

企業級 k8s 導入及架構基礎考量

在不同的導入階段需要具備不同的軟硬體技能，以及為了因應企業內部的動力與阻力，將分享如何循序漸進導入企業級 K8s 的經驗及看法。

Catch
Senior Solution Architect

Agenda

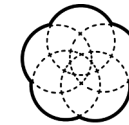
- ▶ **Progressive Transformation**
- ▶ **not only K8S ...**
- ▶ **Design Principles**
- ▶ **Reference Architecture**
- ▶ **What's new on OCP 4**
- ▶ **Conclusion**
- ▶ **Learning resource**

Progressive Architecture Principles

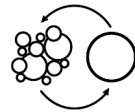
To deliver innovation faster your architecture needs to be based on modern architecture principles. the four pillars of modern architecture are...



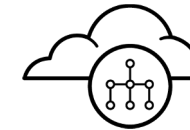
ABSTRACTION



MODULARITY



COMPOSABILITY



PORTABILITY

Common themes in Progressive transformation

- **Culture** – changing the culture of the organisation towards being more innovative - insourcing, agile methods, customer-centric, learning by “doing”
- **DevOps automation** – automating tech infrastructure, continuous delivery, working in small batches
- **Architectural transformation** – migrating to cloud-native, microservice architectures that support rapid change
- **Collaboration around a platform** – fostering innovation both internally & externally around a digital platform



Business Agility

Governance Risk Compliance

Large Cost Takeout Wins

BUSINESS DRIVERS:

Cloud Adoption

App Modernization

Lifecycle & End of Life

Business Plan

BUSINESS CASE REGISTRATION

ECONOMIC
MODEL

AUTOMATION

ECONOMIC
MODEL

INFRASTRUCTURE

ECONOMIC
MODEL

APPLICATION

BUSINESS
MODEL

GRC RISK

Model Validation

ROI/TCO
DASHBOARD

GRAPHANA

ROI Gate
(5 - 10x)

BUSINESS CASE ROI (Cost and Risk calculations)

ADOPTION PIPELINE:

Automation Epic

Application Epic

Program Plane

Execution Throughput

Increment
1

Increment
2

Increment
3

Increment
4

Maturity

Increment
5

Increment
0

Underlying Framework

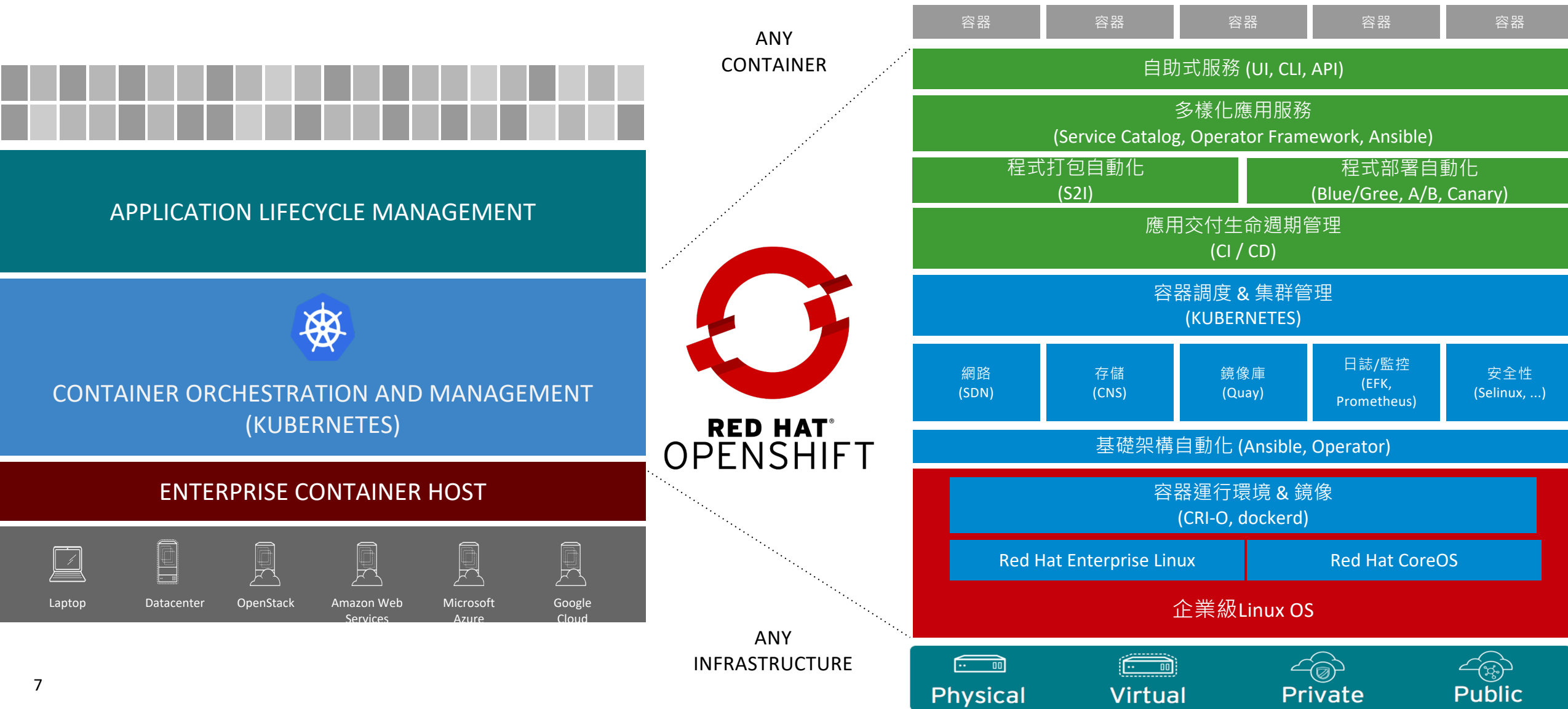
ADOPTION OUTCOME

Achieved Expectation (Y/N)

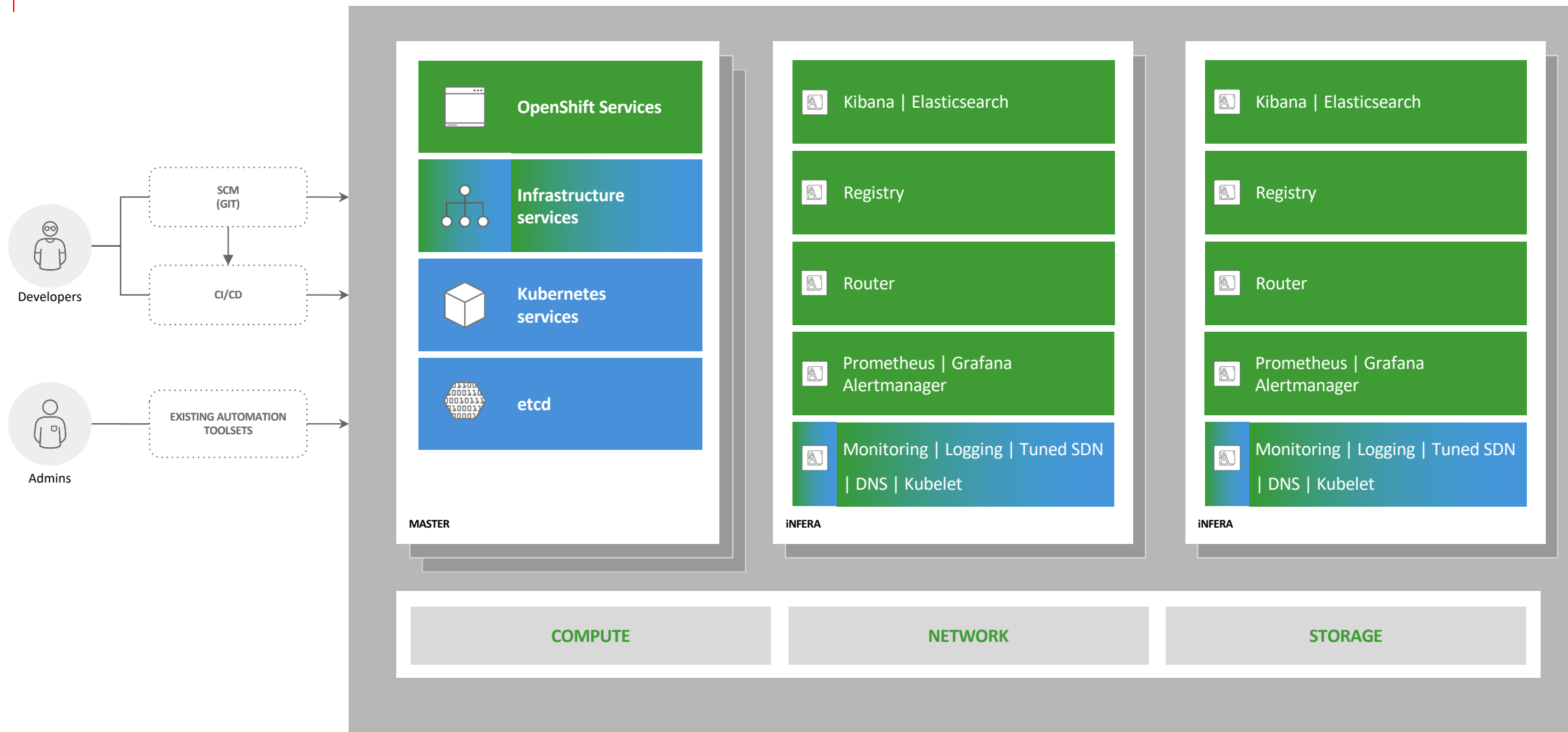
Attainment Measurement %

not only K8S ...

OPENSIFT CONTAINER PLATFORM

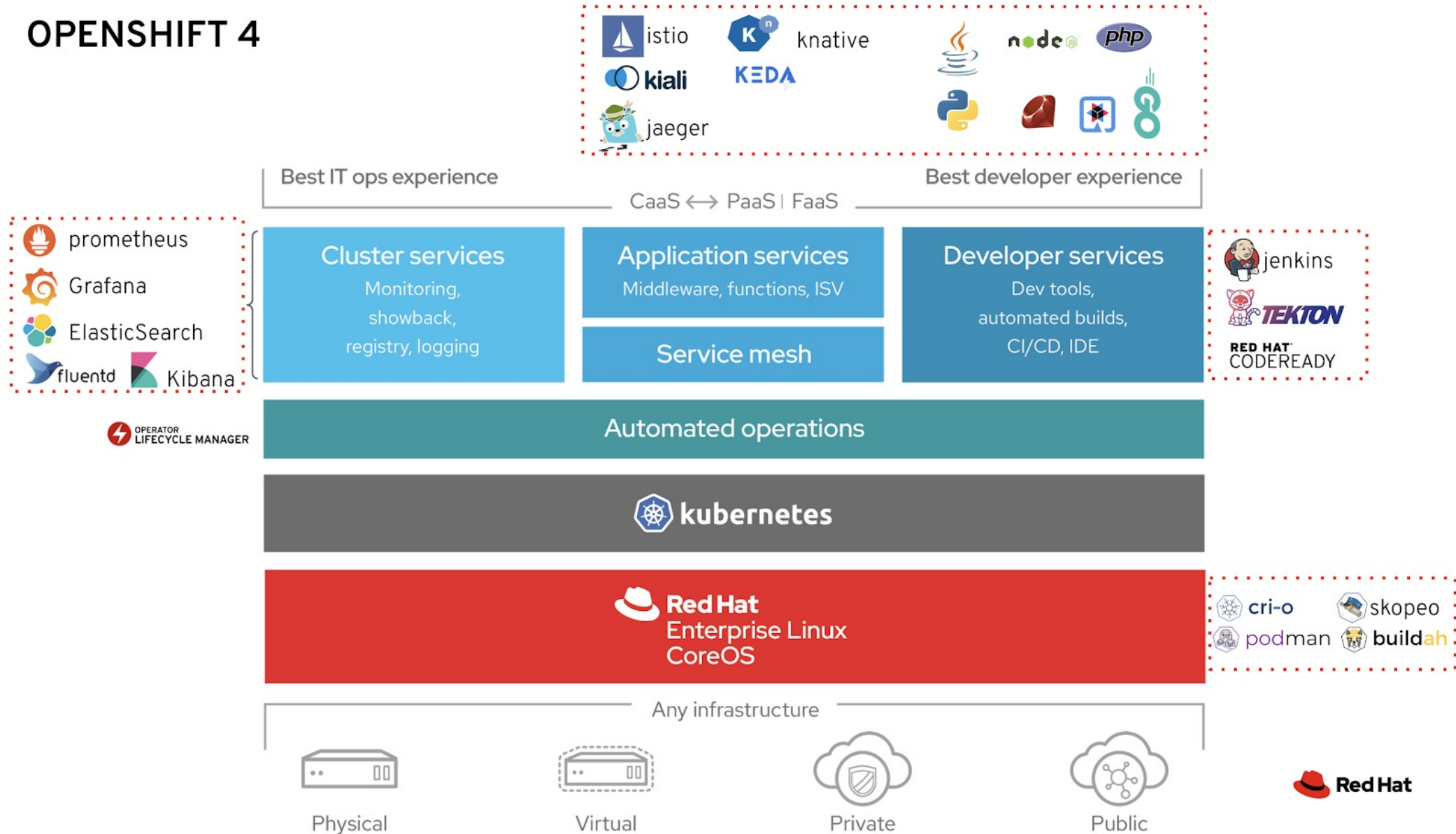


dev and ops via web, cli, API, and IDE

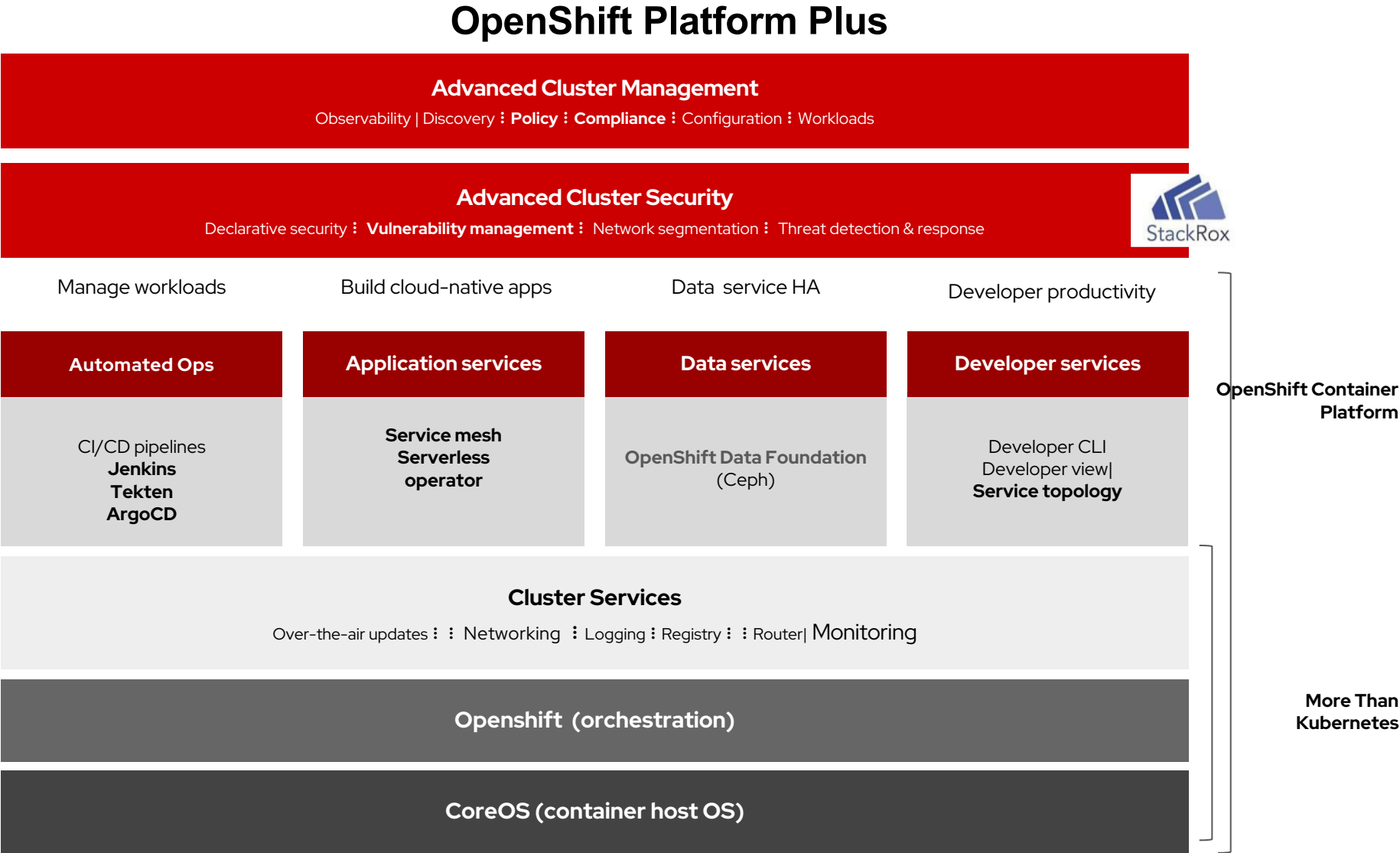


What's Inside

OPENSIFT 4



Continuous security for cloud-native applications



升級服務不中斷

Red Hat

OpenShift

Container Platform

Subscriptions

Secrets

Config Maps

Cron Jobs

Jobs

Daemon Sets

Replica Sets

Replication Controllers

Horizontal Pod Autoscalers

Networking

Storage

Builds

Monitoring

Compute

User Management

Administration

You are logged in as a

Cluster Settings

Details Cluster Operators Global Configuration

Channel

stable-4.4

Last Completed Version

4.4.5

Update to another version

View this cluster and manage subscription settings in OpenShift Cluster Manager

Cluster ID

3834755f-d312-4b46-9f63-bbd86e123f0d

Desired Release Image

quay.io/openshift-release-dev/ocp-release@sha256:7613d8f7db639147b91b16b54b24cfa351c3cbde6aa7b7b1b9c80c260efad06

Cluster Version Configuration

CV version

Cluster Autoscaler

Create Autoscaler

Details Cluster Operators Global Configuration

Channel

stable-4.4

Current Version

4.4.6

Update Status

Update available

Update now

View this cluster and manage subscription settings in OpenShift Cluster Manager

Cluster ID

3834755f-d312-4b46-9f63-bbd86e123f0d

Desired Release Image

quay.io/openshift-release-dev/ocp-release@sha256:7613d8f7db639147b91b16b54b24cfa351c3cbde6aa7b7b1b9c80c260efad06

Cluster Version Configuration

CV version


Cluster Autoscaler

Create Autoscaler

Update History

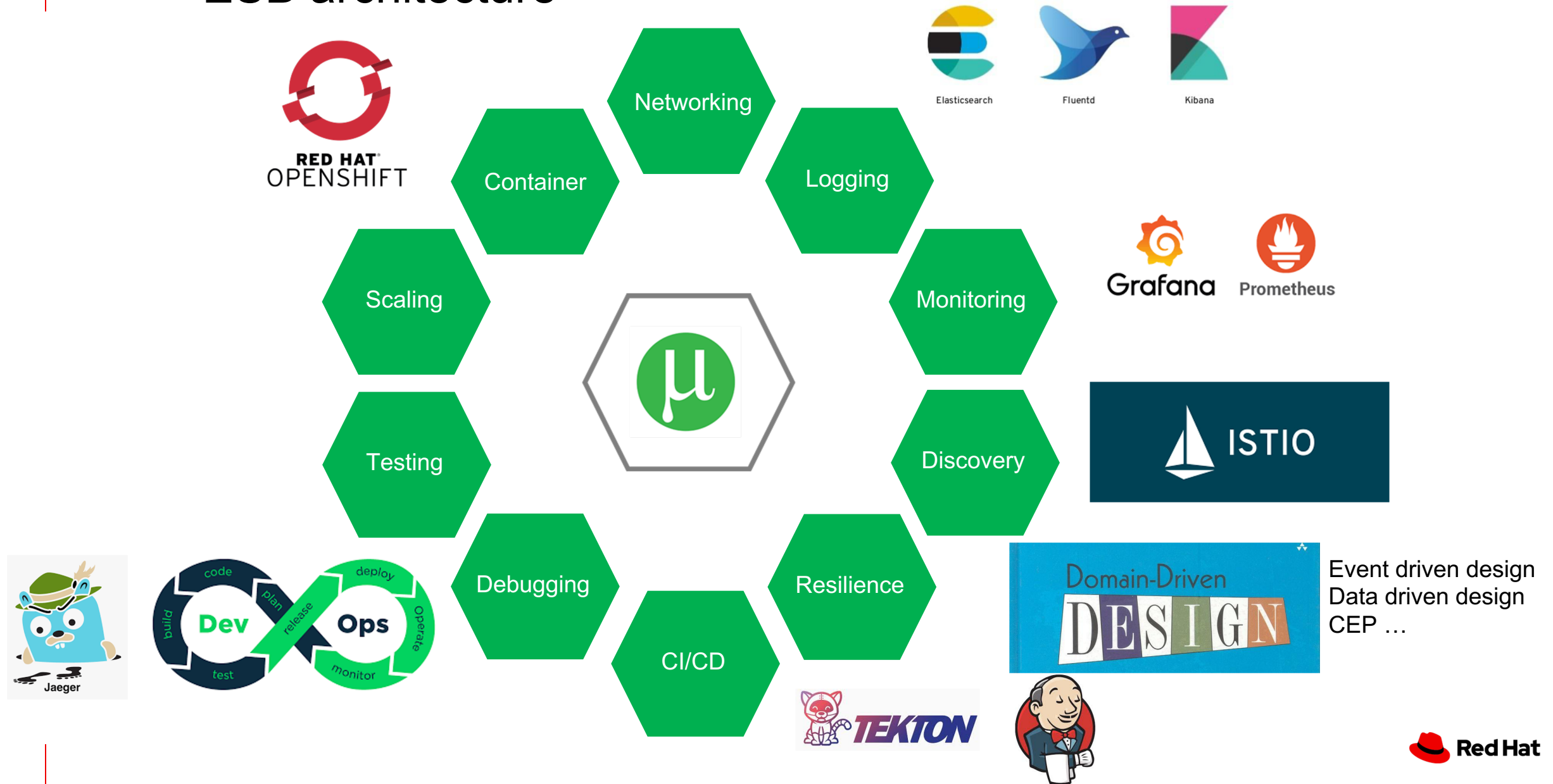
Version	State	Started
4.4.6	Completed	Jul 1, 3:20 pm
4.4.5	Completed	Jul 1, 11:20 am

11

 Red Hat

Design Principles

The service governance, that not easy in traditional ESB architecture



Bottom-up vs. Top-Down

Mode 2

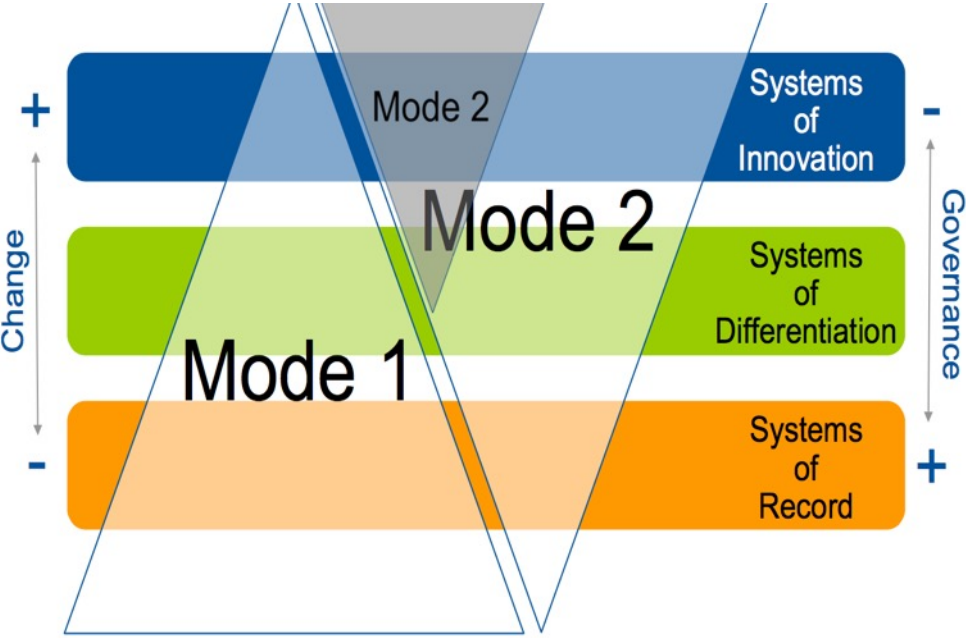
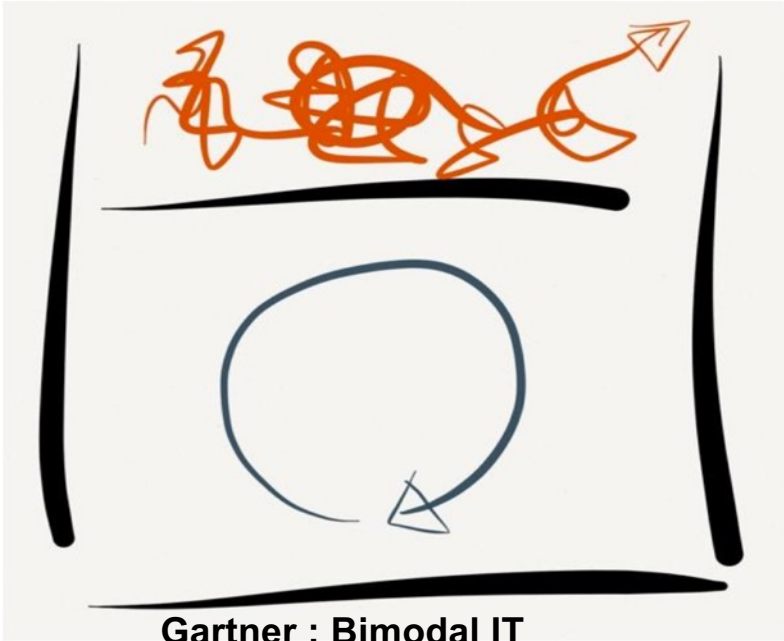
VS.

Mode 1

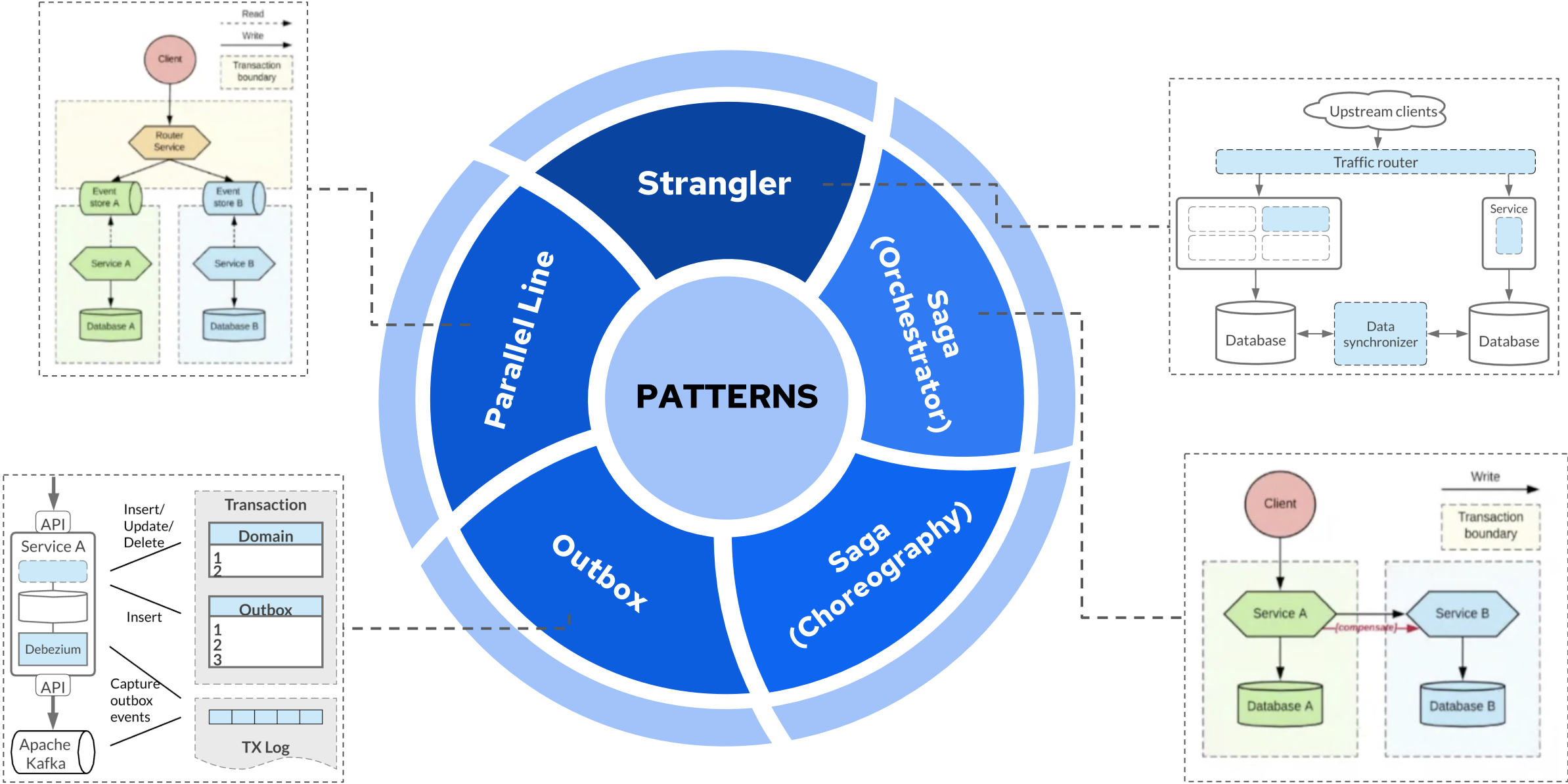
Bottom-up , Agile, Kanban, DevOps	Approach	Top-down , Waterfall, ITIL
Revenue, brand, customer experience	Value	Price for performance
Empirical, continuous, process-based	Governance	Plan-driven, approval-based
Small, new vendors, short-term deals	Sourcing	Enterprise suppliers, long-term deals
Good at new and uncertain projects	Talent	Good at conventional process, projects
Business-centric, close to customer	Culture	IT-centric, removed from customer
Short (days, weeks)	Cycle Times	Long (months)

Mode 2

Mode 1



Architectural Patterns



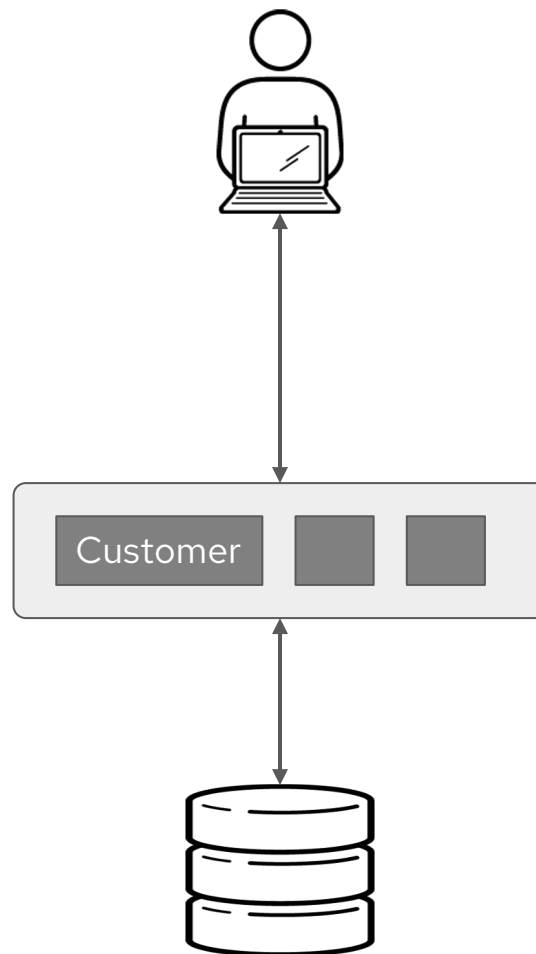
Microservices

Mono to micro: Strangler Pattern

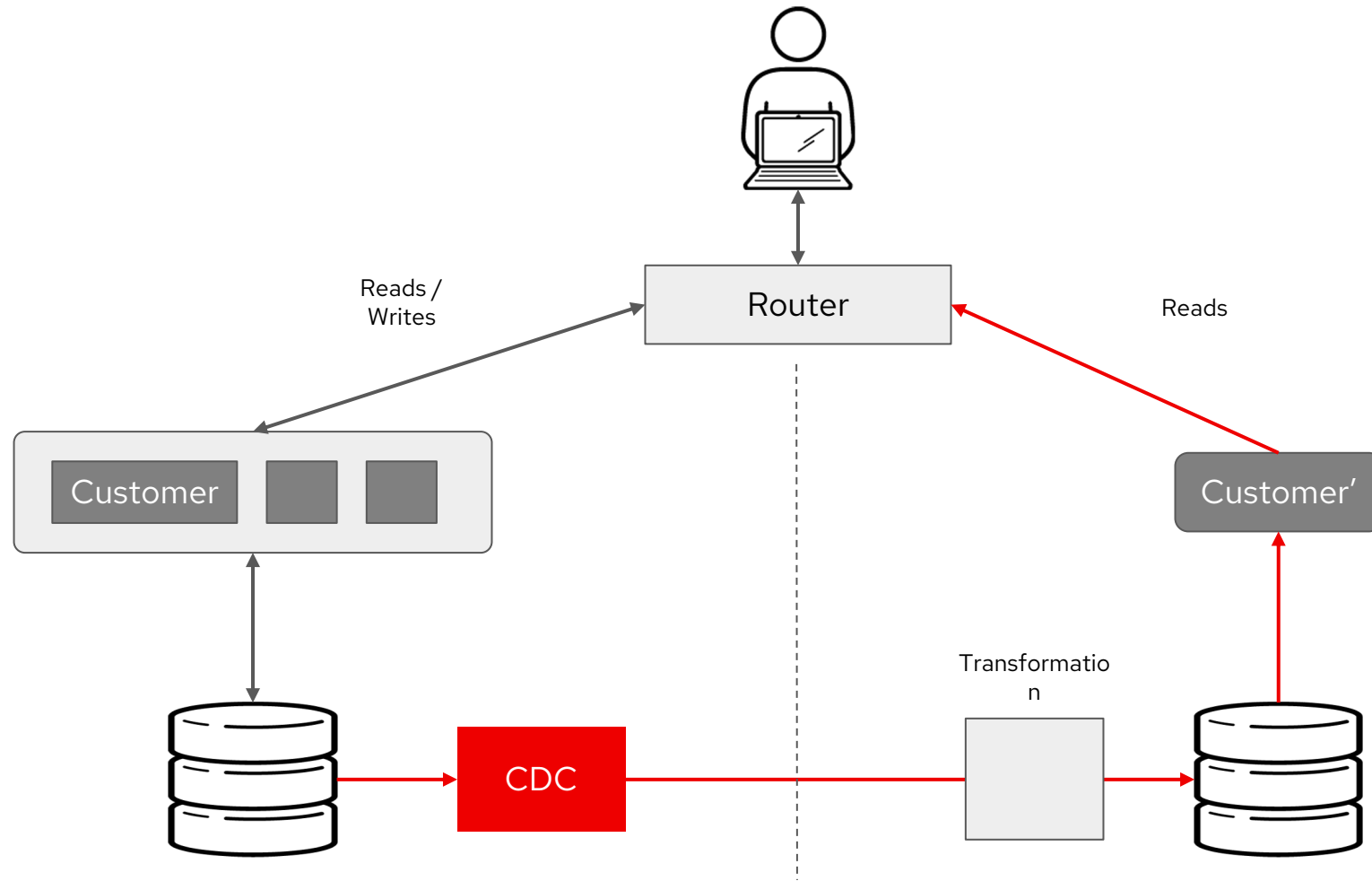


- Extract **microservice** for single component(s)
- Keep write requests **against running monolith**
- **Stream changes** to extracted microservice
- Test new functionality
- **Switch over**, evolve schema only afterwards

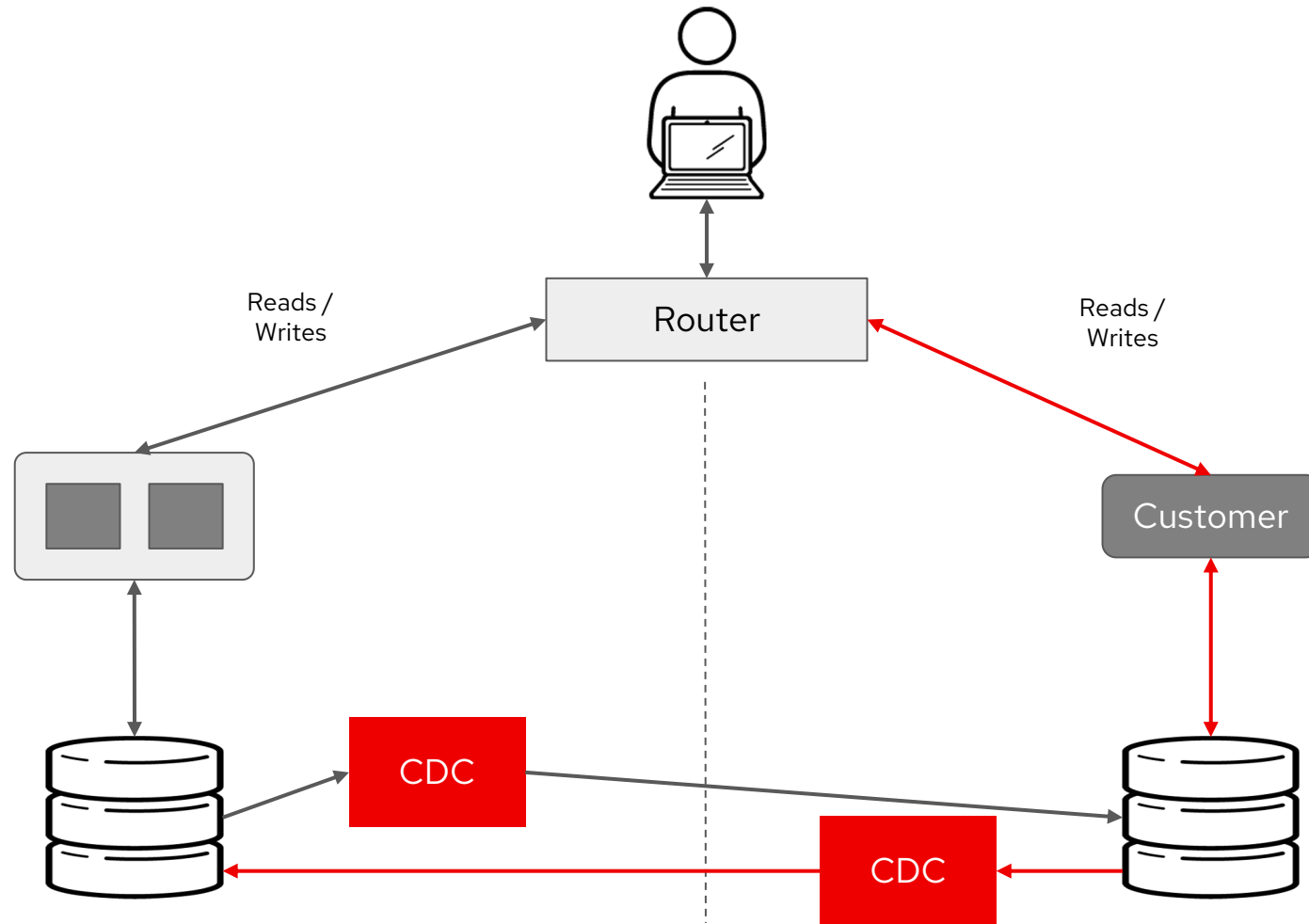
Mono to micro: Strangler Pattern



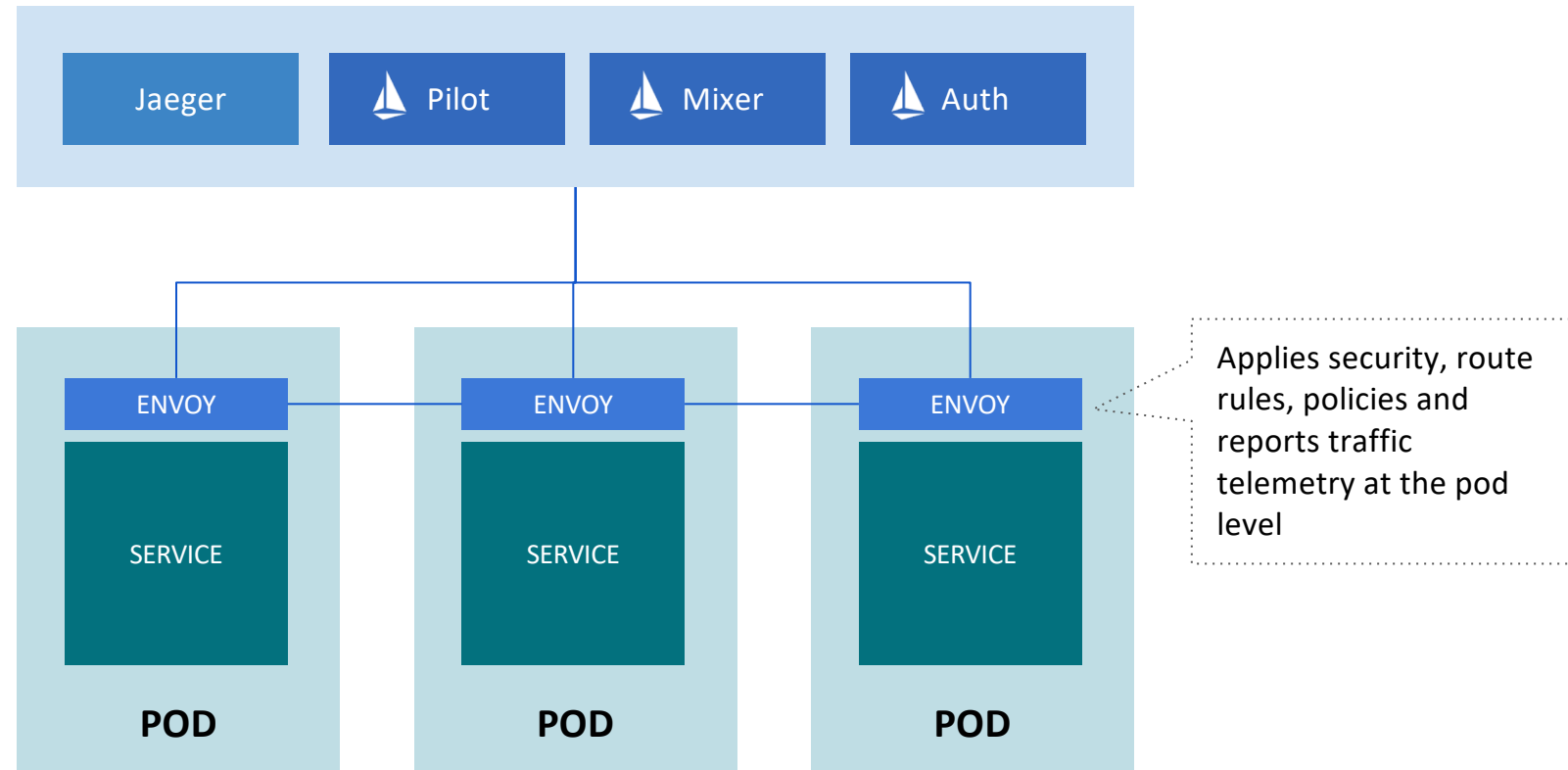
Mono to micro: Strangler Pattern



Mono to micro: Strangler Pattern



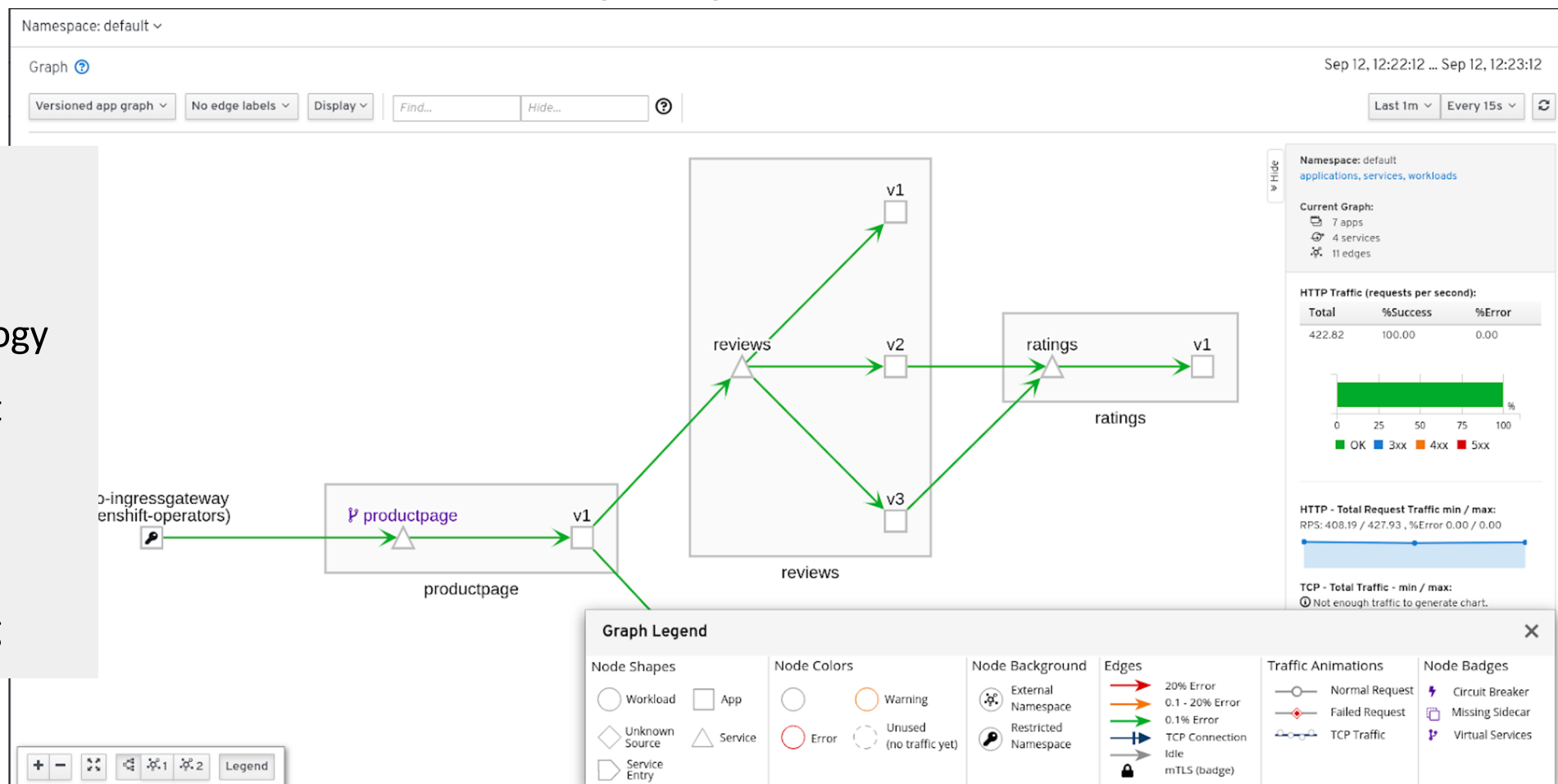
SERVICE MESH ARCHITECTURE



Enhanced Visualization of Cluster Traffic With Kiali

Visualization of what
Matters most:







- Application Topology
- Traffic throughput
- Error Rates
- Service Latency
- Service Versioning



Guided Configuration of Traffic Policies

Create Weighted Routing



WORKLOAD	TRAFFIC WEIGHT
 reviews-v1	<div><div></div><div></div><div>-</div><div>5</div><div>+</div><div>%</div><div></div></div>
 reviews-v2	<div><div></div><div></div><div>-</div><div>80</div><div>+</div><div>%</div><div></div></div>
 reviews-v3	<div><div></div><div></div><div>-</div><div>15</div><div>+</div><div>%</div><div></div></div>

Evenly distribute traffic

▼ [Hide Advanced Options](#)

VirtualService Hosts

reviews

The destination hosts to which traffic is being sent. Enter one or multiple hosts separated by comma.

 TLS

DISABLE ▼

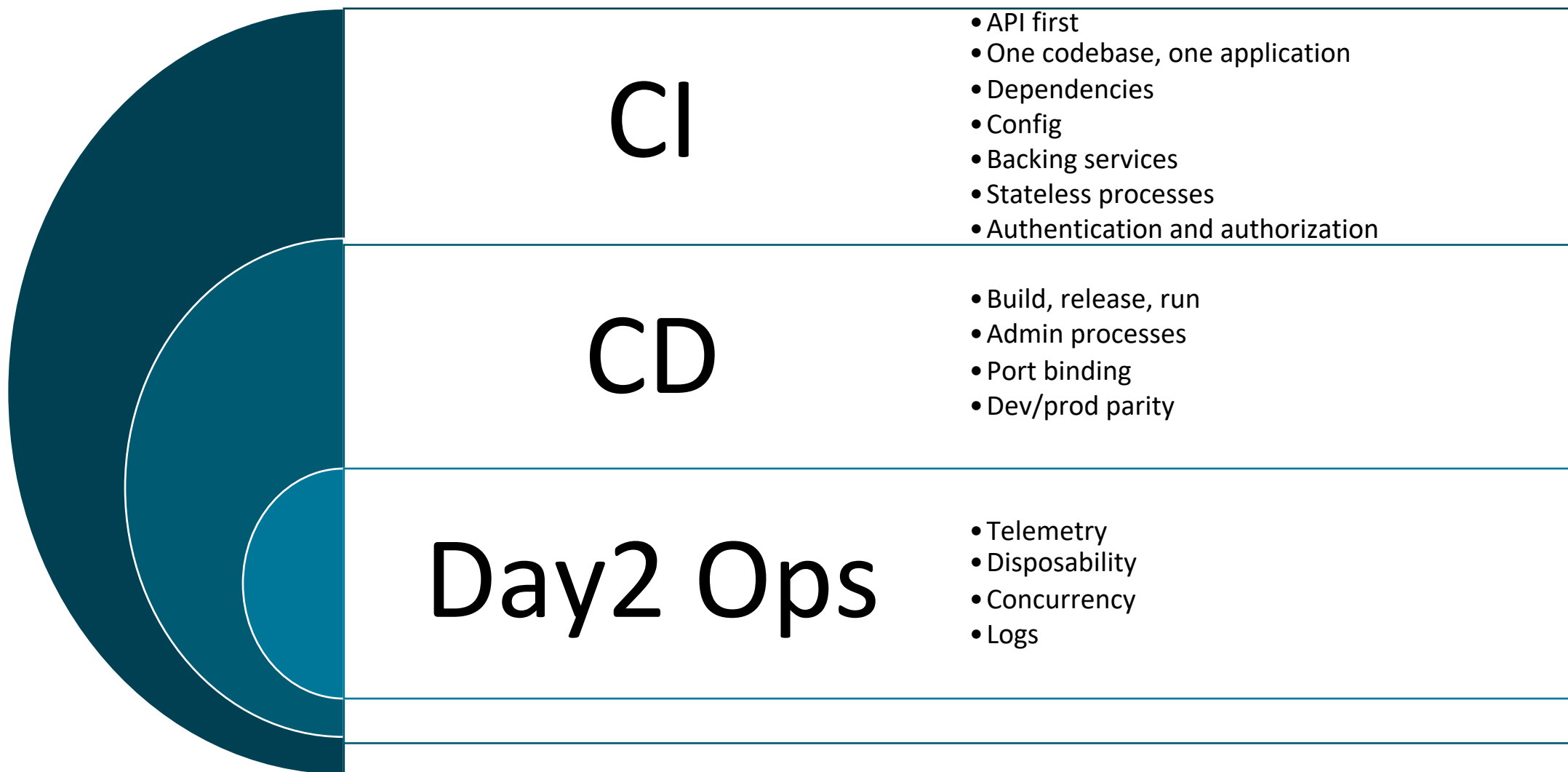
Add LoadBalancer

OFF

Add Gateway

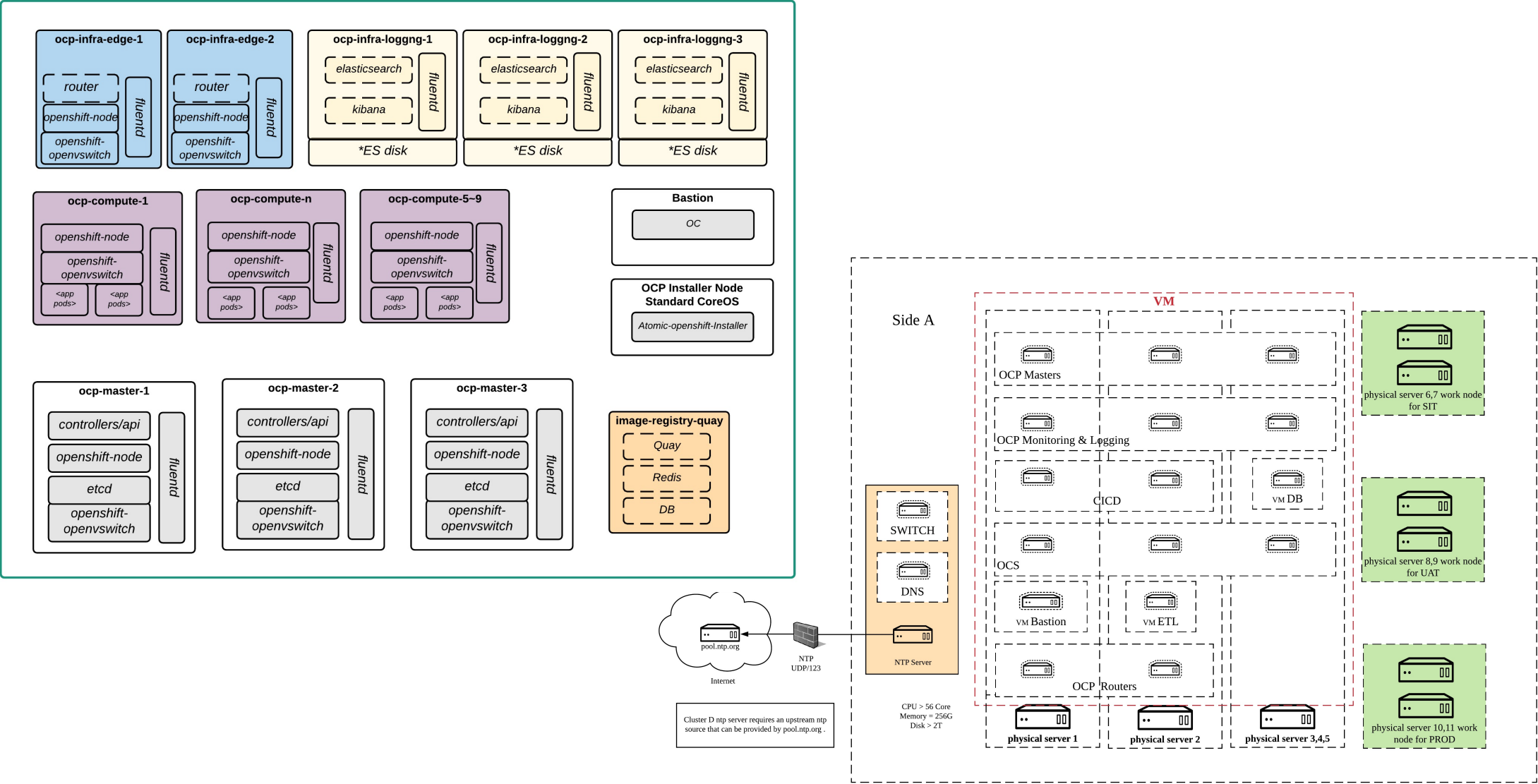
OFF

The Twelve-Factor App



Reference Architecture

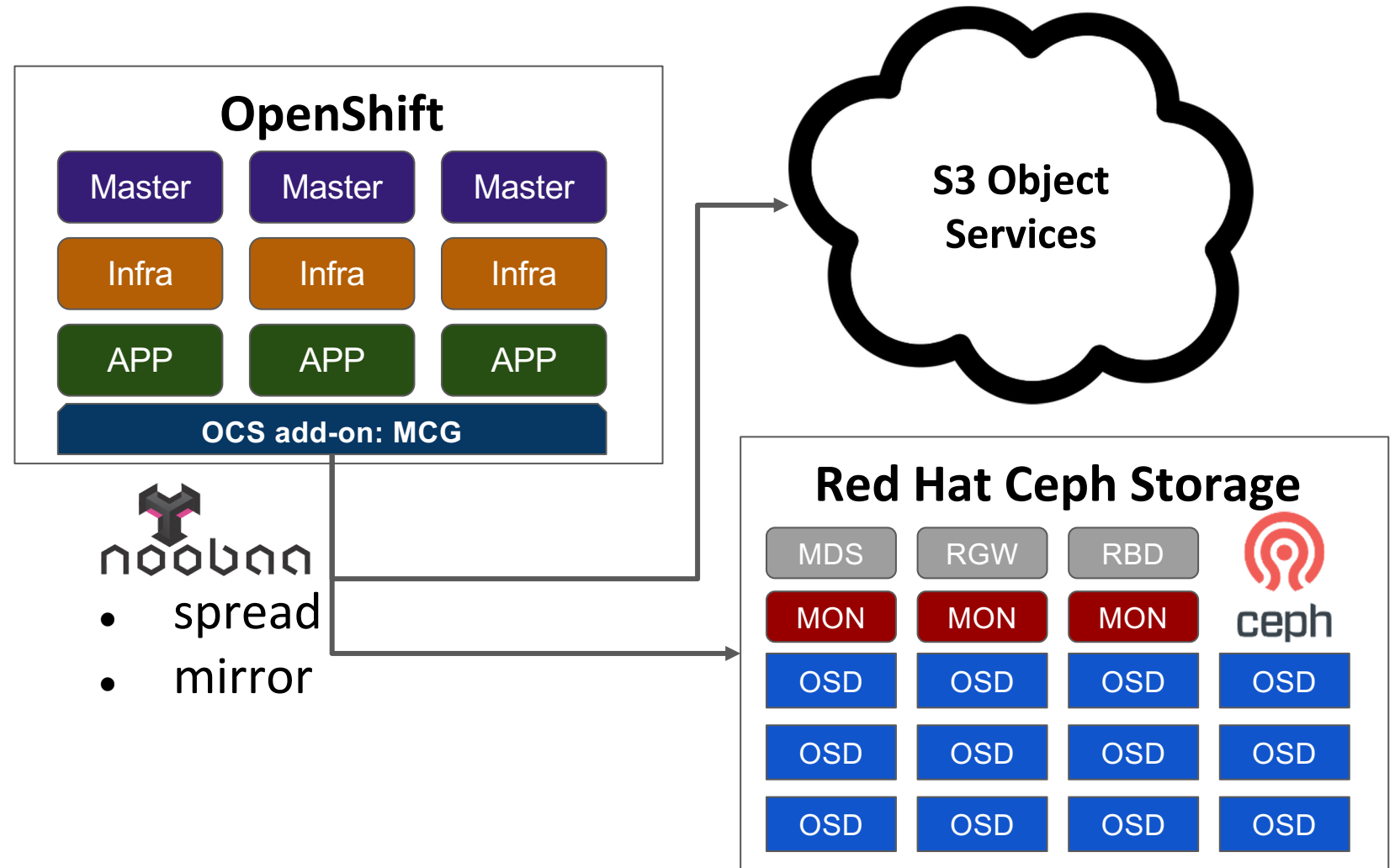
NEXT WAVE OF DEVELOPER TOOLS



OpenShift Backup/Restore (across sites)

Konveyor (velero + restic)

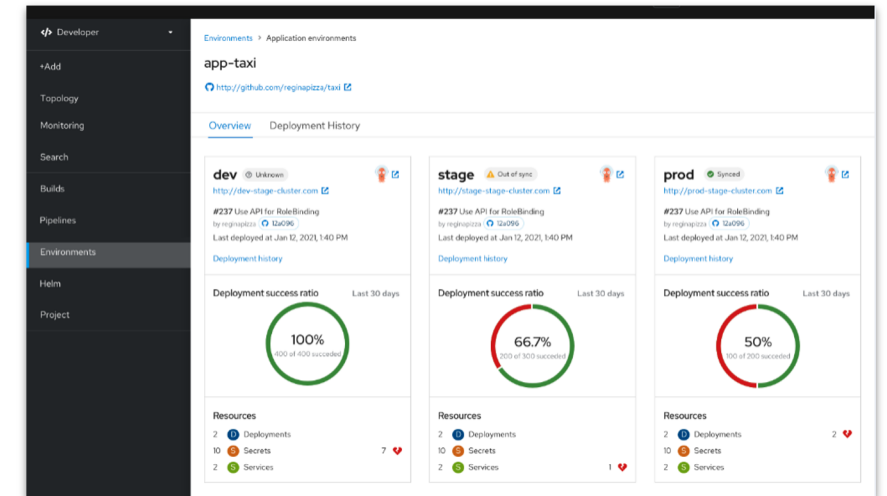
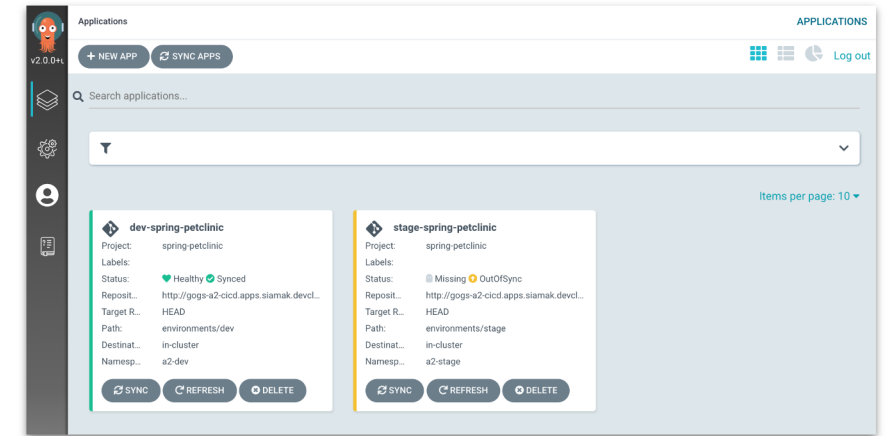
- Backup/Restore Targets
 - K8s Resources
 - PV storage
- Backup Storage Location
 - Only support S3
 - Leverage MCG to distribute backup data
- Backup/Restore CLI
 - [openshift-velero-plugin](https://github.com/redhat-openshift/velero-plugin)



What's new on OCP 4

OpenShift GitOps

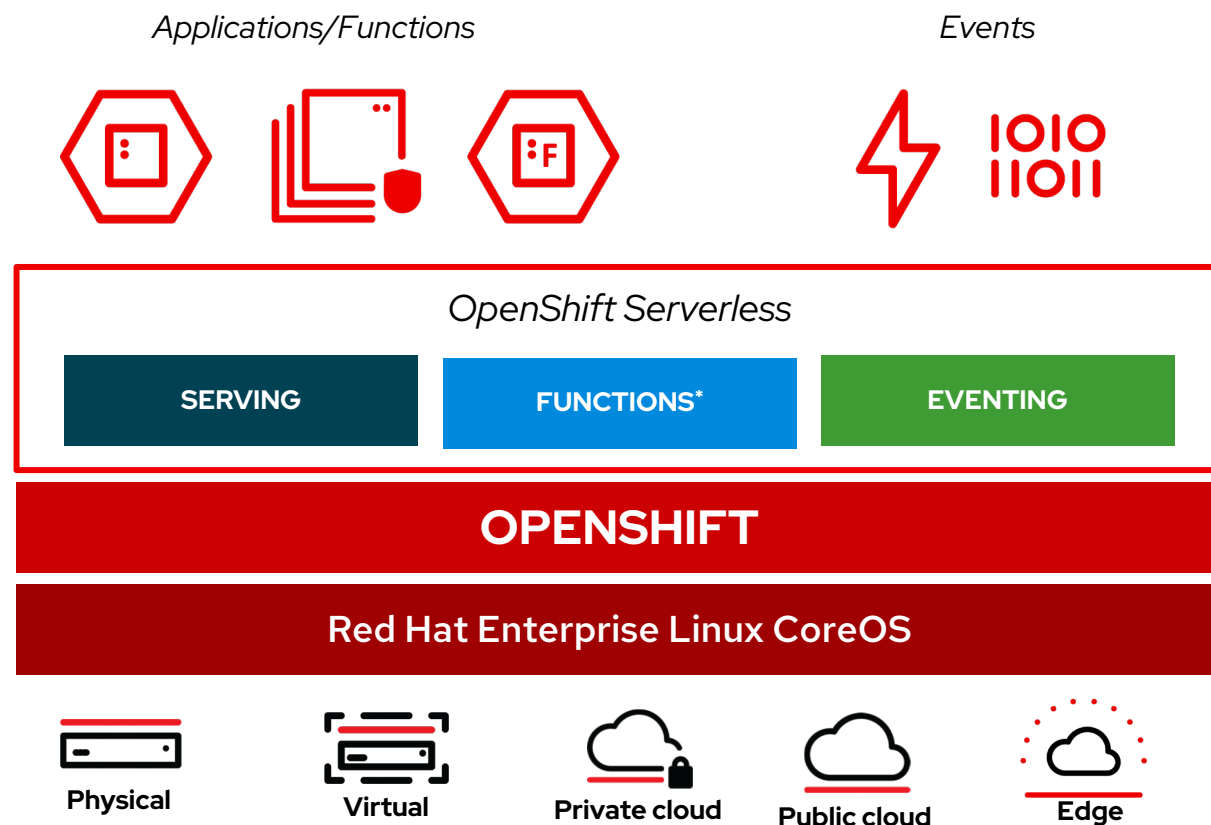
- OpenShift GitOps 1.3
- User groups and kube-admin support when log into Argo CD with OpenShift credentials
- ApplicationSet integration with RHACM for cluster lookup
- kustomize 4 support
- External cert manager support for TLS configs in Argo CD
- Router sharding for Argo CD
- (Dev Console) Application deployment environment details



OpenShift Serverless

Key Features & Updates

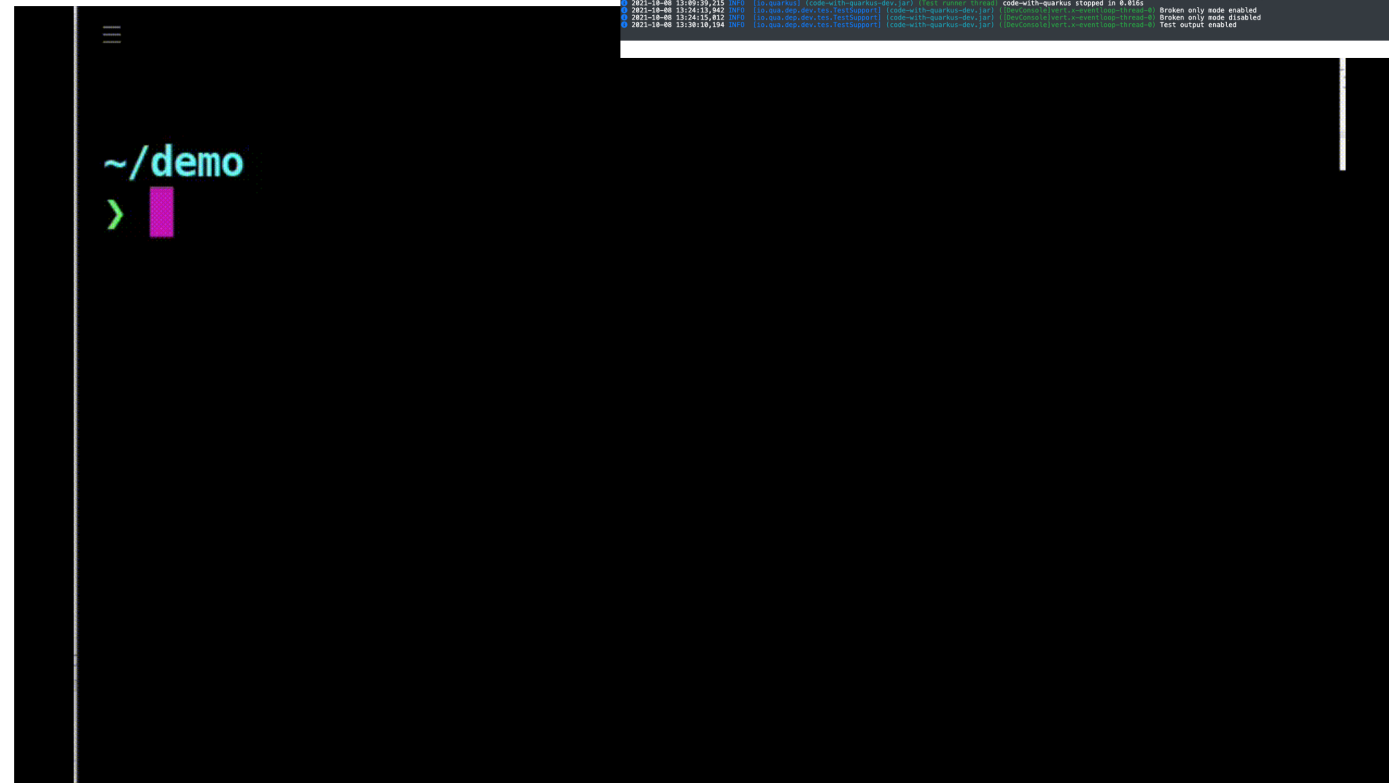
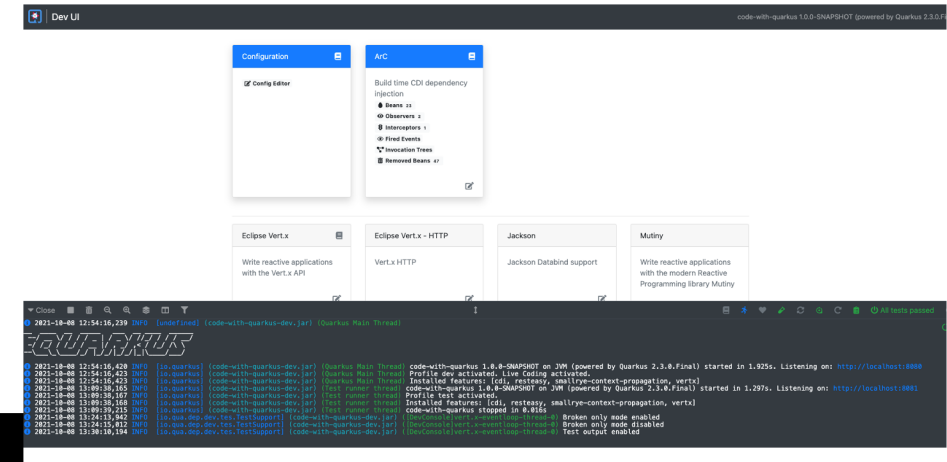
- ❖ Update to Knative 0.24
- ❖ **Security:** Encryption of Inflight Data with Service Mesh
- ❖ Custom Domain Mapping through DevConsole
- ❖ **Visualization:** New Monitoring Dashboards
 - CPU, Memory, Network Usage
 - Scaling Debugging
 - User workload monitoring through Knative Queue Proxy
- ❖ Support for emptyDir
 - Share files between sidecar and the main container
- ❖ **Functions**
- ❖ Node, Quarkus, Python, Go, SpringBoot, TypeScript^{New}, Rust^{New}
 - Access to data stored in secrets and config maps
 - Enabling Google Cloud Function on Knative
 - Available on MacOS , RHEL, Windows with Docker and/or Podman



Red Hat build of Quarkus 2.2

Key Features & Updates

- ❖ Developer Experience improvements
 - Quarkus Dev UI
 - Dev Services
 - Continuous Testing
 - Quarkus CLI
- ❖ Performance and framework efficiency
 - RESTEasy Reactive
 - Vert 4.x
- ❖ Service Binding
- ❖ Operator SDK
 - OpenShift Client



Conclusion

WHERE WE CAN HELP

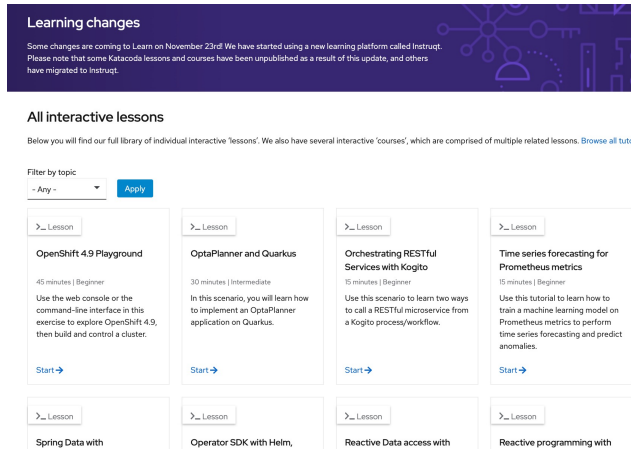
TRANSFORMING MORE THAN JUST TECHNOLOGY

- Build up OpenShift Container Platform
- CI/CD Pipelines
- Skill set Transfer

USS Yorktown: 90 Day (Top down: Traditional Way) VS 68 Hour (Bottom up: Work like the Open Source Community)

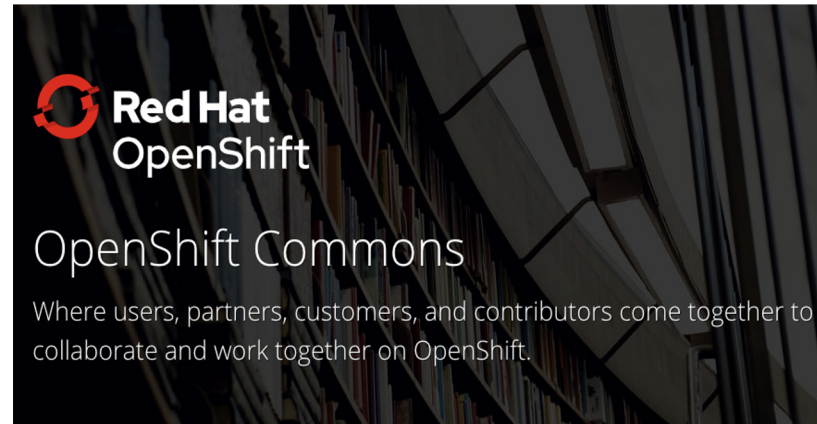
Learning resource

LEARNING MORE ABOUT OPENSIFT



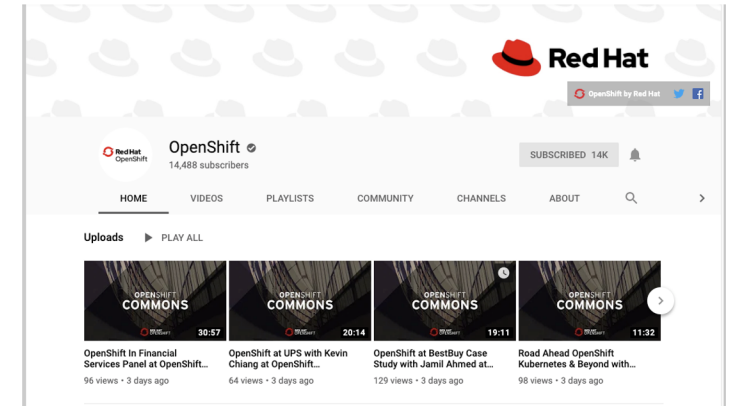
learn.openshift.com

- Self-paced, hands-on labs
- No equipment required



OpenShift Commons

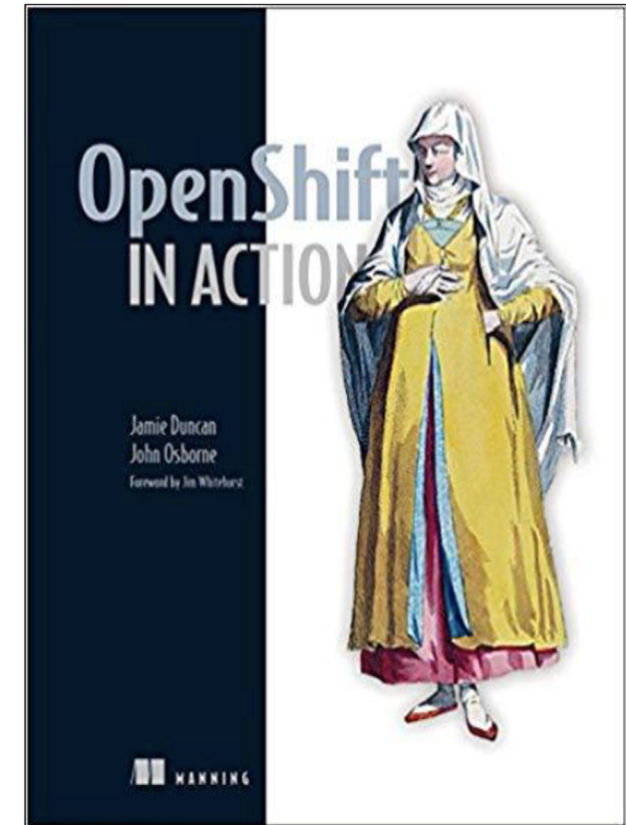
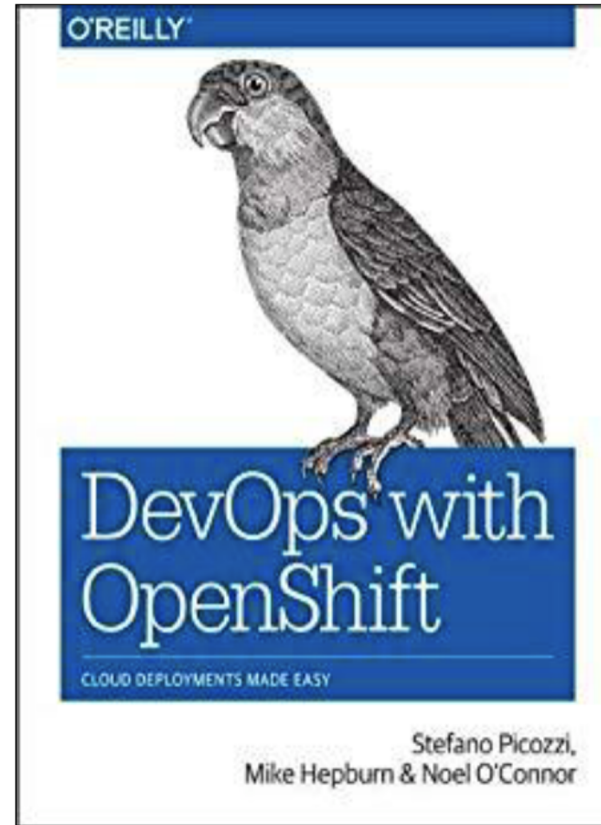
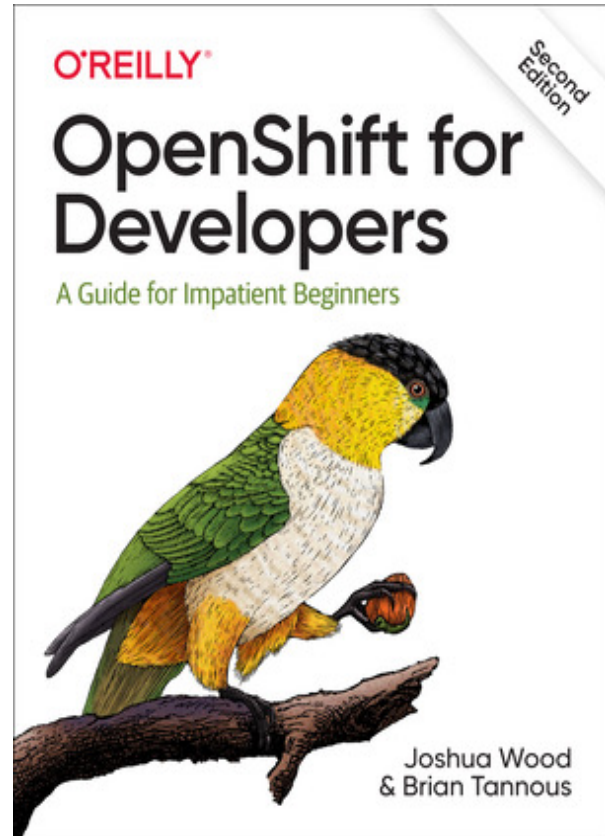
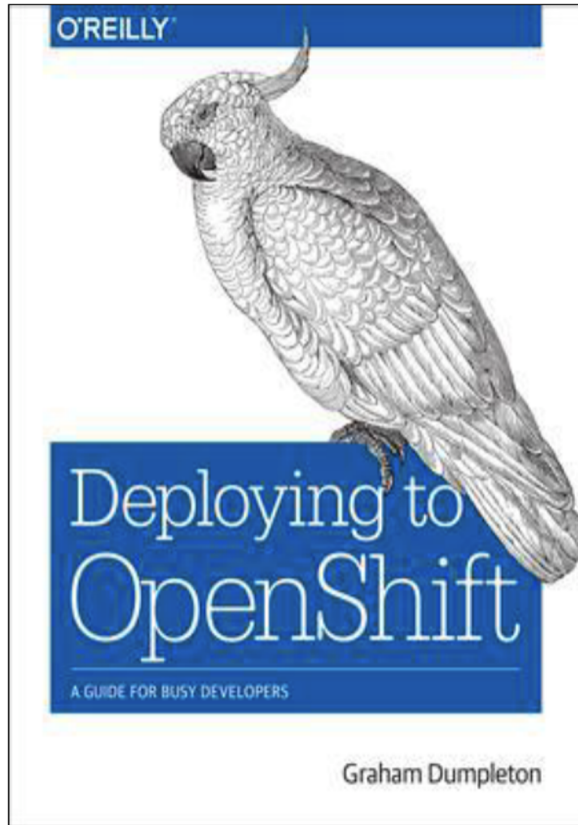
- Weekly videos
- Community
- Learn from others



OpenShift Youtube Channel

- Videos
- OpenShift Update

LEARNING MORE ABOUT OPENSIFT



Thank you

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