Regulatory perspective on measuring network quality for end-users

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Content

- **Requirements in the wider context**
- **Requirements from Internet measurement systems**
- **Measurement approach**
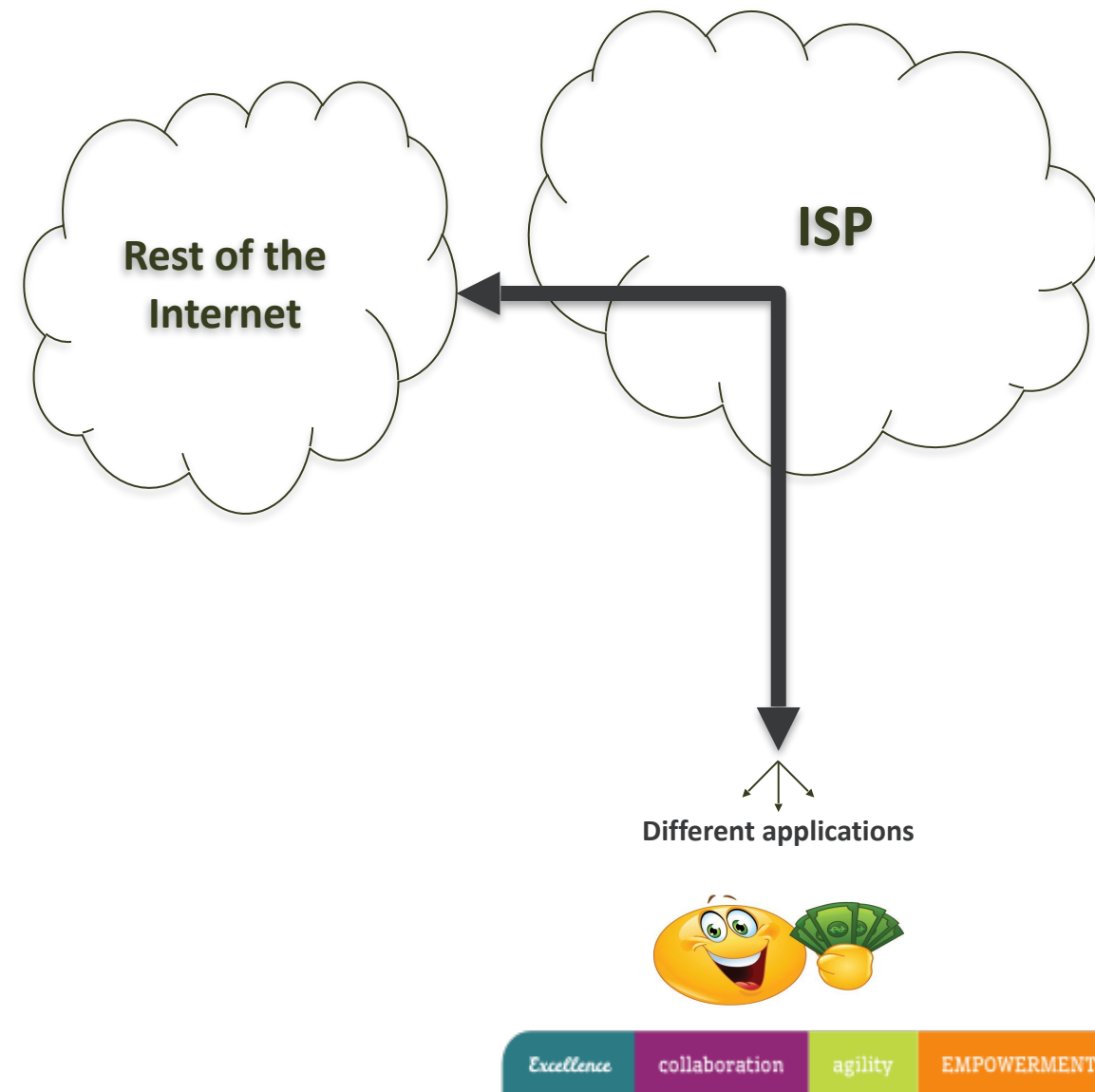
Operator requirements

- Understand the performance of their networks.

- Understand the performance of the equipment.

- The impact that such performance has on the experience of their customers.

- Generally within the context of network management system.

  - Troubleshooting and

  - Pre-fault diagnostics

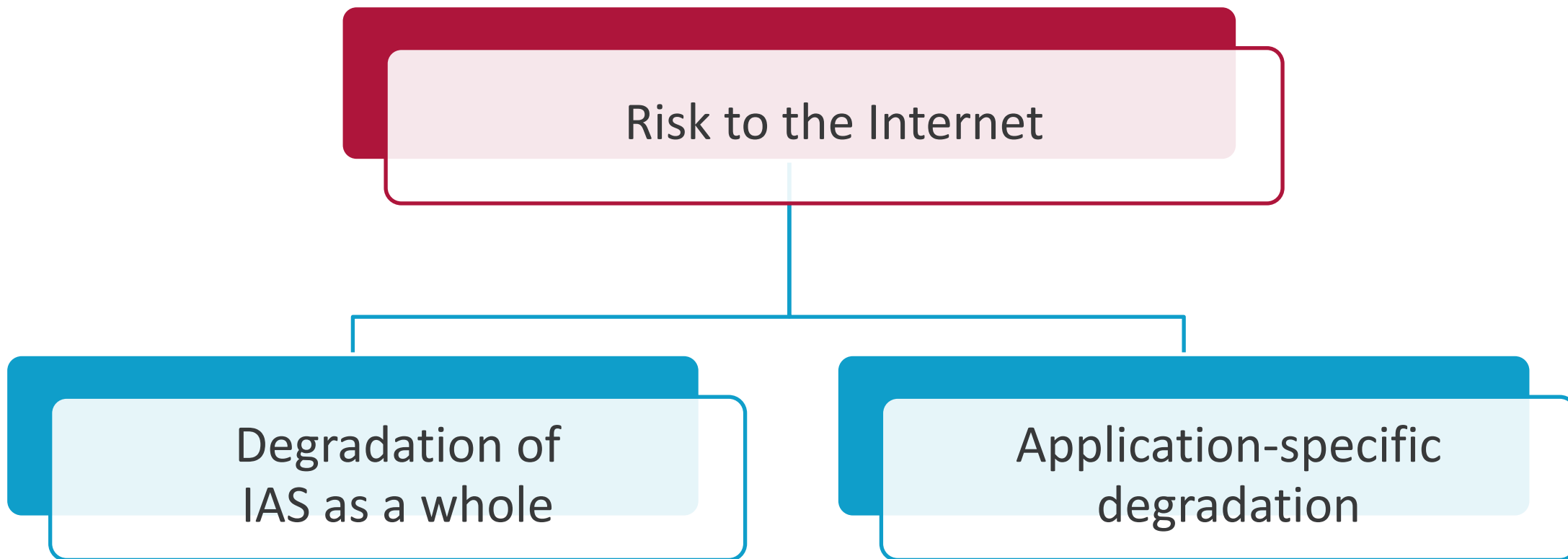## Regulatory perspective

- Promoting the ability of <u>consumers to access and distribute information or run applications</u> and services of their <u>choice</u>.

- Universal service directive aims at promoting a <u>satisfying quality-of-service</u> and ensuring better information for consumers on its actual quality of service which will be received.

Excellence collaboration agility EMPOWERMENT

Consumers access the Internet

- **Transparency: measurement for consumers**

  - **What am I getting?**

  - **etc**

- **Measurements for policy makers**

  - **Evolution of national infrastructure**

- **Innovation**

Rest of the Internet

ISP

Different applications

Risk

Risk to the Internet

Degradation of
IAS as a whole

Application-specific
degradation

High level Internet access quality monitoring system requirements

- **Accuracy**

- **Comparability**
  - Different IAS providers and their offerings
  - Different countries when possible

- **Trustworthiness**
  - Independence (from operators)
  - Accountability and legal value

- **Privacy**

- **Security**

- **Openness**

- **Future proof-ness**

Excellence   collaboration   agility   EMPOWERMENT

Approach: metrics

QoS

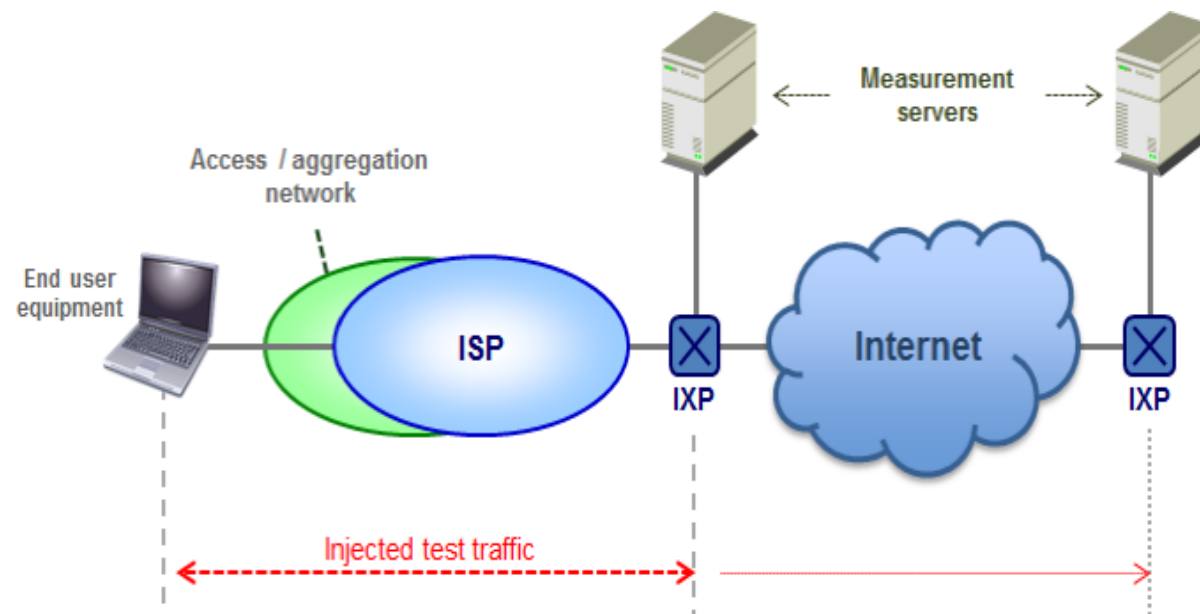- Speed (upload and download)

- Delay and its variations

- Packet loss

- DNS look up time

- etc

- How to measure in view of earlier requirements ?

QoE

- Becoming more and more important

- But is it difficult?

- Lack of common theoretical framework?

- Lack of standardisation

General approach

- Active measurements using test traffic
- Passive measurements using ordinary user traffic

- User initiated tests
- Background tests

- Hardware probes
- Software probes

- Mobile
- Fixed
- Fixed-wireless

- Cost

Crowdsource

- **Rising in importance as it is beginning to open new insights**

- **Lack of standards**

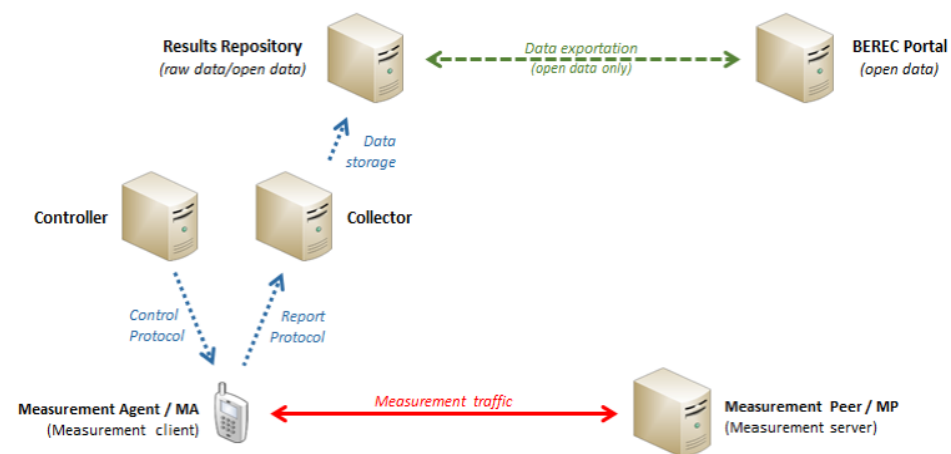- **Privacy issues**

- **Collection is not future proof**

Measurement systems

Considered

- **Large-Scale Measurement of Broadband Performance (IETF/LMAP)**

- **IP Performance Metrics (IETF/ IPPM)**

- **RIPE Atlas**

- **M-Lab**

- **etc**

BEREC

- **Federated system**

- **Drew a great deal from LMAP**

Final remark: where should the future be?

Federation of 'Interoperable' systems

- Standardisation in measurements methods

- Common software implementations

- Standardisation in common data format and APIs

QoS to QoE??

- Difficult to solve?

- What about Delta Q as the basis for future?

- Need for standardisation