Solace PubSub+ Message Broker on the AWS Cloud

Quick Start Reference Deployment

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Solace Corp.
AWS Quick Start Reference Team

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This Quick Start was created by Solace 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 Solace PubSub+ version 8.7 or later on the AWS Cloud.

Note An earlier version of this Quick Start was published under the product name Solace Virtual Message Router (VMR). Solace has renamed their product suite, and VMR is now referred to as Solace PubSub+. See the Solace products page for more information.

Solace PubSub+ is a software message broker that enables event-driven interactions between applications and microservices across hybrid-cloud environments, by using open APIs and protocols.

The PubSub+ platform is available in a range of clouds, containers, and IaaS/PaaS environments. With PubSub+, you can meet all your data movement needs—including publish/subscribe, queueing, request/reply, and streaming—with one platform that spans cloud and on-premises environments. You can choose from a number of open APIs and protocols, including Advanced Message Queuing Protocol (AMQP) and Apache Qpid, Java Message Service (JMS), Message Queuing Telemetry Transport (MQTT) and Eclipse Paho, Representational State Transfer (REST), and WebSocket.

PubSub+ provides enterprise-grade messaging capabilities that address a large number of use cases, with high availability (HA) and disaster recovery built in.

PubSub+ Standard is a free enterprise-grade alternative to open source that supports publish/subscribe, queueing, request/reply, and streaming, with integrated high availability and disaster recovery. PubSub+ Enterprise unlocks additional performance and includes support. You can use this Quick Start to deploy either edition.

For more information about PubSub+ software, see the Solace website.
Solace PubSub+ on AWS
This Quick Start installs message brokers in high-availability (HA) redundancy groups for fault tolerance. HA redundancy provides 1:1 message broker node sparing plus quorum to increase overall service availability. If one of the message broker nodes fails, or is taken out of service, the other message broker node automatically takes over and provides service to the clients of the out-of-service message broker. To increase availability, the message brokers are deployed across three Availability Zones.

If you’re not familiar with message broker redundancy and high availability, see Software Message Broker Redundancy and Fault Tolerance in the Solace documentation.

Costs 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.

Tip 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 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.

You can use this Quick Start to deploy PubSub+ Standard or PubSub+ Enterprise. By using the Solace PubSub+ message broker, you agree to terms and conditions outlined in the License Agreement for Solace Software on the Solace website.

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

- A single virtual private cloud (VPC) that spans three Availability Zones, with one public subnet and one private subnet in each Availability Zone. If you deploy the Quick Start in an AWS Region that has only two Availability Zones or you choose to use only two Availability Zones, the backup and monitoring instances of the message broker will be placed in the same Availability Zone.*

**Note**  We recommend using three Availability Zones, where available, for production systems.

For test or proof-of-concept (PoC) environments, you can choose to omit the private subnets.

- An internet gateway to provide internet access to each subnet. This gateway is used by bastion hosts to send and receive traffic.*
- Load balancer support with health checks (using Classic Load Balancers).*
- Managed NAT gateways in each public subnet to allow outbound internet access for the message broker instances.*
• Linux bastion hosts in an Auto Scaling group in each public subnet to allow inbound Secure Shell (SSH) access to the message broker instances.*

• A single message broker instance that is assigned an HA role in each private subnet. For auto-recovery, these instances are set up with Amazon CloudWatch alarms. Docker is installed on each message broker instance, and the message broker image is installed and executed within a Docker container.

• CloudWatch logging support, including the log file /tmp/install-solace.log, which logs the events during installation

• Your choice of creating a new VPC or deploying a message broker into your existing VPC.

* The template that deploys the Quick Start into an existing VPC skips this task.

Prerequisites

Specialized Knowledge

Before you deploy this Quick Start, we recommend that you become familiar with the following AWS services. (If you are new to AWS, see Getting Started with AWS.)

• Amazon Virtual Private Cloud (Amazon VPC) and subnets
• Amazon Elastic Compute Cloud (Amazon EC2)
• Amazon Elastic Block Store (Amazon EBS)

Deployment Options

This Quick Start provides two deployment options:

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

• **Deploy message brokers into an existing VPC.** This option provisions message brokers in your existing AWS infrastructure.

The Quick Start also lets you configure additional settings such as CIDR blocks, instance types, and message broker settings, as discussed later in this guide.
Deployment Steps

Step 1. Prepare Your AWS Account

1. If you don’t already have an AWS account, create one at https://aws.amazon.com by following the on-screen instructions.

2. Use the region selector in the navigation bar to choose the AWS Region where you want to deploy your message brokers on AWS.

3. Create a key pair in your preferred region.

4. If necessary, request a service limit increase for the Amazon EC2 m4.large instance type. You might need to do this if you already have an existing deployment that uses this instance type, and you think you might exceed the default limit with this reference deployment.

The Quick Start deploys the following AWS resources. Please consult the Amazon VPC Limits page and ensure that your AWS Region is within the limit range per resource before you launch the Quick Start.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Used in this deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPCs</td>
<td>1</td>
</tr>
<tr>
<td>Subnets</td>
<td>6</td>
</tr>
<tr>
<td>Elastic IPs</td>
<td>5</td>
</tr>
<tr>
<td>Internet gateways</td>
<td>1</td>
</tr>
<tr>
<td>NAT gateways</td>
<td>3</td>
</tr>
<tr>
<td>Running instances</td>
<td>5</td>
</tr>
<tr>
<td>Route tables</td>
<td>5</td>
</tr>
<tr>
<td>Network ACLs</td>
<td>1</td>
</tr>
<tr>
<td>VPC endpoints</td>
<td>1</td>
</tr>
<tr>
<td>Security groups</td>
<td>6</td>
</tr>
</tbody>
</table>

Step 2. Obtain a Reference to the Solace PubSub+ Docker Image

1. Decide which Solace PubSub+ message broker and version is suitable to your use case.

2. Make a note of the Docker image reference. You will specify this information in step 3, in the Solace Docker image reference parameter. The Docker image reference can be one of the following:
- The repository name of a public or accessible private Docker registry with an optional tag. This is the recommended option if you’re using PubSub+ Standard. By default, the Quick Start uses the latest message broker image available from Docker Hub (specified as solace/solace-pubsub-standard:latest), or you can use a specific version tag.

- A Docker image download URL. To obtain this URL:
  - If you purchased a Docker image of Solace PubSub+ Enterprise, Solace will give you instructions for downloading the compressed tar archive package from a secure Solace server. Contact Solace Support at support@solace.com if you require assistance. You can then host this tar archive with its MD5 on a file server or in an Amazon S3 bucket and use the download URL as the image reference.

### Step 3. Launch the Quick Start

**Note** 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. Choose one of the following options to launch the AWS CloudFormation template into your AWS account. For help choosing an option, see deployment options earlier in this guide.

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deploy message brokers into a new VPC on AWS</td>
<td>Deploy message brokers into an existing VPC on AWS</td>
</tr>
<tr>
<td><img src="#" alt="Launch" /></td>
<td><img src="#" alt="Launch" /></td>
</tr>
</tbody>
</table>
**Important**  If you’re deploying message brokers into an existing VPC, make sure that your VPC has two or three public subnets in different Availability Zones for the Solace message broker instances. You’ll also need the domain name option configured in the DHCP options as explained in the Amazon VPC documentation. You’ll be prompted for your VPC settings when you launch the Quick Start.

The private subnets require NAT gateways or NAT instances in their route tables for outbound Internet connectivity, and you must create bastion hosts and their associated security group for inbound SSH access. (To set up your VPC, you can use the Amazon VPC Quick Start. To set up bastion hosts, see the Linux bastion host Quick Start. If you deploy into a new VPC, the Quick Start will set these up for you automatically.)

Each deployment takes about 20 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 the message brokers will be built. The template is launched in the US East (Ohio) 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 template parameters that require input and provide values. For all other parameters, review the default settings and customize them as necessary. When you finish reviewing and customizing the parameters, choose **Next**.

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

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

**Option 1: Parameters for deploying message brokers into a new VPC**

**View template**

**Solace Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solace Docker image reference (SolaceDockerImage)</td>
<td>solace/solace-pubsub-standard:latest</td>
<td>A reference to the Solace PubSub+ message broker Docker image, from step 2. Specify either the image name with an optional tag in an accessible Docker registry, or a download URL. You can obtain the download URL from</td>
</tr>
</tbody>
</table>
## Amazon Web Services – Solace PubSub+ Message Broker on the AWS Cloud

### Parameter Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Password to access Solace admin console and SEMP</strong> (AdminPassword)</td>
<td>Requires input</td>
<td>The password to access the Solace PubSub+ Manager or CLI admin console and the Solace Element Management Protocol (SEMP) API for managing message brokers.</td>
</tr>
<tr>
<td><strong>Container logging format</strong> (ContainerLoggingFormat)</td>
<td>graylog</td>
<td>The format of the logs sent by the message broker to Amazon CloudWatch. (See the Solace product documentation for details.)</td>
</tr>
</tbody>
</table>

### Network Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Availability Zones</strong> (NumberOfAZs)</td>
<td>3</td>
<td>The number of Availability Zones (2 or 3) you want to use in your deployment. This count must match the number of selections in the Availability Zones parameter; otherwise, your deployment will fail with an AWS CloudFormation template validation error. (Note that some regions provide only one or two Availability Zones.)</td>
</tr>
<tr>
<td><strong>Availability Zones</strong> (AvailabilityZones)</td>
<td>Requires input</td>
<td>The list of Availability Zones to use for the subnets in the VPC. This field displays the available zones within your selected region. You can choose two or three Availability Zones from this list. The logical order of your selections is preserved in your deployment. After you make your selections, make sure that the value of the Number of Availability Zones parameter matches the number of selections.</td>
</tr>
<tr>
<td><strong>Create production ready environment</strong> (CreatePrivateSubnets)</td>
<td>true</td>
<td>Whether to create and use private subnets and accompanying public ELB with health checks, which is recommended for production deployment. In this case SSH access to the Solace message broker nodes is possible only through the bastion hosts.</td>
</tr>
<tr>
<td><strong>Permitted IP range for console SSH Access</strong> (SSHAccessCIDR)</td>
<td>Requires input</td>
<td>The CIDR IP range that is permitted to access the Solace message broker nodes via SSH for management purposes. We recommend that you set this value to a trusted IP range.</td>
</tr>
<tr>
<td><strong>Allowed External Access CIDR</strong> (RemoteAccessCIDR)</td>
<td>Requires input</td>
<td>The CIDR IP range that is permitted to access the Solace message broker nodes. 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>

### Common Amazon EC2 Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Pair Name</strong> (KeyPairName)</td>
<td>Requires input</td>
<td>An existing public/private key pair within the AWS Region, which allows you to connect securely to your instances after</td>
</tr>
</tbody>
</table>
### Parameter label (name)  | Default  | Description
---|---|---
**Launch Key Pair**  |   | launch. When you created an AWS account, this is the key pair you created in your preferred region.

### Boot Disk Capacity (BootDiskSize)

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boot Disk Capacity</strong></td>
<td>24</td>
<td>Amazon EBS storage allocated for the boot disk, in GiBs. The Quick Start supports 8-128 GiB.</td>
</tr>
</tbody>
</table>

**Message Broker Instance Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance Type</strong></td>
<td>m4.large</td>
<td>The EC2 instance type for the Solace message broker primary and backup instances in Availability Zones 1 and 2.</td>
</tr>
<tr>
<td><strong>Persistent Storage</strong></td>
<td>0</td>
<td>Amazon EBS storage allocated for each block device, in GiBs. The Quick Start supports up to 640 GiB per device. The default value of 0 (zero) indicates ephemeral storage only. A non-zero value will cause a new Provisioned IOPS SSD (io1) disk to be created for message-spool. This disk will not be deleted on stack termination.</td>
</tr>
</tbody>
</table>

**Monitor Instance Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance Type</strong></td>
<td>t2.micro</td>
<td>The EC2 instance type for the message broker monitor instance in Availability Zone 3 (or Availability Zone 2, if you’re using only two zones).</td>
</tr>
</tbody>
</table>

**AWS Quick Start Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quick Start S3 Bucket Name</strong> (QSS3BucketName)</td>
<td>aws-quickstart</td>
<td>S3 bucket where the Quick Start templates and scripts are installed. Use this parameter to specify the S3 bucket name you’ve 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><strong>Quick Start S3 Key Prefix</strong> (QSS3KeyPrefix)</td>
<td>quickstart-solace-pubsub/</td>
<td>The <strong>S3 key name prefix</strong> 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 message brokers into an existing VPC**

**View template**

---

**Solace Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solace Docker image reference</strong></td>
<td>solace/solace-pubsub-standard:latest</td>
<td>A reference to the Solace PubSub+ message broker Docker image, from step 2. Specify either the image name with an optional tag in an accessible Docker registry, or a download URL. You can obtain the download URL from <a href="http://dev.solace.com/downloads/">http://dev.solace.com/downloads/</a> or you can specify the URL to a remotely hosted image version; for example, on Amazon S3.</td>
</tr>
<tr>
<td><strong>Password to access Solace admin console and SEMP</strong></td>
<td>Requires input</td>
<td>The password to access the Solace PubSub+ Manager or CLI admin console and the Solace Element Management Protocol (SEMP) API for managing message brokers.</td>
</tr>
<tr>
<td><strong>Container logging format</strong></td>
<td>graylog</td>
<td>The format of the logs sent by the Solace message broker to Amazon CloudWatch. (See the Solace product documentation for details.)</td>
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**Network Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VPC ID</strong></td>
<td>Requires input</td>
<td>ID of your existing VPC (e.g., vpc-0343606e). This VPC must exist with the proper configuration for Solace cluster access.</td>
</tr>
<tr>
<td><strong>Number of Availability Zones to use</strong></td>
<td>3</td>
<td>The number of Availability Zones (2 or 3) you want to use in your deployment. This count must match the number of Availability Zones in your existing VPC; otherwise, your deployment will fail with an AWS CloudFormation template validation error. (Note that some regions provide only one or two Availability Zones.)</td>
</tr>
<tr>
<td><strong>Use private subnets</strong></td>
<td>true</td>
<td>Keep the default setting to create and use private subnets and accompanying public ELB with health checks, which is recommended for production deployment. In this case, SSH access to the Solace message broker nodes is possible only through the bastion hosts.</td>
</tr>
<tr>
<td><strong>Public Subnet IDs</strong></td>
<td>Requires input</td>
<td>Comma-separated list of the public subnet IDs in your existing VPC (e.g., subnet-4b8d329f,subnet-bd73af08,subnet-a01106c2).</td>
</tr>
<tr>
<td><strong>Private Subnet IDs</strong></td>
<td>Requires input</td>
<td>Comma-separated list of the private subnet IDs in your existing VPC (e.g., subnet-4b8d329f,subnet-bd73af08,subnet-a01106c2).</td>
</tr>
</tbody>
</table>

Note: This parameter is ignored if you set the **Use private subnets** parameter to **false**.
### Security group allowed to access console SSH (SSHSecurityGroupID)

*Parameter label (name)*: Security group allowed to access console SSH (SSHSecurityGroupID)  
*Default*: Requires input 
*Description*: The ID of the security group in your existing VPC that’s allowed to access the console via SSH (e.g., sg-7f16e910).  
*Note*: This parameter is ignored if you set the `Use private subnets` parameter to `false`.

### Allowed External Access CIDR (RemoteAccessCIDR)

*Parameter label (name)*: Allowed External Access CIDR (RemoteAccessCIDR)  
*Default*: Requires input 
*Description*: The CIDR IP range that is permitted to access the message broker nodes. 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.

### Common Amazon EC2 Configuration:

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</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Pair Name</strong> (KeyPairName)</td>
<td>Requires input</td>
<td>An existing public/private key pair within the AWS Region, which allows you to connect securely to your instances after launch. When you created an AWS account, this is the key pair you created in your preferred region.</td>
</tr>
<tr>
<td><strong>Boot Disk Capacity</strong> (BootDiskSize)</td>
<td>24</td>
<td>Amazon EBS storage allocated for the boot disk, in GiBs. The Quick Start supports 8-128 GiB.</td>
</tr>
</tbody>
</table>

### Message Broker Instance Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance Type</strong> (MessageBrokerNode InstanceType)</td>
<td>m4.large</td>
<td>The EC2 instance type for the message broker primary and backup instances in Availability Zones 1 and 2.</td>
</tr>
<tr>
<td><strong>Persistent Storage</strong> (MessageBrokerNode Storage)</td>
<td>0</td>
<td>Amazon EBS storage allocated for each block device, in GiBs. The Quick Start supports up to 640 GiB per device. The default value of 0 (zero) indicates ephemeral storage only. A non-zero value will cause a new Provisioned IOPS SSD (io1) disk to be created for message-spool. This disk will not be deleted on stack termination.</td>
</tr>
</tbody>
</table>

### Monitor Instance Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance Type</strong> (MonitorNode InstanceType)</td>
<td>t2.micro</td>
<td>The EC2 instance type for the message broker monitor instance in Availability Zone 3 (or Availability Zone 2, if you’re using only two zones).</td>
</tr>
</tbody>
</table>
**AWS Quick Start Configuration:**

<table>
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<th>Parameter label (name)</th>
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<td>Quick Start S3 Bucket Name (QSS3BucketName)</td>
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<td>S3 bucket where the Quick Start templates and scripts are installed. Use this parameter to specify the S3 bucket name you’ve 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-solace-pubsub/</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>

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 check box to acknowledge that the template will create IAM resources.

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

8. Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the message broker cluster is ready.

The Quick Start will create the nested VPC, bastion host, and stacks by using the respective templates. The Solace stack creates additional sub-stacks for the deployment of the primary, backup, and monitor Solace message broker nodes. You’ll see all these listed in the AWS CloudFormation console, as illustrated in Figure 2. Follow the links in the **Resources** tab to get detailed information about the underlying resources.
For external access to the deployment (explained in step 4), the resources of interest are:

- The load balancer (ELB)
- The EC2 instances for the primary, backup, and monitor message brokers

For messaging and management access to the active message broker, you will need to note the information about the ELB’s DNS host name, which you can obtain in one of two ways:

- In the AWS CloudFormation console at https://console.aws.amazon.com/cloudformation/, choose the Solace stack for the message broker, choose the Resources tab, and then choose ELB.
- Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/. In the Load Balancing section, choose Load Balancers, as shown in Figure 3.
Figure 3: ELB details

For direct SSH access to the individual message brokers, you will need the public DNS host names (Elastic IP addresses) of the EC2 instances for the bastion hosts and the private DNS host names of the primary, backup, and the monitor message brokers. You can obtain these from the Amazon EC2 console. From the EC2 dashboard, choose **Instances**, as shown in Figure 4.

Figure 4: EC2 instance details
Step 4. Test the Deployment

To check whether the message broker cluster has been set up successfully, you can view its status via the Solace CLI.

You can access the CLI through an SSH connection to the individual message brokers. To access a message broker EC2 instance through SSH, you must first connect to a bastion host instance and then SSH to the message broker instance from the bastion host:

1. The EC2 key pair used during deployment (which you identified with the Key Pair Name parameter in step 3) will be used to access both the bastion host and the message broker EC2 instance, so copy the key to the bastion host, and then log in. The tools require the key not to be publicly viewable.

   chmod 400 <key.pem>
   scp -i <key.pem> <key.pem> ec2-user@<bastion-public-ip>:~/home/ec2-user
   ssh -i <key.pem> ec2-user@<bastion-public-ip>

   At this point you are logged in at the bastion host, with <key.pem> locally available.

2. Use the following SSH command to access the message broker EC2 instance from the bastion host and then to run the cli command:

   ssh -i <key.pem> ec2-user@<message-broker-internal-IP>
   sudo docker exec -it solace /usr/sw/loads/currentload/bin/cli -A

   This will open the CLI session to the target message broker, as shown in Figure 5.
You can use the CLI to monitor client connections and message statistics, or you can use the management tools described in the Solace documentation.

The non-CLI management tools can access the message broker cluster through the ELB’s public DNS host name at port 8080. Use the user admin and the password you set for the Password to access Solace admin console and SEMP (AdminPassword) parameter in step 3.

**Note** Solace PubSub+ Manager is the simplest way to manage the cluster of message brokers. For more information, see the documentation pages on the Solace website.

Now that you’ve verified that the HA cluster is up, you can test it. For messaging, you can access the message broker cluster through the ELB’s public DNS host name and the API or protocol-specific port. If you are unfamiliar with Solace messaging or messaging options, use the tutorials on the Solace website.

```bash
[ec2-user@ip-10-0-26-100 ~]$ sudo docker exec -it solace /usr/sw/loads/currentload/bin/cli -A
```

**Virtual Message Router (Message Routing Node)**

The Virtual Message Router is proprietary software of Solace Corporation. By accessing the Virtual Message Router you are agreeing to the license terms and conditions located at http://www.solace.com/license-software.

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(89 days remaining)

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http://dev.solace.com/contact-us/

```
10.0.26.100> show redundancy group

<table>
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<tr>
<th>Node Router-Name</th>
<th>Node Type</th>
<th>Address</th>
<th>Status</th>
</tr>
</thead>
<tbody>
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<td>backup</td>
<td>Message-Router</td>
<td>10.0.26.177</td>
<td>Online</td>
</tr>
<tr>
<td>monitor</td>
<td>Monitor</td>
<td>10.0.26.11</td>
<td>Online</td>
</tr>
<tr>
<td>primary*</td>
<td>Message-Router</td>
<td>10.0.26.109</td>
<td>Online</td>
</tr>
</tbody>
</table>

* - indicates the current node
```

**Figure 5: Viewing instances in the Solace CLI**
Figure 6: Solace tutorials

From the tutorials page, select your favorite language and protocol for sending and receiving messages. If you have programming skills but are new to messaging, select Java from the set of Solace messaging APIs. If you just want to send and receive messages without coding or APIs, choose REST to access the REST tutorial.

Message Broker Logs

Both host and container logs get logged to Amazon CloudWatch in the AWS Region where you deployed the Quick Start. In the CloudWatch console at https://console.aws.amazon.com/cloudwatch/, you will find the message broker logs under the */solace.log log stream. You can use the ContainerLoggingFormat field to control the log output format.
FAQ

**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. (You’ll want to look at the log files in %ProgramFiles%\Amazon\EC2ConfigService and C:\cfn\log.)

**Important** When you set **Rollback on failure** to **No**, you’ll continue to incur AWS charges for this stack. Please make sure to delete the stack when you’ve finished troubleshooting.

For additional information, see [Troubleshooting AWS CloudFormation](https://aws.amazon.com/support/kb/article/solutions/1683684) 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 location we’ve provided 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.

Q. How exactly does the message broker HA cluster work?

A. For more information about message broker HA clusters, see the Solace documentation.

Q. What are my options to manage or monitor the message broker HA cluster?

A. Solace provides several management tools for managing and monitoring the message brokers; see the Solace documentation. See step 4 for information about accessing the message broker instances by using the Solace CLI.

Q. How do I test message broker failures?

A. For testing tips, see Maintaining Message Broker Redundancy in the Solace documentation. You can test by either reloading nodes or releasing activity on the active node.

Additional Resources

AWS services

- Amazon EC2
- AWS CloudFormation
  https://aws.amazon.com/documentation/cloudformation/
- Amazon VPC
  https://aws.amazon.com/documentation/vpc/

Solace PubSub+ software message broker

- General documentation
  http://docs.solace.com/
- Message broker redundancy and fault tolerance

- Getting started with Solace and open-source APIs
  [http://dev.solace.com/get-started/send-receive-messages](http://dev.solace.com/get-started/send-receive-messages)

**Quick Start reference deployments**

- AWS Quick Start home page
  [https://aws.amazon.com/quickstart/](https://aws.amazon.com/quickstart/)

**GitHub Repository**

You can visit our [GitHub repository](https://github.com) to download the templates and scripts for this Quick Start, to post your comments, and to share your customizations with others.

### Document Revisions

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<tr>
<th>Date</th>
<th>Change</th>
<th>In sections</th>
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<tr>
<td><strong>July 2018</strong></td>
<td>Solace rebranding updates and added option to use a Docker registry repository for the Solace Docker image</td>
<td>Changes in templates and throughout guide</td>
</tr>
<tr>
<td><strong>May 2018</strong></td>
<td>Updated with new features enabled by SolOS 8.7</td>
<td>Changes in templates and throughout guide</td>
</tr>
<tr>
<td><strong>September 2017</strong></td>
<td>Initial publication</td>
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