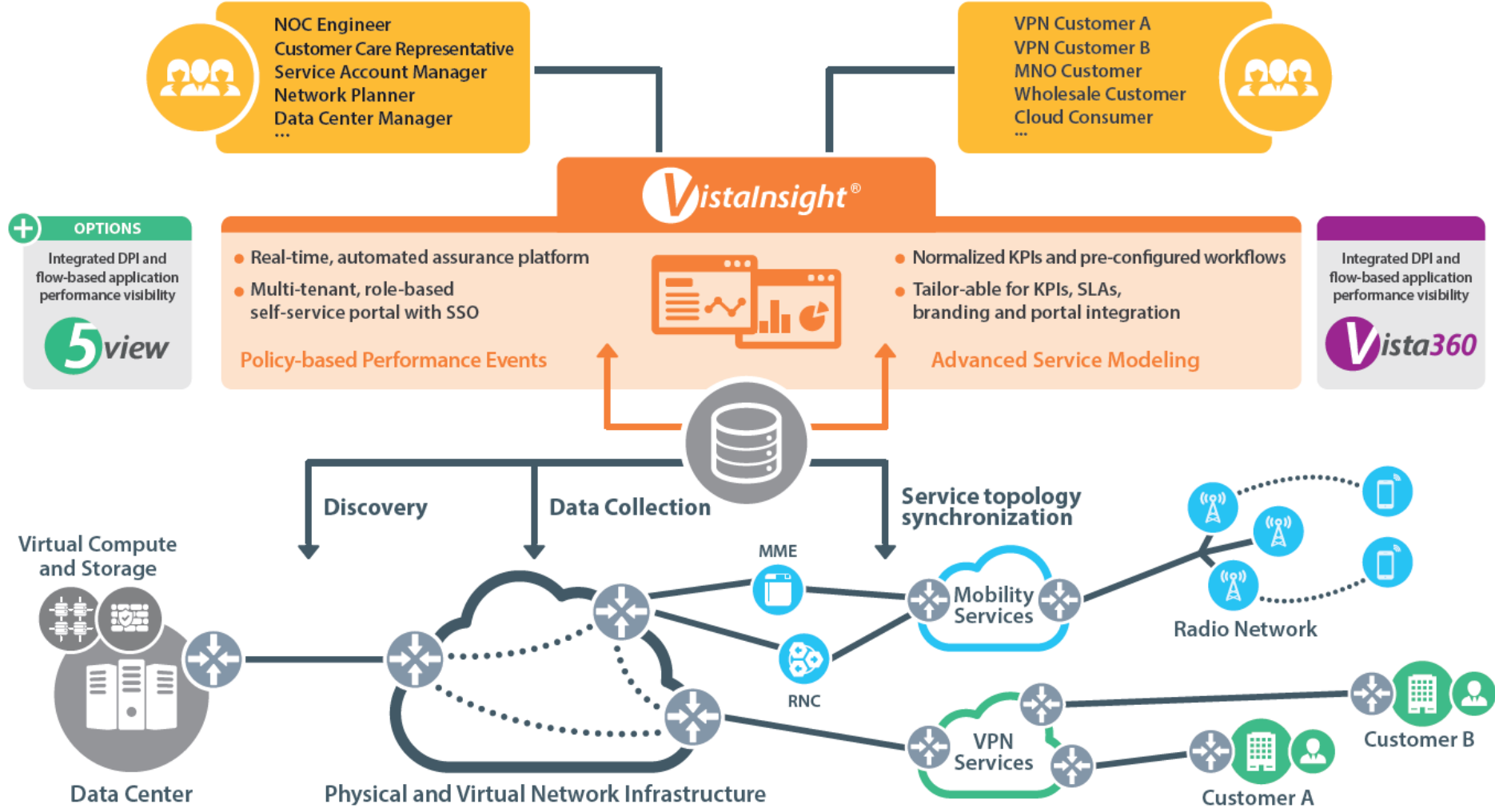


ITU Workshop on Telecommunication Service Quality

Service assurance for Virtualized Networks and End-to-End Xhaul and C-RAN

Evgeny Romanov, Solution Engineer, InfoVista

VistaInsight, A Service Assurance Platform Built for CSPs





Digital Market Trends

What are the Telecom Trends in 2018-2019

Transcending the Physical World

True **NFV** is complex and the ecosystem is developing but Tier 1 CSPs will make it happen

The Launch of C-RAN

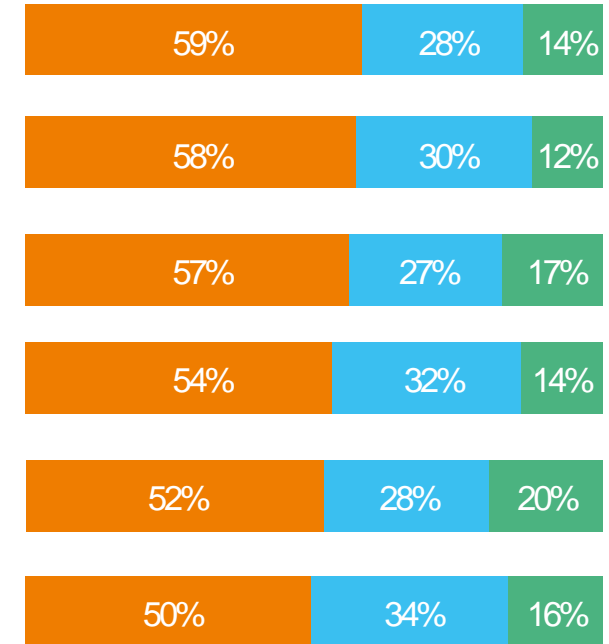
Planning of **C-RAN** and **X-haul** architecture

Continued Massive Network Data Traffic Expansion

5G is key to curb the 6x traffic growth in the next 5 years but this might lead to a fixed-mobile collision

Service Assurance Challenges in NFV Operations

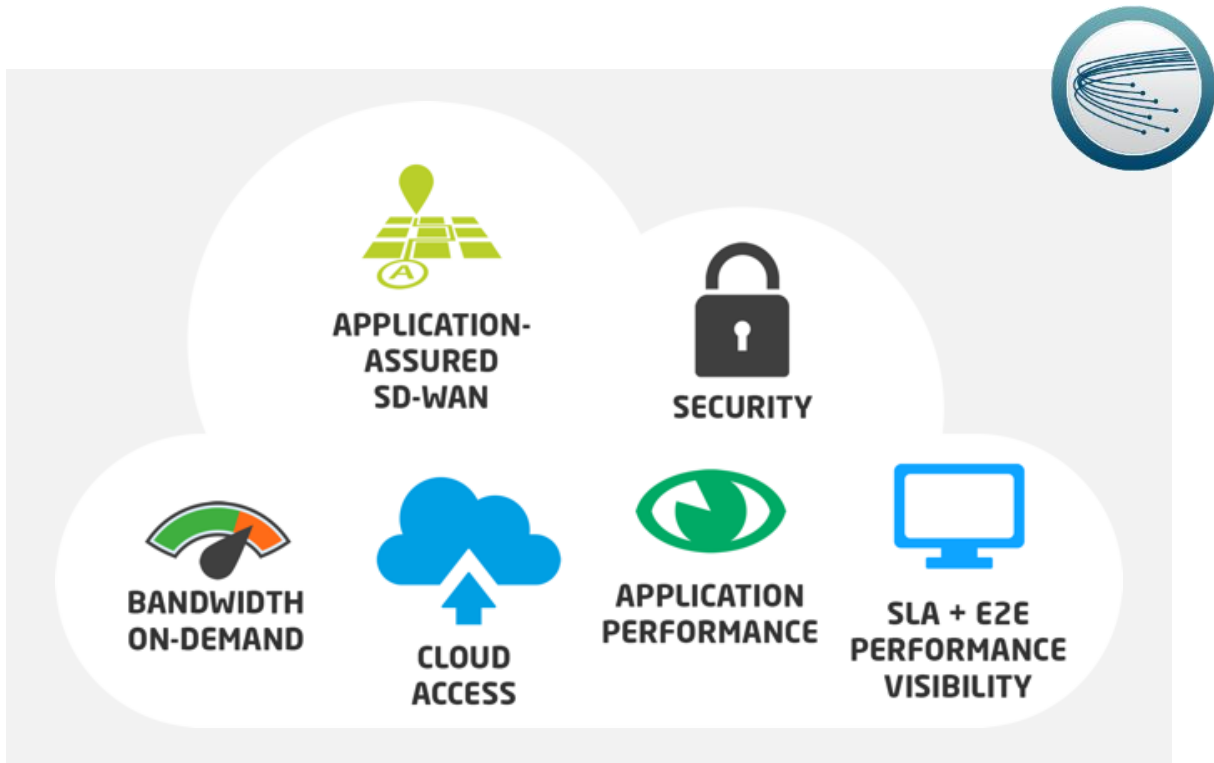
- Assuring performance and interoperability of multi-vendor VNFs
- Offering dynamic SLAs for on-demand services
- Integration/API issues between OSS and MANO
- Handling volume of data from VNFs in real-time
- Assuring hybrid networks through a common platform
- End-to-end service lifecycle orchestration



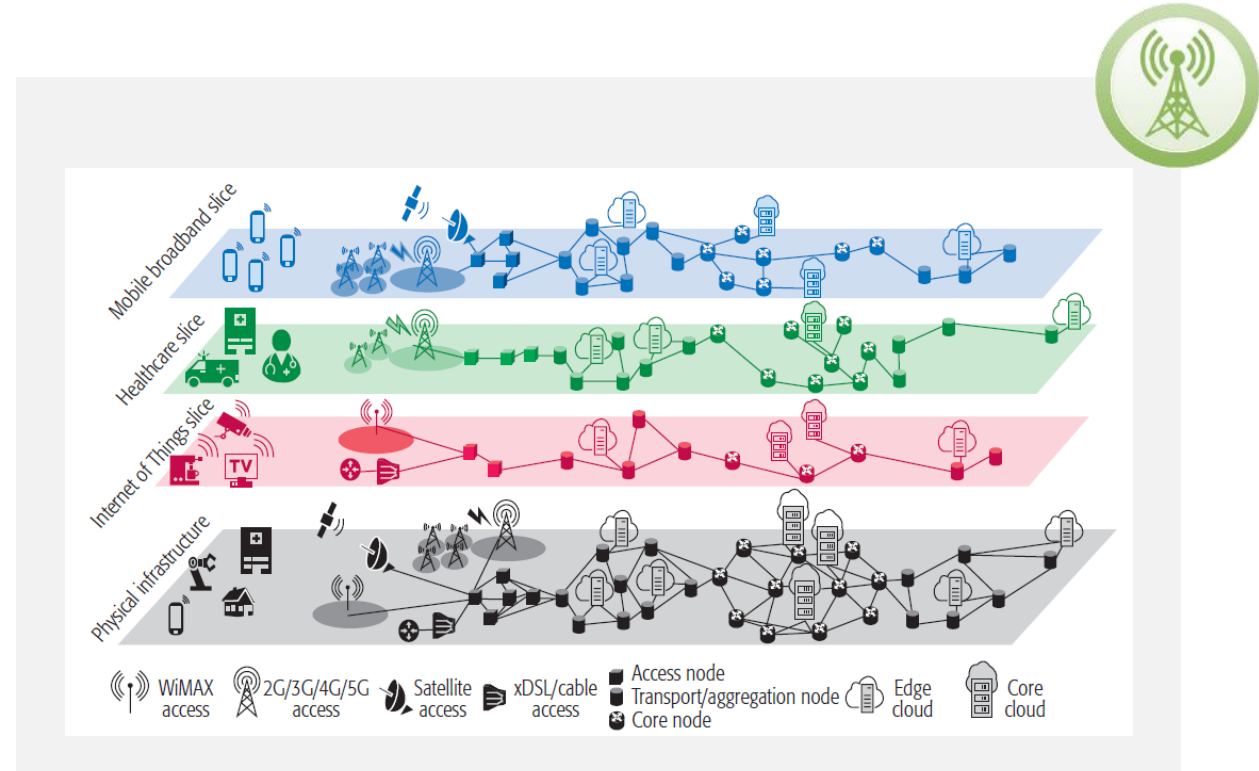
■ A massive or significant challenge ■ A moderate challenge
■ Minor/Not a challenge

Source: Heavy Reading, 2017

How CSPs/MNOs are Bringing Digital Innovation to their Customers ?



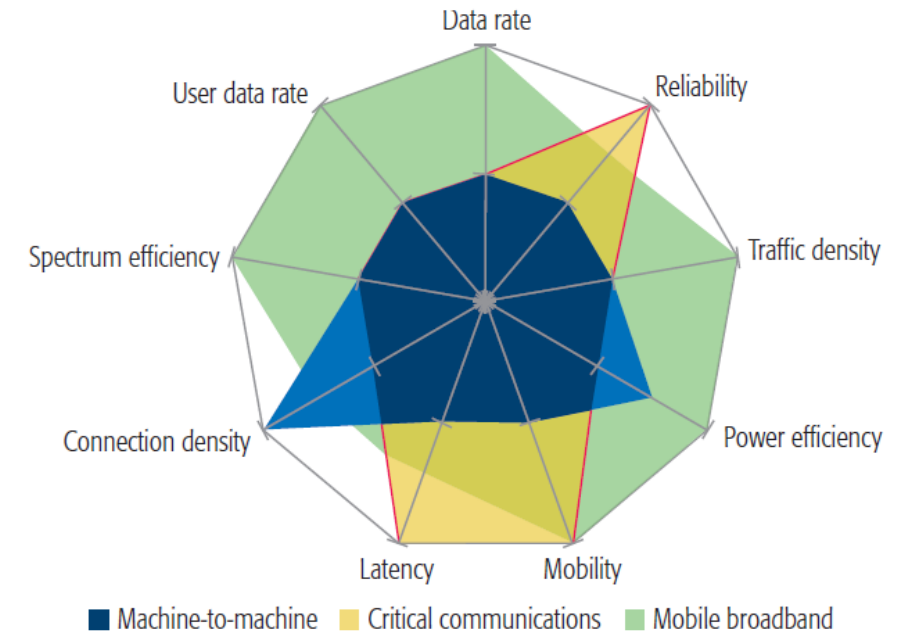
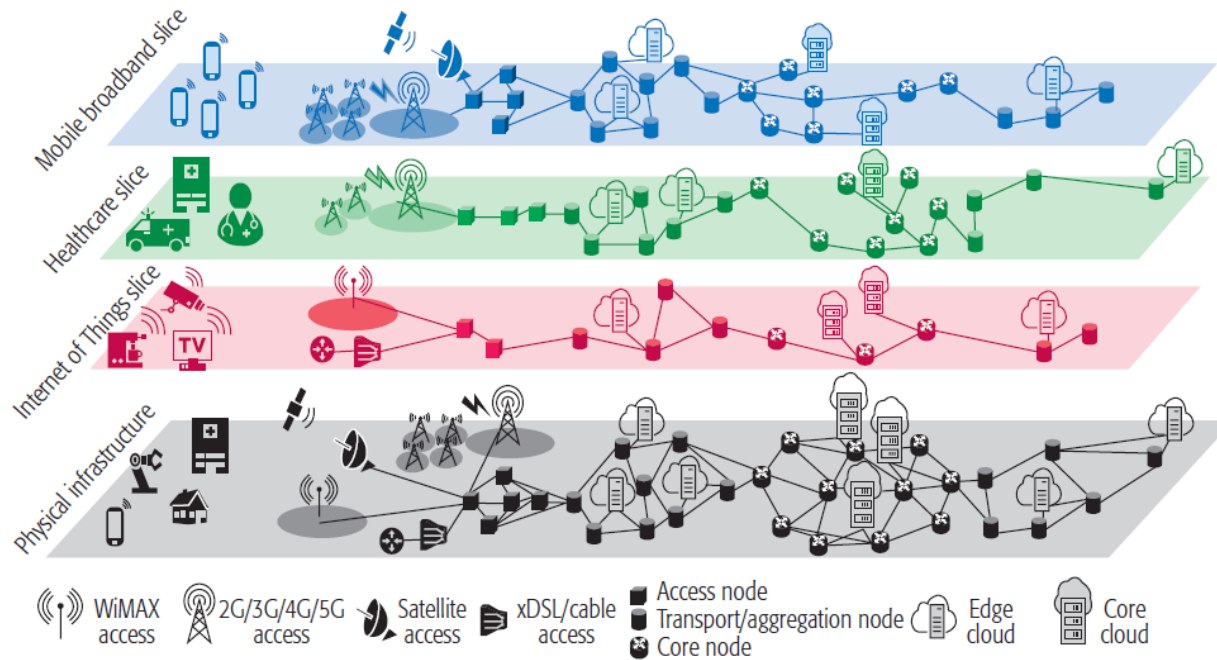
CSPs and MSPs:
vCPE and Ethernet-On-Demand, SD-WAN



MNOs: 5G / Network Slices



SLA Monitoring: Key Requirement for Network Slicing



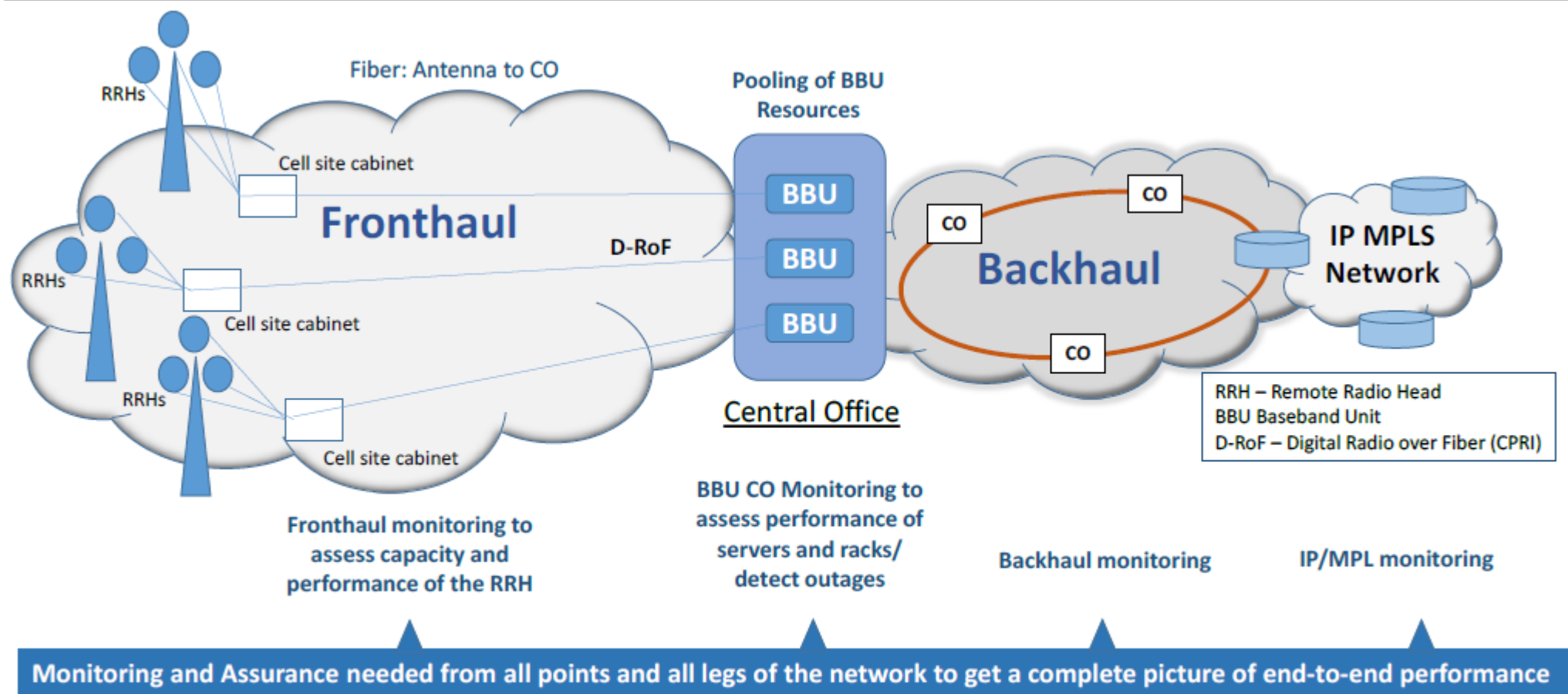
MNOs need to guarantee the performance characteristics of each virtual network slice over an hybrid physical architecture

C-RAN and Xhaul Challenges

- A high capacity, low latency fronthaul
- New protocols: CPRI/eCPRI
- Siloed management
- BBU failures → area outages
- BBU resource utilization and load steering
- Predicting RRH/BBU traffic
- End-to-end view across multiple domains/vendors



The need for end-to-end Xhaul monitoring



Source: InfoVista / Stratecast

Typical tier-1 mobile operator's C-RAN assurance needs

- Availability and utilization of C-RAN resources for:
 - Busy hour
 - Per day
 - Special events
- Forecast capacity for fronthaul and backhaul
- KPIs for multiple traffic peaks and special events
- BBU traffic patterns and service patterns
- One solution for many CSP organizations





InfoVista Service Assurance Solution

SDN/NFV alignment

The Most Important Service Assurance Capability for NFV

1st

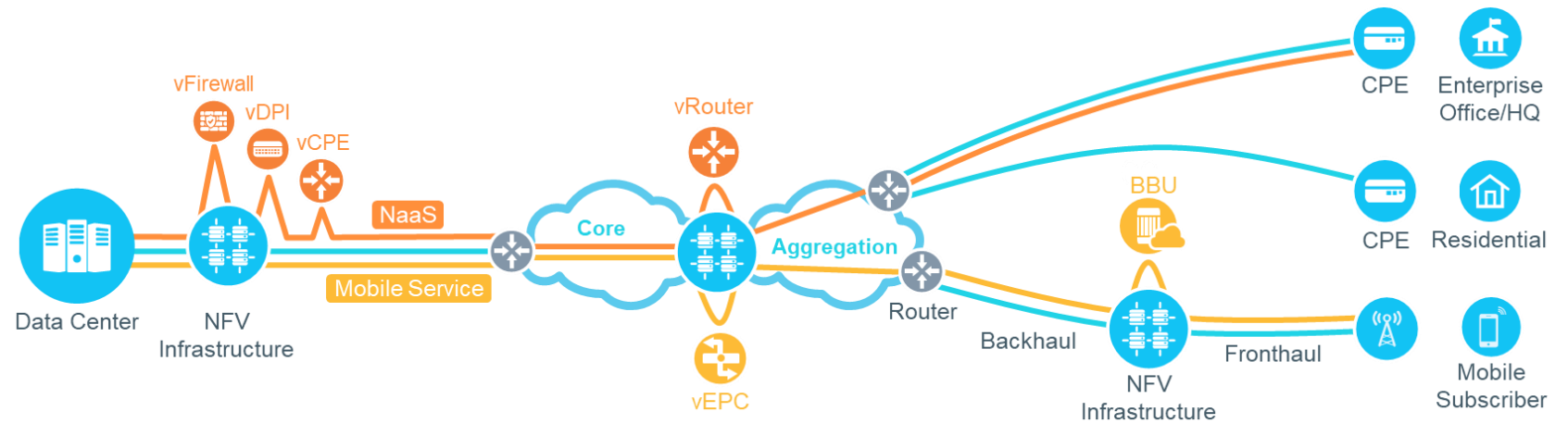


End to end
service visualization
and service modeling
across hybrid networks
(Physical/virtual)

90% Respondents believe it is critical or important !



Source: Heavy Reading survey, September 2017; n=100. Results are the sum of respondents rating a feature as **critical or important**, as opposed to "Useful, but not important" or "Not needed at all."



InfoVista Distinct Competencies

Context

- Service modeling
- Automated sync
- Intelligence vs data

Scale

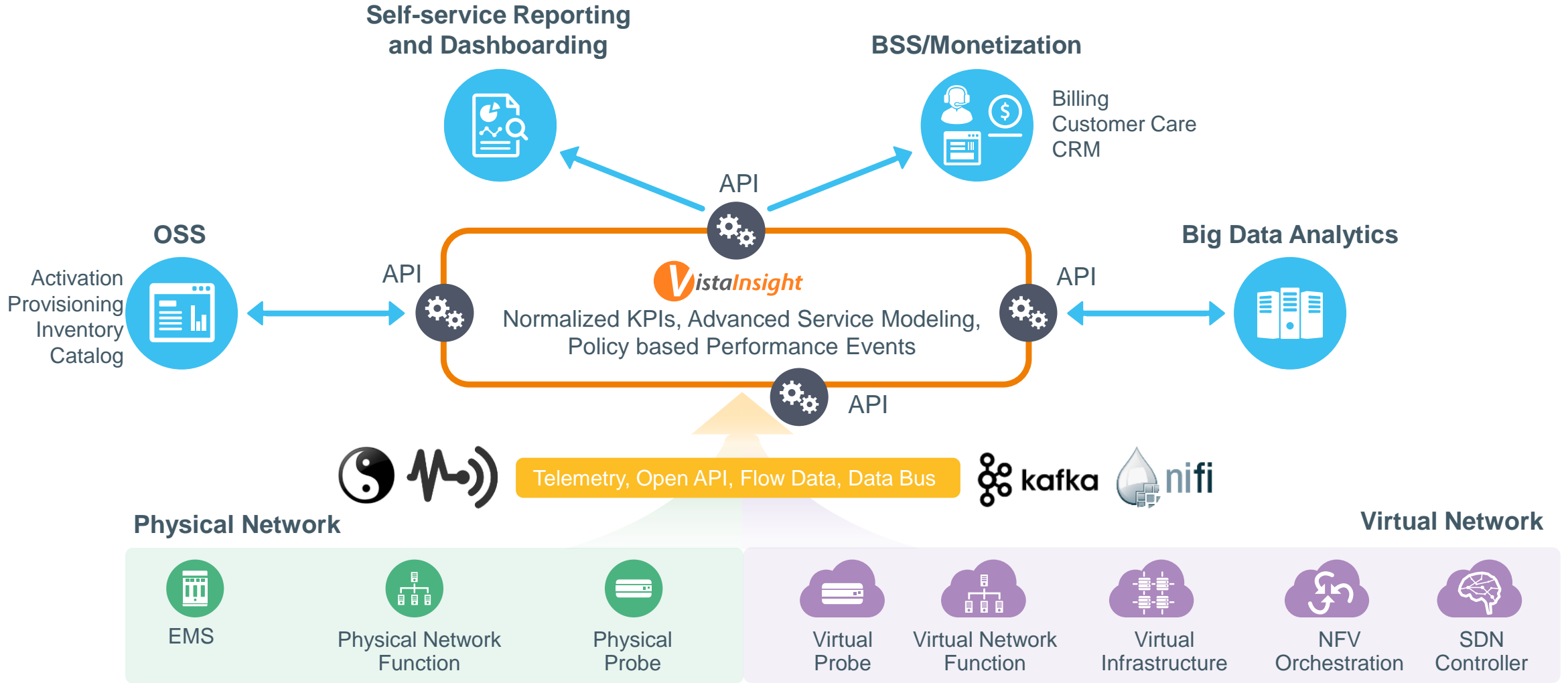
- Capacity for CSPs
- Billions tx per day
- Data reports

Real-Time

- Data acquisition
- Analytics
- Reporting

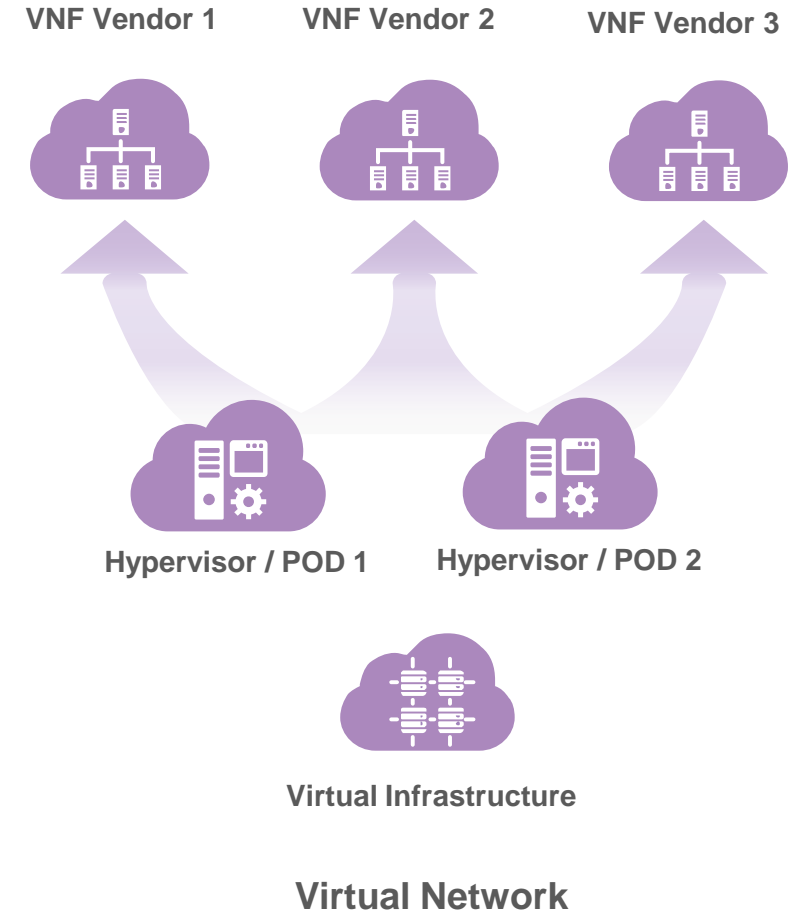
VistaInsight, a Service Assurance Platform Built for CSPs

Open, real-time, extensible, scalable, resilient



Use Case 1: Multi-vendor VNF Onboarding and Performance Auditing

- Performance visibility during VNF onboarding
- Normalization of performance KPIs
- Vendor-agnostic, service-centric & template-driven benchmarking
- Continuity from benchmarking to integration to operations

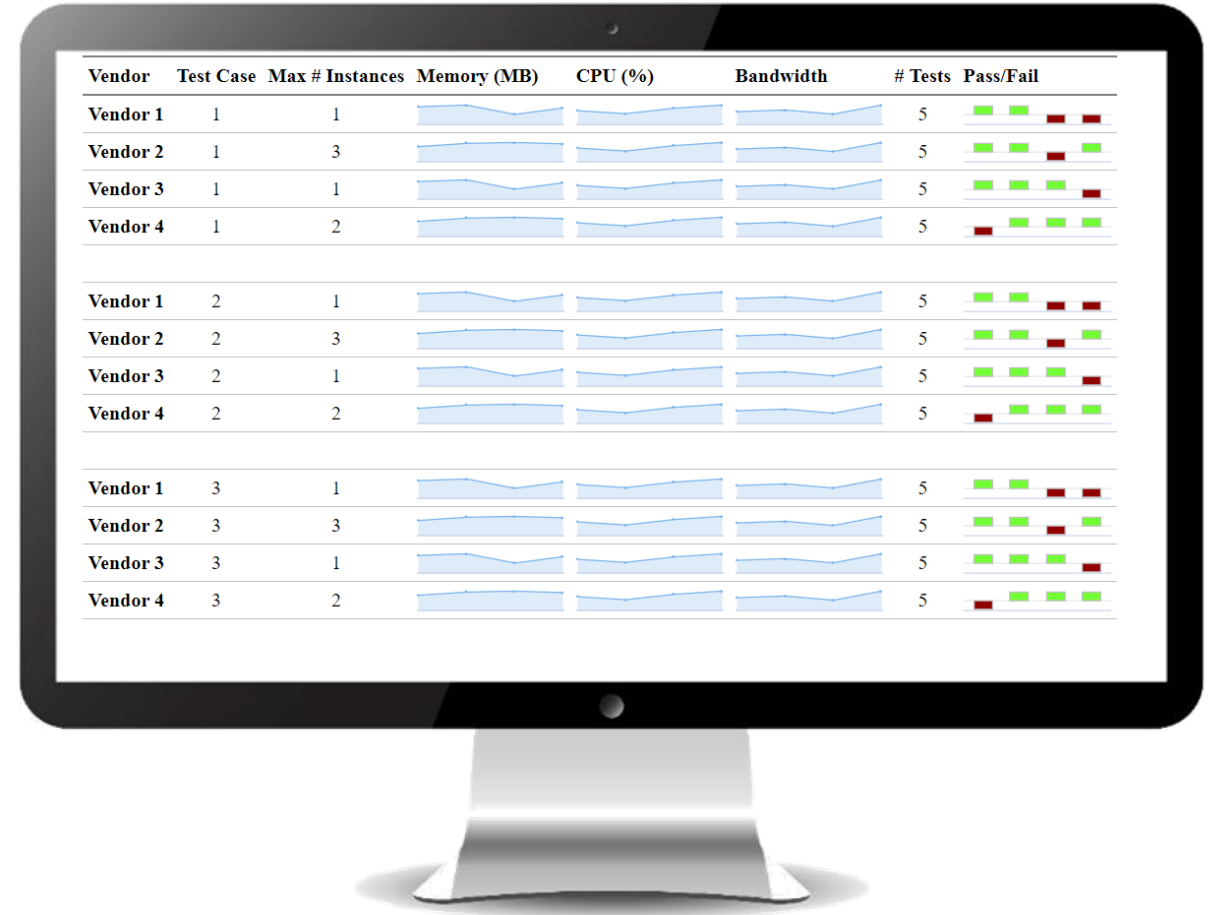


Use Case 2: VNF Capacity Optimization

- VNF allocated vs actual resource utilization (KPIs)

Memory, CPU, bandwidth, storage, dedicated ports

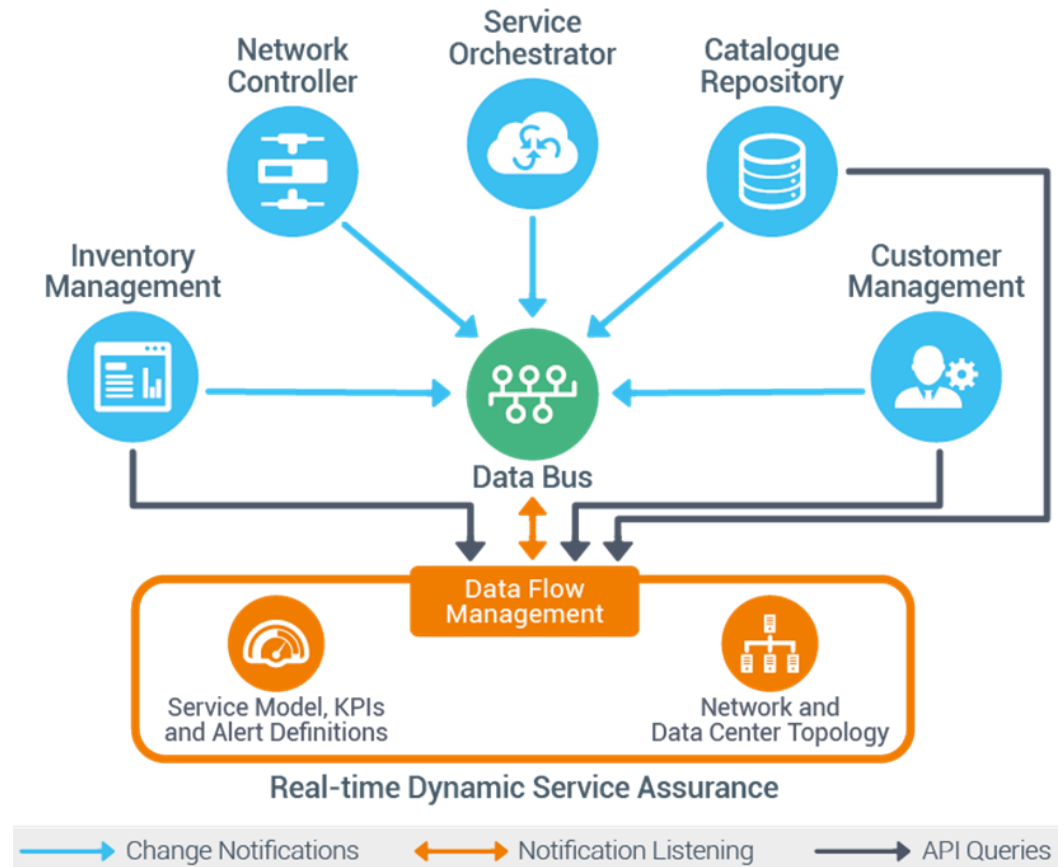
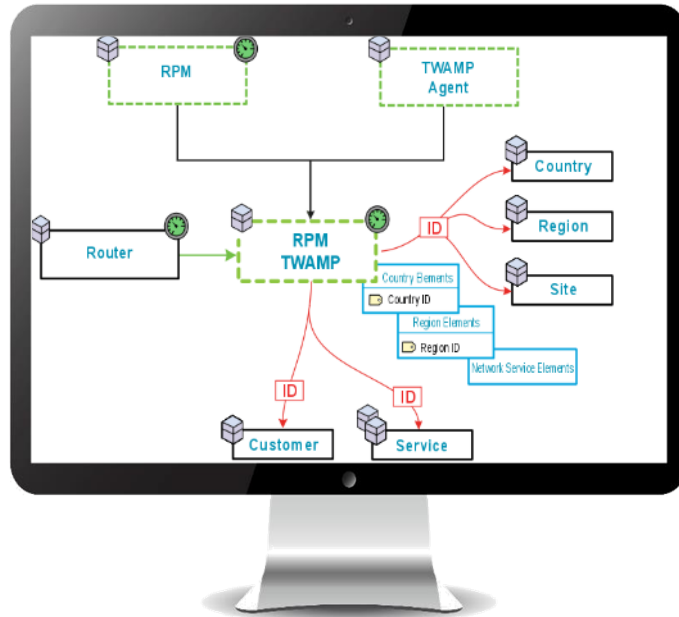
- VNF start/spin-off time
- VNF availability
- Network latency, packet loss and jitter



vCPE Onboarding Test Cases Report

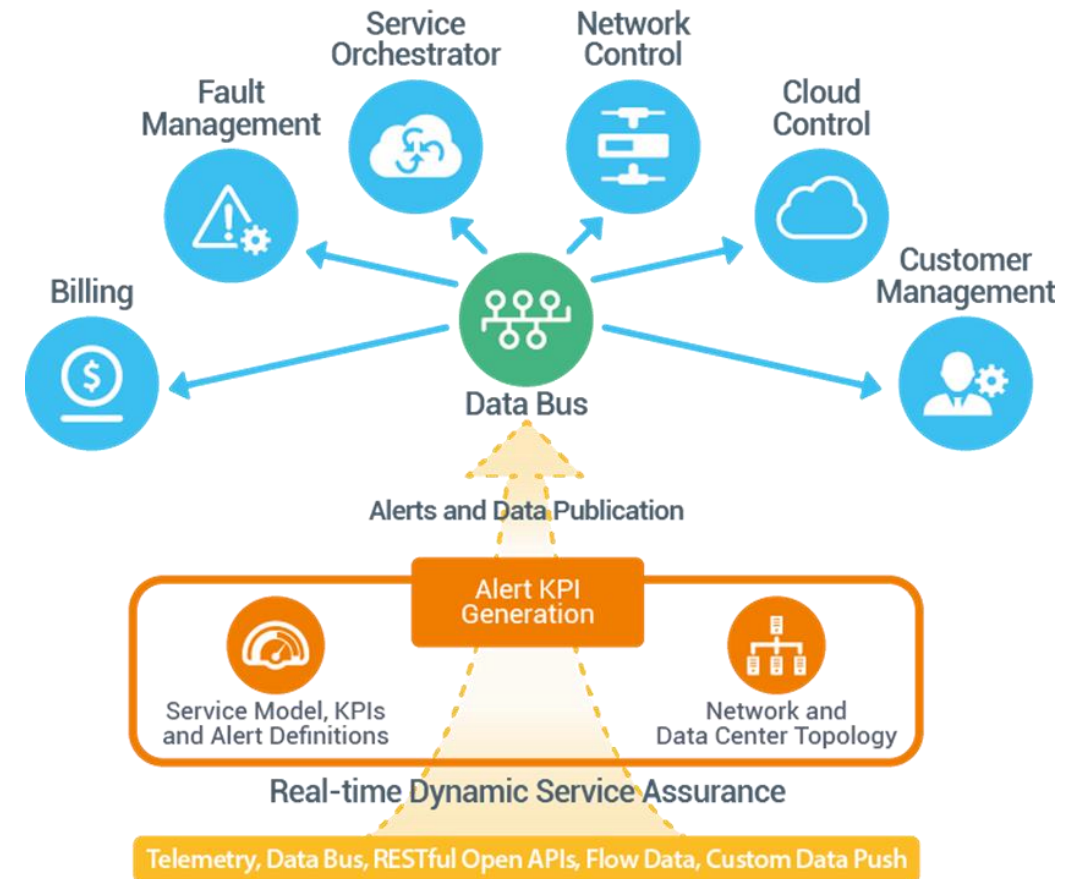
Use Case 3: Dynamic Service Modelling

- Integration with service catalog for service definition
- Synchronize network/service topology and KPIs (via TOSCA/YANG)
- Build effective service policies and service models



Use Case 5: Enabling Zero-touch Operations

- Enable automation of operational tasks
- Automatic interaction with systems that orchestrate network / IT infra (via Mediation data bus)
- Alert and data routing center
 - Stream real time alerts and KPIs
 - Data flow via REST APIs, Data Bus, log, email, tweet etc
 - Multiple destinations based on criteria
 - Enrich alerts per destination
- Advanced alert capabilities
 - Thresholds or flexible Tunnel Crossing Alerts (TCA)
 - Temporal considerations to filter sporadic values
 - Service alert definition composed of several KPIs
 - Alert propagation across service model links





InfoVista Service Assurance Solution

C-RAN & X-haul alignment

Xhaul and C-RAN Service Assurance

Supports 5G transformation

- Seamless 4G to 5G RAN transformation
- Performance metrics for network-slices

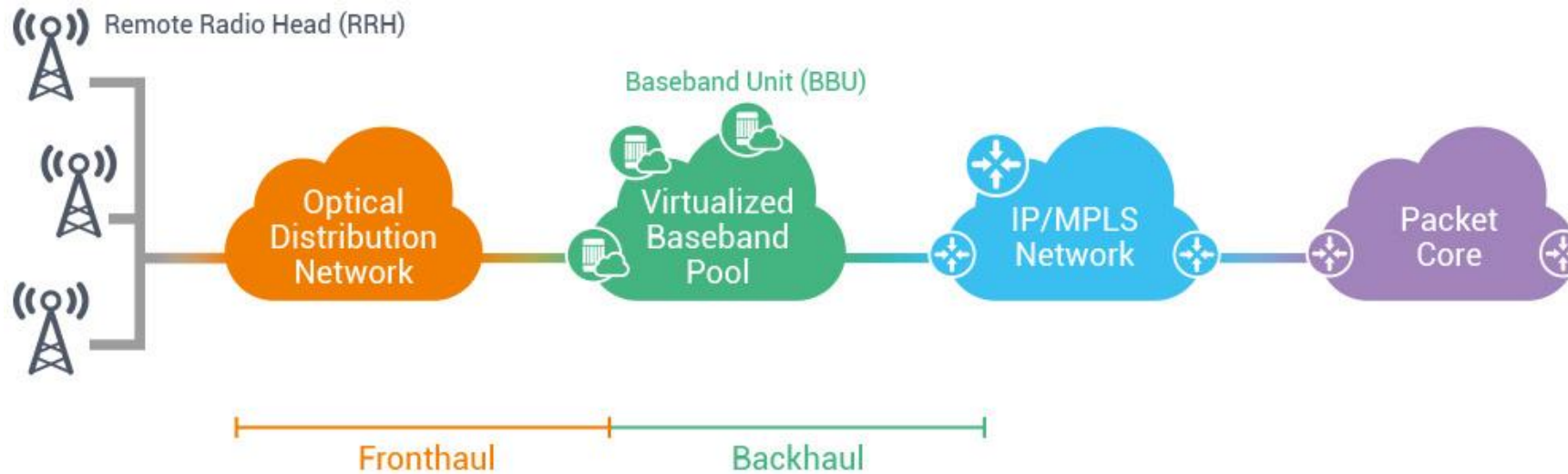
End-to-end visualization

- E2E visualization of C-RAN, Fronthaul and Backhaul performance

Service-centric

- SLA reporting
- Real-time service analytics
- Custom dashboarding

Multi-technology, multi-network, multi-vendor system

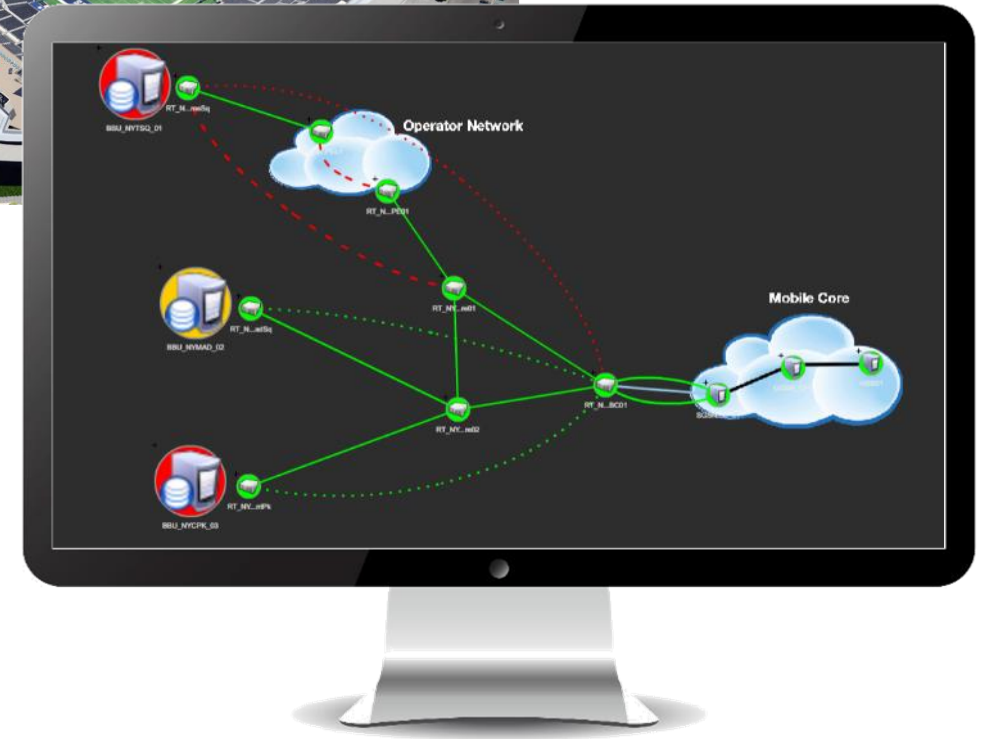
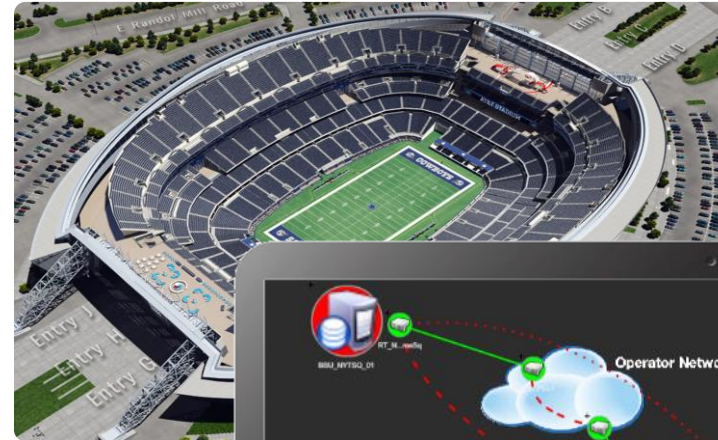


VistaInsight manages end to end fronthaul and backhaul transport networks and C-RAN BBU nodes

Use Case 1: Fronthaul integrity for special events

- Proactive monitoring of fronthaul Integrity: latency, jitter and synchronization
- Prevent call impact through speedy identification and isolation
- Usage and behavior for resource management

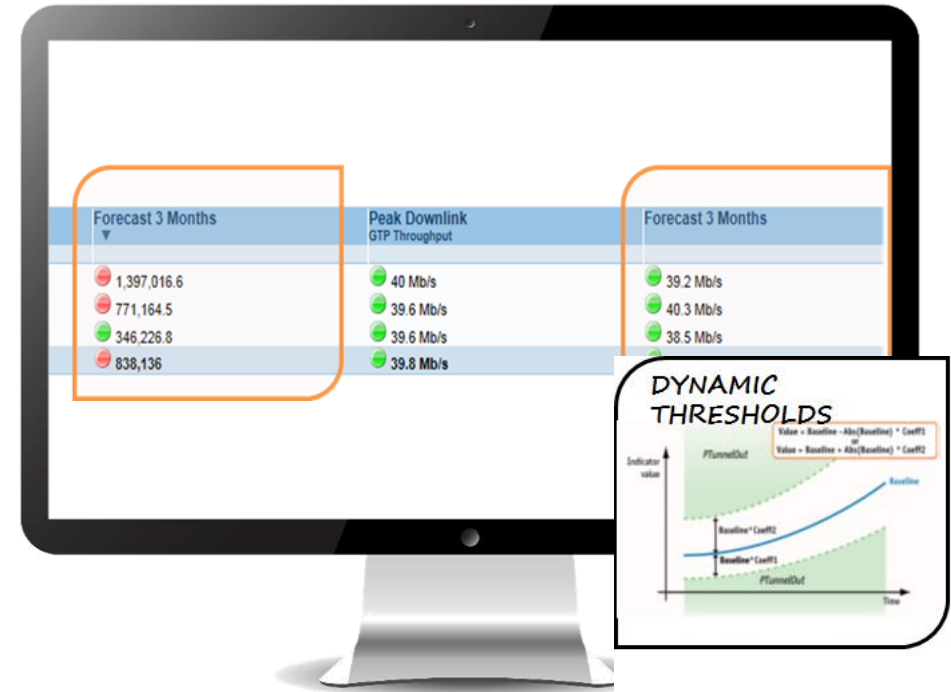
User: Transport Engineer



Use Case 2: Network right-sizing

- Analyze the usage, behavior and network retainability for peak traffic
- BBU resource management to handle traffic for peak hours, special events and load steering

User: Network optimization engineer

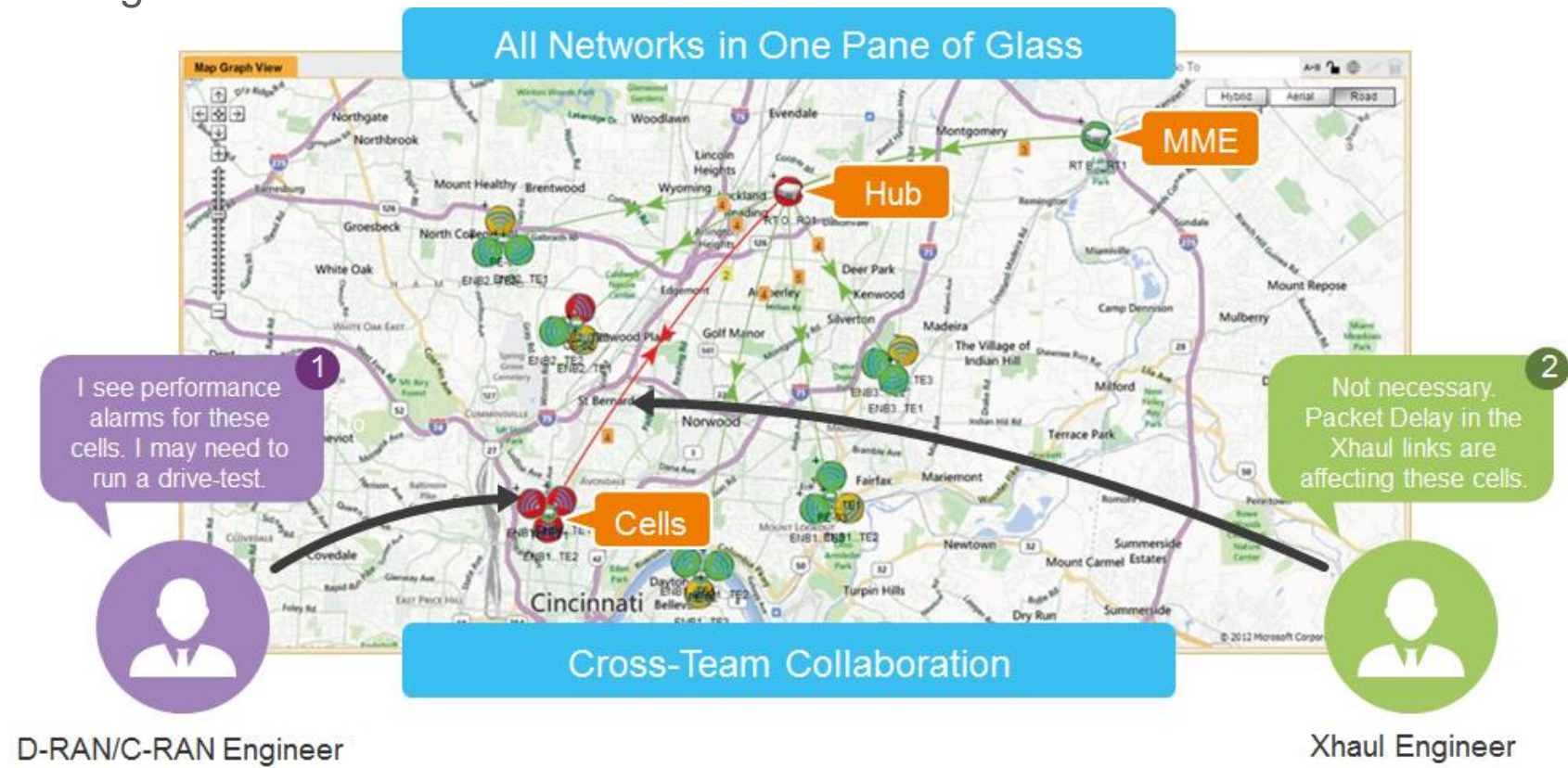


Expansion Planning through 3 months' traffic forecasting

Use Case 3: Cross-Domain troubleshooting with E2E dashboarding

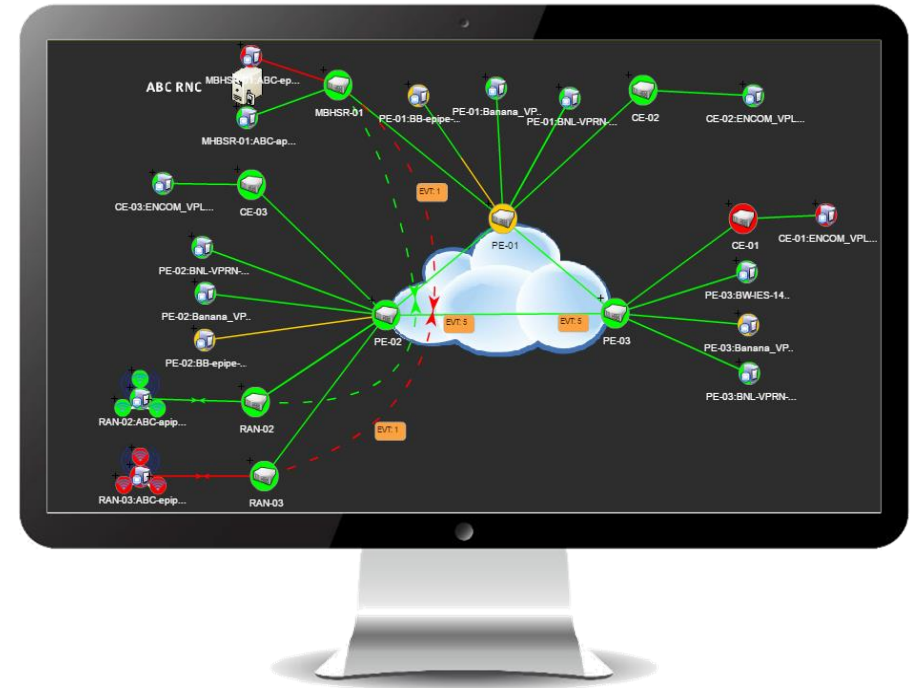
- Multi-domain view for quick remediation
- Simplified end-to-end troubleshooting
- Fast drill-down for low MTTR
- KPIs on each node and link

User: RAN and transport optimization engineer



End-to-End transport and RAN visualization

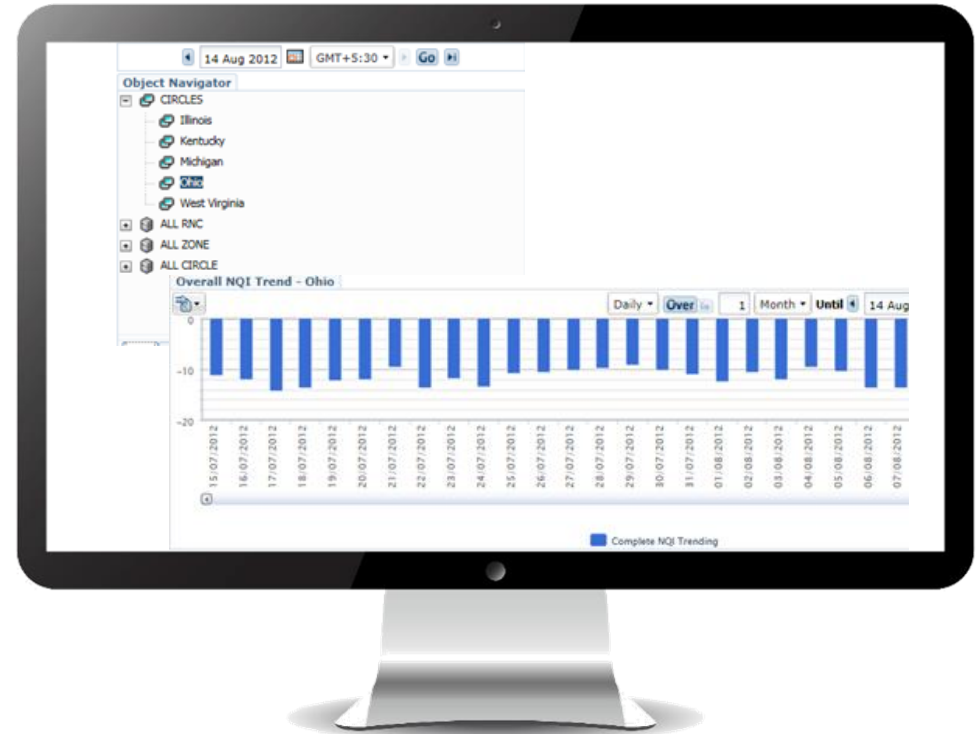
- Monitors and visualizes C-RAN and D-RAN simultaneously
- Visualization of the E2E transport network and C-RAN (Fronthaul, BBU, Backhaul and Core for collaborative teamwork)
- Visualization consolidation through Vista360:
 - Map based reports for specific sites
 - Transport and C-RAN KPIs in one screen (List view, graph view, analytics view, map view etc.)
 - Customized dashboards



Use Case 4: Network Quality Indexing

- Daily network quality status report
- Multiple operator markets in one report
- Consolidated high level status of the network:
 - E2E performance NQI (Network quality indicator)
 - A normalized weighted KQI of the golden KPIs across multiple domains
 - Trending of the NQI for monitoring degradation or improvements
 - Easy identification of problem areas (by clusters, markets or other groupings)

User: RAN, transport and core manager

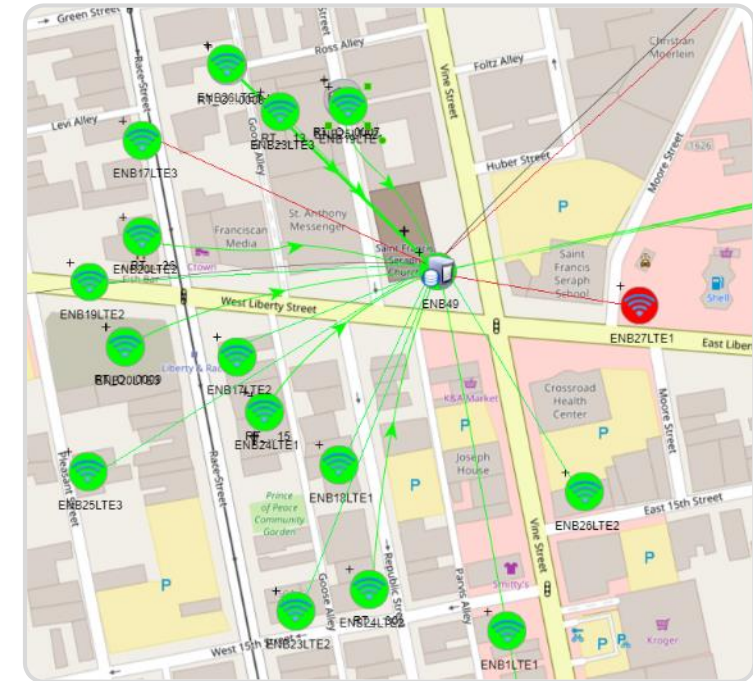


Section A - Radio Daily Table I - Ohio - 14 Aug 2012 GMT+5:30													
Instance	NQI	Voice CSSR Target	KPI	NQI	Video CSSR Target	KPI	NQI	R99 Data CSSR Target	KPI	NQI	HSPA CSSR Target	KPI	
Ohio_Normal	0.09	99	99.05	0	99	99.02	0.05	99	99.93	0.72	98.5	98.93	
Ohio_Top20	-0.68	99.25	98.93	-0.1	99	97.79	0.01	98	98.18	-2.07	99	98.17	

Section A - Radio Daily Table III - Ohio - 14 Aug 2012 GMT+5:30										
Instance	NQI	Avg HSDPA throughput Target	KPI	NQI	3G IRAT SR (CS+PS) Target	KPI	NQI	3G Paging SR Target	KPI	Section A Total Score
	-2	2,250	1,683.43	-1.5	95	88.91	1	93	1	-1.24

Manage D-RAN and C-RAN Together

- C-RAN KPIs:
 - Utilization
 - BBU server capacity
 - BBU performance
- D-RAN KPIs:
 - RF interference
 - Utilization
 - Accessibility, retainability, availability and mobility



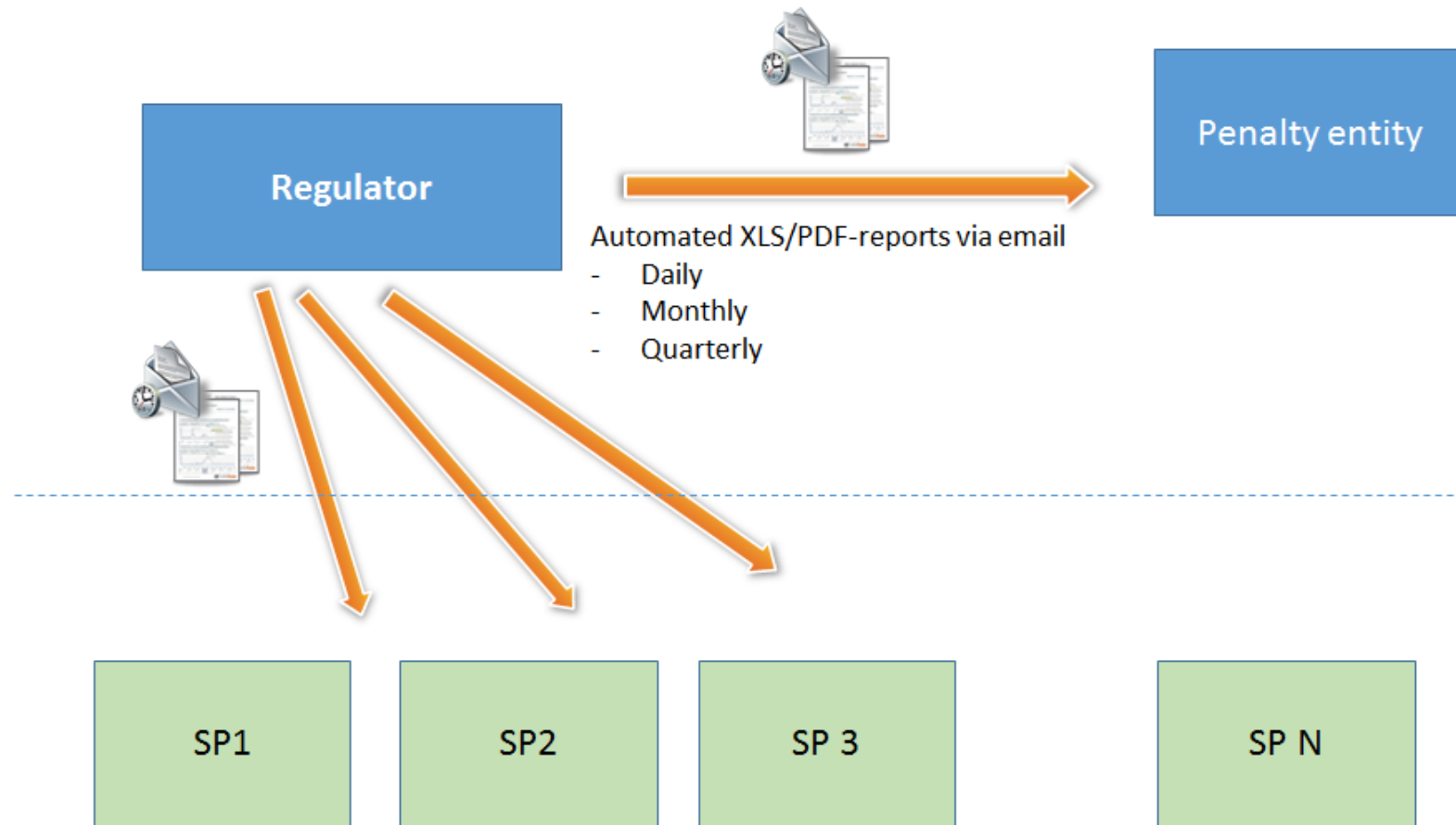
C-RAN Network performance map



InfoVista Service Assurance Solution

What about regulators?

InfoVista Service Assurance for Regulators



Thank you!

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