

Enabling Automatic System Memory and CPU Reservation in OpenShift

Overview

We are currently receiving alerts regarding 'System Memory Exceeds Reservation' across AMS Dev, Test, and Prod environments.

To address this, we will enable OpenShift's ability to automatically determine and allocate system-reserved

CPU and memory on nodes, based on their capacity.

This is done by creating a KubeletConfig Custom Resource (CR) with autoSizingReserved: true.

Before Enabling

Default system-reserved resources:

- CPU: 500m
- Memory: 1Gi

```
sh-5.1# cat /etc/node-sizing.env
SYSTEM_RESERVED_MEMORY=1Gi
SYSTEM_RESERVED_CPU=500m
SYSTEM_RESERVED_ES=1Gi
```

These default values may be insufficient for nodes with higher capacity, leading to alerts.

Procedure

1. Create a KubeletConfig Custom Resource (CR)

Sample YAML configuration:

```
apiVersion: machineconfiguration.openshift.io/v1
kind: KubeletConfig
metadata:
  name: dynamic-node
```

```
spec:  
  autoSizingReserved: true  
  machineConfigPoolSelector:  
    matchLabels:  
      pools.operator.machineconfiguration.openshift.io/worker: ""
```

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- Name: Assign a name for the CR (dynamic-node in this example).
- autoSizingReserved: Set to true to enable automatic sizing.
- machineConfigPoolSelector: Specify the label associated with your machine config pool.

Apply the Configuration

1. Save the YAML content into a file, for example: dynamic-node-kubeletconfig.yaml
2. Create the CR using the command:

```
oc create -f dynamic-node-kubeletconfig.yaml
```

3. If updating an existing file:

```
oc apply -f dynamic-node-kubeletconfig.yaml
```

Verification Steps

1. Debug into a configured node:

```
oc debug node/<node_name>
```

2. Set /host as the root directory:

```
chroot /host
```

3. View the generated system sizing configuration:

```
cat /etc/node-sizing.env
```

Expected Output Example:

SYSTEM_RESERVED_MEMORY=3Gi

SYSTEM_RESERVED_CPU=0.08

In our case:

```
sh-4.4# cat /etc/node-sizing.env
SYSTEM_RESERVED_MEMORY=5Gi
SYSTEM_RESERVED_CPU=0.11
SYSTEM_RESERVED_ES=1Gi
```

Note: It may take a few minutes for these values to be generated after applying the CR.

Important Notes

- No need to manually modify node sizing once autoSizingReserved is enabled.
- Future capacity upgrades on nodes will dynamically adjust their reserved values.

Ensure that machine config pools successfully apply the changes to avoid partial configuration.

Summary

Enabling autoSizingReserved: true will:

- Resolve memory reservation alerts.
- Ensure that system-reserved CPU and memory are optimized according to the node hardware.
- Reduce manual intervention in system resource tuning.

Reference

Refer to the official Red Hat documentation:

https://docs.redhat.com/en/documentation/openshift_container_platform/4.14/html/nodes/working-with-nodes#nodes-nodes-resources-configuring-auto_nodes-nodes-resources-configuring