



*Performance & service quality monitoring
on virtualized networks*

September 2018

 **ARGELA**



Solutions for Telecoms

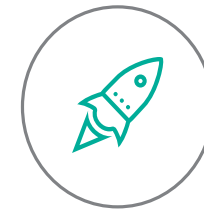
- Network, service and subscriber analytics solutions
- Mobile/Fixed Operators, MVNOs and Enterprises
- Global customer base, spanning Middle East, Asia, Africa, Latin America



Solutions for Public Safety &

Defense

- 4.5G Macro Base Stations
- SDN & NFV Based Secure Network Infrastructure, SD-WAN+



Research and Innovation

- SDN & NFV Transformation
- 5G Center of Excellence, at the forefront of 5G initiatives and enabling technologies
- Multiple patent applications including SDN & RAN Slicing
- Active member of various open source communities (LFN, ONF, etc)



Network Monitoring

- Full visibility across all networks: 2G, 3G, 4G, CS, PS, IMS
- Effective resource optimization and planning
- Vendor independent real-time analytics



Subscriber Analytics

- Customer experience analytics and management
- VIP & corporate analytics and SLA assurance
- Integration to CRM and DWH



Service Analytics

- Roaming and interconnection analytics
- LTE (CSFB and VoLTE) service analyser
- Service quality monitoring for voice, SMS, mobile broadband
- Device and location analytics

Application Layer

Network Performance Monitoring Apps.

- 2G/3G CS Monitoring
- 2G/3G PS Monitoring
 - LTE Monitoring
- User Plane (Data) Monitoring

Customer Experience Management Apps

- Subscriber Experience Analytics
- Corporate and VIP Analytics
 - Device Analytics

Service Quality Monitoring Apps

- Mobile Data and Application Analytics
 - CSFB and VoLTE Analytics
- Roaming and Interconnection Analytics

Middleware

Big Data Analytics (Spark, MapReduce)

Big Data Storage (HBASE)

XDR Collector (Kafka)

Probe Layer

CS Probes

- BSSAP (Aif)
- RANAP (Iu-CS)
- MAP
- CAP/INAP
- ISUP
- SIP

PS Probes

- Gb
- Iu-PS
- MAP-Gr
- Radius
- Gx, Gy

LTE Probes

- S1
- S4/S11
- S5/S8
- S6a/S6d
- SGs
- Sv
- S13

Data Probes

- S1U
- Gn
- S5/S8
- Sgi
- RTP

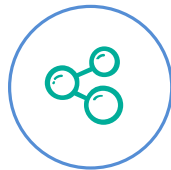
IMS/NGN/VoLTE Probes

- SIP (Sgi)
- RTP/RTCP
- H248
- Gx
- Sv

High level performance indicators and drill down capabilities for fixed and mobile services. Evaluation of service quality and rich KPI reporting for each service in the portfolio, covering all networks



Voice & Messaging



Data



Applications



Roaming



CS Fall Back



VoLTE



Device



Location

End-to-end service visibility across all domains, providing a comprehensive view of service performance – spanning mobile (2G/ 3G/ 4G/VoLTE), IMS/ NGN, Fixed (PSTN/ ISDN). Objective reporting for strategic insights

Network Operators are looking for next generation solutions based on SDN and NFV.



Network

NFV aims to transform the way that network operators architect their networks



Functions

NFV involves the implementation of network functions as a software

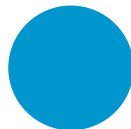
Running on industry standard server hardware

Moved or instantiated in various locations of the network as required without requiring installation of new hardware



Virtualization

Physical network functions are migrating to Virtual Network Functions



Gradual / Partial

Transition to virtual networks will be gradual, it will take quite a time

Not all network functions will be virtualized

Physical networks will not go away completely even if more and more legacy equipment are virtualized every day



Hybrid

Networks will operate in hybrid environments for some time



Open

Open sources projects such as ONAP & OPNFV are preferred by operators

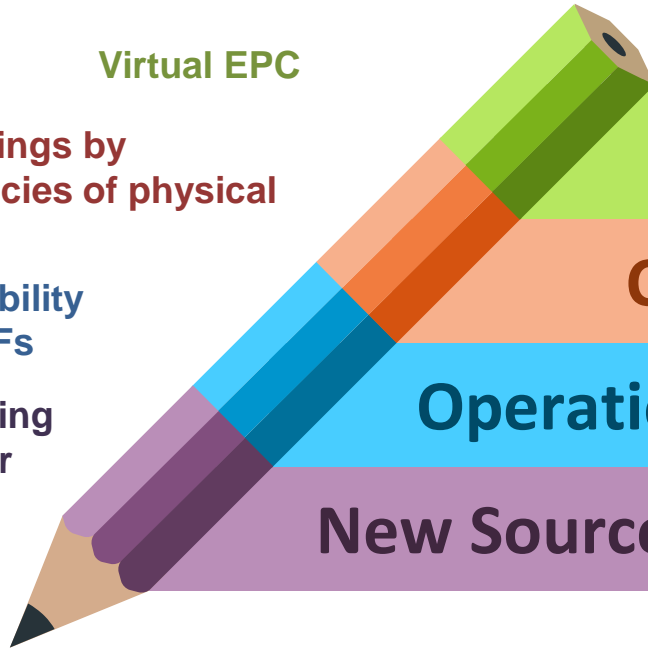
NFV will Change How the Network Operators do Business Forever!

Virtual EPC

Operational cost savings by eliminating inefficiencies of physical networks

Increased operational flexibility and efficiency through VNFs

Increase revenue by quickly rolling out new services that subscriber demands

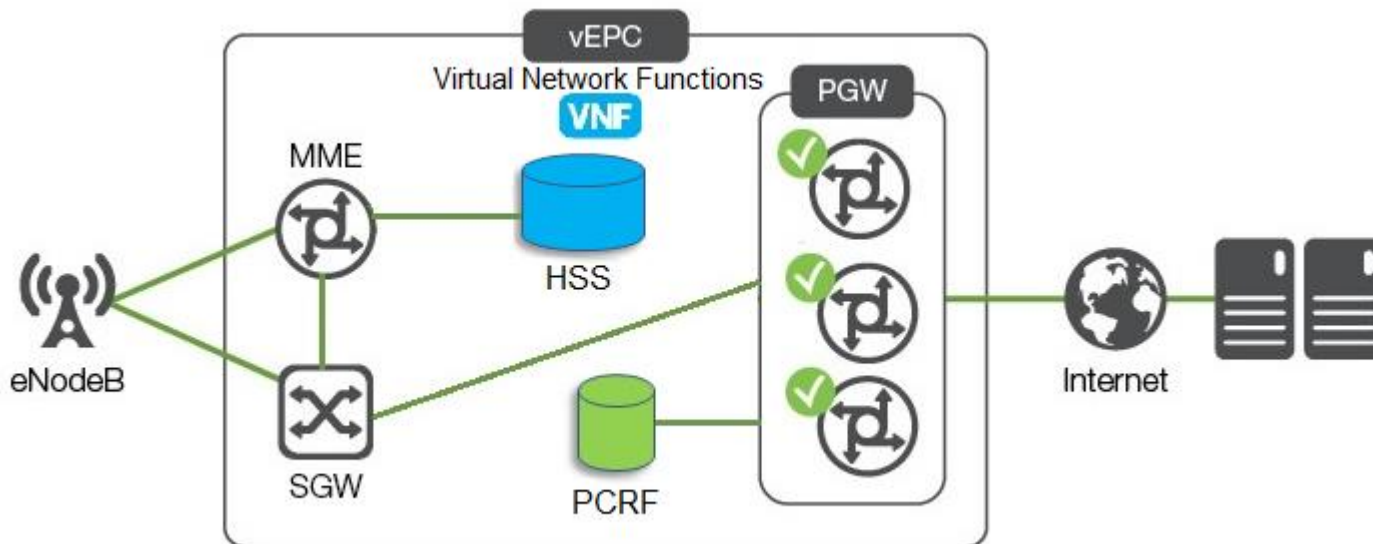


vEPC

Cost Savings

Operational Flexibility

New Sources of Revenue



How can operators know that the Virtualized Network Functions (VNFs) are working correctly and guarantee service reliability?



- Monitoring and optimizing performance in a virtual environment is more challenging
- NFV Orchestrator can modify network configuration by moving, deleting or adding new network nodes, making the conventional monitoring solutions obsolete
- In virtual networks such as vEPC key interfaces are not visible on physical interfaces
- To fully effective monitoring, operators must now be able to monitor not only traffic between physical interfaces, but also logical interfaces
- Current physical probes cannot reach the logical interfaces that use internal VM-to-VM communication between functions hosted on the same server
- Due to the nature of NFV, there will be a loss of visibility between VNFs

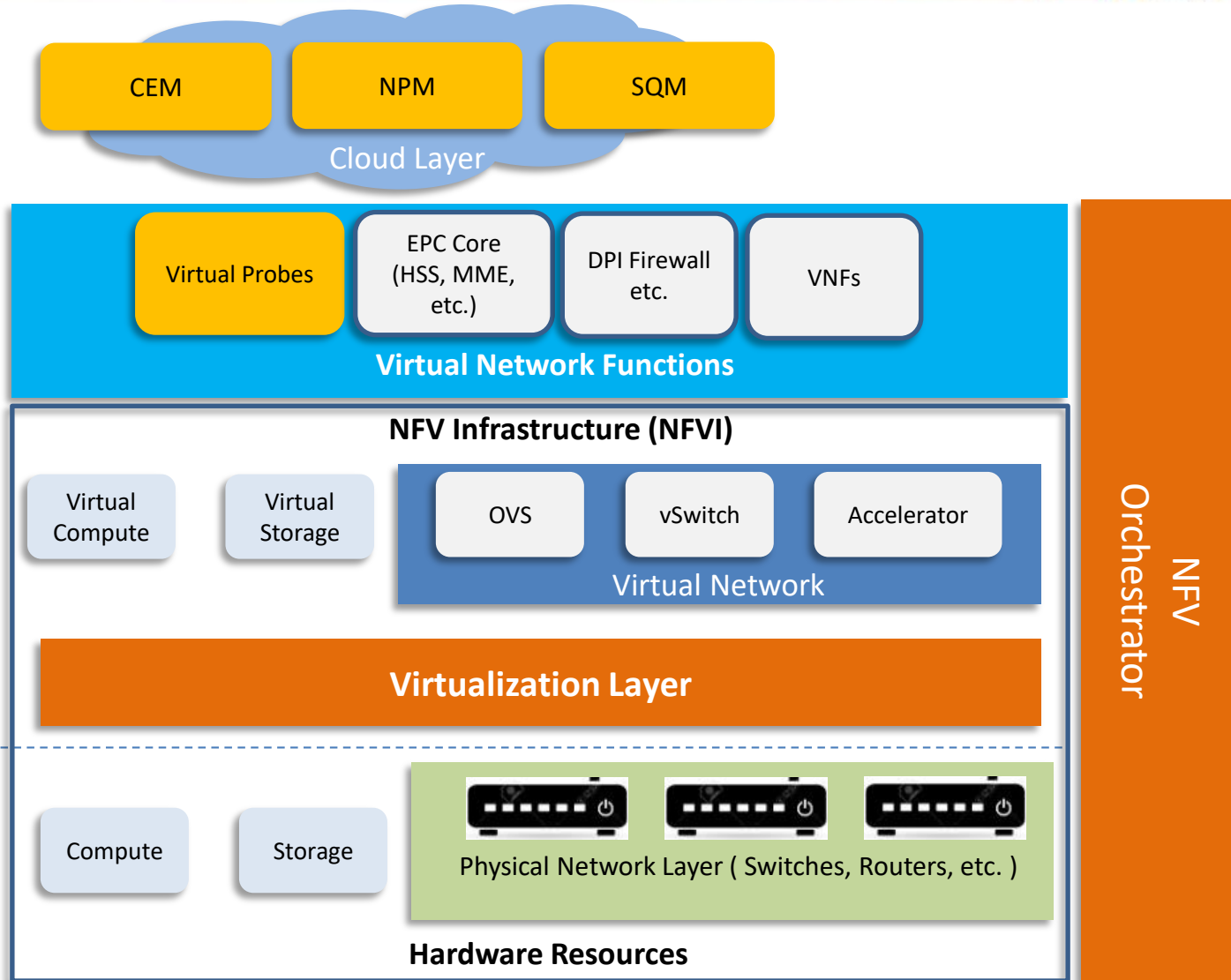
A service assurance solution capable of monitoring both physical and virtual interfaces is critical!

A virtual probe is needed to provide greater overall visibility into and across the virtual networks, improving service levels and overall customer experience

A virtual probe can monitor both external physical interfaces and VM-to-VM communications

A virtual probe monitoring VNFs reduces the CAPEX and OPEX by using a standard off-the-shelf hardware rather than proprietary appliance





- Tapping traffic through vSwitch/OVS and/or Neutron
- vProbe deployed as a VNF (VM or container based)
- Onboarding process
- Session Correlation
- Close Loop Automation
- Inband Telemetry



Subscriber Activity Per Cell

Showing 1 to 10 of 48 entries

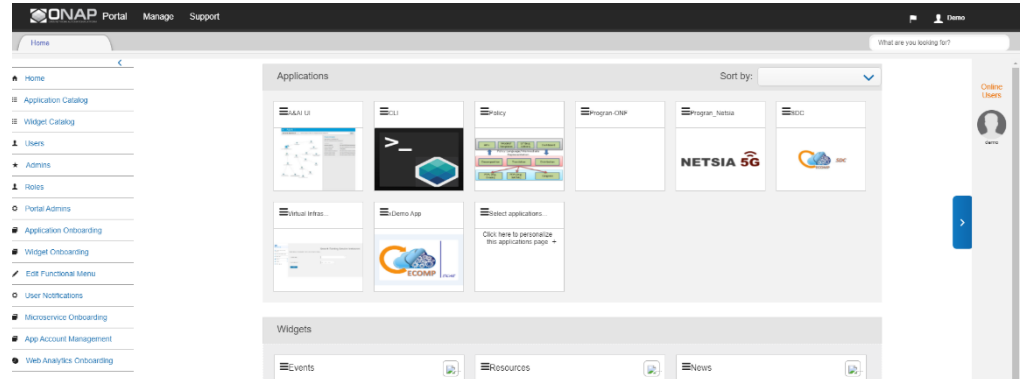
Location	RAT Type	Average Top Flow Throughput	Max Top Throughput	Total User Data Downloaded Top	Total User Data Uploaded Top	Average Round Trip Time	Out Of Order Packets Ratio	Retransmission Ratio
Telecoms 7	3G	87239.38	0	391562.5	302734.36	597.14	0.02	0.02
Telecoms 8	3G	84876.62	0	283871.88	248460.03	700	0.01	0.02
Tele Area 2	3G	78125	0	128053.13	68059.38	1000	0.01	0.02
ARI-3 Bboxes	3G	75209.19	0	283871.88	224909.26	597.14	0.01	0.02
Telecoms 25	4G	68005.9	0	167700.38	78750.13	600	0.02	0.02
ARI-2 Bboxes	3G	64403.13	0	128053.13	195312.5	560	0.01	0.02
47702-0	3G	61848.96	0	220078.13	168075.63	520	0.01	0.02

Subscriber Activity Per Application

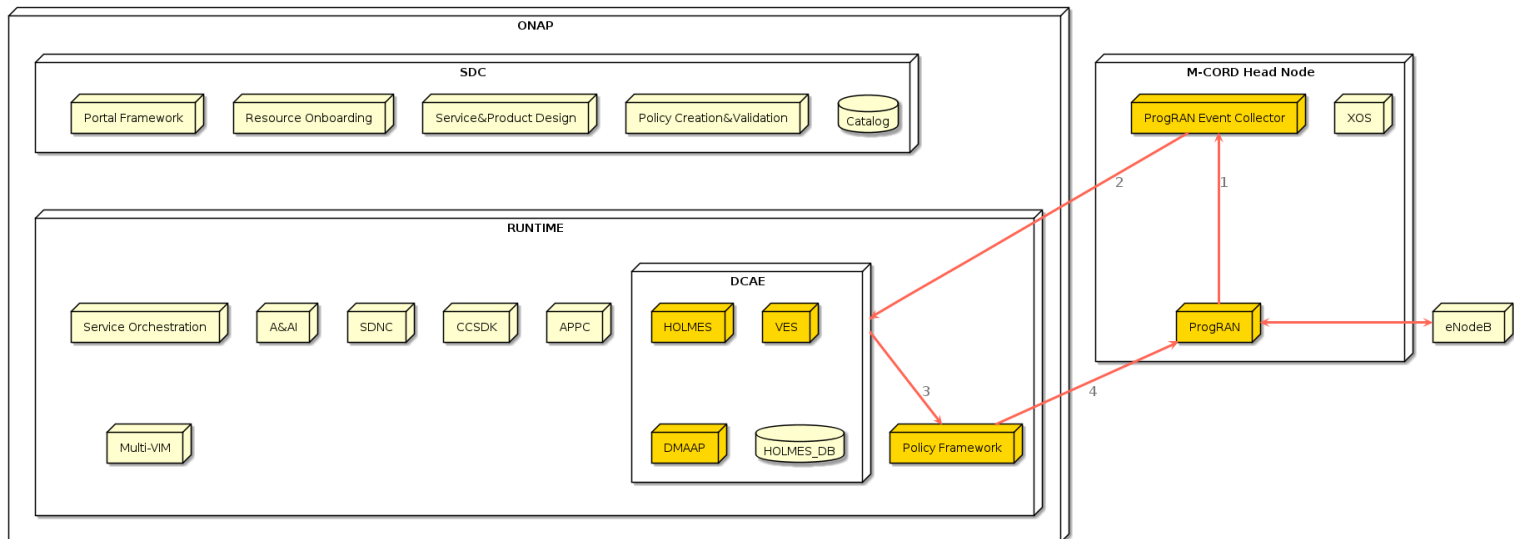
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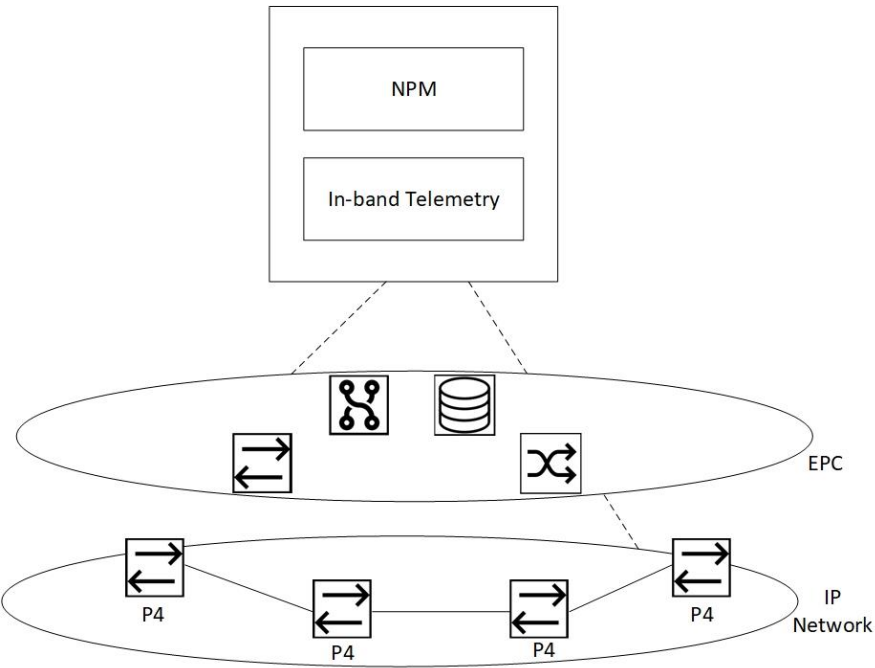
Application	Average Top Flow Throughput	Max Top Throughput	Total User Data Downloaded Top	Total User Data Uploaded Top	Average Round Trip Time	Out Of Order Packets Ratio	Retransmission Ratio
SUDAPHONE	176200	0	39062.5	39062.5	-	0.01	0.02
SDFLTV	156200	0	39062.5	39062.5	500	0	0.02
ARIS	136718.75	0	20206.88	39062.5	-	0	0.1
REKO	136718.75	0	78125	38593.75	300	0	0.01
VORP	117183.5	0	20206.88	20206.88	200	0.8	0
REAMA	117183.5	0	20206.88	20206.88	190	0	0.01
SOH4	112004.88	0	87064.25	128053.13	275	0.02	0.02
FWITTE	107402.88	0	128053.13	87860.63	500	0.01	0.01
VORP_SWITCH	97064.25	0	68705.38	78125	1000	0.01	0.02
REAMAEDIA	97064.25	0	20206.88	19531.25	-	0	0

Utilizing ONAP Closed Loop Automation for ensuring sufficient bandwidth to a subscriber

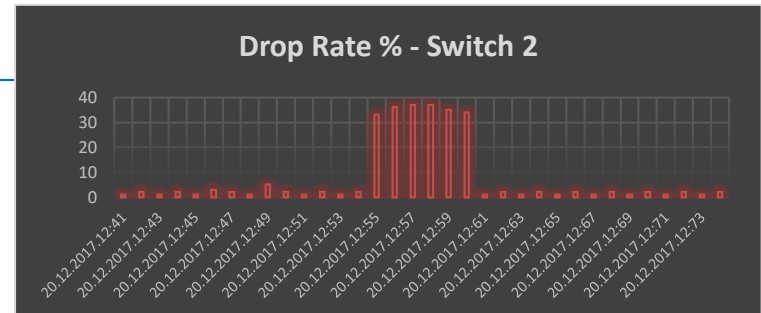
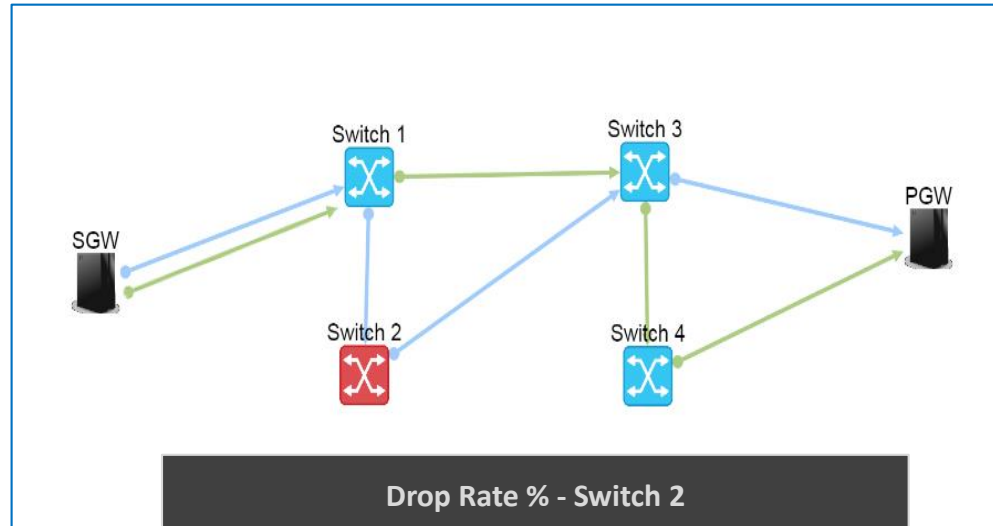
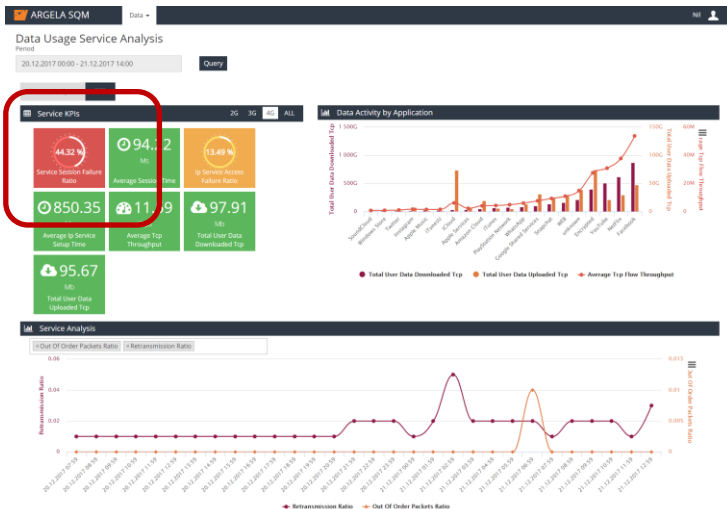


NETSIA MWC 2018 ONAP PROGRAM CLOSED LOOP DEMO





- Automatic detection of anomaly through a sudden increase in packet drop rates
- Automatic enablement of In-band Telemetry header insertion in IP backbone
- Automatic detection of IP switch causing the problem



Thank You