

# Network Neutrality: Why We Should Care

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# Two Different Questions

Netheads: How do we change network service provisioning so the Internet survives?

Telcos and Cablecos: How do we change the Internet so we survive?

Common Problem: How to build and operate a sustainable Internet.

# The Internet is Better

Internet > application-specific networks!

- application discovery
- market discovery
- edge locus of control

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# The Internet brought us . . .

- email,
- the Web,
- e-commerce,
- audio-on-demand,
- video-on-demand,
- blogging, podcasting, vlogging,
- Internet telephony,
- massively multiplayer online games,
- et cetera, et cetera, et cetera

? (more in the future)

Telcos didn't create these -- we did  
Because the Internet is a Neutral Ne

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and let's not forget . . .

- freedom of speech,
- freedom of the press,
- group-forming (freedom of association),
- routes around censorship (to a first approx)
- other freedoms . . .

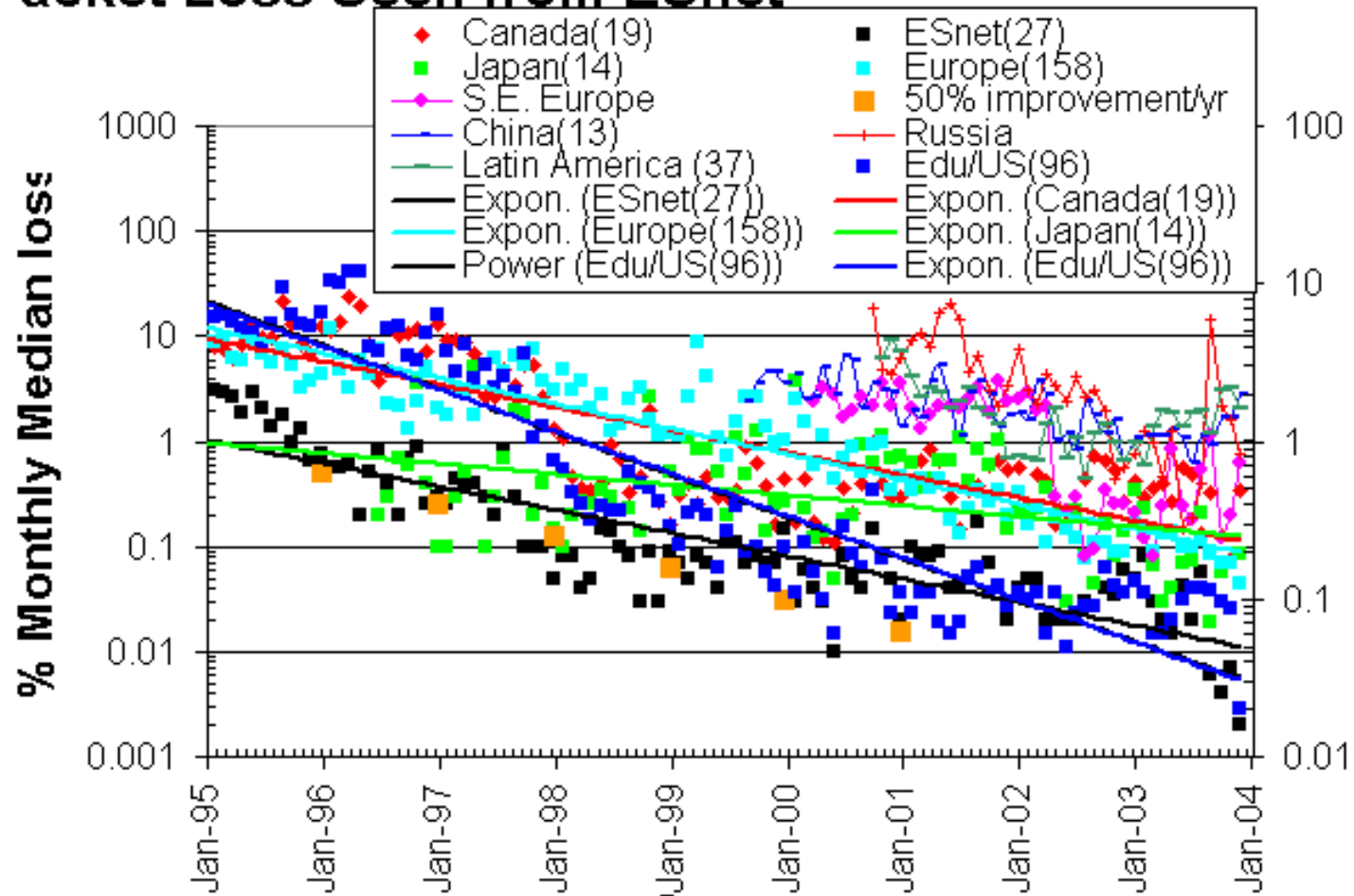
"There's divinity in it"

Professor Charles Nesson  
Berkman Center for Internet & Society

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# Internet Improvement $\sim$ Moore's Law

## Packet Loss Seen from ESnet



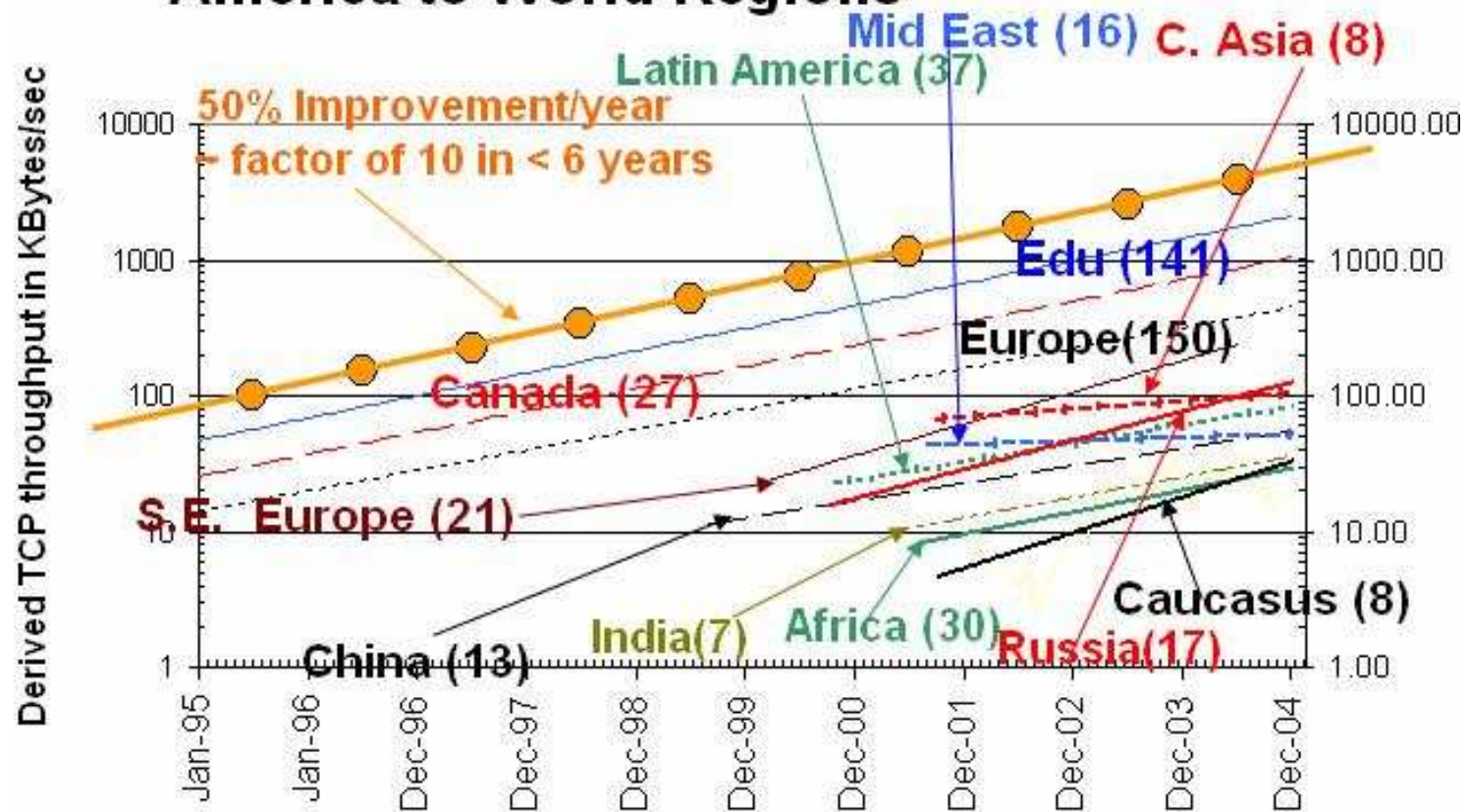
<http://www.slac.stanford.edu/xorg/icfa/icfa-net-paper-jan05>

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# Internet Improvement $\approx$ Moore's Law,

## TCP throughput measured from N. America to World Regions

From the PingER project, Jan 2005



<http://www.slac.stanford.edu/xorg/icfa/icfa-net-paper-jan05/>

In other words . . .

The Internet is doing fine despite:

- It is growing without limit
- It is getting better as technology improves
- Nobody owns it
- Nobody plans its growth
- There's no business model, ROI, etc.

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# Big Accident

Telcos, cablecos, and cellcos -- the Internet access providers! -- will be hurt the most by the growth of the Internet.

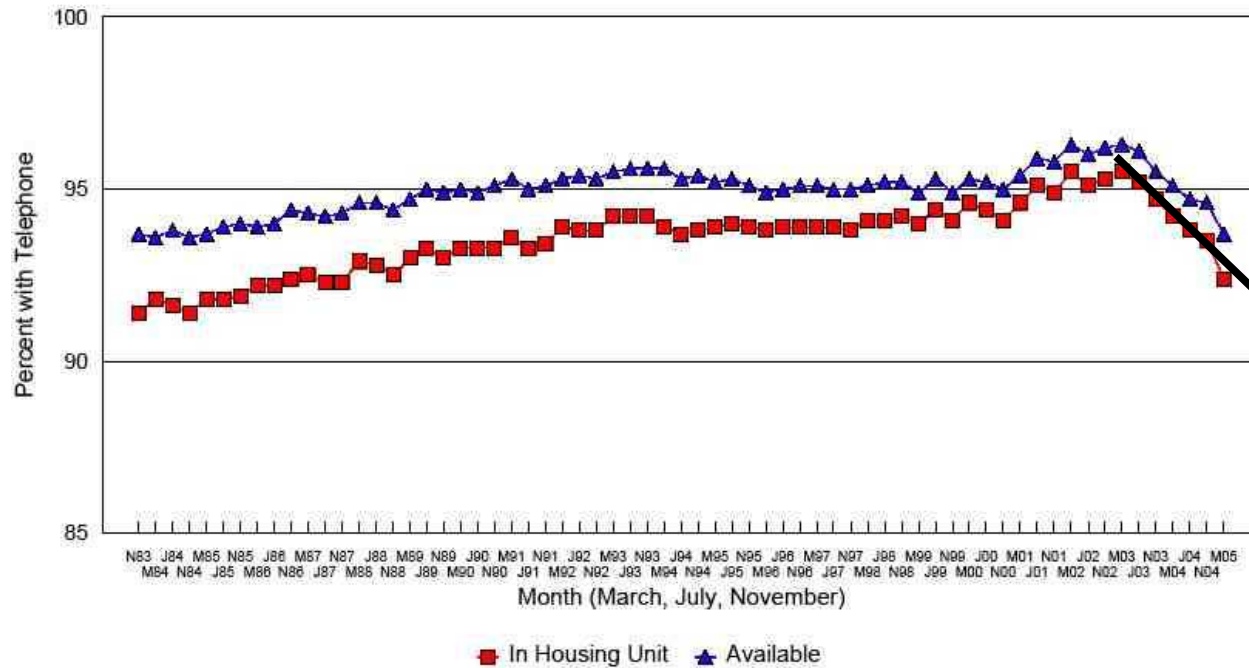
"Network-resident" applications that run on special-purpose networks will be disrupted.

# The Internet "Problem"

- "If AT&T knew what was good for it, it would kill the Internet." -- 1993
- "The Internet can't route money." -- 1997
- "Email is a feature that nobody pays for . . . AT&T needs 'network resident' applications." -- 2003
- "They're not going to use my pipes for free." -- 2006

# Telcos in Crisis

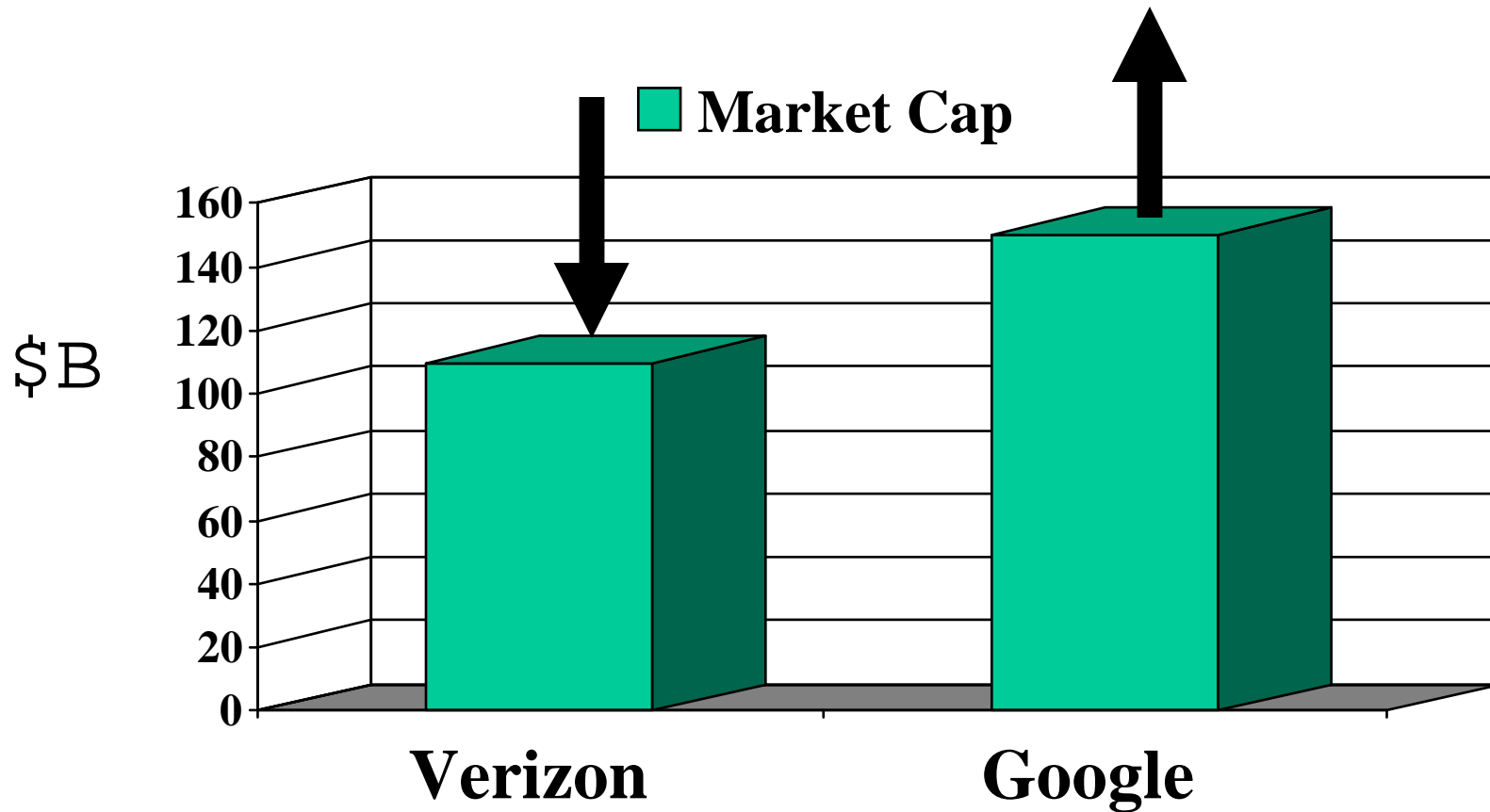
## Telephone Penetration Households



Nov  
2010  
(80% intercept)

Source: FCC December 2005 Universal Service Monitoring Report, Chart 6.1  
[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-262986A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-262986A1.pdf)

# The Internet "Problem" (cont'd)



# Carriers Fight Back

FCC Triennial Order privatized fiber (2003).

Supreme Court Brand X privatized cable (2005).

FCC DSL Order privatized DSL (2005).

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# Network Neutrality

“. . . [Internet access] service that privileges, degrades or prioritizes any packet transmitted . . . based on its source, ownership or destination.”

AT&T Final Merger Commitments, 12/28/06

“We will not block, impair, or degrade content, applications, or services . . . ”

Walter B. McCormick, Jr., President of the U.S. Telecom Association  
Feb 7, 2006 <http://commerce.senate.gov/pdf/mccormick-020706.pdf>

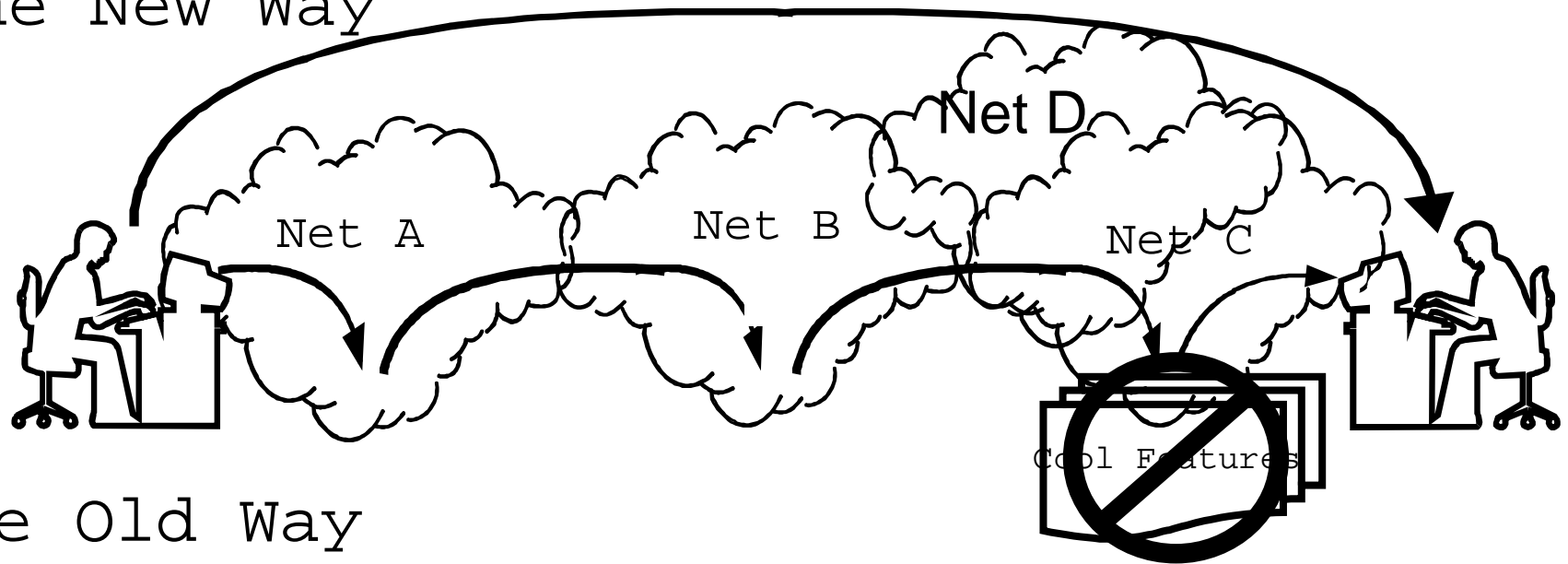
Absence of deliberate anti-competitive discrimination.

I said that

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# Network Neutrality: Architectural Vi

The New Way



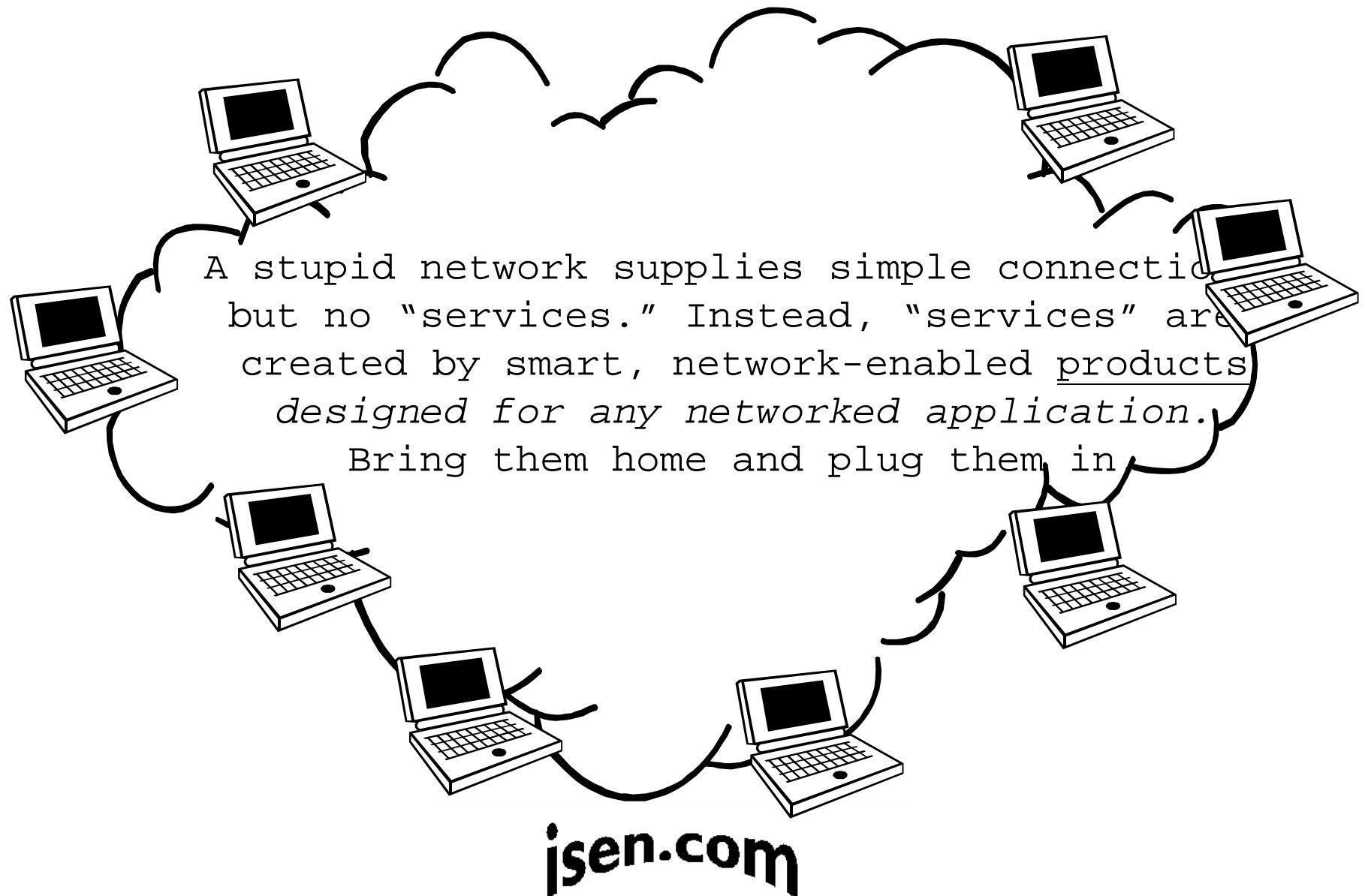
The Old Way

"Network of different networks" pushes differences (and added value) to the edge.

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# The Stupid Network is a Neutral Network.



# Network Neutrality: Business Vi

## App-Specific Network

Application:  
Specific to  
Network

Network Layer:  
Designed for App

Physical Layer:  
Designed for App

Monthly  
Income

Expense  
(Subsidized  
by  
Application)

Expense  
(Subsidized by  
Application)

## Inter-Networking

Application:  
Nonspecific --  
Voice, Video,  
Maps, Games,  
Anything!

Network Layer:  
Internet  
Protocol

Physical Layer:  
Non-specific  
End-to-End  
Connectivity

Product &  
Service  
Income

Commons

Big Question:  
What's the  
(Business?)  
(Operating?)  
Model

**It is hard to make money  
on stupid connections**

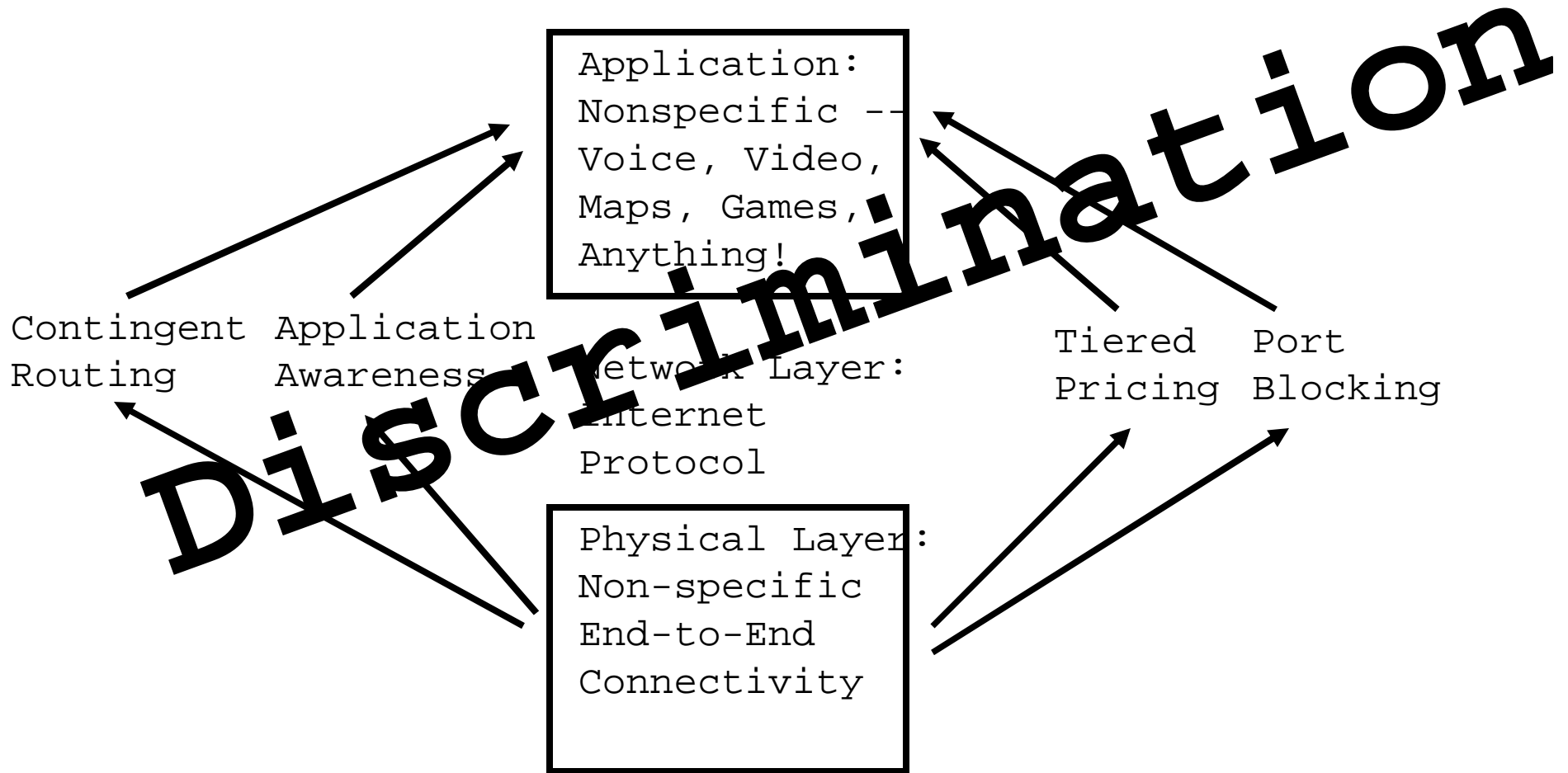
When the middle of the network is empty,  
and bandwidth is plentiful, what do network  
service providers sell?

Ref: Paradox of the Best Network, Isenberg & Weinberger  
<http://netparadox.com>

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# Carrier Attempts to "Fix" Biz Model

## Inter-Networking Model



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# Why telcos want to discriminate

Special-purpose networks discriminate.  
It is consistent with their 130 year legacy.  
Discrimination is "economically efficient."

Reference: Privacy, Economics, and Price Discrimination  
on the Internet, Andrew Odlyzko

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It Takes Smart People to  
Build a Sustainable  
Stupid Network



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