IPv6 support

Chris Mitchell
Program Manager
Microsoft Corporation
Windows Networking & Communications – IPv6

Microsoft

Introduction

- New scenarios and IPv6
- Microsoft’s IPv6 support
- Migration and roadmap

New Engaging Experiences

Real-Time Communications (RTC)

- Instant messaging, voice, video
- Real-time game play / collaboration

Collaboration

- Project workspaces solving a need
- Sharing your files with other people

Shared experiences

- Concert, company meeting, class
- Distribution of product updates

Current challenges

- The development and deployment of these experiences is difficult:
  - NATs deployed within networks (Enterprises, Branch offices, WiFi Hotspots, etc.)
  - Networks have a mix of private and public IP addresses
  - Firewalls prevent end to end connectivity
  - IT/Network administrators have to engineer point solutions to enable communication between applications and/or computers
  - Developers need to be network experts in order to develop successful applications
- Mobility is increasing but not supported in the network

IPv6 - meeting the challenges

- Enables next generation network-based applications without additional expense or expertise
- Enables deployment of these applications without major investment in new network infrastructure
- IPv6 addresses many of the challenges with today's networks:
  - Global addressing (IPv6 has 10^{38} addresses)
    - Scaling well beyond IPv4 3 billion public endpoints
    - Allocations allow ISPs to provision many public addresses
    - Eliminates requirement for NATs and private addresses
    - Restores connectivity as appropriate
  - Secure
    - Anonymous addresses provide privacy across multiple sessions
    - IPSec enables host-based authentication and security at the IP layer to augment edge-based security or obscurity
  - Mobile solution
    - Mobile IPv6 solution does not require additional infrastructure or server-side routing
- IPv6 does **not** require wholesale network upgrade

Migrating to IPv6

We expect a transition from v4 to v6 – how?

- Deployment of migration technologies:
  - ISATAP: Automatic tunneling of IPv6 over IPv4
    - Enables IPv6 without native router support and/or connects native IPv6 islands to IPv6-enabled clients within IPv4 network in the enterprise
    - Enables gradual migration to IPv6
    - Supported in Windows 2003 Server
  - 6to4: Automatic tunneling of IPv6 over IPv4
    - Derives IPv6 network prefix from IPv4 global address
    - Supported in Windows XP SP1, Windows 2003 Server and beyond
  - Teredo: Automatic tunneling of IPv6 through NAT devices
    - Derives IPv6 network prefix from public server used to traverse NAT
    - Supported in Windows XP SP1 + Advanced Networking update
- Typical migration steps:
  - Client-based: Teredo or 6to4
    - Enables new applications within networks with NAT or via 6to4 with no NAT
  - ISATAP router: Deploy ISATAP router within network
    - Improves connectivity, allows test deployments of native IPv6 networks
  - Native internal: ISATAP and Native IPv6 router(s) with 6to4 enabled to public Internet
    - Full IPv6 connectivity internally; opens end-to-end connectivity with external hosts using 6to4
  - Native everywhere: Native IPv6 router(s) with v6 ISP
    - Full IPv6 connectivity internally and to IPv6 Internet

Current Microsoft® IPv6 support

- Operating system
  - Windows® XP SP1 and Windows Server 2003
  - Windows CE .NET, Pocket PC (2003), Windows Embedded SP1
  - Windows XP Advanced Networking pack (Beta) – v6 NAT traversal, Firewall
- Developer
  - Winsock, HTTP, RPC, DPlay, P2P (Beta)
  - Visual Studio® & .Net Framework, DCOM
- Applications
  - IIS 6.0, IE 6.0, Windows Media Server & Client (4/24), File Sharing, DNS Server (client on Windows 2003
  - MSN/Windows Messenger (2H'03)
  - 3 Degrees (Beta) www.threedegrees.com
    - Built on P2P SDK
    - Requires IPv6 connectivity

Microsoft IPv6 messaging

- Developer
  - Build applications to be protocol agnostic (write to new APIs) now (XP, Server 2003)
  - Prepare to take advantage of new functionality available in next release Windows
- Industry
  - Microsoft will enable new applications that require IPv6 so NEP, IHV and ISVs should be ready
- Customers
  - Get prepared:
    - Deploy transition technologies (Teredo/ISATAP/6to4)
    - Buy v6 enabled Gateway Devices / Network equipment
  - Microsoft is shipping and enabling a new class of low cost, efficient network-based applications

IPv6 roadmap

	‘02-’04	’04-??	Future
Industry	•“IPv4 Ocean, IPv6 islands” •Opportunity in the home •Pilot deployments in Asia	•Enterprise deployments •Deployment in other parts of the world •Host transition technologies fully in use	•“IPv6 ocean, IPv4 islands” •Dual-stack important for backward compatibility
Windows	•**Windows** •**XP SP1** •**.NET Server 2003** •**CE .NET** •Transparent connectivity via 6to4, IPv6 NAT traversal, ISATAP, P2P	•Windows & Microsoft applications natively support IPv6 •Adoption by top tier industry applications	•Your potential!

Windows has the necessary support for IPv6 applications today!

More Information on IPv6

- Microsoft IPv6 information portal:
  - http://www.microsoft.com/ipv6/
- Send feedback on Microsoft IPv6 implementations:
  - ipv6-fb@microsoft.com
- IPv6/IPv4 Coexistence and Migration whitepaper:
  - http://www.microsoft.com/windowsserver2003/technologies/ipv6/ipv6coexist.mspx
- Key IETF standards information:
  - Microsoft supports (by RFC)
    - http://www.microsoft.com/windowsserver2003/technologies/ipv6/ipv6rfc.mspx
  - IPv6 specification (ipngwg)
    - RFC 2460, 2463. 2373 - IPv6 protocol ftp://ftp.isi.edu/in-notes/rfc2460.txt & 2463.txt & 2373.txt,
  - IPv6 transition tools (ngtrans/v6ops)
    - RFC 3056 - Connection of IPv6 Domains via IPv4 Clouds (6to4) ftp://ftp.isi.edu/in-notes/rfc3056.txt
    - Internet Draft - Tunneling IPv6 over UDP through NATs (Teredo) ftp://ftp.isi.edu/internet-drafts/draft-ietf-ngtrans-shipworm-08.txt
    - Internet Draft - Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) ftp://ftp.isi.edu/internet-drafts/draft-ietf-ngtrans-isatap-05.txt

Thank You.

Your potential. Our passion.

Microsoft

Backup information

Networking Trends: Enterprise

Climate

- >99% of PCs are networked in US large and medium organizations
- 75M PCs WW in large organizations; 55M PCs WW in medium organizations
- Tablet PC and laptops growing over 21% of total PC sales. By 2005 80% will have built-in wireless interface. Cell phones, PDAs important but second to mobile PCs
- IT Pros focus on efficiency and value; Business decisions targeted at customer satisfaction
- Public WLAN-Hotspots grow to a forecasted 120,000 WW by 2007

Technology

- IP infrastructure becoming central to office networks
  - Steady investment in IP-based phone systems, replacing PBX: $7.5B in 2006
- Widespread wireless LAN adoption: 24% of LORG offer onsite wireless access
  - Security and standards are challenges
- Gigabit networking is forecasted to grow substantially: $8.9B WW spending in 2006
- VPN economical solution for remote access

Empowering employees to work anywhere, anytime, on any device

Information access

Communication

Collaboration

Source: 2002 MSFT PC Tracker; Frost & Sullivan (2002), TeleAnalytics May '02, Gartner Dataquest (July 2002)

Networking Trends: Small Business

Climate

- About 1/3 of US small businesses are networked
- Dial-up is dominant. 25% of US small businesses have broadband connectivity
- 45M WW small businesses. 145M PC WW install base. PC churn is slower than in enterprise
- Overall, small business tends to be very pragmatic about technology investments
- No IT staff makes channel partners critical for advice, implementation and maintenance

Technology

- Peer-based networking is very important
- Reliable, ease-to-use, integrated solutions are essential
- Mobility growing within small businesses
- Wireless LANs promise convenient deployment and an affordable option
- Real-time communications and CRM have great potential

Small businesses need to share.

Files

Peripherals

Internet Connection

Source: 2002 MSFT PC Tracker; MS study 2002, AMI October 2001

Networking Trends: Home

Climate

- Substantial opportunity for growth in Home market: Only 1 of 6 HHs WW own a PC
- 227M home PCs WW: Makes up 44% of entire WW PC install base
- 64% of US HH have Internet connection. 75% use dial-up is connection method
- Home networking still in embryonic stages. 1/3 of US HH have multiple PC. Only 10% are networked.
- Broadband adoption is hindered until end-users are convinced of the value to migrate from dial-up

Technology

- Too much choice, lack of prescriptive guidance and complexity are barriers to adoption
- Wireless LANs promise convenient deployment and an affordable option
- Security and content concerns
- Distributing entertainment experiences within the home will drive future home networks
    - Quality of Service is essential. Interesting device integration scenarios

The Home PC is moving out of the den and into the living room.

Digital Entertainment
Multi-Player Gaming
Rich Communications
Working from home

Source: 2002 MSFT PC Tracker; Frost & Sullivan (2002), TeleAnalytics May '02, Gartner Dataquest (July 2002)