Configuring and managing nodes in Red Hat OpenShift Service on AWS 4
Configuring and managing nodes in Red Hat OpenShift Service on AWS 4 Nodes
Abstract

This document provides instructions for configuring and managing the nodes, Pods, and containers in your cluster. It also provides information on configuring Pod scheduling and placement, using jobs and DaemonSets to automate tasks, and other tasks to ensure an efficient cluster.
CHAPTER 1. NODES .................................................................................................................. 3
  1.1. ABOUT MACHINE POOLS AND AUTOSCALING ................................................................ 3
      1.1.1. Machines .................................................................................................................. 3
      1.1.2. Machine sets ............................................................................................................. 3
      1.1.3. Machine pools ......................................................................................................... 3
      1.1.4. Machine pools in multiple zone clusters ................................................................. 3
      1.1.5. Machine autoscaling ................................................................................................ 3
      1.1.6. Additional resources .............................................................................................. 4
  1.2. MANAGING WORKER NODES ....................................................................................... 4
      1.2.1. Scaling worker nodes ............................................................................................... 4
      1.2.2. Adding node labels .................................................................................................. 5
      1.2.3. Adding instance types ............................................................................................. 5
      1.2.4. Additional resources .............................................................................................. 6
  1.3. ENABLING AUTOSCALING NODES ON A CLUSTER .................................................... 6
      1.3.1. Enabling autoscaling nodes in an existing cluster .................................................... 7
  1.4. AUTOSCALING NODES ON A CLUSTER .................................................................... 7
      1.4.1. Disabling autoscaling nodes in an existing cluster ................................................... 8
      1.4.2. Additional resources ............................................................................................. 8
CHAPTER 1. NODES

1.1. ABOUT MACHINE POOLS AND AUTOSCALING

The Red Hat OpenShift Service on AWS uses machine pools as an elastic, dynamic provisioning method on top of your cloud infrastructure. The primary resources are machines, machine sets, and machine pools.

1.1.1. Machines

A machine is a fundamental unit that describes the host for a worker node.

1.1.2. Machine sets

MachineSet resources are groups of machines. If you need more machines or must scale them down, this is done by configuring the number of replicas in the machine pool to which the machine sets belong.

Machine sets are not directly modifiable in ROSA.

1.1.3. Machine pools

Machine pools are a higher level construct to machine sets.

A machine pool creates machine sets that are all clones of the same configuration across availability zones. Machine pools perform all of the host node provisioning management actions on a worker node. If you need more machines or must scale them down, change the number of replicas in the machine pool to meet your compute needs. Scaling can be configured manually or you can set autoscaling.

By default, a cluster is created with one machine pool. Additional machine pools can be added later to an existing cluster and you can modify the default machine pool. Machine pools can also be deleted.

Multiple machine pools can exist on a single cluster, and they can each have different types or different size nodes.

1.1.4. Machine pools in multiple zone clusters

When you create a machine pool in a multiple availability zone (Multi-AZ) cluster, that one machine pool has 3 zones. The machine pool, in turn, creates a total of 3 machine sets - one machine set for each zone in the cluster. Each of those machine sets manages one or more machines in its respective availability zone.

If you create a new Multi-AZ cluster, the machine pools are replicated to those zones automatically. If you add a machine pool to an existing Multi-AZ, the new pool is automatically created in those zones. Similarly, deleting a machine pool will delete it from all zones. Due to this multiplicative effect, using machine pools in Multi-AZ cluster can consume more of your project’s quota for a specific region when creating machine pools.

1.1.5. Machine autoscaling

The autoscaler option can be configured to automatically scale the number of machines in a cluster.

The cluster autoscaler increases the size of the cluster when there are pods that failed to schedule on any of the current nodes due to insufficient resources or when another node is necessary to meet deployment needs. The cluster autoscaler does not increase the cluster resources beyond the limits.
that you specify.

Additionally, the cluster autoscaler decreases the size of the cluster when some nodes are consistently not needed for a significant period, such as when it has low resource use and all of its important pods can fit on other nodes.

When you enable autoscaling, you must also set a minimum and maximum number of worker nodes.

1.1.6. Additional resources

- Managing worker nodes
- Enabling autoscaling
- Disabling autoscaling

1.2. MANAGING WORKER NODES

This section describes how to manage worker nodes with Red Hat OpenShift Service on AWS (ROSA).

The majority of changes for worker nodes are configured on machine pools. A machine pool is a group of worker nodes in a cluster that have the same configuration, providing ease of management. You can edit the configuration of worker nodes for options such as scaling, instance type, labels, and taints.

1.2.1. Scaling worker nodes

Worker nodes can be scaled manually if you do not want to configure node autoscaling.

Procedure

1. To get a list of the machine pools in a cluster, enter the following command. Each cluster has a default machine pool that is created when you create a cluster.

   ```
   $ rosa list machinepools --cluster=<cluster_name>
   
   Example output
   
<table>
<thead>
<tr>
<th>ID</th>
<th>AUTOSCALING</th>
<th>REPLICAS</th>
<th>INSTANCE TYPE</th>
<th>LABELS</th>
<th>TAINTS</th>
<th>AVAILABILITY ZONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td>us-east-1a</td>
<td></td>
<td>us-east-1a</td>
</tr>
<tr>
<td>mp1</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td>us-east-1a</td>
<td></td>
<td>us-east-1a</td>
</tr>
</tbody>
</table>
   ```

2. Review the output from the `rosa list machinepools` command to find the ID of the machine pool you want to scale and see the current number of replicas.

3. To change the scale, enter the following command and increase or decrease the number of replicas:

   ```
   $ rosa edit machinepool --cluster=<cluster_name> --replicas=<number_worker_nodes> <machinepool_ID>
   ```

4. To verify that the change has taken effect, enter the following command:
CHAPTER 1. NODES

5. Optional: To view this change in the OCM console:
   a. Select the cluster.
   b. From the Overview tab, in the Details pane, review the Compute node number.

1.2.2. Adding node labels

Add or edit labels for worker nodes at any time to manage the nodes in a manner that is relevant to you. For example, you can assign types of workloads to specific nodes.

Labels are assigned as key=value pairs. Each key must be unique to the object it is assigned to. Labels do not change or impact the core system values, such as a machine pool ID.

Procedure

1. To create a new machine pool, add the node labels, and create replica worker nodes, enter the following command:

   $ rosa create machinepool --cluster=<cluster-name> <machinepool_ID> --replicas=<number-nodes> --labels=<key=pair>

   This example shows how to use labels to assign a database workload to a group of worker nodes, and creates 2 replica worker nodes that you can manage as one unit:

   $ rosa create machinepool --cluster=mycluster db-nodes-mp --replicas=2 --labels=app=db, tier=backend

   **Example output**

   I: Machine pool 'db-nodes-mp' created successfully on cluster 'mycluster'

Verification

1. To verify that the machine pool, labels, and replicas were created, enter the following command:

   $ rosa list machinepools --cluster=<cluster_name>

   **Example output**

<table>
<thead>
<tr>
<th>ID</th>
<th>AUTOSCALING</th>
<th>REPLICAS</th>
<th>INSTANCE TYPE</th>
<th>LABELS</th>
<th>TAINTS</th>
<th>AVAILABILITY ZONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td></td>
<td></td>
<td>us-east-1a</td>
</tr>
<tr>
<td>db-nodes-mp</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td>app=db, tier=backend</td>
<td></td>
<td>us-east-1a</td>
</tr>
</tbody>
</table>

1.2.3. Adding instance types
After a machine pool is created, the instance type cannot be changed. To add a different instance type for worker nodes, you must create a new machine pool for the additional instance type.

Procedure

1. To add an instance type with a new machine pool, enter the following command:

   ```
   $ rosa create machinepool --cluster=<cluster-name> <machinepool_ID> --instance-type=<type>
   ```

   This example creates a new machine pool with the instance type `m5.2x.large`, 2 replicas, and labels on a cluster named `mycluster`:

   ```
   $ rosa create machinepool --cluster=mycluster db-nodes-large-mp --replicas=2 --labels=app=db,tier=backend --instance-type=m5.2xlarge
   ```

   **NOTE**

   For a complete list of supported instance types, see the Policies and Service Definition.

2. To verify that the machine pool was created with the instance type, enter the following command:

   ```
   $ rosa list machinepools --cluster=<cluster_name>
   ```

   **Example output**

<table>
<thead>
<tr>
<th>ID</th>
<th>AUTOSCALING</th>
<th>REPLICA</th>
<th>INSTANCE TYPE</th>
<th>LABELS</th>
<th>TAINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVAILABILITY ZONES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td></td>
<td>us-east-1a</td>
</tr>
<tr>
<td>db-nodes-mp</td>
<td>No</td>
<td>2</td>
<td>m5.large</td>
<td>app=db, tier=backend</td>
<td>us-east-1a</td>
</tr>
<tr>
<td>db-nodes-large-mp</td>
<td>No</td>
<td>2</td>
<td>m5.2xlarge</td>
<td>app=db, tier=backend</td>
<td>us-east-1a</td>
</tr>
</tbody>
</table>

1.2.4. Additional resources

- About machinepools and autoscaling
- Enabling autoscaling
- Disabling autoscaling
- ROSA Service Definition

1.3. ENABLING AUTOSCALING NODES ON A CLUSTER

Autoscale worker nodes on a cluster to increase or decrease the number of resources available. Autoscaling for worker nodes is configured in the machine pool definition if you are configuring an existing cluster.
NOTE
Additionally, you can configure autoscaling on the default machine pool when you create the cluster using interactive mode.

1.3.1. Enabling autoscaling nodes in an existing cluster

Configure autoscaling to dynamically scale the number of worker nodes up or down based on load.

Successful autoscaling is dependent on having the correct AWS resource quotas in your AWS account. Verify resource quotas and request quota increases from the AWS console.

Procedure

1. To identify the machine pool IDs in a cluster, enter the following command:

   $ rosa list machinepools --cluster=<cluster_name>

   Example output

<table>
<thead>
<tr>
<th>ID</th>
<th>AUTOSCALING</th>
<th>REPLICAS</th>
<th>INSTANCE TYPE</th>
<th>LABELS</th>
<th>TINTS</th>
<th>AVAILABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td></td>
<td></td>
<td>us-east-1a</td>
</tr>
<tr>
<td>mp1</td>
<td>No</td>
<td>2</td>
<td>m5.xlarge</td>
<td></td>
<td></td>
<td>us-east-1a</td>
</tr>
</tbody>
</table>

   Decide which machine pool ID you want to configure.

2. To enable autoscaling on a machine pool, enter the following command:

   $ rosa edit machinepool --cluster=<cluster_name> <machinepool_ID> --enable-autoscaling --min-replicas=<number> --max-replicas=<number>

   Example

   Enable autoscaling on a machine pool with the ID mp1 on a cluster named mycluster, with the number of replicas set to scale between 2 and 5 worker nodes:

   $ rosa edit machinepool --cluster=mycluster mp1 --enable-autoscaling --min-replicas=2 --max-replicas=5

Additional resources

- About machinepools and autoscaling
- Disabling autoscaling
- Managing worker nodes
- Managing objects with the rosa CLI

1.4. AUTOSCALING NODES ON A CLUSTER
Autoscale worker nodes on a cluster to increase or decrease the number of resources available. Autoscaling for worker nodes is configured in the machine pool definition if you are configuring an existing cluster.

**NOTE**
Additionally, you can configure autoscaling on the default machine pool when you create the cluster using interactive mode.

### 1.4.1. Disabling autoscaling nodes in an existing cluster

Disable autoscaling for worker nodes in the machine pool definition.

**Procedure**

1. Enter the following command:

   ```bash
   $ rosa edit machinepool --cluster=<cluster_name> <machinepool_ID> --enable-autoscaling=false --replicas=<number>
   ```

   **Example**

   Disable autoscaling on the **default** machine pool on a cluster named **mycluster**:

   ```bash
   $ rosa edit machinepool --cluster=mycluster default --enable-autoscaling=false --replicas=3
   ```

### 1.4.2. Additional resources

- About machinepools and autoscaling
- Enabling autoscaling
- Managing worker nodes
- Managing objects with the rosa CLI