Red Hat OpenShift Service on AWS 4

Policies and service definition

Understanding Red Hat OpenShift Service on AWS Policies

Last Updated: 2021-07-12
Red Hat OpenShift Service on AWS 4 Policies and service definition

Understanding Red Hat OpenShift Service on AWS Policies
Abstract
This document provides information on ROSA Policies.
Table of Contents

CHAPTER 1. RED HAT OPENSIFT SERVICE ON AWS SERVICE DEFINITION ........................................... 5
1.1. ACCOUNT MANAGEMENT .................................................................................................................. 5
  1.1.1. Billing ........................................................................................................................................ 5
  1.1.2. Cluster self-service .................................................................................................................... 5
  1.1.3. Compute ...................................................................................................................................... 6
  1.1.4. AWS compute types .................................................................................................................. 7
  1.1.5. Regions and availability zones .................................................................................................... 8
  1.1.6. Service Level Agreement (SLA) ................................................................................................ 8
  1.1.7. Support ....................................................................................................................................... 8
1.2. LOGGING ......................................................................................................................................... 8
  1.2.1. Cluster audit logging .................................................................................................................. 8
  1.2.2. Application logging ..................................................................................................................... 8
1.3. MONITORING ............................................................................................................................... 8
  1.3.1. Cluster metrics .......................................................................................................................... 9
  1.3.2. Cluster status notification .......................................................................................................... 9
1.4. NETWORKING .............................................................................................................................. 9
  1.4.1. Custom domains for applications ............................................................................................. 9
  1.4.2. Domain validated certificates ................................................................................................... 9
  1.4.3. Custom certificate authorities for builds ..................................................................................... 9
  1.4.4. Load Balancers ........................................................................................................................ 10
  1.4.5. Cluster ingress .......................................................................................................................... 10
  1.4.6. Cluster egress ............................................................................................................................ 10
  1.4.7. Cloud network configuration ................................................................................................... 11
  1.4.8. DNS forwarding ....................................................................................................................... 11
1.5. STORAGE ...................................................................................................................................... 11
  1.5.1. Encrypted-at-rest OS and node storage ....................................................................................... 11
  1.5.2. Encrypted-at-rest PV ................................................................................................................ 11
  1.5.3. Block storage (RWO) ............................................................................................................... 11
1.6. PLATFORM ..................................................................................................................................... 11
  1.6.1. Cluster backup policy ................................................................................................................ 11
  1.6.2. Autoscaling .............................................................................................................................. 12
  1.6.3. Daemonsets ............................................................................................................................... 12
  1.6.4. Multiple availability zone ......................................................................................................... 12
  1.6.5. Node labels ............................................................................................................................... 13
  1.6.6. OpenShift version ..................................................................................................................... 13
  1.6.7. Upgrades .................................................................................................................................. 13
  1.6.8. Windows Containers ................................................................................................................. 13
  1.6.9. Container engine ....................................................................................................................... 13
  1.6.10. Operating system ..................................................................................................................... 13
  1.6.11. Kubernetes Operator support ................................................................................................ 13
1.7. SECURITY ..................................................................................................................................... 13
  1.7.1. Authentication provider ............................................................................................................ 13
  1.7.2. Privileged containers ................................................................................................................ 14
  1.7.3. Customer administrator user ..................................................................................................... 14
  1.7.4. Cluster administration role ....................................................................................................... 14
  1.7.5. Project self-service .................................................................................................................... 14
  1.7.6. Regulatory compliance .............................................................................................................. 14
  1.7.7. Network security ....................................................................................................................... 14
1.8. ADDITIONAL RESOURCES ........................................................................................................ 15

CHAPTER 2. RESPONSIBILITY ASSIGNMENT MATRIX ................................................................. 16
2.1. OVERVIEW OF RESPONSIBILITIES FOR RED HAT OPENSSHIFT SERVICE ON AWS

2.2. SHARED RESPONSIBILITY MATRIX
   2.2.1. Incident and operations management
   2.2.2. Change management
   2.2.3. Identity and access management
   2.2.4. Security and regulation compliance
   2.2.5. Disaster recovery

2.3. CUSTOMER RESPONSIBILITIES FOR DATA AND APPLICATIONS

CHAPTER 3. UNDERSTANDING PROCESS AND SECURITY FOR RED HAT OPENSSHIFT SERVICE ON AWS

3.1. INCIDENT AND OPERATIONS MANAGEMENT
   3.1.1. Platform monitoring
   3.1.2. Incident management
   3.1.3. Notifications
   3.1.4. Backup and recovery
   3.1.5. Cluster capacity

3.2. CHANGE MANAGEMENT
   3.2.1. Configuration management
   3.2.2. Patch management
   3.2.3. Release management

3.3. IDENTITY AND ACCESS MANAGEMENT
   3.3.1. SRE access to all Red Hat OpenShift Service on AWS clusters
   3.3.2. Privileged access controls in Red Hat OpenShift Service on AWS
   3.3.3. SRE access to AWS accounts
   3.3.4. Red Hat support access
   3.3.5. Customer access
   3.3.6. Access approval and review

3.4. SECURITY AND REGULATION COMPLIANCE
   3.4.1. Data classification
   3.4.2. Data management
   3.4.3. Vulnerability management
   3.4.4. Network security
      3.4.4.1. Firewall and DDoS protection
      3.4.4.2. Private clusters and network connectivity
      3.4.4.3. Cluster network access controls
   3.4.5. Penetration testing
   3.4.6. Compliance

3.5. DISASTER RECOVERY

3.6. ADDITIONAL RESOURCES

CHAPTER 4. ABOUT AVAILABILITY FOR RED HAT OPENSSHIFT SERVICE ON AWS

4.1. POTENTIAL POINTS OF FAILURE
   4.1.1. Container or pod failure
   4.1.2. Worker node failure
   4.1.3. Cluster failure
   4.1.4. Zone failure
   4.1.5. Storage failure

CHAPTER 5. RED HAT OPENSSHIFT SERVICE ON AWS UPDATE LIFE CYCLE

5.1. OVERVIEW

5.2. DEFINITIONS

5.3. MAJOR VERSIONS (X.Y.Z)

5.4. MINOR VERSIONS (X.Y.Z)

5.5. PATCH VERSIONS (X.Y.Z)
5.6. LIMITED SUPPORT STATUS
5.7. SUPPORTED VERSIONS EXCEPTION POLICY
5.8. INSTALLATION POLICY
5.9. MANDATORY UPGRADES
5.10. LIFE CYCLE DATES
CHAPTER 1. RED HAT OPENSSHIFT SERVICE ON AWS SERVICE DEFINITION

This documentation outlines the service definition for the Red Hat OpenShift Service on AWS (ROSA) managed service.

1.1. ACCOUNT MANAGEMENT

This section provides information about the service definition for Red Hat OpenShift Service on AWS account management.

1.1.1. Billing

Red Hat OpenShift Service on AWS is billed through Amazon Web Services (AWS) based on the usage of AWS components used by the service, such as load balancers, storage, EC2 instances, other components, and Red Hat subscriptions for the OpenShift service.

Any additional Red Hat software must be purchased separately.

1.1.2. Cluster self-service

Customers can self-service their clusters, including, but not limited to:

- Create a cluster
- Delete a cluster
- Add or remove an identity provider
- Add or remove a user from an elevated group
- Configure cluster privacy
- Add or remove machine pools and configure autoscaling
- Define upgrade policies

These tasks can be self-serviced using the `rosa` CLI utility.

1.1.3. Compute

Single availability zone clusters require a minimum of 3 control planes, 2 infrastructure nodes, and 2 worker nodes deployed to a single availability zone.

Multiple availability zone clusters require a minimum of 3 control planes, 3 infrastructure nodes, and 3 worker nodes. Additional nodes must be purchased in multiples of three to maintain proper node distribution.

All Red Hat OpenShift Service on AWS clusters support a maximum of 180 worker nodes.

**NOTE**

The **Default** machine pool node type and size cannot be changed after the cluster is created.
Control plane and infrastructure nodes are deployed and managed by Red Hat. There are at least 3 control plane nodes that handle etcd- and API-related workloads. There are at least 2 infrastructure nodes that handle metrics, routing, the web console, and other workloads. Control plane and infrastructure nodes are strictly for Red Hat workloads to operate the service, and customer workloads are not permitted to be deployed on these nodes.

NOTE
1 vCPU core and 1 GiB of memory are reserved on each worker node to run processes required as part of the managed service. This includes, but is not limited to, audit log aggregation, metrics collection, DNS, image registry, and SDN.

1.1.4. AWS compute types

Red Hat OpenShift Service on AWS offers the following worker node types and sizes:

General purpose
- M5.xlarge (4 vCPU, 16 GiB)
- M5.2xlarge (8 vCPU, 32 GiB)
- M5.4xlarge (16 vCPU, 64 GiB)
- M5.8xlarge (32 vCPU, 128 GiB)
- M5.12xlarge (48 vCPU, 192 GiB)
- M5.16xlarge (64 vCPU, 256 GiB)
- M5.24xlarge (96 vCPU, 384 GiB)

Memory-optimized
- R5.xlarge (4 vCPU, 32 GiB)
- R5.2xlarge (8 vCPU, 64 GiB)
- R5.4xlarge (16 vCPU, 128 GiB)
- R5.8xlarge (32 vCPU, 256 GiB)
- R5.12xlarge (48 vCPU, 384 GiB)
- R5.16xlarge (64 vCPU, 512 GiB)
- R5.24xlarge (96 vCPU, 768 GiB)

Compute-optimized
- C5.2xlarge (8 vCPU, 16 GiB)
- C5.4xlarge (16 vCPU, 32 GiB)
- C5.9xlarge (36 vCPU, 72 GiB)
- C5.12xlarge (48 vCPU, 96 GiB)
C5.18xlarge (72 vCPU, 144 GiB)
C5.24xlarge (96 vCPU, 192 GiB)

1.1.5. Regions and availability zones

The following AWS regions are supported by Red Hat OpenShift 4 and are supported for Red Hat OpenShift Service on AWS. Note: China and GovCloud (US) regions are not supported, regardless of their support on OpenShift 4.

- af-south-1 (Cape Town, AWS opt-in required)
- ap-east-1 (Hong Kong, AWS opt-in required)
- ap-northeast-1 (Tokyo)
- ap-northeast-2 (Seoul)
- ap-south-1 (Mumbai)
- ap-southeast-1 (Singapore)
- ap-southeast-2 (Sydney)
- ca-central-1 (Central Canada)
- eu-central-1 (Frankfurt)
- eu-north-1 (Stockholm)
- eu-south-1 (Milan, AWS opt-in required)
- eu-west-1 (Ireland)
- eu-west-2 (London)
- eu-west-3 (Paris)
- me-south-1 (Bahrain, AWS opt-in required)
- sa-east-1 (São Paulo)
- us-east-1 (N. Virginia)
- us-east-2 (Ohio)
- us-west-1 (N. California)
- us-west-2 (Oregon)

Multiple availability zone clusters can only be deployed in regions with at least 3 availability zones. For more information, see the Regions and Availability Zones section in the AWS documentation.

Each new Red Hat OpenShift Service on AWS cluster is installed within an installer-created or preexisting Virtual Private Cloud (VPC) in a single region, with the option to deploy into a single availability zone (Single-AZ) or across multiple availability zones (Multi-AZ). This provides cluster-level network and resource isolation, and enables cloud-provider VPC settings, such as VPN connections and...
VPC Peering. Persistent volumes (PVs) are backed by AWS Elastic Block Storage (EBS), and are specific to the availability zone in which they are provisioned. Persistent volume claims (PVCs) do not bind to a volume until the associated pod resource is assigned into a specific availability zone to prevent unschedulable pods. Availability zone-specific resources are only usable by resources in the same availability zone.

**WARNING**

The region and the choice of single or multiple availability zone cannot be changed after a cluster has been deployed.

### 1.1.6. Service Level Agreement (SLA)

Any SLAs for the service itself are defined in Appendix 4 of the [Red Hat Enterprise Agreement Appendix 4 (Online Subscription Services)](https://www.redhat.com).  

### 1.1.7. Support

Red Hat OpenShift Service on AWS includes Red Hat Premium Support, which can be accessed by using the [Red Hat Customer Portal](https://www.redhat.com). See Red Hat OpenShift Service on AWS [SLAs](https://www.redhat.com) for support response times.

AWS support is subject to a customer’s existing support contract with AWS.

### 1.2. LOGGING

Red Hat OpenShift Service on AWS provides optional integrated log forwarding to Amazon (AWS) CloudWatch.

#### 1.2.1. Cluster audit logging

Cluster audit logs are available through AWS CloudWatch, if the integration is enabled. If the integration is not enabled, you can request the audit logs by opening a support case.

#### 1.2.2. Application logging

Application logs sent to `STDOUT` are collected by Fluentd and forwarded to AWS CloudWatch through the cluster logging stack, if it is installed.

### 1.3. MONITORING

This section provides information about the service definition for Red Hat OpenShift Service on AWS monitoring.

#### 1.3.1. Cluster metrics

Red Hat OpenShift Service on AWS clusters come with an integrated Prometheus stack for cluster
monitoring including CPU, memory, and network-based metrics. This is accessible through the web console. These metrics also allow for horizontal pod autoscaling based on CPU or memory metrics provided by an Red Hat OpenShift Service on AWS user.

1.3.2. Cluster status notification

Red Hat communicates the health and status of Red Hat OpenShift Service on AWS clusters through a combination of a cluster dashboard available in the OpenShift Cluster Manager (OCM), and email notifications sent to the email address of the contact that originally deployed the cluster, and any additional contacts specified by the customer.

1.4. NETWORKING

This section provides information about the service definition for Red Hat OpenShift Service on AWS networking.

1.4.1. Custom domains for applications

To use a custom hostname for a route, you must update your DNS provider by creating a canonical name (CNAME) record. Your CNAME record should map the OpenShift canonical router hostname to your custom domain. The OpenShift canonical router hostname is shown on the Route Details page after a route is created. Alternatively, a wildcard CNAME record can be created once to route all subdomains for a given hostname to the cluster’s router.

1.4.2. Domain validated certificates

Red Hat OpenShift Service on AWS includes TLS security certificates needed for both internal and external services on the cluster. For external routes, there are two separate TLS wildcard certificates that are provided and installed on each cluster: one is for the web console and route default hostnames, and the other is for the API endpoint. Let’s Encrypt is the certificate authority used for certificates. Routes within the cluster, such as the internal API endpoint, use TLS certificates signed by the cluster’s built-in certificate authority and require the CA bundle available in every pod for trusting the TLS certificate.

1.4.3. Custom certificate authorities for builds

Red Hat OpenShift Service on AWS supports the use of custom certificate authorities to be trusted by builds when pulling images from an image registry.

1.4.4. Load Balancers

Red Hat OpenShift Service on AWS uses up to five different load balancers:

- An internal control plane load balancer that is internal to the cluster and used to balance traffic for internal cluster communications.

- An external control plane load balancer that is used for accessing the OpenShift and Kubernetes APIs. This load balancer can be disabled in OCM. If this load balancer is disabled, Red Hat reconfigures the API DNS to point to the internal control plane load balancer.

- An external control plane load balancer for Red Hat that is reserved for cluster management by Red Hat. Access is strictly controlled, and communication is only possible from whitelisted bastion hosts.
A default external router/ingress load balancer that is the default application load balancer, denoted by apps in the URL. The default load balancer can be configured in OCM to be either publicly accessible over the Internet or only privately accessible over a pre-existing private connection. All application routes on the cluster are exposed on this default router load balancer, including cluster services such as the logging UI, metrics API, and registry.

Optional: A secondary router/ingress load balancer that is a secondary application load balancer, denoted by apps2 in the URL. The secondary load balancer can be configured in OCM to be either publicly accessible over the Internet or only privately accessible over a pre-existing private connection. If a Label match is configured for this router load balancer, then only application routes matching this label are exposed on this router load balancer; otherwise, all application routes are also exposed on this router load balancer.

Optional: Load balancers for services. Enable non-HTTP/SNI traffic and non-standard ports for services. These load balancers can be mapped to a service running on Red Hat OpenShift Service on AWS to enable advanced ingress features, such as non-HTTP/SNI traffic or the use of non-standard ports. These can be purchased in groups of 4 for standard clusters or can be provisioned without charge in Red Hat Customer Cloud Subscription (CCS) clusters; however, each AWS account has a quota which limits the number of Classic Load Balancers that can be used within each cluster.

1.4.5. Cluster ingress

Project administrators can add route annotations for many different purposes, including ingress control through IP allow-listing.

Ingress policies can also be changed by using NetworkPolicy objects, which leverage the ovs-networkpolicy plug-in. This allows for full control over the ingress network policy down to the pod level, including between pods on the same cluster and even in the same namespace.

All cluster ingress traffic will go through the defined load balancers. Direct access to all nodes is blocked by cloud configuration.

1.4.6. Cluster egress

Pod egress traffic control through EgressNetworkPolicy objects can be used to prevent or limit outbound traffic in Red Hat OpenShift Service on AWS.

Public outbound traffic from the control plane and infrastructure nodes is required and necessary to maintain cluster image security and cluster monitoring. This requires that the 0.0.0.0/0 route belongs only to the Internet gateway; it is not possible to route this range over private connections.

OpenShift 4 clusters use NAT gateways to present a public, static IP for any public outbound traffic leaving the cluster. Each availability zone a cluster is deployed into receives a distinct NAT gateway, therefore up to 3 unique static IP addresses can exist for cluster egress traffic. Any traffic that remains inside the cluster, or that does not go out to the public Internet, will not pass through the NAT gateway and will have a source IP address belonging to the node that the traffic originated from. Node IP addresses are dynamic; therefore, a customer must not rely on whitelisting individual IP addresses when accessing private resources.

Customers can determine their public static IP addresses by running a pod on the cluster and then querying an external service. For example:

```
$ oc run ip-lookup --image=busybox -i -t --restart=Never --rm -- /bin/sh -c "/bin/nslookup -type=a myip.opendns.com resolver1.opendns.com | grep -E 'Address: [0-9.]*'"
```
1.4.7. Cloud network configuration

Red Hat OpenShift Service on AWS allows for the configuration of a private network connection through AWS-managed technologies:

- VPN connections
- VPC peering
- Transit Gateway
- Direct Connect

**IMPORTANT**

Red Hat site reliability engineers (SREs) do not monitor private network connections. Monitoring these connections is the responsibility of the customer.

1.4.8. DNS forwarding

For Red Hat OpenShift Service on AWS clusters that have a private cloud network configuration, a customer can specify internal DNS servers available on that private connection, that should be queried for explicitly provided domains.

1.5. STORAGE

This section provides information about the service definition for Red Hat OpenShift Service on AWS storage.

1.5.1. Encrypted-at-rest OS and node storage

Control plane nodes use encrypted-at-rest AWS Elastic Block Store (EBS) storage.

1.5.2. Encrypted-at-rest PV

EBS volumes that are used for PVs are encrypted-at-rest by default.

1.5.3. Block storage (RWO)

Persistent volumes (PVs) are backed by AWS EBS, which is Read-Write-Once.

PVs can be attached only to a single node at a time and are specific to the availability zone in which they were provisioned. However, PVs can be attached to any node in the availability zone.

Each cloud provider has its own limits for how many PVs can be attached to a single node. See AWS instance type limits for details.

1.6. PLATFORM

This section provides information about the service definition for the Red Hat OpenShift Service on AWS (ROSA) platform.

1.6.1. Cluster backup policy
IMPORTANT

It is critical that customers have a backup plan for their applications and application data.

Application and application data backups are not a part of the Red Hat OpenShift Service on AWS service. All Kubernetes objects and persistent volumes (PVs) in each Red Hat OpenShift Service on AWS cluster are backed up to facilitate a prompt recovery in the unlikely event that a cluster becomes irreparably inoperable.

The backups are stored in a secure object storage, or multiple availability zone, bucket in the same account as the cluster. Node root volumes are not backed up, as Red Hat CoreOS is fully managed by the Red Hat OpenShift Service on AWS cluster and no stateful data should be stored on a node’s root volume.

The following table shows the frequency of backups:

<table>
<thead>
<tr>
<th>Component</th>
<th>Snapshot frequency</th>
<th>Retention</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full object store backup, all cluster PVs</td>
<td>Daily at 0100 UTC</td>
<td>7 days</td>
<td>This is a full backup of all Kubernetes objects, as well as all mounted PVs in the cluster.</td>
</tr>
<tr>
<td>Full object store backup, all cluster PVs</td>
<td>Weekly on Mondays at 0200 UTC</td>
<td>30 days</td>
<td>This is a full backup of all Kubernetes objects, as well as all mounted PVs in the cluster.</td>
</tr>
<tr>
<td>Full object store backup</td>
<td>Hourly at 17 minutes past the hour</td>
<td>24 hours</td>
<td>This is a full backup of all Kubernetes objects. No PVs are backed up in this backup schedule.</td>
</tr>
</tbody>
</table>

1.6.2. Autoscaling

Node autoscaling is available on Red Hat OpenShift Service on AWS.

1.6.3. Daemonsets

Customers can create and run daemonsets on Red Hat OpenShift Service on AWS. To restrict daemonsets to only running on worker nodes, use the following `nodeSelector`:

```yaml
... 
  spec:
    nodeSelector:
      role: worker 
  ...
```

1.6.4. Multiple availability zone

In a multiple availability zone cluster, control plane nodes are distributed across availability zones and at least one worker node is required in each availability zone.
1.6.5. Node labels

Custom node labels are created by Red Hat during node creation and cannot be changed on Red Hat OpenShift Service on AWS clusters at this time. However, custom labels are supported when creating new machine pools.

1.6.6. OpenShift version

Red Hat OpenShift Service on AWS is run as a service and is kept up to date with the latest OpenShift Container Platform version. Upgrade scheduling to the latest version is available.

1.6.7. Upgrades

Upgrades can be scheduled using the **rosa** CLI utility or through OpenShift Cluster Manager (OCM).

See the [Red Hat OpenShift Service on AWS Life Cycle](#) for more information on the upgrade policy and procedures.

1.6.8. Windows Containers

Windows Containers are not available on Red Hat OpenShift Service on AWS at this time.

1.6.9. Container engine

Red Hat OpenShift Service on AWS runs on OpenShift 4 and uses **CRI-O** as the only available container engine.

1.6.10. Operating system

Red Hat OpenShift Service on AWS runs on OpenShift 4 and uses Red Hat CoreOS as the operating system for all control plane and worker nodes.

1.6.11. Kubernetes Operator support

All Operators listed in the Operator Hub marketplace should be available for installation. These operators are considered customer workloads, and are not monitored by Red Hat SRE.

1.7. SECURITY

This section provides information about the service definition for Red Hat OpenShift Service on AWS security.

1.7.1. Authentication provider

Authentication for the cluster can be configured using either the **OpenShift Cluster Manager (OCM)** or cluster creation process or using the **rosa** CLI. Red Hat OpenShift Service on AWS is not an identity provider, and all access to the cluster must be managed by the customer as part of their integrated solution. The use of multiple identity providers provisioned at the same time is supported. The following identity providers are supported:

- GitHub or GitHub Enterprise
- GitLab
1.7.2. Privileged containers

Privileged containers are available for users with the `cluster-admin` role. Usage of privileged containers as `cluster-admin` is subject to the responsibilities and exclusion notes in the Red Hat Enterprise Agreement Appendix 4 (Online Subscription Services).

1.7.3. Customer administrator user

In addition to normal users, Red Hat OpenShift Service on AWS provides access to a Red Hat OpenShift Service on AWS-specific group called `dedicated-admin`. Any users on the cluster that are members of the `dedicated-admin` group:

- Have administrator access to all customer-created projects on the cluster.
- Can manage resource quotas and limits on the cluster.
- Can add and manage `NetworkPolicy` objects.
- Are able to view information about specific nodes and PVs in the cluster, including scheduler information.
- Can access the reserved `dedicated-admin` project on the cluster, which allows for the creation of service accounts with elevated privileges and also gives the ability to update default limits and quotas for projects on the cluster.

1.7.4. Cluster administration role

The administrator of Red Hat OpenShift Service on AWS has default access to the `cluster-admin` role for your organization’s cluster. While logged into an account with the `cluster-admin` role, users have increased permissions to run privileged security contexts.

1.7.5. Project self-service

By default, all users have the ability to create, update, and delete their projects. This can be restricted if a member of the `dedicated-admin` group removes the `self-provisioner` role from authenticated users:

```
$ oc adm policy remove-cluster-role-from-group self-provisioner system:authenticated:oauth
```

Restrictions can be reverted by applying:

```
$ oc adm policy add-cluster-role-to-group self-provisioner system:authenticated:oauth
```

1.7.6. Regulatory compliance

See Understanding process and security for ROSA for the latest compliance information.

1.7.7. Network security
With Red Hat OpenShift Service on AWS, AWS provides a standard DDoS protection on all load balancers, called AWS Shield. This provides 95% protection against most commonly used level 3 and 4 attacks on all the public facing load balancers used for Red Hat OpenShift Service on AWS. A 10-second timeout is added for HTTP requests coming to the **haproxy** router to receive a response or the connection is closed to provide additional protection.

### 1.8. ADDITIONAL RESOURCES

- See [Understanding process and security for ROSA](#) for the latest compliance information.
- See [ROSA life cycle](#)
CHAPTER 2. RESPONSIBILITY ASSIGNMENT MATRIX

This documentation outlines Red Hat, cloud provider, and customer responsibilities for the Red Hat OpenShift Service on AWS (ROSA) managed service.

2.1. OVERVIEW OF RESPONSIBILITIES FOR RED HAT OPENSHIFT SERVICE ON AWS

While Red Hat and Amazon Web Services (AWS) manage the Red Hat OpenShift Service on AWS service, the customer shares certain responsibilities. The Red Hat OpenShift Service on AWS services are accessed remotely, hosted on public cloud resources, created in customer-owned AWS accounts, and have underlying platform and data security that is owned by Red Hat.

IMPORTANT

If the cluster-admin role is added to a user, see the responsibilities and exclusion notes in the Red Hat Enterprise Agreement Appendix 4 (Online Subscription Services).

<table>
<thead>
<tr>
<th>Resource</th>
<th>Incident and operations management</th>
<th>Change management</th>
<th>Identity and access management</th>
<th>Security and regulation compliance</th>
<th>Disaster recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer data</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
</tr>
<tr>
<td>Customer applications</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
</tr>
<tr>
<td>Developer services</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
<td>Customer</td>
</tr>
<tr>
<td>Platform monitoring</td>
<td>Red Hat</td>
<td>Red Hat</td>
<td>Red Hat</td>
<td>Red Hat</td>
<td>Red Hat</td>
</tr>
<tr>
<td>Logging</td>
<td>Red Hat</td>
<td>Shared</td>
<td>Shared</td>
<td>Shared</td>
<td>Red Hat</td>
</tr>
<tr>
<td>Application networking</td>
<td>Shared</td>
<td>Shared</td>
<td>Shared</td>
<td>Red Hat</td>
<td>Red Hat</td>
</tr>
<tr>
<td>Cluster networking</td>
<td>Red Hat</td>
<td>Shared</td>
<td>Shared</td>
<td>Red Hat</td>
<td>Red Hat</td>
</tr>
</tbody>
</table>
2.2. SHARED RESPONSIBILITY MATRIX

The customer, Red Hat, and Amazon Web Services (AWS) share responsibility for the monitoring and maintenance of an Red Hat OpenShift Service on AWS cluster. This documentation illustrates the delineation of responsibilities by area and task.

2.2.1. Incident and operations management

The customer is responsible for incident and operations management of customer application data and any custom networking the customer may have configured for the cluster network or virtual network.
### Application networking

- Monitor cloud load balancers and native OpenShift router service, and respond to alerts.
- Monitor health of service load balancer endpoints.
- Monitor health of application routes, and the endpoints behind them.
- Report outages to Red Hat.

### Virtual networking

- Monitor cloud load balancers, subnets, and public cloud components necessary for default platform networking, and respond to alerts.
- Monitor network traffic that is optionally configured through VPC to VPC connection, VPN connection, or Direct connection for potential issues or security threats.

### 2.2.2. Change management

Red Hat is responsible for enabling changes to the cluster infrastructure and services that the customer will control, as well as maintaining versions for the master nodes, infrastructure nodes and services, and worker nodes. The customer is responsible for initiating infrastructure change requests and installing and maintaining optional services and networking configurations on the cluster, as well as all changes to customer data and customer applications.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
</table>
| Logging    | • Centrally aggregate and monitor platform audit logs.  
• Provide and maintain a logging Operator to enable the customer to deploy a logging stack for default application logging.  
• Provide audit logs upon customer request.  | • Install the optional default application logging Operator on the cluster.  
• Install, configure, and maintain any optional app logging solutions, such as logging sidecar containers or third-party logging applications.  
• Tune size and frequency of application logs being produced by customer applications if they are affecting the stability of the logging stack or the cluster.  
• Request platform audit logs through a support case for researching specific incidents.  |
<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application networking</td>
<td>- Set up public cloud load balancers. Provide the ability to set up private load balancers and up to one additional load balancer when required.</td>
<td>- Configure non-default pod network permissions for project and pod networks, pod ingress, and pod egress using <code>NetworkPolicy</code> objects.</td>
</tr>
<tr>
<td></td>
<td>- Set up native OpenShift router service. Provide the ability to set the router as private and add up to one additional router shard.</td>
<td>- Use OpenShift Cluster Manager (OCM) to request a private load balancer for default application routes.</td>
</tr>
<tr>
<td></td>
<td>- Install, configure, and maintain OpenShift SDN components for default internal pod traffic.</td>
<td>- Use OCM to configure up to one additional public or private router shard and corresponding load balancer.</td>
</tr>
<tr>
<td></td>
<td>- Provide the ability for the customer to manage <code>NetworkPolicy</code> and <code>EgressNetworkPolicy</code> (firewall) objects.</td>
<td>- Request and configure any additional service load balancers for specific services.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Configure any necessary DNS forwarding rules.</td>
</tr>
<tr>
<td>Cluster networking</td>
<td>- Set up cluster management components, such as public or private service endpoints and necessary integration with virtual networking components.</td>
<td>- Provide optional non-default IP address ranges for machine CIDR, service CIDR, and pod CIDR if needed through OCM when the cluster is provisioned.</td>
</tr>
<tr>
<td></td>
<td>- Set up internal networking components required for internal cluster communication between worker, infrastructure, and master nodes.</td>
<td>- Request that the API service endpoint be made public or private on cluster creation or after cluster creation through OCM.</td>
</tr>
</tbody>
</table>
### Resource

<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
</table>
| Virtual networking        | - Set up and configure virtual networking components required to provision the cluster, including virtual private cloud, subnets, load balancers, Internet gateways, NAT gateways, etc.  
  - Provide the ability for the customer to manage VPN connectivity with on-premises resources, VPC to VPC connectivity, and Direct connectivity as required through OCM.  
  - Enable customers to create and deploy public cloud load balancers for use with service load balancers. | - Set up and maintain optional public cloud networking components, such as VPC to VPC connection, VPN connection, or Direct connection.  
  - Request and configure any additional service load balancers for specific services. |
| Cluster version           | - Communicate schedule and status of upgrades for minor and maintenance versions.  
  - Publish change logs and release notes for minor and maintenance upgrades. | - Work with Red Hat to establish maintenance start times for upgrades.  
  - Test customer applications on minor and maintenance versions to ensure compatibility. |
| Capacity management       | - Monitor the use of control plane. Control planes are master nodes and infrastructure nodes.  
  - Scale and resize control plane nodes to maintain quality of service.  
  - Monitor the use of customer resources including network, storage and compute capacity. Where autoscaling features are not enabled alert customer for any changes required to cluster resources, such as new compute nodes to scale and additional storage. | - Use the provided OCM controls to add or remove additional worker nodes as required.  
  - Respond to Red Hat notifications regarding cluster resource requirements. |

### 2.2.3. Identity and access management
The Identity and Access Management matrix includes responsibilities for managing authorized access to clusters, applications, and infrastructure resources. This includes tasks such as providing access control mechanisms, authentication, authorization, and managing access to resources.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
</table>
| Logging                 | • Adhere to an industry standards-based tiered internal access process for platform audit logs.  
                           • Provide native OpenShift RBAC capabilities.                                             | • Configure OpenShift RBAC to control access to projects and by extension a project’s application logs.  
                           • For third-party or custom application logging solutions, the customer is responsible for access management.|
| Application networking  | Provide native OpenShift RBAC and dedicated-admin capabilities.                           | • Configure OpenShift dedicated-admin and RBAC to control access to route configuration as required.  
                           |                                                                                           | • Manage organization administrators for Red Hat to grant access to OCM. OCM is used to configure router options and provide service load balancer quota. |
| Cluster networking      | • Provide customer access controls through OCM.                                           | • Manage Red Hat organization membership of Red Hat accounts.                            |
|                         | • Provide native OpenShift RBAC and dedicated-admin capabilities.                         | • Manage organization administrators for Red Hat to grant access to OCM.                  |
|                         |                                                                                           | • Configure OpenShift dedicated-admin and RBAC to control access to route configuration as required. |
| Virtual networking      | Provide customer access controls through OCM.                                             | Manage optional user access to public cloud components through OCM.                      |

### 2.2.4. Security and regulation compliance

The following are the responsibilities and controls related to compliance:
<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging</td>
<td>Send cluster audit logs to a Red Hat SIEM to analyze for security events. Retain audit logs for a defined period of time to support forensic analysis.</td>
<td>Analyze application logs for security events. Send application logs to an external endpoint through logging sidecar containers or third-party logging applications if longer retention is required than is offered by the default logging stack.</td>
</tr>
<tr>
<td>Virtual networking</td>
<td>- Monitor virtual networking components for potential issues and security threats.</td>
<td>- Monitor optional configured virtual networking components for potential issues and security threats.</td>
</tr>
<tr>
<td></td>
<td>- Leverage additional public cloud provider tools for additional monitoring and protection.</td>
<td>- Configure any necessary firewall rules or data center protections as required.</td>
</tr>
</tbody>
</table>

### 2.2.5. Disaster recovery

Disaster recovery includes data and configuration backup, replicating data and configuration to the disaster recovery environment, and failover on disaster events.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual networking</td>
<td>Restore or recreate affected virtual network components that are necessary for the platform to function.</td>
<td>- Configure virtual networking connections with more than one tunnel where possible for protection against outages as recommended by the public cloud provider.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Maintain failover DNS and load balancing if using a global load balancer with multiple clusters.</td>
</tr>
</tbody>
</table>

### 2.3. CUSTOMER RESPONSIBILITIES FOR DATA AND APPLICATIONS

The customer is responsible for the applications, workloads, and data that they deploy to Red Hat OpenShift Service on AWS. However, Red Hat provides various tools to help the customer manage data and applications on the platform.
<table>
<thead>
<tr>
<th>Resource</th>
<th>Red Hat responsibilities</th>
<th>Customer responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer data</td>
<td>- Maintain platform-level standards for data encryption.</td>
<td>Maintain responsibility for all customer data stored on the platform and how customer applications consume and expose this data.</td>
</tr>
<tr>
<td></td>
<td>- Provide OpenShift components to help manage application data, such as secrets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Enable integration with third-party data services, AWS RDS, to store and manage data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>outside of the cluster and cloud provider.</td>
<td></td>
</tr>
<tr>
<td>Customer applications</td>
<td>- Provision clusters with OpenShift components installed so that customers can access the</td>
<td>- Maintain responsibility for customer and third-party applications, data, and their complete lifecycle.</td>
</tr>
<tr>
<td></td>
<td>OpenShift and Kubernetes APIs to deploy and manage containerized applications.</td>
<td>- If a customer adds Red Hat, community, third-party, their own, or other services to the</td>
</tr>
<tr>
<td></td>
<td>- Create clusters with image pull secrets so that customer deployments can pull images</td>
<td>cluster by using Operators or external images, the customer is responsible for these</td>
</tr>
<tr>
<td></td>
<td>from the Red Hat Container Catalog registry.</td>
<td>services and for working with the appropriate provider, including Red Hat, to</td>
</tr>
<tr>
<td></td>
<td>- Provide access to OpenShift APIs that a customer can use to set up Operators to add</td>
<td>troubleshoot any issues.</td>
</tr>
<tr>
<td></td>
<td>community, third-party, and Red Hat services to the cluster.</td>
<td>- Use the provided tools and features to configure and deploy; keep up to date; set up</td>
</tr>
<tr>
<td></td>
<td>- Provide storage classes and plug-ins to support persistent volumes for use with customer</td>
<td>resource requests and limits; size the cluster to have enough resources to run apps;</td>
</tr>
<tr>
<td></td>
<td>applications.</td>
<td>set up permissions; integrate with other services; manage any image streams or templates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>that the customer deploys; externally serve; save, back up, and restore data; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>otherwise manage their highly available and resilient workloads.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Maintain responsibility for monitoring the applications run on Red Hat OpenShift</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Service on AWS, including installing and operating software to gather metrics and create</td>
</tr>
<tr>
<td></td>
<td></td>
<td>alerts.</td>
</tr>
<tr>
<td>Resource</td>
<td>Red Hat responsibilities</td>
<td>Customer responsibilities</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Developer services (CodeReady)</td>
<td>Make CodeReady Workspaces available as an add-on through OpenShift Cluster Manager (OCM).</td>
<td>Install, secure, and operate CodeReady Workspaces and the Developer CLI.</td>
</tr>
</tbody>
</table>
CHAPTER 3. UNDERSTANDING PROCESS AND SECURITY FOR RED HAT OPENSHIFT SERVICE ON AWS

This document details the Red Hat responsibilities for the managed Red Hat OpenShift Service on AWS (ROSA).

Acronyms and terms

- **AWS** - Amazon Web Services
- **CEE** - Customer Experience and Engagement (Red Hat Support)
- **CI/CD** - Continuous Integration / Continuous Delivery
- **CVE** - Common Vulnerabilities and Exposures
- **OCM** - OpenShift Cluster Manager
- **PVs** - Persistent Volumes
- **ROSA** - Red Hat OpenShift Service on AWS
- **SRE** - Red Hat Site Reliability Engineering
- **VPC** - Virtual Private Cloud

3.1. INCIDENT AND OPERATIONS MANAGEMENT

This documentation details the Red Hat responsibilities for the Red Hat OpenShift Service on AWS (ROSA) managed service.

3.1.1. Platform monitoring

Red Hat site reliability engineers (SREs) maintain a centralized monitoring and alerting system for all ROSA cluster components, the SRE services, and underlying AWS accounts. Platform audit logs are securely forwarded to a centralized security information and event monitoring (SIEM) system, where they may trigger configured alerts to the SRE team and are also subject to manual review. Audit logs are retained in the SIEM system for one year. Audit logs for a given cluster are not deleted at the time the cluster is deleted.

3.1.2. Incident management

An incident is an event that results in a degradation or outage of one or more Red Hat services. An incident can be raised by a customer or a Customer Experience and Engagement (CEE) member through a support case, directly by the centralized monitoring and alerting system, or directly by a member of the SRE team.

Depending on the impact on the service and customer, the incident is categorized in terms of severity.

When managing a new incident, Red Hat uses the following general workflow:

1. An SRE first responder is alerted to a new incident and begins an initial investigation.
2. After the initial investigation, the incident is assigned an incident lead, who coordinates the recovery efforts.
3. An incident lead manages all communication and coordination around recovery, including any relevant notifications and support case updates.

4. The incident is recovered.

5. The incident is documented and a root cause analysis (RCA) is performed within 3 business days of the incident.

6. An RCA draft document will be shared with the customer within 7 business days of the incident.

### 3.1.3. Notifications

Platform notifications are configured using email. Some customer notifications are also sent to an account’s corresponding Red Hat account team, including a Technical Account Manager, if applicable.

The following activities can trigger notifications:

- Platform incident
- Performance degradation
- Cluster capacity warnings
- Critical vulnerabilities and resolution
- Upgrade scheduling

### 3.1.4. Backup and recovery

All Red Hat OpenShift Service on AWS clusters are backed up using AWS snapshots. Notably, this does not include customer data stored on persistent volumes (PVs). All snapshots are taken using the appropriate AWS snapshot APIs and are uploaded to a secure AWS S3 object storage bucket in the same account as the cluster.

<table>
<thead>
<tr>
<th>Component</th>
<th>Snapshot frequency</th>
<th>Retention</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full object store backup, all SRE-managed cluster PVs</td>
<td>Daily</td>
<td>7 days</td>
<td>This is a full backup of all Kubernetes objects, such as etcd, and all SRE-managed PVs in the cluster.</td>
</tr>
<tr>
<td></td>
<td>Weekly</td>
<td>30 days</td>
<td></td>
</tr>
<tr>
<td>Full object store backup</td>
<td>Hourly</td>
<td>24-hour</td>
<td>This is a full backup of all Kubernetes objects, such as etcd. No PVs are backed up in this backup schedule.</td>
</tr>
<tr>
<td>Node root volume</td>
<td>Never</td>
<td>N/A</td>
<td>Nodes are considered to be short-term. Do not store anything critical on a node’s root volume.</td>
</tr>
</tbody>
</table>

- The SRE rehearses recovery processes quarterly.
Red Hat does not commit to any Recovery Point Objective (RPO) or Recovery Time Objective (RTO).

Customers are responsible for taking regular backups of their data.

Backups performed by the SRE are taken as a precautionary measure only. They are stored in the same region as the cluster.

Customers can access the SRE backup data on request through a support case.

Red Hat encourages customers to deploy multiple availability zone (multi-AZ) clusters with workloads that follow Kubernetes best practices to ensure high availability within a region.

In the event an entire AWS region is unavailable, customers must install a new cluster in a different region and restore their apps using their backup data.

3.1.5. Cluster capacity

Evaluating and managing cluster capacity is a responsibility that is shared between Red Hat and the customer. Red Hat SRE is responsible for the capacity of all control plane and infrastructure nodes on the cluster.

Red Hat SRE also evaluates cluster capacity during upgrades and in response to cluster alerts. The impact of a cluster upgrade on capacity is evaluated as part of the upgrade testing process to ensure that capacity is not negatively impacted by new additions to the cluster. During a cluster upgrade, additional worker nodes are added to make sure that total cluster capacity is maintained during the upgrade process.

Capacity evaluations by the Red Hat SRE staff also happen in response to alerts from the cluster, after usage thresholds are exceeded for a certain period of time. Such alerts can also result in a notification to the customer.

3.2. CHANGE MANAGEMENT

This section describes the policies about how cluster changes, configuration changes, patches, and releases are managed.

Cluster changes are initiated in one of two ways:

1. A customer initiates changes through self-service capabilities such as cluster deployment, worker node scaling, or cluster deletion.

2. Red Hat site reliability engineering (SRE) initiates a change through Operator-driven capabilities such as configuration, upgrade, patching, or configuration changes.

Change history is captured in the Cluster History section in the OpenShift Cluster Manager (OCM) Overview tab and is available to customers. The change history includes, but is not limited to, logs from the following changes:

- Adding or removing identity providers
- Adding or removing users to or from the dedicated-admins group
- Scaling the cluster compute nodes
- Scaling the cluster load balancer
• Scaling the cluster persistent storage
• Upgrading the cluster

The SRE-initiated changes that require manual intervention by SRE generally follow this process:

• Preparing for change
  • Change characteristics are identified and a gap analysis is performed against current state.
  • Change steps are documented and validated.
  • A communication plan and schedule are shared with all stakeholders.
  • CI/CD and end-to-end tests are updated to automate change validation.
  • A change request that captures change details is submitted for management approval.

• Managing change
  • Automated nightly CI/CD jobs pick up the change and run tests.
  • The change is made to integration and stage environments, and manually validated before updating the customer cluster.
  • Major change notifications are sent before and after the event.

• Reinforcing the change
  • Feedback on the change is collected and analyzed.
  • Potential gaps are diagnosed to understand resistance and automate similar change requests.
  • Corrective actions are implemented.

**NOTE**

SRE only uses manual changes as a fallback process because manual intervention is considered to be a failure of change management.

### 3.2.1. Configuration management

The infrastructure and configuration of the Red Hat OpenShift Service on AWS environment is managed as code. SRE manages changes to the Red Hat OpenShift Service on AWS environment using a GitOps workflow and automated CI/CD pipeline.

Each proposed change undergoes a series of automated verifications immediately upon check-in. Changes are then deployed to a staging environment where they undergo automated integration testing. Finally, changes are deployed to the production environment. Each step is fully automated.

An authorized SRE reviewer must approve advancement to each step. The reviewer cannot be the same individual who proposed the change. All changes and approvals are fully auditable as part of the GitOps workflow.

### 3.2.2. Patch management
OpenShift Container Platform software and the underlying immutable Red Hat CoreOS (RHCOS) operating system image are patched for bugs and vulnerabilities in regular z-stream upgrades. Read more about RHCOS architecture in the OpenShift Container Platform documentation.

3.2.3. Release management

ROSA clusters can be configured for automatic upgrades on a schedule. Alternatively, you can perform manual upgrades using the rosa CLI. For more details, see the Life Cycle policy.

Customers can review the history of all cluster upgrade events in their OCM web console on the Events tab.

3.3. IDENTITY AND ACCESS MANAGEMENT

Most access by Red Hat site reliability engineering (SRE) teams is done using cluster Operators through automated configuration management.

3.3.1. SRE access to all Red Hat OpenShift Service on AWS clusters

SREs access Red Hat OpenShift Service on AWS clusters through the web console or command-line tools. Authentication requires multi-factor authentication (MFA) with industry-standard requirements for password complexity and account lockouts. SREs must authenticate as individuals to ensure auditability. All authentication attempts are logged to a Security Information and Event Management (SIEM) system.

SREs access private clusters using an encrypted tunnel through a hardened SRE support pod running in the cluster. Connections to the SRE support pod are permitted only from a secured Red Hat network using an IP allow-list. In addition to the cluster authentication controls described above, authentication to the SRE support pod is controlled by using SSH keys. SSH key authorization is limited to SRE staff and automatically synchronized with Red Hat corporate directory data. Corporate directory data is secured and controlled by HR systems, including management review, approval, and audits.

3.3.2. Privileged access controls in Red Hat OpenShift Service on AWS

SRE adheres to the principle of least privilege when accessing Red Hat OpenShift Service on AWS and AWS components. There are four basic categories of manual SRE access:

- SRE admin access through the Red Hat Portal with normal two-factor authentication and no privileged elevation.

- SRE admin access through the Red Hat corporate SSO with normal two-factor authentication and no privileged elevation.

- OpenShift elevation, which is a manual elevation using Red Hat SSO. Access is limited to 2 hours, is fully audited, and requires management approval.

- AWS access or elevation, which is a manual elevation for AWS console access. Access is limited to 60 minutes, is fully audited, and requires management approval.

Each of these access types have different levels of access to components:
<table>
<thead>
<tr>
<th>Component</th>
<th>Typical SRE admin access (Red Hat Portal)</th>
<th>Typical SRE admin access (Red Hat SSO)</th>
<th>OpenShift elevation</th>
<th>Cloud provider access or elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenShift Cluster Manager (OCM)</td>
<td>R/W</td>
<td>No access</td>
<td>No access</td>
<td>No access</td>
</tr>
<tr>
<td>OpenShift console</td>
<td>No access</td>
<td>R/W</td>
<td>R/W</td>
<td>No access</td>
</tr>
<tr>
<td>Node Operatiing system</td>
<td>No access</td>
<td>A specific list of elevated OS and network permissions.</td>
<td>A specific list of elevated OS and network permissions.</td>
<td>No access</td>
</tr>
<tr>
<td>AWS Console</td>
<td>No access</td>
<td>No access, but this is the account used to request cloud provider access.</td>
<td>No access</td>
<td>All cloud provider permissions using the SRE identity.</td>
</tr>
</tbody>
</table>

### 3.3.3. SRE access to AWS accounts

Red Hat personnel do not access AWS accounts in the course of routine Red Hat OpenShift Service on AWS operations. For emergency troubleshooting purposes, the SREs have well-defined and auditable procedures to access cloud infrastructure accounts.

SREs generate a short-lived AWS access token for the `osd ManagedAdminSRE` user using the AWS Security Token Service (STS). Access to the STS token is audit-logged and traceable back to individual users. The `osd ManagedAdminSRE` user has the AdministratorAccess IAM policy attached.

### 3.3.4. Red Hat support access

Members of the Red Hat Customer Experience and Engagement (CEE) team typically have read-only access to parts of the cluster. Specifically, CEE has limited access to the core and product namespaces and does not have access to the customer namespaces.

<table>
<thead>
<tr>
<th>Role</th>
<th>Core namespace</th>
<th>Layered product namespace</th>
<th>Customer namespace</th>
<th>AWS account*</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenShift SRE</td>
<td>Read: All</td>
<td>Read: All</td>
<td>Read: None</td>
<td>Read: All</td>
</tr>
<tr>
<td></td>
<td>Write: Very</td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: All</td>
</tr>
<tr>
<td></td>
<td>limited [1]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role</td>
<td>Core namespace</td>
<td>Layered product namespace</td>
<td>Customer namespace</td>
<td>AWS account*</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------</td>
<td>--------------------------</td>
<td>--------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>CEE</td>
<td>Read: All</td>
<td>Read: All</td>
<td>Read: None[^2]</td>
<td>Read: None</td>
</tr>
<tr>
<td></td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: None</td>
</tr>
<tr>
<td>Customer administrator</td>
<td>Read: None</td>
<td>Read: None</td>
<td>Read: All</td>
<td>Read: All</td>
</tr>
<tr>
<td></td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: All</td>
<td>Write: All</td>
</tr>
<tr>
<td>Customer user</td>
<td>Read: None</td>
<td>Read: None</td>
<td>Read: Limited[^4]</td>
<td>Read: None</td>
</tr>
<tr>
<td></td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: Limited[^4]</td>
<td>Write: None</td>
</tr>
<tr>
<td>Everybody else</td>
<td>Read: None</td>
<td>Read: None</td>
<td>Read: None</td>
<td>Read: None</td>
</tr>
<tr>
<td></td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: None</td>
<td>Write: None</td>
</tr>
</tbody>
</table>

1. Limited to addressing common use cases such as failing deployments, upgrading a cluster, and replacing bad worker nodes.

2. Red Hat associates have no access to customer data by default.

3. SRE access to the AWS account is an emergency procedure for exceptional troubleshooting during a documented incident.

4. Limited to what is granted through RBAC by the Customer Administrator, as well as namespaces created by the user.

### 3.3.5. Customer access

Customer access is limited to namespaces created by the customer and permissions that are granted using RBAC by the Customer Administrator role. Access to the underlying infrastructure or product namespaces is generally not permitted without `cluster-admin` access. More information on customer access and authentication can be found in the "Understanding Authentication" section of the documentation.

### 3.3.6. Access approval and review

New SRE user access requires management approval. Separated or transferred SRE accounts are removed as authorized users through an automated process. Additionally, the SRE performs periodic access review, including management sign-off of authorized user lists.

### 3.4. SECURITY AND REGULATION COMPLIANCE

Security and regulation compliance includes tasks such as the implementation of security controls and compliance certification.

### 3.4.1. Data classification
Red Hat defines and follows a data classification standard to determine the sensitivity of data and highlight inherent risk to the confidentiality and integrity of that data while it is collected, used, transmitted, stored, and processed. Customer-owned data is classified at the highest level of sensitivity and handling requirements.

3.4.2. Data management

Red Hat OpenShift Service on AWS (ROSA) uses AWS KMS to help securely manage keys for encrypted data. These keys are used for control plane data volumes that are encrypted by default. Persistent volumes (PVs) for customer applications also use AWS KMS for key management.

When a customer deletes their ROSA cluster, all cluster data is permanently deleted, including control plane data volumes, customer application data volumes, such as PVs, and backup data.

3.4.3. Vulnerability management

Red Hat performs periodic vulnerability scanning of ROSA using industry standard tools. Identified vulnerabilities are tracked to their remediation according to timelines based on severity. Vulnerability scanning and remediation activities are documented for verification by third-party assessors in the course of compliance certification audits.

3.4.4. Network security

3.4.4.1. Firewall and DDoS protection

Each ROSA cluster is protected by a secure network configuration using firewall rules for AWS Security Groups. ROSA customers are also protected against DDoS attacks with AWS Shield Standard.

3.4.4.2. Private clusters and network connectivity

Customers can optionally configure their ROSA cluster endpoints, such as web console, API, and application router, to be made private so that the cluster control plane and applications are not accessible from the Internet. Red Hat SRE still requires Internet-accessible endpoints that are protected with IP allow-lists.

AWS customers can configure a private network connection to their ROSA cluster through technologies such as AWS VPC peering, AWS VPN, or AWS Direct Connect.

3.4.4.3. Cluster network access controls

Fine-grained network access control rules can be configured by customers, on a per-project basis, using NetworkPolicy objects and the OpenShift SDN.

3.4.5. Penetration testing

Red Hat performs periodic penetration tests against ROSA. Tests are performed by an independent internal team by using industry standard tools and best practices.

Any issues that may be discovered are prioritized based on severity. Any issues found belonging to open source projects are shared with the community for resolution.

3.4.6. Compliance

ROSA follows common industry best practices for security and controls.
3.5. DISASTER RECOVERY

Red Hat OpenShift Service on AWS (ROSA) provides disaster recovery for failures that occur at the pod, worker node, infrastructure node, master node, and availability zone levels.

All disaster recovery requires that the customer use best practices for deploying highly available applications, storage, and cluster architecture, such as single-zone deployment or multi-zone deployment, to account for the level of desired availability.

One single-zone cluster will not provide disaster avoidance or recovery in the event of an availability zone or region outage. Multiple single-zone clusters with customer-maintained failover can account for outages at the zone or at the regional level.

One multi-zone cluster will not provide disaster avoidance or recovery in the event of a full region outage. Multiple multi-zone clusters with customer-maintained failover can account for outages at the regional level.

3.6. ADDITIONAL RESOURCES

- For more information about customer or shared responsibilities, see the ROSA Responsibilities document.

- For more information about ROSA and its components, see the ROSA Service Definition.
CHAPTER 4. ABOUT AVAILABILITY FOR RED HAT OPENSSHIFT SERVICE ON AWS

Availability and disaster avoidance are extremely important aspects of any application platform. Although Red Hat OpenShift Service on AWS (ROSA) provides many protections against failures at several levels, customer-deployed applications must be appropriately configured for high availability. To account for outages that might occur with cloud providers, additional options are available such as deploying a cluster across multiple availability zones and maintaining multiple clusters with failover mechanisms.

4.1. POTENTIAL POINTS OF FAILURE

Red Hat OpenShift Service on AWS (ROSA) provides many features and options for protecting your workloads against downtime, but applications must be architectured appropriately to take advantage of these features.

ROSA can help further protect you against many common Kubernetes issues by adding Red Hat site reliability engineering (SRE) support and the option to deploy a multiple availability zone cluster, but there are a number of ways in which a container or infrastructure can still fail. By understanding potential points of failure, you can understand risks and appropriately architect both your applications and your clusters to be as resilient as necessary at each specific level.

NOTE

An outage can occur at several different levels of infrastructure and cluster components.

4.1.1. Container or pod failure

By design, pods are meant to exist for a short time. Appropriately scaling services so that multiple instances of your application pods are running can protect against issues with any individual pod or container. The OpenShift node scheduler can also make sure these workloads are distributed across different worker nodes to further improve resiliency.

When accounting for possible pod failures, it is also important to understand how storage is attached to your applications. Single persistent volumes attached to single pods cannot leverage the full benefits of pod scaling, whereas replicated databases, database services, or shared storage can.

To avoid disruption to your applications during planned maintenance, such as upgrades, it is important to define a Pod Disruption Budget. These are part of the Kubernetes API and can be managed with `oc` commands such as other object types. They allow for the specification of safety constraints on pods during operations, such as draining a node for maintenance.

4.1.2. Worker node failure

Worker nodes are the virtual machines that contain your application pods. By default, a ROSA cluster has a minimum of two worker nodes for a single availability-zone cluster. In the event of a worker node failure, pods are relocated to functioning worker nodes, as long as there is enough capacity, until any issue with an existing node is resolved or the node is replaced. More worker nodes means more protection against single-node outages, and ensures proper cluster capacity for rescheduled pods in the event of a node failure.
NOTE

When accounting for possible node failures, it is also important to understand how storage is affected. EFS volumes are not affected by node failure. However, EBS volumes are not accessible if they are connected to a node that fails.

4.1.3. Cluster failure

ROSA clusters have at least three control plane nodes and three infrastructure nodes that are preconfigured for high availability, either in a single zone or across multiple zones, depending on the type of cluster you have selected. Control plane and infrastructure nodes have the same resiliency as worker nodes, with the added benefit of being managed completely by Red Hat.

In the event of a complete control plane outage, the OpenShift APIs will not function, and existing worker node pods are unaffected. However, if there is also a pod or node outage at the same time, the control planes must recover before new pods or nodes can be added or scheduled.

All services running on infrastructure nodes are configured by Red Hat to be highly available and distributed across infrastructure nodes. In the event of a complete infrastructure outage, these services are unavailable until these nodes have been recovered.

4.1.4. Zone failure

A zone failure from AWS affects all virtual components, such as worker nodes, block or shared storage, and load balancers that are specific to a single availability zone. To protect against a zone failure, ROSA provides the option for clusters that are distributed across three availability zones, known as multiple availability zone clusters. Existing stateless workloads are redistributed to unaffected zones in the event of an outage, as long as there is enough capacity.

4.1.5. Storage failure

If you have deployed a stateful application, then storage is a critical component and must be accounted for when thinking about high availability. A single block storage PV is unable to withstand outages even at the pod level. The best ways to maintain availability of storage are to use replicated storage solutions, shared storage that is unaffected by outages, or a database service that is independent of the cluster.
CHAPTER 5. RED HAT OPENSShift SERVICE ON AWS UPDATE LIFE CYCLE

5.1. OVERVIEW

Red Hat provides a published product life cycle for Red Hat OpenShift Service on AWS in order for customers and partners to effectively plan, deploy, and support their applications running on the platform. Red Hat publishes this life cycle in order to provide as much transparency as possible and might make exceptions from these policies as conflicts arise.

Red Hat OpenShift Service on AWS is a managed instance of Red Hat OpenShift and maintains an independent release schedule. More details about the managed offering can be found in the Red Hat OpenShift Service on AWS service definition. The availability of Security Advisories and Bug Fix Advisories for a specific version are dependent upon the Red Hat OpenShift Container Platform life cycle policy and subject to the Red Hat OpenShift Service on AWS maintenance schedule.

Additional resources
- Red Hat OpenShift Service on AWS service definition

5.2. DEFINITIONS

Table 5.1. Version reference

<table>
<thead>
<tr>
<th>Version format</th>
<th>Major</th>
<th>Minor</th>
<th>Patch</th>
<th>Major.minor.patch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>y</td>
<td>z</td>
<td>x.y.z</td>
</tr>
<tr>
<td>Example</td>
<td>4</td>
<td>5</td>
<td>21</td>
<td>4.5.21</td>
</tr>
</tbody>
</table>

Major releases or X-releases
Referred to only as major releases or X-releases (X.y,z).

Examples
- "Major release 5" → 5.y.z
- "Major release 4" → 4.y.z
- "Major release 3" → 3.y.z

Minor releases or Y-releases
Referred to only as minor releases or Y-releases (x.Y.z).

Examples
- "Minor release 4" → 4.4.z
- "Minor release 5" → 4.5.z
- "Minor release 6" → 4.6.z
Patch releases or Z-releases
Referred to only as patch releases or Z-releases (x.y.Z).

Examples
- "Patch release 14 of minor release 5" → 4.5.14
- "Patch release 25 of minor release 5" → 4.5.25
- "Patch release 26 of minor release 6" → 4.6.26

5.3. MAJOR VERSIONS (X.Y.Z)
Major versions of Red Hat OpenShift Service on AWS, for example version 4, are supported for one year following the release of a subsequent major version or the retirement of the product.

Example
- If version 5 were made available on Red Hat OpenShift Service on AWS on January 1, version 4 would be allowed to continue running on managed clusters for 12 months, until December 31. After this time, clusters would need to be upgraded or migrated to version 5.

5.4. MINOR VERSIONS (X.Y.Z)
Red Hat supports two minor versions of the major release.
- Y: The latest available minor release. For example, 4.8.
- Y-1: The previous minor version. For example, 4.7.

After an upgrade path from the previous minor version (Y-1) to the latest minor version (Y) is available, clusters running Y-2 must upgrade their cluster within a 30 day grace period. Any cluster remaining on Y-2 30 days after notification of upgrade availability are classified as being in limited support status until the cluster is upgraded to a supported release.

Example
1. A customer’s cluster is currently running on 4.5.18. The latest version for 4.6 is 4.6.27.
2. On February 25, 4.7.2 is released as an available upgrade path from 4.6.27 and the customer is notified.
3. The cluster must be upgraded to 4.6.27 or later by March 25.
4. If the upgrade has not been performed, then the cluster will have SRE alerting disabled and will be unsupported until it is upgraded to 4.6.27 or later.

Additional resources
- Red Hat OpenShift Service on AWS limited support status

5.5. PATCH VERSIONS (X.Y.Z)
During the period in which a minor release is supported, all OpenShift Container Platform patch releases are supported unless otherwise specified.

For reasons of platform security and stability, a patch release might be deprecated, which would prevent installations of that release and trigger mandatory upgrades off that release.

Example

1. 4.7.6 is found to contain a critical CVE.

   2. Any releases impacted by the CVE will be removed from the supported patch release list. In addition, any clusters running 4.7.6 will be scheduled for automatic upgrades within 48 hours.

5.6. LIMITED SUPPORT STATUS

While operating outside of the supported versions list, you might be asked to upgrade the cluster to a supported version when requesting support, unless you are within the 30-day grace period after version deprecation. Additionally, Red Hat does not make any runtime or SLA guarantees for clusters outside of the supported versions list at the end of the 30-day grace period.

Red Hat provides best effort to ensure an upgrade path from an unsupported release to a supported release is available. However, if a supported upgrade path is no longer available, you might be required to create a new cluster and migrate your workloads.

5.7. SUPPORTED VERSIONS EXCEPTION POLICY

Red Hat reserves the right to add or remove new or existing versions, or delay upcoming minor release versions, that have been identified to have one or more critical production impacting bugs or security issues without advance notice.

5.8. INSTALLATION POLICY

While Red Hat recommends installation of the latest support release, Red Hat OpenShift Service on AWS supports installation of any supported release as covered by the preceding policy.

5.9. MANDATORY UPGRADES

In the event that a Critical or Important CVE, or other bug identified by Red Hat, significantly impacts the security or stability of the cluster, the customer must upgrade to the next supported patch release within 48 hours.

In extreme circumstances and based on Red Hat’s assessment of the CVE criticality to the environment, if the upgrade to the next supported patch release has not been performed within 48 hours of notification, the cluster will be automatically updated to the latest patch release to mitigate potential security breach or instability.

5.10. LIFE CYCLE DATES

<table>
<thead>
<tr>
<th>Version</th>
<th>General availability</th>
<th>End of life</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
<td>Mar 24, 2021</td>
<td>Release of 4.9 + 30 days</td>
</tr>
</tbody>
</table>