Secure Multimedia Session Control on the AWS Cloud Using Ribbon SBC SWe

Quick Start Reference Deployment

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Ribbon
AWS Quick Start team

Visit our GitHub repository for source files and to post feedback, report bugs, or submit feature ideas for this Quick Start.

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This Quick Start was created by Ribbon in collaboration with Amazon Web Services (AWS).

Quick Starts are automated reference deployments that use AWS CloudFormation templates to deploy key technologies on AWS, following AWS best practices.

**Overview**

This Quick Start reference deployment guide provides step-by-step instructions for deploying the Ribbon Session Border Controller Software Edition (SBC SWe) on the AWS Cloud.

You can use the Ribbon SBC SWe to secure real-time communications, including unified communications, conferencing and collaboration, and contact center services, on AWS. SBC SWe provides robust interworking and normalization for multiple signaling and media protocols, call admission control to manage traffic levels, and multiple security features for both signaling and media, including encryption, to protect privacy and to help ensure regulatory compliance.

**The Ribbon SBC Quick Start**

The Ribbon Quick Start deploys the following elements, illustrated in Figure 1:

- An integrated session border controller as a Session Initiation Protocol (SIP) back-to-back user agent (B2BUA) that is capable of the following, based on licensing options:
- Peering with SIP multimedia endpoints that help protect a core network from malicious attacks and legitimate but high traffic levels.
- Acting as an access SBC to provide security for an access network.
- Interwork between combinations of IPv6 and IPv4 for both media and signaling.
- Signaling/media encryption and audio transcoding.

- A high-availability front-end (HFE) node to assist with improved media restoration times in the event of an SBC instance failure.
- An Asterisk application server acting as a SIP registrar. For more information, see the Asterisk website.
- An Ansible control node to launch playbooks that configure the session border controller through a REST API.

![Figure 1. SBC multimedia session control solution elements](image)

**Cost and licenses**

You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using the Quick Start.

The AWS CloudFormation template for this Quick Start includes configuration parameters that you can customize. Some of these settings, such as instance type, will affect the cost of deployment. For cost estimates, see the pricing pages for each AWS service you will be using. Prices are subject to change.
After you deploy the Quick Start, we recommend that you enable the AWS Cost and Usage Report to track costs associated with the Quick Start. This report delivers billing metrics to an Amazon Simple Storage Service (Amazon S3) bucket in your account. It provides cost estimates based on usage throughout each month and finalizes the data at the end of the month. For more information about the report, see the AWS documentation.

This Quick Start requires a subscription to the Amazon Machine Image (AMI) for SBC SWe, which is available from AWS Marketplace. Additional pricing, terms, and conditions may apply. For instructions, see step 2 in the deployment section.

This Quick Start doesn’t require a license for SBC SWe. However, if you don’t have a license, SBC SWe supports only up to two concurrent calls between registered endpoints. If you are interested in a higher concurrent call count or premium features such as encrypted signaling/media, you will need to purchase a license. Fill out the Ribbon SBC AMI Licensing form to request a license for enhanced services. Follow the instructions in step 7, after you deploy the Quick Start, to apply the license to your deployment.

This Quick Start uses the Asterisk application server as a SIP registrar and also requires a subscription to the AMI for Asterisk from AWS Marketplace. Additional pricing, terms, and conditions may apply. For instructions, see step 3 in the deployment section. There is a free trial period of 15 days, after which you will be billed on an hourly or annual basis.

Architecture

Deploying this Quick Start for a new virtual private cloud (VPC) with default parameters builds the following SBC SWe communications environment in the AWS Cloud.
The Quick Start sets up the following:

- A highly available architecture capable of handling application-level failure within a single Availability Zone.*

- A VPC configured with public and private subnets according to AWS best practices, to provide you with your own virtual network on AWS.*
  
  - The public subnet handles SIP signaling and media from SIP endpoints on the internet. It includes a Linux bastion host that allows inbound Secure Shell (SSH) access to the SBC instances in the management private subnet. It also includes a managed NAT gateway to allow access to the Amazon Elastic Compute Cloud (Amazon EC2) API.*

  - The Quick Start sets up four private subnets:
    - Management subnet for SBC traffic management. This subnet includes an Ansible configuration server to launch playbooks that configure the SBC through a REST API.
- High availability (HA) subnet for mirroring and synchronization of traffic between the two SBC instances.
- Core (trusted media) subnet to handle signaling and media between the SBC and an application server or registrar (Asterisk).
- Access (untrusted media) subnet to handle signaling and media between the SBC and the HFE node.

- A gateway VPC endpoint to allow S3 access from the EC2 instances in a private subnet.*
- Two SBC instances that form an SBC HA pair with four interfaces:
  - Untrusted media interface (pkt0) on the access subnet.
  - Trusted media interface (pkt1) on the core subnet.
  - Management interface (mgt0) on the management subnet.
  - HA interface (ha0) on the HA subnet.
- An HFE node to improve SBC instance failover performance. This node has three interfaces:
  - Private interface on the management subnet (HfeMgt).
  - Private interface on the access subnet (HfePrivate).
  - Public signaling/media interface on the public subnet (HfePublic).
- An Asterisk application server that also acts as a SIP registrar. It has two interfaces:
  - Private interface on the management subnet.
  - Media interface on the core subnet.
- An S3 bucket that contains playbooks and scripts to configure the HFE, SBC, and Asterisk application server.
- VPC endpoints to access the S3 buckets and other services over the AWS private network.

* The template that deploys the Quick Start into an existing VPC skips the components marked by asterisks and prompts you for your existing VPC configuration.
Planning the deployment

Specialized knowledge

This Quick Start assumes familiarity with the Session Initiation Protocol (SIP) and Real-time Transport Protocol (RTP).

This deployment guide also requires a moderate level of familiarity with AWS services. If you’re new to AWS, visit the Getting Started Resource Center and the AWS Training and Certification website for materials and programs that can help you develop the skills to design, deploy, and operate your infrastructure and applications on the AWS Cloud. For more information about the AWS services that are used in this Quick Start, see the Additional resources section.

AWS account

If you don’t already have an AWS account, create one at https://aws.amazon.com by following the on-screen instructions. Part of the sign-up process involves receiving a phone call and entering a PIN using the phone keypad.

Your AWS account is automatically signed up for all AWS services. You are charged only for the services you use.

Deployment options

This Quick Start provides two deployment options:

- **Deploy SBC SWe into a new VPC (end-to-end deployment).** This option builds a new AWS environment consisting of the VPC, subnets, security groups, bastion hosts, and other infrastructure components, and then deploys the SBC SWe components into this new VPC.

- **Deploy SBC SWe into an existing VPC.** This option provisions the SBC SWe components in your existing AWS infrastructure. If you’re using this option, make sure that your VPC meets the prerequisites listed in the Requirements for deploying into an existing VPC section.

The Quick Start provides separate AWS CloudFormation templates for these options. It also lets you configure CIDR blocks, instance types, and endpoint settings, as discussed later in this guide.
Technical requirements

Before you launch the Quick Start, your account must be configured as specified in the following table. Otherwise, deployment might fail.

<table>
<thead>
<tr>
<th>Resources</th>
<th>This deployment uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPCs</td>
<td>1</td>
</tr>
<tr>
<td>Elastic IP addresses</td>
<td>2</td>
</tr>
<tr>
<td>IAM security groups</td>
<td>6</td>
</tr>
<tr>
<td>IAM roles</td>
<td>5</td>
</tr>
<tr>
<td>Instance type for SBC nodes</td>
<td>4</td>
</tr>
<tr>
<td>Instance type for bastion host</td>
<td>2</td>
</tr>
</tbody>
</table>

Key pair

Make sure that at least one Amazon EC2 key pair exists in your AWS account in the region where you are planning to deploy the Quick Start. Make note of the key pair name. You’ll be prompted for this information during deployment. To create a key pair, follow the instructions in the AWS documentation.

If you’re deploying the Quick Start for testing or proof-of-concept purposes, we recommend that you create a new key pair instead of specifying a key pair that’s already being used by a production instance.

IAM permissions

To deploy the Quick Start, you must log in to the AWS Management Console with IAM permissions for the resources and actions the templates will deploy. The AdministratorAccess managed policy within IAM provides sufficient permissions, although your organization may choose to use a custom policy with more restrictions.

S3 buckets

Unique S3 bucket names are automatically generated based on the account number and region. If you delete a stack, the logging buckets are not deleted (to support security review). If you plan to re-deploy this Quick Start in the same region, you must first manually delete the S3 buckets that were created during the previous deployment; otherwise, the re-deployment will fail.
Requirements for deploying into an existing VPC

If you want to deploy the Quick Start into an existing VPC, make sure that your VPC contains the following resources:

- One public subnet with a Linux bastion host to allow secure management access to the SBCs and other instances, and a managed NAT gateway to allow access to the Amazon EC2 API service.
- Four private subnets:
  - Management subnet
  - HA subnet for resiliency
  - Access (untrusted) subnet
  - Core (trusted) subnet
- Gateway VPC endpoint to give the Ansible configuration server access to S3 buckets.

If you do not have an existing VPC that satisfies these requirements, we recommend that you use the new VPC deployment option, so the Quick Start will build this VPC for you in addition to deploying the SBC components within the VPC.

Instance sizes

We recommend the following instance sizes:

<table>
<thead>
<tr>
<th>Instance type</th>
<th>Instances</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC pair</td>
<td>2</td>
<td>c5.2xlarge</td>
</tr>
<tr>
<td>HFE</td>
<td>1</td>
<td>c5.2xlarge</td>
</tr>
<tr>
<td>Asterisk AS</td>
<td>1</td>
<td>c5.2xlarge</td>
</tr>
<tr>
<td>Ansible Control Node</td>
<td>1</td>
<td>t2.micro</td>
</tr>
</tbody>
</table>

Deployment steps

Step 1. Sign in to your AWS account
1. Sign in to your AWS account at https://aws.amazon.com with an IAM user role that has the necessary permissions. For details, see Planning the deployment earlier in this guide.
2. Make sure that your AWS account is configured correctly, as discussed in the Technical requirements section.
Step 2. Subscribe to the SBC AMI

This Quick Start requires a subscription to the AMI for SBC SWe in AWS Marketplace.

To subscribe:

1. Sign in to your AWS account.

2. Open the page for the SBC AMI in AWS Marketplace, and then choose Continue to Subscribe.

3. Review the terms and conditions for software usage, and then choose Accept Terms.
   You will get a confirmation page, and an email confirmation will be sent to the account owner. For detailed subscription instructions, see the AWS Marketplace documentation.

4. When the subscription process is complete, exit out of AWS Marketplace without further action. Do not provision the software from AWS Marketplace—the Quick Start will deploy the AMI for you.

Step 3. Subscribe to the Asterisk AMI

This Quick Start also requires a subscription to the AMI for Asterisk in AWS Marketplace. The AMI is offered with a free trial period of 15 days, after which you will be billed on an hourly or annual basis.

To subscribe:

1. Sign in to your AWS account.

2. Open the page for the Asterisk AMI in AWS Marketplace, and then choose Continue to Subscribe.

3. Review the terms and conditions for software usage, and then choose Accept Terms.
   You will get a confirmation page, and an email confirmation will be sent to the account owner. For detailed subscription instructions, see the AWS Marketplace documentation.

4. When the subscription process is complete, exit out of AWS Marketplace without further action. Do not provision the software from AWS Marketplace—the Quick Start will deploy the AMI for you.
Step 4. Launch the Quick Start

Notes  The instructions in this section reflect the older version of the AWS CloudFormation console. If you’re using the redesigned console, some of the user interface elements might be different.

You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using this Quick Start. For full details, see the pricing pages for each AWS service you will be using in this Quick Start. Prices are subject to change.

1. Sign in to your AWS account, and choose one of the following options to launch the AWS CloudFormation template. For help choosing an option, see deployment options earlier in this guide.

   ![Deploy SBC SWe into a new VPC on AWS](image)
   ![Deploy SBC SWe into an existing VPC on AWS](image)

Important  If you’re deploying SBC SWe into an existing VPC, make sure that your VPC meets the prerequisites listed in the Requirements for deploying into an existing VPC section. This Quick Start doesn’t support shared subnets. You will also need the domain name option configured in the DHCP options as explained in the Amazon VPC documentation. You will be prompted for your VPC settings when you launch the Quick Start.

Each deployment takes about 30 minutes to complete.

2. Check the region that’s displayed in the upper-right corner of the navigation bar, and change it if necessary. This is where the network infrastructure for SBC SWe will be built. The template is launched in the US East (N. Virginia) Region by default.

3. On the Select Template page, keep the default setting for the template URL, and then choose Next.
4. On the **Specify Details** page, change the stack name if needed. Review the parameters for the template. Provide values for the parameters that require input. For all other parameters, review the default settings and customize them as necessary.

In the following tables, parameters are listed by category and described separately for the two deployment options:

- **Parameters for deploying into a new VPC**
- **Parameters for deploying into an existing VPC**

When you finish reviewing and customizing the parameters, choose **Next**.

**OPTION 1: PARAMETERS FOR DEPLOYING RIBBON SBC SWe INTO A NEW VPC**

**View template**

**Network configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPC CIDR (VPCCIDR)</td>
<td>10.74.0.0/16</td>
<td>The CIDR block for the VPC.</td>
</tr>
<tr>
<td>Availability Zone (SBCAvailabilityZone)</td>
<td>Requires input</td>
<td>The Availability Zone to use for the subnets in the VPC. The Quick Start uses a single Availability Zone.</td>
</tr>
<tr>
<td>HFE public subnet 1 CIDR (HFEPublicSubnet1CIDR)</td>
<td>10.74.12.0/24</td>
<td>The CIDR block for the public subnet located in the Availability Zone, for the HFE and first bastion host instance.</td>
</tr>
<tr>
<td>HFE public subnet 2 CIDR (HFEPublicSubnet2CIDR)</td>
<td>10.74.13.0/24</td>
<td>The CIDR block for the public subnet located in the Availability Zone, for the second bastion host instance.</td>
</tr>
<tr>
<td>SBC management subnet CIDR (ManagementSubnetCIDR)</td>
<td>10.74.15.0/24</td>
<td>The CIDR block for the management private subnet.</td>
</tr>
<tr>
<td>SBC HA subnet CIDR (SBCHASubnetCIDR)</td>
<td>10.74.16.0/28</td>
<td>The CIDR block for the HA private subnet.</td>
</tr>
<tr>
<td>SBC access subnet CIDR (SBCAccessVoipCIDR)</td>
<td>10.74.17.0/24</td>
<td>The CIDR block for the access (untrusted media) private subnet.</td>
</tr>
<tr>
<td>SBC core subnet CIDR (SBCCoreVoipCIDR)</td>
<td>10.74.18.0/24</td>
<td>The CIDR block for the core (trusted media) private subnet.</td>
</tr>
</tbody>
</table>
Bastion configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bastion AMI operating system (BastionAMIOS)</td>
<td>Amazon-Linux-HVM</td>
<td>The Linux distribution for the AMI to be used for the bastion host instances. If you choose CentOS, make sure that you have a subscription to the CentOS AMI in AWS Marketplace.</td>
</tr>
<tr>
<td>Bastion instance type (BastionInstanceType)</td>
<td>t2.micro</td>
<td>The EC2 instance type for the bastion host instances.</td>
</tr>
<tr>
<td>Allowed bastion external access CIDR (RemoteAccessCIDR)</td>
<td>Requires input</td>
<td>The CIDR IP range that is allowed SSH external access to the bastion hosts. We recommend that you set this value to a trusted IP range. For example, you might want to grant only your corporate network access to the software.</td>
</tr>
</tbody>
</table>

SBC configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSH key name (KeyPairName)</td>
<td>Requires input</td>
<td>A public/private key pair, which allows you to connect securely to your instance after it launches. This is the key pair you created in your preferred region; see the Technical requirements section.</td>
</tr>
<tr>
<td>SBC instance type (SBCInstanceType)</td>
<td>c5.2xlarge</td>
<td>The EC2 instance type for the SBC and HFE instances.</td>
</tr>
<tr>
<td>Asterisk instance type (AsteriskInstanceType)</td>
<td>c5.2xlarge</td>
<td>The EC2 instance type for the Asterisk application server.</td>
</tr>
<tr>
<td>SBC CLI password (SBCCLIPassword)</td>
<td>Requires input</td>
<td>The password for accessing the SBC management CLI interface.</td>
</tr>
</tbody>
</table>

SBC options:

**Note** The following parameters are optional. We recommend that you keep the default settings to set up a standard environment for SBC SWe.

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC personality type (SBCPersonalityType)</td>
<td>isbc</td>
<td>The SBC personality type. The Quick Start currently supports only isbc (integrated SBC).</td>
</tr>
<tr>
<td>SBC active instance name (SBCActiveInstanceName)</td>
<td>vsbc1</td>
<td>The CE name of the active instance. This is an alphanumeric string that has a maximum length of 63 characters.</td>
</tr>
<tr>
<td>Parameter label (name)</td>
<td>Default</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SBC passive instance name (SBCPassiveInstanceName)</td>
<td>vsbc2</td>
<td>The CE name of the passive instance. This is an alphanumeric string that has a maximum length of 63 characters.</td>
</tr>
<tr>
<td>SBC system name (SBCSystemName)</td>
<td>vsbcSystem</td>
<td>The system name. This is an alphanumeric string that has a maximum length of 26 characters.</td>
</tr>
<tr>
<td>EC2 placement tenancy (Tenancy)</td>
<td>default</td>
<td>The tenancy attribute for the SBC instances: default or dedicated. For more information, see the Amazon EC2 documentation.</td>
</tr>
<tr>
<td>EC2 placement ID (PlacementId)</td>
<td>Optional</td>
<td>The placement group for launching the SBC instances.</td>
</tr>
<tr>
<td>SBC volume type (SBCVolumeType)</td>
<td>i01</td>
<td>The EBS volume type to use for the SBC instances. The two options are General Purpose SSD (gp2) and Provisioned IOPS (io1). For more information, see Amazon EBS Volume Types in the AWS documentation.</td>
</tr>
<tr>
<td>SBC volume IOPS (SBCVolumeIOPS)</td>
<td>600</td>
<td>The IOPS rate for the SBC volumes. The maximum value is 1,950. The IOPS setting applies only if when you set the SBC volume type to io1.</td>
</tr>
<tr>
<td>SBC volume size (SBCVolumeSize)</td>
<td>65</td>
<td>The size of the EBS volumes, in GiB. This value must be between 65 and 1,000.</td>
</tr>
</tbody>
</table>

**AWS Quick Start configuration:**

**Note** We recommend that you keep the default settings for the following two parameters, unless you are customizing the Quick Start templates for your own deployment projects. Changing the settings of these parameters will automatically update code references to point to a new Quick Start location. For additional details, see the AWS Quick Start Contributor’s Guide.

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Start S3 bucket name (QSS3BucketName)</td>
<td>aws-quickstart</td>
<td>The S3 bucket you created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens, but should not start or end with a hyphen.</td>
</tr>
<tr>
<td>Quick Start S3 key prefix (QSS3KeyPrefix)</td>
<td>quickstart-ribbon-sbc/</td>
<td>The S3 key name prefix used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens, and forward slashes.</td>
</tr>
</tbody>
</table>
## Option 2: Parameters for Deploying Ribbon SBC SWe into an Existing VPC

### View template

**Network configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC core subnet CIDR (SBCCoreVoipCIDR)</td>
<td>10.74.20.0/24</td>
<td>The CIDR block for the core (trusted media) private subnet.</td>
</tr>
<tr>
<td>SSH access CIDR (SSHAccessVoipCIDR)</td>
<td>10.74.20.0/24</td>
<td>The CIDR IP range that is allowed SSH external access to the SBC instances.</td>
</tr>
<tr>
<td>VPC ID (VPCID)</td>
<td>Requires input</td>
<td>The ID of your existing VPC (e.g., vpc-0343606e).</td>
</tr>
<tr>
<td>Public subnet ID (PublicSubnetID)</td>
<td>Requires input</td>
<td>The ID of the public subnet in your existing VPC (e.g., subnet-a0246dcd).</td>
</tr>
<tr>
<td>SBC management subnet ID (SBCManagementSubnetID)</td>
<td>Requires input</td>
<td>The ID of the management private subnet in your existing VPC.</td>
</tr>
<tr>
<td>SBC HA subnet ID (SBCHASubnetID)</td>
<td>Requires input</td>
<td>The ID of the HA private subnet in your existing VPC.</td>
</tr>
<tr>
<td>SBC core subnet ID (SBCCoreVoipSubnetID)</td>
<td>Requires input</td>
<td>The ID of the core (trusted media) private subnet in your existing VPC.</td>
</tr>
<tr>
<td>SBC access subnet ID (SBCAccessVoipSubnetID)</td>
<td>Requires input</td>
<td>The ID of the access (untrusted media) private subnet in your existing VPC.</td>
</tr>
<tr>
<td>Bastion security group ID (BastionSecurityGroupID)</td>
<td>Requires input</td>
<td>The ID of the bastion security group in your existing VPC (e.g., sg-7f16e910).</td>
</tr>
</tbody>
</table>

**SBC configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSH key name (KeyPairName)</td>
<td>Requires input</td>
<td>A public/private key pair, which allows you to connect securely to your instance after it launches. This is the key pair you created in your preferred region; see the Technical requirements section.</td>
</tr>
<tr>
<td>SBC instance type (SBCInstanceType)</td>
<td>c5.2xlarge</td>
<td>The EC2 instance type for the SBC and HFE instances.</td>
</tr>
<tr>
<td>Parameter label (name)</td>
<td>Default</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Asterisk instance type (AsteriskInstanceType)</td>
<td>c5.2xlarge</td>
<td>The EC2 instance type for the Asterisk application server.</td>
</tr>
<tr>
<td>SBC CLI password (SBCCLIPassword)</td>
<td>Requires input</td>
<td>The password for accessing the SBC management CLI interface.</td>
</tr>
</tbody>
</table>

**SBC options:**

**Note**  The following parameters are optional. We recommend that you keep the default settings to set up a standard environment for SBC SWe.

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC personality type (SBCPersonalityType)</td>
<td>isbc</td>
<td>The SBC personality type. The Quick Start currently supports only <em>isbc</em> (integrated SBC).</td>
</tr>
<tr>
<td>SBC active instance name (SBCActiveInstanceName)</td>
<td>vsbc1</td>
<td>The CE name of the active instance. This is an alphanumeric string that has a maximum length of 63 characters.</td>
</tr>
<tr>
<td>SBC passive instance name (SBCPassiveInstanceName)</td>
<td>vsbc2</td>
<td>The CE name of the passive instance. This is an alphanumeric string that has a maximum length of 63 characters.</td>
</tr>
<tr>
<td>SBC system name (SBCSystemName)</td>
<td>vsbcSystem</td>
<td>The system name. This is an alphanumeric string that has a maximum length of 26 characters.</td>
</tr>
<tr>
<td>EC2 placement tenancy (Tenancy)</td>
<td>default</td>
<td>The tenancy attribute for the SBC instances: <em>default</em> or <em>dedicated</em>. For more information, see the Amazon EC2 documentation.</td>
</tr>
<tr>
<td>EC2 placement ID (PlacementId)</td>
<td>Optional</td>
<td>The placement group for launching the SBC instances.</td>
</tr>
<tr>
<td>SBC volume type (SBCVolumeType)</td>
<td>i01</td>
<td>The EBS volume type to use for the SBC instances. The two options are General Purpose SSD (gp2) and Provisioned IOPS (io1). For more information, see Amazon EBS Volume Types in the AWS documentation.</td>
</tr>
<tr>
<td>SBC volume IOPS (SBCVolumeIOPS)</td>
<td>600</td>
<td>The IOPS rate for the SBC volumes. The maximum value is 1,950. The IOPS setting applies only if when you set the SBC volume type to io1.</td>
</tr>
<tr>
<td>SBC volume size (SBCVolumeSize)</td>
<td>65</td>
<td>The size of the EBS volumes, in GiB. This value must be between 65 and 1,000.</td>
</tr>
</tbody>
</table>
AWS Quick Start configuration:

Note  We recommend that you keep the default settings for the following two parameters, unless you are customizing the Quick Start templates for your own deployment projects. Changing the settings of these parameters will automatically update code references to point to a new Quick Start location. For additional details, see the AWS Quick Start Contributor’s Guide.

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Start S3 bucket name</td>
<td>aws-quickstart</td>
<td>The S3 bucket you have created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens, but should not start or end with a hyphen.</td>
</tr>
<tr>
<td>QSS3BucketName</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Start S3 key prefix</td>
<td>quickstart-ribbon-</td>
<td>The S3 key name prefix used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens, and forward slashes.</td>
</tr>
<tr>
<td>QSS3KeyPrefix</td>
<td>sbc/</td>
<td></td>
</tr>
</tbody>
</table>

5. On the **Options** page, you can **specify tags** (key-value pairs) for resources in your stack and **set advanced options**. When you’re done, choose **Next**.

6. On the **Review** page, review and confirm the template settings. Under **Capabilities**, select the two check boxes to acknowledge that the template will create IAM resources and that it might require the capability to auto-expand macros.

7. Choose **Create** to deploy the stack.

8. Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the Ribbon SBC SWe environment is ready.

The Quick Start creates an Ansible configuration server (ACS) that will access an S3 bucket to fetch the playbooks and other scripts and variables needed to configure the SBC, HFE, and Asterisk instances. This Quick Start automates all the SIP signaling and media configuration needed to handle SIP registrations and sessions from devices over the internet.
Step 5. Set up the SIP endpoints

The calling and called SIP endpoints illustrated in Figure 1 and referenced in Figures 3 to 5 can be SIP desk phones or softphones. There is a minimal amount of setup required before these SIP endpoints can register with the preconfigured SIP registrar and make SIP calls. You must:

- Provide each endpoint with its authorization credentials.
- Configure the audio codec to be used for the SIP sessions.
- Point each endpoint to its outbound SIP proxy server.

The Quick Start was tested by using the X-Lite and Kapanga softphones.

The following table shows the configuration for these softphones. This will also be available in the Quick Start GitHub repository.

<table>
<thead>
<tr>
<th>Configuration parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calling softphone credentials (username/password)</td>
<td>CALLING/CALLING</td>
</tr>
<tr>
<td>Called softphone credentials (username/password)</td>
<td>CALLED/CALLED</td>
</tr>
<tr>
<td>Audio Codec</td>
<td>G.711 20ms</td>
</tr>
<tr>
<td>Outbound SIP proxy server</td>
<td>&lt;IP of HFE public interface&gt;</td>
</tr>
</tbody>
</table>

The following screen illustrations show the configuration parameters for these softphones. If you’re using a different softphone, the configuration will be similar.
Figure 3: X-Lite softphone configuration
Figure 4: Kapanga softphone SIP configuration

Figure 5: Kapanga softphone proxy configuration
Step 6. Test the deployment

1. Make sure that the access SIP signaling interface facing the SIP endpoints is reachable. On the system where you are running the softphones, ping the access SIP signaling interface (public) IP.

2. Make sure that the core SIP signaling interface facing the Asterisk application server is reachable. On the system that is hosting the Asterisk application server, ping the core SIP signaling interface (private) IP.

For security best practices, the management subnet is private. To access the SBC, HFE, and Asterisk application server management interface, you must use the bastion host.

a. Connect to the bastion host:

```
ssh -i <private-key> ec2-user@<bastion-host-public-IP>
```

b. From the bastion host, access the SBC management CLI interface:

```
ssh admin@<active-SBC-private-management-IP>, Password = <SBC-CLI-password>
```

c. From the bastion host, access the Asterisk application server management CLI interface:

```
ssh -i <private-key> ec2-user@<Asterisk-private-management-IP>
```

3. Try to register each SIP endpoint with the Asterisk application server by using the SBC. A successful registration indicates that the Quick Start was deployed correctly.

From the Asterisk management CLI, use these commands to access the Asterisk CLI and to show peers:

```
asterisk -r
sip show peers
```

If the endpoints have been registered successfully, the command will display output similar to the following:
4. Initiate a test call between two SIP endpoints by using the G.711 codec for both endpoints. This should result in two calls on the SBC, as the signaling for each call flows via the Asterisk application server.

To check call stability and details, use the following commands from the active SBC management CLI.

To display the status of all call counts:

```
show table global callCountStatus
```

To display the ingress and egress characteristics of a call:

```
show table global callDetailStatus
```

To display the ingress and egress characteristics of a media stream:

```
show table global callMediaStatus
```

For more information about these and other CLI commands, see the Ribbon documentation.

**Step 7. (Optional) Obtain and install a BYOL SBC SWe license**

You don’t need a license to use SBC SWe. Without a license, SBC SWe supports up to two concurrent calls between registered endpoints. If you are interested in a higher concurrent call count or premium features such as encrypted signaling/media, follow these steps.

1. From the bastion host, use SSH to connect to the SBC management CLI as an **admin** user:

```
ssh admin@<active-SBC-private-management-IP>, Password = <SBC-CLI-password>
```
2. On the SBC management CLI, use the following CLI command to get the serial number of the SBC instance:

```
show table system serverStatus
```

The output will include a **SERIAL_NUM** attribute (e.g., EC2655E1-AC17-C688-1C3E-72562BB72000).

3. Request an SBC SWe license by filling out the form on the Ribbon website.

4. Copy the license file to the bastion host.

5. From the bastion host, as a *linuxadmin* user, copy the license file to the SBC by using port 2024:

```
scp -i <pem_file> -P 2024 <license_file.xml> linuxadmin@<active-SBC-private-management-IP>:/opt/sonus/external
```

where `<pem_file>` is the PEM file that contains the private key for the *linuxadmin* user and `<license_file.xml>` is the license file from the previous step.

6. From the bastion host, use SSH to connect to the SBC management CLI as an *admin* user:

```
ssh admin@<active-SBC-private-management-IP>, Password = <SBC-CLI-password>
```

7. On the SBC management CLI, run the CLI request command to install the license:

```
request system admin <system_name> license loadLicenseFile bundleName b1 fileName <license_file.xml>
```

**Troubleshooting**

**Q.** I encountered a CREATE_FAILED error when I launched the Quick Start.

**A.** If AWS CloudFormation fails to create the stack, we recommend that you relaunch the template with **Rollback on failure** set to *No*. (This setting is under **Advanced** in the AWS CloudFormation console, **Options** page.) With this setting, the stack’s state will be retained and the instance will be left running, so you can troubleshoot the issue.
**Important** When you set **Rollback on failure** to **No**, you will continue to incur AWS charges for this stack. Please make sure to delete the stack when you finish troubleshooting.

For additional information, see [Troubleshooting AWS CloudFormation](https://aws.amazon.com/documentation/cloudformation/troubleshooting/) on the AWS website.

**Q.** I encountered a size limitation error when I deployed the AWS CloudFormation templates.

**A.** We recommend that you launch the Quick Start templates from the links in this guide or from another S3 bucket. If you deploy the templates from a local copy on your computer or from a non-S3 location, you might encounter template size limitations when you create the stack. For more information about AWS CloudFormation limits, see the [AWS documentation](https://aws.amazon.com/documentation/cloudformation/limits/).

**Send us feedback**

To post feedback, submit feature ideas, or report bugs, use the **Issues** section of the [GitHub repository](https://github.com/aws-samples/amazon-ribbon-sbc-sw) for this Quick Start. If you’d like to submit code, please review the [Quick Start Contributor’s Guide](https://github.com/aws-samples/amazon-ribbon-sbc-sw/blob/master/CONTRIBUTORS.md).

**Additional resources**

**AWS resources**

- [Getting Started Resource Center](https://aws.amazon.com/getting-started/)
- [AWS General Reference](https://docs.aws.amazon.com/)
- [AWS Glossary](https://aws.amazon.com/glossary/)

**AWS services**

- [AWS CloudFormation](https://aws.amazon.com/cloudformation/)
- [Amazon EBS](https://aws.amazon.com/ebs/)
- [Amazon EC2](https://aws.amazon.com/ec2/)
- [IAM](https://aws.amazon.com/iam/)
- [Amazon VPC](https://aws.amazon.com/vpc/)
Ribbon SBC SWe documentation

- SBC Core documentation

Other Quick Start reference deployments

- AWS Quick Start home page

Document revisions

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<tr>
<th>Date</th>
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<th>In sections</th>
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</thead>
<tbody>
<tr>
<td>May 2019</td>
<td>Initial publication</td>
<td></td>
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