portworx

The Storage Platform
for Kubernetes

Now available for
Microsoft Azure

High performance storage, HA, DR, backup, and security for stateful services running on Microsoft Azure Kubernetes Service

By 2022, more than **20%** of enterprise primary storage capacity will be deployed to support container workloads, up from less than **1%** today

Gartner

Portworx Enterprise is the cloud native storage and data management platform that enterprises trust to manage data in containers.

*Gartner, Docker Containers Will Impact Enterprise Storage Infrastructure, Julia Palmer, Arun Chandrasekaran, 08 February 2017

Run mission critical, stateful applications on Microsoft Azure Kubernetes Service with Portworx

In order to run stateful services and applications on Kubernetes, you need scalable persistent storage similar to what is used for VMs, but optimized for containers. Legacy storage systems don't scale to the levels achievable with Kubernetes.

Now, with Portworx and Microsoft Azure, you can:

- **Operate at enterprise scale.** Get the same scalability for data that Azure provides for compute. Easily create thousands of volume in minutes.
- **Meet strict SLAs.** Run stateful applications on Azure Kubernetes Service and still meet strict SLAs and regulatory requirements with high availability, Kubernetes integrated disaster recovery.
- **Move apps and data seamlessly.** Migrate and backup entire applications, including data, between clusters in a single data center or cloud, or between clouds.
- **Achieve Zero RPO and < 1 minute RTO Disaster Recovery** for mission-critical data services.
- **Simplify data access.** Portworx simplifies data access and analysis using leading open-source SQL, NoSQL, Big Data and AI/ML technologies without requiring central IT to give up control.
- **Secure data automatically.** Eliminate security risks with automatic policy-based data encryption in transit and at rest, as well as complete role-based access controls integrated with corporate authentication systems.

About this guide

This guide will help you learn more about containers, why high performance storage, HA, DR, backup, and security optimized for containers is critical for enterprise application deployments on Kubernetes, and how to deploy Portworx with Microsoft Azure Kubernetes Service.
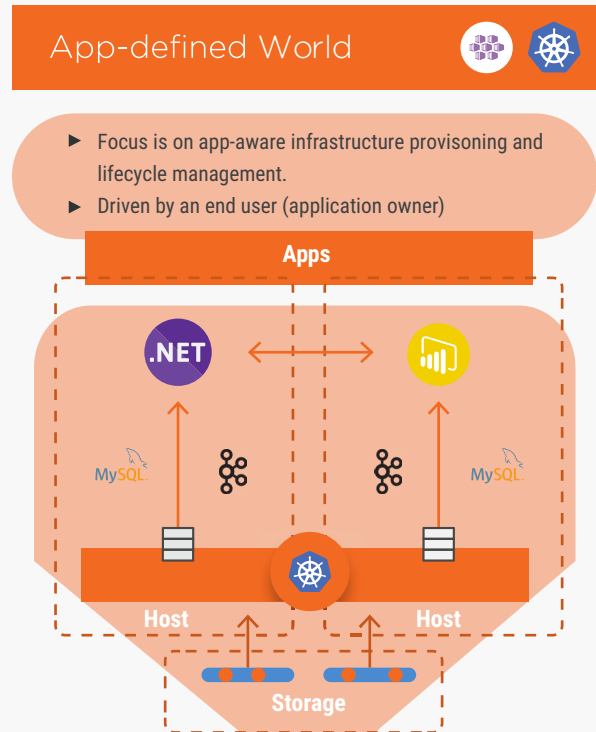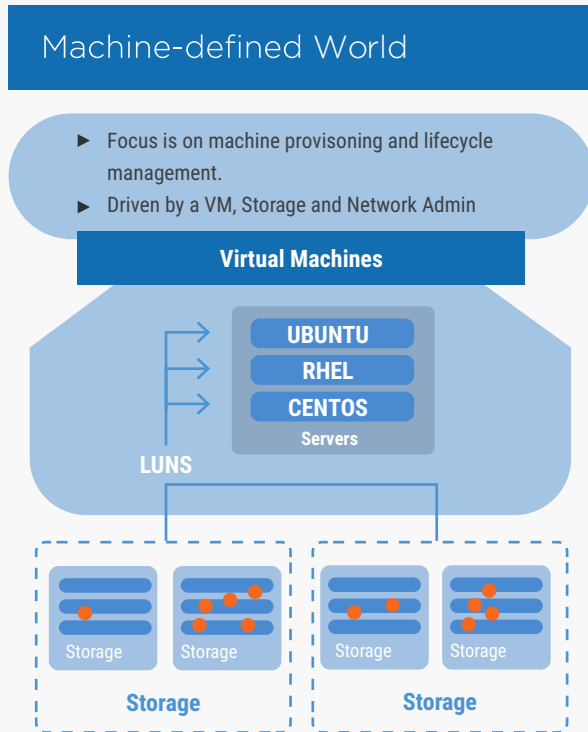
In this Guide

A new paradigm in computing. New requirements for storage.

As more enterprise workloads move to containers, can your storage keep up?

In a hybrid and multi-cloud world, where compute resources are distributed across public and private clouds, machines (even virtual ones) are no longer the right building blocks for applications.

Kubernetes provides the ability to rapidly deploy and scale enterprise applications across multiple VMs using lightweight containers. Containers free applications from the underlying OS, making them more portable and efficient at utilizing available compute resources, but require application-focused management technologies for critical capabilities like storage.

Machine-Defined vs Application-Defined

Machine-defined World

- ► Focus is on machine provisioning and lifecycle management.
- ► Driven by a VM, Storage and Network Admin

Virtual Machines

UBUNTU
RHEL
CENTOS
Servers

LUNS

Storage
Storage
Storage
Storage
Storage
Storage

App-defined World

- ► Focus is on app-aware infrastructure provisioning and lifecycle management.
- ► Driven by an end user (application owner)

Apps

.NET
MySQL
MySQL

Host
Host

Storage

Overcome Data Gravity with Containerized Storage

Traditional enterprise storage revolves around the virtual machine. But when apps are packaged as containers and run across many different VMs, VM-based storage, backup, DR and data security solutions no longer apply.

You need the same performance, reliability and security provided by traditional storage, but optimized for the application-centric world of Kubernetes. That's what Portworx provides.

Top 5 Production Operations Problems Solved by Portworx

Portworx solves the five most common problems DevOps teams encounter when running database containers and other stateful services in production.

High availability

HA for all of your databases and stateful containers.

Backup and recovery

Seamlessly backup any application running on Kubernetes to Microsoft Azure Blob storage or any S3-compatible object storage with the click of a button. Recover to any environment just as easily.

Disaster recovery

No matter how essential your application is, run it with confidence on Kubernetes with Portworx. Achieve Zero RPO Disaster Recovery for data centers in a metropolitan area as well as continuous backups across the WAN for an even greater level of protection.

Application migrations

Easily move entire applications, including their data, between clusters, clouds, and on-prem data centers.

Data security

Highly secure, key-managed encryption and data access controls.

"Our Kubernetes environment relies on multiple SQL and NoSQL databases. We compared many cloud native storage solutions in order to provide the most reliable, performant and available service to our customers. After a rigorous evaluation, we chose Portworx not only because their technology is top notch, but because we can count on the Portworx team to support us through our cloud native journey."

Dailymotion, a Vivendi Company

dailymotion

Container-native storage—built for Kubernetes. Now available for Microsoft Azure

With Portworx Enterprise, Microsoft Azure Kubernetes Service development teams can spend less time on storage and data management and more time driving innovation. Portworx Enterprise enables mission critical, stateful workloads, like databases and data analytics, to run on Azure with high performance and high availability throughout the entire application lifecycle.

Deploy Portworx with Azure Kubernetes Service

Portworx enables data availability, data security, backup and disaster recovery for Kubernetes-based applications running on Azure Kubernetes Service deployments.

There are two ways to deploy Portworx to manage Kubernetes clusters on Azure:

Bring Your Own Portworx License

Portworx has been extensively tested and validated to be compatible with Azure Kubernetes Service. Extend your existing Portworx licenses to Azure Kubernetes clusters or contact your Portworx or Microsoft Azure representatives to explore additional licensing options.

Azure Marketplace Available Q2-2020

The Portworx software-defined storage solution for Azure Kubernetes Service can be provisioned for Kubernetes clusters via the Azure Marketplace.

Portworx provides a single data management layer for all stateful services running on Azure Kubernetes Service:

- Dynamically provisioned, high-performance storage
- High availability, even across racks and AZs
- Seamless migration, backup, and recovery

- Zero RPO disaster recovery
- Data encryption and security
- Automated capacity management

PORTWORX SUPPORTS ANY STATEFUL APP ON KUBERNETES

.NET   cassandra   elasticsearch

PX-CENTRAL

| PX-SECURE | PX-MIGRATE | PX-AUTOPILOT | PX-DR | PX-BACKUP |

PX-STORE

PORTWORX RUNS ON ANY STORAGE HARDWARE

aws   OPENSHIFT   IBM Cloud   vm

Dynamically provisioned, high performance storage

PX - Store

Get the future of storage now— keep your existing hardware

Built from the ground up for containers, PX-Store provides cloud native storage, with built-in HA, for applications running on-prem, in the cloud, and in hybrid or multi-cloud environments. PX-Store takes your underlying hardware, even your cloud block storage or an existing SAN or NAS, and turns it into a cluster-wide storage pool for all your containerized applications.

Storage at the speed of Kubernetes

As the foundation for Portworx Enterprise, PX-Store provides the reliability, performance and data protection you expect from an enterprise storage company, but delivered as a container, and managed 100% via Azure Kubernetes Service and other leading container platforms.

"**A no brainer...** running stateful applications on Kubernetes remains a challenge today, so enabling Portworx on our Kubernetes clusters helps to ease the burden... Esri saved six months of development time by using Portworx."

esri

ESRI relies on Portworx to provide persistent storage with replication, resilience, high availability, data encryption and disaster recovery for its new IoT service running on Azure Kubernetes Service.

Centralized control for all your stateful apps running on Kubernetes

PX - Central

Your data, visualized

A picture is worth a thousand words. PX-Central gives you a centralized view of all your data rich applications running on Kubernetes– even if they are running across multiple clouds and on-premises data centers.

Built-in monitoring and metrics

PX-Central comes with built-in Prometheus monitoring and a Grafana dashboard to visualize your most important metrics like CPU, memory, I/O and disk utilization.

portworx

Dashboard   Nodes   Storage   Containers   **Performance**

Portworx ⌄   PX-1.2.0

Performance

Type
Volumes ⌄

Filter
Vol1 ⌄

Date Range
📅 Live Data ⌄

THROUGHPUT

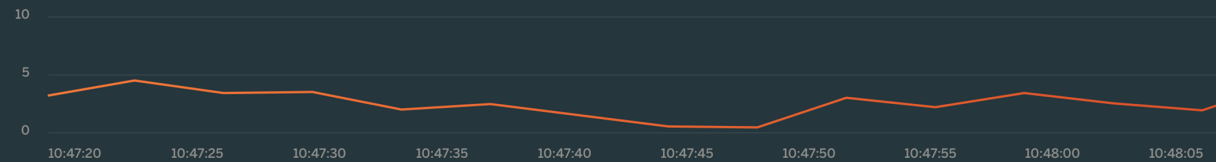From 03-28-2017   To 03-28-2017

─ Read Throughput   ─ Write Throughput

10

5

0

10:47:20   10:47:25   10:47:30   10:47:35   10:47:40   10:47:45   10:47:50   10:47:55   10:48:00   10:48:05
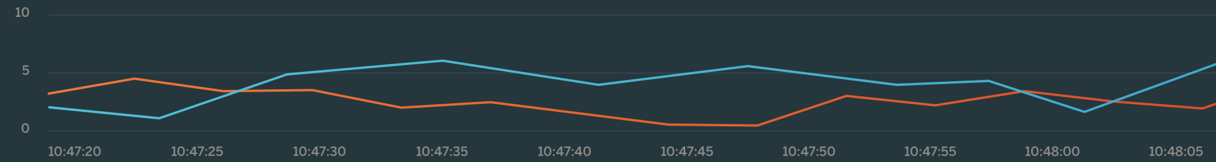
LATENCY

From 03-28-2017   To 03-28-2017

─ Latency

10

5

0

10:47:20   10:47:25   10:47:30   10:47:35   10:47:40   10:47:45   10:47:50   10:47:55   10:48:00   10:48:05

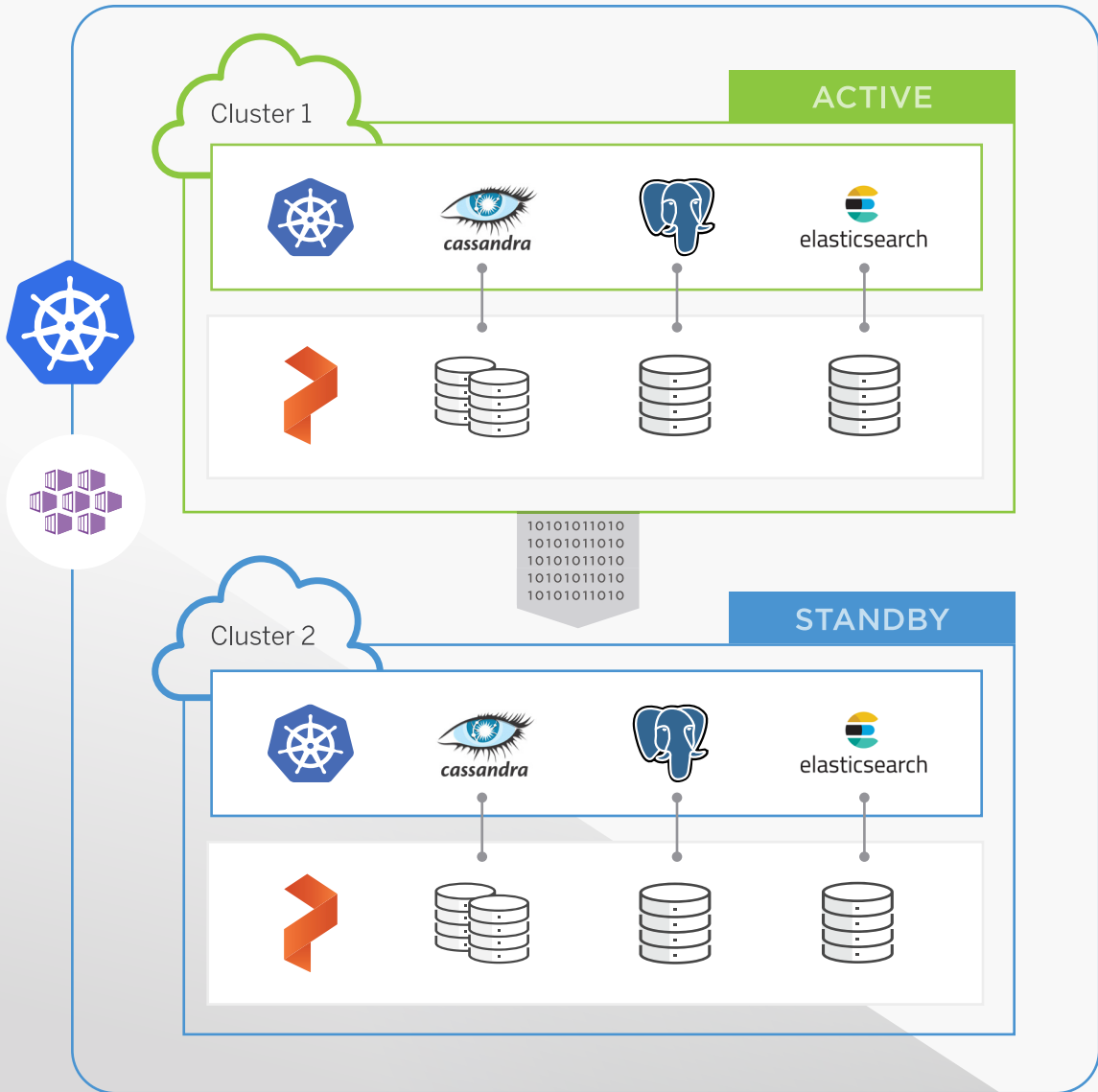# Zero worries with Zero RPO DR and continuous backups

PX - DR

Zero RPO DR

PX-DR extends the high availability data protection included in PX-Store with Zero RPO Disaster Recovery for data centers in a metropolitan area.

Continuous backup across the globe

For DR needs that span a country or globe, PX-DR offers continuous incremental-backups to keep an up-to-date backup of mission critical apps staged in case disaster strikes.

Cluster 1

ACTIVE

cassandra

elasticsearch

10101011010
10101011010
10101011010
10101011010
10101011010

Cluster 2

STANDBY

cassandra

elasticsearch

PX-DR provides data protection for applications
running across multiple data centers

Back up and recover with just one-click

PX - Backup

PX-Backup allows you to capture entire applications, including data, application configuration and Kubernetes objects, and move them to any backup location at the click of a button. Recover entire applications just as easily.

Backup to any S3-compatible storage

PX-Backup captures application data, configuration, and Kubernetes objects as a single unit and enables enterprises to place this critical data into any S3-compatible object storage:

- Continuous backups across global data centers
- Point-and-click recovery for any Kubernetes app
- Backup and recover cloud volumes from Microsoft Azure Managed Disks, Amazon Web Services EBS, and Google Persistent Disks
- Backup multi-node distributed databases like Cassandra, Kafka, Elasticsearch, and MongoDB
- Fulfill compliance and governance responsibilities with a single pane of glass

**PX-Backup captures the entire app**

Kubernetes objects
(PV, PVCs, Controllers...)

App
configuration

Volume

Other solutions only capture the volume
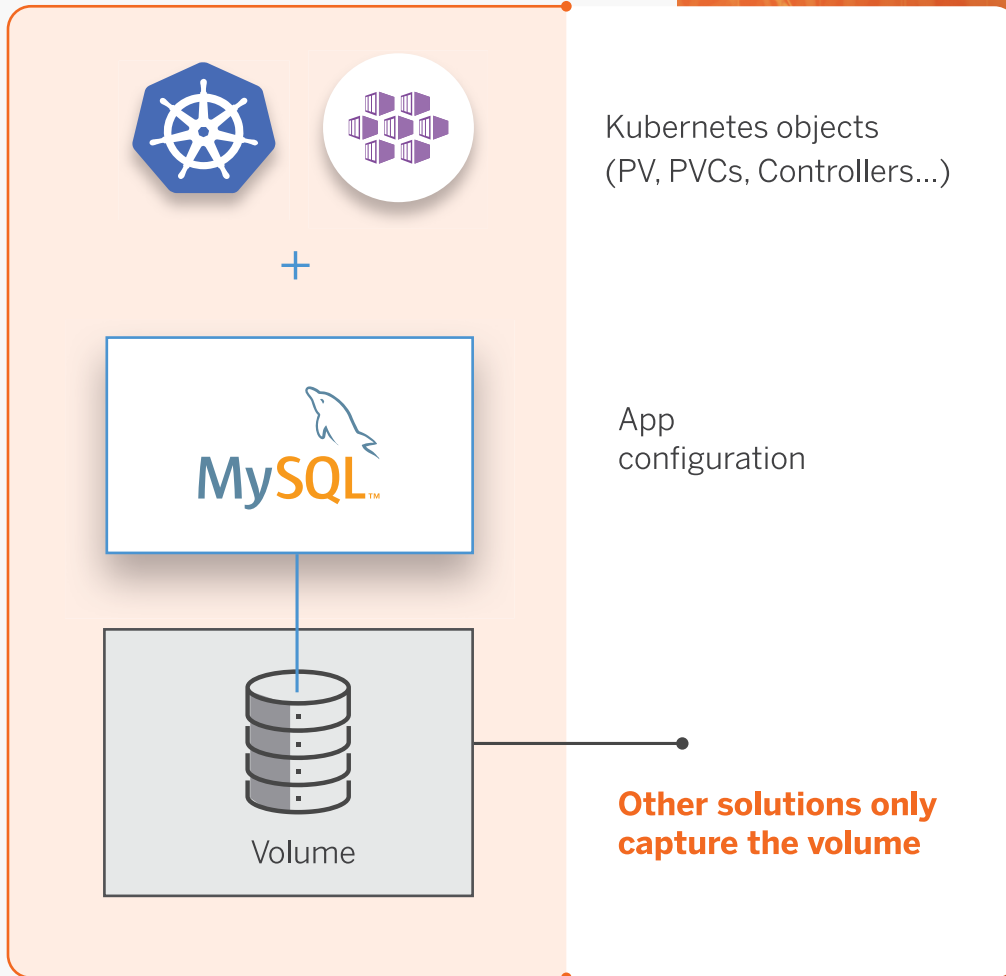
Move apps & data between clusters or clouds with a single command

With PX-Migrate, migrate entire applications, including data, application configuration and Kubernetes objects, between clusters in a single data center or cloud, or between clouds, with a single command.

App-consistent, not just crash consistent

The typical Kubernetes app is composed of multiple stateful pods, so you can't perform a migration with only a single snapshot. PX-Migrate makes migrating multi-pod applications easy with application-consistent snapshots of complex apps.

Cluster 1

Kubernetes objects
(PV, PVCs, Controllers...)

App configuration

Volume

MySQL
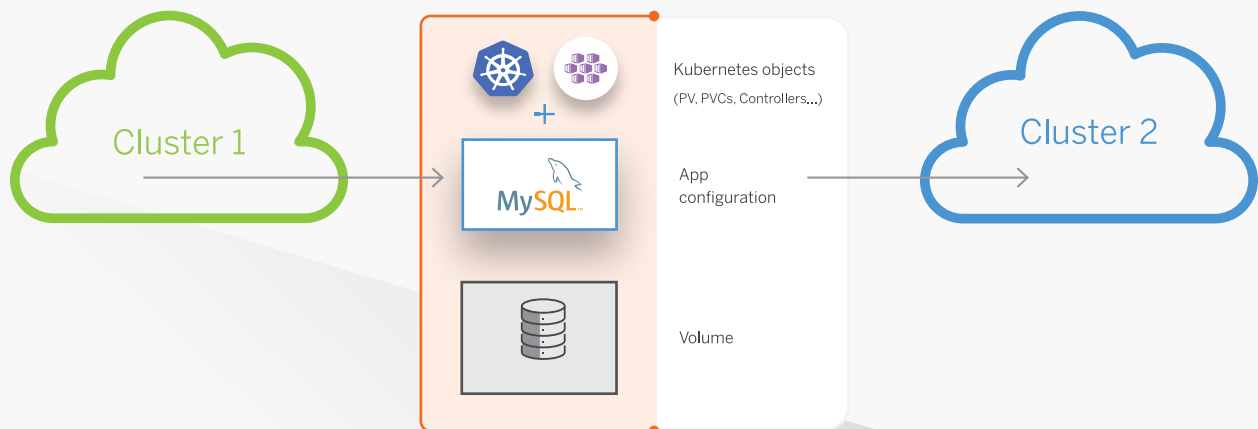
Cluster 2

Kubernetes without compromise

PX - Secure

Bring-your-own-key encryption

PX-Secure enables encryption of Kubernetes data at the volume, storage class or cluster level.

Integrated access controls

Define authentication, authorization and ownership of data volumes in Kubernetes through direct integration with corporate authentication systems like Active Directory or LDAP.

Automate Kubernetes Storage Management
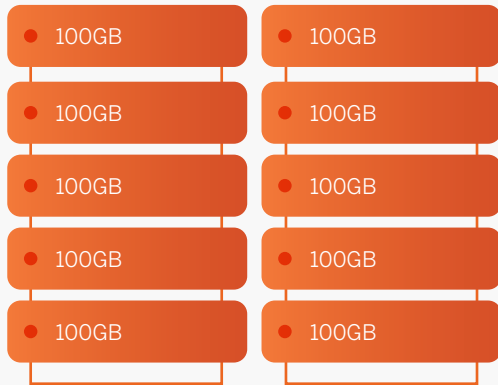
PX - Autopilot

Portworx dynamic volume provisioning and on-demand storage resizing allow enterprises to avoid over-provisioning storage resources

Portworx PX-Autopilot enables you to reduce cloud storage costs by intelligently provisioning Azure managed disk storage only when it is needed, eliminating the inefficiency of paying for cloud storage when it is provisioned, rather than when it is consumed.
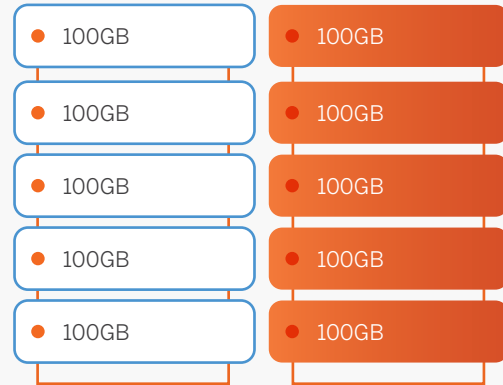
By thin provisioning, you can save
up to 50% on storage costs

● Storage actually provisioned and paid for
○ Thinly provisioned storage

Traditional over-provsioning

100GB	100GB
100GB	100GB
100GB	100GB
100GB	100GB
100GB	100GB

Thin-provisioning with Portworx PX-AutoPilot

100GB	100GB
100GB	100GB
100GB	100GB
100GB	100GB
100GB	100GB

For example, with Portworx, an internal IT team can provide 10 application teams with a PostgreSQL database of 100 GB max each. While most storage solutions would require you set aside 1 terabyte of capacity initially, even though the vast majority of that storage will be underutilized, Portworx "thin provisions" the storage, such that, only a fraction need actually be provisioned, perhaps 500 GB

Lighten up. Compute more.

Containers are dramatically more lightweight than virtual machines. This allows you to significantly increase the density of applications per host, depending on your environment.

Due to increased average density, enterprises report being able to reduce their total server footprint overall through containerization initiatives. Portworx plays a critical role in these infrastructure savings by increasing the number of databases and other stateful services that can run on a single host. Portworx delivers all this without impacting performance or stability.

Up to 40% reduction

in compute footprint

When using application replication to increase read throughput across a greater number of hosts, Portworx can reduce your compute footprint for stateful services. For example, with Portworx you can reduce the number of replicas from 5 containers to 3 containers (40% savings).

3.2X increase

in write performance

In performance tests compared to a single MongoDB container, Portworx improved write performance by 319%. Additionally, compared to a MongoDB replica set of three containers, Portworx increased write performance by 10% but consumed only one third of the compute resources.

(Portworx benchmark test for MongoDB, 2018. See https://portworx.com/kubernetes-failover-mongodb/)

35% better IOPS

Portworx delivered greater than 35% better mixed read/write IOPS than native Azure pvc– even on write operations.

Kubernetes Storage Performance Comparison, Volterra.io, Feb 2019

About Portworx

Portworx is the Kubernetes storage platform enterprises rely on to manage mission critical data services in containers. By enabling data availability, data security, backup and disaster recovery for Kubernetes-based applications running on-prem or across clouds, Portworx has helped dozens of Global 2000 companies such as Carrefour, Comcast, GE Digital, Lufthansa, T-Mobile, and SAIC run containerized data services in production.

> "Specifically designed for cloud native workloads and applications, the Portworx platform shows unmatched flexibility and scalability when compared to traditional storage solutions, leaving the end user the possibility to move applications and data from on-prem to hybrid and multi cloud seamlessly."
>
> ~ Enrico Signoretti, Senior Data Storage Analyst at GigaOm

Portworx Customers

Portworx is used in production more than any cloud native storage solution for containers, and is trusted by many of the world's most sophisticated IT organizations including:

Why Customers Choose Portworx

"Portworx provides infrastructure-agnostic features — such as volume persistence, high availability, data security and automation — that are valuable to a business like GE Digital."

"With Portworx, our containers have fewer moving parts, fewer commands to understand, and fewer things to break."

"We looked for a partner that would provide us a stable performing environment for critical data on Kubernetes and Portworx checked all those boxes."

Partner Certifications

Portworx is a high availability and disaster recovery partner for Microsoft SQL Server 2017, and a certified technology for Red Hat OpenShift and Kubernetes.

Portworx is a high availability and disaster recovery partner for SQL Server 2017 on Docker.

Portworx Enterprise has achieved Red Hat certification for Red Hat OpenShift Container Platform and is available in the Red Hat Container Catalog.

Portworx is a Level 5 certified operator for OpenShift. Red Hat OpenShift Certified Operators deliver enterprise applications with consistent packaging, deployment and lifecycle management across all OpenShift footprints.

Portworx is a Kubernetes certified service provider. Portworx solves the challenges of running stateful services on Kubernetes— stuck volumes, downtime, manual backups and migrations, lost data and more— with cloud native storage and data management built from the ground up for Kubernetes.

Ready to build the next generation of enterprise applications on Microsoft Azure?

**To learn more and get started
with Portworx Enterprise on Microsoft Azure, please visit:**

portworx

Portworx.com/Azure

"Platforms like Portworx offer a coherent ecosystem for automating data management

and protection of Kubernetes-based workloads, combining the flexibility of containers with

enterprise-class business continuity and disaster recovery capabilities."

Steven Hill, senior analyst at 451 Research.

Let's work together

Request a demo and get your free trial for Portworx on Microsoft at:

portworx.com/Azure