IPv6 implementation testing: Results from some TAHI tests

János Mohácsi
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Implementation Testing

• Goals
  – Contribute the quality improvement of the IPv6 implementation
  – Suggestion to avoid certain pitfalls in the configuration
  – Selection, which implementation use as IPv6 server

• Practical Tests
  – Conformance (TAHI, Packet Shell), Interoperability
# FreeBSD 4.2/4.3

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>OK</th>
<th>WARN</th>
<th>FAIL</th>
<th>Overall</th>
</tr>
</thead>
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<tr>
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</tr>
<tr>
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<tr>
<td><strong>Summary</strong></td>
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<td></td>
<td></td>
<td></td>
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- Be careful with setting up default interface
- TAHI is fragile in stateless autoconfig tests
- KAME (ie. *BSD accept sometimes erroneous ND packets
- If you need some latest feature use KAME, but it is sometimes broken
Solaris 8

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- RA, NS, RA problems patch 108528-6 cure them
- Basics are OK. Malformed messages not handled correctly.
- IPSec cannot be tested Solaris 8 does not support assymetrical IPSec config
Linux 2.2.19/2.4.3

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- You should use the latest kernel (some bugs discovered fixed in 2.4.4)
- Fragmentation is not working well
- PathMTU not very well, Source address selection is not working.
- Worth looking at the USAGI patches
AIX 4.3.4 patchkit9

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- Neighdiscovery Cache is handled differently (sometimes does not send NS)
- Link local addresses not handled according the specification in some cases
- Some ICMP answer not expected by the TAHI
- Overall result strange comparing the original (INRIA IPv6 code)
Conclusion and Future

• TAHI
  – very picky, quite KAME specific
  – sometimes misses packets
  – stateless adress autoconfiguration testing is fragile

• Implementation:
  – progress to usable -> applications!

• Testing other platforms
  – W2K
  – Tru64 Unix
  – HP-UX
Survey about IPv6 ready applications and patches

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BME/HUNGARNET
IPv6 application and patch database

• Goal:
  – IPv6 application information in one place
  – Searchable
  – Easily extendable
  – Have an overview

• Solution:
  – Perl scripts, MySQL, Web interface
IPv6 application database
Overview of packages

- Total: 216 package (as 13/06/2001)
  - Native support: 123 (57%)
  - Patch only: 93 (43%)
    - older then the current release: 41 (19%)
    - sync with the current release: 52 (24%)
Overview of packages /2

• Operating system support
  – UNIX: 162 (75%)
  – Windows: 45 (21%)
  – Linux: 172 (80 %)
  – *BSD: 178 (82 %)
  – Solaris only: 2 (1 %)

• Tested?
Overview packages

- ftp: 27
- irc: 13
- news: 7
- mail: 19
- mbone: 7
- multimedia: 11
- devel: 14
- sysutils: 34
- games: 12
- www: 34
- testing: 22
- X: 5
- remote login: 8
- editor: 9
- misc: 29
- DNS: 6
- transition: 8
- routing: 6
Conclusion

• Database
  – working, usable, not very polished yet
  – not flexible enough in the input
  – RFC/protocol info missing
  – e-mail contact sometimes missing (URL always there)

• Next Steps
  – new search options (by category)
  – any new requirements?
IPv6 infrastructure testing

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BME/HUNGARNET
6Bone statistic tools at TIPSTER6

- **Existing Tools**
  - Ping statistics (Pinger-BME)
  - AS-Path statistics (CSELT-IT)
  - Traffic statistics on Tunnels (MRTG)

- **New Tool**
  - Based on traceroute (hop/RTT statistics possible)
  - To understand IPv6 routing/stability
  - Understand IPv6-over-IPv4 tunneling
TROUT6

• Now:
  – Perl scripts with RRD backend
  – Some preselected sites
  – Traceroute statistics for IPv6 and IPv4 for every 15 minutes (maybe it is impolite)

• Future:
  – Clickable image to see what happened
  – Check the corelation with BGP flapping
  – Alarm thresholds?
Trout6 in operation

This Traceroute statistics server TROUT6 version 0.02 is written, maintained and copyrighted by Janos Mohacsyi. All collected traffic data is copyrighted by the TIPSTER6 project.
Summary

• Available:

• Comments?

• Any desired functionality?

• Contribute GÉANT IPv6 monitoring?

• In the near future:
  – Flowtype traffic monitoring in the Hungarian 6bone
Linux Netfilter

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Kis-Szabó András BME
Linux Netfilter

• Architecture
  – Netfilter 1.x.x for Linux 2.3.x and 2.4.x
  – IPv6 was just a programming study, seamlessly copied IPv4 code segments:
    • wildcard address: 0.0.0.0 instead of ::
  – Stateful inspection
  – in 2.5.x kernel will be IPv6 based, IPv4 is implemented as mapped address
  – Netfilter in Kernel, iptables (libs+userspace programs)
Netfilter hooks

- NF IP PRE ROUTING
- Routing
- NF IP LOCAL IN
- NF IP FORWARD
- Routing
- NF IP LOCAL OUT
- NF IP POST ROUTING
- to network interface
- from network interface
- to application
- from application
NetFilter user interface

• Work in our project:
  – First attempt: ip6tables save and ip6tables restore
  – Second attempt: unified iptable interface
  – Addition:
    • aggregation matching kernel filter
  – Testing system in progress:
    • Unfortunately glibc>2.1 specific - low level socket handling changed
Summary

• More information about the TIPSTER6 project:
  – http://tipster6.ik.bme.hu

• HUNGARNET is actively involved in GÉANT program