Tutorial

IP lookup - Bitmap algorithm

Find all the files

The following files are required:

- Controller: ip-lookup.py
  - tree.py
  - node.py
  - readingconfig.py
- Topology Files
  - topology.py
  - config

The files are available at https://github.com/NBajanca/bitmap-IPlookup.

In the Topology folder there are different network topologies, one must be chosen and the name changed to the ones above.

Start the controller

To start the controller the controller file and all its imports (tree.py, node.py, readingconfig.py and config) should be in the app directory of ryu.

In a terminal window we start the controller with following calls:

1. cd (ryu directory)
2. PYTHONPATH=. ./bin/ryu-manager ryu/app/ip_lookup py

```
--Packet IN: Switch id[1], Src MAC[00:00:00:00:00:01], Dst MAC[ff:ff:ff:ff:ff:ff], Port[1]
  Broadcast packet
  Received ARP request for dst IP 195.0.0.254
  Sent gratious ARP reply [195.0.0.254]-[00:00:00:11:11:01] to 195.0.0.1
--Packet IN: Switch id[1], Src MAC[00:00:00:00:00:01], Dst MAC[00:00:00:11:11:01], Port[1]
  --- IP LOOKUP
  --- src_ip[195.0.0.1], dst_ip[154.128.0.2]


Lookup of IP 154.128.0.2 (binary: 10011010100000000000000000000010)
Found child in 5
Found result in 8


Search ended!
Result: 3
  --- Destination present on switch ['154.128.0.254', '16', '00:00:00:11:11:09', 's3', '3']
  --- Output port set to 2
  --- Changing destination mac to 00:00:00:00:00:0a
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--Packet IN: Switch id[3], Src MAC[00:00:00:00:00:0a], Dst MAC[ff:ff:ff:ff:ff:ff], Port[2]
  Broadcast packet
  Received ARP request for dst IP 154.128.0.254
  Sent gratious ARP reply [154.128.0.254]-[00:00:00:11:11:09] to 154.128.0.2
--Packet IN: Switch id[3], Src MAC[00:00:00:00:00:0a], Dst MAC[00:00:00:11:11:09], Port[2]
  --- IP LOOKUP
  --- src_ip[154.128.0.2], dst_ip[195.0.0.1]


Lookup of IP 195.0.0.1 (binary: 11000011000000000000000000000001)
Found result in 2


Search ended!
Result: 1
  --- Destination present on switch ['195.0.0.254', '8', '00:00:00:11:11:01', 's1', '1']
  --- Output port set to 1
  --- Changing destination mac to 00:00:00:00:00:01
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```

Start Mininet

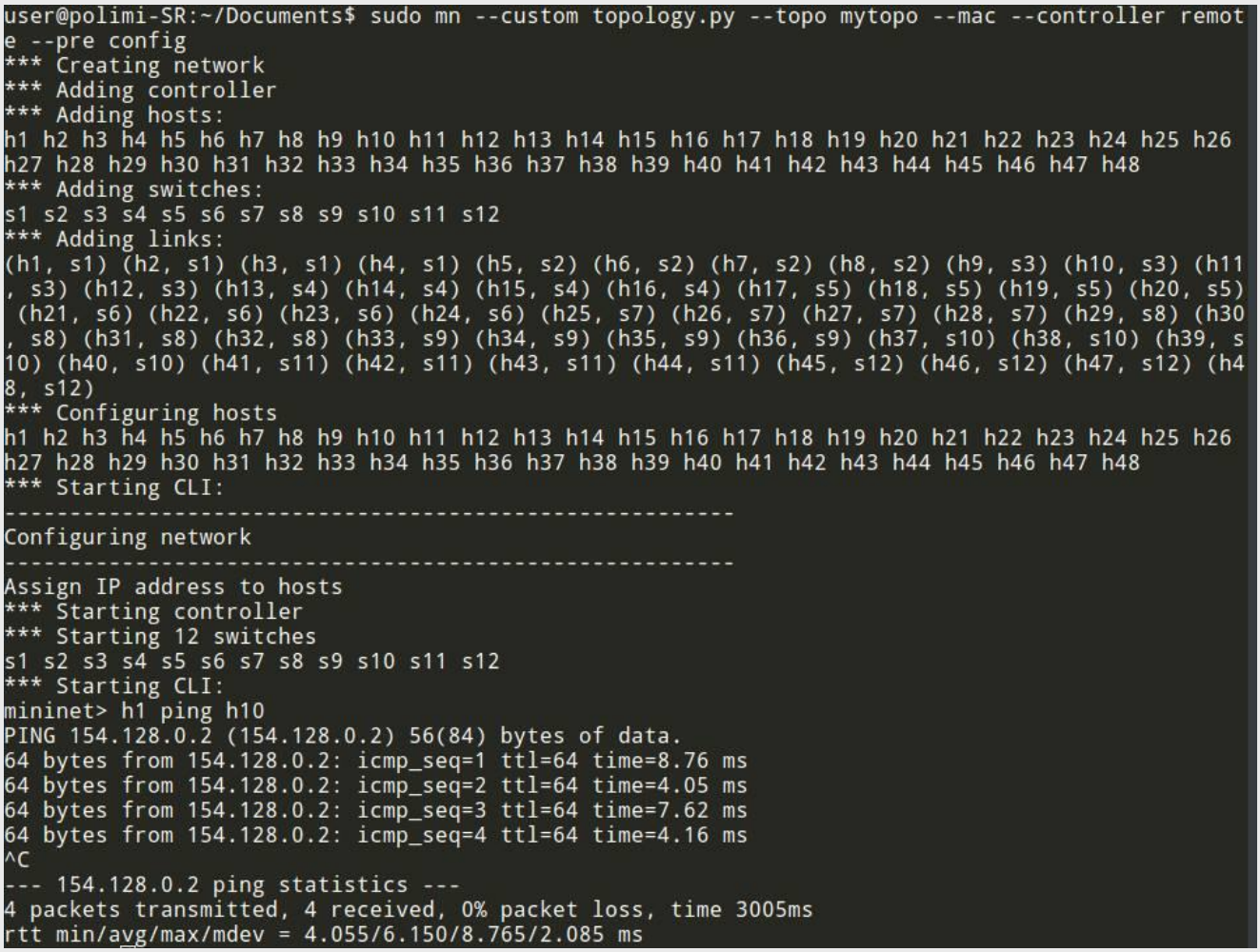
To start mininet the topology files (topology.py and config) must be in the same directory.

In another terminal window we start the controller with following calls:

1. cd (topology and configuration files directory)
2. sudo mn --custom topology.py --topo mytopo --mac --controller remote --pre config

In the above command:

- custom starts mininet from a custom topology file
- topo mytopo uses the topology set in the topology file
  - --mac means that mininet will sequentially assign mac addresses to the various devices
- controller remote means that we are using a remote controller
  - --pre config means that the config file is used to configure the network



Controller Information

Via Rest we can get the following information:

- Switches – IP, MASK, NAME and DPID
  - GET http://0.0.0.0:8080/v1.0/lookup/switches
- Bridge-Table – MACs associated to the routers ports
  - GET http://0.0.0.0:8080/v1.0/lookup/bridge-table
- Timers – Time spent in lookup algorithms
  - GET http://0.0.0.0:8080/v1.0/lookup/timers

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