



# Trends regarding Internet

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Teldok 2.0  
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Vinnare i kategorin  
Årets svenska IT-Person  
utsedd av Affärsvärlden och Computer Sweden

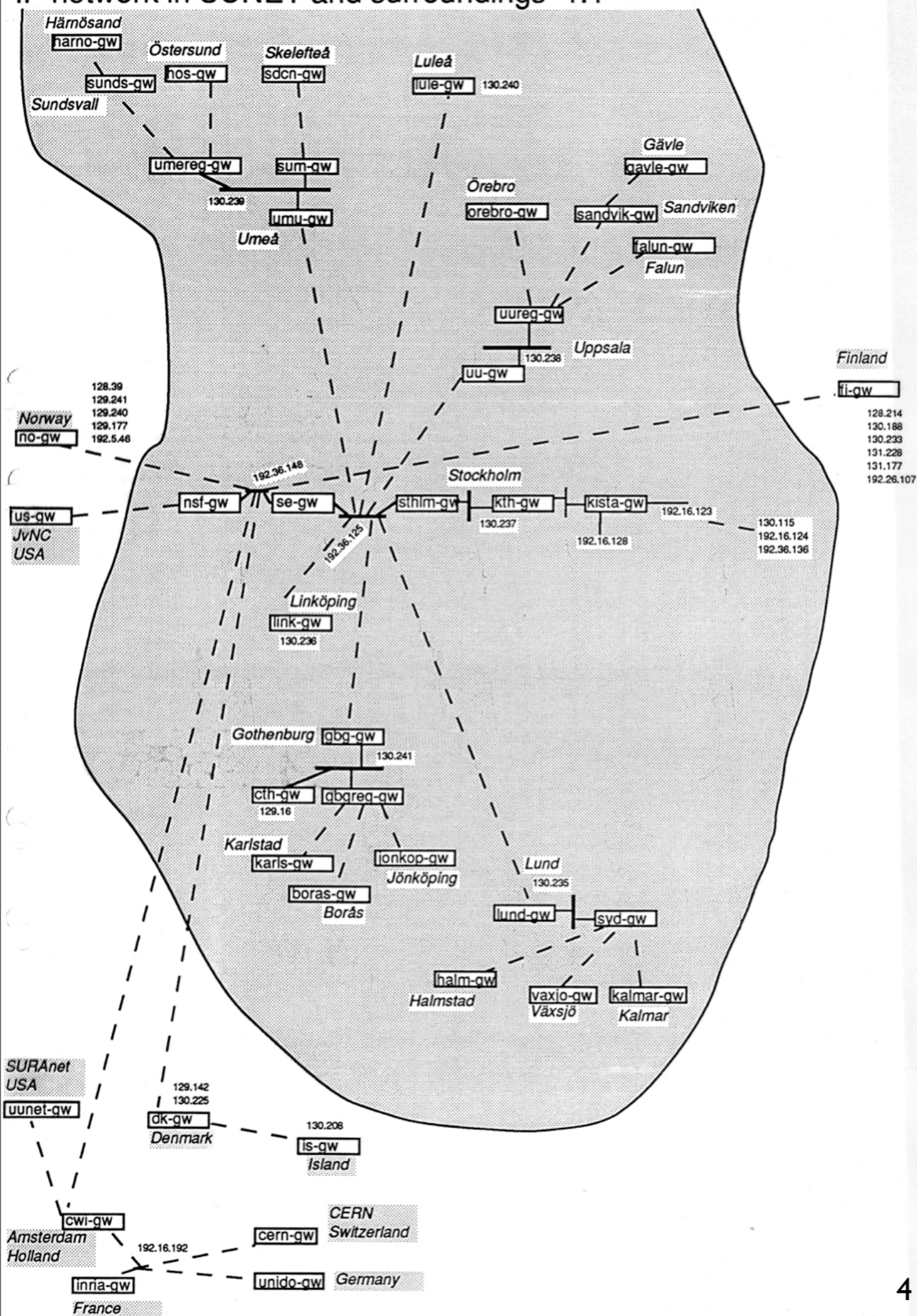
# 30 years ago...

- We had one telco
- They had some services
- 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



# 20 years ago

- We started to get competition
- First political decisions where made that said that competition was to be enabled
  - Number portability
  - More than one company selling phones
  - More than one cellphone provider



# 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

VITALINK  
TransLAN III

Power On    Self Test    Boot State    Packet Received

J 181

J 182

J 184

J 241

J 242

J 243

J 244

MULTIPOINT XVR

192.36.125 SUNET-backbone

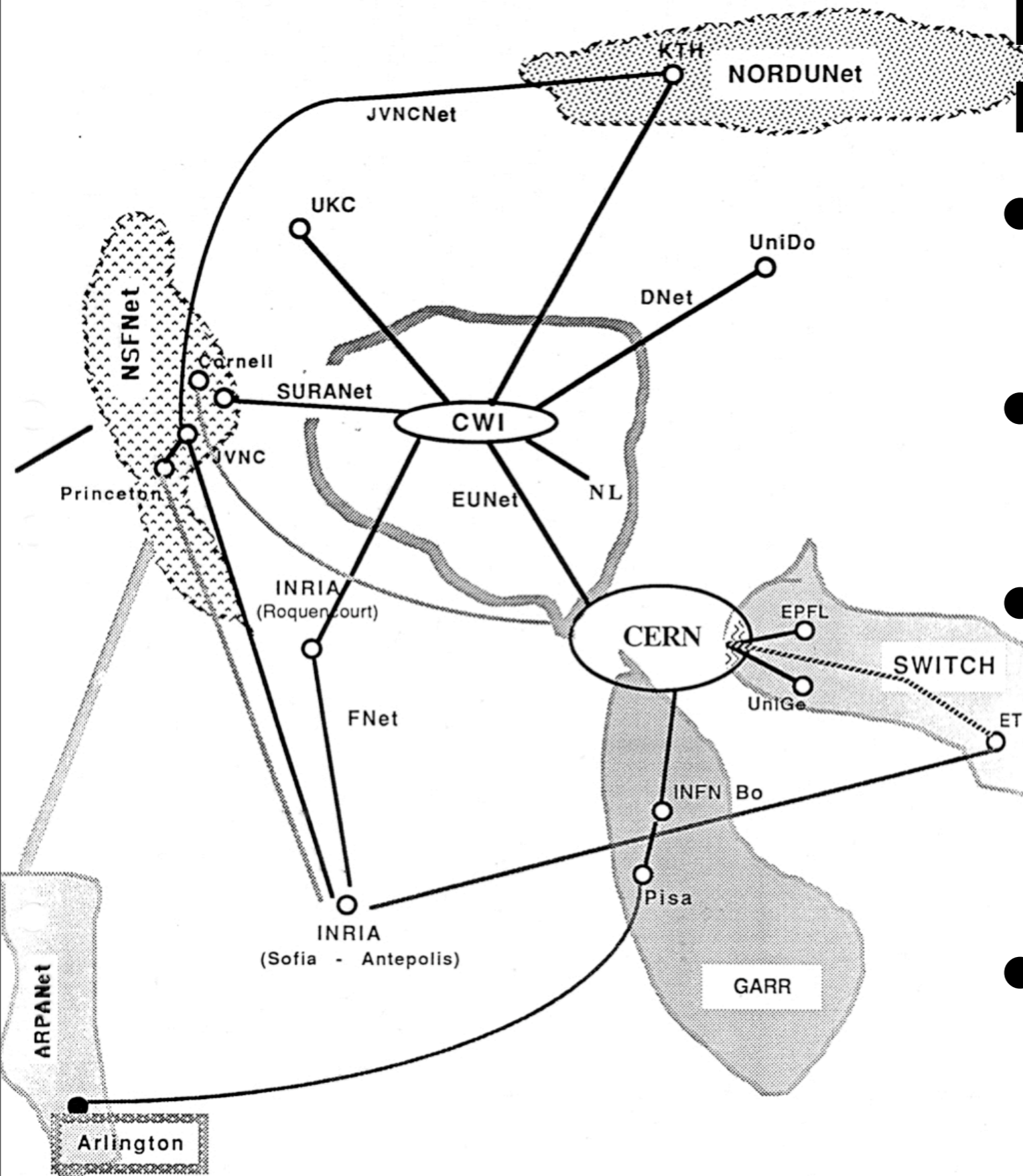
STHLM-GW



cisco Systems

AGS+

# Networks in Europe December 1989



- All connections to NSFNet
- “Default Network” was pointing at NSFNet
- 5 connections over the Atlantic: Stockholm, Amsterdam, Sofia-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

# Computers and Internet

- Everything is in the future a computer, a networked computer of course!
- At its simplest your TV, your phone, your address book, your agenda, your micro-wave, you car, your.. and your laptop are all networked computers
- The Internet belongs to all of us - or at least we all own a bit of it
- Each of us has our own personal Internet and some of it we may choose to share
- Increasingly each of us runs part of the infrastructure



# Convergence?

- Information = Software
- Anyone can create Information
- Anyone can create Software
- Anyone can distribute Information
- Anyone can deploy Services

# Convergence?

- Historically we know who can create information
- Historically we know who can create software
- Historically we know who can deploy services
- Now anyone can deploy services

# My piece of the Internet?

- When a person or organisation connect to “the Internet”, the network and services provided end up being ***a piece of the Internet***
- Protection (and robustness) start at home
- You have a lock on your door, and do not ask road authorities to keep burglars out!

# Old and new world

- Telephony, Cable TV, Satellite, Mobile
  - ▶ Buy connection from one provider
  - ▶ Then buy additional services from provider
- Internet
  - ▶ Buy connection from one provider
  - ▶ Then buy additional services from anyone

# Old and new world

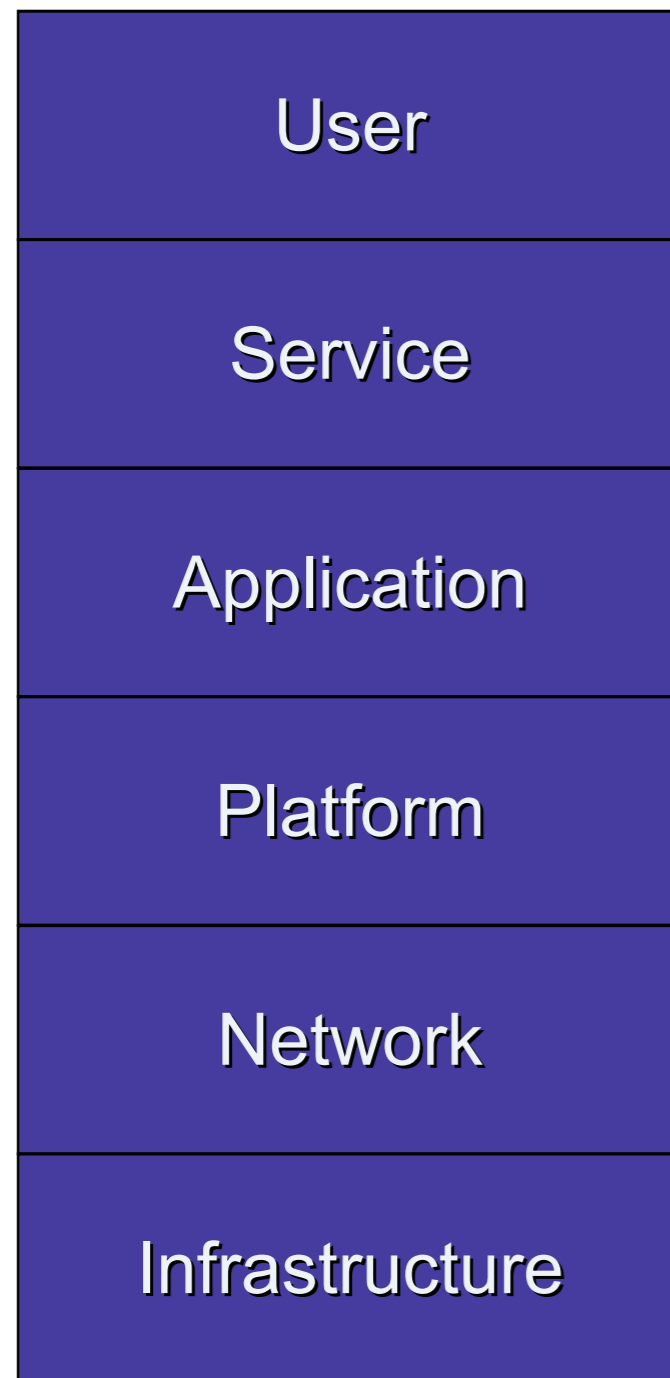
Old

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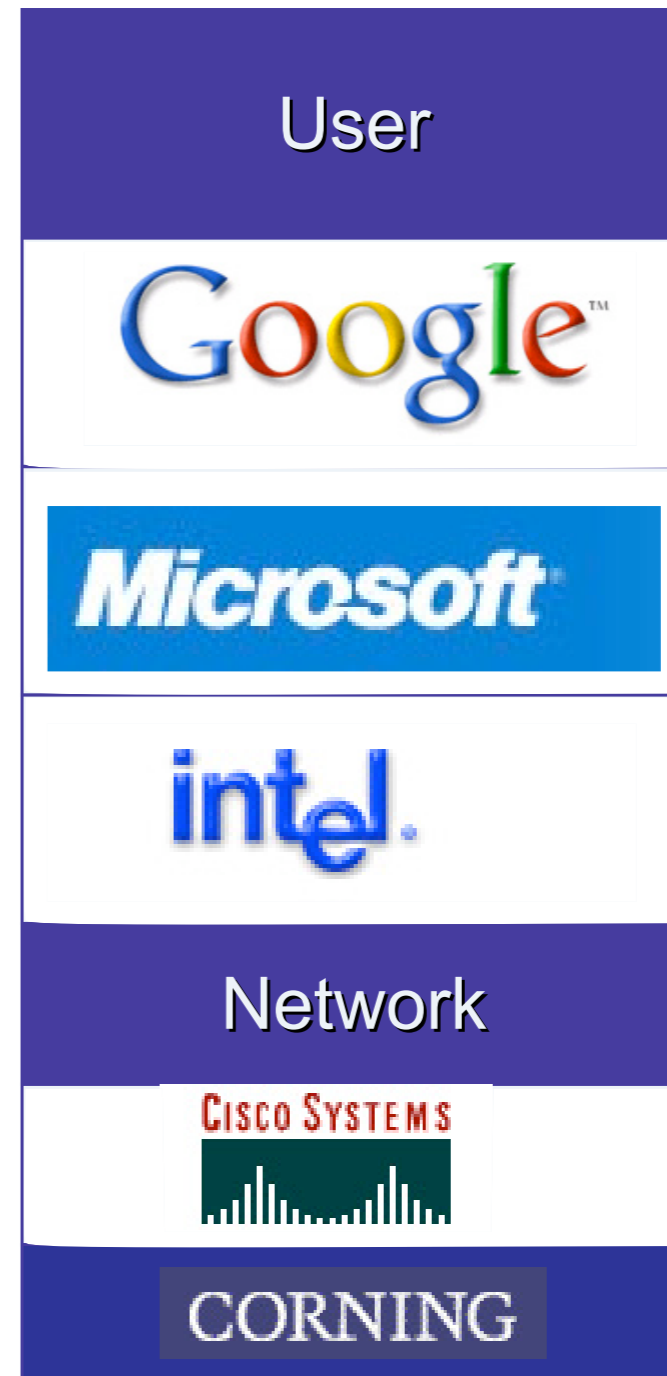
New

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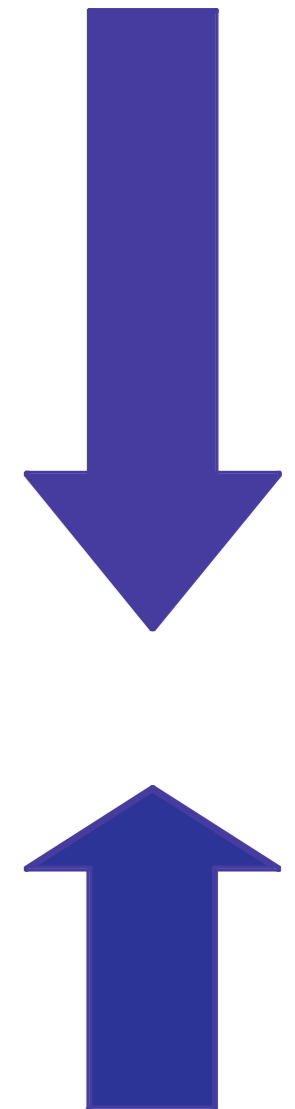
# Old and new world



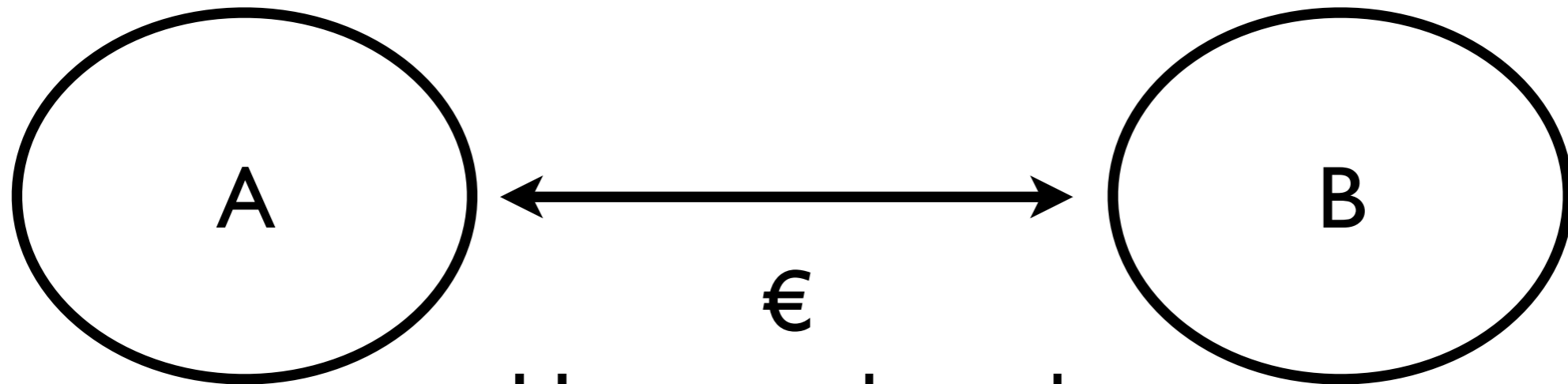
Nostalgia



Reality

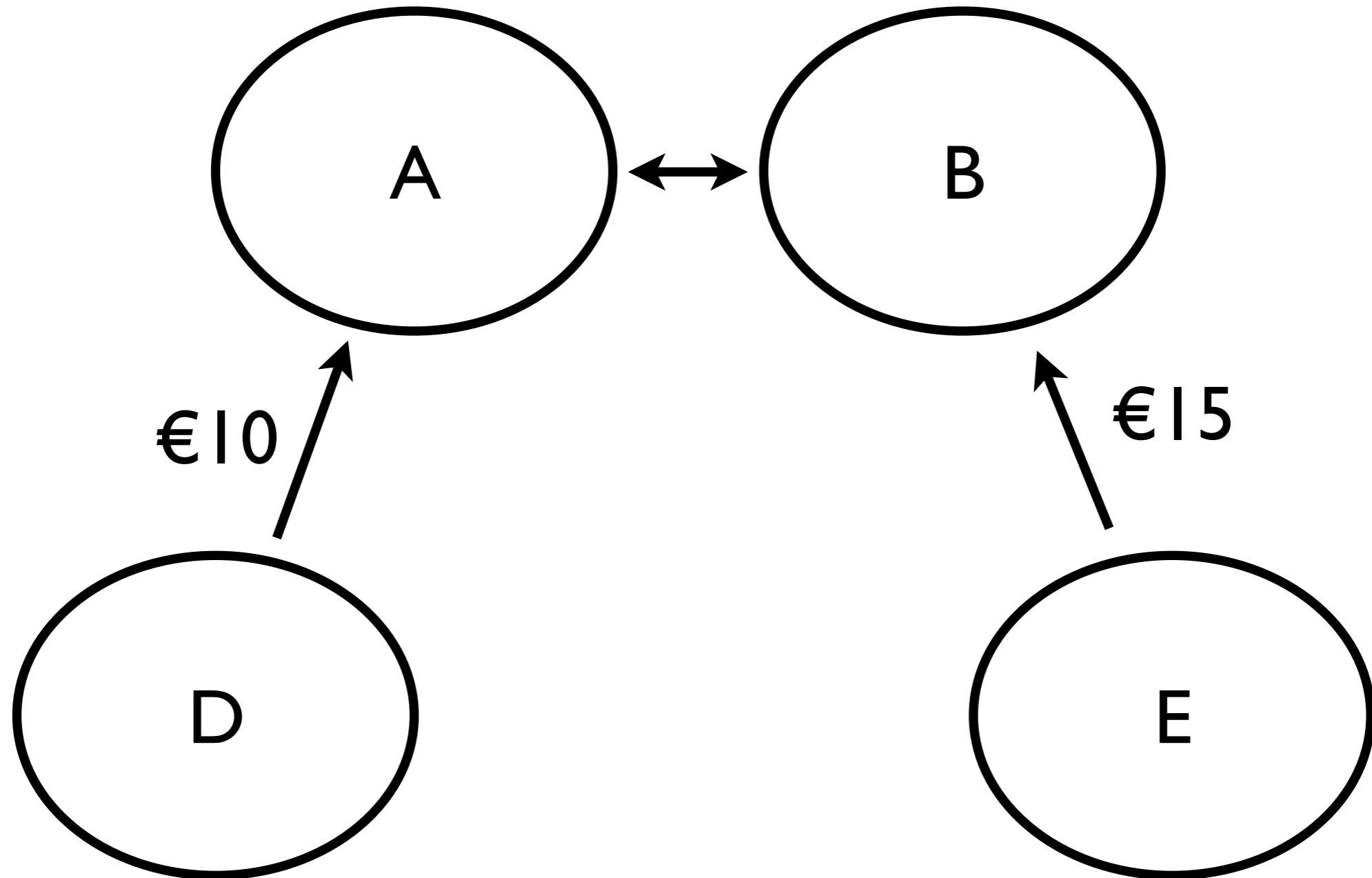


# Payment on Internet



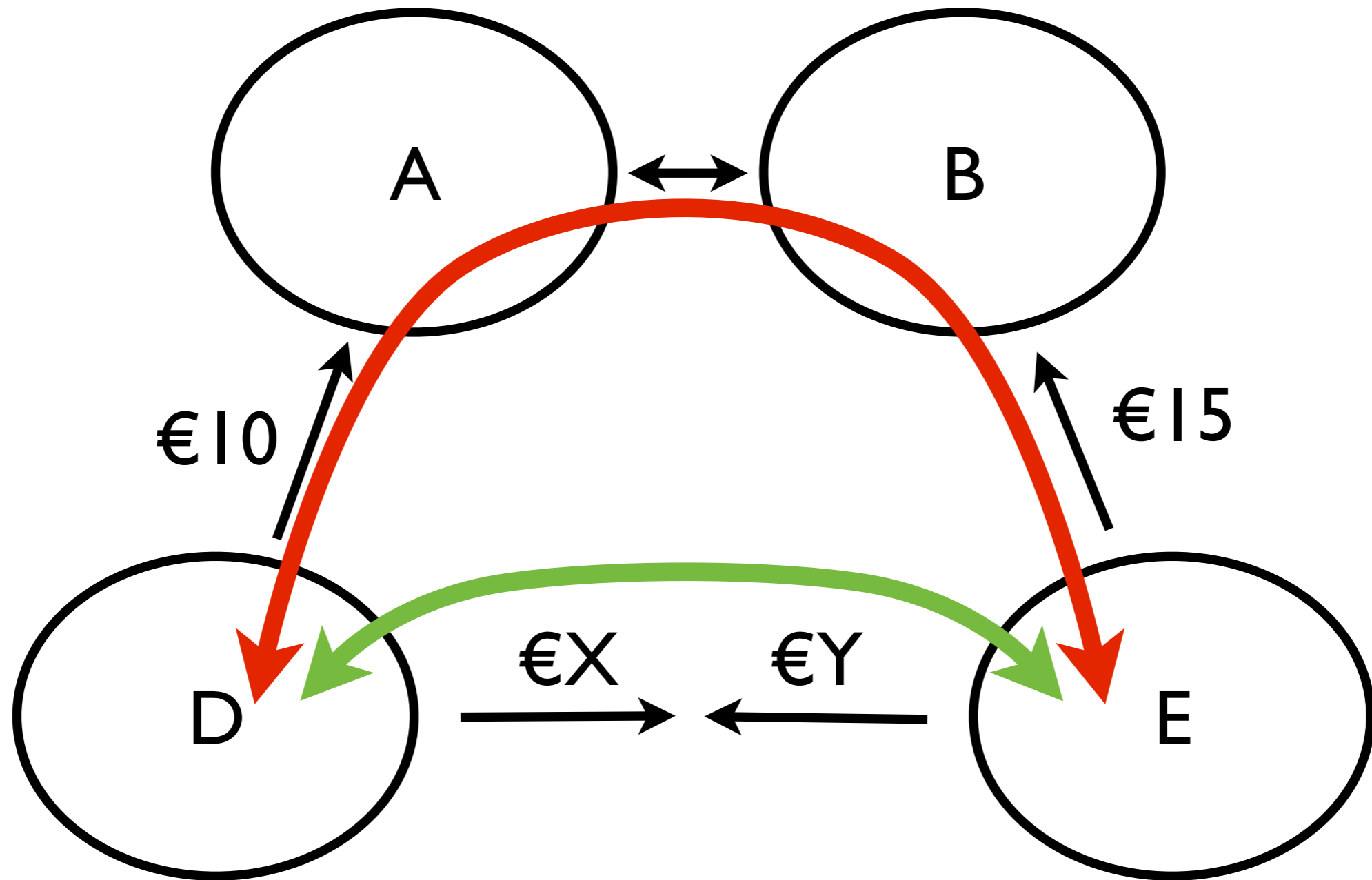
How much, and  
in what direction?

# Payment on Internet

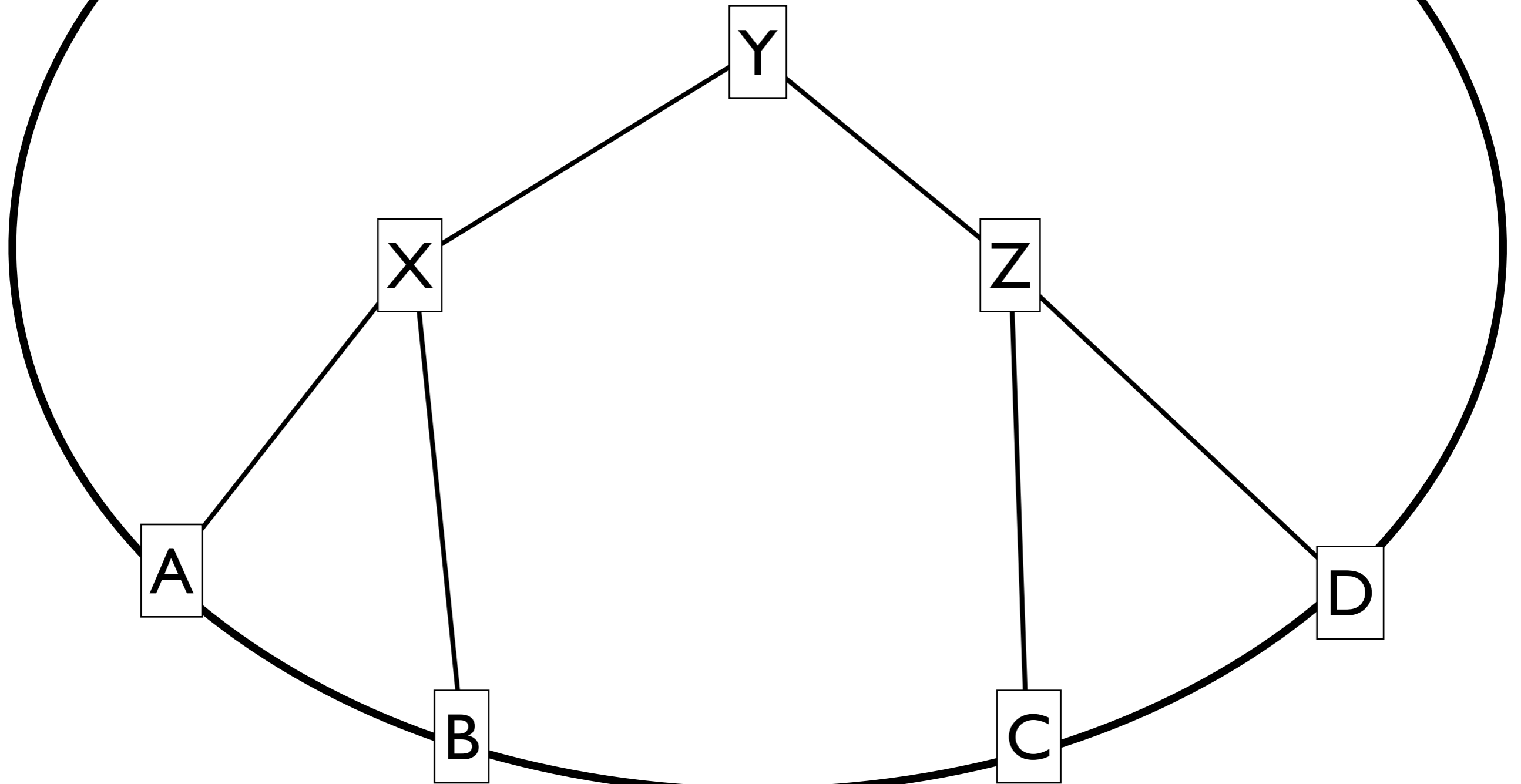




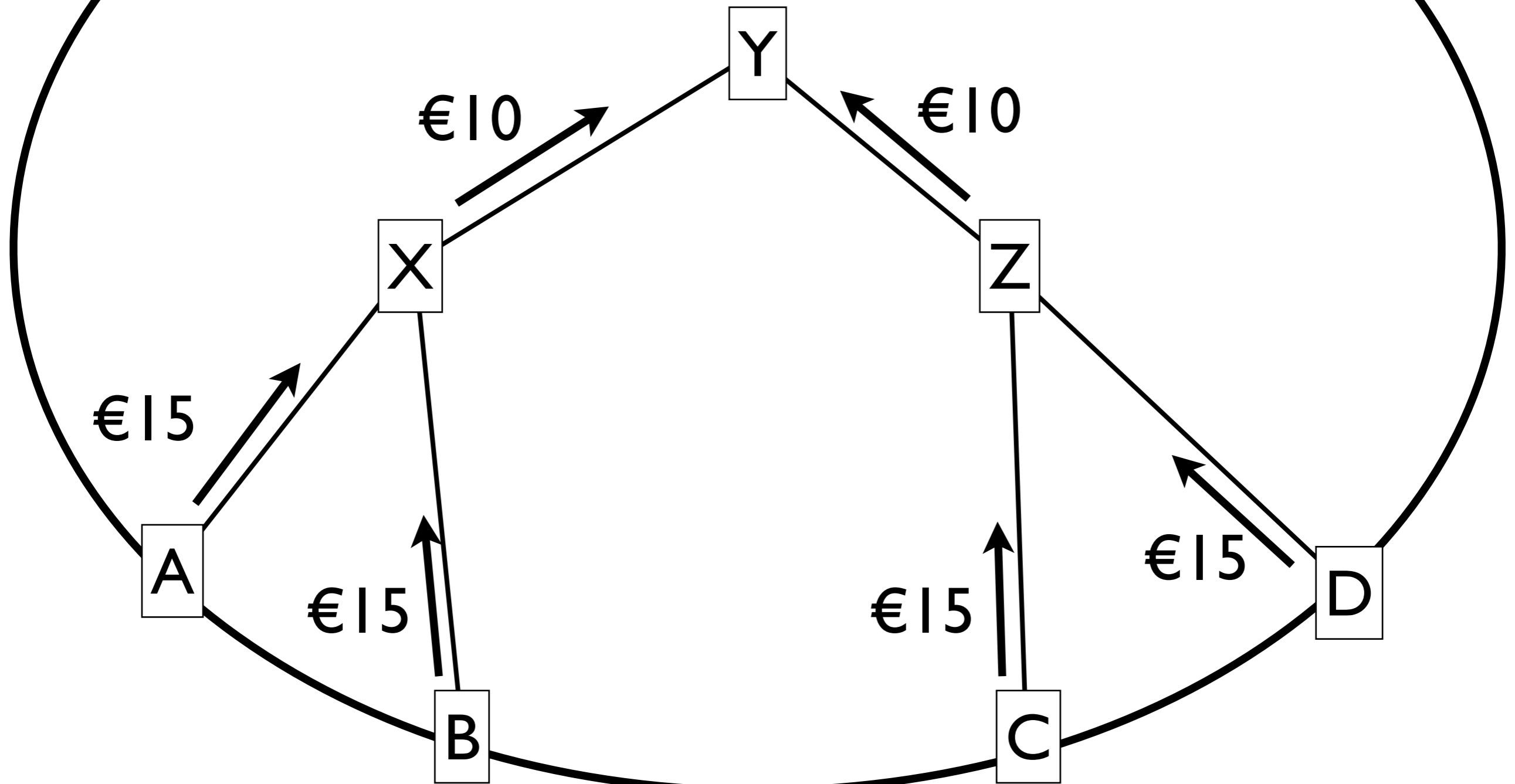
# Payment on Internet



# Traditional Internet



# Traditional Internet

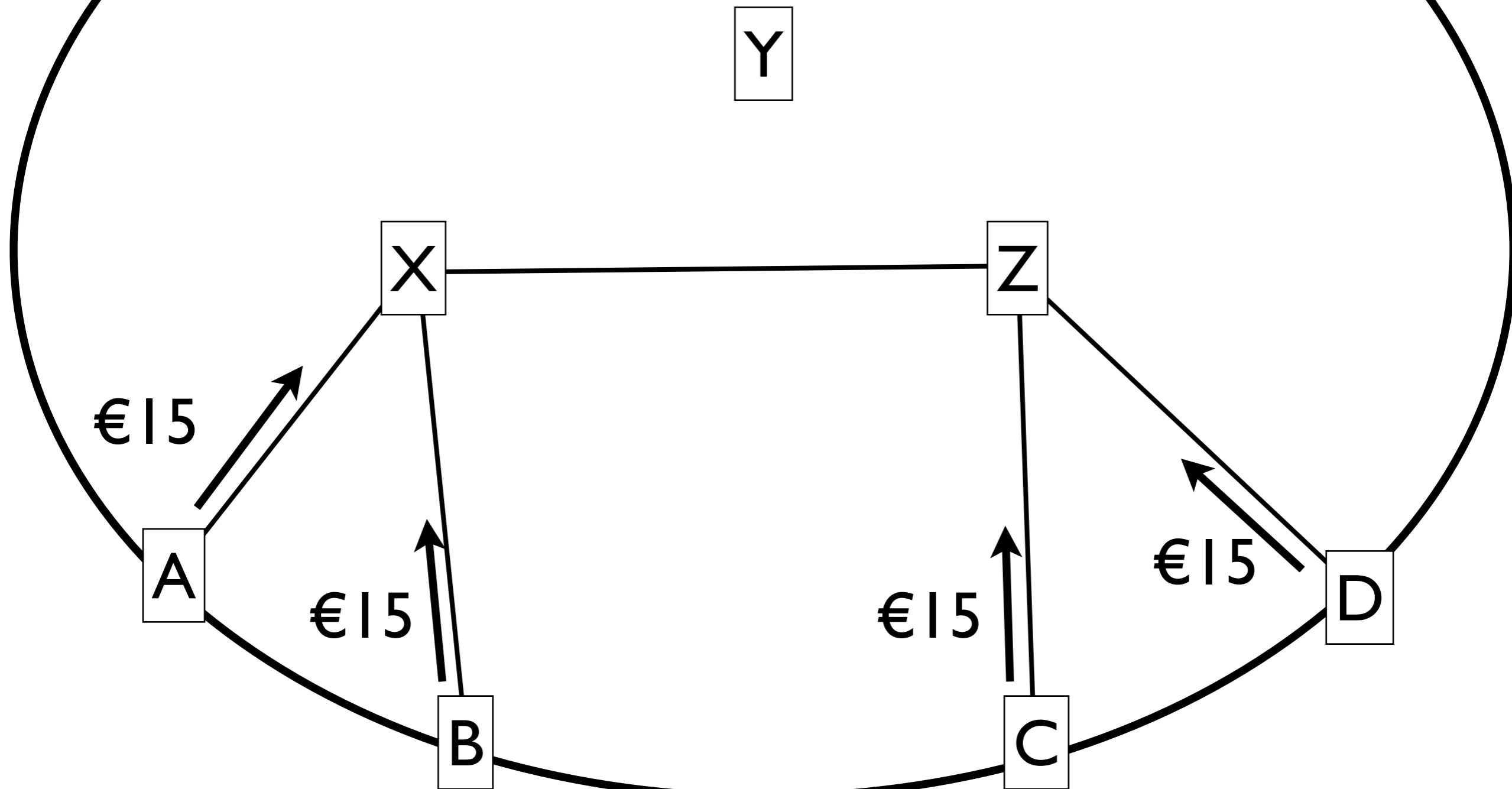


# Traditional Internet

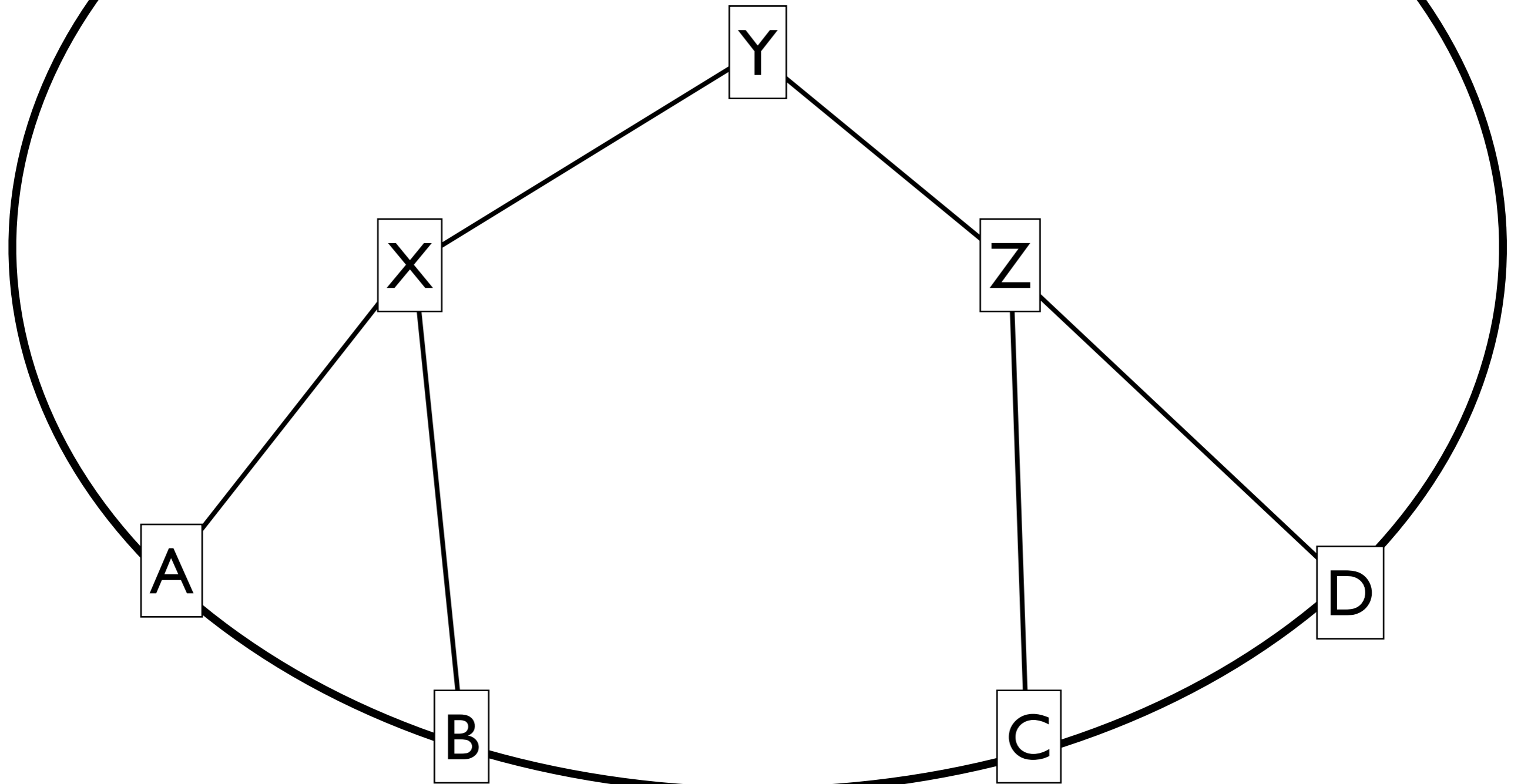
Y might loose traffic

If not Y is “good enough”

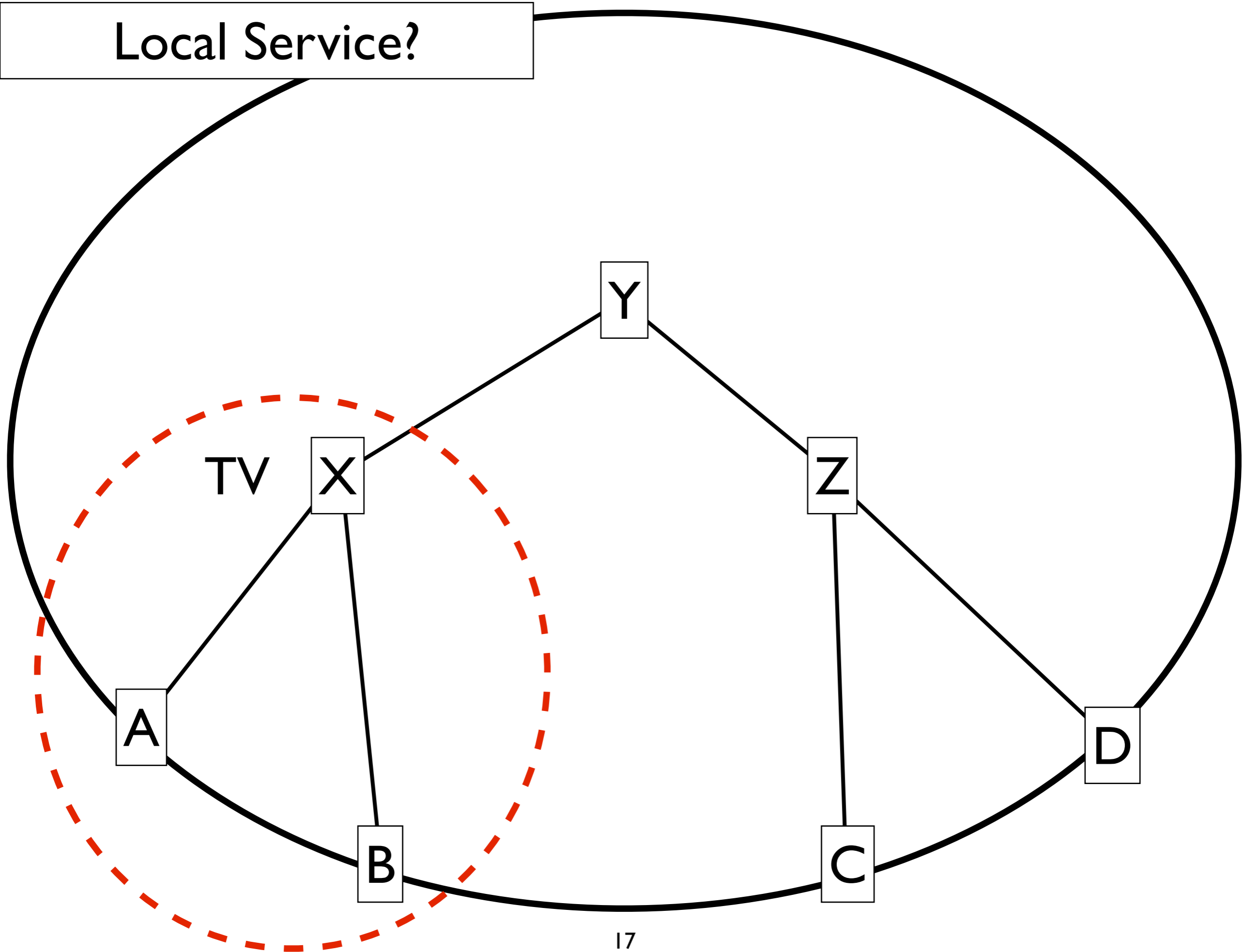
Y



Local Service?



Local Service?

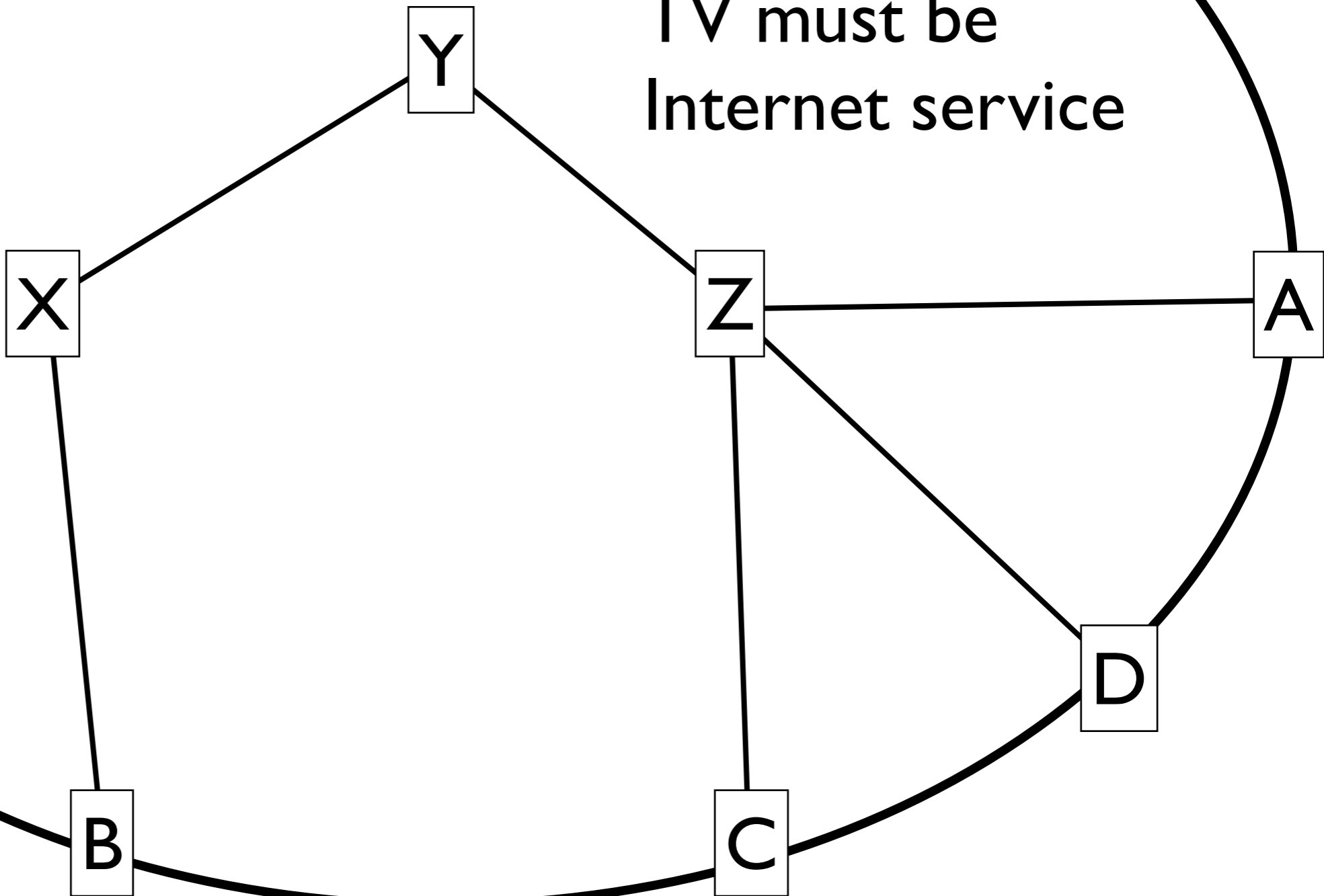


Local Service?

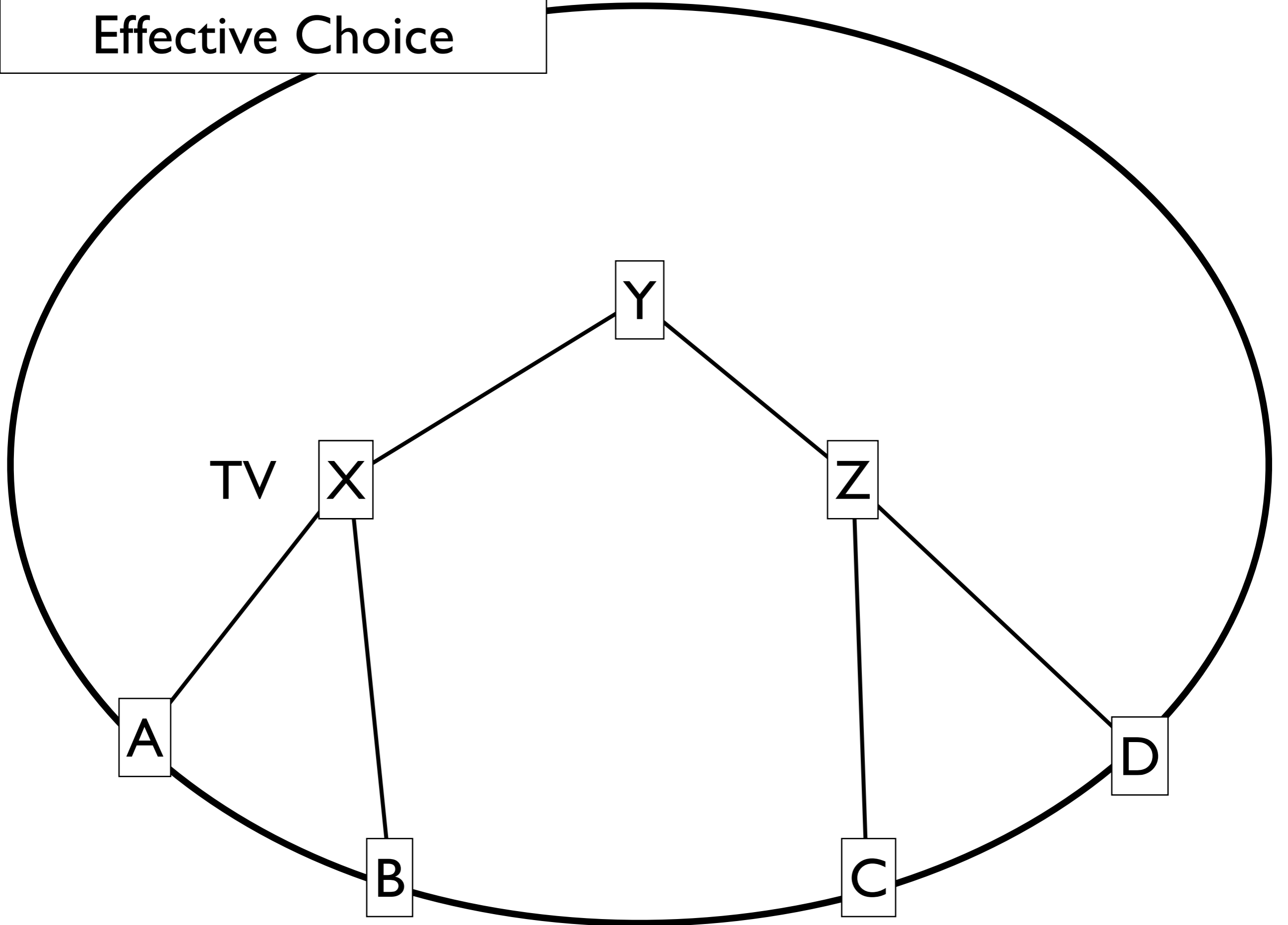
A can not access service  
when not being at home

TV must be  
Internet service

TV



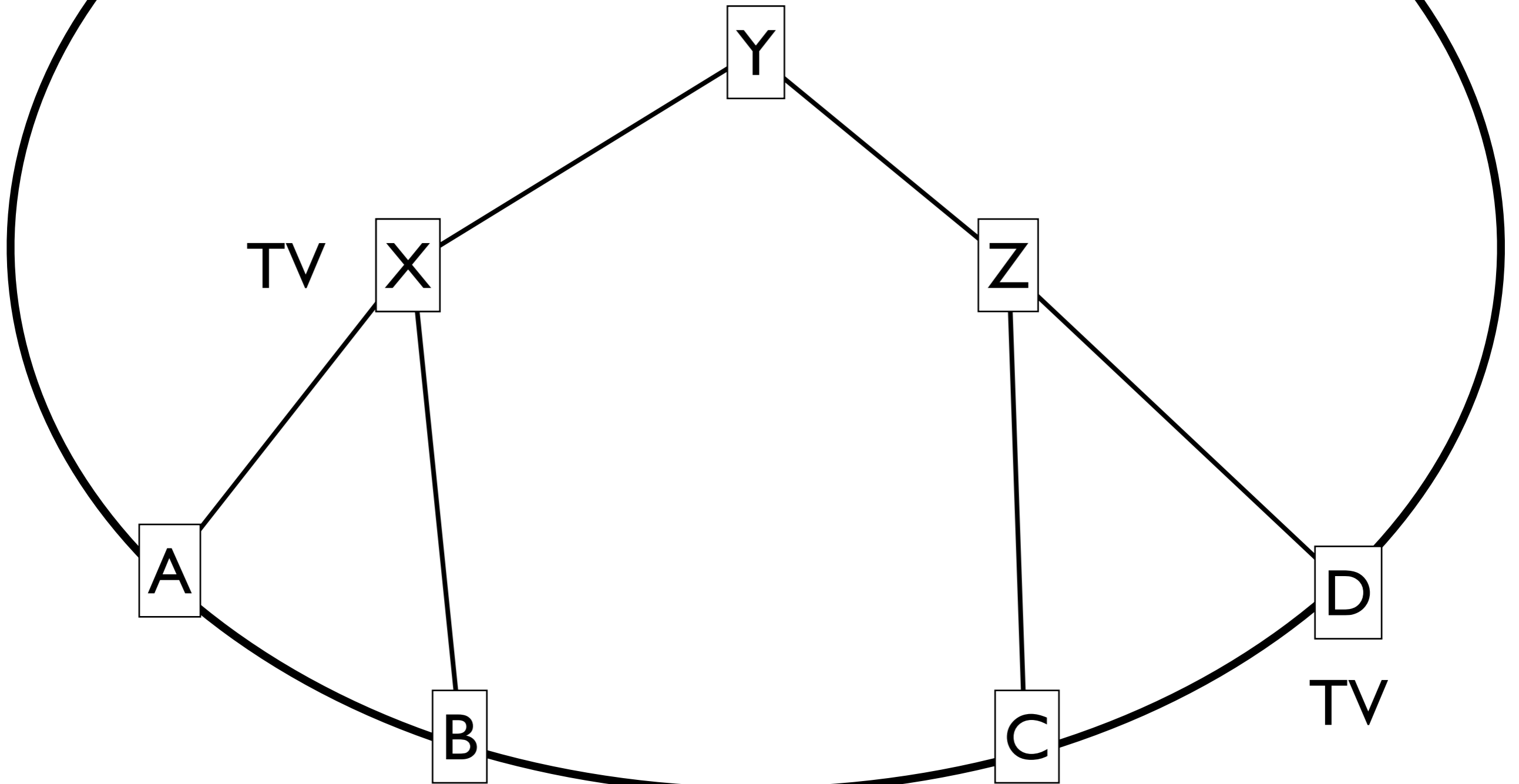
# Effective Choice





# Effective Choice

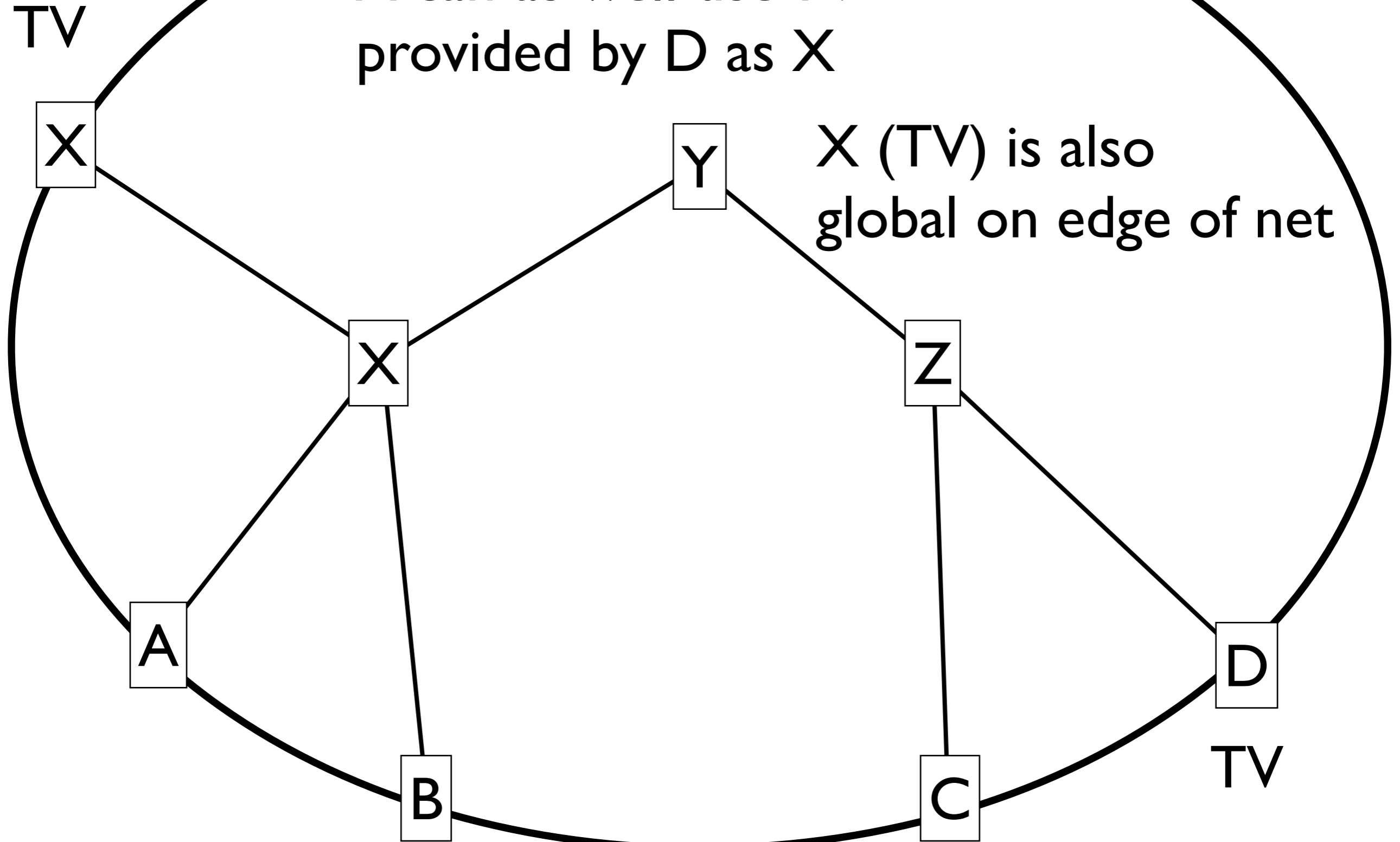
A can as well use TV  
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# Effective Choice

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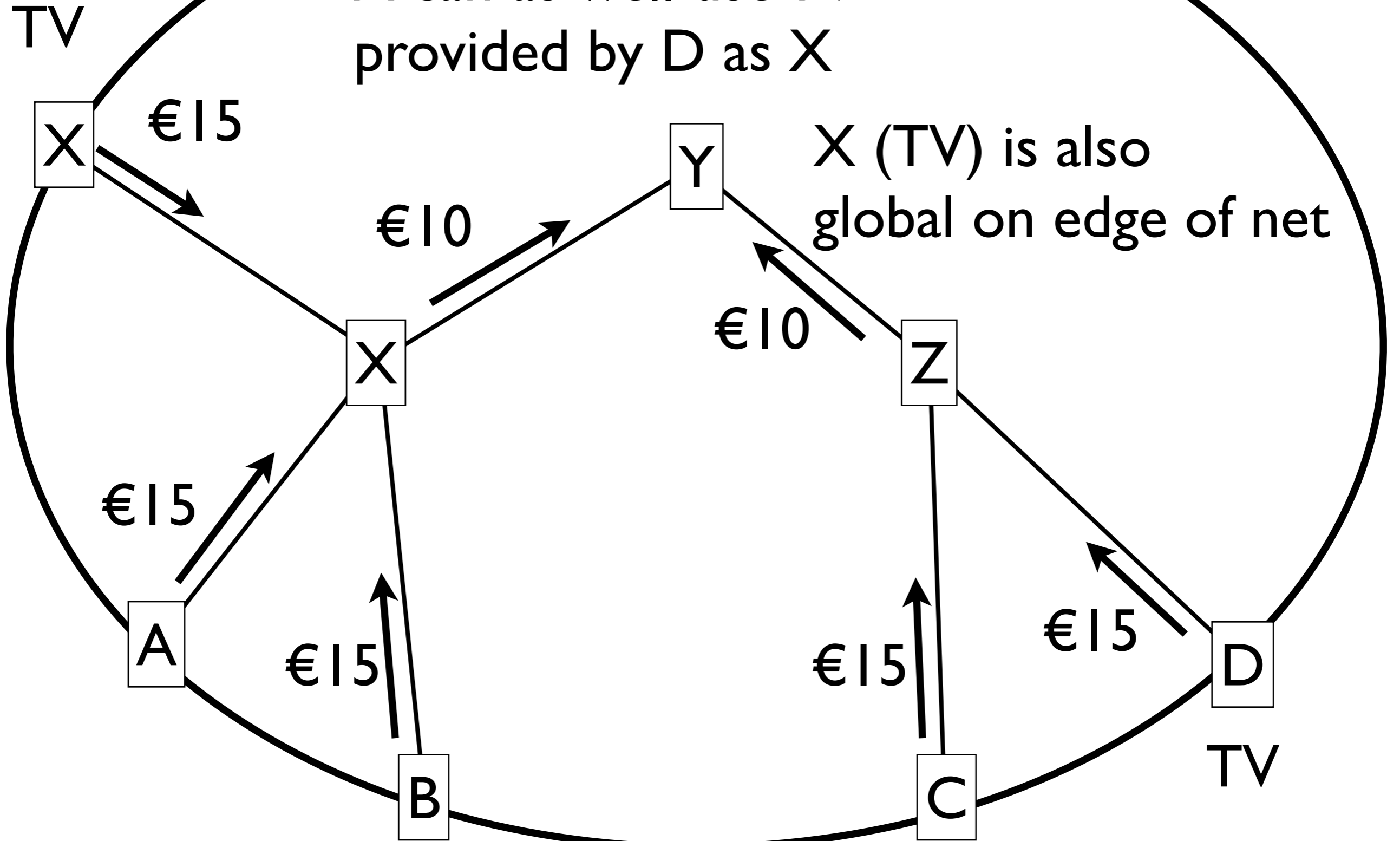
X (TV) is also  
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# Effective Choice

A can as well use TV provided by D as X

X (TV) is also global on edge of net

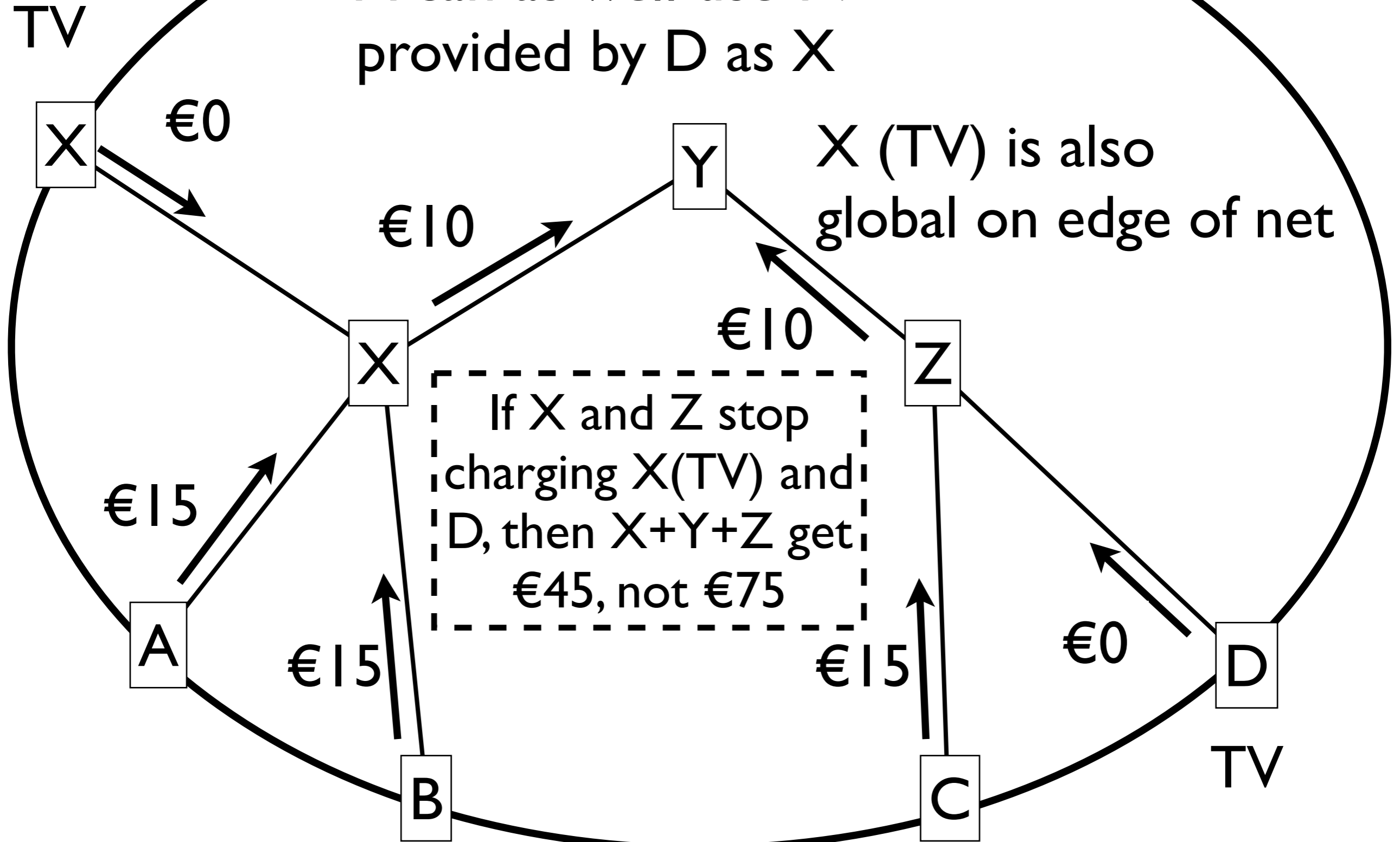


# Effective Choice

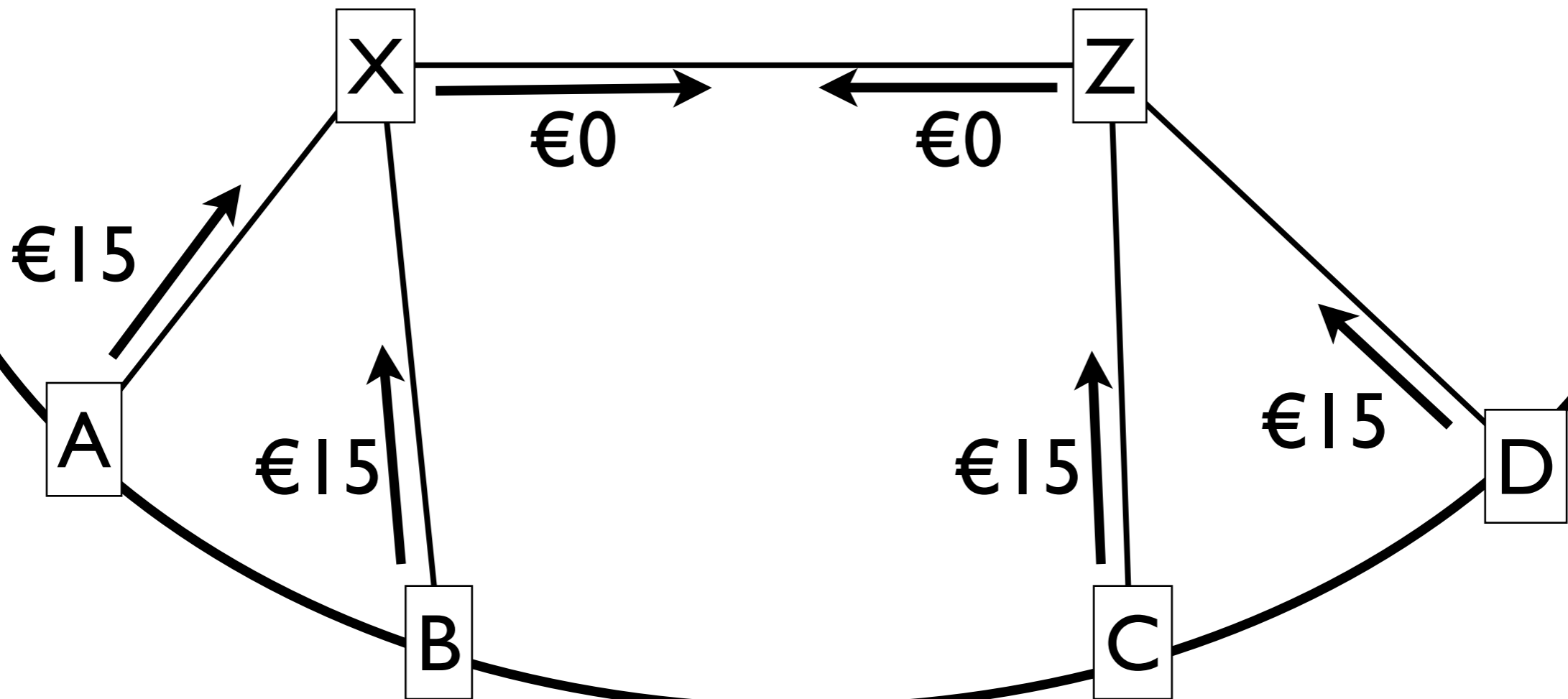
A can as well use TV provided by D as X

X (TV) is also global on edge of net

If X and Z stop charging X(TV) and D, then X+Y+Z get €45, not €75

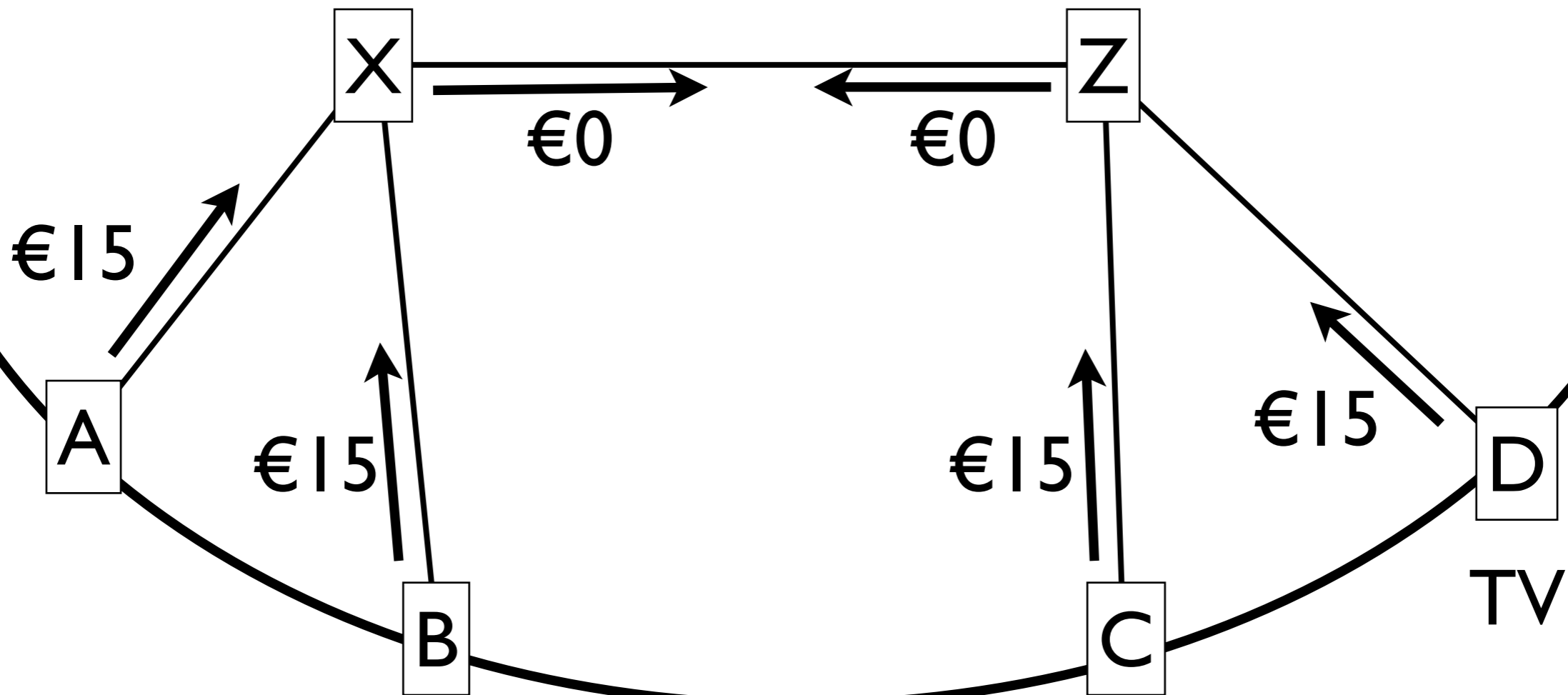


# Money negotiations



# Money negotiations

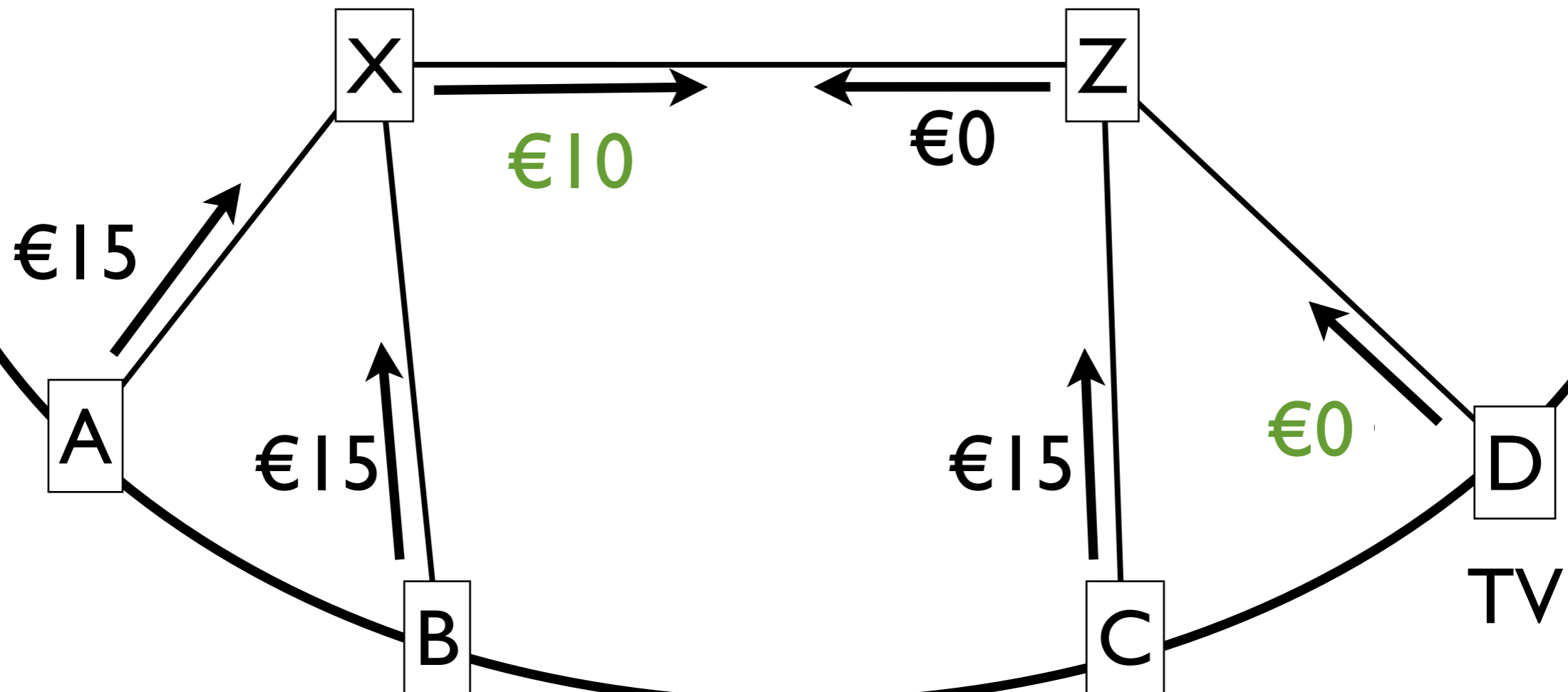
If D start popular service



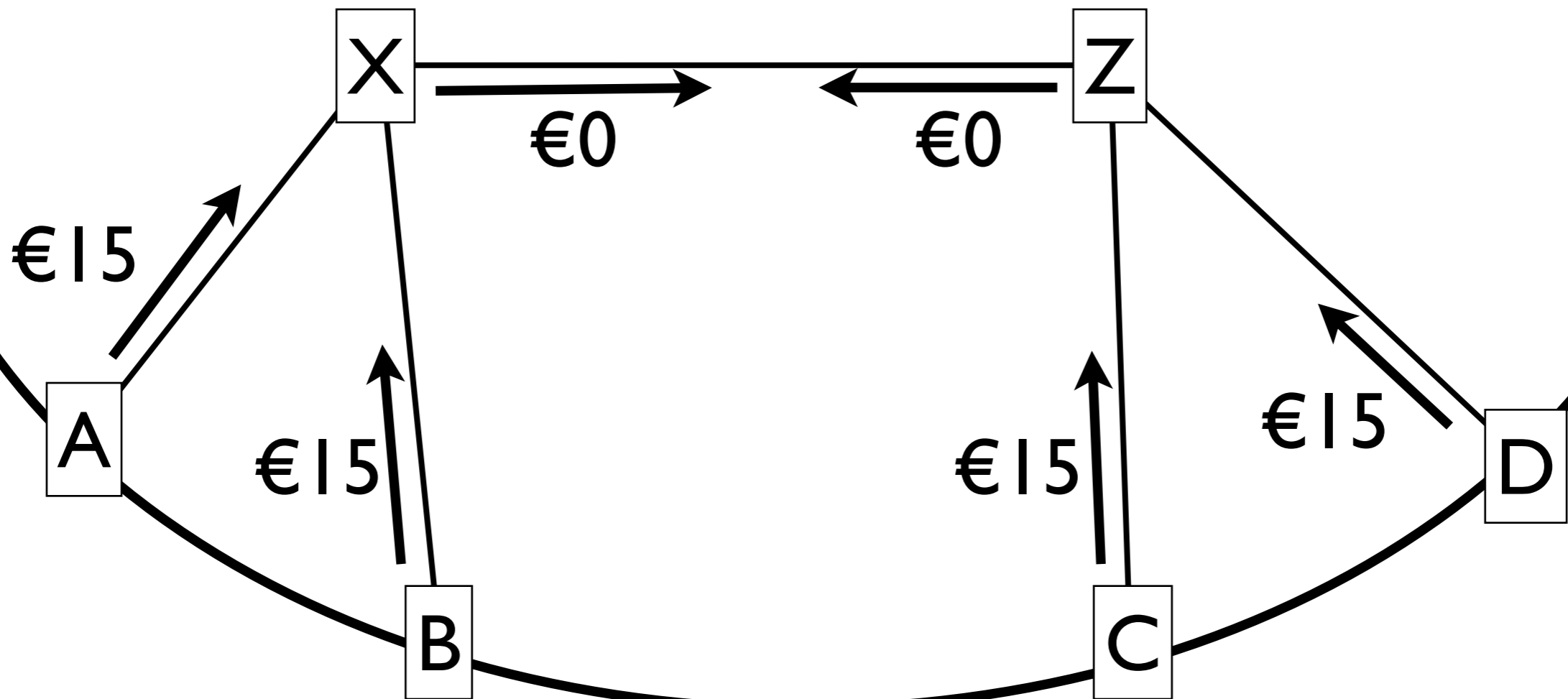
# Money negotiations

If D start popular service

Then Z can request money from X, instead of from D



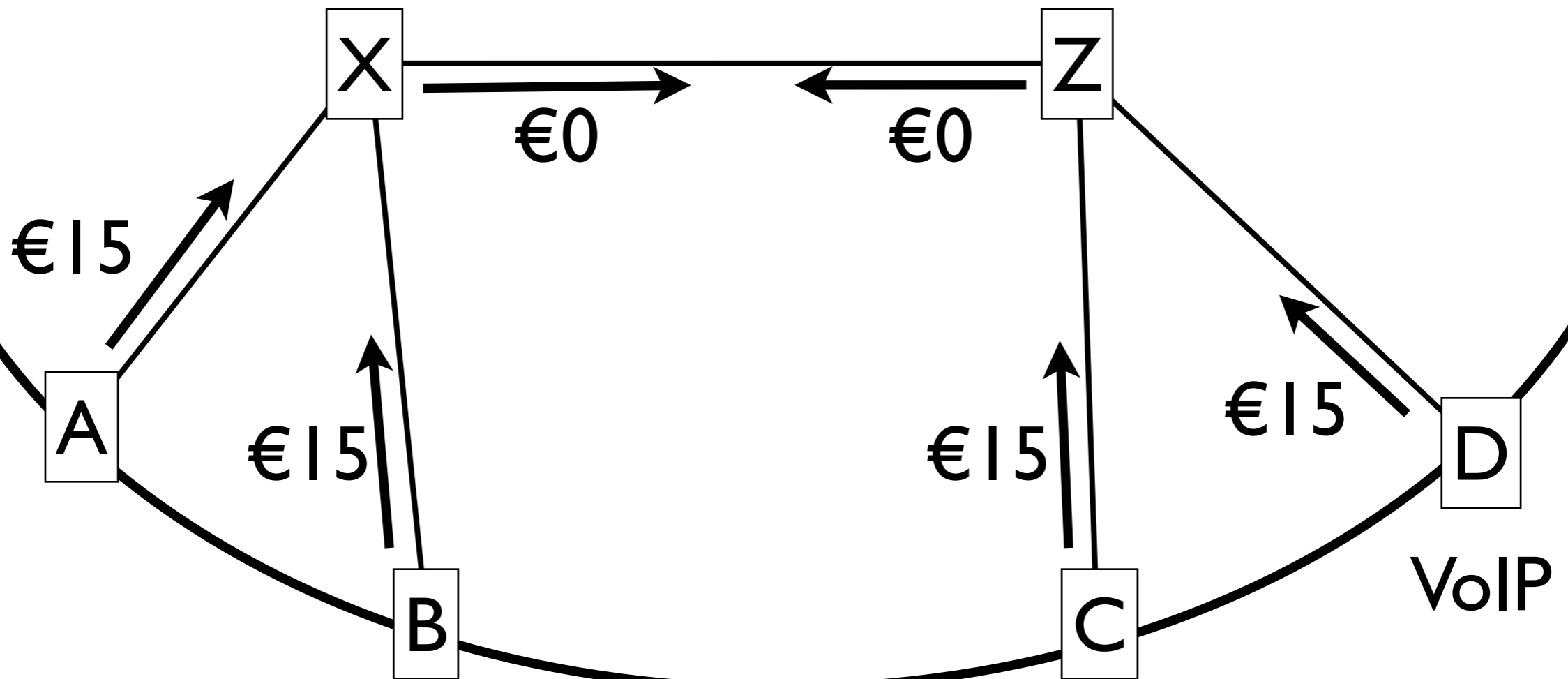
# Money negotiations





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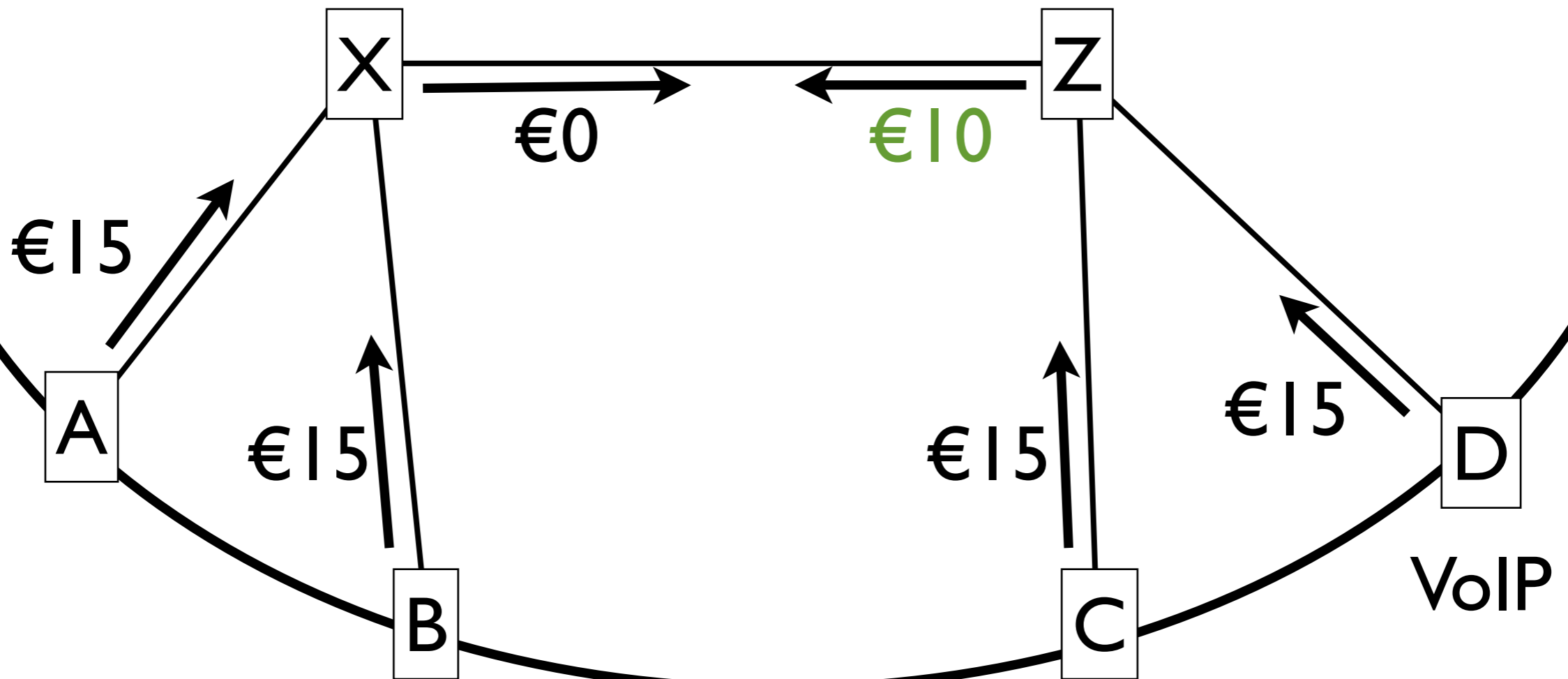
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# Money negotiations

If D start popular service

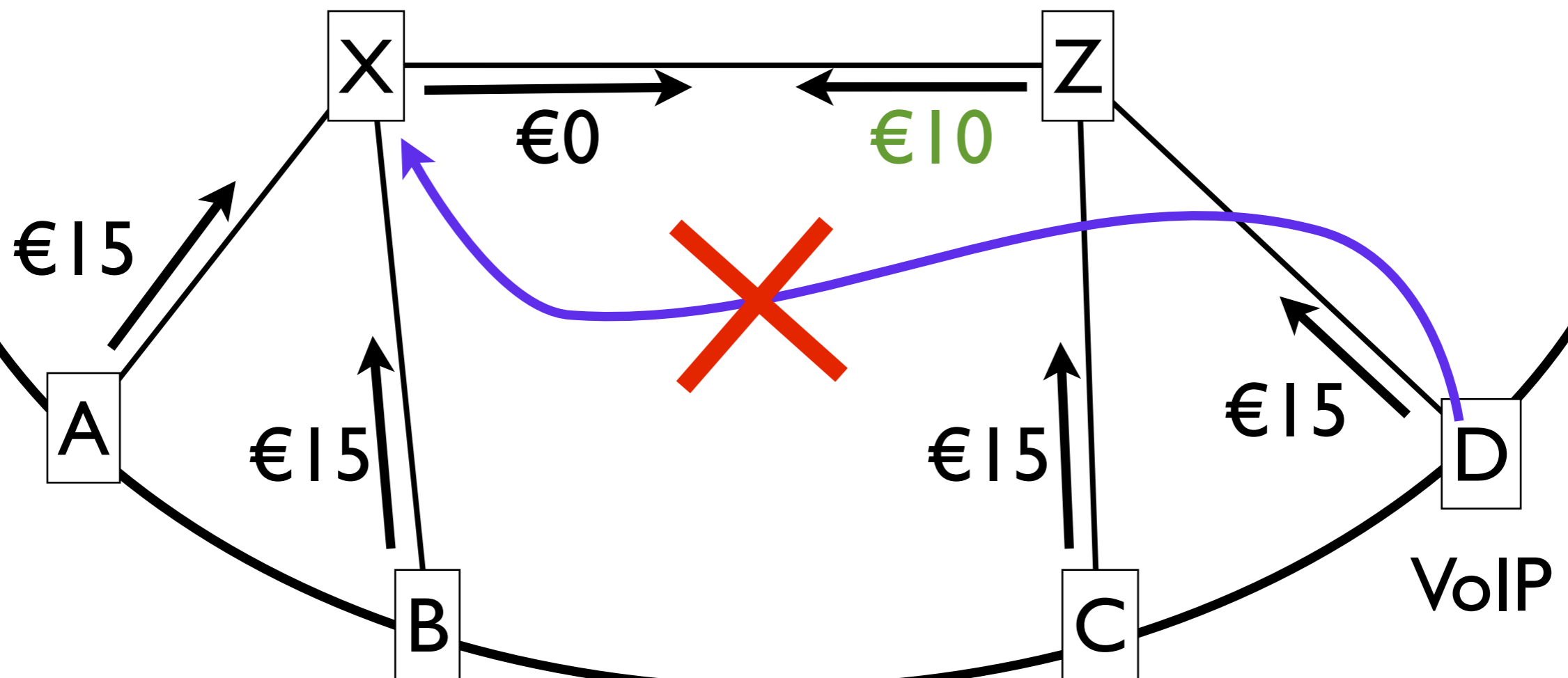
Then X can request money from Z



# Money negotiations

If D start popular service

Then X can request money from Z, instead of from D



# Conclusions

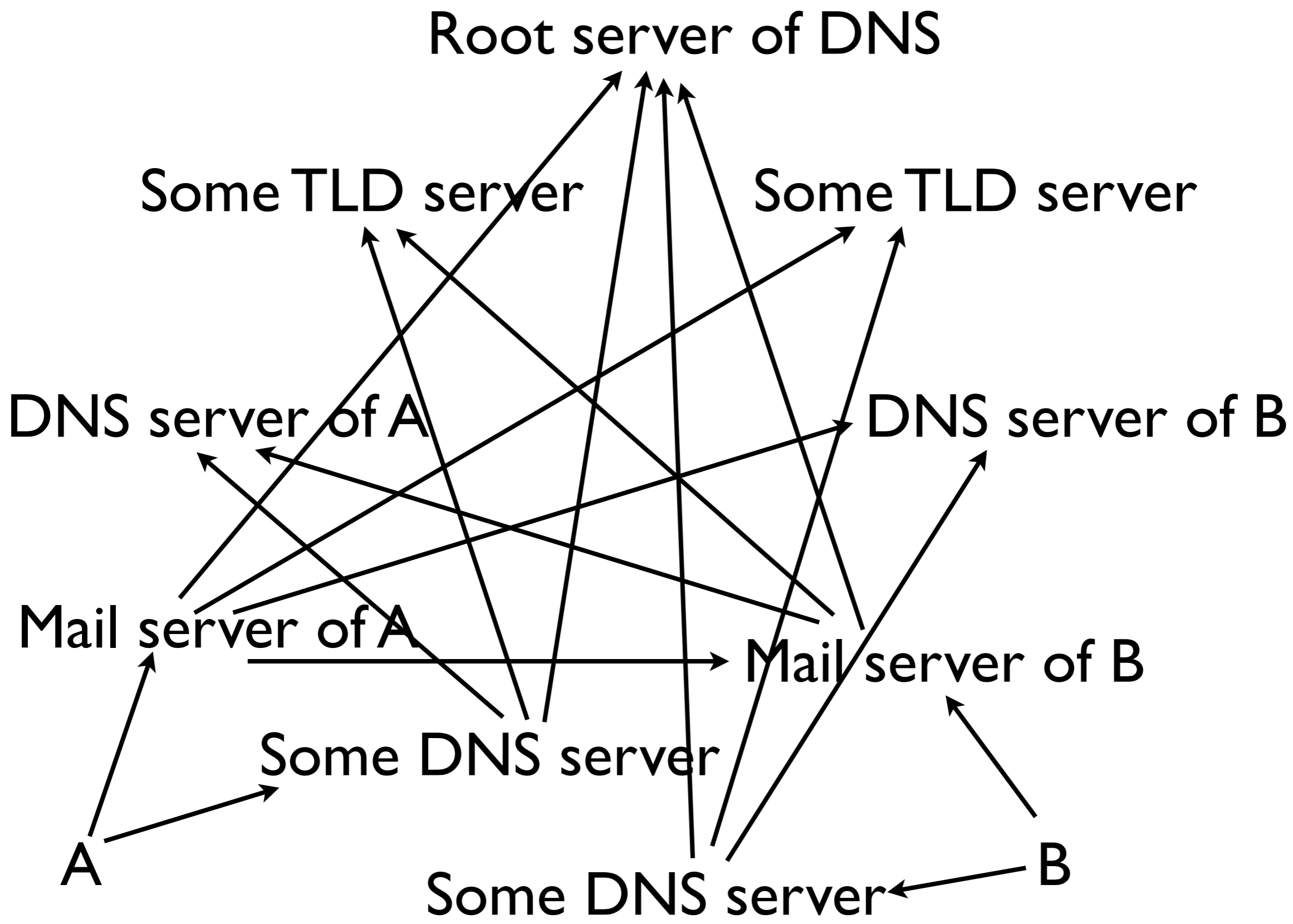
- All services must be globally accessible
- Services are all on the edge of the Internet
- Competing service can come from anywhere
- Network and service run by same provider should be viewed as separate providers
- Customers to access providers are only interested in Internet Access
- Every node on the edge send money towards the center of the Internet

# Warning!

- You can never draw lines and explain how traffic is flowing on the Internet!







# What do people want?

- People want Flickr, Flirtomatic, Facebook, MySpace, Google, Jaiku, YouTube,...
- Service providers want to provide **A Service**
- Vodaphone 2007:

7% increase in voice revenue  
9% increase in SMS revenue  
49% growth in data revenue

Data is not from Vodaphone walled garden

<http://www.arcchart.com/blueprint/show.asp?id=428>



# The real change

Application

Wire

# The real change

Application

Transport

Wire

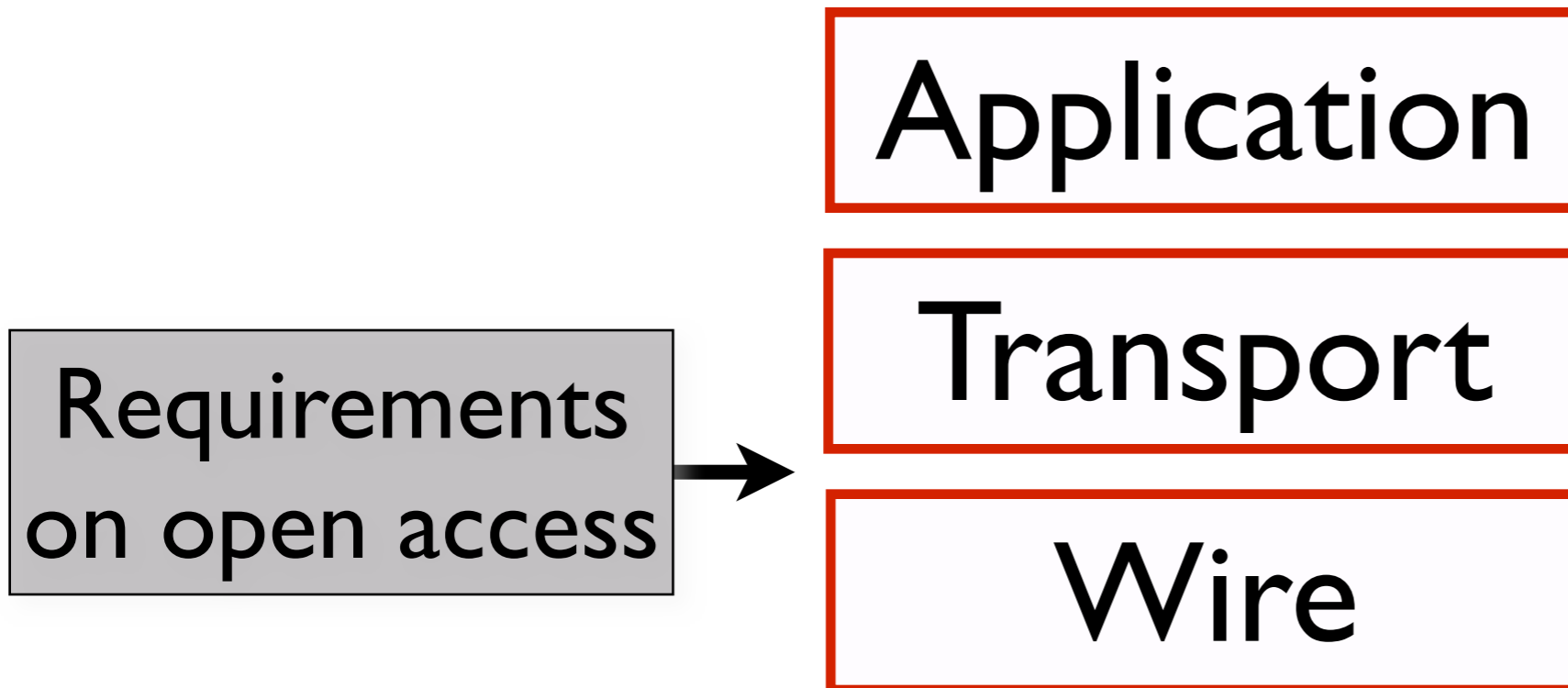
# What is the risk?

Application

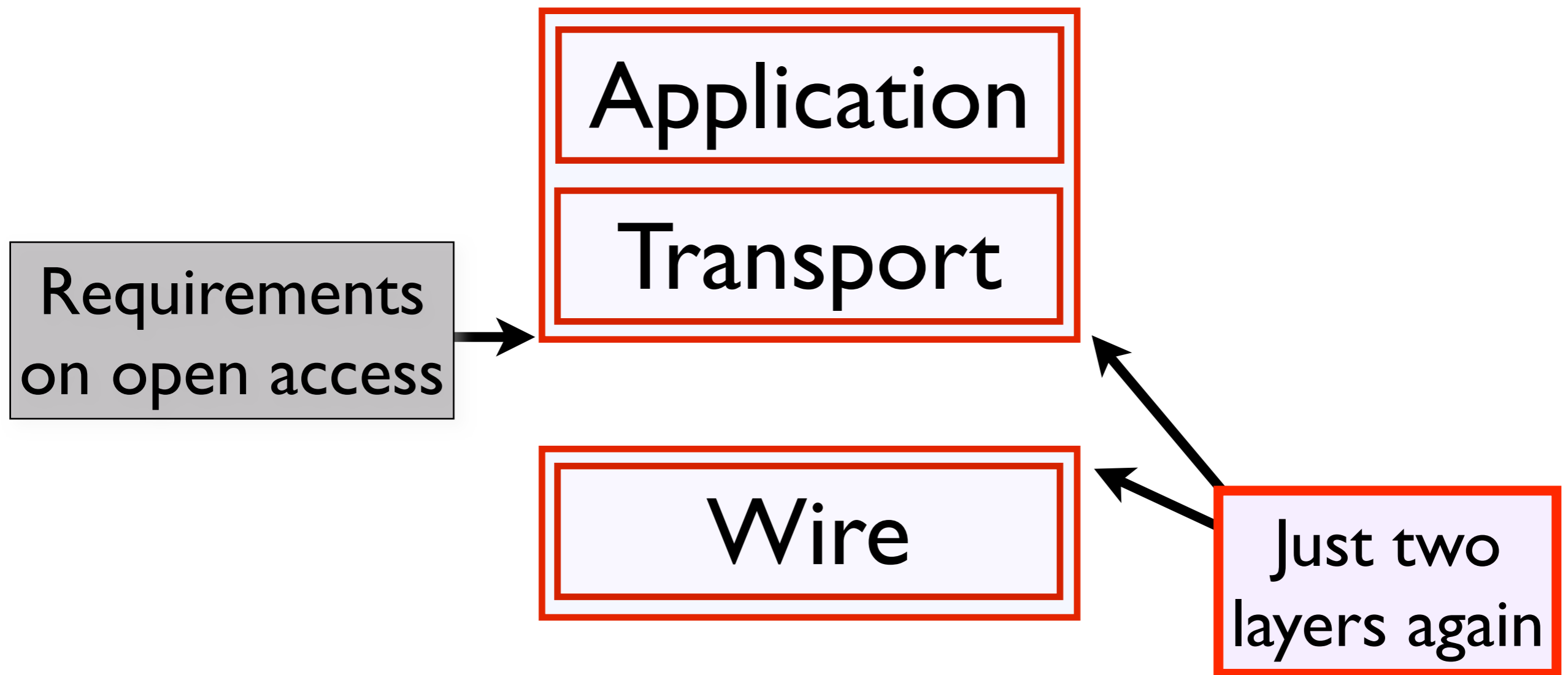
Transport

Wire

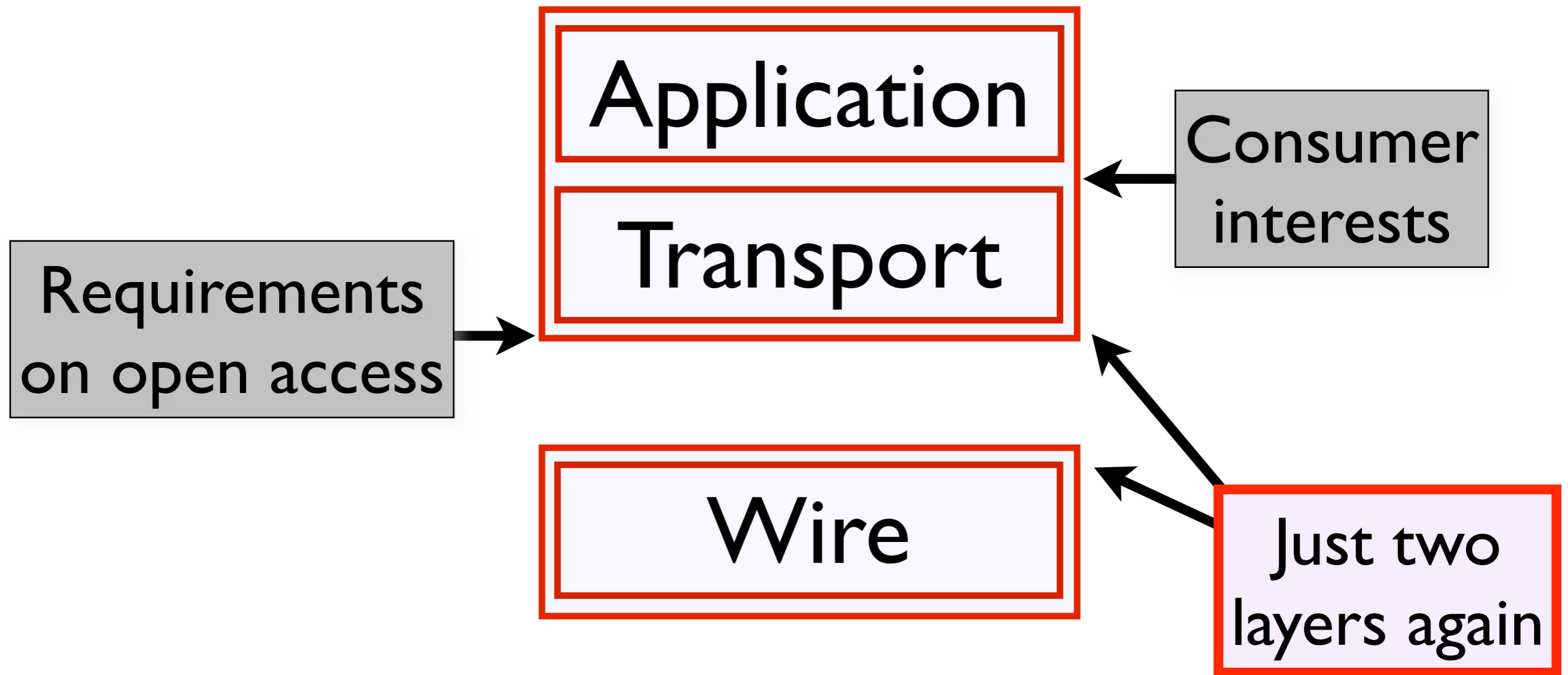
# What is the risk?



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# Standards



## **Inter-Service Provider IP Backbone Guidelines**

**4.5**

**3 December 2008**

[http://www.gsmworld.com/documents/IR3445\(1\).pdf](http://www.gsmworld.com/documents/IR3445(1).pdf)

# IPX

The GRX consists of separate and competing GRX Providers (or GRX Carriers). A GRX network can be operated by any qualified party. Requirements for GRX Providers are described in section 6.1.

GRX Providers connect to each other via peering interfaces. These peering interfaces may be direct connections or may pass through a common peering point. GRX Providers should enter into Service Level Agreements (SLAs) with other GRX Providers.

A common DNS root database supports domain name resolution. This root database may be used by all GRX parties.

The GRX is isolated from the public Internet and security rules are defined to prevent unintended access from it.



# IPX

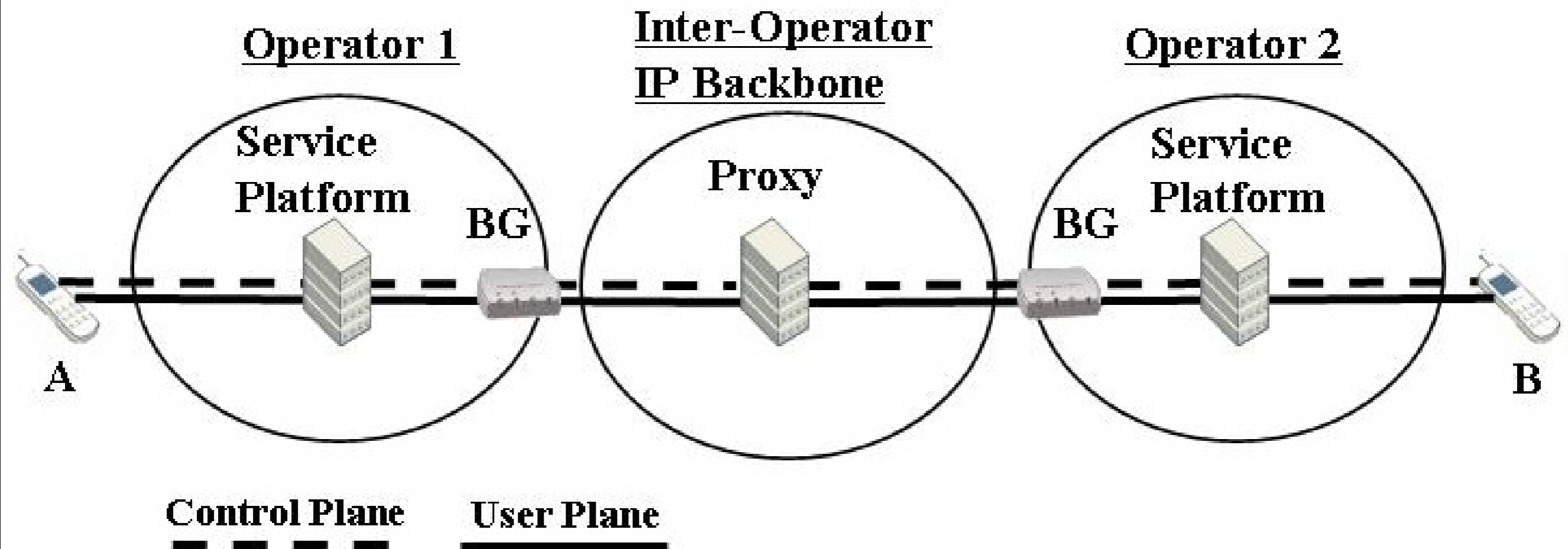
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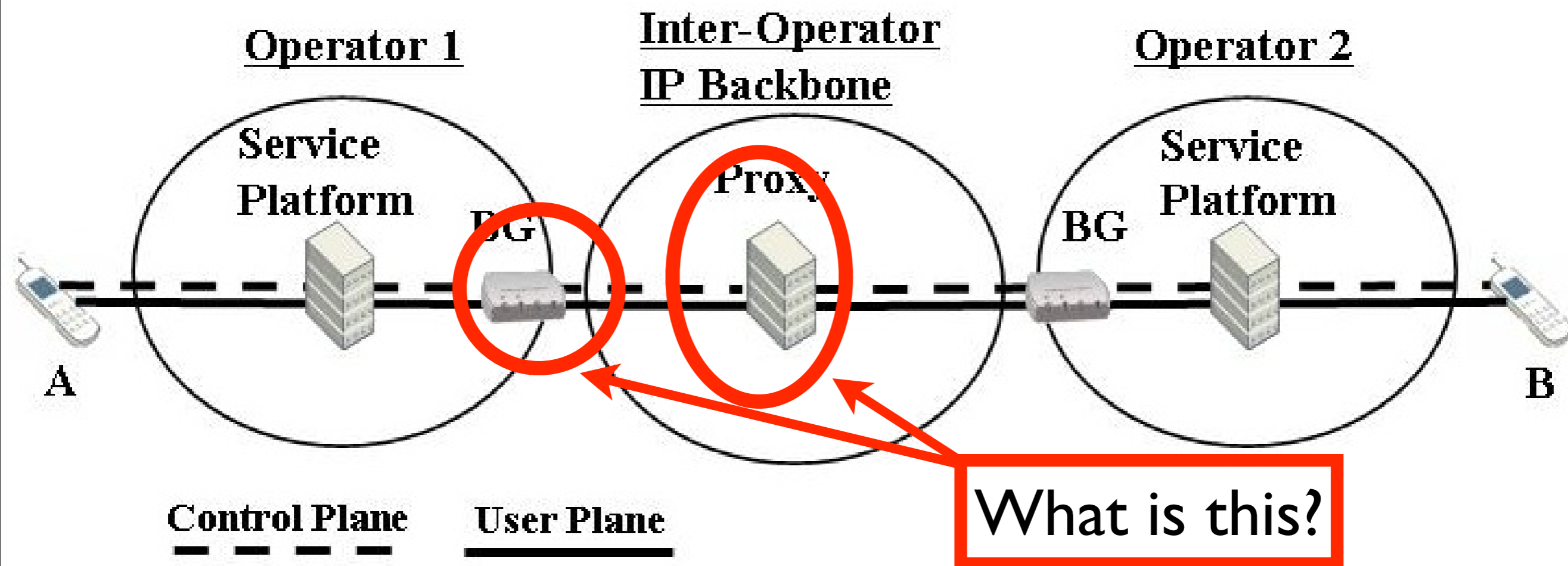
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# Internals...



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Internet routers should not be able to route to the IP addresses advertised to the Inter-Service Provider IP Backbone. The IP Backbone Providers and Service Provider networks shall be totally separated from public Internet, from an IP routing perspective.

Currently, Inter-Service Provider IP Backbone networks use IPv4 addressing and there is no plan to introduce native IPv6 addressing in the foreseeable future. It is intended that IPv6 is supported by tunnelling the IPv6 traffic over IPv4 between Service Providers where required.

# Next 30 years?

- Consumers will choose themselves
- Services must be reachable from everywhere
- We will see fewer service providers, not more
- Internet will carry every information service
- Consumers will pay for Internet access
- New processes will help people “go green”
- All discussions around “NGN” and old business models will (finally) be dead, but it will be a blood bath

ny fjärrkontrollen i  
största videobutik.  
[telia.se/tv](http://telia.se/tv)

**TELIA**

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Telia video on demand är Sveriges största digitala videouthyrning med över 300 000 tv-apparater som uthyrningsställen.

KAPORSEKON EN 600 000

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**This is not special for Telia!**

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*Telia video on demand är Sveriges största digitala vi*

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# Electronic Services - whenever and wherever

- Accessibility
- Robustness
- More secure Internet in Sweden
- IT-standardization
- Electronic identification / authentication
- Information security
- Electronic communication
- Development of digital services
- Openness in the networks
- A sustainable information society
- EU-chairmanship (fall of 2009)
- A renewed national IT agenda

# Electronic Services - whenever and wherever

Information to “IT-Rådet”  
from Näringsdepartementet  
Contact person: Maria Häll

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# Thanks!



Patrik Fältström

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