

# DNS and IPv6

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@alwaysdns

Because It's STILL Always DNS®





# IPv6 Quick Intro

- ✦ IPv4 uses decimal notation
  - ✦ 192.168.50.50
- ✦ IPv6 uses Hex notation
  - ✦ 0123:4567:89AB:CDEF:0123:4567:89AB:CDEF





# IPv6 By The Numbers

- ✦ 32 Nibbles = 8 groups of 4 hex numbers (16 bits each).
- ✦ IP addresses from which email can originate increases from  $2^{32}$  to  $2^{128}$ . Get your cheat sheet here: <http://www.crucial.com.au/blog/?p=801>
- ✦ When you get your IPv6 address assignment it will often be a /48 sized address block.





# Why Size Matters

- ✧ Quiz:
  - ✧ How long will it take to scan a billion IPv6 addresses?
- ✧ I dunno





# Subnetting

- ✦ ISP-Dependant
- ✦ ISP typically assigns the first 48 bits.
- ✦ You choose the number of bits for your subnets





# Addressing How-To

- ✦ Given a host MAC Address of 0050:0F1C:C67A
- ✦ ISP 2001:0DA8::/32
- ✦ Company 2001:0DA8:460D::/48
- ✦ Department 2001:0DA8:460D:34AB::/64
- ✦ Host 2001:0DA8:460D:34AB:0250:0FFF:FE1C:C67A





# Huh?

- ✧ MAC Address = 0050:0F1C:C67A
- ✧ The first 16 bits = 0000 0000 0101 0000
- ✧ Flip the 7th bit = 0000 0010 0101 0000
- ✧ The first 16 bits now = 0250





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# DHCP and IPv6

- ✦ Stateless autoconfiguration
- ✦ DHCP distributes other information (e.g. DNS servers)
- ✦ Every interface has two addresses





# Everything You Want to Know About DNS

# AAAA





# DNS Best Practices

- ✧ What should be in DNS?
- ✧ AAAA
  - ✧ ns1 IN AAAA 2001:0480:0010:1048:0000:0007
  - ✧ ns1 IN AAAA 2001:480:10:1048::7
- ✧ Never put IPv6 link local (fe80::/10) in DNS





# Naming Issues

- ✦ IPv6 + IPv4 in one domain = confusion
- ✦ Ensure good IPv6 connectivity to avoid diversion to high-latency indirect paths





# Create Special Domains

## ✦ Testing:

- ✦ www.example.com (only A record)
- ✦ www.ipv6.example.com (only AAAA record)

## ✦ Production:

- ✦ www.example.com (A and AAAA)
- ✦ www.ipv6.example.com (AAAA)
- ✦ www.ipv4.example.com (A)





# PTR

- ✦ Reverse DNS maps IP to hostname
- ✦ IPv6 allows delegated reverse mapping
- ✦ Reverse the nibbles separated with dots
- ✦ Zone file name reverses the nibbles to IP6.ARPA
- ✦ Zero suppression does NOT apply









# Stop The Insanity!

- ✦ Create the zone file from the left side (28 nibbles)
- ✦ Using 2008:64:128::ee:1 and 2

Zone file is called: e.e.0.0.0.0.0.0.0.0.0.0.0.0.0.0.8.2.1.0.4.6.0.0.8.0.0.2.IP6.ARPA

```
@      IN      SOA      ns1.example.com.      admin.example.com
```

IN NS ns1.example.com

```
1.0.0.0      IN      PTR      mail.example.com
```

```
2.0.0.0      IN      PTR      mail2.example.com
```





# Your Checklist

- ✦ Network equipment
- ✦ Internet Presence
- ✦ Servers and workstations
- ✦ Don't change everything at once
- ✦ Think dual stack host (IPv6 \*and\* IPv4) or tunnelling
- ✦ Make a plan





# Resources

- ✦ <https://supportforums.cisco.com/docs/DOC-17232>
- ✦ <http://www.ipv6whitelist.eu>
- ✦ <http://www.6deploy.eu>
- ✦ [http://www.hpcmo.hpc.mil/IPV6/wp-content/NIST-sp800-119\\_dec2010a.pdf](http://www.hpcmo.hpc.mil/IPV6/wp-content/NIST-sp800-119_dec2010a.pdf)
- ✦ <https://tools.ietf.org/rfc/rfc4472.txt>
- ✦ <http://www.surfnet.nl/en/Pages/default.aspx>
- ✦ <http://rdns6.com/zone>
- ✦ <http://www.zytrax.com/books/dns/ch3/#ipv6>
- ✦ RFC: 2694, 2845, 2931, 3007, 3315, 3596, 3646, 3901





# Discussion



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