Container hybrid deployment to the EDGE powered by Openshift & RHEL

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Solution Architect
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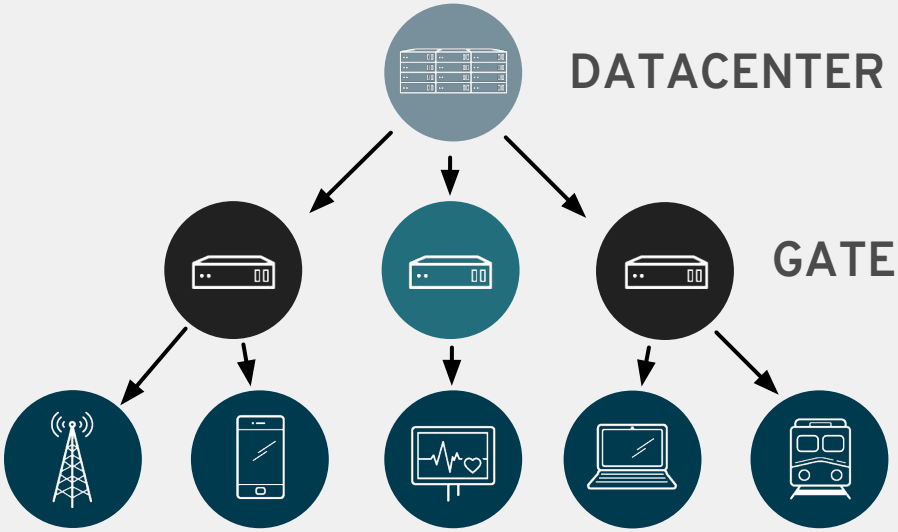
#RedHatOSD

ENTERPRISE IoT ARCHITECTURE

Driving datacenter function to the edge



DATACENTER

- Business processing
- Reporting
- Long-term data analytics
- Data infrastructure
- Enterprise integration
- Software-defined storage

GATEWAYS

- Communications/messaging
- Data pre-processing
- Real-time data analytics
- Real-time actions/rules
- Software-defined storage
- Security

DEVICES

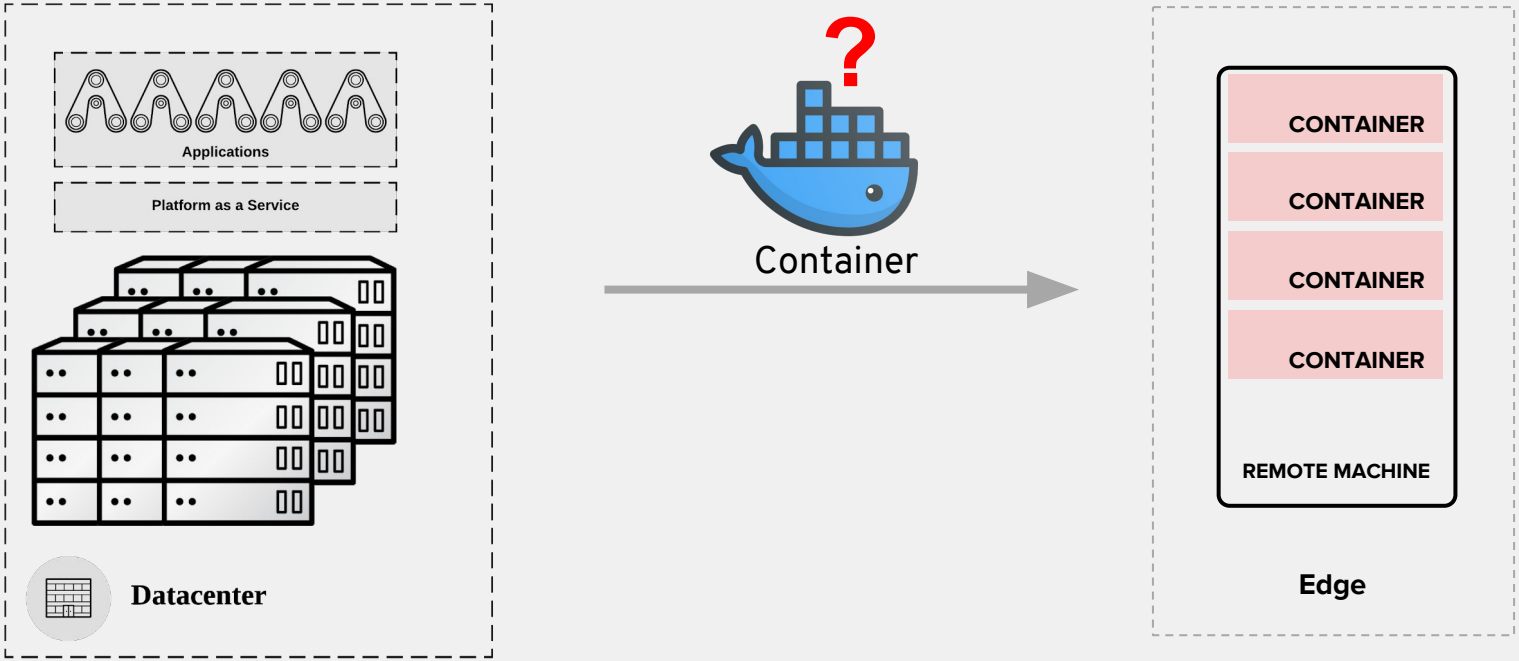
- Communications/messaging
- Data acquisition

EXAMPLES OF TARGETED USE CASES

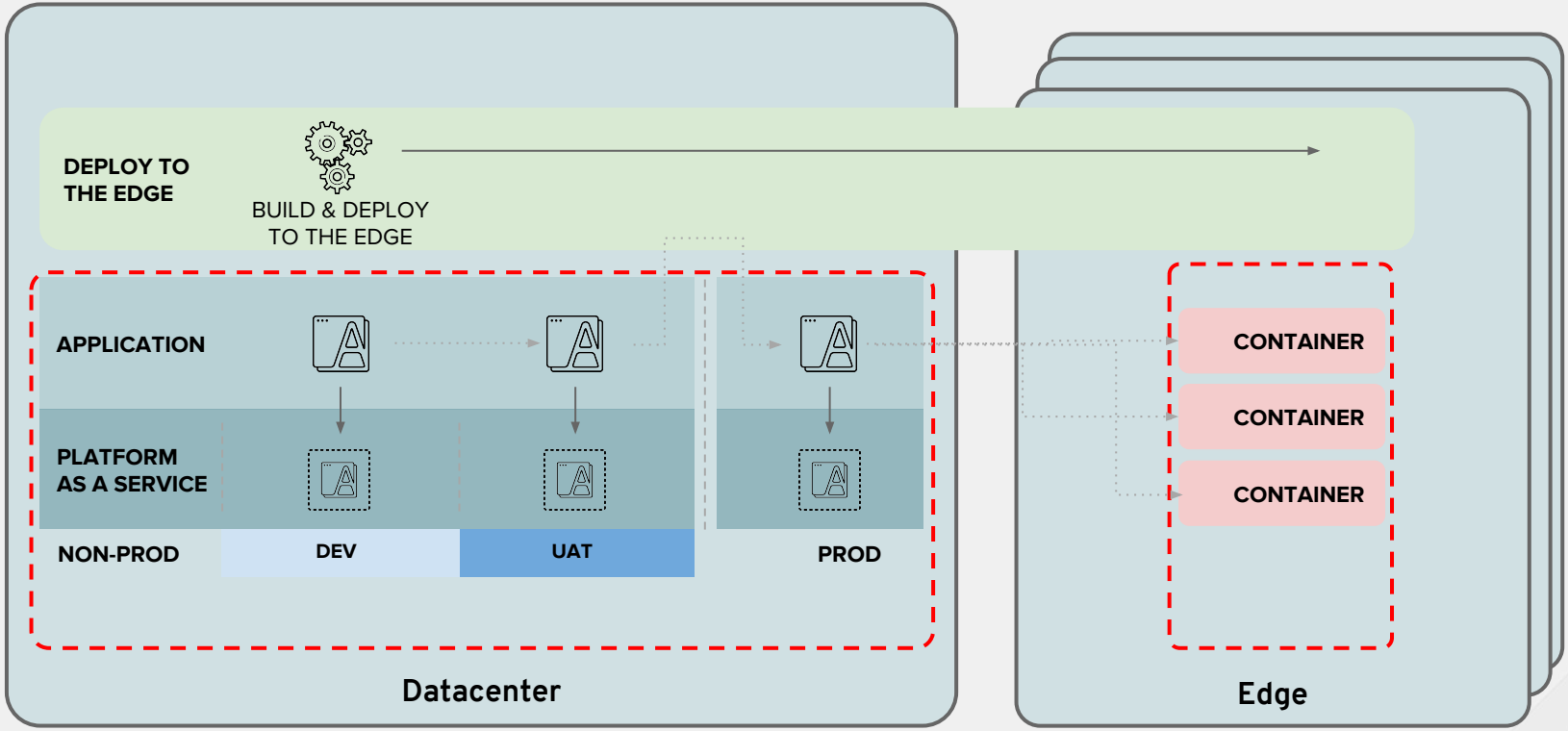
Remote factories, disconnected ferries, trains, oil stations

CUSTOMER NEEDS

How to handle containers deployment to the edge?

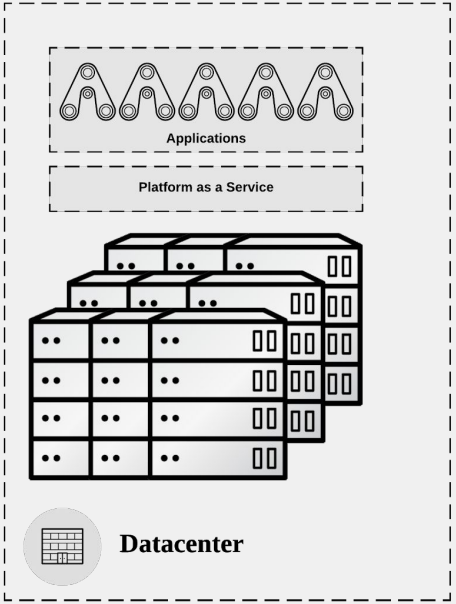


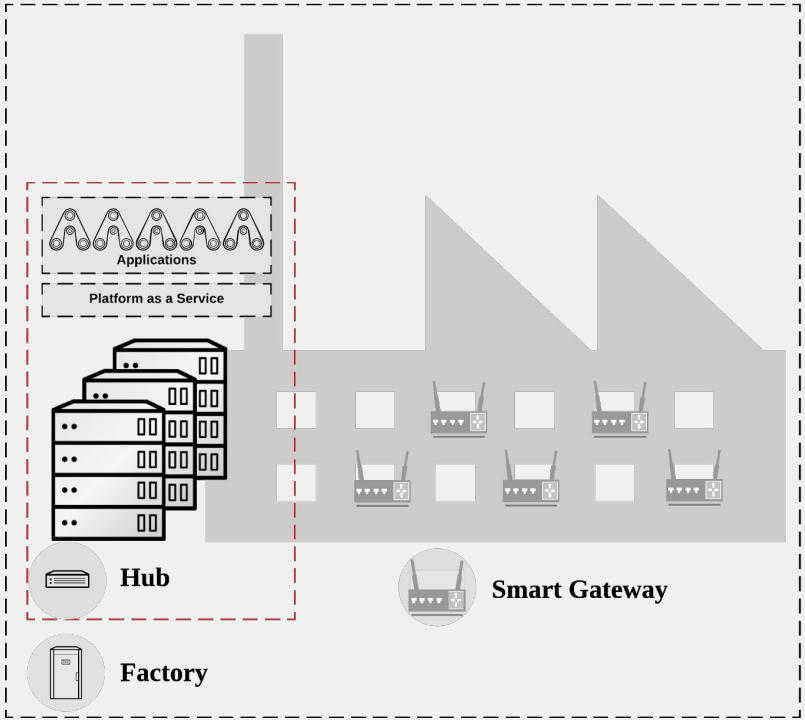
FROM DEVELOPMENT TO THE EDGE



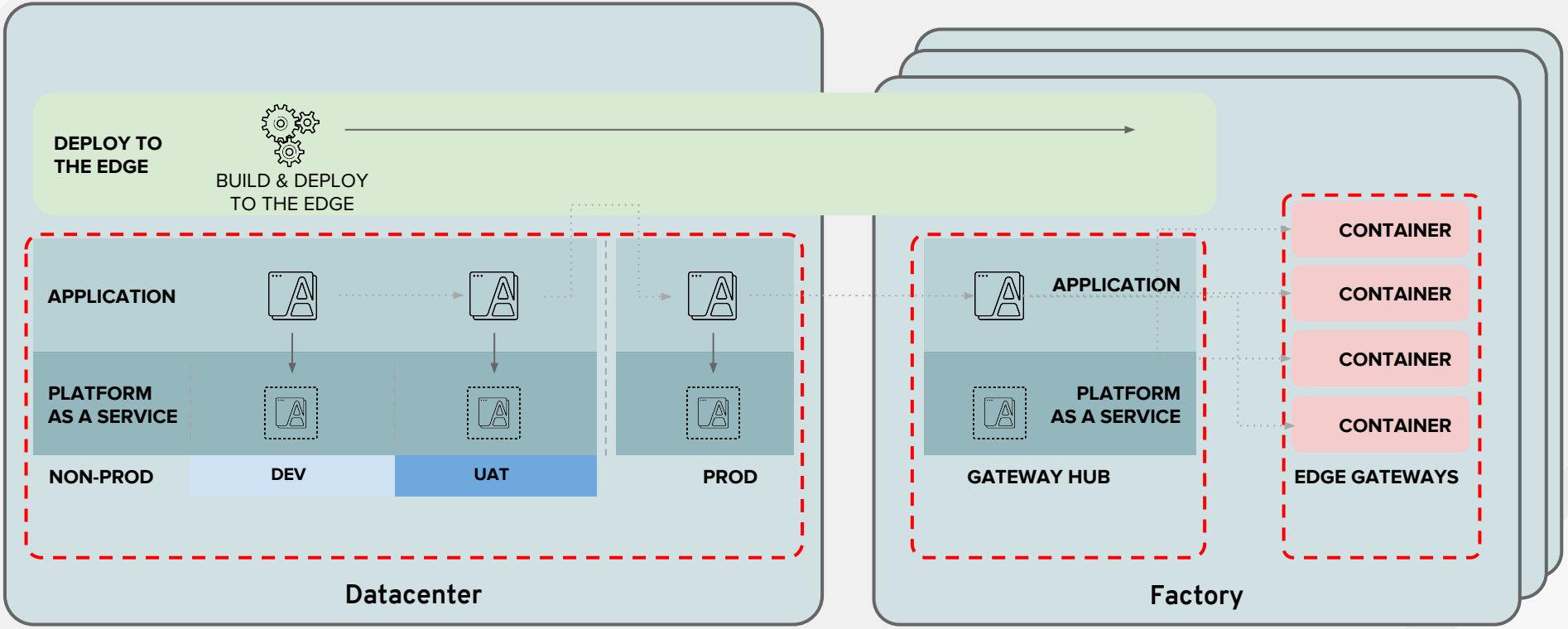
USE CASE SCENARIO

From Datacenter to the Factory





FROM DEVELOPMENT TO EDGE DEPLOYMENTS



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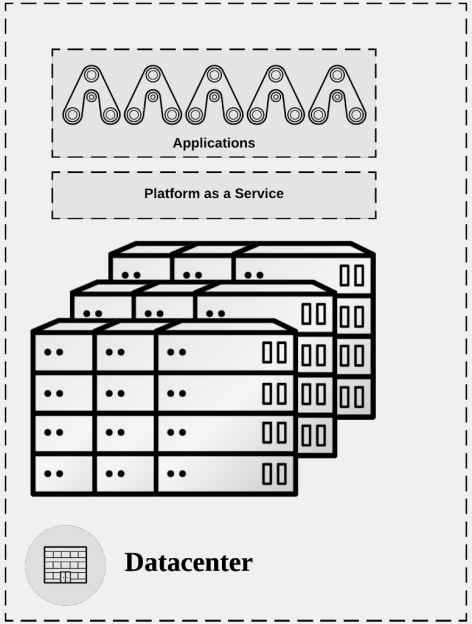
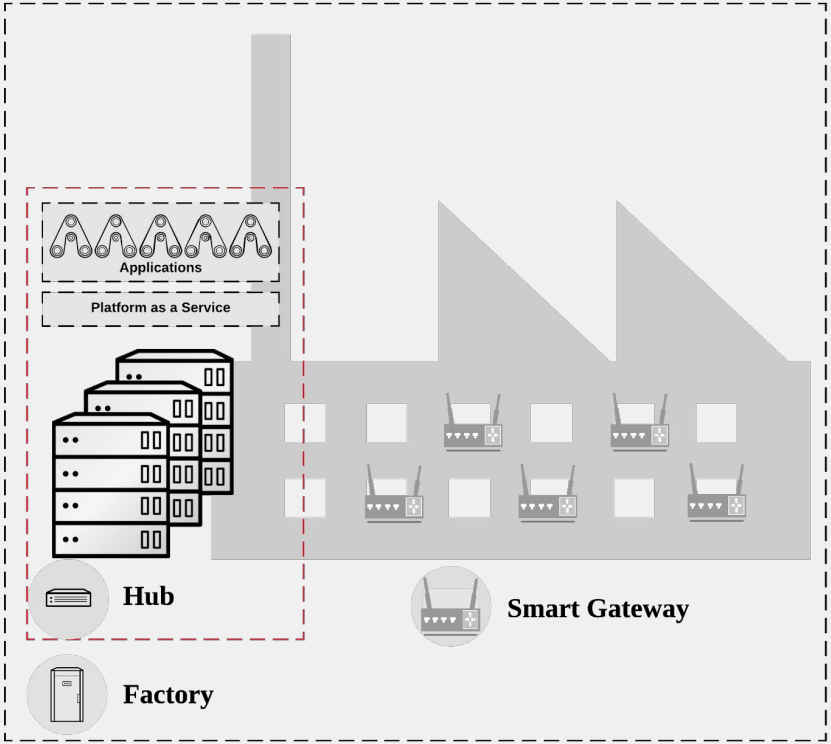
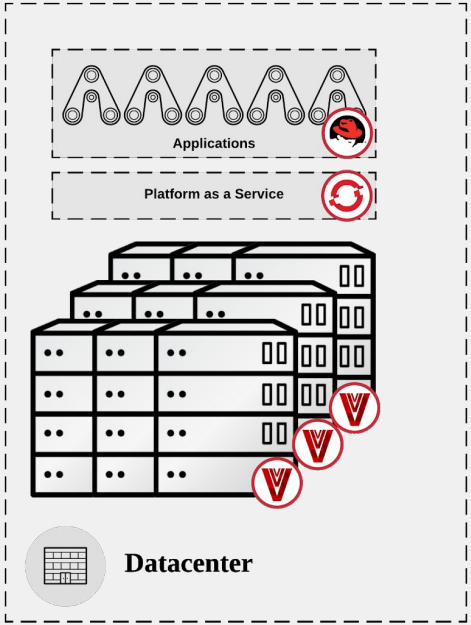
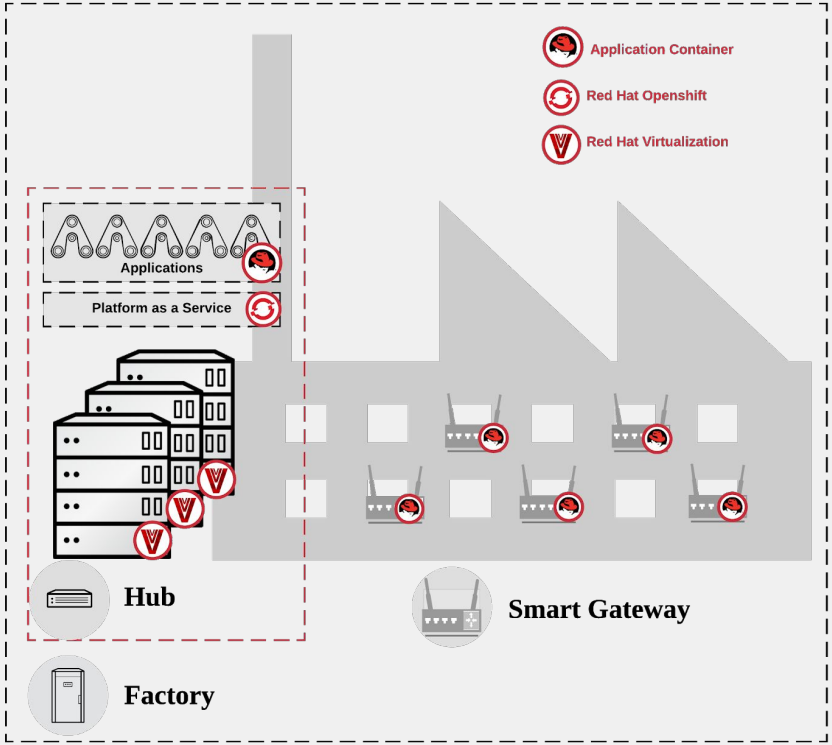




THE RED HAT STACK

Can support your edge deployments





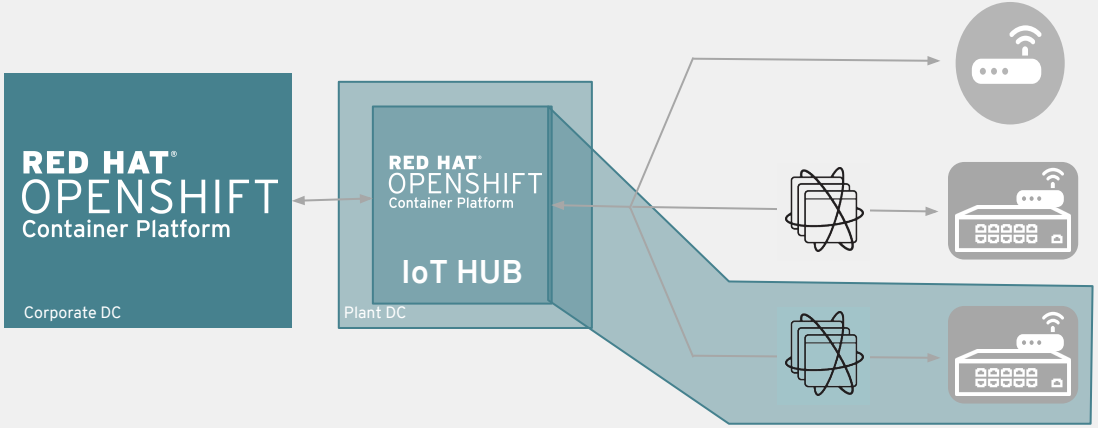
HOW DO YOU HANDLE IT?

MULTIPLE EDGE DEPLOYMENTS SCENARIOS

Corporate Node

Plant Node

Edge Node



Deployment Scenarios (Based on resource (CPU/Memory) and connectivity (Bandwidth/Latency) availability)	Available capabilities
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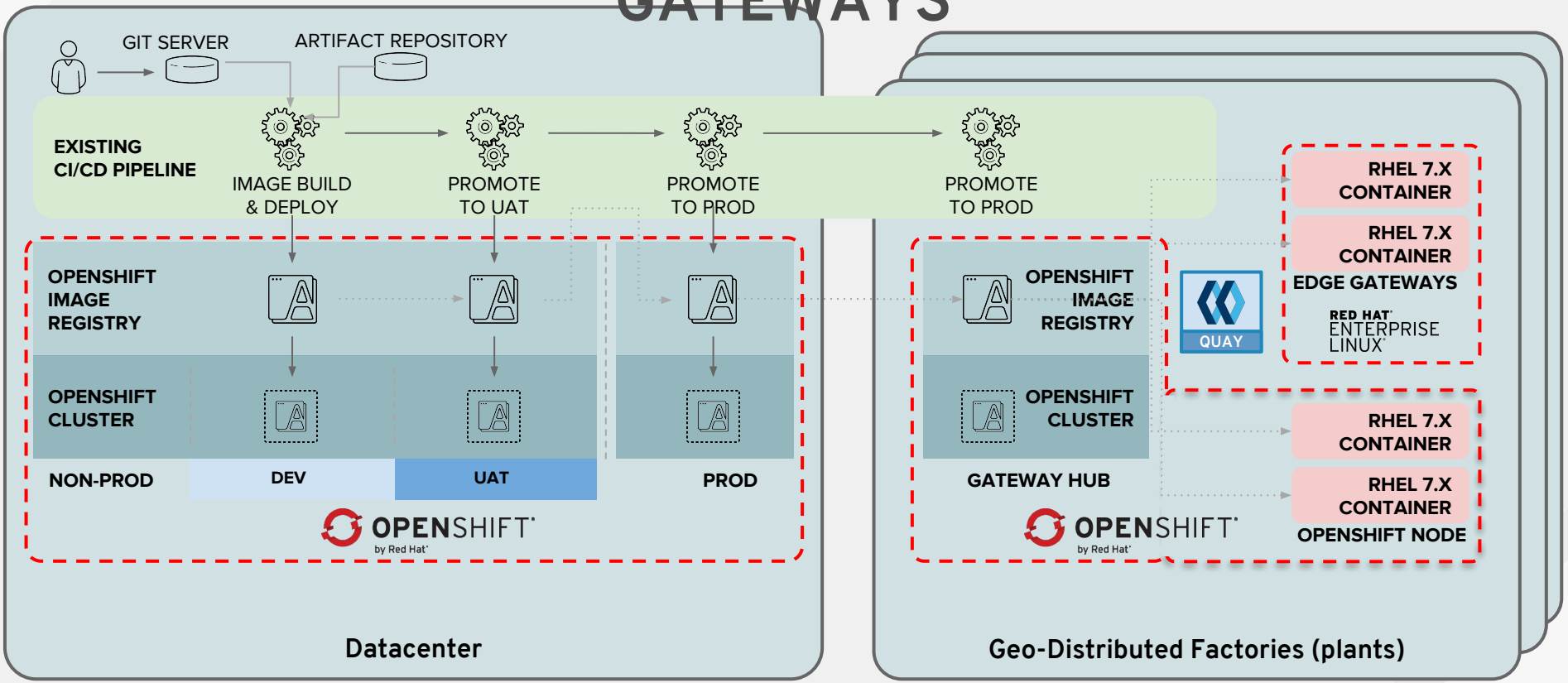
CI/CD THROUGH DATACENTERS & GATEWAYS



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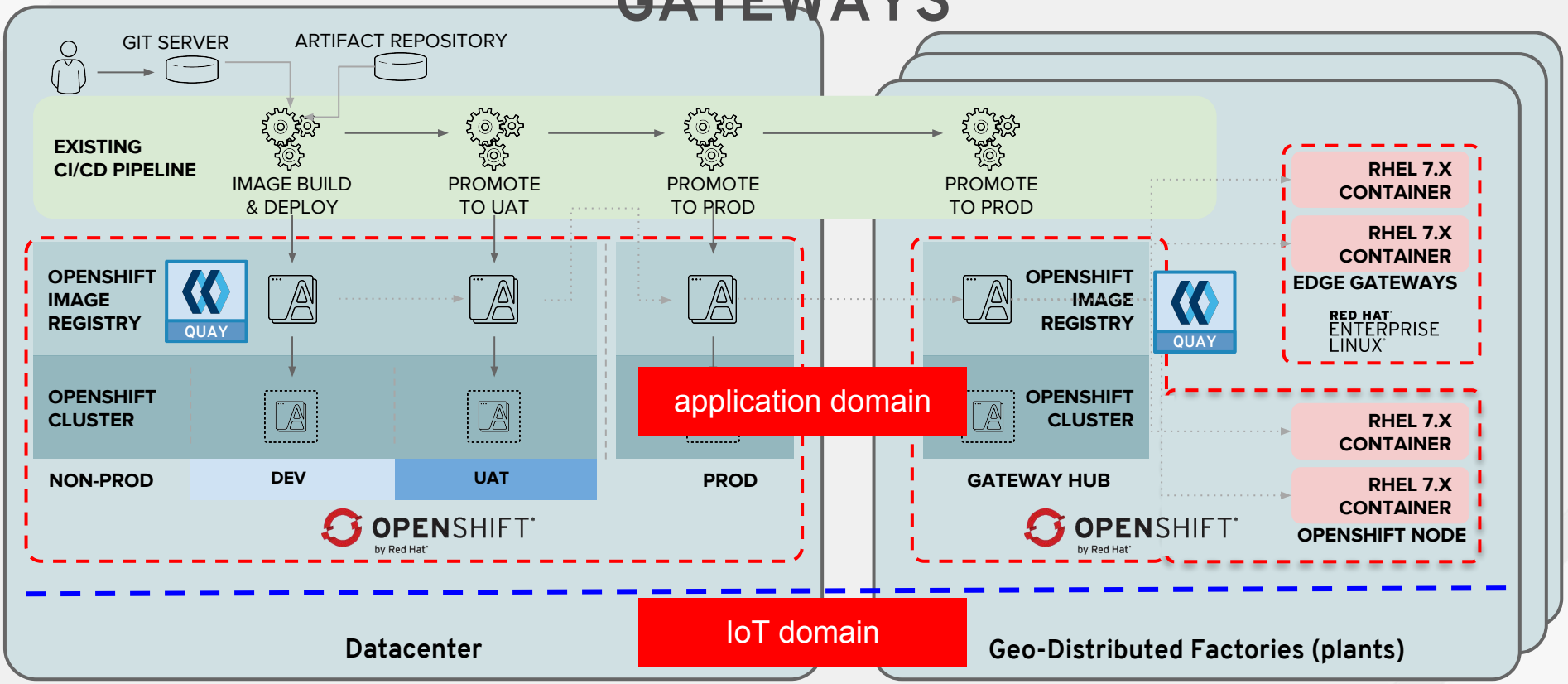
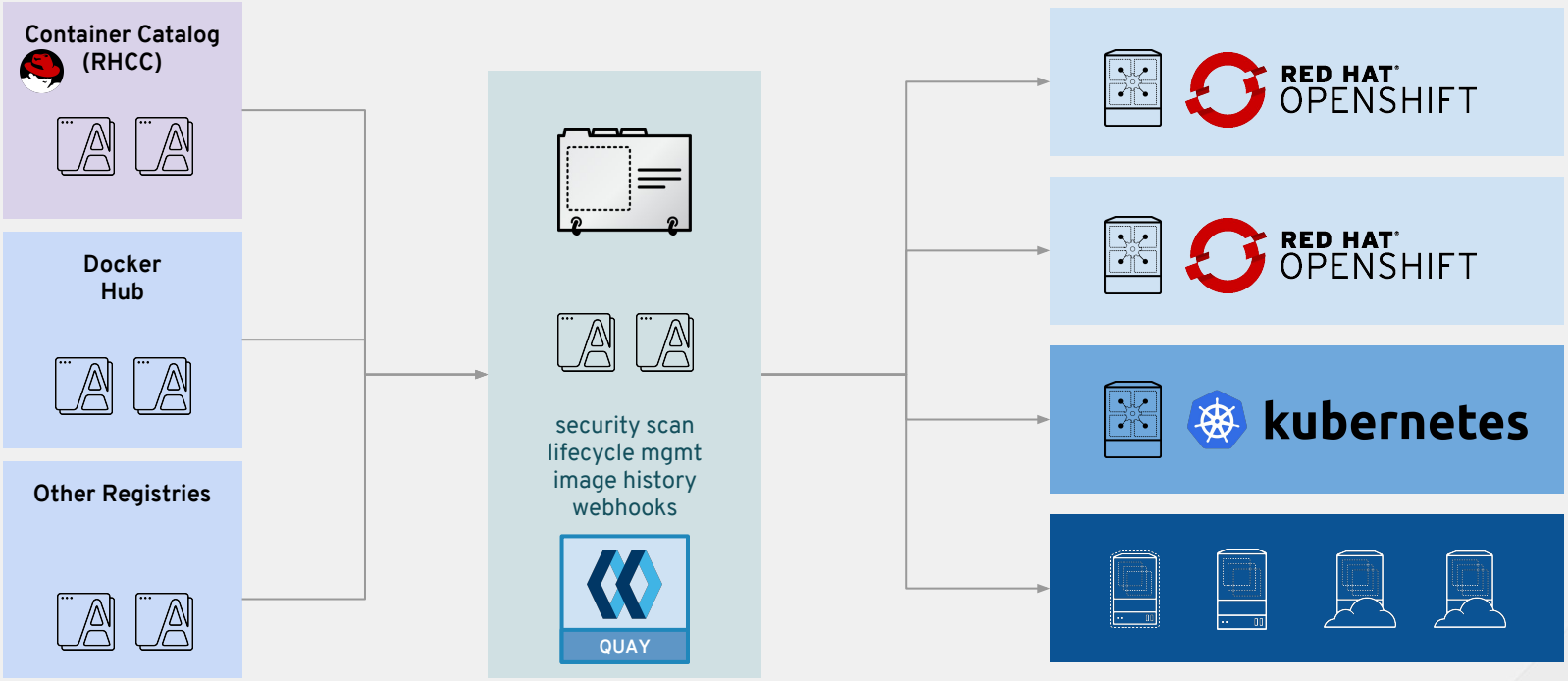


IMAGES DISTRIBUTION w/ RED HAT QUAY

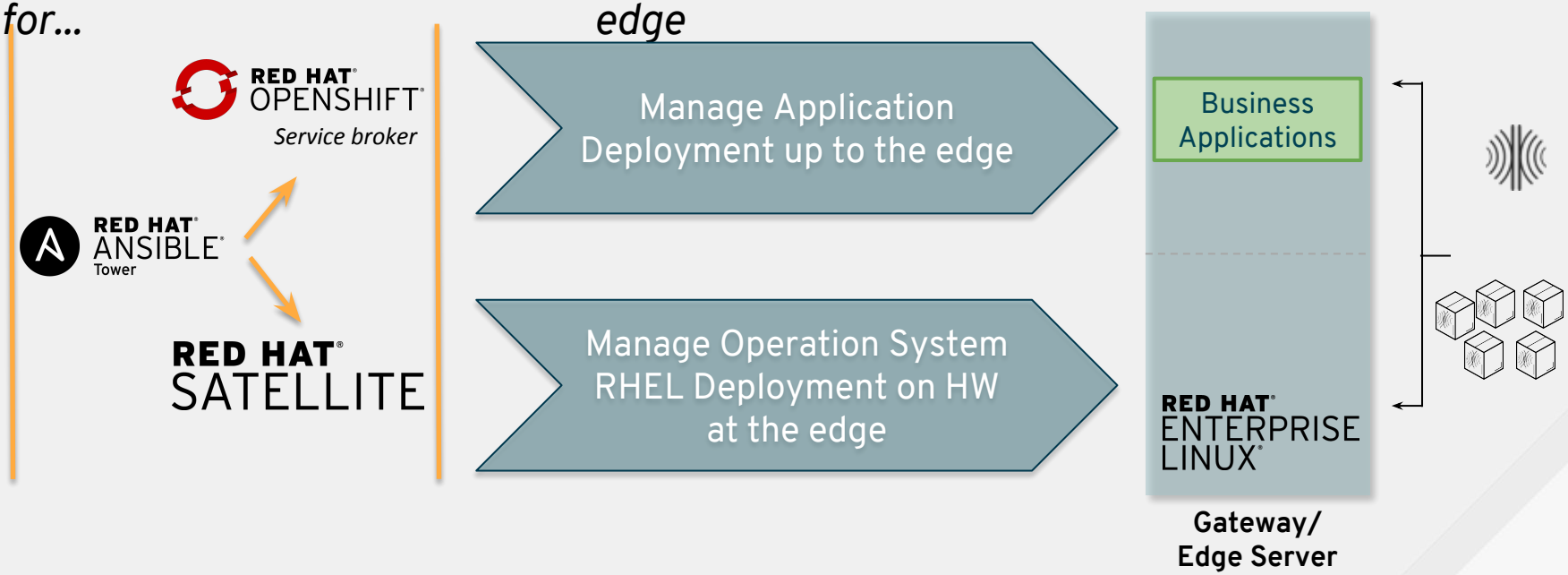
Content governance and ingress for OpenShift / Kubernetes / Edge



SCALE IoT SOLUTION THROUGH CENTRALIZED AUTOMATION PROCESSES

Centralized Management for...

...Automatized processes to the edge



WHAT ABOUT THE TECHNOLOGY?

Six Building Blocks

1. ENTERPRISE READY VIRTUALIZATION LAYER
2. CONTAINER BASED PLATFORM AS A SERVICE
3. AUTOMATION ENGINE ENTERPRISE FRAMEWORK
4. CRITICAL RELIABLE & MILITARY-GRADE SECURE OS
5. O.S. INSTALLATION & MANAGEMENT

RED HAT® VIRTUALIZATION

RED HAT® OPENSHIFT Container Platform

RED HAT® ANSIBLE® Automation

RED HAT® ENTERPRISE LINUX®

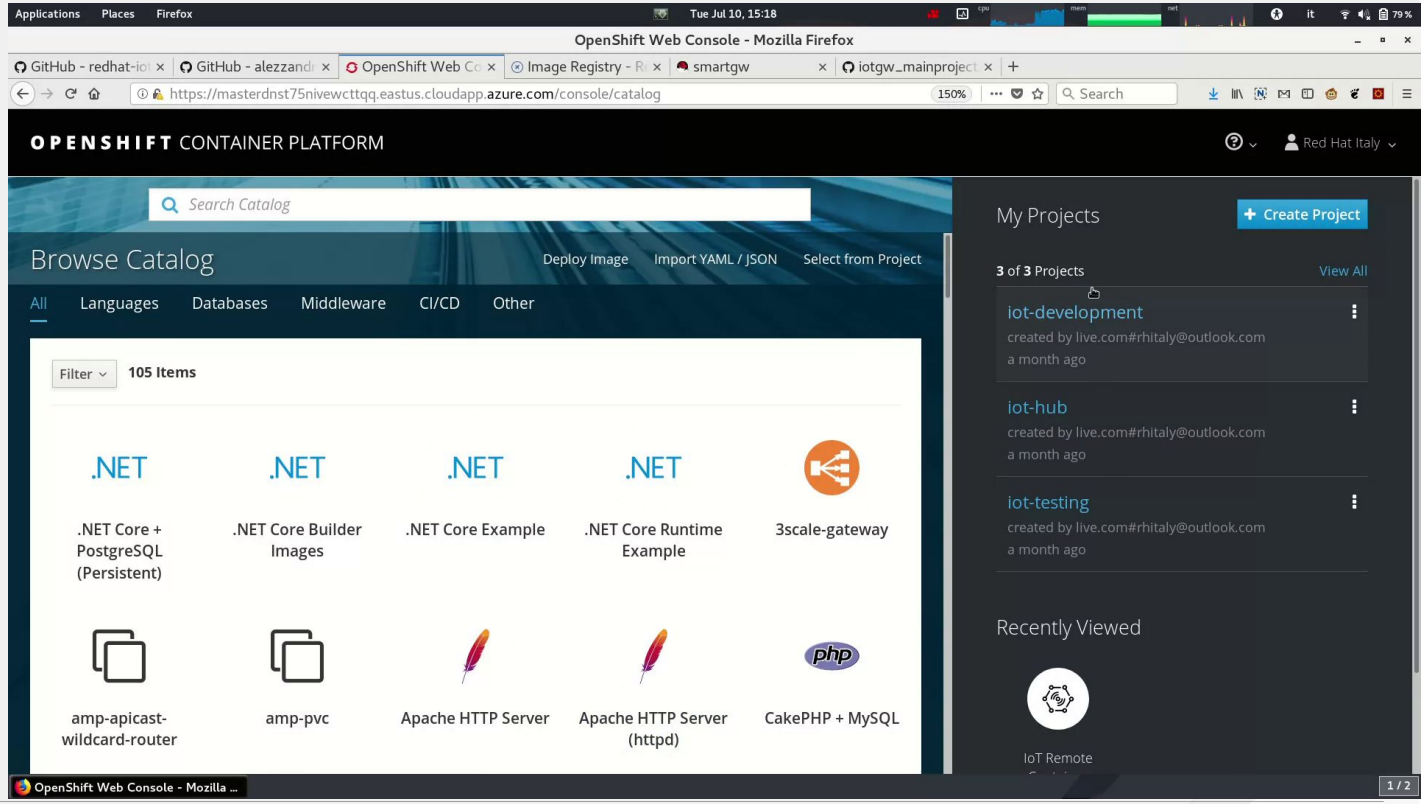
RED HAT® SATELLITE

RED HAT® QUAY

A REAL USE CASE:
INTELLIGENT IoT GATEWAY

https://www.youtube.com/watch?v=bNipu5OA1o4

THE PLATFORM: OPENSHIFT



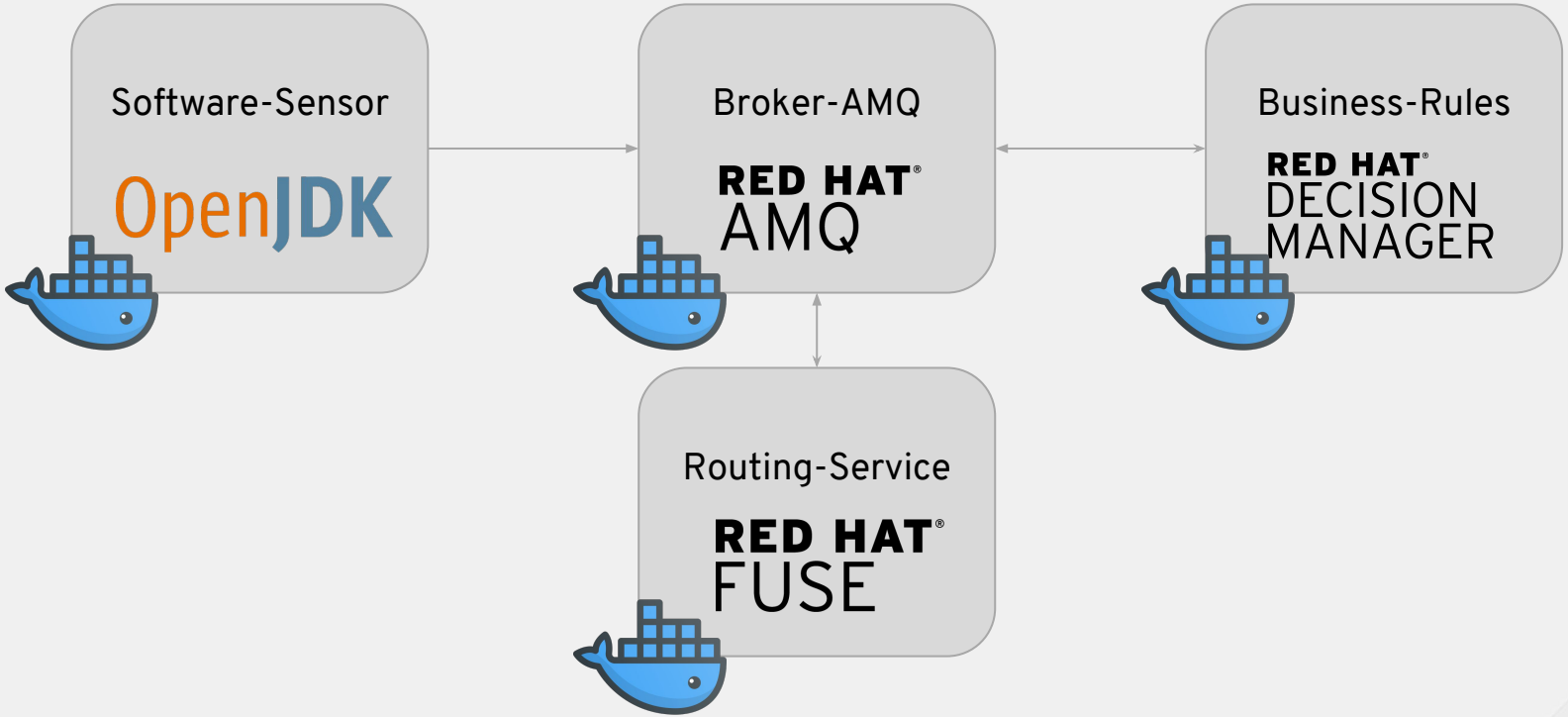
RED HAT LAB: INTELLIGENT IoT GATEWAY

Demo firstly developed for Red Hat Summit 2016
(https://github.com/redhat-iot/Virtual_IoT_Gateway)

- Build the Intelligent IoT Gateway with open source software in a few simple steps
- Main components of the Gateway are:
  - **Red Hat Enterprise Linux** to provide Enterprise class foundation
  - **Red Hat Fuse** to transform sensor data and route it to end points
  - **Red Hat Decision Manager** to enable real-time decision making at the edge
  - **Red Hat AMQ** to arbitrate sensor data
- Red Hat Fuse integrate sensor app and a business rules service
- Sensor app sends temperature data using MQTT to the Red Hat AMQ broker, these messages will be forwarded to the earlier services
- Finally the business rules will trigger desired action when the sensor value reaches a threshold

INTELLIGENT IoT GATEWAY: CONTAINERIZED

Demo refactoring for OpenShift deployment



https://github.com/alezzandro/iotgw_mainproject

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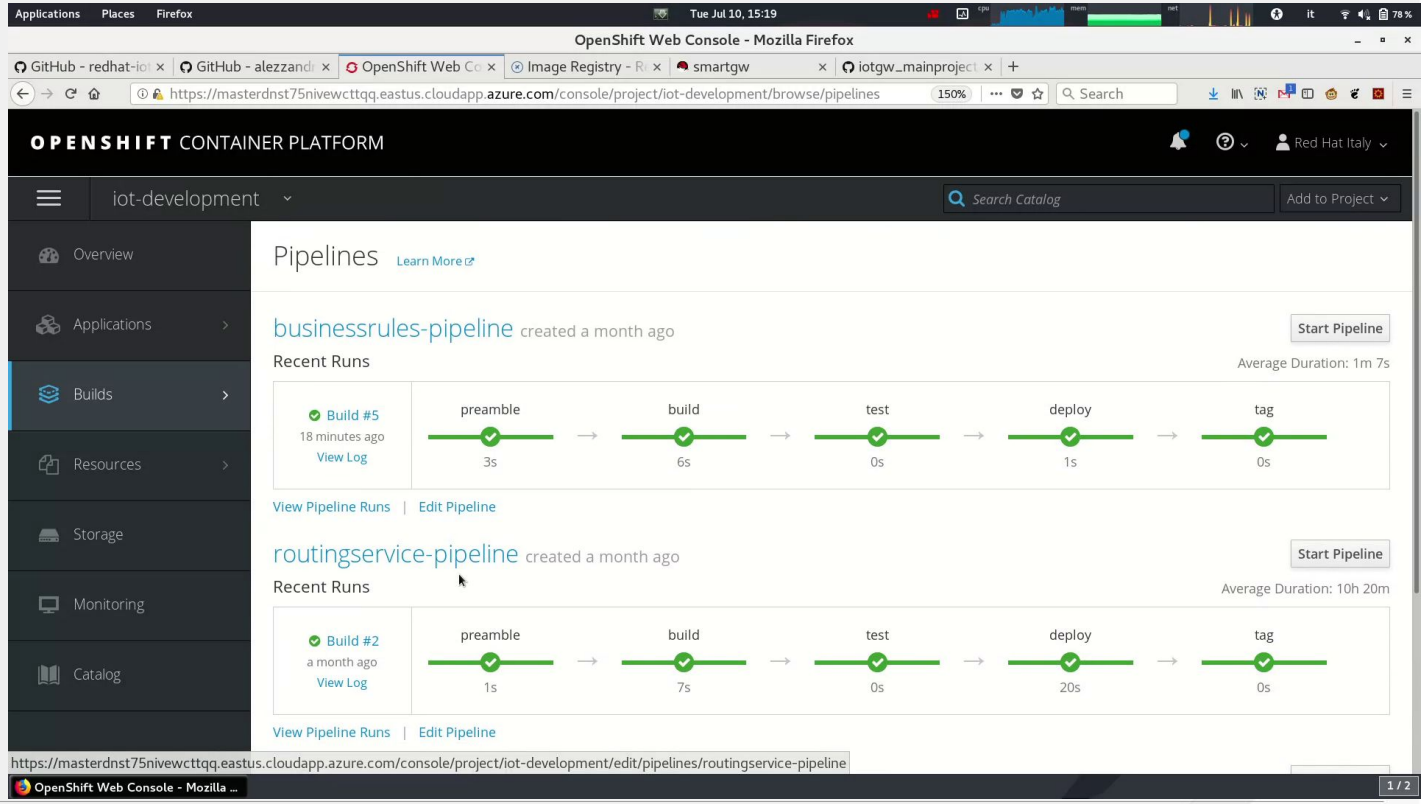
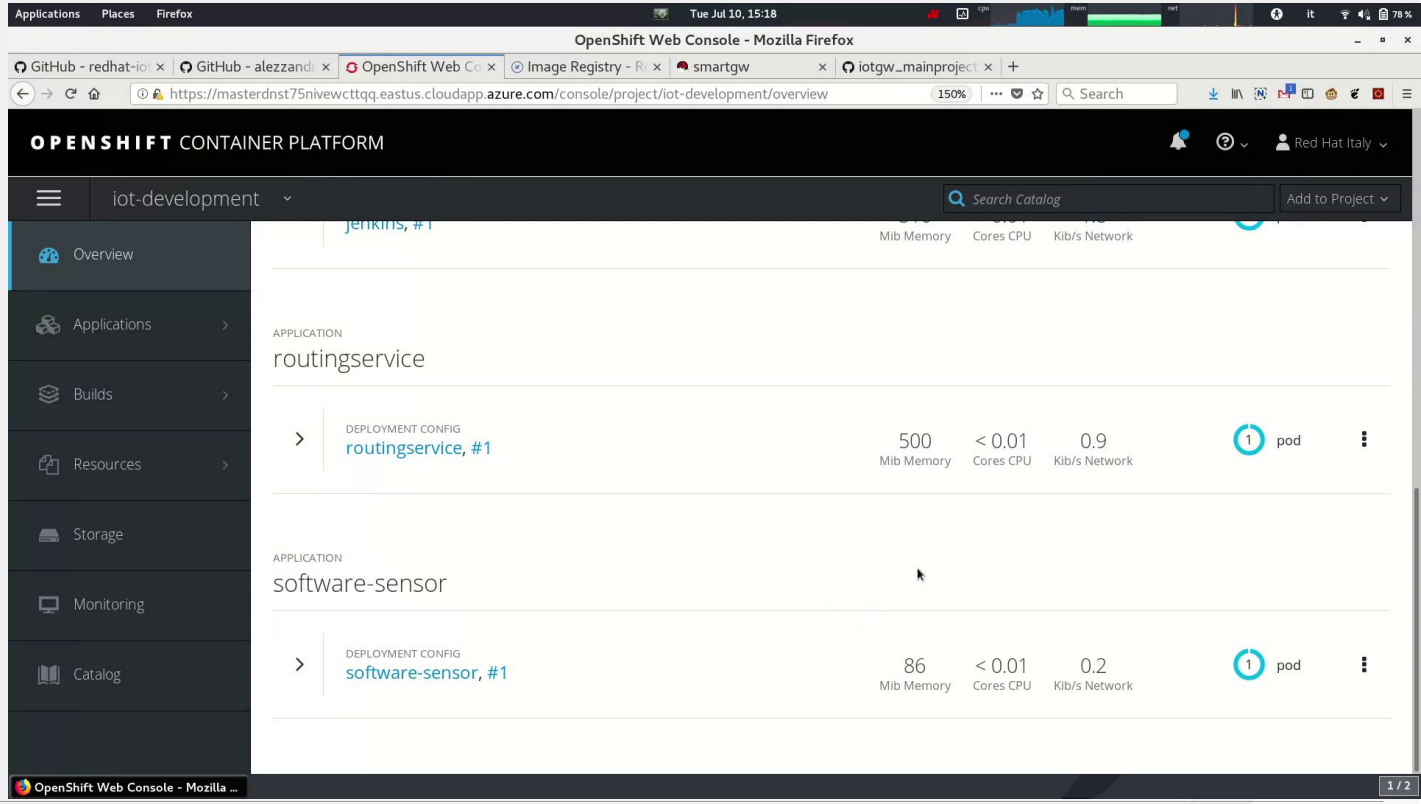
BUILD THE CONTAINERS



DEPLOY THE CONTAINERS



TEST THE CONTAINERS

Applications Places Firefox Tue Jul 10, 15:18

OpenShift Web Console - Mozilla Firefox

GitHub - redhat-iot | GitHub - alezzandr | OpenShift Web Co | Image Registry - Re | smartgw | iotgw_mainproject

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OPENSHIFT CONTAINER PLATFORM Red Hat Italy

iot-development Search Catalog Add to Project

- Overview
- Applications
- Builds
- Resources
- Storage
- Monitoring
- Catalog

Pods » software-sensor-1-wzbjv

software-sensor-1-wzbjv created a month ago

Actions

app software-sensor deployment software-sensor-1 deploymentconfig software-sensor

Details Environment Metrics Logs Terminal Events

Status

Status: Running
Deployment: software-sensor, #1
IP: 10.128.5.30
Node: mycluster-node-3 (10.2.0.4)
Restart Policy: Always

Container software-sensor

State: Running since Jul 10, 2018 3:03:29 PM
Last State Terminated at Jul 10, 2018 3:03:28 PM (Completed)
Ready: true
Restart Count: 147

Template

Containers

software-sensor

Image: iot-development/software-sensor 092d265 174.5 MiB
Build: software-sensor, #1
Source: Adding systemout df7515d authored by Alessandro Arrichiello
Ports: 8080/TCP, 8443/TCP, 8778/TCP
Mount: default-token-7lq47 → /var/run/secrets/kubernetes.io/serviceaccount read-only

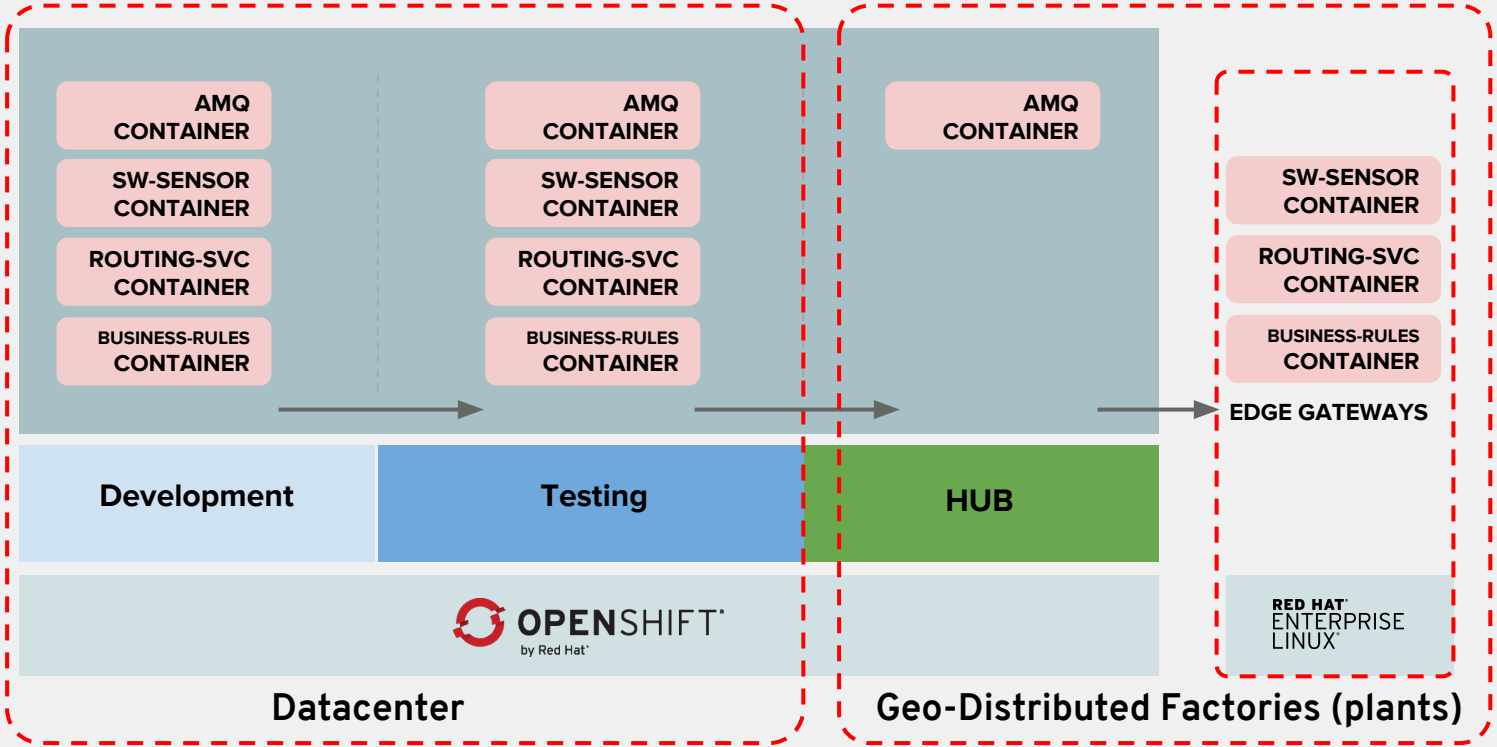
Volumes

default-token-7lq47

OpenShift Web Console - Mozilla ... 1 / 2

DEMO's CONTAINERS DEPLOYMENT TOPOLOGY

Multiple Openshift projects simulating DC and HUB



DEPLOY REMOTE CONTAINERS

Applications Places Firefox Tue Jul 10, 15:21

OpenShift Web Console - Mozilla Firefox

GitHub - redhat-io | GitHub - alezzandr | OpenShift Web Co | Image Registry - R | smartgw | iotgw_mainproject

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OPENSHIFT CON

iot-hub

Overview

Applications

Builds

Resources

Storage

Monitoring

Catalog

IoT Remote Container Deployer - Testing

Information 1 — Configuration 2 — Results 3

IoT Remote Container Deployer - Testing

This default plan deploys deploy-containers-apb

This is a sample APB application that deploys containers on remote host

Cancel < Back Next >

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Add to Project

CakePHP + MySQL

Django + PostgreSQL (Ephemeral)

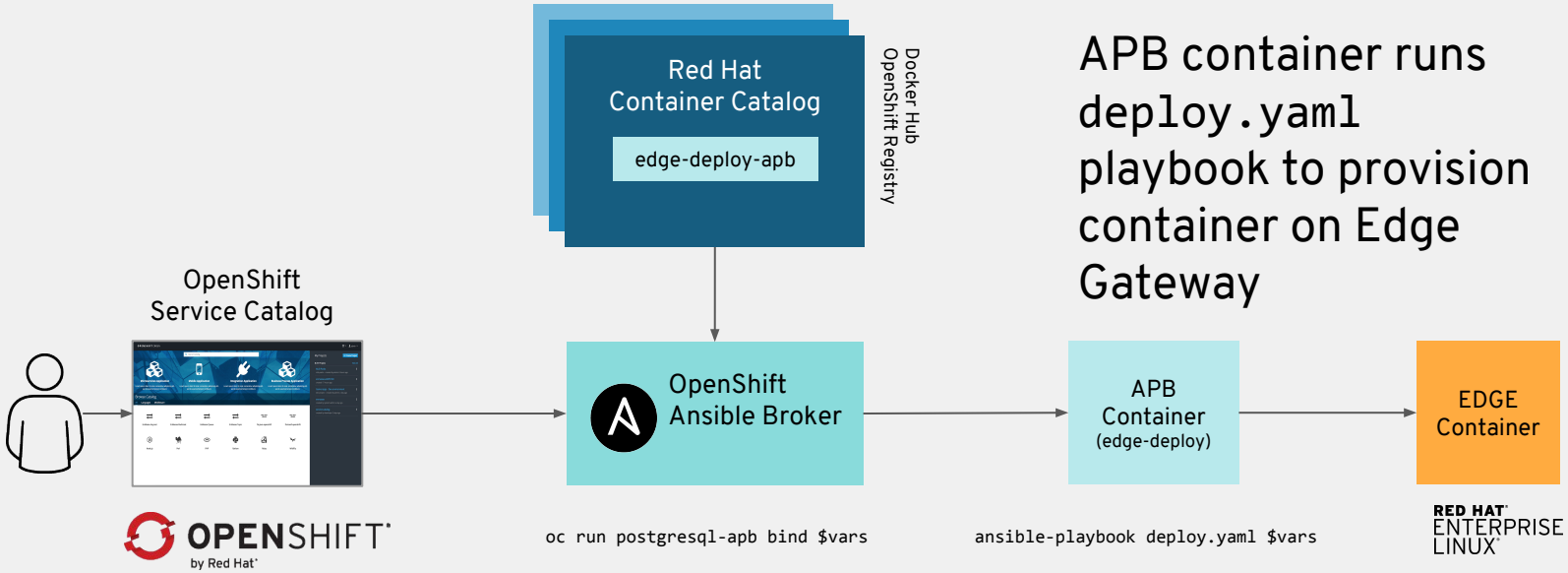
oss A-MQ 6.3 (with SSL)

JBoss BPM Suite 6.4

OpenShift Web Console - Mozilla ... 1 / 2

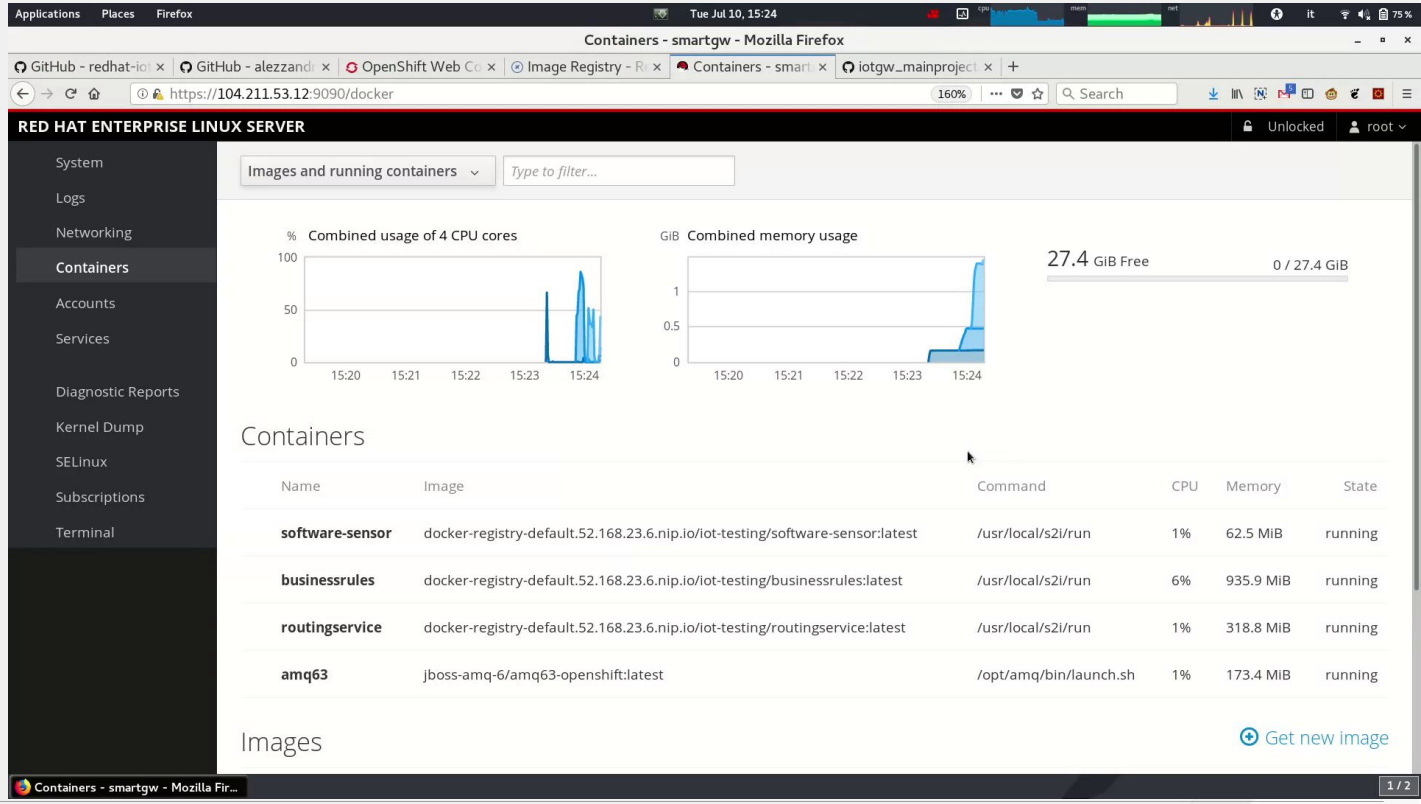
OPENSHIFT ANSIBLE PLAYBOOK BUNDLE

Deploy the container just built through OpenShift

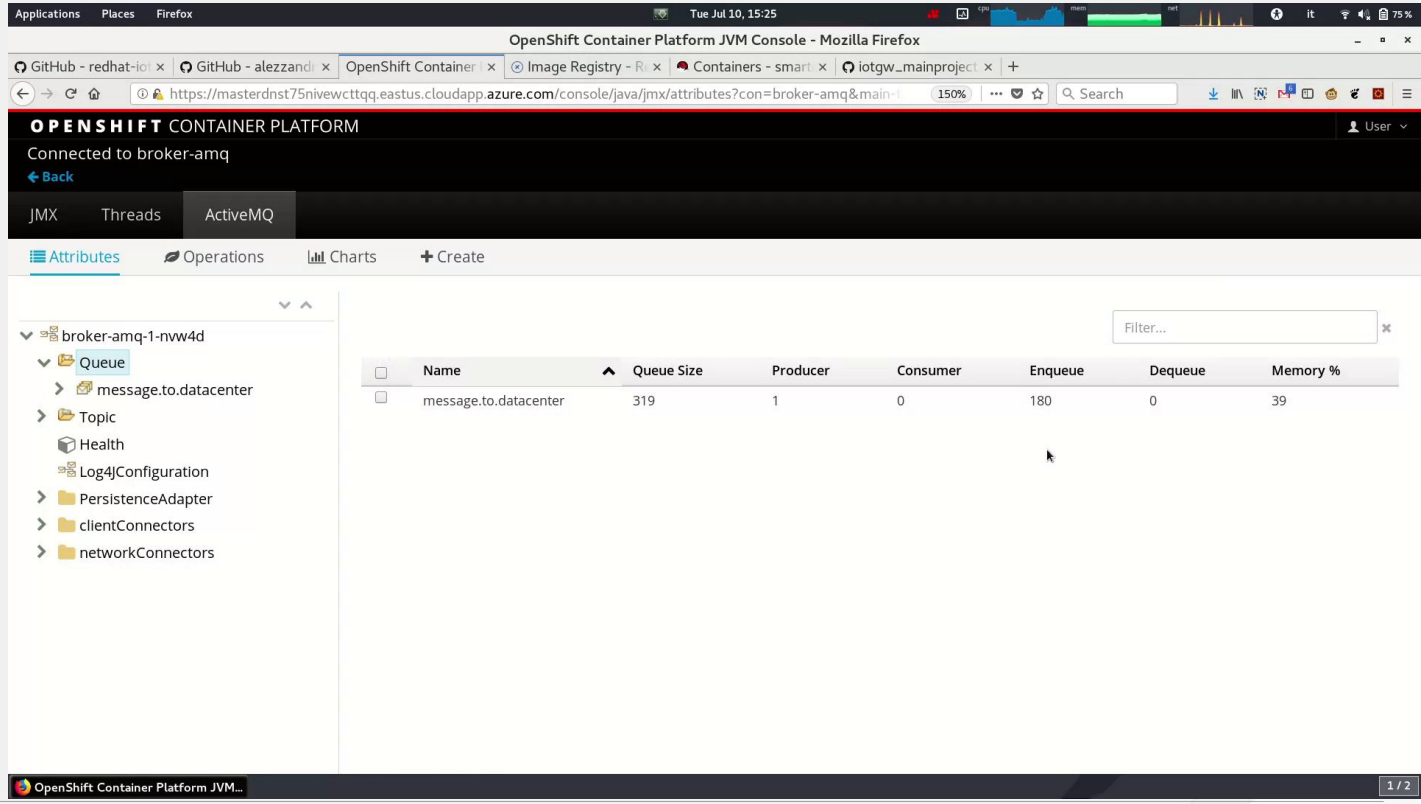


APB container runs `deploy.yaml` playbook to provision container on Edge Gateway

COCKPIT: RHEL MANAGEMENT



DATA FLOWS BACK TO THE HUB



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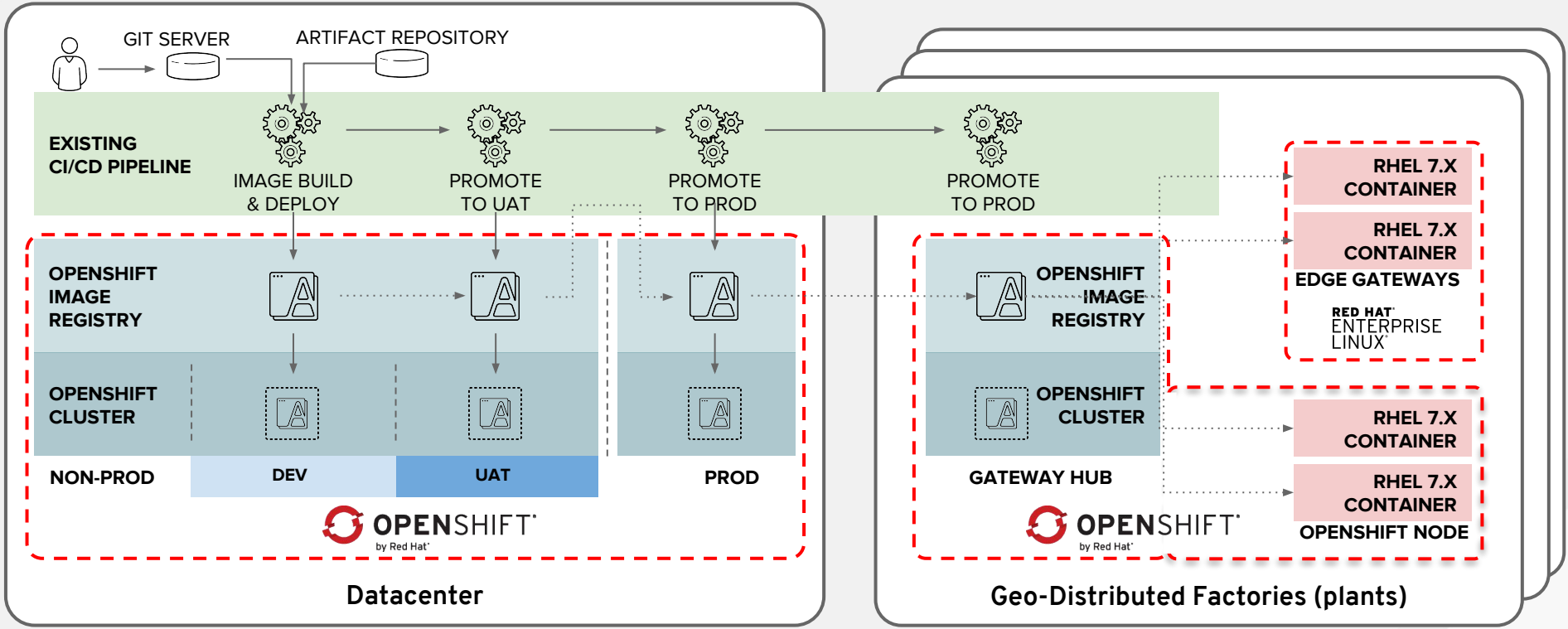

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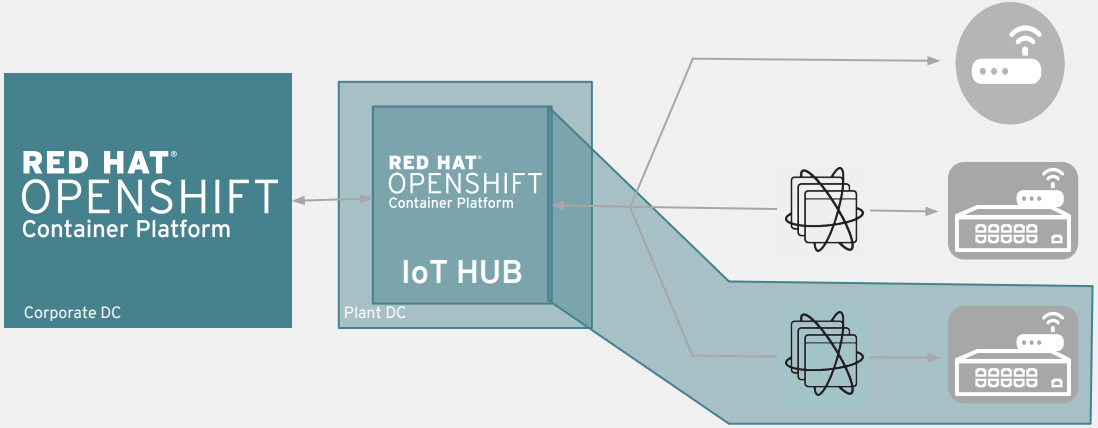

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GRAZIE PER L'ATTENZIONE

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