Meaningful Quality, beyond Meaningful Connectivity

Industry viewpoints on approaches, best practices and challenges experienced in evaluating connectivity status

ITU Workshop
"Trends on QoS and Connectivity Assessment and Evaluation from the user's perspective"

México City,
18-19 September 2023

MedUX

Content

1. From basic connectivity to societal development
2. How to measure Meaningful (Mobile) Connectivity
3. International Use Cases evaluating Connectivity

From basic connectivity to societal development

From basic connectivity to societal development

MedUX's ideas contributing to the concept of "meaningful connectivity" and the applicable analytical framework

Moving up the Maslow's Pyramid

- **Basic Connectivity**: any internet connection, phone conversations and text messaging.
- **Functional Connectivity**: stable internet, transmitting pictures and accessing basic information online.
- **Meaningful Connectivity**: social media, video calls or accessing rich media online.
- **+Meaningful Quality:** high-quality, satisfying and productive experiences online.
- **+Impactful Connectivity**: use of connectivity to achieve societal development while closing the digital divide

What are the concerns around connectivity?

MedUX's ideas contributing to the concept of "meaningful connectivity" and the applicable analytical framework

Some challenges to cope with when measuring quality of connectivity

- Information asymmetry
- Customer experience complaints
- Lack of coverage
- Service availability
- Service degradations
- Outages or disruptions
- False advertising and claims
- Slower-than-promised speeds
- Compliance with license obligations
- Compliance of contractual agreements
- ...

What else?

Evaluating Connectivity Status:

The Four Pillars of Meaningful Connectivity:

- **Universal Access:** Connectivity must be ubiquitous, leaving no one behind from a geographical perspective.
- **Affordability:** Services pricing must be affordable, leaving no one behind from a socio-economic perspective.
- **Usability:** Technology must be user-friendly and equipped with proper devices and plans (no usage restriction).
- **Quality:** Quality metrics to drive meaningful experiences online, extending beyond traditional QoS parameters.

Quality of Experience Everywhere

"Universal access to reliable services and enriching, satisfying, and productive Online experiences"

Measuring Meaningful (Mobile) Connectivity

Measuring Meaningful Connectivity | Massive field-data monitoring

Crowdsourcing

Massive measurements from **end user perspective** using real consumer devices are essential to understand **network connectivity status** and detect network issues at large geographical levels, and therefore very useful for **improving QoS** and **enhancing QoE** nationwide.

Regulators

Provides high-level connectivity information and basic KPIs comparison at different geographical levels depending on the crowdsourcing approach and data quality. It enables benchmarking, user empowerment and persuasive regulatory use cases.

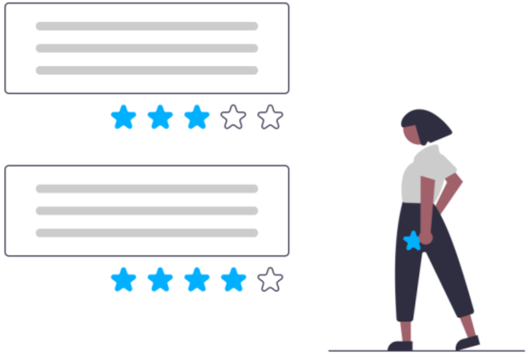
Operators

Enables a good understanding of network performance and different use cases such as benchmarking, and basic planning and optimisation, based on network coverage and performance KPIs.

Measuring Meaningful Connectivity | Grand scale monitoring

Robots

Emulating end-user's behaviour with dedicated active testing devices is crucial to provide **reliable QoS and QoE** measurements with **in-depth information.** It allows to compare, diagnose and troubleshoot network coverage and quality issues in specific locations in real-time.



Regulators

Provides detailed connectivity information and QoE KPIs comparison at different geographical levels depending on the deployment size. It enables benchmarking, service compliance and punitive regulatory use cases.

Operators

Enables a detailed understanding of network performance and different use cases such as benchmarking, and advanced planning, optimization and trouble-shooting, based on coverage, performance, service degradation and lower-layer KPIs.

International use cases evaluating Connectivity

Massive field-data monitoring

for

CSPs and Regulators

Crowdsourcing

CRC Colombia – Embedded SDK

Customer Use case

CRC Colombia

MedUX SDK & Crowdsourcing

EXPLORE OUR PRODUCTS

Massive Quality Measurement System

- Collection, storage, and processing of **very large amounts of data**.
- **Unattended SDK** system providing near real-time and historical end-to-end results.
- A Crowdsourcing solution as a methodology for evaluating mobile service quality.
- SDK embedded into **end-user apps**.
- Quarterly delivery of granular **regulatory reports**.

Project Scope

- Field measurements collected from the operator's end-user applications to:
  - ✓ Elaborate **statistical service performance analysis**.
  - ✓ Benchmark service quality among **mobile network operators**.
  - ✓ Understand service **trends and evolution.**
- More than **15 million speed tests** per month covering **982 municipalities**.
- More than **4 million unique devices** reporting.
- Evaluation of **2G, 3G and 4G** technologies.

Customer Use case

CRC Colombia

Customer needs

CRC and main mobile network operators (Movistar, Claro, Tigo, WOM) need to understand the Quality of Service of mobile networks in Colombia throughout over the entire country.

- Understanding market trends and empowering the end-user (rational consumer)
- Addressing the informational needs for mobile quality measurements to facilitate continuous network improvement.
- Enabling punitive processes if minimum quality thresholds are not met.

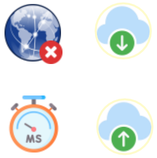
MedUX Solution

MedUX has massively deployed an SDK solution embedded into the customer care apps of major mobile network operators, thanks to the collaboration of million of users in Colombia.

The SDK collects the necessary information for operators to meet performance requirements, including specific regulation on data granularity (geographical levels) and minimum number of samples .

The following QoS/QoE testing functionalities are part of the solution:

- ✓ Service availability
- ✓ Latency, jitter, PL
- ✓ Speed tests DL/UL



The use cases.

Mobile

Fixed

Grand scale QoE monitoring

for

CSPs and Regulators

Robots

MINECO Spain – Light Drive Testing Robots

Customer Use case

MINECO Spain

MedUX Mobile EXPLORE OUR PRODUCTS

Grand-Scale Quality Measurement System

- Collection, storage, and processing of **large amounts of data**.
- **Unattended active testing robots** distributed in vehicles.
- Testing probes solution as a methodology for evaluating mobile service quality.
- Specialized and dedicated Android devices (commercial phones) for intensive testing.
- Benchmarking report focused on rural areas.

GOBIERNO DE ESPAÑA

Project Scope

- Field measurements conducted along **small villages and their access roads**, with the following objectives:
  - ✓ Perform statistical analysis.
  - ✓ Benchmark true service quality and experience.
  - ✓ Correlate results with consumers' complaints.
- **20k tests** and **52k radio** measurements covering a total of **400 municipalities**.
- Real internet services measured in **rural areas**.
- Evaluation of **2G, 3G and 4G** technologies.

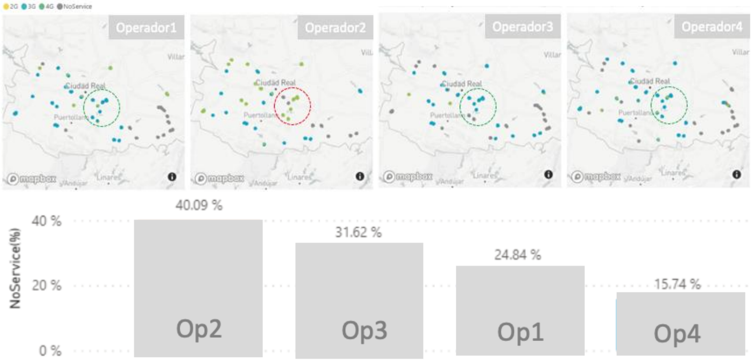
Customer Use case

Mineco Spain

Customer needs

MINECO needs to assess the user experience and network performance of main mobile operators in specific small villages.

- Gaining insights into real services experience.
- Leveraging results to make informed regulatory decisions.



MedUX Solution

MedUX covered more than 2.000 kms with plug-and-play robots deployed in vehicles to measure mobile network performance in rural areas. These measurements were conducted in predetermined villages that typically experience poor connectivity.

The following QoS/QoE testing functionalities are part of the solution:

- ✓Service availability
- ✓Latency, jitter
- ✓HTTP transfers
- ✓Voice Tests
- ✓Web Brrowsing
- ✓Streaming
- ✓Whatsapp

Takeaways from our viewpoints on evaluating connectivity status

The importance of quality for a meaningful connectivity

Defining quality as a pivotal element to transform basic connectivity into an impactful tool for long-term societal development.

Traditional measurement methods are great but not enough

Using advanced active testing tools such as robots, stand-alone APPs and embeded SDK are needed to get where other tools cannot.

The need of a mix of tools to evaluate connectivity status

Choosing the set of tools to find the proper balance between footprint, accuracy and analysis depth, while enabling persuasive and punitive regulatory models.

Going one step beyond

Enabling policy and regulatory environments to expand Internet access and Quality of Experience (QoE) everywhere while closing the digital divide.

QoE Everywhere in the Digital Era

Gracias

Thank you

Rafael González
CMO
rafa@medux.com
www.medux.com

BACK-UP

About MedUX


The internet Quality of Experience testing and monitoring company.
QoE Everywhere in the digital Era.

Why MedUX

With MedUX, you get a unique ecosystem that provides a one-stop-shop QoE suite for all your needs.

We integrate robots and agents, our full-stack technology and advanced analytics to deliver comprehensive multi-play testing and grand scale monitoring.

Our solutions

1	2	3	4
5G	Regulatory compliance	Grand scale QoE monitoring	In-Home performance
Benchmarking	Anomaly Detection	Massive field-data monitoring	CPE performance
Wholesale control			

Our clients

Communication service Providers

Telecom Regulators

Digital Enterprise

Multiplatform QoE Suite

Mobile & Home Robots

Mobile network monitoring and In-Home QoE measurements from real end-user perspective.

Agent App

Available on iOS, Android and Harmony; supports various QoE measurements.

SDK & Crowdsourcing

QoE insights from real world end users. Collects information on the mobile network.

Advanced Analytics

Offers Agile tools for monitoring network services and discovering insights in real time.

QoE Revolution.

Since 2014, MedUX has been revolutionizing networks and services testing from the **customer perspective**. Our figures have not stopped growing.

16.500
Robots

Active testing devices all over the world.

+20 Billion
Samples

Analyzed in real time, without integration and 100% operated by us.

+500M
People

Covered by MedUX deployments.

+3M
Agents

SDK Agents and APPs collecting insights from any device.

Why MedUX?

Global Trusted Partner.

+ 25 Countries

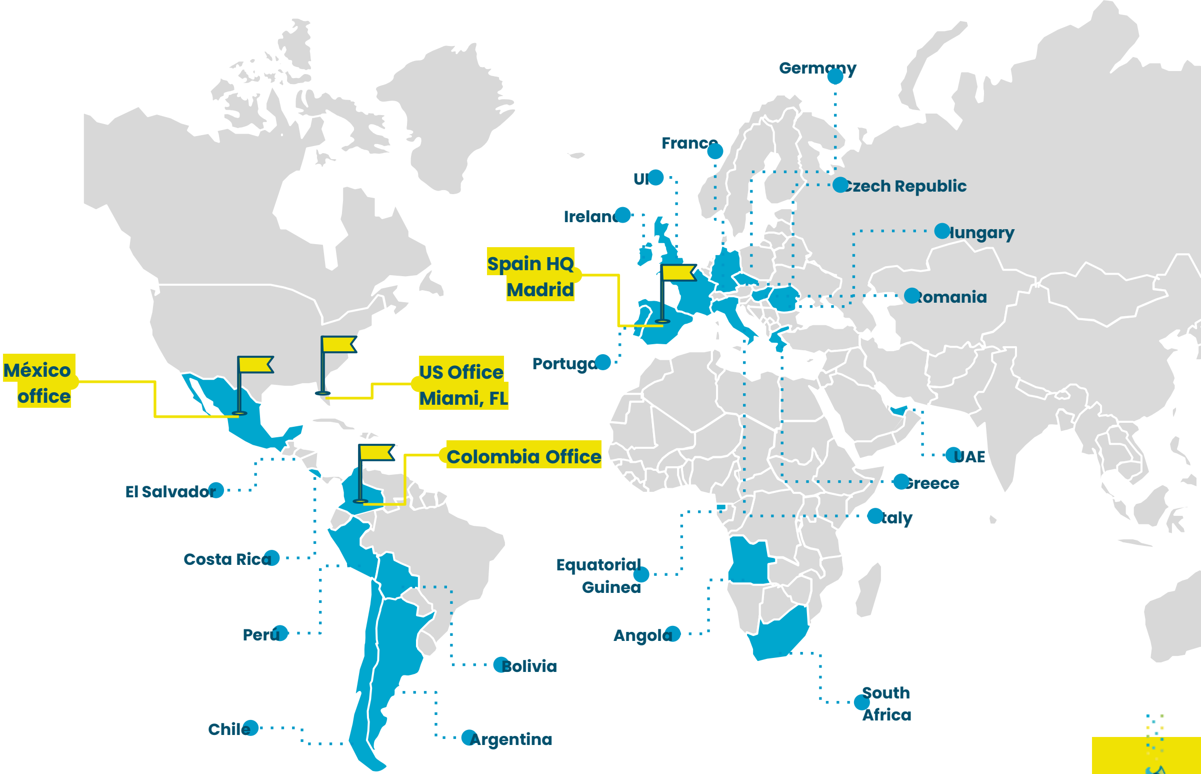
International presence.

Global presence.

Centers of excellence throughout the world.

Projects

Offices



Why MedUX?

Success stories.

Global TELCOs

Governments

Other Carriers

Massive field-data monitoring

for

CSP

Testing everything, with real-field information from everywhere

Challenges persist in Telco industry due to poor network quality and limited visibility of user experience.
In the Digital era, understanding performance from the user's perspective is essential

The use cases.

Massive field-data monitoring | CSP

Our Massive Field Data Monitoring solution, leveraging Applications, SDK and crowdsourcing, enables a wealth of insights to optimize network performance, enhance customer satisfaction, and stay ahead in the digital era.

With MedUX, MNOs and regulators can unlock network performance field-data gathered directly from end-users, provide utilities to verify internet service compliance, promote customer experience improvements, and contrast regulatory KPIs at different geographical levels.

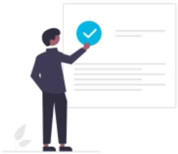
Massive field-data monitoring | CSP

Massive Coverage Analysis

- Coverage hole detection
- New cell sites tracking
- Spectrum usage
- Before/after network changes

Used Technology Analysis

- Device comparison
- Access technology capacity
- Wholesale performance



Regulation compliance

- Fixed and Mobile Network monitoring and auditing.
- End user focused tools.

Network insights

- Network optimization
- Benchmarking
- Network Planning
- Customer care

Mobile

Fixed

Grand scale QoE monitoring

for

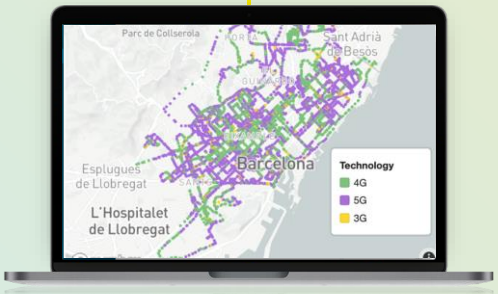
CSP

Technical indicators converted in QoE metrics measured from a customer perspective.

High speed connections and the new digital experiences demand true OTT visibility and a cost- effective data collection and probes deployment strategy. MedUX offers Technical indicators converted in Quality metrics measured from a customer perspective.

The use cases.

Grand scale QoE monitoring | CSP



MedUX's Grand Scale Quality monitoring solution enables operators to **gain valuable insights into users' everyday internet habits**, whether at home or on the go.

With MedUX, operators can investigate faults and degradations of real applications and services, leveraging deep-dive analysis of technical network parameters. Uncover actionable intelligence with MedUX and optimize your network performance.

The use cases

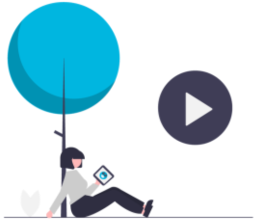
Grand scale QoE monitoring | CSP

Wide Network Monitoring

- Benchmark campaigns.
- Troubleshooting analysis.
- Optimization strategies.
- Regulatory tests.

Technology and Spectrum Analysis

- Environmental data.
- Transport layer information.
- Network layer information.



OTT and digital services Insights

- Cloud services.
- Streaming platforms.
- Social Networks.
- Messaging apps.

Gracias

Jaime González

Product Manager

jaime@medux.com

Rafael González

CMO

rafa@medux.com