

Net Neutrality

**(with a focus on the European context
in policy and regulatory terms)**

Richard A. Cawley
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To cover

- Net neutrality - what is it?
 - Definitions, principles adopted elsewhere, EU approach
- Examples of (practical) problems
 - Categorise (growing pains or more fundamental)
- Dimensions of the problem
 - Fixed/mobile, network/content/applications
 - Technical (congestion), Economic (discrimination or worse)
- Which models/approaches are most useful to assess
- What lessons can be drawn in an EU context
- Role of EU policy/regulation and any revisions



Definitions or principles

- USA/FCC
 - Freedom to choose lawful Internet content
 - Run applications and services of choice
 - Connect devices of choice
 - Information on or competition among network providers, service providers and content providers
- Japan (Ministry IAC)
 - Consumers entitled to use IP networks flexibly and access content and application layer freely
 - Connect devices (that comply with technical standards) to IP networks of choice
 - Consumers entitled to use communication layer and platform layer free from discrimination

BUT discrimination can help to allocate resources and signal willingness to pay for more capacity or better service



Principles and potential oversight in EU context

- EU equivalent
 - No set of published principles by EC
 - Range of views
 - Council statement
 - Discussed in review of regulatory framework, but no specific definitions in the proposals
- Current EU legislation
 - ability to remedy market power over access
 - Powers to deal with interconnection
 - Users' rights (contracts, information, quality)
 - rest for competition law
- Reform proposals
 - Art. 20, 21, 22 Users' directive

Art. 8 "principle that end-users able to access and distribute content and use applications of choice"

I'll come back to this



Examples of problems

- Some things are NOT new
- 1996-97 Microsoft (the fight-back against Netscape)
 - *Would you like to set Internet Explorer as your default browser*
 - *Are you sure you would not like to set IE*
 - *Are you really sure that*
- 1995-96 Discussion of congestion and grades of service
 - Use of the packet header in IP to set service priority level
 - RSVP
 - DiffServ

I'll come back to "Congestion and Traffic Management"



Recent examples

- Complaints from ISPs in the UK about increased traffic/congestion/costs from use of BBC iPlayer
 - But PlusNet offers a service aimed at gamers
- Vodafone Germany announcement to block access to Skype (July 2005)
- Orange and Vodafone sought to disable features in Nokia hand-sets in UK (April 2007)
 - These plans have been abandoned I think
 - “3 Mobile” actively promoting Skype phone
 - and Verizon new “open-access” policy on handsets
- Fixed network operators favouring their affiliated ISP
 - Trade-offs concerning up- and down-stream competition
- Service blocking or degradation - USA and other examples, evidence in EU? (problems switching ISPs)

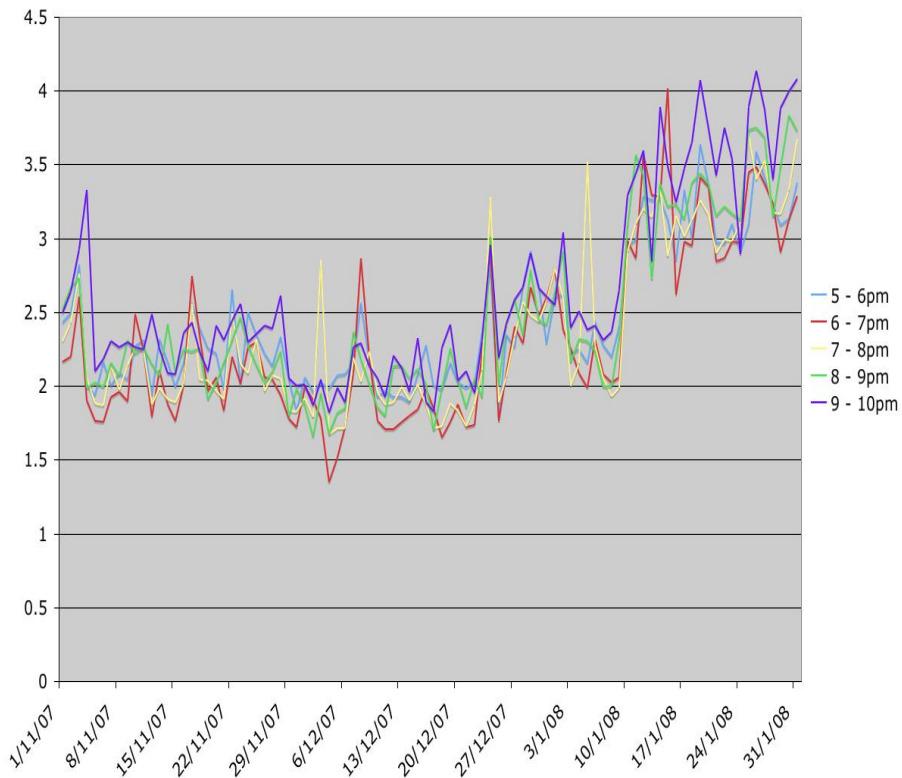
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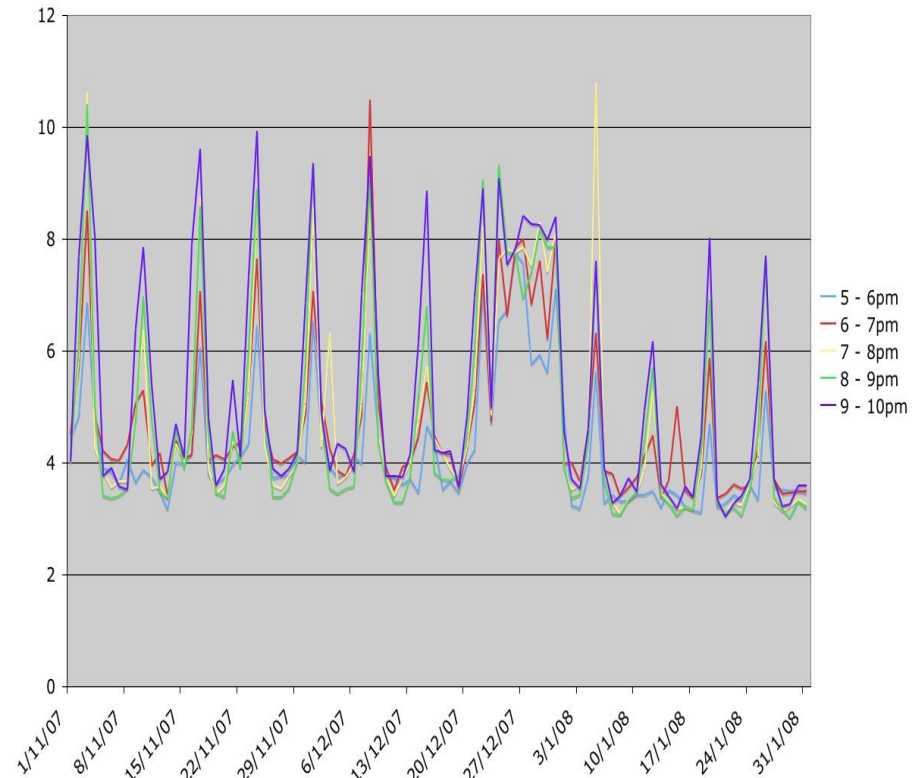
Traffic impact (iPlayer and P2P)

Source: PlusNet UK (Mb per hour per user)

iPlayer effect – streaming traffic



Peer to Peer traffic



Disabling mobile phone features (The Register April 2007)

A Vodafone statement said the mobile operator doesn't offer its own VoIP service because it doesn't believe it's a mature technology.

It requires "in-depth testing, a solid end-to-end customer experience, billing integration and customer service support which is not currently available".

"There is a misleading perception that VoIP services are 'free'. This is, however, not the case when it comes to using VoIP over mobile where customers will need to use data connectivity to establish a service and may incur further charges."

"Vodafone feels responsible that customers should not incur unnecessary charges when competitive mobile rates are a cost-effective choice for customers."

Disabling mobile phone features (Techworld April 2007)

A senior devices person at a large European operator admitted that he might remove some VoIP capabilities, but described it as

"more about stopping Nokia (or whoever) from putting Skype or similar services pre-loaded onto the phone when it ships".

"Basically he said he didn't want users to be able to make out-of-the-box VoIP calls with a competing provider on a phone he'd subsidised, and that all VoIP calls from the phone would initially be routed via the operator's own VoIP servers."



Insights, categories of problems

- Several dimensions
 - Fixed, mobile
 - Network level, content or applications level
 - Technical, economic
 - Discrimination (due or undue)
 - Revenue extraction (networks from content or the reverse)
- Possible anti-competitive behaviour
 - But many attempts to restrict access to content seem to backfire
 - Many attempts to deal with congestion are genuine
 - To what extent are some neutrality complaints based on departures from an idealised modular and pure end-to-end vision of Internet?



Insights, categories of problems

- Anti-competitive behaviour
 - Exploitative (excessive prices or inferior quality)
 - Exclusionary (other vertical entities, downstream service provider, unaffiliated content or application)
 - (leverage and excessive rent extraction)
 - (undue) discrimination may be part of the strategy
- But price or other forms of discrimination can be beneficial
 - I can pay less for my journey or my electricity or my packets if I use off-peak or lower grade service
 - Helps to ration when genuine capacity constraint
 - Willingness to pay more signals an opportunity to upgrade capacity and recover the investment costs
 - Part of effort to cater for different user categories



2 main categories of problems

- Undue discrimination

- Blocking applications

- What if there is network or ISP competition?
 - What if part of tiering or differentiated service?
 - What if part of genuine traffic management?

- Blocking content

- Motivation?

Want discrimination that benefits users but avoid discrimination that risks seriously harming users

Competition
plus user info
helps

- Foreclosure

- Network against content or Content against network
(Revenue extraction?)

But, need both the ability and the incentive

- Need a framework for thinking about possible problems in order to assess validity of non-neutrality claims
- Technical
- Economic
- Technical - Congestion
- Economic - Vertical relationships and two-sided markets



Managing traffic, congestion

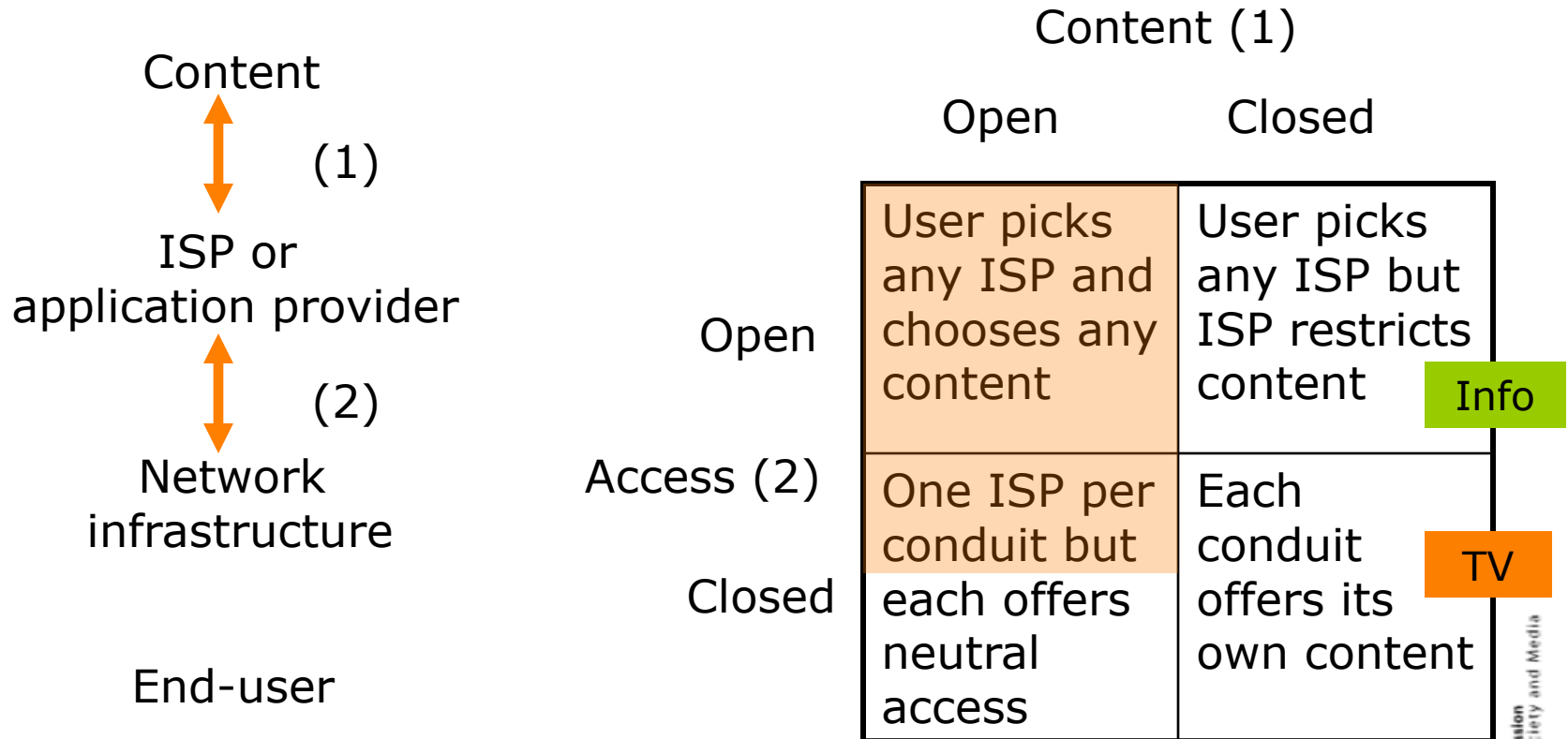
- Various ways for ISP to address congestion in best-efforts Internet
 - Tiered service
 - Drop packets, or prioritise (deep packet inspection – see packeteer.com – distinguishes applications)
 - Minimal distortion
 - Non-minimal (prioritise even below congestion limit/or buffer overflow)
- Implications
 - Intervention affects applications differently
 - Sensitivity to delay or jitter
 - Difficult to distinguish minimal and non-minimal distortion



Managing congestion

- More extreme way to address congestion
 - Systematic quality of service (QoS)
- BUT
 - QoS does not help if application needs higher average speed than that provided
 - QoS might be unnecessary if application needs well below average speed, (VoIP often works even with fluctuations in available speed)
- Implications
 - Attempts to establish systematic quality of service should be seen for what they may be
 - Attempts to move away from best efforts Internet
 - With a view to having greater control over discrimination (due and undue)

Vertical structure (with strategic effects)



Open-ness allows user to contract directly with content provider

Open-ness does not imply that content does not enjoy rents

Two-sided market approach

- Both sides already pay for transport
 - Users, content
- Paying for upgrades
 - Interconnect dynamics already help to clear those prices and revenues
- Arguments about paying
 - Content or networks
- What is going on here?
 - Access platform seeking to re-establish market power (usage prices or share of content revenue)?
 - Plus desire to maintain labelled traffic for usage and interconnect revenues
 - Content seeking to get free transport ?
- Two sides
 - Do users value extra content more than content values extra user or vice versa?

Implications/possible problems

- Discrimination
 - Priority, (quality or speed) by choosing posted price
 - Likely to be efficiency enhancing
 - Exclusive deal for (affiliated) content provider to access end-users
 - Likely to be a problem
- Risk of Foreclosure
 - Network offers exclusive content to own users
 - May or may not be harmful or inefficient
 - Network prevents access to its users by certain content providers
 - Likely to be a problem



Implications/possible problems

- Two-sided/hold-up problem
 - If a platform can extract rents at the edge (on either side?), likely to discourage investment and innovation
- Indicates a key value of an ISP
 - Maybe not for network innovation
 - And may have little impact on price
 - But the increase in consumer choice limits harmful effects from content discrimination



Back to the EU proposals

- Current EU legislation
 - ability to remedy market power over access
 - Powers to deal with interconnection
 - Users' rights (contracts, information, quality)
 - rest for competition law
- Reform proposals
 - Art. 8(4)g Framework
 - Art. 20(5), 21, 22(3) Users' directive
- **Art. 20(5) Contracts**
 - Informed about limitations on ability to access or distribute content or run applications
- **Art. 22(3) Quality of Service**
 - Possibility to adopt technical measures on minimum quality of service requirements



First seems fine, how practical is the second?



Some conclusions

- A. Is there a problem - yes
- B. Is the problem confined to the USA - no
- C. Several dimensions - mobile and fixed, range of economic and technical issues
- D. Do we have the economic tools to analyse it - yes
- E. Do we have the legal measures to deal with it - mostly
- F. Improvements? - informed user choice does help
- G. Does that mean we will arrive at the best equilibrium - no not necessarily



- Thank you

- I look forward to the discussion

