

Microsoft Clients in an IPv6 World

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Microsoft Products Fully Support IPv6

- Since Vista, Microsoft solutions have IPv6 support turned on by default/natively
- Top-to-bottom TCP/IP stack re-design
- Vista and later can operate in an IPv6-only environment
- IPv6 Active Directory, SMB/CIFS file sharing

IPv6 is on by default and preferred over IPv4
(considering network/DNS/application support)



Stateless Address AutoConfiguration (SLAAC) enabled

IPv6 Address: SLAAC

Temporary IPv6: Microsoft

Link-Local: self-assigned

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Wireless LAN adapter Wireless Network Connection:
Connection-specific DNS Suffix . . . : hsd1.co.comcast.net.
Description . . . . . : Intel(R) WiFi Link 1000 BGN
Physical Address. . . . . : 8C-A9-82-A0-F9-44
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
IPv6 Address. . . . . : 2601:1:c100:1ad:98b8:bfb9:3be1:e9fe(Pref
rrred)
Temporary IPv6 Address. . . . . : 2601:1:c100:1ad:65ff:acad:2c30:a50b(Pref
rrred)
Link-local IPv6 Address . . . . . : fe80::98b8:bfb9:3be1:e9fe%14(Preferred)
IPv4 Address. . . . . : 192.168.1.17(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Friday, March 28, 2014 7:33:13 AM
Lease Expires . . . . . : Saturday, March 29, 2014 7:33:16 AM
Default Gateway . . . . . : fe80::ea3e:fcff:fe76:3b91%14
192.168.1.1
DHCP Server . . . . . : 192.168.1.1
DHCPv6 IAD . . . . . : 361539970
DHCPv6 Client DUID. . . . . : 00-01-00-01-14-F4-E4-EC-10-1F-74-12-7B-3
DNS Servers . . . . . : 2001:558:feed:2
2001:558:feed:1
75.75.75.75
75.75.76.76
NetBIOS over Tcpip. . . . . : Enabled
NetBIOS over L2cap . . . . . : Disabled
NetBIOS over Bluetooth . . . . . : Disabled
DHCP Parameters . . . . . :
DHCPv6 Parameters . . . . . :
```

- With SLAAC, the router advertises a network prefix as part of the Router Advertisement (RA) (network prefix: 202a:111:10a:2a20::/64)
- Client will self-assign an IP based on the network prefix
 - Hint: router lifetime must be > 0
- Will the client use SLAAC
 - A: Routers advertisement (RA) contains Prefix Information and the client can use it to create an address
 - O: Other configuration (SLAAC will get the DHCP options from the DHCP server even though it generates its own address)

Temporary Addresses



- A randomly generated IPv6 address that changes over time
- Generated for public address prefixes that use stateless address configuration
- If an interface identifier is always based on EUI-64, then the host could be tracked (regardless of the prefix)

...after a valid lifetime, a new interface identifier and temporary address is generated

Managed DHCP/Stateful DHCPv6

- If do not suppress RA and broadcasting the network prefix AND are configured for Managed DHCP, then the client will have 4 IP addresses:
 - Link local
 - Managed DHCP address
 - SLAAC address
 - Temporary Preferred address

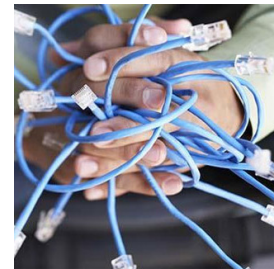


Note: These are the preferred addresses. Deprecated addresses may also exist such as expired temporary addresses.

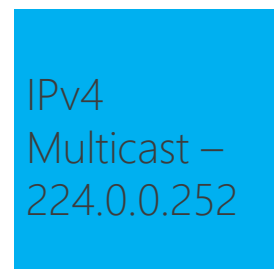
Keep that in mind when determining policy

Link-Local Multicast Name Resolution (LLMNR)

- LLMNR performs name resolution using multicast over an IPv4 or IPv6 network
- Included with Windows Vista and later products
- Responders listen on UDP/TCP port 5355 on link-local scope multicast address
- LLMNR is different from mDNS



IPv6
Multicast –
FF02::1::3



IPv4
Multicast –
224.0.0.252

Dual Stacking

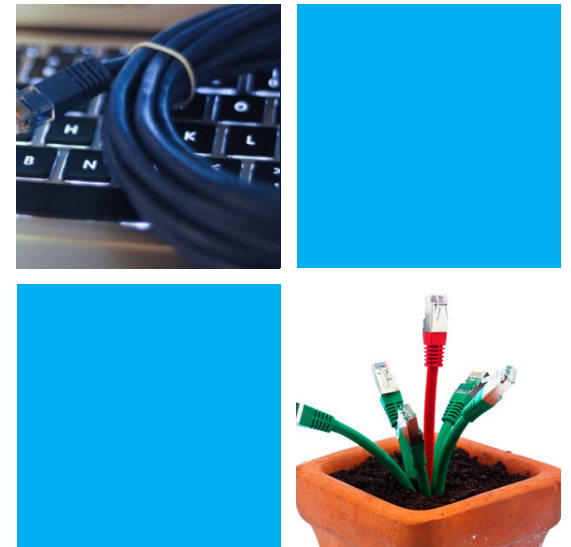
- Dual Stacking your desktop is the recommended configuration for transitioning to IPv6
- Happy Eyeballs (RFC 6555)
 - Provides a fast connection for users by attempting a connection using IPv6 and if not successful, attempts connection using IPv4
 - Avoids thrashing by avoiding simultaneous attempts on both IPv4 and IPv6

▪ Limitations

- **Application implementation dependent - each can be implemented differently**
- **Short term solution as more move to full IPv6**

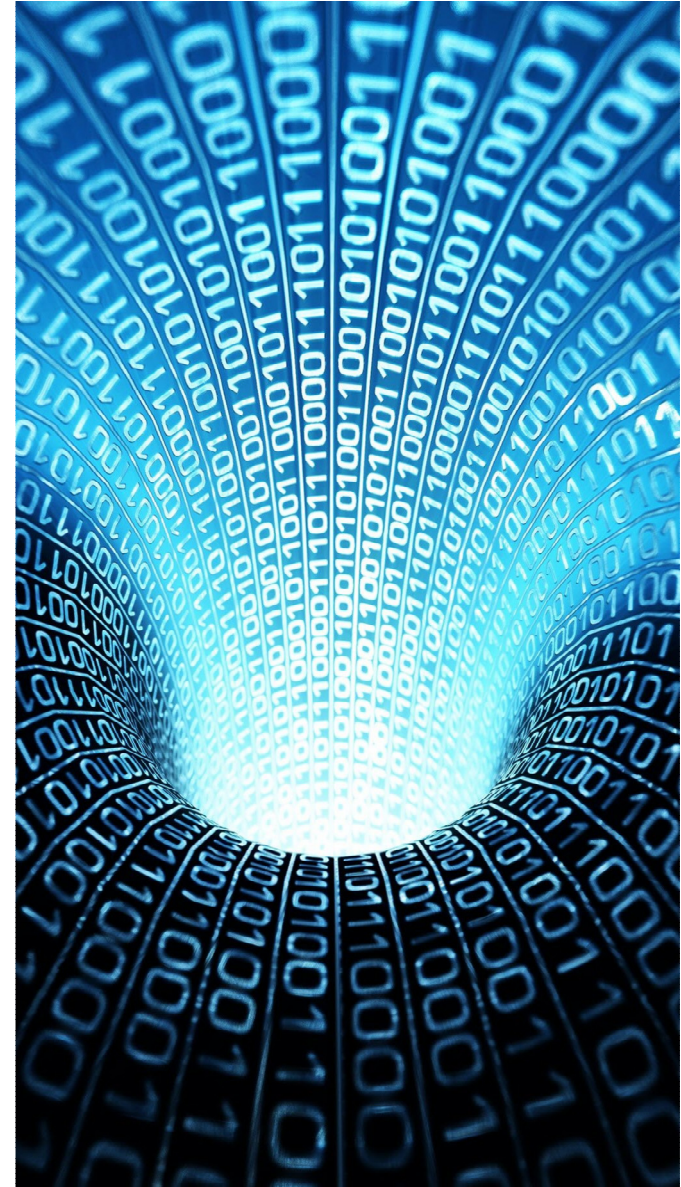
Microsoft Solution in a Dual-Stack Environment

- Looking at a longer term solution for a dual-stack environment as more environments move beyond to native IPv6
- Tests IPv6 when connecting to a network that advertises IPv6 routability and will only use IPv6 if IPv6 is *functioning*
 - IPv6 version of Network Connectivity Status Indicator (NCSI)
 - Windows 8 does a test to for network connectivity to ipv6.msftncsi.com
 - If this works then IPv6 is operational
 - If it fails then IPv4 is preferred (IPv6 is demoted)
- Uses approach mentioned in RFC 6724
 - Default Address Selection for Internet Protocol Version 6 (IPv6)
- Caches information for 30 days



Teredo

- Teredo is an IPv6 transition technology that provides IPv6 addressability and connectivity for capable hosts which are on an IPv4 network but no other connection to an IPv6 network
- Microsoft has included Teredo functionality in a *default* configuration since Vista.
- Tunnels will be used before IPv4 if required by IPv6-enabled applications
- Tunnels/IPv6 can be disabled (not uninstalled) via network properties or registry modifications



XBOX One

- Utilizes IPv6+IPsec and provides secure peer to peer
- IPv6 is not commonly available to end-users
 - Teredo is utilized when needed
- How to provide the best user experience
 - Provide IPv6 Connectivity
 - Allow for IPsec transport mode to function
 - Allow unsolicited inbound IPsec and IKE
 - Support outbound UDP with long port mapping refresh intervals (>60sec)
 - Allow transition technologies such as Teredo
 - Teredo traffic will prefer port 3074



Skype

- Skype is actively working on 464XLAT for older versions of Android devices (pre 4.4 Kitkat e.g. Samsung S3), Windows Phone and iPhone
- IPv6 WiFi is in development





QUESTIONS?

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