Connection to remote ROS simulation - EN

Robot operating system (ROS) is a distributed system consisting of nodes which carry out functionality, e.g. read sensor values, compute kinematics etc. Nodes communicate with each other via topics and services. This structure enables to distribute nodes across a TCP/IP network on multiple machines. The whole system is controlled by a single process called roscore, placed on a single machine.
This attribute of the ROS enables us to connect to Gazebo simulation of the mobile robot on a remote server via a virtual network LogMeIn Hamachi.

Installation of virtual network

From webpage https://www.vpn.net/linux download, but do not run:
logmein-hamachi_2.1.0.203-1_amd64.deb
From the location of the file, run the following console command:
sudo dpkg -i logmein-hamachi_2.1.0.203-1_amd64.deb
Subsequently it is possible to login and connect to the virtual network of the simulation. Run the following commnads in console:

sudo hamachi login
sudo hamachi set-nick your_nickname
sudo hamachi connect network_name network_password

It is possible to check connection to the network with command with server IP address:
ping xx.xx.xx.xx

You can find out server IP address and yours with command:
sudo hamachi list

Configure ROs for remote connection

For the ROS to find roscore, which is running on a remote machine, it s necessary to add environment variables with IP addresses of the remote machine and own. Environment variables are set on initialization of the console from .bashrc file located in the home directory (initial directory). Open .bashrc with console command:
nano .bashrc
At the end of the file on new line add the following two lines and change IP addresses accordingly:
príslušnú IP adresu:
export ROS_IP=xx.xx.xx.xx # own IP address
export ROS_MASTER_URI=http://xx.xx.xx.xx:11311 # servers IP address, where roscore is
Presss:

1. ctrl+x

2. y
3. enter

Close and open the console again. After that the environment variables should be set. They are set only for the current console session, so the “export” statement must remain in the .bashrc file.

Check communication with roscore on remote machine

Run console commands:
rostopic list
rostopic echo /sensors

First command lists all topics available on roscore. Second, should read messages published on /sensors topic and list them to the console:
Reading stops by pressing ctrl+c

In case connection to roscore does not work

Running of SSH
Remote nodes communicate with roscore via SSH, therefore it must be running..

Installation of SSH server - run following commands
sudo apt update
sudo apt install ssh
Running of SSH
sudo systemctl enable ssh
sudo systemctl start ssh
After ending of the work it is possible to stop SSH by running the following commands:
sudo systemctl stop ssh
sudo systemctl disable ssh