

Lesson 4 : Monitor an OpenShift Cluster

Navigate the Events, Compute, and Observe panels of the OpenShift web console to assess the overall state of a cluster.

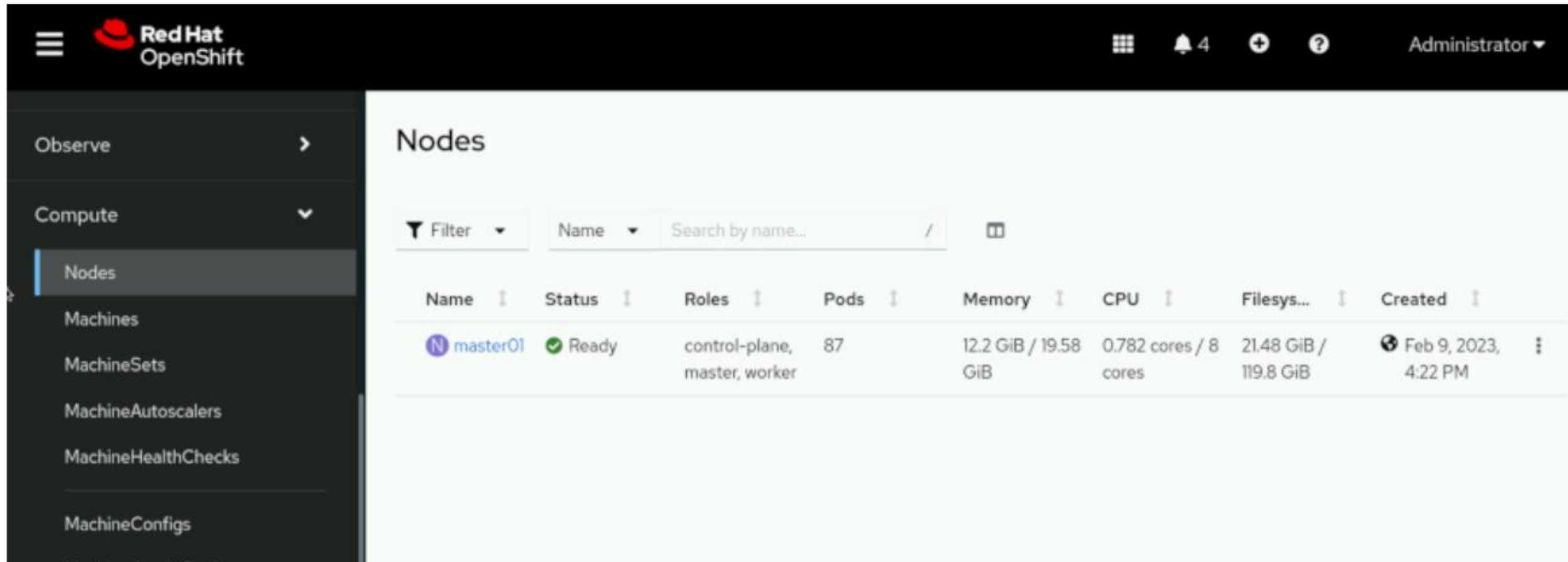
Overview of Nodes, Machines, and Machine Configurations

- Node (in Kubernetes):
 - must be part of cluster
 - single system where pods can run
 - can be bare metal, virtual machine, cloud instances
 - uses kubelet agent to communicate with master node / control plane
- Machine (in OpenShift)
 - to describe cluster node
- MachineConfig
 - defines initial state; including any changes to files, services, OS updates and critical OpenShift service version; particularly : kubelet and cri-o

Machine Config Operator (MCO)

- is cluster-level operator
- maintain the OS and configuration of cluster machines
 - system updates, system state
- ensure correct configuration for each machine
- Uses **MachineConfig** resource to continually **validate** and **remediate** state of cluster machine to intended state
- If **MachineConfig** change, MCO orchestrates execution of changes across all cluster machines
- Prioritized alphabetically by zone (in cloud environment)

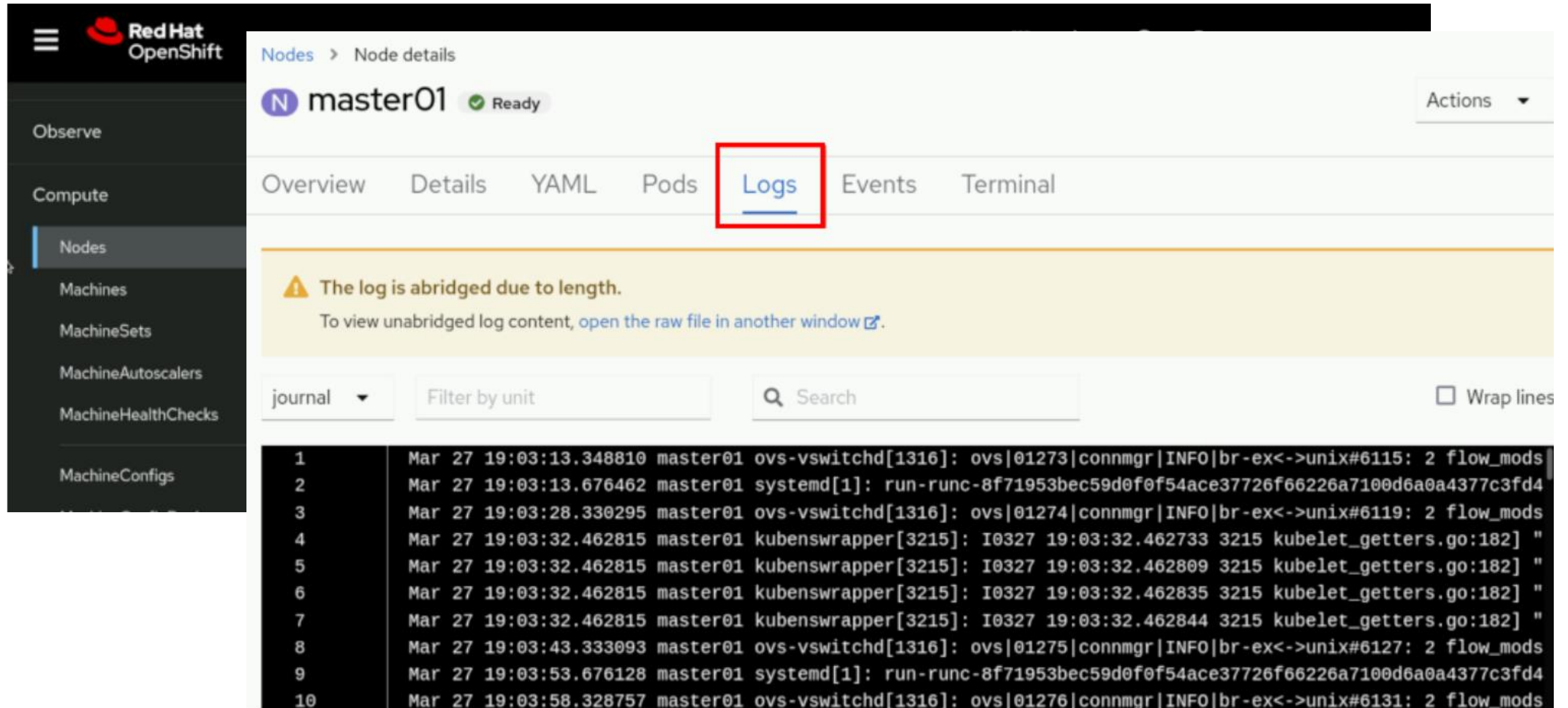
Identify Errors from nodes



The screenshot shows the Red Hat OpenShift console interface. The left sidebar contains navigation links for 'Observe' and 'Compute'. Under 'Compute', the 'Nodes' link is selected. The main panel displays the 'Nodes' page with a table of node information. The table has columns for Name, Status, Roles, Pods, Memory, CPU, Filesys..., and Created. A single node, 'master01', is listed with a 'Ready' status and various resource metrics.

Name	Status	Roles	Pods	Memory	CPU	Filesys...	Created
master01	Ready	control-plane, master, worker	87	12.2 GiB / 19.58 GiB	0.782 cores / 8 cores	21.48 GiB / 119.8 GiB	Feb 9, 2023, 4:22 PM

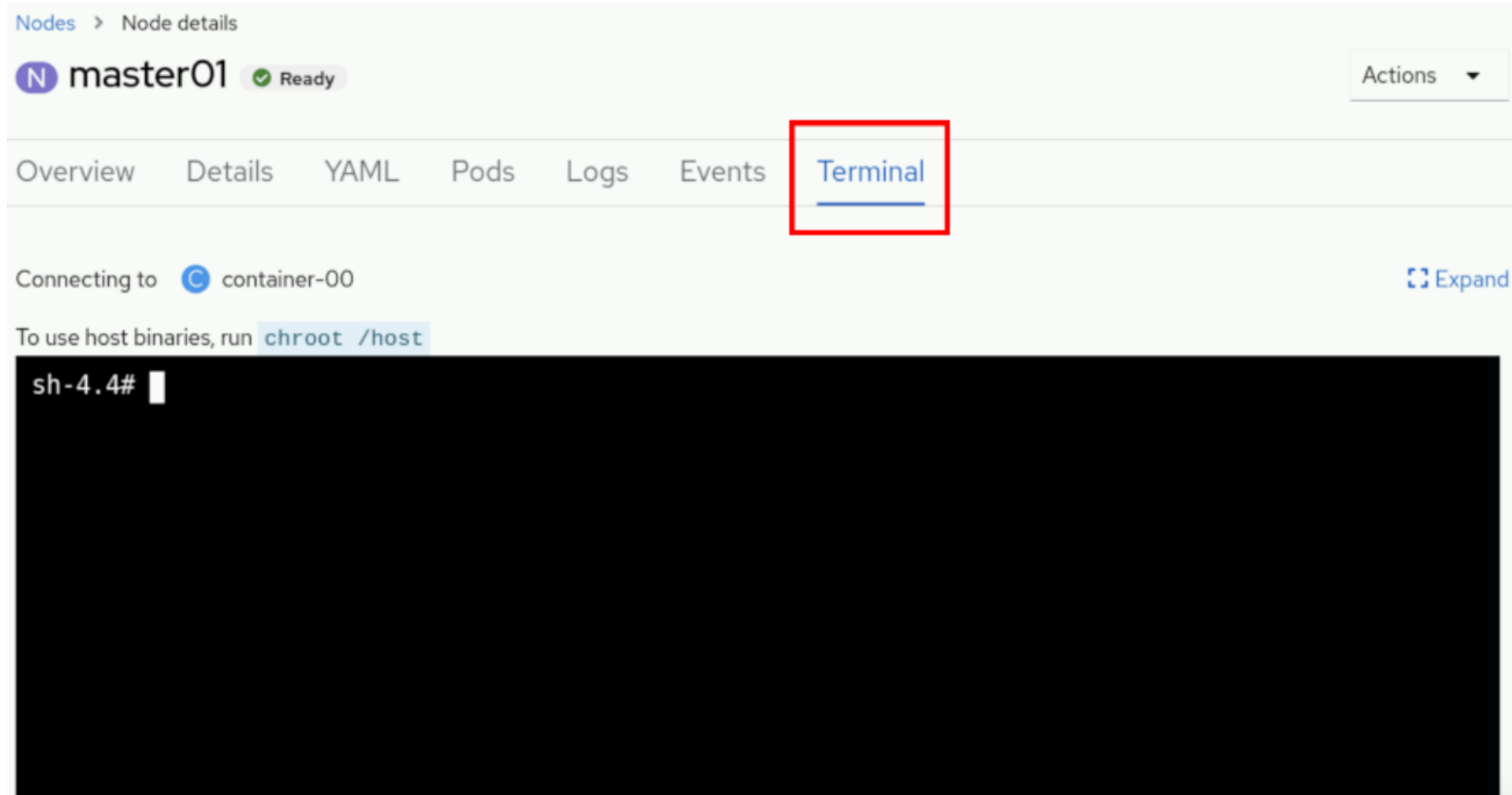
Identify Errors from nodes



The screenshot displays the Red Hat OpenShift console interface. On the left is a dark sidebar with navigation links: Observe, Compute, Nodes (highlighted), Machines, MachineSets, MachineAutoscalers, MachineHealthChecks, and MachineConfigs. The main panel shows the 'Node details' page for 'master01', which is in a 'Ready' state. A red rectangle highlights the 'Logs' tab in the top navigation bar. Below the tabs, a yellow warning banner states: 'The log is abridged due to length. To view unabridged log content, open the raw file in another window'. Below this, there are filters for 'journal', a 'Filter by unit' input, a search bar, and a 'Wrap lines' checkbox. The bottom section shows a list of log entries with line numbers 1 through 10.

Line	Log Entry
1	Mar 27 19:03:13.348810 master01 ovs-vswitchd[1316]: ovs 01273 connmgr INFO br-ex<->unix#6115: 2 flow_mods
2	Mar 27 19:03:13.676462 master01 systemd[1]: run-runc-8f71953bec59d0f0f54ace37726f66226a7100d6a0a4377c3fd4
3	Mar 27 19:03:28.330295 master01 ovs-vswitchd[1316]: ovs 01274 connmgr INFO br-ex<->unix#6119: 2 flow_mods
4	Mar 27 19:03:32.462815 master01 kubenswrapper[3215]: I0327 19:03:32.462733 3215 kubelet_getters.go:182] "
5	Mar 27 19:03:32.462815 master01 kubenswrapper[3215]: I0327 19:03:32.462809 3215 kubelet_getters.go:182] "
6	Mar 27 19:03:32.462815 master01 kubenswrapper[3215]: I0327 19:03:32.462835 3215 kubelet_getters.go:182] "
7	Mar 27 19:03:32.462815 master01 kubenswrapper[3215]: I0327 19:03:32.462844 3215 kubelet_getters.go:182] "
8	Mar 27 19:03:43.333093 master01 ovs-vswitchd[1316]: ovs 01275 connmgr INFO br-ex<->unix#6127: 2 flow_mods
9	Mar 27 19:03:53.676128 master01 systemd[1]: run-runc-8f71953bec59d0f0f54ace37726f66226a7100d6a0a4377c3fd4
10	Mar 27 19:03:58.328757 master01 ovs-vswitchd[1316]: ovs 01276 connmgr INFO br-ex<->unix#6131: 2 flow_mods

Further investigate thru terminal



The screenshot shows the 'Node details' page for a node named 'master01' which is in a 'Ready' state. A red rectangle highlights the 'Terminal' tab in the navigation bar. Below the tabs, it indicates 'Connecting to container-00' and provides a tip: 'To use host binaries, run `chroot /host`'. The terminal window itself is black with the prompt 'sh-4.4#' and a cursor.

Nodes > Node details

N master01 Ready Actions

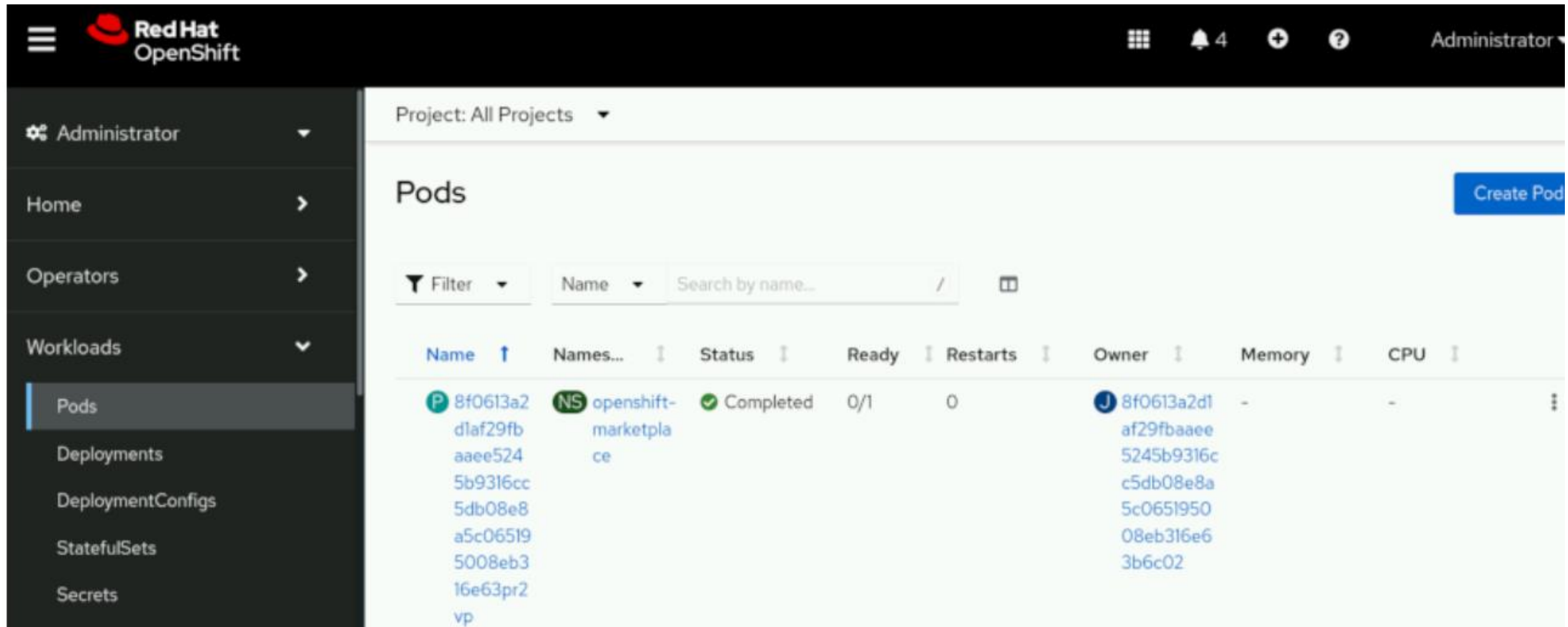
Overview Details YAML Pods Logs Events Terminal

Connecting to **C** container-00 Expand

To use host binaries, run `chroot /host`

```
sh-4.4#
```

Accessing Pod Logs



The screenshot shows the Red Hat OpenShift console interface. The left sidebar contains a navigation menu with the following items: Administrator, Home, Operators, Workloads, and Pods (which is currently selected). The main content area is titled 'Pods' and includes a 'Create Pod' button. Below the title, there is a filter section with a 'Filter' dropdown, a 'Name' dropdown, and a search input field labeled 'Search by name...'. The pods are displayed in a table with the following columns: Name, Names..., Status, Ready, Restarts, Owner, Memory, and CPU. A single pod is listed with the following details:

Name	Names...	Status	Ready	Restarts	Owner	Memory	CPU
8f0613a2d1af29fb aaee5245b9316cc 5db08e8a5c0651950 08eb316e63b6c02 vp	NS openshift-marketplace	Completed	0/1	0	8f0613a2d1af29fb aaee5245b9316cc 5db08e8a5c0651950 08eb316e63b6c02	-	-

Accessing Pod Logs

The screenshot displays the Red Hat OpenShift web console interface. On the left is a dark sidebar with navigation links: Administrator, Home, Operators, Workloads, Pods (selected), Deployments, DeploymentConfigs, StatefulSets, and Secrets. The top header shows the Red Hat OpenShift logo and user information (Administrator). The main content area shows the 'Project: All Projects' dropdown and a breadcrumb 'Pods > Pod details'. A pod is displayed with its ID '8f0613a2d1af29fb...316e63pr2vp' and a 'Completed' status. Below this is a tabbed interface with 'Details' selected. The 'Pod details' section shows fields for Name, Status (Completed), Restart policy (Never restart), Active deadline seconds (Not configured), Namespace (openshift-marketplace), and Labels. An 'Edit' button is visible next to the Labels field.

Project: All Projects

Pods > Pod details

P 8f0613a2d1af29fb...316e63pr2vp Completed Acti...

Details Metrics YAML Environment Logs Events Terminal

Pod details

Name	Status
8f0613a2d1af29fb...316e63pr2vp	✓ Completed
Restart policy	
	Never restart
Active deadline seconds	
	Not configured
Namespace	
NS openshift-marketplace	
Labels	Edit

Red Hat OpenShift Container Platform Metrics and Alerts

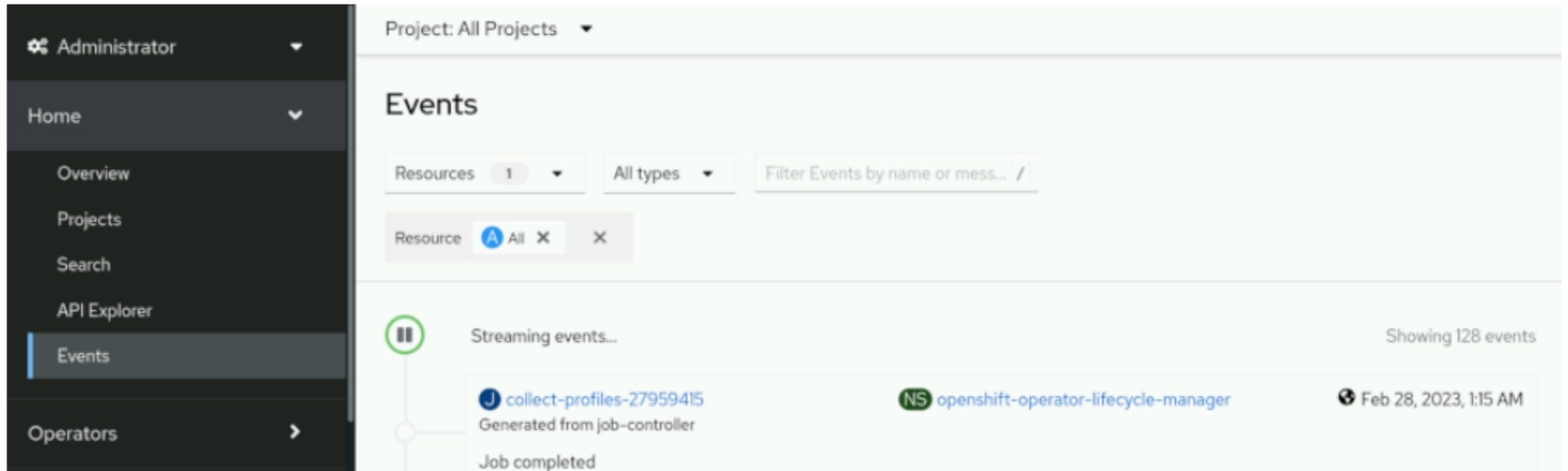
- Metrics pertaining cluster performance and application performance
- Prometheus
 - open-source monitoring and alerting toolkit
 - provide client libraries accessing application level's metrics
- Alert based on degradation of service
 - \leq storage space
 - \geq CPU utilization
- PodMonitor resource
 - Monitor and generate alerts based on information from pods
- ServiceMonitor resource
 - Monitor and generate alerts based on information from services

Kubernetes Events

- Application logs tends to
 - be highly detailed and granular
 - deeper level of details for remediating specific issues
- Events are meaningful in
 - provide high-level abstraction, significant changes
 - understand general performance
 - understand behaviour of nodes, projects, pods at glance
 - highlight meaningful issues

Events console page

Access thru **Home** → **Events** page



The screenshot displays the OpenShift Events console interface. On the left is a dark sidebar with navigation links: Administrator, Home (selected), Overview, Projects, Search, API Explorer, Events, and Operators. The main content area has a light green header with 'Project: All Projects'. Below this is the 'Events' section, which includes filters for 'Resources' (set to 1), 'All types', and a search bar. A 'Resource' filter shows 'All' selected. The event list shows a status icon (a green circle with a pause symbol), the text 'Streaming events...', and 'Showing 128 events'. The first event entry is for 'collect-profiles-27959415', generated from 'job-controller', with namespace 'openshift-operator-lifecycle-manager' and timestamp 'Feb 28, 2023, 1:15 AM'. The event message is 'Job completed'.

Project: All Projects ▼





Events

Resources 1 ▼ All types ▼ Filter Events by name or mess... /

Resource A All X X

Streaming events...

Showing 128 events

	 collect-profiles-27959415 Generated from job-controller Job completed	 openshift-operator-lifecycle-manager	 Feb 28, 2023, 1:15 AM
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API Explorer

- Start learning more about the K8s resources
 - Elaborated definition, metadata
 - Access review (permissions)

The screenshot shows the Red Hat OpenShift API Explorer interface. The top navigation bar includes the Red Hat OpenShift logo, a hamburger menu, and user information (Administrator). The left sidebar contains navigation links: Administrator, Home, Overview, Projects, Search, and API Explorer (which is highlighted). The main content area is titled 'API Explorer' and features filters for 'All groups', 'All versions', 'All scopes', and a 'Filter by kind...' dropdown. Below the filters is a table with the following columns: Kind, Group, Version, Namespaced, and Description. The table contains one entry for 'Binding'.

Kind	Group	Version	Namespaced	Description
Binding	-	v1	true	Binding ties one object to another; for example, a pod is bound to a node by a scheduler. Deprecated in 1.7, please use the bindings subresource of pods instead.

Administrator

Home

Dashboards

Projects

Search

Explore

Events

Operators

Workloads

Networking

Storage

Builds

Service Catalog

Monitoring

Compute

You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Project: all projects

Explore > Resource Details

Resource Quota

Overview

Schema

Instances

Access Review

ResourceQuota > metadata > ownerReferences

List of objects depended by this object. If ALL objects in the list have been deleted, this object will be garbage collected. If this object is managed by a controller, then an entry in this list will point to the controller field set to true. There cannot be more than one managing controllers.

- **apiVersion** string (required)

API version of the referent.

- **blockOwnerDeletion** boolean

If true, AND if the owner has the "foregroundDeletion" finalizer, then the owner cannot be deleted from the key-value store until this reference is removed. Defaults to false. To set this field, a user must have the permission of the owner, otherwise 422 (Unprocessable Entity) will be returned.

- **controller** boolean

If true, this reference points to the managing controller.

- **kind** string (required)

Administrator

Home

Operators

Workloads

Pods

Deployments

Deployment Configs

Stateful Sets

Secrets

Config Maps

Cron Jobs

Jobs

Daemon Sets

Replica Sets

Replication Controllers

Horizontal Pod Autoscalers

Networking

Storage

Builds

Project: openshift-console-operator

Deployments > Deployment Details

console-operator

Overview

YAML

Pods

Environment

Events

```
1 kind: Deployment
2 apiVersion: apps/v1
3 metadata:
4   name: console-operator
5   namespace: openshift-console-operator
6   selfLink: >
7     /apis/apps/v1/namespaces/openshift-console-operator/deployments/console-operator
8   uid: 263bec13-d881-11e9-81c6-0684bea57c06
9   resourceVersion: '7578'
10  generation: 1
11  creationTimestamp: '2019-09-16T12:54:41Z'
12  annotations:
13    deployment.kubernetes.io/revision: '1'
14  spec:
15    replicas: 1
16    selector:
17      matchLabels:
18        name: console-operator
19    template:
20      metadata:
21        creationTimestamp: null
22        labels:
23          name: console-operator
24      spec:
```

Save

Reload

Cancel

Download



Guided Exercise: Monitor an OpenShift Cluster

Explore and show the monitoring features and components.

Explore the Overview page to inspect the cluster status.

Use a terminal connection to the master01 node to view the crio and kubelet services.

Explore the Monitoring page, alert rule configurations, and the etcd service dashboard.

Explore the events page, and filter events by resource name, type, and message.

Lab: Introduction to Kubernetes and OpenShift

You should be able to :

- Navigate the Red Hat OpenShift Container Platform web console to find various information items and configuration details.
- As the student user on the workstation machine, use the lab command to prepare your system for this exercise.
- This command ensures that the Red Hat OpenShift Container Platform is deployed and ready for the lab.

Chapter Summary

In this chapter, you learned:

- Containers are an isolated application runtime created with very little overhead.
- A container image packages an application with all of its dependencies, making it easier to run the application in different environments.
- Applications such as Podman create containers using features of the standard Linux kernel.
- Container image registries are the preferred mechanism for distributing container images to multiple users and hosts.
- OpenShift orchestrates applications composed of multiple containers using Kubernetes.
- Kubernetes manages load balancing, high availability, and persistent storage for containerized applications.
- OpenShift adds to Kubernetes multitenancy, security, ease of use, and continuous integration and continuous development features.
- OpenShift routes enable external access to containerized applications in a manageable way.