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Homework – Multiple controllers

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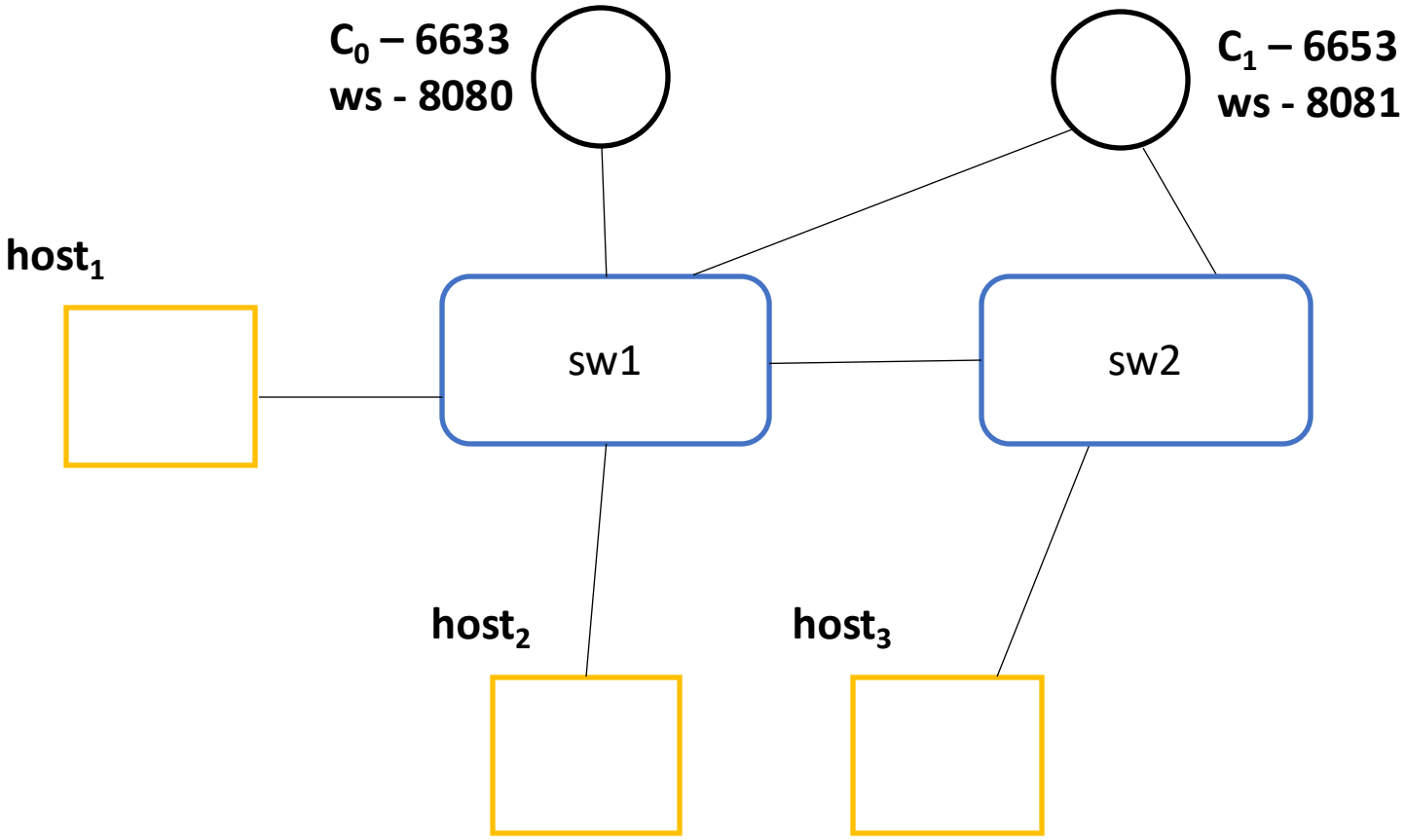
LAB. OF NETWORK PROGRAMMABILITY AND AUTOMATION - PROGRAMMABLE NETWORKING (A.Y. 2024/2025)

The goal of this exercise is twofold:

1. make you practice, and get confident, with practical sessions seen during previous lab sessions;
2. show limitations of the approach, i.e., triggering role requests from the outside of the SDN controller framework (in this case, Ryu)

Here, you are asked to carry out the exercise following all the steps, and to answer all related questions. You will have to provide a report (pdf format) containing answers and screenshots.

Topology:
C_0 and C_1 assume different roles for switches

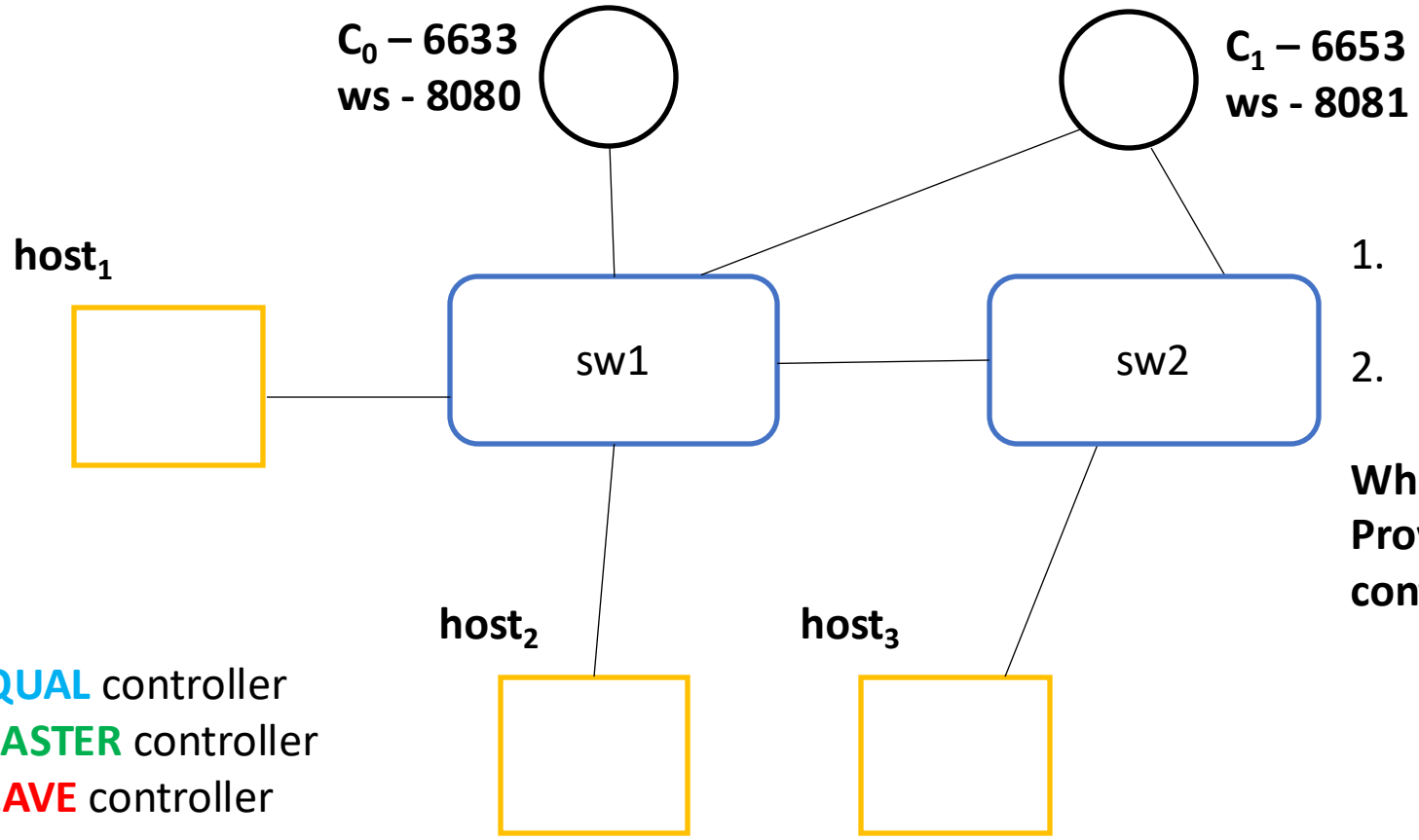


EQUAL controller
MASTER controller
SLAVE controller

Topology:

- Modify *1switch_3host_ext_cntlr.py* to build the topology with 2 switches and 3 hosts required for the assignment

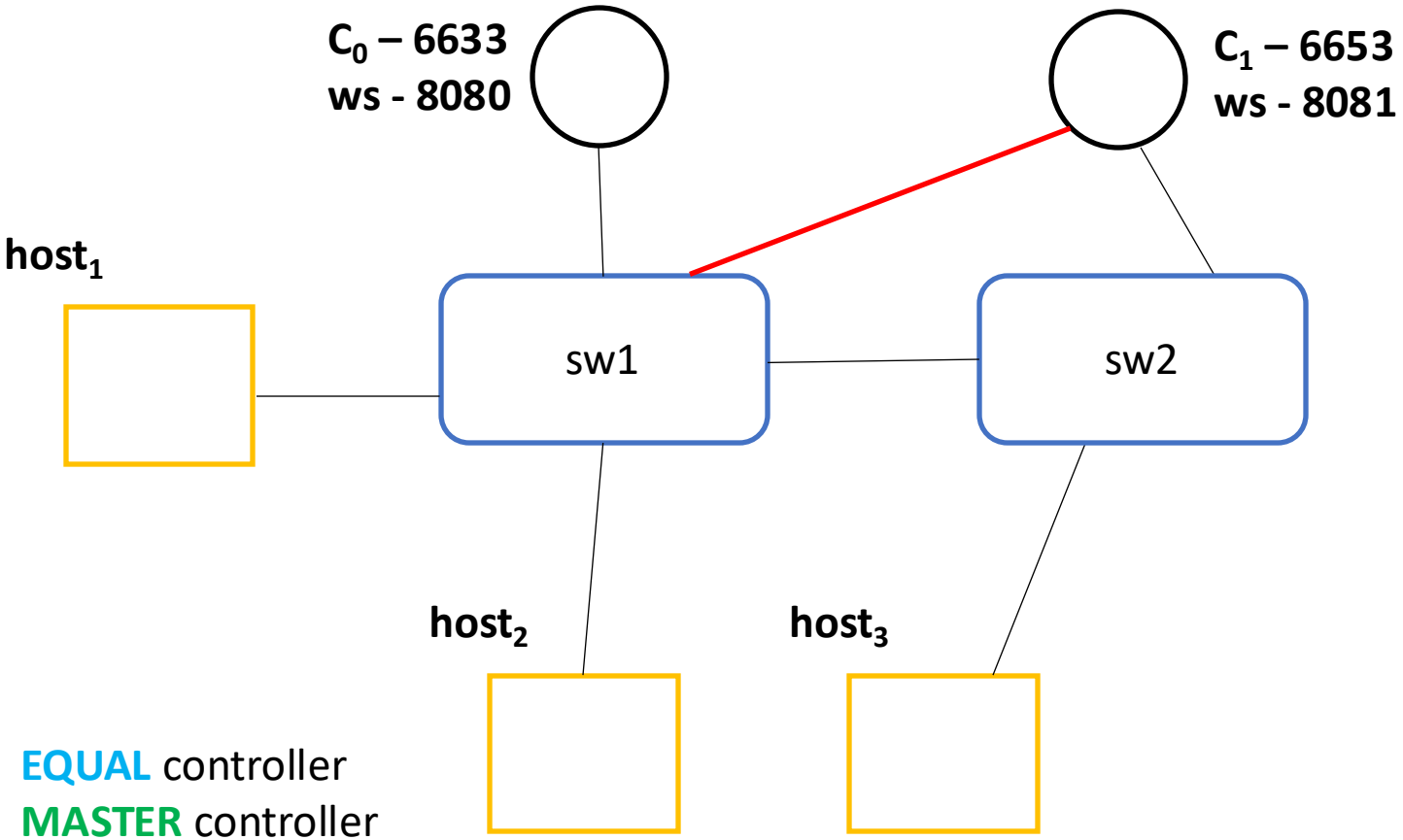
Step 0: start controllers and topology



1. Start two simple_switch_13 controllers, together with related REST web servers
2. Start Mininet topology

What is the (default) situation?
Provide a screenshot that shows state of each controller by using the Open vSwitch command suite

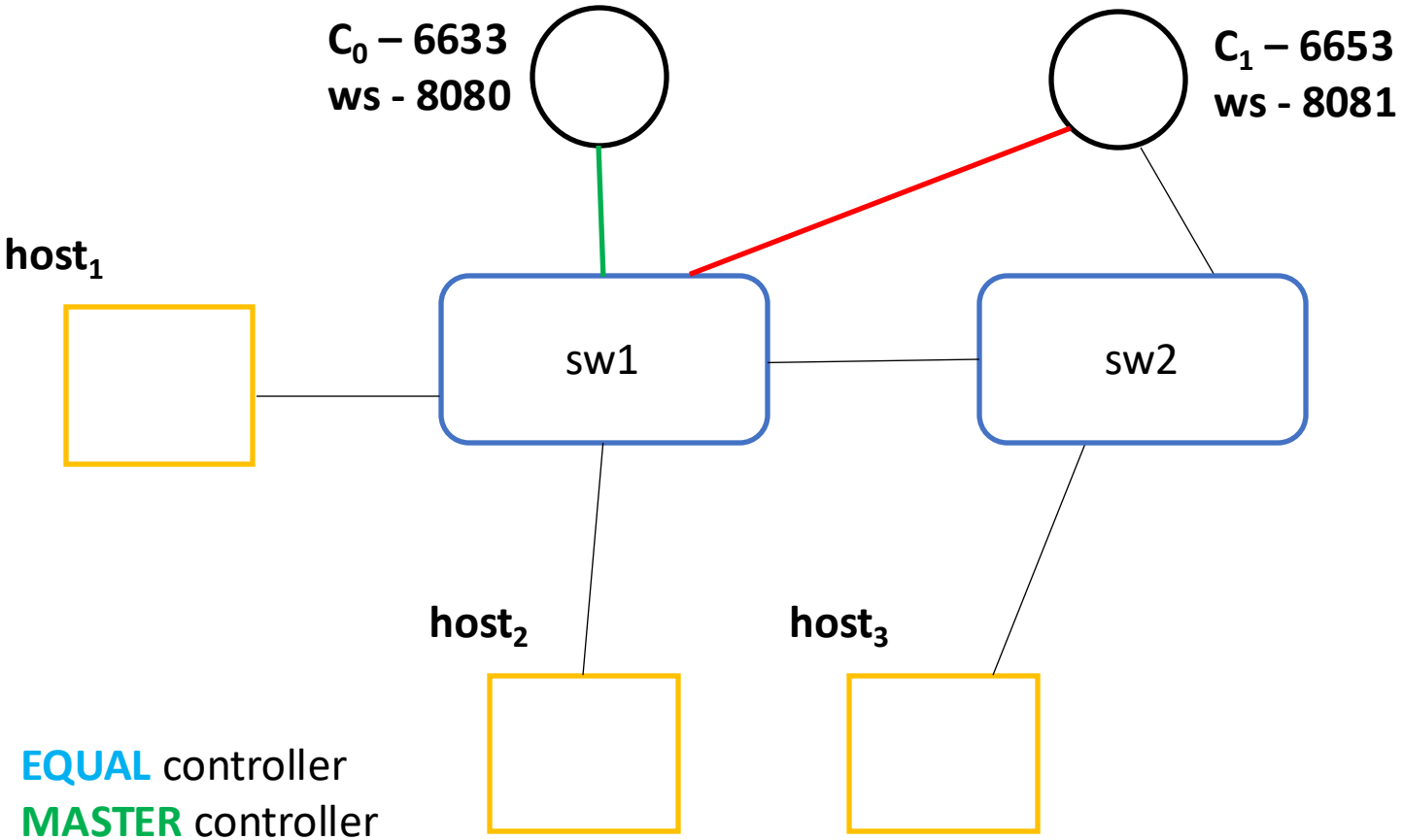
Step 1: C_1 requires to be SLAVE for sw1



Set C_1 to act as SLAVE for sw1

Provide the command that allows you to trigger such a change

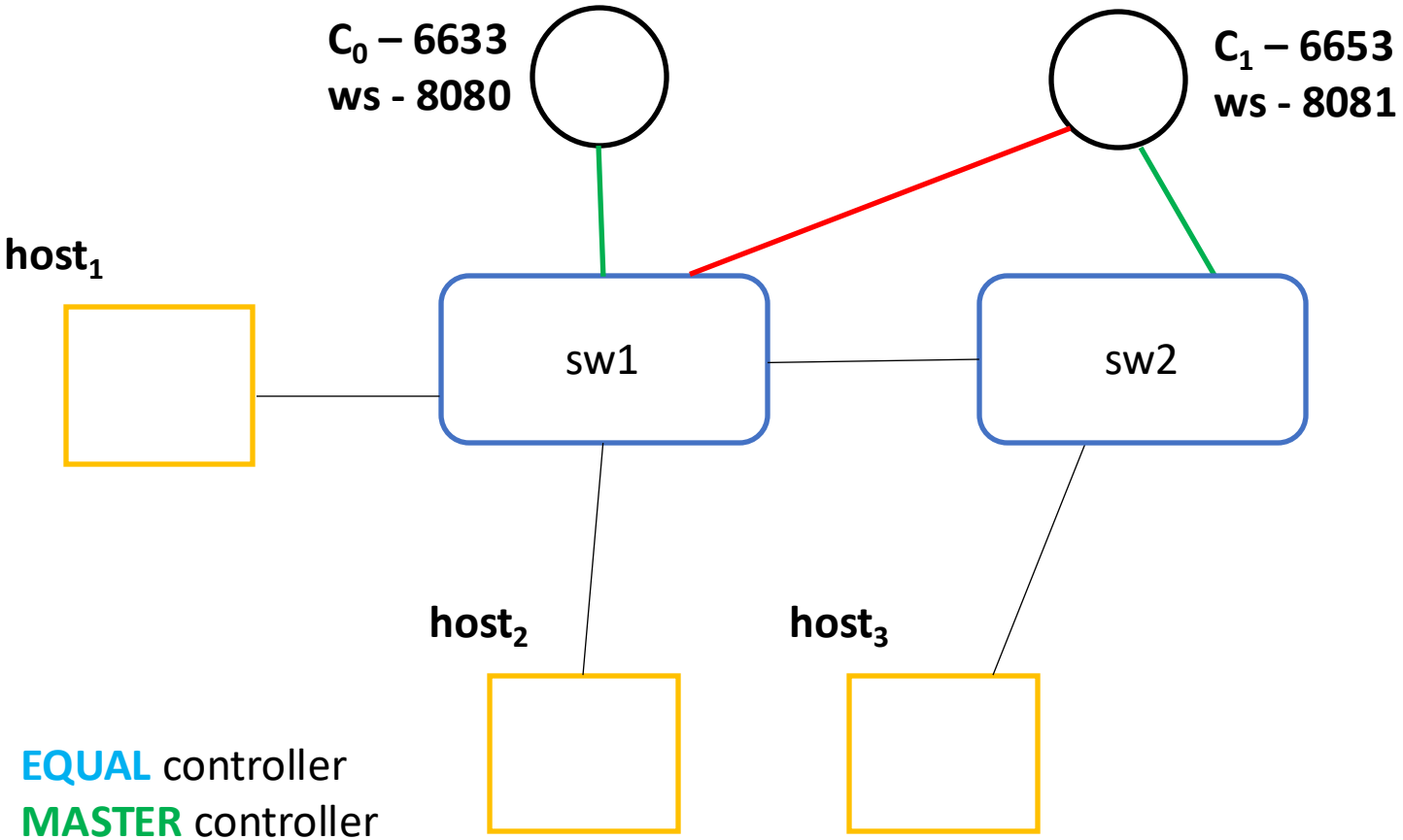
Step 2: C_0 requires to be MASTER for sw1



Set C_0 to act as MASTER for sw1

Provide the command that allows you to trigger such a change

Step 3: C_1 requires to be MASTER for sw2

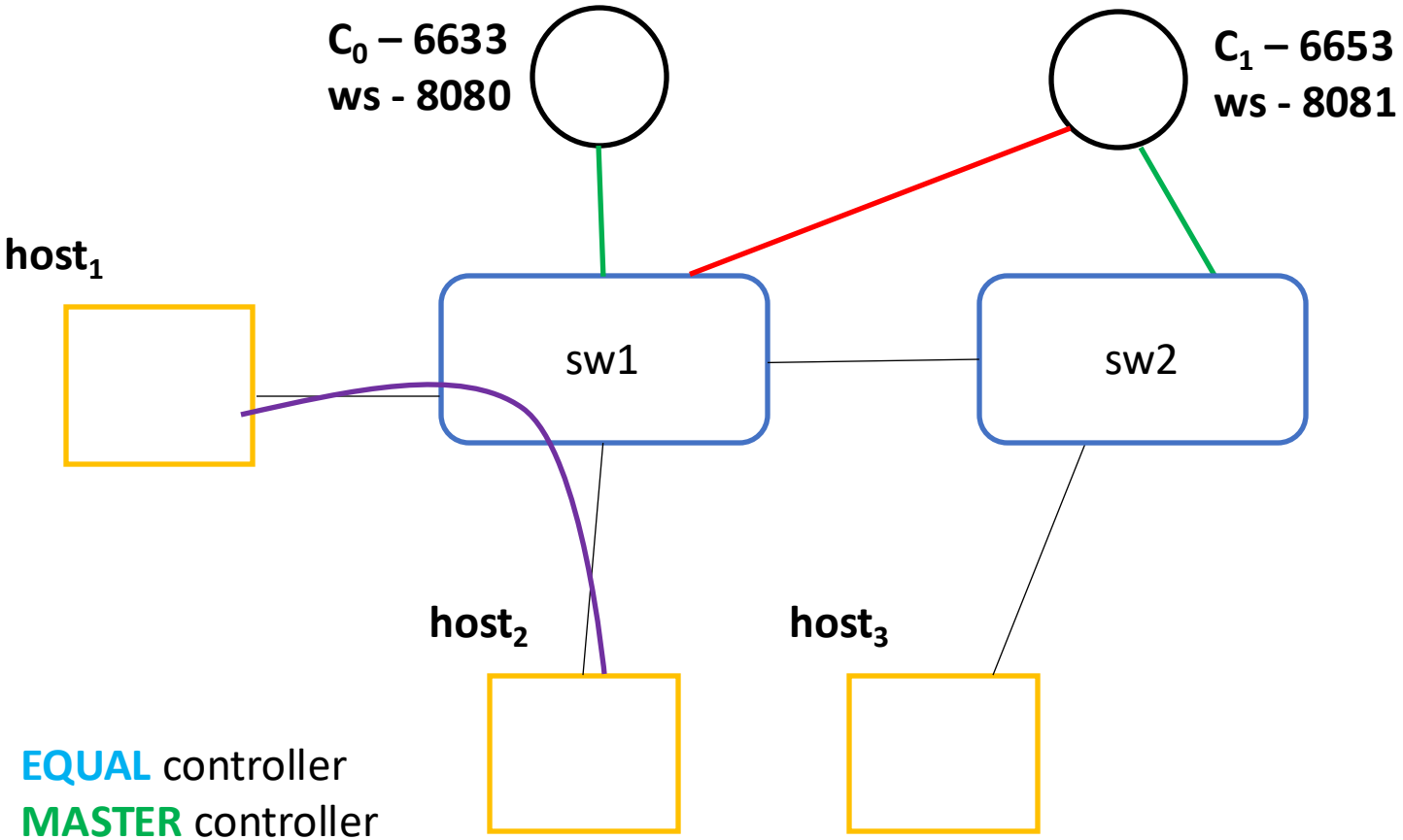


Set C_1 to act as MASTER for sw2
Note that, to do this, you will have to compose a proper json file, by indicating correct datapath id and role

Provide:

1. **the command that allows you to trigger such a change**
2. **a screenshot of the states of the controllers at the end of this step**

Step 4: $host_1$ ping $host_2$

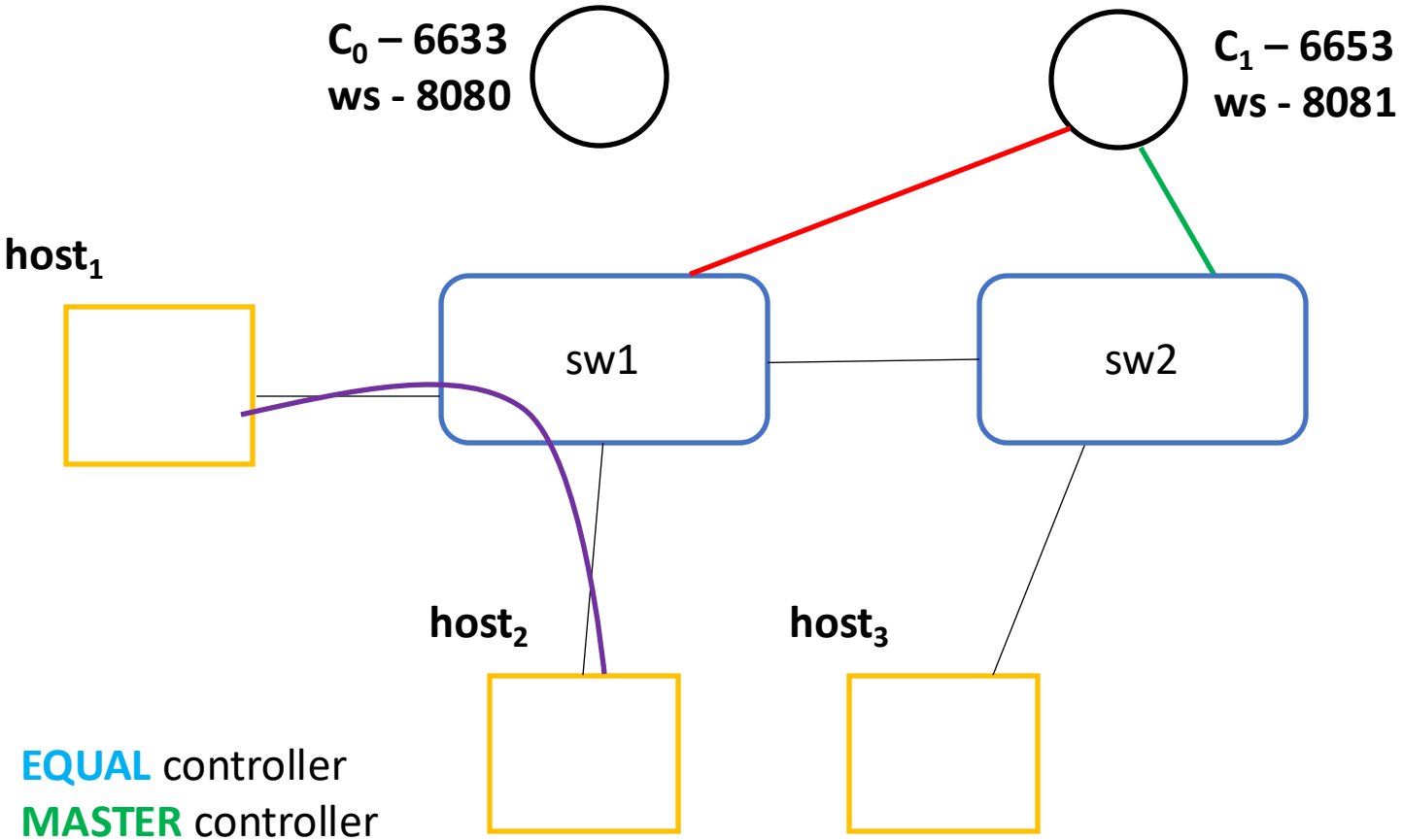


Use Mininet to make a ping between host1 and host2

Provide:

1. **a screenshot of Mininet CLI of the ping**
2. **the answer to the following questions**
   a. **Does ping work?**
   b. **Why?**
   c. **Support your comments by dumping and taking a screenshot of OpenFlow rules on sw1**

Step 5: stop C_0 controller

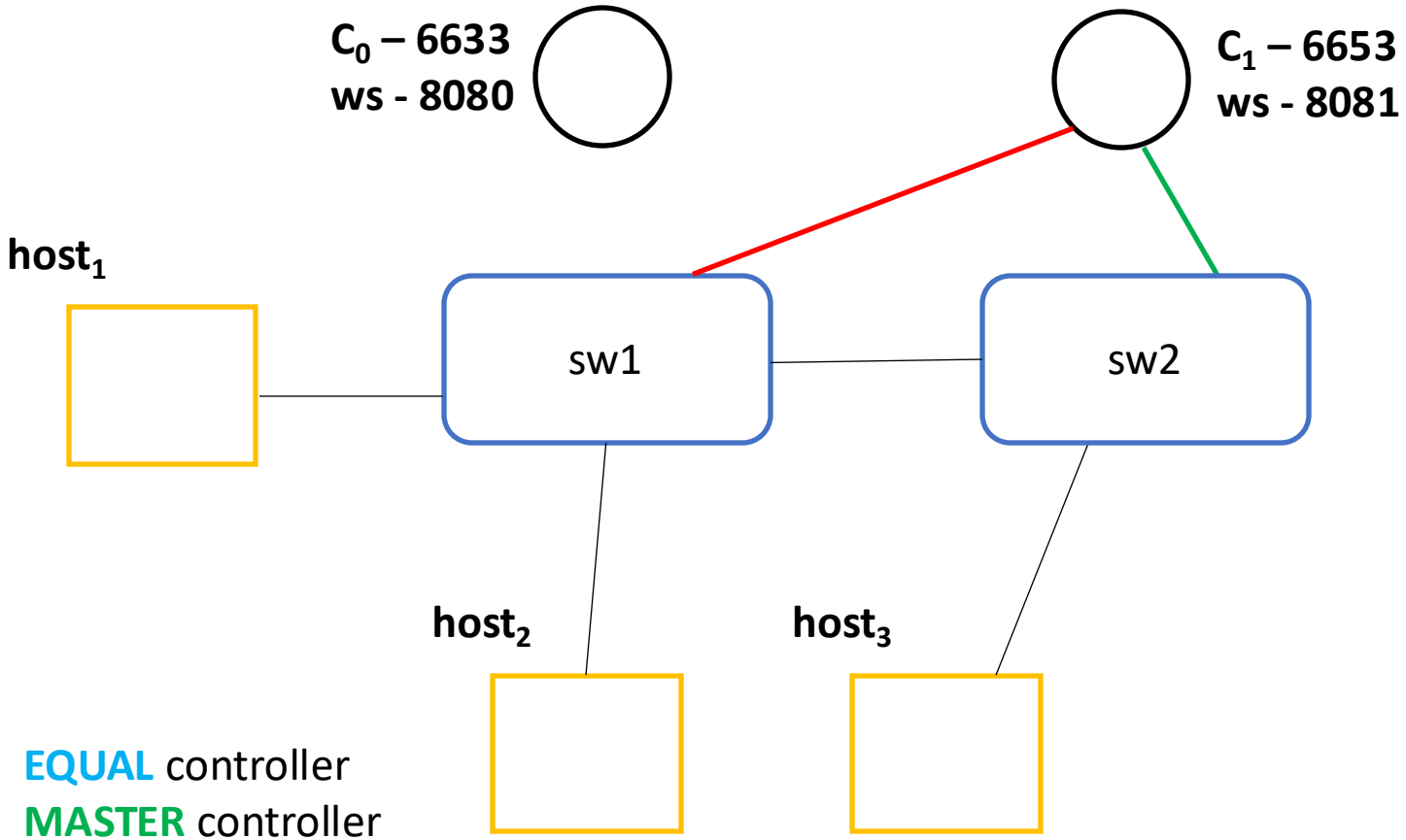


Stop C_0 controller

Provide answers to these questions:

1. **Does ping between host1 and host2 still work?**
2. **Why?**

Step 6: host1 ping host3



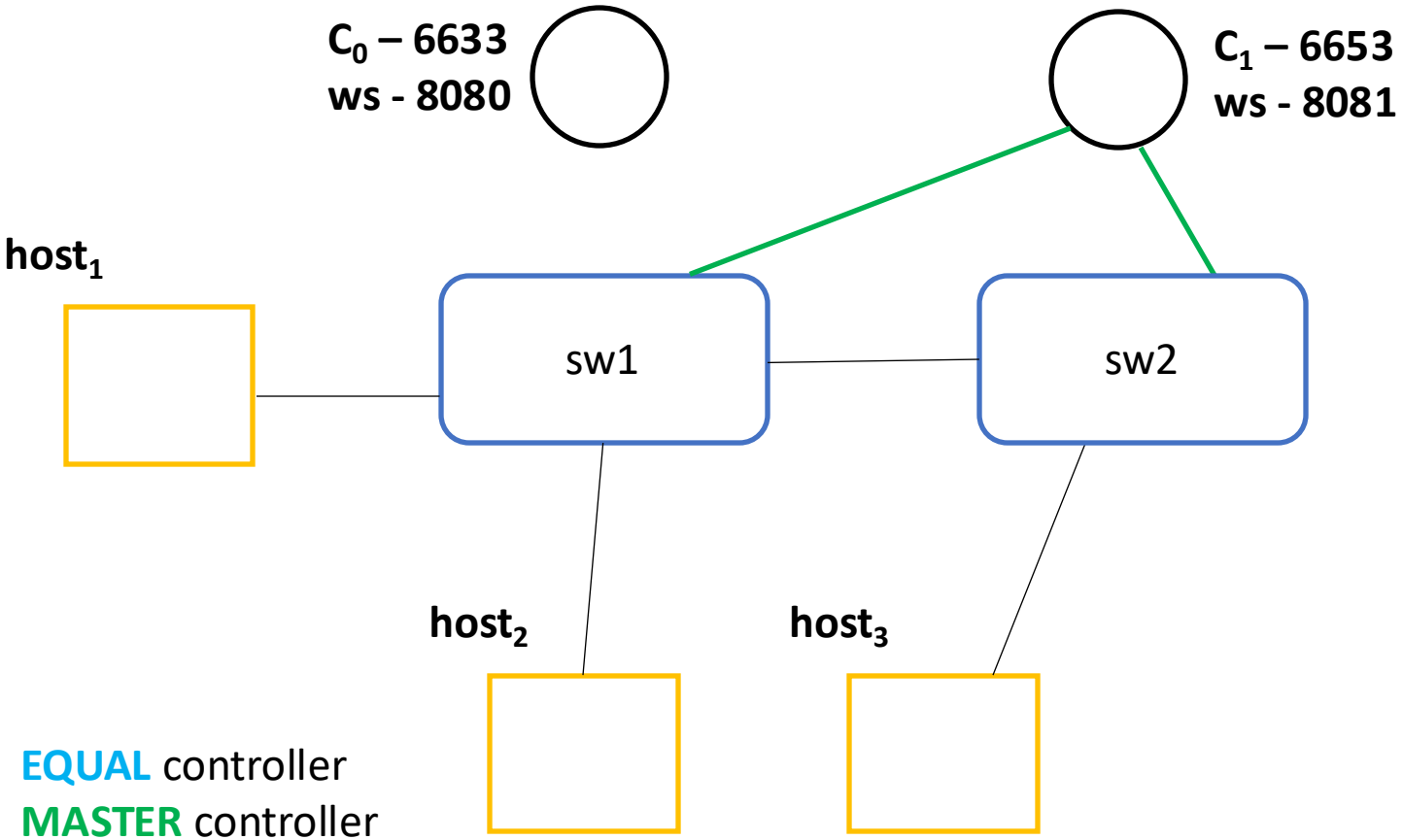
EQUAL controller
MASTER controller
SLAVE controller

Use Mininet to make a ping between host1 and host3

Provide:

1. **a screenshot of Mininet CLI of the ping**
2. **the answer to the following questions**
   a. **Does ping work?**
   b. **Why?**
   c. **Support your comments by dumping and taking a screenshot of OpenFlow rules on sw1 and sw2**
3. **What is the state of each controller? Support your comments providing a screenshot of the state of controllers**

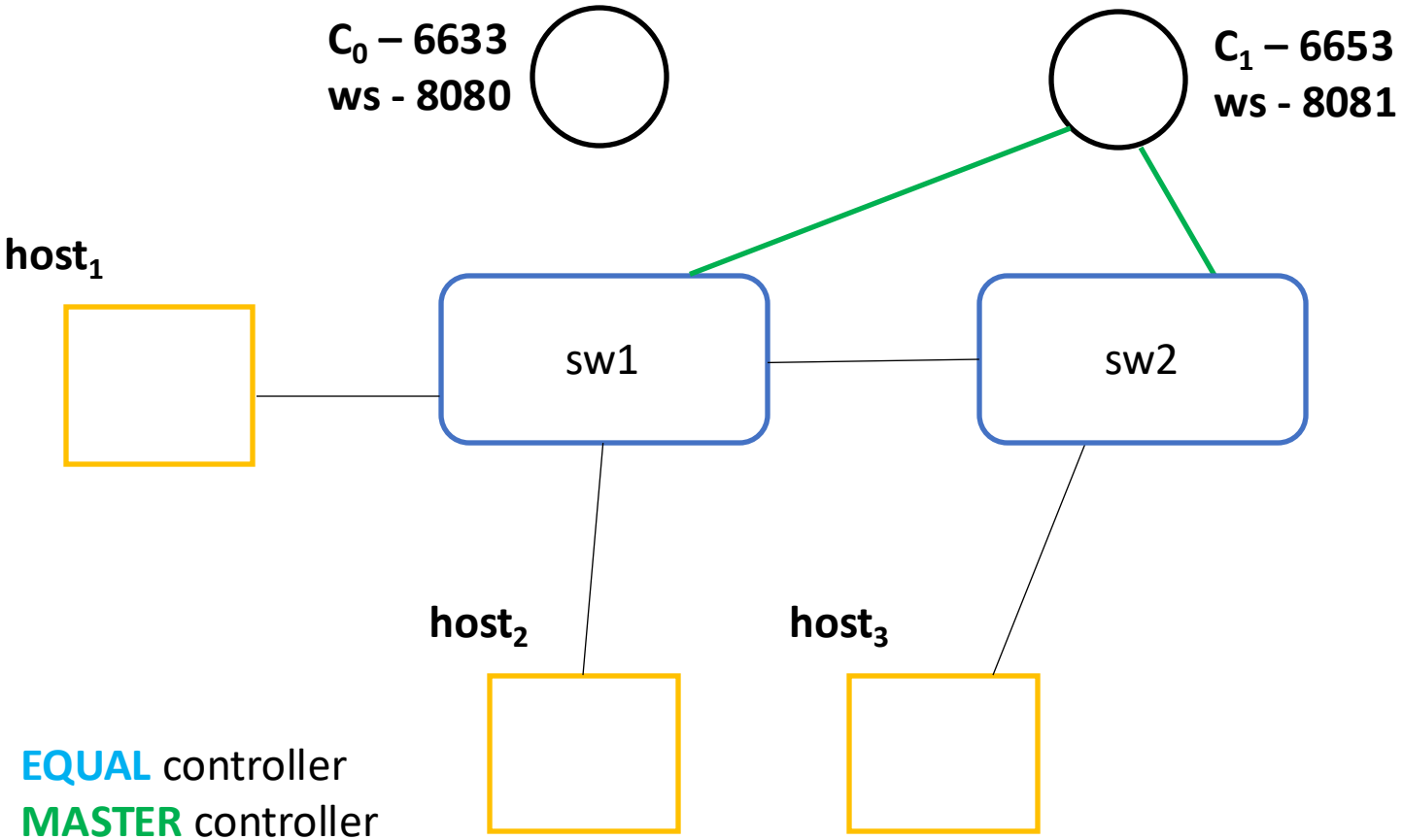
Step 7: C_1 requires to be MASTER for sw1



Set C_1 to act as MASTER for sw1

Provide the command that allows you to trigger such a change

Step 8: host1 ping host3



Use Mininet to make a ping between host1 and host3

Provide:

1. **a screenshot of Mininet CLI of the ping**
2. **the answer to the following questions**
   a. **Does ping work?**
   b. **Why?**
   c. **Support your comments by dumping and taking a screenshot of OpenFlow rules on sw1 and sw2**