

BEREC Report on the IP interconnection ecosystem

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Long history of addressing IP-IC issues

- **BEREC IP-IC reports: 2024, 2017, 2012**
- **BEREC works on charging mechanism**
- **BEREC also contributed to the debate on payments from CAPs to telcos**

Comprehensive / evidence-based approach

- 12 stakeholder **workshops** (Sept. – Oct. 2023)
- exhaustive **data collection** exercise (autumn 2024)
- ad hoc questionnaire to a broad range of stakeholders → *for timing reasons not included in the report*
- **Public consultation** (11. June – 1. Aug.)
 - 36 responses: civil society, CAPs, CDN providers, cloud and hosting providers, ISPs, IXPs, academics/experts

High-level observations

- **Diverging** views: ISPs vs CAPs
- Report **not replicating** debate on payments from large CAPs to ISPs
- ...IP-IC arguments raised by stakeholders often stem from that debate
- Focus often **large** players on both sides – but also of relevance for **smaller** players

Issues assessed

- Traffic developments
- Pricing / cost developments
- Market developments
- Generic structure of IP-IC issues
- Bargaining situation (CAPs/ISPs)
- Relationship IP-IC / OIR

Traffic developments

- Data traffic still growing, stabilising after Covid-19 spike
- Peak-to-average ratio stable 2019-2023
- Future: increasing diffusion of UHD video / live streaming
- **On-net CDNs** installed in vast majority of IASs' networks / more efficient **compression techniques**
- Internet managed to **coped** with traffic growth/peaks
 - Due to **competition** / **technological progress**

Pricing / cost developments

- Prices and costs for IP-IC services → downward trend continues
- Traffic growing – but cost per GB has fallen faster
- Technological development (e.g. on-net CDNs) reason why increase in data traffic has not passed through to prices/costs
- Larger players more successful in reducing costs than smaller players

Market developments (i)

- Large CAPs' **investments** in backbone infrastructure → competitive pressure on transit providers
- Traffic via **on-net CDNs** increasing, most ISP allow on-net CDNs
- IAS providers vertically integrated with Tier 1 providers generally use their own transit services. Then, CAPs typically pay for IC

Market developments (ii)

Substitutability peering / transit

- Quality: peering rather a substitute to transit than vice-versa
- Transit as fall-back option:
 - availability/pricing of transit constraining negotiations over the settlement basis of peering agreements
- Transit less of a substitute to peering if high latency/bandwidth requirements
- Under certain conditions transit can *technically* be provided that it may serve as a substitute

Generic structure of IP-IC issues (i)

- Both sides market sides **hold each other responsible** for causing congestion
- Generic description: artificial congestion of transit routes
 - Thus: either low quality or (high) fee for premium transit
- Not only conceivable if ALL routes are congested
- Workshops showed: most disputes stem from **vertically integrated** IAS providers attempting to **leverage** their termination monopoly to introduce (higher) fees for IP-IC directly from CAPs.

Generic structure of IP-IC issues (ii)

- Evidence from the US:
 - ISPs **deliberately** let IC interfaces congest
 - ISPs accepted **short-term costs** (more expensive routing) because they expected higher **long-term benefits**
- IP-IC ecosystem is driven by **functioning market dynamics** / cooperation. But: **some disputes** since 2017
 - stakeholders: “**edge cases**” / not calling for regulation

Bargaining situation (CAPs/ISPs) (i)

- Stakeholder with **opposing views**:
 - ISPs: CAPs with must-have content, asymmetric regulation
 - CAPs: ISPs with termination monopoly
- **Factors** impacting on the relative bargaining situation, e.g. :
 - Degree of substitutability transit/peering
 - Cost structure transit/peering
 - Scales
 - Market/technological developments

Bargaining situation (CAPs/ISPs) (ii)

- Generally, debate largely mostly about **large** CAPs vs. ISPs - but **small CAPs also affected**

Switching

- Opposing views on whether end-users switch in case of qualitative issues
- OFCOM/FCC): switching rates rather **low** in practice

Bargaining situation (CAPs/ISPs) (iii)

Number of end-users

- ...important for the relative bargaining power of an IAS provider
- ...impacts the ability to request termination fees
 - FCC explicitly emphasized this
- In general, IP-IC bargaining situation **balanced**
- **Smaller** players : typically higher costs thus affecting their bargaining situation

Relationship IP-IC / OIR

- OIR applicable for the part of the internet value chain for which IAS provider is responsible
- Finding of OIR infringement → **case-by-case** examination (specifically if circumvention through IP-IC)

Main findings

- Findings **consistent** with previous IP-IC reports
- IP-IC market driven by **competitive market forces** without regulatory intervention
- ...but **few** disputes since 2017
- **No structural** problem in peering / transit markets
- No need for additional regulation – the market works
- IP-IC ostensibly out of OIR scope, but **indirectly** within