Expert Integrated Systems: Best Practices, Problem Determination Tips & Techniques

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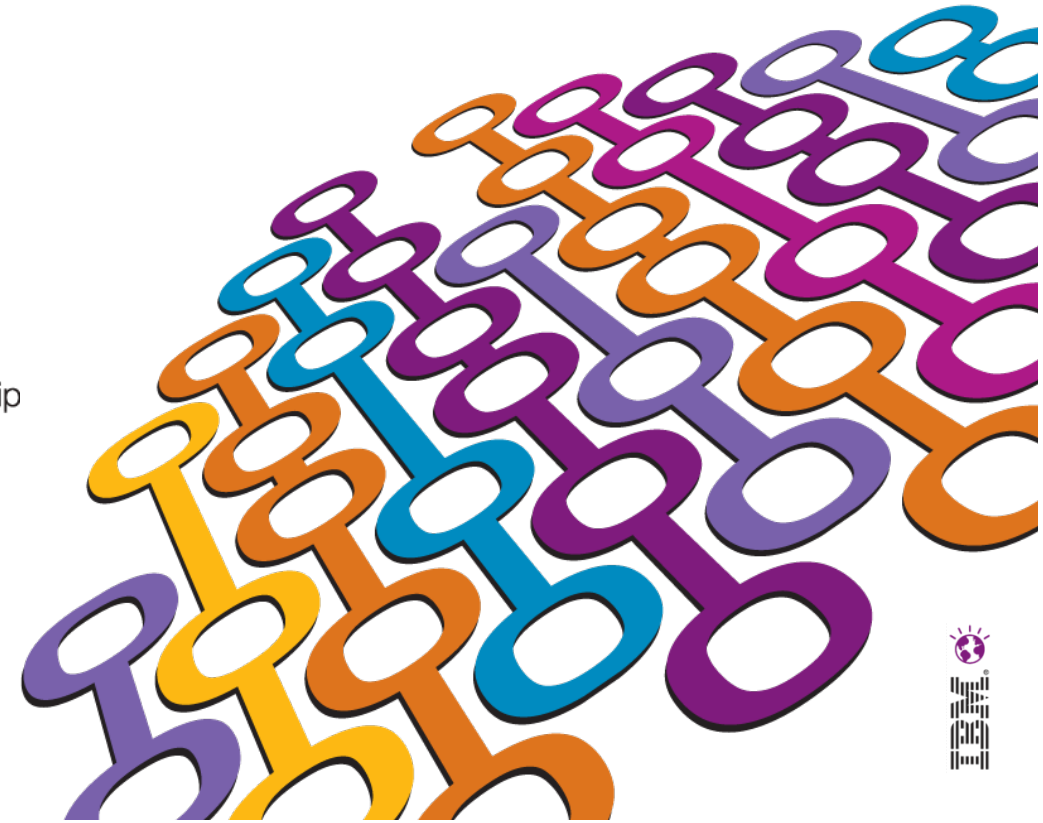

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Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

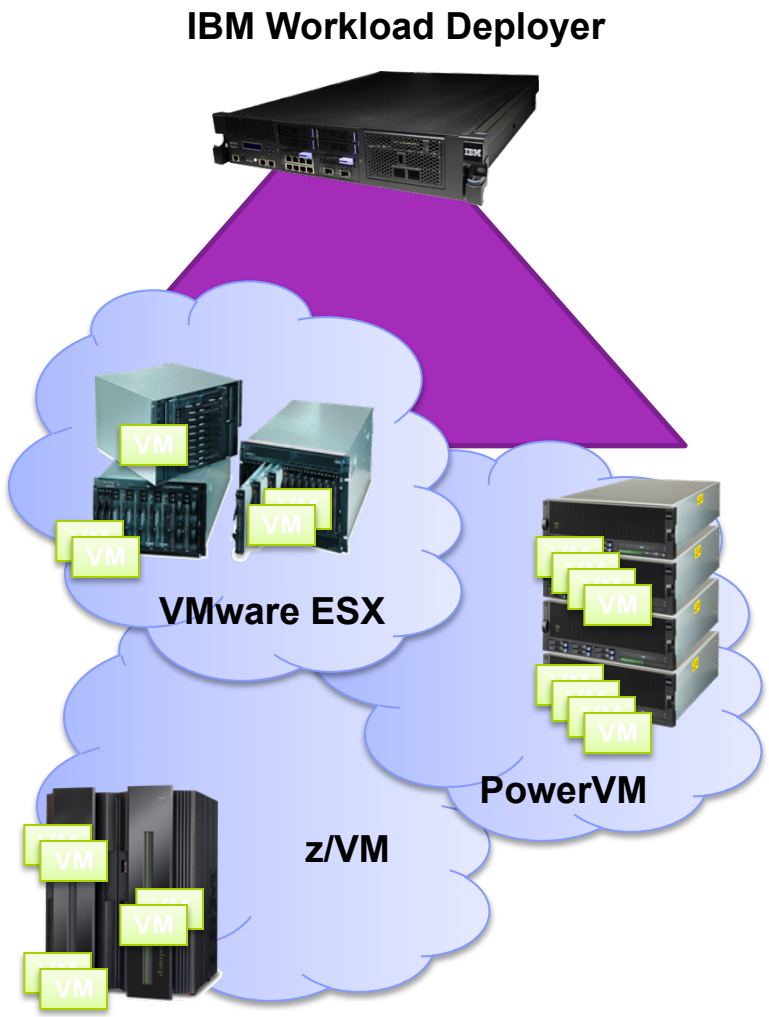
Agenda

- Best practices through the lifecycle
  - Plan
  - Build
  - Run
  - Manage
- Troubleshooting
  - Appliance
  - Pattern Deployment
  - Virtual Application Patterns
  - Virtual System Patterns

IBM Workload Deployer (IWD)

Bring your own private cloud

- IBM Workload Deployer is a secure, self-service cloud management hardware appliance
- Design and deploy consistent and repeatable middleware patterns into your private cloud of virtualized hardware
  - IBM Workload Deployer supports VMware ESX, PowerVM, z/VM
- Bring your own cloud to leverage your existing underutilized hardware
- Full lifecycle management for IBM middleware, limited lifecycle management for third part products



IBM PureApplication System
A Simple, Efficient, Flexible, Virtualized Application Platform

Complete, Ready-to-Go Systems

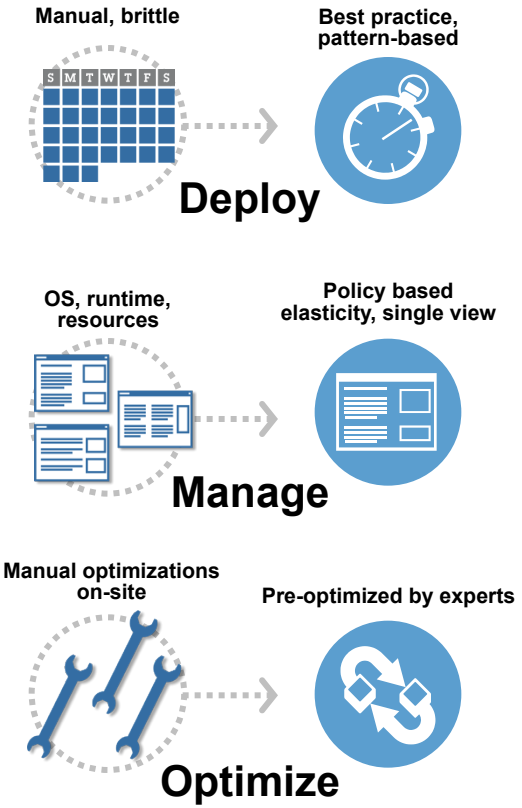
- Pre-integrated, up and running in <4 hours
- Pre-optimized for enterprise application workloads

Simplify Ongoing Tasks

- Single point of platform and application management
- Repeatable self service application provisioning

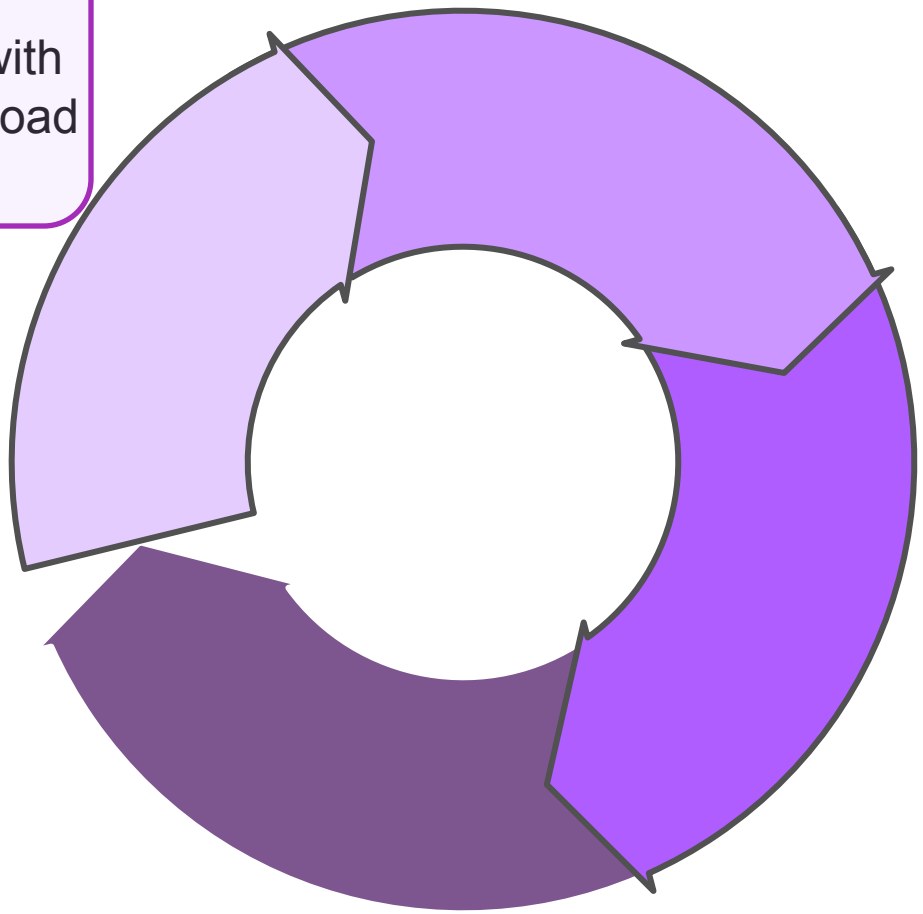
Built for Cloud

- “Platform as a Service”
- Elastic application runtimes



Workload Deployer and PureApplication System Lifecycle

Plan
Maximize utilization with advanced multi-workload capacity planning



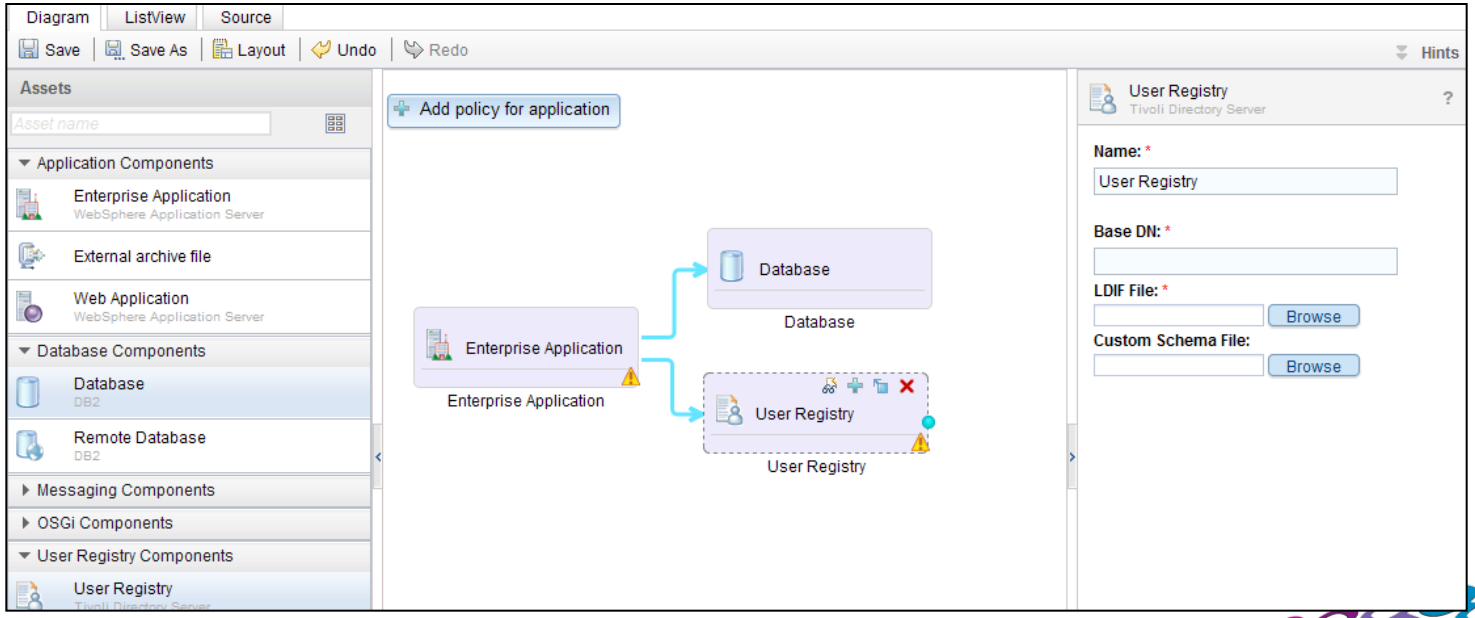
Build
Import existing enterprise standard assets to accelerate adoption

Run
Expanded ecosystem with pre-optimized vendor applications

Manage
Analyze growth trends to predict business workload requirements

Planning Best Practices

- Browse the PureSystem Market Place for relevant assets
- Consider using a Virtual Application Pattern (VAP) when onboarding a new application. VAPs provided additional value-add capabilities when compared to VSPs
- Leverage the all-you-can-eat aspect of PureApplication System, especially with Websphere Application Server (WAS) and DB2 applications



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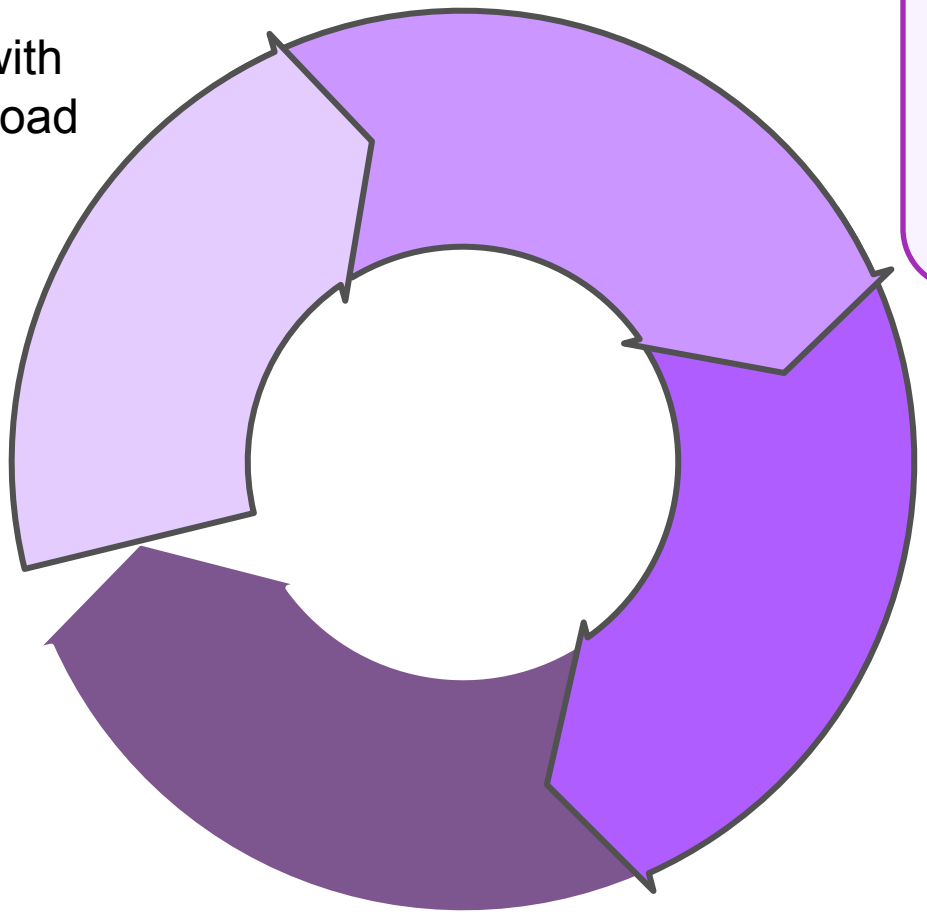

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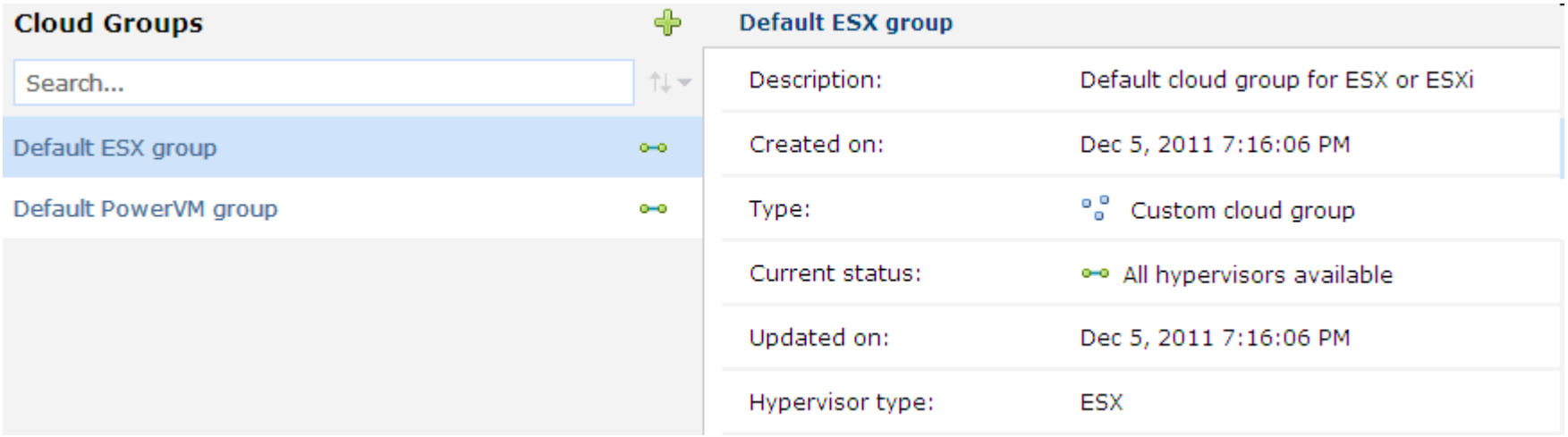
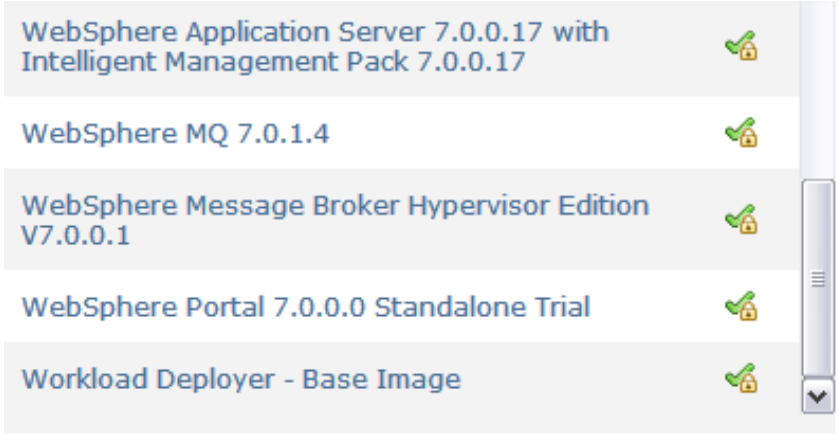
Build Best Practices: General

- Always have 2 hypervisors in each Cloud Group for failover and maintenance
- Leverage shared services when possible for common platform services
- Reuse existing post-provisioning scripts as Script Packages
- Leverage additional assets provided through the PureSystem System Centre



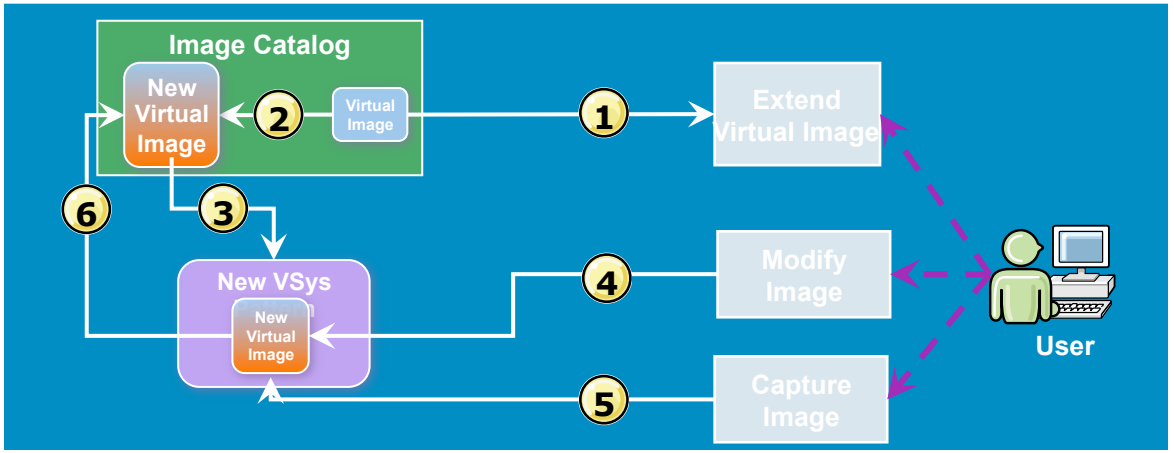
Build Best Practices: Migrating Apps

- Take advantage of the Advanced Middleware Configuration (AMC) to help with migration of applications onto PureApplication System
- When migrating to PureApplication System with the AMC, it is easier to first do a physical to virtual transformation and then allow AMC to migrate the virtual environment
- Use out-of-the-box images and configuration if applicable instead of immediately customizing since IBM will release fixes and updates which can be applied directly to out-of-the-box materials (e.g. use the provided Hypervisor Edition images instead of building your own)



Build Best Practices: Extend/Capture

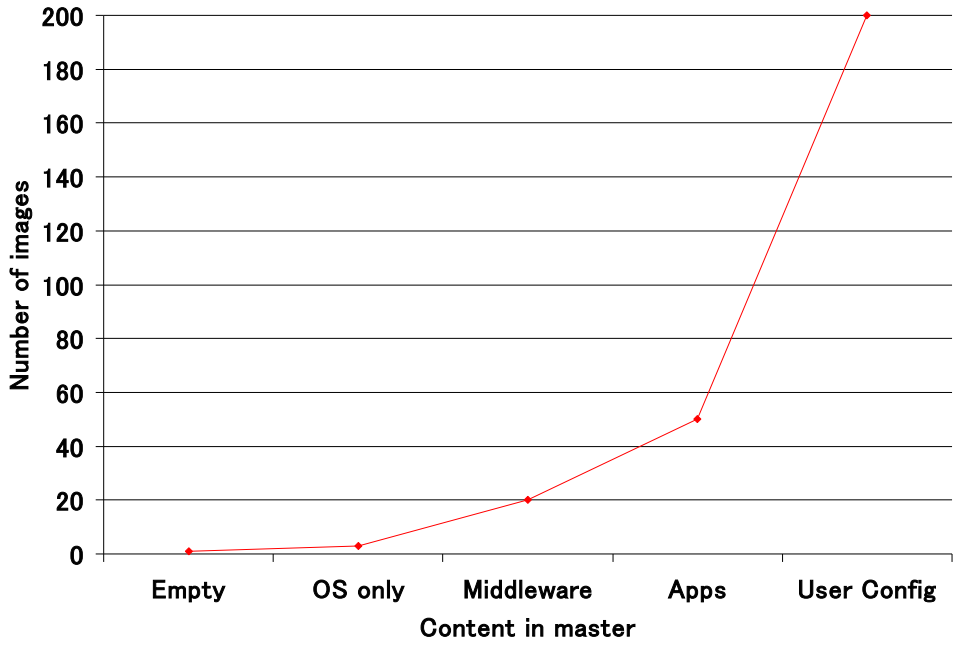
- Use extend and capture for:
  - Large tasks
    - Operating system
    - Large product binaries
  - Slow scripts/tasks
    - Long-running configurations
  - Common tasks
    - Company standard software for every deployment (ie, monitoring agents)
    - Activation framework



Build Best Practices: Extend/Capture

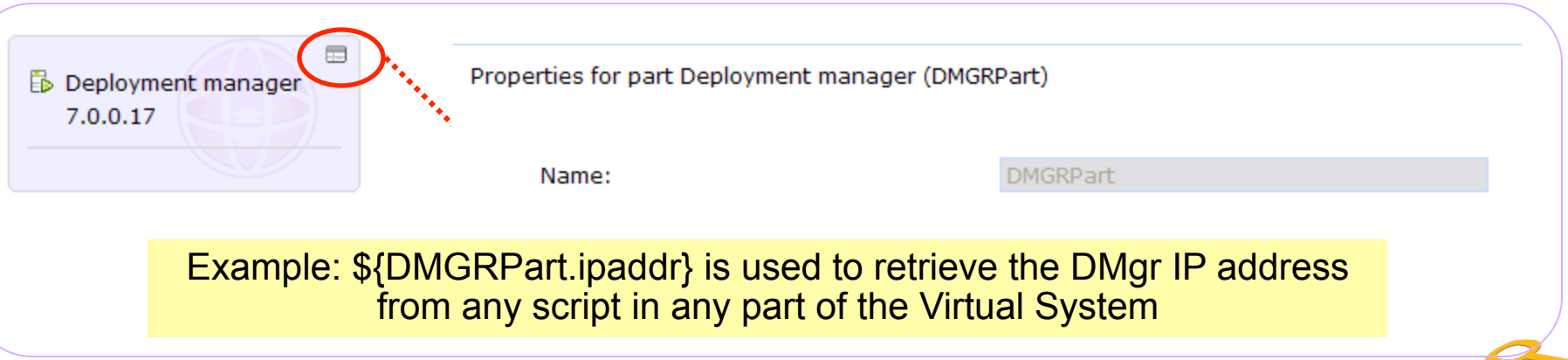
- Use Image Construction and Composition Tool (ICCT) tool to add/ modify images in a repeatable way
  - 1520: Building Custom Content for Expert Integrated Systems (Wed, 10:45)
  - 1888 Hands-On Lab: Expert Integrated Systems Custom Content (Thu, 11:45)

- Do not use Extend/Capture for:
  - Frequently changing tasks
    - Applications
    - Dev Components
    - Emergency patches
  - Fast, small tasks
    - Simple configurations



Build Best Practices: Script Packages

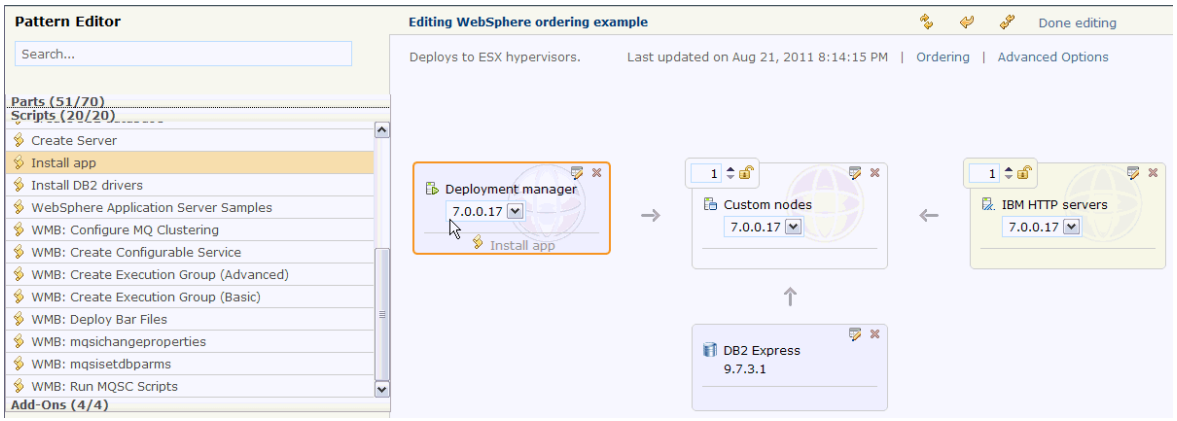
- Write scripts on their target platform
  - Write scripts on the platform on which they will run
  - For scripts on Windows platforms, ensure that the dos2unix tool or a similar tool is run on the scripts before uploading them
- Use qualified configuration parameter names
  - Fully qualify each deployment parameter with respect to its associated script package to ensure the parameters are more recognizable and logically grouped at deployment time
- Mount NFS with large binaries to reduce package size



Example: ${DMGRPart.ipaddr} is used to retrieve the DMgr IP address from any script in any part of the Virtual System

Build Best Practices: Script Packages

- Script Package Execution
  - Scripts are run on the deployed virtual machines using the root user context
  - If needed, switch user inside your script:
    - su virtuser -c "./nextShellScript.sh"
- When writing script packages, make sure to log messages frequently as they are the only means of tracing execution



Workload Deployer and PureApplication System Lifecycle

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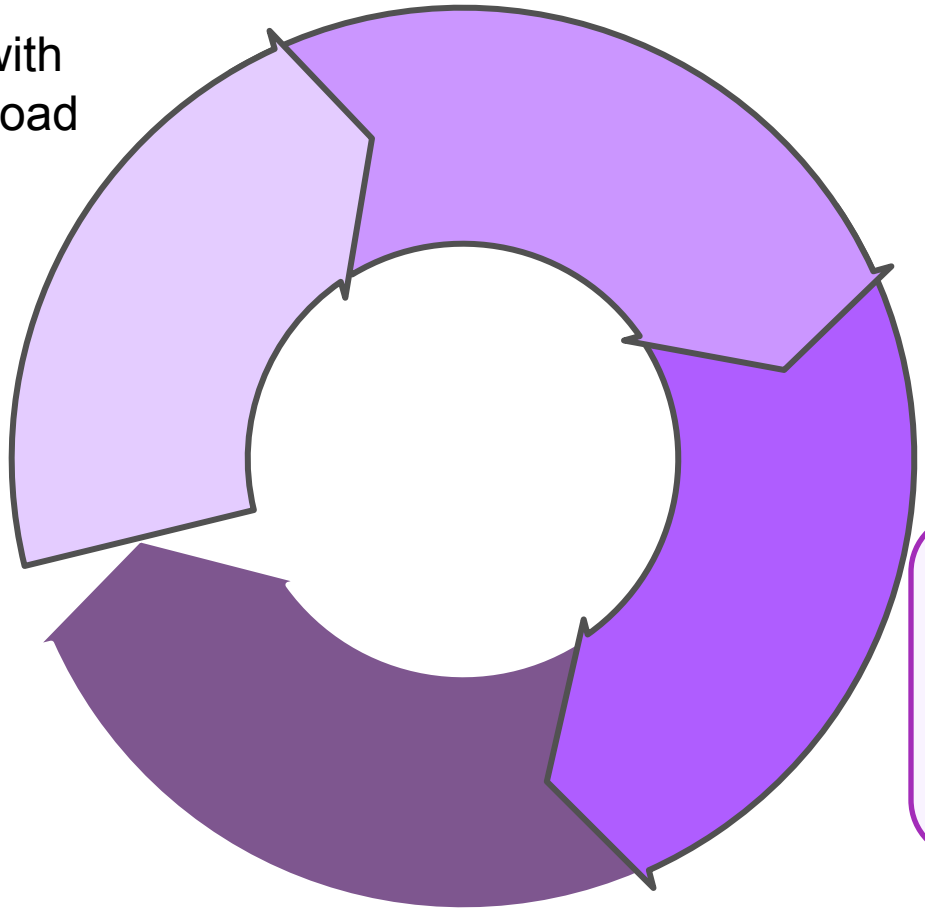
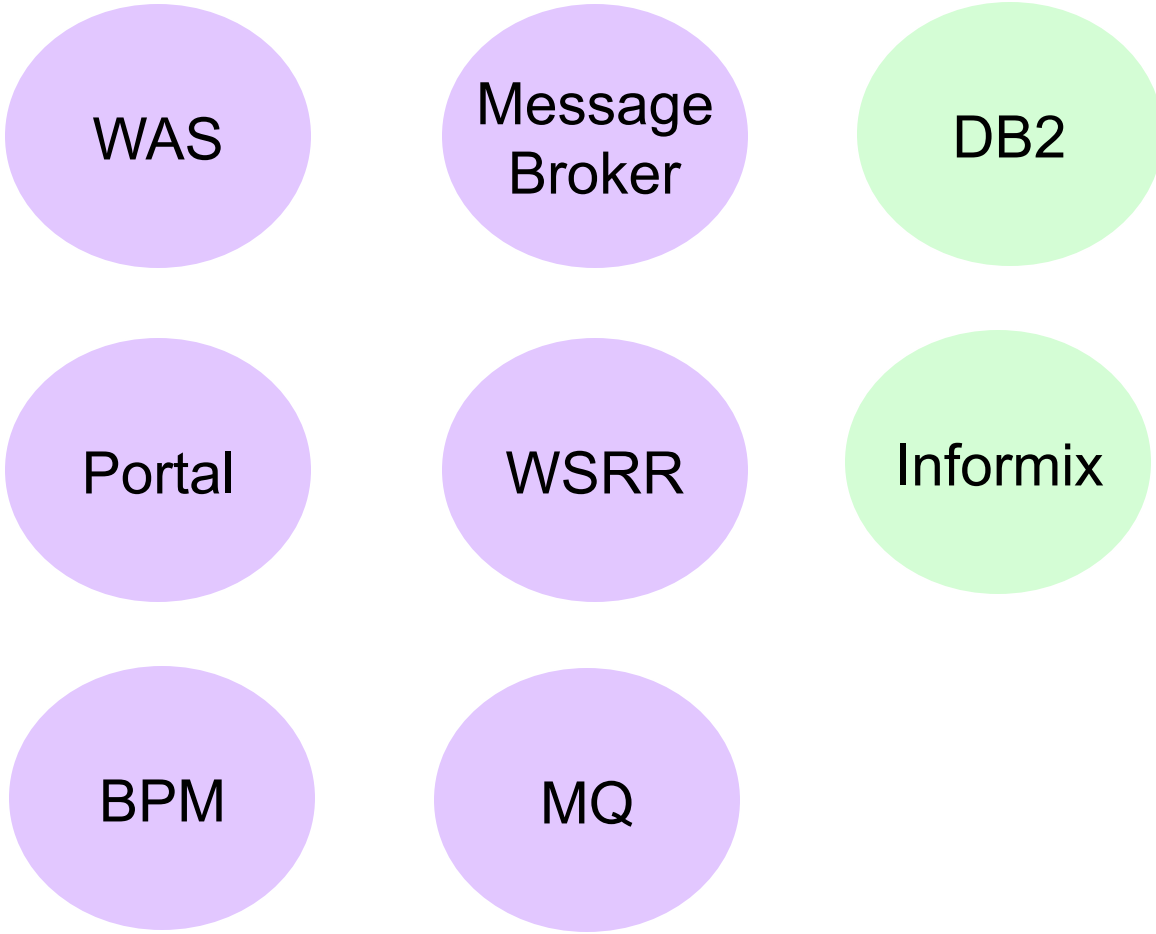


Manage
Analyze growth trends to predict business workload requirements

Run
Expanded ecosystem with pre-optimized vendor applications

Run Best Practices: General

- Remember that all standard middleware/development best practices apply



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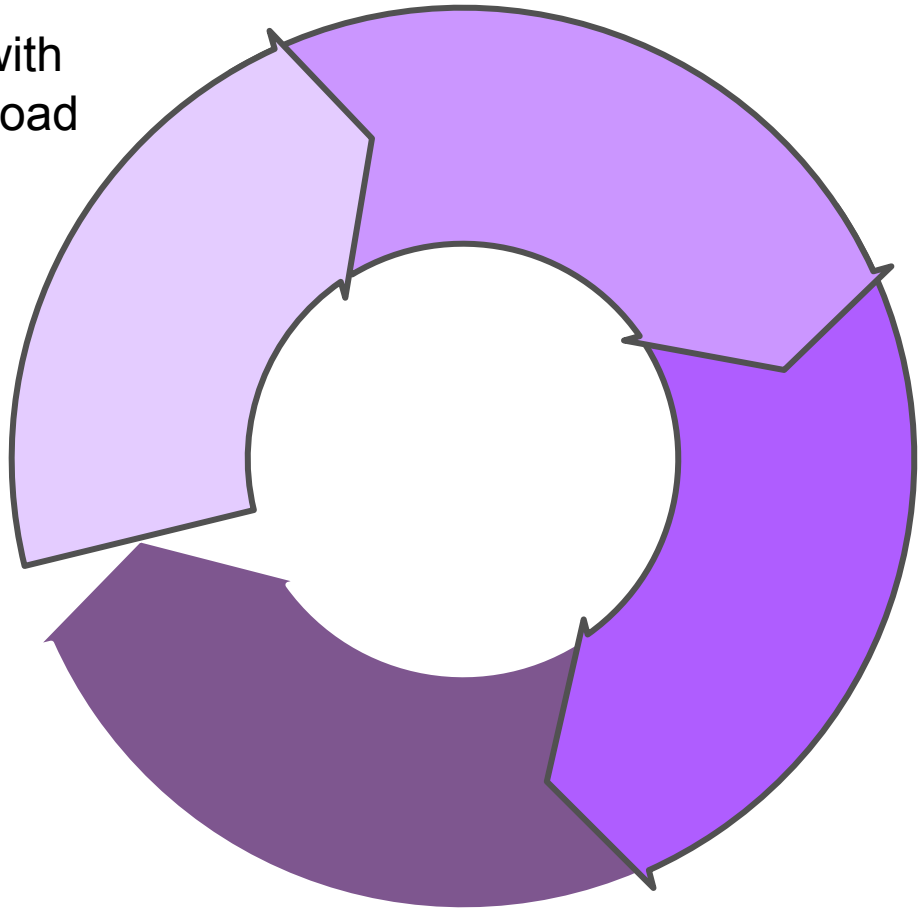

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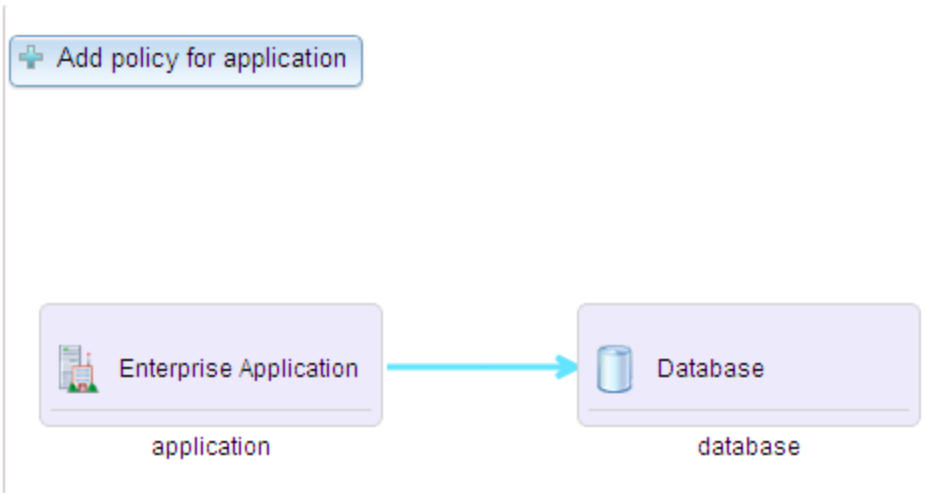
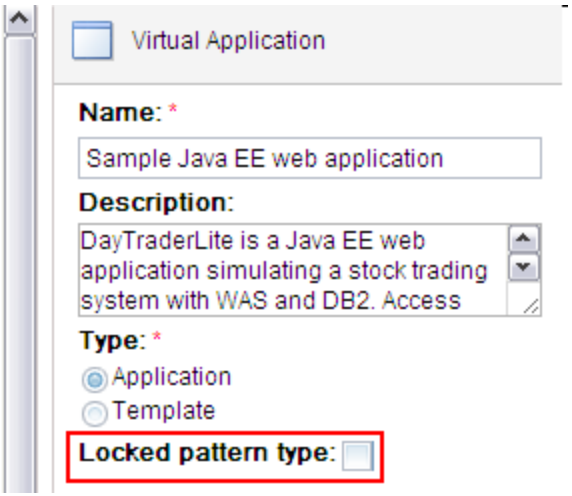
Manage Best Practices: General

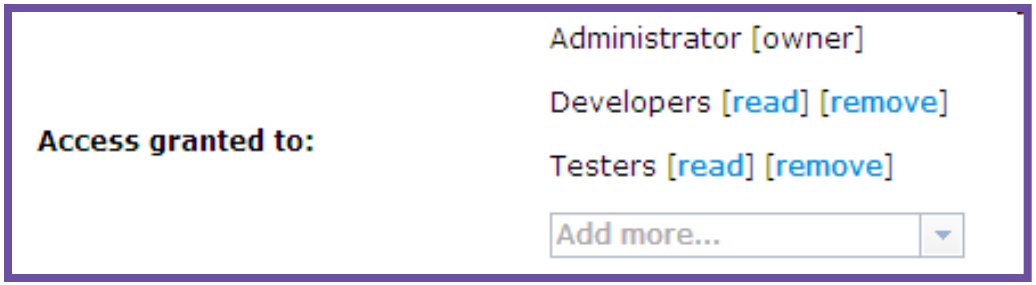
- Use the Command Line Interface to script common tasks
  - Creates a well-known and repeatable process
- Management should be done through the Deployment UI, Only Secure Shell (SSH) into Virtual Application Pattern VMs as an exception
- "Lock" a Virtual Application Pattern only if you no longer want that application to receive patches and updates
- To make sure components stay synchronized, configure NTP for all parts of your environment (IWD / PureApplication System, Hypervisors, ...)





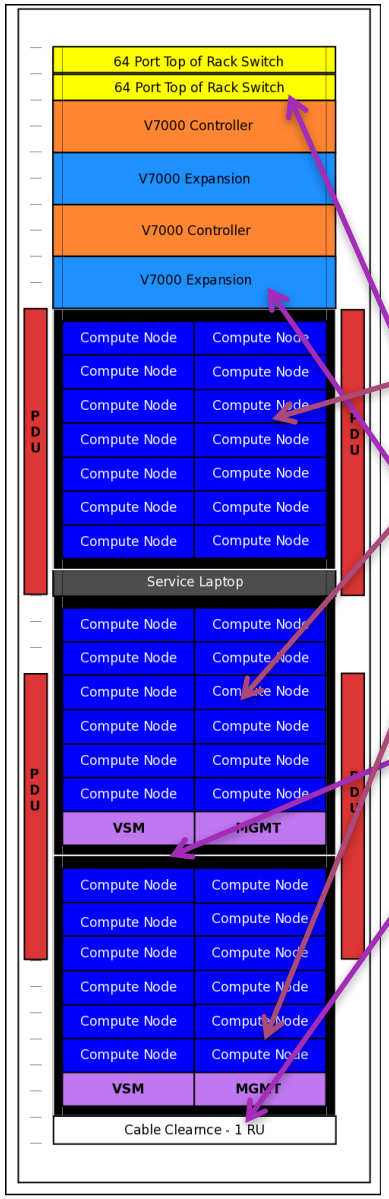
Manage Best Practices: Auth & Permissions

- Users/Groups
  - Create users for each person using the system
  - Group Users into Roles with designated access controls
  - Group permissions are additive
- Make use of fine access permission for controlling assets in the appliance
  - Virtual images
  - Script packages
  - Emergency fixes
  - Patterns
  - Virtual systems



Appliance Troubleshooting Issues

IBM PureApplication System - Troubleshooting Breakdown



Workload

- Guest VM and above
  - OS and Middleware
- Patterns deployed to the cloud
  - Virtual Systems
  - Virtual Applications

System

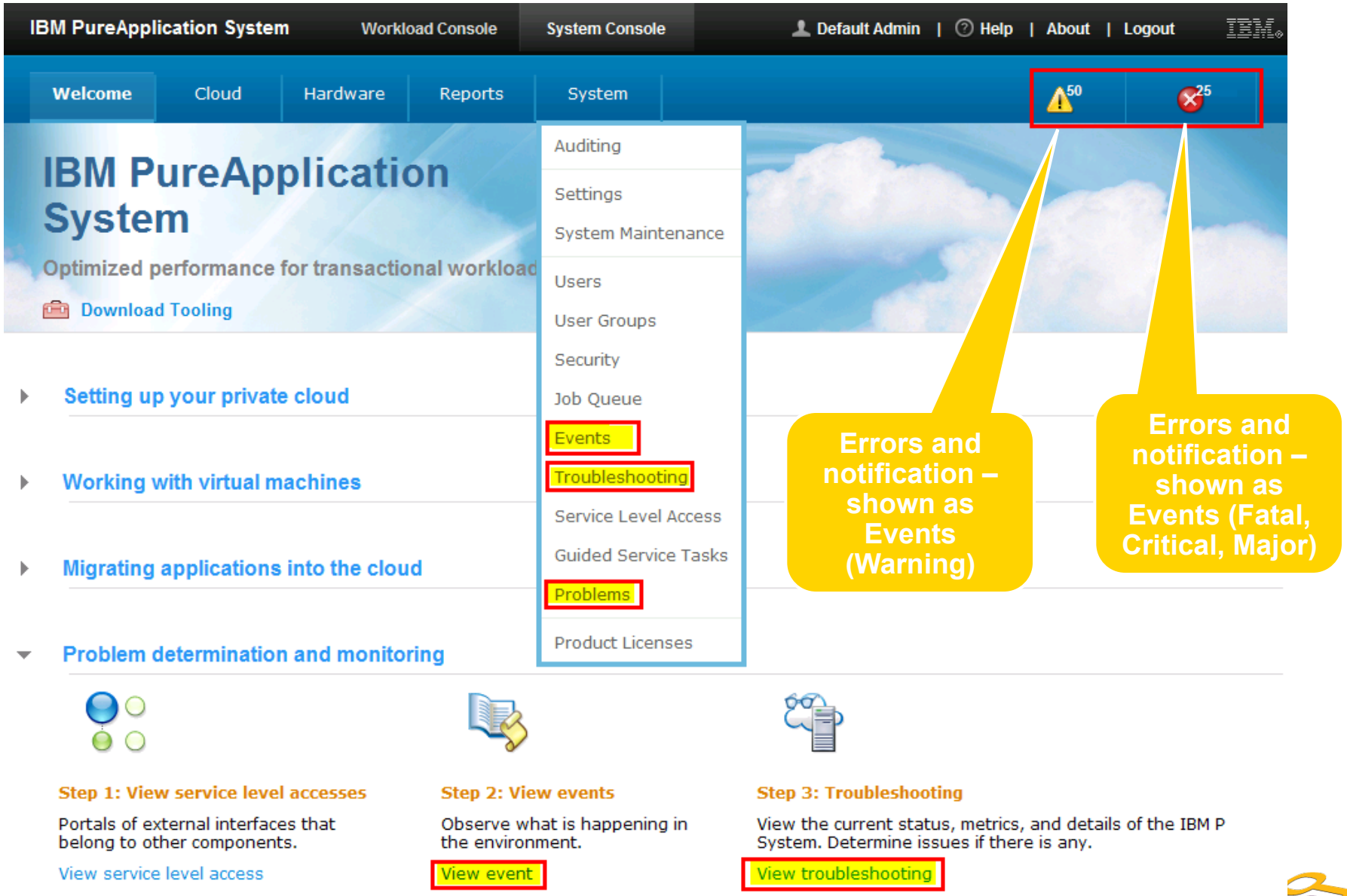
- Everything below Guest VM
- Hardware and Firmware
  - Management, Hypervisor, Compute Nodes, switches, power, storage, etc

Problem Determination - Logs

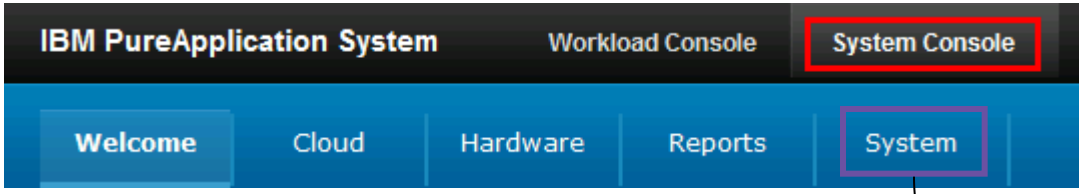
IBM PureApplication System creates several log files to determine problems

- **System logs** – accessed via System Console
  - IWD Management logs
    - Mainly related to logs around managing the workloads, deployments
- **Workload logs** – accessed via Workload Console
  - OS level logs from VM
  - Middleware logs from within VM – WebSphere Application Server, DB2, scripts, etc.
    - Related to the actual issues of the middleware runtime components
    - Logs from Configuration scripts

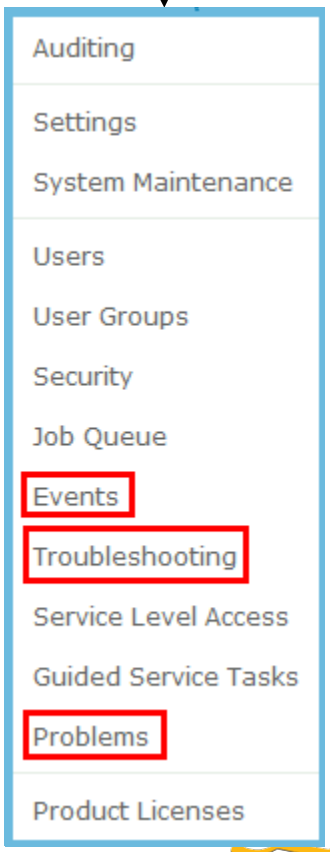
System related Troubleshooting info



System Console – User tasks and its UI



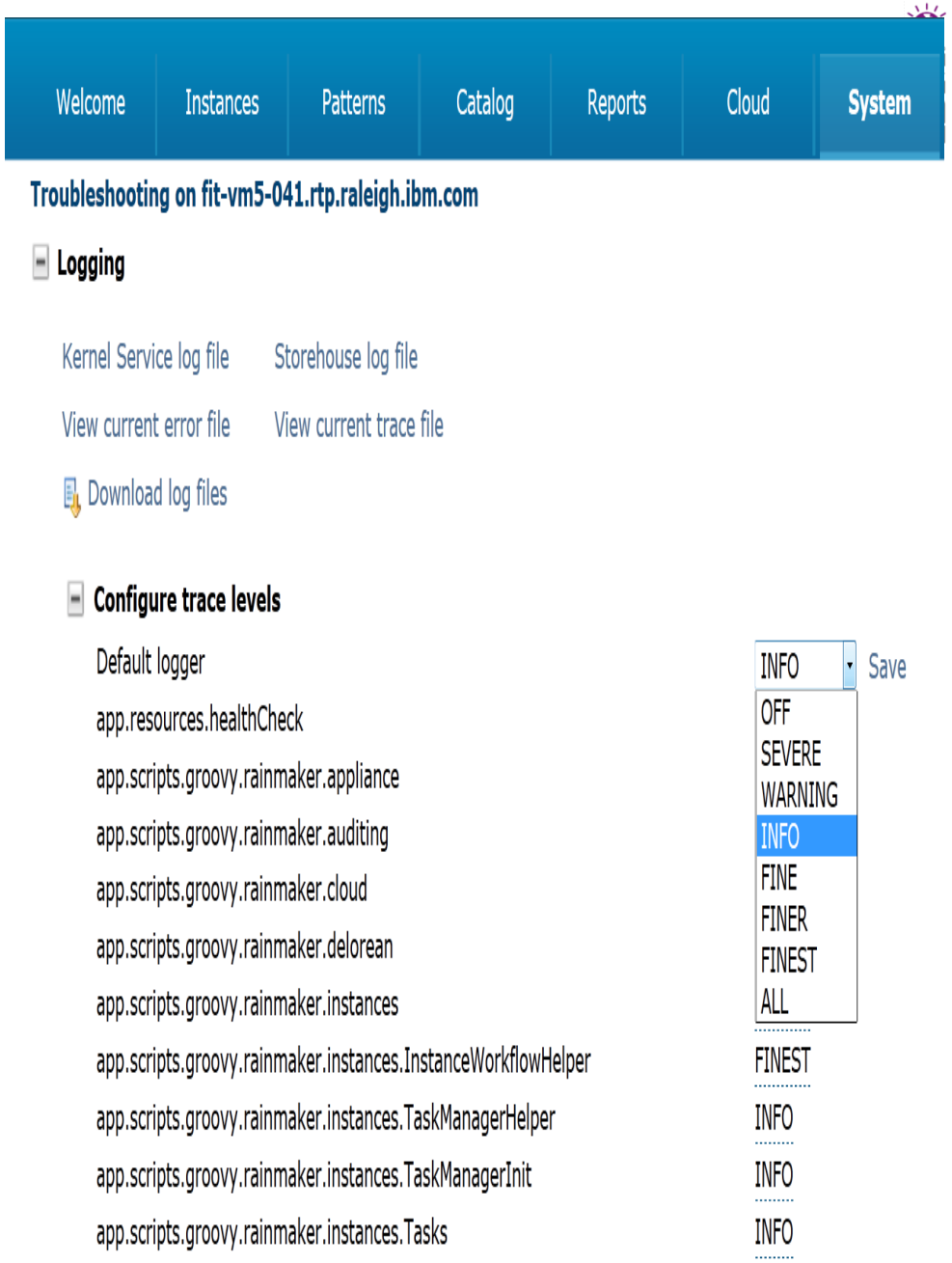
- Access to Troubleshooting UI is through the panel on the right



- ***Events*** – single view for events sent by different components
- ***Troubleshooting*** – System logs, Vendor information, LEDs and other information
- ***Problems*** – list of problems in the system for issues where clients might open a PMR

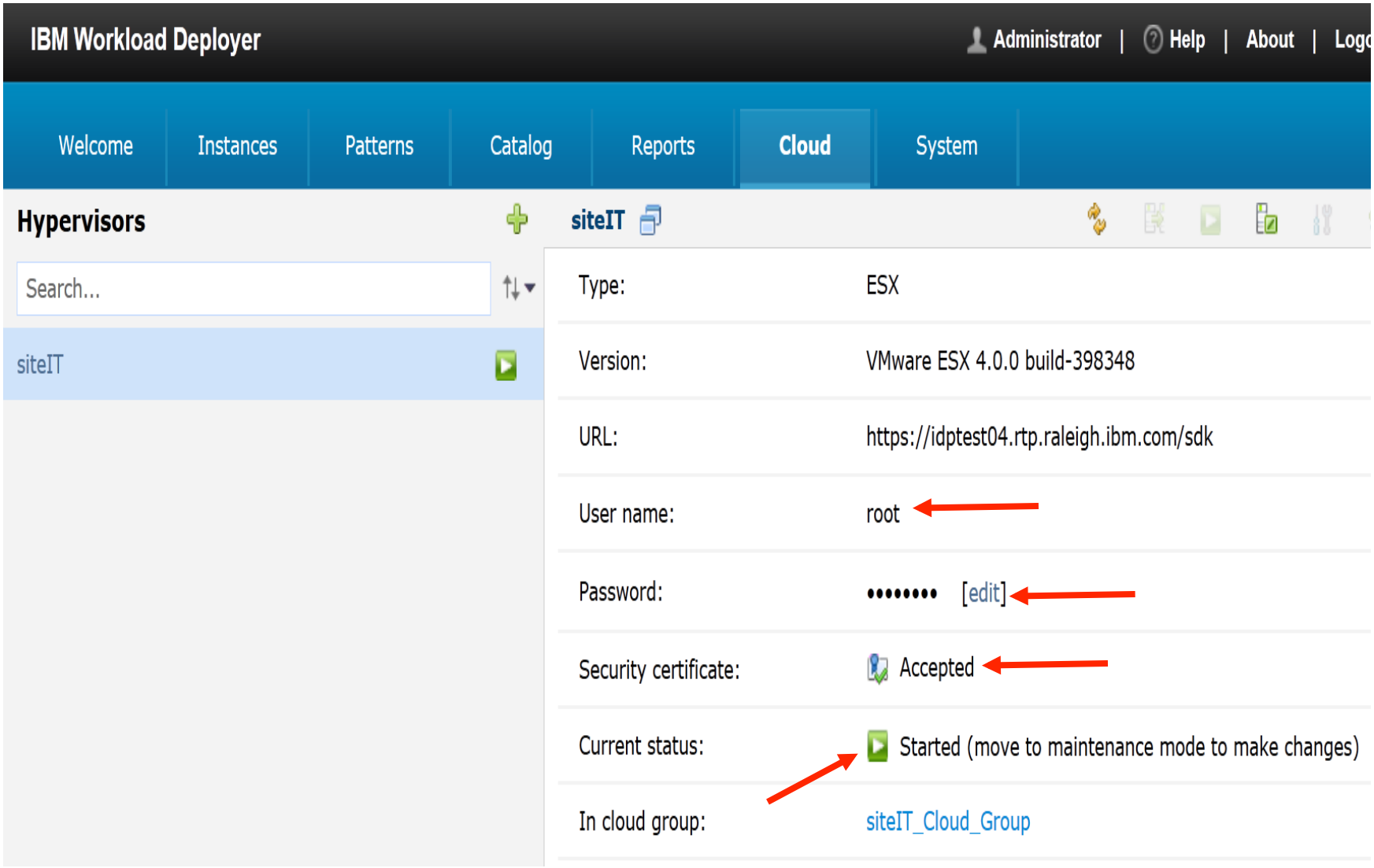
Trace Settings

- Ability to add more details in the logs through different Trace settings
- Can add new Trace string if not in the list
  - This allows tracing of components that may not have been included in the list when shipped
- Trace level from no tracing to Finest

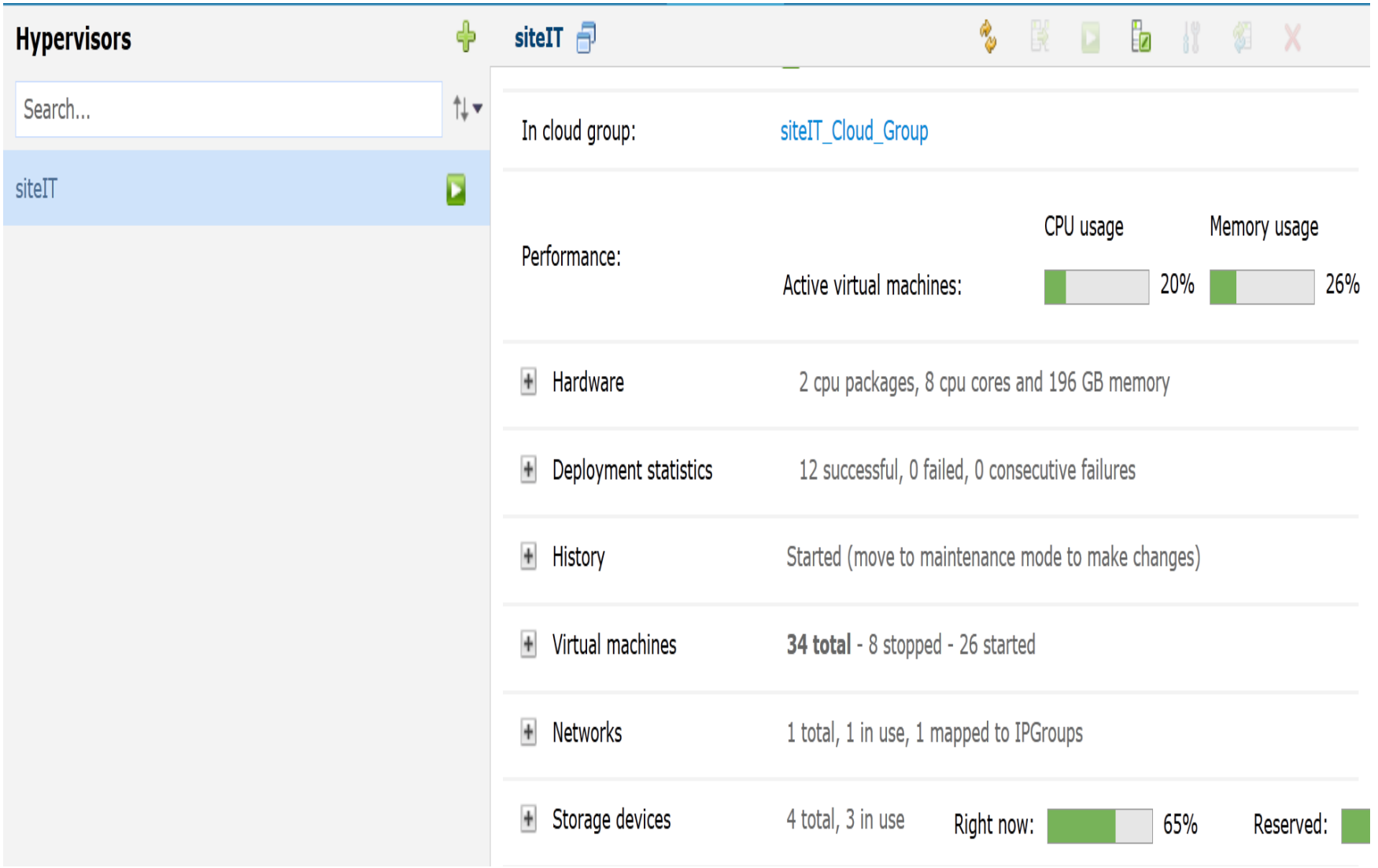


Troubleshooting Pattern Deployment

Check the Hypervisor Properties



Check the Hypervisor Properties contd…



Trace Log Indicates Connectivity Issues

Executing script package WebSphere Application Server Samples on virtual machine ldtiwdvm100-Standalone-IWD_ACID_TEST-2 Mar 14, 2012 3:23:51 PM
Starting virtual machine ldtiwdvm100-Standalone-IWD_ACID_TEST-2 Mar 14, 2012 1:48:01 PM
Starting virtual machines in virtual system IWD_ACID_TEST. Mar 14, 2012 1:48:01 PM
Registering virtual system IWD_ACID_TEST Mar 14, 2012 1:47:37 PM
Transferring files to hypervisor cache (4 of 4 WebSphere Application Server 8.0.0.1) Mar 14, 2012 1:46:44 PM
Transferring files to hypervisor cache (3 of 4 WebSphere Application Server 8.0.0.1) Mar 14, 2012 1:46:42 PM
Transferring files to hypervisor cache (2 of 4 WebSphere Application Server 8.0.0.1) Mar 14, 2012 1:36:08 PM
Transferring files to hypervisor cache (1 of 4 WebSphere Application Server 8.0.0.1) Mar 14, 2012 1:36:03 PM
Transferring virtual images to hypervisors Mar 14, 2012 1:35:55 PM
Generating model for topology and network Mar 14, 2012 1:35:45 PM
Reserving cloud resources Mar 14, 2012 1:35:35 PM
Deployment has been queued Mar 14, 2012 1:35:24 PM

[2012-03-14 13:52:07:147 UTC] 00001722 RXA E com.ibm.tivoli.remoteaccess.SSHProtocol beginSessionImpl [10.125.190.100] CTGRI0001E The application could not establish a connection to 10.125.190.100.
[2012-03-14 13:52:07:148 UTC] 00001712 RXA E com.ibm.tivoli.remoteaccess.BaseProtocol beginSession [10.125.190.100] CTGRI0026E A connection could not be completed to 10.125.190.100 during the specified timeout interval.

Outbound Connections

Ping remote host

Ping

Avoid Special Characters in DataStore Names

at java.lang.Thread.run(Thread.java:736)
Caused by: com.ibm.venture.vm.BadConnectionException: Error putting file or folder on VMware server. Local path: /drouter/ramdisk2/mnt/raid-volume/raid0/image/image-cache/img-0.0/SLES11SP1-32-flat.vmdk Remote path:
https://ldtpsv0650.etf.barcapetf.com/folder/cloudburst_cache/virtualimages/5cabdd2c8af7274dee88100dedb4ebc2d758a7cd/SLES11SP1-32-flat.vmdk?dcPath=ha-datacenter&dsName=LDTPSV0650#T3#TXDA#001 shim=S1_1_copy2 endpoint=S1_1_copy2
localizedMessage="RM14017("%2Fdrouter%2Framdisk2%2Fmnt%2Fraid-volume%2Fraid0%2Fimage%2Fimage-cache%2Fimg-0.0%2FSLES11SP1-32-flat.vmdk","https%3A%2F%2Fldtpsv0650.etf.barcapetf.com%2Ffolder%2Fcloudburst_cache%2Fvirtualimages%2F5cabdd2c8af7274dee88100dedb4ebc2d758a7cd%
2FSLES11SP1-32-flat.vmdk%3FdcPath%3Dha-datacenter%26dsName%3DLDTPSV0650%23T3%23TXDA%23001")" causeType=java.lang.IllegalArgumentException cause=java.lang.IllegalArgumentException
at com.ibm.venture.vmware.impl.FaultUtils.badConnection(FaultUtils.java:335)
at com.ibm.venture.vmware.impl.FaultUtils.badConnectionErrorPuttingFile(FaultUtils.java:98)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOnDatastore_Vi25.putRegularFile(PutFileOnDatastore_Vi25.java:251)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOnDatastore_Vi25.call(PutFileOnDatastore_Vi25.java:146)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOnDatastore_Vi25.call(PutFileOnDatastore_Vi25.java:36)
at com.ibm.vespa.util.task.VSPInlineSubtask.call(VSPInlineSubtask.java:193)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOrFolderOnDatastore_Vi25.putRegularFile(PutFileOrFolderOnDatastore_Vi25.java:217)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOrFolderOnDatastore_Vi25$FileToTransfer.transfer(PutFileOrFolderOnDatastore_Vi25.java:155)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOrFolderOnDatastore_Vi25.putFileOrFolder(PutFileOrFolderOnDatastore_Vi25.java:197)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOrFolderOnDatastore_Vi25.call(PutFileOrFolderOnDatastore_Vi25.java:113)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOrFolderOnDatastore_Vi25.call(PutFileOrFolderOnDatastore_Vi25.java:26)
at com.ibm.vespa.util.task.VSPInlineSubtask.call(VSPInlineSubtask.java:193)
at com.ibm.venture.vmware.adapters.VMwareFileSupport2$5.execute(VMwareFileSupport2.java:460)
at com.ibm.venture.vmware.adapters.VMwareFileSupport2$5.execute(VMwareFileSupport2.java:439)
at com.ibm.venture.vmware.adapters.ActionOnViClientClone.prepare(ActionOnViClientClone.java:94)
at com.ibm.venture.vmware.adapters.ActionOnViClient$1.call(ActionOnViClient.java:97)
at com.ibm.vespa.util.concurrent.VSPMultipleLockForEntity.executeUnderLock(VSPMultipleLockForEntity.java:104)
... 8 more
Caused by: java.lang.IllegalArgumentException
at java.net.URI.create(URI.java:853)
at org.apache.http.client.methods.HttpPut.<init>(HttpPut.java:68)
at com.ibm.venture.vmware.impl.HttpClientHttpHook.put(HttpClientHttpHook.java:199)
at com.ibm.venture.vmware.HttpHook.put(HttpHook.java:373)
at com.ibm.venture.vmware.impl.actions.vi25.PutFileOnDatastore_Vi25.putRegularFile(PutFileOnDatastore_Vi25.java:205)
... 22 more
Caused by: java.net.URISyntaxException: Illegal character in fragment at index 180: https://ldtpsv0650.etf.barcapetf.com/folder/cloudburst_cache/virtualimages/5cabdd2c8af7274dee88100dedb4ebc2d758a7cd/SLES11SP1-32-flat.vmdk?dcPath=ha-datacenter&dsName=LDTPSV0650#T3#TXDA#001
at java.net.URI$Parser.fail(URI.java:2820)
at java.net.URI$Parser.checkChars(URI.java:2993)

Virtual Application/Instance Troubleshooting

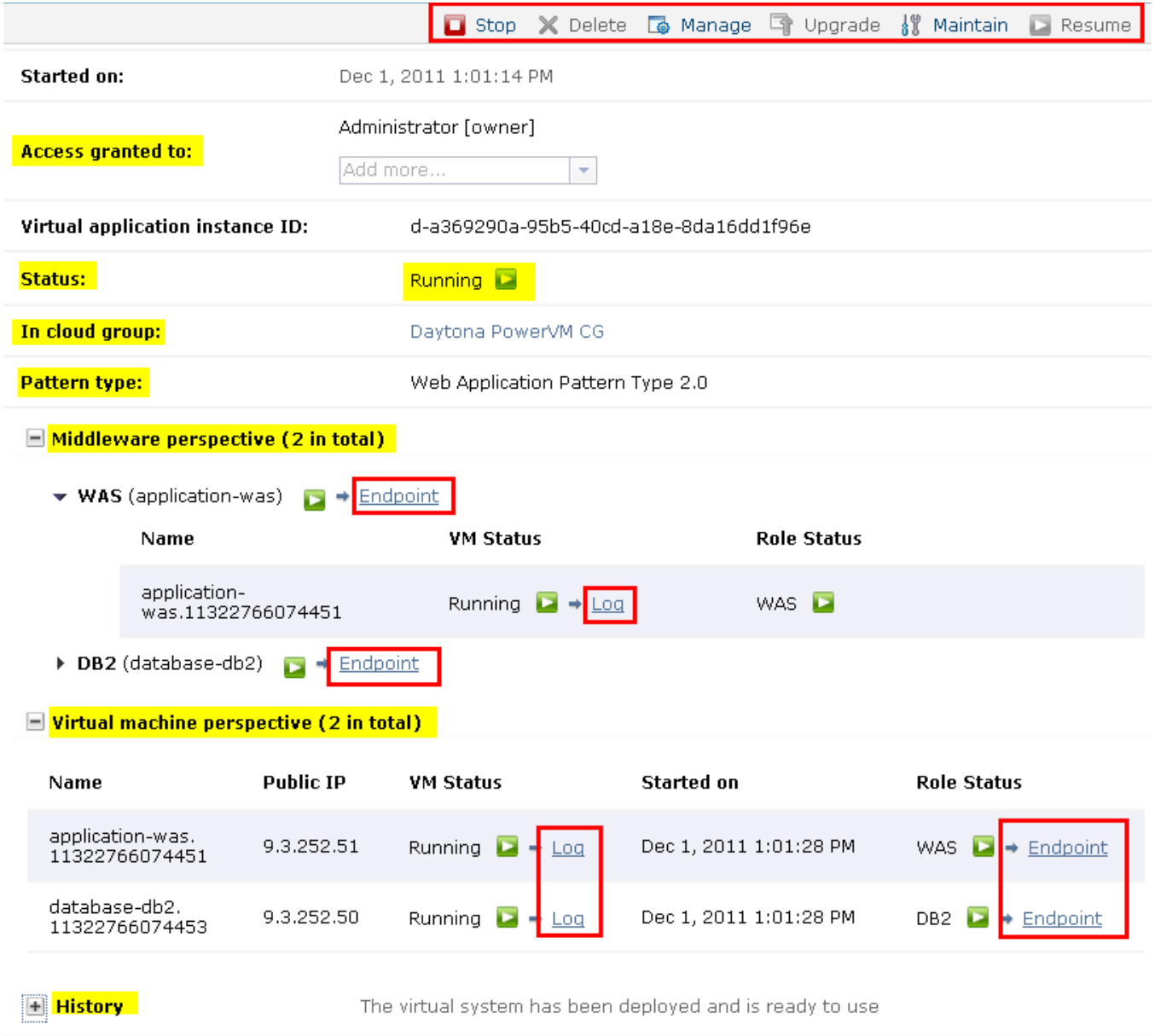
Virtual Application: Troubleshooting

- Virtual Applications patterns
  - In order to create a pattern based on the pattern types, make sure to enable the pattern type and configure the System plug-ins for the pattern type where applicable
    - If not done, you will not be able to view or create the Virtual Application patterns
  - Before you deploy any Virtual Application, ensure that you have default images defined for deployment
    - Cloud → Deploy Default Settings

Virtual Application: Troubleshooting

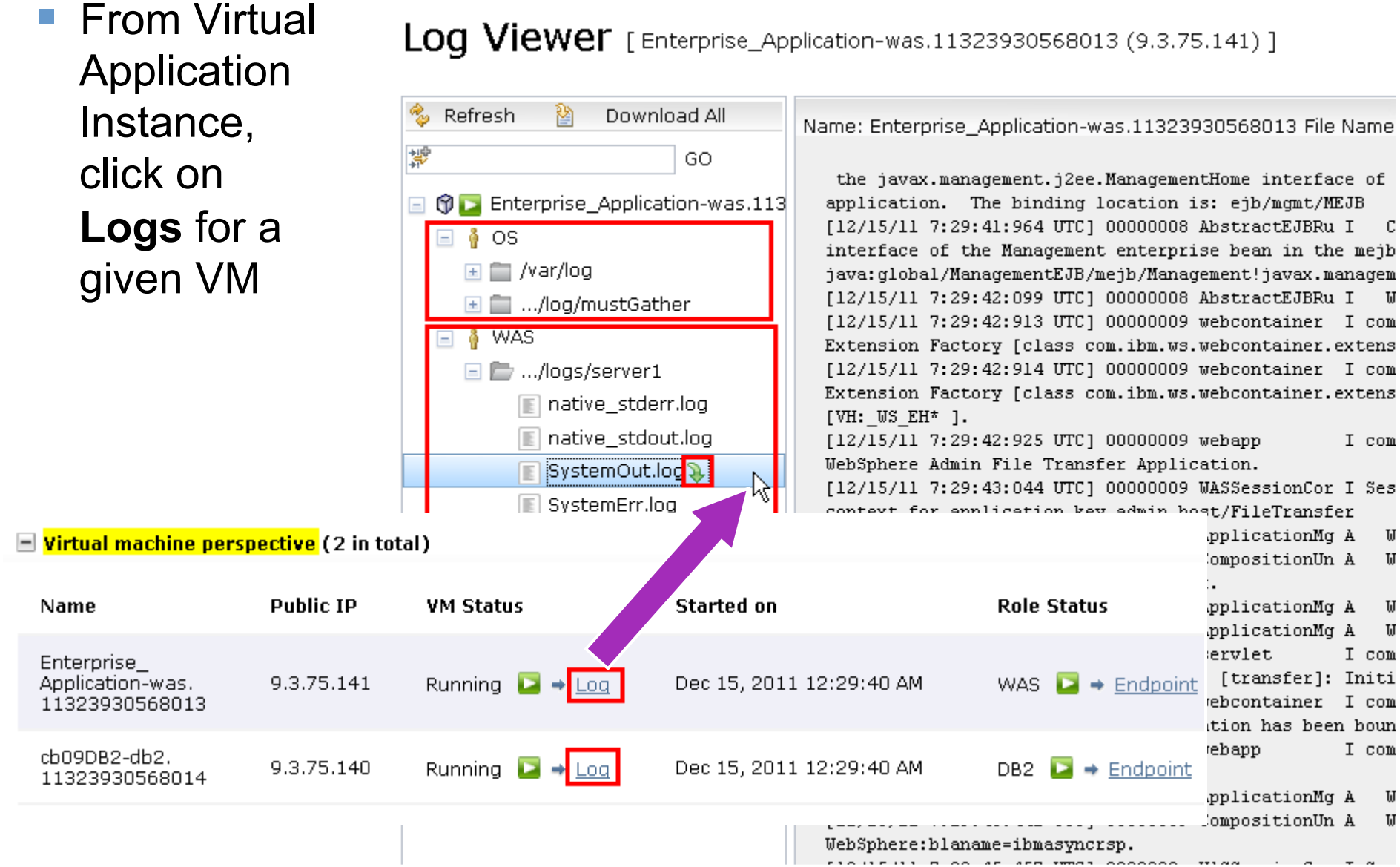
- Virtual Application Instance VMs – no administrative control on the middleware components, all control from PureApplication System console or SSH into VM
  - From Virtual Application instance panel, you can view/download logs
    - Go to Virtual Application Instance panel, click Manage and go to Logging or Operations
    - View logs of all VMs
    - Perform advanced Trouble shooting of VM (like set Trace, Generate javacore, Heap dump, System dump, etc.)
    - Modify/remove SSH keys
  - If SSH is enabled, you can SSH into the VM providing the security keys you supplied or had PureApplication System generate during deployment of Virtual Application

Virtual Application: Logs

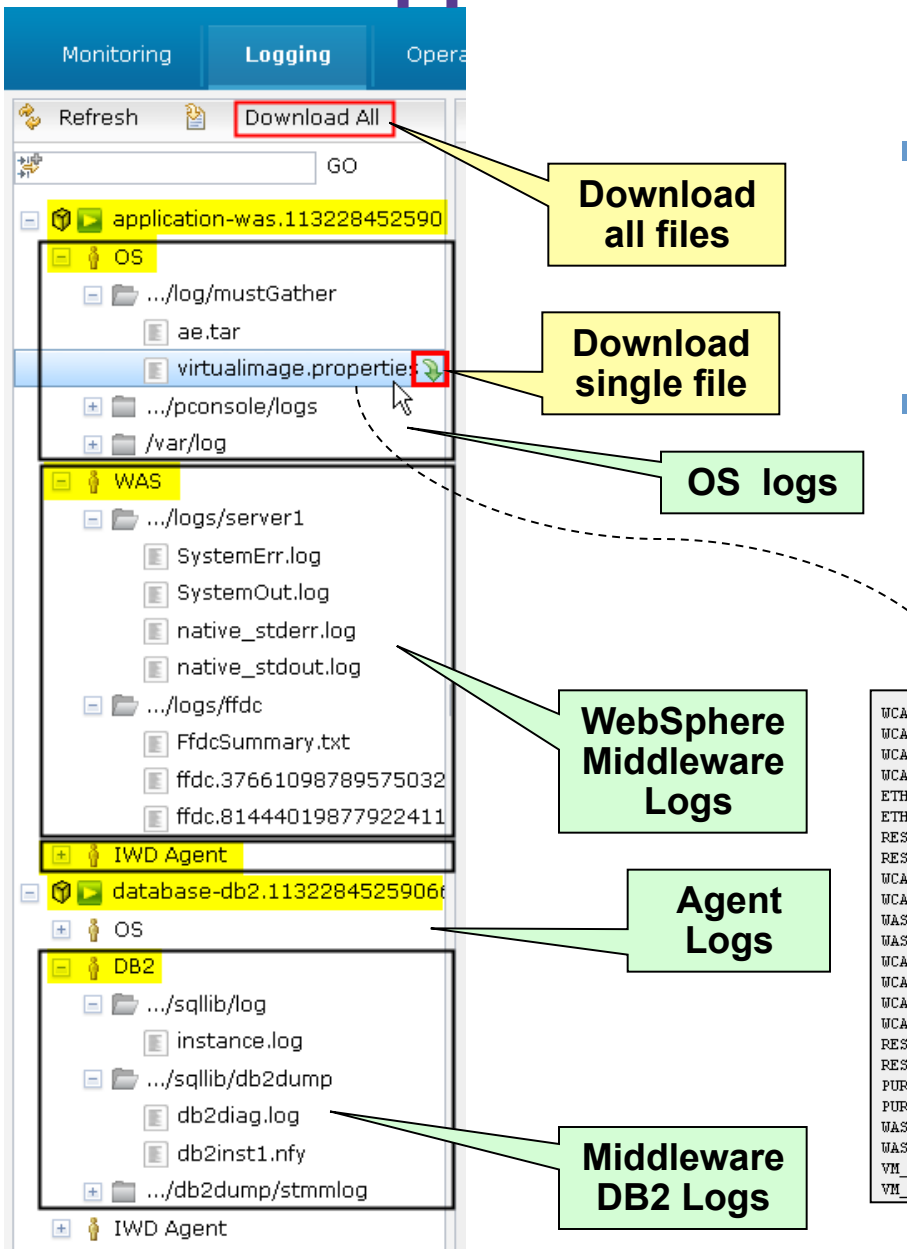


Virtual Application: VM log

- From Virtual Application Instance, click on **Logs** for a given VM



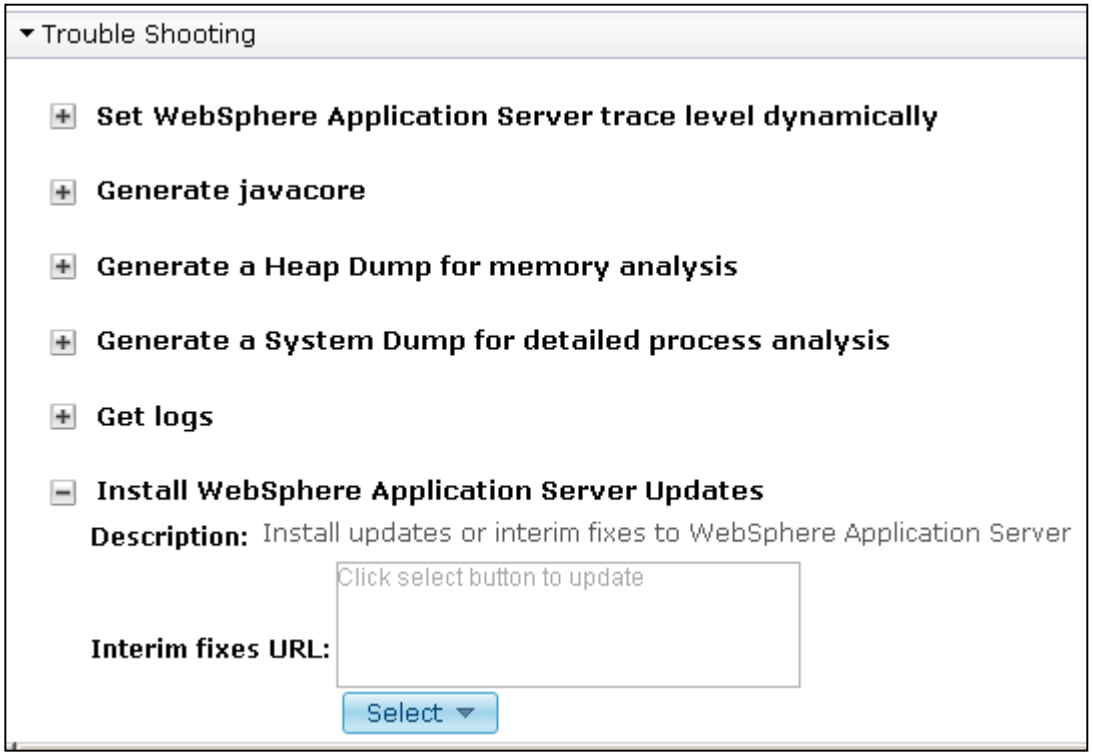
Virtual Application: Logging



- For each VM in the instance, logs are available for:
  - OS, Middleware
- You can download each of the files, all the files or view them in the console

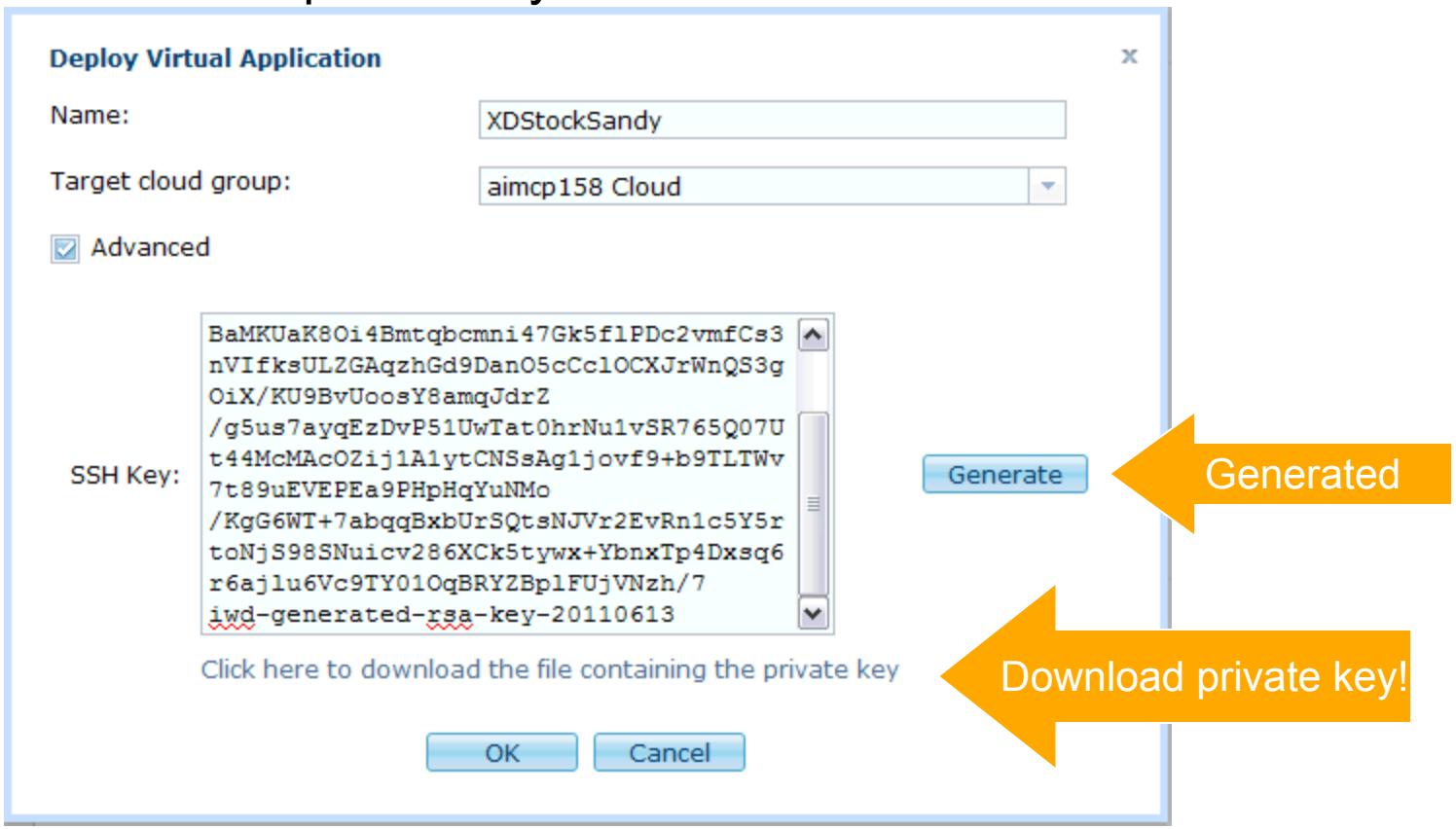
```
WCA_VIRTUAL_MACHINE=/resources/virtualSystems/14/virtualMachines/23
WCA_VIRTUAL_MACHINE=/resources/virtualSystems/14/virtualMachines/23
WCA_USERNAME=\<xor\>bh4JHR4w0BIoNTE4agYUaAYuExEHKGOMJRsbLhEcChA6Eh4NCxY4KxFqBTsRGilnPWZpCwpsJScHCwUNCzwmDA==
WCA_USERNAME=\<xor\>bh4JHR4w0BIoNTE4agYUaAYuExEHKGOMJRsbLhEcChA6Eh4NCxY4KxFqBTsRGilnPWZpCwpsJScHCwUNCzwmDA==
ETHERNET0="Virtual Network 1"
ETHERNET0="Virtual Network 1"
RESET_VIRTUAL_IMAGE_COMMAND=/var/adm/ibmvmcoc-postinstall/resetvm.sh
RESET_VIRTUAL_IMAGE_COMMAND=/var/adm/ibmvmcoc-postinstall/resetvm.sh
WCA_IPADDRESS=9.3.75.75,9.3.75.254,192.168.0.2,
WCA_IPADDRESS=9.3.75.75,9.3.75.254,192.168.0.2,
WAS_PASSWORD=passw0rd
WAS_PASSWORD=passw0rd
WCA_PASSWORD=\<xor\>bh4JHR4w0BIoNTE4agYUaAYuExEHKGOMJRsbLhEcChA6Eh4NCxY4KxFqBTsRGilnPWZpCwpsJScHCwUNCzwmDA==
WCA_PASSWORD=\<xor\>bh4JHR4w0BIoNTE4agYUaAYuExEHKGOMJRsbLhEcChA6Eh4NCxY4KxFqBTsRGilnPWZpCwpsJScHCwUNCzwmDA==
WCA_VIRTUAL_SYSTEM=/resources/virtualSystems/14
WCA_VIRTUAL_SYSTEM=/resources/virtualSystems/14
RESET_VIRTUAL_IMAGE_COMMAND_LOCATION=/var/adm/ibmvmcoc-postinstall
RESET_VIRTUAL_IMAGE_COMMAND_LOCATION=/var/adm/ibmvmcoc-postinstall
PURESCALE_IPADDRESS=9.3.75.75
PURESCALE_IPADDRESS=9.3.75.75
WAS_USERNAME=virtuser
WAS_USERNAME=virtuser
VM_IS_IP6=false
VM_IS_IP6=false
```

Virtual Application: WAS Troubleshooting



Virtual Application: SSH access to the VMs

- Able to provide or generate SSH keys when deploying a Virtual Application pattern
  - Save the private key for later use to SSH into the VM



Virtual System

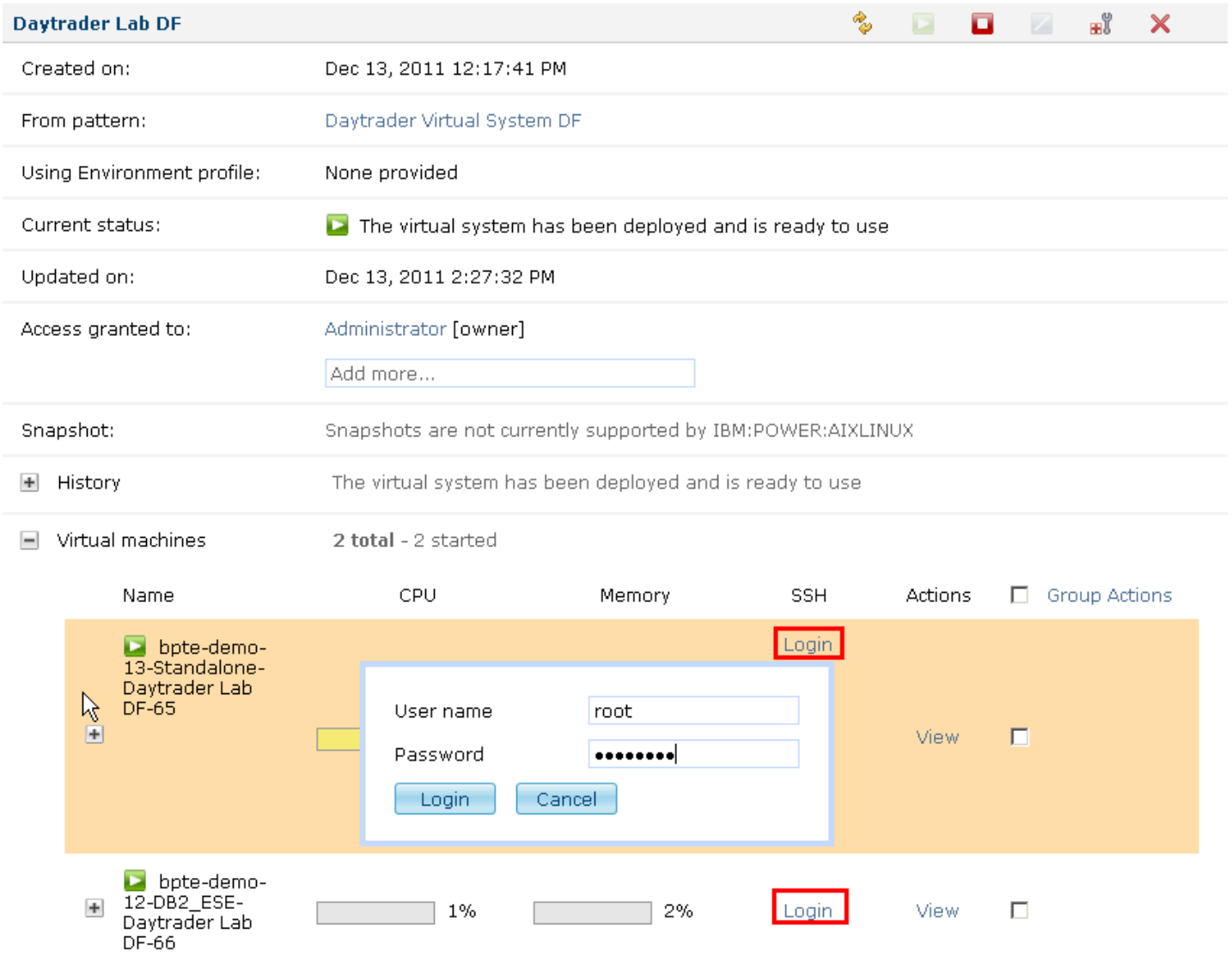
Troubleshooting, Logs, Traces and SSH

Virtual System VM: Troubleshooting

- Virtual System Instances - you have full control of the entire administration of the Virtual System Instance
  - Go to Virtual System Instance panel for all operations related to Trouble Shooting
  - If enabled during deployment, you can VNC into the VM
  - Can SSH into VM using “root” and your assigned password
  - From Virtual System instance panel, you can view/download logs, and access WebSphere console
  - Traces can be enabled via Middleware console

Virtual System VM: SSH

- Open the Virtual System Instance panel and for each VM, you can SSH “Login”
- Expanding the VM, you can access the logs



Virtual System VM: Logs

- Go to the Virtual System Instance panel and expand the VM to view and download logs, access Middleware consoles

Summary

- Best practices through the lifecycle
- Troubleshooting tips & tricks
  - Appliance
  - Pattern deployment
  - Virtual application patterns
  - Virtual system patterns

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