Configuring ROS Networks for Multiple Computers

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1 Overview

Connecting multiple computers together in a ROS network requires a few simple modifications to inform computers where the network master is located. This will provide a quick set of instructions for setting things up. There are other ways for configuring this, which can be found in the official ROS documentation, but this attempts to simplify things for rapid integration.

2 Defining the ROS Master

One computer in the network must run the master, which provides a central listing of which nodes are registered in the network, what parameters are set, and other such book-keeping details. The master is the computer which is executing the command `roscore`. Only one computer should execute this command, and all other computers should be configured to communicate with this computer. To do this, you need to define `ROS_MASTER_URI`, which will generally be done by entering the following command into the terminal:

```
export ROS_MASTER_URI=http://$HOST:11311
```

where `$HOST` is the hostname of the computer acting as the ROS master. This command only affects the terminal it's executed in, so to make this the default setting when launching a new terminal, you can insert this command at the end of the `~/.bashrc` file.

3 Defining Host Names

ROS, by default, requires every node to know the name of every other node in the network, so network communication happens by host names, as opposed to IP addresses. In order to do this, you must have the hostname and IP address of every computer you want to have in the ROS network, which will be referred to as `$IP` and `$HOST`. On

every computer in the network, you must log in and edit the `/etc/hosts` file, and
add one line for every other computer that reads:

```
$IP $HOST
```

For two computers, you must add two lines to two files, one file on each computer.
For three computers, you must add three lines to a file on all three computers. If you add
fewer lines, or add them to fewer computers, you will run into an error on a computer
which reads something along the lines of:

```
Couldn't find an AF_INET address for [$HOST]
```