# Reimagine Virtualization, Containerization and Infrastructure Strategy

**TD SYNNEX IBM & Red Hat Innovation Days 2024**

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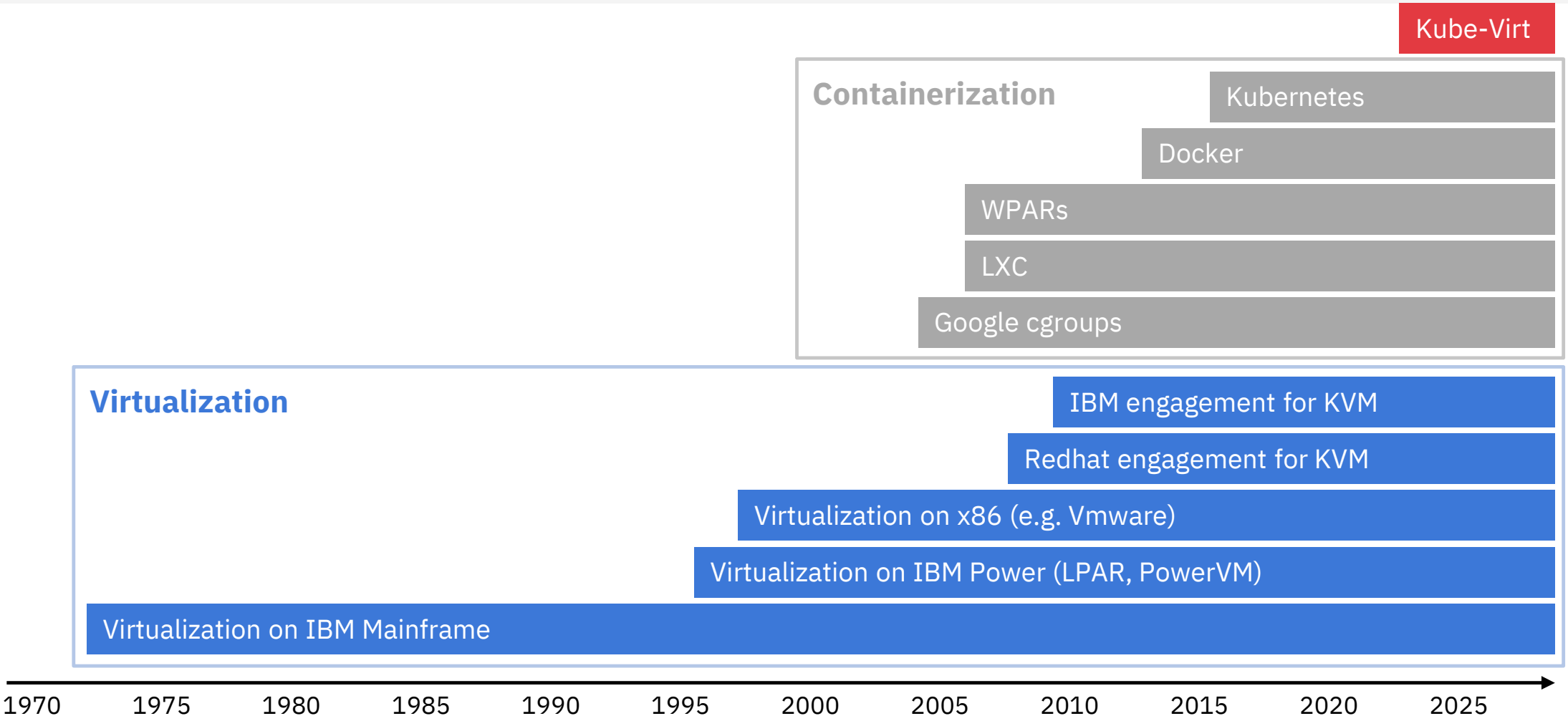
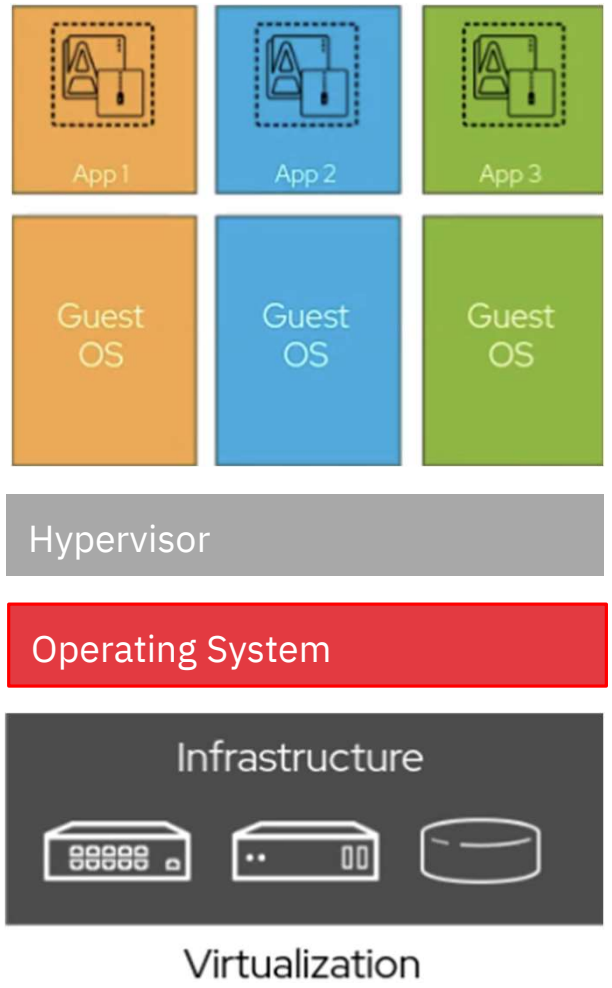
IBM

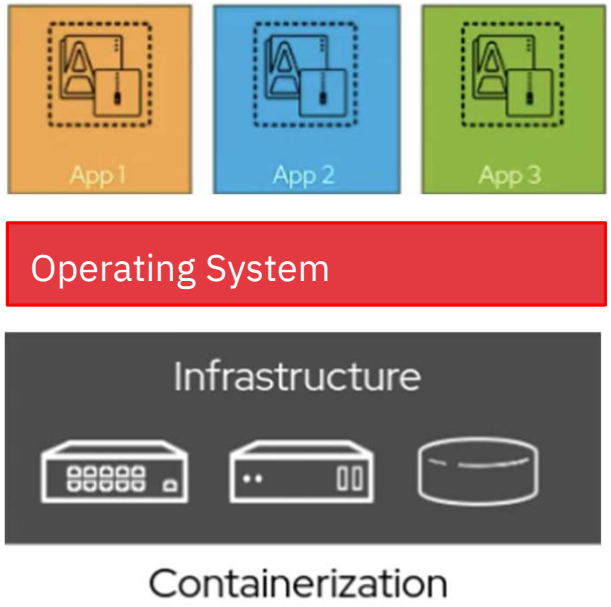
# About infrastructure optimization

# History of IT optimization



# History of IT optimization



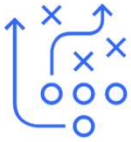
# Sometimes the journey gets a bit bumpy

# Let’s move on


Different Hardware
Different Virtualisation
Vmware in the Cloud
Public Cloud
On Premise
Containerization
Application Modernization
OpenShift

# What is the issue?

- Every company is doing a form of application modernization or digital transformation.
- Cloud was the main target.
- Platform was a consequence of the app modernization.



## App Modernization

Quick start, very slow finish … or never finished.
Cloud first isn't really working, we needed cloud smart?
New platforms should have additional benefits like agility, efficiency, and sustainability.
Alignment with business is key for any transformation or experiment.

## Accelerate transformation

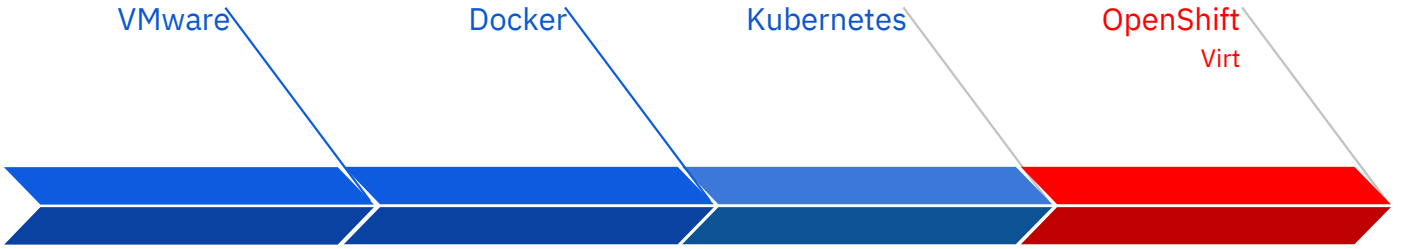
Platform modernization to drive focus on a cloud like experience (everywhere).
The current platform (VMware) holds most of the legacy and technical debt.
Placing a cloud-like platform on top didn't change the behaviour.
Scale needs automation and new behavior.

## Conflicting structures and organizational alignment

Developers want a PaaS-like experience.
Operations want stability and predicted outcomes.
The budget was aligned with the function, not the delivery.
No alignment between IT spending and business outcome.

# Modern Open Hybrid Platform

- Platforms evolved overtime but they were rather stacked.
- From a DC centric virtualization to an application centric virtualization
- Integrated in the new open hybrid platform.




**DC Virtualization**

Increase density and operation efficiency by virtualization of your DataCenter

**Containerization**

Increase innovation, reduce downtime, Introduction of DevOps,

**Container management**

Manage multiple containers, infrastructure independent, single point of control, failover, Increase DevOps Efficiency

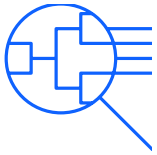
**Towards Application Centric**

Evolve around Applications, LOB, Users groups, self service. Increase efficiency, iPaas capabilities, Optimize costs

# History of IT optimization

Goal: Decrease or even remove VMware dependency

- Analyze workload/VM and right-size
- Design Target Landing Zones
- Define Target Operating Model
- Define Migration strategy
- Transform applications (cloud native)
- Re-platform to more sustainable platforms

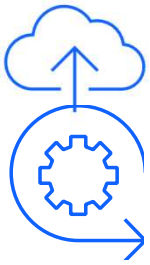


## Discover and Optimize

Outcome: Optimized VMware estate (licenses/subscriptions), view on the application landscape, and landing zone options

## Define and Design

Outcome: Focused adoption of new platform, migration with efficiency

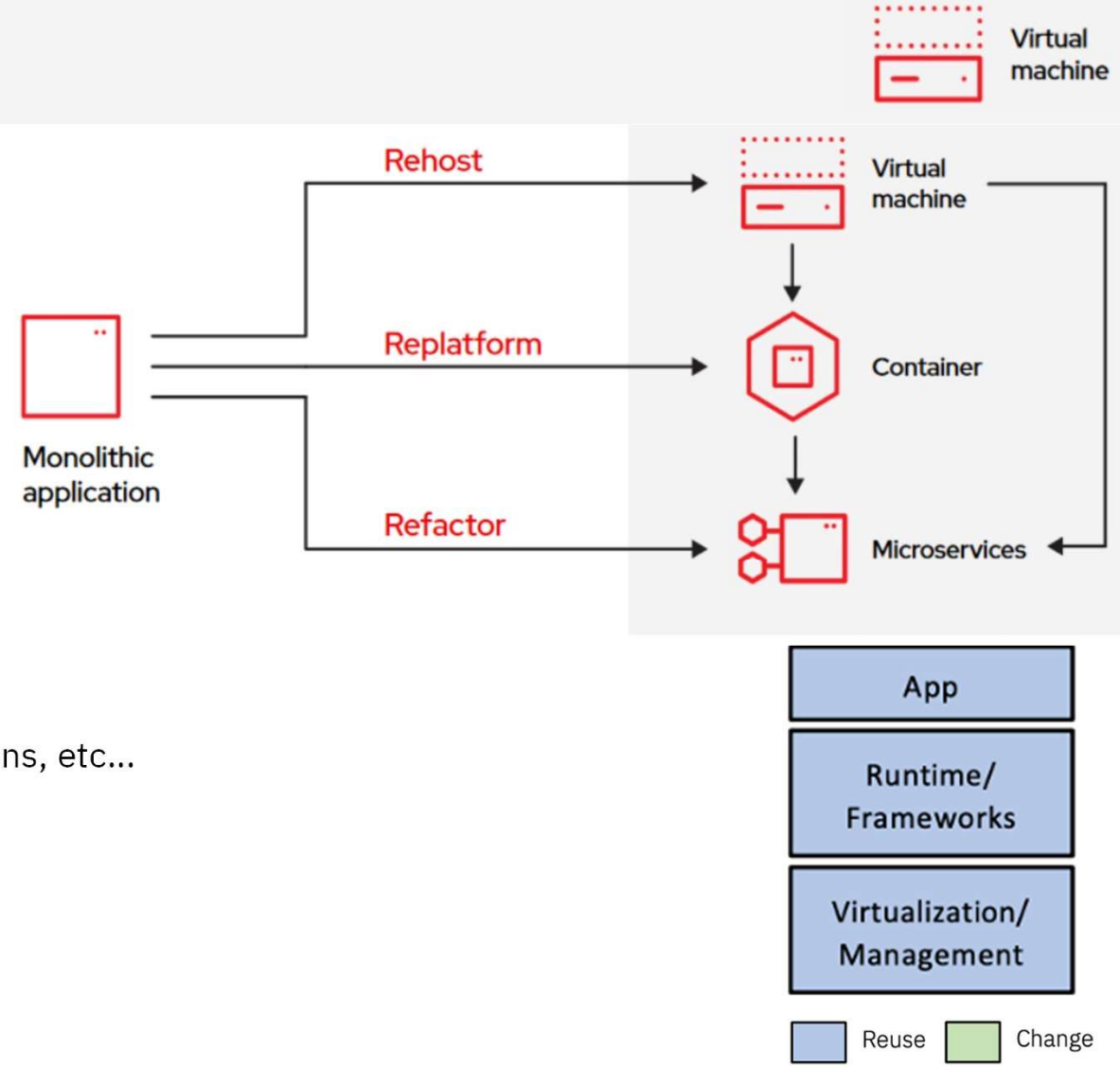


## Transform and Re-platform

Outcome: Modern hybrid cloud architecture at lower cost. Improved agility (time to market), faster adoption of innovation, common platform approach (3X times more value)

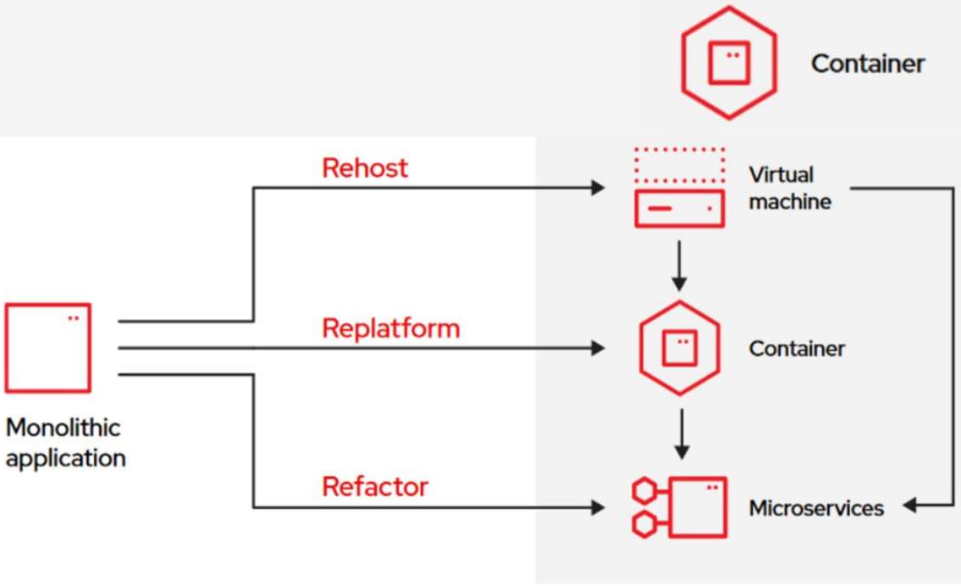
# Rehost

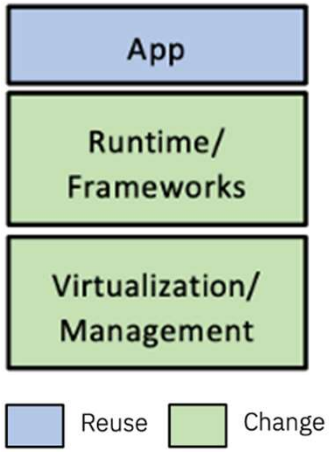
- Different Virtualization Solution
- IBM VMWare cloud
- How many VMs?
- What is the lifecycle of these VMs?
- When do I need to renew licenses for OS, VM solutions, etc...
- Where do I stand on the journey to cloud?



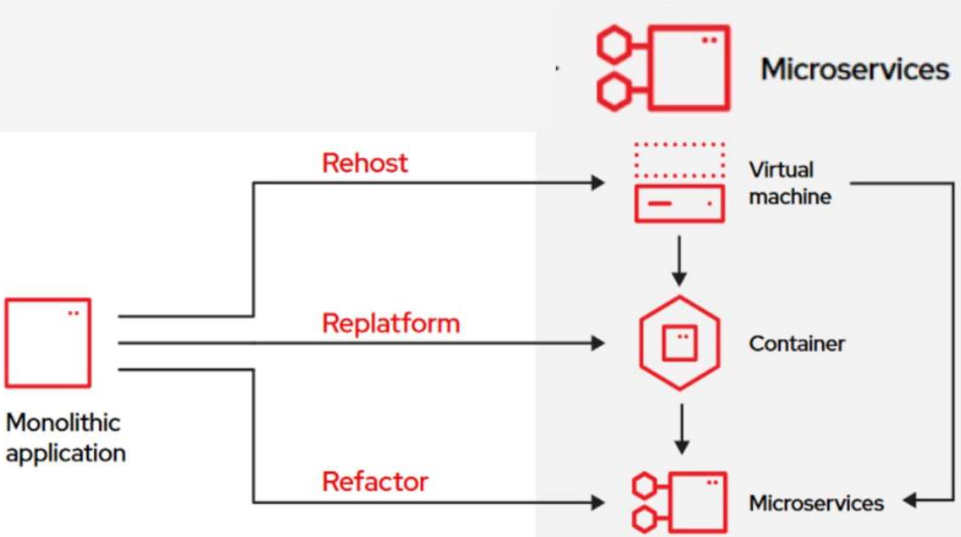
# Replatform

- Bespoke or COTS?
- What are the components of my VMs? What is the similarity?
- Is there already an automation in place to build the VMs?
- What is the maturity of my enterprise regarding the usage of a modern kubernetes platform and the associated processes around like dev/ops, CI/CD, etc.
- Do I stay on x86?
- Some of the apps which have been hosted in VMs are using databases. What are my thoughts with databases? Do we see strategic changes the way database
  services should be provided/consumed? Conversions from traditional databases to open
  source databases? From relational to non-relational. Maybe considering the Power Platform
  for the big databases?
- Will I exchange some applications with ISV SaaS applications?

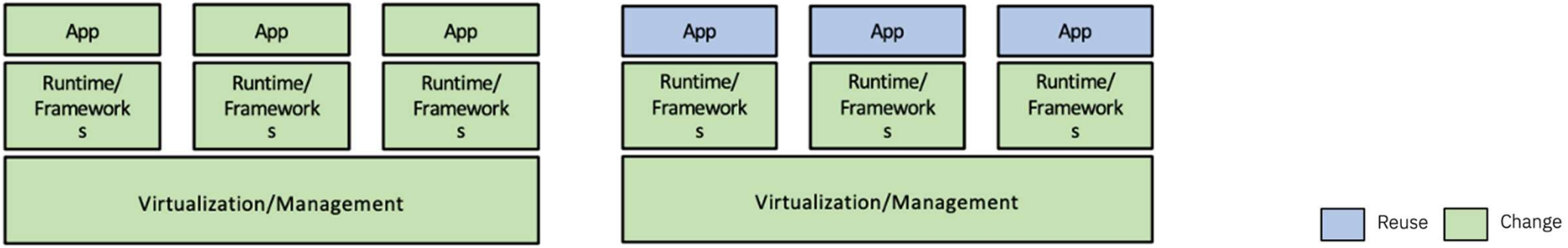


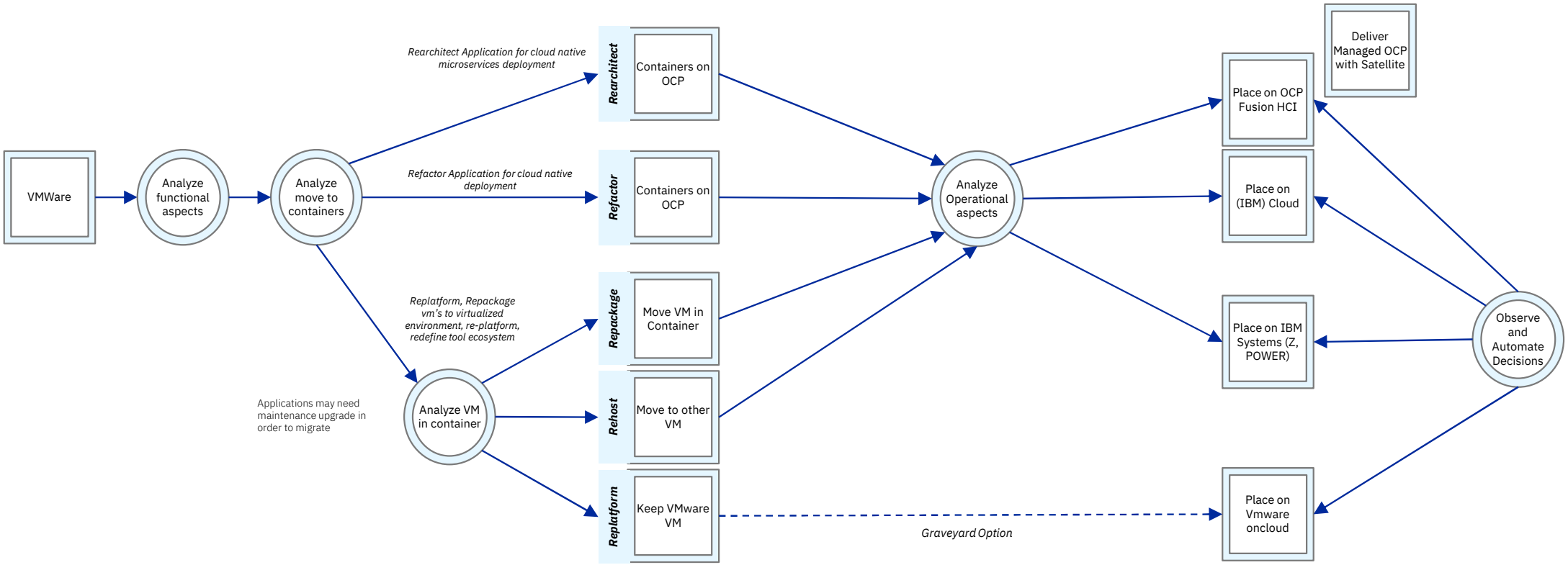
# Refactor



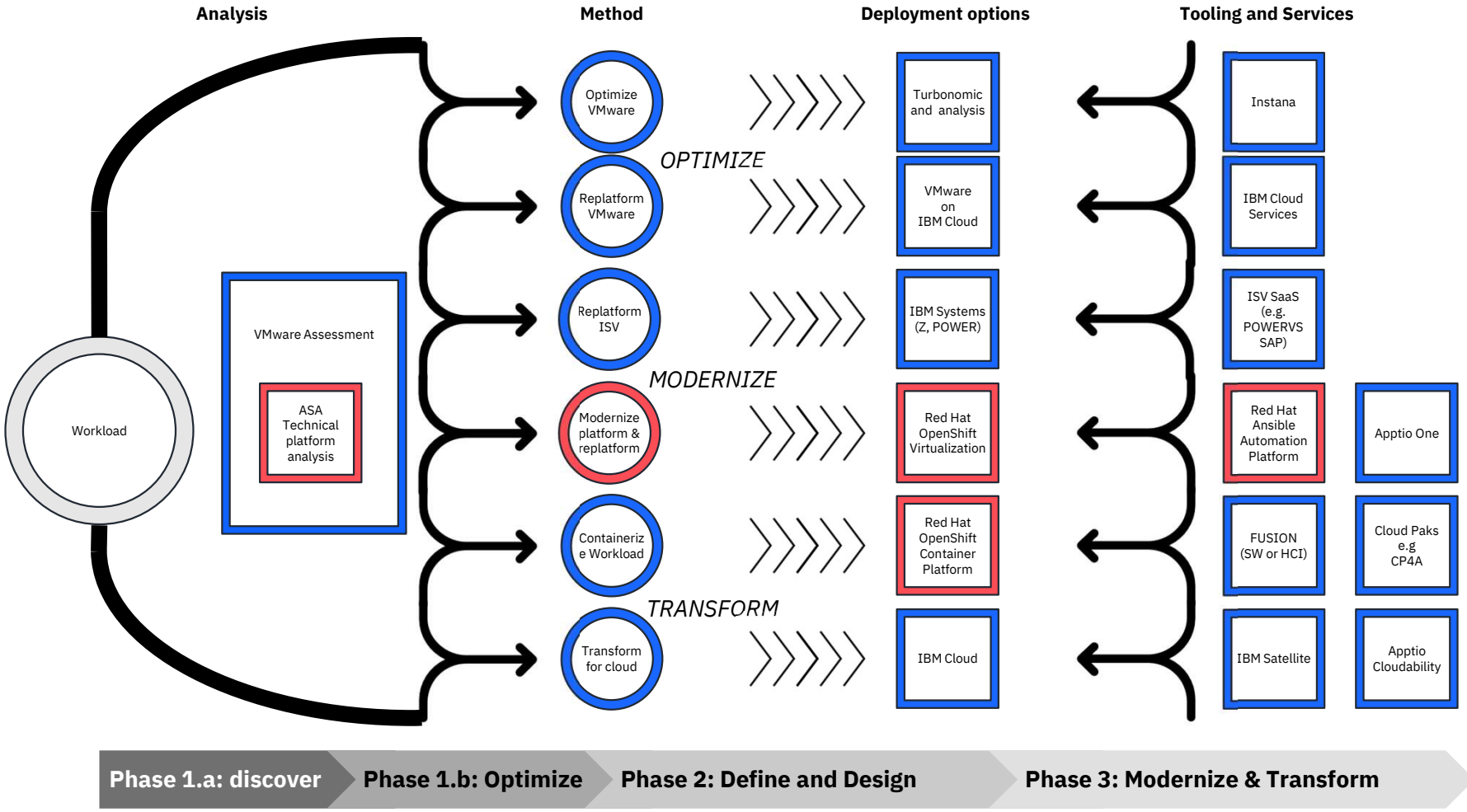

- Will it be possible to reshape the architecture
- Or even re-write from scratch?
- In many situations that takes too much time and is no option.
- But it may be a valid option for your core system?



# Journey for application modernization



# IBM view of Platform modernization for faster digital transformation



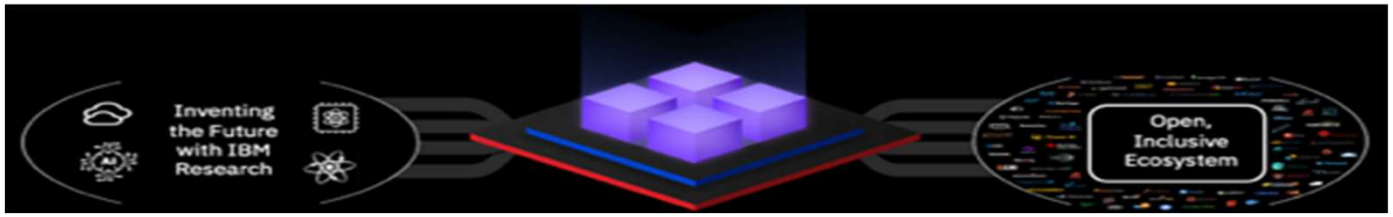

**Phase 1.a: discover** | **Phase 1.b: Optimize** | **Phase 2: Define and Design** | **Phase 3: Modernize & Transform**

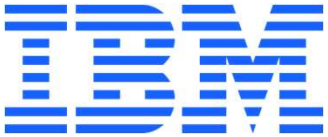
# How can IBM and the Ecosystem help?

IBM has the capabilities, program offerings, and ecosystem partnerships that can be leveraged to shape the path forward.

The IBM approach includes ..

| | |
|---|---|
| **Expertise** | IBM Consulting Cloud<br>Client Engineering<br>IBM Expert Labs<br>Red Hat Consulting Services |
| **Products** | Apptio (TBM) - FinOps<br>Turbonomic – VM Estate Right-Sizing<br>Instana – Application Performance<br>Red Hat OpenShift<br>IBM and Red Hat Automation Software<br>Cloud Pak for Applications |
| **Technology** | IBM Cloud<br>IBM Fusion HCI<br>IBM Power Systems, LinuxONE |



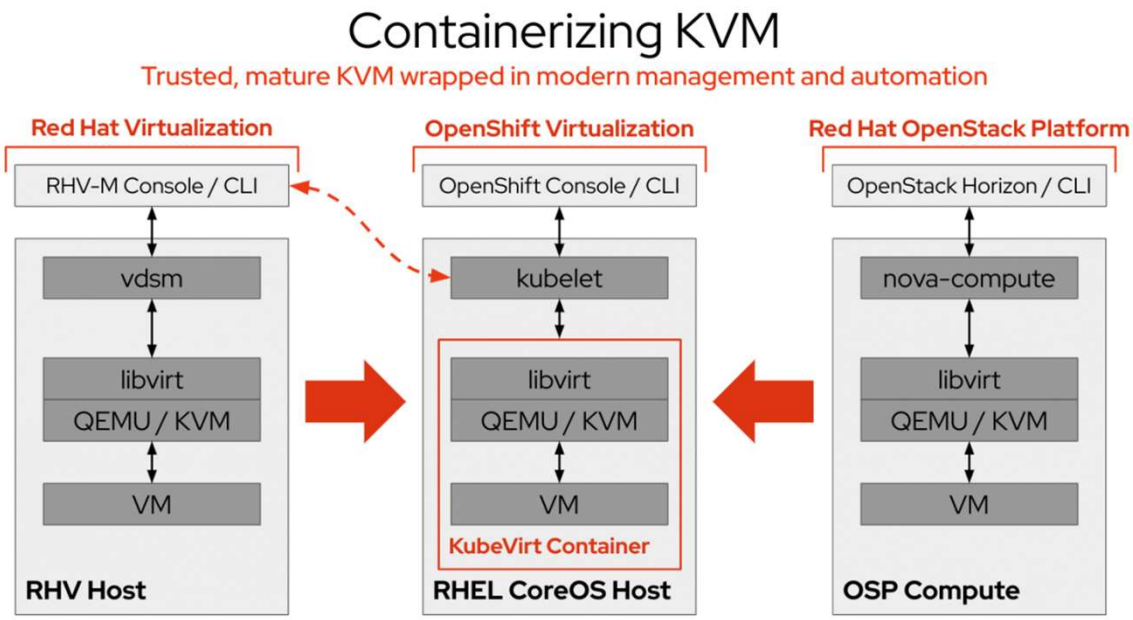


# OpenShift Virtualization

OpenShift Virtualization is here for prime time and a valid alternative for hosting VMs.

Support for all productive environments is available.

ISVs support is needed for certain workloads like SAP.

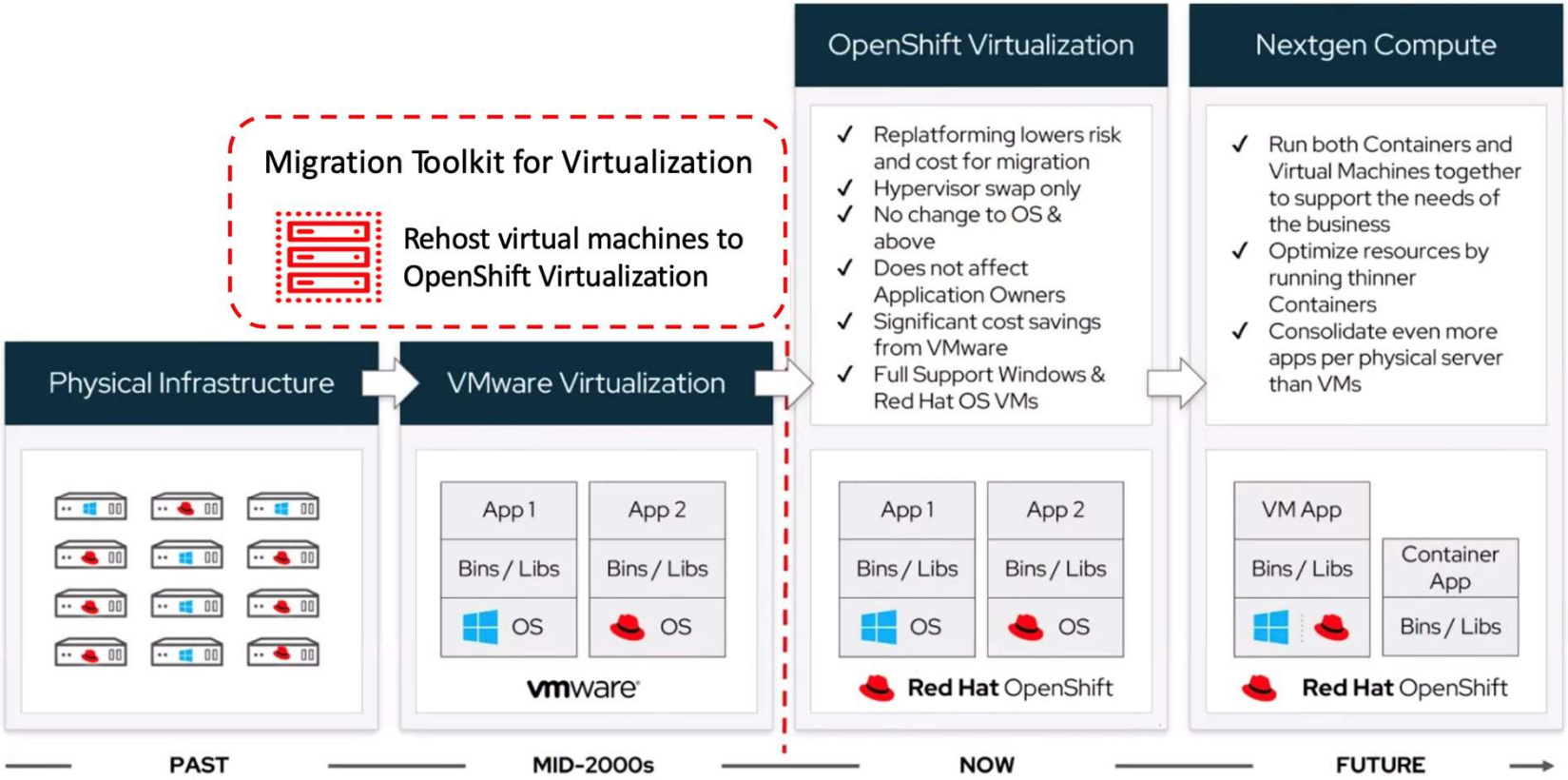



## Red Hat Summit 2024:

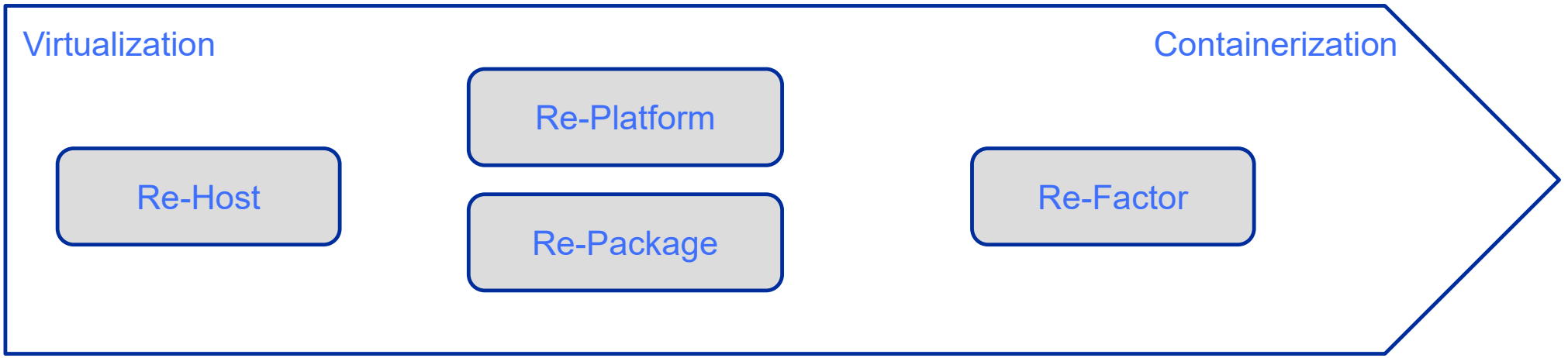
**Migrating thousands of virtual machines to Red Hat OpenShift Virtualization at Ally Bank**
Recently, Ally Bank started working with Red Hat to migrate thousands of virtual machines (VMs) from VMware to Red Hat OpenShift Virtualization. In this session, technology experts from Ally Bank will share insights from the migration process **…**
https://events.experiences.redhat.com/widget/redhat/sum24/SessionCatalog2024/session/1700167099105001rF4Q

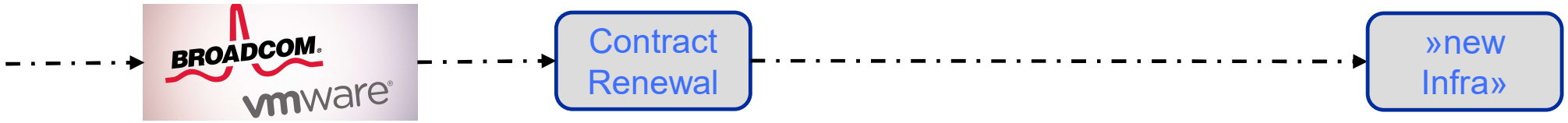
**Modernizing virtualization with Red Hat OpenShift Virtualization**
Join this roundtable session to hear how organizations have tackled challenges of traditional virtualization, such as operational complexity, by modernizing with Red Hat OpenShift Virtualization.
Morgan Stanley
Goldman Sachs
https://events.experiences.redhat.com/widget/redhat/sum24/SessionCatalog2024/session/1712925068557001d7O6

# VMs & Containers in one Platform



# Journey to cloud




How much time is left?

How much time is needed to use «new» infrastructure

# How can IBM help?

IBM has the capabilities, program offerings, and ecosystem partnerships that can be leveraged to shape the path forward. The IBM approach includes ..

**IBM Consulting**

IBM Consulting Cloud Accelerator – platform with transformation journeys across hybrid multi-cloud landscapes.

Client Engineering Business Value Assessment – IT Economics Experts

IT Ops with Apptio (TDM)

**Partners**

**HCL, Accenture, Kyndryl, TCS**

**Technology Lifecycle Services**

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IBM Expert Labs

Redhat Consulting Services

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Turbonomic – VM Estate Right-Sizing

Instana

IBM CP4A – Application Modernization

**System Integrator Partner**

**Kyndryl, ...**

**IBM Systems Technology**

IBM Expert Labs

Redhat Consulting Services

IBM Multivendor Support

IBM Storage Fusion HCI

IBM Power Systems, LinuxONE

Red Hat OpenShift
[OCP, OCP-V] + IBM and Red Hat Automation Software [ Ansible, ACM, ... ]

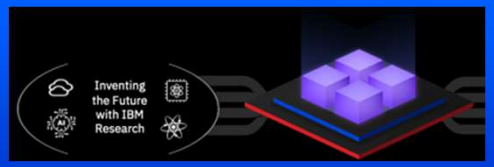
IBM Cloud

IBM Vmware Cloud

**Public Clouds**

**Enterprise Infrastructure**

**IBM Research**



# Exec summary

## Acquisition impact

- All clients are affected once their ELA must be renewed or if they do not have an ELA at all.
- For many enterprise clients VMware partners aren't involved anymore, subscription is directly with Broadcom.
- Customers may just now getting a new proposal from Broadcom moving VMware in a subscription model

## Client impact (limited sampling, IBM view)

- Increased pricing (depending on the usage factors between 2 and 10 are reported, IBM also affected in that range)
- No more (new) perpetual licenses – only subscriptions.
- Complex calculations with cores, CPUs and servers.
- Essential components are delivered through bundles (like NSX only available in VMware Cloud Foundation)

## IBM Structured Approach


- Optimize, Define and Transform, for the full scope.
- Balancing quick wins with strategic transformation.
- Adjust with business objectives, e.g. sustainability.

# Discover and Optimize: Workload analysis & rightsizing

Use Turbonomic to get insight and execute recommendations.

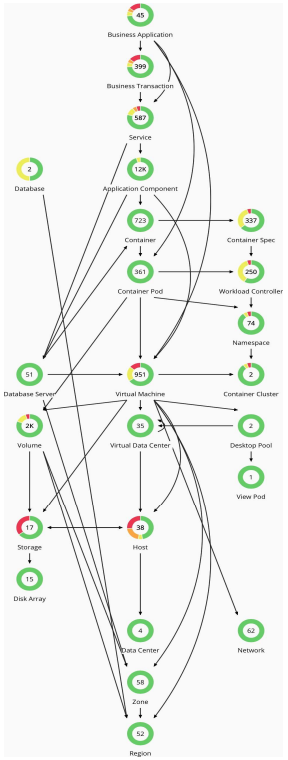
Analyse workloads with Expert Labs & Client Engineering.

Understand before you act.
- Optimized resource usage for best performance
- Workload analysis with Lab Experts and Client Engineering

Understanding the application supply chain
- Tangible outcome after 3 weeks data collection
- Application and infrastructure rightsizing

Optimize in hybrid context
- On premises activations vs. Off premise activations
- “what if”-analysis for moving and optimization
- ISV support options

Optimize existing estate:
- Execute safe/simple and investigate complex recommendations
- Remove redundancies and right size the environment
- Apptio-One ensuring technology to business alignment



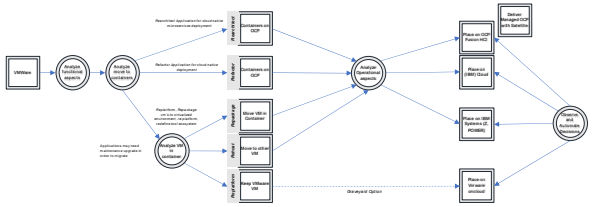

First get the proper insight and optimize before we act.

# Define and Design: Target landing zones and migration strategy

IBM Expert Labs, IBM Consulting to drive the design activities for the landing zones and establish right fit migration paths.

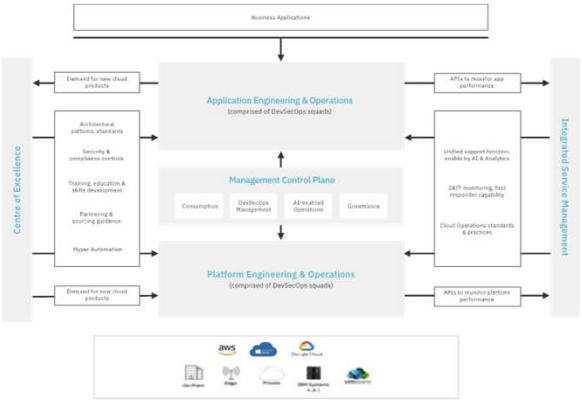
Define migration strategy.
- New landscape will have multiple targets (optimized for performance and cost)
- migration analysis with Expert labs and IBM

Evaluate target options
- Transformation and refactoring options as primary focus. (Higher value stream)
- Replatforming as an alternative.
- Graveyard and holding pattern for workloads not migrated yet



Design Target Landing zones
- On premises activations vs. Off premise activations
- “what if”-analysis for moving and optimization
- analysis with Expert Labs and IBM Consulting

Target Operating Model:
- Define consistency across the different landing zones
- Align processes and organization to the new target architecture




Define and design for the complete environment, no workload is left behind.

# Transform: Rearchitect

Strategic vision focused on cloud native

Different flavors: micro-services, macro-services (business objects), serverless.

Transformation analysis and engagements

Main drivers for cloud native platform (hybrid cloud)
- Digital transformation programs
- Innovation and new technology
- Business agility
- Speed
- Customer-obsessed transformation (personalized experiences)

Architectures
- New application with micro services architecture
- Composable business architectures with API exposed business objects
- Serverless architectures for event driven business interactions.

Accelerators for moving to cloud native
- mono2micro (java only)
- Conveyer-Tackle
- ISV packages

Co-creation services
- Red Hat/IBM Client Engineering – Application MVPs
- IBM Consultancy – end to end approach
- Eco-system – partnerships for completeness of solution

Long-term strategy is transformation, accelerate with our solutions & practices.

# Re-platform

On premises applications can be moved to newer and improved platforms …

… more sustainable platforms …

… or new hybrid cloud platform.

Focus is to move to OpenShift Virtualisation
- RHEL subscription for the OS of the VMs are included in OpenShift subscription
- forklift (use OpenShift Virtualization to host the VMs)
- move2kube (make the app run natively in a container)
- Red Hat Migration Toolkit for Virtualization (Link)

Rehost to other virtualization options
- IBM Fusion HCI for fast On-Premise activation
- IBM Systems (POWER/LinuxONE)
- Eco-system partners (KVM, Hyper-V, other)

Consolidate on IBM systems (LinuxONE and POWER)
- Smaller footprint (less DC space)
- Reduced energy & cooling (50% reduction for SAP HANA on POWER)
- Less carbon emissions (71% reduction for MongoDB on LinuxONE)

Securing funding for the IT transformation
- Sustainability and ESG scorecards
- Business performance (Apptio One)
- Governmental funds for sustainability and resiliency

Co-investigate and co-create with Red Hat/IBM Client Engineering services
- Workload analysis
- Application analysis and migration validation
- ISV conformity

Replatforming to deliver the best business outcome (performance, sustainability).

# Re-platform: Accelerate Move to cloud

Cloud for more flexibility and agility.

Remove the uncertainties with VMware on IBM Cloud.

Moving to cloud
- VMware on (IBM) Cloud
- Native cloud VMs
- Cloud native containers (long-term strategy)

Operating model change and service management alignment
- Establish a VMware on IBM Cloud as a fast-track
- Move application by application to local VMs in (IBM) Cloud.

Compliancy, privacy and regulations
- IBM FS Cloud - isolate and encrypt data (technical assurance)
- Monitor regulatory compliances.
- Applicable outside financial services - many of the technologies are in our regular VPC.


VMware on IBM Cloud
- Passthrough option or retirement construct
- Admin access to vSphere, better aligning with current service processes.

Move to VMware on (IBM) Cloud, followed by a native cloud transition.

# Where are we heading?

Kubernetes as the abstraction layer

Driving composite applications through a service-oriented approach

Agility is not owned by the developers, it needs to be everywhere – service delivery, architecture and business.

Kubernetes is becoming the new abstraction layer, being it in the cloud or on premise.

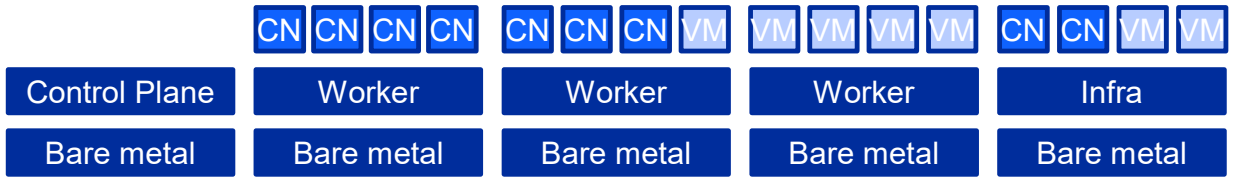
OpenShift will be running on bare metal as we will run VMs and Containers on this abstraction layer.

We will see OpenShift being delivered by OpenShift, the ‘armada’ principle that many cloud providers and some new private cloud appliances are using. Hosted Control Planes and HyperShift are the open-source initiative from Red Hat supporting this principle.

This will simplify the automation and delivery of applications, as we are using a single interface to deliver VMs, Containers or serverless. Same pipeline approach can be used, enabling a unified GitOps.

Driving down cost through removing a redundant abstraction layer and by simplifying the different Ops-integrations (DevOps, GitOps, SecOps …).

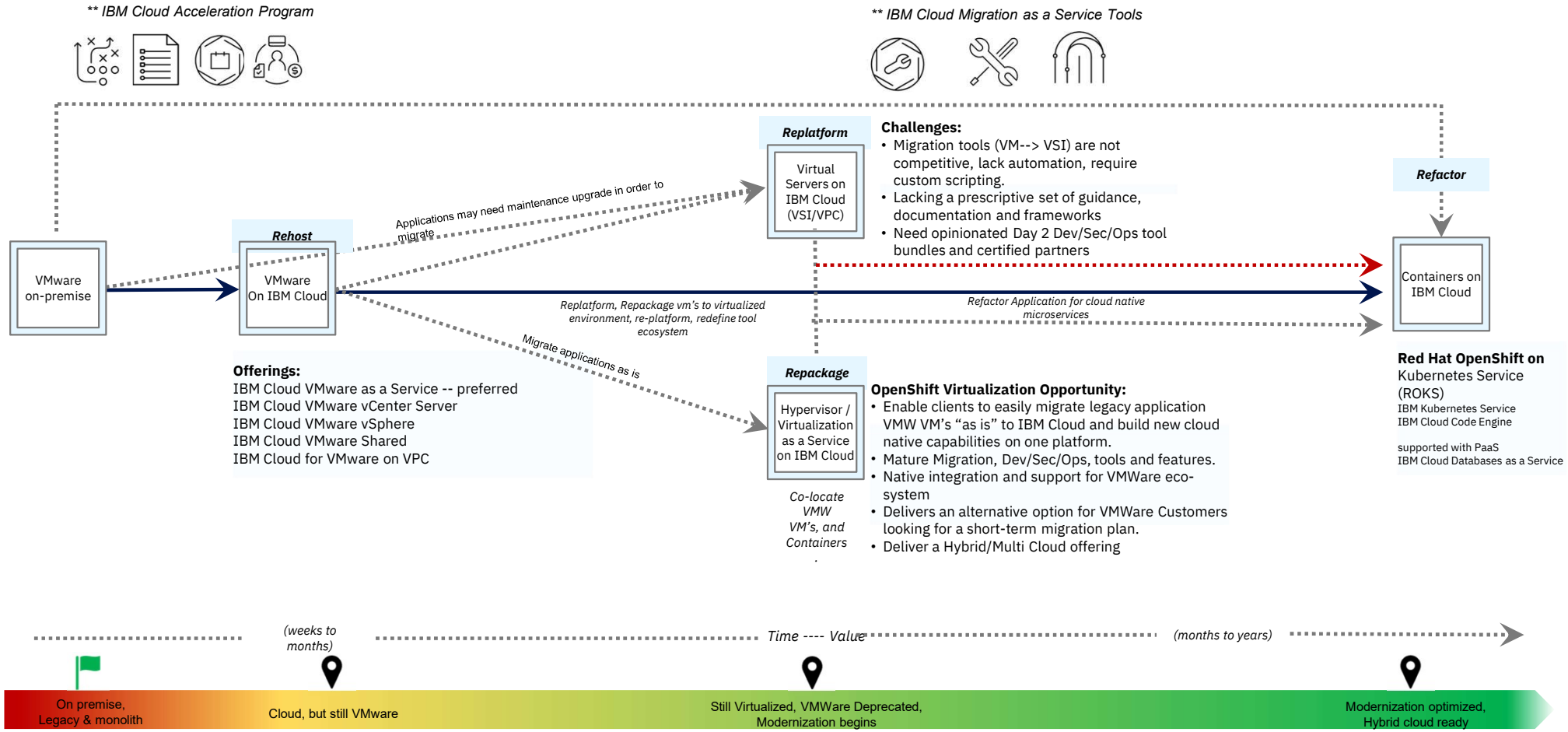
No lock-in by a single vendor with ‘fair market price’ as there are different Kubernetes vendors available, making reversibility a reality.




Removing the redundant abstraction layer and evolve to container-driven.

# Cloud first approach – VMware Migration Journey

*The client journey starts with a VMware on-premise architecture and leads towards a modernized hybrid cloud environment, with workloads containerized and application microservices, on IBM Cloud supported by an industrialized k8s platform.*



# What we understood for some customers

Your actual challenges

- Price increase versus IT budget
- Increase agility
- Address future business needs (containerization)

What are your goals/objectives?

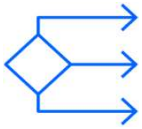
- Decrease VMware estate (to what extend?)
- Remove operational dependency

How do you balance between quick-win, tactical and strategic options?

# What we see at other clients

## Uncertainty

- VMware subscription pricing
- Broadcom bundled strategy
- Broadcom cost reduction after acquisition
- Skills and innovation drainage



## Alternatives?

- OpenShift Virtualization is becoming **the** OpenSource x86 alternative
- Move to VMware on cloud
- Move to POWER/LinuxONE especially for ORACLE and SAP

! VMware embedded into the DC core - dependencies Skills and operating model changes !

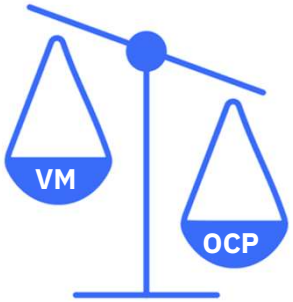
## Options vs budget vs timeline

- Digital transformation prioritized
- Application modernization timelines are long(er)
- Replatforming to cloud and OCP are faster options

## VMWare did not invent VMs

M44/44X 1960s
Full Virtualization VM/370 1970s
VMs will go on

## Majority of apps will be cloud-native

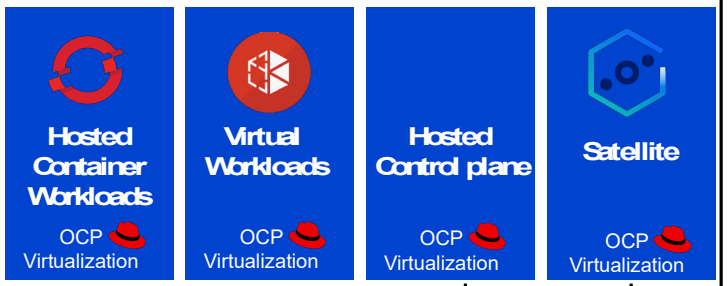



**95% new** cloud-native Strategic replatforming

Read the Gartner report

Source: State of Workload Deployment on Containers and Kubernetes

## What role will VMs play in the future?




## Appeal of VMs

- ✓ Flexibility of OpenShift on VMware
- ✓ Benefits of OpenShift on bare-metal
- ✓ Significantly lower cost

Application Developers
Application DevOps
Site Reliability Engineers

Consumer

Platform Engineering

Provider

## OpenShift + Fusion runs VMs

**First-class**
**No duplication**


- Cost
- Simplicity
- Performance
- Protection
- Availability

## Rethink infrastructure

**Start using Virtual Machines on OpenShift with Fusion**

# Terminology comparison

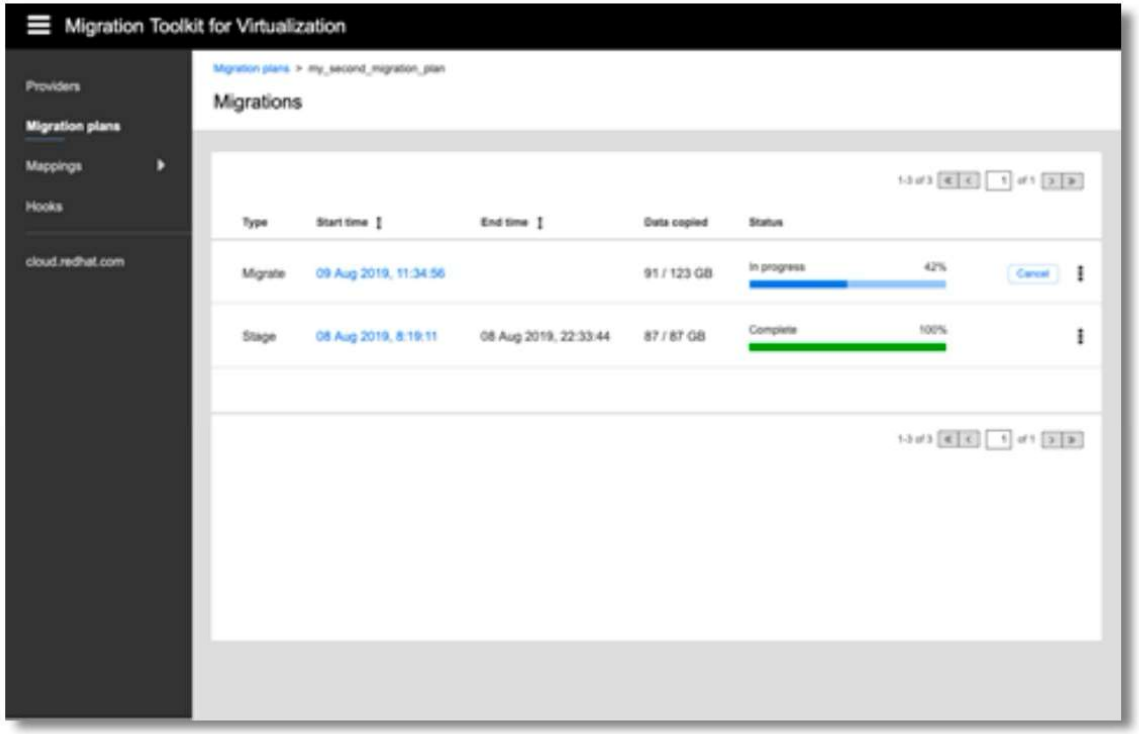


| Feature | RHV | OpenShift Virtualization | vSphere |
|---|---|---|---|
| **Where VM disks are stored** | Storage Domain | PVC | datastore |
| **Policy based storage** | None | StorageClass | SPBM |
| **Non-disruptive VM migration** | Live migration | Live migration | vMotion |
| **Non-disruptive VM storage migration** | Storage live migration | *Preview with OCP 4.15.* | Storage vMotion |
| **Active resource balancing** | Cluster scheduling policy | Pod eviction policy, descheduler | Dynamic Resource Scheduling (DRS) |
| **Physical network configuration** | Host network config (via nmstate w/4.4) | nmstate Operator, Multus | vSwitch / DvSwitch |
| **Overlay network configuration** | OVN | OCP SDN (OpenShiftSDN, OVNKubernetes, and partners), Multus | NSX-T |
| **Host / VM metrics** | Data warehouse + Grafana (RHV 4.4) | OpenShift Metrics, health checks | vCenter, vROps |

MIGRATION TOOLKIT FOR VIRTUALIZATION

# Migration Toolkit for Virtualization (MTV)

## Migration at scale of virtual machines to OpenShift




***Migration Analytics***

Detect potential compatibility issues before migrating to ensure a successful migration

***Mass Migration of VMs***

Migrate workloads at scale to OpenShift

- Provide source and destination credentials
- Map infrastructure
- Create migration plans

***Current Providers to migrate from***

- VMware
- Red Hat Virtualization
- Red Hat OpenStack
- OCP-V
- Open Virtual Appliance (OCA)

Red Hat