

Routing and Policy Management

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SBC 5000 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 platform provides 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 hardware.
3. **External Sonus Policy Server (PSX)** – SBC 5000 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.

Configuration	Basic ERE	Advanced ERE	Standalone ePSX	Replica ePSX (Connected to External Master PSX)	Centralized External PSX
Number of SBCs Deployed (Small: 1-3, Large: more than 3)	Small	Small	Small	Small	Large
Routing Complexity	Simple	Complex	Complex	Complex	Complex

For performance and capacity comparison of ERE, ePSX and PSX, refer to [Routing Engines Comparison](#).

 ePSX is not supported on SBC Software Edition (SBC SWe) platform.

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

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 Platform Manager. For more information on installing SBC application (ERE Configuration), refer to [Installing SBC 5000 Series Application \(ERE Configuration\)](#).

Figure 1: SBC with ERE



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

Table 1: Basic ERE vs. Advanced ERE

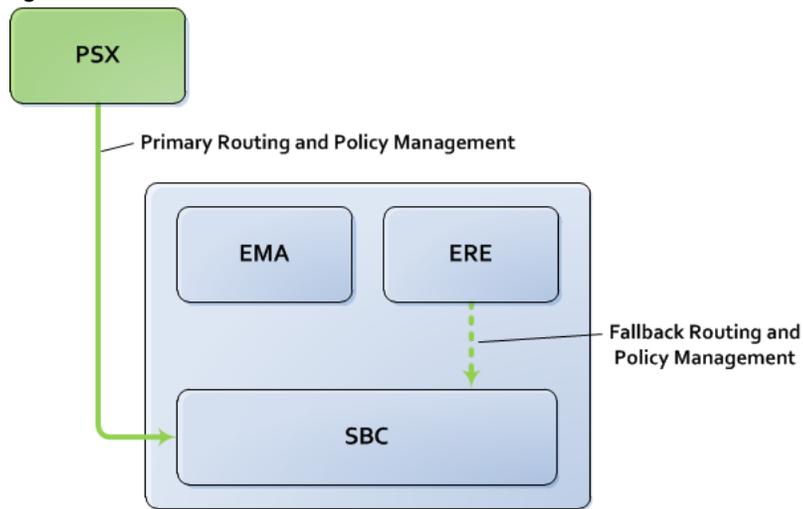
Features	Basic-ERE	Advanced-ERE
Maximum Number of Routes	2,000	2,000
Route Prioritization	Route prioritization	Route prioritization with more parameters such as Time of Day and overflow routing.
Routing Mechanisms	Routing mechanisms such as User Name and Standard Destination Based Routing.	Routing mechanisms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

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:

To setup this scenario, perform the following:

1. From **EMA Navigator > Policy Server**, 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. From **Provision > Routing** in EMA, provision routing using ERE.

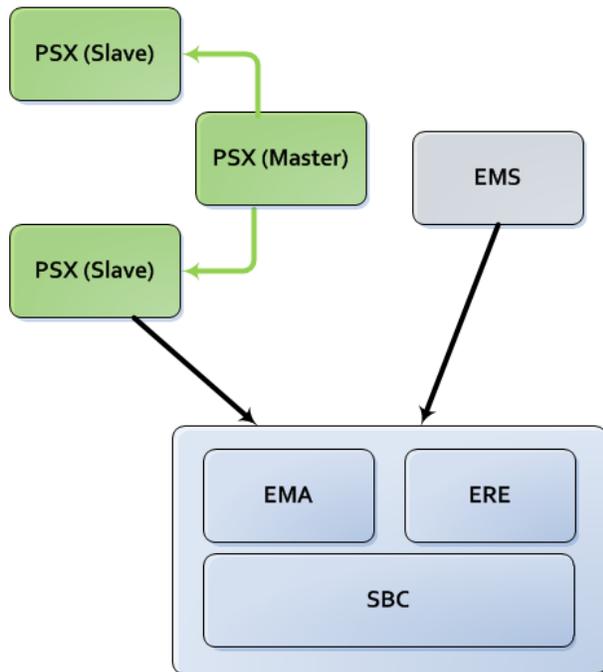
 For more information on the routing and policy management features supported by ERE, refer to [Routing Engines Comparison](#).

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, 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 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 SBX virtualization services. The ePSX application executes as a completely independent machine from the host SBC 5000 series 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 Platform Manager, the user first chooses ePSX option instead of ERE. Once the SBC application is installed on both servers, the ePSX OVF package is installed.

 You must download the ePSX OVF package before starting the installation process.

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.

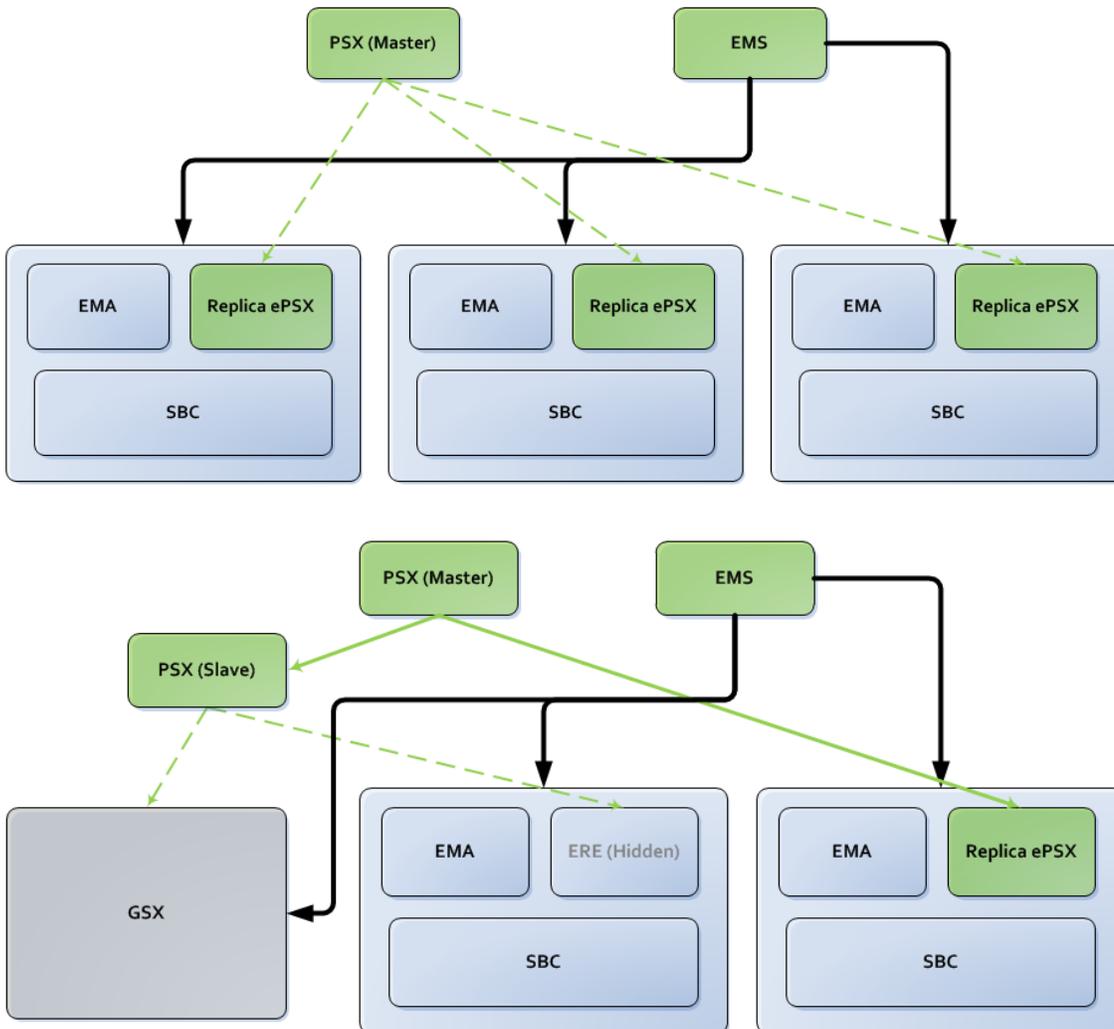
For more information on installing and configuring the ePSX, see [Installing Standalone ePSX](#), [Provisioning ePSX](#) and [Configuring SBC to Use External PSX](#).

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



For more information, see [Installing Replica ePSX](#), [Provisioning ePSX](#), [Configuring SBC to Use External PSX](#). For more information on the PSX policy server capabilities, refer to [Sonus Policy Server \(PSX\) documentation](#).



The sequence to upgrade PSXs when there is a replica ePSX acting as a slave to an external PSX Master is similar to the existing Master-Slave PSX upgrade scenarios. For more information on the LDM or other upgrade scenario sequences, refer the [Sonus Policy Server \(PSX\) documentation](#).

Related Topics

	ERE Reference	ePSX Reference
Install SBC Application	Installing SBC 5000 Series Application (ERE Configuration)	Installing SBC 5000 Series Application (ePSX Configuration)
Upgrade application	Upgrading SBC 5000 Series Application Software	Upgrading the ePSX
Provision routing	Provisioning Routing (via EMA)	<ul style="list-style-type: none"> • Provisioning ePSX (via PSX Manager) • Sonus PSX 9.1 Provisioning Guide
Set up a basic call flow	Basic Call Flow Using ERE	Basic Call Flow Using ePSX
Configure ERE/ePSX	<ul style="list-style-type: none"> • EMA Object Navigator • CLI Configure Mode 	<ul style="list-style-type: none"> • Vm Application (EMA) • VM Application (CLI)