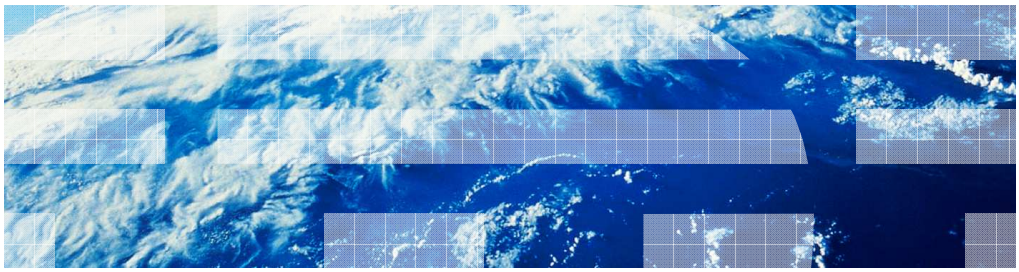
IBM WebSphere CloudBurst Appliance

PowerVM architecture



WebSphere. software

This presentation gives an overview of the architecture of the PowerVM™ environment for use with WebSphere® CloudBurst™.

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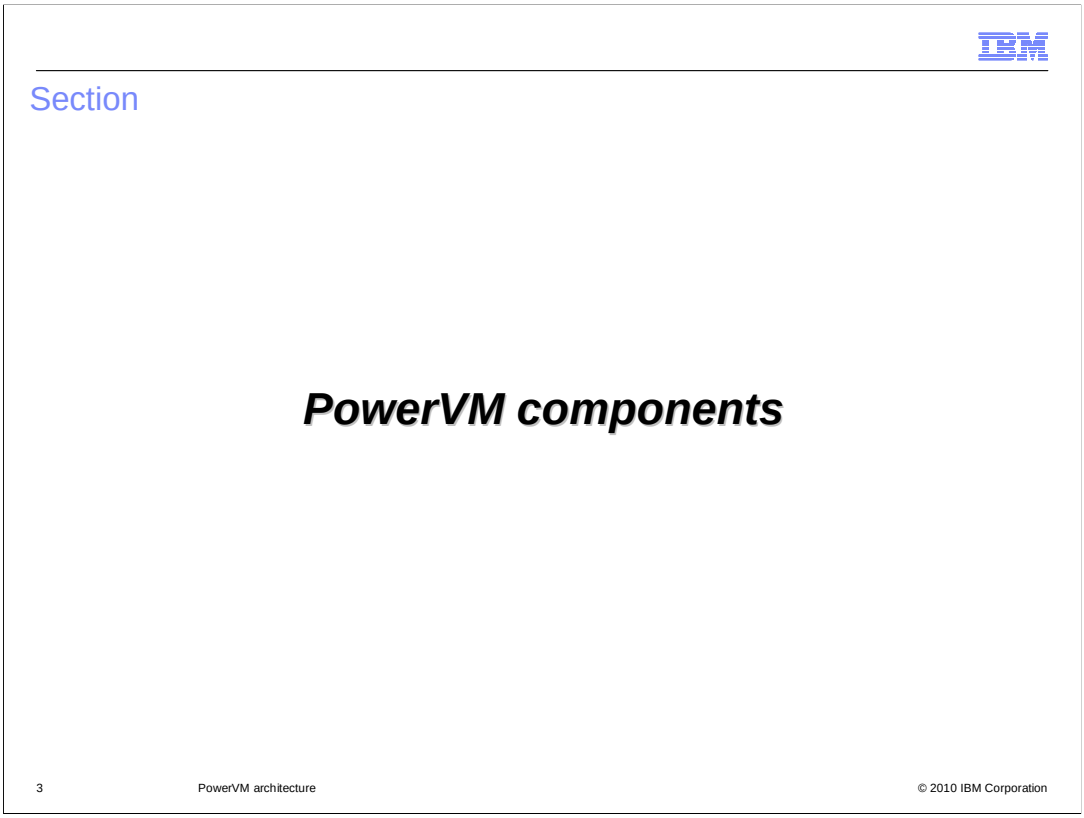
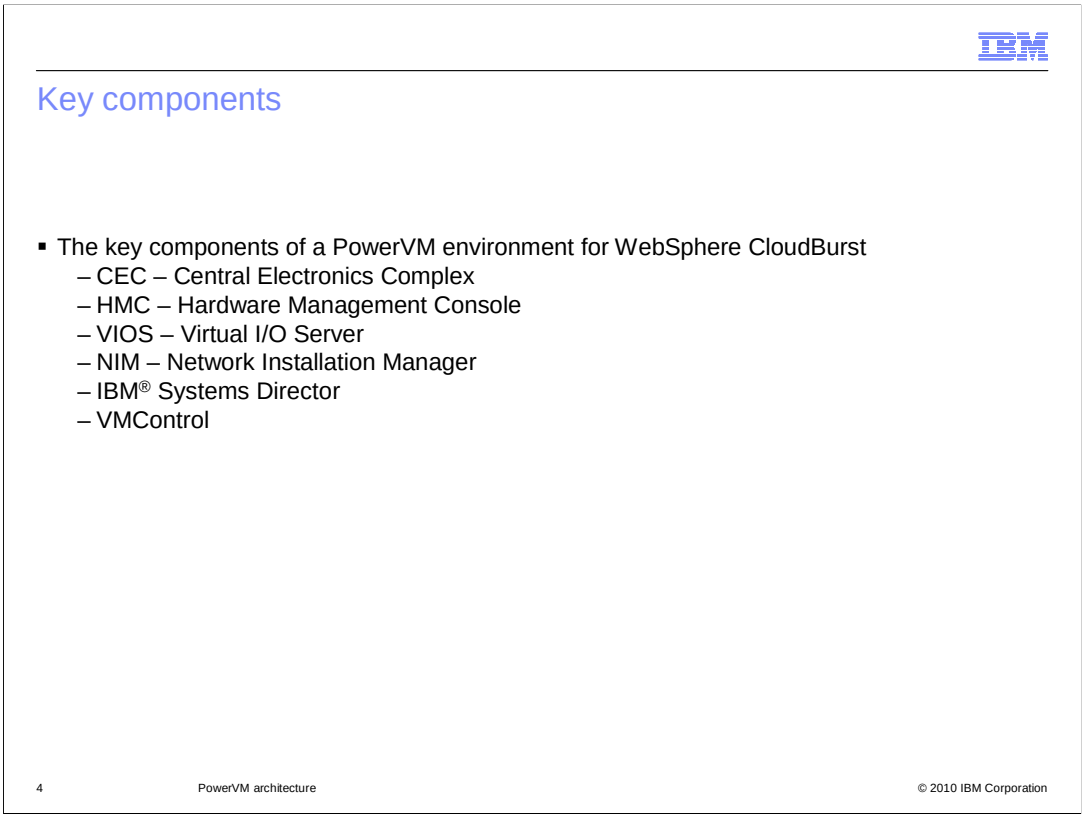
The first section of the presentation describes the hardware and software components of the PowerVM environment, followed by an overview diagram that illustrates how the different pieces fit together.



This section describes the different components that make up the PowerVM environment, including hardware and software.



The PowerVM environment for WebSphere CloudBurst includes:

the CEC, which stands for Central Electronic Complex, which are the computers that will run the PowerVM components and target systems;

the HMC, the Hardware Management Console, which runs as a stand-alone appliance controlling the CEC;

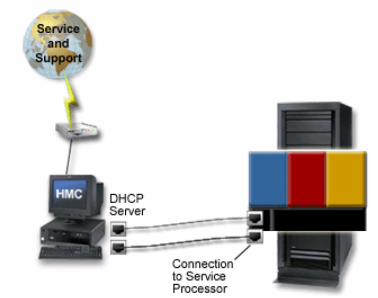
VIOS, the Virtual I/O Server, which runs as a software partition;

the NIM, Network Installation Manager, which runs as a set of services within its own AIX® partition;

the IBM Systems Director, which runs as an application within an AIX partition;

VMControl, which runs as a plug-in to the IBM Systems Director application.

HMC – Hardware Management Console

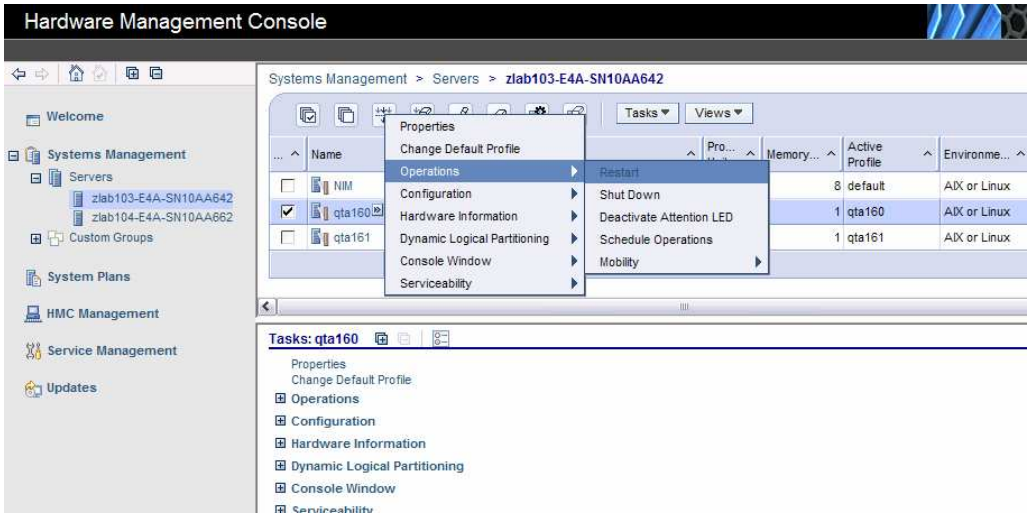


- HMC – A stand-alone appliance
- Used to:
  - Create / change / delete logical partitions
  - Assign hardware to a partition
  - Central hardware control point
  - Central administration point
  - Provides virtual terminal access to all LPARs
  - Provides management through a GUI or through a command-line interface
- WebSphere CloudBurst uses HMC functions to create, manage and delete LPARs for deployed virtual systems
  - Connects to HMC through IBM Systems Director and VMControl

The HMC is an IBM-supplied stand-alone appliance maintained by IBM. It is used to administer, manage and control the systems within the PowerVM complex. You can perform tasks such as create, change, and delete LPARs, power on and power off hardware, start and shut down operating systems, review hardware information, review, defined and modify virtual I/O, channel, and Ethernet adapters, dynamically modify definitions and resources for LPARs, open console interfaces directly to the operating systems on the LPARs, manage serviceable events, and even install firmware updates to the AIX hardware components. The HMC requires both Ethernet connections to each hardware device in the CEC but also requires Service Processor connections to the Power equipment as well to enable the full set of control functions.

WebSphere CloudBurst, through the IBM Systems Directors and VMControl, uses HMC functions to create, manage, and delete LPARs related to its deployments.

HMC GUI

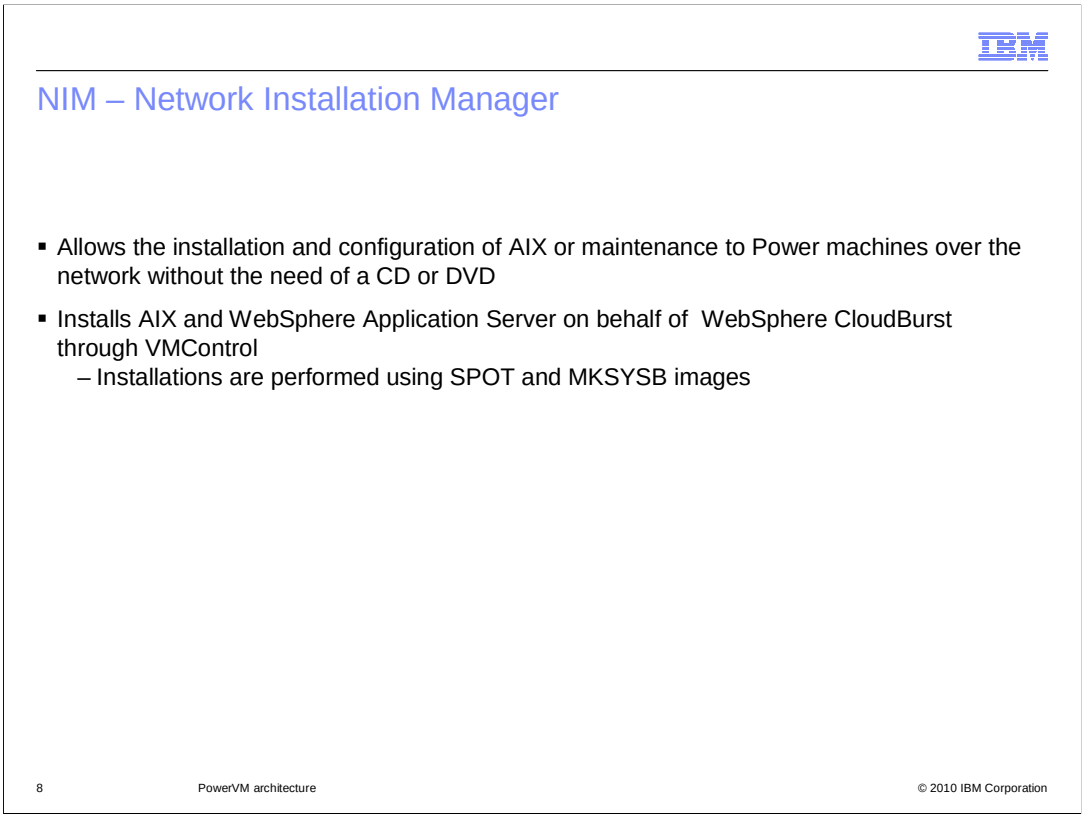


Here is an HMC console view of a server within a PowerVM complex. On the selected server, you can see three logical partitions defined. One partition (in this example, qta160) is selected with a check box, causing a tiny double-arrow box (>>) to appear to the right of the name. If you left-click the double-arrow, you can see a popup with some of the controls available from the HMC. For example, in Operations, you can restart the partition, shut down the partition, deactivate attention LEDs on the hardware, schedule activation, modification, or shutdown operations of the partition, or perform some of the mobility capabilities available to the HMC for that partition.

VIOS – Virtual I/O Server

- Runs as a VIOS LPAR
- Allows resource sharing between LPARs
  - Virtual SCSI – sharing disks between LPARS
  - Virtual networking – sharing physical network adapters
- Provides the disk space (storage pools, virtual disks, physical disks) for virtual systems deployed by WebSphere CloudBurst
  - Optionally can provide disk space and storage pools for NIM, IBM Systems Director, VMControl

The Virtual I/O Server installs within an LPAR. Logons to VIOS use a special shell for user padmin, and does not allow **root** access. The VIOS command set is somewhat different than the familiar AIX commands. VIOS allows for the sharing of network and disk resources used by the other partitions within the PowerVM complex. It is used for the disk space and network resources for the target system and optionally can be used by IBM Systems Director and by NIM for their disk and network resources as well.



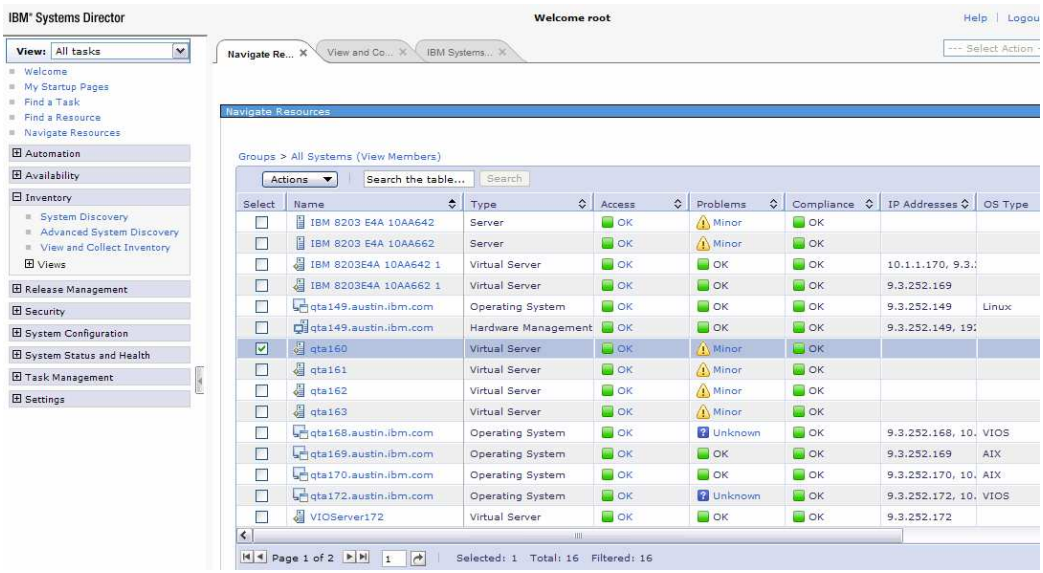
The Network Installation Manager is a client/server technology available on the Power platform that allows you to install and configure AIX operating systems without the need for removable media. In the WebSphere CloudBurst environment, NIM works on behalf of WebSphere CloudBurst through the IBM Systems Director and VMControl to install AIX and WebSphere binaries onto the partitions that the HMC has created. These installations use a MKSYSB image (a type of AIX system backup image) along with an associated SPOT image (a boot image supporting only the devices found in the associated MKSYSB image).

IBM Systems Director

- A platform manager
  - Runs on multiple platforms and supports multiple platforms
  - For WebSphere CloudBurst, runs on AIX for resource management and visualization of PowerVM partitions
  - Discovers, navigates and depicts virtual and physical systems and their inventories
    - Disks, Ethernet adapters, SCSI adapters, memory
- Used by WebSphere CloudBurst – in conjunction with VMControl plug-in and NIM – to deploy, manage and delete virtual systems

The IBM Systems Director is a free product that runs on multiple operating system platforms to depict and manage the resources on servers and multiple types of operating systems. IBM Systems Director provides functionality extended by the VMControl plug-in and by NIM to deploy, manage and delete virtual systems.

IBM Systems Director GUI



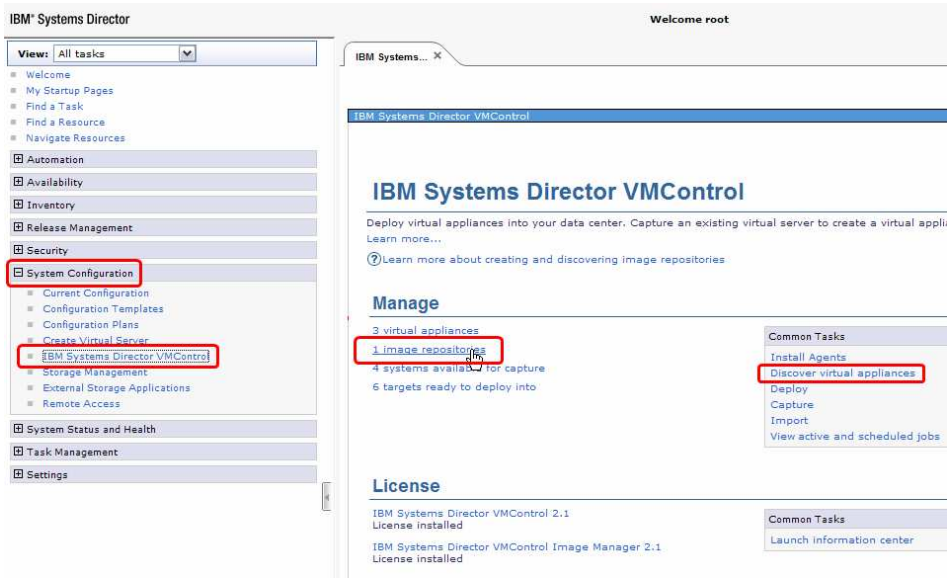
Here is a snapshot of the IBM Systems Director administrative console, showing the various servers that are being visualized within this complex. The IBM Systems Director administrative console can give you a better indication of the health of the environment than provided by the HMC, particularly in terms of intercommunications and virtual resources.

VMControl

- A plug-in for IBM Systems Director
- Works with Systems Director to enable deployment of virtual systems
  - Manages virtual appliances
  - Provides GUI wizards for deploying and capturing operating system images
- WebSphere CloudBurst uses the VMControl API interface during its image operations

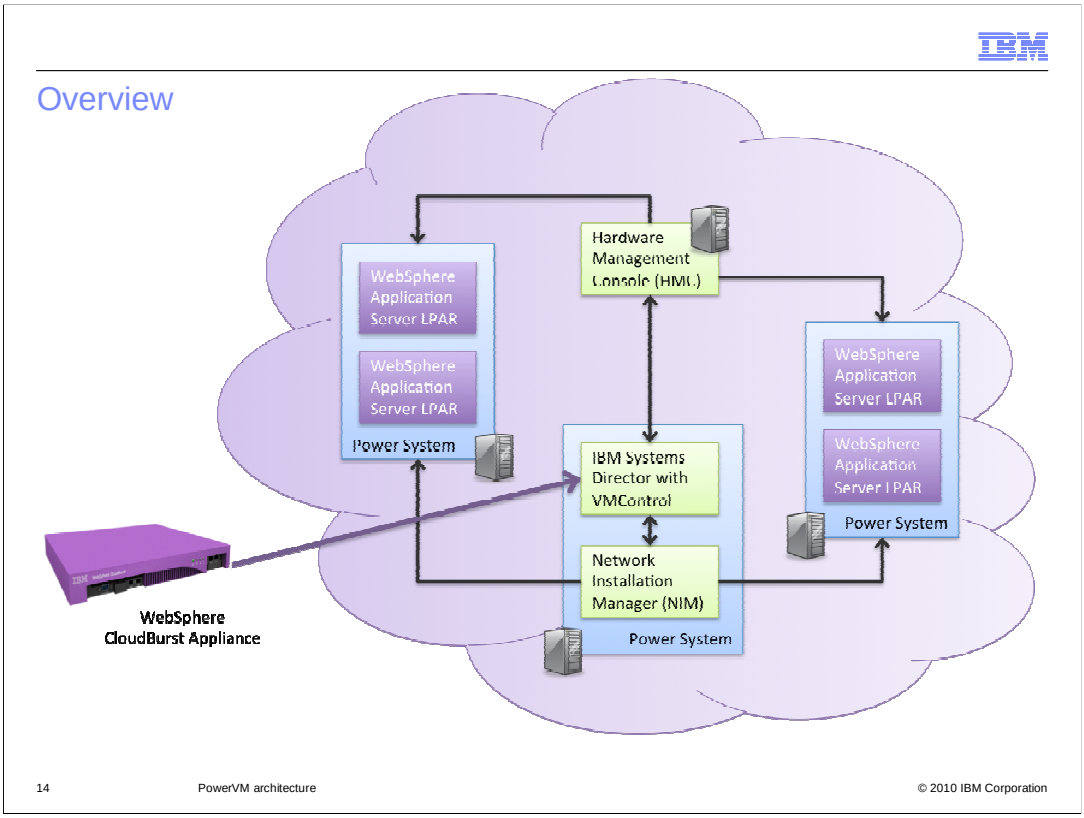
VMControl is the last component that is installed in the PowerVM environment. It is provided as a plug-in to IBM Systems Director, to extend its capabilities to provide support for virtual appliances and for extended functions such as deploying and capturing operating system images. The functions available in VMControl are used by WebSphere CloudBurst to manipulate virtual systems and images.

VMControl GUI



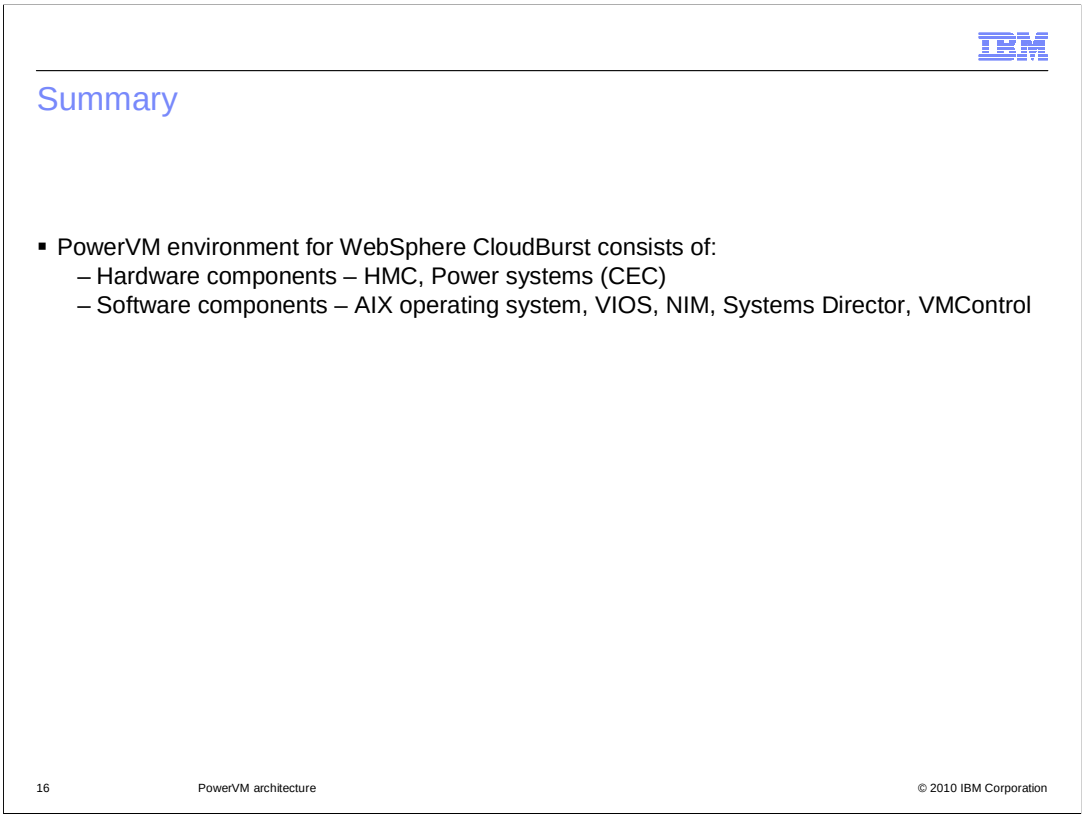
Here is a snapshot of the IBM Systems Director console. Located within the System Configuration expansion is the VMControl plug-in console interface. In the right pane, notice the ***image repository*** under the **Manage** topic section. This repository, required for WebSphere CloudBurst to work with virtual images, was “discovered” by using the ***Discover virtual appliances*** link, located at the right under the **Common Tasks** topic section of the screen.

This section provides a diagram that shows how the different components of the PowerVM environment fit together to support WebSphere CloudBurst.



Here is a graphical overview of WebSphere CloudBurst in respect to the PowerVM environment. The VIOS is not shown since it is not directly involved with most of the deployment activity. When you deploy a PowerVM Virtual System, several events occur. First, the WebSphere CloudBurst appliance checks for available IP addresses, hypervisor, disk storage space and processor and LPAR partition availability. Then, if the necessary resources are available, the appliance goes through VMControl to request that the HMC creates a logical partition (LPAR) within the PowerVM environment. At that point, the appliance transfers the operating system and WebSphere Application Server binary images from the appliance to the IBM Systems Director and VMControl storage cache. IBM Systems Director and VMControl invoke NIM to install the operating system into the LPAR, with VIOS providing dynamic communications connections and disk storage for the LPAR being built. Then, appliance runs scripts to customize the partition and the WebSphere Application Server installation. Finally, the appliance starts the partition and the WebSphere Application Server environment.

The next section provides a summary of this presentation.



This presentation discussed the overview of the PowerVM environment for WebSphere CloudBurst. The PowerVM environment is made up of both hardware and software components. You need an HMC, or hardware management console, connected to the physical hardware of your Power systems. The Power systems themselves need to be configured with the correct levels of the operating system, Virtual I/O Server, Network Installation Manager, and IBM Systems Director with the VMControl plug-in.

References

- HMC
  - http://www.ibm.com/developerworks/wikis/display/virtualization/HMC
- VIOS main page
  - http://www14.software.ibm.com/webapp/set2/sas/f/vios/home.html
- IBM Systems Director
  - http://www-03.ibm.com/systems/management/director/
- VMControl
  - http://www.ibm.com/systems/management/director/plugins/syspools/index.html
- Step-by-step movie demos
  - http://www.ibm.com/developerworks/wikis/display/WikiPtype/Movies
- YouTube channel
  - http://www.youtube.com/user/WebSphereClouds

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

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