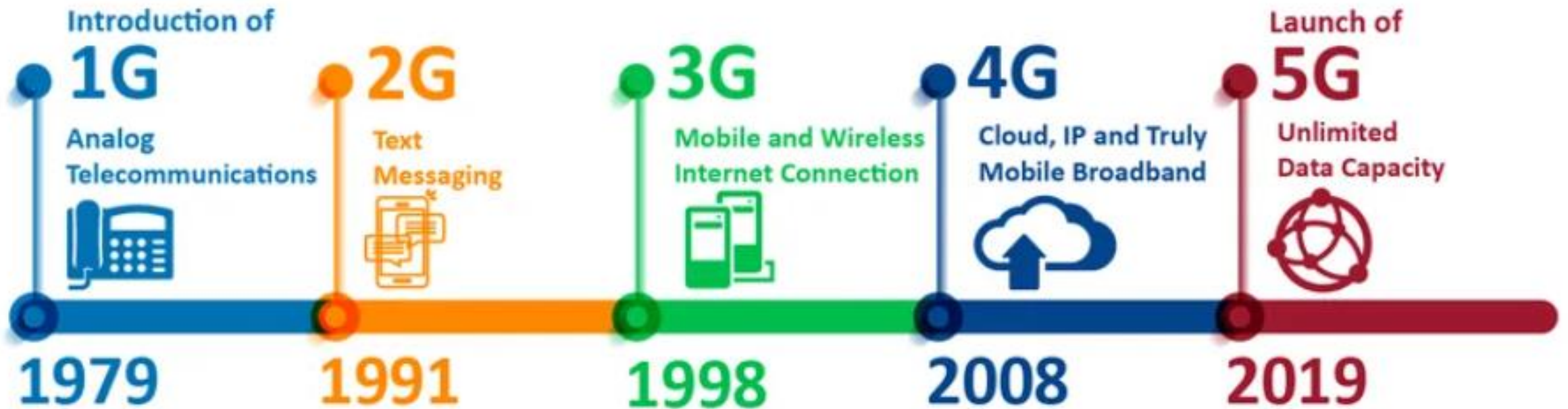


# Network Function Virtualization Infrastructure

Raskin Paul

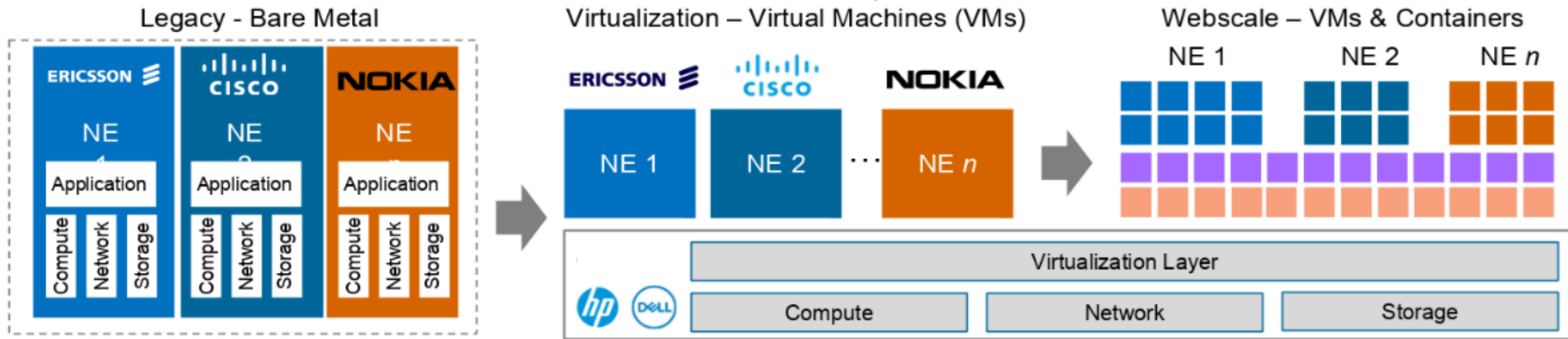
# The Transition of Mobile Internet



# Legacy Telecom Nodes



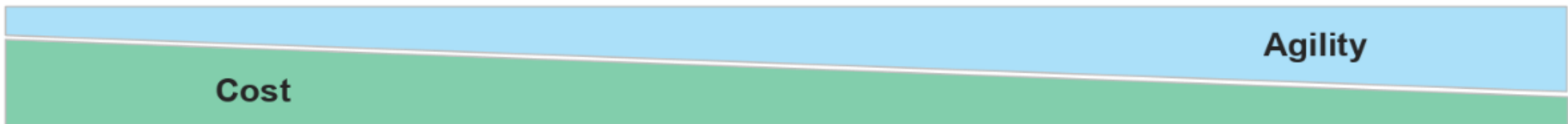
# Telco Core Cloud Platform Evolve Trend



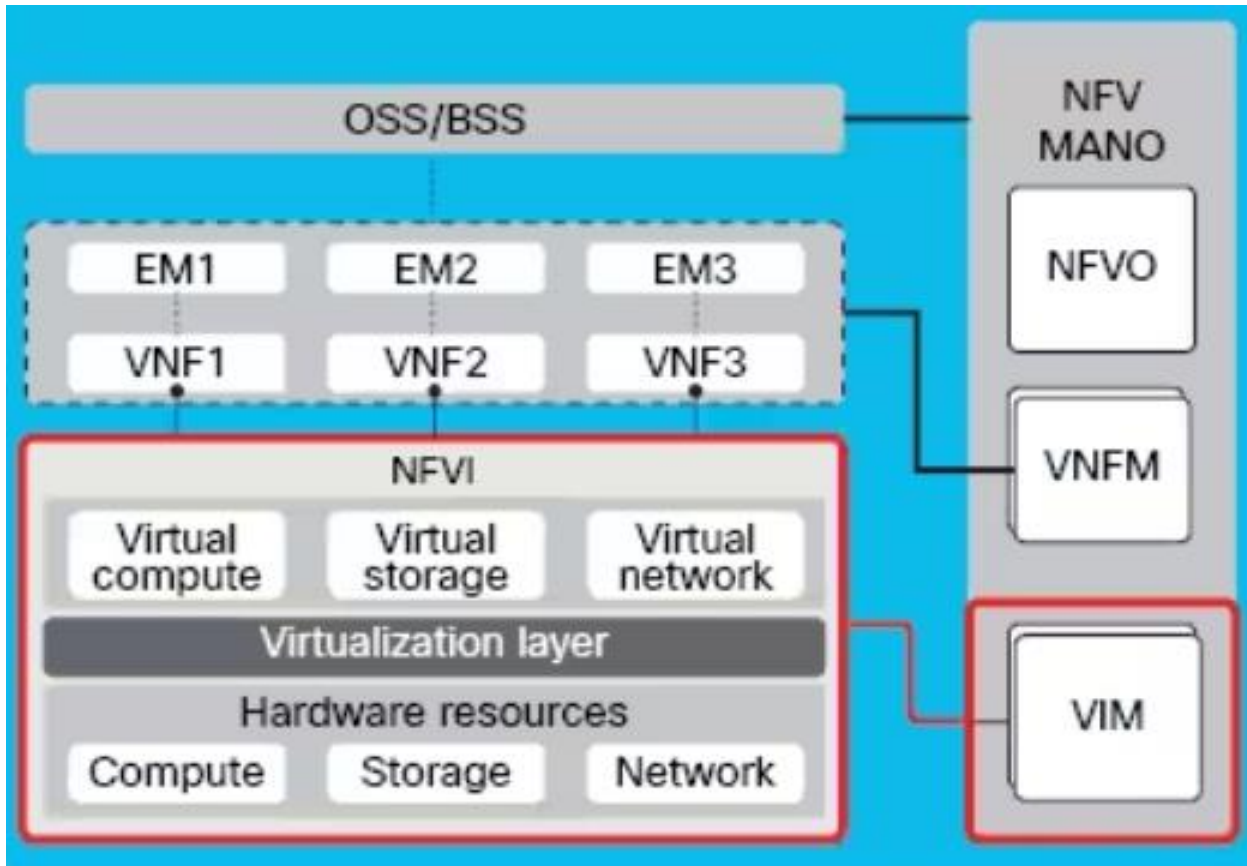
- Bare Metal Servers / Purpose-built HW Appliances
- HW and SW coupling
- Manual MOP-driven Operational Processes

- Eliminate Hardware dependency
- "Software-only" model for vendor VNFs
- Automation and Orchestration
- Multi-tenant: Optimized shared Infrastructure
- Deployment from months to weeks

- "Cloud-Native" Micro-services based architecture for 5G and RAN
- Dynamic network elasticity
- Service orchestration



# ETSI NFVI Definition



- **NFVI – Network Function Virtualization Infrastructure**  
Is the totality of all hardware and software components that build the environment in which VNFs are deployed
- **VIM – Virtualized Infrastructure Manager**  
Controls and manages the NFVI compute, storage, and network resources

# Components Of NFVI Architecture

- **OSS/BSS**

The operations support system (OSS) and business support system (BSS) of service providers deliver management functions and are not included in the NFV infrastructure. MANO and network elements (NEs) provide interfaces for communication with the OSS/BSS.

- **VNF**

VNFs refer to virtual machines (VMs), as well as service NEs and network function software deployed on VMs.

- **NFVI**

NFVI refers to the required hardware and software components that build the environment where VNFs are deployed. It comprises of:

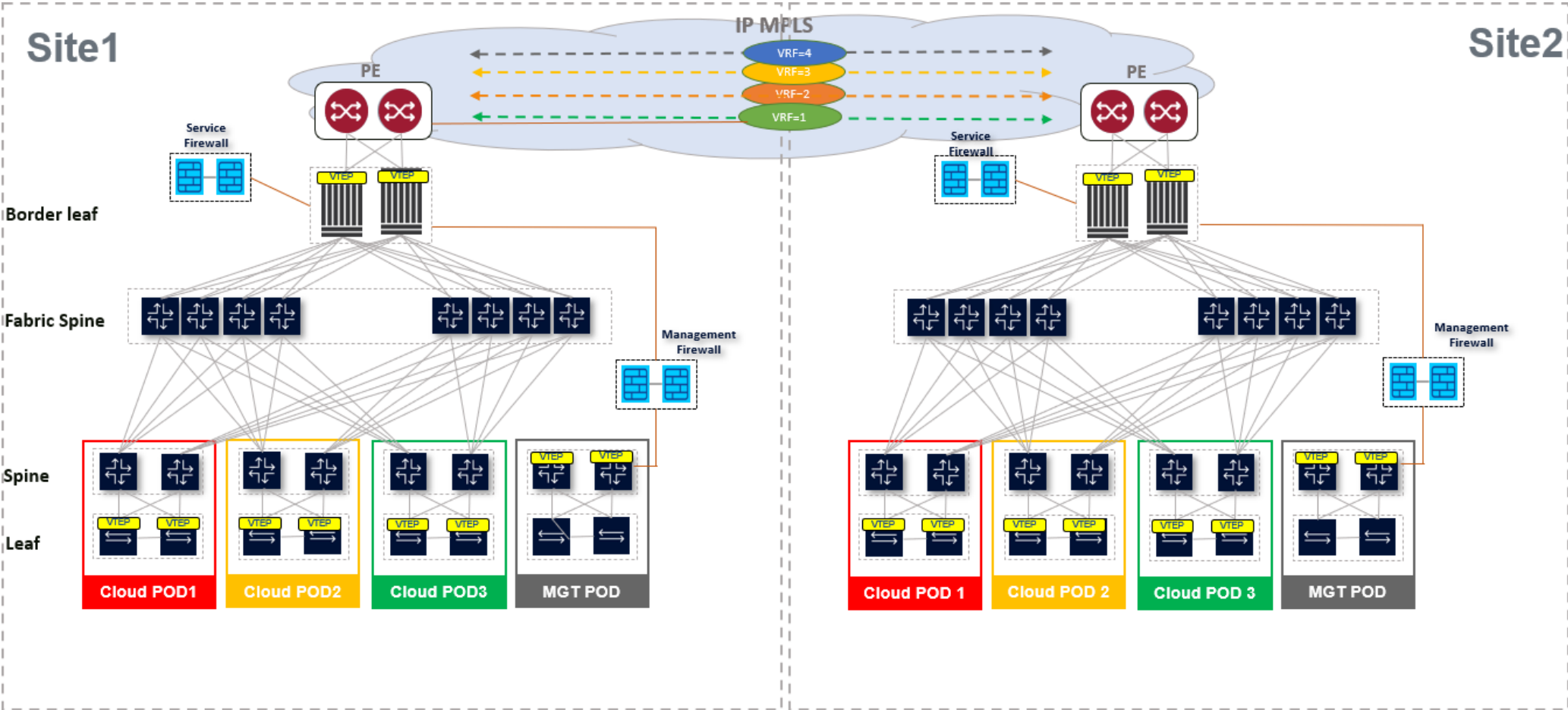
- **Hardware layer:** The actual hardware resides at this layer, including devices that provide computing, network, and storage resources.
- **Virtualization layer:** At this layer, hardware resources are virtualized into virtual resources, including virtual computing, storage, and network resources. It is a main functional module defined in NFV.

- **MANO**

MANO is responsible for unified management and orchestration of NFVI and VNFs. It is broken up into three functional blocks:

- **Virtualized Infrastructure Manager (VIM)**, responsible for discovering resources, managing and allocating virtual resources, and handling faults.
- **VNF Manager (VNFM)**, responsible for the lifecycle management of VNFs, including VNF instantiation, configuration, and termination.
- **NFV orchestrator (NFVO)**, responsible for orchestrating and managing all software resources and network services on NFV networks.

# Typical Large Scale NFVI DC Architectures



# Comparison between IT and NFVI workloads

## Similarities between IT and NFV Workloads

- Multi-Tenant Requirements
- Differentiate workloads based on CPU, Memory, and Storage requirements
- System automation
- Redundancy and Disaster Recovery
- Load Balancing
- Performance and Fault Monitoring

## Differences between IT and NFV Workloads

- NFV workloads have much higher network throughput requirements
- NFV workloads might need dedicated resource allocation
- Specific HW resources are needed for certain types of NFV workloads (crypto, etc.)
- Networking and service chaining requirements are more complex
- NFV availability requirements are typically higher than IT applications



# Benefits of NFVI

NFV applies to various network solutions, including SD-WAN, network slicing, and mobile edge computing. NFV decouples software functions from hardware and brings several benefits with the improvement of this standardized architecture:

- **Flexible services**

NFV offers the flexibility of running VNFs across different servers or moving them around as needed when demand changes. This accelerates the delivery of network functions and applications.

- **Less spending**

With NFV, multiple virtualized network functions can run on a single hardware server. This means that less physical hardware is needed, which allows for resource consolidation to reduce costs in spaces and power needed for hardware.

- **Higher resource utilization efficiency**

NFV eliminates the need for hardware changes when network requirements change. The basic network architecture can be quickly updated using software, avoiding physical device redundancy and migration.

- **No vendor lock-in**

By running VNFs on general-purpose hardware, NFV decouples network functions from dedicated hardware and eliminates vendor-lock due to specific functions, reducing network device maintenance costs.

# Question and Answer



Thank You

