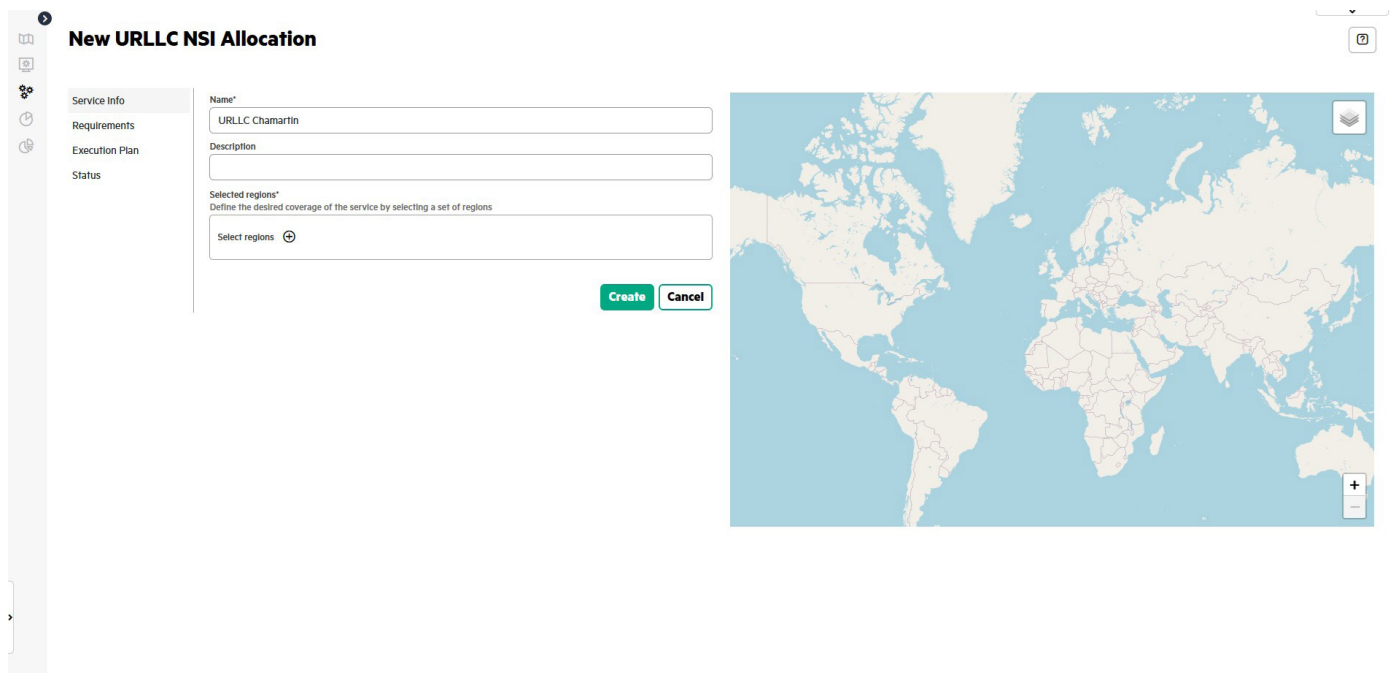


Figure 4. Network slice allocation



Figure 5 represents a graphical example of the user interface that allows to select the coverage area for a specific network slice instance.

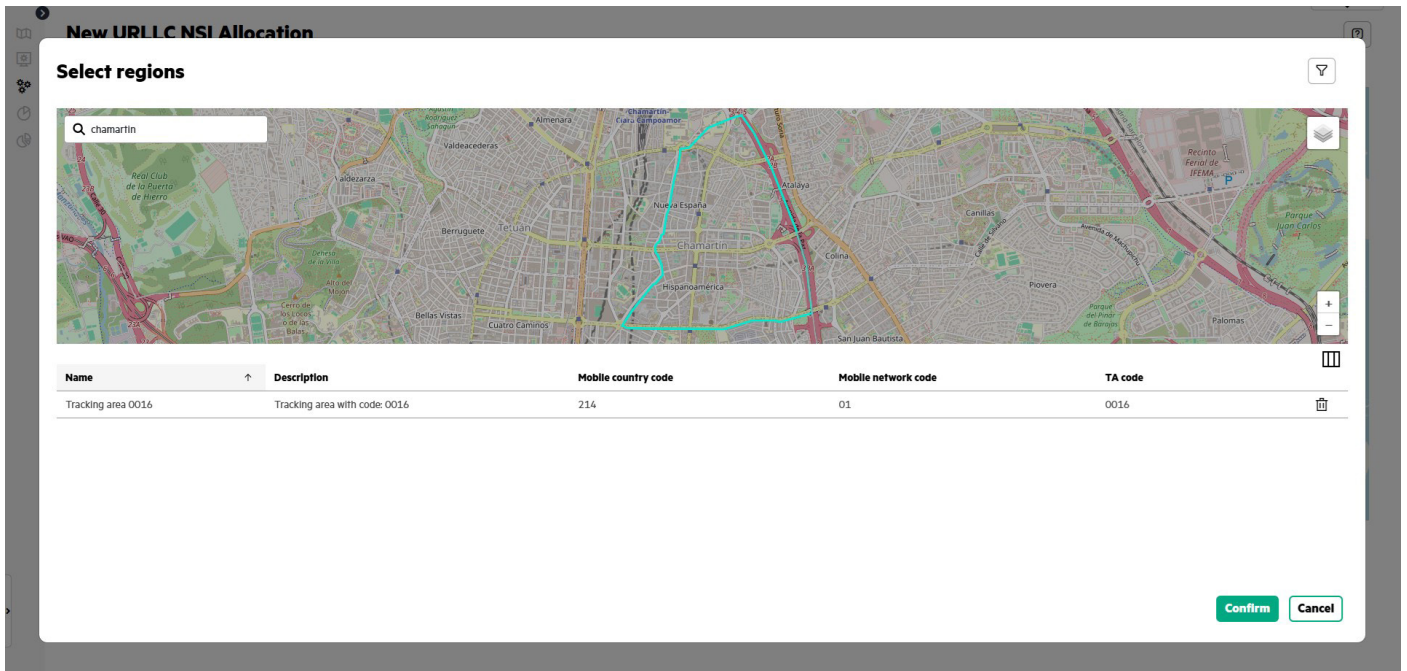


Figure 5. Assisted selection of the coverage area

Figure 6 represents a graphical example of the user interface that shows a network slice instance already allocated.

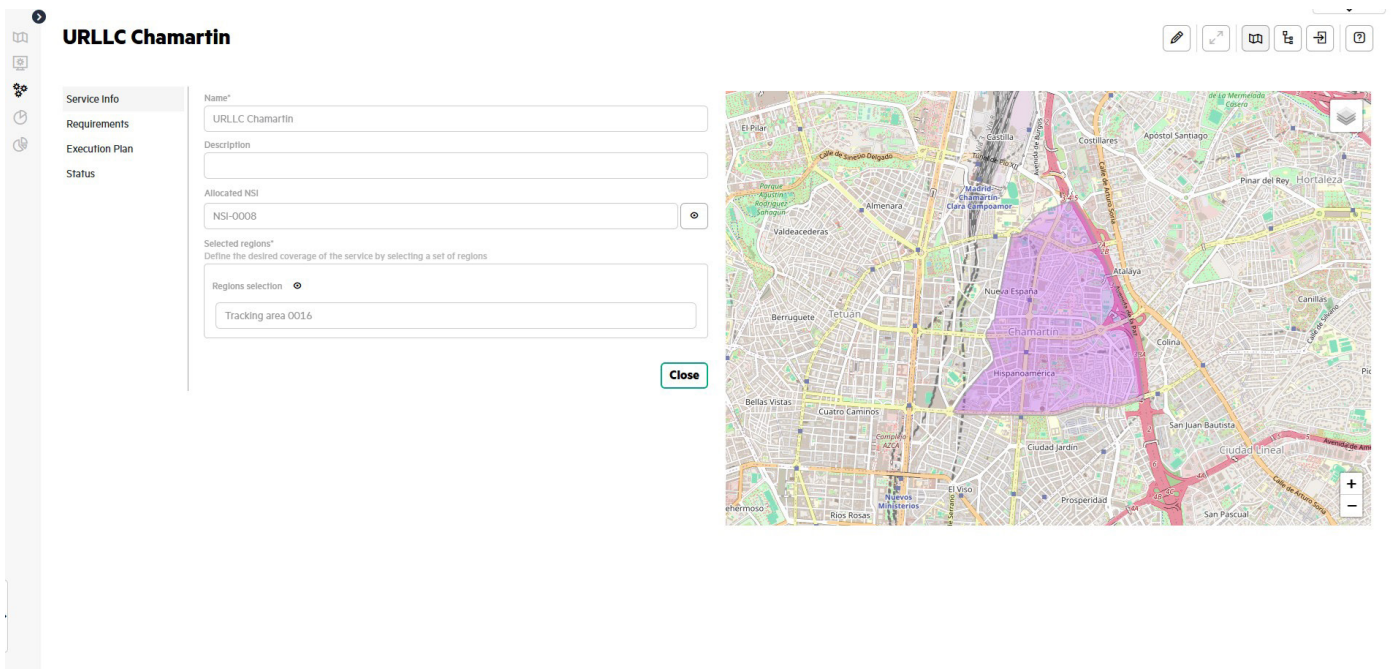


Figure 6. Network slice allocated



Figure 7 represents a graphical example of the user interface that shows details of the decomposition of the network slice into the constituent network slice subnets and the network functions supporting them.

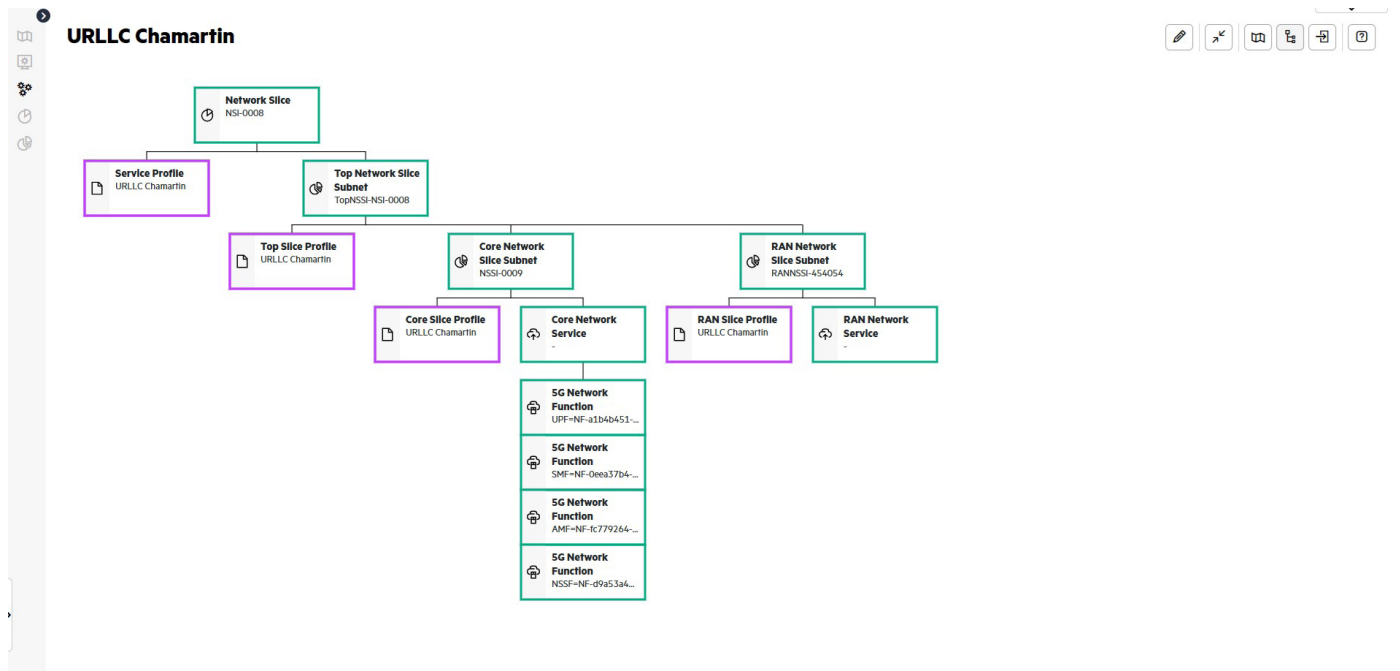


Figure 7. Network slice detailed view

Figure 8 represents a graphical example of the user interface with a resource view showing the resource associated with one constituent network slice subnet.



Figure 8. Resources view of the constituent slice subnets



Composite services management

HPE Telco Service Orchestrator value packs are designed to be integrated into a common platform so that customers can expand their catalog of available services by purchasing additional value packs that are jointly managed from this common platform, including the self-service portal. Another important aspect is that services provided by the value packs are designed to be easily combined as building blocks, allowing the rapid generation of composite services that cover the end-to-end needs. It allows to bring new services to the market very fast and in one of the most agile ways. Once defined, the composite services will be automatically available on the platform and the self-service portal for deployment, as any other service. Additionally, the solution can be complemented with a full end-to-end orchestrator, built on HPE Telco Service Orchestrator as well. It allows extending the current solution capabilities to orchestrate complex service decomposition and long-running tasks and configuring telecommunications services across multiple domains (that is, SD-WAN, VAS, cloud integrations, and such) even when they are not delivered by HPE Telco Service Orchestrator value packs. This add-on also allows to enable the use of TMF641 Service Order Management.

Learn more at

[HPE.com/dsp/transform](https://hpe.com/dsp/transform)

