2019 IBM Cloud
用戶實作課程 秋季班

講師介紹

IBM雲端專家馮建國為IBM Cloud資深技術顧問，擁有二十年的IT經驗與私營和公共部門客戶合作，管理國際團隊進行技術銷售和專案部署。精通雲端基礎設施設計、技術銷售與專案管理，並擁有以下多項專業認證：

- IBM Certified Solution Architect-Cloud Platform Solution V2
- PMP
- IBM Certified Solution Advisor-Cloud Reference Architecture V5
- IBM Certified Solution Advisor-Softlayer V1
- IBM Certified Mobile Application Developer

https://github.com/owhc/ibmcloud-workshop-gcg/tree/master/taiwan/handson/oct2019

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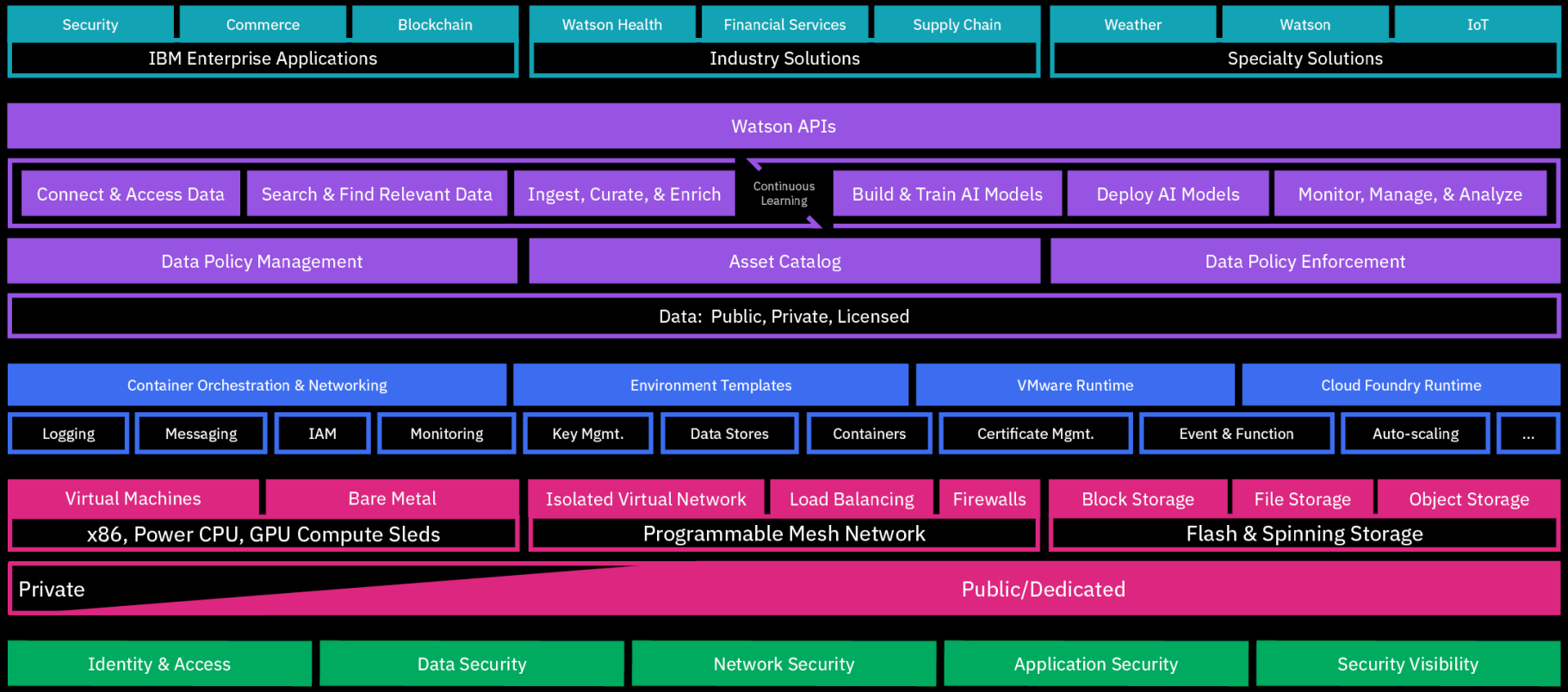
IBM Cloud 服務介紹

IBM Cloud Unit
雲端專家
馮建國 (Gordon Fung)

IBM Cloud One Architecture



IBM Cloud – full stack platform for cloud-native apps

IBM Services

- Application Services
- Business Process and Operations
- Business Resiliency Services
- Business Strategy and Design
- Cloud Services
- Digital Workplace Services
- Network Services
- Security Services
- Technology Consulting Services
- Technology Support Services

AI

- Watson Studio
- Watson Knowledge Catalog
- Watson Assistant
- Watson Discovery
- Watson Language Translator
- Watson Nat. Language Classifier
- Watson Nat. Language Understanding
- Watson Speech to Text
- Watson Text to Speech
- Watson Personality Insights
- Watson IoT Platform
- Data Refinery
- Watson Machine Learning
- Deep Learning

Analytics

- Analytics Engine
- Apache Spark
- Decision Optimization
- Db2 Warehouse on Cloud
- Master Data Mgmt. (MDM) on Cloud
- Information Server on Cloud
- Streaming Analytics

Security

- Activity Tracker
- App ID
- Network Security
- SSL Certificates
- Certificate Manager
- Hardware Security Module
- Hyper Protect Services
- Identity Access Mgmt.

DevOps

- Continuous Delivery
- Continuous Release
- Globalization Pipeline
- Cloud CLI
- Availability Monitoring
- Cloud Developer Console for Apple
- Cloud Event Management
- Workload Scheduler
- DevOps Insights
- Log Analysis
- Monitoring
- Multi Cloud Manager

Mobile

- Mobile Foundations
- App ID
- Mobile Analytics
- Push Notifications

Databases

- Cloudant
- IBM Cloud DBs
- Db2 Hosted
- Db2 on Cloud
- Db2 Warehouse
- Informix on Cloud
- Lift
- Mass Data Migration

Integration

- API Connect
- App Connect
- Aspera on Cloud
- Event Streams
- MQ on Cloud
- IBM Cloud DB for Rabbit MQ
- Direct Link
- Secure Gateway

VMWare

- Secure Virtualization
- Veeam on IBM Cloud
- VMWare Horizon on IBM Cloud
- F5 on IBM Cloud
- Fortinet on IBM Cloud
- Spectrum Protect Plus on IBM Cloud
- Zerto on IBM Cloud

IoT

- IoT Platform
- Weather Data APIs

Compute

- Bare Metal Servers
- Cloud Virtual Servers
- Mass Storage Servers
- IBM Cloud Private
- Container Registry
- Kubernetes Service
- Cloud Foundry
- Cloud Functions
- IBM Cloud Dedicated
- WAS on Cloud
- Auto Scaling
- VMWare Cloud Solutions
- SAP-Certified Infrastructure

Networking

- Internet Services
- Virtual Router Appliance
- DNS
- CIS
- CDN
- Load Balancing
- Direct Link
- Network Security

Storage

- Block Storage
- File Storage
- Object Storage
- EVault

IBM Cloud Infrastructure

Designed for your data.
AI ready.
Secure to the core.
IBM Cloud is the cloud for business.

A cloud infrastructure that meets you where you are and takes you where you want to go

Customized

Best-in-class, powerful compute, storage, & network infrastructure for any workload and any budget size — from born-on-cloud to Fortune 500 enterprises

Open

First to build on a foundation of open source (Kubernetes, OpenWhisk, Cloud Foundry), paving the way for others

Trusted

Expertise in over 20 industries, standardized approach for auditable consistency, and global and regulated industry compliance

Visionary

First to see and build for future-proofing with Watson — the oldest AI at 7-years-old —blockchain, and a single architecture platform

Data Centers: Globally local

Built with multiple deployment options for your unique workload needs

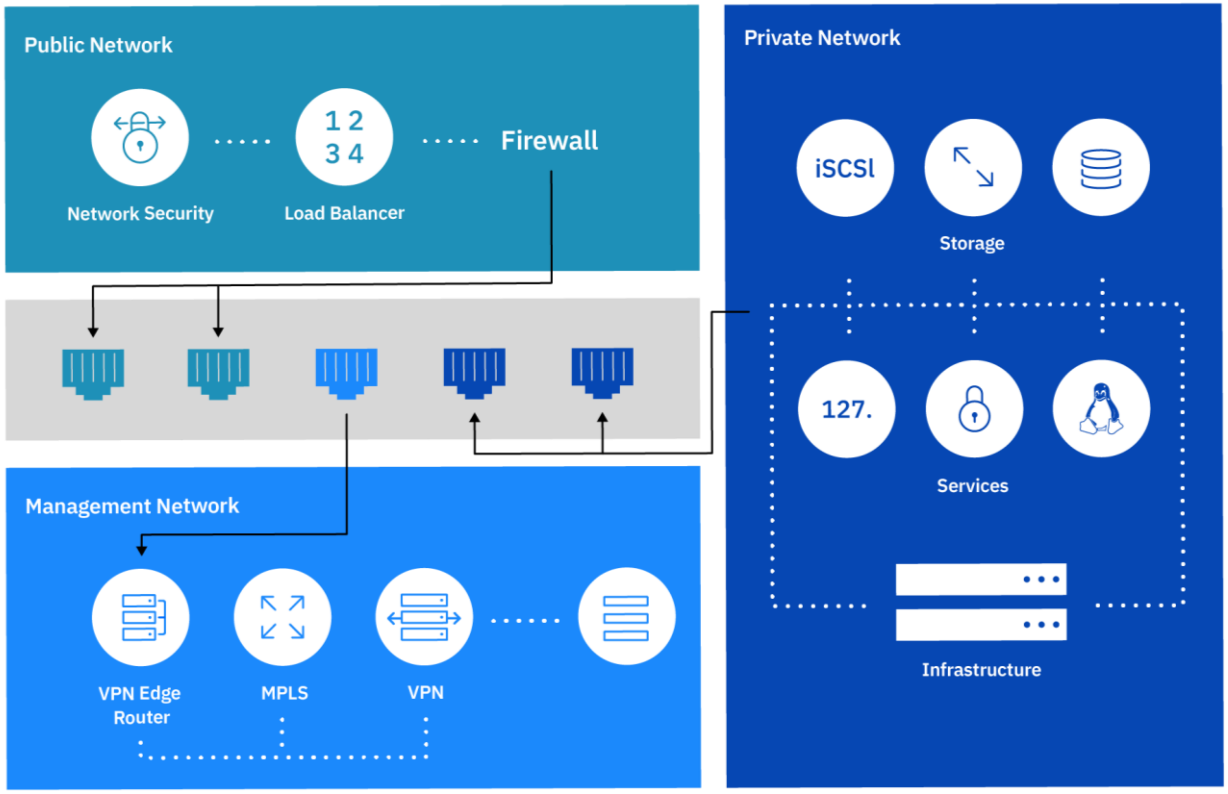
Choose where to deploy from nearly 60 locations in 19 countries

"The ability to access IBM's global network of cloud data centers, which are all connected by a high-speed fiber network, is extremely attractive to us."
-Rob Platzer, chief technology officer, *Bitly*

Unique, triple-layer network architecture

Public, private, and management traffic travel on separate networks, giving you unmatched control, security, and speed.

The private network connects your services in all data centers, free of charge.



End to end security for cloud native and enterprise workloads

Secure to the core: Technology

- Comprehensive cloud security offering portfolio
- API ready services for cloud integration

End to end security for cloud native and enterprise workloads

Secure to the core: Expertise

- Deep security and regulatory compliance expertise
- Managed services for security operations and intelligence

Infrastructure-as-a-Service Highlights

Smart partnerships for a better cloud

VMware, SAP, and Intel power cloud for the custom workloads your business needs

Built for security

High assurance, enterprise-strong cloud security portfolio and expertise to help you adopt IBM Cloud with confidence

Fast provisioning

Spin up bare metal or virtual servers in 30 minutes or less, with network offerings that provide consistent, cutting edge computing speeds

Power and performance

13 Tbps connectivity on a low latency, high resiliency global network with powerful bare metal and VM compute performance

Compute

A high performing cloud starts with a strong compute foundation

Choose a server type

Compute options from high-abstraction to high-control

Customize to suit your workloads

Pre-configuration to fully customizable server options

Provision on demand

Deploy an IaaS bare metal or virtual server in minutes and customize bare metal in 2–4 hours

Compute Infrastructure

SAP Certified Servers

Build, deliver, and run SAP applications in the cloud

Bare Metal Servers

Raw IaaS horsepower for processor-intensive and disk I/O-intensive workloads

Virtual Servers

Fast deployment when resources are needed on the fly

GPU Computing

Handle complex, compute-intensive workloads, including analytics, graphics, and AI

POWER Servers

Develop, test, and run Linux applications

Server Software

Operating systems to control panels to simplify IaaS administration

Bare Metal Servers

Bare Metal Servers

Real challenges and real solutions

High-performance computing

Solve problems faster

Secure data

Match data security needs — previously available with on premise servers only

High volume data

Gather and store, analyze data, and gain insights to make better business moves

AI

65% more machine learning with latest GPUs to find new value in your data

Bare Metal Servers Family Benefits

Choice with Consistency

Bare Metal servers are available in all data centers

Hybrid Integration

Customize Bare Metal to look exactly like your on premise solution or add to it

Powerful, Accessible Data & Analytics

Use Bare Metal servers for high performance data and analytics workloads

DevOps Productivity

Use Bare Metal servers for high performance needs in production environments

Cognitive Solutions

Use Bare Metal servers for high performance Cognitive solutions

Bare Metal Servers

The power you demand for your processor — and disk I/O-intensive workloads

- **Performance:**
  Eliminates multi-tenant resource conflicts with competing work streams
- **Control:**
  Complete control of physical hardware

Power from the ground up — dedicated to you.

- **Solve problems faster**
  - Powerful
  - On-demand
  - Customizable

Bare Metal Processor Options

Single Socket

Ideal for:

Entry-level web hosting

Development sandbox

Simple email servers

Dual Socket

Ideal for:

Hosting resellers

Moderately-sized websites

SMB back office apps

Quad Socket

Ideal for:

High transaction apps

Virtualization

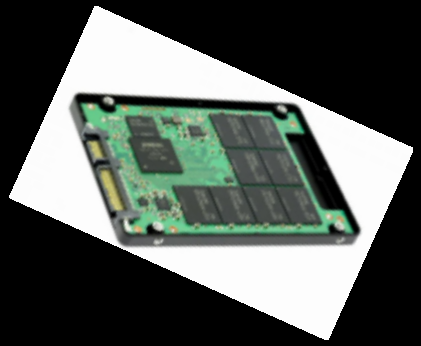
Disaster recovery

Octo Socket

Ideal for:

Everything quad socket servers offer plus in-memory computing with large database applications. *Only available with SAP offering.*

Bare Metal
Hard Drive Options



SSD SED

- High performance, low latency, enterprise-class storage
- Drive capacities up to 3.8TB
- Ideal for high-performance and data-intensive applications

SAS

- Includes 3.0Gb/s interface with 16MB cache and 15K RPM rotation speeds
- High performance speed and reliability
- Ideal for gaming, database, streaming media, and mission-critical servers

SATA

- Each unit includes up to 6.0Gb/s interface with 64MB cache (SATA III)
- Drive capacity ranges 1TB to 10TB
- Each unit includes up to 6.0Gb/s interface with 64MB cache (SATA III)
- Ideal for web, mail, or high-capacity storage servers

3D XPoint™ Technology

- High performance cell and array architecture that can switch states 1000x faster than NAND
- 10x denser than conventional memory
- Storage and memory converged

SAP Certified Servers for HANA and Applications

SAP Certified HANA servers	SAP Certified NetWeaver servers		Other Components
8 Socket 8890v4 4, 8, 12* TB RAM	4 Socket 8890v4 1 TB RAM	1 Socket 1270v6 32, 64 GB RAM	Network Gateways HW or SW options
4 Socket 8890v4 1, 2, 4, 6* TB RAM	2 Socket 6140 192, 384, 768 GB RAM	1 Socket 1270v6 32, 64 GB RAM	Firewalls HW or SW options
2 Socket 6140 192, 384, 768 GB RAM	2 Socket 2690v4 512 GB RAM	SUSE SLES 12 SP2 RHEL 6.x or 7.x Windows Server	Backup Veeam, Object Storage, Endurance Storage
SUSE SLES 12 SP2 RHEL 6.7, 7.4 for HANA VMware 6.0, 6.5	2 Socket 2690v3 128, 256 GB RAM	DB2, MSSQL VMware 6.0, 6.5	Virtual Servers BOBJ, AD, Jump, Dev/Test

Virtual Servers

Virtual Servers

Real challenges and real solutions

Dynamic Workloads

Not all workloads are the same—some require different resources

- Small, medium, large sizes
- Various isolation types
- Data stored where you need

Flexibility

Allows for dynamic resizing depending on data

- Fast provisioning times
- Hourly or monthly models

Predictability

High and predictable performance

- No oversubscription of vCPU or RAM
- Guaranteed 2.0 GHz or faster

Virtual Servers Family Benefits

Ease of use

Improved selection process from a broader spectrum of public virtual server flavors

Lower provisioning times

Pre-configured virtual servers based on workloads to easily select a best fit

More control and visibility

Single tenant virtual server offerings allow clients in heavily regulated industries overcome cloud adoption barriers

Cost savings

Servers dedicated to specific workloads to minimize under- or over-utilized resources

Virtual Servers

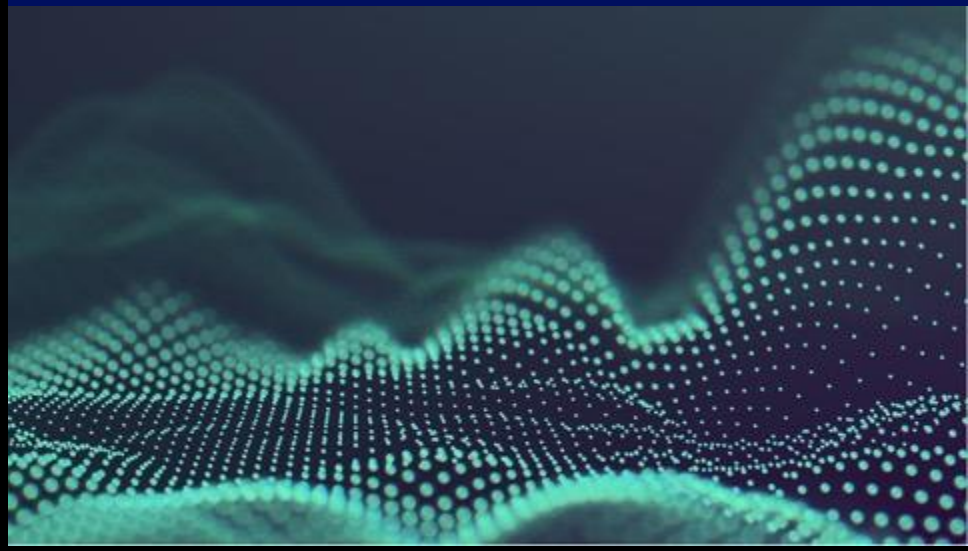
Real challenges and real solutions

Virtual servers give you the ability to change your cloud environment as fast as business moves.

- **Choice:**
  Single-tenant eliminates resource conflicts. Hourly and monthly options for short-term and long-term applications.
- **On-demand:**
  Provision virtual servers in minutes to combat workload spikes.
- **Performance:**
  2.0Ghz or faster with no oversubscription on core or RAM.

Quickly deploy and scale cloud infrastructure on demand

- Flexible
- On-demand
- Powerful



Virtual Servers

Virtual servers give you fast access to compute resources to meet any workload

Public

Multi-tenant offering with rapid provisioning and scalability

Dedicated Instance

Single tenant offering with rapid provisioning, allowing further control and flexibility in virtual server deployments

Dedicated Host

Virtual servers dedicated to customers providing the most control by enabling workload placement and flexibility in virtual server deployments

Virtual Server Families and Applications

Balanced

Common cloud workloads requiring a balance of vCPU and RAM

Compute

Front end, batch-processing workloads, requiring more compute than memory

Memory

Caching, in-memory, database solutions, requiring more memory than compute

Balanced Local

Common cloud workloads requiring a balance of vCPU and RAM along with local storage (SSD and HDD options) and performance

GPU Computing

GPU Computing

Real challenges and real solutions

AI

Add GPUs to enable up to 65% more machine learning than traditional servers*

Big Data

Take on massive data analytics computations

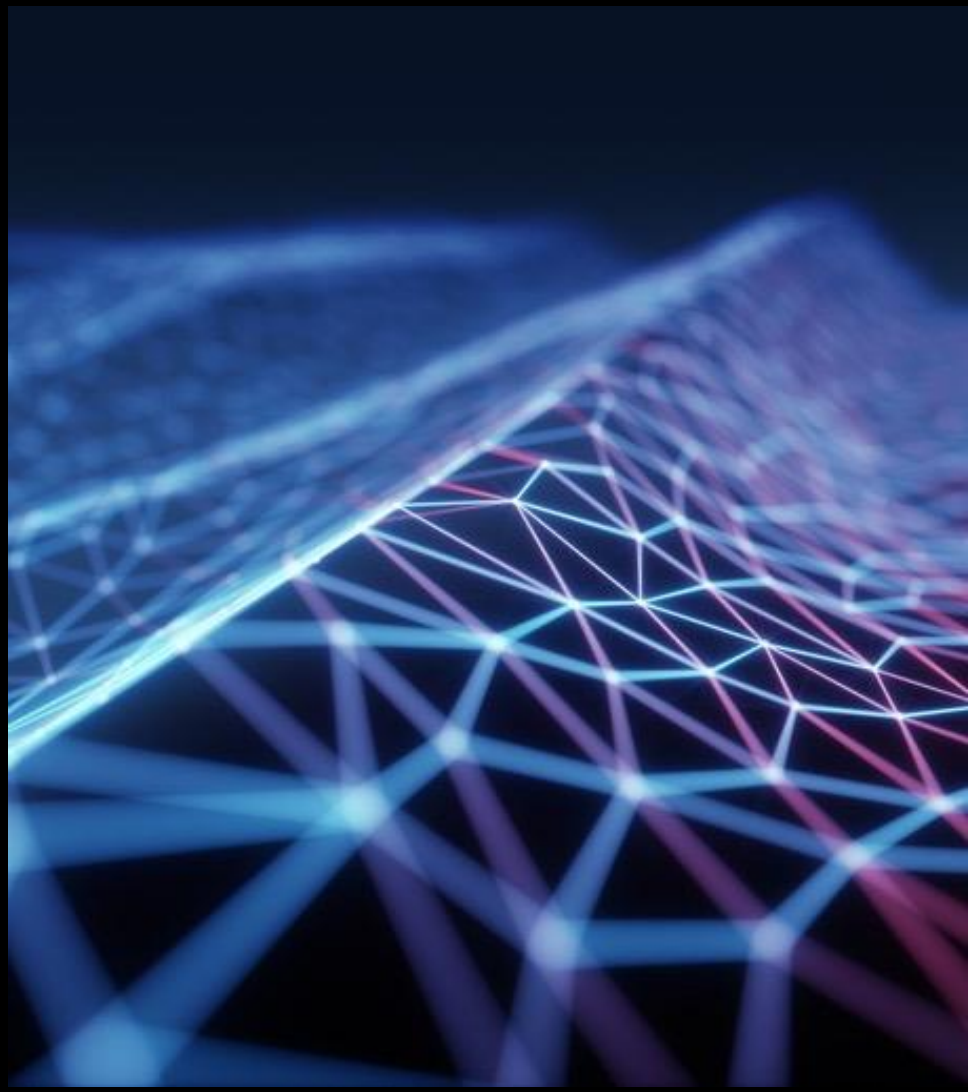
GFX Applications

Get blazing speeds for graphic-intensive workloads like 3D CADs and data rendering for gaming

GPU Computing Benefits

The processing power for high performance computing, deep learning, machine learning, AI, Virtual Desktops (VDI):

- **Powerful:**
  Solve complex problems faster and with less power than CPUs
- **Fully integrated:**
  GPUs seamlessly integrate into our cloud infrastructure, API, and management tools



GPU Computing

NVIDIA Tesla P100/K80

Applications: AI, deep learning

Get up to 50x performance over the Tesla K80

Enable up to 65 percent more machine learning*

NVIDIA Grid K2

Applications: Professional-grade graphics

- Ramp up any graphics applications that require blazing speed
- *NEW* Now available by the hour

NVIDIA Tesla M60

Applications: Data analysis, scientific computation

Massive data analytics computations

NEW Now available by the hour

GPU Computing use cases

Virtual desktop infrastructure
- Scale, secure, standardize, and provide enhanced performance with GPU enabled offerings

Financial services
- Performing large and complex financial transactions

Gaming
- Process and render data and graphics for high game performance

Scientific research
- Solve complex molecular modeling calculations or analyze massive amounts of seismic data

Healthcare
- Log on to your desktop from any workstation within the network facility without slowing down traffic

Graphic design
- Experience smooth, multimedia-rich applications, including 3D-intensive programs

Direct Link

Direct Link

Real challenges and real solutions

Native access to key Resources

With a high speed, direct network link between your data centers and ours, you can move data between servers at the speed of light– plus access key resources such as AI, blockchain, IoT, and more

Hybrid Workload Support

On-prem apps run off-premises on a public cloud that analyzes data stored on-premises due to residency requirements.

Super Secure Data Transfer

Moving sensitive data to and from our cloud platform further ensures its security by completely avoiding exposure to the public internet at all times.

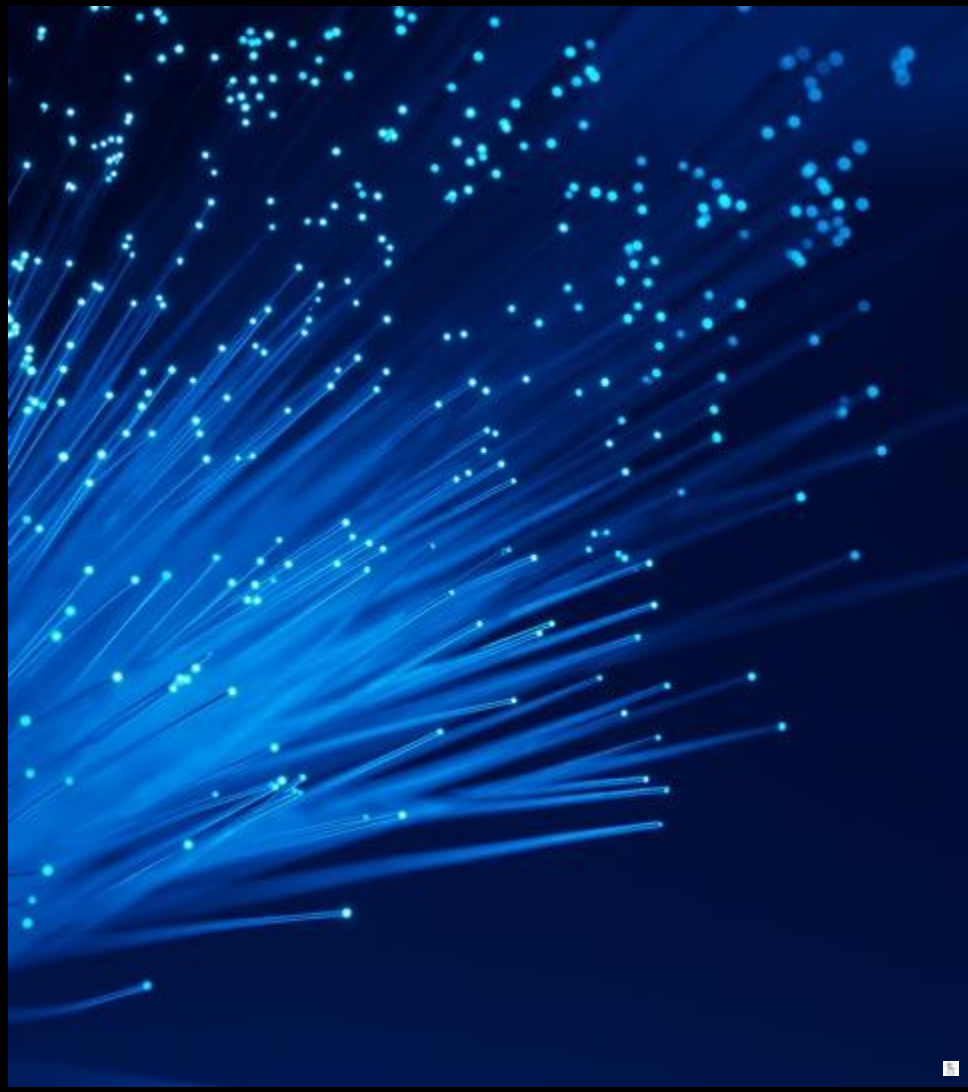
Leverage existing IT investments

IT modernization is the top driver of public cloud adoption, followed by cost savings. Do both by leveraging existing investments while emphasizing cost savings.

Direct Link

IBM Cloud Direct Link helps ensure the security of sensitive data to and from the IBM Cloud. Back up or store huge volumes of data from your data center on IBM Cloud with predictable bandwidth costs. With a dedicated network connection, your transfer rates are fast, consistent and reliable.

- **Faster speed, lower latency:**
  Move data to and from your data center across network connections at speeds up to 10Gbps.
- **Higher security:**
  Protect your sensitive, business-critical data by controlling every network hop.
- **More reliability:**
  Receive consistent, higher-throughput connectivity between a remote network and your IBM Cloud environments.



Network Security

Network Security

Real challenges and real solutions

E-commerce, Payment card industry

Businesses with security compliance requirements may require additional firewall layers between each tier of your network

Healthcare, Financial Services

Achieve regulatory compliance, improve efficiency, and enhance overall asset management by condensing the number of security groups

Small-Medium Business

81% of all data breaches happen to SMBs*, so protect data with a security plan that lets you control, deploy, and provision network security features quickly

Improved Migration Options

Leverage the WanClouds third-party Configuration Conversion tool to assist in migration from our legacy Vyatta 5400 offering to IBM Cloud Virtual Router Appliance

Network Security Options

Shared Hardware Firewall

- Protection for single servers provisioned on demand without service interruptions.

Dedicated Hardware Firewall

- 1Gbps, single-tenant protection for servers that share the same VLAN
- Provisioned on demand without service interruptions

FortiGate® Security Appliance 10Gbps

- Single-tenant firewall for multiple VLANs on public and private networks
- Provides access to add-ons such as intrusion prevention, anti-virus protection, and web filtering

Security Groups

- Value-added network security solution
- Define security policies at the instance level
- No support for bare metal

Shared Firewall

A shared hardware firewall leverages a multi-tenant enterprise platform to protect an individual server. It delivers virtualized network security through its virtual domain (VDOM) technology, providing separately provisions and managed virtualized security domains.

IBM Cloud – Dedicated Firewall

A dedicated firewall leverages a single-tenant appliance to protect any or all servers on a public VLAN. It can be added to a public VLAN at any time. Firewall rules are applied on a per-IP or per-subnet basis.

FortiGate® Security Appliance

A FortiGate® Security Appliance (FSA) is a dedicated single-tenant network device connected upstream from a server and protects any or all servers on a public VLAN.

Our **FortiGate Security Appliance 10Gbps** offering offers up to 10Gbps on both public and private VLANs for robust perimeter security.

Security Groups

Security groups are a value-added, zero cost solution that easily add instance-level network security to manage incoming and outgoing traffic on both private and public networks.

- Enhanced, instance-level control
- Scalable and customized for your needs
- You set ingress and egress filtering

Which Firewall is for me?

Offerings

Features

	Security Groups	Shared Hardware Firewall	Dedicated Hardware Firewall	FortiGate Security Appliance	FortiGate Security Appliance 10 Gbps
Stateful Packet Inspection	Yes	Yes	Yes	Yes	Yes
Customer managed appliance	No	No	Yes	Yes	Yes
VLAN Protection	No	No	Yes	Yes	Yes
Ingress Rules	Yes	Yes	Yes	Yes	Yes
Egress Rules	Yes	No	No	Yes	Yes
NAT Support	No	No	No	Yes	Yes
Multi-VLAN Support	No	No	No	No	Yes
DMZ and Multi-Tiered Network Support	No	No	No	No	Yes
Public and Private Network Support	Yes	No	No	No	Yes
SSL VPN Termination	No	No	No	Yes	Yes
IPsec VPN Termination	No	No	No	Yes	Yes
Open VPN Termination	No	No	No	No	No
HA Option	N/A	No	Yes	Yes	Yes
Manage from API & Portal	Yes	Yes	Yes	Appliance GUI	Appliance GUI
10Gbps Support	N/A	No	No	No	Yes
NGFW Add-ons (IPS, AV, WAF)	No	No	No	Yes	Yes

Storage

Block and File Storage

Deploy full-featured, Flash-backed[1] block storage in granular increments — from 1,000GB to 12,000GB — with customizable deployments, IOPS, and billing.

- **Go global:**
  Provision block storage alongside your cloud servers in IBM Cloud data centers worldwide.
- **Easy to work with:**
  Stay confident with a higher class of block storage designed to protect, simplify, and cater to your changing needs.
- **Get predictable billing:**
  Lock in your costs by the month or by the hour, without the surprise of hidden fees or additional charges.

Now with monthly and hourly billing.

Block and File Storage

20GB to 12TB storage | Max of 48,000 IOPS(2) | Monthly and hourly billing

Choose your deployment:

1) Endurance tiers:

Specify capacity only (IOPS and throughput scale with volume size). Pre-defined for simplicity. Ideal for most workloads.

Example:

500GB volume @ 2 IOPS
500GB * 2 IOPS/GB tier = 1,000 IOPS total
1000 IOPS * 16kb block size = 16MB/s throughput
$0.20/GB * 500GB = $100/month

2) Performance options:

Specify both capacity and IOPS. Ideal for workloads with well-defined performance requirements.

Example:

500GB volume with 250 IOPS
250 * 16kb block size = 4 MB/s throughput
$0.10/GB * 500 GB + $0.07/IOP * 250 = $50 + $17.50 = $67.50 / month

Block and File Storage
Industry essentials come standard

At rest data encryption: Disk level with provider managed keys(5)

Expandable volumes/adjustable IOPS: Accommodate dynamic workload needs on the fly

Flash-backed: Decreased latency/increased throughput(1)

Max durability: Maintain availability and integrity through events without RAID arrays

Granular volume sizes: Lower your costs with TB increments

Customizable IOPS: Tailor assigned levels of IOPS tiers and customizable IOPS for top performance

Hourly or monthly: Create short-term use storage volumes for Dev/Ops, DR testing, etc.(3)

Snapshots and replication: Non-disruptive and automatically copied to an IBM Cloud data center(6)

High availability: Uses redundant networking connections to maximize availability; iSCSI-based Block Storage uses Multipath I/O (MPIO)

Volume duplication: Make updates offline, use for DR/Ops or as the golden template

Object Storage

Real challenges and real solutions

Safe enterprise collaboration

A secure solution for global file access and workloads

- Mobile device sync
- Cloud drive and VDI services
- Remote data protection & backup for endpoints and servers
- Regulatory compliance
- Archive for inactive NAS data

Data Transfer

Fast, secure, reliable transfer of data to Object Storage

- Migrate large volumes of unstructured data to cloud storage
- Archive data to cloud from on-premises storage systems
- Replicate for disaster recovery sites in the cloud

Content repository and archiving

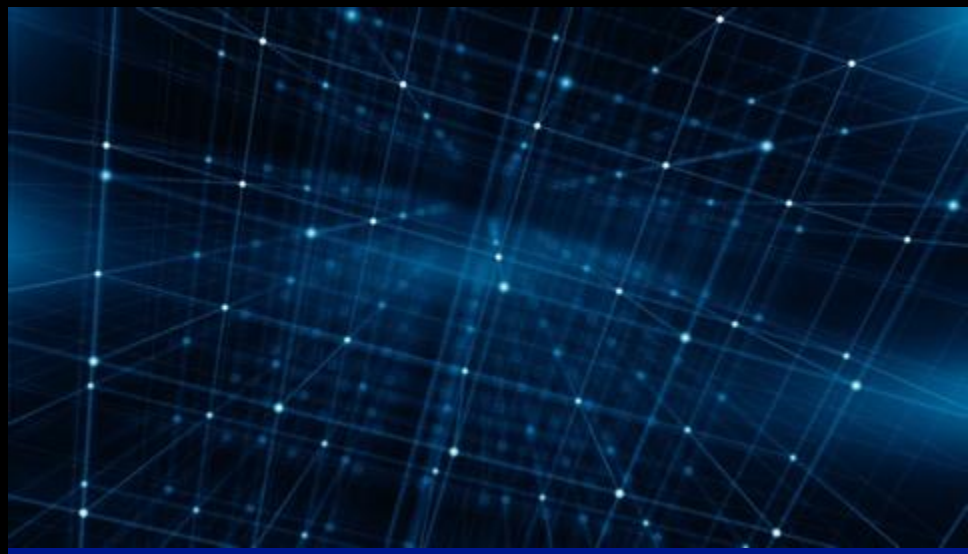
Eliminate data silos & increase the usability of your data across modern applications

- Repository for video, images, project data (Object, NAS, Legacy Storage)
- Repository for data used by IBM Spark as a Service, IBM Analytics Engine & Data Science
- Media asset repository
- Medical image repository

Object Storage Benefits

Store and access your data from anywhere in the world via self-service portals and APIs. Get enterprise availability and security with cloud economics and scale. Pay only for what you use, and leverage IBM Cloud Object Storage with your applications, or integrate with other IBM Cloud services, including analytics, compute, and cognitive.

- **Use it your way:**
  Create a backup, archiving, or multimedia content repository solution. Store unstructured data for analytics, IoT, social, cognitive and mobile applications.
- **Always-on availability:**
  Choose the level of resiliency that's right for you.
- **Simple, predictable billing:**
  Pay only for what you use across multiple storage classes. Help save costs with price caps for dynamic data access.



Object Storage IBM recognized in July 2017 Gartner Magic Quadrant for Public Cloud Storage Services, Worldwide

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IBM Cloud Object Storage

Industry-leading flexibility, scalability, and simplicity

On-Premise

- Single tenant
- Design-specific to client needs
- Total control of system

Dedicated

- Single tenant (compliant)
- No data center space required
- Flexible configuration options
- OPEX vs CAPEX

Public

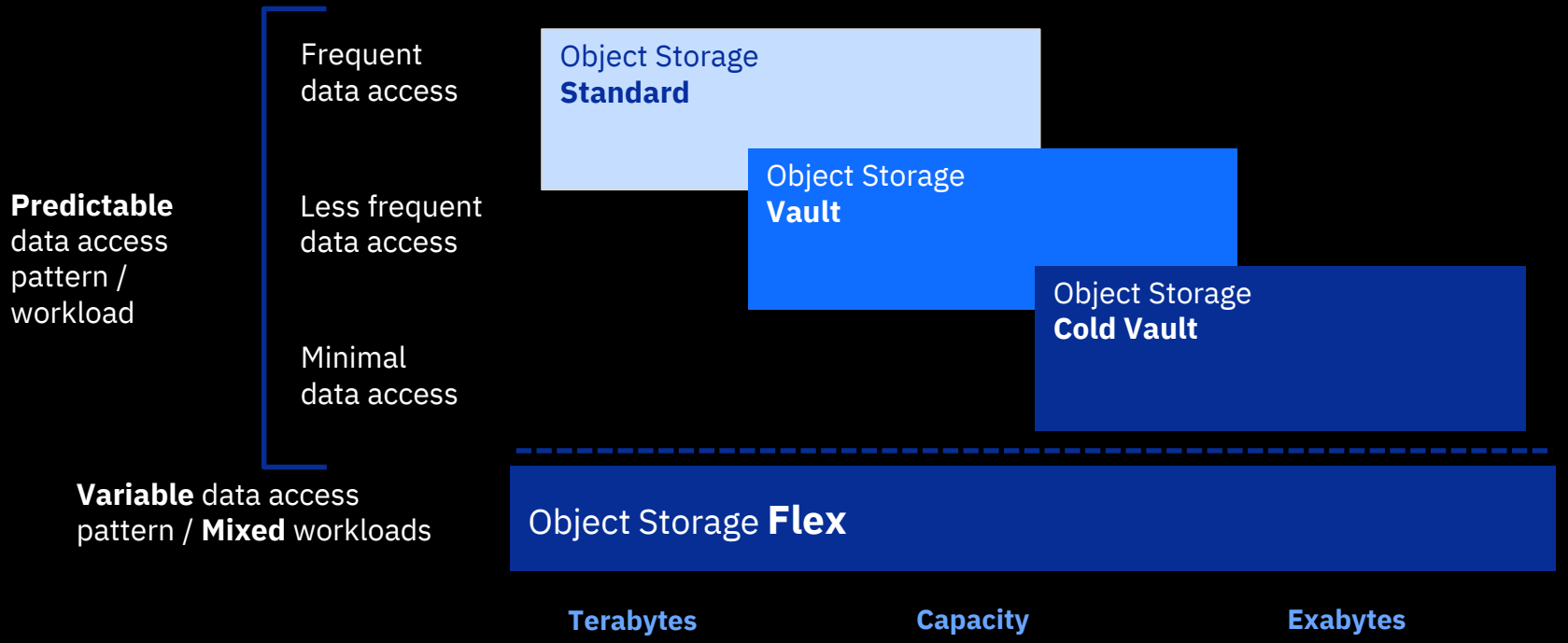
- Multi-tenant
- Usage-based pricing
- Elastic capacity
- No data center space required.
- Fully managed
- OPEX vs CAPEX

Hybrid

Consistent, uniform, and open technology across on-premises, dedicated, and public cloud makes it easier and more efficient to manage data, workloads, and business processes

Object Storage

Public cloud services designed for today's dynamic workloads

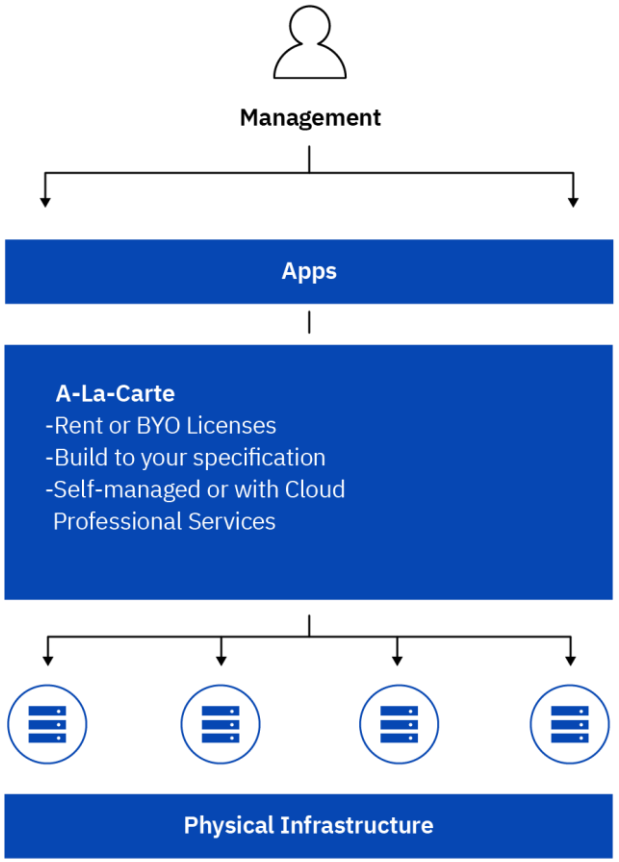


VMware

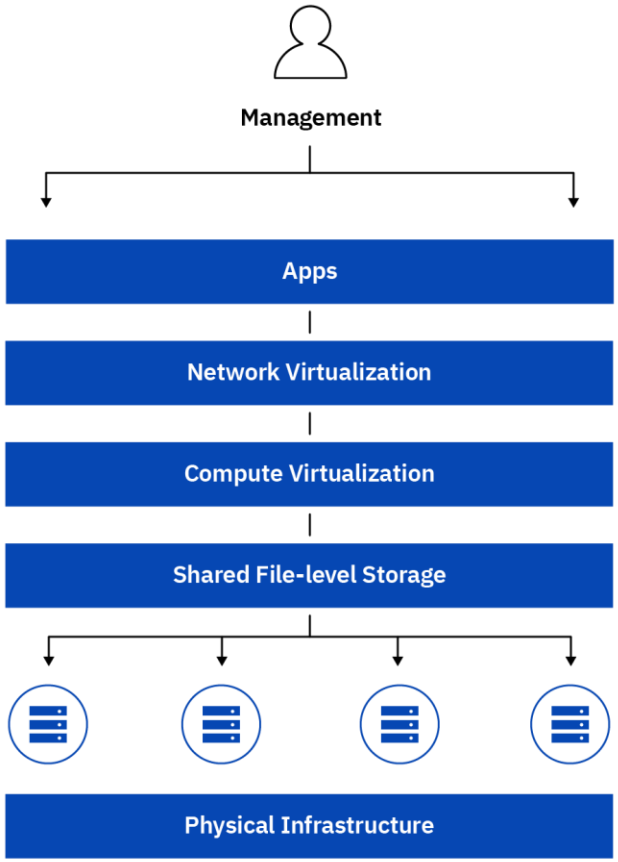
VMware vSphere®
on IBM Cloud

Benefits

- Purchase or bring your VMware licenses – Per CPU licensing
- Build your own custom Private VMware Cloud on IBM Cloud
- Manage environment to your specifications



VMware vCenter Server on IBM Cloud



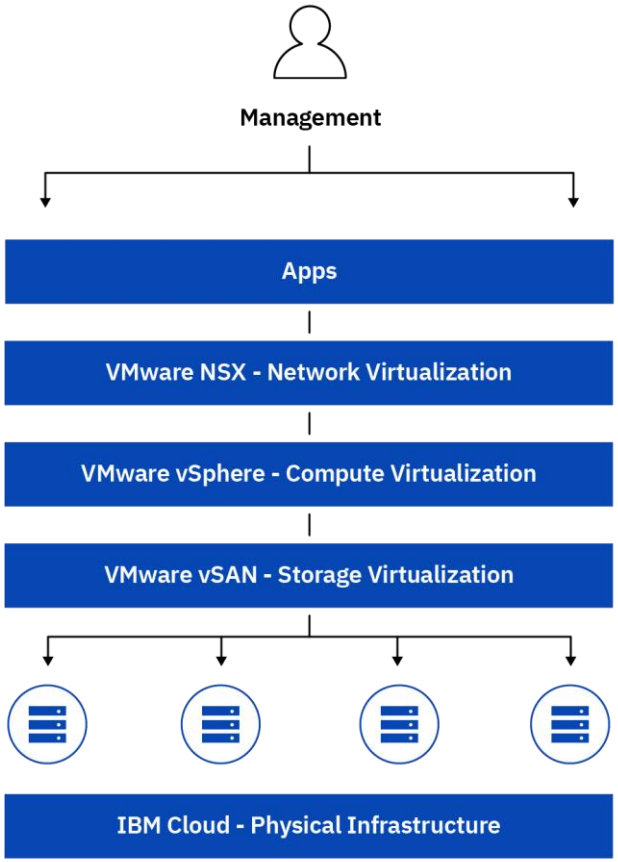
Benefits

- Hosted private cloud with easy-to-manage logical firewall powered by NSX, dedicated IBM Cloud bare metal servers, and shared storage with data encryption at rest*
- Accelerate the delivery of IT projects by reducing the time it takes for deployment of resources from weeks to hours
- Easily manage workloads in the cloud using existing familiar vSphere-compatible tooling

VMware Cloud Foundation on IBM Cloud

Benefits

- Hosted Private Cloud consisting of a complete VMware SDDC with software lifecycle management
- Secure, single-tenant, IBM Cloud bare metal infrastructure
- Automated deployment in the cloud accelerates the delivery of IT projects
- Centralized view and management of multi-site deployments
- Easily manage workloads using familiar VMware products and vSphere compatible tooling



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THANK YOU