Computer Networks

Tutorial 7:

Flow Tables

Scope of This Tutorial

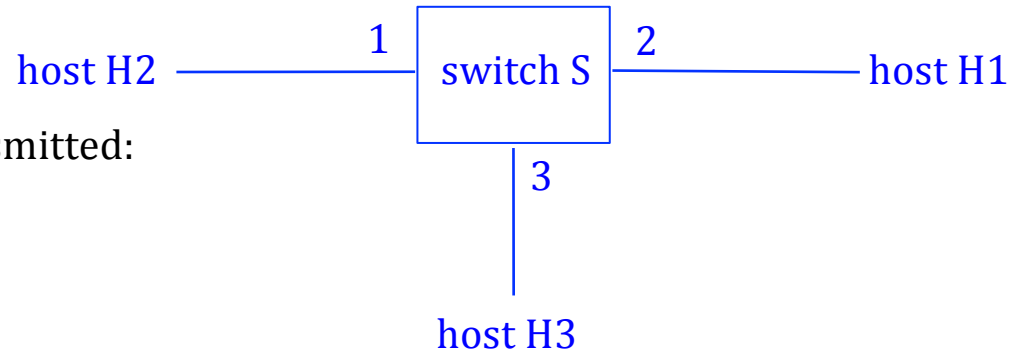
- OpenFlow learning switch
  - with one OF table
  - with two OF tables

OpenFlow Learning Switch

OF learning switch can be implemented on modern OF switches more efficiently than it is presented in the exercises below.

However, simple OF switches work that way.

Exercise 1



Four packets are transmitted:

a) H1→H2

b) H2→H1

c) H3→H1

d) H2→H3

S reports to the controller C all packets with unknown destination

- The reports include the source and destination addresses and the arrival port

C installs on S a forwarding entry for that source address.

S floods the packet of unknown destination

S forward the packet of known destination

match field	**match action**	**no-match default**
destaddr	forward	flood and send to controller

3 + 1 table entries will taken

For the four packets above, indicate

- whether S reports the packet to C
- if so, any new forwarding entry C installs on S
- whether S is able to forward the packet using its table, or must fall back to flooding

Solution to Exercise 1

a) H1→H2

- This packet is reported to C, as destination H2 is not known by S
- C installs on S the rule that H1 can be reached via port 1
- The packet is then flooded

b) H2→H1

- This packet is not reported to C, as destination H1 is known by S
- The packet is not flooded, it is forwarded to port 1

c) H3→H1

- This packet is again not reported to C
- It is forwarded to port 1

d) H2→H3

- This packet is reported to C, as destination H3 is not known by S
- C installs on S the rule that H2 can be reached via port 2
- The packet is then flooded

Exercise 2

The same network and the same transmitted packets

S reports to C all packets with unknown destination or unknown source

match field	**match action**	**no-match default**
destaddr & srcaddr	forward	flood and send to controller
only destaddr	forward & send to controller	

3^2 + 3 + 1 table entries will taken

For the four packets above, indicate

- whether S reports the packet to C
- if so, any new forwarding entry C installs on S
- whether S is able to forward the packet using its table, or must fall back to flooding

Two OF Tables

Learning switch implemented in two tables

Table	match field	match action	no-match default
T_0	destaddr	forward and send to T_1	flood and send to T_1
T_1	srcaddr	do nothing	send to controller

Exercise 3

Give a similar table where the matches are reversed; that is, T0 matches the srcaddr field and T1 matches the destaddr field.

How many table entries will be taken in both tables?

Table	match field	match action	no-match default