IBM Power Systems Virtual Server Level 3 Demonstration Guide

None

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1. Introduction

Welcome to the IBM Power Systems Virtual Server - Level 3 Demonstration Guide. The goal of this demonstration guide is to provide IBM and Business Partner Sales and Technical Sales the knowledge and tools to perform introductory demonstrations of IBM Power Systems Virtual Server (PowerVS).

There are 9 parts to this demonstration guide as seen in the left hand navigation. To complete the IBM Power Systems Virtual Server - Level 3 badge requirements, IBM and Business Partner **sellers** must complete Parts 1, 2, 3, 4, 5, and 8 of this demonstration guide. IBM and Business Partner **technical sellers** must complete all sections. The associated Learning Plan Stand and Deliver rubrics (IBM) and quizzes (Business Partners) are based upon the sections required for the respective roles. **All are welcome and encouraged to complete all sections.**

Business Partner Tip

To complete the IBM Power Systems Virtual Server - Level 3 badge, all Business Partners must complete a 5 question quiz. **The quiz is focused on validating completion of this demonstration script, and not general knowledge of PowerVS.** It is highly recommended to complete the quiz while the IBM Technology Zone environment is active. Several of the questions ask about specific settings or content that is seen in the IBM Cloud Portal.

In Parts 1, 2, and 3, learn how the demonstration environment was built, and how to perform a "baking show" style demonstration using the IBM Cloud Portal, click-thru demonstrations, and videos. New PowerVS resources are **not** provisioned as part of this demonstration guide. All resources are pre-provisioned in a shared environment to save time and money.

In Part 4, learn how to use the IBM Cloud Portal to manage PowerVS instances.

In Part 5, learn how to access the pre-provisioned PowerVS instances using the IBM Cloud Shell.

Parts 1 through 5 provide a good foundation for performing a high-level, customer facing demonstration of IBM Power Systems Virtual Server.

Parts 6 and 7 introduce several more technical aspects of IBM Power Systems Virtual Server including using the PowerVS IBM Cloud command line interface (CLI) plugin.

Finally, in Part 8, learn where to find additional resources about IBM Power Systems Virtual Server, and how to complete the IBM Power Systems Virtual Server - Level 3 badge.

Before jumping to part 1, please read the guidance below. Reading and understanding the information will save time while completing the steps in this guide.

1.1 Helpful tips for using this demonstration guide and environment

The IBM Power Systems Virtual Server - Level 3 Demonstration Guide is organized in parts and sub-parts or chapters. Most chapters contain numbered steps, which are actions to be performed.

Throughout the guide, images are used as examples of the IBM Cloud Portal, IBM Cloud Shell, and PowerVS instance consoles.

Warning

The IBM Cloud Portal and IBM Power Systems Virtual Server changes on a regular basis and may differ from the iamges captured in this guide.

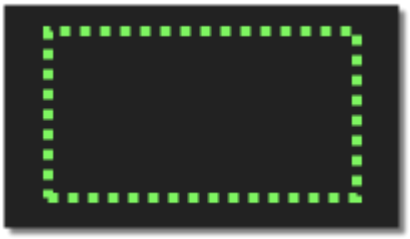
In some images, the following styles of highlighting are utilized:

- Action highlight box: Illustrates where to click, enter, or select an item:

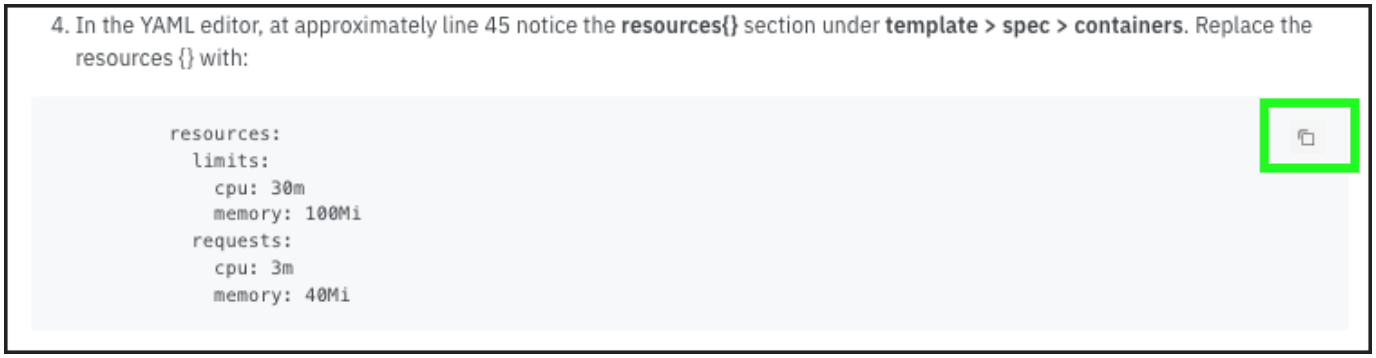
• Path/explore highlight box: Illustrates one of two things:

• the path to follow to get to a specific location in the user interface

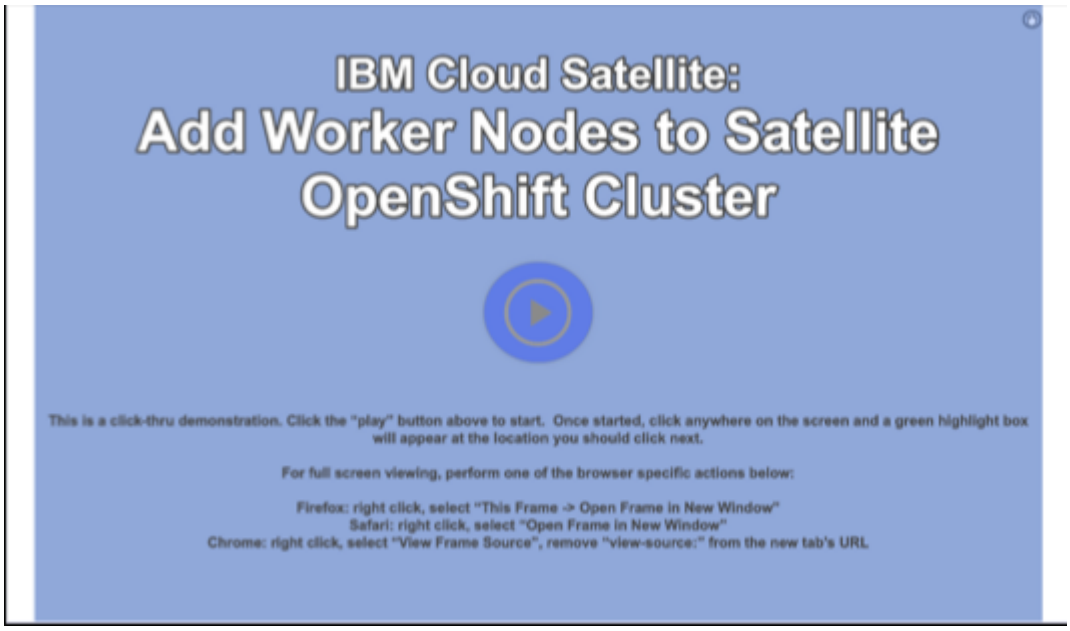
• areas to explore



• Copy to clipboard box: The text is copied to the clipboard. Click the copy icon (highlighted below) and then paste using the operating systems paste function, for example, entering ^ +**v**, ⌘ +**v**, or right click and select paste.



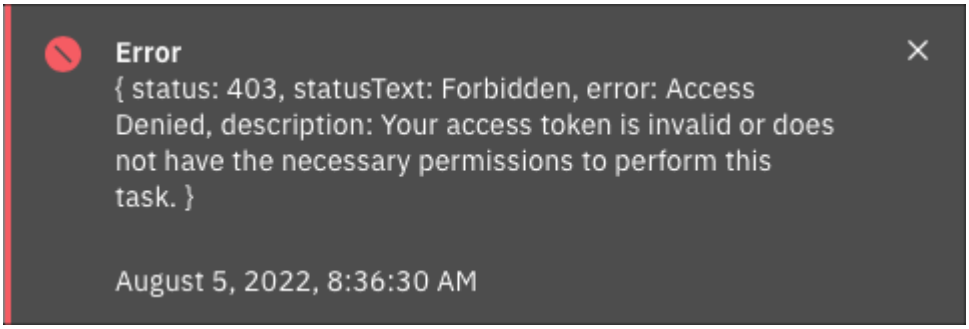
Additionally, there are several "click-thru" demonstrations. Links to click-thru demonstrations will open in a new browser window or tab with a screen similar to the image below. ***UPDATE THE IMAGE BELOW***



Click the play button in the middle of the screen to start the demo. Then, simply follow the steps in the demonstration guide. If unsure where to click, click anywhere on the screen and a highlight box will appear showing where to click next.

In this demonstration environment, full access to the IBM Cloud account is NOT provided. User identifications (IDs) will be restricted to specific capabilities. Permission to create or modify PowerVS service instances, virtual machines (instances), networks, images, etc. is not provided.

> **Warning**
>
> Attempting to perform an action without the appropriate permissions will result in an error message like the one below. This is not an issue with the IBM Cloud or PowerVS, rather a restriction of the demo environment and the permissions assigned to users.



1.2 Acronyms

The following acronyms are used throughout this demonstration guide:

It is now time to proceed to Part 1, an overview of IBM Power Systems Virtual Server.

2. Part 1 - Overview

2.1 Introduction

IBM Power Systems Virtual Server (PowerVS) delivers flexible compute capacity for Power Systems workloads. Integrated with the IBM Cloud platform for on-demand provisioning, this offering provides a secure and scalable server virtualization environment built upon the advanced RAS features and leading performance of the Power Systems™ platform.

This IBM Technology Sales Enablement demonstration guide is part of the following Your Learning Level 3 learning plans for PowerVS:

UPDATE ALL THE LINKS BELOW

- **IBM Sales: Coming Soon**https://yourlearning.ibm.com/activity/PLAN-4E64FE2FDBF0
- **IBM Technical Sales: Coming Soon**
- **Business Partner Sales: Coming Soon**
- **Business Partner Technical Sales: Coming Soon**

You should be familiar with PowerVS and should have completed the IBM Power Systems Virtual Server Sales Foundation Badge (Level 2):

- **IBM:** https://yourlearning.ibm.com/activity/PLAN-4E64FE2FDBF0
- **Business Partners:** https://learn.ibm.com/course/view.php?id=11419

The content here is **not** a replacement for the Level 1 and 2 content that is part of that learning plan.

This demonstration environment has multiple purposes. First, it is meant to educate you on IBM Power Systems Virtual Server (PowerVS) and to hone your skills to perform PowerVS demonstrations. Additionally, the IBM Technology Zone (TechZone) environment, this demonstration guide and associated click-thru demos and videos can be re-used to perform client demonstrations.

> **Important**
>
> The focus of the demonstration is on the Infrastructure as a Service capability of PowerVS and not on the operating systems supported by the offering: AIX, IBM i, and Linux.

In Part 2, learn about PowerVS **services** and how they are provisioned.

3. Part 2 - Provisioning a PowerVS service

3.1 Introduction

Before you create a PowerVS virtual server, you must understand the difference in terminology between a PowerVS **service** and a PowerVS **instance**. Think of the PowerVS **service** as a container for all PowerVS **instances** at a specific geographic region. The **service** is available from the Resource list in the IBM Cloud Portal. The **service** can contain multiple **instances**. For example, you can have two **services**, one in Dallas, Texas, and another in Washington, D.C. Each **service** can contain multiple **instances**. A **service** must be associated with an IBM Cloud **resource group** which helps in grouping resources and assigning permissions. To learn more, refer to Getting Started with IBM Power Systems Virtual Server.

The key parameters for a PowerVS service are:

- **Datacenter location:** As of August 2022, PowerVS is co-located with 15 IBM Cloud datacenters located around the world. When selecting a datacenter, consider choosing the datacenter located nearest the majority of the end users that will be accessing the workloads running in PowerVS.
- **Service name:** The PowerVS service name will appear in the IBM Cloud Portal under the provisioned services. Specify a name that is easily understood and recognized.
- **Resource group:** Resource groups are used to organize resources in your IBM Cloud account. Administrative and access rights for all PowerVS resources are associated with the PowerVS service and not individual PowerVS instances (VMs). Once a PowerVS service is assigned to a resource group, the resource group can not be changed.

In the next chapter, view a video of a PowerVS service being provisioned.

3.2 Watch a service being provisioned

In this chapter, watch a video of an IBM Power Systems Virtual Server **service** being provisioned in the IBM Cloud Portal.

The video has been edited to minimize the viewing time and does not reflect the actual provisioning time of a PowerVS **service**. The actual provisioning time will vary, but it is typically less than 5 minutes. This video includes audio that explains the steps being taken and things to consider while making choices on options. This video can be utilized for client demonstrations either with or without the audio.

> **Tip**
>
> If the video appears blurry, click the fullscreen  or  icon.

3.3 Click through demonstration of a service being provisioned

Now it is time for you to provision a PowerVS service. Use the click-thru demonstration below to practice provisioning a PowerVS service. The click-thru demonstration corresponds to the video from the previous chapter. Refer to the video for talking points if the click-thru demonstration is utilized with clients.

Note, fields that require a text entry (e.g. service name) are pre-populated in the click-thru demonstration.

> **Tip**
>
> Not sure where to click or what to do next? Simply click anywhere on the screen and the spot to click next will be highlighted.

1. Open the link below and then click the play button  to begin the demonstration.

   Click-thru demo: Create an IBM Cloud Satellite Location
2. Click the **Catalog** in the top menu bar.
3. Enter PowerVS in the **Search** text field.
4. Click the **Power Systems Virtual Server** tile.
5. Click the **Select a location** pull-down.
6. Click **Dallas (us-south) Region****.
7. Click the **Select a resource group** pull-down.
8. Click **Default**.

   Note: Tags can also be added to the service to assist in grouping, sorting, and applying flexible access policies.

1. Click the **I have read and agree to the following license agreements** check box.
2. Click **Create**.

   Provisioning a new PowerVS service typically takes about ***ADD VALUE HERE***. Once the provisioning completes, the new PowerVS service can be found in the **services and software** section of the IBM Cloud Portal dashboard.

1. Click **Services and software**.
2. Click the **PowerVS-service** under **Services and software**.

   The PowerVS service is now ready to be populated with virtual server **instances**. In the next Part of the demonstration guide, learn how to provision an **instance**.

4. Part 3 - Provisioning a PowerVS instances

4.1 Introduction

IBM Systems Virtual Servers are located in the IBM data centers, distinct from the IBM Cloud servers with separate networks and direct-attached storage. The environment is in its own pod and the internal networks are fenced but offer connectivity options to meet customer requirements. This infrastructure design enables IBM Power Systems Virtual Server to maintain key enterprise software certification and support as the PowerVS architecture is identical to certified on-premises infrastructure. The virtual servers, also known as instances, logical partitions (LPAR), or virtual machines (VMs) run on IBM Power Systems hardware with the PowerVM hypervisor.

The key parameters for a PowerVS instance are:

- **Instance name:** The PowerVS instance name will appear in the IBM Cloud Portal under the list of instances within a service. Specify a name that is easily understood and recognized.
- **Server placement group:** Server placement groups provide control over the host or server on which a new virtual machine (VM) is placed. By using server placement groups, high availability solutions can be created within a data center. Apply an affinity or anti-affinity policy to each VM instance within a server placement group. After creating e a placement group, provision a new VM instance in the placement group. When setting a placement group with an affinity policy, all VMs in that placement group are launched on the same server. When setting a placement group with an anti-affinity policy, all VMs in that placement group are launched on different servers. Learn more about placement groups.
- **VM pinning policy:** VM pinning controls the movement of VMs during disasters and other restart events. Learn more about hard and soft pinning here.
- **SSH key:** A SSH public/private key pair is required to to access the instance. Learn more about using and generating SSH keys here.
- **Operating system:** PowerVS instances can run either IBM AIX, IBM i, or Linux operating systems (OS). Several Linux images are available specifically for servers that will run SAP.
- **OS image:** Users have the ability to choose an operating system image from the PowerVS image catalog or users can bring their own image. Each supported OS has a specific set of images in the PowerVS catalog for supported OS versions. Each instance is provisioned with a boot volume using the storage tier selected.
- **Storage tier:** PowerVS supports both Tier 1 and Tier 3 storage. Tier 1 provides a maximum of 100 input/output operations per second (IOPs) per GB, while Tier 3 provides a maximum of 3 IOPS/GB. Tier 3 storage should only be utilized for non-production workloads.
- **Storage pool affinity:** Three storage pool affinity options are available: Auto-select, affinity, and anti-affinity. The affinity option specifies requires the boot volume to be placed in the same pool as another existing instance or existing boot volume. The new storage volume(s) for the instance will be placed in the same storage pool where the affinity object resides. The anti-affinity specifies a different pool should be used from that of another existing instance or existing boot volume.
- **Machine type:** Two IBM Power Systems machine types are supported: s922 and e980. Learn more about these s922 here and the e980 here.
- **Core type:** PowerVS supports **shared uncapped**, **shared capped**, and **dedicated** cores. Shared uncapped cores are shared among other clients. Shared capped cores are shared, but resources do not expand beyond those that are requested (used mostly for licensing). Dedicated cores are allocated for a specific client (used for specific third-party considerations). Learn more about core types here.
- **Number of cores:** The option for the number of cores assigned to an instance depends on the core type. Shared capped and unshared capped cores support .25 core increments, while dedicated cores must be assigned a full core. Note, the maximum number of cores will depend on the machine type and availability in the selected location.
- **Amount of memory:** PowerVS instances must be provisioned with a minimum of 2GB of random access memory (RAM). The maximum amount of memory varies based upon machine type and availability in the selected location. If greater than 64GB RAM per core is specified, a higher price is charged.
- **Additional storage volumes:** When provisioning a new instance, for additional storage, a new data volume can be created or an existing volume can be attached. Any storage volume added at this time will use the same storage tier as the boot volume specified earlier.
- **Networking:** PowerVS instances will always be attached to a private network and can optionally be attached to a public, Internet accessible network. Use private networks to connect to existing subnets or go a new subnet can be created. Learn more about PowerVS networking here.

In the next chapter, view a video of a PowerVS instance being provisioned.

4.2 Watch a instance being provisioned

In this chapter, watch a video of an IBM Power Systems Virtual Server **instance** being provisioned using the IBM Cloud Portal.

The video has been edited to minimize the viewing time and does not reflect the actual provisioning time of a PowerVS **instance**. The actual provisioning time will vary, but it is typically less than 5 minutes. This video includes audio that explains the steps being taken and things to consider while making choices on options. This video can be utilized for client demonstrations either with or without the audio.

Tip

If the video appears blurry, click the fullscreen  or  icon.

4.3 Click through demonstration of a service instance being provisioned

Now it is time for to provision a PowerVS instance. Use the click-thru demonstration below to practice provisioning a PowerVS instance. The click-thru demonstration corresponds to the video from the previous chapter. Refer to the video for talking points if the click-thru demonstration is utilized with clients.

Note, fields that require a text entry (e.g. instance name) are pre-populated in the click-thru demonstration.

> **Tip**
>
> Not sure where to click or what to do next? Simply click anywhere on the screen and the spot to click next will be highlighted.

1. Open the link below and then click the play button  to begin the demonstration.

   Click-thru demo: Create an IBM Cloud Satellite Location
2. Click the **Services and software** link under **Resource summary** on the IBM Cloud Portal dashboard.
3. Click the **PowerVS-service** entry under **Services and Software**.
4. Click the **Create instance**+ button.

The next steps refer to the entries in the **General** section of the **Create virtual server instance** form.

1. Click the **Add to a server placement group** check box.
2. Click the **Select a server placement group** pull-down.
3. Click **AffinityGroup**.
4. Click the **Select VM pinning** pull-down.
5. Click **Soft**.
6. Click the **Select SSH key** pull-down.
7. Click **PowerVS-sshkey**.
8. Click the **Continue** button under the **General** section.

The next steps refer to the entries in the **Boot image** section of the **Create virtual server instance** form.

1. Click the **Select the OS** pull-down.
2. Click **Linux**.
3. Click the **Select an image** pull-down.
4. Click **RHEL8-SP6**. Note: **RHEL8-SP6** stands for Red Hat Enterprise Linux version 8 service pack 6.
5. Click the **Select storage tier** pull-down.
6. Click **Tier 3 (3 IPOs / GB)**.
7. Click the **Auto-select pool** tile.
8. Click the **Continue** button under the **Boot image** section.

The next steps refer to the entries in the **Profile** section of the **Create virtual server instance** form.

Note: the **Machine type** option is not editable since a server placement group was selected. When an affinity server placement policy is selected, all VMS must be of the same machine type. The default of .25 cores and 2 GB of memory will be used.

1. Click the **Shared uncapped** core type radio button.
2. Click the **Continue** button under the **Profile** section.

The next steps refer to the entries in the **Storage volumes** section of the **Create virtual server instance** form.

1. Click the **Create volume +** button.
2. Click the **+** icon for the **Size** field.
3. Toggle the **Shareable** button to **On**.
4. Click the **Create and attach** button.
5. Click the **Continue** button under the **Storage volumes** section.

The next steps refer to the entries in the **Networking** section of the **Create virtual server instance** form.

Note: for this demonstration, the instance will be provisioned using a public network (Internet facing). Using the public network makes demonstrating access to instances easy, but most production deployments of PowerVS will utilize private networks and control access using Direct Link, Virtual Private Network (VPN), or Megaport Software Defined Network (SDN). To learn more about PowerVS networking options, look here.

1. Toggle the **Public networks** button to **On**.
2. Click the **Finish** button under the **Networking** section.
3. Click the **I agree to the Terms and Conditions** checkbox.
4. Click **Create**.

The PowerVS instance is now being provisioned. This process typically takes less than 5 minutes. Notice the value under the **Status** column of the **Virtual server instances** table. Once the status changes to an **Active** state, the instance is ready to be accessed.

In the next part of the demonstration script, learn how to use the IBM Cloud Portal to manage PowerVS instances.

5. Part 4 - Managing PowerVS instances

5.1 Introduction

Via the IBM Cloud Portal, clients can control and manage many aspects of their PowerVS deployment.

On a per PowerVS instance (VM) basis, using the IBM Cloud Portal or IBM Cloud Portal application programming interfaces (APIs) clients can (not all options are available for all operating systems):

- Perform an OS shutdown
- Perform an immediate shutdown (without killing processes)
- Restart
- Reset
- Open an instance console
- Delete the instance
- Capture and export an image of the instance

In addition, some instances can be modified. Depending on core type, operating system, etc., a client can:

- Change VM pinning (soft, hard)
- Change core type (Shared uncapped, Shared capped, Dedicated)
- Change number of cores
- Change amount of RAM
- Change placement group

And it is possible to attach and detach storage volumes and attach an instance to an existing network.

In the next chapter, explore some of the options listed above for managing PowerVS instances.

5.2 Managing instances

Through the IBM Cloud Portal or APIs, administrators with the appropriate IBM Cloud Portal access can manipulate PowerVS instances without needing to directly access the instance operating system.

In the video below, watch how easy it is to demonstrate some of the management capabilities of a PowerVS instance.

> **Tip**
>
> If the video appears blurry, click the fullscreen  or  icon.

INSERT VIDEO LINK HERE

In the above video, the actions described were performed. In most cases, the video was edited to speed up the video during the time required to complete the action. When performing client demonstrations it is often best to perform a "baking show" style of demonstrations especially when actions take longer than a minute or two to complete, or have a high risk of failure. While the actions performed here are low risk, as seen in the video they do take some time to complete.

Using your IBM Cloud credentials and the IBM Cloud portal, complete the following scenarios of managing PowerVS instances using the "baking show" demonstration technique. Note, an error message like the one below will be encountered if an attempt is made to complete an action. This is normal, as full access to the shared environment is **not** provided. To avoid the error message, simply click the **Cancel** button on the action dialog. If performing a live client demonstration, or for IBM employees completing the Stand and Deliver for the IBM Power Systems Virtual Server - Level 3 badge, tell the audience why the action is being canceled but explain what would typically happen if the action was completed.

INSERT ERROR MESSAGE

1. open the portal in anew browser tab/window
2. if not already opened, go to dashboard
3. change account
4. click services and software
5. click powervs-service
6. click ... at far right of one of the instances in the table

Notice what operations can be performed. Some operations will be disabled. For example the **Start** option will be disabled if the instance is already in a running state. Some of the operations will only be enabled for specific operating systems.

Details of a instance and other management tasks are also available by selecting on a particular instance in the **Virtual server instances** table.

1. click anywhere on the main screen (away from the pop-up menu from step 5)
2. click the **VM actions** button.

Notice what operations can be performed. These actions are specific to the node, its current state, and OS.

1. click **VM actions** button again to dismiss the actions menu.
2. click the **Edit details** link
3. Click **Edit details**

Explore what instance configuration options can be modified. Depending on the running state of the instance, some options may not be possible.

1. Click the + icon under the Memory field until the value is 4 GB.
2. Click the **I have read the service agreement and agree to the terms.** checkbox.
3. Note the **Save edits and order** button is now active.
4. Click **Cancel**
5. Click the **Virtual server instances** item in left hand menu bar.

In the next Part, learn how to access a running PowerVS instance.

6. Part 5 - Accessing PowerVS instances

6.1 Introduction

IBM Power Systems Virtual Server is an Infrastructure as a Service (IaaS) offering. PowerVS allows clients to rapidly provision new instances running AIX, IBM i, or Linux. Ultimately, clients will want to deploy applications on those machines. The applications that clients choose to deploy will vary widely. They may include middleware like databases, third party software products like SAP, or applications they have developed themselves. To install these applications, they need to access the instance and install the software.

In the next chapter, learn how to access a running instance by using secure socket shell (SSH).

6.2 Access an instance

Accessing PowerVS instances will depending on several factors, including the operating system the instances is running and the network connectivity available. Remote login tools like Secure Socket Shell (SSH), telnet, and other terminal emulators can be used to access instances. Note these tools will vary by operating system. PowerVS also provides access to running instances using a web-based console tool. In most cases, clients will deploy PowerVS instances using a secured network like Direct Link or Virtual Private Network (VPN). Learn more about the PowerVS network connectivity options here.

For this exercise, the IBM Cloud Shell will be used. IBM Cloud Shell gives users complete control of their cloud resources, applications and infrastructure, from any web browser. IBM Cloud Shell provides pre-authenticated access to the latest tools and programming languages for cloud-based development, deployment and management of services and applications — all in a secure shell. IBM Cloud Shell is instantly accessible from the IBM Cloud portal.

To quickly demonstrate the value of PowerVS, this demonstration environment and all running instances are provisioned with a public, Internet facing network interface.

Follow the steps below to login to a running PowerVS instance using the IBM Cloud Shell and SSH. You can learn more about SSH and SSH keys here.

1. Open a browser window/tab to the IBM Cloud Portal: cloud.ibm.command
2. Switch to the 2435442 - ITZ - Satellite Cloud account.
3. Click the IBM Cloud Shell icon 

The next steps are performed in using the IBM Cloud Shell window that was opened. First, you need to create a SSH public key file using the key provided in your IBM Technolgoy Zone's reservation welcome e-mail. The public key will look like:

ssh-rsa abunchofjumbleduplettersandnumbersandspecialcharaters/thatarerandomandhardtoundesrtandbut!!
provideasecuremeansofconenctingtoopeartingsytesmsthatsupportssh/
andpossiblyotherprotocols123478thereisalsoaprivatekeyassociatedwithpublickey+yourprivatekeywaspacedontherunniningsinstanceaspartoftheibmtehnolgyzoneprovisioningproc
ibmtechzone@ibmtechzone.ibm.com

A private key was also provisioned at the same time and copied to the running PowerVS instances.

1. Copy your public key from the TechZone welcome e-mail using your operating system's copy to clipboard capabilities (e.g. highlight the text starting with **ssh-rsa** to the end of the key and then use ^ **+c** or ⌘ **+c**.)
2. In the IBM Cloud Shell window, enter the following string, but do not hit enter.

```
cat "
```

1. Paste your public key into the IBM Cloud Shell window using either ^ **+v** or ⌘ **+v**.
2. In the IBM Cloud Shell window, after the text you just pasted, enter the following and press enter:

```
"
```

1. To verify, run the following command in the IBM Cloud Shell.

```
cat ~/.ssh/authorized_keys
```

Sample output:

```
ssh-rsa abunchofjumbleduplettersandnumbersandspecialcharaters/thatarerandomandhardtoundesrtandbut!!
provideasecuremeansofconenctingtoopeartingsytesmsthatsupportssh/
andpossiblyotherprotocols123478thereisalsoaprivatekeyassociatedwithpublickey+yourprivatekeywaspacedontherunniningsinstanceaspartoftheibmtehnolgyzoneprovisioningproc
ibmtechzone@ibmtechzone.ibm.com
```

1. Using the value of the **UserName** field found in your TechZone reservation, use ssh to log into the AIX-vm-1 instance. You must substitute your UserName in place of the string **UserName** in the command below:

```
ssh -i mykey UserName@52.117.38.29
```

sample output:

1. Try running a few OS commands:

Sample output:

Sample output:

To explore further, use the following public IP addresses to access the other instances:

table AIX-vm-2 52.117.38.26 RH-vm-1 52.117.38.28 RH-vm-2 52.117.38.30

Use the command to connect to the other servers. Be sure to replace **UserName** with the **UserName field found in your TechZone reservation.

For IBM and Business Partners wishing to complete the IBM Power Systems Virtual Server - Level 3 for Sales, please proceed to Part 9. ***ADD internal link to Part 9*** For technical sellers please proceed to the next Part and explore PowerVS server placement groups.

7. Part 6 - Explore other PowerVS topics

7.1 Introduction

In the earlier Parts of this demonstration script, you probably noticed additional features for managing other aspects of PowerVS instances. Below are brief introductions to some of those topics and links to more detailed information for each. Additionally, high level guidance of how to explore these topics using the IBM Cloud Portal are provided.

Learn more about these advanced topics in the next chapters.

7.2 Server placment groups

Server placement groups provide control over the host or server on which a new instance is placed. By using server placement groups, high availability within a data center can be achieved. When a placement group is set with an affinity policy, all instances in that placement group are launched on the same physical server. When a placement group is set with an anti-affinity policy, all instances in that placement group are launched on different servers.

A few facts about server placement groups: - By default, there is a maximum of 25 server placement groups. A support ticket needs to be raised to go beyond this limit. - The IBM Cloud Portal for server placement groups can only be used if the cloud account has less than 100 instances. If the account has > 100 instances, the command line interfaces (CLI) or application programming interfaces (API) must be used to create server placement groups.

In the TechZone environment, - Explore the **Server placement groups** page in the IBM Cloud Portal. - Drill down into the server placement groups that have already been created.

Learn more about server placement groups here.

Learn more about High Availability (HA) and Disaster Recovery (DR) options in PowerVS here.

7.3 Storage volumes, boot volumes, and images

As mentioned earlier PowerVS supports both Tier 1 and Tier 3 storage volumes. Every instance consists of a boot volume and optionally additional storage volumes. While IBM manages the underlying physical storage, it is the client's responsibility to manage and protect the data on instances.

A few facts about storage volumes: - Storage volumes can be increased in size in 1GB increments, but not decreased. - Storage volume sizes maximums will depend on availability within the selected IBM datacenter. - Storage volumes can be marked as **shareable**. - Storage volumes can be marked as **bootable**. - Affinity and anti-affinity rules can be applied to storage volumes.

A few facts about boot volumes/images: - Boot volumes can be imported from IBM Cloud Object Storage (COS). - Boot volumes can be exported to IBM COS. - Affinity and anti-affinity rules can be applied to boot volumes. - Boot volumes (and storage volumes) of running instances can be captured (also know as a snapshot) to either the local image catalog associated with the PowerVS service or to IBM COS. - Captured boot images can be used to provision new instances.

In the TechZone environment, - Explore the **Storage volumes** page in the IBM Cloud Portal. - Explore the **Boot images** page in the IBM Cloud Portal.

Learn more about storage volumes here.

Learn how to import a boot image here.

7.4 Subnets, Cloud connections, and VPN connections

A few facts about subnets: - A Classless inter-domain routing (CIDR) must be specified when creating a subnet. - The first IP address in the CIDR is always reserved for the gateway in all data centers. - The second and third IP addresses are reserved for gateway high availability (HA) in only the PowerVS colocation in the Washington, DC 04 datacenter (WDC04).

A few facts about Cloud connections: - Cloud Connect (Managed Networking Services using Megaport) is available only in USA. - A maximum of 2 connections can be created. - A subnet must be created prior to creating a Cloud connection.

A few facts about VPN connections: - A maximum of 4 connections can be created. - A subnet must be created prior to creating a Cloud connection.

In the TechZone environment, - Explore the **Subnets** page in the IBM Cloud Portal. - Explore the **Cloud connections** page in the IBM Cloud Portal. - Explore the **VPN connections** page in the IBM Cloud Portal.

Learn more about subnets here.

Learn more about Cloud connections here.

Learn how to configure a VPN connection here.

7.5 Additional services catalog

Complimentary products and services are available for IBM Power Systems Virtual Server.

In the TechZone environment, - Explore the **Additional services catalog** page in the IBM Cloud Portal.

In the next Part, learn about the PowerVS command line interfaces (CLI).

8. Part 7 - Use the PowerVS command line interfaces (CLI)

8.1 Introduction

IBM Power Systems Virtual Server provides command line interfaces (CLI) as a plugin to the IBM Cloud CLI. The PowerVS CLIs provide system administrators the ability to programmatically manage their PowerVS environment with out having to use the IBM Cloud Portal.

In the next chapter, use the IBM Cloud Shell to learn more about the PowerVS CLIs.

8.2 Command line exercises

In this exercise, explore several of the PowerVS CLIs. It is important to remember you are using a shared environment and have limited administrative permissions. The CLIs being executed here are command that only require "read" access to the environment. CLIs also exist to create and modify the PowerVS resources, you will just not have sufficient permissions to execute those commands in the shared environment. Attempting to do so will result in an error.

For this exercise, the IBM Cloud Shell will be used. IBM Cloud Shell gives users complete control of their cloud resources, applications and infrastructure, from any web browser. IBM Cloud Shell provides pre-authenticated access to the latest tools and programming languages for cloud-based development, deployment and management of services and applications — all in a secure shell. IBM Cloud Shell is instantly accessible from the IBM Cloud portal. The IBM command line interface (CLI) along with all the IBM Cloud CLI plugins are pre-installed in IBM Cloud Shell, including the PowerVS CLIs.

It is also possible to install the IBM Cloud CLIs and PowerVS CLI plugin other systems, like personal desktops, development servers, etc. To learn more about installing the PowerVS CLI locally click here.

To get started, first open the IBM Cloud Shell from the IBM Cloud portal:

1. Open a browser window/tab to the IBM Cloud Portal: https://cloud.ibm.com.
2. Switch to the 2435442 - ITZ - Satellite Cloud account.
3. Click the IBM Cloud Shell icon

To be written

9. Part 8 - Next steps

9.1 Next steps

In this demonstration guide, you learned how easy it is to provision resources with IBM Power Systems Virtual Server (PowerVS). You also learned some of the basics for managing PowerVS resources. But there is still more to learn about PowerVS. Links to specific PowerVS topics were provided throughout this demonstration guide. If you haven't already, take the time to read the PowerVS documentation to learn the full capabilities of the offering.

Finally, remember to complete the IBM Power Systems Virtual Server - Level 3 learning plan.

IBM Sales and **IBM Technical sales** must complete a Stand and Deliver exercise to demonstrate to your manager your newly learned ability to demonstrate PowerVS. Be sure to refer to the evaluation rubric in the learning plan when preparing your Stand and Deliver demonstration.

Business Partners must pass the PowerVS quiz in learn.ibm.com. Remember, you will want to take the quiz while you have access to the TechZone environment. The BP quiz questions verify your use of the demonstration environment and not necessarily your knowledge of PowerVS.