Red Hat build of MicroShift 4.15

Troubleshooting

Troubleshooting common issues

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Abstract

Information about troubleshooting common Red Hat build of MicroShift issues.

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CHAPTER 1. CHECKING WHICH VERSION YOU HAVE INSTALLED

To begin troubleshooting, determine which version of Red Hat build of MicroShift you have installed.

1.1. CHECKING THE VERSION USING THE COMMAND-LINE INTERFACE

To begin troubleshooting, you must know your MicroShift version. One way to get this information is by using the CLI.

Procedure

- Run the following command to check the version information:

```
$ microshift version
```

Example output

```
Red Hat build of MicroShift Version: 4.15-0.microshift-e6980e25
Base OCP Version: 4.15
```

1.2. CHECKING THE MICROSHIFT VERSION USING THE API

To begin troubleshooting, you must know your MicroShift version. One way to get this information is by using the API.

Procedure

- To get the version number using the OpenShift CLI (**oc**), view the **kube-public/microshift-version** config map by running the following command:

```
$ oc get configmap -n kube-public microshift-version -o yaml
```

Example output

```
apiVersion: v1
data:
  major: "4"
  minor: "13"
  version: 4.13.8-0.microshift-fa441af87431
kind: ConfigMap
metadata:
  creationTimestamp: "2023-08-03T21:06:11Z"
  name: microshift-version
  namespace: kube-public
```

1.3. CHECKING THE ETCD VERSION

You can get the version information for the etcd database included with your MicroShift.

Procedure

- To display the base database version information, run the following command:

```
$ microshift-etcd version
```

Example output

```
microshift-etcd Version: 4.15.1
Base etcd Version: 3.5.10
```

- To display the full database version information, run the following command:

```
$ microshift-etcd version -o json
```

Example output

```
{
  "major": "4",
  "minor": "15",
  "gitVersion": "4.15.1",
  "gitCommit": "2e182312718cc9d267ec71f37dc2fbe2eed01ee2",
  "gitTreeState": "clean",
  "buildDate": "2024-01-09T06:51:40Z",
  "goVersion": "go1.20.10",
  "compiler": "gc",
  "platform": "linux/amd64",
  "patch": "",
  "etcdVersion": "3.5.10"
}
```

CHAPTER 2. TROUBLESHOOTING DATA BACKUP AND RESTORE

To troubleshoot failed data backups and restorations, check the basics first, such as data paths, storage configuration, and storage capacity.

2.1. BACKING UP DATA FAILED

Data backups are automatic on **rpm-ostree** systems. If you are not using an **rpm-ostree** system and attempted to create a manual backup, the following reasons can cause the backup to fail:

- Not waiting several minutes after a system start to successfully stop MicroShift. The system must complete health checks and any other background processes before a back up can succeed.
- If MicroShift stopped running because of an error, you cannot perform a backup of the data.
    - Make sure the system is healthy.
    - Stop it in a healthy state before attempting a backup.
- If you do not have sufficient storage for the data, the backup fails. Ensure that you have enough storage for the MicroShift data.
- If you do not have sufficient permissions, a backup can fail. Ensure you have the correct user permissions to create a backup and perform the required configurations.

2.2. BACKUP LOGS

- Logs print to the console during manual backups.
- Logs are automatically generated for **rpm-ostree** system automated backups as part of the MicroShift journal logs. You can check the logs by running the following command:

```
$ sudo journalctl -u microshift
```

2.3. RESTORING DATA FAILED

The restoration of data can fail for many reasons, including storage and permission issues. Mismatched data versions can cause failures when MicroShift restarts.

2.3.1. RPM-OSTree-based systems data restore failed

Data restorations are automatic on **rpm-ostree** systems, but can fail, for example:

- The only backups that are restored on **rpm-ostree** systems are backups from the current deployment or a rollback deployment. Backups are not taken on an unhealthy system.
    - Only the latest backups that have corresponding deployments are retained. Outdated backups that do not have a matching deployment are automatically removed.
    - Data is usually not restored from a newer version of MicroShift.

    - Ensure that the data you are restoring follows same versioning pattern as the update path. For example, if the destination version of MicroShift is an older version than the version of the MicroShift data you are currently using, the restoration can fail.

2.3.2. RPM-based manual data restore failed

If you are using an RPM system that is not **rpm-ostree** and tried to restore a manual backup, the following reasons can cause the restoration to fail:

- If MicroShift stopped running because of an error, you cannot restore data.
    - Make sure the system is healthy.
    - Start it in a healthy state before attempting to restore data.
- If you do not have enough storage space allocated for the incoming data, the restoration fails.
    - Make sure that your current system storage is configured to accept the restored data.
- You are attempting to restore data from a newer version of MicroShift.
    - Ensure that the data you are restoring follows same versioning pattern as the update path. For example, if the destination version of MicroShift is an older version than the version of the MicroShift data you are attempting to use, the restoration can fail.

2.4. STORAGE MIGRATION FAILED

Storage migration failures are typically caused by substantial changes in custom resources (CRs) from one MicroShift to the next. If a storage migration fails, there is usually an unresolvable discrepancy between versions that requires manual review.

CHAPTER 3. TROUBLESHOOTING A CLUSTER

To begin troubleshooting a Red Hat build of MicroShift cluster, first access the cluster status.

3.1. CHECKING THE STATUS OF A CLUSTER

You can check the status of a MicroShift cluster or see active pods by running a simple command. Given in the following procedure are three commands you can use to check cluster status. You can choose to run one, two, or all commands to help you retrieve the information you need to troubleshoot the cluster.

Procedure

- You can check the system status, which returns the cluster status, by running the following command:

```
$ sudo systemctl status microshift
```

  If MicroShift is failing to start, this command returns the logs from the previous run.

- Optional: You can view the logs by running the following command:

```
$ sudo journalctl -u microshift
```

NOTE

The default configuration of the **systemd** journal service stores data in a volatile directory. To persist system logs across system starts and restarts, enable log persistence and set limits on the maximum journal data size.

- Optional: If MicroShift is running, you can see active pods by entering the following command:

```
$ oc get pods -A
```

CHAPTER 4. TROUBLESHOOT UPDATES

To troubleshoot MicroShift updates, use the following guide.

IMPORTANT

You can only update MicroShift from one minor version to the next in sequence. For example, you must update 4.14 to 4.15.

4.1. TROUBLESHOOTING MICROSHIFT UPDATES

In some cases, MicroShift might fail to update. In these events, it is helpful to understand failure types and how to troubleshoot them.

4.1.1. Update path is blocked by MicroShift version sequence

MicroShift requires serial updates. Attempting to update MicroShift by skipping a minor version fails:

- For example, if your current version is **4.14.5**, but you try to update from that version to **4.16.0**, the message, **executable (4.16.0) is too recent compared to existing data (4.14.5): version difference is 2, maximum allowed difference is 1** appears and MicroShift fails to start.

In this example, you must first update **4.14.5** to a version of **4.15**, and then you can upgrade to **4.16.0**.

4.1.2. Update path is blocked by version incompatibility

RPM dependency errors result if a MicroShift update is incompatible with the version of Red Hat Enterprise Linux for Edge (RHEL for Edge) or Red Hat Enterprise Linux (RHEL).

Check the following compatibility table:

Red Hat Device Edge release compatibility matrix

The two products of Red Hat Device Edge work together as a single solution for device-edge computing. To successfully pair your products, use the verified releases together for each as listed in the following table:

RHEL for Edge Version(s)	MicroShift Version	MicroShift Release Status	MicroShift Supported Updates
9.2, 9.3	4.15	Generally Available	4.15.0→4.15.z and 4.15→future minor version
9.2, 9.3	4.14	Generally Available	4.14.0→4.14.z and 4.14→4.15
9.2	4.13	Technology Preview	None
8.7	4.12	Developer Preview	None

Check the following update paths:

Red Hat build of MicroShift update paths

- Generally Available Version 4.14.0 to 4.14.z on RHEL for Edge 9.2
- Generally Available Version 4.14.0 to 4.14.z on RHEL 9.2

4.1.3. OSTree update failed

If you updated on an OSTree system, the Greenboot health check automatically logs and acts on system health. A failure can be indicated by a system rollback by Greenboot. In cases where the update failed, but Greenboot did not complete a system rollback, you can troubleshoot using the RHEL for Edge documentation linked in the "Additional resources" section that follows this content.

Checking the Greenboot logs manually

- Manually check the Greenboot logs to verify system health by running the following command:

```
$ sudo systemctl restart --no-block greenboot-healthcheck && sudo journalctl -fu greenboot-healthcheck
```

4.1.4. Manual RPM update failed

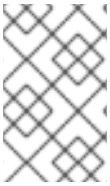
If you updated by using RPMs on a non-OSTree system, an update failure can be indicated by Greenboot, but the health checks are only informative. Checking the system logs is the next step in troubleshooting a manual RPM update failure. You can use Greenboot and **sos report** to check both the MicroShift update and the host system.

Additional resources

- Enabling **systemd** journal service data persistency
- Checking the MicroShift version
- Stopping the MicroShift service
- Starting the MicroShift service
- Composing, installing, and managing RHEL for Edge images
- Rolling back RHEL for Edge images

4.2. CHECKING JOURNAL LOGS AFTER UPDATES

In some cases, MicroShift might fail to update. In these events, it is helpful to understand failure types and how to troubleshoot them. The journal logs can assist in diagnosing update failures.



NOTE

The default configuration of the **systemd** journal service stores data in a volatile directory. To persist system logs across system starts and restarts, enable log persistence and set limits on the maximum journal data size.

Procedure

- Check the MicroShift journal logs by running the following command:

```
$ sudo journalctl -u microshift
```

- Check the Greenboot journal logs by running the following command:

```
$ sudo journalctl -u greenboot-healthcheck
```

- Check the journal logs for a boot of a specific service by running the following command:

```
$ sudo journalctl --boot <boot> -u <service-name>
```

- Examining the comprehensive logs of a specific boot uses two steps. First list the boots, then select the one you want from the list you obtained:
  - List the boots present in the journal logs by running the following command:

```
$ sudo journalctl --list-boots
```

  - Check the journal logs for the boot you want by running the following command:

```
$ sudo journalctl --boot <-my-boot-number>
```

4.3. CHECKING THE STATUS OF GREENBOOT HEALTH CHECKS

Check the status of Greenboot health checks before making changes to the system or during troubleshooting. You can use any of the following commands to help you ensure that Greenboot scripts have finished running.

Procedure

- To see a report of health check status, use the following command:

```
$ systemctl show --property=SubState --value greenboot-healthcheck.service
```

  - An output of **start** means that Greenboot checks are still running.
  - An output of **exited** means that checks have passed and Greenboot has exited. Greenboot runs the scripts in the **green.d** directory when the system is a healthy state.
  - An output of **failed** means that checks have not passed. Greenboot runs the scripts in **red.d** directory when the system is in this state and might restart the system.

- To see a report showing the numerical exit code of the service where **0** means success and non-zero values mean a failure occurred, use the following command:

```
$ systemctl show --property=ExecMainStatus --value greenboot-healthcheck.service
```

- To see a report showing a message about boot status, such as **Boot Status is GREEN - Health Check SUCCESS**, use the following command:

```
$ cat /run/motd.d/boot-status
```

CHAPTER 5. CHECKING AUDIT LOGS

You can use audit logs to identify pod security violations.

5.1. IDENTIFYING POD SECURITY VIOLATIONS THROUGH AUDIT LOGS

You can identify pod security admission violations on a workload by viewing the server audit logs. The following procedure shows you how to access the audit logs and parse them to find pod security admission violations in a workload.

Prerequisites

- You have installed **jq**.
- You have access to the cluster as a user with the **cluster-admin** role.

Procedure

1. To retrieve the node name, run the following command:

```
$ <node_name>=$(oc get node -ojsonpath='{.items[0].metadata.name}')
```

2. To view the audit logs, run the following command:

```
$ oc adm node-logs <node_name> --path=kube-apiserver/
```

Example output

```
rhel-92.lab.local audit-2023-08-18T18-25-41.663.log
rhel-92.lab.local audit-2023-08-19T11-21-29.225.log
rhel-92.lab.local audit-2023-08-20T04-16-09.622.log
rhel-92.lab.local audit-2023-08-20T21-11-41.163.log
rhel-92.lab.local audit-2023-08-21T14-06-10.402.log
rhel-92.lab.local audit-2023-08-22T06-35-10.392.log
rhel-92.lab.local audit-2023-08-22T23-26-27.667.log
rhel-92.lab.local audit-2023-08-23T16-52-15.456.log
rhel-92.lab.local audit-2023-08-24T07-31-55.238.log
```

3. To parse the affected audit logs, enter the following command:

```
$ oc adm node-logs <node_name> --path=kube-apiserver/audit.log \
  | jq -r 'select((.annotations["pod-security.kubernetes.io/audit-violations"] != null) and
(.objectRef.resource=="pods")) | .objectRef.namespace + " " + .objectRef.name + " " +
.objectRef.resource' \
  | sort | uniq -c
```

CHAPTER 6. RESPONSIVE RESTARTS AND SECURITY CERTIFICATES

Red Hat build of MicroShift responds to system configuration changes and restarts after alterations are detected, including IP address changes, clock adjustments, and security certificate age.

6.1. IP ADDRESS CHANGES OR CLOCK ADJUSTMENTS

MicroShift depends on device IP addresses and system-wide clock settings to remain consistent during its runtime. However, these settings may occasionally change on edge devices, such as DHCP or Network Time Protocol (NTP) updates.

When such changes occur, some MicroShift components may stop functioning properly. To mitigate this situation, MicroShift monitors the IP address and system time and restarts if either setting change is detected.

The threshold for clock changes is a time adjustment of greater than 10 seconds in either direction. Smaller drifts on regular time adjustments performed by the Network Time Protocol (NTP) service do not cause a restart.

6.2. SECURITY CERTIFICATE LIFETIME

MicroShift certificates are separated into two basic groups:

1. Short-lived certificates having certificate validity of one year.
2. Long-lived certificates having certificate validity of 10 years.

Most server or leaf certificates are short-term.

An example of a long-lived certificate is the client certificate for **system:admin user** authentication, or the certificate of the signer of the **kube-apiserver** external serving certificate.

6.2.1. Certificate rotation

Certificates that are expired or close to their expiration dates need to be rotated to ensure continued MicroShift operation. When MicroShift restarts for any reason, certificates that are close to expiring are rotated. A certificate that is set to expire imminently, or has expired, can cause an automatic MicroShift restart to perform a rotation.

NOTE

If the rotated certificate is a Certificate Authority, all of the certificates it signed rotate.

6.2.1.1. Short-term certificates

The following situations describe MicroShift actions during short-term certificate lifetimes:

1. No rotation:
   a. When a short-term certificate is up to 5 months old, no rotation occurs.
2. Rotation at restart:
   a. When a short-term certificate is 5 to 8 months old, it is rotated when MicroShift starts or

a. When a short-term certificate is 5 to 8 months old, it is rotated when MicroShift starts or restarts.

3. Automatic restart for rotation:

    a. When a short-term certificate is more than 8 months old, MicroShift can automatically restart to rotate and apply a new certificate.

6.2.1.2. Long-term certificates

The following situations describe MicroShift actions during long-term certificate lifetimes:

1. No rotation:

    a. When a long-term certificate is up to 8.5 years old, no rotation occurs.

2. Rotation at restart:

    a. When a long-term certificate is 8.5 to 9 years old, it is rotated when MicroShift starts or restarts.

3. Automatic restart for rotation:

    a. When a long-term certificate is more than 9 years old, MicroShift can automatically restart to rotate and apply a new certificate.