



# MORPHEUS

## An open approach to multi-cloud and multi-platform orchestration

Morpheus Overview and Strategic  
Comparison with VMware and Red Hat

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MORPHEUS

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## BACKGROUND

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**By 2021 over 75% of midsize and large organizations will have adopted a multi-cloud and/or hybrid IT strategy.<sup>1</sup>**

**By 2023, Kubernetes will be deployed in more than 80% of all on-premises private cloud and cloud inspired environments, up from less than 10% today, requiring I&O to acquire operational competencies.<sup>2</sup>**

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Today's modern IT environment has become significantly more complex as organizations simultaneously deal with application platform modernization from VMs (pets) moving to Containers (cattle) at the same time having to manage deployment of those applications into both on-premises and public cloud endpoints.

Legacy technology giants such as VMware and Red Hat are at the center of many of these conversations as enterprises around the world leverage core platform offerings from those companies in various forms as part of their App-Dev and IT Operations. As such, both VMware and Red Hat have developed ancillary products to help their customers automate and orchestrate the provisioning of workloads into their platforms.

While these platform-specific tools are suitable options for those that want to invest 100% in a specific vendor, they do not work well in more complicated heterogeneous environments. This is why many organizations seek to abstract automation and governance away from the underlying hypervisor, container, or cloud platform. Abstraction provides technical and economic freedom to adapt to change without penalty.

**Morpheus is a 100% agnostic and application-centric cloud management platform for multi-cloud orchestration, unified operations, and self-service automation.**

It's a foundation to bridge the gap between teams, tools, and processes independent of where and how applications are deployed. Unlike vendor-specific tools that force you to rip and replace existing technologies, Morpheus unifies tools you already have and lets you manage your clouds and application platforms your way - just better and with zero lock-in.

This paper will dive deeper into how Morpheus can complement and sometimes replace various elements of the VMware and Red Hat technology stack while still enabling organizations to benefit from existing expertise with their respective core offerings.

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<sup>1</sup> Increasing Reliance on Cloud Computing Transforms IT and Business Practices. Gartner Dec 2018 by various

<sup>2</sup> How I&O Can Properly Deliver Kubernetes Support. May 2019. Dennis Smith

# OUR VISION AND SERVICE FRAMEWORK

Morpheus provides a systematic approach to multi-cloud self-service and DevOps automation which bridges the gap between teams, tools, and processes across Mode 1 and Mode 2 applications independent of where and how those applications are deployed.

Our aim is not to replace existing tools. Instead, we improve the return on those investments by linking technologies together (“the glue for your tools”) and filling in gaps with built-in functionality. We also provide an abstraction so changes in your tools and platforms do not cause disruption to your overall enterprise agility.

Lastly, we are a unified operations framework that enables Developers, Operations, and Security teams to collaboratively serve the needs of the Business in a frictionless way by delivering on what each needs to be successful without negatively impacting the other.

## COMPOSE

Establish the foundation by discovering brownfield instances and clusters, create new VM or K8 clusters, and optimize resources with analytics and guided rightsizing.

## GOVERN

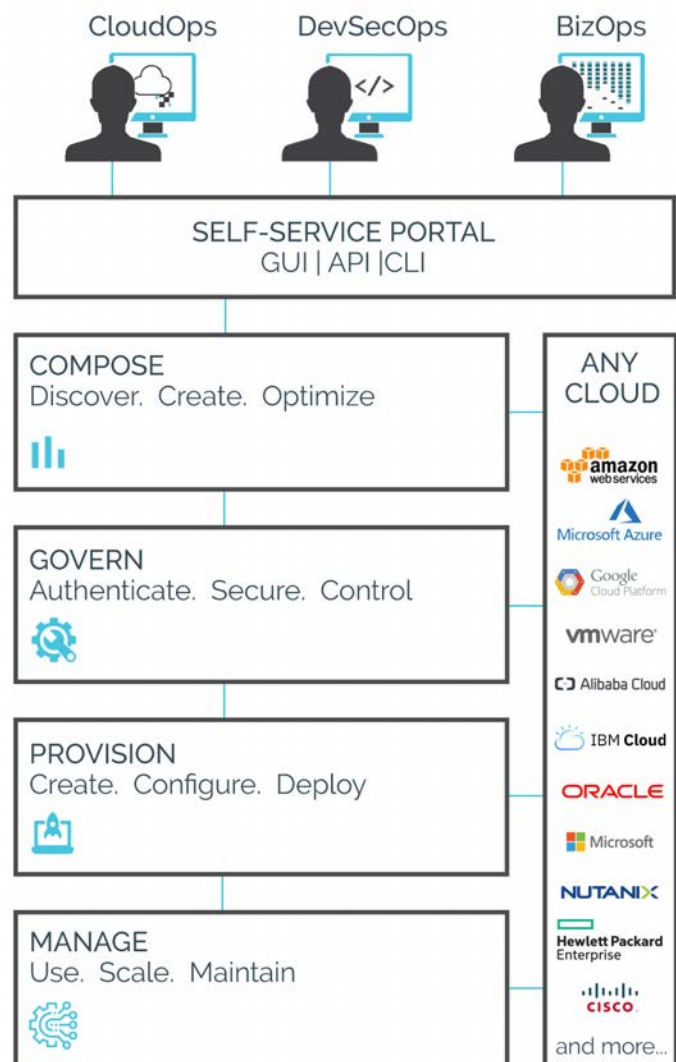
Manage enterprise-wide role-based access across tools and clouds with IAM integration, improve security with CVE scanning of instances and set policies to control sprawl.

## PROVISION

Automate app deployment with hybrid cloud blueprinting (Morpheus, Terraform, Cloud Formation, ARM, HELM) and integration into config. management and artifact deployment.

## MANAGE

Simplify day-2 operations with task automation and streamline dev with instant access to consolidated logging, monitoring, and backup utilities.



## FROM VM TO KUBERNETES TO WHATEVER'S NEXT

Morpheus was designed to look at the overall application lifecycle with abstractions that are broad enough to cover provisioning of almost any workload concept but also detailed enough to properly represent complex objects or IT processes. As an application-centric orchestrator, we care about fully realized application services as opposed to individual VM or a Container.

What does this mean? In some platforms, an Instance is representative of a singular object, like a “Virtual Machine” in Amazon or VMware. In Morpheus however, an Instance is a representation of a Resource or Service. This deeper definition of a service may involve several VMs along with code deployment or even several docker Containers and Pods as well as all of the operational tool settings and service configurations that are required to manage and maintain that application

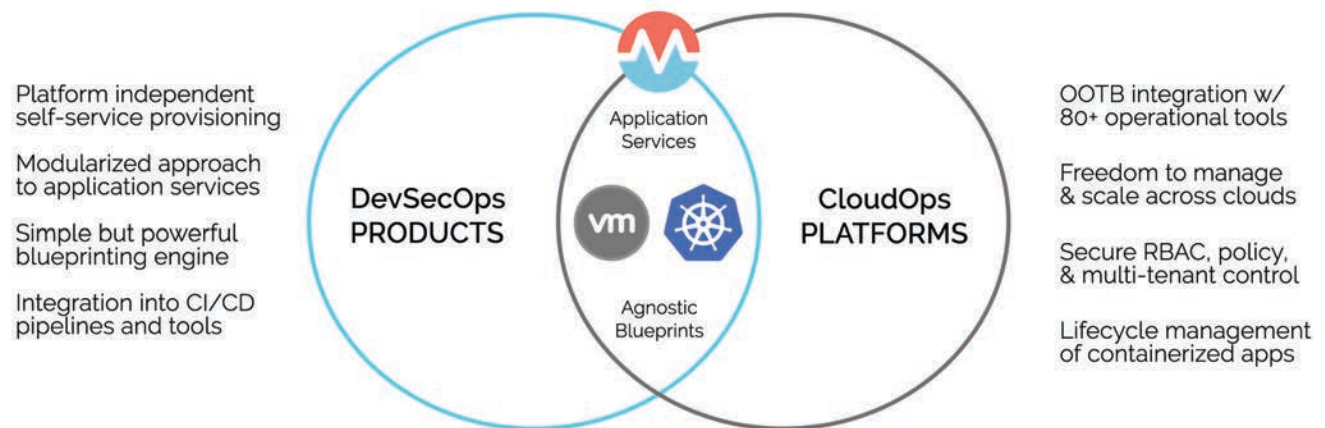
Unlike VM-centric designs that fail to properly represent microservice and container concepts or container-only designs that don't work well in brownfields, Morpheus excels in both VMware and Kubernetes environments and in both legacy and new deployments.

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**By 2023, Kubernetes will be deployed in more than 80% of all on-premises private cloud and cloud inspired environments, up from less than 10% today, requiring I&O to acquire operational competencies.**<sup>3</sup>

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Gartner research indicates that 20% of global companies are now running containers in production and while developers have fully embraced the platform, I&O leaders have found Kubernetes to be difficult to install, operate, and maintain. The same IT teams trying to manage on-prem VMware and Public Cloud are now being tasked with Kubernetes projects which is, in turn, exposing major skill and resource gaps.

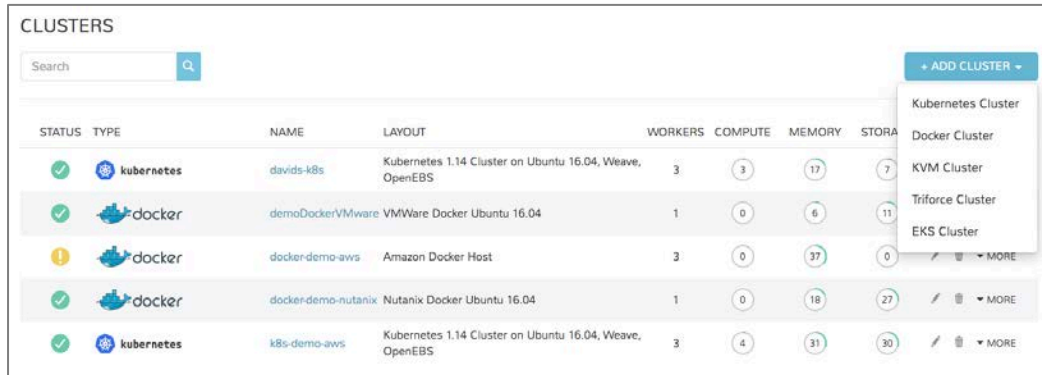


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<sup>3</sup> How I&O Can Properly Deliver Kubernetes Support. May 2019. Dennis Smith

## BUILD, MANAGE, AND UTILIZE KUBERNETES ON ANY CLOUD

While some IT teams may have the skills to 'build your own Kubernetes' (BYOK), it can be time-consuming to manage plug-ins and integrate service layers. Morpheus ships out-of-the-box with a Morpheus Cluster service which can be used to quickly stand up our CNCF-certified Morpheus Kubernetes Service (MKS) on any one of the dozen or more clouds we support. This approach gives you a consistent and fully-managed Kubernetes service independent from the variations found on various cloud platforms.



STATUS	TYPE	NAME	LAYOUT	WORKERS	COMPUTE	MEMORY	STORA
✓	kubernetes	dauids-k8s	Kubernetes 1.14 Cluster on Ubuntu 16.04, Weave, OpenEBS	3	3	17	7
✓	docker	demoDockerVMware	VMWare Docker Ubuntu 16.04	1	0	6	11
!	docker	dockerdemo-aws	Amazon Docker Host	3	0	37	0
✓	docker	dockerdemo-nutanix	Nutanix Docker Ubuntu 16.04	1	0	18	27
✓	kubernetes	k8s-demo-aws	Kubernetes 1.14 Cluster on Ubuntu 16.04, Weave, OpenEBS	3	4	31	30

Like all facets of Morpheus, we want to provide a native service but also integrate with third-party tools so you don't have to be locked into any one path. Our Cluster Service can also be used to quickly provision and manage other services such as Docker Clusters, Amazon Elastic Kubernetes Service (EKS) and Azure Kubernetes Service (AKS). For those that may still want to customize various services within their cluster deployment, you can use our Image Library and modify our Kubernetes layout to fit your needs while still assuring an automated and repeatable deployment.

With Morpheus you can:

- Share K8 clusters across tenants and teams
- Add and manage Namespaces including service plans
- Monitor and control K8 Master and Worker nodes
- View details on specific services including labels and specs
- Monitor status and specs on specific Containers
- Get full details on Jobs, Volumes, Data Stores, and more

We're also extending this service to include full inventory and utilization of brownfield Kubernetes clusters meaning if you are already using a popular technology like Red Hat OpenShift you can incorporate those clusters and enable a more open approach.

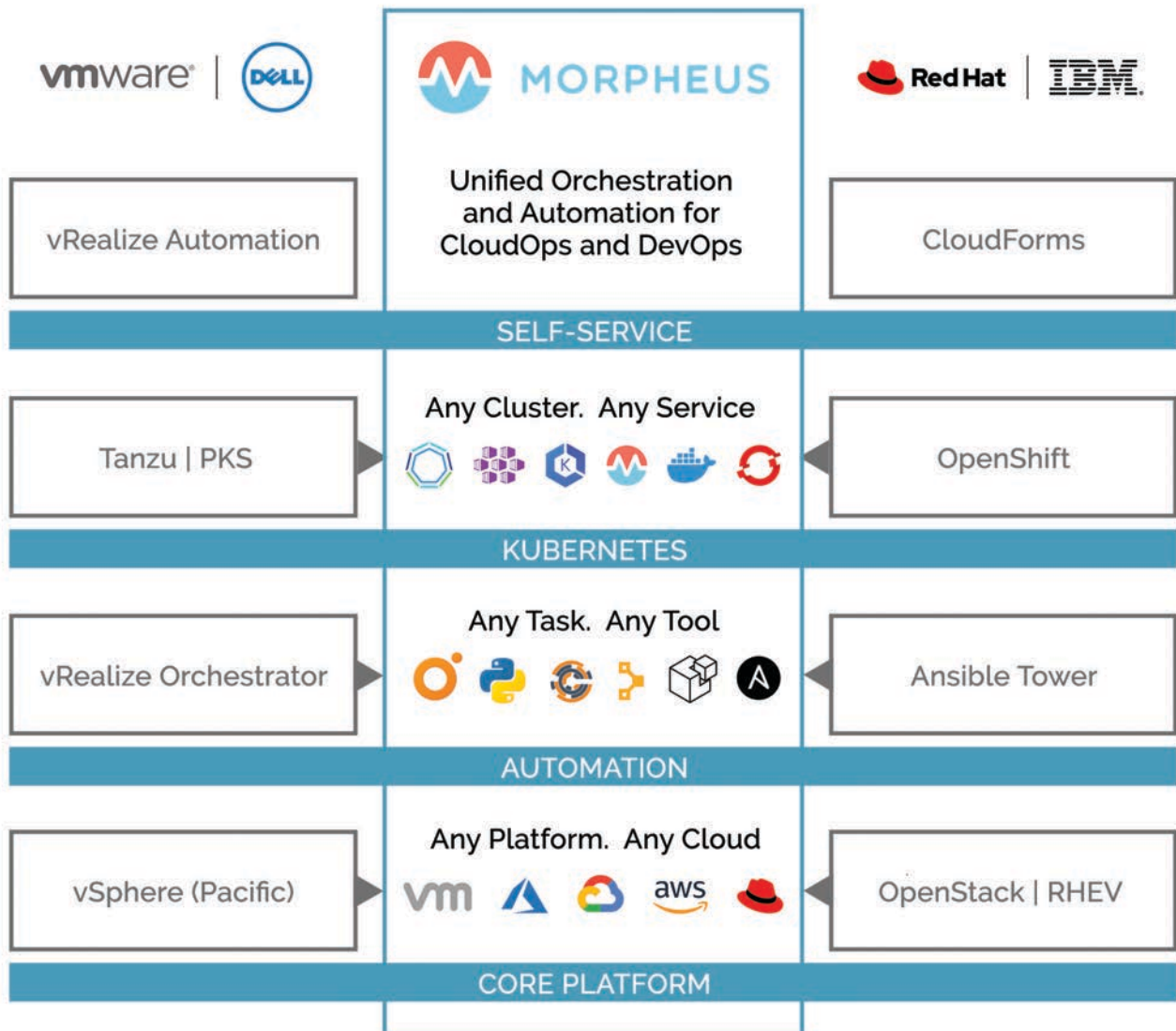
Building and managing the K8 cluster is a small part of the equation. This is where the rest of the Morpheus stack really shines. We can apply all of the multi-cloud provisioning and DevOps automation services to your greenfield and brownfield Kubernetes clusters. Self-service provisioning, cost optimization, secure governance, and day-2 automation.

## COMPARING ENTERPRISE OPTIONS

Life is all about choices, and life for IT leaders has become much more complex in recent years as the number of choices has skyrocketed. This is particularly true when it comes to digital transformation and application modernization initiatives.

As mentioned previously, abstraction is a key concept that can reduce the risk of making the wrong choice by providing degrees of freedom without sacrificing simplicity or control.

The figure below is a simple architectural framework that illustrates the major categories of service specific to multi-platform automation and orchestration. While VMware and Red Hat each have their own products in each of these layers, Morpheus provides the best of both worlds with integration as well as abstraction.



## **CORE APPLICATION PLATFORM**

vSphere is a great hypervisor platform and now dominates over 75% of that market. For most traditional mode-1 applications is the default choice but customers continuously run into problems exposing it as a true private cloud.

OpenStack was a project with great promise but was never fully realized due to ongoing complexities around deployment and the lack of a true community ecosystem. Other Red Hat options include their virtualization engine along with the core RHEL operating system.

Morpheus provides best in class VMware integration including brownfield discovery and management hooks into VMware vSphere, VMware Cloud on AWS, vCloud Director, VMware Integrated OpenStack, ESXi, and Fusion plus other VMware Cloud Foundation technologies like VMware NSX and vSAN.

On the Red Hat OpenStack side of the house, Morpheus is a simple to manage front-end to a number of extremely large OpenStack environments plus has connectivity into a number of adjacent Red Hat projects.

In addition to VMware and OpenStack/KVM, Morpheus is able to provision natively into private cloud stacks such as Nutanix AHV, HPE OneView, Cisco UCS, and many more. In the public landscape, we are able to discover, provision, and manage application services in AWS, Azure, GCP, IBM Cloud, Oracle Cloud, Alibaba, and others.

## **TASK AND WORKFLOW AUTOMATION**

When it comes to automation, there are a number of features in Morpheus that rise to the top. If purchasing from VMware, they are most likely to encourage vRealize Orchestrator (vRO) as a key part of an automation strategy. The vRealize Orchestrator (vRO) Integration provided for Morpheus enables users to easily inventory then trigger existing workflows that may already exist in vRealize Orchestrator. Not only can the user trigger these workflows, but they can also be chained easily into non-vRO workflows and process both output and input parameters of a workflow.

When it comes to automation and Red Hat, Ansible or Ansible Tower is usually the go-to configuration management solution. Morpheus not only supports Ansible but greatly enhances Ansible to do things that it could not do in its native form. For example, Ansible can be configured to run over the Morpheus agent communication bus. This allows playbooks to be run against instances where ssh/winrm access may not be feasible due to network security restrictions or other firewall constraints. Instead, it can run over the Morpheus Agent which only requires port 443 access back to the Morpheus appliance URL. The integration supports both Linux based and Windows platforms for playbook execution and can also be configured to query secrets from the Morpheus Cypher services.

Looking beyond vRO and Ansible, the Morpheus task engine supports bash, powershell, http/api, chef, puppet, SaltStack, groovy, python, jRuby, javascript, and library scripts and templates, which can be configured for resource, remote or local execution targets. Workflows come in two flavors and are used to chain Tasks, pass variables, collect user inputs, and mix task technologies.

## KUBERNETES CLUSTER MANAGEMENT

VMware is the default name in virtualization but has recently recognized the disruptive nature of containers and is aggressively reinventing itself to position both VMs and Containers via Kubernetes. The 'walled garden' strategy is slightly fragmented due to existing Pivotal Kubernetes Services (PKS) but is shifting to focus on the Tanzu Mission Control vision and Heptio acquisition. Specifics around Tanzu (and the product itself) are not yet available but VMware claims it will be able to provision new clusters and attach existing clusters running in multiple environments, manage policies for the cluster, and enable self-service. This is an interesting vision and is in fact what Morpheus delivers out-of-the-box today.

Of all the Red Hat properties, OpenShift appears to be one of the most rapidly growing and has been speculated as a driver for the IBM acquisition due to the opportunity to provide services and disrupt the legacy VMware grasp on the datacenter. For Red Hat Linux customers, OpenShift describes itself as having push-button, automatic platform updates for the container host, Kubernetes cluster, and application services running on the cluster using a CNCF certified Kubernetes distribution.

As described earlier in this paper, Morpheus was designed as a container-first architecture in 2010 with its own native Docker orchestration engine but has also supported Docker EE as well as Kubernetes for a number of years. In 2019, Morpheus made a major enhancement with the introduction of a multi-cloud cluster engine and its own CNCF certified Morpheus Kubernetes service. This service is completely hardware and OS agnostic and can be rapidly deployed to any of the dozens of on-prem and public clouds we support. Outside of this opinionated deployment, we enable customers to completely customize their K8 layout with unique services and sidecars. Lastly, we enable centralized management of public cloud services like EKS and AKS.

The ability to span on-prem and public cloud with a fully customizable K8 cluster management engine, as well as connect to brownfield Kubernetes clusters such as OpenShift, makes Morpheus one of the most open and flexible Kubernetes players in the market. This along with the ability to also inventory, automate, and manage legacy bare metal and VMware implementations gives organizations maximum agility to re-platform applications and modernize at their own pace without fear of lock-in to expensive options exclusively tied to VMware and Red Hat.



**MORPHEUS**

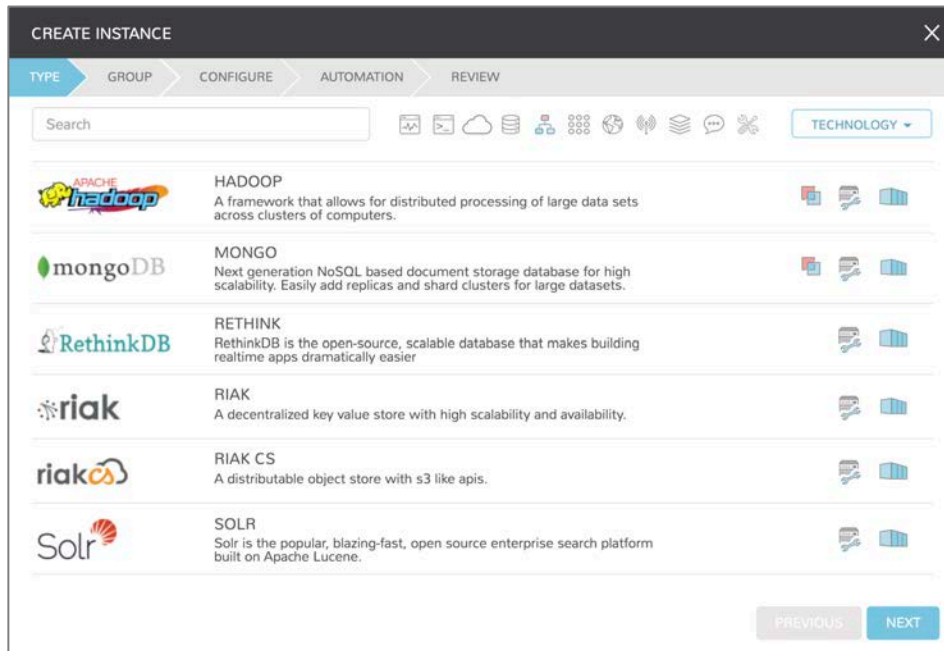
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## SELF-SERVICE PROVISIONING PORTAL

**Self-service is at the core of everything Morpheus does and when it comes to self-service automation for complex heterogenous environments, there is nothing like it.** While it sounds boastful, with over 350,000 application instances under management, we've helped hundreds of customers streamline developer access to application stacks provisioned into over a dozen clouds while also providing operations teams the governance and policy engine to keep everything secure and under control. Morpheus also is highly extensible with the ability to access self-service blueprints from Git repositories and leverage third-party blueprints like Terraform, CloudFormation, ARM, and Kubernetes spec or HELM.



VMware's solution for self-service relies on vRealize Automation (vRA), a software add-on based on the 2012 DynamicOps acquisition. vRA has historically been recognized by customers and partners as being difficult to install and configure due to its decentralized plug-in architecture. Connecting to other clouds and tools such as load balancers, IPAM, etc. requires purchasing or sourcing third-party plug-ins and then writing scripts to connect those elements together to create workflows that are then executed with the help of vRealize Orchestrator. Recent updates have improved the initial install process but have not fundamentally changed the plug-in and script-heavy nature of the product. For organizations who are not 100% invested in an all VMware stack, there are other, more agnostic options that provide greater flexibility and economic value.

Red Hat CloudForms is an infrastructure management platform that allows IT departments to control users' self-service abilities to provision, manage, and ensure compliance across virtual machines and private clouds largely based on underlying Red Hat software elements such as Red Hat Enterprise Virtualization, OpenStack, and Ansible. For customers who have on-prem platforms outside of Red Hat, or a desire to manage and provide self-service to public clouds, CloudForms is not a suitable option.

## CONCLUSION

If you are a small startup doing everything 100% in a single public cloud like AWS or Azure there are a number of excellent tools and resources available from those providers. Similarly, if you're committed to a 100% VMware or Red Hat strategy and have bet your enterprise success on their stacks, then you should look at their cloud management solutions.

However, if you are a modern enterprise with a complex application library made up of both VMs and Containers and you wish a flexible approach to private and public cloud automation then we hope this paper has given you food for thought and a reason to learn more about Morpheus.

There is no single product or magic bullet that can make your Digital Transformation initiative an overnight success, but we believe our agnostic automation and orchestration platform can be a catalyst to help you get there faster and provide the freedom to more quickly adapt to an ever-changing landscape.

## RESOURCES

- For a detailed whitepaper outlining the full Morpheus service framework, check out [5 Steps to Multi-Cloud Mastery and Continuous DevOps Delivery](#)
- To get a third-party view of this market check out the Gartner 2019 Magic Quadrant for Cloud Management Platforms visit [www.morpheusdata.com/gartner-cmp-mq](http://www.morpheusdata.com/gartner-cmp-mq).
- We'd love to learn more about your journey and discuss how we can help you along the way. Reach out to us at [www.morpheusdata.com/demo](http://www.morpheusdata.com/demo).