

IBM Client Center Montpellier

IBM i 7.4

Hardware, HA/DR, Cloud Computing



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IBM Cognitive Systems - Client Center Montpellier, France

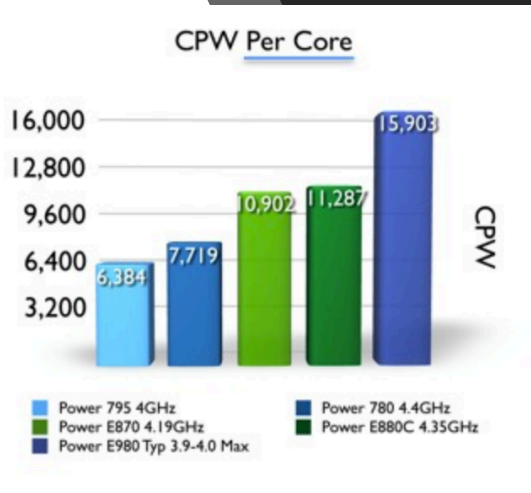
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<https://ibm.biz/bma-wiki>



IBM i 7.4 - Infrastructure

POWER8 vs. POWER9?



POWER8 vs. POWER9 : x1.5 to x2 CPW

- Performance - [Performance Guide May 2019](#)
=> Single-thread Performance (RPG) , Multi-thread (Java, Node.js, Db2 SQE) Performance
- Better HW compatibility (SAN, VIOS)
=> Less technical limitation for consolidation
=> IBM i Storage Matrix Up to date:
<https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4563>
- Improve Business Continuity : Db2 Mirror (RTO Zero), PowerHA , VM Recovery Manager HA or DR , Simplified Remote Restart, BRMS & SWA
- Bring new Hybrid Cloud Features:
 - Cloud backup with BRMS/Cloud (object) Storage
 - Dynamic Infrastructure: Private Cloud & Multi-LPAR
- Bring new Infrastructure open source solutions for AI & Cloud
 - PowerVC (OpenStack), CAM (Terraform)
 - Cloud Service Providers: IBM (4Q19), Google, Skytap, Skytap on Azure, IBM GTS C4i
 - ICP/ K8s for App Modernization

IBM i System Support



| Servers | IBM i 7.2 | IBM i 7.3 | IBM i 7.4 |
|--|-----------|-----------|-----------|
| POWER9 S914, S922 (VIOS only), H922 (VIOS only), S924, H924, E980 | | | |
| POWER8 S812, S814, S822 (VIOS only), S824, E870, E870C, E880, E880C | | | |
| POWER7/7+ 710, 720, 730, 740, 750, 760, 770, 780, 795 | | | |
| POWER7 BladeCenter PS700/701/702/703/704 (all VIOS only) POWER7/7+ Flex p260/270/460 (all VIOS only) | | | |
| POWER6+ 520, 550, 560, 570, JS23/43 (VIOS only) POWER6 520, 550, 570, 595, JS12/22 (VIOS only) | 1 | | |

Current as of 2019-04-23

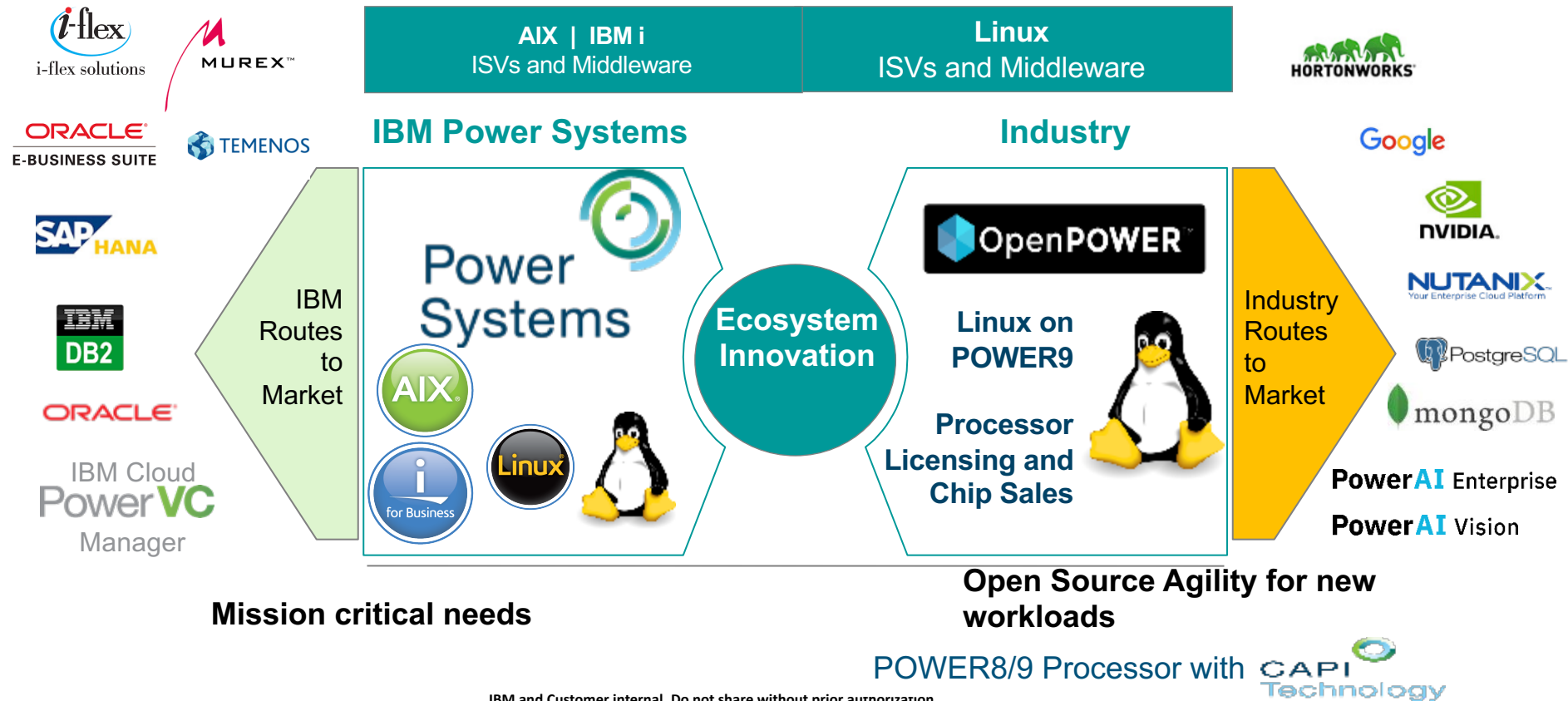
1 – no IOP or HSL support

<http://www-01.ibm.com/support/docview.wss?uid=ssm1platformibmi>

Important Dates and Links

- **IBM i 7.3 TR6 and IBM i 7.4 – Announce: April 23, 2019**
 - Books updated in IBM Knowledge Center
 - Enhancement fact pages added to the IBM i Technology Updates wiki
- **IBM i 7.3 TR6 – GA: May 10, 2019**
- **IBM i 7.4 – GA: June 21, 2019**
 - OS Limits increased for Max Disk Arms (2047 → 3999) and LUN Size (4 → 16TB)
- **Enhancement Landing pages...**
 - <http://www.ibm.com/developerworks/ibmi/techupdates/i73-TR6>
 - <http://www.ibm.com/developerworks/ibmi/techupdates/i74>
 - Ex: Unmap for IBM Spectrum Virtualize / FlashSystems LUNs
- **IBM i 7.2 → No further enhancements**

Power Opens to all Ecosystems for Innovation



POWER9 Systems Portfolio Designed to Fuel Innovation

Power Enterprise Systems

S922/S914/S924
H922/H924
Q1 2018



Power E950
3Q18



Power E980
3Q18



Mission Critical Workloads

LC922/LC921
2 Socket
Linux only
2Q 2018



Big Data Workloads

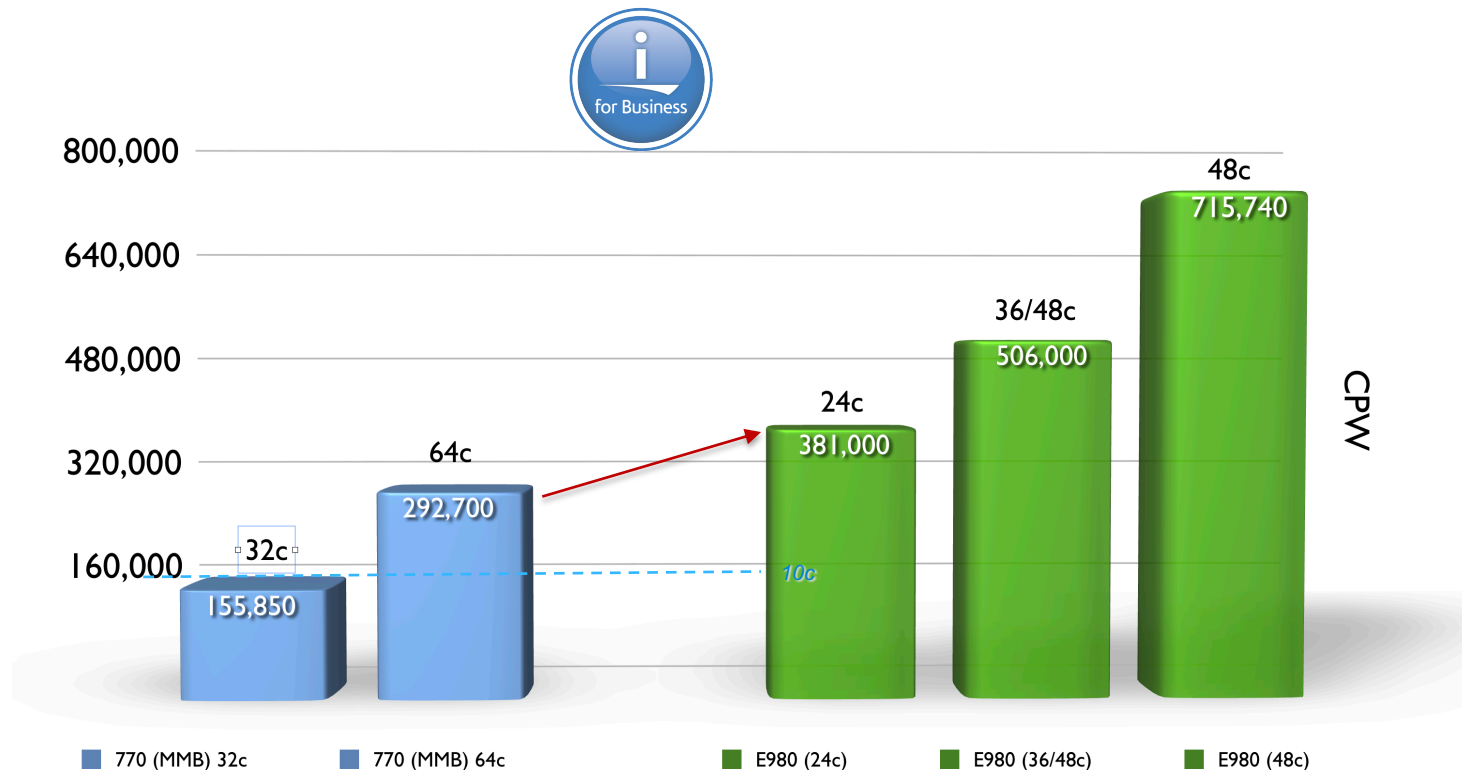
AC922
Q4 2017



Enterprise AI Workloads

A 24-core Power E980 is an ideal replacement for a POWER7 Power 770 with up to 64 cores

Improve response time and deliver over 30% more throughput (CPW), with less than ½ the cores.



POWER8 & POWER9 High-end Offerings

POWER8

Power E880C
48-192 cores

Power E880C
40-160 cores

Power E880C
32-128cores

Power E870C
32-64 cores

Power E980
48-192 cores

Power E980
44-176 cores

Power E980
40-160 cores

Power E980
32- 128 cores

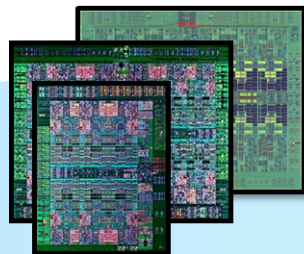
New!

Power E980
24-96 cores

POWER9

- ✓ Lower entry price for E980
- ✓ Up to 4 nodes vs. E870's 2 node max

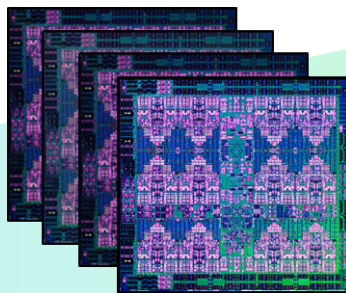
POWER Processor Technology Roadmap



POWER8 22nm

- Up to 12 Cores
- SMT8
- CAPI Acceleration
- High Bandwidth GPU Attach

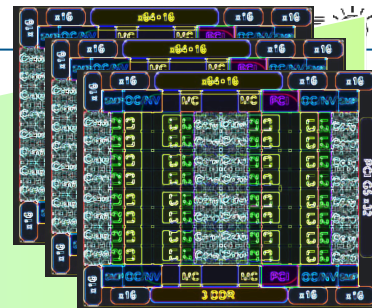
1H14 – 2H16



**POWER9 Family
14nm**

- Enhanced Core Optimized for Emerging Workloads
- Scale-Up and Scale-Out Optimized Silicon
- Premier Platform for Accelerated Computing
- *P9' :*
 1. *Advanced Memory Technologies - Non Volatile Memory (NVM) or Storage Class Memory (SCM)*
 2. *Secure VMs or Containers*
 3. *Enhanced Accelerator Interfaces: NVLINK3.0 & OpenCAPI4.0*

2H17 – 2H20



**POWER10 Family
7nm**

Performance and Capacity

- Thread Strength Optimize for Application Performance
- Core Performance & System Capacity Increase
- Significant performance/watt improvements

Accelerator and I/O Interfaces

- NVLink 3.0 at High Bandwidth
- PCI Gen 5

Security and Trust

- Memory Encryption at high bandwidth
- Fine Grained Secure Containers (SMF)

AI/ML/DL

- Inferencing Engine ML/DL
- Enhanced SIMD performance

2021 -

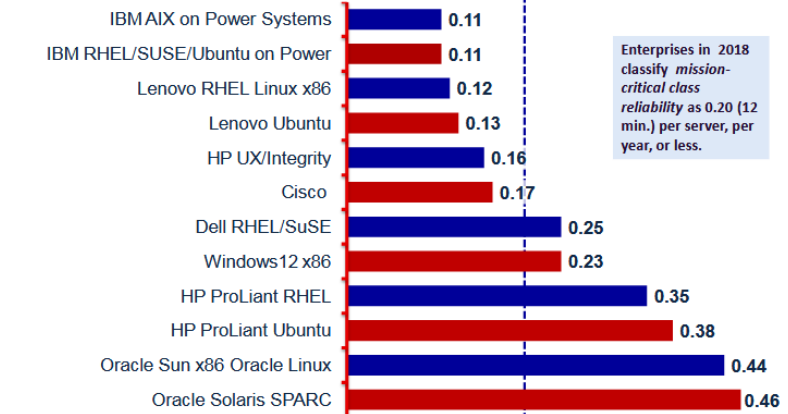
HA/DR?



Ranked Number 1 in every
major reliability category by
ITIC

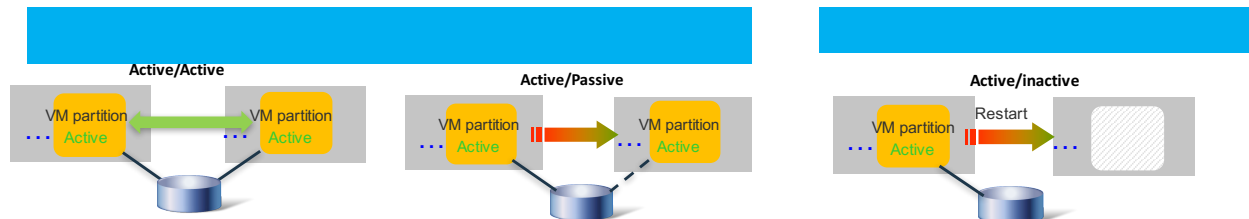


Unplanned Downtime in 2017 - 2018 (Hours per Year)



“IBM POWER8-based processor systems and the latest POWER9 servers provide several key feature/function advantages that advance reliability and enable customers to lower Total Cost of Ownership (TCO) and achieve near-immediate ROI.”

High Availability topology classification & positioning



| Technology | Active/Active Clustering | Active/Passive Clustering | Active/Inactive |
|-------------------|---|---|--|
| Definition | Application level clustering; applications in the cluster have simultaneous access to the production data therefore no app restart upon an app node outage. Certain types enable read-only access from secondary nodes | OS level clustering; one OS in the cluster has access to the production data, multiple active OS instances on all nodes in the cluster. Application is restarted on a secondary node upon outage of a production node. | VM level clustering, One VM in a cluster pair has access to the data, one logical OS, one or two physical copies. OS and applications must be restarted on a secondary node upon a primary node outage event. LPM enables the VM to be moved non-disruptively for a planned outage event. |
| Outage Types | SW,HW,HA, planned, unplanned RTO 0, limited distance | SW,HW,HA,DR, planned, unplanned, RTO>0, multi-site | HW,HA,DR, planned, unplanned, RTO>0, multi-site |
| OS integration | Inside the OS | Inside the OS | OS agnostic |
| RPO | Sync mode only | Sync/Async | Sync/Async |
| RTO | 0 | Fast (minutes) | Fast Enough (VM Reboot) |
| Licensing* | N+N licensing | N+1 licensing | N+0 licensing |
| Industry Examples | Oracle RAC, Db2 Mirror , pureScale | PowerHA, Redhat HA, Linux HA | VMware, VMR HA, LPM, |

- N = number of licensed processor cores on each system in the cluster
- Illustrations represent two-node shared-storage configurations for conceptual simplicity. There are many other topologies and data resiliency combinations

Power Systems Latest HA/DR offerings & positioning

| Pain point | Desired Outcome | Solution Offering | Technology | Benefit | Considerations |
|---|--|--|--|--|--|
| Down time for software maintenance | mission critical HA solution requiring minimal admin | PowerHA | shared/replicated storage based clustering | all outages; planned and unplanned are covered | -cluster admin -multiple data -active standby OS's -vary-on time |
| DR compliance testing is labor intensive and disruptive | simple DR solution requiring no admin | GDR | replicated virtual machine restart | low cost simple to use automates DR operations | -full frame restart -replicated copies of VMs -reboot time |
| admin required to manage clustering | simple HA solution requiring no admin | PowerVC / SRR | virtual machine restart | low cost simple to use automatic restart | -full frame restart -single copy of VM -primarily CEC outage -reboot time |
| Tape backup operations and off site storage | low cost alternative to local tape drives | IBM Cloud Storage Solutions for I | cloud object data containers | low cost automated off-site archive and backups | -bandwidth requirements -total restore time |

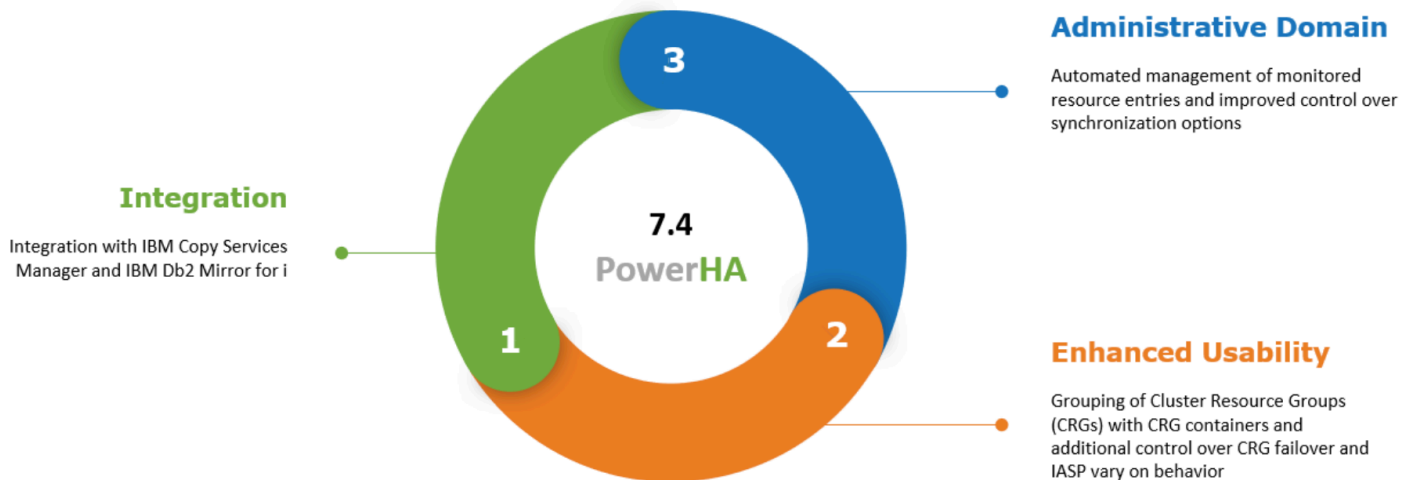
PowerHA
Clustering

GDR
*Replicated
VM Restart*

SRR
VM Restart

Tape Backup
*Minimal downtime
with Flashcopy*

PowerHA on IBM i 7.4 - Enhancements



IBM PowerHA SystemMirror for i enhancements (IBM i 7.4 BASE, not available on 7.2/7.3):

- ☐ Support for DS8000 HyperSwap with a Global Mirror link
- ☐ Automation of administrative domain operations (PowerHA Policies)
- ☐ Support for disaster recovery of a Db2 Mirror deployment
- ☐ Support for replication of IFS data in a Db2 Mirror deployment
- ☐ For more details, see the [PowerHA 7.4 Wiki page](#)

IBM Db2 Mirror for i

Operating System Synchronous Replication

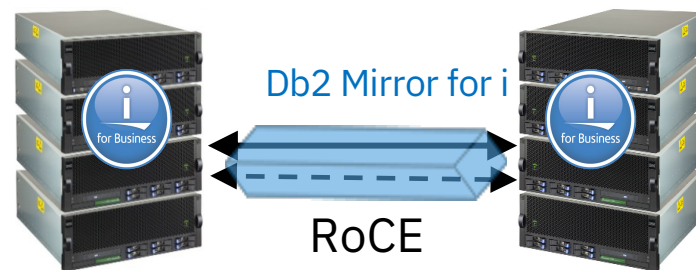
Continuous Availability

24 x 7 Up Time

Rolling Upgrades

RTO/RPO Near Zero

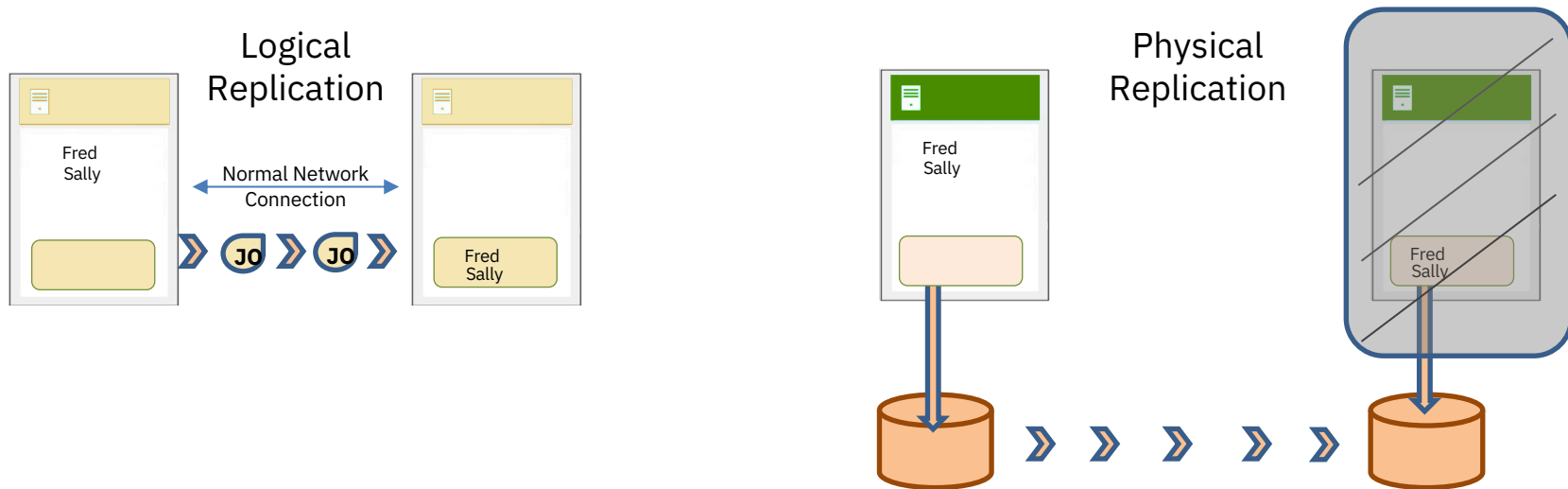
IBM Db2 Mirror for i (5770-DBM)



POWER8 or later & IBM i
7.4
+ External Storage

Db2 Mirror – What makes it different

- IBM i Operating System synchronization technology
- Does not leverage any previous Availability technology to provide continuous availability
 - But does work with existing technology



Cloud Computing



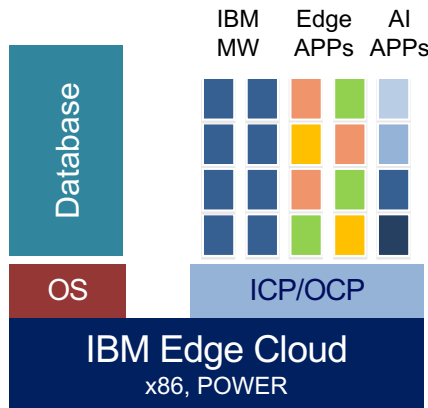
IBM Enterprise Cloud Strategy

IBM Cloud Strategy delivers faster time to value, lowers development and operational costs

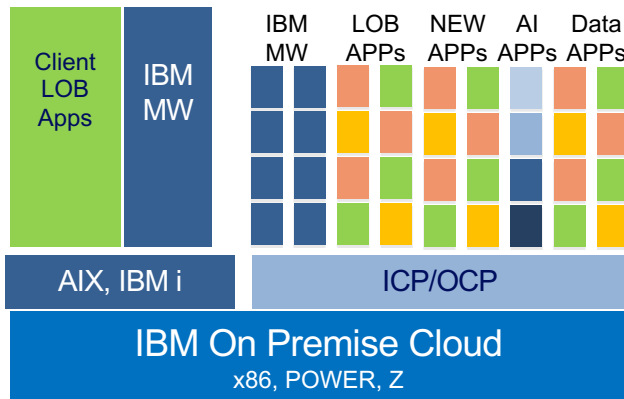


Develop Once – Deploy Anywhere – Operate Everywhere

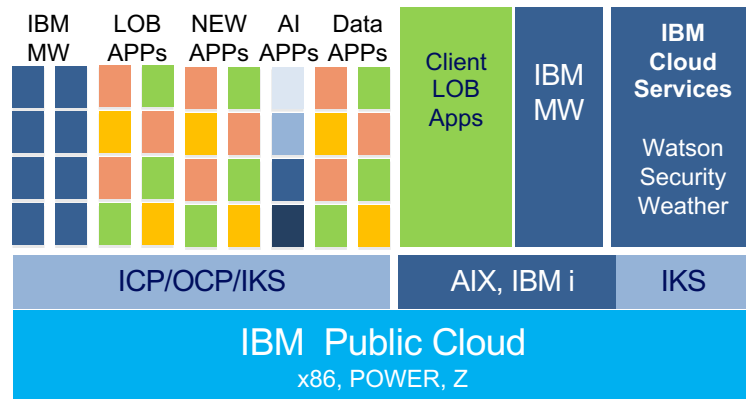
Distributed



On-Premise



Public



Enterprise Grade Infrastructure – *Runs All Your Apps*
Built from Open Source – *No Technology Lock-in*
Reliable, Extensible, Scalable – *Grows with You*
Multicloud enabled – *Goes anywhere you need*



ICP Multicloud Manager

Single dashboard to manage all of your clusters: Public, Private and Distributed



Hybrid Multicloud Solutions on Power Systems



Business need:
Increase flexibility,
competitiveness and
reduce costs



Enterprise Pools

Capacity on Demand

Cloud Management
Console

Business need:
On-premises, cloud-
like provisioning,
agility, simplicity



IBM PowerVC

IBM Hyperconverged
Systems (Nutanix)

Business need:
AIX, i, Linux workloads
on Power in
Public Cloud



IBM Cloud
Power Systems Virtual Server

IBM Cloud Next Gen
Accelerated Virtual Priv. Cloud

Google Cloud
Power Infra.-as-a-Service

Partner Clouds
(Skytap, Nimbix, +++)

Business need:
Modernize existing
apps, build new
cloud-native, AI apps



IBM Cloud Private

Red Hat OpenShift

IBM Cloud Private
for Data

Business need:
Simplify management
of multiple clouds
(private & public)



IBM Cloud Automation
Manager

VMware vRealize

IBM Multicloud Manager

Automation

Agility

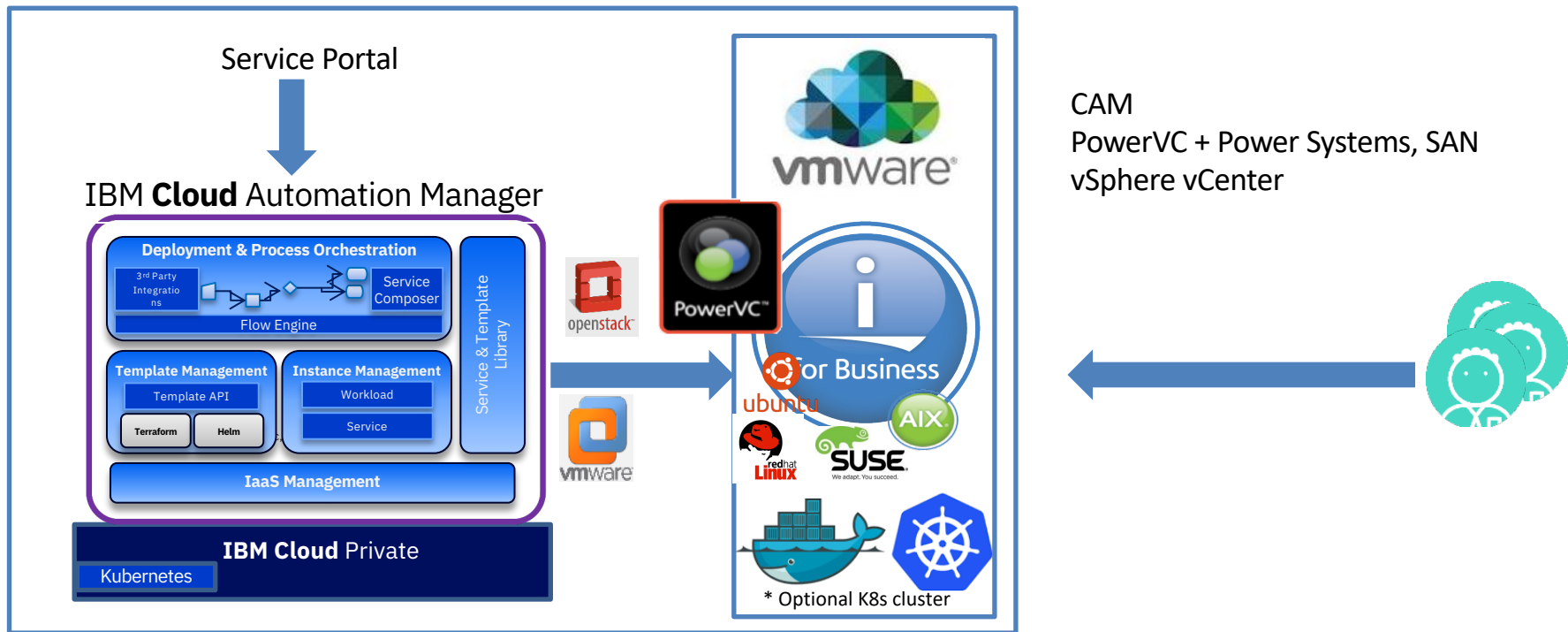
Innovation

Where are you in your cloud journey?

*We'll meet you where you
are and help you get
to where you want to be!*

- Discovery workshops
- Cloud workshops
- IBM Garage services
- Lab Services implementations
- Power Developer Cloud
- Power Systems Entry for ICP
- Power to Cloud Rewards
- Cloudcare funding for PoCs

1 - Private Cloud on Power – Cloud Automation Manager

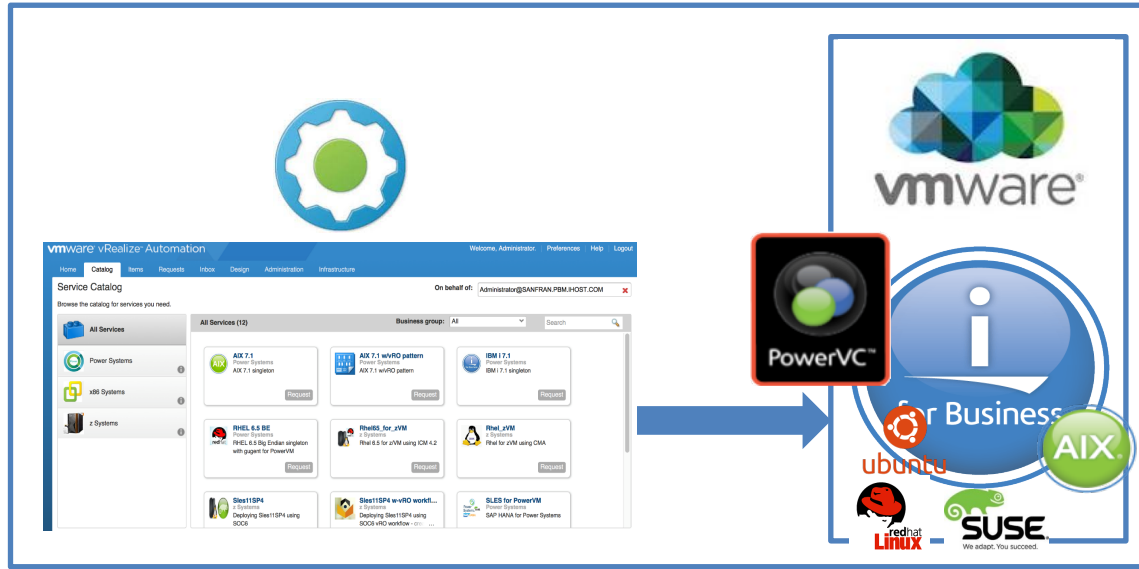


Demo CAM+ PowerVC IBM i : Video - <https://ibm.box.com/v/ibmi-powervc-cam-icp-demo1>

Demo CAM+ VMWare vCenter. [Service composition in IBM's Cloud Automation Manager](#)

**Optional - Demo CAM + IBM Cost & Asset Management + AWS <https://ibm.ent.box.com/s/2yre7wjvs5uz97lr543xt8vkn6ieiva6>

2- Private Cloud on Power – VMWare vRealize



vRealize Automation
+ Optional vRealize Operations for Power)
PowerVC + POWER7,8,9 + SAN
vSphere vCenter

vRealize Automation

- [What's new in 7.5](#)
- [Demo \(Youtube\) with Power](#)
- [Technical Article - vRA + PowerVC](#)

vRealize Operations for Power

- [Announcement.](#)
- [vROps for Power Technical Article](#)
- [IBM Product Page](#)
- [Product Download](#)
- [*Optional Storage Plugin](#)

Hybrid Multicloud Solutions on Power Systems



Business need:
Increase flexibility,
competitiveness and
reduce costs



Enterprise Pools

Capacity on Demand

Cloud Management
Console

Business need:
On-premises, cloud-
like provisioning,
agility, simplicity



IBM PowerVC

IBM Hyperconverged
Systems (Nutanix)

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AIX, i, Linux workloads
on Power in
Public Cloud



IBM Cloud
Power Systems Virtual Server

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Partner Clouds
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IBM Cloud Private

Red Hat OpenShift

IBM Cloud Private
for Data

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Simplify management
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IBM Cloud Automation
Manager

VMware vRealize

IBM Multicloud Manager

Automation

Agility

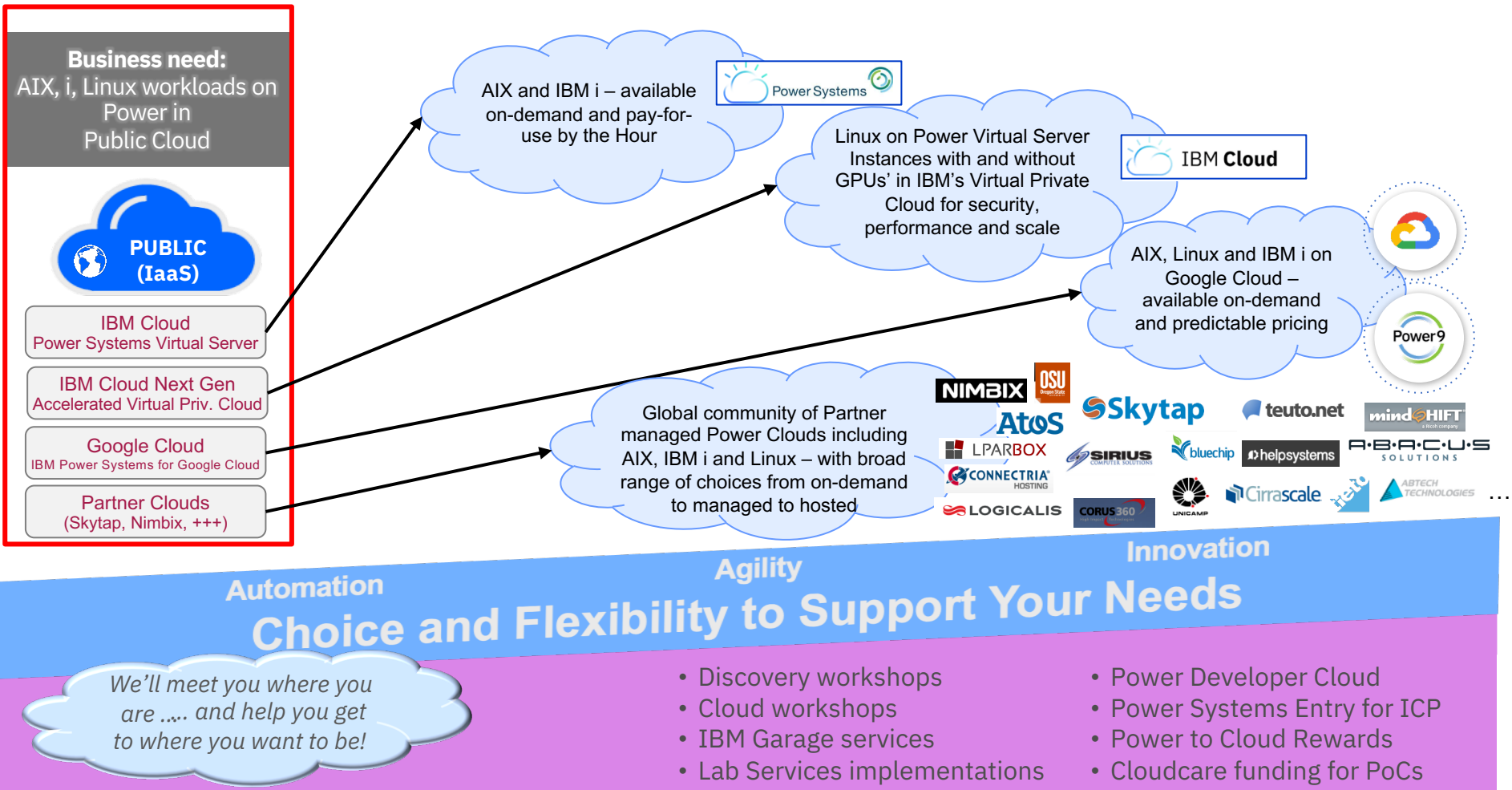
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- Cloudcare funding for PoCs

Public Cloud Solutions on Power Systems



IBM Cloud Roadmap for Power

Target 2020

Public

- Robust Enterprise Cloud
- Premier AI Cloud Capabilities
- Deploy Existing Enterprise Apps
- Extend with Cloud Native Apps
- Best Price/Performance Platform

Target 3Q2019

IBM Next Generation Enterprise Cloud

Public

- Scale Out P9 with GPU's Fully integrated into Next Gen
- Same Virtual Private Cloud(VPC) function for Linux KVM, Container, Storage, and Networking on X86 and Power
- Mixed X86 and **Power Systems** in the same account
- Integrated in IBM Kubernetes Service (managed)
- Supports hosted IBM Cloud Private with a Rich App Catalog

IBM Next Gen Enterprise Cloud

Scale-Up P9 with AIX and IBM i Fully integrated into Next Gen Cloud
Same VPC Experience for VM, Storage, and Networking
Mixed X86 and Power Systems in the same account
Run Existing Enterprise Apps
Full Native Access to IBM Cloud Resources/Services

Target 2Q2019

IBM Cloud Gen 1: AIX and IBM-i

Public

- Runs the most demanding **IBM AIX and IBM i** applications with complete equivalence to on-Prem with FC-SAN
- Integrated into the IBM Cloud Experience for Purchasing and Managing VM, Network and Storage
- Tie into other IBM Cloud Resources via Direct Link



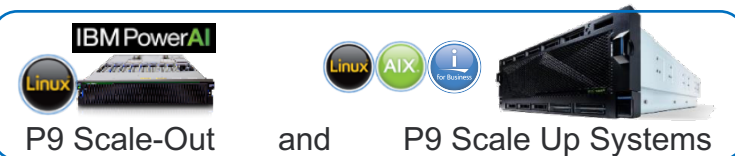
Shipping Today

IBM Cloud Private/ RH OpenShift

On Premise

- Open, Supported Linux Kubernetes with Containers
- Integrate and Manage Existing **AIX/IBMi VM Apps**
- Fully Supports all P8 & P9 Servers
- Modernize Existing Apps, and Create New Cloud Native apps with the Fastest DB's in the Industry
- Infuse AI and Cognitive Apps with the Fastest GPU Accelerated Servers in Industry

All P8, P9 Systems



P9 Scale-Out

and

P9 Scale Up Systems

Integrate Existing Enterprise Apps + Cognitive, AI and Cloud Native Technologies:

- In IBM's Cloud or Yours
- Connected to work together
- Accelerated by Power

IBM POWER9 on IBM Cloud: More Choice and Flexibility, On- Premise and Off



<https://www.ibm.com/blogs/bluemix/2019/02/ibm-power9-on-ibm-cloud/>

IBM Offering

Offering Name:

IBM Power Systems Virtual Server on IBM Cloud

Offering Description:

A user can purchase an AIX or IBM i Power VM-based Virtual Machine-as-a-Service on IBM Cloud. IBM manages up to OS deployment and the client self-manages the OS and up. Our users can purchase the offering through Cloud consumption-based pricing plans available through IBM Cloud Catalog.

MVP Offering:

Systems: **S922 or E880**

Compute: **0.25-143 cores (15 for S922, 143 for E880/980), Dedicated or Shared option**

Memory: **8-64 GB per core**

Storage Type: **Type: Tier 3 (HDD) or Tier 1 (SSD)**

Storage Quantity: **10 GB minimum / 2 TB maximum per disk, 10 GB increments**

Network: **Public and/or Private IP**

OS: **AIX / IBM i**

More details [Here](#)

IBM Offering Costs

| US Hourly | US Monthly | Metric | Element |
|-----------|------------|--------------------|-------------------------------|
| \$0.161 | \$117.69 | per core per month | Scale Out Shared (\$922) |
| \$0.645 | \$470.74 | per core per month | Scale Out Dedicated (\$922) |
| \$0.434 | \$316.85 | per core per month | Enterprise Shared (E880) |
| \$1.736 | \$1,267.38 | per core per month | Enterprise Dedicated (E880) |
| \$0.015 | \$11.11 | per GB per month | Memory (std price) |
| \$0.023 | \$16.67 | per GB per month | Memory (High Use, >64GB/core) |
| \$0.040 | \$29.00 | per core per month | AIX Small |
| \$0.108 | \$79.00 | per core per month | AIX Medium |
| \$1.370 | \$1,000.00 | per core per month | IBM i OS P10 |
| \$3.014 | \$2,200.00 | per core per month | IBM i OS P30 |
| \$0.548 | \$400.00 | per core per month | IBM i LPP P10 |
| \$1.205 | \$880.00 | per core per month | IBM i LPP P30 |
| \$0.00027 | \$0.200 | per GB per month | Tier 1 Storage (SSD) |
| \$0.00014 | \$0.100 | per GB per month | Tier 3 Storage (HDD) |

More details [Here](#)

Offering Name:

IBM Power Systems Virtual Server on IBM Cloud

Offering Summary:

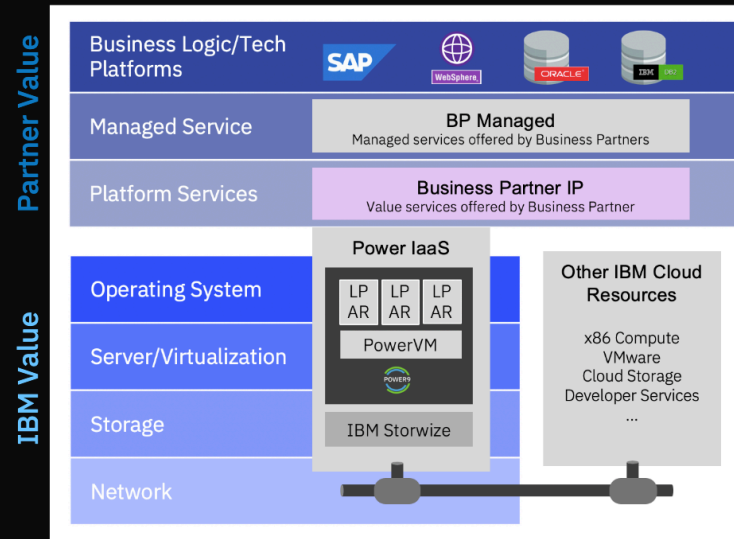
- Power and IBM Cloud co-owned offering through IBM Marketplace
- S922 and E880/E980 based virtual systems with v7K based storage
 - Power compute as-a-service

Offering Logistics:

- Client purchases through the IBM Marketplace w/ UI or via scripts for larger/internal contracts – extend geographical reach and scale of existing partner solutions built on IBM Power Systems
- Flexible offering – Client selects # cores, type of cores, storage, Operating System, etc.

Offering Timeline:

- WDC and Dallas PODs in 2Q19
- Expand to Europe (Frankfurt) in 3Q
- Continue expansion into GEOs and increase capacity in existing PODs as demand drives



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

More details [Here](#)

Offering Roadmap

- Availability
- Specifications

Q2
'19

Q3
'19

Q4 '19 - 1H2020

(May) Beta in WDC

- US East availability (Washington DC)
- E880 and S922 LPARS (PowerVM based) w/ IBM storewide v7000 storage (SSD and Disk)

(June 15) General Availability (US East / South)

- US East and South (Dallas) availability

Post-GA Geo Expansion

- September Frankfurt availability (Multi Datacenter HA)
- E980 available in FRA

Post-GA Functionality

- Terraform Provider

Post-GA Compliance

- HIPPA Readiness

Geo Expansion

- Consequent rapid expansion into other Geos (UK, TOR, AP and beyond)

Future Functionality

- Integrated DRaaS
- Backup as a service
- Linux on PowerVM

Future Compliance

- SOC2
- ISO 27001

Resource list /

P

Power Systems Virtual Server - us-east

Resource group: Default Location: Washington DC demo

Power Infrastructure

Getting started

- Overview
- Documentation
- CLI

Compute

- Virtual Instances
- SSH Keys

Storage

- Data Storage Volumes
- Boot Images

Network

- Subnets

Virtual Server Instances

Refresh Provision New

LOCATION

RESOURCE GROUP

All locations All resource groups

| Status | Name | Resource Groups | Location | IPs | Image | CPU | RAM |
|--------------------|---------------------------|-----------------|----------|-------------|----------------|-----------|------|
| <div></div> BUILD | test-vm-1 | | us-east | | eab9c2ab-68... | 1.25 ... | 2 GB |
| <div></div> ACTIVE | test-vm-2 | | us-east | 172.16.1.17 | eab9c2ab-68... | 0.25 ... | 2 GB |
| <div></div> ACTIVE | test-vm-3 | | us-east | 172.16.1.8 | eab9c2ab-68... | 0.25 ... | 2 GB |
| <div></div> ACTIVE | test-vm-4 | | us-east | 172.16.1.20 | 1d7c8f91-78... | 1 cores | 2 GB |
| <div></div> ACTIVE | test-vm-5 | | us-east | 172.16.1.13 | eab9c2ab-68... | 0.25 ... | 2 GB |
| <div></div> ACTIVE | test-vm-6 | | us-east | 172.16.4.5 | 66e82742-d2... | 0.5 co... | 4 GB |
| <div></div> ACTIVE | test-vm-7 | | us-east | 172.16.1.38 | eab9c2ab-68... | 0.25 ... | 2 GB |
| <div></div> ACTIVE | test-vm-8 | | us-east | 172.16.1.35 | eab9c2ab-68... | 1.25 ... | 2 GB |
| <div></div> ACTIVE | test-vm-9 | | us-east | 172.16.1.12 | 4a86244d-28... | 1 cores | 2 GB |

Items per page: 10 | 1-9 of 9 items

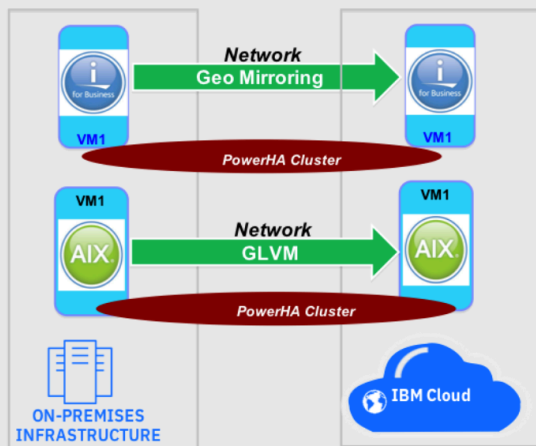
1 of 1 pages

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Disaster Recovery using OS-based mirroring

Scenario-1: Customer can use OS capabilities to setup DR backup site in Power public cloud

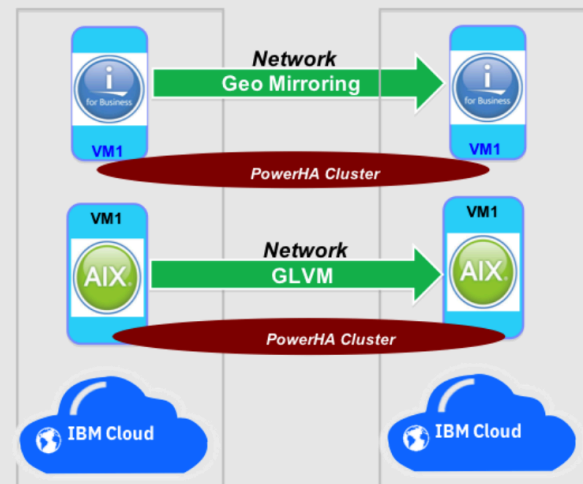
- *IBM I: geomirroring capability allows for OS to OS mirroring across distance*
- *AIX: GLVM allows for OS to OS mirroring across distance*
- Independently or recommended with Power HA EE



Scenario-1: Illustrates Private to Public Cloud: DR solution

Scenario-2: Customer can deploy across IBM Cloud regions

PowerHA Enterprise Edition can be used to do DR across Washington and Dallas



Scenario-2: Illustrates Public to Public Cloud DR solution

Note: Scenarios assumes use of Power HA Enterprise Edition.

Disaster Recovery Scenarios (Other Replication Methods)

Customer can implement other replication methods(log replication) as in line with software capabilities(database, applications).

Common options include

- Oracle Data guard

- <https://www.oracle.com/database/technologies/high-availability/dataguard.html>

- DB2 HADR

- <https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/DB2HADR/page/HADR%20Tutorial>

- MiMix

- <https://www-356.ibm.com/partnerworld/gsd/solutiondetails.do?&solution=11871>

- Rocket iCluster

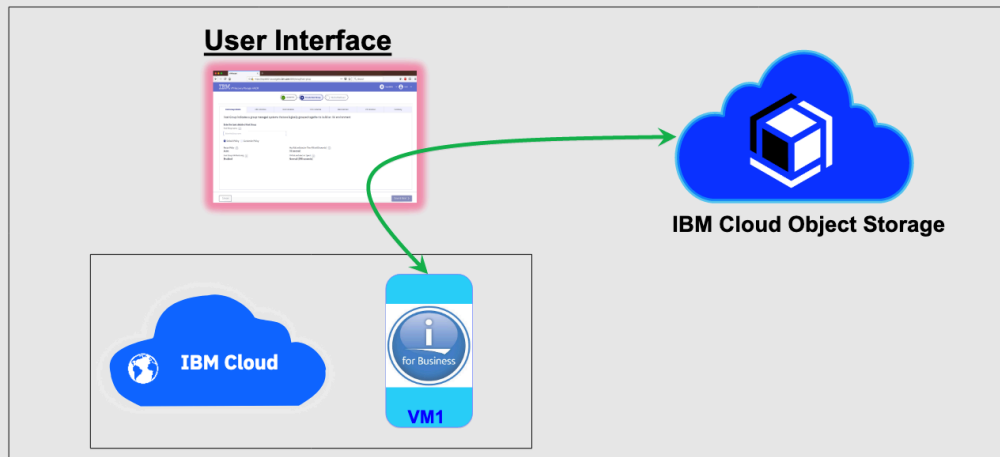
- <https://www.rocketsoftware.com/products/rocket-icluster>

* Follow best practices as documented by the vendor

Backup/Restore Scenario for Clients

Scenario-1: UI based backup/restore

- *Volumes (disks) can be backed up or restored*
- *Entire VM can be backed up*

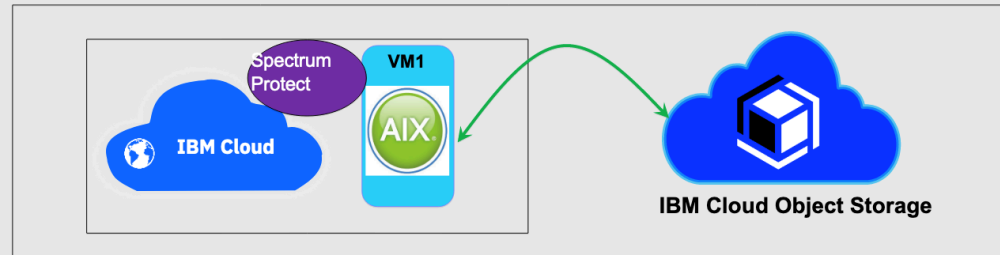


Scenario-1 Diagram: Backup/Restore Disks or entire VM image

Scenario-2: Spectrum Protect

- *Object level/File level backup/restore*
- *Fine granular automated policies*

Note: Requirements for each Client's Backup and Restore capabilities will vary based on defined architecture. These capabilities require IBM Cloud Object Storage and potentially a VSI that can host management software.



Scenario-2 Diagram: Backup/Restore objects from OS (files, file system etc)

Sample Migration Techniques

- IBM Cloud Mass Data Migration (MDM)

<https://www.ibm.com/cloud/mass-data-migration/faq>

- IBM Cloud Object Storage (ICOS)

<https://www.ibm.com/cloud/object-storage/faq>

- Data migration with IBM CloudData migration with IBM Cloud

<https://www.ibm.com/cloud/data-migration>

- Host/Database Replication

- Databases/Applications (Oracle data guard/golden gate, etc)
- MIMIX, etc

- Other Third Party Vendors

IBM Cloud Storage Solutions ([5733ICC](#))



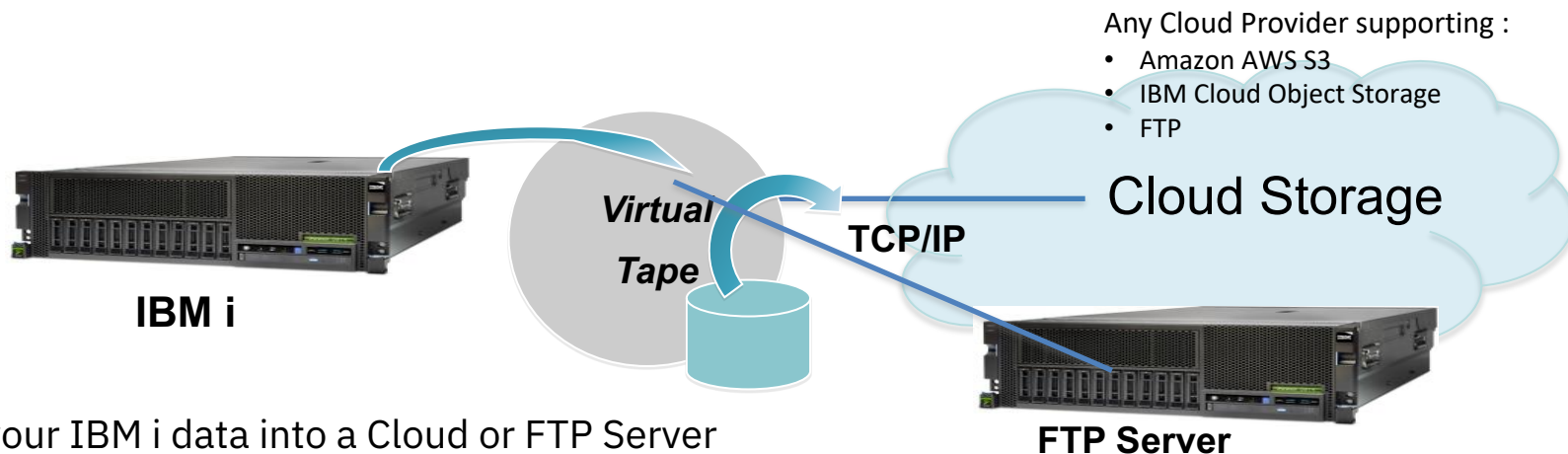
- Today
 - Tape Drives
 - Tapes are then shipped to offsite location
 - Disaster Recovery
 - Tapes need to be shipped back
- Why not remove the tape drive from the equation
- Send the backup 'directly' to an off site location



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IBM Cloud Storage Solutions for i ([5733ICC](https://www.ibm.com/support/knowledgecenter/ssw_ibm_i_73/icc/topics/iccuoverview.htm))



- Two modes
 1. BRMS to Cloud for backup operations
 2. GUI dashboard for storing files in the Cloud (think of BOX-like usage cases)

http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_73/icc/topics/iccuoverview.htm

Introducing IBM Power Systems for Google Cloud (Cloud Next '19)

https://www.youtube.com/watch?v=_0ml4AwewXo



HYB221: Introducing IBM Power Systems for Google Cloud

Carl Burnett, Distinguished Engineer,
Andy Waddell, Technical Program Manager,
Kyle Johnson, Senior Engineer, IBM

Google Cloud



0:07 / 35:31

Scroll for details



IBM Power Systems for Google Cloud

An IBM solution available on GCP marketplace

Offering Overview

Power Infrastructure as a service

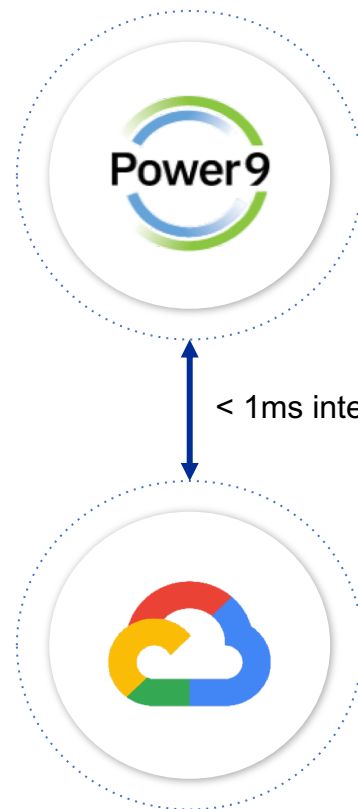
Capacity via monthly subscription ... “cloud instances”

A GCP-aligned user experience for VM management

Private, low-latency access to GCP resources

IBM runs the infrastructure, Clients manage the OS and up

One consolidated monthly billing by Google Cloud



IBM Power Systems Infrastructure

PowerVM

AIX, IBM i, Linux

Traditional Power Workloads:
DB2, Oracle, SAP, WebSphere ...

GCP Services

X86 Compute

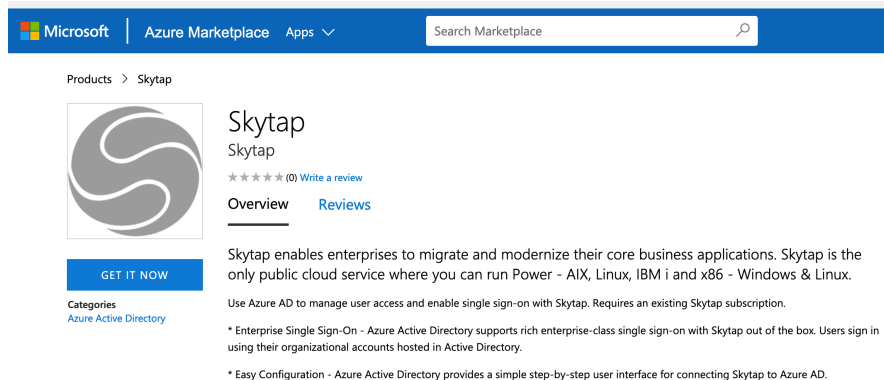
Storage

Networking

Analytics

IBM i / AIX on Skytap

IaaS Offering in Skytap datacenters, now extended to Microsoft Azure



*« Microsoft is buying IBM Power Systems Model S922,
and will deploy them in its US-East data center »*

<https://azuremarketplace.microsoft.com/en-/marketplace/apps/aad.skytap?tab=Overview>

<https://www.itjungle.com/2019/09/11/ibm-i-headed-to-azure-by-way-of-skytap/>

<https://www.youtube.com/watch?v=LbaztC5ekGU>

Montpellier Cognitive Systems Lab

Manager : Philippe Chonavel

Coordinator : Alain Roy

Team PowerAI ATS Europe

Jean-Armand Broyelle

Regis Cely

Sebastien Chabrolles

Sylvain Delabarre

Maxime Deloche

Benoit Marolleau

Team CAPI/SNAP (FPGA)

Bruno Mesnet

Alexandre Castelane

Fabrice Moyen

Team HPC

Ludovic Enault

Pascal Vezolle

Montpellier Client Center (France)

Our Offerings

Technical Consultancy & Assistance

Co-Creation Lab Workshops

Hands-On Technical Enablement

Demonstration/PoT

PoC/Benchmark



| Offering | Description | Consumption | Management |
|--|---|-------------------------------|---|
| <u>POWER8 Bare Metal</u> | Dedicated bare metal 1 socket, 8/10 core systems available in Dallas, TX. Ubuntu 14 | Monthly | SoftLayer IMS Managed |
| <u>PowerAI</u> in IBM Cloud | On-demand access to GPU supported PowerAI framework | Hourly | PaaS and IaaS, easy access to PowerAI environment |
| <u>IBM Cloud Skytap Services for AIX</u> | Skytap hosted and managed service sold by IBM, available in NA, EMEA and planned to expand globally | Monthly, with annual contract | Fully managed environment, built in response to client demand |
| <u>IBM Cloud Managed Services for IBM i</u> | Custom-built in response to client demand; Limited GEO availability, more locations planned | Monthly, with annual contract | Fully managed environment, built in response to client demand |
| <u>POWER9 with GPUs*</u> *Coming in 3Q 2019 | Foundation for GPU-accelerated services in the IBM Cloud; Containerized services coming later | Hourly or monthly | Fully supported infrastructure; services client-managed |

IBM Cloud Roadmap for Power Systems

| Today | 2Q 2019 | 3Q 2019 | 2020 |
|--|--|---|--|
| IBM Cloud Private | IBM Cloud: AIX & IBM i | Next Generation Cloud | Next Generation Cloud 2.0 |
| <p>Open, supported Linux Kubernetes with containers</p> <p>Integrate and manage existing AIX/IBM i VM apps</p> <p>Fully supports all POWER8 and POWER9 servers</p> <p>Modernize existing apps and create new cloud native apps with the fastest DBs in the industry</p> <p>Infuse AI and cognitive apps with the fastest GPU accelerated servers in industry</p> | <p>Runs the most demanding IBM AIX and IBM i applications with complete equivalence to on-prem with FC-based SAN</p> <p>Integrated into the IBM Cloud experience for purchasing and managing VM, network and storage</p> <p>Tie into other IBM Cloud resources via direct link</p> | <p>Scale Out P9 with GPUs fully integrated into next Gen</p> <p>x86 & POWER: same Virtual Private Cloud (VPC) function for Linux VM, container, storage, and networking</p> <p>Integrated in IBM kubernetes service (managed)</p> <p>Supports hosted IBM Cloud private & rich app catalog</p> | <p>Scale-Up P9 w/ AIX and IBM i</p> <p>Fully integrated into Next Gen cloud and storage</p> <p>Same VPC experience for PowerVM, storage and networking</p> |

IBM Power Systems Virtual Server on IBM Cloud

Offering Highlights

<https://cloud.ibm.com/catalog/services/power-systems-virtual-server>

Offering Summary:

- AIX and IBM i Virtual Servers available on-demand, priced monthly
- Flexible sizing with sliding scale configuration for number of cores, type of cores (dedicated / shared), memory, storage, etc.
- Purchase through the IBM Marketplace, API enabled for programmatic fulfillment of established contracts
- Systems exist in IBM Cloud colocation site; DirectLink services available for integration with on-prem and other IBM cloud resources

Best fit for:

- Clients looking for hybrid cloud flexibility for Power hardware
- Clients looking to lower costs and continue to leverage existing skills
- Clients wanting to off-load some OS and infrastructure management
- VARs, ISVs and MSPs looking to resell, hosting or managed services

Typical Use Cases:

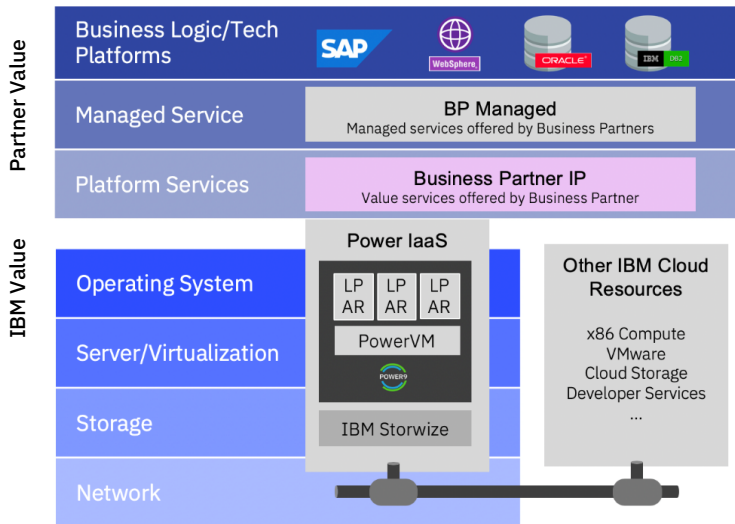
- Dev/Test environment
- Temporary compute for cyclical spikes in demand
- Move business critical apps to the cloud for hybrid cloud flexibility
- HA/DR on cloud as alternative to second datacenter
- Backup to the cloud for archive of less frequently accessed data
- Host AIX and IBM i apps as a Service (ISVs, VARs, MSPs)

US : Available now

Europe : Frankfurt 4Q 3019 , etc.

Power Pods with S922 and E980

Up to 160 cores • Up to 7 TB RAM • Choose of AIX or IBM i OS • Fiber Attached IBM Storwize V7000 Storage



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

IBM i Software Included

- Base OS
- 5770-DG1: HTTP Server for i
- 5770-JV1: Developer Kit for Java
- 5770-NAE: Network Authentication Enablement for i
- 5733-SC1: Portable Utilities for i
- 5770-TC1: TCP/IP
- 5770-TS1: Transform Services for i
- 5770-UME: Universal Manageability Enablement for i
- 5770-XE1: IBM i Access for Windows
- Zend
- 5733-ARE: IBM Administration Runtime Expert
- 5798-FAX: IBM Facsimile Support for i
- 5770-SM1: IBM System Manager for i
- 5770-DFH: IBM CICS Transaction Server for i
- 5770-MG1: IBM Managed System Services for i
- 5770-SS1: IBM i Option 23, OptiConnect
- 5770-SS1 : IBM i Option 44, Encrypted Backup Enablement
- 5770-SS1 : IBM i Option 45, Encrypted ASP Enablement
- 5770-SS1 IBM i Option 18 Media & Storage Extensions
- 5770-SS1 IBM i Option 26 DB2 Symmetric Multiprocessing
- 5770-SS1 IBM i Option 27 DB2 Multisystem
- 5770-SS1 IBM i Option 38 PSF for IBM i Any Speed Printer Support
- 5770-SS1 IBM i Option 41 HA Switchable Resources
- 5770-SS1 IBM i Option 42 HA Journal Performance
- 5761-AMT: Rational Application Management Toolset
- 5770-AP1: Advanced DBCS Printer Support
- 5733-B45: AFP Font Collection for i
- 5770-BR1: Backup, Recovery and Media Services
- 5761-DB1: System/38 Utilities
- 5761-CM1: Communications Utilities
- 5761-DS2: Business Graphics Utility
- 5648-E77: InfoPrint Fonts
- 5769-FN1: AFP DBCS Fonts
- 5769-FNT: AFP Fonts
- 5770-JS1: Advanced Job Scheduler for i
- 5770-PT1: Performance Tools
- 5770-QU1: Query for i
- 5770-ST1: DB2 Query Manager and SQL Dev Kit for i
- 5733-XT2: XML Toolkit
- 5770-XW1: IBM i Access Family - unlimited users included

Cloud Enable Mission Critical Applications

including existing VM applications running on AIX, IBM i, Linux, VMware & more

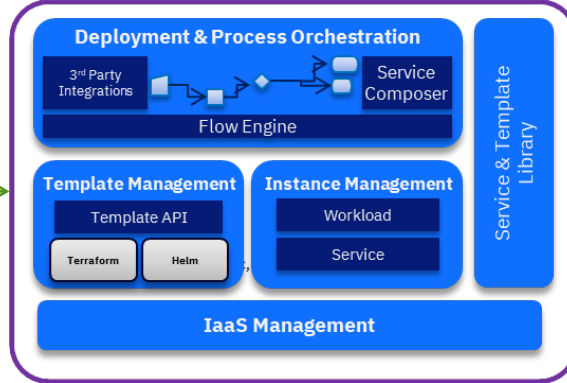
Traditional Enterprise Apps

WebSphere App Srv
WebSphere MQ
SAP R/3
Oracle
Db2

Container Apps

WebSphere Liberty
MongoDB
Redis
Jenkins

Cloud Automation Manager (CAM)



(Built as an ICP Kubernetes application)

- Create App Templates
- Define Service Compositions
- Uses Standard Terraform API's to deploy to Any Cloud
- Standard Helm Charts in ICP for Consistent Operations

IBM Cloud Private Catalog

VM based apps



Cloud Automation Manager

+

Container Apps



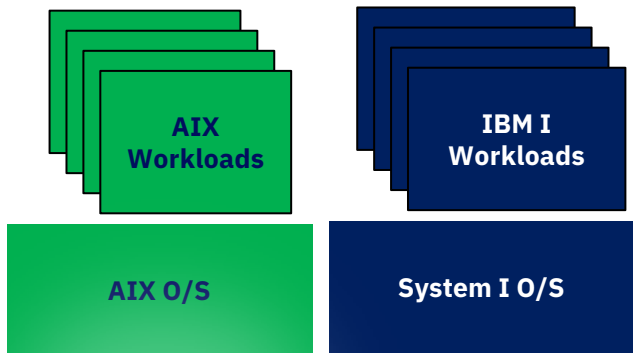
IBM Cloud Private

- Deploy existing **VM-based applications** in a multi-cloud environment with **Cloud Automation Manager (CAM)**
- Add any **AIX, IBM i, or Linux VM-based** application to the Cloud Private catalog
- Integrate new services with existing mission critical workloads (e.g., DBs), achieving a *single catalog* and **coordinated orchestration**
- Deploy and manage applications with a **common self-service interface**, seamlessly align workloads to most optimized infrastructure

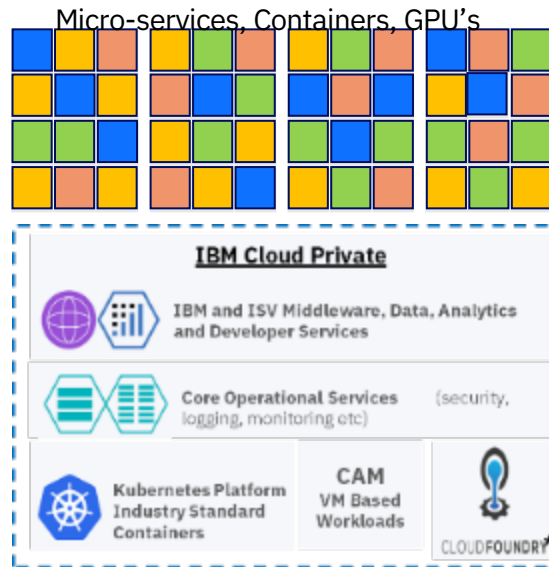
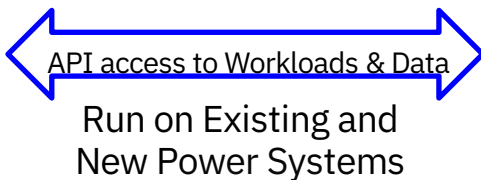
Extend your existing Power Systems with IBM Cloud Private

From where you are  to the Future

Extend current applications and data with new languages, tools and open source software in containers



Power - THE Competitive Platform*



Infrastructure Managed by PowerVC



Enterprise Systems

+



OpenPower Scale-Out



Accelerated

Cognitive Business

* Note: see pages 19-21 for details

* Future Possibility

Private Cloud on Power Foundation: PowerVC

PowerVC

- Hides the complexity of PowerVM , help you manage your Power Virtualization like a vCenter
- Can manage a subset of a machine, several machines, with VM failover automation (LPM, SRR...)
- Can manage also the zoning config on the SAN Switches connected to the VIOS and perform all the virtual I/O attachment & cleanup. Demo : <http://ibm.biz/powervc142>
- CAM & vRealize can trigger actions on PowerVC using the PowerVC Openstack API

PowerVC Standard or Cloud Edition on a RHEL 7.5+ VM on ppc64le (PowerVM/KVM) or VMWare.

Per core licensing . [Prereqs PowerVC 1.4.3 details](#)

- HMC V8R8, V9R1
- IBM i 7.1+ AIX 7.1+, Linux RHEL SLES Ubuntu
- POWER7,8,9 with PowerVM , VIOS 2.2.6+
- SAN Fabric : Brocade, Cisco
- Storage IBM (Storwize, SVC, DS8K) , EMC , Hitachi, Shared Storage Pool)

IBM i / AIX Licensing & Workload Isolation

PowerVC supports multiple shared processor pools. This support allows you to share a group of processors between multiple virtual machines.

You can dedicate VIOS (network, san) to the PowerVC, and keep other VIOS for traditional workloads.

IBM i Cores/Partition – SMT – Threads

| Processor | Limit | IBM i 7.1 | IBM i 7.2 | IBM i 7.3 | IBM i 7.4 |
|-----------|---|------------------------|-----------|-------------------------|-------------------------|
| POWER7 | Max Cores/Partition (Lab Services RPQ only) | 64 (SMT4) | 96 (SMT4) | 96 (SMT4) | --- |
| POWER7 | Max Threads | 256 | 384 | 384 | --- |
| POWER8 | Max Cores/Partition (Lab Services RPQ only) | 64 (SMT4) 32 (SMT8) | 96 (SMT8) | 192 (SMT4) 96 (SMT8) | 192 (SMT4) 96 (SMT8) |
| POWER8 | Max Threads | 256 | 768 | 768 | 768 |
| POWER9 | Max Cores/Partition (Lab Services RPQ only) | --- | 96 (SMT8) | 192 (SMT4) 96 (SMT8) | 192 (SMT8) |
| POWER9 | Max Threads | --- | 768 | 768 | 1536 |

POWER9 High-end Transition

