How to deploy an AlmaLinux OS server VM (CIT 470)

For example purposes, this article supposes the following:

- CIT 470 students *Kitty Cat* and *Puppy Dog* are assigned to Team 4, and their instructor's name is *Brigham Young*;
- They intend to deploy the server in their DMZ, and name it *T04-dmz-AL0*;
- They already completed a network diagram for their proposed zones and firewalls, in which they recorded the following information:
  - They selected 172.16.4.0/24 as their DMZ's private IPv4 subnet;
  - They chose IP addresses 172.16.4.11 for the server, and 172.16.4.1 for the firewall's DMZ gateway.

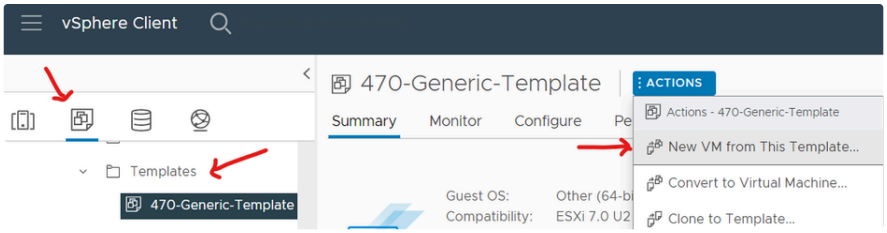
Instructions

Three stages for setting up a virtual machine:

1. Create the VM using vSphere, and edit its settings
2. Power-on the VM and install AlmaLinux OS
3. Restart the VM after installation and configure additional server settings
4. (Optional) Create a clone of the VM, as an easy way to deploy an additional AlmaLinux server.

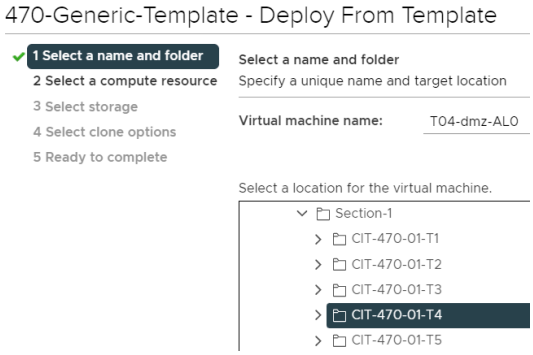
Stage 1: Create the VM using vSphere, and edit its settings

A generic template has been provided for you in the Templates subfolder. Select the generic template, then open the **Actions** menu and choose **New VM from This Template**:

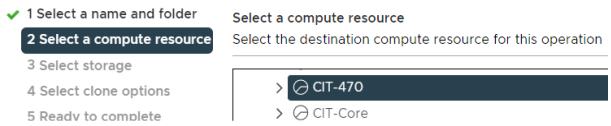


There is more than one way to create a VM. Some students choose to select their team folder, then use the New Virtual Machine action.

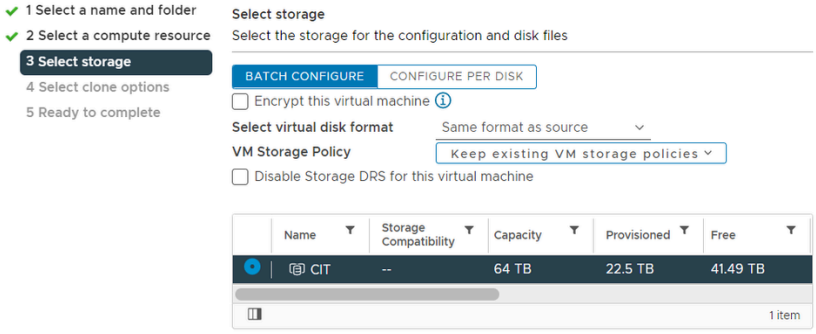
The "New VM" wizards are pretty easy to figure out. For step 1, enter the VM name and select the folder where it belongs. Here is the server name that Kitty and Puppy selected and the folder assigned to their team:



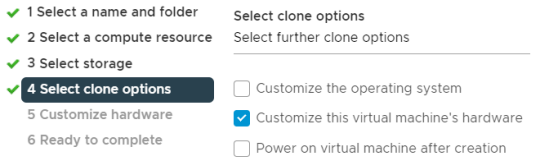
For step 2, select the compute resource provisioned for the course:



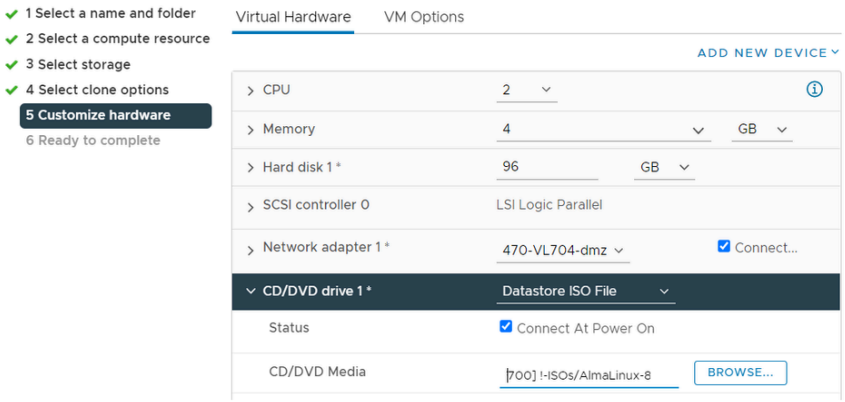
For step 3, select the department's storage resource:



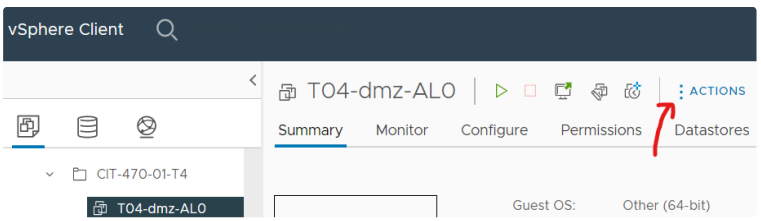
For step 4, activate the hardware customization option. This enables another configuration step in the wizard:



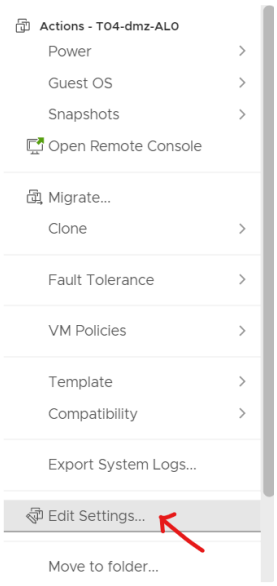
For the hardware settings step, specify the correct VLAN for the VM's network adapter. Also, select an ISO for the virtual CD/DVD drive. (You will find the AlmaLinux OS installation ISO image in the storage resource named **v103**, in the **!-ISOs** subfolder.) Make sure that both the network adapter and the optical device are set to connect at power on:



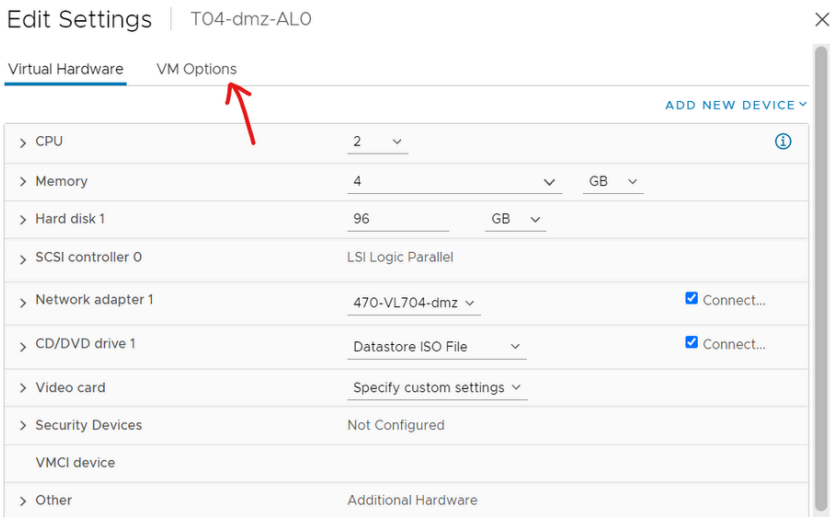
The last step is there to review and finish creating the VM. After that, there are two more items that should be adjusted in the new VM. Select it, and tap the **Actions** menu:



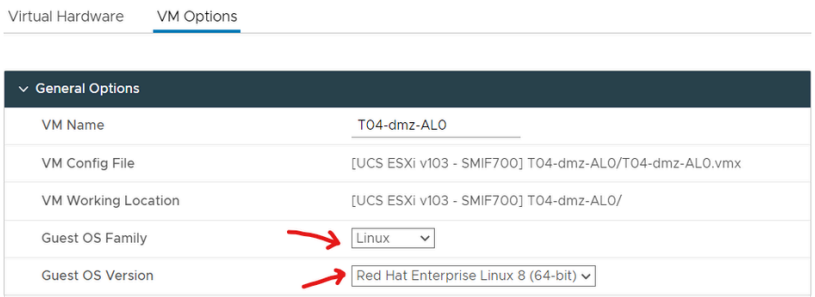
Choose **Edit Settings**:



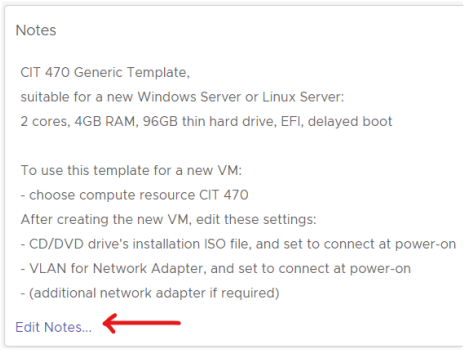
Select the editor's **VM Options** tab:



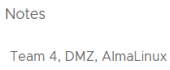
Then expand General Options and update the VM's "OS family and version" settings. (There is no "AlmaLinux" option among the "Guest OS Versions." Since AlmaLinux OS is a variant of Red Hat Enterprise Linux; please select its appropriate version.)



Finally, after saving those changes, select the **Summary** tab and edit the notes field:



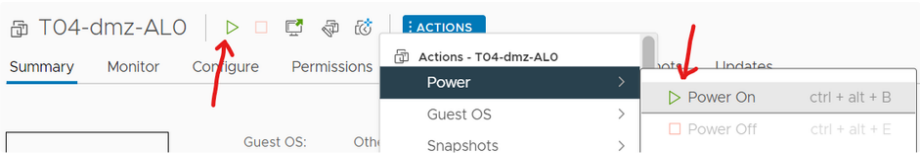
Replace the generic template's notes with a note about your own server VM:



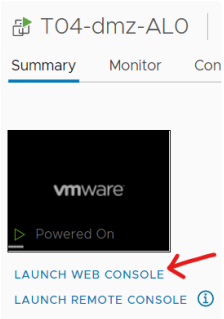
At this point, the new VM should be ready to power on and begin the installation process. (If you aren't in a hurry, you might enjoy exploring other settings and options in the vSphere web interface before you power the new VM.)

Stage 2: Power-on the VM and install its operating system

There's a convenient green triangle "power on" button to the left of the **Actions** menu, or you may instead select the **Power On** choice inside the menu:

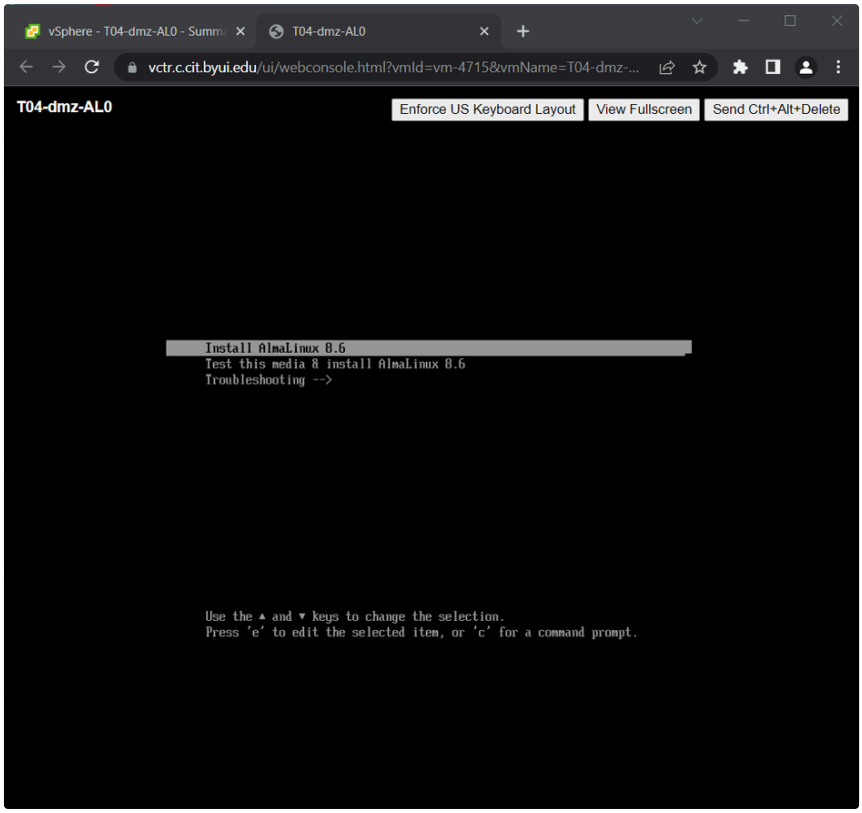


As soon as the VM starts up, immediately launch a console to interact with the new VM. If you don't yet have remote console software, a web console will do:

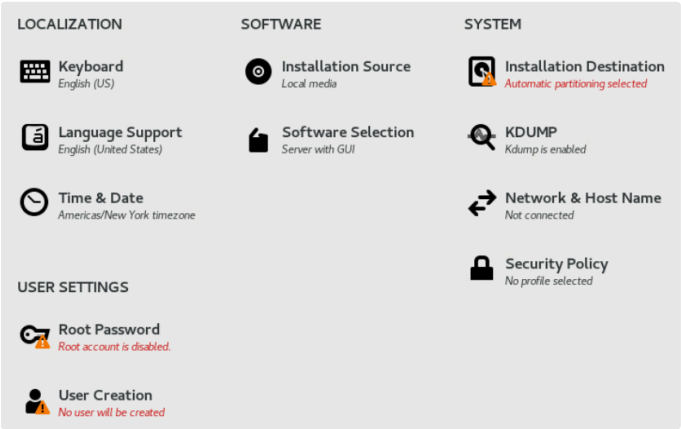


> *Recommended*: the web console has some limitations, so most students prefer to launch a remote console instead of a web console. To do so, you must download and install VMware's remote console app. (If you purchased and installed a copy of VMware Workstation or VMware Fusion, or if you downloaded and installed a free VMware player product, one of those may also function as your remote console.)

If you open a remote console, your browser will launch that program. If you open a web console, it opens in a new browser tab or window, and then you will need to click or tap once on the web console, so that your subsequent keystrokes operate the guest VM inside the console rather than operate your host system and web browser. Use arrow keys, [Tab], and [Enter] to navigate the installer's boot-up menu:



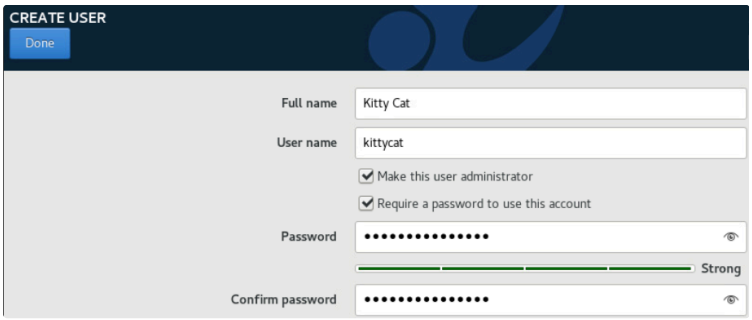
Follow the instructions. After you choose the default language and keyboard layout, you should see an arrangement of various configuration options:



Some of the options have colored warning symbols, which *must* be attended before the installation process may proceed. It's also a good idea to configure **Time & Date** and **Network & Host Name**.

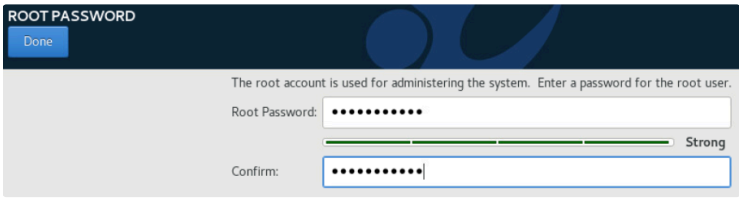
The easiest option to configure is the system **Installation Destination**; just tap the [Done] button in the upper left corner to accept the virtual disk provided by the generic template:

In **User Creation**, configure a user account for a member of the team, and give the new account administrator privileges:



(You will create accounts for the other team member and for your instructor later on.)

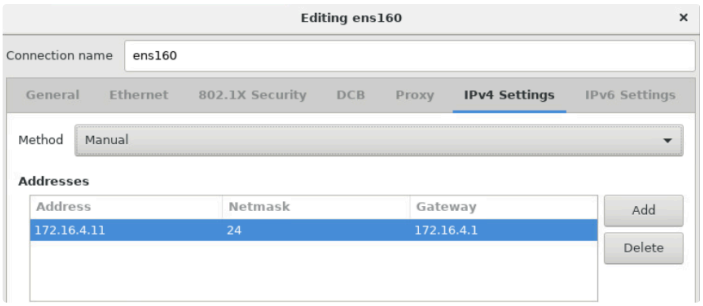
If it is enabled, the “root” system account is shared by both team members. It’s probably a good idea to enable it, so configure a strong **Root Password**:



Important: provide a *secure* way to share the root password among team members, such as a secure password manager app.

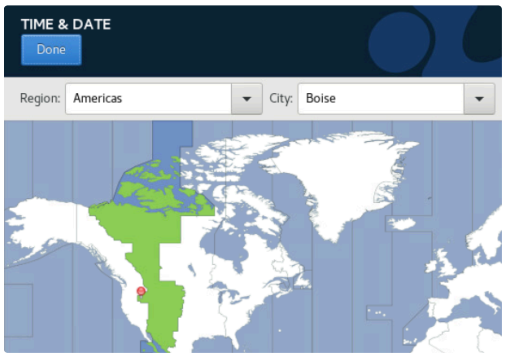
In **Network & Host Name**, find the hostname in the bottom left corner, and change it from localhost to the name selected by the team:

In the bottom right corner, tap [Configure] and manually enter the server’s IPv4 network information:



Then in the top right corner, turn on the VM's network interface. Then tap [Done].

There is more than one way to configure **Time & Date** localization. The easiest might be to just click on the map until you find a suitable city in the same time zone as BYU-Idaho:

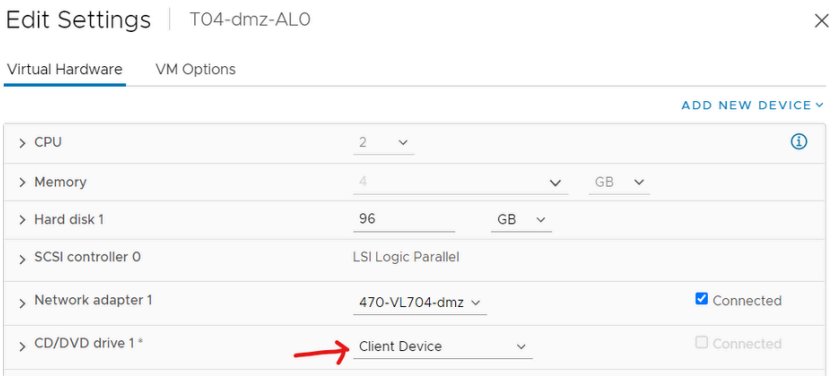


In the upper right corner, select the cog ("gear") button to configure NTP (*Network Time Protocol*). Add the IP addresses of BYU-Idaho's private time synchronization servers (10.9.160.114 and 10.10.160.114) and unselect the preconfigured server pool. (These won't synchronize until the VM achieves Internet connectivity, but it's probably easier to set these up now rather than later.)

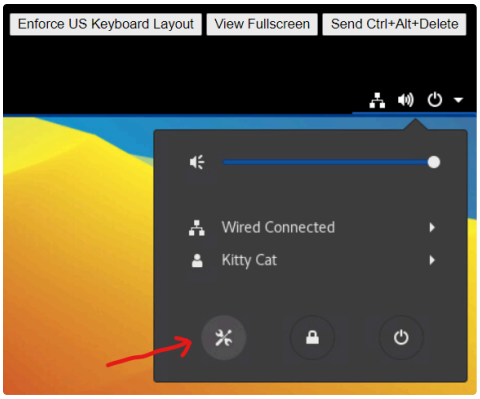
That should be every pre-installation setting you can reasonably configure, so go ahead and click or tap [Begin Installation], which will take a few minutes to complete.

Stage 3: Restart the VM after installation and configure additional server settings.

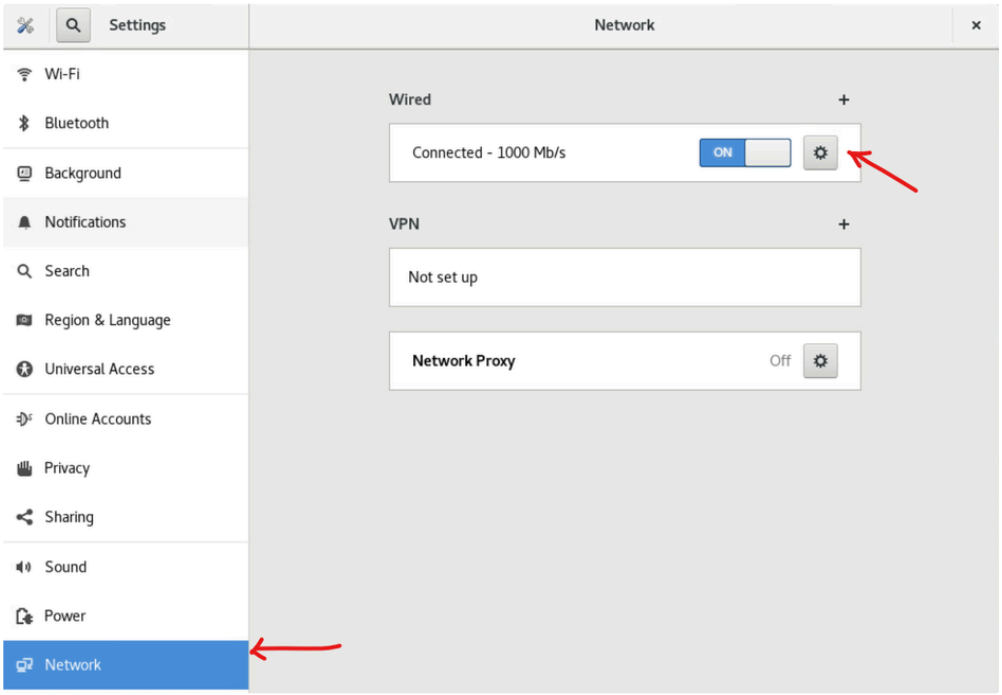
When installation is done and you click or tap [Reboot], the VM will restart. It's recommended that you go back to vSphere, [Edit Settings] again, and "virtually eject" the installation ISO image by restoring the optical drive back to its original "Client Device" setting:



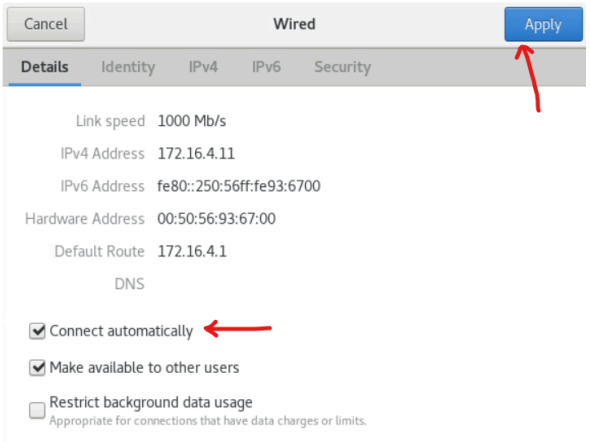
Back in the console, log into the new user account, click through all of the "first time user" messages. (Turn off location services and skip personalized service activations.) Tap one of the system indicators in the upper right corner to get a system menu, and open the "Settings" app by clicking or tapping the "wrench-and-screwdriver" button:



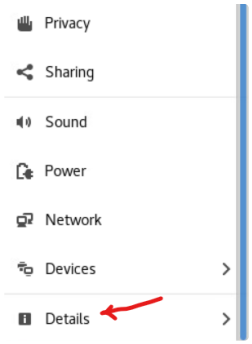
Select the **Network** settings option, then click or tap the “cog” button:



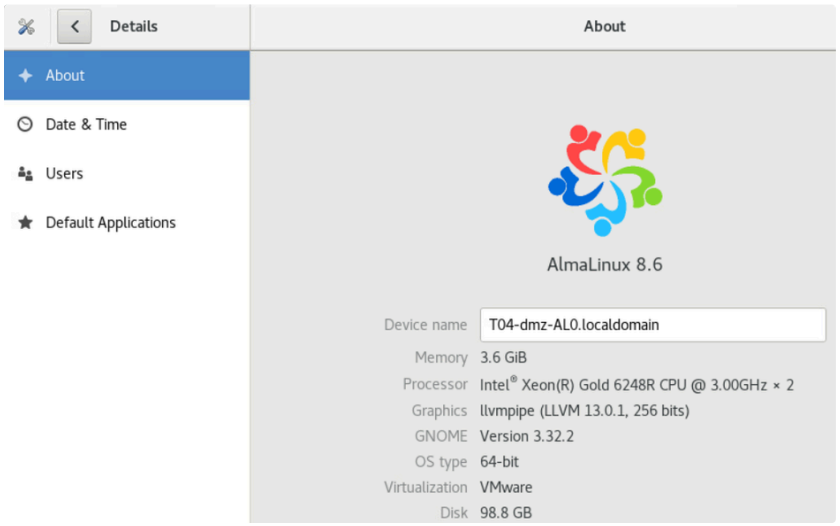
Make sure the network details are correct, and that the adapter is set to connect automatically at startup:



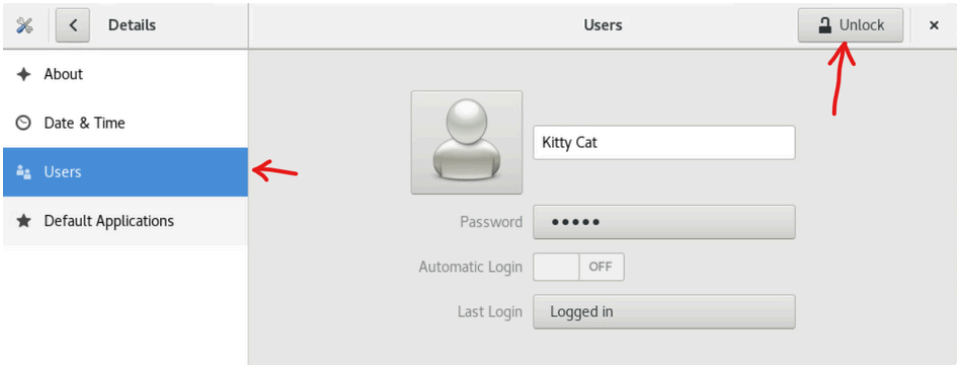
Find **Details**, which is probably the bottommost settings item:



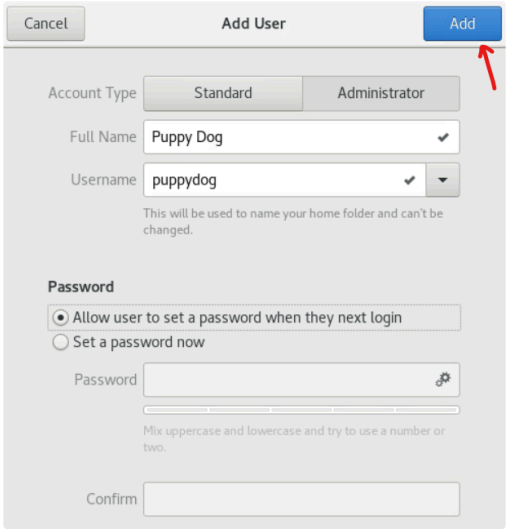
In the Details sub-menu, select **About** and verify that the hostname is correct:



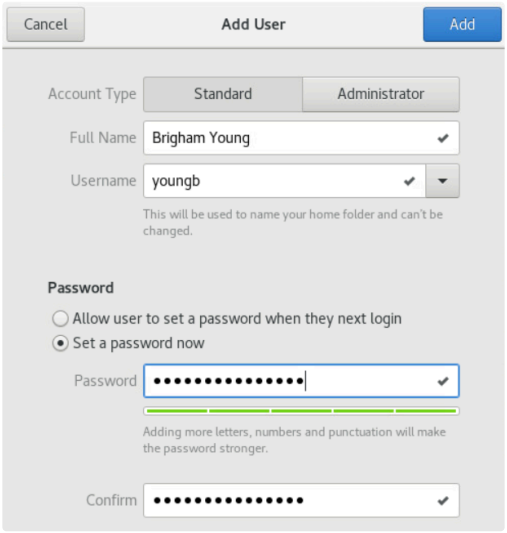
Also in the Details sub-menu, select **Users** and unlock the user configuration feature:



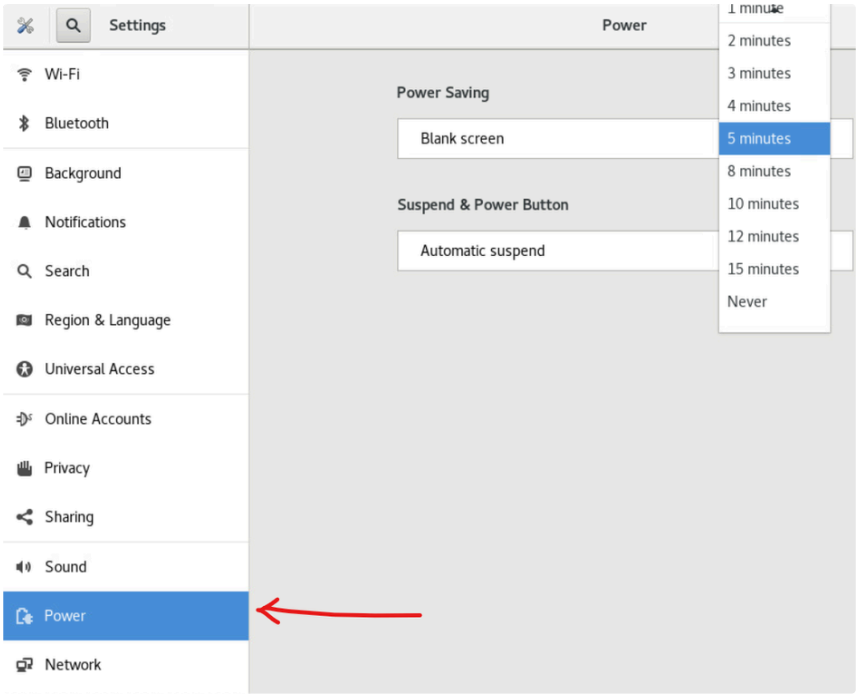
Then create two additional user accounts with administrator privileges, one for your team partner:



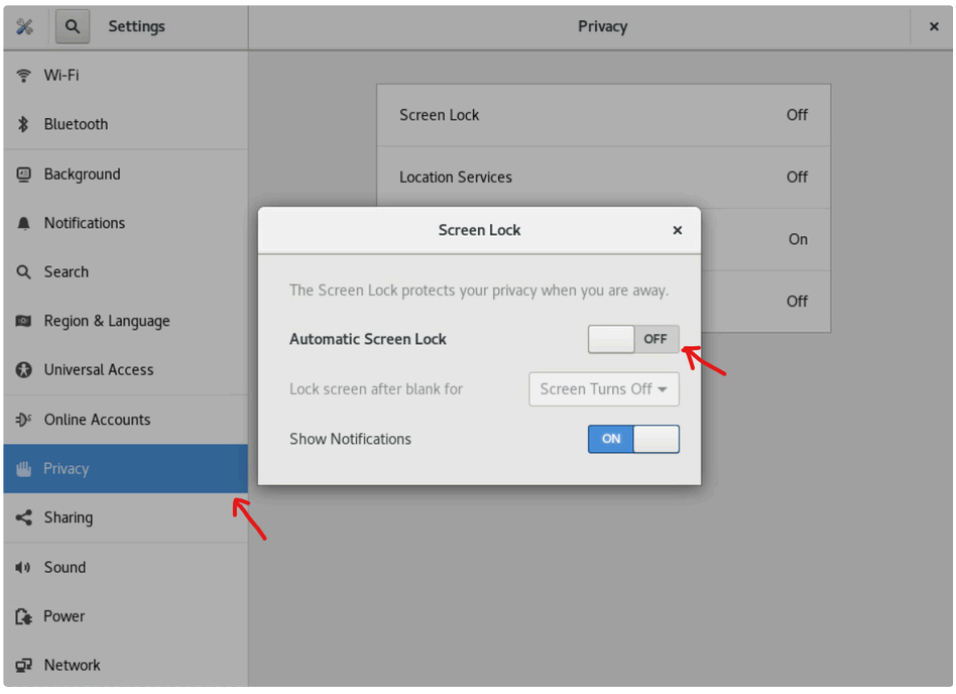
and the other for your instructor:



Finally (and optionally), there's a timeout setting that most students choose to alter. Select **Power** and extend (or disable) the idle timeout for screen blanking:



Then select **Privacy** and turn of the Automatic Screen Lock feature:



Operating the VM in a web or remote console will be more convenient with power and screenlock timeouts relaxed. (It's up to your team to decide how to set these timeouts. At some businesses, disabling them might not be an acceptable security compromise, but our CIT VM environment has other *compensating controls* to deter unauthorized actors from operating your team's VMs.)

Optional: Clone the server VM

To deploy another AlmaLinux OS sever in a different security zone VLAN, you could repeat the instructions outlined above. But if you want to save a little time, select the VM and in its **Actions** menu choose **Clone to Virtual Machine**. The cloning wizard in vSphere is very similar to the "new VM" wizards. You won't need to put an image in the virtual CD/DVD drive, because the OS is already installed; but you will need

to customize the hardware if you need to change the network adapter's VLAN of the clone. Change your VM's notes field if appropriate. After the clone is powered on, you should log in and update the following settings:

- **Network** settings (to change the clone's IPv4 host address, subnet mask, and gateway address)
- **Details** > **About** (to update the clone's hostname)
- (optional) **Background** (to change the clone's desktop wallpaper or background color. This helps users more quickly distinguish between a team's various AlmaLinux VMs.)

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