



Quality of Service and Quality of Experience Regulation

Telecommunication Development Bureau (BDT)





QoS and QoE

- **QoS and QoE is important for both customers (individuals and businesses) and service providers**
- **Quality of service and quality of experience measuring is becoming more and more complex**
- **NRA needs to keep pace with technology, market and business innovations to ensure reasonable QoS**
- **QoS and QoE provisioning should be monitored as well as encouraged and enforced when needed**



QoS Regulation Manual

A one stop shop reference manual for regulators and market players

- ▶ QoS Trends
- ▶ QoS framework from a technical perspective, drawing from the work done by ITU-T on QoS standardization (ITU-T Study Group 12)
- ▶ QoS regulatory framework and the role of National Regulatory Authorities (NRAs) in addressing QoS
- ▶ Traffic management
- ▶ QoS parameters and Key Performance Indicators (KPIs)
- ▶ Broadband QoS measurement, examining different measurement tools and platforms.
- ▶ The economic principles for QoS regulation
- ▶ Network neutrality and its regulation worldwide
- ▶ Consumer protection and privacy aspects
- ▶ QoS enforcement (country cases)
- ▶ Conclusion
- ▶ (Annexes)

QoS and QoE Regulation

Main activities in QoS regulation:

- Defining parameters
- Setting targets
- Making measurements
- Auditing measurements
- Publishing measurements
- Ensuring compliance/Enforcement

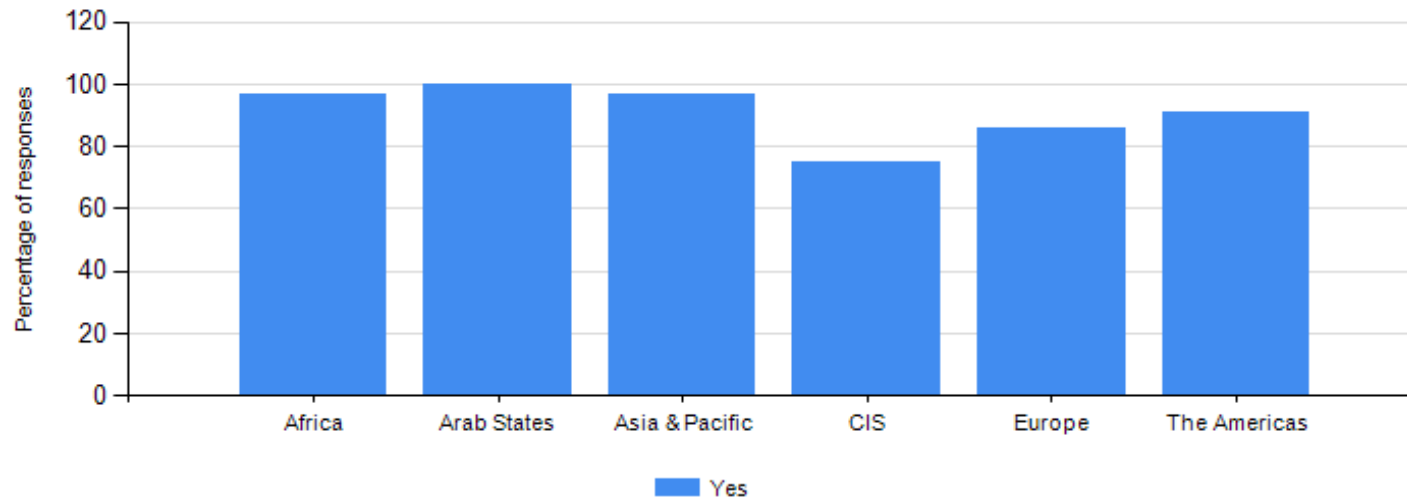


QoS Objectives

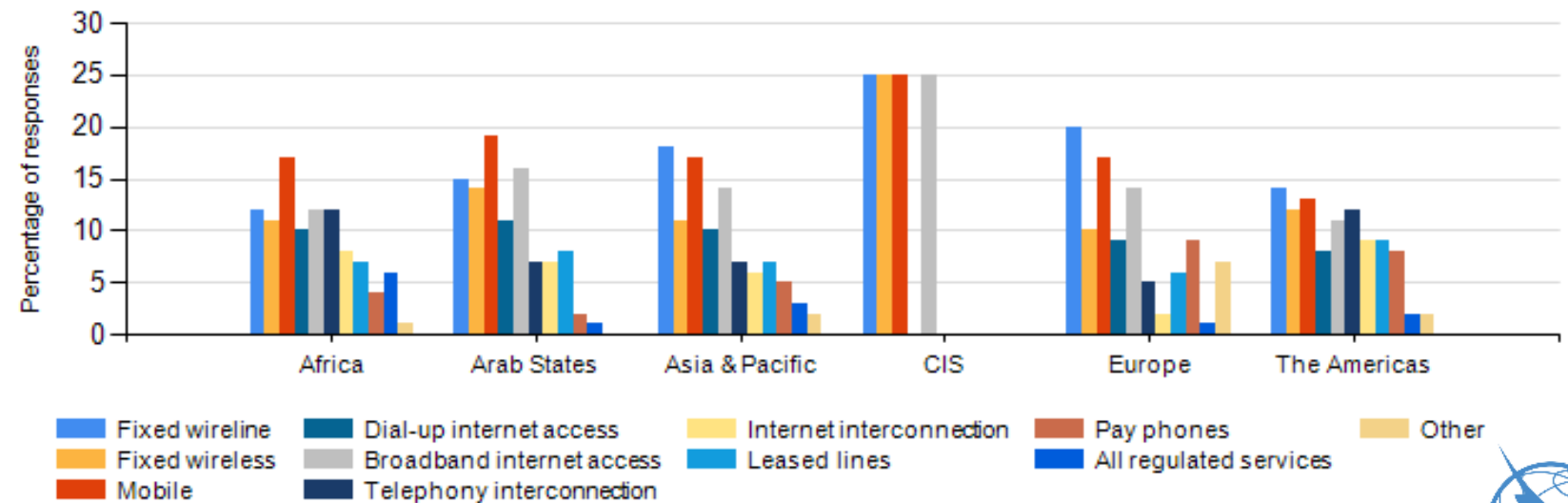
- To maintain a basic **minimum level of quality**
- To use **competition**
- To **improve quality**
- To promote **consumer choice over quality vs price**
- To ensure **quality choices are available for all groups** of consumers

Is QoS monitoring required? Which services are subject to QoS monitoring?

Quality of service monitoring required, 2016



Services subject to quality of service monitoring, 2016

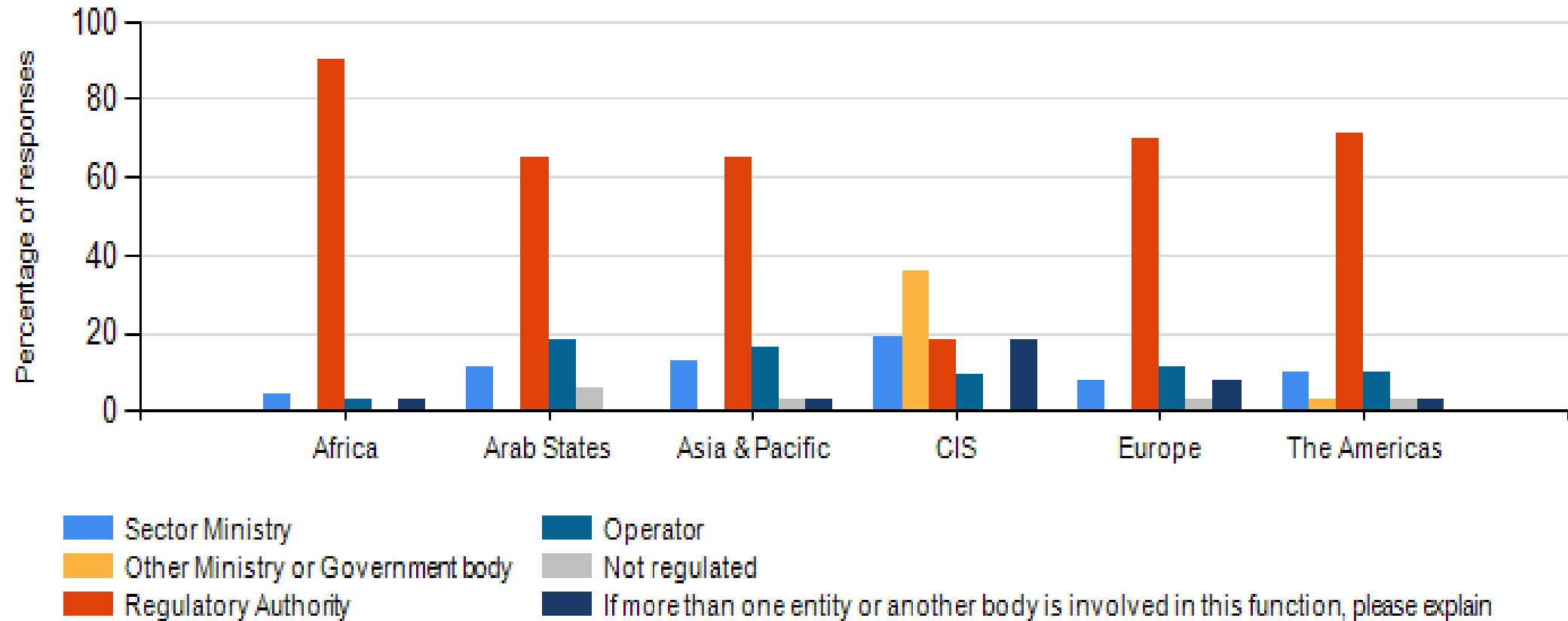


(Note: total country responses: 145. Source: ITU Telecommunications/ICT Regulatory Database)



Who's in charge of QoS monitoring?

Entity in charge of service quality monitoring, 2016



(Note: total country responses: 140. Source: ITU Telecommunications/ICT Regulatory Database)

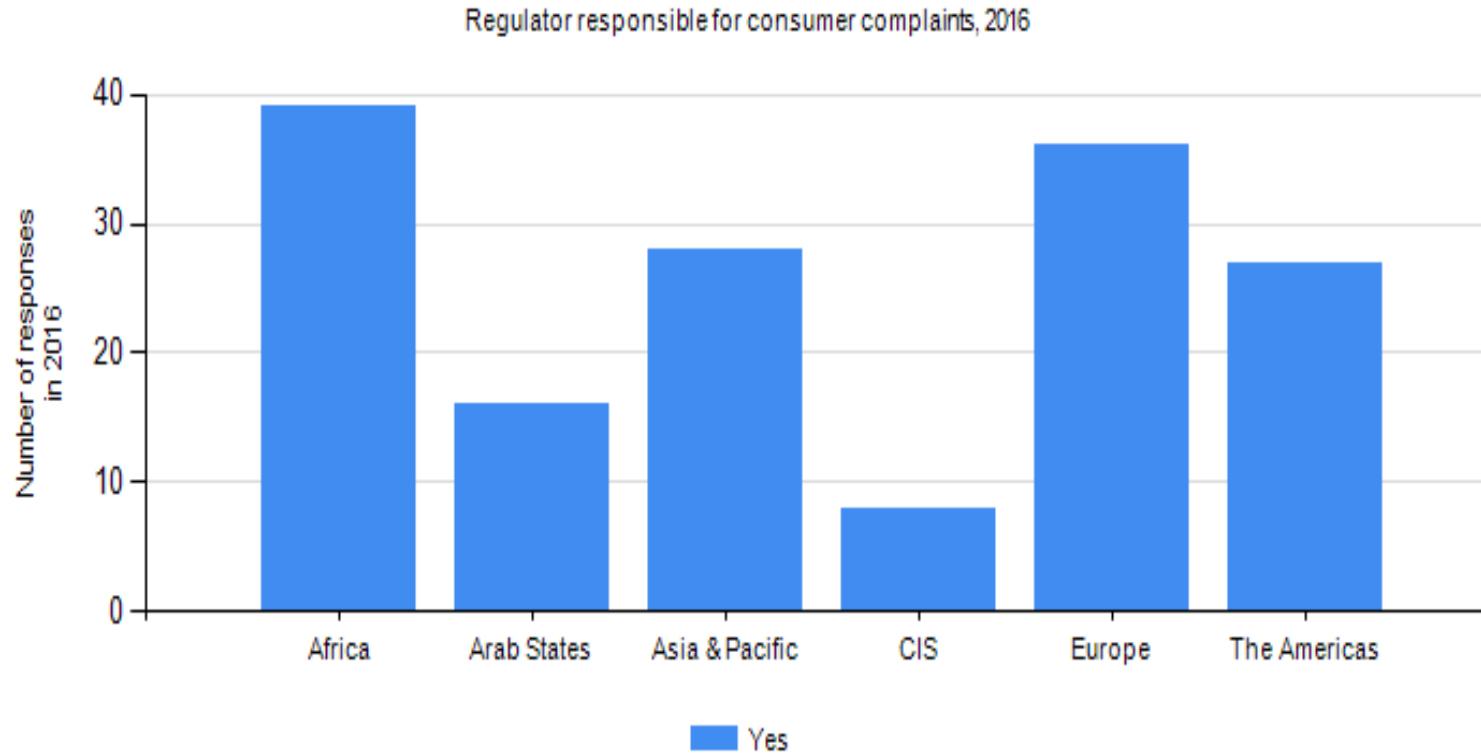


The role of NRAs

- Impose special **obligations on operators** of publicly available services
- Keep an **updated database of prices, conditions of access and use** (including limitations), and the **quality of public communications networks** and services (including voice, messaging, TV, data services, etc.) and make it publicly available on its website.
- **Monitor, measure** and **ensure** that networks are **professionally designed** and of a **satisfactory quality**, and that they provide the desired **QoS** for different services offered
- Ensure and enforce the **quality** of the **communication services** and **Internet access** service. Set **minimum QoS requirements**
- Ensure and enforce the **quality of QoS-enabled services** (e.g. carrier grade VoIP, IPTV, business services, etc.)



QoS and consumer protection



Source: ITU Telecommunications/ICT Regulatory Database)

Quality of service is **important for consumers** and is part of **consumer protection** regulation. The **customer/user** should have access to QoS information in a clear, transparent, publicly available and appropriate manner.



Quality of Service Regulation



- **QoS Regulation** is part of **consumer protection**
- Main **purposes of QoS regulation** are [ITU-T Supp. 9 of E.800 Series]:
 - Helping **customers be aware of the Quality of service provided** by Telecom Operators/ ISPs through networks (mobile & fixed), so that to **make their own choices**
 - **Checking claims** by operators
 - Understanding the **state of the market**
 - Maintaining / improving the **QoS** in **presence of competition**
 - Maintaining / improving the **QoS** in **absence of competition**
 - Helping operators to achieve **fair competition**; and
 - Making **interconnected networks work** well together





Consumer Protection and QoS

GSR-14 Best practice guidelines on consumer protection in a digital world

Quality of service and consumer experience: A series of measures can be taken to ensure consumers have easy and reliable access to ICT services as well as web content, such as, developing and regularly reviewing minimum quality of service standards and specifications of new technologies and services; monitoring network service providers; regularly assessing telecom/ICT services quality and publishing the results.

Consumers should thus be able to understand the nature of the services, including prices and how they are calculated, and the **quality of service** provided, in addition to their own rights and responsibilities.

GSR-13 Best practice guidelines on the evolving roles of both regulation and the regulators in a digital environment

Empowering consumers to make informed decisions through the development of **online tools** to check speed, quality of service and price of access is another measure regulators may take to foster competition.

...ensure a sufficient level of quality of service to the user (in particular for communication services that are sensitive to time delay.

GSR14 BEST PRACTICE GUIDELINES ON CONSUMER PROTECTION IN A DIGITAL WORLD

Regulating the ever-changing ICT sector is like aiming at a moving target. Developing and using best practices is the best way to track our efforts to adapt to change and embrace new technologies for faster development and business.



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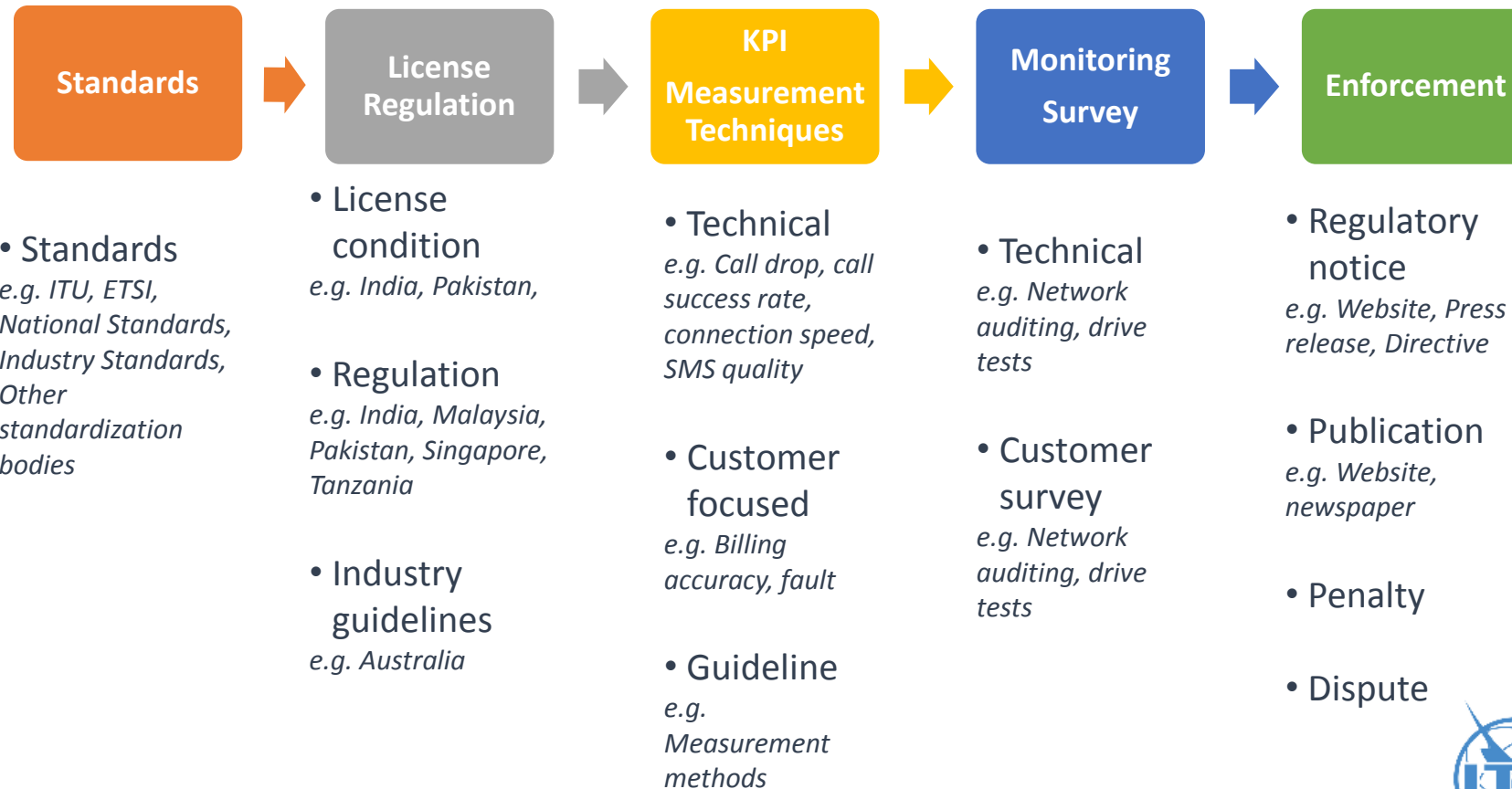
GSR13 BEST PRACTICE GUIDELINES ON THE EVOLVING ROLES OF BOTH REGULATION AND THE REGULATORS IN A DIGITAL ENVIRONMENT

Regulating the ever-changing ICT sector is like aiming at a moving target. Developing and using best practices is the best way to track our efforts to adapt to change and embrace new technologies for faster development and business.

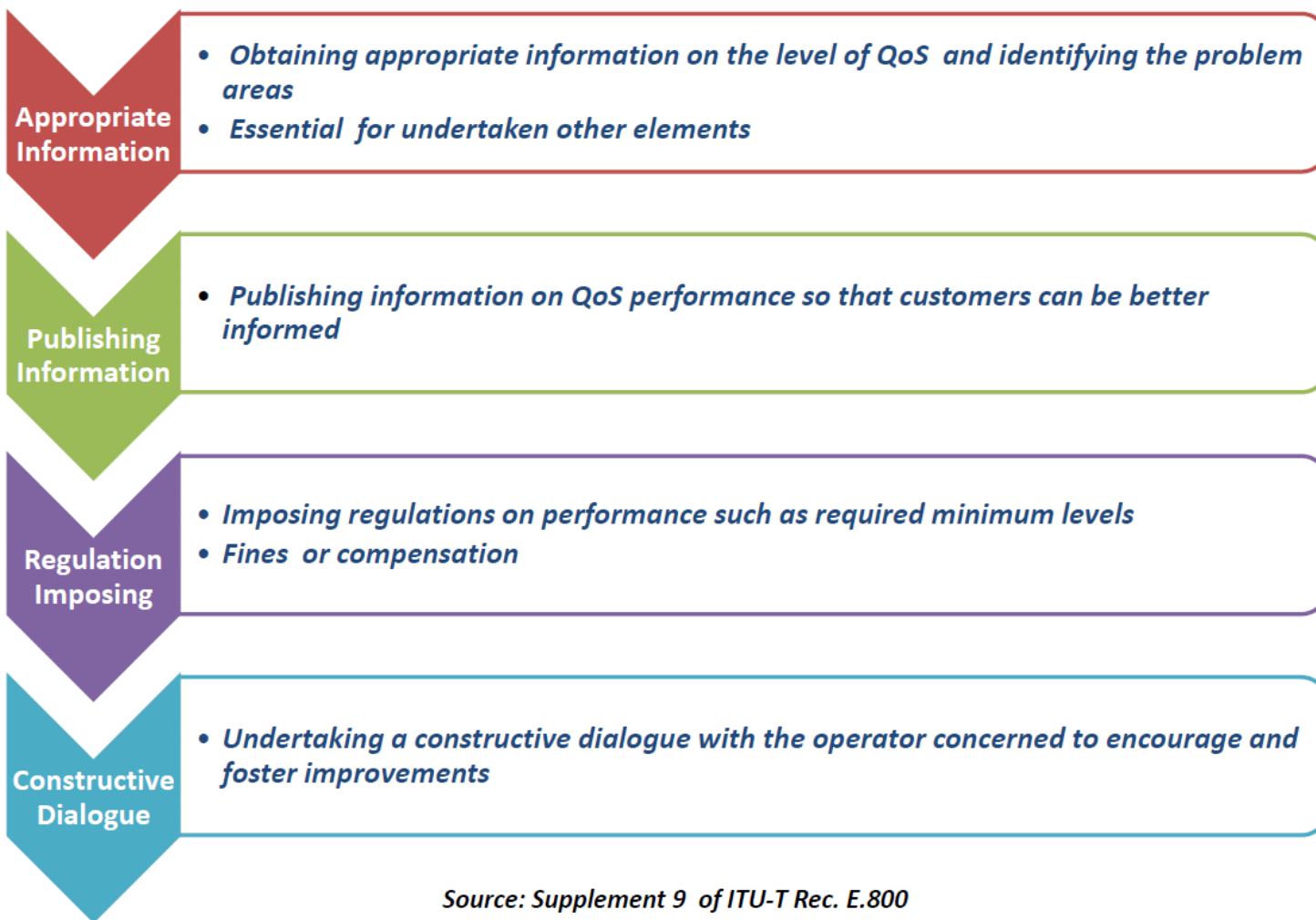


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Quality of Service Regulatory Framework



Element in Regulator's Approach to QoS



Making measurements : Methods for evaluating the QoS of operators

QoS Classic approach

Drive Test



Assessing the **coverage**, capacity and **Quality of Service (QoS)** of a mobile radio network Benchmarking, Network **optimization and Troubleshooting**, **Fine-tuning** Network parameters for newly deployed sites.

End to End Measurement



Qualifying a given service from the **access point** through to PSTN from an end users perspective. QoE, **Interoperability** between mobile operators, benchmarking.

End user Surveys



Aimed at assessing the **end-user's perception and acceptance of services**. QoE, Benchmarking.

Churn – Rate Monitoring

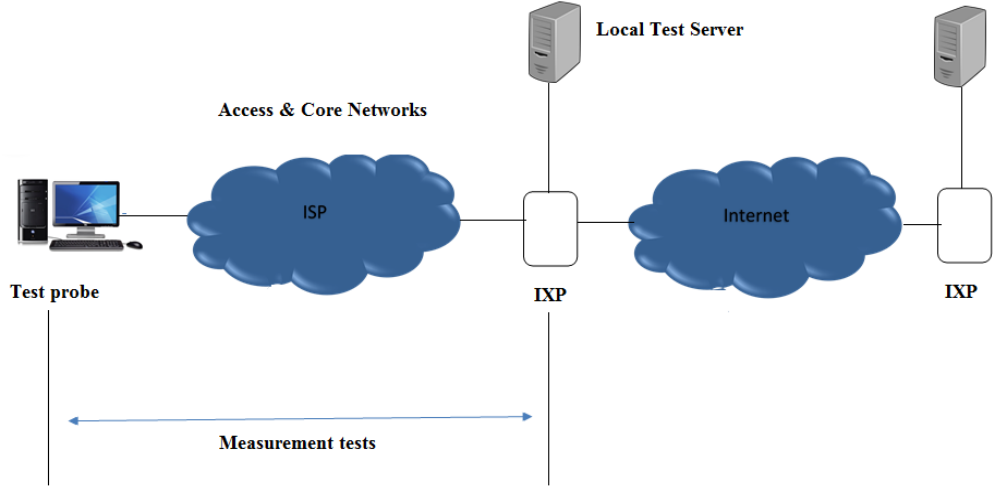


Determine the **degree of satisfaction or dissatisfaction** of a user of a service. QoE, Check on Customer support reactivity.



Measurement and Monitoring Tools

Set-up of measurements of Internet QoS at national level



Source: ITU-T Rec. 1545.1

The screenshot shows the SamKnows website. At the top left is the SamKnows logo. To its right is the logo for the Canadian Radio-television and Telecommunications Commission (CRTC). Further right are navigation links: SIGN UP, ABOUT, FAQ, and CONTACT US. The main content area has a banner that says "MEASURE YOUR BROADBAND ACCURATELY." followed by "Join our Canadian campaign..." and "Sign up with us today to accurately measure your broadband performance." Below the banner is a "JOIN TODAY" button.

The Canadian Radio-television and Telecommunications Commission (CRTC) and SamKnows have established the 'Measuring Broadband Canada' program in order to provide Canadian citizens with reliable and accurate data concerning broadband provision across the country. Anyone who would like to be part of this project just needs to [sign up](#). It might be worth reading the [requirements](#) before doing so just to make sure you're eligible to join!

On signing up, volunteers will receive a purpose-built broadband measurement unit, also known as a SamKnows Whitebox. The Whitebox is easy to [install](#); once it has been plugged into the existing modem / router then it is good to go. Volunteers will also be able to see their own data from their broadband connection using a purpose-built SamKnows dashboard.

Please note, not everyone who registers will necessarily receive a SamKnows Whitebox. We do want to thank everyone for signing up and for working together to make Canadian broadband better!

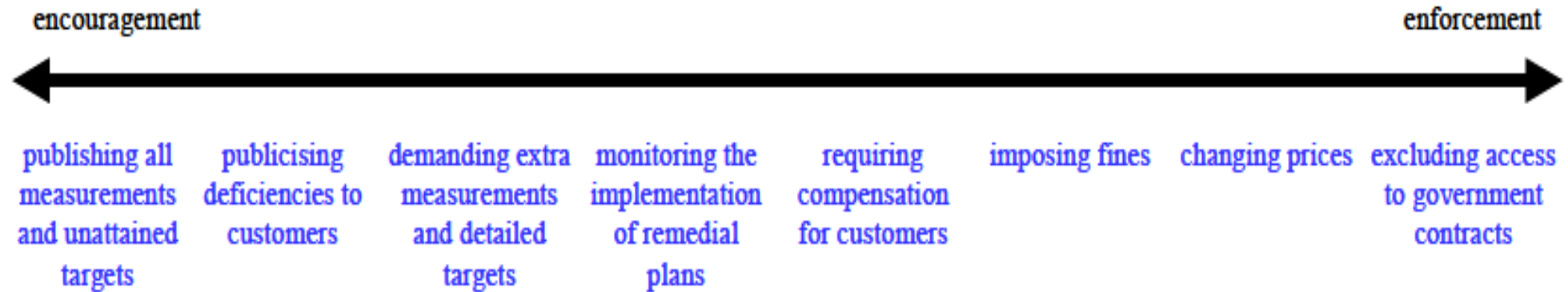
<https://www.measuringbroadbandcanada.com/about>

The screenshot shows the RTR-NetTest website. At the top is the RTR-NetTest logo and a large green button that says "Start RTR-NetTest". Below this is a grid of four sections:

- App and Browser Test**: Download iOS or Android App or conduct the browser test.
- Statistics**: Statistics on the test results.
- Map view**: Map with test results.
- Help**: Detailed background information.

<https://www.netztest.at/en/>

Enforcement measures

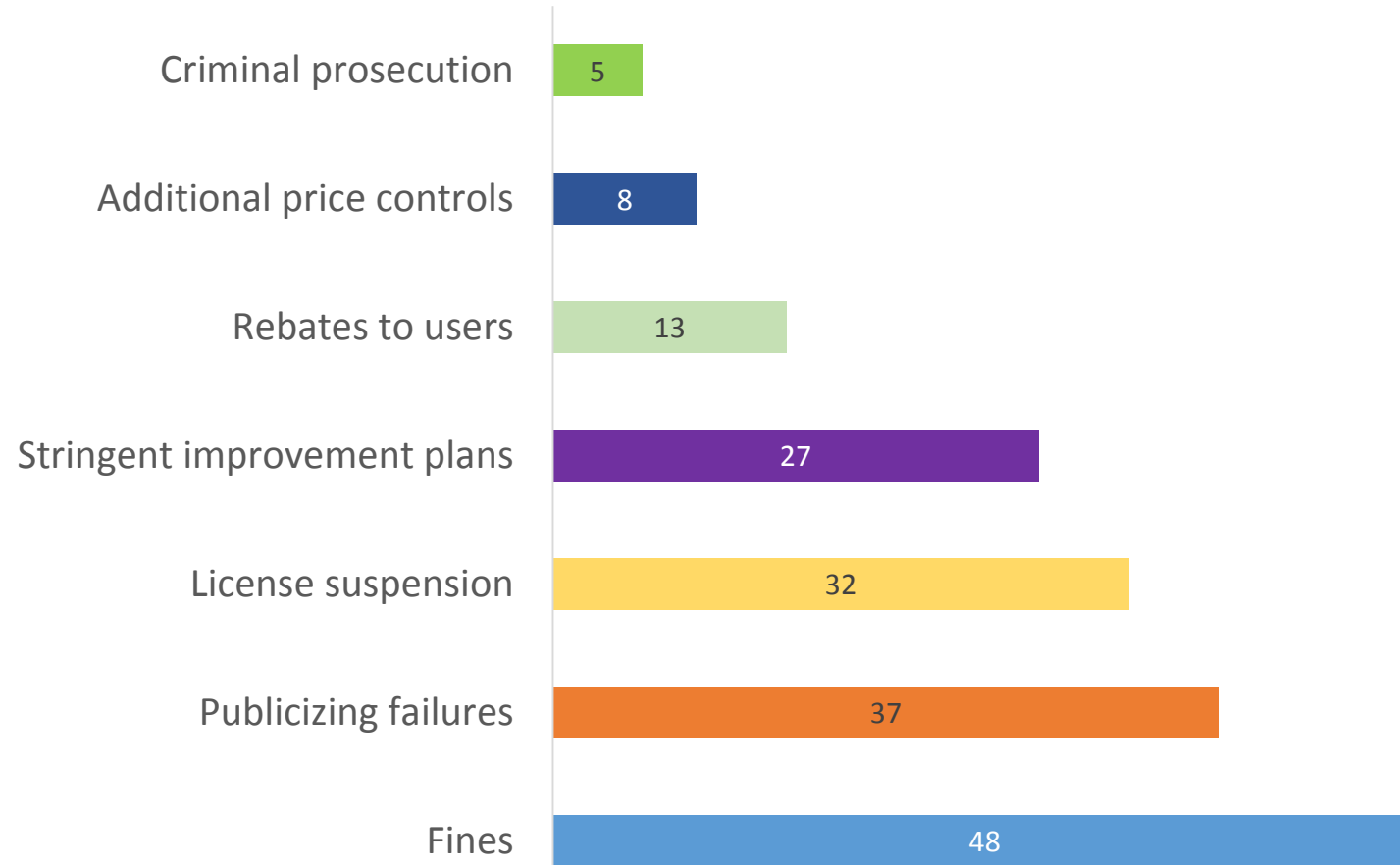


Source: Robert Milne (Antelope Consulting).

The **regulator** can adopt a **range of techniques**, starting from "naming and shaming" strategies to tighter regulation, financial penalties and finally more drastic legal enforcements.

Sanctions

Sanctions the regulator can impose when QoS obligations are not met, 2016



Based on responses from 77 countries.

Source: ITU.



Quality of Service Training Programme

OM5 - Regulatory Aspects of QoS

- Introduction
- Economic principles of QoS management
- Technical principles of QoS management
 - QoS management philosophy and metrics
 - The mathematics of QoS management
 - Technical methods applied for management of QoS
- Public policy principles of QoS management
 - Aggressive imposition of QoS standards versus light touch approaches
 - The great debate over network neutrality
 - Privacy aspects
- Evolution of network neutrality regulation in the US, the EU, and Brazil
- Summary and concluding remarks

<http://academy.itu.int>



QoS, QoE related regional Initiative- activities in Africa

- **May 2017**-Training for Southern Africa –Hosted by BOCRA and CRASA in Gaborone, Botswana

Issues Agreed

- Develop a **common QoS policies and** regulations of data services in the **SADC region**
 - To work towards a **common position on Net Neutrality** for the **SADC region**
 - Develop a **common broadband measurement platform and database** for QoS and QoE for the SADC region
- **December 2017**- Training and Inception meeting for the Development of a QoS & QoE guideline for the West Africa – Hosted by WATRA, ESMT, Dakar, Senegal
 - **Planned 2nd Quarter 2018**- Validation meeting and completion of the QoS Guideline for the ECOWAS–WATRA member state
 - **Planned 3rd Quarter 2018-Validation** meeting and completion of the QoS Guideline for the SADC –CRASA member states

Regulatory and Market Environment

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Global ICT Regulatory Outlook 2017

A new landmark publication of ITU released!



About us Quick links

- ITU Thematic Reports
- GSRs and Best Practice Guidelines
- ICT Regulatory Tracker
- International Mobile Roaming Resources

HIGHLIGHTS

Events Links

- ITU Fifth Regional Forum on Inter-connectivity & Reduction of telecommunication service prices and Internet access cost
Mexico City, Mexico
22 September 2017
- ITU Regional Economic and Financial Forum of Telecommunications/ICT for Latin America and the Caribbean
Mexico City, Mexico

GSR

Since its launch in 2000, the annual Global Symposium for Regulators (GSR) provides a unique venue for regulators and policy-makers from both developed and developing countries to meet and exchange views and experiences. The meeting fosters an open dialogue between regulators and industry.

- [GSR17: Living in a World of Digital Opportunities](#)
11-14 July 2017, Nassau, Bahamas
- [GSR16: Be Empowered, Be included! Building blocks for smart societies in a connected world](#), 11-14 May 2016, Sharm el-Sheikh, Egypt
- [GSRs Best Practice Guidelines and documents](#)

PUBLICATIONS & STUDIES

We produce a number of flagship reports including [Trends in Telecommunication Reform](#) focusing on best practice regulation to enable ubiquitous broadband markets to thrive. Various thematic studies provide valuable viewpoints and strategies on multiple issues that affect regulation and economics in a converged broadband world.

- [Trends in Telecommunication Reform Series](#)
- [ITU Thematic Reports Series](#)
- [Publications on Economics & Finance](#)
- [EUIPO-ITU Report: The economic cost of IPR Infringement in the Smartphones Sector](#)
- [Global ICT Regulatory Outlook 2017](#) **NEW!**
- [Other publications](#)

Useful links

- ICT policy, regulatory and economic information:
www.itu.int/treg
- ITU Academy:
<http://academy.itu.int>
- ITU-T SG-12:
www.itu.int/en/ITU-T/studygroups/2017-2020/12/Pages/default.aspx

WTSA 2016

Resolution 95 – ITU Telecommunication Standardization Sector initiatives to raise awareness on best practices and policies related to service quality

BDT – WTSA Res. 95 – a collaborative approach:

- Manual
- Regional Workshops 2017 (CRASA, WATRA)
- Capacity-building (ITU Academy QoS TP Training programme)

THANK YOU!

