

A SDN/NFV Based Network Slicing Creation System

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Abstract. The next-generation network system is envisioned to be a multi-service network supporting different applications with multiple requirements. In this vision, Network SLicing (NSL) is considered a key mechanism to create multiple virtual networks over the same physical infrastructure. However, it is a challenging problem to deploy NSL with great flexibility. In this paper, we propose a novel SDN/NFV based NSL creation system, which includes the design domain, execution domain, and infrastructure domain. With these components, tenants can create NSL freely via an easy-to-use UI on a web browser.

Keywords: Network Slicing · 5G · SDN · NFV.

1 Introduction

The emerging fifth-generation (5G) network is expected to support a multitude of applications with diverse performance requirements. Recently, Network SLicing (NSL) [2] has been introduced as a promising solution to address this challenge. NSL is a concept that enables the operator to provide multiple dedicated virtual networks over a common network infrastructure. In this situation, NSL [1] is facing a rapid change by embracing Software Defined Networking (SDN) and Network Function Virtualization (NFV).

Although some excellent works have been done on NSL, there are still some existing problems. Firstly, most of the current NSL systems are specific and NSLs are difficult to reuse. Secondly, an NSL provider has to deploy NSL instances for multiple tenants. Thirdly, although there are many NFV management and orchestration systems, few of them can orchestrate network service by integrating both SDN and NFV. Given these facts, we propose a novel SDN/NFV based NSL creation system.

2 System Overview

As Fig. 1 shows, our proposed NSL creation system consists of three main domains: design domain, execution domain, and infrastructure domain. In this architecture, we mainly focus on the transport network and core network, ignoring the RAN domain for simplicity.

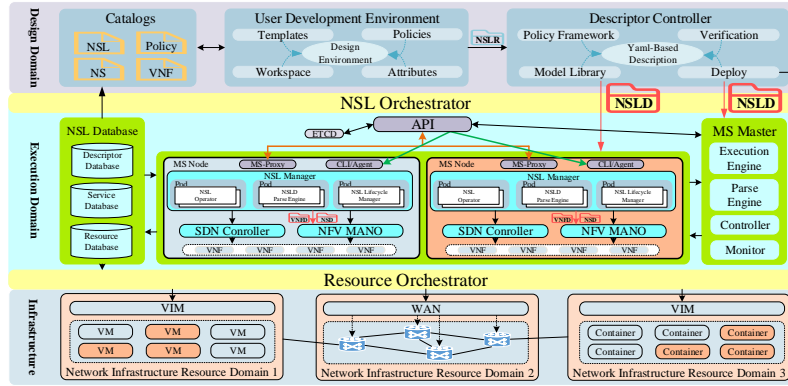


Fig. 1. The architecture of SDN/NFV based NSL creation system.

At the design domain, there are multiple sub-services available in catalogs. Tenants can use sub-services to design their own NLS in a drag-and-drop way. After designing, the NLS Descriptor (NSLD) is generated.

As Fig. 1 shows, NSLD is delivered to the execution domain. It is a service execution environment designed to manage the NSL life cycle. This microservice architecture based domain is distributed and self-organized.

At the infrastructure domain, there are multiple VIMs and Wide Area Networks (WANs) connecting them. In this domain, NSL instances belonging to different tenants run simultaneously in multiple VIMs.

3 Conclusion

In this paper, we propose a novel SDN/NFV based NSL creation system. The design domain provides an easily-operating service design environment. The execution domain is a distributed and self-organized service execution environment with multi-tenancy support. The infrastructure domain contains multiple network infrastructure resource domains. Tenants can create NSL with great flexibility and full automation.

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