Operationalizing Hybrid Cloud Environments

with IBM Cloud Pak for Multi cloud Management

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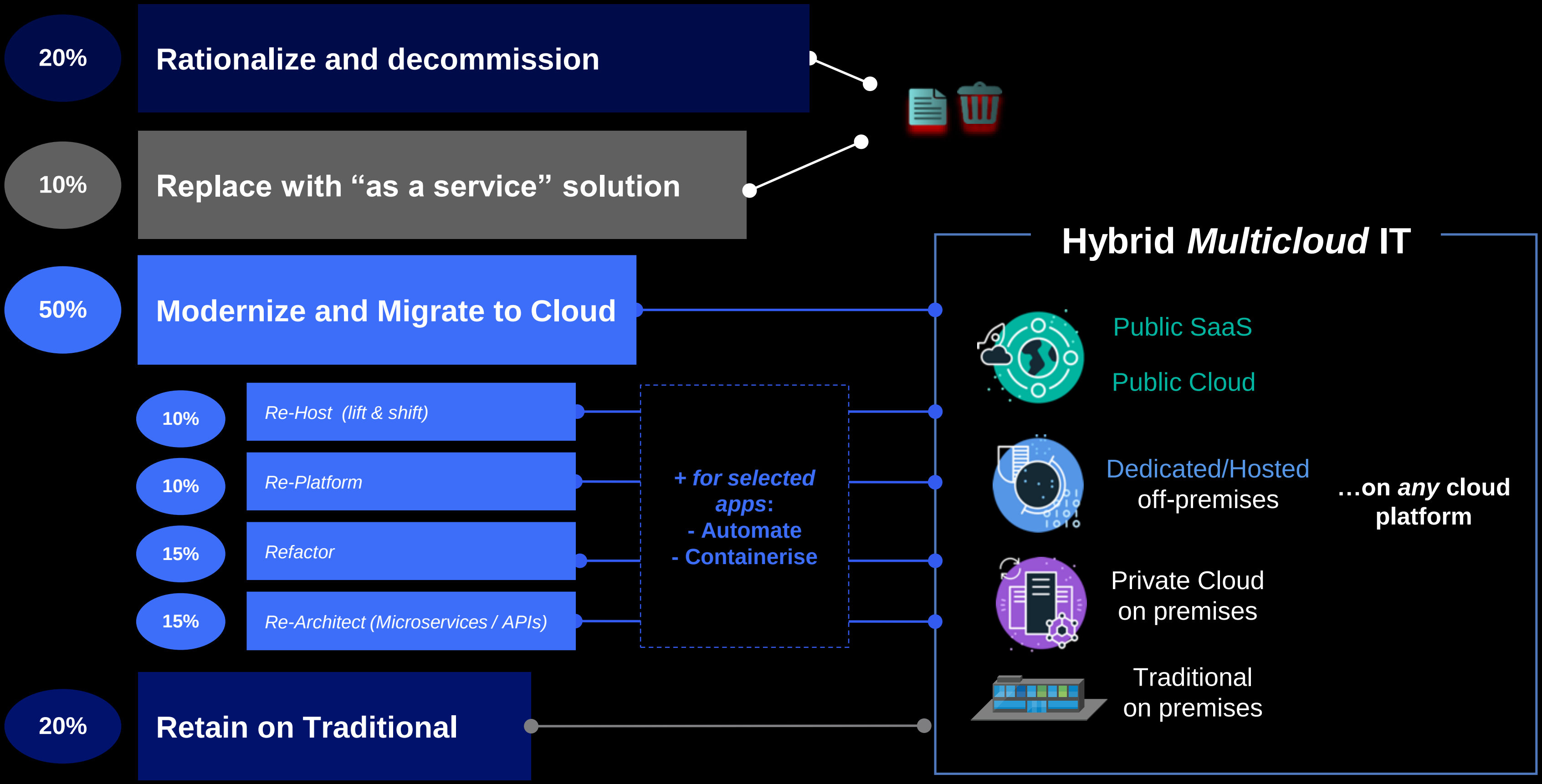
IBM Distinguished Engineer

Agenda

- ❑ IBM Point of View
- ❑ Cloud Pak for MCM Technical Details
- ❑ Demonstration

An application-centric approach Hybrid Clouds



20% Rationalize and decommission

10% Replace with “as a service” solution

50% Modernize and Migrate to Cloud

10% *Re-Host (lift & shift)*

10% *Re-Platform*

15% *Refactor*

15% *Re-Architect (Microservices / APIs)*

***+ for selected apps*:**
- Automate
- Containerise

20% Retain on Traditional

Hybrid *Multicloud* IT

Public SaaS

Public Cloud

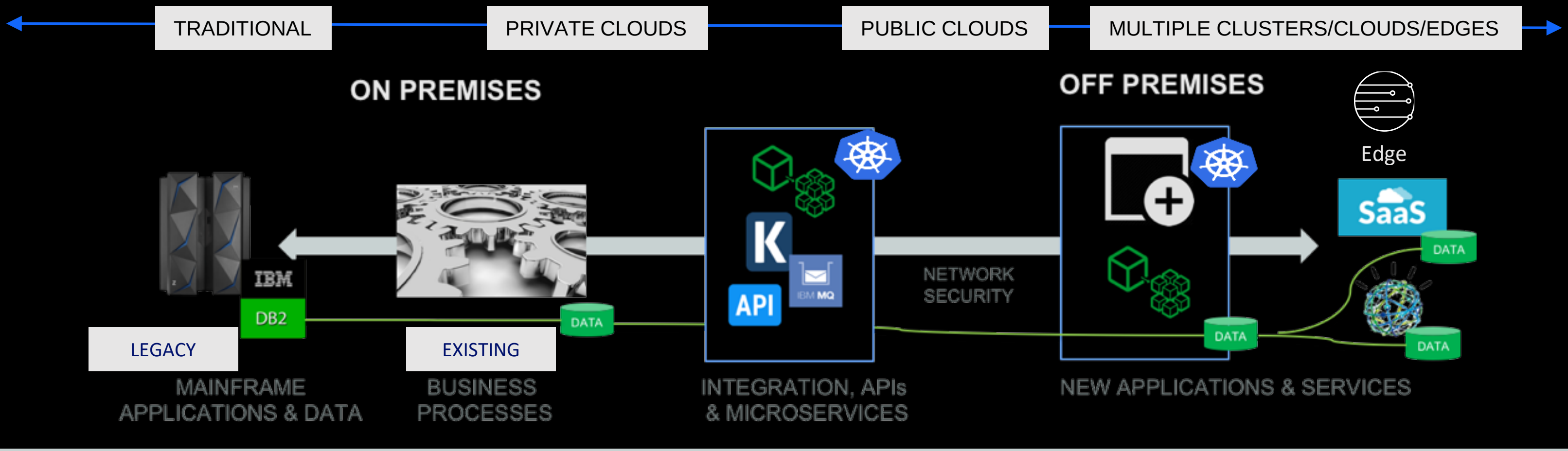
Dedicated/Hosted
off-premises

Private Cloud
on premises

Traditional
on premises

…on *any* cloud platform

Challenges in Managing Hybrid Cloud Applications



TRADITIONAL

PRIVATE CLOUDS

PUBLIC CLOUDS

MULTIPLE CLUSTERS/CLOUDS/EDGES

ON PREMISES

OFF PREMISES

LEGACY

MAINFRAME APPLICATIONS & DATA

EXISTING

BUSINESS PROCESSES

INTEGRATION, APIs & MICROSERVICES

NETWORK SECURITY

NEW APPLICATIONS & SERVICES

CHALLENGES (DevSecOps)

Effective & scalable cloud-native development

Core modernization

Agile integration

Data architecture, placement & governance

Next-gen security & compliance

Service mgmt & site reliability engineering

A HYBRID CLOUD PLATFORM with CONSISTENT MANAGEMENT IS CRITICAL

Modern Management Accelerates Digital Transformation

Development, Security, Operations **in silos**

Merged workflows to **enable DevSecOps** velocity

Separate tools for VM’s, Containers & COTS

Open-standards & unified tooling in one **complete automation** solution

Many point products that don’t add up to a complete solution

Integrated, pluggable core – extendable with your own capabilities (BYO)

75% improvement in overall IT efficiency

Ovum Whitepaper, Delivering Business Value through Transitioning from Managing VMs to Orchestrating Containers, https://ibm.ent.box.com/s/nhswt2ebnhyyekhjap71cgln0dsfpgqv

How are our clients entering this modernization journey?

Cloud Pak for Multicloud Management

Red Hat OpenShift

Visibility Across Hybrid Environment

ITOps Transformation

Application Modernization and Management

Governance and Compliance Management

New Hybrid Cloud Management Platform

The New Hybrid Cloud Management Platform

Application Modeling, Automation, Container & VM Management, Cost Management, Governance & Compliance, Observability, Pluggable Ecosystem

Increase Developer Productivity

Improve Operational Productivity

Reduce Operational Risk

Reduce Security Risk

Cloud Pak for MCM – How it is built

- ❑ Cloud Native Kubernetes Implementation
- ❑ Use, Contribute and Lead Open Source Projects, no vendor lock-in
- ❑ Integrate with Market leading function and vendors
- ❑ Leveraging AI for bringing in higher levels of Automation and Intelligence (AIOps)
- ❑ Integrated Dev Sec Ops control plane for the Enterprise

Accelerate development to production

Self-service provisioning allows app dev teams to request clusters directly from a catalog removing central IT as a bottleneck.

Increase application availability

Placement rules can allow quick deployment of clusters across distributed locations for availability, capacity, and security reasons.

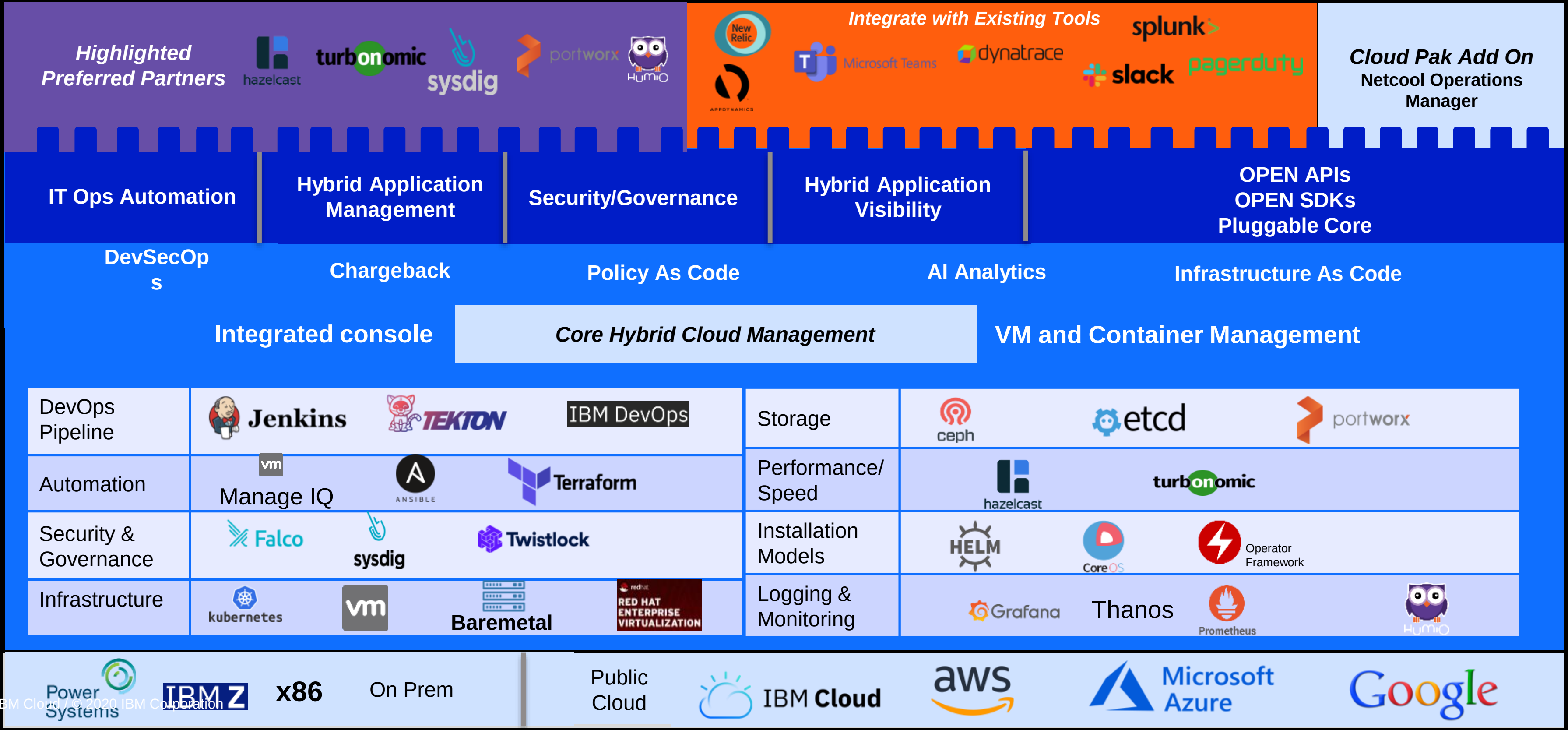
Reduce costs

Centralized management of clusters reduces operational cost, makes the environment consistent, and removes the need to manually manage individual clusters.

Ease compliance

Policies can be written by the security team and enforced at each cluster, allowing environments to conform to your policy.

Cloud Pak for Multicloud Management
Platform Services – Leverage Open Source Projects



Highlighted Preferred Partners

hazelcast · turbonomic · sysdig · portworx · HUMIO

Integrate with Existing Tools

New Relic · APPDYNAMICS · Microsoft Teams · dynatrace · splunk · slack · pagerduty

Cloud Pak Add On
Netcool Operations Manager

IT Ops Automation | **Hybrid Application Management** | **Security/Governance** | **Hybrid Application Visibility** | **OPEN APIs**
OPEN SDKs
Pluggable Core

DevSecOp s | **Chargeback** | **Policy As Code** | **AI Analytics** | **Infrastructure As Code**

Integrated console | ***Core Hybrid Cloud Management*** | **VM and Container Management**

DevOps Pipeline	Jenkins TEKTON IBM DevOps
Automation	vm Manage IQ ANSIBLE Terraform
Security & Governance	Falco sysdig Twistlock
Infrastructure	kubernetes vm Baremetal redhat RED HAT ENTERPRISE VIRTUALIZATION

Storage	ceph etcd portworx
Performance/ Speed	hazelcast turbonomic
Installation Models	HELM CoreOS Operator Framework
Logging & Monitoring	Grafana Thanos Prometheus HUMIO

Power Systems · IBM Z · x86 · On Prem | Public Cloud · IBM Cloud · aws · Microsoft Azure · Google

Why Cloud Pak for MCM Benefits Devs & Development KPIs

Developer

- Enables developers to get quick and easy access to environments & software stacks
- Shows clear and transparent remediations for code vulnerabilities
- Automated compliance checking drives safer and more efficient code releases
- Integrates with existing DevOps toolchains
- Automated synthetic monitoring gives visibility into app availability

Developer Productivity **Increases**

Quality of the Release **Improves**

Time to Market **Shortened**

Why Cloud Pak for MCM Benefits Ops, SRE and IT KPIs

SRE/Ops

- Support infrastructure as code, ensuring deployments are repeatable, simply debugged, & tracked
- Operations team can leverage same systems as Git to bringing Ops closer to Dev
- Provisioning & configuration operations codified using policies, increasing deployment repeatability
- Shift from procedural management to declarative makes SRE/Ops tasks more predictable
- Gives SRE/Ops an onramp to GitOps, driving a single source of truth for all management tasks in containers & VMs

SRE Productivity
Increases

IT Operations
Productivity
Improves

Predictability **increases**
Risks **minimized**

Why Cloud Pak for MCM Benefits Security & Compliance Teams

Security/ Compliance

- Integrated GRC solution bringing all security requirements across clouds into one place
- Compliance policies to guard against exposures, internal protocols, adhere to government regulations
- Confidence in governance oversight, leads to faster paced dev updates to revenue generating apps
- Compliance-aware placement of workloads
- Security findings API to integrate with ecosystem partners

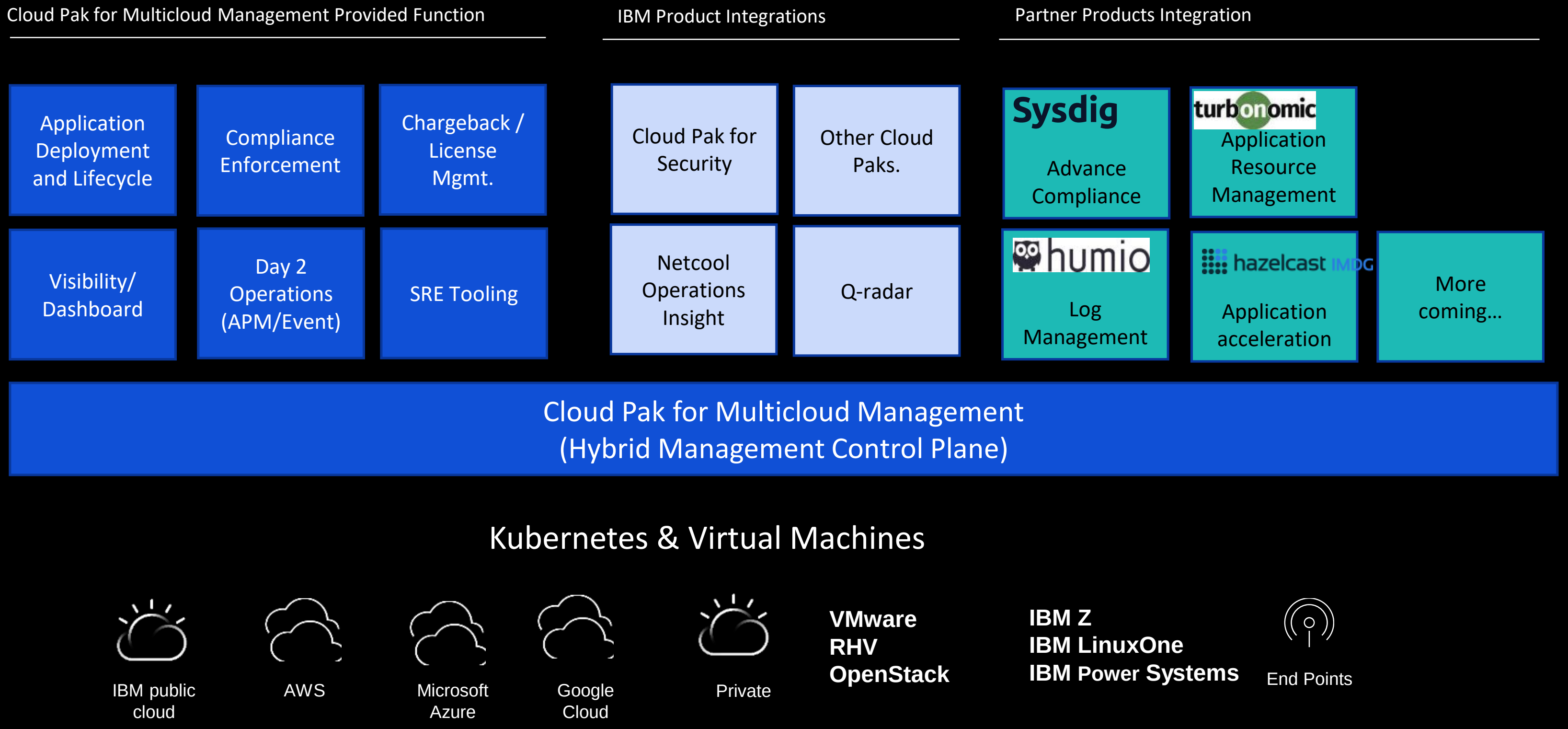
Reduced **Costs** of Security Breaches

Increased Productivity of Compliance Teams

Predictability **increases**
Risks **minimized**

Cloud Pak for Multicloud Management is a Hybrid Multicloud management control plane

Cloud Pak for Multicloud Management is designed as a platform allowing partners to plugin in using public APIs.



Cloud Pak for Multicloud Management Provided Function

Application Deployment and Lifecycle

Compliance Enforcement

Chargeback / License Mgmt.

Visibility/ Dashboard

Day 2 Operations (APM/Event)

SRE Tooling

IBM Product Integrations

Cloud Pak for Security

Other Cloud Paks.

Netcool Operations Insight

Q-radar

Partner Products Integration

Sysdig Advance Compliance

turbonomic Application Resource Management

humio Log Management

hazelcast IMDG Application acceleration

More coming…

Cloud Pak for Multicloud Management (Hybrid Management Control Plane)

Kubernetes & Virtual Machines

IBM public cloud

AWS

Microsoft Azure

Google Cloud

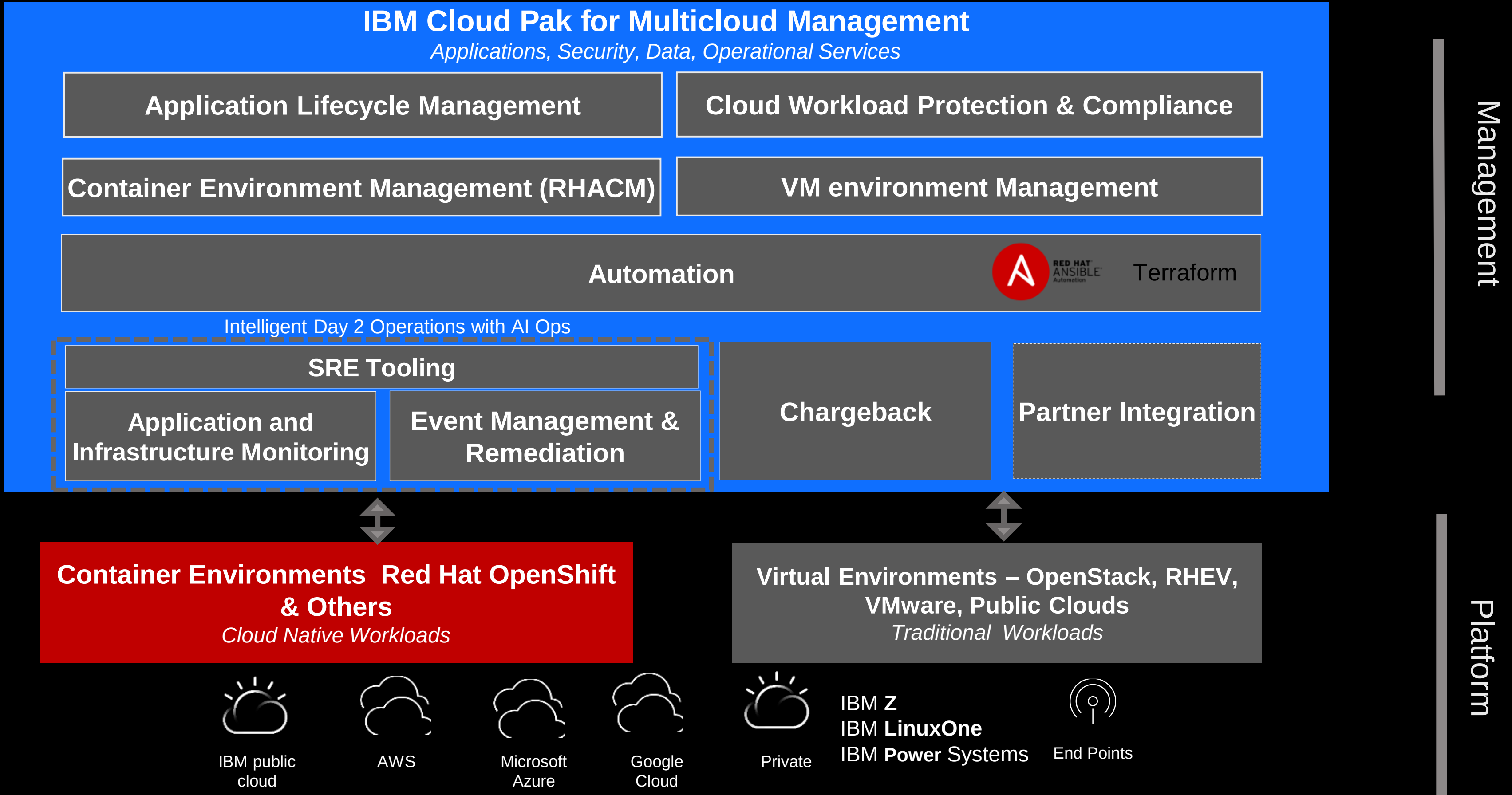
Private

VMware
RHV
OpenStack

IBM Z
IBM LinuxOne
IBM Power Systems

End Points

Overall Solution Capability



IBM Cloud Pak for Multicloud Management

Applications, Security, Data, Operational Services

Application Lifecycle Management

Cloud Workload Protection & Compliance

Container Environment Management (RHACM)

VM environment Management

Automation

RED HAT ANSIBLE Automation

Terraform

Intelligent Day 2 Operations with AI Ops

SRE Tooling

Application and Infrastructure Monitoring

Event Management & Remediation

Chargeback

Partner Integration

Container Environments Red Hat OpenShift & Others

Cloud Native Workloads

Virtual Environments – OpenStack, RHEV, VMware, Public Clouds

Traditional Workloads

IBM public cloud

AWS

Microsoft Azure

Google Cloud

Private

IBM **Z**
IBM **LinuxOne**
IBM **Power** Systems

End Points

Management

Platform

So how does this look in practice?

IBM Cloud / © 2020 IBM Corporation

Visibility and Management Across Hybrid Environment

Visibility Across Hybrid Environment

IT Ops Transformation

Application Modernization and Management

Governance and Compliance Management

Full visibility to Hybrid Environment

Single Control Plane

Manage both cloud native and VM environments together as your enterprise evolves

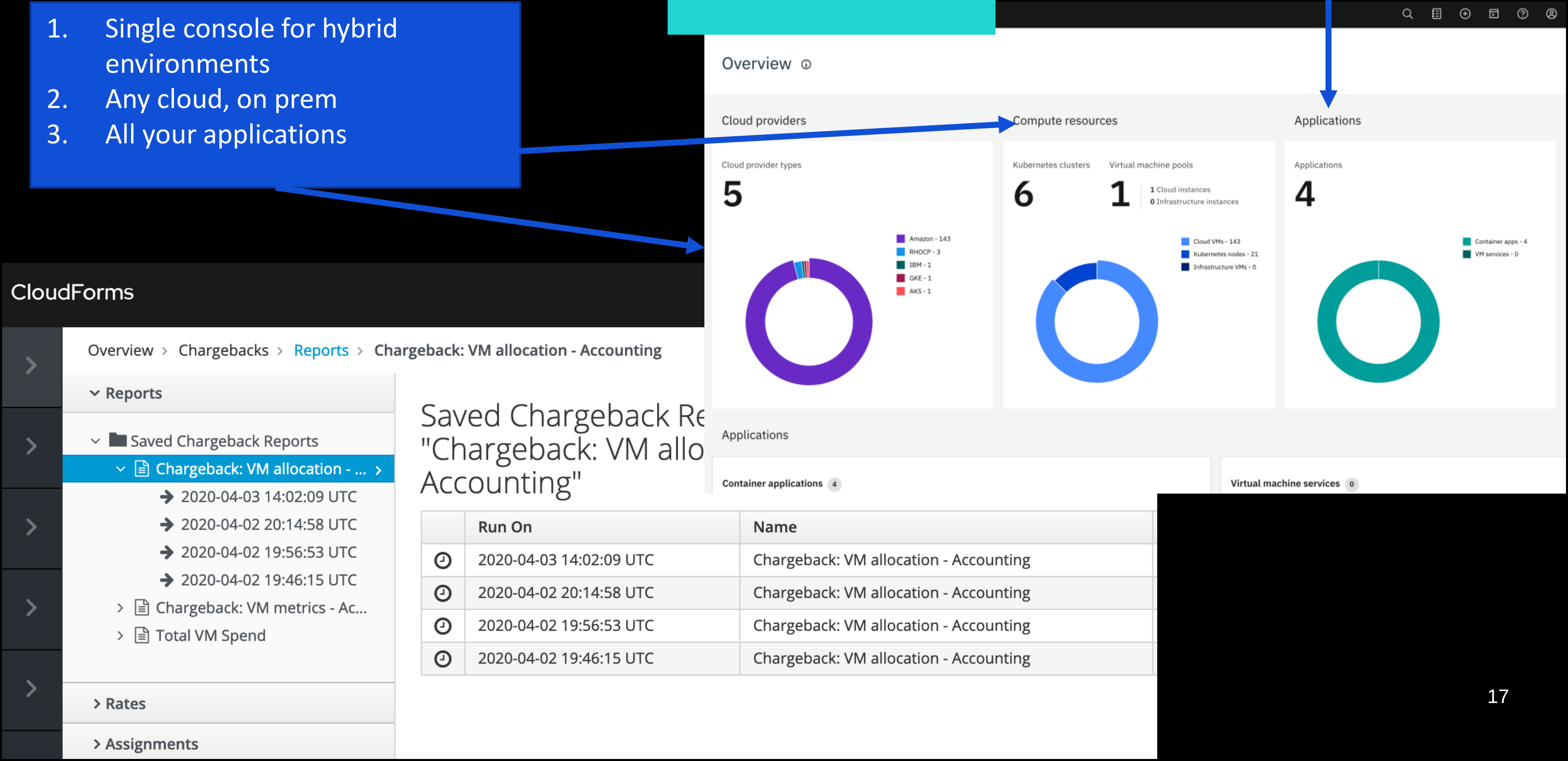
Single console driving environmental observability and control

Cost tracking & analysis to understand cloud resource charges

Search capabilities span inventory of all hybrid application components

Visibility across Hybrid Environments

1. Single console for hybrid environments
2. Any cloud, on prem
3. All your applications



Cloud provider types: 5

- Amazon - 143
- RHOCP - 3
- IBM - 1
- GKE - 1
- AKS - 1

Kubernetes clusters: 6

Virtual machine pools: 1 (1 Cloud instances, 0 Infrastructure instances)

- Cloud VMs - 143
- Kubernetes nodes - 21
- Infrastructure VMs - 0

Applications: 4

- Container apps - 4
- VM services - 0

Applications

Container applications 4

Virtual machine services 0

Saved Chargeback Reports
- Chargeback: VM allocation - ...
  - 2020-04-03 14:02:09 UTC
  - 2020-04-02 20:14:58 UTC
  - 2020-04-02 19:56:53 UTC
  - 2020-04-02 19:46:15 UTC
- Chargeback: VM metrics - Ac...
- Total VM Spend

Saved Chargeback Re
"Chargeback: VM allo
Accounting"

	Run On	Name
🕘	2020-04-03 14:02:09 UTC	Chargeback: VM allocation - Accounting
🕘	2020-04-02 20:14:58 UTC	Chargeback: VM allocation - Accounting
🕘	2020-04-02 19:56:53 UTC	Chargeback: VM allocation - Accounting
🕘	2020-04-02 19:46:15 UTC	Chargeback: VM allocation - Accounting

Enabling IT Ops Transformation

Visibility Across Hybrid Environment

IT Ops Transformation

Application Modernization and Management

Governance and Compliance Management

IT Ops Automation

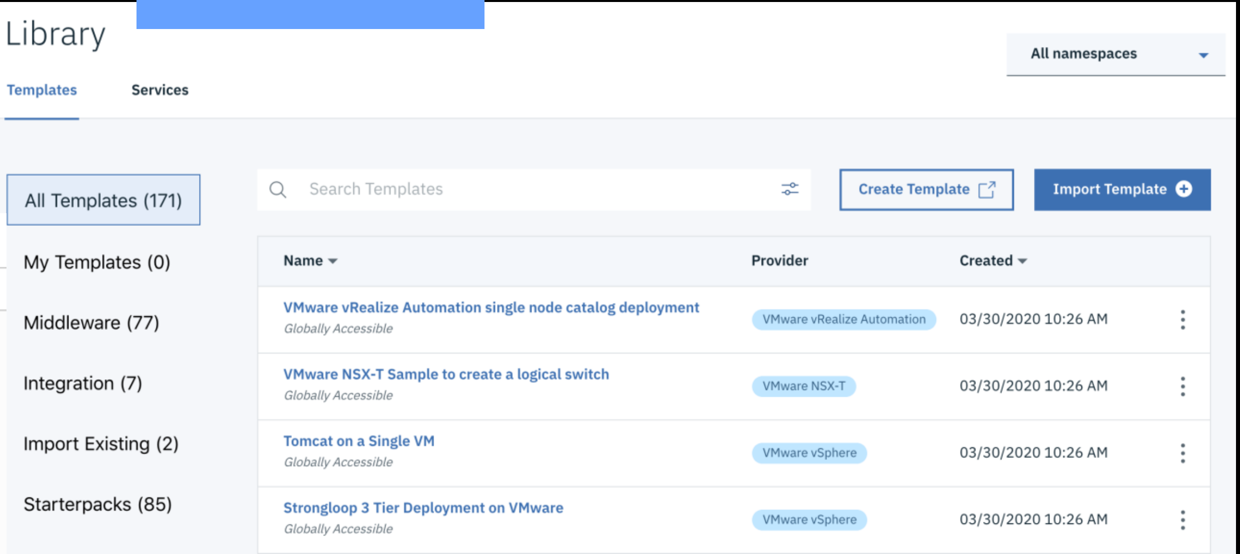
Create pre-defined templates to accelerate provision time with market leading open source tools such as Ansible and Terraform

Accelerate root cause analysis with auto remediation tools

Address dynamic scaling requirements automatically and on demand

1. Client choice in automation tooling
2. Any cloud, on prem
3. All your applications on any infrastructure

ITOps Transformation



Library

Templates | Services

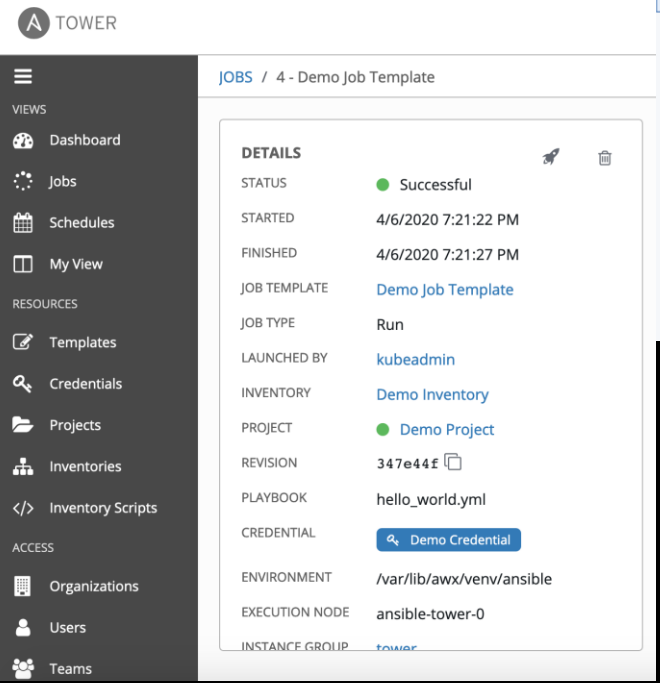
All namespaces

- All Templates (171)
- My Templates (0)
- Middleware (77)
- Integration (7)
- Import Existing (2)
- Starterpacks (85)

Search Templates

Create Template | Import Template

Name	Provider	Created
VMware vRealize Automation single node catalog deployment *Globally Accessible*	VMware vRealize Automation	03/30/2020 10:26 AM
VMware NSX-T Sample to create a logical switch *Globally Accessible*	VMware NSX-T	03/30/2020 10:26 AM
Tomcat on a Single VM *Globally Accessible*	VMware vSphere	03/30/2020 10:26 AM
Strongloop 3 Tier Deployment on VMware *Globally Accessible*	VMware vSphere	03/30/2020 10:26 AM



TOWER

JOBS / 4 - Demo Job Template

DETAILS

STATUS	● Successful
STARTED	4/6/2020 7:21:22 PM
FINISHED	4/6/2020 7:21:27 PM
JOB TEMPLATE	Demo Job Template
JOB TYPE	Run
LAUNCHED BY	kubeadmin
INVENTORY	Demo Inventory
PROJECT	● Demo Project
REVISION	347e44f
PLAYBOOK	hello_world.yml
CREDENTIAL	Demo Credential
ENVIRONMENT	/var/lib/awx/venv/ansible
EXECUTION NODE	ansible-tower-0
INSTANCE GROUP	tower

Application Modernization and Management

Visibility Across Hybrid Environment

ITOps Transformation

Application Modernization and Management

Governance and Compliance Management

Application Management

Deploy and move applications seamlessly across cloud deployments

Event Management

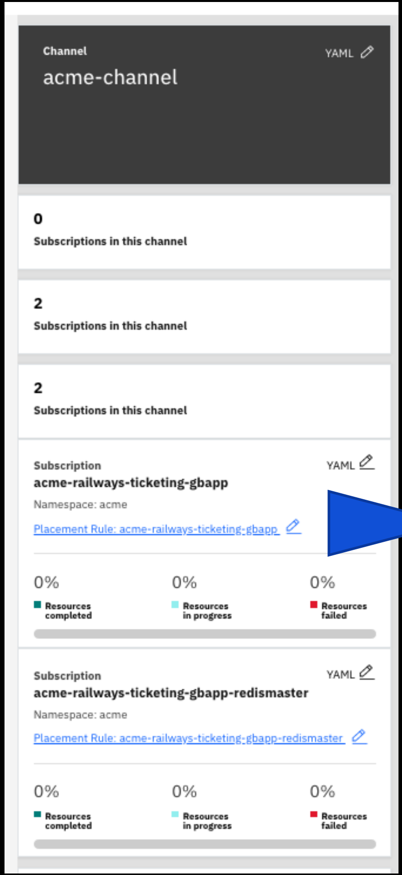
Automatic incident routing, bringing together DevSecOps teams to resolve complex faults fast

Proactively prevent application bottlenecks and performance issues with real time metrics

Application Modernization

https://github.com/hybridapp-io

1. Update/Move apps with placement rules (policy as code!!)
2. Understand metrics from applications – Prometheus/Grafana/Thanos Based
3. Remediate application bottlenecks quickly



Channel

acme-channel

0
Subscriptions in this channel

2
Subscriptions in this channel

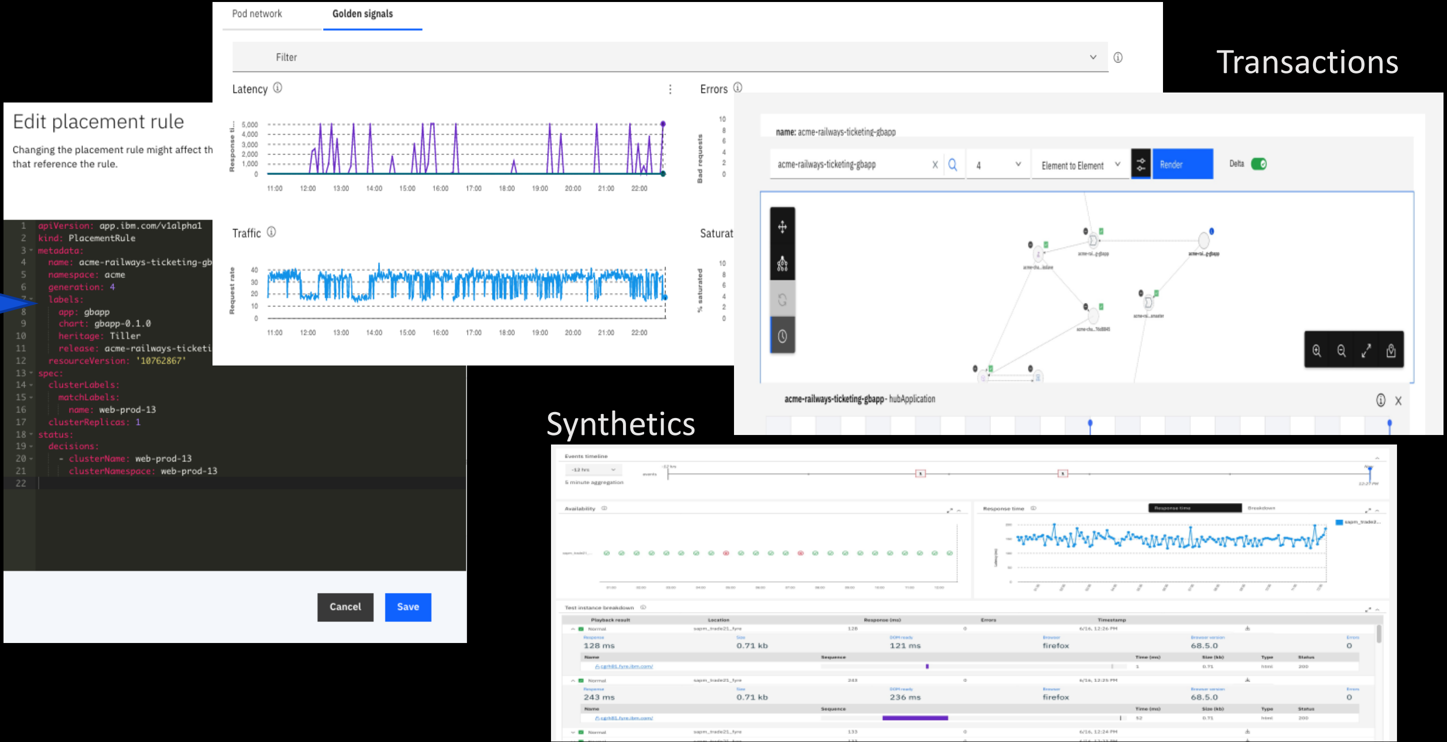
2
Subscriptions in this channel

Subscription
acme-railways-ticketing-gbapp
Namespace: acme
Placement Rule: acme-railways-ticketing-gbapp

0%	0%	0%
Resources completed	Resources in progress	Resources failed

Subscription
acme-railways-ticketing-gbapp-redismaster
Namespace: acme
Placement Rule: acme-railways-ticketing-gbapp-redismaster

0%	0%	0%
Resources completed	Resources in progress	Resources failed



Golden Signals

Edit placement rule

Changing the placement rule might affect th
that reference the rule.

```yaml
apiVersion: app.ibm.com/v1alpha1
kind: PlacementRule
metadata:
  name: acme-railways-ticketing-gb
  namespace: acme
  generation: 4
  labels:
    app: gbapp
    chart: gbapp-0.1.0
    heritage: Tiller
    release: acme-railways-ticketi
  resourceVersion: '10762867'
spec:
  clusterLabels:
    matchLabels:
      name: web-prod-13
  clusterReplicas: 1
status:
  decisions:
    - clusterName: web-prod-13
      clusterNamespace: web-prod-13
```

Transactions

name: acme-railways-ticketing-gbapp

acme-railways-ticketing-gbapp - hubApplication

Synthetics

Test instance breakdown

Playback result	Location	Response (ms)	Errors	Timestamp
Normal	sapm_trade21_fyre	128	0	6/16, 12:26 PM

Response	Size	DOM ready	Browser	Browser version	Errors
128 ms	0.71 kb	121 ms	firefox	68.5.0	0

Name	Sequence	Time (ms)	Size (kb)	Type	Status
cgrh81.fyre.ibm.com/		1	0.71	html	200

Playback result	Location	Response (ms)	Errors	Timestamp
Normal	sapm_trade21_fyre	243	0	6/16, 12:25 PM

Response	Size	DOM ready	Browser	Browser version	Errors
243 ms	0.71 kb	236 ms	firefox	68.5.0	0

Name	Sequence	Time (ms)	Size (kb)	Type	Status
cgrh81.fyre.ibm.com/		52	0.71	html	200

Playback result	Location	Response (ms)	Errors	Timestamp
Normal	sapm_trade21_fyre	133	0	6/16, 12:24 PM

Modernize Governance and Compliance Management

Visibility Across Hybrid Environment

ITOps Transformation

Application Modernization and Management

Governance and Compliance Management

Security & Compliance Management

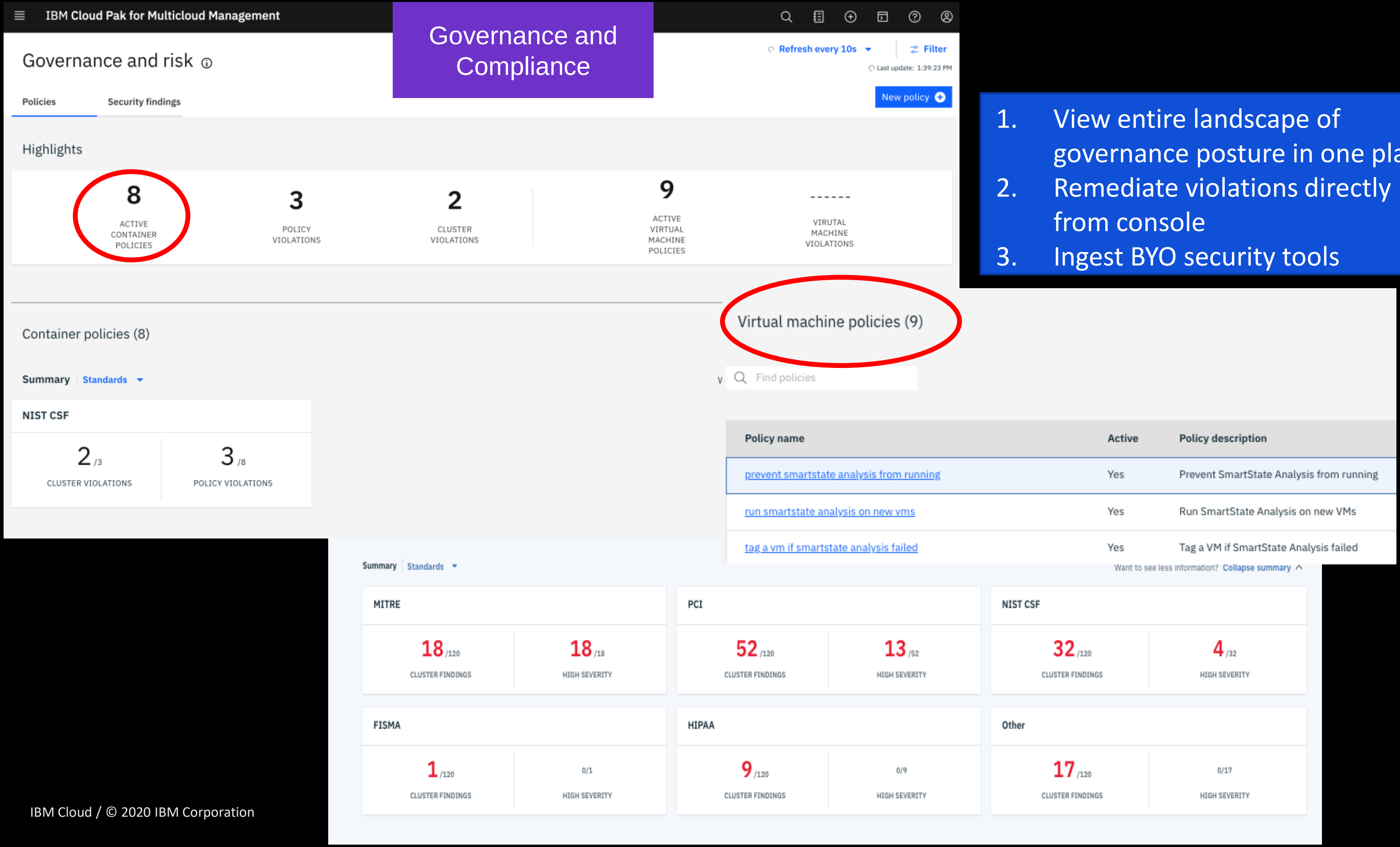
Enforce policies and ensure compliance across hybrid infrastructures and applications

Build more reliable, secure applications with DevSecOps brought together in one place

Auditability of all policies, known vulnerability exposures and regulatory requirement tracking

Governance and Compliance

1. View entire landscape of governance posture in one place
2. Remediate violations directly from console
3. Ingest BYO security tools



IBM Cloud Pak for Multicloud Management

Governance and risk

Refresh every 10s · Filter

Last update: 1:39:23 PM

New policy

Policies · Security findings

Highlights

8	3	2	9	------
ACTIVE CONTAINER POLICIES	POLICY VIOLATIONS	CLUSTER VIOLATIONS	ACTIVE VIRTUAL MACHINE POLICIES	VIRUTAL MACHINE VIOLATIONS

Container policies (8)

Summary · Standards

NIST CSF

2 /3	3 /8
CLUSTER VIOLATIONS	POLICY VIOLATIONS

Virtual machine policies (9)

Find policies

Policy name	Active	Policy description
prevent smartstate analysis from running	Yes	Prevent SmartState Analysis from running
run smartstate analysis on new vms	Yes	Run SmartState Analysis on new VMs
tag a vm if smartstate analysis failed	Yes	Tag a VM if SmartState Analysis failed

Summary · Standards

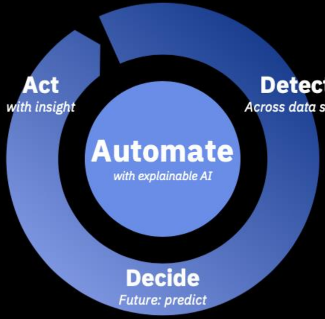
Want to see less information? Collapse summary

Standard	Cluster findings	High severity
MITRE	18 /120	18 /18
PCI	52 /120	13 /52
NIST CSF	32 /120	4 /32
FISMA	1 /120	0/1
HIPAA	9 /120	0/9
Other	17 /120	0/17

Infused AI for Intelligent IT Operations

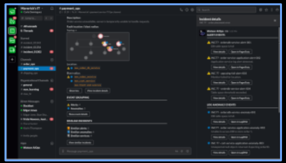
AI at the core of IT workflows

Harness the power IT data to reduce toil and free skills and resources for innovation that matters



Deliver insights where teams work

Insights delivered to a converged DevSecOps team's preferred user experience



Deep Understanding of your Applications

Open management platform to maximize impact across business workflows

Proactive Incident Resolution

Automated Application Scaling and Deployment

Intelligent Governance, Risk, Compliance

Extend existing investments

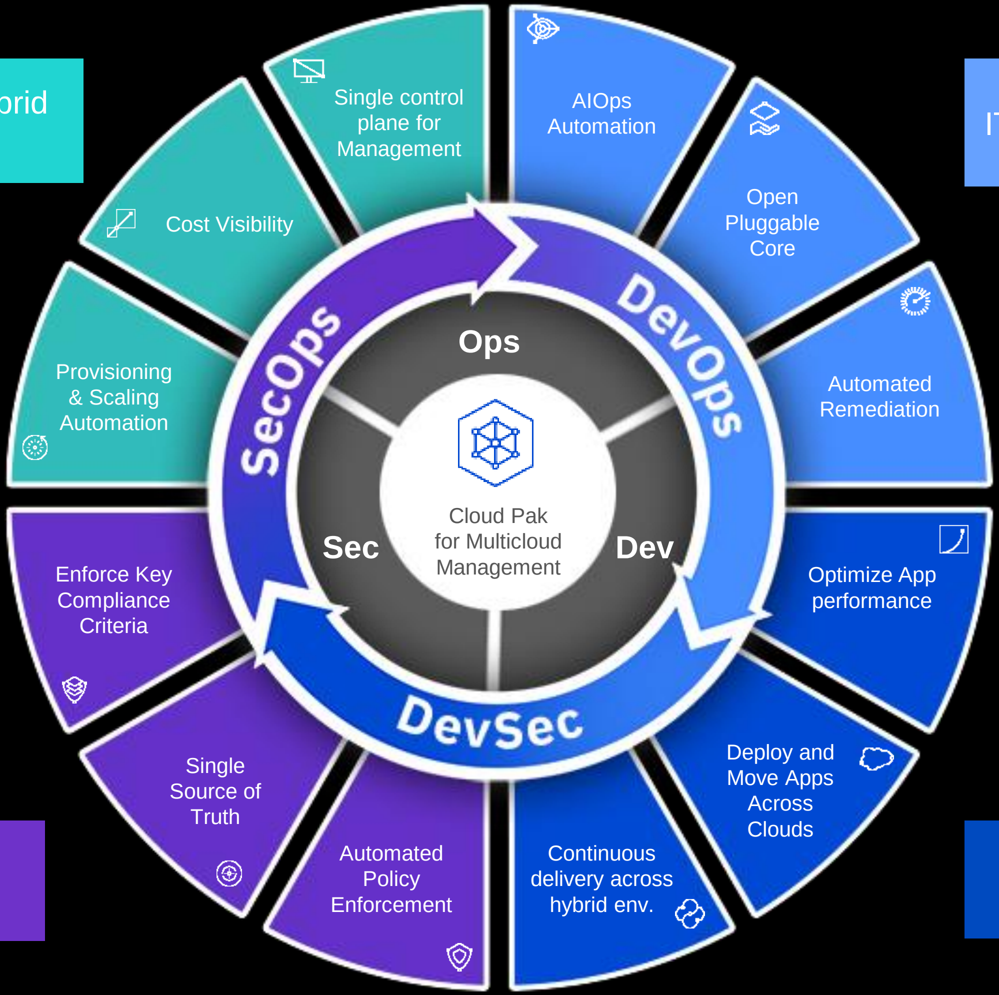
AppDynamics dynatrace servicenow

Ecosystem of best in class tools

slack humio turbonomic sysdig

Visibility across Hybrid Environments

ITOps Transformation


Single control plane for Management
AIOps Automation
Open Pluggable Core
Automated Remediation
Optimize App performance
Deploy and Move Apps Across Clouds
Continuous delivery across hybrid env.
Automated Policy Enforcement
Single Source of Truth
Enforce Key Compliance Criteria
Provisioning & Scaling Automation
Cost Visibility
SecOps
DevOps
DevSec
Ops
Sec
Dev
Cloud Pak for Multicloud Management

Governance and Compliance

Application Modernization

Thank you!