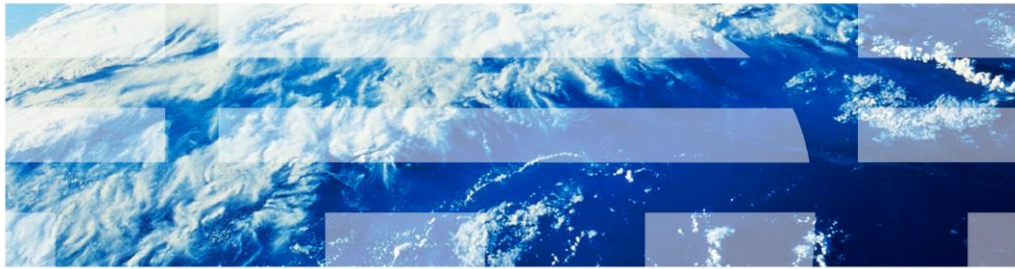IBM

IBM Workload Deployer

## PowerVM configuration

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This presentation provides an overview of the PowerVM configuration that is required for use with the IBM Workload Deployer Appliance.

Table of contents

- PowerVM configuration overview
- Installing and configuring the PowerVM environment
- Helpful commands
- Example screen captures

PowerVM configuration

The first section of the presentation gives an overview of the PowerVM environment and the steps that are required to install and configure it. The second section gives details about the configuration process, including required hardware and software levels. Finally, the presentation covers some helpful commands to gather information about the different components of the PowerVM environment, and some example screen captures that might be useful for you.

Overview
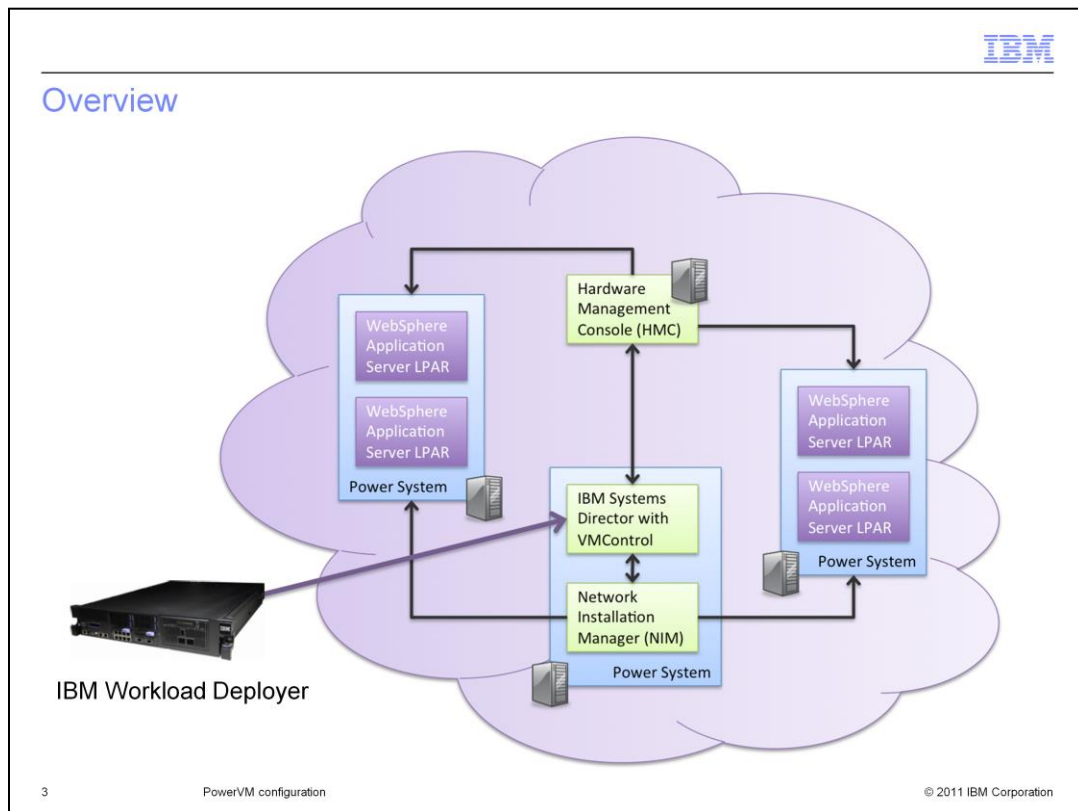
IBM Workload Deployer Appliance works with specific versions of PowerVM hypervisors. The PowerVM hypervisor, in IBM Workload Deployer, is defined within a cloud group that is managed by IBM Systems Director VMControl. The diagram here shows a sample topology for using PowerVM with IBM Workload Deployer. In this environment, the appliance communicates with IBM Systems Director using the VMControl plug-in to deploy and interact with virtual systems. VMControl coordinates with the Network Installation Manager (NIM) and the Hardware Management Console (HMC) to deploy virtual systems into the PowerVM cloud. Each virtual system is an LPAR running AIX 6.1 and WebSphere Application Server Hypervisor Edition.

Overview of installation steps

- Network configuration
- Update and configure HMC
- Update firmware on all Power systems in CEC
- Install and configure VIOS
- Install AIX on the NIM and Systems Director LPARs
- Install and configure NIM
- Install and configure IBM Systems Director
- Install VMControl

PowerVM configuration

The PowerVM installation and configuration for the IBM Workload Deployer environment requires at least three days of effort. You must ensure your network is ready for the PowerVM components and for the large images that are moved across the network. You must update and configure the HMC to the required level. The firmware on all Power systems likely needs to be updated, all to the same firmware level. You must install and configure VIOS, Network Installation Manager (NIM) and the IBM Systems Director to the required level. Additionally, you need to install the correct level of the VMControl plug-in for IBM Systems Director.

Section

Installing and configuring the PowerVM environment

This section describes how to install and configure the components of the PowerVM environment.

Restrictions

- Only one Virtual I/O Server (VIOS)
- The rootvg volume group used for all file systems for NIM and IBM Systems Director
- Physical disk mappings cannot be used
- Disks must be allocated from storage pools as logical volumes
- Use a single, dedicated Hardware Monitor Console (HMC) at the specified levels shown in subsequent slides
- No support for Power Blades
- IVM (Integrated Virtualization Manager) not supported
- If the version information in the subsequent tables does not state "or later", the version requirement is the exact level stated.

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First, consider the restrictions for the PowerVM installation if it is to be used as a hypervisor for IBM Workload Deployer. There is support for only one Virtual I/O Server, or VIOS. The rootvg volume group is used for all file systems for NIM and IBM Systems Director LPAR's. Physical disk mappings cannot be used. All disks must be allocated from storage pools as logical volumes. You must use a single, dedicated Hardware Monitor Console (HMC) at the specified levels shown in subsequent slides. Power blades are not supported. The Integrated Virtualization Manager, or IVM, is not supported. The component versions of PowerVM components are provided in the IBM Workload Deployer Information Center. When reviewing those versions, be aware that unless the entry specifies "or later", the version requirement is the exact level stated.

Network configuration

- Network: 1GBit network switch speed
- DNS registration is required for all components
    - All DNS entries must be searchable by forward and reverse lookup
    - To test DNS:
        - *nslookup < host name>*
            - Should return IP address
        - *nslookup < ip address >*
            - Should return fully-qualified host name
- You need IP addresses / host names for:
    - HMC, VIOS, NIM, IBM Systems Director
    - Deployed systems
        - Pool or pools of IP addresses defined within IBM Workload Deployer

Since the IBM Workload Deployer appliance dispenses large images across the network, it is important that the network is fast. A minimum network speed of 1GBit is highly recommended for optimum speed. The IBM Workload Deployer appliance also has 10GBit network adapter connections available as well.

Domain name server (DNS) registration is required for all IBM Workload Deployer-related network-addressable components. This includes all PowerVM components, (VIOS, NIM, IBM Systems Director), VMWare servers and VMWare license servers, the reserved target IP addresses and target host names, the IBM Workload Deployer appliance, and the HMC. The entries within DNS for all the PowerVM systems must be resolvable by host name and by IP address. Failure to have DNS properly set up can create difficult-to-diagnose failures in IBM Workload Deployer functionality.

To test entries in the DNS, issue these commands:

nslookup <host name> **- should return IP address**

nslookup <ip address> **- should return fully-qualified host name**

You need IP addresses and host names for your Hardware Management Console, Virtual I/O Server, IBM Systems Director, and for the systems that you deploy with IBM Workload Deployer.

Information Center

- Product information center
  - Authoritative source for latest:
    - HMC model recommendations
    - Power firmware levels
    - Component levels
- IBM Workload Deployer V3 Information Center
  - PowerVM prerequisites
    http://publib.boulder.ibm.com/infocenter/worlodep/v3r0m0/index.jsp?topic=/com.ibm.worlodep.doc/gs/gsr_powvmtsp.html
  - PowerVM tuning
    http://publib.boulder.ibm.com/infocenter/worlodep/v3r0m0/topic/com.ibm.worlodep.doc/tp/tpr_powvmtun.html
  - PowerVM constraints
    http://publib.boulder.ibm.com/infocenter/worlodep/v3r0m0/topic/com.ibm.worlodep.doc/gs/gsr_powvmlim.html
- IBM Power Systems Hardware Information Center
  - http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/index.jsp
- Review the subsequent IBM Workload Deployer slides for general information
- Consult the product information center for your specific requirements

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In subsequent slides, you see the original PowerVM prerequisites for IBM Workload Deployer V3. Constantly updated with the latest information, the product information center is the authoritative source for the latest information about PowerVM prerequisites, requirements and limitations, including HMC model requirements, Power firmware levels, and component levels. Press "stop" on this slide to copy the links to PowerVM requirements in the information center for the IBM Workload Deployer V3 and for the other information links you see on this page. Then click "play" to review the subsequent slides for general information about the components that comprise the PowerVM environment. Consult the product information center for your specific requirements.

HMC and Power firmware (original V1.1 levels)

- HMC
    - Models 7042-CR5 or 7042-CR6
    - 3GB RAM required but 4GB RAM is recommended
    - HMC level V7.7.2.0.2 or later
        - For level V7.7.3, fix MH012057 is required
    - RMC connectivity
- Firmware levels
    - Power 7 – EL710_114 or later
    - Power 6 – EL350_103 or later
    - Power 5 – SF240_403 or later

The Hardware Management Console must be a 7042-CR5 or CR6.A minimum of 3GB RAM is required but 4GB is recommended. The firmware level of the HMC must be 7.7.2 with Service Pack 2, or 7.7.3 with fix MH012057, or the latest level available. You must have RMC (Resource Monitoring and Control) connectivity between the HMC and the PowerVM system components, such as Systems Director, NIM, and VIOS. You can check for RMC connectivity using the HMC by checking for the existence of the "Mobility" options in the Operations popup for your NIM or Systems Director LPARs. The "Mobility" option is not present if RMC is not established. The Power Information Center has information about enabling RMC connections.

The recommended firmware levels for AIX processors are EL710_114 or later for Power7, E350_103 or later for Power 6 and SF240_403 or later for Power 5.

LPARs - VIOS

- Processor/RAM/disk space
    - Minimum: 0.5 processor, 2 GB RAM, 30 GB disk
    - Optimal: 1.0 processor, 4 GB RAM, 60 GB mirrored disk
    - Only storage pools assigned to logical volumes are supported
    - Minimum: local attached storage
    - Optimal: Fiber Channel storage area network (SAN) attached multi-disk array

- "rootvg" storage pool is used for NIM and IBM Systems Director LPARs

- "cloudvg" storage pool required for target logical partitions on system
    - Minimum: 30 GB disk per active and defined LPAR with at least 40 GB for captures
    - Optimal: 40 GB disk per active and defined LPAR with at least 40 GB for captures
        - Sizing estimate: **40GB X <max number of deployed virtual machines> + 40GB X <number of "extend and captures">**
            - Example: 20 Virtual machines deployed and active with 3 active "extend and captures"
            - 20 X 40GB + 120GB = **920GB**

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The VIOS LPAR requires a minimum of one-half processor, two GB of RAM and thirty GB of disk space. Optimal specifications are one processor, four GB of RAM, and sixty GB of mirrored disk space. Only storage pools assigned to logical volumes are supported by the PowerVM environment. Minimally you can use local attached storage, and optimally you should use fiber channel storage area network (or SAN) with an attached multi-disk array. The "rootvg" storage pool is used for NIM and IBM Systems Director LPAR disk assignment. Additionally you must have a "cloudvg" storage pool, using a name of your choice, which is used for the deployed target logical partitions in the cloud. The minimal size required for each active, deployed target LPAR is thirty GB, and the optimal size is forty GB, plus forty GB of space for each active "extend and capture" operation. The example shown shows that nine hundred twenty GB of space is required for twenty deployed and active virtual machines and three active "extend and capture" operations.

LPARs - NIM

- Processor/RAM/Disk Space
    - Minimum: 1.0 processor, 4 GB RAM, 30 GB DISK
    - Optimal: 2.0 processor, 8 GB RAM, 30 GB Mirrored DISK
- Separate file system required for **/export/nim** ("Image repository")
    - Minimum: 300 GB Disk Local Attached
    - Optimal: 500 GB Disk Fiber Channel SAN Attached
    - Determined by number of unique images and unique patterns
        - You might need more space than 500GB if you plan to have lots of unique virtual images

The Network Installation Manager (or NIM) LPAR minimally requires one processor with four GB RAM and thirty GB of disk space. Optimal specifications are two processors, eight GB RAM, and thirty GB of mirrored disk space. You must have a separate file system - /export/nim – called the "image repository" for cached images. Minimally you must have three hundred GB locally attached disk space for this file system. Optimally you should have at least five hundred GB of disk space, staged on fiber channel SAN storage. You might need more than five hundred GB of space if you plan to generate a lot of unique catalog images for deployment.

LPARs – IBM Systems Director

- Processor/RAM/Disk Space
    - Minimum: 1.0 processor, 4 GB RAM, 60 GB disk
    - Optimal: 2.0 processors, 8 GB RAM, 60 GB mirrored disk
    - **/tmp** minimum 20 GB beyond typical allocation for disk deployment
    - **/opt** minimum 4 GB beyond typical allocation.
        - Example: if /opt allocated to 3 GB, increase allocation to 7 GB

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The IBM Systems Director LPAR requires a minimum one processor, four GB of RAM and sixty GB of disk space. Optimal specifications are two processors, eight GB of RAM and sixty GB of mirrored disk space. The /tmp file system must be enlarged beyond the default sizing so that an additional twenty GB of free space is available for use by the IBM Systems Director during deployments. The /opt file system should be enlarged by four GB beyond your typical allocation to allow for IBM Systems Director installation and additional logging space and database.

Component levels – AIX

- AIX – 6.1 +TL5 with Service Pack 1119
    - Level 6100-05-06-1119
        - Use "oslevel –s" command to view
    - DSM (dsm.core - 6.1.5.3) – **a required fileset but not installed by default**
        - Available on the AIX installation CDs or in lpp_source
    - openssl (0.9.8.x) and openssh (5.2.0.x) required on VIOS, NIM, and IBM Systems Director LPARs
        - Not installed by default

AIX must be at level 6.1, plus Technology Level 5, plus Service Pack 1119, which displays using *oslevel –s* as 6100-05-06-1119. Note that dsm.core fileset is required but is not installed by default and is available on the AIX installation CDs or in lpp_source. Openssl and openssh filesets are also required on the VIOS, NIM, and IBM Systems Director lpars.

Component levels – VIOS

- VIOS
  - Level 2.2.0.11-FP-24 SP-01
    - Use "ioslevel" command to view in ssh shell
  - DSM (dsm.core – 6.1.5.3) required
    - Not installed by default
  - openssl (0.9.8.x) and openssh (5.2.0.x) required
    - Not installed by default
  - After IBM Systems Director installation, push the director VIOS subagent installation to VIOS

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VIOS must be at level 2.2.0.11-FP-24 SP-01.Confirm this level by using the *ioslevel* command in an SSH session to the VIOS server. The dsm.core level 6.1.5.3 is also required on the VIOS LPAR. Openssl and openssh filesets must be installed, and they are not installed by default. You can later use the IBM Systems Director console interface to push the required VIOS subagent to the VIOS lpar.

Component levels – VIOS storage pools and volume groups

- All disks must be allocated from storage pools as logical volumes

- Storage pools within IBM Workload Deployer
  - "rootvg" displays in IBM Workload Deployer hypervisor view but must not be selected as "in use"
  - "cloudvg" (or your named storage pool) should be selected as "in use" in the IBM Workload Deployer hypervisor view

- "Cloudvg" storage pool should be large enough to contain the file systems for the highest number of virtual machine you might deploy
  - Sizing estimate: **40GB X <max number of deployed virtual machines> + 40GB X <number of "extend and captures">**
    - Example: 20 Virtual machines deployed and active with 3 "extend and captures" active
    - 20 X 40GB + 120GB = **920GB**

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All disks must be allocated from storage pools as logical volumes. The rootvg volume group is used by default for file systems for "service LPARs", such as NIM and IBM Systems Director. The rootvg volume group displays as a "storage device" within IBM Workload Deployer hypervisor view when the PowerVM cloud group is defined. You must not select rootvg as "in use" by the hypervisor. You must define a large "cloud" storage pool in a volume group for the hypervisor to assign to the operating systems that it deploys within the cloud. Within the IBM Workload Deployer hypervisor view, the cloud storage pool (such as "cloudvg" in the example) displays as a storage device. Select the cloud storage device (the cloud volume group you defined) as "in use" within the hypervisor view. For a rough sizing for the cloud storage pool, use forty GB multiplied by the maximum number of virtual machines that you plan to deploy. Then add an additional estimate factoring in the number of "extend and captures" that might be active.

Component levels – NIM master file sets

- NIM file set information
  - NIM Master 6.1.5 and NIM Client 6.1.5 come as part of TL5
    - If NIM already installed during TL5 installation, it is automatically upgraded
  - nim.master – 6.1.5.4 (NIM master file set should be on NIM LPAR only)
  - DSM (dsm.core – 6.1.5.3) required
    - Not installed by default
  - openssl (0.9.8.x) and openssh (5.2.0.x) required
    - Not installed by default
  - Director Common Agent 6.2.1.0
    - After you install Director Common Agent 6.2.0.0, upgrade it to Director Common Agent 6.2.1.0 using:
      - (Within Director) - *Navigate Resources / <All Systems> / <Select NIM Operating System> / Actions / Release Management / Show needed updates*

NIM master and client file set upgrades come as part of Technology Level 5. If NIM is installed when TL5 is applied, the NIM Master and NIM Client are upgraded to 6.1.5.4 and 6.1.5.5 respectively. The dsm.core level 6.1.5.3 or higher must be installed on the NIM server (for the VMControl agent), and for Director Common Agent. The openssl and openssh filesets at the levels indicated must be installed and are not installed by default. After you have upgraded the Director Common Agents to V6.2.1, use the IBM Systems Director GUI to show and install the needed updates to the NIM and VIOS LPARs

Component levels – NIM info

- NIM master – 6.1.5.4 or higher
  - Ulimit settings
    - **ulimit –n unlimited**
    - **ulimit –f unlimited**
    - Set these globally by editing file /etc/security/limits
  - NIM repository - /export/nim
    - Should be separate very large file system (example: 500GB or larger)
    - Cached images for IBM Workload Deployer deployments are stored here
    - Each cached image can be as large as 60 MB each

- Refer to the IBM Workload Deployer information center for the latest component level information

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The ulimit setting for the maximum number of file descriptors must be set to unlimited. Also, the ulimit setting for maximum file size must be set to unlimited. You can set these globally by editing the file /etc/security/limits.

The nim repository file system contains the cached virtual images that are deployed to the PowerVM hypervisor. Since each cached image can be at least 60MB in size, the /export/nim file system should be very large. If you are unsure of the size you need, start with an allocation of 500GB of space and then enlarge the file system as required.

Component levels – IBM Systems Director

- IBM Systems Director – 6.2.1.2
  - Ulimit settings
    - **ulimit –n unlimited**
    - **ulimit –f unlimited**
    - Set these globally by editing file /etc/security/limits
  - /tmp file system
    - Must contain free space at least as large as the largest image to be deployed to PowerVM
      - Example: 20GB free space
- After Systems Director installation:
  - Update IBM Systems Director to 6.2.1.2
  - Update DirectorCommonAgent to 6.2.1.0
  - Update DirectorPlatformAgent to 6.2.1.0

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IBM Systems Director must be at level 6.2.1.2 or later. IBM Systems Director is currently a free downloadable product, but you must purchase a support agreement for service. You must install the indicated Systems Director fixes provided by IBM for use with IBM Workload Deployer. The ulimit setting for the maximum number of file descriptors must be set to unlimited. Also, the ulimit setting for maximum file size must be set to unlimited. You can set these globally by editing the file /etc/security/limits.

The deployed images for PowerVM are first staged in the /tmp directory on the IBM Systems Director. You must ensure that the free space in the /tmp file system is as large as the largest image you think you might attempt to deploy to PowerVM. If you are unsure of what size to use, then start with a /tmp file system size that allows twenty gigabytes of free space.

Component levels – Director more tuning

- More tuning
  - Edit USMIKernel.properties file to set max.cli.threads
    - Edit **<sysdir_installation_root>/lwi/conf/overrides/USMIKernel.properties**
    - Add these two lines
      - **Kernel.REST.Max.Concurrent.Requests=40**
      - **max.cli.threads=17**
  - Increase Java heap size for IBM Systems Director
    - Edit **<sysdir_installation_root>/lwi/conf/overrides/director.javaopt**
      - Change the Java heap to **–Xms2048m –Xmx4096m**
    - Setting is based on an 8GB IBM Systems Director server
  - To be activated, the settings require a restart of the IBM Systems Director server

- Start IBM Systems Director server
  - Use Systems Director **Release management > Agents** to install VMControl Common Repository agent on VIOS

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This slide discusses additional required tuning for the IBM Systems Director server. You must edit the USMIKernel.properties, adding the two lines indicated on this slide to increase the REST API maximum concurrent requests value and to set the maximum command-level-interface thread value to 17. Also you must increase the Java heap size for the IBM Systems Director. Edit the director.javaopt file to change the heap size parameters, as indicated on this slide. You must then stop and restart the IBM Systems Director server to complete the changes. From the IBM Systems Director console, you can navigate to **Release management** then click **Agents** to install the VMControl Common Repository agent on your VIOS.

Component levels – VMControl

- VMControl (Systems Director plug-in) – 2.3.1.2
    – Standard Edition or Enterprise Edition
        • You must purchase a license to run VMControl plug-in for more than 60 days
        • Install the maintenance on VMControl to move from 2.3.1 to 2.3.1.2
    – From VMControl, use the *Install Agents* wizard to install the common agent packages on the NIM server
    – If you have not previously installed the agents on VIOS using IBM Systems Director, you can do that from VMControl as well

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VMControl is a plug-in extension for IBM Systems Director and must be at level 2.3.1.2 after you've applied all maintenance. You can install a free trial license version of VMControl but before the trial license expires, you must purchase and install the licensed version of VMControl. After VMControl is installed, update it to the required 2.3.1.2 version. After VMControl is installed at the correct level, you can use it to install the common agent services on the NIM server.

Component levels – Final steps

- From Systems Director:
    - Run discovery and inventory on the NIM server
    - Run discovery and inventory on the HMC, managed systems, VIOS

- From VMControl
    - Run *Discover virtual appliances* to discover the NIM image repository
    - If NIM image repository not seen in VMControl, the NIM subagent for IBM Systems Director might not be installed on the NIM LPAR

Once all of these components are in place, use Systems Director to discover them and collect inventories. First, run discovery and take an inventory of the NIM server. Then, you also need to run discovery and take an inventory of the HMC, the managed systems – which are all of the operating systems in your environment, and the VIOS. If the NIM image repository doesn't appear within VMControl, run the **Discover virtual appliances** wizard in VMControl to collect virtual system information, including the NIM image repository. If the NIM image repository doesn't appear in VMControl, this might mean the NIM subagent for IBM Systems Director was not installed on the NIM LPAR.

Section

Helpful commands

This section presents some commands that might be helpful to you.

Helpful commands for AIX

- Show technology and service pack level
  ```
  # oslevel -s (On NIM and IBM Systems Director LPARs)
        6100-05-06-1119
  ```

- List installed software for <component>
  ```
  # lslpp -L all | grep -i <component>
  -openssl.base  0.9.8.1101  COMMITTED  Open Secure Socket Layer
  -openssl.license 0.9.8.1101  COMMITTED  Open Secure Socket License
  -openssl.man.en_US 0.9.8.1101  COMMITTED  Open Secure Socket Layer
  -openssl.base  0.9.8.1101  COMMITTED  Open Secure Socket Layer
  ```

These commands might prove helpful on the NIM, VIOS, IBM Systems Director, and target partitions. Use the *oslevel –s* to determine the AIX operating system's release, technology level, and Service Level. Use the *lslpp –L* command to look at installed software.

Helpful commands for VIOS

- Show installation and fix pack level (VIOS)
  ```
  $ ioslevel
       2.2.0.11-FP-24 SP-01
  ```
- List storage pools and backing devices
  ```
  $ lssp
  Pool          Size      Free(mb)  Alloc Size(mb)BDs  Type
  rootvg        285696 202752  512                2   LVPOOL
  cloudvg       856856 752384  256                4   LVPOOL
  $ lssp -bd -sp cloudvg
  Name          Size    VTD            SVSA
  lp2vd1        26112   None           None

  lp2vd2        27136   vtscsi0 vhost2
  ```

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Issue these commands when logged onto the VIOS partition. The *ioslevel* command shows you the maintenance level for VIOS. The *lssp* command can be useful if you suspect problems with the management of storage pools on VIOS. The first example shows all of the storage pools. Cloudvg is the storage pool of interest for the IBM Workload Deployer configuration, so the second command displays additional information about the cloudvg storage pool.

Helpful commands for IBM Systems Director

- Start the IBM Systems Director
  - # smstart
- Stop the IBM Systems Director
  - # smstop
- Display status while starting
  - # smstatus -r
  - Type ctrl-C once "Active" to terminate shell

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The IBM Systems Director is started automatically when the partition is started. Use the *smstop* command to stop the IBM Systems Director. This might be necessary when, for example, you apply maintenance to the IBM Systems Director. Use the *smstart* command to start the IBM Systems Director. Since it might take several minutes to start, use the *smstatus –r* command to monitor IBM Systems Director's progress starting. Once the status shows **Active**, type Ctrl-C to exit the smstatus shell.

Additional debugging

- The mountd service on NIM must be available
  – Issue **showmount –e** command to test if service is available
  – Should automatically be launched from /etc/rc.nfs at boot time

- The tftp service on NIM must be started on NIM
  – **ps –ef | grep tftpd**
  ```
  root   3670214 3211386   0   Aug 30      -  0:00 /usr/sbin/tftpd -n
  nobody 5701810 3670214 0   Aug 30      -  0:00 /usr/sbin/tftpd -n
  ```

- A dsm.core ssh key installation fails when a custom **.ssh** directory is used that is not in the default AIX **/.ssh** or the **$HOME/.ssh** as defined by /etc/passwd. As a workaround, symbolically link the custom directory to **/.ssh** or **$HOME/.ssh**.

- Some functions within the IBM Systems Director agent installation wizards might not function correctly with newer levels of Firefox. When managing systems through the IBM Systems Director console, these browsers are recommended:
  – **Firefox, version 3.0, 3.5, or 3.6**
  – **Microsoft Internet Explorer, version 7 or 8**

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The mountd service on NIM must be available. You can issue the **showmount –e** command to see if the service is available. The mountd service should be automatically launched from /etc/rc.nfs at boot time if it is enabled. The tftp (trivial file transfer protocol) service on NIM must be available. You can use the command shown here to see if the service is started.

If you did not accept the default settings when you installed openssh, you might encounter a problem with dsm.core and it's ssh key installation. If you specified a custom .ssh directory that is not in the default /.ssh or in the $HOME/.ssh, you might have to symbolically link the custom directory to /.ssh or $HOME/.ssh.

Some functions within the IBM Systems Director agent installation wizards might not function correctly with newer levels of Firefox. When managing systems through the IBM Systems Director console, these browsers are recommended: Firefox, version 3.0, 3.5, or 3.6, and Microsoft Internet Explorer, version 7 or 8.

Section

Example screen captures

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This section presents some screen captures that might be helpful to you.

This example shows you how to check your maintenance levels quickly for IBM Systems Director and VMControl. When you log on the IBM Systems Director, you initially see the Welcome page. In the right pane, look for the entry for IBM Systems Director Server, and verify that it shows version 6.2.1.2. Farther down the list of entries, you see an entry for VMControl (either Standard or Enterprise Edition). Verify that the entry shows version 2.3.1.2.

Example view of IBM Systems Director "All Systems"

After the system resources are "discovered" within the IBM System Director, they are displayed as "Managed End-Points", or MEPs. There are several types of "MEPs". The Hardware Management Console MEP represents the HMC hardware itself. The "Virtual Server" MEP represents the LPARs defined. Another type is the Operating System MEP, which represents the operating system resources of the HMC, the VIOS server, the IBM Systems Director server, and any LPARs deployed from IBM Workload Deployer. And finally the "Server" MEP represents the actual Power hardware itself, such as the Power7 model 750.

Systems Director – displaying property of a managed end point

- Navigate Resources > All Systems > (select "managed end point") > Actions > Properties
  - Note: Protocols are listed here

When logged into the IBM Systems Director, you can see a list of all systems by navigating to **Navigate Resources > All Systems.** A helpful thing to review from this list is to review the protocols that are active for your VIOS, NIM, and IBM Systems Director. One at a time, select the "Operating System" MEP for these three key resources, and click **Actions > Properties.** Within the Properties display, look at the list of **Protocols** for the Operating System MEPS. A subsequent slide shows you the protocols that should be listed for the VIOS, NIM, and IBM Systems Director.

IBM Systems Director console view of protocols

- This view of protocols indicates that the agents are installed and running
- **Navigate Resources > All Systems > (select operating system) > Actions > Properties**
- Select the "Operating system" (not the "Virtual server") managed end point (MEP)

- Review "Protocols" output

  – VIOS: Protocols: CAS, CIM, SSH

  – NIM: Protocols: CAS, CIM, SSH

  – Director: Protocols: CIM, SSH

- Absence of one of the protocols listed indicates a "problem"
  – Agent is not running
  – Agent failed during startup
  – Agent is not installed

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The previous slide showed you how to display the protocols for a particular Operating System MEP. For the VIOS Operating System MEP, you should see the CAS, CIM, and SSH protocols. For the NIM Operating System MEP, you should see the CAS, CIM, and SSH protocols. For the IBM Systems Director Operating System MEP, you should see CIM and SSH protocols. The absence of one of the protocols seen here indicates a significant problem. Either the agent is not running, the agent failed during startup, or the agent is not installed.

VMControl view of image repository

- In IBM Systems Director, navigate to **System Configuration > VMControl**
- Click "Virtual Appliances" tab
- You should see the **/export/nim** file system show up as an "Image repository"
  - Absence of Image repository can indicate
    - IBM Systems Director agent on NIM is not started
    - Agent failed during startup
    - Agent is not installed

| Basics | Workloads | Virtual Appliances | Server System Pools | Virtual Servers/Hosts |

What to deploy: Where to deploy:
3 Virtual appliances   9 Existing virtual servers
                       1 Hosts and server system pools

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

Common tasks

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

Another aspect to check is the image repository. This displays within the VMControl portion of the IBM Systems Director console. Navigate to **System Configuration > VMControl,** click the **Virtual Appliances** tab, and you should see the **/export/nim** file system appear as an image repository. Absence of the image repository might mean the IBM Systems Director agent on NIM is not started, or it failed during startup, or the agent is not installed.

Creating the PowerVM Cloudgroup

- **Cloud > Cloud Groups**
- For PowerVM, your first step is to add the cloud group
  - Type cloud group name
  - Select "PowerVM" as hypervisor type
  - Type the host name or IP for the VMControl LPAR (IBM Systems Director)
  - Type user name
  - Type password
  - Click "Create"

Describe the cloud you want to create.

* Name: Daytona_PowerVM_CG

Description: A detailed description

* Hypervisor type: PowerVM

Group type: Managed by a VMControl

Provide the credentials for VMControl

* Host name: p32n03.pbm.ihost.com

* User name: root

* Password: ••••••••

* Verify password: ••••••••

Create   Cancel

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In IBM Workload Deployer and the PowerVM environment, you do not define the PowerVM hypervisor directly. Instead, you define the PowerVM Cloudgroup, and the IBM Workload Deployer appliance then discovers and create the PowerVM hypervisor entry for you. To define the PowerVM Cloudgroup, in the IBM Workload Deployer console navigate to **Cloud > Cloud Groups.** Type in the name of the cloudgroup, an optional description, and select the hypervisor type using the dropdown menu. Type in the host name for the VMControl LPAR, which is the same as the IBM Systems Director LPAR, and type the user name and password for the IBM Systems Director. Then click **Create.**

IBM Workload Deployer view of PowerVM Hypervisor

Cloud > Hypervisors

The "rootvg" storage pool is NOT selected as "in use"
The "datavg" storage pool (cloud storage pool) selected as "in use"

Type:	PowerVM
Version:	
Current status:	▶ Started (move to maintenance mode to make changes)
In cloud group:	PowerVM Cloud Group

		CPU usage	Memory usage	
Performance:	Active virtual machines:	▮▮▮▯▯ 44%	▯▯▯▯▯ 0%	[show more]

⊞ Hardware	16 cpu packages, 16 cpu cores and 194 GB memory
⊞ Deployment statistics	10 successful, 0 failed, 0 consecutive failures
⊞ History	Discovering networks and storage devices
⊞ Virtual machines	**11 total** - 10 started - 1 deleted
⊞ Networks	1 total, 1 in use, 1 mapped to IPGroups
⊟ Storage devices	2 total, 1 in use Right now: ▮▮▮▯▯ 62% Reserved: ▮▮▮▮▮ 93%

In use		Name
☐	⊞	rootvg:VIOS daytona_vios
☑	⊞	datavg:VIOS daytona_vios

Once the IBM Workload Deployer appliance creates the PowerVM hypervisor entry, you must supply a network and IP group for the hypervisor to use. You must also select the storage device that the hypervisor is to use for the storage space to use when creating virtual machines. All storage pools are discovered, including rootvg. You must not select rootvg as "in use". Instead, you should select the storage pool you defined for your cloud resources. In the example above, the storage pool "datavg" was selected.

Section

Summary

PowerVM configuration

The next section provides a summary of this presentation.

Summary

- Configuring the PowerVM environment requires hardware and software setup
    - Network configuration
    - HMC and Power system updates
    - Installing the operating system, VIOS, NIM, Systems Director, VMControl
- Helpful commands
- Example screen captures

The PowerVM environment that is used with IBM Workload Deployer, requires specific hardware and software configuration steps. The networking environment needs to be configured at a level that supports large file transfers and reverse DNS lookup for all components. The HMC and Power systems need to be updated to the required firmware and maintenance levels, and the operating system, VIOS, NIM, and Systems Director components need to be loaded on the appropriate Power systems. You saw some helpful commands that you might use when working with your PowerVM environment. Finally, you saw some example screen captures that might be helpful to you when reviewing your PowerVM configuration.

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Here are some references for more information about the PowerVM environment.