Challenges to Troubleshoot and Assure Partially Virtualized Networks

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From Fixed to Dynamic Service Chains

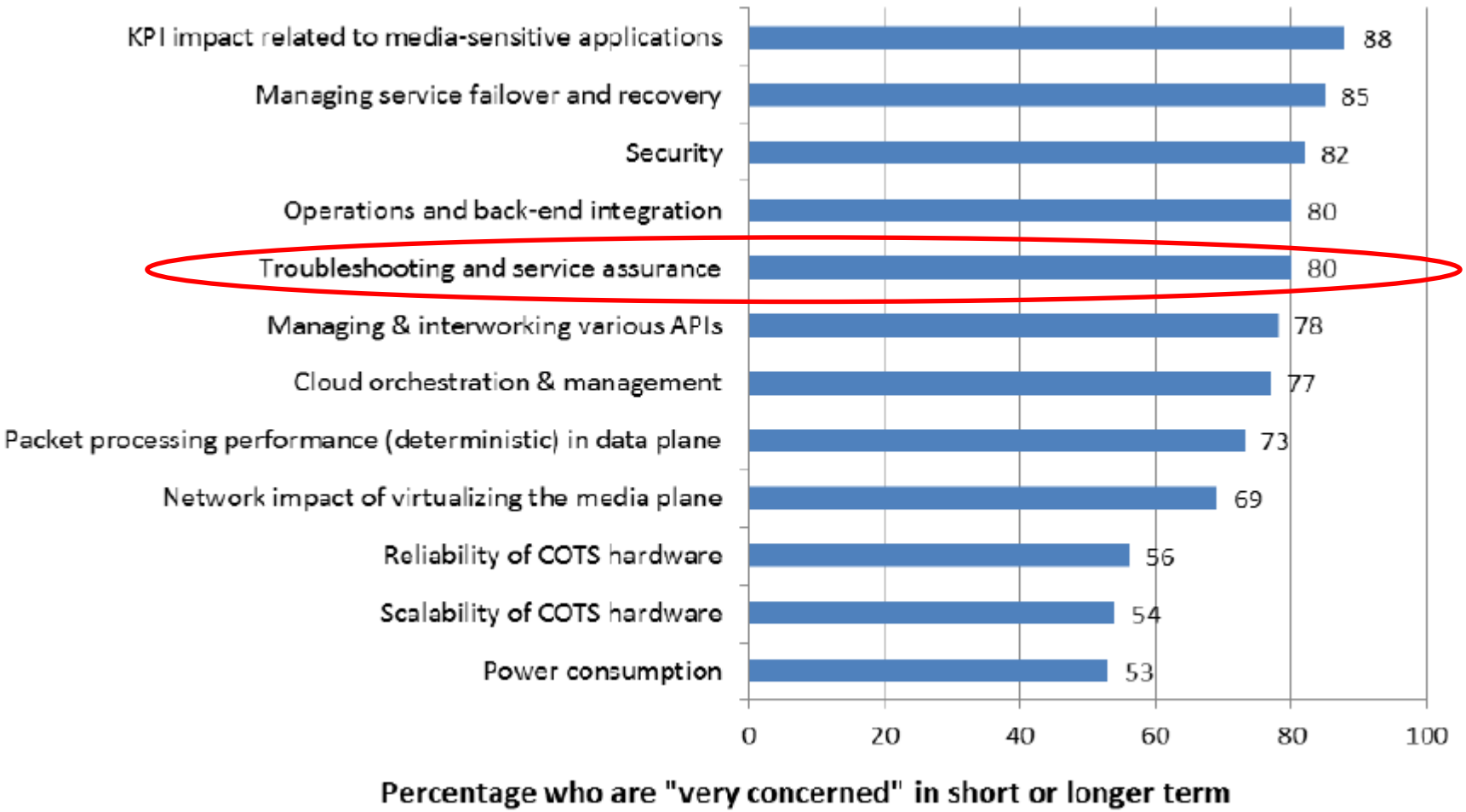
Static/Rigid

Dynamic (NFV/SDN enabled)

- Service mapped on dedicated h/w network topology dependent and rigid
- NFV enabled - Dynamic service provisioning

Challenge – instrumenting dynamic service chains, enabling real-time service performance monitoring and troubleshooting

NFV Key Challenges



Heavy Reading 2013

Test & Troubleshooting Challenges

Assure & Troubleshoot

Technology

Organizational

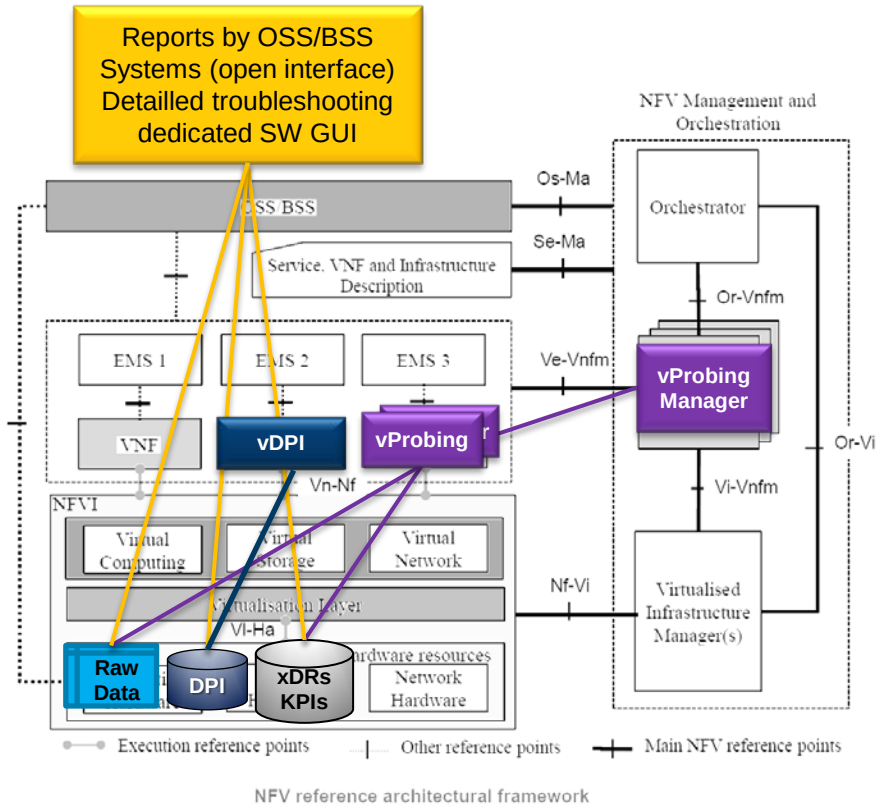
Monitoring & Troubleshooting Hybrid Networks

100% NFV view

Passive Troubleshooting must be integrated to NFVI

Don’t loose the benefits of NFV without instrumentation!

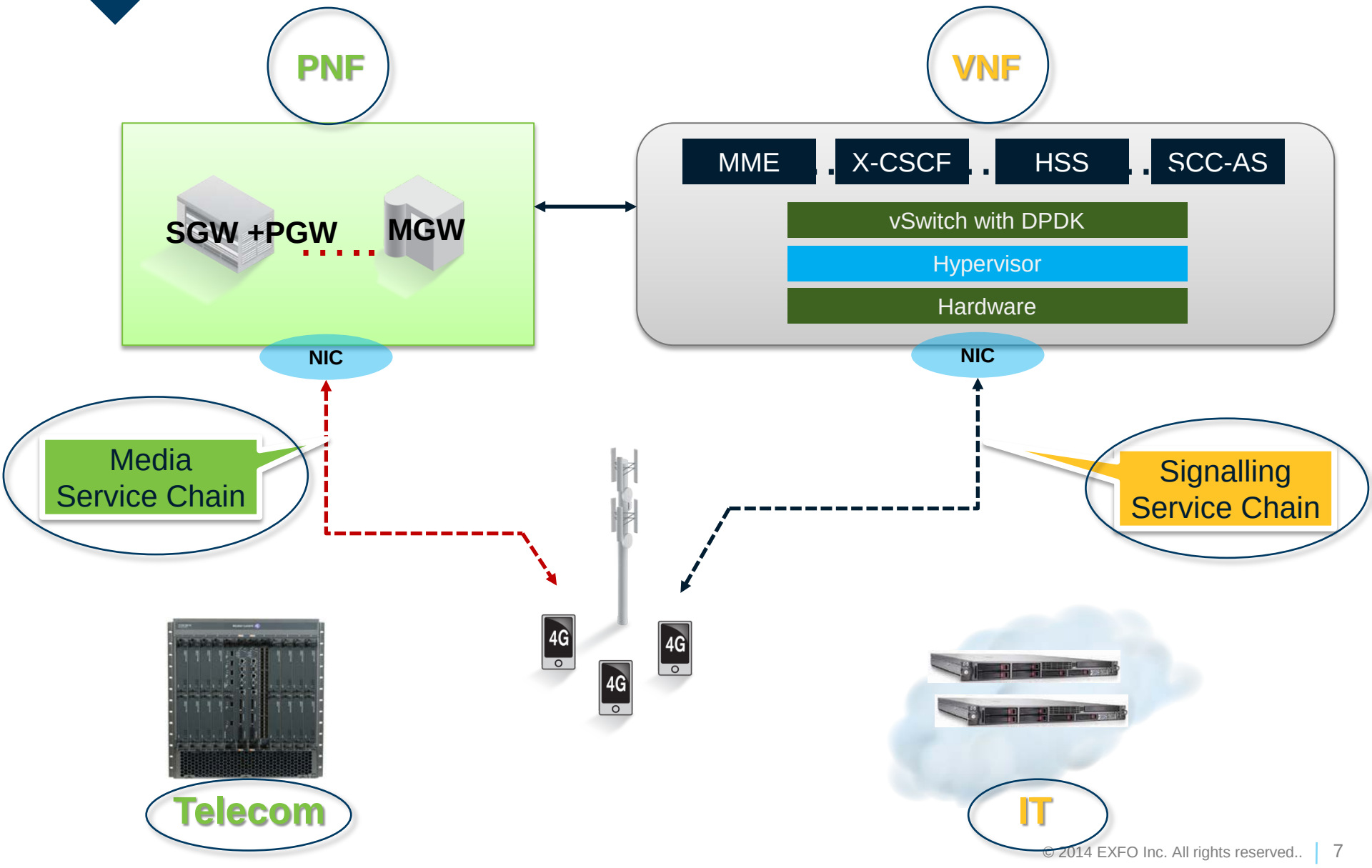
- Full Solution Elements NFV Compliant:
  - vProbes (signalling / Data / Element analysis modules, Active and Passive)
  - vProbe Manager
- Benefit from the presence of a DPI VNF
- Integration with OSS/BSS



NFV reference architectural framework

Network is hybrid, but E2E View is one

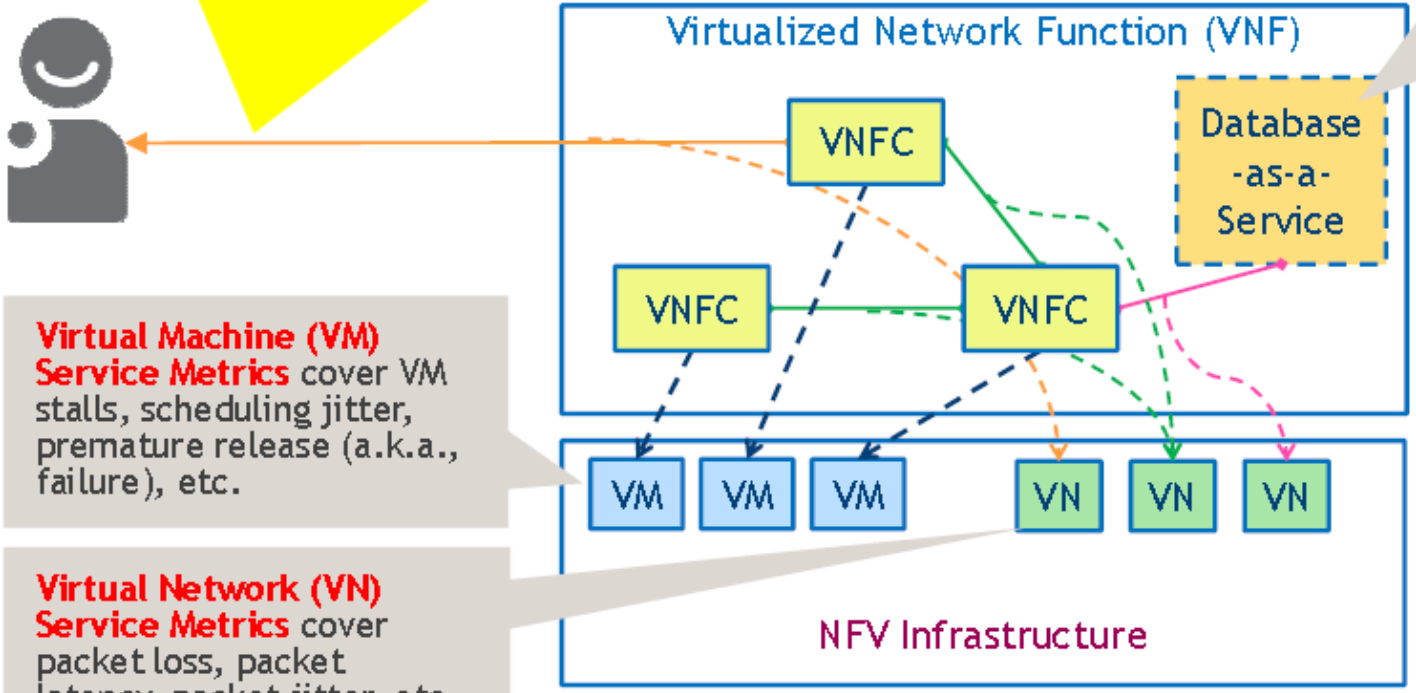
No silo in service assurance or troubleshooting



Service Quality Metrics Proposal

ETSI-NFV Group

Assuring that VNF service quality delivered to end users is acceptable relies upon acceptable NFV service quality being delivered to the VNF's components



Technology-Component-as-a-Service Metrics for components like Database-as-a-Service, cover availability, latency and reliability

Virtual Machine (VM) Service Metrics cover VM stalls, scheduling jitter, premature release (a.k.a., failure), etc.

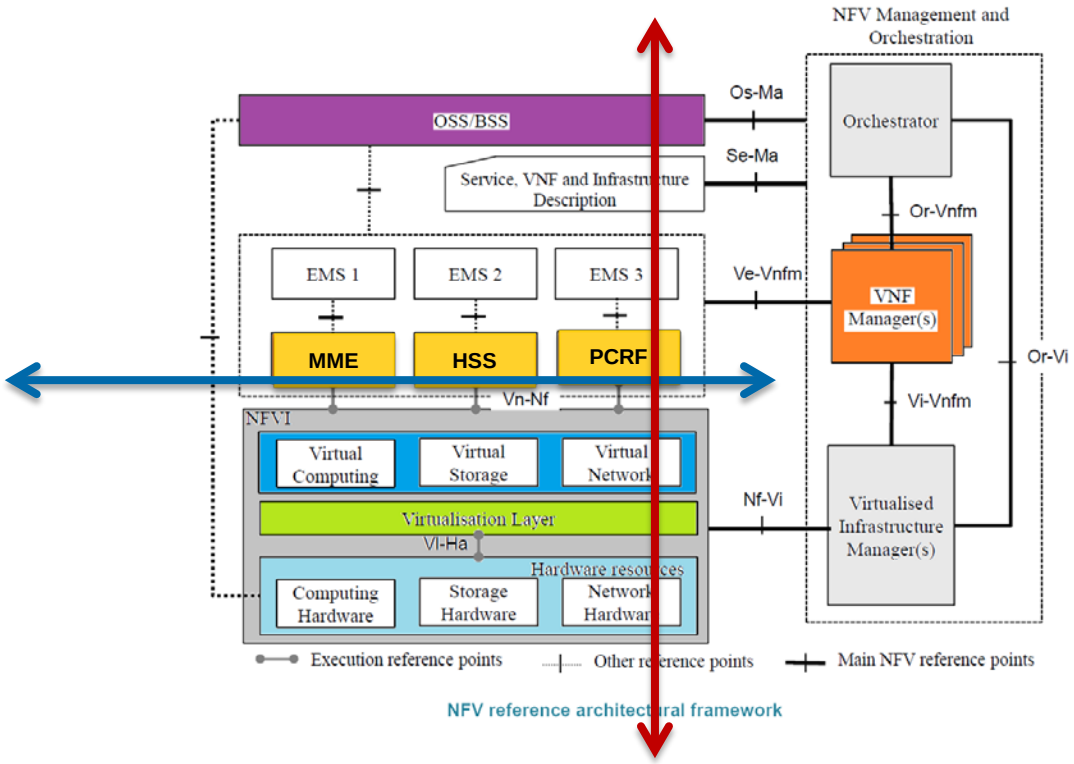
Virtual Network (VN) Service Metrics cover packet loss, packet latency, packet jitter, etc.

Orchestration Service Metrics cover VM allocation reliability and latency, VM dead-on-arrival, etc

E2E : Vertical and Horizontal

Service Assurance/Passive Troubleshooting must be integrated to NFVI

Horizontal:
- Service Chaining over virtual functions



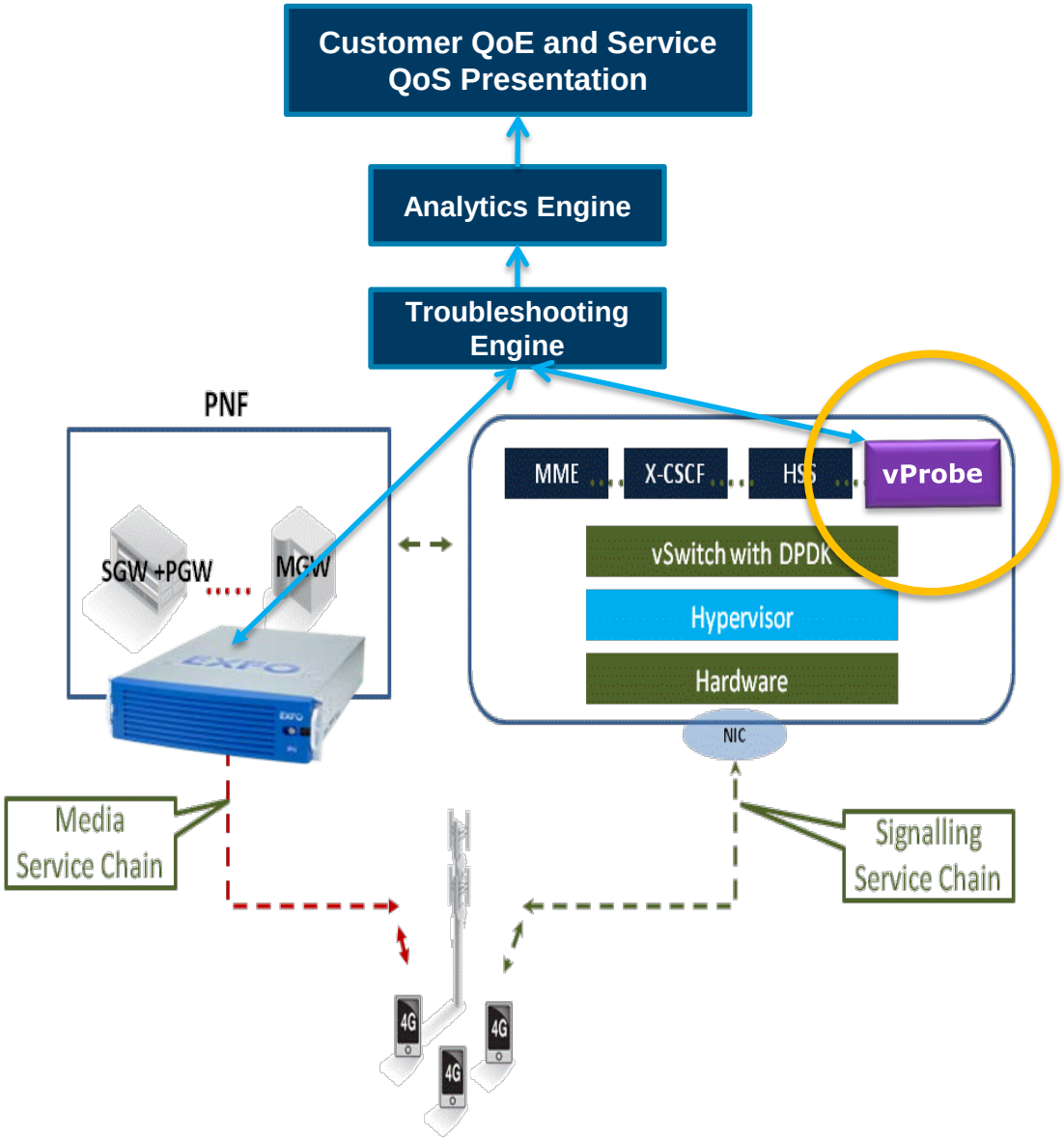
What if service chain is broken in IT but debugging in Telecom and vice versa ?

Chaining IT to Telecom will be the final converging that NFV brings !

Vertical:
- Orchestration
- Services (MME...)
- Storage
- CPU
- Power

What is an E2E NFV testing solution?

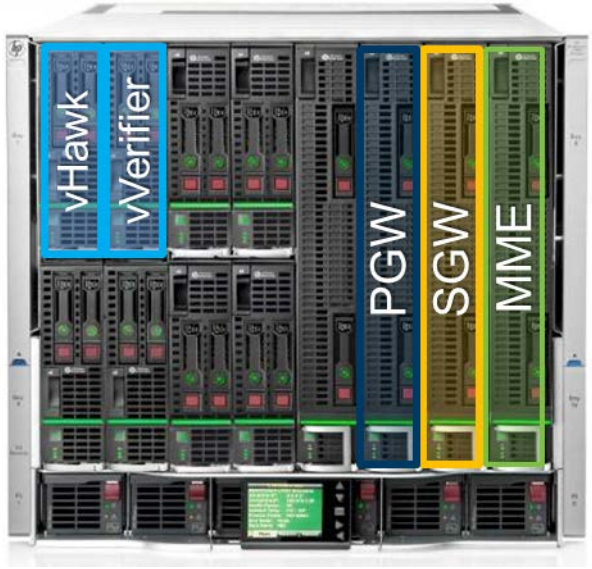
Automated - On the fly deployed - Real-Time



1. Captures and initiate active testing (Passive/Active)
2. If defect found, invoke troubleshooting
3. Root cause of failure sent to Analytics engine
4. The service chain related current and failure prediction are presented
5. As a result reduced OPEX and shorter TTM

Measuring NFV KQIs

1. Service Active Testing & Passive Monitoring
   - Availability
   - Latency
   - Loss
   - Load Time…



2. Infrastructure Monitoring
   - Monitor the Physical Hardware
     - › Blades and their components, Power…
   - Hypervisor
     - › VM, Between VMs…
   - Each Network Function
     - › Processes, DB, Comm Bus…

Key Takeaways

1. NFV will make E2E Service Testing Troubleshooting and Assuring very challenging
   - Service path will have both physical and virtual segments

2. Instrumenting both horizontal service chains and vertical infrastructure is critical for root-cause analysis

3. E2E service assurance requires an intelligent combination of Active, Passive and Infrastructure monitoring

Thank You

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