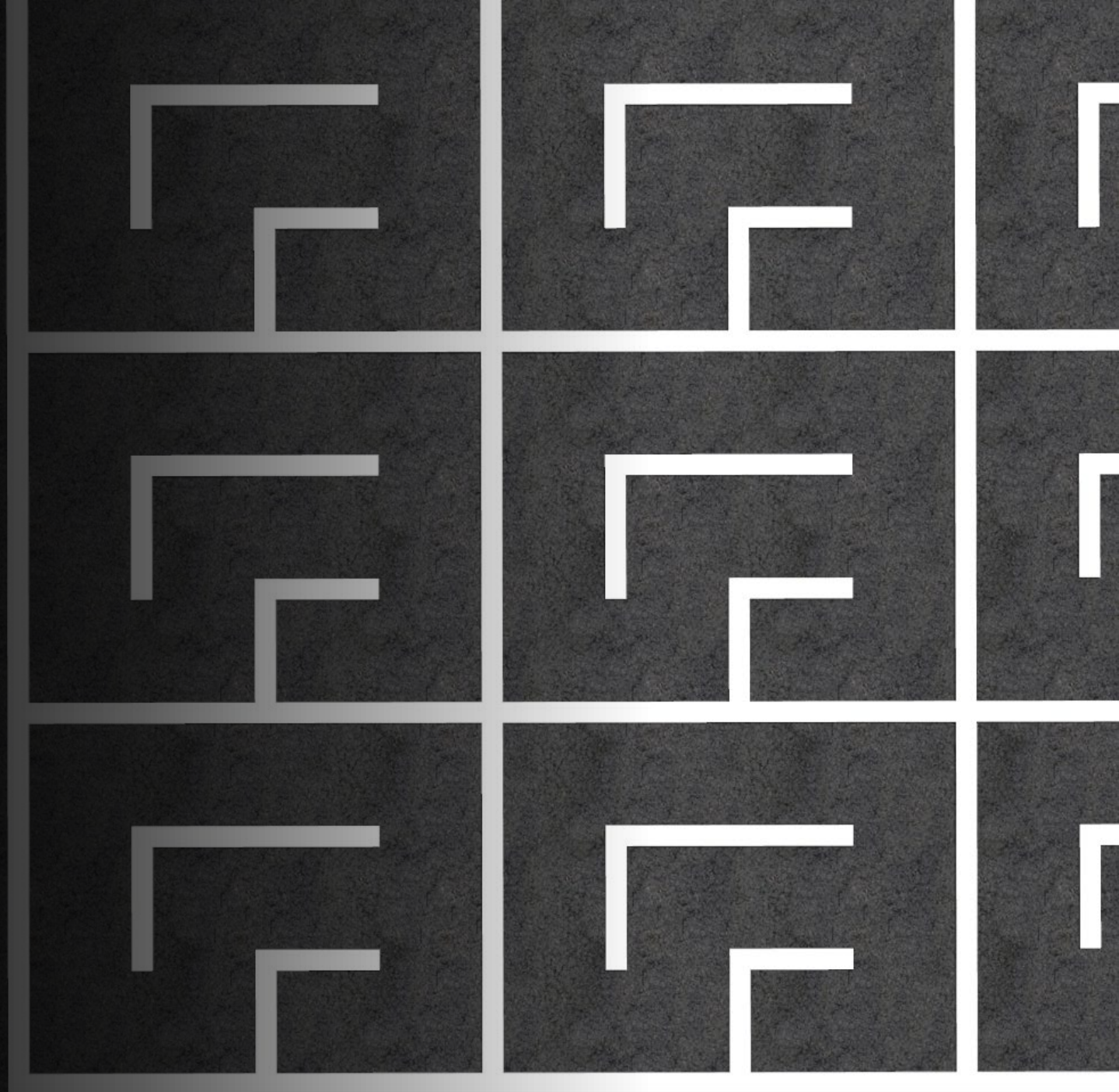# F1/10 Autonomous Racing Simulator

CS-4501 Simulator Access Instructions

Jingyun Ning
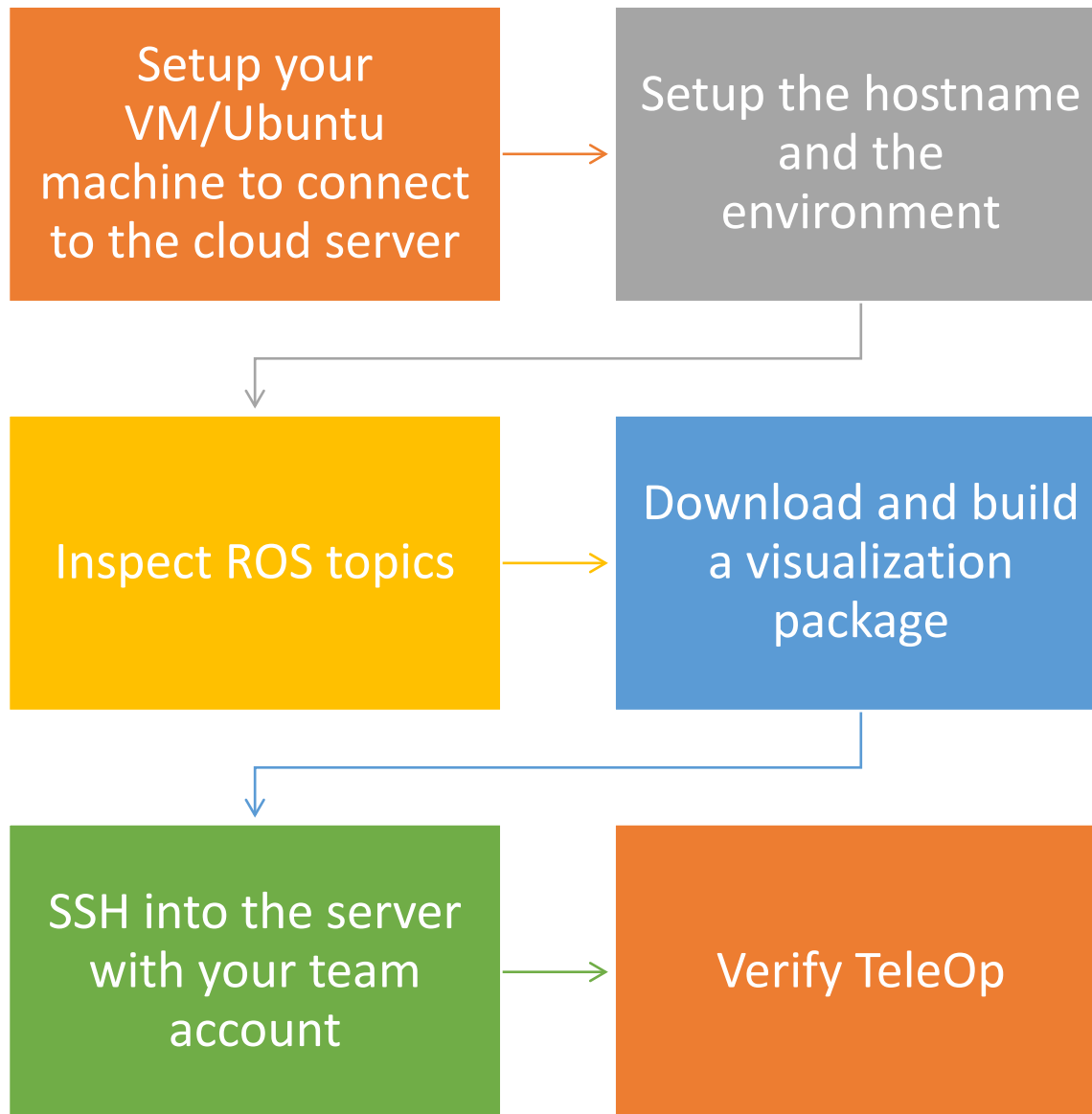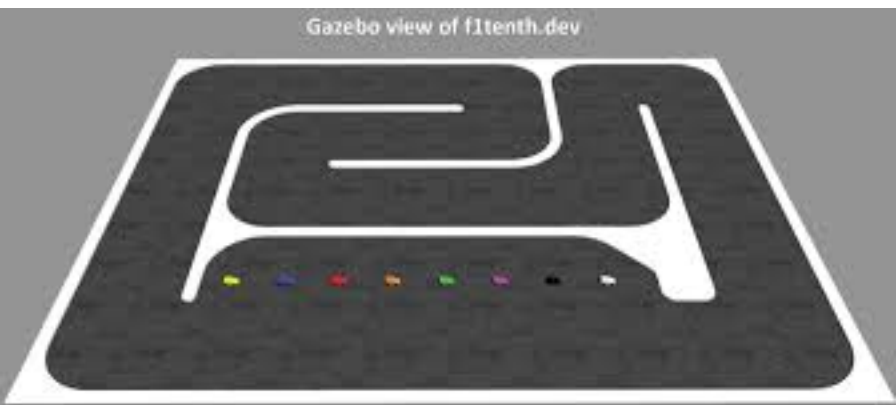
Varundev Sureshbabu

Prof. Madhur Behl

Overview of steps

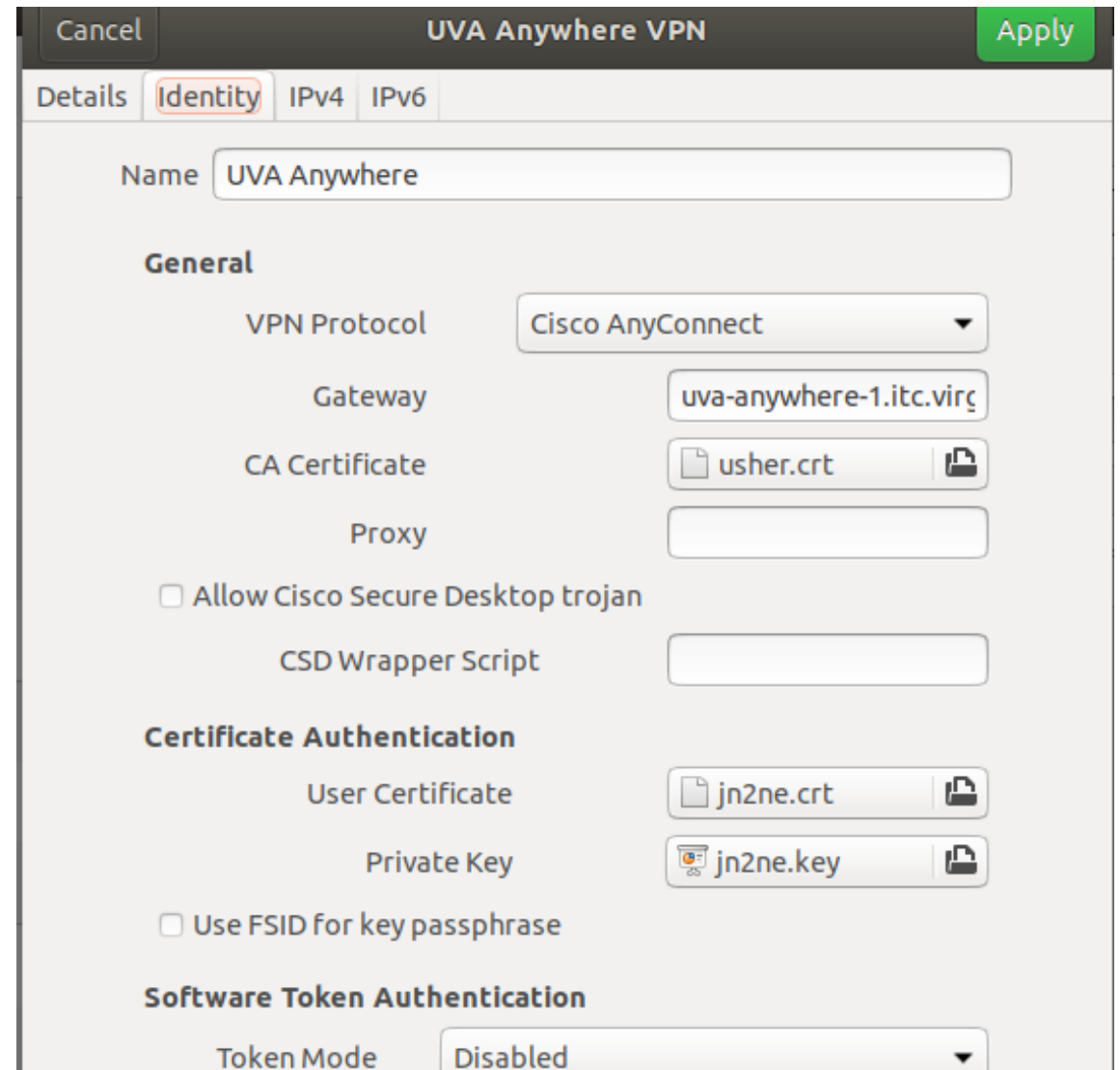Setup your VM/Ubuntu machine to connect to the cloud server → Setup the hostname and the environment

Inspect ROS topics → Download and build a visualization package

SSH into the server with your team account → Verify TeleOp

[Step 1] UVA VPN Setup

- Follow instructions on [this page](#) to setup VPN on Linux

  https://www.rc.virginia.edu/userinfo/linux/uva-anywhere-vpn-linux/

  - If you are not able to connect to the More Secure VPN, try:
    - At step 5: instead of "*moresecure-vpn-1.itc.virginia.edu*", set the gateway as "uva-anywhere-1.itc.virginia.edu"
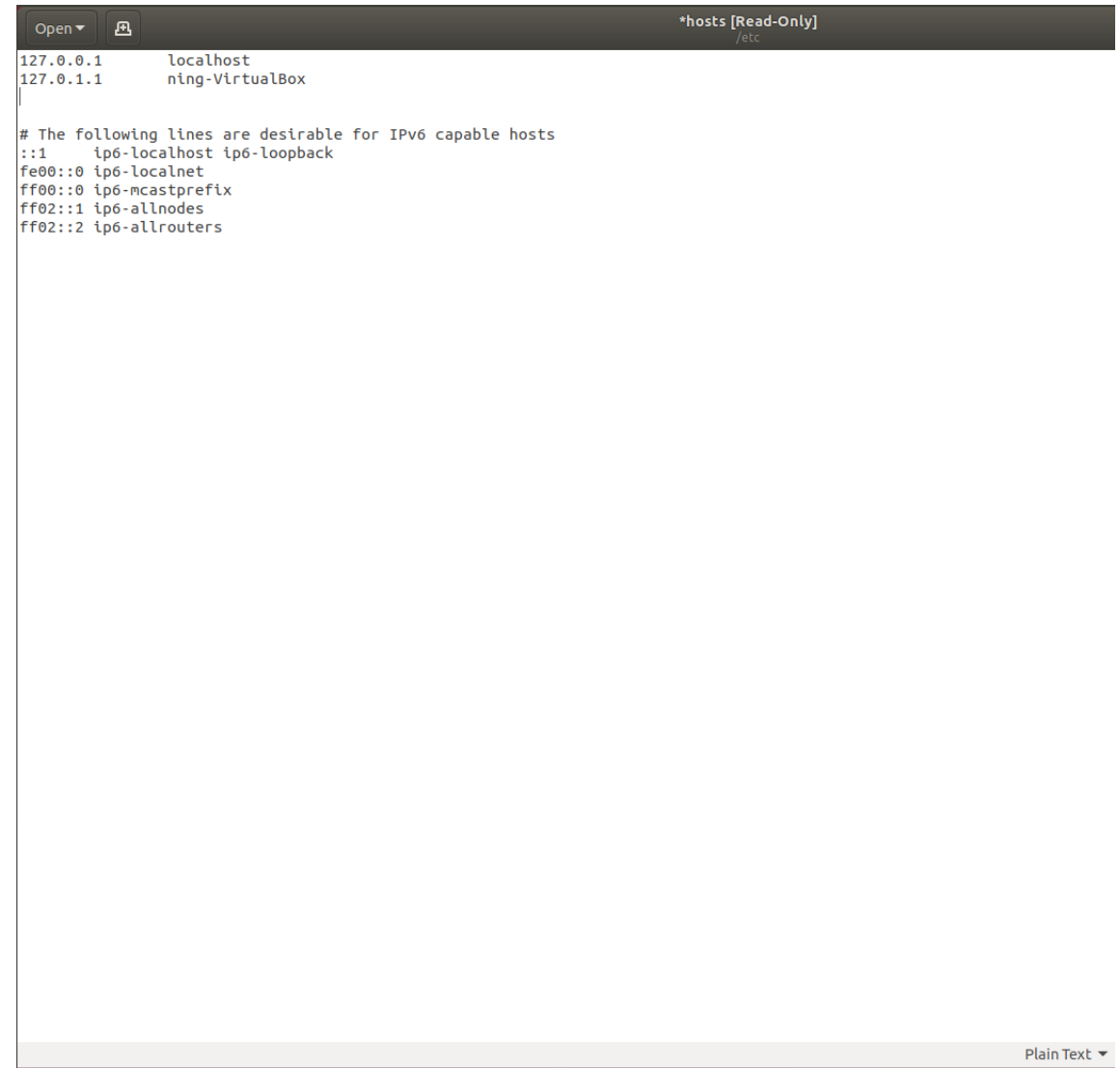
Setup the Hostnames

```
Open ▼   🔖                          *hosts [Read-Only]
                                          /etc
127.0.0.1       localhost
127.0.1.1       ning-VirtualBox


# The following lines are desirable for IPv6 capable hosts
::1     ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters




                                                        Plain Text ▼
```
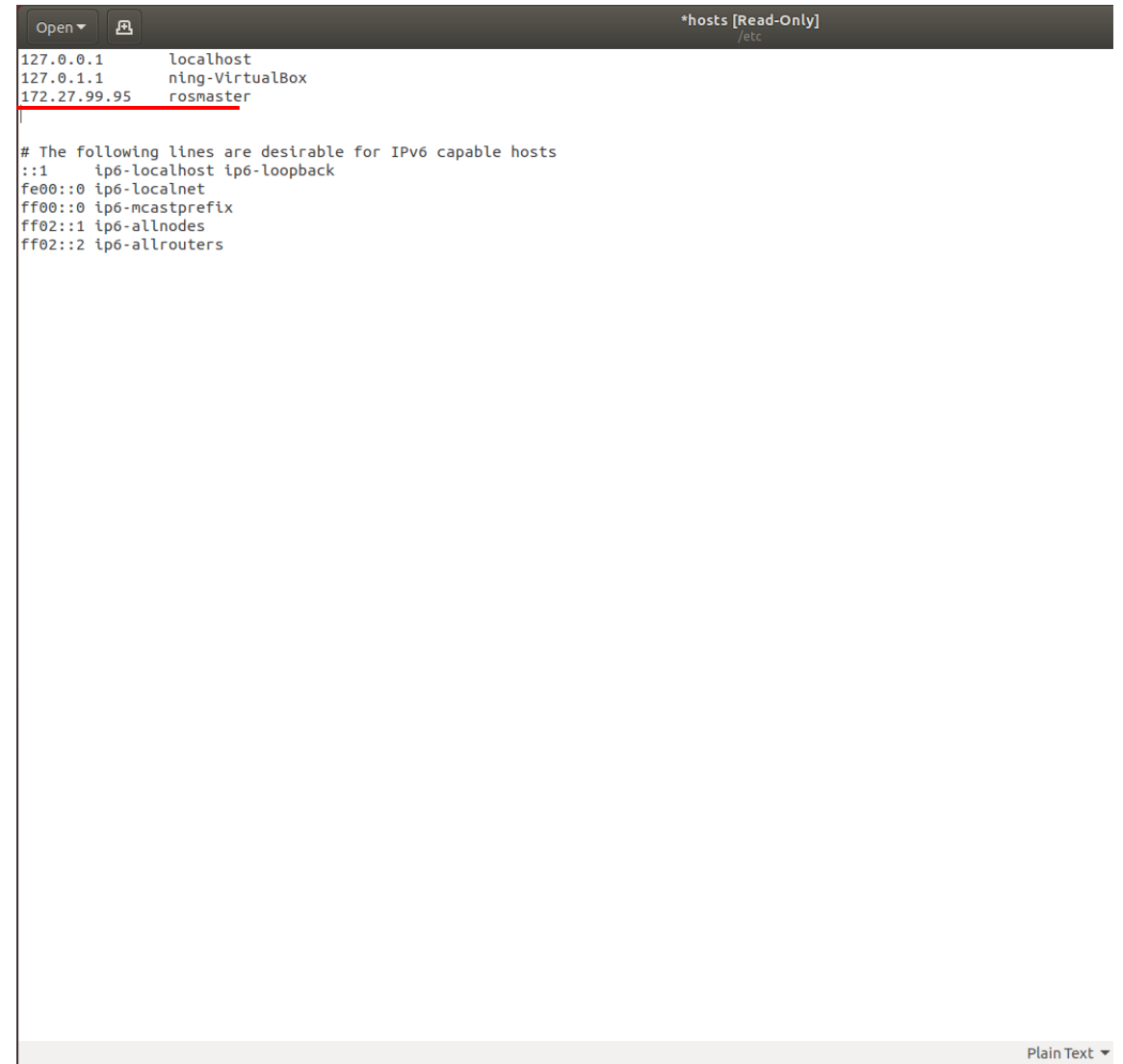
- Open the file at "/etc/hosts"
    - e.g. "$ cd ~ && sudo gedit /etc/hosts"

Setup the Hostnames

- Add the current IP address and the hostname of the simulation server
  172.27.99.95 rosmaster

Setup the Hostnames


```
ning@ning-VirtualBox: ~
                                                    ning@ning-VirtualBox: ~ 108x31
ning@ning-VirtualBox:~$ ping rosmaster
PING rosmaster (172.27.99.95) 56(84) bytes of data.
64 bytes from rosmaster (172.27.99.95): icmp_seq=1 ttl=60 time=24.5 ms
64 bytes from rosmaster (172.27.99.95): icmp_seq=2 ttl=60 time=27.5 ms
64 bytes from rosmaster (172.27.99.95): icmp_seq=3 ttl=60 time=38.6 ms
64 bytes from rosmaster (172.27.99.95): icmp_seq=4 ttl=60 time=39.3 ms
64 bytes from rosmaster (172.27.99.95): icmp_seq=5 ttl=60 time=45.4 ms
64 bytes from rosmaster (172.27.99.95): icmp_seq=6 ttl=60 time=31.5 ms
```

$ ping rosmaster

- Enter "$ *ping rosmaster*" to verify everything is set properly
  - If you do not see output info as the image shows on the right, check if VPN is connected.

Setup the Environment

- Add following lines to your .bashrc file:
  - e.g. ~/"$ gedit .bashrc"

  # ROS environment variables

  source /opt/ros/melodic/setup.bash

  source ~/catkin_ws/devel/setup.bash

  # ROS network variables

  export ROS_MASTER_URI=http://rosmaster:11311

  # Confirm setup to user

  echo "This terminal is connected to the UVA F1/10 simulator"

Source the Environment

$ rostopic list

- Open a new terminal.
 - Enter "$ *rostopic list*"

  make sure VPN is connected

Remote Visualization

- Download the F1/10 visualization package
  - $ cd ~/catkin_ws/src/f1tenth-course-labs && git pull.
  - If not working, try rebuild your workspace:

    $ mkdir -p catkin_ws/src/ && cd catkin_ws/src && catkin_init_workspace

    $ git clone https://github.com/linklab-uva/f1tenth-course-labs

    $ cd .. && catkin_make && source devel/setup.bash

Remote Visualization
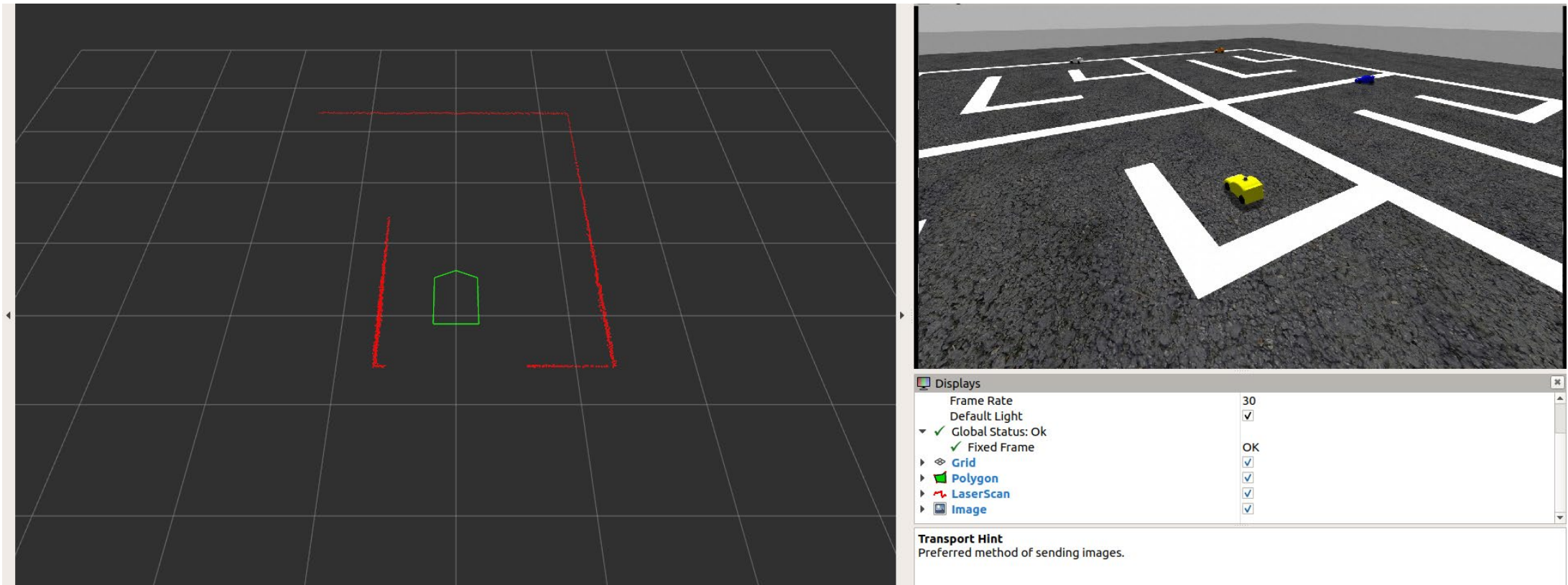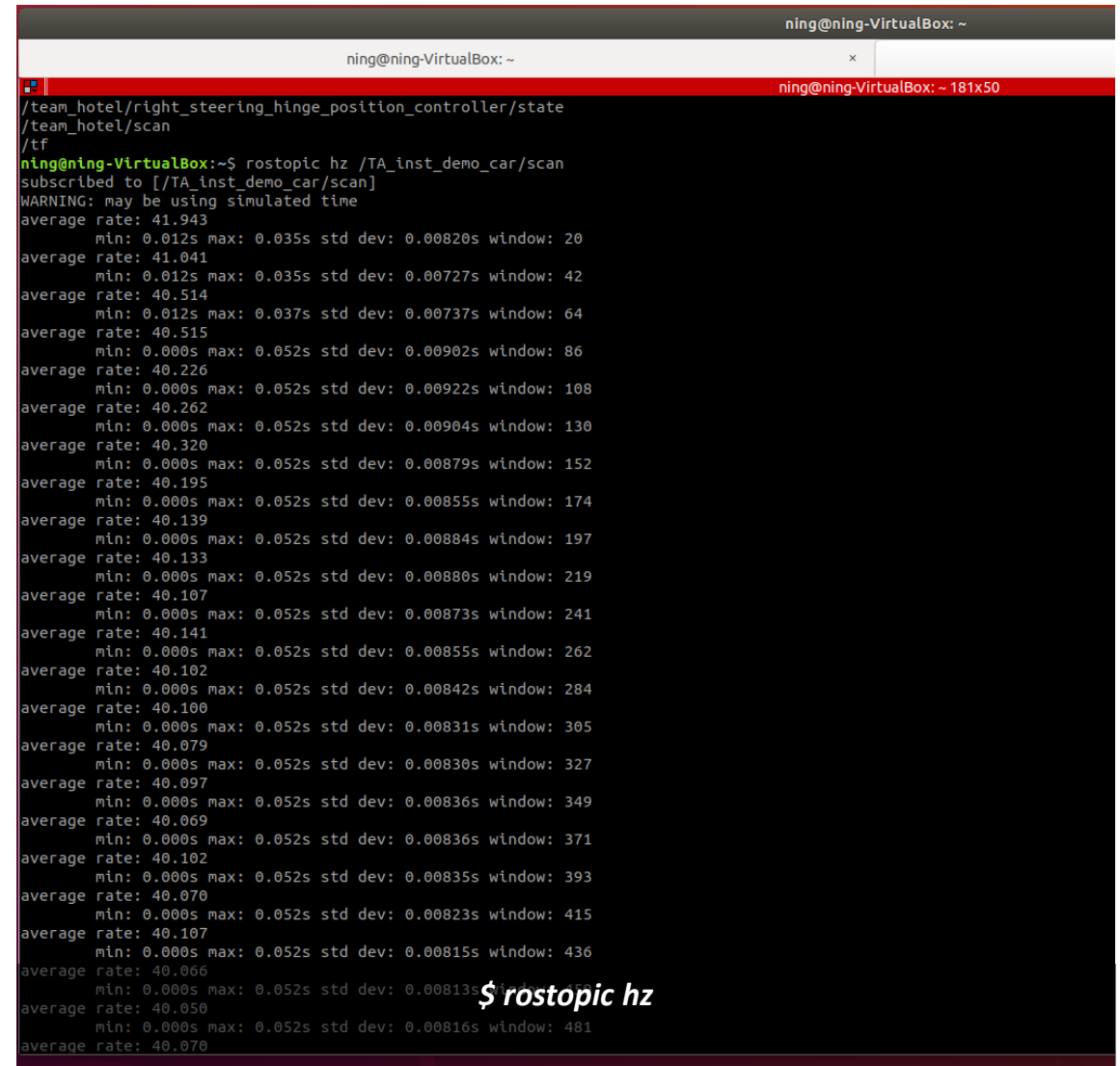
- **Connect to team car**
  - **Open a new terminal:**
    - *$ roslaunch f1tenth-sim-viz racecar.viz *
    - *> computing_id:=<your_computing_ID> *
    - *> team_name:=team_<phonetic_alphabet>*

Remember to connect to VPN before connecting to your team car.
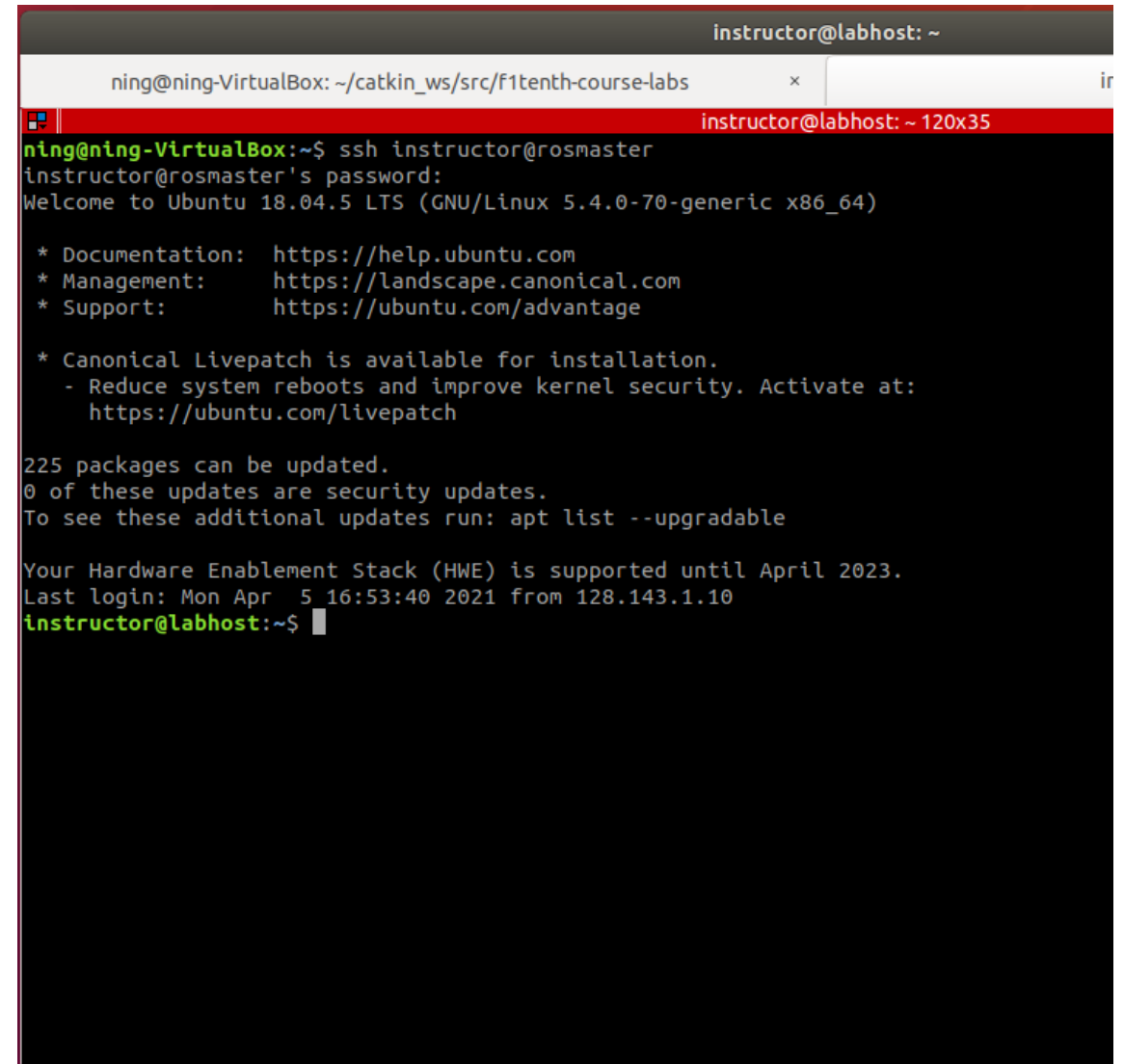
Connecting to the Team Workspace

- Check the configurations have been setup correctly.
  - In your terminal, enter *"$ rostopic hz /team_<phonetic_alphabet>/scan"* in a terminal

Connecting to the Team Workspace

- SSH to access the workspace
  - *$ ssh team_<phonetic_alphabet>@rosmaster*
  - For the first time, type *"yes"* then enter your team password

- *One step process to connect to workspace
  - $ *sshpass -p '<your_team_password>' ssh team_<phonetic_alphabet>@rosmaster*
  - Install **sshpass** using **apt-get**

Verify Teleop

- After connecting to your team workspace

- Enter "$ roslaunch f1tenth-sim-utils teleop.control"
  - Instructions:

    w – forward

    s – reverse

    a – turn left

    d – turn right

    q – stop

$ roslaunch f1tenth-sim-utils teleop.control

Reset car position

- Open a new terminal and connect to team workspace

- Enter "$ rosparam set / *team_<phonetic_alphabet >*/reset_to_pit_stop 1"