All about OpenShift Windows Containers

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OpenShift Container Platform

Red Hat

!rhatwho

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Agenda

What we'll discuss today

- Why Windows Containers?
- Mixed Workloads
- Use cases
- WMCO Design
- WMCO Workflow
- Prerequisites
- Configuring Hybrid Networking
- Operator Installation
- Windows MachineSet Object
- Troubleshooting
- Collecting Logs
- Accessing Windows Node
- Windows OS Updates
- Limitations
- Case Workflow

Why Windows Containers?

To avoid rebuilding these Windows-based applications and get them to the cloud, some container orchestration platforms can support Windows containers while delivering the benefits of Kubernetes.

Windows presence

Windows Server still enjoys significant presence amongst server operating systems in the datacenter

.NET app development

.NET has been and continues to be used widely for application development

Commingle in Linux ecosystem

Work side by side with Linux® containers

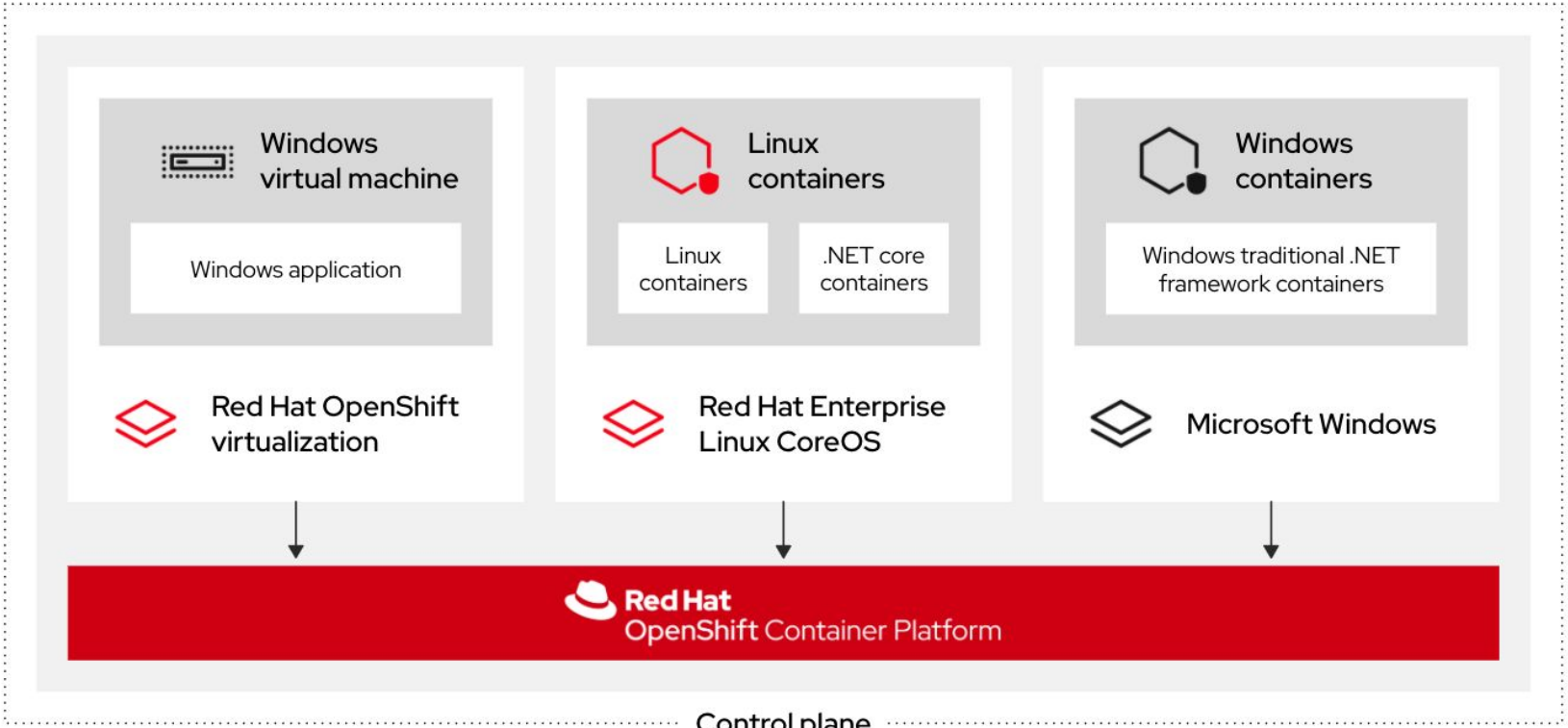
Embrace microservices

Help Windows application developers adopt microservices by running Windows containers

Windows Servers have a long history (*but*)

- Application development shifts to cloud-native deployments
- Traditional Windows applications have transitioned
- From data centers, to the cloud with the support of container technology

Mixed Windows and Linux workloads



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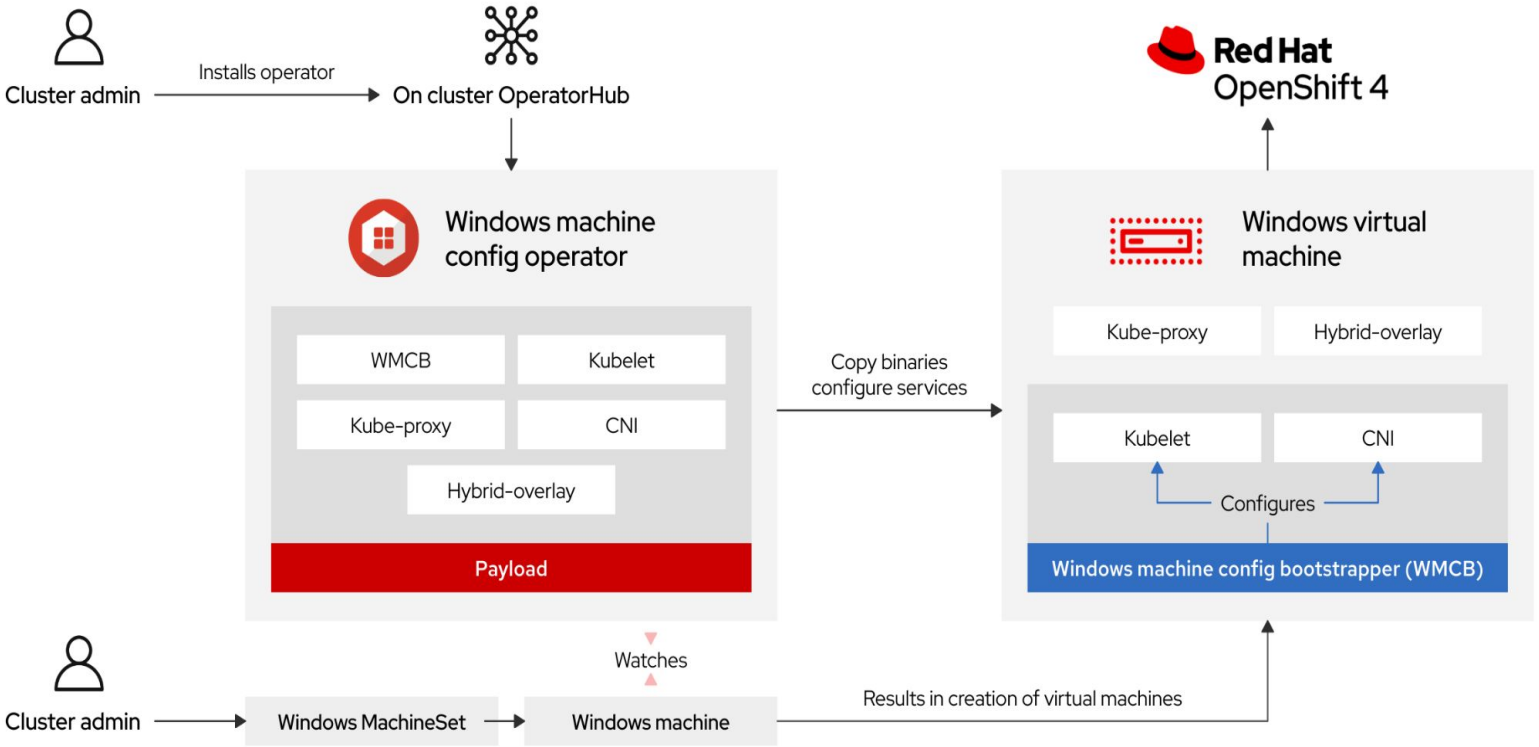
Windows Container workloads use cases

Step	Red Hat OpenShift feature	Use case	Advantages	Trade offs
Rehost	OpenShift Virtualization	Lift and shift Windows virtual machines to OpenShift	Easy and low friction	Few benefits of containerization
Refactor	Red Hat OpenShift support for Windows Containers	Containerize and run traditional .NET framework apps on Windows Server containers and deploy to Windows worker nodes on Red Hat OpenShift Container Platform	Benefits of containerization and OpenShift	Evolving Windows container ecosystem, supported only for newer version of Windows including Windows Server 2019
Re-architect	Red Hat Enterprise Linux Red Hat Enterprise Linux CoreOS	Migrate traditional .NET frameworks apps to .NET Core and deploy to Red Hat Enterprise Linux containers in OpenShift.	Full benefit of containerization and OpenShift, highly evolved community	Migration effort involved, time consuming
Rebuild	Red Hat Enterprise Linux Red Hat Enterprise Linux CoreOS	Build cloud native apps using Linux containers and deploy to Red Hat Enterprise Linux/Red Hat Enterprise Linux CoreOS containers on OpenShift.	Full benefit of containerization and OpenShift highly evolved community	Net new development may not be an option for customers running in maintenance mode

Windows Machine Config Operator Design



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Workflow

- The WMCO expects a predetermined secret in its namespace containing a private key that is used to interact with the Windows instance. WMCO checks for this secret during boot up time and creates a user data secret which you must reference in the Windows MachineSet object that you created. Then the WMCO populates the user data secret with a public key that corresponds to the private key.
- Copies the following files Windows Machine Config Bootstrapper (WMCB), kubelet, hybrid-overlay, kube-proxy, CNI package.
- Remotely executes the following.
  - WMCB to configure the kubelet.
  - Hybrid-overlay to create the OpenShift HNS networks.
  - WMCB to configure the kubelet for CNI plugin.
  - Kube-proxy
- CSRs are approved.

Prerequisites

Supported cloud providers based on OpenShift Container Platform and WMCO versions

Cloud provider	Supported OpenShift Container Platform version	Supported WMCO version
Amazon Web Services (AWS)	4.6+	WMCO 1.0+
Microsoft Azure	4.6+	WMCO 1.0+
VMware vSphere	4.7+	WMCO 2.0+

Supported Windows Server versions

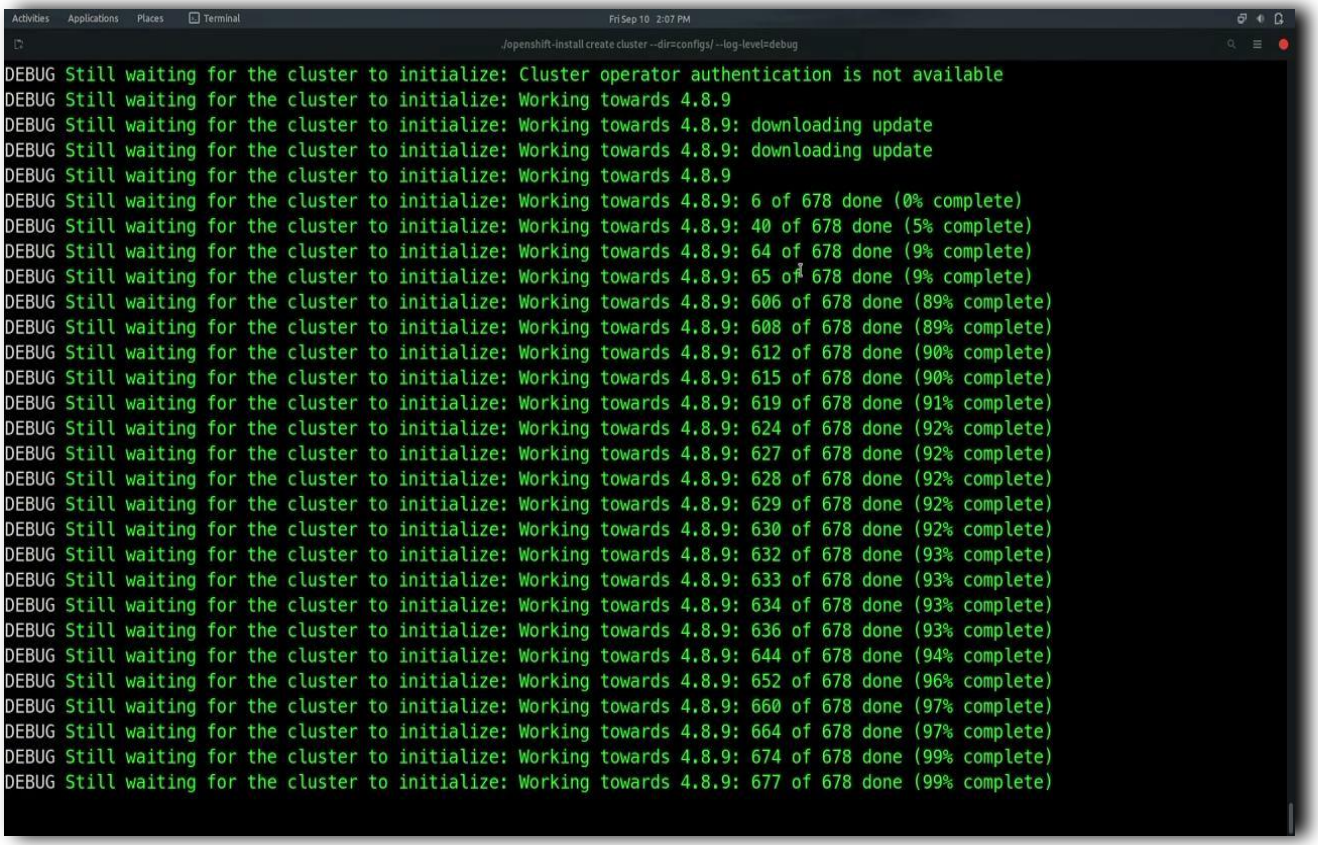
Cloud provider	Supported Windows Server version
Amazon Web Services (AWS)	Windows Server Long-Term Servicing Channel (LTSC): Windows Server 1809
Microsoft Azure	Windows Server Long-Term Servicing Channel (LTSC): Windows Server 1809
VMware vSphere	Windows Server Semi-Annual Channel (SAC): Windows Server 2004

Supported networking

Cloud provider	Supported networking
Amazon Web Services (AWS)	Hybrid networking with OVN-Kubernetes
Microsoft Azure	Hybrid networking with OVN-Kubernetes
VMware vSphere	Hybrid networking with OVN-Kubernetes with a custom VXLAN port

The hybrid networking with OVN-Kubernetes must be configured during the installation of cluster.

Hybrid networking with OVN-Kubernetes



https://docs.openshift.com/container-platform/4.8/networking/ovn_kubernetes_network_provider/configuring-hybrid-networking.html

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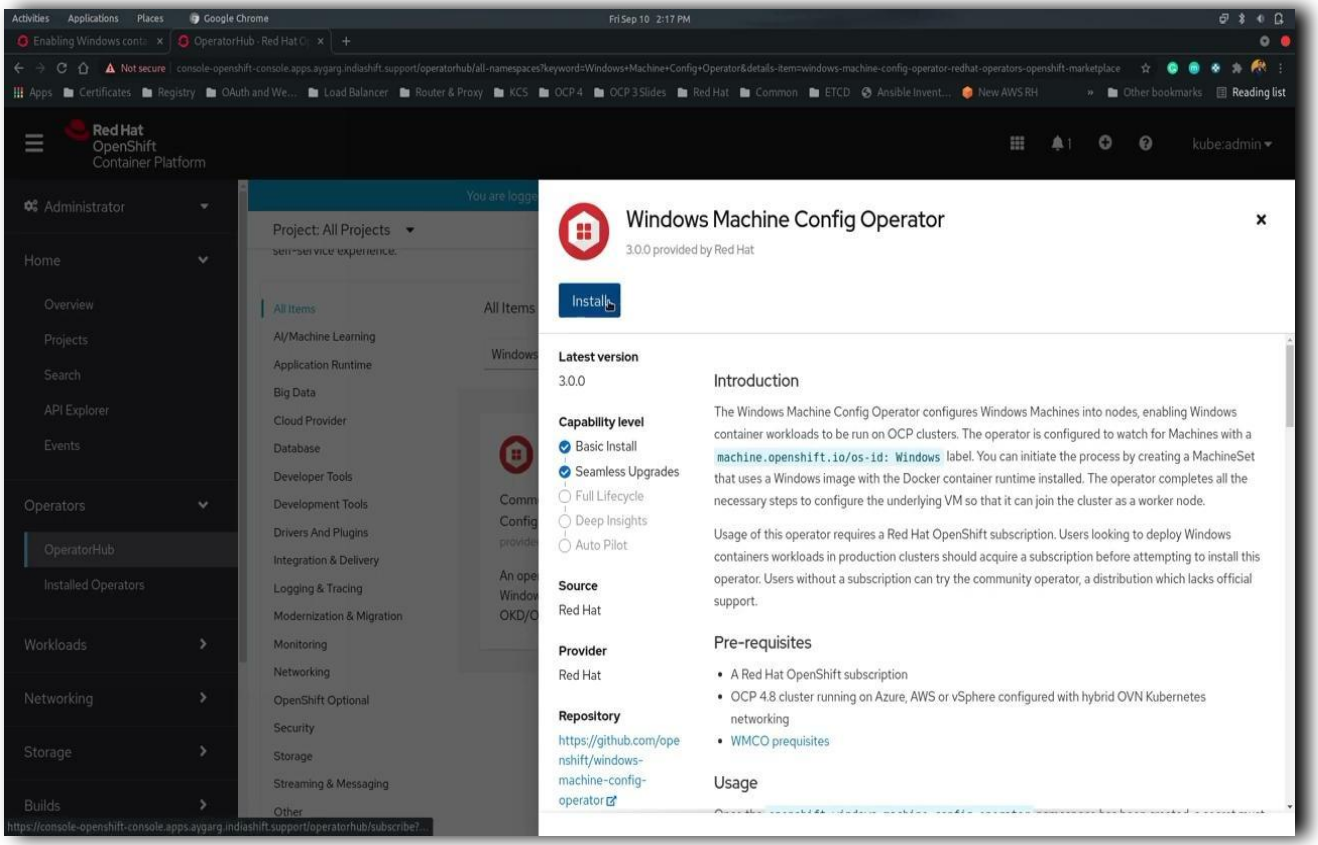
WMCO Installation



https://docs.openshift.com/container-platform/4.8/windows_containers/enabling-windows-container-workloads.html

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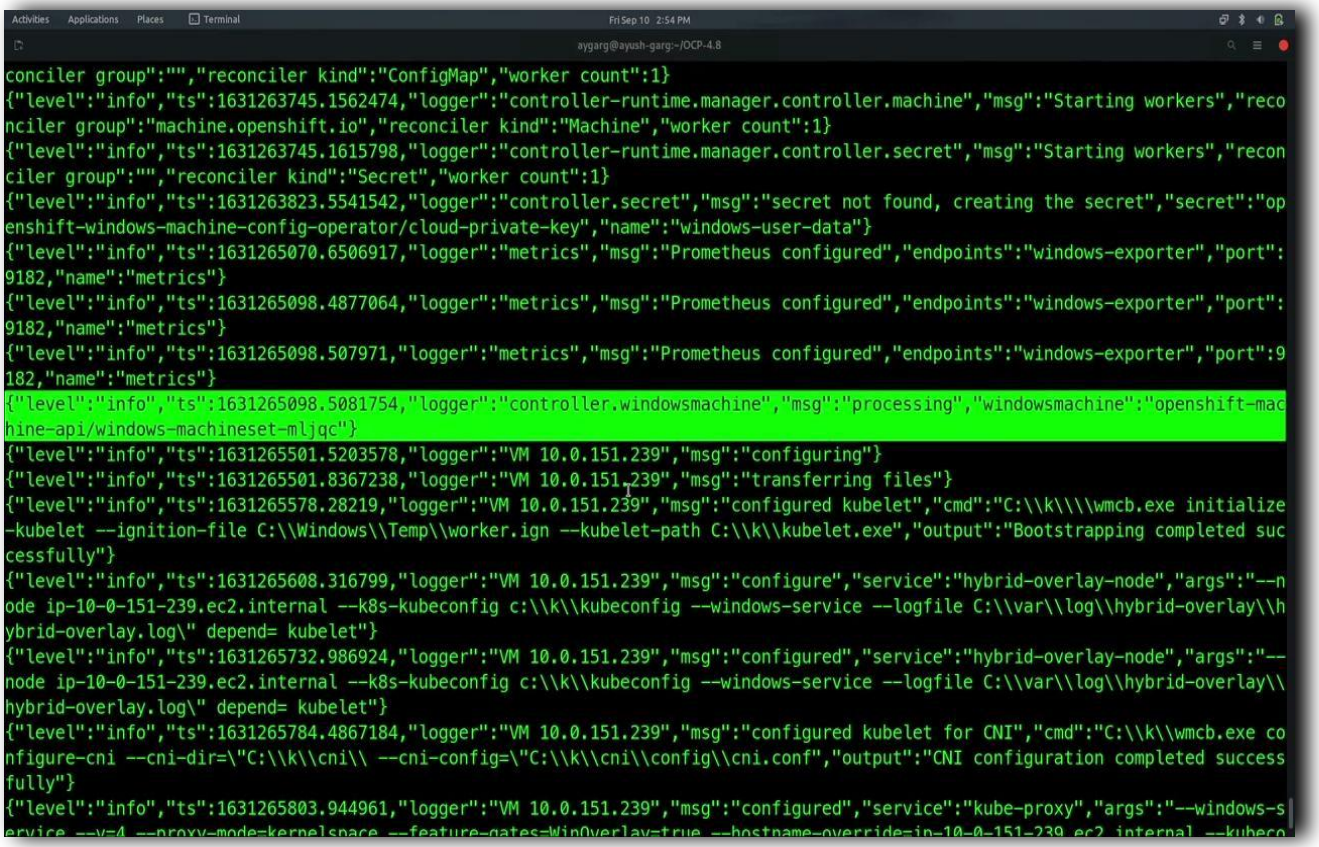
Windows MachineSet object on AWS



https://docs.openshift.com/container-platform/4.8/windows_containers/creating_windows_machinesets/creating-windows-machineset-aws.html

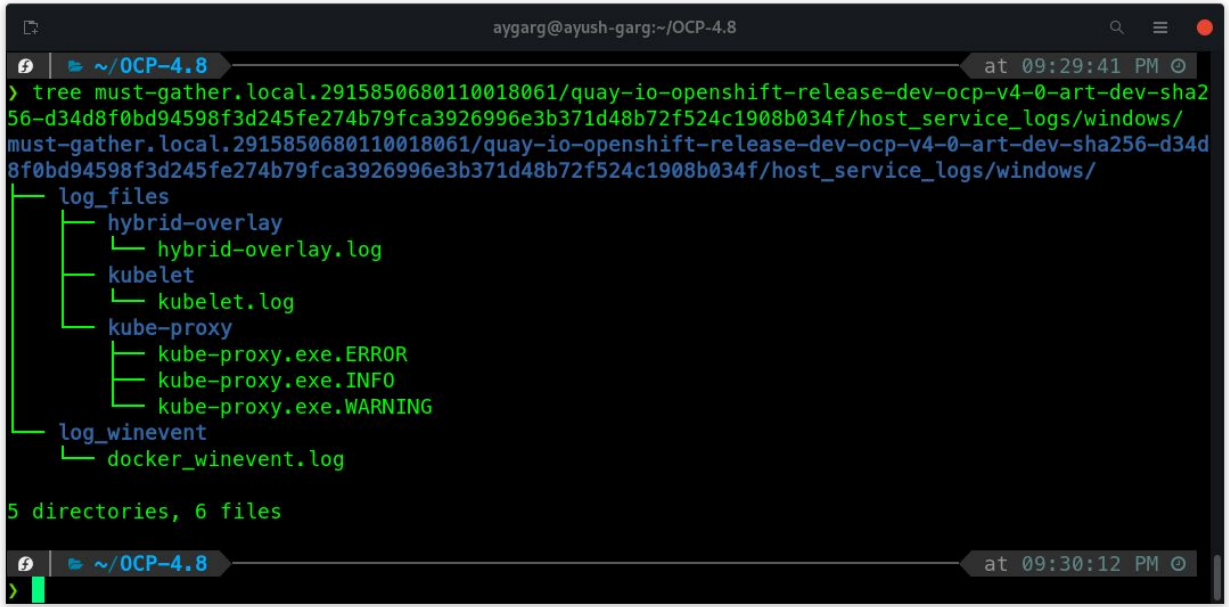
Troubleshooting

The following two namespaces only need to be checked for troubleshooting issues related to Windows Containers.

- openshift-machine-api for Windows Machine provisioning issue.
  - $ oc get events
  - $ oc get machines
  - $ oc describe machine <windows-machine>
  - $ oc logs machine-api-controllers-<id> -c machineset-controller
  - $ oc logs machine-api-controllers-<id> -c machine-controller
  - $ oc get machineset <windows-machineset-name> -o yaml
- openshift-windows-machine-config-operator for WMCO pod logs and if windows node doesn't join cluster.
  - $ oc get network.operator cluster -o yaml
  - $ oc get events
  - $ oc logs windows-machine-config-operator-<id>

Collecting Logs

- $ oc adm must-gather [+]
- $ oc adm inspect ns/openshift-windows-machine-config-operator



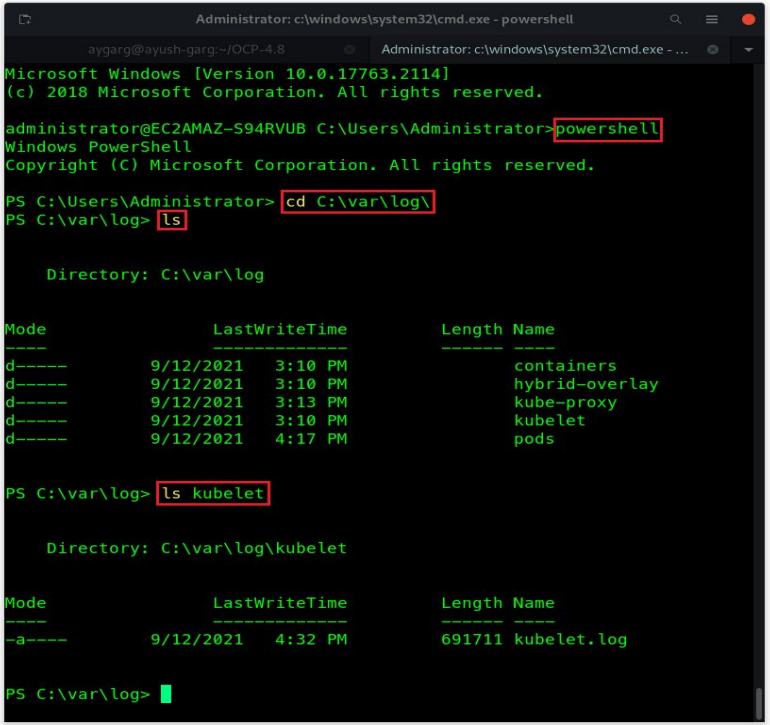
The must-gather will contain CSV, installplans, etc. only for openshift-windows-machine-config-operator project.

Accessing a Windows Node

Windows nodes can't be accessed using the oc debug command, as it requires a privileged pod on the node, which is not yet supported for Windows. Instead, a Windows node can be accessed using SSH or RDP.

- $ ssh -i
  \\ For Amazon Web Services (AWS)
- $ ssh -i
  \\ For Microsoft Azure

The must-gather won't be
when Windows Node is in
"oc adm node-logs" comma



The same SSH private key is needed using which the secret was created inside WMCO namespace.

The WMCO is not responsible for the Windows operating system updates.

The Cluster Administrator provides the Windows image while creating the VMs and hence, the Cluster Administrator is responsible for providing an updated image. The Cluster Administrator can provide an updated image by changing the image in the MachineSet spec.

https://docs.openshift.com/container-platform/4.8/windows_containers/windows-node-upgrades.html

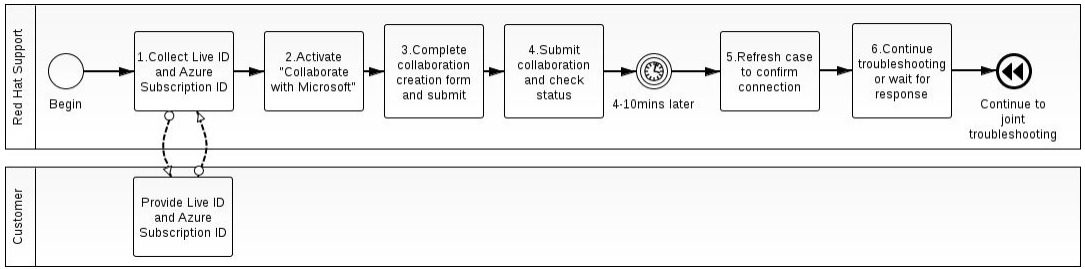
Limitations

- **Serverless**
- **Service Mesh**
- **OpenShift Pipelines**
- **Cost Management**
- **CodeReady**
- **Thanos User Workload Monitoring**
- **Builds V2 or BuildConfig or s2i**
- **No built in Windows OS**

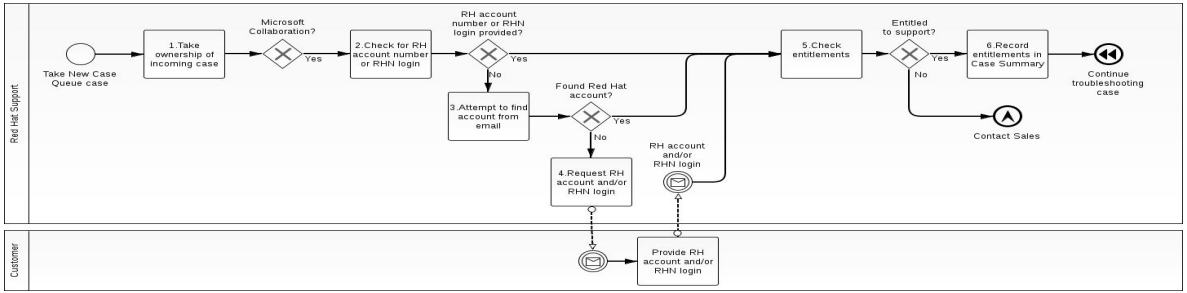
  (bring your own Windows license)

Red Hat / Microsoft collaboration support workflow

- Open a collaboration with Microsoft



- Receiving a new collaboration from Microsoft



https://source.redhat.com/groups/public/support-delivery/global_support_delivery_wiki/red_hat__microsoft_collaboration_support_workflow

Available Resources

- Windows Containers Landing Page
- Troubleshooting Windows container workload issues
- Hybrid cloud blog
- Scheduling Windows container workloads

Thank you

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