



Peer-to-peer networking - Phenomenon and impacts to carriers

Jorma Mellin / Song Networks

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Agenda

- **Definitions**
 - Peer-to-Peer
 - Carriers
- **Name of the Game**
 - History
 - Drivers
- **Networks and Peer-to-Peer**
- **Carrier strategies**
- **Where is the beef ?**
- **Enlightened guess of evolution**

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Definitions – Peer-to-Peer

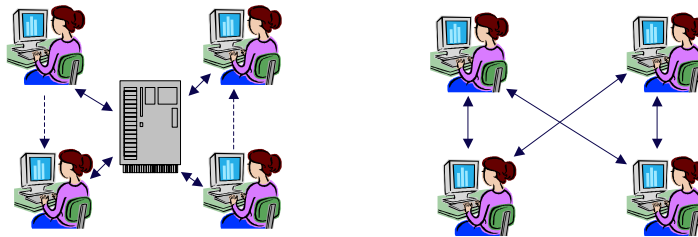
- **Various definitions exist**
- **Network -related definitions include**
 - Telephony network and voice calls
 - IP-networks and voice over IP (VOIP)
 - Internet and IRC peer to peer sharing
 - Internet and web browsing (content distribution)
- **Content –related definitions include**
 - illegal distribution of copyrighted material (in some countries)
 - music, video, software, what so ever.. (piracy in general)

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Definitions – Peer-to-Peer



- **File Sharing between decentralised workstations**
 - with or without a common meeting point
 - indexed and searchable content



- **Overlay'ed logical network**

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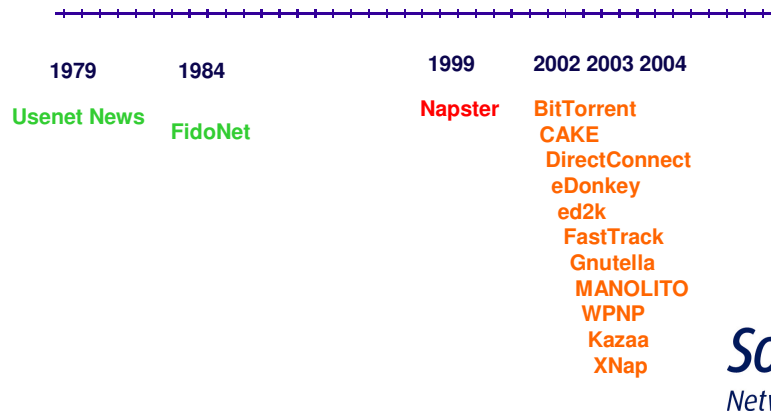
Definitions - carriers



- **Commercial operators selling, buying and operating:**
- **IP backbone capacity**
 - IP transit in general
 - national backbones including cross-border links
 - cross-Atlantic / Pasific capacity
- **Distribution networks**
 - Wholesale connectivity for (residential) areas
- **Access services (broadband)**
 - xDSL / WLAN / Ethernet -access

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Name of the Game - history



Name of the Game - drivers



- higher bandwidth and always-on access (broadband)
- more powerful desktops (CPU)
- cheaper storage
- flat rate Internet access

- music, MP3
- video, DivX
- software applications (games, OS, ...)

- regional differences do exist (Asia, US, Europe)
- differences also within regions (countries)

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Networks and P2P

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Traffic growth rates, Aug-03/04

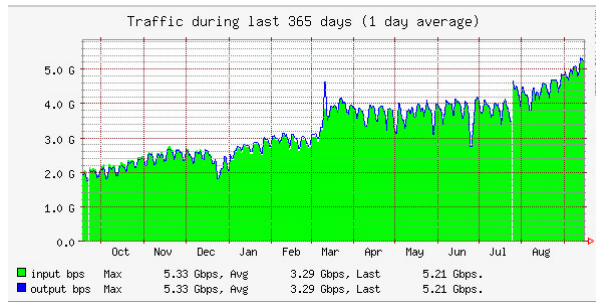
	Backbone growth	Average growth	Peak growth
Trans-Atlantic	32 %	110 %	133 %
Trans-Pasific	68 %	119%	123 %
Intra-Europe	50 %	82 %	69 %
Intra-Asia	101 %	434 %	452 %
Intra-Americans	46 %	208 %	206 %
Elsewhere	28 %	89 %	85 %
Overall	46 %	115 %	111 %

Source: Telegeography Research, Global Internet Geography, Primetrica Inc

- 40-60 % of backbone traffic is P2P
- 80-90 % of local traffic is P2P

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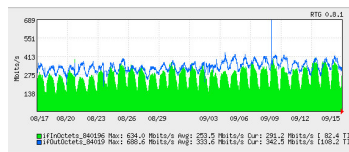
Traffic growth rates, Finland



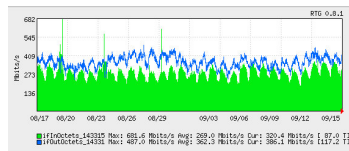
summary of FICIX peering points yearly traffic



Content is ... where?



Traffic from Stockholm to UK and US
- example taken from one GbE -link



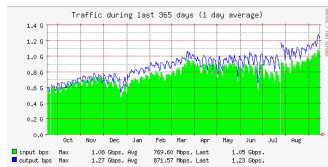
Traffic from Finland to Sweden:
- example taken from one STM16 -link

Source: multinational anonymous ISP

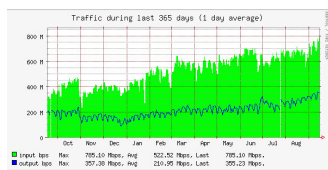




Traffic origins, Finland



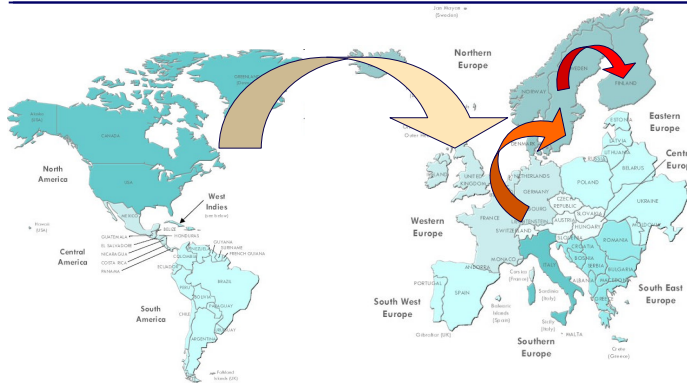
Sonera's traffic pattern at FICIX:
- users are pulling traffic from the IXP's
(ca 200 000 residential broadband users)



Song Networks traffic pattern at FICIX:
- users are pushing traffic to the IXP's
(hardly any residential broadband users)



P2P content pulling map





Relevant trends ongoing

- *within the business of backbone traffic management*
- **Expensive IXP's lose customers to cheaper ones**
 - AMS-IX growth rate exceeds LINX's (UK) growth
- **Carriers prefer transit over IXP's as TCO is cheaper**
 - some major carriers withdrawn from major IXP's already
- **Price difference of IP Transit US-Europe is diminishing**
- **Virtual presence to do peering and transit is evolving**

No evidence that P2P is driving this evolution

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Carrier strategies

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Carrier strategies, #1

- **Tolerate**
 - do nothing and wait
 - Very easy strategy to follow
 - The most used in todays Internet
 - May lead to out-of-control situations that put business plans at risk
-
- ***If this is your strategy then measure P2P at least***

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Carrier strategies, #2

- **Deny totally**
 - simply claim it against AUP
 - Adjust agreements to prohibit, if you can figure out how to describe peer-to-peer
 - Filter all P2P traffic from networks, if you can figure out what is peer-to-peer traffic and what is not
 - Prepare that some customers do not like it and leave
-
- ***If this is your strategy then be honest about it***

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Carrier strategies, #3

- **Hamper**
 - make P2P unattractive and less resource hungry
 - make P2P to follow "not-so-costly" paths, or de-prioritise it
 - steer usage to avoid network peak-hours
 - watch for heavy users and make them pay
- *If this is your strategy take good care of your processes.*

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Carrier strategies, #4

- **Control**
 - hop into the bandwagon and steer usage effectively
 - install cache devices to get the content into the network
 - install proxy devices to control connections
 - install (super)nodes to control content availability
- *If this is your strategy don't tell anyone*

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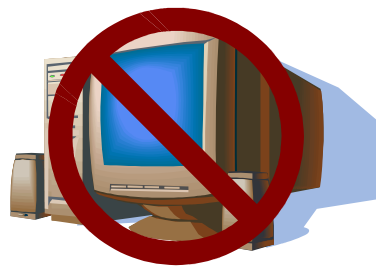
Carrier strategies - Finland



- Study compiled by Finnish Communications Authority FICORA
- Timeframe of study was March, 2004
- 40 ISP/Telcos answered
- outcome to follow ...

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Carrier strategies - Finland

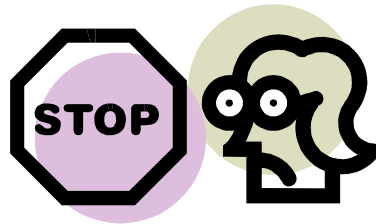


- **Banned servers from residential access**

50 %

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Carrier strategies - Finland



- Banned file sharing explicitly

2 pcs

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Carrier strategies - Finland

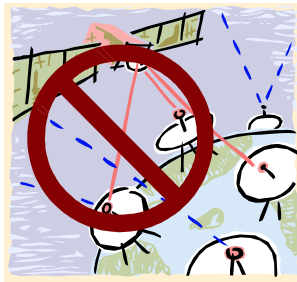


- Banned subscribers to host services

35 %

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Carrier strategies - Finland

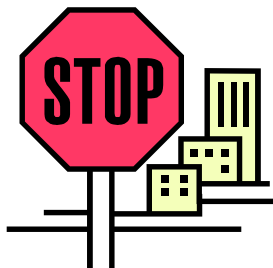


- Banned subscription sharing and 3rd party traffic

55 %

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Carrier strategies - Finland

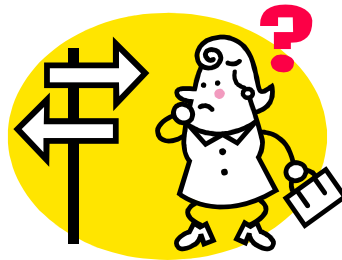


- (IP) port filtering (for security)

78 %

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Carrier strategies - Finland

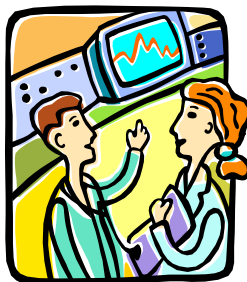


- Policing peer-to-peer traffic at least partially

20 %

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Carrier strategies - Finland

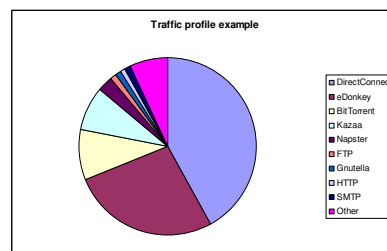
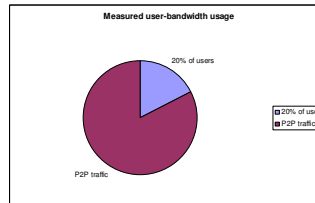
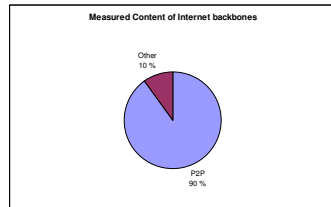


- limiting subscriber flows

1 pcs

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Carrier strategies - Finland



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Analysis



- **P2P is well known issue among finnish operators**
- **Security is number one concern today**
 - introducing SPAM controls
 - scanning emails, firewalling
 - blocking troijan/worm/virus well-known ports
- **Actions to control P2P are emerging**
 - strategies vary
- **Tolerance –factor seems to be quite high**
 - excellent infrastructure
 - well maintained services

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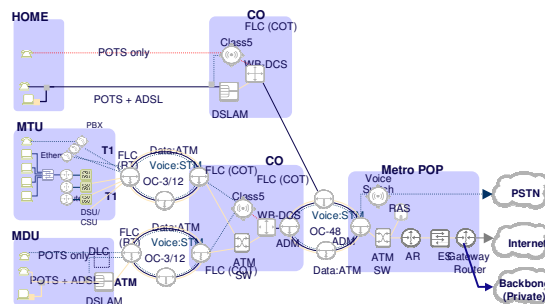
Feet on the ground, eyes up high

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Where is the beef

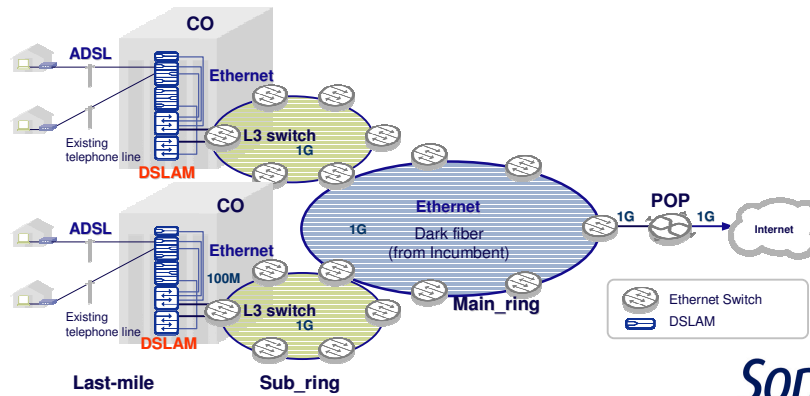
- for carriers it is only traffic
 - unequal customer profiles – all pay but only some use
 - traffic does not follow topology – problem with legacy networks



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Modern telco network structure

Case: SBB/Japan (Yahoo)



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Where is the beef



- **Carriers want to turn traffic into earnings**
 - volume based billing
 - fat pipes for fat money – but the competition
- **If traffic isn't a valid revenue source, then**
 - providing access becomes a necessity for business
 - value-add offerings become extremely important
 - controlling traffic becomes an art of it's own

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Where is the beef

- **type of eBusiness, between users this time**
 - content is the money - what you have to share is your wallet
 - content ownership absolutely suspicious – dirty money
- **Piracy and copyright violations**
 - impact to copyright owners non-measurable
 - no impact to CD/DVD sales within U.S. so far
- **If there is a (real) demand, why there ain't enough supply?**

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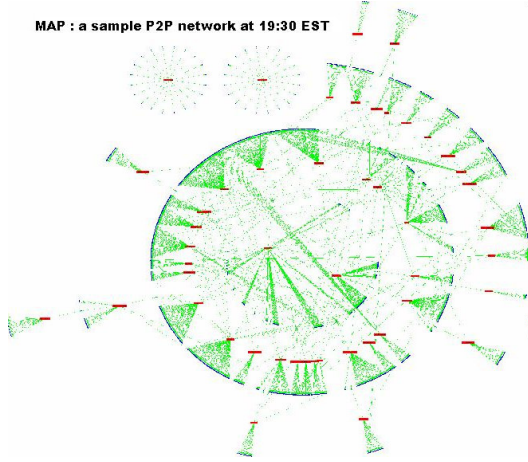


Enlightened guess of evolution

- **Here to stay**
- **Downloading a DVD movie from 15 700 km distance in 4 seconds!**
 - multiple TCP-Reno streams with jumbo frames: 6,63 Gbps
 - http://ultralight.caltech.edu/lsr_06252004/
- **Digital currency has to evolve**
 - there will be frauds, as there is today with credit cards etc
- **Carrier's have to control it or make money out of it**
- **Entertainment industry is (extremely) stupid if not participating**
- **P2P could also be the next-gen overlay network for**
 - emergency information flow
 - SPAM detection and filtering
 - software (patch) distribution
 - telephony services
- **#1 issue to solve is *TRUST***

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MAP : a sample P2P network at 19:30 EST



• Digital Intelligence Centre <<http://www.itic.ca/DIC/>>



Thank You for sharing the time



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