Enhancing Over-The-Top (OTTs) service quality and connectivity assessment in mobile networks

ITU Workshop on "Telecommunication Service Quality"

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Gibril Njai

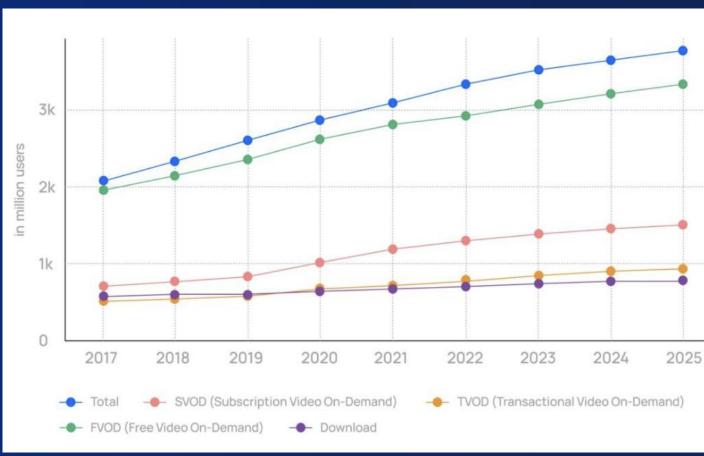
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Introduction

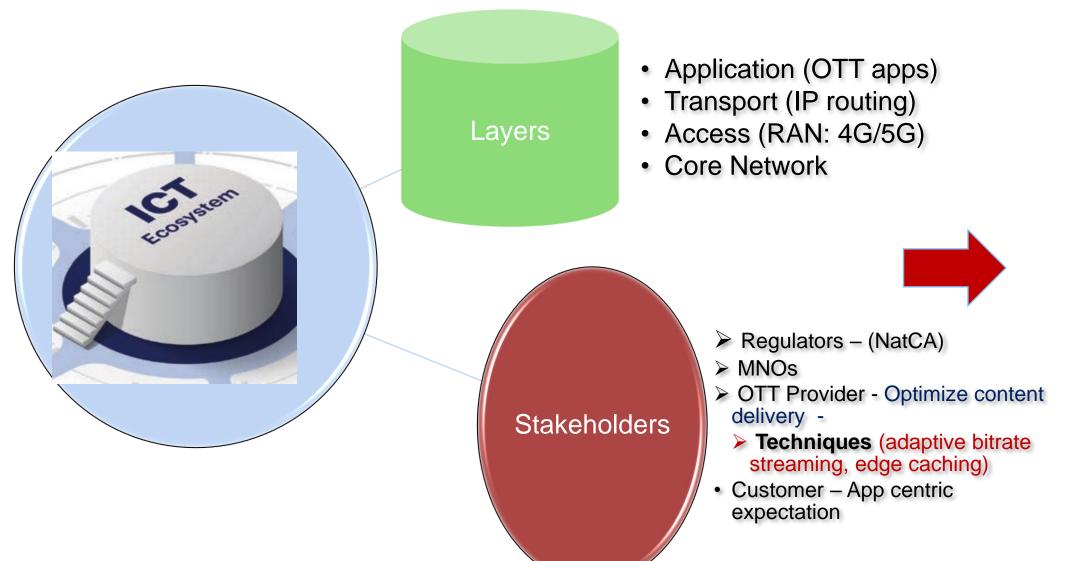
- Over-The-Top (OTT) services
 - refers to Apps like Netflix, WhatsApp, YouTube delivered over the internet that bypass traditional network operators.
 - > 70%+ of mobile data traffic is OTT
 - Generally, users expect high performance regardless of network - no longer signal strength or call drop rates
 - ✓ Hence, Quality of Service (QoS) and accurate Quality of Experience (QoE) assessments is technically complex.

The Rise of OTTs – wings of fire

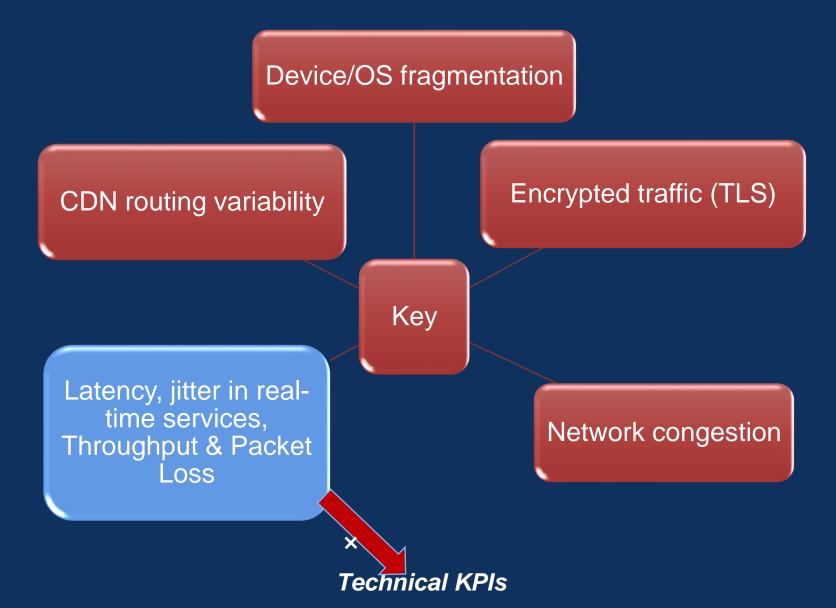


https://www.uscreen.tv/blog/ott-statistics/

OTT & Mobile Network Ecosystem

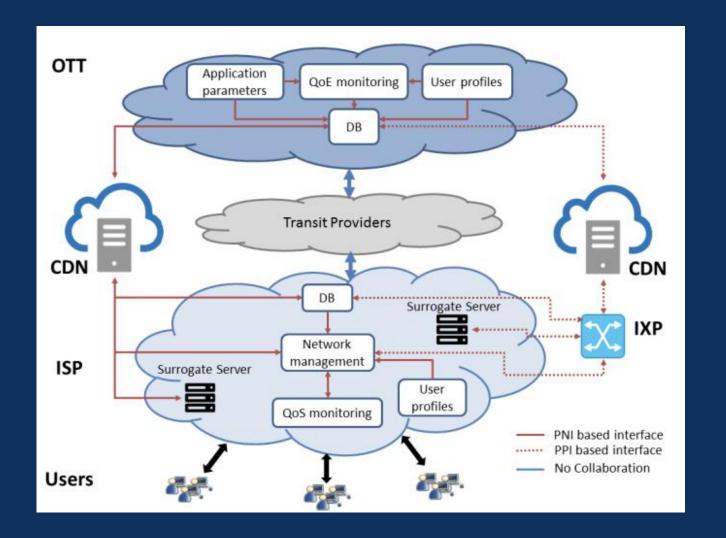


Key Challenges in OTT Service Delivery



To address CDN routing variability challenges

- Arslan et al proposed a QoE-aware collaboration approach
 - Joint optimization on both network
 and application sides basis of
 economic factors



OTT QoS/QoE Assessment Methods

Passive Monitoring

Technique

- Deep Packet Inspection (DPI),
- Flow analysis
 - Traffic flow inspection

Use Case

Assessing overall traffic patterns and identifying service bottlenecks

Active Testing

Technique

- QoS test probes synthetic traffic generation
- > iPerf
- ➤ Ping
- Drive test

Use Case

Simulating WhatsApp calls or YouTube streaming to benchmark latency, jitter, and buffering

Hybrid Crowdsourced Data

Technique

- NetProbe
- OpenSignal
- Netradar

QoE variation across geographies

Use Case

Capturing QoE trends across rural and urban settlement or peer benchmarking

Drive Testing

Technique

Useful for benchmarking OTT service performance geographically. network-level performance metrics

Case Use Case

Monitoring session drops, codec adaptation, or usertriggered retries

QoS Techniques

OTT QoS/QoE Assessment Methods

Subjective Testing

Technique

- Mean Opinion Score (MOS) surveys
 - field tests with user panels.

Objective QoE Model Testing

Technique

- Estimate MOS from QoS metrics.
 - ➤ ITU-T P.1203 (for video), VMAF (Netflix), PSNR, SSIM.

Analytics from OTT Apps

Technique

- SDKs embedded in OTT applications.
 - Metrics: playback errors, resolution changes, time to first frame.

QoE Techniques

Practical Insights

Use Case: Enhancing OTT Service Quality in West Africa

Use case

- Rapid rise in YouTube and
 Netflix consumption in
 urban zones at 6 10pm.
 - triggers increasedbuffering and latency

Improve Quality of Experience (QoE) and reduce customer complaints

Technique

- Passive Monitoring
- Active Testing
- > KPI Analysis

Tools

- ➢ QoE Engines, DPI
- Drive Tests, Test UEs
- Latency, Throughput
- High buffering ratio during peak hours
- > DNS delays, server path suboptimal
- Backhaul congestion, weak RSRP in clusters

Outcome

- **> Buffering Incidents** ↓ 34%
- **→ Video Startup Time** ↓ 1.2 seconds
- > User Satisfaction ↑ 20+ pts

Lessons Learned

- > MNO OTT collaboration is essential
- ➤ QoE + QoS = full visibility
- > MEC enhances OTT experience
- > Monitor continuously, not occasionally
- > Content localization drives bandwidth constrained areas

Conclusion

- OTT ecosystem complexity requires cross-layer visibility
- Passive and active monitoring are complementary tools
- QoS & QoE assessment must be continuous and dynamic (align with evolving regulatory standards
- Prioritize user-centric metrics that reflect perceived quality, not just technical performance.
- Clear regulatory framework that encourage transparent quality reporting, net neutrality compliance, and OTT-MNO collaboration

THANK YOU