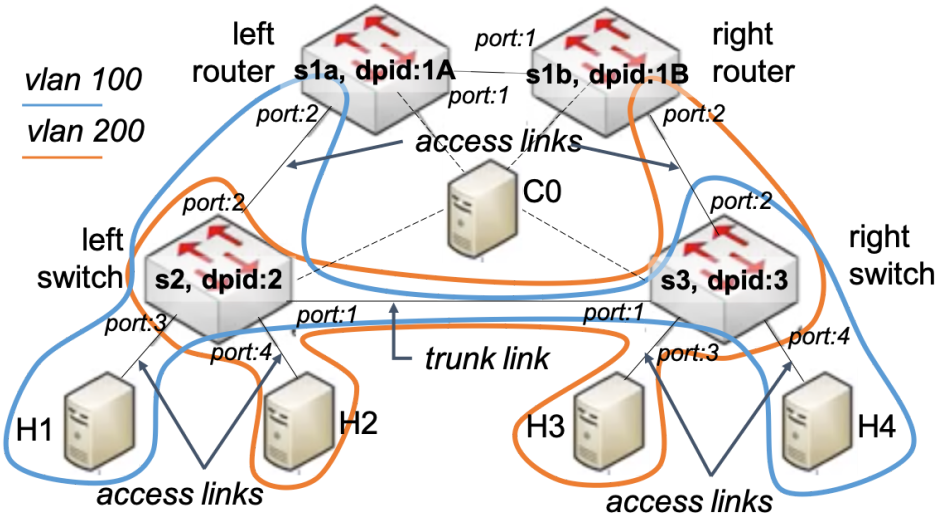
VLAN with OpenFlow

Create a network with two interconnected switches, divided into two virtual LANs with use of the VLAN technology, which are connected through two routers. You should run the script mininet-router-vlan.py, by copying this file to your working directory and executing

```
root@node0ID:~# chmod 777 mininet-router-vlan.py
root@node0ID:~# ./mininet-router-vlan.py
```

which creates in Mininet the following topology. The dashed lines represent the connections to the controller C0.



Left and right switches have datapath ids 0x2 and 0x3 respectively, and create two VLANs with ids 100 and 200, which use IP networks **known to the routers**. Let's say that VLAN 100 uses the IP network 192.168.1.0/24, while VLAN 200 uses the IP network 192.168.2.0/24. The left router has datapath id 0x1A and behaves as a gateway for VLAN 100, having the IP address 192.168.1.1 at its interface connected to the left switch and participating in VLAN 100. The right router has datapath id 0x1B and is the gateway for VLAN 200, having the IP address 192.168.2.1 at its corresponding interface connected to the right switch and participating in VLAN 200. When packets pass through the **access links**, they are **not VLAN encapsulated**, while the trunk link is the one that packets are **VLAN encapsulated**. Have also in mind that the left and right interfaces of the left router have the MAC addresses 00:00:00:00:01:01 and 00:00:00:00:03:01 respectively, while the left and right interfaces of the right router have the MAC addresses 00:00:00:00:03:02 and 00:00:00:00:02:01 respectively.

Extend your controller from the previous exercise (static routing with two routers), in a way that each router does the same job with before, and each switch handles the packets and

reactively configures flows for:

- **receiving packets from its access ports** and forwarding them according to the normal L2 functionality. If these packets are to be forwarded to a trunk link, they are **encapsulated with the known VLAN id** (e.g. left switch encapsulates packets coming from port 3 and pushes to port 1, with VLAN id 100).
- **receiving packets from its trunk ports** and forwarding them according to the normal L2 functionality. If these packets are to be forwarded to an access link, they are **decapsulated from the VLAN header**.

Have in mind that packets exchanged between two hosts of the same VLAN, should pass through the trunk link if the hosts are attached to different switches. On the other hand, if the hosts belong to different VLANs, then their exchanged packets should pass through the routers.