The Myth of Network Neutrality

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Internet Architectural Principle

e2e

let the ends do it

(or control it)

let the user decide

(a.k.a., The Stupid Network)

End-to-End Arguments in System Design - Saltzer, Reed & Clark
http://web.mit.edu/Saltzer/www/publications/endtoend/endtoend.txt
The Rise of the Stupid Network - David Isenberg http://www.isen.com/stupid.html

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But!

no QoS!

no business model!

where is security?

QoS

can you sell better QoS at a higher price?

multiple levels per customer

multiple levels per application service provider

"the Internet is not reliably crappy enough"

S. Bradner

"It fails to fail often enough so it looks like it works."

Mike O' Dell

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ISP Business Model

service can be provided by 3rd parties - not just by carriers

a quote from an IETF mailing list

> Hi Roy,
>
> I still don't understand why it is a "users" choice where the "services" are executed - I would have thought that this would be networks choice

and ISP does not profit from applications using network - i.e., Internet is a commodity

"We do not know how to route money" Dave Clark

Internet Security

e2e means security is an end system responsibility

end systems under relentless attack

> worms, versus, spyware, ...

Internet infrastructure under occasional attack

> DNS root servers, routers, management systems, ...

Internet does not protect end system

> makes sure the worm is delivered promptly

end users & regulators may demand that "the Internet" protect the users

carriers may leap to help

> same tools can access to content providers

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Thus

Internet & IP networks

by definition - to traditional networking folk

What Did It Give Us

e2e Internet, and open computer operating
  systems, are *generative*

  enable innovation by others

impact society by moving or eliminating control
  points

The Internet is a "parent revolution"

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Regulatory Approaches

openists
  net must be open to enable *innovation commons*
    require *network neutrality*
      e.g., power grid does not favor toasters
  to let people at edge/end innovate
  dumb pipe must be available
deregulationists
  if network is property then companies will innovate
    note: "property" specifically includes right to exclude
  network owner needs incentive to invest
  forced *smart pipe* OK

The Broadband Debate: A User's Guide - Tim Wu http://ssrn.com/
abstract=557330

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FCC

4 "principles" (5 August 2005)
  consumers are entitled to access the **lawful** *Internet content of their choice*
  consumers are entitled to run applications and use services of their choice, **subject to the needs of law enforcement**
  consumers are entitled to connect their choice of **legal** *devices that* **do not harm the network**
  consumers are entitled to competition among network providers, application and service providers, and content providers

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf

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FCC: CALEA

Internet & interconnected VoIP providers subject to CALEA (wiretapping) law

VoIP provider "*must necessarily use a router or other server*" thus is facilities-based

logic in FCC Order & principles logically leads to a requirement that the FBI pre-approve applications

something they requested

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-153A1.pdf

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U.S. House

House Energy and Commerce Committee draft covers BITS, VoIP & video providers

preempt state & local regulations

all types of providers must register with govt.

requires BITS providers to

provide subscribers with access to lawful content, applications, and services provided over the Internet, and to not block, impair, or interfere with the offering of, access to, or use of such content, applications or services

http://energycommerce.house.gov/108/News/09152005_staff_disc.pdf

Why e2e is(was) Important

customer freedom to access information & content

    psychology important - not clear economically vital

allows widespread innovation activity

    dramatic (and chaotic) innovation using Internet

        (chaos does bother some people)

non-transparent net restricts ability to innovate

    must get permission of block owner or hide in HTTP

CDA testimony - Bradner - http://www.sobco.com/papers/index.htm
The Future and its Enemies - Postrel - http://www.dynamist.com/tfaie/

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e2e

convinced that the e2e principle is important?

    Google & Skype are

can you get e2e these days?

    maybe

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Do you have e2e

NATs & firewalls in the paths

who owns "your" computer?

    today enterprise often owns your desktop

        you may not have admin access

    you own your home computer

        modulo spyware etc

    what about trusted computing?

        Microsoft direction - control what software can run in computer - e.g., to protect intellectual property

where is "end" in these cases?

    are we endless?

        The Future of the Internet and How to Stop it. - Zittrain
        http://cyber.law.harvard.edu/zittrain/netfuture.pdf

Reality

IP-level end-to-end is gone for the average user

    enterprise firewalls, ISP firewalls, personal NATs, wiretapping...

IP-level end-to-end for enterprises is still here

    at least for now

    because ISPs provide e2e service (edge-2-edge)

thus enterprise sanctioned IP-level innovation can happen

but, gone are the days of IP-level e2e being the normal case for the Internet user

Net Neutrality

Senate Commerce Committee hearing 2/7/06

Vint Cerf at al vs. TIA et al

Cerf

- described e2e concept & power of Internet
- asked Senators to not let carriers destroy it

Walter McCormick, Jr for US Telecom Industry Association

- would never "block, impair, or degrade content, applications or services."
- but do not make any rules to stop us

Net Neutrality, contd.

Vint's reason

- carriers could make it so carrier permission (or payment) is required for new applications
- block new app development - destroy generative effect

TIA's reason

- if Internet is a commodity then carrier is not assured a return on investment
- (note - did not say what they would actually do - disavowed AT&T etc CEO statements

http://commerce.senate.gov/hearings/witnesslist.cfm?id=1705

Carrier View

- it's my wire, I'll do what I want with it
    Edward E. Whitacre - CEO AT&T
        'Google, Vonage & Skype are using **my** network for **free**'
    William L. Smith - CTO Bell South
        'we should be able to charge Yahoo to let their web page load faster than Google'
- pushing to charge services for "better service"
    small step to making payment required for any useful transport (i.e., a protection racket)

Ball now in Washington

ball is now in the hands of congress & FCC

legislation pending in DC to update '93 telcom act

proposals on table to gut the Internet e2e concept in order to protect incumbent carriers

outcome TBD

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