

# IPv6 Deployment in DIAS

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# IPv6 Deployment in DIAS

- I. Existing setup back in July 2003
- II. IPv6 setup and implementation
- III. Applications
- IV. Caveats
- V. Future work
- VI. Resources



# I. Existing setup in 2003

- Allocation of 2001:770:60::/48 by HEAnet
- 1MB link to HEAnet for IPv6 testing
- 7204 Cisco router with IPv6 IOS image
  - 12.2(15)T1 (LD)
- Router Advertisement setup on the router
- No *or* few stations/servers enabled with IPv6



## II. IPv6 setup and implementation

- CISCO & IOS
  - 7204 : 12.3(XX) releases
  - Dual Stack configuration done (october 2004)
  - 3750 : 12.2(25)SEA (currently on 12.2(25)SEB) (proper IPv6 support)
- Defining proper topology per VLAN
  - VLAN1 : 2001:770:60:1::1/64
  - VLAN7 : 2001:770:60:7::1/64



## II.b IPv6 setup and implementation

- Configuring DNS with Ipv6
  - Bind 9.2/3 (used by OpenBSD and Debian Linux)
    - zone "1.0.0.0.0.6.0.0.0.7.7.0.1.0.0.2.ip6.arpa" {
    - type master;
    - file "rev-2001-770-60-1\_64.ip6.arpa";
    - };
- Building reverse zones
  - <http://www.fpsn.net/?pg=tools&tool=ipv6-inaddr>



## II.c IPv6 setup and implementation

- Firewall
  - Cisco v6 ACLs
    - ipv6 traffic-filter acl6in in
    - ipv6 traffic-filter acl6out out
    - permit tcp any host 2001:770:60:1:205:5dff:fe78:b73e established
    - permit udp any host 2001:770:60:1:205:5dff:fe78:b73e eq 53
  - Netfilter ip6tables for critical servers
    - enable proto 41 (IPv6)



# II.d IPv6 setup and implementation

- Systems
  - Debian Linux enabled by default
    - inet6 ::1/128 scope host
    - inet6 2001:770:60:1:250:8dff:fe7:abad/64 scope global dynamic
    - inet6 fe80::250:8dff:fe7:abad/64 scope link
  - OpenBSD requires two changes
    - /etc/rc.conf : ipv6\_enable="YES"
    - /etc/sysctl.conf : net.inet6.ip6.accept\_rtadv = 1



# II.e IPv6 setup and implementation

- Systems
  - NetBSD 2.x requires also one change
    - `/etc/rc.conf : ipv6mode="autohost"`
  - Windows XP/2003 ready
    - ipv6 install (from the command line)
  - Windows 2000 requires an extra package setup
    - <http://www.ipv6.org/impl/windows.html>



# III. Applications

- Servers

- OpenSSH

- /etc/ssh/sshd\_config : ListenAddress ::

- OpenLDAP

- slapd\_flags='-h " ldaps://[2001:770:60:1:230:48ff:fe2c:7996]:636/"

- Bind (DNS)

- listen-on-v6 { any; };
    - query-source-v6 address 2001:770:60:1:2c0:dfff:fe10:6929 port 53;
    - transfer-source-v6 2001:770:60:1:2c0:dfff:fe10:6929 port 53;
    - notify-source-v6 2001:770:60:1:2c0:dfff:fe10:6929;



# III.b Applications

- Servers
  - NTP
    - broadcast 160.6.1.15
    - broadcast 2001:770:60:1:230:5ff:fe33:a216
  - Apache2 (HTTP/HTTPS/PROXY)
    - Listen 160.6.1.111:80
    - Listen 160.6.1.111:443
    - Listen [2001:770:60:1:207:e9ff:fe39:52ef]:80
    - Listen [2001:770:60:1:207:e9ff:fe39:52ef]:443



# III.c Applications

- Servers
  - Postfix (SMTP)
    - `inet_protocols = all`
    - `inet_interfaces = all`
  - Courier (IMAPS)
    - `/etc/courier/imapd-ssl : SSLADDRESS=0`



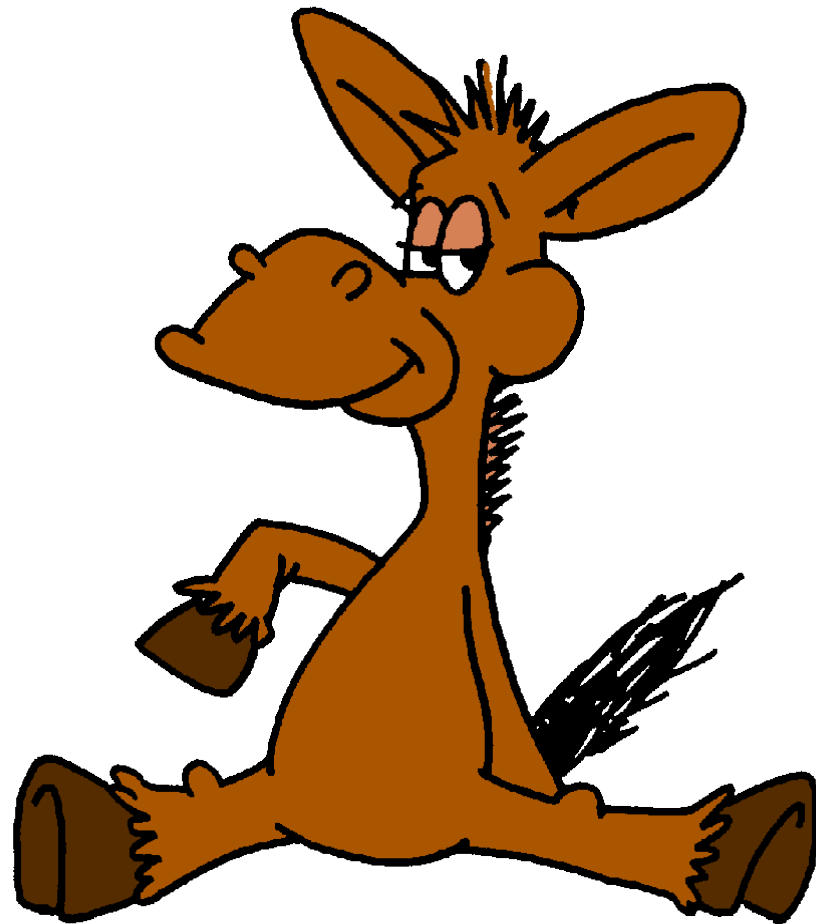
# III.d Applications

- Clients
  - Debian Linux overly well supported
  - Windows has support but commercial applications not really
  - MacOS has increasing support but again limited
- Applications in general
  - OpenSource software has great support for IPv6
  - Scientific software lacks basic support
  - Commercial software still has a long way to go



## IV. Caveats

- “The network is slow ...” - Quote from a user



## IV.b Caveats

- DNS resolution (int vs. arpa)
  - e.3.e.0.8.5.e.f.f.f.8.1.0.2.2.0 IN PTR pollux.cp.dias.ie.
- ACLs (whatever system, plan ahead)
- Extra work in maintaining both protocols
- Bugs (IOS)
- New technology can be a lot of fun !



# V. Future Work

- Enabling more VLANs with v6
  - Clusters (Cosmogrid and DIAS testing Cluster)
  - VPN links
  - Wireless
  - IP Phones
- Reworking a better DNS maintenance for v6 addresses
- More ACLs



# VI. Resources

- SAGE - <http://www.ie.sage.org>
- ILUG - <http://www.linux.ie>
- SixXS - <http://www.sixxs.net>
- Kame.net - <http://www.kame.net>
- Zones <http://www.fpsn.net/?pg=tools&tool=ipv6-inaddr>
- Ipv6.org - <http://www.ipv6.org>
- Search Engines – use your imagination



# Any Questions ?



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