IPv6 Intro

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SkullSpace Hackathon

Online HTML5 Slides

Presentation source/download available at
github.com/tbaschak/ipv6-intro-presentation

Who I Am

- Employed by VOI Network Solutions – primary administrator of Winnipeg-based commercial Internet Service Provider and carrier.
- Avid opensource software user/fanatic, and recently, contributor.
- Involved with both Internet Exchanges in Winnipeg.
  - Elected member on the Board of Directors for the Manitoba Internet Exchange (MBIX).
  - Also involved with the creation and technical operations of the Winnipeg Internet Exchange (WpgIX).

My IPv6 Experience

- Running IPv6 since 2004
  - Over tunnels for many, many years up until getting native IPv6
  - Native IPv6 since December 2012, via Voi Networks BGP address space
- My internal network currently runs OSPFv3 (IPv6 OSPF)
  - 2604:4280:d00d::/48

IPv6 Address Basics

- The IPv6 address space is 128-bits (2^128) in size, containing 340,282,366,920,938,463,463,374,607,431,768,211,456 IPv6 addresses.
- Like IPv4, Network and Host bits.
- Unlike IPv4, Network and Host bits are usually equal (at least on a /64 network)

rfc4291: IPv6 Addressing

- Valid Host Addresses
  - 2001:DB8:0:0:8:800:200C:417A
  - 2001:DB8::8:800:200C:417A
  - 2604:4280:d00d::80
  - 2604:4280:d00d:200::1
  - ::1 (loopback)
  - :: (0:0:0:0:0:0:0:0)

rfc4291 (cont)

- Valid Network Addresses
  - 2001:0DB8:0000:CD30:0000:0000:0000:0000/60
  - 2001:0DB8::CD30:0:0:0:0/60
  - 2001:0DB8:0:CD30::/60
  - ::/0

IPv6 Subnetting vs IPv4

- Where a /24 is often used with IPv4, /64's are encouraged with IPv6.
  - This allows various autoconfiguration mechanisms to function.
  - a /48 (Recommended network size for one site) allows 64k /64's
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Resources

- ipv6.he.net/certification/
- www.sixxs.net/tools/grh/ula/
- ipvfoo chrome extension
- ipvfox firefox extension

Useful IPv6 RFCs

- RFC2460: IPv6 Specification
- RFC6434: IPv6 Node Requirements
- RFC4291: IPv6 Addressing Architecture
- RFC3484: Default Address Selection
- RFC4193: Unique Local IPv6 Unicast Addresses (ULA)
- RFC4443: ICMPv6
- RFC3315: DHCPv6 client
- RFC4862: SLAAC
- RFC4861: Neighbor Discovery
- RFC6177: IPv6 Address Assignment to End Sites

Even More IPv6 RFCs

- RFC1981: Path MTU Discovery
- RFC4213: Basic Transition Mechanisms for IPv6 Hosts and Routers
- RFC3596: DNS protocol extensions for incorporating IPv6 DNS resource records
- RFC2671: DNS message extension mechanism
- RFC3226: DNS message size requirements
- RFC5095: Deprecation of Type 0 Routing Headers in IPv6
- More info at: http://www.ripe.net/ripe/docs/ripe-554
- BIG GIANT list at: http://ipv6now.com.au/RFC.php

The End

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