

HP IPv6 Direction and Capabilities

Team-IPv6-Extended

May 2007



HP IPv6 Statement of Direction

- HP is rolling out IPv6 support in stages with the goal of ensuring a smooth transition and deployment where IPv6-updated applications can take advantage of IPv6, without breaking existing applications
- HP supports IPv6 across many of its product lines:
 - HP has been shipping IPv6 on its Business Critical Server since 2000
 - HP-UX (Gold IPv6 ready logo (core and IPsec), OpenVMS (Sliver IPv6 ready logo), NSK and Linux
 - ESS SW (HP SIM, Proliant essentials and Storage essentials)
 - IPv6 support for ESS SW is being investigated to meet OMB mandate
 - HP ProCurve high end switches support IPv6
 - HP OpenView Network Node Manager can manage IPv6-IPv4 devices
 - IPv6 support throughout the rest of BTO portfolio (50+ products) is being investigated to meet OMB mandate.
 - HP Enterprise Jetdirect printers support IPv6 (Gold IPv6 ready logo for both core and IPsec and the DoD IPv6 Approved Product List), HP LaserJet P2014n Printer and P3005n.
 - Note: Any of HP LaserJet printers can be paired with our Jetdirect 635n card as well.
 - HP OpenCall SIP and diameter support IPv6
 - IPv6 support throughout the rest of OpenCall portfolio is being investigated to meet OMB mandate.
 - HP Handheld System Business Unit
 - Supports IPv6 in Windows Mobile based devices. IPv6 support for HP developed software/firmware is being investigated to meet OMB mandate.
 - HP Personal System Business Unit
 - Supports IPv6 with Windows 2003 and Windows Vista. IPv6 support for PSG developed software/firmware is being investigated to meet OMB mandate.
 - HP ISS and BladeSystems
 - Supports IPv6 though the OS platforms
 - IPv6 support for hardware acceleration OEM hardware and HP developed software/firmware is being investigated to meet OMB mandate.
 - HP Storage Division (45+ products) provides a customer statement of support committing support of IPv6 per the US OMB mandate
 - Evaluation and impact analysis done. IPv6 product enablement across the products line is in progress
 - HP IT provides IPv6 support to R&D labs



IPv6 History & Roadmap



HP-UX 11iv1, v2, v3

PA-RISC and Itanium

2005 - 2007

- IPQoS
- Mobile IPv6 (with IPsec+IKE)
- IPfilter
- ONC/NFS

*2007+

- MLDv2
- OSPFv6
- NIS
- SCTP
- SLP
- SIP
- RFC 3041 – Privacy Extensions for Stateless Address Autoconfiguration
- PKI
- NTP 4.0
- CIFS
- Advanced Socket API

2001-2004

- | | | | | |
|-----------------------|----------------------|--------------------|----------------------------|----------------------------------|
| • IPv6 Base Protocols | • PPPv6 | • EMS | • Kerberos Client | • Glance/Measureware |
| • Ethernet | • RIPng | • Infiniband | • CDE/Motif | • X server |
| • FDDI | • BGP4+ | • CDE/Motif | • SharedX | • Xlib |
| • BIND 9.2 | • IS-ISv6 | • 6to4 | • Mobile IPv6 (with IPsec) | • Apache Web Server |
| • Sendmail | • Dual-stack | • ftp | • Online Diagnostics | • MLDv1 |
| • IPsec | • Configured Tunnels | • Kerberos Client | • DHCPv6 | • OpenView NNM |
| • Secure Shell | | • MC/Service Guard | • ndd | • Multimedia Streaming Protocols |
| | | | | • tftp |

Internet Express

- Curl
- Globus
- Libcap
- OpenLDAP
- Ethereal
- Jabber
- Net-SNMP
- xinetd
- tcpdump



OpenVMS IPv6 History & Roadmap

1997-2002

TCP/IP Services V5.0 – V5.3

- IPv6 Base Protocols
- Ethernet
- FDDI
- RIPng
- Basic and Advanced socket APIs
- Generic tunneling IP-in-IP
- Transition Mechanism: Tunneling and dual stack 6to4 transition
- Applications: BIND8.*, SMTP, TELNET, FTP, RSH, RCP, REXEC, RLOGIN
- Network Management
- Apache web server (Separate Product)
- Mozilla IPv6 support (Separate Product)

2003

TCP/IP Services V5.4

- Update to latest RFCs
- BIND9
- Mobile IPv6 Home Agent (EAK)
- Java IPv6 support (separate Product)

2005

TCP/IP Services V5.5

- Update to latest RFCs
- BIND9
- SSH support for IPv6
- failSAFE IP support for IPv6
- NTP 4.2

2006

TCP/IP Services V5.6 and next

- Update to latest RFCs
- IPsec (in process)
- LPD and TELNETSYN
- BIND 9.3
- IPFilter
- NFS
- And more

Alpha and Itanium



NonStop Enterprise Server TCP/IP IPv6 Roadmap

Release 1

- Single NEBS/CO-compliant CLIM
- 1GbE connectivity for IP-based Constellation connections
- TCP/IP Offload (IPv4, IPv6)
- Full IPv6 compliance (except IPsec and MobileIP)
- Enabling SCTP
- KIT-API/ServerNet
- Enabling initial manageability features
- One CLIM per LNP

▲
F1Q06

Release 2

- Low-End and High-End CLIM
- IPsec
- SNMPv3
- IPv6Ready Certification 2a
- RFC3542 Advanced Socket API for IPv6
- Enabling Full Manageability
- Multiple CLIMs per LNP
- Constellation access
- Firewall

▲
F3Q06

Release TBD

- MobileIP (MIP)
- IPv6Ready Certification 2b
- SCTP security

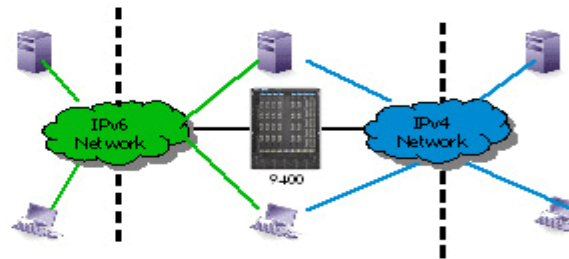
▲
TBD

IPv6 Support

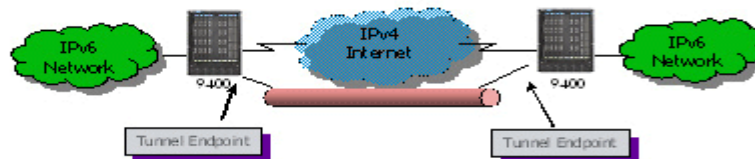
- ProVision ASIC offers full support for IPv6 in hardware
 - Enables switches that use the ProVision ASIC to not only support current IPv6 capabilities, but also incorporate future features as they arise.
- ProCurve Switch 5400
 - Integrates many of the functions of the ProCurve Switch 5300 into silicon
 - Extends the capabilities with functions like IPV6 and jumbo packets. Uses ProVision ASIC
- ProCurve Routing Switch 9400sl series
 - Deliver new generation of high-performance, high-density and multilayer switching and routing network solutions
 - Support for high-density and wire-speed 10 Gigabit Ethernet (GbE) for up to 32 ports and IPv6 support in the hardware
 - Protocol VLANs separate IPv4 and IPv6 at layer 2
 - Dual Stacks allow IPv4 and IPv6 applications to coexist. Allowing applications to migrate one at a time from the IPv4 to IPv6 protocol
 - Tunneling encapsulates IPv6 traffic within IPv4 packets in order to connect IPv6 domains over an existing IPv4 network

9408sl Use Model Enterprise IPv6 Migration

Dual Stack & Protocol VLANs
Allow coexistence of both IPv6 and IPv4 on the same infrastructure



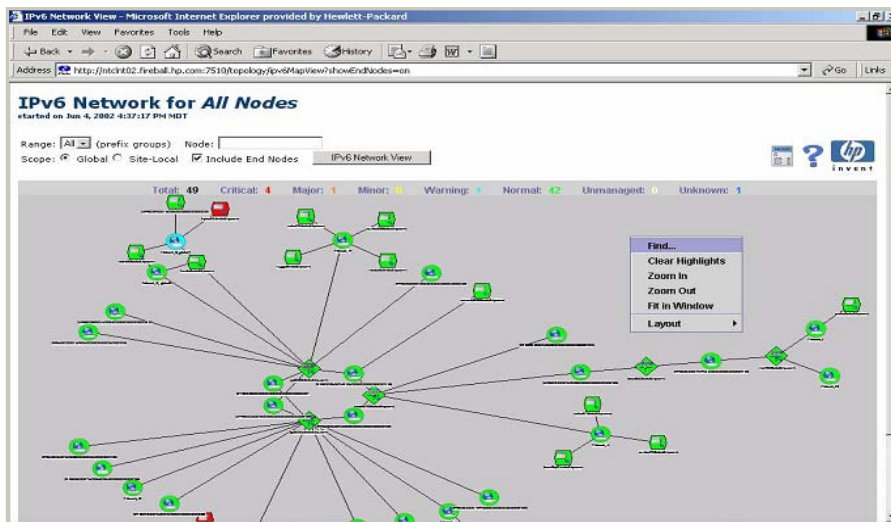
Tunneling
Connects IPv6 sites over the IPv4 Internet



HP OpenView Network Node Manager Smart Plug-in for Advanced Routing

- IP network fault manager
 - Global backbone to LAN mgmt
 - Routing protocols, redundancy protocols
 - Complex sub-IP topology for MANs/LANs, including stackable devices
 - Sub-IP WAN for MPLS networks with MPLS SPI
 - Root-cause & Impact analysis
- Extends the capabilities of Network Node Manager Advanced Edition to intelligently diagnosis dynamic networks for:

- Cisco HSRP (hot standby router protocol)
 - Graphical views of the routers in an HSRP group and HSRP state monitoring
- OSPF backbone views
 - Shows OSPF area and how they communicate via their border routers
- IPv6
 - Discovery of IPv6 devices
 - Monitors both IPv4 and IPv6 protocols from one management station
 - Enables status monitoring via ICMPv6 "ping"
 - Integrates status change events into the Network Node Manager event subsystem
 - Provides visualization of IPv6 layer III connectivity
 - Provides visualization of IPv6 dynamic status changes
 - Supports Hitachi, NEC, Juniper and Cisco equipment





IPv6 and Linux

- Major distributions have IPv6 enabled by default
- Phase 1 Logo Certifications
 - SUSE SLES 10 (host and router) on 4/14/06
 - Red Hat RHEL 4 soon
 - Debian GNU/Linux with HP Telco Extensions soon
- Phase 2 Logo (host and IPsec end node)
Kernel.org 2.6.15 kernel (5/30/06)
- Most Mobile IPv6 extensions in 2.6.22 kernel.org tree

Printing and Imaging IPv6 Network Connectivity



- Enterprise Jetdirect EIO print server card with IPv6 and IPSEC Release in 2005
 - Gold IPv6 ready logo for both core and IPsec and the DoD IPv6 Approved Product List
 - HP LaserJet P2014n Printer and P3005n IPv6 support Gold IPv6 ready logo
 - Note: Any of HP LaserJet printers can be paired with our Jetdirect 635n card as well
 - More releases planned
- Consumer Imaging and Printing (CIP) IPv6 targeting support in 2007

IPv6 and HP OpenCall

- HP OpenCall Software brings IPv6 towards IP Multimedia Subsystem
- HP OpenCall software relies on underlying Linux, NSK and HP-UX platforms leveraging availability of IPv6, including SCTP, and enables migration to IPv6 and coexistence with IPv4 towards IMS.
 - HP OpenCall USP SIP and Diameter have IPv6 support.
 - HP OpenCall HSS application currently has IPV6 support included.
 - HP OpenCall MRFP has IPv6 and H.248 support built in.
- 2007 and onward:
 - HP OpenCall Media Platform: IPv6 support is introduced at the bearer (RTP, Mb), towards SIP signaling, management, and distributed media resources from the OCMP 4.01 in H2 2007 and towards 4.1 releases in H1 2008. **Dates are subject to change.**

IPv6 and HP StorageWorks

- HP Storage Division (45+ products) provides a customer statement of support committing support of IPv6 per the US OMB mandate (June 2008)
 - Evaluation and impact analysis done. IPv6 product enablement across the products line is in progress
- Hewlett Packard's StorageWorks Division and their solution partners have compliance with IPv6 on current product road maps. We have as an objective to support the new protocol by June 2008 in accordance with the timelines defined in the August 2005 "Memorandum 5-22" from the U.S. Office of Management and Budget and per the recently released IPv6 FAQ released by the U.S. Government Chief Information Officers Council.

HP-IT IPv6 Direction

- IPv6 established as a Strategic Focus for HP IT Network & Telecom
 - Dedicated resources assigned to developing IPv6 Strategy and Architecture
- Global IPv6 Test Bed Environment Established and Supported
 - Dedicated L3 IPv6 environments routed via IPv4 Backbone
 - Services provided for product development and testing
 - Reviewing options for Dual Stack L3 environments for controlled testing
- Continued Approach
 - Continue to establish Enterprise Test Environments
 - Integrate IPv6 into standards for all internal Network Components
 - Designation of strategic resources focused on IPv6 developments
 - Acquisition of provider-independent IPv6 address space
 - Educate Applications organizations on IPv6 roadmap and requirements
 - Continue to partner and provide input to IPv6 standards development



Thank You for your Time