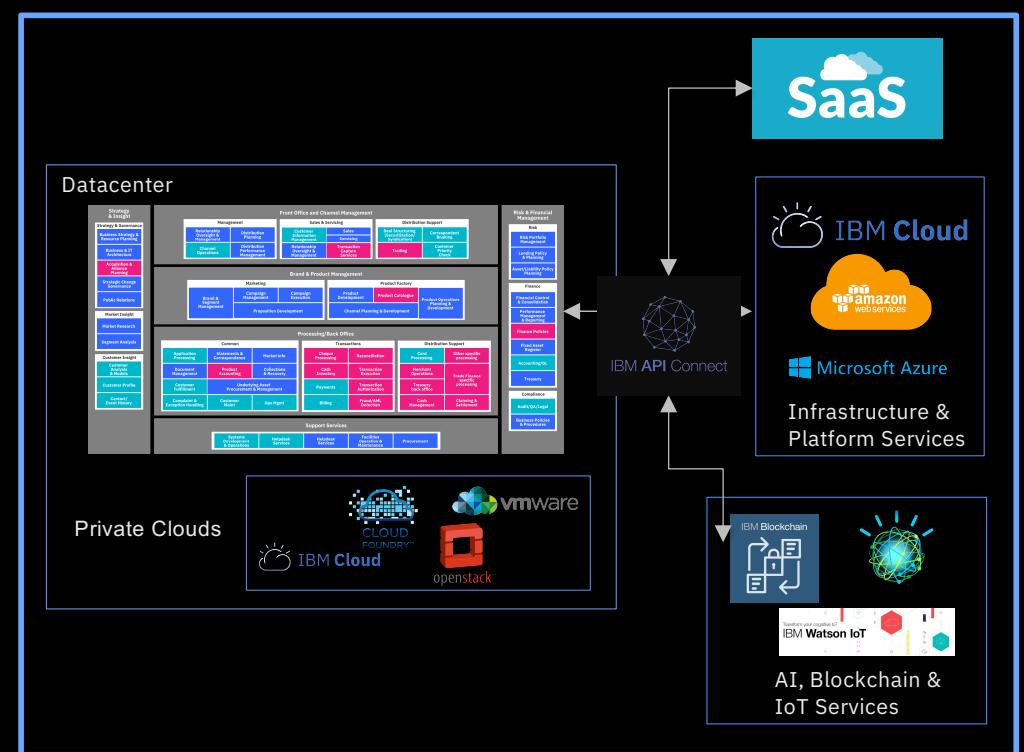
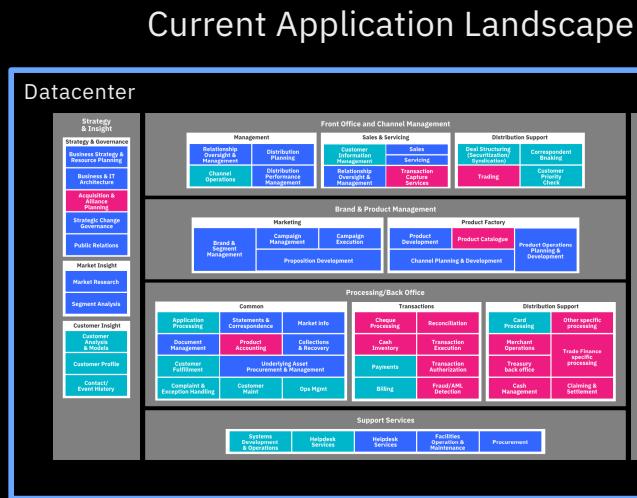


IBM Cloud Private Overview



IBM Cloud

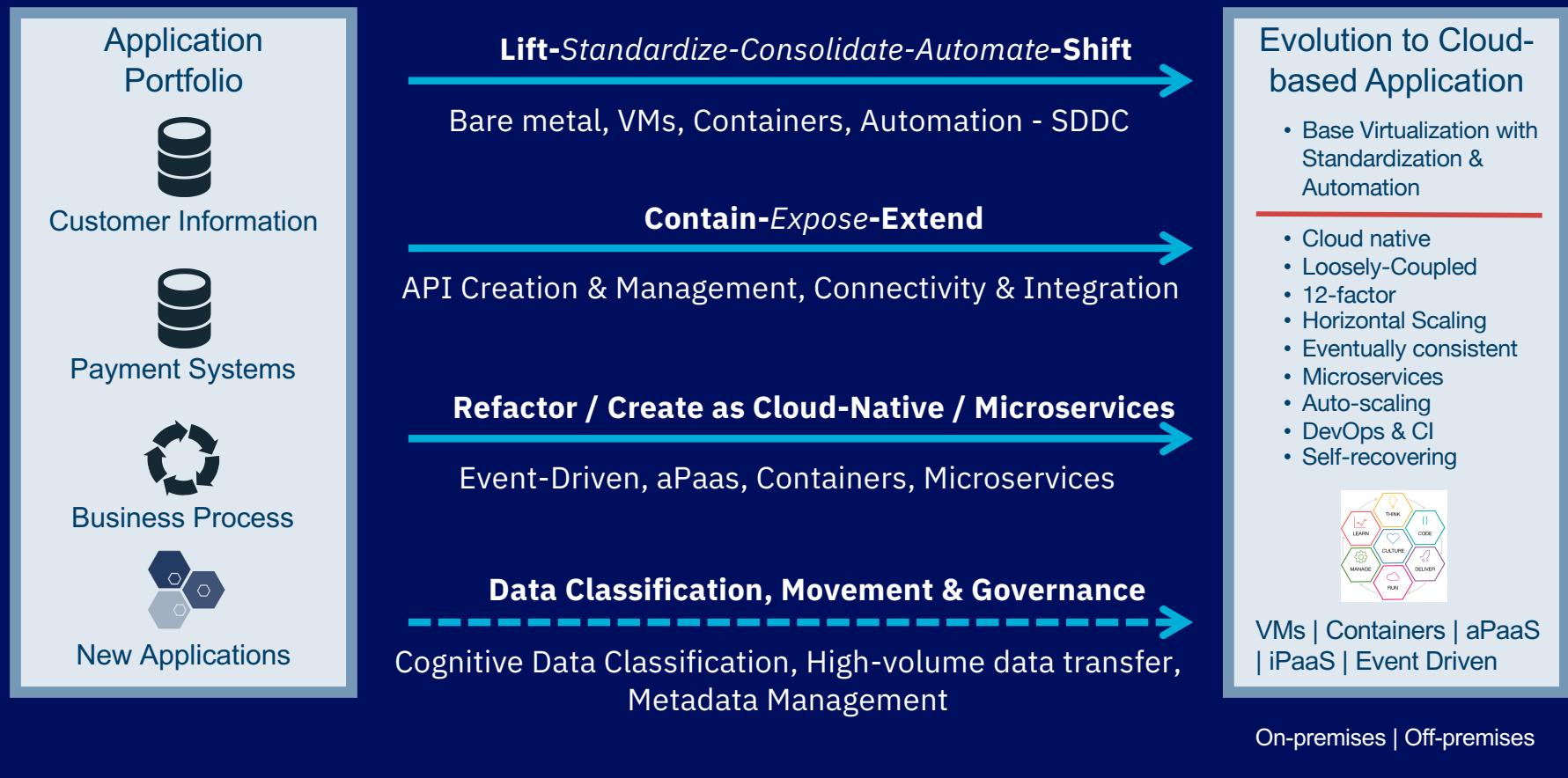
To accelerate digital transformation, enterprises are extending their applications and data to “clouds”...



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

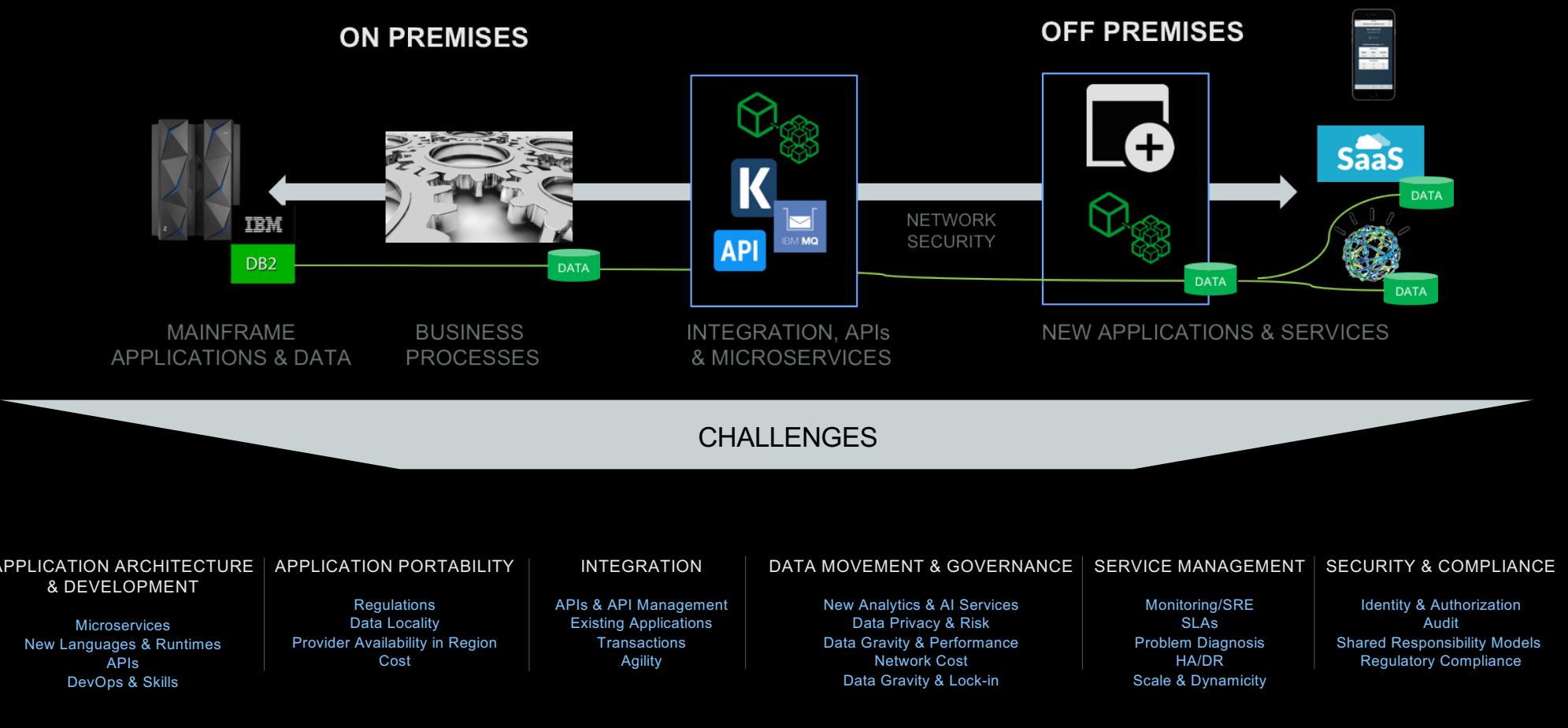
Machine Learning on p/z
Blockchain
Business Process
Data & Apps
On-Premises Software & Services

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

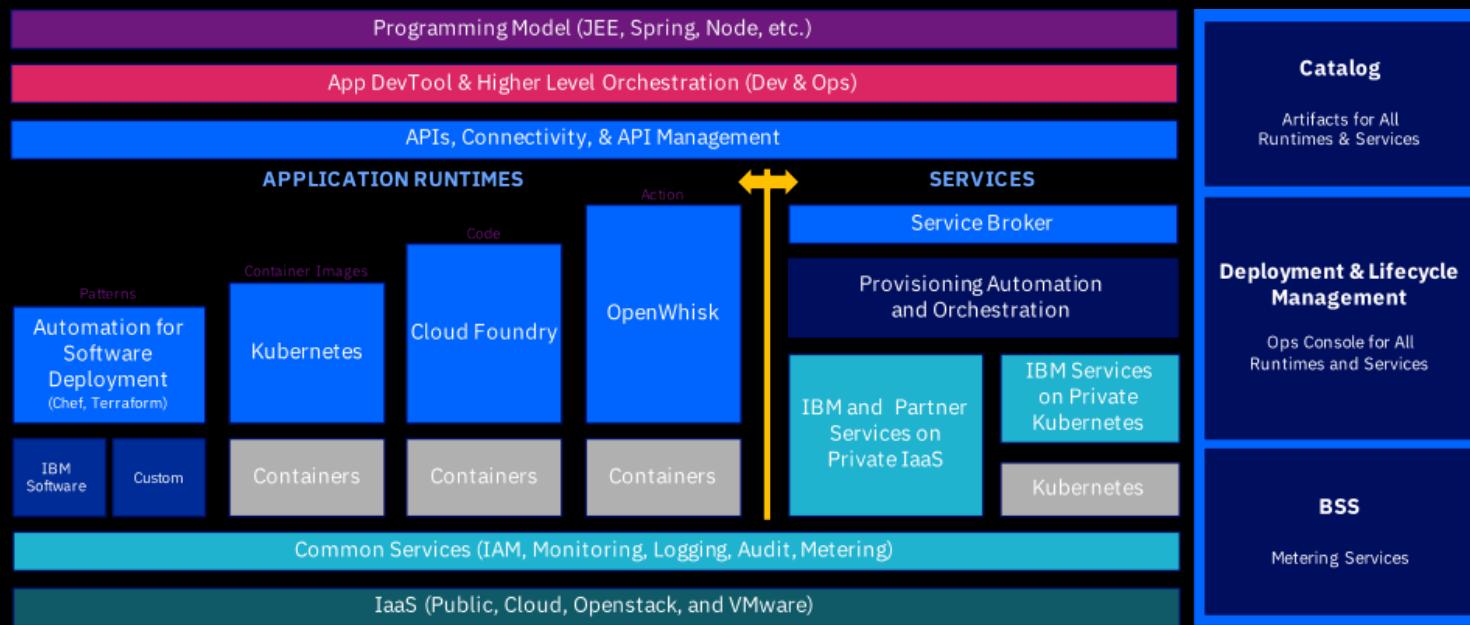
- Helm Charts
- Patterns
- Cloud Foundry Services

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



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

Key use cases are driving private cloud adoption

Use Case #1

Create new cloud-native applications

Use Case #2

Modernize and optimize existing applications

Use Case #3

Open up enterprise data centers to work with cloud services



Key use cases are driving private cloud adoption

Use Case #1

Create new cloud-native applications

Use Case #2

Modernize and optimize existing applications

Use Case #3

Open up enterprise data centers to work with cloud services



Use case #1: IBM Cloud Private for cloud-native applications

Use case #1: Developers need access to a platform of capabilities to create cloud native applications that meet the security and regulatory requirements of their organization.

IBM's Capabilities:

- IBM Microclimate
- APM for Microservices
- Enterprise grade application development services integrated with the platform runtimes, data and analytics, messaging, DevOps services, ...

Key use cases are driving private cloud adoption

Use Case #1

Create new cloud-native applications

Use Case #2

Modernize and optimize existing applications

Use Case #3

Open up enterprise data centers to work with cloud services



Use case #2: IBM Cloud Private to cloud-enable applications

Use case #2: Developers need to cloud enable applications that meet security and regulatory needs. IBM Cloud private provides the platform for rapidly developing and deploying cloud enabled applications, while meeting the security and regulatory needs of the enterprise.

IBM's capabilities

- Transformation Advisor provides guidance on where to run your critical workloads
- Next generation versions of industry leading IBM Middleware and Analytics (WAS, MQ, DB2) to speed innovation and gain new insights into data
- Vulnerability assessment
 - Vulnerability Advisor
 - Mutation Advisor
- Elastic runtimes enable the enterprise to scale up and scale down as needed

Key use cases are driving private cloud adoption

Use Case #1

Create new cloud-native applications

Use Case #2

Modernize and optimize existing applications

Use Case #3

Open up enterprise data centers to work with cloud services



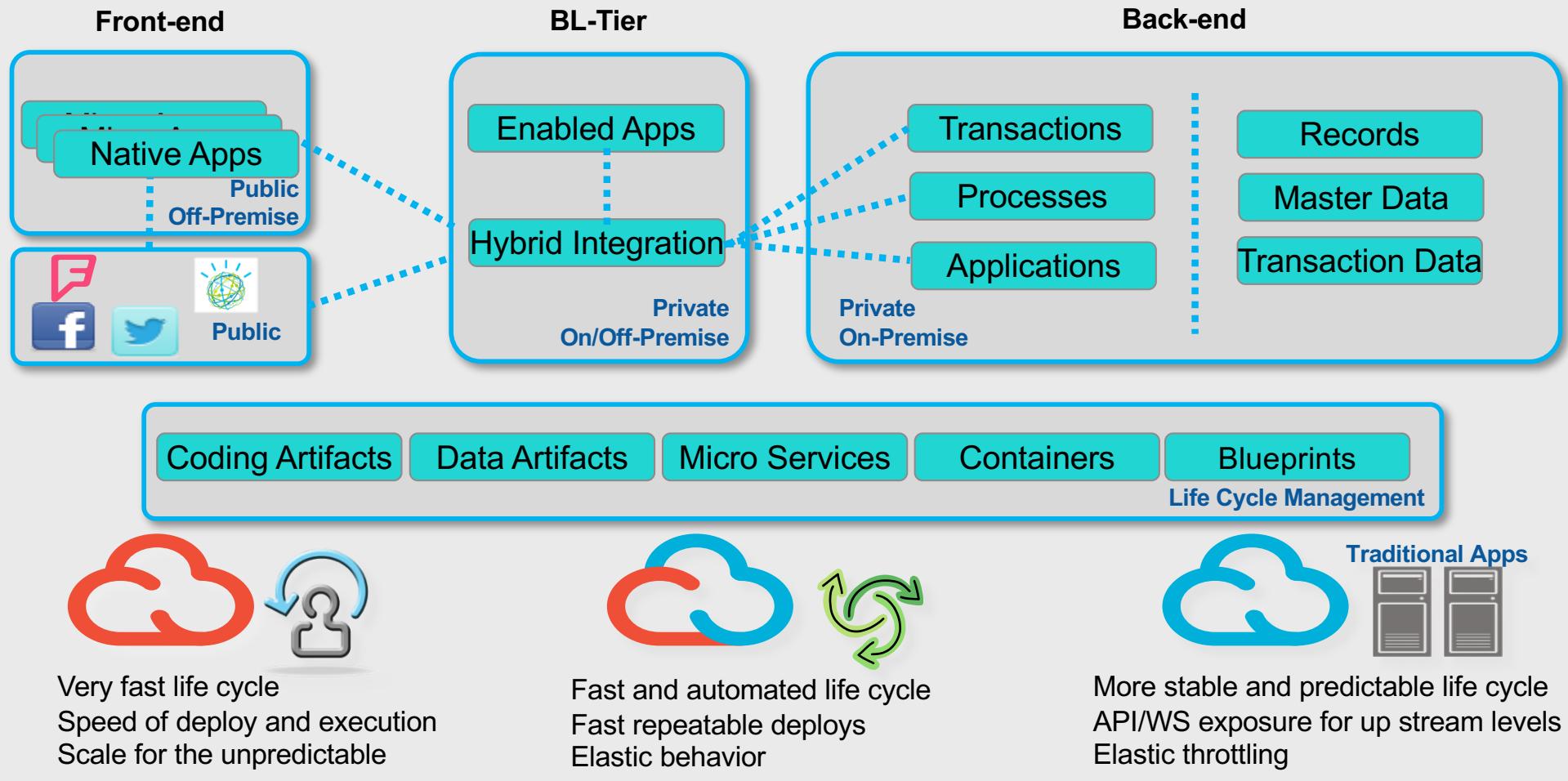
Use case #3: IBM Cloud Private for hybrid cloud applications

Use case #3: Enterprises need to integrate data and application services (from other locations) in their new cloud native and cloud enabled applications which are running in their own data center.

IBM's capabilities

- Kubernetes-based orchestration platform
- API Management, Application Integration Suite
- Cloud foundry platform for service syndication
- Multi-cloud deployments through CAM
- APM for Hybrid Workload

Use case #3: New applications need an agile cloud architecture



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

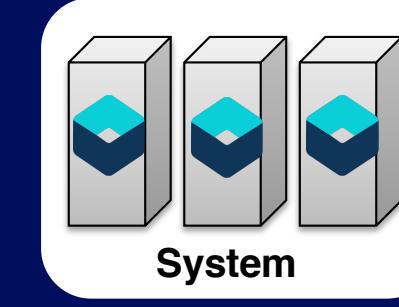
How do you run Kubernetes in
the Enterprise?

**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

12-factor apps break

down into many microservices

so you're really

debugging logs

across many containers



Many logs are written in files

within the container

.. and IBM containers use filebeat

to stream these logs

*ELK + Filebeat is part of
IBM Cloud Private*



737 hits

New Save Open Share < ⏪ ⏴ Last 15 minutes >

kubernetes.namespace:tranadv

Uses lucene query syntax



Discover

Visualize

Dashboard

Timelion

Dev Tools

Management

Add a filter +

logstash-*

Selected Fields

t kubernetes....

t log

Available Fields

Popular

t kubernetes.con...

t kubernetes.na...

@timestamp

@version

t _id

t _index

_score

t _type

t beat.hostname

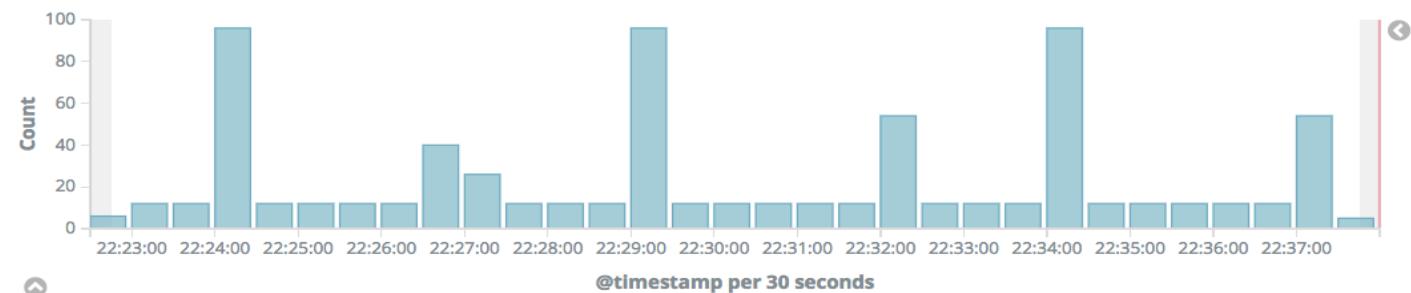
t beat.name

t beat.version

t input_type

t kubernetes.con...

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



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) <=

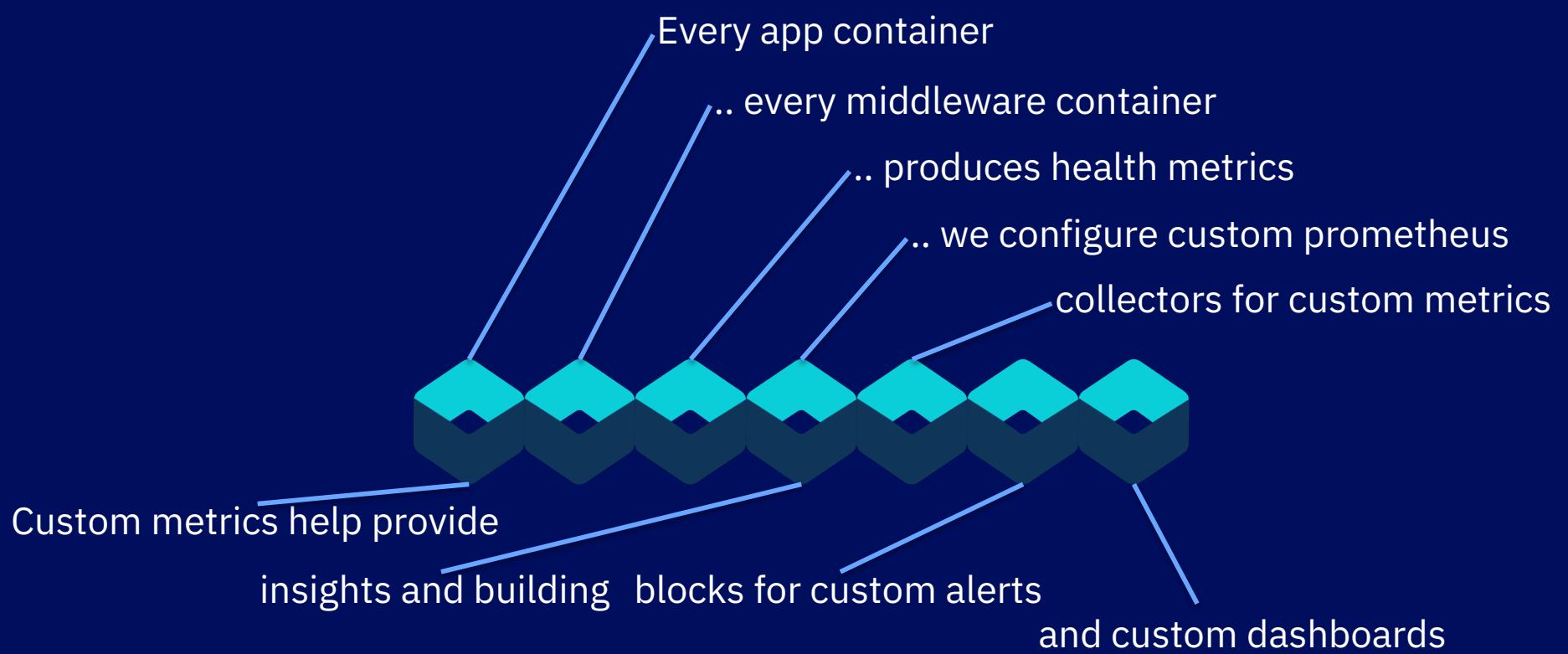
Collapse



Every container must have its health monitored

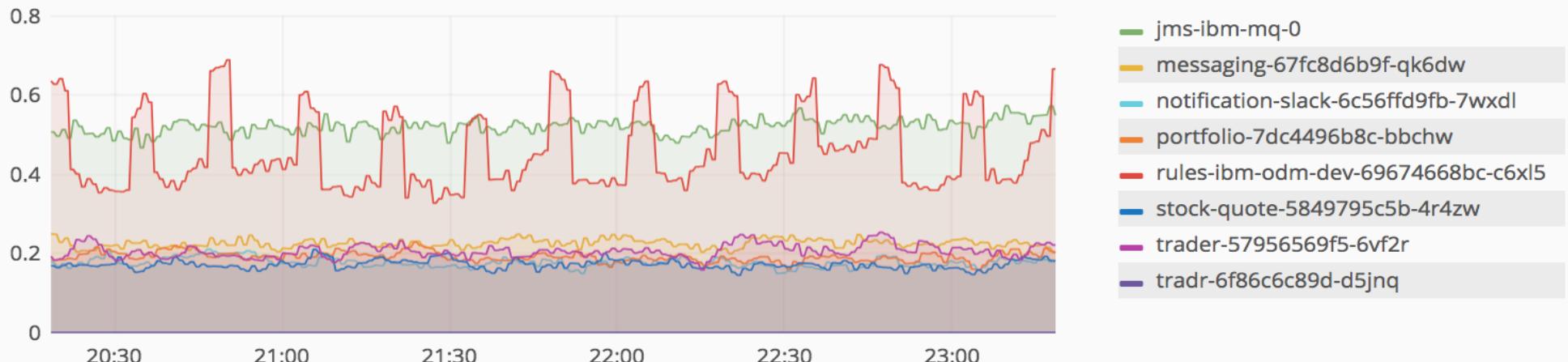
Basic liveness probes in Kubernetes ensure failed pods are restarted.

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

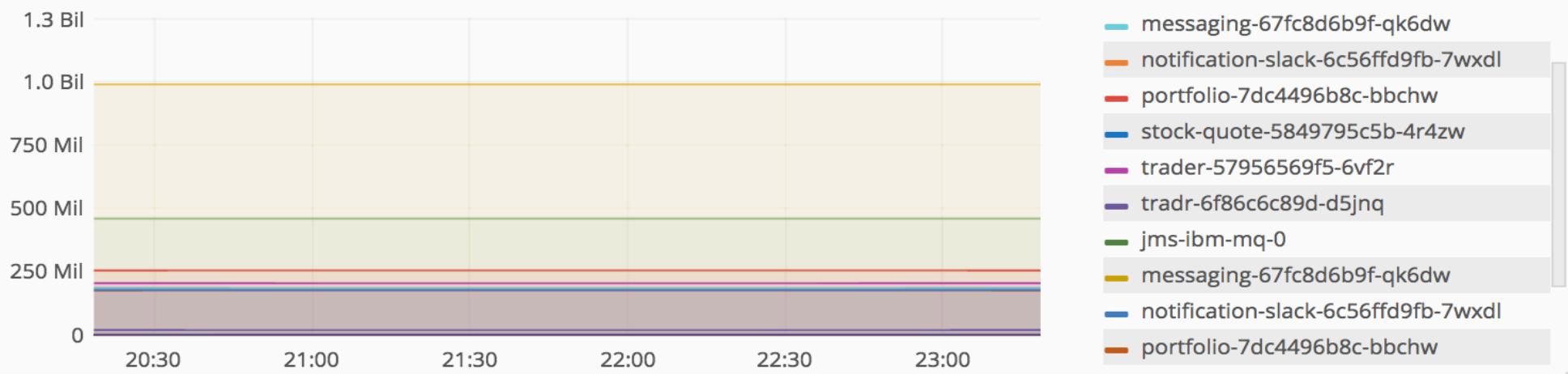


Prometheus + Grafana is part of IBM Cloud Private

Namespace "stock-trader" CPU by pod name



Namespace "stock-trader" Memory by pod name



stock-trader kube pod container status ready

Last 1 second



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

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

qmgr

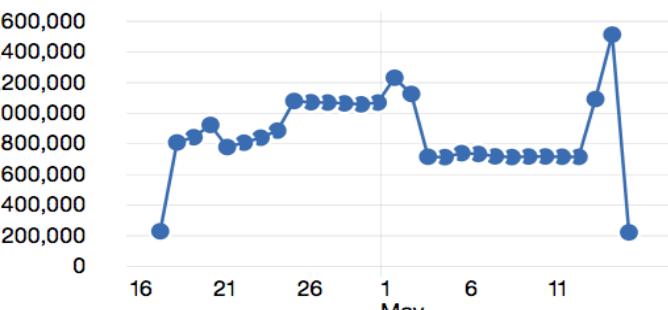
[Usage](#) [Details](#)

Processor Usage (ms)

1 Month

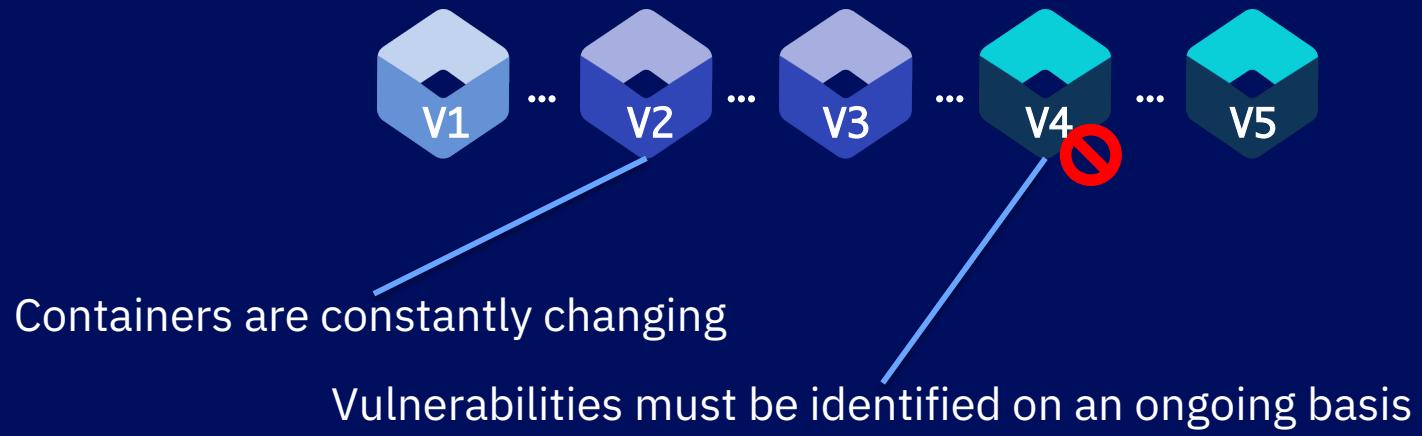
[Export to CSV](#)

Latest update: May 15, 2018 | 23:24:52 EDT



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

Total 24930027.28 ms

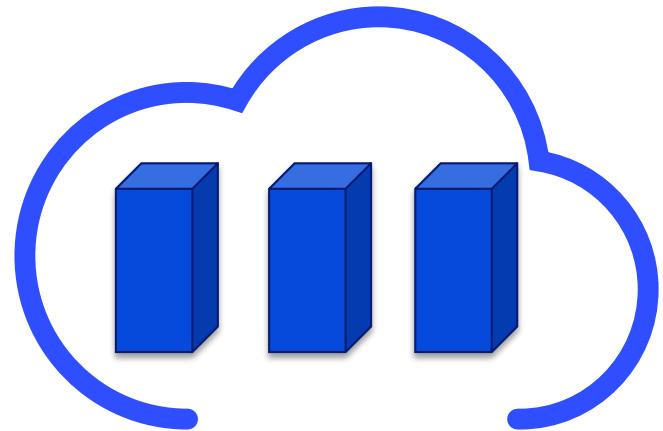


IBM Vulnerability Advisor is
part of IBM Cloud Private

Name	Owner	Crawled Time	Type	Organizational Policies	Vulnerable Packages	Container Settings
kube-system/k8s-proxy-10.10.25.226/POD/17dd5c395b38a4e82233590b2247f60e972af5b5d25c2bccb0e29ad7b000f40b	kube-system	2018/05/15 23:40:18	Container	Passed	Not Scanned	Not Scanned
kube-system/vulnerability-advisor-rootkit-annotator-7dc7d8454b-gsv52/rootkit-annotator/1033d13335ab151219584b82e537cf0158a6146161e6126f55a372192bb5ef64	kube-system	2018/05/15 23:40:17	Container	Passed	Not Scanned	Not Scanned
kube-system/k8s-etcd-10.10.25.226/POD/e5da0dc402bd7b0199457126ed202ade70879f494f2b0d456a54574a36340801	kube-system	2018/05/15 23:40:15	Container	Passed	Not Scanned	Not Scanned
kube-system/k8s-proxy-10.10.25.226/proxy/d9bdc517810372e0c5ca3611c756ee1018ce958a762c3fb3b927ae24232ce6ab	kube-system	2018/05/15 23:40:15	Container	Passed	Not Scanned	Not Scanned
kube-system/k8s-etcd-10.10.25.226/etc/3af5f81ed53d108e1d551f8ea018a3cc567032ab0f1ecc9a1f1d7e5e1225f17	kube-system	2018/05/15 23:40:14	Container	Passed	Not Scanned	Not Scanned
kube-system/k8s-master-10.10.25.226/POD/c7f2c39cc05c24a66910bfee95a1faf8be514a93edadcd1b1132e40ebc3f121da	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

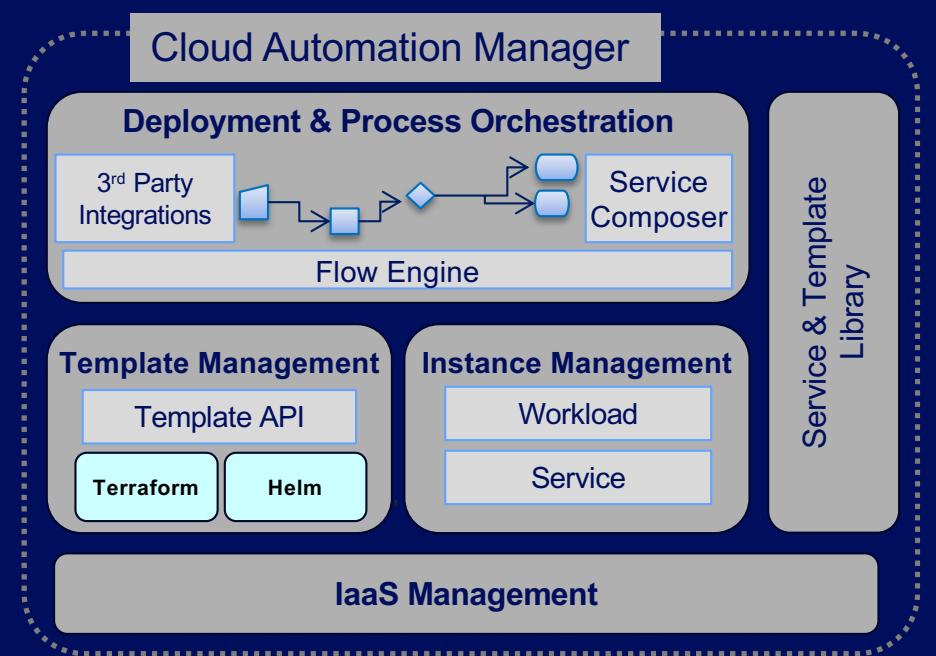
IBM Cloud Automation Manager: Full stack automation and service orchestration

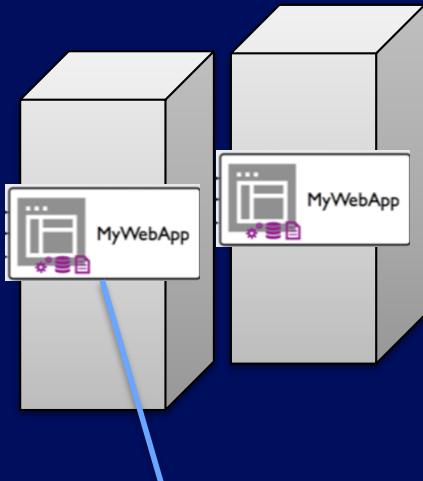
Automated provisioning of infrastructure and applications with workflow orchestration

Self-service access to cloud infrastructure and application services

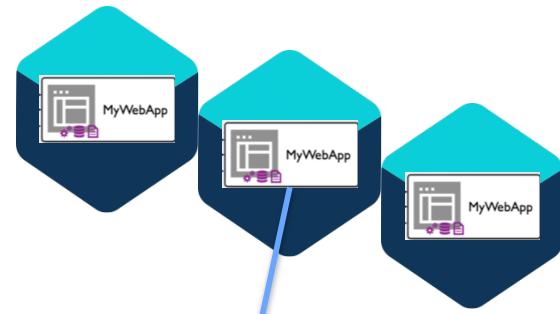
Manage and govern workloads across multiple and hybrid clouds

Built with **open technology** to avoid vendor lock-in





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.

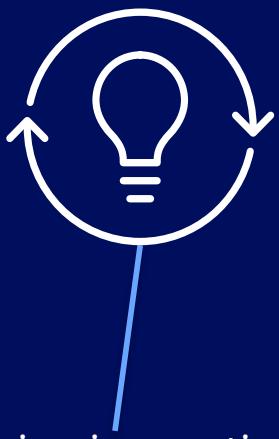
Choose a workspace. [?](#)

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



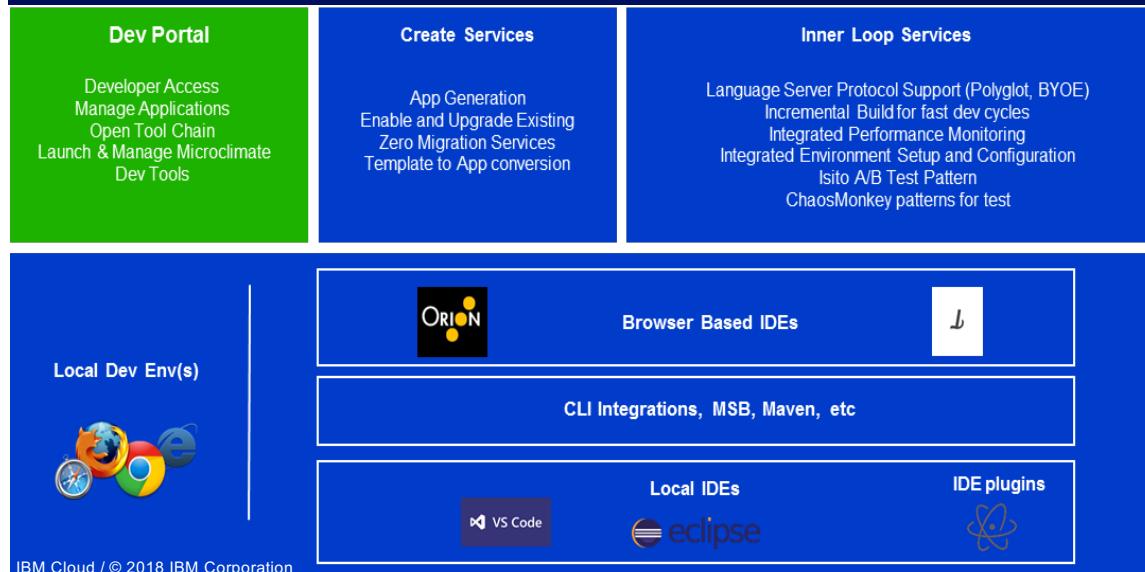
... into business value delivered
through containers

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**.



Providing an integrated DevOps experience for all apps is part of *IBM Cloud Private*

LEGEND:

ICP

Microclimate Local or ICP

Option for 3rd Party

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 'Catalog' page of the IBM Cloud Private interface. At the top, there's a search bar labeled 'Search items' and a 'Filter' button. Below the search bar, the heading 'Helm charts' is displayed, followed by the sub-instruction 'Deploy your applications and install software packages'. The main area contains a grid of nine Helm chart entries, each with a circular icon, the chart name, a brief description, and a small 'ibm-charts' badge below it. 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-), ibm-dsm-dev (IBM Data Server Manager Developer-C Edition. Note), ibm-dsx-dev (IBM Data Science Experience (DSX)), ibm-iclogging (Log storage and search management solution), ibm-iclogging-kibana (Installs Kibana, a web UI to query and visualize), and ibm-icmonitoring (IBM monitoring service in private cloud).

Chart Name	Description	Type
ibm-cloudant-dev	Cloudant for Linux.	ibm-charts
ibm-datapower-dev	IBM DataPower Gateway	ibm-charts
ibm-db2oltp-dev	IBM Db2 Developer-C Edition 11.1.2.2 iFix002	ibm-charts
ibm-db2warehouse-dev	Db2 Warehouse Developer-C for Non-	ibm-charts
ibm-dsm-dev	IBM Data Server Manager Developer-C Edition. Note	ibm-charts
ibm-dsx-dev	IBM Data Science Experience (DSX)	ibm-charts
ibm-iclogging	Log storage and search management solution	ibm-charts
ibm-iclogging-kibana	Installs Kibana, a web UI to query and visualize	ibm-charts
ibm-icmonitoring	IBM monitoring service in private cloud	ibm-charts

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

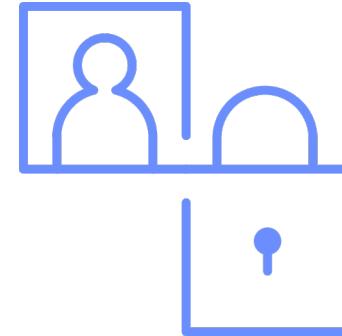
All of these services store data which is encrypted at rest



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

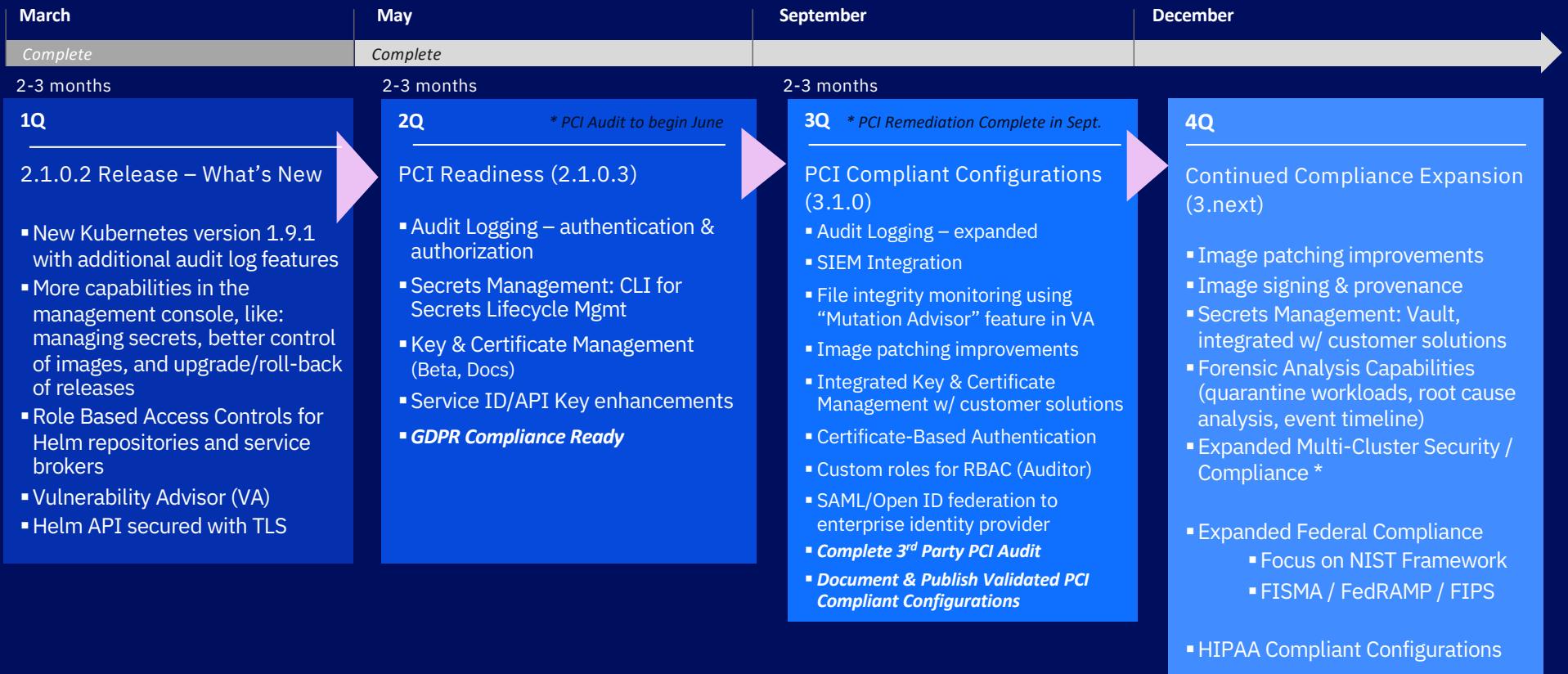
- Logging
 - Monitoring
 - Alerts
 - IBM Metering
 - IBM Vulnerability Analysis
 - IBM Cloud Automation Manager
 - IBM Transformation Advisor
 - IBM Microclimate
 - A rich catalog of content
-

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

