Moving an exchangepoint

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What happened?

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Netnod

Who are Netnod?

- Largest Internet exchangepoint in Sweden
- Operations in four cities
  - Stockholm, Malmö, Gothenburg, Sundsvall
- Various medias in use at various locations
  - Gigabit Ethernet, FDDI, DPT622 and DPT2.5G

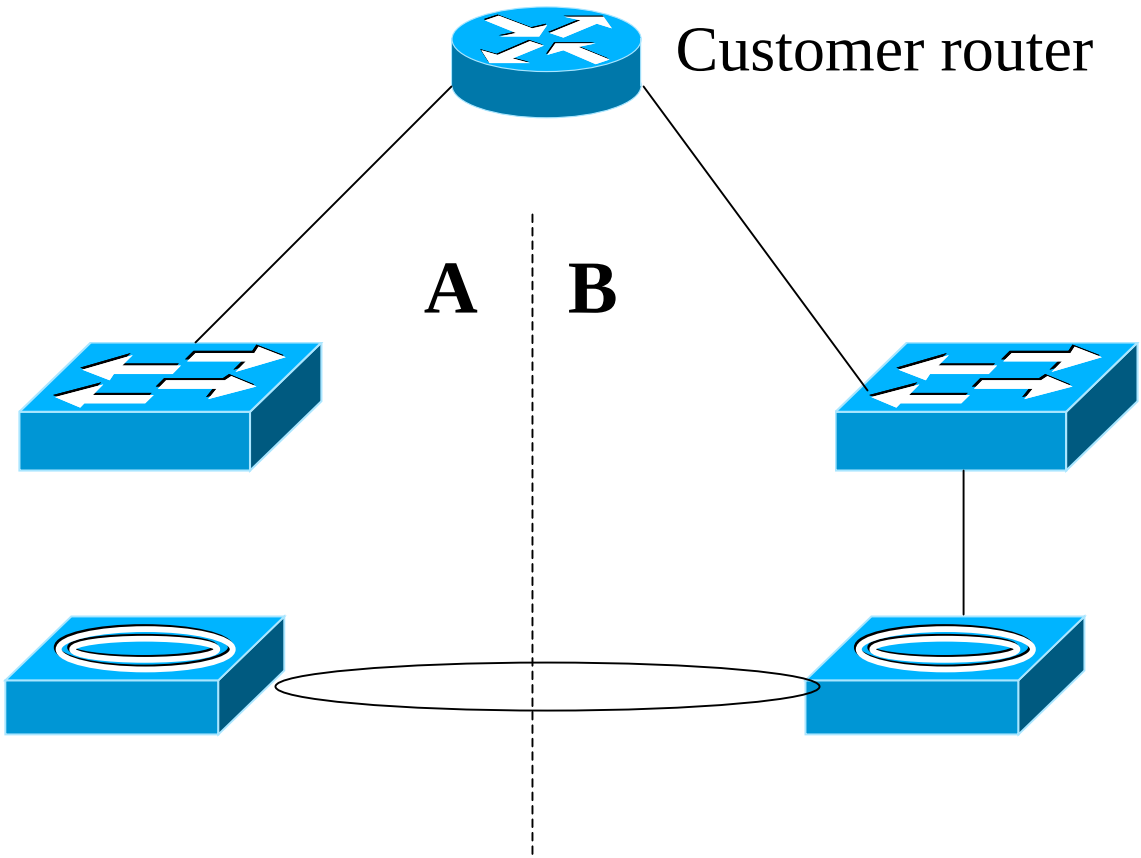
Who are Netnod?

- Focus have been on redundancy
- Switches and shared infastructure are in government owned mountain caves
- Each of the technologies are redundant
- Each of the locations are redundant

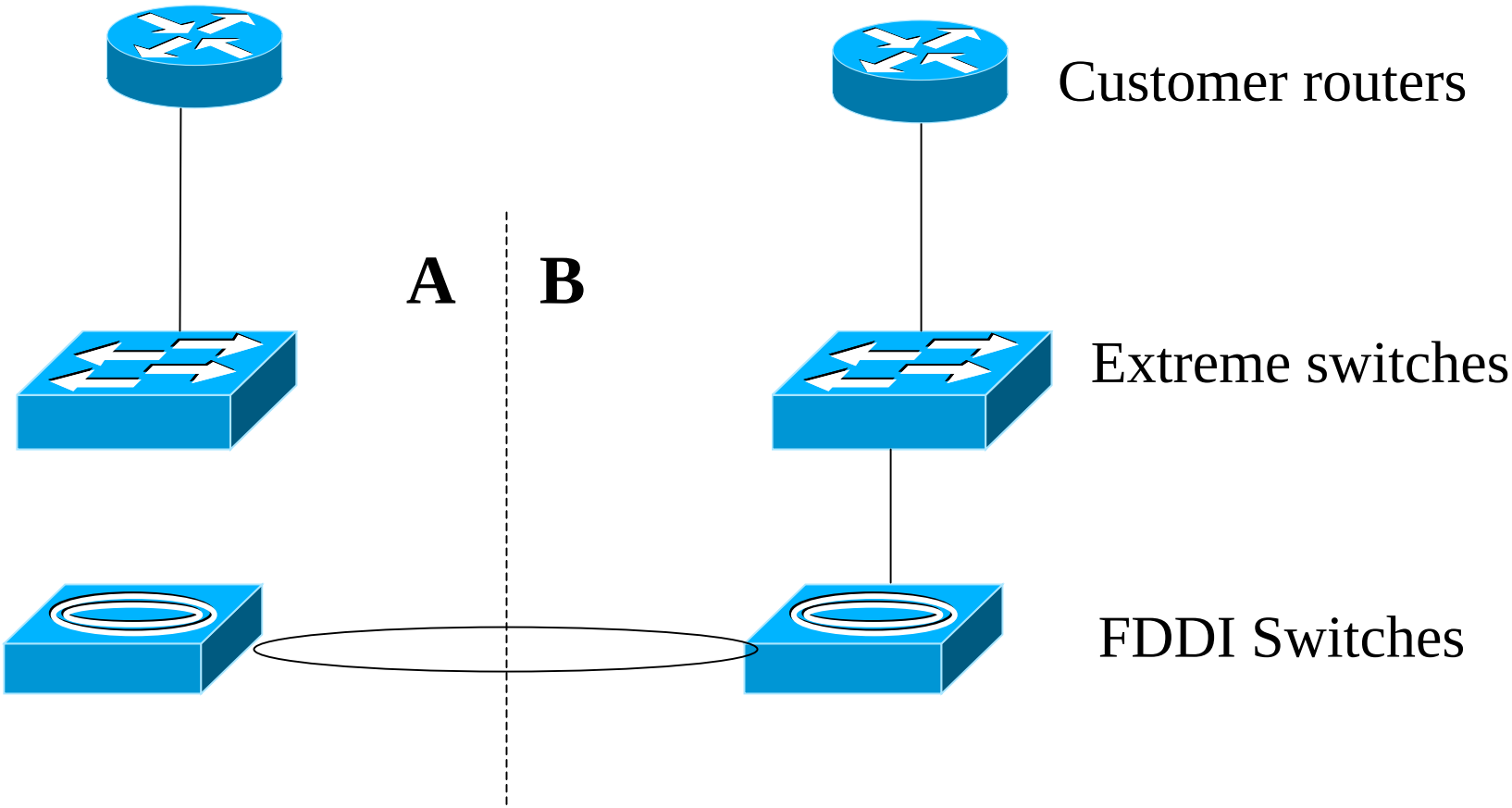
The test

- Locations in Stockholm called A and B.
- Not enough space in A
  - Migration to a new location needed
  - This would take down half of the redundancy

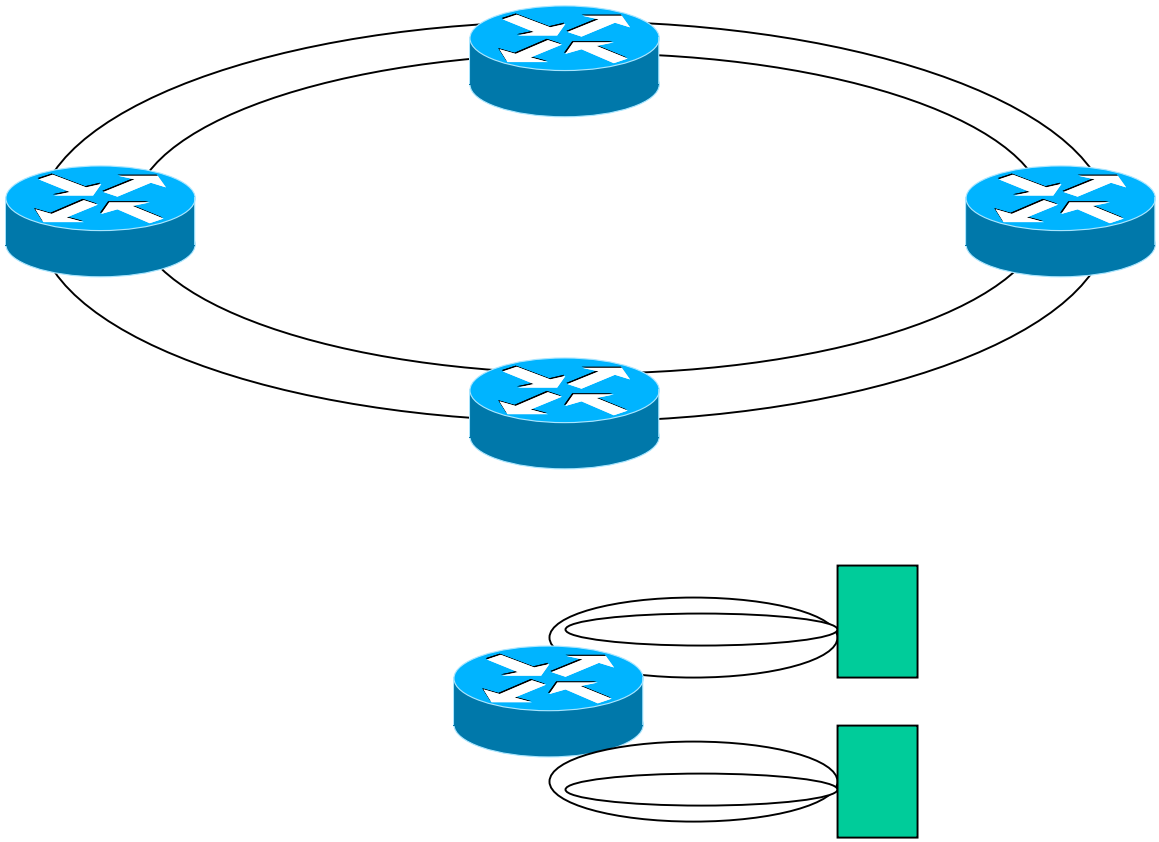
Netnod setup - GigE 1



Netnod setup - GigE 2



Netnod setup - DPT



...and then we migrated ”A”...

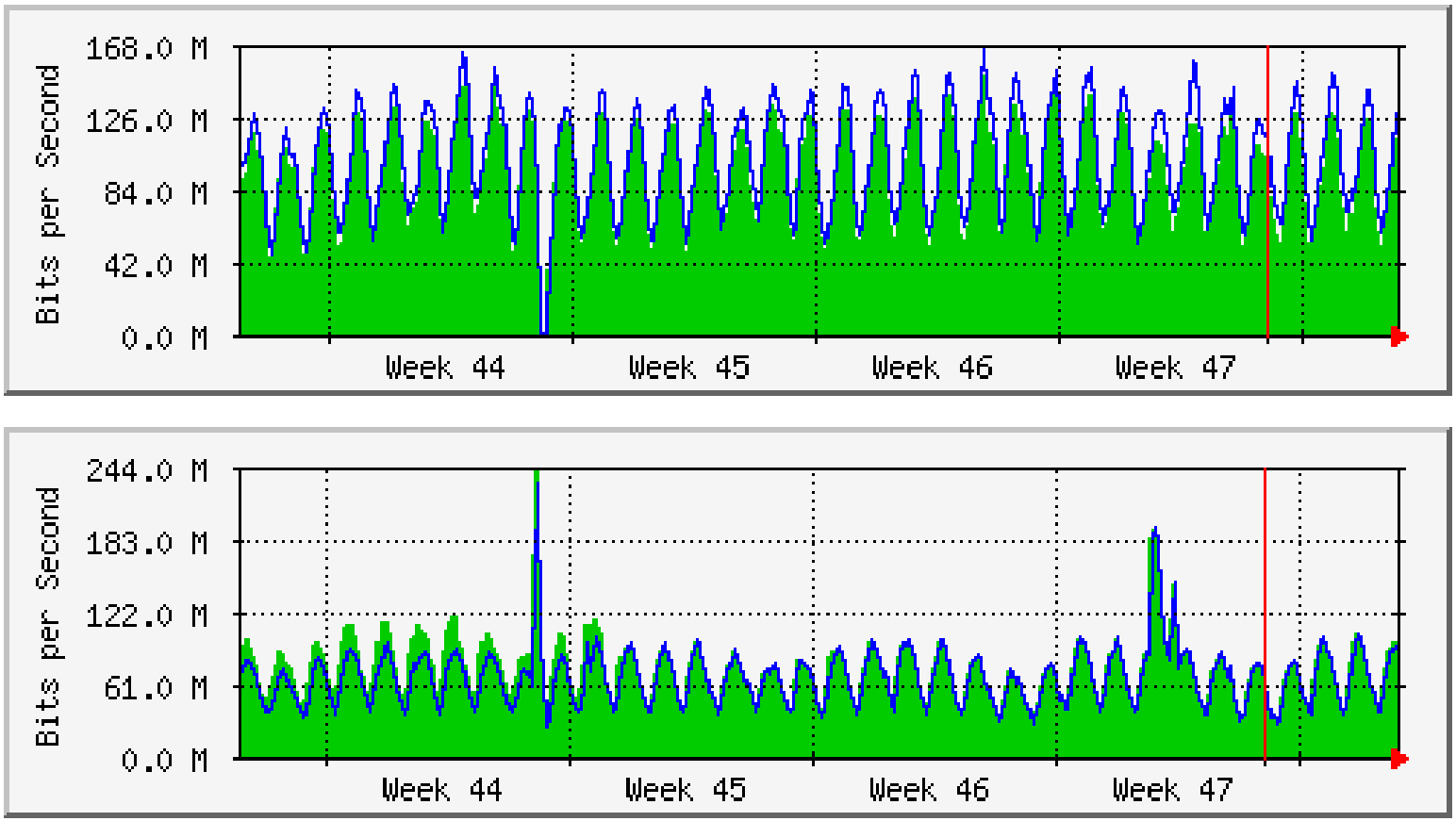
...so what happened?

Nothing really...

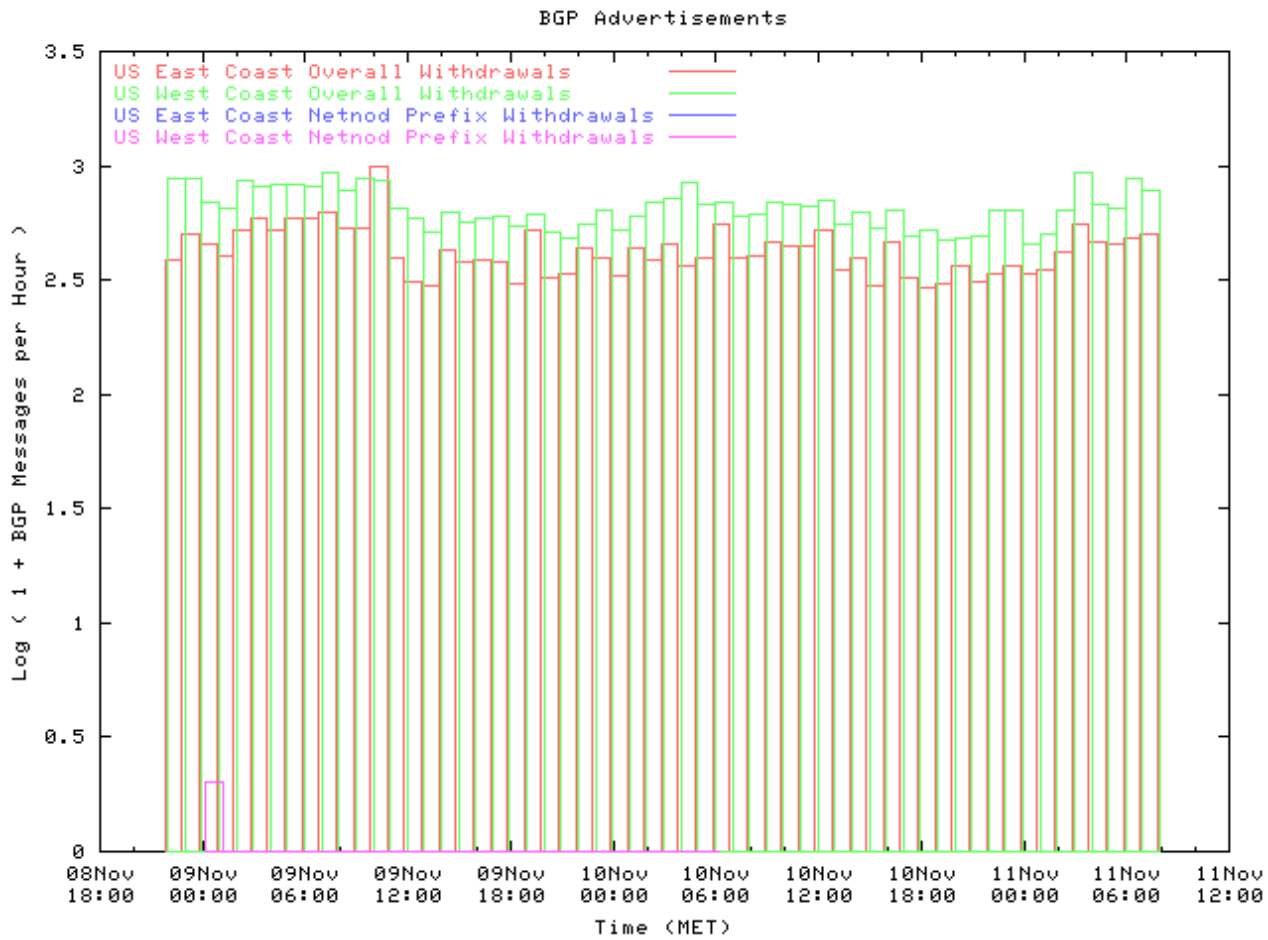
Government project

- Study of the overall stability of the Internet in Sweden
  - DNS
  - Exchange points
- Gathered a number of data
  - BGP logs of 10 ISPs...almost
  - BGP listening on US East/west coast
  - Load graphs
  - Connection characteristics of 10 locations

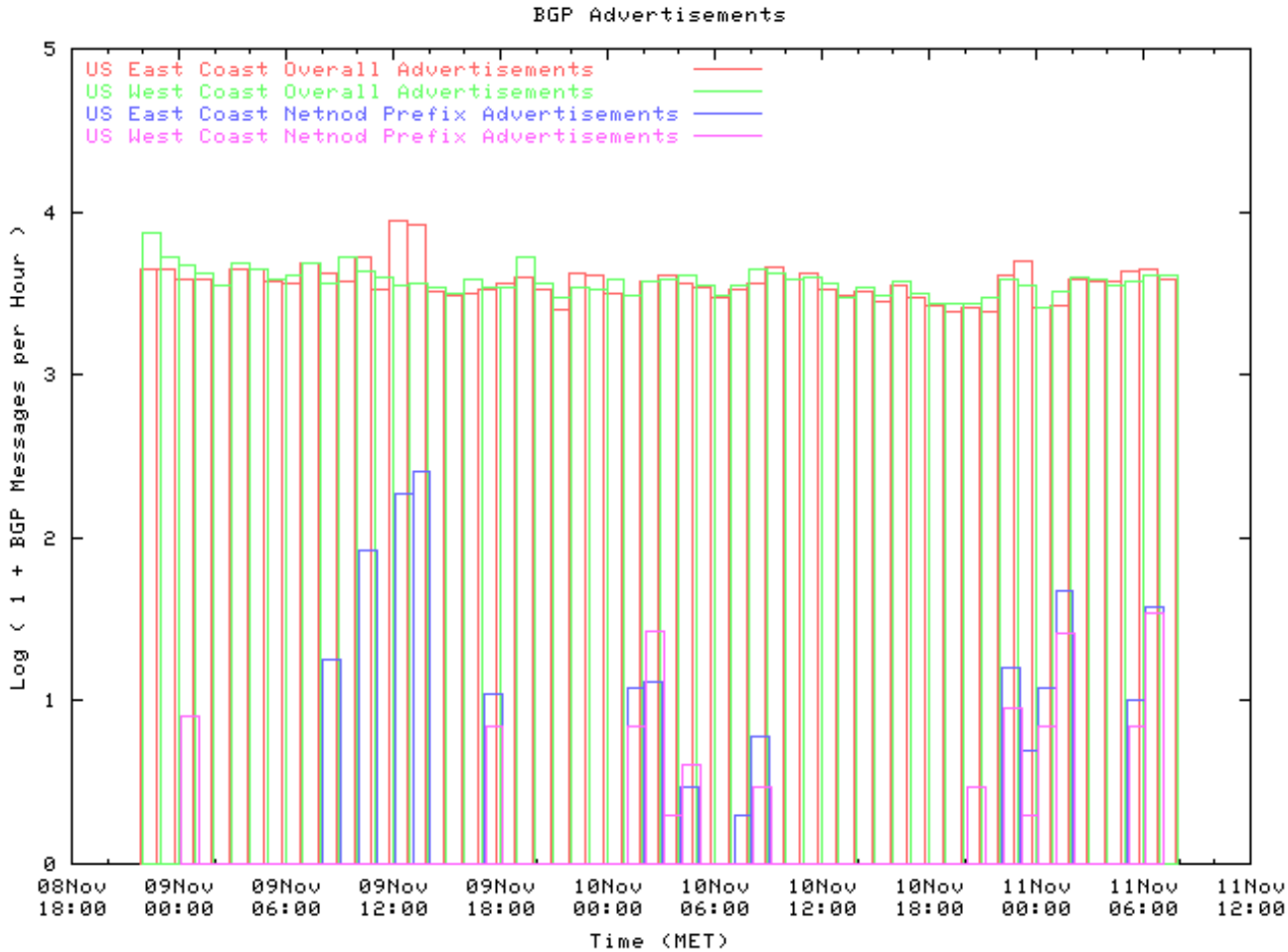
Traffic shifted as planned



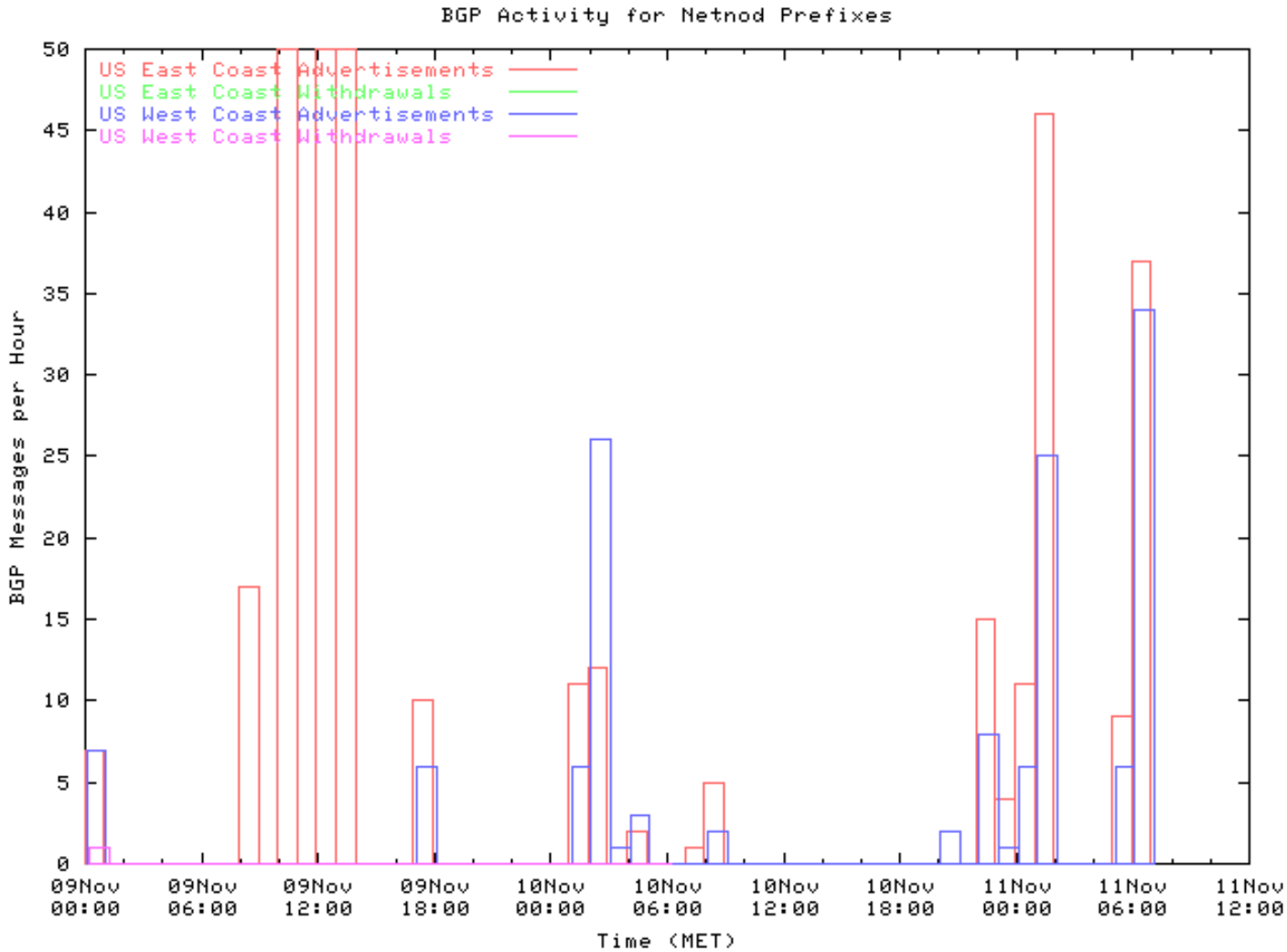
BGP Activity in the US - Withdrawals



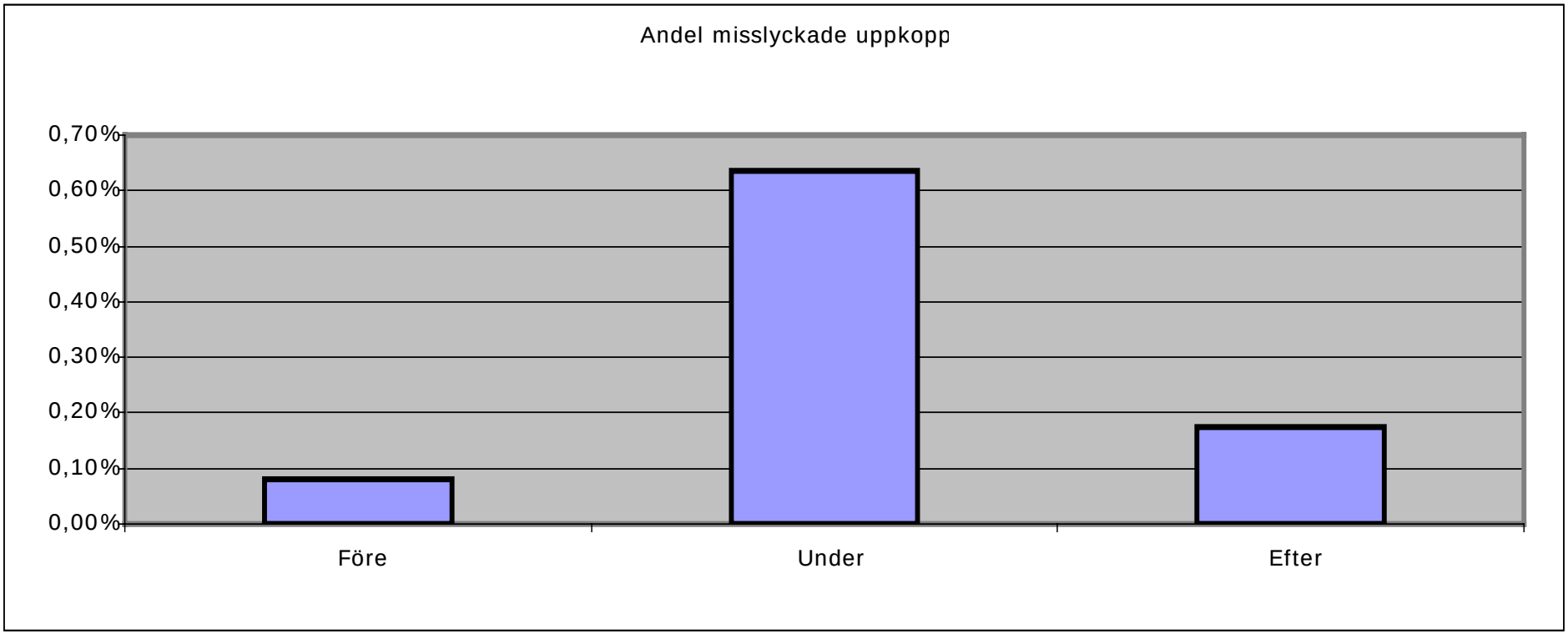
BGP Activity in the US - Advertisements



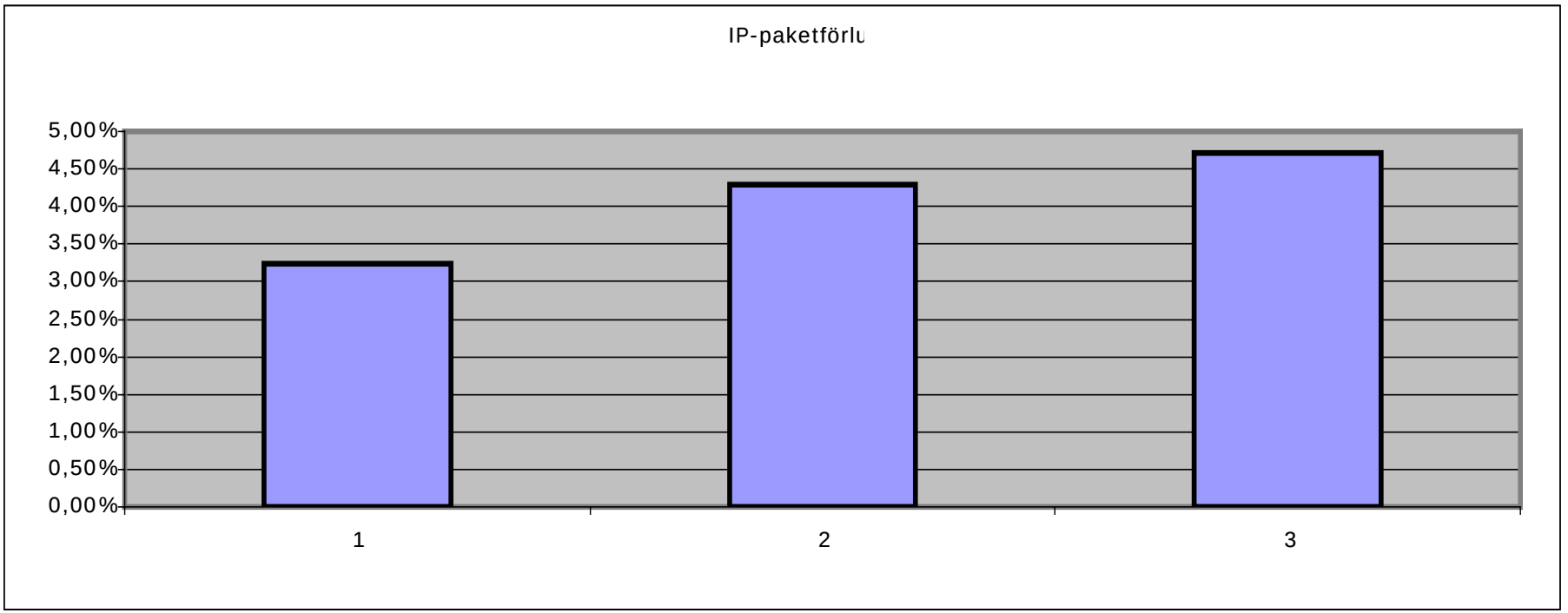
BGP Activitv - details



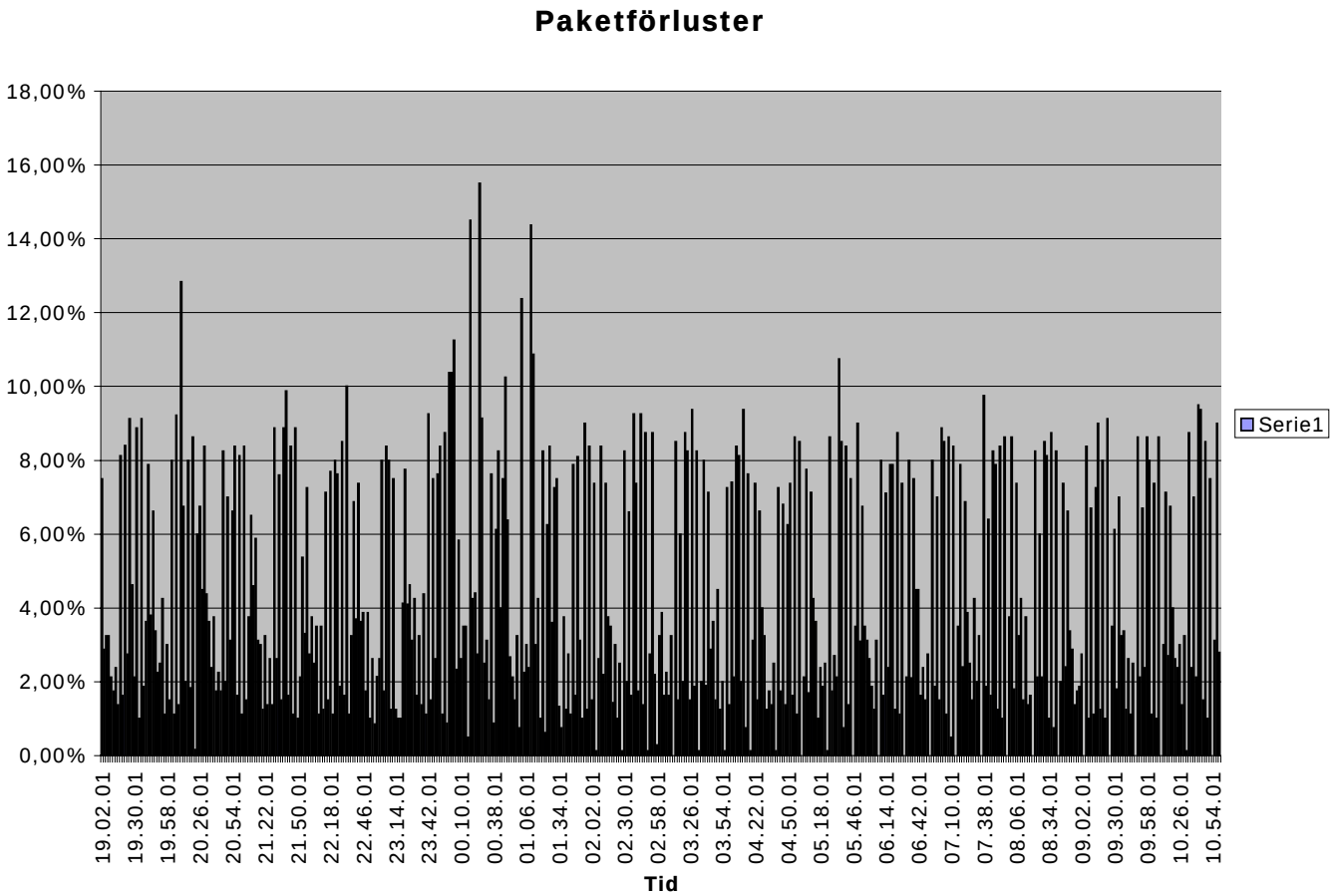
Failed connection attempts



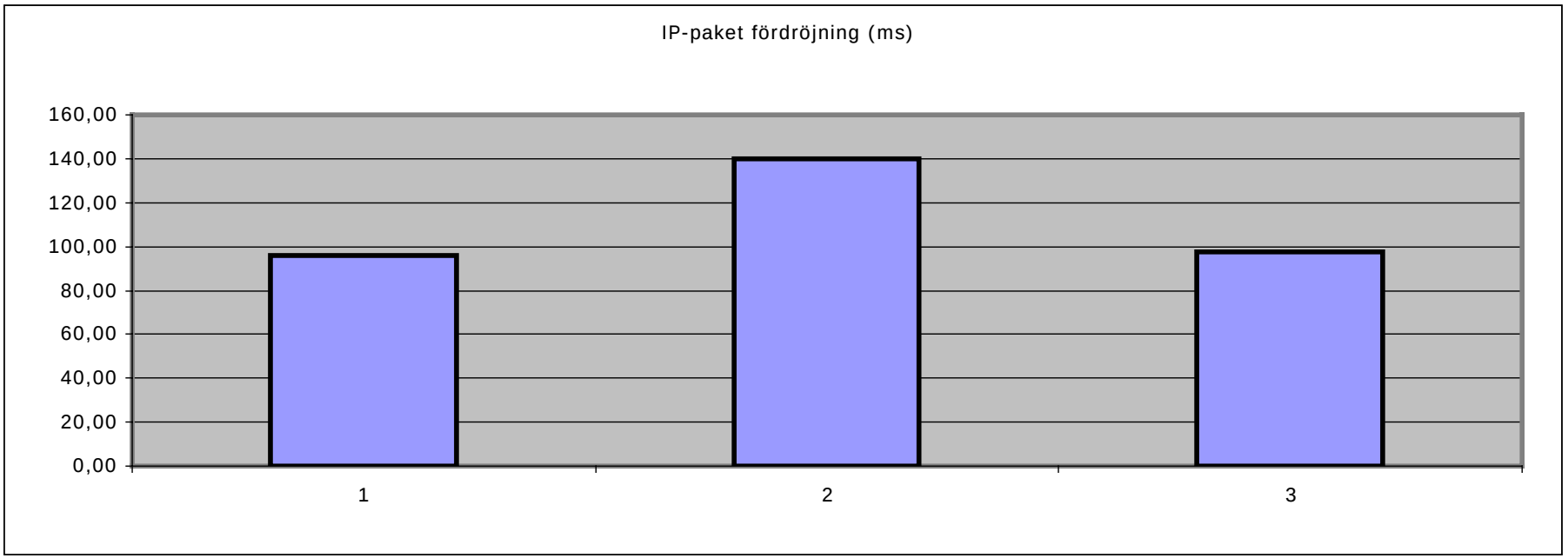
Packetloss



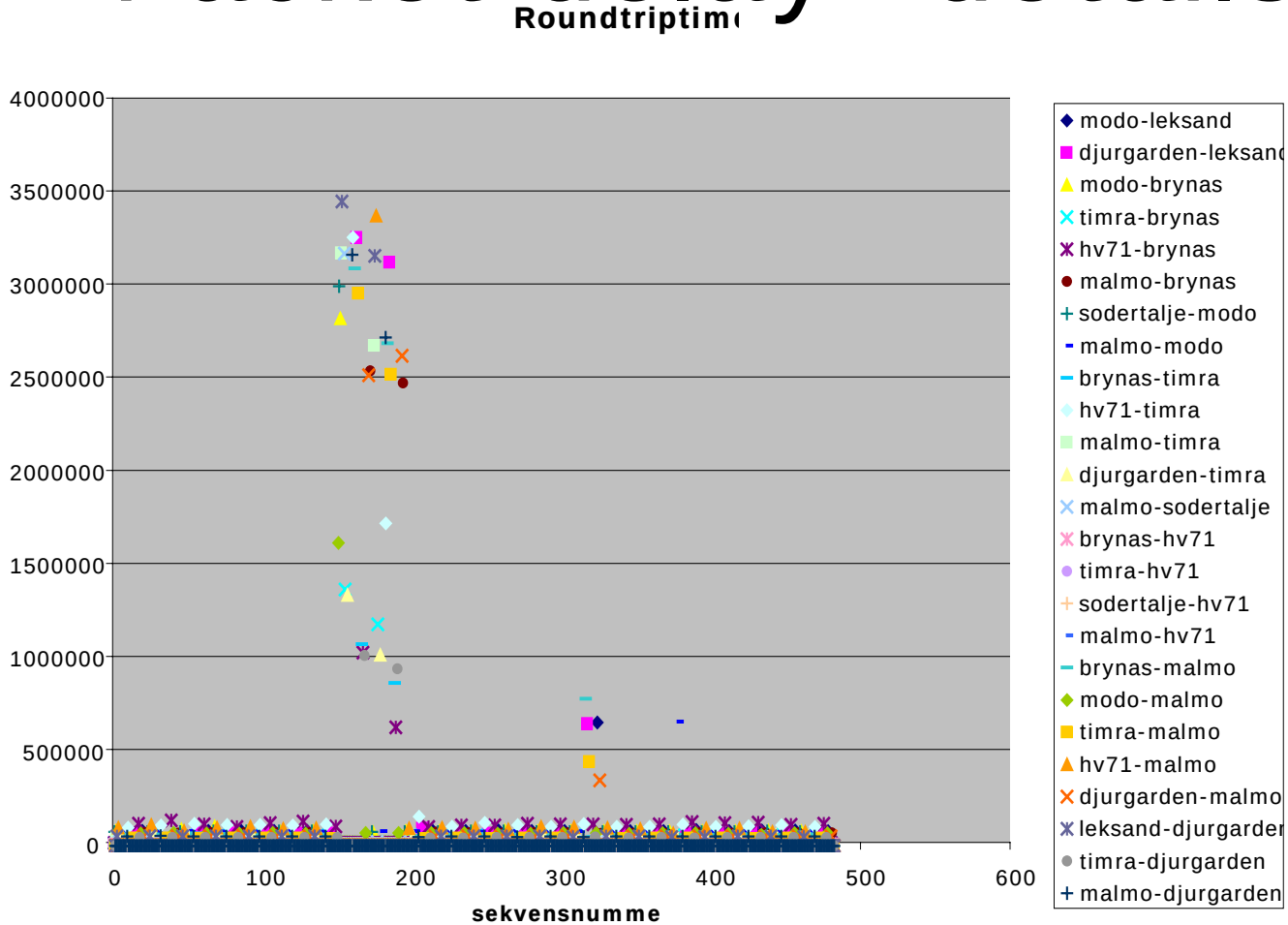
Packetloss - details



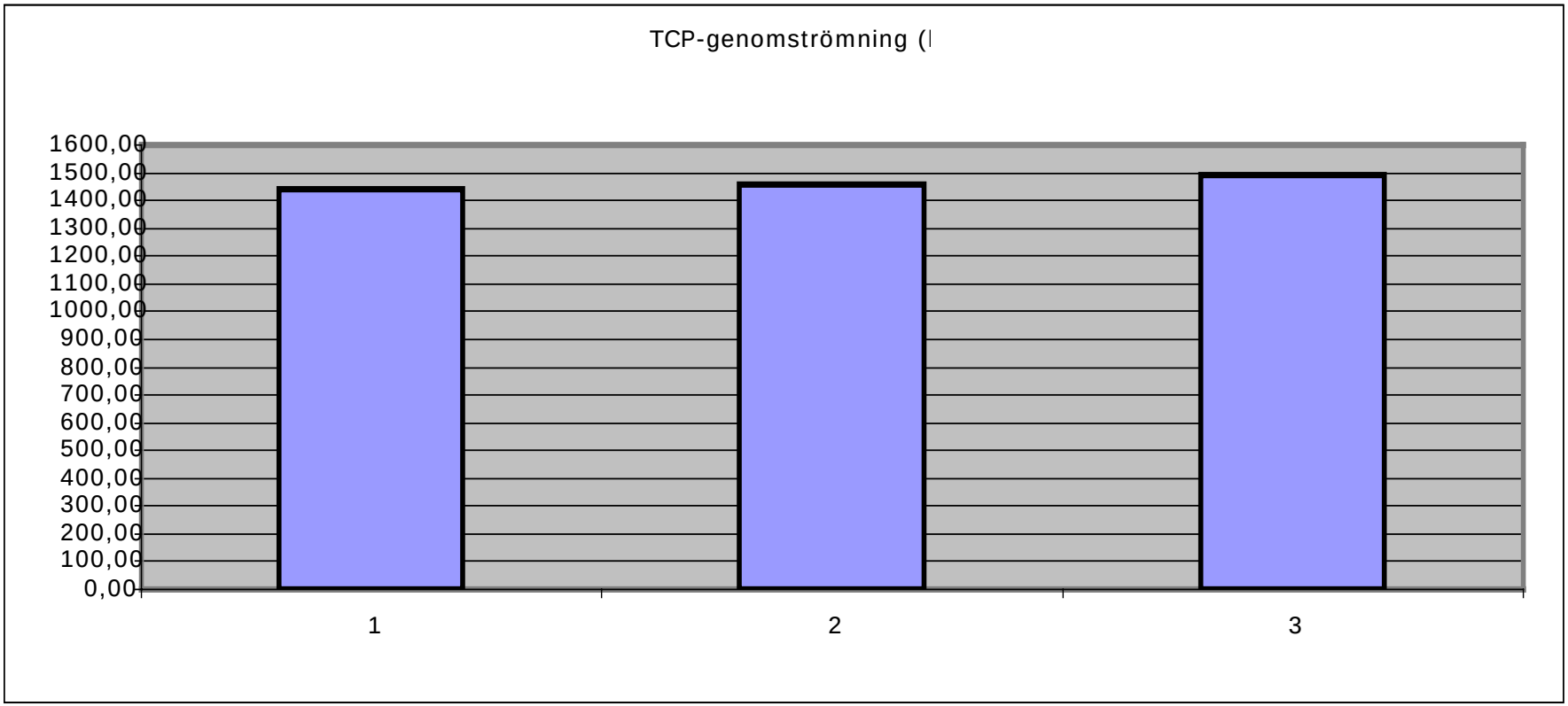
Packet delay



Packet delay -details



TCP Throughput



What conclusions can we make?

- Exchange points are not really crucial
  - Some ISPs actually shifted the traffic beforehand
- Interconnects can be made stable
  - Layer 2 convergence will help
  - But GigE can also be made to work…
  - …but you need to be careful

So what do we think happened?

- Well, the only thing that really changed was the NEXT_HOP
- Backup paths was known
- So BGP recalculation was very limited, if at all

- But this needs planning and luck!
  - And not necessarily in that order...

Operational stability

- This “proves” that major topology changes can be done with little impact
  - Or that IXPs are irrelevant
- Operational stability is becoming more and more important
  - Mostly based on commercial reasons
- But there might be other needs as well
  - How dependent is your country on the Internet?

Conclusions

- Built right, an IXP can prove to be a very reliable tool for exchanging traffic
  - Some of the characteristics are hard to get with private peerings
- Maybe there is a future for IXPs....

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