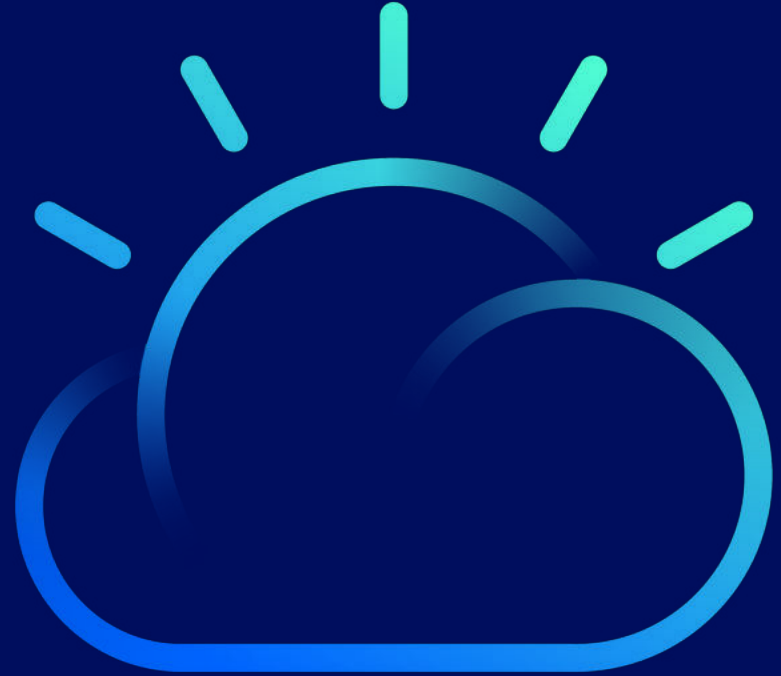


# IBM Cloud Private IBM Power Systems

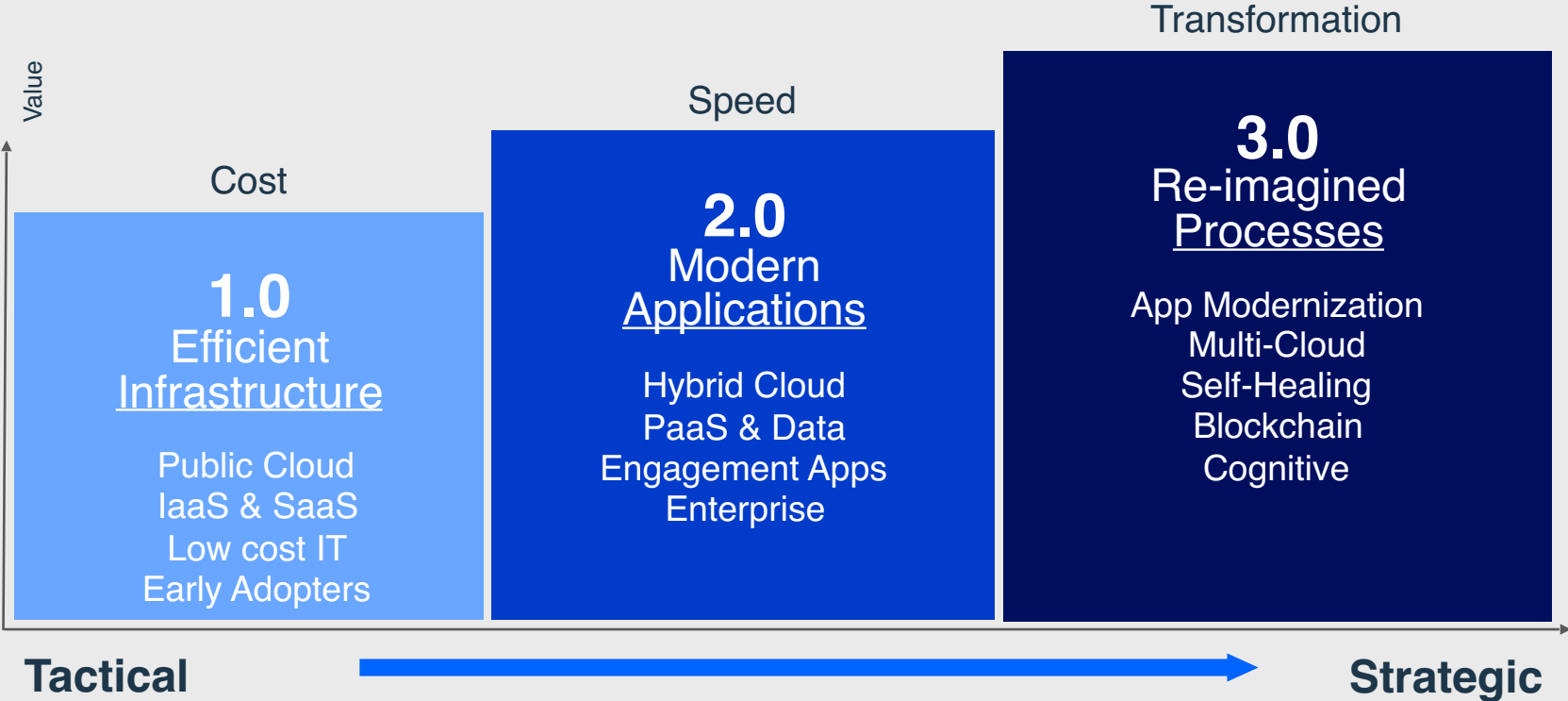


**Rafał Owczarek**

[rafal.owczarek@techdata.com](mailto:rafal.owczarek@techdata.com)

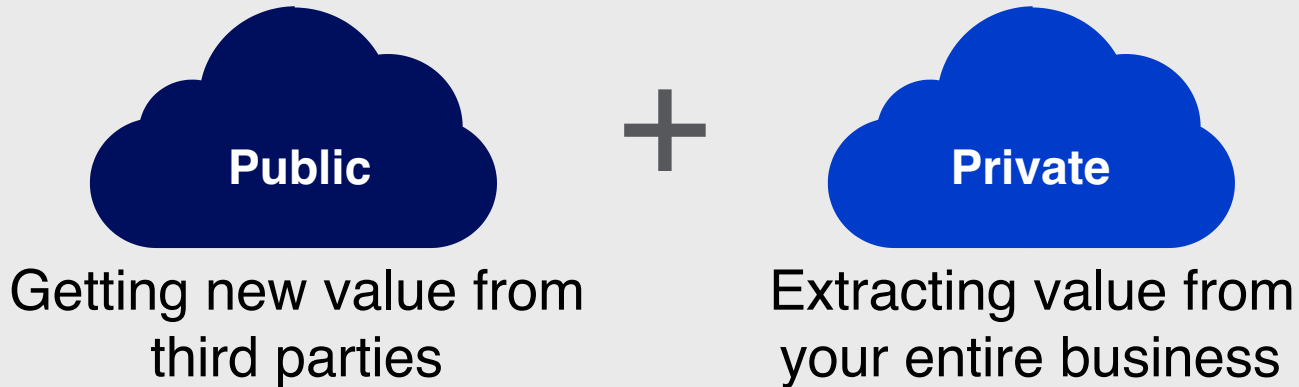
**IBM Cloud**

# The cloud has evolved as the technology for transformation



# Multi-cloud is the key to organizational agility

8 out of 10 committing to Multi-Cloud  
71% use 3 or more clouds



# Key use cases driving private cloud adoption

1

Create new cloud-native applications

2

Modernize and optimize existing applications

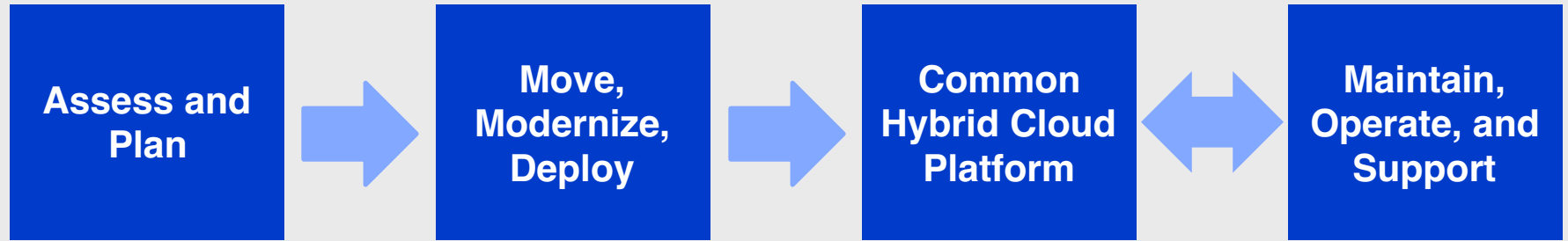
3

Opening up enterprise data centers to work with cloud services

Multi-cloud management and orchestration

# Organizations are focusing on modernization

- 70% of private cloud adoption is being driven by the need to modernize
- IBM delivers a framework to accelerate the app modernization journey:



# IBM Cloud Private brings cloud native to the enterprise:



## Rapid Innovation

- Open Kubernetes-based container platform
- Cloud Foundry for app dev and deployment
- DevOps toolchain integration



## Hybrid Integration

- Integration capabilities to unlock and connect
- Secure access to public cloud services (AI, Blockchain)
- Consistent experience across private/public



## Investment Leverage

- Containerized versions of IBM Middleware
- Prescriptive guidance to optimize workloads
- Work with existing apps, data, skills, infrastructure



## Management & Compliance

- Core operational services including logging, monitoring, security
- Flexibility to integrate with existing tools and processes

# Built with open standards, preventing vendor lock-in



Executable package of software that includes everything needed to run it

**Containers**



Automate deployment, scaling, and management of containerized applications

**Orchestration**



Define, install, and upgrade Kubernetes applications

**Management**



Infrastructure as code to provision public cloud and on-premises environments

**Provisioning**

# Solution Overview



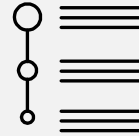
## Enterprise Content Catalog

Open Source and IBM Middleware, Data, Analytics, and AI Software



## Core Operational Services

Log Management, Monitoring, Security, Alerting



## Kubernetes Container Orchestration Platform



Choose your infrastructure:



IBM Z



## Strategic Value:

Self-service catalog

Agility, scalability, and elasticity

Self-healing

Enterprise security

No vendor lock-in



# Enterprise Content Catalog

## Toolchain & Runtimes

Microclimate Beta  
Microservice Builder  
Jenkins (open source)  
IBM WebSphere Liberty  
Open Liberty (open source)  
IBM SDK for Node.js  
Swift runtime (open source)

## Logging & Monitoring Services

ELK (open source) & Prometheus (open source)

## App Modernization Tooling

IBM Transformation Advisor

## Multi-cloud Management

IBM Cloud Automation Manager

## Mobile

IBM Mobile Foundation

## Digital Business Automation

IBM Operational Decision Manager for Developers

## Data Services

IBM Db2 Dev-C  
IBM Data Server Manager (for Db2 Dev-C)  
IBM Db2 Direct Advanced Edition / AESE with Data Server Manager  
IBM Db2 Warehouse Dev-C  
IBM Db2 Warehouse Enterprise  
IBM Cloudant Developer Edition  
MongoDB (open source)  
PostgreSQL (open source)  
MariaDB (open source)  
Galera with MariaDB (open source)

## Messaging

IBM MQ Advanced for Developers  
IBM MQ Advanced  
Rabbit MQ (open source)

## Integration

IBM Integration Bus for Developers  
IBM Integration Bus  
IBM DataPower Gateway for Developers  
IBM DataPower Gateway Virtual Edition

## Data Science and Business Analytics

IBM Data Science Experience  
Developer Edition  
IBM Data Science Experience Local

## Data Governance and Integration

IBM InfoSphere Information Server for Evaluation

## Cognitive Connectivity

IBM Voice Gateway Developer Trial

## Tooling

Web Terminal (open source)  
Skydive – network analyzer (open source)

## HPC / HPDA

IBM Spectrum LSF Community Edition  
IBM Spectrum Symphony Community Edition

## Bring your own

Add a Helm repo or your own charts

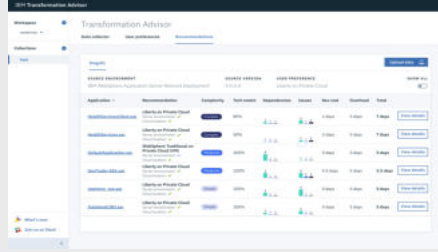
*Catalog content is not distributed with IBM Cloud Private. Content is distributed separately, licensed under separate terms and conditions.*

# Proven Solutions to Accelerate Modernization



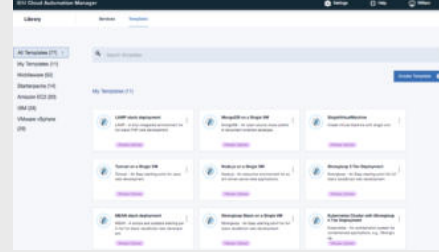
## IBM Cloud Garage

Best Practices  
Reference Architectures



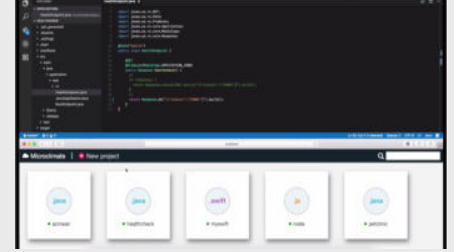
## Transformation Advisor

Assess and Plan  
Prescriptive Guidance



## Cloud Automation Manager

Multi-Cloud Provisioning  
and management



## Microclimate

End-to-End  
Development  
Experience

# IBM Cloud Private Editions

## Community

### Platform

- Kubernetes
- Core services
- Content catalog

**Freely Available  
in Docker Hub**

## Cloud Native

### Platform

- Kubernetes (+ Helm)
- Core services
- Content catalog (Containers)

### Cloud Foundry (Optional)

### IBM Enterprise Software

- Microservice Builder
- WebSphere Liberty
- IBM SDK for node.js
- Cloud Automation Manager

## Enterprise

### Platform

- Kubernetes (+Helm)
- Core services
- Content catalog (Containers)

### Cloud Foundry (Optional)

### IBM Enterprise Software

- Cloud Native Edition, plus:
- + WAS ND
  - + MQ Advanced
  - + API Connect Professional

# Why IBM Cloud Private? It's a differentiating experience

**Public and Private  
Cloud Consistency**

**Enterprise Content  
Catalog**

**Open Innovation  
Platform  
(No Vendor Lock-In)**

**Machine Learning  
and Analytics  
(Watson)**

**Multi-Cloud  
Management and  
Integration**

**Best Practices and  
Prescriptive  
Guidance**

# IBM Cloud Private Services Powered by Cognitive Systems

# IBM Cloud Private Services Powered by Cognitive Systems

## **Middleware, Data, Analytics and Developer Services**

Cloud enabled middleware, messaging, databases, analytics, and cognitive services

## **Core Operational Services**

Simplify Operations Management, Security, and Hybrid integration  
Provision infrastructure and apps across Multi-Cloud environments

## **Kubernetes-based Container Platform**

Industry leading container orchestration

## **Cognitive Systems Infrastructure**

Optimized for the IBM Cloud Private Platform



# Where Cloud Private sits on the Power Cloud Stack

Cloud  
Orchestration  
Solutions

NEW



IBM  
Cloud  
Private



Nutanix  
PRISM



PowerVC family

Cloud and Virtualization Management for Power



Alternate  
OpenStack  
solutions

NEW

OpenPOWER™

KVM

NUTANIX™



Enterprise Power



# IBM Cloud Private

- Full stack private cloud software offering – not an appliance
- Built using industry standard open source projects
- Sits behind your firewall
- Enterprise grade; Open by design; **Accelerated by POWER**



Rapid Innovation



Differentiated  
Integration



Investment  
Leverage



Management and  
Compliance



# Why Sell Cloud Private On IBM POWER?

## Faster and Better Results for You and Your Customer!

### Modernization

#### Accelerate deal closure and increase productivity

- 40%+ of WAS running on Power today
- Large-scale DB2 installs on Power today
- No shift from or investment in additional infrastructure required with P8 or higher
- 57% more containers per server; 45% more throughput
- 1.96X better price-performance

### Cloud Native

#### Bring leadership performance for leading OS DB's to transform client data services

- Leverage incumbency and strong data “gravity” of Power
- Preferred platform for leading OSDB providers i.e. MongoDB, Redis, neo4J, EnterpriseDB
- Bring OSDB ISV technical experts to your clients
- Tap 100 clients wins, refs
- 2x better cost/performance on Power for most OS DBs

### Deep Learning/AI

#### Get new deals and opportunities you can't get to today

- Self service for Data Scientists and Business Analysts
- Training models for AI/Deep Learning built faster with more iterations in less time
- Reduce training time from 9 days to 4 hours
- Get 4x more training iterations with GPUs on POWER compared to x86



## Rapid Innovation



Power  
Systems

### Capabilities

Containers as a Service  
(Kubernetes, Helm)

Platform as a Service  
(Cloud Foundry)

---

Open Standards

Multi-cloud Management

---

Powerful Analytics and  
Machine Learning

---

Unique infrastructure  
solutions optimized for  
Machine Learning / Data / AI;  
Hyperconverged systems

### Business Value

Speed Business Innovation

Rapidly Provision to  
Meet Demand

Avoid vendor lock-in

Choice of deployment

Gain new insights into  
applications

---

2x better overall cost/  
performance for data;  
5-10x faster deep learning;

## Capabilities

## Business Value

API management to unlock and integrate

Connect applications with data and services across all clouds securely

Consistent experience across private/  
public

---

Secure access to  
public cloud services  
(Watson, Blockchain)

Enhance application intelligence  
with public cloud services,  
including Watson integration

---

Proximity to existing  
enterprise data stores;

Near zero latency for data  
integration;

GPUs on POWER in IBM  
the Cloud\*

Short term, on demand  
access to accelerated  
infrastructure



## Differentiated Integration





## Investment Leverage



### Capabilities

### Business Value

Container-based versions of  
IBM Middleware

Reduced cost of managing your  
on-premises IBM middleware

Prescriptive guidance to optimize  
workloads; refactor applications

Faster time to market

---

Work with existing applications, data,  
skills, infrastructure

Cost savings through leveraging  
existing infrastructure investments

Cost savings through leveraging  
existing personnel

---

Large installed base of highly  
available, secure and  
performant Power Systems  
and skilled administrators

Application modernization  
with little or no additional  
investment, simple path to  
modernize infrastructure

## Capabilities

## Business Value

Core operational services, including monitoring, log management and security

Choice of management: leverage integrated set of operational services or integrate with existing tools

Untethered environment

Security with flexibility to choose who manages the platform and infrastructure

Multi-cloud provisioning, orchestration, and management

Choice of deployment

Highly secure virtualization stack and Security portfolio to support private cloud

Security at all layers of infrastructure stack including virtualization and OS



## Management & Compliance

Power  
Systems



# Power with Cloud Private

It's a heterogeneous world – When to leverage Power Systems for Private Cloud?

Examples of Power Benefits

## Application & Infrastructure Modernization



Modernize and optimize existing applications with high performance access to enterprise data

Run on Same CPU as AIX and IBM i Apps for fastest data access

## New Cloud Native Applications



Create new cloud-native applications with Open Source apps and databases

Use Industry Leading OS DB's with 2X Performance

## Deep Learning



Create new ML/DL apps with PowerAI, DSX, Open Source tools

Train 4X+ Faster on P9

# Workloads Best Suited for Power with Cloud Private

Infrastructure solutions for each workload



## Application & Infrastructure Modernization



Power VM

Power VC



## New Cloud Native Applications



IBM Hyperconverged Systems powered by






## Deep Learning



IBM PowerAI



# Improved Container Density at Lower Solution Price

 Acme Air  Open source Docker containers  Websphere Application Server Liberty Profile	IBM Power S822LC for BD (20-core, 512GB)	HP DL380 (24-core, 512GB)
		
<b>Server price</b> -3-year warranty	<b>\$18,080</b>	<b>\$26,711</b>
<b>System Cost</b> Server + WAS Liberty ND Annual Subscription @ \$4,606 per core (3yrs)	<b>\$110,200</b>	<b>\$137,255</b>
<b>Total Throughput (tps)</b>	<b>48,780</b>	<b>33,420</b>
<b>Number of containers</b>	<b>120</b>	<b>76</b>
<b>\$/container</b>	<b>\$919/container</b>	<b>\$1,805/container</b>

1.45X

Throughput per Server

1.57X

Containers per Server

1.96X  
Price-Performance

WebSphere Application Server V9 Liberty on IBM Power S822LC for BD with open source Docker delivers 1.57X more containers and 1.96X *better price-performance* than Intel Xeon E5-2650 v4 Broadwell

1.96X better

\* Results are based on IBM internal testing of single system and OS image running with Acme Air work load (https://github.com/acmeair) on a private network with a dedicated JMETER driver machine and dedicated MongoDB server machine: One MongoDB instance per 8 WAS containers. Each WAS container was bound to a full core to run with 20 users and a 25ms think time between transactions. The number of containers were increased for each system until average throughput dropped below 400 transactions/second or latency exceeded 25ms. Tests were run on November 29th, 2016. Individual results will vary depending on individual workloads, configurations and conditions. IBM Power System S822LC for Big Data; 20 cores / 160 threads, POWER8; 2.92GHz, kernel 4.4.0-12-generic, CPU frequency governor of performance, and hardware prefetch disabled. HP ProLiant DL380, 24 cores / 48 threads; Intel E5-2650 v4; 2.2 GHz; CPU frequency governor of performance, and hardware prefetch disabled. Both configurations ran Ubuntu 16.04, had 512 GB memory, included 1TB SATA 7.2K rpm HDD, 10 Gb 4-port, 1 x 16gbps FCA; Websphere Application Server V9.0 Liberty profile; Java options: -Xms512m -Xmx512m -Xgcthreads8 -Xnoclassgc -Xconcurrentlevel0 -Xdisableexplicitgc; Open source Docker Version: 1.12.0 / API : 1.24 / Go : 1.6.3; Docker storage driver: overlay2 and aufs had similar results. Pricing is based on:





# Designed for data to deliver performance at scale

**4X**  
Threads per core\*

POWER8 SMT8 Hyperthread

x86

Parallel Processing

**4X**  
Mem. Bandwidth\*

Data flow

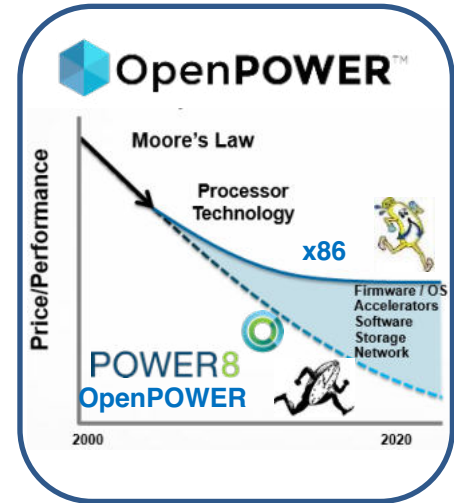
POWER8 NVLINK OpenCAPI

x86 pipe

**4X**  
More cache\* @  
lower latency

POWER8

x86

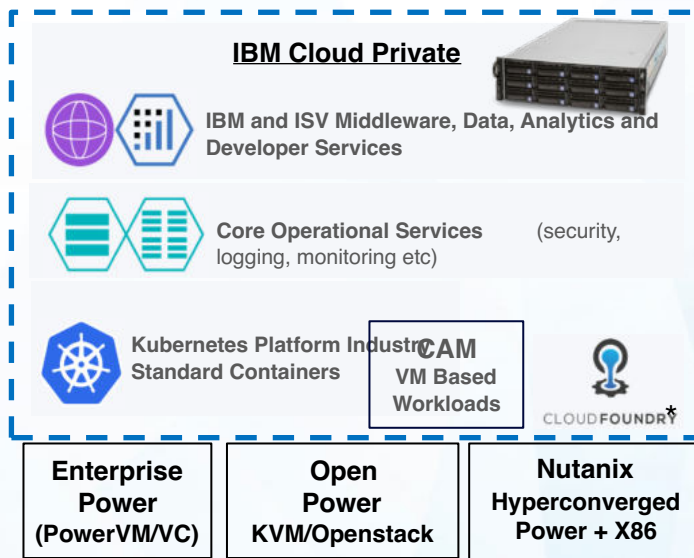


These design decisions result in best performance for data centric workloads like:  
**NoSQL and Relational Databases, Big Data Analytics, OLTP**

# IBM Cloud Private on Power

## Benefits on Power

- Faster Insights for Cognitive Applications
- Better Performance at Lower Cost
- Seamless Modernization alongside AIX and I applications
- Easiest Heterogeneous Cloud to Install and Operate



## Features

- Enterprise grade services
- Enterprise grade operations
- **Open Hardware** and Software by design
- Large and Growing Ecosystem of Applications
- Supports Power, Z, X86 Heterogeneous Clusters



**Enterprise** grade. **Open** by design. **Accelerated by Power**

