U-5 (SDN).

DOMS | Page No.
Date / /

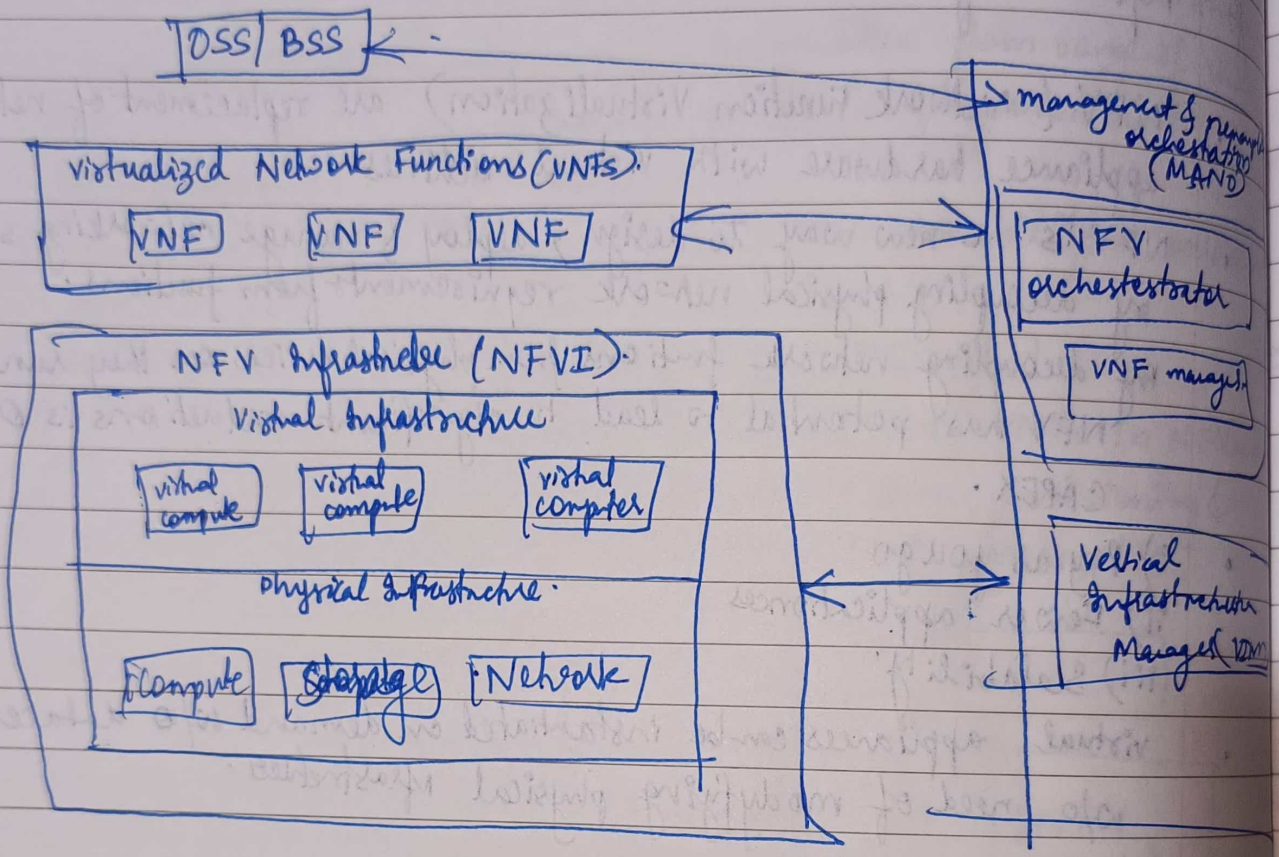
* Definition of NFV-

- NFV (Network Function Virtualization) are replacement of network appliance hardware with virtual machines.
- NFV is a new way to design, deploy & manage networking services by decoupling physical network requirements from functions.
- By decoupling network functions from physical devices on they run, NFV has potential to lead to significant reductions is OPEX & CAPEX.
- i) Pay as you go
  ii) Fewer appliationces
  iii) Scalability.
- virtual appliances can be instantiated on demand w/o datacenters & w/o need of modyfying physical infrastructures.

- Need of NFV-

i) Virtualization.
ii) Orchestration.
iii) Programmable
iv) Automation.
v) Dynamic Scaling
vi) visibility.
vii) Performance
viii) Multi-enances.
ix) servic Integration
x) open fees choice of modular plugins.

* NFV architecture.



consists of 3 main parts -

i) Centralized virtual network infrastructure
ii) compute code applications
iii) Framework (MANO).

RRFs of NFV -

① physical security controls do not seem to be effective virtualizing will increase expose to attacks.
② Malware is tough isolate & contain.
③ Network traffic is smaller amount transparent
④ complex layer needs multiple kinds of security.

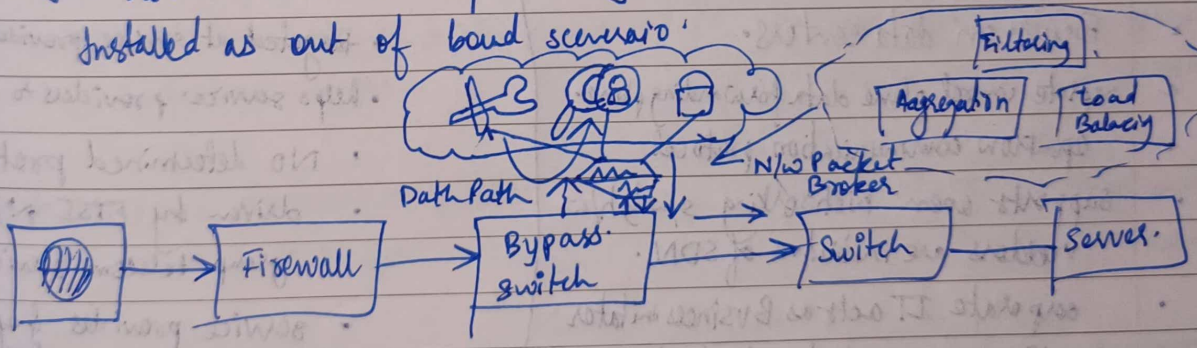
DOMS | Page No.
Date / /

Inline Network Functions -

(1) Inline network device is a device that receives packet and forwards them to their intended destination.
eg → routers, switches, firewalls, for web application intrusion detection systems & prevention systems, anti malware & n/w taps.

(2) Nature of out of band or in line surveillance scenario impacts.
i) placements of surveillance equipment
ii) type of surviellance device used.
iii) surviellance activities that can be performed as part of visibility.

(3) Firewall is typically placed on company main n/w interface to outside world. That is why they are in-line. But IDS (detection system) are not typically placed inline as it is used to used to scandals for intruders. It is not intended to inspect every packet that transresses n/w.
Installed as out of band scenario.



Benefits of Network Function.

- Improved Communication
- Resource Sharing
- Scalability
- Flexibility
- Centeralized Management
- Security
- Vendor Independace
- Faster time to Market
- Reduced Environment Impact

DOMS Page No. Date / /

* Challenges for Network Function Virtualization –

→ Orchestration & Integration in Hybrid Networks
→ Business cases (unrealistic idea, cost reduced, (Vendor lock in, s/w compu. preparation, full acces, dynamic)
→ Lack of capabilities (reduction of OPEX, operational simplicities, customer experience)
→ Organizational Issue (absence of gov, more s/w centreral)
→ Lack of Standards (small impedence, help innovative, fast proceding)
→ Management & orchestration issues (resource needs fluctuate, short duration, flexibility resources)
→ Security & Privacy (open interface, remote attestation, account management)

SDN	NFV
• Focuses on data centers.	• targeted at service providers & operators
• seprate control plane data forwarding plane.	• helps service providers to virtually function
• openFlow communication protocol	• No determined protocol
• supports open Networking s/w & h/w vendors are initiative of SDN.	• driven by ETSI NFV working group telecom service providers
• corporate IT acts as Business initiator	• service provides & operators are business initiators
• Appl^n seen on industry standard servers	• Runs on industry standard servers
• Reduces cost of network.	• Increases scalability & agility

NFV	NV
① Architecture is centered around data centers.	① primarily meant for service providers & operators
② offers key components of complete network, including its infrastructure & available app^ns.	② offers broad range of specialisation capabilities that need to be carried out all levels of N/W
③ NFV adds virtual functions to physical n/w	③ NV adds tunnels to physical network

* NFV is NV on electrainer
* NFV controls NF lives network address transaction, firewalls, IDS.
* NV is a use case, a service that can be arranged, where diff N/w uses each a topology
* VNF can utilise multiple VMs to acheive its functionalities each individual VMs are known as VNF components.

DOMS | Page No.
Date / /

NFV

- architecture is centered on datacenters
- NFV separates control plane & data forwarding plane.
- SDN isolates control plane from data
- communication protocol, NFV employs OpenFlow
- supported by manufactures of gear & software for business networking
- corporate IT services as SDN Business initiator
- Industry standard servers or switches used to created SDN appln
- SDN reduces network expenses further by doing away with requirement for pricey switches & routers

NV

- meant for service providers & operators.
- enables service provider or operators to virtualize operation.
- Enables service providers or operators to virtualize operation dedicated equip to virtual servers.
- No protocol has yet been established
- operators or telecom service.
- service providers or operator serve as NFV business holder
- On industry-standard servers NFV appln are executed
- ~~NFV~~ Hardware capacity to network services that are needed at any given time.

Reading NFV vendors-

1) Juniper Networks, Inc—
- Helps clients create scalable, dependable, secure & affordable n/w by designing, developing & distributing high-performance when soln assoc.
- Two divisons - Products & services.
  VPNs, service control gateways, orchestration & automation of VNF.
- Americas, Asia Pacific, Middle East & Africa.
- Subsidiaries - Mist System, Inc, AppFormix Inc & Aurrion Inc (US)

2) Ericsson —
- Top ICT supplies to services provides.
- Offers N/w assistance pioneer in 4G & 5G tech-
- Business segments - N/w management, digital services, managed services
- America, Asia Pacific, ME, Africa-
- Subsidiaries Leax Inc, Ericson - (south Korea), Ericsson - Jesta (Australia) US

3) CISCO systems, Inc.
- Internet is powered by wide variety to tech that cisco systems creates 2 sol
- Intent based soln → security, collaboration, apps & cloud to give customers by
- 4 divisions - Infrastructure platform, services, Appln, Security-
- operation across - ME & Africa, Europe, Asia, North America,
- Subsidaries - Broadsoft, Inc, open DNs, Cisco Webex Inc.

4) Hewlett Packard Enterprises
- offers consumers, small & big business others, comprehensive range of hardware & related services-
- Range of NFV services like vulnerability research, data devices. security enhancement & ongoing scrutiny maintenance.
- ME & Africa, Asia Pacific, Latin America, NA & Europe
- Subsidaries - Voodoo Ltd, Apogee Corporation & Indigo America

3) Fujistu • Ltd -

- Another top ICT firm, fujistu offers wide selection of goods, services,
- 3 business segments: Ubiquitous & soln; Techday "soln & Device soln.
- Wide variety of NFV soln, network, storage, computation & virtual analog
- ME, Africa, Europe, Asia, NA.
- Subsidaries - Niffy Corporation, PFU Limited, FDT Corp, Rigun Kiak.

4) Affirmed Networks -

- 2010, Massachewells, services to change & advance intelligro in mobile dt
- offers slicing, virtual probe & analytics & IOT virtualy & soln.
- virtalized DPI & optimized IOT access, wifi & service automation.
- NA, Europe, Asia - Pacific.

5) Huawei Technologies Co, Ltd -

① Leading ICT supplier
② 4 Business segments - carrier B, enterprises B, consumer B & others.
③ Provides services for NFV, including EC & IOT soln for intelligent computing
④ NA & europe, Asia Pacific, Me & Africa
⑤ Subsidaries - Huawei Device Co-, Ltd, Heawi Machine CO. Ltd, Shangai Huawei Technologies, Co. Ltd.