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## Global Commission on Internet Governance

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PAPER SERIES: NO. 33 — MAY 2016

# Market-driven Challenges to Open Internet Standards

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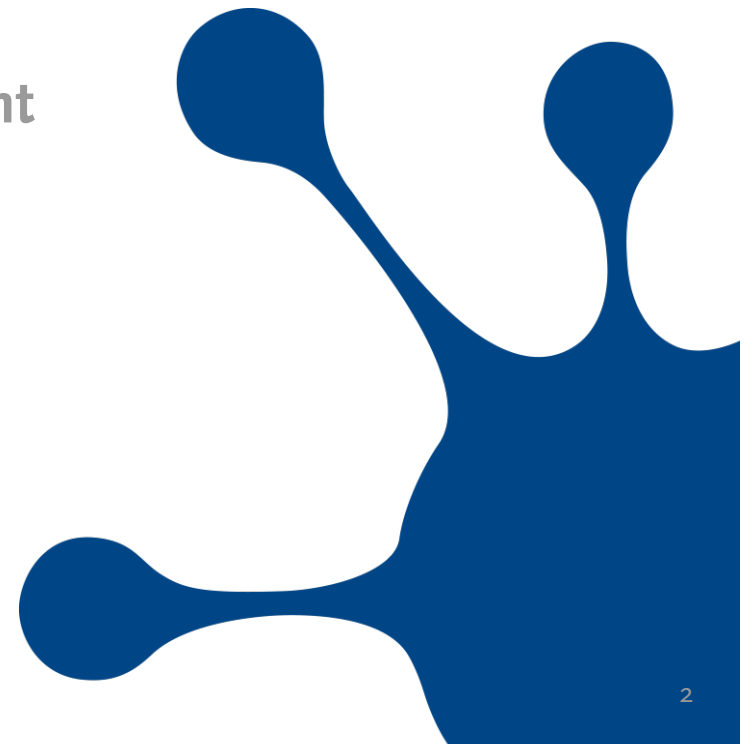
Patrik Fältström



Patrik Fältström - [paf@netnod.se](mailto:paf@netnod.se)

Head of Engineering, Research & Development

Netnod



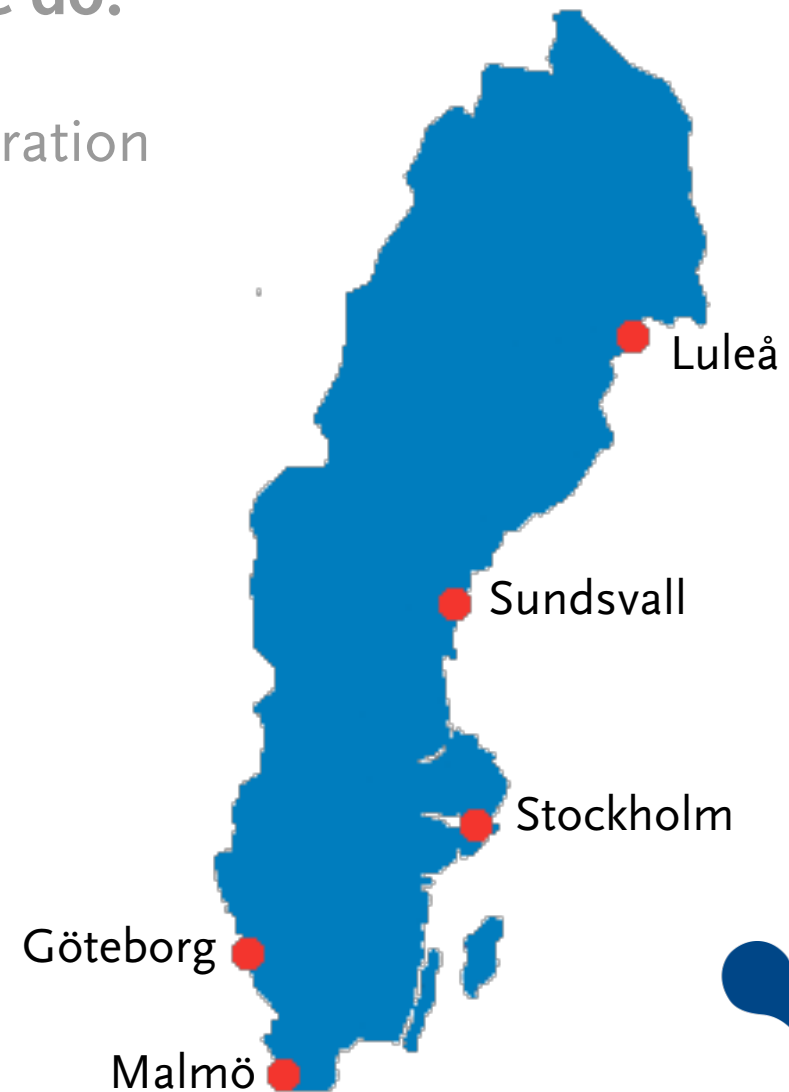
## What is Netnod, and what do we do?

By a foundation fully owned incorporation

Not for profit

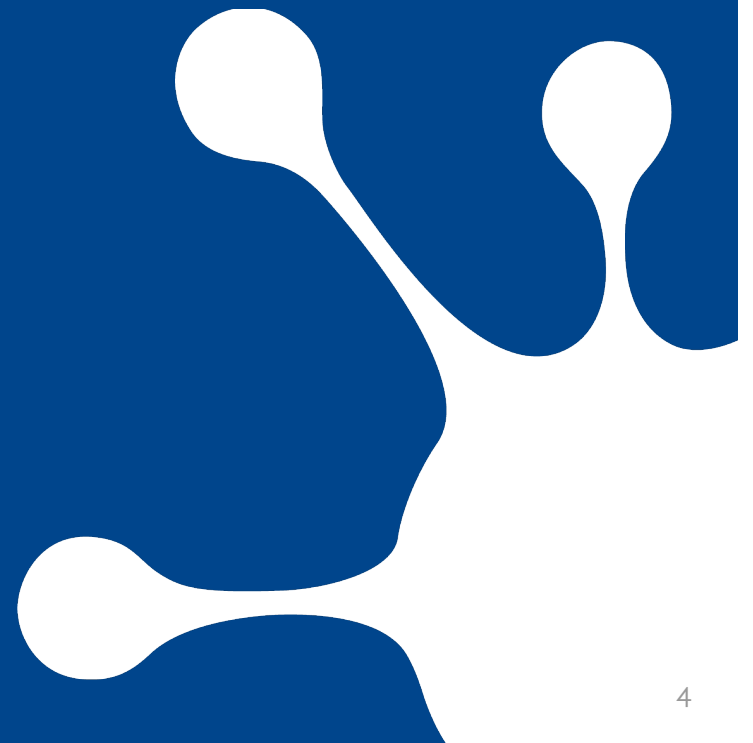
Provides:

- IX in 6 locations in Sweden
- DNS in 55 locations in the world
- NTP-service in 4 locations in Sweden



WE LIVE IN A NEW WORLD

*What was it we were thinking of?*



35 years ago...

We had one telco

They had some services

Provided TDM based communication

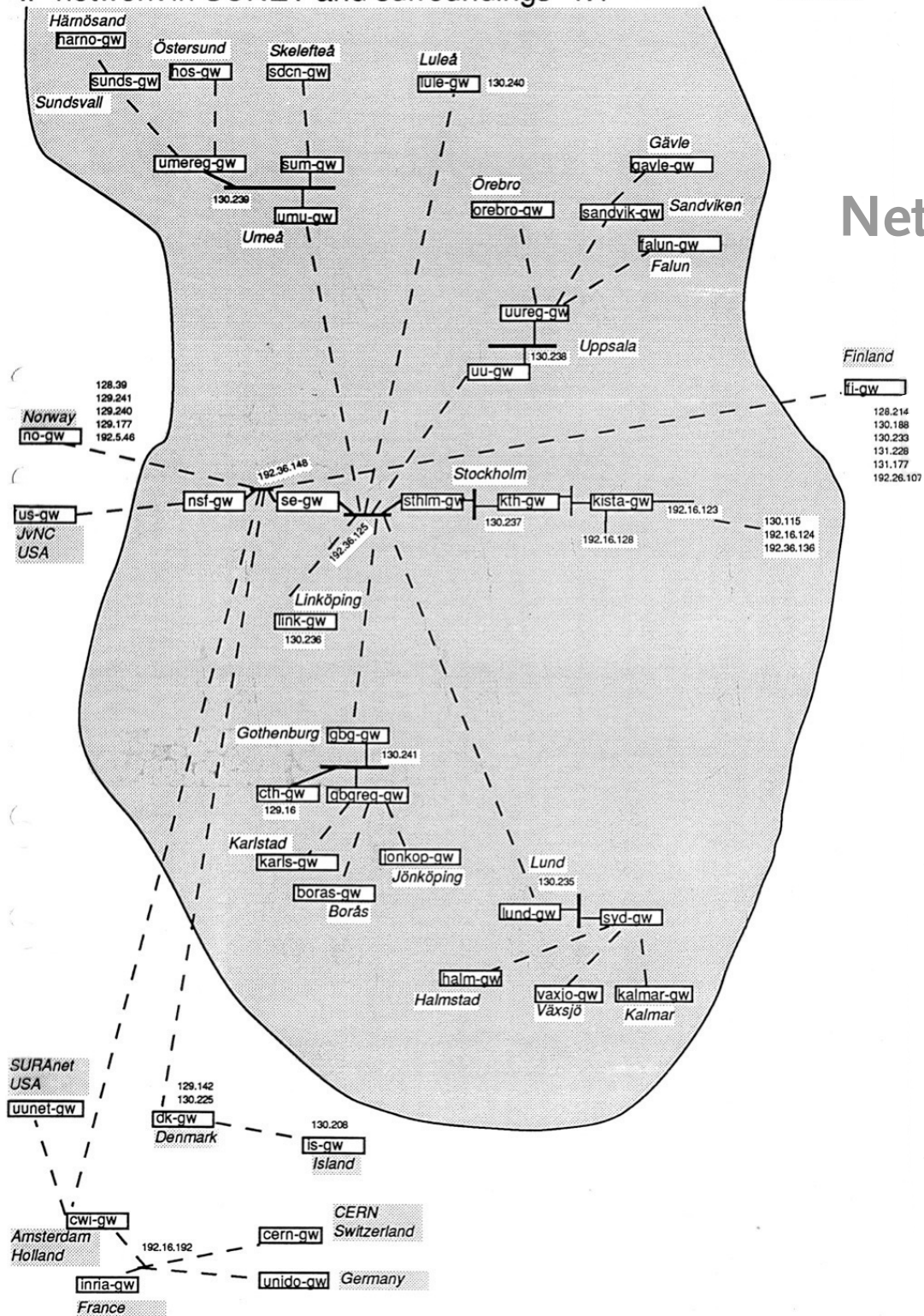
They sold the end equipment

Most fascinating service was call forwarding when there was no answer

The telco was responsible for everything, and legislation was written to target only them

And, they were owned by the government



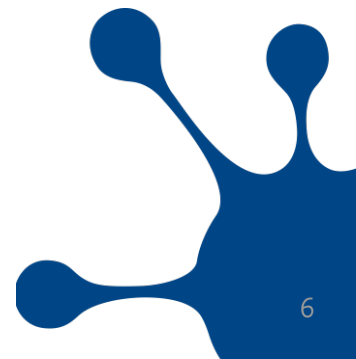


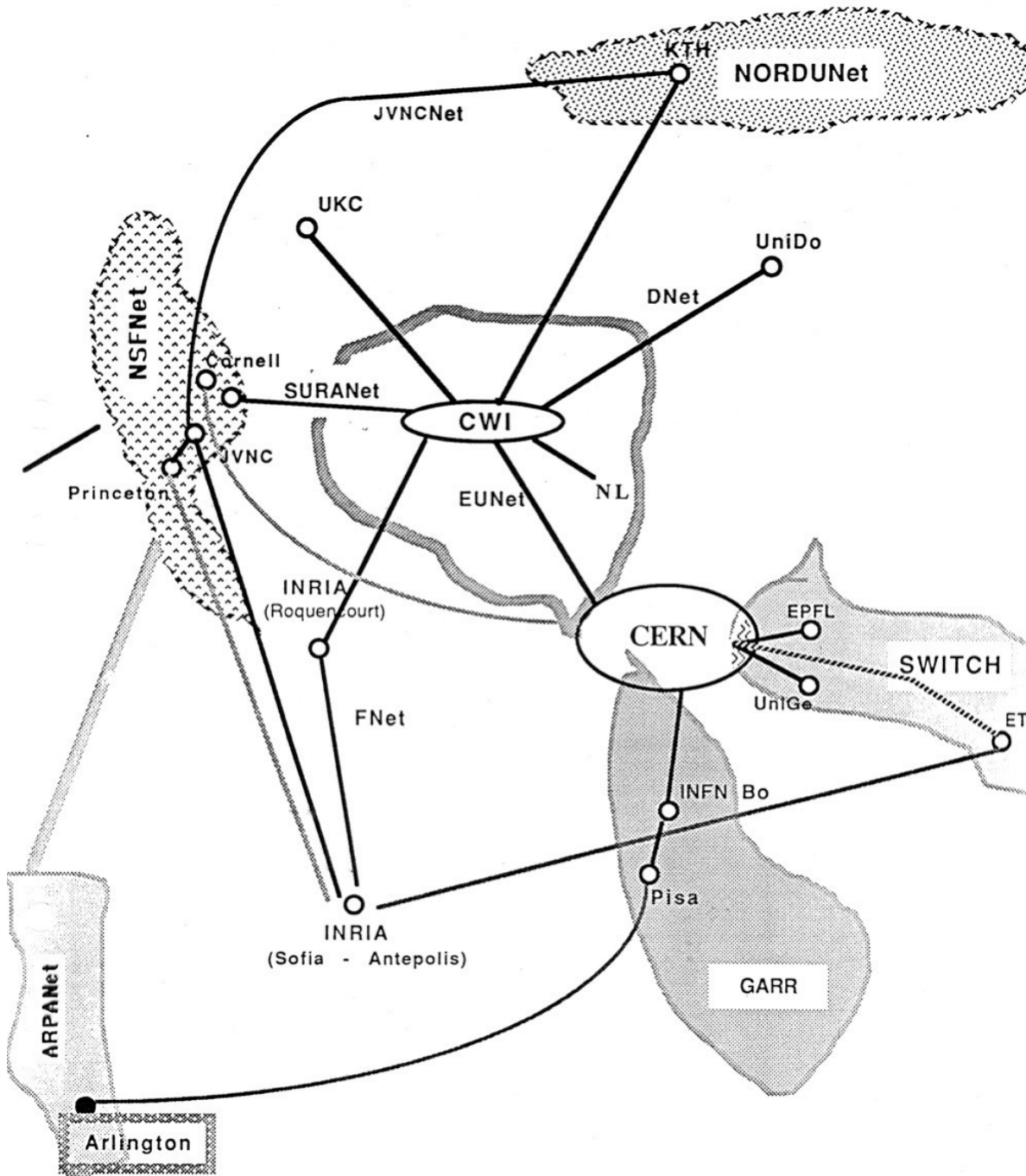
# Network in Sweden December 1989

Cisco and  $\mu$ -vax together with Vitalink bridges created long distance connections

Star-shaped network (64kbps links), with multi-port transceivers as local "LAN" segments

Connection via 64kbps satellite to JvNC in US and to Amsterdam





## Networks in Europe December 1989

All connections to NSFNet  
“Default Network” was pointing at NSFNet

5 connections over the Atlantic:  
Stockholm, Amsterdam, Sofi-  
Antipolis and Pisa

4 large networks: NorduNet,  
EUNet, Switch and Garr



## Today a different world

Many telcos

Competition regarding new services

Not only “telephony” uses telco equipment

Internet has taken off

With Internet, global reach at zero cost

Globalization is here





## Old and new world

Telephony, Cable TV, Satellite, Mobile

Old

- Buy connection from one provider
- Then buy additional services from provider

Internet

New

- Buy connection from one provider
- Then buy additional services from anyone



## Old and new world

Telephony, Cable TV, Satellite, Mobile

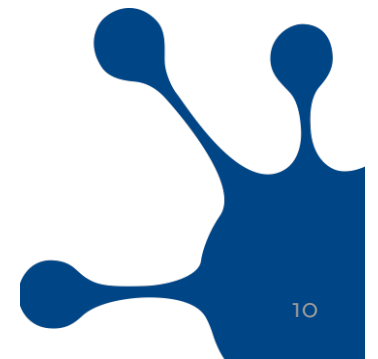
Old

- Buy connection from one provider
- Then buy additional services from provider

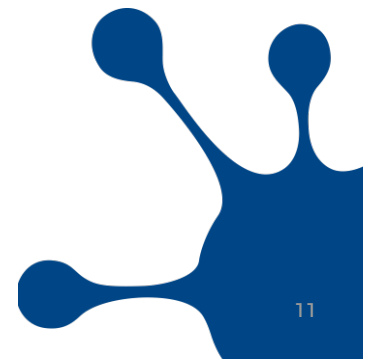
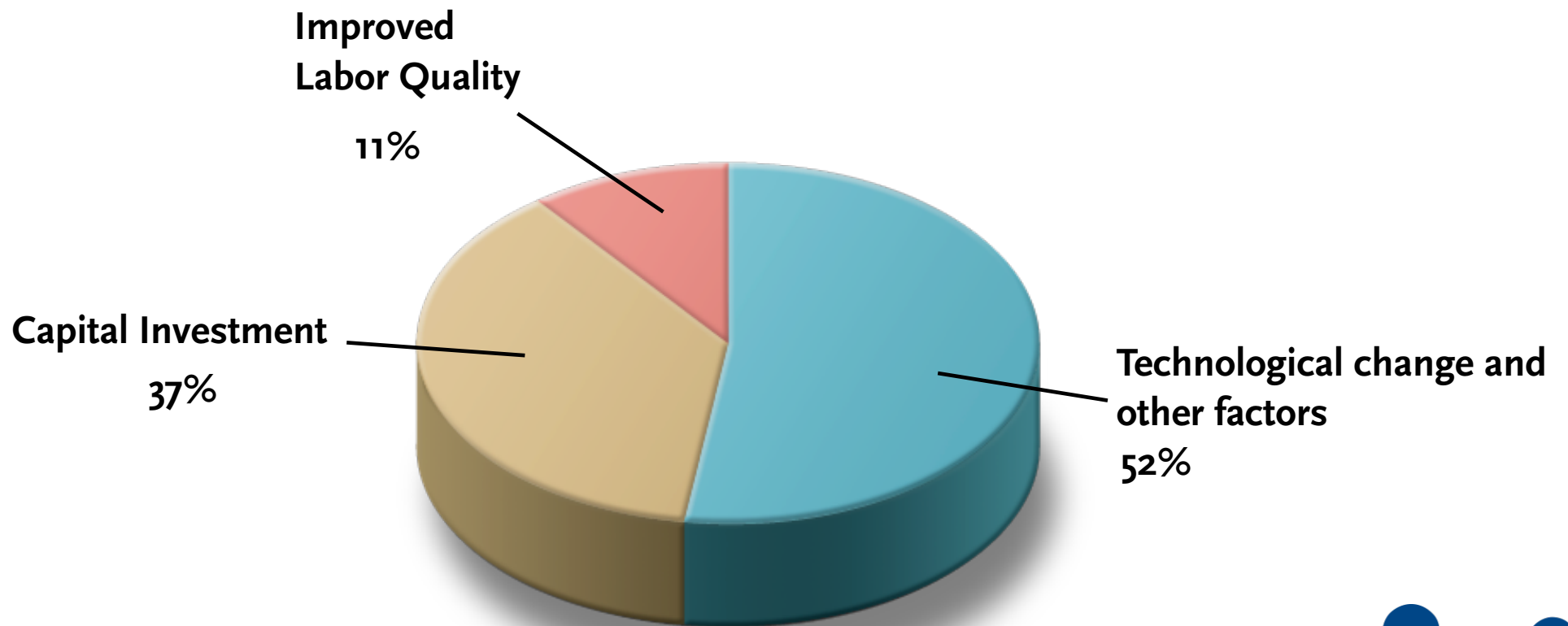
Internet

New

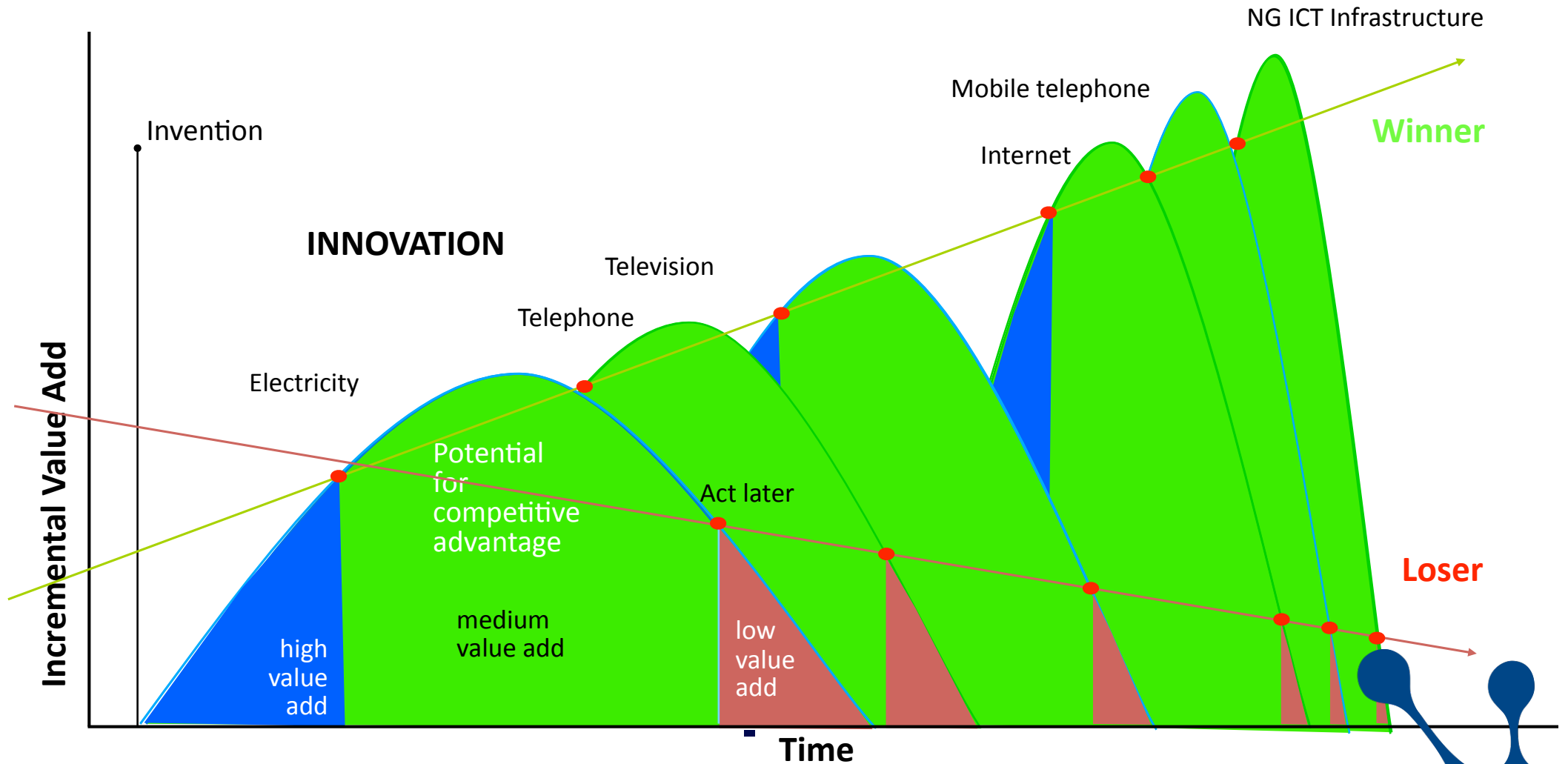
- Buy connection from one provider
- **Then buy additional services from anyone**



## What drives productivity?

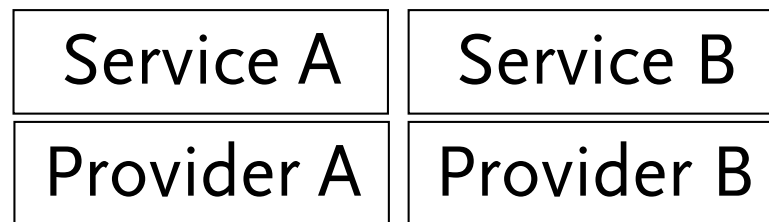


# Winners and losers

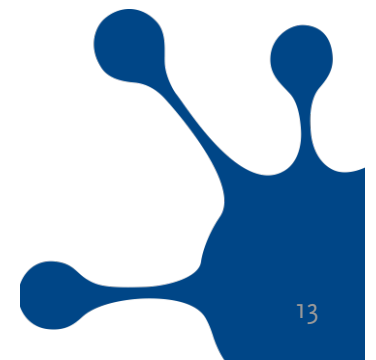
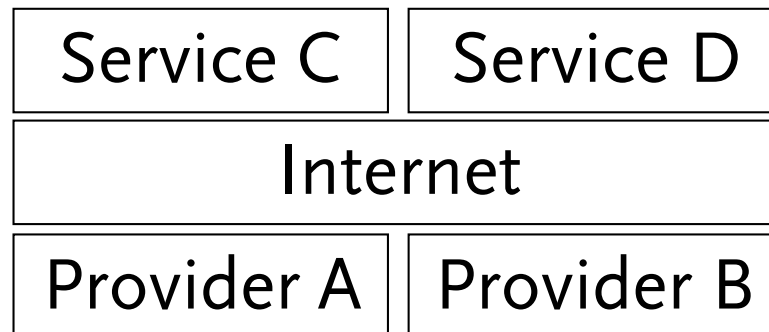


## That does not explain change in the value chain...

Historically we had two layers, and vertically integrated providers

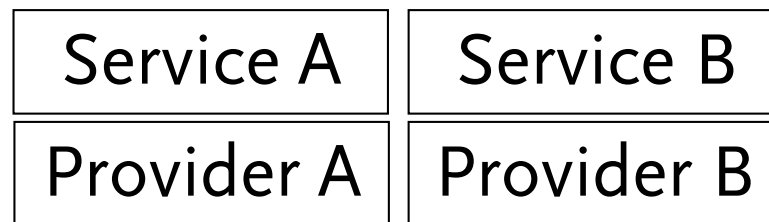


Today, we have three layers, and horizontally separated layers

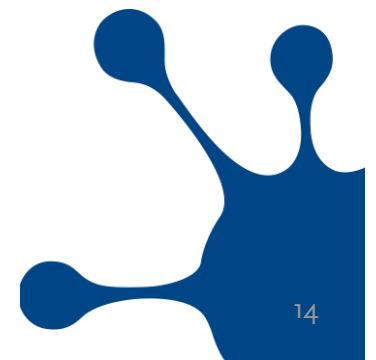
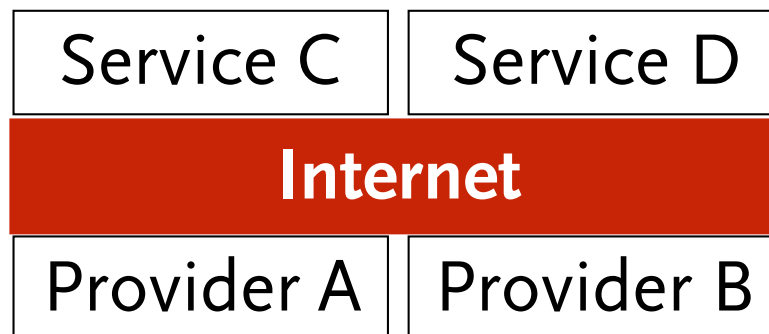


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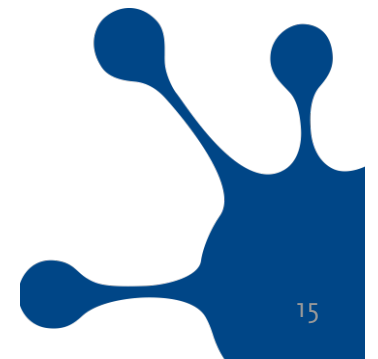
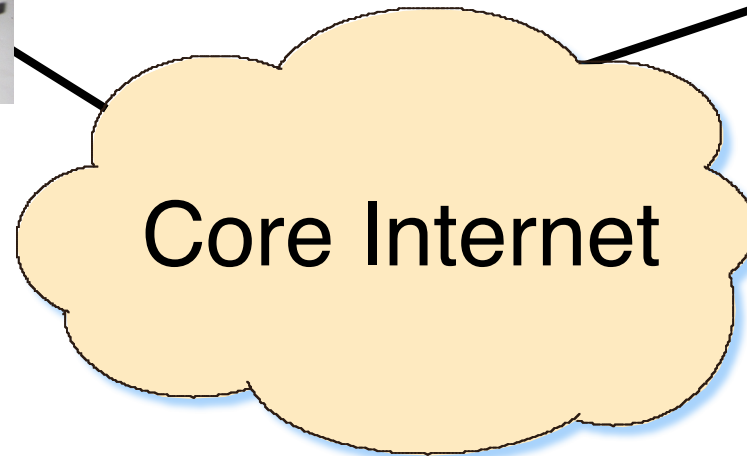
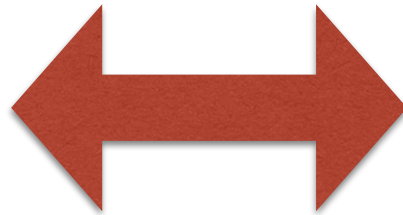
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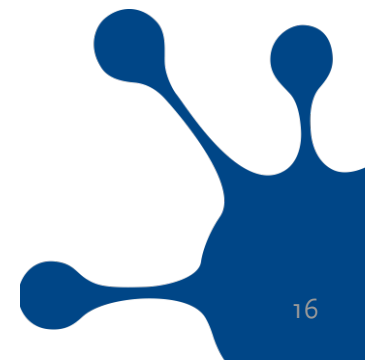
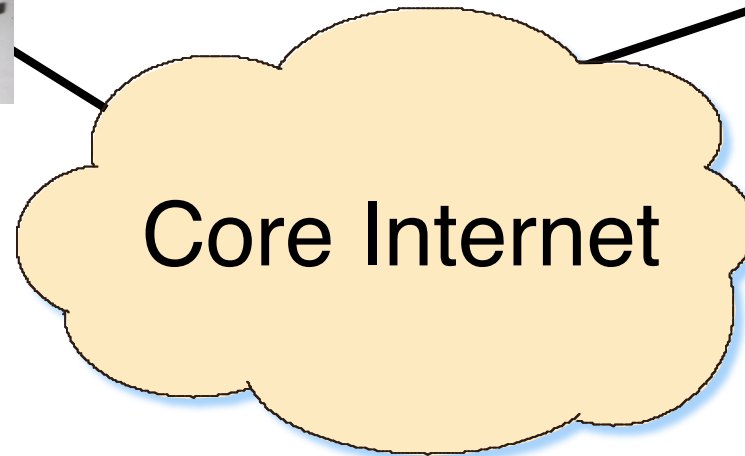
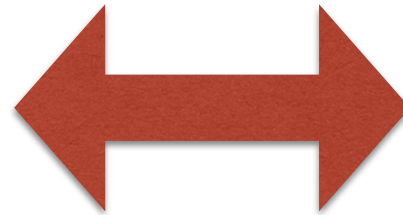
Today, we have three layers, and horizontally separated layers



## Early days, client - client (east - west)

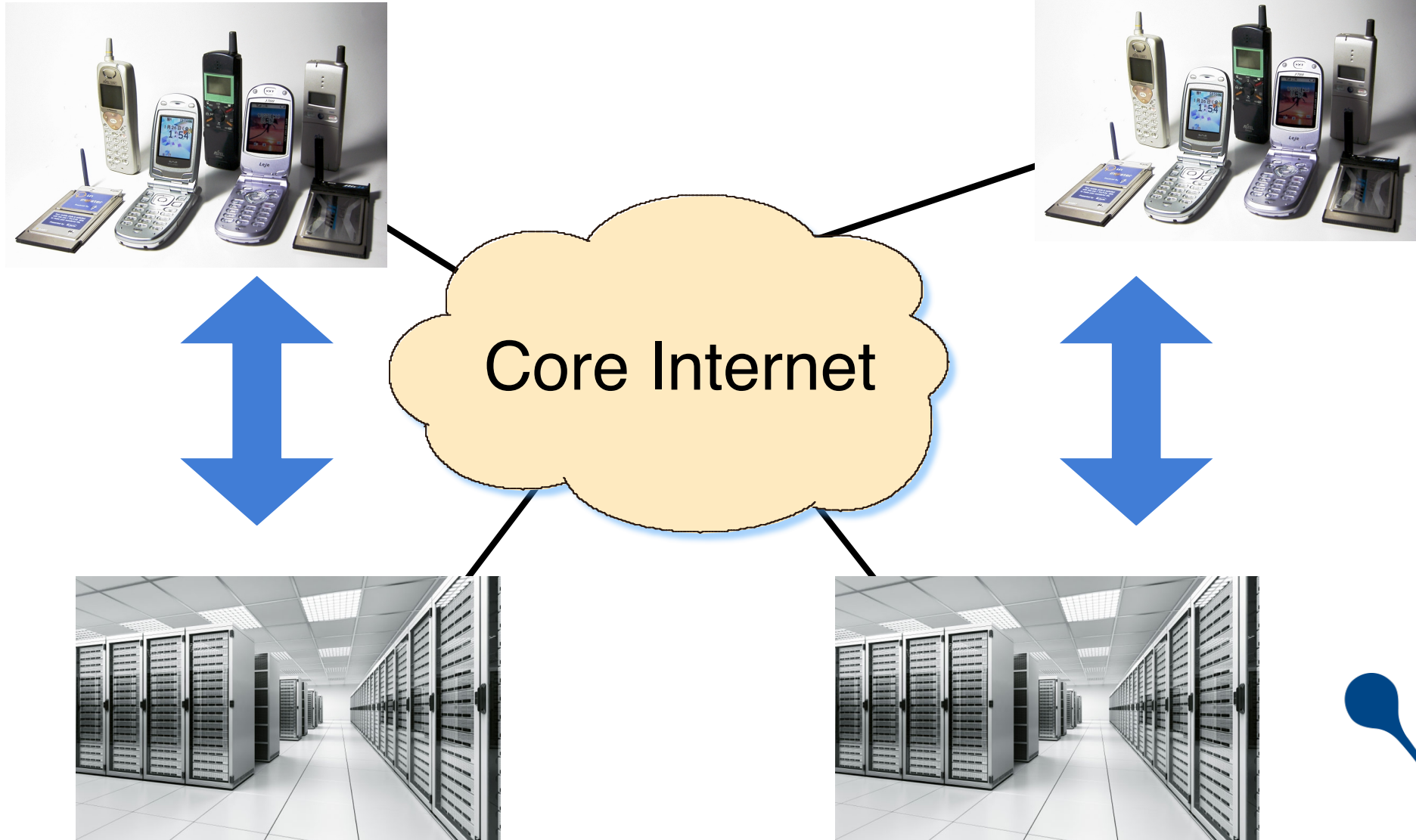


We normally call this *end-to-end*

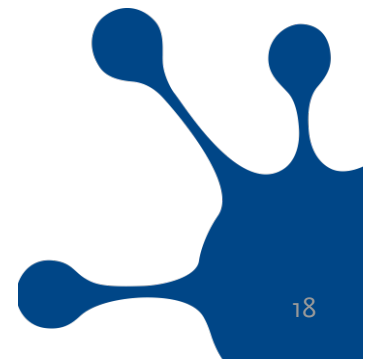
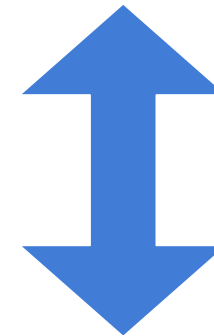
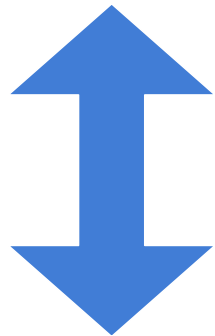
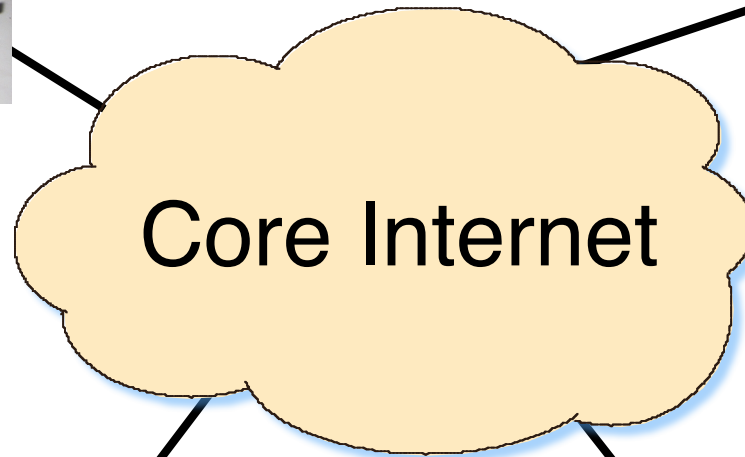




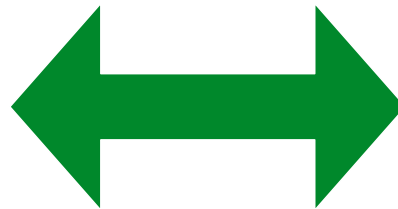
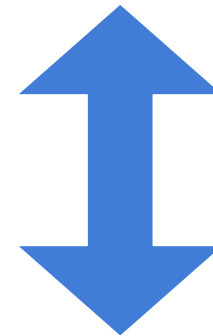
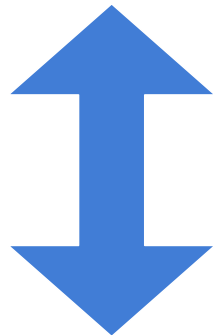
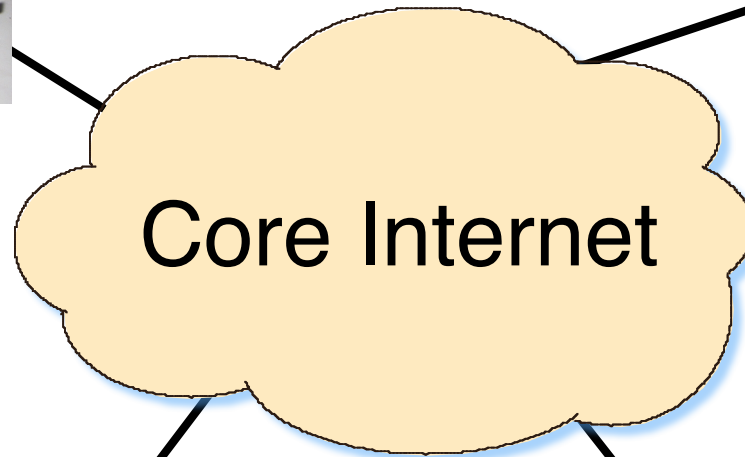
# But also, client - server (north - south)



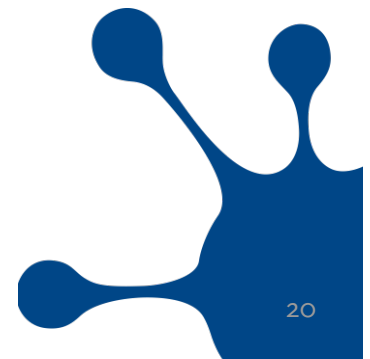
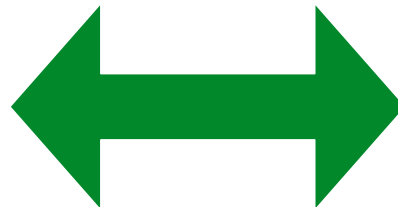
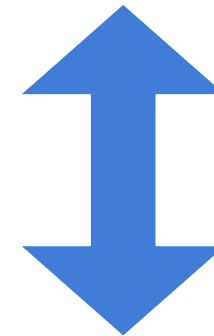
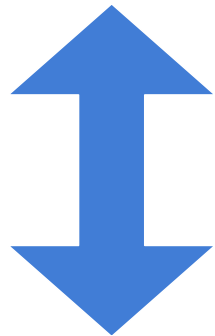
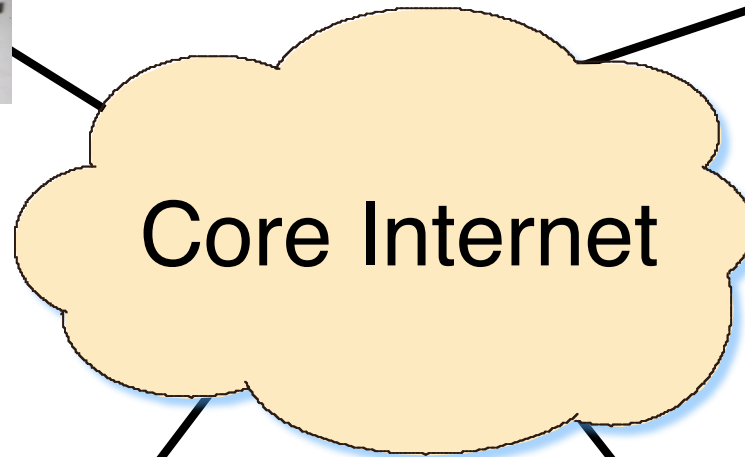
# Still end-to-end



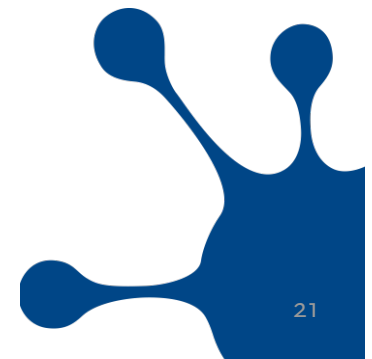
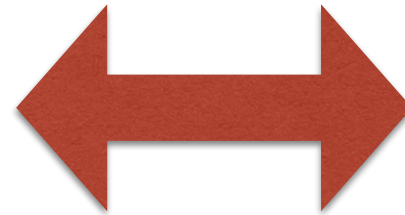
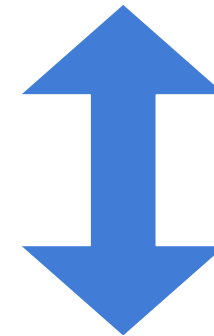
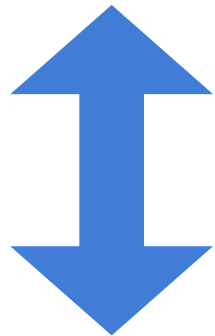
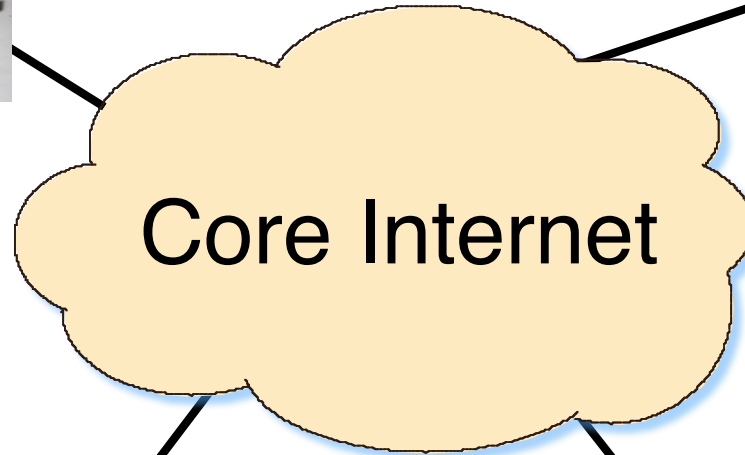
# Today, server - server (east - west)



I call this *end-cloud-end*

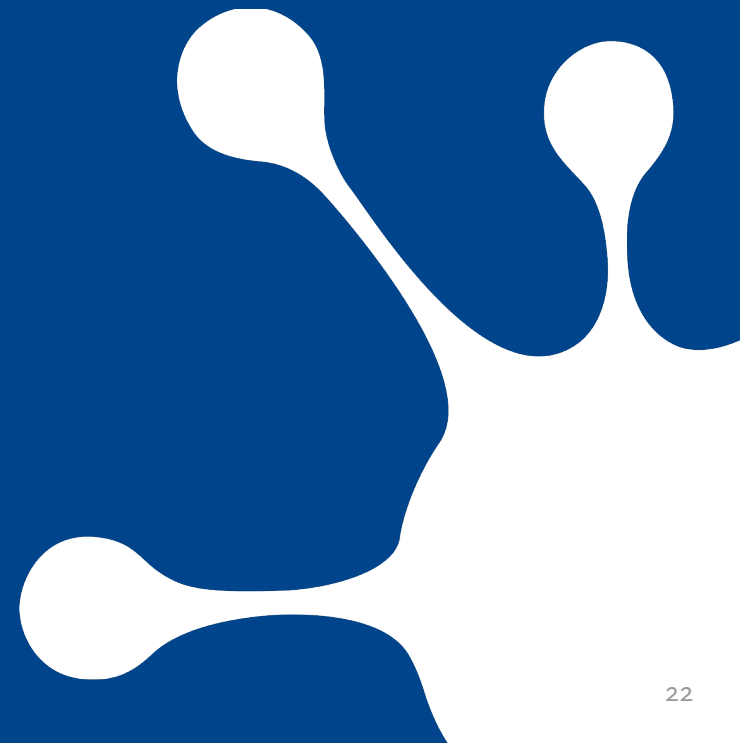


I hope we can go back to *end-to-end*



# INTERNET OF THINGS

*Your lips move, but I can not hear what you are saying*



## Whats up?

- *Internet of Things*

Is not Internet by definition communication between things?

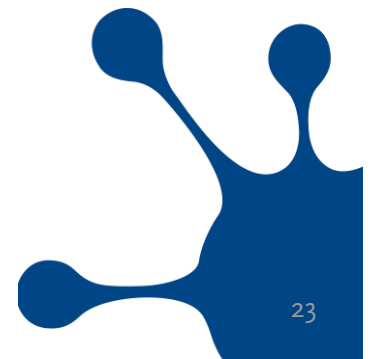
Is the difference what controls the things?

Do things have to be autonomous to participate in IoT?

Do we not have *Internet of Everything*?

Is it about data?

Is it about hyperconnect the world?



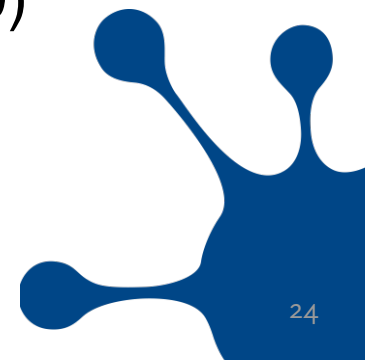
Its old stuff - we have done this before!



Trojan Room Coffee Pot  
First webcam - 1991



Carnegie Mellon Internet  
Coke Machine (1982, 1990)









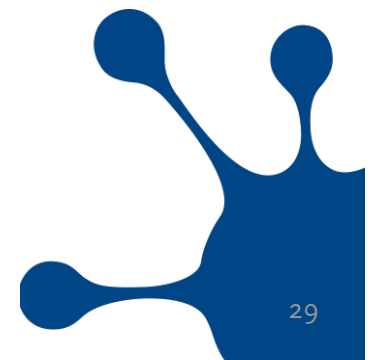
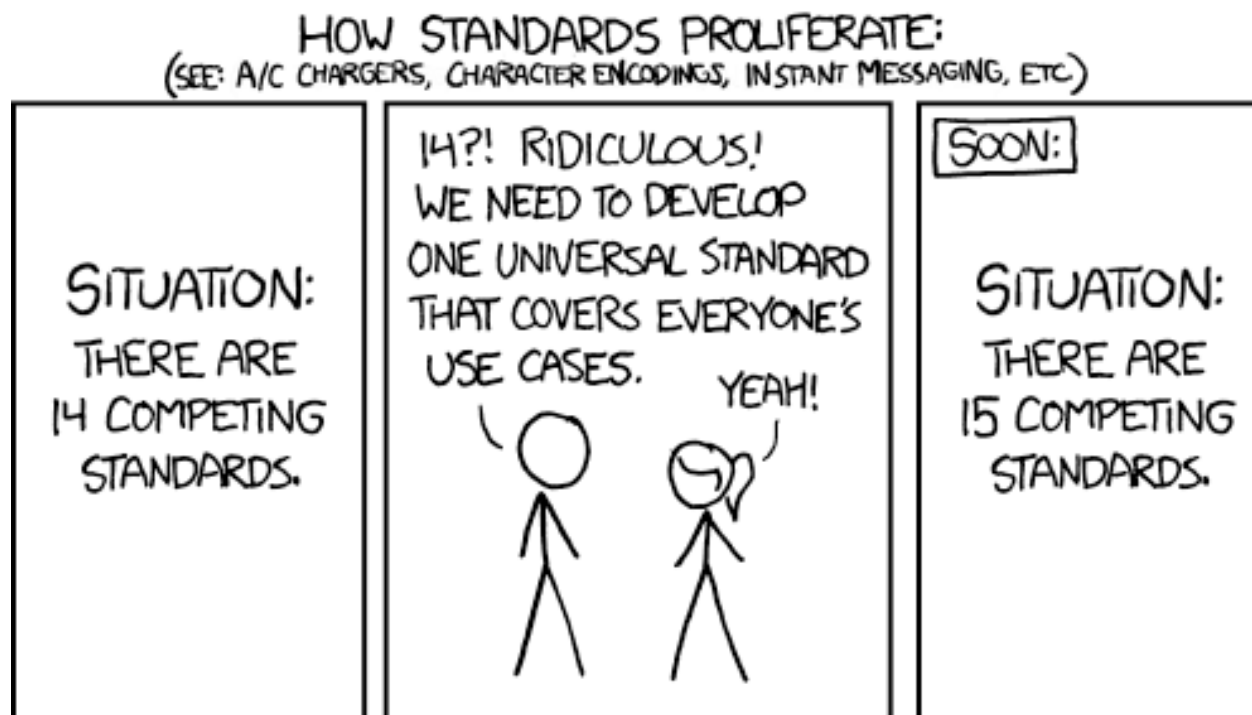




## Internet of things

I define Internet of Things as the Internet as we know it, but, where at least one of the nodes that communicate acts autonomous, either as a sensor that collect data, or as a node that acts on command, or both.

If that is the definition, what is the problem?



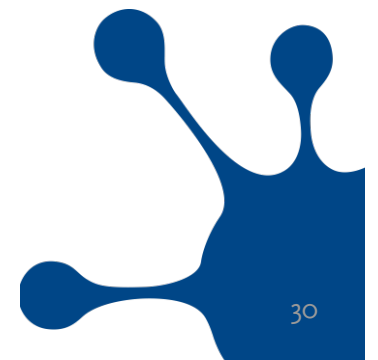
## Internet of things

I define Internet of Things as the Internet as we know it, but, where at least one of the nodes that communicate acts autonomous, either as a sensor that collect data, or as a node that acts on command, or both.

### If that is the definition, what is the problem?

Well, the same as we always have had, but exaggerated in many cases:

- The ability to communicate
- To have proper soft- and hardware
- To manage the information correctly





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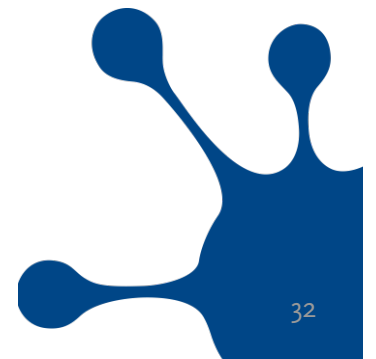
## **Market-driven Challenges to Open Internet Standards**

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Patrik Fältström

# Internet fundamentals

- End to end communication
- Global uniqueness
- Open Standards





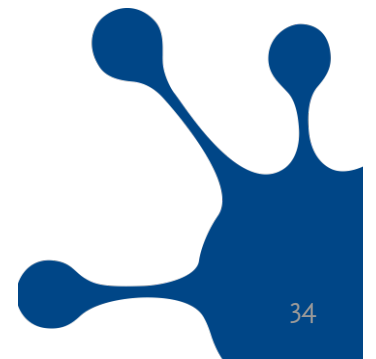
# Open Standard Development

- Ability to Participate in Development of the Standard
- Ability to Access Working Documents
- Ability to Participate in Decision Making
- Ability to Appeal
- Ability to Access the Standard
- Ability to Implement the Standard



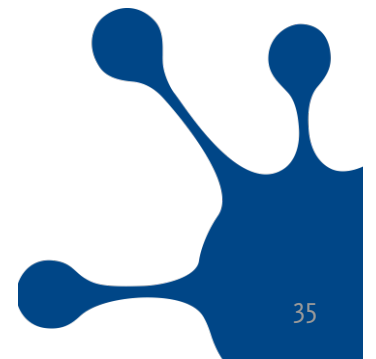
# Market forces

- Sell services, not products
- *End-Cloud-End* enables Big Data
- Make services sticky
- Work in NAT:ed IPv4 environments based on REST
- API to the cloud



# The future / challenges

- Longer term interest gains interest
- Competition / cooperation grows market
- IPv6 is interesting
- *End-to-end* comes back again
- Devices does not turn into bricks when cloud dies
- Open standards becomes interesting



# Conclusion

Public sector organizations should use every opportunity that arises in procurement, regulation and project funding to require the use of open standards when they are available and to promote their development when they are not. This responsibility is especially important for socially critical systems such as electronic identification and payment schemes, for which the third-party control feature of service silos is unacceptable.

The market forces that favour service-oriented vertical integration over a disintermediated open Internet create strong economic incentives for individual companies to build silos with APIs rather than interoperable devices that implement standard protocols. Countering those forces to preserve the broad economic and social benefits of an open Internet for its users will require awareness and effort on the part of users and their public sector organizations, and a willingness to take a longer view of their business interests on the part of individual companies and industry consortia.

**Market-driven Challenges to Open Internet Standards**, Patrik Fältström. Global Commission on Internet Governance. Paper Series: No.33, May 2016. Centre for International Governance Innovation (CIGI) and Chatham House.

<https://ourinternet.org/publication/market-driven-challenges-to-open-internet-standards/>

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