

# Network Function Virtualization (NFV)

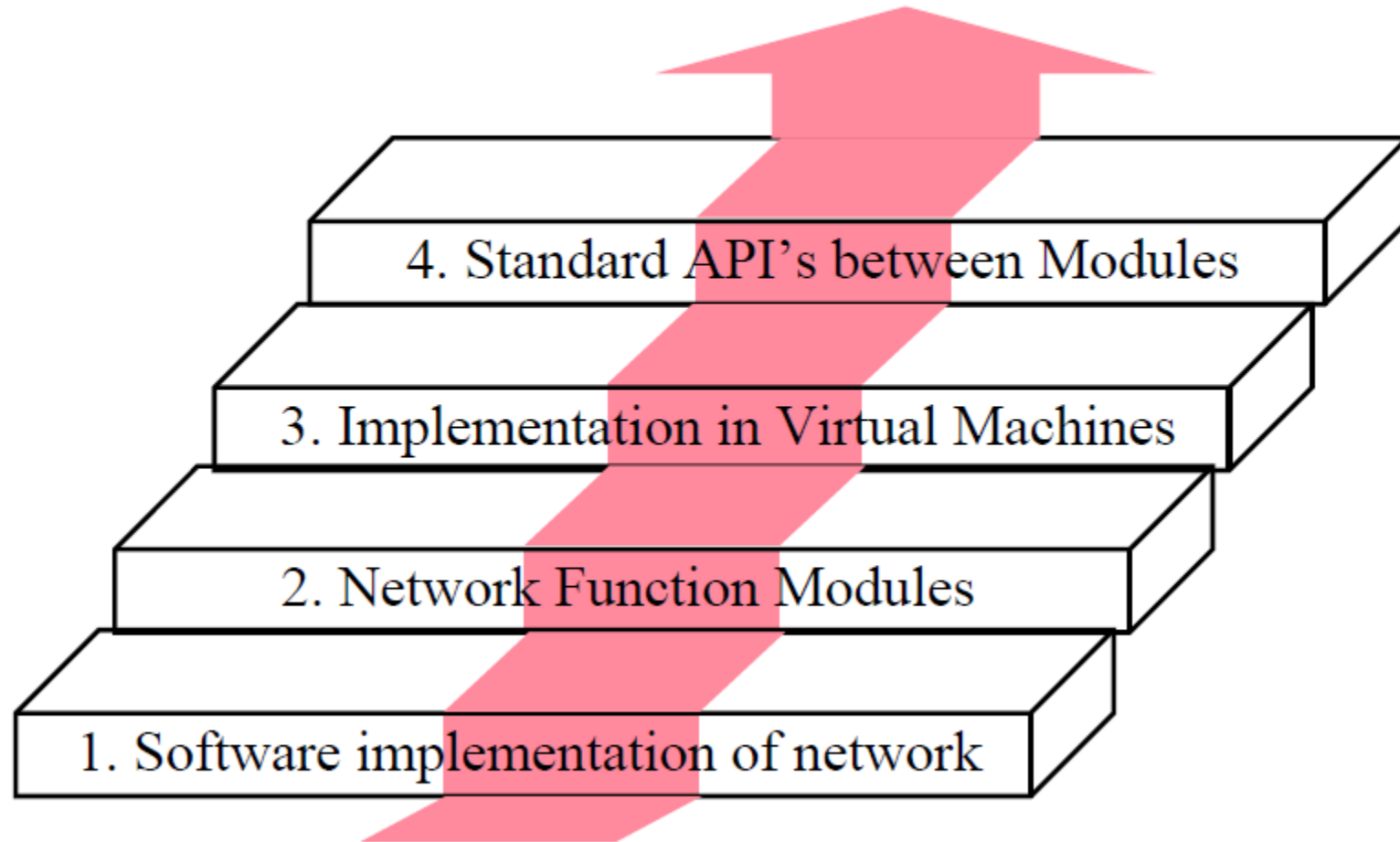
Cloud based networks

vitmma 02

# Network Function Virtualization (NFV)

- Why we need it?
- What is it compared to the earlier technologies?
- How it is defined?
- How does it look in practice?

# The way towards NFV



# Network Function Virtualization (NFV)

- Virtual Machines
- Virtual Networks
- Cloud
- SDN

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  - services

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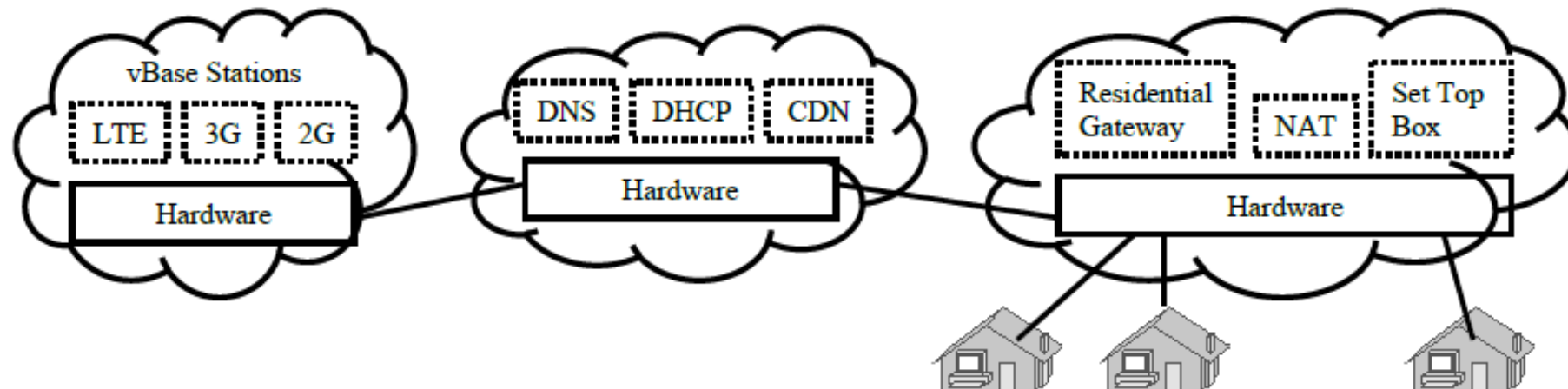
## 1. Fast standard hardware $\Rightarrow$ **Software based Devices**

Routers, Firewalls, Broadband Remote Access Server (BRAS)

$\Rightarrow$  A.k.a. *white box* implementation

## 2. **Function Modules** (Both data plane and control plane)

$\Rightarrow$  DHCP (Dynamic Host control Protocol), NAT (Network Address Translation), Rate Limiting,

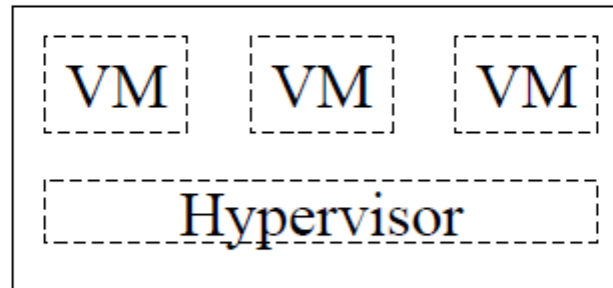


# Network Function Virtualization (NFV)

## 3. Virtual Machine implementation

⇒ Virtual appliances

⇒ All advantages of virtualization (quick provisioning, scalability, mobility, Reduced CapEx, Reduced OpEx, ...)



## 4. Standard APIs: New ISG (Industry Specification Group) in ETSI (European Telecom Standards Institute) set up in November 2012



# NFV requirements (1/2)

- The rapid operations

- configuration, provisioning, and chaining of virtual network functions

- In addition to other resources required for the service.

- To create innovative and customized services.

- Intelligent service placement

- Automating the determination and selection of an optimal

- physical location

- platform

- Depending on various business and network parameters

- cost, performance, and user experience

- Location: ☐on various devices in the network

- in a data center, in a network node, or even on the customer premises

# NFV requirements (2/2)

- Dynamic and elastic scaling of services

- The orchestration process

- maps the instantiation of virtual network functions against real-time demand

- Frees up physical capacity to be used for other services.

- S/ISP user their infrastructure more efficiently

- more predictable and optimized return on investment (ROI)

- deploying additional network services without unnecessary equipment costs

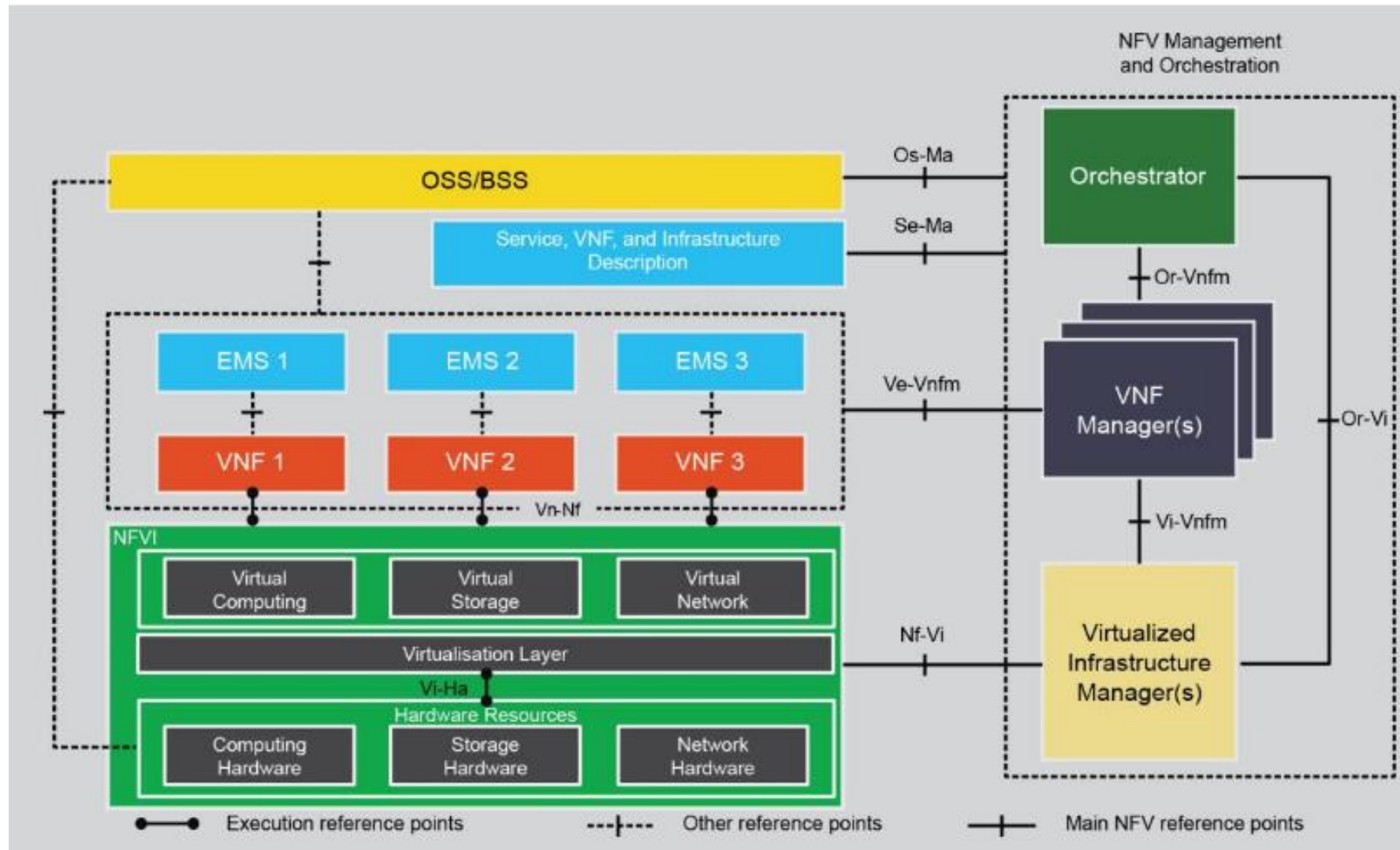
- Full lifecycle management of the VNFs

- management of:

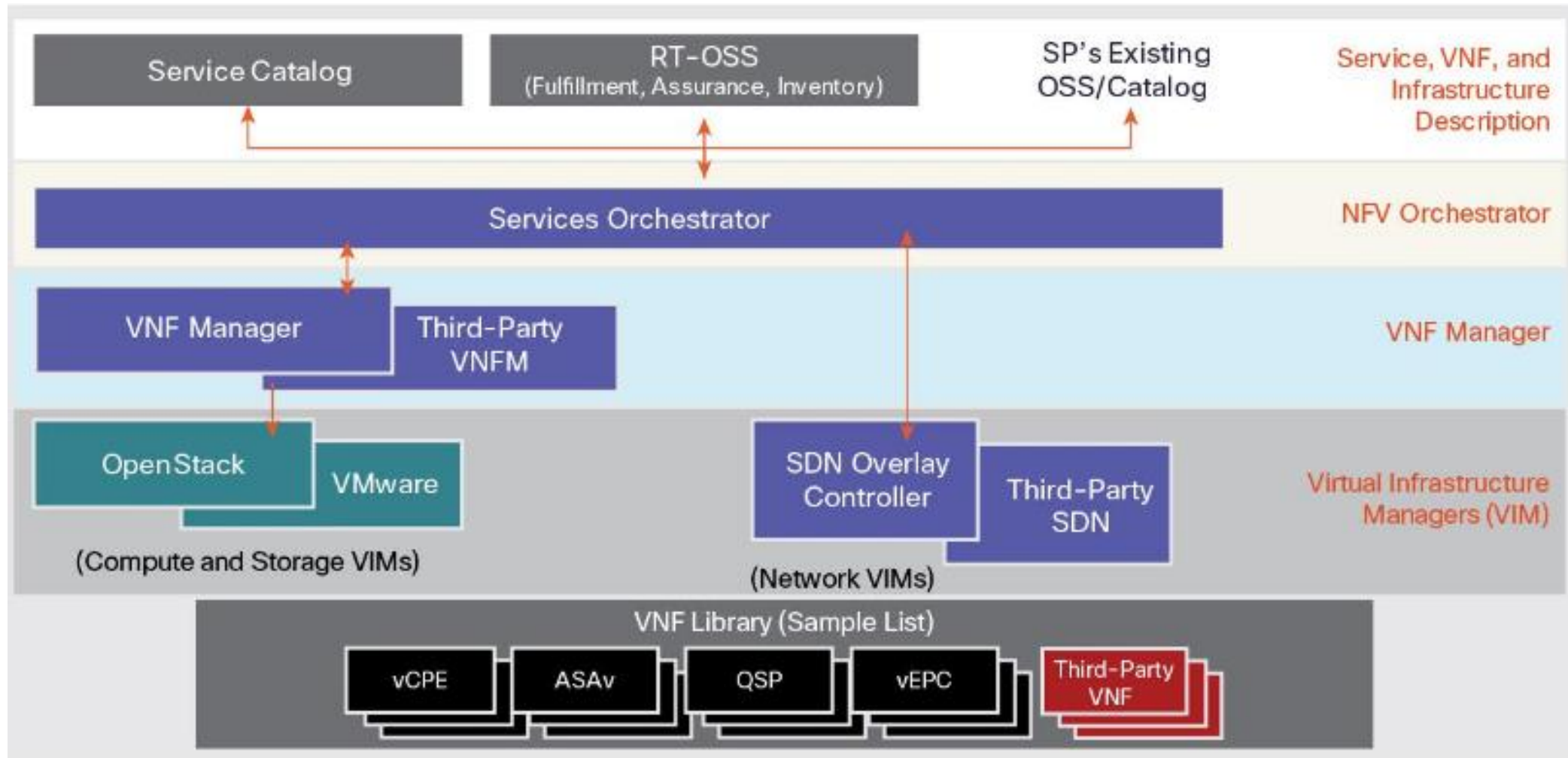
- the creation, instantiation, and monitoring of the VNF

- until it is decommissioned

# ETSI NFV reference architecture



# NFV architecture (example)



# Communications Networks Evolving

- Growth of data traversing the network
- Cloud computing changing the way applications are delivered and consumed
- Operators are under pressure to meet demands for services from consumers, enterprises and the Internet of Things
- Industry shift towards Software-Defined Networking and Network Functions Virtualization

# Industry Needs

- Flexibility, efficiency, new service offerings
- Cloud-based delivery models
- Dynamic bandwidth allocation
- Common standards for core network elements
- Integration of existing open source NFV building blocks
- Ecosystem collaboration, coordination and testing
- Carrier-grade service performance



OPNFV is a carrier-grade, integrated, open source reference platform for NFV

# OPNFV Project Goals

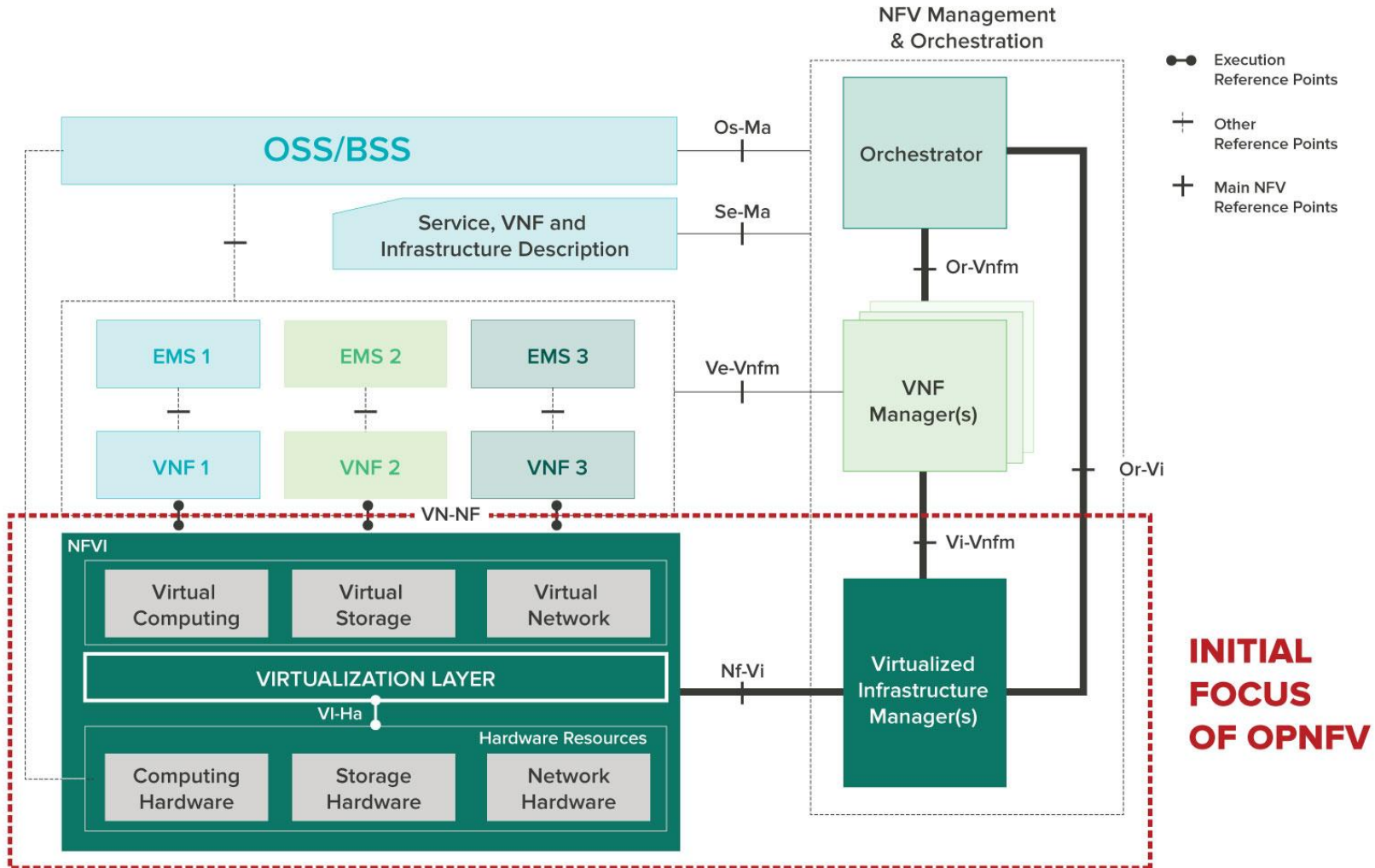
- Develop an integrated and tested open source platform that can be used to build NFV functionality, accelerating the introduction of new products and services
- Include participation of leading end users to validate OPNFV meets the needs of user community
- Contribute to and participate in relevant open source projects that will be leveraged in the OPNFV platform; ensure consistency, performance and interoperability among open source components
- Establish an ecosystem for NFV solutions based on open standards and software
- Promote OPNFV as the preferred open reference platform



# OPNFV Initial Scope

To provide NFV Infrastructure (NFVI), Virtualized Infrastructure Management (VIM), and APIs to other NFV elements, which together form the basic infrastructure required for Virtualized Network Functions (VNFs) and Management and Network Orchestration (MANO) components.

# OPNFV Architecture Framework



# Ericsson – Utilizing Openstack for NFV

- <https://www.youtube.com/watch?v=eeaTQsZdxHE>

# Summary

- Network Functions are different from generic IT computing tasks
- NFV addresses this issue
- OPNFV Architecture – a first standard
  - Other solutions also exist

- [https://www.youtube.com/watch?v=a5kCP7X\\_onI](https://www.youtube.com/watch?v=a5kCP7X_onI)
- <https://www.youtube.com/watch?v=eeaTQsZdxHE>
- <https://www.youtube.com/watch?v=SIKxuFsx1l0>
- <https://www.youtube.com/watch?v=imkJOobsfxE>