



*“Taking your
Network and Services
to the Next Level”*



Issues and Challenges of a Successful Deployment of Future Networks “Performance & QoS Issues”

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Who are we?



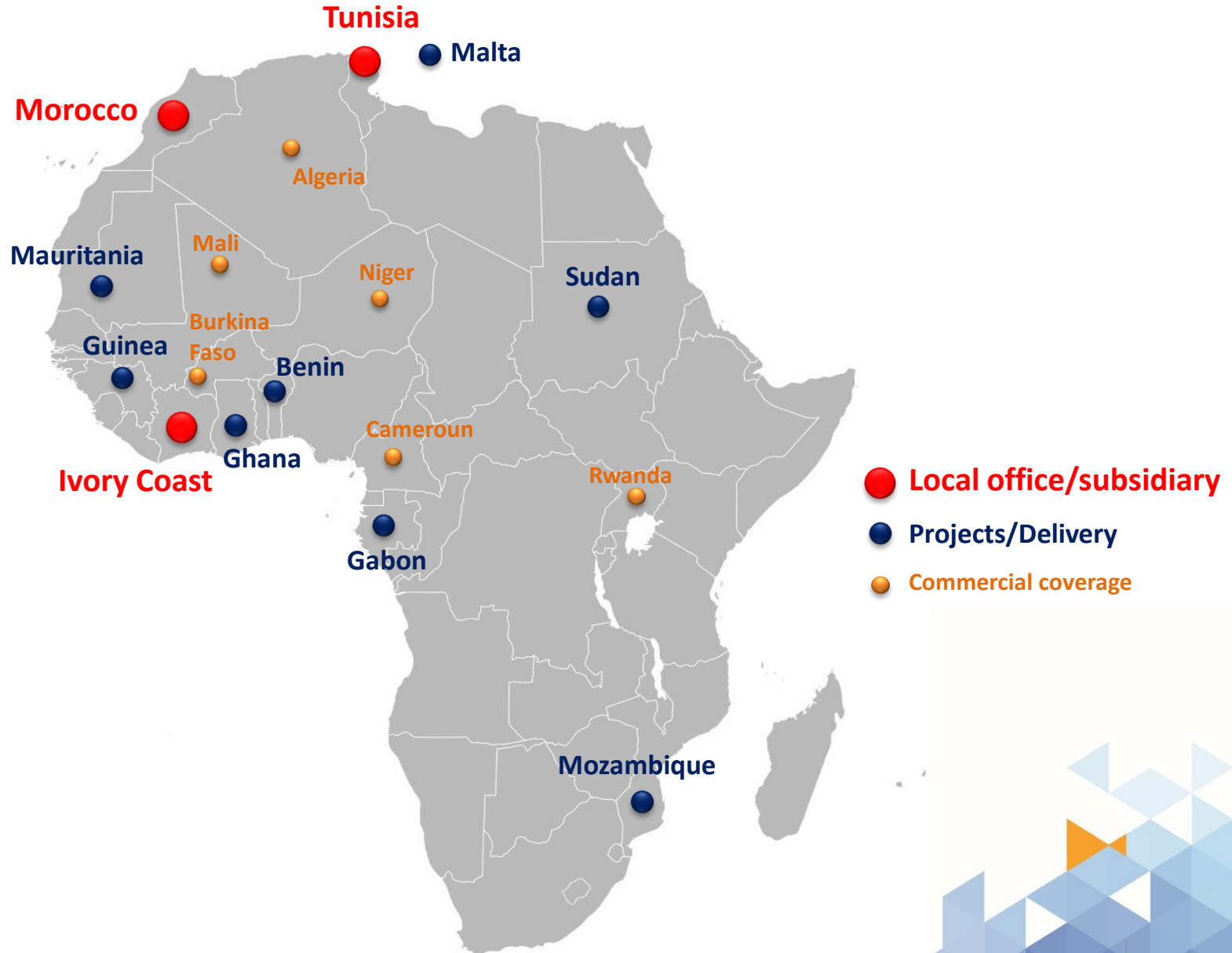
- North African based company specializing in IT and Telecoms consulting, engineering, and value-added services in operation since 2001

- We are specialized in providing solutions and services related to:
 - Architecture, design, planning and project management;
 - Testing services and monitoring of applications, services and systems;
 - Optimization and service improvements;
 - DPI, Traffic Management & Network Synchronisation
 - Deployments, operations and systems maintenance;
 - Software development (web/mobile) and integration services

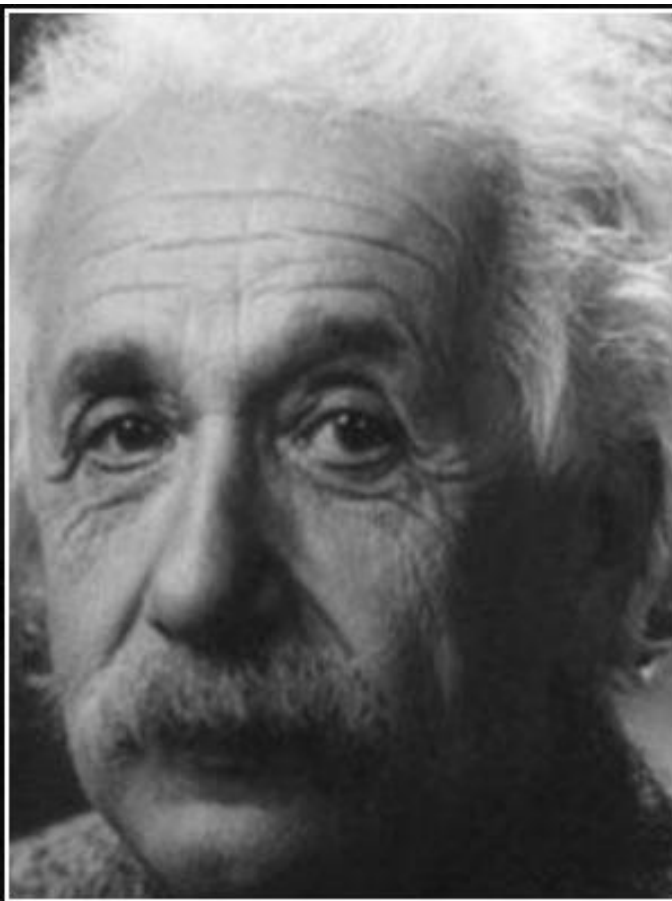
- Active ITU member (SG12: Performance, QoS & QoE)



Market Coverage



Performance and QoS Issues & Challenges in Future Networks



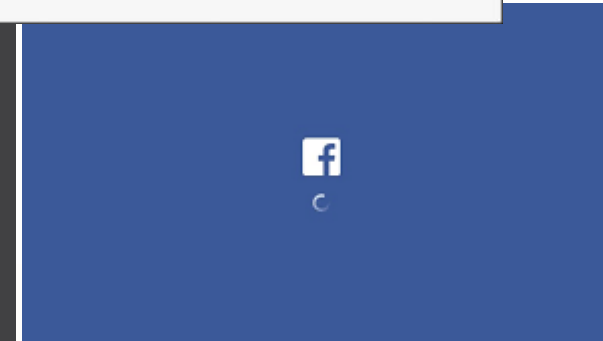
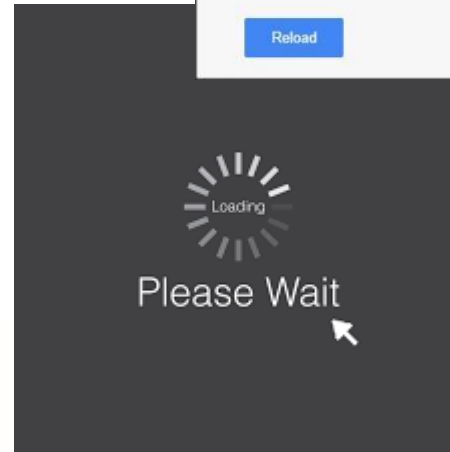
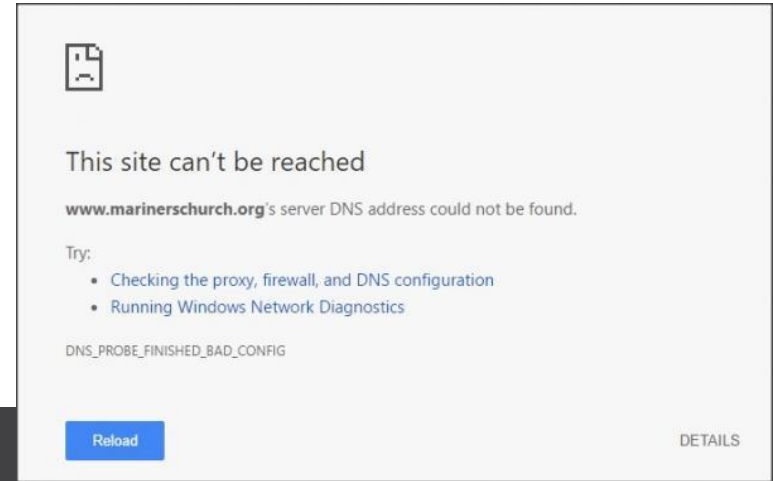
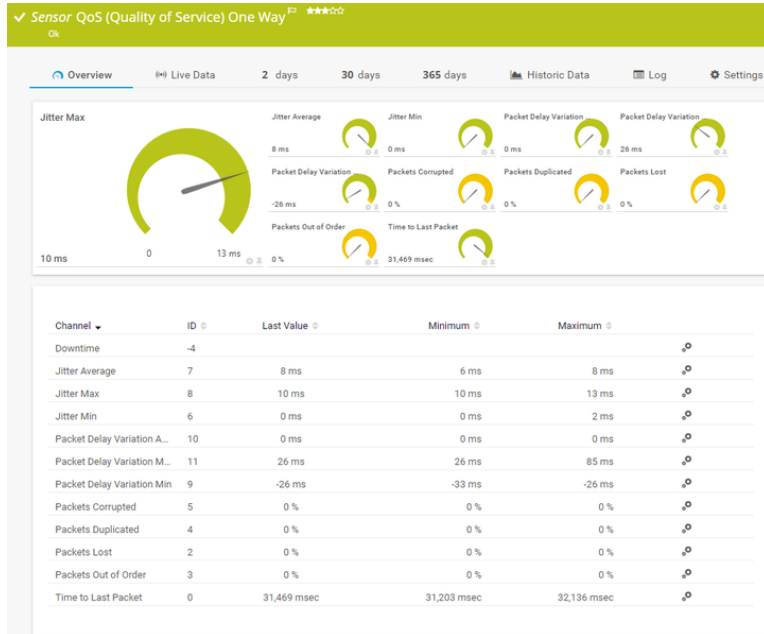
If you want to know the future, look
at the past.

— *Albert Einstein* —

1- QoE is more important than QoS



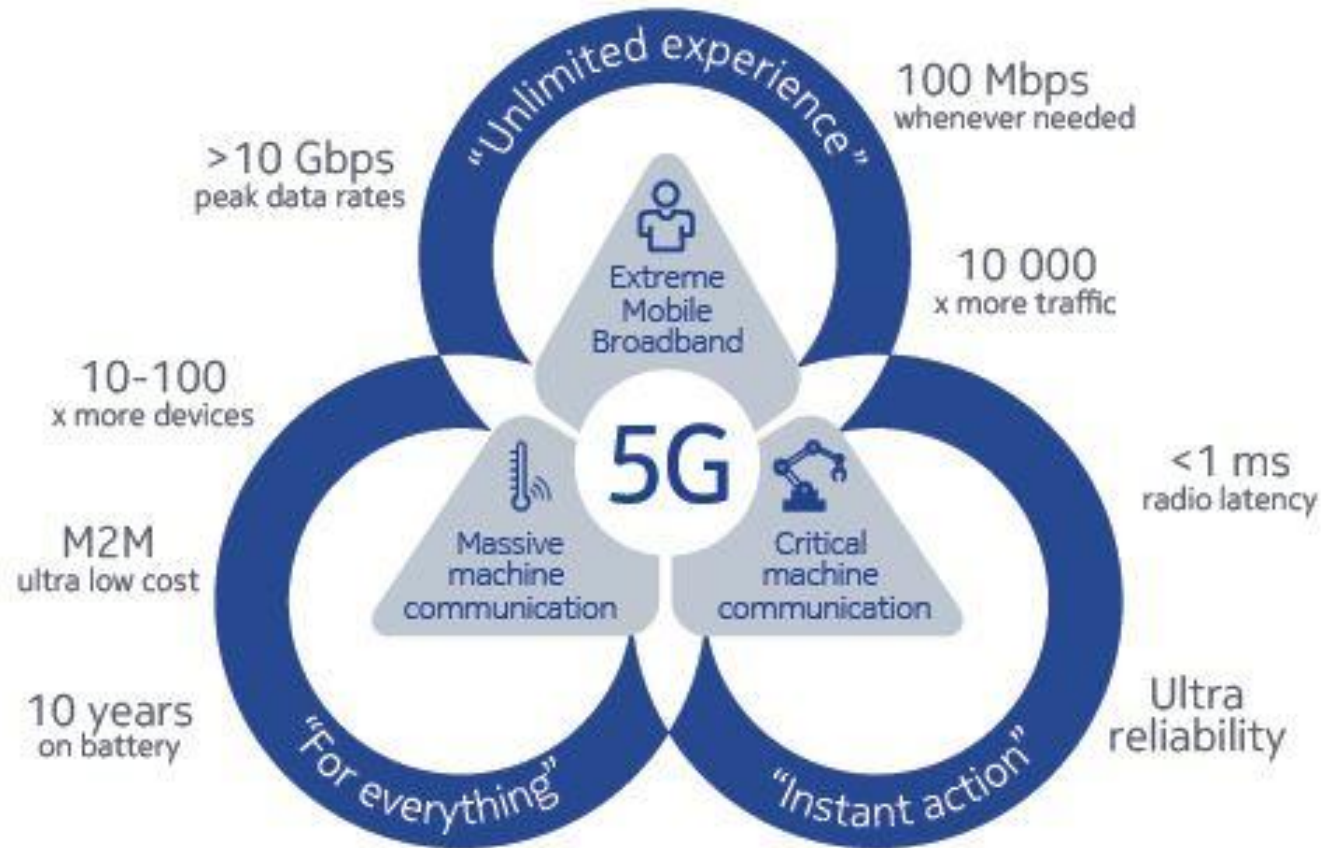
QoS may look good...



.....Meanwhile, the end subscriber is not enjoying his user experience!



2- QoS is about trade-offs



The ultimate trade-off element is: COST!

Source: Nokia

3- *Passive & Active Monitoring will co-exist*



	<i>Active</i>	<i>Passive</i>
<i>Traffic Type</i>	<i>Simulated/Injected</i>	<i>Real</i>
<i>Service Base</i>	<i>Sampling</i>	<i>Full Customer Base</i>
<i>QoE</i>	<i>E2E QoE</i>	<i>Computed QoE</i>
<i>TTD</i>	<i>Proactive</i>	<i>Reactive</i>
<i>RCA - Tracing</i>	<i>Limited</i>	<i>Full</i>
<i>Testing</i>	<i>Continuous</i>	<i>Limited/Not Reproducible</i>
<i>Implementation Cost</i>	<i>Low</i>	<i>High</i>

4- *Other things to Consider*



- Encryption will put additional limitation on passive monitoring
- NFV & SDN implementations will imply: Interaction across additional layers, RCA harder to pin-point, and less overall predictability (cause & effect)
- Inaccessible QoE related APIs (with few exceptions)

Overcoming the performance & QoS challenges in future networks

I NEED YOU TO PUT TOGETHER A FIVE – YEAR TECHNOLOGY PLAN FOR OUR CEO.

SURE.

HOW ABOUT “TOMORROW WILL BE THE SAME AS TODAY, AND NEXT YEAR WILL BE ALL FLYING CARS AND WHATNOT.”

WORD IT UP AND PUT A BOW ON IT.

I’LL ADD A PIE CHART FOR THE SIZZLE.

Dilbert.com DilbertCartoonist@gmail.com

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1- Do what we preach



- Forget about proactive monitoring....It's all about predictive monitoring
 - ▶ Use of Data Science, Big Data, Analytics
 - ▶ Use of AI for passive monitoring

- IoT for active monitoring

- Use of virtualization for probing (both active & passive)

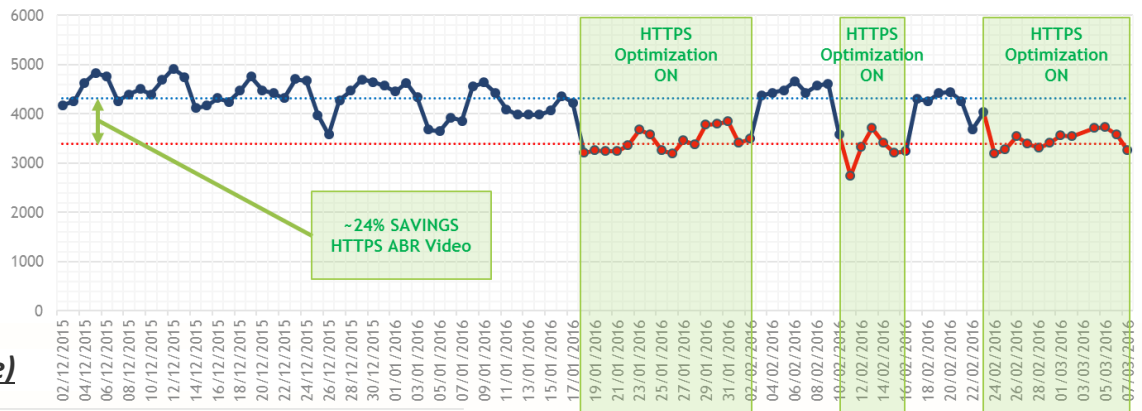
- From NoC to SoC to the new « Customer Operation Center »
 - ▶ Holistic approach to monitor User-Centric Experience
 - ▶ Use « top percentile » threshold for SLAs

2- Deploy Advanced TM Techniques

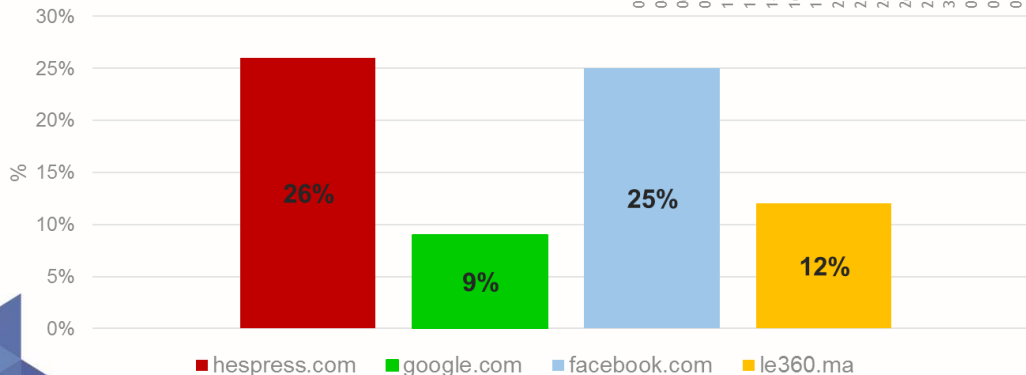


- Dynamic resource allocation with advanced traffic management
- Multi-variable traffic optimization
- QoE driven KPIs (at least for high profile media/content)
- Service differentiation based on the service requirements, category of traffic and should be protocol agnostic

HTTPS Video Optimization



TCP Acceleration (Throughput Increase)



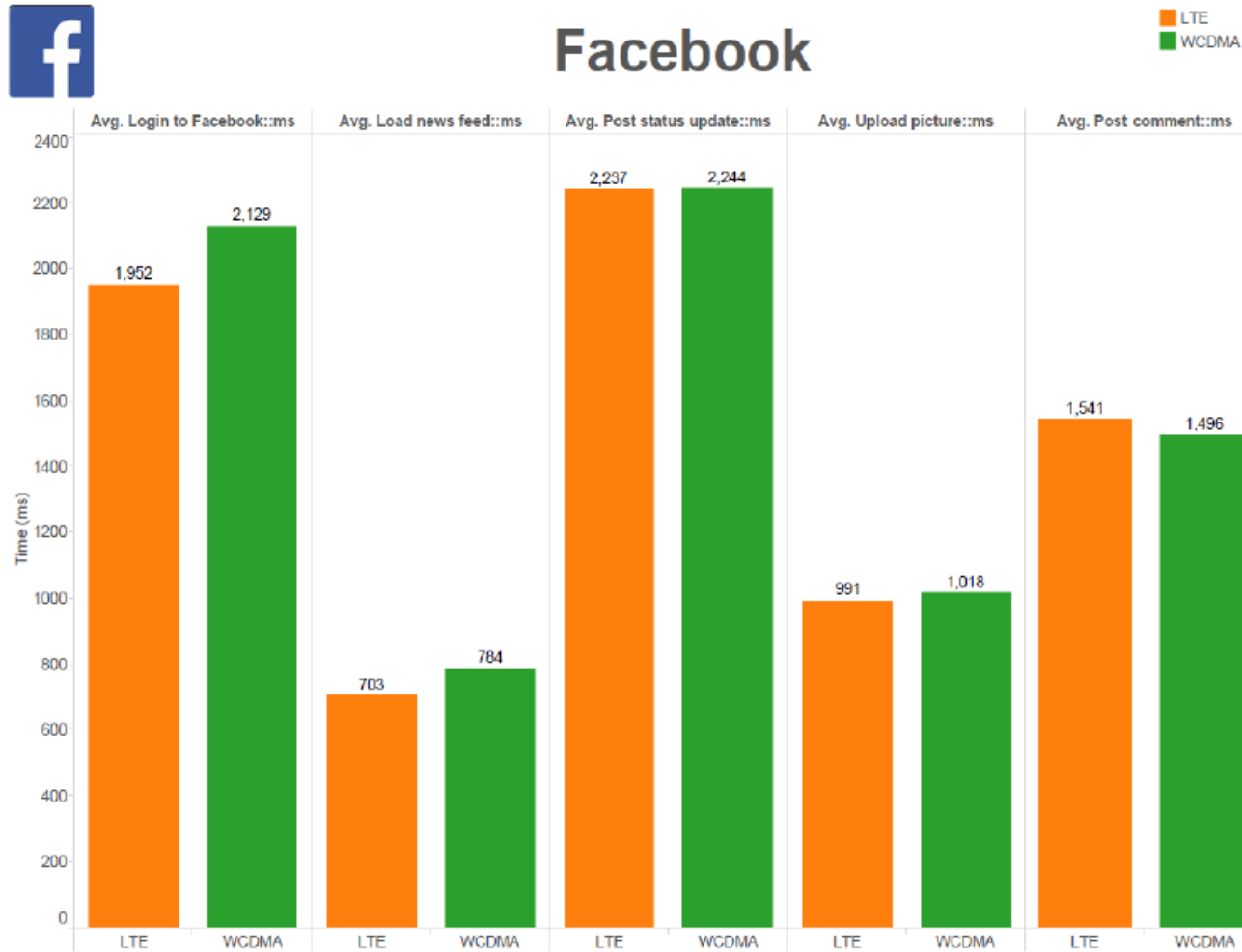
3- Establish a collaborative approach to QoE monitoring & management



- Between the service providers themselves
- Service providers and content enablers/providers
- Service providers & regulators
- Extend beyond QoE: Revenue Assurance, security, push notifications,...

One thing to learn from OTTs: There is no free service!

In Conclusion.....



Our capacity to solve the issues and to surpass the challenges for successful deployment of future networks will be driven by ECONOMICS not technology!



Taking your network and services to the next level®

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