

Stateful vs Stateless. How to choose. FRNOG19 – 29 Jun 2012

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With IPv4, only two methods:

-Static

-DHCPv4







Global/routable addresses

"Private" RFC 1918 non-routable

Anycast (sort of)







- Classic: static
- StateLess Address Auto Configuration (SLAAC)
- Stateless DHCPv6
- Stateful (full DCHPv6)



Unicast

Multicast

Anycast



- Link Local
- Global Unicast
- Unique Local
- Transition
- Misc (Site Local, Reserved, Special)



- 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

RA Message Contents

- 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

Not in RA Messages...

- 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
- Update DNS with A/PTR
- But no default route!





Differences

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.



Differences

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?



- Need auditing
- Need access control
- Senior technical staff not everywhere
- DHCPv6 is your friend



- Baristas are not networking folks
- Customers just need it to work
- No logging, lease churn would be burden
- Small range of client machines
- SLAAC!

- 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





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