Lab 4

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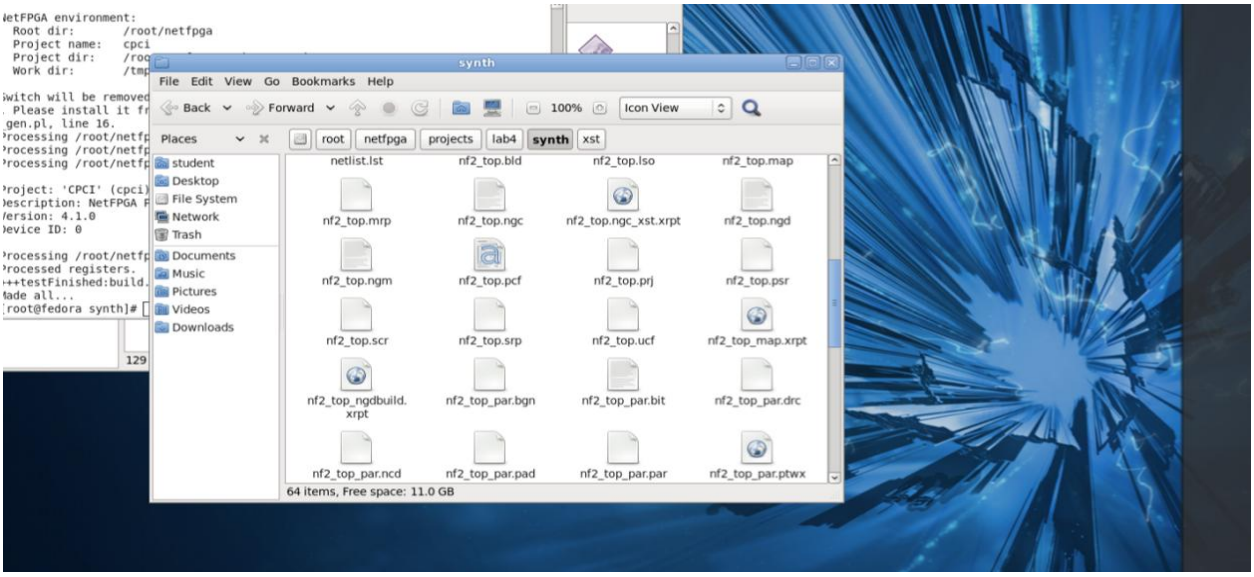
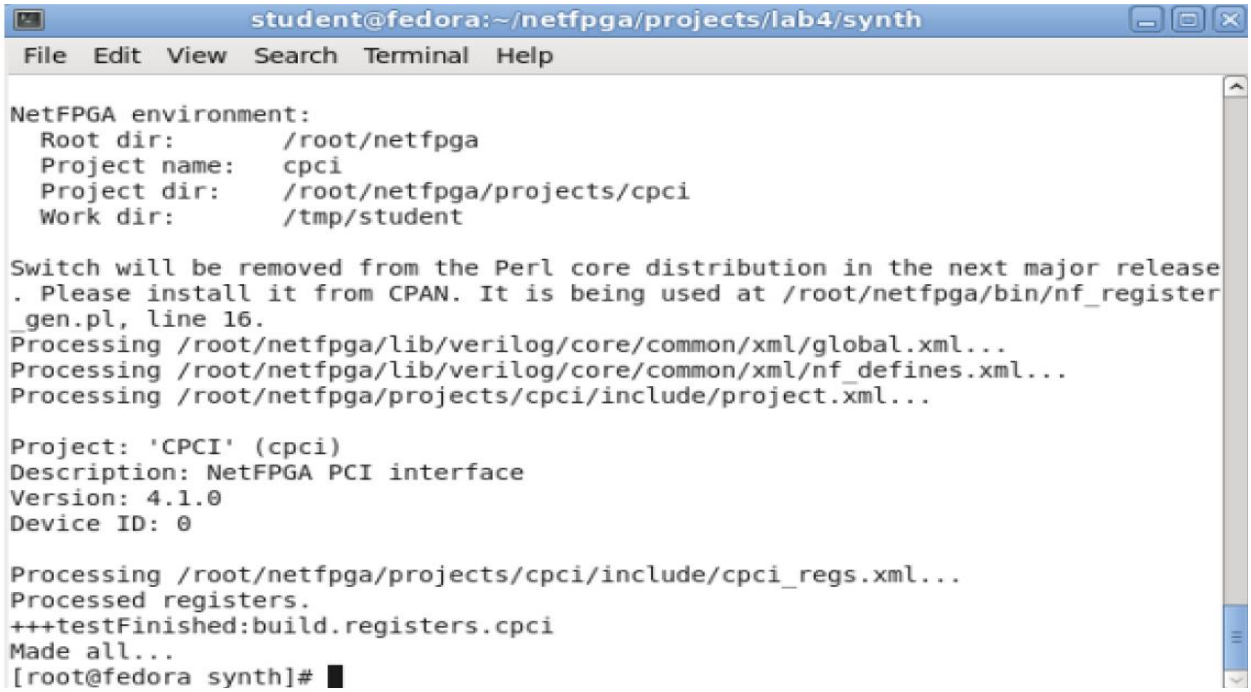
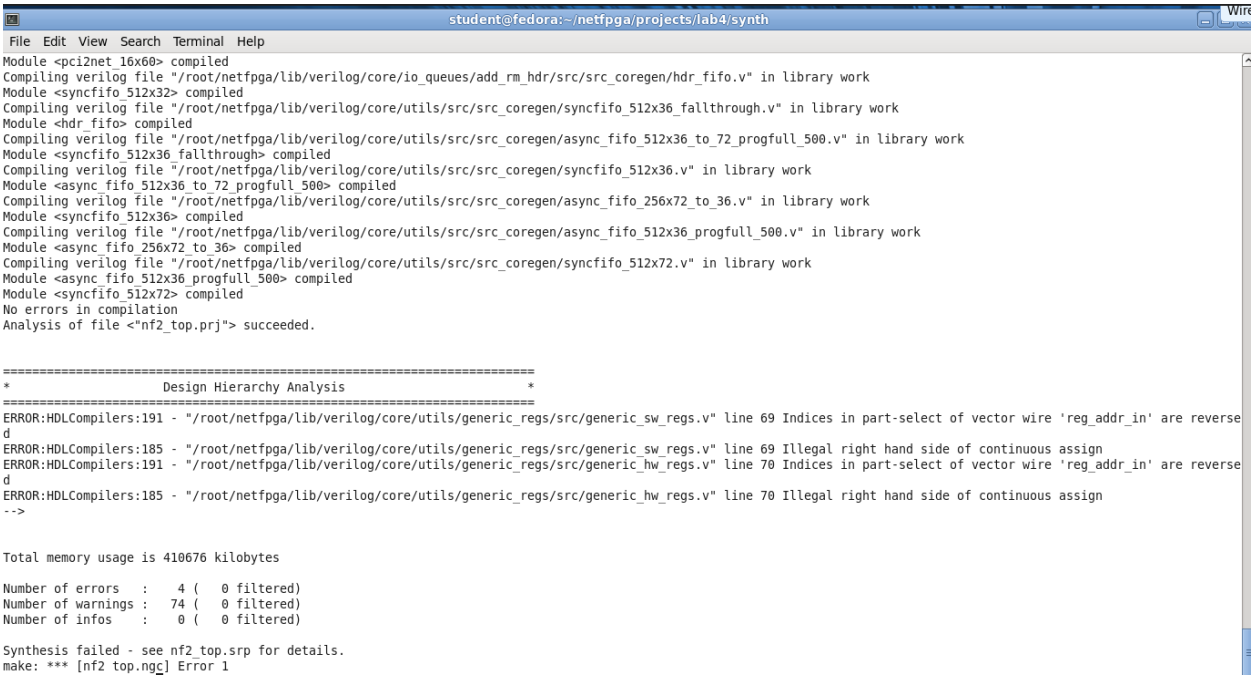
Step 1: Setting up NetFPGA tool and copying files to machines.





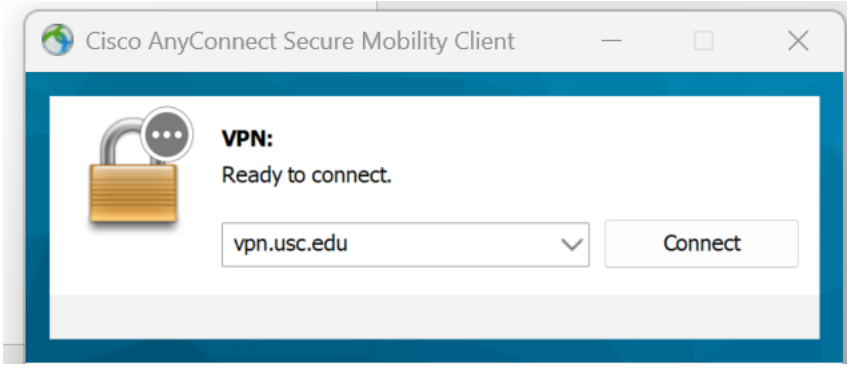
Running the reference project and generating the bit file

Step2: Compile and generate a design bit file for NetFPGA.

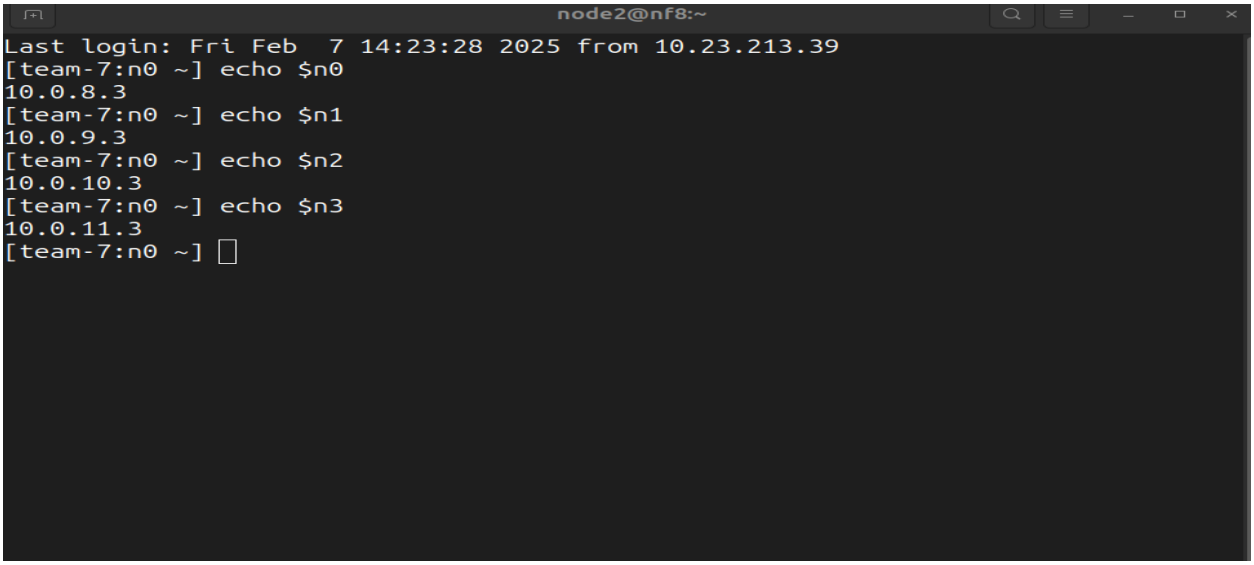


We are getting this error, and we tried solving it but is taking time it seems. Will go through the error and try to solve it as soon as possible.

Step 3: Setup VPN to USC

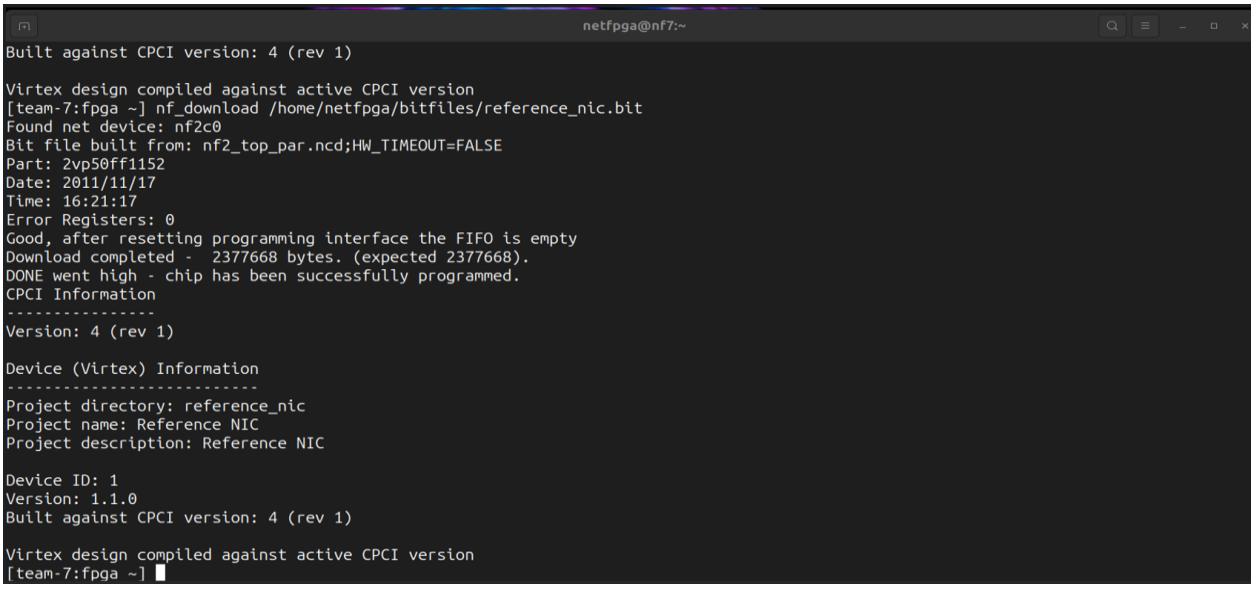


Step 4: NetFPGA Environment.



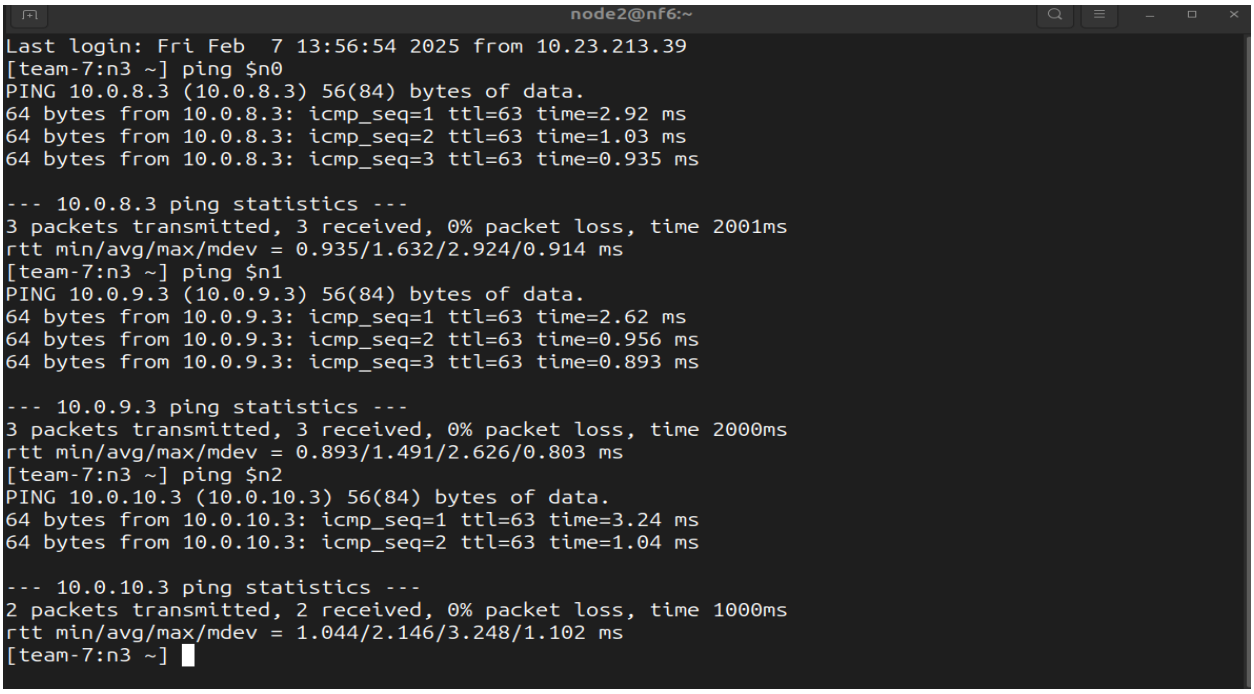
IP address for the nodes 0 through 3.

Step 5: NetFPGA- based Linux Kernel IP router

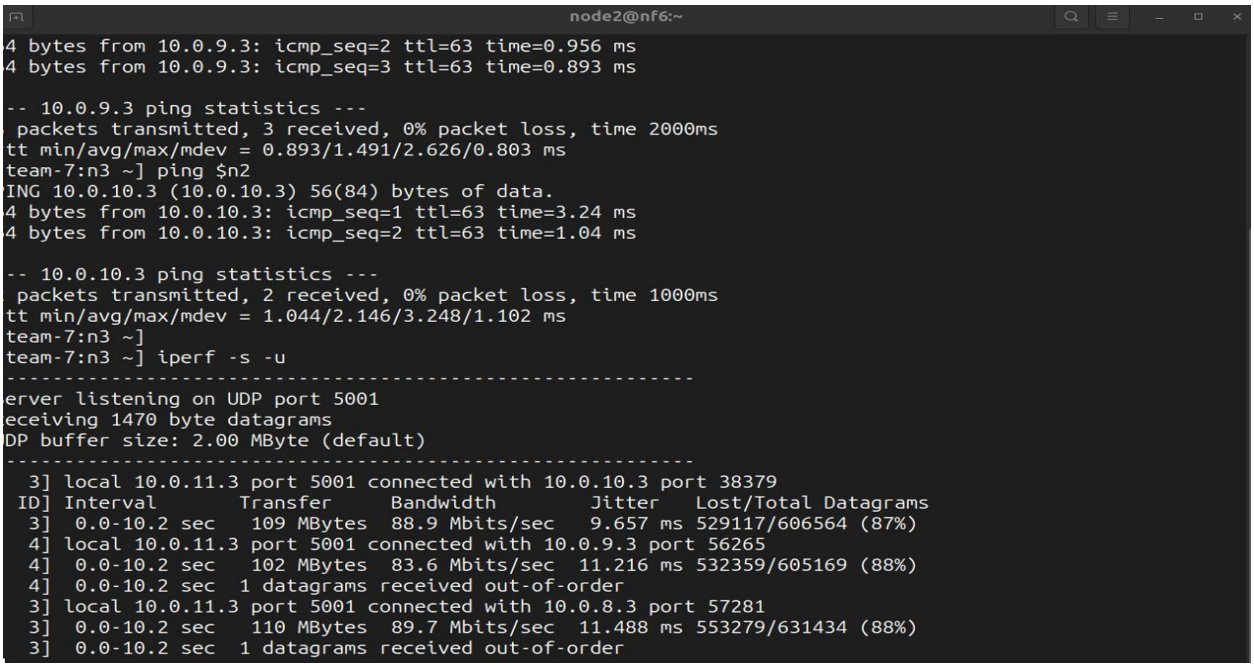


Running the command and observing the output that was expected.

(b &c)


node2@nf6:~
Last login: Fri Feb 7 13:56:54 2025 from 10.23.213.39
[team-7:n3 ~] ping $n0
PING 10.0.8.3 (10.0.8.3) 56(84) bytes of data.
64 bytes from 10.0.8.3: icmp_seq=1 ttl=63 time=2.92 ms
64 bytes from 10.0.8.3: icmp_seq=2 ttl=63 time=1.03 ms
64 bytes from 10.0.8.3: icmp_seq=3 ttl=63 time=0.935 ms
--- 10.0.8.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2001ms
rtt min/avg/max/mdev = 0.935/1.632/2.924/0.914 ms
[team-7:n3 ~] ping $n1
PING 10.0.9.3 (10.0.9.3) 56(84) bytes of data.
64 bytes from 10.0.9.3: icmp_seq=1 ttl=63 time=2.62 ms
64 bytes from 10.0.9.3: icmp_seq=2 ttl=63 time=0.956 ms
64 bytes from 10.0.9.3: icmp_seq=3 ttl=63 time=0.893 ms
--- 10.0.9.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 0.893/1.491/2.626/0.803 ms
[team-7:n3 ~] ping $n2
PING 10.0.10.3 (10.0.10.3) 56(84) bytes of data.
64 bytes from 10.0.10.3: icmp_seq=1 ttl=63 time=3.24 ms
64 bytes from 10.0.10.3: icmp_seq=2 ttl=63 time=1.04 ms
--- 10.0.10.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 1.044/2.146/3.248/1.102 ms
[team-7:n3 ~]

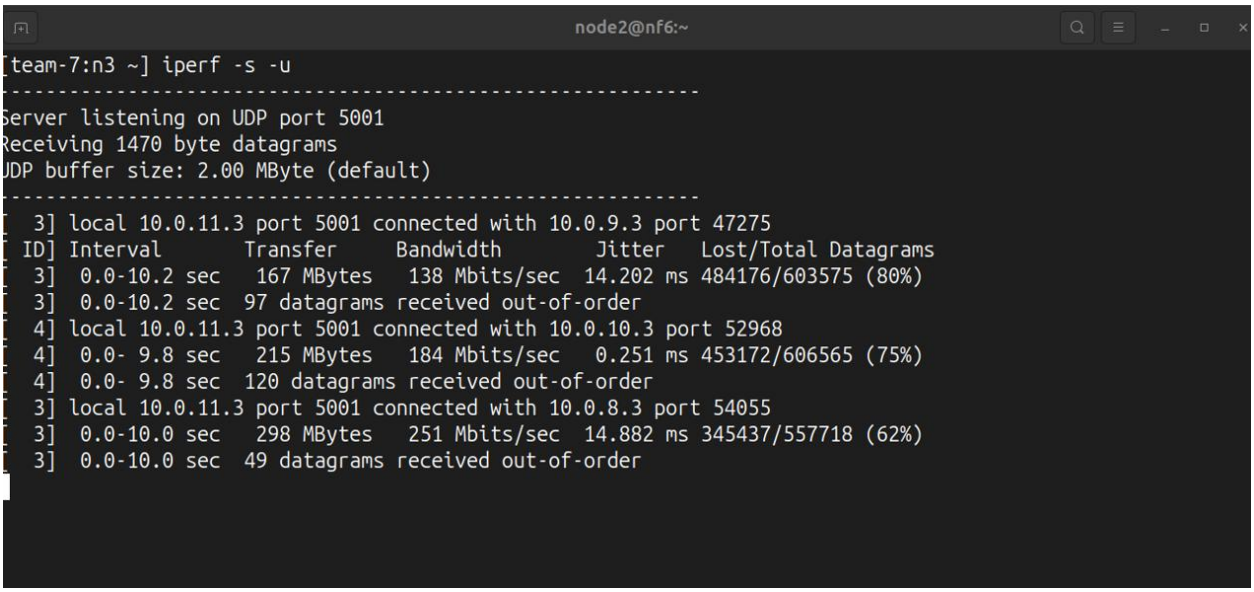
e&g


node2@nf6:~
4 bytes from 10.0.9.3: icmp_seq=2 ttl=63 time=0.956 ms
4 bytes from 10.0.9.3: icmp_seq=3 ttl=63 time=0.893 ms
-- 10.0.9.3 ping statistics ---
packets transmitted, 3 received, 0% packet loss, time 2000ms
tt min/avg/max/mdev = 0.893/1.491/2.626/0.803 ms
team-7:n3 ~] ping $n2
ING 10.0.10.3 (10.0.10.3) 56(84) bytes of data.
4 bytes from 10.0.10.3: icmp_seq=1 ttl=63 time=3.24 ms
4 bytes from 10.0.10.3: icmp_seq=2 ttl=63 time=1.04 ms
-- 10.0.10.3 ping statistics ---
packets transmitted, 2 received, 0% packet loss, time 1000ms
tt min/avg/max/mdev = 1.044/2.146/3.248/1.102 ms
team-7:n3 ~]
team-7:n3 ~] iperf -s -u
erver listening on UDP port 5001
eceiving 1470 byte datagrams
DP buffer size: 2.00 MByte (default)
3] local 10.0.11.3 port 5001 connected with 10.0.10.3 port 38379
ID] Interval Transfer Bandwidth Jitter Lost/Total Datagrams
3] 0.0-10.2 sec 109 MBytes 88.9 Mbits/sec 9.657 ms 529117/606564 (87%)
4] local 10.0.11.3 port 5001 connected with 10.0.9.3 port 56265
4] 0.0-10.2 sec 102 MBytes 83.6 Mbits/sec 11.216 ms 532359/605169 (88%)
4] 0.0-10.2 sec 1 datagrams received out-of-order
3] local 10.0.11.3 port 5001 connected with 10.0.8.3 port 57281
3] 0.0-10.2 sec 110 MBytes 89.7 Mbits/sec 11.488 ms 553279/631434 (88%)
3] 0.0-10.2 sec 1 datagrams received out-of-order

h&i

N0 pinging to n3	Transfer-109MB	Bandwidth-88.9Mbps
N1 pinging to n3	Transfer-102MB	Bandwidth-83.6Mbps
N2 pinging to n3	Transfer-110MB	Bandwidth-89.7Mbps

Step 6: NetFPGA Hardware IP Router



e

N0 pinging to n3	Transfer-167MB	Bandwidth-139Mbps
N1 pinging to n3	Transfer-215MB	Bandwidth-184Mbps
N2 pinging to n3	Transfer-298MB	Bandwidth-251Mbps