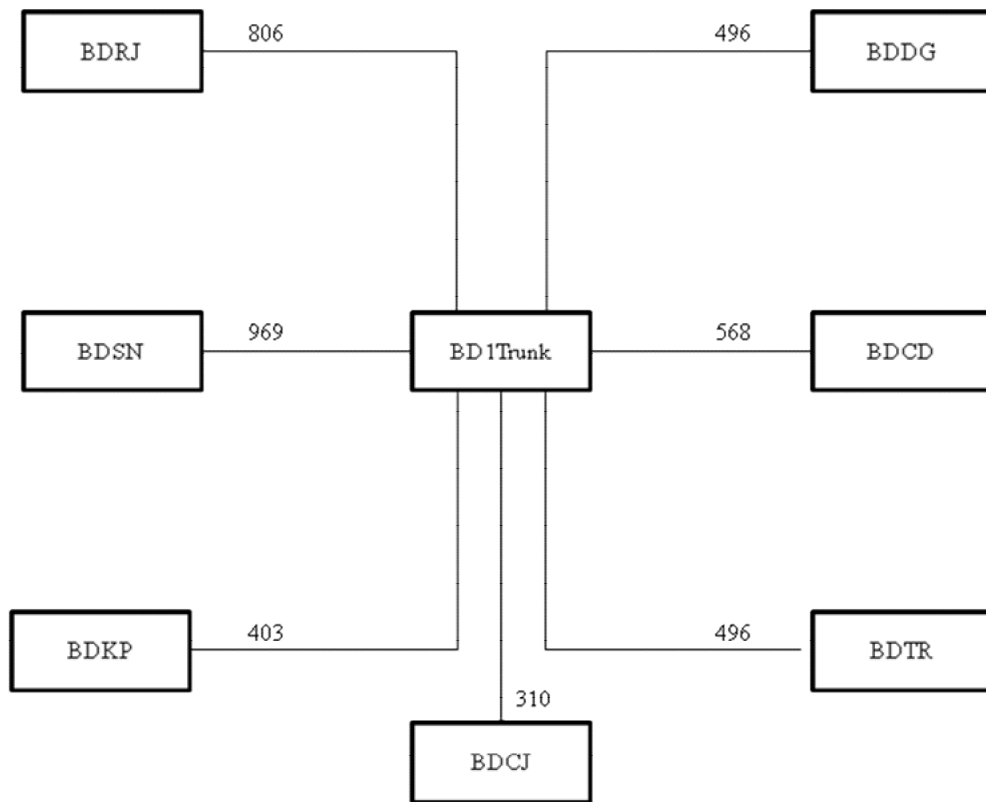


**LAMPIRAN A**  
**DATA-DATA MEA (*MULTI EXCHANGE AREA*)**  
**BANDUNG**

## Lampiran A

### DATA-DATA MEA (MULTI EXCHANGE AREA) BANDUNG



Gambar Konfigurasi Eksisting MEA bandung bagian BD1Trunk sentral jenis EWSD

Tabel Data Pola Trafik Sentral

|      |        | SIRKIT | TRAFIK (ERL) |        | ANSWER |      |
|------|--------|--------|--------------|--------|--------|------|
| DARI | RUAS   | OPE    | OG           | IC     | OG     | IC   |
| BDCD | B7BD1T | 568    | 200.66       | 44.31  | 6132   | 1738 |
| BDCJ | B7BD1T | 310    | 119.43       | 25.73  | 3695   | 922  |
| BDDG | B7BD1T | 496    | 204.77       | 57.47  | 6451   | 2388 |
| BDKP | B7BD1T | 403    | 193.45       | 26.17  | 6242   | 940  |
| BDRJ | B7BD1T | 806    | 302.96       | 87.82  | 9912   | 3718 |
| BDSN | B7BD1T | 969    | 425.02       | 103.38 | 13493  | 4471 |
| BDTR | B7BD1T | 496    | 188.35       | 29.74  | 5786   | 1076 |
| BDCJ | B7BDCD | 556    | 87.35        | 120.84 | 3110   | 3362 |
| BDDG | B7BDCD | 432    | 41.3         | 31.03  | 1199   | 920  |
| BDKP | B7BDCD | 123    | 28.65        | 23.37  | 716    | 642  |
| BDRJ | B7BDCD | 679    | 46.77        | 48.65  | 1272   | 1470 |
| BDSN | B7BDCD | 703    | 96.4         | 209.3  | 2909   | 6240 |
| BDTR | B7BDCD | 525    | 86.54        | 89.28  | 3259   | 2862 |
| BDCD | B7BDCJ | 556    | 121.13       | 87.2   | 3360   | 3115 |
| BDSN | B7BDCJ | 277    | 65.36        | 131.18 | 1897   | 3397 |
| BDTR | B7BDCJ | 248    | 29.02        | 29.3   | 840    | 829  |
| BDCD | B7BDDG | 432    | 31.67        | 40.69  | 899    | 1196 |
| BDRJ | B7BDDG | 155    | 35.16        | 35.73  | 1087   | 1031 |
| BDSN | B7BDDG | 1176   | 169.24       | 254.64 | 5384   | 8313 |
| BDTR | B7BDDG | 124    | 22.86        | 18.01  | 702    | 536  |
| BDCD | B7BDKP | 123    | 23.33        | 28.33  | 643    | 707  |
| BDSN | B7BDKP | 556    | 123.05       | 174.96 | 3444   | 4802 |
| BDTR | B7BDKP | 155    | 19.62        | 15.96  | 560    | 439  |
| BDRJ | B7BDKP | 402    | 122.3        | 131.24 | 3951   | 4596 |
| BDCD | B7BDRJ | 679    | 47.49        | 47.13  | 1437   | 1256 |
| BDDG | B7BDRJ | 155    | 35.79        | 35.04  | 1031   | 1088 |
| BDKP | B7BDRJ | 402    | 131.62       | 122.02 | 4593   | 3953 |
| BDSN | B7BDRJ | 959    | 177.41       | 280.17 | 5920   | 8301 |
| BDTR | B7BDRJ | 155    | 36.12        | 28.39  | 1149   | 841  |
| BDCD | B7BDSN | 703    | 210.06       | 96.53  | 6159   | 2860 |
| BDCJ | B7BDSN | 277    | 131.24       | 63.7   | 3297   | 1848 |
| BDDG | B7BDSN | 1176   | 255.29       | 168.63 | 8287   | 5395 |
| BDKP | B7BDSN | 556    | 175.48       | 122.67 | 4796   | 3445 |
| BDRJ | B7BDSN | 959    | 281.07       | 176.7  | 8286   | 5920 |
| BDTR | B7BDSN | 401    | 185.48       | 89.73  | 5300   | 2845 |
| BDCD | B7BDTR | 525    | 90.13        | 83.98  | 2914   | 3223 |
| BDCJ | B7BDTR | 248    | 29.83        | 28.45  | 831    | 821  |

|      |        |     |       |        |      |      |
|------|--------|-----|-------|--------|------|------|
| BDDG | B7BDTR | 124 | 18.07 | 22.78  | 536  | 703  |
| BDKP | B7BDTR | 155 | 16.01 | 19.58  | 439  | 560  |
| BDRJ | B7BDTR | 155 | 28.47 | 36.01  | 842  | 1150 |
| BDSN | B7BDTR | 401 | 90.08 | 184.92 | 2842 | 5310 |

Tabel Trafik Sentral Per Ruas

| dari/ke | BD1T   | BDCD  | BDCJ   | BDDG   | BDKP   | BDRJ   | BDSN   | BDTR  |
|---------|--------|-------|--------|--------|--------|--------|--------|-------|
| BD1T    | 0      | 44.31 | 25.73  | 57.47  | 26.17  | 87.82  | 103.38 | 29.74 |
| BDCD    | 200.66 | 0     | 121.13 | 31.67  | 23.33  | 47.49  | 210.06 | 90.13 |
| BDCJ    | 119.43 | 87.35 | 0      | 0      | 0      | 0      | 131.24 | 29.83 |
| BDDG    | 204.77 | 41.30 | 0      | 0      | 0      | 35.79  | 255.29 | 18.07 |
| BDKP    | 193.45 | 28.65 | 0      | 0      | 0      | 131.62 | 175.48 | 16.01 |
| BDRJ    | 302.96 | 16.77 | 0      | 35.16  | 122.30 | 0      | 281.07 | 28.47 |
| BDSN    | 425.02 | 96.40 | 65.36  | 169.24 | 123.05 | 177.41 | 0      | 90.08 |
| BDTR    | 188.35 | 86.54 | 29.02  | 22.86  | 19.62  | 36.12  | 185.48 | 0     |

**LAMPIRAN B**

***DATA OUTPUT PLANNING TOOLS 1 (VPI SERVICE  
MAKER SWITCH V.3.5)***

## Data Output Planning Tools 1 Jaringan TDM Sebelum Optimalisasi

*Tabel Performace of Traffic Relations*

| From | To   | Traffic offered (Erl) | Traffic carried (Erl) | EEB (%)  | GOS demand (%) | GOS violation |
|------|------|-----------------------|-----------------------|----------|----------------|---------------|
| BD1T | BDCD | 44.310000             | 44.310000             | 0.000000 | 1.000000       |               |
| BD1T | BDCJ | 25.730000             | 25.730000             | 0.000000 | 1.000000       |               |
| BD1T | BDDG | 57.470000             | 57.470000             | 0.000000 | 1.000000       |               |
| BD1T | BDKP | 26.170000             | 26.170000             | 0.000000 | 1.000000       |               |
| BD1T | BDRJ | 87.820000             | 87.820000             | 0.000000 | 1.000000       |               |
| BD1T | BDSN | 103.380000            | 103.380000            | 0.000000 | 1.000000       |               |
| BD1T | BDTR | 29.740000             | 29.740000             | 0.000000 | 1.000000       |               |
| BDCD | BD1T | 200.660000            | 200.660000            | 0.000000 | 1.000000       |               |
| BDCD | BDCJ | 121.130000            | 121.130000            | 0.000000 | 1.000000       |               |
| BDCD | BDDG | 31.670000             | 31.670000             | 0.000000 | 1.000000       |               |
| BDCD | BDKP | 23.330000             | 23.330000             | 0.000000 | 1.000000       |               |
| BDCD | BDRJ | 47.490000             | 47.490000             | 0.000000 | 1.000000       |               |
| BDCD | BDSN | 210.060000            | 210.060000            | 0.000000 | 1.000000       |               |
| BDCD | BDTR | 90.130000             | 90.130000             | 0.000000 | 1.000000       |               |
| BDCJ | BD1T | 119.430000            | 119.430000            | 0.000000 | 1.000000       |               |
| BDCJ | BDCD | 87.350000             | 87.350000             | 0.000000 | 1.000000       |               |
| BDCJ | BDDG | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDCJ | BDKP | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDCJ | BDRJ | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDCJ | BDSN | 131.240000            | 131.240000            | 0.000000 | 1.000000       |               |
| BDCJ | BDTR | 29.830000             | 29.830000             | 0.000000 | 1.000000       |               |
| BDDG | BD1T | 204.770000            | 204.770000            | 0.000000 | 1.000000       |               |
| BDDG | BDCD | 41.300000             | 41.300000             | 0.000000 | 1.000000       |               |
| BDDG | BDCJ | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDDG | BDKP | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDDG | BDRJ | 35.790000             | 35.790000             | 0.000000 | 1.000000       |               |
| BDDG | BDSN | 255.290000            | 255.290000            | 0.000000 | 1.000000       |               |
| BDDG | BDTR | 18.070000             | 18.070000             | 0.000000 | 1.000000       |               |
| BDKP | BD1T | 193.450000            | 193.450000            | 0.000000 | 1.000000       |               |
| BDKP | BDCD | 28.650000             | 28.650000             | 0.000000 | 1.000000       |               |
| BDKP | BDCJ | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDKP | BDDG | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDKP | BDRJ | 131.620000            | 131.620000            | 0.000000 | 1.000000       |               |
| BDKP | BDSN | 175.480000            | 175.480000            | 0.000000 | 1.000000       |               |
| BDKP | BDTR | 16.010000             | 16.010000             | 0.000000 | 1.000000       |               |
| BDRJ | BD1T | 302.960000            | 302.960000            | 0.000000 | 1.000000       |               |

|      |      |            |            |          |          |  |
|------|------|------------|------------|----------|----------|--|
| BDRJ | BDCD | 16.770000  | 16.770000  | 0.000000 | 1.000000 |  |
| BDRJ | BDCJ | 0.000000   | 0.000000   | 0.000000 | 1.000000 |  |
| BDRJ | BDDG | 35.160000  | 35.160000  | 0.000000 | 1.000000 |  |
| BDRJ | BDKP | 122.300000 | 122.300000 | 0.000000 | 1.000000 |  |
| BDRJ | BDSN | 281.070000 | 281.070000 | 0.000000 | 1.000000 |  |
| BDRJ | BDTR | 28.470000  | 28.470000  | 0.000000 | 1.000000 |  |
| BDSN | BD1T | 425.020000 | 425.020000 | 0.000000 | 1.000000 |  |
| BDSN | BDCD | 96.400000  | 96.400000  | 0.000000 | 1.000000 |  |
| BDSN | BDCJ | 65.360000  | 65.360000  | 0.000000 | 1.000000 |  |
| BDSN | BDDG | 169.240000 | 169.240000 | 0.000000 | 1.000000 |  |
| BDSN | BDKP | 123.050000 | 123.050000 | 0.000000 | 1.000000 |  |
| BDSN | BDRJ | 177.410000 | 177.410000 | 0.000000 | 1.000000 |  |
| BDSN | BDTR | 90.080000  | 90.080000  | 0.000000 | 1.000000 |  |
| BDTR | BD1T | 188.350000 | 188.350000 | 0.000000 | 1.000000 |  |
| BDTR | BDCD | 86.540000  | 86.540000  | 0.000000 | 1.000000 |  |
| BDTR | BDCJ | 29.020000  | 29.020000  | 0.000000 | 1.000000 |  |
| BDTR | BDDG | 22.860000  | 22.860000  | 0.000000 | 1.000000 |  |
| BDTR | BDKP | 19.620000  | 19.620000  | 0.000000 | 1.000000 |  |
| BDTR | BDRJ | 36.120000  | 36.120000  | 0.000000 | 1.000000 |  |
| BDTR | BDSN | 185.480000 | 185.480000 | 0.000000 | 1.000000 |  |

**Data Output Planning Tools 1 Jaringan TDM Optimalisasi FAR EEB (Fixed Alternate Routing End-to-end Blocking)**

*Tabel Performace of Traffic Relations*

| From | To   | Traffic offered (Erl) | Traffic carried (Erl) | EEB (%)  | GOS demand (%) | GOS violation |
|------|------|-----------------------|-----------------------|----------|----------------|---------------|
| BD1T | BDCD | 44.310000             | 44.195168             | 0.259200 | 1.000000       |               |
| BD1T | BDCJ | 25.730000             | 25.640295             | 0.348600 | 1.000000       |               |
| BD1T | BDDG | 57.470000             | 57.247199             | 0.387700 | 1.000000       |               |
| BD1T | BDKP | 26.170000             | 26.086889             | 0.317600 | 1.000000       |               |
| BD1T | BDRJ | 87.820000             | 87.486183             | 0.380100 | 1.000000       |               |
| BD1T | BDSN | 103.380000            | 103.167844            | 0.205200 | 1.000000       |               |
| BD1T | BDTR | 29.740000             | 29.655758             | 0.283300 | 1.000000       |               |
| BDCD | BD1T | 200.660000            | 200.139977            | 0.259200 | 1.000000       |               |
| BDCD | BDCJ | 121.130000            | 120.674857            | 0.375700 | 1.000000       |               |
| BDCD | BDDG | 31.670000             | 31.511079             | 0.501800 | 1.000000       |               |
| BDCD | BDKP | 23.330000             | 23.200348             | 0.555700 | 1.000000       |               |
| BDCD | BDRJ | 47.490000             | 47.168455             | 0.677100 | 1.000000       |               |
| BDCD | BDSN | 210.060000            | 209.108357            | 0.453000 | 1.000000       |               |
| BDCD | BDTR | 90.130000             | 89.760053             | 0.410500 | 1.000000       |               |
| BDCJ | BD1T | 119.430000            | 119.013621            | 0.348600 | 1.000000       |               |
| BDCJ | BDCD | 87.350000             | 87.063518             | 0.328000 | 1.000000       |               |
| BDCJ | BDDG | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDCJ | BDKP | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDCJ | BDRJ | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDCJ | BDSN | 131.240000            | 130.600319            | 0.487400 | 1.000000       |               |
| BDCJ | BDTR | 29.830000             | 29.646320             | 0.615800 | 1.000000       |               |
| BDDG | BD1T | 204.770000            | 203.976144            | 0.387700 | 1.000000       |               |
| BDDG | BDCD | 41.300000             | 41.052270             | 0.599800 | 1.000000       |               |
| BDDG | BDCJ | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDDG | BDKP | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDDG | BDRJ | 35.790000             | 35.538635             | 0.702300 | 1.000000       |               |
| BDDG | BDSN | 255.290000            | 254.157229            | 0.443700 | 1.000000       |               |
| BDDG | BDTR | 18.070000             | 17.963069             | 0.591800 | 1.000000       |               |
| BDKP | BD1T | 193.450000            | 192.835638            | 0.317600 | 1.000000       |               |
| BDKP | BDCD | 28.650000             | 28.468232             | 0.634400 | 1.000000       |               |
| BDKP | BDCJ | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDKP | BDDG | 0.000000              | 0.000000              | 0.000000 | 1.000000       |               |
| BDKP | BDRJ | 131.620000            | 131.056477            | 0.428100 | 1.000000       |               |
| BDKP | BDSN | 175.480000            | 174.679727            | 0.456000 | 1.000000       |               |
| BDKP | BDTR | 16.010000             | 15.905437             | 0.653100 | 1.000000       |               |



|      |      |            |            |          |          |  |
|------|------|------------|------------|----------|----------|--|
| BDRJ | BD1T | 302.960000 | 301.808404 | 0.380100 | 1.000000 |  |
| BDRJ | BDCD | 16.770000  | 16.686814  | 0.496000 | 1.000000 |  |
| BDRJ | BDCJ | 0.000000   | 0.000000   | 0.000000 | 1.000000 |  |
| BDRJ | BDDG | 35.160000  | 34.907607  | 0.717800 | 1.000000 |  |
| BDRJ | BDKP | 122.300000 | 121.777618 | 0.427100 | 1.000000 |  |
| BDRJ | BDSN | 281.070000 | 279.605871 | 0.520900 | 1.000000 |  |
| BDRJ | BDTR | 28.470000  | 28.285753  | 0.647200 | 1.000000 |  |
| BDSN | BD1T | 425.020000 | 424.147778 | 0.205200 | 1.000000 |  |
| BDSN | BDCD | 96.400000  | 96.123574  | 0.286700 | 1.000000 |  |
| BDSN | BDCJ | 65.360000  | 65.155698  | 0.312600 | 1.000000 |  |
| BDSN | BDDG | 169.240000 | 168.713571 | 0.311100 | 1.000000 |  |
| BDSN | BDKP | 123.050000 | 122.628216 | 0.342800 | 1.000000 |  |
| BDSN | BDRJ | 177.410000 | 176.807155 | 0.339800 | 1.000000 |  |
| BDSN | BDTR | 90.080000  | 89.791693  | 0.320100 | 1.000000 |  |
| BDTR | BD1T | 188.350000 | 187.816479 | 0.283300 | 1.000000 |  |
| BDTR | BDCD | 86.540000  | 86.161370  | 0.437500 | 1.000000 |  |
| BDTR | BDCJ | 29.020000  | 28.839692  | 0.621300 | 1.000000 |  |
| BDTR | BDDG | 22.860000  | 22.711856  | 0.648000 | 1.000000 |  |
| BDTR | BDKP | 19.620000  | 19.481342  | 0.706700 | 1.000000 |  |
| BDTR | BDRJ | 36.120000  | 35.868738  | 0.695600 | 1.000000 |  |
| BDTR | BDSN | 185.480000 | 184.492871 | 0.532200 | 1.000000 |  |

## Data Output Planning Tools 1 Jaringan TDM Sebelum Optimalisasi

Tabel Node Data

| Name | System type | Software version | Node type | Number of subscribers | Average traffic per entity (Erl) | Internal BHCA (millions) | Terminated Incoming BHCA (millions) | Originated Outgoing BHCA (millions) | Transit BHCA (millions) | Crankback BHCA (millions) | Total BHCA (millions) | Maximum BHCA (millions) | Load (%) | Number of E1/T1 modules |
|------|-------------|------------------|-----------|-----------------------|----------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------|---------------------------|-----------------------|-------------------------|----------|-------------------------|
| BD1T | Unknown     | Unknown          | TEX       | --                    | --                               | 0                        | 0.058847                            | 0.013486                            | 0                       |                           | 0.072333              | 1                       | 7.2333   | 132                     |
| BDCD | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.014448                            | 0.026081                            | 0                       |                           | 0.040528              | 1                       | 4.0528   | 117                     |
| BDCJ | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.008685                            | 0.013243                            | 0                       |                           | 0.021927              | 1                       | 2.1927   | 45                      |
| BDDG | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.01139                             | 0.019988                            | 0                       |                           | 0.031378              | 1                       | 3.1378   | 77                      |
| BDKP | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.011321                            | 0.019628                            | 0                       |                           | 0.030948              | 1                       | 3.0948   | 53                      |
| BDRJ | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.018585                            | 0.028322                            | 0                       |                           | 0.046907              | 1                       | 4.6907   | 102                     |
| BDSN | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.048312                            | 0.041276                            | 0                       |                           | 0.089588              | 1                       | 8.9588   | 164                     |
| BDTR | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.010884                            | 0.020448                            | 0                       |                           | 0.031332              | 1                       | 3.1332   | 68                      |

Tabel Service Data Load Matrics

| Traffic Matrix | BD1T       | BDCD      | BDCJ       | BDDG       | BDKP       | BDRJ       | BDSN       | BDTR      |
|----------------|------------|-----------|------------|------------|------------|------------|------------|-----------|
| BD1T           | 0.000000   | 44.310000 | 25.730000  | 57.470000  | 26.170000  | 87.820000  | 103.380000 | 29.740000 |
| BDCD           | 200.660000 | 0.000000  | 121.130000 | 31.670000  | 23.330000  | 47.490000  | 210.060000 | 90.130000 |
| BDCJ           | 119.430000 | 87.350000 | 0.000000   | 0.000000   | 0.000000   | 0.000000   | 131.240000 | 29.830000 |
| BDDG           | 204.770000 | 41.300000 | 0.000000   | 0.000000   | 0.000000   | 35.790000  | 255.290000 | 18.070000 |
| BDKP           | 193.450000 | 28.650000 | 0.000000   | 0.000000   | 0.000000   | 131.620000 | 175.480000 | 16.010000 |
| BDRJ           | 302.960000 | 16.770000 | 0.000000   | 35.160000  | 122.300000 | 0.000000   | 281.070000 | 28.470000 |
| BDSN           | 425.020000 | 96.400000 | 65.360000  | 169.240000 | 123.050000 | 177.410000 | 0.000000   | 90.080000 |
| BDTR           | 188.350000 | 86.540000 | 29.020000  | 22.860000  | 19.620000  | 36.120000  | 185.480000 | 0.000000  |

Tabel Trunk Group Data

| From | To   | Trunk group sizes (no. of trunks) | No. of reserved trunks (for state protection) | Blocking direct traffic (%) | Blocking alternate traffic (%) | Link spec. call loss probability (%) | Direct traffic: Mean offered | Direct traffic: Peak offered | Direct traffic: Mean carried | Direct traffic: Peak carried | Direct traffic: Mean overflow | Direct traffic: Peak overflow | Alternate traffic: Mean offered | Alternate traffic: Peak offered | Alternate traffic: Mean carried | Alternate traffic: Peak carried | Alternate traffic: Mean overflow | Alternate traffic: Peak overflow | Targeted TGRP load threshold | Load per trunk (Erl/trunk) | Trunk group size violation |
|------|------|-----------------------------------|---|-----------------------------|--------------------------------|--------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|------------------------------|----------------------------|----------------------------|
| BDRJ | BDCD | 679                               | 0   | 0.000000                    | 0.000000                       |                                      | 64.260000                    | 1.000000                     | 64.260000                    | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.094639                   |                            |
| BDCJ | BDSN | 277                               | 0   | 0.000000                    | 0.000000                       |                                      | 196.600000                   | 1.000000                     | 196.599998                   | 0.999999                     | 0.000002                      | 2.343218                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.709747                   |                            |
| BDTR | BDRJ | 155                               | 0   | 0.000000                    | 0.000000                       |                                      | 64.590000                    | 1.000000                     | 64.590000                    | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.416710                   |                            |
| BDDG | BDRJ | 155                               | 0   | 0.000000                    | 0.000000                       |                                      | 70.950000                    | 1.000000                     | 70.950000                    | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.457742                   |                            |
| BDDG | BDTR | 124                               | 0   | 0.000000                    | 0.000000                       |                                      | 40.930000                    | 1.000000                     | 40.930000                    | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.330081                   |                            |
| BDCJ | BDCD | 556                               | 0   | 0.000000                    | 0.000000                       |                                      | 208.480000                   | 1.000000                     | 208.480000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.374964                   |                            |
| BDKP | BDTR | 155                               | 0   | 0.000000                    | 0.000000                       |                                      | 35.630000                    | 1.000000                     | 35.630000                    | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.229871                   |                            |
| BDKP | BDCD | 123                               | 0   | 0.000000                    | 0.000000                       |                                      | 51.980000                    | 1.000000                     | 51.980000                    | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.422602                   |                            |
| BDKP | BDRJ | 402                               | 0   | 0.000000                    | 0.000000                       |                                      | 253.920000                   | 1.000000                     | 253.920000                   | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.631642                   |                            |
| BDDG | BDSN | 1176                              | 0   | 0.000000                    | 0.000000                       |                                      | 424.530000                   | 1.000000                     | 424.530000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.360995                   |                            |
| BDSN | BDTR | 401                               | 0   | 0.000000                    | 0.000000                       |                                      | 275.560000                   | 1.000000                     | 275.560000                   | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.687182                   |                            |
| BDSN | BDCD | 703                               | 0   | 0.000000                    | 0.000000                       |                                      | 306.460000                   | 1.000000                     | 306.460000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.435932                   |                            |
| BD1T | BDCD | 568                               | 0   | 0.000000                    | 0.000000                       |                                      | 244.970000                   | 1.000000                     | 244.970000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.431285                   |                            |
| BD1T | BDTR | 496                               | 0   | 0.000000                    | 0.000000                       |                                      | 218.090000                   | 1.000000                     | 218.090000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.439698                   |                            |
| BD1T | BDCJ | 310                               | 0   | 0.000000                    | 0.000000                       |                                      | 145.160000                   | 1.000000                     | 145.160000                   | 1.000000                     | 0.000000                      |                               | 0.000002                        | 2.170371                        | 0.000002                        | 1.704202                        | 0.000000                         | 1.000000                         | 0                            | 0.468258                   |                            |
| BD1T | BDKP | 403                               | 0   | 0.000000                    | 0.000000                       |                                      | 219.620000                   | 1.000000                     | 219.620000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.544963                   |                            |
| BD1T | BDSN | 969                               | 0   | 0.000000                    | 0.000000                       |                                      | 528.400000                   | 1.000000                     | 528.400000                   | 1.000000                     | 0.000000                      |                               | 0.000002                        | 1.894675                        | 0.000002                        | 1.502385                        | 0.000000                         | 1.000000                         | 0                            | 0.545304                   |                            |
| BDSN | BDRJ | 959                               | 0   | 0.000000                    | 0.000000                       |                                      | 458.480000                   | 1.000000                     | 458.480000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.478081                   |                            |
| BDKP | BDSN | 556                               | 0   | 0.000000                    | 0.000000                       |                                      | 298.530000                   | 1.000000                     | 298.530000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.536924                   |                            |
| BDTR | BDCJ | 248                               | 0   | 0.000000                    | 0.000000                       |                                      | 58.850000                    | 1.000000                     | 58.850000                    | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.237298                   |                            |
| BDCD | BDTR | 525                               | 0   | 0.000000                    | 0.000000                       |                                      | 176.670000                   | 1.000000                     | 176.670000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.336514                   |                            |
| BDDG | BDCD | 432                               | 0   | 0.000000                    | 0.000000                       |                                      | 72.970000                    | 1.000000                     | 72.970000                    | 1.000000                     | 0.000000                      | 1.000000                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.168912                   |                            |
| BD1T | BDDG | 496                               | 0   | 0.000000                    | 0.000000                       |                                      | 262.240000                   | 1.000000                     | 262.240000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.528710                   |                            |
| BDRJ | BD1T | 806                               | 0   | 0.000000                    | 0.000000                       |                                      | 390.780000                   | 1.000000                     | 390.780000                   | 1.000000                     | 0.000000                      |                               | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.484839                   |                            |

Tabel *Traffic Carried Matrix*

|             | <b>BD1T</b> | <b>BDCD</b> | <b>BDCJ</b> | <b>BDDG</b> | <b>BDKP</b> | <b>BDRJ</b> | <b>BDSN</b> | <b>BDTR</b> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>BD1T</b> |             | 44.310000   | 25.730000   | 57.470000   | 26.170000   | 87.820000   | 103.380000  | 29.740000   |
| <b>BDCD</b> | 200.660000  |             | 121.130000  | 31.670000   | 23.330000   | 47.490000   | 210.060000  | 90.130000   |
| <b>BDCJ</b> | 119.430000  | 87.350000   |             | 0.000000    | 0.000000    | 0.000000    | 131.240000  | 29.830000   |
| <b>BDDG</b> | 204.770000  | 41.300000   | 0.000000    |             | 0.000000    | 35.790000   | 255.290000  | 18.070000   |
| <b>BDKP</b> | 193.450000  | 28.650000   | 0.000000    | 0.000000    |             | 131.620000  | 175.480000  | 16.010000   |
| <b>BDRJ</b> | 302.960000  | 16.770000   | 0.000000    | 35.160000   | 122.300000  |             | 281.070000  | 28.470000   |
| <b>BDSN</b> | 425.020000  | 96.400000   | 65.360000   | 169.240000  | 123.050000  | 177.410000  |             | 90.080000   |
| <b>BDTR</b> | 188.350000  | 86.540000   | 29.020000   | 22.860000   | 19.620000   | 36.120000   | 185.480000  |             |

**Data Output Planning Tools 1 Jaringan TDM Optimalisasi FAR EEB (Fixed Alternate Routing End-to-end Blocking)**

*Tabel Node Data*

| Name | System type | Software version | Node type | Number of subscribers | Average traffic per entity (Erl) | Internal BHCA (millions) | Terminated Incoming BHCA (millions) | Originated Outgoing BHCA (millions) | Transit BHCA (millions) | Crankback BHCA (millions) | Total BHCA (millions) | Maximum BHCA (millions) | Load (%) | Number of E1/T1 modules |
|------|-------------|------------------|-----------|-----------------------|----------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------|---------------------------|-----------------------|-------------------------|----------|-------------------------|
| BD1T | Unknown     | Unknown          | TEX       | --                    | --                               | 0                        | 0.058671                            | 0.013486                            | 0.002434                |                           | 0.074591              | 1                       | 7.4591   | 79                      |
| BDCD | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.014391                            | 0.026081                            | 0                       |                           | 0.040472              | 1                       | 4.0472   | 44                      |
| BDCJ | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.008651                            | 0.013243                            | 0                       |                           | 0.021894              | 1                       | 2.1894   | 24                      |
| BDDG | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.011343                            | 0.019988                            | 0                       |                           | 0.031331              | 1                       | 3.1331   | 33                      |
| BDKP | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.011274                            | 0.019628                            | 0                       |                           | 0.030902              | 1                       | 3.0902   | 33                      |
| BDRJ | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.018501                            | 0.028322                            | 0                       |                           | 0.046824              | 1                       | 4.6824   | 49                      |
| BDSN | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.048089                            | 0.041276                            | 0                       |                           | 0.089365              | 1                       | 8.9365   | 90                      |
| BDTR | Unknown     | Unknown          | LEX       | --                    | --                               | 0                        | 0.010836                            | 0.020448                            | 0                       |                           | 0.031284              | 1                       | 3.1284   | 36                      |

*Tabel Service Data Load Matrics*

| Traffic Matrix | BD1T       | BDCD      | BDCJ       | BDDG       | BDKP       | BDRJ       | BDSN       | BDTR      |
|----------------|------------|-----------|------------|------------|------------|------------|------------|-----------|
| BD1T           | 0.000000   | 44.310000 | 25.730000  | 57.470000  | 26.170000  | 87.820000  | 103.380000 | 29.740000 |
| BDCD           | 200.660000 | 0.000000  | 121.130000 | 31.670000  | 23.330000  | 47.490000  | 210.060000 | 90.130000 |
| BDCJ           | 119.430000 | 87.350000 | 0.000000   | 0.000000   | 0.000000   | 0.000000   | 131.240000 | 29.830000 |
| BDDG           | 204.770000 | 41.300000 | 0.000000   | 0.000000   | 0.000000   | 35.790000  | 255.290000 | 18.070000 |
| BDKP           | 193.450000 | 28.650000 | 0.000000   | 0.000000   | 0.000000   | 131.620000 | 175.480000 | 16.010000 |
| BDRJ           | 302.960000 | 16.770000 | 0.000000   | 35.160000  | 122.300000 | 0.000000   | 281.070000 | 28.470000 |
| BDSN           | 425.020000 | 96.400000 | 65.360000  | 169.240000 | 123.050000 | 177.410000 | 0.000000   | 90.080000 |
| BDTR           | 188.350000 | 86.540000 | 29.020000  | 22.860000  | 19.620000  | 36.120000  | 185.480000 | 0.000000  |

Tabel Trunk Group Data

| From | To   | Trunk group sizes (no. of trunks) | No. of reserved trunks (for state protection) | Blocking direct traffic (%) | Blocking alternate traffic (%) | Link spec. call loss probability (%) | Direct traffic: Mean offered | Direct traffic: Peak offered | Direct traffic: Mean carried | Direct traffic: Peak carried | Direct traffic: Mean overflow | Direct traffic: Peak overflow | Alternate traffic: Mean offered | Alternate traffic: Peak offered | Alternate traffic: Mean carried | Alternate traffic: Peak carried | Alternate traffic: Mean overflow | Alternate traffic: Peak overflow | Targeted TGRP load threshold | Load per trunk (Erl/trunk) | Trunk group size violation |
|------|------|-----------------------------------|---|-----------------------------|--------------------------------|--------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|------------------------------|----------------------------|----------------------------|
| BDRJ | BDCD | 70                                | 5   | 0.000000                    | 4.733700                       |                                      | 64.260000                    | 1.000000                     | 61.218142                    | 0.731957                     | 3.041858                      | 3.166804                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.874545                   |                            |
| BDCJ | BDSN | 208                               | 8   | 0.000000                    | 2.489900                       |                                      | 196.600000                   | 1.000000                     | 191.704854                   | 0.768592                     | 4.895146                      | 4.599484                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.921658                   |                            |
| BDTR | BDRJ | 70                                | 5   | 0.000000                    | 4.949200                       |                                      | 64.590000                    | 1.000000                     | 61.393286                    | 0.772783                     | 3.196714                      | 2.788090                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.877047                   |                            |
| BDDG | BDRJ | 76                                | 5   | 0.000000                    | 5.122800                       |                                      | 70.950000                    | 1.000000                     | 67.315398                    | 0.765525                     | 3.634602                      | 2.845876                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.885729                   |                            |
| BDDG | BDTR | 46                                | 4   | 0.000000                    | 5.361100                       |                                      | 40.930000                    | 1.000000                     | 38.735709                    | 0.791429                     | 2.194291                      | 2.398060                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.842081                   |                            |
| BDCJ | BDCD | 221                               | 8   | 0.000000                    | 2.271100                       |                                      | 208.480000                   | 1.000000                     | 203.745268                   | 0.794250                     | 4.734732                      | 4.430699                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.921924                   |                            |
| BDKP | BDTR | 40                                | 4   | 0.000000                    | 6.115500                       |                                      | 35.630000                    | 1.000000                     | 33.451042                    | 0.784515                     | 2.178958                      | 2.283491                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.836276                   |                            |
| BDKP | BDCD | 57                                | 4   | 0.000000                    | 5.341600                       |                                      | 51.980000                    | 1.000000                     | 49.203438                    | 0.777715                     | 2.776562                      | 2.582689                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.863218                   |                            |
| BDKP | BDRJ | 267                               | 9   | 0.000000                    | 2.180400                       |                                      | 253.920000                   | 1.000000                     | 248.383637                   | 0.792245                     | 5.536363                      | 4.708956                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.930276                   |                            |
| BDDG | BDSN | 441                               | 11  | 0.000000                    | 1.741300                       |                                      | 424.530000                   | 1.000000                     | 417.137469                   | 0.779866                     | 7.392531                      | 6.040185                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.945890                   |                            |
| BDSN | BDTR | 288                               | 9   | 0.000000                    | 2.275000                       |                                      | 275.560000                   | 1.000000                     | 269.290928                   | 0.756125                     | 6.269072                      | 5.318341                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.935038                   |                            |
| BDSN | BDCD | 320                               | 9   | 0.000000                    | 2.102400                       |                                      | 306.460000                   | 1.000000                     | 300.016951                   | 0.755911                     | 6.443049                      | 5.642393                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.937553                   |                            |
| BD1T | BDCD | 298                               | 9   | 8.934600                    | 1.033800                       |                                      | 244.970000                   | 1.000000                     | 244.335145                   | 0.945101                     | 0.634855                      | 5.143226                      | 24.018633                       | 3.291222                        | 21.872665                       | 1.227408                        | 2.145968                         | 1.365827                         | 0                            | 0.893315                   |                            |
| BD1T | BDTR | 266                               | 9   | 9.442700                    | 1.082200                       |                                      | 218.090000                   | 1.000000                     | 217.472237                   | 0.937655                     | 0.617763                      | 5.204935                      | 20.842301                       | 2.913376                        | 18.874235                       | 1.205740                        | 1.968066                         | 1.340112                         | 0                            | 0.888521                   |                            |
| BD1T | BDCJ | 181                               | 7   | 8.467800                    | 0.970600                       |                                      | 145.160000                   | 1.000000                     | 144.653916                   | 0.940975                     | 0.506084                      | 4.175424                      | 12.042340                       | 2.939837                        | 11.022621                       | 1.338662                        | 1.019719                         | 1.332224                         | 0                            | 0.860091                   |                            |
| BD1T | BDKP | 263                               | 9   | 9.642100                    | 0.946400                       |                                      | 219.620000                   | 1.000000                     | 218.922527                   | 0.927468                     | 0.697473                      | 5.424535                      | 15.882633                       | 3.123306                        | 14.351206                       | 1.317229                        | 1.531427                         | 1.341102                         | 0                            | 0.886972                   |                            |
| BD1T | BDSN | 603                               | 13  | 8.460600                    | 0.716600                       |                                      | 528.400000                   | 1.000000                     | 527.315622                   | 0.937081                     | 1.084378                      | 7.090731                      | 34.895844                       | 2.844169                        | 31.943443                       | 1.144558                        | 2.952401                         | 1.161491                         | 0                            | 0.927461                   |                            |
| BDSN | BDRJ | 474                               | 11  | 0.000000                    | 1.825900                       |                                      | 458.480000                   | 1.000000                     | 450.108827                   | 0.766478                     | 8.371173                      | 6.280931                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.949597                   |                            |
| BDKP | BDSN | 312                               | 9   | 0.000000                    | 2.114400                       |                                      | 298.530000                   | 1.000000                     | 292.217944                   | 0.779759                     | 6.312056                      | 5.150563                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.936596                   |                            |
| BDTR | BDCJ | 64                                | 4   | 0.000000                    | 5.179800                       |                                      | 58.850000                    | 1.000000                     | 55.801678                    | 0.776030                     | 3.048322                      | 2.675109                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.871901                   |                            |
| BDCD | BDTR | 187                               | 7   | 0.000000                    | 2.732100                       |                                      | 176.670000                   | 1.000000                     | 171.843136                   | 0.787043                     | 4.826864                      | 4.055165                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.918947                   |                            |
| BDDG | BDCD | 79                                | 5   | 0.000000                    | 4.509400                       |                                      | 72.970000                    | 1.000000                     | 69.679486                    | 0.776093                     | 3.290514                      | 2.922852                      | 0.000000                        |                                 | 0.000000                        |                                 | 0.000000                         |                                  | 0                            | 0.882019                   |                            |
| BD1T | BDDG | 306                               | 9   | 10.194300                   | 0.942000                       |                                      | 262.240000                   | 1.000000                     | 261.223343                   | 0.923497                     | 1.016657                      | 5.184375                      | 15.710148                       | 3.262336                        | 14.108613                       | 1.388978                        | 1.601536                         | 1.453490                         | 0                            | 0.899778                   |                            |
| BDRJ | BD1T | 444                               | 11  | 11.527600                   | 0.983300                       |                                      | 390.780000                   | 1.000000                     | 389.294587                   | 0.912946                     | 1.485413                      | 6.140474                      | 22.355630                       | 3.252231                        | 19.778565                       | 1.301350                        | 2.577065                         | 1.415858                         | 0                            | 0.921336                   |                            |

Tabel *Traffic Carried Matrix*

|             | <b>BD1T</b> | <b>BDCD</b> | <b>BDCJ</b> | <b>BDDG</b> | <b>BDKP</b> | <b>BDRJ</b> | <b>BDSN</b> | <b>BDTR</b> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>BD1T</b> |             | 44.195168   | 25.640295   | 57.247199   | 26.086889   | 87.486183   | 103.167844  | 29.655758   |
| <b>BDCD</b> | 200.139977  |             | 120.674857  | 31.511079   | 23.200348   | 47.168455   | 209.108357  | 89.760053   |
| <b>BDCJ</b> | 119.013621  | 87.063518   |             | 0.000000    | 0.000000    | 0.000000    | 130.600319  | 29.646320   |
| <b>BDDG</b> | 203.976144  | 41.052270   | 0.000000    |             | 0.000000    | 35.538635   | 254.157229  | 17.963069   |
| <b>BDKP</b> | 192.835638  | 28.468232   | 0.000000    | 0.000000    |             | 131.056477  | 174.679727  | 15.905437   |
| <b>BDRJ</b> | 301.808404  | 16.686814   | 0.000000    | 34.907607   | 121.777618  |             | 279.605871  | 28.285753   |
| <b>BDSN</b> | 424.147778  | 96.123574   | 65.155698   | 168.713571  | 122.628216  | 176.807155  |             | 89.791693   |
| <b>BDTR</b> | 187.816479  | 86.161370   | 28.839692   | 22.711856   | 19.481342   | 35.868738   | 184.492871  |             |

**LAMPIRAN C**  
**DATA OUTPUT PLANNING TOOLS 2 (VPI SERVICE**  
**MAKER IP V.3.5)**



Tabel Link Data

| Node 1         | Node 2         | Active | Suggested no. of links | No. of links | Link Type     | Routing metric interface costs | Max. capacity (Mbit/s) | Effective utilization (Mbit/s) max(1->2, 2->1) | Effective utilization % max(1->2, 2->1) | Effective utilization (Mbit/s) 1->2 | Effective utilization % 1->2 | OSPF utilization 1->2 | LSP utilization 1->2 | Effective utilization (Mbit/s) 2->1 | Effective utilization % 2->1 | OSPF utilization 2->1 | LSP utilization 2->1 | Free capacity 1->2 | Free capacity 2->1 |
|----------------|----------------|--------|------------------------|--------------|---------------|--------------------------------|------------------------|--|---|-------------------------------------|------------------------------|-----------------------|----------------------|-------------------------------------|------------------------------|-----------------------|----------------------|--------------------|--------------------|
| Core_IP_BDCD   | Core_IP_BDDG   | ⊗      | 1                      | 1            | 1FastEthernet | 3.1                            | 100                    | 3.1  | 3.1                                     | 0                                   | 3.1                          | 3.1                   | 0                    | 3.1                                 | 3.1                          | 0                     | 3.1                  | 96.9               | 96.9               |
| Core_IP_BDCD   | Router_PE_BDCD | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDCD   | Core_IP_BDCI   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 8.7  | 8.7                                     | 8.7                                 | 8.7                          | 8.7                   | 0                    | 8.7                                 | 8.7                          | 0                     | 8.7                  | 91.3               | 91.3               |
| Core_IP_BDCI   | Core_IP_BDTR   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 2.5  | 2.5                                     | 2.5                                 | 2.5                          | 2.5                   | 0                    | 2.5                                 | 2.5                          | 0                     | 2.5                  | 97.5               | 97.5               |
| Core_IP_BDCI   | Router_PE_BDCI | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDDG   | Core_IP_BDCI   | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDDG   | Core_IP_BDRJ   | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDDG   | Router_PE_BDDG | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDDG   | PubInt         | ⊗      | 0                      | 1            | 1STM-1/STS-3  | 1                              | 150.336                | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 150.336            | 150.336            |
| Core_IP_BDDG   | Core_IP_BDTR   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 1.8  | 1.8                                     | 1.8                                 | 1.8                          | 1.8                   | 0                    | 1.8                                 | 1.8                          | 0                     | 1.8                  | 98.2               | 98.2               |
| Core_IP_BDKP   | Core_IP_BDCI   | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDKP   | Core_IP_BDCD   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 2.2  | 2.2                                     | 2.2                                 | 2.2                          | 2.2                   | 0                    | 2.2                                 | 2.2                          | 0                     | 2.2                  | 97.8               | 97.8               |
| Core_IP_BDKP   | Core_IP_BDTR   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 1.6  | 1.6                                     | 1.6                                 | 1.6                          | 1.6                   | 0                    | 1.6                                 | 1.6                          | 0                     | 1.6                  | 98.4               | 98.4               |
| Core_IP_BDKP   | Core_IP_BDDG   | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDKP   | Core_IP_BDRJ   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 10.5   | 10.5                                    | 10.5                                | 10.5                         | 10.5                  | 0                    | 10.5                                | 10.5                         | 0                     | 10.5                 | 89.5               | 89.5               |
| Core_IP_BDKP   | Router_PE_BDKP | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDRJ   | Core_IP_BDCI   | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDRJ   | Core_IP_BDCD   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 2.7  | 2.7                                     | 2.7                                 | 2.7                          | 2.7                   | 0                    | 2.7                                 | 2.7                          | 0                     | 2.7                  | 97.3               | 97.3               |
| Core_IP_BDRJ   | Core_IP_BDTR   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 2.7  | 2.7                                     | 2.7                                 | 2.7                          | 2.7                   | 0                    | 2.7                                 | 2.7                          | 0                     | 2.7                  | 97.3               | 97.3               |
| Core_IP_BDRJ   | Core_IP_BDSN   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 18.6   | 18.6                                    | 18.6                                | 18.6                         | 18.6                  | 0                    | 18.6                                | 18.6                         | 0                     | 18.6                 | 81.4               | 81.4               |
| Core_IP_BDRJ   | Router_PE_BDRJ | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDRJ   | PubInt         | ⊗      | 0                      | 1            | 1STM-1/STS-3  | 1                              | 150.336                | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 150.336            | 150.336            |
| Core_IP_BDSN   | Core_IP_BDCI   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 8.2  | 8.2                                     | 8.2                                 | 8.2                          | 8.2                   | 0                    | 8.2                                 | 8.2                          | 0                     | 8.2                  | 91.8               | 91.8               |
| Core_IP_BDSN   | Core_IP_BDCD   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 12.5   | 12.5                                    | 12.5                                | 12.5                         | 12.5                  | 0                    | 12.5                                | 12.5                         | 0                     | 12.5                 | 87.5               | 87.5               |
| Core_IP_BDSN   | Core_IP_BDTR   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 11.3   | 11.3                                    | 11.3                                | 11.3                         | 11.3                  | 0                    | 11.3                                | 11.3                         | 0                     | 11.3                 | 88.7               | 88.7               |
| Core_IP_BDSN   | Core_IP_BDDG   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 17.3   | 17.3                                    | 17.3                                | 17.3                         | 17.3                  | 0                    | 17.3                                | 17.3                         | 0                     | 17.3                 | 82.7               | 82.7               |
| Core_IP_BDSN   | Core_IP_BDKP   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 12.2   | 12.2                                    | 12.2                                | 12.2                         | 12.2                  | 0                    | 12.2                                | 12.2                         | 0                     | 12.2                 | 87.8               | 87.8               |
| Core_IP_BDSN   | Router_PE_BDSN | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Core_IP_BDTR   | Core_IP_BDCD   | ⊗      | 1                      | 1            | 1FastEthernet | 1                              | 100                    | 7.3  | 7.3                                     | 7.3                                 | 7.3                          | 7.3                   | 0                    | 7.3                                 | 7.3                          | 0                     | 7.3                  | 92.7               | 92.7               |
| Core_IP_BDTR   | Router_PE_BDTR | ⊗      | 0                      | 1            | 1FastEthernet | 1                              | 100                    | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 100                |
| Router_PE_BDCD | BDCD_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |
| Router_PE_BDCI | BDCI_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |
| Router_PE_BDDG | BDDG_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |
| Router_PE_BDKP | BDKP_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |
| Router_PE_BDRJ | BDRJ_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |
| Router_PE_BDSN | BDSN_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |
| Router_PE_BDTR | BDRJ_AGW       | ⊗      | 0                      | 1            | 1Ethernet     | 10                             | 10                     | 0  | 0                                       | 0                                   | 0                            | 0                     | 0                    | 0                                   | 0                            | 0                     | 0                    | 0                  | 10                 |

Tabel Traffic Trunks

| Traffic Trunk Name          | Group Name | From Node    | To Node      | Amount | Active | Priority | No. of LSP Paths | Routed Amount | Percentage Routed(%) |
|-----------------------------|------------|--------------|--------------|--------|--------|----------|------------------|---------------|----------------------|
| BDCJ_BDTR_1                 | TrunkGroup | Core_IP_BDCJ | Core_IP_BDTR | 2.5    | 1      | 1        | 1                | 2.5           | 100                  |
| Core_IP_BDTR_Core_IP_BDCJ_1 | TrunkGroup | Core_IP_BDTR | Core_IP_BDCJ | 2.5    | 1      | 1        | 1                | 2.5           | 100                  |
| BDCJ_BDSN_1                 | TrunkGroup | Core_IP_BDCJ | Core_IP_BDSN | 8.2    | 1      | 1        | 1                | 8.2           | 100                  |
| Core_IP_BDSN_Core_IP_BDCJ_1 | TrunkGroup | Core_IP_BDSN | Core_IP_BDCJ | 8.2    | 1      | 1        | 1                | 8.2           | 100                  |
| BDDG_BDCD_1                 | TrunkGroup | Core_IP_BDDG | Core_IP_BDCD | 3.1    | 1      | 1        | 1                | 3.1           | 100                  |
| Core_IP_BDCD_Core_IP_BDDG_1 | TrunkGroup | Core_IP_BDCD | Core_IP_BDDG | 3.1    | 1      | 1        | 1                | 3.1           | 100                  |
| Core_IP_BDRJ_Core_IP_BDCD_1 | TrunkGroup | Core_IP_BDRJ | Core_IP_BDCD | 2.7    | 1      | 1        | 1                | 2.7           | 100                  |
| Core_IP_BDCD_Core_IP_BDRJ_1 | TrunkGroup | Core_IP_BDCD | Core_IP_BDRJ | 2.7    | 1      | 1        | 1                | 2.7           | 100                  |
| BDSN_BDCD_1                 | TrunkGroup | Core_IP_BDSN | Core_IP_BDCD | 12.5   | 1      | 1        | 1                | 12.5          | 100                  |
| Core_IP_BDCD_Core_IP_BDSN_1 | TrunkGroup | Core_IP_BDCD | Core_IP_BDSN | 12.5   | 1      | 1        | 1                | 12.5          | 100                  |
| Core_IP_BDKP_Core_IP_BDCD_1 | TrunkGroup | Core_IP_BDKP | Core_IP_BDCD | 2.2    | 1      | 1        | 1                | 2.2           | 100                  |
| Core_IP_BDCD_Core_IP_BDKP_1 | TrunkGroup | Core_IP_BDCD | Core_IP_BDKP | 2.2    | 1      | 1        | 1                | 2.2           | 100                  |
| BDCD_BDTR_1                 | TrunkGroup | Core_IP_BDCD | Core_IP_BDTR | 7.3    | 1      | 1        | 1                | 7.3           | 100                  |
| Core_IP_BDTR_Core_IP_BDCD_1 | TrunkGroup | Core_IP_BDTR | Core_IP_BDCD | 7.3    | 1      | 1        | 1                | 7.3           | 100                  |
| BDCJ_BDCD_1                 | TrunkGroup | Core_IP_BDCJ | Core_IP_BDCD | 8.7    | 1      | 1        | 1                | 8.7           | 100                  |
| Core_IP_BDCD_Core_IP_BDCJ_1 | TrunkGroup | Core_IP_BDCD | Core_IP_BDCJ | 8.7    | 1      | 1        | 1                | 8.7           | 100                  |
| Core_IP_BDSN_Core_IP_BDTR_1 | TrunkGroup | Core_IP_BDSN | Core_IP_BDTR | 11.3   | 1      | 1        | 1                | 11.3          | 100                  |
| Core_IP_BDTR_Core_IP_BDSN_1 | TrunkGroup | Core_IP_BDTR | Core_IP_BDSN | 11.3   | 1      | 1        | 1                | 11.3          | 100                  |
| Core_IP_BDKP_Core_IP_BDTR_1 | TrunkGroup | Core_IP_BDKP | Core_IP_BDTR | 1.6    | 1      | 1        | 1                | 1.6           | 100                  |
| Core_IP_BDTR_Core_IP_BDKP_1 | TrunkGroup | Core_IP_BDTR | Core_IP_BDKP | 1.6    | 1      | 1        | 1                | 1.6           | 100                  |
| BDRJ_BDTR_1                 | TrunkGroup | Core_IP_BDRJ | Core_IP_BDTR | 2.7    | 1      | 1        | 1                | 2.7           | 100                  |
| Core_IP_BDTR_Core_IP_BDRJ_1 | TrunkGroup | Core_IP_BDTR | Core_IP_BDRJ | 2.7    | 1      | 1        | 1                | 2.7           | 100                  |
| Core_IP_BDSN_Core_IP_BDDG_1 | TrunkGroup | Core_IP_BDSN | Core_IP_BDDG | 17.3   | 1      | 1        | 1                | 17.3          | 100                  |
| Core_IP_BDDG_Core_IP_BDSN_1 | TrunkGroup | Core_IP_BDDG | Core_IP_BDSN | 17.3   | 1      | 1        | 1                | 17.3          | 100                  |
| BDDG_BDTR_1                 | TrunkGroup | Core_IP_BDDG | Core_IP_BDTR | 1.8    | 1      | 1        | 1                | 1.8           | 100                  |
| Core_IP_BDTR_Core_IP_BDDG_1 | TrunkGroup | Core_IP_BDTR | Core_IP_BDDG | 1.8    | 1      | 1        | 1                | 1.8           | 100                  |
| BDSN_BDRJ_1                 | TrunkGroup | Core_IP_BDSN | Core_IP_BDRJ | 18.6   | 1      | 1        | 1                | 18.6          | 100                  |
| Core_IP_BDRJ_Core_IP_BDSN_1 | TrunkGroup | Core_IP_BDRJ | Core_IP_BDSN | 18.6   | 1      | 1        | 1                | 18.6          | 100                  |
| BDKP_BDRJ_1                 | TrunkGroup | Core_IP_BDKP | Core_IP_BDRJ | 10.5   | 1      | 1        | 1                | 10.5          | 100                  |
| Core_IP_BDRJ_Core_IP_BDKP_1 | TrunkGroup | Core_IP_BDRJ | Core_IP_BDKP | 10.5   | 1      | 1        | 1                | 10.5          | 100                  |
| BDKP_BDSN_1                 | TrunkGroup | Core_IP_BDKP | Core_IP_BDSN | 12.2   | 1      | 1        | 1                | 12.2          | 100                  |
| Core_IP_BDSN_Core_IP_BDKP_1 | TrunkGroup | Core_IP_BDSN | Core_IP_BDKP | 12.2   | 1      | 1        | 1                | 12.2          | 100                  |

**LAMPIRAN D**  
**VOIP BANDWIDTH CALCULATIONS**

*VoIP Bandwidth Calculations*

| Sample Size   |                  | IP Overhead         |    |     | ATM (AAL5) |                         |              | Ethernet                    |                |         | GbE Usage |             |               |                        |                        |
|---------------|------------------|---------------------|----|-----|------------|-------------------------|--------------|-----------------------------|----------------|---------|-----------|-------------|---------------|------------------------|------------------------|
| Bitrate       | Packet Time (ms) | Sample Size (bytes) | IP | UDP | RTP        | AAL5 trailer (overhead) | Payload Size | Total Cells (48 bytes/cell) | Calls per call | Bps     | Overhead  | Packet Size | bits per call | Simultaneous Calls/GbE | Packets per Second/GbE |
| <b>G.711</b>  |                  |                     |    |     |            |                         |              |                             |                |         |           |             |               |                        |                        |
| 64,000        | 30               | 240                 | 20 | 8   | 12         | 8                       | 288          | 6                           | 200.00         | 9600.00 | 38        | 318         | 84,800        | 11,792                 | 393,082                |
| 64,000        | 25               | 200                 | 20 | 8   | 12         | 8                       | 248          | 6                           | 240.00         |         | 38        | 278         | 88,960        | 11,241                 | 449,640                |
| 64,000        | 20               | 160                 | 20 | 8   | 12         | 8                       | 208          | 5                           | 250.00         |         | 38        | 238         | 95,200        | 10,504                 | 525,210                |
| 64,000        | 15               | 120                 | 20 | 8   | 12         | 8                       | 168          | 4                           | 266.67         |         | 38        | 198         | 105,600       | 9,470                  | 631,313                |
| 64,000        | 10               | 80                  | 20 | 8   | 12         | 8                       | 128          | 3                           | 300.00         |         | 38        | 158         | 126,400       | 7,911                  | 791,139                |
| 64,000        | 5                | 40                  | 20 | 8   | 12         | 8                       | 88           | 2                           | 400.00         |         | 38        | 118         | 188,800       | 5,297                  | 1,059,322              |
| <b>G.726</b>  |                  |                     |    |     |            |                         |              |                             |                |         |           |             |               |                        |                        |
| 32,000        | 30               | 120                 | 20 | 8   | 12         | 8                       | 168          | 4                           | 133.33         |         | 38        | 198         | 52,800        | 18,939                 | 631,313                |
| 32,000        | 25               | 100                 | 20 | 8   | 12         | 8                       | 148          | 4                           | 160.00         |         | 38        | 178         | 56,960        | 17,556                 | 702,247                |
| 32,000        | 20               | 80                  | 20 | 8   | 12         | 8                       | 128          | 3                           | 150.00         |         | 38        | 158         | 63,200        | 15,823                 | 791,139                |
| 32,000        | 15               | 60                  | 20 | 8   | 12         | 8                       | 108          | 3                           | 200.00         |         | 38        | 138         | 73,600        | 13,587                 | 905,797                |
| 32,000        | 10               | 40                  | 20 | 8   | 12         | 8                       | 88           | 2                           | 200.00         |         | 38        | 118         | 94,400        | 10,593                 | 1,059,322              |
| <b>G.729A</b> |                  |                     |    |     |            |                         |              |                             |                |         |           |             |               |                        |                        |
| 8,000         | 10               | 10                  | 20 | 8   | 12         | 8                       | 58           | 2                           | 200.00         |         | 38        | 88          | 70,400        | 14,205                 | 1,420,455              |
| 8,000         | 20               | 20                  | 20 | 8   | 12         | 8                       | 68           | 2                           | 100.00         |         | 38        | 98          | 39,200        | 25,510                 | 1,275,510              |