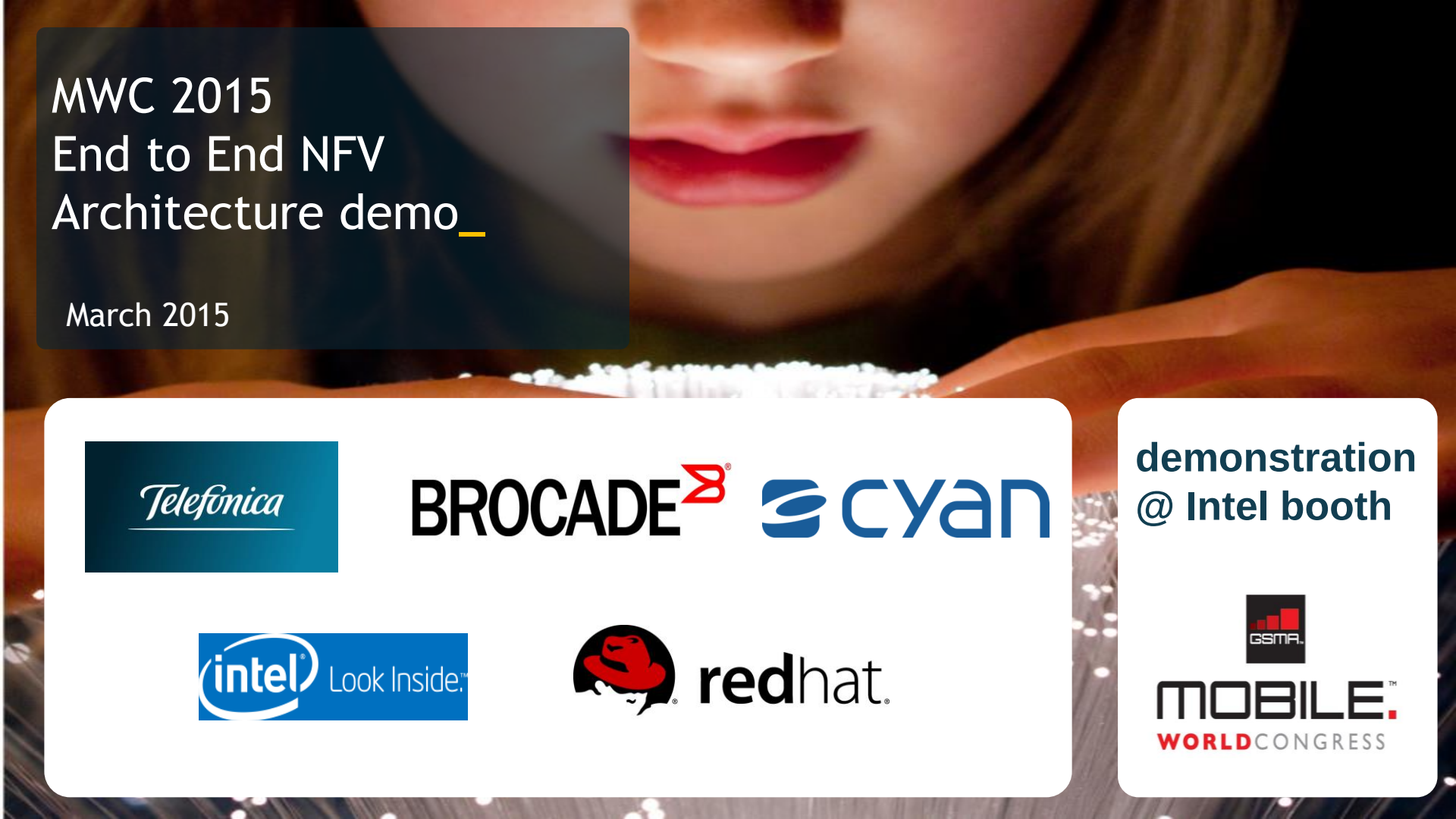


MWC 2015
End to End NFV Architecture demo_

March 2015

Telefónica

BROCADE

cyan

intel Look Inside.™

redhat.

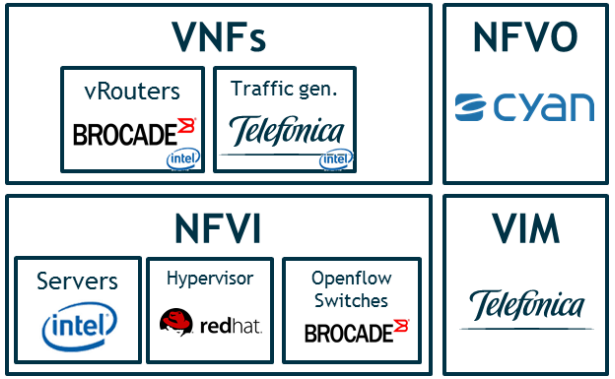
demonstration @ Intel booth

GSMA MOBILE WORLD CONGRESS

Executive summary

The goal is to demonstrate how an **advanced multi-vendor implementation of the ETSI ISG NFV architecture with intelligent orchestration of resources is capable of providing carrier grade performance, and highlight why a classic cloud infrastructure is insufficient**

The **Telefónica** hosted demo is based on **components from different parties**: **Intel** servers, **Brocade** switches, KVM hypervisor from **Red Hat**, VNFs from **Brocade** and **Telefónica** powered by **Intel**'s DPDK, deployed using **Telefónica** VIM and **Cyan** NFVO



Two scenarios are deployed in parallel and compared in terms of performance results:

- **Cloud scenario**, where a Cloud Management System is used to deploy the VMs
- **NFV ready scenario**, where a Virtualized Infrastructure Manager (VIM) is used to deploy the VMs, allocating resources following the recommendations in NFV-PER001

NFV Challenges: performance, scalability and predictability

Performance

Underlying HW server characteristics have a strong impact on the performance. Making appropriate use of the underlying HW is critical to ensure maximum VNF performance.

Scalability

Throughput must scale as utility increases. Bottlenecks in the hypervisor or in the underlying hardware must be avoided to scale effectively.

Predictability of data plane workloads

VNF Descriptors request the resources required for deterministic performance. It's critical the NFV-O and VIM use these descriptors for optimal deployment.

Network Virtualisation is not Cloud Computing

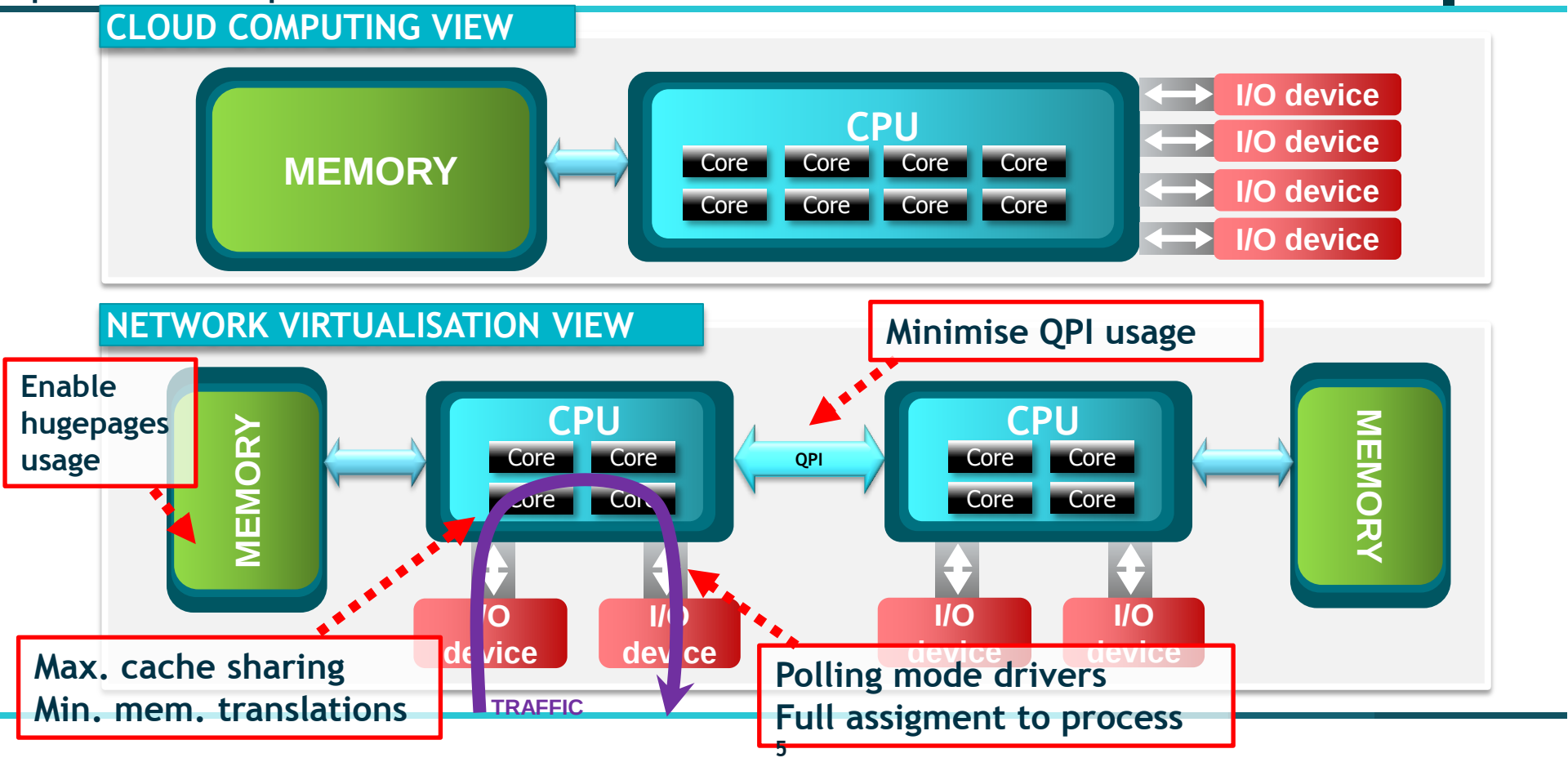
The network differs from the computing environment in 2 key factors:

1. **Data plane workloads** (which are huge!) → NEED OF **HIGH AND PREDICTABLE PERFORMANCE** (as with current equipment)
2. **Network requires shape** (+ E2E interconnection) → **GLOBAL NETWORK VIEW** IS REQUIRED FOR MANAGEMENT

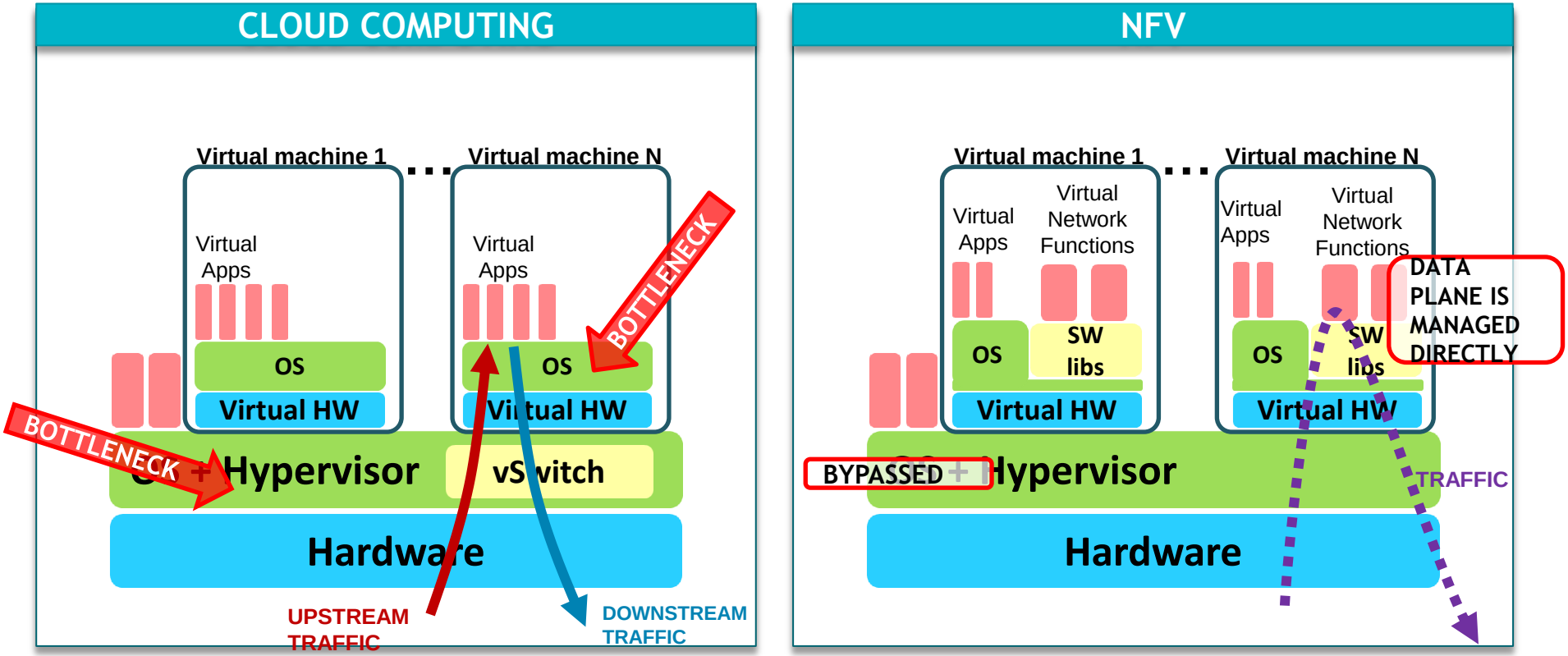
…which are big challenges for vanilla cloud computing

…and **most of industry is offering to Telcos just IT based cloud products** as network virtualization environments

Enhanced Platform Awareness (EPA) is needed to get proper and predictable performance



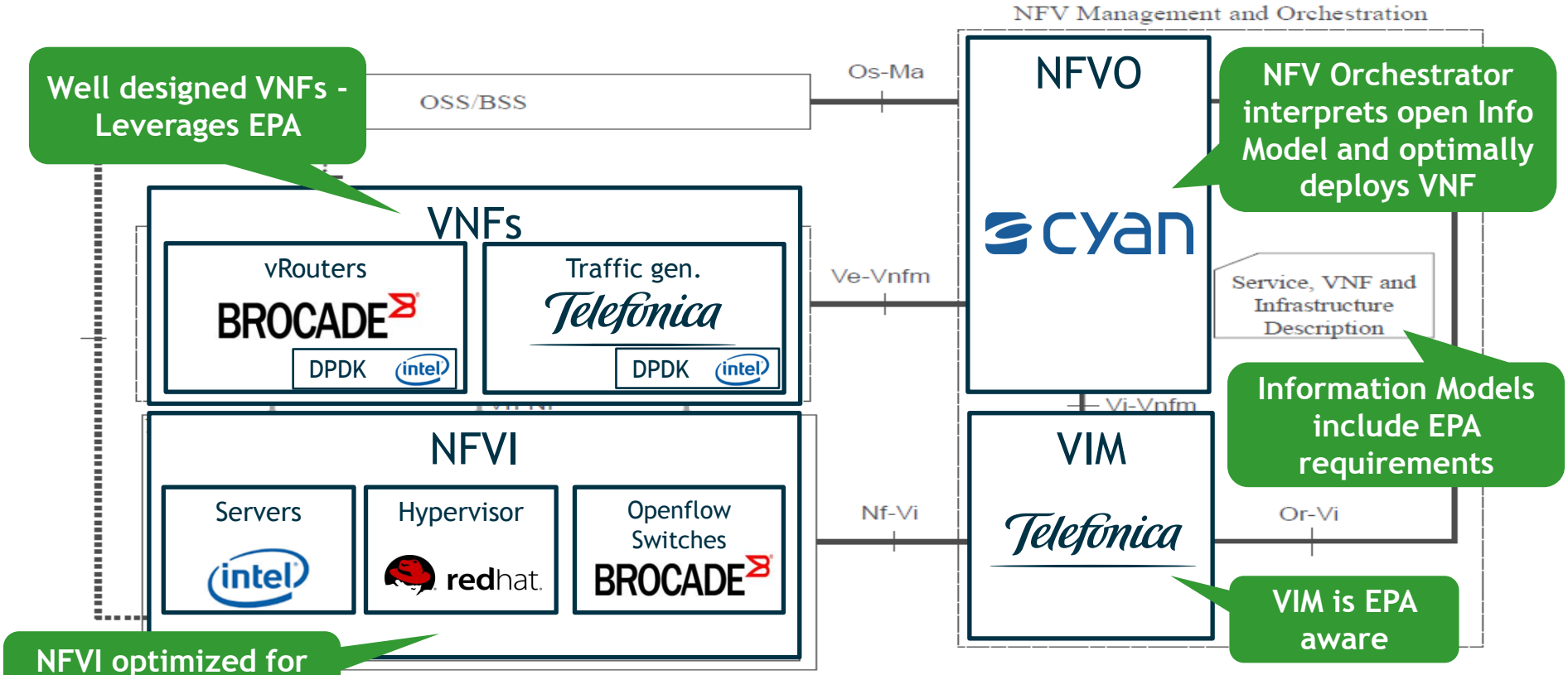
Avoiding **bottlenecks in the hypervisor and OS** is critical



Demo

Going beyond the theory

NFV Architecture and Contributor Roles



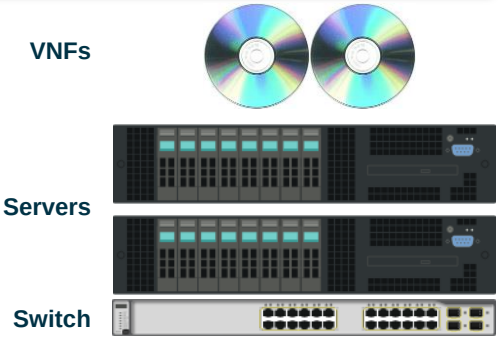
Two identical HW setups, but with different MANO

TRADITIONAL CLOUD

Same:

- VNFs
- Servers
- Switches
- Hypervisor

NFV



THEN WHAT'S THE DIFFERENCE?

TRADITIONAL CLOUD

- Cloud Management System acting as VIM
  - No Enhanced Platform Awareness
  - Networks based on vSwitch

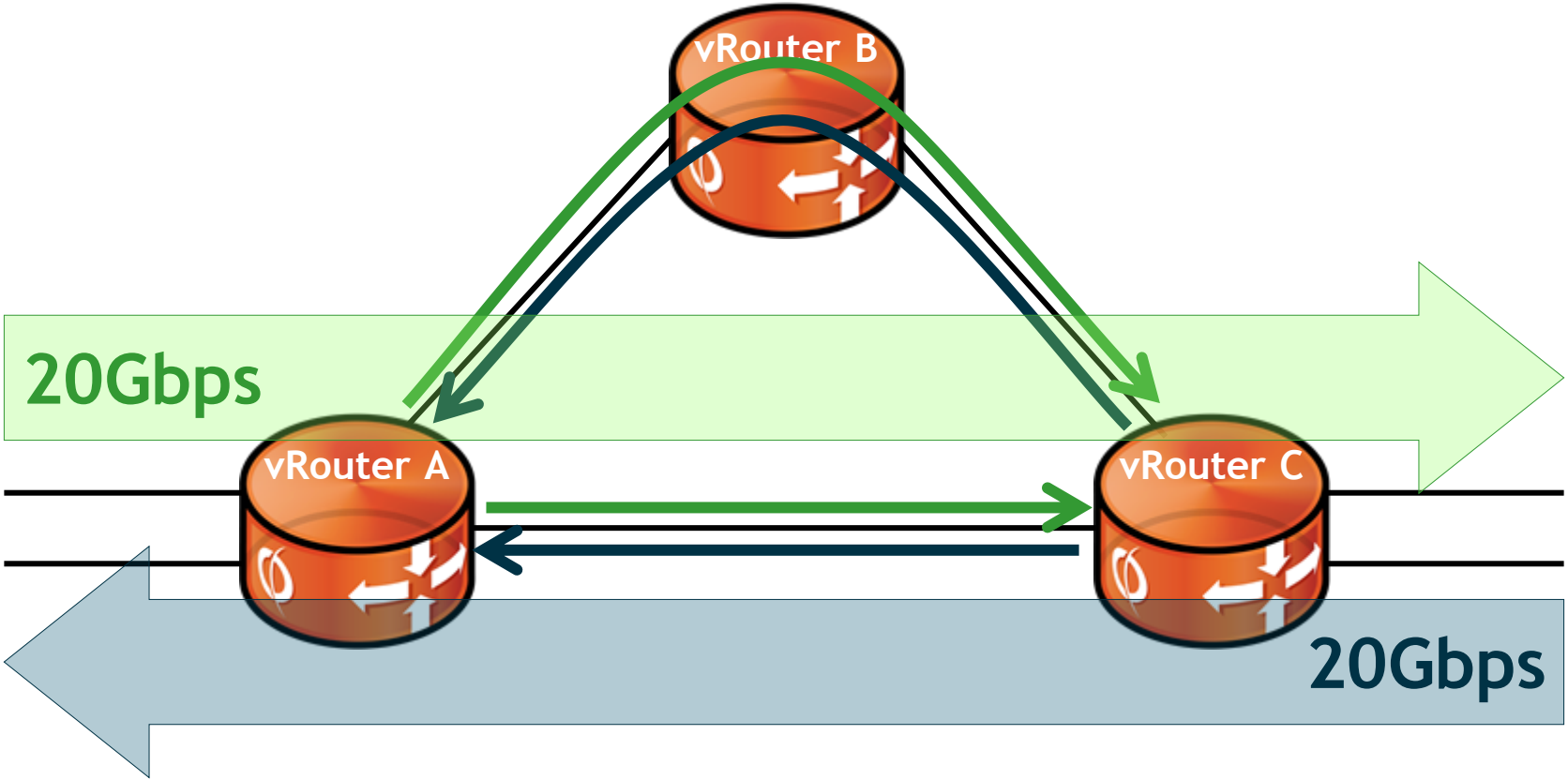
- VNF and Network Service Descriptors *à la cloud*

NFV

- NFV VIM, platform-aware
  - CPU & NUMA pinning, PCI passthrough, hugepages, etc.
  - Networks based on ToR Openflow switch

- VNF and Network Service descriptors, enhanced with platform-aware fields

Scenario description



Simple maths

Gbps = **Mpps** x frame_size

Attention is often paid here

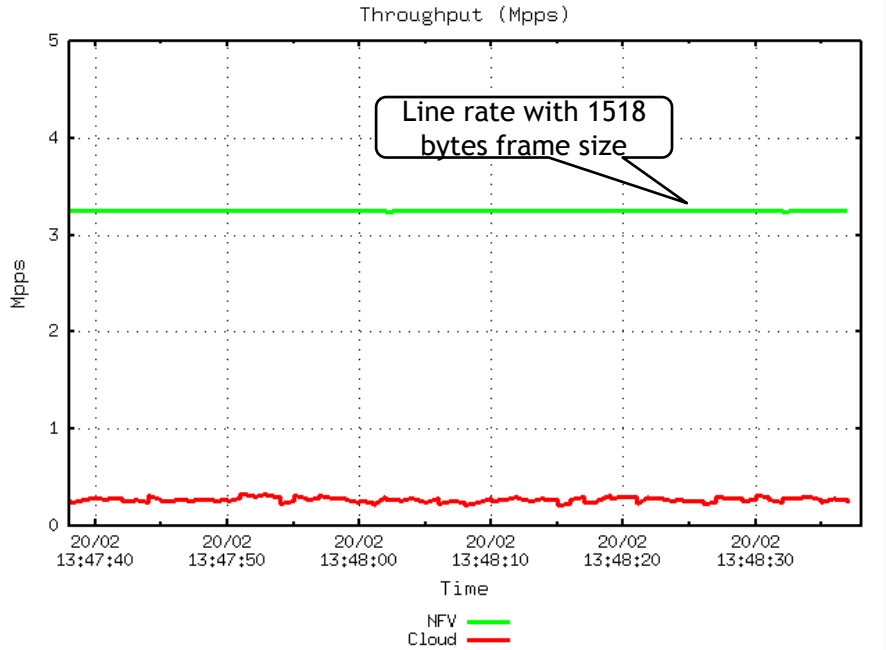
Tweaking this parameter, higher Gbps can be 'advertised'

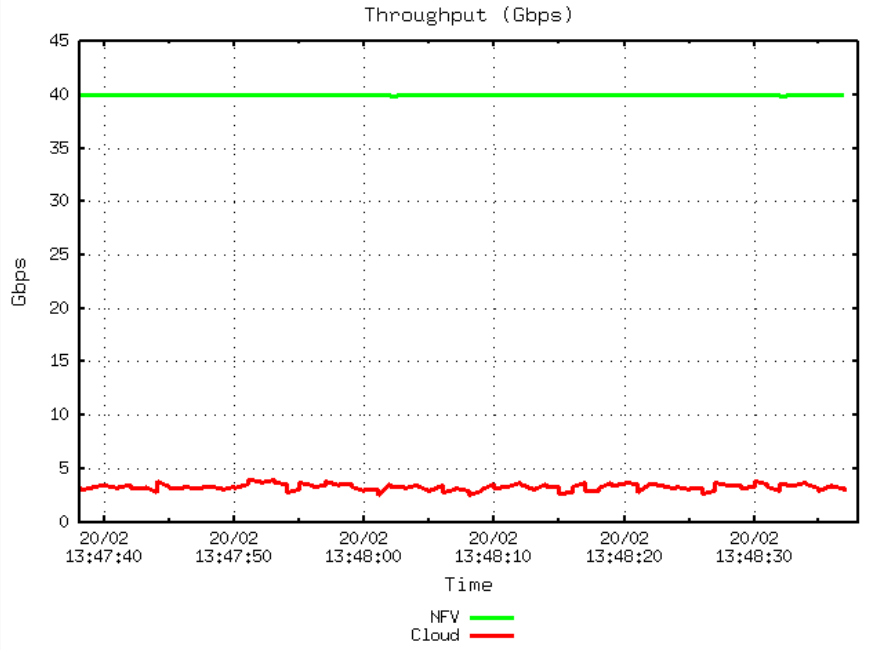
Performance limit is given by this value

Gbps = Gigabits per second
Mpps = Millions of packets per second
frame_size = Frame size (in kilobits)

NFV vs. Cloud
Performance figures (large frame size)

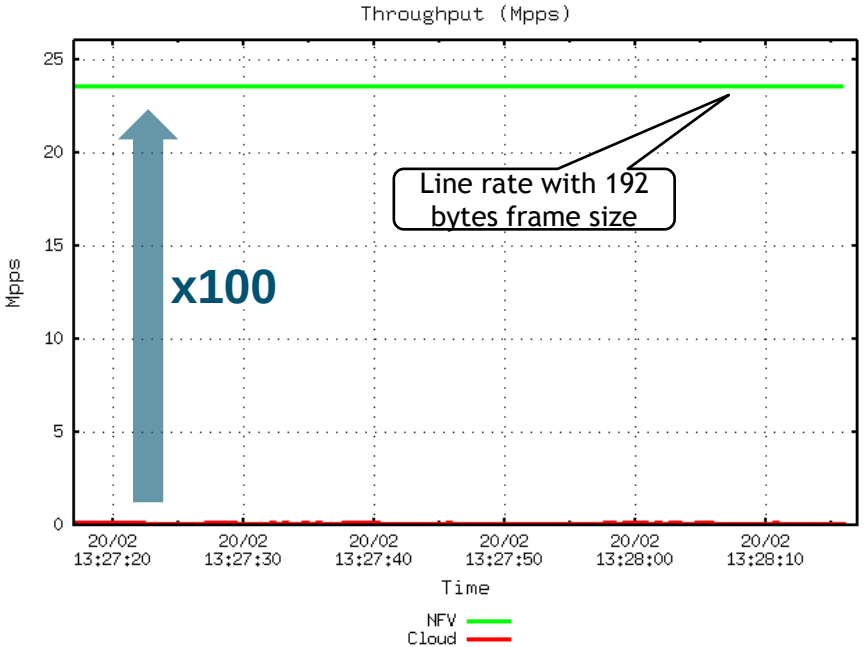
Even large frame sizes cannot hide the actual difference between both scenarios.

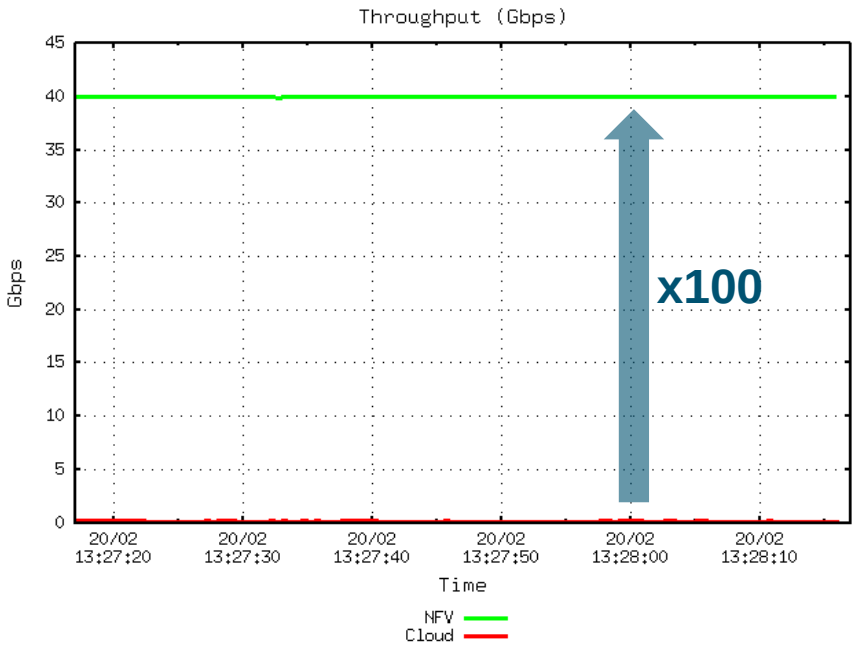




NFV vs. Cloud
Performance figures (small frame size)

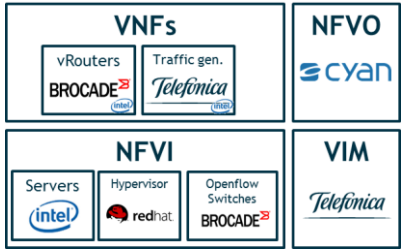
Small frame sizes show real difference between both scenarios.





Conclusions

End to End NFV Architecture has been demonstrated in a multi-vendor environment implementing the whole NFV architecture



Classic cloud cannot provide carrier-grade performance since it does not have proper view of Data Plane effecting HW resources and introduces bottlenecks in packet processing

vmware openstack cloudstack amazon web services

Enhanced Platform Awareness at NFV-O and VIM level enables an intelligent allocation of resources, allowing well-designed VNFs to provide carrier grade performance

ETSI World Class Standards

Next steps

VNFD and NSD standardization at ETSI

Contributing to OpenStack to enable EPA

VIM to be released as open source

DISCOVER_

DISRUPT_

DELIVER_