

# IBM Public Cloud for Microsoft Developers

The most open and secure  
public cloud for business

# IBM Cloud: the most Open and Secure public cloud for business



TrustRadius: 2020 Top Rated for Bare Metal Servers, IBM Cloud Object Storage, IBM Cloud Virtual Servers, IBM Cloud Databases, and Kubernetes Services

Nucleus Research - 2020 IaaS Value Matrix Leader



Customer Choice Award for Cloud IaaS



Stratus Award for User Experience



Good Design Award for API Connect



Good Design Award for VPC

IBM Cloud / August, 2020 / © 2020 IBM Corporation



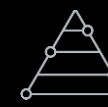
## Open Innovation

- API Services that are cloud managed
- Kubernetes on IBM Cloud supports 1k+ enterprise clients, 16k+ clusters in prod
- Major contributor to Cloud Native Open Source Projects like Razee, Istio, Knative, and Eirini



## Security Leadership

- Highest industry compliance for data encryption
- Configurable so that not even IBMers can see your data
- Threat management with IBM Security integration



## Enterprise Grade

- #1 VMware public cloud with ~2,000 clients
- Cloud migration for Power AIX, IBM i, Z, SAP and mission critical
- Broadest portfolio of secure compute choices



BNP PARIBAS



Templating with Cloud Schematics

Managed Istio Service

Day 2 Management with Razee

Tech Preview: IBM Cloud Satellite

Keep Your Own Key (KYOK) support

Hyper Protect Virtual Servers

Hyper Protect DBaaS in 3 MZRs

6 MZRs with more rolling out

Up to 80 Gbps Hyperscale VSI

SOC2 Type 2 & EBA certification



# IBM Cloud Service Level Agreements are equal to Azure but IBM pays out more quickly when there is an outage.

- **IBM is competitive, if not better**, than our main competitors.
- For HA services, 99.99% matches both AWS and Azure.
- **IBM's 25% credit level kicks in much earlier** in terms of downtime.
- For non-HA, IBM is at par with Azure

**Azure has significantly higher downtime than GCP and AWS**

<https://www.networkworld.com/article/3394341/when-it-comes-to-uptime-not-all-cloud-providers-are-created-equal.html>

SLA  
competitive  
with major  
providers

IBM	
HA	< 99.99% (4.4 Mins)
Both	< 99.9% (44 Mins)
Non-HA	<99.0 (446 Mins)
Both	< 95% (2,232 Mins)

## Key

Better for Customer

% is SLA Credit  
Percentage

Monthly Minutes Downtime	New IaaS SLA Credit Amazon / Azure			New IaaS SLA Credit Amazon / Google		
	HA	HA	HA	Non-HA	Non-HA	Non-HA
20	10%	10%	10%	0%	n/a	0%
40	10%	10%	10%	0%	n/a	0%
60	25%	10%	10%	10%	n/a	10%
80	25%	10%	10%	10%	n/a	10%
100	25%	10%	10%	10%	n/a	10%
120	25%	10%	10%	10%	n/a	10%
140	25%	10%	10%	10%	n/a	10%
160	25%	10%	10%	10%	n/a	10%
180	25%	10%	10%	10%	n/a	10%
200	25%	10%	10%	10%	n/a	10%
220	25%	10%	10%	10%	n/a	10%
240	25%	10%	10%	10%	n/a	10%
260	25%	10%	10%	10%	n/a	10%
280	25%	10%	10%	10%	n/a	10%
300	25%	10%	10%	10%	n/a	10%
320	25%	10%	10%	10%	n/a	10%
340	25%	10%	10%	10%	n/a	10%
360	25%	10%	10%	10%	n/a	10%
380	25%	10%	10%	10%	n/a	10%
400	25%	10%	10%	10%	n/a	10%
420	25%	10%	10%	10%	n/a	10%
440	25%	10%	10%	10%	n/a	10%
460	25%	30%	25%	25%	n/a	25%
480	25%	30%	25%	25%	n/a	25%
500	25%	30%	25%	25%	n/a	25%
1000	25%	30%	25%	25%	n/a	25%
2300	100%	100%	100%	100%	n/a	100%

IBM Confidential

# A selection of IBM Cloud customers



IBM Cloud is trusted by 47 of the Fortune 50, 10 out of 10 of the world's largest banks, and 8 of the 10 largest airlines.





# How can a Microsoft developer use IBM Cloud?

- IBM Cloud provides offerings that support .NET and Windows
- Take advantage of IBM Cloud offerings (Windows and non-Windows)

# What is .NET? What is .Net Core? *IBM Cloud provides support for both!!!*



**.NET is a free, cross-platform, open source developer platform for building many different types of applications.**

With .NET, you can use multiple languages, editors, and libraries to build for web, mobile, desktop, games, and IoT.

<https://docs.microsoft.com/en-us/dotnet/standard/choosing-core-framework-server>

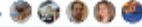


**.NET Core has the following characteristics:**

- Cross platform: ***Runs on Windows, macOS, and Linux operating systems***
- Modern: It implements modern paradigms like asynchronous programming, no-copy patterns using structs, and resource governance for containers
- Consistent across environments: Runs code with the same behavior on multiple operating systems and architectures, including x64, x86, and ARM
- Flexible deployment: ***Can be used with Docker containers.***
- The C#, Visual Basic, and F# languages can be used to write applications and libraries for .NET Core.

<https://docs.microsoft.com/en-us/dotnet/core/about>

## .NET Core vs. .NET Framework for server apps

04/28/2020 • 6 minutes to read •  +18

**Use .NET Core for your server application when:**

- You have cross-platform needs.
- You're targeting microservices.
- You're using Docker containers.
- You need high-performance and scalable systems.
- You need side-by-side .NET versions per application.

**Use .NET Framework for your server application when:**


- Your app currently uses .NET Framework (recommendation is to extend instead of migrating).
- Your app uses third-party .NET libraries or NuGet packages not available for .NET Core.
- Your app uses .NET technologies that aren't available for .NET Core.
- Your app uses a platform that doesn't support .NET Core. Windows, macOS, and Linux support .NET Core.

<https://docs.microsoft.com/en-us/dotnet/standard/choosing-core-framework-server>

**"If you're building a new application and have a choice between .NET Core and .NET Framework, .NET Core is the way to go."**

<https://www.c-sharpcorner.com/article/difference-between-net-framework-and-net-core/>


# IBM Cloud Catalog – Compute Windows and .NET Support



**Bare Metal Server**  
IBM • Compute

Bare metal servers provide the raw horsepower you demand for your processor-intensive and disk I/O-intensive workloads. These servers...

Up-to 80 cores,  
Also SAP certified and VMware certified  
**Windows** & Linux operating systems




**Virtual Server for VPC**  
IBM • Compute

Our all-new x86 virtual machines with faster provisioning, higher performance, and enhanced isolation.

IAM-enabled


Balanced, Compute and Memory t-shirt sizes  
From 2 vCPU/4 GB RAM to 48 vCPU/384 GB RAM  
**Windows** & Linux operating systems



**Virtual Server**  
IBM • Compute

Our virtual servers deliver a higher degree of transparency, predictability, and automation for all workload types. Virtual servers are...

Balanced, Compute, Memory and GPUs  
Public, Dedicated, Reserved and Transient  
From 1 vCPU/2 GB RAM to 48 vCPU/192 GB RAM  
**Windows** & Linux operating systems




**Functions**  
IBM • Compute

IBM Cloud Functions is a Function-as-a-Service (FaaS) platform which executes functions in response to incoming events.

HIPAA Enabled • IAM-enabled

Serverless Computing  
Runtime support includes:

- JavaScript/Node
- Python • Go
- Swift • Java
- PHP • Ruby
- Docker • **.NET Core (2.2)**



**Cloud Foundry**  
IBM • Compute

Create and deploy applications on a managed multi-tenant Cloud Foundry environment

Deploy your applications using the **ASP.NET Core**

Compute						
Bare Metal Server	VMware vSphere on IBM Cloud	HCX on IBM Cloud	Veeam Availability Suite for Virtual Server	OSNEXUS Software Defined Storage for Bare Metal	Liberty for Java	Red Hat OpenShift Cluster
Cloud Foundry Enterprise Environment	NetApp ONTAP Select	HyTrust CloudControl on IBM Cloud	Veeam on IBM Cloud	Defined Storage for Bare Metal	SDK for Node.js	Kubernetes Service
HPCaaS from Rescale	Single-node Trial for Migration and App Modernization	HyTrust CloudControl on IBM Cloud	VMware vRealize Operations and vRealize Log Insight on IBM Cloud	Plesk Onyx Linux Unlimited for Virtual Server	ASP.NET Core	Container Registry
Power System Virtual Server	Single-node Trial for Data Protection & Disaster Recovery	HyTrust DataControl on IBM Cloud	Mission Critical VMWare on IBM Cloud	Red Hat Enterprise Linux OS for Virtual Server	Runtime for Swift	
Virtual Server	Caveon RiskForesight on IBM Cloud	HyTrust KeyControl on IBM Cloud	Managed Services from IMI		Go	
Virtual Server for VPC	F5 on IBM Cloud	IBM Cloud Private Hosted	Managed Services for Veeam on IBM Cloud		PHP	
WebSphere Application Server	FortiGate Security Appliance on IBM Cloud	IBM Cloud Secure Virtualization	Managed Services for Zerto on IBM Cloud		Python	
VMware vCenter Server on IBM Cloud	FortiGate Virtual Appliance on IBM Cloud	IBM SPECTRUM Protect Plus on IBM Cloud	IBM Cloud Backup		Ruby	
		KMIP for VMware on IBM Cloud			Tomcat	



# IBM Cloud Catalog – Development and Operations

## Dev Tools

Availability Monitoring	<i>IBM Cloud Monitoring with Sysdlog</i>
Continuous Delivery	<i>IBM Log Analysis with LogDNA</i>
DevOps Insights	<i>Pager Duty</i>
Cloud Event Management	
Globalization Pipeline	
Monitoring	
<a href="#">Schematics</a>	
Toolchain	
<i>IBM Cloud Activity Tracker with LogDNA</i>	

IBM offers a broad portfolio of developer tools to build your apps on the public cloud.

We offer [IBM Cloud Developer Tools for Visual Studio Code](#)

The Continuous Delivery service provides a core set of tools for any DevOps toolchain: Git Repos and Issue Tracking, Delivery Pipeline

The Eclipse Orion Web IDE supports [C# and Visual Basic](#)

Activity tracking/analysis and monitoring services are available for Windows workloads.

## Starter Kits

Custom Vision Model for Core ML with Watson	Node.js Web App with Express.js
Internet of Things Platform Starter	Python Microservice Flask
Java Microservice with MicroProfile and Java EE	Python Web App with Django
Java Microservice with Spring	Python Web App with Flask
Java Web App with Spring	Watson Assistant Basic
Mobile Basic	Watson Natural Language Understanding Basic
Node.js Microservice with Express.js	Watson Visual Recognition Basic
	Node-RED Starter

Starter kits are application patterns that can be integrated with services to generate a production-ready asset and deployed from a DevOps pipeline.

IBM provides Starter Kits for a variety of languages:

- Go, Java (Liberty & Spring), NodeJS, Python (Django & Flask), Swift

IBM provides Starter Kits for a variety of purposes:

- AI, IOT, Mobile, Web

# IBM Cloud Catalog – Databases, AI, Mobile and Storage

## Databases

Blockchain Platform	Db2
Cloudant	Db2 Warehouse
Databases for PostgreSQL	<a href="#">Hyper Protect DBaaS for Mongo DB</a>
Databases for Redis	<a href="#">Hyper Protect DBaaS for PostgreSQL</a>
Databases for Elasticsearch	Informix
Databases for MongoDB	SQL Query
Messages for RabbitMQ	<i>GEO Web Services</i>
Databases for etcd	<i>InfluxCloud</i>

IBM provides a broad set of database capabilities to support Microsoft developers

- Blockchain [VSCode extension](#)
- ODBC Driver support for **Windows** environments: DB2, DB2 Warehouse and PostgreSQL
- Programming support for **.NET** developers: DB2, DB2 Warehouse
- Cloudant support for **C# / .NET** using MyCouch

## AI

Watson Assistant	Personality Insights
Watson Studio	Speech to Text
Compare and Comply	Text to Speech
Discovery	Tone Analyzer
Knowledge Catalog	Visual Recognition
Knowledge Studio	<a href="#">Voice Agent with Watson</a>
Language Translator	Watson OpenScale
Machine Learning	PowerAI
Natural Language Classifier	
Natural Language Understanding	

Watson is the AI platform for business.

[Watson SDKs for .NET](#):

- Assistant
- Compare Comply
- Discovery
- Language Translator
- Natural Language Understanding
- Natural Language Classifier
- Personality Insights
- Speech-to-Text
- Text-to-Speech
- Tone Analyzer
- Visual Recognition

## Web & Mobile

Mobile Foundation	<i>Telstra Messaging API</i>
Push Notifications	<i>Twilio Programmable SMS</i>
<a href="#">Email Delivery, powered by Sendgrid</a>	<i>Twilio Programmable Video</i>
<i>Bitbar Testing Cloud</i>	<i>Twilio Programmable Voice</i>
<i>Esri ArcGIS for Developers</i>	
<i>Nexmo</i>	
<i>Phunware Location Based Services</i>	
<i>Phunware Mobile Marketing Automation</i>	
<i>SPLICE Pre-CAT Insurance Notifications</i>	

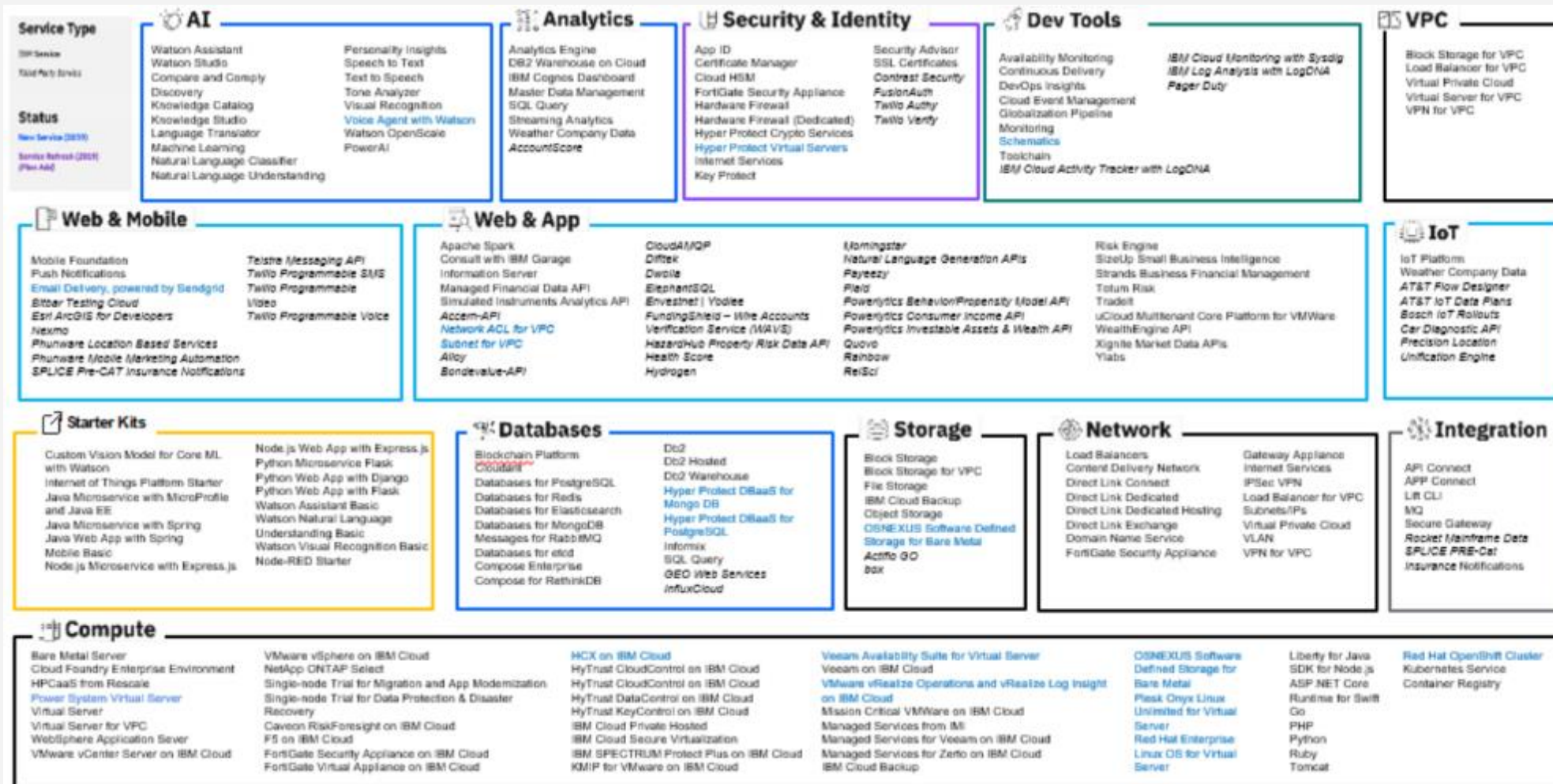
[Xamarin](#) is supported through NuGet, the Microsoft development platform package manager (including **.NET**)

## Storage

Block Storage  
Block Storage for VPC  
File Storage  
IBM Cloud Backup  
Object Storage  
[OSNEXUS Software Defined Storage for Bare Metal](#)  
*Actifio GO box*

[Connecting to NAS Storage in Windows](#)

# IBM Cloud Catalog – REST API and SDK support across Cloud Services

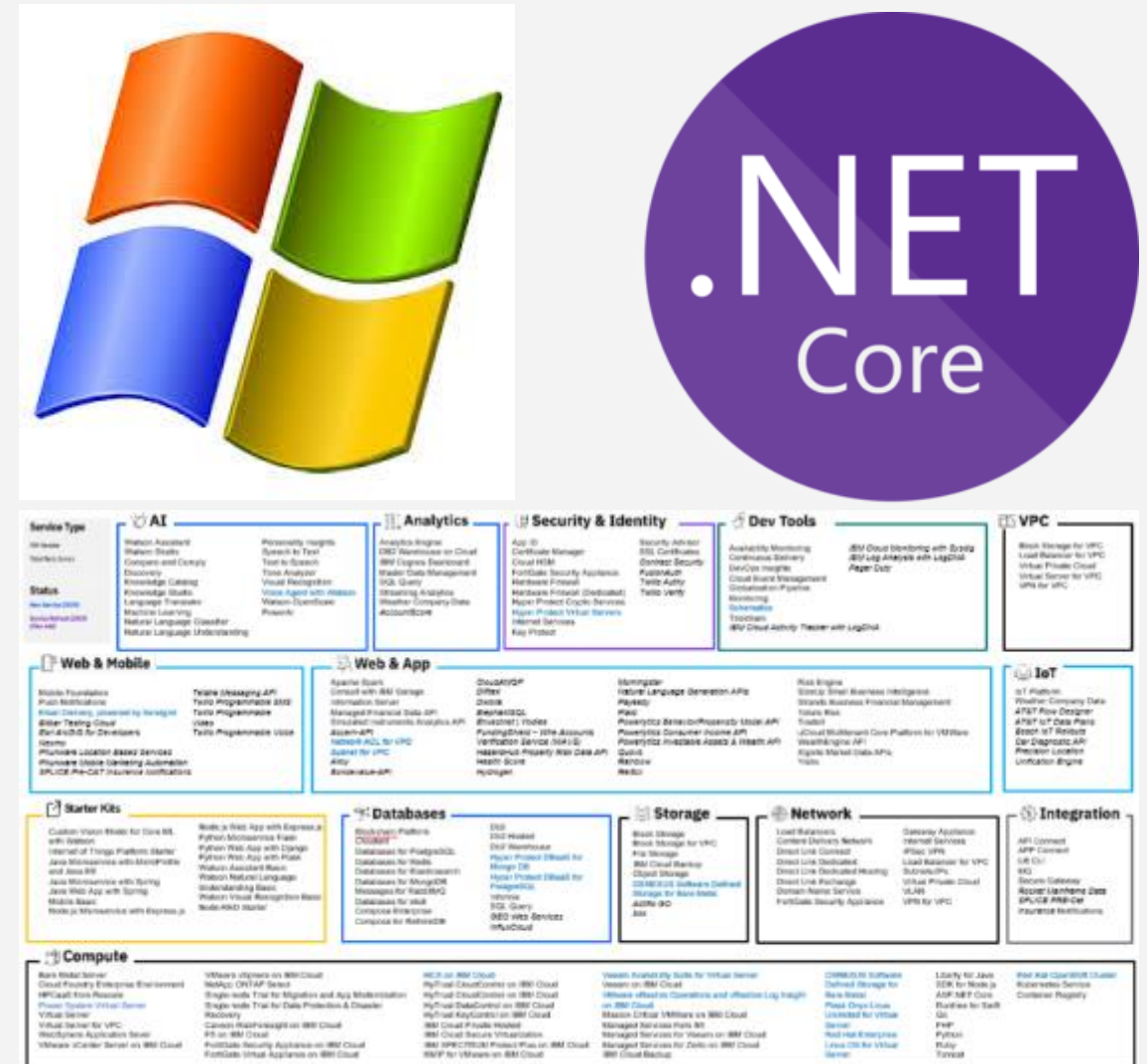


- APIs & SDKs for:
- AI/Machine Learning
  - Analytics
  - Blockchain
  - Cloud Paks
  - Compute
  - Containers
  - Databases
  - Developer Tools
  - Integration
  - Mobile
  - Networking
  - Platform
  - Security
  - Storage

IBM Cloud API & SDK Documentation: <https://cloud.ibm.com/docs?tab=api-docs&>

# To summarize....

- Windows applications can be run on Bare-metal, on a Windows VSIs and/or on Windows VSIs running within a Virtual Private Cloud
- .NET applications can run with the Windows on Bare-metal, on VSIs and/or on VSIs running within a Virtual Private Cloud
- .NET Core applications can run with Linux on Bare-metal, on VSIs and/or on VSIs running within a Virtual Private Cloud
- Windows and .NET applications can take advantage of 200 IBM Cloud services available in the IBM Cloud Catalog





**Great!**

**But why use IBM  
Cloud instead of  
other clouds with  
similar capabilities?**

# How can a Microsoft developer use IBM Cloud?

IBM Cloud provides offerings that support Windows and .NET

Take advantage of IBM Cloud offerings (Windows and non-Windows)

# IBM Cloud has some important differentiators from other Cloud Providers

## Open Innovation

### Kubernetes Everywhere

**Open Standards** to enable workload portability at scale

**1** **Cloud Native** with ROKS/IKS and **Modernize** with Cloud Paks

**Modernize or build scalable cloud native applications**

**Enterprise grade isolation, security, performance & compliance!**

**New! Cloud Satellite, Financial-Services Cloud, 5G and Edge**



Kubernetes



Blockchain



Knative



CLOUDFOUNDRY



Functions



## Security Leadership

### Hyper Protect Services

– Powered by Z

**2**

#### Hyper Protect Crypto

KYOK for cloud data encryption in a dedicated cloud HSM (FIPS 140-2 level 4)

#### Hyper Protect Containers

Build and deploy micro services within a hyper secure environment

#### Hyper Protect DBaaS

Provision & manage highly secure databases

### Workloads



SAP



Database



### Bare Metal

#### On-Demand

Provision servers in hours

#### Control & Security

Dedicated single tenant

**3**

#### No Noisy Neighbors

Utilize the entire network w/o sacrificing performance

#### Powerful & Customizable

Choose your hardware to meet performance needs

SAP



HPC & Gaming

vmware



Dedicated Hosting



## Enterprise Grade

### VMware

**#1**

VMware SISO partner

**#1**

VMware NSX business partner

**#1**

VMware workloads operator

**4**

**~2,000 clients**

Largest VMware cloud footprint

#### Solutions

Available in 60+ data centers



HCX



vCenter



NST



vSphere

### IBM Power

**5**

#### AIX and IBMi

VM's as a service in IBM Cloud Enterprise storage, variable partition sizes

#### Data

>1.8X memory & I/O Bandwidth and Capacity for data-centric workloads

#### Key Solutions

Enterprise Applications (e.g. SAP)

### Workloads



SAP



Database



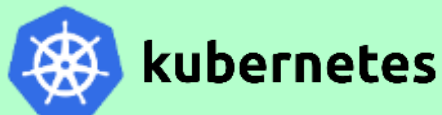
# What are containers, Kubernetes and the IBM Cloud Kubernetes Service?

1

Containers



A **ready-to-run software package**, containing everything needed to run an application: the code and runtime, application and system libraries, and default values. Containers **decouple applications from underlying host infrastructure**.



An open-source **orchestration software** for **deploying, managing, and scaling containers**.



IBM Cloud  
Kubernetes Service

A **managed service** providing an intuitive user experience with simplified cluster lifecycle management on upstream **Kubernetes** clusters. Includes built-in **security and isolation** to enable rapid delivery of apps, while leveraging IBM Cloud Services including Weather data, IoT, Analytics, or **AI capabilities with Watson**. Available in six IBM regions worldwide, including **30+ datacenters**.

Learn more at: [www.ibm.com/cloud/container-service](https://www.ibm.com/cloud/container-service)





# IBM Kubernetes Service Capabilities

1



## Design Your Own Cluster

- Tunable capacity
- Select between shared and dedicated compute VSIs
- Bare metal worker nodes enabling Trusted Compute
- Multizone clusters in IBM Cloud multizone regions
- Single zone clusters in 30+ datacenters
- Edge nodes
- Configurable networking and storage
- Integrated VPN in-cluster providing IPsec tunnels



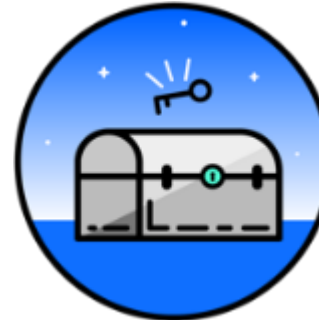
## Simplified Cluster Management

- Intuitive graphical user experience
- CLI and API alternatives
- Fully managed master nodes
- Highly available (HA) masters
- User controlled worker node management
- Worker node auto-recovery
- Worker node auto-scaling



## Extend IBM Cloud Services

- Enhance your application with Watson, IoT, Analytics and Data Services
- Persistent volumes using IBM Cloud storage (file, block, object)
- IP and application Load Balancing
- Integrated with IBM Cloud identity and access management
- Control access and billing using Resource Groups



## Container Security & Isolation

- Isolated compute, networking, and storage
- Automatic encryption of secrets and volumes
- Customer managed keys using IBM Key Protect (HSM)
- Every worker node has a unique encryption key
- Store your images securely in your hosted private registry
- Vulnerability Advisor scans images and running container to detect vulnerabilities
- Image signing by integrating with Docker Notary
- Image security deployment enforcement controls



## Native Kubernetes Experience

- Seamless experience moving from local development to IBM Cloud
- 100% Kubernetes API and tools
- Certified Kubernetes provider
- Supported Kubernetes versions
- Supports Kubernetes dashboard
- Leverage Docker images



## Integrated Operational Tools

- Built-in log and metrics collection with IBM Cloud log and monitoring services
- Use with IBM DevOps tools such as Delivery Pipeline
- Supports popular add-ons including Prometheus, Weave, Sysdig, fluentd and others

# What is Red Hat OpenShift on IBM Cloud?



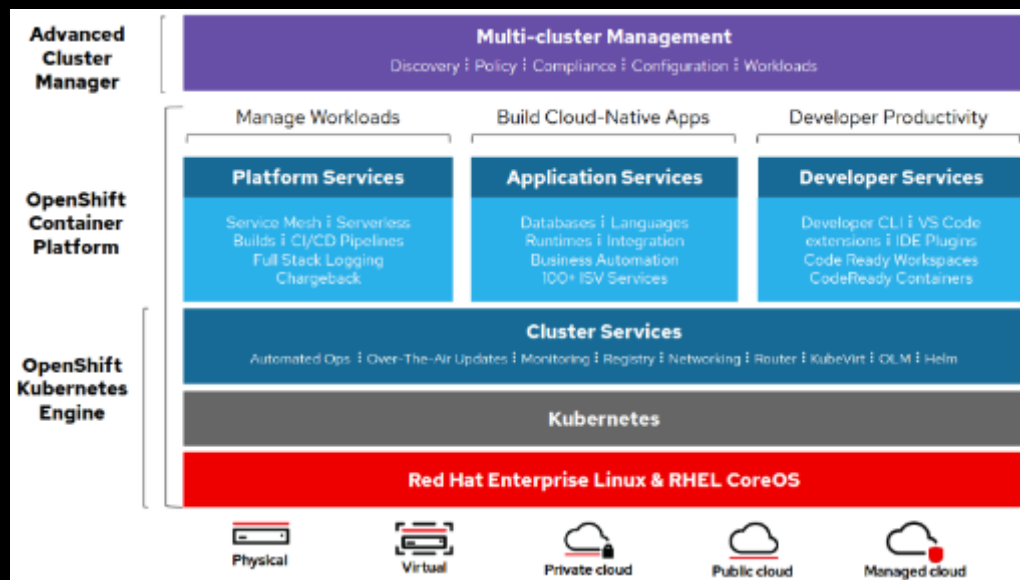
1

## What is Red Hat OpenShift?

Red Hat® OpenShift® is a hybrid cloud, enterprise Kubernetes application platform. It is the leading hybrid cloud, enterprise Kubernetes application platform, trusted by 2,000+ organizations.

## What is Red Hat OpenShift on IBM Cloud?

A managed service providing an intuitive user experience with simplified cluster lifecycle management on native OpenShift clusters. Includes built-in security and isolation to enable rapid delivery of apps, while leveraging IBM Cloud Services including Weather data, IoT, Analytics, or AI capabilities with Watson. Available in six IBM regions worldwide, including 35+ datacenters.



### As-a-Service Value

- Automated provisioning
- Installation
- Configuration
- Upgrades
- Patch management
- Scaling
- Performance tuning
- 24/7 global SRE support
- Engage with experts via Slack

### Resilient and Secure

- **Automatic multizone deployments with failure recovery**
- **Highly available master nodes**
- **Security hardening**
- **Compliance**
- **Enterprise isolation options including dedicated compute, bare metal servers, and private clusters**

### Complete Platform

- Built-in monitoring
- Built-in logging
- **Key Protect**
- **KYOK with HyperProtect**
- Identity and Access Management
- Activity Tracker
- Storage options (File, Block, **COS Volumes**)
- **Security Advisor**
- Service Catalog
- Container Registry
- **Vulnerability Advisor**



Differentiated

# What can Microsoft developers do with IKS and OpenShift?

1

- Build and run containerize .NET Core applications managed by IKS
  - It is easier to get started with Kubernetes with IKS
  - Take advantage of the simplified cluster management capabilities of IKS
  - Get started quickly using the [ASP.NET Helm chart from Bitnami](#)
- Build and run containerized .NET Core applications managed by Red Hat OpenShift
  - Build towards a hybrid cloud future
  - Focus on delivering of mission-critical applications
  - Innovating with high-value IBM Cloud services such as AI, blockchain and advanced analytics



OPENS SHIFT



**IBM Cloud**  
**Kubernetes Service**



**ASP.NET**

Third party • Software • Developer Tools

ASP.NET Core is an open-source framework for web application development created by Microsoft. It runs on both the full .NET...

Helm charts • IBM Kubernetes Service • Free

## **Microsoft**

Putting the ".NET" into "Kubernetes":

<https://channel9.msdn.com/Events/dotnetConf/NET-Conf-2019/B337>

## **IBM Kubernetes Service**

Deploy an ASP.NET Core application in the IBM Cloud Kubernetes Service

<https://developer.ibm.com/tutorials/aspnet-core-app-deployment-in-ibm-cloud-kubernetes-service/>

Building containers from images: <https://cloud.ibm.com/docs/containers?topic=containers-images>

Pushing images to IBM Cloud Container Registry:

<https://cloud.ibm.com/docs/containers?topic=containers-images>

Deploying containers from an IBM Cloud Container Registry image to the default

Kubernetes namespace: <https://cloud.ibm.com/docs/containers?topic=containers-images>

## **Red Hat OpenShift**

Using OpenShift to deploy .NET Core applications:

<https://developers.redhat.com/blog/2018/07/05/deploy-dotnet-core-apps-openshift/>

Building images for your apps: <https://cloud.ibm.com/docs/openshift?topic=openshift-images>

Deploying containers from an IBM Cloud Container Registry image to the default

OpenShift project: <https://cloud.ibm.com/docs/openshift?topic=openshift-images#namespace>



**IBM Cloud  
Kubernetes Service**



# Secure your Microsoft workloads with IBM Cloud Hyper Protect Crypto Services



## Keep Your Own Keys (KYOK)

Single-tenant Key Management Service  
with key-vaulting provided by  
dedicated, customer controlled  
Hardware Security Modules (HSM)

Hosted in datacenters:  
Dallas, Washington DC (WDC), Frankfurt, Sydney

- Exclusive encryption key control, even IBM Cloud admins have no access
  - Industry-leading security: Built on FIPS 140-2 Level 4 certified cloud HSM (neither Azure nor AWS have a FIPS 140-2 Level 4 certified cloud HSM)
  - Customer control of HSM: First cloud provider to provide CLI for HSM Key Ceremony
  - No unauthorized access: Service runs in LinuxONE secure enclaves
- **Managed HSM** where IBM provisions, monitors, manages HA & backup\*
 

\* Master key is not backed up
- **Key Management and Cloud HSM Service**

Key Lifecycle Management  
including create, import, rotate,  
delete, audit

Support for industry standards like  
PKCS #11 for cryptographic  
operations

Integration with IBM Cloud Services for access management (IAM),  
logging and monitoring, auditing (IBM Activity Tracker)

Industry & Compliance Certifications  
GDPR, ISO 27001, ISO 27017, and ISO 27018, SOC 2 Type 1, IRAP  
Protected

In Plan: HIPAA-ready, PCI-DSS

## About HPCS on IBM Cloud

- At it's root, it is a Key Management Services and Hardware Security Module
- It is a Dedicated Service (single tenant)
- It is supported by FIPS 140-2 Level 4 and Common Criteria EAL4 certified cryptographic hardware
- It supports both BYOK (Bring your own Key) and KYOK (Keep your own Key)
- Accessible via CLI by using API like Enterprise PKCS#11 (EP11) and the gRPC framework
- Supports the use of Smart Cards to store Master Key parts
- Fully integrated with a number of services on IBM Cloud today!
- Standalone highly secure services that leverage HPCS at their core.

vCS on IBM Cloud  
- vSAN Encryption  
- vSphere Encryption



KMIP for VMware  
& Key Protect



**HYTRUST**  
Hytrust Data Control  
for VMware Solutions

IBM Cloud Object  
Storage



Hyper Protect DBaaS



VPC VM & Block Storage



IBM Kubernetes  
Service



Red Hat OpenShift on  
Kubernetes Service

**Hyper Protect Crypto  
Services**



IBM Cloud Activity Tracker  
with LogDNA

# Hyper Protect Crypto Services Core Offerings

2

## About HPCS on IBM Cloud

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- **Standalone highly secure services that leverage HPCS at their core.**

Hyper Protect  
Virtual Server



Hyper Protect  
Crypto Services



COMING  
SOON

IKS with Hyper Protect

Hyper Protect DBaaS  
for MongoDB



Hyper Protect DBaaS  
for PostgreSQL



**LinuxONE**  
**Secure Services Container**

- Use a FIPS 140-2 Level 4 certified cloud HSM to secure your Microsoft and/or .NET Core workloads running on VMware, Virtual Servers, IKS and OpenShift and more
- Use Hyper Protect services in Windows and/or .NET CORE applications





# Run your Microsoft workloads on IBM Cloud Bare Metal Servers

3



## Dedicated & Secure

A single tenant bare metal server is dedicated to customers for complete control, flexibility, and security.



## Powerful

Available options from single processor 4-core architectures to 8-processor 192-core architectures and up to 8TB RAM. Local storage ranges from 800 GB to 7.8TB SSDs and up to 36 drives per server.



## Customizable

Choose a processor that best meets your performance needs. Upgrade from the base configuration to fine tune the hardware with customizable RAM, SSD, and more.



## No Noisy Neighbors

Bare Metal allows clients to utilize their entire network without sacrificing performance from sharing with other clients



## Access to Services

IBM offers a wide range of cloud services to provide our clients the most robust offering possible, including the world's most advanced A.I. with Watson.



## On-Demand

Provision servers in IBM Cloud data centers around the world in two to four hours. If you need to be online in minutes or only need limited resources, select an hourly bare metal server.

**Bare Metal Servers** are best fits for:

- ✓ **Long term enterprise HPC production workloads:** If your enterprise IT requirements include: ERP, CRM, SCM or HPC workloads (e.g SAP HANA), then bare metal is a perfect fit
- ✓ **Workloads with high security requirements:** Aircraft manufacturing, medical, oil & gas, automotive modeling... for example
- ✓ **Deep-learning, AI:** With support for multiple GPUs per server, bare metal is a great fit for deep learning, analytics – and it tightly integrated with Watson Cloud Services
- ✓ **Dev / test for SAP Netweaver and HANA:** Only IBM Cloud Bare Metal offers servers certified dual-processor Intel Xeon Scalable 6140's which are perfect for deploying small SAP workloads – just the right size for dev/test

## Differentiators

- ✓ **Breadth of Configuration Offerings:** Match your workload to your infrastructure
- ✓ **No hypervisor tax:** Equals higher performance, greater flexibility
- ✓ **Support for the latest processors:** Intel Xeon Cascade Lake (coming in 2Q) – First to market
- ✓ **Support for multiple NVIDIA GPUs:** M60, P100 and V100 generation for HPC, AI and simulation workloads
- ✓ **More Platforms Supported:**
  - ✓ Intel Xeon x86
  - ✓ Power 8/9
  - ✓ IBM z

# Comparing bare metal server availability on Azure, AWS and IBM Cloud

Microsoft offers approximately 14 bare metal servers in a data center

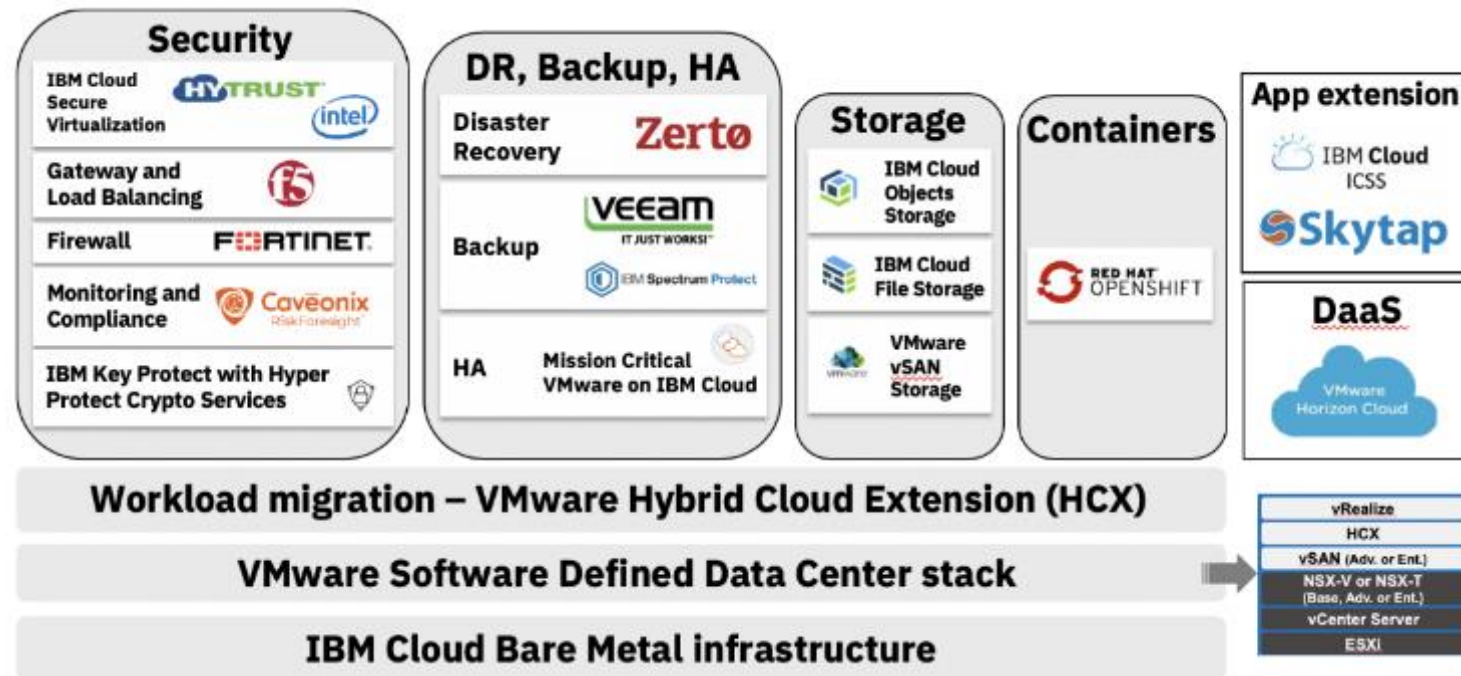
Region	Country		
North America	United States		
Device Type	Available VMs	Available RAM	CPU
Dv2_Type1	64	256 GB	2x Intel Xeon E5-2670 v4 (Broadwell)
Dv2_Type2	72	384 GB	Intel Xeon E5-2680 v4 (Broadwell)
Dv2_Type3	96	512 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type4	128	768 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type5	160	1024 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type6	192	1280 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type7	256	1638 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type8	320	2048 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type9	384	2432 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type10	448	2816 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type11	512	3200 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type12	576	3584 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type13	640	3968 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type14	704	4352 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type15	768	4736 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type16	832	5120 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type17	896	5504 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type18	960	5888 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type19	1024	6272 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type20	1088	6656 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type21	1152	7040 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type22	1216	7424 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type23	1280	7808 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type24	1344	8192 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type25	1408	8576 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type26	1472	8960 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type27	1536	9344 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type28	1600	9728 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type29	1664	10112 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type30	1728	10496 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type31	1792	10880 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type32	1856	11264 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type33	1920	11648 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type34	1984	12032 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type35	2048	12416 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type36	2112	12800 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type37	2176	13184 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type38	2240	13568 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type39	2304	13952 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type40	2368	14336 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type41	2432	14720 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type42	2496	15104 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type43	2560	15488 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type44	2624	15872 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type45	2688	16256 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type46	2752	16640 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type47	2816	17024 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type48	2880	17408 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type49	2944	17792 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type50	3008	18176 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type51	3072	18560 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type52	3136	18944 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type53	3200	19328 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type54	3264	19712 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type55	3328	20096 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type56	3392	20480 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type57	3456	20864 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type58	3520	21248 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type59	3584	21632 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type60	3648	22016 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type61	3712	22400 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type62	3776	22784 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type63	3840	23168 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type64	3904	23552 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type65	3968	23936 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type66	4032	24320 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type67	4096	24704 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type68	4160	25088 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type69	4224	25472 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type70	4288	25856 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type71	4352	26240 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type72	4416	26624 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type73	4480	27008 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type74	4544	27392 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type75	4608	27776 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type76	4672	28160 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type77	4736	28544 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type78	4800	28928 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type79	4864	29312 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type80	4928	29696 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type81	4992	30080 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type82	5056	30464 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type83	5120	30848 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type84	5184	31232 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type85	5248	31616 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type86	5312	32000 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type87	5376	32384 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type88	5440	32768 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type89	5504	33152 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type90	5568	33536 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type91	5632	33920 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type92	5696	34304 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type93	5760	34688 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type94	5824	35072 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type95	5888	35456 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type96	5952	35840 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type97	6016	36224 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type98	6080	36608 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type99	6144	36992 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type100	6208	37376 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type101	6272	37760 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type102	6336	38144 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type103	6400	38528 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type104	6464	38912 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type105	6528	39296 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type106	6592	39680 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type107	6656	40064 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type108	6720	40448 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type109	6784	40832 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type110	6848	41216 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type111	6912	41600 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type112	6976	41984 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type113	7040	42368 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type114	7104	42752 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type115	7168	43136 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type116	7232	43520 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type117	7296	43904 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type118	7360	44288 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type119	7424	44672 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type120	7488	45056 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type121	7552	45440 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type122	7616	45824 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type123	7680	46208 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type124	7744	46592 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type125	7808	46976 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type126	7872	47360 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type127	7936	47744 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type128	8000	48128 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type129	8064	48512 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type130	8128	48896 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type131	8192	49280 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type132	8256	49664 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type133	8320	50048 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type134	8384	50432 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type135	8448	50816 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type136	8512	51200 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type137	8576	51584 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type138	8640	51968 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type139	8704	52352 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type140	8768	52736 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type141	8832	53120 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type142	8896	53504 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type143	8960	53888 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type144	9024	54272 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type145	9088	54656 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type146	9152	55040 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type147	9216	55424 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type148	9280	55808 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type149	9344	56192 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type150	9408	56576 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type151	9472	56960 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type152	9536	57344 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type153	9600	57728 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type154	9664	58112 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
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Dv2_Type158	9920	59648 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
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Dv2_Type162	10176	61184 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
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Dv2_Type164	10304	61952 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type165	10368	62336 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type166	10432	62720 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
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Dv2_Type169	10624	63872 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type170	10688	64256 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
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Dv2_Type172	10816	65024 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type173	10880	65408 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type174	10944	65792 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type175	11008	66176 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type176	11072	66560 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type177	11136	66944 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type178	11200	67328 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type179	11264	67712 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type180	11328	68096 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type181	11392	68480 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type182	11456	68864 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type183	11520	69248 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type184	11584	69632 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type185	11648	70016 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type186	11712	70400 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type187	11776	70784 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type188	11840	71168 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type189	11904	71552 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type190	11968	71936 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type191	12032	72320 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type192	12096	72704 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type193	12160	73088 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
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Dv2_Type195	12288	73856 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type196	12352	74240 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type197	12416	74624 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type198	12480	75008 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type199	12544	75392 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type200	12608	75776 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type201	12672	76160 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type202	12736	76544 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type203	12800	76928 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type204	12864	77312 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type205	12928	77696 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type206	12992	78080 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type207	13056	78464 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type208	13120	78848 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type209	13184	79232 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type210	13248	79616 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type211	13312	80000 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type212	13376	80384 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type213	13440	80768 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type214	13504	81152 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type215	13568	81536 GB	2x Intel Xeon E5-2690 v4 (Broadwell)
Dv2_Type216	13632	81920 GB	2x Intel Xeon E5-2690 v4 (

# Run your Microsoft workloads on the #1 Cloud for VMware

4

- IBM Cloud was first to market delivering and operating VMware workloads in public cloud
- A decade-long partnership led to a new offering in 2016
- IBM Cloud named 2017 VMware Partner of the Year and was also named VMware Partner Innovation award 2018 Global Winner
- Nearly 2000 VMware clients globally
- Joint Innovation Lab established to further advance technologies on IBM Cloud
- IBM is the largest operator of VMware workloads in the world

## VMware Solutions Portfolio on IBM Cloud



Hybrid Cloud  
Transformation

Transformation &  
Modernization of  
VMware  
workloads

Data Protection,  
Disaster Recovery  
and High  
Availability

Risk Mitigation  
and Compliance  
Readiness

Migration to SAP  
HANA

# IBM Cloud - the best cloud for VMware solutions



4

Migrate & Modernize VMware workloads on the most secure, enterprise-grade cloud at global scale

ibm.com/cloud/vmware

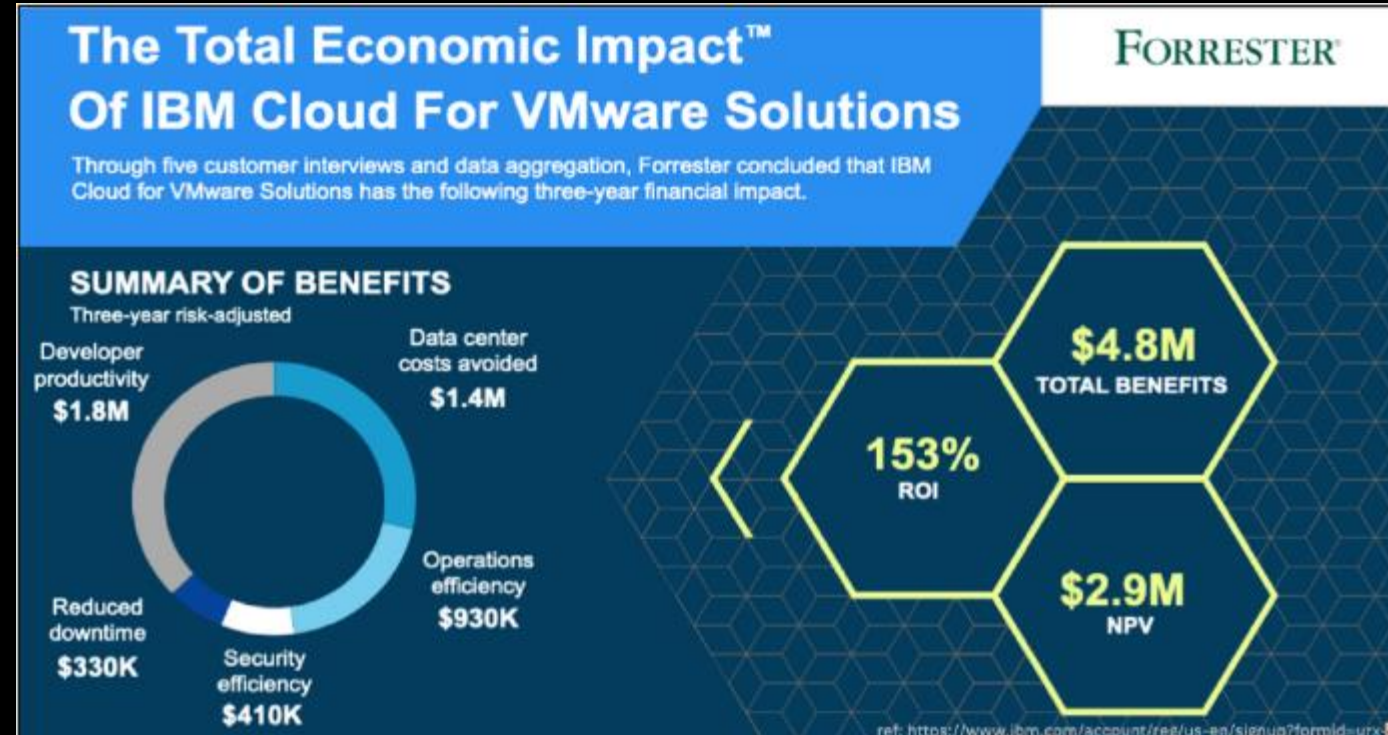
## On Premises VMware vs. VMware on IBM Cloud

**Forrester Research** conducted a study interviewing 5 IBM Cloud for VMware enterprise customers

- 3 FSS clients
- 1 IT services client
- 1 Data Analytics client

**Quantified Benefits** of moving to IBM Cloud for VMware

- Reduced data center costs by **avg of 40% over 3 years**
- Operations staff can now more efficiently manage VMware workloads, **reducing operations efforts by 2/3**
- Security efforts around investigation and patching also **reduced by two-thirds with IBM Cloud**
- Improved application availability, **avoiding 4 downtime events per year by Year 3**
- **Developers are 40% more efficient** with access to RedHat OpenShift



### Other Key Benefits

- Interviewed organizations achieved improvements in performance and latency
- Interviewees associate improved customer satisfaction with IBM Cloud investment



# Why should Microsoft Developers choose VMware on IBM Cloud?

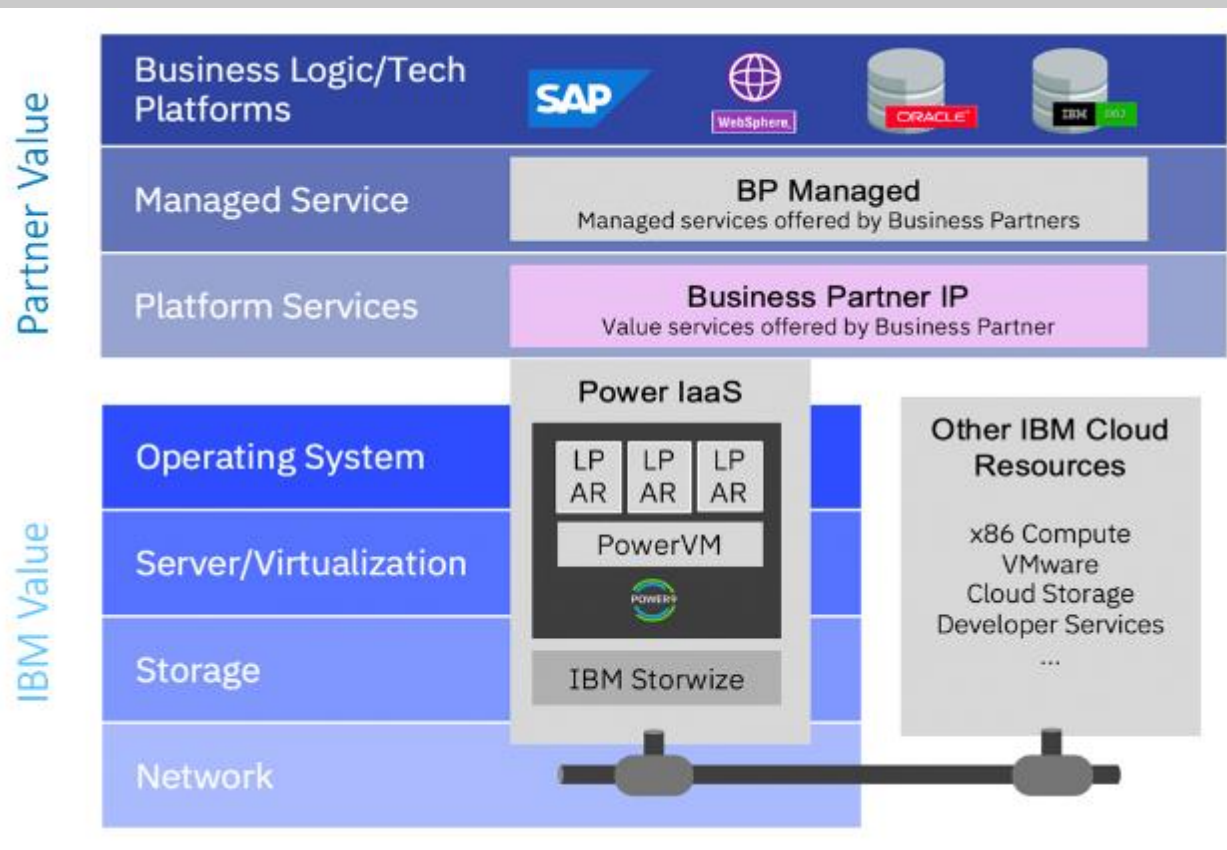
## Differentiation vs VMC on AWS & Azure

Categories	Capabilities (roadmap*)	Self Managed VCS on IBM	VMC on AWS	Azure VMW	Google Cloud VMW Engine
! Single Tenant Self Managed	Root access to hipervisor	✓	X	X	X
	User control patching, upgrading SDDC stack				
	BYO toolchains, scripts, workflows				
	VMware logging, and monitoring tools		SaaS		
Resiliency & HA	Automated deployment of backup	✓	✓	X	X
	Automated deployment of DR solution		X		
	Stretched vSAN clusters with 99.99% availability SLA		✓		
Security & Compliance	KYOK with FIPS 140-2 level 4	✓	X	X	X
	Trusted servers with role-based access				
	Automated Compliance monitoring for auditing, reporting				
	Encryption of data at rest and in motion		✓	✓	✓
Hardened Design	Secure connectivity to advanced cloud services	✓	✓	✓	✓
	Policy-based networking - security e.g. microsegmentation				
	Option public internet isolation		X	X	X
	BYOIP		✓	✓	✓
Geographic reach	Singe Zone Regions (SZRs) WW	34	52	3	2 US/8 WW
	Multi-zone Resgions (MZR) WW with HA stretched vSAN clusters	6 going to 9	17	X	X
Journey to the cloud and to cloud native	Migration	✓	✓	✓	✓
	App Mod of VMware workloads with Tanzu - requires vSphere 7	4Q20	4Q20	4Q20	GKE
	App Mod of VMware workloads with Red Hat OpenShift	✓	X	X	X
Biz Critical SAP	SAP-certified bare metal cascade lake	✓	Expected	Expected	X
! Flexibility & Billing	Multiple Server/storage configs : lower cost & perf	100+	2	2	2
	No Infra lockdown: upgrade to latest HW even with reserved	✓	X	X	X
	Min initial host NSX-v	4	3	3	3
	Min initial host NSX-t	8 going to 4 Oct20	3	3	3
	Service provider controls HW refresh e.g. Cascade Lake	✓	X	✓	✓
	BYOL VMware licensing		Loyalty Pgm	X	X
	Use of SPP credits - exclusive (U.S. Only)		X		
	Flexible billing: hourly, reserved		Spec bid till reserved Oct20	hourly & reserved	reserved
	Flexible billing: No prepaid upfront payment for reserved discounts	✓			
	Flexible SDDC stack & SW entitlements		X	X	X
	No bandwidth private network charges				
Self-serve UI	Add/remove host and add/remove cluster	✓	✓	X (No mention in Preview)	✓
	Rapidly provision host in minutes	✓		✓	✓
	Add/remove attached storage in vSphere or vSAN cluster	✓	X	X	X



# Choose IBM Cloud for Power workloads

With IBM Cloud, you have single cloud support for Microsoft and non-Microsoft workloads!



*Multi-tenant, self managed, Power compute as-a-service in IBM Cloud with consumption-based OPEX pricing*

## Power VS Capabilities

- **Infrastructure as a Service for Power:** allows a user to purchase a Power VS AIX or IBM i Power VM-based Virtual Machine-as-a-Service on IBM Cloud
- **Self-Service Ordering via IBM Portal or APIs:** Client purchases through the IBM Marketplace w/ UI or via scripts with REST API
- **Flexible, Granular Configuration:** Flexible offering allows users to select the quantity of cores, type of cores, memory and storage allocations, and Operating System.
- **Usage Based Pricing:** resources for Power VS resources will be charged at an hourly or monthly prices for the number of cores consumed
- **Managed Service Support:** IBM manages up to OS deployment and the client self-manages the OS and up. Users can self-manage Power VS instances or engage IBM Services for Managed Service Support.
- **IaaS Networking Configurations:** Data and configurations are saved with the application environment in the Snapshot, allowing for complete environment deployment

# Selected customers



## Open Innovation

### Kubernetes Everywhere



## Security Leadership

### Hyper Protect Services

– Powered by Z



### Bare Metal



## Enterprise Grade

### VMware



### IBM Power



# Key Considerations for Public Cloud

## You Have

- Demanding business stakeholders
- A heterogeneous IT landscape
- A need to accommodate
  - Bare metal
  - Cloud native
  - VMware, SAP
  - x86, Solaris, Power, AIX, IBM i

## You Need

- Full control over your data
- Portability. No vendor lock in
- Security across a complex, hybrid environment
- Overcome skills shortage through automated management
- Better control over cost, especially for data & storage intensive workloads
- Industry Expertise, to help with the journey

Why should you think about IBM cloud?

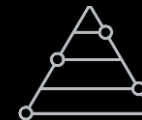
## We Evolved



Open Innovation



Security Leadership



Enterprise Grade

# Thank you!



# Backup Slides