

Melvin Mokhtari (9831143)

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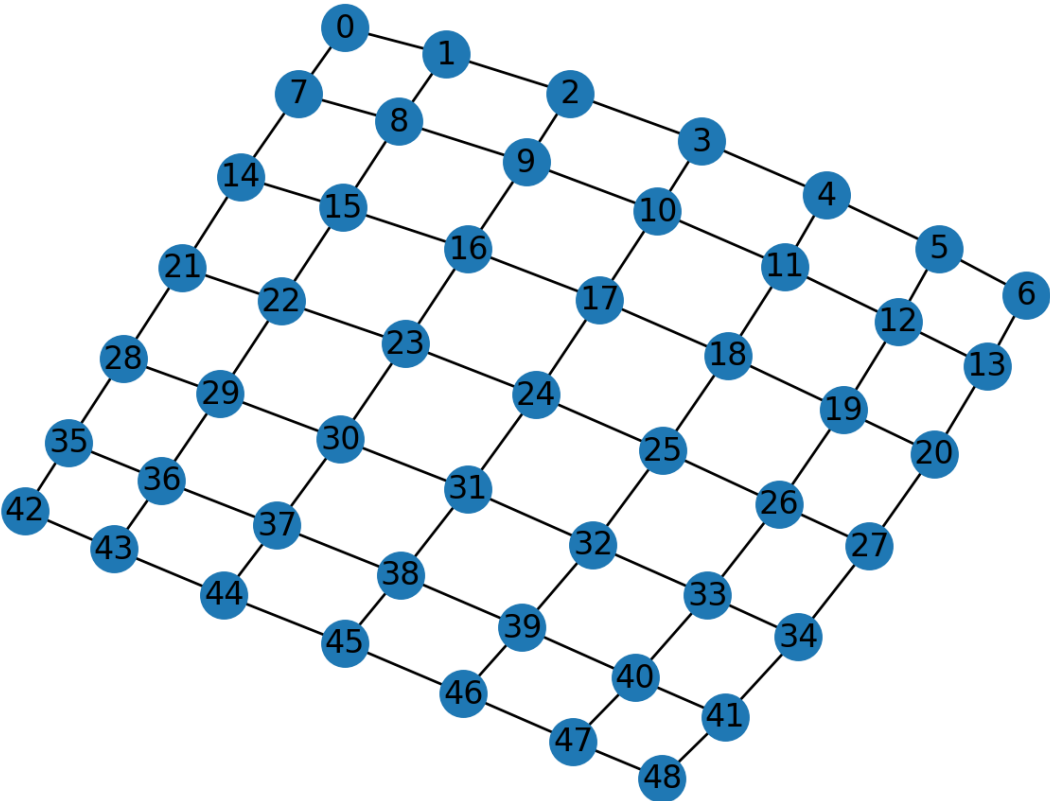
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Scenario One

Grid

Topology



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Output of the performance_analyzer.py

```
[29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 0.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0,                29.0,                29.0,                29.0,                29.0]
-----
nodes PDR [100.0, 100.0, 100.0, 96.55172413793103, 100.0, 100.0,
100.0, 96.55172413793103, 100.0, 96.55172413793103, 100.0, 100.0,
100.0, 100.0, 96.55172413793103, 100.0, 96.55172413793103, 100.0,
96.55172413793103, 100.0, 100.0, 100.0, 96.55172413793103, 100.0,
0, 100.0, 100.0, 93.10344827586206, 100.0, 100.0, 100.0, 100.0,
100.0, 100.0, 89.65517241379311, 100.0, 96.55172413793103, 100.0,
100.0, 100.0, 100.0, 100.0, 100.0, 100.0, 100.0, 100.0,
96.55172413793103,                100.0,                100.0]
-----
average      latency      in      each      node      [25.078620689655416,
25.69482758620683,          11.018620689655195,          8.787500000000007,
11.121724137931395,          22.965517241379082,          14.657586206896534,
36.89464285714286,          11.240344827586224,          17.000714285714675,
17.117586206896384,          16.703103448276117,          35.03137931034471,
18.198620689655037,          23.906428571428478,          16.471379310344915,
19.381071428571595,          0.5765517241383711,          15.828571428571617,
15.243448275861871,          26.822758620689402,          9.884137931034635,
29.685714285714507,          1.3975862068961744, 0,          0.6024137931035355,
19.551034482758432,          41.5937037037039,          21.561034482758927,
16.68137931034439,          23.166551724137943,          5.630000000000025,
7.485862068965389,          29.43448275862103,          13.877307692307655,
14.188620689654993,          16.89285714285715,          11.771034482758852,
20.731379310344995,          33.07137931034511,          23.56689655172392,
21.742068965516857,          19.212758620689563,          39.103448275862384,
35.60068965517244,          23.689310344827444,          19.974999999999746,
12.511724137930898,          49.186206896551646]
-----
average      PDR      in      the      network      [98.99425287356321]
-----
average      burst      packet      loss      in      each      node      [[0, 0, 0,
0.03571428571428571, 0, 0, 0, 0, 0, 0.03571428571428571, 0, 0, 0,
0, 0, 0, 0, 0, 0.03571428571428571, 0, 0, 0, 0.03571428571428571,
0, 0, 0, 0, 0, 0.07407407407407407, 0, 0, 0, 0, 0, 0,
0.07692307692307693, 0, 0.03571428571428571, 0, 0, 0, 0, 0, 0,
0, 0, 0.03571428571428571, 0, 0]]
-----
scanning      energy      in      each      node      [1222.8441600029867,
1214.1705600029552,          1220.5590000029783,          1214.7543600029574,
```

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1221.2262000029807,	1214.3206800029557,	1222.4688600029851,
1215.8302200029611,	1218.3405600029703,	1204.3377000029195,
1216.7809800029647,	1203.7455600029173,	1216.9394400029653,
1212.1022400029476,	1221.8350200029831,	1204.8631200029213,
1208.3492400029338,	1194.4798200028833,	1206.3810000029266,
1203.2535000029152,	1220.6674200029788,	1215.2797800029591,
1216.8727200029648,	1196.3313000028902,	1250.5663200030874,
1193.52906000288,	1215.788520002961,	1216.1137800029621,
1221.2929200029812,	1206.3393000029264,	1209.5835600029384,
1196.28126000289,	1207.6653600029315,	1203.220140002915,
1221.4847400029817,	1216.5641400029638,	1217.0645400029657,
1205.6637600029242,	1216.6809000029643,	1203.120060002915,
1217.0728800029656,	1213.4616600029524,	1223.8866600029903,
1213.9287000029542,	1220.2671000029773,	1215.1129800029585,
1222.2436800029843,	1214.5208400029564,	1223.0776800029873]

switching	energy	in	each	node	[1.782054000000036,
2.3716800000000586,		1.9039320000000408,			2.279448000000055,
1.9204020000000415,		2.345328000000057,			1.7985240000000366,
2.233332000000053,		2.091690000000048,			3.0008340000000464,
2.1608640000000503,		3.050244000000039,			2.210274000000052,
2.486970000000063,		1.8775800000000398,			2.9448360000000546,
2.750490000000073,		3.6266939999999517,			2.878956000000065,
3.0930660000000327,		1.9566360000000427,			2.253096000000054,
2.1872160000000513,		3.544343999999964,		0.02305799999999995,	
3.715631999999938,		2.2662720000000545,		2.223450000000053,	
1.864404000000039,		2.9086020000000605,		2.6944920000000705,	
3.5608139999999615,		2.757078000000073,		3.030480000000042,	
1.9006380000000407,		2.2399200000000534,		2.164158000000005,	
2.9283660000000573,		2.197098000000052,		3.037068000000041,	
2.206980000000052,		2.3848560000000587,		1.6898220000000326,	
2.351916000000058,		1.9500480000000424,		2.2827420000000553,	
1.834758000000038,		2.3189760000000565,		1.7425260000000347]	

transmitting	energy	in	each	node	[12.507487199999513,
16.645823999999152,		13.362897599999439,			15.99848639999921,
13.478493599999428,		16.46087039999917,			12.623083199999503,
15.674817599999239,		14.680691999999324,			21.06159119999877,
15.166195199999281,		21.40837919999874,			15.512983199999253,
17.45499599999908,		13.177943999999455,			20.668564799998805,
19.30453199999892,		25.454239199998387,			20.206180799998844,
21.708928799998713,		13.732804799999407,			15.813532799999226,
15.351148799999265,		24.87625919999844,		0.16183440000000002,	
26.07845759999838,		15.906009599999217,		15.605459999999244,	
13.085467199999462,		20.414253599998826,		18.911505599998957,	
24.99185519999843,		19.35077039999892,		21.269663999998752,	
13.33977839999944,		15.721055999999235,		15.189314399999281,	

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```
20.552968799998812,    15.42050639999926,    21.31590239999875,  
15.489863999999255,    16.738300799999145,    11.86014959999957,  
16.507108799999166,    13.68656639999941,    16.02160559999921,  
12.877394399999481,    16.275916799999187,    12.230056799999536]
```

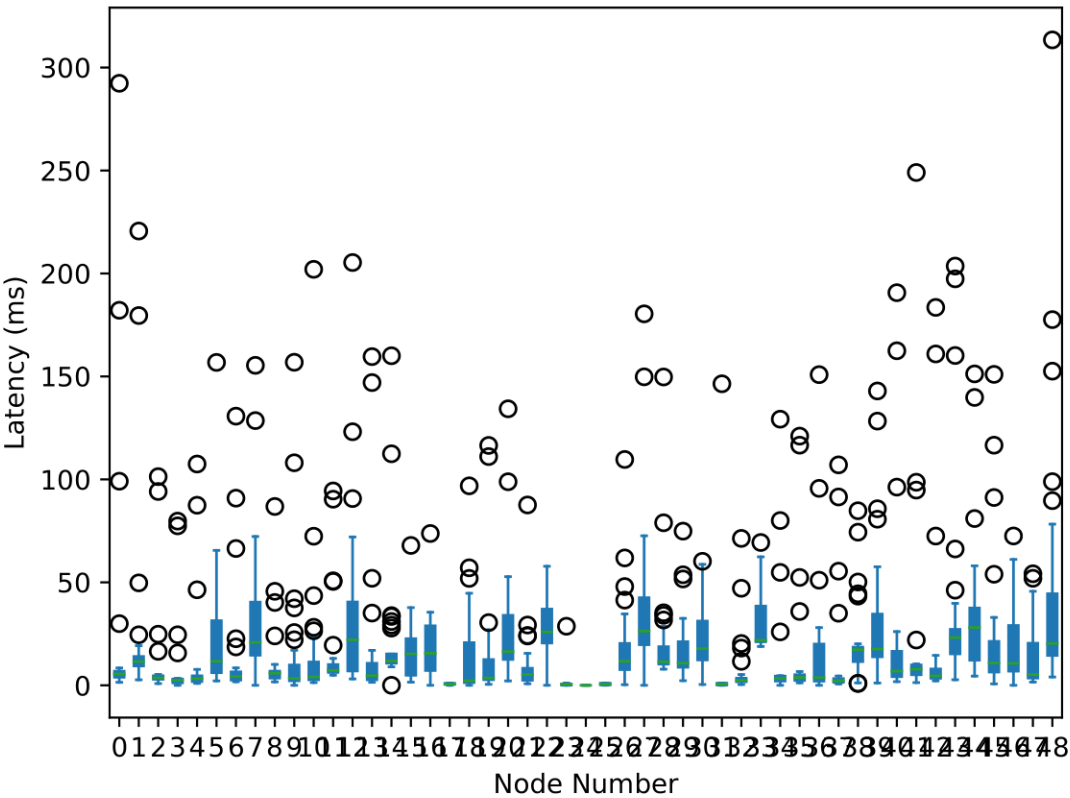
```
-----  
sleeping energy in each node [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, -0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0,                                0.0,                                0.0]
```

```
-----  
total energy in each node [1237.1337012029862, 1233.1880640029542,  
1235.8258296029778,    1233.0322944029565,    1236.62509560298,  
1233.1268784029548,    1236.8904672029846,    1233.7383696029603,  
1235.1129420029695,    1228.4001252029182,    1234.108039202964,  
1228.204183202916,    1234.6626972029646,    1232.0442060029468,  
1236.8905440029826,    1228.4765208029203,    1230.404262002933,  
1223.5607532028819,    1229.4661368029256,    1228.055494802914,  
1236.3568608029784,    1233.3464088029584,    1234.411084802964,  
1224.7519032028886,    1250.7512124030875,    1223.3231496028782,  
1233.9608016029601,    1233.9426900029614,    1236.2427912029807,  
1229.6621556029252,    1231.1895576029374,    1224.8339292028882,  
1229.7732084029305,    1227.520284002914,    1236.7251564029812,  
1234.525116002963,    1234.4180124029651,    1229.145094802923,  
1234.2985044029638,    1227.4730304029138,    1234.769724002965,  
1232.5848168029518,    1237.43663160299,    1232.7877248029533,  
1235.903714402977,    1233.4173276029578,    1236.9558324029838,  
1233.1157328029556,    1237.050262802987]
```

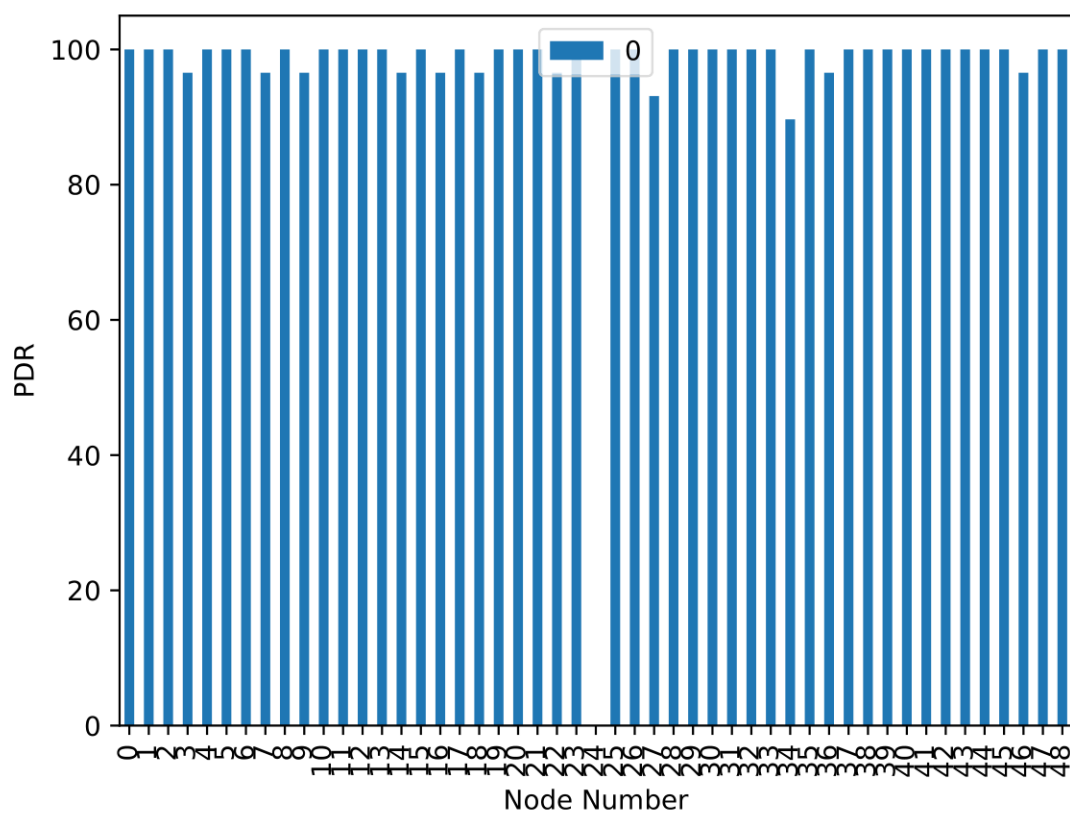
```
-----  
network energy consumption (mJ) 60409.61932334466
```

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Latency Plot



PDR Plot



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Packet tracing

27.log:

(generate)	27	5356.62	[24]	5
---------------------	----	---------	------	---

26.log:

(relay)	27	27	5356.62	5	5356.62	5	1
(advertise)	26	5356.82	27	5			

25.log:

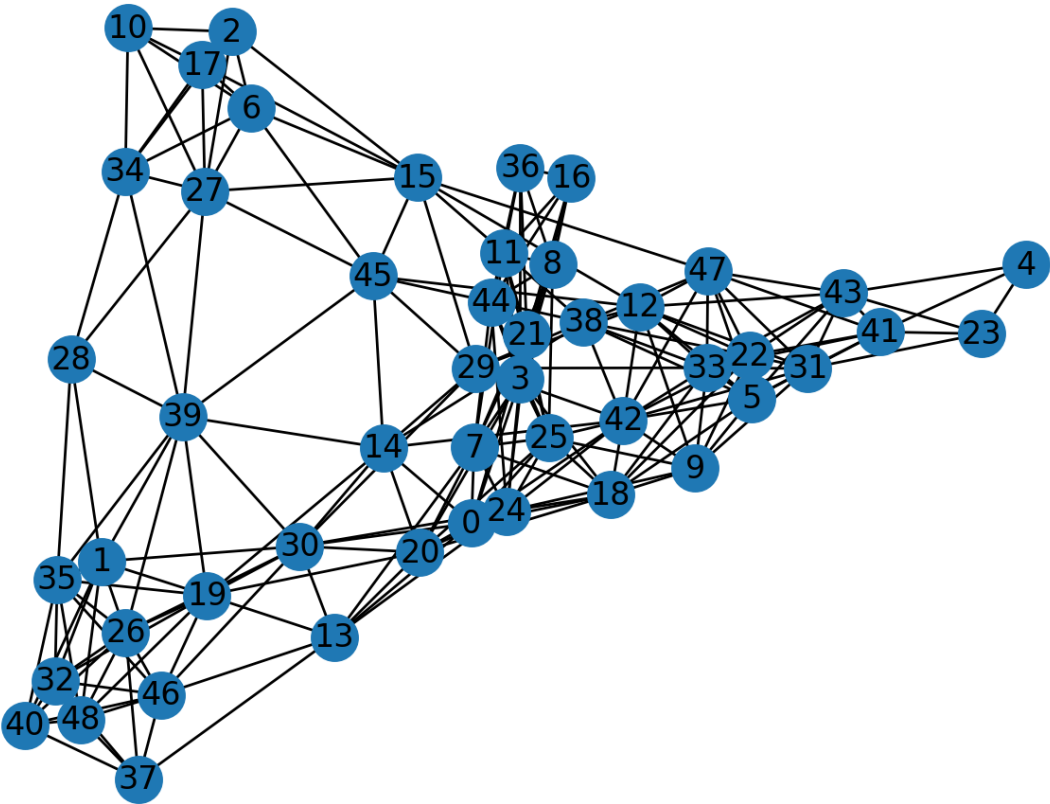
(relay)	26	27	5357.3	5	5356.62	4	5
(advertise)	25	5362.7	36	5			

24.log:

(main)	27	5	5356.62	24	5398.81
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Random
Topology



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Output of the performance_analyzer.py

```
[29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 30.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 0.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0]
```

```
-----
nodes PDR [100.0, 100.0, 100.0, 100.0, 100.0, 100.0,
96.55172413793103, 100.0, 93.10344827586206, 100.0, 100.0,
100.0, 100.0, 100.0, 100.0, 96.55172413793103, 100.0, 0.0,
100.0, 100.0, 0.0, 100.0, 100.0, 93.10344827586206, 100.0,
100.0, 100.0, 100.0, 93.33333333333333, 100.0, 100.0, 100.0,
100.0, 100.0, 96.55172413793103, 100.0, 0, 100.0,
96.55172413793103, 100.0, 100.0, 100.0, 100.0, 100.0, 100.0,
100.0, 89.65517241379311, 100.0, 96.55172413793103]
```

```
-----
average latency in each node [2.3117241379310722,
0.6148275862074742, 0.60000000000002619, 1.233103448275697,
15.63827586206895, 8.00586206896578, 41.882499999999894,
19.102758620689773, 8.730370370370178, 22.45620689655127,
19.818275862068777, 49.869999999999994, 7.451034482758312,
44.035862068965805, 0.8134482758622856, 9.45464285714289,
43.52758620689647, 0, 1.858275862069008, 12.381379310344716, 0,
0.646551724137931, 22.269655172413923, 8.080740740740524,
12.366206896551619, 31.437931034482965, 0.4817241379310825,
32.31241379310351, 3.214285714286053, 52.03068965517257,
19.216896551724528, 23.66379310344826, 13.999310344827979,
1.3913793103447225, 8.031785714285897, 14.232413793103527, 0,
23.70068965517241, 31.726071428571426, 1.2255172413789641,
9.679310344827698, 7.88206896551727, 13.821724137931174,
0.6237931034485004, 1.2331034482758383, 0.6306896551728908,
33.67769230769241, 0.6241379310343855, 10.6650000000000402]
```

```
-----
average PDR in the network [94.8323754789272]
```

```
-----
average burst packet loss in each node [[0, 0, 0, 0, 0, 0,
0.03571428571428571, 0, 0.037037037037037035, 0, 0, 0, 0, 0, 0,
0.03571428571428571, 0, 0, 0, 0, 0, 0, 0, 0.07407407407407407,
0, 0, 0, 0, 0.07142857142857142, 0, 0, 0, 0, 0,
0.03571428571428571, 0, 0, 0, 0.03571428571428571, 0, 0, 0, 0,
0, 0, 0, 0.11538461538461539, 0, 0]]
```

```
-----
scanning energy in each node [1209.9088200029396,
1200.3261600029048, 1204.9798800029216, 1191.610860002873,
1213.5367200029527, 1191.869400002874, 1207.556940002931,
```

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```
1216.5724800029639, 1204.6045800029203, 1208.9163600029358,  
1204.6546200029204, 1201.468740002909, 1206.1141200029258,  
1205.3551800029231, 1195.5473400028875, 1208.0907000029329,  
1207.9322400029325, 1247.997600003078, 1201.9774800029109,  
1217.8401600029686, 1247.7390600030772, 1192.119600002875,  
1214.2456200029553, 1205.3551800029231, 1199.308680002901,  
1211.685240002946, 1198.4246400028976, 1204.1375400029185,  
1206.5061000029273, 1224.4037400029924, 1202.311080002912,  
1211.910420002947, 1210.0172400029398, 1198.9917600028998,  
1215.4299000029596, 1206.2392200029262, 1249.9408200030853,  
1215.1463400029586, 1215.7551600029608, 1194.6633000028842,  
1207.1316000029296, 1195.4722800028871, 1202.4862200029127,  
1189.2423000028643, 1199.3920800029014, 1194.5882400028838,  
1209.1248600029369, 1196.9401200028924, 1221.4764000029818]
```

```
-----  
switching energy in each node [2.651670000000069,  
3.2380020000000105, 2.948130000000054, 3.794687999999926,  
2.4342660000000061, 3.8375099999999196, 2.7966060000000743,  
2.1773340000000051, 3.0107160000000045, 2.7406080000000723,  
2.94483600000000546, 3.1688280000000021, 2.8987200000000062,  
2.90201400000000616, 3.5542259999999626, 2.7867240000000074,  
2.79660600000000743, 0.187758000000000017, 3.16553400000000214,  
2.13780600000000496, 0.191052000000000014, 3.8045699999999245,  
2.3288580000000057, 2.9646000000000052, 3.3038820000000007,  
2.5495560000000065, 3.4158779999999833, 3.043656000000004,  
2.8624860000000067, 1.68323400000000325, 3.1490640000000024,  
2.51332200000000636, 2.5956720000000067, 3.3302339999999964,  
2.2761540000000055, 2.85260400000000688, 0.02305799999999995,  
2.30250600000000557, 2.21686200000000523, 3.6662219999999457,  
2.84601600000000703, 3.5509319999999963, 3.0996540000000031,  
3.9758579999999899, 3.3368219999999957, 3.6332819999999506,  
2.66484600000000695, 3.4554059999999778, 1.887462000000004]
```

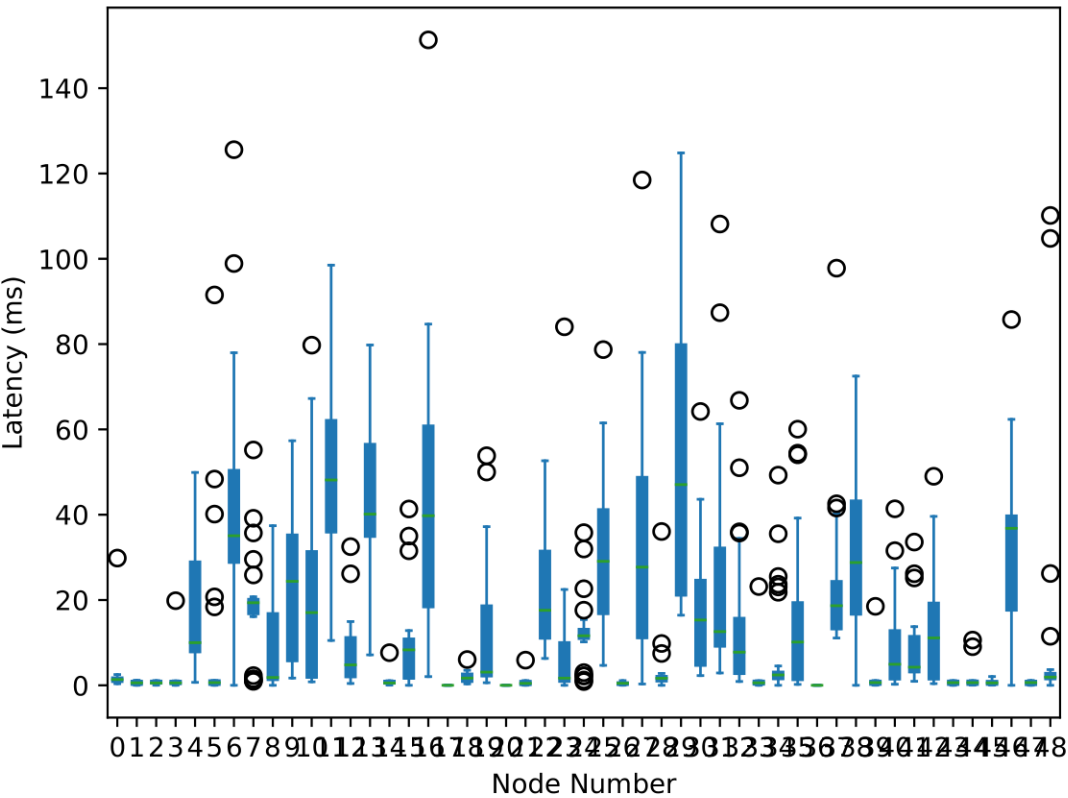
```
-----  
transmitting energy in each node [18.610955999998982,  
22.726173599998628, 20.691683999998805, 26.63331839999854,  
17.085088799999117, 26.933867999998625, 19.628200799998897,  
15.281791199999272, 21.130948799998766, 19.23517439999893,  
20.668564799998805, 22.240670399998667, 20.344895999998833,  
20.36801519999883, 24.945616799998433, 19.5588431999989,  
19.628200799998897, 1.31779440000000017, 22.21755119999867,  
15.004360799999297, 1.34091360000000017, 26.702675999998558,  
16.34527439999918, 20.80727999999879, 23.188557599998585,  
17.894260799999046, 23.974610399998518, 21.362140799998745,  
20.090584799998854, 11.813911199999573, 22.10195519999868,  
17.639949599999067, 18.217929599999017, 23.37351119999857,  
15.975367199999212, 20.02122719999886, 0.16183440000000002,  
16.160320799999194, 15.559221599999248, 25.731669599998362,
```

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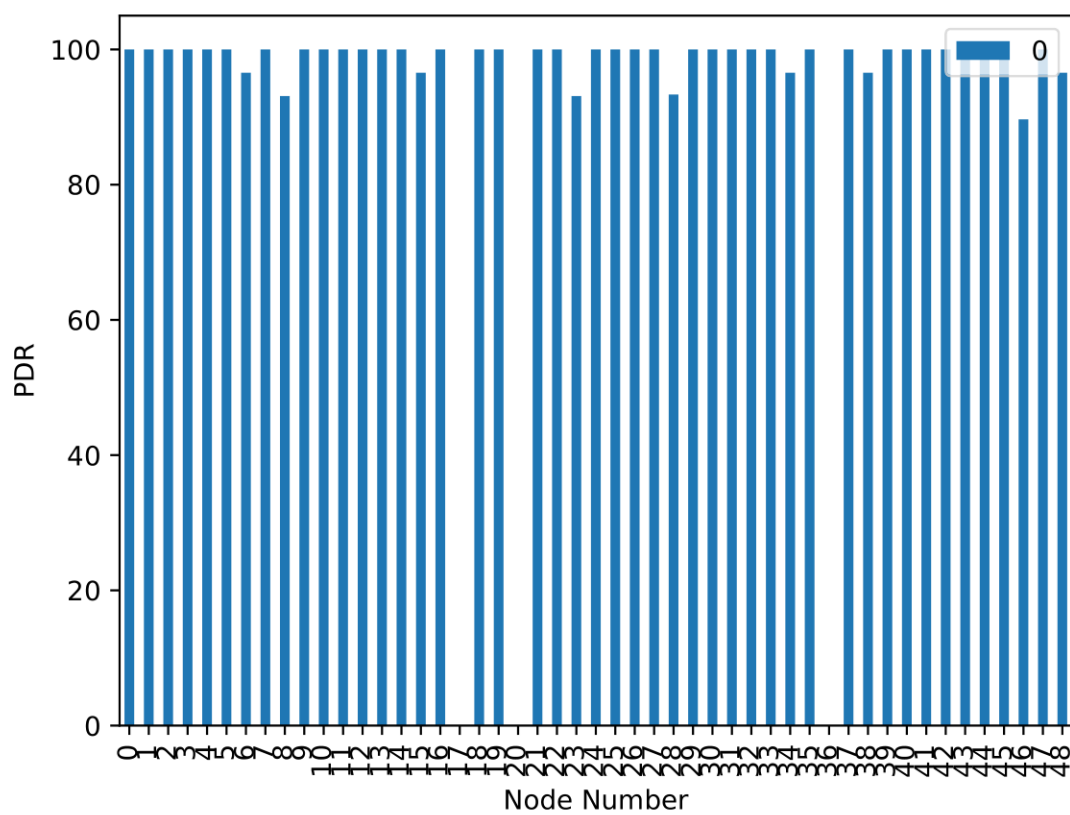
```
19.974988799998865, 24.922497599998433, 21.75516719999871,  
27.904874399998906, 23.419749599998564, 25.500477599998383,  
18.703432799998975, 24.252040799998493, 13.24730159999945]  
-----  
sleeping energy in each node [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0, 0.0,  
0.0, -0.0, 0.0001, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, -0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0001, 0.0, 0.0, 0.0, 0.0, 0.0]  
-----  
total energy in each node [1231.1714460029386,  
1226.2903356029035, 1228.6196940029204, 1222.0388664028717,  
1233.0560748029518, 1222.6407780028726, 1229.98174680293,  
1234.0316052029632, 1228.7462448029191, 1230.8921424029347,  
1228.2680208029194, 1226.8782384029078, 1229.3577360029249,  
1228.625209202922, 1224.0471828028858, 1230.4362672029317,  
1230.3570468029316, 1249.503152403078, 1227.3605652029096,  
1234.982326802968, 1249.271025603077, 1222.6269460028734,  
1232.9197524029546, 1229.127060002922, 1225.8011196028995,  
1232.1290568029453, 1225.815128402896, 1228.5433368029173,  
1229.459170802926, 1237.9008852029922, 1227.5620992029105,  
1232.063691602946, 1230.830841602939, 1225.6955052028984,  
1233.681421202959, 1229.1130512029254, 1250.1257124030853,  
1233.6091668029578, 1233.53124360296, 1224.0611916028824,  
1229.9526048029284, 1223.9457096028855, 1227.3410412029116,  
1221.1231324028631, 1226.1486516029, 1223.7219996028823,  
1230.493138802936, 1224.6475668028909, 1236.6111636029814]  
-----  
network energy consumption (mJ) 60275.13709414363
```

Melvin Mokhtari (9831143)

Latency Plot



PDR Plot



Melvin Mokhtari (9831143)

Packet tracing

14.log

(generate)	14	4585.54	[22]	4
---------------------	----	---------	------	---

35.log

(relay)	14	14	4586.52	4	4585.54	3	4
(advertise)	35	4587.12	22	1			

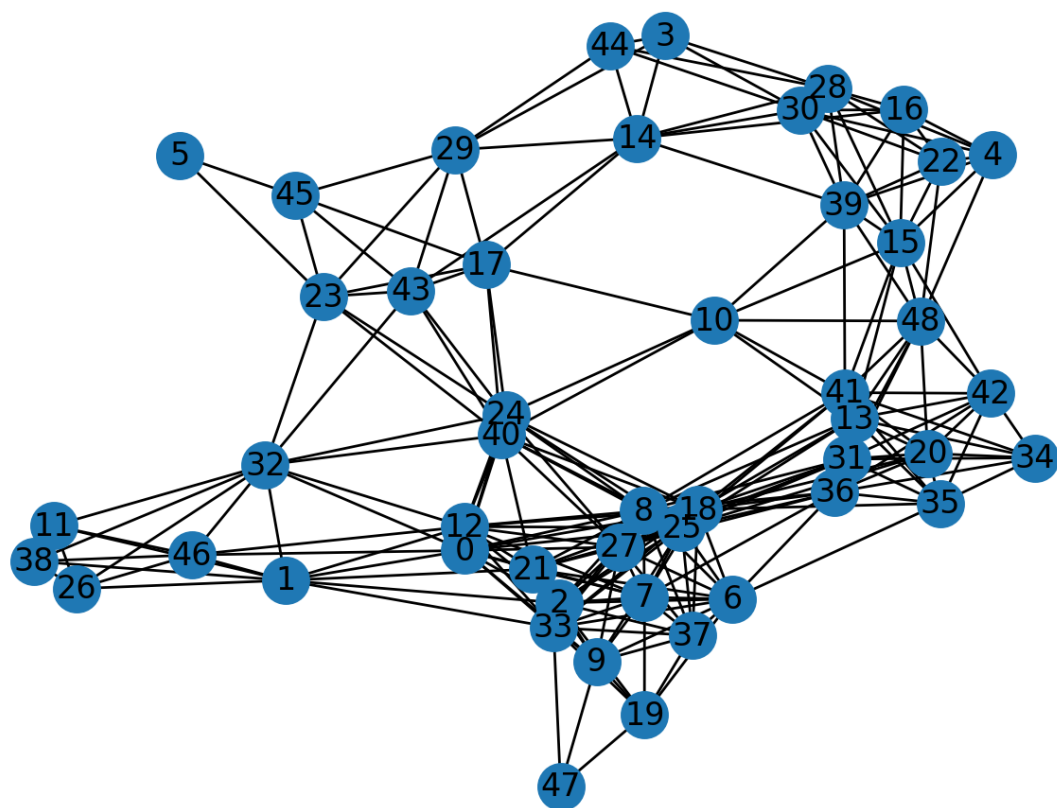
22.log:

(main)	14	4	4585.54	22	4654.41
--------	----	---	---------	----	---------

Melvin Mokhtari (9831143)

Scenario Two

Topology



Melvin Mokhtari (9831143)

Output of the performance_analyzer.py

```
[29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 0.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0]
```

```
-----
nodes PDR [100.0, 100.0, 96.55172413793103, 100.0, 100.0,
96.55172413793103, 100.0, 100.0, 100.0, 93.10344827586206,
100.0, 86.20689655172413, 100.0, 100.0, 100.0, 100.0, 100.0,
100.0, 0, 100.0, 100.0, 100.0, 100.0, 100.0, 100.0, 100.0,
100.0, 100.0, 100.0, 100.0, 96.55172413793103, 100.0, 100.0,
96.55172413793103, 100.0, 100.0, 100.0, 100.0,
96.55172413793103, 100.0, 100.0, 100.0, 100.0, 100.0,
96.55172413793103, 96.55172413793103, 100.0, 100.0, 100.0]
```

```
-----
average latency in each node [5.257155172413793,
2.742413793103382, 14.479818181818224, 43.262631578947456,
47.98638297872327, 40.994910714285425, 20.349189189189264,
10.412477876106275, 20.970000000000015, 16.847009345794376,
20.881913043478175, 22.1944000000000044, 4.654482758620481,
17.993289473684108, 18.086956521738948, 58.2139759036146,
9.56745614035088, 12.907017543859459, 0, 34.481478260869565,
38.79932432432425, 13.59698275862075, 25.566306306306156,
8.46769911504412, 7.698965517241199, 19.04739130434778,
10.636896551724073, 16.874869565217338, 43.2812612612612,
32.543217391304154, 19.927297297297283, 11.886206896551657,
4.9454310344828745, 10.172946428571223, 35.774659090909225,
44.465058823529375, 5.824878048780353, 16.595909090909135,
7.740267857142663, 44.26666666666667, 10.417413793103531,
43.806526315789625, 39.05965116279072, 19.924561403508772,
39.68648648648631, 37.634818181818495, 14.152931034482794,
38.89879310344775, 10.897526881720582]
```

```
-----
average PDR in the network [99.06609195402298]
```

```
-----
average burst packet loss in each node [[0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]]
```

```
-----
scanning energy in each node [1193.0703600028783,
1201.5187800029091, 1196.6899200028915, 1217.2563600029664,
1214.3373600029556, 1219.107840002973, 1196.0394000028891,
1192.7951400028771, 1187.6493600028587, 1199.0001000029,
1196.3313000028902, 1211.168160002944, 1192.2697200028754,
```

Melvin Mokhtari (9831143)

```
1196.1728400028894, 1210.1423400029405, 1207.4235000029307,  
1214.395740002956, 1203.7122000029171, 1250.399520003087,  
1213.9120200029543, 1200.2677800029046, 1193.4706800028798,  
1215.1630200029585, 1203.9207000029178, 1190.3848800028686,  
1188.0163200028599, 1211.4934200029452, 1189.2840000028646,  
1213.7869200029536, 1211.4517200029452, 1213.5200400029528,  
1195.4222400028868, 1199.6172600029022, 1196.9734800028925,  
1206.9147600029287, 1201.3102800029083, 1193.1537600028787,  
1203.411960002916, 1211.426700002945, 1206.0474000029253,  
1190.6767800028697, 1195.1887200028862, 1206.205860002926,  
1204.0541400029183, 1216.5224400029635, 1213.036320002951,  
1206.2892600029265, 1221.8683800029833, 1203.4870200029163]
```

```
-----  
switching energy in each node [3.761747999999931,  
3.1655340000000214, 3.5015219999999703, 2.18392200000000514,  
2.3090940000000056, 2.02581000000000456, 3.544343999999964,  
3.741983999999934, 4.071383999999984, 3.310469999999999,  
3.511403999999969, 2.5264980000000064, 3.765041999999931,  
3.57069599999996, 2.5956720000000067, 2.8328400000000072,  
2.36509200000000584, 3.0337740000000041, 0.02305799999999995,  
2.3667390000000058, 3.2281200000000012, 3.7057499999999397,  
2.29591800000000554, 2.98765800000000486, 3.8770379999999136,  
4.0582079999999887, 2.51332200000000636, 4.0055039999999894,  
2.3585040000000058, 2.4968520000000063, 2.36509200000000584,  
3.5871659999999572, 3.2676480000000006, 3.504815999999997,  
2.8031940000000075, 3.1951800000000017, 3.6859859999999425,  
3.0667140000000036, 2.5232040000000064, 2.9168370000000059,  
3.8770379999999136, 3.573989999999996, 2.84931000000000697,  
3.0304800000000042, 2.1938040000000052, 2.4342660000000061,  
2.89542600000000622, 1.82158200000000376, 3.04036200000000404]
```

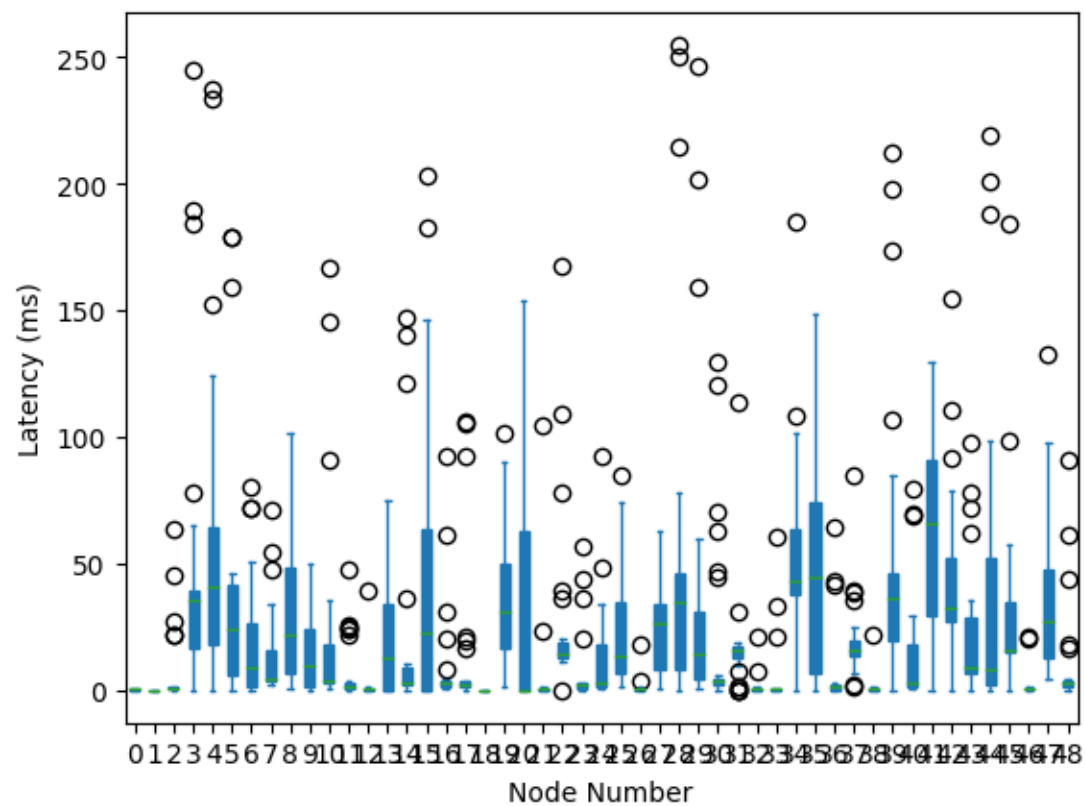
```
-----  
transmitting energy in each node [26.402126399998473,  
22.21755119999867, 24.57570959999847, 15.328029599999269,  
16.20655919999919, 14.218307999999364, 24.87625919999844,  
26.263411199998433, 28.5753311999991, 23.234795999998582,  
24.645067199998458, 17.732426399999056, 26.42524559999848,  
25.061212799998422, 18.217929599999017, 19.882511999998872,  
16.59958559999916, 21.292783199998752, 0.16183440000000002,  
16.614998399999156, 22.65681599999863, 26.009099999998362,  
16.1140823999992, 20.96911439999878, 27.211298399998704,  
28.482854399999074, 17.639949599999067, 28.112947199998967,  
16.553347199999163, 17.524353599999078, 16.59958559999916,  
25.176808799998412, 22.934246399998607, 24.598828799998465,  
19.67443919999889, 22.42562399999865, 25.87038479999835,  
21.52397519999873, 17.70930719999906, 20.475904799998823,  
27.211298399998704, 25.09203839999842, 19.99810799999886,  
21.269663999998752, 15.397387199999262, 17.085088799999117,
```

Melvin Mokhtari (9831143)

```
20.321776799998837, 12.78491759999949, 21.339021599998745]
-----
sleeping energy in each node [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
0.0, 0.0001, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0,
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0001, 0.0, 0.0001, 0.0, 0.0,
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
-----
total energy in each node [1223.2342344028766,
1226.9018652029079, 1224.76715160289, 1234.7683116029657,
1232.8530132029548, 1235.3519580029724, 1224.4600032028875,
1222.8005352028756, 1220.2961752028575, 1225.5453660028984,
1224.4877712028886, 1231.4270844029431, 1222.460007602874,
1224.8047488028878, 1230.9559416029397, 1230.1388520029295,
1233.3604176029553, 1228.0387572029158, 1250.584412403087,
1232.8937574029535, 1226.1527160029032, 1223.185530002878,
1233.5730204029578, 1227.8774724029165, 1221.4732164028671,
1220.5574824028588, 1231.6466916029442, 1221.4025512028634,
1232.6987712029527, 1231.4729256029443, 1232.484717602952,
1224.1862148028852, 1225.8191544029007, 1225.077124802891,
1229.3923932029277, 1226.9310840029068, 1222.710130802877,
1228.0026492029147, 1231.659211202944, 1229.440141802924,
1221.7651164028682, 1223.8547484028845, 1229.053278002925,
1228.3542840029172, 1234.1136312029628, 1232.55567480295,
1229.5064628029254, 1236.4748796029828, 1227.866403602915]
-----
network energy consumption (mJ) 60189.418041743
```

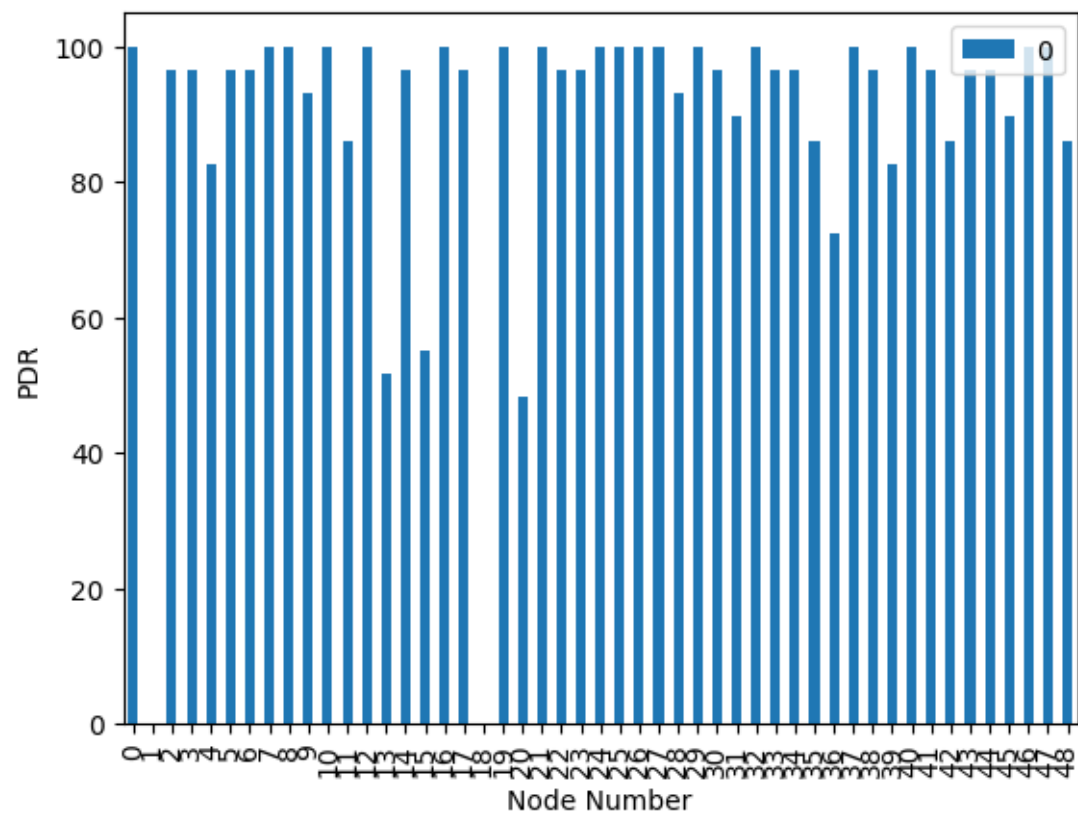
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Latancy Plot of the 1st destination node



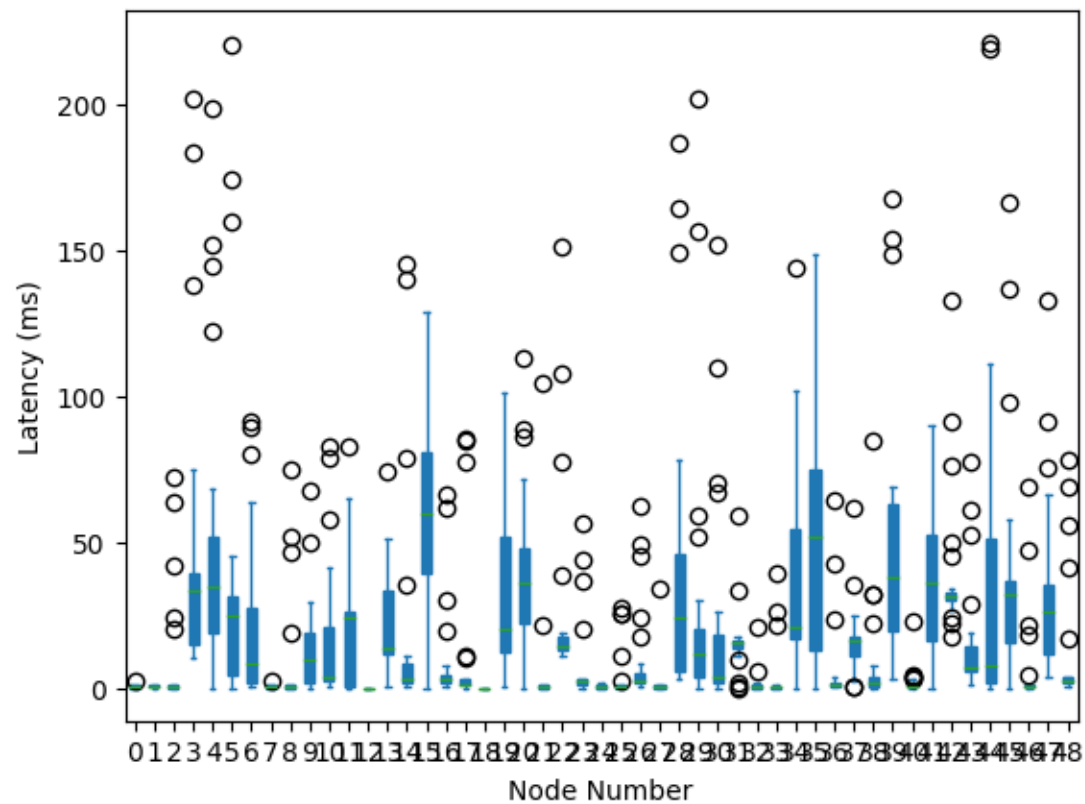
Melvin Mokhtari (9831143)

PDR Plot of the 1st destination node



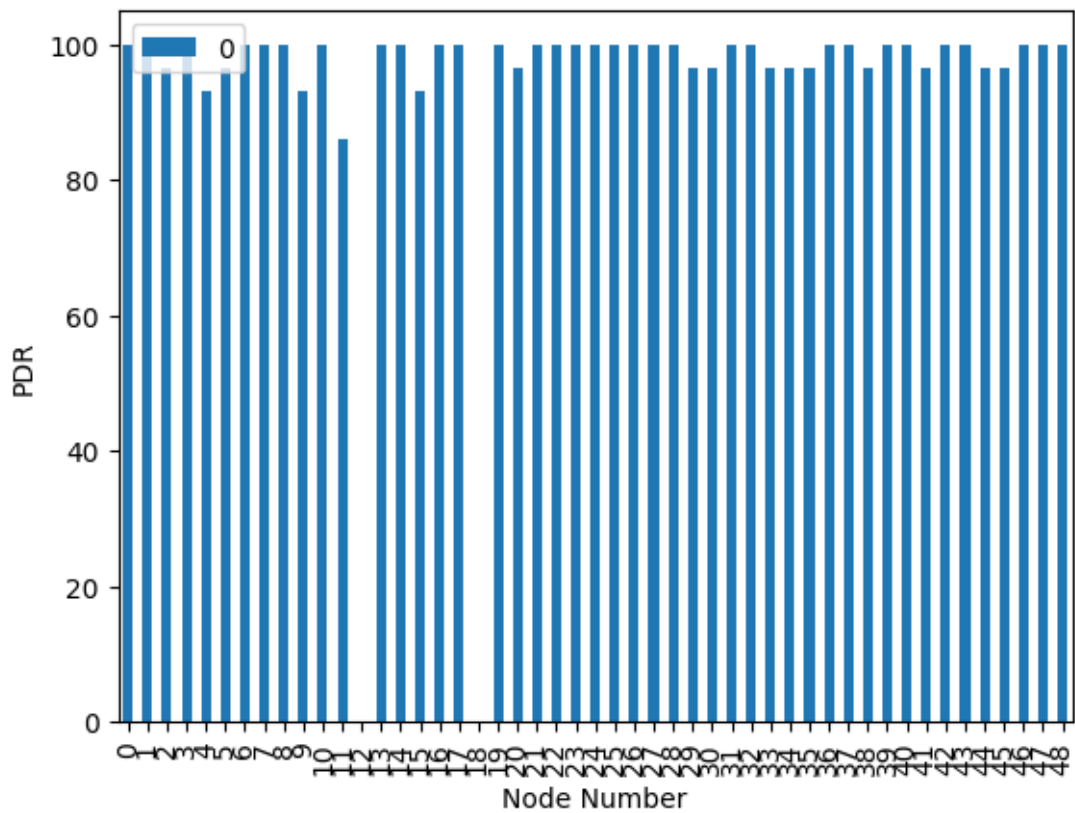
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Latency Plot of the 2nd destination node



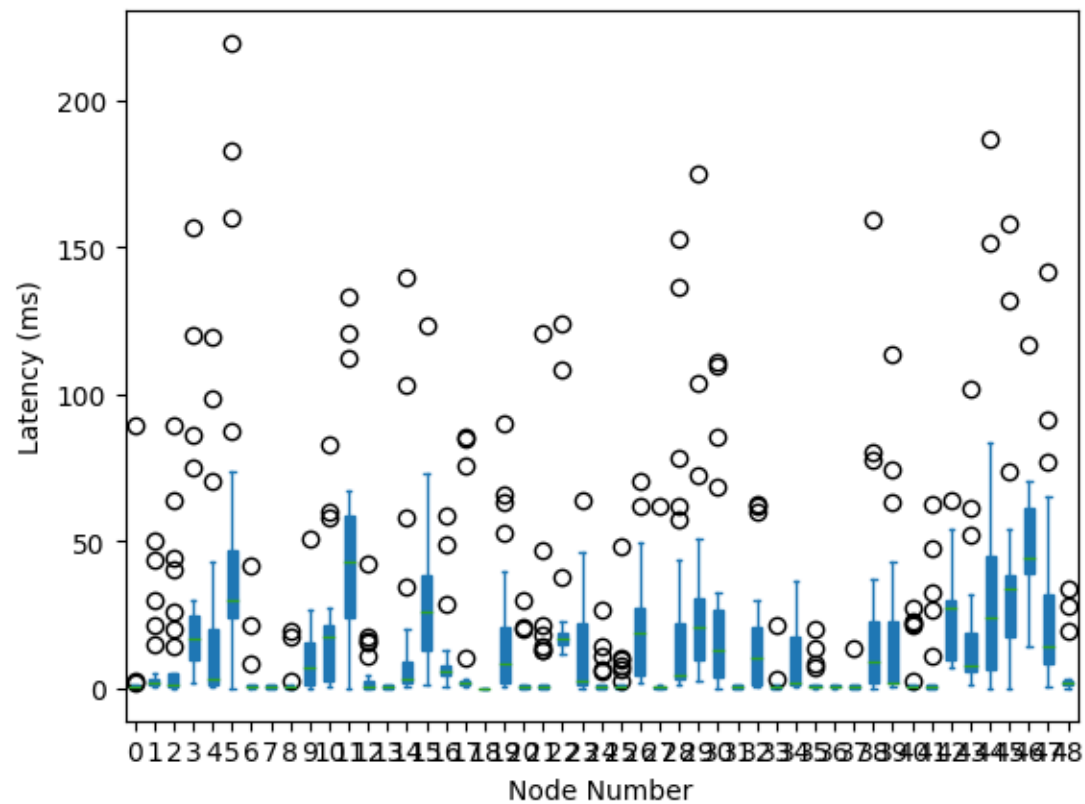
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PDR Plot of the 2nd destination node



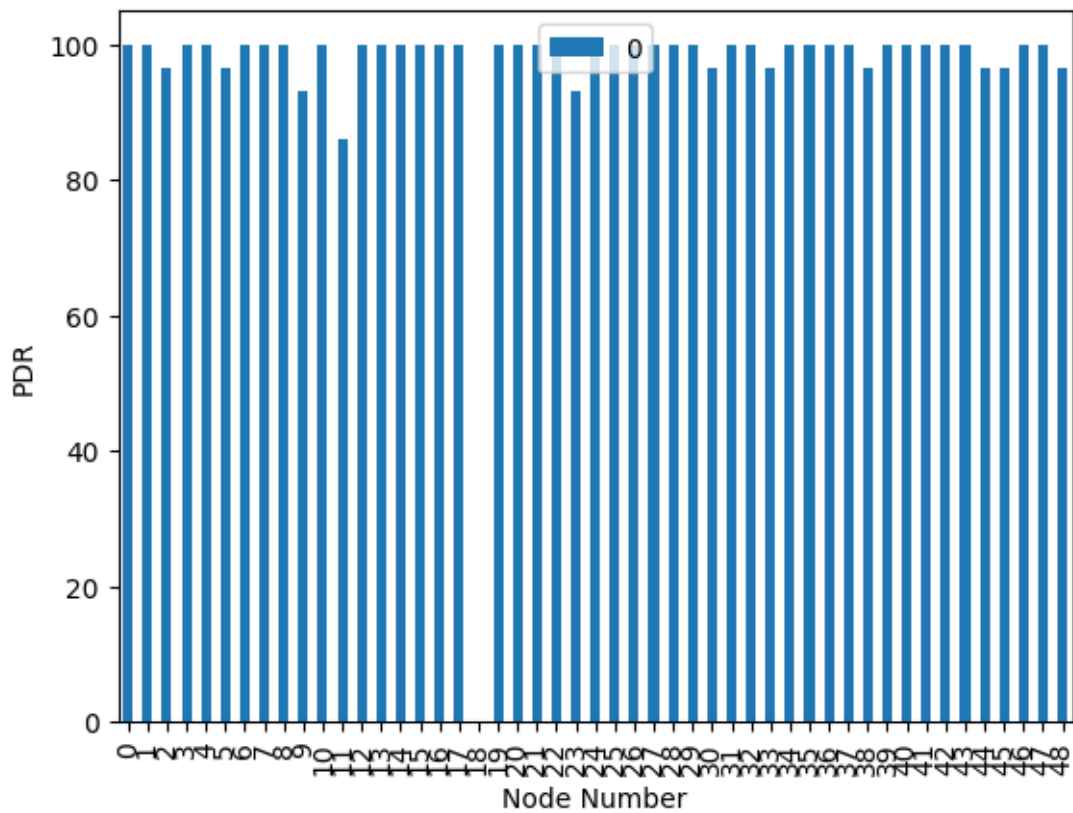
Melvin Mokhtari (9831143)

Latency Plot of the 3rd destination node



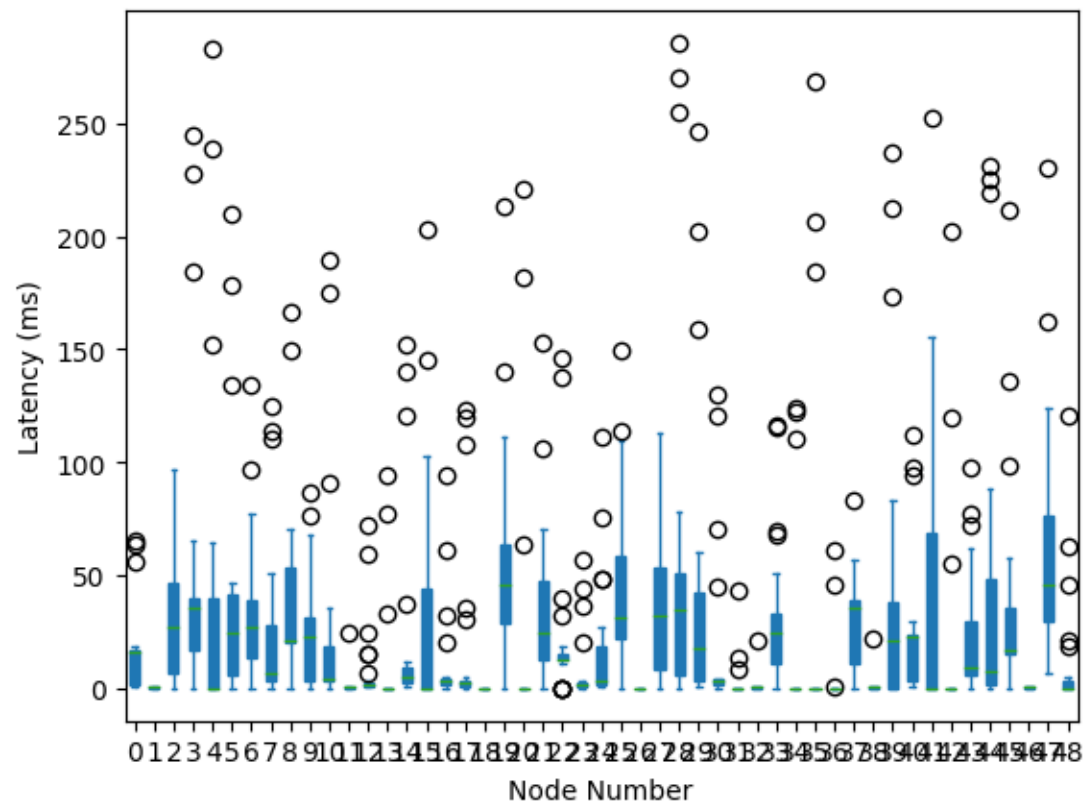
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PDR Plot of the 3rd destination node

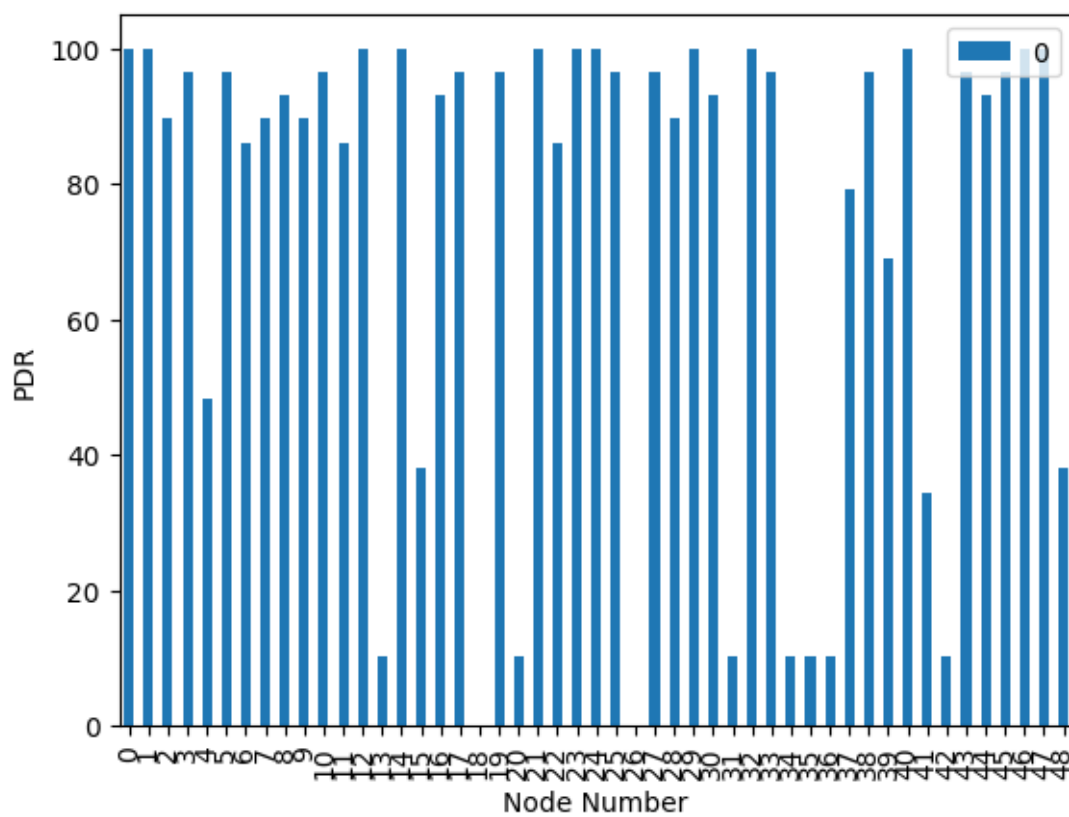


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Latency Plot of the 4th destination node



PDR Plot of the 4th destination node



Melvin Mokhtari (9831143)

Packet tracing

33.log:

(generate)	33	2113.19	[12, 26, 1, 3]	2
------------	----	---------	----------------	---

6.log:

(relay)	33	33	2113.8	2	2113.19	127	4
(advertise)	6	2189.04	33	2			

1.log:

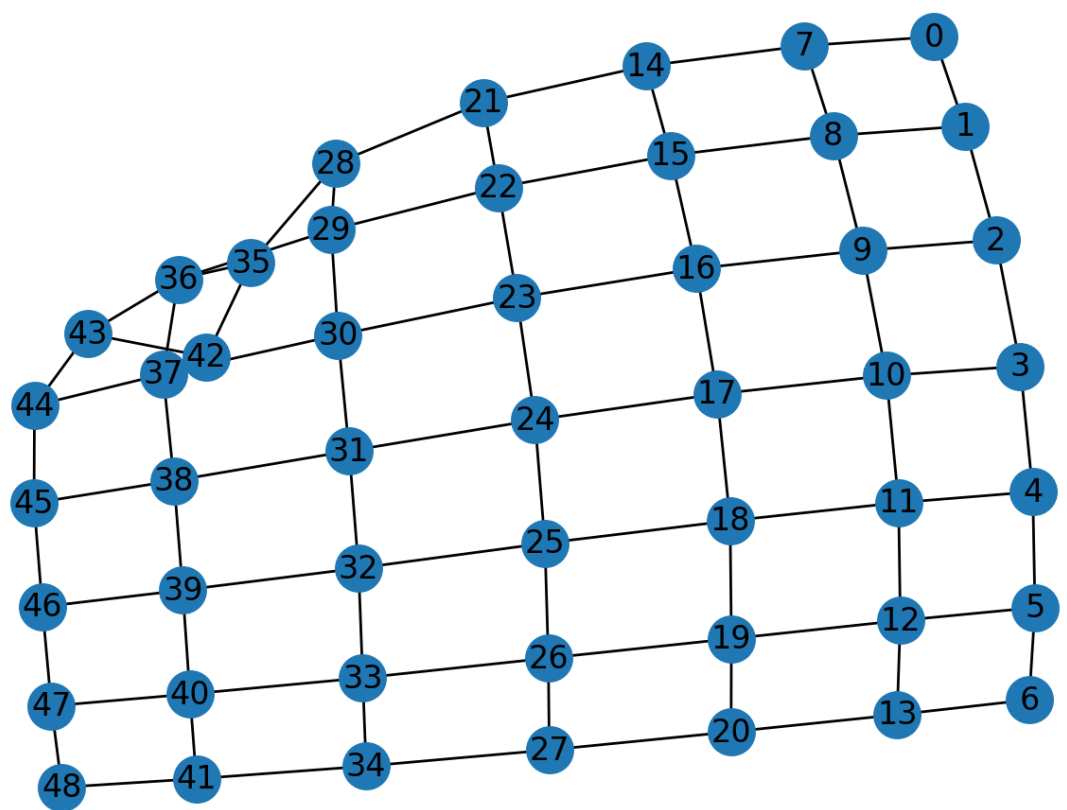
(main)	33	2	2113.19	1	2197.44
--------	----	---	---------	---	---------

Melvin Mokhtari (9831143)

Scenario Three

Grid

Topology



Melvin Mokhtari (9831143)

Output of the performance_analyzer.py

```
[30.0, 30.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 30.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 0.0, 29.0, 29.0, 30.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0,
29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0, 29.0]
```

```
-----
nodes PDR [80.0, 96.66666666666667, 100.0, 100.0, 100.0,
96.55172413793103, 96.55172413793103, 96.55172413793103, 100.0,
96.55172413793103, 82.75862068965517, 100.0, 100.0, 100.0,
100.0, 100.0, 100.0, 93.10344827586206, 100.0, 100.0,
96.55172413793103, 100.0, 100.0, 100.0, 0, 100.0, 100.0,
76.66666666666667, 100.0, 100.0, 100.0, 93.10344827586206,
100.0, 96.55172413793103, 100.0, 93.10344827586206, 100.0,
100.0, 96.55172413793103, 100.0, 100.0, 96.55172413793103,
100.0, 100.0, 100.0, 96.55172413793103, 100.0, 100.0,
96.55172413793103]
```

```
-----
average latency in each node [53.06583333333347,
75.29827586206903, 40.634482758620614, 49.018620689655364,
57.24448275862099, 38.74321428571428, 74.4292857142854,
36.34785714285703, 16.791379310344993, 21.115000000000016,
2439.2379166666665, 44.390000000000017, 74.53034482758633,
43.096206896551685, 34.336896551724465, 27.386333333333358,
15.381379310344709, 2319.6911111111112, 21.9951724137928,
41.858620689655275, 12.67571428571441, 12.828965517241636,
48.325862068965655, 0.6279310344824698, 0, 0.47793103448262975,
44.14965517241378, 44.52739130434789, 46.13758620689652,
59.85655172413803, 23.246551724138154, 1.676296296296195,
30.811034482758878, 18.969642857142894, 27.44999999999993,
66.859999999999984, 45.00896551724151, 13.083448275862127,
22.439285714285795, 12.956896551724169, 34.35310344827563,
23.086785714285636, 31.230344827586208, 22.841379310344927,
66.01379310344845, 32.412499999999991, 17.81689655172424,
47.23482758620698, 88.67321428571417]
```

```
-----
average PDR in the network [97.51915708812261]
```

```
-----
average burst packet loss in each node [[0.20833333333333334, 0,
0, 0, 0, 0.03571428571428571, 0.03571428571428571, 0, 0,
0.03571428571428571, 0.125, 0, 0, 0, 0, 0, 0, 0,
0.037037037037037035, 0, 0, 0.03571428571428571, 0, 0, 0, 0, 0,
0, 0.2608695652173913, 0, 0, 0, 0.07407407407407407, 0, 0, 0,
0.037037037037037035, 0, 0, 0.03571428571428571, 0, 0,
0.03571428571428571, 0, 0, 0, 0.03571428571428571, 0, 0, 0]]
```

Melvin Mokhtari (9831143)

```
-----  
scanning energy in each node [133.49003999996998,  
1212.6026400029493, 1218.9994200029728, 1214.6209200029566,  
1219.5081600029746, 1212.1856400029478, 1225.1710200029952,  
1212.1272600029477, 1213.5700800029529, 1202.8031400029138,  
1215.246420002959, 1203.6538200029167, 1214.2122600029554,  
1216.072080002962, 1217.7067200029678, 1203.6037800029167,  
1206.0891000029255, 1192.6867200028769, 1205.4302400029233,  
1203.3535800029158, 1246.3879800030722, 1212.3107400029483,  
1214.420760002956, 1192.0695600028746, 1249.5238200030838,  
1195.6307400028875, 1213.8202800029537, 138.66083999996528,  
1219.2162600029735, 1198.7248800028988, 1202.7864600029136,  
1192.127940002875, 1205.3802000029232, 1203.5120400029161,  
1218.9827400029726, 1211.393340002945, 1213.9287000029542,  
1199.4588000029016, 1211.943780002947, 1201.293600002908,  
1211.8937400029467, 1212.7611000029501, 1221.6682200029823,  
1211.626860002946, 1218.32388000297, 1210.9846800029436,  
1216.5057600029634, 1209.6502800029386, 1222.5772800029856]  
-----
```

```
switching energy in each node [0.24375599999999967,  
2.4573240000000062, 2.0192220000000045, 2.3585040000000058,  
2.0159280000000045, 2.4573240000000062, 1.63053000000000305,  
2.49355800000000632, 2.3617980000000058, 3.06012600000000376,  
2.29591800000000554, 3.07000800000000356, 2.3387400000000057,  
2.26956600000000544, 2.1279240000000049, 3.07330200000000355,  
2.84601600000000703, 3.7568069999999932, 2.9514240000000054,  
3.0568320000000038, 0.2569319999999995, 2.4573240000000062,  
2.37168000000000586, 3.7946879999999926, 0.02305799999999995,  
3.55422599999999626, 2.3617980000000058, 0.26681399999999944,  
2.0620440000000047, 3.3368219999999957, 3.09636000000000318,  
3.7880999999999927, 2.90860200000000605, 3.0304800000000042,  
2.03898600000000457, 2.50344000000000634, 2.39803200000000592,  
3.3434099999999994, 2.50014600000000635, 3.17212200000000203,  
2.50344000000000634, 2.4441480000000061, 1.8644040000000039,  
2.55614400000000655, 2.0982780000000048, 2.5792020000000066,  
2.2465080000000054, 2.6549640000000069, 1.85122800000000387]  
-----
```

```
transmitting energy in each node [1.7108208000000004,  
17.246923199999102, 14.17206959999937, 16.553347199999163,  
14.14895039999937, 17.246923199999102, 11.444003999999605,  
17.50123439999908, 16.57646639999916, 21.477736799998734,  
16.1140823999992, 21.547094399998727, 16.414631999999177,  
15.929128799999216, 14.935003199999302, 21.570213599998727,  
19.974988799998865, 26.371300799998465, 20.7148031999988,  
21.454617599998734, 1.8032976000000005, 17.246923199999102,  
16.645823999999152, 26.63331839999854, 0.16183440000000002,  
24.945616799998433, 16.57646639999916, 1.8726552000000052,  
-----
```


Melvin Mokhtari (9831143)

```
14.472619199999343, 23.419749599998564, 21.73204799999871,  
26.58707999999853, 20.414253599998826, 21.269663999998752,  
14.310784799999357, 17.570591999999074, 16.830777599999138,  
23.46598799999856, 17.547472799999074, 22.263789599998663,  
17.570591999999074, 17.15444639999911, 13.085467199999462,  
17.940499199999042, 14.72693039999932, 18.102333599999028,  
15.76729439999923, 18.634075199998982, 12.99299039999947]
```

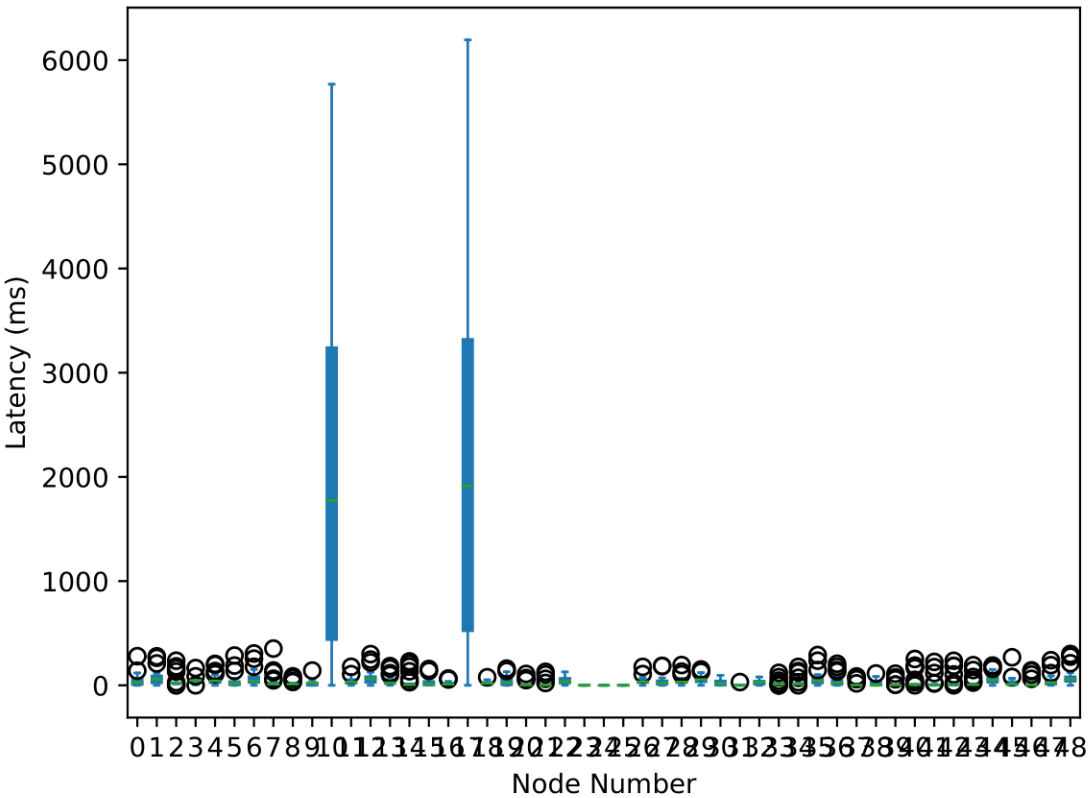
```
-----  
sleeping energy in each node [1.1669, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, -0.0, 0.0, 0.0, 1.1954, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,  
0.0, 0.0, 0.0, 0.0, 0.0]
```

```
-----  
total energy in each node [136.61151679996996,  
1232.3068872029485, 1235.1907116029722, 1233.5327712029557,  
1235.673038402974, 1231.889887202947, 1238.2455540029948,  
1232.1220524029468, 1232.5083444029522, 1227.3410028029125,  
1233.6564204029582, 1228.2709224029156, 1232.9656320029546,  
1234.2707748029611, 1234.7696472029672, 1228.2472956029153,  
1228.9101048029243, 1222.8148278028752, 1229.0964672029222,  
1227.8650296029145, 1248.4482096030722, 1232.0149872029474,  
1233.438264002955, 1222.4975664028732, 1249.7087124030838,  
1224.1305828028858, 1232.758544402953, 141.9957091999653,  
1235.750923202973, 1225.4814516028973, 1227.6148680029123,  
1222.5031200028734, 1228.703055602922, 1227.812184002915,  
1235.332510802972, 1231.467372002944, 1233.1575096029535,  
1226.2681980029001, 1231.9913988029462, 1226.7295116029068,  
1231.9677720029458, 1232.3596944029493, 1236.6180912029818,  
1232.1235032029451, 1235.1490884029693, 1231.6662156029427,  
1234.5195624029625, 1230.9393192029377, 1237.421498402985]
```

```
-----  
network energy consumption (mJ) 58176.85831193835
```

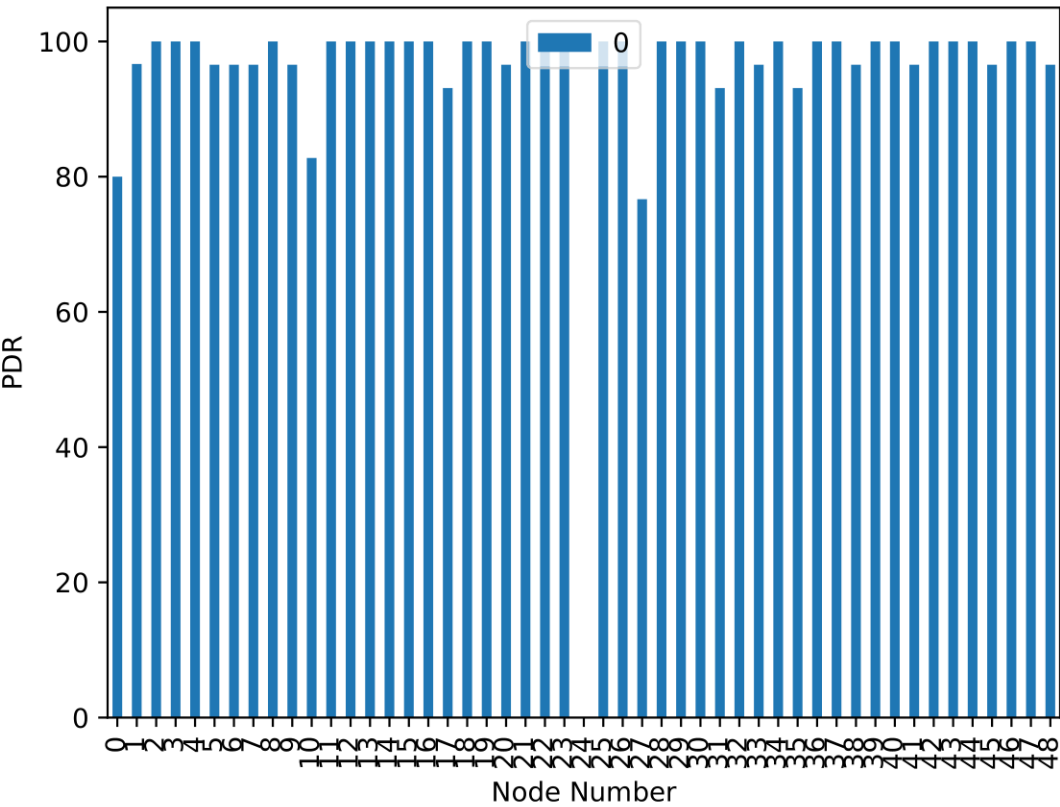
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Latency Plot



Melvin Mokhtari (9831143)

PDR Plot



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Packet tracing

17.log:

(generate)	17	5600.8	[0]	5
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18.log:

(relay)	4	17	5603.85	5	5600.8	2	2
(advertise)	18	5643.46	17	5			

19.log:

(relay)	5	17	5606.45	5	5600.8	1	1
(advertise)	19	5702.46	17	5			

20.log:

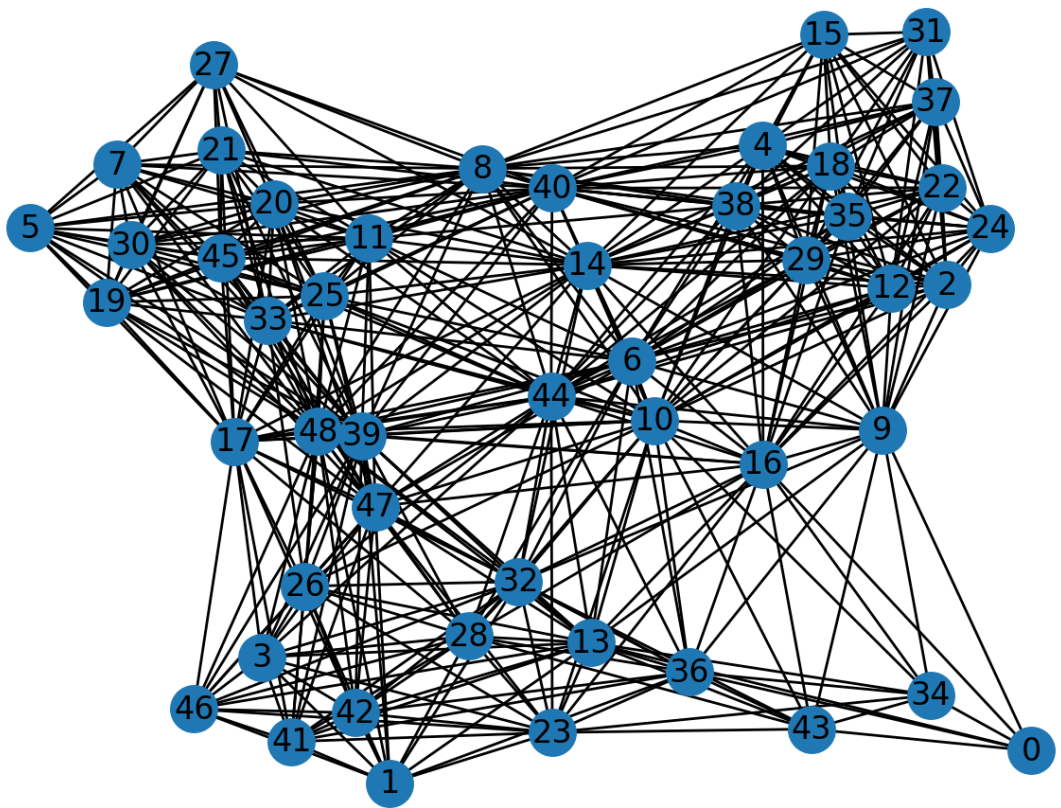
Friend	Node!
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27.log:

(main)	17	5	5600.8	27	8134.93
--------	----	---	--------	----	---------

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Random
Topology



```
average burst packet loss in each node [[0.07142857142857142,
0.07407407407407407, 0.03571428571428571, 0,
0.037037037037037035, 0, 0, 0, 0, 0, 0, 0,
0.16666666666666666, 0, 0, 0, 0, 0, 0, 0.03571428571428571,
0, 0, 0, 0, 0, 0.42857142857142855, 0, 0, 0, 0, 0,
0.03571428571428571, 0, 0, 0, 0, 0, 0, 0, 0,
0.03571428571428571, 0.03571428571428571, 0,
0.03571428571428571, 0, 0, 0]]
```

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```
-----  
scanning energy in each node [36.645960000002624,  
1202.7364200029135, 1192.5699600028765, 1197.073560002893,  
1193.4623400028797, 1202.386140002912, 1188.1414200028605,  
1196.8567200028922, 1246.012680003071, 1191.4607400028724,  
1249.9408200030853, 1191.5691600028729, 1193.2955400028793,  
1191.010380002871, 1187.215680002857, 1200.985020002907,  
1188.9337200028633, 1195.0469400028853, 1193.3539200028792,  
1195.7058000028878, 1193.2872000028792, 1195.714140002888,  
1195.2888000028865, 1196.7232800028914, 1195.3555200028866,  
1193.6958600028806, 1197.2570400028937, 218.8999799998923,  
1193.4540000028796, 1193.7208800028807, 1195.2387600028862,  
1202.7948000029137, 1189.409100002865, 1192.3614600028757,  
1200.4846200029053, 1192.7451000028773, 1191.369000002872,  
1197.2570400028937, 1190.9520000028706, 1189.1922600028643,  
1191.6775800028731, 1200.342840002905, 1200.100980002904,  
1199.7256800029027, 1187.8995600028595, 1192.4949000028762,  
1200.5847000029057, 1192.2530400028752, 1190.74350000287]  
-----
```

```
switching energy in each node [0.13834800000000022,  
3.13259400000000263, 3.7617479999999931, 3.438935999999998,  
3.69586799999999413, 3.10624200000000306, 4.0450319999999888,  
3.5179919999999968, 0.2569319999999995, 3.834215999999992,  
0.023057999999999995, 3.8078639999999924, 3.69586799999999413,  
3.86056799999999163, 4.0779719999999884, 3.241296000000001,  
4.0285619999999891, 3.60034199999999555, 3.6892799999999942,  
3.5575199999999962, 3.71233799999999386, 3.55422599999999626,  
3.62010599999999523, 3.504815999999997, 3.5970479999999956,  
3.7321019999999936, 3.46199399999999767, 0.32281199999999893,  
3.69916199999999408, 3.7222199999999937, 3.56081399999999615,  
3.1095360000000003, 3.99232799999999896, 3.77821799999999284,  
3.241296000000001, 3.71233799999999386, 3.80456999999999245,  
3.46199399999999767, 3.83750999999999196, 3.96268199999999006,  
3.86056799999999163, 3.26106000000000067, 3.29070600000000024,  
3.30388200000000007, 4.07138399999999884, 3.72880799999999364,  
3.23470800000000011, 3.8177459999999923, 3.9132719999999908]  
-----
```

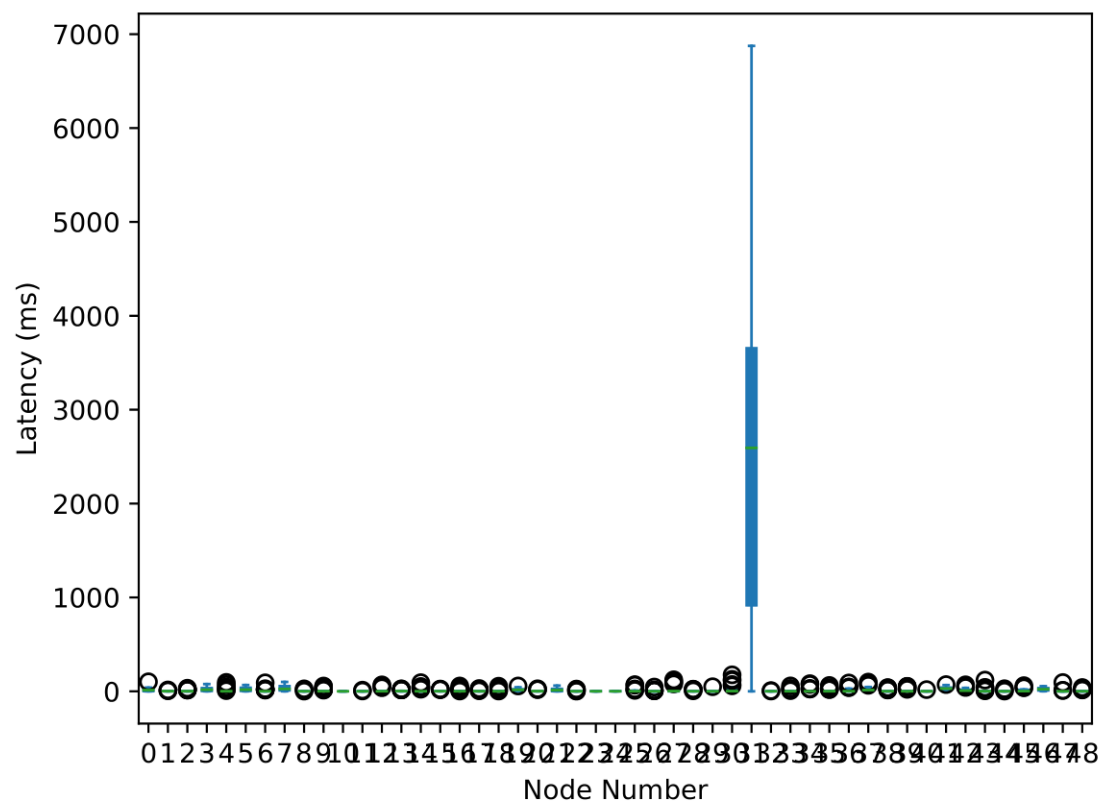
```
transmitting energy in each node [0.97100639999999993,  
21.986359199998688, 26.402126399998473, 24.136444799998504,  
25.939742399998348, 21.801405599998706, 28.39037759999904,  
24.691305599998454, 1.8032976000000005, 26.91074879999862,  
0.161834400000000002, 26.72579519999857, 25.939742399998348,  
27.095702399998675, 28.621569599999113, 22.749292799998624,  
28.274781599999013, 25.269285599998405, 25.893503999998348,  
24.968735999998433, 26.055338399998373, 24.945616799998433,  
25.408000799998394, 24.598828799998465, 25.24616639999841,  
26.194053599998412, 24.298279199998486, 2.2656816000000008,  
-----
```

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```
25.962861599998348, 26.124695999998394, 24.99185519999843,
21.824524799998706, 28.02047039999894, 26.517722399998508,
22.749292799998624, 26.055338399998373, 26.702675999998558,
24.298279199998486, 26.933867999998625, 27.81239759999888,
27.095702399998675, 22.888007999998614, 23.096080799998596,
23.188557599998585, 28.5753311999991, 26.17093439999841,
22.703054399998628, 26.79515279999859, 27.46560959999878]
-----
sleeping energy in each node [1.3048, 0.0, 0.0, 0.0, 0.0, 0.0,
0.0, 0.0, 0.0, 0.0, -0.0, 0.0001, 0.0, 0.0001, 0.0001, 0.0,
0.0001, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.08,
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0001, 0.0, 0.0,
0.0001, 0.0001, 0.0, 0.0, 0.0, 0.0001, 0.0, 0.0, 0.0, 0.0001]
-----
total energy in each node [39.060114400002625,
1227.8553732029122, 1222.733834402875, 1224.6489408028915,
1223.097950402878, 1227.293787602911, 1220.5768296028596,
1225.0660176028907, 1248.072909603071, 1222.205704802871,
1250.1257124030853, 1222.1029192028714, 1222.9311504028776,
1221.9667504028694, 1219.9153216028558, 1226.9756088029055,
1221.2371636028622, 1223.9165676028838, 1222.9367040028776,
1224.2320560028863, 1223.0548764028777, 1224.2139828028862,
1224.316906802885, 1224.8269248028898, 1224.1987344028848,
1223.622015602879, 1225.0173132028922, 222.56847359989234,
1223.116023602878, 1223.567796002879, 1223.7914292028845,
1227.7288608029123, 1221.4218984028637, 1222.6574004028741,
1226.4752088029038, 1222.5127764028757, 1221.8763460028706,
1225.0173132028922, 1221.7233780028691, 1220.967439602863,
1222.6339504028715, 1226.4919080029035, 1226.4877668029026,
1226.2181196029012, 1220.5463752028584, 1222.3946424028745,
1226.5224624029042, 1222.8659388028736, 1222.1224816028687]
-----
network energy consumption (mJ) 57825.91015973575
```

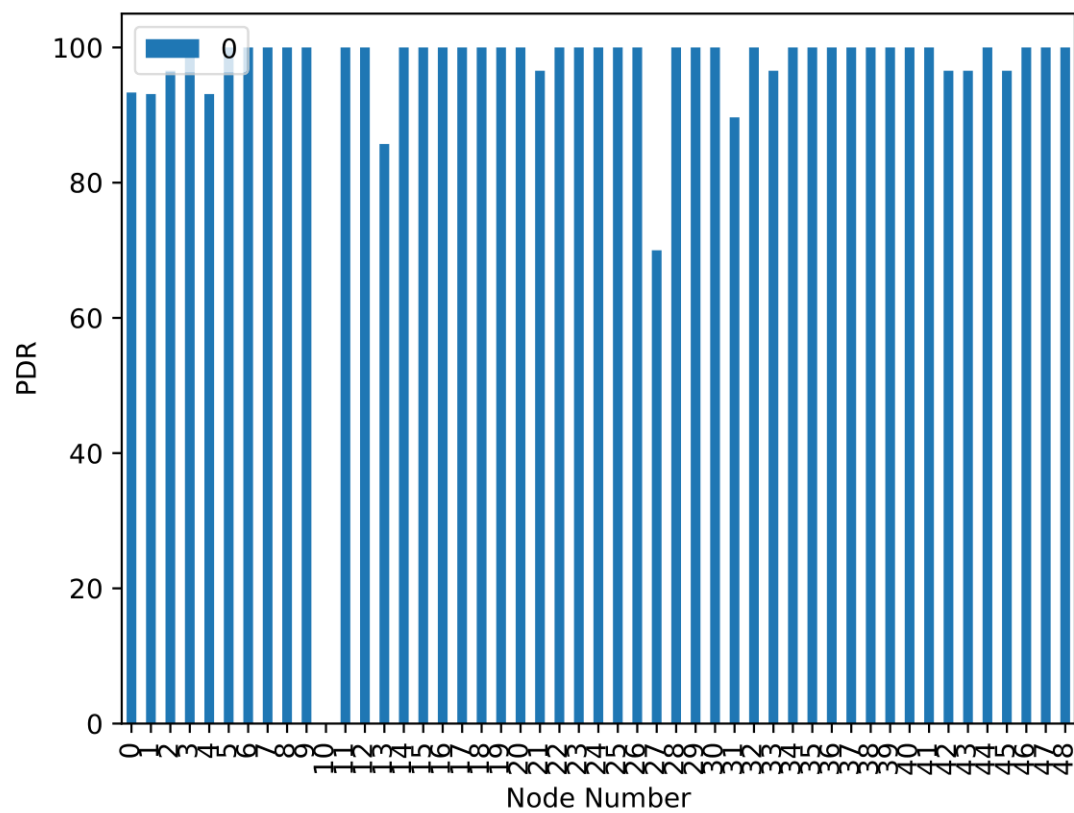

Melvin Mokhtari (9831143)

Latency Plot



Melvin Mokhtari (9831143)

PDR Plot



Melvin Mokhtari (9831143)

Packet tracing

31.log:

(generate)	31	3242.55	[27]	3
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15.log:

(relay)	31	48	3168.73	3	3076.45	124	1
(advertise)	15	3189.93	48	3			

27.log:

(main)	31	3	3242.55	27	8962.36
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