

Lab 4_SCP

CSCI 4306_60L – Computer Networks Lab

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❖ First, I used lab_1 experiment from deterlab to create and run this lab *twonode* in Jupyter Lab notebook.

```
csci3306yndw@csci3306yndw:~$ # su - csci3306yndw
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

csci3306yndw@csci3306yndw:~$ startexp twonode
Path /share/education/lab/twonode name twonode proj csci3306yndw
Logging csci3306yndw into Merge
Reading twonode model (revision b0a12a37b11d731c21b81b830edf40f6e4c21a03)
Model is already realized.
Checking materialization status...
Materialization status: Success
Checking XDC attachment...
XDC already attached to current materialization real.twonode.csci3306yndw
csci3306yndw@csci3306yndw:~$ runlab twonode
install

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

install
csci3306yndw@csci3306yndw:~$
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Err:1 http://security.debian.org/debian-security bullseye-security InRelease
       Could not resolve 'security.debian.org'
Err:2 http://deb.debian.org/debian bullseye InRelease
       Could not resolve 'deb.debian.org'
Err:1 http://security.debian.org/debian-security bullseye-security InRelease
       Could not resolve 'security.debian.org'
Err:2 http://deb.debian.org/debian bullseye InRelease
       Could not resolve 'deb.debian.org'
Err:3 http://deb.debian.org/debian bullseye-updates InRelease
       Could not resolve 'deb.debian.org'
Reading package lists...Err:3 http://deb.debian.org/debian bullseye-updates InRelease
       Could not resolve 'deb.debian.org'
Reading package lists...
Building dependency tree...
Reading state information...
43 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: Failed to fetch http://deb.debian.org/debian/dists/bullseye/InRelease Could not resolve 'deb.debian.org'
W: Failed to fetch http://security.debian.org/debian-security/dists/bullseye-security/InRelease Could not resolve 'security.debian.org'
W: Failed to fetch http://deb.debian.org/debian/dists/bullseye-updates/InRelease Could not resolve 'deb.debian.org'
W: Some index files failed to download. They have been ignored, or old ones used instead.

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Reading package lists...
Building dependency tree...
Reading state information...
ipperf is already the newest version (2.0.14+dfsg1-1).
0 upgraded, 0 newly installed, 0 to remove and 43 not upgraded.

Building dependency tree...
Reading state information...
```

The screenshot displays the SPHERE BETA dashboard. The left sidebar contains navigation links: Dashboard, Users, Organizations, Projects, Experiments (with sub-links for Manage, Reservations, and Actions), XDCs, Model Editor, and Resources. The main content area is divided into several sections:

- SPHERE News**: 10 unread notifications. It includes three items: "Upcoming INDIS submission deadline" (7/16/2024), "XDC Changes" (6/12/2024), and "Upcoming CBET submission deadline" (5/12/2024).
- Activated Experiments**: Shows two active experiments, "helloworldjud01lab.in.judolab1.csci3306yndw" and "real.twonode.csci3306yndw", each with a "Deactivate" button.
- Attached XDCs**: Lists "csci3306yndw.csci3306yndw".
- Allocated, But Inactive Experiments (Reservations)**: States "You have no allocated and inactive experiments."
- Resource Usage by Project**: Contains two pie charts. The first chart shows memory usage (Of 11 TB of Memory) with categories: Unused (8 TB), socialkeyrecover (508 GB), rname (252 GB), rgenesh (160), and rsnetsite (56 GB). The second chart shows machine core usage (Of 6912 Machine Cores) with categories: Unused (5892), socialkeyrecover (130), rname (136), rgenesh (80), and rsnetsite (55).
- Your Account Summary**: A table with columns: Username, Full Name, Institution, Category, Country, US State, Access, Access Mod, User, Group, Projects, Experiments, and Organization.

- ❖ Next, I logged into node a to ping node b to confirm the creation of twonode lab was working (additionally checking to see if my XDC connected as well).

```
csci3306yndw@csci3306yndw:~$ ssh a
Linux a.infra.real.twonode.csci3306yndw 5.10.0-29-amd64 #1 SMP Debian 5.10.216-1 (2024-05-03) x86_64

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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Sep 19 23:15:29 2024 from 192.168.254.2
csci3306yndw@a:~$ ping b
PING b.exp.real.twonode.csci3306yndw (10.1.1.3) 56(84) bytes of data.
64 bytes from 10.1.1.3 (10.1.1.3): icmp_seq=1 ttl=64 time=0.459 ms
64 bytes from 10.1.1.3 (10.1.1.3): icmp_seq=2 ttl=64 time=0.349 ms
64 bytes from 10.1.1.3 (10.1.1.3): icmp_seq=3 ttl=64 time=0.372 ms
64 bytes from 10.1.1.3 (10.1.1.3): icmp_seq=4 ttl=64 time=0.344 ms
64 bytes from 10.1.1.3 (10.1.1.3): icmp_seq=5 ttl=64 time=0.356 ms
^C64 bytes from 10.1.1.3: icmp_seq=6 ttl=64 time=0.304 ms

--- b.exp.real.twonode.csci3306yndw ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 10010ms
rtt min/avg/max/mdev = 0.304/0.364/0.459/0.047 ms
csci3306yndw@a:~$
```

- ❖ Then, I checked the bandwidth between node a and node b.

```
csci3306yndw@a:~$ iperf -s
-----
Server listening on TCP port 5001
TCP window size: 128 KByte (default)
-----
[  4] local 10.1.1.2 port 5001 connected with 10.1.1.3 port 43126
[ ID] Interval           Transfer     Bandwidth
[  4] 0.0000-10.0005 sec   26.3 GBytes 22.6 Gbits/sec

csci3306yndw@b:~$ iperf -c a
-----
Client connecting to a, TCP port 5001
TCP window size: 170 KByte (default)
-----
[  3] local 10.1.1.3 port 43126 connected with 10.1.1.2 port 5001
[ ID] Interval           Transfer     Bandwidth
[  3] 0.0000-10.0001 sec   26.3 GBytes 22.6 Gbits/sec
```

- ❖ Redid previous step of node b bandwidth check but saved it to iperf.out.

```
csci3306yndw@b:~$ iperf -c a > iperf.out
csci3306yndw@b:~$ ls
iperf.out
```

- ❖ Following that I installed the merge command line interface onto my physical machine and ran this command.

```
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> .\mrg config set server grpc.sphere-testbed.net
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386>
```

- ❖ I logged into the server.

```
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> .\mrg login csci3306yndw
Enter password for csci3306yndw:
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386>
```

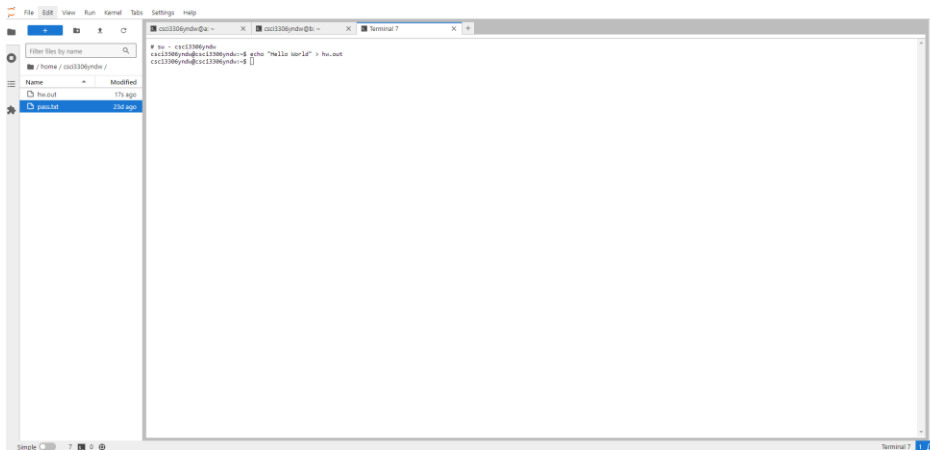
- ❖ After logging into the server, I copied the file from node b onto my machine.

```
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> .\mrg xdc scp download -x csci3306yndw.csci3306yndw b:iperf.out .
level=info msg="downloading b:iperf.out to . via csci3306yndw.csci3306yndw ..."
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> ls
```

Directory: C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386

Mode	LastWriteTime	Length	Name
-a----	9/20/2024 12:57 PM	362	iperf.out
-a----	7/25/2023 12:18 PM	24884224	mrg.exe
-a----	7/25/2023 12:00 PM	1354	README.md

- ❖ I went back to Jupyter Labs and opened a new terminal to copy file from my physical machine to my XDC.



```
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> .\mrg xdc scp download csci3306yndw.csci3306yndw:hw.out .
level=info msg="downloading csci3306yndw.csci3306yndw:hw.out to . ..."
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> ls
```

Directory: C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386

Mode	LastWriteTime	Length	Name
-a----	9/20/2024 1:02 PM	12	hw.out
-a----	9/20/2024 12:57 PM	362	iperf.out
-a----	7/25/2023 12:18 PM	24884224	mrg.exe
-a----	7/25/2023 12:00 PM	1354	README.md

- ❖ I copied file from my machine to node b that I created in terminal.

```
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> echo "Local file" > lf.out
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> .\mrg xdc scp upload -x csci3306yndw.csci3306yndw lf.out b:.
level=info msg="uploading lf.out to b:. via csci3306yndw.csci3306yndw ..."
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386>
```

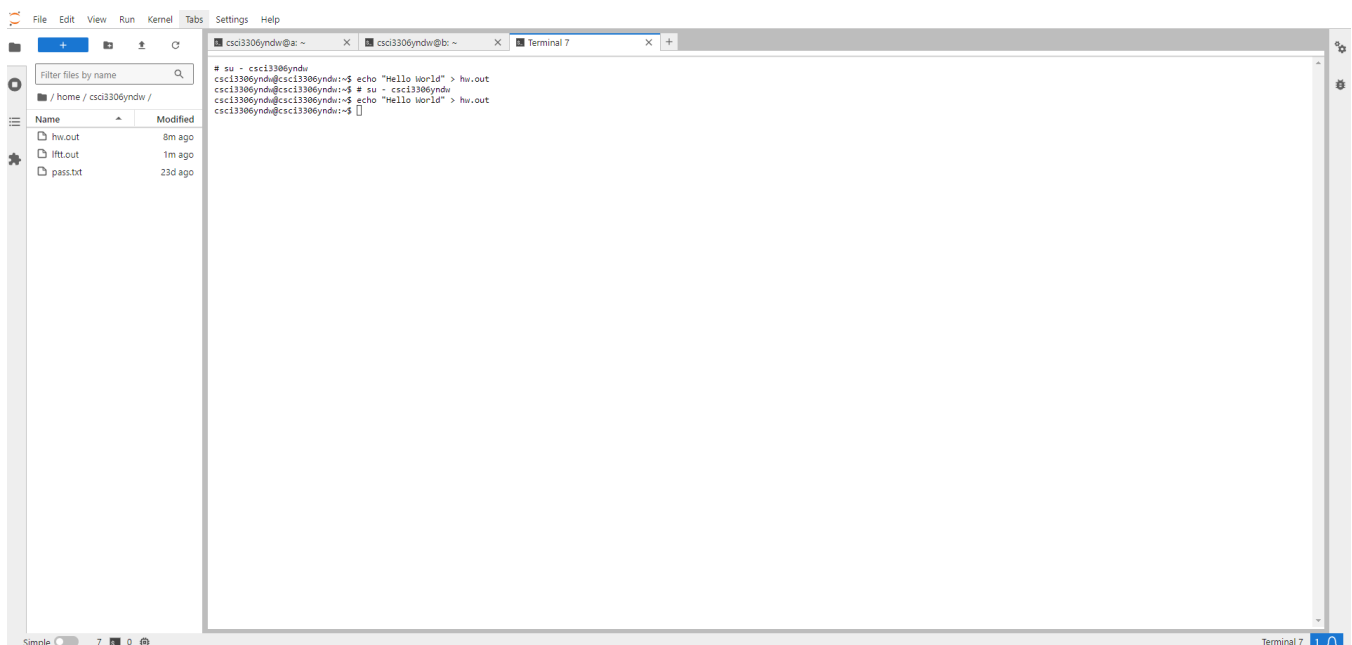
```
csci3306yndw@b:~$ ls
iperf.out lf.out
```

- ❖ Finally, I copied file from my physical machine to my XDC.

```
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> echo "Local file take two" > lftt.out
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> .\mrg xdc scp upload lftt.out csci3306yndw.csci3306yndw:.
level=info msg="uploading lftt.out to csci3306yndw.csci3306yndw:. ..."
PS C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386> ls
```

Directory: C:\Users\Jludo\Downloads\mrg_1.1.10_windows_386

Mode	LastWriteTime	Length	Name
-a----	9/20/2024 1:02 PM	12	hw.out
-a----	9/20/2024 12:57 PM	362	iperf.out
-a----	9/20/2024 1:04 PM	26	lf.out
-a----	9/20/2024 1:06 PM	44	lftt.out
-a----	7/25/2023 12:18 PM	24884224	mrg.exe
-a----	7/25/2023 12:00 PM	1354	README.md



- ❖ *What I learned from this lab:*

From this lab, I learned how to utilize an existing experiment to create a new experiment through command-line terminal in SPHERE. Additionally, Nodes can hold files using the Transfer Control Protocol (TCP) and User Datagram Protocol (UDP) as they are connection points that allow data to be sent, received, or forwarded within a network. This allows for separation of data from one physical machine to another machine as it can stay in the network, specifically, in a single Node.