Network slicing in the context of IoT

Sławomir Kukliński
Orange Polska
Geneva, June 6th, 2017

Introduction

Slicing seems to be a hot topic, but mostly in the 5G community

- The technology can be also nicely used for other (non-mobile) solutions – it is very well suited for IoT

- Slicing is typically applied to softwarized networks (SDN/NFV/Clouds)

- It solves similar problems to MEC (and gives much more)

- It enables deployment of different (QoS), multiple large scale IoT networks with low OPEX and short TTM

- It may give the slice (IoT network) tenant rich management capabilities

- It impacts IoT business models

orange™

3GPP and slicing

- A slice is composed as a collection of logical network functions that supports the communication service requirements of particular use case(s)

- The network slicing primarily targets a partition of the core network, but it is not excluded that RAN may need specific functionality to support multiple slices or even partitioning of resources for different network slices

3

orange™

Slicing according to NGMN (5G P1 01/2016)

The network slicing concept consists of 3 layers:

- Resource layer

  - Physical Resource: computation, storage or transport

  - Logical Resource: partition of a physical resource, or grouping of multiple physical resources dedicated to a Network Function

- Network Slice Instance Layer that is created using Network Slice Blueprint that provides the network characteristics which are required by a Service Instance. A Network Slice Instance may also be shared across multiple Service Instances.

- Service Instance Layer represents the services which are to be supported. Services can be provided by the network operator or by 3rd parties

orange™

NGMN (5G P1 01/2016): Network Slice Instance

- <u>A set of network functions, and resources</u> to run these network functions, forming a complete instantiated logical network to meet certain network characteristics required by the Service Instance(s)

- A network slice instance may be fully or partly, logically and/or physically, isolated from another network slice instance

- The resources comprise of physical and logical resources

Network Slice Blueprint: A complete description of the structure, configuration and the plans/work flows for how to instantiate and control the Network Slice Instance during its life cycle. It enables the instantiation of a Network Slice, with certain network characteristics (e.g. ultra-low latency, …)
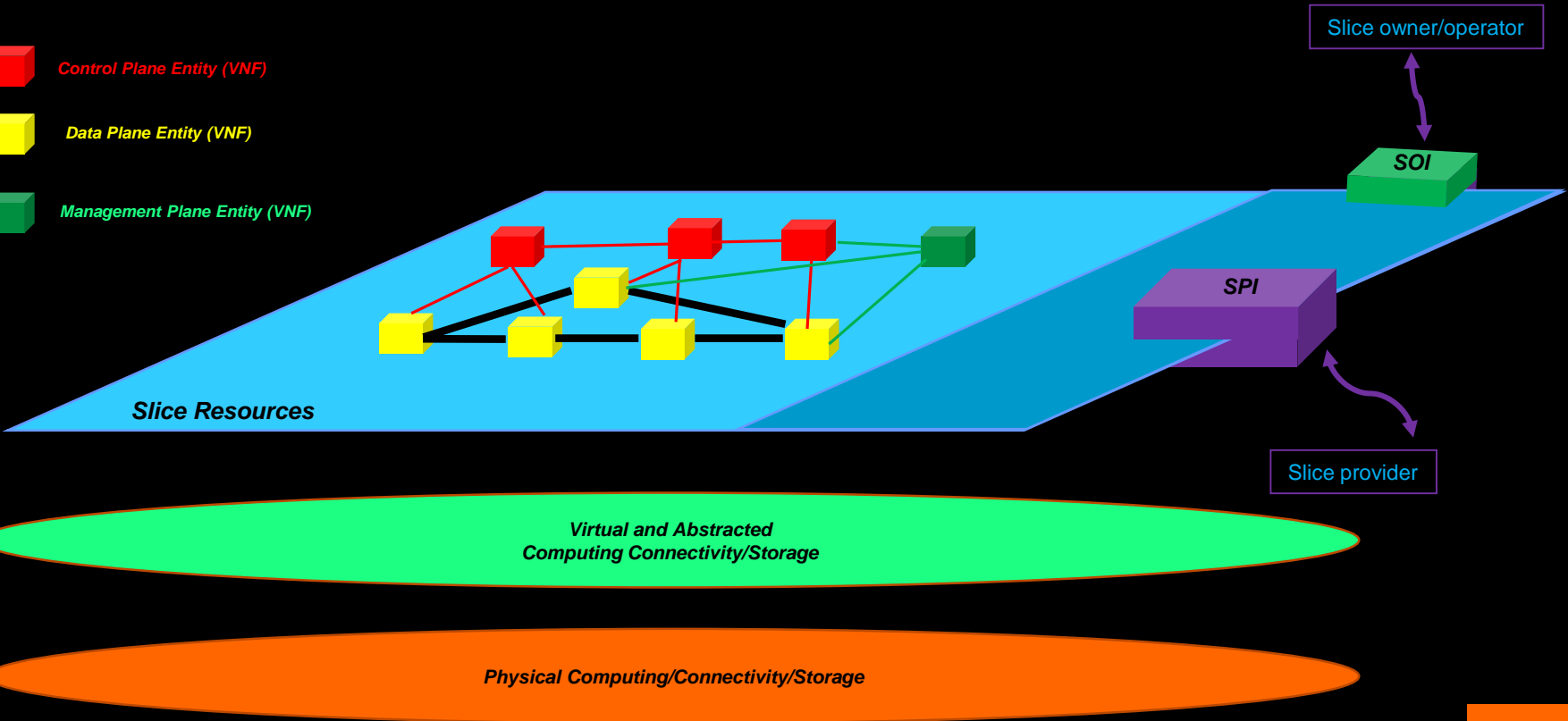
5

orange™

NGMN (5G P1 01/2016): The overall picture
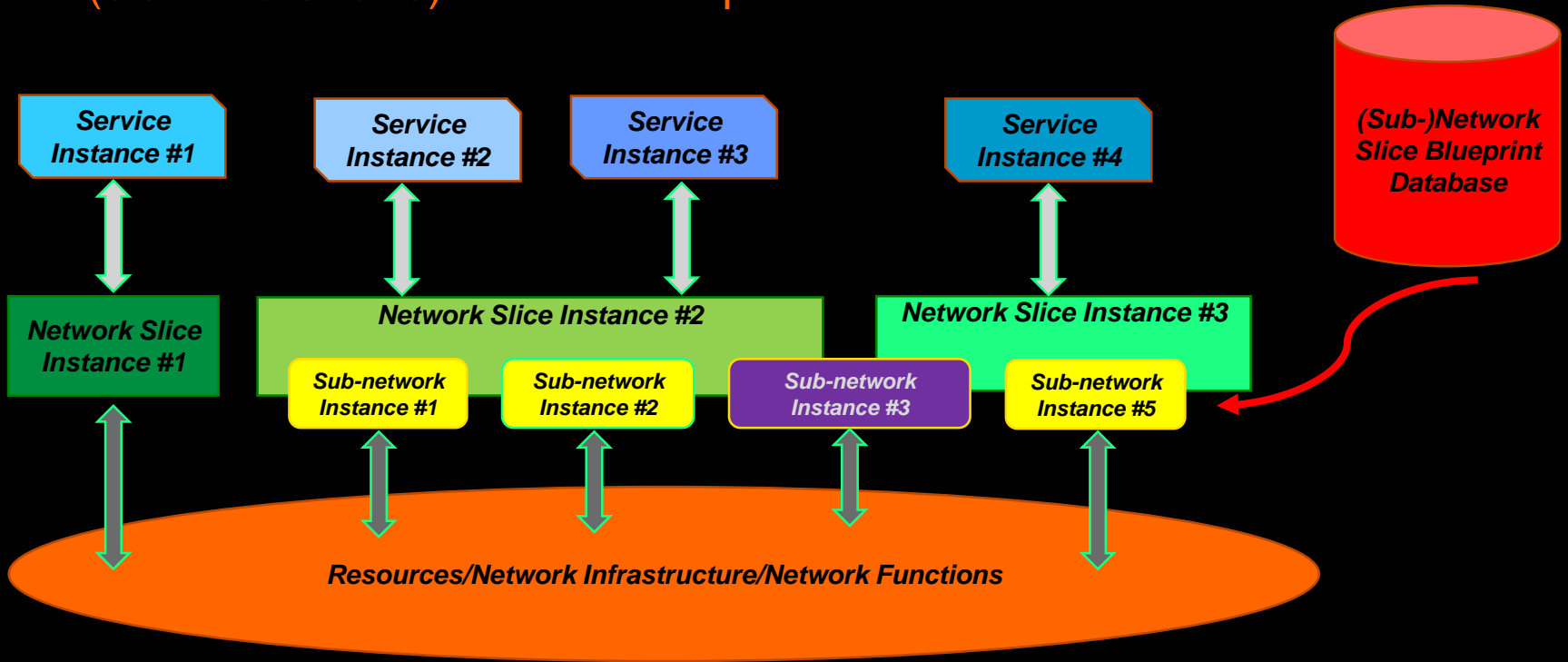
Generic slicing architecture

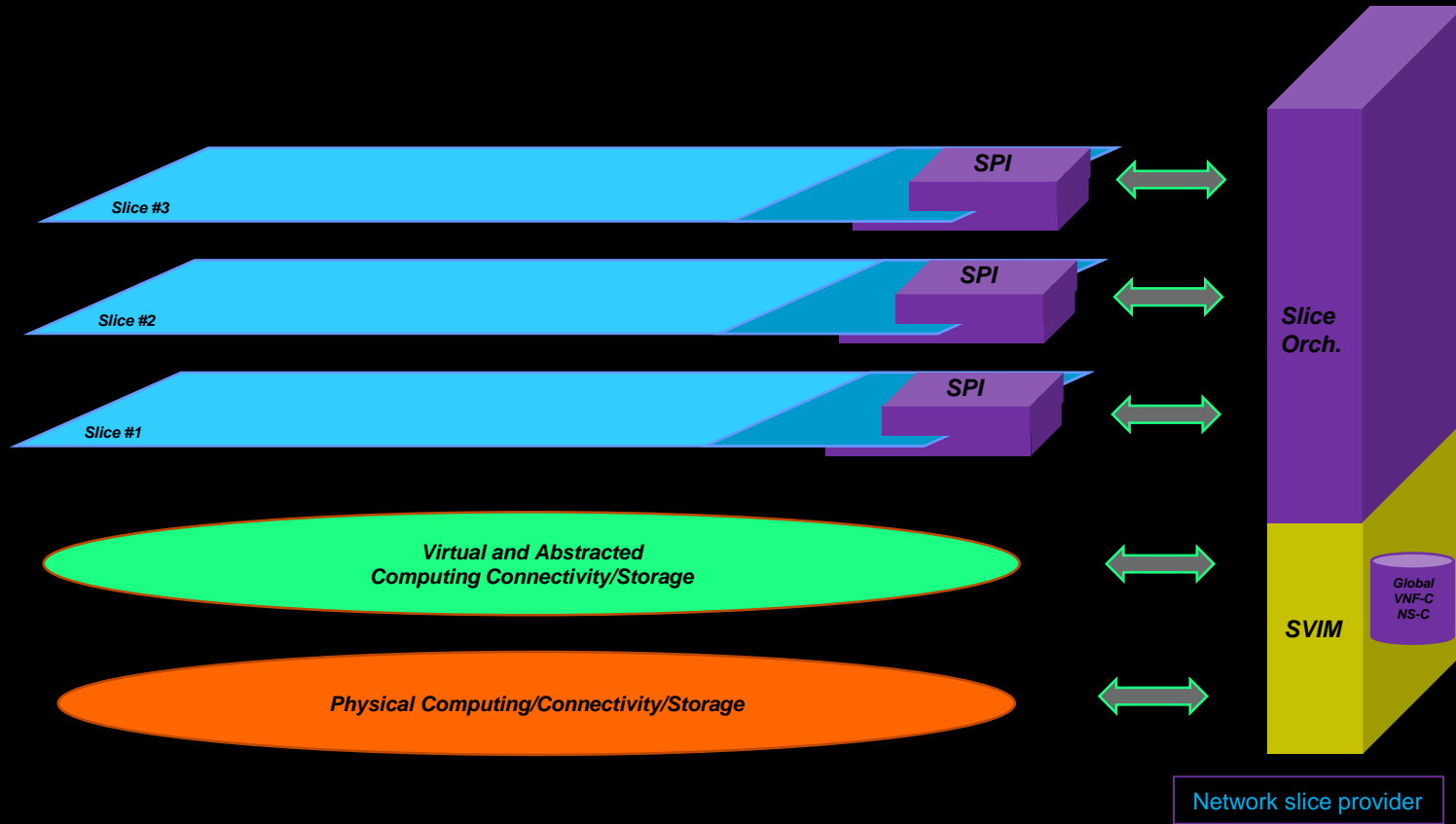Control Plane Entity (VNF)

Data Plane Entity (VNF)

Management Plane Entity (VNF)

Slice owner/operator

SOI

SPI

Slice Resources

Slice provider

Virtual and Abstracted
Computing Connectivity/Storage

Physical Computing/Connectivity/Storage

orange™

Slice Orchestration and Management

Slice #3

Slice #2

Slice #1

SPI

SPI

SPI

Virtual and Abstracted Computing Connectivity/Storage

Physical Computing/Connectivity/Storage

Slice Orch.

SVIM

Global VNF-C NS-C

Network slice provider

8

orange™

Benefits of slicing

- **Shared infrastructure but many networks** with different features of
  - Data plane (QoS, caching, encryption)
  - Customized Control Plane properties
  - Cross ISO stack operations (network well integrated with services)
  - Dynamic placement of functions (cf. follow-the-crowd approach)
- **Automated operations via orchestration**
  - Includes dynamic placement of functions on the edge
- **Ownership**
  - Slice owner may have control over its network slice
- **Network slice on demand** (cf. every day early in the morning)
  - The infrastructure is ready
  - Slice templates (Blueprints) are reusable
  - On-demand slices can be created by the end users

orange™

Merci!

slawomir.kuklinski@orange.com