ARCEP/IDATE

Table ronde IPv6

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IPv6 ...
...pour garantir l’expérience utilisateur !!
The World Today

- Client OS
- Enterprise Network
- ISP
- Internet
IPv6 adoption

• Why?
IPv6-Centric Networking – Simplicity & Opportunity

Creating a global conduit of shared information touching applications, services, networks, processes, data…
Carrier Grade NAT: Sharing public IPv4 addresses

- Makes the Internet Statefull! ... Really?

Session States
\{SIP@,DIP@,Sp,Dp\}

Private IPv4
- 10.0.0.0 /8
- 100.64.0.0 /16

Public IPv4
- Shared/Oversubscribed
- State per session

IPv6 deployment

- Cisco Methodology
Validated Solution: IPv6 Integration with Cisco SD-Access, SD-WAN, and Firepower


The objective is to enable IPv6-only clients while keeping the underlay infrastructure dual stack during transition. Migrating to a single-stack IPv6 architecture for both overlay and underlay will be performed when an end-to-end, IPv6-only environment is fully supported.
Cisco Validated Design (CVD) & Validated profiles (CVP)

- IPv6 in Cisco SD-Access (Campus)
  - Over time Cisco DNA Center architecture has evolved from traditional campus LAN designs to the Cisco SD-Access design architecture. Cisco SD-Access uses Cisco DNA Center to design, provision, and apply policies, as well as provide wired and wireless network assurance for an intelligent campus network. In this solution, the Cisco SD-Access fabric underlay uses IPv4 addressing. In the Cisco SD-Access fabric, overlay IPv6 traffic is transported in IPv4 Virtual Extensible LAN (VXLAN) tunnels.

- IPv6 in Cisco SD-WAN (WAN)
  - The Cisco SD-WAN architecture consists of separate orchestrations, managements, controls, and data planes. The overlay IPv6 traffic can be transported in IP security (IPsec) tunnels established over IPv4 or IPv6 transports based on local and remote Cisco SD-WAN edge device configurations.

- Cisco SD-Access | SD-WAN Independent Domain Pairwise Integration
Firewall Instance Types

- At the main site, three types of firewall instances are deployed: Infra Firewall, VN Firewall, and Internet Firewall.
- The **Infra Firewall instance** provides Cisco SD-Access underlay connectivity for Cisco DNA Center to discover Cisco SD-Access fabric devices at the main site and remote branch sites.
- The **VN Firewall instance** connects the Cisco SD-Access VN to the Cisco SD-WAN VPN and provides VN connectivity to the shared-services network in the data center.
- The **Internet Firewall instance** provides internet access to the Cisco SD-Access VN hosts
  - The Internet Firewall instance receives IPv4 and IPv6 default routes from the internet router through the eBGP.
  - The Internet Firewall instance advertises IPv4 and IPv6 default routes to fabric borders through the eBGP
  - The Internet Firewall instance denies traffic between different VNs to maintain macrosegmentation
  - The Internet Firewall instance allows outbound traffic to IPv4 and IPv6 internet.
  - The Internet Firewall instance performs NAT64 function to allow IPv6 clients reachability to the IPv4 internet.
## Scale

<table>
<thead>
<tr>
<th>Category</th>
<th>Scale Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNIs per site</td>
<td>5</td>
</tr>
<tr>
<td>Wireless controllers per site</td>
<td>2 per HA</td>
</tr>
<tr>
<td>Fabric sites</td>
<td>10</td>
</tr>
<tr>
<td>APs per site</td>
<td>200-1000</td>
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<tr>
<td>IPv6 endpoints</td>
<td>20,000</td>
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<tr>
<td>SSIDs per site</td>
<td>4</td>
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<tr>
<td>SGTs</td>
<td>100</td>
</tr>
<tr>
<td>Traffic profile</td>
<td>Unicast and multicast</td>
</tr>
</tbody>
</table>
Use cases

- Automated secure Cisco SD-WAN transporting IPv4 and IPv6 traffic
- Fabric-enabled wireless deployment for IPv6 Enterprise users
- Network visibility, monitoring, and troubleshooting for IPv6 devices and endpoints
- IPv6 application visibility and health
- Network robustness for IPv6 networks
- Secure onboarding for various IPv6-only endpoints
- End-to-end IPv6 traffic and secure internet access
- End-to-end inline SGT traffic enforcement between Cisco SD-Access sites across Cisco SD-WAN
- IPv6-only clients access of IPv6 applications and legacy IPv4 applications
- IPv6 application performance optimization with quality of service (QoS) and path selection
- IPv6 endpoints and addresses scale
- Day-n operations for the following operations: Image Upgrade, Configuration Management, Backup and Restore, and Network Expansion.