Introduction

NFV

Telco Cloud Networks
What is Cloud? Why Cloud is necessary?

- Demystifying Cloud:
  - NFV
  - SDN
  - Hypervisor Vs Container
NFV: Network function Virtualization
also known as virtual network function (VNF)

Traditional LTE Network
NFV: Network function Virtualization

Traditional LTE Network

Specialized Appliances / Purpose Build
Combination of Capacity & Functionality

Traditional LTE Network
NFV: Network function Virtualization

**Virtual Network**

**Generic Hardware**

**Features of NFV**
- Purpose Build hardware to Generic Hardware
- App running on Software
- Separation of Network Function & Capacity
- Easy Capacity Scale Up / Down
- VM are Building Blocks

**COTS HARDWARE**
Common hardware for all Apps
*Commercial off-the-shelf*

**NFV**
- Softwarization
- Virtualization
- Orchestration
NFV Architecture

Virtualized Network Functions (VNFs)

NFV Infrastructure (NFVI)

Virtual Compute

Virtual Storage

Virtual Network

Virtualization Layer

Compute

Storage

Network

Hardware Resources

NFV Management and Orchestration

Governing Specs

October 2012
White Paper

- AT&T USA
- BT
- CenturyLink
- China Mobile
- Colt
- Deutsche Telekom
- KDDI
- Orange
- Telecom Italia
- Telefonica
- Telstra
- Verizon
NFV: Network function Virtualization

**Components of NFV**

- MME
- MSC
- CRAN
- PCRF
- PGw
- SMSC
- HLR
- Switch
- Router
- Virtual Machines
- Generic Hardware

Each Application running on One or Multiple VMs

**Cloud LTE Network**

**Virtualized Network Functions (VNFs)**

- vSMSC
- vMSC
- vHLR
- vSGSN
- vGGSN

**NFV Infrastructure (NFVI)**

- Virtual Compute
- Virtual Storage
- Virtual Network

**Virtualization Layer**

- Compute
- Storage
- Network

**Hardware Resources**

www.TelecomTutorial.info
**NFV Architecture**

**NFV Layers**

**NFVI**
(Network Function Virtualization Infrastructure)
- Manage Physical part in NFVI
- Hypervisor: Responsible for abstracting physical resources into virtual resources

**VIM**
(Virtualized Infrastructure Manager)
- Management / Control for NFVI
- Also manages Reports & events

**OSS / BSS**

**VNF (Virtual Network Function)**
- EM1
- EM2
- EM3
- VNF1 vSMSC
- VNF2 vMSC
- VNF3 vHLR

**NFV Management & Orchestration**
- Orchestration
- Or-Vnfm
- Or-Vi
- Vi-Vnfm
- Ve-Vnfm
- Se-Ma
- Os-Ma
- NF-Vi

**Virtualization Layer**
- Virtual Compute
- Virtual Memory
- Virtual Network

**Compute**
- Blades of HP / DELL Hardware

**www.Telemedia.info**
VNF
• A VNF is the basic block in NFV Architecture, Example:
  • vIMS
  • vMME
  • vMSC
  • vSwitch
  • vRouter
• EM (Element Management) FCAPS of Application such as Link down, KPI Degradation etc.

VNF Manager
• Life cycle VNFs:
  • setting up/
  • Maintaining
  • Tearing down
• FCAPS of Virtualization and VNF
NFV Architecture

NFV Orchestrator (NFVO)
- Key to Automation of SDN & NFV
- Performs:
  - Resource orchestration
  - Network service orchestration
  - Global resource management of NFVI resources via VNFM & VIM
  - Allocating and scaling resources
  - Single Orchestrator for NFV service

OSS / BSS

NFV Layers

VNF (Virtual Network Function)
- EM1
- EM2
- EM3
- VNF1
- VNF2
- VNF3

NFVI (NFV Infrastructure)
- Virtualization Layer
  - Virtual Compute
  - Virtual Memory
  - Virtual Network
- Compute
- Memory
- Network

NFV Management & Orchestration
- Orchestration
- VNF Manager
- VIM Virtualized Infrastructure Manager
- VNFM
- VIM

Service, VNF & Infra description
https://docbox.etsi.org/ISG/NFV/Open/Publications_pdf/Specs-Reports
Why SDN?

New Service or Node

Virtual Compute

Network Reachability

NFV

Few Seconds

• IP Allocation
• Policy Opening
• Routing changes
• Bandwidth Allocation
• End to End Reachability
• Service testing

Few Days
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