Body of European Regulators for Electronic Communications

BEREC

QoS Monitoring Activity at BEREC

In the context of net neutrality

Dr Ahmed Aldabbagh (Ofcom), Volker Sypli (BNetzA),

Ben Wallis (Ofcom), Frode Sørensen (Nkom)

96th IETF meeting, IPPM working group, 19 July 2016, Berlin

Overview of the Presentation

- What is BEREC and how it is organised?
- The NN Expert Work Group
  - The journey so far, and where next…
  - Perspective
- Programme
- Challenges
- Final Remarks

What is BEREC?

- **B**ody of **E**uropean **R**egulators for **E**lectronic **C**ommunications
- Established by Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009, as part of the Telecom Reform package
- Successor to European Regulators Group (ERG), established in 2002 as advisory group to the EC

Main role

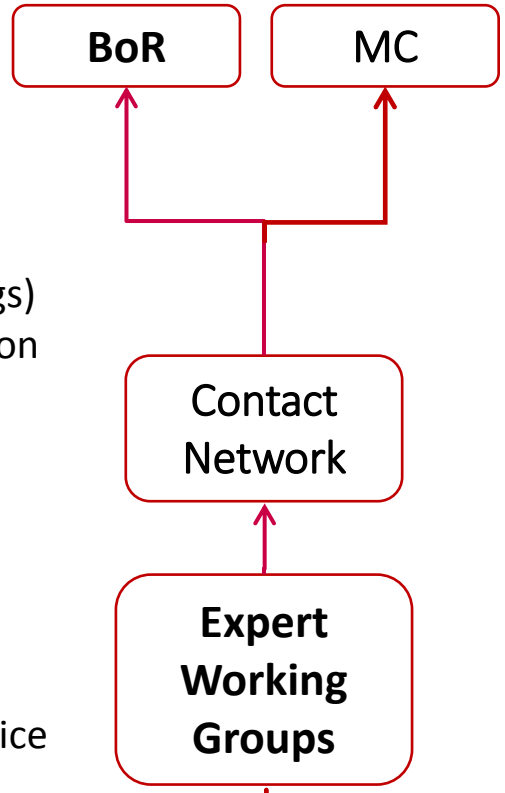
- Assists the EC and the national regulatory authorities (NRAs) in implementing the EU regulatory framework for electronic communications

- Provides advice on request and on its own initiative to European institutions

How does BEREC work?

The Board of Regulators (BoR)
(a regulatory network)

- *Make the decisions*
- One member per EU Member State
- Meets 4 times a year (Plenary Meetings)
- Includes observers: EFTA, EEA, accession states, and Commission



The Management Committee (MC)

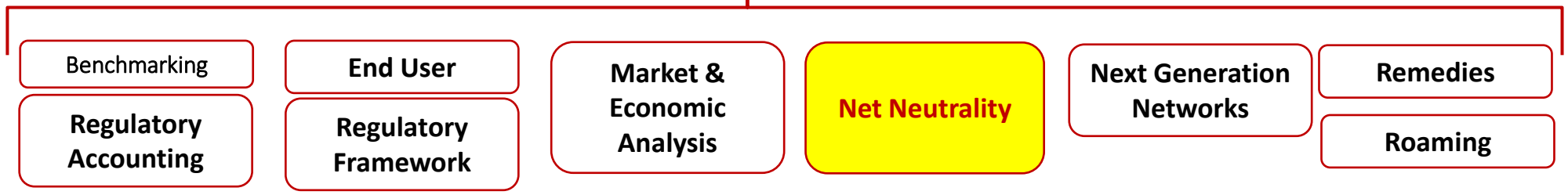
- *Oversees the Office and the BEREC budget, and appoints the Administrative Manager*
- One member per EU MS + Commission
- Includes observers: EFTA, EEA, accession states

The Contact Network (CN)

- *Prepares decisions to be taken by BoR and MC*
- Meets 3 weeks before relevant Plenary Meetings
- Includes observers

The Expert Working Groups

- *Deliver BEREC's Work Programme*
- Created by BoR and set up by BEREC Office

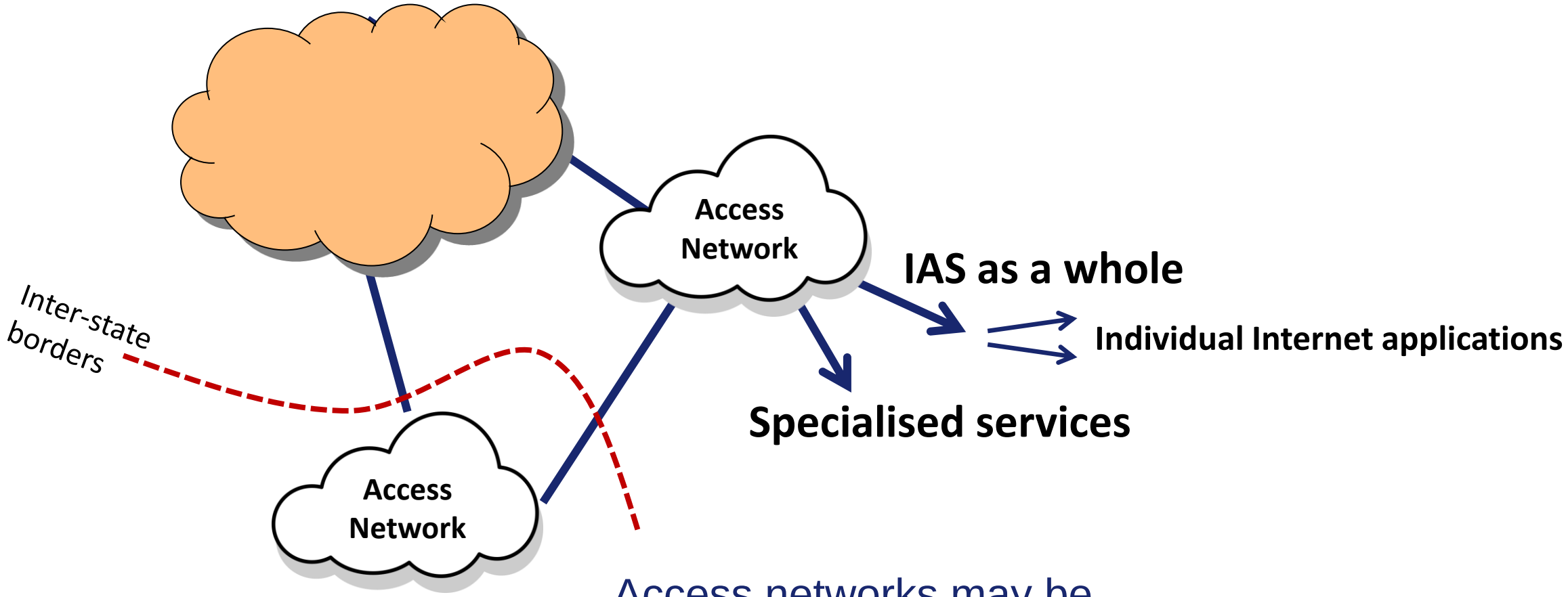


NN QoS activities – past and present

2011	2012	2013	2014	2015	2016	2017	2018
NN QoS Framework	**NN QoS Guidelines**	**NN QoS Monitoring**		**NN QoS Feasibility**	**NN Guidelines**	**NN QoS Assessment**	
•QoS concepts and evaluation • Types of congestion • Specialized services • Most relevant QoS Indicators: throughput, latency, jitter, packet loss • Generic and application-specific degradation	• Guidance on when and how to exercise powers to impose minimum QoS requirements • 3 pilars: - Ensuring that market forces work -Monitoring QoS over time - Case-by-case investigations of NN incidents	• More detailed study of QoS metrics • Promotion of crowd-sourcing platforms • Mainly active measurements based on injected traffic • Proposes further study of a common measurement platform		• Feasibility of a common measurement platform: technical, legal and economic issues	• More about this in the other BEREC presentation	• Work starting in Sept'2016	

New European single telecom market regulation

Regulatory perspective



Access networks may be

- Wired: Fibre, ADSL, Cable, etc.
- Wireless: Mobile, WLAN, etc.

2014-16 BEREC Programme

Previous work

- **2014** BEREC
  NN QoS Monitoring Report:
  - *What to measure*
  - *How to measure*
- **2015** BEREC
  NN QoS Feasibility Study:
  - *Collaborative monitoring*

2015-16
Guidelines for the implementation of Net Neutrality provisions of the TSM regulation

- *Work-in-Progress*
- *Currently in public consultation*
- *Final publication by BEREC, end of Aug 2016*

2016-17
Regulatory assessment of QoS in the context of Net Neutrality

Kick-off September 2016

Feasibility study of a common measurement platform

Outcome from the feasibility study

- Recommendations on feasible quality monitoring metrics & methods
- Architectural options of a opt-in measurement system
- Including legal and economic considerations

NN QoS Regulatory Assessment

- **Aim:**
  - To develop metrics and methods for NN QoS regulatory assessment
  - Specify the opt-in QoS monitoring software functionality
  - Potentially develop system software, subject to BEREC BoR approval

Regulatory assessment, starting in Sept 2016

Scope:

- Monitoring will encompass both IAS as a whole and individual apps:
  - Measure IAS performance: up/download speed, latency etc
  - Scrutinise ISPs' traffic management practices (e.g. as per application)
- Specifying a collaborative framework for multi-NRA monitoring, including methodology for overall system governance
- BEREC advocates adoption of standards and best practices

Challenges for monitoring Internet service quality

1. Harmonisation of measurement methodologies of basic performance parameters (throughput, delay, jitter, packet loss)

   - **Significant variations** in current measurement tools used by NRAs (NDT, Ookla, Samknows, NRA tools)
   - **There is no single best tool** for doing the measurements; nevertheless, measurements with the same tool may be required for comparability
   - What is best practices ?

Challenges for monitoring Internet service quality

2. A toolbox for monitoring NN violations

- Different traffic management practices may be used, and each practice may require a different detection method:
  - Blocking/throttling based on port numbers (TCP/UDP ports)
  - Blocking/throttling using DPI (Deep Packet Inspection) or DCI (Deep Content Inspection)
  - Traffic shaping

- Current public tools (Glasnost, Shaperprobe, NANO, Neubot, Netalyzr) are not so useful to regulators
  - Some tools have not been tested over real networks (e.g. Shaperprobe, NANO)
  - Most tools do not pinpoint the cause of differentiation
  - May produce inconclusive results (due e.g. to cross-traffic)
  - Have much smaller number of users, compared to speed measurement tools
  - May not be actively supported by the development community (concurrency)

- Monitoring over time on different time scales (hours to weeks or months) is necessary

Challenges for monitoring Internet service quality

3. Sampling methodology

a) Preselected panel approach

- Aggregate statistics over population groups (e.g. mean performance result of an ISP, for a specific access technology, over a specific area, etc.) must be derived from a proper sampling plan

- Even a good tool can produce far-off results, if sampling is wrong

b) Crowd-sourced approach

- Typically provided with a software-based measurement agent that allows for user-initiated measurements executed on the end user's own equipment

- User-initiated test measurement generates a measurement sample that is stored in a central database for subsequent statistical analysis

Challenges for monitoring Internet service quality

4. Privacy
5. System governance
6. Distributed systems
7. Common data structures
8. System and data integrity and security

Interoperability

BEREC and NN Expert Working Group

Current BEREC list of publications on net neutrality
as of January 2016, encompassing economics, technical and legal aspects:

- Guidelines on Transparency in the scope of Net Neutrality, 2011
- A framework for Quality of Service in the scope of Net Neutrality, 2011
- Traffic Management Investigation, 2012
- Guidelines for quality of service in the scope of net neutrality, 2012
- Differentiation practices and related competition issues in the scope of NN, 2012
- An assessment of IP interconnection in the context of Net Neutrality, 2012
- Overview of BEREC's approach to net neutrality (4 pages), 2012
- Summary of BEREC positions on net neutrality (12 pages), 2012
- Monitoring quality of Internet access services in the context of net neutrality, 2014 and Annex
- How consumers value net neutrality (Ecodem), 2015
- Feasibility study of quality monitoring in the context of net neutrality (London Plenary 2015)

Please, click on link to load the publication when available.

Thank you