Use case

Network slicing in 5G core

Providing premium event services to customers

NOKIA

Targeting the customer experience with 5G network slicing

Network slicing is a feature of 5G networks that holds great promise for communications service providers (CSPs). It enables them to tailor the network service precisely to the needs of the enterprise customer or individual subscriber and dedicate the network resources required to assure contracted service levels. This allows the operator to add value to its generic service offerings and monetize the many capabilities of the 5G network

Technically, a network slice is a configuration that allows multiple independent logical networks to be created on top of a common physical infrastructure. Each slice of the network can be defined in terms of performance, based on the specific needs of the application, vertical use case or customer service. Each slice is managed from an integrated and automated network manager that makes it possible to provision and manage slices efficiently.

An enterprise might order a slice to support a single use case, such as automated manufacturing, or it can order multiple slices, configured differently to support separate use cases, such as a slice for IoT sensors, a slice for video surveillance and a third slice for an autonomous

robot application. The 5G network can assure the precise performance characteristics for each slice because the slice is supported across access, transport and core domains, which work together seamlessly in an automated manner, end-to-end.

Network slicing technology can also facilitate quick and efficient deployment of innovative services for temporary applications. In this use case, we look at using network slicing to support a live event. This use case illustrates one way that network slicing can help service providers to further leverage their 5G investment with special focus on the role of the core domain.

Use case

Live event premium services

Sports, cultural and social events can often put a strain on the local communications networks as fans and attendees share the excitement by streaming video from their phones. This tends to overload the local network and makes it difficult for event organizers to use the network to offer value-added content to their customers. Network slicing from the operator can solve this problem by allowing the organizer to reserve bandwidth for paid services during the event.

Imagine a Formula 1 race where, for a fee, event customers could see the race being streamed from their favorite driver's onboard camera on their smartphone or virtual reality glasses. Fans watching a football match could have live statistics overlaid on the game using augmented reality glasses. Or video analytics trained on the concession queues could alert VIP fans when it is the best time for procuring food or beverages. These premium services could be value-added options offered during the purchasing of tickets, and the bandwidth required by the applications and analytics services could be provisioned in real-time using a network slice.

Even security teams can benefit from the advanced surveillance and analytics services for the duration of the event. They can use cloud-based video analytics tools to detect COVID regulation compliancy, potential trespassing or criminal activity. Security and first responder teams can have network resources assured as part of an end-to-end slice that might also include push-to-talk and push-to-video communications.

Creating the core network slice subnet

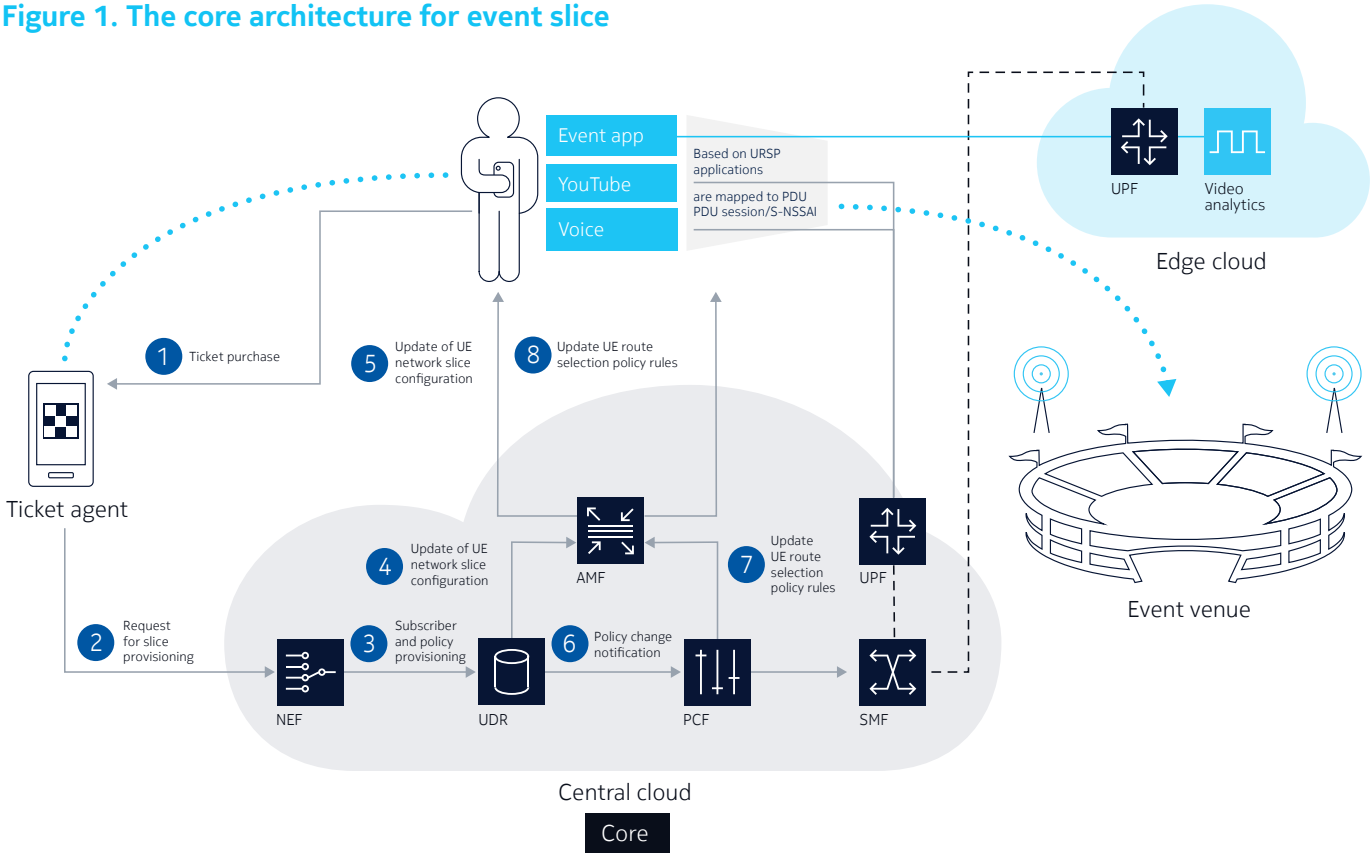
The 5G core network is the heart of the network and plays essentially the same role in network slicing as in any other service. It connects the various domains of access, IMS and data networks and enables them to interwork without interruption. It provides the standard registration and session management, policy, charging, roaming and network exposure capabilities per slice. The slice lifecycle is managed in a uniform and fully automated manner.

Taking our specific use case as an example, the ticket service of the event venue is integrated with the CSP 5G core using APIs exposed by the network exposure function (NEF). After a ticket is purchased, NEF is informed of the subscription permanent identifier (SUPI) of the customer. It triggers the provisioning of the event network slice(s) to the subscriber profile in the user data repository (UDR). The policy control function (PCF) uses the access and mobility management function (AMF) to update the user equipment (UE) enabling it to associate applications and services with packet data unit (PDU) sessions and network slices. Moments after the ticket is purchased, the customer is already enjoying the new value-added services.

All the user plane traffic is routed to a slice dedicated user plane function (UPF) in the edge cloud, which provides local breakout for the video analytics service and to the internet. Thanks to the cloud-native, high performance core architecture and dedicated UPF, the high bandwidth requirement of the event venue can easily be met. This UPF instance exists only for the duration of the event, ensuring local resources remain efficiently allocated.

If the above-described deployment, configuration and provisioning activities were to be done manually, it would be close to impossible to deliver network slicing at scale. Of course, automating the 5G Core is only one part of the journey, complete end-to-end automation is needed across radio, transport and core. The Nokia Digital Operation Center ties the various domains into a seamlessly automated flow that ensures end-to-end support for the network slice.

Figure 1. The core architecture for event slice



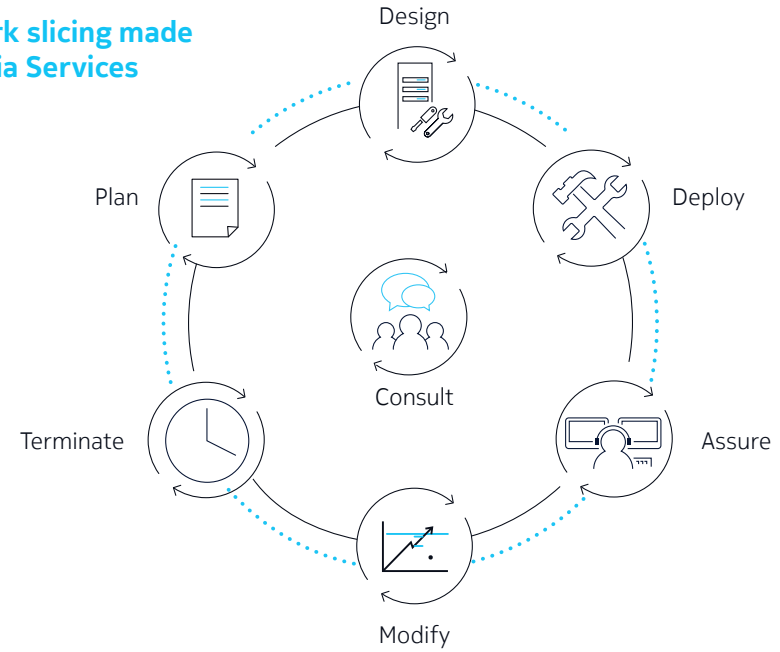
Deploying an event slice with Nokia Services

The planning and design of network slicing services need to account for the specific requirement of the event venue, event organizer and participants. Our consultants start by bringing together all relevant stakeholders, helping them to select the right business use cases from our catalogue, and using our tested design methodology to prototype the service based on the defined customer experience requirements. The security considerations for the network slice are built in from the design stage.

Having prototyped the use case and defined the value ranges for the selected 5G slicing parameters, the fulfillment teams define the slicing templates and orchestrate the slice delivery. They provide the workflows and templates with the right input parameters, and deployment is managed through the Nokia Orchestration Center in a fully automated manner.

Creation and deployment of a network slice is only half of the job. During the lifecycle of a service, we monitor the predefined network slice KPIs and SLA targets. The policies defined during the fulfillment and orchestration process are passed through to the Nokia Assurance Center. Slice requirements may change during their lifecycle for efficiency or other reasons such as provisioning additional subscribers or scaling out a network slice before the event and scaling it in afterwards. Depending on the slice characteristics or the provisioned data to be modified, it is facilitated with the help of DO Center or NEF dynamically, on the fly. When it comes time, the network slice is terminated with the click of a button and the previously reserved resources are immediately freed up for other uses.

Figure 2. Network slicing made simple with Nokia Services



At Nokia we believe in designing use cases that can be replicated easily and efficiently. A network slice should be designed once and reapplied to different events automatically, for example, a concert followed by a football match occurring in the same event venue. There is no need to continuously maintain it. Nokia's 5G core capabilities are easily exposed by APIs for integration with third-party applications designed for events or other use cases.

Network slices can take a wide variety of different forms depending on the end customer's needs. This is what makes network slicing an ideal way to leverage the many features of 5G technology to tailor a precise solution for your customers. There is always a first for everyone, and our consultants have global experience to guide you through the network slicing journey step by step.

Learn more

Website

Video

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About Nokia

We create the critical networks and technologies to bring together the world's intelligence, across businesses, cities, supply chains and societies.

With our commitment to innovation and technology leadership, driven by the award-winning Nokia Bell Labs, we deliver networks at the limits of science across mobile, infrastructure, cloud, and enabling technologies.

Adhering to the highest standards of integrity and security, we help build the capabilities we need for a more productive, sustainable and inclusive world.

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