



//Exploring OpenShift 4 Event

- OCP 4 -- What's New - Phil
- OCP 4 -- On Prem - A Briefing - Shea
- OCP 4 -- Deploy to GCP & Service Mesh - Shea
- OCP 4 -- Migrations - Jeff

What's New (and exciting)

//OCP 4 Where we at?

Full Stack Automation

Pre-existing Infrastructure

 **OPENSIFT[®]**
by Red Hat[®]
4.1^{*}



 **OPENSIFT[®]**
by Red Hat[®]
4.2



 **OPENSIFT[®]**
by Red Hat[®]
4.3 (tentative)



** Requires Internet connectivity; support for cluster proxy & disconnected installation/updating not planned until 4.2*

*** On qualified hardware stack*

//OCP 4 Where we at?

Q2 CY2019 OpenShift 4.1

DEV	<ul style="list-style-type: none">• OpenShift Serverless (Knative) - DP• OpenShift Pipelines (Tekton) DP2• CodeReady Workspaces• CodeReady Containers Alpha• Developer CLI (odo) Beta
APP	<ul style="list-style-type: none">• OperatorHub• Operator Lifecycle Manager• Service Mesh (~4 month after)
PLATFORM	<ul style="list-style-type: none">• Kubernetes 1.13 with CRI-O runtime• RHEL CoreOS, RHEL7• Automated Installer for AWS• Pre-existing Infra Installer for Bare Metal, VMware, AWS• Automated, one-click updates• Multus (Kubernetes multi-network)• Quay v3
HOSTED	<ul style="list-style-type: none">• cloud.redhat.com - Multi-Cluster Mgmt• OCP Cluster Subscription Management• OpenShift Dedicated consumption pricing

Q3 CY2019 OpenShift 4.2

DEV	<ul style="list-style-type: none">• Developer Console GA• OpenShift Serverless (Knative) - TP• OpenShift Pipelines (Tekton) DP3• CodeReady Containers GA• Developer CLI (odo) GA
APP	<ul style="list-style-type: none">• OperatorHub Enhancements• Operator Deployment Field Forms• Application Migration Console
PLATFORM	<ul style="list-style-type: none">• Kubernetes 1.14 w/ CRI-O runtime• Disconnected Install and Update• Automated Installer for Azure, OSP, GCP• Pre-existing Infra Installer for GCP• Cluster-wide Egress Proxy• OVN Tech Preview• OpenShift Container Storage 4.2 (1 month after)
HOSTED	<ul style="list-style-type: none">• Insights Operator• Azure Red Hat OpenShift new features (monitoring, logging)

Q4 CY19/Q1 CY20 OpenShift 4.3

DEV	<ul style="list-style-type: none">• OpenShift Serverless (Knative) - GA• OpenShift Pipelines (Tekton) TP• Helm 3 TP
APP	<ul style="list-style-type: none">• Metering for Services• Windows Containers (Planned)• GPU Metering• Application Operator Binding - DP
PLATFORM	<ul style="list-style-type: none">• Kubernetes 1.16 w/ CRI-O runtime• Automated Installer for RHV• Private/Internal Clusters support from the installer• Deploy to pre-existing VPC & Subnets• OVN GA w/ Windows Networking Integration (Planned)• FIPS• Pre-existing Infra Installer for OSP• OpenShift Container Storage 4.3
HOSTED	<ul style="list-style-type: none">• cloud.redhat.com - Subscription Mgmt Improvements• Azure Red Hat OpenShift new features (private clusters)• Azure Red Hat OpenShift preview of 4.x• OSD on Google Cloud preview on 4.x

- Red Hat Enterprise Linux CoreOS (RHCOS) for the control plane (masters)
- Operators, Operators, Operators! - Using kubernetes to manage kubernetes
- CRI-O
- <https://cloud.redhat.com>
- ~~Minishift~~ Code Ready Containers

- MachineSet - Like a daemonset for Machines
- Chargeback - showback?
- Code Ready Workspace
- Cluster Updates
- API Explorer
- odo

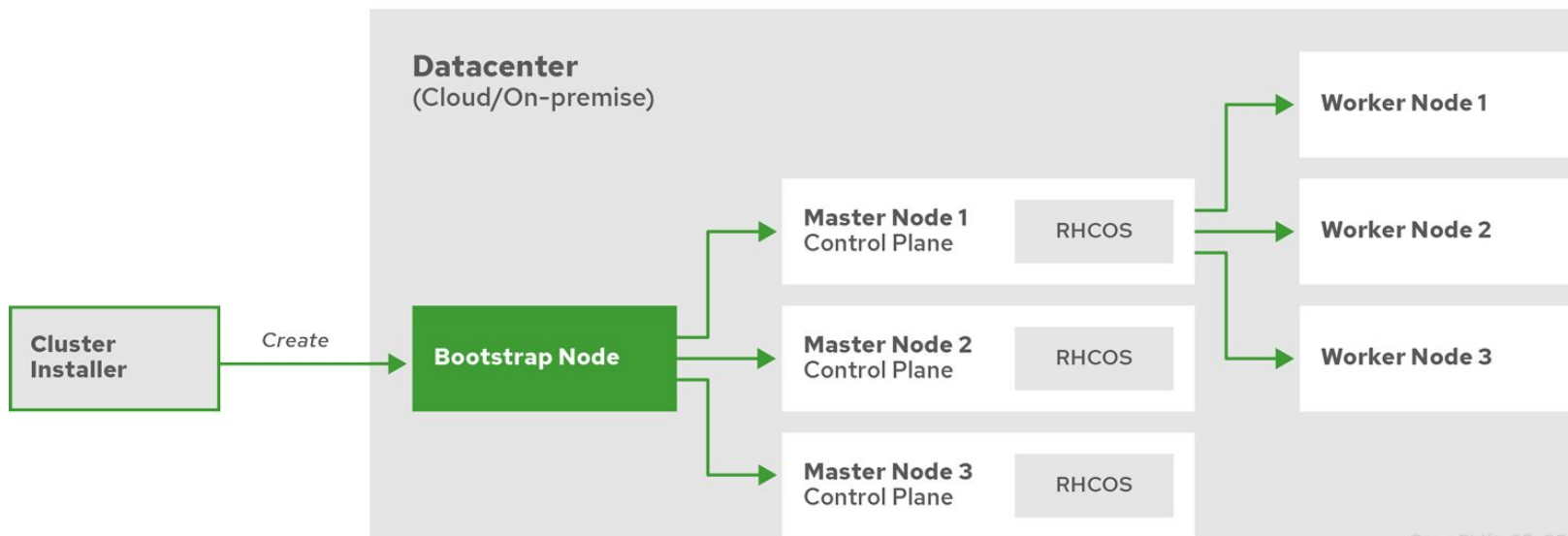


//OCP 4 What's New - Resources?

Resources

- docs.openshift.com/container-platform/4.2/release_notes/ocp-4-2-release-notes.html
- <https://try.openshift.com>
- <https://code-ready.github.io/crc/>
- <https://blog.openshift.com/enabling-openshift-4-clusters-to-stop-and-resume-cluster-vms/>
- <https://github.com/openshift/odo>

- What do we need?
 - Azure Account DNS Pull Secret ServiceAccount (SP) oc & kubectl
- Generate the install config
- Go!



- Can we customize the deploy?
- Can I shut it down with 24hrs of initial deploy?

Parameter	Description	Values
<code>machines.platform.azure.type</code>	The Azure VM instance type.	VMs that use Windows or Linux as the operating system. See the Guest operating systems supported on Azure Stack in the Azure documentation. <code>machines.platform.azure.osDisk.diskSizeGB</code>
The Azure disk size for the VM.	Integer that represents the size of the disk in GB, for example <code>512</code> . The minimum supported disk size is <code>120</code> .	<code>platform.azure.baseDomainResourceGroupName</code>
The name of the resource group that contains the DNS zone for your base domain.	String, for example <code>production_cluster</code> .	<code>platform.azure.region</code>

//OCP 4 on Azure - Resources

- <https://github.com/openshift/installer/tree/master/docs/user/azure>
- <https://github.com/openshift/installer/blob/master/docs/user/customization.md#examples>
- <https://github.com/openshift/installer/blob/master/docs/user/azure/customization.md>
- <https://blog.openshift.com/enabling-openshift-4-clusters-to-stop-and-resume-cluster-vms/>

- Tech Preview in 4.2 & GA 4.3
- Its an Operator! – interact with pipeline using oc/kubectl
- Portable across different K8s platforms
- Containers are the building blocks
- Decoupled - Tasks can be run in isolation



TEKTON

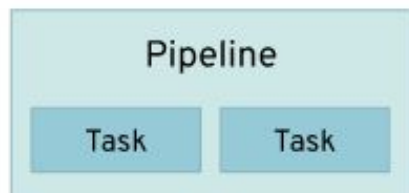
A Kubernetes-native pipeline resource

//OpenShift Pipelines

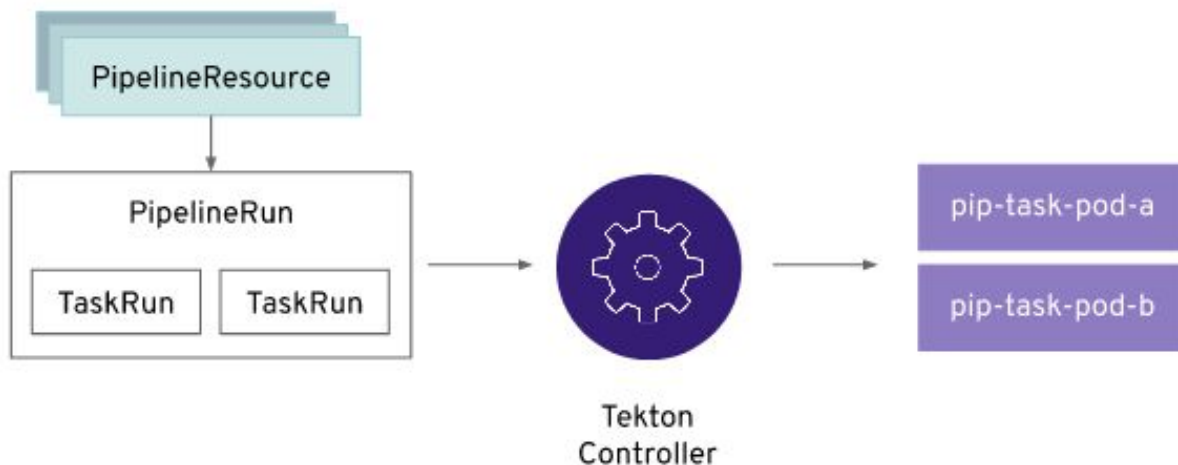
- Custom Resources:

- Tasks Pipelines TaskRuns PipelineRuns PipelineResources

Define pipeline



Invoke pipelines



Resources

- <https://github.com/tektoncd/catalog>
- <https://github.com/tektoncd/pipeline>
- <https://github.com/openshift/pipelines-catalog>
- <https://github.com/openshift/pipelines-tutorial>
- <https://github.com/openshift/pipelines-docs>

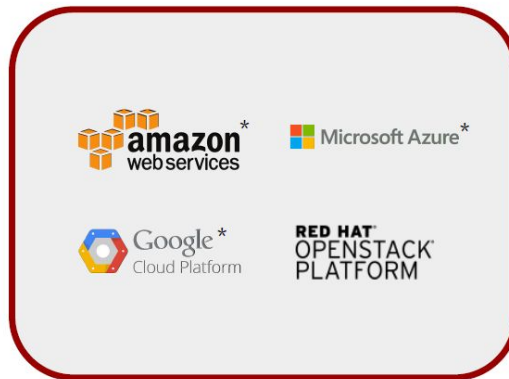
A photograph of a brick wall with a small, arched window. The window has a dark frame and is partially covered by a dark, possibly metal, grate or shutter. The bricks are reddish-brown and arranged in a traditional pattern. The overall lighting is somewhat dim, giving the image a slightly moody appearance.

On-Prem - A Briefing

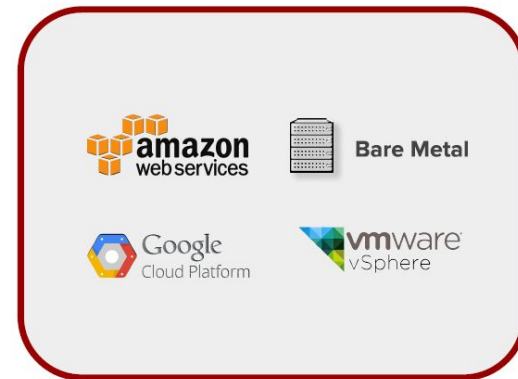
Current State

- UPI is currently best-case
- RHV, VMware, Bare Metal
- 4.2 (GA) - OpenStack IPI
- 4.3 / 4.4 vSphere IPI Targeted

Full Stack Automation (IPI)



Pre-existing Infrastructure (UPI)



* Support for full stack automated installs to pre-existing VPC & subnets and deploying as private/internal clusters is planned for 4.3.

//Operating System Choice

RED HAT® ENTERPRISE LINUX®

General Purpose OS

BENEFITS

- 10+ year enterprise life cycle
- Industry standard security
- High performance on any infrastructure
- Customizable and compatible with wide ecosystem of partner solutions

WHEN TO USE

When customization and integration with additional solutions is required

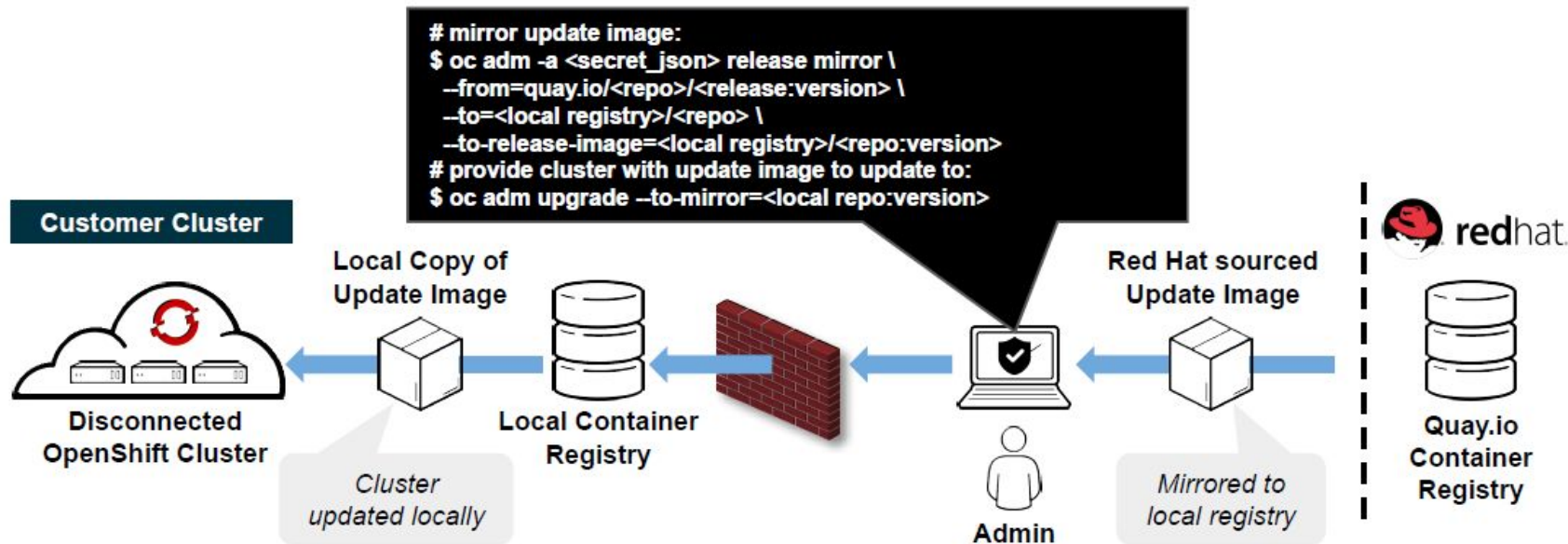
RED HAT® ENTERPRISE LINUX CoreOS

Immutable container host

- Self-managing, over-the-air updates
- Immutable and tightly integrated with OpenShift
- Host isolation is enforced via Containers
- Optimized performance on popular infrastructure

When cloud-native, hands-free operations are a top priority

//Disconnected Install



Details you need

Essentially → know your hypervisor and RTF(OCP4)M..

1. Key minimal **requirements*** on VMs
 - a. Bootstrap node: 4vcpu, 8GB RAM, 120GB disk
 - b. Masters/workers: 8vcpu, 12-16GB RAM, 120GB disk
2. Pre-downloaded, binaries, packages, tgz, where possible (speed*)
3. Ignition needs internet!
4. **Cert** and SSH key for the installer to use, from try.openshift.com

Details you need (cont'd)

Essentially → gather all the ducks in a row and RTF(OCP4)M..

5. Bare-metal openshift installer files
6. Openshift 4 client package
7. Bare-metal BIOS/UEFI file
8. A triple-check of all the above
9. Some DHCP and DNS control*

And all on-prem deploys have “subtle nuances” per hypervisor chosen

Sandbox

Preparation?

*Remember, we don't
have on-prem, what
we take for granted in
the cloud!*

Virtual or Physical Cluster

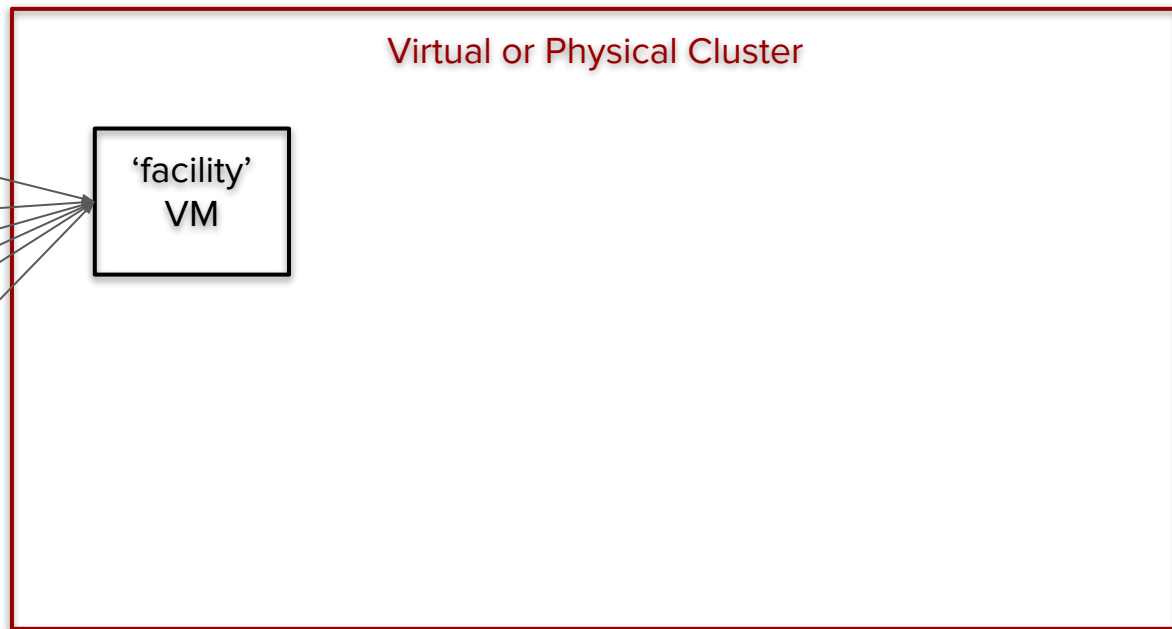
DHCP?

Static?

Pre-build VMs?

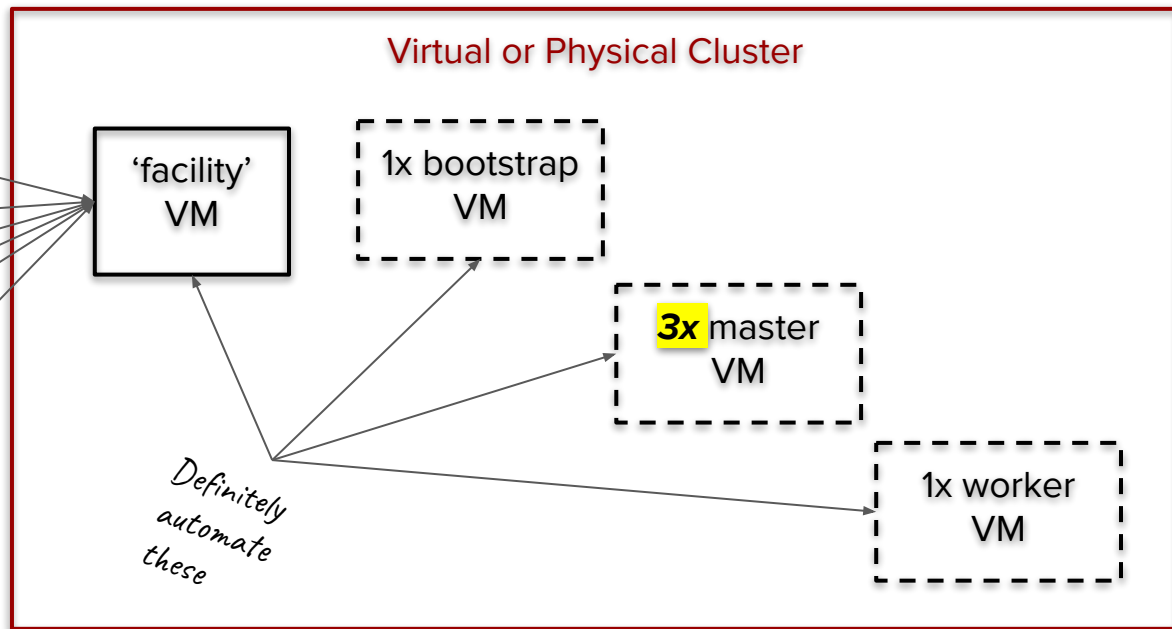
Sandbox Preparation !!

- Load Balancers
- apache (httpd)
- pxe/ tftp
- DHCP
- DNS
- NFS (opt'l)



Components of Note

- Load Balancers
- apache (httpd)
- pxe/ tftp
- DHCP
- DNS
- NFS (opt'l)





Compute » Virtual Machines

Vms: ocp4



New

Edit

Remove

Run



Suspend

Shutdown



Reboot

Console



Migrate

Create Snapshot



1 - 7

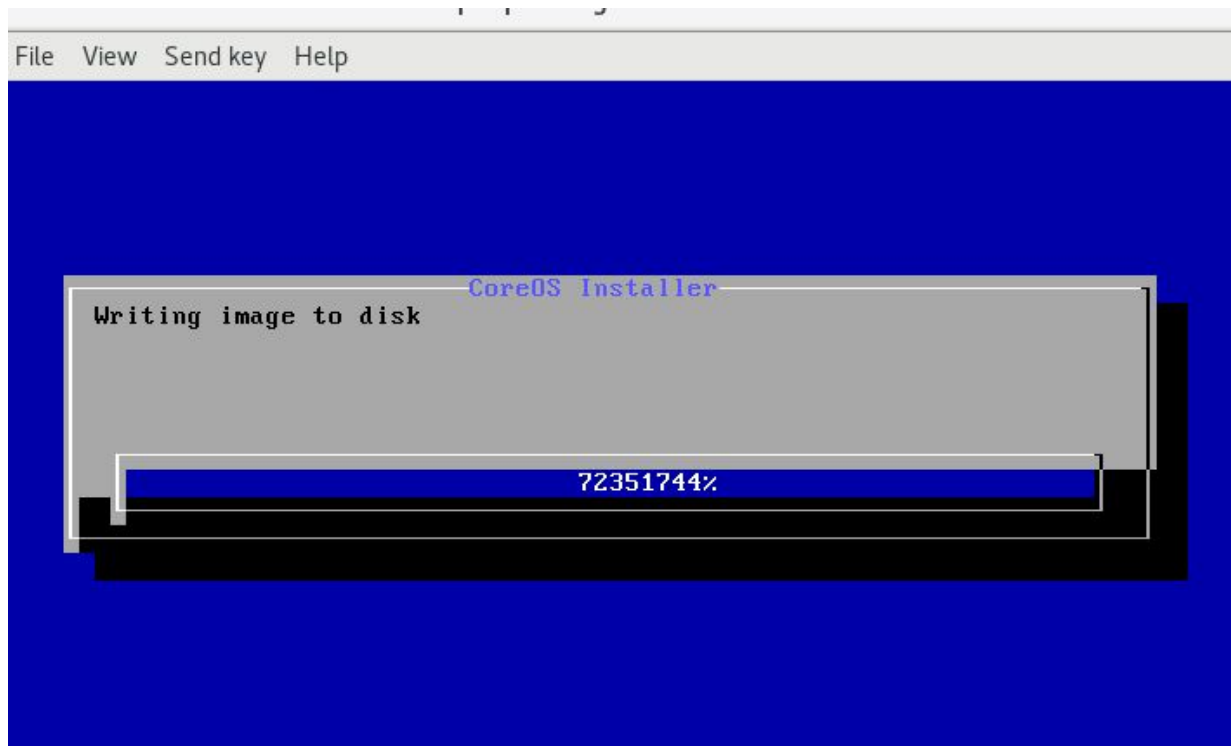


		Name	Memory	CPU	Network	Graphics	Status
		bootstrap.ocp4.cdcug.local	0%	5%	0%	SPICE	Up
		master0.ocp4.cdcug.local	0%	2%	0%	SPICE	Up
		master1.ocp4.cdcug.local	0%	1%	0%	SPICE	Up
		master2.ocp4.cdcug.local	0%	2%	0%	SPICE	Up
		ocp4-facility	28%	3%	0%	SPICE	Up
		ocp4-net-test	--	--	--	None	Down
		worker0.ocp4.cdcug.local	0%	0%	0%	SPICE	Up

//You've been warned

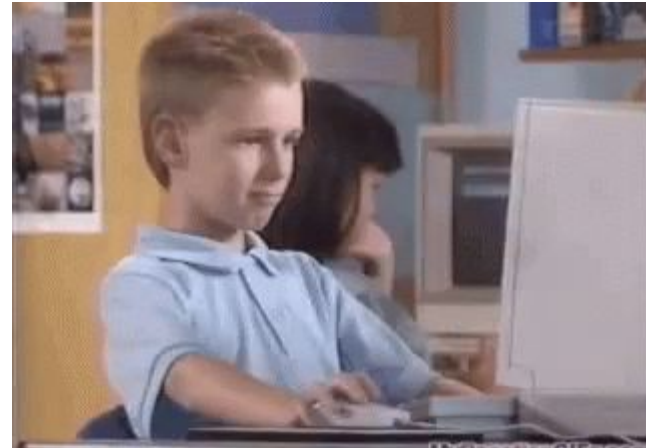
```
Red Hat Enterprise Linux CoreOS 410.8.20190920.2  
WARNING: Direct SSH access to machines is not recommended.  
  
---  
[core@master2 ~]$
```

//This brings back memories



In Short

1. Download
2. Prepare infra
3. Prepare configs
4. Run installer
5. ?????
6. Profit!

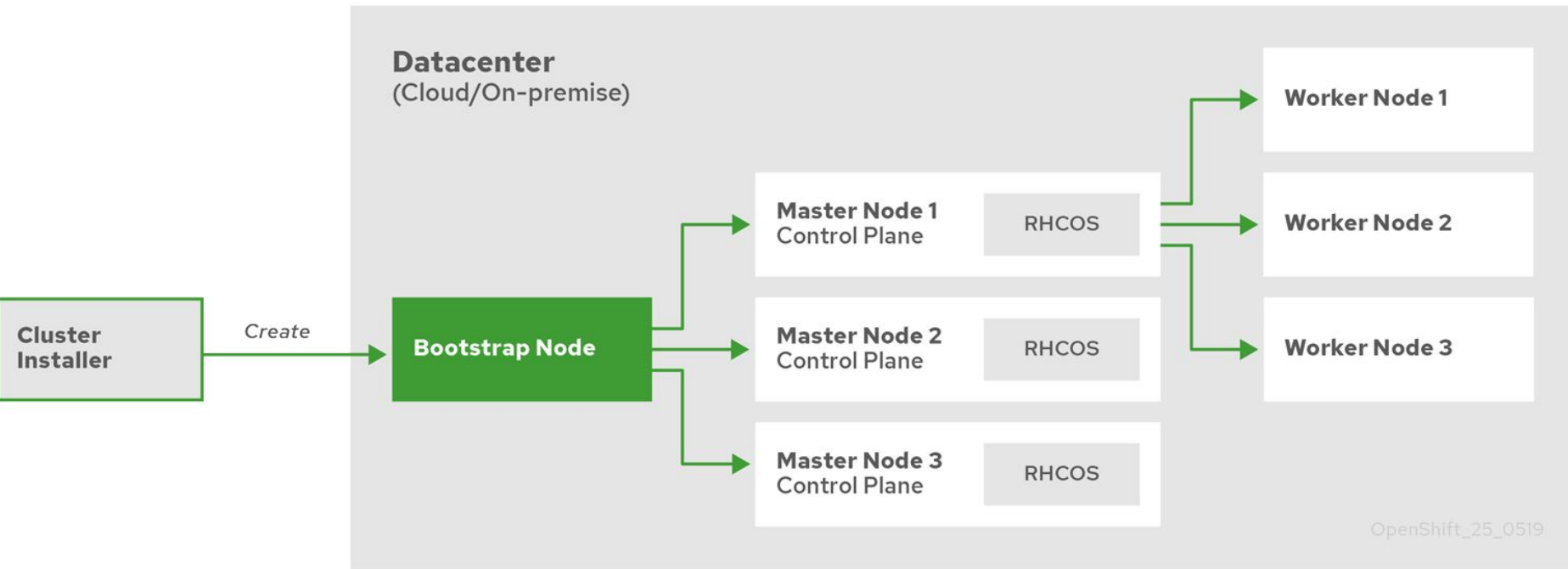


Deploy to GCP

Openshift 4.2 can be installed on Google Cloud Platform

- Currently in Developer Preview
- Single binary installer
- Based on ignition and terraform
- RHEL CoreOS the base operating system

//Installer Architecture



OpenShift_25_0519

Requirements for the GCP environment:

- DNS - Publicly accessible and registered with the Google DNS service in GCP
- Quotas - 500GB SSD drives minimum (excluded some DCs by default)
- Service Accounts Permissions
- API/Service enablement

What does the default installer deploy?

- Six Virtual Machines (n1-standard-4 (4 vCPUs, 15 GB memory))
- Storage buckets (Image registry storage bucket)
- Network Objects (master/worker subnets, public ips, firewall rules and routes)
- DNS zone (api endpoint and internal DNS zone)

Download the single openshift binary and.....

```
[~]$ openshift-install create cluster
```

```
? SSH Public Key /home/user_id/.ssh/id_rsa.pub
```

```
? Platform gcp
```

```
? Project ID my_gcp_project ( it should pick this up automatically if the key is installed correctly )
```

```
? Region us-east1
```

```
? Base Domain example.com ( it should pick this up automatically if the key is installed correctly )
```

```
? Cluster Name mycluster
```

```
? Pull Secret [? for help] < paste the pull secret here. You can find it on the install website >
```

//Installer Recommendations

- Use **debug** command!! It is pretty helpful (openshift-install create cluster --log-level debug)
- Make sure your **DNS** works properly and can resolve from the internet (the installer will fail if the kubernetes API is not installed)
- Once the installer is complete, keys and credentials are saved to an auth directory where you ran the installer

GCP Object Walkthrough

Red Hat Service Mesh

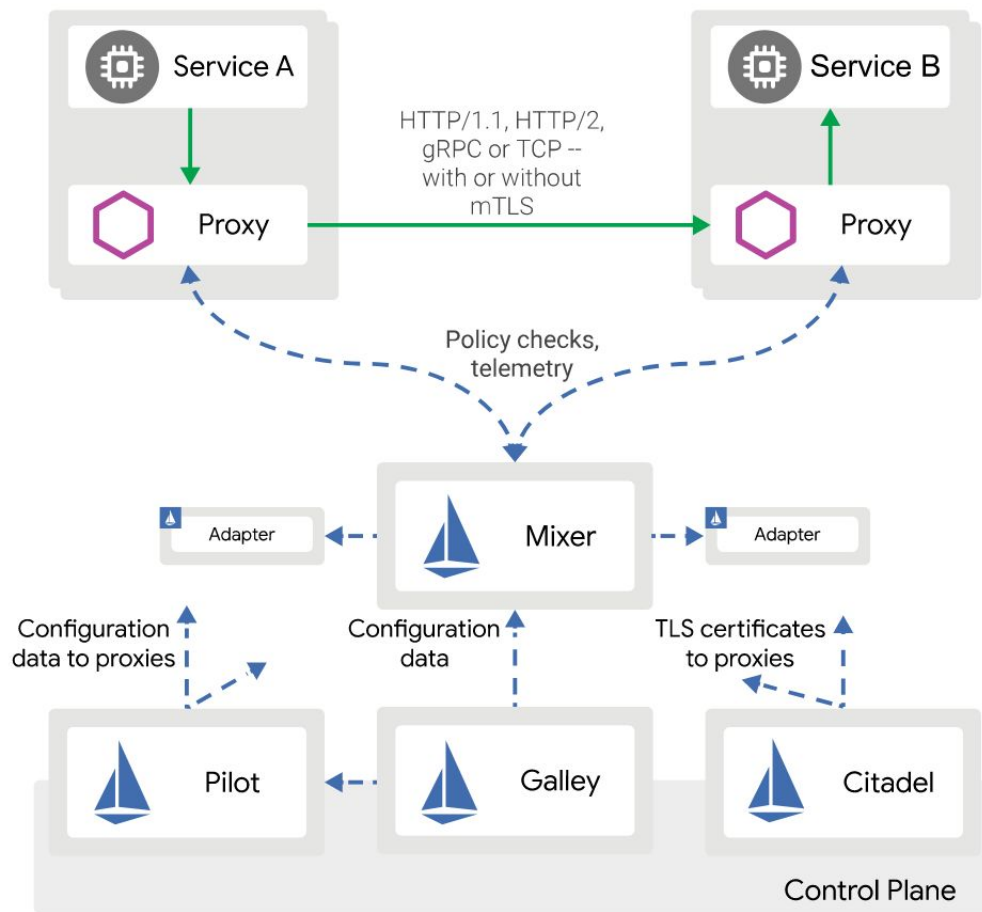
What is it and Why use it?

The explosion of microservices leaves much to be desired. We need:

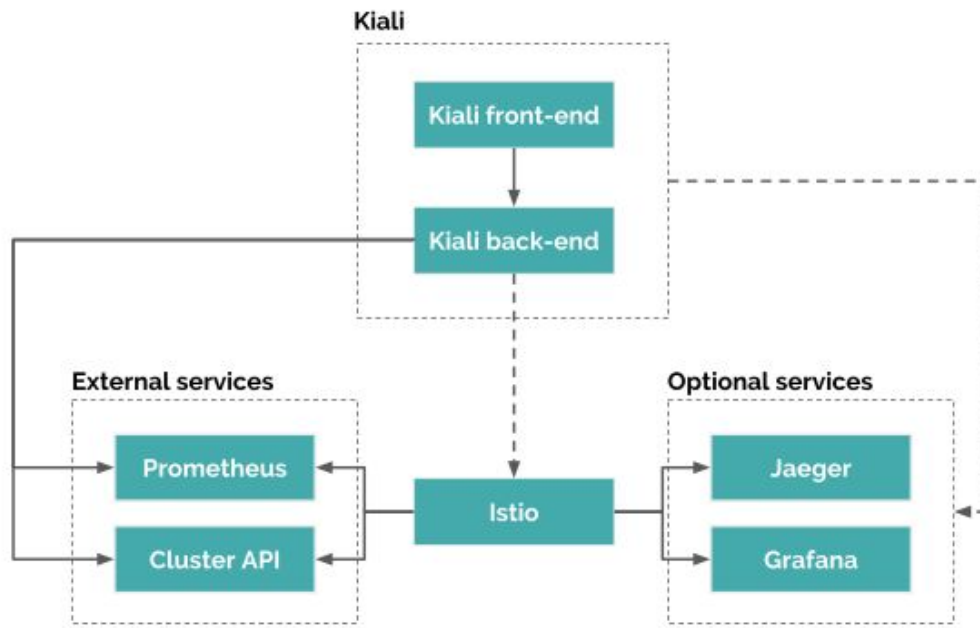
- Discovery
- Load balancing
- Service-to-service authentication
- Failure recovery
- Metrics
- Monitoring



//Red Hat Service Mesh



//Red Hat Service Mesh - Telemetry



//Red Hat Service Mesh - Operators

The Red Hat Service Mesh is controlled by the Service Mesh Operator. It requires:

- Kiali Operator
- Elasticsearch Operator
- Jaegar Operator

Everything is in an Operator



//Red Hat Service Mesh vs. Istio

Based on the upstream **Istio** project:

- Step 1: Inject sidecars to intercept traffic for existing applications (*data plane*)
- Step 2: Configure the service mesh (*control plane*)

Notable differences in the OpenShift implementation:

- Multi-tenant (by default)
- OpenShift automatically creates the necessary network policies to support mesh communication
- Does not automatically inject sidecars
 - Annotate pods that you want joined to the mesh
 - Automatic injection can be enabled
- Adds the ability to use regex in RBAC configurations
- Uses OpenSSL instead of Boring SSL
- Adds an optional Istio CNI plugin

Red Hat Service Mesh Demo



OCP 3 to 4 Migration

No in-place upgrade from Openshift 3 to 4

What needs to move?

- Cluster Settings? (CPMA)
- Cluster Shared Tools?
- Applications?
- State/Data?

//Control Plane Migration Assistant

CLI tool that can stage some feature configurations for the OCP 4 cluster operators to consume.

- Limited to features that are supported in 4
- Can report for full, partial, or no support for features
- Creates Custom Resource manifests for OCP 4 operators

//Red Hat Migration Controller

The OpenShift Migration Controller assists with application migration from OpenShift 3.7+ to 4.x clusters:



Migration Tool Demo

High Level Installation Overview

- Install the Mig Operator to both clusters
- Install the Migration Controller to both clusters
- Install the CAMS UI
- Enable CORS (Cross-Origin resource sharing) on 3.x cluster
- Install a compatible S3 bucket (Minio* in this case)

//To Migrate, or Not to Migrate

Don't migrate applications; Re-deploy your code!

Only migrate non-coded artifacts

- State/Data
- Technical debt

External Dependencies (**It Depends**)

Name changes/cutovers?

Multiple teams to coordinate?

Anything else?

//OCP 4 Migrations - Resources

<https://www.youtube.com/channel/UCBDU5UK5Okq3mllMygpkbNA>

<https://github.com/fusor/mig-operator>

<https://github.com/fusor/mig-agnosticd>

<https://github.com/vmware-tanzu/velero>

<https://docs.openshift.com/container-platform/4.2/migration/migrating-openshift-3-to-4.html>

