NFV ISG PoC Proposal – Service Chaining for NW Function Selection in Carrier Networks

A.1 NFV ISG PoC Proposal Template

A.1.1 NFV PoC Project Participants

Include additional manufacturers, operators or labs should additional roles apply.
PoC Project Name: Service Chaining for NW Function Selection in Carrier Networks

Network Operators/ Service Providers:
NTT — Contact: Hiroyuki Kitada(kitada.hiroyuki@lab.ntt.co.jp)
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Manufacturer C: Juniper Networks — Contact: Masami Takebayashi (mtakebay@juniper.net)

A.1.2 PoC Goals

- This PoC will verify a new Service Chaining method which works on carrier networks with virtualized NW functions (VNFs). We assume some Service Chaining use cases and make it work in our test environment, which will verify if our Service Chaining method is effective for carrier networks.
- This PoC will verify requirements of Service Chaining method for carrier networks, such as consideration of scalability and agility. Also, by using VNFs provided by several vendors, we will clarify some subjects to consider in terms of interoperability.
- This PoC will verify tasks which we should consider to let Service Chaining work appropriately with VNFs. Some problems may occur in L2 or L3 connection with VNFs in some case of Service Chaining.

A.1.3 PoC Demonstration

The PoC network environment will be hosted at NTT Laboratory Musashino(Tokyo Japan). The Result of our test will be shown at NTT R&D Forum 2014, which will be held from 13-14 February, 2014 at Musashino-City, Tokyo Japan.

A1.4 Publication

Publication of PoC results are shown at public demonstrations at NTT R&D Forum 2014. The abstract of our PoC may be shown at URL: http://labevent.ecl.ntt.co.jp/forum2014/e/index.html

A.1.5 PoC Project Timeline

- What is the PoC start date? — November 1, 2013(Already underway)

- (First) Demonstration target date February 13, 2014
- PoC Report target date March 31, 2014
- When is the PoC considered completed? March 31, 2014

A.2 NFV PoC Technical Details

A.2.1 PoC Overview

On the environment that network functions are integrated into cloud servers as VNFs, it is expected that each user can individually select and apply his/her intended network functions.
Also it is expected that administrators are able to add, delete or migrate VNFs at any time.
For applying network functions responding to each user's service contract, routing and forwarding the traffic to each intended VNFs per user is required on a network.
However, in terms of scalability and agility, IP routing protocol is difficult to control traffic routes per user, since IP routing in carrier networks usually aggregates network prefixes.
Therefore, we propose a new Service Chaining method to enable routing and forwarding traffic per user on IP network.
In our PoC we will demonstrate several use cases of Service Chaining with our method.
Figure 1 shows the overview of PoC environment and figure 2 shows system architecture.

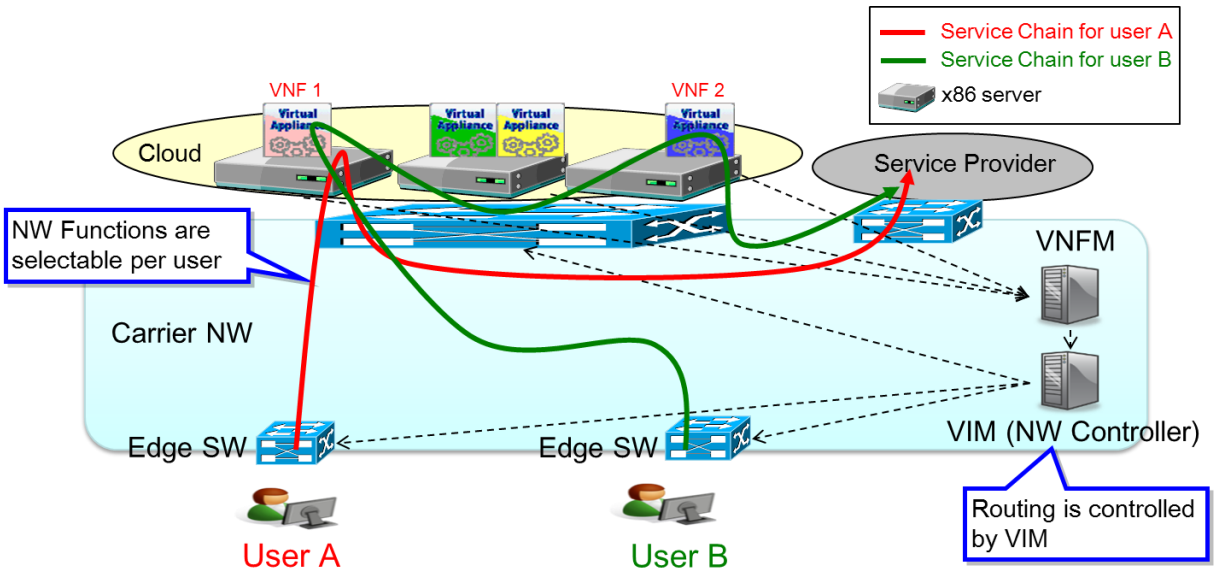

Figure 1. Abstract of our PoC.

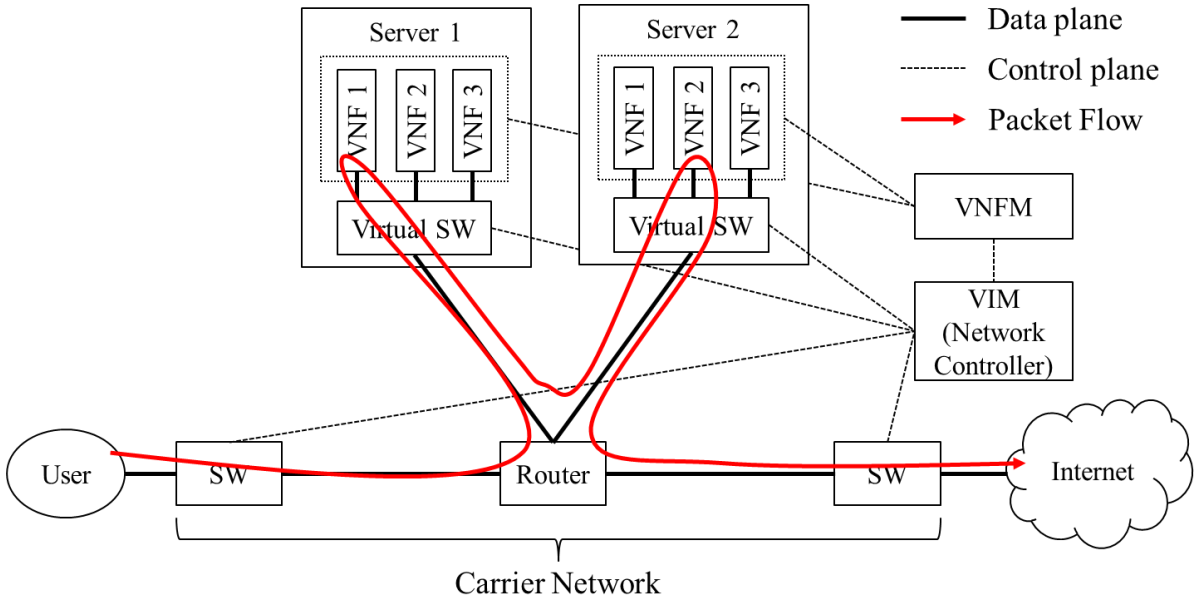

Figure 2. System Architecture of our PoC.

A.2.2 PoC Scenarios

Scenario 1 –We demonstrate how to enable per user NW function adoption on demand by applying Service Chaining method for carrier networks.
Current carrier networks enable NW functions by applying physical appliance equipment such as Customer premises equipment (CPE), Firewall(FW), Deep Packet Inspection (DPI) which network administrators have to set, install and configure at each location(or, each prefix).
In this scenario we assume that these NW functions are installed on cloud servers connected to a carrier network as virtual appliances.
The carrier provides NW functions as network services, which users can apply on demand.
Figure 3 shows the abstract of scenario 1.
Appliances used in this scenario are:

- vDPI: CSR 1000v (Cisco Systems)
- vCPE: VSR1000 (Hewlett-Packard)
- vFW: FireFly (Juniper Networks)
- VIM (NW Controller): Service Chaining Function (prototype) + Ryu (NTT)

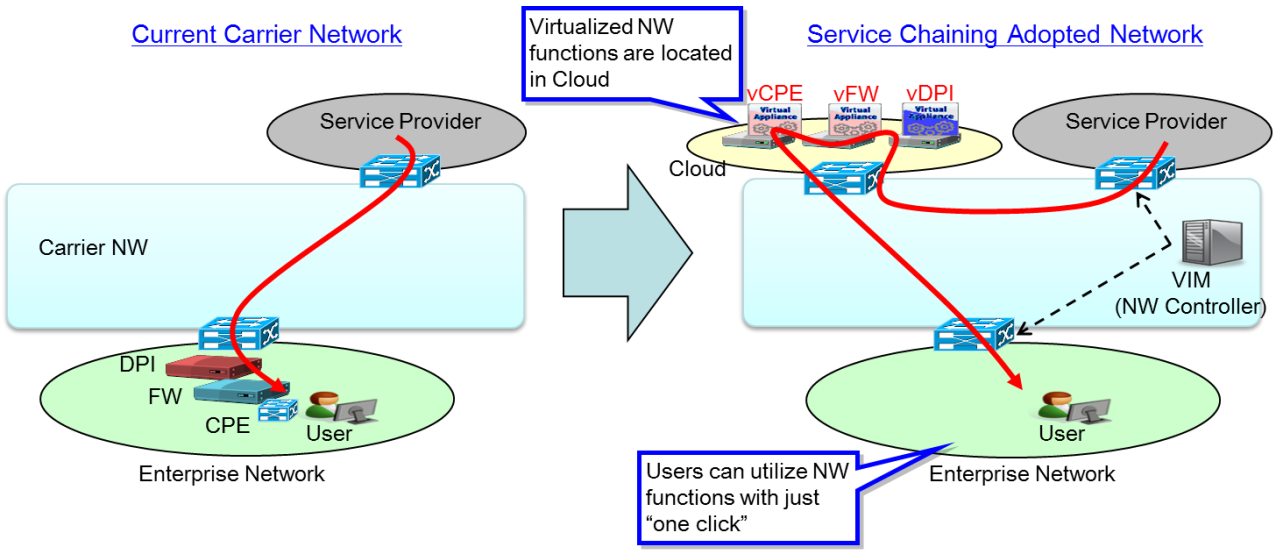

Figure 3. Abstract of PoC scenario 1.

Scenario 2 – We demonstrate a scenario of routing and forwarding on a carrier network controlled automatically by a VNFM and a VIM when adding, deleting or migrating VMs which VNFs are set, as a result of applying virtualized network service on demand.
Figure 4 shows the abstract of scenario 2.

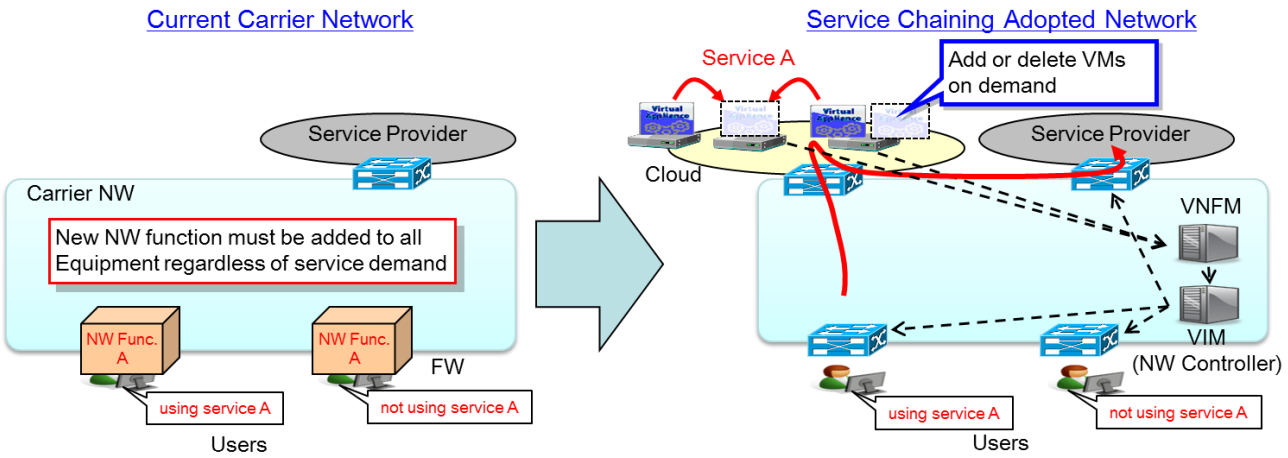

Figure 4. Abstract of PoC scenario 2.

A.2.3 Mapping to NFV ISG Work

Describe how this PoC relates to the NFV ISG work:

	Use Case	Requirement	E2E Arch	Comments
Scenario 1	*UC#4 UC#2*	*Gen.1 Gen.4*	*Service,VNF and Infrastructure Description*	*Implementation of service chaining method by VNF Forwarding Graph.*
Scenario 2	*UC#4*	*OaM.1 OaM.2*	*Vi-Vnfm Ve-Vnfm*	*adding, deleting or migrating VMs when applying virtualized network service on demand.*
…				

	INF	SWA	MAN	REL	PER	Comments
Scenario 1			*x*			*This scenario will contribute to the improvement of VNF Forwarding Graph description.*
Scenario 2						
…						

A.2.4 PoC Success Criteria

The success criteria is that our demonstration realizes each scenario and that some considerations, problems are detected when applying mechanisms used for our use cases to carrier networks:
When each user contract services they intend, which means they decide what function to use, the network routes and VM configurations are automatically controlled by our Service Chaining

method.

A.2.5 Expected PoC Contribution

One of the intended goals of the NFV PoC is to support the various groups within the NFV ISG. The NFV PoC Committee therefore expects a contribution to the NFV ISG and the NFV WG/EG Please List of PoC Intended Contributions to Specific NFV Groups:

1) PoC Project Contribution #1: This PoC will contribute to the MANO WG, since MANO WG discusses the description of VNFs, including VNF Forwarding Graph.

2) PoC Project Contribution #2: This PoC will contribute to the INF WG. For example, a use case “Network Service Provider obtains and operates a VNF on the NFV Infrastructure” in the NFVI documents (GS NFV INF 002) requires service chaining techniques to be applied to [Vn-Nf]/N interfaces of multi-vendor environment.