AUTOMATING DAY TWO OPENSHIFT OPERATIONS WITH ANSIBLE

Instantaneous Intergalactic Containers

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AGENDA

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What we're going to talk about today.

- Ansible Engine and Ansible Tower Automation
- OpenShift Container Platform
- OpenShift Day Zero
- OpenShift Day Two Common Operations Tasks
  - Classifications of Task Type
  - Automation with Ansible
- Ansible powered OpenShift Online Ops Utilities
- Red Hat Insights
- Ansible Service Broker
- Hybrid Automation
- Leveraging Ansible and Openshift at CSX

ANSIBLE

What is Ansible?

(Other than an instantaneous intergalactic communications device)

RED HAT® ANSIBLE® Automation

RED HAT ANSIBLE TOWER

Scale + operationalize your automation

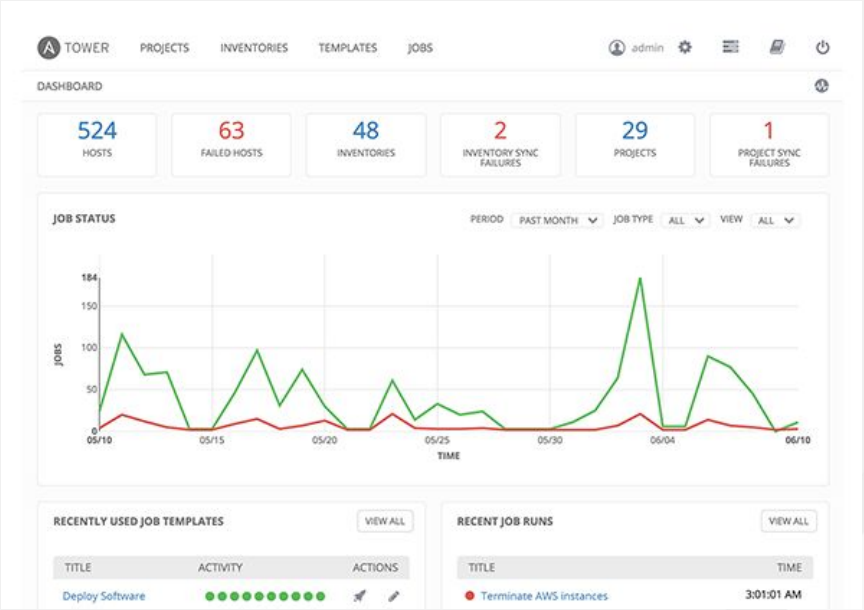
CONTROL | KNOWLEDGE | DELEGATION

RED HAT ANSIBLE ENGINE

Support for your Ansible automation

SIMPLE | POWERFUL | AGENTLESS

FUELED BY AN INNOVATIVE **OPEN SOURCE** COMMUNITY

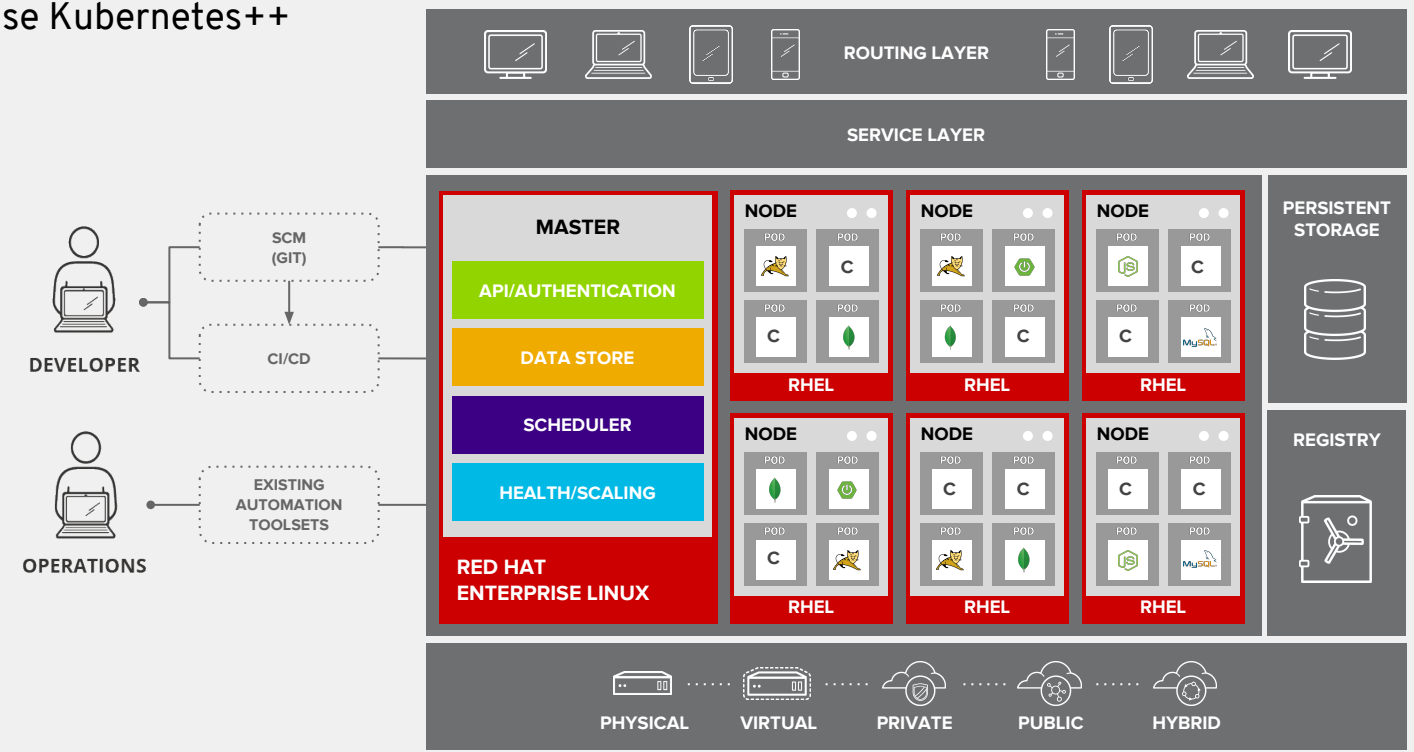


redhat.

OPENSHIFT

OpenShift Container Platform

Enterprise Kubernetes++



OPENSHIFT DAY ZERO

INSTALLING OPENSHIFT

Day Zero

The OpenShift Installer

- Guided Install Utility (The “Installer”)
  - `atomic-openshift-installer install`
- Advanced Installation: `openshift-ansible`
- Fun Fact: These are the same!
  - The installer is a wrapper, everything is powered by Ansible on the backend

OPENSHIFT DAY TWO OPERATIONS

Common OpenShift Operations Tasks

Categories

- Categories
  - Cluster Health Checks
  - Operating System Level
  - Project Level
  - Cluster Level

- Ansible-ization of tasks
  - OpenShift Native Modules: oc, openshift_raw, openshift_scale (more planned)
  - CLI Modules: command/shell (these should be wrapped for idempotency)
  - Creating use-case roles

Day 2 Operations

Cluster Health Checks

- Project/App Validation
  - Create a project, create an app, validate the app, delete the project , validate deletion
- Host Health
  - Verify node Ready-ness
  - Ensure etcd cluster health and cluster member list
- OpenShift Router and Registry
  - Check replica count and status
- Network
  - SkyDNS, cluster overlay network, REST API, MTU Size
- Storage
  - Cluster ephemeral pod storage, Docker storage, Gluster Container Native

Day 2 Operations

Host Level

- Adding master or node Hosts to a cluster
- Deprecation master or node Hosts
- Creating backups of master or node Hosts
  - Capturing OpenShift relevant information
- Adding or removing etcd Hosts
- Backing up etcd Hosts
  - Capturing etcd relevant information
- Relevant Procedures:
  - https://access.redhat.com/documentation/en-us/openshift_container_platform/3.9/html-single/installation_and_configuration/#install-config-adding-hosts-to-cluster
  - https://access.redhat.com/documentation/en-us/openshift_container_platform/3.9/html/day_two_operations_guide/day_two_host_level_tasks

Day 2 Operations

Project Level

- Project Backups
  - Exporting `all` doesn't actually export *all* as there's contextual data about the individual artifacts
  - `rolebindings serviceaccounts secrets imagestreamtags podpreset cms egressnetworkpolicies rolebindingrestrictions limitranges resourcequotas pvcs templates cronjobs statefulsets hpas deployments replicasets poddisruptionbudget endpoints`
- Persistent Volume Backups
  - `oc rsync`

Day 2 Operations

Cluster Level

- Pruning Objects
  - Deployments, Builds, Images (also redis-cache clean-up)
  - `oc adm prune <object_type> <options>`
  - https://access.redhat.com/documentation/en-us/openshift_container_platform/3.9/html-single/cluster_administration/#admin-guide-pruning-resources
- Docker Storage
  - Always evacuate the node
  - Stop the docker daemon
- Docker Maintenance
  - Docker Certificates
  - Secure/Insecure Registries
  - External registries whitelist/blacklist
  - Import of images and lifecycle management (imagestreams)

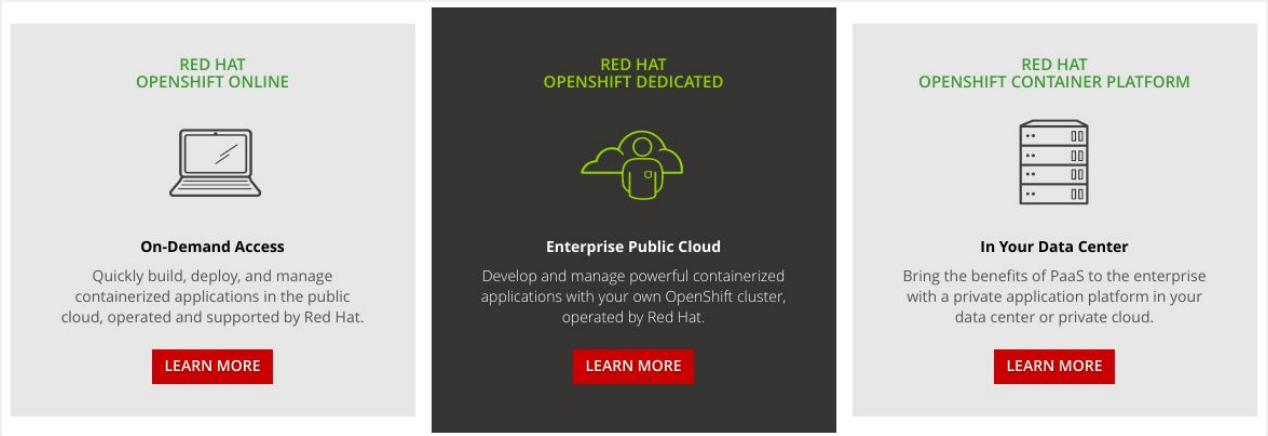
OPENSHIFT ONLINE OPS

OpenShift Online

In case you didn't know!

OpenShift Online is OpenShift Container Platform, as a Service

- Provided and hosted by Red Hat
- Red Hat handles Operations for you



OpenShift Online Ops Tools

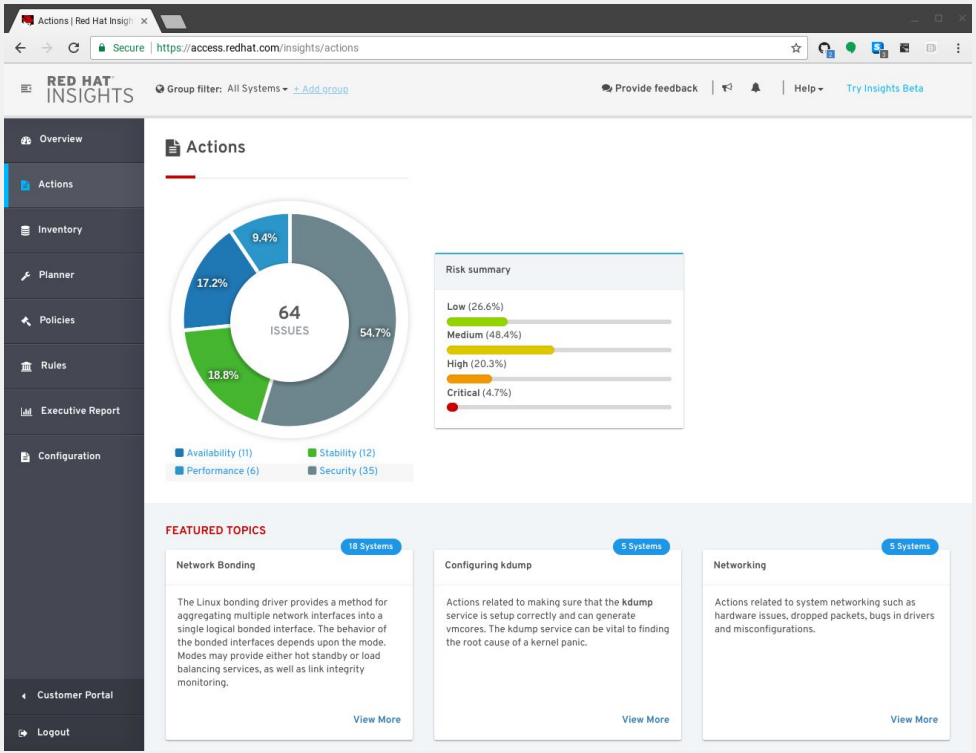
Utilities brought to you in part by OpenShift!

OpenShift Online Ops Team open sources the tools they use

- Ad-Hoc playbooks such as:
  - docker storage configuration and clean up
  - SDN operations
  - Metrics setup/deployment
- Over 100 Ansible Roles for various OpenShift Operations Tasks
- Important Notes:
  - These are not officially supported by Red Hat
  - There are some utils that are going to be very environment specific
- https://github.com/openshift/openshift-tools/
  - Released Open Source under Apache License 2.0

RED HAT INSIGHTS

What Is Red Hat Insights



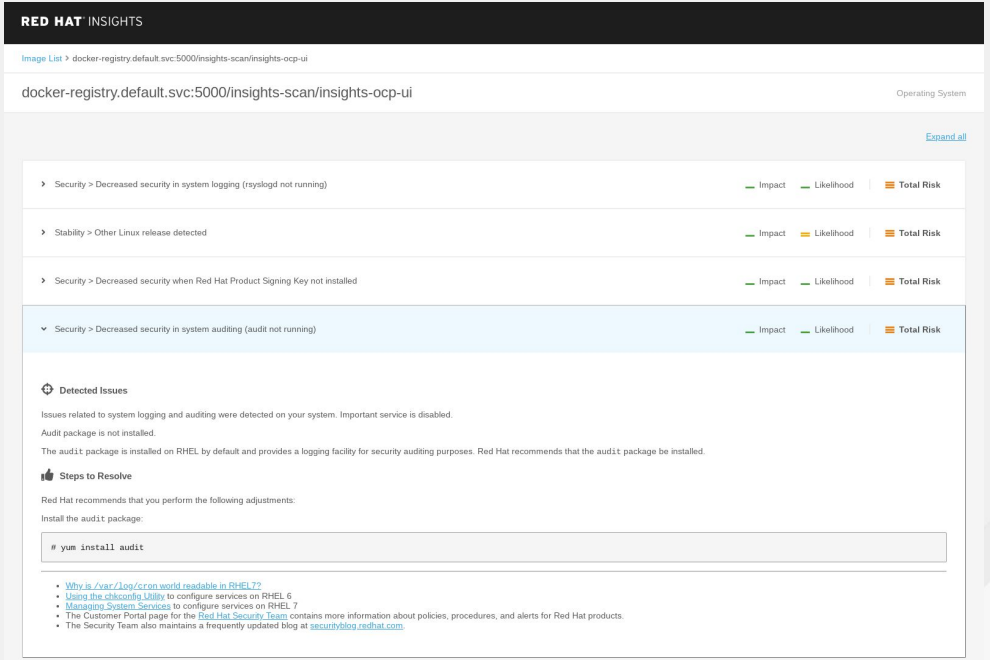
Red Hat Insights is a predictive IT analytics service that enables customers to proactively identify and automatically resolve infrastructure risks before they impact business operations.

Red Hat Insights + OpenShift

Analytics for the Container Platform

Insights In OpenShift

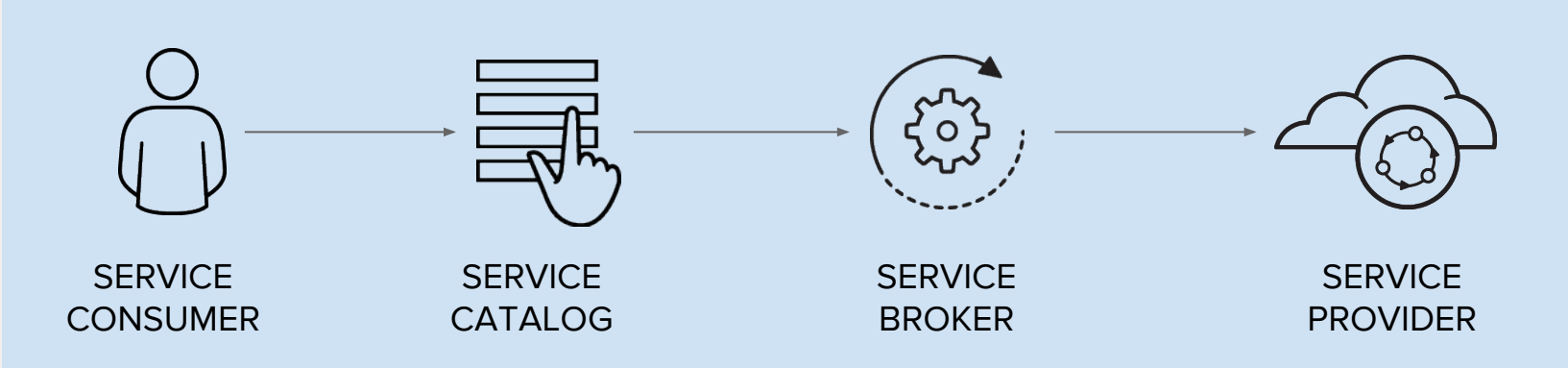
- Scans Container Images to provide analytics
- Runs Container-Native
  - Insights API Pod
  - Scanning Daemon Set
  - Scanner Worker Pods
  - Results UI Service
- Results Web Console
  - View potential Risks with ranked impact and likelihood
  - Remediation Steps for each Risk



SERVICE BROKER

What is a Service Broker?

Automated, Standard, Consistent



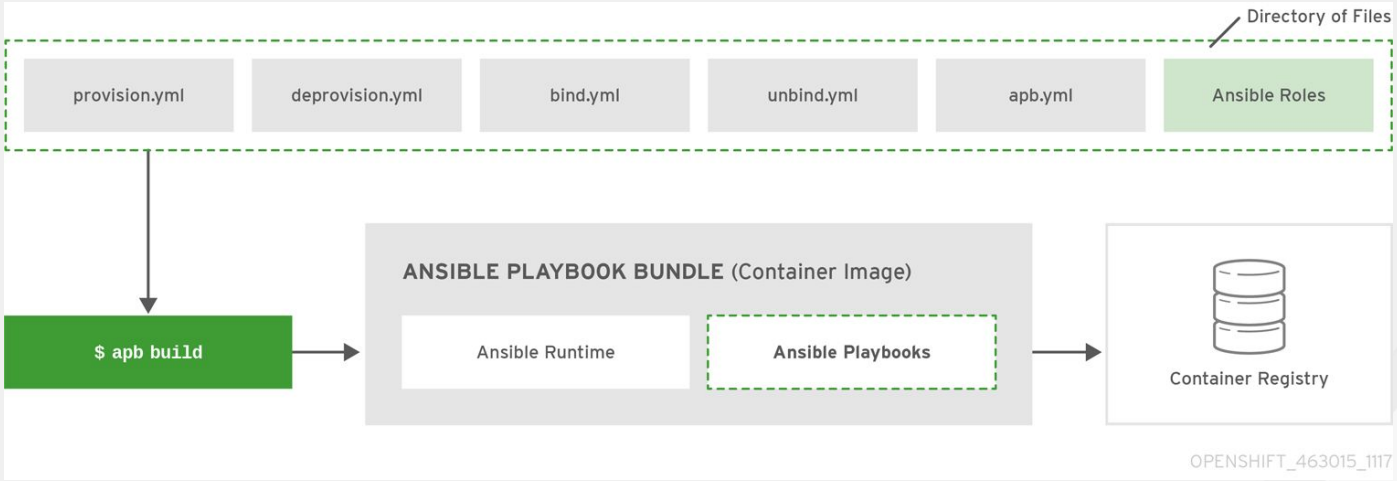
Automated, Standard and Consistent

OpenShift Ansible Broker

Using Ansible Playbook Bundles via the Service Catalog

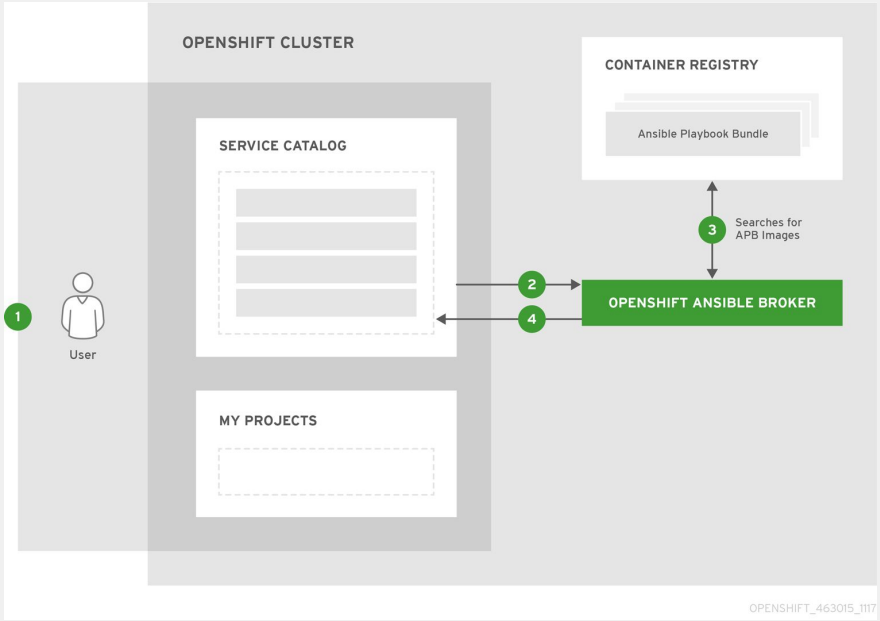
Ability to use Ansible to deploy applications into OpenShift

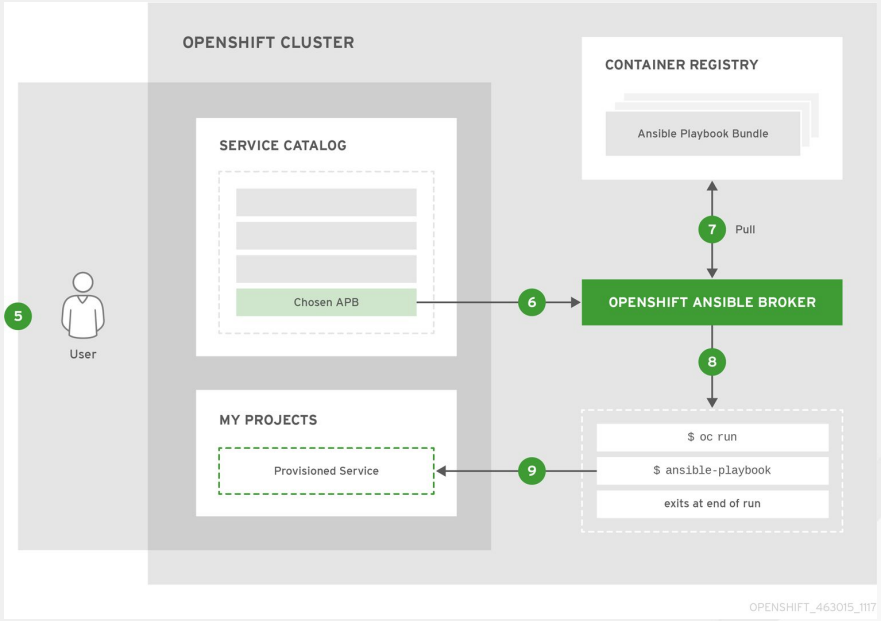
- Provision
- Deprovision
- Bind
- Unbind
- Bundled Roles



OpenShift Ansible Broker

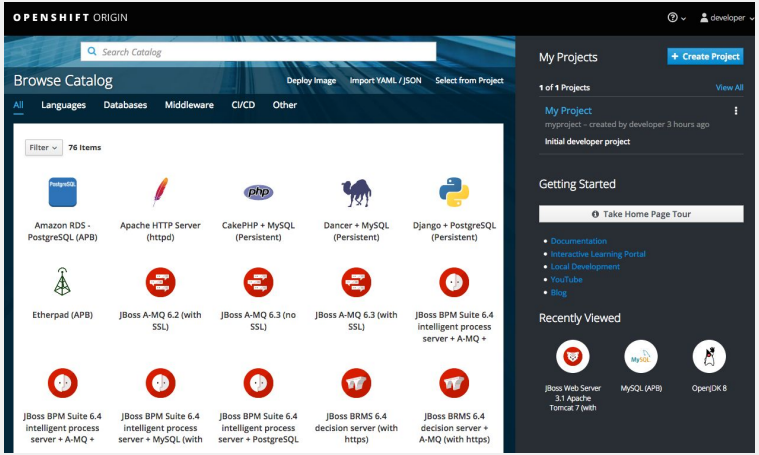
Deploying a service



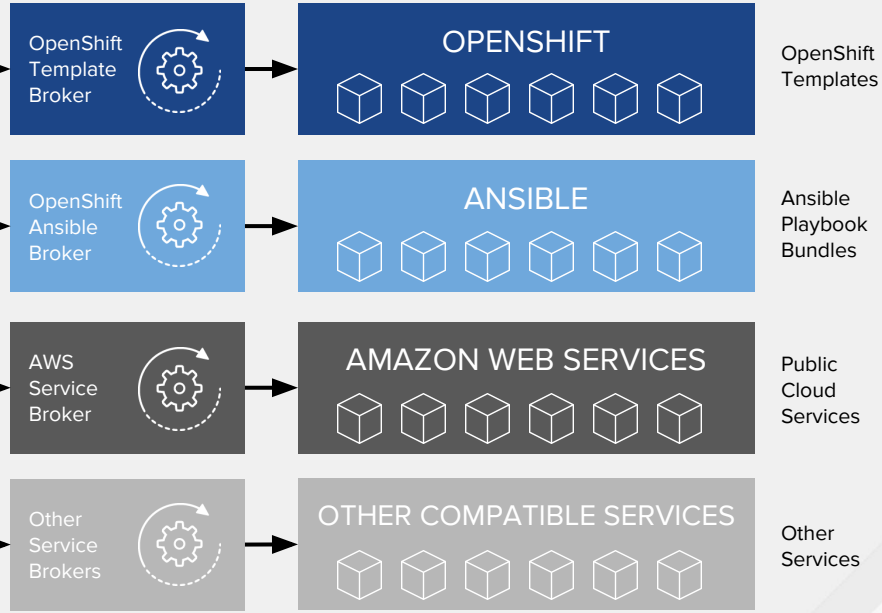


Service Brokers

To The Service Catalog and Beyond!



OPEN SERVICE BROKER API™



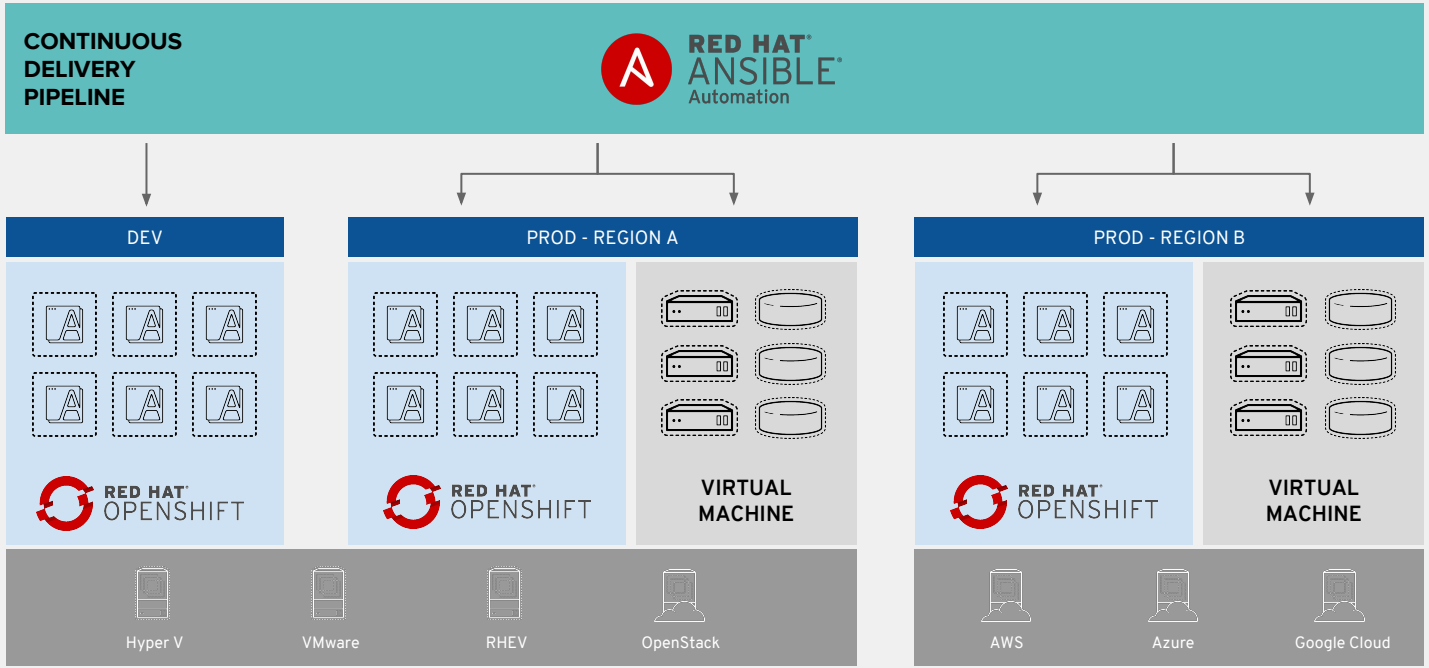
OPENSHIFT SERVICE CATALOG

SERVICE BROKERS

HYBRID AUTOMATION

Hybrid Application Automation

OpenShift and Ansible



LEVERAGING ANSIBLE AND OPENSHIFT AT CSX

DevOps at CSX

Leveraging Ansible and OpenShift to facilitate IT Transformation

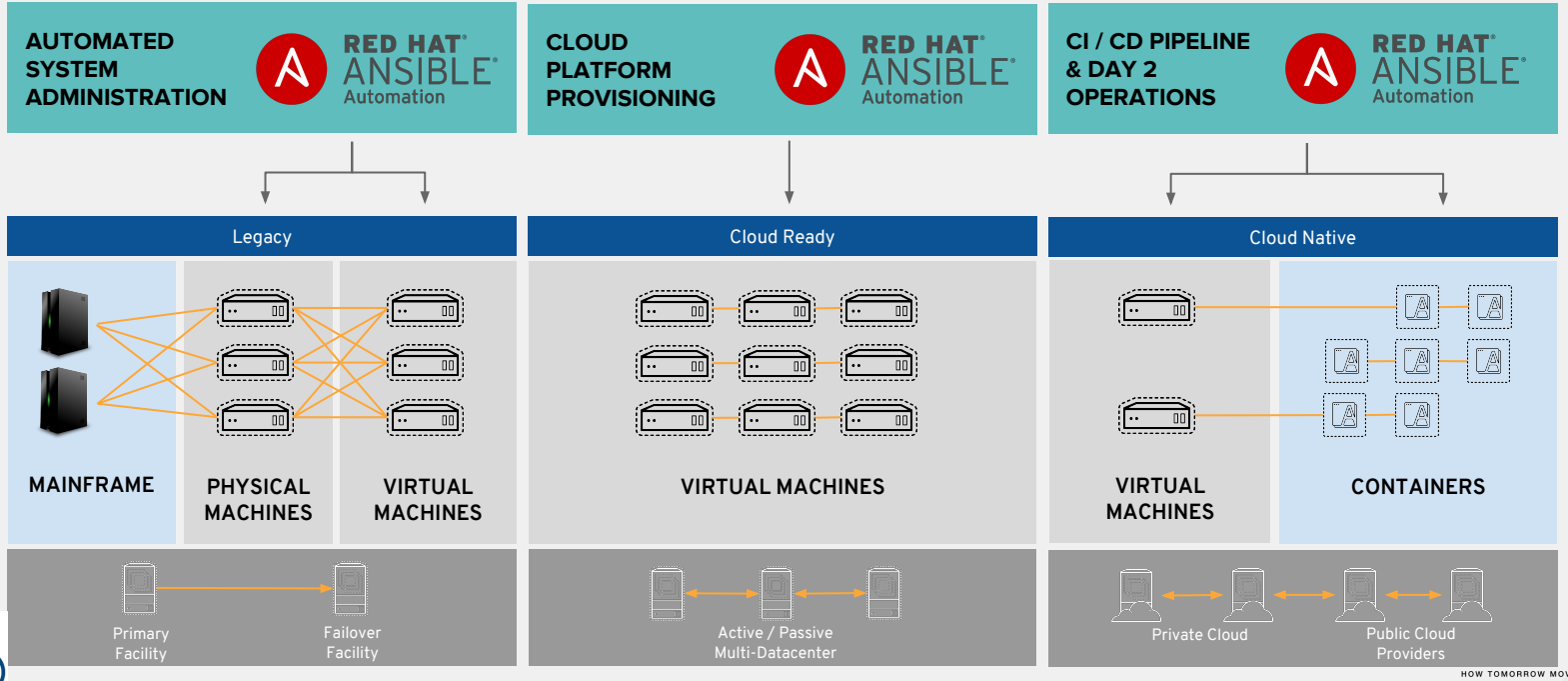
DevOps

DevOps focuses on a combination of software development and operations – and as its name suggest, it's a melding of these two disciplines in order to emphasize communication, collaboration, and cohesion between traditionally separate developer and IT operations teams.

CSX Corporation, based in Jacksonville, Fla., is one of the nation's leading transportation suppliers. Our rail and intermodal businesses provide rail-based transportation services including traditional rail service and the transport of intermodal containers and trailers.

IT Automation for CSX

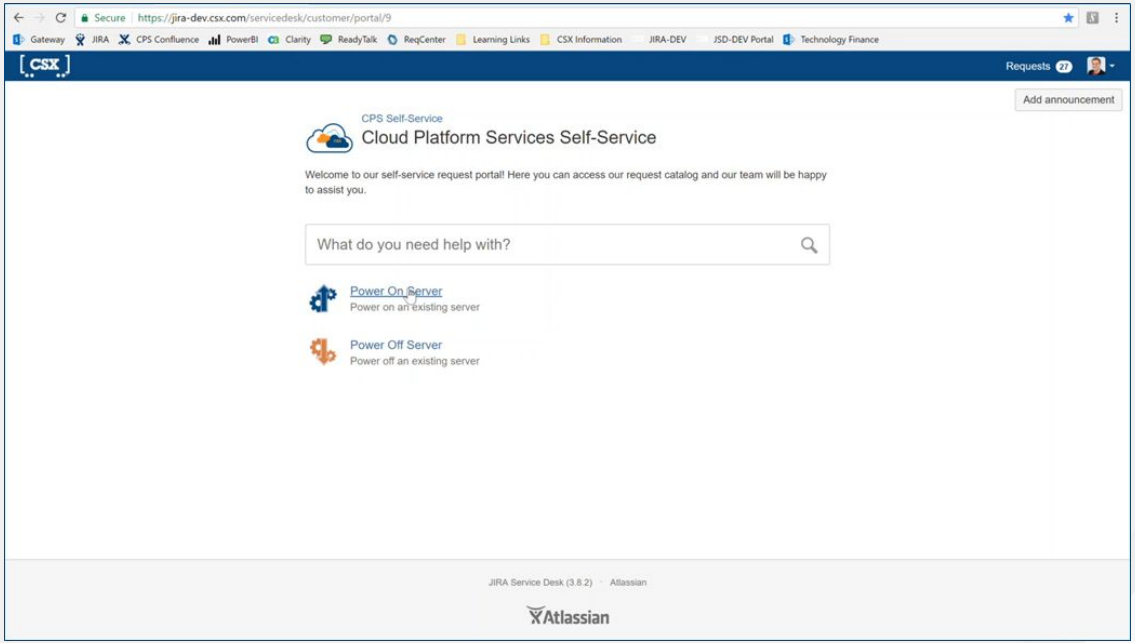
Legacy, Cloud Ready, and Cloud Native Environments



Automated System Administration

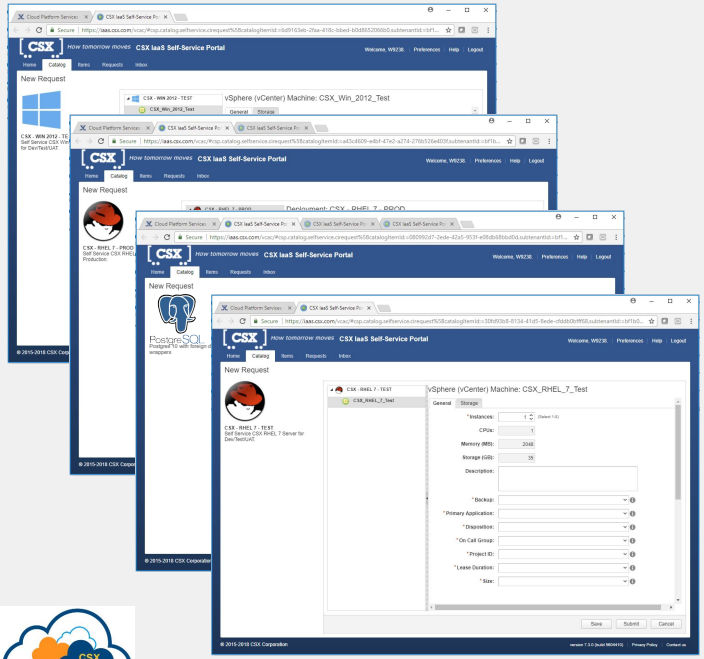
Using Tower API to integrate with existing tools

With Ansible Tower we are able to leverage API calls to Tower from multiple management systems to trigger playbooks to automate legacy administrative tasks, reducing overhead, and freeing up people to focus on transformation projects that support DevOps initiatives.



Cloud Platform Provisioning

Bridging the gap from Legacy to Cloud Native



Using Ansible playbooks to post-configure a small number of standardized images, we are able to rapidly deliver Infrastructure-as-a-Service.

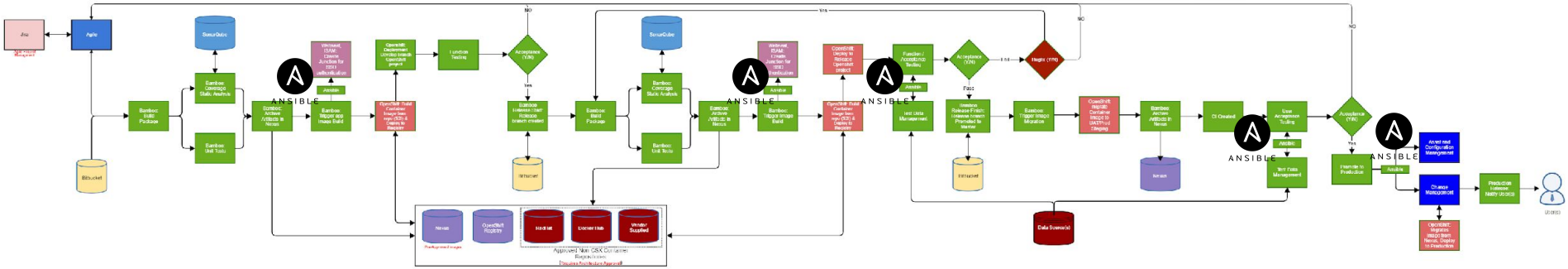
IaaS provides a transitional infrastructure architecture allowing us to break up highly consolidated infrastructure silos without having go to the extent of re-factoring the applications.

This allows us introduce more open source infrastructure options and continue to drive out wasted manual effort and focus resources on transformation.

HOW TOMORROW MOVES CSX TECHNOLOGY

CI/CD Pipeline

Making CI/CD work in an ITIL aligned Hybrid Environment



Ansible is integrated across the CI/CD pipeline with OpenShift to interface with external systems for security configuration, test data management, configuration management, change control, and deployment.

Day 2 Operations

Building the Backlog

Health Check is underway at CSX now.

Current installation and configuration of OpenShift already heavily leverages built-in Ansible playbooks with appropriate configuration input.

Health check is expected to identify additional opportunities to leverage Ansible to automate management of the OpenShift environment.

Backlog items already include adding OpenShift configuration to source control and integrating provisioning of OpenShift environments from Ansible Tower.

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Special Thank You to all Content Creators of the following:

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- https://www.openshift.com/
- https://access.redhat.com/insights/overview/
- https://github.com/openshift/openshift-tools/
- https://docs.openshift.org/latest/day_two_guide/index.html
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