

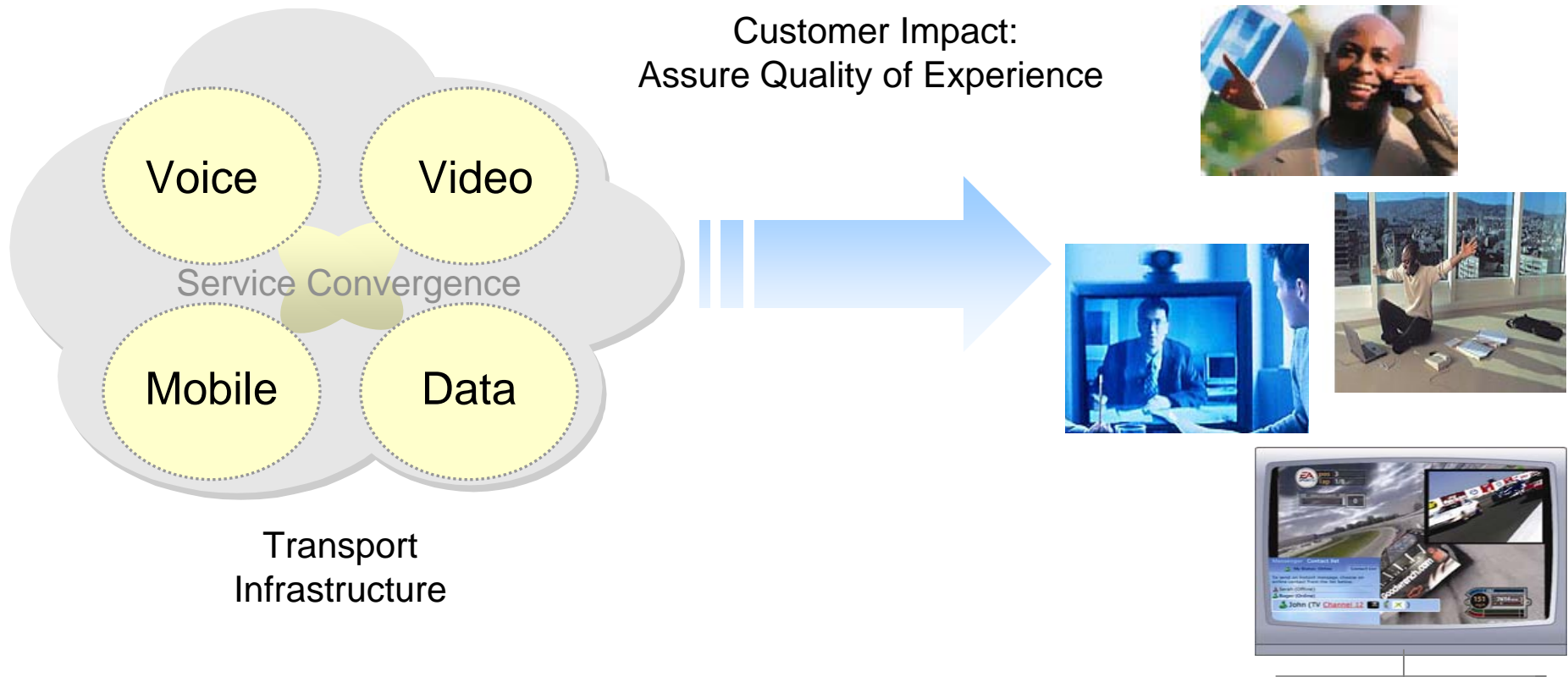


TRAI QoS Issues in NGN

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Solution Architect**

4th December 2007

NGN: Converged Services



Assure any IP Service, over any Network, to any Endpoint

NGN QoS Challenges

- ❖ Subscriber Perceptions of Quality
 - PSTN vs VoIP
 - Broadcast TV vs IPTV Multicast

- ❖ Understanding Service Quality
 - Circuit vs IP switched
 - Traffic Characterization
 - End to End QoS

- ❖ Element vs Service Centric monitoring
 - End to End, Segmented Views
 - Leveraging Industry Standards/Algorithms

- ❖ Operationalize QoS Management
 - Converged view of Service Quality

Understanding Service Quality Traffic Characterization



Data

- ❖ High speed Internet Data
- ❖ Peer to Peer
- ❖ Online Gaming

Smooth or Bursty
Greedy
Drop/Delay insensitive



Voice

- ❖ Class4/5 Replacement
- ❖ International /Long Distance Telephony
- ❖ Voice VPNs
- ❖ VoIP Centrex

Smooth
Benign
Jitter/Drop/Delay sensitive



Video

- ❖ Broadcast/ Multicast TV
- ❖ Premium Channel Subscription
- ❖ Pay-per-view, Video on Demand
- ❖ Video Conferencing

Bursty
Bandwidth Greedy
Jitter/Drop/Delay sensitive

Typical QoS Issues

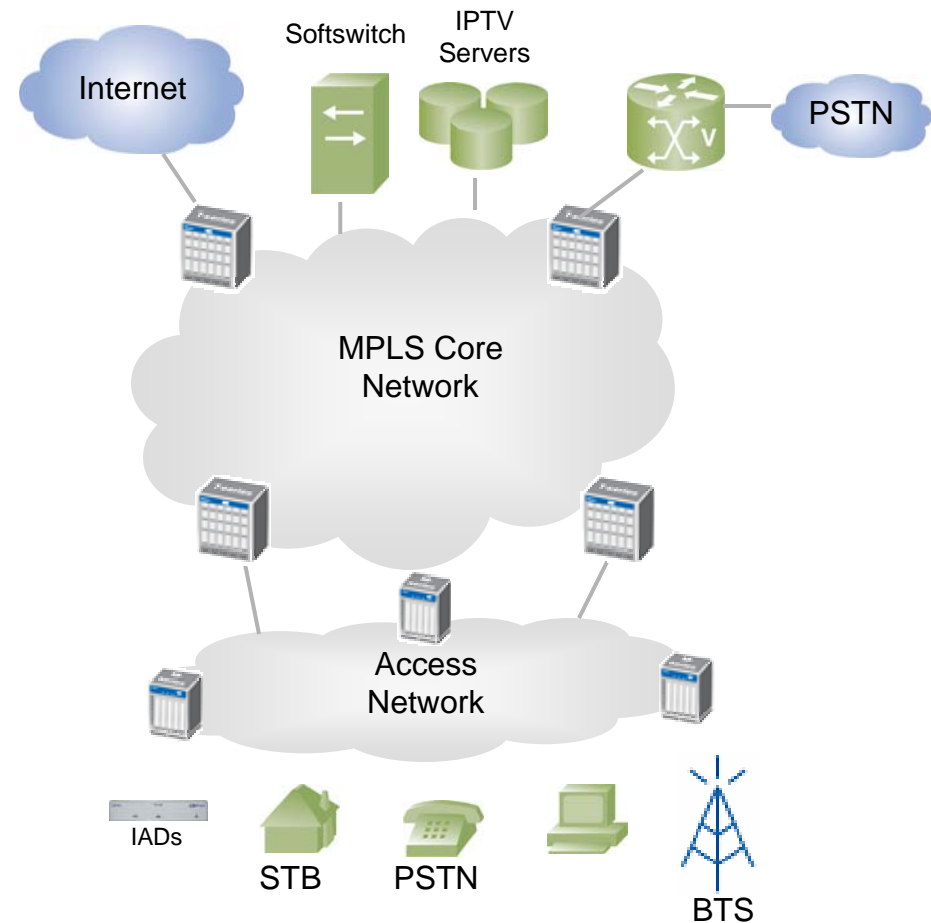
Challenges	Description
Voice Quality Issues	<ul style="list-style-type: none"> Call Setup Failures Mid-call connection drop Long Duration Calls One way voice Voice dropouts/Choppy Voice Speech Clipping Echo Noisy/Distorted Voice
IPTV/Video Quality Issues	<ul style="list-style-type: none"> Channel Change Time Slow start Picture Freeze Picture Blockiness Lip synch

NGN QoS Metrics

Services	Key QoS Metrics			Standards / Algorithms
	Signaling	Delivery	Transaction	
Data (Enterprise IPVPN)	TCP	Pkt Loss, Latency, Jitter	Application specific	
VoIP	Post Dial Delay Post Pickup Delay Call Setup	Pkt Loss < 1% Latency <= 150ms Jitter <= 30ms	MOS > 3.6	G.107 E-Model P.800 (MOS) P.862 (PESQ)
Video	Media start time Channel change time (Join/Leave)	<u>Interactive</u> Pkt Loss < 1% Latency <= 150ms Jitter < = 30ms <u>Streaming</u> Pkt Loss < 2% Latency <= 4-5secs	MDI, MQI	MDI MQI J.144

End to End QoS

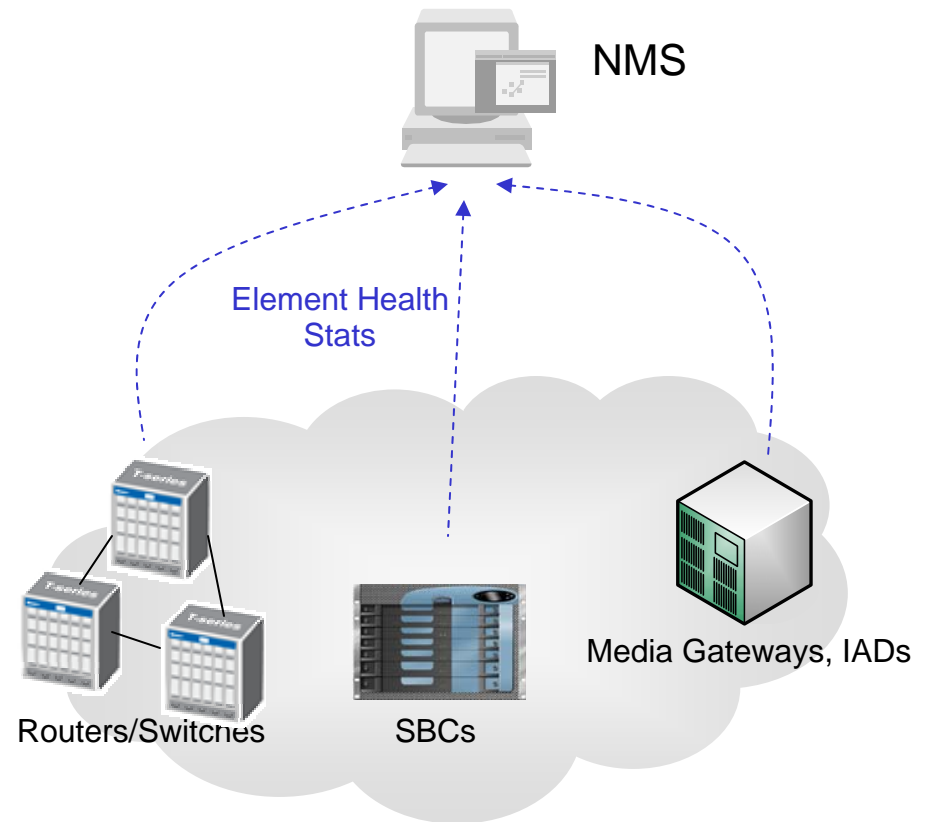
- ❖ End to End is not just the network
 - Only as good as the weakest link
- ❖ VoIP Endpoints
 - Trunking Gateways (Class 4)
 - Access Gateways (Class 5)
 - Media Gateways
 - IAD, MTA
- ❖ IPTV Endpoints
 - Video Encoders
 - STB
- ❖ Critical Network Services
 - DNS
 - HTTP



Element vs Service Centric

❖ Element Centric Monitoring

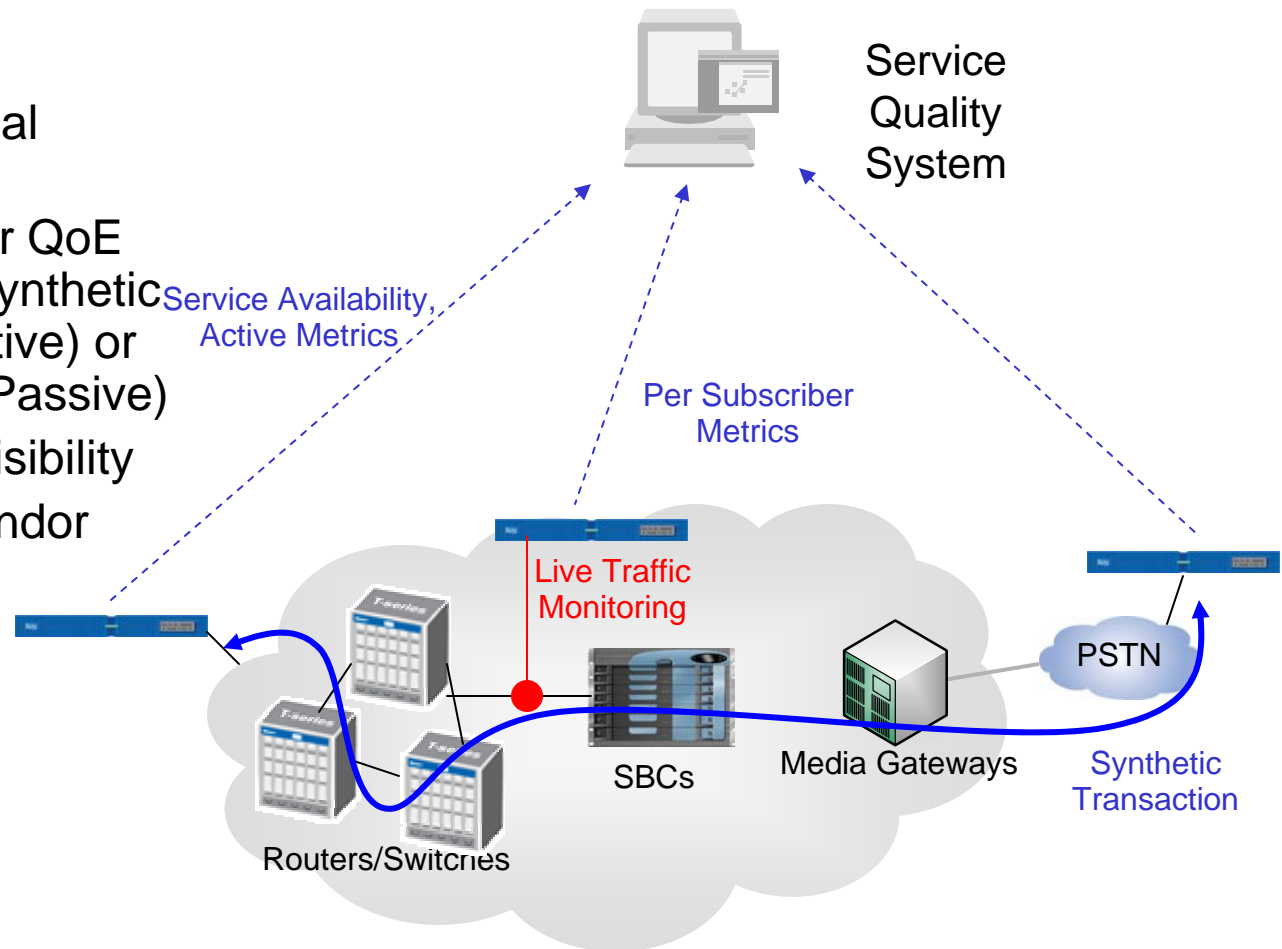
- Traditional Method (SNMP Polling)
- Focused on Element health statistics e.g. CPU, Interface utilization
- Reliant on Element MIBs
- SNMP agent has lower priority
- Element is not purpose built for service quality monitoring
- Aggregated metrics – Impact is not visible



Element vs Service Centric

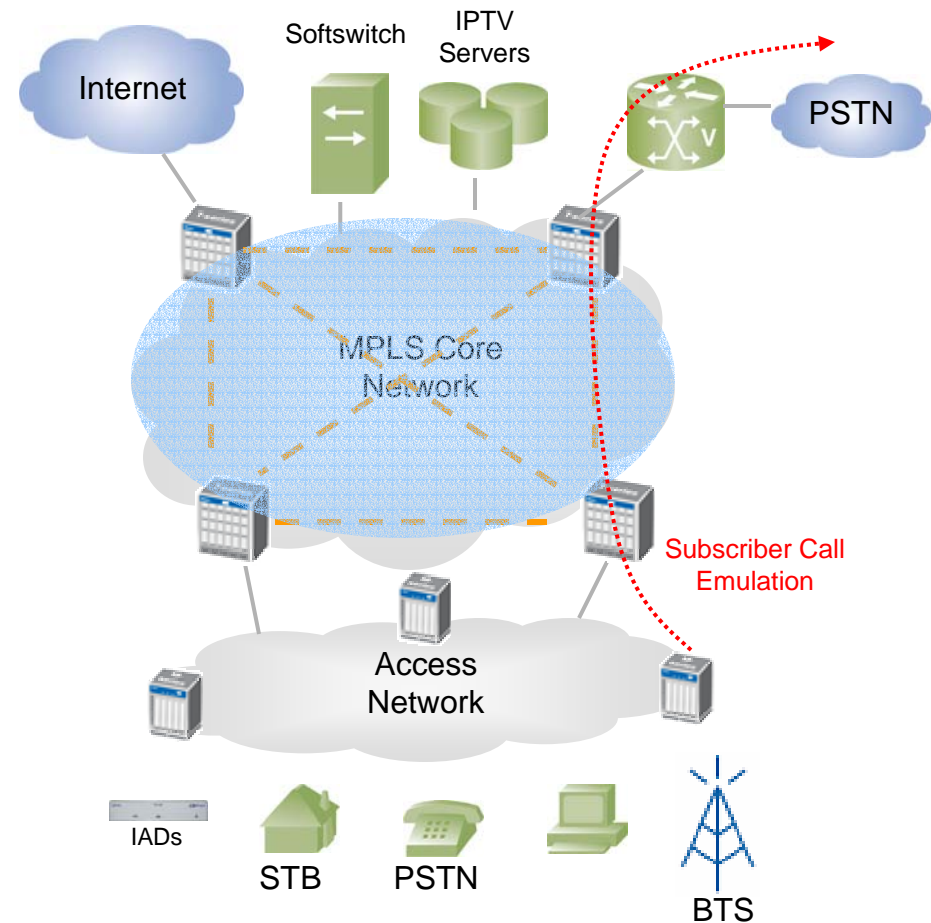
❖ Service Centric Monitoring

- Focused on actual service
- Actual subscriber QoE measured with synthetic transactions (Active) or live monitoring (Passive)
- Per subscriber visibility
- Infrastructure vendor agnostic



Service Quality Starts at the Core

- ❖ Network QoS monitoring across the core directly impacts subscribers' QoE
 - Need strict latency and jitter requirements
 - Higher QoS requirements for next-gen services
 - Verify across multiple CoS



Extends to the Edge/Subscriber

❖ Service Edge

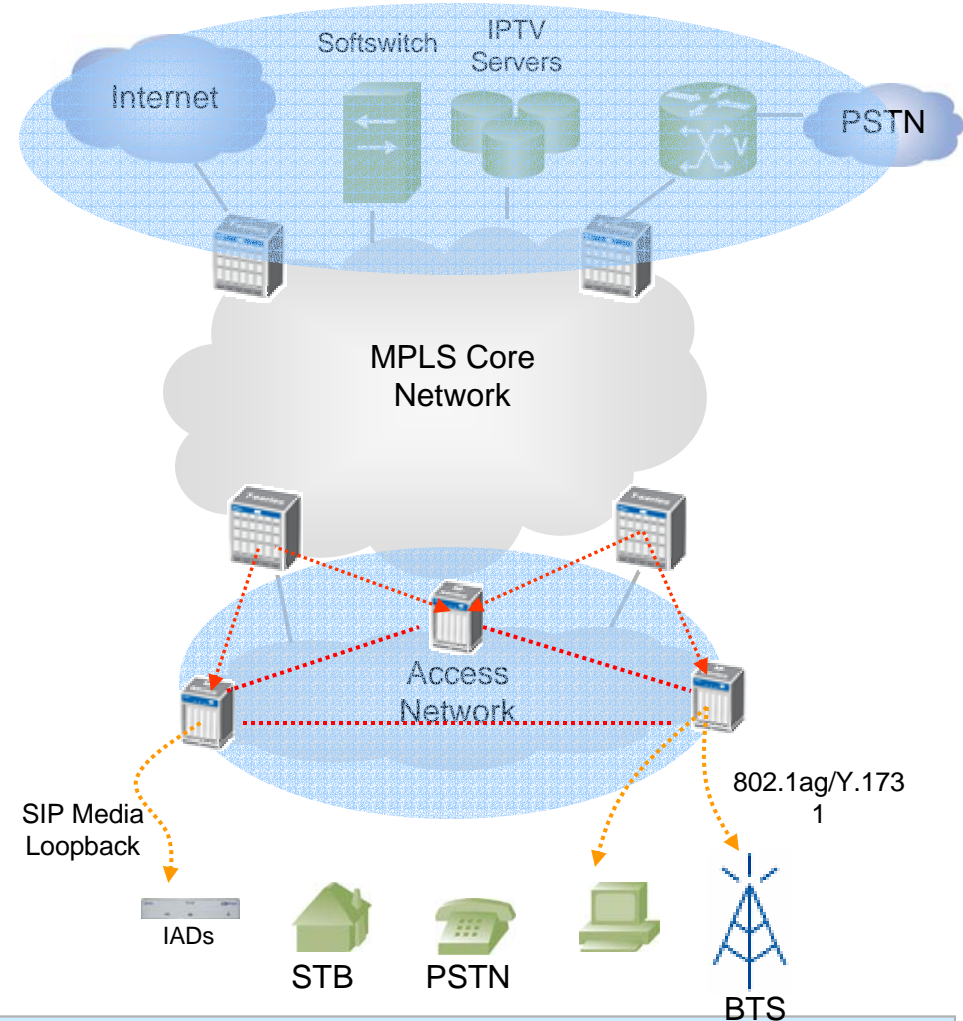
- Hosted IP services such as IP Centrex, IPTV, Class4/5 VoIP, Off-Net voice

❖ Access Edge

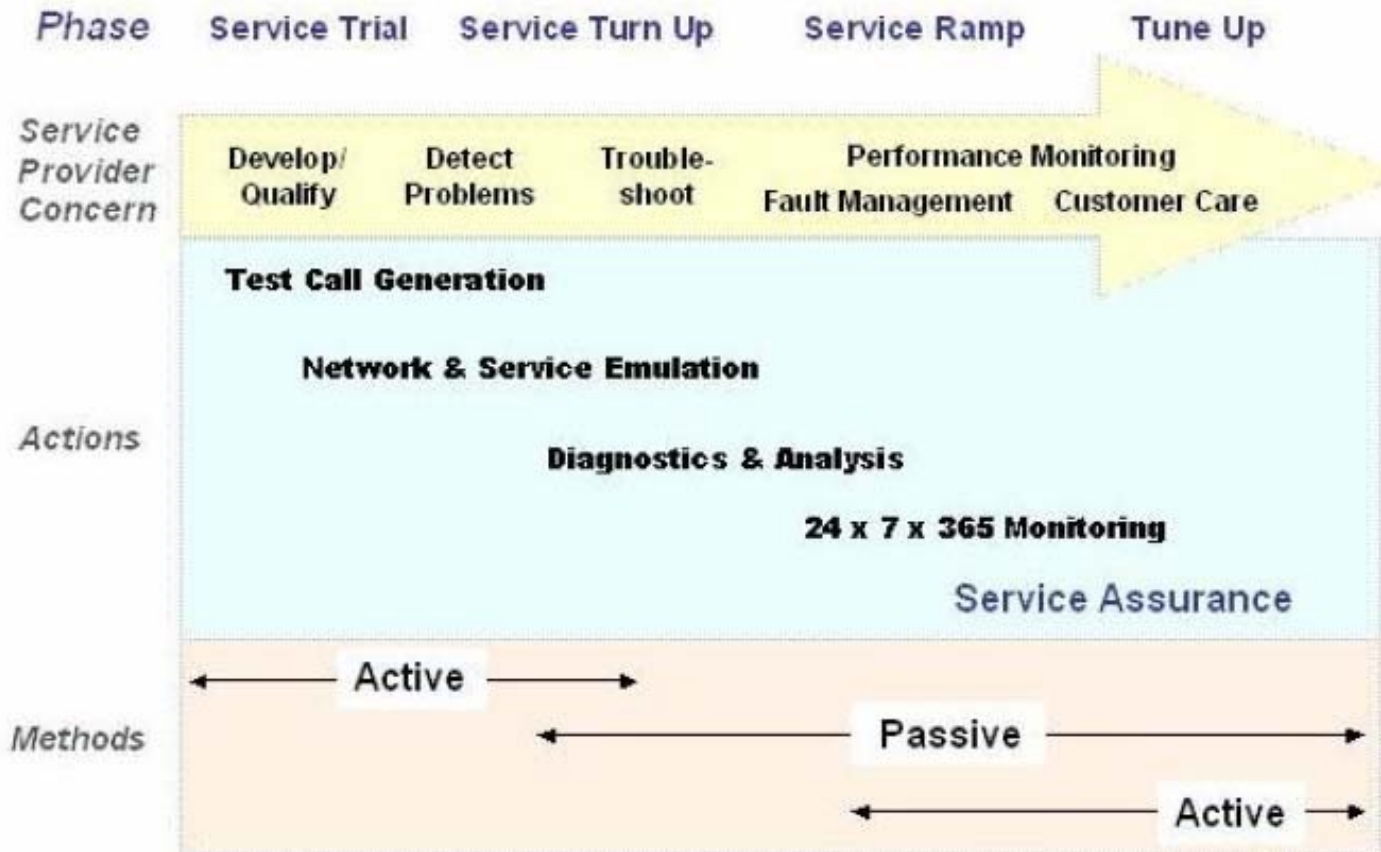
- 802.1ag for Carrier Ethernet e.g. Mobile IP Backhaul, Carrier Ethernet, Y.1731
- TR-069 (DSL)

▪ And Further out to the Subscriber

- SIP Media Loopback for Residential/Enterprise VoIP
- RTCP-XR



Managing NGN QoS Service Lifecycle



❖ Focus on Service Quality

- Characterize services and QoS requirements
- Much more than just Network QoS
- Leverage Industry Standards for End-to-End QoS and to gain visibility out to the Subscriber/Edge

❖ NGN OSS - Operationalize

- Service Views (End to End, Segmented)
- Active + Passive
- 24x7 + Troubleshooting
- Unified QoS view across operational groups

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