



Large Enterprise Deployment - Microsoft -

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Microsoft IT IPv6 Deployment Drivers

- Deployment vision
 - Provide ubiquitous and consistent connectivity by making IPv6 available across the entire enterprise, to any device, through any media
- Objectives
 - Provide infrastructure to support engineering work
 - Gain operational experience with different deployment configurations
 - Dual-stack
 - IPv6-Only
 - “Dog-food” Microsoft products



Potential Values to MS IT

- Operational simplification
 - We're already starting to realize small efficiencies for host configuration (e.g. Auto-configuration, DHCPv6 PD)
 - Potential for architectural simplification → simpler, lower-cost networking
- Better security
 - With true end-to-end comes potential for wider use of host-based security (IPsec) model, even across administrative boundaries (e.g. B2B)



Potential Values to MS IT (cont.)

- New access methods
 - With true end-to-end comes potential for connectivity by new devices, new services, integration of existing services (e.g. DTaps + Extranet + Corpnet)
- Product differentiation
 - Yes! In fact, Microsoft IT is a Showcase for all of our products!
 - By enabling IPv6 on our Enterprise, we maintain leadership role and display value of Microsoft products in a real-world scenario



IPv6 Deployment Timeline

- Launched pilot services in late 1990's
 - Primarily for research groups
- Expanded services to product groups (Windows Networking) by 2001
- Established MS IT Tier 1 Help Desk support for IPv6 in early 2004
 - Escalation path through IT Operations and Engineering (Tiers 2, 3, 4)



IPv6 Education

- Conducted formal training sessions for IT personnel
- Hosted extensive brown bag sessions across the entire Windows division
 - IPv6 Protocol
 - Transitional Technologies
 - Application Porting Methodologies
 - Testing & Lab Set-up



Supported Internet Services

- Internet IPv6 (6Bone) network presence
 - Address allocation from 6Bone Registry
- Announcement of MICROSOFT-6BONE
 - 3FFE:8310::/28 “non-production” addressing
- Simple peers/route exchanges
 - Sprint, Hurricane Electric, WinISP, etc.
- 6to4 relay router
 - 6to4.ipv6.microsoft.com -> 6bone router
- Configured tunnels to Teredo servers



Supported Enterprise Services

- IPv6 routers
 - IPv6 router announcements for native/dual-stack hosts
 - Stateless auto-configuration
 - Deployed in 12 buildings plus Cambridge Research Center
 - 100+ buildings in Redmond
- Other network services deployed
 - ISATAP service points
 - DNS AAAA registrations/queries
 - DHCPv6 configuration options

PNRP seed service



IPv6 Network Implementation

- Service platforms used
 - DNS, PNRP on Windows Server 2003
 - ISATAP on both Cisco IOS and Windows Server 2003
 - We've alternated between both several times w/o service impact
 - DHCPv6 on Cisco IOS
- Routing platforms used
 - Cisco, Juniper, et al



Test Labs Deployment

- Each product teams have additional test labs
 - 100+ independent test labs in Windows
- Labs may or may not be connected to the corporate network
- All labs are capable of creating IPv6-Only test environment
- Lab routers support for IPv6 and upgrade schedule depend on product requirements



Deployment Size

- World's largest IPv6 enterprise network
 - 40,000+ potential users
 - 150,000+ potential machines
 - 7,000+ machines are IPv6-enabled today
- Longhorn's Beta program will greatly increase the IPv6 traffic on the network
 - Anticipate 30,000+ clients



Longhorn IPv6 Self-Host Plans

- Test and substantiate claim that Longhorn is IPv6-Ready
 - Support 1,000 hosts in IPv6-Only mode
 - All other Longhorn beta machines will be dual-stack
- Services that need to be upgraded & deployed
 - Email
 - Bug tracking database
 - Uses SQL
 - Source code depot
 - Document store
 - Uses SharePoint & cluster servers
 - Test tools
 - Media server
 - Major LOB applications such as travel reservations, accounting/expense reports, HR, purchasing, internal communication
 - Many use IIS, SharePoint, and others



Future Plans For Microsoft IT

- Continued equipment evaluation and testing
- Apply for RIR IPv6 address space
 - Need address space that is portable and non-expiring
- Expand IPv6 network
 - Deploy additional routers
 - Focus on Seattle-area network for dual-stack
 - Enable world-wide sites via ISATAP or configured tunnel
- Expand IPv6 network services
 - DHCPv6 configuration options (DNS opts, PD)
 - DNS service on IPv6-enabled servers
 - IPSecV6 on all hosts
 - Today we're using IPSecV4 on ALL domain-joined machines
 - ISATAP service on Windows platform

- Provide IPv6 Internet access



Thank You.