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Routing Phases

- On-the-fly routing: use the routing table
- Proactive routing: build routing tables
  - Manual configuration
    - Static routing
  - Distribute destination information throughout the network
    - Routing protocols
- Support for both IPv4 and IPv6
Enabling IPv6 routing

- Recent routers support IPv6 forwarding
  - Most likely disabled
- Sample configuration on Cisco router

Router# configure terminal

Router(config)# ipv6 unicast-routing

- IPv6 addresses can be configured on interfaces
- IPv6 packets are forwarded
IPv6 routing table

- Routing based on longest prefix match
  - Same as in IPv4

- IPv6 and IPv4 are dealt with as two independent protocols
  - Separate routing tables
Routing protocols

- Integrated Routing
  - A single protocol to advertise destinations of both protocol families

- Ships in the night
  - Each address family uses a distinct protocol
    - Protocols are completely independent one from the other
Integrated Routing

- No need to duplicate mechanisms
  - Advertisement messages
  - Fault detection

- Which family (IPv4, IPv6) will transport protocol messages?

- A new protocol: might have bugs hampering IPv4 operation

- IPv4 and IPv6 topologies might be different
Ships in the night

- It is possible to use different routing protocols
  - Tune choice to topology/scenario
- Smoother migration
- Simpler troubleshooting
- Duplicated mechanisms
### IPv6 routing protocol options

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static</td>
<td>Ships in the night</td>
</tr>
<tr>
<td>RIPng</td>
<td>Ships in the night</td>
</tr>
<tr>
<td>EIGRP</td>
<td>Ships in the night</td>
</tr>
<tr>
<td>OSPFv3</td>
<td>Ships in the night (Integrated routing is possible)</td>
</tr>
<tr>
<td>IS-IS</td>
<td>Integrated routing</td>
</tr>
<tr>
<td>MP-BGP</td>
<td>Both (configuration-dependent); “Integrated Routing” is the most commonly deployed because of practicality: BGP process identified by AS number, which is the same for both IPv4 and IPv6.</td>
</tr>
</tbody>
</table>

![Diagram showing AS1, BGP, AS2 with RIPng, OSPFv3, IS-IS, and EIGRP]
Routing table example

C2800#sh ipv6 route
IPv6 Routing Table - 15 entries

Codes: C - Connected, L - Local, S - Static, R - RIP
      O - OSPF intra, OI - OSPF inter

<table>
<thead>
<tr>
<th>Code</th>
<th>Prefix</th>
<th>Metric</th>
<th>Interface(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>2013::/112</td>
<td>110/65</td>
<td>via FE80::20F:34FF:FEE7:ABDE, FastEthernet1</td>
</tr>
<tr>
<td>O</td>
<td>2016::/112</td>
<td>110/65</td>
<td>via FE80::223:EBFF:FE44:C6EE, FastEthernet0, FastEthernet1</td>
</tr>
<tr>
<td>C</td>
<td>2017::/64</td>
<td>0/0</td>
<td>via ::, FastEthernet0/1</td>
</tr>
<tr>
<td>L</td>
<td>2017::2/128</td>
<td>0/0</td>
<td>via ::, FastEthernet0/1</td>
</tr>
<tr>
<td>L</td>
<td>FE80::/10</td>
<td>0/0</td>
<td>via ::, Null0</td>
</tr>
<tr>
<td>L</td>
<td>FF00::/8</td>
<td>0/0</td>
<td>via ::, Null0</td>
</tr>
<tr>
<td>S</td>
<td>::/0</td>
<td>1/0</td>
<td>via FE80::20D:BCFF:FEB9:29A3, FastEthernet2</td>
</tr>
</tbody>
</table>