Red Hat OpenShift

Advanced Cluster Management

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Red Hat OpenShift

Lunch & Learn Agenda

- Advanced Cluster Management Presentation (~ 25 minutes)
  - Why Advanced Cluster Management?
  - Features of Advanced Cluster Management?
- Demo ---------- (~30 minutes)
  - Cluster Lifecycle Management
  - Policy and Governance
  - Application Lifecycle Deployments

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Why Advanced Cluster Management?

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Educated Prediction of Future Conditions

If we accept that enterprise kubernetes is going to grow,, what can we predict?

Let's do the Math

For Your Average Large Company

Years	2	3	4	5
For Every 1000 Applications	1,000	1,000	1,000	1,000
% Containerized	20.00%	30.00%	40.00%	60.00%
Containerized Apps	200	300	400	600
Number of Kubernetes Clusters (Dev/Test/Prod)	10	20	25	30
Sub-Total Containerized Apps	2,000	6,000	10,000	18,000
Concurrency Factor	1.40	1.40	1.40	1.40
Total Containerized Apps	2,800	8,400	14,000	25,200
Annual Frequency of Change				
Slow (1 per week)	145,600	436,800	728,000	1,310,400
Medium (2 per week)	291,200	873,600	1,456,000	2,620,800
Fast (daily)	1,022,000	3,066,000	5,110,000	9,198,000
Years	2	3	4	5
Volume of Daily Pipelines				
Slow (1 per week)	560	1,680	2,800	5,040
Medium (2 per week)	2,240	6,720	11,200	20,160
Fast (daily)	2,800	8,400	14,000	25,200

Expected Pace of Change

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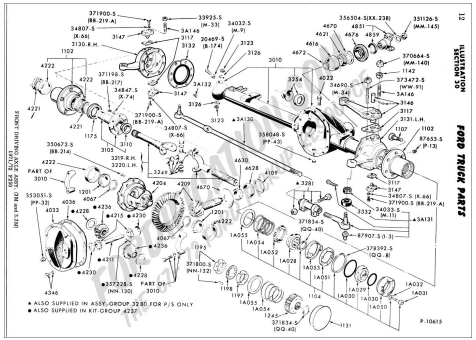
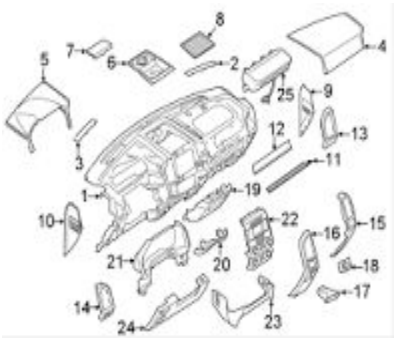
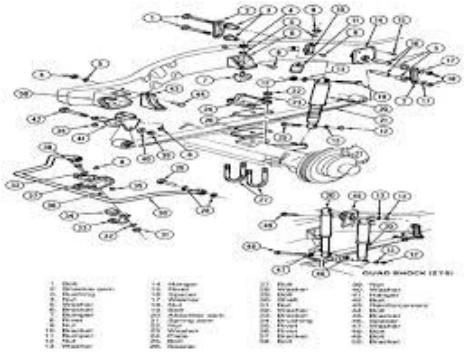
Enterprise Kubernetes

xKS/DIY?



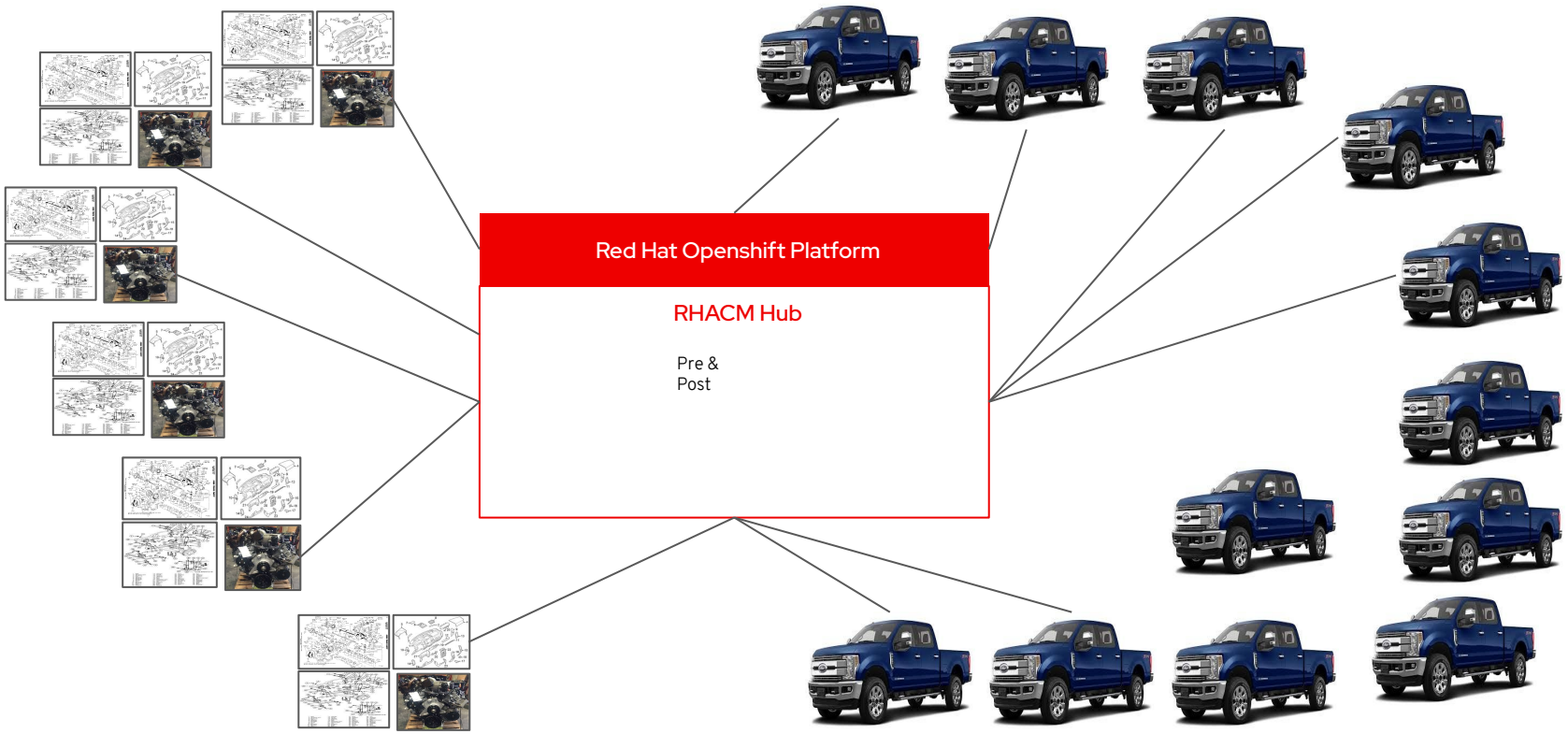




OR

OpenShift?

Advanced Cluster Management to the Rescue



Benefits

Red Hat OpenShift and Red Hat Advanced Cluster Management for Kubernetes

Accelerate development to production

Self-service provisioning allows app dev teams to request clusters directly from a catalog removing central IT as a bottleneck.

Increase application availability

Placement rules can allow quick deployment of clusters across distributed locations for availability, capacity, and security reasons.

Reduce costs

Centralized management of clusters reduces operational cost, makes the environment consistent, and removes the need to manually manage individual clusters.

Ease compliance

Policies can be written by the security team and enforced at each cluster, allowing environments to conform to your policy.

Advanced Cluster Management

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*Observed usage consumes around 2 CPU steady state for 30+ clusters

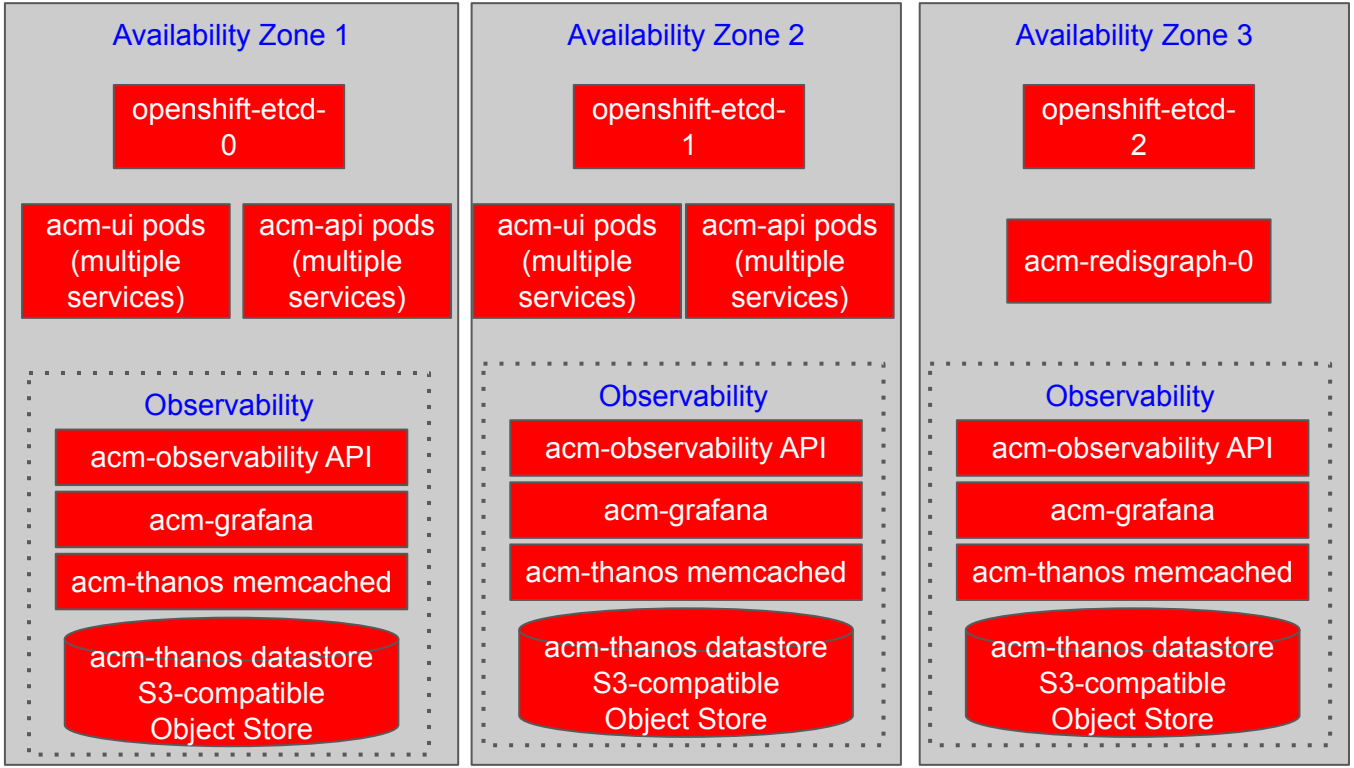
Advanced Cluster Management for Kubernetes

Hub Sizing Requirements

+ About 20Gi of persistent storage

2.0

OpenShift Node Role	Availability Zones	Data Stores	Total reserved memory (lower bound)	Total reserved CPU (lower bound)
Master	3	**etcd** x 3	*Per OpenShift sizing guidelines*	*Per OpenShift sizing guidelines*
Worker	3	**redisgraph/redis** x 1	**12Gi**	**6 CPU**



High Availability

- Fault domains spread pods across AZs via podAntiAffinity
- Stateful datastores require 3 replicas
- All Stateless UI & API services will be run with at least 2 replicas to support rolling updates and fault domain outages
- Thanos requires an S3 object store that can be run inside or outside the cluster
- Redis/RedisGraph provides an in-memory index for search; search data re-indexed in case of Pod or Node failure

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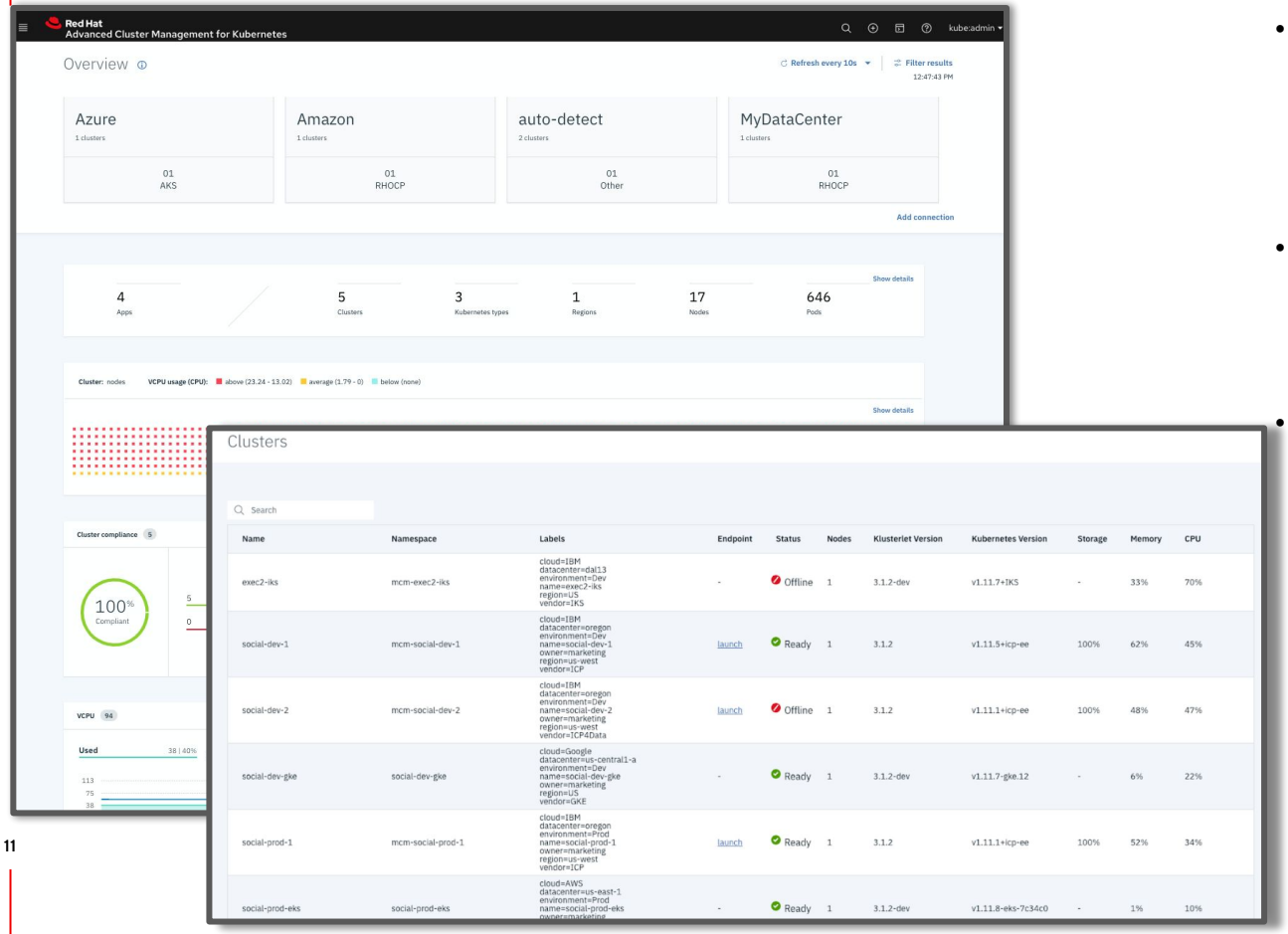
Unified Multi-Cluster Management

Single Pane for all your Kubernetes Clusters



- **Centrally** create, update and delete Kubernetes clusters **across multiple** private and public clouds
- Search, find and modify **any** kubernetes resource across the **entire** domain.
- **Quickly** troubleshoot and resolve issues across your **federated** domain

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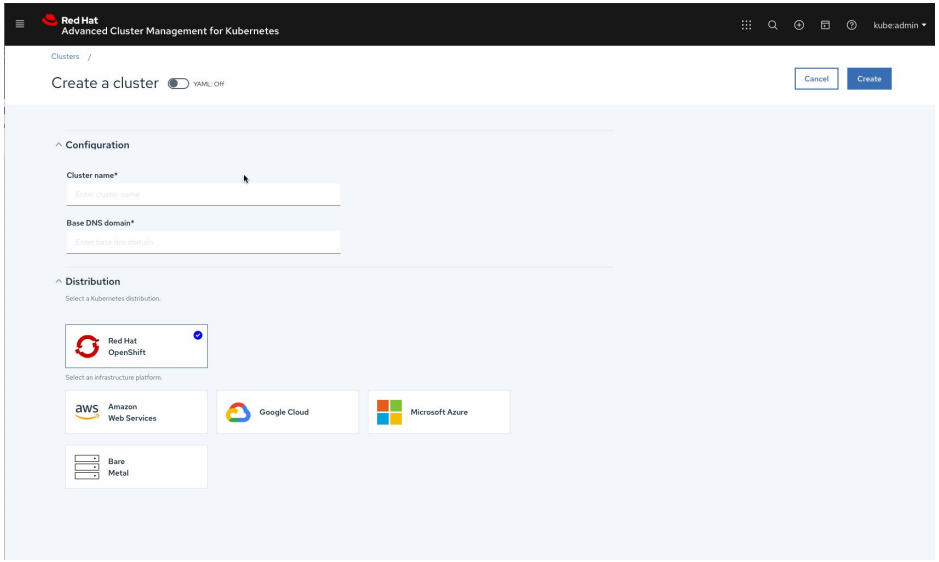
Multi-Cluster Lifecycle Management

Creating & Importing Clusters

IT Operations

DevOps/SRE

- **Create**, **Upgrade** and **Destroy** OCP clusters running on **Bare-metal** as well as public cloud
- Leverage **Hive** API for OCP cluster deployment
- Wizard or YAML based create cluster flow
- Launch to an OCP Console from ACM
- Access cluster login credentials and download kubeadmin configuration



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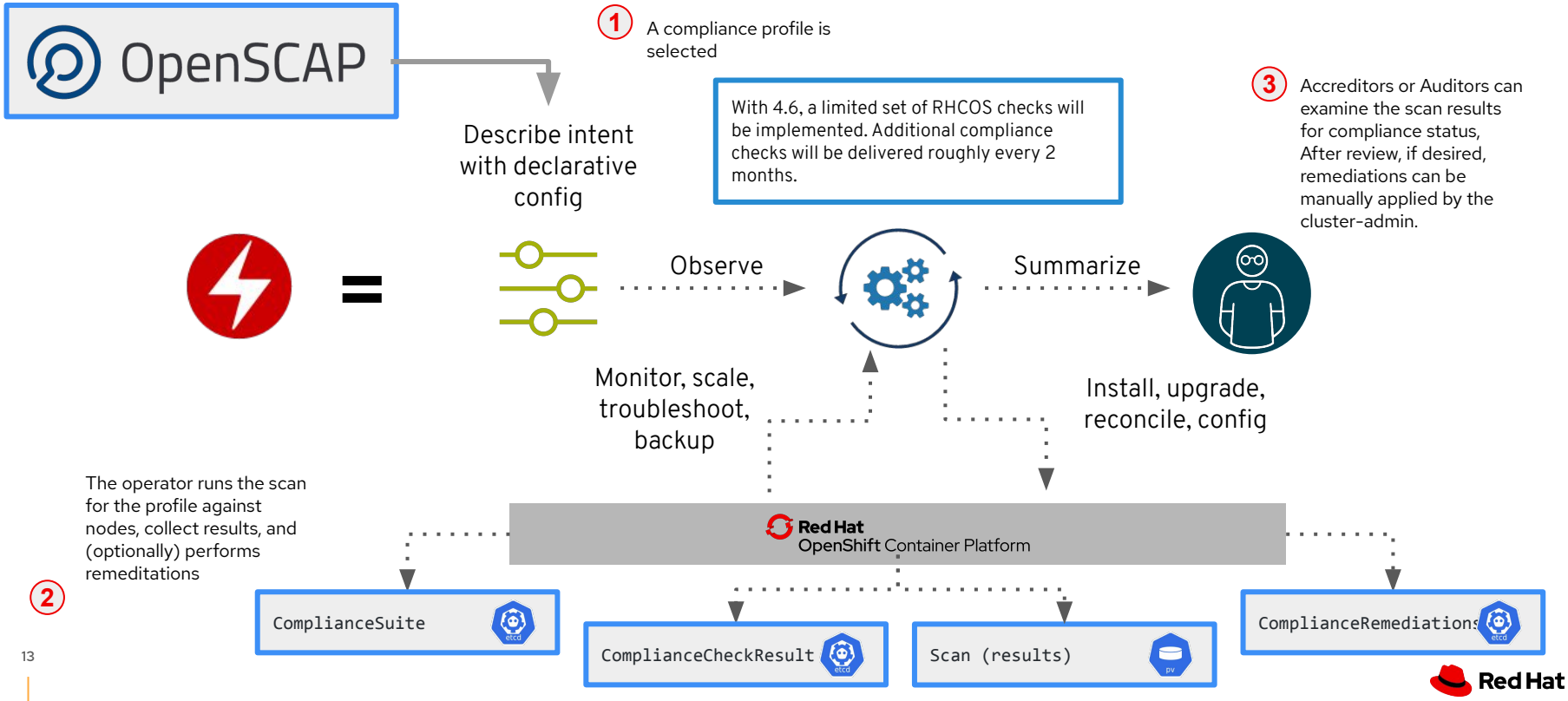
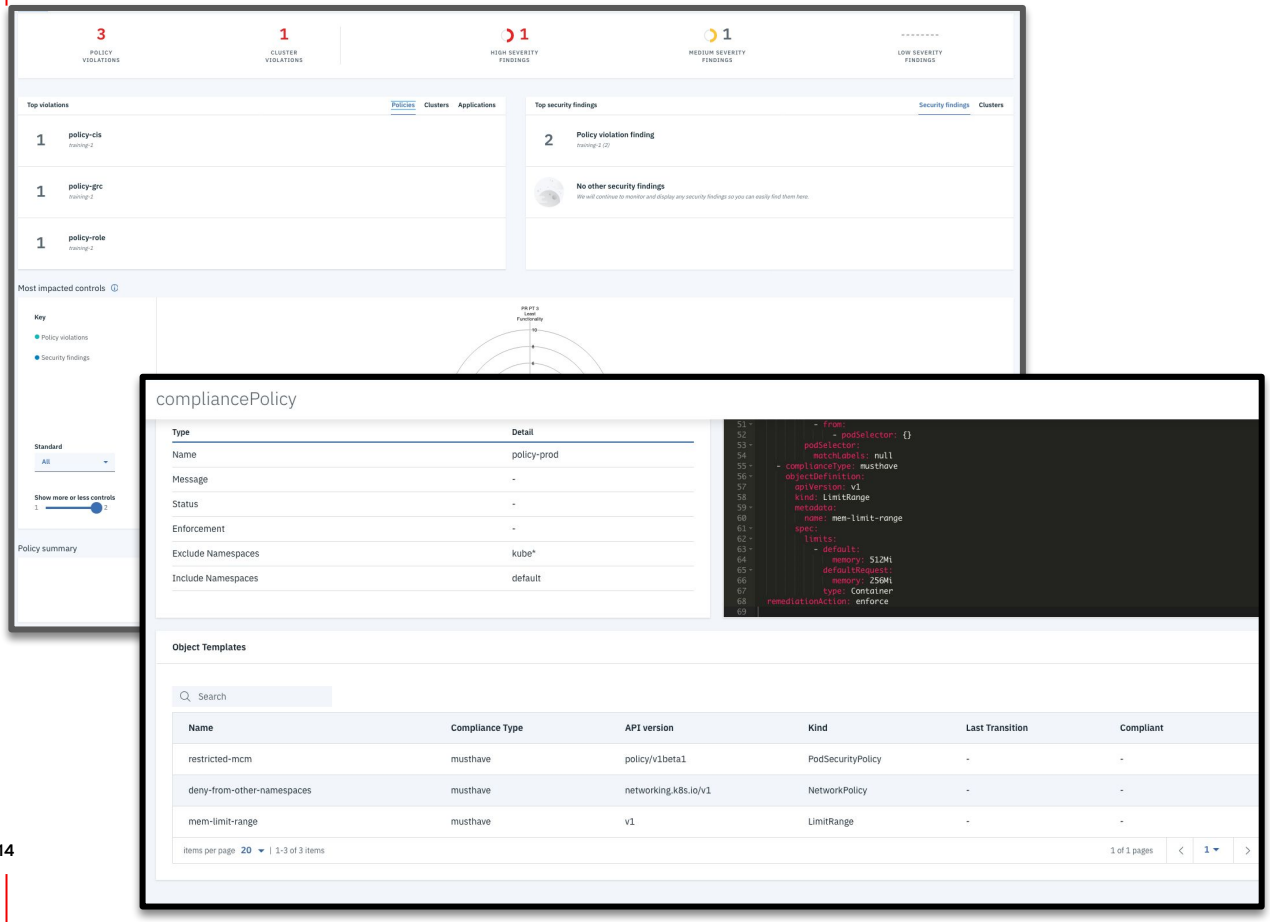
For Each OpenShift Cluster

OpenShift Compliance Operator: Declarative Security Compliance (As of 10/22)



Policy based Governance, Risk and Compliance

Don't wait for your security team to tap you on the shoulder



- **Centrally** set & enforce policies for security, applications, & infrastructure
- Quickly **visualize** detailed **auditing** on configuration of apps and clusters
- Built-in **CIS** compliance policies and audit checks
- **Immediate** visibility into your compliance posture based on **your** defined standards

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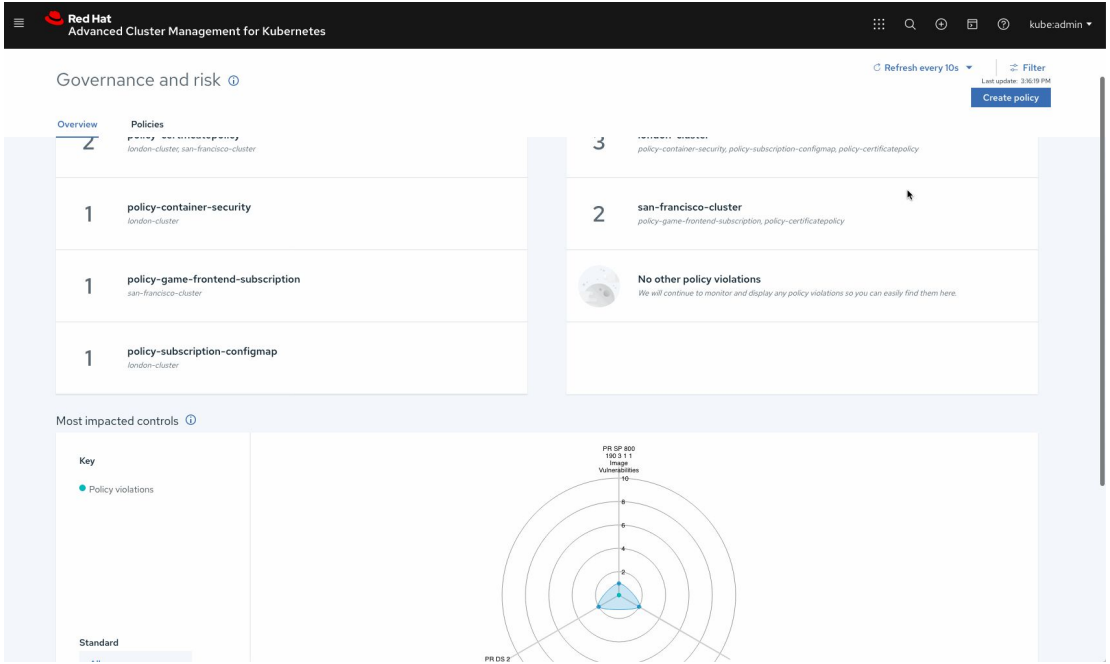
Policy based Governance, Risk and Compliance

Don’t wait for your security team to tap you on the shoulder

Security Ops

IT Operations

- Standard Policies out of the box
  - FISMA
  - HIPAA
  - NIST
  - PCI
- Leverage Different Categories to Represent more standards (if Needed)
- Use Labels to enforce policies against clusters
- Use **inform** to view policy violations
- Use **enforce** to view violations and automatically remediate



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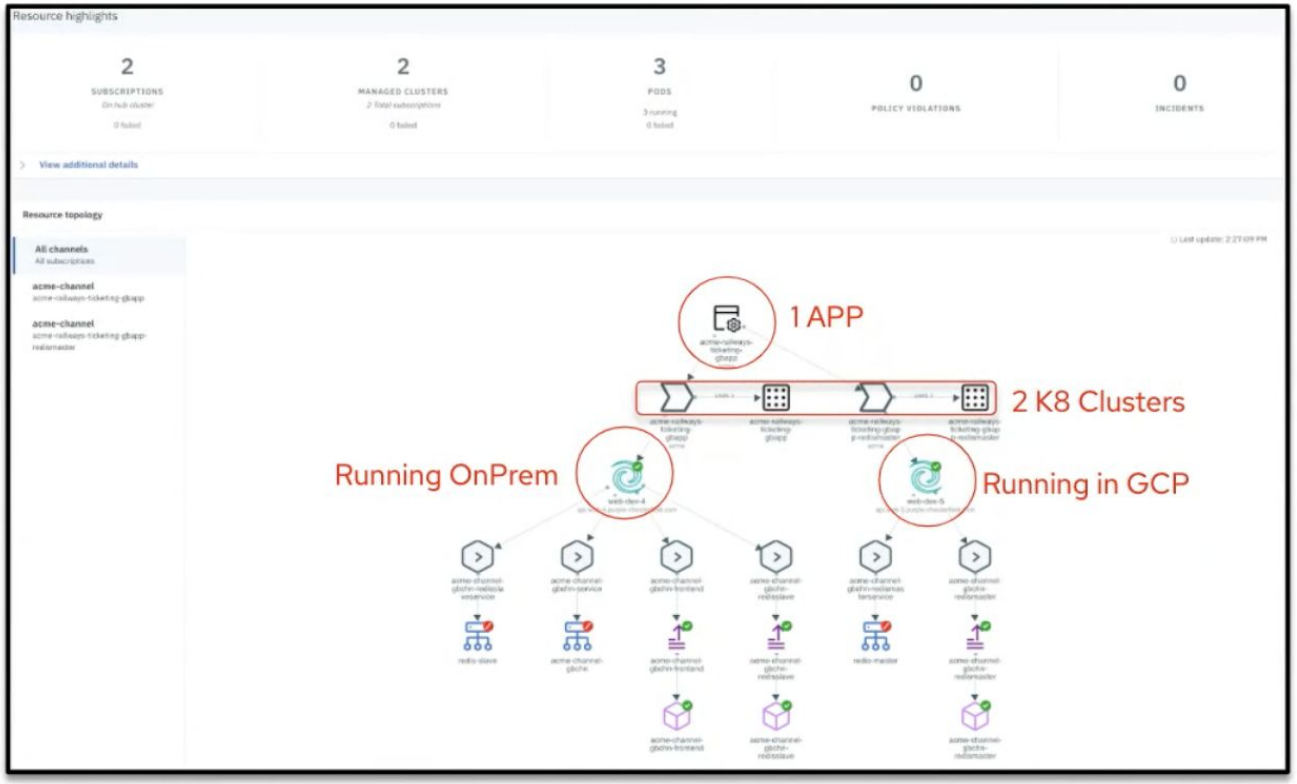
Advanced Application Lifecycle Management

Simplify your Application Lifecycle



Easily Deploy Applications at **Scale**

Deploy Applications from **Multiple** Sources

Quickly **visualize** application relationships **across** clusters and those that **span** clusters

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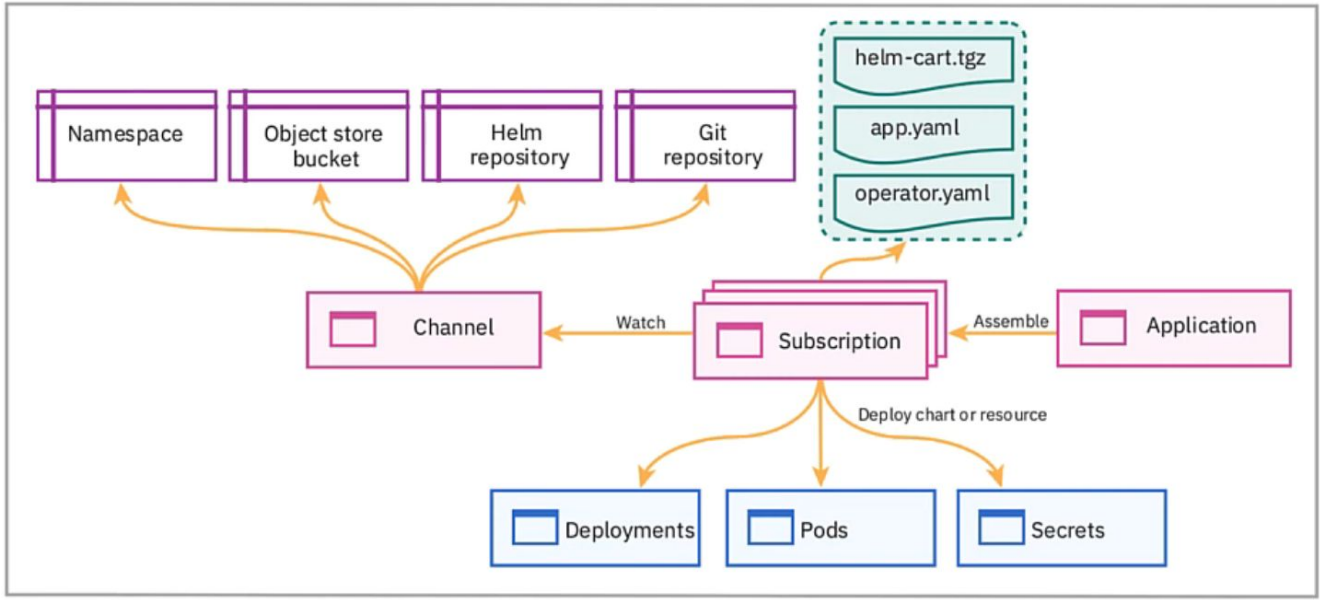
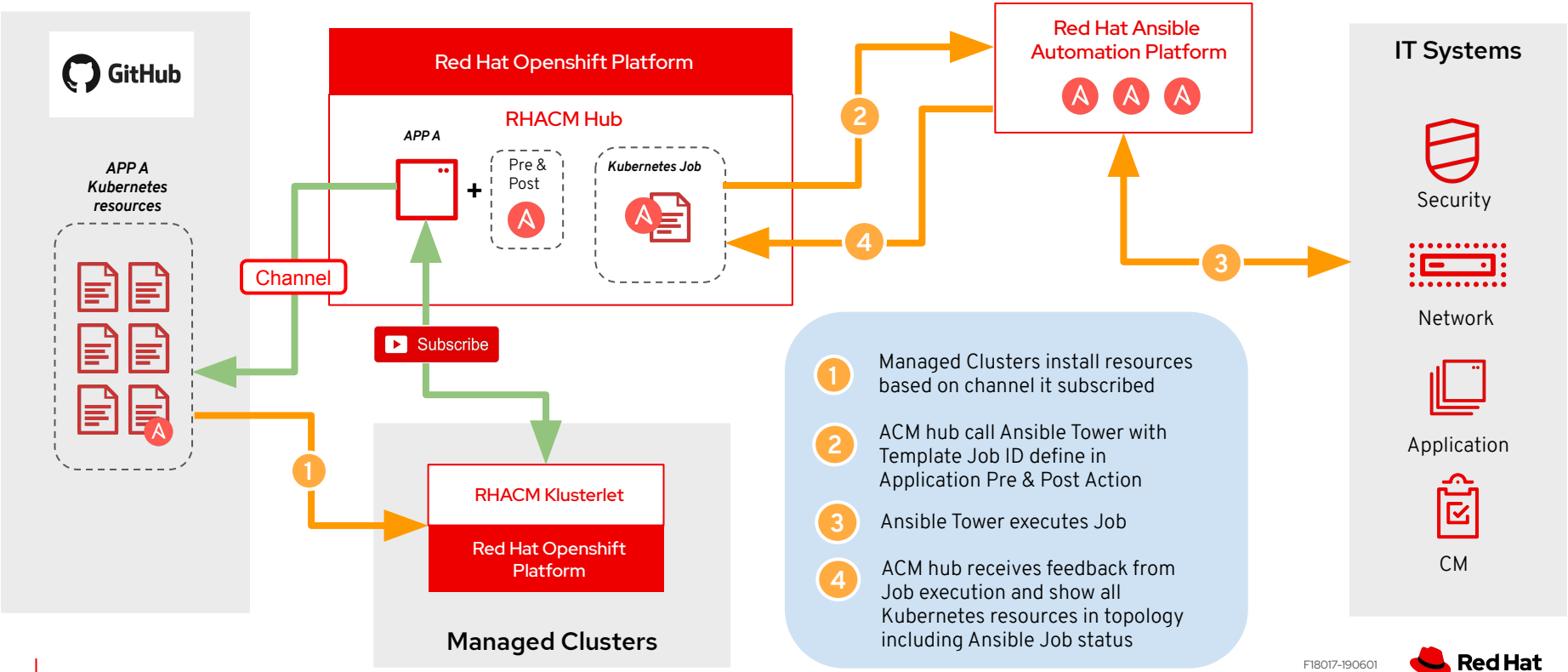
Application LifeCycle Management



Tech Preview

Integration Architecture Overview for Application Life Cycle



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