sFlow implementation at AMS-IX

NANOG 40
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Agenda

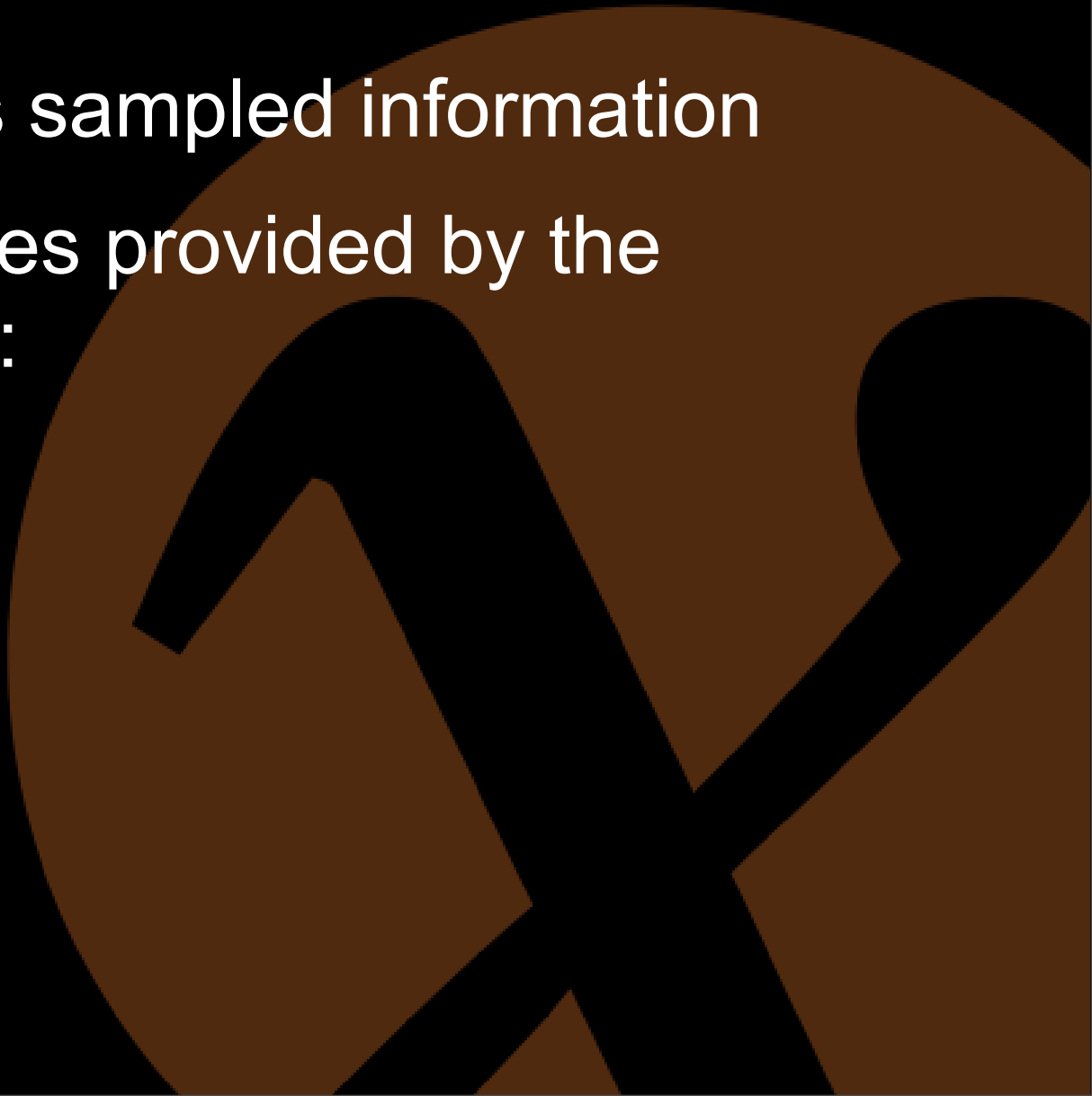
- What is sFlow?
- AMS-IX requirements
- Hardware specifics
- Software
- Results and usage
- Future plans

What is sFlow?

- Capture traffic data in switched or routed networks
- Sampling technology
- Datagram format standard defined in RFC 3176
- Implemented on a wide range of devices (Foundry, Force10, Extreme...)

What is sFlow?

- Not everything is sampled information
- Two different types provided by the datagram format:
  - Flow samples
  - Counter samples



What is sFlow?

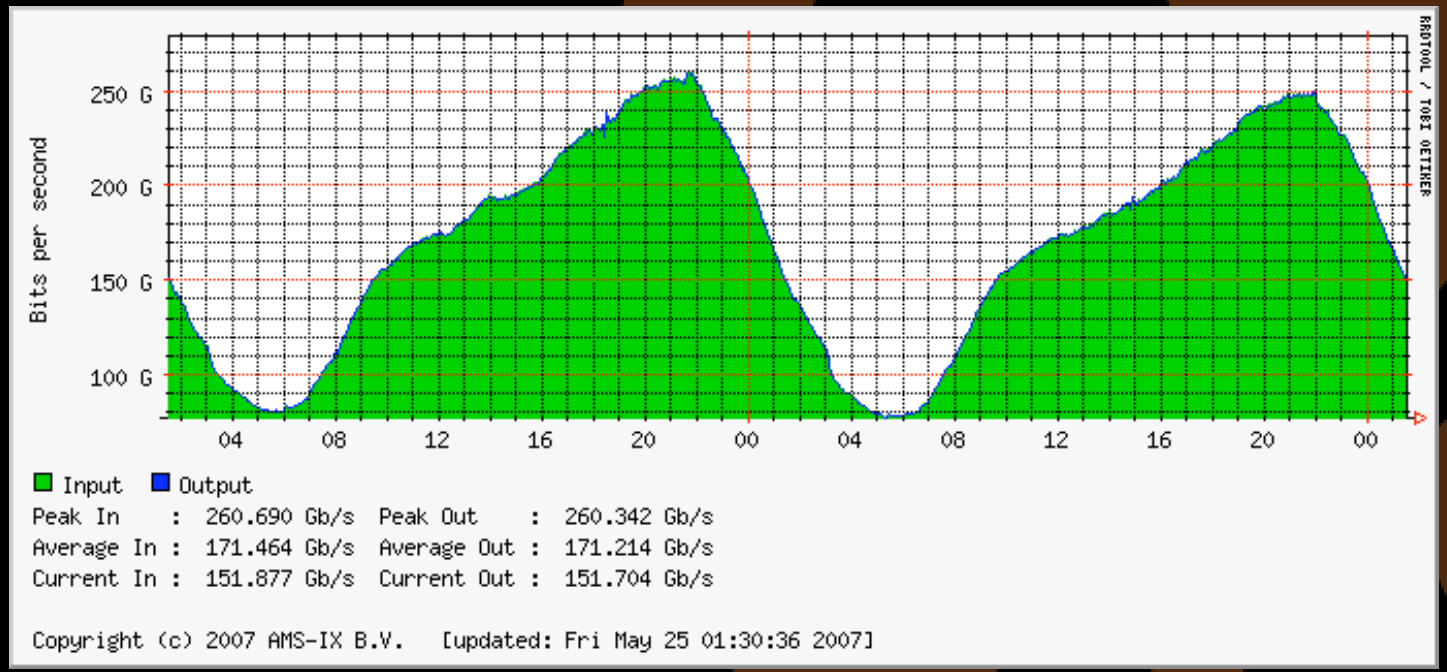
- Flow samples
  - Whole captured packet (L2-L7)
  - Defined sampling rate (eg. one out of 8192)
- Counter samples
  - Interface counters (octets/packets/errors/...)
  - Polling interval (eg. 30 sec.)

AMS-IX Requirements

- Use flow samples to show member to member traffic statistics
  - Operates only on layer 2
  - One MAC address per member
- Show other information, eg. ether type
- Use counter samples to show interface statistics

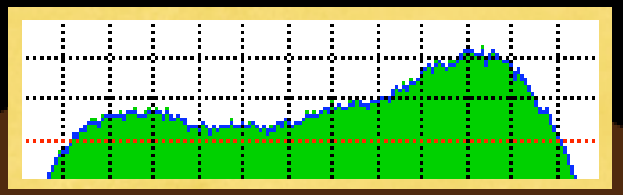
AMS-IX Requirements

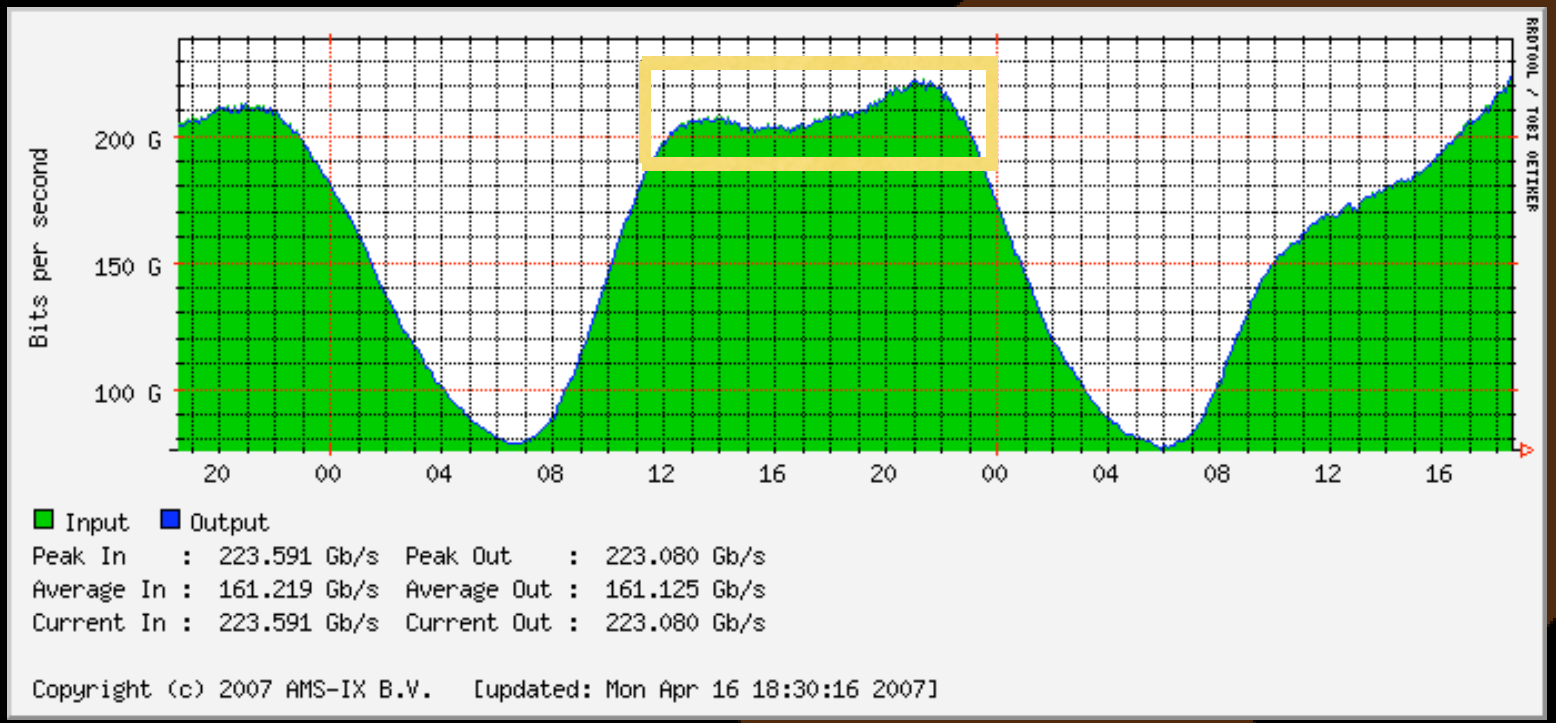
- High performance demands
- 260 Gbps - 40 Mpps
  - Sampling rate 8192 → ca. 4800 samples per second



AMS-IX Requirements

- Issues with MRTG





- Spikes due to CPU load

Hardware Specifics

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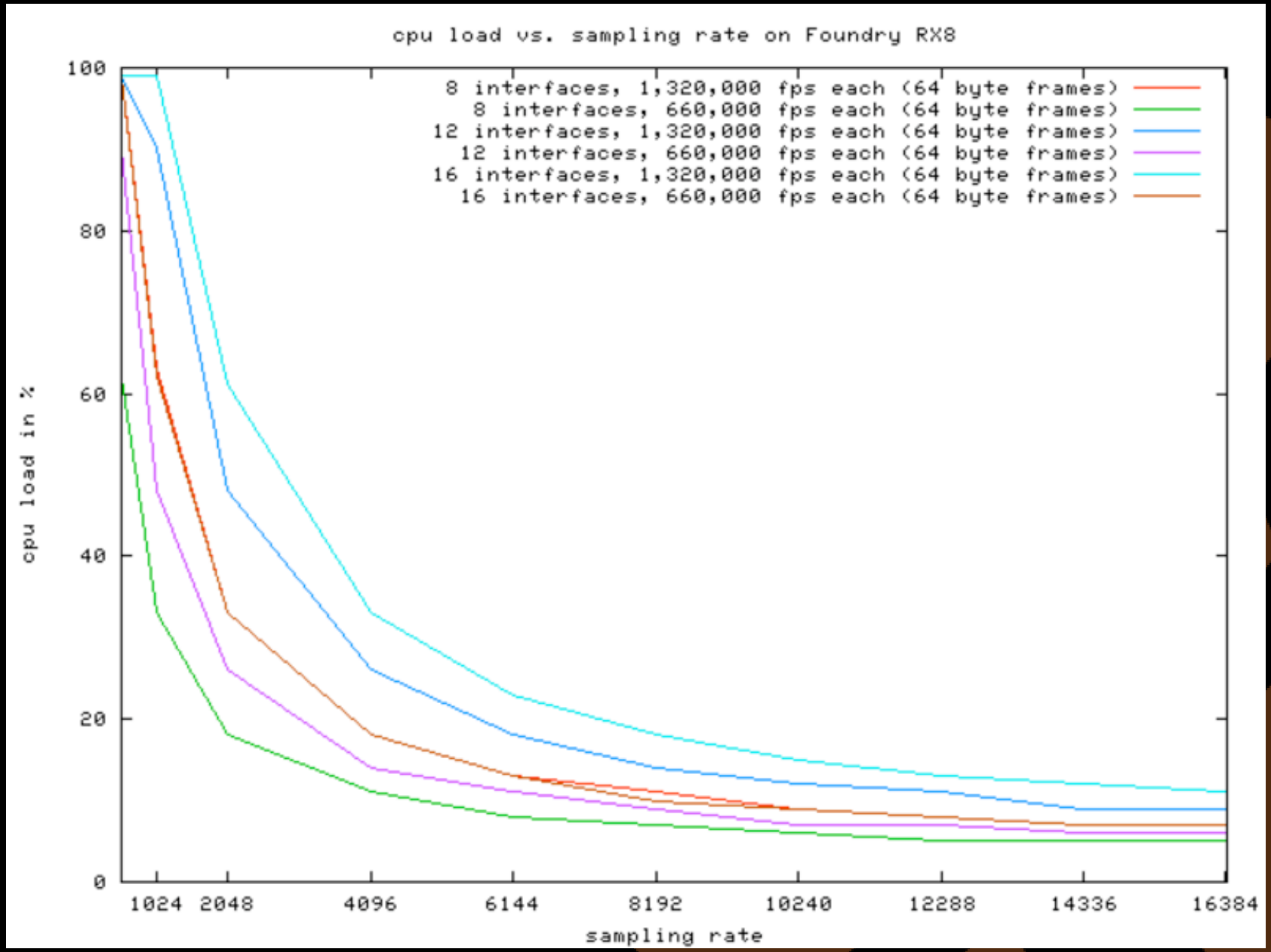
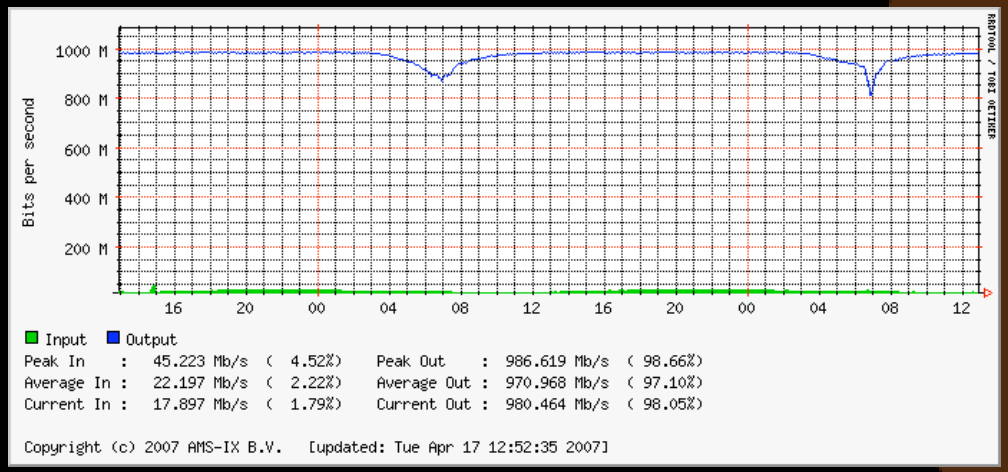
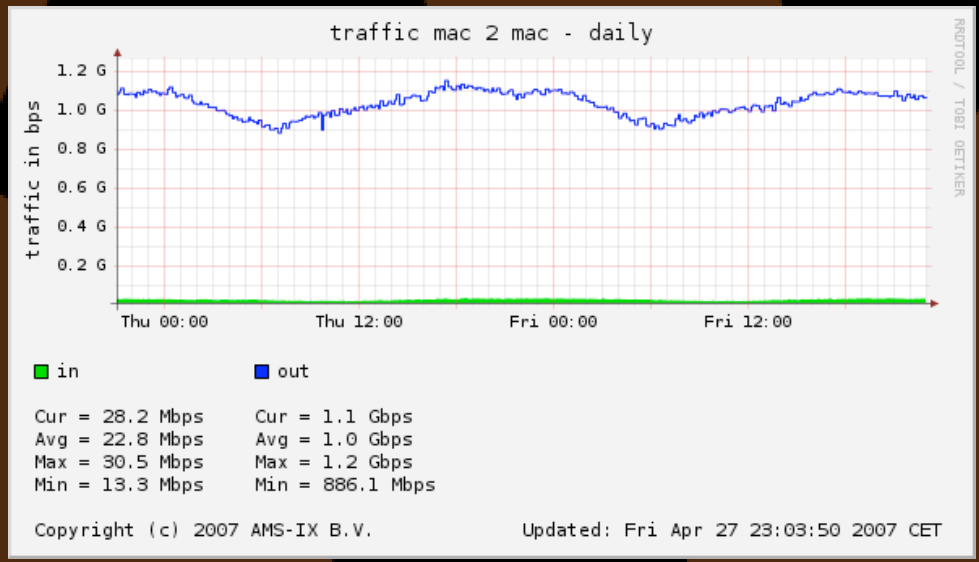


Hardware Specifics

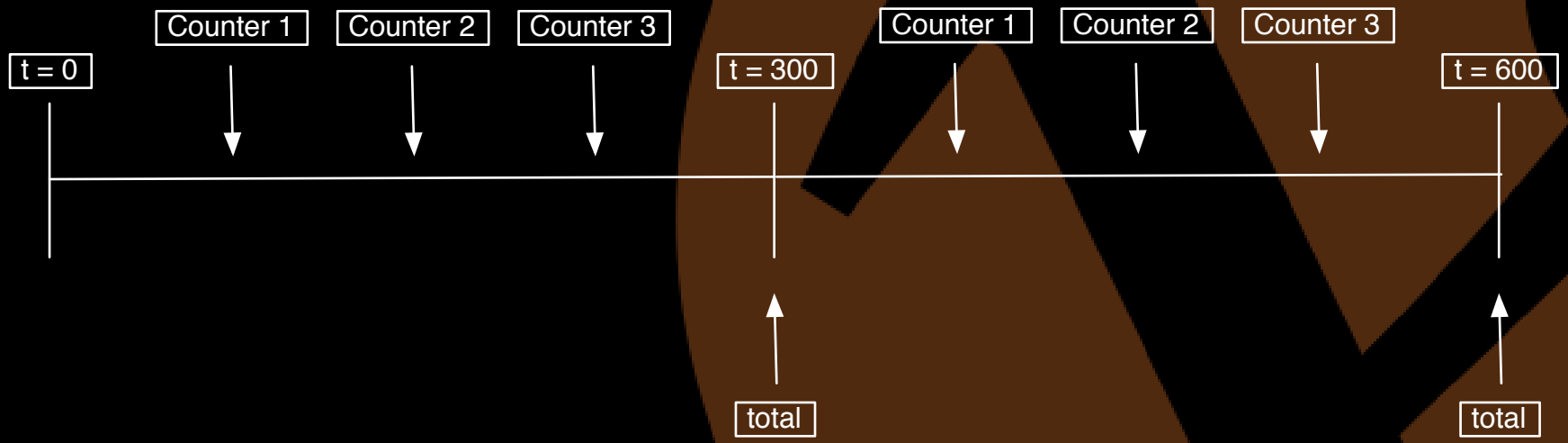
- Foundry - inbound traffic
  - Packets dropped by the switch still counted
- Force10 - outbound sampling





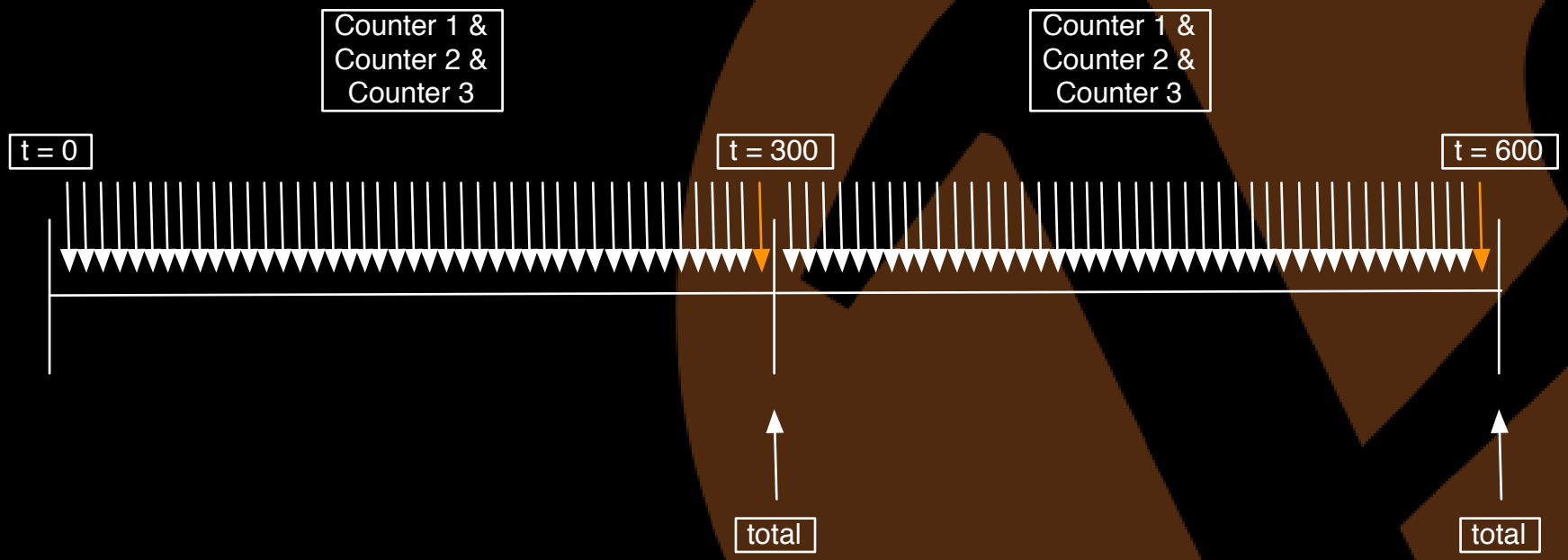
Hardware Specifics

- Counter samples with fixed polling interval
- Different and not configurable arrival times



Hardware Specifics

- To accumulate traffic correctly high interval needed



Software

- InMon – sflowtool
- Pmacct
- InMon – Traffic Sentinel
- libsflow / sflowd
- ...

AMS-IX Software

- Written in PERL
- Based on decoding module Net::sFlow
- Fully customized and integrated into the AMS-IX environment

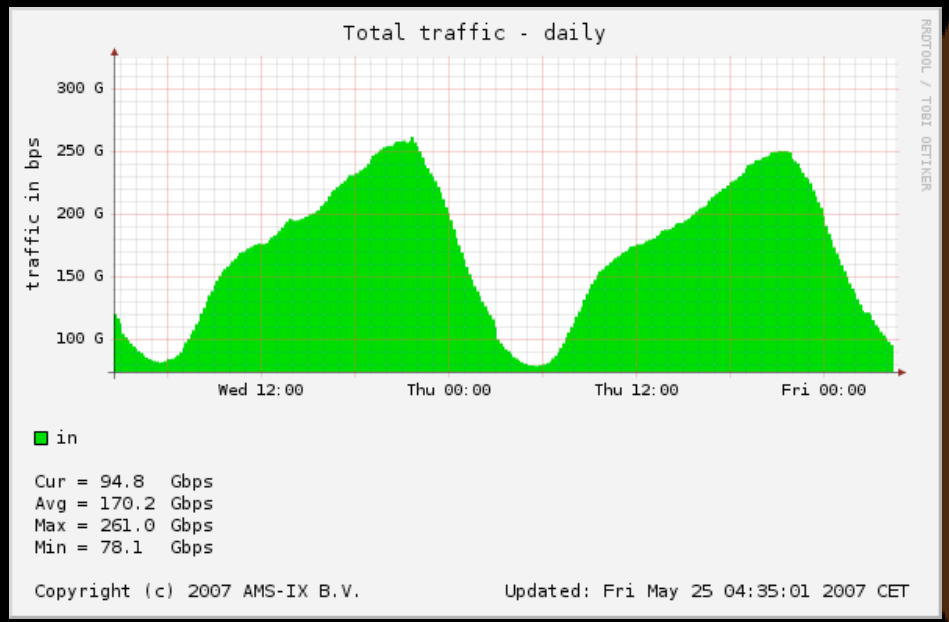
AMS-IX Software

- CPU usage growing linearly with amount of packets/samples
- I/O performance feasible
  - Preprocessing the data
  - Only storing needed information
  - Currently writing 50 000 files

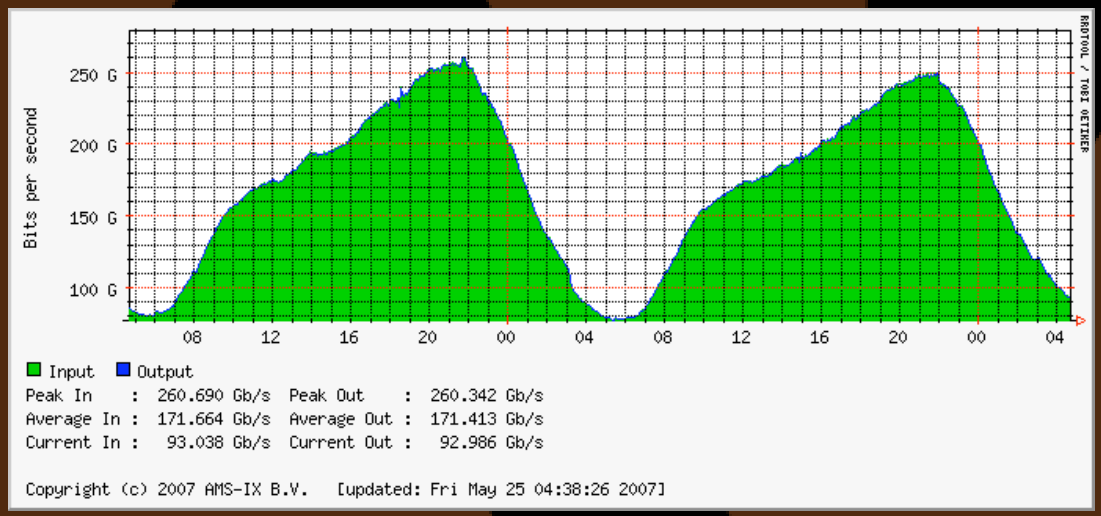
Results and Usage

- Accuracy

sFlow



SNMP



Results and Usage

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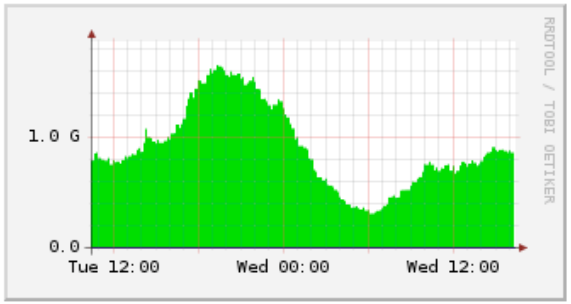
Fnord Internet B.V.

Switchport:	23@switch01
IP:	192.168.45.131
AS:	25538
Route server:	yes

Sorted by bps | Top 10 | Sorted by "Total" (both directions) | Go

Note:
The graphs are sorted by the sum of bps or pps over the last 24 hours,
a single peak will not necessarily make the peer appear on top of the list.

1.

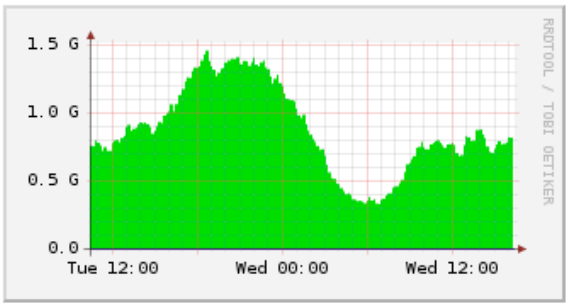


Foobar Industries INC

IP:	192.168.45.134
AS:	250
Switch:	switch02
Route server:	no

AS details:
AS 25538 to AS 250

2.

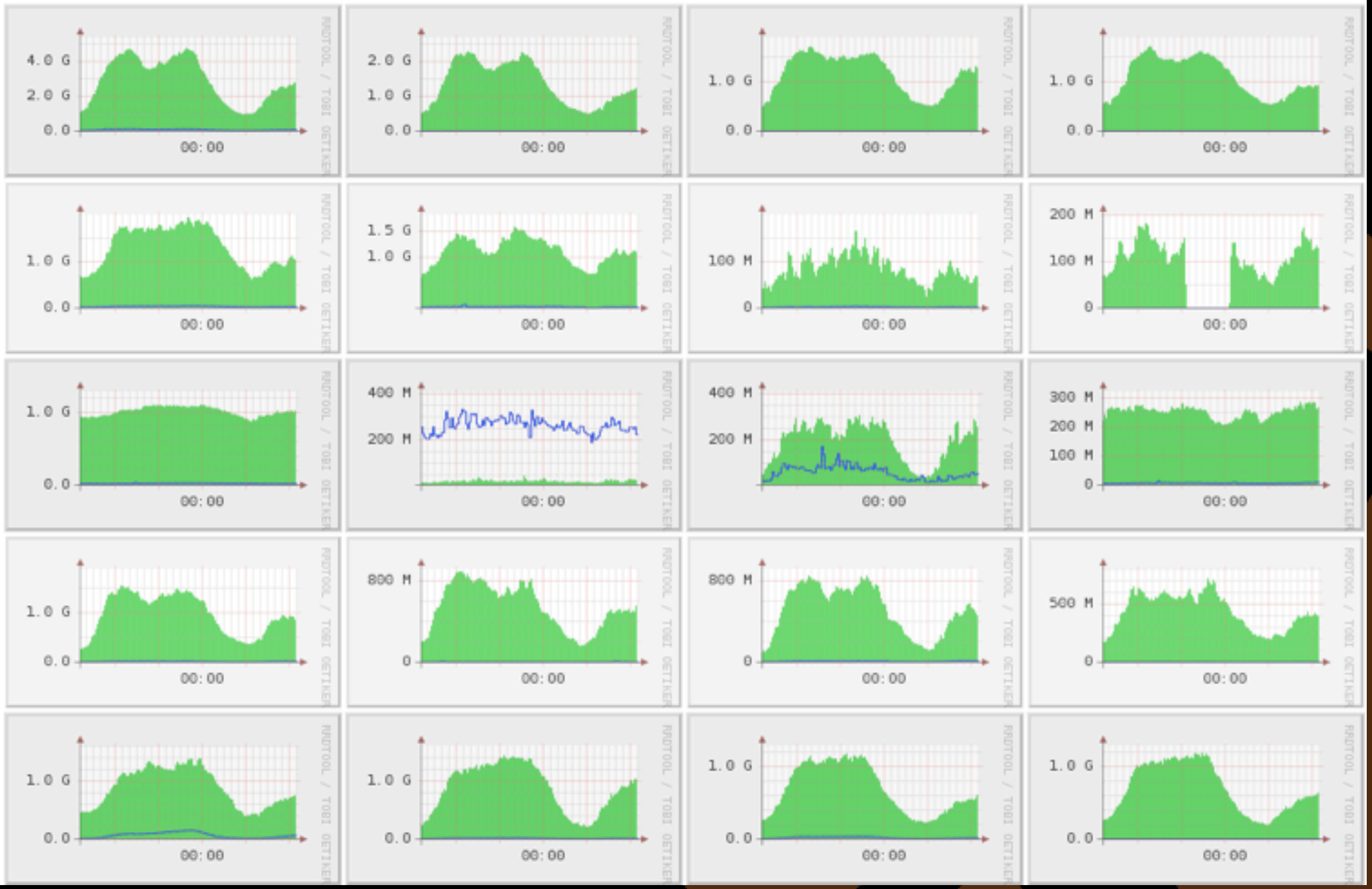


Network GmbH

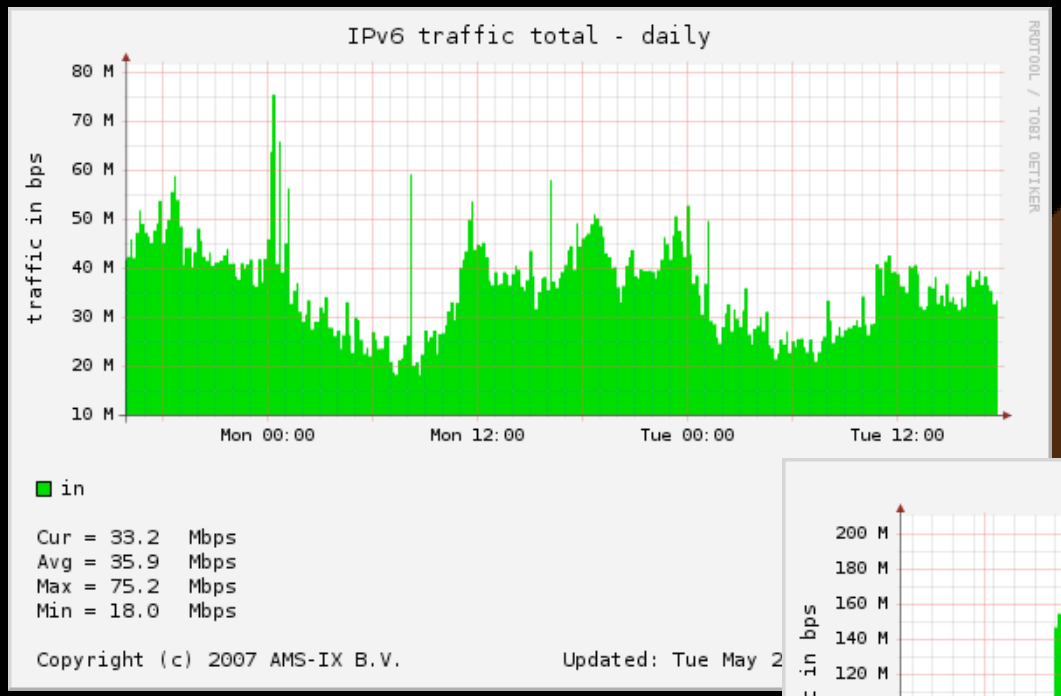
IP:	192.168.45.102
AS:	248
Switch:	switch03
Route server:	yes

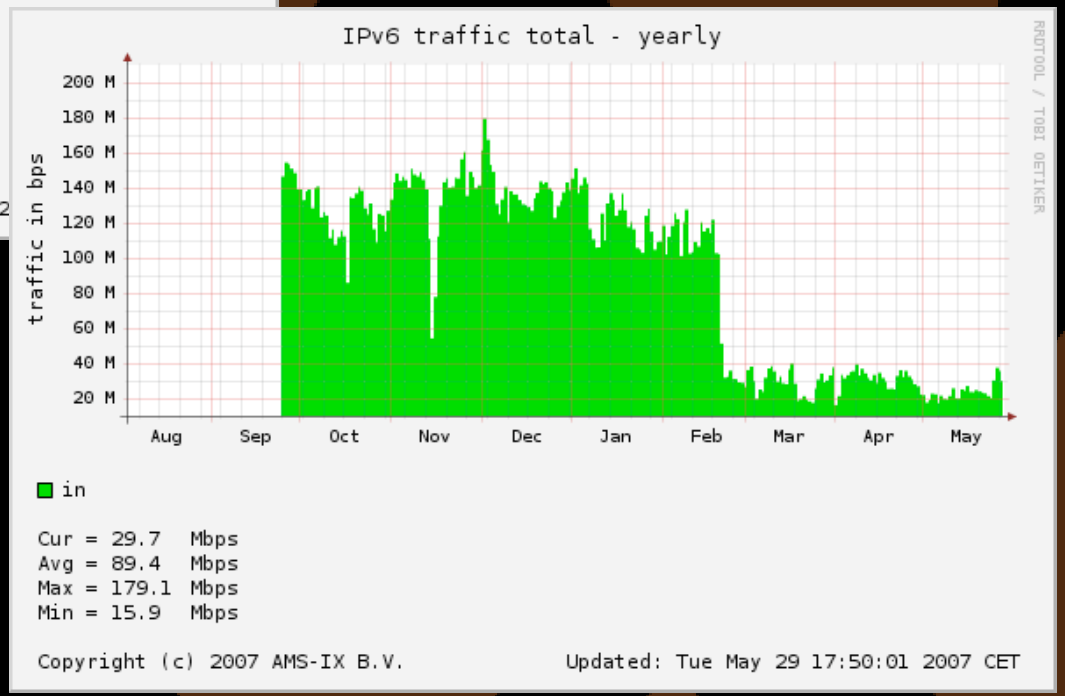
AS details:
AS 25538 to AS 248

sFlow Peering Matrix



Results and Usage





Results and usage

- Traffic engineering
  - Members
  - AMS-IX NOC
- Debugging
- Detailed view on peering changes
- Private interconnects... or not...

Future plans

- Automated detection of...
  - Peerings
  - Outages
  - Traffic shifts
  - Fully utilized links
  - ...

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Thanks for listening!

Questions?

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