Department of Computer Science and Engineering
Data Science

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Semester: V
Class / Branch: CSE(DS)
Subject: WCN Lab
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Date Of Performance: 8/10/24
Date Of Submission: 10/10/24

Experiment No. 10

Aim:- To simulate Software Defined Network using Mininet.

```
apsit@apsit-HP-Pro-Tower-280-G9-E-PCI-Desktop-PC:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04 LTS
Release:        24.04
Codename:       noble
apsit@apsit-HP-Pro-Tower-280-G9-E-PCI-Desktop-PC:~$ sudo apt get install mininet
[sudo] password for apsit:
E: Invalid operation get
apsit@apsit-HP-Pro-Tower-280-G9-E-PCI-Desktop-PC:~$ sudo apt-get install mininetReading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  cgroup-tools iperf libcgroup2 libevent-2.1-7t64 libunbound8 libxdp1
  openvswitch-common openvswitch-switch python3-openvswitch python3-packaging
  python3-sortedcontainers socat
Suggested packages:
  openvswitch-doc python-sortedcontainers-doc
The following NEW packages will be installed:
  cgroup-tools iperf libcgroup2 libevent-2.1-7t64 libunbound8 libxdp1 mininet
  openvswitch-common openvswitch-switch python3-openvswitch python3-packaging
  python3-sortedcontainers socat
0 upgraded, 13 newly installed, 0 to remove and 169 not upgraded.
Need to get 5,159 kB of archives.
After this operation, 17.2 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 libevent-2.1-7t64 amd64 2.1.12-stable-9ubuntu2 [145 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libunbound8 amd64 1.19.2-1ubuntu3.2 [442 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 openvswitch-common amd64 3.3.0-1ubuntu3 [1,040 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 python3-sortedcontainers all 2.4.0-2 [27.6 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble/main amd64 libxdp1 amd64 1.4.2-1ubuntu4 [62.5 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 python3-openvswitch amd64 3.3.0-1ubuntu3 [1,033 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 openvswitch-switch amd64 3.3.0-1ubuntu3 [1,607 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble/universe amd64 libcgroup2 amd64 2.0.2-2build1 [49.3 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble/universe amd64 cgroup-tools amd64 2.0.2-2build1 [70.5 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble/universe amd64 iperf amd64 2.1.9+dfsg-1 [136 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble/main amd64 python3-packaging all 24.0-1 [41.1 kB]
```

```
apsit@apsit-HP-Pro-Tower-280-G9-E-PCI-Desktop-PC:~$ mn --version
2.3.0
apsit@apsit-HP-Pro-Tower-280-G9-E-PCI-Desktop-PC:~$ sudo mn
*** No default OpenFlow controller found for default switch!
*** Falling back to OVS Bridge
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2
*** Adding switches:
s1
*** Adding links:
(h1, s1) (h2, s1)
*** Configuring hosts
h1 h2
*** Starting controller

*** Starting 1 switches
s1 ...
*** Starting CLI:
mininet> nodes
available nodes are:
h1 h2 s1
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth2
s1 lo:  s1-eth1:h1-eth0 s1-eth2:h2-eth0
mininet> dump
<Host h1: h1-eth0:10.0.0.1 pid=10931>
<Host h2: h2-eth0:10.0.0.2 pid=10933>
<OVSBridge s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None pid=10938>
mininet> links
h1-eth0<->s1-eth1 (OK OK)
h2-eth0<->s1-eth2 (OK OK)
mininet> ports
s1 lo:0 s1-eth1:1 s1-eth2:2
mininet> intfs
```

```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2
h2 -> h1
*** Results: 0% dropped (2/2 received)
mininet> pingallfull
*** Ping: testing ping reachability
h1 -> h2
h2 -> h1
*** Results:
 h1->h2: 1/1, rtt min/avg/max/mdev 0.783/0.783/0.783/0.000 ms
 h2->h1: 1/1, rtt min/avg/max/mdev 0.109/0.109/0.109/0.000 ms
mininet> h1 ping h2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=0.657 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.094 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.078 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.087 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.085 ms
64 bytes from 10.0.0.2: icmp_seq=6 ttl=64 time=0.099 ms
64 bytes from 10.0.0.2: icmp_seq=7 ttl=64 time=0.092 ms
64 bytes from 10.0.0.2: icmp_seq=8 ttl=64 time=0.098 ms
64 bytes from 10.0.0.2: icmp_seq=9 ttl=64 time=0.081 ms
64 bytes from 10.0.0.2: icmp_seq=10 ttl=64 time=0.091 ms
64 bytes from 10.0.0.2: icmp_seq=11 ttl=64 time=0.091 ms
64 bytes from 10.0.0.2: icmp_seq=12 ttl=64 time=0.080 ms
64 bytes from 10.0.0.2: icmp_seq=13 ttl=64 time=0.080 ms
64 bytes from 10.0.0.2: icmp_seq=14 ttl=64 time=0.074 ms
64 bytes from 10.0.0.2: icmp_seq=15 ttl=64 time=0.079 ms
64 bytes from 10.0.0.2: icmp_seq=16 ttl=64 time=0.087 ms
64 bytes from 10.0.0.2: icmp_seq=17 ttl=64 time=0.086 ms
^C
--- 10.0.0.2 ping statistics ---
17 packets transmitted, 17 received, 0% packet loss, time 16395ms
rtt min/avg/max/mdev = 0.074/0.119/0.657/0.134 ms
mininet> h1 ping h5 -c 5
ping: h5: Temporary failure in name resolution
```

```
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 47  bytes 3890 (3.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 8  bytes 584 (584.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8  bytes 584 (584.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

mininet> link s1 h1 down
mininet> pingall
*** Ping: testing ping reachability
h1 -> X
h2 -> X
*** Results: 100% dropped (0/2 received)
mininet> link s1 h1 up
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2
h2 -> h1
*** Results: 0% dropped (2/2 received)
mininet> help

Documented commands (type help <topic>):
========================================
EOF    gterm  iperfudp  nodes        pingpair      py      switch  xterm
dpctl  help   link      noecho       pingpairfull  quit    time
dump   intfs  links     pingall      ports         sh      wait
exit   iperf  net       pingallfull  px            source  x

You may also send a command to a node using:
  <node> command {args}
For example:
```

```
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dpctl  help   link      noecho       pingpairfull  quit    time
dump   intfs  links     pingall      ports         sh      wait
exit   iperf  net       pingallfull  px            source  x

You may also send a command to a node using:
  <node> command {args}
For example:
  mininet> h1 ifconfig

The interpreter automatically substitutes IP addresses
for node names when a node is the first arg, so commands
like
  mininet> h2 ping h3
should work.

Some character-oriented interactive commands require
noecho:
  mininet> noecho h2 vi foo.py
However, starting up an xterm/gterm is generally better:
  mininet> xterm h2

mininet> exit
*** Stopping 0 controllers

*** Stopping 2 links
..
*** Stopping 1 switches
s1
*** Stopping 2 hosts
h1 h2
*** Done
completed in 810.016 seconds
apsit@apsit-HP-Pro-Tower-280-G9-E-PCI-Desktop-PC:~$
```

Conclusion:We have successfully simulated Software Defined Network using Mininet.