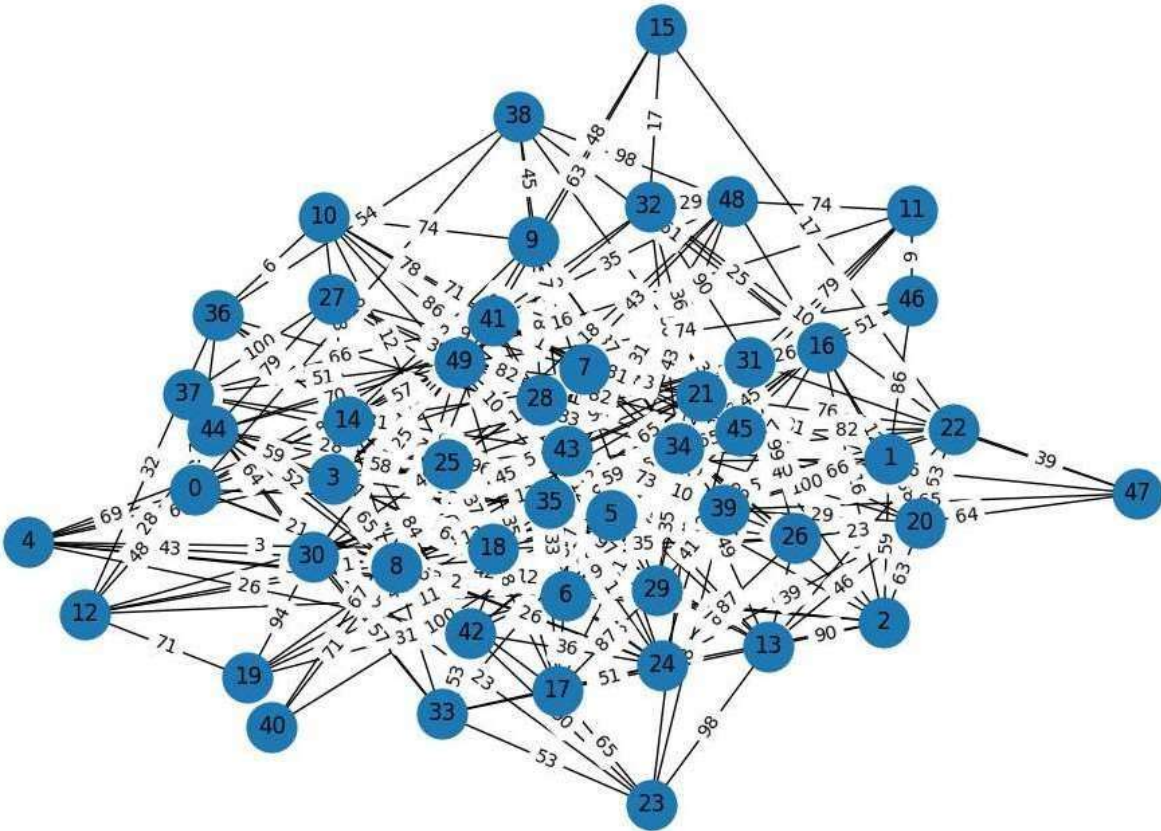


Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

50 nodes

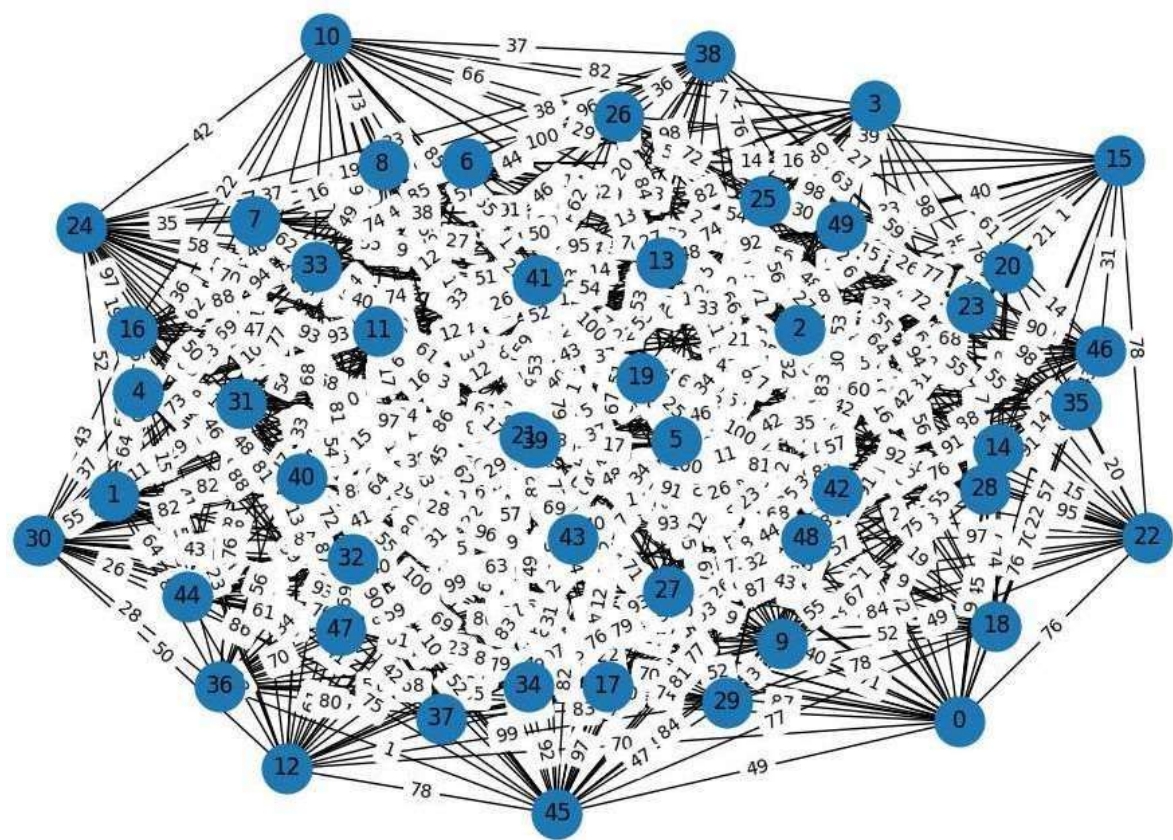


Shortest Paths

{'0': 0, '1': inf, '2': inf, '3': inf, '4': 69, '5': inf, '6': 99, '7': 5, '8': 21, '9': inf, '10': 76, '11': 131, '12': 48, '13': inf, '14': 157, '15':

Total time taken: 0.027179956436157227 seconds

Optimized Algorithm



Shortest Paths

{'1': None, '2': None, '3': None, '4': None, '5': None, '6': None, '7': None, '8': None, '9': None, '10': None, '11': None, '12': None, '13': None, '14': [

Total time taken: 0.0 seconds

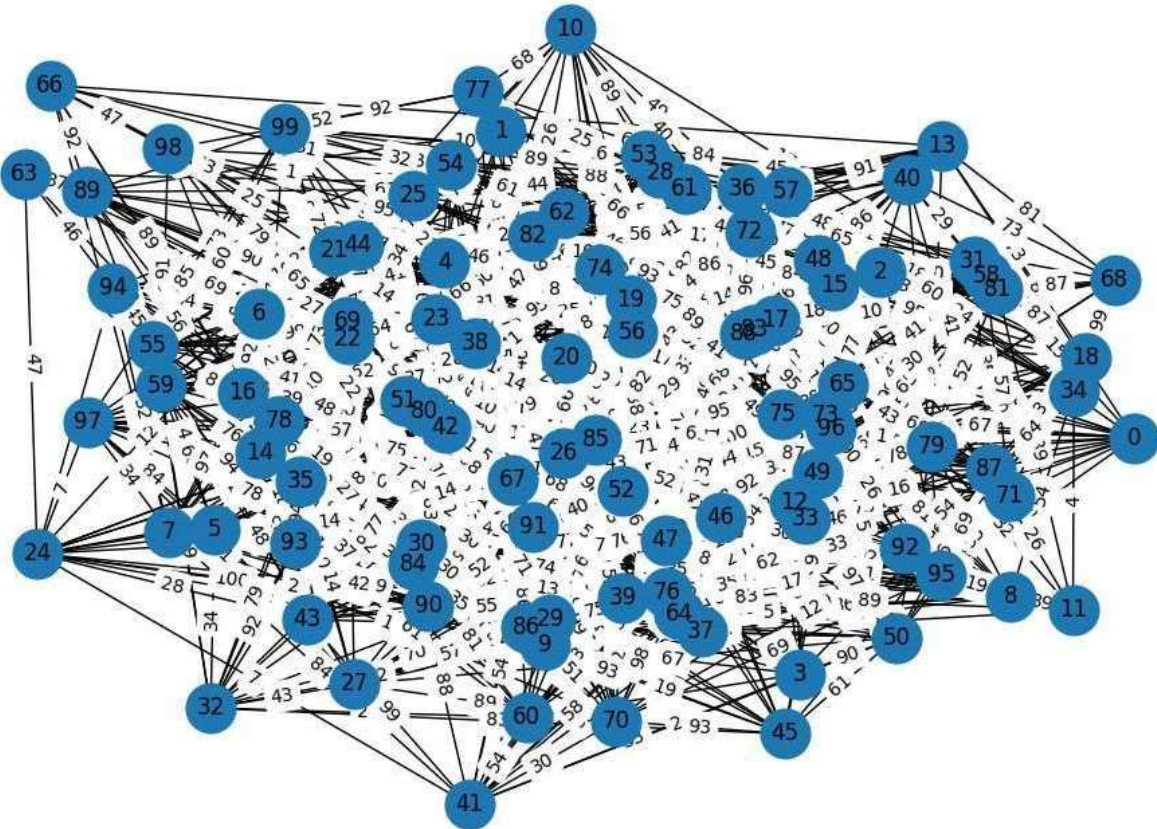
Number of Clusters Formed:7

Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

100 nodes

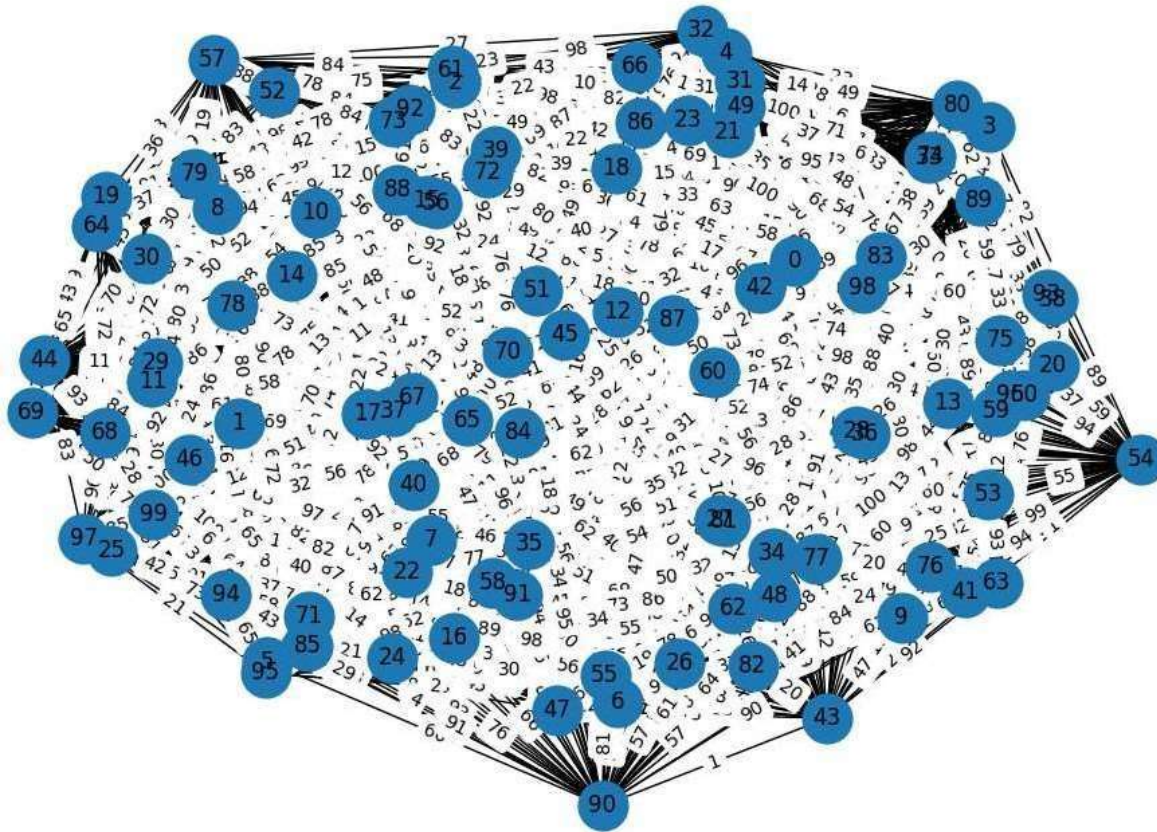


Shortest Paths

{'0': 0, '1': inf, '2': inf, '3': inf, '4': inf, '5': inf, '6': inf, '7': inf, '8': inf, '9': 66, '10': inf, '11': inf, '12': inf, '13': 80, '14': inf, '15': inf, '16': inf, '17': inf, '18': inf, '19': inf, '20': inf, '21': inf, '22': inf, '23': inf, '24': inf, '25': inf, '26': inf, '27': inf, '28': inf, '29': inf, '30': inf, '31': inf, '32': inf, '33': inf, '34': inf, '35': inf, '36': inf, '37': inf, '38': inf, '39': inf, '40': inf, '41': inf, '42': inf, '43': inf, '44': inf, '45': inf, '46': inf, '47': inf, '48': inf, '49': inf, '50': inf, '51': inf, '52': inf, '53': inf, '54': inf, '55': inf, '56': inf, '57': inf, '58': inf, '59': inf, '60': inf, '61': inf, '62': inf, '63': inf, '64': inf, '65': inf, '66': 66, '67': inf, '68': inf, '69': inf, '70': inf, '71': inf, '72': inf, '73': inf, '74': inf, '75': inf, '76': inf, '77': inf, '78': inf, '79': inf, '80': inf, '81': inf, '82': inf, '83': inf, '84': inf, '85': inf, '86': inf, '87': inf, '88': inf, '89': inf, '90': inf, '91': inf, '92': inf, '93': inf, '94': inf, '95': inf, '96': inf, '97': inf, '98': inf, '99': inf}

Total time taken: 0.2688117027282715 seconds

Optimized Algorithm



Shortest Paths

{ '1': ['0', '87', '1'], '2': ['0', '87', '2'], '3': ['0', '11', '47', '63', '3'], '4': ['0', '62', '92', '27', '4'], '5': ['0', '62', '92', '27', '96', '5

Total time taken: 0.07939338684082031 seconds

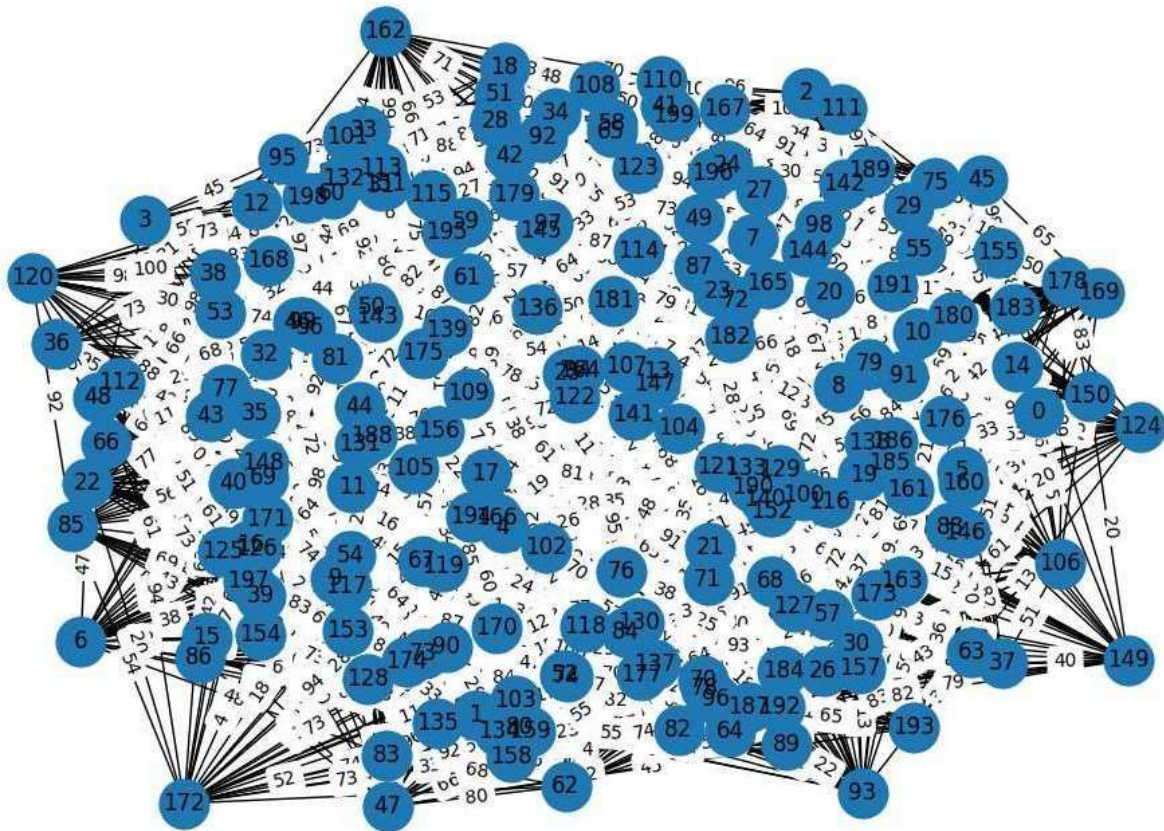
Number of Clusters Formed:10

Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

200 nodes

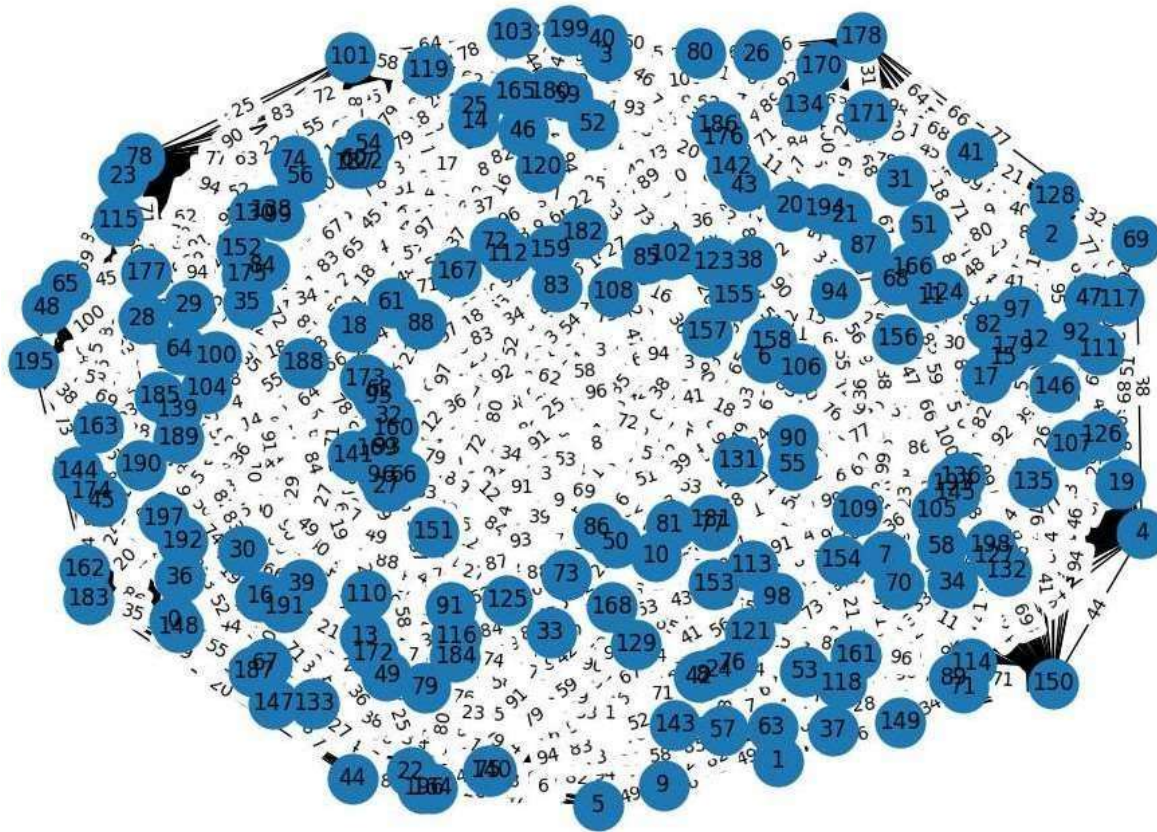


Shortest Paths

{'0': 0, '1': inf, '2': inf, '3': inf, '4': 9, '5': inf, '6': inf, '7': inf, '8': 79, '9': inf, '10': 51, '11': inf, '12': 34, '13': 88, '14': 111, '15':

Total time taken: 1.083188533782959 seconds

Optimized Algorithm



Shortest Paths

{'1': ['0', '87', '102', '132', '166', '144', '1'], '2': ['0', '87', '102', '132', '178', '24', '59', '151', '36', '54', '77', '70', '2'], '3': ['0', '87',

Total time taken: 0.5149173736572266 seconds

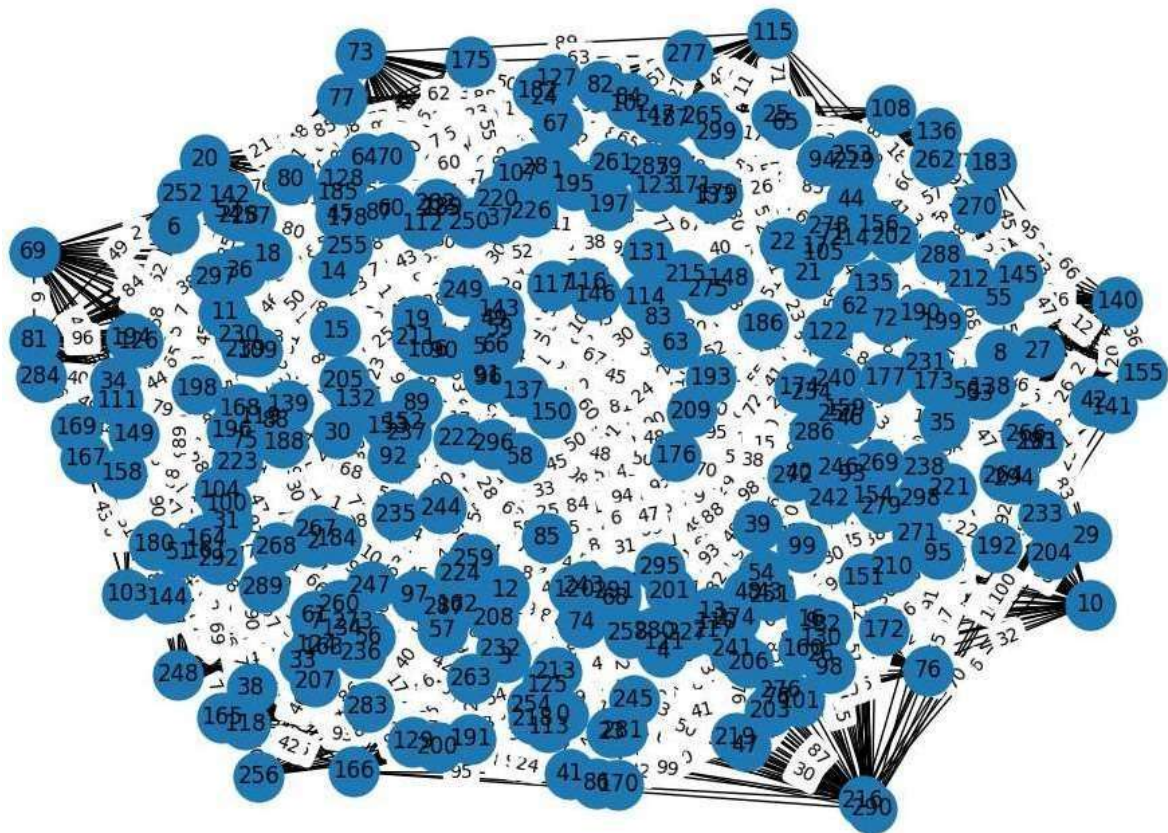
Number of Clusters Formed:14

Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

300 nodes

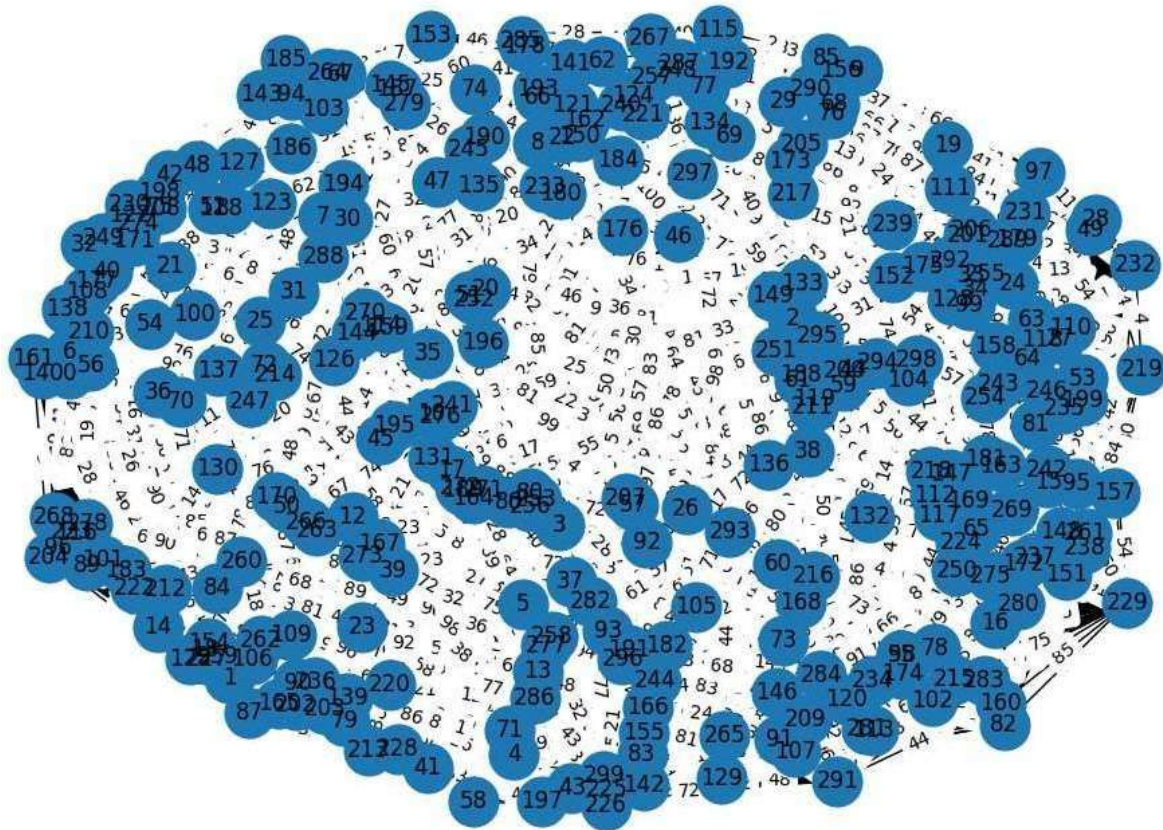


Shortest Paths

{'0': 0, '1': inf, '2': inf, '3': 56, '4': inf, '5': inf, '6': inf, '7': 82, '8': inf, '9': inf, '10': 61, '11': 136, '12': 117, '13': 50, '14': 200, '15':

Total time taken: 3.6780879497528076 seconds

Optimized Algorithm



Shortest Paths

{'1': ['0', '259', '106', '161', '156', '144', '1'], '2': ['0', '259', '106', '161', '156', '144', '1', '2'], '3': ['0', '259', '106', '72', '105', '289',

Total time taken: 1.344918966293335 seconds

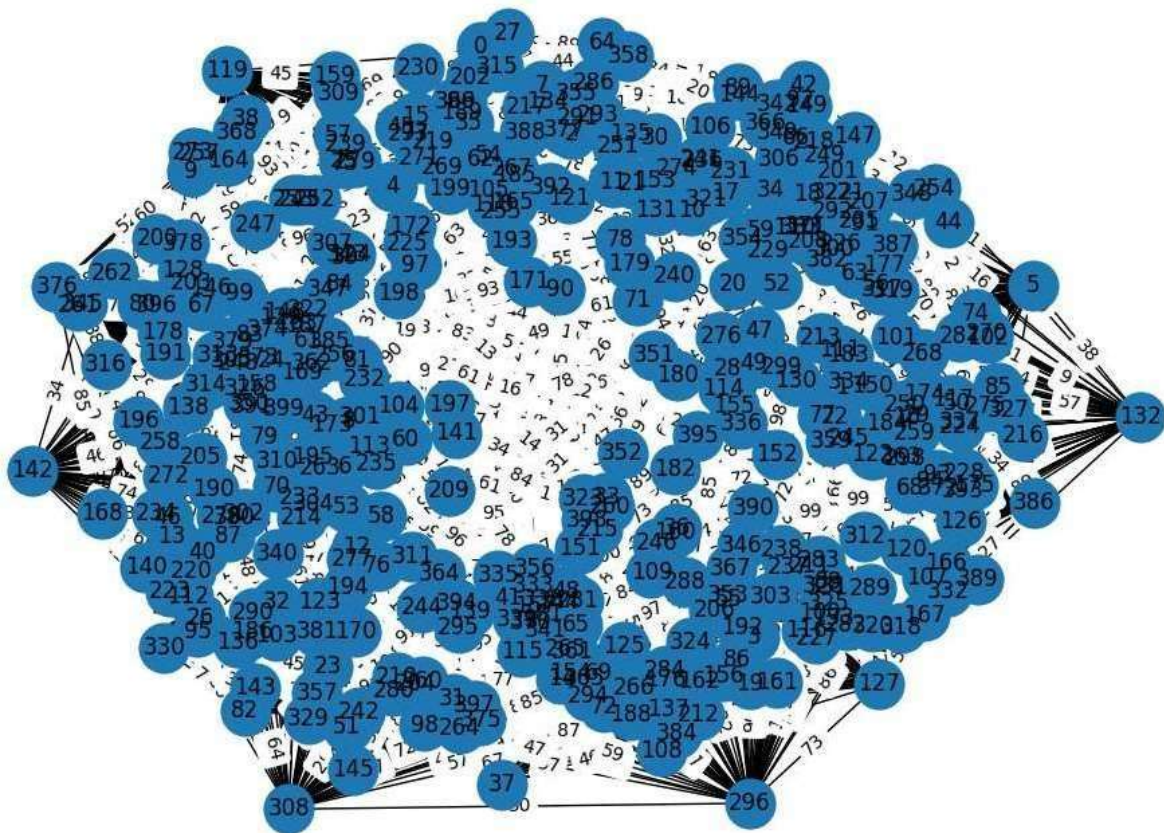
Number of Clusters Formed:17

Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

400 nodes

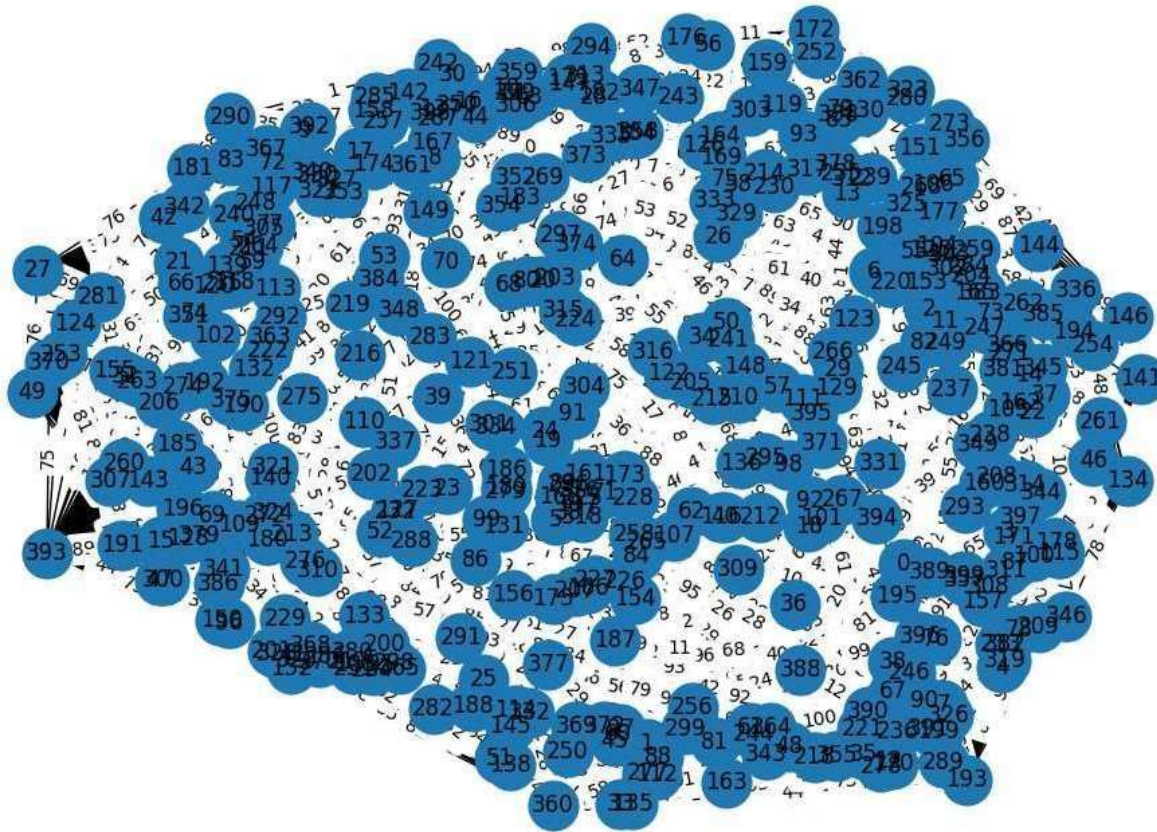


Shortest Paths

{'0': 0, '1': inf, '2': inf, '3': inf, '4': inf, '5': inf, '6': inf, '7': inf, '8': inf, '9': inf, '10': inf, '11': inf, '12': inf, '13': inf, '14': inf,

Total time taken: 8.928441524505615 seconds

Optimized Algorithm



Shortest Paths

{'1': ['0', '267', '288', '134', '218', '187', '228', '71', '1'], '2': ['0', '267', '288', '357', '377', '161', '75', '2'], '3': ['0', '267', '288', '281',

Total time taken: 2.774507761001587 seconds

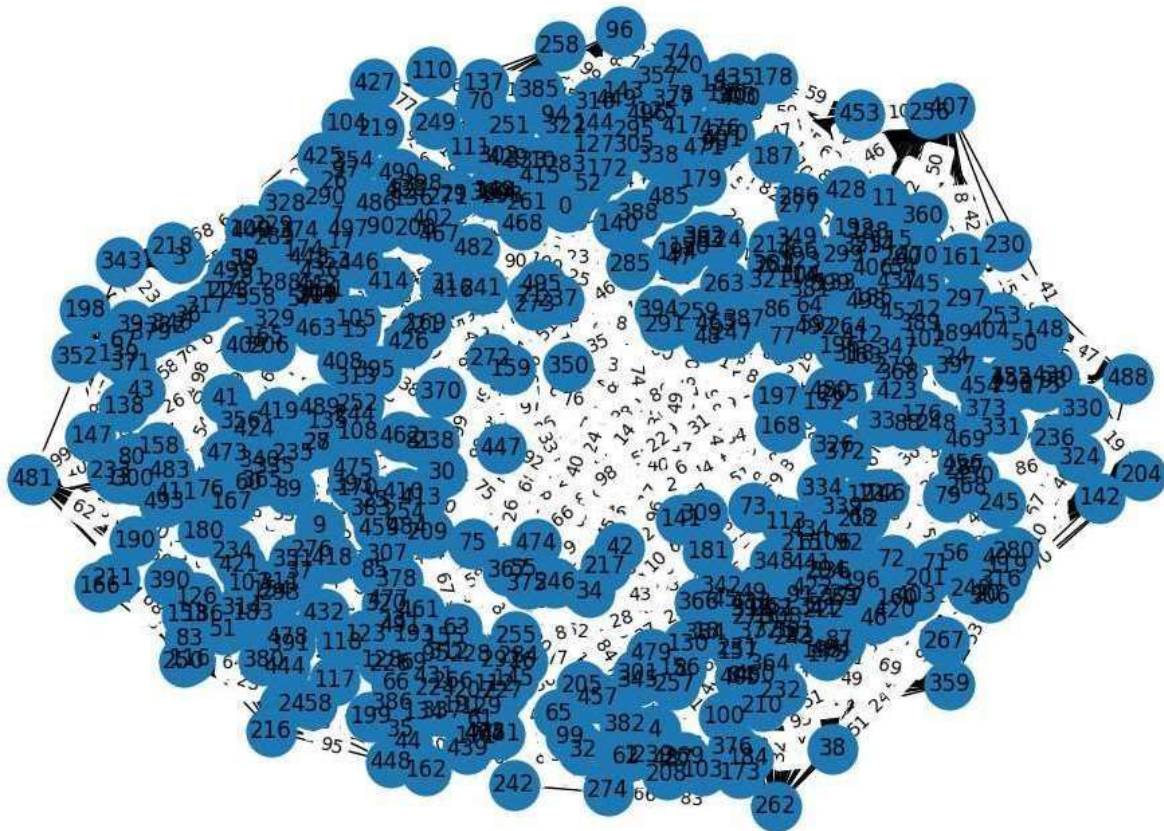
Number of Clusters Formed:20

Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

500 nodes

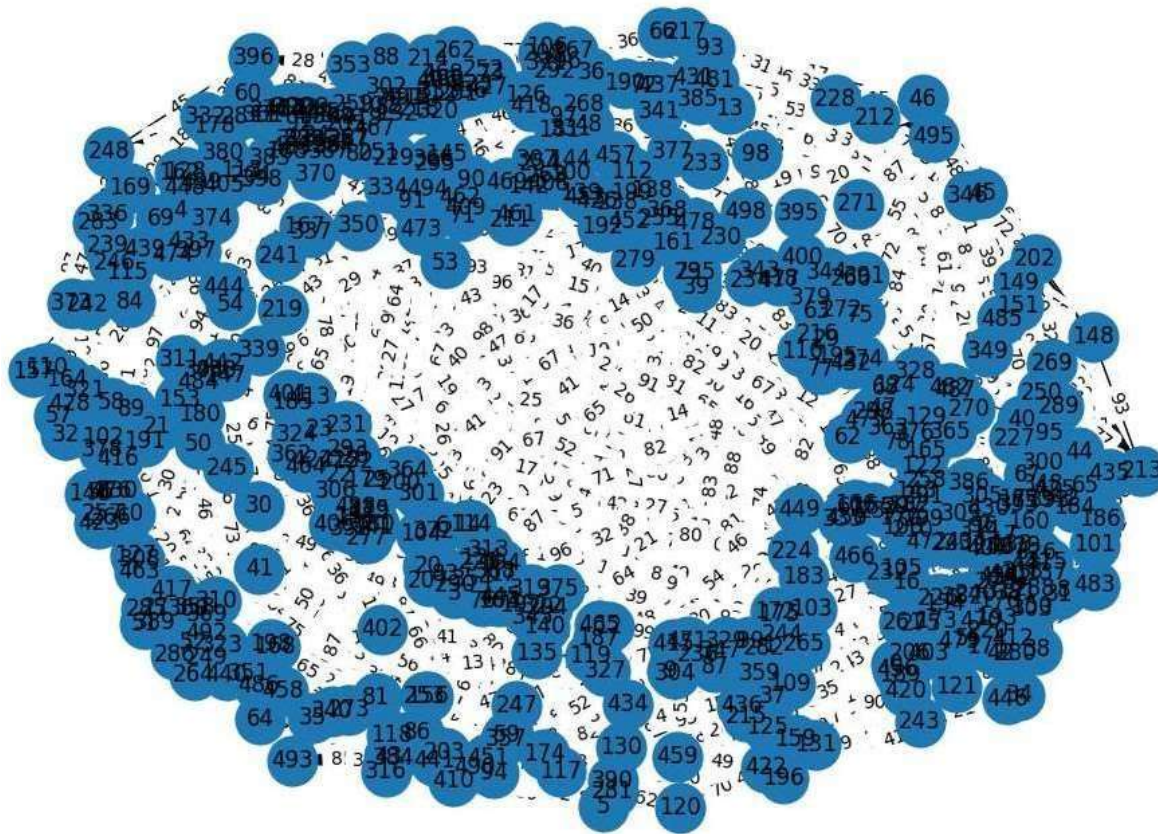


Shortest Paths

{'0': 0, '1': 93, '2': 49, '3': 64, '4': 64, '5': 79, '6': 157, '7': 113, '8': 164, '9': 64, '10': 8, '11': 96, '12': 65, '13': 178, '14': 164, '15': 135,

Total time taken: 17.565444231033325 seconds

Optimized Algorithm



Shortest Paths

{ '1': ['0', '314', '415', '365', '242', '437', '428', '461', '237', '188', '270', '1'], '2': ['0', '314', '415', '365', '196', '75', '358', '317', '2'], '3': ['0', '314', '415', '365', '196', '75', '358', '317', '2', '1'] }

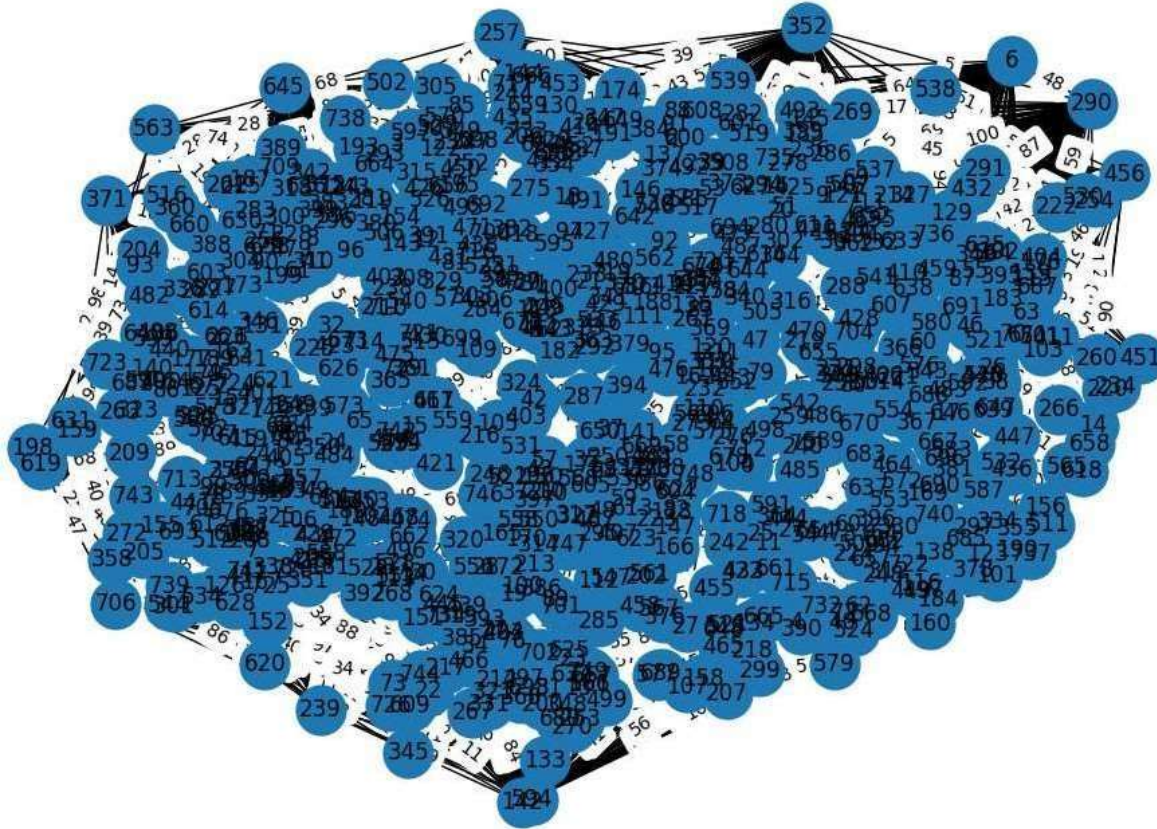
Total time taken: 8.753796339035034 seconds

Number of Clusters Formed:22

Optimized Link-State Routing Algorithm

Enter number of nodes: [Generate Graphs](#)

Baseline Algorithm

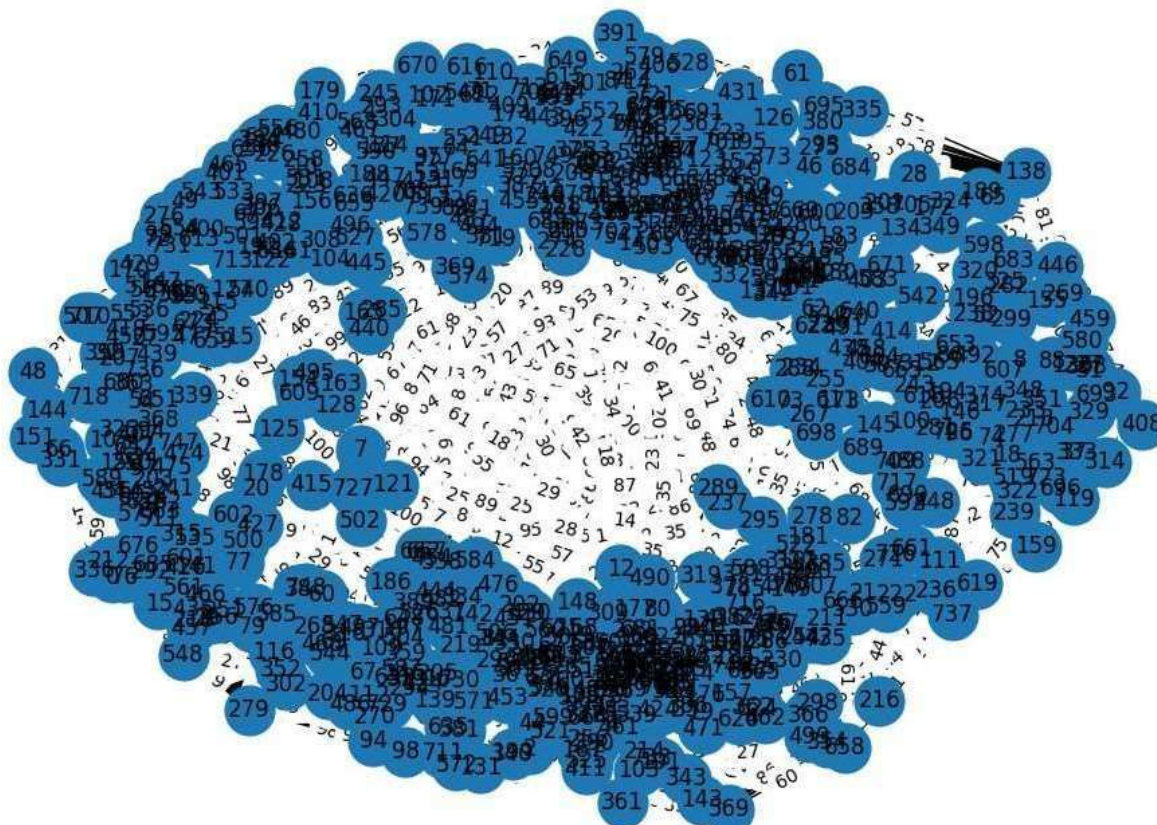
750 nodes

Shortest Paths

```
{'0': 0, '1': inf, '2': 93, '3': 95, '4': 192, '5': inf, '6': 43, '7': inf, '8': 124, '9': 124, '10': 79, '11': 72, '12': 174, '13': 140, '14': 168, '15':
```

Total time taken: 62.15333938598633 seconds

Optimized Algorithm



Shortest Paths

{'1': ['0', '440', '572', '372', '473', '141', '698', '439', '695', '199', '690', '427', '555', '686', '1'], '2': ['0', '440', '572', '372', '473', '141',

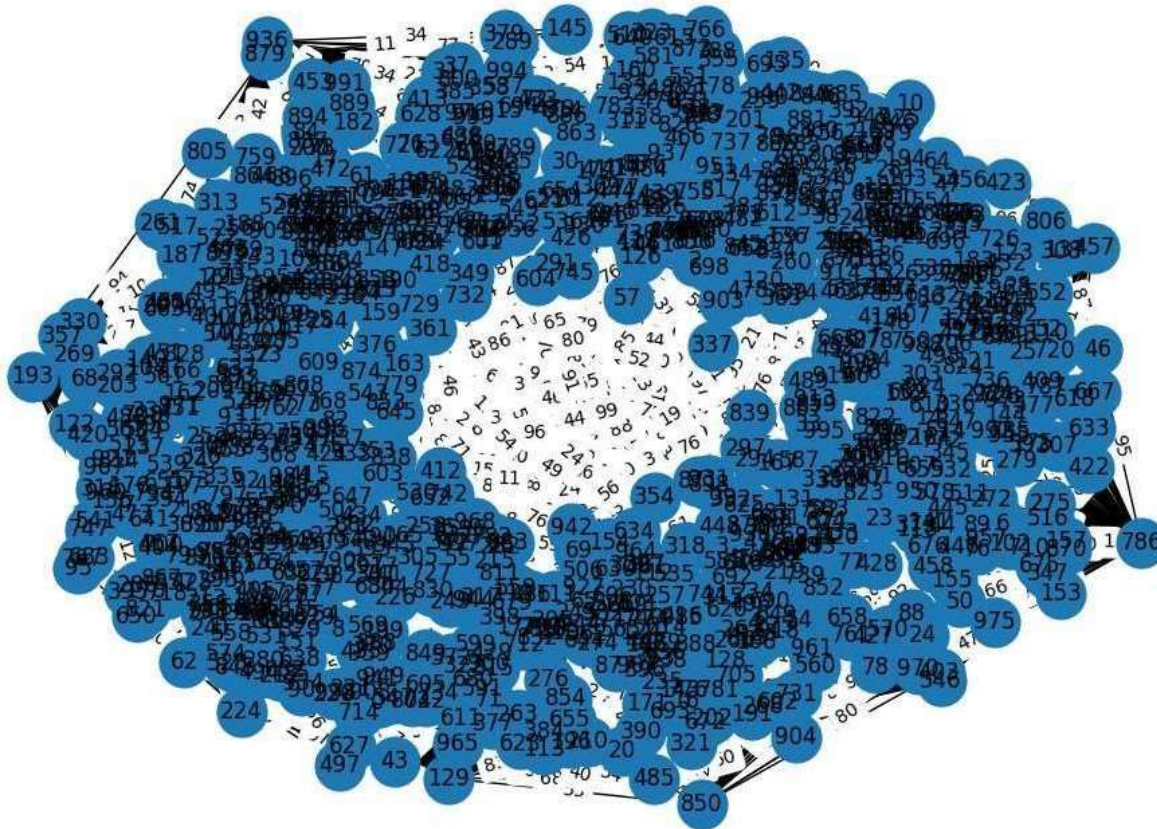
Total time taken: 13.069523096084595 seconds

Number of Clusters Formed:27

Optimized Link-State Routing Algorithm

Enter number of nodes: [Generate Graphs](#)

Baseline Algorithm

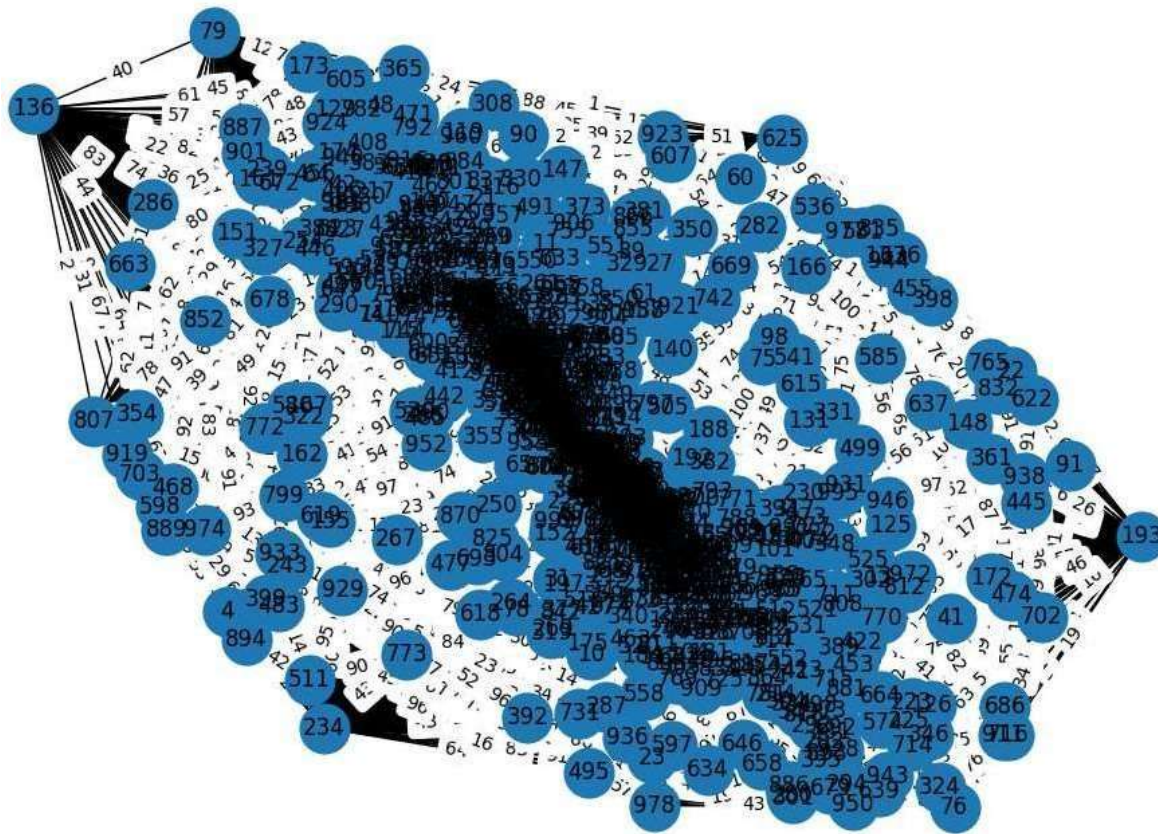
1000 nodes

Shortest Paths

```
{'0': 0, '1': 31, '2': inf, '3': inf, '4': inf, '5': 91, '6': inf, '7': 113, '8': 87, '9': 92, '10': 186, '11': 154, '12': 90, '13': 103, '14': 170, '15':
```

Total time taken: 146.99368023872375 seconds

Optimized Algorithm



Shortest Paths

{'1': ['0', '99', '605', '909', '370', '119', '126', '623', '864', '1'], '2': ['0', '99', '605', '263', '606', '506', '68', '420', '222', '2'], '3': ['0',

Total time taken: 22.572798490524292 seconds

Number of Clusters Formed:31

Optimized Link-State Routing Algorithm

6/16/24, 9:11 PM

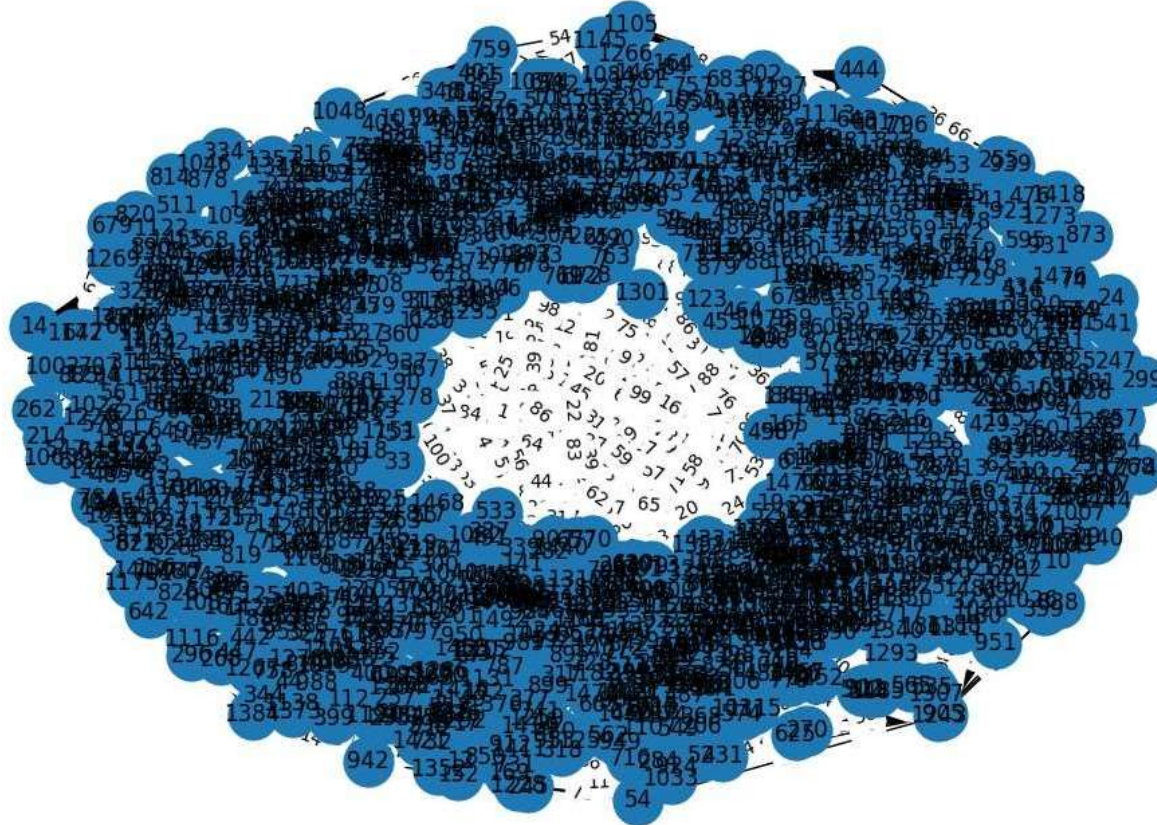
Optimized Link-State Routing Algorithm

Enter number of nodes:

Generate Graphs

Baseline Algorithm

1500 nodes

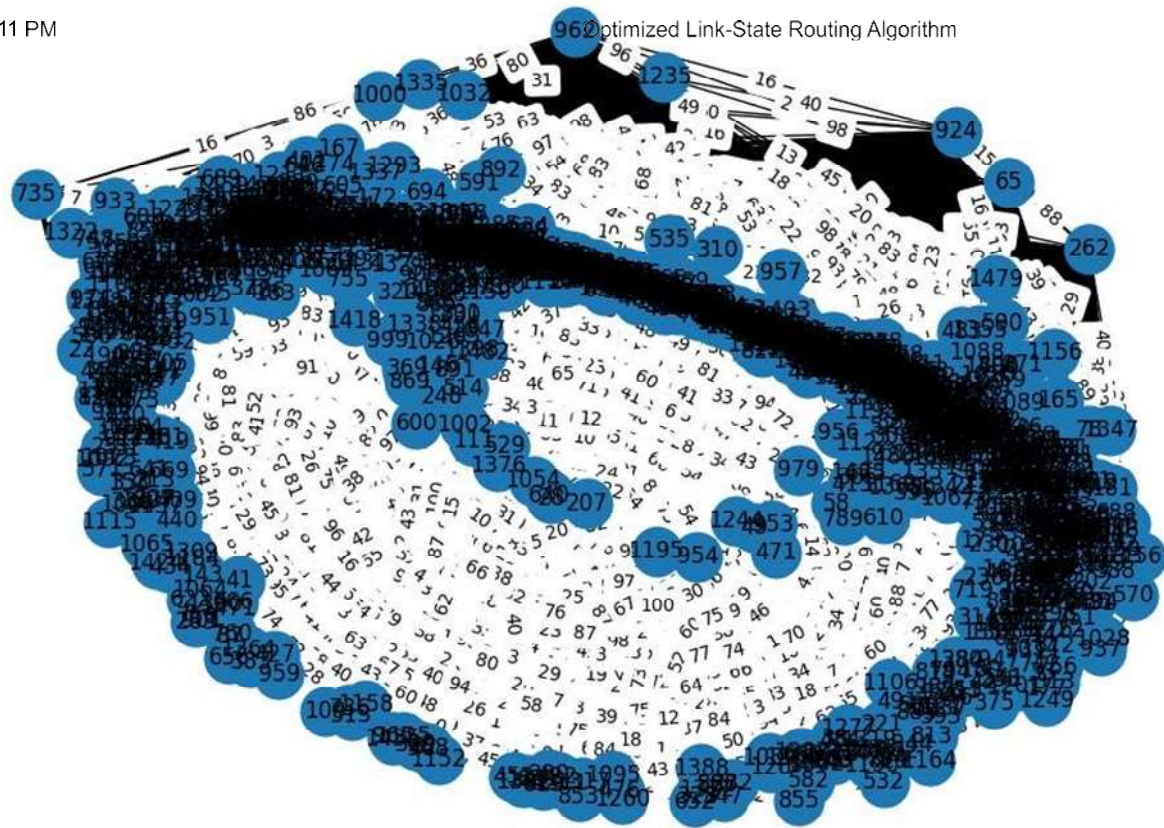


Shortest Paths

```
{'0': 0, '1': inf, '2': inf, '3': inf, '4': inf, '5': inf, '6': inf, '7': inf, '8': inf, '9': inf, '10': inf, '11': inf, '12': inf, '13': inf, '14': 45, '15': inf, '16': inf, '17': inf, '18': inf, '19': inf, '20': inf, '21': inf, '22': inf, '23': inf, '24': inf, '25': inf, '26': inf, '27': inf, '28': inf, '29': inf, '30': inf, '31': inf, '32': inf, '33': inf, '34': inf, '35': inf, '36': inf, '37': inf, '38': inf, '39': inf, '40': inf, '41': inf, '42': inf, '43': inf, '44': inf, '45': inf, '46': inf, '47': inf, '48': inf, '49': inf, '50': inf, '51': inf, '52': inf, '53': inf, '54': inf, '55': inf, '56': inf, '57': inf, '58': inf, '59': inf, '60': inf, '61': inf, '62': inf, '63': inf, '64': inf, '65': inf, '66': inf, '67': inf, '68': inf, '69': inf, '70': inf, '71': inf, '72': inf, '73': inf, '74': inf, '75': inf, '76': inf, '77': inf, '78': inf, '79': inf, '80': inf, '81': inf, '82': inf, '83': inf, '84': inf, '85': inf, '86': inf, '87': inf, '88': inf, '89': inf, '90': inf, '91': inf, '92': inf, '93': inf, '94': inf, '95': inf, '96': inf, '97': inf, '98': inf, '99': inf}
```

Total time taken: 458.3824939727783 seconds

Optimized Algorithm



Shortest Paths

{'1': ['0', '1008', '7', '255', '153', '532', '1295', '170', '1'], '2': ['0', '1008', '7', '255', '298', '367', '527', '877', '2'], '3': ['0', '1008', '7',

Total time taken: 66.33883023262024 seconds

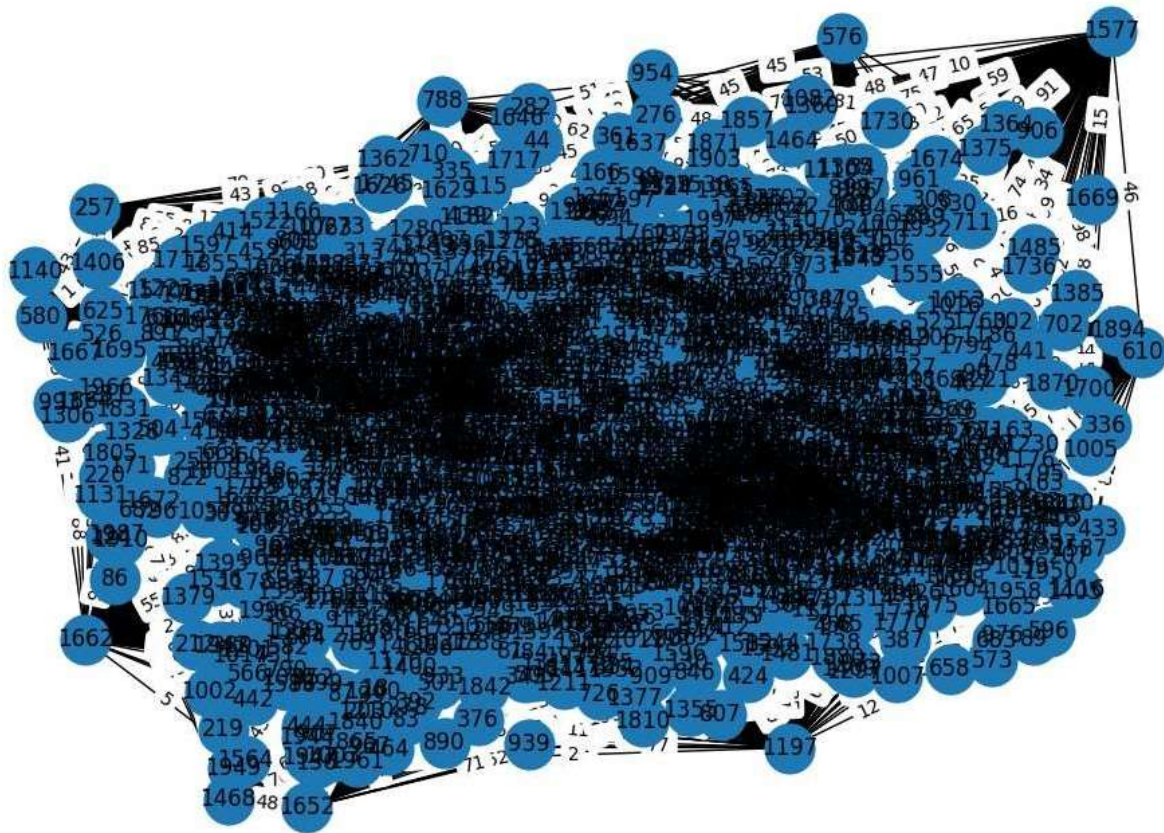
Number of Clusters Formed:38

Optimized Link-State Routing Algorithm

Enter number of nodes:

Baseline Algorithm

2000 nodes

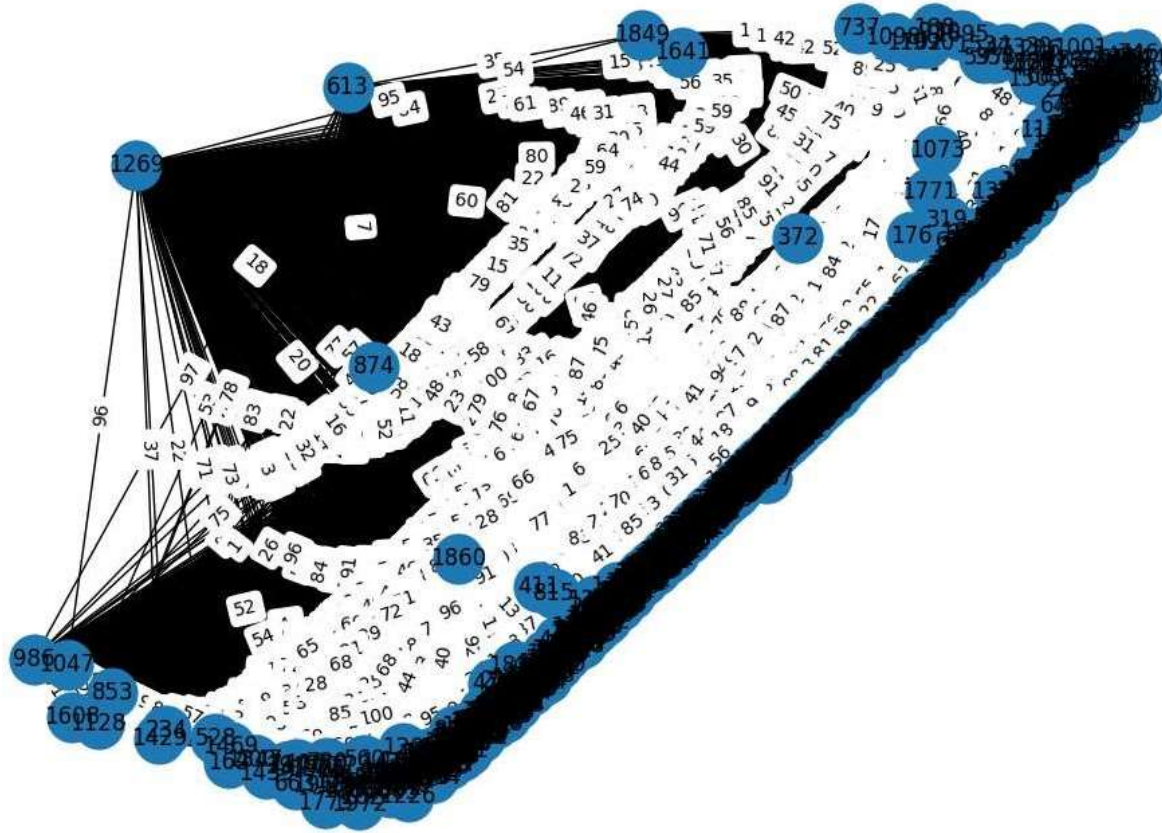


Shortest Paths

{'0': 0, '1': inf, '2': inf, '3': 59, '4': inf, '5': inf, '6': 27, '7': inf, '8': inf, '9': inf, '10': 53, '11': 64, '12': 146, '13': 96, '14': inf, '15':

Total time taken: 1091.7922577857971 seconds

Optimized Algorithm



Shortest Paths

{ '1': ['0', '625', '833', '1571', '1445', '1659', '1762', '870', '1'], '2': ['0', '625', '833', '1571', '1308', '1200', '1759', '72', '2'], '3': ['0', '625', '833', '1571', '1308', '1200', '1759', '72', '2'] }

Total time taken: 872.2266070842743 seconds

Number of Clusters Formed:44