Importing virtual machine image

This process will import the .ova image into the virtualbox installation.

1. Open virtualbox
2. Got to file > import appliance
3. Open the .ova image to import
4. Set machine base folder to **C:\cpre488\mp-4**
5. Leave all default settings for appliance settings
6. Click import at the bottom of the window

Virtual machine installation location

The virtual machine instance will be installed at **C:\cpre488\mp-4**, this is a local folder that all students will be able to access with read-write permissions. This way multiple students will share the same virtual machine instance

Exporting virtual machine image

Once the VM image has been setup need to export it to a .ova file to be installed

1. Shutdown VM
2. File > export appliance
3. Open Virtualization Format 2.0
4. Include only NAT network adapter MAC address
5. Write manifest file
6. Do not include ISO image files
7. Export

Install guest additions

Install additional drivers to the guest machine to improve performance

1. VM must have an optical drive for this to work:
    a. Shutdown the VM
    b. Machine settings > storage > SATA controller > add optical drive
    c. Leave empty button at bottom of window
    d. Start the VM
2. Devices > insert guest additions CD
3. Mount CD
4. In CD directory run sudo ./VBoxLinuxAdditions.run
5. Restart VM after installation

Adding the Virtual Machine Instance

New students will not be able to see the VM instance until it is imported.

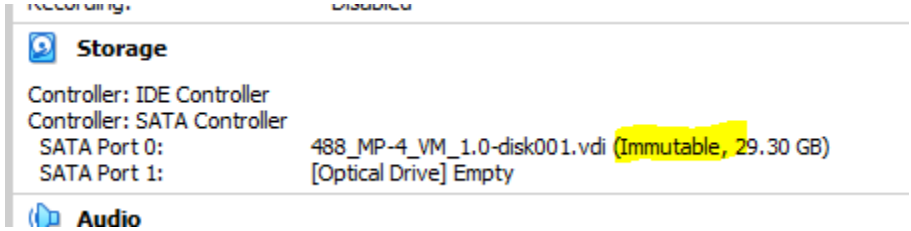
1. Open Virtual box application
2. Go to machine -> add
3. Navigate to the VM installation, **C:\cpre488\mp-4**
4. Open the .vbox file
5. The virtual machine should now be available

Folder Sharing with the Virtual Machine

1. Go to VM settings, machine -> settings then shared folders
2. On the far right click the blue folder with a green cross to add a new shared folder
3. Set the folder path to a folder on the windows system to share with the VM
4. Select Auto-mount
5. For the mount point enter '/home/bitcraze/shared-folder'
6. Select make permanent
7. Select ok on both dialog boxes to complete the shared folder setup
8. You should now be able to navigate to /home/bitcraze/shared-folder in the VM and see the files in your shared folder

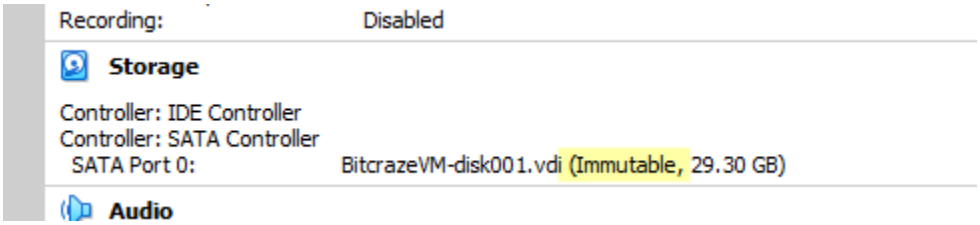
How to make a VM drive immutable:

1. Install VM image as usual, setting files and installations that will be reset to on reboot
2. After installed, shutdown the vm
3. Option 1: Using the GUI (don't need admin privileges)
    a. Open File > Virtual Media Manager
    b. Select the .vdi file for the VM instance
    c. Select Properties at the top of the window
    d. Under attributes tab, change type from normal to immutable
    e. Click apply at the bottom of the window
    f. Virtual box will warn you the drive must be detached from the vm instance, click release
    g. Close the virtual media manager window
    h. The storage drive should now show up as immutable
    i.



4. Option 2: Using the command line (need admin privileges to open cmd in c drive)
    a. Go into VM storage settings
    b. Note the host OS location of the .vdi file, this will be used later
    c. Right click the .vdi drive selecting "Remove attachment"
    d. Open command prompt, navigate to the virtualbox installation folder
        i. By default C:\Program Files\Oracle\VirtualBox\
    e. Run the following command to set the .vdi hard drive to be immutable
        i. vboxmanage.exe modifyhd <path of the .vdi file found earlier> --type immutable
            1. Use --type normal to revert to a normal hard drive
    f. After successful execution, reattach the .vdi drive under VM storage settings
        i. SATA controller, Add hard disk
        ii. The .vdi file should show up in the list of hard drives
    g. Click ok

h. Should now show the storage drive as immutable



i.

Exporting Work From the Virtual Machine

With a bare git repository on the host machine

1. Create a bare repository on your removable media or your x drive
    a. 'git init --bare my_repo_name.git'
    b. This will create a **folder** called my_repo_name.git with no working tree.
2. Share this folder with the VM and mount it at '/home/bitcraze/shared-folder/', see details on sharing a folder with the VM
3. Once the bare repository is accessible from within the VM
4. The Microcart repository should already be setup to use '/home/bitcraze/shared-folder/' as a remote, check this with 'git remote -v'
5. Commit and push your changes to your shared folder
    a. If this fails try setting the remote url again with 'git remote set-url origin <absolute path to shared folder>'
6. Your changes will now be on the bare repo in your shared folder

With normal GitHub/GitLab repository

1. Note: the first commit will take a while as all the git history must be uploaded
2. Create a new blank repo on github or gitlab, obtain the url or ssh address to the repo
3. In the Microcart folder run 'git remote set-url origin <address of remote repo>'
    a. Note this set-url command must be run each time the VM is rebooted due to the immutable hard drive setup
4. Commit and push your changes as normal

Importing Work Into the Virtual Machine

With a bare git repository on the host machine

1. Ensure the bare repository is accessible within the VM, see details on sharing a folder with the VM
2. The Microcart repo should already be setup to use '/home/bitcraze/shared-folder/' as a remote
3. From within the Microcart folder run 'git pull'

With normal GitHub/GitLab repository

1. Set the remote repository with 'git remote set-url origin <address of remote repo>'
2. From within the Microcart folder run 'git pull'

Final export from the virtual machine

Final export will export all files that have been modified since the original state of the Microcart repo.

1. Ensure folder sharing and your git repository are setup correctly
2. Commit all changes within the git repository to be exported
3. From the **root of the Microcart** folder, Run ‘cp -pv --parents $(git diff Lab_Part_2_tag --name-only) **DESTINATION-DIRECTORY**’
    a. The destination should be a shared folder so the files are accessible from the host machine
    b. This will copy all modified files since the Lab_Part_2_tag into the destination directory