



Network Softwarization, NFV and 5G

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Outline



1. Network Softwarization, NFV and 5G
2. Introduction of ETSI ISG NFV
3. Multi-Site services in ETSI ISG NFV

Definition of Network Softwarization

Network Softwarization is an overall transformation trend for designing, implementing, deploying, managing and maintaining network equipment and/or network components by software programming, exploiting the natures of software such as flexibility and rapidity all along the lifecycle of network equipment / components, for the sake of creating conditions enabling the re-design of network and services architectures, optimizing costs and processes, enabling self-management and bringing added values in network infrastructures.

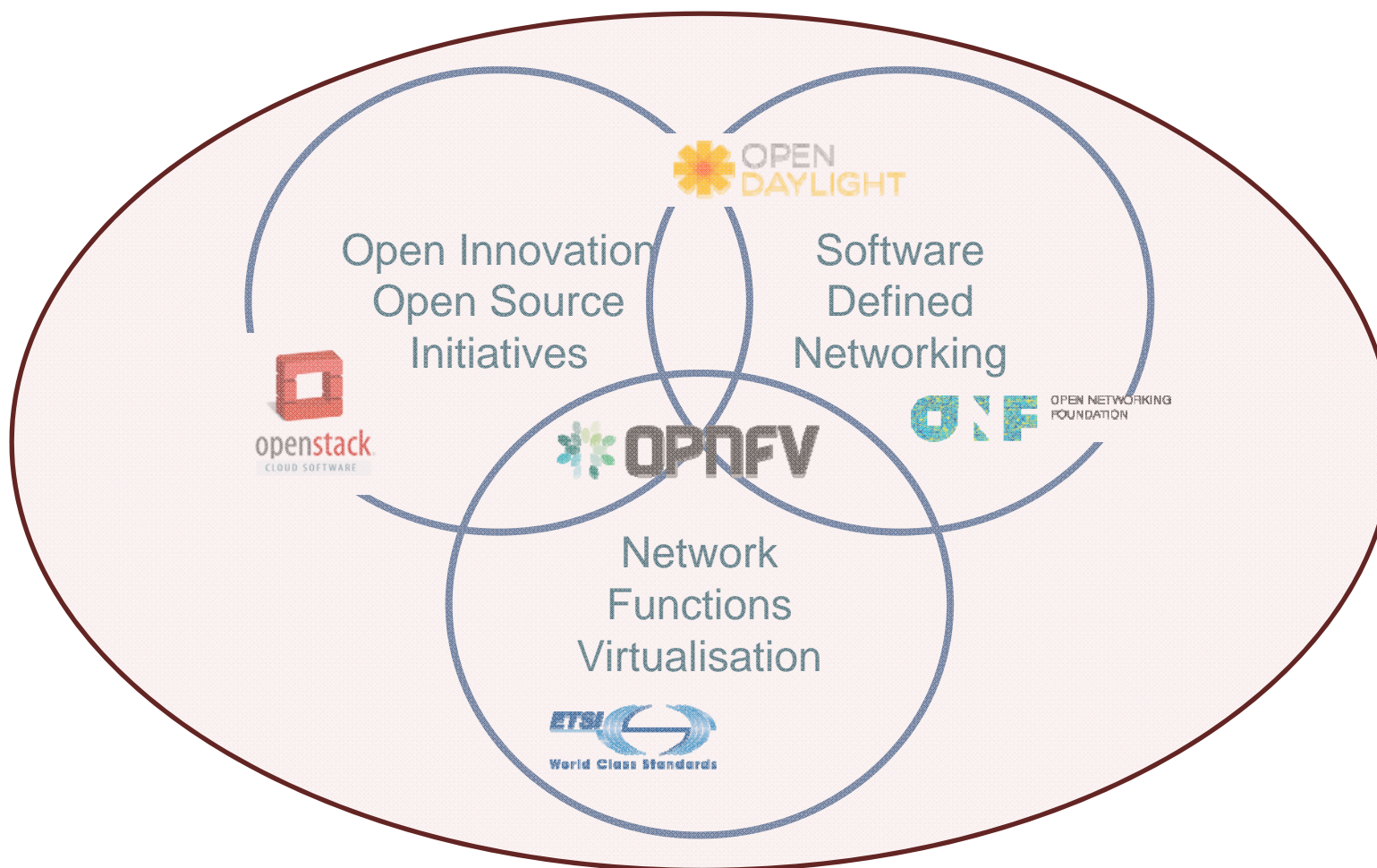
From FG IMT-2020 "Report on Standards Gap Analysis"

The term was first introduced at the academic conference NetSoft 2015, the First IEEE Conference on Network Softwarization, in order to include broader interests regarding:

- **Network Functions Virtualisation (NFV)**
- **Software Defined Networking (SDN)**
- Network Virtualization
- Mobile Edge Computing (MEC)
- Cloud and IoT technologies.



NFV/SDN and Network Softwarization

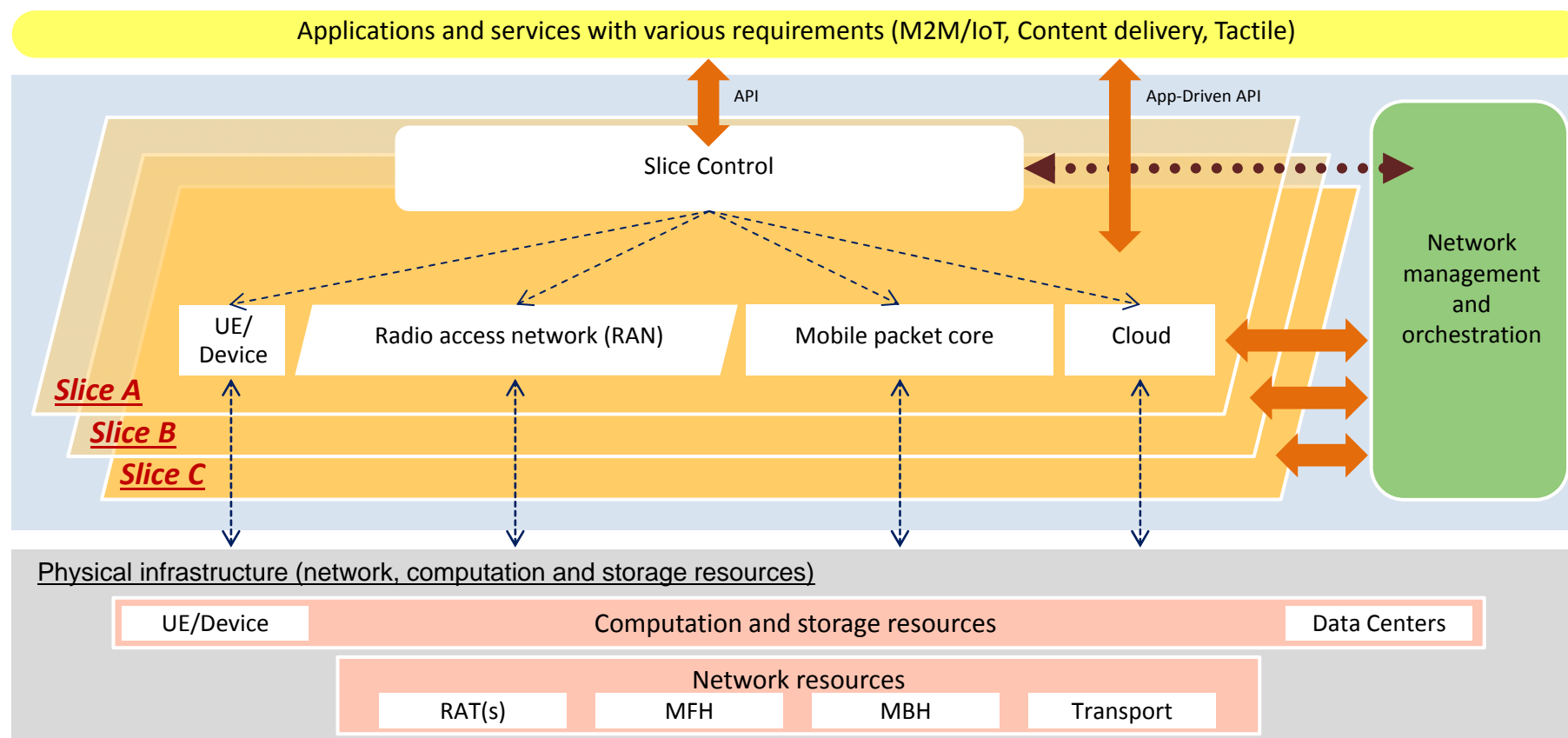


To be harmonized under the concept of Network Softwarization

Network Softwarization and Slicing



Network softwarization will provide the basis for managing life-cycle of “slices” to support a variety of services in a extremely flexible manner, while maintaining the efficiency of physical infrastructure.



ETSI ISG NFV



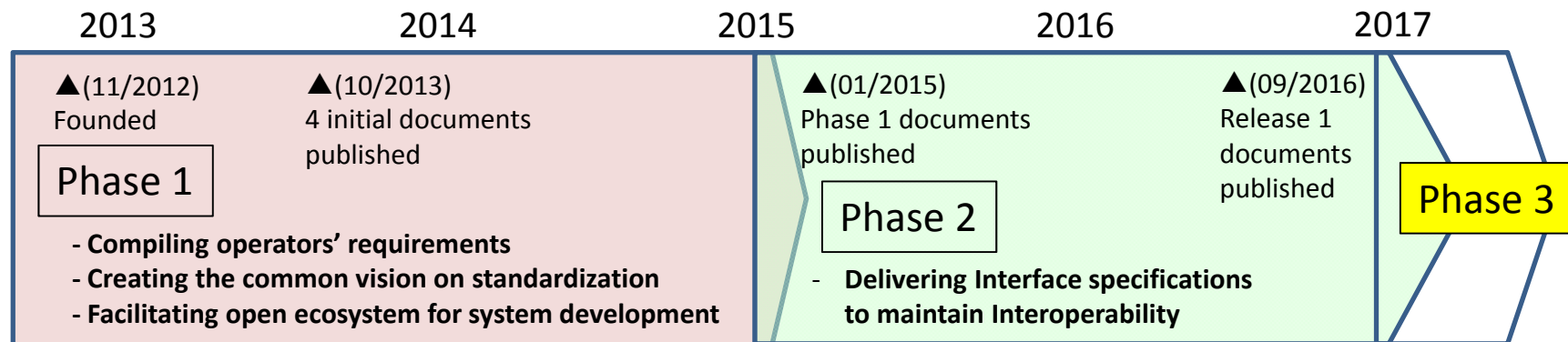
ETSI ISG NFV is the industry specification group in ETSI, which studies Network Functions Virtualisation. Founded in Nov. 2012 by telecom operators.



Initial members



More than 290 telecom and IT companies, including 37 telecom operators worldwide joined. Phase 1 activity delivered 17 documents detailing use cases, architectural framework and requirements. Phase 2 activity, started in 2015, have delivered the interface specifications in Sep. 2016. This activity is extended for Phase 3, starting from 2017.



ETSI (European Telecommunications Standards Institute)

ISG (Industry Specification Group)

NFV (Network Functions Virtualisation)

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Deliverables of ETSI ISG NFV



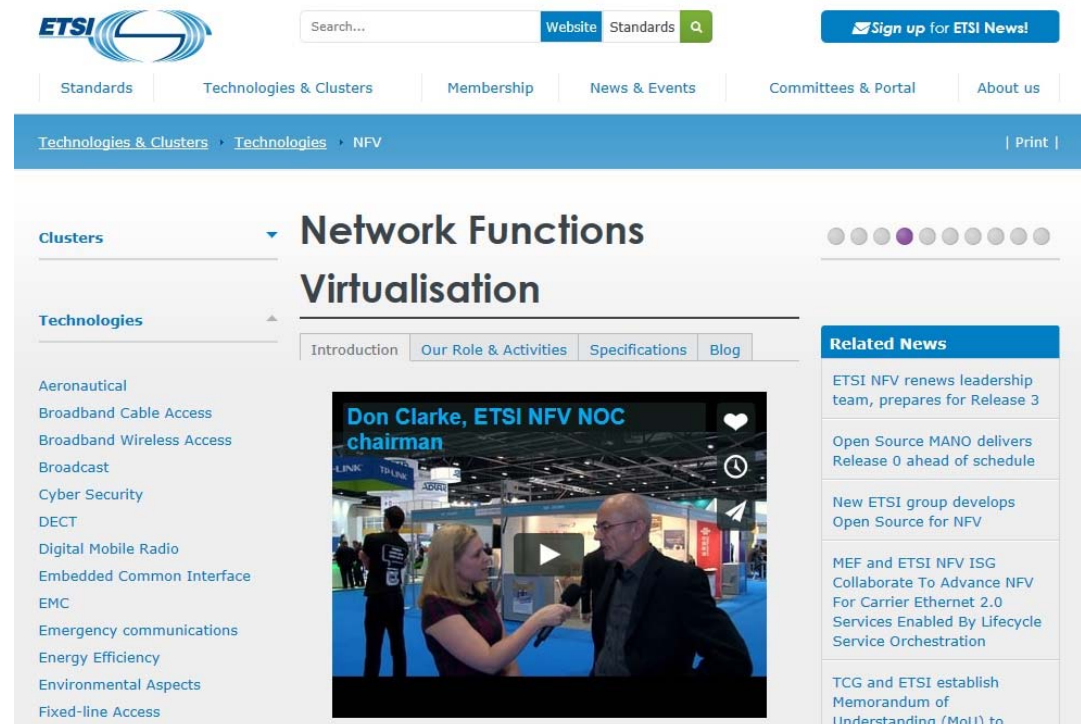
The specifications published by ETSI ISG NFV and the latest working drafts are available via ETSI portal site.

ETSI ISG NFV Portal

<http://www.etsi.org/technologies-clusters/technologies/nfv>

Open Area of ETSI ISG NFV

<https://docbox.etsi.org/ISG/NFV/Open/Drafts/>



Announcement of NFV Release 2



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ETSI brings virtualization of telecommunication networks closer with announcement of NFV Release 2

Sophia Antipolis, 27 September 2016

NFV Architectural Framework gains further traction as greater breadth of key parameters are determined

ETSI has today announced the availability of the NFV Release 2 specifications, delivering requirements, interfaces and information models for Network Functions Virtualisation (NFV).

This underlines the significant progress made in the development and future utilization of NFV technology. Undertaken by the ETSI Industry Specification Group on NFV (ETSI ISG NFV) now covering an expansive range of core activities, the successful completion of the specifications from the Release 2 roadmap will move the telecommunication sector closer to the goal of a more agile, flexible and cost-effective network infrastructure.

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Management functions of NFV (NFV-MANO)



Management and orchestration functions of NFV (NFV-MANO) consists of three components: For Network Services, VNFs and Infrastructure.

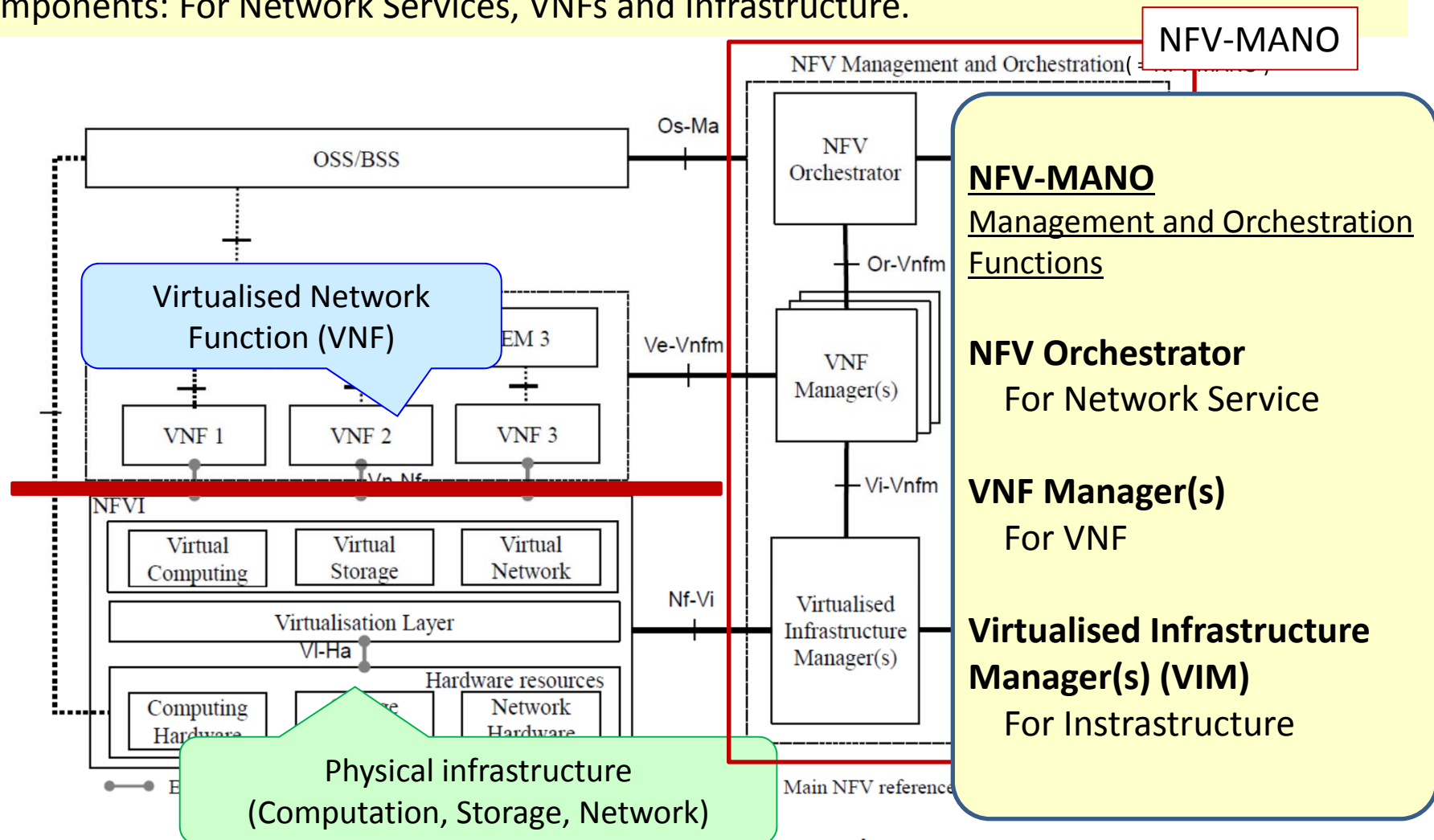
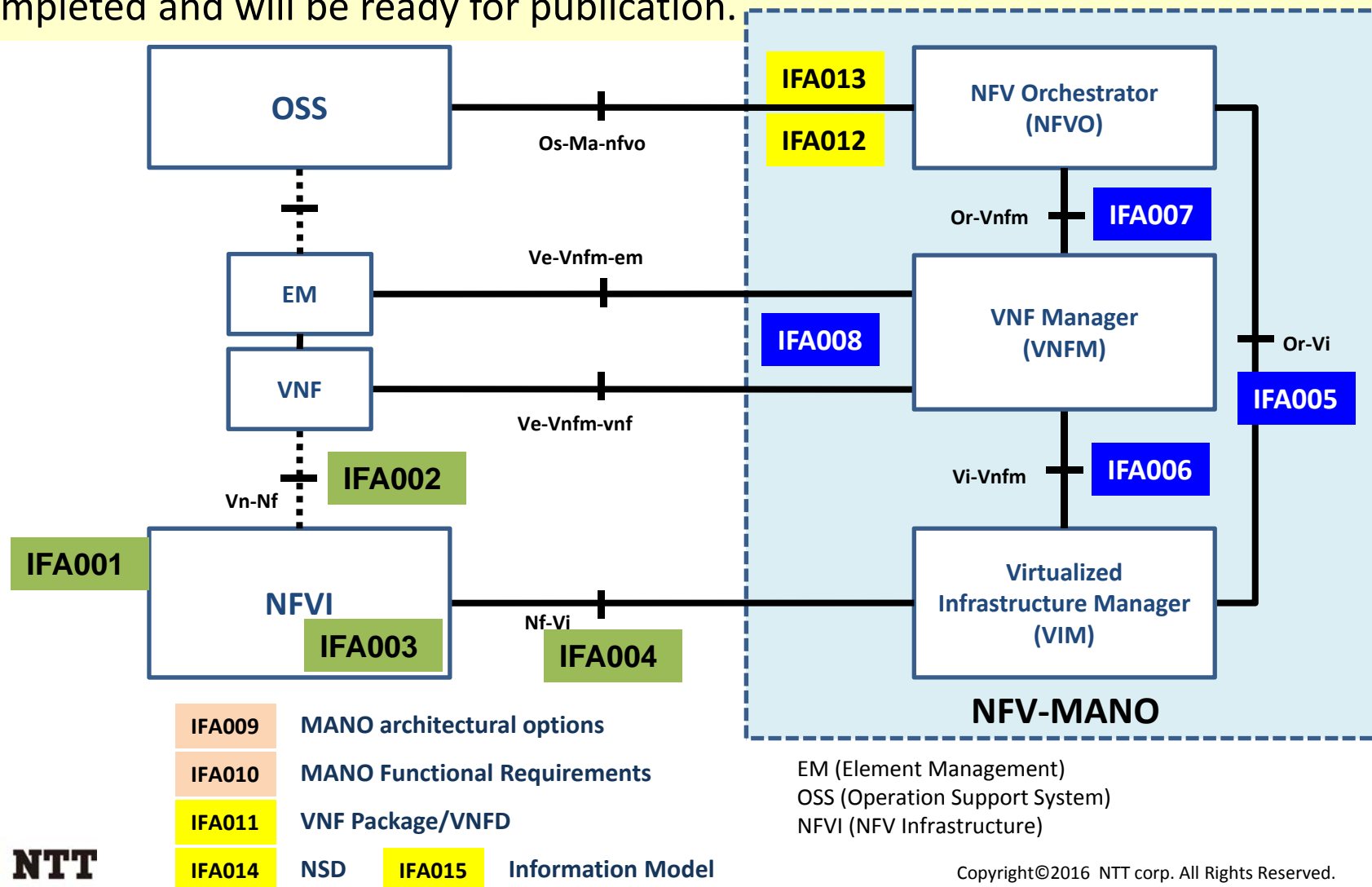


Figure 4: NFV reference architectural framework

Interfaces associated with NFV-MANO

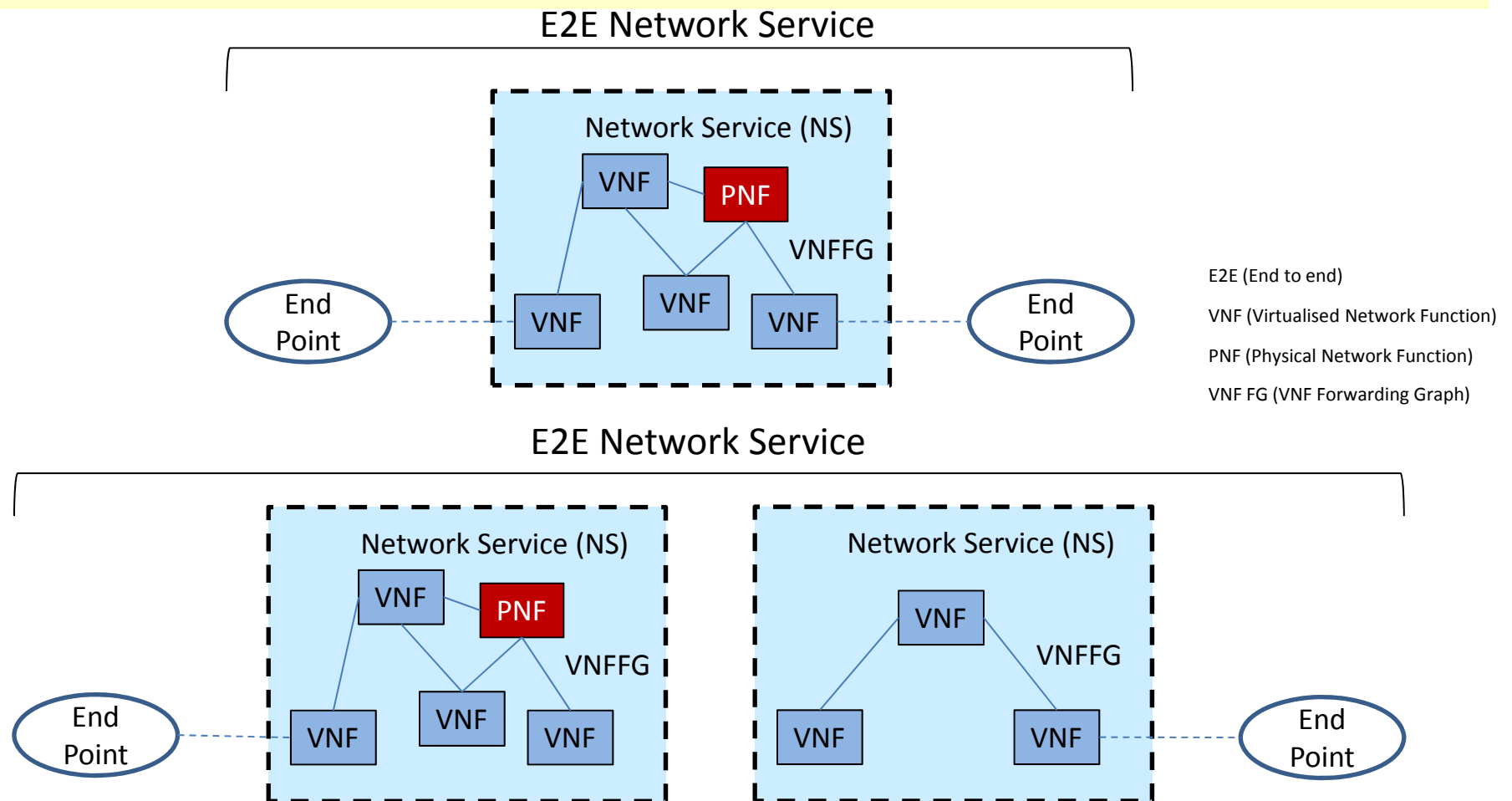


The NFV Release 2 description has been determined. The specifications has been completed and will be ready for publication.



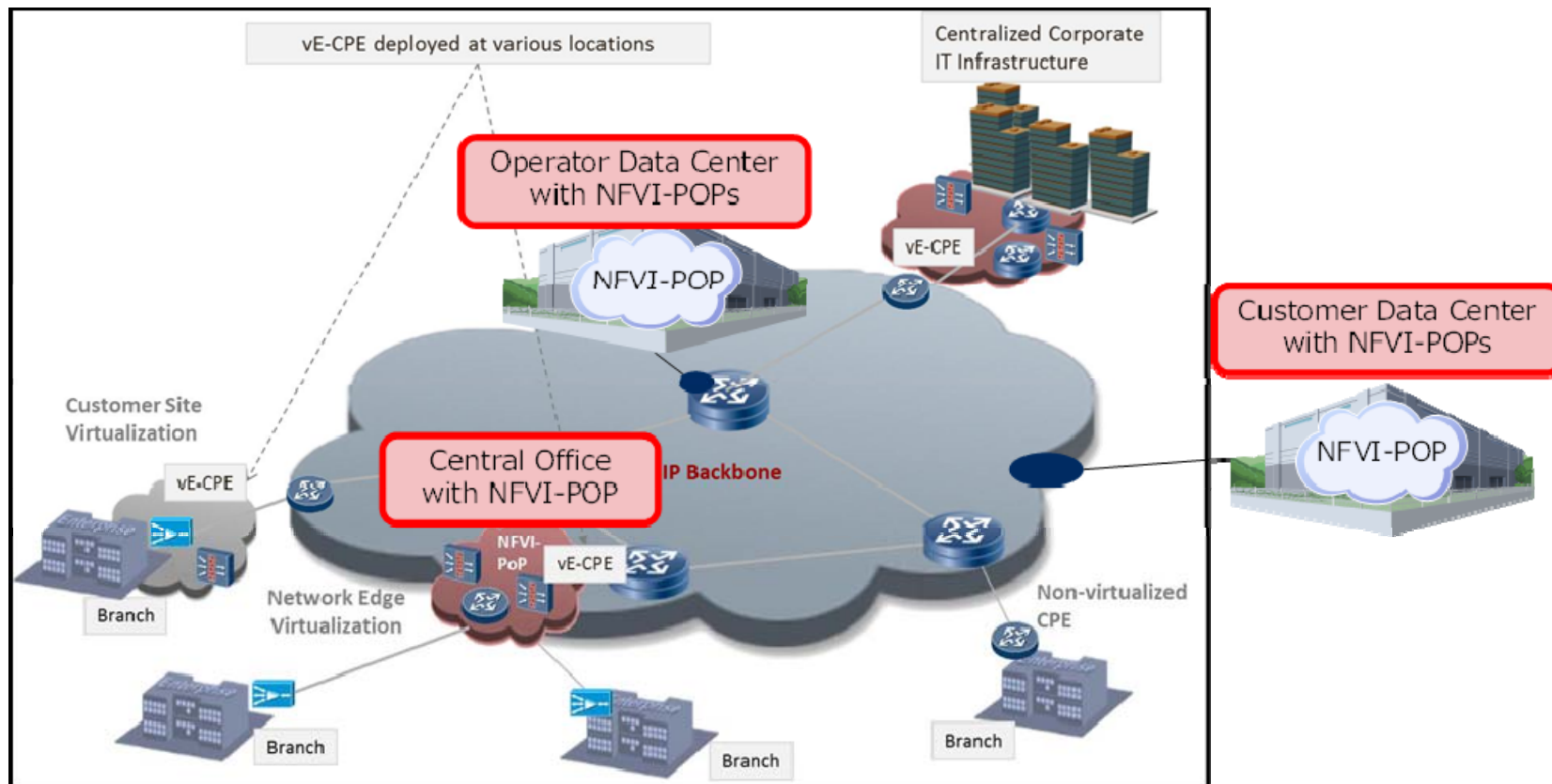
VNF, NS and E2E Network Service

The model of “Network Service (NS)” and “Virtualised Network Function (VNF)” are defined as follows.



A scenario of NFV deployment

Multiple sites, such as Operator Data Centers, Central Offices and Customer Data Centers, may deploy NFV systems and are connected via network infrastructure, such as WAN and access networks.



Multi-Site Services: A new WI in ISG NFV

Report on functional architecture necessary to manage and provide connectivity for multi-site NFV services (i.e. over WANs, access networks)

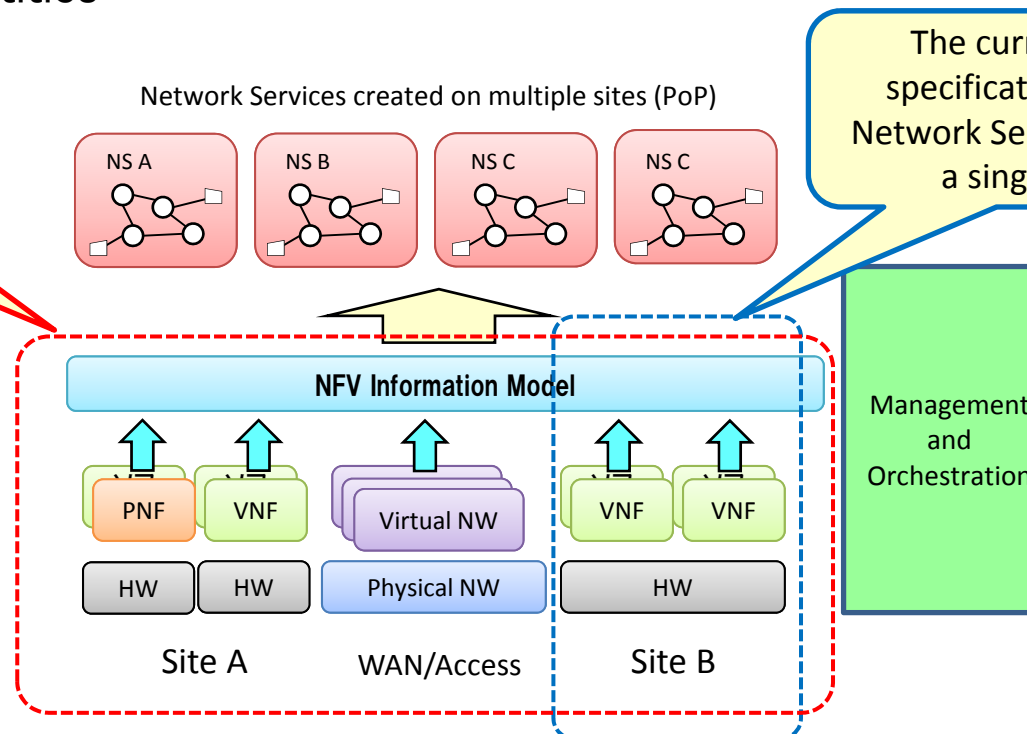
- How to define and describe “multi-site services”
- How to provide “infrastructure connectivity” via WANs and access networks
- How to the infrastructure connectivity to support the multi-site services and their associated functional entities

This new work items tries to cover those created on multiple sites.

The current NFV specification covers Network Services within a single site.

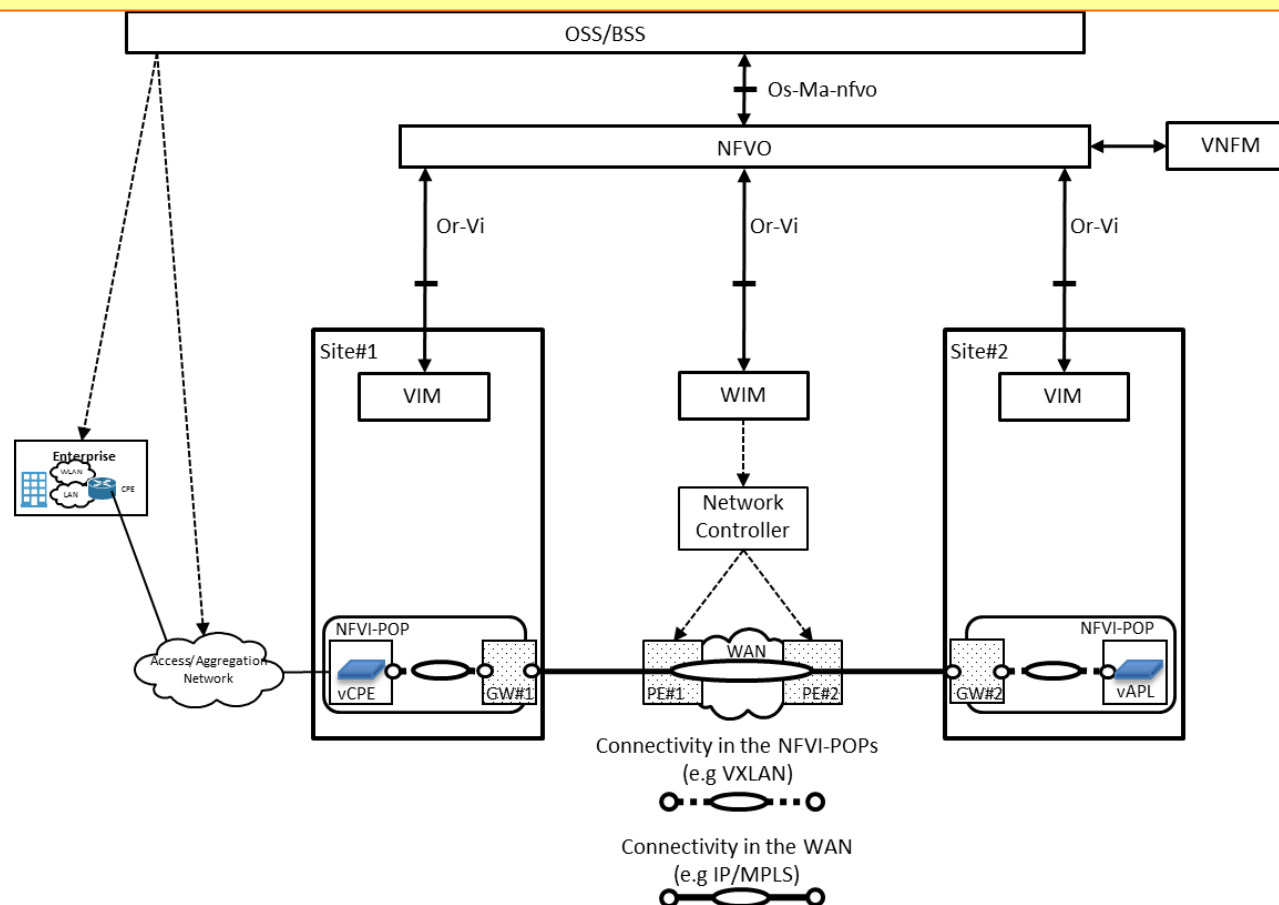
Supporting organizations

ORANGE, PT PORTUGAL SGPS SA, Nokia Networks, Hewlett-Packard Enterprise, Ericsson LM, NEC EUROPE LTD, TeliaSonera AB, Deutsche Telekom AG, NTT corporation, Hitachi Europe Ltd., ZTE Corporation, AT&T GNS Belgium SPRL, NetCracker



An example of use cases under study

The work has been started in July, 2016 and the use case given below has been identified for study. This work is scheduled to be completed at the end of 2016.

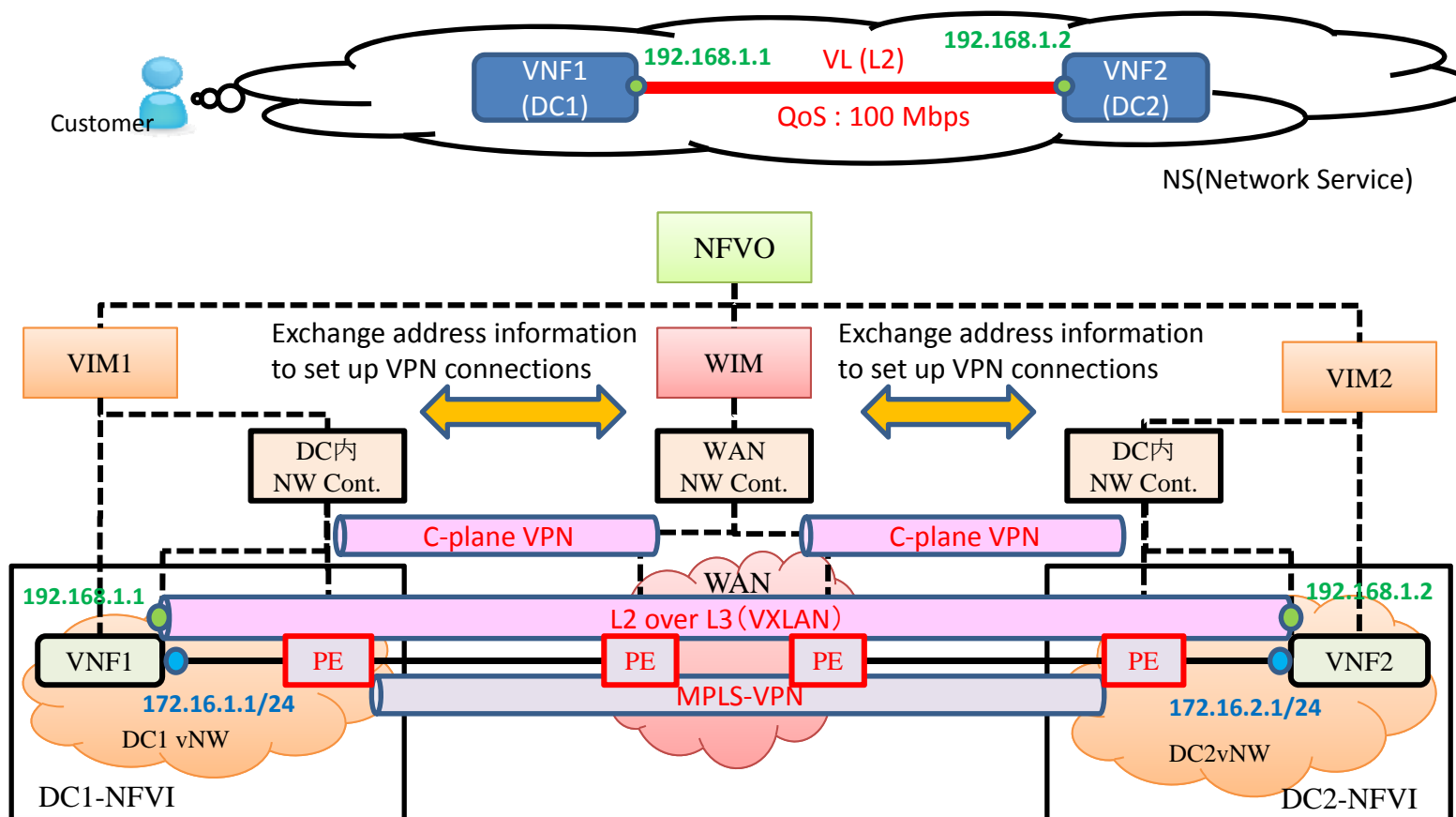


Consideration on a deployment scenario



Using VXLAN tunnel over MPLS-VPN via InterAS option B

“Impact of management data placement in NFV service coordinated across multiple datacenters and WANs”, A. Taniguchi, et.al, International Conference on Network and Service Management (CNSM), 2015.



Summary

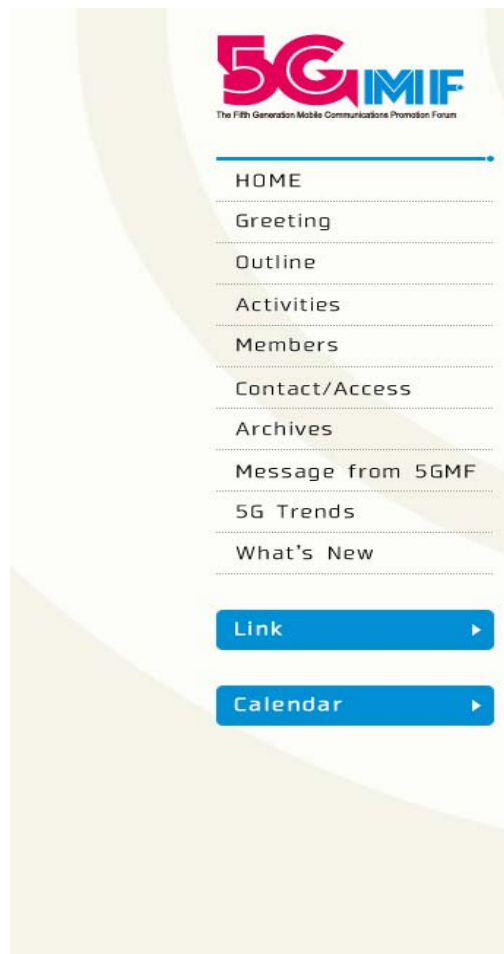


- Network Softwarization is an overall transformation trend in this industry
 - Including NFV and SDN
 - For harmonization
- The specifications of ETSI ISG NFV can be used as the basis for delivering “Slices”.
 - The current specifications can cover single site services.
 - The new work item on “multi-site services” will enable broader use cases.

The White Paper is in 5GMF's HP



(http://5gmf.jp/en/archives/5gmf-white-paper-1-0_e/)



5GMF White Paper “5G Mobile Communications Systems for 2020 and beyond”, Version 1.01 July 4, 2016

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