World Class Standards

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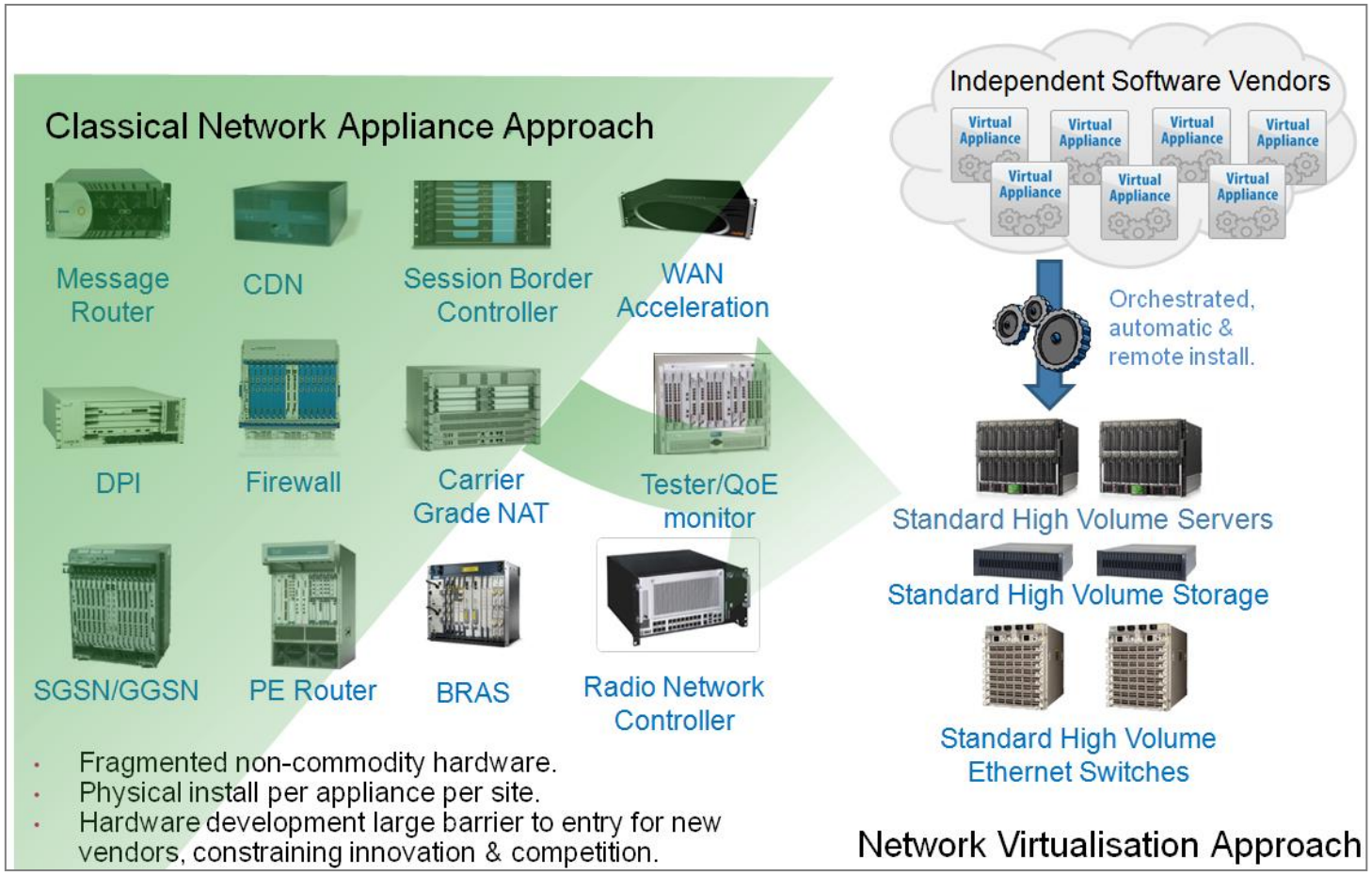
IN THE FRAMEWORK OF
Project
SESEI
http://eustandards.in/

2

NETWORK FUNCTION VIRTUALIZATION - An insight

Presented by: Deepanshu Gautam, DGM – Network Technology & Standards,
Reliance Jio Infocomm Limited

VISION



Efficient Resource Utilization

Remote configuration and install

Single design based on commodity hardware

Reduces OpEX and VapEX.

Reduces system complexities

Multivendor network management platform

Reduce power consumption

Rapid Time to Market

Efficient test and integration bcz of common infrastructure

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ETSI NFV ISG

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CURRENT MEMBERSHIP

Allot Communications Systems Ltd
Amdocs Software Systems Ltd
AT&T
Alcatel Lucent
Benu Networks
Broadcom Corporation
BT Group PLC
Cablelabs
Ceragon Networks
Cisco Systems Belgium
Citrix Systems Inc
Deutsche Telekom AG
DOCOMO
ETRI
France Telecom S.A.
Freescale Semiconductor EMEA S.A.
Fujitsu Laboratories of Europe
Hewlett-Packard
Hitachi Europe
Huawei Technologies (UK) Co. Lt
IBM Europe
Intel Corporation (UK) Ltd
Iskratel Ltd
Italtel S.p.A
JDSU Deutschland GmbH
Juniper Networks
KT Corporation
NEC Europe Ltd
Nokia Siemens Networks
NTT Corporation www.ntt.co.jp
Portugal Telecom SGPS SA
RadiSys Inc
Samsung Electronics
Seven Principles AG
Spirent Communications
Sprint www.sprint.com
Swisscom SA
Telecom Italia S.p.A
Telefon AB LM Ericsson
Telefonica S.A.
Telekom Austria AG
Telenor ASA
Tellabs OY
UPRC
Verizon UK Ltd.
Vodafone Group Services plc
Yokogawa Europe B.V
ZTE Corporation

ADVA Optical Networks SE
AEPONYX Inc.
Affirmed Networks Inc.
Brocade Communications Systems
Cavium
CenturyLink Corporation
Ciena Corporation
CIMI Corporation
Colt Technology Services
Connectem Inc.
ConteXtream Inc.
Cyan Inc.
DELL Inc.
DESS GmbH & Co. KG
EMC Informations Systems Int.
EnterpriseWeb LLC
Everything Everywhere Ltd
F5 Networks Inc.
IDT Canada Inc.
Infinera Corporation
Intune Networks Ltd
IP Infusion Inc.
KDDI Corporation
Lancaster University
LSI Corporation
Mellanox Technologies Ltd
Metaswitch Networks Ltd
Michael M Damena
Mojatatu Networks
Netronome Systems Inc.
Overture Networks
Plexxi Inc.
Qosmos
Saisei Networks Pte Ltd
SCILD Communications
Shenick Network Systems
SK Telecom
Softbank Telecom Corp
Sunbay AG
Tail-f Systems
Telco Systems Inc.
Telstra Corporation Ltd
Tieto Sweden AB
Tilera
Ulticom, Inc.
VMware
6WIND

NFV ISG LIFE SPAN

October 2012 — NFV White Paper Released at SDN & OpenFlow summit in Germany

February 2013 — **NFV#1** Kick-off ETSI headquarter, France Structure decided

April 2013 — **NFV#2** Santa Clara ISG WI created for
- E2E architecture,
- use cases
- requirements
- terminology

July 2013 — **NFV#3** Bonn ISG mainly work on the ISG level documents

MANO#1

October 2013 — **NFV#4** Sunnyvale Phase 1 work continues

ISG releases first set of specifications as a major milestone
- E2E architecture,
- use cases
- requirements
- terminology

February 2014 — MANO#2 **NFV#5** Malaga
- ISG decided to go for Phase 2
- OPNFV proposed

MANO#3

May 2014 — **NFV#6** Okinawa ISG leadership changes.
- AT&T took the chair position
- NOC chair changed affiliation

July 2014 — **NFV#7** Santa Clara
- Docomo took the ISG vice-chair position
- ISG approves the Phase 2 mission statement
- IT was decided that Phase 2 will develop normative stage 2 (Architecture) work

Phase 1 specifications published
MANO, SWA, REL, INF etc.

November 2014 — **NFV#8** Scottsdale
- ISG Phase 2 started
- NFV Phase 1 officially ended.

Election of 2 additional ISG vice-chair took place. HP and ALU took the positions

February 2015 — **NFV#9** Prague
- WG chairs and vice chair elected
- Phase 2 progresses

MANO#4

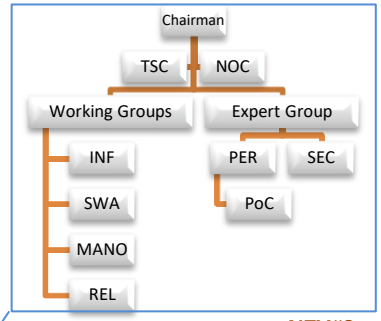
May 2015 — **NFV#10** Sanya
ISG decided to make all working drafts publically available

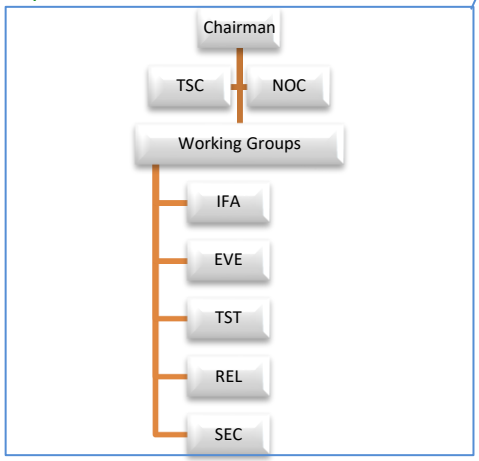
July 2015 — MANO#5 **NFV#11** San Jose
- Phase 3 planning started
- Beyond 2016 planning started

Phase 3 features proposals starts flowing

October 2015 — **NFV#12** Jersey City

NFV#13





LEADERSHIP AND STRUCTURE

ETSI **ISG NFV**
WG Structure and leadership


Technical Manager: **Diego LOPEZ**, Telefonica
Assistant TM: **Joan TRIAY**, DOCOMO

Chairman: **Steven WRIGHT**, AT&T
Vice Chair : **Bruno CHATRAS**, Orange
Vice Chair : **Michael BRENNER**, Clearpath
Vice Chair : **Marie-Paule ODINI**, HP



Technical Steering Cttee

	Chair	Vice Chair
Interfaces & Architecture (IFA)	Raquel Morera, Verizon 	Mehmet Ersue, Nokia 
Evolution & Ecosystem (EVE)	Thinh NGUYENPHU, Nokia Networks 	Julien MAISONNEUVE, Alcatel Lucent 
Testing, Experimentation and Open Source **(TST)**	FJ RAMON SALGUERO, Telefonica 	Marie-Paule ODINI, Hewlett Packard 
SECurity	Igor FAYNBERG, Alcatel-Lucent 	Mike BURSELL Intel 
RELiability Availability and Assurance	Marcus SCHÖLLER, NEC Europe 	Stefan ARNTZEN, Huawei 

Elected at NFV#9

No election. Only nominations.

Major Issues

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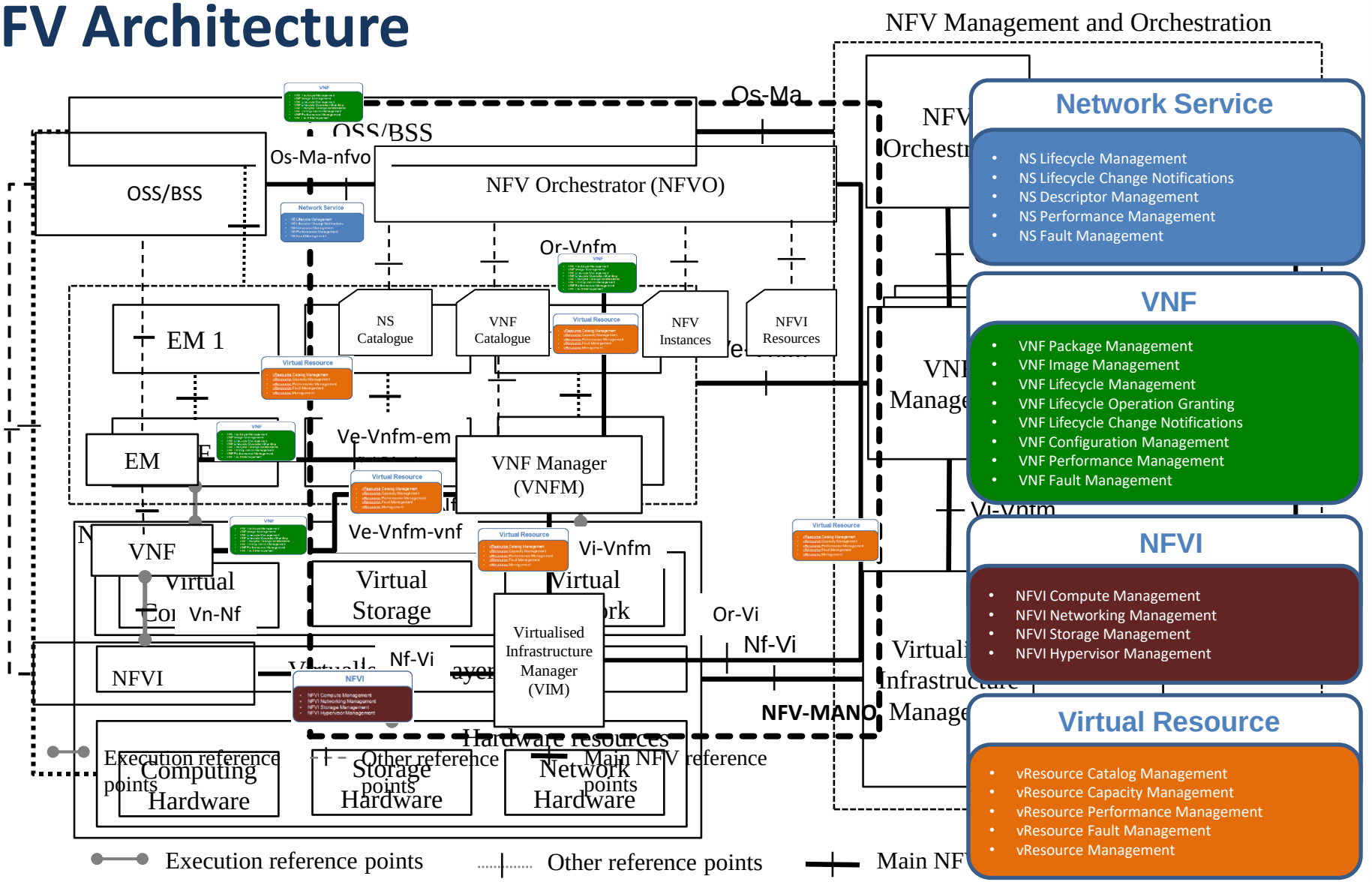
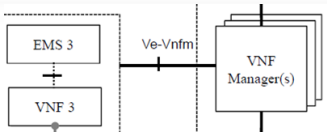
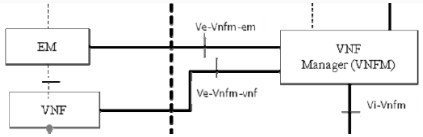
NFV Architecture

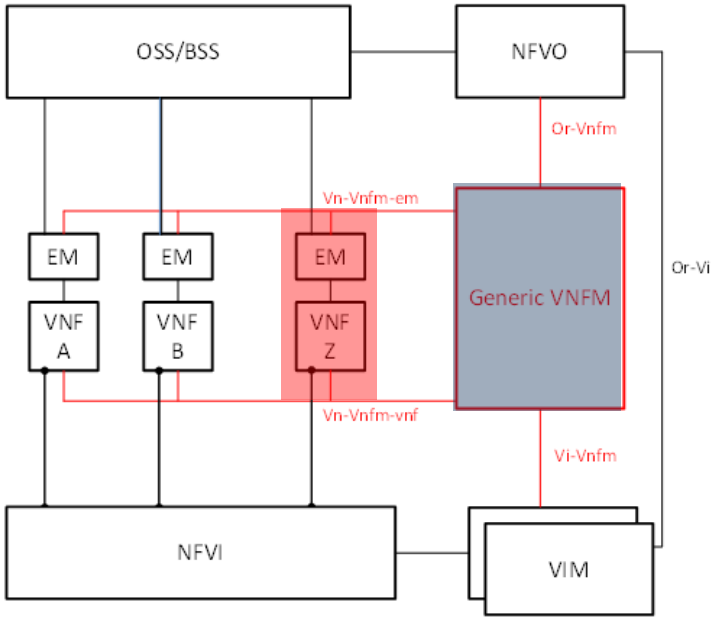


IFA008 (Ve-Vnfm)

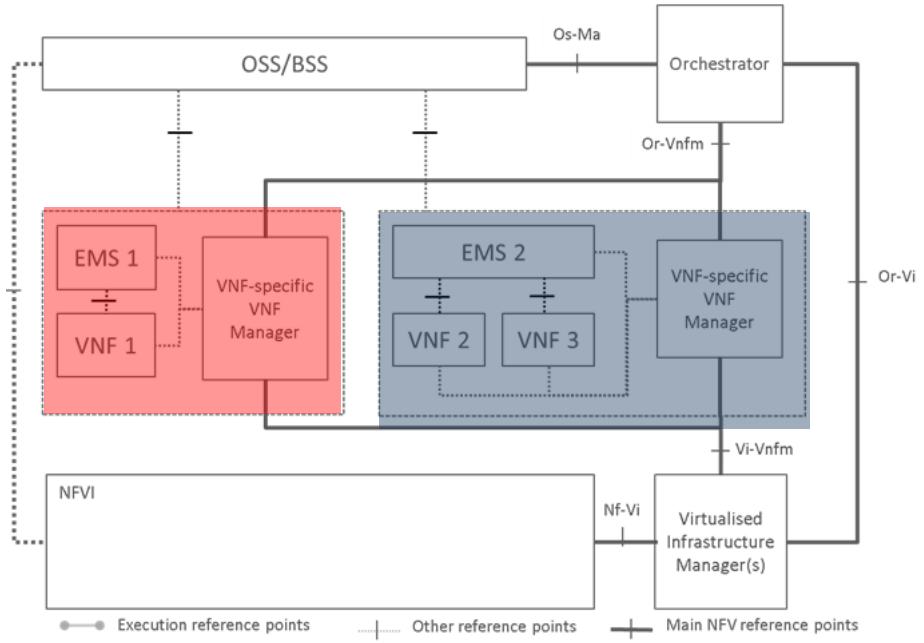




Generic VNFM



Specific VNFM



The most controversial Interface in NFV architecture

Telefónica, orange, at&t, Deutsche Telekom

VS

NOKIA, ERICSSON, CISCO, HUAWEI

Vendors Boundaries

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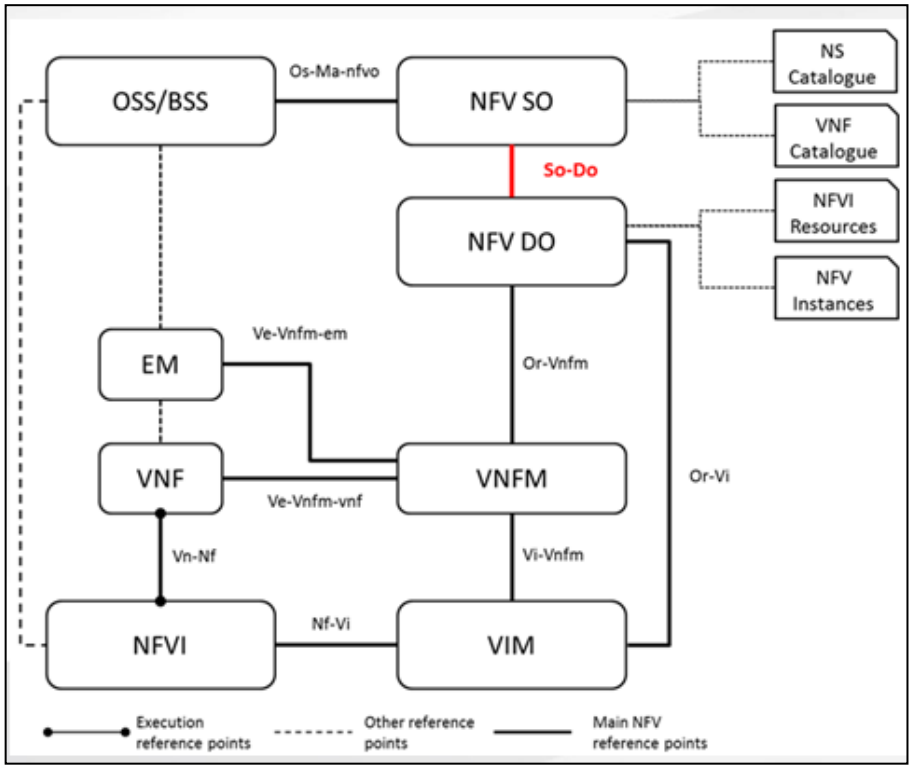
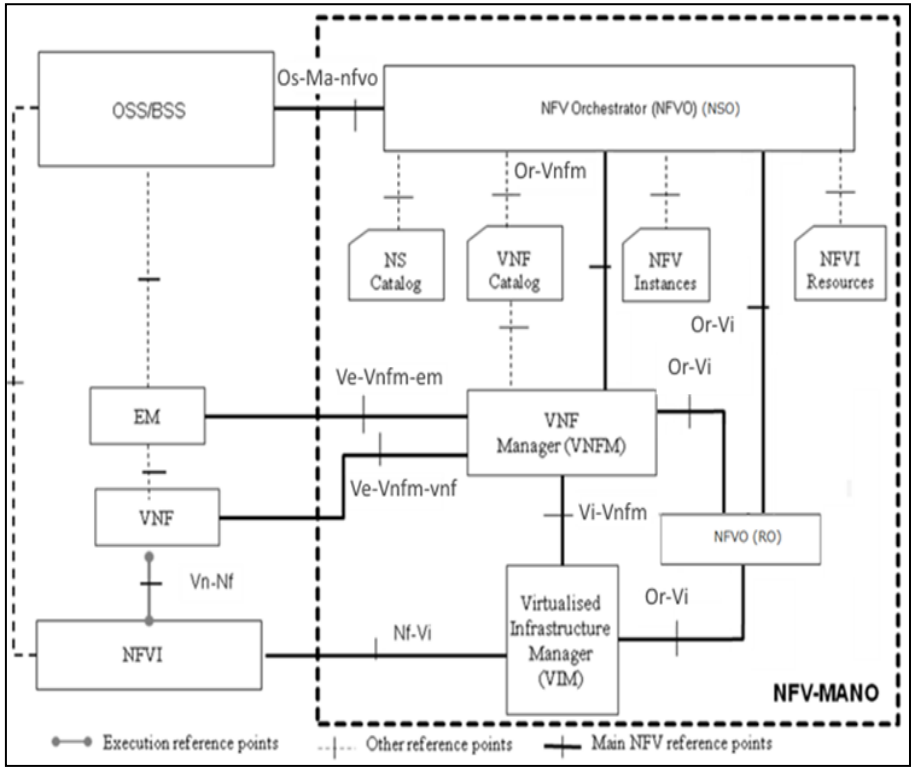
NFVO SPLIT

vodafone



NFVO- DO acts as a proxy between NFV-SO and VNFM for VNF LCM

NEC



NFVO(RO) acts as a proxy between NSO and VIM hiding underlining multiple VIM form NSO.

IFA012 (app & services running on top)

Details of 'DGS/NFV-IFA012' Work Item

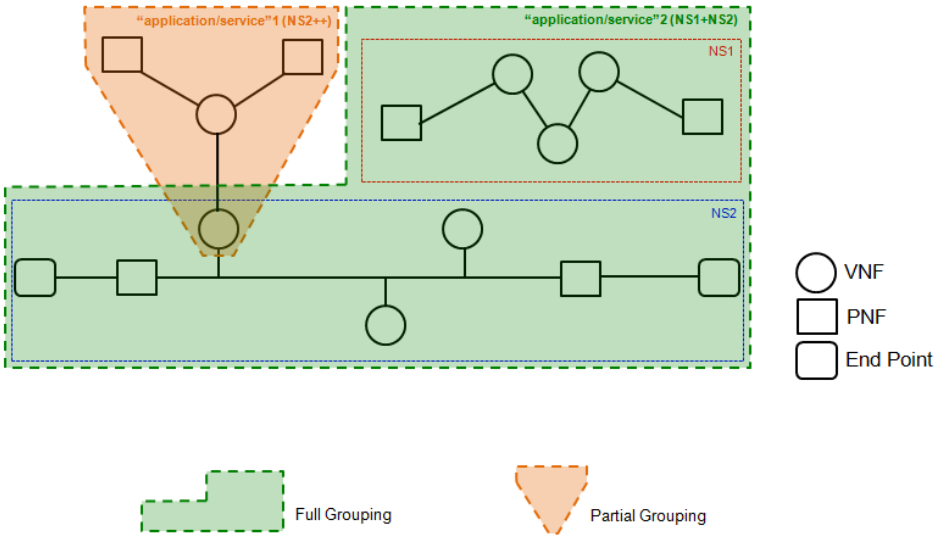
This work item will entail work to specify the interface(s) and the corresponding requirements that comprise the Os-Ma-nfvo reference point as currently defined in the GS NFV-MAN 001 regarding applications/services on top of Network Services (NS).

- Life cycle management of Services (applications/services on top of NS).
- Monitoring/Tracing (e. g. concerning services).
- Flexible/dynamic service orchestration including creation and modification (e. g. orchestration, launching of a service and adaptation of running services.

What is on-top??

On-top may imply:

- Grouping:
  - Having an existing NS grouped with the “application/service” on top.
    - Full (entire NS) and partial (few VNF of a NS) grouping is possible
    - Grouping may imply dependencies between NS and “application/service” on-top.



NFV Future Planning

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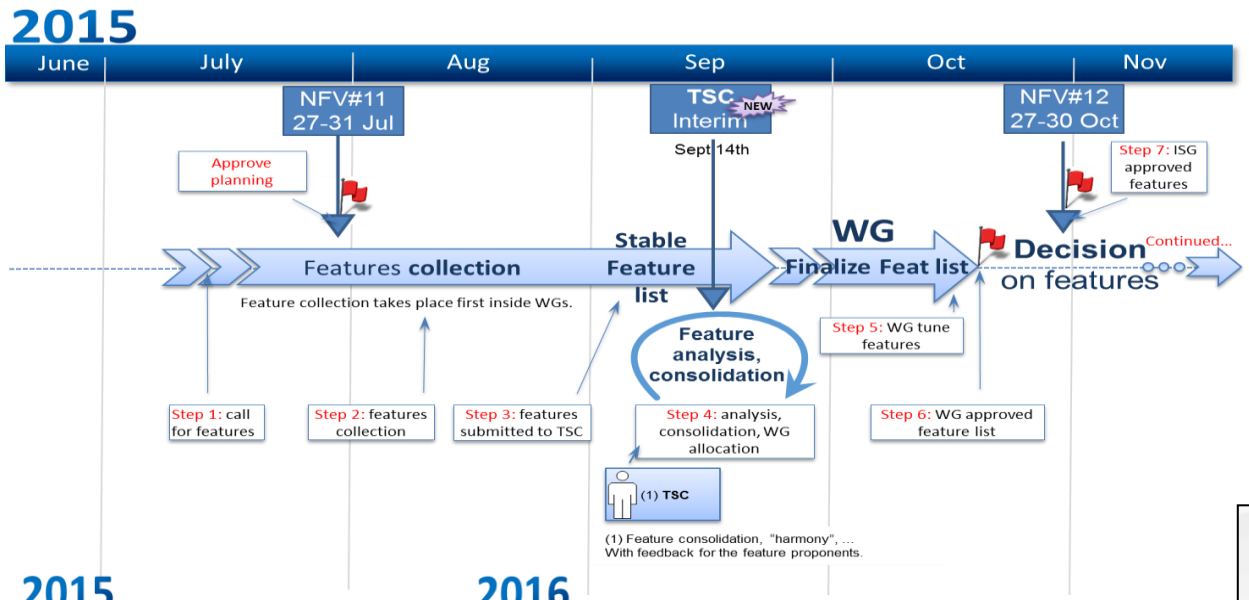
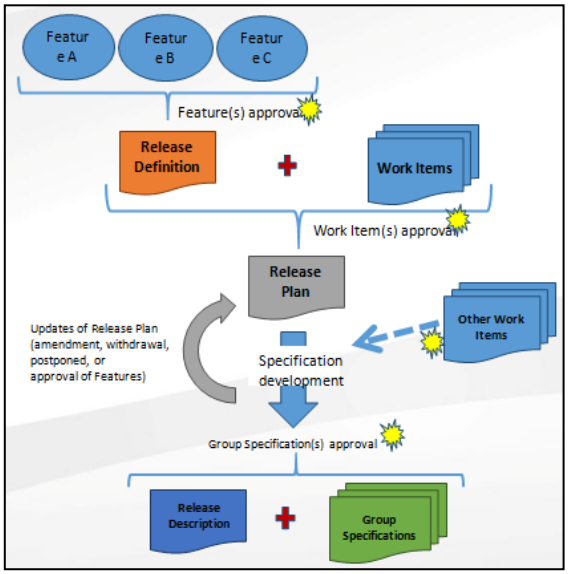
RELEASE 2016 TIMELINE

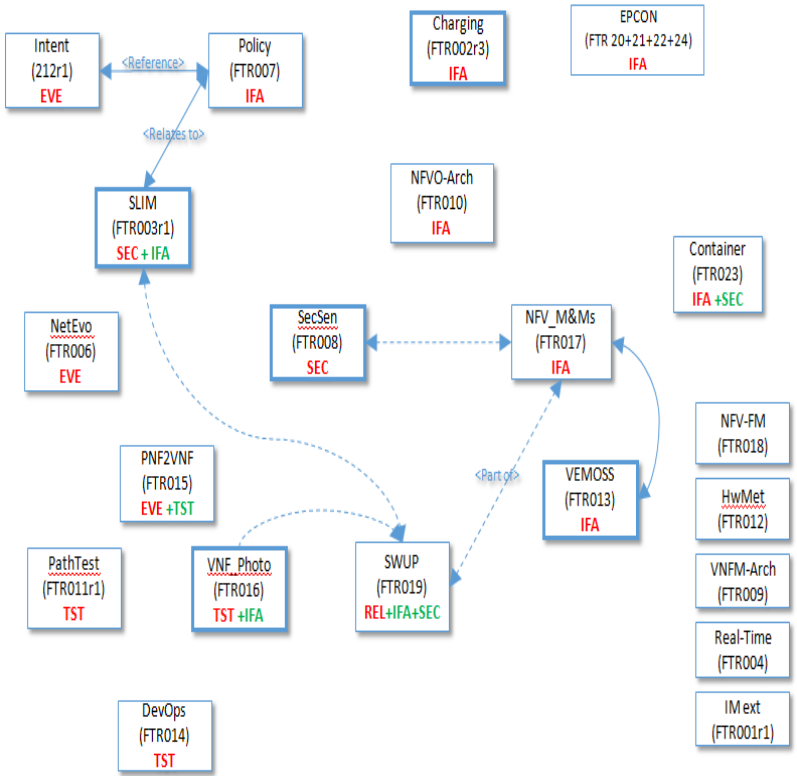


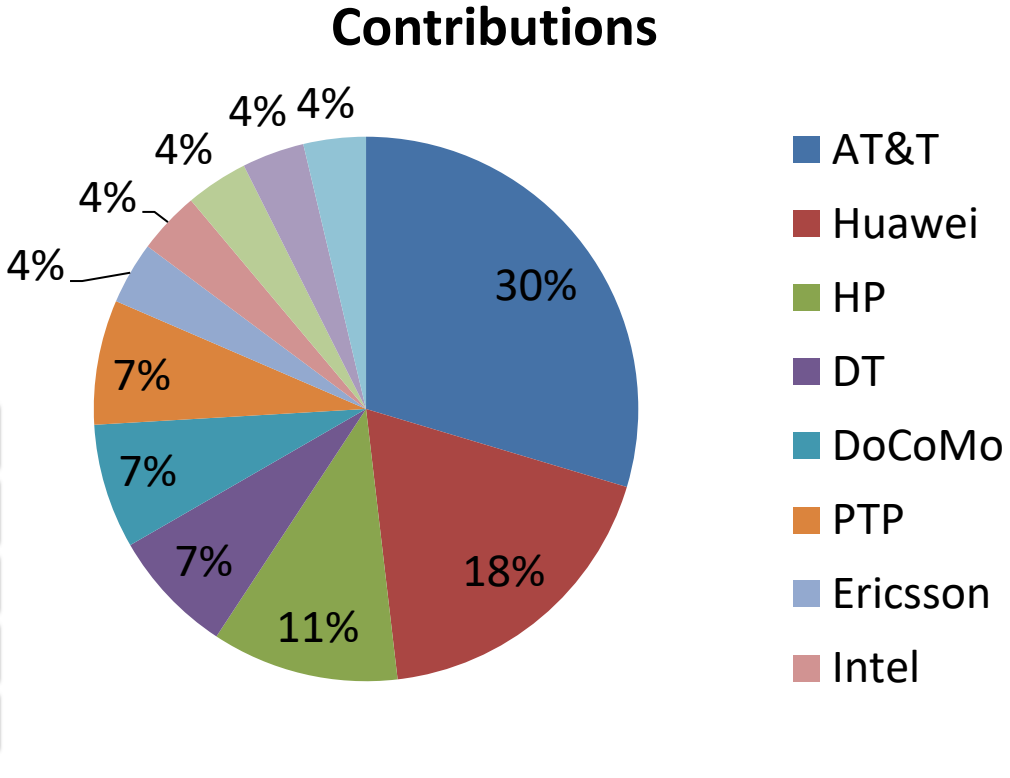
Feature based 2016 Release



FEATURE PROPOSAL SUBMITTED

Total 24 feature proposal were submitted for 2016 release.





BEYOND 2016

- Whether ISG NFV should continue
- Whether ISG should do Stage 3 work
  - Whether to use open source based stage 3 work
  - Whether to use conventional specification based stage 3 work

NFV Standardization and Deployments

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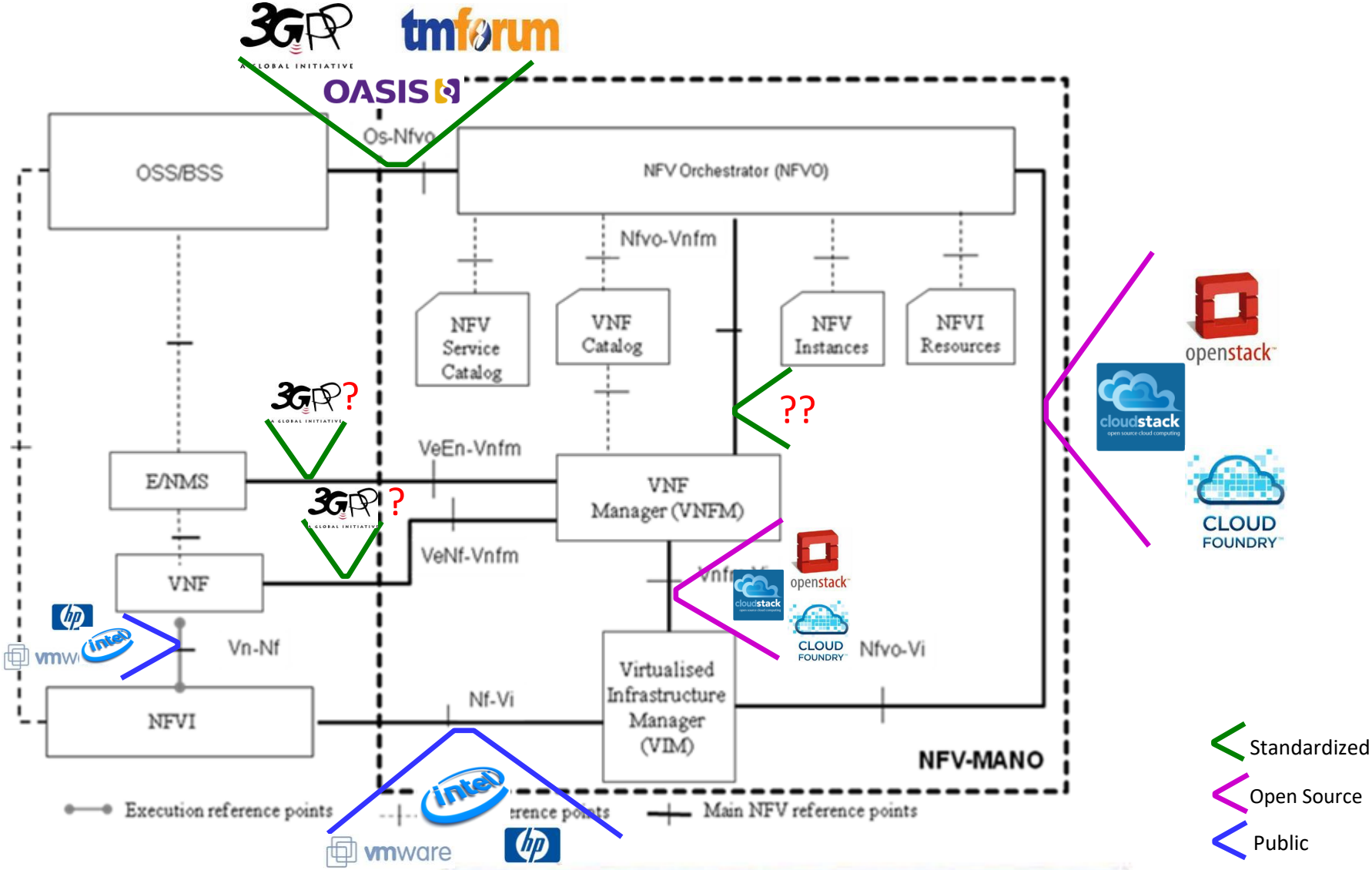
STAKEHOLDERS

- Vendors: providing solutions/products
  - VNF/Network Service Vendors
    - Converting their existing NFs into VNF/NS
  - NFV Hardware vendors (NFV COTS)
    - Provide an efficient COTS which can meet integrated hardware in terms of efficiency.
  - NFV MANO vendor
    - Providing multivendor NFV network management system.
  - Legacy NMS (EM, OSS/BSS) vendor
    - Saving the current investments
- Network Operators: deploying provided solutions/products
  - No-vendor lock-in
  - Reducing OpEx
  - Reducing CpEx
- Service Providers: consuming NFV service and providing further service to end-users
  - VNFaaS, NFVIaaS
- End Users
  - No impact

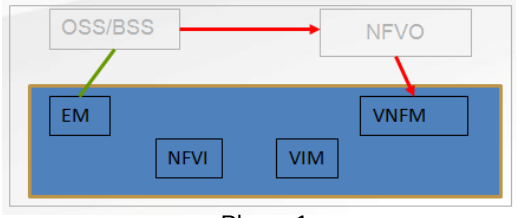
STAGE 3 STANDARDIZATION LANDSCAPE



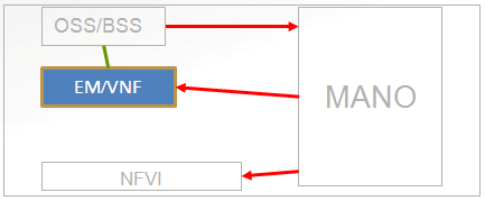
NFV PHASED DEPLOYMENTS

NFV is considered to be a disruptive technology. Specially, it is expected to change the way current networks is being managed.

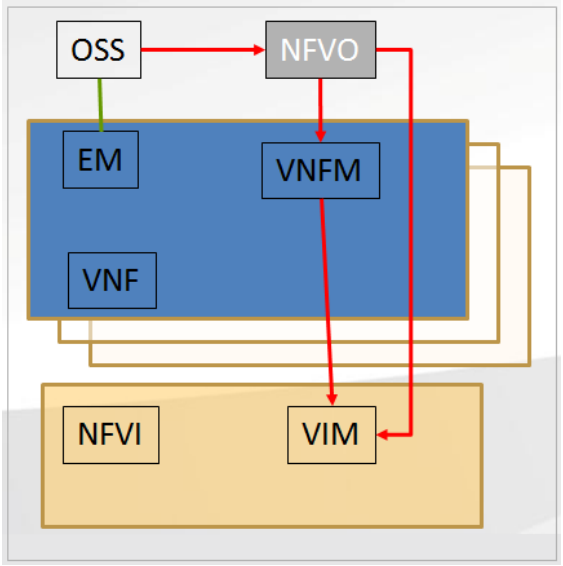
The multi-vendor management and orchestration objective of NFV need to controlled. Smooth migration is required.



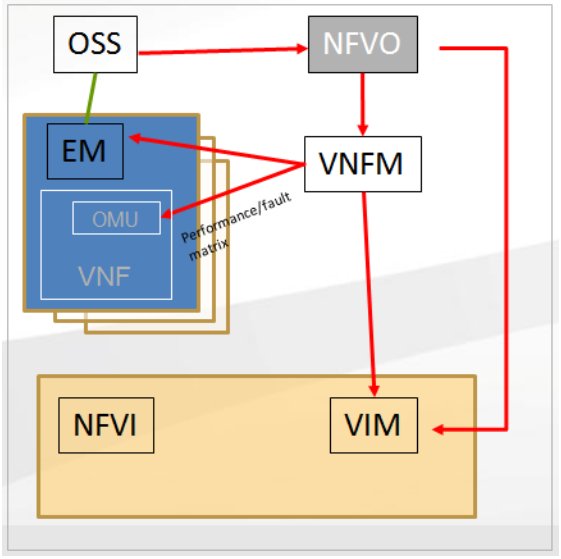
Phase 1



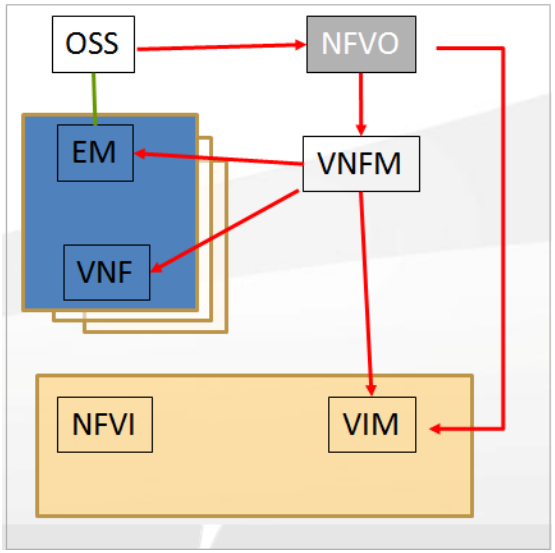
Phase 2



Phase 3



Phase 4



Final Phase

Standardized Interface

NFV Open Source

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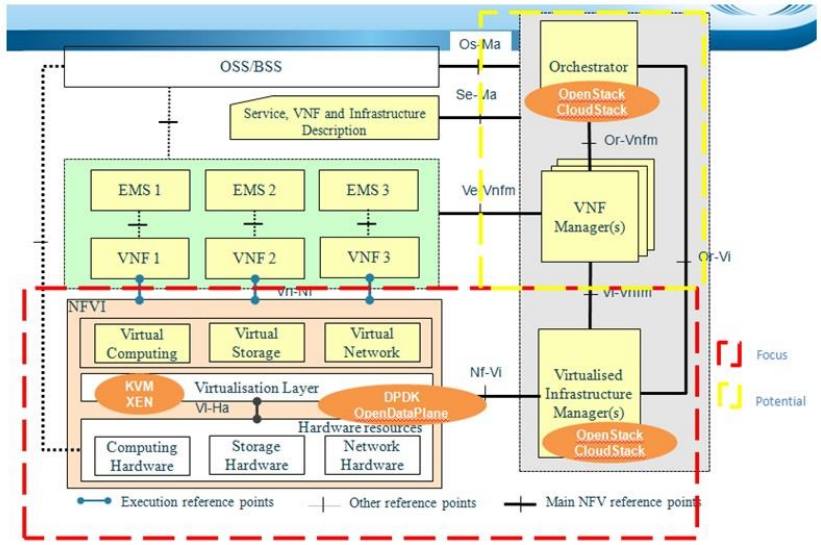
OPNFV (Open Platform for NFV)

- Launched 30 Sep 2014
- Speed up implementation of NFV
- Create a carrier grade Open Source Ecosystem



Website: https://www.opnfv.org/
Wiki: https://wiki.opnfv.org/
OPNFV Arno: https://www.opnfv.org/arno

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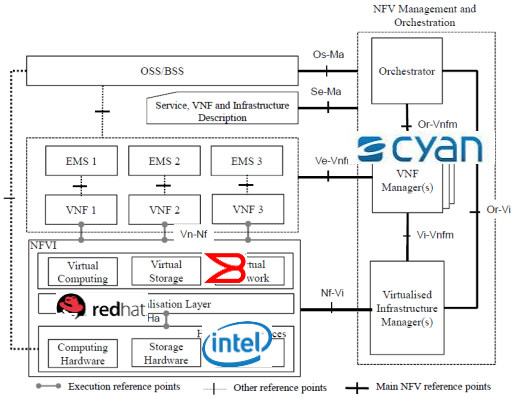
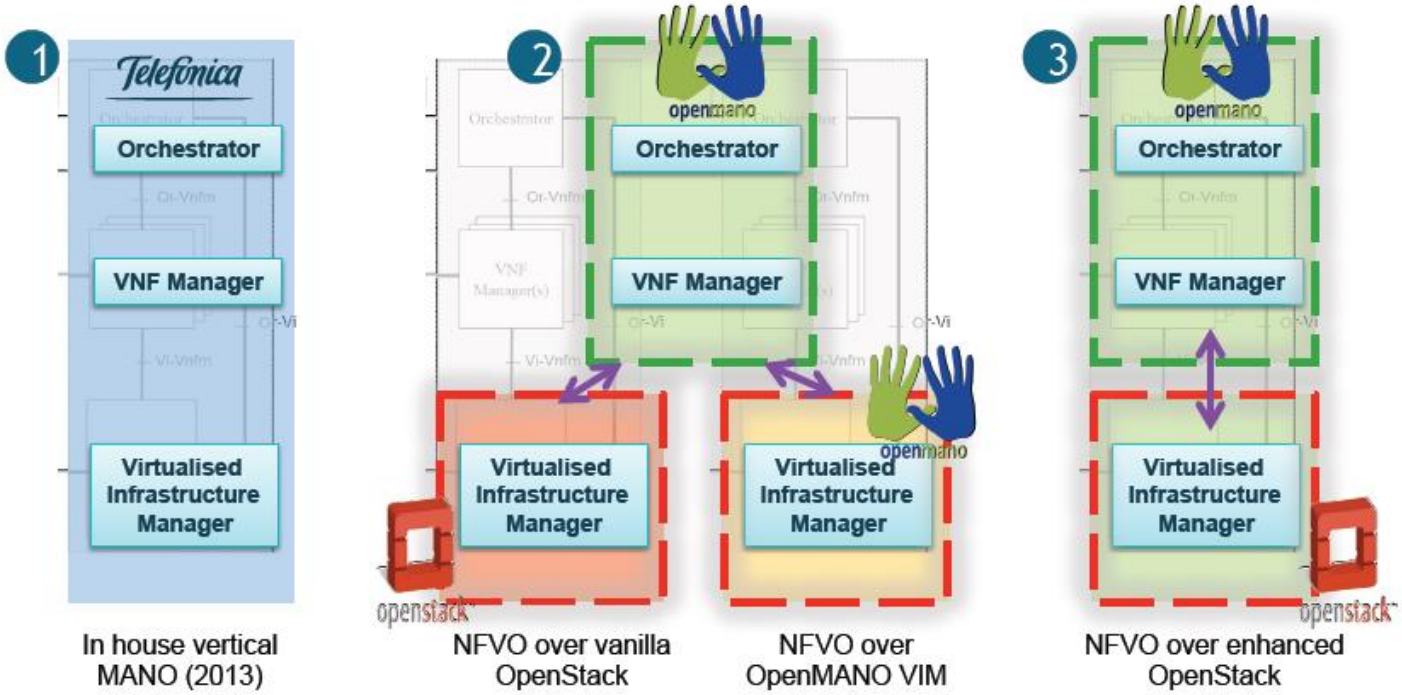
OPEN MANO

- Openmano (spelled without capitals), a reference implementation of an NFV orchestrator
- Openvim, a reference implementation of a virtualized infrastructure manager (VIM)
- A graphical user interface.





In house vertical MANO (2013)

NFVO over vanilla OpenStack

NFVO over OpenMANO VIM

NFVO over enhanced OpenStack

openmano

SDN Vs. NFV

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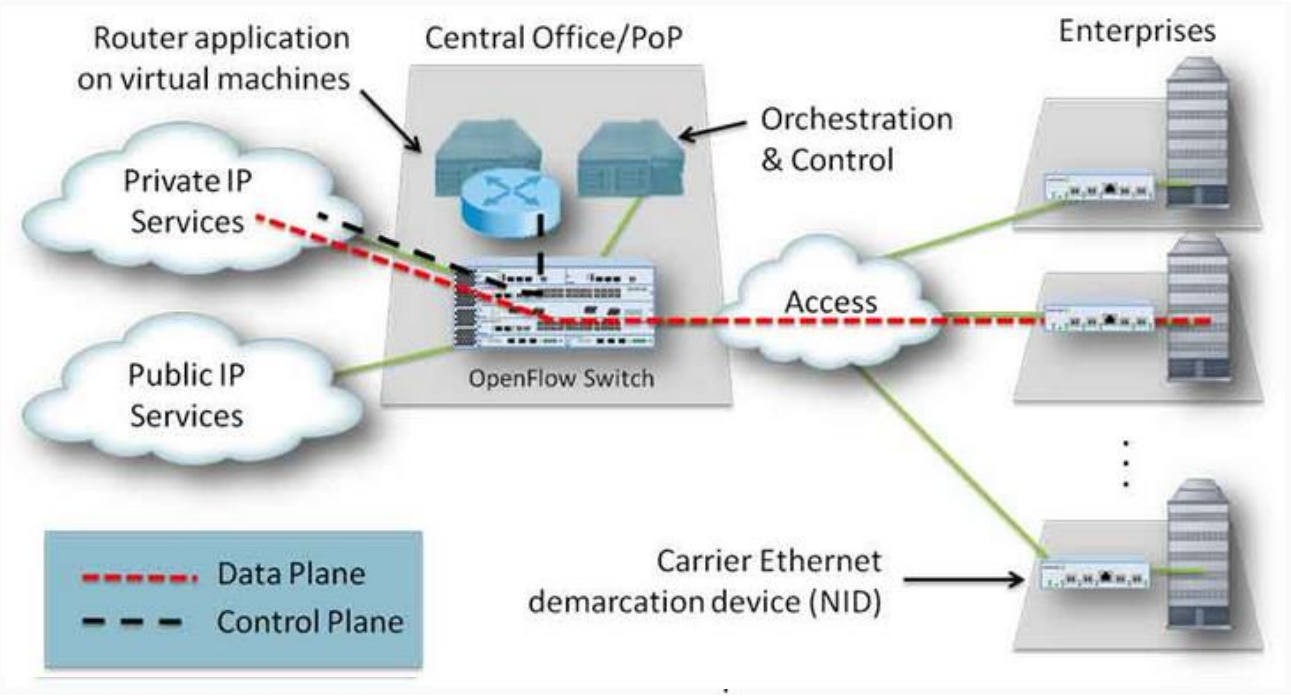
WHAT ARE THEY?

NFV enables executing existing network functions on virtual machine where as, SDN separate control flow from data flow.

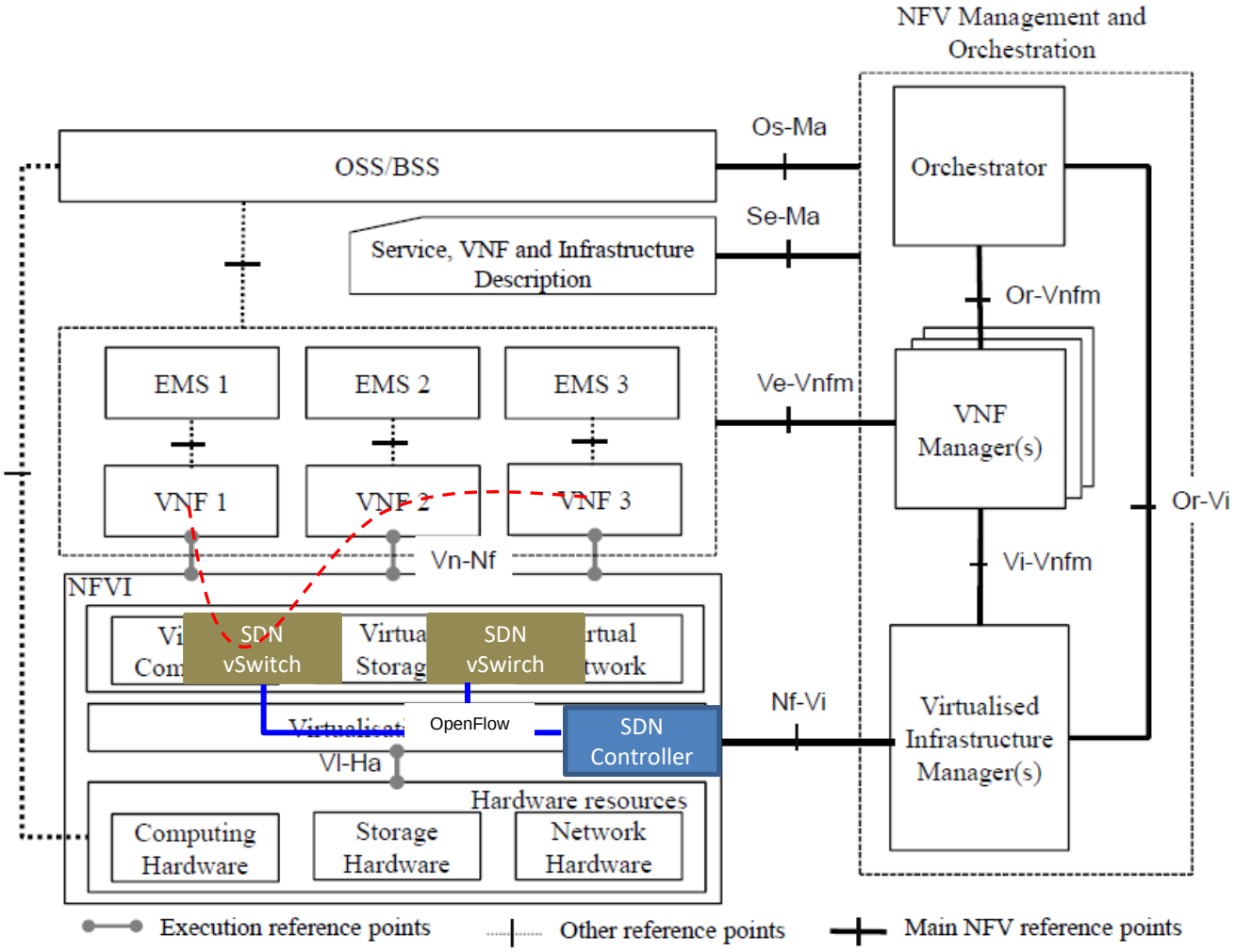
NFV Applied



SDN Applied

Managed Router Service

PLACEMENT IN ETSI NFV ARCHITECTURE



The most obvious NFV construct related with SDN would be NFPs (network forwarding path aka service chain) included in VNFFG.

SDN could be used to configure vSwitch to forward the traffic as per a particular NFP.

SOME USEFUL POINTERS

NFV Public page
http://www.etsi.org/technologies-clusters/technologies/nfv
NFV published Specifications
http://www.etsi.org/technologies-clusters/technologies/nfv
All NFV working drafts are publically accessible
http://docbox.etsi.org/ISG/NFV/Open/Drafts/
NFV PoC updates
http://www.etsi.org/technologies-clusters/technologies/nfv/nfv-poc
NFV Liaison Matrix
https://portal.etsi.org/TBSiteMap/NFV/NFVLiaisonMatrix.aspx

THANKS

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