

ATS Experts Exchange
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Shifting Gears: VMControl to PowerVC

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**Advanced
Technical
Sales Support**



Agenda

- **A review of VMControl**
 - Express, Standard and Enterprise Editions
 - Image repositories
 - System Pools
- **PowerVC**
 - Based on OpenStack
 - Express and Standard Editions
 - Requisites
 - Capabilities
- **Demonstration**
- **Recommendations**
- **Additional Information**



IBM Systems Director VMControl

Providing consistent virtualization management for all IBM server environments



VMControl features:

- Discover virtual resources
- Display inventory and topology
- Monitor virtual resource health
- Relocate virtual resources
- Create and manage virtual servers
- Deploy and manage workloads
- Provision and manage virtual images
- Manage virtual resource pools

VMControl encompasses virtual server lifecycle management, image management and system pool management as an plug-in to IBM Systems Director.

VMControl V2.4.3 Editions

- **Express Edition (no-charge)**
 - Create and edit virtual servers
 - Manage and relocate virtual servers
 - Monitor, thresholds and automation
- **Standard Edition (chargeable, 90-day trial)**
 - Adds to Express Edition features
 - Discover existing image repositories
 - Import OVF images into repositories as virtual appliances
 - Capture an existing virtual server; includes OS, applications and metadata
 - Deploy virtual appliances quickly to create new virtual servers
- **Enterprise Edition (chargeable, 90-day trial)**
 - Adds to Standard Edition features
 - Create server, storage and network system pools
 - Manage hosts in server system pools through optimization and maintenance tasks
 - Deploy virtual appliances into system pools
 - Manage workloads with availability policies

VMControl V2.4.3 Editions

	Express Edition	Standard Edition	Enterprise Edition
Key Capabilities	Manage resources	Automate virtual images	Optimize system pools
Enterprise Virtualization Platform Support			
Create/manage virtual servers (x86, PowerVM and z/VM)	✓	✓	✓
Virtual server relocation	✓	✓	✓
Capture/import, create/remove standardized virtual appliances		✓	✓
Deploy virtual appliances		✓	✓
Maintain virtual appliances in a image repositories		✓	✓
Create/remove system pools and manage system pool resources			✓
Add/remove physical servers within system pools			✓

Image Repositories – AIX NIM-based



Image Repository

- **AIX Network Installation Manager (NIM)-based Image Repositories rely on the basic capabilities with AIX**
 - Basic AIX installation via mksysb or rte (lpp_source)
 - VMControl does not perform AIX migrations, must use NIM directly
 - Uses the NIM capability to network boot directly via the HMC/IVM added in AIX 6.1 TL3+
- **Stores captured or imported images in dedicated directory tree**
 - Default is /export/nim/appliances
 - Can be changed via configuration file
- **VMControl requires the NIM master to already be installed and configured**
 - Does not create NIM master
 - DOES create all necessary NIM resources
 - standalone machines, mksysb, spot, bosinst_data, etc
- **There can be many NIM image repositories**

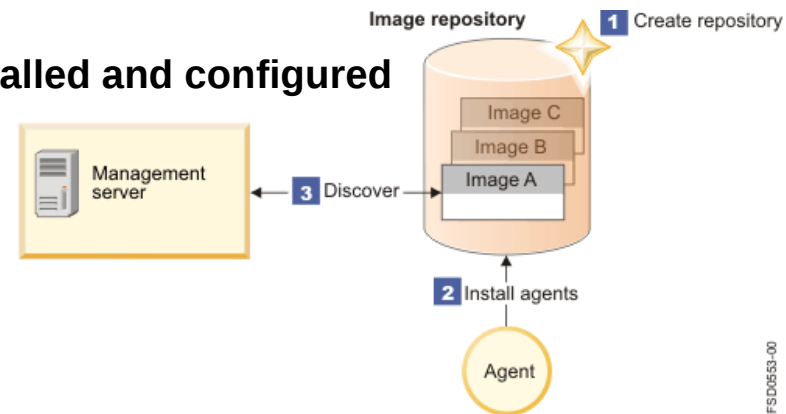


Image Repositories – Storage Copy Services-based Managed SAN Storage

- **Uses the VIOS V2.2.1+ to create virtual appliances directly from provisioned SAN LUNs**
 - Can't use regular VIOS Storage Pools (i.e. volume groups) for SCS
- **Faster capture and deploy compared to NIM-based operations**
 - LPAR must be stopped for capture
 - Activation Engine must be installed and activated before shutdown and capture
 - Raw disks only, not file-based
- **Works for AIX, Linux on Power and IBM i**
 - All must be virtualized under VIOS, no dedicated resources
- **Supports multiple disks**
 - Virtual Appliance must contain OS disk(s), other disks may be definition-only (empty)
- **FlachCopy with TPC-R or SVC/V7000 can further speed capture/deploy operations**

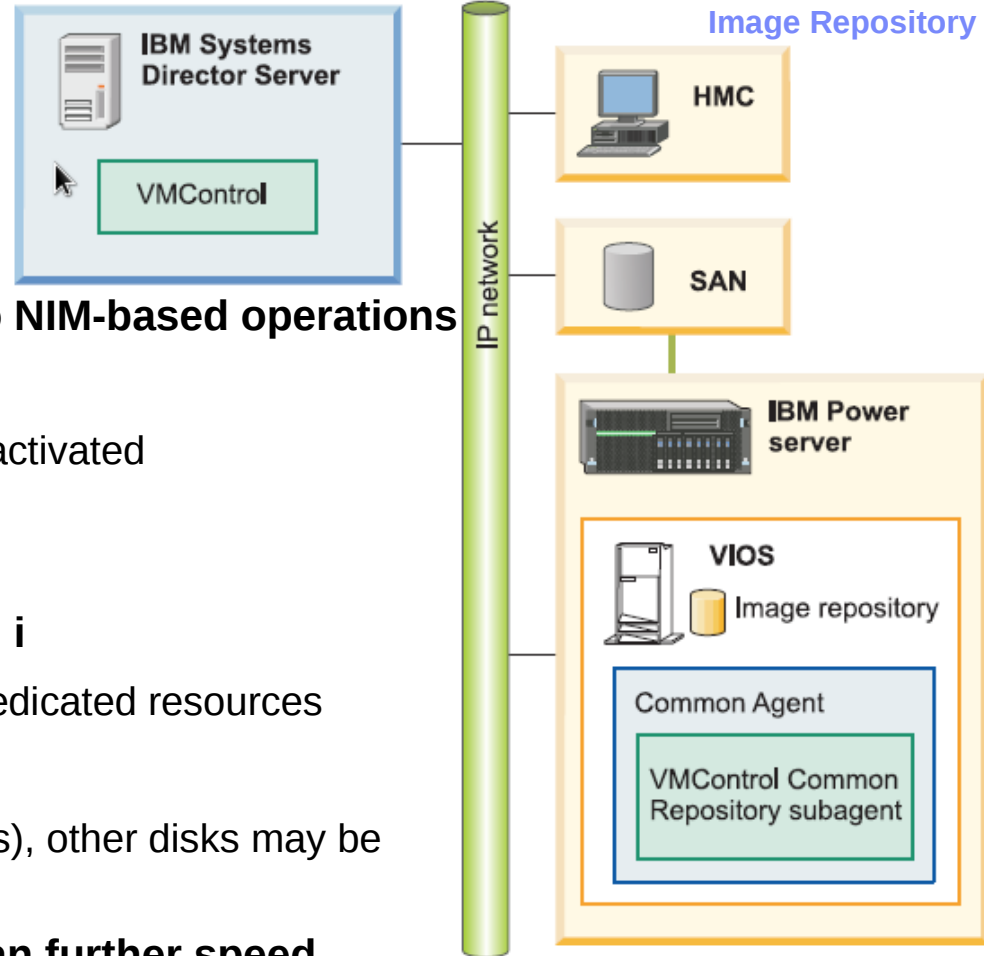
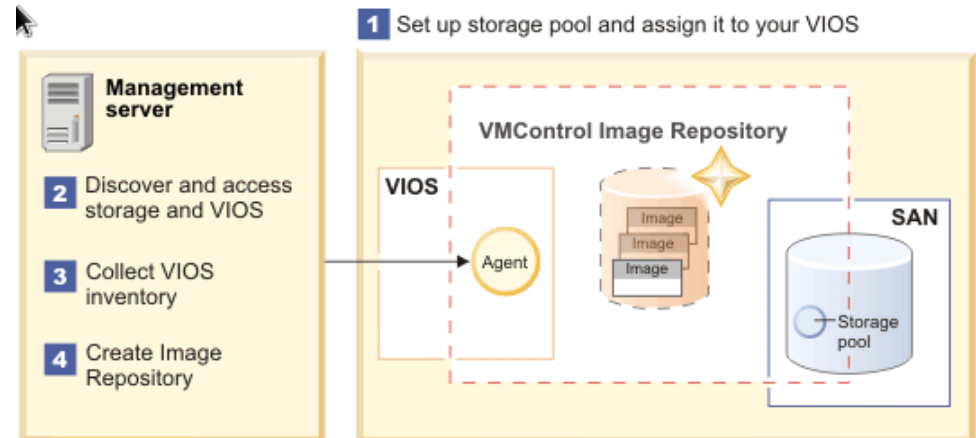
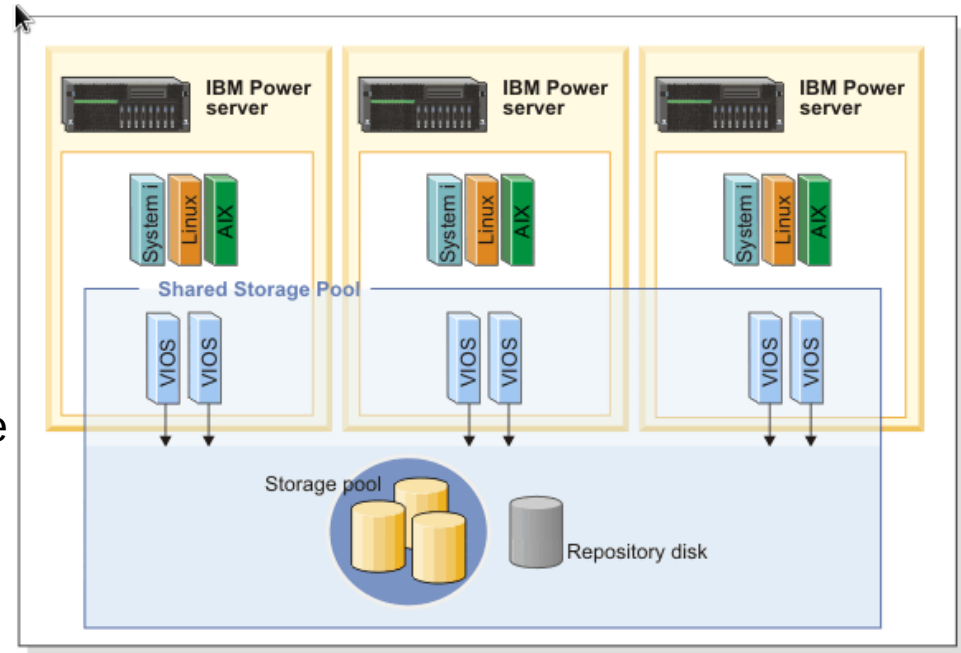


Image Repositories – VIOS Shared Storage Pools

Storage+SAN agnostic

- **Uses the VIOS V2.2.2.0+ capability of Shared Storage Pools (SSP)**
 - Simplifies LPM, AMS, Suspend/resume
- **SSP is vSCSI only, no NPIV**
- **VMControl creates all disks as thin-provisioned**
 - SSP itself supports thick-provisioning
- **Capture and deployment are very fast!**
 - ATS lab tests <1 minute for capture, 1-2 minutes for deploy



System Pools

▪ Server System Pools

- A logical group of like hosts and their virtual servers/workloads with the goal of better resource usage and workload resilience

▪ Capabilities:

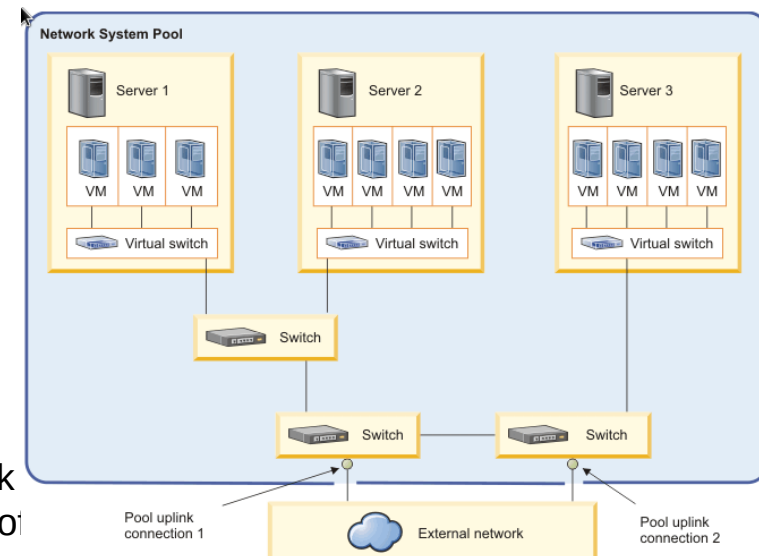
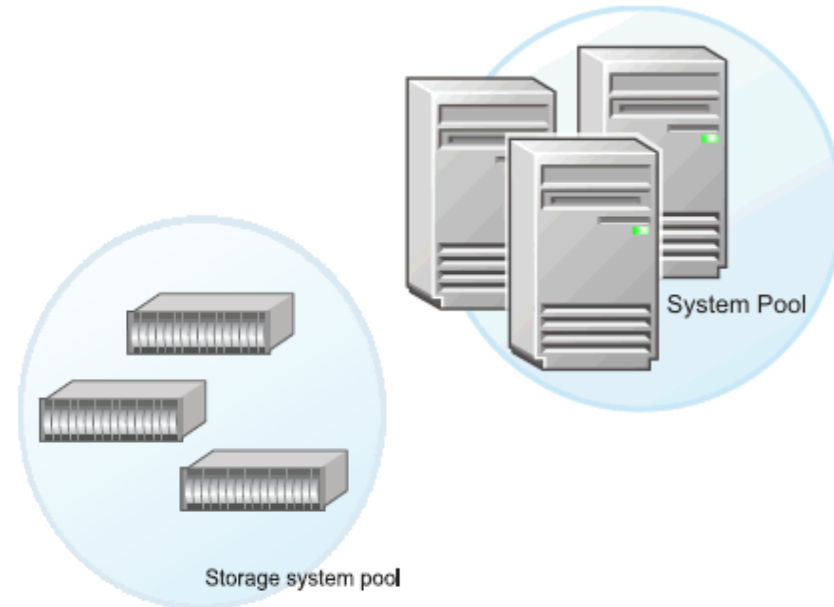
- Create System Pool
- Add/remove hosts
- Monitor resilient workloads
- Automatic placement during deploy
- Optimization of workloads
- Maintenance mode

▪ Storage System Pools

- A logical group of similar storage subsystems to facilitate the allocation of storage for Server System Pools

▪ Network System Pools

- Used together with server system pools to ensure network connectivity when performing deployment and relocation of
- Only with Network Control V1.4 installed



PowerVC

- **Positioning**
- **Built on OpenStack**
- **Express and Standard Editions**
- **Requisites**
- **Capabilities**
- **Demonstration**

IBM Power Systems Management

Cloud
Management

SmartCloud

Infrastructure as a Service with IBM SmartCloud

- End-user self-service provisioning of IaaS with SCE
- Service catalog with virtual systems and applications
- Subscriber and account management (multi-tenancy)
- Delivered as Entry, Provisioning and Orchestration

Virtualization
Management

PowerVC

Virtualization Management with PowerVC

- Leadership solution for PowerVM virtualization
- Virtual Image Management and Deployment
- Resource Pooling and Dynamic VM Placement
- Express (IVM) and Standard Edition (HMC)

Platform
Management

HMC

Power Systems Hardware Management Console

- Hardware and firmware management for Power
- Hardware and firmware configuration and controls
- Service, support and update management
- Hardware appliance



Providing comprehensive and consistent management experience for rack server, blades and PureFlex

Virtual Systems Management for PowerVM

Leveraging PowerVM virtualization to provide superior management and optimization

Differentiated with deep integration with IBM Power Systems...

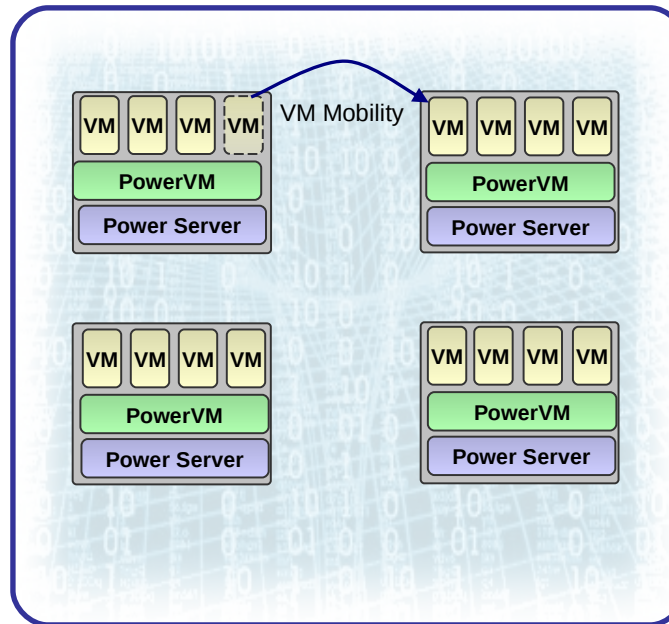
Managing a pool of resources with single system simplicity

Vertically integrated and workload aware...

Image Deployment and Capture

VM Monitoring, Management, Mobility

Policy based VM Placement



VM Resilience and High Availability

On-Going Optimizations and Rebalancing

Security Isolation and Multi-Tenancy

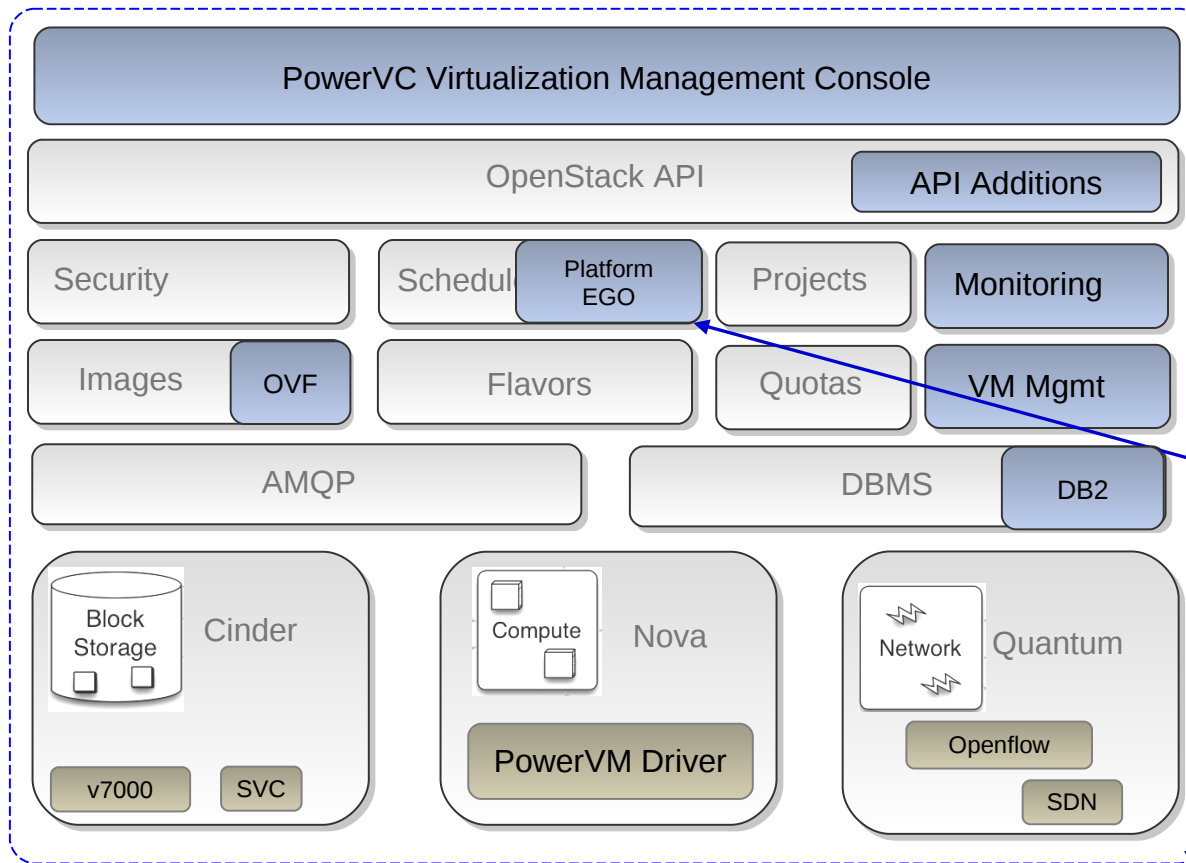
Futures

Key Infrastructure as a Service (IaaS) elements required for Cloud...

Integrated Server, Storage and Network Provisioning and Mobility

Horizontally integrated across server, storage and networking...

PowerVC: Built on OpenStack



Virtualization Mgmt UI

- Simple and Intuitive
- Targeting the IT Admin

New Management APIs

- Virtualization Management
- Monitoring & Events

New Mgmt Capabilities

- Monitoring & Events
- More granular VM Mgmt
- OVF Image Formats
- Configuration Patterns

Platform EGO Provides...

- Virtual Machine Placement
- Workload Aware Mgmt
- Performance Mgmt
- Availability Mgmt

Virtualization Drivers

- IVM/HMC driver for PowerVM
- Leverage ecosystem to support broad range of IBM and non-IBM storage and network attached to Power

Packaging and Simplification

- Simplified Install and Configuration
- Intuitive Administration Model
- Focus on day 0/1 TTV



Storage
IBM and 3rd Party



IBM Power Systems



Network
IBM and 3rd Party



PowerVC Editions

IBM PowerVC offers a lightweight, simple unified advanced virtualization management solution for Power workloads

- **PowerVC Express Edition**
Simplified lightweight advanced virtualization management for Entry Level Power Systems
- **PowerVC Standard Edition**
Simplified lightweight advanced virtualized management for any Enterprise Class Power Systems

<i>Features-PowerVC</i>	<i>Express</i>	<i>Standard</i>
IVM managed servers	✓	
HMC managed servers		✓
Managed Server Type	Express Servers	All Servers
Hardware P7/P7+ P6	✓	✓ ✓
Managed LPAR Type	PowerLinux AIX IBM i*	PowerLinux AIX IBM i*
Managed From OS	RHEL 6.4 Power or x86	RHEL 6.4 Power or x86
Highly available VIOS configs		✓
System Pools & Placement	✓	✓
PowerVM Functionality	Partial	Full

* Statement of Direction

PowerVC Requisites – General

- **General requisites (apply to both Express and Standard Edition):**
 - PowerVC server runs on RHEL V6.4 for Power or x86
 - **Important!** This must be acquired separately and is not provided as part of PowerVC
 - 8GB memory, 2 vCPU uncapped, 1.0 entitled (minimum), 2.0 entitled (recommended)
 - 40GB of disk (more if you will be importing many ISO images)
 - IBM SVC-family (SVC/V7000) storage with V6.4 or later code
 - The PowerVC server must be able to communicate across the network to the storage, fabric (Standard Edition) and the HMC/IVM/VIOS LPARs.
 - The Power Systems Servers must already be installed and configured via HMC/IVM/VIOS
 - PowerVC does not install HMC/IVM/VIOS
 - VIOS media repository must be setup if ISO images will be deployed
 - At least one Shared Ethernet Adapter (SEA) must be setup on the VIOS
 - Supports multiple managed storage subsystems

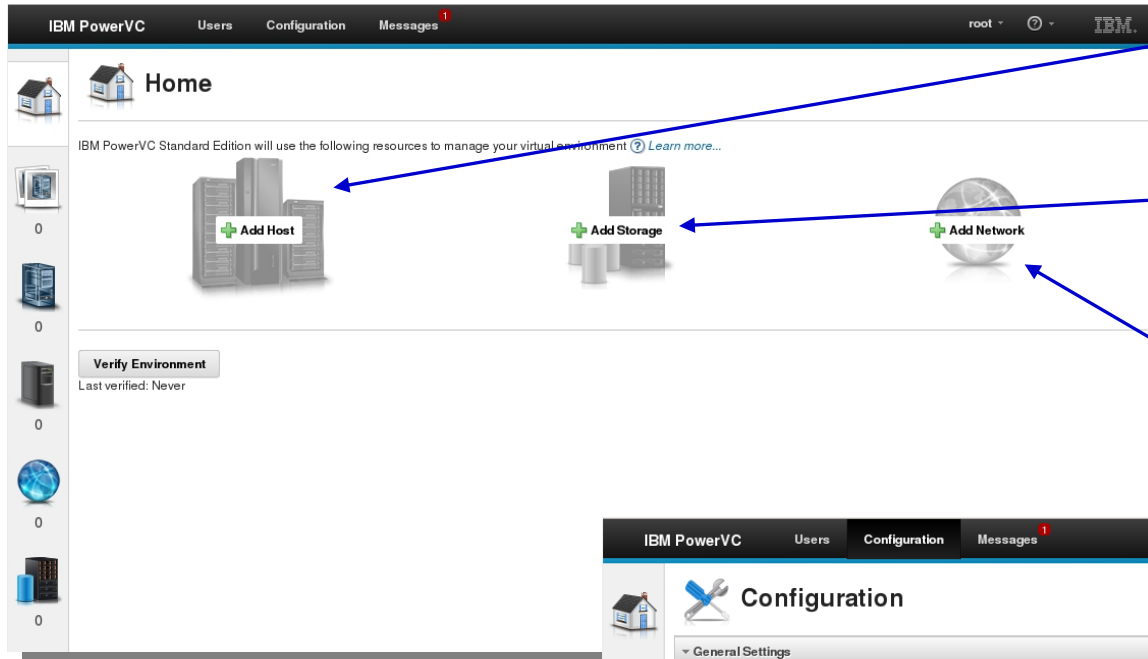
PowerVC Requisites – Express Edition

- **Express Edition-specific requisites**
 - IVM V2.2.1.5 or later
 - Virtual SCSI only, no NPIV
 - no SAN switch [Fabric] connectivity required
 - storage must be pre-zoned
 - POWER7/7+ Express servers with 780 firmware
 - Limit of five (5) managed hosts, maximum of 100 LPARs

PowerVC Requisites – Standard Edition

- **Standard Edition-specific requisites**
 - HMC V7.7.8 or later, CR5/C08 or later models
 - VIOS V2.2.3 or later
 - NPIV-only (Fabric connectivity required)
 - Brocade only, V7 firmware or later
 - POWER6 servers and POWER7/7+ with 780 firmware
 - Older firmware will work with loss of functionality
 - Limit of ten (10) managed hosts, 40 LPARs per host, maximum of 400 LPARs
- **License for PowerVC Standard Edition is no-charge for current SWMA users of:**
 - SmartCloud Entry Bundle for Power
 - AIX Enterprise Edition V6 or V7
 - VMControl Standard or Enterprise Edition
 - Systems Director Standard or Enterprise Edition
- **PowerVC is bundled with the above, so new customers get it too.**
 - Per processor core: small, medium, large charge for standalone SWMA
 - Express Edition is for small class systems only
- **Licensing is done per managed host**

PowerVC Setup and Configuration



1. Add Servers to be managed...

- Provide IP address of IVM/HMC
- For HMC, select hosts to add
- Provide user & password

2. Add Servers to be managed...

- Provide IP address of v7000
- Provide user & password
- Add Fabric (SAN) if Standard Edition

3. Add Network Template...

- Provide VLAN ID
- Provide IP Configuration

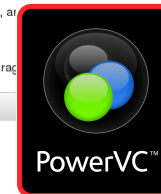
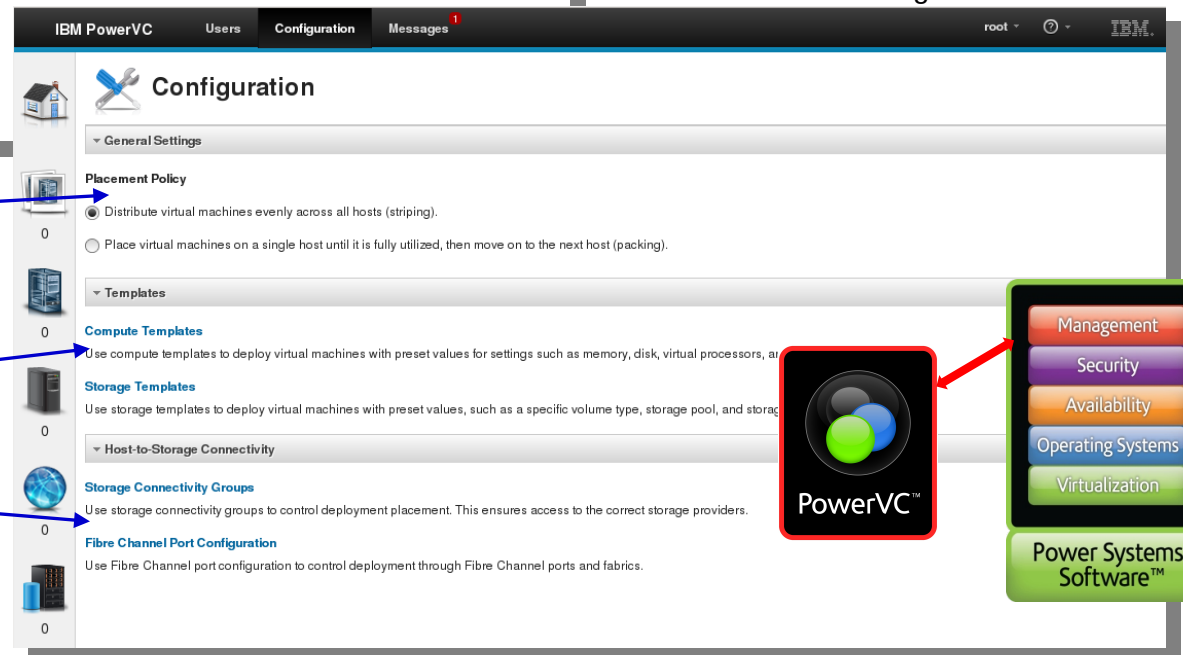
Configuration Placement Policies...

- Stripe Virtual Machines
- Pack Virtual Machines

Compute and Storage Templates

Host to Storage Connectivity

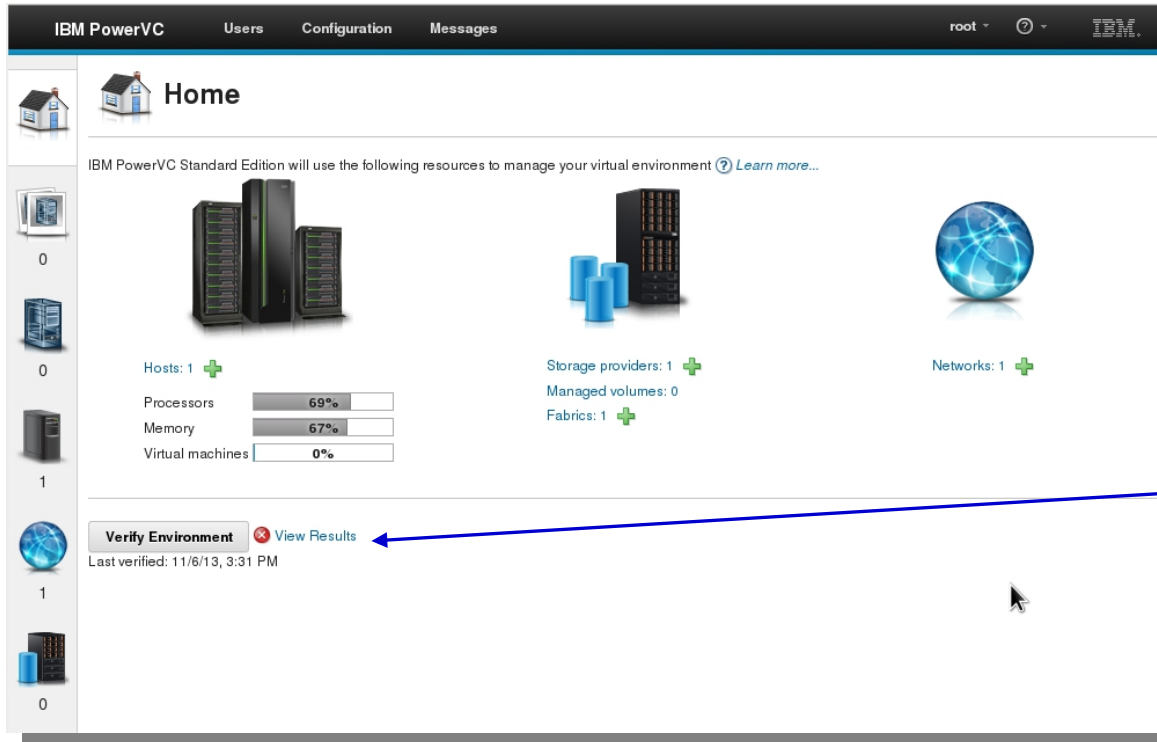
- Storage Connectivity Groups
- Fibre Channel Port Configuration





Ensuring the PowerVC Environment is Operational and Healthy

Verify the both the management server and managed systems...



Management Server Checks...

- Operating System pre-requisites
- Network configuration
- PowerVC processes
- DB2 configuration
- File system space
- Communication with all resources

Server Checks...

- Required VIOS levels and mode
- Host network configuration
- Valid machine types and models
- Maximum number of hosts

Storage Checks...

- Valid machine types and models
- LUN Visibility test
- Required SVC firmware level
- Required Brocade level

- *Runs interactively from the Home page of the console*
- *Runs from the command line when the management server is not started*
- *Produces and saves the last report - viewable at any time*
- *Proactively identifies root cause of environmental problems that would result in failures*





Selecting the Resources to Manage

Choose *hosts* and *LPARs* to manage

Manage Virtual Machines

Select the existing virtual machines that you want PowerVC to manage. Any supported volumes attached to the virtual machines will also be managed.

☐ Manage any supported virtual machines that are not currently being managed by PowerVC.
☒ Select specific virtual machines.

Virtual machines available to manage:

Name	Task
bmnode1	
bmnode2	

Total: 19 Selected: 1

Some cannot be managed. [Hide these](#)

Virtual machines not available to manage:

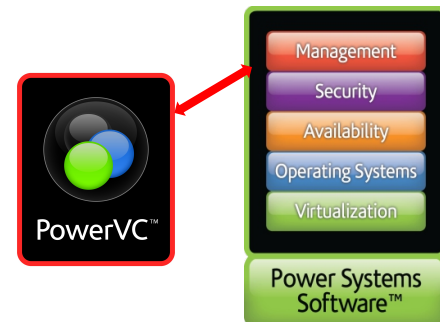
Name	Reason
isd189_pittman	This virtual machine is not a candidate for management because it has a virtual SCSI volume attached to it. You can only manage volumes configured through NPIV to the storage controller. To manage this virtual machine into PowerVC, first

Manage hosts

- Select machines managed by an HMC that you wish to manage with PowerVC

Manage Virtual Machines

- Select available
- Unavailable VMs are listed with rationale for invalidation





Additional Customization

Storage Connectivity Groups and Fibre Channel Port Configurations

Configuration ▸ Storage Connectivity Groups



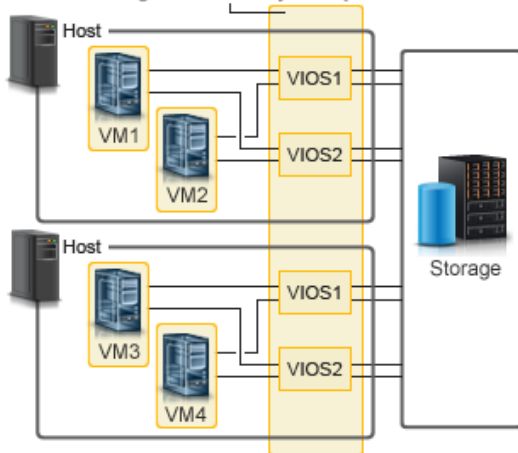
Storage Connectivity Groups

▼ Overview

Your storage environment is ready!

PowerVC is automatically set up with basic storage connectivity to support image deployments, so you do not need to take any actions.

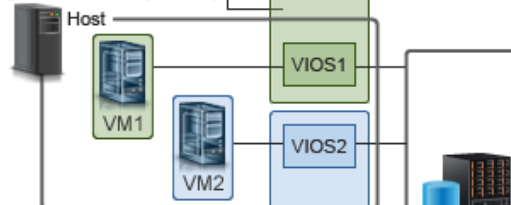
Default Storage Connectivity Group



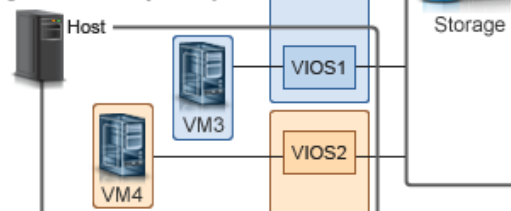
Specify advanced settings.

If you need advanced storage connectivity for image deployment, open the Storage Connectivity Group section below to create additional groups. [? Learn more...](#)

Storage Connectivity Group 1



Storage Connectivity Group 2



Storage Connectivity Group 3



[Customizing VIOS-to-Storage for customer environments](#)

- Fibre Channel port selection too

[Simple environments](#)

- Default is paired VIOS on each host

[Advanced settings](#)

- Groups of VIOS and storage Select available
- Unavailable for selection with reasoning





Virtual Machine Image Deployment and Capture

IBM PowerVC Users Configuration Messages root

Images

Images > Deploy rhel62

General

* Virtual machine name: rhel62 Instances: 1

Host: Selected by placement policy

Specification preconfigurations:

3 - Large

* Processors: 4

* Processor Units: 0.4

* Memory (MB): 8,192

* Disk Size (GB): 0

Network

Network template: my_static

IP address:

Deploy Cancel

Current and projected use:

Your projected usage based on your selections is shown in this color.

Resource	Current	Total
Virtual Machines (0)	0%	100 Total
Processor Units (1.8)	23%	8 Total
Disk Size (1,853.5 GB)	67%	2,757.25 GB Total
Memory (MB) (18,176 MB)	18%	98,304 MB Total

Virtual Machine Templates...

- Processor, memory and disk
- Allows override at time of deploy

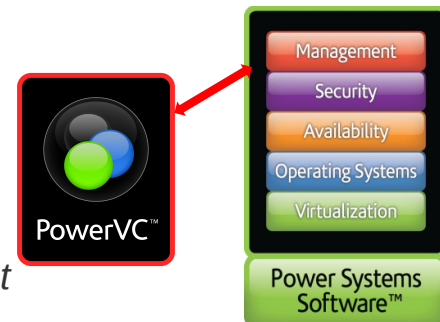
At-a-Glance View of Allocation...

- Processor, memory and disk
- Current allocation
- Allocates resulting from deploy

Network Templates...

- VLAN ID and IP Configuration
- User specified IP for new VM
- Provided to OS as part of activation

- Existing VMs can be captured as images within the image repository
- Images within the Repository can be deployed with policy based placement
- The necessary virtual machine is created based on the template (flavor) selected
- The necessary storage is allocated and attached to the virtual machine
- The virtual machine is connected to the VLAN specified in the network template
- The Operating System is configured with the specified IP configuration at first boot



So where do I go from here?

▪ I perform these advanced tasks with VMControl

- LPAR suspend/resume
- Remote Restart
- Evacuate a server in preparation for service activities
- Automatically evacuate a server in the event of a predictive failure notification



▪ With PowerVC, I can:

- Wait for this support
- Wait for this support
- Manually move all LPARs or wait for this support
- Use other products like PowerHA SystemMirror or wait for this support

Live Demonstration

Recommendations

or

Where do I go from here?

PLEASE DO NOT DISTRIBUTE THIS SECTION TO CUSTOMERS !!

So where do I go from here?

▪ I'm doing this with VMControl

- Capturing/deploying AIX
- Capturing/deploying Linux on Power
- Capturing/deploying IBM i
- Creating empty LPARs



▪ With PowerVC, I can:

- Capture/deploy AIX
- Capture/deploy Linux on Power
- Be patient, it's a SOD
- Continue to use the HMC



So where do I go from here?

- **I have this kind of hardware managed by IBM Systems Director with VMControl**

- POWER6/POWER7 with HMC



- POWER6/POWER7 with IVM



- Mixed HMC- and IVM-managed servers



- **With PowerVC, I can:**

- Manage POWER6/POWER7 with HMC V7.7.8 or later using Standard Edition

- Manage P6/P7 with IVM V2.2.2 or later using Express Edition

- Use separate PowerVC Servers, one for each Edition

So where do I go from here?

- **I have this kind of storage managed VMControl and Storage Control**

- V7000/SVC
- High-end IBM storage like XIV, DS8000-class
- Have EMC storage
- Have Hitachi storage

- **With PowerVC:**

- Can use this storage with firmware V6.4 or later

For anything not SVC/V7000:

- Option 1: Put it behind an SVC or V7000
- Option 2: Wait for VIOS SSP support
- Option 3: Have the customer ask the vendor to publish OpenStack drivers.

So where do I go from here?

- **I have these images in VMControl**

- NIM-based mkysyb images
- SCS-based appliance images
- VIOS SSP images



- **With PowerVC, I can:**

- Import as an ISO (mkdvd command), deploy and re-capture
- Re-capture existing LPARs, no import today
- Wait for this support

Conclusions

- **Examine VMControl capabilities currently by customers**
 - Where they are available in PowerVC, suggest trial or proof-of-concept
 - Even without 100% coverage, perhaps the rapid provisioning alone can be useful
- **PowerVC's capabilities will continue to expand**
 - Not just with IBM development effort, but also
 - OpenStack community effort, including 3rd party device drivers
- **Demonstrate to customers the simple configuration and quick time-to-value**

Additional Information

- **PowerVC**

<http://www.ibm.com/systems/power/software/virtualization-management>

- **PowerVC on Service Management Connect**

(this is where an IBMer/BP can check out the hosted environment for demo)

<https://www.ibm.com/developerworks/servicemanagement/cvm/pvc/>

- **PowerVC Prototype Demo**

<https://www.youtube.com/watch?v=Ug-OobzmSEQ>

- **PowerVC on Facebook**

<http://facebook.com/ibmpowervc>



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Thank You !



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