

SLAACer or Prisoner of State

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IPv4 Address Assignment

- **With IPv4, only two methods:**
 - **Static**
 - **DHCPv4**

- **Global/routable addresses**
- **“Private” RFC 1918 non-routable**
- **Anycast (sort of)**



IPv6 Address Assignment

- **Classic: static**
- **StateLess Address Auto Configuration (SLAAC)**
- **Stateful (DCHPv6)**

- **Unicast**
- **Multicast**
- **Anycast**

- **SLAAC == Stateless Address AutoConfiguration**
- **Uses Router Advertisement (RA) messages**
- **Network policy moved to the edge**

- **Client configures link-local address**
 - **Generates 64 bit host ID**
 - **Combines link local prefix and EUID to generate tentative address (such as fe80::028c:f5ff:fe05:4235)**
 - **Does DAD (Duplicate Address Detection)**
 - **Sends a multicast Neighbor Solicitation message containing its new tentative address to the solicited node address**
 - **If no other node responds with a Neighbor Advertisement using that address, the host configures itself with that address**

- **Host now looks for Router Advertisement (RA) Messages**
 - **Sends multicast Router Solicitation message**
 - **Listens for RA messages**
 - **Configures itself based on contents of RA message, including doing DHCPv6**

- **Local prefix(es), including A (autonomous address configuration) flag**
- **Router info**
 - Router's link-level address
 - Lifetime of default route
 - Router priority
- **Flags: M (ManagedAddress) flag and O (OtherConfiguration) flag**
- **Maximum Transmission Unit (MTU) of upstream link**

- **RDNS server**
- **NTP or “other” configuration**
- **RFC 6106 for RDNS in RA**
 - **Lack of client support...**

- **“public” or “private” (temporary) addresses**
- **RDNS server, NTP, TFTP**
- **Vendor options**
- **But no default route!**



Decisions, Decisions

- **DHCPv6**
 - **Filter/control access**
 - **Update IP address management system**
 - **Update A/PTR records in DNS**
 - **Further from client, more centralized**
 - **Handles more complex configs, phones, printers, etc.**

- **SLAAC**
 - **Local/fast**
 - **Light weight**
 - **Decentralized**
 - **No logging, A/PTR updates or IPAM updates**

- **Do you have auditing or logging requirements?**
- **Centralized or distributed management**
- **Technical level of support staff**
- **Range of different gear?**

- **Send RA messages with A=0, O/M=1**
- **DHCP for all configurations except default route**
- **DHCP server does A/PTR and IPAM updates**

- **Send RA messages with A/O=1, M=0**
- **Send RDNS in RA messages**
- **DHCP server does no leases, just gives DNS for clients that can't do RFC 6106**



And IP6.arpa... Sigh...

How did this all start?

- ftp (<ftp.uu.net>, <ftp.wustl.edu>)
- SMTP
- Security devices
- Silly web things

How did we do it IPv4

- **By hand (ow)**
- **Scripts**
- **\$GENERATE**
- **IPAM**

- A single subnet is a /64
- A /64 has 18 quintillion (4 bil x 4 bil) addrs
- A PTR record has 34 labels in IPv6
- Anyone got a computer with enough disk or RAM to hold one /64 zone file?

So what are we left with?

- **Admit that PTRs are pointless**
- **Pre-populate (assuming FTL travel...)**
- **Pre-populate statics for routers & big servers**
- **As previous plus DHCP server adding clients**
- **Lie on the fly (if not doing DNSSEC)**



Questions?



Thank you!