

Red Hat OpenShift on the AWS Cloud

Quick Start Reference Deployment

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Amazon Web Services (AWS)

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Overview

This Quick Start reference deployment guide provides step-by-step instructions for deploying Red Hat OpenShift on the Amazon Web Services (AWS) cloud. [Quick Starts](#) are automated reference deployments that use AWS CloudFormation templates to launch, configure, and run the AWS compute, network, storage, and other services required to deploy a specific workload on AWS.

Red Hat OpenShift is a platform as a service (PaaS) solution that gives application development and IT operations teams the ability to accelerate application delivery with speed and consistency.

Red Hat OpenShift is based on Docker-formatted Linux containers, Google Kubernetes orchestration, and Red Hat Enterprise Linux (RHEL) 7, and provides full support from the operating system to application runtimes.

Red Hat OpenShift provides the following features:

- Support for standardized containers through the Red Hat APIs for Docker
- Container orchestration, scheduling, and management at scale with Kubernetes
- Integration with container-optimized RHEL 7 operating system
- Extensive selection of programming languages, frameworks, and services
- Rich set of tools and interfaces, including a web console and collaboration features, for development and operations
- Distributed application platform with container networking, streamlined deployment and administration

For more information about Red Hat OpenShift, see the [OpenShift documentation](#).

Architecture

Deploying this Quick Start with the **default parameters** deploys Red Hat OpenShift into the AWS cloud environment illustrated in Figure 1.

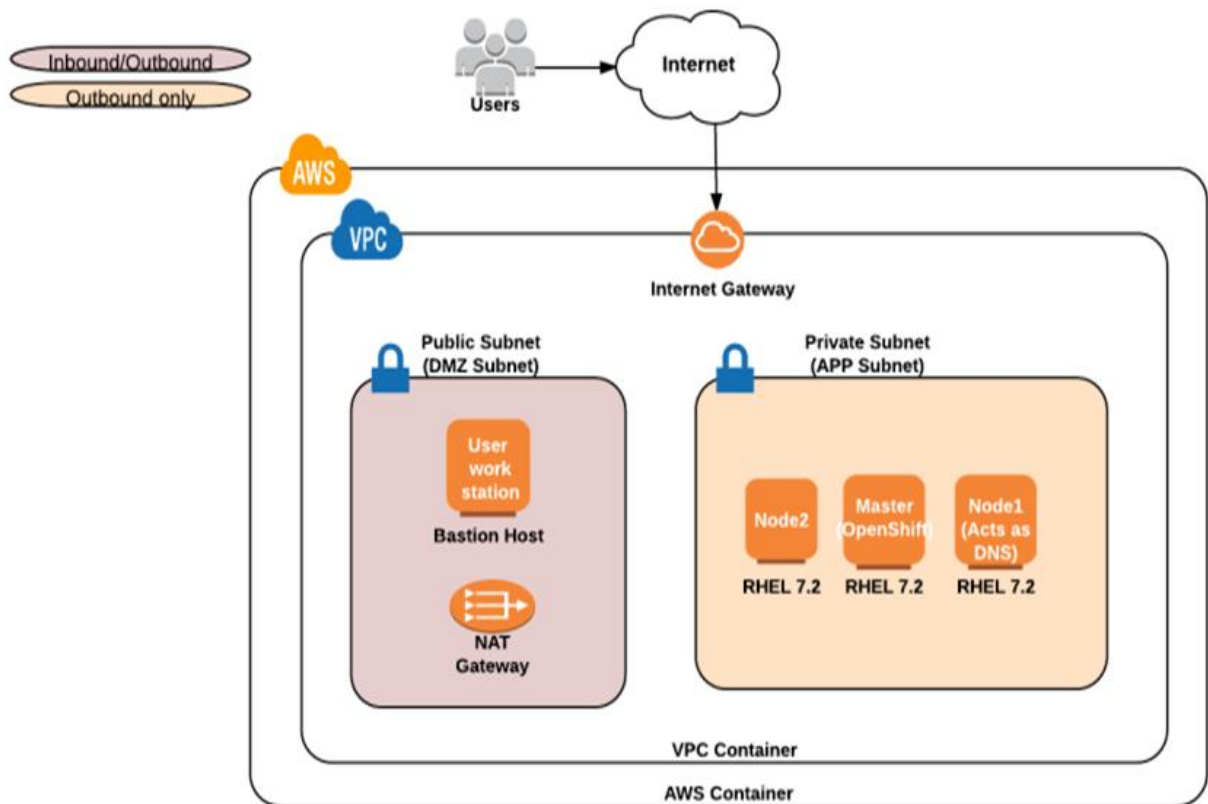


Figure 1: Red Hat OpenShift architecture on AWS

This Quick Start uses AWS CloudFormation to build out AWS infrastructure components, and then bootstraps Red Hat OpenShift on RHEL 7. The template builds an Amazon VPC with two subnets (private and public) and a NAT gateway to enable instances in the private subnet to connect to the Internet. A virtual network computing (VNC) enabled bastion host is provided for additional security.

The Quick Start architecture includes the following Red Hat OpenShift components:

- **Master:** The host or hosts that contain Red Hat OpenShift control components, including the API server and the controller manager server. The master manages nodes in its Kubernetes cluster and schedules pods to run on nodes.
- **Node1 and Node2:** Nodes provide the runtime environments for containers. Each node in a Kubernetes cluster has the required services to be managed by the master. Nodes also have the required services to run pods, including Docker, a kubelet and a service proxy. In the Quick Start architecture, Node1 also acts as the DNS server.

- **Workstation (bastion host):** This is a special-purpose computer on a network specifically designed and configured to withstand attacks. The computer generally hosts a single application (for example, a proxy server), and all other services are removed or limited to reduce the threat to the computer. The workstation is hardened in this manner primarily due to its location and purpose, which is either on the outside of a firewall or in a demilitarized zone (DMZ), and usually involves access from untrusted networks or computers.

Prerequisites

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 \(Amazon VPC\)](#)
- [Amazon Elastic Compute Cloud \(Amazon EC2\)](#)

The Quick Start also assumes familiarity with PaaS concepts and Red Hat OpenShift. For more information, see the [Red Hat OpenShift documentation](#).

Deployment Steps

Step 1. Subscribe to Red Hat OpenShift

1. Log in to the Red Hat customer portal at <https://idp.redhat.com/idp/>.

If you don't have an account, choose **Register** to create one, and fill out the form.

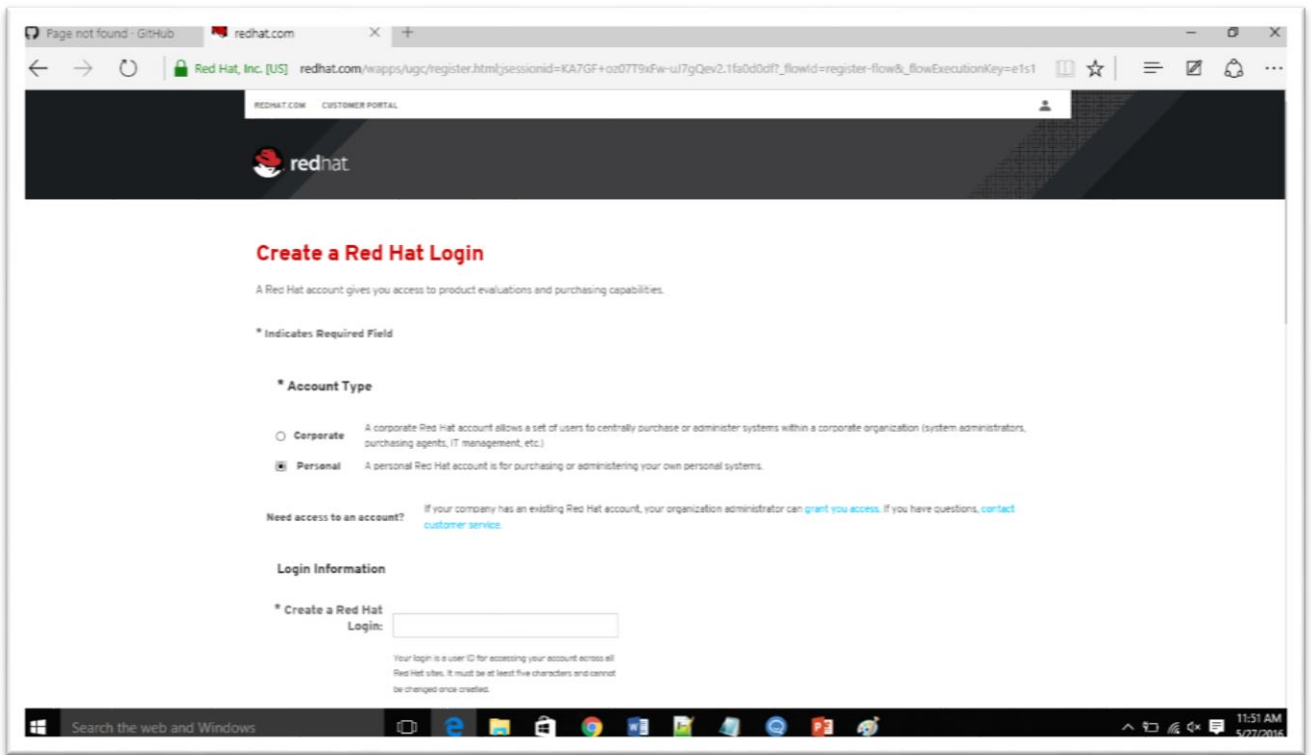


Figure 2: Creating a new Red Hat account

2. Open the [Red Hat OpenShift](#) webpage, and choose **Continue** to start your 30-day evaluation.

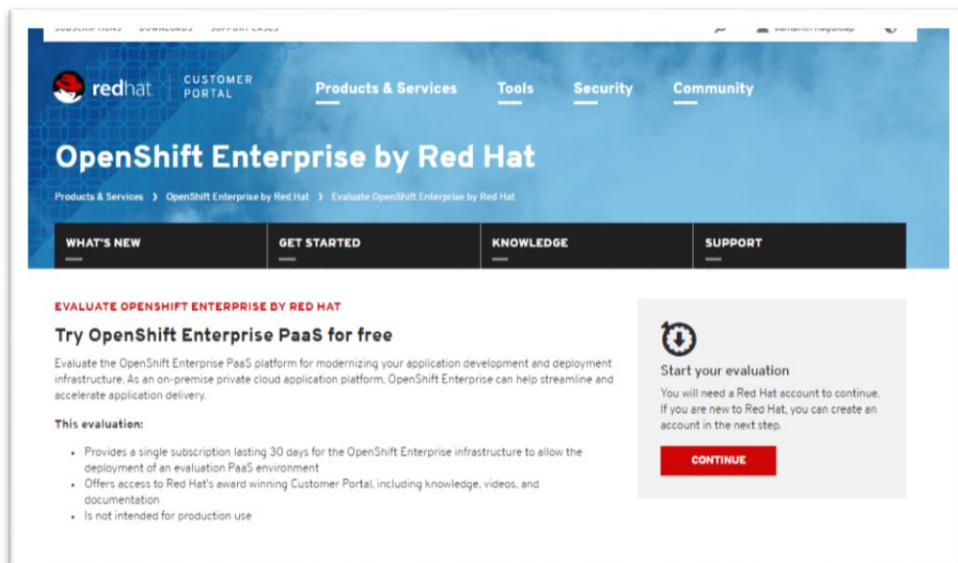


Figure 3: Starting your Red Hat OpenShift evaluation

3. Review the subscription evaluation terms, and choose **Agree and Get Started**.
4. On the customer portal, choose **Subscriptions, Active Subscriptions**. The Red Hat OpenShift evaluation should be listed on the page.

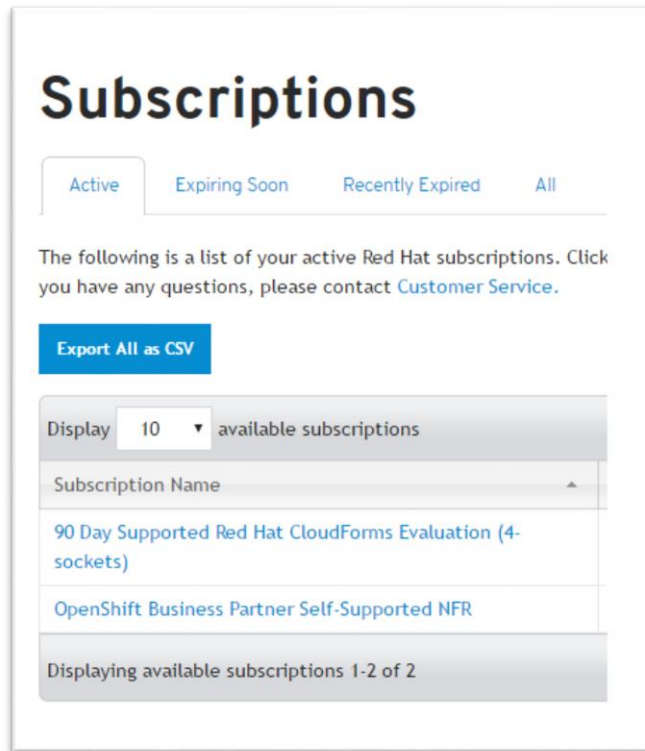


Figure 4: Active subscriptions

If you encounter any difficulties, contact [Red Hat customer service](#) for assistance.

Step 2. Prepare an AWS Account

1. If you don't already have an AWS account, create one at <http://aws.amazon.com> by following the on-screen instructions.
2. Use the region selector in the navigation bar to choose the Amazon EC2 region where you want to deploy Red Hat OpenShift on AWS.
3. Create a key pair in your preferred region.
4. If necessary, request a service limit increase for the Amazon EC2 **t2.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.

Step 3. Launch the Quick Start

1. [Deploy the AWS CloudFormation template](#) into your AWS account.



The template is launched in the US West (Oregon) region by default. You can change the region by using the region selector in the navigation bar.

This stack takes less than 30 minutes to create.

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. See the pricing pages for each AWS service you will be using or the [AWS Simple Monthly Calculator](#) for full details.

You can also [download the template](#) to use it as a starting point for your own implementation.

2. On the **Select Template** page, keep the default setting for the template URL, and then choose **Next**.
3. On the **Specify Details** page, review the parameters for the template. Enter values for the parameters that require your input. For all other parameters, you can customize the default settings provided by the template.

Parameter	Default	Description
RedhatPortalUsername	<i>Requires input</i>	User name for the Red Hat customer portal from step 1.
RedhatPortalPassword	<i>Requires input</i>	Password for the Red Hat customer portal from step 1.
KeyPairName	<i>Requires input</i>	Public/private key pair, which allows you to connect securely to your instance after it launches. When you created an AWS account in step 2, this is the key pair you created in your preferred region.
Set the root password for Instances	<i>Requires input</i>	Password for root account.
BastionPassword	<i>Requires input</i>	Password for bastion host.
MasterInstanceType	t2.large	Amazon EC2 instance type for the master instance.
Node1InstanceType	t2.large	Amazon EC2 instance for the Node1 instances, which provide the runtime environment for containers. This node also acts as the DNS server.
Node2InstanceType	t2.large	Amazon EC2 instance for the Node2 instances, which provide the runtime environment for containers.
BastionInstanceType	t2.large	Amazon EC2 instance for the Fedora bastion instances.

Parameter	Default	Description
AllowConnectionFrom	0.0.0.0/0	Change this value to your system IP address (e.g., 184.191.212.25/32).
VPCCIDR	10.90.0.0/16	CIDR range for the Amazon VPC.
PublicSubnetCIDR	10.90.1.0/24	CIDR range for the public subnet.
PrivateSubnetCIDR	10.90.2.0/24	CIDR range for the private subnet.

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

- 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**.
- 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.
- Choose **Create** to deploy the stack.
- Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the deployment is complete.
- You can use the URL displayed in the **Outputs** tab for the stack to view the resources that were created.

Step 3. Configure and Test the Deployment

- Use one of the following links to download a virtual network computing (VNC) client, if you don't already have a client on your computer. The VNC client is required to access the bastion host interface.

For Microsoft Windows: [TightVNC](#)

For Mac OS X: [Chicken of the VNC](#)

- Connect to the Fedora workstation by using the bastion host public IP and port number 5901. Enter the bastion password you provided during deployment in step 2.

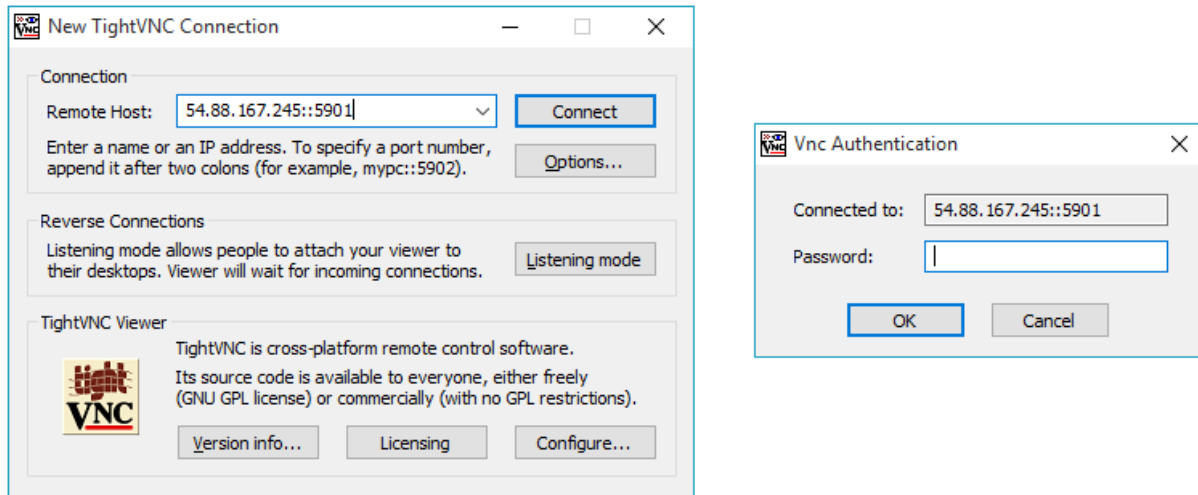


Figure 5: Connecting to the Fedora workstation

3. If a blue screen appears, use the **Refresh** option in the VNC client, or drag the blue screen up to see the login screen.
4. Enter the bastion password that you provided during deployment in step 2.
5. To access the Gnome browser, choose the **Activities** tab in the top-left corner.

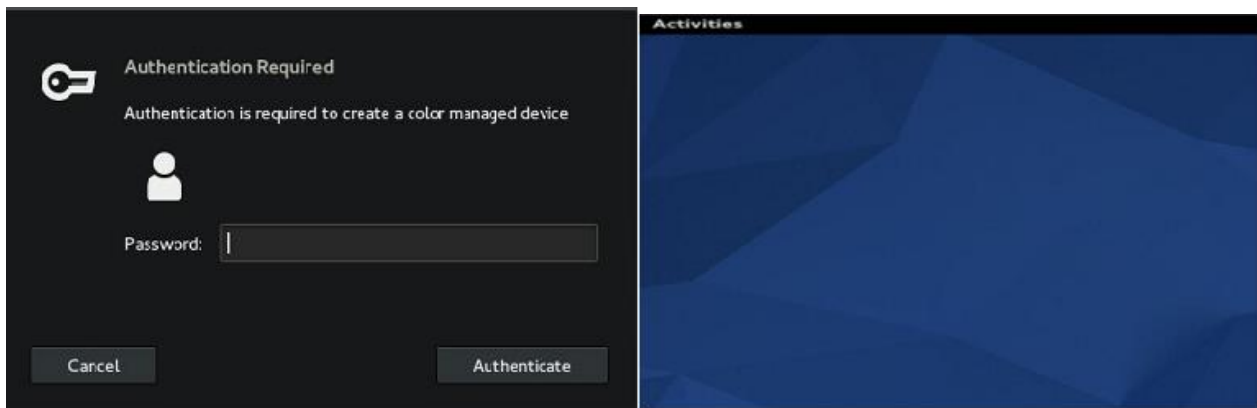


Figure 6: Accessing the Fedora interface

6. To open the terminal, choose the **xterm** icon shown in Figure 7 and run these commands:

```
sudo su -
tar -zxvf /root/oc-3.2.0.44-linux.tar.gz
cp /root/mnt/redhat/staging-cds/ose-clients-3.2.0.44/usr/share/atomic-OpenShift/linux/oc /bin/
chmod +x /bin/oc
oc version
```

The last command will provide version information similar to the following:

```
oc v3.2.0.44
kubernetes v1.2.0-36-g4a3f9c5
```

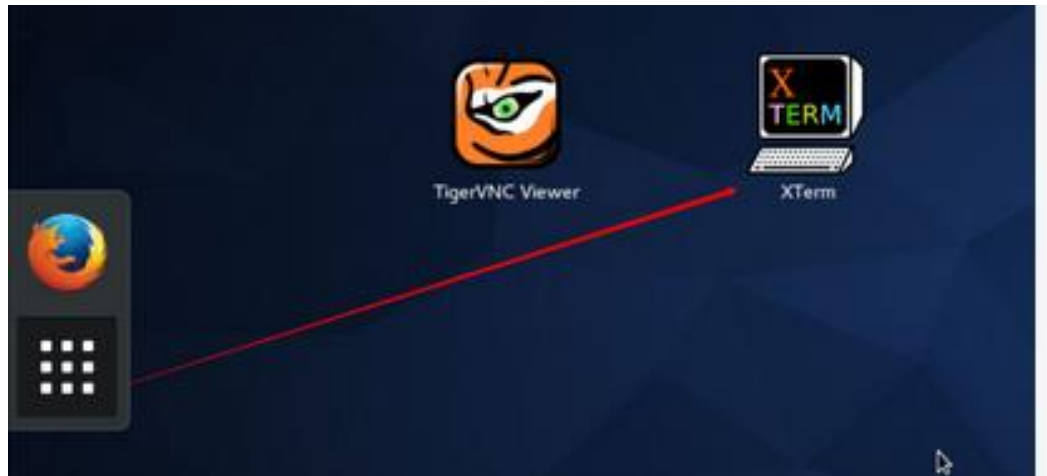


Figure 7: xterm icon

7. Log in to the bastion host as root user:

```
$ sudo su -
```

8. Log in to the master:

```
# ssh ose-master
```

9. Change to the root user:

```
$ sudo su -
```

```

root@ose-master:~
[fe-dora@ip-10-90-1-96 ~]$ sudo su -
[root@ip-10-90-1-96 ~]# ssh ose-master
The authenticity of host 'ose-master (10.90.2.251)' can't be established.
ECDSA key fingerprint is SHA256:HH+jQBSdGA61vddidarwYxmqJrKr1Ej02MLzNukHB3c.
ECDSA key fingerprint is MD5:b8:af:95:7b:6a:be:8e:aa:d6:fb:4d:23:68:ba:8e:e8.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ose-master,10.90.2.251' (ECDSA) to the list of known
hosts.
Password:
Last login: Wed Jun  1 13:44:37 2016 from ose-master.rhosepaas.com
[root@ose-master ~]# █

```

Figure 8: Logging in to the master host

10. Run these two commands to verify the Red Hat OpenShift installation:

```

# oc get nodes
# oc get pods

```

You should expect to see a **Ready** status for the nodes and a **Running** status for the pods.

```

root@ose-master:~
[root@ose-master ~]# oc get nodes
NAME                                STATUS    LABELS                                AGE
ose-master.rhosepaas.com            Ready,SchedulingDisabled            50m
ose-node1.rhosepaas.com             Ready                                     50m
ose-node2.rhosepaas.com             Ready                                     49m
[root@ose-master ~]# █

root@ose-master:~
[root@ose-master ~]# oc get pods
NAME                                READY    STATUS    RESTARTS    AGE
docker-registry-1-2vpau             1/1     Running  0           48m
ose-master-1-3n2zn                  1/1     Running  0           47m
[root@ose-master ~]# █

```

Figure 9: Verifying the Red Hat OpenShift installation

Troubleshooting

If you encounter a `CREATE_FAILED` error when you launch the Quick Start, 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](#) on the AWS website or contact us on the [AWS Quick Start Discussion Forum](#).

Additional Resources

AWS services

- AWS CloudFormation
<http://aws.amazon.com/documentation/cloudformation/>
- Amazon EC2
<http://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/>
- Amazon VPC
<http://aws.amazon.com/documentation/vpc/>

Red Hat OpenShift

- Red Hat OpenShift product information
<https://www.openshift.com/>
- Red Hat OpenShift documentation
<https://docs.openshift.com/>
- Red Hat OpenShift evaluation
<https://access.redhat.com/products/openshift-enterprise-red-hat/evaluation>

Quick Start reference deployments

- AWS Quick Start home page
<https://aws.amazon.com/quickstart/>

- Quick Start deployment guides
<https://aws.amazon.com/documentation/quickstart/>

Send Us Feedback

We welcome your questions and comments. Please post your feedback on the [AWS Quick Start Discussion Forum](#).

You can visit our [GitHub repository](#) to download the templates and scripts for this Quick Start, and to share your customizations with others.

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