

H O S T C O N N E C T I V I T Y

Check the 4 configurations on the host and ensure that they are compatible with the network to host is in. (ipconfig or ifconfig, depending on host os).

- Unicast Address
- Prefix Length
- Default Router
- DNS Server

Ping & Traceroute—might be "ping6" and "traceroute6 (Linux, MAC) or tracert (Win). From a router, there's no change from IPv4. Extended ping can test routing over the entire path. In an extended ping, say "ipv6" when it prompts for protocol, defaulting to IP.

Route Choice—can be determined, just like with IPv4.

```
R1# show ipv6 route 2001:db8::2
```

If no route, will respond with "Route not found"

ARP—replaced with NDP (Network Discovery Protocol). If an address is missing from the table look for what would have blocked NDP. Note: NDP is a replacement for ARP, not CDP.

```
R7# show ipv6 neighbors
```

IPv6 Address	Age	Link-layer Addr	State	Interface
FE80::21B:D4FF:FE76:6058	5	001b.d476.6058	STALE	Gi0/1
2001:DB8::5	0	001e.1321.e3a8	REACH	Gi0/1
2001:DB8::6	6	001b.d476.6058	STALE	Gi0/1
FE80::21E:13FF:FE21:E3A8	5	001e.1321.e3a8	DELAY	Gi0/1

In the "State" column, "REACH" and "DELAY" mean the neighbor has recently been heard from (the Age column tell you in minutes). Delay means that a packet has recently been sent (in this case, to the unicast address of the same destination). The "Interface" column is your own interface.

T R O U B L E S H O O T I N G

- Host
 - Host & Gateway in same subnet
 - Host & Gateway use same prefix length
 - Gateway address should be right
 - DNS Address
- Router
 - Interfaces up/up
 - Addresses in same subnet at both ends of a link
 - Each router should have route to each subnet in design
- Filtering
 - Switches can perform MAC address filtering
 - VLANs must be present in each switch along a path
 - ACLs

Scenario—Only Some Host Pings Work

Check the host settings. Start with the static ones, based on error likelihood.

Some things should match between router and host:

HOST VALUE	GATEWAY ROUTER VALUE	SYMPTOM
Default Router	Interface Address	Addresses on LAN work; off-LAN fail. Off-LAN DNS fail.
Prefix Length	Prefix Length	Router routing table MAY not include host
Subnet	Subnet	Router routing table WILL not include host
DNS Address	—	Addresses work; Names fail

The subnet of both the host and gateway are calculated by applying the prefix length to the address of each.

Scenario—Host Can't Ping Gateway

This may not be an IPv6 problem, other causes:

- The router (sub)interface is shutdown. Perhaps the host interface is shutdown (rare)
- LAN problem—See CCNA notes 1-4(A) VLANs and 1-4(E) STP Problem Solving
- LAN filtering—L2 port security (Tricky, not all settings record the killed frames) or L3 ACL [see CCNA chapter 25 for IPv6 ACLs]

Scenario—DNS Fails

Possible Causes

- Incorrect host setting for DNS server address—static or DHCP-supplied. Both SLAAC and stateful DHCP get their DNS address from DHCP
- Network problem between host and DNS server, even if net to the "real" destination OK
- DNS server really is down—CCNA doesn't consider this possibility

Scenario—Stateful DHCPv6 Client Has No Settings

If a stateful DHCPv6 server isn't on the same LAN as the host, then

- Its router needs to be correctly configured as a relay

```
interface Gi 0/0
  ipv6 dhcp relay destination 2001:db8::1
```
- Connectivity is required to the DHCP server

Scenario—SLAAC Client Has No Settings

Perhaps the network discovery (NDP) exchange of RS (Router Solicitation) and RA (Router Advertisement) messages failed to give the host a default router and a prefix to build an address from. This can be caused by

- Connectivity failure
- Router interface facing the LAN has no IPv6 address
- Router needs "ipv6 unicast routing"—From an on-LAN neighbor, this router will show in "show ipv6 neighbors" but not in "show ipv6 routers."

Scenario—Traceroute Fails Partway to Destination

If the host settings look good and it can ping its default router but not all the way to the destination, you've probably got a routing problem, possibilities include

- Link down along the path
- Routing Protocol
 - Neighbor Relationship Problems
 - Route Filtering keeps route out of table
 - Incorrect Static Route
 - Poor Subnet Design causes nets to be falsely advertised in the wrong direction

Scenario—Routing Good but Traceroute Fails

Probably an IPv6 ACL—See Chapter 25.