Red Hat Open Tour 2022

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Red Hat OpenShift Reference Architecture

Joint Red Hat and Intel OpenShift Reference Architecture

Solution overview

Summary: The RA enables deployment of performant and low-latency container-based workloads onto different footprints, such as bare metal, virtual, private cloud, public cloud, or a combination of these, in either a centralized data center or at the edge

Purpose: A general purpose OpenShift reference architecture to showcase the best of Intel and Red Hat products with key workloads

Easy management and orchestration for container

Validated design simplifies design and speeds time to deployment

Scalability from edge to private cloud to public clouds

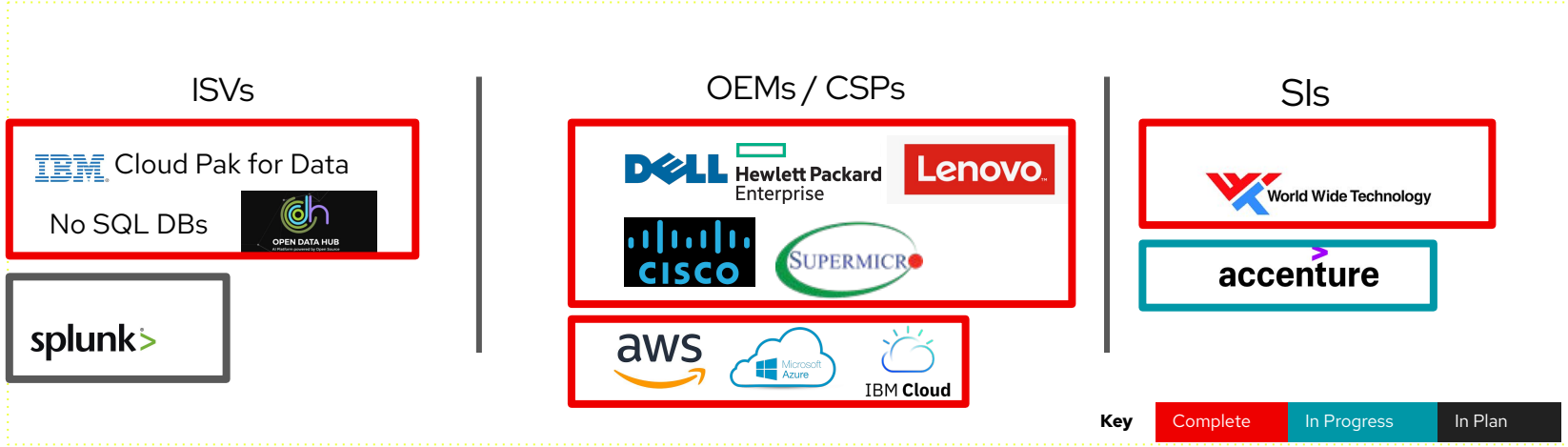
High performance for AI, analytics and DB workloads

3rd Gen Intel Xeon Scalable for container

Intel Optane and Intel NAND-based SSDs

Intel Ethernet Network Adapters

Solution ecosystem



Intel enabling status

- Intel® Xeon (2nd Gen – Cascade Lake, 3rd Gen – Ice Lake)
- Intel Optane (PMEM, SSD); Columbiaville

Collateral

- Intel OpenShift RA for 4.6
- Intel OpenShift Solution Brief for 4.6
- Red Hat: OpenShift Ref Arch – Multiple OEMs
- Dell: OpenShift Offering
- HPE: OpenShift Offering
- Cisco: OpenShift Offering
- Lenovo: OpenShift Offering
- Supermicro: OpenShift Offering
- Penguin Computing: OpenShift Offering

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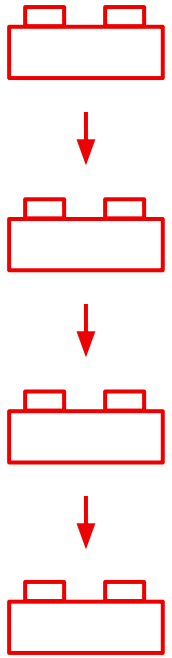
Gain robust repeatability as self service, by automating the automation

Speaker:
Senior Solution Architect
Michael Bang

In this presentation i am going to talk about

- Standardisation
- Automation
- Collaboration

It all starts with standardisation



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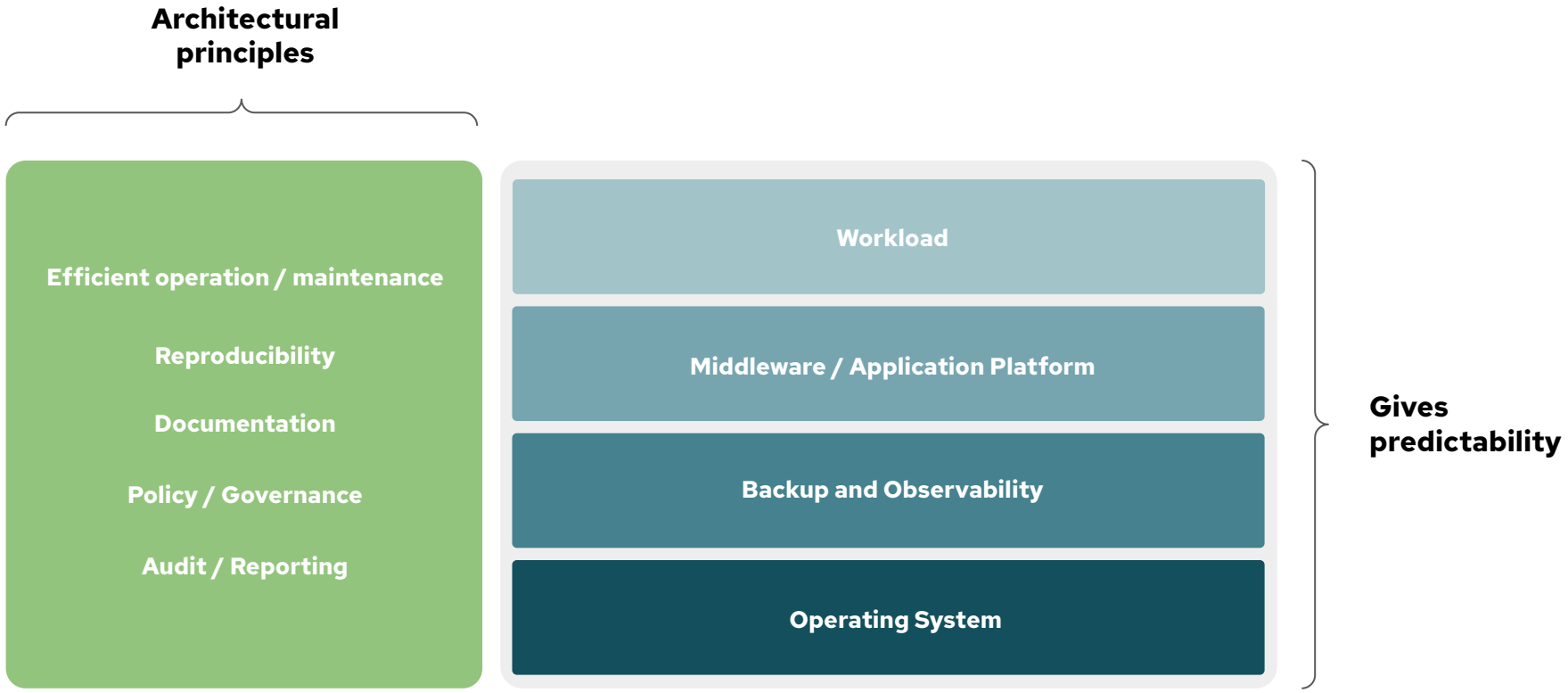
Picture credit to Association for Advancing Automation (A3)

Standardisation in IT

Strategic Viewpoint



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Standard Operating Environment (SOE)

Definition:

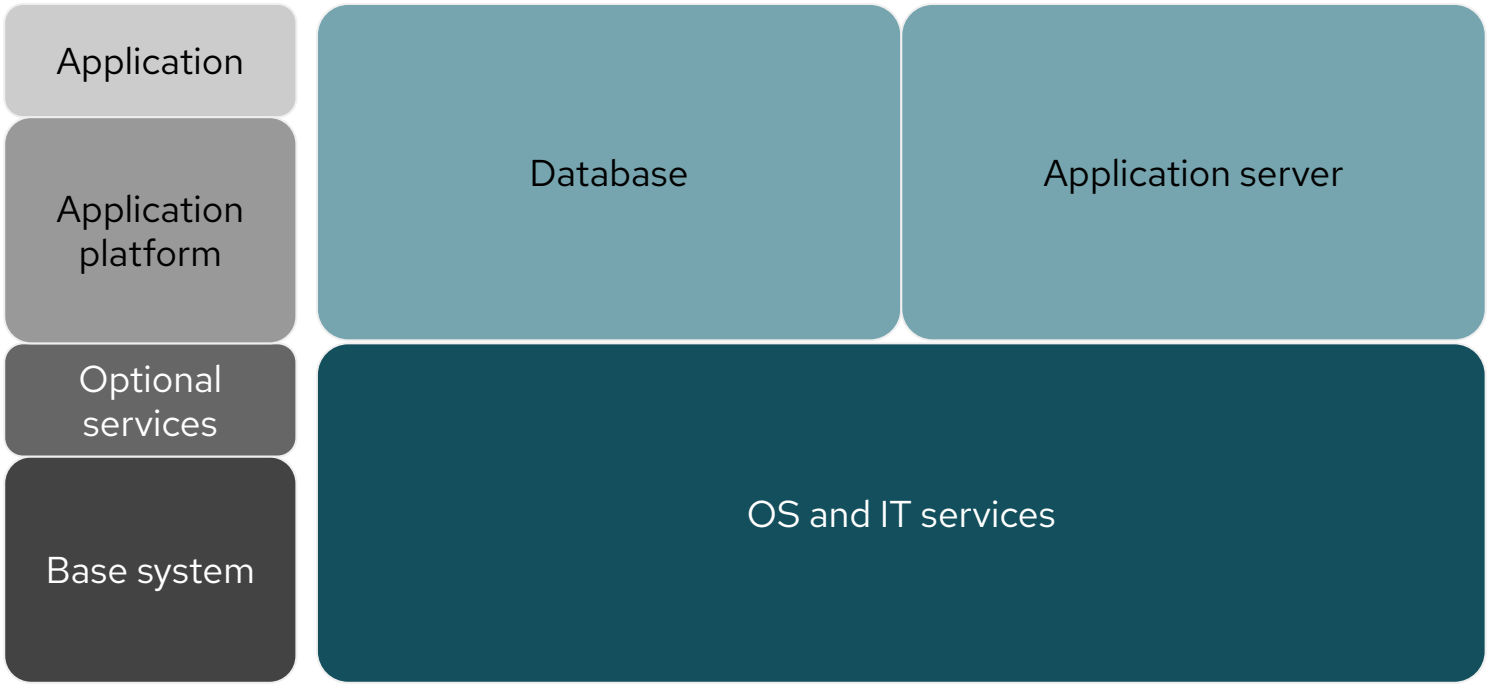
“Provides tools, standards and best practices to manage the lifecycle of an entire, deployed stack – from operating system and infrastructure services through to middleware and applications.”

What areas does it focus on?

- Automation
- Standardisation
- Lifecycle management
- Reporting

Standard Operating Environment (SOE)

One-size-fits-most, generic servers with functional application blocks



Basic approach

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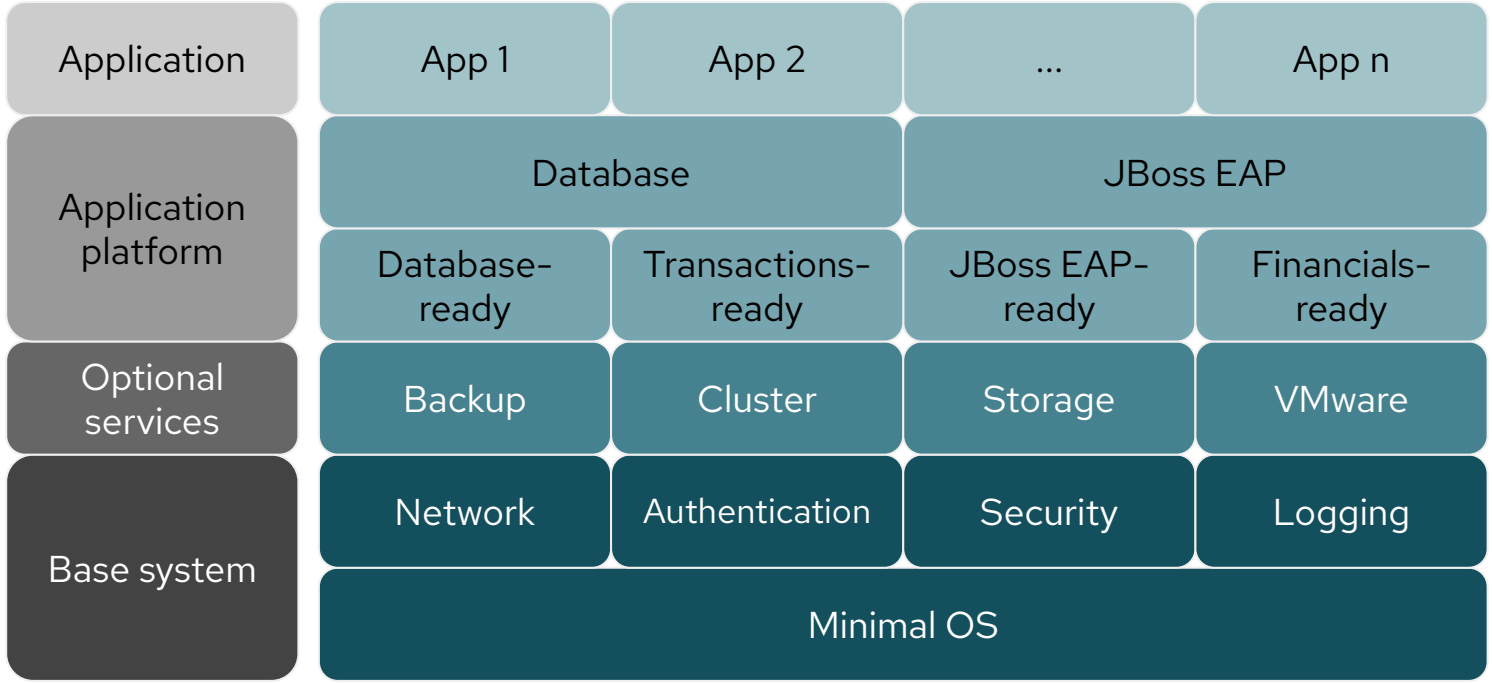
Standard Operating Environment (SOE)

Concept: Independent yet compatible and interchangeable components



Adaptive SOE approach

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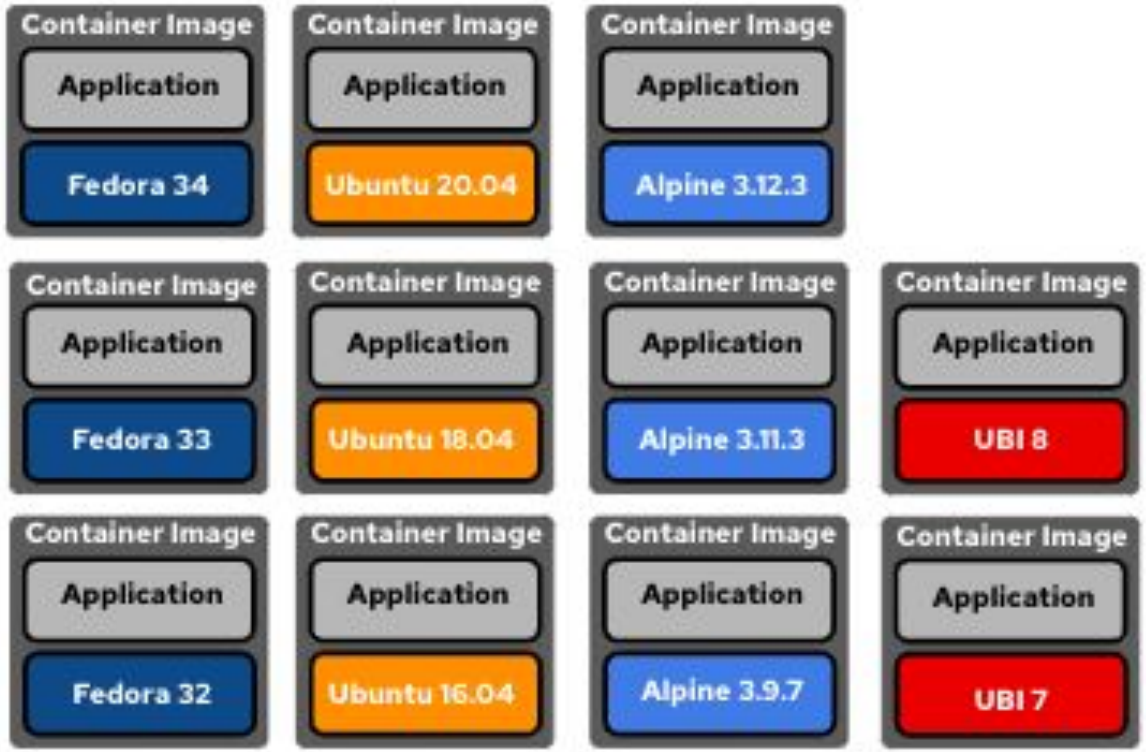
What about containers? they need SOE's too



- 8 different versions of glibc
- 3 different versions of muslc
- 11 different versions of openssl

Efficiency Through Automation

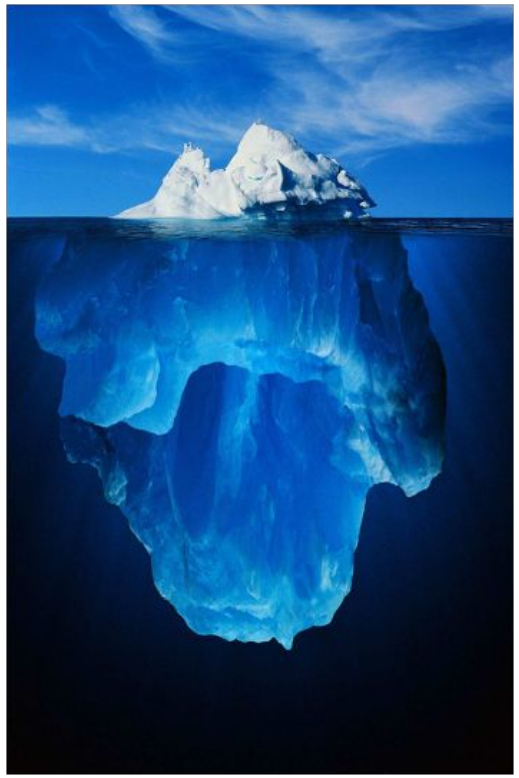
Ok, standards are great, but:

- only define point-in-time snapshots of the environment
- take time to maintain in a complex environment
- By automating the process of implementing standards we achieve:
- higher flexibility to accommodate change ⇒ higher agility
- higher operational efficiency
- eases lifecycle management

What kinds of automation?

IT Automation

your stack



Business value

Lots of tech

use cases

FULLY AUTOMATED PROVISIONING

SECURITY/ COMPLIANCE

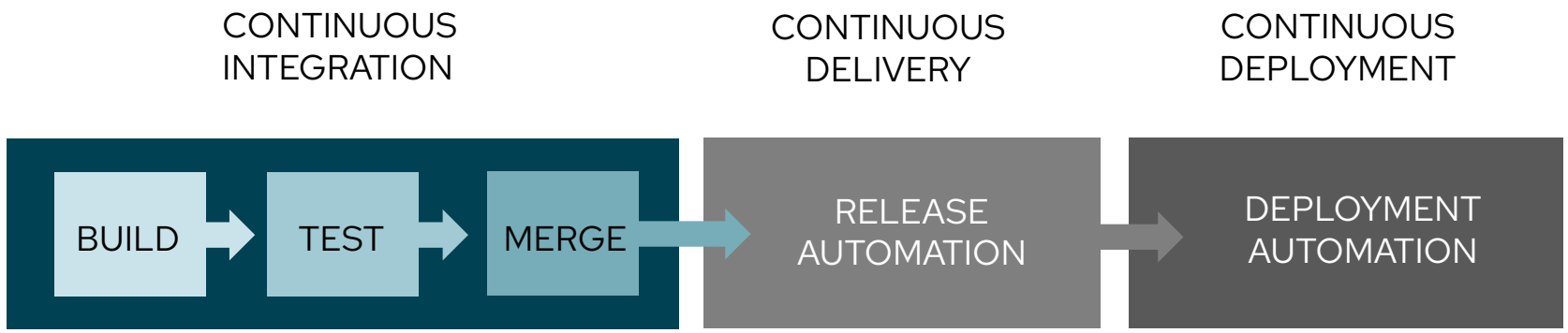
CONFIG MANAGEMENT

CONTINUOUS DELIVERY

ORCHESTRATION

APP DEPLOYMENT

Application Development and Deployment



Red Hat OpenShift

Red Hat Ansible Automation Platform

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GitLab & Ansible Automation Platform Application upgrade via CI/CD

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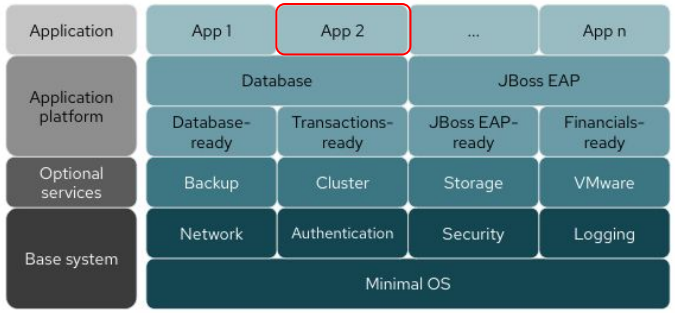
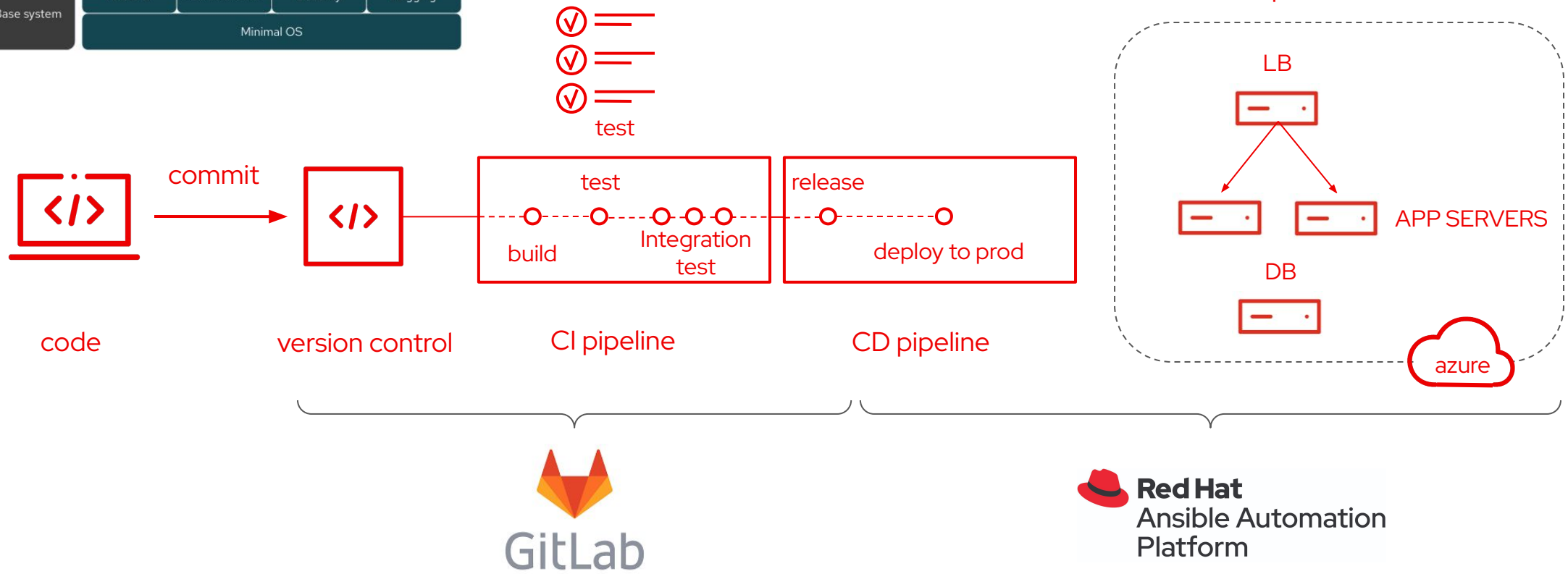
In this demo you will see

- Commit application change to git
- Triggers pipeline run with tests
- Deploy change to production
- Remove 1st appserver from load balancer
- Update 1st appserver and enable in load balancer
- Remove 2nd appserver from load balancer
- Update 2nd appserver and enable in load balancer.

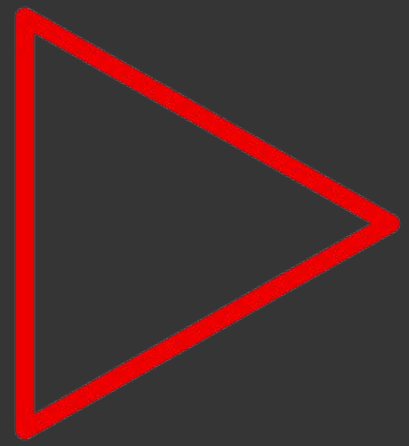
Seamless upgrade of application


Application
App 1
App 2
...
App n
Application platform
Database
JBoss EAP
Database-ready
Transactions-ready
JBoss EAP-ready
Financials-ready
Optional services
Backup
Cluster
Storage
VMware
Base system
Network
Authentication
Security
Logging
Minimal OS


test
commit
test
release
build
Integration test
deploy to prod
production
LB
APP SERVERS
DB
azure
code
version control
CI pipeline
CD pipeline
GitLab
Red Hat
Ansible Automation
Platform

Red Hat

DEMO



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Seamless upgrade of application

- ✓ No manual steps
- ✓ No human errors
- ✓ Predictable outcomes
- ✓ Higher efficiency
- ✓ Faster time to market
- ✓ Less stress

Continuous Integration

OpenShift Pipelines

Open source, standardised cloud-native style

based on TEKTON

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- Self service application platform
- Build and test your application automatically
- Standardised native tools
- Everything as code
  - Application
  - Deployment
  - Build and test
- Collaborative workflow

Simplified collaborative application development

Red Hat

Automate the automation

Standardise your CI - cloud-native style

Pipelines as a (cluster) service

CI resources - cloud-native

Git-centric workflow

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Why OpenShift Pipelines?

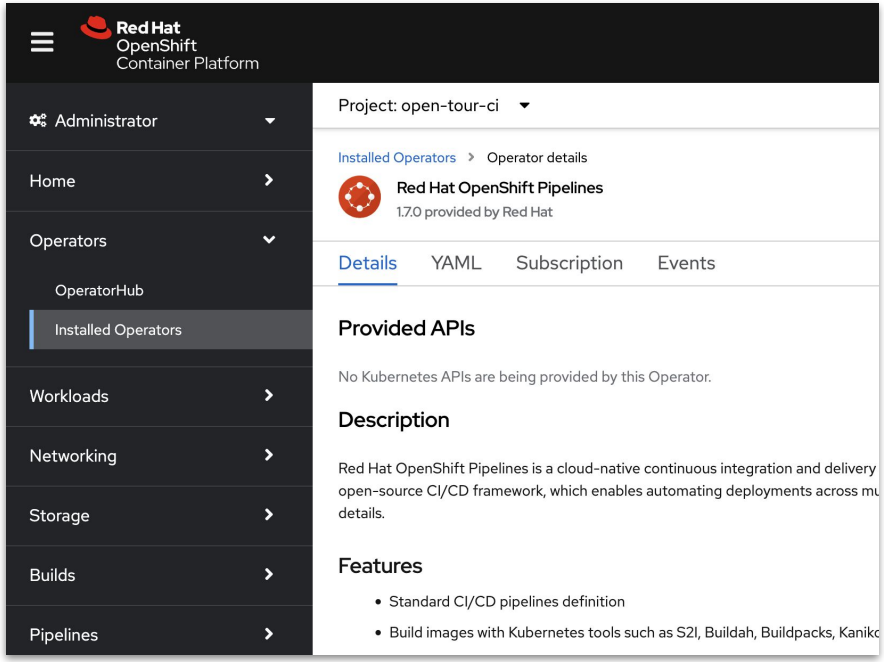
Built for
Cloud-native

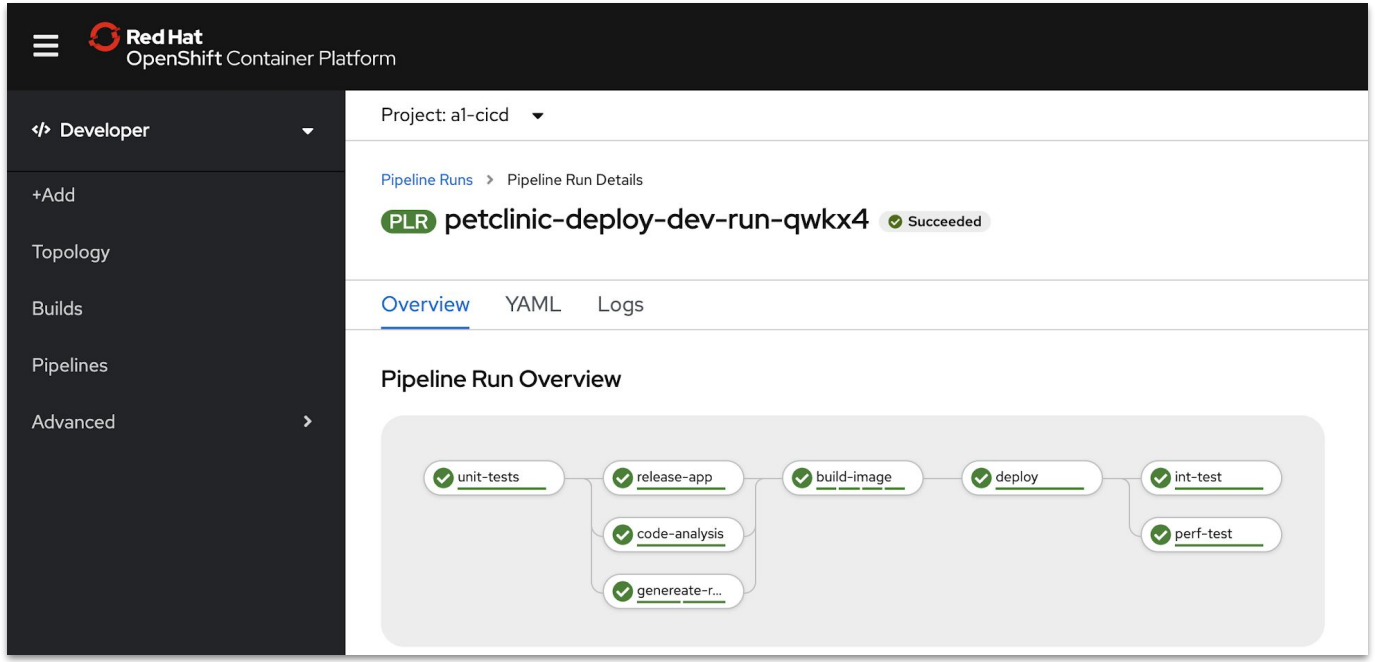
Scale
on-demand

Secure pipeline
execution

Flexible and
powerful

Pipelines as a service





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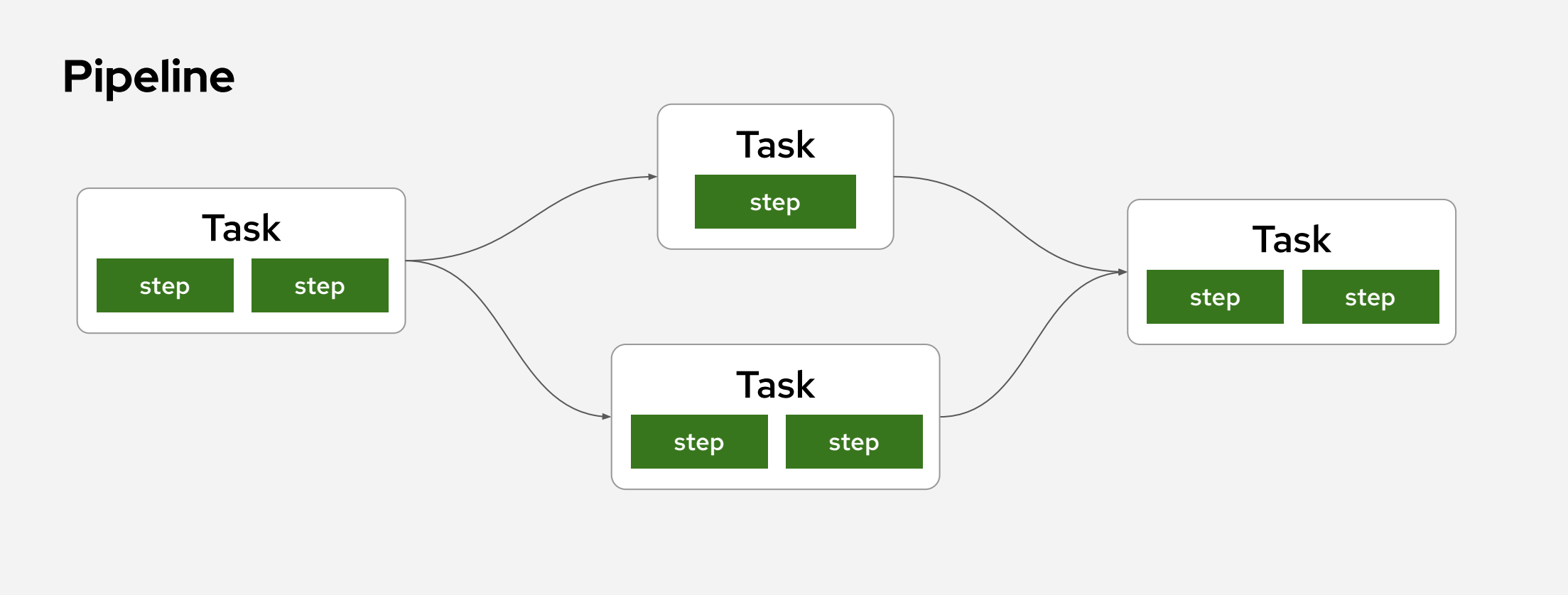
OpenShift Pipelines - Tekton concepts



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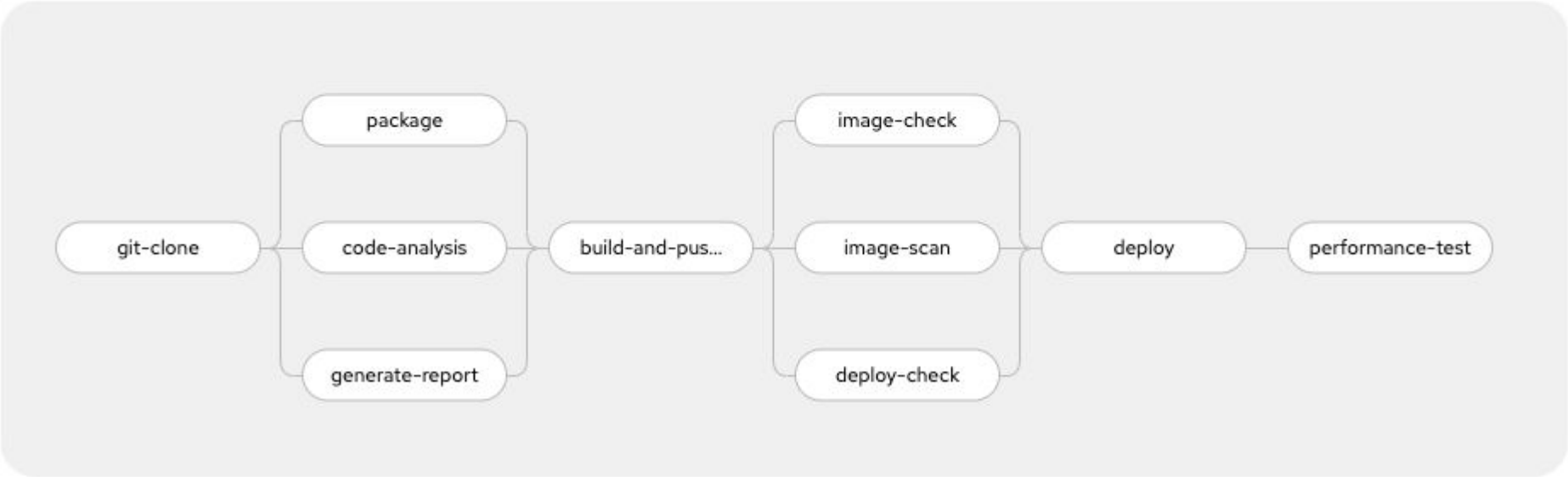
Pipelines > Pipeline details

PL build-and-push-image

Details | Metrics | YAML | PipelineRuns | Parameters | Resources

Pipeline details



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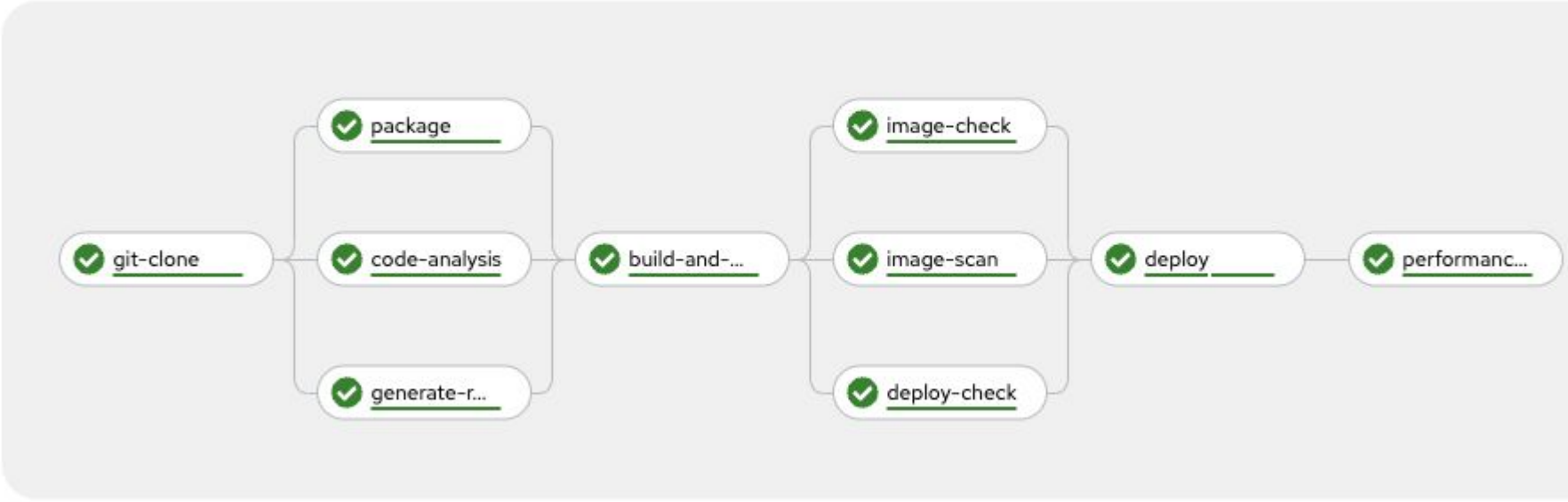
PipelineRun details



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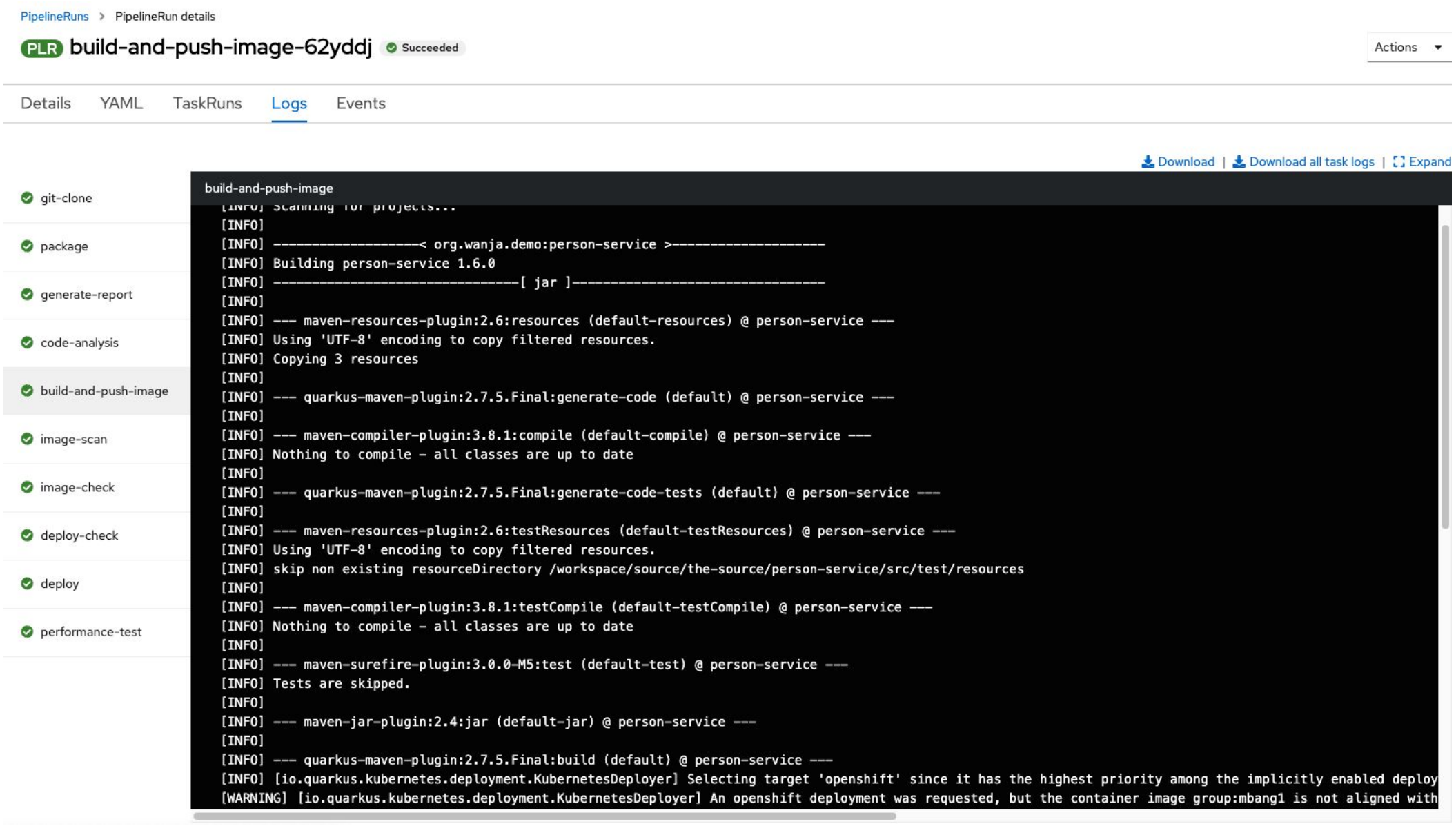
PipelineRuns > PipelineRun details
PLR build-and-push-image-62yddj Succeeded
Actions
Details YAML TaskRuns Logs Events
Download | Download all task logs | Expand
git-clone
package
generate-report
code-analysis
build-and-push-image
image-scan
image-check
deploy-check
deploy
performance-test
build-and-push-image
[INFO] Scanning for projects...
[INFO]
[INFO] -------------------< org.wanja.demo:person-service >--------------------
[INFO] Building person-service 1.6.0
[INFO] --------------------------------[jar]---------------------------------
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ person-service ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 3 resources
[INFO]
[INFO] --- quarkus-maven-plugin:2.7.5.Final:generate-code (default) @ person-service ---
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile) @ person-service ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- quarkus-maven-plugin:2.7.5.Final:generate-code-tests (default) @ person-service ---
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ person-service ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /workspace/source/the-source/person-service/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ person-service ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:3.0.0-M5:test (default-test) @ person-service ---
[INFO] Tests are skipped.
[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ person-service ---
[INFO]
[INFO] --- quarkus-maven-plugin:2.7.5.Final:build (default) @ person-service ---
[INFO] [io.quarkus.kubernetes.deployment.KubernetesDeployer] Selecting target 'openshift' since it has the highest priority among the implicitly enabled deploy
[WARNING] [io.quarkus.kubernetes.deployment.KubernetesDeployer] An openshift deployment was requested, but the container image group:mbang1 is not aligned with

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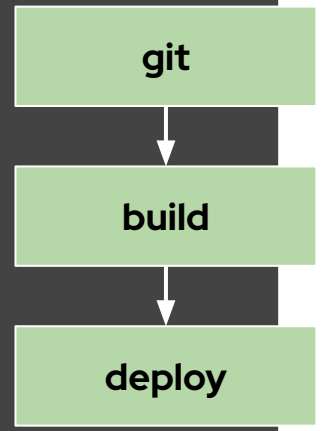
Everything as code

```
.
├── my-service
│   └── <application-code>
└── manifests
    ├── deployments
    │   ├── deployment.yaml
    │   └── service.yaml
    └── pipelines
        ├── tekton-pipeline.yaml
        └── tasks
            ├── kustomize-task.yaml
            └── maven-task.yaml
```

```yaml
kind: Pipeline
metadata:
 name: deploy-dev
spec:
 params:
   - name: IMAGE_TAG
 tasks:
   - name: git
     taskRef:
       name: git-clone
     params: [...]
   - name: build
     taskRef:
       name: maven
     params: [...]
     runAfter: ["git"]
   - name: deploy
     taskRef:
       name: knative-deploy
     params: [...]
     runAfter: ["build"]
```



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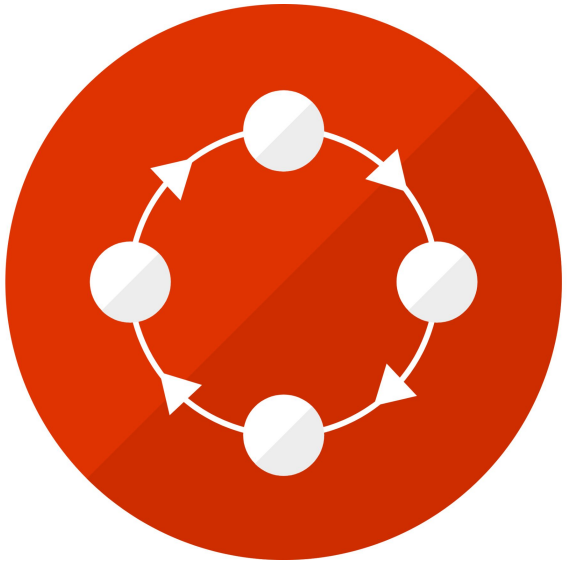
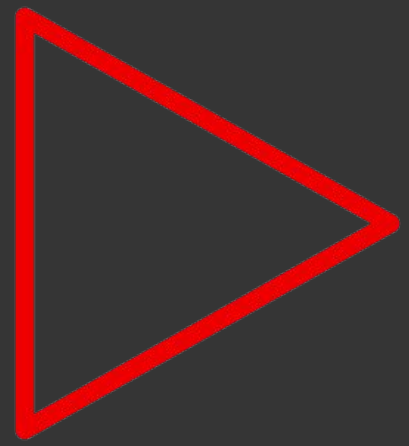
Pipelines as code



- GitOps enabled - git-centric workflow
- Integrated with Git provider
  - Events, actions
- Pipelines run in cluster
  - No pre-configured infrastructure

DEMO



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- ✓ No manual steps
- ✓ No human errors
- ✓ Predictable outcomes
- ✓ Higher efficiency
- ✓ Faster time to market
- ✓ Less stress

Simplified collaborative application development

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Continuous Deployment

Hybrid cloud pattern: Multicloud GitOps

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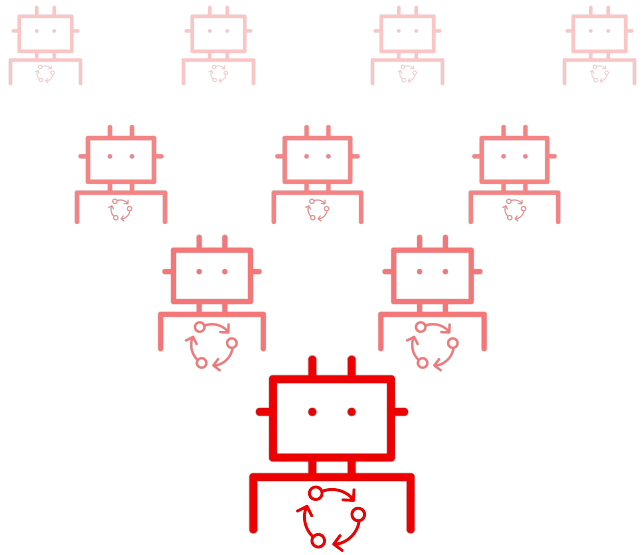
- Keep delivering no matter the location
- Automate introduction of new features
- Manage risks by replication and scaling out environments
- Everything automated

Automated business continuity

We want everything as code.

Applications, configurations and secrets delivered to autonomous environments.
Visible change history.
Comes with self healing.



Installed Operators > Operator details

Red Hat OpenShift GitOps

1.5.1 provided by Red Hat Inc.

Details | YAML | Subscription | Events | All instances | Application | ApplicationSet | AppProject | Argo CD

Provided APIs

A Application

An Application is a group of Kubernetes resources as defined by a manifest.

Create instance

AS ApplicationSet

ApplicationSet is the representation of an ApplicationSet controller deployment.

Create instance

AP AppProject

An AppProject is a logical grouping of Argo CD Applications.

Create instance

ACD Argo CD

Argo CD is the representation of an Argo CD deployment.

Create instance

Operator based

Red Hat

OpenShift GitOps

Multi-cluster config management

Declaratively manage cluster and application configurations across multi-cluster OpenShift and Kubernetes infrastructure with Argo CD

Automated Argo CD install and upgrade

Automated install, configurations and upgrade of Argo CD through OperatorHub

Opinionated GitOps bootstrapping

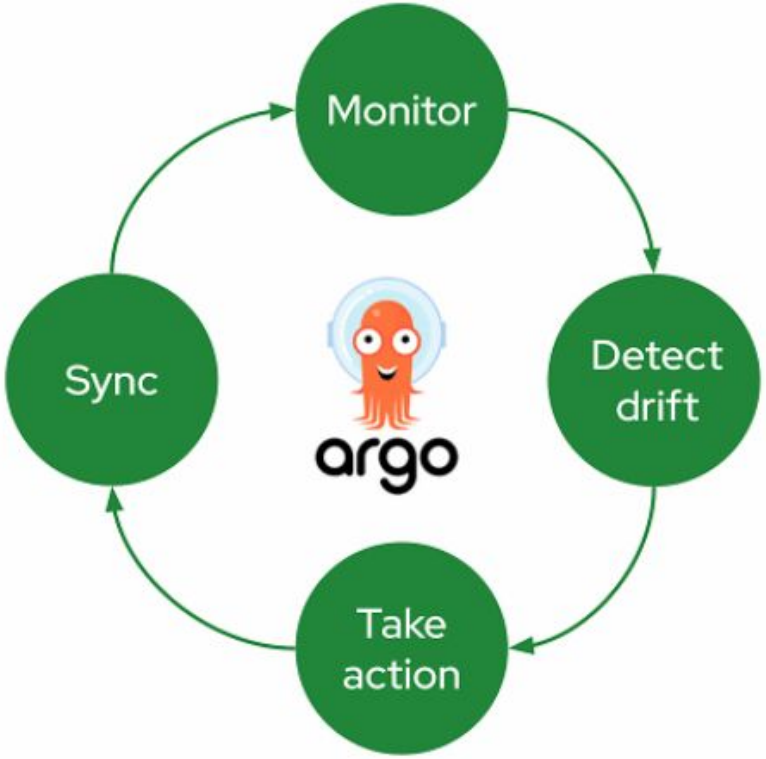
Bootstrap end-to-end GitOps workflows for application delivery using Argo CD and Tekton with GitOps Application Manager CLI

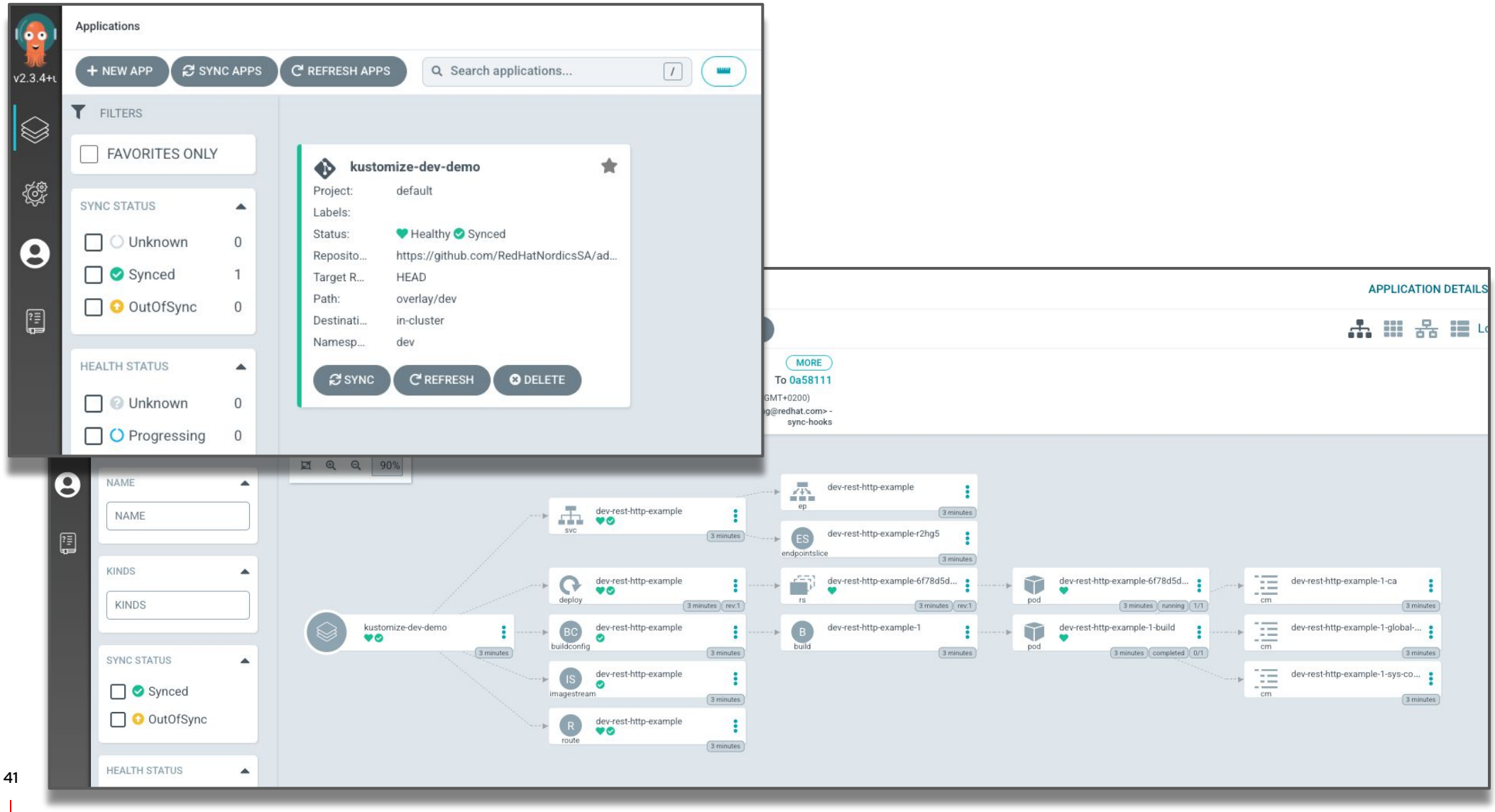
Deployments and environments insights

Visibility into application deployments across environments and the history of deployments in the OpenShift Console

Argo CD

- Cluster and application configuration versioned in Git
- Automatically syncs configuration from Git to clusters
- Drift detection, visualization and correction
- Granular control over sync order for complex rollouts
- Rollback and rollforward to any Git commit
- Manifest templating support (Helm, Kustomize, etc)
- Visual insight into sync status and history




Applications
+ NEW APP
SYNC APPS
REFRESH APPS
Search applications...
FILTERS
FAVORITES ONLY
SYNC STATUS
Unknown 0
Synced 1
OutOfSync 0
HEALTH STATUS
Unknown 0
Progressing 0
kustomize-dev-demo
Project: default
Labels:
Status: Healthy Synced
Reposito... https://github.com/RedHatNordicsSA/ad...
Target R... HEAD
Path: overlay/dev
Destinati... in-cluster
Namesp... dev
SYNC
REFRESH
DELETE
APPLICATION DETAILS
MORE
To 0a58111
sync-hooks
NAME
KINDS
SYNC STATUS
Synced
OutOfSync
HEALTH STATUS
90%
kustomize-dev-demo
dev-rest-http-example
svc
dev-rest-http-example
ep
dev-rest-http-example-r2hg5
endpointslice
dev-rest-http-example
deploy
dev-rest-http-example-6f78d5d...
rs
dev-rest-http-example-6f78d5d...
pod
dev-rest-http-example-1-ca
cm
dev-rest-http-example
buildconfig
dev-rest-http-example-1
build
dev-rest-http-example-1-build
pod
dev-rest-http-example-1-global-...
cm
dev-rest-http-example
imagestream
dev-rest-http-example-1-sys-co...
cm
dev-rest-http-example
route

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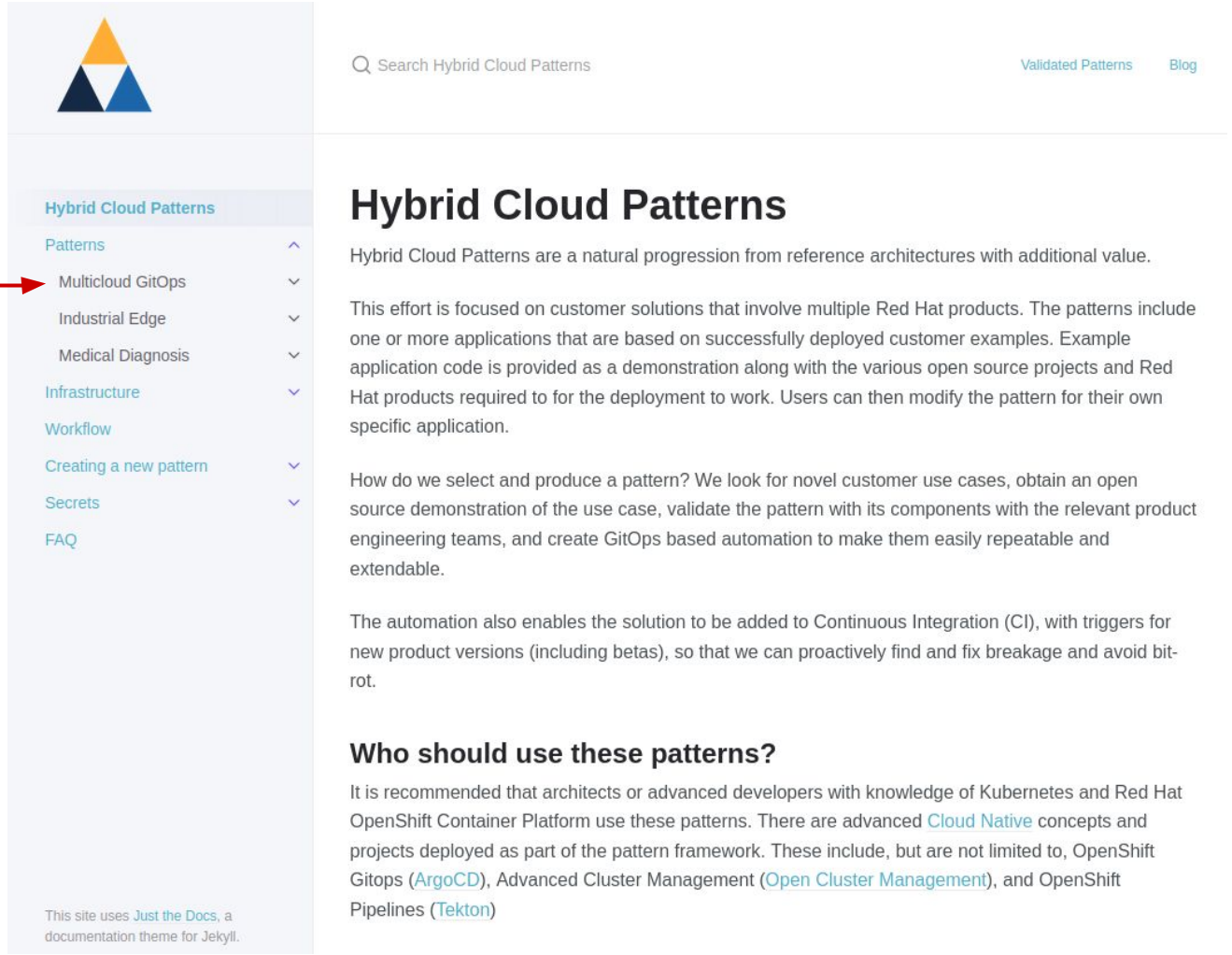
TAKE IDEAS FROM HYBRID CLOUD PATTERNS



Let’s look at the multicloud gitops pattern today

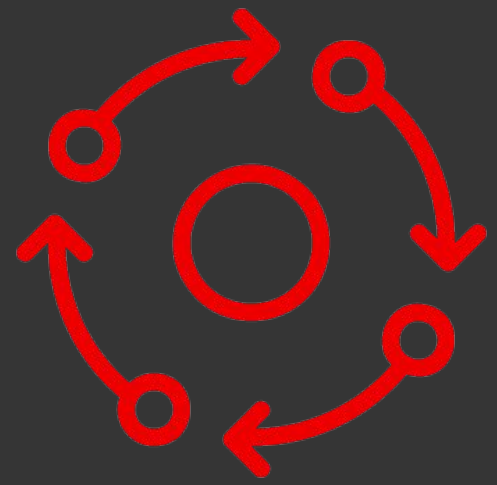
https://redhat-gitops-patterns.io/
https://hybrid-cloud-patterns.io/multicloud-gitops/

1 **Create or Enhance**

2 **Version Control**

3 **Automate**

4 **Continuously Deployment**



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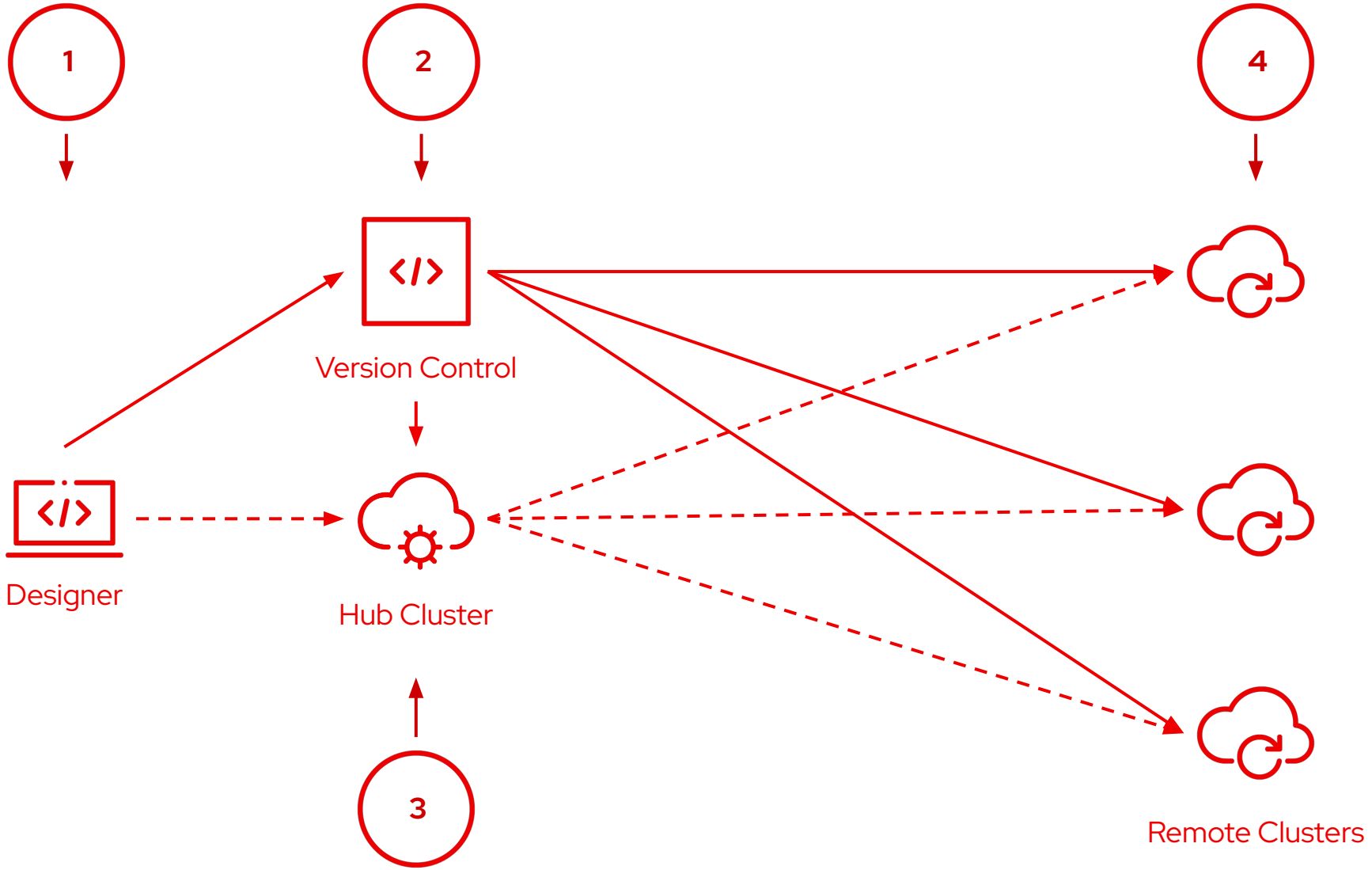

One repository to control delivery versions

Several environments in hybrid clouds to automatically adapt to configuration or application changes.

1. Create
2. Commit
3. Automate
4. Keep Delivering

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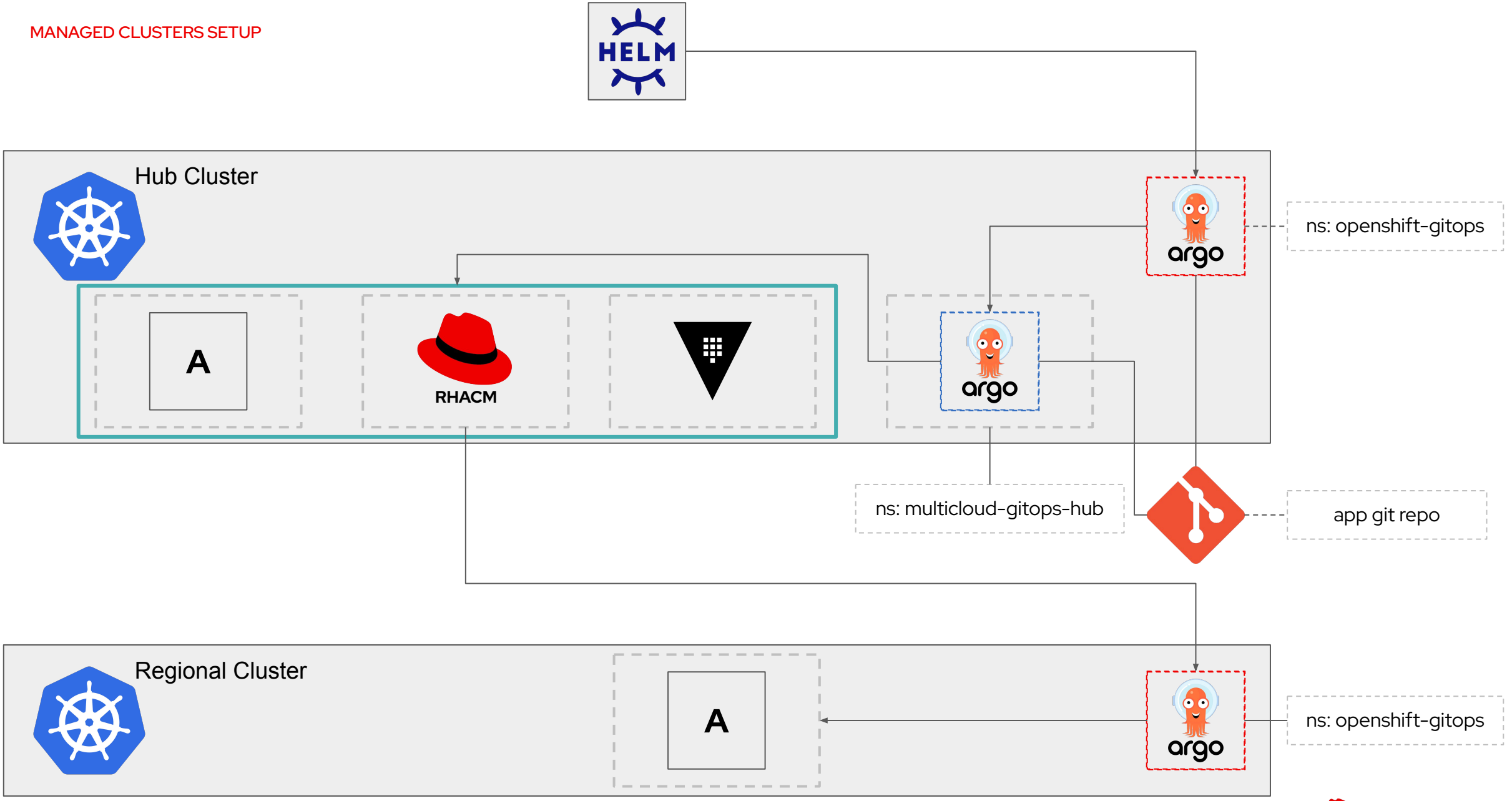
HELM
Hub Cluster
argo
ns: openshift-gitops
A
RHACM
argo
ns: multicloud-gitops-hub
app git repo
Regional Cluster
A
argo
ns: openshift-gitops

Red Hat

- ✓ No manual steps
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- ✓ Less stress

Automated business continuity

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Provide business value through collaboration

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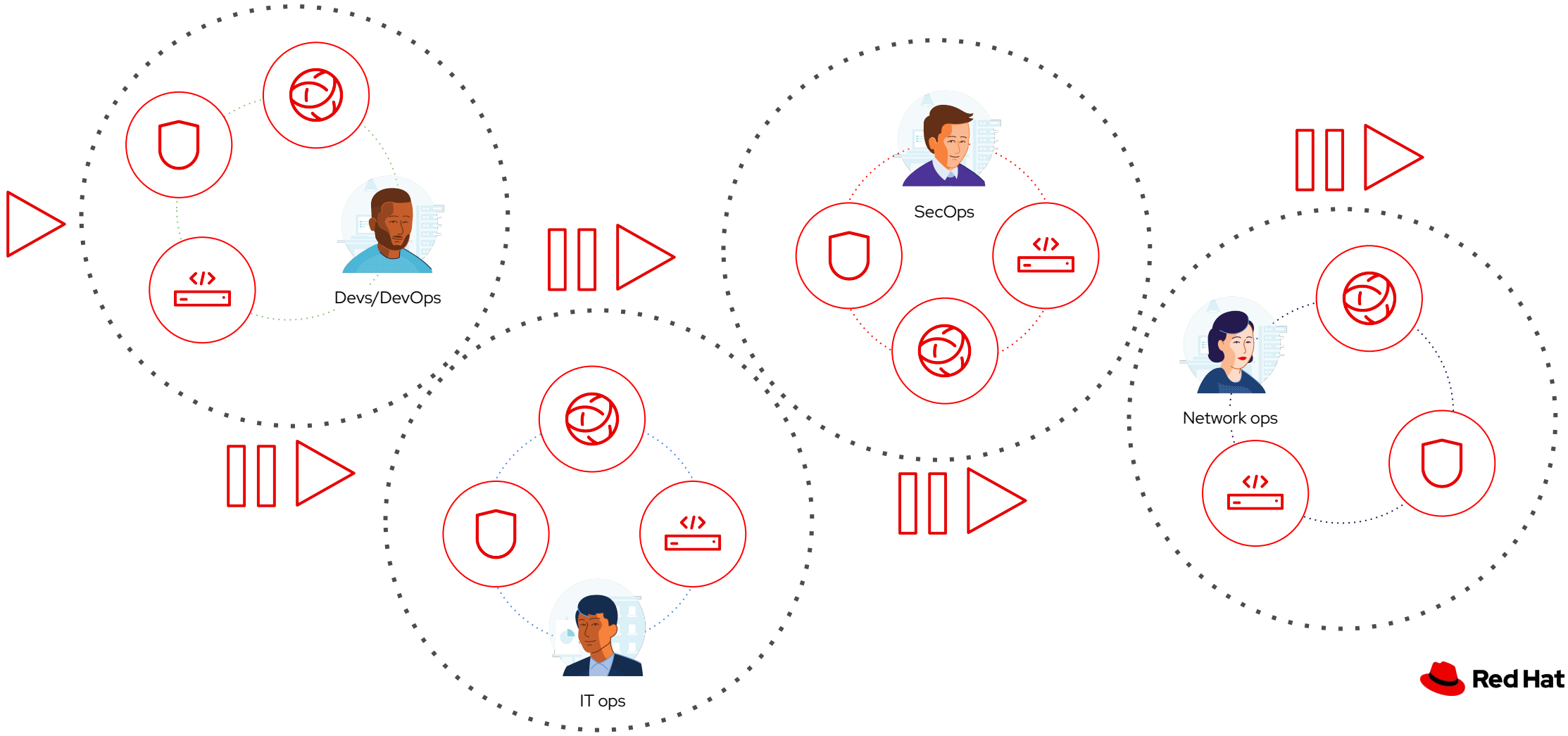
But many organizations have a common problem...

Too many unintegrated, domain-specific tools, limited collaboration and scale



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In this presentation you learned about

- Standardisation
- Automation
- Collaboration

To gain robust repeatability as self service, by automating the automation

Red Hat Services get you going!