

CSE427:VIRTUALIZATION AND CLOUD COMPUTING LABORATORY

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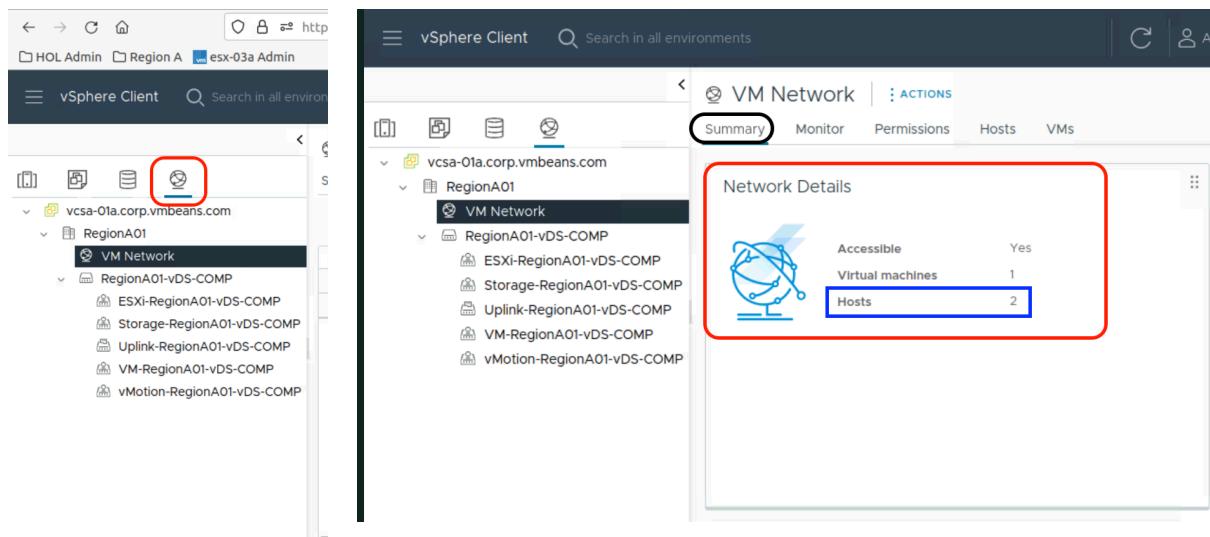
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P1: Creation of Standard and Distributed switch on HOL 2410 - VMWARE

We are going to create virtual switches and in order to create that we have seen that what are the other switches that are pre-existing in the VM ware.

STEP 1: Go to VM Network and you can see the switches there Moreover you can see in Summary section that how many host are using these switches



STEP 2: Go to host and create V switch (Standard switches) - *Right click on that - Add Networking*

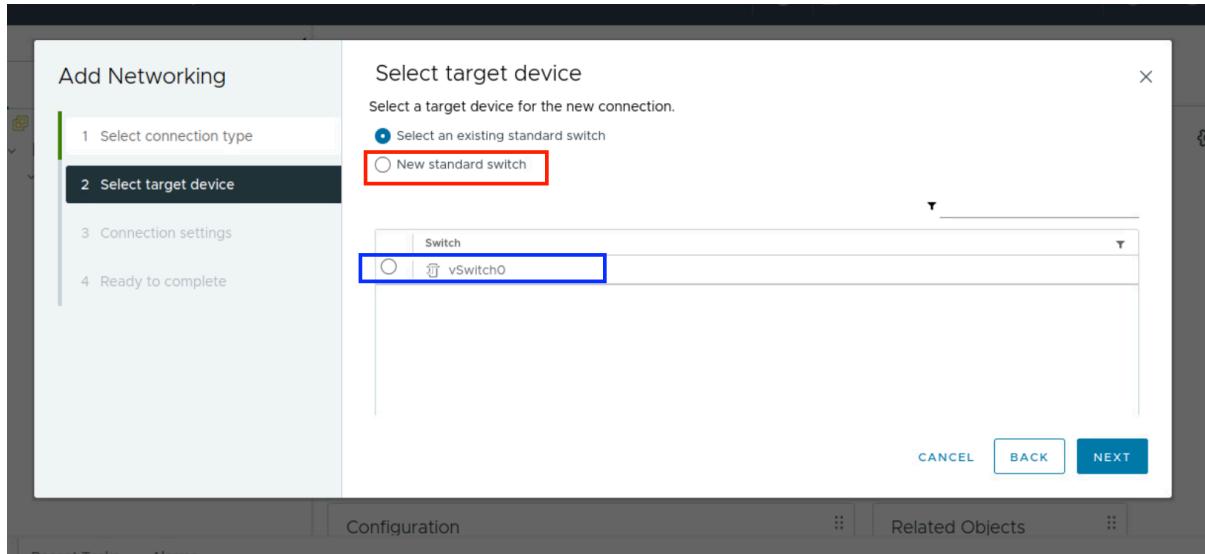
The screenshot shows the vSphere Client interface. On the left, the navigation tree displays a hierarchy: RegionA01 > RegionA01-COMP01 > esx-01a.corp.vmbeans.com. The 'esx-01a.corp.vmbeans.com' node is selected and highlighted with a blue box. On the right, the main pane shows the host's configuration details. The 'Actions' dropdown menu is open, and the 'Add Networking...' option is also highlighted with a blue box.

STEP 3:
Select
Virtual
machine
Port Group
and click on

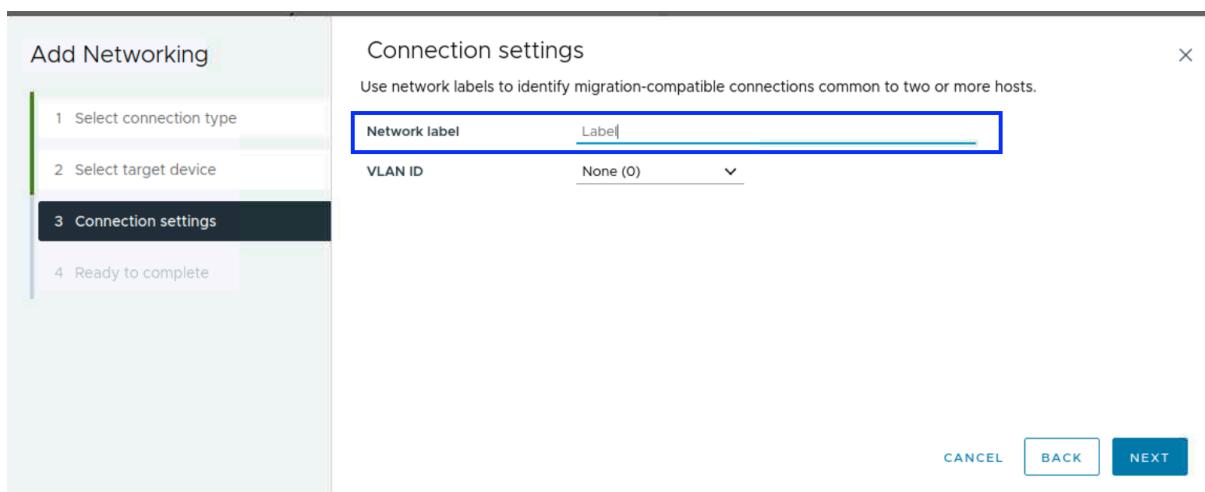
Next.

The screenshot shows the 'Add Networking' wizard. The first step, 'Select connection type', is active. It displays two options: 'VMkernel Network Adapter' and 'Virtual Machine Port Group for a Standard Switch'. The 'Virtual Machine Port Group for a Standard Switch' option is selected and highlighted with a blue box. The 'NEXT' button is visible at the bottom right of the dialog.

STEP 4: You can *select the existing switch* and also you can create new switch from here - **Next.**



STEP 5: Name the switch and create **next and Finish**, it will be **ready to use and complete.**

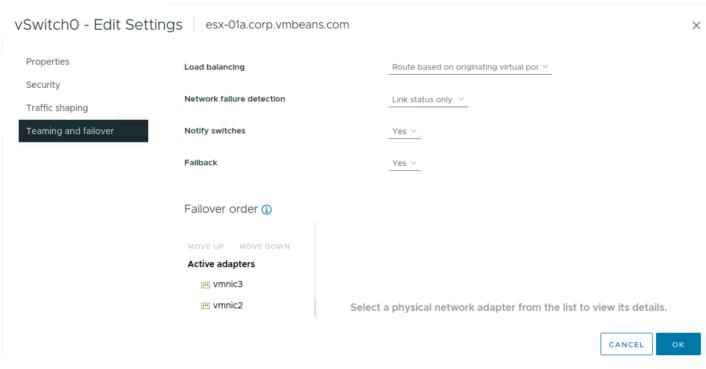


STEP 6: You can see the switch here (**Host - esxvmbens - configure - Networking - Virtual Switches**) Dropdown father Standard switch vSwitch0 - You can see your created switch with the name (Label).

STEP 7: If you want to add an adaptor to it - Click on Manage Physical Network Adaptors - Select the adaptor from unclaimed adaptors - Click on

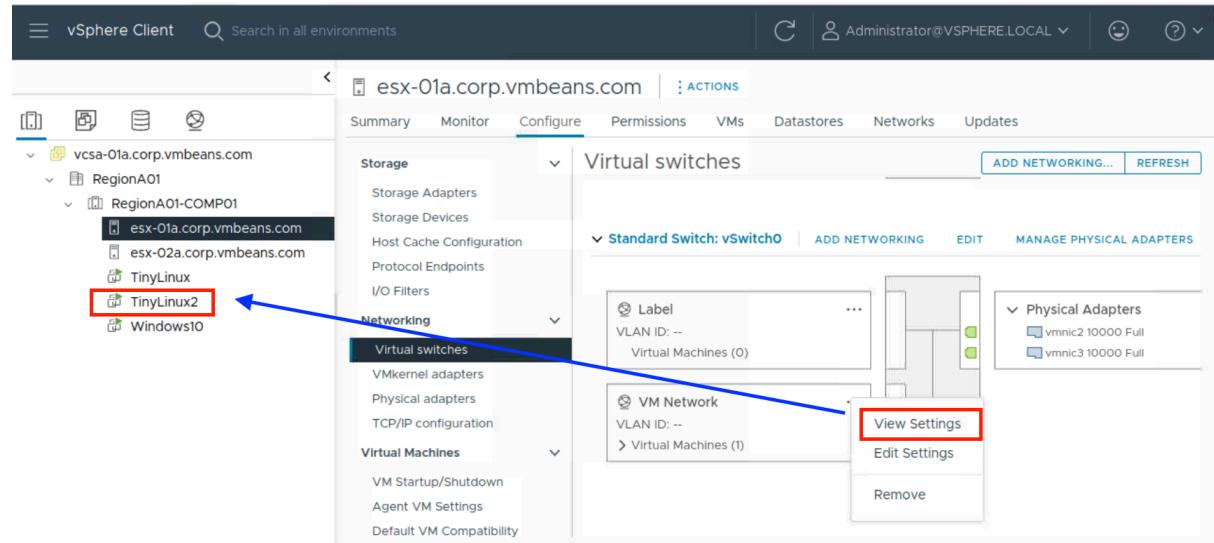
Move down - It moved to Active adaptor - click on Ok - Now you can see that there are ***two adaptor there.***

You can edit the further settings like **Properties - Security - Traffic shaping** you can decide how much traffic flow you are allowing ,also you can reject some ip addresses in order to make the system more secure - **In Teaming and failover option - you can keep one adaptor on standby mode in case of some system failures.**

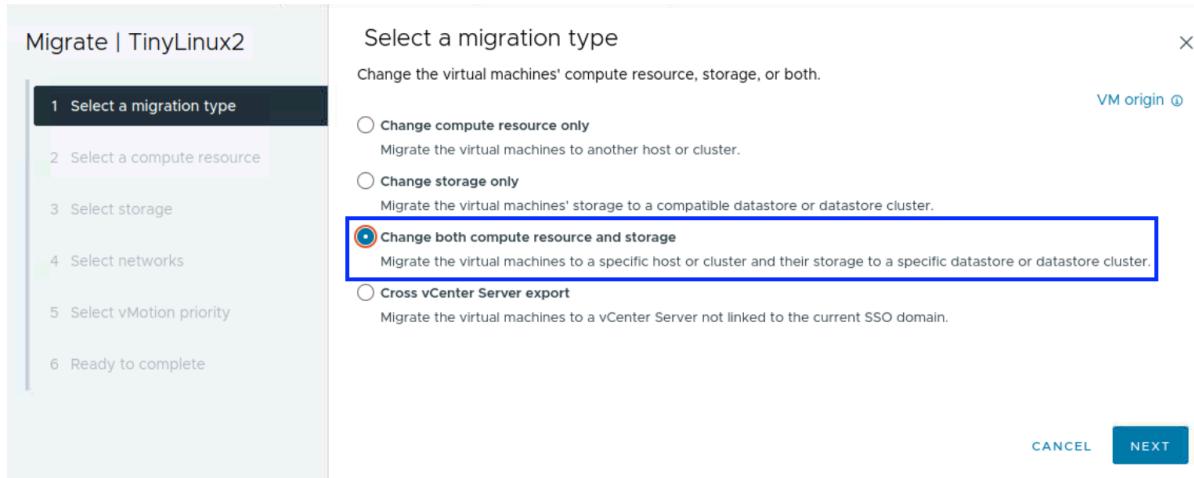


How to Migrate Virtual Machine

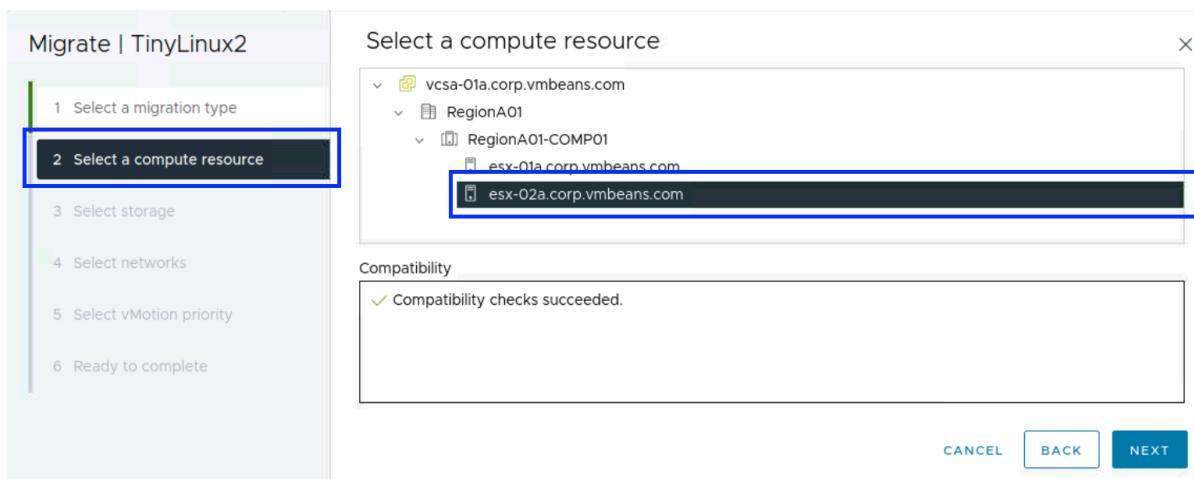
Step 1- Select vm - right click - View Setting - **select Tinylinux2 from host - Right click on it - Select Migrate.**



- **Step 2-** Select Migration Type - **Change both Compute resources and storage**

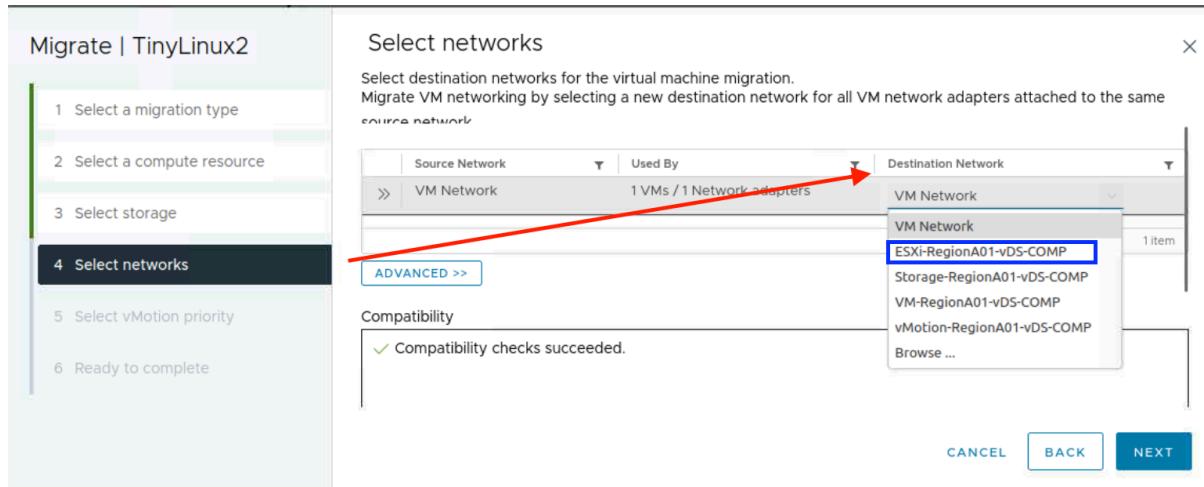


- **Step 3 - Select compute resources - Select the new place for it - next**



- **Step 4- Select storage - Next**

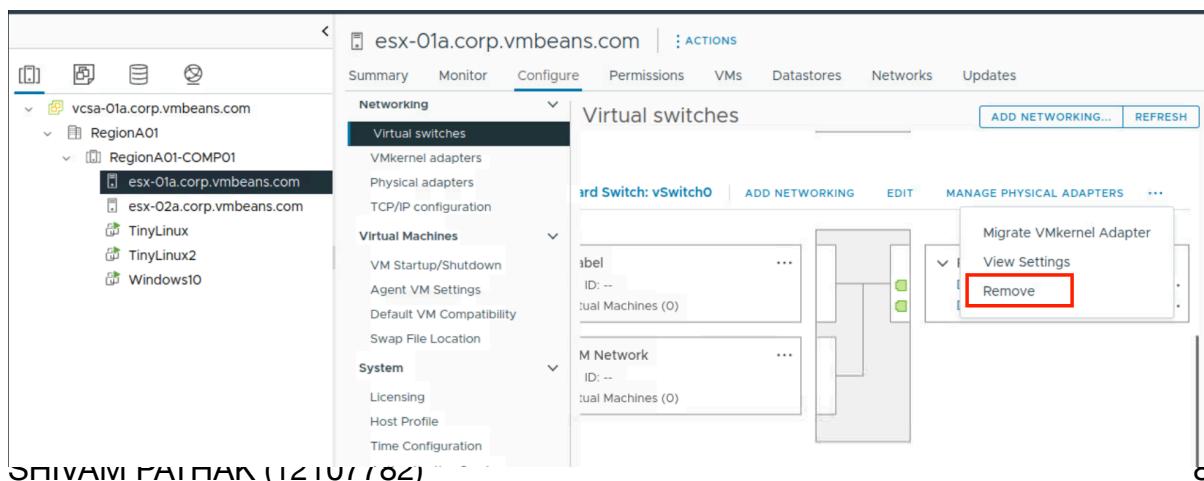
- **Step 5 - Select network (*Change VM Network to ESXI Region 01* from Destination network option)**



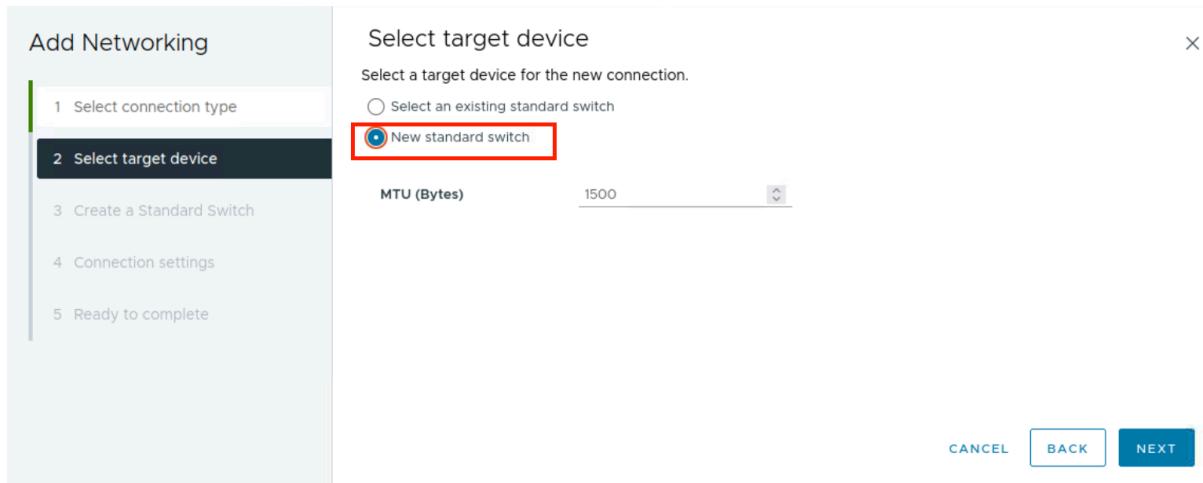
- **Step 6 - Select V motion priority - *Scheduled with high Priority***
- ***Ready to complete - Finish after some time it will be shifted***

How to Create New Standard Switch vSS frOM Scratch

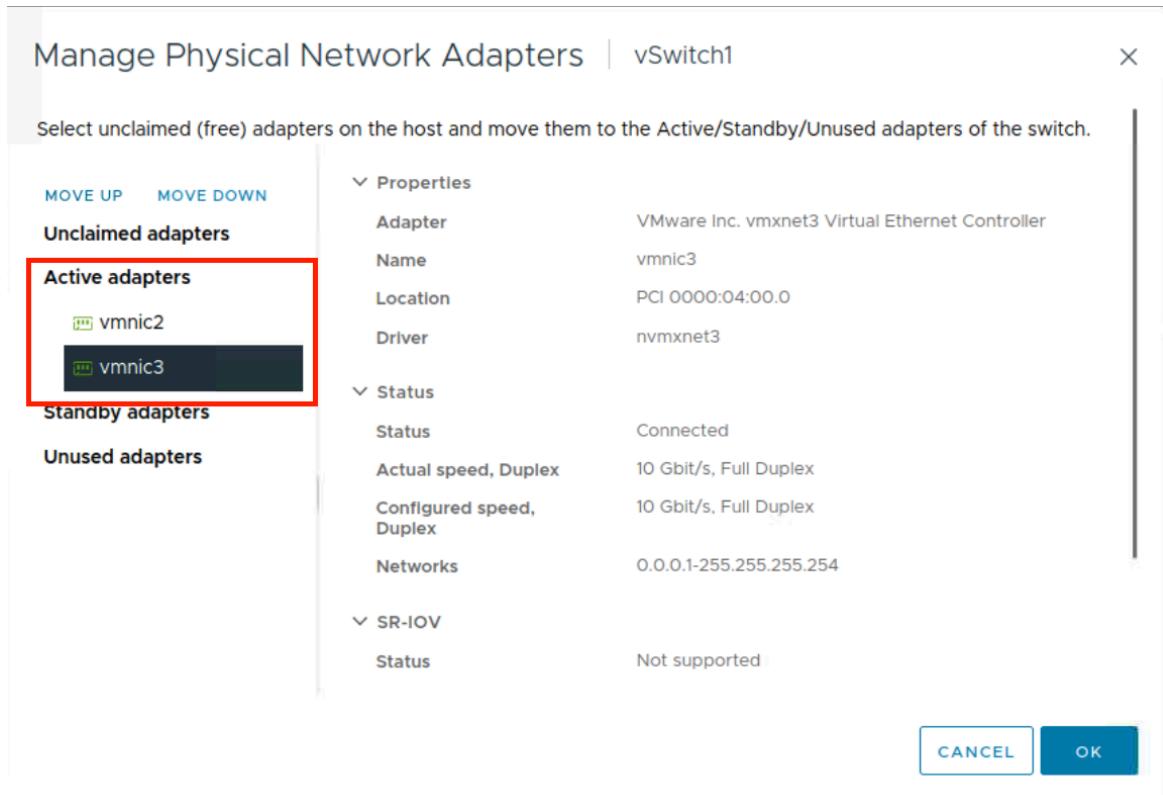
Step 1- delete the old switch and make new Standard switch for or virtual machine After deleting all pre existing switch we can create new switch and connect it to Virtual machine .



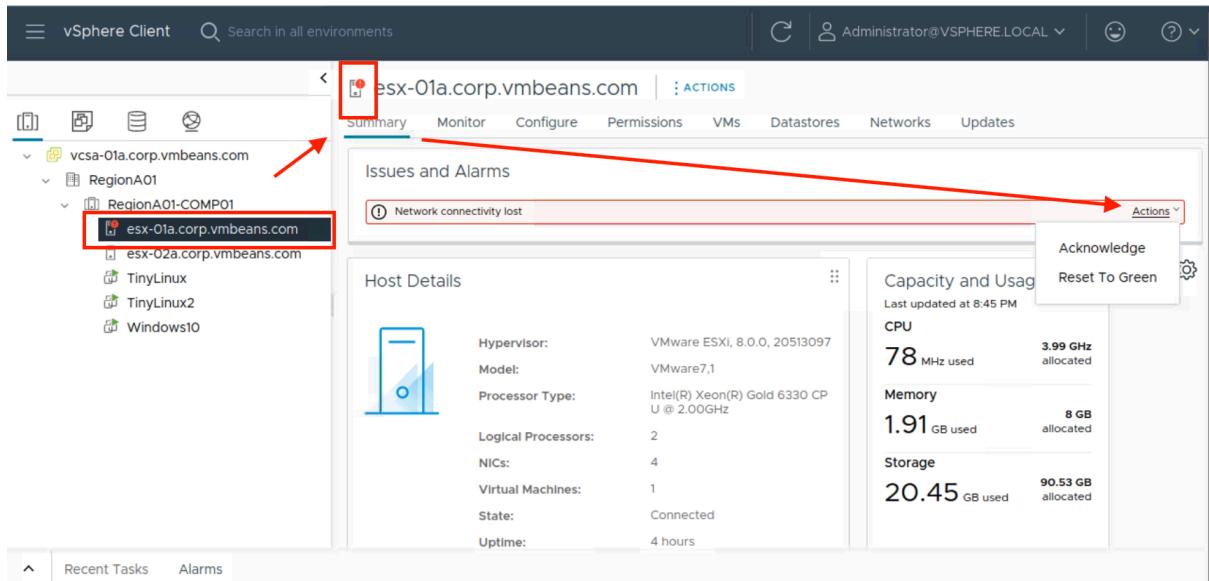
Step 2 - Right click on host - Add networking - **Selection connection type** - Virtual Machine port group Select target device. - Now select **New Standard switch** in order to make new Switch.



Step 3 - Create standard switch - here **make both the adaptor in active mode** in order to make run the system normal



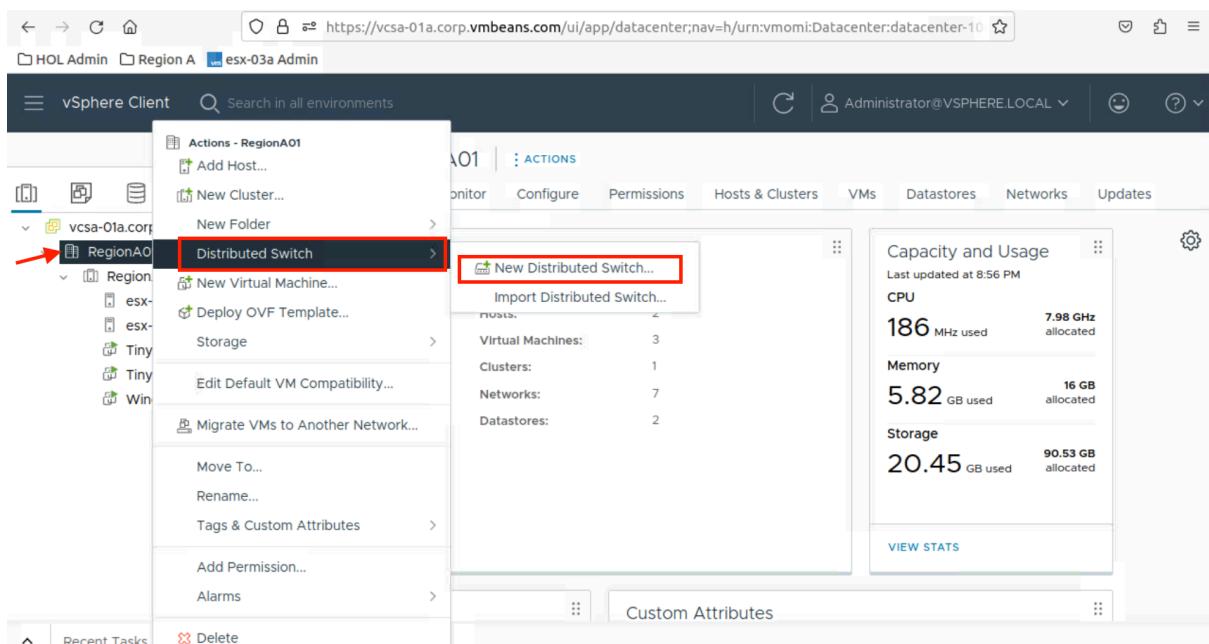
Step 4 - If the host will show some **red sign** - Go to summary - Click on Action and **Reset to green** - Wait for while then host will accept the switches.



How to create Distributed Switch

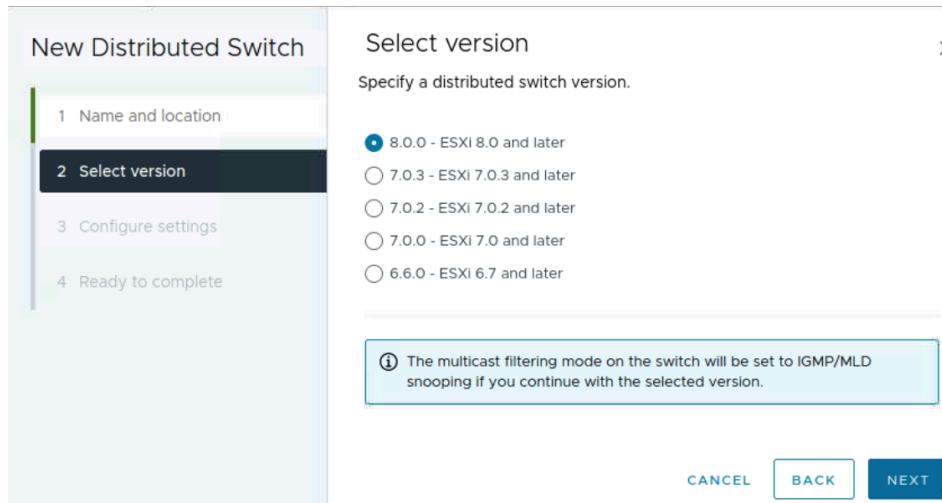
**A standard vSwitch works within one ESX/ESXi host only.
Distributed vSwitches allow different hosts to use the switch as long as they exist within the same host cluster.**

Step 1 - Click on *RegionA01 server* - Distributed Switch - *New Distributed Switch.*



Step 2 - Click on *Name and location* - Select version (8.0.0) - Configure

Setting and Ready to complete.



Step 3 - Go to network - You can find your distributed Switch - You can further add port groups.

vcsa-01a.corp.vmbeans.com

RegionA01

NEW switch

VM Network

DSwitch

DPortGroup

DSwitch-DVUplinks-12003

RegionA01-vDS-COMP

ESXi-RegionA01-vDS-COMP

Storage-RegionA01-vDS-COMP

Uplink-RegionA01-vDS-COMP

VM-RegionA01-vDS-COMP

vMotion-RegionA01-vDS-COMP

DSwitch | ACTIONS

Summary Monitor Configure Permissions Ports

Switch Details

| | |
|------------------|--------------|
| Manufacturer | VMware, Inc. |
| Version | 8.0.0 |
| Networks | 2 |
| Hosts | 0 |
| Virtual machines | 0 |
| Ports | 8 |

Features

Conclusion

Initially, we made a ***new standard switch***, but we had to make it separately on each host where we wanted it to work. After that, we came up with a smarter idea. We made a ***single distributed switch that can work on all hosts at the same time***. Additionally, ***we created port groups***, kind of like teams, and you can make lots of these groups, each with its own job. We can also set up each group with special settings, such as ***controlling the traffic, making it secure***, working together for backup, keeping an eye on things, and more. This way, we have an easy and organised way to manage everything!

Port Group in a virtualised environment organises virtual ports with specific rules for VMs. In RegionA01, there are 5 port groups serving distinct functions:

1. **ESXi** Stores virtual machines.
2. **Storage - RegionA01**: Manages storage operations.
3. **Uplink - RegionA01**: Facilitates VM uplink connections.
4. **VM - RegionA01**: Stores virtual machines.
5. **vMotion - RegionA01**: Enables the movement of virtual machines.

New ports or hosts can be added and configured for specific tasks by right-clicking on the D-switch, selecting "New Distributed Port" for ports, or "Add and Manage Host" for hosts.

Teaming - Network Teaming is the process of combining NICs to provide bandwidth and failover to a switch

Load balancing - Load balancing allow you to determine how network traffic is distributed between network adapters and how to re-route traffic in the event of adapter.

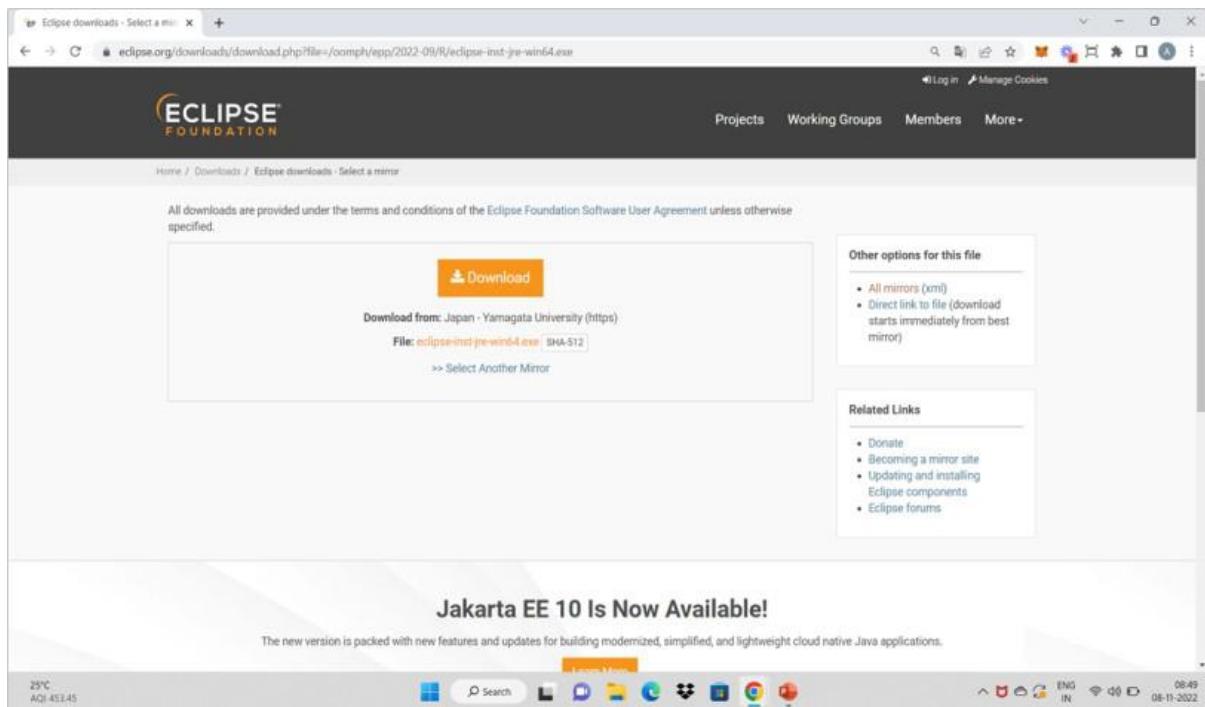
Uplinks. Uplinks are connections from the virtual switch to the outside world:

Standard switch and Distributed switch

| | Standard Switch | Distributed Switch |
|-------------------|--|--|
| Location | Associated with a single physical server | Associated with multiple servers |
| Management | Configured on a per-host basis | Centralized management for all hosts |
| Example | Small office with separate switches | Large corporate office with central control room |

P2: Cloud sim project creation and examples

Step 1: Download Eclipse IDE for Java Developers. It is developed by the CLOUDS Lab organization and is written entirely in Java so we would need a Java IDE to simulate a cloud scenario using CloudSim.



Step 2: Download the CloudSim 3.0.3 zip file from **GitHub** and extract the folders within a folder in our computer storage.

cloudsim-3.0.3

nikolayg released this Mar 19, 2015 · 55 commits to master since this release · cloudsim-3.0.3 · 46c4660

Changes from CloudSim 3.0.2 to CloudSim 3.0.3

WHAT'S NEW

This is a bug fix and refactoring release. The following updates have been made:

- Removed the dependency on the flanagan library. It is now replaced with Apache Math. The implementation and interface of the MathUtil has been changed accordingly.
- The minimal time between events is now configurable.
- Fixed Issue 44 : UtilizationModelPlanetLabelMemory: use a global constant to define the size of the data field: a new constructor for the classes, allowing definition of data size, was added.
- Fixed Issue 49 : Wrong calculation of debt during migrationL: all references to debt from Datacenter and its subclasses were removed.

Assets 4

| File | Size | Last Updated |
|-----------------------|---------|--------------|
| cloudsim-3.0.3.tar.gz | 9.9 MB | Mar 19, 2015 |
| cloudsim-3.0.3.zip | 13.1 MB | Mar 19, 2015 |
| Source code (zip) | | May 2, 2013 |
| Source code (tar.gz) | | May 2, 2013 |

Step 3: Download Apache Commons Math 3.6.1 zip file. It is required as it provides a faster, more accurate, portable alternative to the regular Math and StrictMath classes for large-scale computation in java files.

Download Apache Commons Math

Using a Mirror

We recommend you use a mirror to download our releases builds, but you may verify the integrity of the downloaded files using signatures downloaded from our main distributions directories. Recent releases (all files) may not yet be available from all the mirrors.

You are currently using <https://dist.apache.org>. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are backup mirrors at the end of the mirror list that should be available.

Other mirror: <http://ccnchost.apache.org> | Change

It is essential that you verify the integrity of download files, preferably using the [HTTP signature](#). Most testing tools using the [Apache TestKit](#) framework will do this automatically.

The [LICENSE](#) file contains the public PGP keys used by Apache Commons developers to sign releases.

Apache Commons Math 3.6.1 (requires Java 5+)

Binaries

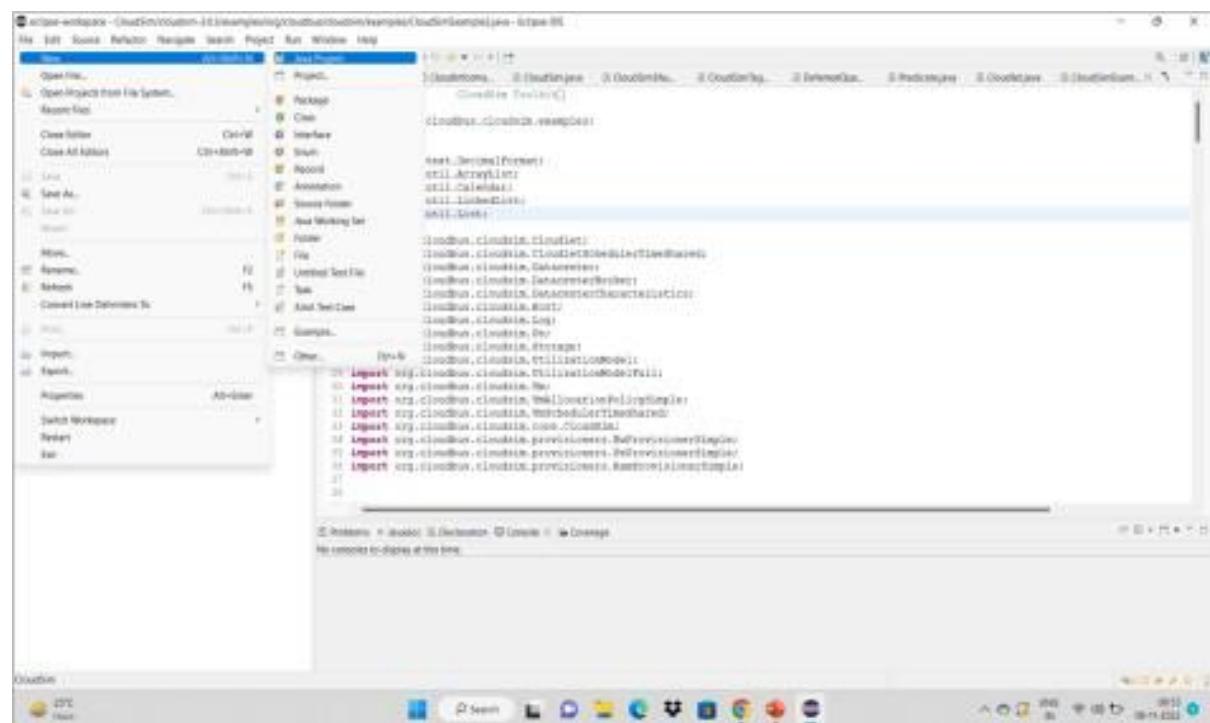
| | |
|-----------------------------|--------|
| commons-math3-3.6.1-bin.jar | Binary |
| commons-math3-3.6.1-bin.zip | Binary |

Source

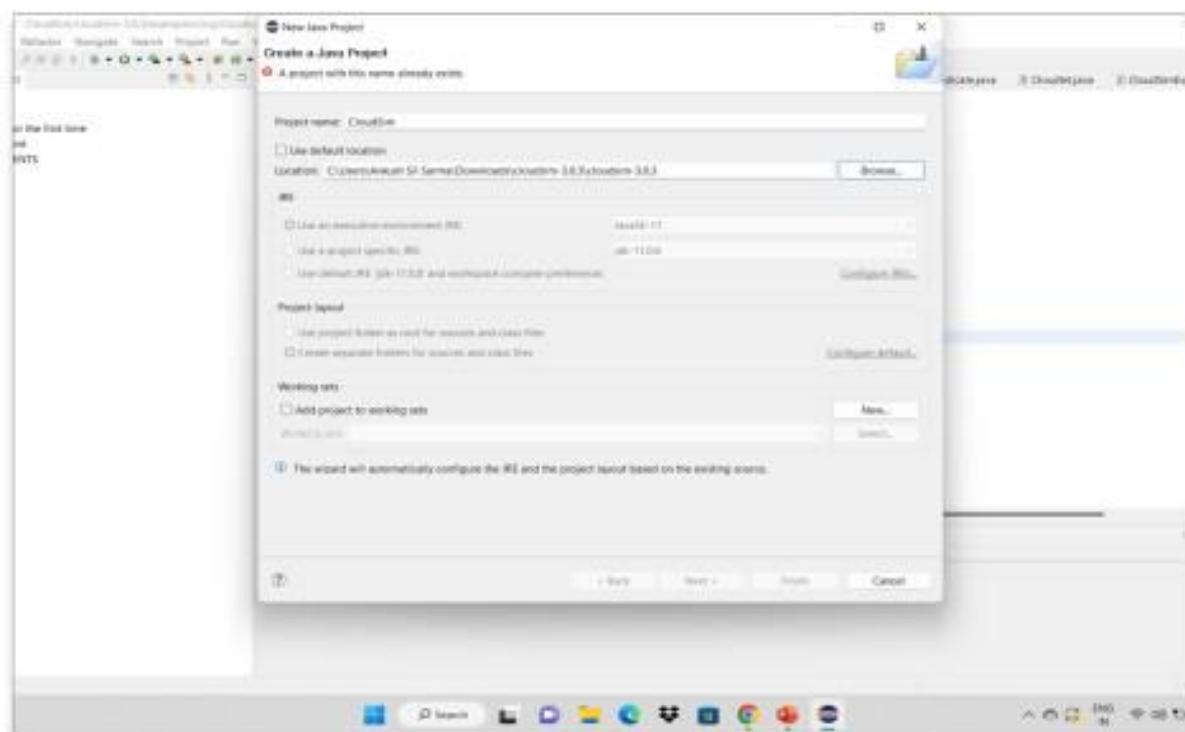
| | |
|-----------------------------|--------|
| commons-math3-3.6.1-src.jar | Source |
| commons-math3-3.6.1-src.zip | Source |

Archives

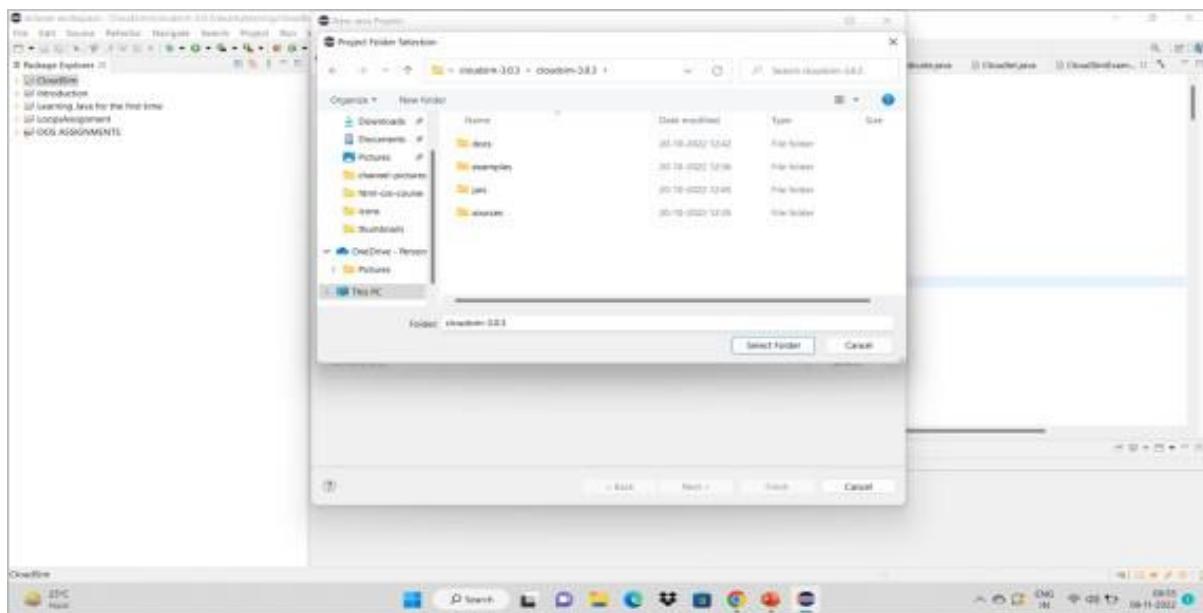
Step 4: Open Eclipse IDE and create a new Java Project.



Step 5: The above-mentioned Java Project should be created with the location of the previously downloaded and extracted CloudSim 3.0.3 folder.

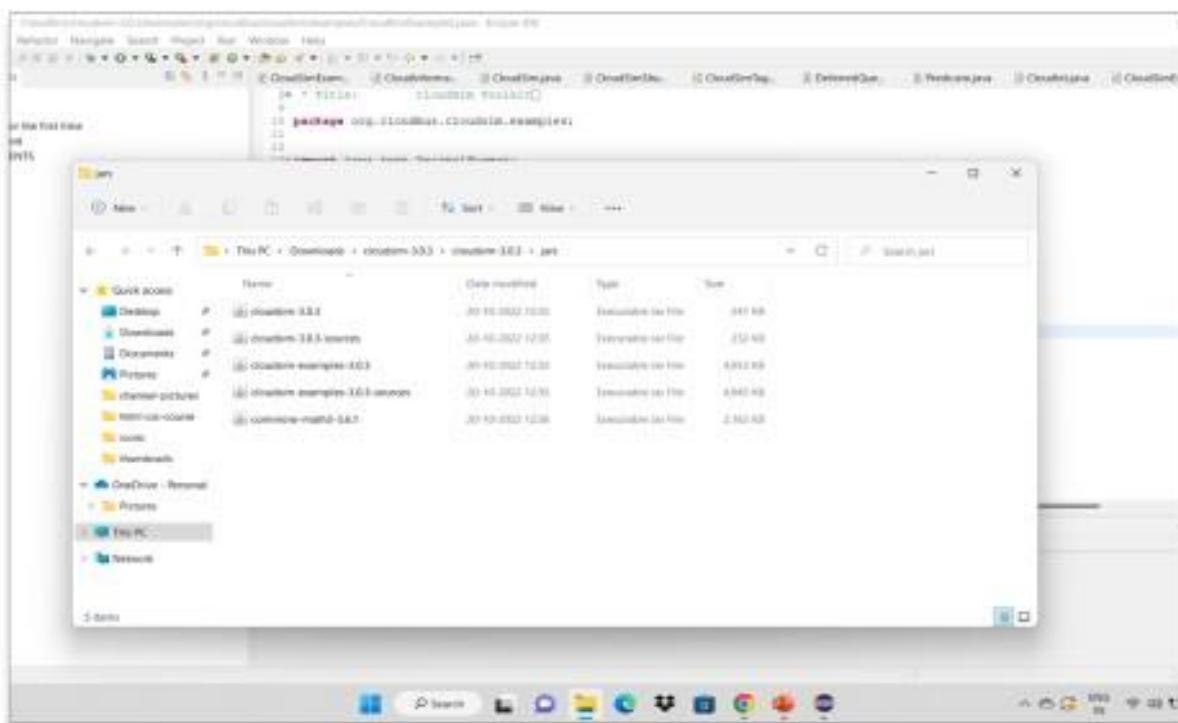


Select name of the project as mentioned and extract CloudSim folder



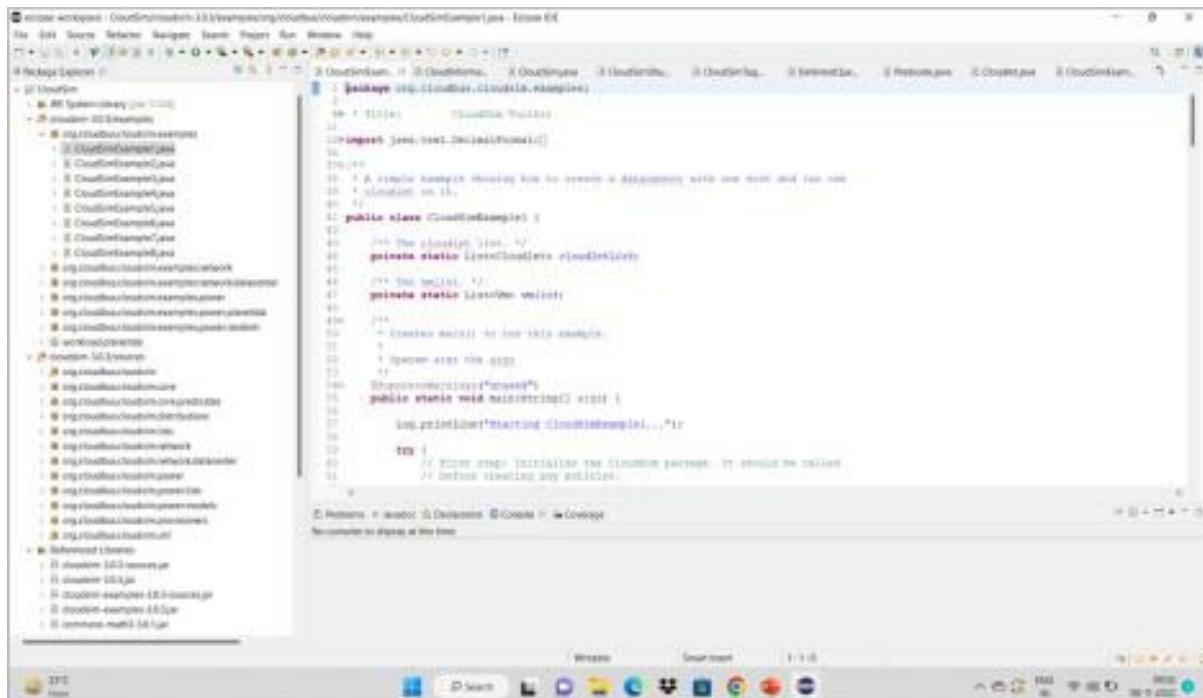
Selecting the CloudSim 3.0.3 folder

Step 6: The JAR file from the extracted Apache Commons Math 3.6.1 folder needs to be added to the JAR files of CloudSim.



Jar files of Apache Commons Math extracted to the Jar files of CloudSim

Step 7: Now the CloudSim Environment has been setup in the Eclipse IDE.

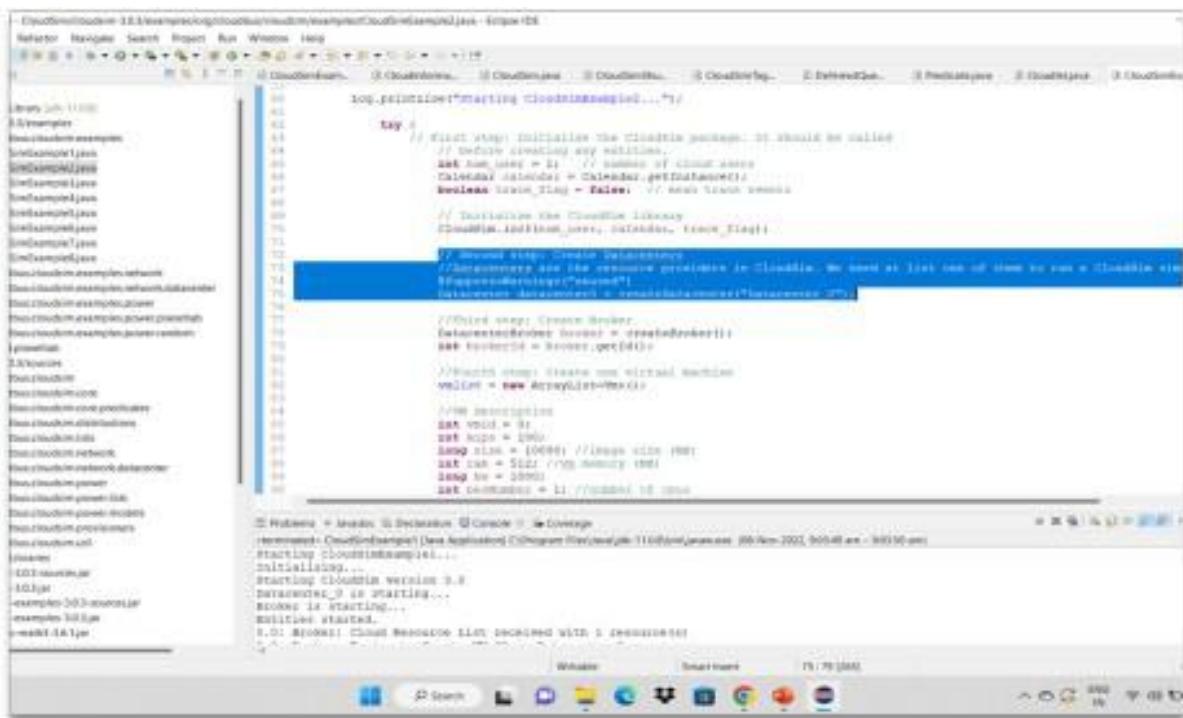
A screenshot of the Eclipse IDE interface. The left sidebar shows a package explorer with several projects listed under 'CloudSim'. One project, 'CloudSimExample', is expanded, showing its contents. The right side of the screen displays a code editor with Java code. The code is a simple example for creating a datacenter with one host and two VMs. It includes imports for 'CloudSim' and 'Cloudlet', defines a class 'CloudSimExample', and contains a main method with code to initialize the simulation and create a datacenter.

```
1 package org.cloudsim.examples;
2
3 import java.util.ArrayList;
4
5 /**
6 * A simple example showing how to create a datacenter with one host and two VMs
7 * @author maziar
8 */
9
10 public class CloudSimExample {
11
12     /* The cloudlet size. */
13     private static final int cloudletSize = 100;
14
15     /* Create a datacenter to run this example. */
16     /* Open port 8080 for UI. */
17     /* Start the simulation. */
18     /* Print the starting cloudSim instance. */
19     /* Turn stage initializing the simulation package. It should be called
20      before creating any entities. */
21
22 }
23
24
25 /**
26 * @param args
27 */
28 public static void main(String[] args) {
29     System.out.println("Starting cloudSim...");
```

CloudSim Environment Has Been Setup

Now Creating Datacenters, Virtual Machines, And Cloudlets In The CloudSim Environment And Checking Its Output

Step 1: We open CloudSimExample2.java from the library on the left and create a data centre first.



Creating a datacenter in CloudSimExample2.java

Step 2: The initial configuration of one of VM(Virtual machine) is done i.e mips(million instructions), ram(size of RAM), bw(bandwidth), etc. Here we create 4 VMs which are initialized with different configuration and added to vmlist, which is the array list created to store all the 4VMs.

The screenshot shows the Eclipse IDE interface with the following details:

- Project Explorer:** Shows files like `CloudBeesExample.java`, `CloudBeesExampleTest.java`, `CloudBeesExampleTest.xml`, `CloudBeesExample.war`, and `CloudBeesExample.wadl`.
- Code Editor:** Displays the `CloudBeesExample.java` file with Java code for creating a cloud instance and starting a worker.
- Terminal:** Shows the command line output of running the application, including the log message "Worker is starting..." and "CloudBees Example received with 1 parameters".

Configuring Virtual Machine

Step 3: We create 8 cloudlets that are initialized with different properties or characteristics i.e id length, outputsize, and filesize.

Creating Cloudlets With Different Characteristics

Step 4: Now the VM-cloudlet binding is done using the broker.

```
CloudSimSimulator>10.ls -l /home/CloudSimUser/Downloads/CloudSimSampled.java -line 100
File: /home/CloudSimUser/Downloads/CloudSimSampled.java
Line: 100
    Cloudlet cloudlet = new CloudletCloudlet(input, workload, utilizationRate, utilizationRate, utilizationModel, utilizationModel,
        cloudlet.setCloudletID(10000000000L);

    //add the Cloudlets to the list
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);
    cloudletList.addCloudlet(cloudlet);

    //remove cloudlet list as the worker
    broker.removeCloudletList(cloudletList);

    //start the cloudlets to the worker. This way the broker
    //will submit the request according only to the specific VM
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());
    broker.startCloudletWorkload(cloudlet.getCloudletID(),null.getTID());

    // sixth step: create the simulation
    simulation.startSimulation();

    // final step: print results after simulation is over
    brokerCloudletList = broker.getCloudletReceivedList();
    Cloudlet.stopSimulation();
    printCloudletListInWhitelist;

```

File used - https://drive.google.com/file/d/1p_mEGiTTeCCTv3I83cKPKY-h3PZh7DfhD/view

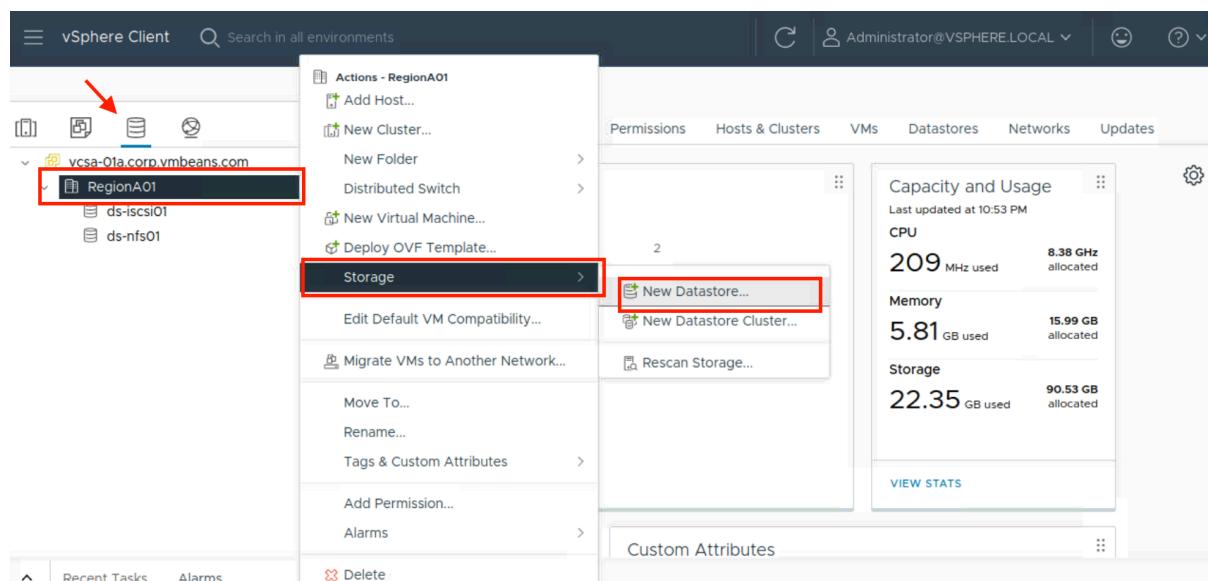
P3: Creation of VMFS and NFS data Store on HOL 2410

Creation of VMFS: (Virtual machine file system) Imagine making a special space on your computer where you can store and run virtual machines. This is like creating a playground for your virtual machines to play in.

NFS Data Store: Now, think of another space, like a shelf, where you can keep important stuff for your virtual machines. NFS (Network File System) is like a magic shelf that helps your virtual machines access the things they need.

HOL 2410: This is like the address or name of the place where you're doing all this—like saying, "I'm doing these things in Room 2410." So, in simple words, it's like setting up a play area for your virtual machines and a special shelf for their important things in a place called HOL 2410.

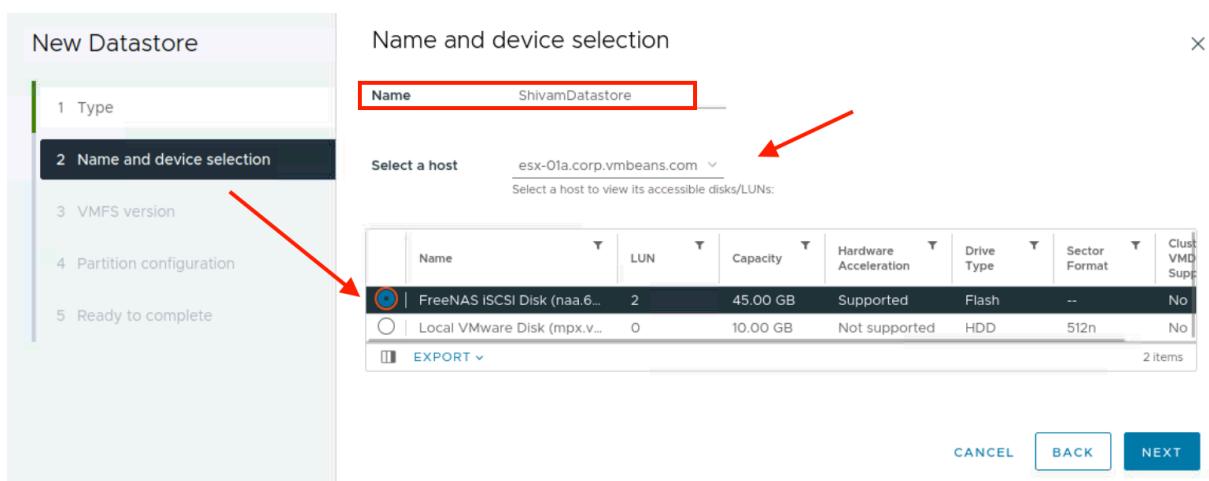
Step 1 - Go to datastore and Right Click on RegionA01- Storage - New datastore



Step 2 - Select type VMFS

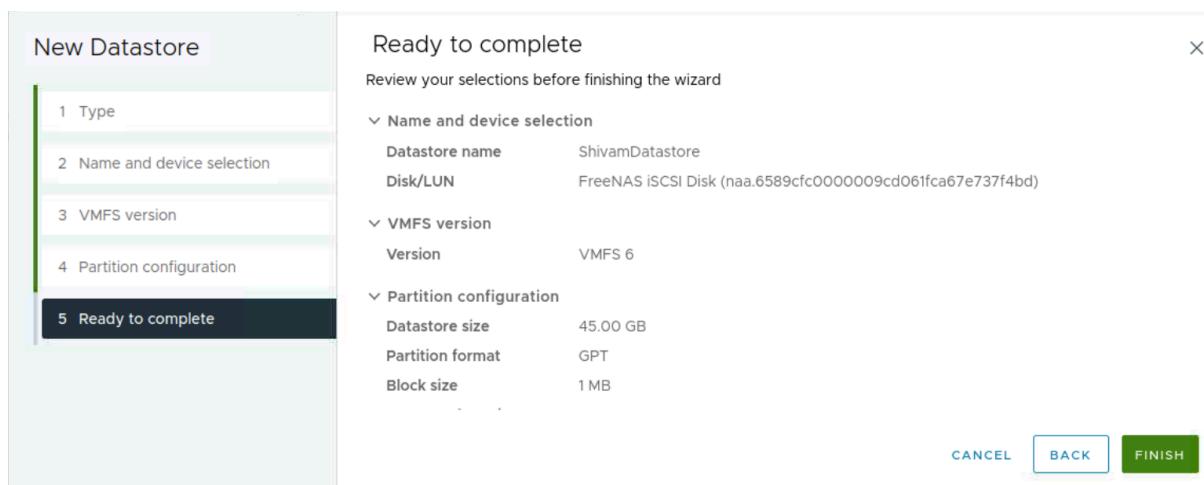


Step 2 - Name and device selection - name your datastore - Select host

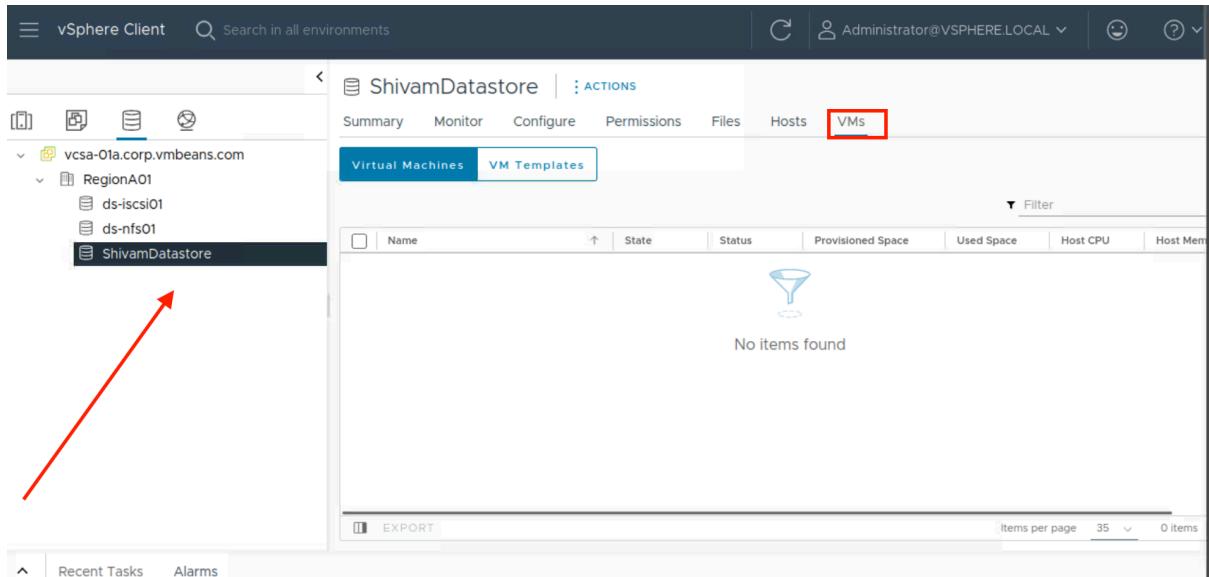


Step 3 - Select VMFS Version - **VMFS 6**

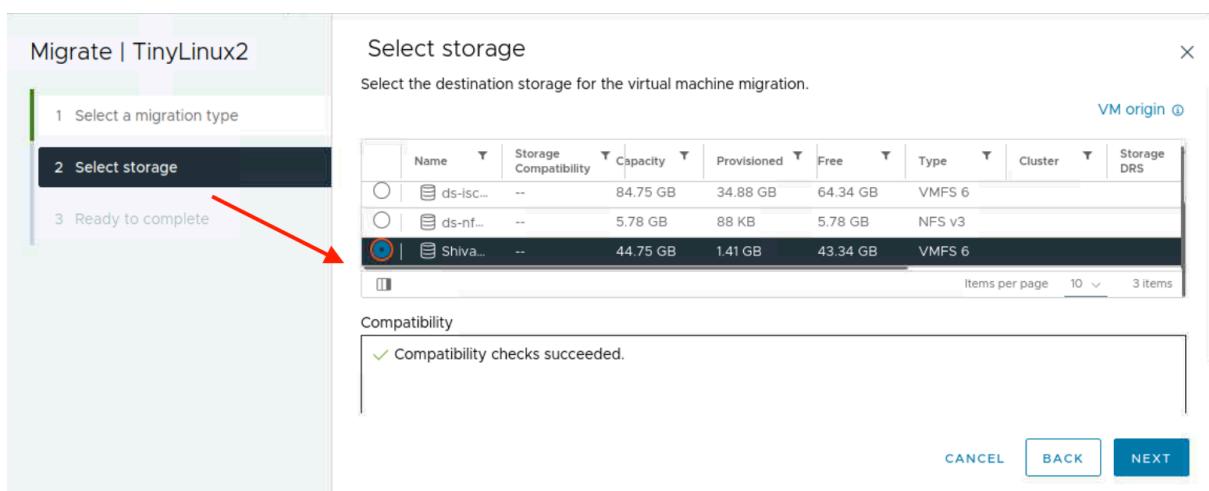
Step 4 - Partition configuration - Ready to complete.



Step 5 - Your datacenter is ready you can see it from here also you can add some virtual machine to this datastore from - VM - Migrate - Select storage



Step 6 - Migrate a VM to it - Select Migration type - Select storage - Ready to complete



Step 7 - Now your Virtual machine is migrated and you can see it in your datastore now

The screenshot shows the vSphere Web Client interface. On the left, the navigation tree displays a host (vcsa-01a.corp.vmbeans.com) with a RegionA01 folder containing two datastores: ds-iscsi01 and ds-nfs01. Below them is the newly created ShivamDatastore. On the right, the main content area is titled 'ShivamDatastore' and shows the 'VMs' tab selected. A table lists the virtual machines, with one entry for 'TinyLinux2'. The table includes columns for Name, State, Status, Provisioned Space, Used Space, Host CPU, and Host Memory. A red arrow points from the left margin to the 'VMs' tab in the top navigation bar. Another red arrow points from the right margin to the 'Name' column header in the table.

Step 8 - Now lets create an **NFS datastore go through same procedure** Go to datastore and Right Click on RegionA01- Storage - New datastore. But this time choose on NFS datastore

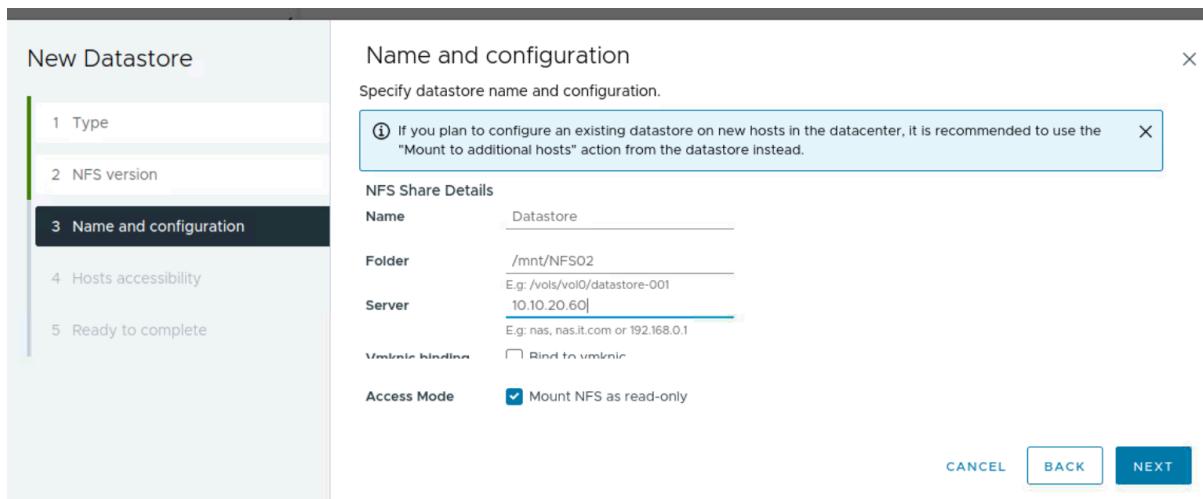
The screenshot shows the 'New Datastore' wizard. Step 1, 'Type', is currently selected. The wizard asks to 'Specify datastore type' and lists four options: 'VMFS' (radio button is not selected), 'NFS' (radio button is selected and highlighted with a blue circle), 'vVol' (radio button is not selected), and 'vVols' (radio button is not selected). The 'NFS' option is described as 'Create an NFS datastore on an NFS share over the network.' At the bottom right, there are 'CANCEL' and 'NEXT' buttons. A red arrow points to the 'NFS' radio button. The left sidebar shows the progress steps: 1. Type (selected), 2. NFS version, 3. Name and configuration, 4. Hosts accessibility, 5. Ready to complete.

Step 9 - Select NFS Version -

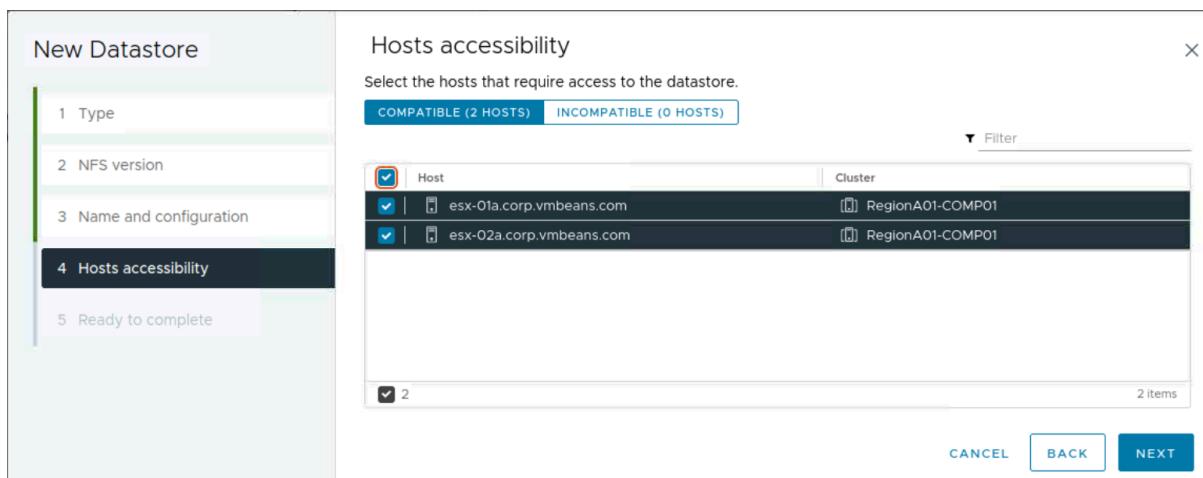
Name - name your datastore

Select folder - /mnt/NFS02

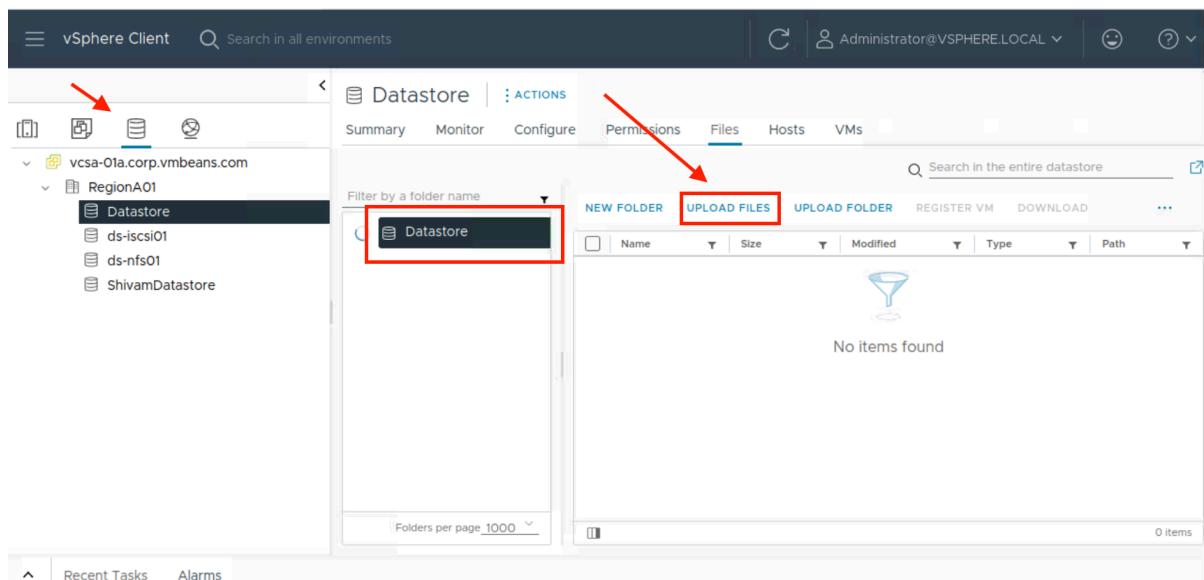
IP - 10.10.20.60



Step 10 - Host accessibility - Select both the host and then ready to complete



Step 11 - Now you have created NFS datastore you can upload any file or Folders there

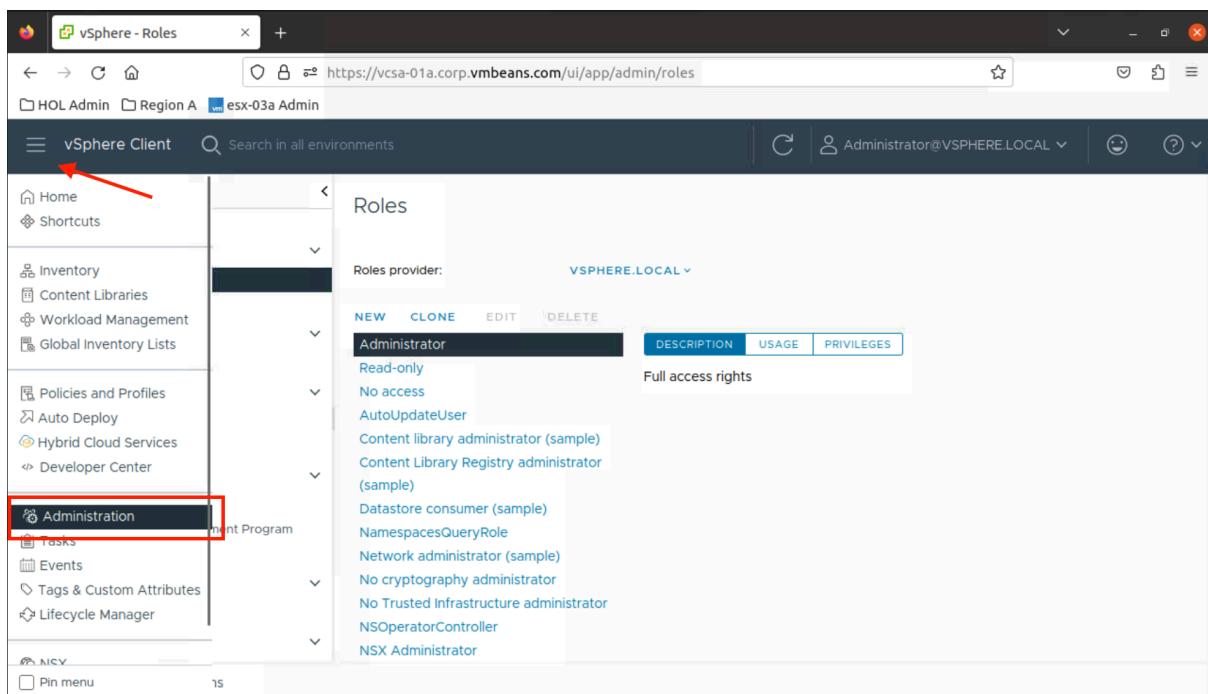


P4: Creation of Single Sign-on HOL 2410 CSE427

Single sign-on (SSO) is an important cloud security technology that reduces all user application logins to one login for greater security.

Q1. You are an admirer of the data centre. You want to enable the administrator account that is named after your company "zeta". do all the necessary steps to enable the account ?

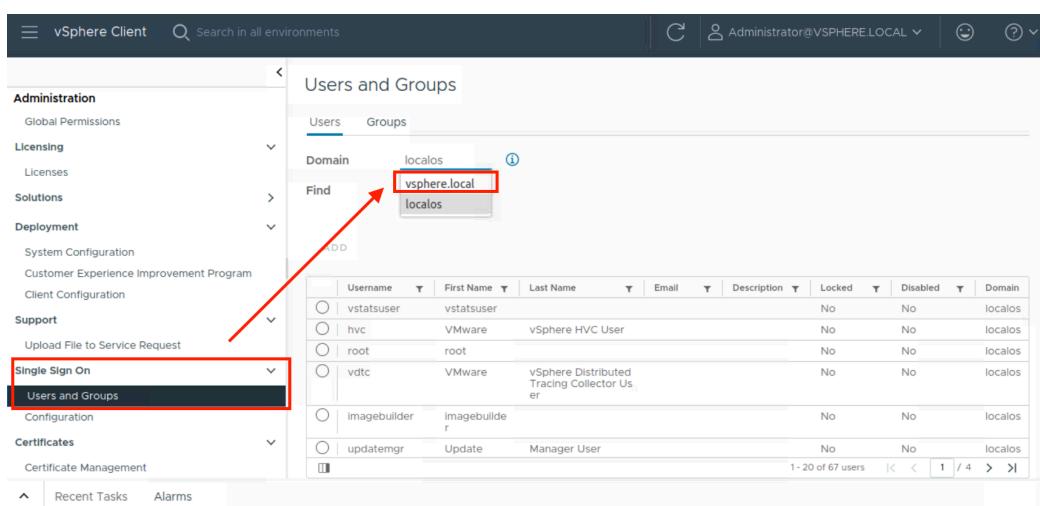
Step 1 - Click on three line left tip side and *Click on Administration*



The screenshot shows the vSphere Client interface in a web browser. The left sidebar has a 'Navigation' section with various links like Home, Inventory, Content Libraries, etc., and a 'Administration' section which is highlighted with a red box. A red arrow points from the text above to this 'Administration' link. The main content area is titled 'Roles' and shows a list of roles with their descriptions and privileges. The 'Administrator' role is selected, and its details are shown in the center panel.

| Role | Description | Privileges |
|---|---|--------------------|
| Administrator | Read-only No access AutoUpdateUser Content library administrator (sample) Content Library Registry administrator (sample) | Full access rights |
| Datastore consumer (sample) | | |
| NamespacesQueryRole | | |
| Network administrator (sample) | | |
| No cryptography administrator | | |
| No Trusted Infrastructure administrator | | |
| NSOperatorController | | |
| NSX Administrator | | |

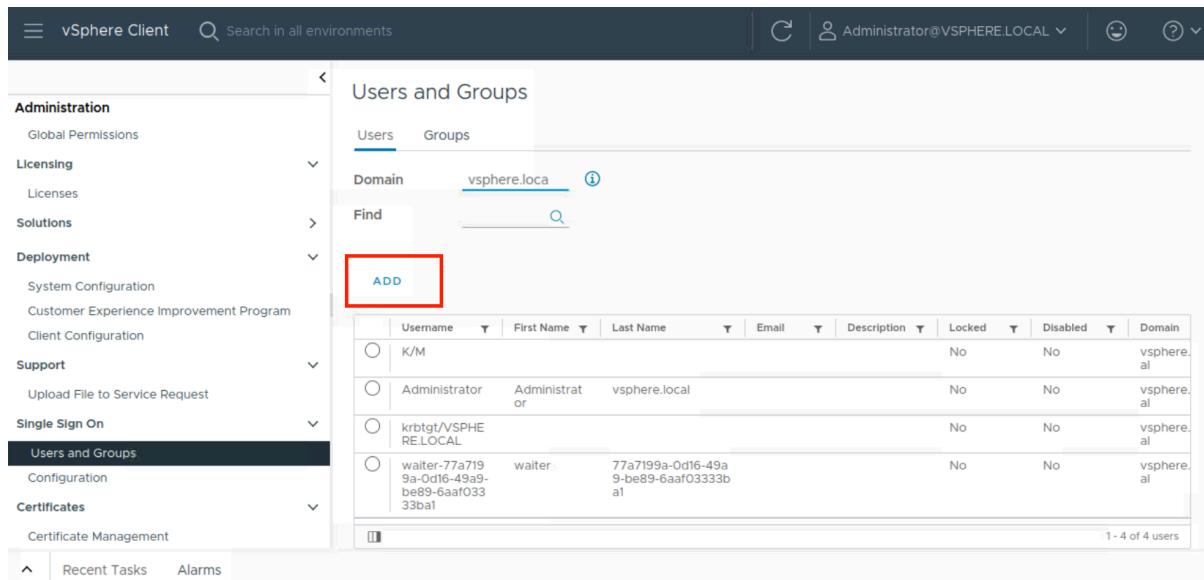
Step 2 - Scroll down - Click on Single sign on - User and groups - Select vSphere local in Domain



The screenshot shows the 'Users and Groups' section of the vSphere Client. The left sidebar has a 'Single Sign On' section with a 'Users and Groups' link, which is highlighted with a red box. A red arrow points from the text above to this 'Users and Groups' link. The main content area shows a table of users and their details, including their domain. One user, 'vsphere.local', is highlighted with a red box in the search results.

| Username | First Name | Last Name | Email | Description | Locked | Disabled | Domain |
|--------------|--------------|--|-------|-------------|--------|----------|---------|
| vstsuser | vstsuser | | | | No | No | localos |
| hvc | VMware | vSphere HVC User | | | No | No | localos |
| root | root | | | | No | No | localos |
| vdtc | VMware | vSphere Distributed Tracing Collector User | | | No | No | localos |
| Imagebuilder | Imagebulilde | r | | | No | No | localos |
| updatemgr | Update | Manager User | | | No | No | localos |

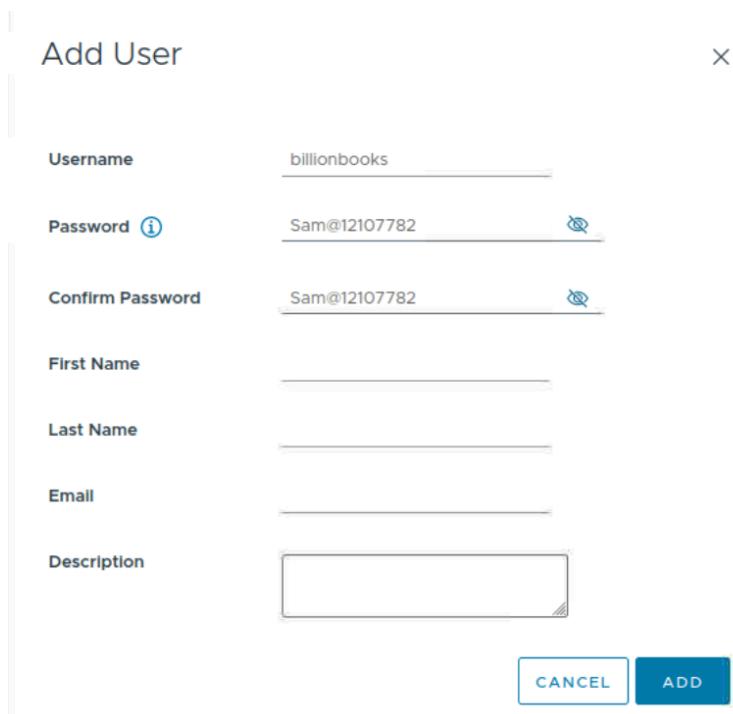
Step 3 - click on **Add user**



The screenshot shows the vSphere Client interface. On the left, there's a navigation sidebar with various sections like Administration, Licensing, Solutions, Deployment, Support, Single Sign On, and Users and Groups (which is currently selected). The main pane is titled 'Users and Groups' and shows a table of existing users. At the top of the main pane, there's a search bar and a domain selector set to 'vsphere.local'. A large red box highlights the 'ADD' button, which is located just below the search bar. The user table has columns for Username, First Name, Last Name, Email, Description, Locked, Disabled, and Domain. There are four users listed.

| | Username | First Name | Last Name | Email | Description | Locked | Disabled | Domain |
|-----------------------|---|---------------|---------------|------------------------------------|-------------|--------|----------|---------------|
| <input type="radio"/> | K/M | | | | | No | No | vsphere.local |
| <input type="radio"/> | Administrator | Administrator | vsphere.local | | | No | No | vsphere.local |
| <input type="radio"/> | krbtgt/VSHERE.LOCAL | | | | | No | No | vsphere.local |
| <input type="radio"/> | waiter-77a7f99a-0d16-49a9-be89-6aa0333ba1 | waiter | | 77a7f99a-0d16-49a9-be89-6aa0333ba1 | | No | No | vsphere.local |

Step 4 - Create **user id and Password** and Confirm Password.



The screenshot shows the 'Add User' dialog box. It has several input fields: 'Username' (billionbooks), 'Password' (Sam@12107782), 'Confirm Password' (Sam@12107782), 'First Name' (empty), 'Last Name' (empty), 'Email' (empty), and 'Description' (empty). At the bottom, there are 'CANCEL' and 'ADD' buttons. The 'ADD' button is highlighted with a blue box.

Step 5 - Select **user** and then go to Groups

Users and Groups

Users Groups

Domain vsphere.local

Find

ADD EDIT DELETE MORE

| Username | First Name | Last Name | Email | Description | Locked | Disabled | Domain |
|--|---------------|---------------|-------------------------------------|-------------|--------|----------|---------------|
| Administrator | Administrator | vsphere.local | | | No | No | vsphere.local |
| krbtgt/VSPHERE.LOCAL | | | | | No | No | vsphere.local |
| waiter-77a7199a-0d16-49a9-be89-6aaf0333ba1 | waiter | | 77a7199a-0d16-49a9-be89-6aaf0333ba1 | | No | No | vsphere.local |
| billionbooks | | | | | No | No | vsphere.local |

1 - 5 of 5 users

Step 6 - Select **role of user** and click on **Edit**

ironments

Administrator@VSPHERE.LOCAL

Users and Groups

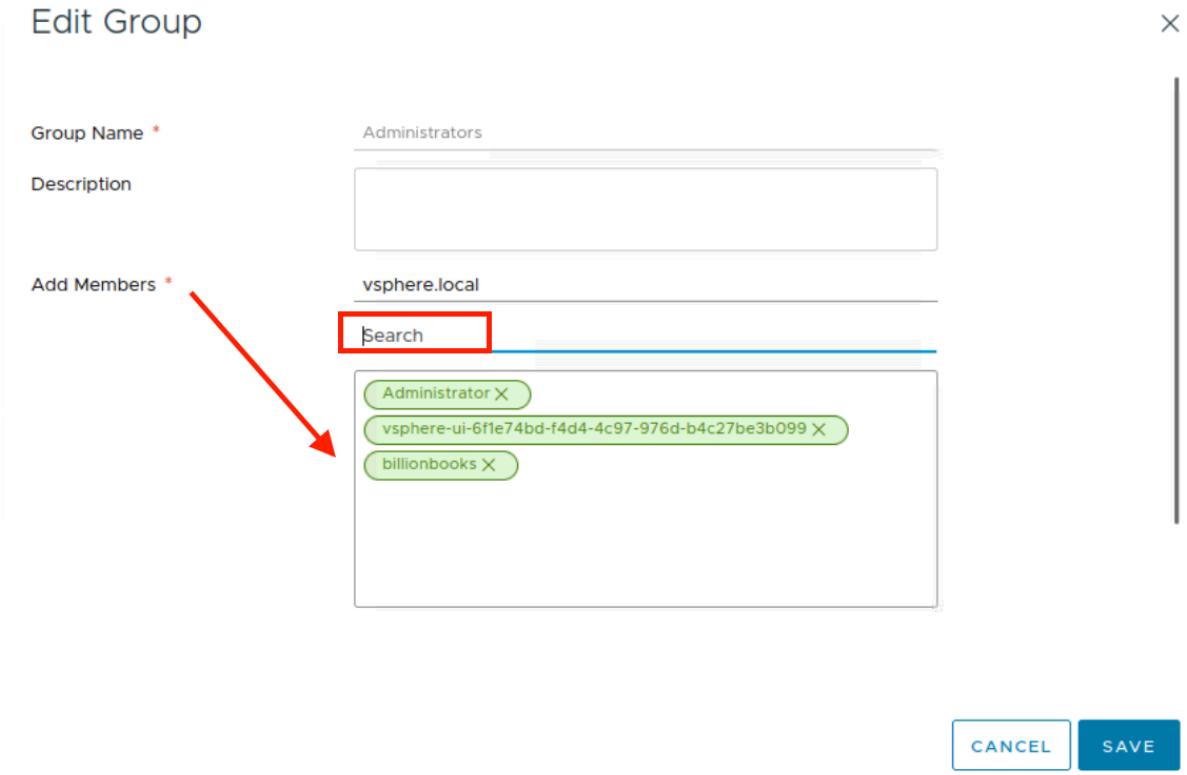
Users Groups

Find

ADD EDIT DELETE

| Group Name | Description |
|---------------------------------|---|
| Administrators | Analytics Service Administrators. |
| AutoUpdate | Users allowed to perform update related operations |
| CAAdmins | |
| ComponentManager.Administrators | Component Manager Administrators |
| DCAdmins | |
| DCClients | |
| ExternalIDPUsers | Well-known external IDP users' group, which registers external IDP users as guests. |
| LicenseService.Administrators | License Service Administrators |

Step 7 - Add your user from *add Member* section

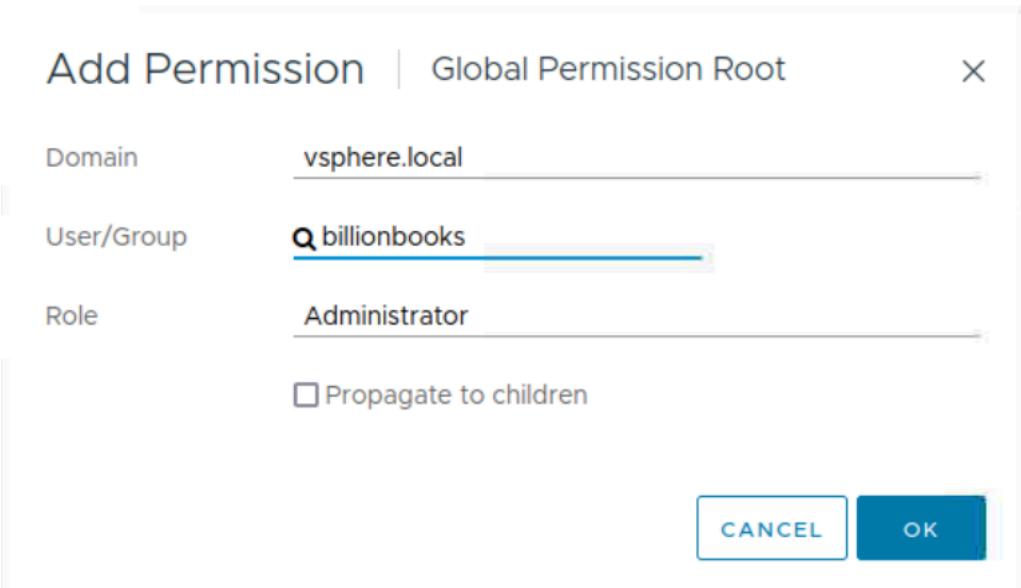


Step 8 - Again Click on three line left tip side and Click on **Global Permission > Access Controls**

The screenshot shows the vSphere Client interface. On the left, the navigation sidebar is expanded, with 'Access Control' selected and 'Global Permissions' highlighted with a red box. The main panel displays the 'Global Permissions' screen, which lists various users and groups with their permissions. The 'Permissions provider' is set to 'VSPHERE.LOCAL'. The list includes:

| User/Group |
|---|
| VSPHERE.LOCAL\Administrator |
| VSPHERE.LOCAL\Administrators |
| VSPHERE.LOCAL\AutoUpdate |
| VSPHERE.LOCAL\CAAdmins |
| VSPHERE.LOCAL\certificateauthority-6f1e74bd-f4d4-4c97 |
| VSPHERE.LOCAL\NsxAdministrators |
| VSPHERE.LOCAL\NsxAuditors |
| VSPHERE.LOCAL\NsxViAdministrators |
| VSPHERE.LOCAL\ReadOnlyUsers |

Step 9 - Click on add Permissions and search for your username in *User and Group* section

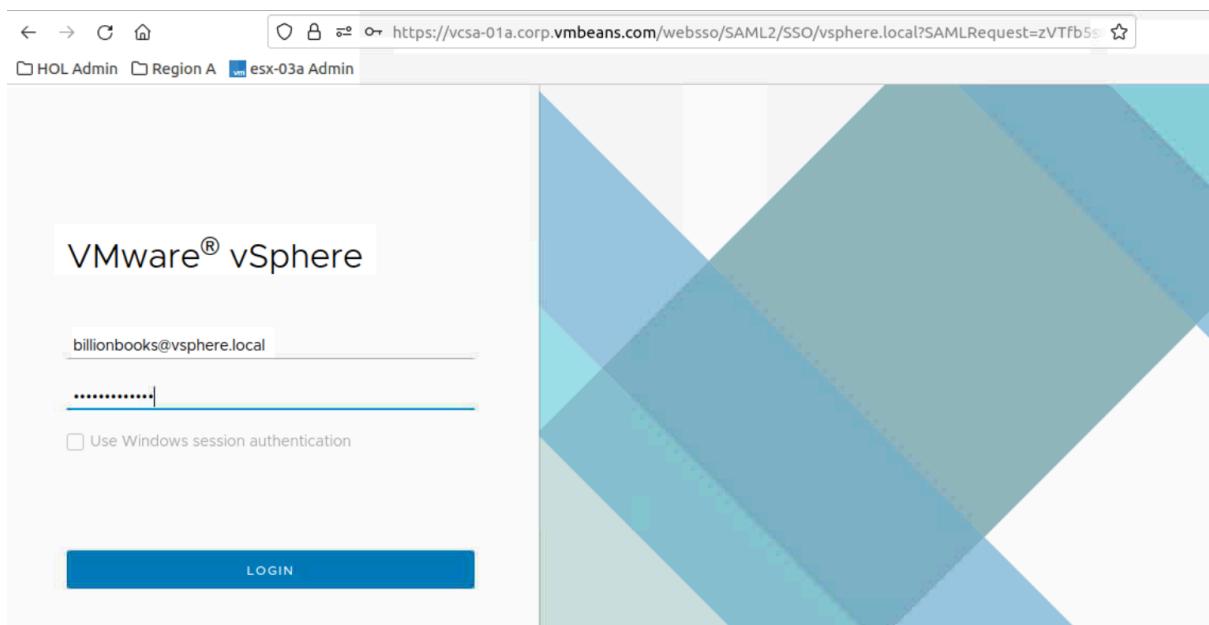


Step 10 - Click on *logout* from here

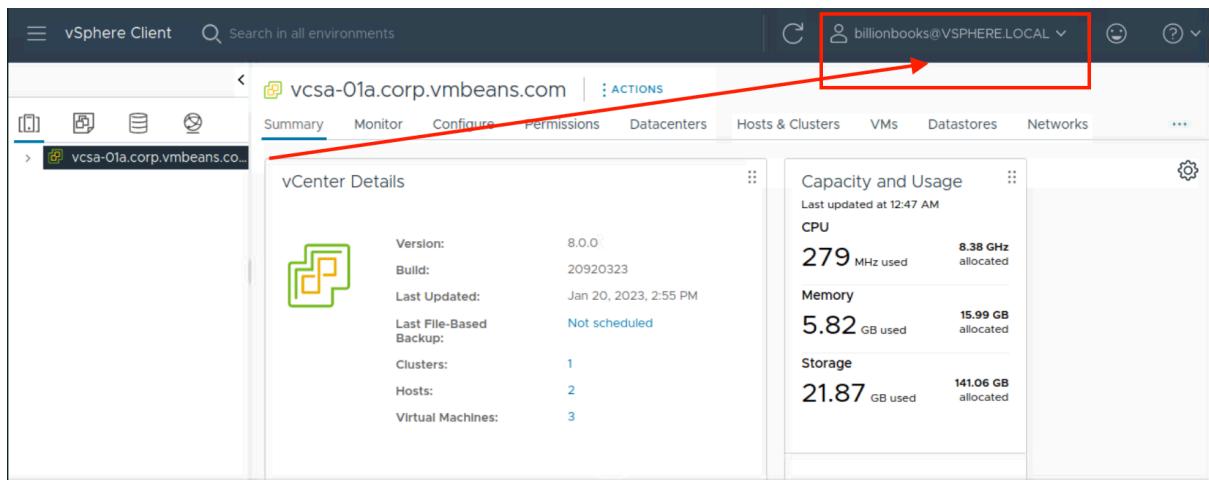
The screenshot shows the 'Global Permissions' interface in the vSphere Client. The left sidebar is collapsed. The main area shows a table of permissions with columns for User/Group, Role, and several NSX-related roles like NSX Administrator and NSX Auditor. A red arrow points from the top right towards the user dropdown menu, which is highlighted with a red box. Another red arrow points from the top left towards the 'Permissions provider' dropdown, which is also highlighted with a red box.

| User/Group | Role |
|--|----------------------|
| VS SPHERE.LOCAL\Administrator | Administrator |
| VS SPHERE.LOCAL\Administrators | Administrator |
| VS SPHERE.LOCAL\AutoUpdate | AutoUpdateUser |
| VS SPHERE.LOCAL\billionbooks | Administrator |
| VS SPHERE.LOCAL\CAAdmins | Read-only |
| VS SPHERE.LOCAL\certificateauthority-6f1e74bd-f4d4-4c97-976d-b4c27be3b0... | Read-only |
| VS SPHERE.LOCAL\NsxAdministrators | NSX Administrator |
| VS SPHERE.LOCAL\NsxAuditors | NSX Auditor |
| VS SPHERE.LOCAL\NsxVIAdministrators | NSX VI Administrator |

Step 11 - Now login in the system with your *new Id and Password* .

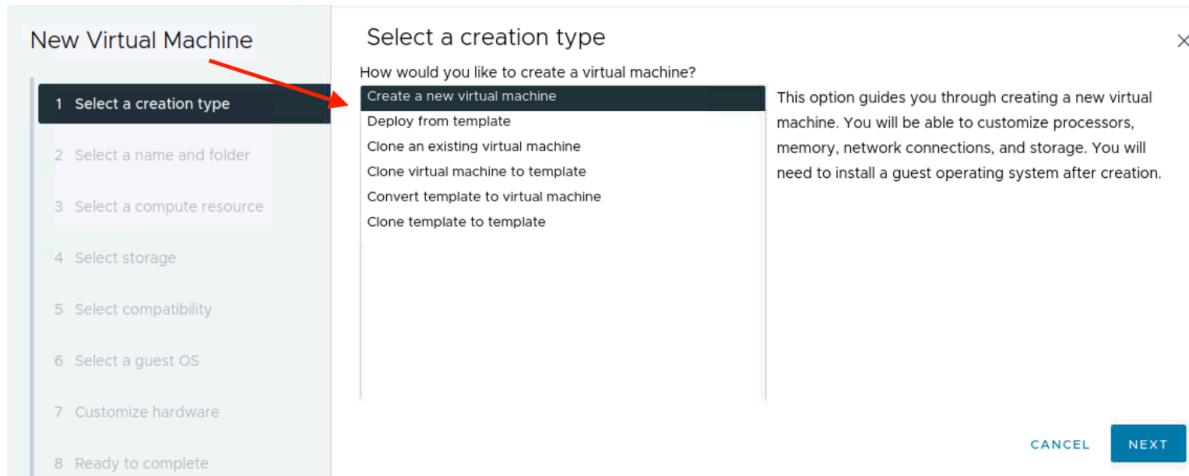


Step 12 - You have been logged in with your user with administration role .



P5: How to Create a Virtual Machine Using vSphere Client 7.0 | Vcenter Server 7.0.1

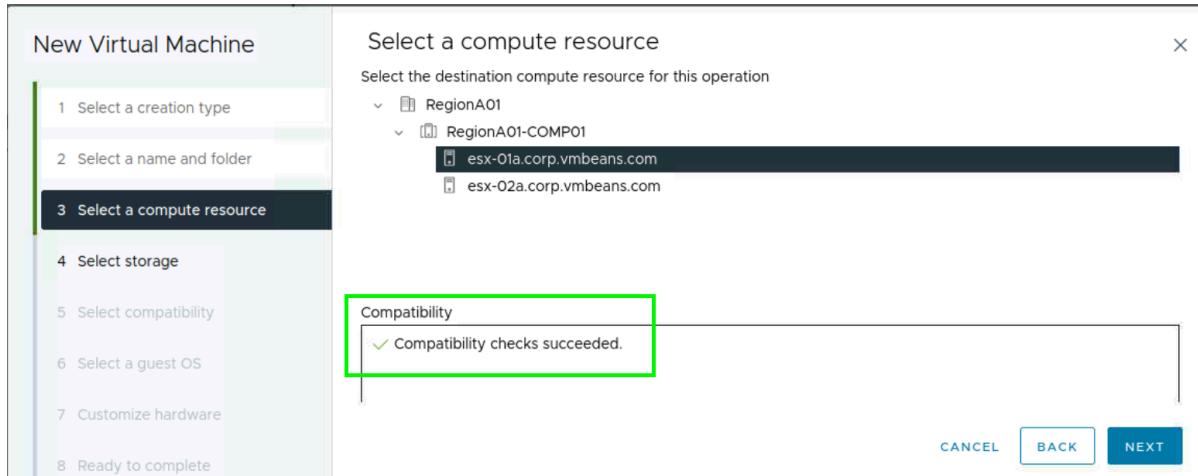
Step 1- Right Click on esx server - Select New virtual Machine - select on Create new Virtual Machine



Step 2- Select a creation type. Click **Create a new virtual machine** because you need to create a new VM from scratch. If you need to clone a VM or deploy a VM from a template, choose one of the other options. Click Next at each step to continue.

Step 3. Select a **name and folder**. Enter a name for the new virtual machine. Then select a location for the virtual machine.

Step 4. Select a compute resource. Select the ESXi host to run a new virtual machine. We select this host in the list. **Compatibility checks succeeded** means that everything is correct and you can continue.



Step 5. Select storage. **Select a datastore** where the virtual machine files, including the virtual disk files, will be stored. Make sure that there is enough free space on the selected datastore. In this example, LDS1 datastore is selected.

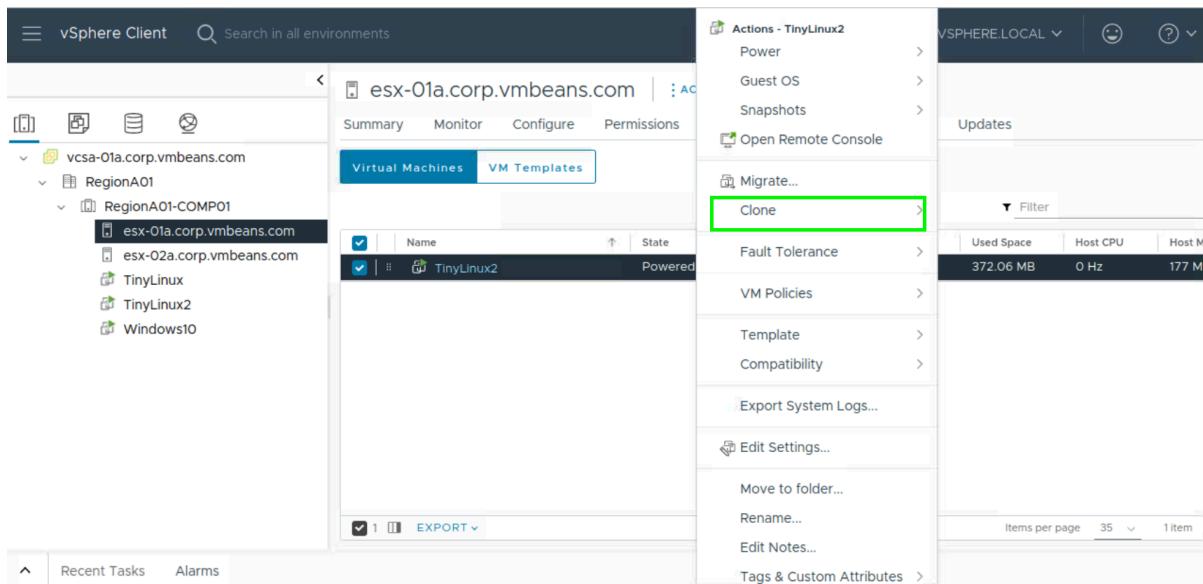
Step 6. Select compatibility. Select compatibility for this virtual machine depending on the ESXi hosts used in your environment. VMware vCenter 7.0.1 can be configured to manage ESXi 7.0, ESXi 6.7 and ESXi 6.5 hosts. The ESXi compatibility level defines the virtual machine hardware version. The ESXi 7.0.1 compatibility level is used for the **VM hardware version 18 and supports all vSphere 7 features**.

Step 7. Select a guest OS. Select a guest OS family and then select a guest OS version. In this example, Windows 10x64 is installed.
Guest OS Family: Windows Guest OS Version: Windows 10 (64-bit)
Selecting the correct guest OS in the list allows the wizard to provide the suitable default configuration of the VM for installing an operating system on the VM.

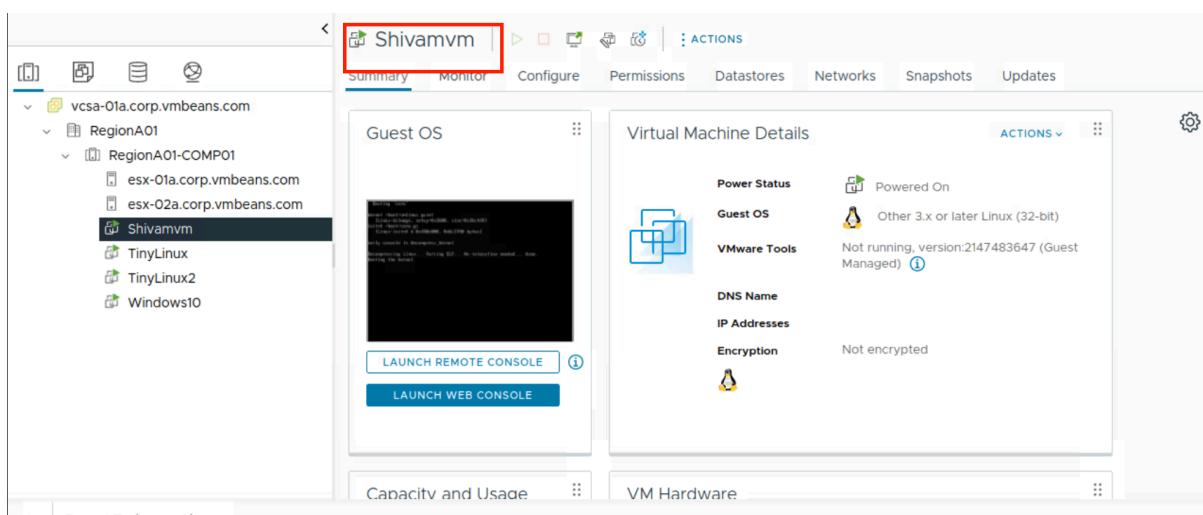
Step 8. Customise hardware. Configure virtual hardware for the virtual machine. Click the type of hardware to expand settings. In most cases, you can leave the default settings except for: CPU – select the number of processors and CPU cores. **Memory – define the amount of RAM. Ready to complete** - Finish to create the new VM.

P6: Cloning, Template and Snapshots of Virtual Machine.

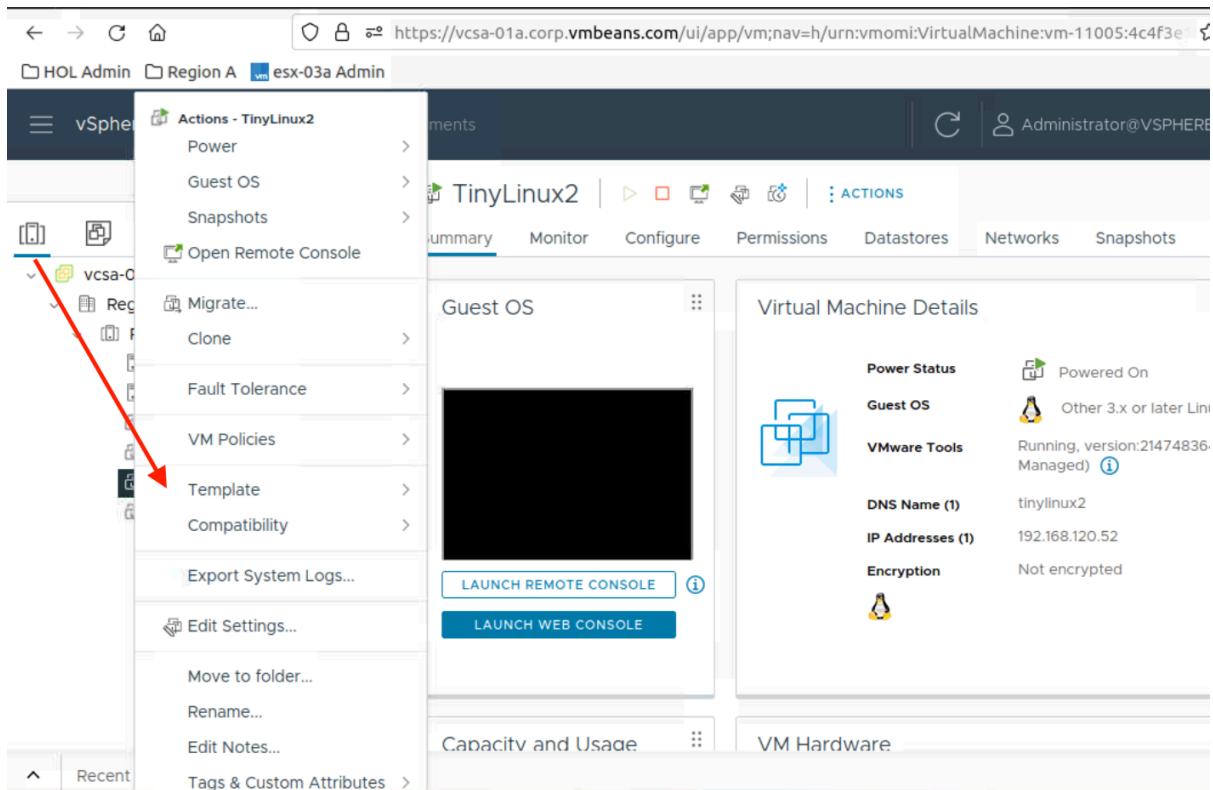
Step 1 Click on host - vm - Here you can see the list of all VM you have made in that host - Right click on that and you can clone it the Virtual machine.



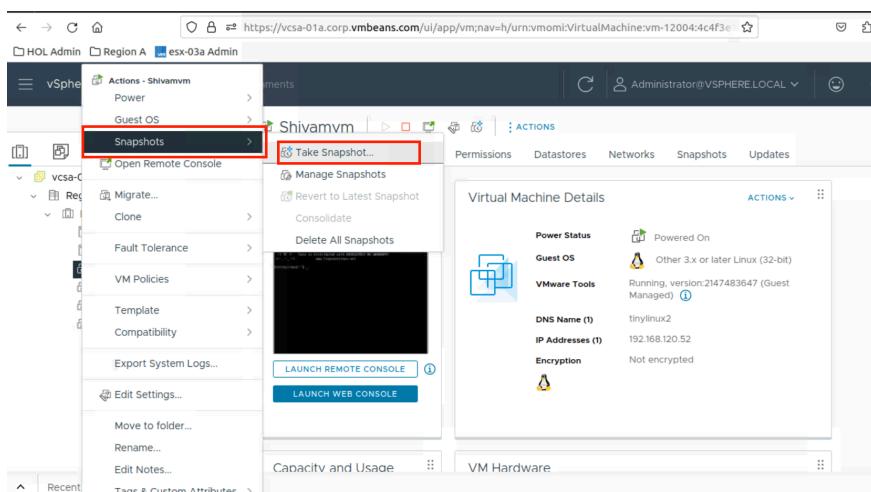
Step 2- Select Name and location of Vm - Select a compute resource - Select storage - Customise clone options - Ready to complete.and click on finish and my virtual machine cloned and Is ready to use .



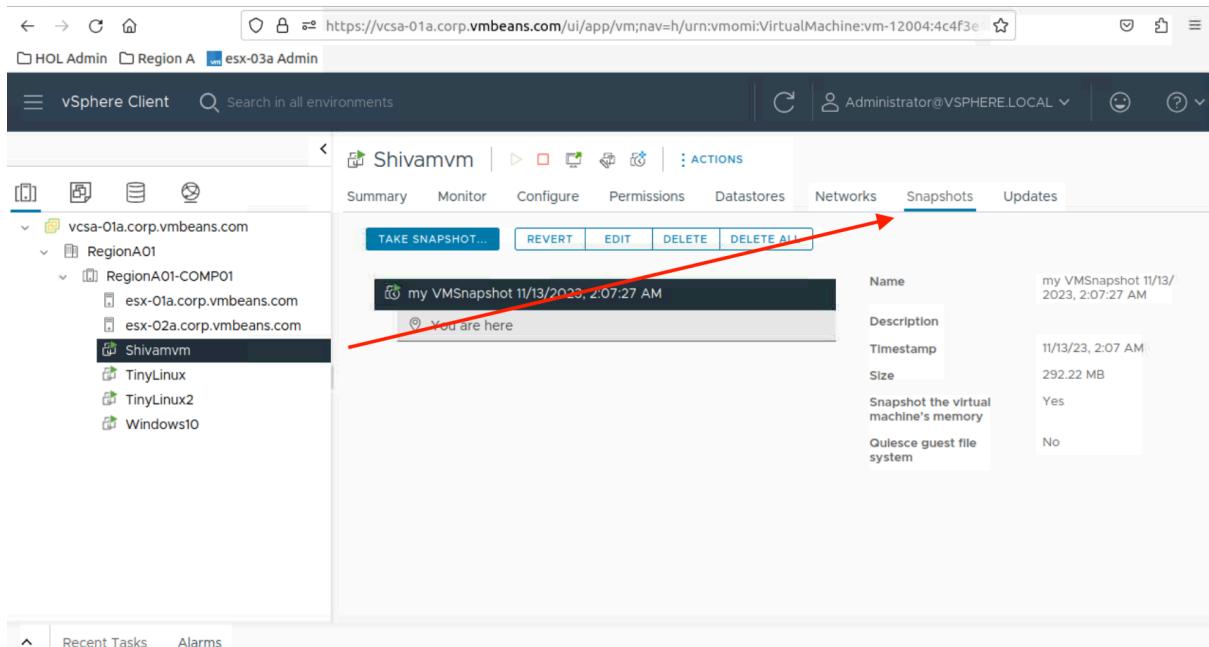
Step 2- but now we want to convert the same cloned virtual machine into template - Select any VM and right click on it - Template - Convert it to template



Step 3- Now you want to take snapshot of any Virtual machine - Select Virtual machine - Right click - Snapshot - Take snapshot - Finish.



Step 4- Select Virtual Machine - Click on snapshots to see all your snapshots



Difference between Cloning , Template and Snapshots

Cloning

Definition: Cloning involves creating an exact duplicate or copy of an existing virtual machine.

Purpose: Cloning is useful for rapidly deploying multiple instances of the same VM. It's often used in scenarios where you need identical configurations for multiple machines, such as in a development or testing environment.

Characteristics: The cloned VM is independent of the original, and changes made to one do not affect the other. Cloning typically results in a separate, standalone VM with its own unique identity (such as a MAC address).

Template:

Definition: A template is a pre-configured, standardised image or blueprint of a virtual machine.

Purpose: Templates are used as a foundation for creating new VMs with consistent configurations. Instead of duplicating an existing VM, you start with a template to ensure a standardised setup.

Characteristics: Templates are often created from a base VM with a desired configuration, and then new VMs are created based on this template. This helps maintain consistency across multiple instances.

Snapshots:

Definition: Snapshots capture the current state and data of a virtual machine at a specific point in time.

Purpose: Snapshots are useful for creating a point-in-time backup or for testing changes. If changes lead to issues, you can revert the VM to the state captured in the snapshot.

Characteristics: Unlike cloning or templates, snapshots are not intended for creating independent VMs. They are more like a "freeze frame" of the VM's state, allowing you to roll back to that state if needed.

Hypervisor is a technology that lets a single physical machine run multiple virtual machines, each with its own operating system.

Type 1 Hypervisor (Bare-Metal):

Installs directly on hardware, no need for an operating system in between and controls hardware resources directly.

Type 2 Hypervisor (Hosted):

Installs on top of an existing operating system and Relies on the host OS for hardware access.

Virtualization is like running multiple entire computers on one machine.

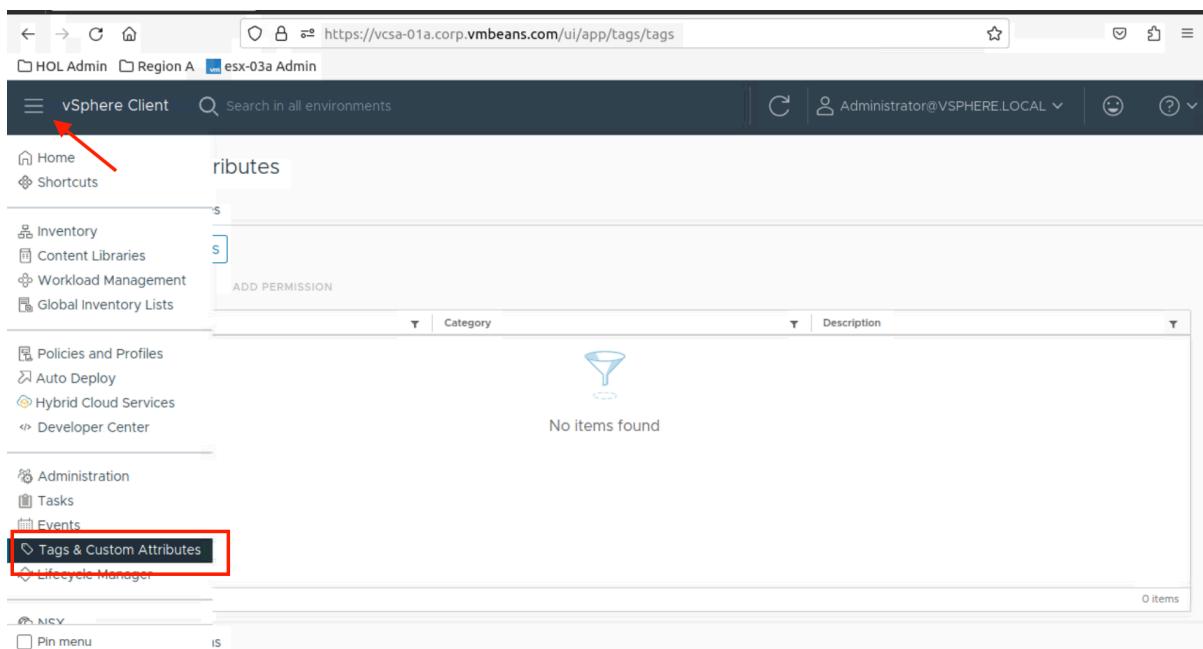
Containers are like separate compartments on that computer, each holding just what a specific application needs.

P7: Tagging and Searching in VM

Tagging in VMs: Adding labels to virtual machines for better organisation and identification.

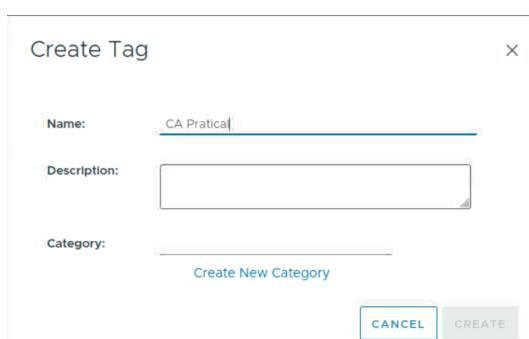
Searching in VMs: Quickly finding virtual machines based on criteria like tags, names, or attributes for efficient management , Lets see how to do that.

Step 1 : Go to menu - Scroll down - Click on tags and Attributes



The screenshot shows the vSphere Client interface. A red arrow points to the 'Tags & Custom Attributes' option in the 'Events' section of the navigation menu. The main pane displays a table titled 'ADD PERMISSION' with columns for 'Category' and 'Description'. A search bar at the top right shows the URL: https://vcsa-01a.corp.vmbeans.com/ui/app/tags/tags. The status bar at the bottom indicates the user is 'Administrator@VSPHERE.LOCAL'.

Step 2 - Create New Tag - Name it - Choose category if you want also you can made new categories from here.



The 'Create Tag' dialog box is open. The 'Name' field contains 'CA Pratik'. The 'Description' field is empty. The 'Category' field has a placeholder 'Create New Category'. At the bottom are 'CANCEL' and 'CREATE' buttons.

Step 3 - You can create Categories and choose associable object types

Create Category

Category Name: Pratical VMs

Description:

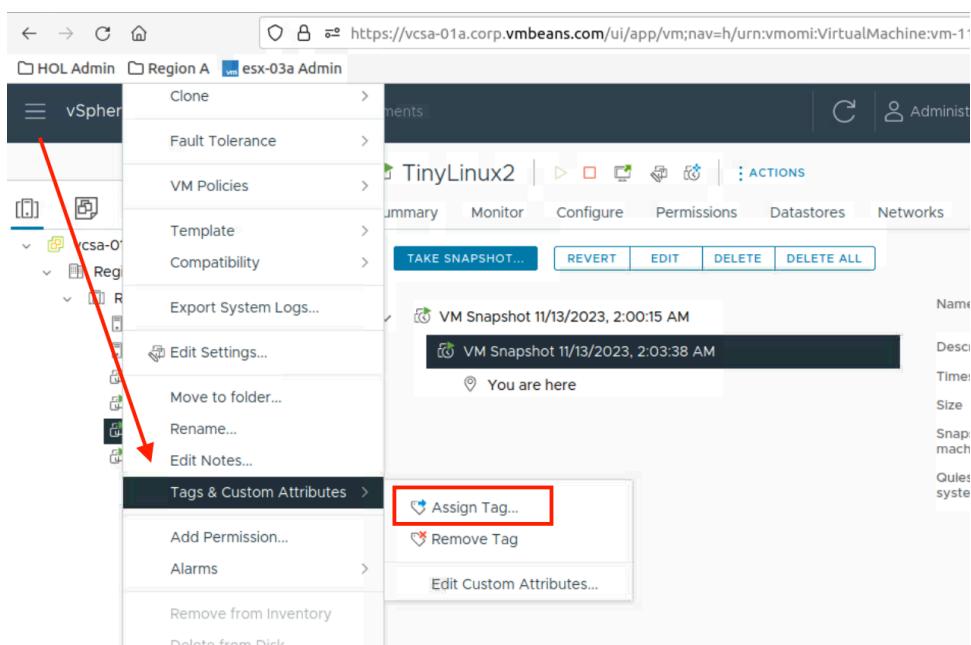
Tags Per Object: One tag Many tags

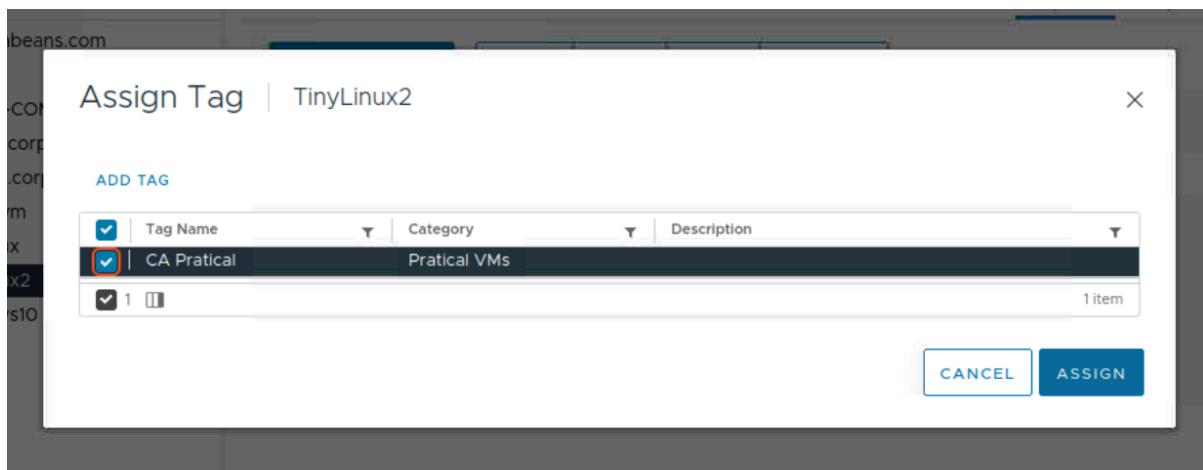
Associable Object Types:

| | |
|---|---|
| <input type="checkbox"/> All objects | <input type="checkbox"/> Cluster |
| <input type="checkbox"/> Folder | <input type="checkbox"/> Datastore |
| <input type="checkbox"/> Datacenter | <input type="checkbox"/> Distributed Port Group |
| <input type="checkbox"/> Datastore Cluster | <input type="checkbox"/> Host |
| <input type="checkbox"/> Distributed Switch | <input type="checkbox"/> Library Item |
| <input type="checkbox"/> Content Library | <input type="checkbox"/> Resource Pool |
| <input type="checkbox"/> Network | <input checked="" type="checkbox"/> Virtual Machine |
| <input type="checkbox"/> vApp | |

CANCEL CREATE

Step 4 - Select a Virtual Machine - Right click on it - Tags - Assign tags .





Step 5 - Now you can search your Virtual machines by using your tags and categories .

Search for "CA" (2 results , including 1 Tag Category, 1 Tag)

- Practical VMs
- CA Pratical

P8: Enable vSphere HA and DRS for VMware vSphere (vSOM)

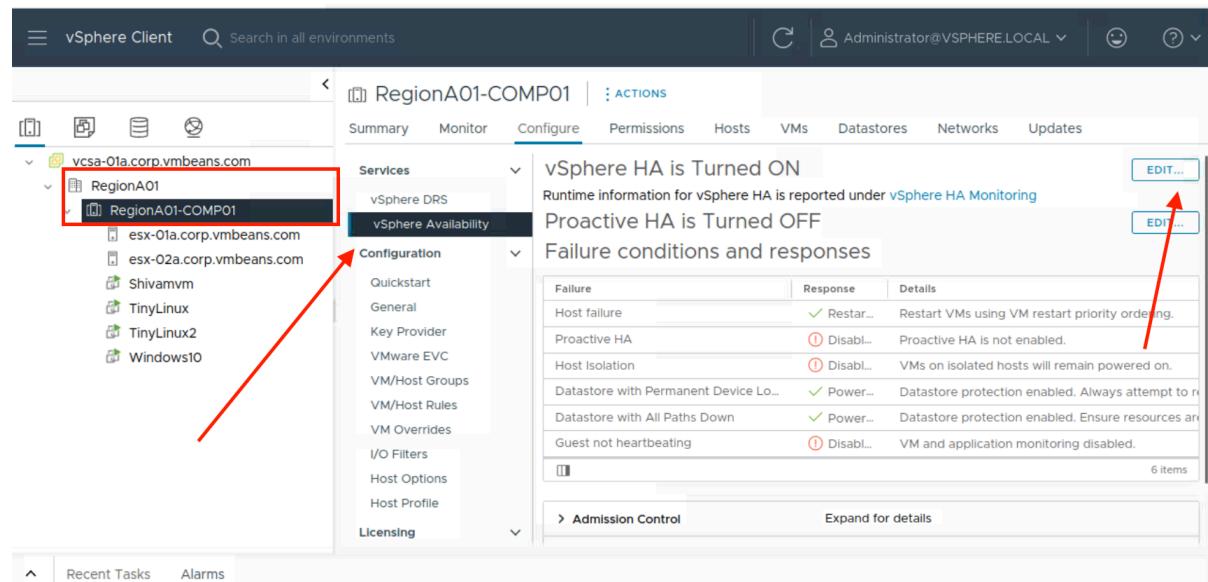
This Practical shows how to use the VMware vSphere web client to enable and configure (HA) and Dynamic Resource Scheduling (DRS) with vSOM.

HA (High Availability) protects against machines down time by automating recovery in the event of a host failure.

DRS (Dynamic Resource Scheduling) ensures performance by balancing virtual machine workloads across hosts a cluster.

Cluster - A cluster is a set of connected computers that work together as a single system. These computers, often referred to as nodes or members, are linked to share resources and distribute processing tasks.

Step 1- Select on datastore (RegionA01) - Right click on it - Setting - vSphere Availability - Turn on vSphere HA.



Step 2- Select on datastore (RegionA01) - Right click on it - Setting - vSphere DRS - Turn on vSphere DRS.

vSphere Client Search in all environments Administrator@VSPHERE.LOCAL

RegionA01-COMP01 ACTIONS

RegionA01-COMP01

vSphere DRS is Turned ON

SCHEDULE DRS... RESTORE RESOURCE POOL TREE... ...

| | |
|--------------------|-----------------------------|
| DRS Automation | Partially Automated |
| Additional Options | Expand for policies |
| Power Management | Off |
| Advanced Options | Expand for advanced options |

Recent Tasks Alarms

P9: Performance monitoring and alarm creation

Performance monitoring in VMware is keeping an eye on how virtual machines (VMs) and their underlying infrastructure are doing. It involves watching metrics like CPU, memory, storage, and network usage to ensure everything runs smoothly.

Real-time Monitoring: Gives instant insights into VM and host performance.

Alerts and Notifications: Notifies administrators when there are issues or performance anomalies.

Trend Analysis: Looks at past performance to spot patterns and plan for the future.

Capacity Planning: Uses historical data to prepare for upcoming resource needs.

Resource Utilisation: VM Resource Allocation: Watches how VMs use assigned resources.

Alarm creation : - Alarms in virtualisation platforms like VMware enable proactive monitoring and management of system health and performance.

- They facilitate early issue detection, providing immediate alerts to administrators for timely investigation and resolution.
- Certain alarms can trigger automated responses, streamlining remediation actions and reducing manual intervention.

Step 1 : Click on host - Monitor - Performance - Overview we can see in real time the CPU usage in percent for esx-02a.corp.vmbeans.com.

The screenshot shows the vSphere Client interface. On the left, the inventory tree displays a hierarchy: vcsa-01a.corp.vmbeans.com > RegionA01 > RegionA01-COMP01 > esx-02a.corp.vmbeans.com. The host esx-02a.corp.vmbeans.com is selected and highlighted with a red box. In the top navigation bar, the 'Monitor' tab is selected and highlighted with a blue arrow. Below the navigation bar, there are tabs for 'Summary', 'Monitor', 'Configure', 'Permissions', 'VMs', 'Datastores', 'Networks', and 'Updates'. The 'Monitor' tab is currently active. A dropdown menu under 'Monitor' shows options: 'Issues and Alarms', 'All Issues', 'Triggered Alarms', 'Performance' (which is selected and highlighted with a red box), and 'Advanced'. The main content area is titled 'Performance Overview' with a sub-section 'CPU'. It shows two graphs: 'CPU' and 'Memory'. The CPU graph displays usage in % over time, with a major spike around 3:00 AM on November 13, 2023. The Memory graph displays usage in KB over time, with values ranging from 1,500,000 to 3,000,000 KB. The period shown is 'Real-time' from '11/13/2023, 2:20:40 AM' to '11/13/2023, 3:20:20 AM'. The view is set to 'Overview'.

Step 2 : Right Click on host - Alarm - Create new alarm Definition - NAME alarm - Create rules - Ready to complete

The screenshot shows the vSphere Client interface. The inventory tree on the left shows the same host selection as the previous screenshot. In the top navigation bar, the 'VMs' tab is selected and highlighted with a blue arrow. Below the navigation bar, there are tabs for 'Power', 'Certificates', 'Storage', 'Add Networking...', 'Host Profiles', 'Export System Logs...', 'Reconfigure for vSphere HA', 'Assign License...', 'Settings', 'Move To...', 'Tags & Custom Attributes', 'Remove from Inventory', 'Add Permission...', 'Alarms' (which is selected and highlighted with a red box), and 'vSAN'. A context menu has been opened at the 'Alarms' option, with the 'New Alarm Definition...' option highlighted and also highlighted with a red box. The main content area shows a table of alarms with two entries:

| | State | Status | Provisioned Space | Used Space | Host CPU | Host Mem |
|------------|-------|--------|-------------------|------------|----------|----------|
| Powered on | ✓ | Normal | 436.55 MB | 371.55 MB | 0 Hz | 170 M |
| Powered on | ✓ | Normal | 32.08 GB | 17.81 GB | 83 MHz | 2.04 G |

Reference LINKS

Lab- <https://labs.hol.vmware.com/HOL/catalogs/catalog/1936>



New Series in HINDI



What is Virtualization ?

**ESXI Host
vCenter Server
HA,DRS
Cluster
Clone ,Templates etc.**

