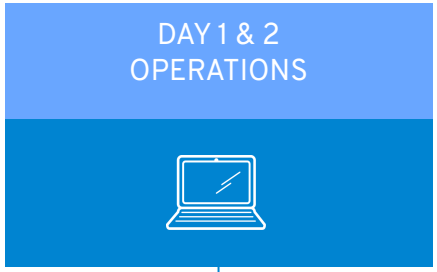
Red Hat OpenShift

Installation

Red Hat

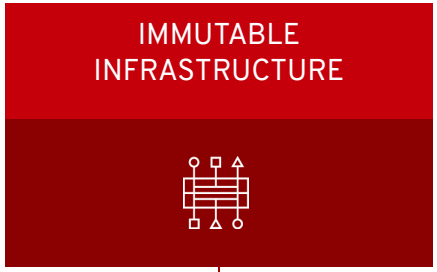
OpenShift 4 Architectural Principles



Installer + bootstrapping

Autoscale out of the box

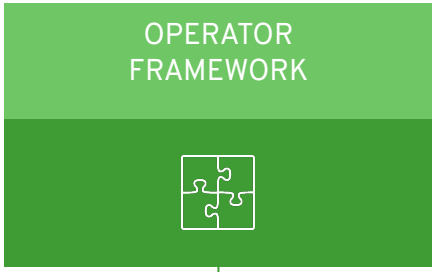
MachineSet node pools



Red Hat Enterprise Linux CoreOS

Discourage SSH/node mutation

Ignition for Machine config



SDK & testing tools

OperatorHub for discovery

OLM delivers upper stack services

OpenShift 4 Architectural Principles

DAY 1 & 2 OPERATIONS

Installer + bootstrapping

Autoscale out of the box

MachineSet node pools

IMMUTABLE INFRASTRUCTURE

Red Hat Enterprise Linux CoreOS

Discourage SSH/node mutation

Ignition for Machine config

OPERATOR FRAMEWORK

SDK & testing tools

OperatorHub for discovery

OLM delivers upper stack services

Installation Paradigms

OPENSHIFT CONTAINER PLATFORM

Full Stack Automated (IPI)

Simplified opinionated "Best Practices" for cluster provisioning

Fully automated installation and updates including host container OS.

Red Hat Enterprise Linux CoreOS

Pre-existing Infrastructure (UPI)

Customer managed resources & infrastructure provisioning

Plug into existing DNS and security boundaries

Red Hat Enterprise Linux CoreOS

Red Hat Enterprise Linux

HOSTED OPENSHIFT

Red Hat OpenShift on IBM Cloud *

Deploy directly from the IBM Cloud console. An IBM service, master nodes are managed by IBM Cloud engineers.

Azure Red Hat OpenShift **

Deploy directly from the Azure console. A MSFT service, jointly managed by Red Hat and Microsoft

OpenShift Dedicated **

Get a powerful cluster, fully managed by Red Hat engineers and support; a Red Hat service.

* Based on OCP v4.3 GA slated for March; public beta available now

** Entitlements of OCP obtained through a Cloud Pak purchase are not transferable to these environments

Red Hat

4.3 Supported Providers

Full Stack Automation (IPI)

Pre-existing Infrastructure (UPI)

** Support planned for an upcoming 4.3 z-stream release*

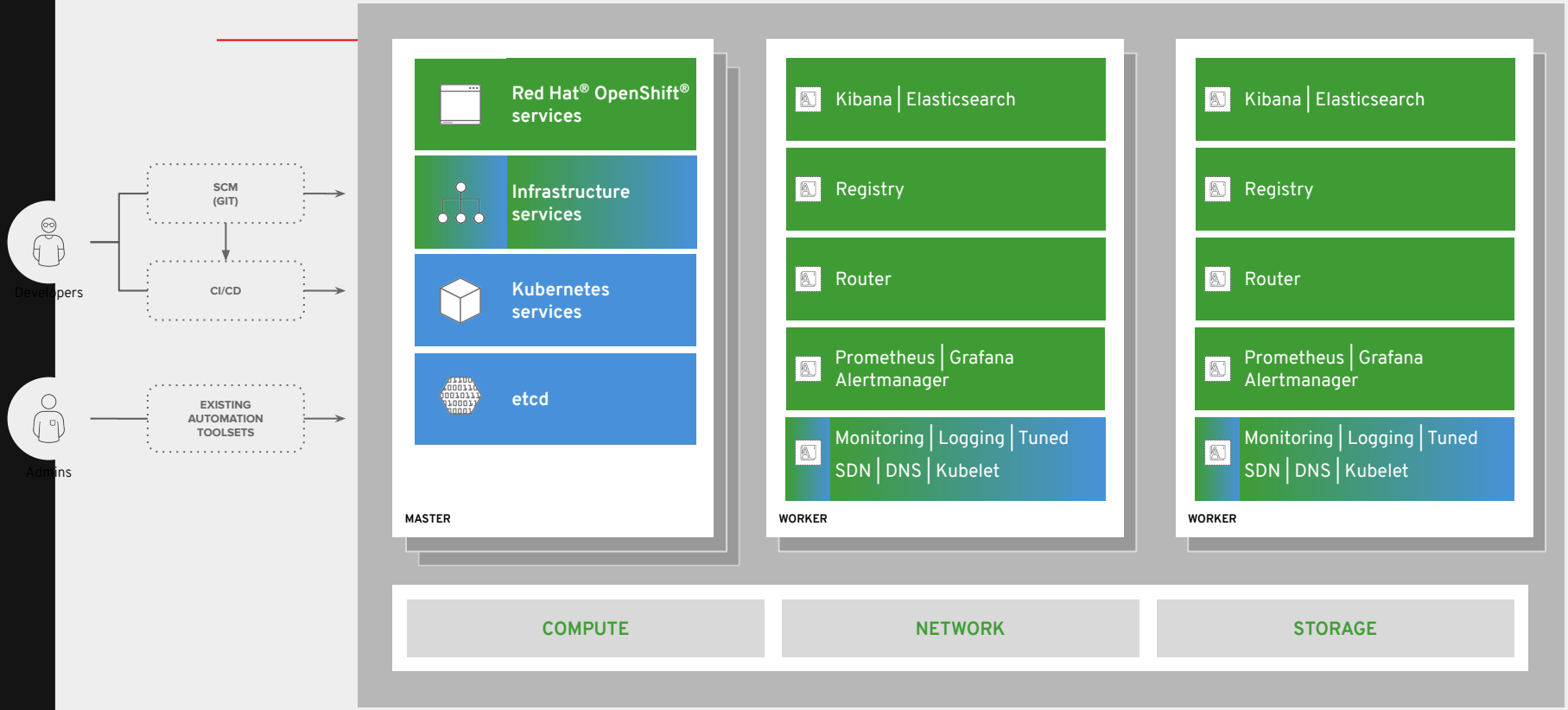
Generally Available

Provider Roadmap & Minimum Supported Version

Provider	Full Stack Automation (Installer provisioned infra)	Pre-existing Infrastructure (User provisioned infra)
amazon web services	4.1	4.1
Microsoft Azure	4.2	4.3+ *(z-stream)*
Bare Metal	4.4 (TBD)	4.1
Google Cloud Platform	4.2	4.2
RED HAT OPENSTACK PLATFORM	4.2	4.4
RED HAT VIRTUALIZATION	4.4	4.4
vmware vSphere	4.4	4.1
IBM Z	-	4.2+ *(z-stream)*
IBM Power Systems	-	4.3+ *(z-stream)*
Alibaba Cloud	4.5	-

PMs: Katherine Dubé (AWS, Azure, GCP), Maria Bracho (BM UPI, VMware, Alibaba), Peter Lauterbach (RHV), Ramon Acedo Rodriguez (OSP, BM IPI), Mike Barrett (IBM Z & Power)

OpenShift Architecture



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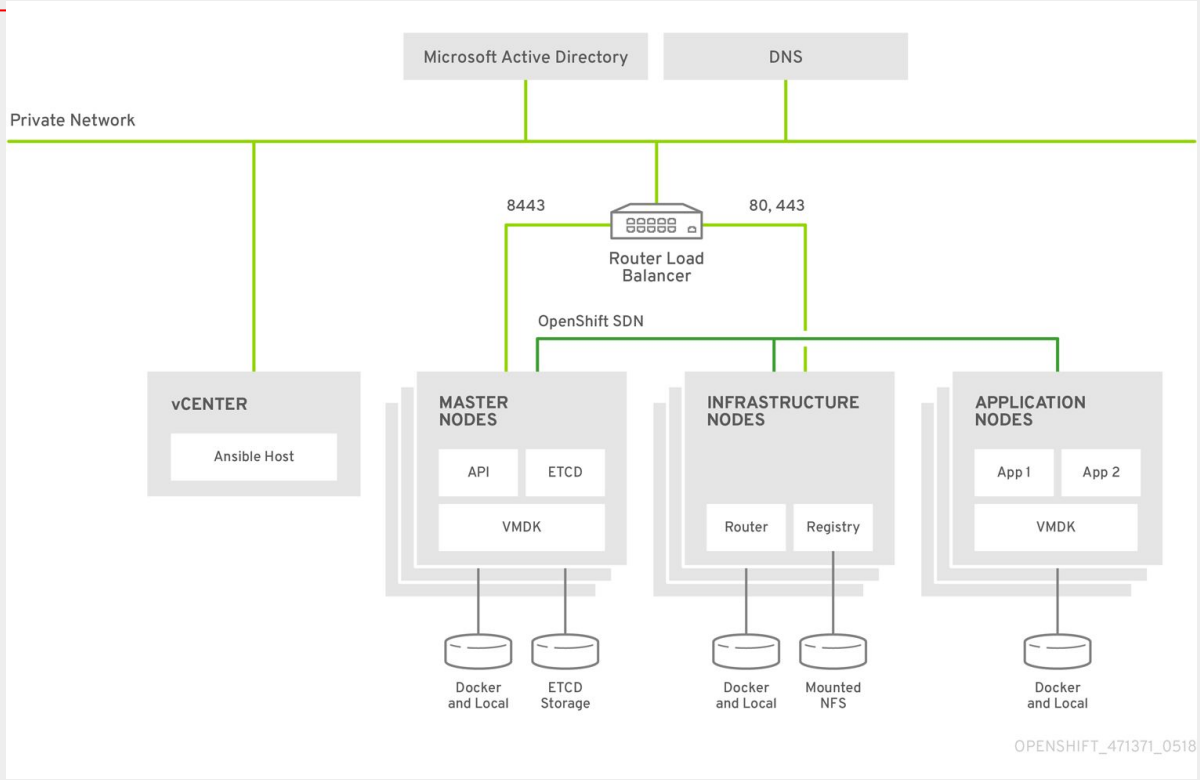
Virtual Environments



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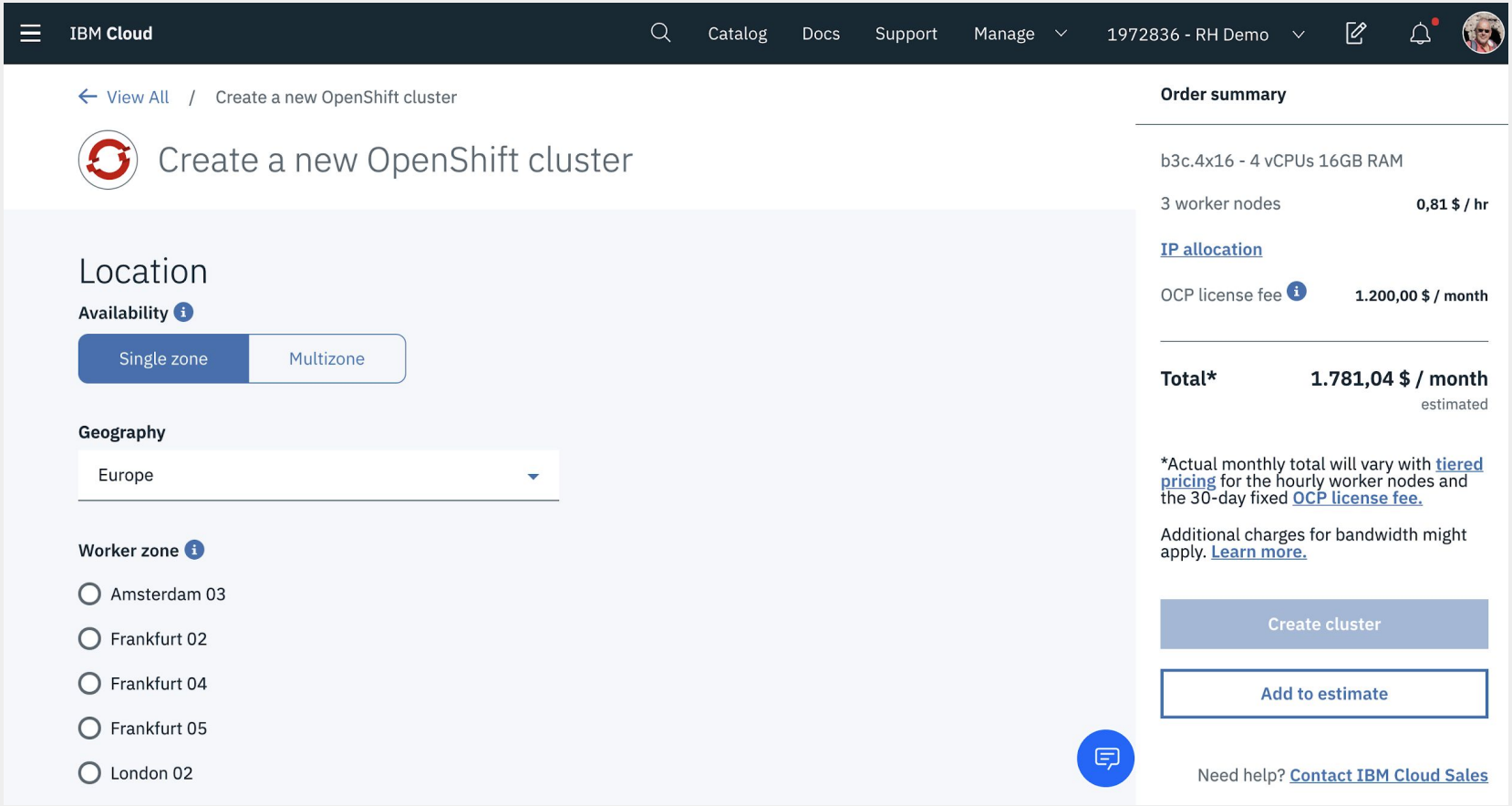
IBM Cloud
Catalog
Docs
Support
Manage
1972836 - RH Demo
View All / Create a new OpenShift cluster
Create a new OpenShift cluster
Location
Availability
Single zone
Multizone
Geography
Europe
Worker zone
Amsterdam 03
Frankfurt 02
Frankfurt 04
Frankfurt 05
London 02
Order summary
b3c.4x16 - 4 vCPUs 16GB RAM
3 worker nodes
0,81 $ / hr
IP allocation
OCP license fee
1.200,00 $ / month
Total*
1.781,04 $ / month
estimated
*Actual monthly total will vary with tiered pricing for the hourly worker nodes and the 30-day fixed OCP license fee.
Additional charges for bandwidth might apply. Learn more.
Create cluster
Add to estimate
Need help? Contact IBM Cloud Sales

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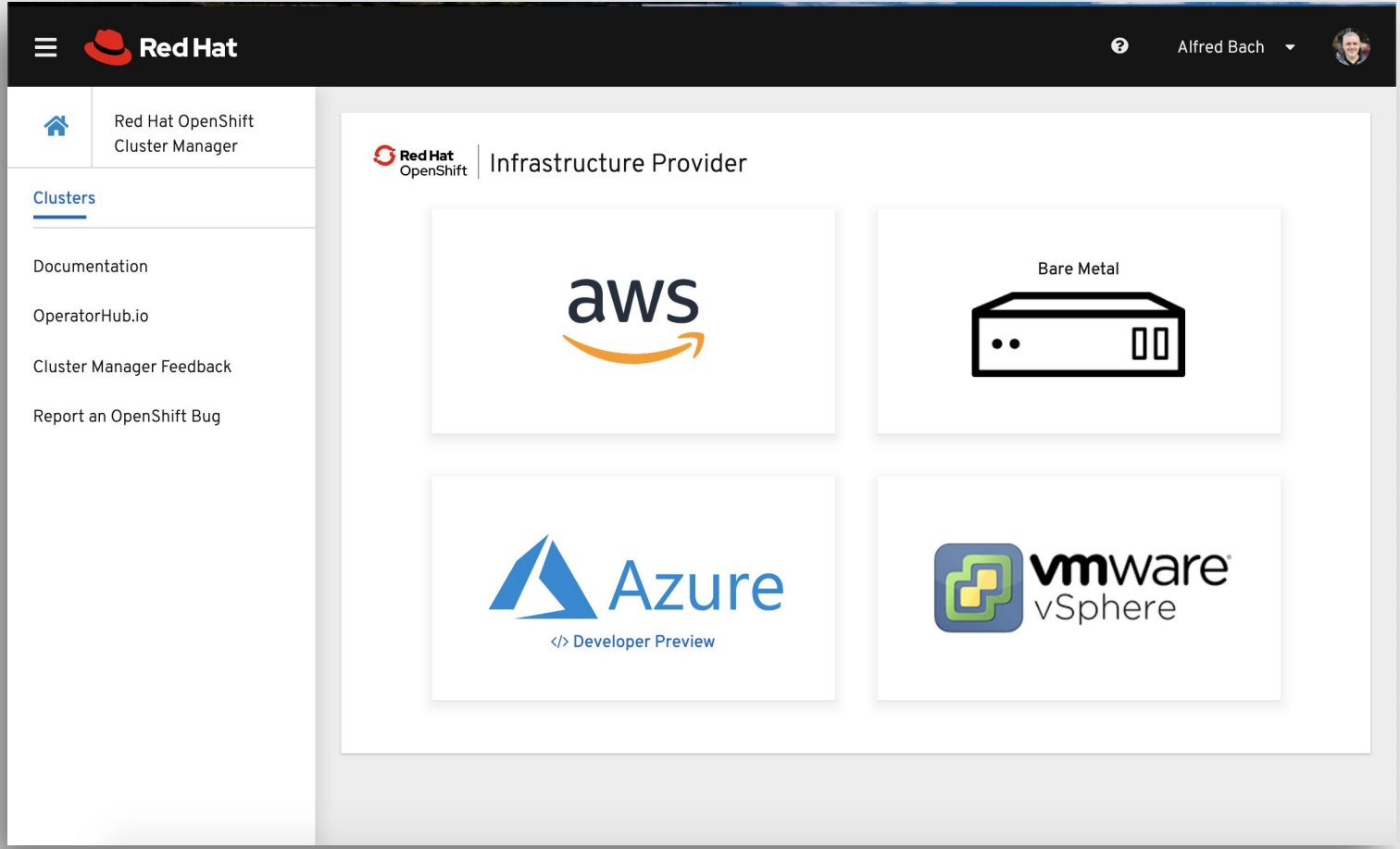
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Alfred Bach
Red Hat OpenShift Cluster Manager
Clusters
Documentation
OperatorHub.io
Cluster Manager Feedback
Report an OpenShift Bug
Red Hat OpenShift
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aws
Bare Metal
Azure
</> Developer Preview
vmware vSphere

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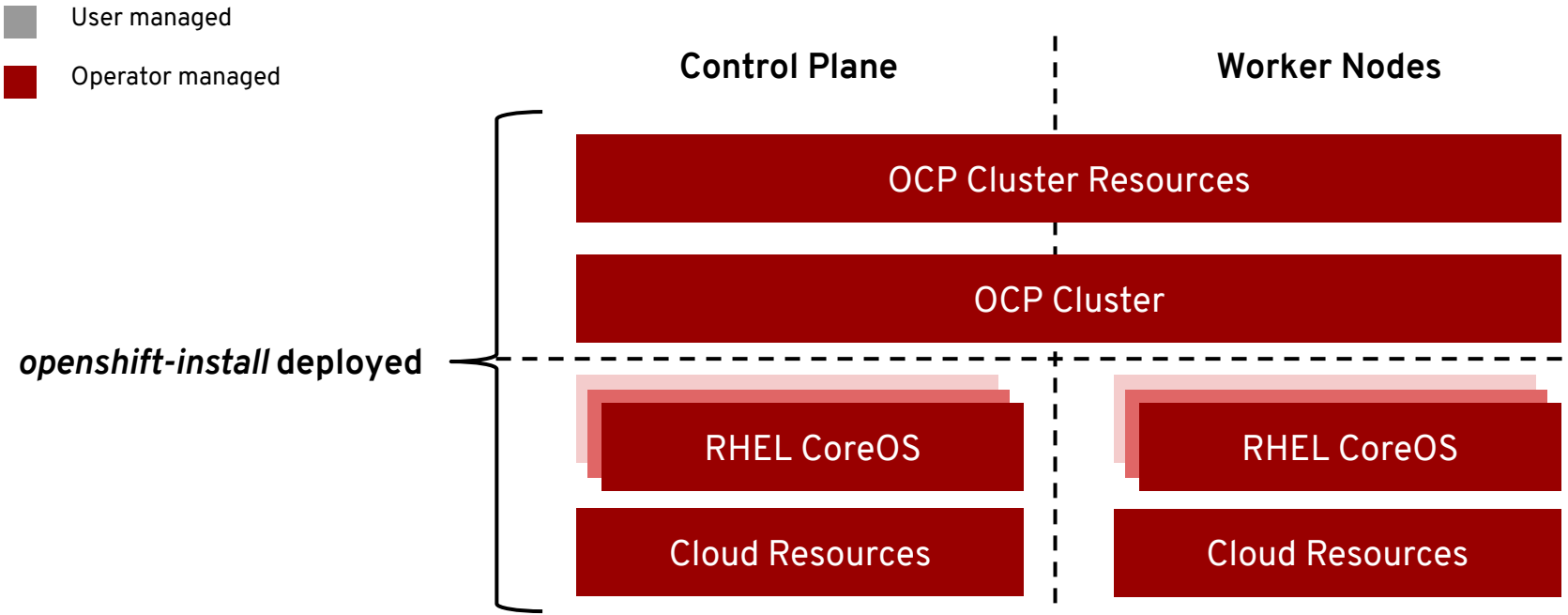
Full-stack Automated Installation (aka IPI)



Full Stack Automated Deployments

Simplified Cluster Creation

Designed to easily provision a “best practices” OpenShift cluster

- New CLI-based installer with interactive guided workflow that allows for customization at each step
- Installer takes care of provisioning the underlying Infrastructure significantly reducing deployment complexity
- Leverages RHEL CoreOS for all node types enabling full stack automation of installation and updates of both platform and host OS content

Faster Install

The installer typically finishes within 30 minutes

- Only minimal user input needed with all non-essential install config options now handled by component operator CRD’s
- See the OpenShift documentation for more details

```
$ ./openshift-install --dir ./demo create cluster
? SSH Public Key /Users/demo/.ssh/id_rsa.pub
? Platform aws
? Region us-west-2
? Base Domain example.com
? Cluster Name demo
? Pull Secret [? for help]
************************************************************
INFO Creating cluster...
INFO Waiting up to 30m0s for the Kubernetes API...
INFO API v1.11.0+c69f926354 up
INFO Waiting up to 30m0s for the bootstrap-complete event...
INFO Destroying the bootstrap resources...
INFO Waiting up to 10m0s for the openshift-console route to be created...
INFO Install complete!
INFO Run 'export KUBECONFIG=<your working directory>/auth/kubeconfig' to
manage the cluster with 'oc', the OpenShift CLI.
INFO The cluster is ready when 'oc login -u kubeadmin -p <provided>'
succeeds (wait a few minutes).
INFO Access the OpenShift web-console here:
https://console-openshift-console.apps.demo.example.com
INFO Login to the console with user: kubeadmin, password: <provided>
```

How everything deployed comes under management

Masters (Special)

- Terraform provisions initial masters*
- Machine API adopts existing masters post-provision
- Each master is a standalone Machine object
- Termination protection (avoid self-destruction)

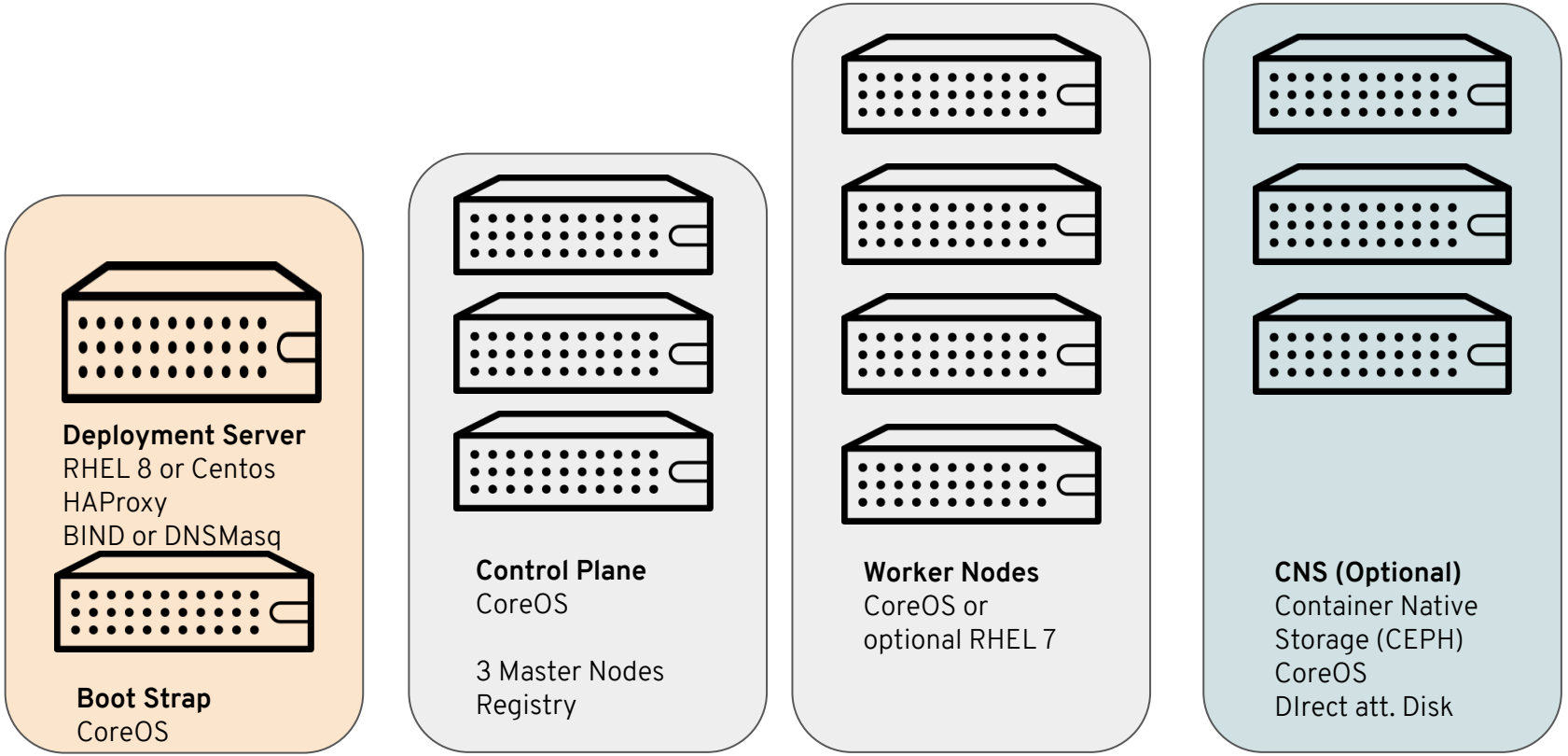
Workers

- Each Machine Pool corresponds to MachineSet
- Optionally autoscale (min,max) and health check (replace if not ready > X minutes)

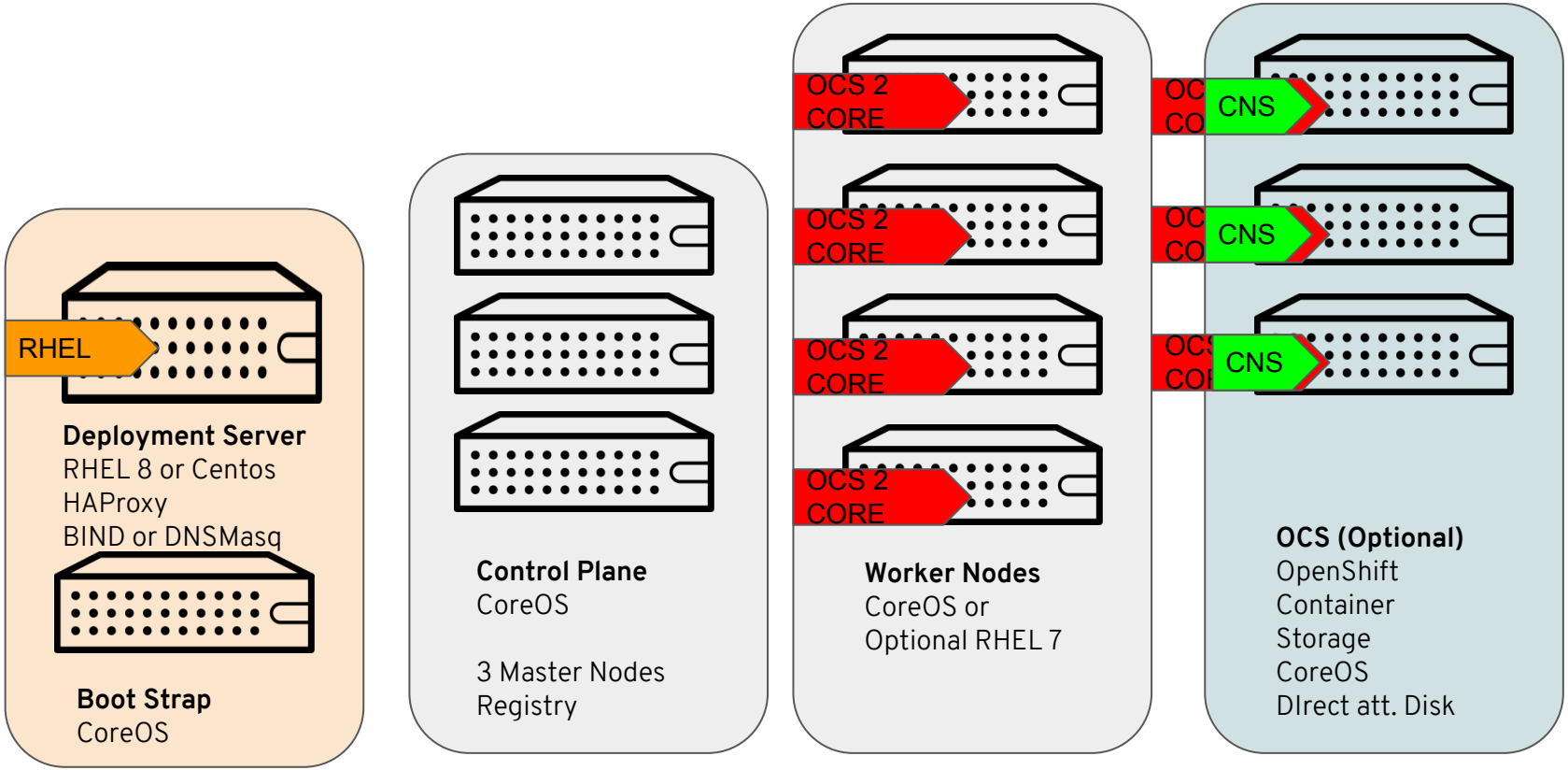
Multi-AZ

- MachineSets scoped to single AZ
- Installer stripes N machine sets across AZs by default
- Post-install best effort balance via cluster autoscaler

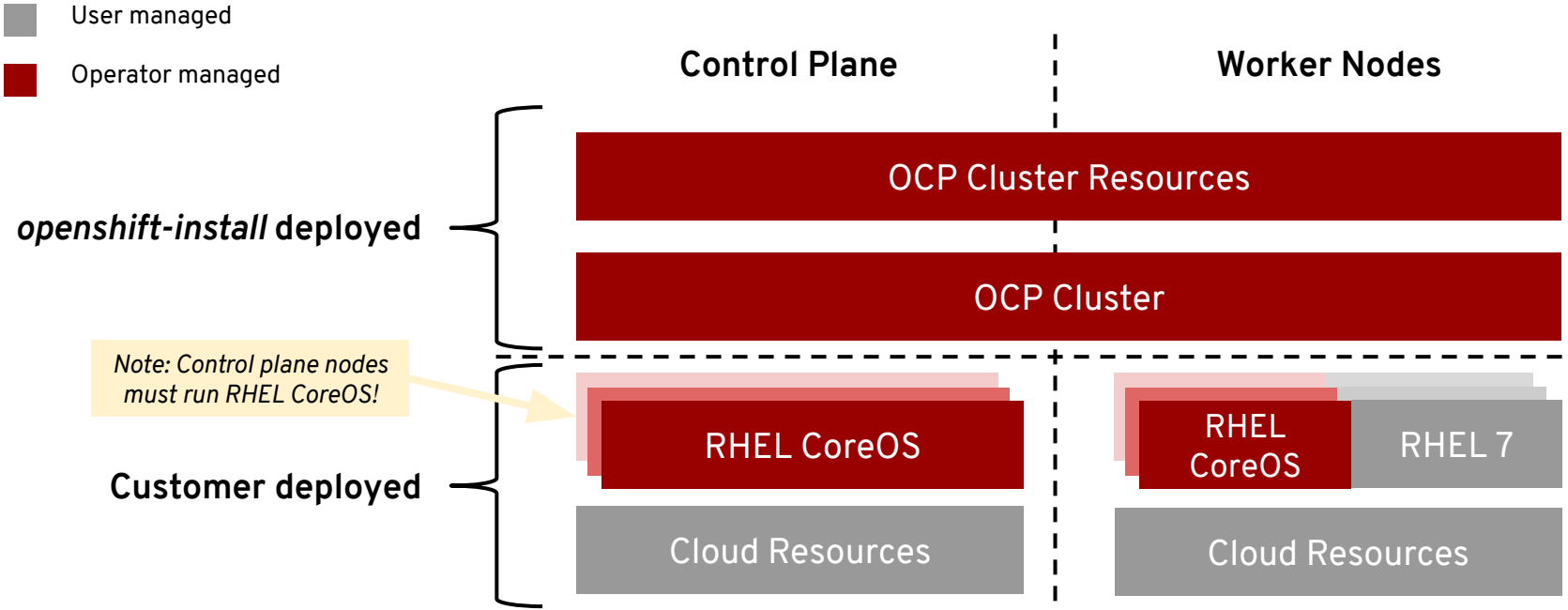
INSTALL A OPENSHIFT CLUSTER



Subscribe an OpenShift 4 cluster



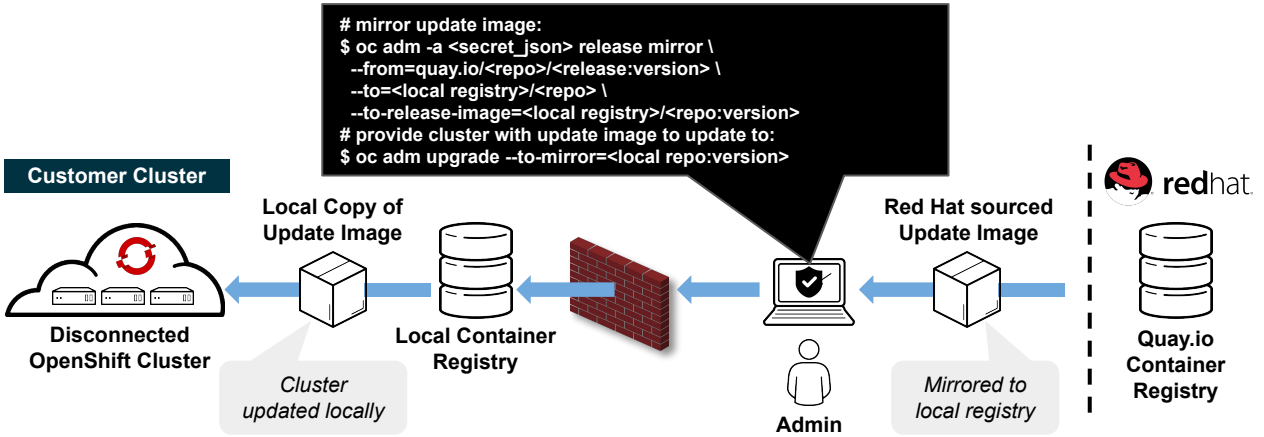
Pre-existing Infrastructure Installation (aka UPI)



Comparison of Paradigms

	Full Stack Automation	Pre-existing Infrastructure
Build Network	Installer	User
Setup Load Balancers	Installer	User
Configure DNS	Installer	User
Hardware/VM Provisioning	Installer	User
OS Installation	Installer	User
Generate Ignition Configs	Installer	Installer
OS Support	Installer: RHEL CoreOS	User: RHEL CoreOS + RHEL 7
Node Provisioning / Autoscaling	Yes	Only for providers with OpenShift Machine API support

Disconnected “Air-gapped” Installation & Upgrading



Overview

- 4.2 introduces support for installing and updating OpenShift clusters in disconnected environments
- Requires local Docker 2.2 spec compliant container registry to host OpenShift content
- Designed to work with the user provisioned infrastructure deployment method
  - *Note: Will not work with Installer provisioned infrastructure deployments*

Installation Procedure

- Mirror OpenShift content to local container registry in the disconnected environment
- Generate install-config.yaml: $ ./openshift-install create install-config --dir <dir>
  - Edit and add pull secret (PullSecret), CA certificate (AdditionalTrustBundle), and image content sources (ImageContentSources) to install-config.yaml
- Set the OPENSHIFT_INSTALL_RELEASE_IMAGE_OVERRIDE environment variable during the creation of the ignition configs
- Generate the ignition configuration: $ ./openshift-install create ignition-configs --dir <dir>
- Use the resulting ignition files to bootstrap the cluster deployment

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