

IBM Garage for Systems



IBM PowerVC

Virtualization Center for Private Cloud

Thierry Huché

Power demonstration Leader

thierry.huche@fr.ibm.com

IBM **Garage** for Systems - Montpellier



January 2021

Software

PowerVC

Power Virtualization and Cloud Management

- ✓ Increase IT productivity and agility
- ✓ Manage Private Cloud without complexity



PowerSC

Security and Compliance

- ✓ Protect Virtual Workloads
- ✓ Maintain and Demonstrate Compliance

- ✓ **Designed for Big Data**
- ✓ **Superior cloud economics**
- ✓ **Open Innovation Platform**

PowerHA

Resiliency without Downtime

- ✓ Roadmap to continuous availability
- ✓ High availability systems and scaling



AIX - The Future of UNIX

Total Integration with i

Scalable Linux ready for x86
Consolidation

PowerVM

Virtualization without Limits

- ✓ Drive over 90% utilization
- ✓ Dynamically scale per demand

PowerVC - Choice of 2 Editions to Address Client Needs



Key Features:

1. Deploy VMs in minutes instead of days
2. Full lifecycle management of VMs
3. Automated VM recovery
4. Single-click host evacuation
5. Automated cloud optimization via DRO
6. Multi-tenancy and resource isolation
7. Software defined networking capabilities
8. OpenStack API enablement
9. Upward integration for cloud managers



Key Features:

1. ***EVERYTHING in PowerVC Edition!***
2. Self-service capabilities for cloud users that enable one-click deploy operations for all genres of app. developers, data scientists, QA engineers, and so on
3. Provides cloud administrators with various policies and quota management to govern how the cloud operates.

OpenStack-based Cloud Management for Power Systems

OpenStack: integrated, easy to use and simple to deploy with PowerVC

Manage Virtualization

- Simple UI and Setup
- Resize VMs and Migration
- Capture and Deploy VMs
- Policies for Placement
- Manages up to 5,000 VMs & 200 hosts

Cloud Management

- Self-Service Portal
- Catalog of VMs and Images
- Access to OpenStack APIs
- Metering Data

Advanced Cloud (Optional)

- Self-Service Portal with image catalog
- Capacity Management & Advanced Usage Metering / Accounting
- Advanced Orchestration Patterns or Blueprints



PowerVC

Simple upgrade



PowerVC
For Private Cloud

IBM and ISV Solutions

- Managed Services (CAM)
- Urban Code Deploy
- VMware vRealize Automation

Increasing Automation & Function

PowerVC is built on the OpenStack community foundation

- ✓ Provides an **Open alternative** to proprietary cloud stacks
- ✓ **Protects clients current investment** with simple path to new technology
- ✓ **Open APIs** provides great flexibility and agility



OpenStack Software delivers a massively scalable cloud operating system.



PowerVC: Integration Point for the Multi-Cloud Ecosystem

Cloud
Orchestration
Solutions



IBM Cloud Pak for
Multicloud
Management



openstack™

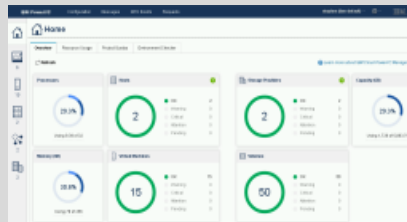
Cloud and Virtualization Management

- Build Power Systems private clouds
- Quickly capture and deploy VMs
- Virtual machine resiliency and more...

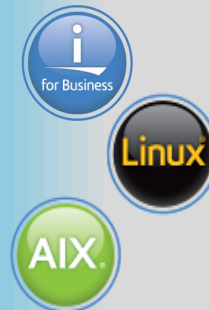


openstack™
Alternate
OpenStack
solutions

IBM
PowerVC



Enterprise Power

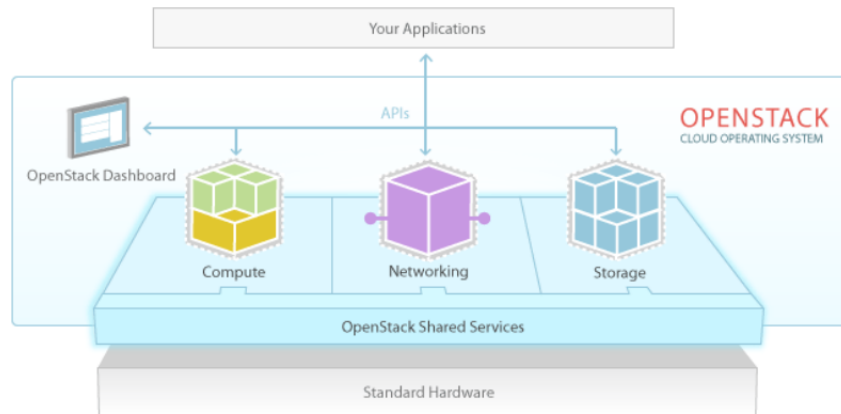


What Can PowerVC do for you ?

“A simple tool to quickly roll out LPARs/Virtual Machines on Power Systems”

- Easily clone, copy and relocate Power Systems virtual machines
 - Improve virtual machine consistency through replication
 - Policy-based placement of new and relocated virtual machines
 - Complete virtual machine management: Storage, Compute, Network
- Quick and easy installation to get you up and running quickly
 - One button verification of stack integration and operational environment
 - Simplify operations by not having to logon to HMC, VIOS, or storage to provision virtual machines
- Build a Private Cloud with PowerVC + Upward integration to cloud managers for private cloud management
 - Build on OpenStack APIs for automation and extensibility
 - Integration to IBM Cloud Orchestrator

PowerVC Edition Overview



Rapid provisioning and management of VMs/LPARs on Power Systems using an intuitive Web interface

Base provisioning and virtualization

- Rapid LPAR provisioning and deprovisioning
- Storage provisioning
- Virtual network configuration
- Physical and virtual resource discovery
- LPAR resize (dynamic LPAR changes)
- LPAR migration (Live Partition Mobility)
- Host Maintenance Mode
- Image capture
- Image repository and authentication services

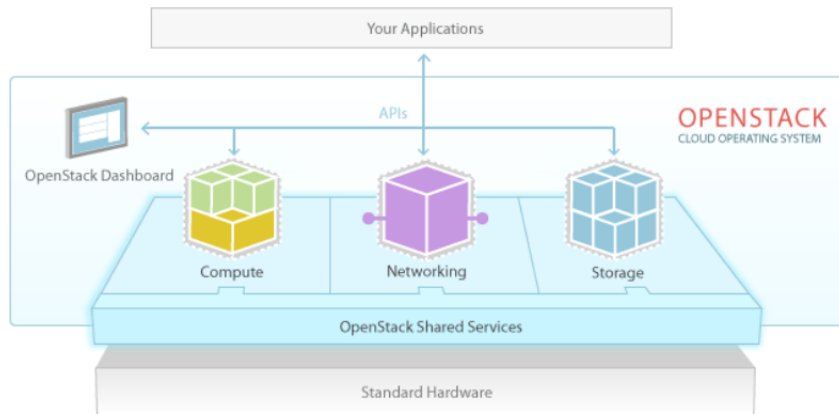
Advanced capabilities

- Compute templates ("t-shirt sizes")
- Storage templates
- Storage Connectivity Groups
- Host Groups
- Placement policies
- Collocation rules
- SAN volume create/delete
- Remote restart
- Switched HMC support
- Dynamic Resource Optimization (DRO)



PowerVC for Private Cloud Edition overview

Self-service entry cloud solution



Capabilities

- Self-service portal
- Projects
- Image templates
- Approvals
- Metering

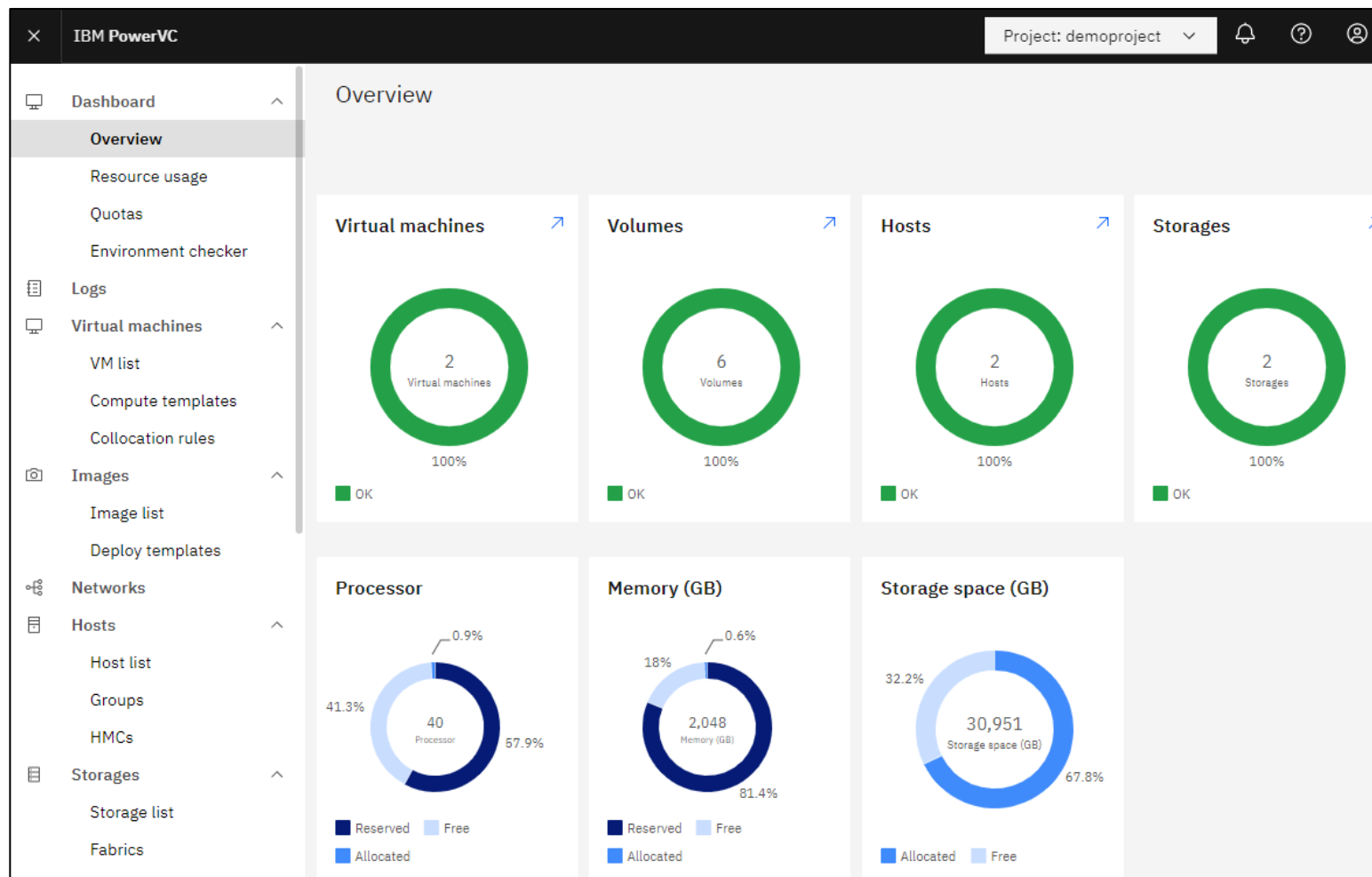
Plus all PowerVC Edition Capabilities



PowerVC 2.0.0 – New Features

#	Feature	Description
1	PowerVC version 2.0.0 UI enhancements	IBM Power Virtualization Center version 2.0.0 introduces all new user interface that is designed based on Carbon framework.
2	Virtual machine snapshot and restore	Virtual machine snapshot allows you to take consistent snapshot of the volumes attached to a virtual machine to restore at any point in time.
3	Clone virtual machine	Clone virtual machine feature allows you to create new identical virtual machine.
4	Retype	By using this capability, you can change the current storage template of a volume to a target storage template.
5	Consistency groups	A consistency group is a set of volumes that can be used to create a point in time snapshots, or to create a consistency copy of volumes.
6	Clone volumes	Clone volume feature allows you to create a consistent copy of volumes that are available or attached to a virtual machine.

PowerVC 2.0.0 – New UI



PowerVC 2.0.0 – Virtual machine snapshot and restore

You can create a snapshot with all the volumes attached to the virtual machine or select specific volumes.

Snapshot VM: aix71demo Cancel Snapshot

Snapshot name * Comment

Description

Select volume types from below *

☐ All volumes

☐ Boot set only

☒ Select specific volumes

<input checked="" type="checkbox"/>	Name	Size (GiB)	Bootable	Description	State	Health	Shared
<input checked="" type="checkbox"/>	aix71demodisk1	1	false		In-use	OK	false
<input checked="" type="checkbox"/>	aix71demo-e7bd55ff-0000001b-boot-0	10	true		In-use	OK	false

You can restore your VM from snapshot

Virtual machine: aix71demo Actions Close Save

Active OK

Details Networks **Snapshots** Volumes Logs >

Retry Rollback Restore Delete Refresh Snapshot +

<input checked="" type="checkbox"/>	Name	Status	Creation time	Description
<input checked="" type="checkbox"/>	aix71demo_Snapshot	Available	2021-01-12T10:40:22.000000	

PowerVC 2.0.0 – Clone Virtual machine

You can clone a virtual machine to create a new one with specific volumes.

Clone VM aix71demo

CancelClone VM

Details *Networks *Volumes

General properties

VM name *

aix71demo_clone

Host group ⓘ

Default Group

Host

CPT

Description

Activation input

Resources

Compute template * ⓘ

tiny

Virtual processors [1 - 1] *

1

Processing units [0.1 - 1] *

0.5

Memory (GB) [2 - 6] *

4

Customization

SCG * ⓘ

Any host, all ...

Processor

1.3%0.2%

34%64.6%

24Processor

ReservedFreeAllocatedProjected

Memory(GB)

0.8%5.9%0.4%









92.9%

1,024Memory(GB)

ReservedFreeAllocatedProjected

PowerVC 2.0.0 – Retype

You can change the current storage template of a volume to a target storage template. You can change the volume properties like QoS.

<div>Manage existing  Retype  Clone  Unmanage  Set storage template </div>					
 Name	Size (GiB)	State / Health	VMs	Storage template	Storage provider
<input checked="" type="checkbox"/> aix71demodisk1	1	 In-use  OK	1	SVC base template	SVC

You can also choose to migrate the volume to another pool specified in the target template.

Retype Volume from source storage template SVC base template Cancel Retype

Select target storage template to retype.

☐ Allow storage assisted migration

☒ Allow generic migration

Storage templates	Pool name	Available pool capacity
<input type="radio"/> Pool-DS5020_2	Pool-DS5020_2	1628.16

PowerVC 2.0.0 – Consistency Group

A consistency group is a set of volumes that can be used to create a point in time snapshots, or to create a consistency copy of volumes. You can choose the volumes that will be part of the consistency group.

Create Consistency Group

Consistency Group name * ⓘ
aix71democg

Storage provider *
SVC

Description
Consistency group for aix71demo vm

Group Type *
CG-snapshot

2 selected








Search filter

☐ Show selected rows only

	Name	State / Health	Size (GiB)	Bootable	Storage template	Storage provider
<input checked="" type="checkbox"/>	aix71demo-e7bd55ff-0000001b-boot-0	<div>In-use</div> <div>OK</div>	10	Yes	SVC base template	SVC
<input checked="" type="checkbox"/>	aix71demodisk1	<div>In-use</div> <div>OK</div>	1	No	SVC base template	SVC

PowerVC 2.0.0 – Clone volumes

You can create a consistent copy of volumes that are available or attached to a virtual machine.

<div>Manage existing  Retype  Clone  Unmanage  Set storage template </div>						
<input type="checkbox"/> Name	Size (GiB)	State / Health	VMs	Storage template	Storage provider	
<input checked="" type="checkbox"/> aix71demodisk1	1	 In-use  OK	1	SVC base template	SVC	

You can specify a common suffix name and a Storage template

Clone volumes

You can clone volumes for attaching to other VMs.
All volumes that are selected for cloning must have a storage template assigned.

Common suffix name *

aix71demodisk1-clone

Storage template

Pool-DS5020_2

Confirm the volumes to be cloned

☒ Volumes

☒ aix71demodisk1

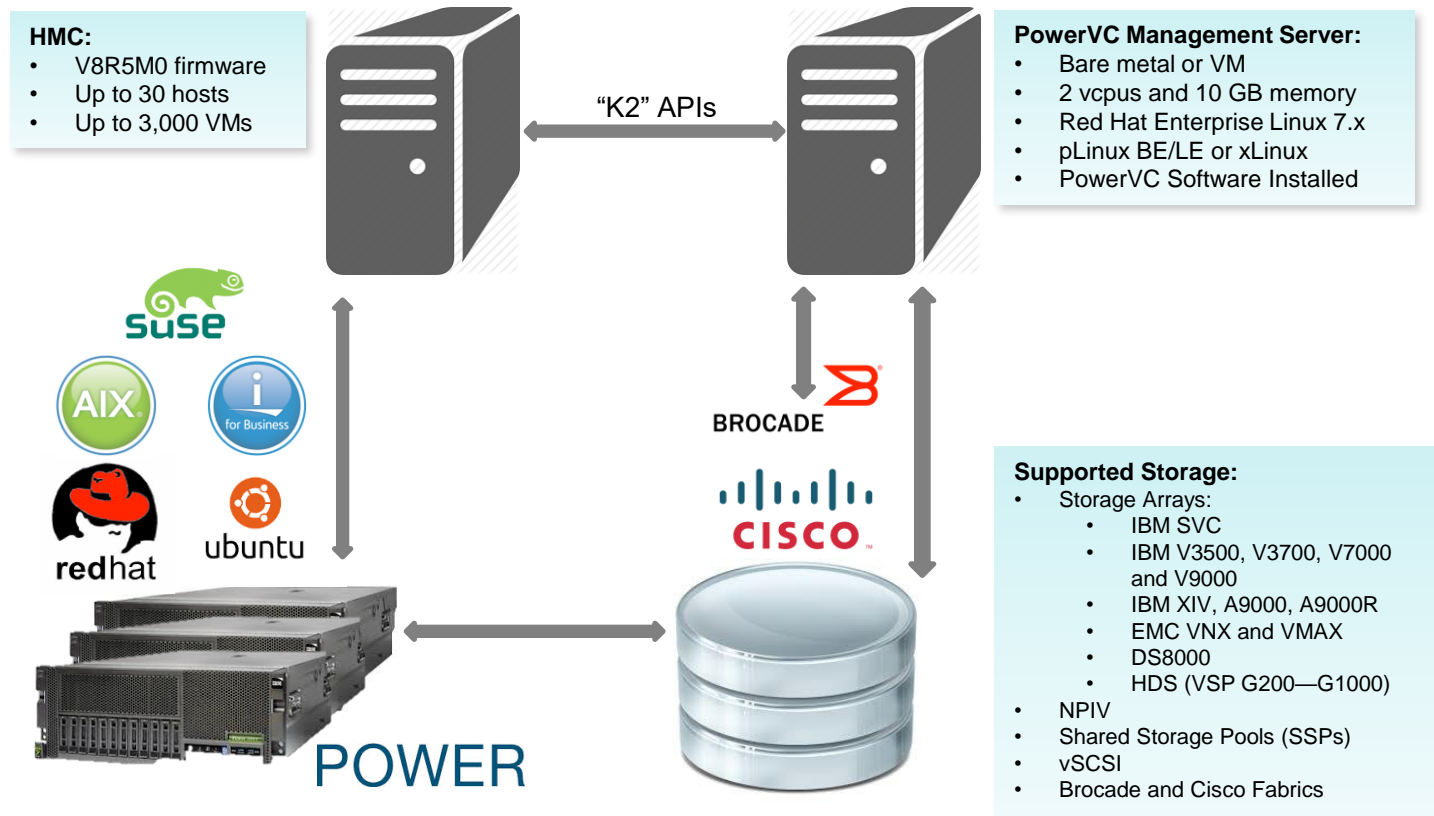
Comment

Why are you cloning this volume?

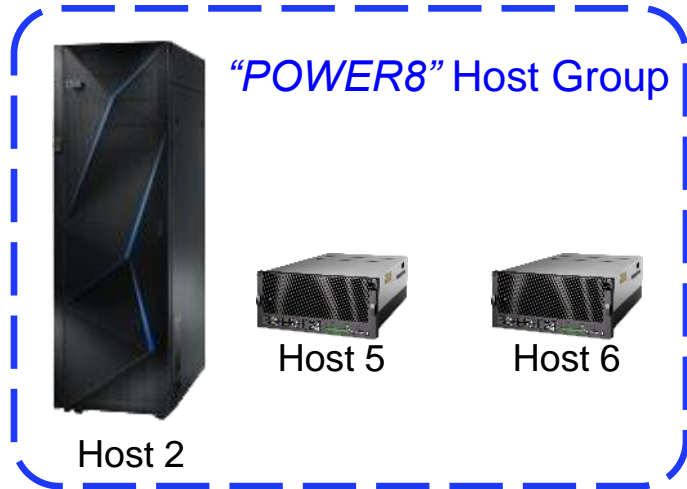
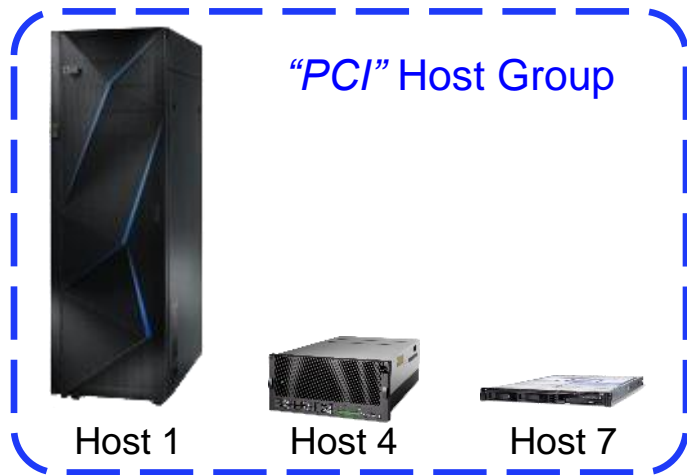
Cancel

Clone

Architecture for PowerVM (HMC)

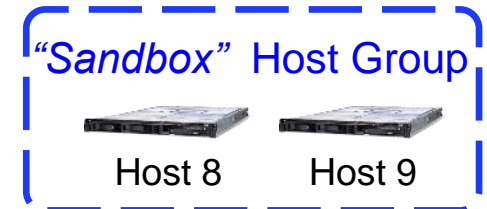


PowerVC Host Groups



Host Groups allow the PowerVC administrator to create a logical boundary around a group of physical servers

- Each server can only be in one host group
- Deployment, mobility and remote restart are only allowed within the group
- Each group has its own placement policy
- Hosts are placed in the default group when added



One Click System Evacuation

Provides easy, graceful way to prepare for maintenance

- Automatically relocate all virtual machines to other machines
 - Use the PowerVC scheduler to determine the target host or manually select the destination host
 - Clears the system of virtual machines without excessive administrator work
- Alternatively, fence off the physical host to prevent new virtual machines from being deployed or moved to that host
 - Option to allow administrators greater control of relocation operation



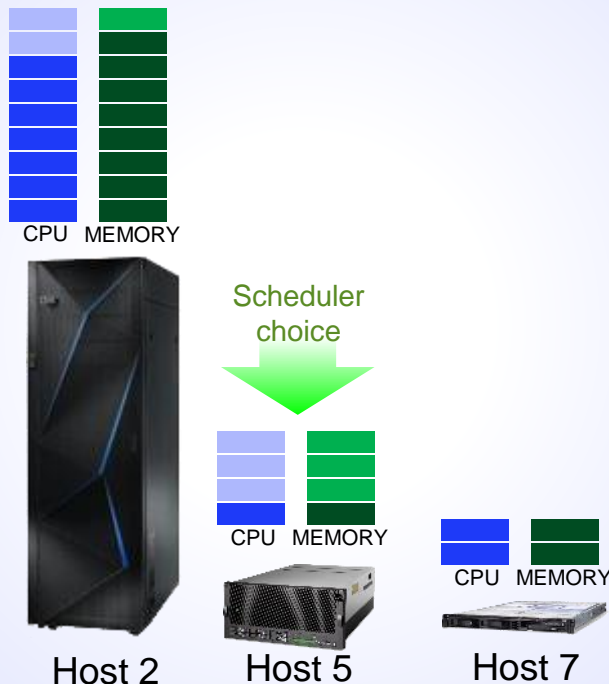
PowerVC Advanced Placement

Scheduler support VM placement based on CPU & Memory capacity and CPU Utilization

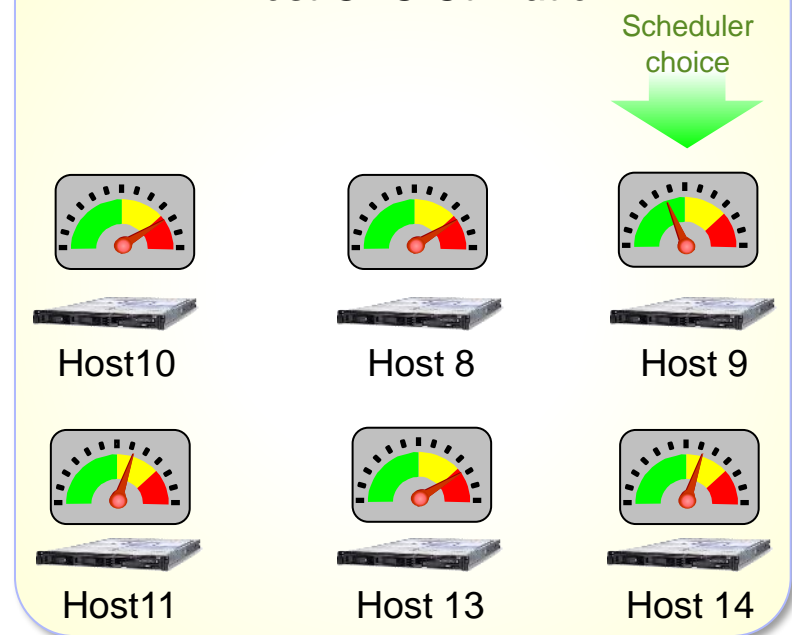
The PowerVC scheduler takes the capacity of servers into account to determine which host to deploy or relocate VMs to. Hosts with the greatest free CPU or memory allocation becomes the target of the next VM.

The scheduler can also take host CPU utilization into account when scheduling VMs

Free CPU / Memory Capacity



Host CPU Utilization

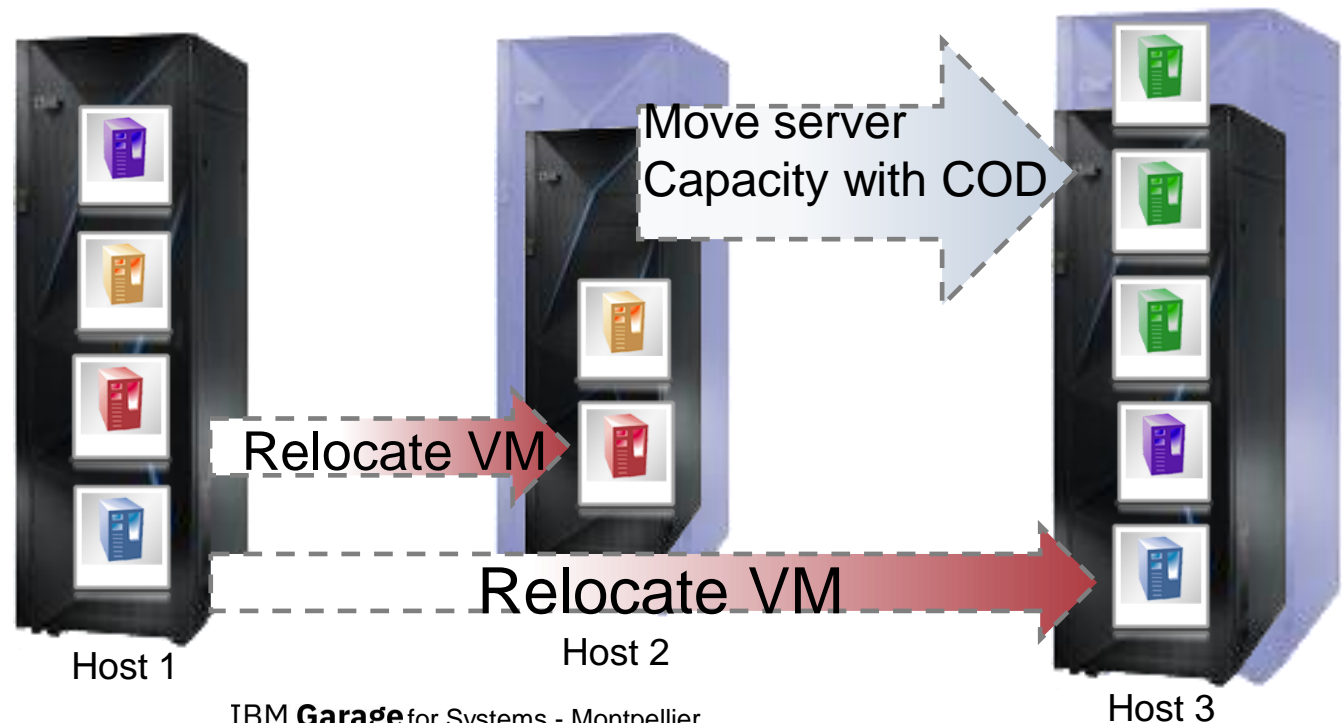


PowerVC Dynamic Resource Optimizer

Policy-based automation to balance workloads

PowerVC Dynamic Resource Optimizer allows for automated rebalancing of workloads between servers

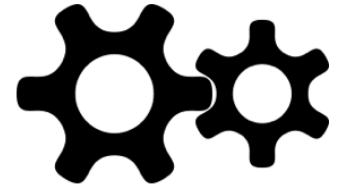
- Server workload can be automatically balanced two ways:
 - Relocating Virtual Machines between servers
 - Moving processor capacity between servers using Enterprise Capacity on Demand
- Works with AIX, IBM i or Linux VMs for Compute Resources
- Works with AIX or Linux VMs for Memory resource balancing
- Option to balance on Compute or Memory resources.



Automated Virtual Machine Remote Restart

✓ Automatically detect host failure and rebuild VMs on healthy hosts

- Can be enabled/disabled at host group, host and VM level
- VMs are placed based on the host group's placement policy
- Supported on PowerVM (NovaLink and HMC) and PowerKVM
- Works on AIX, Linux and IBM i VMs; requires Power 8



IBM PowerVC for Private Cloud : Self Service Portal

- One-click deploy templates
- Approvals and expirations
- Role-based access control
 - Cloud administrator
 - Cloud user
- Project-based resource isolation (multi-tenancy)
- Metering
- Built atop OpenStack



IBM PowerVC for Private Cloud : Cloud Admin and User View

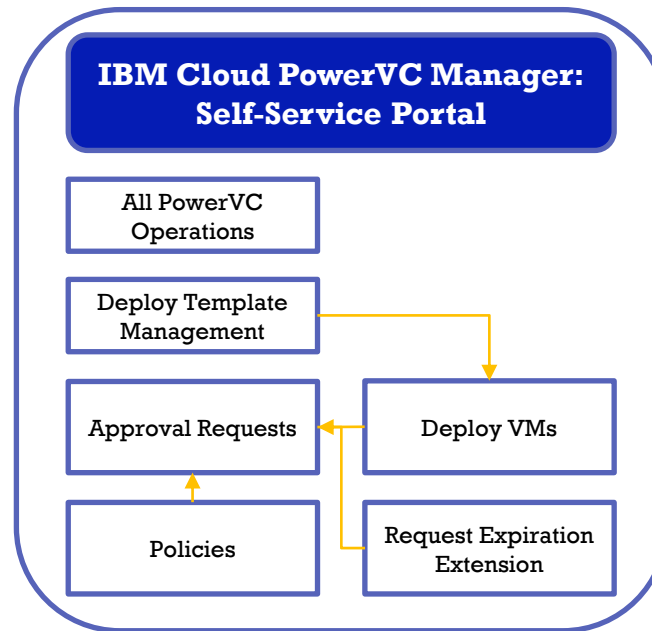


Cloud Admins



Configure and manage:

- ☐ Deploy templates
- ☐ Policies (VM age, etc.)
- ☐ Approvals and expirations
- ☐ Multi-tenant metering data



Cloud Users



Use the self-service portal to:

- ☐ One-click request for VM deployments
- ☐ Request VM expiration extensions
- ☐ View their own metering data



Thank you