

# IBM Cloud Private Overview

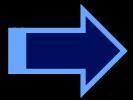
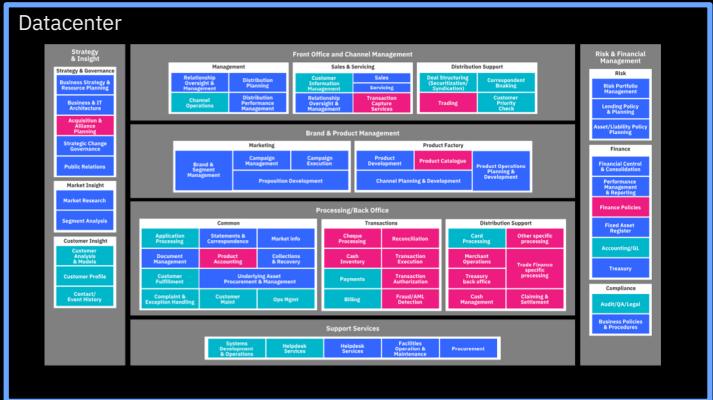
IBM



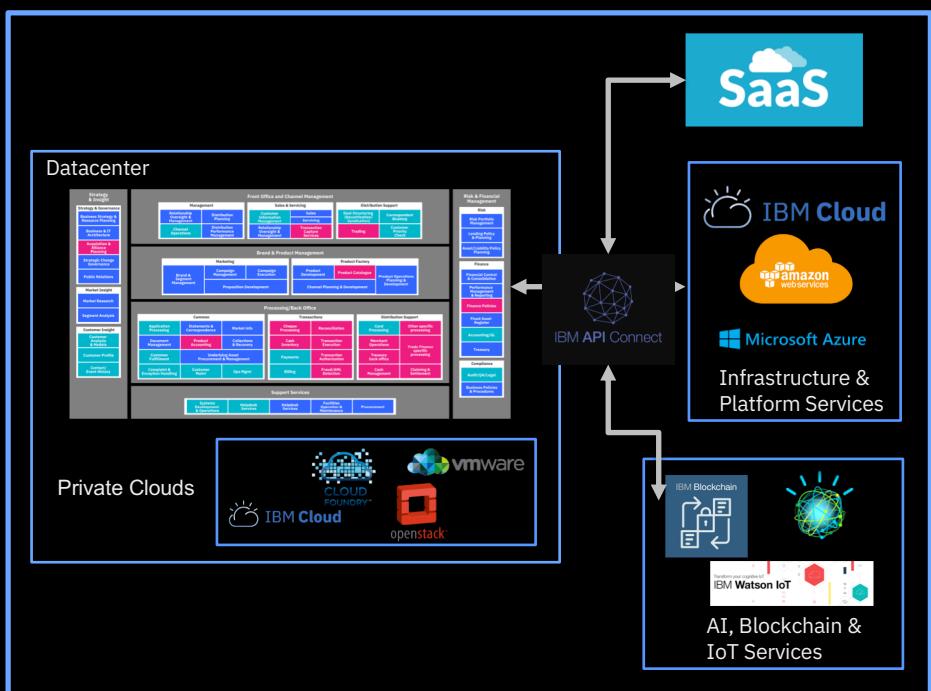
IBM Cloud 1

To accelerate digital transformation, enterprises are extending their applications and data to “clouds”...

Current Application Landscape



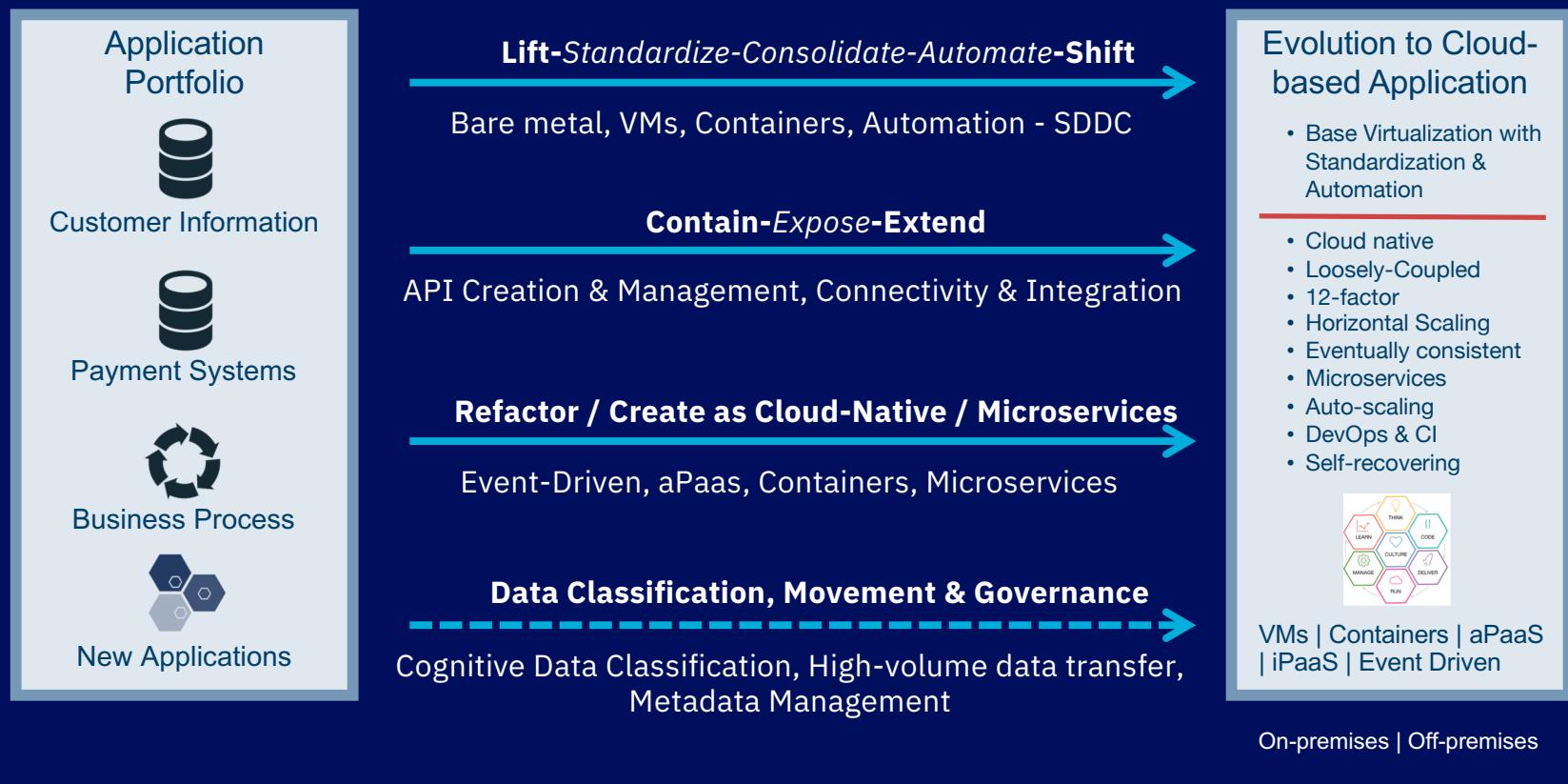
The New Application Landscape



The new landscape will be multi-cluster & multi-cloud

# Transformation uses multiple concurrent approaches

... to minimize risk & cost while leveraging new & existing investments to innovate & differentiate



# Use cases driving private cloud adoption

Optimize legacy apps with cloud

Self-service Experience
Next Generation Middleware, Data & Analytics
Automation & Orchestration
Containers & Common Services

Cloud-enabled middleware

Open your datacenter to work with cloud services

APIs
Integration Services & Cloud Native Programming Models
Automation & Orchestration

Integration & Hybrid Cloud

Public Cloud Services

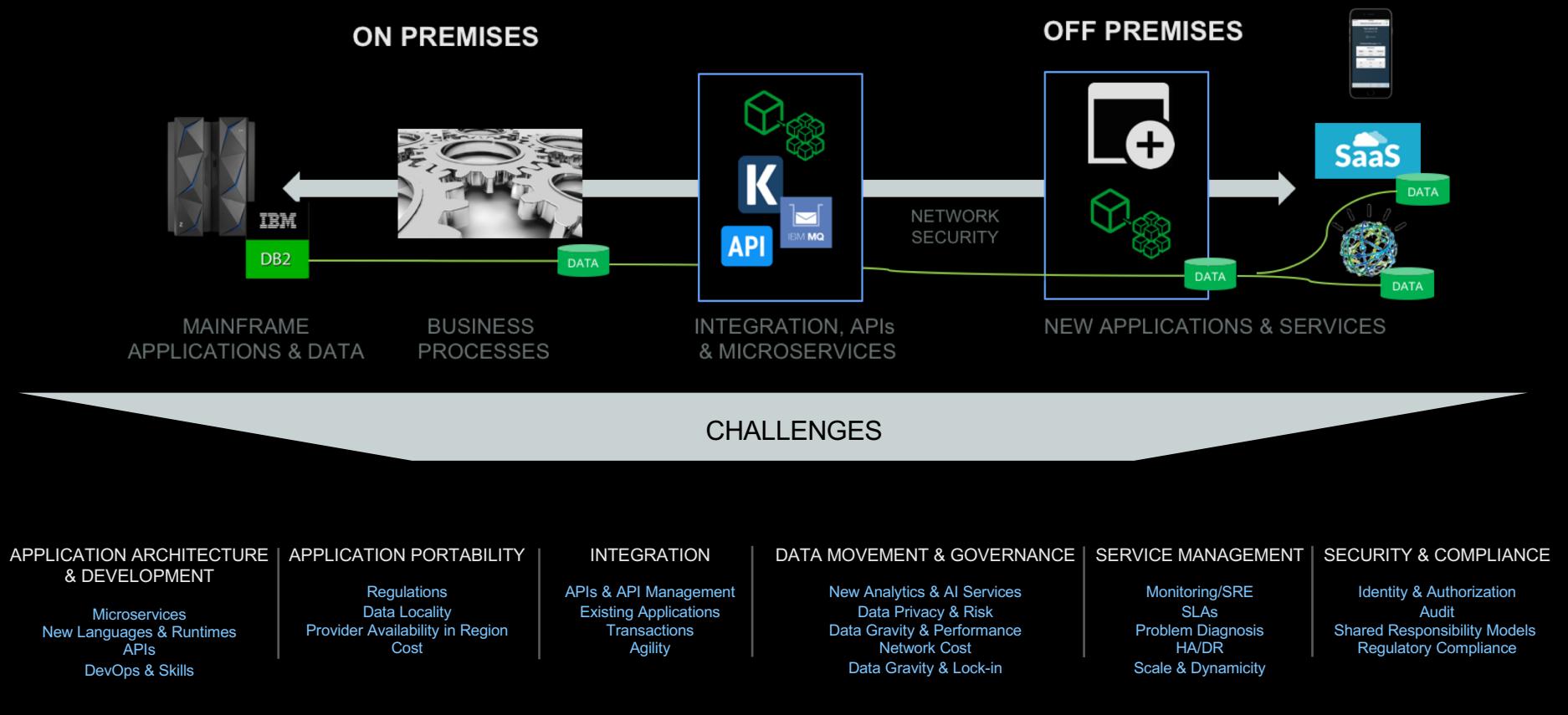
Machine Learning on p/z
Blockchain
Business Process
Data & Apps
On-Premises Software & Services

Create new cloud native applications

New Applications
Cloud Native Services & Runtimes
Automation & Orchestration
Containers & Common Services

New Applications

Enterprises will face new challenges in broadening the adoption of Cloud to critical applications ....



# IBM Cloud Private



## Kubernetes based container platform

Industry leading container orchestration platform across private, dedicated & public clouds

## Common Services

To simplify operations management, DevOps and hybrid integration

## IBM Middleware, Data & Analytics Services

Cloud enabled middleware, application runtimes, messaging, databases and analytics to optimize current investments and rapidly innovate

## Cloud Foundry

For prescribed application development & deployment

# IBM Cloud Private capabilities

## IBM DevOps Tools + Open Source

- Urban Code Release/Deploy
- Cloud Automation Manager

## IBM Supported Languages & Frameworks

- Container Images & Buildpacks for Java, Node, Swift, .Net
- Frameworks: Spring, JEE, Mobile, Many Node & Reactive

## IBM Cloud Private Catalog

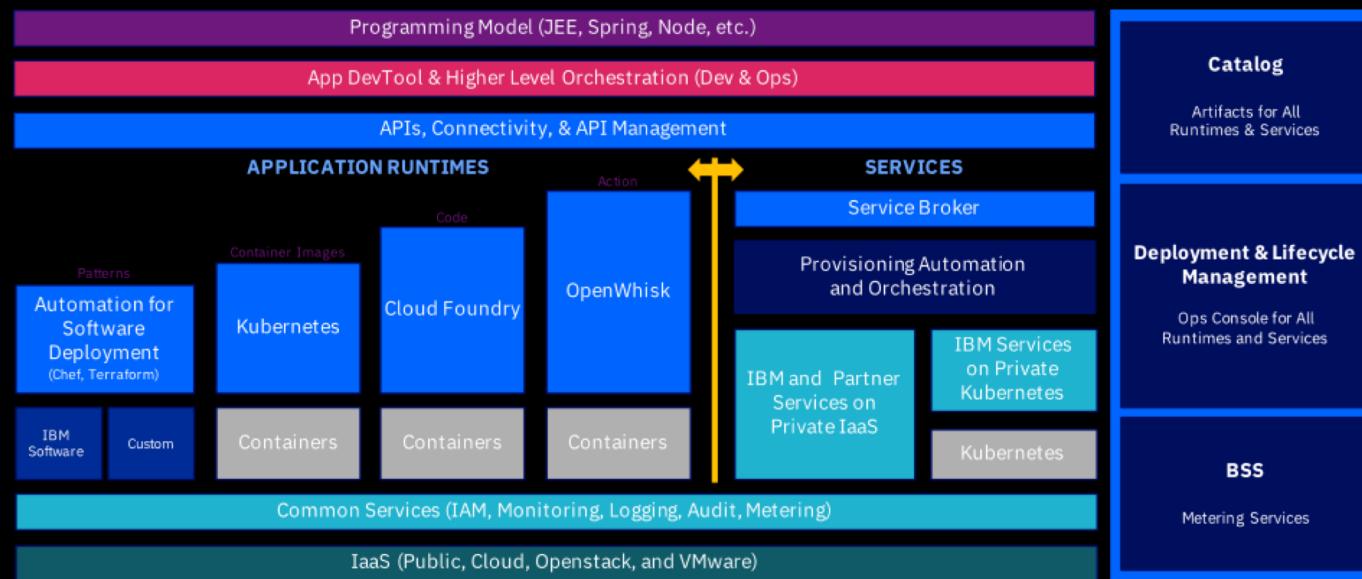
- Helm Charts
- Patterns
- Cloud Foundry Services

## IBM API Connect

- API Management
- Multi-cloud
- Open Standards

## Optimized runtimes for workloads

- Automation Patterns & Orchestration
- Container images
- Container Orchestration
- Buildpacks
- Actions, Events & Integrations



- Reuse existing infrastructure & virtualization
- Multiplatform support (Intel, System p & z)
- IBM Managed services
- IBM Storage

## Common Services

- Monitoring: Prometheus, Grafana
- Logging: ELK
- IAM: Built-in + Federation to

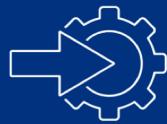
## Enterprise

- Metering: Product insights
- Key Management: Vault

Built upon Open Technologies

# The Four Tenets

Built on 4 Key Tenets to  
Drive Enterprise Transformation



Rapid  
Innovation



Hybrid  
Integration



Investment  
Leverage



Management and  
Compliance

**Enterprise** grade. **Open** by design.

# IBM Cloud Private brings cloud native to the enterprise



## Rapid Innovation

Open Kubernetes-based container platform

Cloud Foundry for app dev and deployment

Integrated DevOps toolchain



## Hybrid Integration

Integration capabilities to unlock and connect

Secure access to public cloud services (AI, Blockchain)

Consistent experience across private/public



## Investment Leverage

Containerized versions of IBM Middleware (WebSphere, MQ, DB2, DSX and popular Open Source)

Prescriptive guidance to optimize workloads

Work with existing apps, data, skills, infrastructure



## Management and Compliance

Core operational services including logging, monitoring, security

Flexibility to integrate with existing tools and processes

# Broadening the adoption of cloud

Preserve, standardize  
and automate subset of  
existing applications

Target: 20-30%  
Full Automation

Modernize and cloud-  
enable majority of  
infrastructure and  
applications

Target: 70-80%

Cloud-first approach to  
new applications and  
processes

Target: All new applications

## Key Challenges:

- Cultural transformation is complex and limits the scope & velocity of movement to cloud native development & management
- Lack of integrated solutions and tools to build new cloud native applications while integrating & evolving existing applications
- Operational challenges in integrating, managing and securing cloud and on-premises applications and data

# IBM **Cloud** Private changes your daily work routine



**Todd**

Operations / Admin

*Responsible for infrastructure, security, and management of the environment.*



**Jane**

Enterprise Developer

*Responsible for modernizing existing applications and creating new Cloud Native Workloads.*

IBM **Cloud** Private empowers both developers and administrators to meet business demands:

- IT Operations and Administrators can quickly set up a modern, flexible, and compliant private cloud on enterprise infrastructure that enables enterprise developers to innovate; they can also integrate with their existing management tools and processes
- Developers can create new cloud-native applications, optimize existing ones, and securely connect their applications with data and services across all clouds

# **IBM Cloud Private**

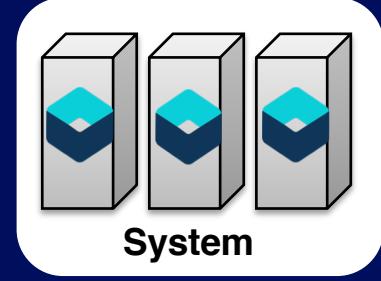
How do you run Kubernetes in  
the Enterprise?

**Let's say we want to run a  
container in production...**



Kubernetes brings  
orchestration  
primitives to  
support different  
styles of workloads:

- Stateless  
(ReplicaSets)
- Stateful  
(StatefulSets)
- Batch (Jobs)
- System  
(DaemonSets)

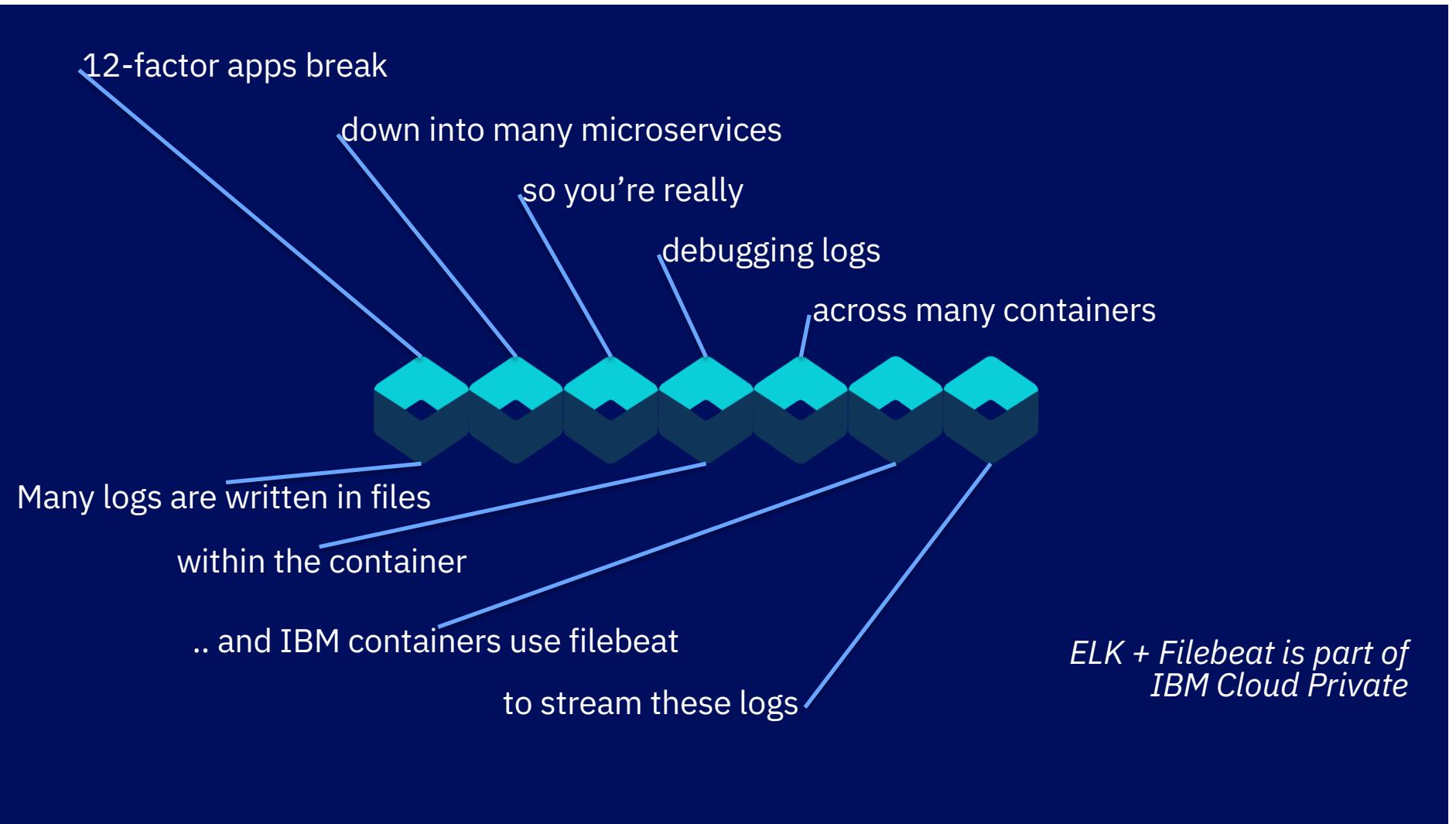


**How do you manage these containers in production?**



Every container produces logs

Logs are critical for debugging and post-mortem in production failures



**kibana**

737 hits      New Save Open Share < ⏪ Last 15 minutes ⏩

kubernetes.namespace:tranadv      Uses lucene query syntax

Add a filter +

**logstash-\***

Selected Fields  
t kubernetes....  
t log

Available Fields

Popular  
t kubernetes.con...  
t kubernetes.na...  
@ @timestamp  
t @version  
t \_id  
t \_index  
# \_score  
t \_type  
t beat.hostname  
t beat.name  
t beat.version  
t input\_type  
t kubernetes.con...

May 15th 2018, 22:22:45.693 - May 15th 2018, 22:37:45.693 — Auto

Count

@timestamp per 30 seconds

Time	kubernetes.pod	log
▶ May 15th 2018, 22:37:41.990	tranadv-ibm-transadv-dev-couchdb-664ddb57b-vw2lt	[error] 2018-05-16T02:37:41.989525Z nonode@nohost emulator ----- Error in process <0.11553.1900> with exit value: {database_does_not_exist, [{mem3_shards,load_shards_from_db,"_users", [{"file,"src/mem3_shards.erl"},{line,403}]}], [{mem3_shards,load_shards_from_disk,1, [{"file,"src/mem3_shards.erl"},{line,378}]}]}
▶ May 15th 2018, 22:37:36.989	tranadv-ibm-transadv-dev-couchdb-664ddb57b-vw2lt	[error] 2018-05-16T02:37:36.988732Z nonode@nohost emulator ----- Error in process <0.6782.1900> with exit value: {database_does_not_exist, [{mem3_shards,load_shards_from_db,"_users", [{"file,"src/mem3_shards.erl"},{line,403}]}], [{mem3_shards,load_shards_from_disk,1, [{"file,"src/mem3_shards.erl"},{line,378}]}]}
▶ May 15th 2018, 22:37:36.989	tranadv-ibm-transadv-dev-couchdb-664ddb57b-vw2lt	[notice] 2018-05-16T02:37:36.988772Z nonode@nohost <0.342.0> ----- chttpd_auth_cache changes listener died database_does_not_exist at mem3_shards:load_shards_from_db/6(line:403) <= mem3_shards:load_shards_from_disk/1(line:378) <= mem3_shards:load_shards_from_disk/2(line:407) <=

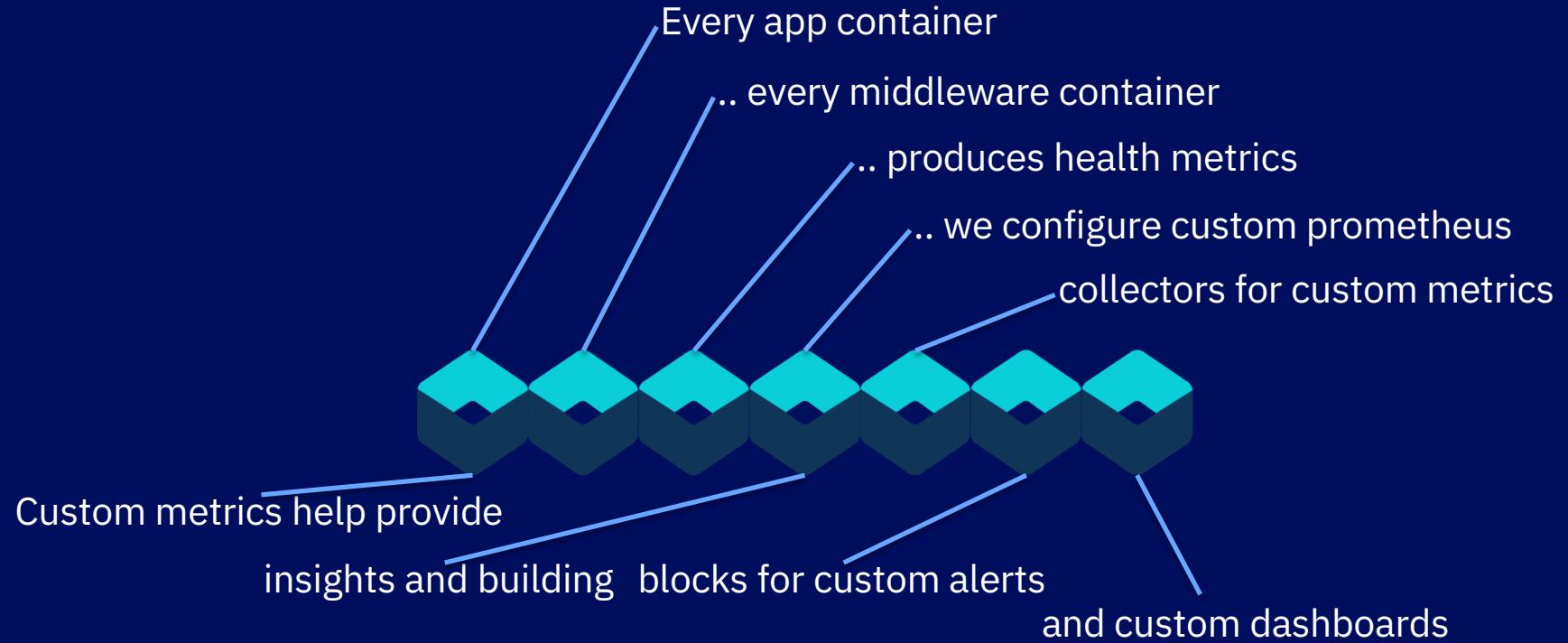
Collapse



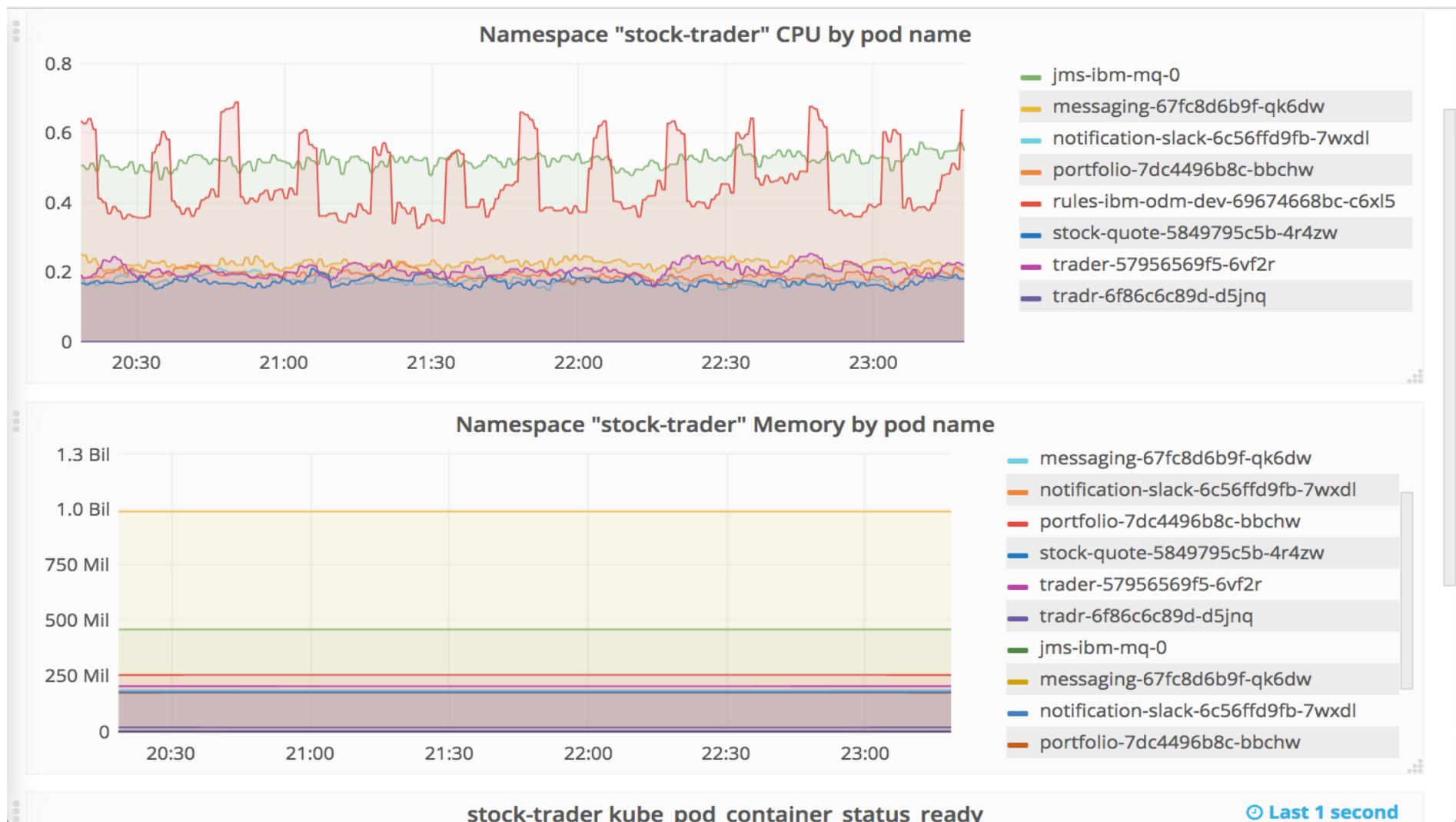
Every container must have its health monitored

Basic liveness probes in Kubernetes ensure failed pods are restarted.

But this is only the beginning of your monitoring challenge across a containerized platform



*Prometheus + Grafana is part of IBM Cloud Private*





Every container must be managed for license usage  
Showback per namespace is supported now

**IBM Metering** is part of *IBM Cloud Private*

[← Back](#)[View all](#)[IBM Integration Bus \(1\)](#)[IBM Microclimate Devop... \(1\)](#)[modernpets-jpetstoredb \(21\)](#)[nginx \(13\)](#)[Node.js Sample Application \(2\)](#)[qmgr \(7\)](#)[Reference Product \(25\)](#)[Web Terminal \(2\)](#)

### Search Instances (7)

appmsg-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

appmsg10-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

appmsg11-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

davemq-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

davemq1-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

myappmsgq-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

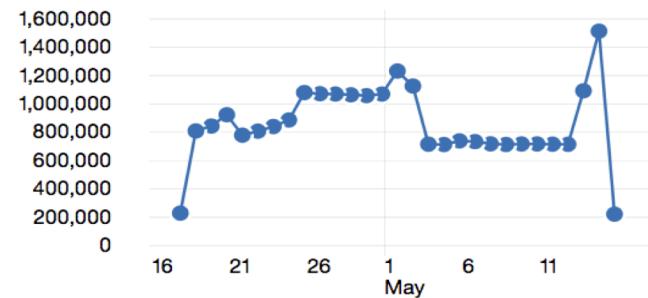
myappq-ibm-mq-0  
/NAMESPACE:default?CONTAINER:qmgr

qmgr

[Usage](#)[Details](#)

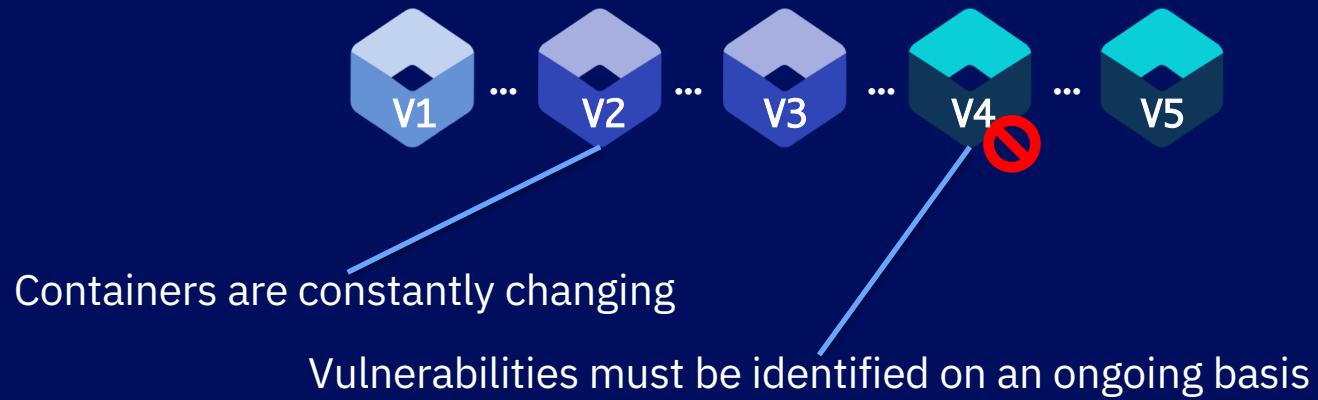
Processor Usage (ms)

1 Month

Latest update: May 15, 2018 | 23:24:52  
EDT[Export to CSV ↑](#)

Apr 15, 8:00 PM - May 15, 11:31 PM

Total ..... 24930027.28 ms

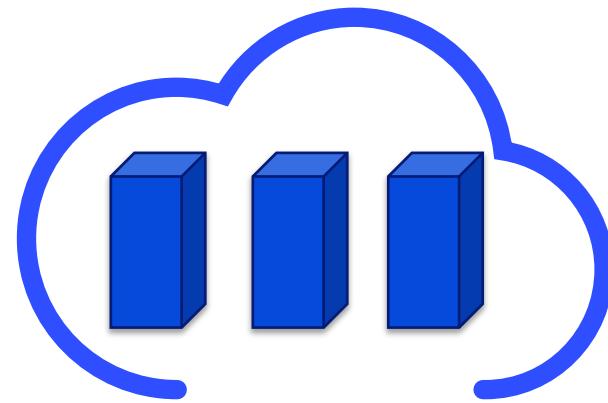


***IBM Vulnerability Advisor*** is  
part of IBM Cloud Private

Vulnerability Advisor for IBM Cloud Private		List Images/Containers	Manage Policies			
Name	Owner	Crawled Time	Type	Organizational Policies	Vulnerable Packages	Container Settings
<a href="#">kube-system/k8s-proxy-10.10.25.226/POD/17dd5c395b38a4e82233590b2247f60e972af5b5d25c2bccb0e29ad7b000f40b</a>	kube-system	2018/05/15 23:40:18	Container	Passed	Not Scanned	Not Scanned
<a href="#">kube-system/vulnerability-advisor-rootkit-annotator-7dc7d8454b-gsv52/rootkit-annotator/1033d13335ab151219584b82e537cf0158a6146161e6126f55a372192bb5ef64</a>	kube-system	2018/05/15 23:40:17	Container	Passed	Not Scanned	Not Scanned
<a href="#">kube-system/k8s-etcd-10.10.25.226/POD/e5da0dc402bd7b0199457126ed202ade70879f494f2b0d456a54574a36340801</a>	kube-system	2018/05/15 23:40:15	Container	Passed	Not Scanned	Not Scanned
<a href="#">kube-system/k8s-proxy-10.10.25.226/proxy/d9bdc517810372e0c5ca3611c756ee1018ce958a762c3fb3b927ae24232ce6ab</a>	kube-system	2018/05/15 23:40:15	Container	Passed	Not Scanned	Not Scanned
<a href="#">kube-system/k8s-etcd-10.10.25.226/etc/3af5f81ed53d108e1d551f8ea018a3cc567032ab0f1ecc9a1f1d7e5e1225f1f7</a>	kube-system	2018/05/15 23:40:14	Container	Passed	Not Scanned	Not Scanned
<a href="#">kube-system/k8s-master-10.10.25.226/POD/c7f2c39cc05c24a66910bfee95a1faf8be514a93edacd1b1132e40ebc3f121da</a>	kube-system	2018/05/15 23:40:14	Container	Passed	Not Scanned	Not Scanned

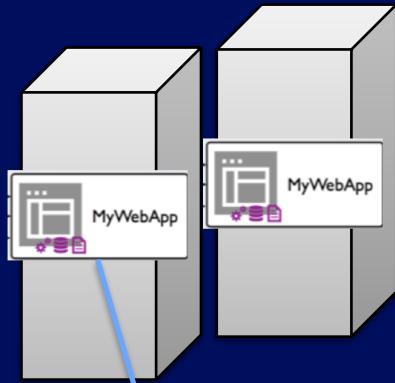


Containers are everything!

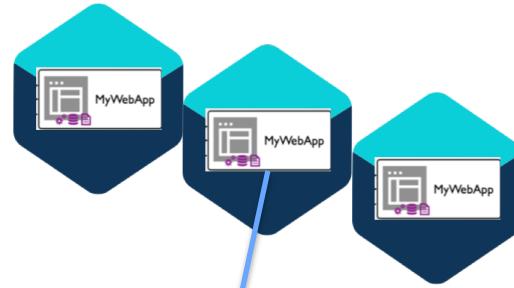


... but not everything is a container yet.

***IBM Cloud Automation Manager*** enables  
*hybrid workload management*  
*which is part of IBM Cloud Private*



Most apps today aren't in containers



... and customers need help  
to modernize these  
workloads

***IBM Transformation Advisor*** enables  
*insights into existing apps which is part of*  
*IBM Cloud Private*

# IBM Transformation Advisor

Transformation Advisor is a tool that **consumes information about your WebSphere Environment and Applications.** These inputs are combined with rules and insights gained from years of working with WebSphere and WebSphere applications to provide recommendations for your cloud journey.

## CHALLENGES

- Leverage existing application logic
- Need to accelerate application development and maintenance
- Monolithic applications that are complex and brittle

## BENEFITS

- Included and deployed on IBM Cloud Private
- Introspects existing WebSphere Deployments
- THE source of truth
- Provides recommendations for Application Modernization

Welcome to Transformation Advisor.

We know that migrating your legacy applications to the cloud can be overwhelming and difficult. Transformation Advisor will help you take your first step towards getting your legacy WebSphere applications onto IBM Cloud Private.



Tired of this top section? [Hide it](#)

Let's get started.

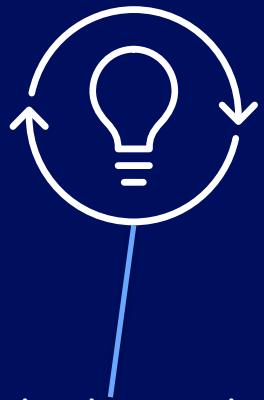
Choose a workspace. [?](#)

Add a new workspace



You have no workspaces, try creating one!

*Enabling app modernization for our existing estates is part of IBM Cloud Private*



Transforming innovative ideas



... into business value delivered through containers

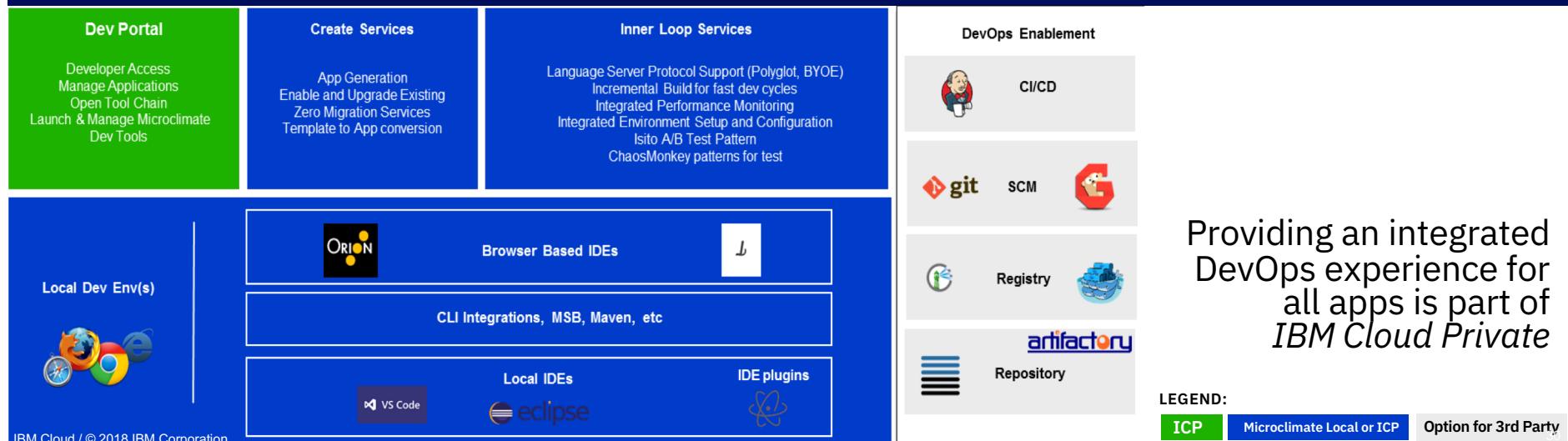


***IBM Microclimate*** enables rapid creation of new apps which is part of *IBM Cloud Private*

# IBM Microclimate

Microclimate is an **end to end development environment that lets you rapidly create, edit, and deploy applications.**

Applications are run in **containers** from day one and can be delivered into production on **Kubernetes** through an automated DevOps pipeline using **Jenkins**. Microclimate can be installed locally or on **IBM Cloud Private**.



# Helm - Introduction

Helm helps you manage Kubernetes applications – Helm Charts helps you define, install, and upgrade even the most complex Kubernetes application.

## Why Teams ❤️ Helm



### Manage Complexity

Charts describe even the most complex apps; provide repeatable application installation, and serve as a single point of authority.



### Easy Updates

Take the pain out of updates with in-place upgrades and custom hooks.



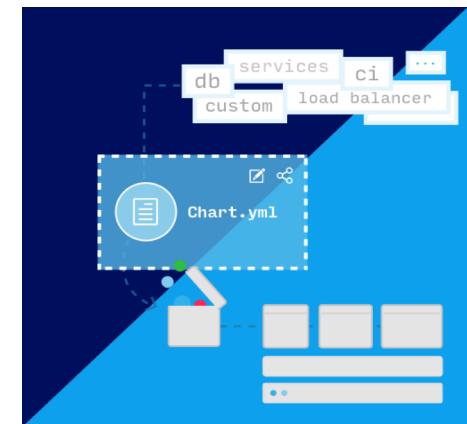
### Simple Sharing

Charts are easy to version, share, and host on public or private servers.



### Rollbacks

Use `helm rollback` to roll back to an older version of a release with ease.



# Charts, Repositories and Releases

**Charts:** A bundle of Kubernetes resources

**Repository:** A collection of charts.

**Releases:** A chart instance loaded into Kubernetes . Same chart can be deployed several times and each becomes its own release

The screenshot shows the IBM Cloud Private Catalog interface. At the top, there's a navigation bar with 'IBM Cloud Private' and links for 'Create resource', 'Docs', 'Support', and a user icon. Below the navigation is a search bar with a placeholder 'Search items' and a 'Filter' button. The main area is titled 'Catalog' and contains a section for 'Helm charts'. It says 'Deploy your applications and install software packages'. There are three rows of charts, each with a circular icon, the chart name, a brief description, and a 'ibm-charts' badge. The charts listed are: 'ibm-cloudant-dev' (Cloudant for Linux), 'ibm-datapower-dev' (IBM DataPower Gateway), 'ibm-db2oltp-dev' (IBM Db2 Developer-C Edition 11.1.2.2 iFix002); 'ibm-db2warehouse-dev' (Db2 Warehouse Developer-C for Non-Stop), 'ibm-dsm-dev' (IBM Data Server Manager Developer-C Edition. Note), 'ibm-dsx-dev' (IBM Data Science Experience (DSX)); 'ibm-icplogging' (Log storage and search management solution), 'ibm-icplogging-kibana' (Installs Kibana, a web UI to query and visualize), 'ibm-icpmonitoring' (IBM monitoring service in private cloud).

*Providing an easy to use, extend, and compose catalog of IBM and Third-Party content is part of IBM Cloud Private*

So we've talked about:

- Logging
  - Monitoring
  - Alerts
  - IBM Metering
  - IBM Vulnerability Analysis
  - IBM Cloud Automation Manager
  - IBM Transformation Advisor
  - IBM Microclimate
  - A rich catalog of content
- 

All of these services require ongoing updates



*Ensuring seamless ongoing updates for all services is part of IBM Cloud Private*

- Logging
  - Monitoring
  - Alerts
  - IBM Metering
  - IBM Vulnerability Analysis
  - IBM Cloud Automation Manager
  - IBM Transformation Advisor
  - IBM Microclimate
  - A rich catalog of content
- 



... as Jane or Todd, how do I interact with these services?

*Identity & Access Management ensures consistent identity across all platform services and is part of IBM Cloud Private*

We introduce “Teams” on top of raw Kubernetes Roles/ClusterRoles

Teams bind a collection of resources – both inside and outside of Kubernetes

... to a set of users with defined roles

- Namespaces
- Image Repos
- Helm Repos
- Helm Charts
- ... and more



Operator



Editor

Team

*Our team model is based on the proven access control model from UrbanCode Deploy which is part of IBM Cloud Private*

- Logging
  - Monitoring
  - Alerts
  - IBM Metering
  - IBM Vulnerability Analysis
  - IBM Cloud Automation Manager
  - IBM Transformation Advisor
  - IBM Microclimate
  - A rich catalog of content
- 

All of these services expose network endpoints via TLS

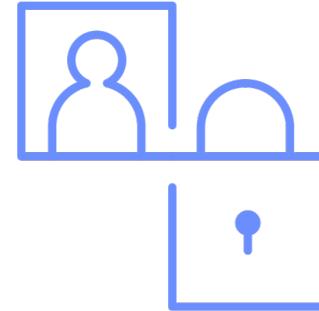
All of these services store data which is encrypted at rest



*Ensuring data in transit and data at rest security for all platform services is part of IBM Cloud Private*

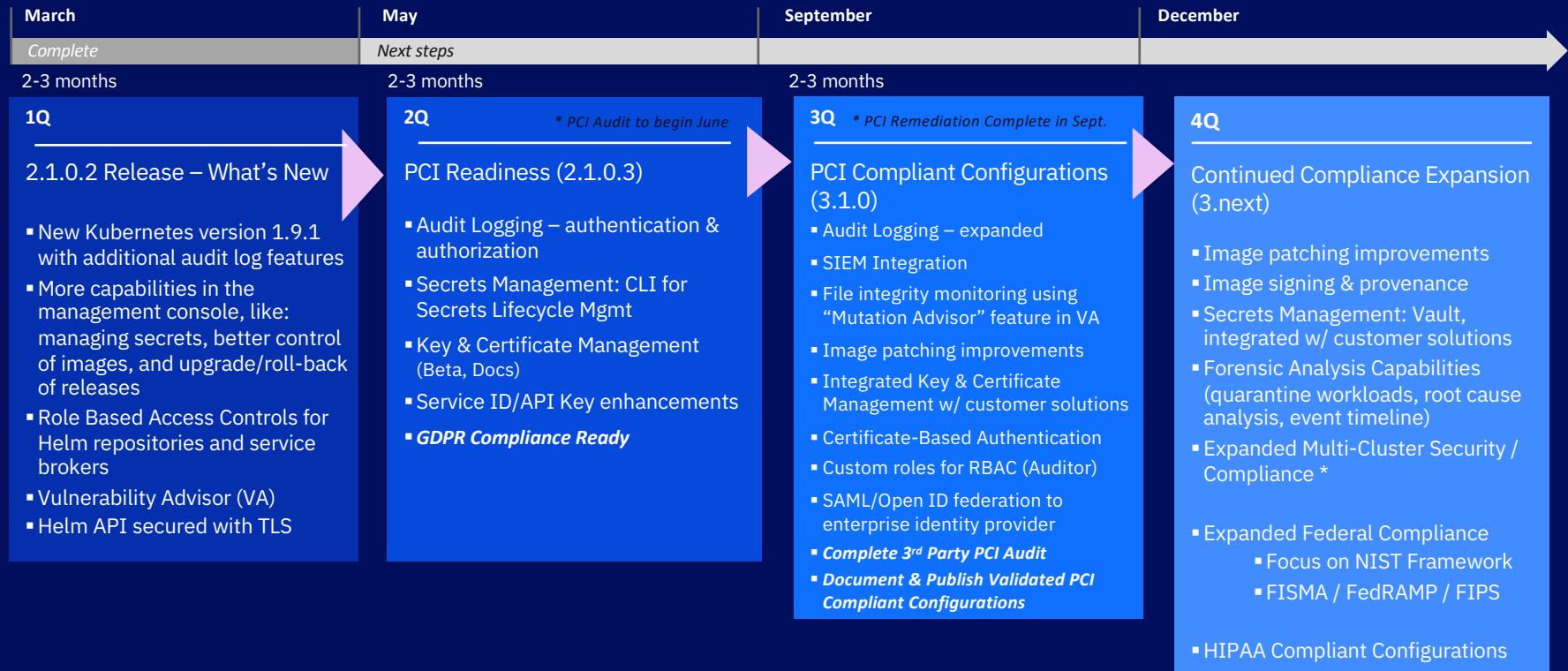
- Logging
  - Monitoring
  - Alerts
  - IBM Metering
  - IBM Vulnerability Analysis
  - IBM Cloud Automation Manager
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  - A rich catalog of content
- 

All of these services must provide audit logs for actions performed, when they were performed, and who performed the action



*Ensuring consistent audit trails for all platform services is part of IBM Cloud Private*

# Security & Compliance Roadmap Overview



# IBM Cloud Private Editions

## Community Edition

### Platform

- Kubernetes (+ Helm)
- Core services
- Content catalog

**Freely Available  
in Docker Hub**

## Cloud Native

### Platform

- Kubernetes (+ Helm)
- Core services
- Content catalog (Containers)

**Cloud Foundry (Optional)**

### IBM Enterprise Software

- Microservice Builder
- WebSphere Liberty
- IBM SDK for node.js
- Cloud Automation Manager

## Enterprise

### Platform

- Kubernetes (+Helm)
- Core services
- Content catalog (Containers)

**Cloud Foundry (Optional)**

### IBM Enterprise Software

Cloud Native Edition, plus:  
+ WAS ND  
+ MQ Advanced  
+ API Connect Professional

