Quality of Service: international experiences

Geneva, 26 November 2018

Elena Scaramuzzi – Cullen International
Quality of Service
Network and non-network criteria

QoS

• Characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service

• Characteristics should be observable and/or measurable

• When the characteristics are defined, they become parameters and are expressed by indicators

Network performance
• packet loss
• latency
• dropped calls

Non-network performance
• provision time
• repair time
• complaints resolution time
Quality of Experience
End user expectations and context

QoE

- Level of quality that customers 'believe' they have experienced
- expressed in terms of degrees of satisfaction and not in technical terms
- assessed by customer surveys and from customer's own comments on levels of service

End-to-end service quality + end user expectations & context
Quality of Service
Regulatory approaches

**QoS: Command and control**
- Parameters and measurements criteria
- Targets set
- Data collection, validation, reporting
- Compliance control, enforcement and sanctioning

**QoE: Consumers empowerment**
- Tools to compare offers
- Speed testing tools
- Coverage maps
- Other apps
- Feedback from users

**Encouragement and transparency**
- Operators set own targets
- Publicise results
- Industry codes of conduct
Europe – key facts

- General framework provided at EU level (US directive and TSM)
- European approach to QoS regulation has been traditionally focused on transparency and end-user empowerment
- For voice telephony, QoS transparency obligations apply to all operators in most EU countries, while QoS targets typically only apply to the designated USO providers
- For internet access service, QoS monitoring is important in the context of net neutrality in order to prevent potential degradation of service
EU regulatory framework – NRA powers
Universal service directive: all providers

USD art. 21(3c)
To oblige undertakings to “inform subscribers of any change to conditions limiting access to and/or use of services and applications”

USD art. 21(3d)
To oblige providers to “provide information on any procedures put in place by the provider to measure and shape traffic as to avoid filling or overfilling a network link, and on how those procedures could impact on service quality”

USD art. 22(1)
To “require providers of publicly available electronic communications networks and/or services to publish comparable, adequate and up-to-date information for end-users on the quality of their services”

USD art. 22(2)
To “specify the QoS parameters to be measured and the content, form and manner of the information to be published, including possible quality certification mechanisms”

USD art. 22(3)
To “set minimum QoS requirements on undertakings providing public communications networks” to prevent the degradation of service and the hindering or slowing down of traffic over networks
To set performance targets for undertakings with universal service obligations

**USD art. 11(1)**

To ensure that designated providers “publish adequate and up-to-date information concerning their performance in the provision of universal service, based on the QoS parameters, definitions and measurement methods”

**USD art. 11(2)**

To specify additional QoS standards, where relevant parameters have been developed, to assess the performance of undertakings in the provision of services to disabled end-users and disabled consumers

**USD art. 11(4)**

To set performance targets for undertakings with universal service obligations

**USD art. 11(5)**

To monitor compliance with these performance targets by designated undertakings
## EU regulatory framework – NRA powers

### TSM regulation: Internet access service providers


<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4(1a)</td>
<td>Information on how <strong>traffic management measures</strong> applied by a provider could impact on the quality of the internet access services, on the privacy of end-users and on the protection of their personal data</td>
</tr>
<tr>
<td>4(1b)</td>
<td>An explanation as to how any <strong>volume limitation, speed and other QoS parameters</strong> may in practice have an impact on internet access services, and in particular on the use of content, applications and services</td>
</tr>
<tr>
<td>4(1d)</td>
<td>An explanation of the <strong>minimum, normally available, maximum and advertised download and upload speed</strong> of the IAS in the case of fixed networks, or of the <strong>estimated maximum and advertised download and upload speed</strong> of the IAS in the case of mobile networks</td>
</tr>
<tr>
<td>4(1e)</td>
<td>An explanation of the <strong>remedies</strong> available to the consumer in accordance with national law in the event of any continuous or regularly recurring QoS discrepancy</td>
</tr>
</tbody>
</table>
Voice telephony
Fixed and mobile

- **Transparency obligations in 20 EU member states**
- **In 6 of them they only apply to the designated USO provider**

- **Targets** in 15 EU member states, but 10 of them only on designated USO providers
Some operators are required to publish their QoS performance against targets

- **France**: fixed ISPs >100,000 users. Measurements audited and published by ARCEP. New tools under development. Mobile: obligations in licences.

- **Germany**: Transparency ordinance. BNetzA measurement website

- **Italy**: Only fixed: speed, latency and packet loss. Measurements by ISPs, results to AGCOM

- **Spain**: For USO provider specific target ser (at least 1 Mbps for 95% of connections)
France - transparency
Publication of annual results for mobile

Pour la première fois les données brutes de l'ensemble des tests sont disponibles en open data afin que chacun puisse s'approprier et retravailler les données qui l'intéressent. Suivre ce lien : www.data.gouv.fr/fr/datasets/monreseaumobile

Source: ARCEP
Quality of experience
Surveys and new tools

Surveys and online tools both available in only four of the ten studied countries
(Cullen international)
Download Nemesys

Il software Nemesys è il programma ufficiale del progetto Misurainternet dell’Autorità per le Garanzie nelle Comunicazioni (AGCOM). Nemesys è un software ufficiale, certificato, che misura della qualità della connessione ad Internet da postazione fissa. Il software è disponibile per tutti i principali sistemi operativi di PC.

Certified measurements, per operator

End-user may download software

If download speed is below the one in contract, may recede from contract within 30 days

Publication of results, statistical database

Source: AGCOM
HAKOMetar Plus – a mobile application for measuring speed and quality of Internet access in mobile and WLAN networks

- Support for iOS and Android mobile devices; IPv4 / IPv6
- Based on publicly available open code, commercial use prohibited
- Results of measurements cannot be used in the process of resolving complaints
- A summary map provides information on coverage and speeds based on cumulative measurements

Source: HAKOM
Americas – key facts

- Strong differences in QoS approach between North America and the rest of the region.
- US and Canada mainly rely on transparency measures.
- In Latin America QoS regulation has been traditionally focused on a strict command-and-control approach, with targets, and sanctioning in case of non-compliance.
- More recently, increasing introduction of transparency and end-user empowerment mechanisms and tools.
## QoS in the Americas
Fixed and mobile telephony

<table>
<thead>
<tr>
<th>Country</th>
<th>Targets set?</th>
<th>Imposed on all operators?</th>
<th>Measurement audited</th>
<th>Obligation to publish?</th>
<th>Specific penalties?</th>
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</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Brazil</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Canada (only fixed)</td>
<td>✔</td>
<td>✔</td>
<td>( &gt;50k )</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Chile</td>
<td>✔</td>
<td>✔</td>
<td>( no small cities )</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Colombia</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Costa Rica</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Ecuador</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Mexico (only mobile)</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
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<td>✔</td>
<td>✔</td>
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<td>Peru</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
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<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
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</tr>
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# QoS in the Americas

## Broadband – fixed and mobile

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<tr>
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<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Colombia</td>
<td>✓</td>
<td>✓ (no small cities)</td>
<td>✓</td>
<td>✓</td>
<td>✓ (autom. comp.)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ecuador</td>
<td>✓ (non-network)</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>✗</td>
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<td>✗</td>
<td>✗</td>
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</tr>
<tr>
<td>Country</td>
<td>Download speed</td>
<td>Upload speed</td>
<td>Packet loss</td>
<td>Latency</td>
<td></td>
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<tr>
<td>--------------</td>
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</tbody>
</table>
Compliance control
Brazil

14 indicators

Banda Larga Fixa (SCM)
Cumprimento de Metas (jan-jun/2018)

50% 70%
68.5%
0% 90% 100%

16 indicators

Telefonia Fixa (STFC)
Cumprimento de Metas (jan-jun/2018)

50% 70%
75.0%
0% 90% 100%

10 indicators

Telefonia Móvel (SMP)
Cumprimento de Metas (jan-jun/2018)

50% 70%
71.5%
0% 90% 100%

TV por Assinatura (STVA)
Cumprimento de Metas (jan-jun/2018)

50% 70%
90.3%
0% 90% 100%
Entidade aferidora da Qualidade (EAQ) is an external entity selected and funded by providers, to implement the measurements and certify them to Anatel on a regular basis.

<table>
<thead>
<tr>
<th>Date</th>
<th>Guaranteed average (download and upload) speed target versus maximum speed in end user contract</th>
<th>Guaranteed instant (download and upload) speed versus maximum instant speed in end user contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 1, 2012</td>
<td>60%</td>
<td>20%</td>
</tr>
<tr>
<td>Nov. 1, 2013</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>Nov. 1, 2014</td>
<td>80%</td>
<td>40%</td>
</tr>
</tbody>
</table>
Tools
Brazil - Anatel

Access to voice network
User Experience
Quality and amount of antennas
Voice and data ranking
Guaranteed speeds Peru and Costa Rica

- **Peru**: since 2014, fixed and mobile broadband providers can only sell service plans which guarantee at least 40% of the maximum (download) speed indicated in end users’ contracts. All internet plans launched before that date had to comply with the new rules by March 31, 2015.

- **Costa Rica**: since 2017, operators must provide their customers a minimum percentage of advertised download speed for mobile data services.

<table>
<thead>
<tr>
<th>Key performance indicator (KPI)</th>
<th>June 2018</th>
<th>June 2019</th>
<th>June 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QoS for data services (download speed)</th>
<th>June 2018</th>
<th>June 2019</th>
<th>June 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G</td>
<td>At least 40% of advertised speed</td>
<td>At least 50% of advertised speed</td>
<td>At least 60% of advertised speed</td>
</tr>
<tr>
<td>4G</td>
<td>At least 50% of advertised speed</td>
<td>At least 60% of advertised speed</td>
<td>At least 70% of advertised speed</td>
</tr>
</tbody>
</table>
IFT consulted until 19 February 2018 on the minimum speed to be mandated on all broadband service providers. The regulator proposes **minimum download and upload broadband speeds** to be implemented in accordance with a three-year schedule, until 2020.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mobile broadband speed (Mbps)</th>
<th>Fixed broadband speed (Mbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upload</td>
<td>Download</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2019</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>2020</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

In this case IFT is proposing minimum speeds to be offered broadband services, and not to a percentage of the advertised speed.
Tools

Mexico - IFT

Your tools

- Guaranteed coverage maps
- Rates' comparison tool
- Certified terminal equipment
- Mobile service quality
- Accessible mobile equipment
- Registered consumer contracts
- Tracker of number portability requests
- IMEI consultation
- Data consumption simulator
Operators in MENA are generally obliged to perform **QoS measurements** on **KPIs** identified by regulators, and to **report** on them on a regular basis (regulation or in licence).

Some regulators in the region recently revised their QoS regulatory frameworks, to introduce stronger **enforcement mechanisms**, improve **transparency**, with the publication of QoS measurement reports and consumer surveys.

**New tools** to empower consumers have started appearing in the region.
Kingdom of Bahrein

TRA revised its 2008 QoS regulation. The new rules include, amongst others:

- New provisions on network outages
- More precise criteria TRA may follow to set binding targets on operators
- New provisions on enforcement, incl. sanctions
- A review of KPIs (now fewer, but more relevant and more precisely defined)

Quality of Service Regulation

A Regulation issued by the
Telecommunications Regulatory Authority of the
Kingdom of Bahrain

Resolution No. (11) of 2018

Date: 16 Aug 2018
Saudi Arabia
Revised QoS rules (April 2018)

Revising rules of 2009, among the key changes, the obligation to publish geographical coverage maps for both mobile and fixed services.
Tunisia
INT “Grand Publique” app

INT, launched a mobile application that enables consumers to measure:
• connection speed (ping, download and upload speeds)
• internet browsing speed (loading time of websites); and
• video streaming speed for different video quality settings.
The app also provides an interactive map to compare service providers performance in a given location.
Conclusion: how to ensure QoS?
There is no magic formula. It much
Depends on national circumstances

Price-quality trade-off

In the absence of competition…

Helping to achieve fair competition…

Helping to make informed choices…
THANK YOU!

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