Working with IPv6

The SBC Edge supports IPv6 functionality. IPv6 is supported in network services (such as interface addressing, static routing, neighbor resolution and DNS), as well as support in voice applications (such as SIP, Media Stream Control, Common Control, etc.). This document provides an overview of the IPv6 functionality and where to find configuration details.

Typical Network Layout

A typical network layout defined below includes an SBC 1000 interoperating with a BroadWorks server. In this setup, the SIP users register with the SBC 1000 as an outbound proxy (either through IPv4 or IPv6) and the SBC is configured to route to the BroadWords server (either through IPv4 or IPv6). Through this layout, the SBC 1000 handles IPv4 and IPv6 addressing on all interfaces, as well as support using basic services (i.e., DNS client, static routing, etc), using IPv6.

In the diagram below, the SBC 1000 is displayed; the SBC 2000 supports the same functionality.

Figure 1: Typical Network

IPv6 Supported Deployments - Examples

Logical interfaces support three modes of addressing: IPv4, IPv6, and Both (IPv4/IPv6). The three most basic flows are listed below; there will most likely be a combination of IPv4 and IPv6 on both the LAN and the WAN. See Managing Logical Interfaces.

Examples are as follows:

- **IPv6-to-IPv4.** The LAN uses IPv6 and the WAN uses IPv4. The SBC is responsible for interworking SIP calls between the two networks. The DNS server is provided by the ISP and the NTP is provided locally.
• **IPv6-to-IPv6.** The LAN and the WAN use IPv6. The SBC is responsible for serving as a back-to-back user agent between the two call legs. The DNS server and NTP server are both on the WAN.

• **IPv4-to-IPv6.** The LAN uses IPv4 and the WAN uses IPv6. Just as in the IPv6-to-IPv4 case, the SBC is responsible for protocol interworking between the two call legs. The DNS server and the NTP server are both on the LAN.

![Diagram of Sample Deployment Scenario](image)

**Figure 2:** Sample Deployment Scenario

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**IPv6 Features Supported**

**Addressing**

Three modes of addressing are supported for Logical Interfaces: IPv4 only, IPv6 only, and IPv4/IPv6 dual stack. Default interfaces are in IPv6. For configuration details, see Managing Logical Interfaces.

**Routing**

The SBC supports routing IPv6 protocol between two connected subnets. Two types of routes are supported:

- Static Routes. A static route that consists of a destination IPv6 address, along with the network prefix and IPv6 address of the nexthop gateway. See Managing Static IPv6 Route Tables.
- Runtime Routes. IPv6 routes established in the system. The IPv6 Routing Table displays all directly connected routes (i.e., subnets directly reachable through the system interfaces) and the user configured static routes.

**Neighbor Discovery**

IPv6 uses Neighbor Distribution Protocol (NDP) to map IPv6 addresses to link-layer addresses. In the most common scenario, this mapping occurs dynamically as and when the IPv6 address needs to be resolved to its link-layer address. Along with this dynamic IPv6 neighbor resolution, you can also create Static Neighbor Entries. These entries include: IPv6 address, MAC address, and associated interface. This provides a static mapping between the provided IPv6 address and the provided MAC address.
DNS Client

In the SBC, the primary and/or secondary DNS server addresses can be IPv6 addresses; this simply allows you to connect to the DNS server over an IPv6 network. Also, the SBC can request the AAAA (quad-A) record to get the IPv6 address for a given domain name. This allows you to use domain names, but still operate on an IPv6 network.

NTP Client

The primary and/or secondary NTP servers can be set to IPv6 address.

ASM and SBA

IPv4 and IPv4/IPv6 are supported in the SBC; IPv6 alone is not supported. Although an IPv4 address on the port used by the ASM is required; configuring an IPv6 address is optional. Through the IPv6 options, you can configure IPv6 Address, Default Gateway, and Prefix Length.

Hostname

A hostname can be mapped to an IPv6 address. See Managing the Hosts Table.

Access Control Lists

Access Control Lists provides a way to filter packets based on a set of IPv6 rules you define and apply to an IPv6 Logical Interface. Rules include Source and Destination IPv6 addresses and subnets, IP Protocol, Source port, Destination port and corresponding Action (i.e., Allow/Deny).

IPv6 Call Communications

Call Processing Supported

For IPv6 communications, the following are supported:

- SIP Signaling (one signaling group supports both IPv4 and IPv6). Ingress Signaling Group receives inbound request on both IPv4 and IPv6; egress Signaling Group sends SIP message to next-hop, which can be SIP Server or Outbound proxy.
- SDN (media portion)
- Multiple transport protocols
- Protocol preference at multiple levels (i.e., signaling media)
- SIP Transport (UDP, TCP, TLS)
- SIP Registration
- UDP, TCP, TLS

IPv6 Configuration Guidelines

The SBC Edge runs as a Back to Back User agent, which means one call leg can run the same IP or a different IP version from the other leg. The following are guidelines for configuring IPv6:

IPv6 < > IPv6 Calls

The SBC supports IPv6 Registration, basic calls, call hold, and call transfer. For details on configuring the SIP Signaling Group, see Creating and Modifying SIP Signaling Groups.
IPv6 Federated IP/FQDN | Signaling/Media Source IP - select IPv6 interface only | DSP mode, RTP-Proxy, Direct Media
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**IPv4 <-> IPv6 Interworking Calls**

Call configuration other than IPv4 <-> IPv4 or IPv6 <-> IPv6 will result in IPv4 <-> IPv6 interworking. See below for configuration guidelines.

**Things to Note:**
- If one call leg media's IP version is different than the other call leg, the Media configuration must be DSP mode; Proxy Mode or Direct Media must not be used.
- For each call leg, bi-directional signaling must use the same IP version.
- For each call leg, bi-directional media must use the same IP version.
- For each leg, all media (audio and video) must use the same IP version.

**Configuration Guidelines**

<table>
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<tr>
<th>Ingress Signaling/Media</th>
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<tr>
<td>IPv6</td>
<td>IPv6</td>
<td>DSP-Mode, RTP-proxy, Direct Media</td>
<td>RTP-Proxy, Direct Media</td>
</tr>
<tr>
<td>IPv4</td>
<td>IPv6</td>
<td>DSP-Mode only</td>
<td>Video not allowed</td>
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</table>

**How IPv6 is Monitored**

Two diagnostic tools support IPv6 addressing: **Ping** and **Traceroute**. The IP address type selection determines which IP Protocol an FQDN will be resolved when when performing a ping or traceroute on an FQDN.