

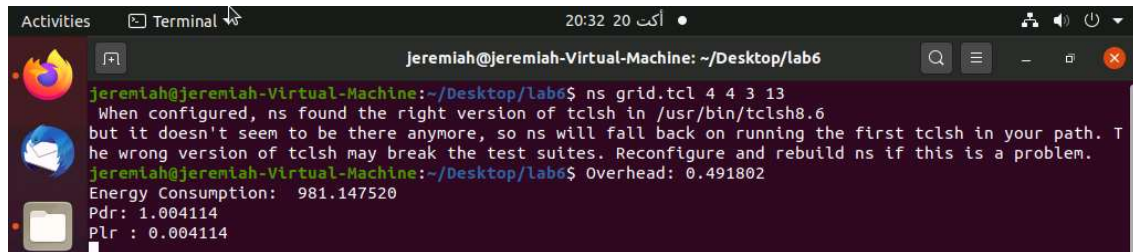
## LAB 6

JEREMIAH THOMAS

W/o any link Failures:-

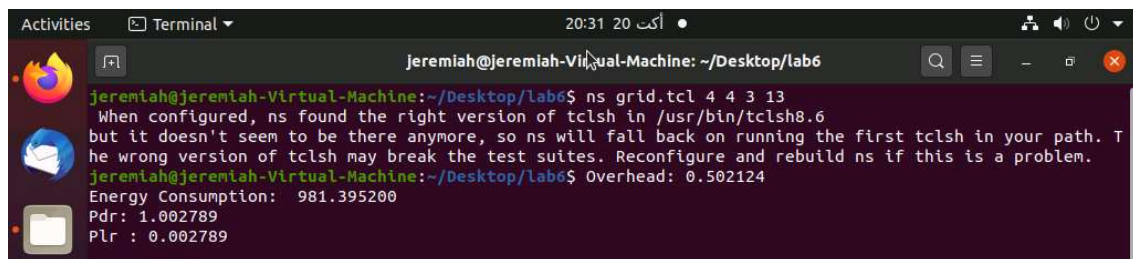
For 16 stations:-

RIP:-

A terminal window titled 'Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6' showing the execution of 'ns grid.tcl 4 4 3 13'. The output includes a warning about the tclsh version, performance metrics, and a RIP status.

```
Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 4 4 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.491802
Energy Consumption: 981.147520
Pdr: 1.004114
Plr : 0.004114
```

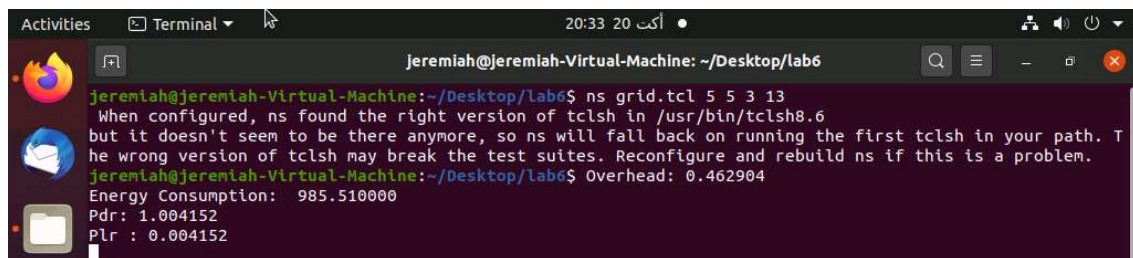
OSPF:-

A terminal window titled 'Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6' showing the execution of 'ns grid.tcl 4 4 3 13'. The output includes a warning about the tclsh version, performance metrics, and a RIP status.

```
Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 4 4 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.502124
Energy Consumption: 981.395200
Pdr: 1.002789
Plr : 0.002789
```

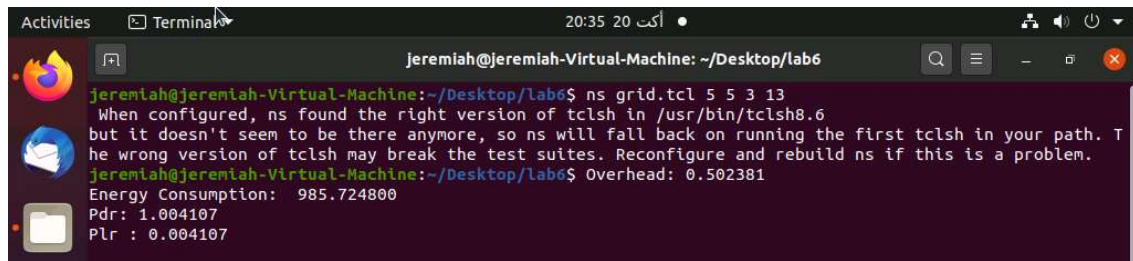
For 25 stations:-

RIP:-

A terminal window titled 'Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6' showing the execution of 'ns grid.tcl 5 5 3 13'. The output includes a warning about the tclsh version, performance metrics, and a RIP status.

```
Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 5 5 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.462904
Energy Consumption: 985.510000
Pdr: 1.004152
Plr : 0.004152
```

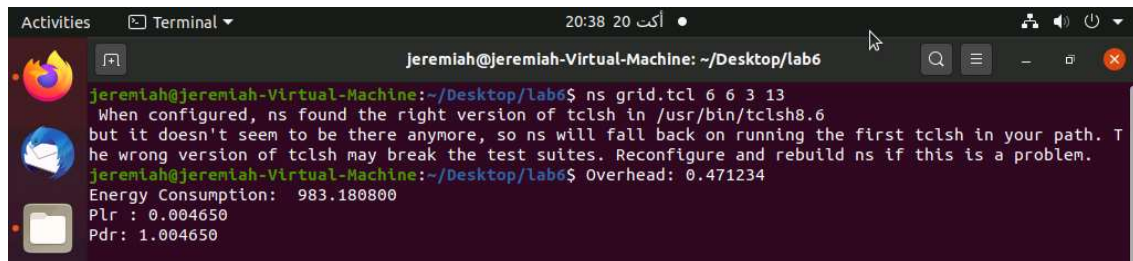
OSPF:-



```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 5 5 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.502381
Energy Consumption: 985.724800
Pdr: 1.004107
Plr: 0.004107
```

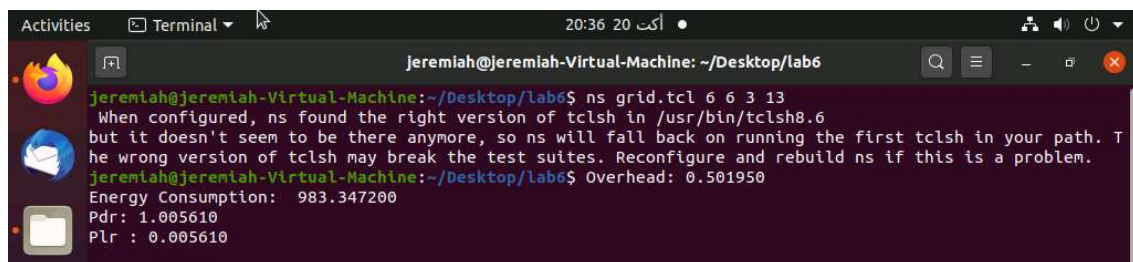
For 36 stations:-

RIP:-



```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 6 6 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.471234
Energy Consumption: 983.180800
Plr: 0.004650
Pdr: 1.004650
```

OSPF:-



```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 6 6 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.501950
Energy Consumption: 983.347200
Pdr: 1.005610
Plr: 0.005610
```

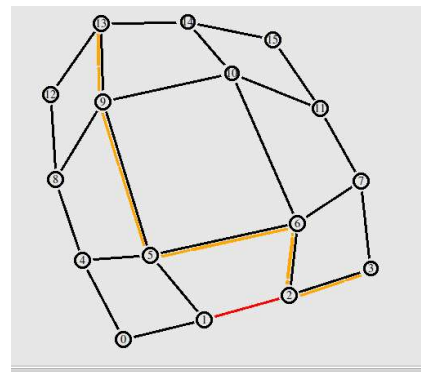
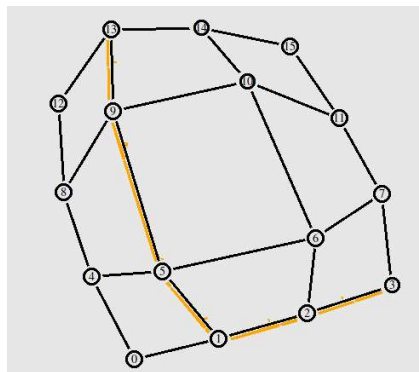
(Do Scroll Down)

### With Link Failures:-

### For 16 stations:-

A snapshot of Link being down (red):-

Here, for instance at the 30s mark. Link between Node 1 & 2 is down and is revived much at 60s and OSPF algorithm modified the routing tables and finds another suitable path as can be seen



### RIP:-

```
Activities Terminal 20:48 20 اکت Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ nam out.nam
^C
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 4 4 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.491384
Energy Consumption: 965.737600
Pdr: 1.001703
Plr : 0.001703
```

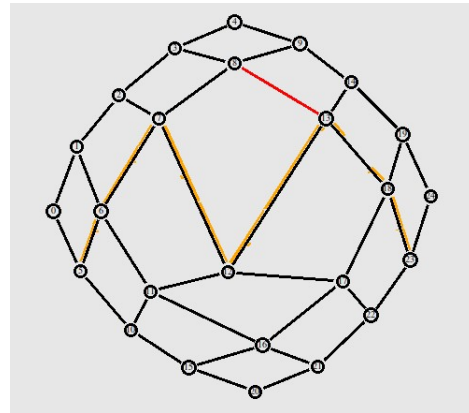
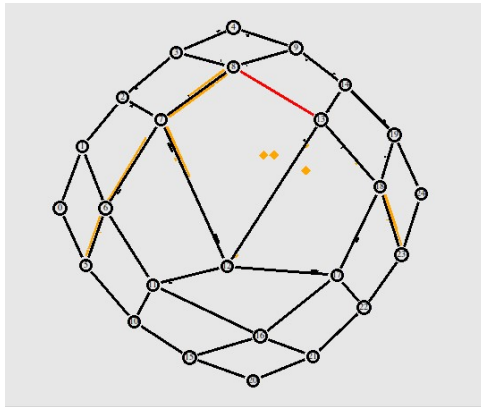
### OSPF:-

```
Activities Terminal 20:53 20 اکت Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 4 4 3 13
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.496613
Energy Consumption: 966.571200
Plr : 0.003168
Pdr: 1.003168
```

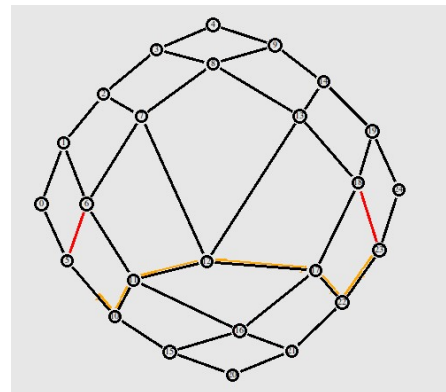
## For 25 stations:-

A snapshot of key instances on NAM:-

Here, for instance at the 30s mark. Link between Node 8 & 13 is down and as you can see packets that were being transmitted then on this link are dropped. Also now, DV algorithm modifies the routing tables and finds another suitable path as can be seen on the left diagram below:-



Similarly at the 60s, Link between Node 8 and 13 is revived. However, there are 2 more failures that occur bw N5-N6 and N18-N23. Packets are dropped once again and DV algorithm reroutes the path from src to destination as can be seen on the left.



At the 90 sec mark all links are active and the DV algorithm reroutes with the initial path that was taken between 0 to 30s

RIP:-

```
Activities Terminal 21:16 20 أكتوبر Jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 5 5 5 23
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. The
wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.486977
Energy Consumption: 925.261600
Plr : 0.003886
Pdr: 0.996114
```

## OSPF:-

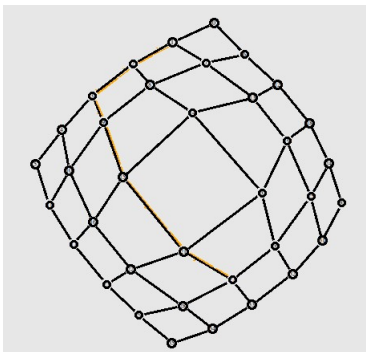
```
Activities Terminal 21:15 20 أكت
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 5 5 5 23
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.483890
Energy Consumption: 926.969600
Plr : 0.001591
Pdr: 0.998409
^C
```

## For 36 stations:-

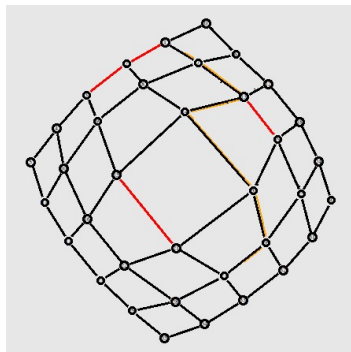
A snapshot of key instances on NAM:-

### For RIP Algorithm:-

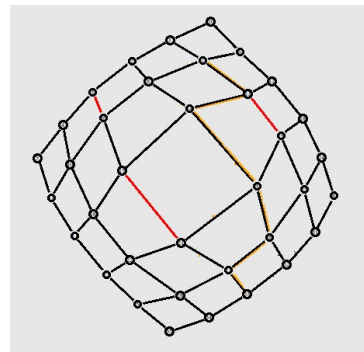
At 15 sec: Best Path



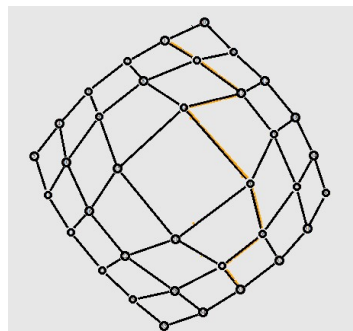
At 32 sec



At 62sec



At 92 sec



- Similar to the previous no of stations, DV algorithm behaves similarly. However here what would be able to notice that at 90 sec onwards and between 0 to 30secs the paths are not essentially the same, despite there being no link down.

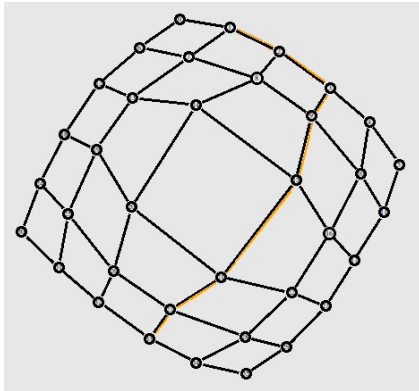


- Thus, it could imply that DV makes optimal choices from its immediate previous path and not from scratch. It could also mean that there could be many paths between a source and destination node that have DV would allocate the same priority/efficiency.

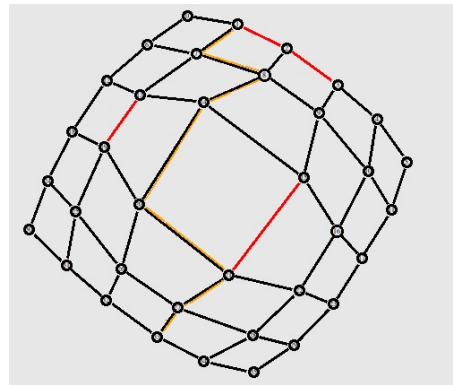
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For OSPF Algorithm:-

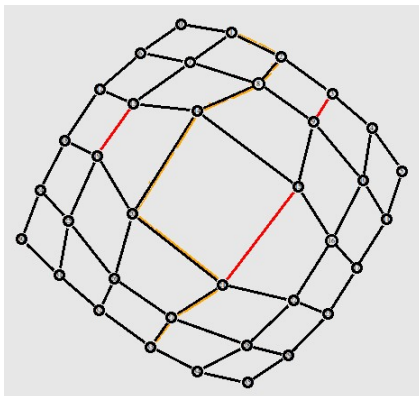
At 15 sec: Ideal Path



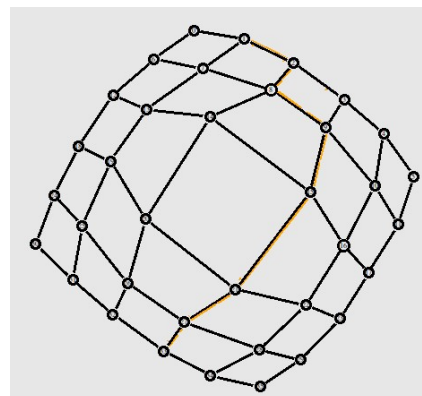
At 32 sec



At 62 sec



At 92 sec

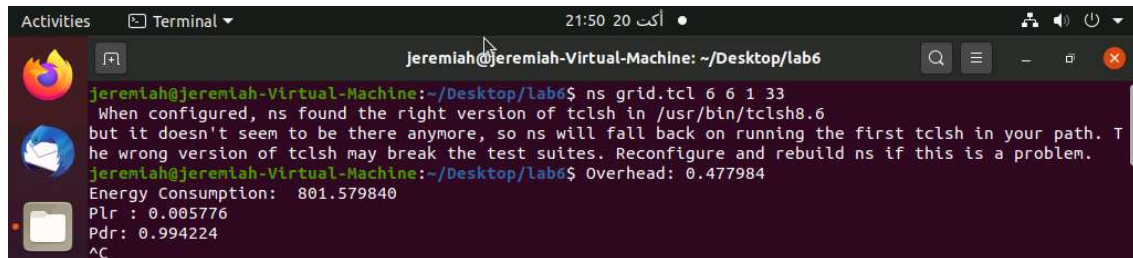


- Here you can see that though the exact same links were dropped at the exact same time for both OSPF and RIP, OSPF because it's a Link State routing protocol reacts differently.
- One can from the figures observe that here the switch is based on Dijkstra's unlike the previous.
- Also, in this scenario, one can notice how similar the NAM graph is post 90 secs and between 0-30s which is clear indicator of the fact that LS routing protocols have

global knowledge, unlike in the case of DV routing protocols which make decisions based on the local information they possess.

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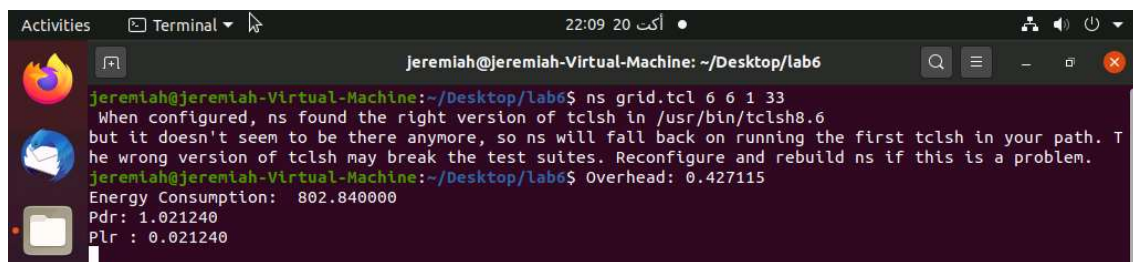
## RIP:-



A terminal window titled 'jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6' showing the execution of the command 'ns grid.tcl 6 6 1 33'. The output includes a warning about the tclsh version and the following metrics: 'Overhead: 0.477984', 'Energy Consumption: 801.579840', 'Plr : 0.005776', and 'Pdr: 0.994224'. The prompt is followed by '^C'.

```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 6 6 1 33
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.477984
Energy Consumption: 801.579840
Plr : 0.005776
Pdr: 0.994224
^C
```

## OSPF:-



A terminal window titled 'jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6' showing the execution of the command 'ns grid.tcl 6 6 1 33'. The output includes a warning about the tclsh version and the following metrics: 'Overhead: 0.427115', 'Energy Consumption: 802.840000', 'Pdr: 1.021240', and 'Plr : 0.021240'.

```
jeremiah@jeremiah-Virtual-Machine: ~/Desktop/lab6
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ ns grid.tcl 6 6 1 33
When configured, ns found the right version of tclsh in /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fall back on running the first tclsh in your path. T
he wrong version of tclsh may break the test suites. Reconfigure and rebuild ns if this is a problem.
jeremiah@jeremiah-Virtual-Machine:~/Desktop/lab6$ Overhead: 0.427115
Energy Consumption: 802.840000
Pdr: 1.021240
Plr : 0.021240
```

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THANK YOU