Network Slicing for VMware Telco Cloud Automation

Exceed SLAs with modern network automation and programmability

At-a-glance

VMware® Telco Cloud Automation is an automation platform that accelerates the time to market of connectivity services while igniting operational agility through unified automation of networks and clouds. It applies an automated, cloud-smart and standard-compliant approach that abstracts and streamlines multi-cloud resource management for network functions, services, and 5G network slices across domains.

Key benefits

- Create on-demand, isolated, programmable, end-to-end logical networks.
- Orchestrate slices across domains.
- Improve network security to protect sensitive customer data.
- Meet and exceed a variety of customer SLAs.
- Build a network environment that satisfies stringent regulatory requirements.
- Configure for high availability to guarantee performance and reliability for customers.
- Provide the technological framework to support, enable and scale 5G-related use cases.
- Easily segment networks, provision network resources on-demand and help their customers unlock additional revenues.

5G's advent will usher in an array of new consumer and enterprise use cases that demand high levels of connectivity with low latency. From autonomous driving and remote healthcare to smart energy grids and factories, 5G technology offers novel business opportunities. In the pre-5G era, service providers relied on a single shared network for their operations that offered limited avenues for differentiated service offerings. Today, however, with consumers and enterprises' newfound demand for varying 5G use cases, service providers are searching for ways to fulfill—and monetize—customer requests.

The confluence of 5G, network virtualization, cloud-native deployments, effective automation, management and orchestration has laid the groundwork for a new type of networking technology suited for these emerging use cases—network slicing.

What is network slicing?

Network slicing enables service providers to create use case–specific logical networks over their shared physical infrastructure. By tailoring (or slicing) their physical infrastructure to provide independent, isolated, programmable and customizable virtual networks, service providers can address specific connectivity requirements for customers. Running on collective infrastructure, these custom overlay networks are associated with specific business purposes that follow a set of predefined service level agreements (SLAs), quality of service (QoS) indicators, security and regulatory requirements. Network slicing provides a standard way of managing and exposing network resources to the end user while ensuring the delivered slice's purpose and characteristics (i.e., throughput, latency, geographical location, isolation level, etc.).

Network slicing allows service providers to create and monetize a new breed of services—like massive machine type communication (mMTC), ultra-reliable low latency communication (uRLLC) or enhanced mobile broadband (eMBB)—through standard frameworks to design, create and manage network resources that can be packaged and exposed directly to the service providers' customers.

VMware Telco Cloud Automation is uniquely positioned to offer unparalleled network slicing capabilities for the modern network.

Network slicing is the cornerstone of modern 5G networks

Service providers today face numerous challenges when unveiling new 5G services that leverage network slicing. First, the industry is nascent: newly developing standards, partially automated networks, a general lack of 5G network function readiness and a fragmented ecosystem of vendors lead to complex, difficult-to-maintain integrations. As such, service providers can find that even developing network slicing as a foundational technology proves daunting.

What's more, even if a service provider can partition its network to offer slicing, then automating, monitoring and managing a slice to meet SLAs with QoS indicators and security requirements has its own hurdles. It is difficult, for instance, to easily segment one's network, provision network resources on demand, offer slices at scale (i.e., for expanding vRAN deployments) and help customers unlock additional revenues through new 5G use cases. In other words, delivering network slicing at scale and enabling 5G services can prove nearly impossible without modern automation.

VMware Telco Cloud Automation is uniquely positioned to offer unparalleled network slicing capabilities for the modern network. First, Telco Cloud Automation unifies domains—RAN, edge and core—and automation layers (i.e., infrastructure, CaaS, xNF/NS) over a single platform. It centralizes and aligns the process for managing network functions over container and VM-based infrastructures while abstracting differences through underlying integrations and automation capabilities. The platform, moreover, provides a unified framework for Day 0, 1 and 2 operations of infrastructure software and standard-compliant and onboarded network functions. Telco Cloud Automation can, moreover, provision cloud-native network functions directly on public cloud providers, bringing unified management of workloads on-premises and on public cloud infrastructures.

Finally, Telco Cloud Automation is not a multifaceted project where substantial integration remains, resulting in expensive fees for service providers. It is, rather, a software-packaged product adapted specifically for the telco cloud with native integrations to VMware Cloud and telco cloud products. Service providers can also leverage VMware's robust, multi-vendor ecosystem of network functions plus key integrations into VMware Telco Cloud and VMware Telco Cloud Service Assurance that enable automation, monitoring and closed-loop remediation from the slice down to the physical infrastructure.

The confluence of Telco Cloud Automation's centralized platform, multi-cloud support capabilities and product-centric design allows Telco Cloud Automation to streamline the network slice instantiation process, expose network resources as slices so they can scale easily (i.e., exposing RAN resources as slices to support vRAN expansions) and enables the service provider to configure underlying network resources with a single abstraction across domains and clouds. As such, service providers can easily create, instantiate and scale 5G-related services grounded in network slicing.

Your journey to unlock network slicing

VMware's Telco Cloud Automation offers a 3GPP standard–compliant network slicing management layer that enables users to plan, design and instantiate end-to-end network slices across the RAN, edge and core domains. Telco Cloud Automation offers three essential components when creating a network slice, as depicted in Figure 1 below.

- The communication service management function, or CSMF, which interfaces with the service order management and OSS
- The network slice management function, or NSMF, which manages the lifecycle of the end-to-end slice across network domains (i.e., RAN, 5G core and transport)
- The network slice subnet management function, or NSSMF, which manages the lifecycle of the network slice subnets within a network domain and applies the NSMF's lifecycle management commands (there can be more than one NSSMF within a network domain—i.e., RAN, core—and in a network.)

The addition of network slicing to VMware Telco Cloud Automation enables service providers to unify domains and close the gap between the endpoint consumed services and the required network resources, from physical or cloud infrastructure.

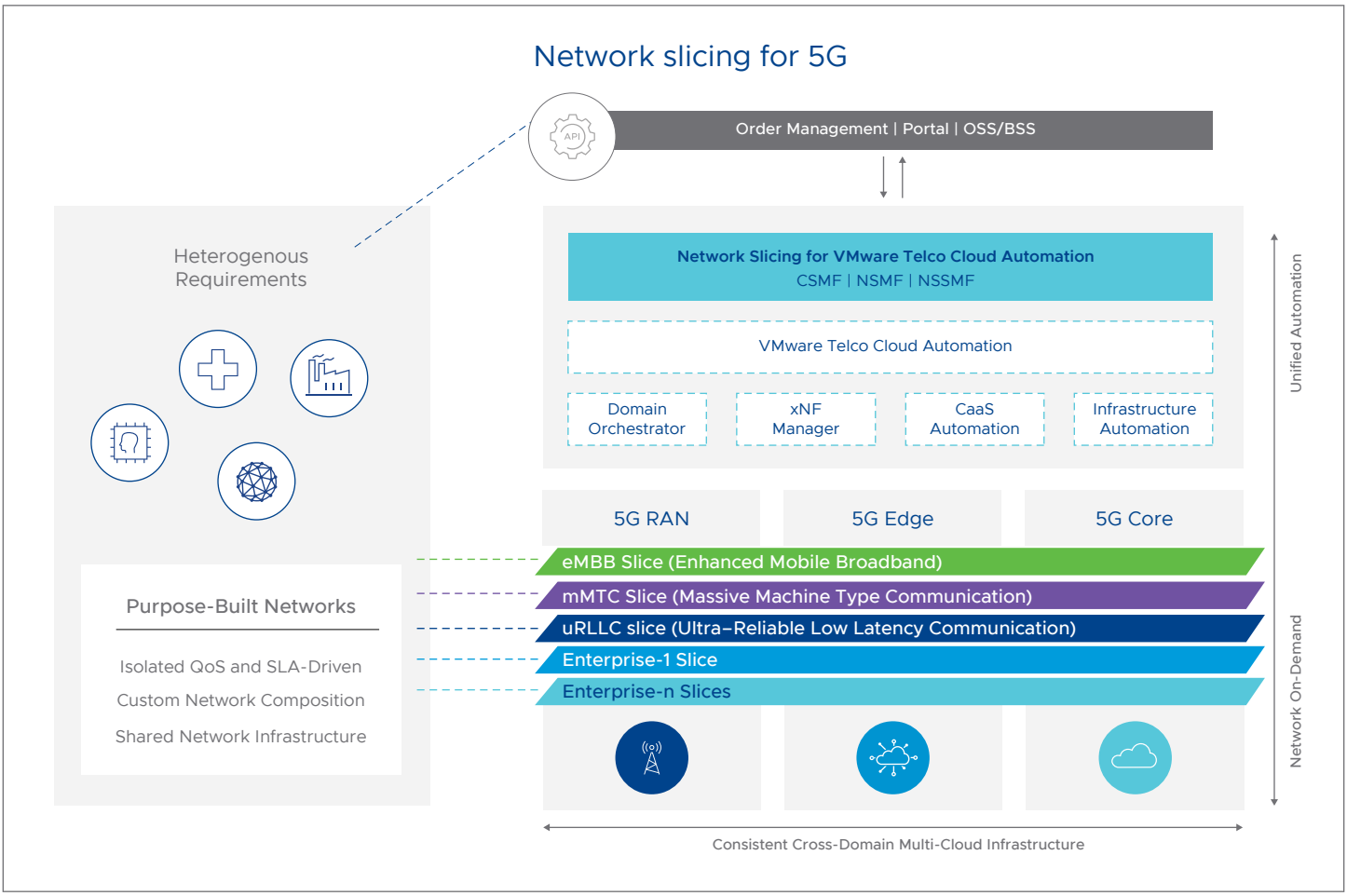

Figure 1: Network Slicing for VMware Telco Cloud Automation

Learn more

Visit vmware.com/products/telco-cloud-automation to learn more about how VMware Telco Cloud Automation can help you leverage the telco cloud to its full potential.

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In Figure 2 below, we highlight how VMware Telco Cloud Automation facilitates the creation, instantiation and monitoring of a network slice from capturing the slice requirements, to onboarding slice templates, creating and activating a slice, and, finally, managing the slice lifecycle.

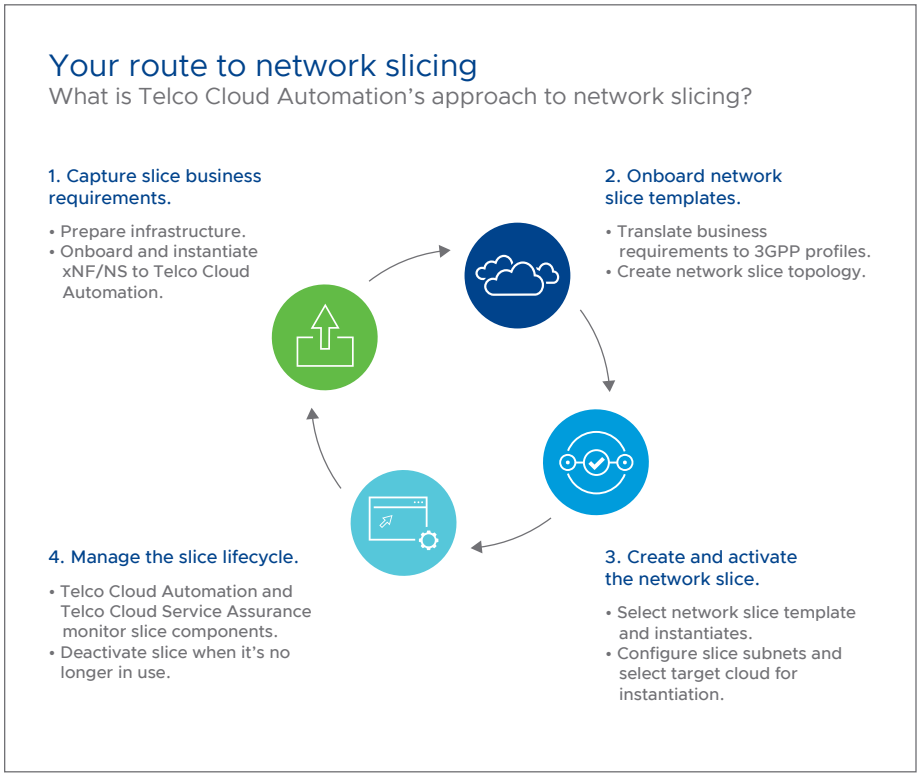

Figure 2: Telco Cloud Automation's unique approach to network slicing

Network slicing—Interoperability		
Supported interfaces	• TMF 641 • TMF 633 • TMF 638	• 3GPP 28.531 • 3GPP 28.532 • NRM 28.541

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