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# Labeling of broadband products

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# Support from:

# Background

- Work initiated in the IT Policy and Strategy Group in Swedish Government
- Working group *IT Infrastructure and Broadband* created a report that outlined this work
  - <http://www.regeringen.se/sb/d/6320/a/73823>

# Buying Internet Access (1)

- It ought to be easy. But....
- What do I really need to buy to do what I really want to do?
- What could I buy to make it better, easier?
- What should I not buy, waste my money on?

## Buying Internet Access (2)

- I suppose I need a computer...
- Microsoft? Apple?? Linux!!!
- Can I have more than one?
- Do I need a modem? What kind?
- Can I do WiFi?
- And what about my new phone? And my old TV?

## Buying Internet Access (3)

- Do I need special software?
- WoW? Skype? Firefox? MSN? Anti-spam? Anti-virus?? Powerpoint!!!
- Can I buy it in the shop or do I already need to be on-line?
- Oh, and I need what kind of web-cam and headset?

## Buying Internet Access (4)

- Now all I need is an access provider...
- Is their “top speed” meaningful?
- Can I use all their services?
- Are there hidden limitations?

# Is this getting complicated?

- Yup!
- Even in an almost average household the people - mother and father, son and daughter - will want to do very different things
- And also think of the SoHo, the very small business

# Choosing access provider

- The choice of access provider is important
- The access provider can colour the whole experience
- Yet their products are perhaps the hardest to understand
- So we concentrate there...

# Simple problems

- Your access provider offers:
- Parental controls - but only if you also use some Microsoft product
- Spam filtering - but only on their e-mail service
- Security - but only if...

## Other problems

- The actual speed is much lower than the head-line advertised speed
- If you change providers they do not offer mail forwarding
- You cannot run some kinds of service - such as a small family web-site

# Bad problems

- Your access provider may prefer you to use - and pay for - any additional services from them
  - **This is legitimate**
- They may then define, build and operate their network to artificially constrain your choices
  - **This may not be legitimate...**

# Your problem!

- There are over a billion people out there using the Internet
- There are lots and lots of web-sites, e-mail addresses, services, networks
- Nobody else knows who you know, goes where you go
- So sometimes it is your problem!

# Our problem

- Understanding the offer can be too hard
- Very many technical terms. And the technology keeps changing
- Difficult to link to what users want to do. And users want to do so many different things!

# Our solution!

- We propose some standard products
- These will be defined in two ways:
  - In terms of the user experience
  - In terms of the technology implications

# Labels on access products

- The products could be labeled with colors or icons or text
- But better if the list is open so that it can be added to
  - And better also if a simple hierarchy - bronze, silver, gold - is **not** implied

# Questions regarding services

1. Is a service possible to access when trying to access it from different locations (nomadic use) or can I just access it locally?
2. What is needed from an Internet connection to be able to get as good experience from the service as possible?

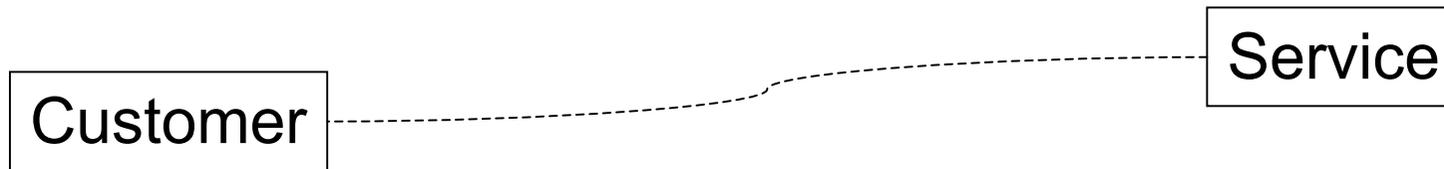
# The situation

- Consumers are complaining on products they buy, both access products and services (using the access product)
- Access providers want to charge more for products that guarantee specific characteristics that are expensive to produce
- Service providers want to provide services that require high performance access
- Consumers are today used to access products labeled as “Up to N Mbps for X kr/month”
  - Nothing about what is guaranteed
  - Nothing about other parameters than bitrate
  - Price is dominant factor when choosing provider

# Definitions

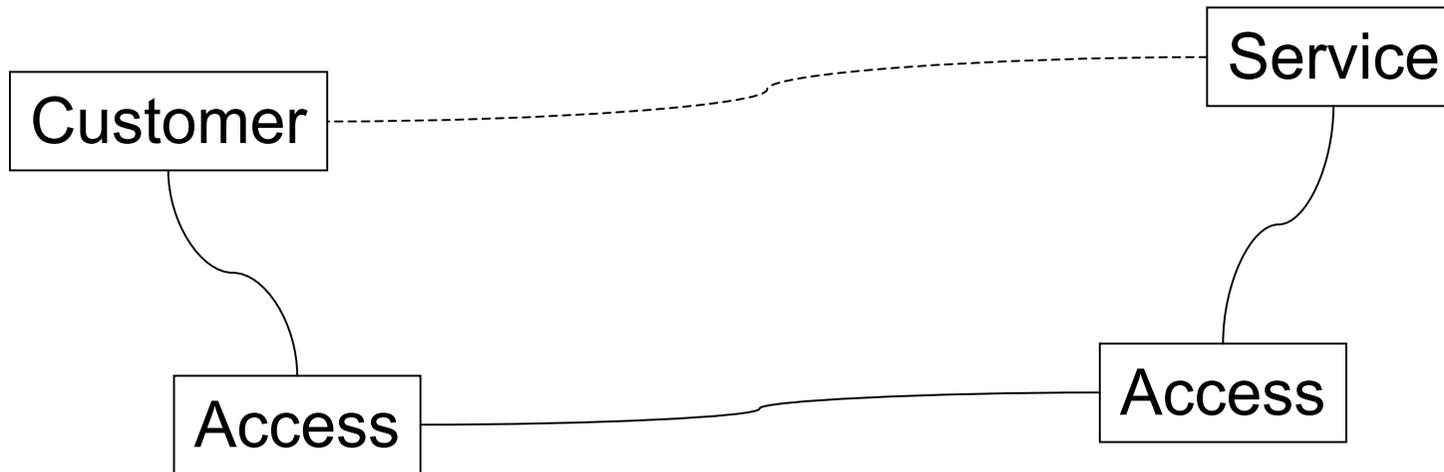
- A customer buys access
  - Access is using the IP protocol
  - Access can be radio or wire
- A customer buys services
  - Services require access
- Providers of access and services might be same or different organizations
  - Providers might not own all infrastructure used
  - Providers of services must buy access as well

# Customer and service provider



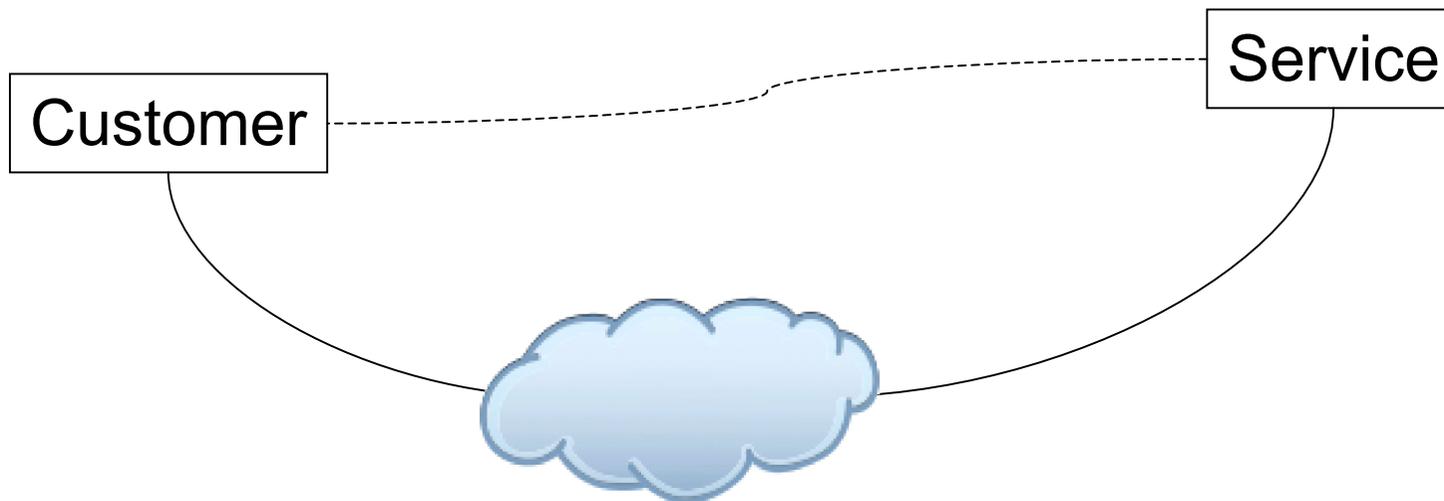
- The customer uses a service provided by a service provider

# Use of access



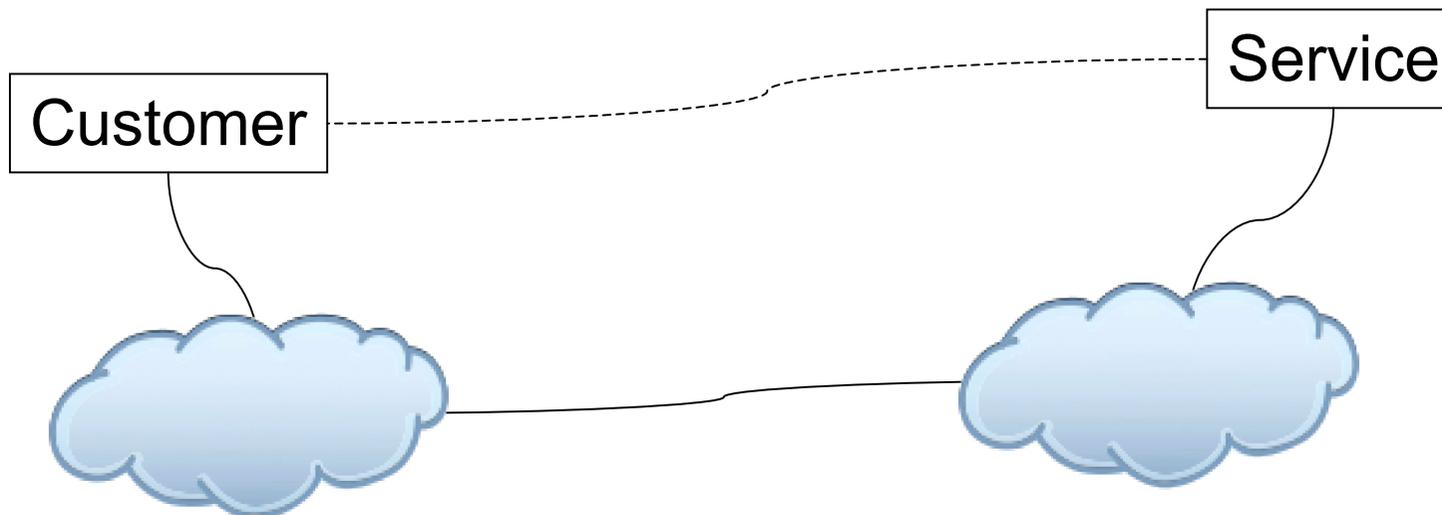
- Both Customer and Service need access

# Access and service



- Access is provided by access provider

# Access and service



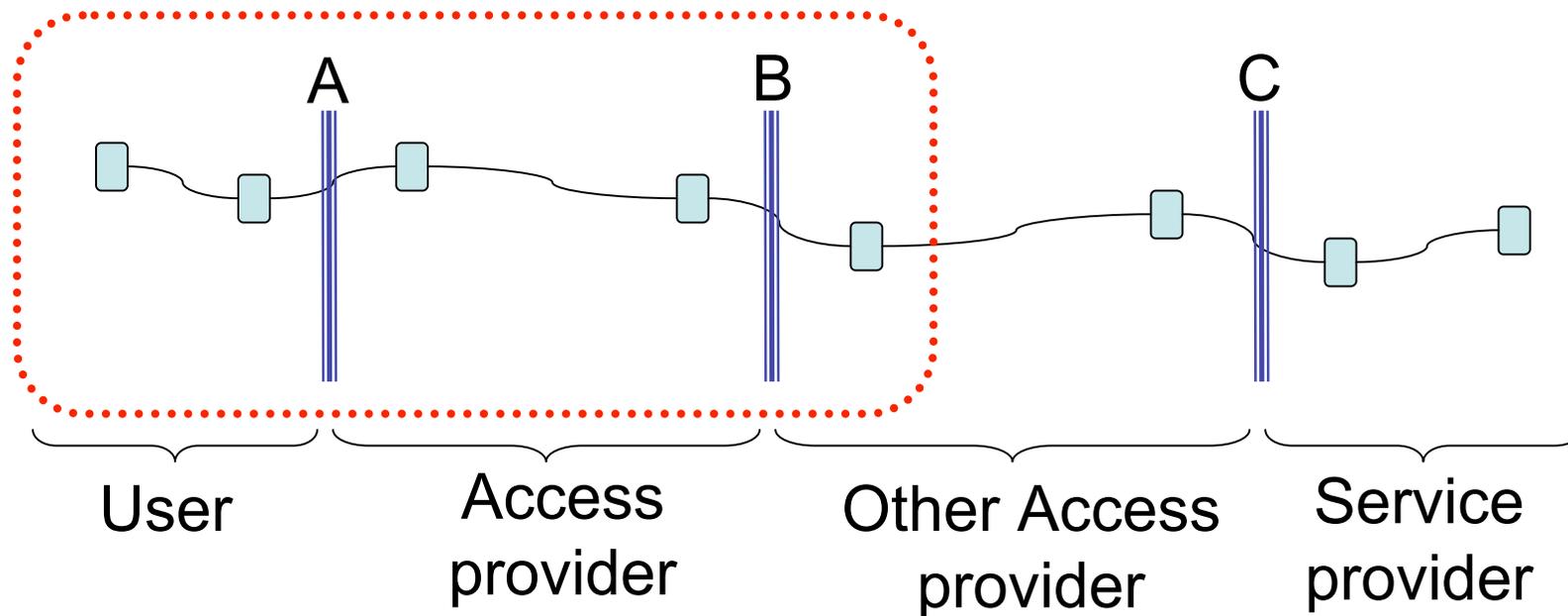
- Access providers exchange traffic
  - Specifically when Customer and Service uses different access providers

# Access and service

- A customer buys access
- A customer buys services
- A service provider buy access
- Users perception of the service depends on whether the characteristics of the connection between customer and service matches the needs of the service

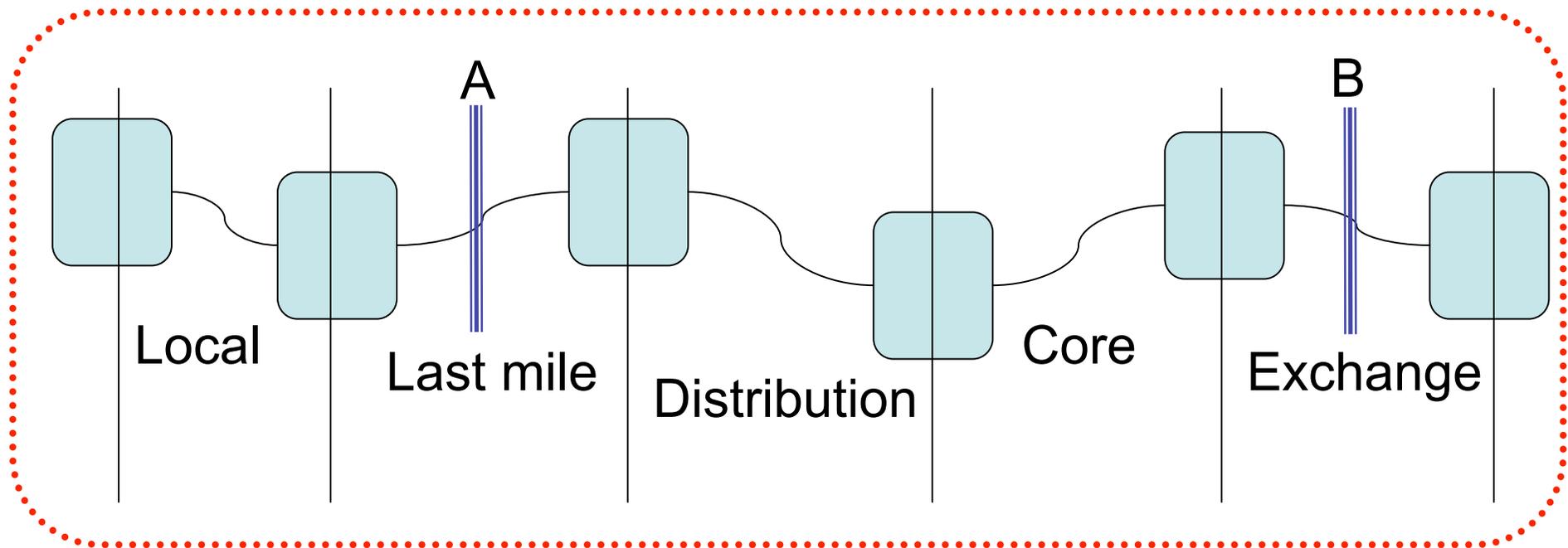
# Access in more detail

- Different providers for different pieces



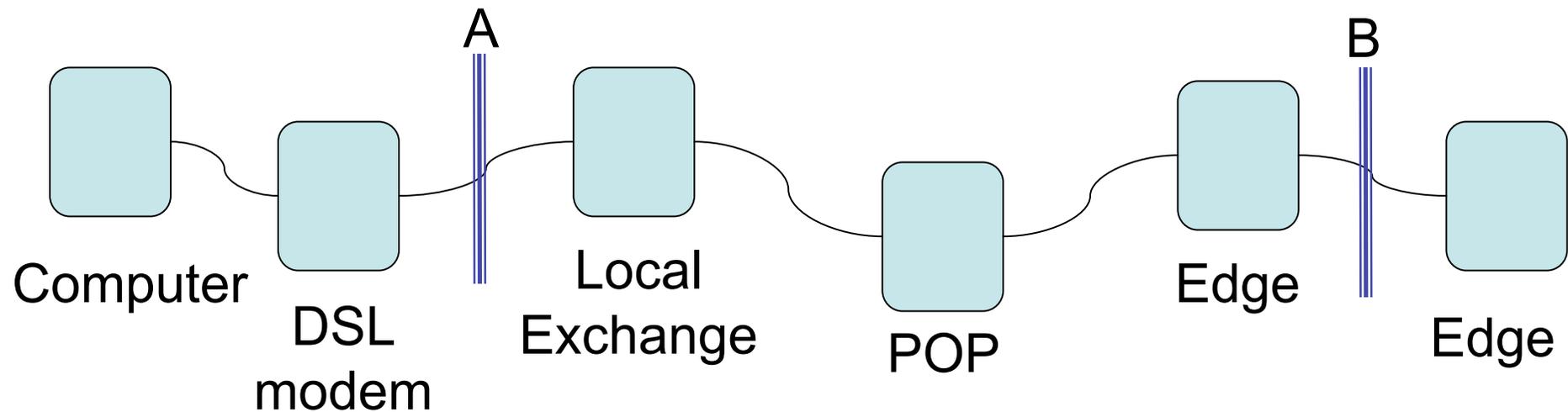
# Access from customer

- Access consists of multiple “legs”



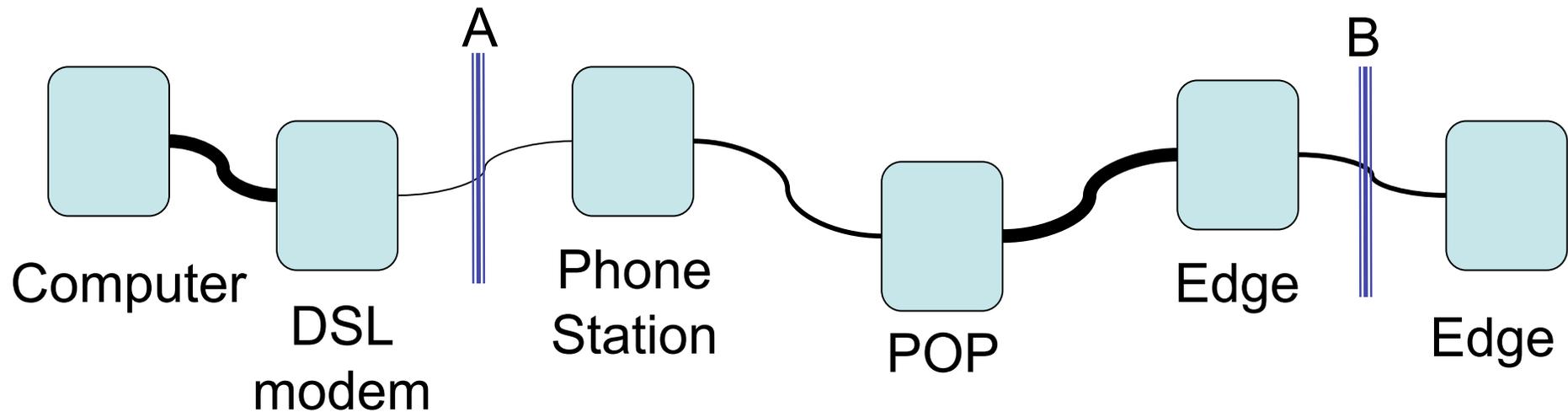
# Access from customer

- Example if different nodes used

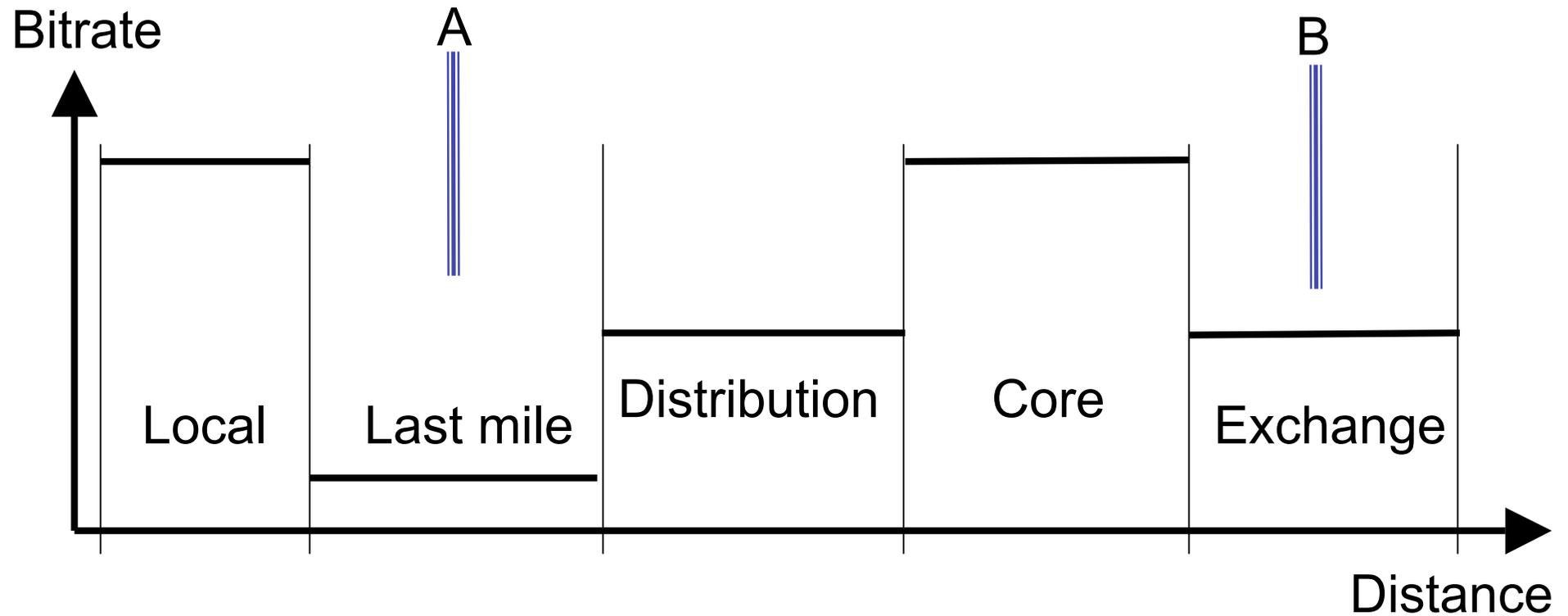


# Access from customer

- Average amount of bitrate in different legs differ, and we know where bottlenecks are
  - Thicker lines, higher bitrate

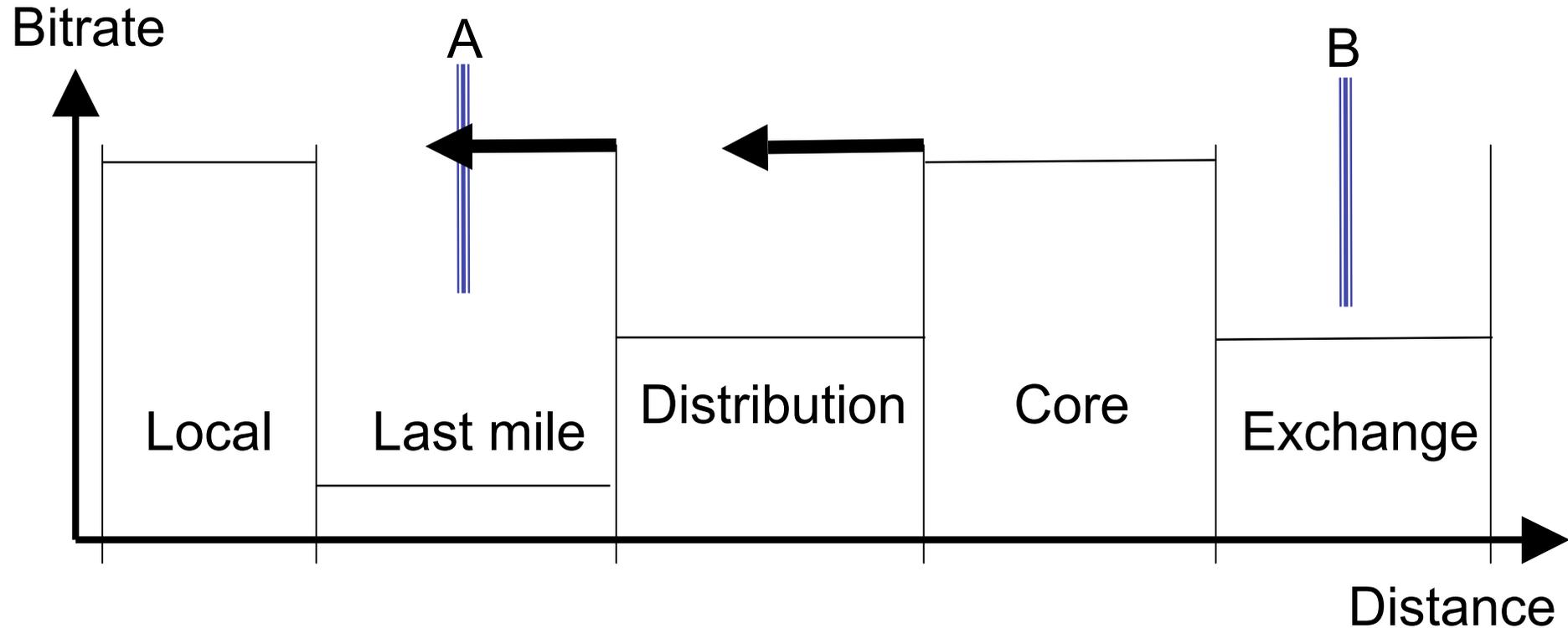


# Bitrate as function of distance



# Access from customer

- Core moves towards Customer
  - Shorter distance make it easier to get higher bitrate

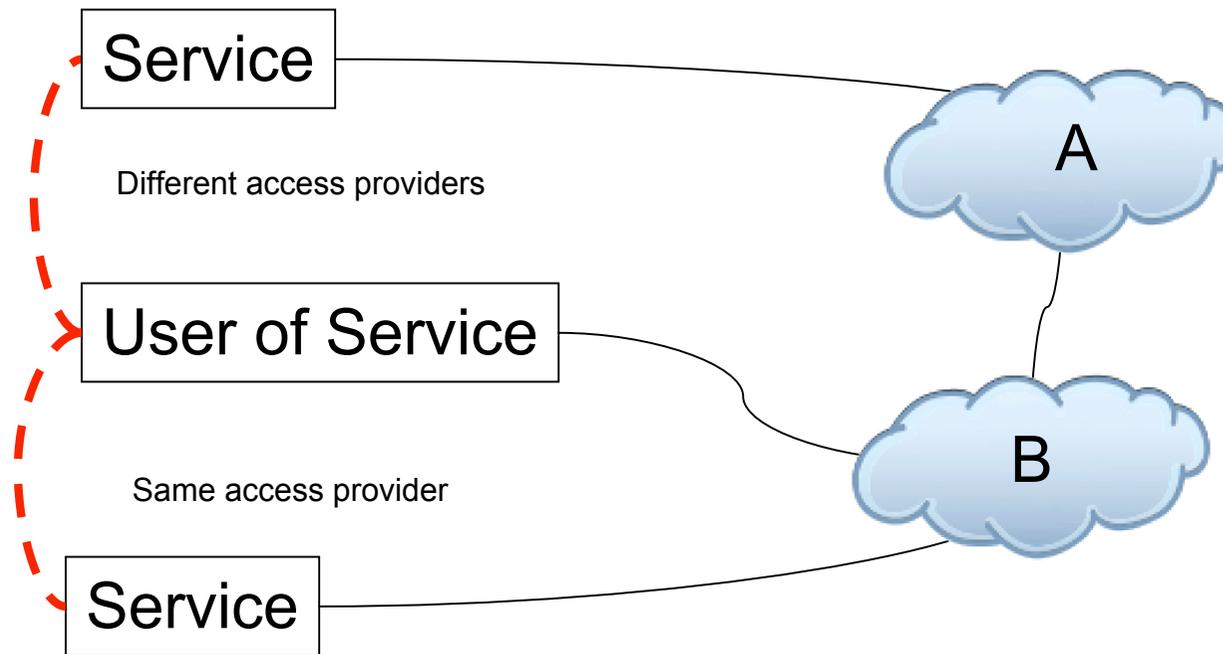


## Not one “bitpipe”

- An access can be logically divided in different channels
- Different kind of traffic might have different priority
  - Noticeable when a connection is overloaded
- Different types of technology have different characteristics
- Remember slide about “hidden problems”

# Same or different access providers?

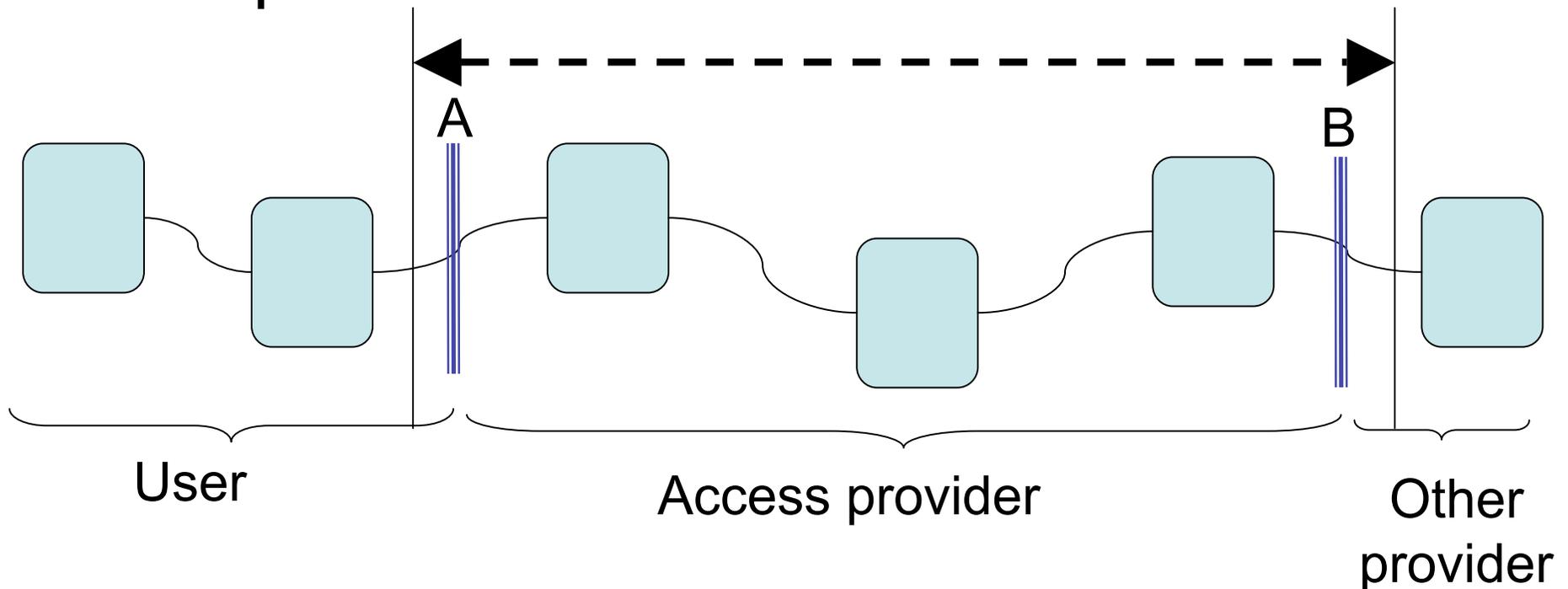
- Does this have impact on competition?



Labeling of broadband products

# Characteristics of Internet Access?

- An access provider can only be responsible for their own network



# Questions (again)

1. Is a service possible to access when moving around (nomadic use) or just locally?
2. What kind of access is needed for user to maximize chance to be able to use a service?
3. What characteristics do an Internet connection have?
  - Bitrate is not the only indicator!

# Why focus on Internet access?

- Public e-services will use Internet Access
- New innovations will use Internet Access
- Many competing services will use Internet Access
- Services (only) accessible locally will work anyway
  - Because the characteristics is guaranteed by the single access provider that can control the connection between user of the service and the service

# Responsibility

- An access provider can only guarantee characteristics for the network they are responsible for
- When a user accesses a service, more than one access provider is often used
- The user can only set requirement on the access provider they use
- The access provider can because of that not guarantee characteristics for the whole connection between user and service
- Access provider can guarantee characteristics across their network, including peering to other providers (not only between user and their core)

# Local or Internet services?

- Services might be accessed from different locations
  - From one location only (local)
  - Inside one access providers network (local)
  - From anywhere on the Internet (Internet)
- Local services are often easier to implement
- Some users need services accessible over the Internet (from anywhere)
- This is not about what is better, but information to the consumer so that the type of service matches the needs of the customer

# Characteristics

- Services that are accessible over the Internet have different behavior and needs (bitrate, packet loss etc)
- An access gives certain characteristics regarding access to Internet services (bitrate, uptime, IP-address allocation policy, jitter)
- Both can be specified using technical terms
  - These terms are hard to understand for the consumer
  - Too many to make it easy to compare access products from different access providers
  - Only look at bandwidth as today is not good enough
- Much easier to use coding system, with icons

# Coding is not (only) in Mbps!

- Instead, simple *labels* are used, for example using animals:
  -  Rabbit (TV distribution)
  -  Rooster (Telephony)
  -  Pig (Video conferencing)
  -  Horse (Online gaming)
  -  Dog (Traditional web/email)
- Each label states what the connection is optimized for, either like this, or for a specific usage pattern

# How the coding can be used (1)

- Access that is optimized for World of Warcraft has a 🐎
- Access optimized for web/email has a 🐓
- 🐎 might cost €40/month, while 🐓 costs €25 and 🐎🐓 is €45

# How the coding can be used (2.1)



- User wants:
  - Simple protected e-mail from provider
  - Low volume web-access
- Provider delivers:
  - Realistic (evening) bit-rate of ...
  - Data transfer cap of ...
  - Some outgoing ports blocked (which ones?) / incoming firewall
  - Benign traffic shaping

# How the coding can be used (2.2)



- User wants:
  - External e-mail service
  - Medium web-use
  - External VoIP (Skype-like)
  - User VPN to office
- Provider delivers:
  - Realistic (24h) bit-rate of ...
  - Data transfer cap of ...
  - No port blocking

# Note!

- We can only say *what access is optimized for the usage pattern (or what kind of service)*, not what access is better than another access, and not that an access provider guarantee that a specific service “works”
- Example: DSL 8/1 is normally better than DSL 24 for online gaming

# Do we have discussions elsewhere?

- Not really...
- Some work is done for example in
  - ITU-T (Y.1541)
  - .SE Sweden / TPTest
- None of them fulfill the needs we have

# This is not NGN!

- NGN imply an access provider do not sell (Internet) access, but instead services, and exchange of traffic between access providers are based on agreements on exchange of these services
- We talk about normal Internet access, with different characteristics
- One could call it “bronze”, “silver” “gold”, but that imply one is better than another
- Our goal is to make it easier for an consumer to buy the kind of access they need, and know what access is optimized for what kind of usage pattern

# Parameters to play with

- **Bitrate**
  - Throughput UDP and/or TCP
- **Delay**
  - Time to send and receive a response
- **Jitter**
  - Changes in delay over time
- **Packet drop**
  - Number of lost packets
- **MTU size**
  - Maximum size of transfer unit
- **Packet errors**
  - Number of errors in packets
- **IP address allocation**
  - IPv4 / IPv6, public address / NAT etc
- **IP Multicast**
  - Availability of IP multicast
- **Port level filtering**
  - Are some ports closed?
- **Uptime**
  - What uptime is expected, and how fast is a broken connection repaired?

# Example (does not work)

- As you see, many parameters are missing, while the categories are probably wrong

	<b>Bandwidth</b>	<b>Latency</b>	<b>Jitter</b>	<b>Loss</b>
Multimedia/VoIP	Medium	Important	Important	Moderate
Interactive	Low	Important	Moderate	Important
Data Transfer	High	Unimportant	Unimportant	Moderate
Web browsing	High	Unimportant	Unimportant	Moderate

# Example: ITU-T Y.1541

<http://www.itu.int/rec/T-REC-Y.1541-200602-I/en>

Quality parameter	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5
Delay	100ms	400ms	100ms	400ms	1s	U
Jitter	50ms	50ms	U	U	U	U
Packet drop	$1 \times 10^{-3}$	U				
Packet error	$1 \times 10^{-4}$	U				

- As you can see, this does not work either, for similar reasons

# ITU-T Y.1541

<http://www.itu.int/rec/T-REC-Y.1541-200602-I/en>

QoS Class	Applications (examples)	Node mechanisms	Network techniques
0	Real-time, jitter sensitive, high interaction (VoIP, VTC)	Separate queue with preferential servicing, traffic grooming	Constrained routing and distance
1	Real-time, jitter sensitive, interactive (VoIP, VTC)		Less constrained routing and distance
2	Transaction data, highly interactive (Signalling)	Separate queue, drop priority	Constrained routing and distance
3	Transaction data, interactive		Less constrained routing and distance
4	Low loss only (short transactions, bulk data, video streaming)	Long queue, drop priority	Any route/path
5	Traditional applications of default IP networks	Separate queue (lowest priority)	Any route/path

Note: Any example application listed in Table 2 could also be used in Class 5 with unspecified performance objectives, as long as the users are willing to accept the level of performance prevalent during their session.

# What to use?

- What parameters?
  - 
  - 
  -
- What categories / usage patterns?
  - 
  - 
  -

# Other questions

- Who is responsible for the labeling standard itself?
- Is this an open or closed system?
- Third party licensing / tests, with or without accreditation?
- Financing model, who pays what to whom, and how is the price calculated (percentage of product, flat fee)?
- How is the marketing done, specifically in the initial phase?
- Who decides finally about the criteria for each label? The owner of the standard or a third party, or a board of some kind?
- Who guarantee the value of the labels long term, and how can the value be maximized?

# Good things!

- Easier for consumers to know what access is optimized for themselves
- Easier for access providers to explain why their high performance products cost more
- Easier for service providers to explain why specific access is needed for their service
- Easier for consumers to choose products on the market that matches their needs
- Easier to change technical requirements for each label “during flight” (with great care though!)

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# Questions?

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