OpenShift Container Platform 4 for Operations: EXERCISES

1. Installation

   a. Adding day-1 kernel arguments
   b. Setting DNS to private
   c. Setting the Ingress Controller to private
   d. Restricting the API server to private
   e. Reviewing the installation log
   f. Getting cluster version, status, and update details
   g. Querying the status of the cluster nodes by using the CLI
   h. Gathering logs from a failed installation
   i. Manually gathering logs with SSH access to your host(s)
   j. Manually gathering logs without SSH access to your host(s)
   k. Getting debug information from the installation program

2. Updating a cluster by using the CLI

3. Post-installation

   a. Post-installation machine configuration tasks
       i. Checking machine config pool status
       ii. Configuring chrony time service
       iii. Adding kernel arguments to nodes
       iv. Adding a real-time kernel to nodes
       v. Configuring journald settings
       vi. Configuring container image registry settings
       vii. Adding extensions to RHCOS
       viii. Creating a KubeletConfig CRD to edit kubelet parameters
       ix. Creating a ContainerRuntimeConfig CR to edit CRI-O parameters

   b. Post-installation cluster tasks
       i. Scaling a machine set manually
       ii. Creating default cluster-wide node selectors
       iii. Moving resources to infrastructure machine sets
       iv. Creating infrastructure machine sets for production environments
       v. Sample YAML for a machine set custom resource on AWS
       vi. Creating an infrastructure node
       vii. Creating infrastructure machines
       viii. Deploying the cluster autoscaler
       ix. Deploying the machine autoscaler
       x. Enabling etcd encryption
       xi. Disabling etcd encryption
       xii. Defragmenting etcd data
       xiii. Specifying the number of pods that must be up with pod disruption budgets

c. Post-installation node tasks
    i. Creating a MachineHealthCheck resource
    ii. Setting up CPU Manager
    iii. Configuring huge pages
    iv. Adding taints and tolerations
    v. Adding taints and tolerations using a machine set
    vi. Binding a user to a node using taints and tolerations
    vii. Controlling nodes with special hardware using taints and tolerations
    viii. Removing taints and tolerations
    ix. Disabling or enforcing CPU limits using CPU CFS quotas
    x. Disabling overcommitment for a project
    xi. Configuring garbage collection for containers and images
    xii. Configuring the maximum number of pods per node

d. Post-installation network configuration
    i. Creating a network policy
    ii. Deleting a network policy
    iii. Viewing network policies
    iv. Configuring multitenant isolation by using network policy

e. Preparing for users
    i. Viewing cluster roles and bindings
    ii. Viewing local roles and bindings
    iii. Adding roles to users
    iv. Creating a local role
    v. Creating a cluster role
    vi. Creating a cluster admin
    vii. Removing the kubeadmin user

4. Troubleshooting

a. Gathering data about your cluster
    i. Gathering data about your cluster for Red Hat Support
    ii. Gathering data about specific features
    iii. Obtaining your cluster ID
    iv. Generating a sosreport archive for an OpenShift Container Platform cluster node
    v. Querying bootstrap node journal logs
    vi. Querying cluster node journal logs
    vii. Collecting a network trace from an OpenShift Container Platform node or container
    viii. Summarizing cluster specifications through clusterversion

b. Troubleshooting installations
   i. Specifying OpenShift Container Platform installer log levels
   ii. Troubleshooting openshift-install command issues
   iii. Monitoring installation progress
   iv. Gathering bootstrap node diagnostic data
   v. Investigating master node installation issues
   vi. Investigating etcd installation issues
   vii. Investigating master node kubelet and API server issues
   viii. Investigating worker node installation issues
   ix. Querying Operator status after installation
   x. Gathering logs from a failed installation

c. Verifying node health
   i. Reviewing node status, resource usage, and configuration
   ii. Querying the kubelet's status on a node

d. Troubleshooting CRI-O container runtime issues
   i. Verifying CRI-O runtime engine status
   ii. Gathering CRI-O journald unit logs

e. Troubleshooting Operator issues
   i. Viewing Operator subscription status using the CLI
   ii. Querying Operator pod status
   iii. Gathering Operator logs
   iv. Disabling Machine Config Operator from automatically rebooting

f. Investigating pod issues
   i. Reviewing pod status
   ii. Inspecting pod and container logs
   iii. Accessing running pods
   iv. Starting debug pods with root access
   v. Copying files to and from pods and containers

g. Troubleshooting storage issues
   i. Resolving multi-attach errors

h. Diagnosing OpenShift CLI (oc) issues
   i. Specifying OpenShift CLI (oc) log levels

5. Web console

   a. Configuring the web console
   b. Disabling the web console

6. Security

    a. Container security
        i. Watching cluster events

    b. Configuring certificates
        i. Replacing the default ingress certificate
        ii. Add an API server named certificate

    c. Viewing the audit log
    d. Configuring the audit log policy

7. Encrypting etcd

    a. Enabling etcd encryption
    b. Disabling etcd encryption

8. Authentication

    a. Configuring identity providers
        i. Configuring an HTPasswd identity provider
            1. Creating an HTPasswd file using Linux
            2. Creating the HTPasswd Secret
            3. Adding an identity provider to your clusters
            4. Updating users for an HTPasswd identity provider

    b. Using RBAC to define and apply permissions
        i. Viewing cluster roles and bindings
        ii. Viewing local roles and bindings
        iii. Adding roles to users
        iv. Creating a local role
        v. Creating a cluster role
        vi. Creating a cluster admin

    c. Removing the kubeadmin user
    d. Understanding and creating service accounts
        i. Creating service accounts
        ii. Examples of granting roles to service accounts
        iii. Using a service account's credentials externally

    e. Managing security context constraints
        i. Creating security context constraints
        ii. Role-based access to security context constraints
        iii. Security context constraints reference commands

  f. Creating and using config maps
    i. Creating a config map
    ii. Creating a config map from a directory
    iii. Creating a ConfigMap from a file
    iv. Creating a config map from literal values
    v. Populating environment variables in containers by using config maps
    vi. Setting command-line arguments for container commands with ConfigMaps
    vii. Injecting content into a volume by using config maps

9. Networking

  a. Accessing hosts on Amazon Web Services in an installer-provisioned infrastructure cluster

  b. Expanding the node port range

  c. Networking policy
    i. Creating a network policy
    ii. Viewing network policies
    iii. Editing a network policy
    iv. Deleting a network policy
    v. Configuring multitenant isolation by using network policy

10. Storage

  a. Persistent storage using hostPath
    i. Statically provisioning hostPath volumes
    ii. Mounting the hostPath share in a privileged pod

11. Operators

  a. Administrator tasks
    i. Installing from OperatorHub using the CLI
    ii. Deleting Operators from a cluster using the CLI
    iii. Viewing Operator subscription status using the CLI

12. Applications

    a. Quotas
        i. Creating a quota
        ii. Creating object count quotas
        iii. Setting resource quota for extended resources
        iv. Viewing a quota
        v. Configuring explicit resource quotas
        vi. Selecting multiple projects during quota creation
        vii. Viewing applicable cluster resource quotas

    b. Pruning objects to reclaim resources
        i. Basic pruning operations
        ii. Pruning groups
        iii. Pruning DeploymentConfig objects

13. Machine management

    a. Creating a machine set
    b. Scaling a machine set manually
    c. Modifying a machine set
    d. Deleting a specific machine
    e. Deploying the cluster autoscaler
    f. Deploying the machine autoscaler
    g. Sample YAML for a machine set custom resource on AWS
    h. Binding infrastructure node workloads using taints and tolerations
    i. Moving resources to infrastructure machine sets
    j. Creating a MachineHealthCheck resource

14. Working with nodes

    a. Creating daemonsets
    b. Creating jobs
    c. Creating cron jobs
    d. About listing all the nodes in a cluster
    e. Listing pods on a node in your cluster
    f. Viewing memory and CPU usage statistics on your nodes
    g. Configuring master nodes as schedulable
    h. Deleting nodes from a cluster
    i. Adding kernel arguments to nodes
    j. Modifying Nodes
    k. Configuring the maximum number of pods per node
    l. Rebooting a node using pod anti-affinity
    m. Configuring garbage collection for containers and images

15. Working with clusters

    a. Viewing events using the CLI
    b. Running the cluster capacity tool on the command line
    c. Running the cluster capacity tool as a job inside a pod
    d. Creating a Limit Range
    e. Viewing a limit
    f. Deleting a Limit Range

16. Backup and restore

    a. Backing up etcd data
    b. Identifying an unhealthy etcd member
    c. Determining the state of the unhealthy etcd member
    d. Replacing an unhealthy etcd member whose machine is not running or whose node is not ready
    e. Replacing an unhealthy etcd member whose etcd pod is crashlooping
    f. Shutting down the cluster
    g. Restarting the cluster
    h. Restoring to a previous cluster state
    i. Recovering from expired control plane certificates

17. CLI tools

    a. Installing the CLI by downloading the binary
    b. Logging in to the CLI
    c. Using the CLI
    d. Getting help
    e. Logging out of the CLI
    f. Basic CLI commands
    g. Application management CLI commands
    h. Troubleshooting and debugging CLI commands
    i. Advanced developer CLI commands
    j. Settings CLI commands
    k. Cluster management CLI commands
    l. Node management CLI commands
    m. Security and policy CLI commands
    n. Maintenance CLI commands
    o. Configuration CLI commands
    p. Usage of oc and kubectl commands