intel®
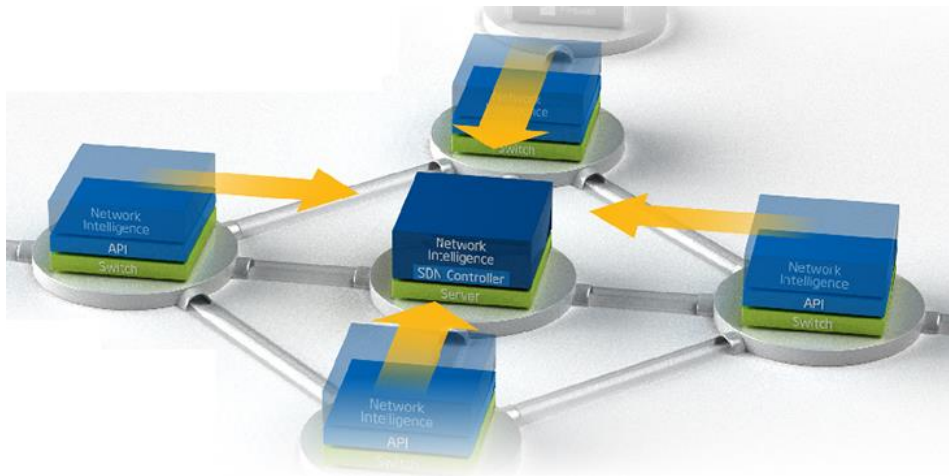
# NETWORK FUNCTIONS VIRTUALIZATION (NFV) AND VIRTUAL NETWORK FUNCTIONS (VNFS)

# DEFINE NFV AND NFVI

# Software Defined Networking (SDN)

**SDN** is an approach to networking that allows managing network services through abstraction of lower-level functionality.

- Example: decoupling the system that makes decisions about where traffic is sent (the Control Plane) from the underlying systems that forward traffic to the selected destination (the Data Plane)

# Network Function Virtualization (NFV)

NFV is a network architecture concept of using IT technologies to virtualize network node functions.

- Example: using volume servers running Virtualized Network Functions connected or chained to create communication services

# NFV Infrastructure (NFVI) and Virtualized Network Functions (VNFs)

A **VNF** may consist of one or more virtual machines running different software and processes, instead of having single-purpose hardware appliances for each function.

- Example: virtualized load balancer, firewall, intrusion detection or Wide Area Networks accelerators

**NFVI** is part of NFV platform including virtualization layer and hardware for computing, storage and networking.
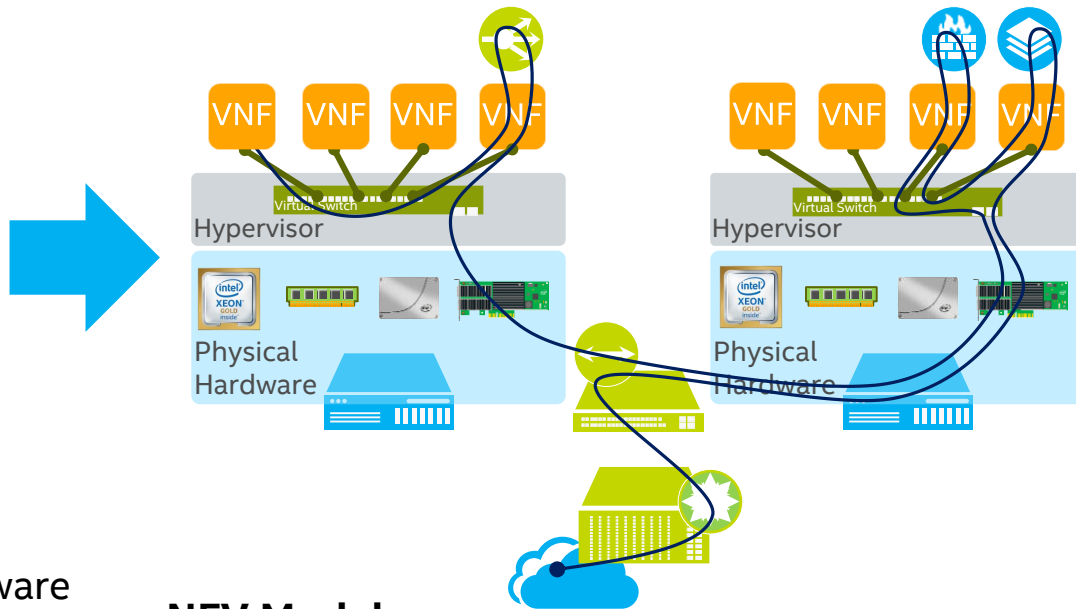
# WHAT DOES NFV DO?

# Network Functions Virtualization

Delivering network services based on volume servers running software Virtual Network Functions (VNFs), instead of single purpose boxes.
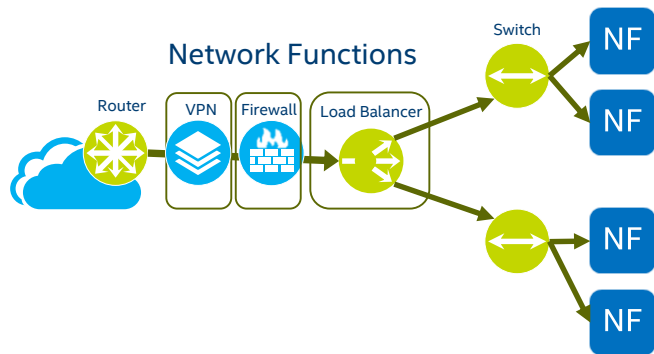


**Physical Model**
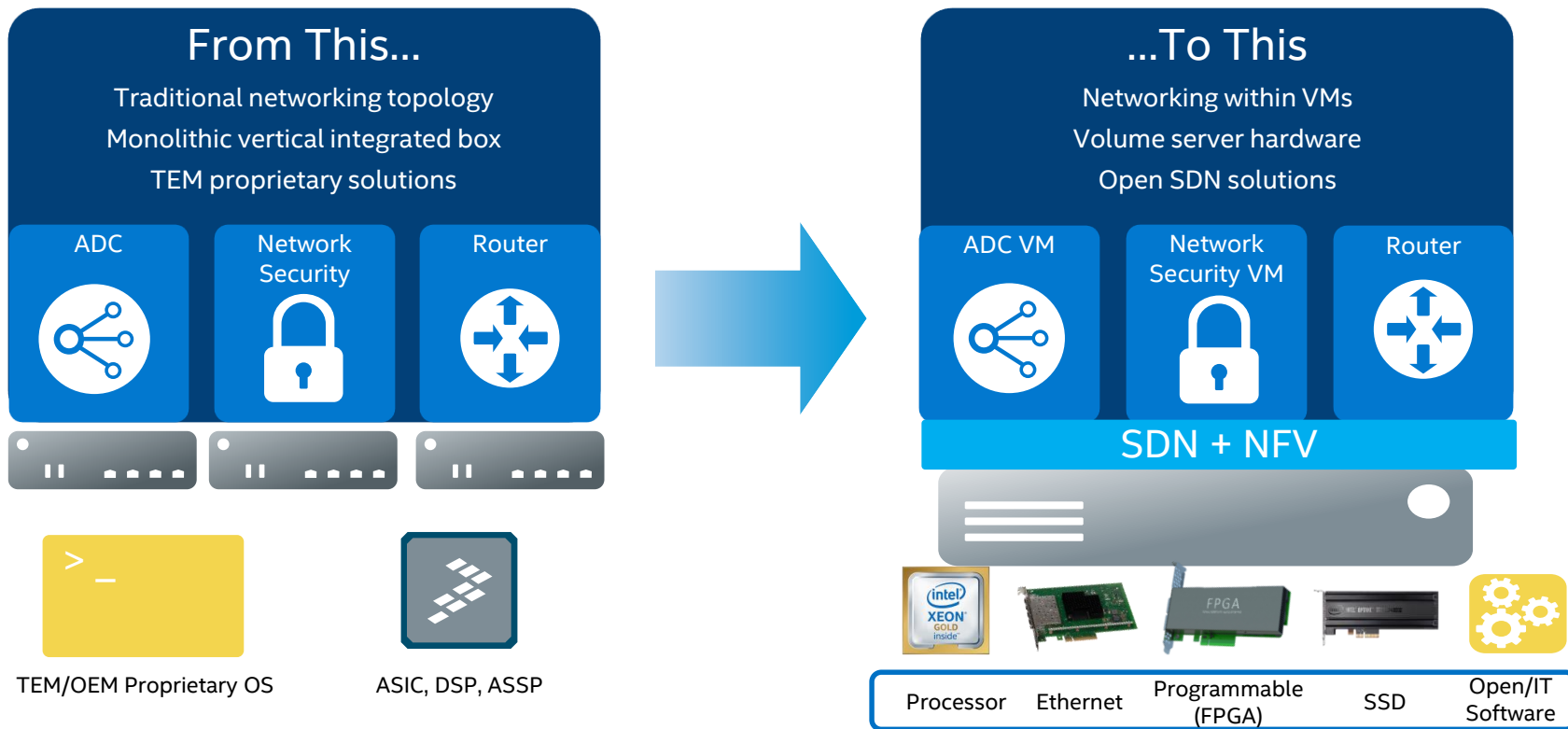Inflexible Services in dedicated hardware or physical boxes that are network topology dependent
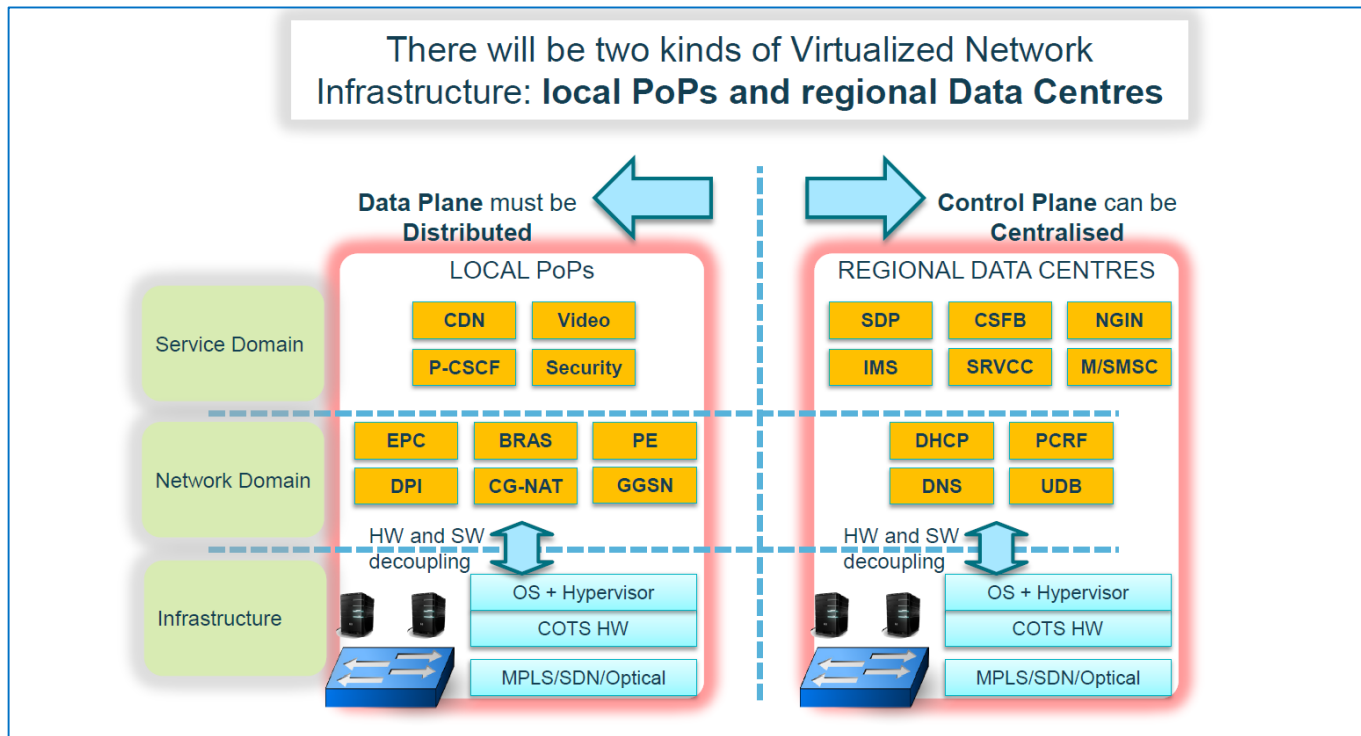
**NFV Model**
Dynamic provisioning of network services as Virtual Network Functions (VNF)

# NFV: Driving Architectural Transformation

# Concept of Future-Proof Network Architecture



There will be two kinds of Virtualized Network Infrastructure: **local PoPs and regional Data Centres**

**Data Plane** must be **Distributed**

**Control Plane** can be **Centralised**

LOCAL PoPs

Service Domain: CDN, Video, P-CSCF, Security

Network Domain: EPC, BRAS, PE, DPI, CG-NAT, GGSN

HW and SW decoupling

Infrastructure: OS + Hypervisor, COTS HW, MPLS/SDN/Optical

REGIONAL DATA CENTRES

Service Domain: SDP, CSFB, NGIN, IMS, SRVCC, M/SMSC

Network Domain: DHCP, PCRF, DNS, UDB

HW and SW decoupling

Infrastructure: OS + Hypervisor, COTS HW, MPLS/SDN/Optical

Source: Telefonica* public presentation

(intel)

# CommSP Cloud Transformation Vision

**Services**

| Telephony | Video | Mobility | IoT | | Call Centers | Portals | Customer Interface |

**Workloads**

| Access | Edge | Control | OA | VAS | Cloud | OSS/BSS |

**Orchestration**

**Infrastructure**

| Service Provider Network Cloud | ⟷ | Service Provider Private Cloud | ⟷ | Public Cloud |

**Technology**

uCPE
Edge

**Extended Private Cloud**

Distributed DCs ← Distributed DCs ← DC ← DC

**Single Technology Platform**
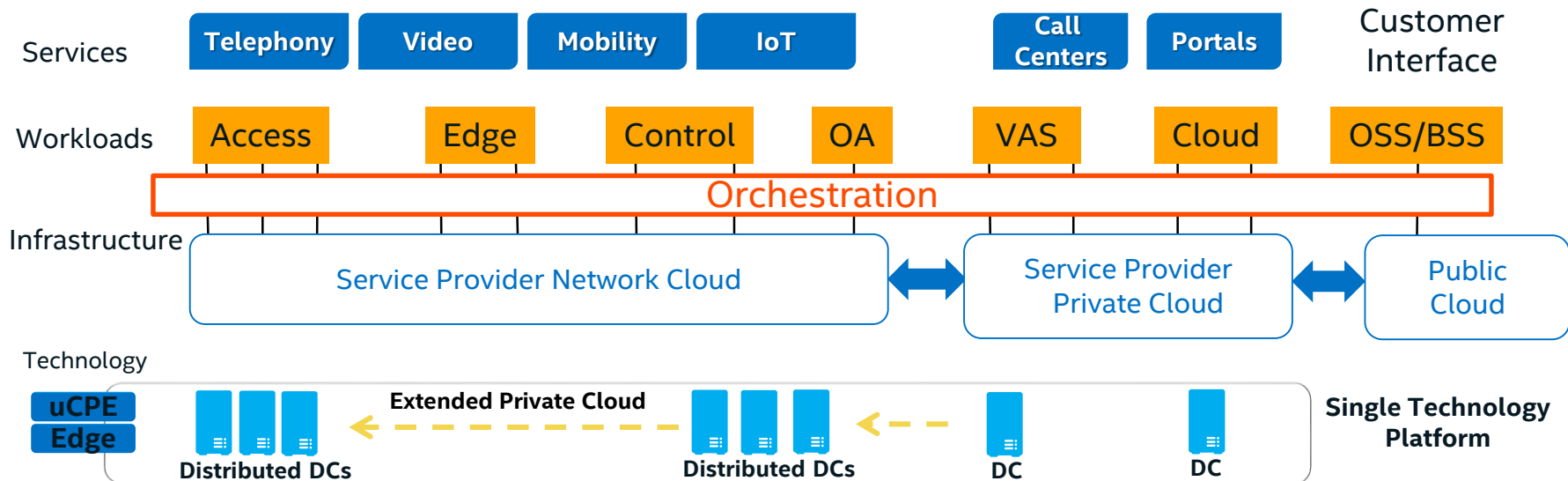
- **Consistent technology platform** for most Network, Call Server, OSS/BSS, and Enterprise IT workloads, leveraging Intel® Architecture and ethernet, reducing diversity of required skills

- **Automated orchestration** enables optimised workload placement and cost reduction, removing manual process issues

- Enables **software based service innovation**