

# IBM PureApplication System

Virtual system instance administration and its virtual machine operations



This IBM PureApplication™ System presentation covers both virtual system instance administration and operating the virtual machines within the instance.

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- Managing virtual system instance
- Managing virtual machines (VMs) within the virtual system instance
- Accessing VM
- VM operations
- Monitoring virtual system VMs

This presentation covers virtual system instance management, followed by managing, accessing, and operating on the VMs inside the virtual system instances.

## ***Managing virtual system instance***

This section covers the virtual system instance

**Virtual system instance - Administration**

**Virtual System Instances**

Search...

DayTrader Static Cluster VSys

**Instance operations**

Refresh Start Stop Store Service Delete

**DayTrader Static Cluster VSys**

Created on: Jul 20, 2012 3:15:45 PM

From pattern: DayTrader Static Cluster VSys **Parent pattern**

Using Environment profile: envProfile18

Deployment priority: Low

Current status: The virtual system has been deployed **Current status**

Updated on: Jul 20, 2012 4:19:12 PM

Deployment ID: d-f706f2cd-c7a0-4605-921a-14810e7ac0c4

Access granted to: deploy18 [owner]

Add more...

Snapshot: (none)

Create **Create Snapshot of all VMs and restore from a snapshot**

**Grant access**

**History**

**History**

The virtual system has been deployed

**Virtual machines**

4 total - 4 started **VM details and operations, SSH, VNC**

**Comments**

There are no comments yet

Workload Console → Instances → Virtual Systems

Once the pattern is deployed, you can manage the instance by going to the “Virtual Systems” tab for that instance from the workload console, or from the welcome screen of the workload console.

The Virtual System Instance panel allows you to view and manage the instance and its VMs.

The “From pattern” entry in the details of the instance has the link to the pattern from which the virtual system was created.

The “Using Environment Profile” shows the environment profile that was used to deploy this instance.

“Current status” provides a high-level view of the virtual system’s status. A green arrow indicates that the virtual system is available and ready for use. During deployment, the status changes with the deployment steps.

“Access granted to” shows a list of users who can manage this instance. Only the owner of a virtual system instance can grant access to other users.

Virtual systems deployed to a PureApplication System provide the ability to save a copy of the entire current state of a virtual system. This copy is called a snapshot. Taking a snapshot of a virtual system will result in every virtual machine that makes up the virtual system having its own snapshot taken. Restoring from the snapshot takes you back to the state defined by the snapshot. You can take only one snapshot of the instance. Note that the restore button will not appear until the snapshot is created.

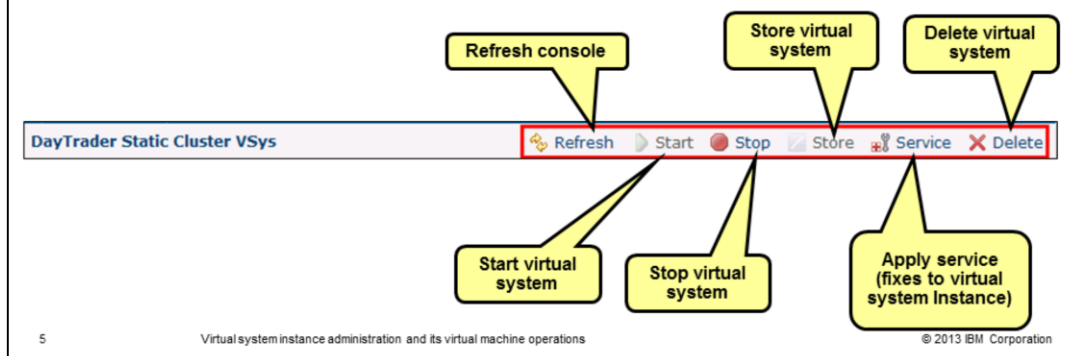
“History” provides a view of the history of the creation and operations of the instance. In case of deployment failure, this is a good troubleshooting area to see the last successful step and the first failed step

The "Virtual machines" section provides details and operations on individual VMs of the instance.

The "comment" section allows you to add comments for later reference.

## Virtual system instance - Operations

- **Stop:** stops all VMs – resources are still kept
- **Start:** starts the stopped or stored VMs of this instance (assuming resources are available to start the VM)
- **Delete:** release all resources (storage, IP addresses) and deletes the instance
- **Store:** releases resources (CPU and RAM ) of a stopped instance - stores the VMs in the storage, and IP reservations are kept, so they can be started at a later time
- **Service:** apply custom or IBM supplied emergency or service level fixes on the VMs
  - This link is active only if applicable fixes are available for any VM in the instance



The virtual system's view offers the basic functions of starting, stopping, and deleting the virtual systems from the cloud. These actions affect all of the virtual machines that are part of the virtual system. Deleting a virtual system will release all of its resources, such as storage and IP addresses, back to the pool.

Two additional features deserve a deeper look: emergency fixes and storing virtual systems.

IBM maintains the virtual images that come preloaded on PureApplication System. When a new fix pack or emergency fix is available for these virtual images and imported into PureApplication System, they can be applied to the applicable VMs in the deployed instance.

The service link will be active only if there are fixes available for any VM in the instance. Applying service will allow you to select the fixes for the images that you want to apply and let PureApplication System then apply the fixes to all the applicable VMs within the instance and restart them.

Storing a virtual system releases the resources associated with the virtual system and keeps the virtual system in the storage, so that it can be started at a later time. The delete operation releases the associated resources as well, but it also removes the virtual system VMs from the storage.

## Virtual system instance - History

- History shows the all the deployment steps from the start of the deployment to when the virtual system is ready for use
- Subsequent operations on the instance are also noted in the history

History		The virtual system has been deployed and is ready to use
The virtual system has been deployed and is ready to use		Feb 22, 2012 5:25:11 PM
Executing script package Install DayTrader Application Single Server on virtual machine aimcp070-Standalone-DayTrader Single Server-181		Feb 22, 2012 5:22:12 PM
Executing script package Install DayTrader DB drivers on virtual machine aimcp070-Standalone-DayTrader Single Server-181		Feb 22, 2012 5:21:46 PM
Starting virtual machine aimcp070-Standalone-DayTrader Single Server-181		Feb 22, 2012 5:12:28 PM
Starting virtual machine aimcp069-DB2_ESE-DayTrader Single Server-182		Feb 22, 2012 5:08:17 PM
Starting virtual machines in virtual system DayTrader Single Server.		Feb 22, 2012 5:08:17 PM
Registering virtual system DayTrader Single Server		Feb 22, 2012 5:06:57 PM
Transferring virtual images to hypervisors		Feb 22, 2012 5:06:42 PM
Generating model for topology and network		Feb 22, 2012 5:06:12 PM
Reserving cloud resources		Feb 22, 2012 5:05:07 PM
Deployment has been queued		Feb 22, 2012 5:04:59 PM

Expand the History section of the panel to see the entire history of the virtual system since deployment. Significant events in the virtual system life cycle are recorded, including resource allocation and virtual machine start and shutdown.

## ***Managing virtual machines in virtual system instance***

This section covers management of the VMs in the virtual system instance.

## Virtual system instance – Virtual machines (VMs)

- View details VMs of the instance
- Access the operating system using SSH
- Links to VM console (VNC) or middleware (WebSphere®) console
- Perform operation on one VM or group action on one or more VMs – clone, stop, delete, and so on.

The screenshot displays the 'Virtual machines' management console. At the top, it indicates '4 total - 4 started'. The table below lists VMs with their names, CPU usage (0%), and memory usage (13% and 5%). The 'SSH' column contains a 'Login' link, and the 'Actions' column contains 'Login' and 'Manage' links. The 'Group Actions' column contains a 'Group Actions' link. A callout box labeled 'Expand for details' points to a plus sign icon next to the second VM, which has opened a detailed view showing a login form with 'User name' (virtuser) and 'Password' fields, and 'Login' and 'Cancel' buttons. Other callouts point to the 'SSH Login', 'VM operation action', 'Group action', 'SSH', 'Actions', 'Group Actions', 'Login', and 'Manage' links.

You can view all the virtual machines or VMs of the virtual system instance from the instance panel, as shown on the slide.

Virtual system instance consists of one or more VMs.

The virtual machine information indicates the amount of processor capacity and the amount of allocated memory currently used by the VM. If the indicator is green then either the processor or memory is operating within in normal limits. Yellow indicators tell you that the item should be monitored and possible adjustments made. A red indicator is a warning and action should be taken immediately.

You can SSH into the VM using the SSH login link as shown. Applicable operations like start, stop, delete, and clone can be performed on a single VM or can be performed on a group of VMs. Expand the VM tab for more details and additional operations on the VM.


Expanding a virtual machine will present you with information about the virtual machine. This page is divided into several sub-sections that provide varying levels of information and details for the VM. It contains information such as the cloud group where the VM is running, hardware and network information, like the assigned IP address and host name, middleware information like the cell name and node name of WebSphere Application Server environment, scripts that have run on the VM and its log files, and access to VNC and middleware consoles.





## VM details (1 of 2)

- **General information:**

- Parent Virtual image and part name for this VM
- Current status
- Cloud group that contains this VM
- License info:
  - PVU consumed by this VM

 **General information**

Created on:	Jul 20, 2012 3:15:51 PM
From virtual image:	<a href="#">WebSphere Application Server 8.0.0.3</a>
Part name:	DMGR
Current status:	 Virtual machine has been started
Updated on:	Jul 20, 2012 4:09:52 PM
In cloud group:	<a href="#">CloudGroupLarge</a>
Registered as:	2017e667-475d-4318-b383-80722d5fa7ca
Stored on:	CloudGroupLarge storage
In virtual application:	None provided

 **IBM products (with license count for isolated usage)**

In the “General Information” section you will find information pertinent to the virtual machine. You can monitor the virtual machine’s status from here. The cloud group where this VM is running is displayed. The VM could be running on any compute node within the cloud group, based on the placement of the VM and on the automatic re-balance of the VMs across the compute nodes.

The IBM products section names all products installed on the virtual machine along with the number of licenses in use and the type of license (PVU or server).

## VM details (2 of 2)

- **Hardware and network info:**

- Virtual CPU count \*
- CPU share and consumed
- VM Virtual memory \*
- SSH public key – can be downloaded
- Network interface – host and IP address
- MAC address

\* Can only be modified after stopping the VM

Hardware and network	
Virtual CPU count:	1 (You must stop this virtual machine in order to change this value.)
Virtual memory (MB):	2048 (You must stop this virtual machine in order to change this value.)
SSH public key:	<a href="#">id_rsa.pub</a>
Network interface 0:	fd8c:215d:178e:2011:250:56ff:feb2:5d40 (fd8c:215d:178e:2011:250:56ff:feb2:5d40)
MAC address 0:	00:50:56:b2:5d:40
Network interface 1:	ipas-lpar-110-248.purescale.raleigh.ibm.com (172.17.110.248)
MAC address 1:	00:50:56:b2:5d:41

- **Operating System info:**

- VM's OS name, type and version

Operating system	
Name:	Linux
Type:	RedHat Linux
Version:	2.6.32-220.13.1.el6.x86_64

In the “Hardware and network” section you will find information pertinent to the virtual machine. The number of processors and virtual memory configured on the virtual machine are displayed. The host name and IP address shown are assigned to the virtual machine during virtual machine deployment. SSH public key information is also displayed. The link to the public key shows the contents of the key. You can change the VM's Virtual CPU count and memory. Note that you need to stop the VM to change these values, and then restart the VM again.

In the “Operating system” section you will find the type and version of the operating system that your virtual machine was created on.

**VM details – Middleware configuration**

**WebSphere configuration**  
 Cell name: CloudBurstCell\_1  
 Node name: CloudBurstNode\_1  
 Profile name: DefaultDmgr01

[Show all environment variables](#)

**Script Packages**

Script Package	Status	Time	Log Files
wasHVPatternConfiguration	✓	Jul 20, 2012 4:08:02 PM	remote_std_out.log remote_std_err.log cloudburst_collect1342818482648.zip
Install DayTrader Static Cluster Application 18	✓	Jul 20, 2012 4:11:47 PM	remote_std_out.log remote_std_err.log cloudburst_collect1342818707390.zip
ILMT Agent Install Package	✓	Jul 20, 2012 4:04:19 PM	remote_std_out.log remote_std_err.log
maestro	✓	Jul 20, 2012 4:16:52 PM	remote_std_out.log remote_std_err.log cloudburst_collect1342819011939.zip
Must Gather Logs	✓	Jul 20, 2012 4:18:17 PM	remote_std_out.log remote_std_err.log cloudburst_collect1342819093920.zip

**Consoles**  
[VNC](#) [WebSphere](#)

[Execute now](#)

Product administrator user name and password  
 User name:   
 Password:

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The middleware configuration displays information related to the middleware configuration, running of the script files and its log files, link to environment variables, with WebSphere configuration shown here as an example.

The “**Script Packages**” section is divided into log files and other important files generated when the script package runs and when the application server starts. The archive file contains a collection of log files, error files, and the activity log. This archive file is very useful for debugging and troubleshooting any problems with the initial deployment of the package.

For scripts configured to run “**When I initiate it**”, a link to “**Execute Now**” will be added to allow running that script at any time after the VM has been deployed. This allows you to control when to run the script rather than at the time when the VM is created. Ability to control execution of the script gives you the ability to debug the script in a more controlled fashion. Error flags appear when there were errors running the script.

## Virtual machine – OS and middleware environment variables

- Virtual machine environment variables – contains OS and middleware specific variables
  - These variables are used in scripts and at runtime, they will be substituted to actual values

**WebSphere configuration**

Cell name:	CloudBurstCell_1
Node name:	CloudBurstNode_1
Profile name:	DefaultDmgr01

[Show all environment variables](#)

**Read-only list  
opens in separate  
browser window**

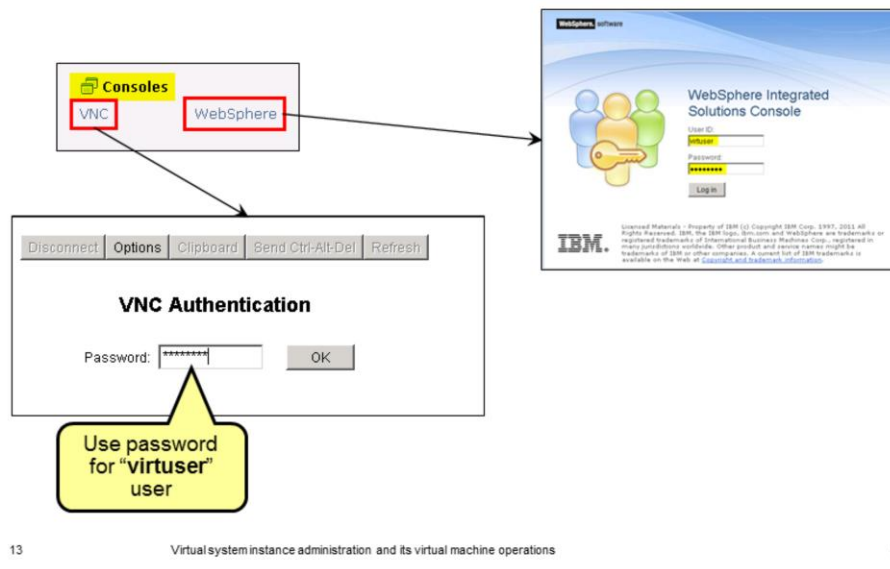
ADMIN_CONSOLE_URL	http://ipas-lpar-110-248.purescale.raleigh.ibm.com:9060/ibm/console
ADVANCED_FEATURE_SELECTED	false
AMT_MEM	2051160
APP_SERVICE_COMMAND	/opt/IBM/AE/AS/installAppService.sh
APP_SERVICE_COMMAND_LOG	/opt/IBM/WebSphere/AppServer/logs
APP_SERVICE_PACKAGE_LOCATION	/tmp/update/app
AUGMENT_LIST	none
AUTOSTART	true
CELL_NAME	CloudBurstCell_1
DELETE_VIRTUAL_MACHINE	/opt/IBM/AE/AS/removeWASVM.sh
DMGR_FEDERATE	false
HOSTNAME	ipas-lpar-110-248.purescale.raleigh.ibm.com
JMGR_REGISTER	false
NODE_NAME	CloudBurstNode_1
NUM_CPUS	1
OPERATION_COMMAND	"/opt/IBM/WebSphere/AppServer/bin/ws_ant.sh -f /opt/IBM/AE/AS/wasHVControl.ant"
OPERATION_COMMAND_LOCATION	/opt/IBM/AE/AS
OS_NAME	Linux

**OS and middleware  
(WebSphere  
Application Server)  
environment  
variables**

In the “WebSphere configuration” section you can locate the cell, node, and profile names for the virtual machine. Click the link to Show all environment variables. This opens a separate browser tab or window with a list of WebSphere Application Server environment variables. The list is read only.

## VNC and middleware console

- **Consoles** section to access **VNC** (if enabled during deployment) and middleware console, like the WebSphere administrative console
  - Depending on the VM and the middleware in it, you may have links to other consoles



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The “Consoles” section contains the VNC and the links to middleware consoles.

During pattern creation, the default setting is for your host operating system to be configured to accept VNC connections. If a virtual machine was created with VNC access enabled, the “VNC” link opens a VNC session in a separate browser window. The new browser window initially shows a VNC authentication panel to allow access to the virtual image. VNC server password is the password configured for the virtuser ID when deploying the pattern to create the virtual system. Once you have entered the VNC server password, you can use VNC to remotely control the virtual image.

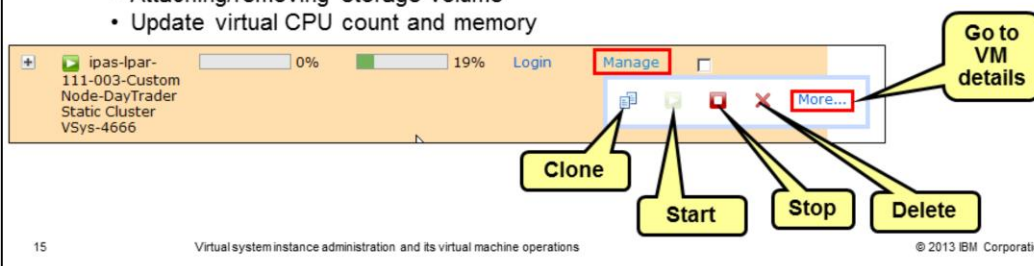
Based on the middleware running on the VM, links to one or more middleware consoles are exposed. For example, for a VM containing a WebSphere Deployment manager or a single server, the “WebSphere” link opens the WebSphere administrative console in a separate browser window.

## ***Virtual machine operations***

This section gives the details of the virtual machine operations.

## Virtual machine operations

- Navigate to the deployed instance panel, expand virtual machines and select Manage
- Available operations
  - **Clone** this virtual machine to handle increased workload
    - Available on certain VMs, where applicable, like WebSphere Custom node
  - **Start** this virtual machine, after it was stopped
  - **Stop** this virtual machine
  - **Delete** this virtual machine (to handle reduction in workload)
    - For Virtual System VMs, scripts marked to run at VM deletion will be invoked before deleting the VM
  - **More...** – go to the details of this VM for additional operations
    - Attaching/removing storage volume
    - Update virtual CPU count and memory



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Each virtual machine that makes up the virtual system now has four additional operations. Those operations are “Clone”, “Start”, “Stop”, and “Delete”. To view or use these operations navigate to the deployed instance panel and expand “Virtual machines”

To change the hardware allocations, expand the twisty next to the virtual machine and go to the “Hardware and network” section.

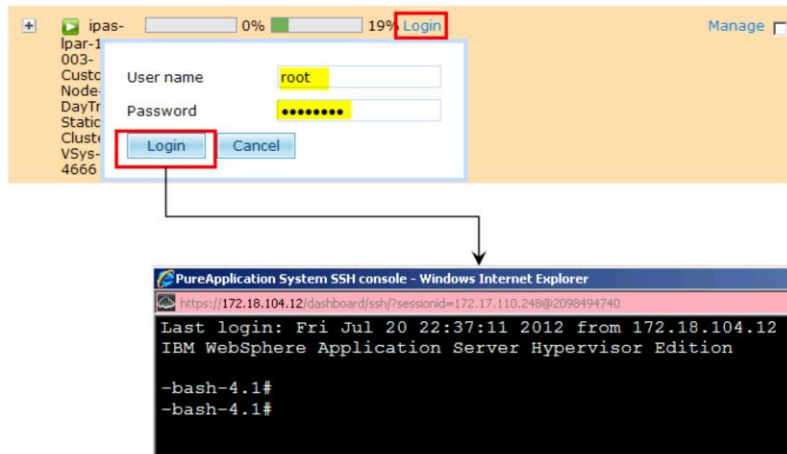
The PureApplication System virtual machine operations clone and delete give you a great deal of flexibility to react to your changing environment workload, but it is your responsibility to monitor the environment and start the actions when appropriate.

Clone operation is valid on certain types of VMs, like WebSphere Custom Node. It is not available on all VMs

The “Login” link on the virtual machine status line will open an SSH session to the virtual machine. You must provide a user name and password that are valid on the virtual machine.

## Virtual machine SSH console

- In the instance panel for a deployment, expand virtual machines, and click **Login**
- Enter **root** and its password (set during deployment of the pattern)



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Virtual system instance administration and its virtual machine operations

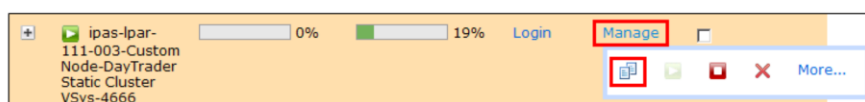
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The “Login” link on the virtual machine will open a separate browser window with an SSH session to the virtual machine. You must provide a user name and password that are valid on the virtual machine. The console does not connect your client directly to the target virtual machine. Instead, the PureApplication System manages the SSH connection and acts as a proxy between the client browser session and the virtual machine.



## Virtual machine operations - Clone

- Create a clone of an existing virtual machine to handle increased workload
  - Script packages marked for “on virtual system creation” are executed
  - Multiple clone operations can occur simultaneously under the same virtual system
  - Script packages marked to run at virtual system creation get run after the virtual machine has been created
  - Any maintenance applied to the source virtual machine is applied to the cloned virtual machine automatically
- Manual intervention required
  - Your responsibility to monitor the environment and clone or delete the virtual machines
  - Your responsibility to regenerate routing rules on virtual machine clone
  - Your responsibility to drain active activity of clone before virtual machine delete



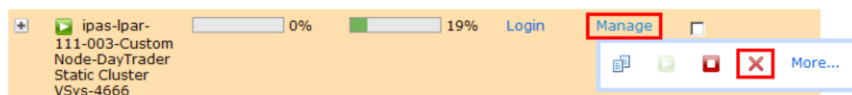
The clone operation allows you to create a copy of the virtual machine. This feature can be used when the workload has exceeded the resources of the existing virtual machines. Cloning a virtual machine is a manual process and requires that you monitor your environment and initiate a clone operation when appropriate.

If the virtual machine you are cloning contains any script or maintenance packages, those script packages and maintenance packages are applied to the newly created virtual machine. Script packages are applied to the new virtual machine using the same “executes” preferences that you had specified for the original virtual machine. For example, if any of your script packages were marked to run “at virtual system creation” those script packages get run at virtual machine creation. The same logic applies to script packages marked to be run “when I initiate it” and “at virtual system deletion”. In addition, if you are cloning a virtual machine that is a “custom node”, PureApplication System will invoke the “addNode” command against the new node to add it to the cell.

The ability to start multiple clone operations at the same time can save you time. The only limiting factor is that the virtual machines must all belong to the same virtual system.

## Virtual machine operations (delete)

- Delete operation
  - Deletes virtual machine from virtual system
  - Multiple delete operations can occur simultaneously under the same virtual system
  - Script packages marked to run **at virtual system deletion** will get run before deleting the virtual machine



The delete operation allows you to delete a virtual machine. This feature can be used when the virtual machines far exceed the workload or if a virtual machine is misbehaving. As with cloning a virtual machine, the deletion of a virtual machine requires that you monitor your environment and initiate a delete operation when appropriate.

During the delete operation any script packages whose **“execute”** field is marked with **“at virtual system deletion”** will get run before deleting the virtual machine. In addition, if you are deleting a virtual machine that is a “custom node”, PureApplication System will invoke the “removeNode” command against the node to remove it from the cell. One caveat is that the node must be in a started state in order for the “removeNode” command to be executed and the node removed from the cell. If your node is in a stopped state then it is not removed. To remove the node in this scenario, run the “cleanNode” command.

The ability to start multiple delete operations at the same time can save you time. The only limiting factor is that the virtual machines must all belong to the same virtual system.

## Virtual machine – more details and operations

The screenshot displays the IBM Virtual Machines management interface. On the left, a list of virtual machines is shown, with the first one selected. The main panel shows details for the selected VM, including its status (Running), creation and update dates, CPU utilization (1%), and virtual memory usage (11% of 2GB). A 'Configure' button is highlighted with a red box. A dialog box titled 'Configure memory and CPU of a virtual machine' is open, showing input fields for 'CPU count', 'Physical CPU count', and 'Virtual memory(MB)'. A yellow callout bubble points to this dialog with the text 'Modify VM memory and CPU'. Another yellow callout bubble points to the 'Add more...' button in the 'Storage volumes' section with the text 'Add additional storage volume'. The bottom of the slide contains the text 'Virtual system instance administration and its virtual machine operations' and '© 2013 IBM Corporation'.

The VM details panel shows the status, usage, compute node where the VM is running, and other information. It shows the storage volumes used by the VM. You can associate additional storage volume to the VM, or remove it from the VM. The storage volume needs to have been created on the cloud group before assigning to the VM.

After a pattern has been deployed you can change virtual CPU and memory settings on the VM, as shown in the slide.

## ***Summary***

And, in summary...

## Summary

- Virtual system instance information
- Control - Start, stop, update, service, store
- Virtual machines metrics, configuration information, and logs
- Virtual machine consoles: SSH, VNC, and middleware consoles like WebSphere administrative console
- Virtual machine operations
  - Ability to clone, start, stop and delete individual virtual machines that make up a virtual system
    - Increase or decrease virtual machines based on demand
    - Manual step required to clone, start, stop or delete an individual virtual machine
  - Virtual machine hardware update

This presentation has described managing the virtual system instance and its virtual machine. You can control the VMs that make up the virtual system or apply maintenance updates. You can also create an operational snapshot of the VMs or restore from a previously created snapshot. High level operational metrics and detailed configuration information are provided for each VM contained in the virtual system. You can access the VM directly in several ways: an SSH session provides low-level access to a VM terminal environment, and a VNC session allows you to access the virtual machine's desktop. Finally, a link is provided to the middleware consoles like the WebSphere Integrated Solutions Console.

You also saw the available virtual machine operations that give you the capability to clone, start, stop, and delete individual virtual machines that make up a virtual system. Based on demand you can create and teardown certain middleware virtual machines to keep your environment healthy.

You also saw how you can update the number of virtual CPUs and memory in a VM after deployment and add or remove additional storage to the VM. This also allows you to react to an increase or decrease in demand.

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