Experience with IPv6 at FZU in Prague

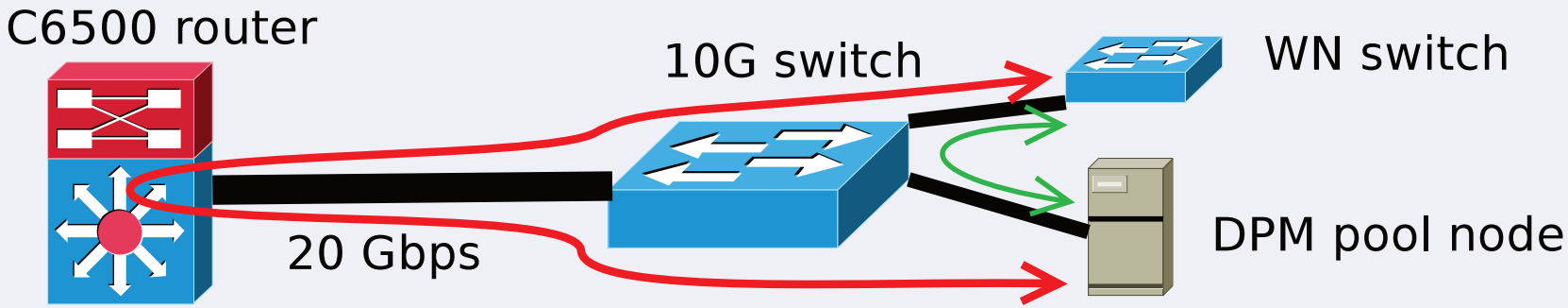
Jiří Chudoba, Marek Eliáš, Lukáš Fiala, Tomáš Kouba
elias@fzu.cz

WLCG pre-GDB — IPv6 Workshop, 10 Jun 2014

Institute of Physics AS CR, v. v. i. (FZU)

IPv4 shortage

- we have just one C-class range
- worker nodes in a private network
- problems with routing between worker nodes and disk nodes



- we use some override to avoid this situation, but we still don't like it

Routing and network

History

- 6. 6. 2011: our router has an IPv6 address
- 8. 6. 2011 (world's IPv6 day): routing setup in special VLANs
- problems with firewall
  - no support for IPv6 filtering
  - firmware upgrade: IPv6 filtering just in software
  - FWSM later decomisioned, ACLs implemented in router directly

IPv6 address configuration

- DHCPv6, DUID-LL
- RA just to distribute default route

FZU IPv6 testbed

Fyzikální ústav
Akademie věd ČR, v. v. i.

Testbed mission

- Test our current tools and computing centre administration processes in IPv6 environment
- Find alternatives for IPv6 incompatible tools and processes
- We try to setup small IPv6 "computing site" with middleware services, workernodes etc

Testbed parameters

- Two physical servers for running virtual machines
- Using infrastructure and connectivity of production network
- Several separate VLANs
- Running mostly Scientific Linux 6 (SL6)

FZU IPv6 testbed

Fyzikální ústav
Akademie věd ČR, v. v. i.

Automatic Installation

- basicly no support for PXE in IPv6
- neither in software (dhcp servers) nor in hardware
- we tried to setup PXE installation with no outside IPv4 connectivity:
  - set of proxies, IPv4 and IPv6 DHCP servers...
  - it works and we use this to deploy testbed services
  - ...but initialy quite painful to setup

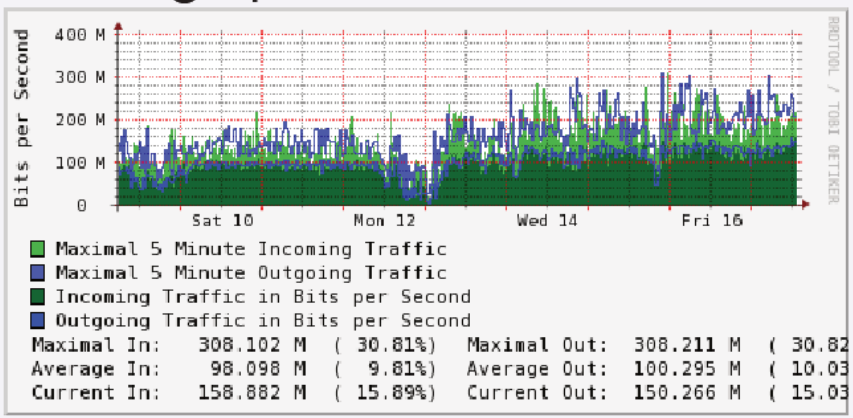
Testing new tools

- puppet
- KVM
- ...

Fyzikální ústav
Akademie věd ČR, v. v. i.

Tony's GridFTP mesh

- one SL5 node with GridFTP
- traffic graph:



Other services

- two perfsonars
- nagios: PMTU discovery sensor, DNS sensor
  `http://monitor.ipv6.farm.particle.cz/check_mk/`

Deployment in production

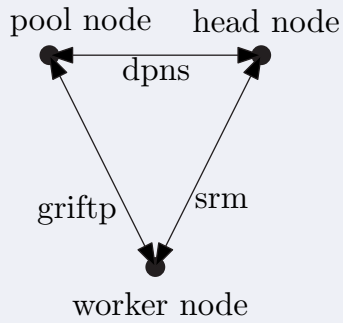
Fyzikální ústav
Akademie věd ČR, v. v. i.

Currently on dual-stack:

- dpm headnode
- all production disk nodes
- all but 2 subclusters of worker nodes

What goes over IPv6:

- dpns between disk nodes and head node
- srm between WNs and headnode
- actual data transfer via gridftp
- we tested webdav access: curl and aria2c

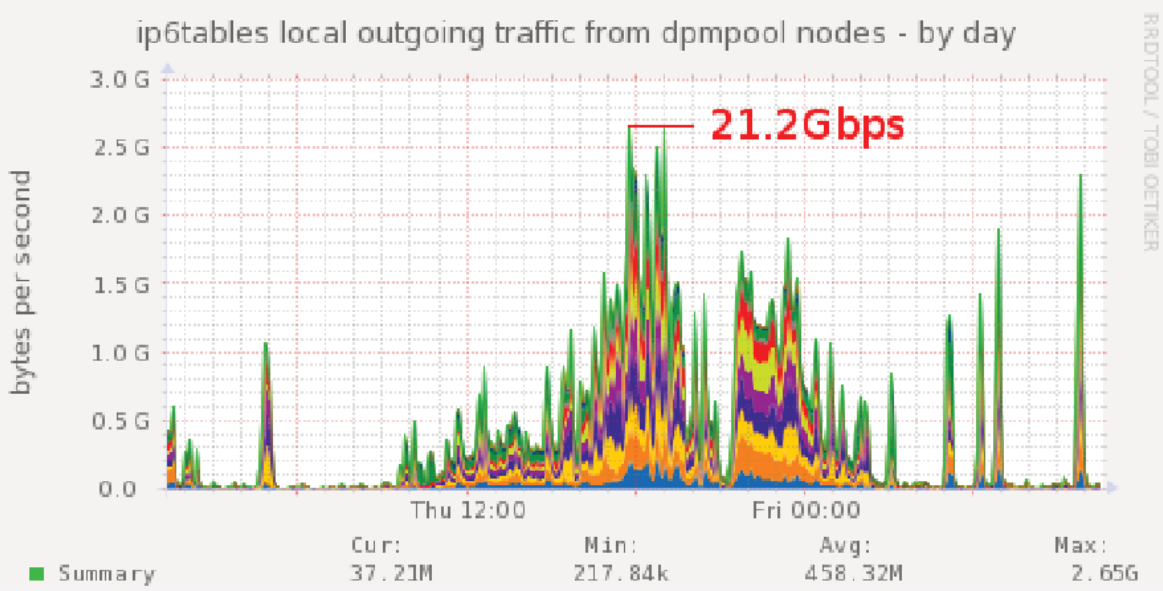


What does not:

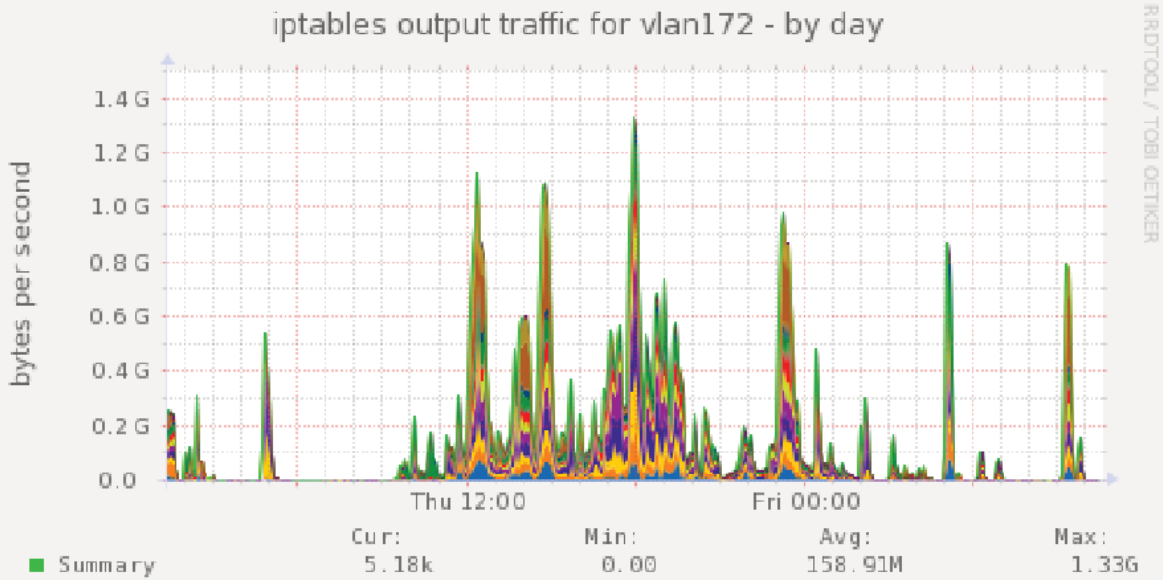
- xrootd goes via IPv4; we expect new version to change this

IPv6 traffic in real production

Fyzikální ústav
Akademie věd ČR, v. v. i.



DPM → WNs:
IPv6 traffic



DPM → WNs:
IPv4 traffic

Monitoring

Nagios sensors

- DHCPv6 lease sensor
- IPv6 default route sensor (routes are setup by RA and can expire)
- monitoring node currently IPv4-only
- ping6 sensor still missing

Network traffic monitoring

- our netflow monitoring not ready yet
- we work to replace flow-tools by nfdump+nfsen
- this requires switch from netflow v5 to v9
- `ipt_NETFLOW` kernel module already tested to report IPv6 traffic
- nowadays using just iptables munin plugin

Thank You

Marek Eliáš

elias@fzu.cz

http://www.farm.particle.cz

Work partially supported by CESNET, z. s. p. o.
project number 482/2013.