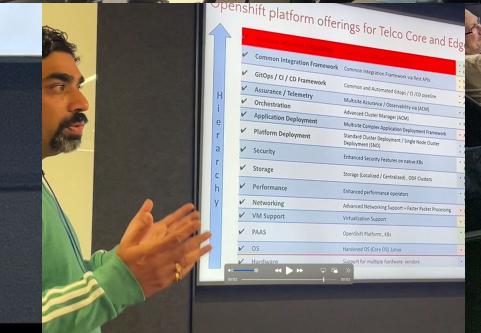
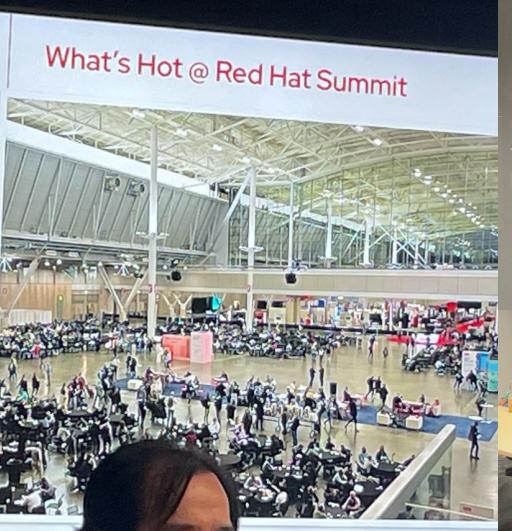
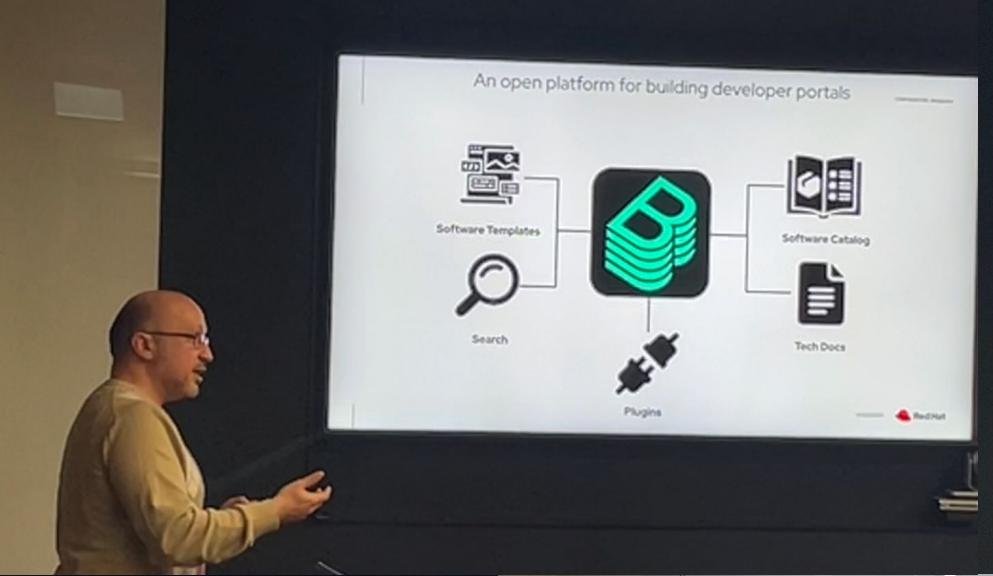
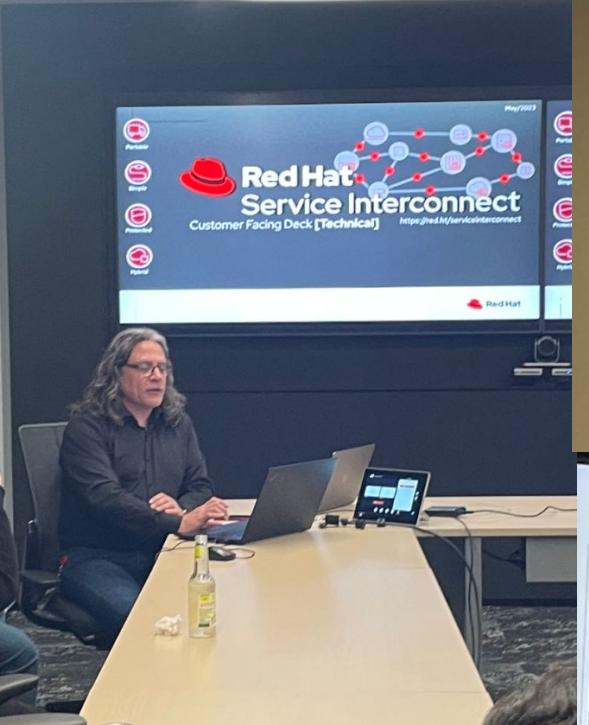




OpenShift Meetup - Melbourne August 2023



# Agenda:

Welcome

Summit News in Brief (5 mins)

Bryon Baker - Service Interconnect (25 mins)

Terry Lee - Summit Experience (10 mins)

Ramy El Essawy - Backstage & Janus (20 mins)

Gaurav Agarwal - Telco Use case (10 mins)

# Summit News

# New from Red Hat

Product innovation highlights and more...



## Red Hat Developer Hub

[Preview] Improving developer productivity and product velocity with plugins for Backstage and preview of Developer Hub, including verified, curated tools and components for IT operations teams to support developers



## Red Hat OpenShift AI

[New capabilities] AI-focused portfolio building on Red Hat OpenShift Data Science to make production-ready AI models and applications an achievable reality for modern enterprises



## Red Hat Trusted Software Supply Chain

[Preview] A new family of software and service offerings that address software supply chain security challenges, including the new Red Hat Trusted Content and Red Hat Trusted Application Pipelines services



## Ansible Lightspeed

[Limited availability] Using the domain-specific AI of IBM Watson Code Assistant to make automation more accessible to all corners of an organization



## Red Hat Advanced Cluster Security Cloud Service

[Limited availability] Pushing security further left in cloud-native operations without needing to be a Kubernetes expert



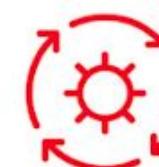
## Event-Driven Ansible

[General availability] Delivering “always on” automation, enabling Ansible Automation Platform to respond to changing operational conditions automatically and rapidly based on organization-defined rules



## Red Hat Service Interconnect

[General availability] Based on Skupper, connects distributed applications or microservices together across clouds, Kubernetes clusters, or virtual machines without requiring in-depth networking knowledge



## Expanding Red Hat Insights for RHEL management

[General availability] Simplifying the RHEL management experience across the hybrid cloud, building on existing Insights-driven predictive analytics to add patching, monitoring, and more for administrators of all

# Bryon Baker



Portable



Simple



Protected



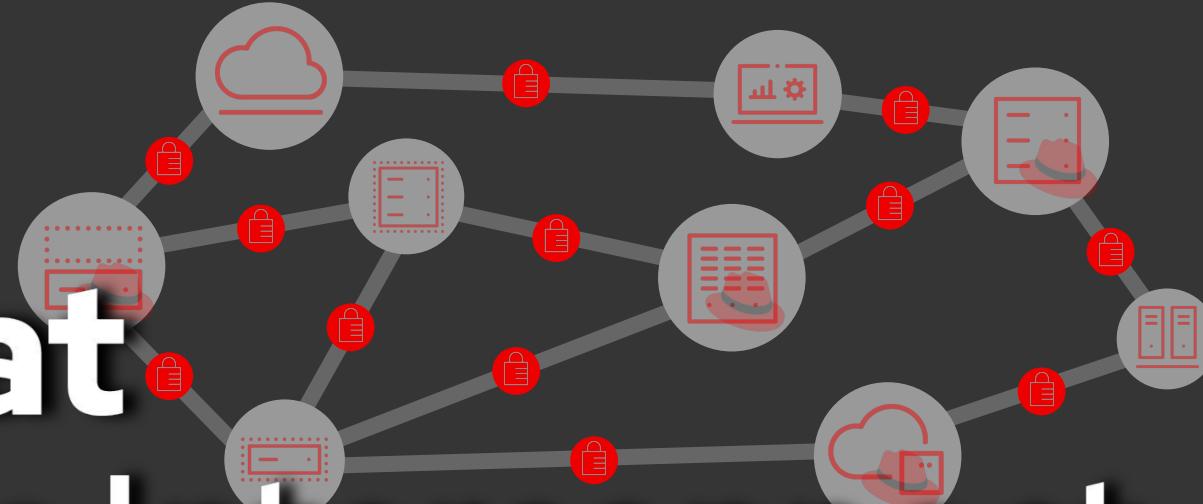
Hybrid



# Red Hat Service Interconnect

Customer Facing Deck [Technical]

<https://red.ht/serviceinterconnect>



# Organizations today rely on Distributed Applications

Each application resides in different environments



# Applications reside in a diverse mix of environments

Either On-Premises, in the Public Cloud, or at the Edge



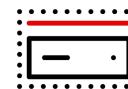
## Multiple versions of OpenShift

OpenShift 3.x, OpenShift 4.x,  
ARO, ROSA



## Other Kubernetes Offerings

Kubernetes from hyperscalers  
(Amazon EKS, Azure AKS,  
Google GKE) Vanilla  
Kubernetes



## Bare metal and VMs

Variety of bare metal and VM  
environments running existing  
existing services



## Legacy Systems

Old unixes, Mainframes



# Drivers for Hybrid Cloud

## Security & Compliance

Regional regulations, internal company wide policy enforcement. Industry specific rules. National supervisory requirements.

## IT Agility

Choose right cloud for your workload. Keep options open. Better when cross-cloud resilience applied.

## Flexibility

Avoid vendor lock-in, deploy close to development center. Backup and contingency plan. Exit strategy. Optimize limited budgets.

## GeoLocation

Closer to business. Closer to Help-center establishment. Map workload. Expand geographical coverage.

## Data Gravity

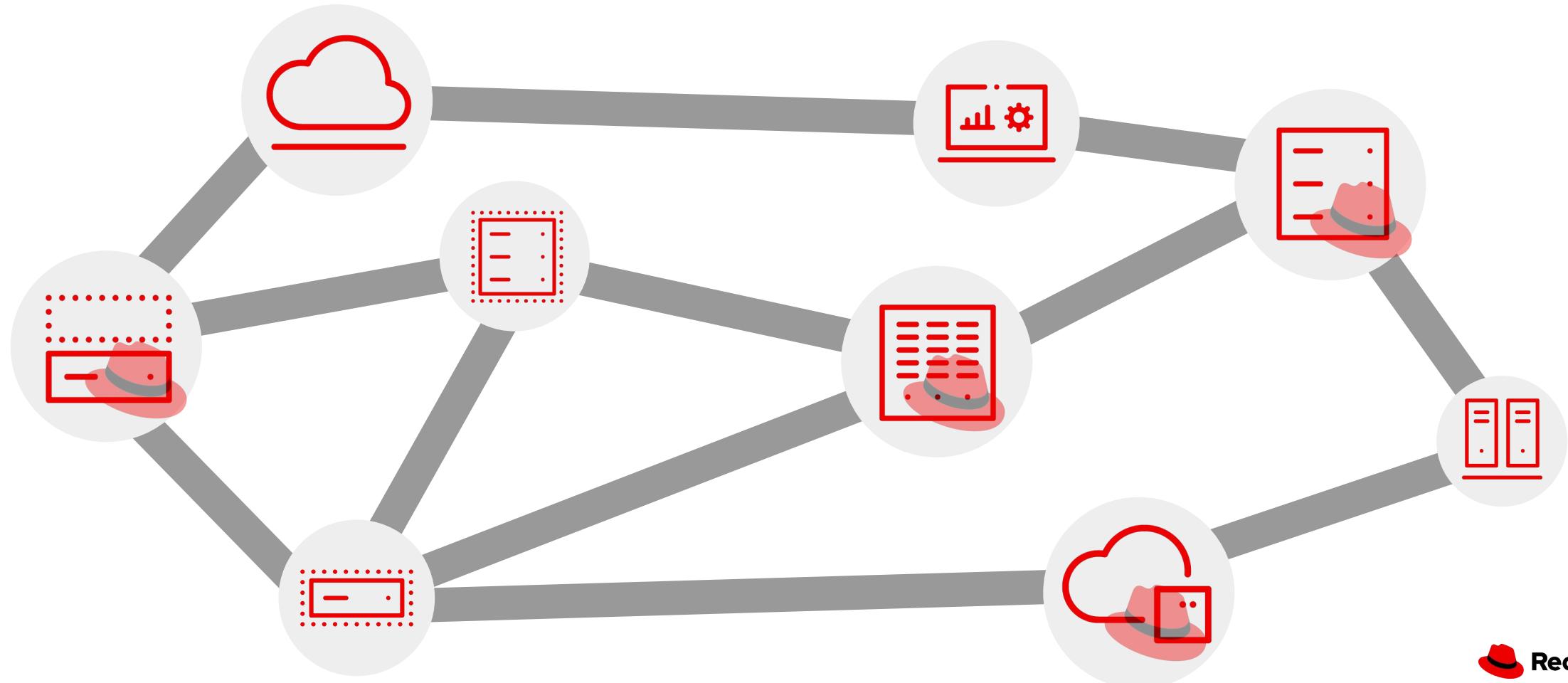
Data close to where it's heavily used. Less ingress/egress traffic. Data Lake access offering choices.

## Better Solution Offerings

Cloud vendors offer better service on certain areas.

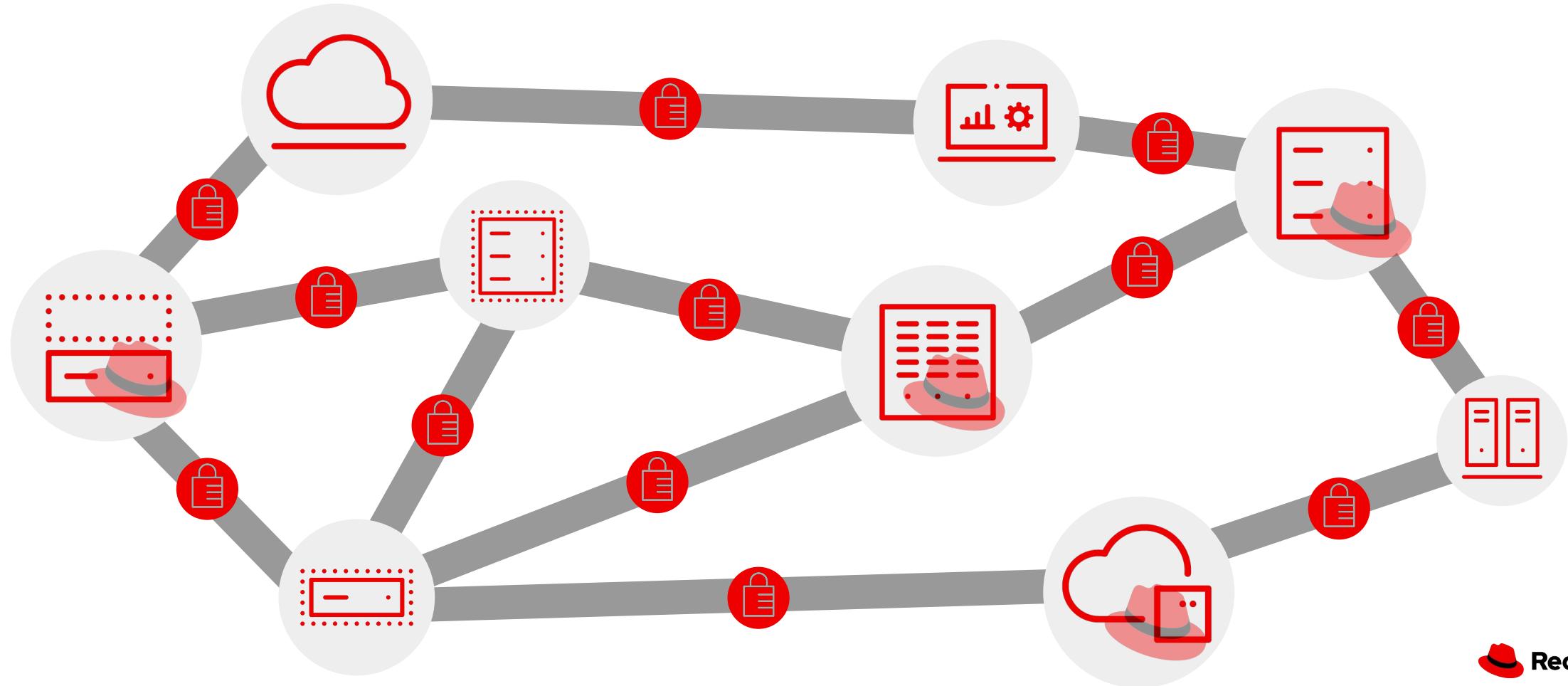
## Interconnectivity delivers value

Combining different capabilities helps organizations deliver products and services.



## Interconnections must be protected

Interconnections should not compromise the infrastructure or data

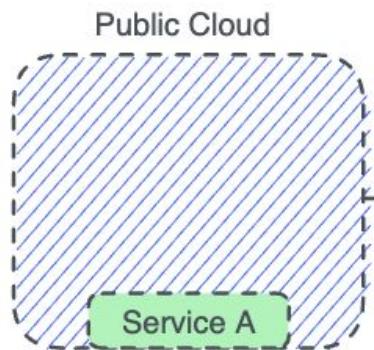


# Connectivity Options/Choices



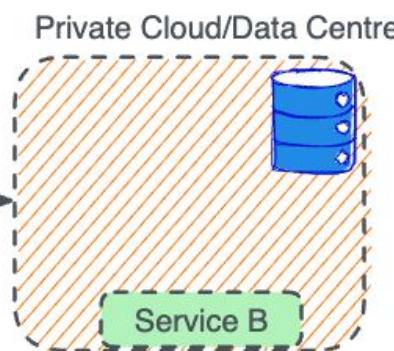
## Public IP Networks

- No network isolation
- No connectivity to sites behind NAT or Firewalls
- Each IP is a cost



## Set up your own VPN network

- Network isolation
- Complexity (iptables and firewall rules)
- Hub-n-spoke topology
- Requires administrator privileges



## Larger Provider Networks(AWS VPC)

- Network isolation
- Vendor lock in
- Requires cluster privileges
- Each connection is a cost



**Red Hat**  
Service Interconnect



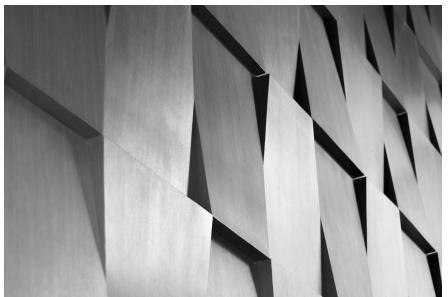
## Overlay Network (VAN)

- Fine-grained network isolation
- Low complexity
- Developer controlled
- Very low cost for additional resource



# Red Hat Service Interconnect

Simple and secure application connectivity across platforms, clusters, and clouds



## Application Focused Integration

Individual Apps running on virtually any platform can make native TCP calls locally to any other app running on any other platform securely without special VPNs.



## Mutual TLS Encryption

Interconnections use Mutual TLS in order to prevent unauthorized interconnections.



## Application Layer Abstraction

Agnostic of the environment and IP versions (such as IPv4 and IPv6) Enables portability for both applications and its associated networking. Migrations can be easily done without recreating the networking.



## Layer 7 Addressing

Instead of routing IP packets between network endpoints, Layer 7 application routers route messages between application addresses

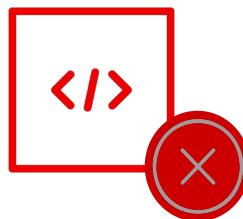
# Simplicity



What makes Red Hat Service Interconnect unique is the ability to simplify application connectivity across Red Hat or non-Red Hat environments and platforms.

# Eliminates Time Taking Complex Configurations

An application-layer solution can significantly reduce complexity and coordination delay



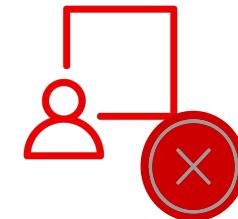
## No code changes

You don't have to change your application code. Services communicate transparently as though they were deployed together in one location.



## No network changes

You don't need new firewall rules, and you don't need your infra team to install a gateway. If you can connect (either way), you can create a service network.



## No admin privileges

It requires no elevated privileges to set up. Operates with the same privileges as your application.



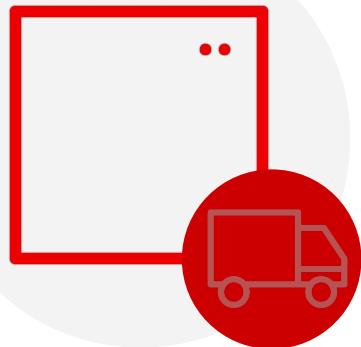
# Portability



Applications using Service Interconnect are highly portable from a networking perspective, offering great freedom of operational efficiency and migration.

## Some elements in software are still not portable

Portability allows to decouple elements in software



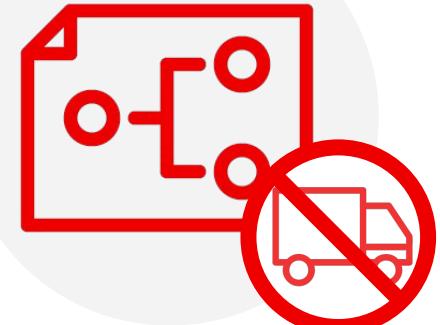
### Containers turned computing **PORTABLE**

Containers enable to move applications from different environments effortlessly



### Object Storage turned storage **PORTABLE**

Object Storage enable to move data stored from one location to another easily

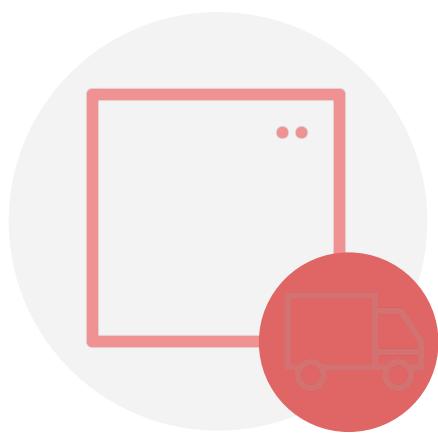


### **Networking is still NOT PORTABLE**

Networking is still the only element in software that is still immutable. It requires a new configuration for a new environment

# Service Interconnect changes that

Interconnections follows your application to different environments and platforms



**Containers turned  
computing  
**PORTABLE****

Containers enable to move applications from different environments effortlessly



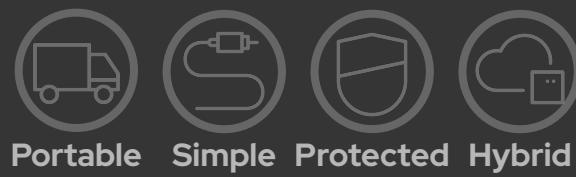
**Object Storage turned  
storage  
**PORTABLE****

Object Storage enable to move data stored from one location to another easily



**Networking is now  
**PORTABLE****

Because it operates on Layer 7, it abstracts the underlying networking and helps to re-establish interconnections in different environments



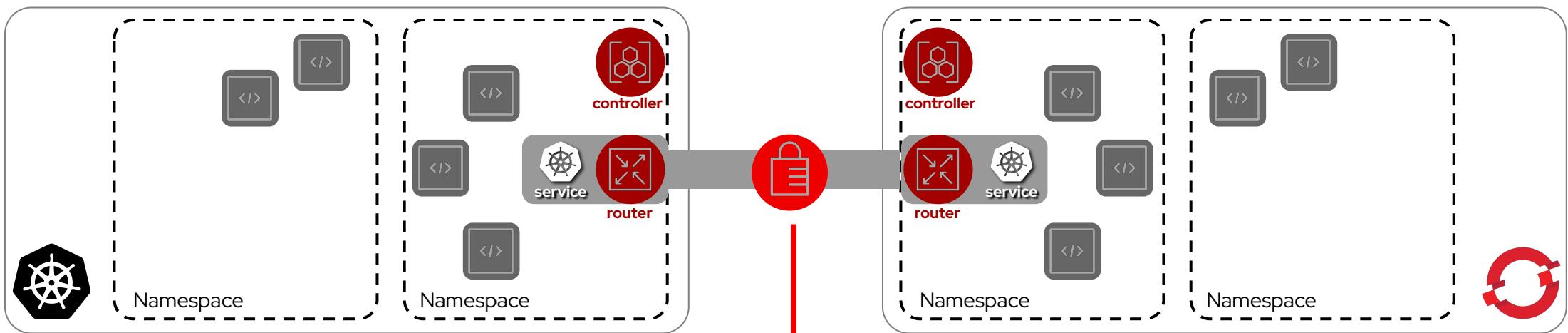
# Protected



Interconnections created by Service Interconnect use Mutual TLS in order to prevent unauthorized interconnections.

# Interconnections are always protected

## Using Mutual TLS Encryption



- ▶ Exposes specific application components, not subnets

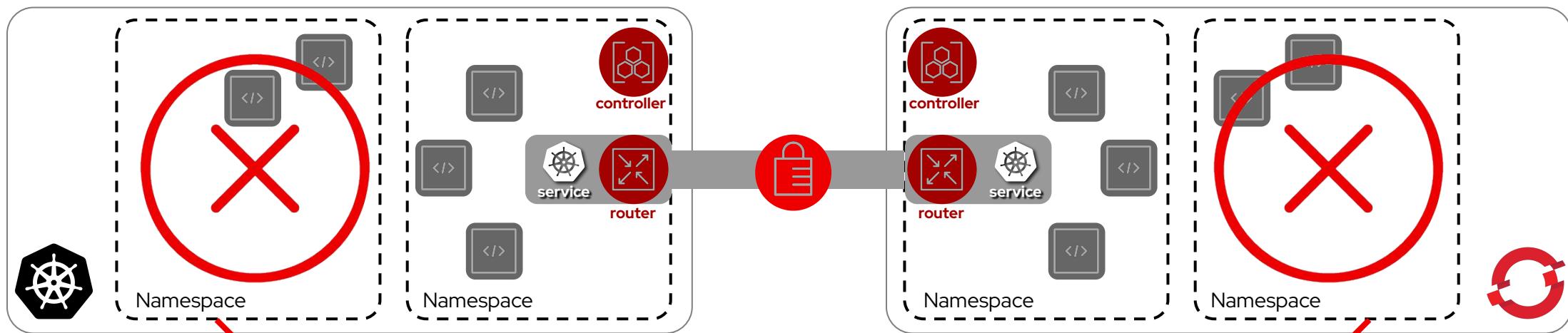


**Mutual TLS  
Encryption**

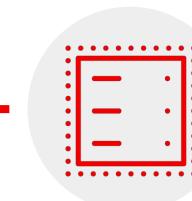
- ▶ Avoids security pitfalls arising from Layer 3 Networking complexity

# Only namespaces running the Router can interconnect

Developers have to explicitly mention which services to expose



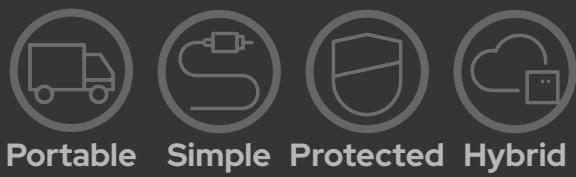
 None of the Services are available on the service network by default



**Network  
Isolated**

# Security

- The service owner (or data owner) directly controls who can connect
- Inter-site links are secured with mutual TLS
- Application-layer networks are *compartimentalized*: each network is form-fitted to the components of one distributed application and uses its own dedicated router network
- Exposes specific app components, not subnets
- Avoids the security pitfalls arising from L3 networking complexity
- When an app network is no longer needed, it's easy to remove it - you don't have to coordinate with another team



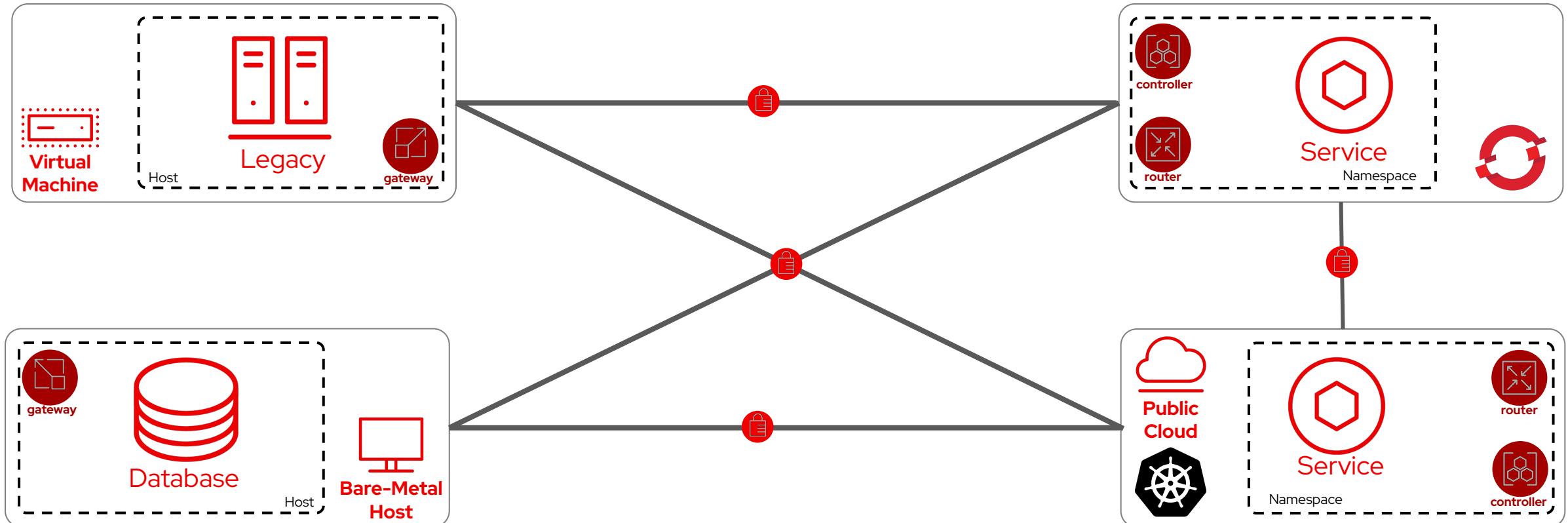
# Hybrid



Service Interconnect makes hybrid cloud strategies easier to implement by allowing customers' development teams to easily, rapidly and safely interconnect any Kubernetes cluster, any public cloud, any virtual machine or any bare-metal host.

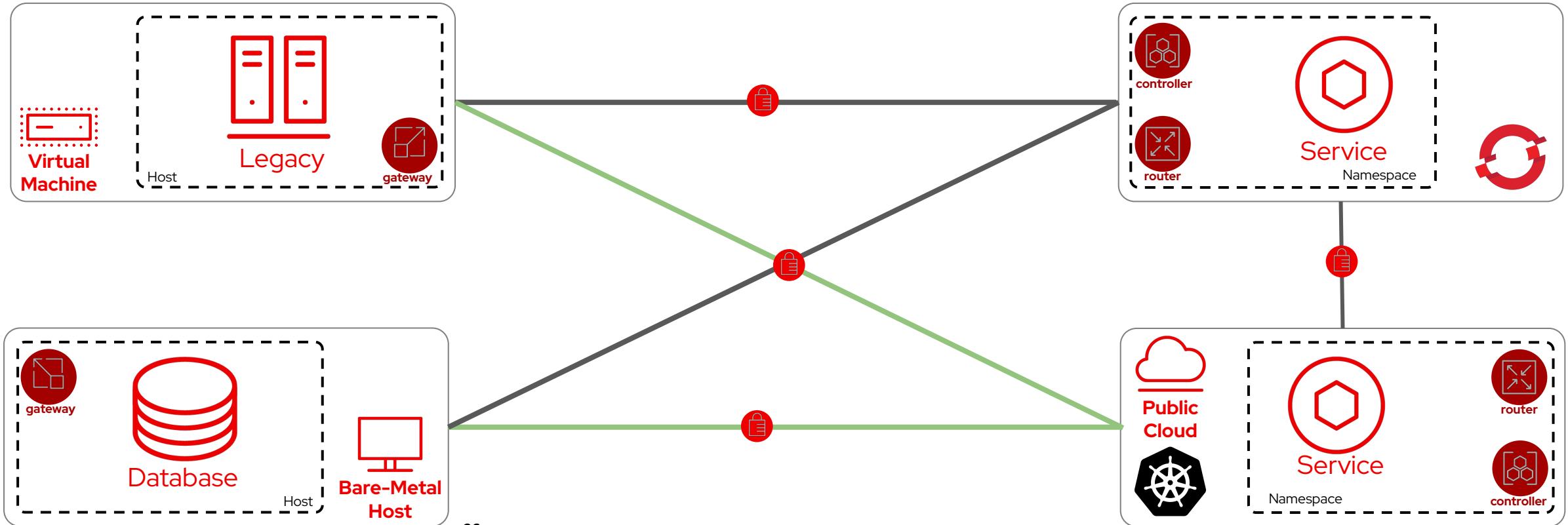
# Hybrid interconnections

Linking different applications and services across different environments



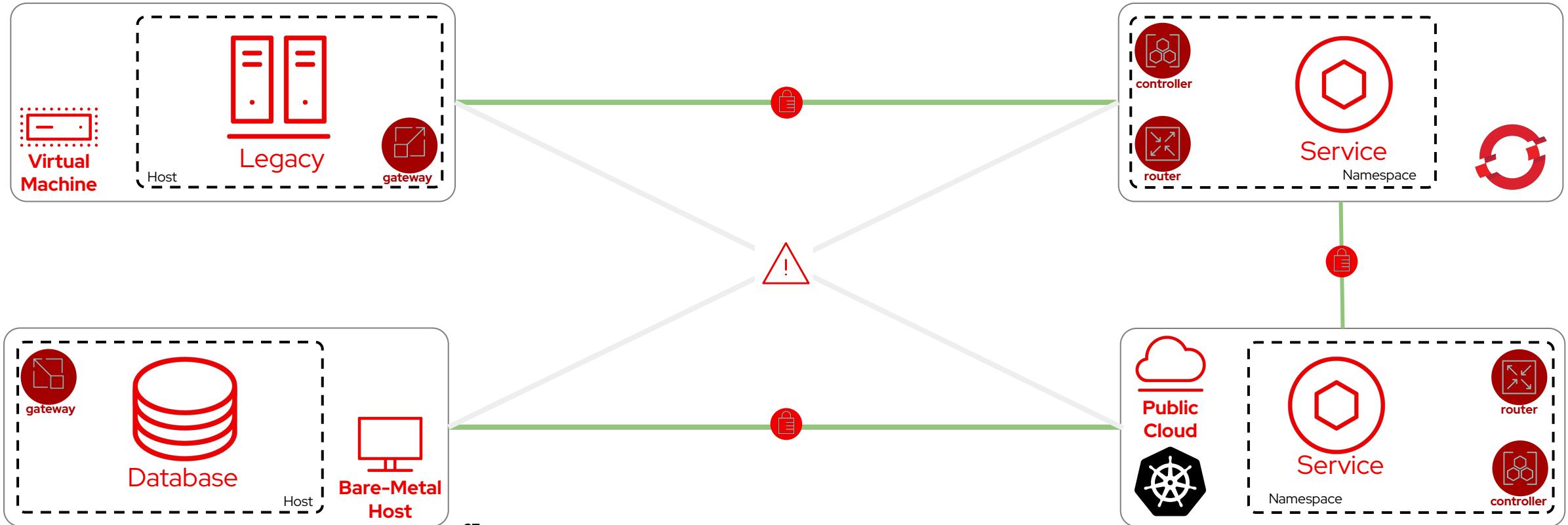
## Indirect connections amongst services

Services that are a part of the network and not directly connected can access each other if needed



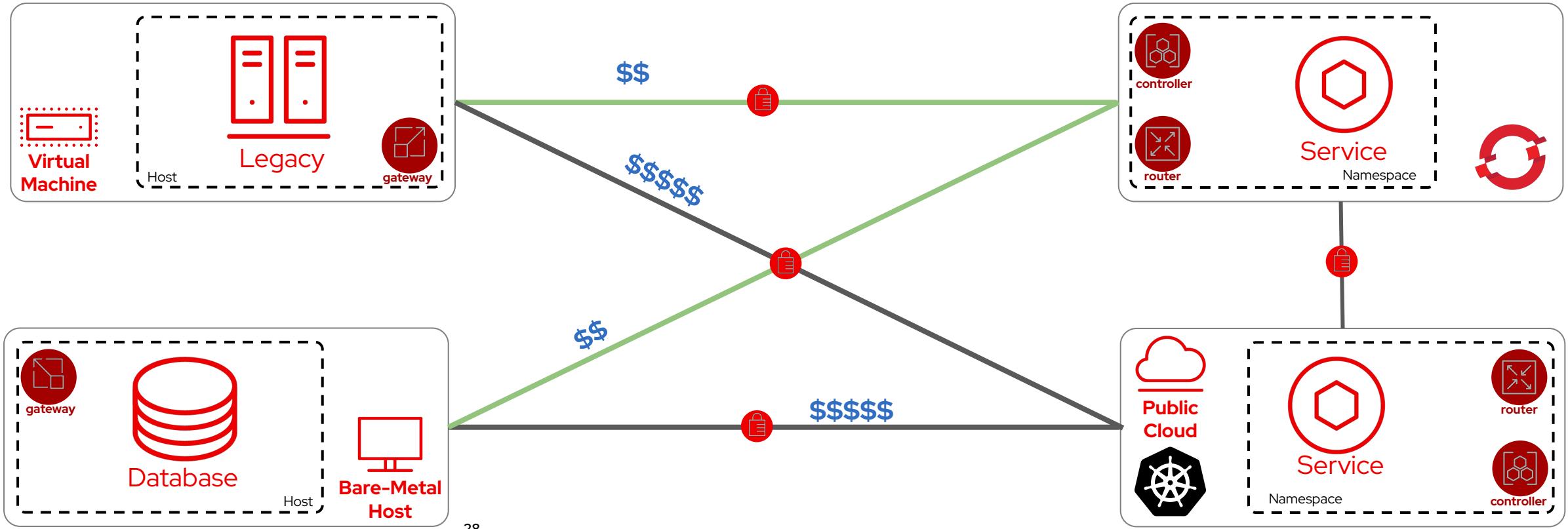
# High Availability

In case of a Router outage, alternate path is found



# Cost- and locality-aware traffic forwarding

Interconnections find the optimal path to reach a destination

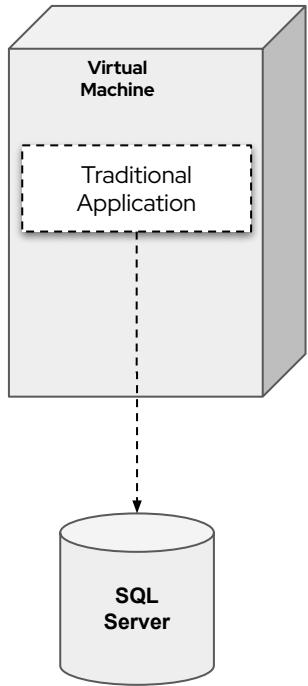


# Use Cases

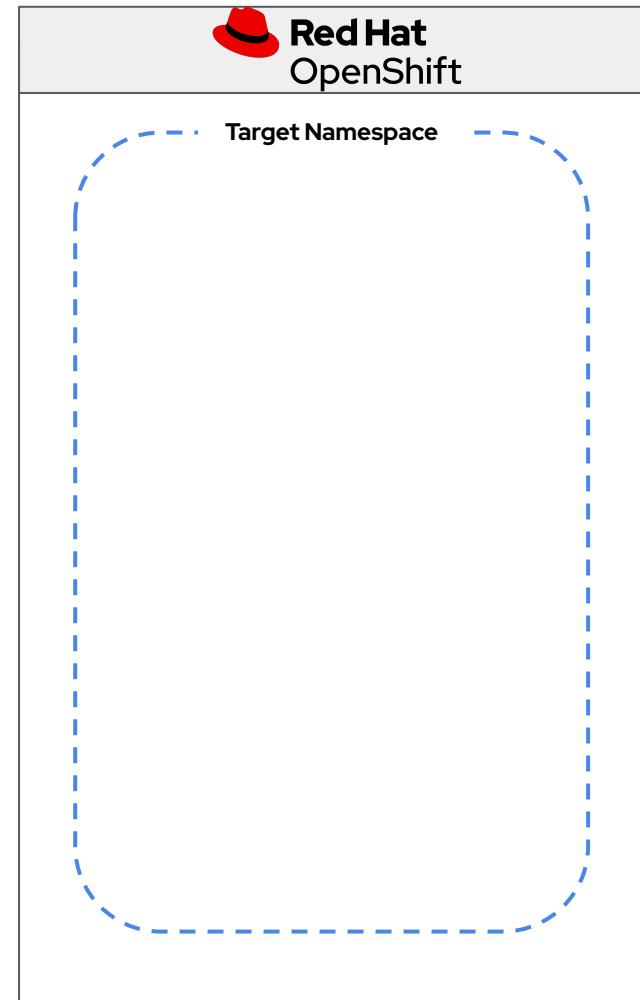


Service Interconnect makes hybrid cloud strategies easier to implement by allowing customers' development teams to easily, rapidly and safely interconnect services across any Kubernetes cluster, any public cloud, any virtual machine or any bare-metal host.

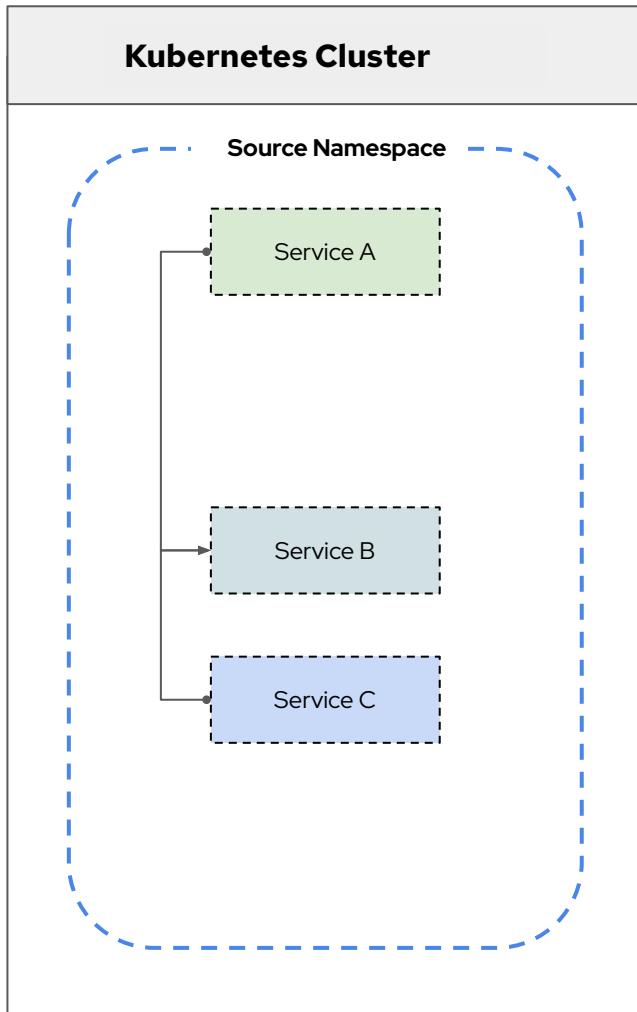
## Use Case : Migration to OpenShift



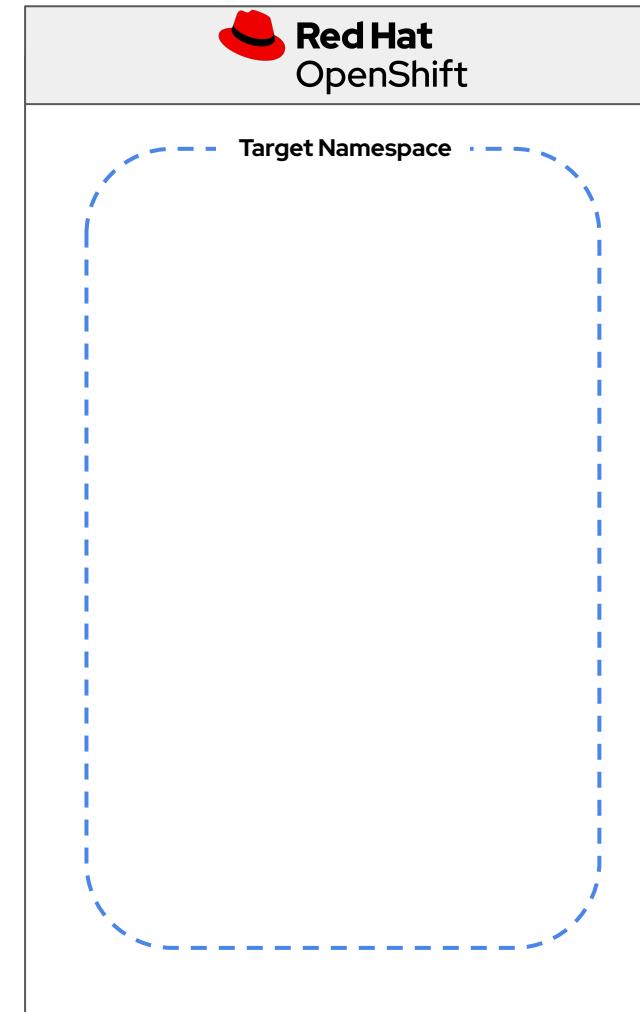
How do you “strangle the monolith” in the most efficient way possible?



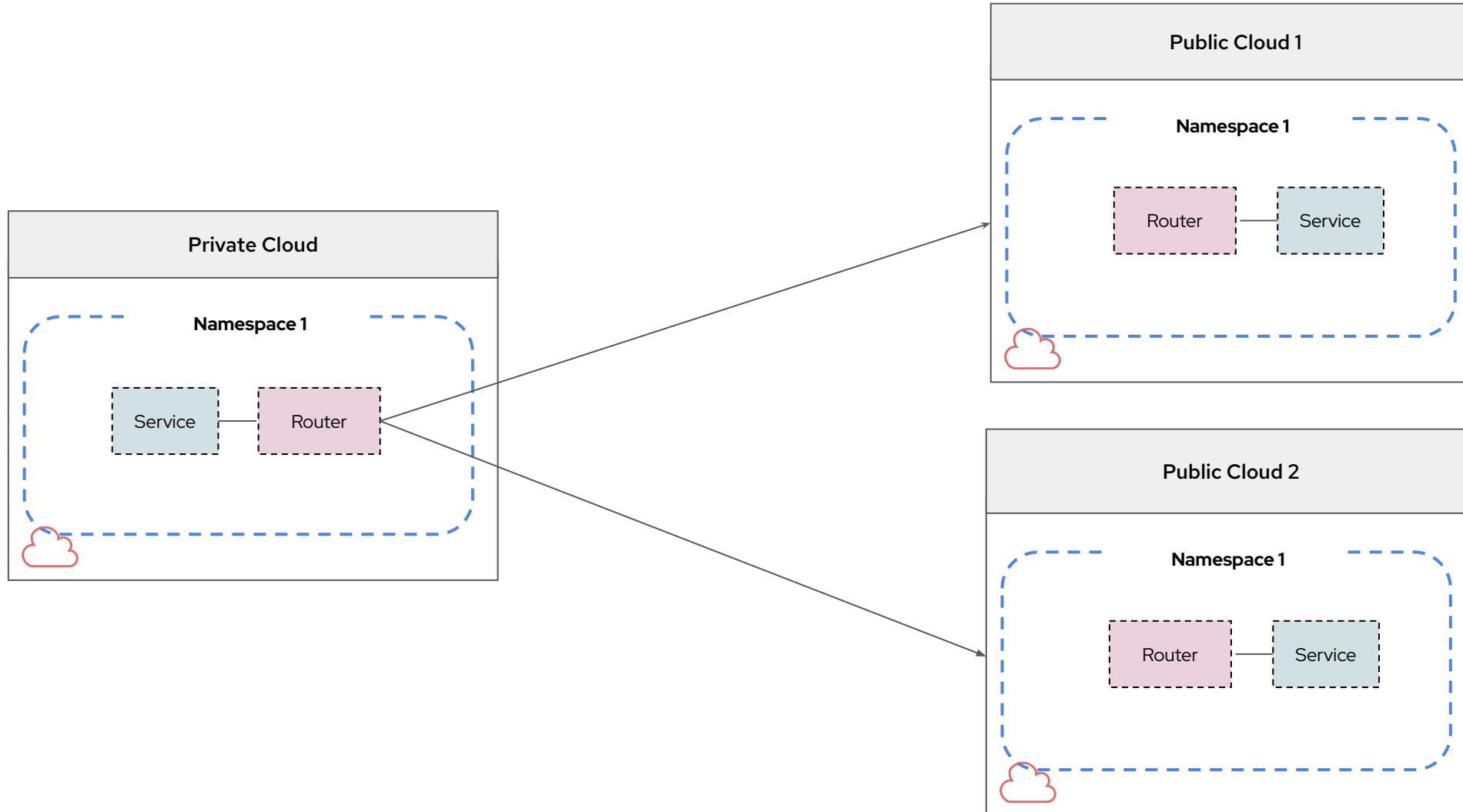
## Use Case : xKs to OpenShift



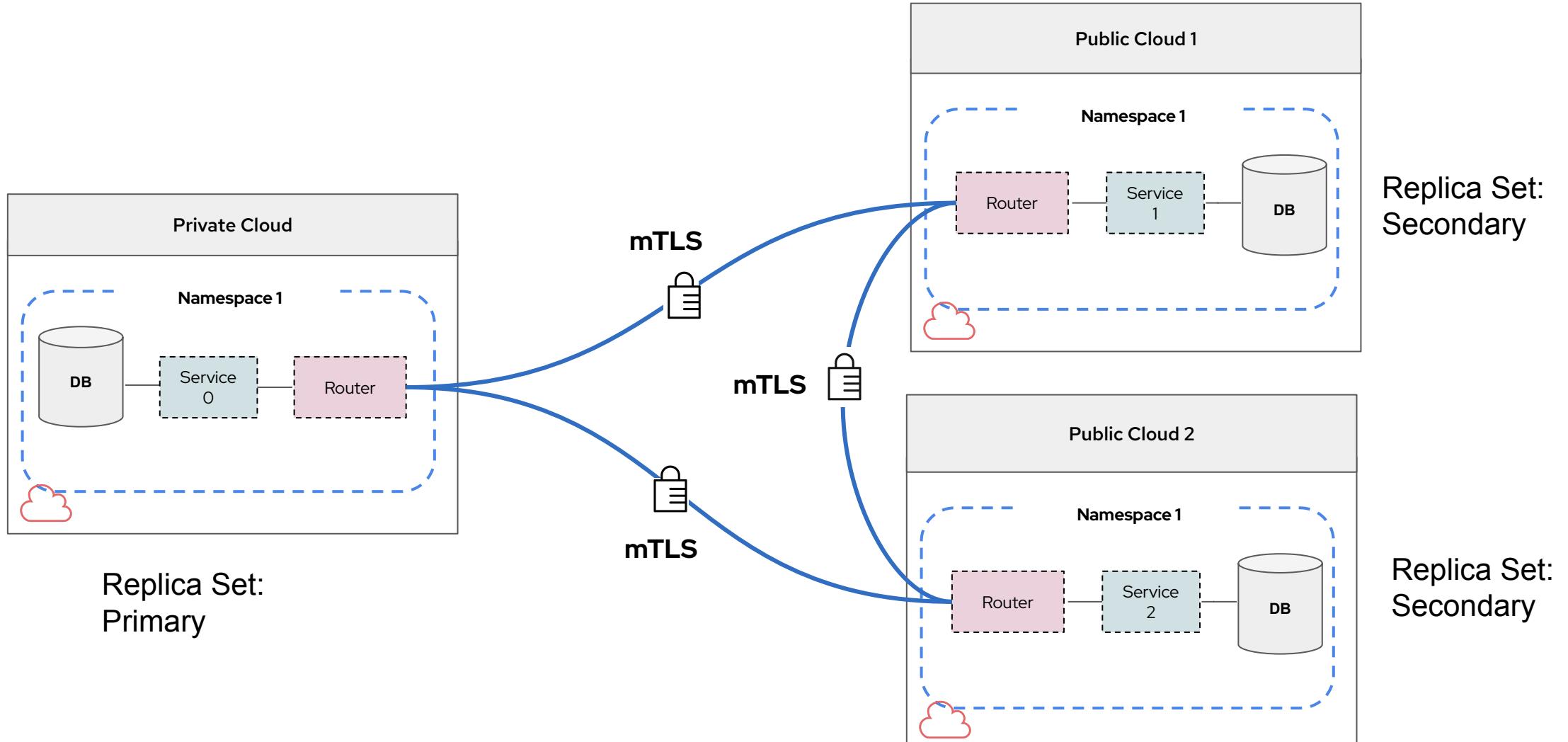
How do you move the workloads from cluster A to cluster B in the most efficient way possible?



# Use Case: High Availability of Services Across Multiple Clusters



# Use Case: Distributed Data Replication



Powered by open source

# Apache Qpid™

**Apache Qpid** develops tools for AMQP 1.0 messaging under the Apache Foundation

**Apache Qpid Dispatch** is an AMQP 1.0 message router for wide-area messaging

**Started:** 2014

**Releases:** 27

**Committers:** 51

[qpid.apache.org](http://qpid.apache.org)

[github.com/apache/qpid-dispatch](https://github.com/apache/qpid-dispatch)



**Skupper** is a cloud service interconnect. It enables secure communication across clusters.

Skupper uses Apache Qpid Dispatch for its communication backbone

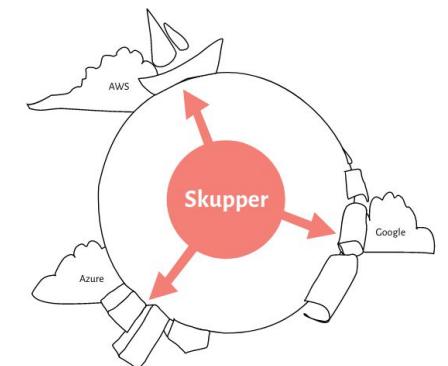
**Started:** June 2019

**Releases:** 13

**Committers:** 17

[skupper.io](http://skupper.io)

[github.com/skupperproject](https://github.com/skupperproject)



# Skupper and Interconnect Router

Skupper Router is the *data plane* (mature):

- ▶ Based on Apache Qpid Dispatch Router
- ▶ 20 GA releases since 2017
- ▶ Lightweight
  - Written in C, runs purely in memory
  - Scales down to small devices
- ▶ Routers form a fault-tolerant backbone
  - Multipath routing
  - Application-layer addressing
- ▶ Adapted for Skupper use cases

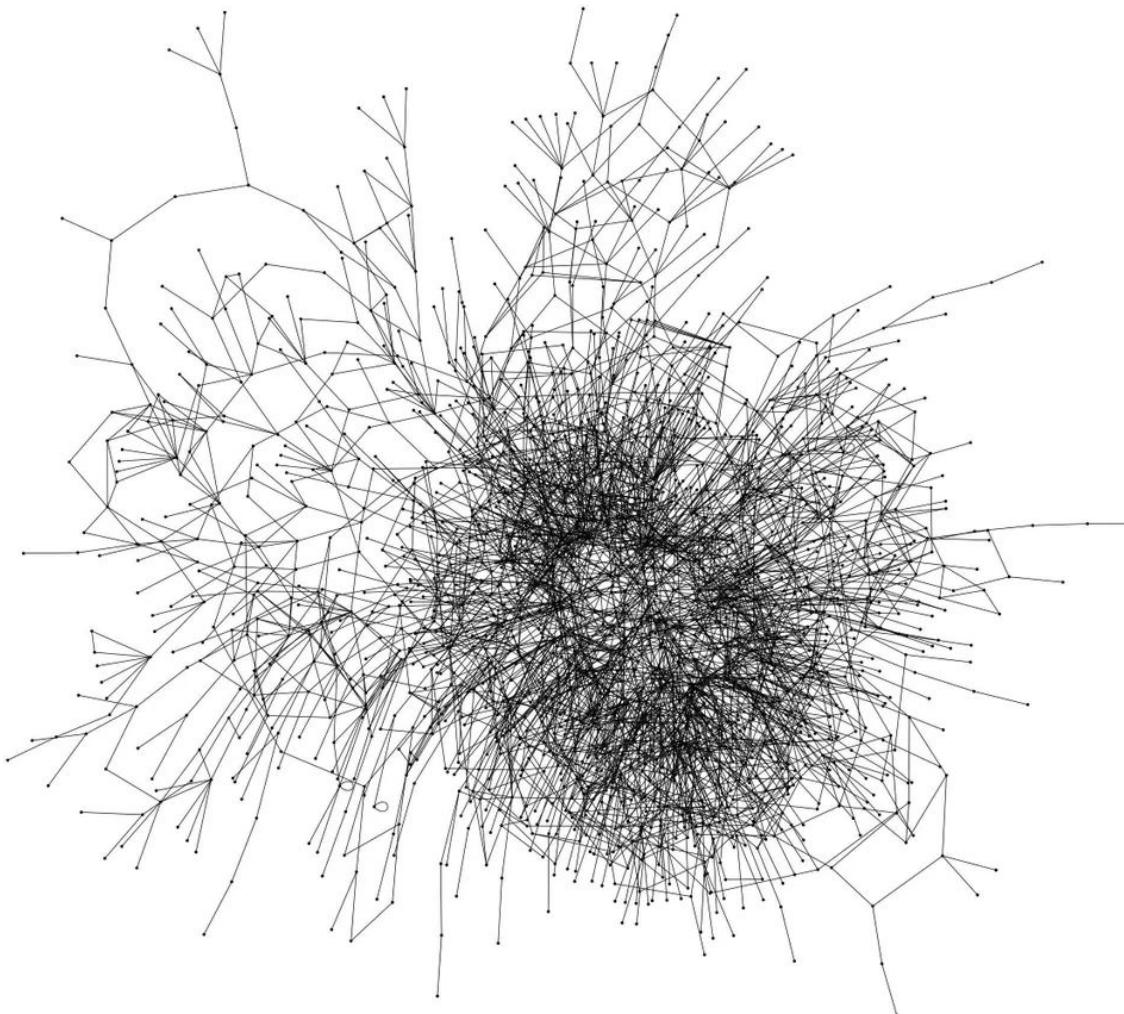
Skupper is the *control plane* (new):

- ▶ Automation for Interconnect Router
- ▶ Integration for all environments:
  - OpenShift, any Kubernetes flavor
  - Docker and Podman
  - VMs and bare metal
- ▶ Gives the *app owner* control and agility
  - You don't need cluster admin
  - You don't need new firewall rules
  - You don't need to change your app

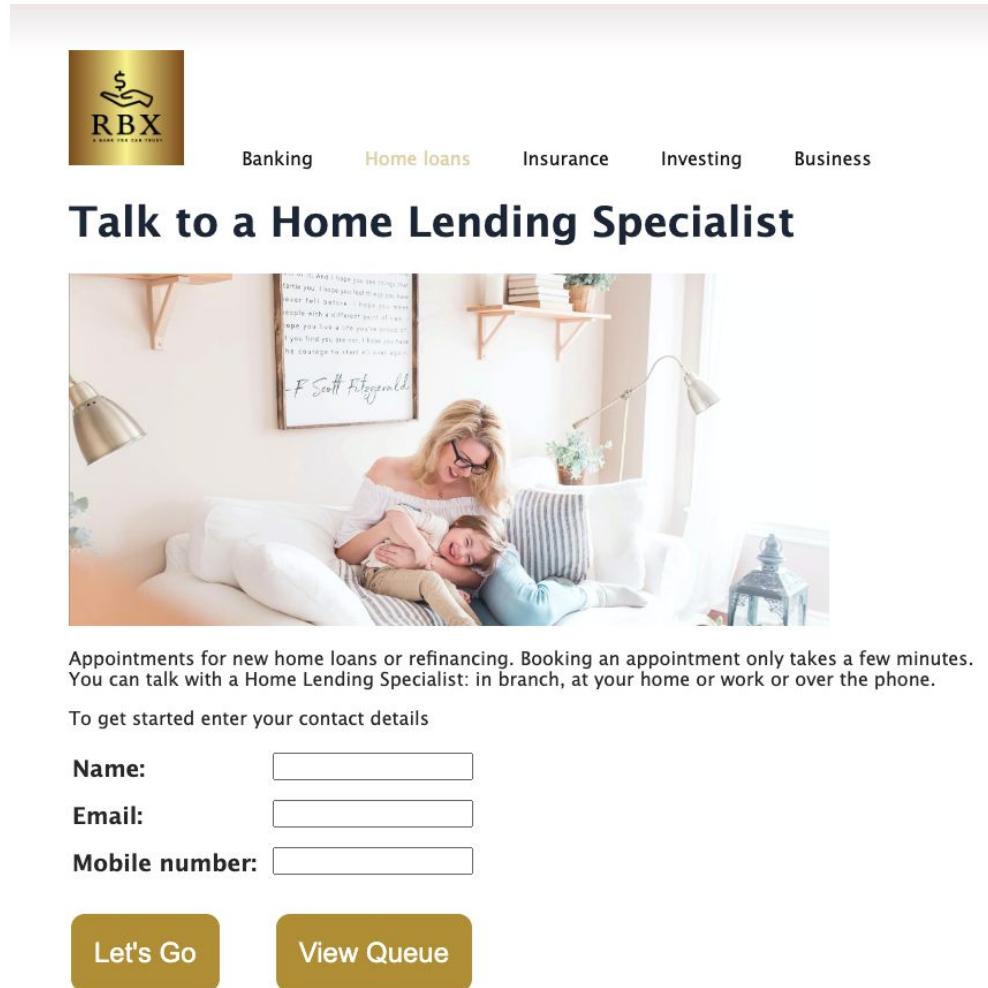
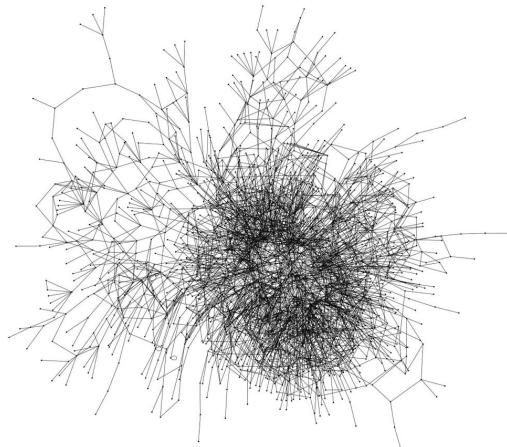
# Demonstration



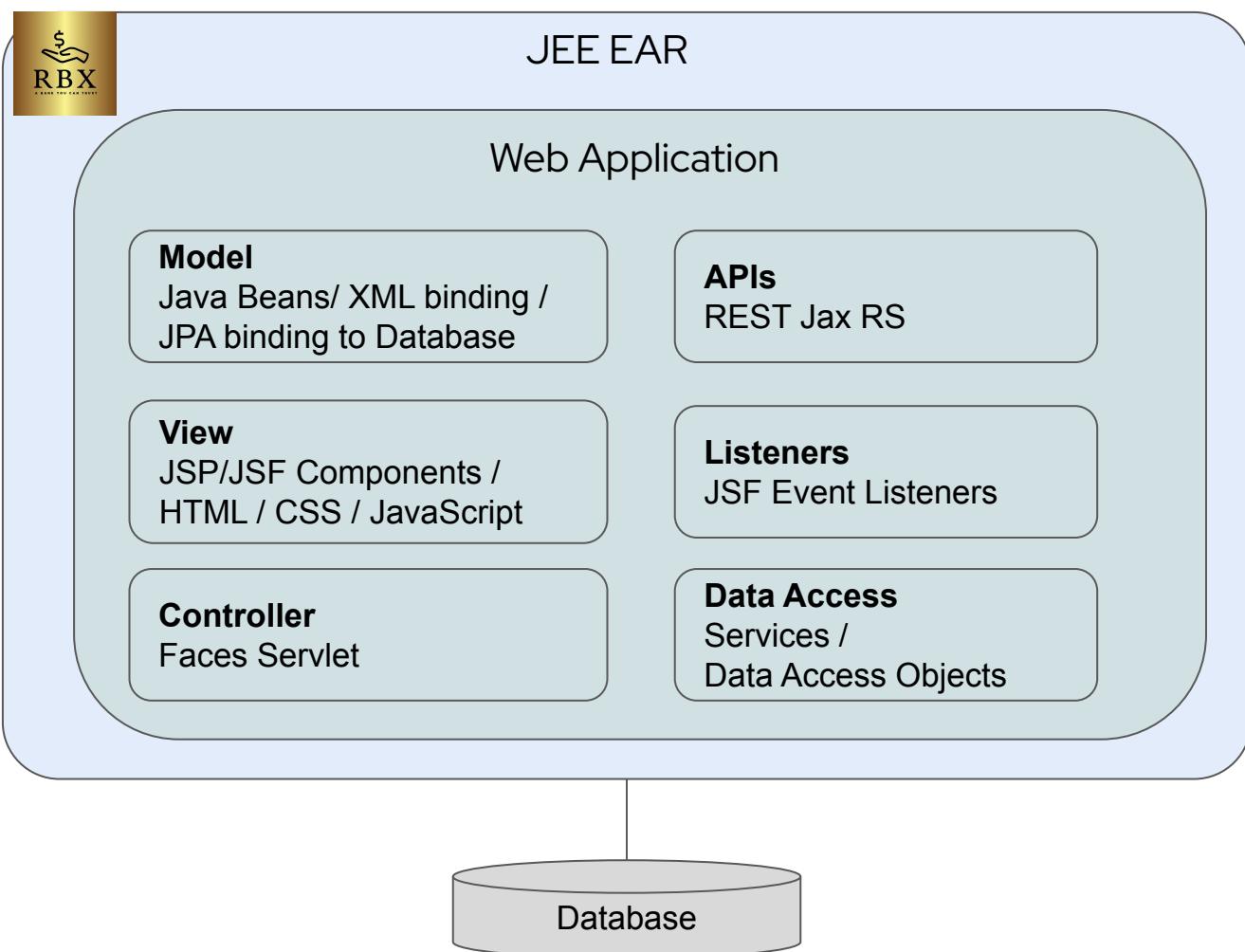
## Monoliths



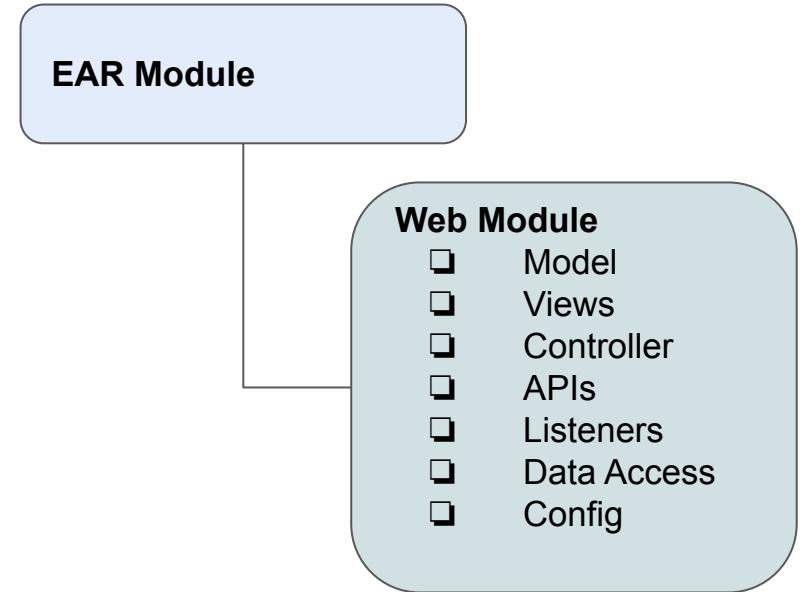
## Demo: Our Monolith Today

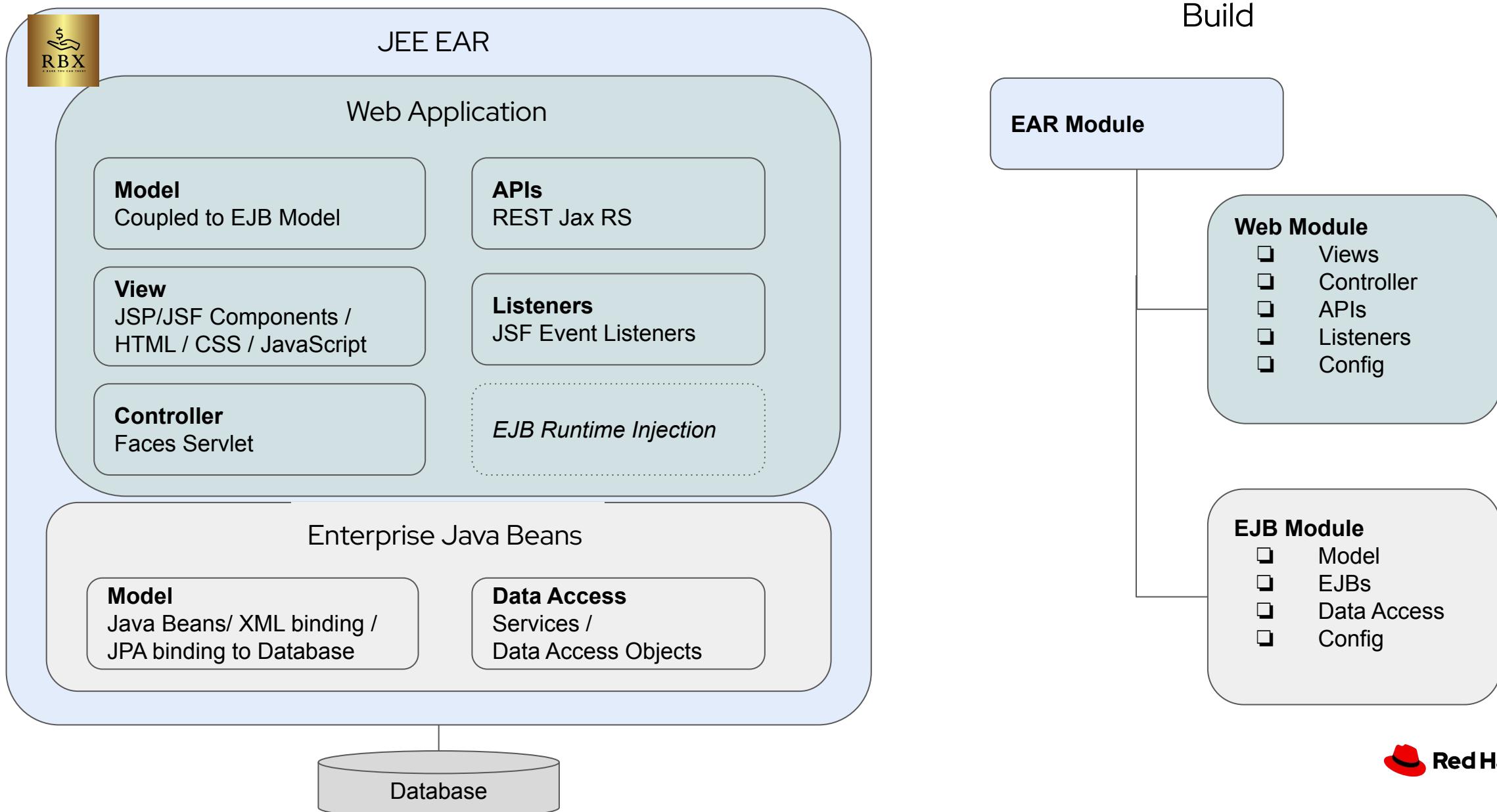


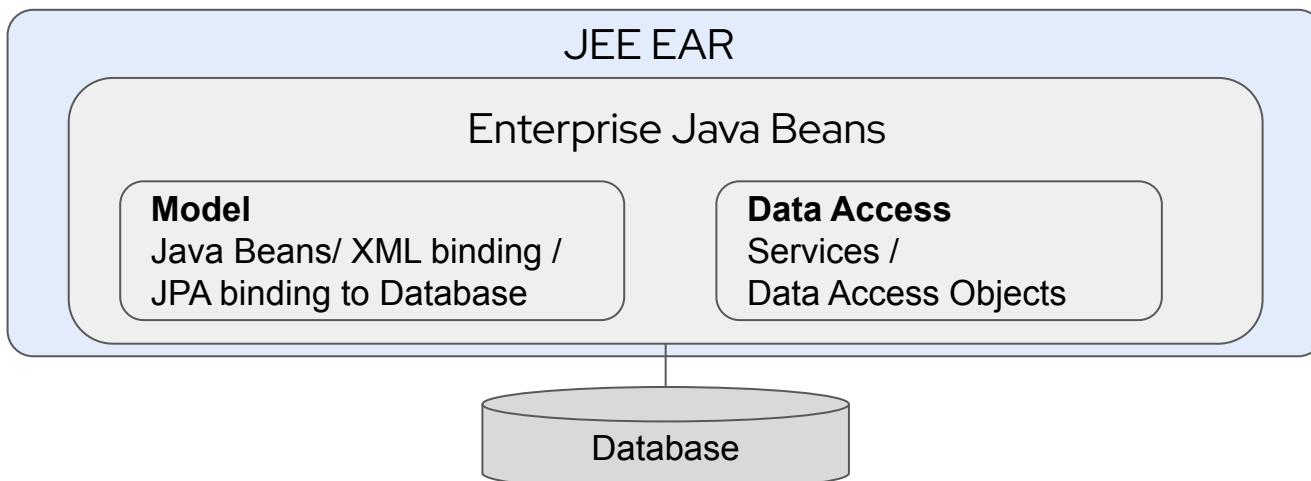
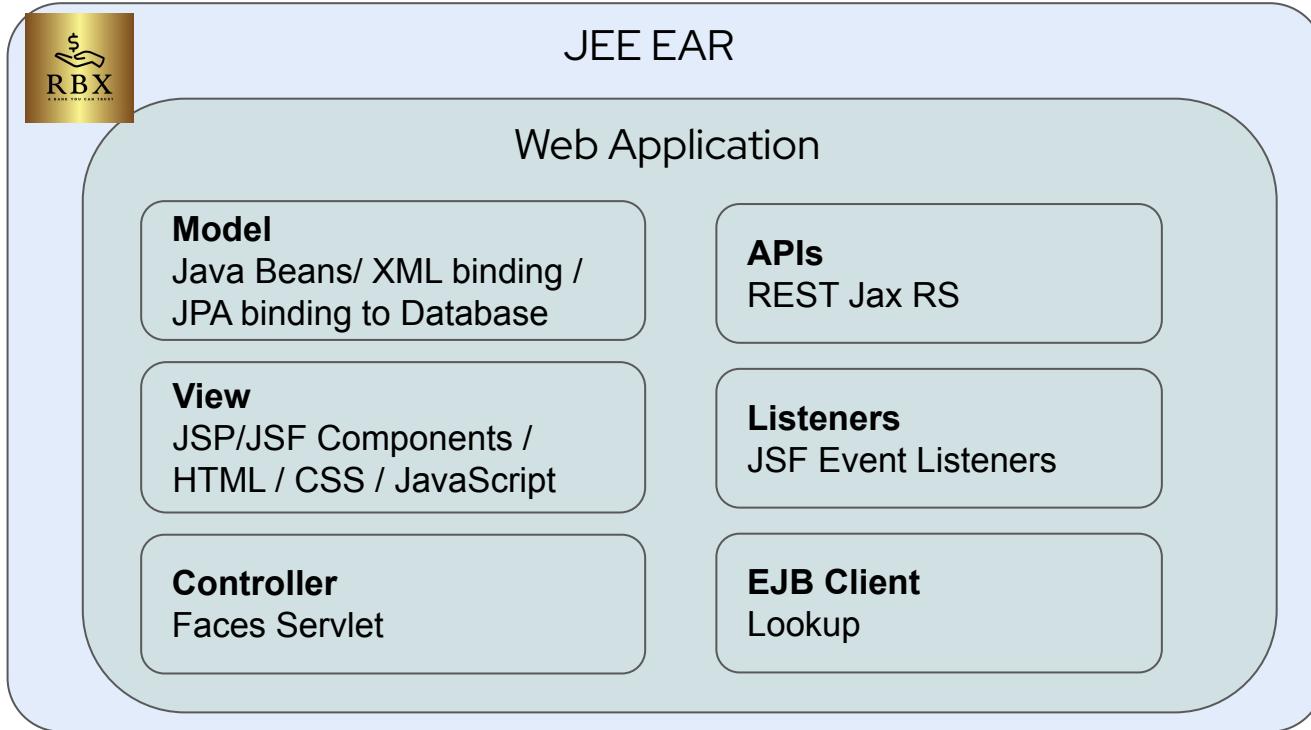
The screenshot shows a web page for RBX, a bank. At the top is a navigation bar with a logo featuring a hand holding a dollar sign, followed by links for Banking, Home loans, Insurance, Investing, and Business. Below the navigation is a large heading "Talk to a Home Lending Specialist". Underneath is a photograph of a woman and a child sitting on a couch. Text on the page reads: "Appointments for new home loans or refinancing. Booking an appointment only takes a few minutes. You can talk with a Home Lending Specialist: in branch, at your home or work or over the phone." Below the photo is a form for entering contact details: Name (input field), Email (input field), and Mobile number (input field). At the bottom are two buttons: "Let's Go" and "View Queue".



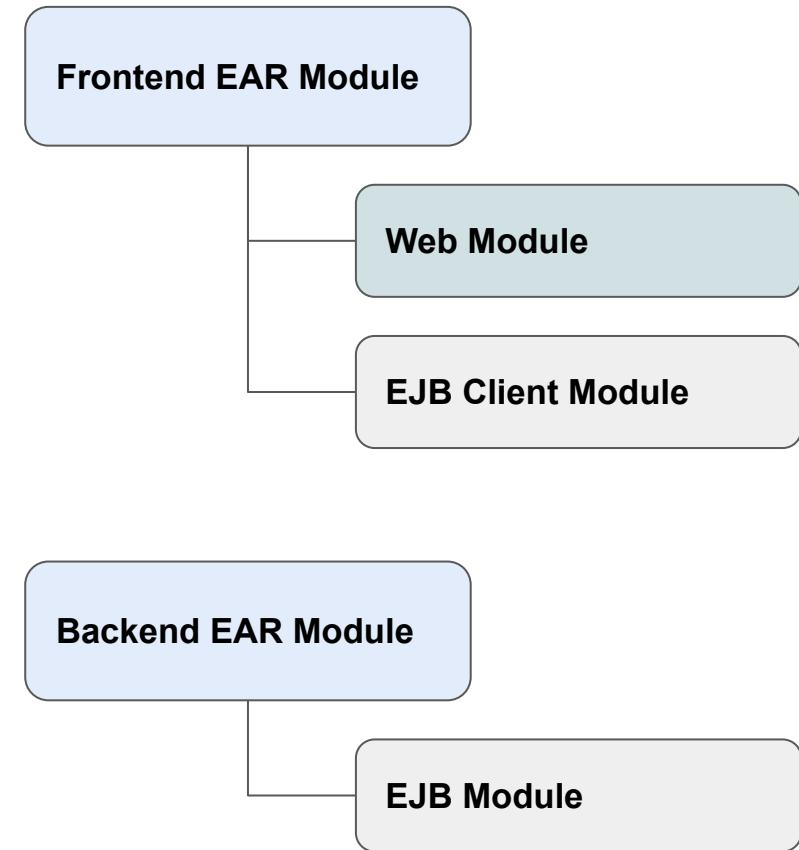
Build







Builds





Get to cloud faster



Refactor the monolith



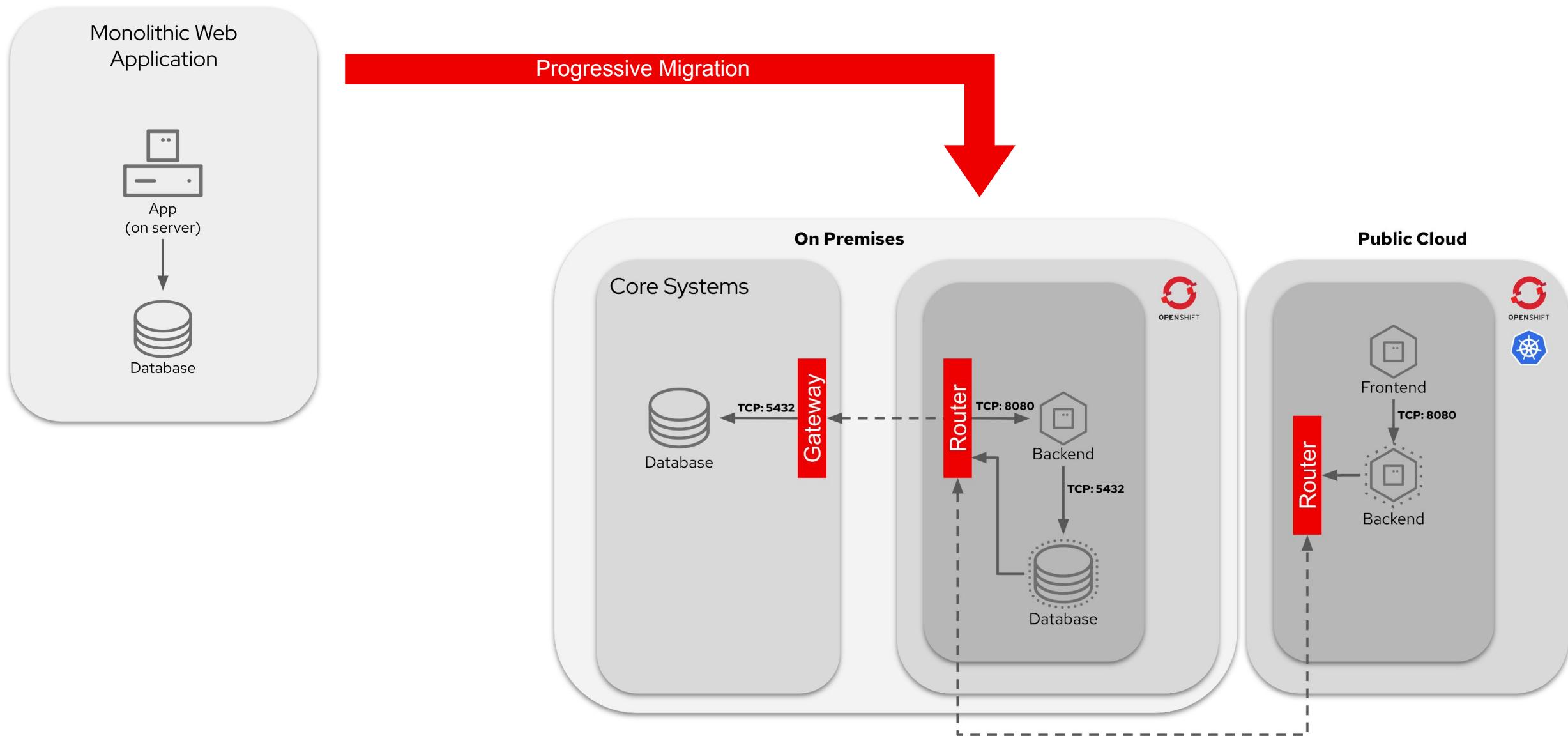
Progressive migration in action

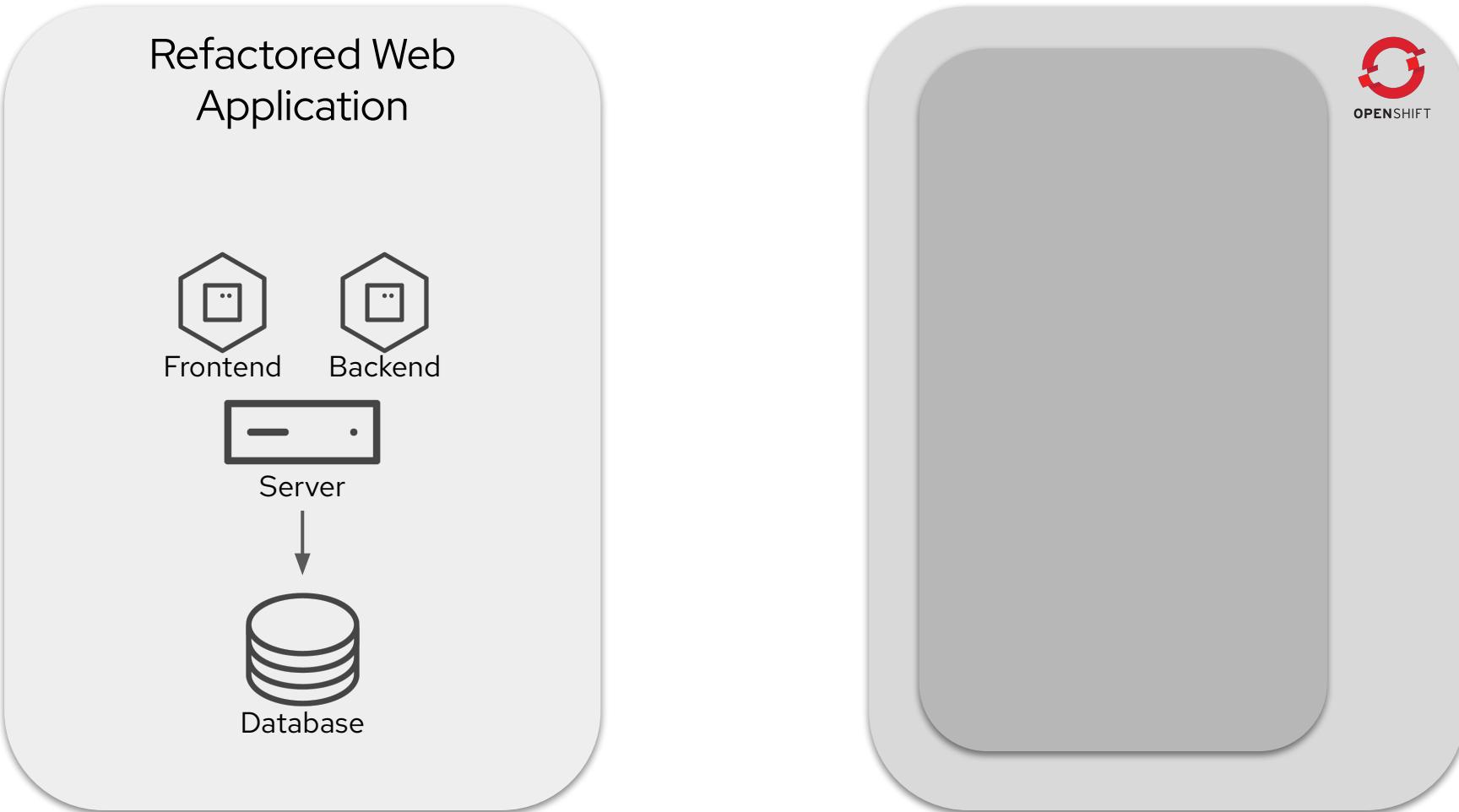
## Start with the End

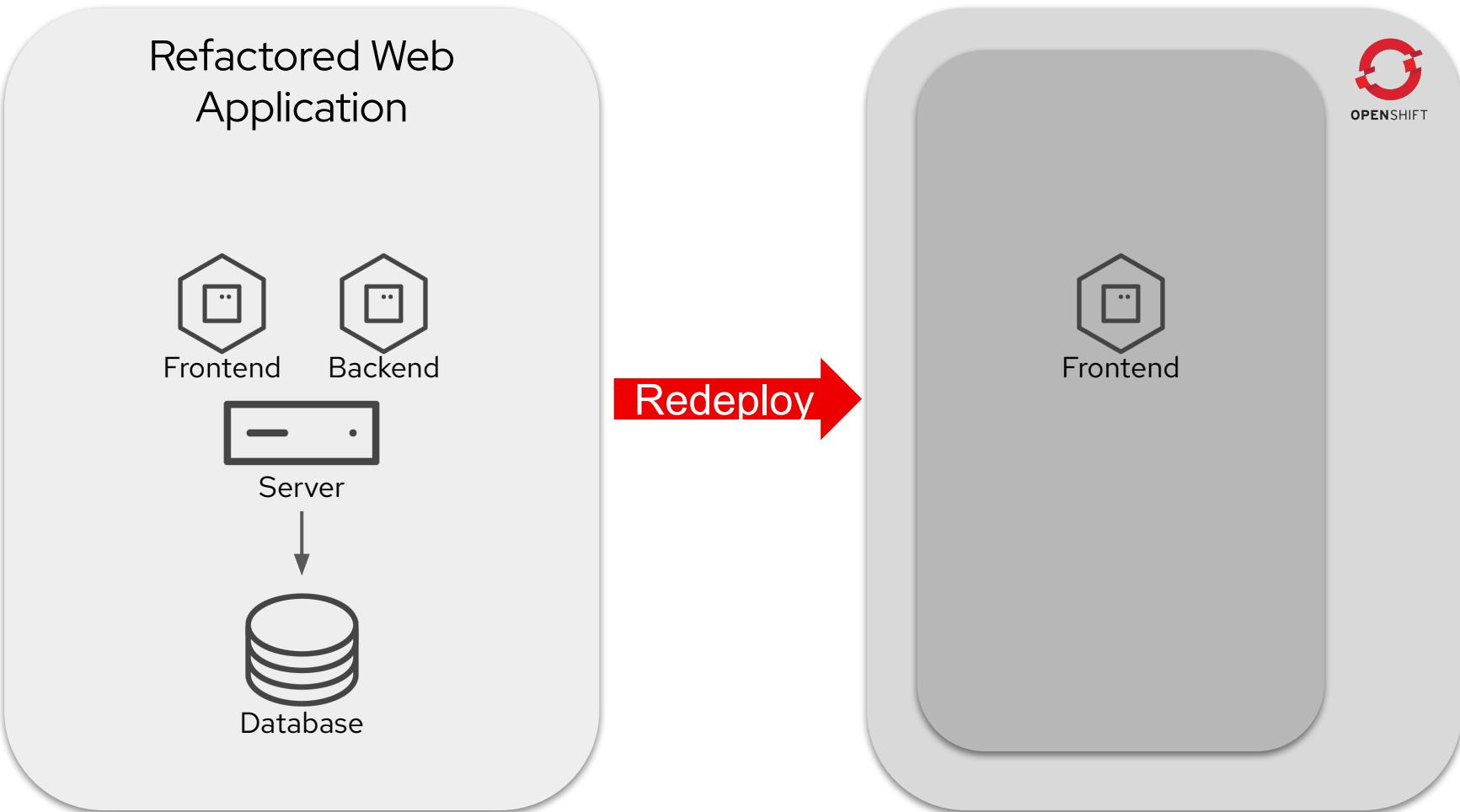
Monolithic Web Application

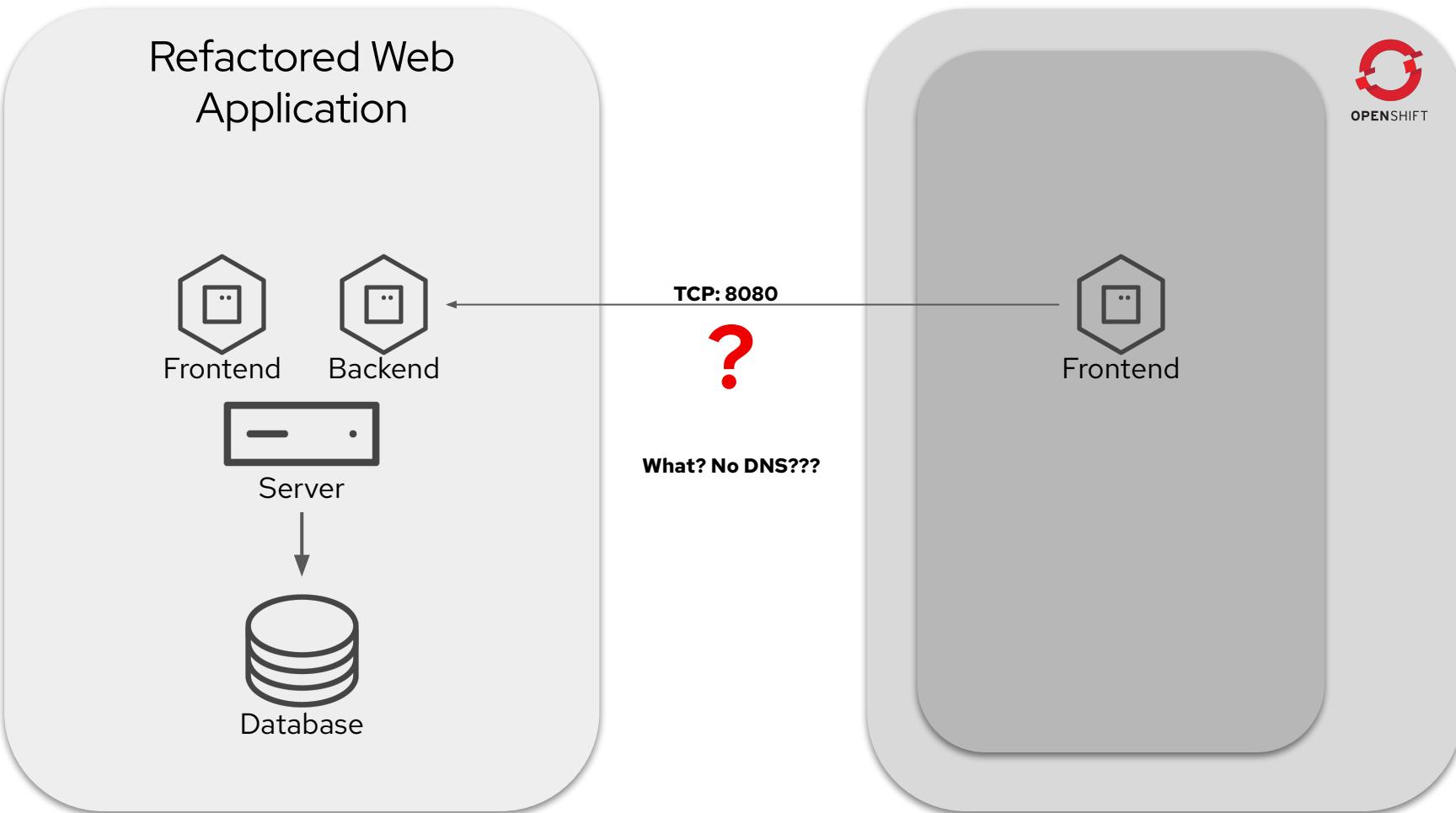


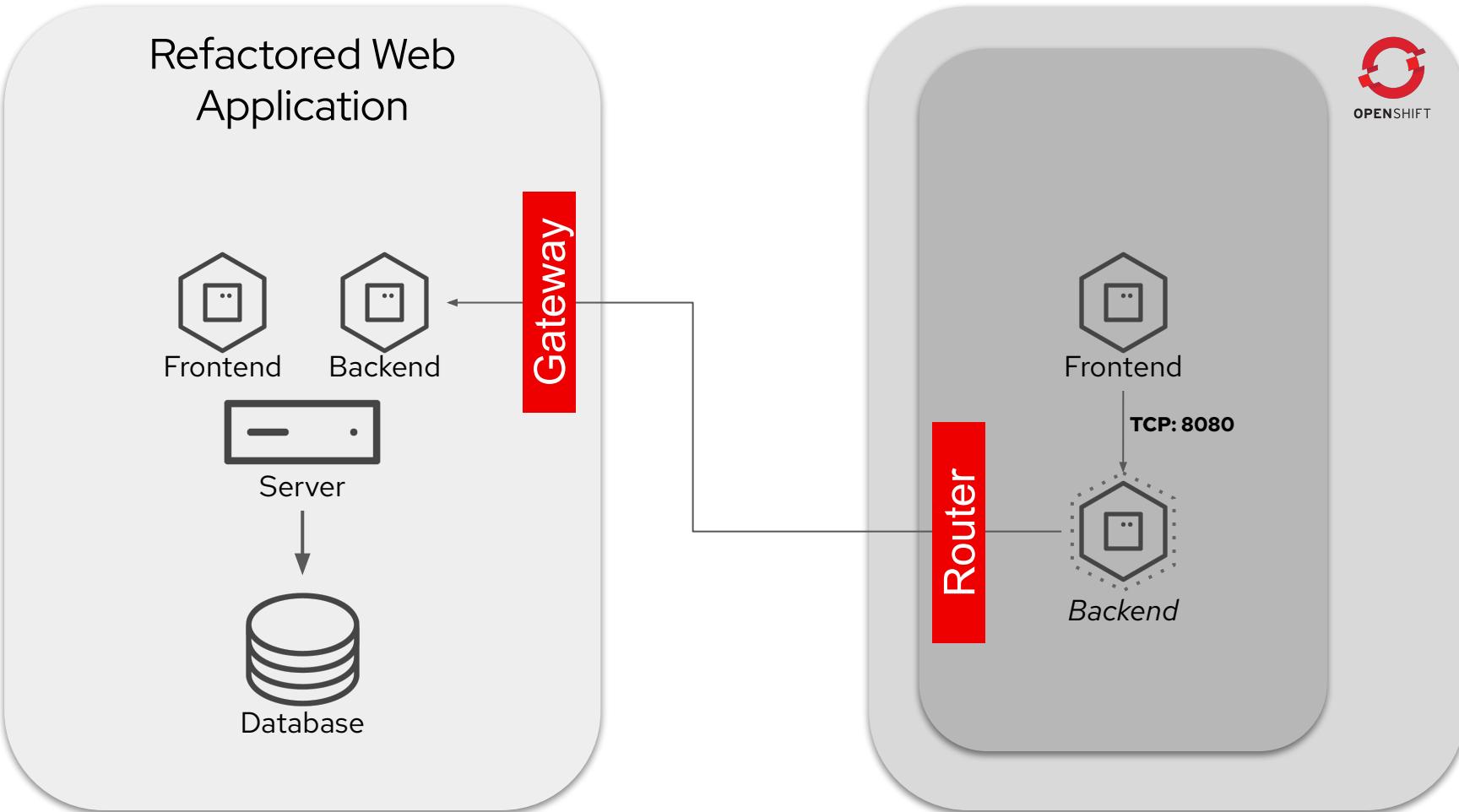
## Start with the End

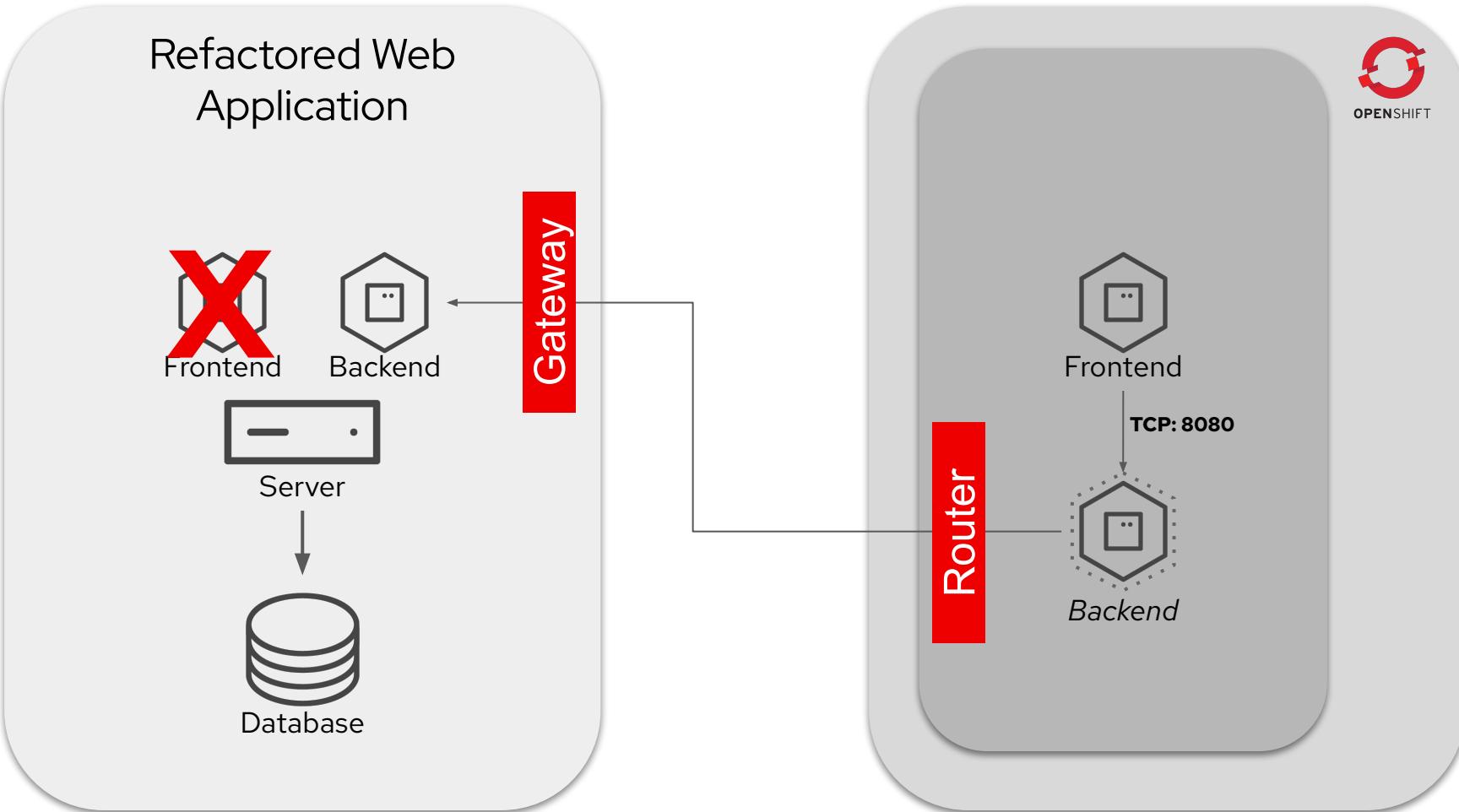




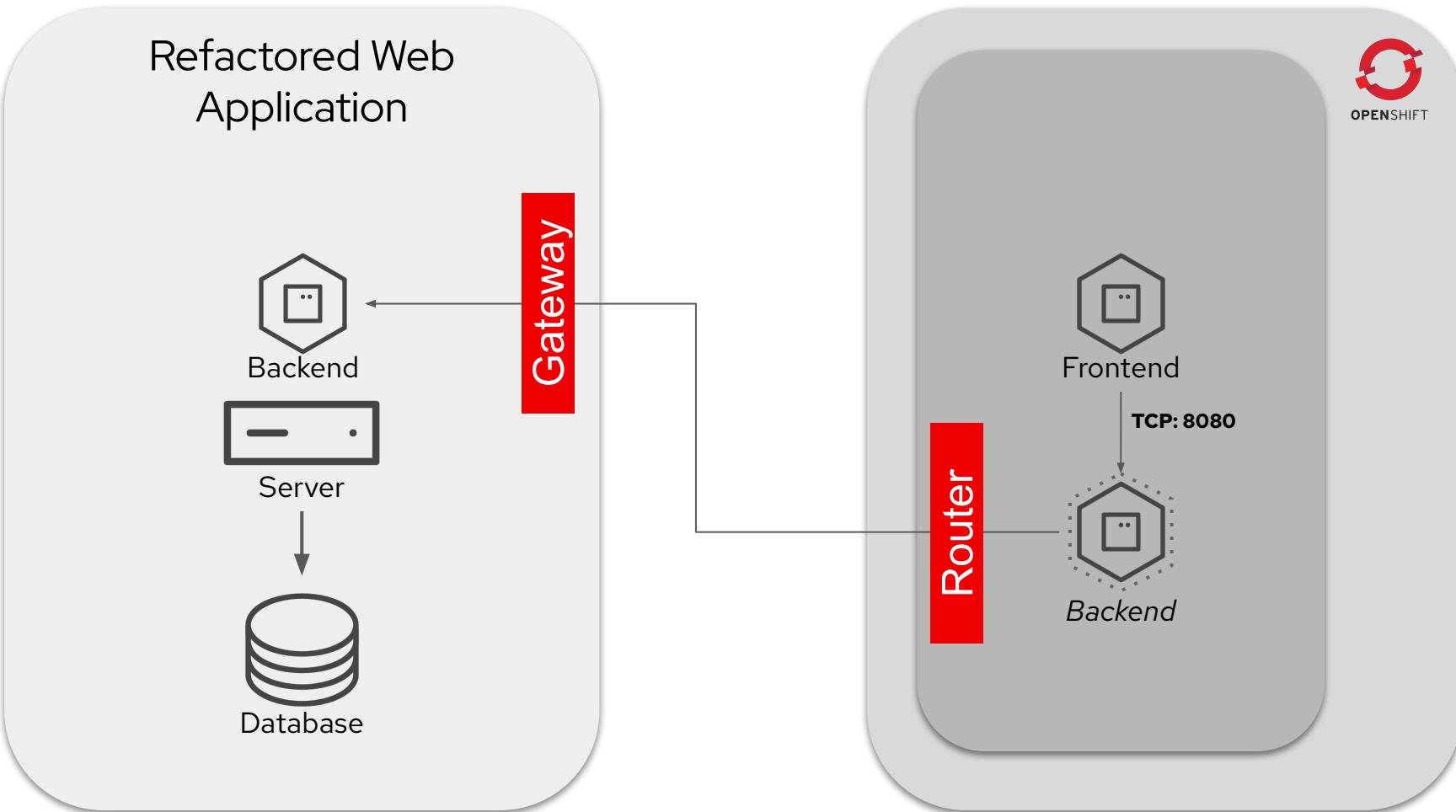


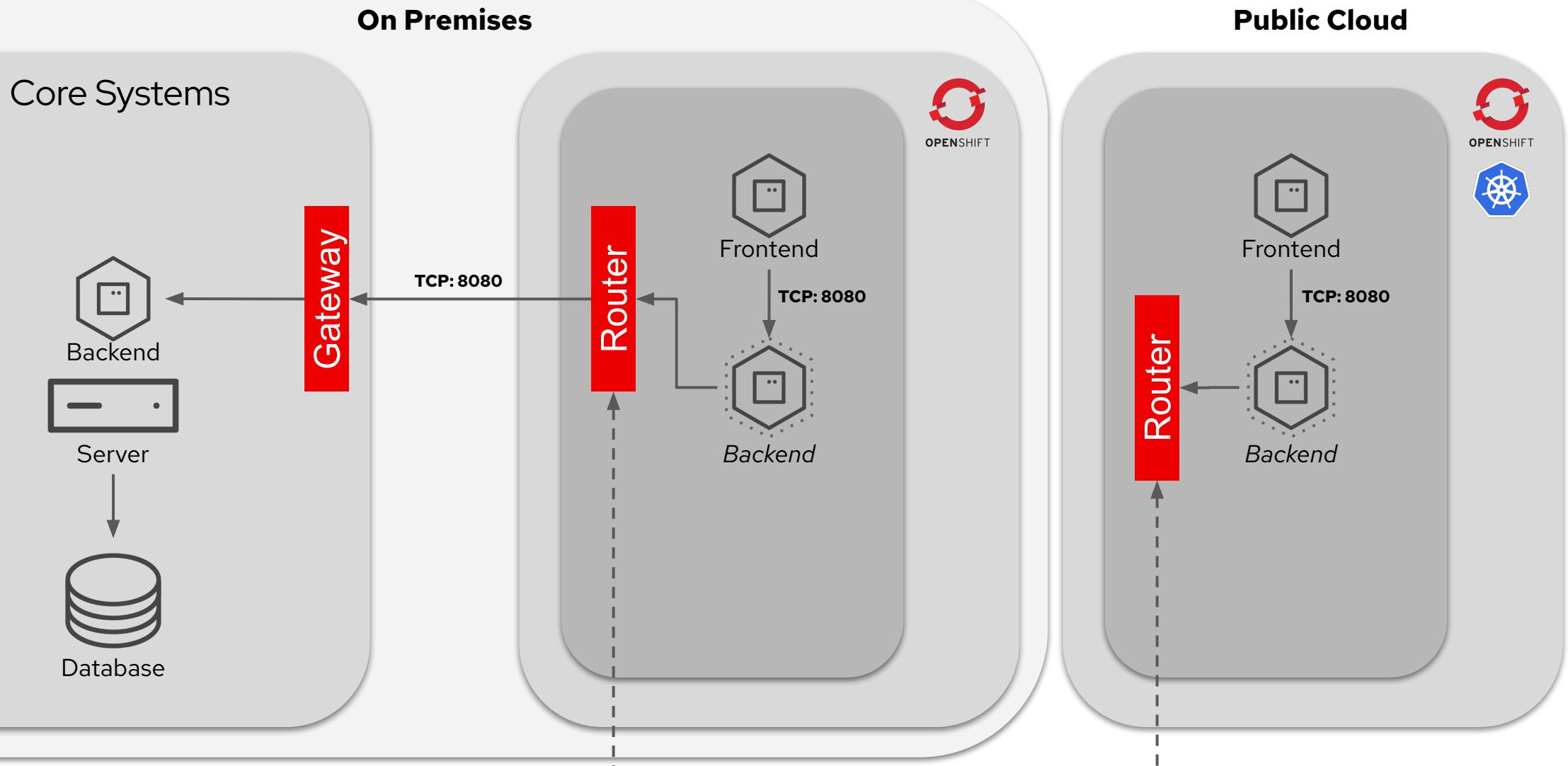


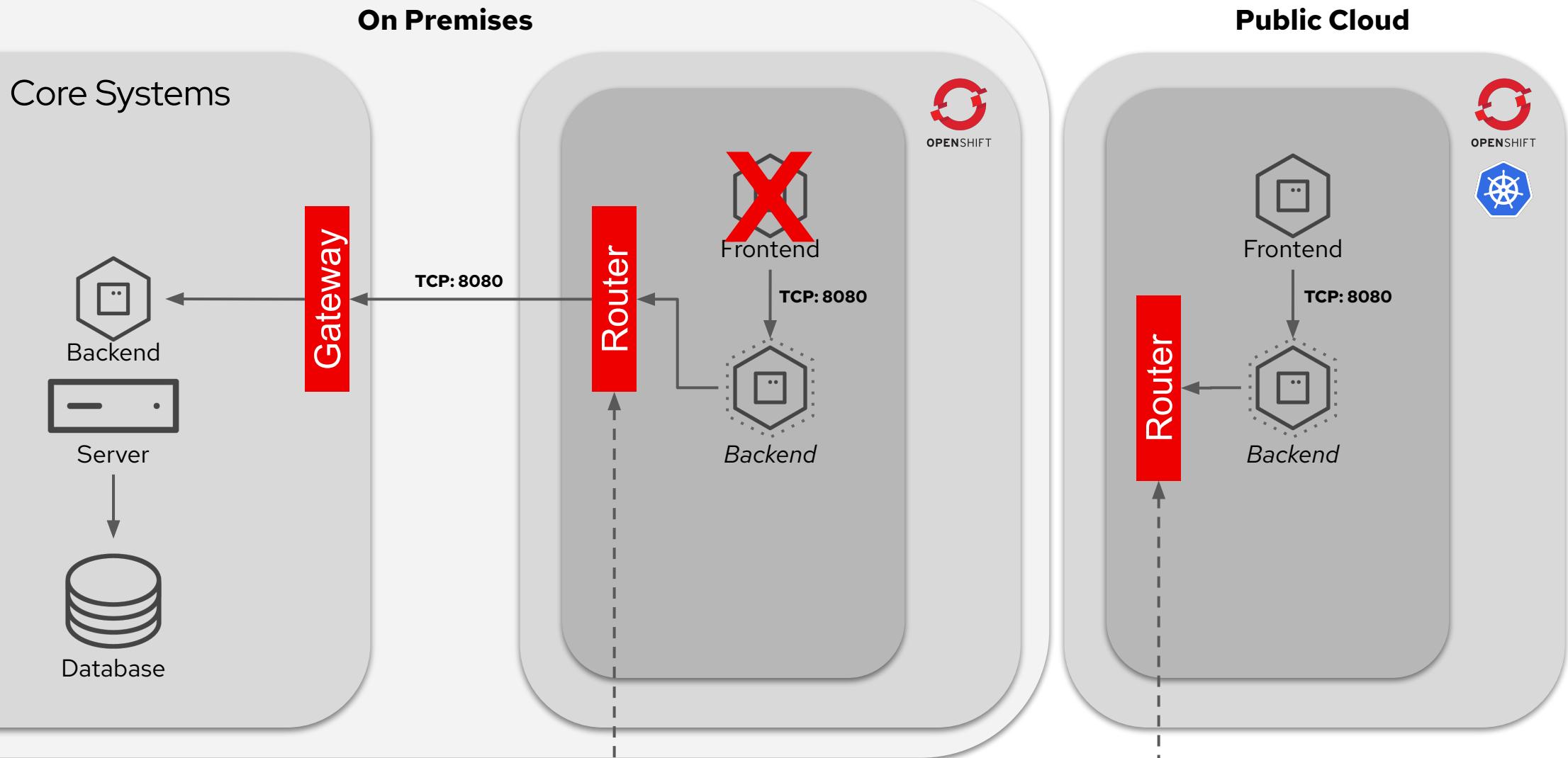




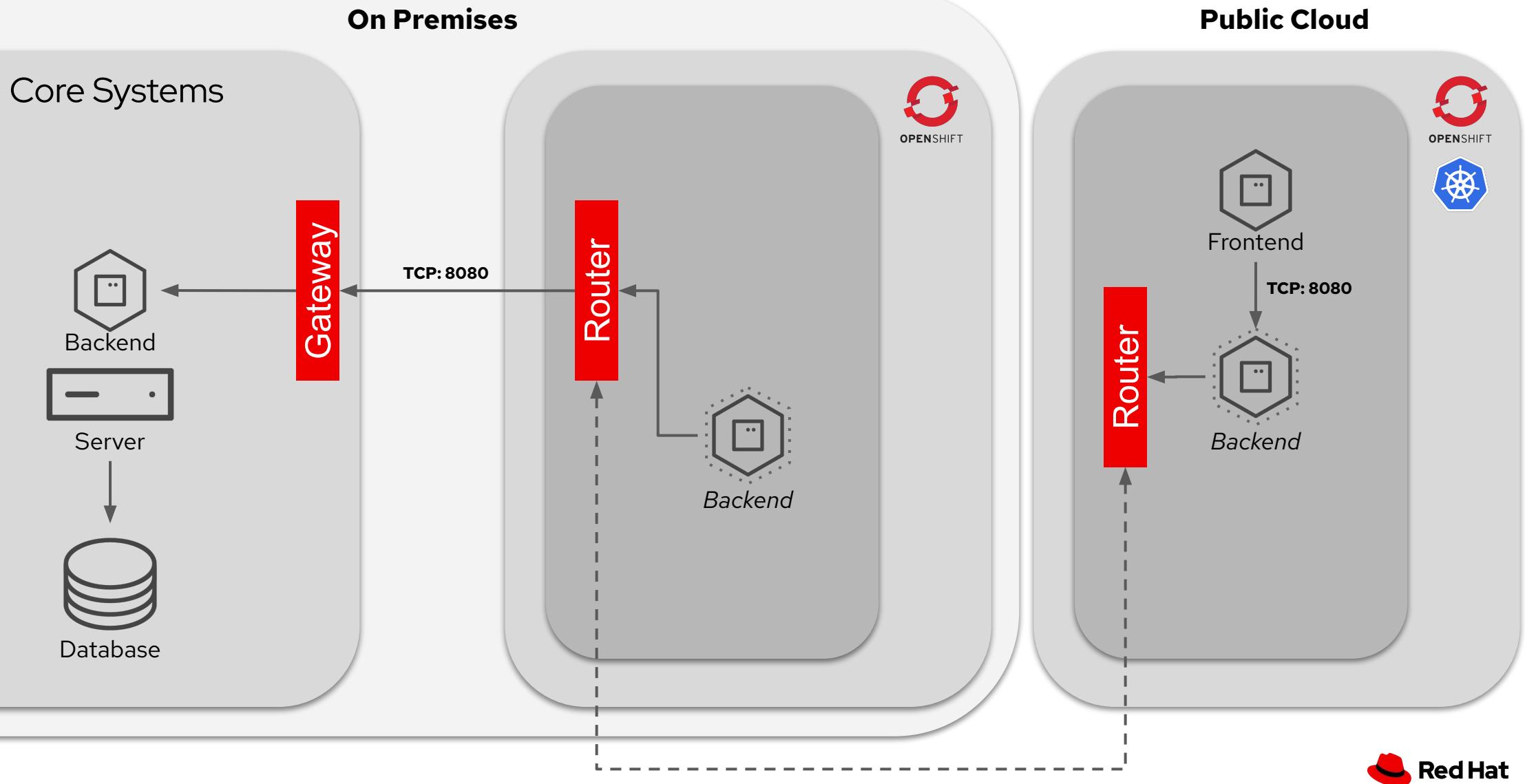
# Demonstration

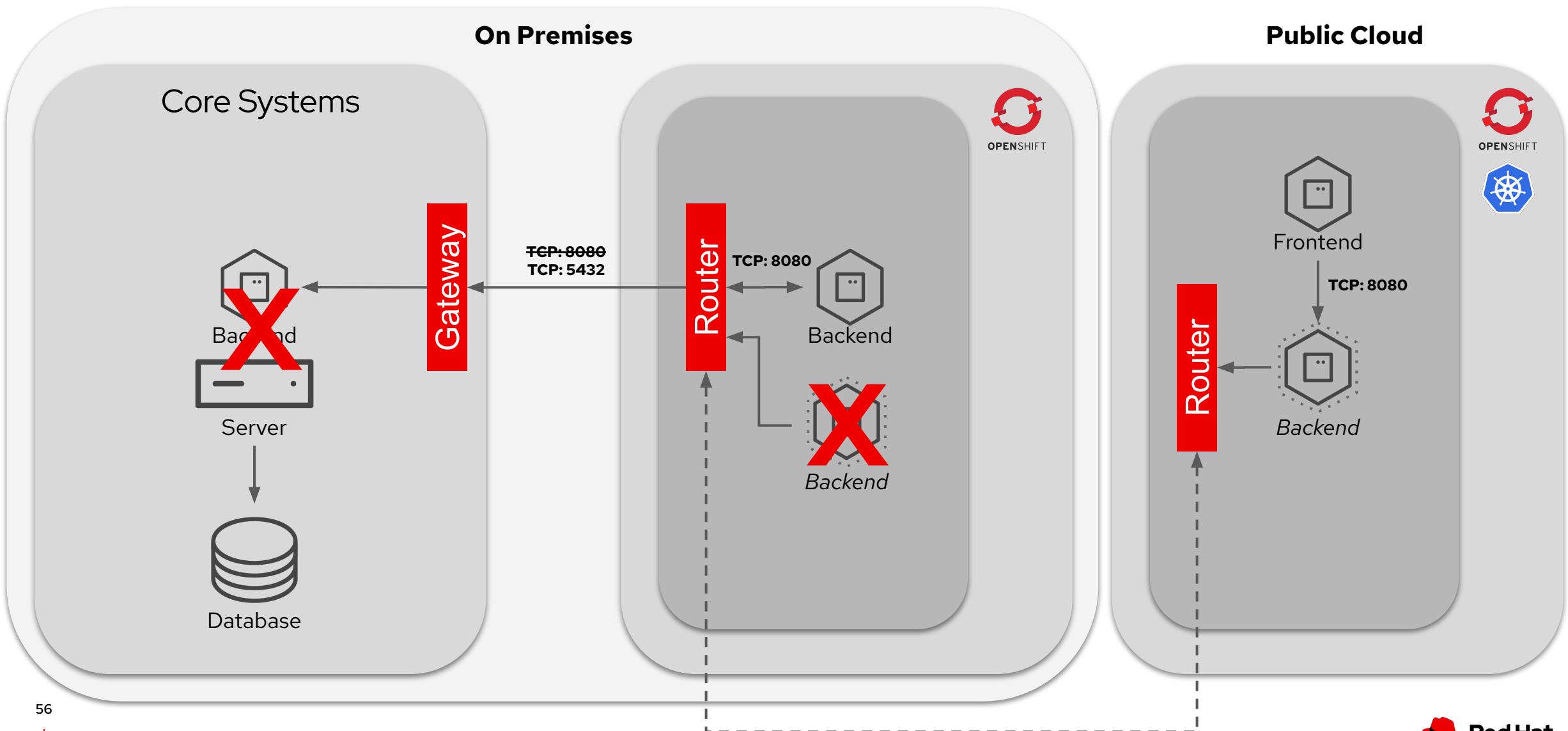


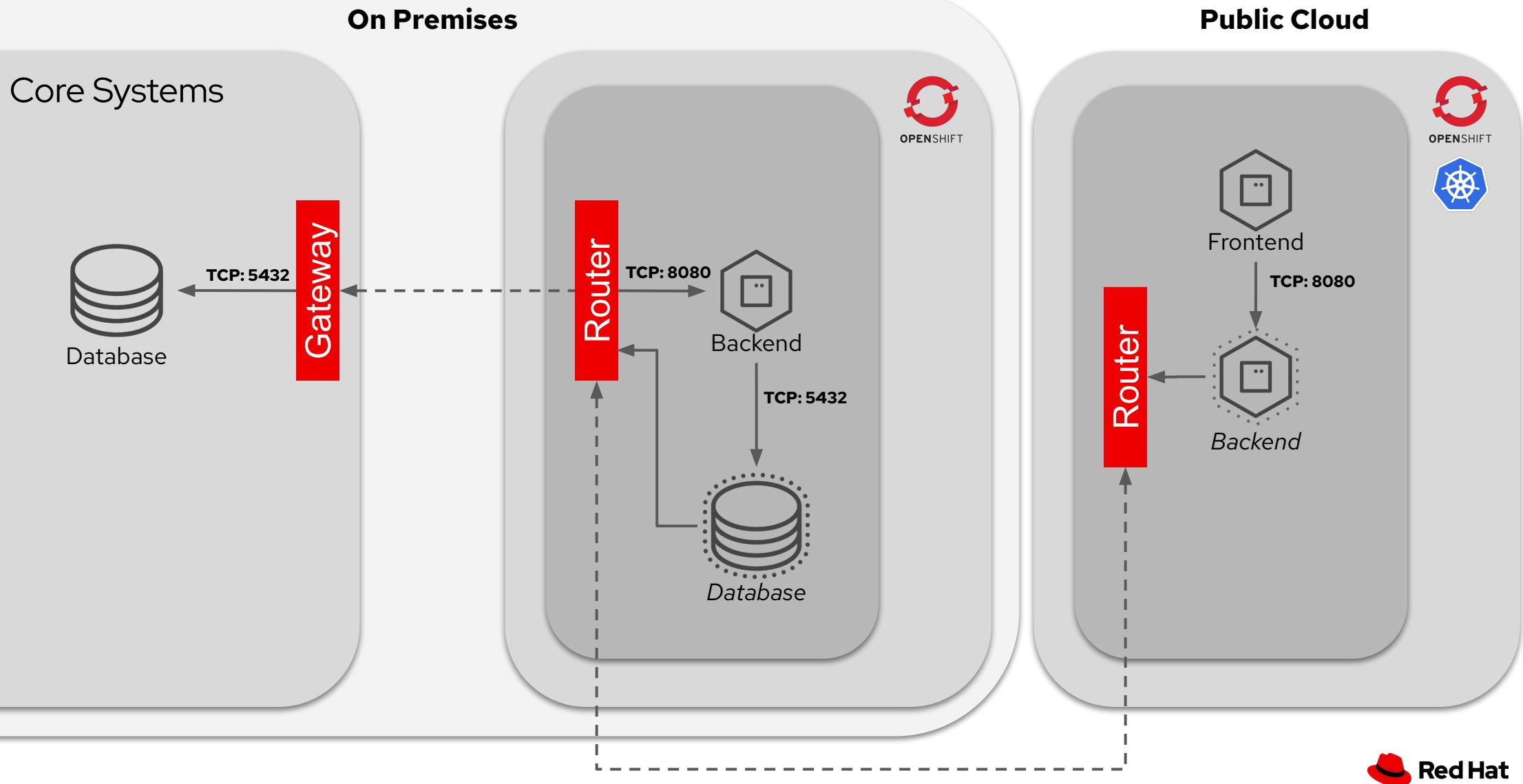




# Demonstration

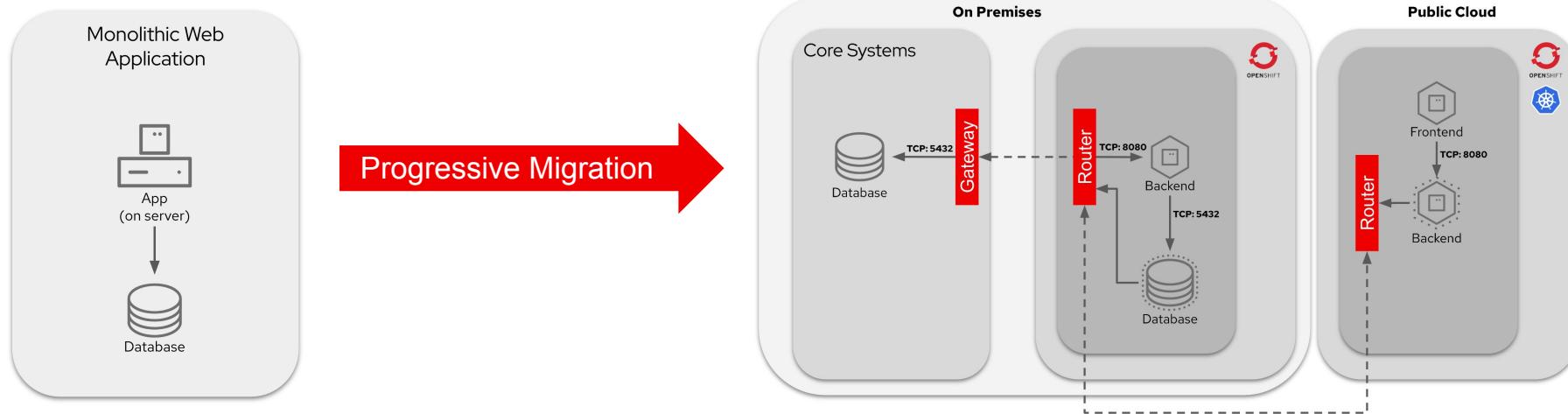






# Demonstration

## Summary



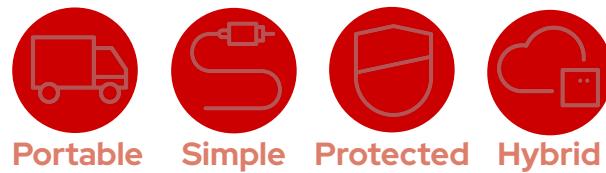
1. Strangled the monolith into standalone EARs running on a Virtual Machine
2. Packaged the EARs into containers
3. Prepared the application for cloud with OpenShift
4. **Demonstrated “the locationless application!”**
  - Progressively migrated the components out to the public cloud with no application changes
5. Demonstrated how cloud migration does not have to be **big bang**.
  - Migration can be done as part of the normal application lifecycle planning.



# Resources



These are the resources available today to deep dive into Service Interconnect



## Several other resources available

Please reach out to a Red Hat representative near you



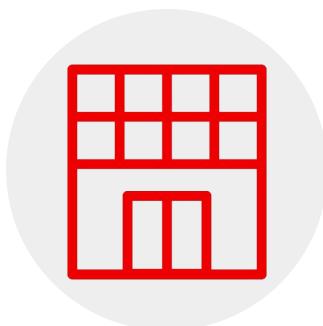
### Frequently Asked Questions

Addressing questions of supportability, availability and some most frequently use case scenarios



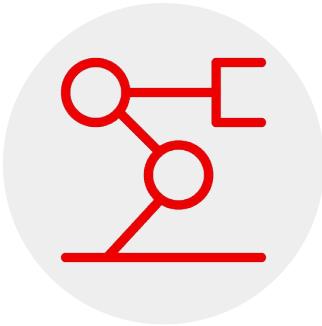
### DataSheet

Describes what Service Interconnect for customers to get familiar quickly



### Executive Deck View

Short presentation aimed at Decision Makers, explaining what is Service Interconnect



### Customer Facing Deck [Technical]

Deep technical content about Service Interconnect



# Red Hat Service Interconnect

<https://red.ht/serviceinterconnect>



ありがとう

謝謝

תודה לך

Gracias

Obrigado

Bedankt

Дякуємо

Merci

# Thank You

Tack

Danke

Děkuji

Σας ευχαριστώ

감사합니다

ধন্যবাদ

شكرا لك



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# Summit Experience



Red Hat  
**Summit**

May 23-25, 2023  
Boston, Massachusetts



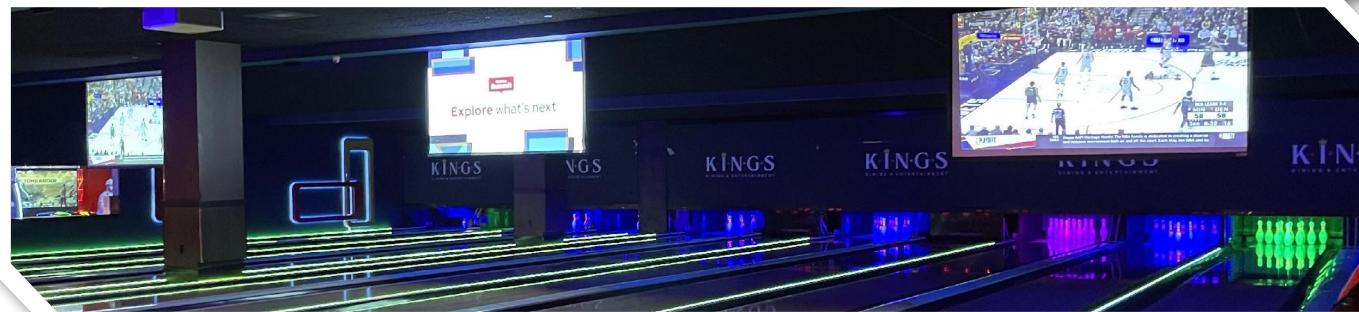
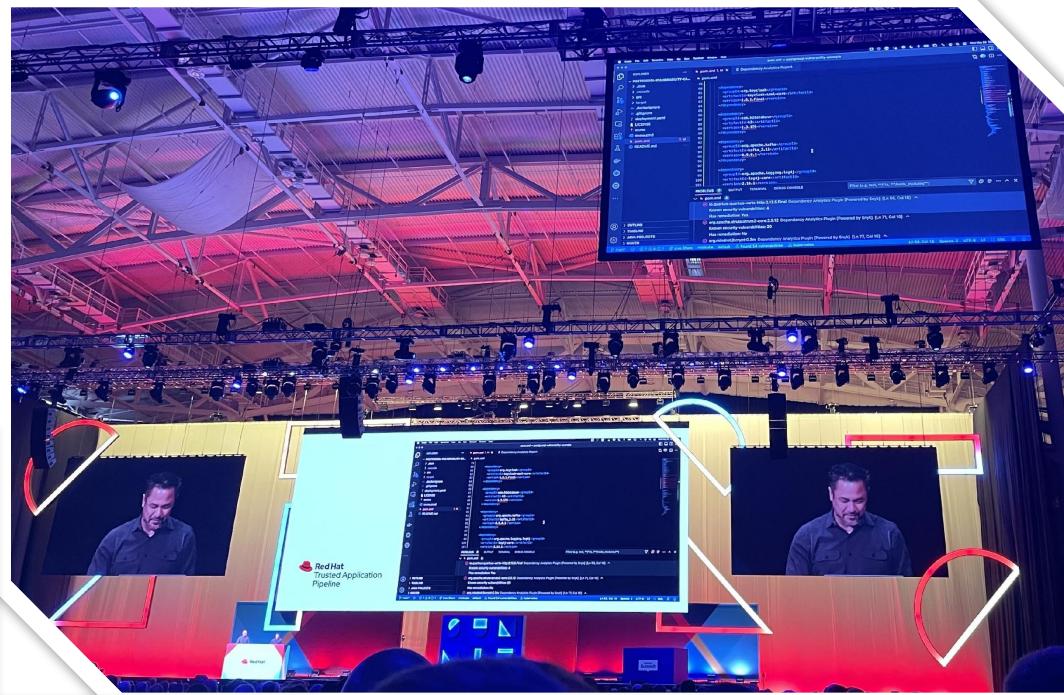
# Red Hat Summit 2023 @Boston

CONFIDENTIAL designator



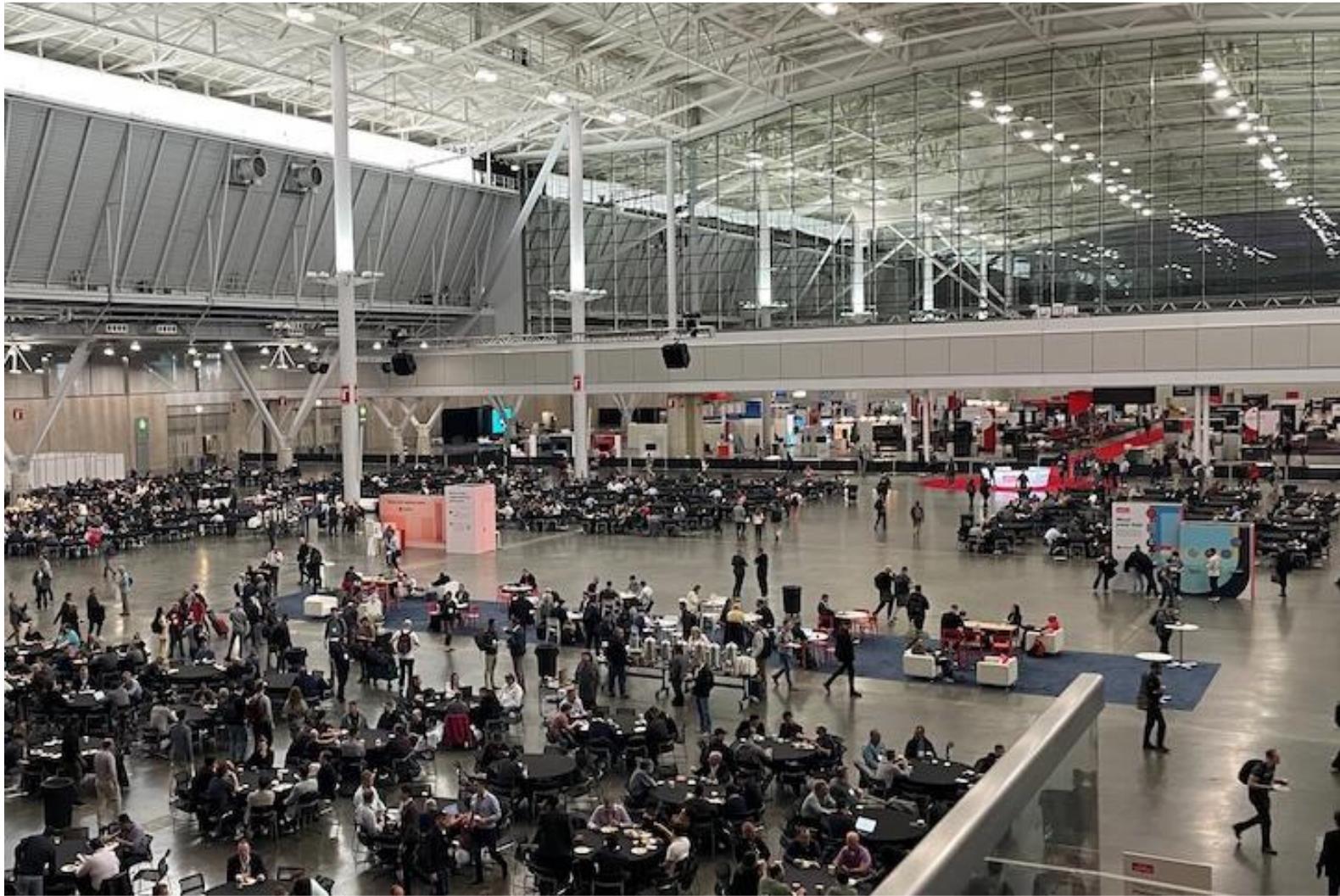
# Leonardo @ Red Hat Summit

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# What's Hot @ Red Hat Summit

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 **Pandemic  
Developer Hub  
OpenShift @edge  
Ecosystem**

 **Event-Driven Ansible  
Ansible Lightspeed & AI**

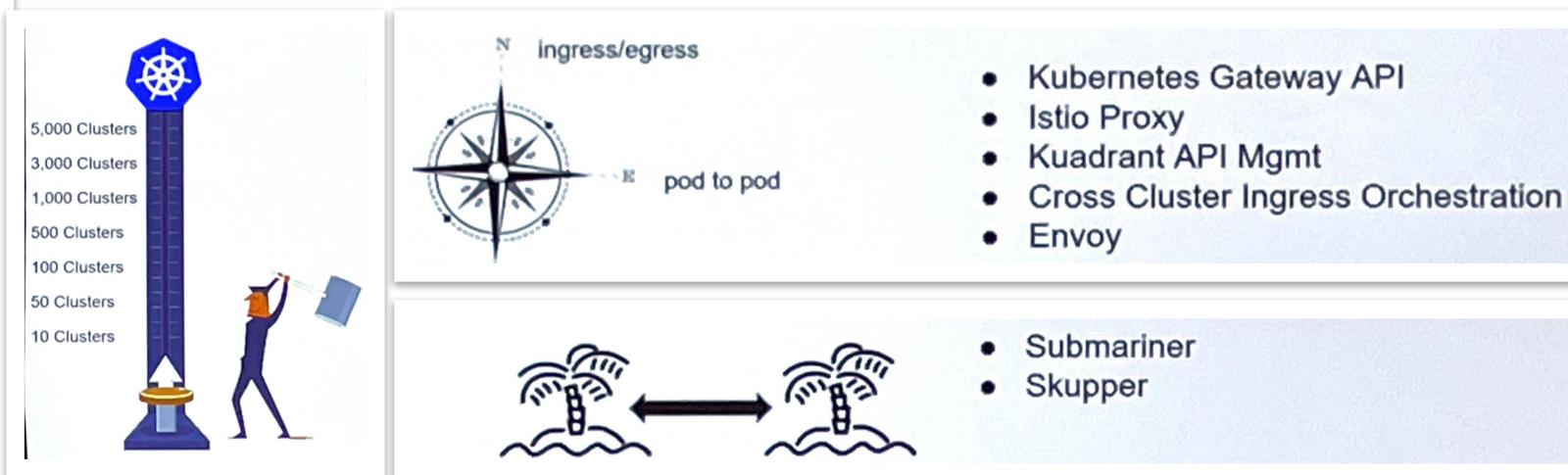
 **Serverless  
IBM**

# What's Going on @ OpenShift Commons

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Open Source Project	The Big Thing
Kubernetes	HyperShift, MicroShift
Fedora CoreOS & CRI-O	RPM layers and Crun
OVN	Scale
Istio	ztunnels
Ingress	control plane convergence
Knative	Function Experience Focus and Kserv
KubeVirt	Hot swap
KataContainer	Peer Pods
RDO	Podified Control Plane
Authn/Authz	Cloud Tokens and Workload Identity
etcd	Operational Improvements
Rook/Ceph	DR/BC & Backups
Operators	Multi-tenancy
Tekton	Pipeline as Code with Logging Awareness
Quay	UX
Argo	Enhanced Application Sets
Loki & Prometheus	What could happen & DialTone
StackRox	Cloud Service and Shift Left
Open Cluster Management	Policy Driven Governance

Pattern	Location	Overhead	Control Plane	Network	Node	Maintenance (Infra/App)	Tenancy Approach
standalone	A cluster in a data center	host	isolated	shared	dedicated	decoupled	infra offers namespace as a service
hypershift	N clusters in common data center	pod	isolated	decoupled from control	dedicated	decoupled	infra may offer cluster as a service in addition
edge	1ks of sites	device	converged	converged	converged	coupled	converged
n-1 virt cluster	N "clusters" common data center	pod	isolated	shared	shared	?	infra may offer ci/cd/dev flows
n-n virt API	?	?	?	?	?	?	?



# Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.



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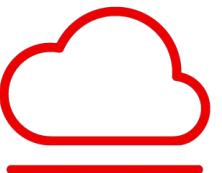
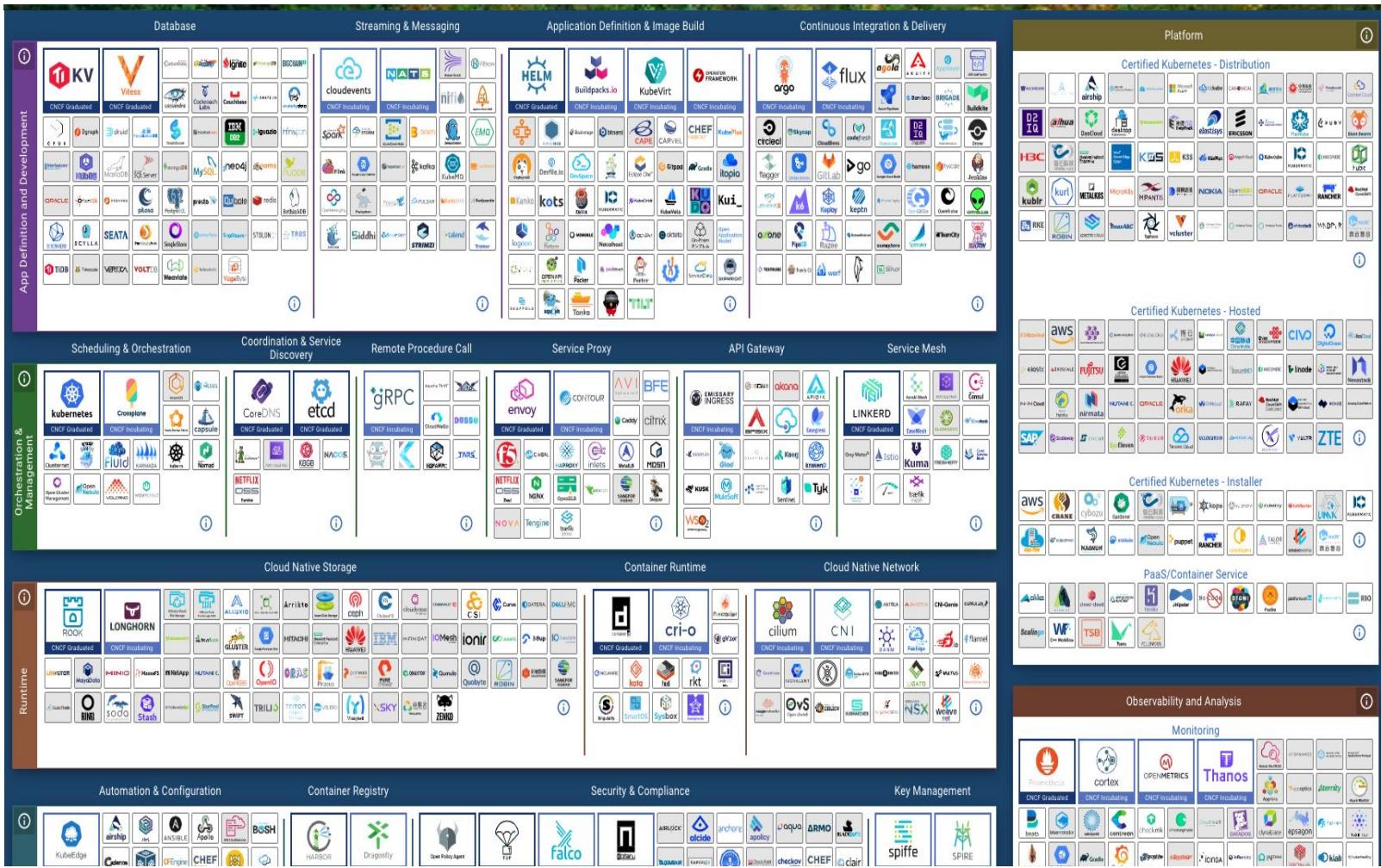


[twitter.com/rhdevelopers](https://twitter.com/rhdevelopers)

# Introduction to Backstage and Project Janus



# Great Idea!



# Production



# The Path to Production



## Platform Engineer

- 
- Standardization
  - Guard Rails
  - Security & Compliance



## Developer

- 
- Freedom to innovate
  - Fastest path
  - Unhindered Development

# An open platform for building developer portals



<http://backstage.io>

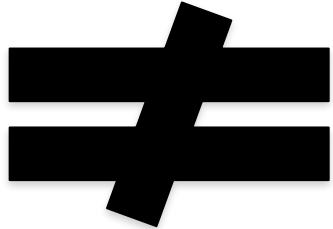
*Backstage unifies all your tooling service and documentation to create a streamlined development environment*

*Allowing developers to focus on what they want to ... coding, rather than navigating to all the different tools*

*Resulting in lowering the cognitive load and unlocking developer productivity*

*Happy developers makes happy code!*

# Backstage is not



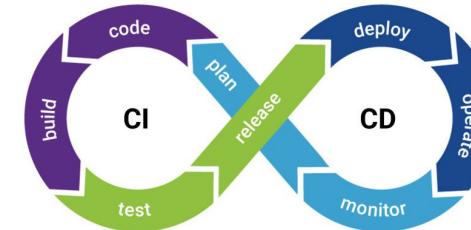
Developer IDE



Search Engine

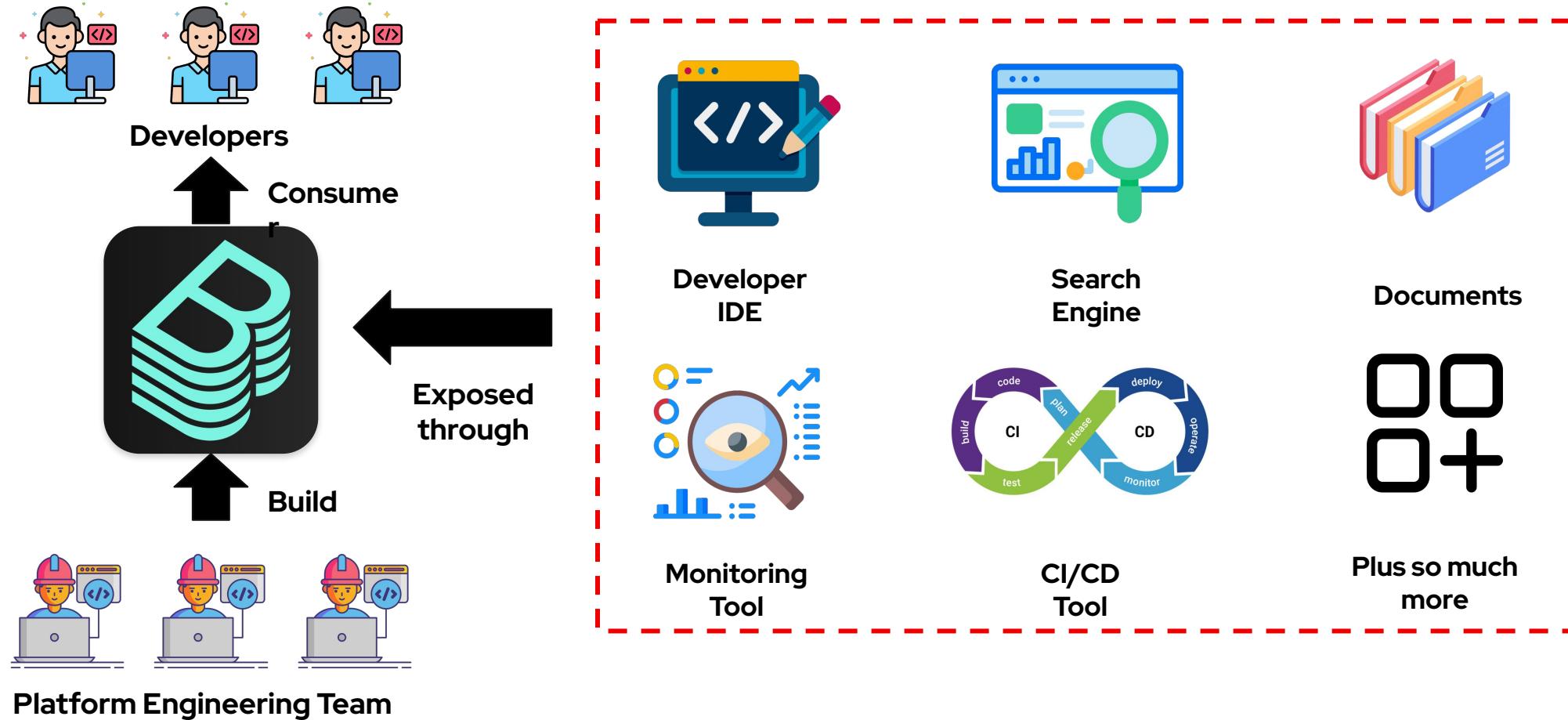


Monitoring  
Tool

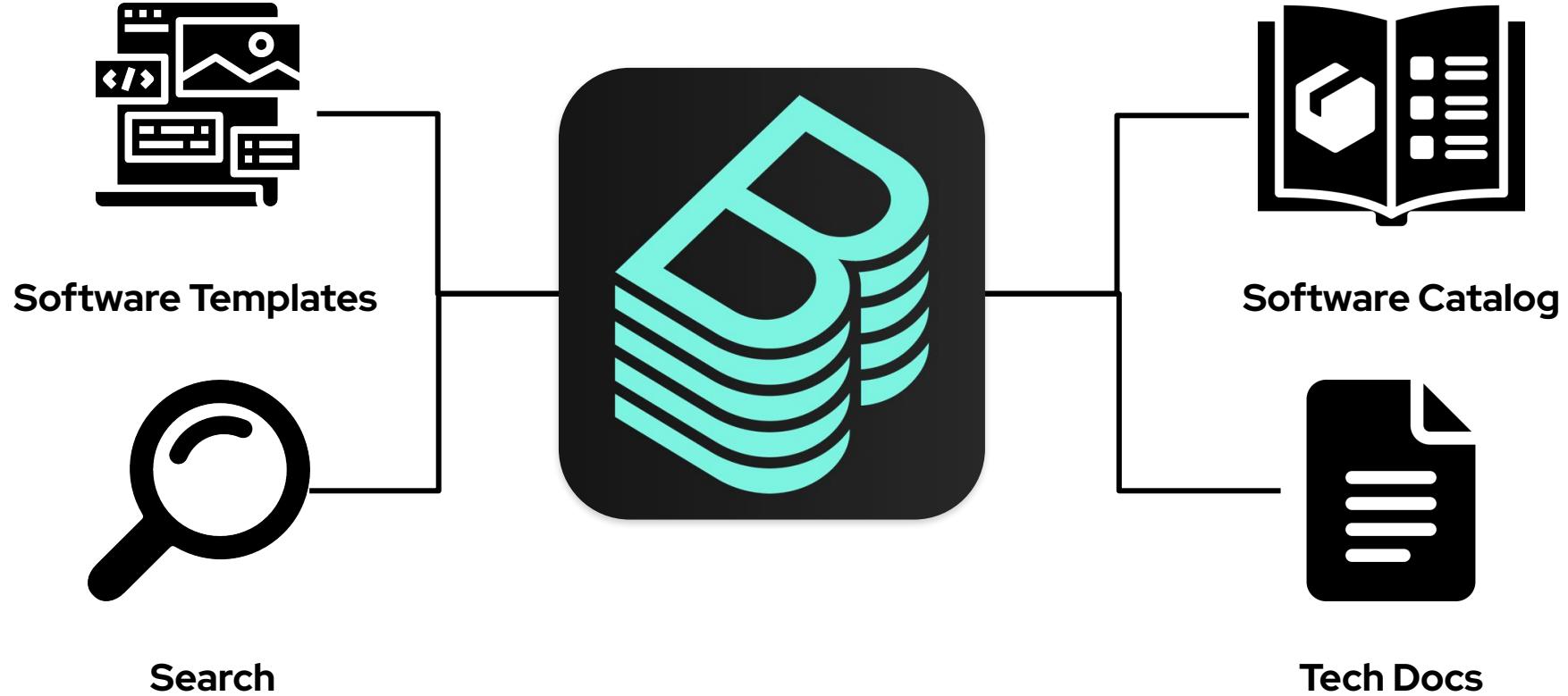


CI/CD Tool

# What Backstage is



# An open platform for building developer portals



# Backstage

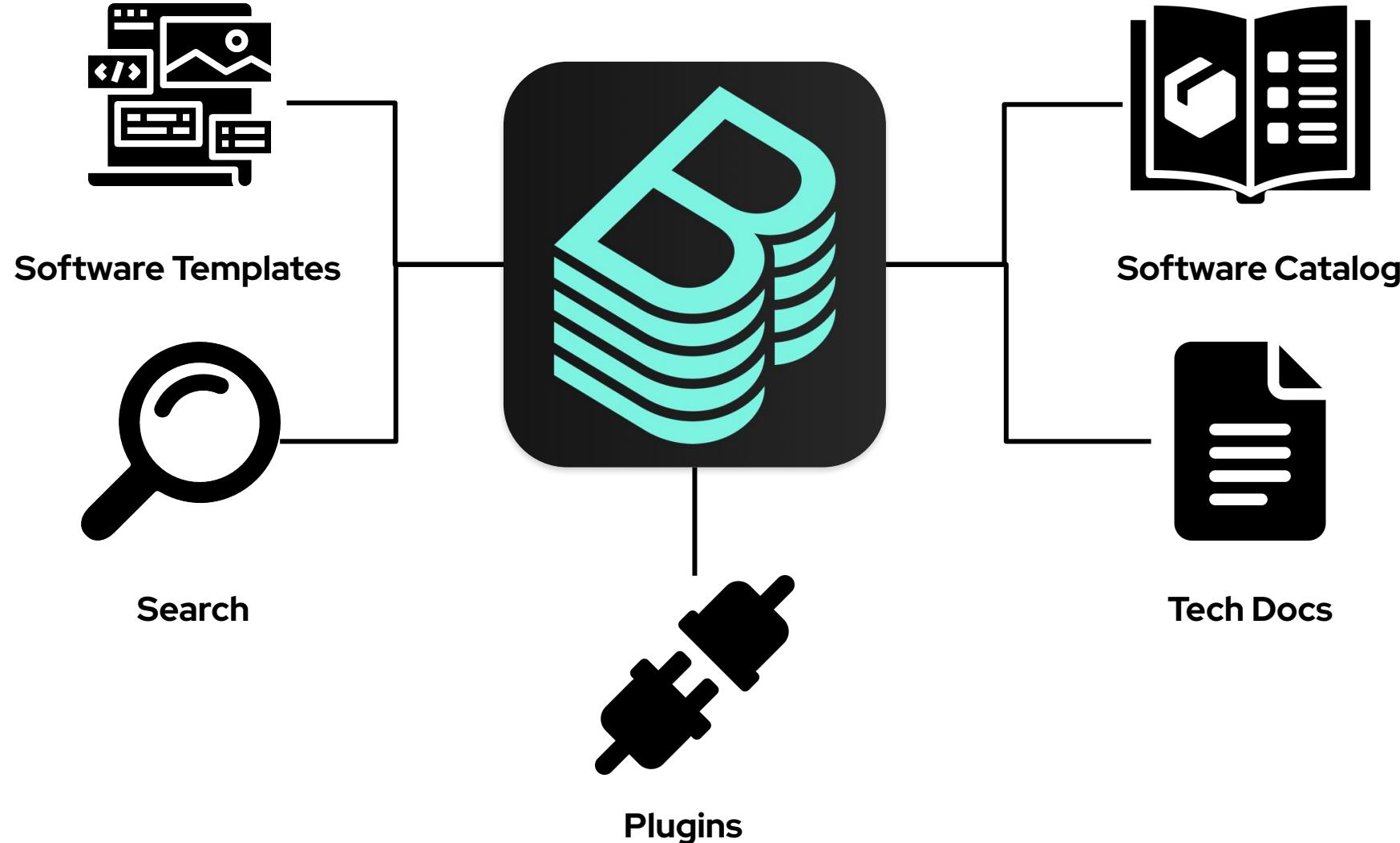


SERVICE  
DEFINITIONS

BACKSTAGE  
SERVICE CATALOG

INTEGRATED TOOLING  
VIA PLUGINS

# An open platform for building developer portals



# Backstage Plugin Ecosystem



100+ plugins, some  
examples:

- ▶ SCM
- ▶ CI/CD
- ▶ Monitoring
- ▶ Issue tracking
- ▶ Code quality



kubernetes



snyk



sonarQube



Jira Software



Vault



Jenkins



argo



dynatrace



Prometheus



GitHub



GitLab



TEKTON

+ MANY MORE

Red Hat

# Backstage Adopters



Over 200 adopters already



SIEMENS



splunk>



ferrovial box

PELOTON



AmericanAirlines



paloalto  
NETWORKS

Expedia

Telstra

HBOmax vmware®



Unity

NETFLIX



seek

LinkedIn

ANZ Fidelity INVESTMENTS QBE

+ MANY MORE

# Backstage - The downside

I learned that it takes a dedicated team to really run and get value out of Backstage.

I started implementing Backstage and rapidly understood that this project would require an entirely new team to customize it and make it work for us. simple topics like:

- SAML/OpenID authentication
- Authorization
- Jenkins plugin - we have more than one job for a component
- Visualizations - you need to write in react
- Self-services - you have a catalog to choose from, but what about operations on existing objects?

To get full value, there will be **a lot** of plugins to write

Second, Backstage's language of choice for plugin development is TypeScript. Writing plugins and customizations in TypeScript was a significant obstacle that I and my team encountered. Ramping up on TypeScript was a non-trivial investment of time.

- ▶ Ongoing Maintenance <sup>[1]</sup>
- ▶ No “set and forget” <sup>[2]</sup>
- ▶ Coding Required for Installation of Plugins (ugh)
- ▶ How well do you know TS? NodeJS? React?
- ▶ No Automatic Service Discovery

[1] [https://www.reddit.com/r/devops/comments/10quddj/backstageio\\_common\\_issues\\_and\\_pitfalls/](https://www.reddit.com/r/devops/comments/10quddj/backstageio_common_issues_and_pitfalls/)

[2] <https://www.opslevel.com/blog/hands-on-backstage-learnings>



# Enter Project Janus

## Announcement

[Red Hat joins the Backstage.io community](#)



# Where are we investing?



Backstage Core



Best practices

Custom actions



Plugins



Sample Golden Path Templates

Showcase Application

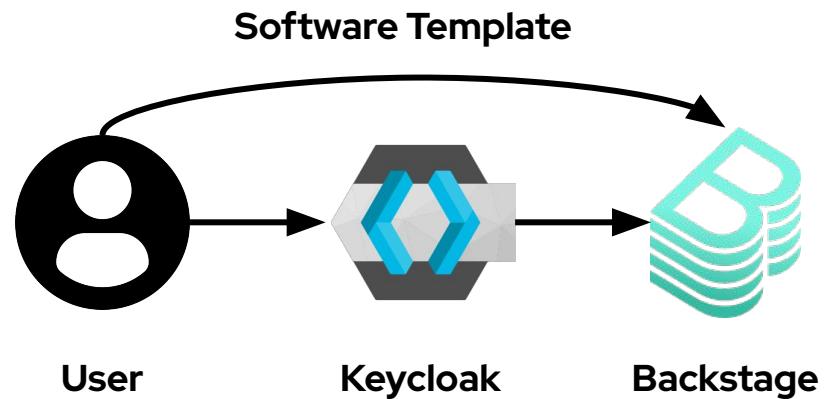


Enterprise support

Red Hat build and distribution of Backstage core & selected plugins

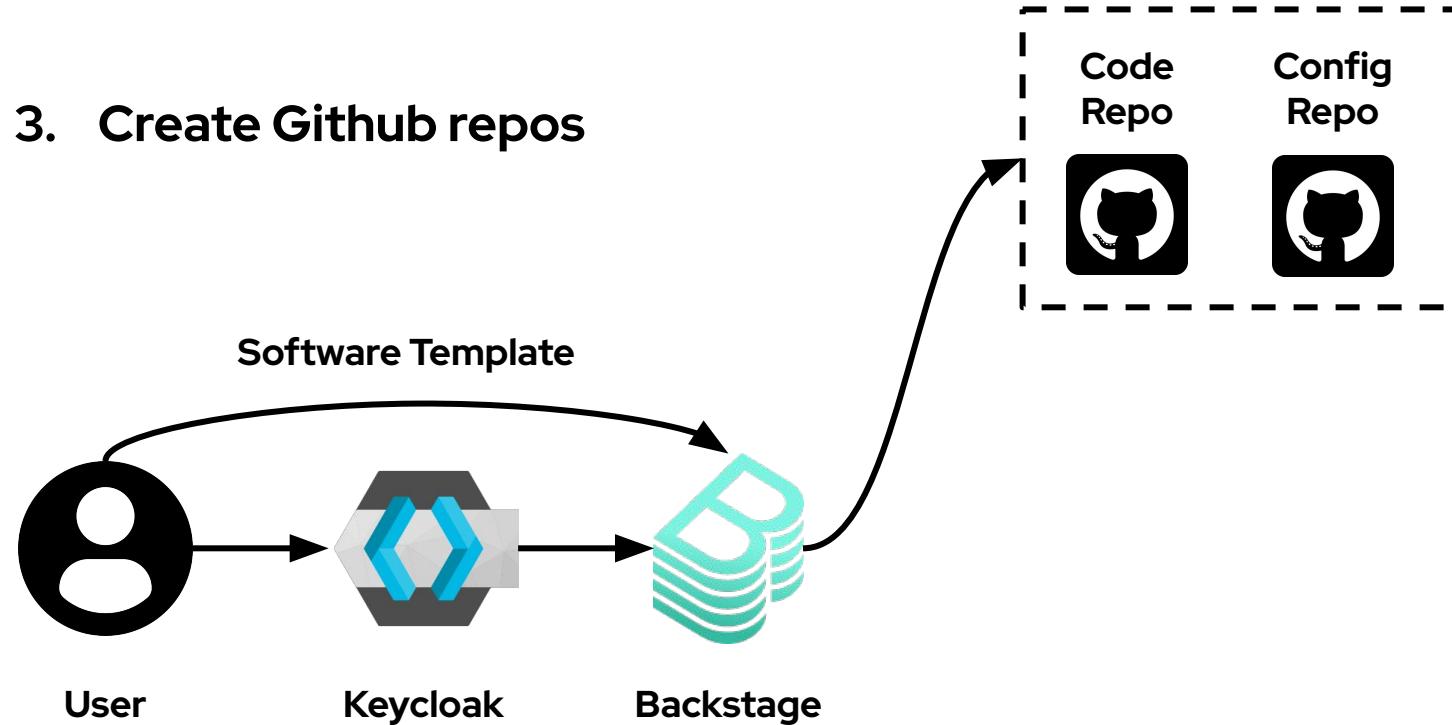
# Janus Demo

## 2. User Onboarding Using Keycloak Template



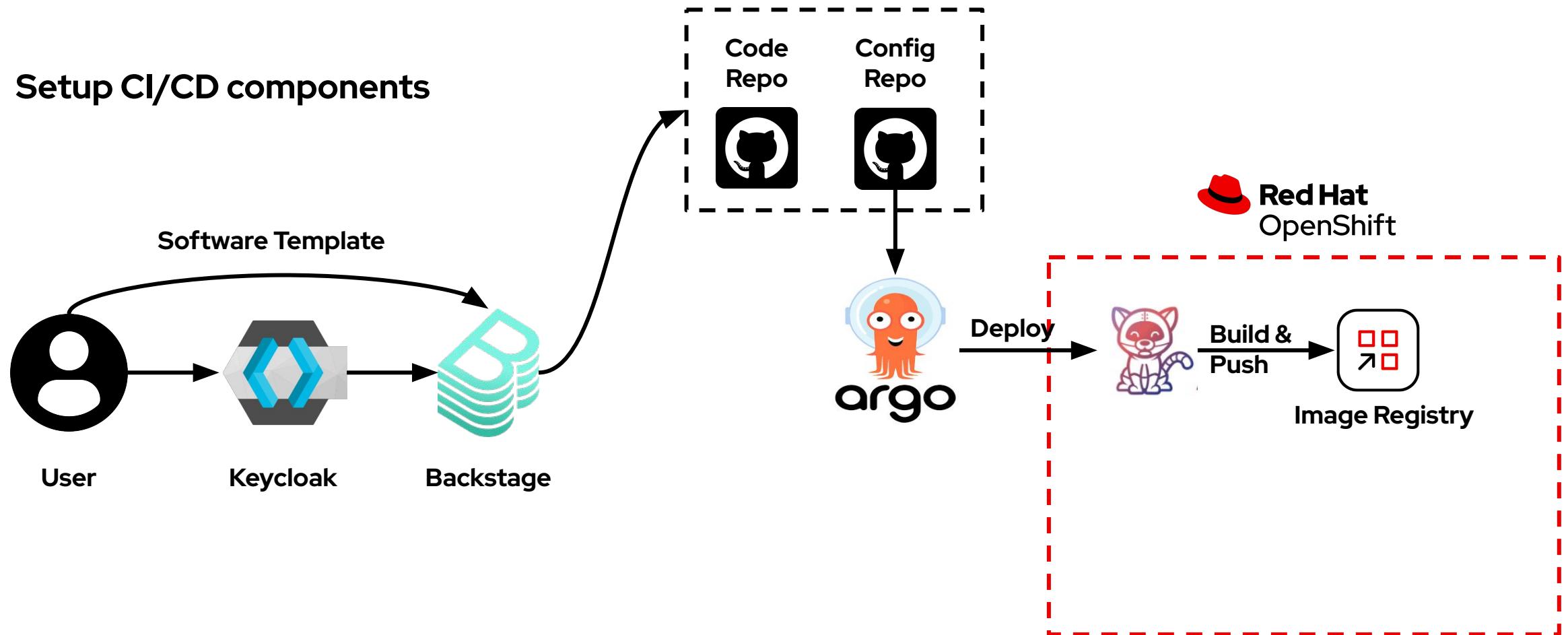
# Janus Demo

## 3. Create Github repos



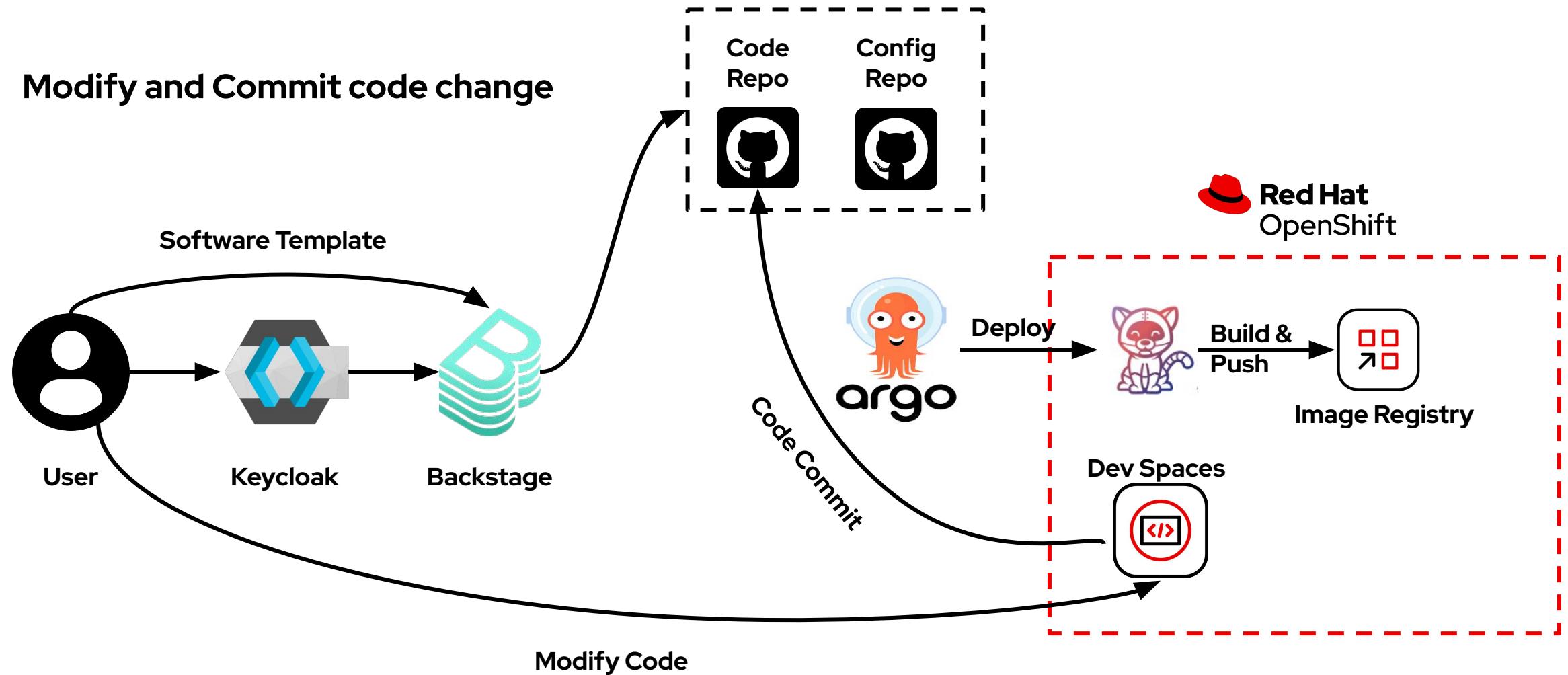
# Janus Demo

## 4. Setup CI/CD components



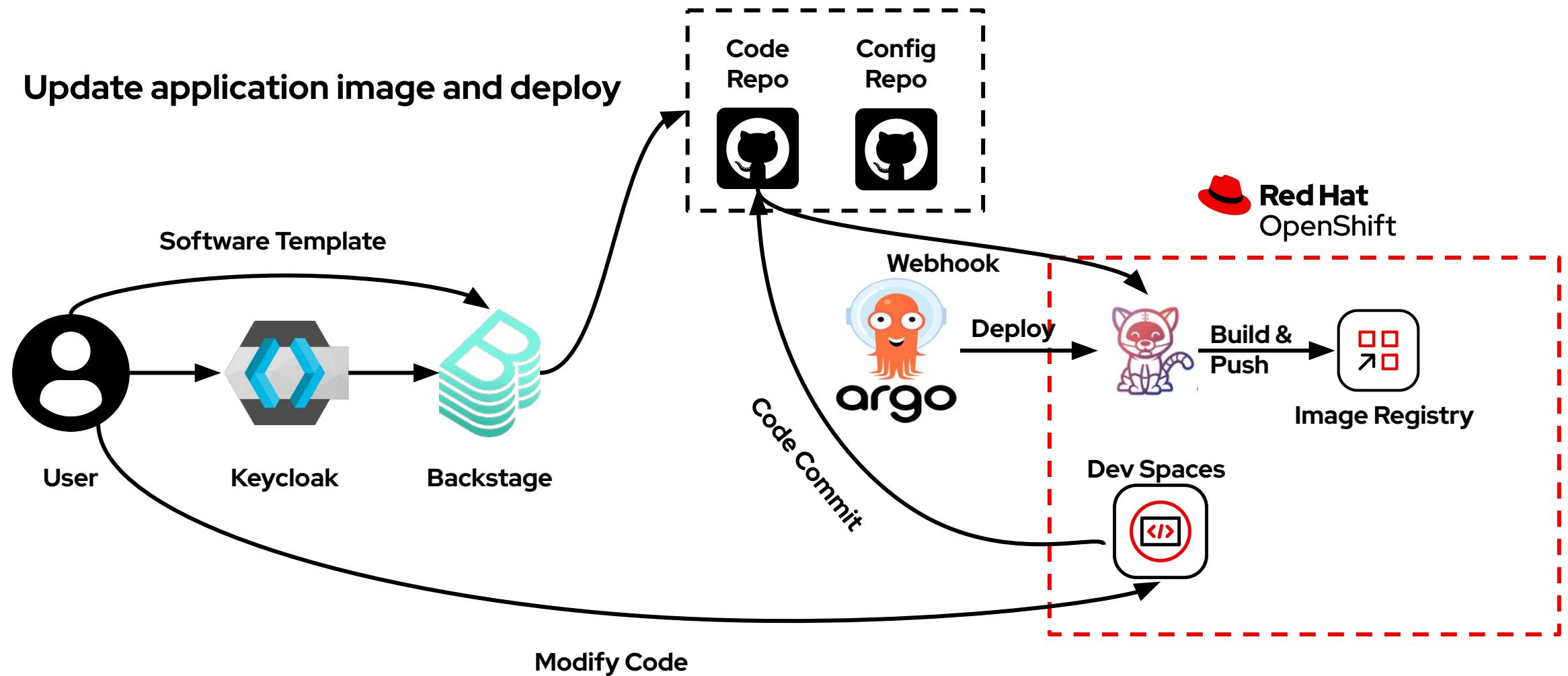
# Janus Demo

## 5. Modify and Commit code change



# Janus Demo

## 6. Update application image and deploy





# Golden Path Template with Project Janus

# Project Janus

## Sample Golden Path Templates

### Available runtimes

- ▶ .NET
- ▶ Go
- ▶ Node
- ▶ Python
- ▶ Quarkus
- ▶ Spring

### Choose CI method

- ▶ GH Actions
- ▶ Tekton

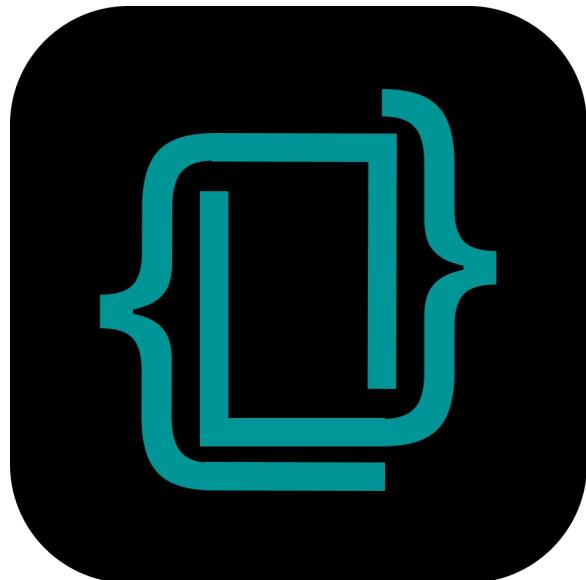
The screenshot shows a web-based application for creating new software components. The title bar says "Create a New Component" and "Create new software components using standard templates". The main section is titled "Node.js Backend Golden Path Template". Step 1 is labeled "Provide information about the GitHub location" and includes fields for "GitHub Organization\*" and "Repository Name\*". There are "BACK" and "NEXT STEP" buttons. Below this, steps 2, 3, and 4 are listed: "Provide information about the new component", "Provide information about the ArgoCD deployment", and "Choose a CI method".

<https://github.com/janus-idp/software-templates>



# Project Janus

Community plugins



**Available in Q2 2023**

- ▶ 3scale \*
- ▶ Argo (enhancing the existing Roadie plugin)
- ▶ Artifactory \*
- ▶ Keycloak plugin \*
- ▶ Multi cluster plugin \*
- ▶ Quay/OCI Image registry \*
- ▶ Topology \*
- ▶ Tekton

\* Plugins available today [here](#)



# Project Janus

Janus Showcase Application

The screenshot shows the Project Janus Showcase Application interface. On the left is a dark sidebar with the Janus logo at the top, followed by a search bar, and a list of navigation items: Home, Catalog, APIs, Docs, Clusters, Create..., and Tech Radar. At the bottom of the sidebar is a Settings icon. The main content area has a teal header with the text "Welcome back!". Below the header is the Janus logo and a search bar. The interface is divided into two sections: "Quick Access" on the left and "Your Starred Entities" on the right. The "Quick Access" section contains a list of categories: Janus Community, Learning Path, OpenShift Clusters, Devops Tools, Monitoring Tools, and Security Tools. The "Your Starred Entities" section contains a placeholder message: "Click the star beside an entity name to add it to this list!".

<https://showcase.janus-idp.io/>



# Janus community

Want to learn more?



[www.github.com/janus-idp](https://www.github.com/janus-idp)



janus-idp.slack.com - [Invite](#) to our community Slack workspace



<https://groups.google.com/g/janus-idp-community>



Join our bi weekly community calls! [Community calendar](#)



Community site: <https://janus-idp.io>

Showcase application: <https://showcase.janus-idp.io/>

# Openshift Meetup - 02

## Aug

### Topics

- Telecom Infrastructure Landscape
- Openshift as a PAAS platform
- ACM use case and architecture

By :-

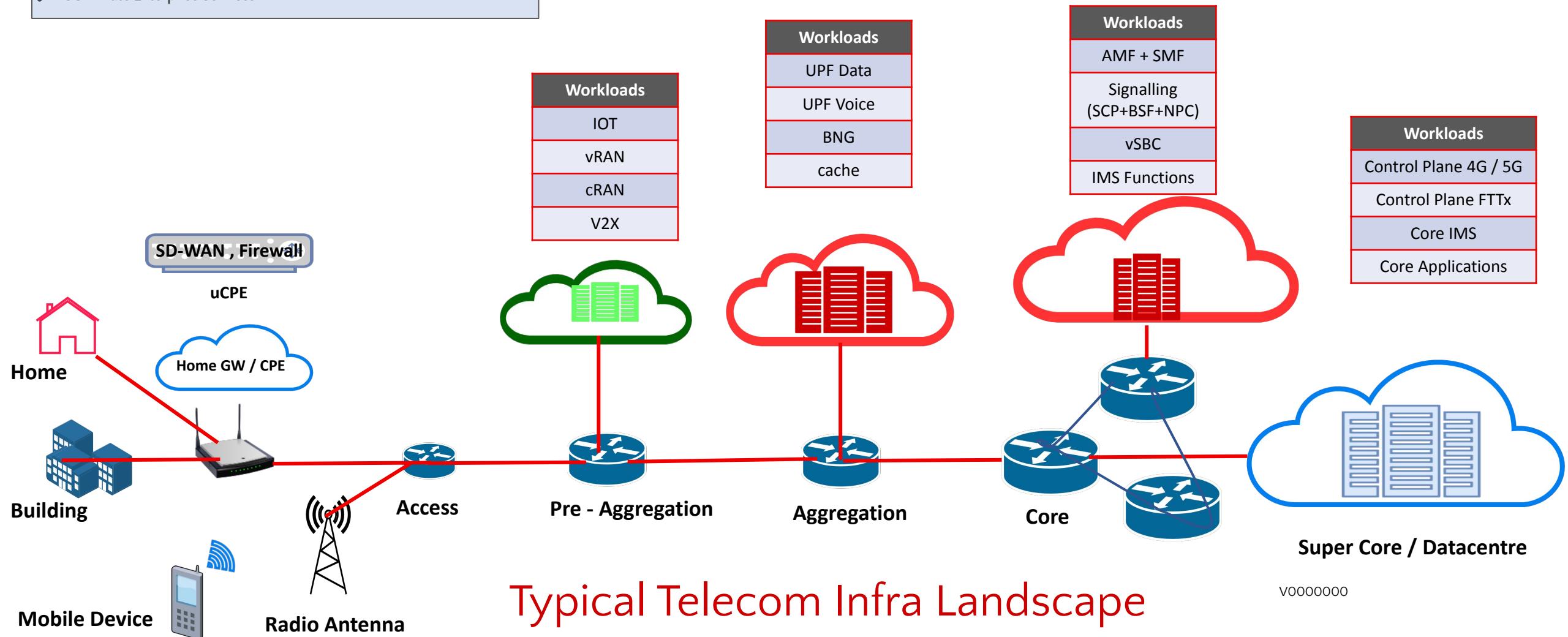
**Gaurav Aggarwal**  
General Manager (Leading Telco)

## Typical Telco Grade Services Offered

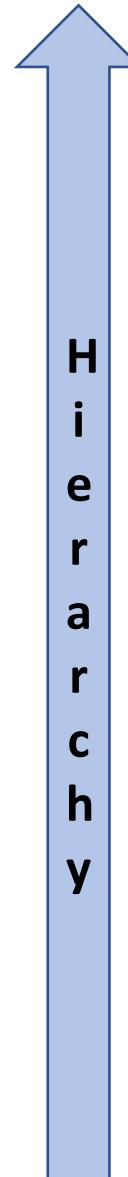
- ✓ Mobility 4G / 5G
- ✓ Enterprise Services (WAN services , Business Internet , SDWAN)
- ✓ FTTx Services for HSI / IPTV / Old POTs telephony
- ✓ 5G Private Enterprise Services

## Key Challenges faced by Telco Operators

- Legacy proprietary appliances and hardware for various data plane and control plane applications
- Uniform cloud for multi site (core , aggregation and access) applications with unified orchestration and assurance.
- High Throughput , Low latency , low packet drops for real or near real time services
- Seamless operations and Network Operation Centre (NOC) functions
- Reducing complexity and deployment times for workloads



# Openshift platform offerings for Telco Core and Edge Clouds



✓ <b>Platform Evolution / Roadmap</b>	Comply / Include most CNCF projects	<ul style="list-style-type: none"> <li>Roadmap for the Cloud Native Technologies</li> <li>Evolving Ecosystem with many incubated and live projects</li> </ul>
✓ <b>Common Integration Framework</b>	Common Integration Framework via Rest APIs	<ul style="list-style-type: none"> <li>Integration with NBI / SBI interfaces</li> <li>Support for 3<sup>rd</sup> Party integrations via common frameworks</li> </ul>
✓ <b>GitOps / CI / CD Framework</b>	Common and Automated Gitops / CI /CD pipeline	<ul style="list-style-type: none"> <li>AI / ML Ops (Predictive Analytics)</li> <li>Automated Upgrades / Future Deployments using ansible</li> </ul>
✓ <b>Assurance / Telemetry</b>	Multisite Assurance / Observability via (ACM)	<ul style="list-style-type: none"> <li>Common Assurance + Telemetry Framework</li> </ul>
✓ <b>Orchestration</b>	Advanced Cluster Manager (ACM)	<ul style="list-style-type: none"> <li>Multisite Multicluster Orchestration and LCM management</li> </ul>
✓ <b>Application Deployment</b>	Multisite Complex Application Deployment Framework	<ul style="list-style-type: none"> <li>Application Deployment using helm or yaml</li> </ul>
✓ <b>Platform Deployment</b>	Standard Cluster Deployment / Single Node Cluster Deployment (SNO)	<ul style="list-style-type: none"> <li>Automated Platform Deployment for core and edge sites</li> <li>Automated Advance Cluster Manager Deployment (ACM)</li> </ul>
✓ <b>Security</b>	Enhanced Security Features on native K8s	<ul style="list-style-type: none"> <li>Inbuild Security Context (SCC) , RBAC , OAuth , Certificates , Encryption</li> </ul>
✓ <b>Storage</b>	Storage (Localized / Centralized) , ODF Clusters	<ul style="list-style-type: none"> <li>Multiple Storage Support via CSIs, ODF (Block , File and Object Storage)</li> </ul>
✓ <b>Performance</b>	Enhanced performance operators	<ul style="list-style-type: none"> <li>CPU Pinning / Isolation , HUGE pages , Node Feature Discovery (NFD) , NUMA Awareness</li> </ul>
✓ <b>Networking</b>	Advanced Networking Support + Faster Packet Processing	<ul style="list-style-type: none"> <li>(CNI including MULTUS CNI, SRIOV CNI , BOND CNI)</li> </ul>
✓ <b>VM Support</b>	Virtualization Support	<ul style="list-style-type: none"> <li>Support for legacy VMs via Kubevirt</li> </ul>
✓ <b>PAAS</b>	OpenShift Platform , K8s	<ul style="list-style-type: none"> <li>Universally accepted proven containerization and runtimes technology</li> </ul>
✓ <b>OS</b>	Hardened OS (Core OS) ,Linux	<ul style="list-style-type: none"> <li>Core OS is hardened container OS</li> </ul>
✓ <b>Hardware</b>	Support for multiple hardware vendors	<ul style="list-style-type: none"> <li>Support for intel , Mellanox and other hardware vendors</li> </ul>

# ACM – Helps manage scale and associated operational complexities

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## Cluster LCM (GitOps Model)

- Define Test and product clusters using GitOps framework
- Policy Enforcement and governance across development , test and production clusters.

## Application Deployment

- Onboard and Deploy CNF
- Ensuring CNF deployments from onboarding to production.

## Hybrid Multicloud

- Clusters deployed across public , private clouds, edge in different geographies
- Single pane of glass visibility
- Deploying and distributing apps at scale

## Multicluster Observability

- Multicluster observability for health and optimization

## ACM – Architecture

**Central Hub Cluster**  
Advanced Cluster Manager  
Advanced Cluster Security



**Regional DC**  
**Openshift Cluster**



**Far Edge 1**  
**Red Hat OpenShift**

**Far Edge 2**  
**Red Hat OpenShift**

**Far Edge3**  
**Red Hat OpenShift**

# Thank you

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