

**Today**

# Power Systems Virtualisation from IBM - Technical Webinar User Group

## Capture and Deploy Partitions

Starting at 10:00 am UK time by Fred Robinson



Series details, registration and replays of previous webinars from  
<http://tinyurl.com/UK-PowerVM-VUG>

Register by sending email to Jyoti Dodhia – [jyoti\\_dodhia@uk.ibm.com](mailto:jyoti_dodhia@uk.ibm.com)

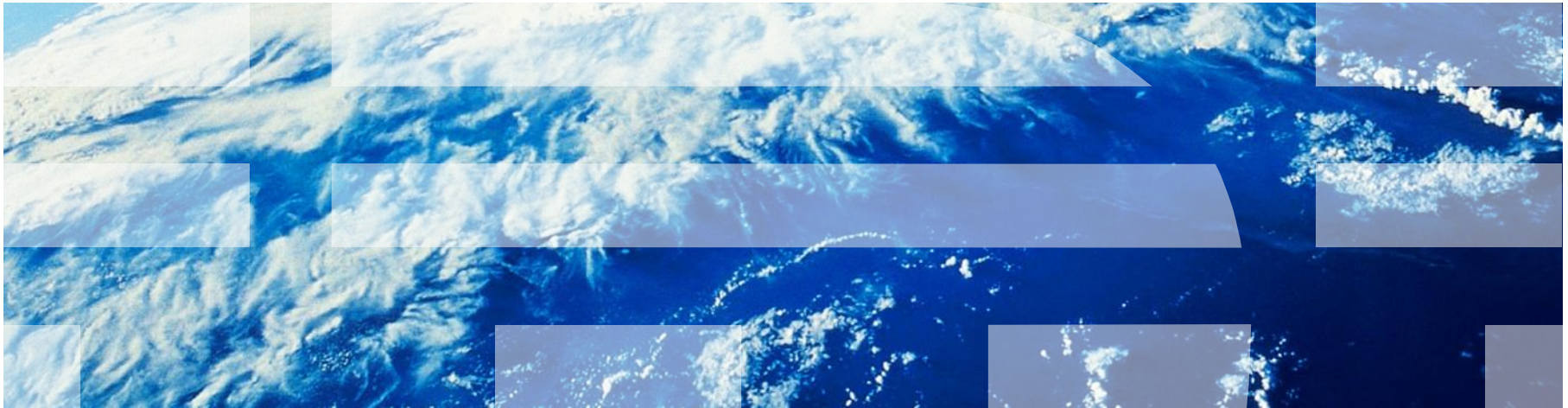
### Upcoming sessions .....

**Session 16: Updating Power Systems, I/O and HMC**  
on August 15th 2012, 10:00 - 11:00 BST (UK time)

**Session 17: Virtual Partition Manager for IBM i in action**  
on September 19th 2012, 10:00 - 11:00 BST (UK time)

# Cloud Foundations: Capture and Deploy Partitions with VMControl

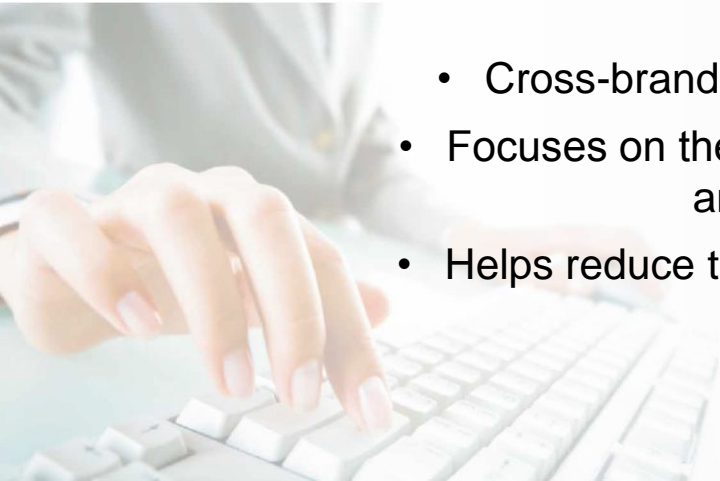
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**IBM Lab Services**  
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# Agenda

- Introduction to VMControl and relationship to “Cloud”
- Components necessary for VMControl
- VMControl Editions

# IBM® Systems Director



- Cross-brand IBM hardware platform manager
- Focuses on the “care and feeding” of the physical and virtual environment
- Helps reduce the costs of IT service management



**Discover managed endpoints and collect detailed OS and system level information**



**Hardware failure and pre-failure notification, event logging, and automation**



**Ensure systems are operating optimally thru platform update identification and distribution**

# IBM Systems Director Topology

**IBM System Director Server**  
Windows, Linux (Power & Intel), AIX



**Management Console(s)**  
Web Interface



**IBM Systems Director Agents & Managed Systems**

Operating Systems, Logical Partitions, HMCs, Switches, Storage, Servers, Desktops, Laptops, SNMP devices, CIM devices

- **Three-tiered architecture**
- **Thousands of managed nodes**
- **Upward Integration modules supporting**
  - Tivoli, Computer Associates, Hewlett Packard, Microsoft



## Preferred packaging: Editions

### ▪ **Express Edition**

- Basic Care and Feeding of an IBM Server Environment
  - Inventory, Monitoring (Including Energy), Automation, Compliance and Updating
- Included on every Power 7 order unless you take it off
- Cost for maintenance after the first year

### ▪ **Standard Edition**

- Energy Management
- Virtualized Partition capture and deploy to a specific system
- Network Discovery and Management

### ▪ **Enterprise Edition**

- Virtualized Partition deployment to a Pool of Systems & Storage
- Capacity planning, historical trending of performance and energy with customized reporting for Single/Multiple Partitions/Systems.
- Compliance checking with tracking of changes over time and also relationships and causal analysis between partitions/systems

# IBM Systems Director Editions packaging for Power Systems

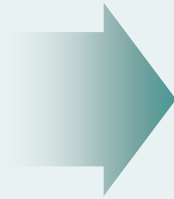
Products	Express	Standard	Enterprise	AIX Enterprise
IBM System Director	✓	✓	✓	✓
Active Energy Manager	✓	✓	✓	✓
VMControl				
Express	✓	✓	✓	✓
Standard		✓	✓	✓
Enterprise			✓	✓
Storage Manager		✓	✓	✓
Network Control		✓	✓	✓
Transition Manager for HP® SIM	✓	✓	✓	✓
Service and Support Manager	✓	✓	✓	✓
IBM Tivoli Monitoring with Performance Analyzer, Energy Management			✓	✓
Tivoli Application Dependency Discovery Manager			✓	✓
AIX 6.1 or AIX 7.1				✓
Workload Partitions Manager				✓
1 or 3 year software maintenance	✓	✓	✓	✓

Note: Most components can be bought individually ( with appropriate pre-req software)

# How virtualization management needs evolve



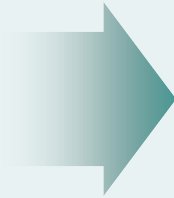
**Automate**



## ***Optimize With System Pools***

- Create, modify, delete pools
- Automate resource mobility
- Manage utilization and availability

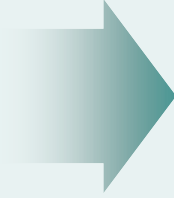
**Manage**



## ***Manage Virtual Image Libraries***

- Create, capture, import, deploy
- Centralize image management
- Migrate and move virtual images

**Visualize**



## ***Virtualize Workloads***

- View, create, modify, delete VMs
  - Start/stop, relocate VMs
- Manage multiple hypervisors



# IBM Systems Director Editions map client progress

**IBM Systems Director Enterprise with VMControl Enterprise Edition**

*for cloud computing*



**AUTOMATE**

- Create virtual pools
- Automate workload provisioning
- Balance workloads



Statement of Direction for IBM i for Enterprise Edition function

**IBM Systems Director Standard Edition with VMControl Standard Edition**

*for rapid deployment*



**MANAGE**

- Create standardized images
- Automate resource provisioning
  - Move virtual resources



**IBM Systems Director Express Edition with VMControl Express Edition**

*for lifecycle management*



**VISUALIZE**

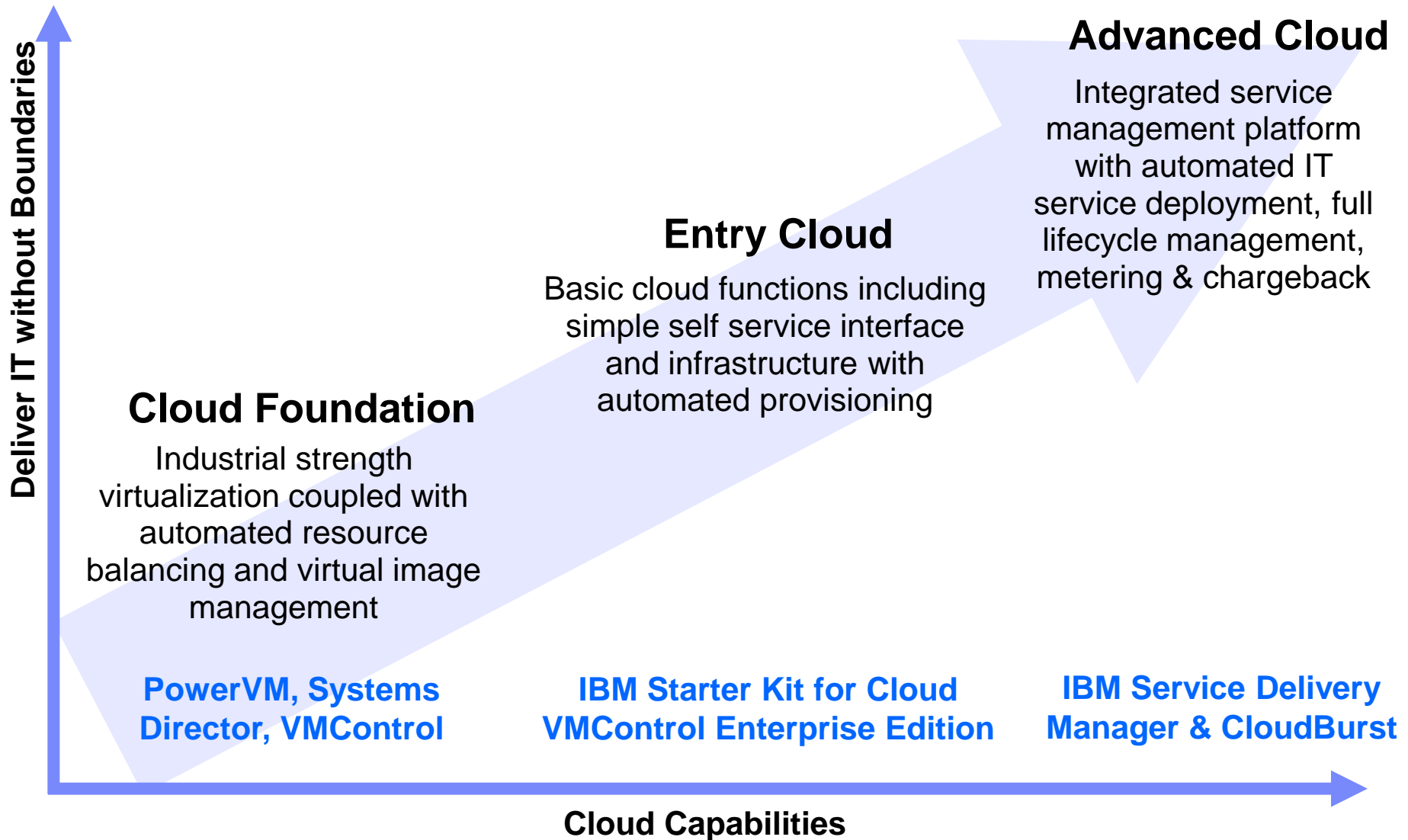
- Discover resources
  - Monitor health
- Update components



**Increasing management simplicity**

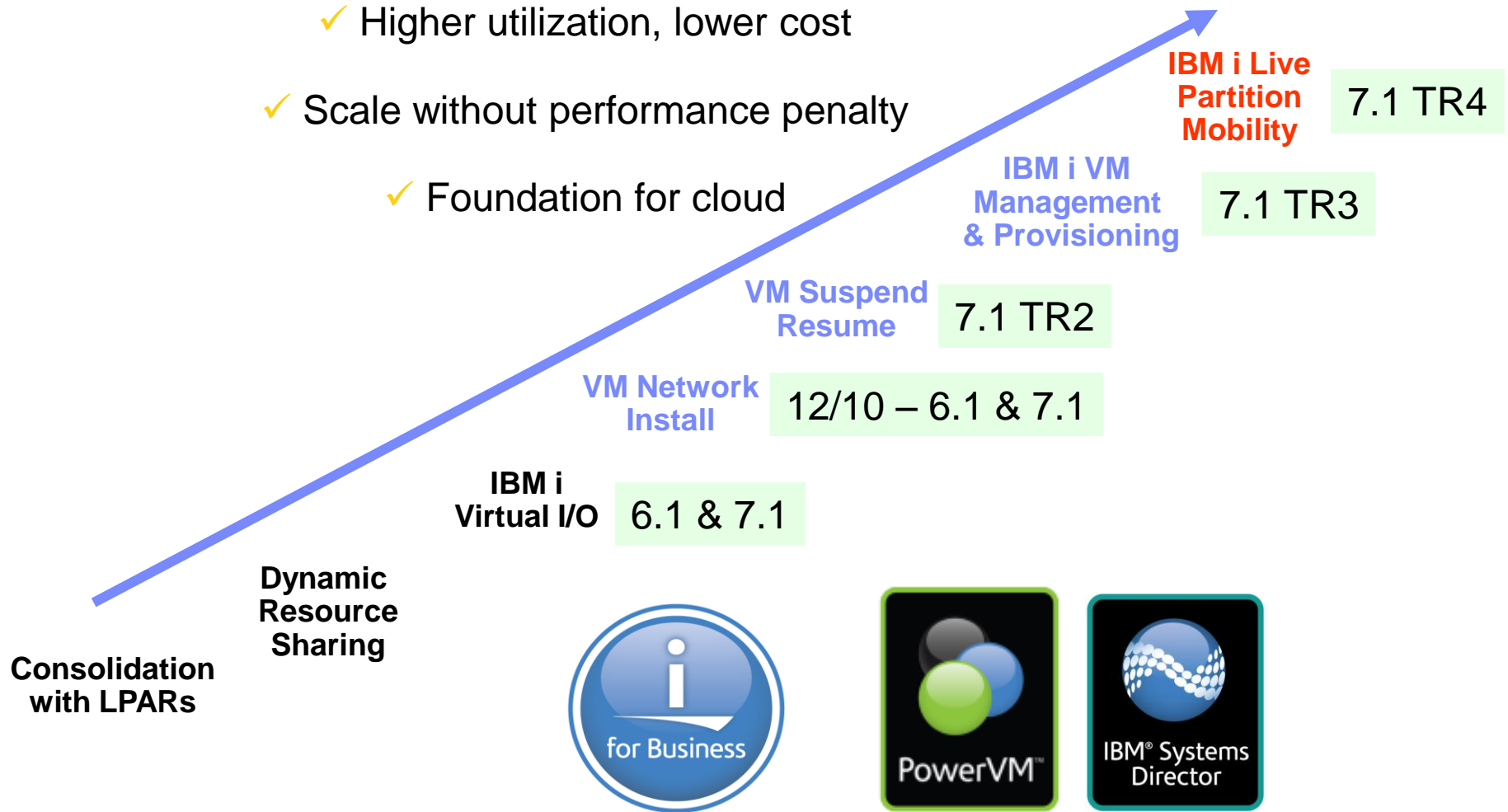
**Increasing scope of control**

# Power Systems Cloud Solution Positioning



# IBM i adoption of IBM PowerVM cloud technologies

- ✓ Higher utilization, lower cost
- ✓ Scale without performance penalty
- ✓ Foundation for cloud



# VMControl's Virtual Systems Management Strategy

- Traditional Focus...
  - – Hardware centric; partitioning and sharing hardware; bottoms up
  - – Server, storage and network virtualization and management silos
  - – Point products and solutions for the different management domains
  - – Homogenous management solutions for System z, Power and System x
  - – Managing large number of individual systems
  - – Attempts to manage virtual resources like hardware
- VMControl's Focus...
  - – Workload aware; tops down; in the context of the business needs
  - – **The system = server + storage + network**
  - – **Integration across availability, energy, performance and security management domains**
  - – A single and consistent solution for all IBM Systems
  - – **Managing pools of cooperating systems within the simplicity of a single system**
  - – A shift from managing virtualization to using virtualization to manage
- The Value...
  - – Radically ***improved time to value*** for new workloads
  - – Provide ***repeatable accuracy and consistency*** via automation
  - – Drive ***higher utilization*** and efficiencies of IBM System

## Comparison times of Capture and Deploy

Operation	NIM Based	SCS CR – DD Copy	SCS CR - FastCopy
AIX (~5 GB Image) Lab	4 Minutes Capture 13 Minutes Deploy	2.5 Minutes Capture 5 Minutes Deploy	15 Seconds Capture 3 Minutes Deploy
AIX Deploy 300 GB 5 Disk Volumes (Customer)	San Team- allocate storage Network -zone switches 70 GB Root NIM deploy Restore VG 80 GB Oracle Restore VG 50 Application Restore VG 50 (2) paging Disk	60 Minutes Capture 58 Minute Deploy	3 Minutes Capture 13 Minutes Deploy (over new disks) 6 Minutes Deploy (over existing disks)
IBM i 100 GB	N/A	12 Minutes Capture 18 Minutes Deploy	45 seconds Capture 45 seconds Deploy & then 7 minutes before 5250 session sign-on
IBM i 40 GB	N/A	10 Minutes Capture 6 Minutes Deploy	30 seconds Capture 30 seconds Deploy + 6 minutes to 5250 sign-on

*VMControl encompasses virtual workload lifecycle management, image management and system pool management as an extension to IBM Systems Director, usually purchased as IBM Systems Director Standard Edition*

What is the key word in the above definition - **VIRTUAL**

What does Virtual mean for Power? – **PowerVM (VIOS) & SAN Storage**

What does PowerVM Provide?

Industry-leading virtualization technology for...

IBM Power Systems

AIX, Linux and IBM i operating systems

Capabilities include

**Logical partitions, micro-partitioning**

**Virtual I/O Server**

**Suspend / resume**

Shared processor pools

Shared storage pools

Thin provisioning

**Live Partition Mobility**

Active Memory Sharing

# Virtualization Terms – Mostly Interchangeable

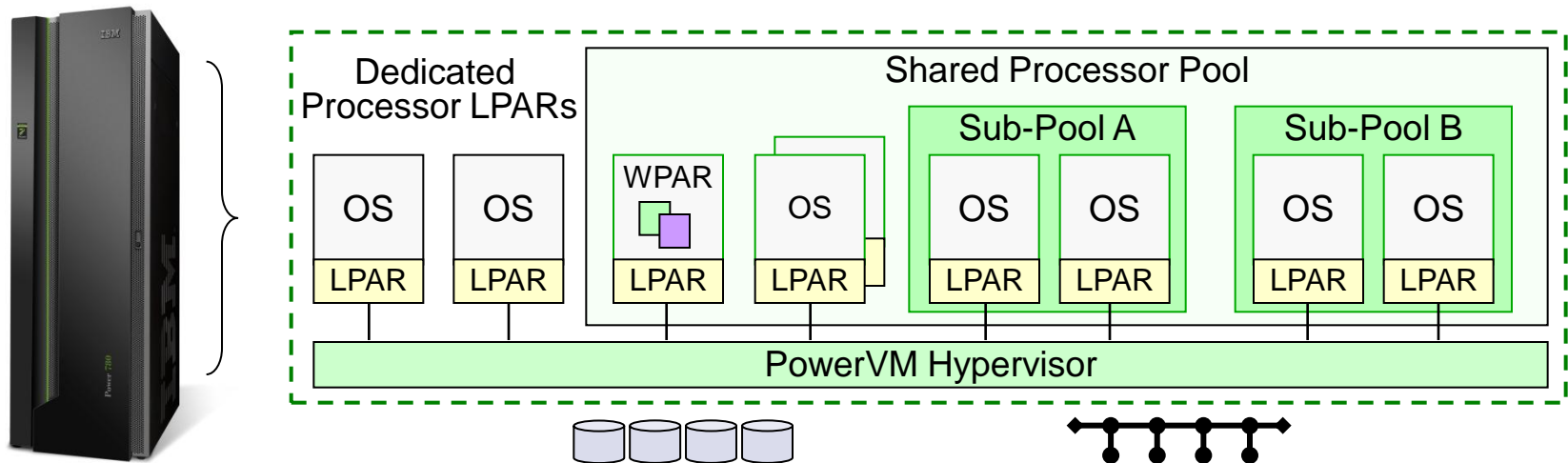
## *Variations of the same theme*

Logical Partition = LPAR = Virtual Machine  
= VM = Virtual Image = Virtual System

- “Logical partition” (a.k.a. LPAR) is familiar to Power Systems customers
- “Virtual machine” (a.k.a. VM) originated with the mainframe and was later embraced by VMware
- A “Virtual image” contains the requisite software to be application-ready
- “Virtual system” is a generic term for an independent environment configured with virtual resources

# Logical Partitions (LPARs)

- Power Systems hardware can be virtualized into multiple logical partitions, each operating as an independent system
- Processors, memory and I/O are assigned to each LPAR
- Can run AIX, IBM i, Linux or the Virtual I/O Server

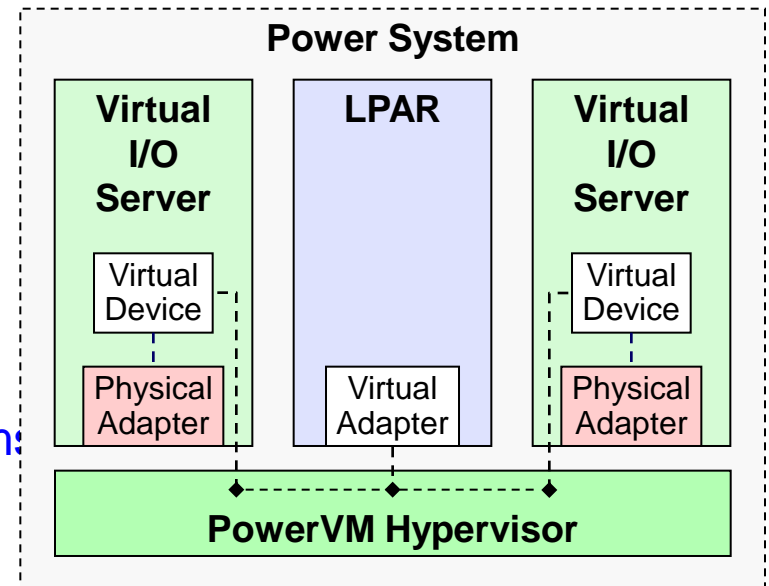


**DEDICATED I/O: Typical for most today**



# Virtual I/O Server (VIOS)

- I/O virtualization appliance partition
  - Storage (virtual SCSI, virtual Fibre Channel)
  - Network (virtual Ethernet)
- Enables sharing of physical I/O resources among partitions
  - VIOS owns the physical I/O
  - Serves AIX, IBM i and Linux operating systems
- Multiple VIOS support
  - Typically deployed in pairs
  - Improve availability and performance
- Maximize the utilization of physical adapters
- Set up logical partitions faster and at lower cost



*VIOS and SAN Storage Necessary for Live Partition Mobility and quick deployment of partitions*

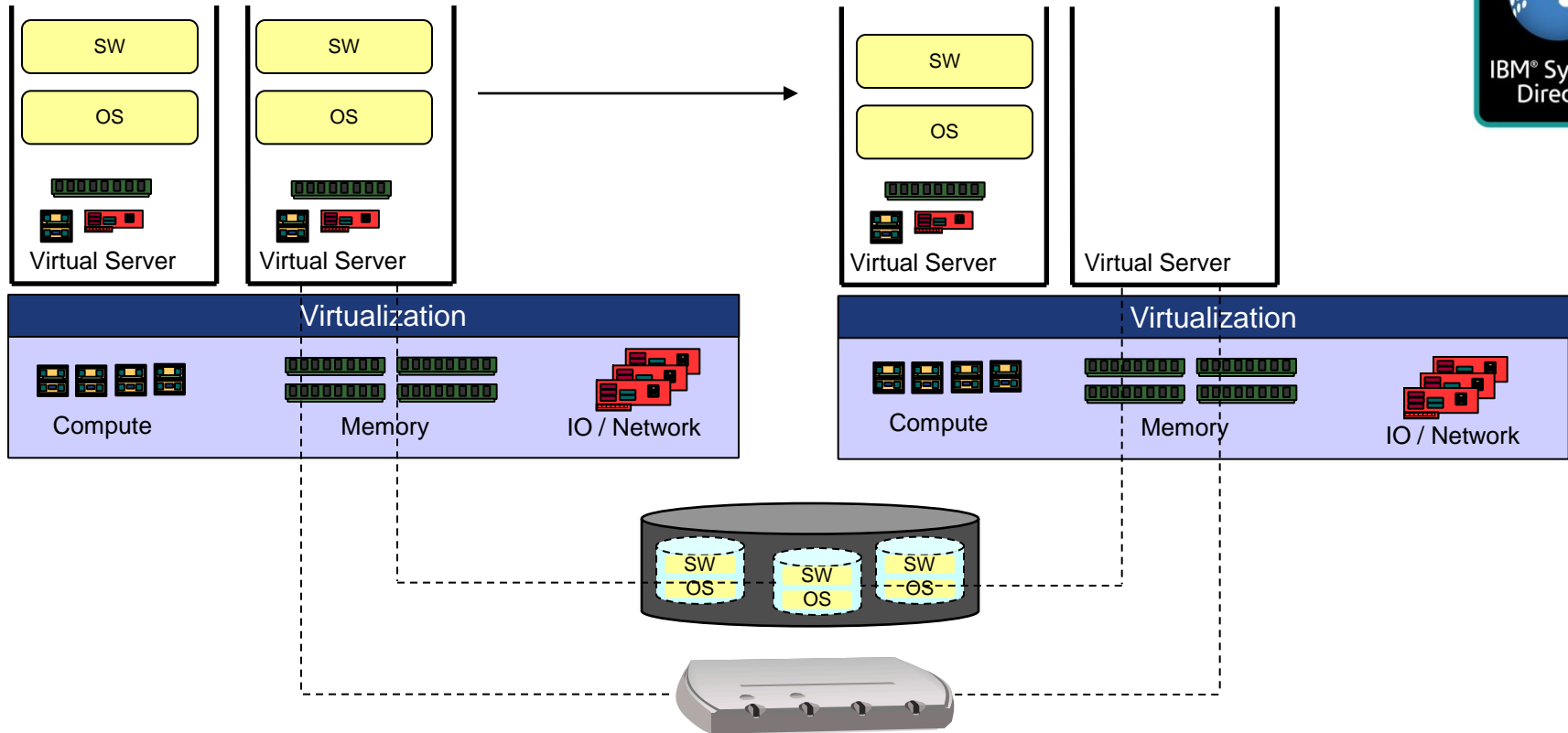
# Why Virtualize Workloads with PowerVM?



- It's simple
  1. Create a new virtual machine (VM) – a.k.a. logical partition (LPAR)
  2. Install AIX, IBM i or Linux
  3. Deploy the workload
  4. Configure/tune as required
- A virtualized workload can be stored, copied, archived or modified
- Operational benefits
  - Rapid provisioning
  - Scalability
  - Recoverability
  - Consolidation
- Bottom line – save time and reduce costs

*IBM Systems Director Standard Edition with VMControl can help automate the creation, deployment and management of those workloads*

# Automating VM relocation (Live Partition Mobility)



- There is significant value in the tight integration of server, storage and network aspects
  - Allocate resources on the target host.
  - Provide access (re-zone/re-mask) to the virtual server storage on the target host
  - Move the virtual server in-memory state to target host.
  - De-allocating resources on the source host.

# IBM Systems Director VMControl Express

## Visualize, Monitoring and Manage Virtual Servers

### Discover, Visualize and Monitor Virtual Servers

- Host and Virtual Server Discovery
- Topology Maps showing relationships
- Virtual Resource Monitoring
- Host and Virtual Server Status
- Thresholds

### Virtual Server Lifecycle Management

- Create/Delete Virtual Servers
- Dynamically Edit Virtual Servers

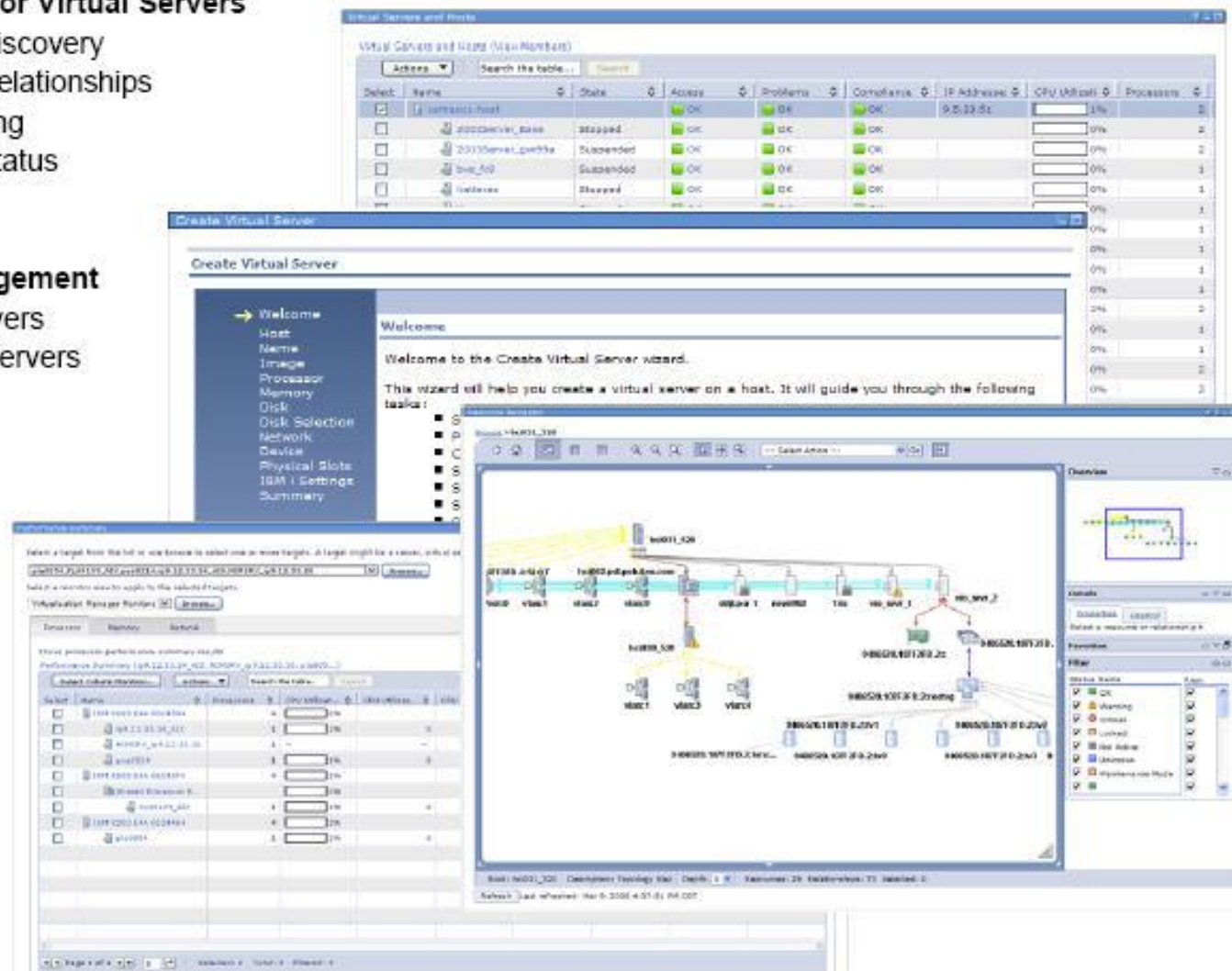
### Basic Virtual Server Mobility

- Move Virtual Server
- Evacuate Host
- Relocation Plans

### Cross Platform Consistency

- VMware ESX
- VMware vCenter
- Hyper-V
- Xen
- KVM\*
- PowerVM
- z/VM

\*New in VMControl 2.3.1



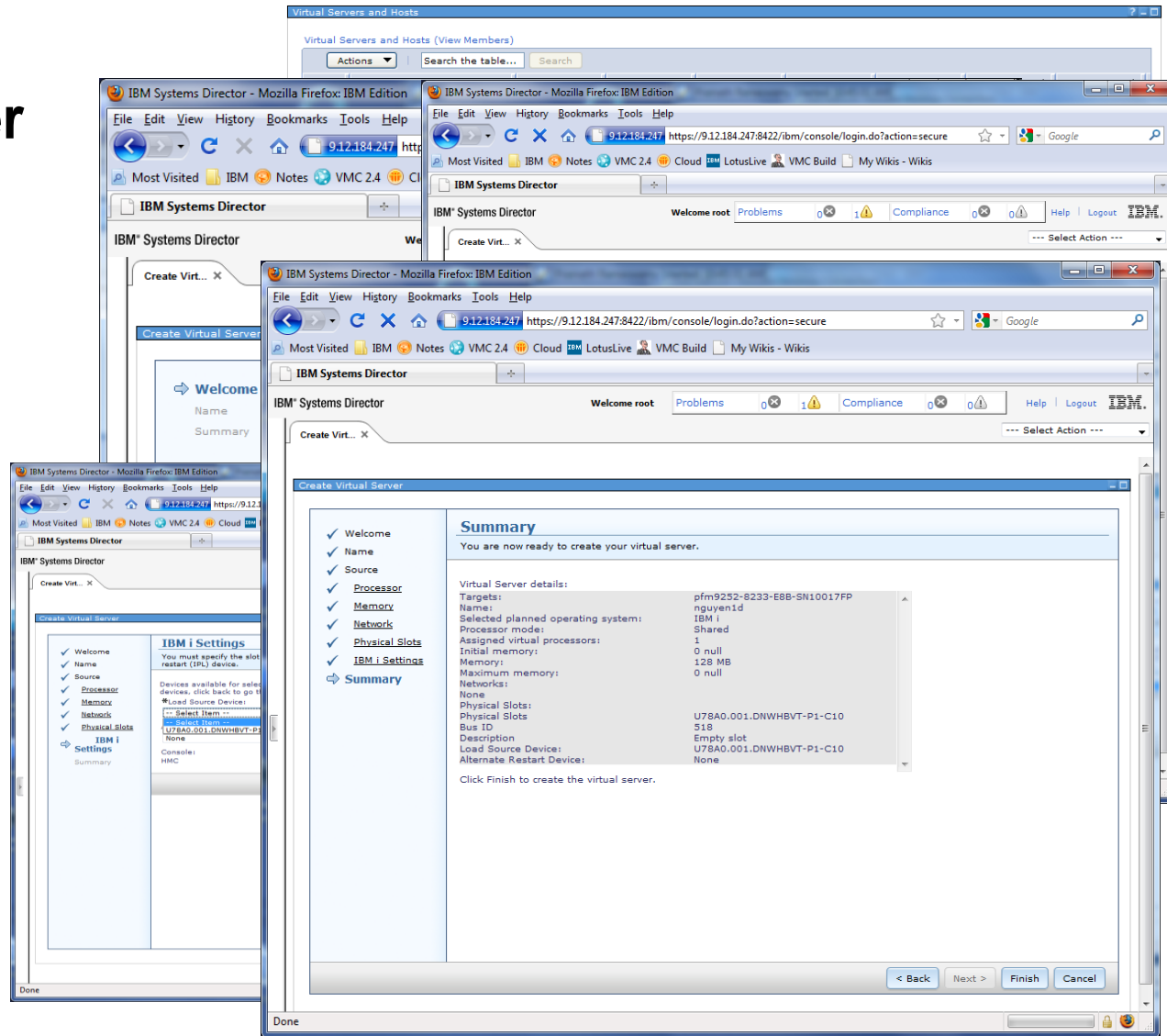
# Create & Edit VS Wizards tailored to Partition specifics (AIX, VIOS, i)

- **Wizard guides user through VS creation**

- Processor
- Memory
- Network

- **IBM i required parameters**

- Physical Slots
- Load Source
- Alternate Restart Device



## Supporting an Ecosystem around Open Standards

- **OVF standardizes a virtual machine image structure and packaging format**
  - The Open Virtualization Format is being standardized in the DMTF.
  - Allows complex software solutions to be defined as compositions of virtual machine images.
  - IBM's collaboration with other industry leaders has driven the OVF standard.
- **A Virtual Machine Image is a Virtual Appliance**
  - Simplifies delivery and deployment of complex software systems
  - Provides pre-installed, pre-configured and tested software stack  
Operating Systems, Middleware and Application Software
  - The entire software solution is managed (deployed, updated, etc.) as a unit  
Removes the need to deal with problematic dependency management
- **Virtual Machine Images enable the delivery of Software in the Cloud**
  - IBM Software is being delivered as Virtual Appliances (e.g. WebSphere Cloudburst)
  - Many others within the industry are forming ecosystems around Virtual Machine Images



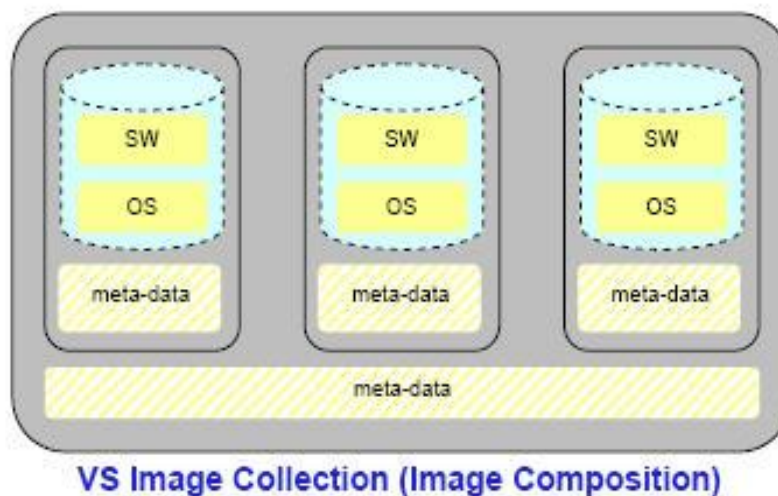
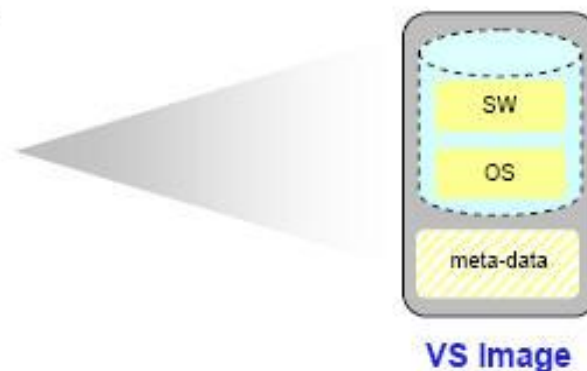
*Appliance Simplicity  
for Complex  
Software Solutions*



VMControl enables the delivery and management of Open Standard Virtual Machine Images on IBM Systems.

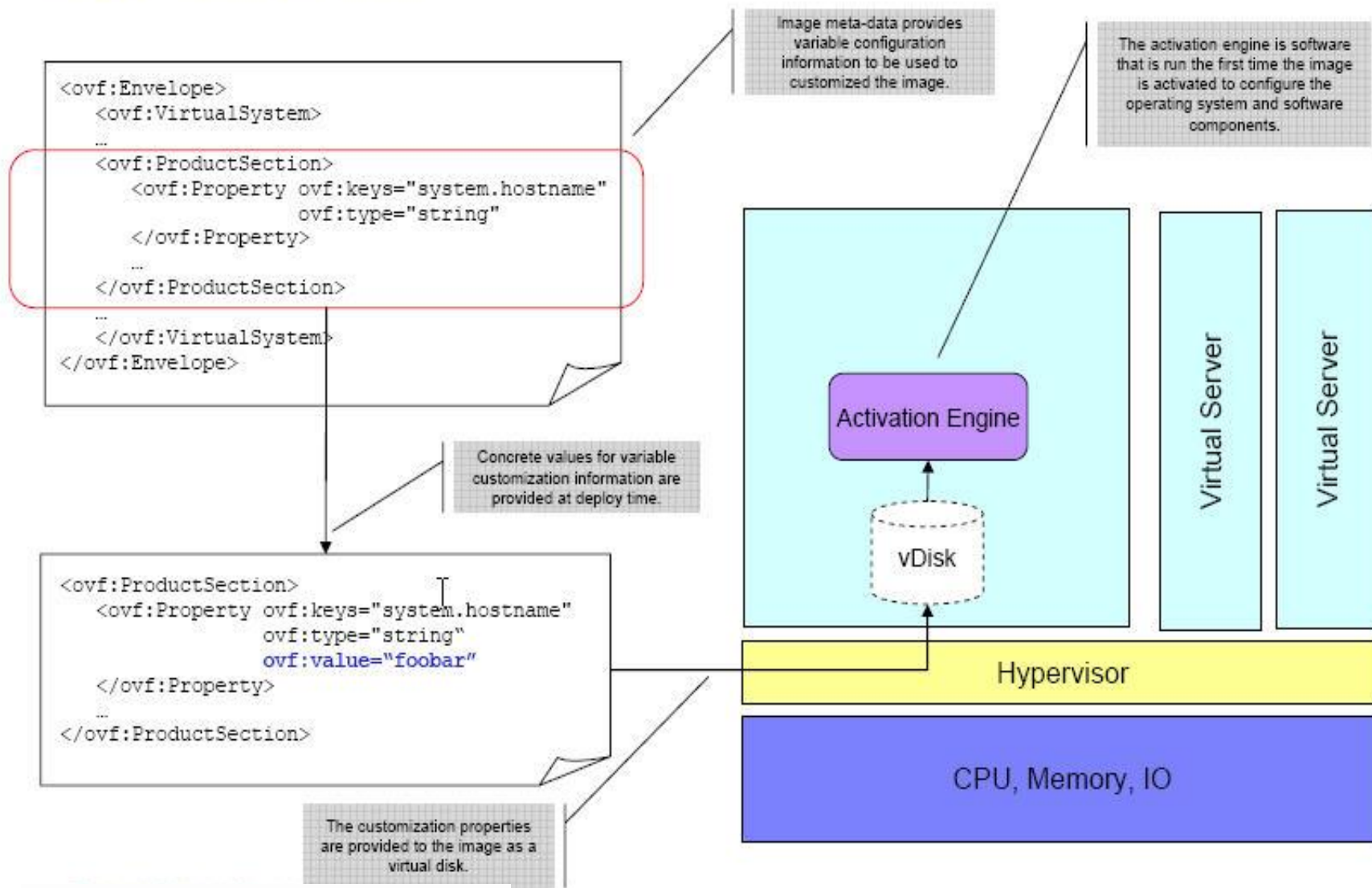
## Virtual Server Image Detailed View

- **Virtual Server Definition**
  - CPU requirements
  - Memory requirements
  - I/O requirements
- **Virtual Network Definition**
  - VLAN Identifiers
  - Network properties
- **Virtual Disk Image(s)**
  - Disk type
  - Disk format
  - Data (by value / by reference, *optional\**)
- **Customization Details**
  - OS properties
  - Middleware properties
  - Software properties
- **Goals and Constraints**
  - Availability goals
  - Placement constraints



\*New with VMControl 2.4

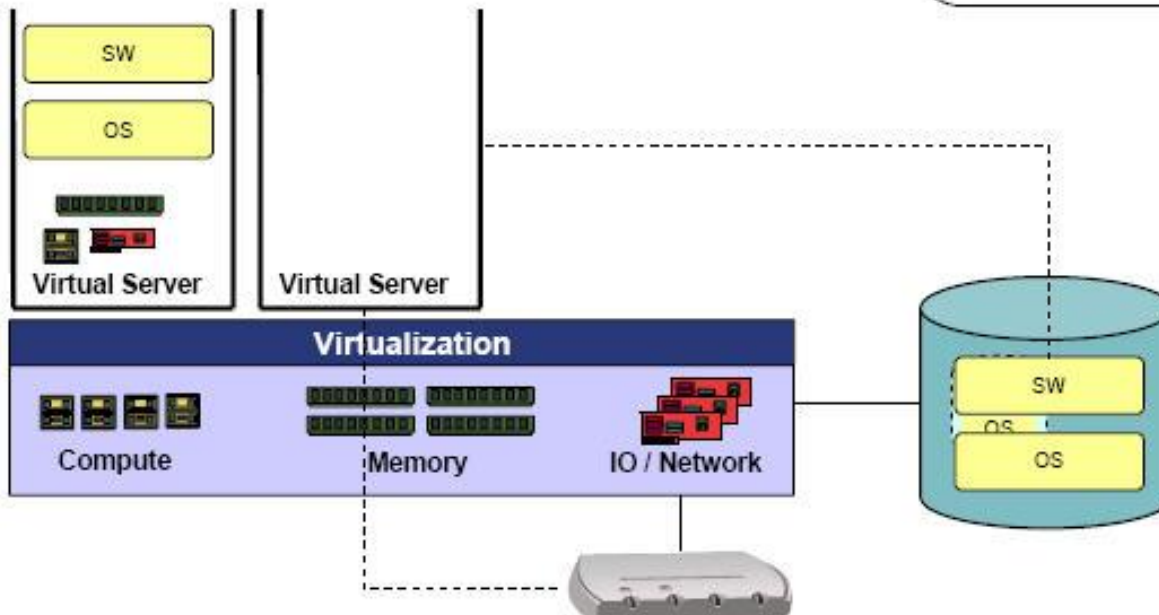
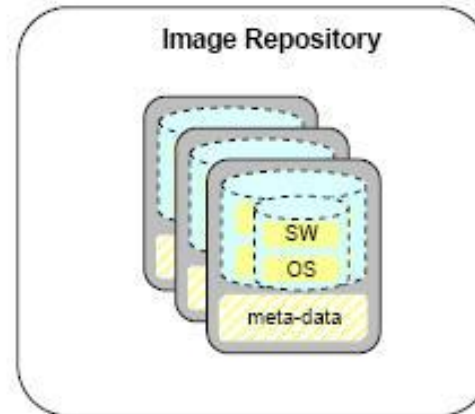
# Image Customization





# Deploying a Virtual Server Image

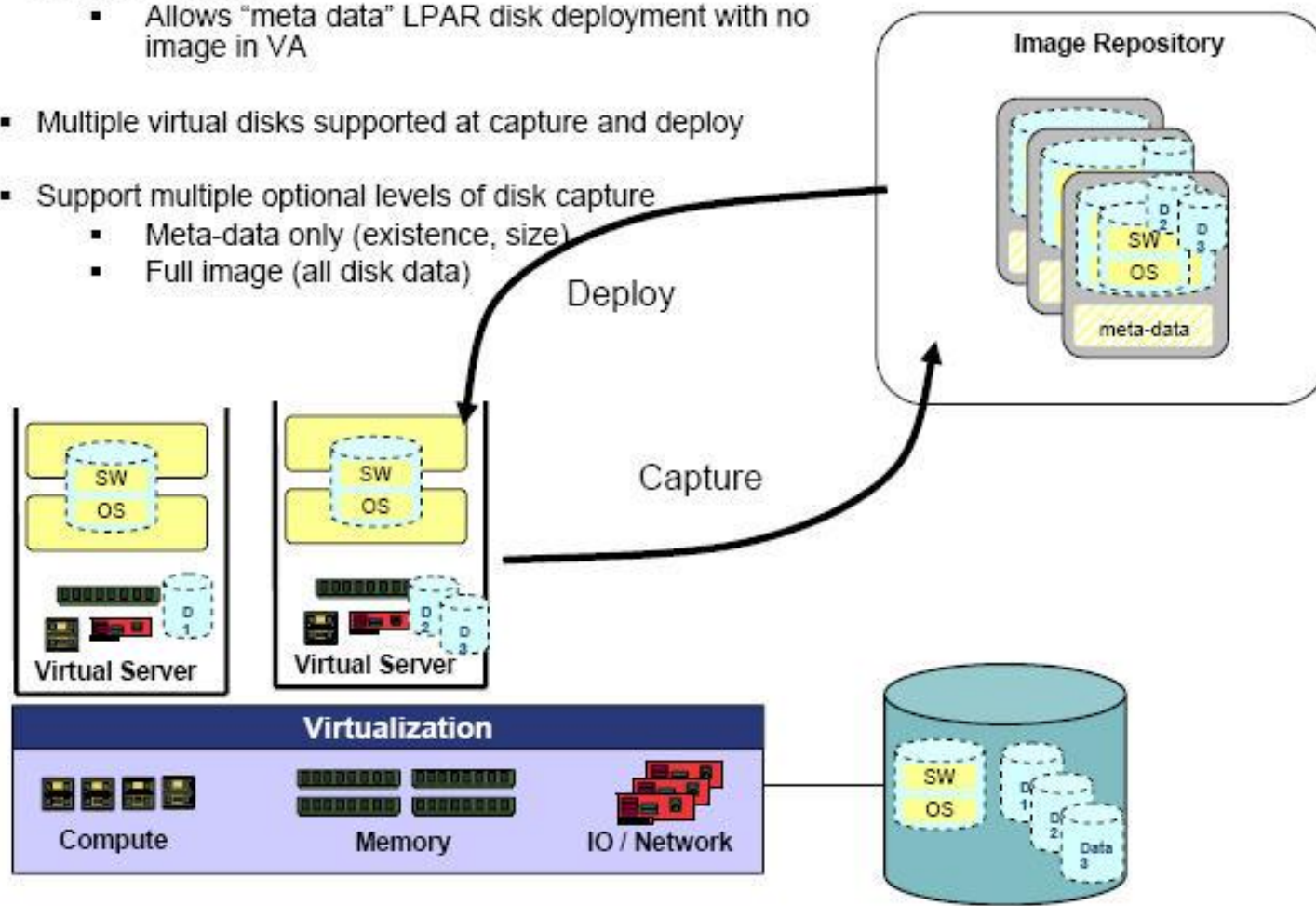
- The VS image meta-data is used to create VS container, allocating the required platform resources.
- Storage is dynamically allocated and attached to the virtual server - other data disks are attached.
- The VS is dynamically attached to the appropriate networks and VLANs.
- The virtual server is started from the bootable disk image and customized as part of its initial boot.



- Improved time-to-value...
- Fewer tools and fewer tasks...
- Workload (business) context...

## Multiple virtual data disk Virtual Appliances\*

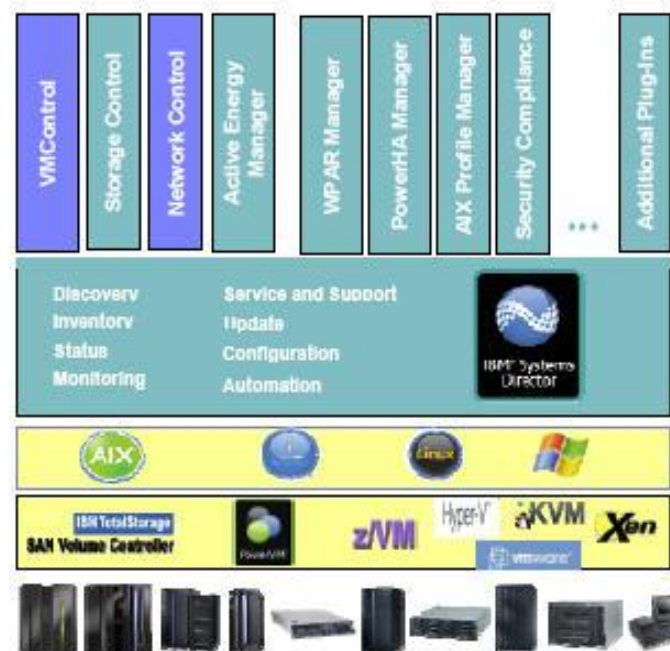
- Support for the capture and deployment of LPAR non-OS disk in a VS image
  - Allows "meta data" LPAR disk deployment with no image in VA
- Multiple virtual disks supported at capture and deploy
- Support multiple optional levels of disk capture
  - Meta-data only (existence, size)
  - Full image (all disk data)



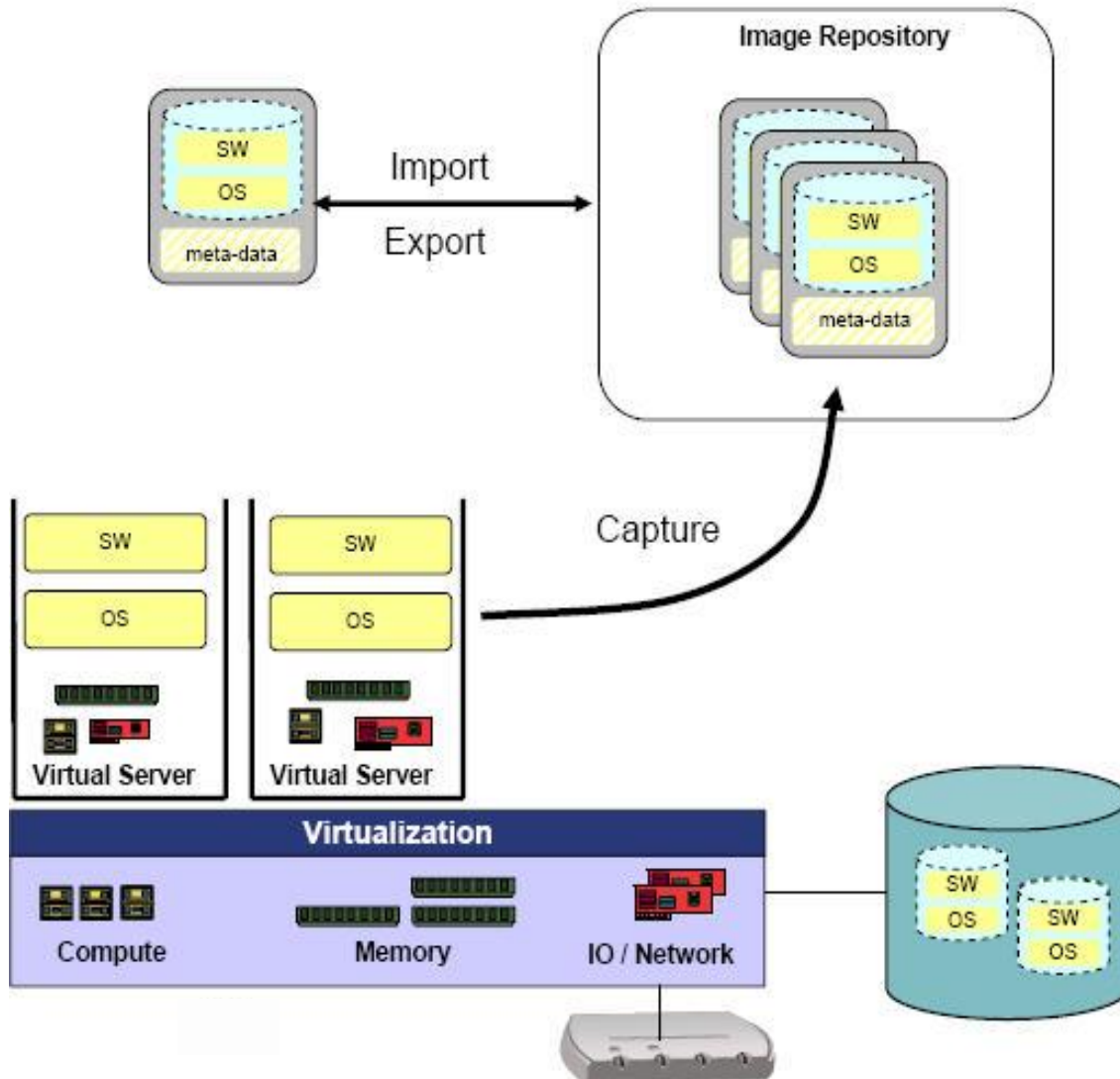
\*New with VMControl 2.4

## Attaching Network Resources

- VMControl provides the ability to attach to existing logical networks when deploying virtual servers
- When Network Control is also installed & licensed, VMControl provides the ability to dynamically provision and attach new logical networks when deploying virtual servers
  - Leverages Network System Pools (NSP)
  - Deployment of new Virtual Appliances
  - Relocating Virtual Servers within a virtual farm
  - Relocating Virtual Servers within System Pools



# Managing Virtual Server Images



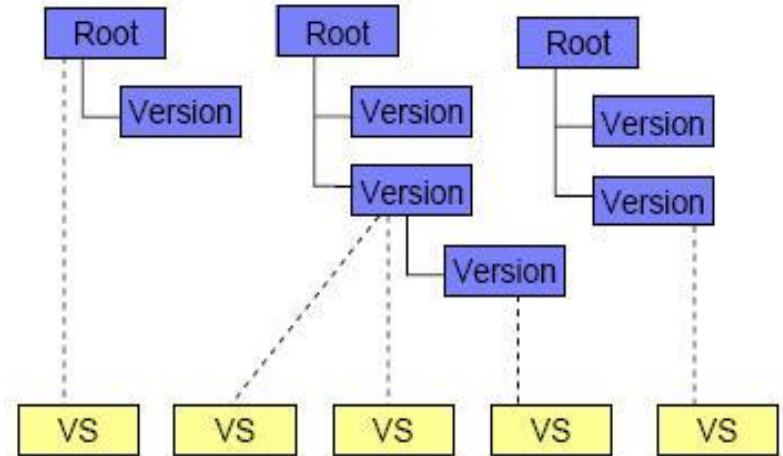
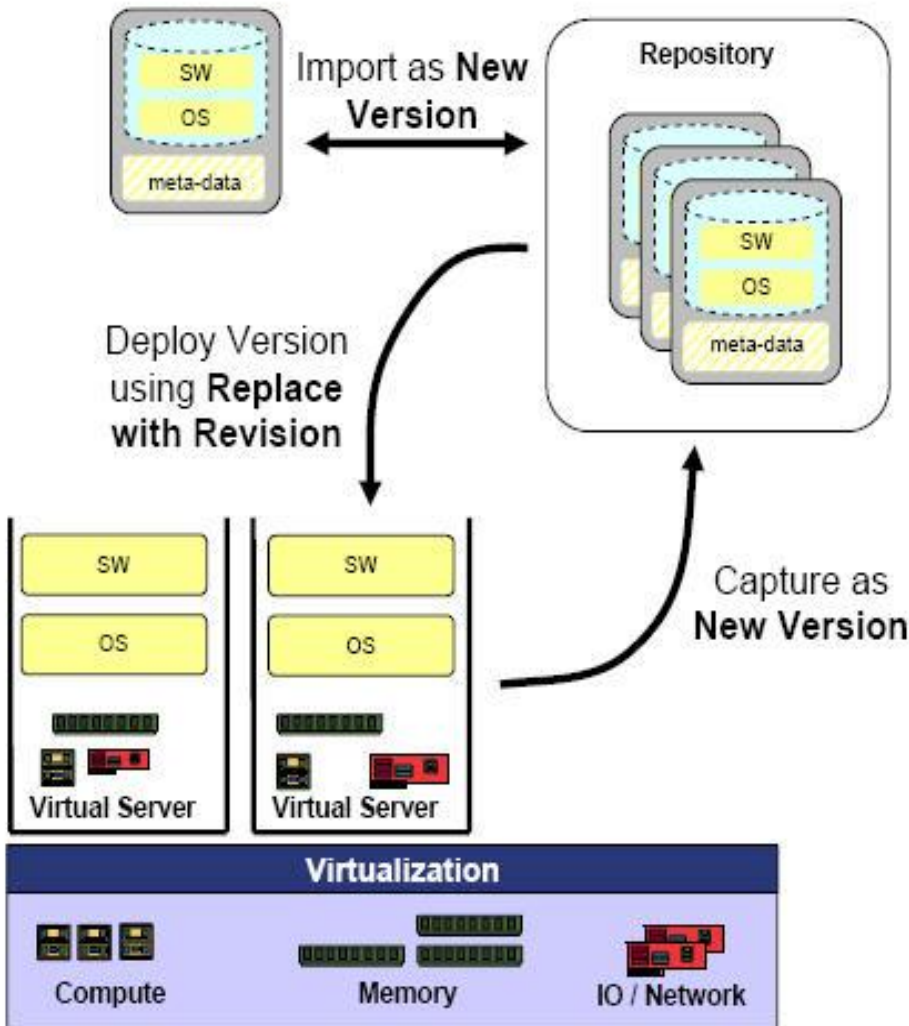
## ▪ Capture a Virtual Server

- The bootable disk image is copied into the image repository.
- Image meta-data describing the VS container is captured and included as part of the virtual appliance.

## ▪ Import/Export a VS Image

- A VS image may be imported to the image repository and cataloged by VMControl.
- A VS image can be exported from a repository and easily distributed to other systems and environments.

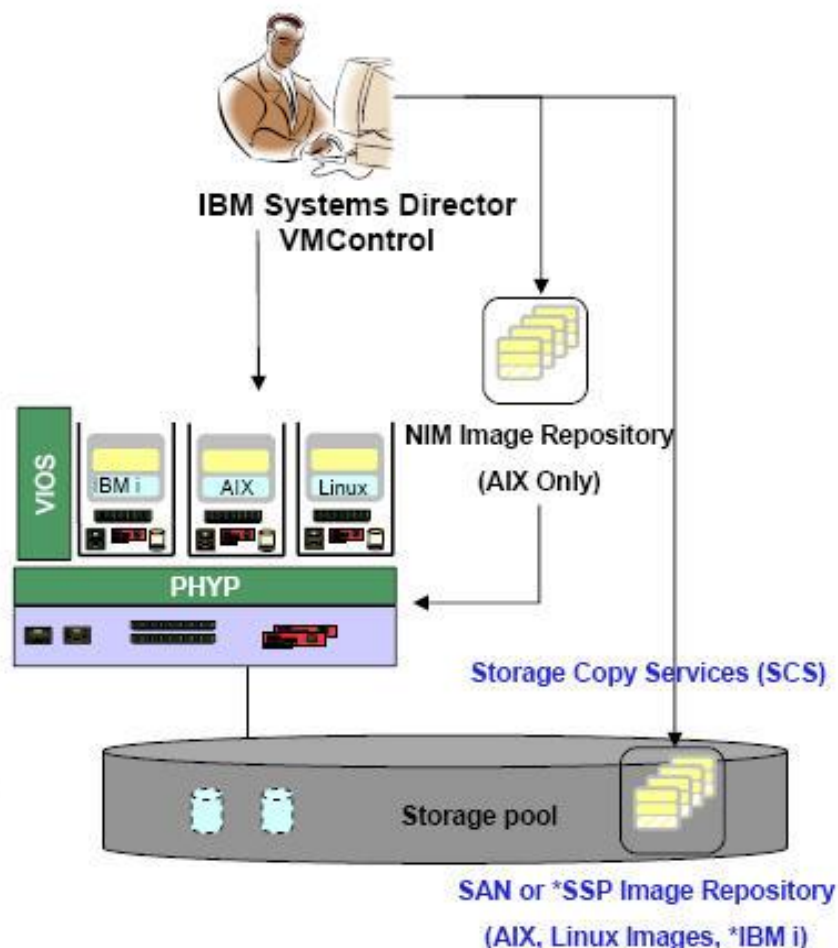
# Image Versioning



- Key relationships maintained in the resource model aiding in managing the full image lifecycle
- "version-of" relationship indicating an image is a version of another image in the repository.
- "deployed" relationship between an image in the repository and a deployed virtual server.

## Managing PowerVM Images with VMControl

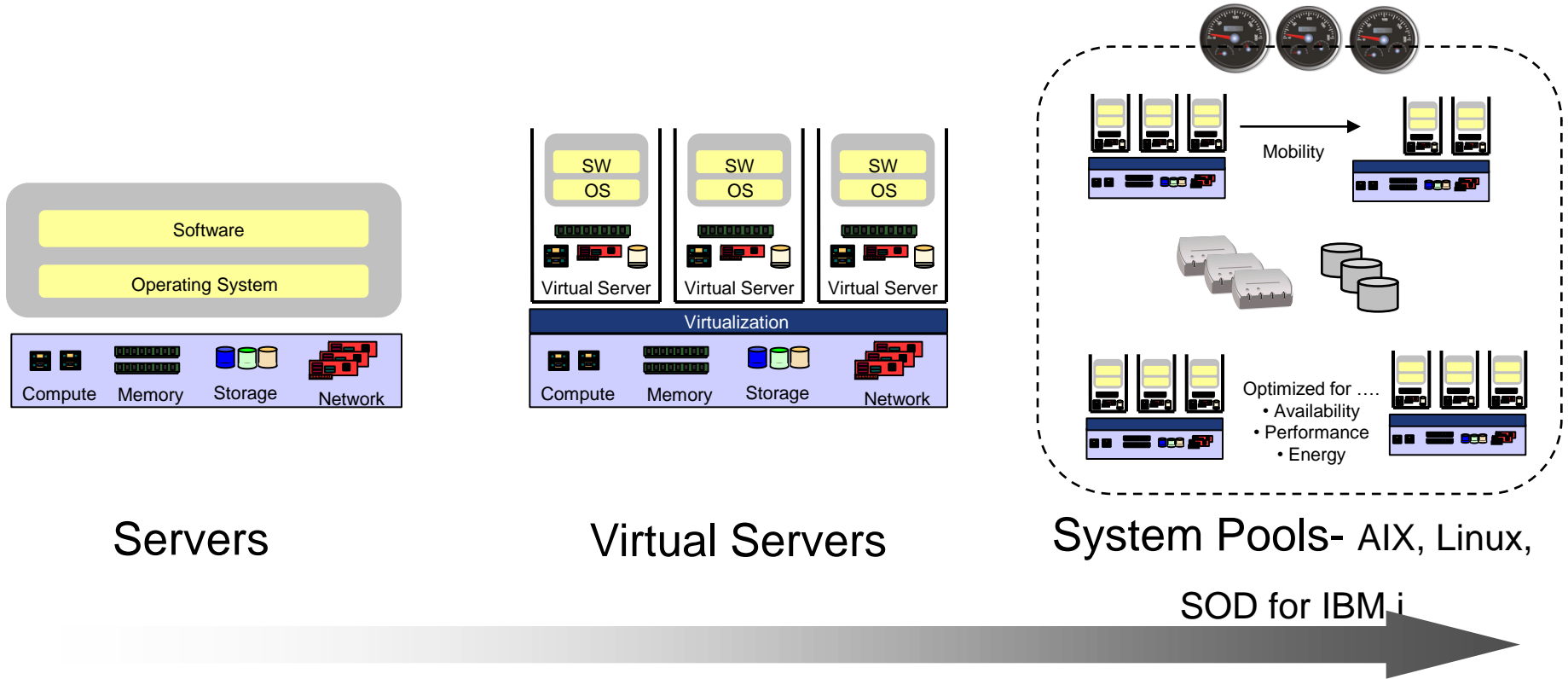
- Capture and Catalog PowerVM Virtual Servers
    - Within a NIM Image Repository for AIX
    - \*Within a common repository on the SAN or SSP for AIX, Linux and iOS
  - Deploy to NEW or EXISTING LPAR
    - New LPAR provisioning based on Image (OVF) meta-data
    - \*New LPAR provisioned and attachment of pre-allocated storage (LUN)
    - Existing LPAR validated against Image (OVF) meta-data
  - Dynamic allocation of Storage resources
    - VIOS managed volume groups
    - Shared SAN storage pools
    - Storage System Pools
    - NPIV
    - Multi-path IO to storage supported
  - Dynamic allocation of Network resources
    - Map the networks in the virtual appliance to the host server's networks
  - NIM resources auto-created during Deploy
    - Adapter file, SPOT, User-specified resource
- \*New with VMControl 2.4**  
**Note: SCS provides NIM alternative, but both can be used, if desired**



- Logical Volumes (LV) allocated from VIOS Volume Group
- Physical Volumes (LUN) allocated from SAN pool zoned to VIOS

# IBM Systems Director VMControl Enterprise

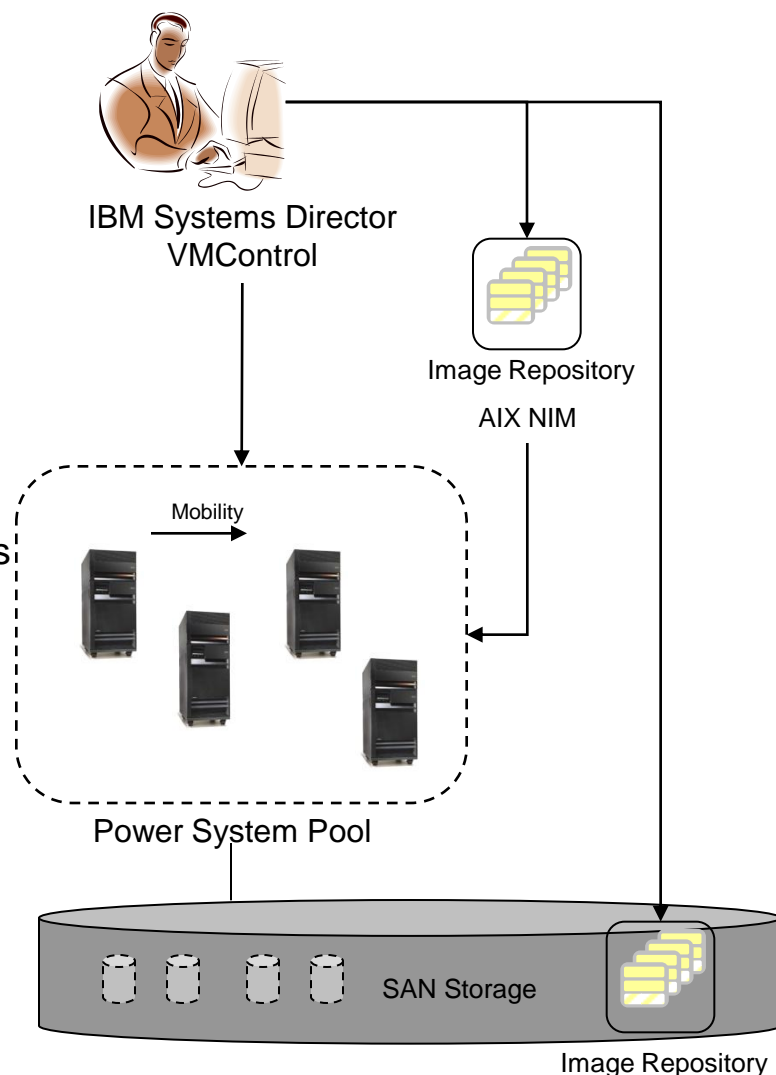
## IBM System Pools and Workload Management



Managing a pool of system resources with the simplicity of a single system.

# Power Systems Pools with VMControl Enterprise Edition

- Simplifying the management of Power Systems
  - Integration with the IBM Systems Director dashboard
    - Dynamic Virtual Server Placement
    - Simplified Image Capture, Deploy and Customize
      - Virtual Server Relocation/Mobility
  - Workload Resilience (Hardware PFA automated Relocation)
    - Host Maintenance Mode
- Support for P5, P6 and P7 Systems
  - New systems or available capacity from existing systems
    - IVM and HMC managed systems
- Support for NIM and Storage Based Image Repositories
  - Capture, Search, Version and Deploy AIX Images
  - Capture, Search, Version and Deploy Linux Images
- Dynamic allocation of SAN storage
  - Shared SAN storage pools
  - Non-IBM storage via SVC and TPC
  - Multi-path IO to storage supported
    - Storage System Pools
  - Storage Control providing embedded TPC
- Provides the foundation for IBM CloudBurst on Power



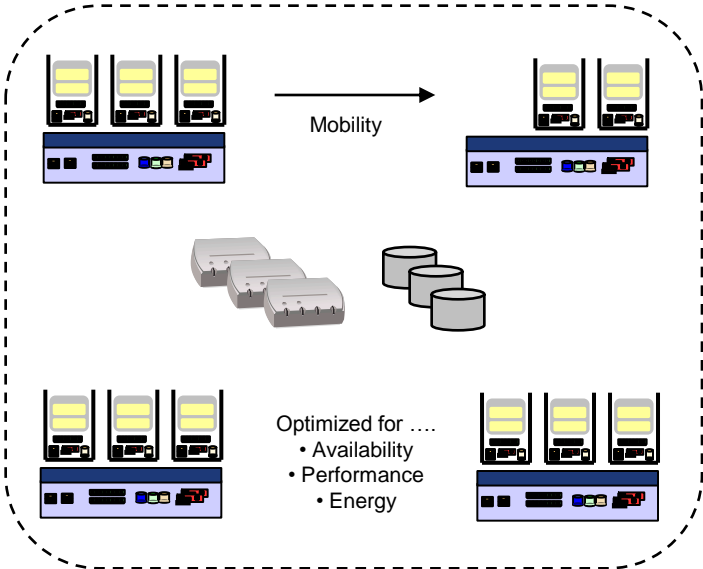


# System Pools within IBM Systems Director

Managing a pool of system resources with single systems simplicity



IBM Systems Director  
VMControl



System Pool

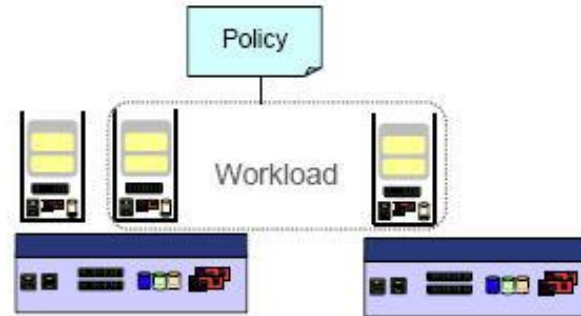


- System pools are being integrated as a new type of system with the IBM System Director tools, allowing the pool to be managed a single logical entity in the data center.
- A dashboard view for System pools will provide overall view of health and status of the pool and the deployed workloads.
- The dashboard will provide simplified monitoring and visualization of the aggregate capacity and utilization for the systems within a pool.

# IBM Systems Director VMControl

## VMControl Workloads

- Group of virtual servers that contribute to an application workload or business service
- Summarize health and status of the composition of workload's virtual resources
- Aggregated monitoring
- Attachment of workload policies



Dashboard - Workload1

### Workload1 – my web application serving the world

Source virtual appliance: MyVirApp  
Availability policy: Active

#### Scoreboard

Active Status	OK	Warning	Info
Hardware	1	-	-
Virtualization	-	3	-
LED	-	2	-
Threshold	-	1	-
Compliance	1	-	-

#### Virtual Servers

Virtual Server	State	Problems	Compliance	CPU Utilization
Unix Good	Active	OK	OK	30%
Sales App	Active	OK	OK	40%
Web Site	Active	OK	Warning	80%
My App	Active	OK	OK	30%
AIXplus	Active	OK	OK	95%

### WL - Workload

Resilience policy: Not Active

#### Scoreboard

Active Status	OK	Warning	Info
Hardware Status	1	-	-
Virtualization Status	-	-	-
Threshold Status	-	-	-

#### Monitors

Monitor	Average	Peak
CPU Utilization %	1.01	1.01

#### Virtual Servers

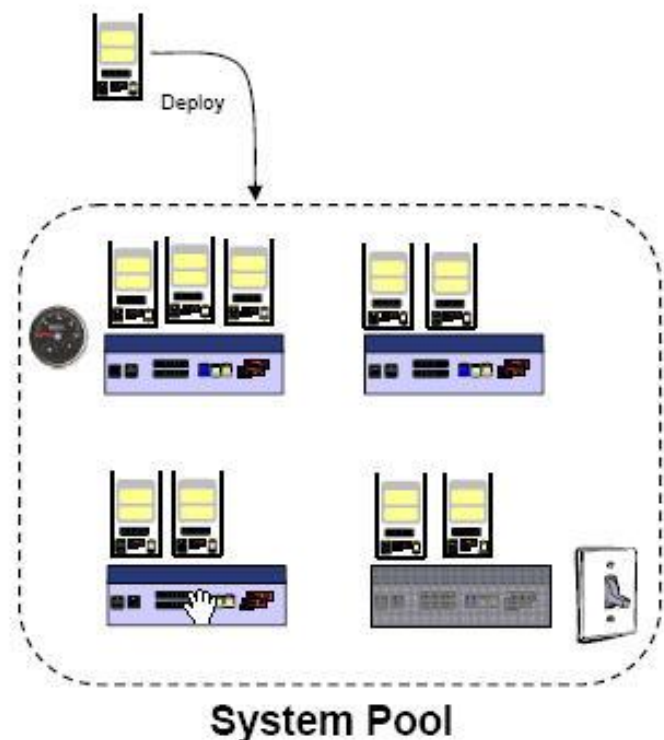
Select	Name	State	Access	Problems	Compliance	IP Addresses	CPU Utilization
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#### Resources being used by this workload

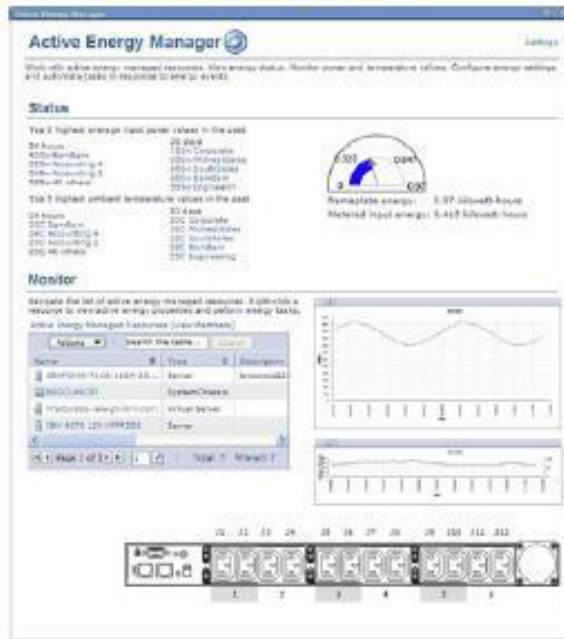
Resource	Total
Memory (MB)	2176.0
Virtual Disks	2
Hosts	1
Entitled Processing Units	0.5

## Ongoing optimization / rebalancing within a System Pool



- **User initiated or scheduled optimization / re-balancing**
  - New placement plan calculated favoring performance
  - Virtual servers moved away from areas of resource contention
  - Host and virtual server CPU and memory utilization considered
- **Re-balancing placement during deployment**
  - New placement plan calculated
  - Existing virtual servers may move to make room new virtual server
  - Virtual server capacity and existing virtual server and host utilization
- **Dynamic Consolidation and Power Controls**
  - Included as part of user initiated or scheduled optimization
  - Placement plans influenced by AEM to favor consolidation
  - Host systems power dynamically managed by AEM
  - New sleep and hibernations modes within IBM Systems leveraged
- **Dynamic Allocation and Resource Management**
  - Dynamically move virtual resource between workloads
  - Temporarily suspend lower priority workloads (VMs)
  - Dynamically add capacity via CUOD

# Automated Energy Optimizations\*



System Pool

- **Integrate with IBM Systems Director Active Energy Manager**
  - Leverage AEM's rich energy monitoring and power controls
  - AEM contributes to placement decisions via an energy placement advisor
- **Consolidate VMs on a fewer number of host systems during periods of lower utilization**
  - Move using VM mobility (relocation) and dynamic virtual machine placement within a System Pool
  - Reduce host power, leveraging new suspend and sleep modes within IBM Systems
- **Redistribute VMs as workload utilization needs increase**
  - Resume host capacity as required – leveraging new resume modes within IBM Systems

# Demo Time

## Requirements for VMControl SCS Environment

- All AIX, Linux and IBM i virtual servers to be “captured from” or “deployed to” using VMControl must have their storage allocated from the SAN and provided through one or more VIOS partitions.
- The virtual servers must use virtual Ethernet connections provided through one or more VIOS partitions.
  - The virtual servers must not have any physical devices allocated from the IBM Power server.
- Hardware Management Console (HMC) and POWER7®, must use HMC V7R7.4 or higher and all available updates.
- For POWER7 processor-based servers, use FW7.2 or higher and all available updates
- Communication to the SAN switch needed
  - SMI-S provider for Brocade, QLOGIC, Tivoli Productivity Center (TPC) for CISCO
- Communication to the IBM SAN needed
  - IBM Storage Control or Tivoli Productivity Center (TPC) or SMI-S provider

# SCS Common Repository Setup and Configuration

- Basic Steps
  - Activate Common Agent Services (CAS) on VIOS
  - Discover the VIOS OS in Systems Director
  - Install Common Repository Subagent on VIOS
  - Create and Assign SAN Storage for SCS Common Repository
  - Create the SCS Common Repository in VMControl
  - Install the Activation Engine in the Virtualized partition you want to capture (IBM i, AIX, Linux)

## Five Easy Steps to scope VMControl capabilities

1. What function do you want to perform with VMControl: Single disk (NIM), or multi disk (SCS) capture and deploy?
2. Do you attach storage with NPIV or VSCII?
3. What is your backend storage? IBM, EMC, Hitachi, SVC or V7000 with OEM?
4. Who is your SAN network switch vendor? Brocade, CISCO, QLOGIC or IBM (Brocade or BNT branded)
5. Now walk through the tables.



## VMControl Function: SCS or NIM

Method	Access to Switch Required	Access to Storage Required	IBM Storage Supported	EMC Storage Supported	HDS Storage Supported
<b>VSCII</b>					
SCS	Yes	Yes	Yes	Via SVC	Via SVC
NIM	No	No	Yes	Yes *	Yes
<b>NPIV</b>					
SCS	Yes	Yes	Yes	Via SVC	Via SVC
NIM Capture	No	No	Yes	Yes *	Yes
NIM Deploy	Yes	Yes	Yes	Via SVC	Via SVC

\* VIOS Level 2.2.1.3 HMC 7.7.4 or greater

## SAN Attached to VIOS Partition

Storage	SMIS	Storage Control	TPC
DS3/4/5	Yes ( via netapp)	Yes	Yes
DS8000	SSPC	Yes	Yes
SVC/V7000	No	Yes	Yes
EMC	Yes**	Yes**	Yes**
HDS	Via SVC	Via SVC	Via SVC

\*\* Needed for SERVER to SAN Mapping

## San Network Switch \*\*

Switch Vendor	SMI-S
Brocade	120.10 or 120.11 or Brocade Network Advisor 11.1.2 or above (x86 Linux or Windows)
Cisco	TPC
Qlogic	Built-In
IBM (BNT)	?

\*\* Access to SAN Network Switch needed for SERVER to SAN Mapping, VMControl NPIV, or SCS Capture/Deploy

## Bottom Line

- Bottom Line: IBM Storage Supported for SCS and NIM deploys of all types
- EMC & HDS supported for SCS and NIM deploys of all types if attached via an SVC or V7000
- EMC VIOS native storage attachment only supported for VMControl NIM with VSCII. Additional IBM Systems Director function of Server to San mapping enabled if you have access to both San and Switch
- Hitachi (HDS) supported for VMControl NIM via VSCII only. No San to Storage mapping.
- Can not mix types of VIOS attachment ie Local Boot from SAN and SAN Disks or VSCII Boot and NPIV SAN Disks.

# IBM Systems Director Next Steps

- 1. Decide what IBM Systems Director Function is important to you**
  - **Accurate Inventory**
  - **OS, Firmware updating**
  - **Energy Management**
  - **Image Automation**
- 2. Determine IBM Systems Director Server**
  1. 8-12 GB Memory, .5 to 2 cores – uncapped, 100 GB disk
  2. Could be IBM i hosted Power Linux or AIX
- 3. Load Appropriate Program Products and/or PTFs to support IBM Systems Director**
- 4. Obtain help from someone who has done this before**
  1. Most problems with troubleshooting endpoints – IBM Systems Director communication
  2. Don't forget about IBM i Voucher, PowerCare services, or including services into a sale
- 5. Implement all of the prereqs and follow all of the instructions, not just the ones you like**

# Good Reference Documentation

- V7000 & Brocade configuration for SCS
  - Chapter 11 Configuring the Management Stack of Implementing IBM SmartCloud Entry on POWER Systems using the POWER 740 Express Reference Configuration
  - <ftp://public.dhe.ibm.com/common/ssi/ecm/en/poo03078usen/POO03078USEN.PDF>
- Cisco Configuration within TPC
  - 3.1.6.1 Configuring Cisco MDS9000 switches for Out-of-band communication of TPC Hints and Tips – Update for 4.2.2
  - <https://www-304.ibm.com/support/docview.wss?uid=swg27008254&aid=1>
- IBM Systems Director 6.3 information center – SCS Requirements
  - [http://publib.boulder.ibm.com/infocenter/director/pubs/index.jsp?topic=%2Fcom.ibm.director.vim.helps.doc%2Fsd0\\_vim\\_r\\_sb\\_aix\\_on\\_power.html&resultof=%22scs%22%20%22sc%22%20%22requirements%22%20%22requir%22](http://publib.boulder.ibm.com/infocenter/director/pubs/index.jsp?topic=%2Fcom.ibm.director.vim.helps.doc%2Fsd0_vim_r_sb_aix_on_power.html&resultof=%22scs%22%20%22sc%22%20%22requirements%22%20%22requir%22)
- IBM Systems Director VMControl Wiki
  - Minimum levels, NIM trouble shooting guide, SCS troubleshooting guide
  - <https://www.ibm.com/developerworks/wikis/display/WikiPtype/IBM+Systems+Director+VMControl>

# VMControl Web resources

## IBM Systems Director Redbook:

[VMControl Implementation Guide on IBM Power Systems](#)

## VMControl Performance Summary :

[Optimizing Virtual Infrastructure with VMControl](#)

## VMControl Information Center:

[IBM Systems Director InfoCenter - VMControl](#)

## VMControl Web site:

[VMControl Web page](#)

## IBM Systems Director Downloads

<http://www.ibm.com/systems/management/director/downloads>

## IBM Systems Director Upward Integration

<http://www.ibm.com/systems/software/director/downloads/integration.html>

## IBM Systems Director Best Practices Wiki

<http://www.ibm.com/developerworks/wikis/display/WikiPtype/IBM+Systems+Director+Best+Practices+Wiki>

## YouTube VMControl Video Library:

[10 Minute Overview of VMControl](#)

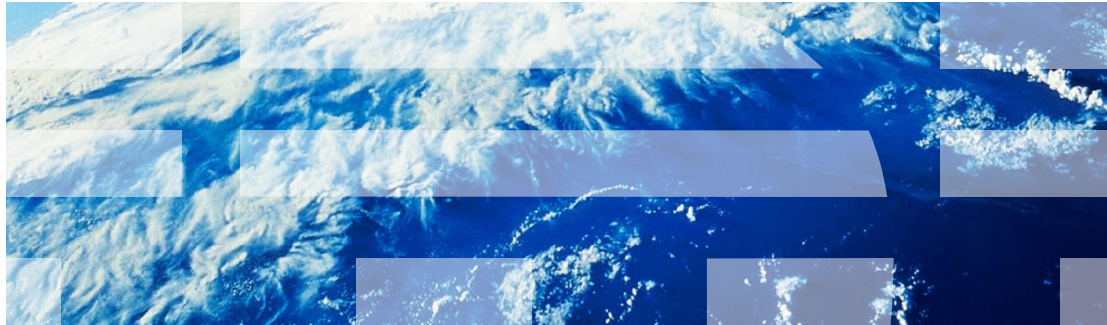
[4 minute Value Summary of VMControl](#)

[Virtualization Overview for x86 Systems](#)







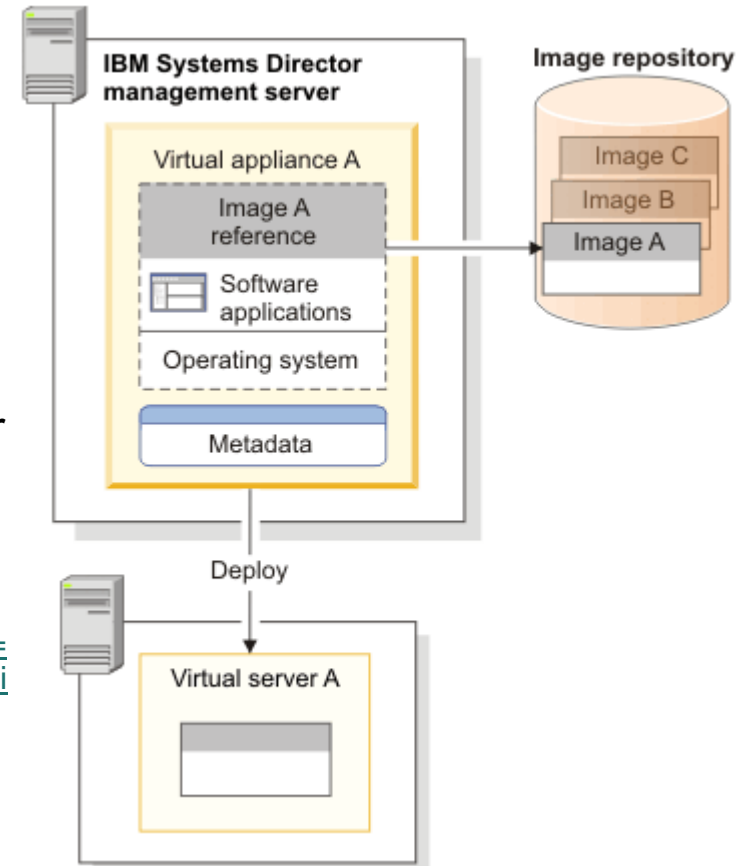


## Deploying a Virtual Appliance Example

# IBM Systems Director VMControl

## Deploying A Virtual Appliance – Overview

- Deploy a virtual appliance to a host or system pool, existing virtual server.
- Customize various attributes for the resulting virtual server, such as network settings.
- Deploy virtual appliances that have been captured or imported into IBM® Systems Director VMControl
- Deploy requirements found at [http://publib.boulder.ibm.com/infocenter/director/pubs/index.jsp?topic=%2Fcom.ibm.director.vim.helps.doc%2Fsd0\\_vim\\_r\\_power\\_virtualization.html](http://publib.boulder.ibm.com/infocenter/director/pubs/index.jsp?topic=%2Fcom.ibm.director.vim.helps.doc%2Fsd0_vim_r_power_virtualization.html)



# IBM Systems Director VMControl

## Deploy – Steps

The steps to deploy a Virtual Appliance are as follows:

### WHAT

- Select a **virtual appliance** to deploy, *virtual appliance A*, from the virtual appliances that are stored on IBM Systems Director Server.
  - *Virtual appliance A* contains a reference to *Image A* that is stored in the image repository. *Image A* contains an operating system and software applications.

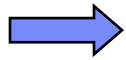
### WHERE

- The user specifies a **Host, System Pool** or **existing virtual server** where he wants to deploy *virtual appliance A*.
  - *When virtual appliance A* is deployed, *virtual server A* is created with the definitions detailed in *virtual appliance A*. If the user selects to deploy *virtual appliance A* to existing *virtual server A*, the existing virtual server is filled with the operating system and software applications defined in *virtual appliance A*.

# IBM Systems Director VMControl

## Deploy

Select WHAT to deploy:



– Virtual appliance

The screenshot shows the IBM Systems Director VMControl interface. At the top, there are tabs for 'Basics', 'Workloads', 'Virtual Appliances', 'System Pools', and 'Virtual Servers/Hosts'. The 'Virtual Appliances' tab is selected. Below the tabs, there are summary statistics for 'What to deploy' (2 Virtual appliances), 'Where to deploy' (15 Existing virtual servers, 2 Hosts and 0 server system pools), 'What to capture' (0 Workloads, 6 Virtual servers and operating systems), and 'Where to store' (1 Image repositories). A 'Common tasks' panel on the right lists actions like 'Deploy virtual appliance', 'Capture', 'Import', etc. Below this is a table titled 'Virtual Appliances (View Members)'. The table has columns for 'Select', 'Name', 'Operating System', 'Repository', and 'Description'. Two rows are visible: 'Client Capture' (IBM AIX) and 'Golden master - AIX 7.1.0.0' (IBM AIX 7). The 'Deploy Virtual Appliance' button is highlighted with a red box. The bottom of the interface shows a pagination bar with 'Page 1 of 1', 'Selected: 1', 'Total: 2', and 'Filtered: 2'.

Basics Workloads Virtual Appliances System Pools Virtual Servers/Hosts

What to deploy: 2 Virtual appliances  
Where to deploy: 15 Existing virtual servers  
2 Hosts and 0 server system pools

What to capture: 0 Workloads  
6 Virtual servers and operating systems  
Where to store: 1 Image repositories

Common tasks

- Deploy virtual appliance
- Capture
- Import
- View active and scheduled jobs
- View virtual appliance versions
- Create image repository

Virtual Appliances (View Members)

Capture **Deploy Virtual Appliance** Import Actions Search the table... Search

Select	Name	Operating System	Repository	Description
<input type="checkbox"/>	Client Capture	IBM AIX	m1-nim-m2-1	Virtual Appliance
<input checked="" type="checkbox"/>	Golden master - AIX 7.1.0.0	IBM AIX 7	m1-nim-m2-1	Golden master image for produc..

Page 1 of 1 | 1 | Selected: 1 Total: 2 Filtered: 2

# IBM Systems Director VMControl

## Deploy > Virtual Appliance

Select WHERE to deploy:

➔ – Target

- The virtual appliance is deployed to a new virtual server on the selected host or system pool
- Existing virtual server
  - The virtual appliance is deployed to the selected existing server

Target

Select the location where you want to deploy the virtual appliance.

You can deploy the virtual appliance to create a new virtual server on an existing host system or system pool. Or, you can deploy the virtual appliance to an existing virtual server.

Deploy to a new virtual server on the following:

Select	Name	State	IP Addresses	Installed OS Na	Description
<input checked="" type="radio"/>	m1-750-2-8233-E88-SN103733P	Started			
<input type="radio"/>	m1-750-1-8233-E88-SN103736P	Started			

Page 1 of 1 | Selected: 1 Total: 2 Filtered: 2

Deploy to an existing virtual server:

Select	Name	State	IP Addresses	Description
<input type="radio"/>	m1-dir-t1	Started		
<input type="radio"/>	m1-dir-t2	Started		
<input type="radio"/>	m1-ALT-nim-m1	Started		
<input type="radio"/>	m1-sys11	Started	10.31.193.61	
<input type="radio"/>	m1-dir-m2	Started	10.31.193.50	

Page 1 of 3 | Selected: 0 Total: 15 Filtered: 15

Note: When deploying to a server system pool, the server system pool must identify the host where the virtual appliance will be deployed. This process might take a few minutes to complete.

< Back Next > Finish Cancel

# IBM Systems Director VMControl

Deploy > Virtual Appliance > PowerVM Host

➔ Specify a workload name

The screenshot shows a web-based configuration interface for IBM Systems Director VMControl. On the left is a vertical navigation pane with a light blue background, containing a list of steps: 'Welcome' (checked), 'Target' (checked), 'Workload Name' (highlighted with a blue arrow), 'Storage Mapping', 'Network Mapping', 'Product', and 'Summary'. The main content area has a light blue header with the title 'Workload Name'. Below the header is a light blue box containing the text 'A workload is created as a result of deploying the virtual appliance.' Underneath this is a white box with the instruction '\*Specify a unique name for the workload.' and a text input field containing 'My workload'. At the bottom right of the main content area are two buttons: '< Back' and 'Next >'. The entire interface is set against a white background.

# IBM Systems Director VMControl

Deploy > Virtual Appliance > PowerVM Host

## Assign storage for the new Virtual Appliance



- Select an existing storage volume
- Create a storage volume from an existing storage pool

**Storage Mapping**

Specify how to assign the storage for the virtual disks when you deploy the virtual appliance.

Ensure each disk in the table is assigned to either a storage volume or storage pool. To assign a disk to a storage volume, select a single disk. You can select multiple disks to assign to a storage pool.  
Total required disk space for virtual server: 40,832 MB

[Learn more about storage mapping for deploying to a new virtual server](#)

**Storage Mapping**

Assign to Storage Volume... Assign to Storage Pool... Actions Search the table... Search

Select	Disk Name	Size (MB)	Image	Assigned St...	Description
<input checked="" type="checkbox"/>	disk1	40,832	True	Not assigned	

Page 1 of 1 | 1 | Selected: 1 Total: 1 Filtered: 1

< Back Next >

# IBM Systems Director VMControl

Deploy > Virtual Appliance > PowerVM Host

## Storage Mapping: Assign to existing storage volume

- Only hdisks not already in use are shown
- Only hdisks large enough for the Virtual Appliance are shown

**Assign to Storage Volume**

Select an existing storage volume you want to use for disk1.  
Total disk space required for selected disk: '40832' (MB)  
If some of the hosts using the SAN have not been discovered, the following list of storage volumes might not be accurate. To ensure that the list of storage volumes is accurate, click Update Storage Volumes Table. The update process might take a few minutes.

Storage Volumes

Actions ▾ | Search the table... Search

Select	Volume Name	Storage Server	Storage Pool	Type	VIOS Count	Size (GB)	Description
<input type="radio"/>	hdisk1	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...
<input checked="" type="radio"/>	hdisk2	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...
<input type="radio"/>	hdisk3	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...
<input type="radio"/>	hdisk4	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...
<input type="radio"/>	hdisk5	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...
<input type="radio"/>	hdisk6	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...
<input type="radio"/>	hdisk7	m1-vios-m2	Not Applicable	VIOS Physical Vol...	1	136.732	VIOS physical volume(s) accessed thr...

Page 1 of 1 | 1 | Selected: 1 Total: 7 Filtered: 7

[? Why do I not see my storage volume?](#)

Update Storage Volumes Table OK Cancel



# IBM Systems Director VMControl

Deploy > Virtual Appliance > PowerVM Host

## Storage Mapping: Create new Storage volume from existing pool

- Only pools large enough for the Virtual Appliance are shown

**Assign to Storage Pool**

Select the storage pool that you want to use for the selected disks. A storage volume will automatically be created on the selected storage pool.  
Total disk space required for selected disks: '40832' (MB)

Storage Pools:

Actions ▾ | Search the table... Search

Select	Name	Location	VIOS Count	Maximum Allocation ...	Description
<input type="radio"/>	rootvg	VIOS: m1-vios-m2	1	102,912	VIOS logical volume pool. Virtual servers using this po...

Page 1 of 1 | 1 | Selected: 0 Total: 1 Filtered: 1

? Why do I not see my storage pool?

OK Cancel

# IBM Systems Director VMControl

Deploy > Virtual Appliance > Existing PowerVM Virtual Server

- Select optional network virtual server settings:

➔ – Network Mapping

The screenshot shows the 'Network Mapping' configuration page in the IBM Systems Director VMControl interface. On the left is a navigation sidebar with a tree view containing: Welcome, Target, Workload Name, Storage Mapping, Network Mapping (highlighted with a blue arrow), Product, and Summary. The main content area is titled 'Network Mapping' and includes the instruction: 'Select a virtual network for each network defined for the appliance.' Below this, it states: 'The following networks will be assigned for this virtual server. Network Mapping'. There is a search bar with 'Search the table...' and a 'Search' button. A table with the following columns is displayed: 'Network Name', 'Description', and 'Virtual Networks on Host'. The table contains one row: 'Discovered-1-0' with description 'Production VLAN - bridged'. The 'Virtual Networks on Host' column has a dropdown menu open, showing options: 'Discovered-1-0 (VLAN 1, Bridged)', 'Discovered-1-0 (VLAN 1, Bridged)', 'Discovered-3-0 (VLAN 3, Bridged)', and 'Discovered-2-0 (VLAN 2, Bridged)'. At the bottom of the table, it shows 'Page 1 of 1' and 'Total: 1 Filtered: 1'. At the bottom right of the interface are '< Back' and 'Next >' buttons.

Network Name	Description	Virtual Networks on Host
Discovered-1-0	Production VLAN - bridged	Discovered-1-0 (VLAN 1, Bridged) Discovered-1-0 (VLAN 1, Bridged) Discovered-3-0 (VLAN 3, Bridged) Discovered-2-0 (VLAN 2, Bridged)

# IBM Systems Director VMControl

Deploy > Virtual Appliance > Target > Customize Appliance

- Customize the virtual appliance

➡ – What the OS needs to run

The screenshot displays the 'Product' configuration page in the IBM Systems Director VMControl interface. The left sidebar shows a navigation menu with the following items: Welcome, Target, Workload Name, Storage Mapping, Network Mapping, Product (selected), and Summary. The main content area is titled 'Product' and contains the following sections:

- System Level Networking**
  - Short host name for the system:
  - DNS domain name for the system:
  - IP addresses of DNS servers for system:
  - Default IPv4 gateway:
- Network adapter configuration for Network adapter 1 on Discovered-1-0**
  - Internet Protocol Version 4**
    - Static IP address for the network adapter "Network adapter 1 on Discovered-1-0":
    - Static network mask for network adapter "Network adapter 1 on Discovered-1-0":
  - Deployment use**
    - The adapter order for network adapter "Network adapter 1 on Discovered-1-0":
    - Production VLAN - bridged:
- NIM-specific settings**
  - NIM Resource or Resource Group:

At the bottom of the page, there are four navigation buttons: '< Back', 'Next >', 'Finish', and 'Cancel'.

# IBM Systems Director VMControl

## Deploy > Summary

- Run or Schedule the deploy

The screenshot shows the 'Summary' page of the IBM Systems Director VMControl interface. On the left is a navigation pane with a list of steps: Welcome, Target, Workload Name, Storage Mapping, Network Mapping, Product, and Summary (which is highlighted with a blue arrow). The main content area is titled 'Summary' and contains a message: 'You are now ready to deploy the virtual appliance.' Below this is a 'Deployment details' section with a scrollable list of configuration items:

Deployment details:	
Virtual appliance to deploy:	Golden master - AIX 7.1.0.0
Target server or system pool:	m1-750-2-8233-E8B-SN103733P
Workload Name	My workload
Storage Mapping:	
Disk Name	disk1
Size (MB)	40832
Image	Yes
Assigned Storage	Storage pool: rootvg
Description	

Click Finish to deploy the virtual appliance.

At the bottom right of the window are four buttons: '< Back', 'Next >', 'Finish', and 'Cancel'.

# IBM Systems Director VM Control Deploy

- Active and Scheduled Jobs

Click on job instance in the Name column in order to view its logs

## Job Instance

Select	Name	Status
<input checked="" type="checkbox"/>	2/13/12 at 3:19 PM	Complete

Page 1 of 1 | 1 | Selected: 1 Total: 3

## Job log

```
February 13, 2012 3:17:00 PM CST-Level:50-MEID:0073--MSG: DNZVMP451 Requesting to create a volume in pool rootvg.  
February 13, 2012 3:19:56 PM CST-Level:50-MEID:5673--MSG: DNZVMP545I Requesting to create a volume in pool rootvg.  
February 13, 2012 3:19:59 PM CST-Level:50-MEID:5673--MSG: DNZVMP546I Volume lp12vd2 was created in pool rootvg.  
February 13, 2012 3:20:43 PM CST-Level:50-MEID:5673--MSG: DNZVMP509I Create Virtual Server request completed successfully for host, m1-750-2-8233-E8B-SN103733P. Systems Director might not display the new virtual server immediately. It might take a few minutes for the new virtual server to be displayed.  
February 13, 2012 3:20:49 PM CST-Level:150-MEID:0--MSG: DNZLOP412I Deploying virtual appliance Golden master - AIX 7.1.0.0 to server m4-sys01.  
February 13, 2012 3:20:49 PM CST-Level:150-MEID:0--MSG: DNZLOP401I Booting virtual server m4-sys01 to the Open Firmware state.  
February 13, 2012 3:21:58 PM CST-Level:150-MEID:0--MSG: DNZLOP402I Gathering network adapter information for virtual server m4-sys01.  
February 13, 2012 3:22:00 PM CST-Level:150-MEID:0--MSG: DNZLOP405I Initiating deploy processing on the NIM master.  
February 13, 2012 3:41:48 PM CST-Level:200-MEID:0--MSG: Subtask activation status changed to "Complete".  
February 13, 2012 3:41:48 PM CST-Level:1-MEID:0--MSG: Job activation status changed to "Complete".  
February 13, 2012 3:41:48 PM CST-Level:150-MEID:0--MSG: Virtual server, m4-sys01, added to workload, My workload.  
February 13, 2012 3:41:49 PM CST-Level:150-MEID:0--MSG: Workload, My workload, is started.  
February 13, 2012 3:41:49 PM CST-Level:150-MEID:0--MSG: DNZIMC094I Deployed Virtual Appliance Golden master - AIX 7.1.0.0 to new Server m4-sys01 hosted by system m1-750-2-8233-E8B-SN103733P.  
February 13, 2012 3:41:49 PM CST-Level:200-MEID:0--MSG: Subtask activation status changed to "Complete".  
February 13, 2012 3:41:49 PM CST-Level:100-MEID:0--MSG: Deploy virtual server complete.
```