A transformation journey to improve QoS and QoE

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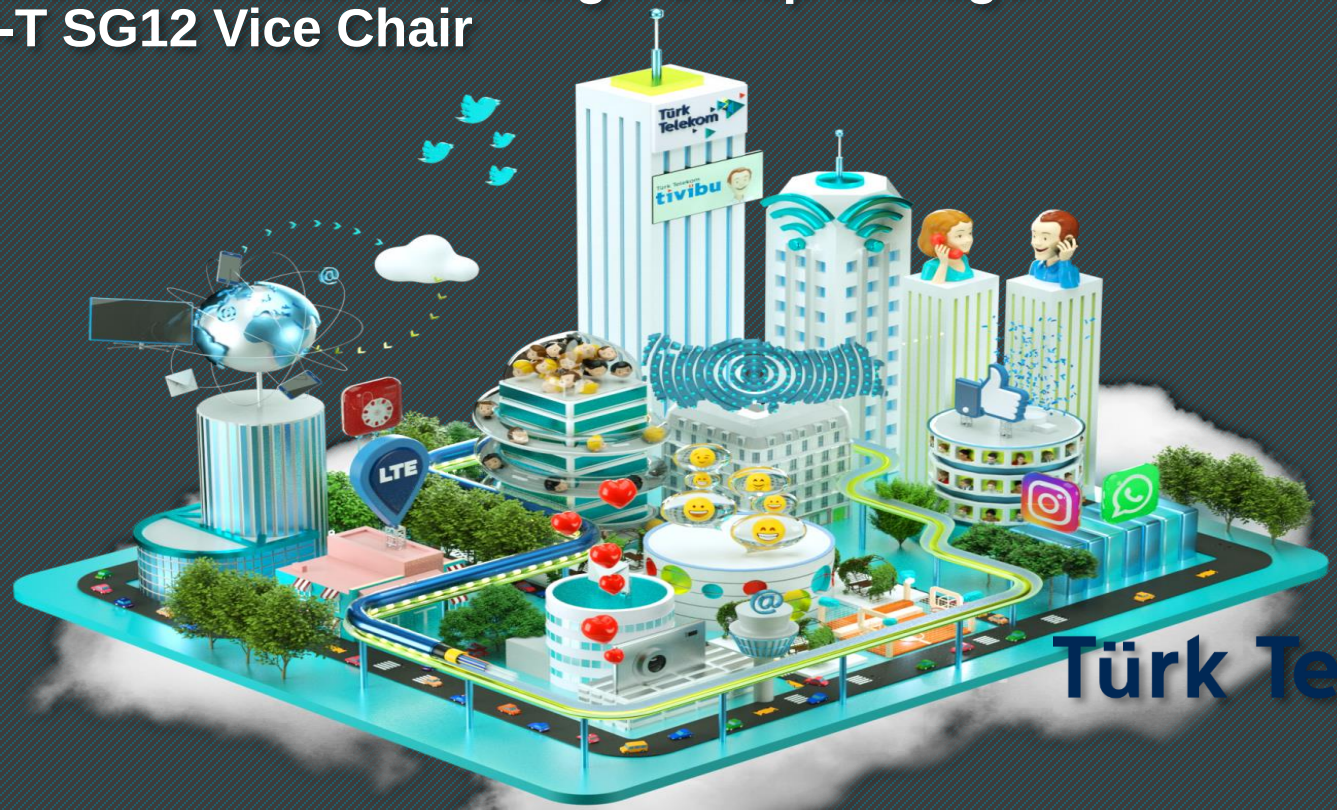


Türk Telekom

Agenda

- Türk Telekom Facts and Figures
- Requirements for the transformation
- Virtualization Strategy
- Components & Principles
- Reference Architecture
- Qoe improvement
- Y.CVMS
- Argela vProbe

Leading software developer & integrator in Turkey

Next generation telco technologies R&D company

Leading and largest edtech company in Turkey

Leader customer service solutions company

International arm of the Group in wholesale data, voice and roaming services

Payment services company

Türk Telekom Facts & Figures

LEADING COMPANY INTURKEY

Offering Integrated telecom services

Most valuable telco brand for

10 CONSECUTIVE YEARS

Serving

43.5 MN

Subscribers

~55%

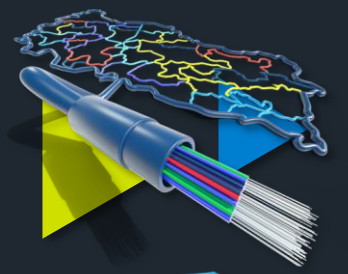
Fiber connected LTE Base Stations

88%

LTE Population Coverage

>90%

Fixed line household coverage



268K km

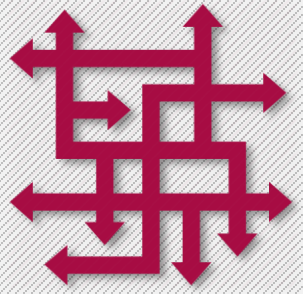
Fiber network in **81** cities

17.4mn

Fiber Homepass*

*Homepass includes FTTC & FTTH/B

Why Transformation ?



COMPLEX PROTOCOLS

INCREASING NUMBER OF MOBILE DEVICES

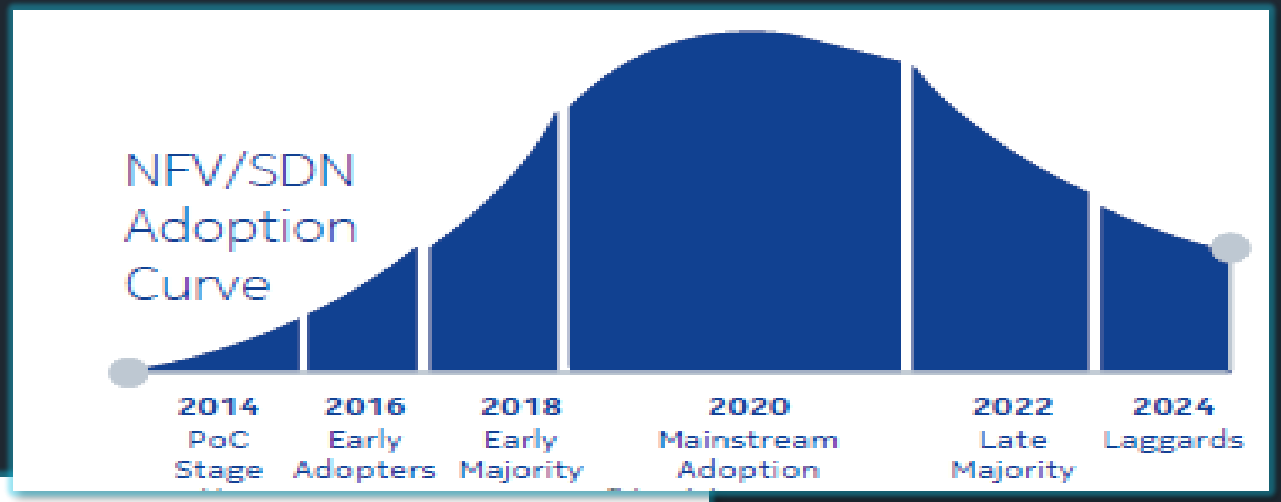
VENDOR LOCK–IN

MANAGEMENT, MONITORING & SECURITY PROBLEMS

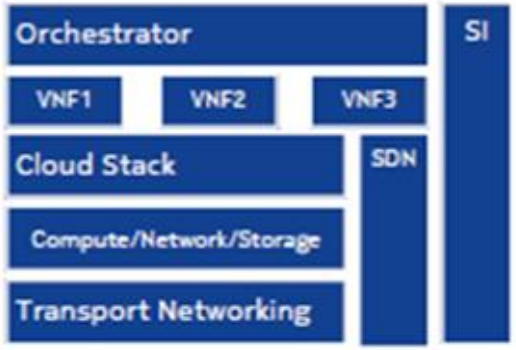
COMPLEX SERVICE SUPPORT

HIGH OPEX/CAPEX

Approaches



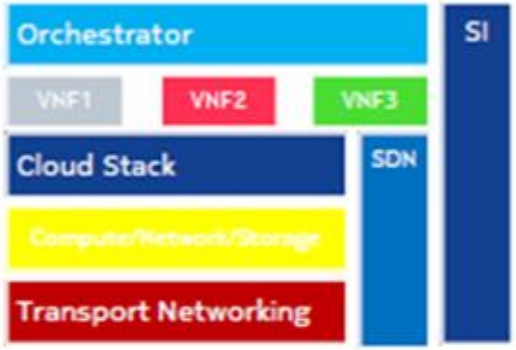
One stop shop



Ex: H3G UK

+ Lower complexity: single interface
+ Faster TTM
- Vendor lock in risk

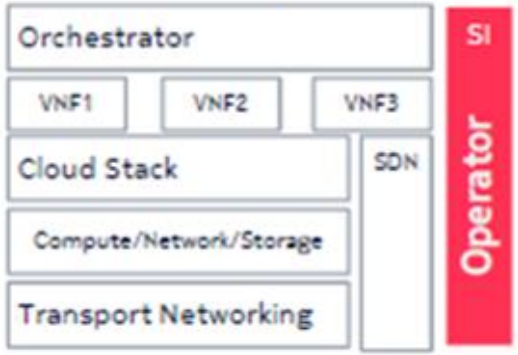
Best of breed for each layer



Mainly Tier 1 :Verizon, Orange, DT..

+ no vendor lock in
+ Best solution for each layer
- Solution complexity high
- Complex Responsibility Matrix

DIY based on open source



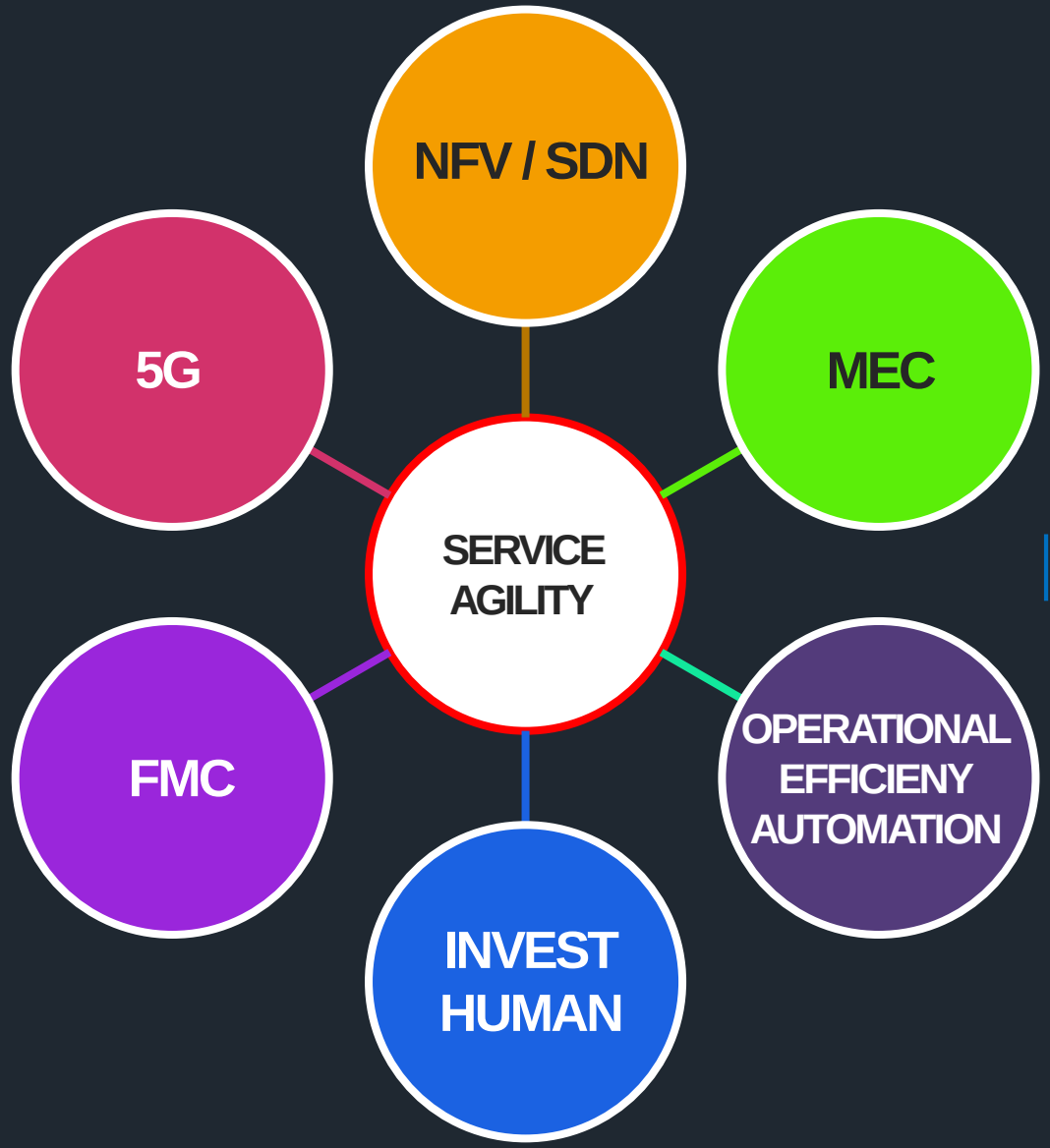
No concrete implementation

Some attempts like Jio/Reliance and DT but no success yet.

+ SW price very low
- Complexity extremely high
- big investment for integration

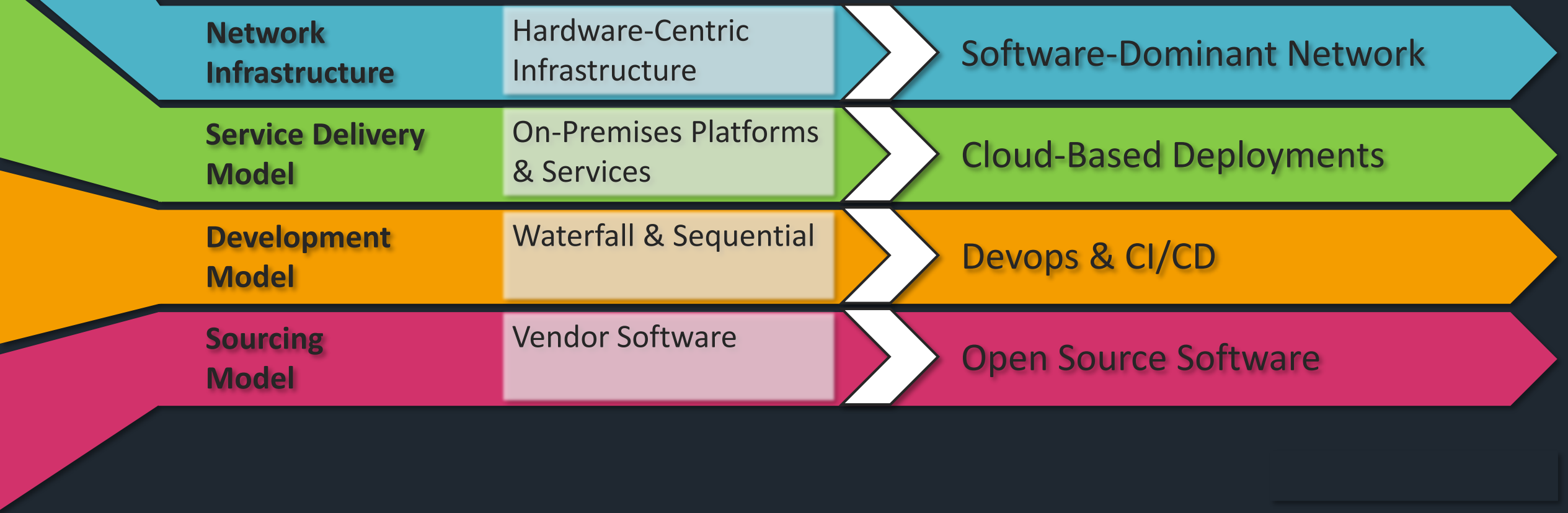
Source: TBR

Transformation Components



Transformation Required !

Principles


Network Infrastructure
Hardware-Centric Infrastructure
Software-Dominant Network
Service Delivery Model
On-Premises Platforms & Services
Cloud-Based Deployments
Development Model
Waterfall & Sequential
Devops & CI/CD
Sourcing Model
Vendor Software
Open Source Software

Benefits of Open Source

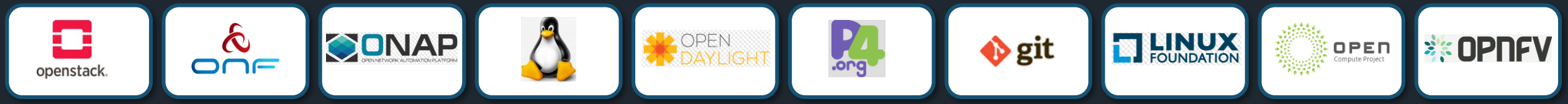
OPENNESS
Lower vendor lock-in, more transparent solutions

LEARN FROM OTHERS
Benefit and re-use innovation from other players and industries

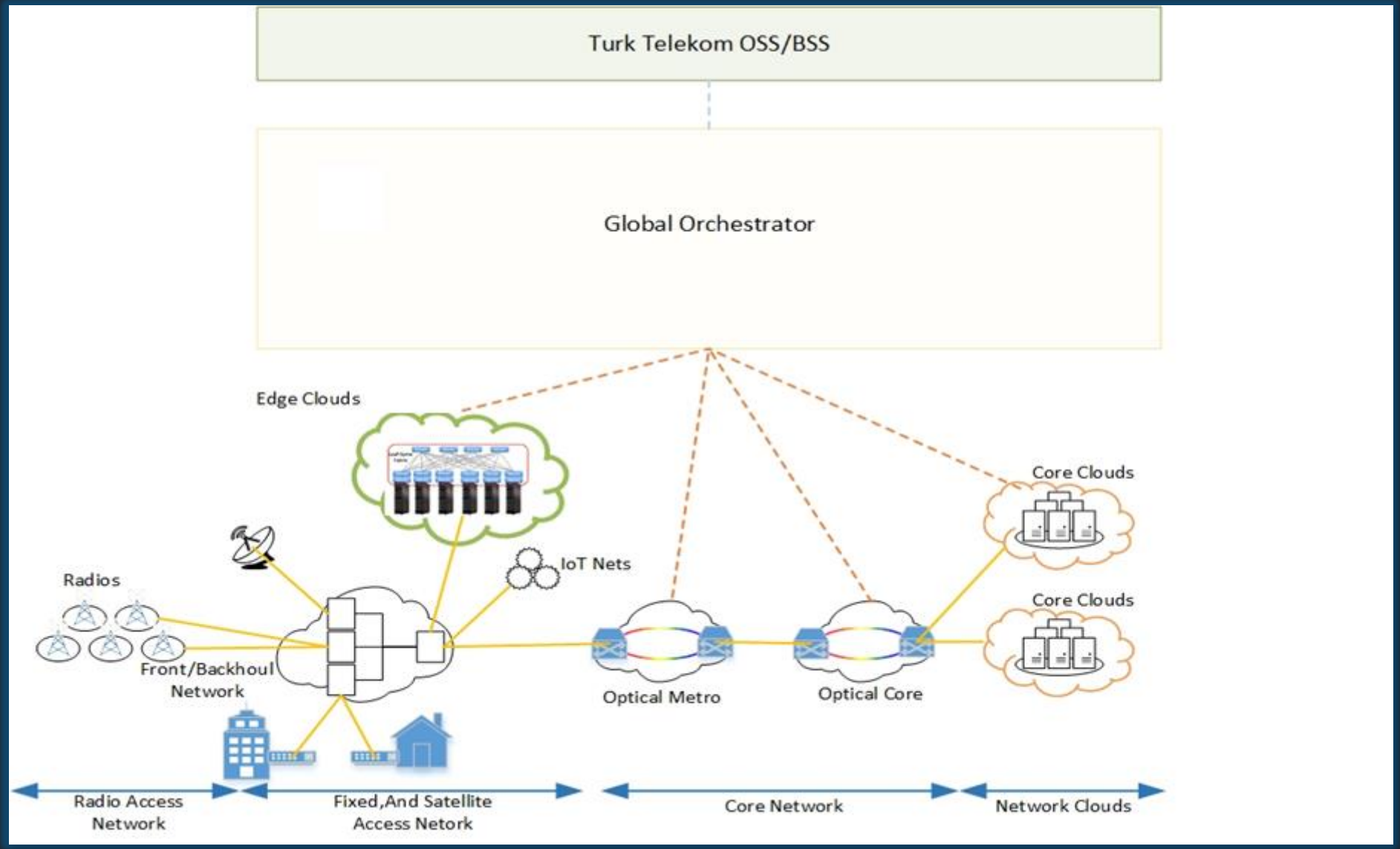
FASTER DEVELOPMENT
Development can focus on things that make the difference

SECURITY
Transparent code that can be fixed quickly by anyone

QUALITY
Widely used, scalable software with many users and contributions



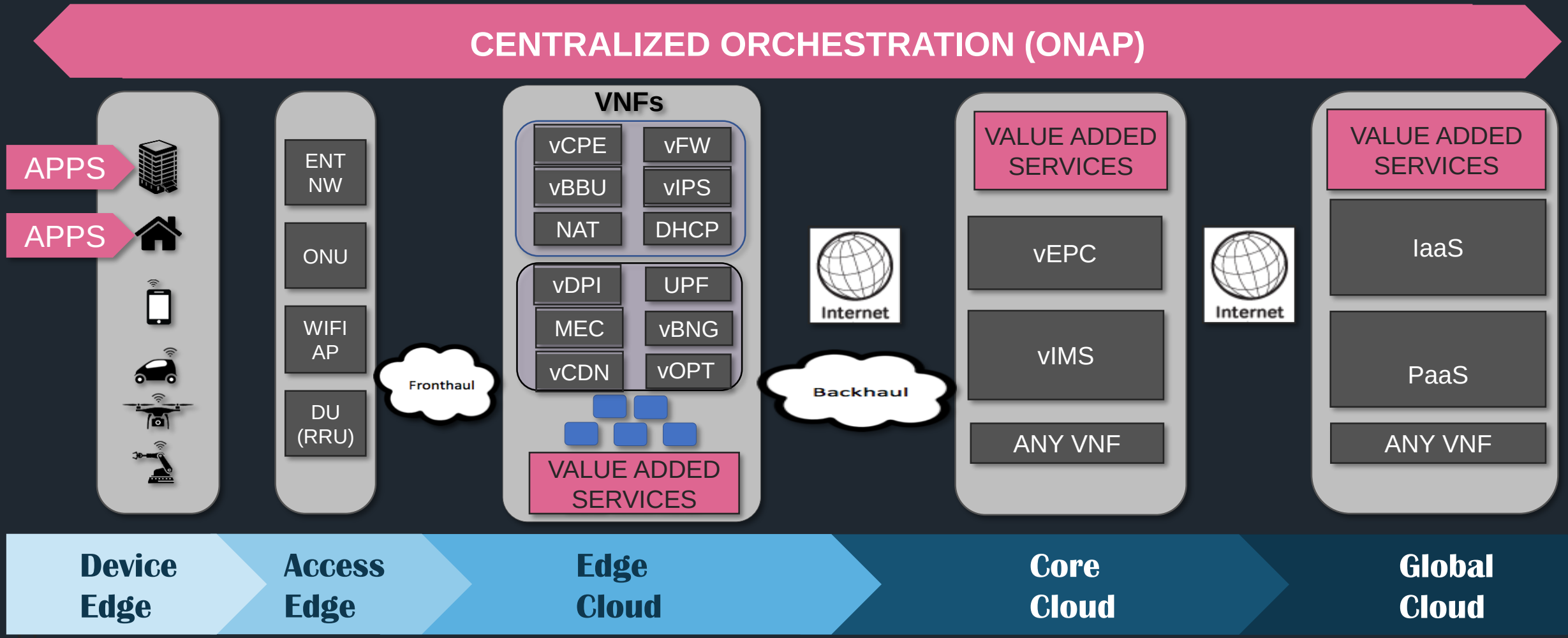
High Level Architecture



Reference Architecture for MAC (Multi Access Edge Cloud) to improve QoE/QoS

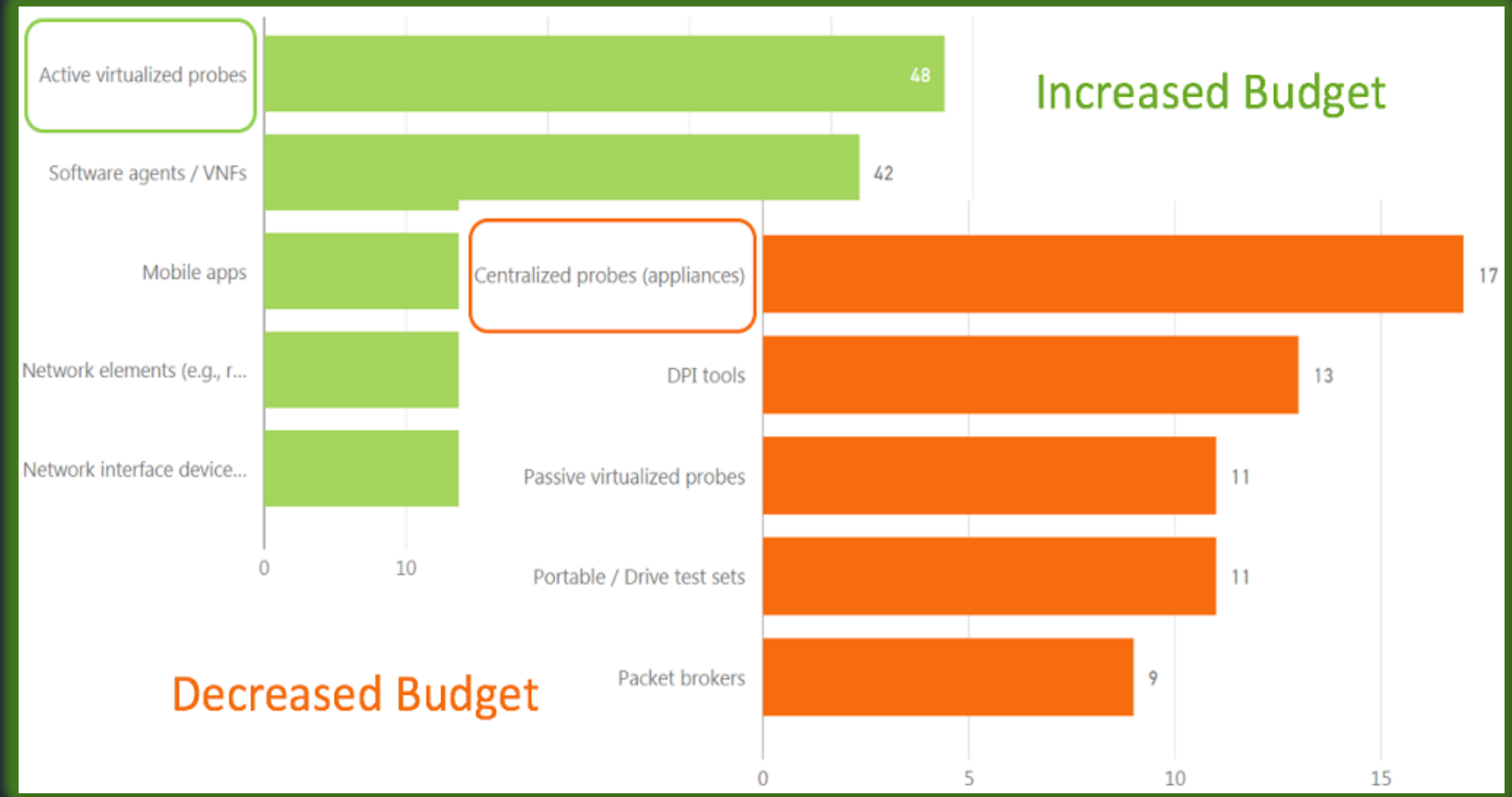
- Realization of FMC
- Low latency

- Consolidation of multi-access technologies in the same CO
- New services (AR,VR,V2x,Location Tracking,IoT..)



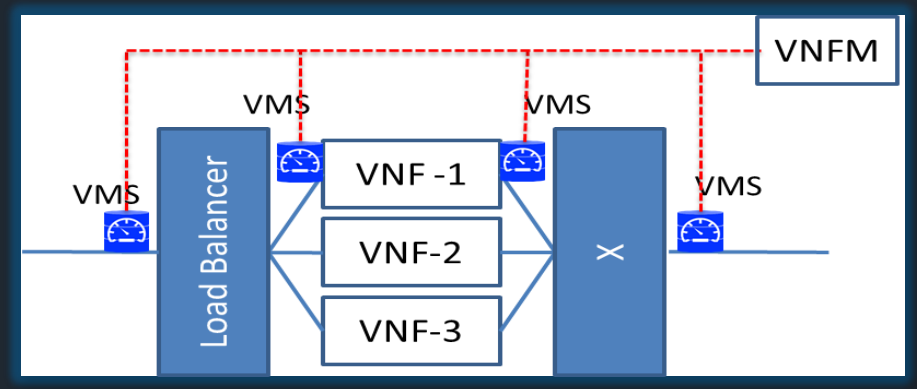
Next-Gen QoE/QoS Measurement

1. Best-effort QoE assurance is no longer good enough
2. QoE management for virtualized networks is a whole new ballgame
3. Understanding the relationship between QoS and QoE is critical
4. Next-gen performance assurance is beyond human control
5. Active, virtualized probes are the future of QoE assurance



Source: Accedian Servey

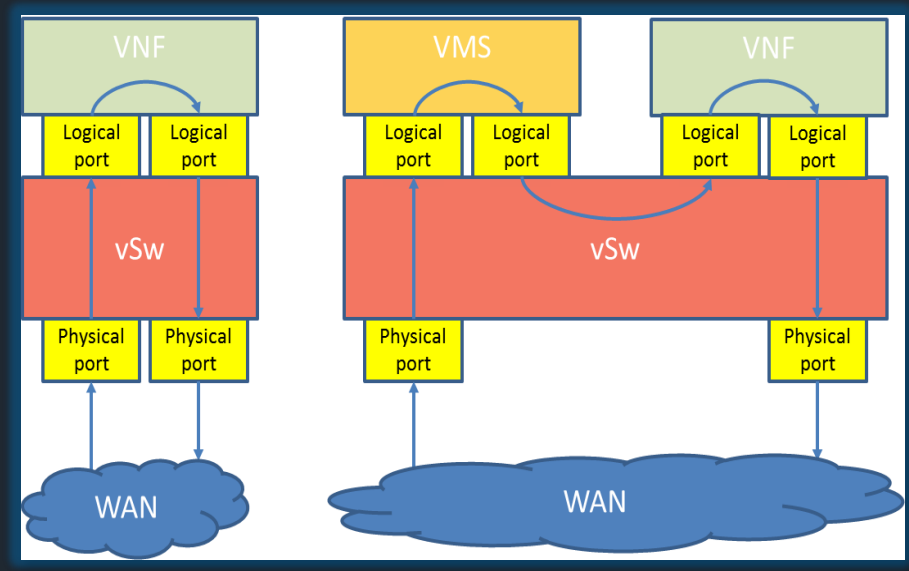
Q8/12- Initial Draft text of Y.cvms, "Considerations for Realizing Virtual Measurement Systems"



VMS Positioning - Al Morton, Q8/SG12

The main issues when the VMS is operating as a virtual network function (VNF) are:

- timestamp accuracy considerations,
- isolation of the measurement function,
- mitigation of breaches,
- trade-offs between accuracy and resource demands



VMS Deployment - Al Morton, Q8/SG12

Recommendations

- Ensure that these resources are available before deploying a VMS
- Establish their time stamp accuracy requirements
- The presence of mitigations is a necessary compliment to configurations that attempt to achieve VMS isolation.
- To monitor their own compute and network interface resources to identify suspect measurement intervals and notify their managers

Q8: Virtualized deployment of recommended methods for network performance, QoS and QoE assessment

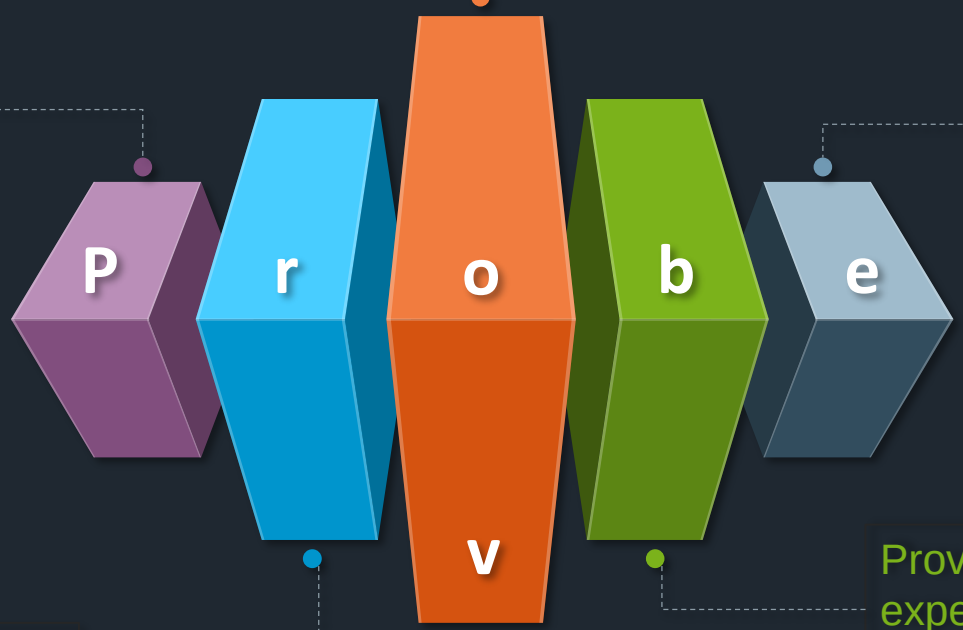
Argela CEM vProbe

Used in TT network

Mobile 2G/3G/4G CS and PS Monitoring,
Fixed NGN/IMS Monitoring System ,
Mobile/Fixed Broadband Quality Analyzer,

Operators can rapidly increase network analytics capacity when needed by adding new Argela vProbe instances

Feeds data for better decision making to network operations and planning personnel, C-level decision makers, marketing, customer care, etc.



Supports all network technologies – 3G, LTE, vEPC, IMS

Receives and processes information from any physical network entity and VNF

Provides visibility into subscriber experience, networks, roamers and geographical regions


Transformation is key to meet the QoS /Qoe requirements of growing traffic/services using a unified environment


Thank you