Net Neutrality – intersection between regulation and technology

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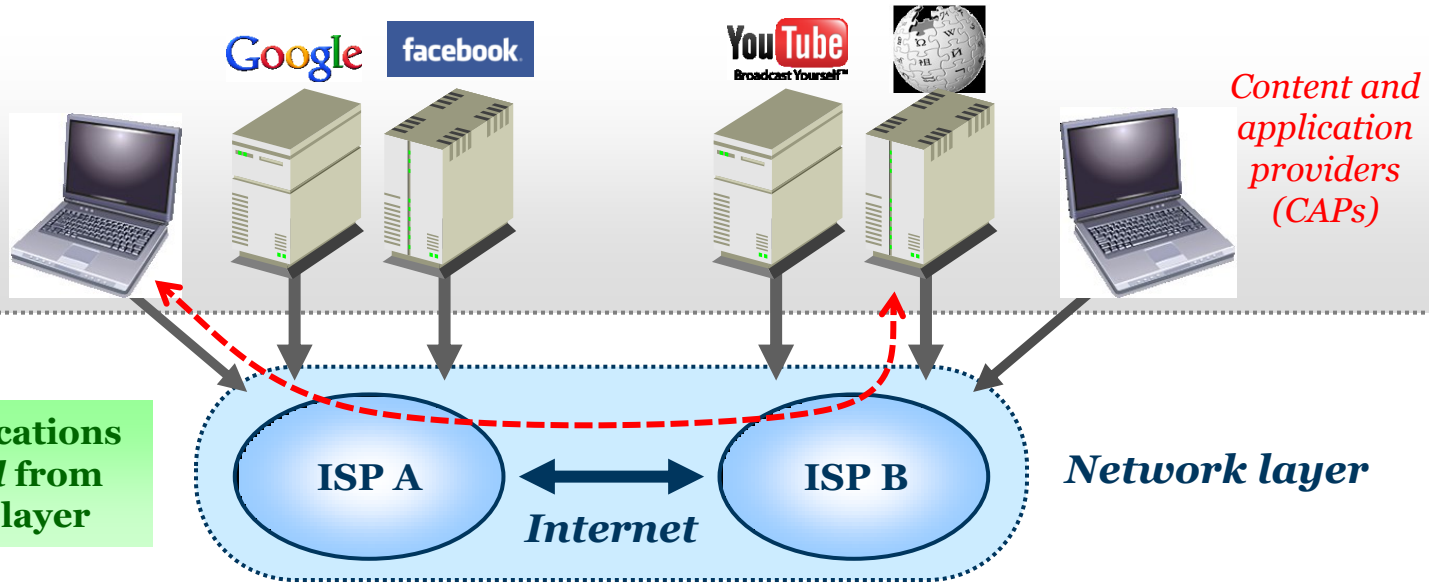
What is net neutrality?



Content/applications are *decoupled* from the network layer

Net neutrality belongs to the network layer of the Internet

Is QoS possible with net neutrality?

Opponents to net neutrality tend to use this as a counterargument

General principal discussion (may differ from specific regulation)

- Net neutrality regulates Internet access services only
- Non-Internet access service aka “specialized services”
- “Best effort” Internet ≠ low quality communication
- User/application-initiated vs. network-initiated
- Reasonable traffic management measures
- Minimum quality of service requirements

European Net Neutrality Regulation

- **Regulation** 2015/2120 of 25 November 2015
- **Objective**: Article 1 – "This Regulation establishes common rules to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end-users' rights."
- **Definitions**: Article 2 – Internet access service
- **Content**: Article 3 – Safeguarding of open internet access
  Article 4 – Transparency measures for ensuring open internet access
- **Regulators' tasks**: Article 5 –"National regulatory authorities shall closely monitor and ensure compliance with Articles 3 and 4…"
- **QoS relevance**: Article 3(3) about reasonable traffic management
  Article 3(5) about specialised services

BEREC Net Neutrality Guidelines

- **Regulation** 2015/2120: By 30 August 2016 BEREC shall issue guidelines
- "**Guidelines** constitute recommendations to NRAs, and NRAs should take utmost account of the Guidelines. The Guidelines should contribute to the consistent application of the Regulation, thereby contributing to regulatory certainty for stakeholders."
- **Clarifications regarding**
  - commercial practices, including zero-rating (criteria etc.)
  - internet access services and traffic management
  - specialized services, including some examples
  - regulatory supervision and enforcement

The Net Neutrality service model

- **Internet access services** (IAS) – publicly available electronic communications services that provide access to the internet
- **Specialised services** (SpS) – services other than internet access services which are optimised for specific content, applications or services, or a combination thereof, where the optimisation is necessary in order to meet requirements of the content, applications or services for a specific level of quality
- **Example SpS** – Typical examples of specialised services provided to end-users are VoLTE and linear broadcasting IPTV services with specific QoS requirements, subject to them meeting the requirements of the Regulation, in particular Article 3(5) first subparagraph.

Discussion about NN Regulation and QoS

- **The Regulation is compatible with the technology evolution**
- Facilitating flexible **network technology** innovation, simultaneously safeguarding innovation at **the edge of the network**
- **Futureproof framework** for regulatory enforcement of NN which maintains continued evolution of the Internet architecture and ecosystem
- **On the one hand**, traditional best effort communications, congestion control, and potential class-based QoS, including user-controlled QoS
- **On the other hand**, provision of specialised services in parallel with Internet communications, which facilitates different business models
- **Regarding mobile networks**, the 5G architecture emphasises QoS-based services, but at the same time providing high-performance Internet access services

Discussion about IAS and traffic management

- Article 3(3) 1st subparagraph
- “Treat traffic equally" = **processed agnostic** to sender and receiver, to the content accessed or distributed, and to the application used or provided.
- This is the **ground level** of traffic management, usually referred to as “best effort”.
- **Congestion control**: Feedback-based adjustment of transmission rate by endpoints, endpoints thereby “back off” during congestion
- TCP vs. UDP, and other transport layer protocols
- Modern example: Web Real-Time Communication, WebRTC / RMCAT
- Article 3(3) 2nd subpara: Reasonable traffic management
- Article 3(3) 3rd subpara: Exceptional traffic management

Discussion about specialised services

- Article 3(5) 1st subpara: "**Necessity requirement**"
  SpS necessary in order to meet requirements for a specific level of quality
- SpS shall not be usable or offered as a replacement for IAS
- Article 3(5) 2nd subpara: "**Capacity requirement**"
  Sufficient network capacity to provide SpS in addition to any IAS provided
- In other words, SpS should not be provided at the expense of IAS
- **NN Guidelines** provide a few examples, such as specific types of VoIP and IPTV, but are carefully avoiding "freezing" the interpretation of the concept

5G critique against the NN Regulation

- **5G Manifesto** for timely deployment of 5G in Europe: “The telecom Industry warns that the current Net Neutrality guidelines, as put forward by BEREC, create significant uncertainties around 5G return on investment.”
- **Response from regulators** in BEREC NN Guidelines:
  “Network-slicing in 5G networks may be used to deliver specialised services”
- **5G Manifesto**: “A fundamental enhancement brought by 5G is the possibility to deliver virtual ‘network slices’ offering different capabilities according to specialised needs. 5G network slices are meant to run on shared infrastructure without deteriorating the agreed levels of service.” – Compare with Art. 3(5)!
- **Specialised services** ensure compatibility between the European net neutrality Regulation and provision of services with QoS requirements e.g. in 5G networks.

Prospects for the Internet

- Applications are **separated from** the network layer – the “end-to-end argument”
- QoS under this regime, in case **applications request** QoS from network layer
- **“Congestion control”** facilitates capacity sharing and mitigates congestion
- **To what extent** is a comprehensive QoS architecture needed for the Internet?
- Internet technology is developing over time, e.g. congestion control schemes (e.g. Conex, LEDBAT, RMCAT), overlay networks (p2p, CDN, ALTO), adaptive media coding (DASH), multimedia applications (Skype, YouTube, Spotify)
- For discussion: WebRTC (with RMCAT) as an alternative to VoLTE and RCS
- For discussion: WLAN as an alternative / supplement to 3G-4G-5G

Concluding remarks

- **Main takeaways**
  - NN relates to the Internet, nothing else
  - NN regulation is compatible with 3G/4G/5G, due to specialised services
  - NN may be compatible with some approached to QoS on the Internet

- **Happy to discuss, e.g.**
  - Where are all the specialised services in 3G and 4G?
  - Will this change considerably when 5G is finally deployed?
  - Why not look for opportunities, instead of false arguments?

Further reading

- BEREC, 2016, Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, BoR (16) 127, http://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/6160-berec-guidelines-on-the-implementation-b_0.pdf
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