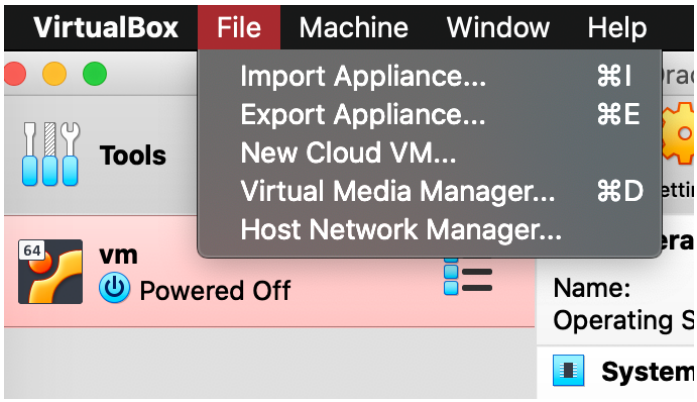
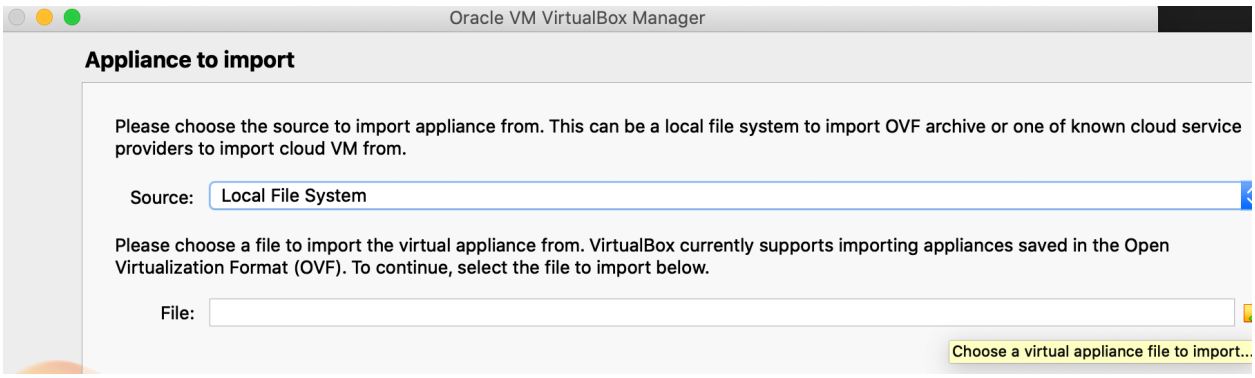
Sipster: Settling IOU of Smart Meters Privately and Quickly （How to get the environment ready?）

To run the VM Image:

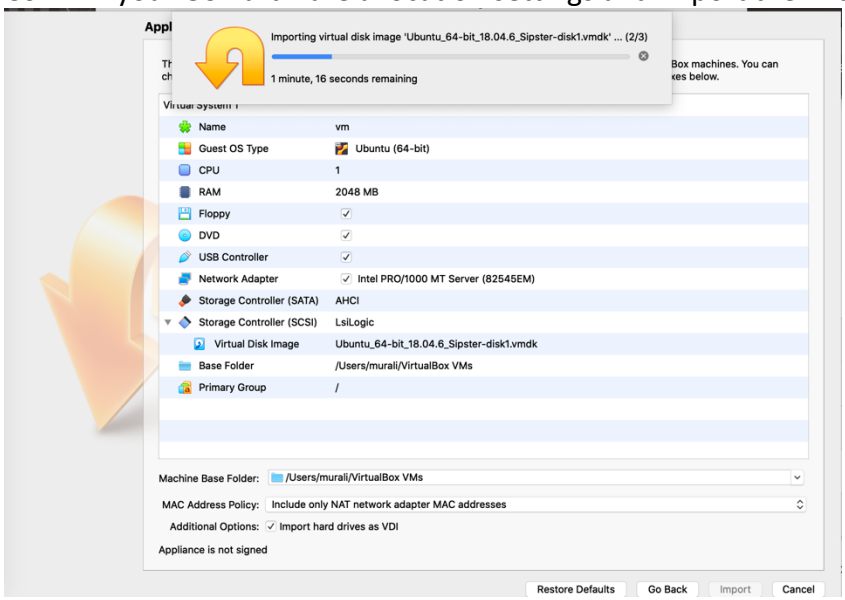
1. Please download the VM Disk Image from the provided Google Drive link: < https://drive.google.com/file/d/1NqDl308I_k9x1-cWMQGFNzpbMy3VfG6-/view?usp=sharing >
2. Please download Oracle VM VirtualBox Software from: https://www.virtualbox.org/wiki/Downloads
3. Install the Oracle VM Virtual Box software on your computer
4. Once installed, open the software
5. In the “File” Menu, please select “Import Appliance”



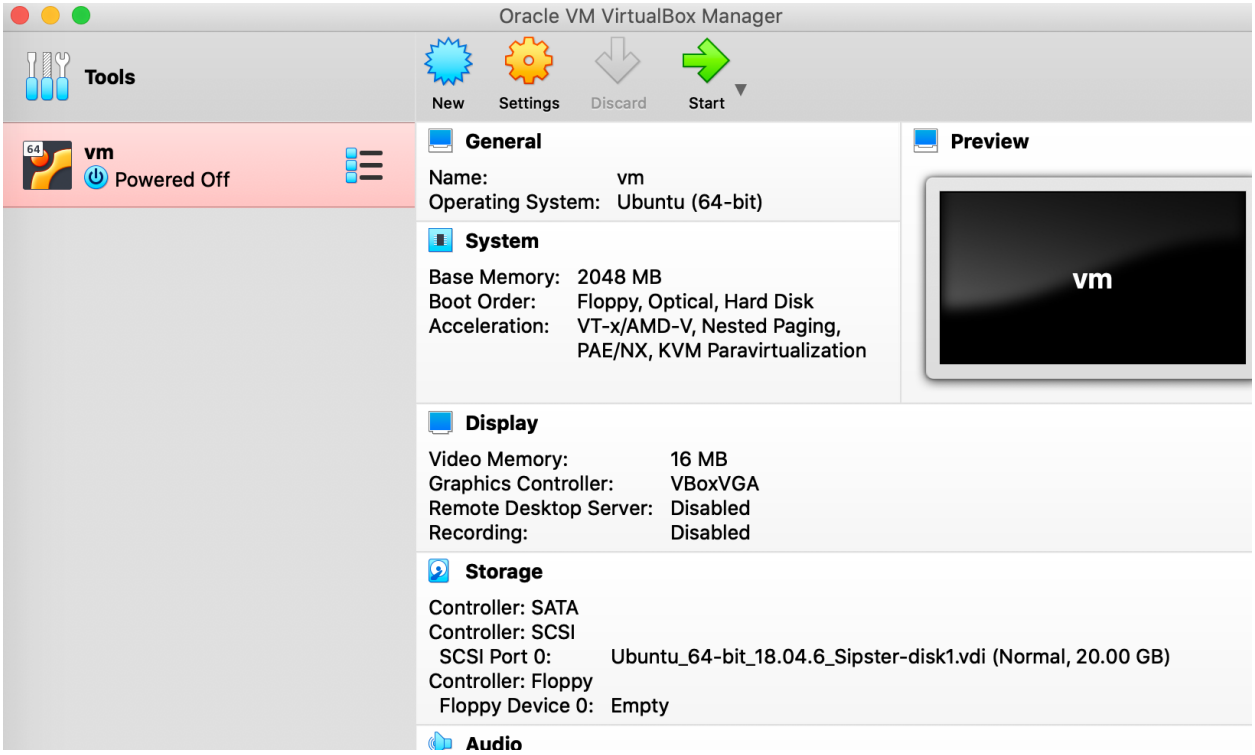
6. Please select the downloaded disk image (.ova) file to be loaded



7. Confirm your OS hardware allocation settings and import the image



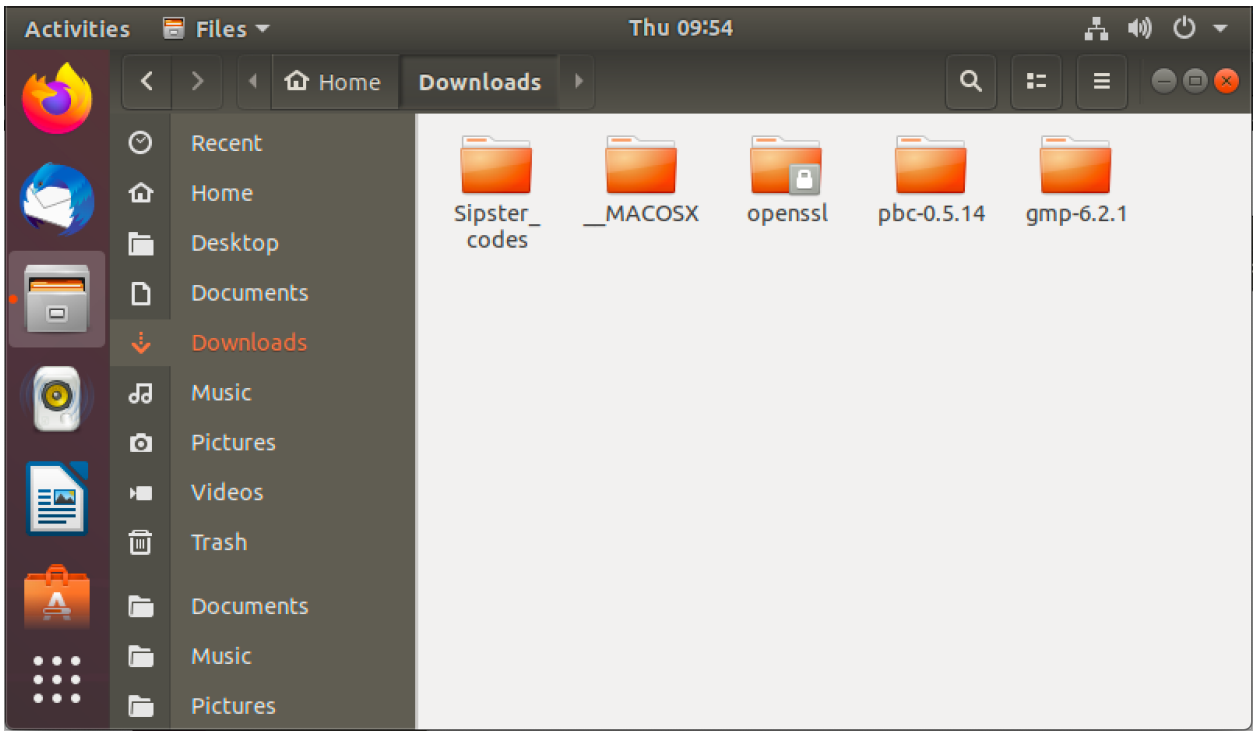
8. Double click on the loaded image to open the OS. Please remember to grant all required system permissions for the Virtual Box to run.



9. The pre-installed OS package should automatically open and prompt you for the password. Please enter cse@uta as the password.

10. The codes for the artifact is located in /home/Sipster/Downloads/

11. The folder Sipster_codes has a number of benchmarks tests.



12. Please navigate to /home/Sipster/Downloads/Sipster_codes

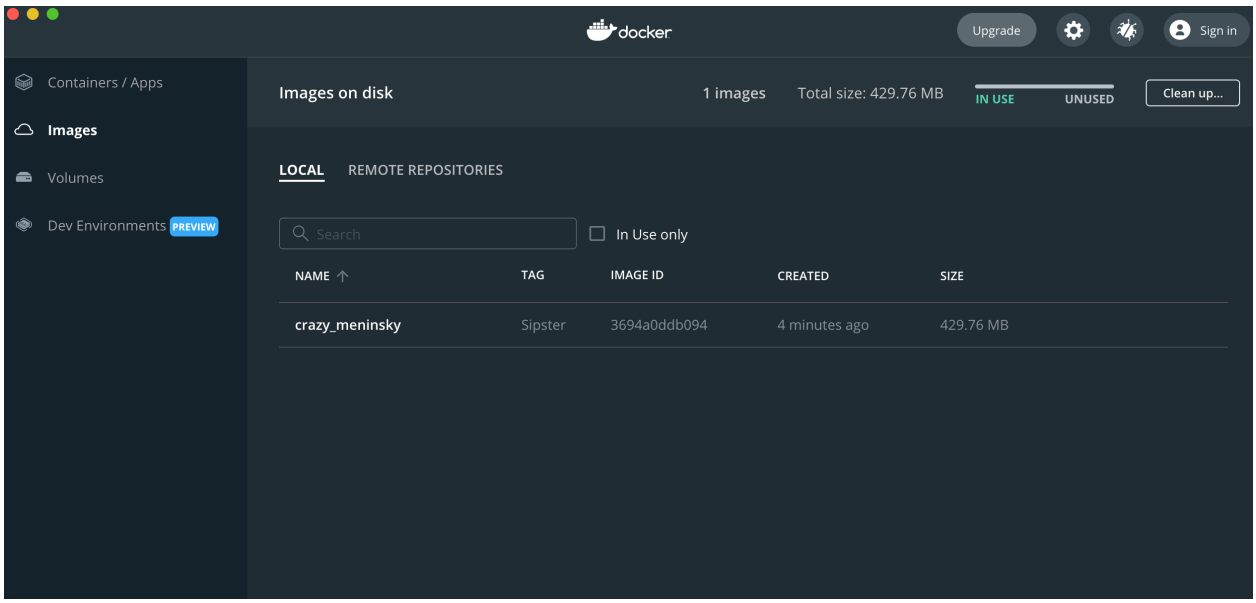
13. Please enter ./Sipster.run to run the program and try different inputs for benchmarks.

To install and run the docker container:

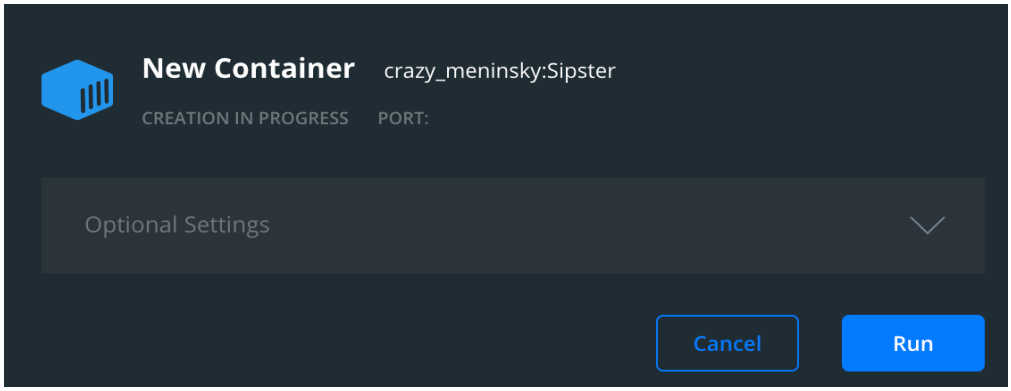
1. Please go to https://docs.docker.com/get-docker/ and install Docker Application.
2. Please download the docker container from : https://drive.google.com/file/d/1DV6kW2n01jB6uagqY7DV-fzxVrfJoIbf/view?usp=sharing
3. Once installed, please open the terminal, go to the location where you downloaded the container and type the command 'docker load -i crazy_meninsky.sipster.tar'

```
Downloads — root@3953258dd73d: /home/Sipster — -bash — 80×5
cse124762:Downloads srinivasanmurali$ docker load -i crazy_meninsky.sipster.tar
824bf068fd3d: Loading layer  65.51MB/65.51MB
b5ea6efbf690: Loading layer  376.6MB/376.6MB
Loaded image: crazy_meninsky:Sipster
```

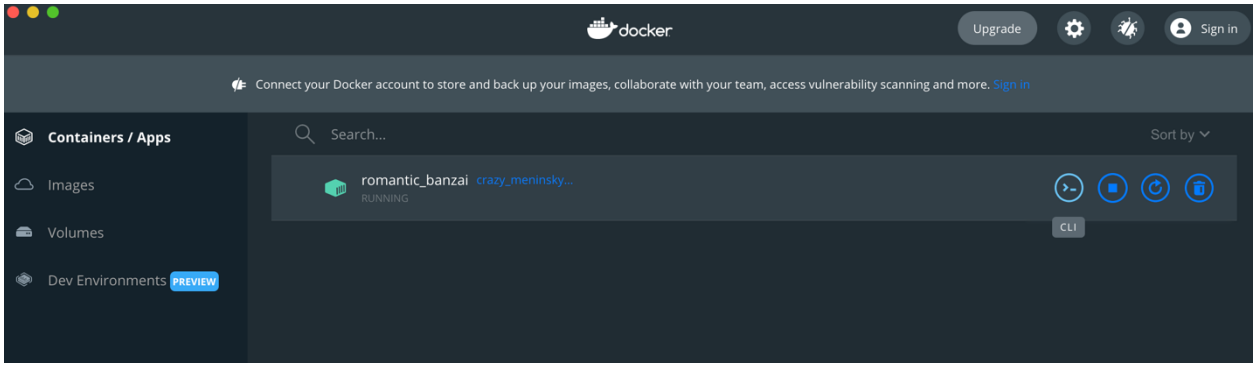
4. Now, go to the Docker App and check the images menu and please check if the .tar file is loaded in the images. Click on RUN.



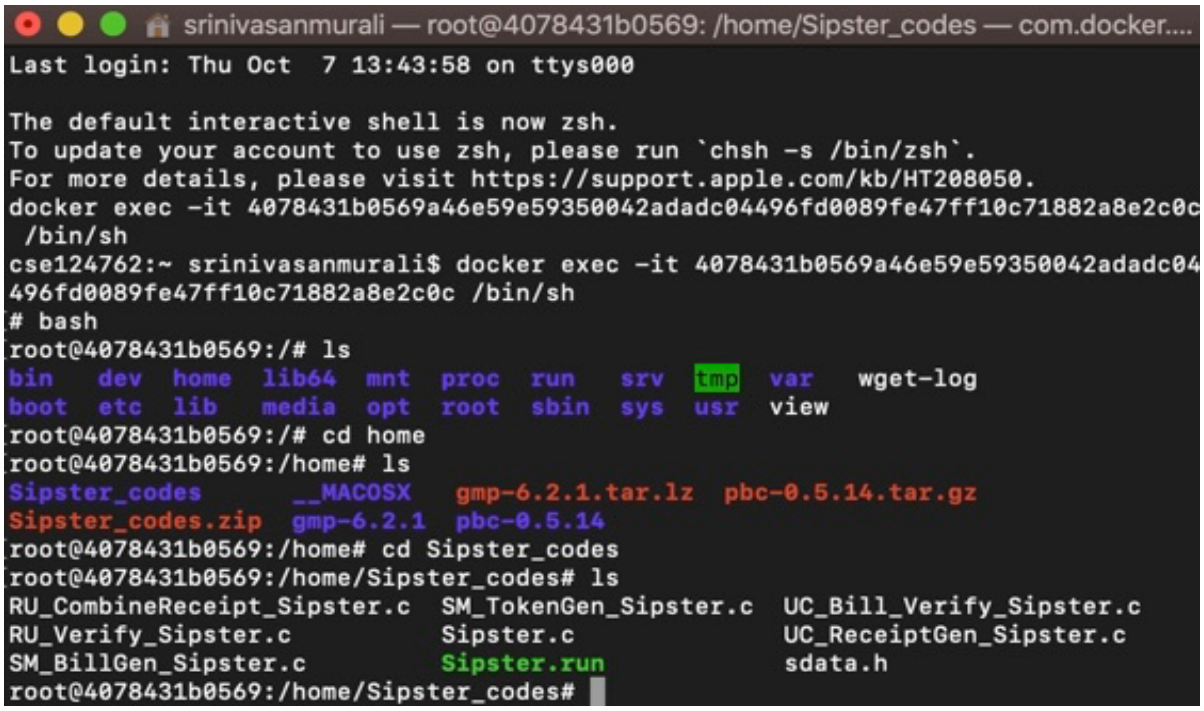
5. Another window should pop up as shown below. Please click RUN again.



6. You should see an instance running the Container/Apps sub-menu, as shown in the figure below. Please click on the CLI Icon to start the terminal.



7. Once the terminal opens up , please type “bash” .



Please navigate to /home/Sipster_codes to find the codes to run.

To build the Sipster program with bare Linux systems:

Sipster requires the pbc and gmp libraries to run.

1. Please download the gmp library from https://gmplib.org/
2. Please download the pbc library from https://crypto.stanford.edu/pbc/download.html
3. Unzip both the archives
4. Please navigate to **the gmp folder** and type the following commands:
    a. ./configure. If you get no errors in this step, please proceed to step 4d
    b. If you get an error : No usable M4 in $PATH or /usr5bin, please type sudo apt-get install m4
    c. ./configure again after step 4b
    d. make
    e. sudo make install
    f. make check
    g. If you get any errors reporting missing libraries, please install them via CLI using ‘sudo apt-get install xxxx’
5. Please navigate to **the pbc folder** and type the following commands:
    a. ./configure

    b. make
    c. sudo make install
6. Please go to where the pbc and gmp libraries are installed in your computer
    a. This is usually in /usr/local/lib
    b. Type this command: (**Remember** to replace the username (Sipster))given here with your own username and the directory where you have downloaded pbc and gmp
        i. gcc /home/Sipster/Downloads/pbc-0.5.14/example/bls.c -I/usr/local/include/pbc -L/usr/local/lib -lpbc -lgmp -o /home/Sipster/Downloads/pbc-0.5.14/example/bls
    c. Please enter the following to set the bls.c environment path:
        i. export LIBRARY_PATH=$LIBRARY_PATH:/usr/local/lib
        ii. export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib
        iii. echo "export LIBRARY_PATH=$LIBRARY_PATH:/usr/local/lib" >> .bashrc
        iv. echo "export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib" >> .bashrc
7. Please install openssl and opensssldev by using:
    a. sudo apt-get install openssl
    b. sudo apt-get install libssl-dev
8. If you get the error " libpbc.so.1: cannot open shared object file: No such file or directory" please do the following: (If you do not, please go to step 9)
        1. nano /etc/ld.so.conf
        2. Enter /usr/local/lib
        3. Save it
        4. sudo ldconfig
9. All libraries have now been installed, please download Sipster from the GitHub link: https://github.com/MobiSec-CSE-UTA/Sipster
10. Now please go to the "Sipster_codes" folder and type the command:
    a. If there is a Sipster.run file, please execute it. If not please go to step 10b.
    b. gcc -std=c99 Sipster.c RU_CombineReceipt_Sipster.c RU_Verify_Sipster.c SM_BillGen_Sipster.c SM_TokenGen_Sipster.c UC_Bill_Verify_Sipster.c UC_ReceiptGen_Sipster.c -o ./Sipster.run -I /usr/local/include/pbc -I /usr/local/opt/openssl/include -L/usr/local/opt/openssl/lib -l pbc -lgmp -lssl -lcrypto
    c. The file should be compiled and you should see a 'Sipster.run' file within your directory
    d. Enter ./Sipster.run to execute the program.

11. If you would like to execute a suite of example tests, please go to the folder "Sipster_codes" within the docker container/ VM Image.