Running ROS across multiple machine

↳ It explains the use of ROS_MASTER_URI to configure multiple machine to use a single master.

* Overview

⇒ ROS is designed with distributed computing in mind.

⇒ A well-written node makes no assumptions about where in the network it runs, allowing computation to be relocated at runtime to match the available resources.

↳ Exception is driver node that communicate with a piece of hardware.

⇒ Deploying a ROS system across multiple machines :-

- You only need one master. Select one machine to run it on.
- All nodes must be configured to use the same master, via ROS_MASTER_URI.

- There must be complex, bi-directional connectivity between all pairs of machine, on all ports.
- Each machine must advertise itself by a name that all other machines can resolve.

In raspberry Pi

ssh adityashriwastava33@coffee_bot
export ROS_MASTER_URI = http://
coffeebot:11311

=== run any node ===

On Laptop

ssh aditya@laptop
export ROS_MASTER_URI = http://coffeebot:11311

=== run any node or subscribe ===
to any topic that is hosted
by coffeebot.

ROS/NetworkSetup

⇒ ROS has certain requirements of the network configuration:

- ⇒ There must be complete bi-directional connectivity between all pairs of machine, on all ports.
- ⇒ Each machine must advertise itself by a name that all other machine can resolve.

⇒ In the following sections, we'll assume that you want to run a ROS system on two machines, with the following hostnames and IP address.

- marvin.example.com : 192.168.1.1
- hal.example.com : 192.168.1.2

* Name resolution

⇒ When a ROS node advertises a topic, it provides a hostname:port combination (a URI) that other nodes will contact when they want to subscribe to that topic.

URI ⇒ A Uniform resource Identifier is a string of characters that unambiguously identifies a particular resource.

⇒ Most common form of URI is the Uniform Resource Locator (URL)

⊕ Setting a name explicitly

⇒ If a machine supports a hostname that is not addressable by other machines, then you need to set either the ROS_IP or ROS_HOSTNAME environment variables.

In /etc/hosts

192.168.43.18 Coffeebot

192.168.43.21 laptop