vienna
university
computer
center

aconet

austrian scientific data network

QTPv6 & ACOnet

Quantum Test Program IPv6 & ACOnet

Wilfried Wöber,   Vienna University Computer Center - ACOnet
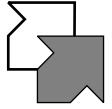
with a lot of help from

Harald Michl, DI(FH),   Vienna University Computer Center - ACOnet
Kurt Bauer,   Diplomand, Fachhochschule Wiener Neustadt

Woeber@CC.UniVie.ac.at, Michl@CC.UniVie.ac.at, Bauer@CC.UniVie.ac.at

RIPE #35, European Operators Forum

Amsterdam, February 22nd, 2000

`ww$extkurse:ipv6-ripe35.doc`

vienna
university
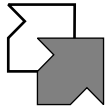computer
center

QTP:

Quantum Test Program

TF-TANT,
The Joint DANTE/TERENA Task Force,
work items:

- Differentiated Services
- RSVP to ATM SVC Mapping
- Qos Monitoring
- MPLS
- IP over ATM
- Flow-based Monitoring Analysis
- **IP Version 6**
- ATM Signalling

```
http://www.dante.org.uk/tf-tant/
http://www/tbit.dk/quantum/ip6.html
```

Quantum Test Program: "IP Version 6"

Coordination:

- Simon Nybroe, Alex van der Plas, Ericsson Telebit A/S, DK-8260 Viby J

Participants:

- Ericsson/Telebit   (Router in Amsterdam, test lab in DK)
- SURFnet, NL   DFN/JOIN, DE   DANTE, EU
- SWITCH, CH   Southampton University, GB
- ACOnet, AT   RENATER/G6, FR   CESNET, CZ   see...

        `http://www.tbit.dk/quantum/participants.html`

ACOnet's focus:

- Check and rate various implementations for IPv6 routing technology
- DNS und ReverseDNS
- "Dual-Homing"

                `http://noc.aco.net/ipv6/extern/IPv6-LAN-NIG.html`

vienna
university
computer
center

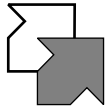## Test Environment at our Lab (Vienna University)

Equipment:

- Router: cisco4500 (betaIOS 11.3-based), cisco2500(betaIOS 12.0-based), PC w/ MRTd & ZEBRA
- Hosts: PCs w/ RedHat Linux, PCs w/ freeBSD, IBM RS6000 w/ AIX planning to look into Solaris 7 and/or 8 for Intel hardware
- Links: Serial, Ethernet, ATM [local switch and WAN links (TEN155)]

AS setup:

- AS8933 in Amsterdam   Telebit Router
- AS1122 in Vienna   cisco4500,   `IPv6Vie.v6.ACO.net`
- AS1121 in Vienna   cisco2500,   `IPv6Vie2.v6.ACO.net`
- private AS in Wien   PC,   `nsIPv6.v6.ACO.net`
          (freeBSD + KAME stack + MRTd)

see sketches...

`http://noc.aco.net/ipv6/extern/IPv6-LAN-sketch.html`

vienna
university
computer
center

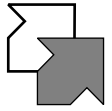## Experiences:

Setup for Hosts:

- Only minor problems to be expected, mostly straight-forward!
  Router Adv./Disc. and (stateless) Autoconfiguration is working fine

- be prepared to see significant differences in software packages,
  wrt completeness, integration and ease of use... (e.g. Linux, *BSD)

- there are basic differences in configuration philosophy, e.g. for AIX

Setup for Routers:

Only a few vendors are offering complete and rugged, i.e. production-level,
IPv6 implementations. (But at least the announcements keep coming... ;-)

Possible solutions for tests and "early deployment"?

- Join a Beta-Test Program with vendors, e.g. cisco Beta-Test-Program (NDA)

- Deploy host-based routing, at least initially
  PCs or WSs, some *n*x and MRTd, Zebra or GateD(really? $$$?)
  --> Excellent results working with the MRTd team. Thank you!!!

- "Some" router implementations still require(d) bug fixes for stability.

Experiences (cont...):

Applications:

Routing: `MRTd` works fine (on freeBSD),
both with RIPng (IGP) as well as BGP4+ (EGP).
`Zebra` seems to work fine (on freeBSD),
both with RIPng and BGP4+,
it's going to be stress-tested next (also OSPFng against Telebit).

Net-Admin: `ping,traceroute,telnet,ssh` are "widely" vailable -
but be careful, some IPv6-packages do not include those tools.

Web: `apache` plus patches is IPv6-capable, but there are some pitfalls
with configuration, in particular w/ ports! (--> Quake discussion)
`Mozilla` works fine with IPv6 transport as well.

eMail: `qmail` for SMTPv6 works

"Real App.s":   `quake` has recently been announced!

Your App.s: fill-in-the-blanks! Rumors heard about NFS, `rwhois` being
worked on, any network management applications?

vienna
university
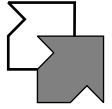computer
center

A Difficult Child: DNS!

Status:

- Development and implementation is still going on (`bind 8.x -> 9.0`)
  — DNAME, A6, Binary Labels
- Sending IPv6-related queries by using IPv4 as transport works in principle assuming that the IPV6-specific RR-Types are properly implemented.
- IPv6-Transport can only be used with "old", (production) `bind 8.x` versions and for those platforms and IPv6-stacks which are "supported" by patches. This didn't work for us with RS6000/AIX...
- Full integration is expected to be available in `bind 9.0` which is currently (Feb 18, 2000) at *beta1*.
- IPv6 support for all the resolvers (resolver libraries and configuration) is still an open issue! In particular, mixing and matching IPv4 and IPv6 addresses.
- How about a "tree-walk via the root"?? (using IPv6, that is :-)
- Stateful Autoconfiguration (DHCPv6) and DNS plus ReverseDNS?
- Have an eye on the next IETF: `ip6.int` may move to `ip6.arpa` ?!

vienna
university
computer
center
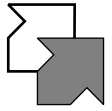
Next Steps

Local:

- Trying to establish stable links to 6Bone, 6REN and other European R&D Networks and beyond (what you'd call global connectivity :-)

- Dual-Homing and using alternate and/or backup path
  (e.g. by using pTLA and sTLA addresses)

- Implementing and test-driving additional applications (e.g. SMTP, other than qmail) and alternate routing implementations, protocols (e.g. Zebra, OSPFng)

- Q to the audience:

  —anyone heard rumors about IS-ISng and/or

  —a replacement for RIPng (other than OSPFng)?

- continue testing IPv6-related DNS and ReverseDNS features

  —9.0 beta1 on freeBSD 3.4 + KAME and freeBSD 4.0 (incl. KAME) *works*

  —9.0 beta1 on AIX (server access config broken / non-existent ??)   *works*

vienna
university
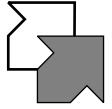computer
center

Next Steps

Logistics:

- Work on the IPv6 Routing Registry (extensions).
  Proposal:

  — develop within the RIPE Routing-WG

  — forward to IETF!
- Develop an IPv6-aware RPSL version
- Blueprint: 6Bone registry

```
http://www.6bone.net/
http://www.6bone.net/whois.html
```

National:

- Migrate from pTLA address space to sTLA addresses,
- add more sites to the IPv6-Pilot within ACOnet.

Last Minute Offers! Last Minute Offers! Last Minute Offers!

The Ping-Size Maze

We still don't understand the "interactions" between path-MTU-detection, physical link technology used and the IPv6 stacks! More research required.

Some implementations are "vulnerable" to "excessive" packet sizes ;-)

IPv6 Policiy Document Review

See message by Mirjam Kuehne, Jan 31, 2000 to `ipv6-wg@ripe.net` forwarding comments submitted by the IETF WG chairs!
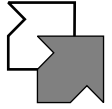
DNS

See a message by Bob Fink, Feb 1, 2000 to `6bone@isi.edu`
"DNS setup for the 6bone" updated

```
http://www.isi.edu/~sekiya/IPv6/DNS.html
```

Jessica Yu's ...multihome... Draft

Still doesn't look like a "real" solution to me....

```
*ipv6multihome-with-aggr*
```

Implementations?

Well...

- Solaris 8 to be available early March (also for the Intel platform??) is supposed to include IPv6 (fully integrated)
- Compaq has announced (officially??) that their ("Digital")Unix would support IPv6 around the middle/2nd half of 2000
- AIX/RS6000 is already IPv6-enabled

MSR IPv6 release 1.4

See a message by Richard Draves, Jan 14, 2000 to `6bone@isi.edu` .

IPv6-enabled Linux Distribution(s)

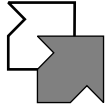See a message by Raizada Manoj, Jan 13, 2000 to `6bone@isi.edu` announcing the availability of Debian V2.2

`http://www.debian.org/`

*BSD

freeBSD 4.0 is going to include the KAME stack

`http://www.freebsd.org/projects/#networking`
`http://www.kame.net/`

vienna
university
computer
center

Thanks for your interest!

Questions or Comments?

<u>Acknowledgements:</u>