Routing and Policy Management

SBC 5000 series and SBC 7000 series routing and policy management involves high performance SIP routing with scalable routing policies for service provider and enterprise networks.

Key Features

- Screening, blocking, routing, presentation, call type filters
- Route prioritization
- Leading digit routing; International routing; URI based routing
- Digit/parameter manipulation
- E911 support; Priority Call handling
- Toll-free routing
- Least cost routing
- Number portability

Policy Server Modes

The SBC 5000 series and SBC 7000 series servers provide the following three routing and policy management options for your network:

1. **Embedded Routing Engine (ERE)** – ERE provides less routing and policy management functionality and is intended for smaller networks with no complex routing needs.

2. **Embedded Policy Server (ePSX)** – The ePSX provides the ability to run a fully functional Sonus Policy Server (PSX) within a virtual machine running on SBC 5000 series and SBC 7000 series hardware.

3. **External Sonus Policy Server (PSX)** – SBC is configurable to interact with one or more (up to nine) centralized external Sonus Policy Server (PSX), the embedded routing engine (ERE) or a combination of external PSXs and ERE.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Basic ERE</th>
<th>Advanced ERE</th>
<th>Standalone ePSX</th>
<th>Replica ePSX (Connected to External Master PSX)</th>
<th>Centralized External PSX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of SBCs Deployed</td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>(Small: 1-3, Large: more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>than 3)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Routing Complexity</td>
<td>Simple</td>
<td>Complex</td>
<td>Complex</td>
<td>Complex</td>
<td>Complex</td>
</tr>
</tbody>
</table>

For performance and capacity comparison of ERE, ePSX and PSX, refer to Routing Engines Comparison.
Deployment Scenarios

SBC ERE

Basic and Advanced ERE

The ERE provides less routing and policy management functionality and is intended for smaller networks with no complex routing needs. Basic ERE is the default routing engine on the SBC 5000 series for performing basic call routing services.

The ERE can be installed by selecting the embedded routing engine (ERE) option while installing the SBC application using the EMA Platform Mode. For more information on installing SBC application (ERE Configuration), refer Installing SBC Application - ERE Configuration.

Figure 1: SBC with ERE

![](image)

The Advanced ERE is a licensed option for customers requiring expanded routing functionality.

Table 1: Basic ERE vs. Advanced ERE

<table>
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<tr>
<th>Features</th>
<th>Basic-ERE</th>
<th>Advanced-ERE</th>
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<tr>
<td>Maximum Number of Routes</td>
<td>2,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Route Prioritization</td>
<td>Route prioritization</td>
<td>Route prioritization with more parameters such as Time of Day and overflow routing.</td>
</tr>
<tr>
<td>Routing Mechanisms</td>
<td>Routing mechanisms such as User Name and Standard Destination Based Routing.</td>
<td>Routing mechanisms such as User Name, Standard Destination Based Routing, Call Type, Digit Type and Time Range.</td>
</tr>
<tr>
<td>Call Screening and Blocking Services</td>
<td>Not applicable</td>
<td>Call screening and call blocking services to enable a carrier to restrict calls based on either origination, destination or both.</td>
</tr>
</tbody>
</table>

ERE With External PSX
You can configure the SBC to use an external PSX for routing and the ERE for fallback routing. When the external PSX is up and running, all routing is handled by the external PSX and ERE routing configurations are ignored.

Thus, in the unlikely event that the external PSX goes down, you can fall back to ERE routing by simply setting the SBC's remote server state to 'disabled' from the EMA UI.

**Figure 2: ERE With External PSX**

To set up an external PSX for routing, perform the following:

   a. Navigate to **Configuration > SystemSetup** tab.
   b. Click the arrow next to **Policy Server** perspective in the navigation panel, and select **Remote Server** option. The "Remote Server" configuration window displays.
   c. Configure the remote policy server settings to use the external PSX.
2. Provision routing for the SBC in the external PSX using the PSX Manager.
3. Provision routing from EMA (see Category - Call Routing for details).
   a. Navigate to **Configuration > System Provisioning** tab.
   b. From the Category drop-down menu, select **Call Routing**.
   c. Choose applicable perspectives to provision routing using ERE.

**Centralized PSX**

The centralized PSX server combines call routing functionality with exceptional capacity of storing tens of millions of call routes in a single database. This SBC-Centralized PSX deployment distributes that routing intelligence to every PSX server in the network and simplifies the provisioning process. For more information on Sonus Policy Server (PSX), refer the Policy Server (PSX) Documentation.

The following figure depicts the SBC deployed with external PSX and EMS.

**Figure 3: SBC with External PSX and EMS**
To configure external PSXs as Active and Standby remote policy servers from the SBC 5000 series or SBC 7000 series server, see Configuring SBC to Use External PSX.

**Standalone ePSX**

The following figure depicts the standalone ePSX which uses EMA for provisioning.

**Figure 4: SBC with Standalone ePSX**

The ePSX provides the ability to run a fully functional PSX within a virtual machine running on SBC 5000 series/SBC 7000 series hardware. One of the advantages of this ability is that it eliminates the need for a physically separate PSX machine in the network. As with the PSX, the ePSX is intended for larger networks with complicated routing.

The core technology of virtualization is the hypervisor. A hypervisor manages virtual machines, allocates resources and provides hardware emulation to the guest systems. A type 1 hypervisor runs directly on the hardware, providing services for all running systems. A type 2 hypervisor runs under a native operating system and provides services to all but the host system. KVM (Kernel-based Virtual Machine) is a type 2 hypervisor for Linux systems and is used to provide SBC virtualization services. The ePSX application executes as a completely independent machine from the host SBC system.

The ePSX shares the host’s network interfaces, but maintains a separate IP address. This is accomplished by linking the physical and virtual interfaces via a Linux bridge device. The bridge is a layer 2 software switch that allows multiple logical interfaces to be combined on the same physical interface. Network processor (NP) enhancements to support multiple virtual interfaces are needed to maintain network performance and security.

The ePSX is delivered as an additional package in SBC software bundle. During SBC installation, either ERE or ePSX can be selected as the routing engine. The ePSX is delivered as an OVF (Open Virtualization Format) package. OVF is an emerging standard for the distribution of virtual machines, and provides mechanisms for defining the resource requirements of the guest and for tailoring applications to their target environment.

To enable ePSX functionality during initial SBC application installation from the EMA, the user first chooses ePSX option instead of ERE. Once the SBC application is installed on both servers, the ePSX OVA package (a tar archive file including the OVF directory) is installed.
The ePSX supports two modes: Replica ePSX and Standalone ePSX. In Replica ePSX mode, the ePSX functions like a PSX slave, where all configuration data is replicated from its designated master. In Standalone ePSX mode, the ePSX behaves similar to a PSX master where all configuration data is provisioned via EMS/EMA. The Standalone ePSX does not replicate data to any external PSX slaves.

- The ePSX is not supported on SBC 5100 due to the hard drive size limitation.

- ePSX is not supported in SBC Software Edition (SBC SWe).

For more information on installing and configuring a Standalone ePSX, see [Installing Standalone ePSX, Call Routing: System Provisioning - ePSX and Configuring SBC to Use External PSX]

For more information on the PSX policy server capabilities, refer to [Sonus Policy Server (PSX) documentation]

**Replica ePSX**

The following figure depicts replica ePSX deployments using an external PSX Master for provisioning and external EMS for FCAPS functionality.

**Figure 5: SBC Deployments Using Replica ePSX**
Hidden SBC Configuration Objects When ePSX is Installed

The following SBC configuration objects are not available (hidden) when the ePSX is installed because the configurations are controlled by PSX.

- Call Parameter Filter Profile
- Carrier (Global object)
- Class of Service
- Codec Entry
- Codec List Profile
- Codec Routing Priority
- Country (Global object)
- Crypto Suite Profile
- DM/PM Criteria (Digit Parameter Handling object)
- DM/PM Rule (Digit Parameter Handling object)
- e911 (Servers object)
- e911VpcDevice (Servers object)
- Element Routing Priority Profile
- Enum Domain (Servers object)
- Enum Service (Servers object)
- Feature Control Profile
- Holiday Profile
- IP Signaling Peer Group
- Ip Signaling Profile
- Media Qos KPI Profile
- Call Routing
- NPA/Nxx (Global object)
- Number Globalization Profile
- Numbering Plan (SIP Trunk Group Policy)
- Number Translation Criteria (Digit Parameter Handling object)
- Packet Service Profile
- Prefix Profile (Digit Parameter Handling object)
- Route (Call Routing object)
- Routing Label (Call Routing object)
- Script (Global object)
- Signaling Profile
- Signaling QoS KPI Profile
- SIP Domain (Global object)
- Subscriber (Global object)
- Time Range Profile

Related Topics

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<td>Installing SBC Application - ePSX Configuration</td>
</tr>
<tr>
<td>Upgrade application</td>
<td>Upgrading SBC Application</td>
<td>Upgrading the ePSX</td>
</tr>
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Sonus PSX Provisioning Guide |
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