Container & Cloud Native Roadshow 2022

Red Hat Enterprise Linux

Stefano Linguerri
Senior Solution Architect

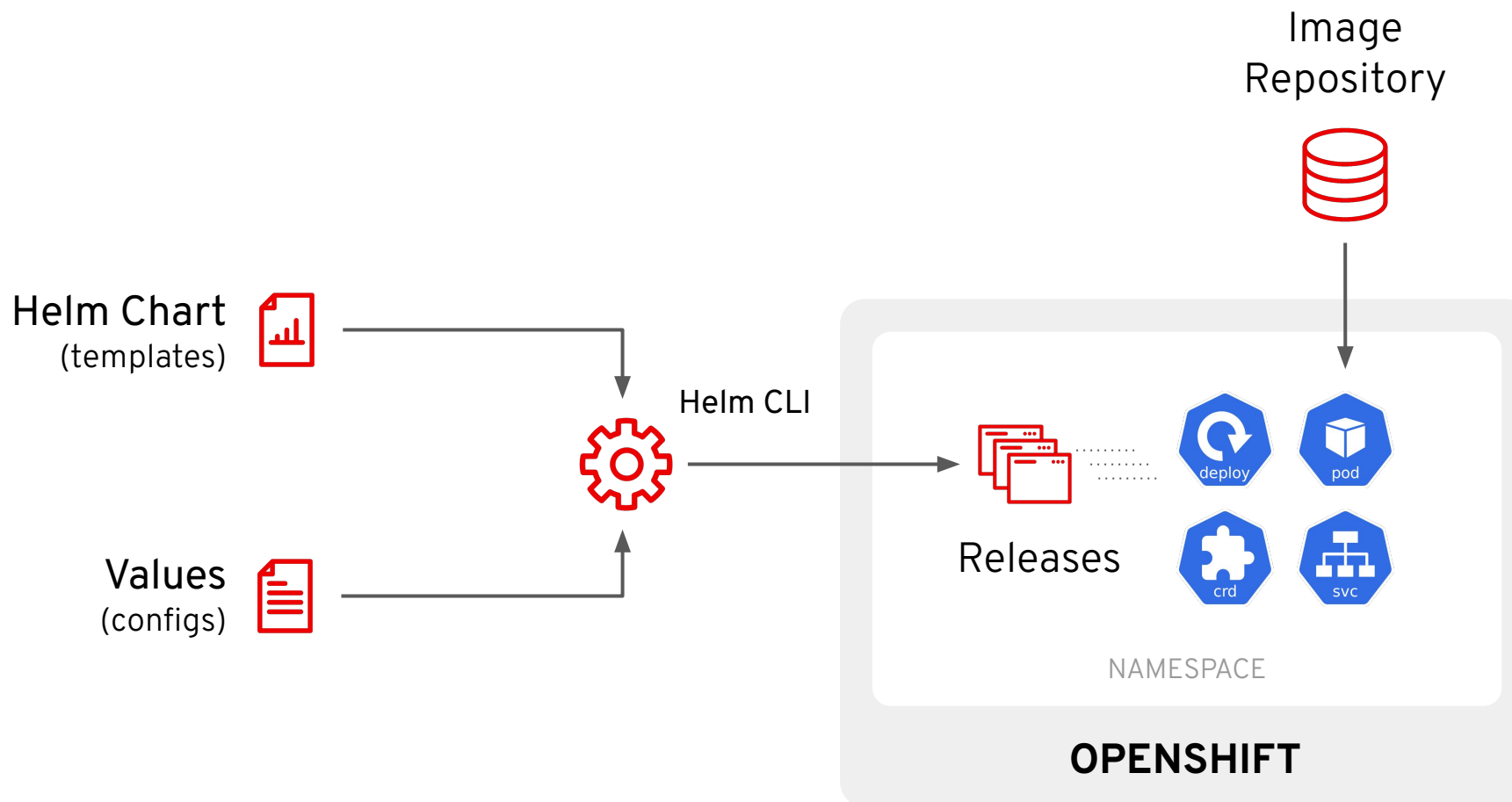Gianni Salinetti
Solution Architect

Services Development

Red Hat

Helm is a package manager for Kubernetes applications

define, install and update apps
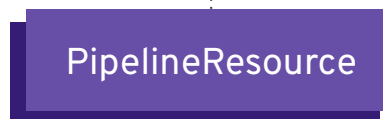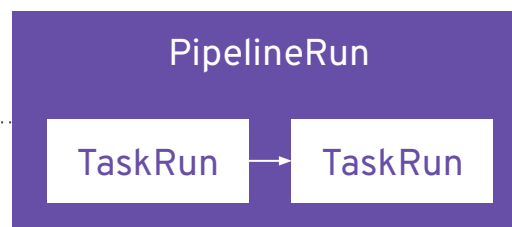
CLOUD NATIVE
COMPUTING FOUNDATION

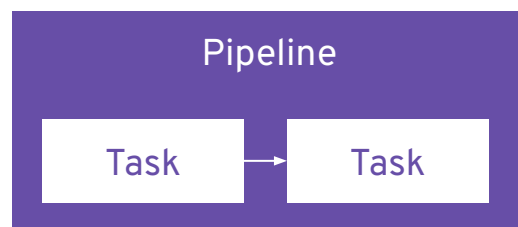
An open-source project for providing a set of shared and standard components for building Kubernetes-style CI/CD systems

CD.FOUNDATION

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Image Repository

Helm Chart (templates)

Values (configs)

Helm CLI

Releases

deploy

pod

crd

svc

NAMESPACE

OPENSHIFT

Define pipeline

Run pipelines

Pipeline

Task → Task

PipelineRun

TaskRun → TaskRun

PipelineResource

Pipeline Controllers
(Tekton, ext, ...)

pipeline-pod-a
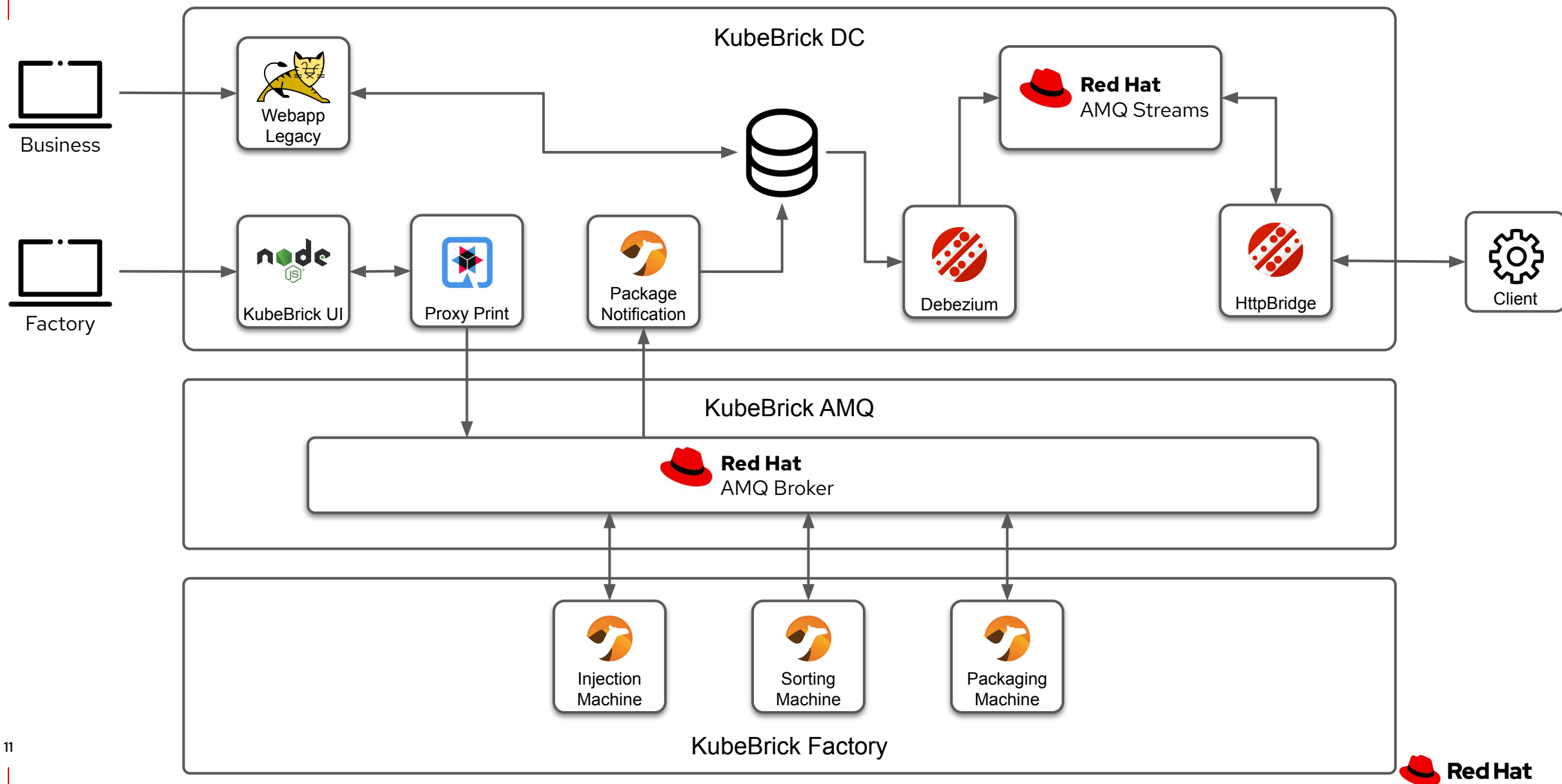
pipeline-pod-b

pipeline-pod-c
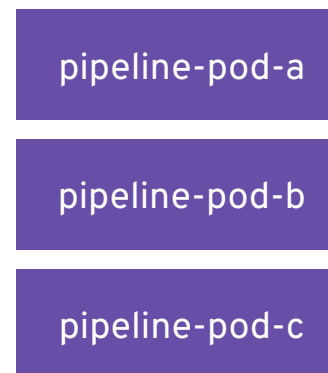
Pipelines Example

1 Pipeline inputs and outputs

2 List of tasks in the pipeline

3 Parameters passed to a task

4 Pipeline resources as task input/output

5 Execute task after another task

```yaml
kind: Pipeline
metadata:
  name: petclinic-deploy-pipeline
spec:
  resources:                                      (1)
  - name: app-git
    type: git
  - name: app-image
    type: image
  tasks:                                          (2)
  - name: build
    taskRef:
      name: s2i-java-8
    resources:                                    (3)
      inputs:
      - name: source                              (4)
        resource: app-git
      outputs:
      - name: image
        resource: app-image
  - name: deploy
    taskRef:
      name: openshift-client
    runAfter:
      - build                                     (5)
    params:
    - name: ARGS
      value: "rollout latest spring-petclinic"
```
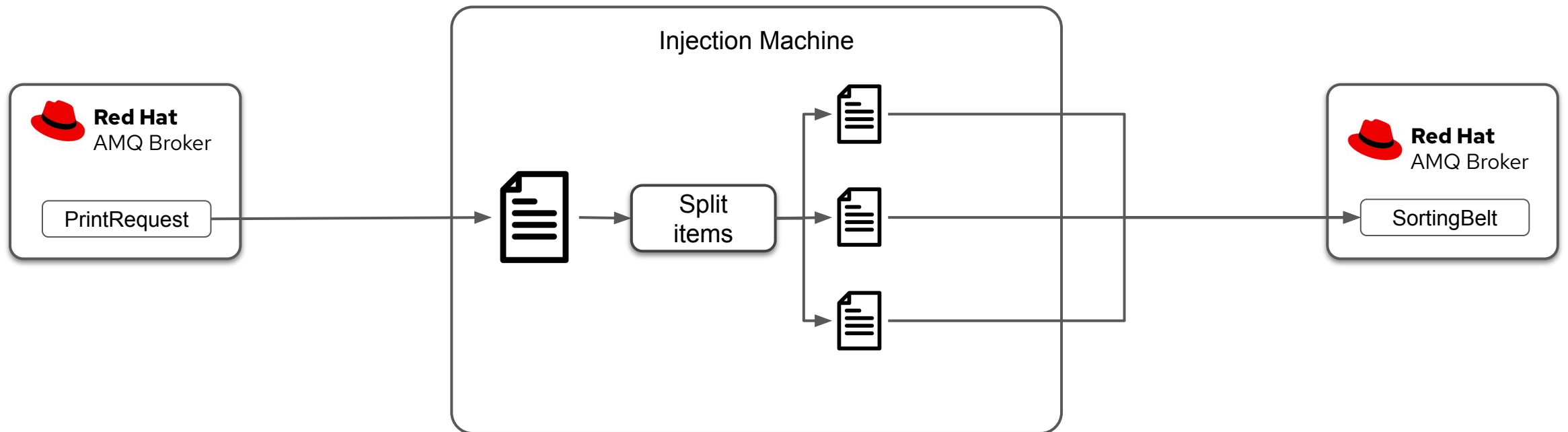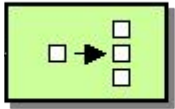
Setup dev environment

Red Hat

Big Picture

KubeBrick DC

Business

Factory

Webapp Legacy

KubeBrick UI

Proxy Print

Package Notification

Debezium

Red Hat AMQ Streams

HttpBridge

Client

KubeBrick AMQ

Red Hat AMQ Broker

KubeBrick Factory

Injection Machine

Sorting Machine

Packaging Machine

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Red Hat
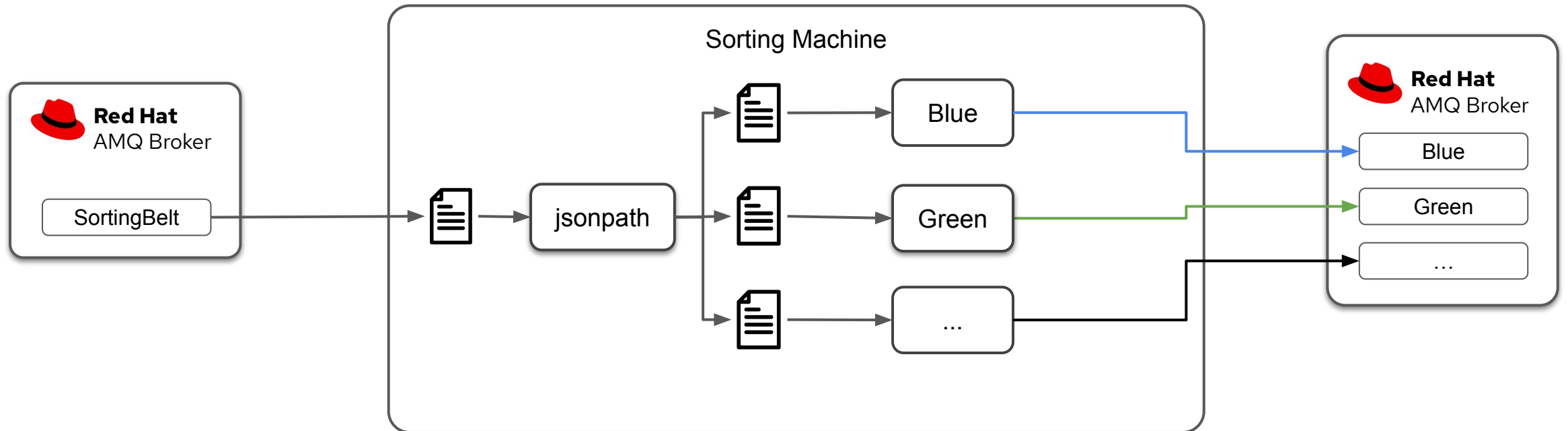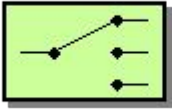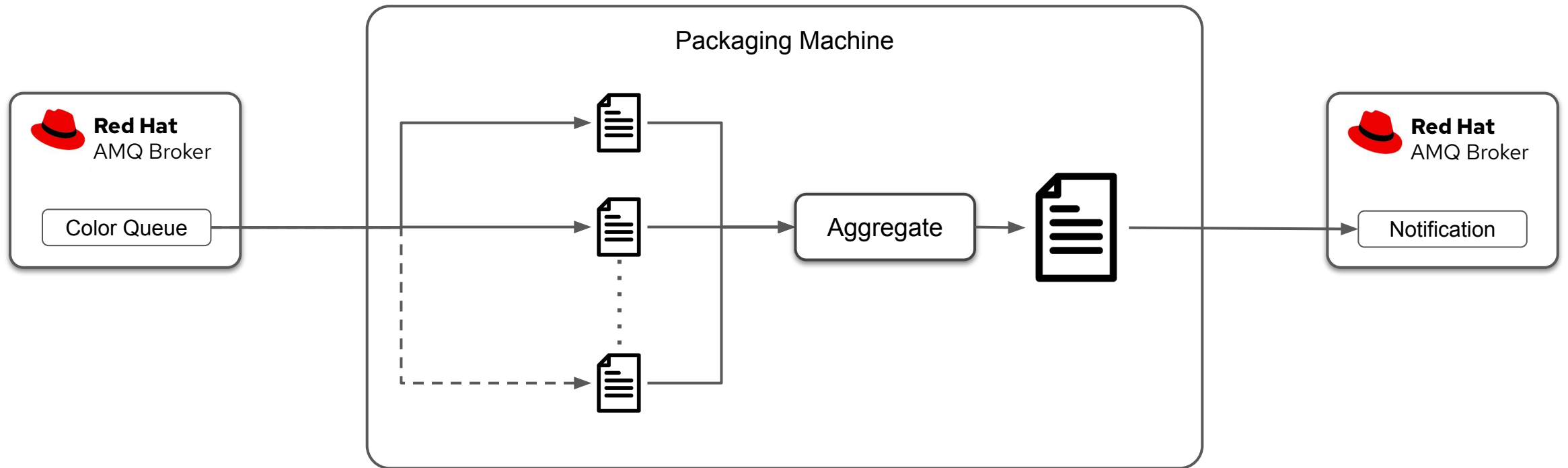
Injection Machine: Splitter

Sorting Machine: Content-Based Router

Packaging Machine: Aggregator

Packaging Machine

Red Hat AMQ Broker — Color Queue → [documents] → Aggregate → [document] → Red Hat AMQ Broker — Notification
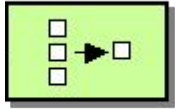
Services evolution: CamelK

Red Hat

Big Picture

Big Picture

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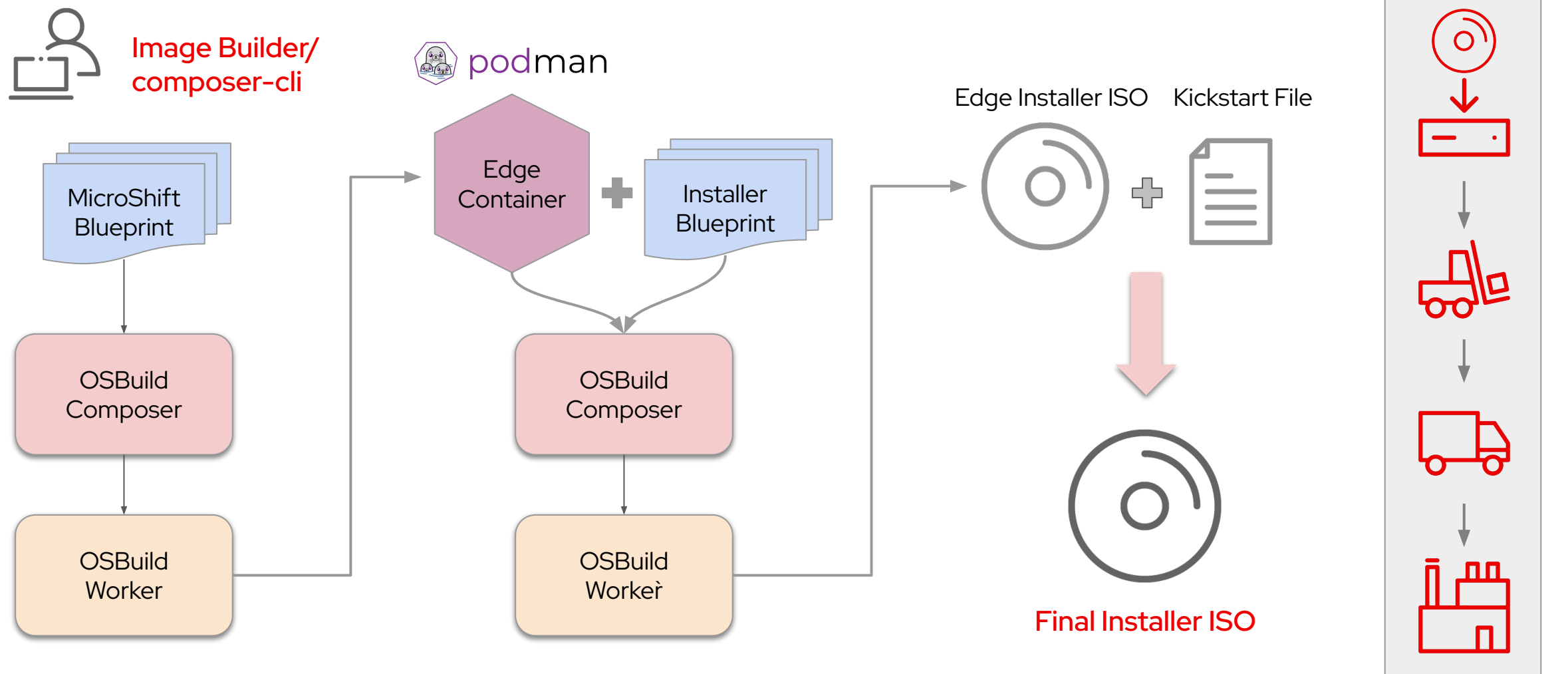
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Red Hat
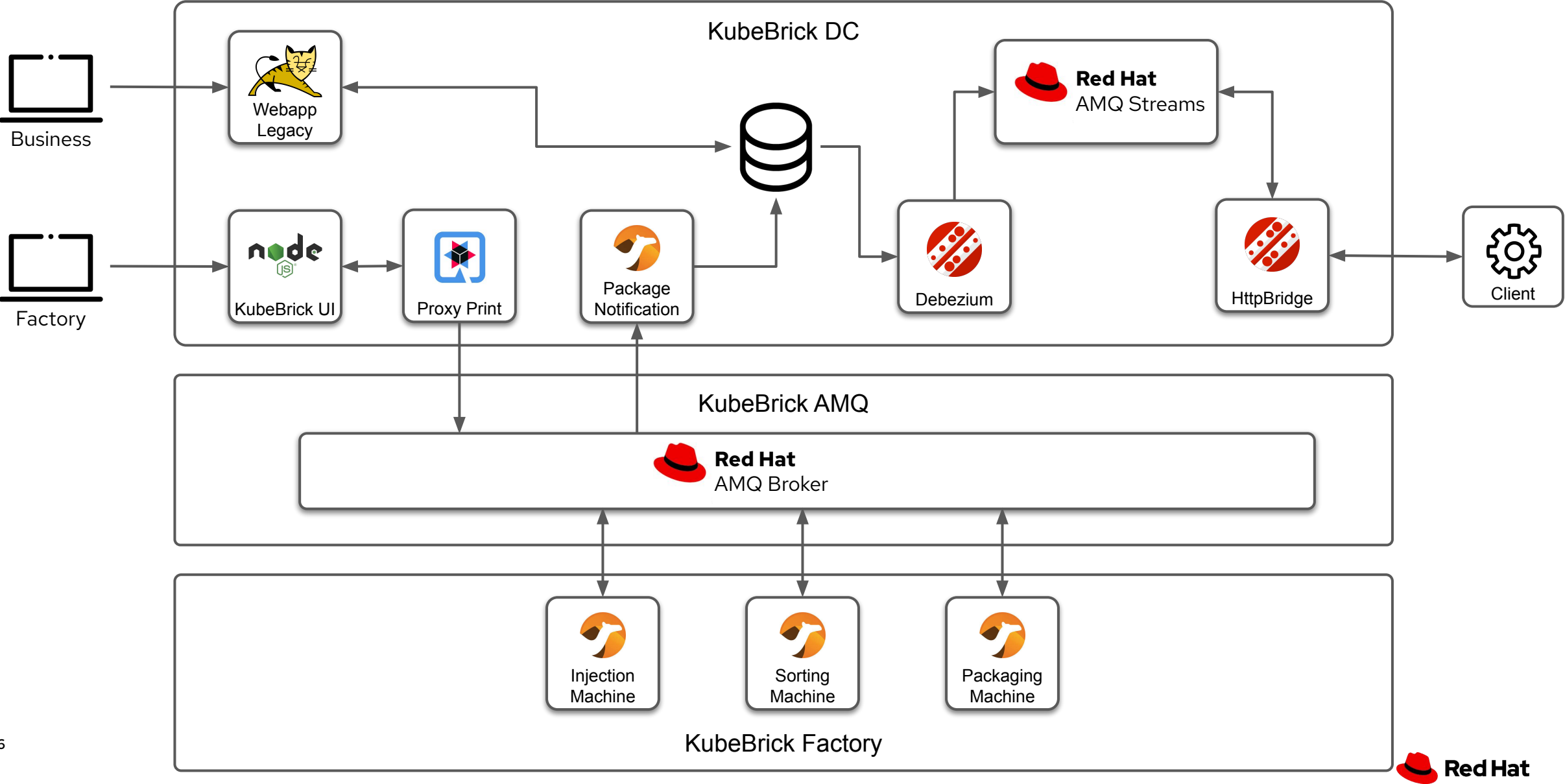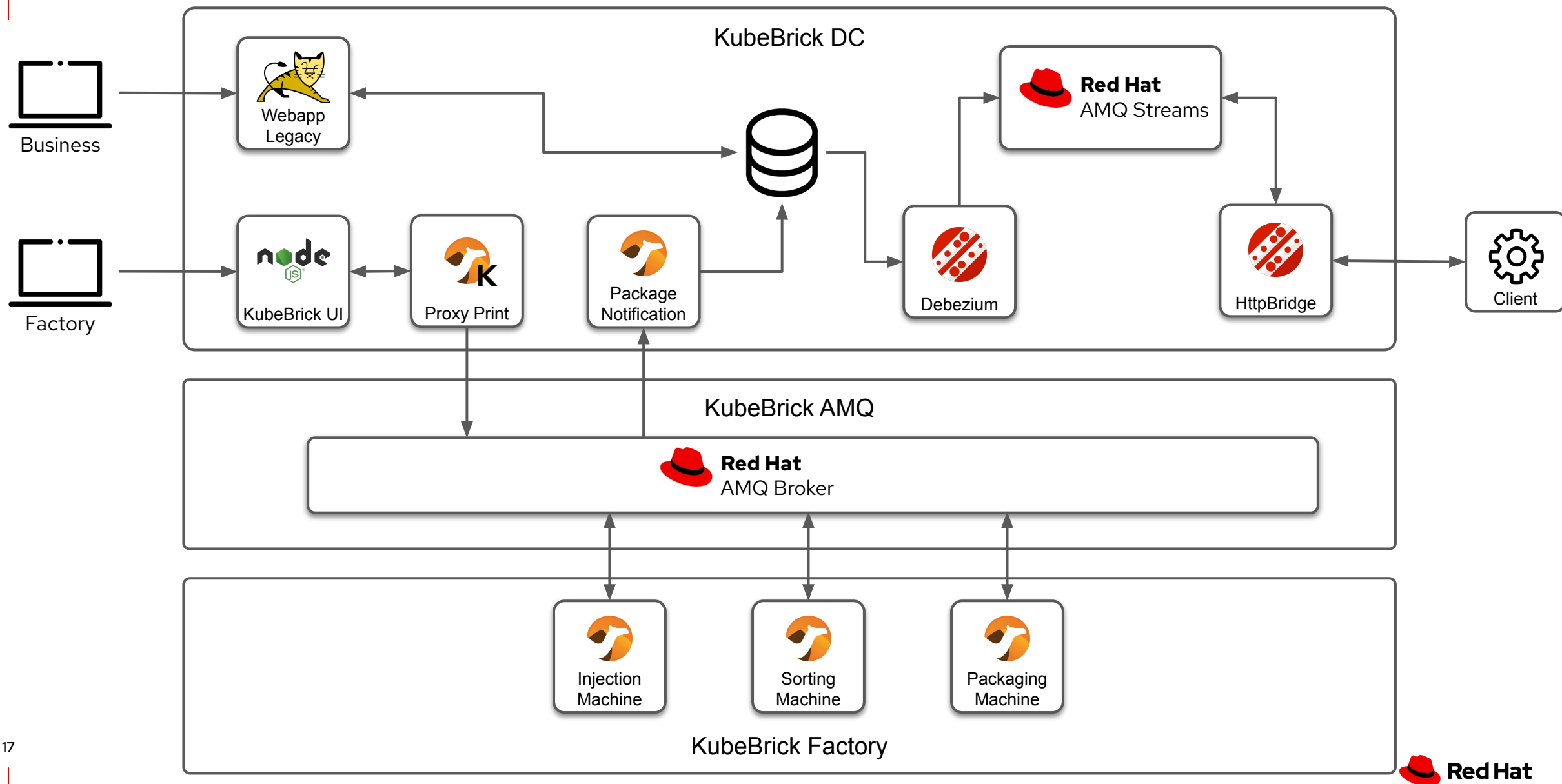
RHEL for Edge Lifecycle

Red Hat

Introducing OSTree

OSTree (libostree) is both a shared library and suite of command line tools that combines a "**git-like**" model for committing and downloading bootable filesystem trees.

OSTree is used by the **rpm-ostree** project to provide RPM package management and transactional, background image-based upgrades.

RHEL for Edge + MicroShift Build Pipeline

Image Builder/ composer-cli

pod**man**

Edge Installer ISO   Kickstart File

Edge Delivery

MicroShift Blueprint

OSBuild Composer

OSBuild Worker

Edge Container

Installer Blueprint

OSBuild Composer

OSBuild Worker

Final Installer ISO

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Orchestrating MicroShift with RHACM

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RHACM Architecture Overview
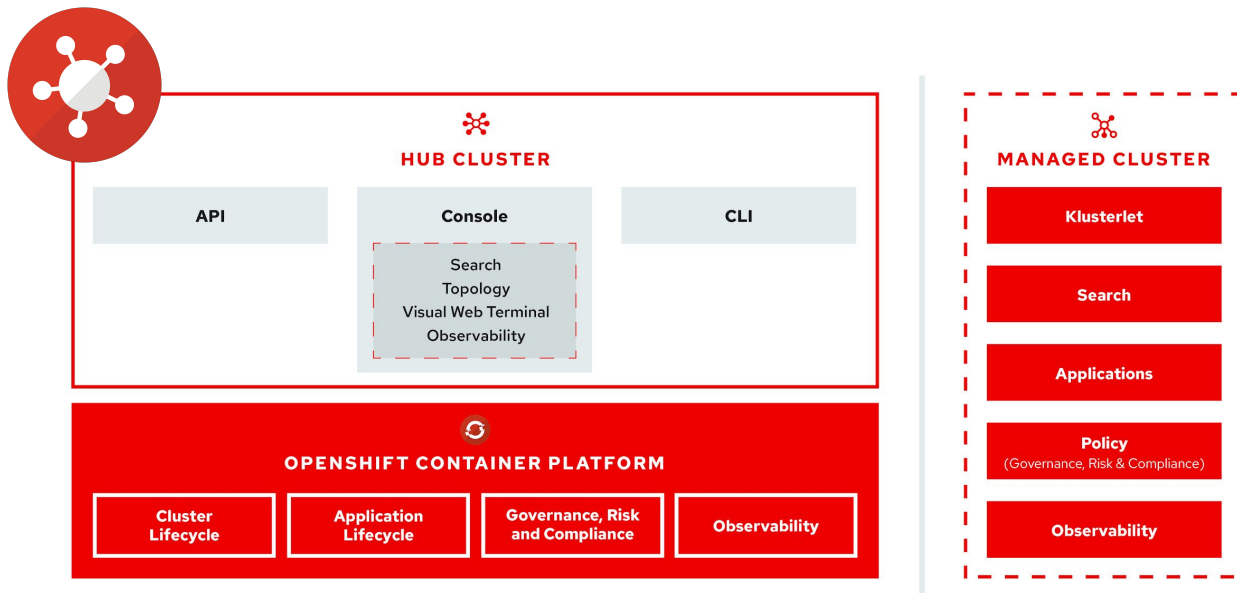
Hub architecture and components

Red Hat Advanced Cluster Management uses the **multicluster-hub** operator and runs in the **open-cluster-management** namespace

Managed cluster architecture and components

Red Hat Advanced Cluster Management managed clusters use the **multicluster-endpoint** operator which runs in the **open-cluster-management** namespace

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Emerging Technology

Device Configuration Management

Transmission is an experimental device management agent for ostree-based Linux operating systems.

It manages device configuration similar to **OSTree** managing a device OS: It periodically queries a configuration service for updates to a device's target configuration.

Transmission supports a **GitHub** provider to enable a GitOps-based management and an **Ignition** provider to support OS customizations at boot.

https://github.com/redhat-et/transmission
https://next.redhat.com/project/transmission/

Edge Device Registration to RHACM
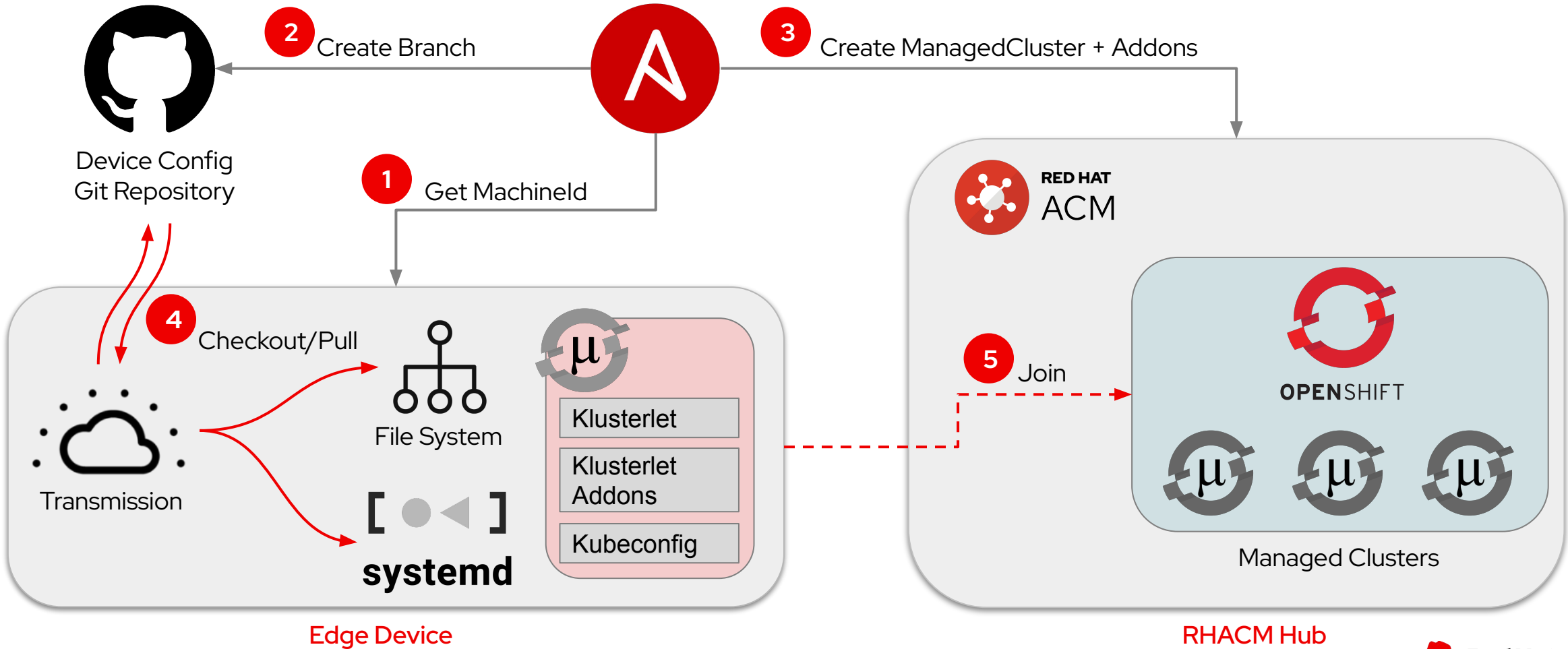
Application Lifecycle Management with RHACM

Red Hat

Application Lifecycle Management Custom Resources

Namespace

A Namespace on the hub cluster is assigned to each Application deployed using RHACM

```
apiVersion: v1
kind: Namespace
metadata:
  name: packaging
```

Channel

A Channel defines the source repository from which the Application is deployed

```
apiVersion: apps.open-cluster-management.io/v1
kind: Channel
metadata:
  annotations:
    apps.open-cluster-management.io/reconcile-rate: medium
  name: packaging
  namespace: packaging
spec:
  type: Git
  pathname:
'https://github.com/redhat-italy/kubebrick-showcase'
```

Application Lifecycle Management Custom Resources

PlacementRule

A PlacementRule is used to define the target clusters for the Application to deploy on

```
apiVersion: apps.open-cluster-management.io/v1
kind: PlacementRule
metadata:
  labels:
    app: packaging
  name: packaging-placement-1
  namespace: packaging
spec:
  clusterSelector:
    matchLabels:
      'role': 'packaging'
```

Subscription

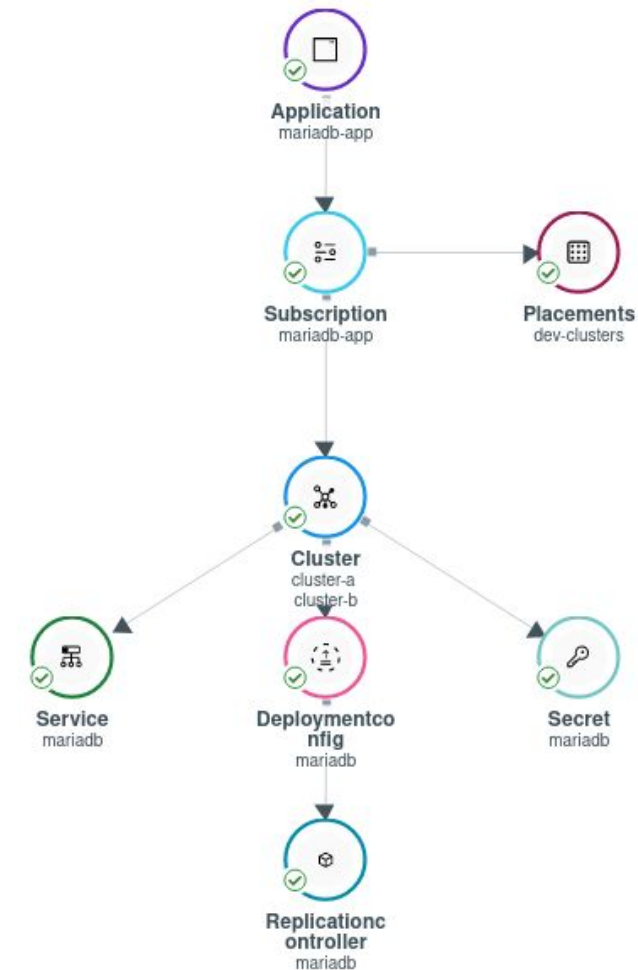A Subscription associates between PlacementRules and Channel resources

```
apiVersion: apps.open-cluster-management.io/v1
kind: Subscription
metadata:
  annotations:
    apps.open-cluster-management.io/github-path: microshift
  labels:
    app: packaging
  name: packaging-subscription-1
  namespace: packaging
spec:
  channel: packaging/packaging
  placement:
    placementRef:
      kind: PlacementRule
      name: packaging-placement-1
```

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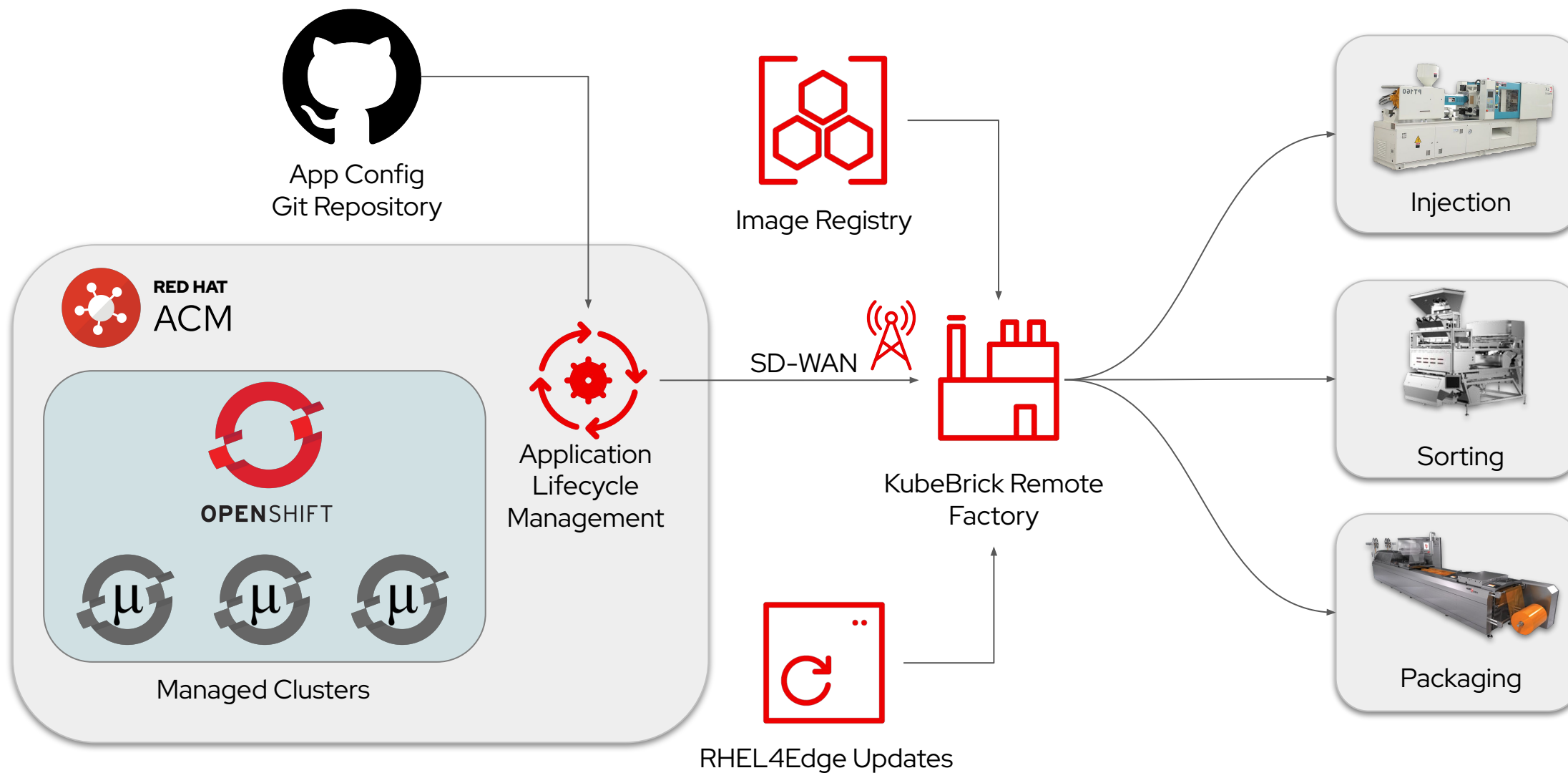# Application Lifecycle Management Custom Resources

Application

The Application resource is used to group the

Kubernetes resources that make up an application

```
apiVersion: app.k8s.io/v1beta1
kind: Application
metadata:
  name: packaging
  namespace: packaging
spec:
  componentKinds:
  - group: apps.open-cluster-management.io
    kind: Subscription
  descriptor: {}
  selector:
    matchExpressions:
      - key: app
        operator: In
        values:
          - packaging
```

KubeBrick Device Architecture

App Config
Git Repository

Image Registry

RED HAT
ACM

OPENSHIFT

Managed Clusters

Application
Lifecycle
Management

SD-WAN

KubeBrick Remote
Factory

RHEL4Edge Updates

Injection

Sorting

Packaging

Red Hat

Thank you

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