

Network_dataset_lab_19_04

April 19, 2023

```
[ ]: import numpy as np
import pandas as pd
import seaborn as sn
import matplotlib.pyplot as plt
```

```
pd.set_option("display.max.columns", None)
pd.set_option("display.precision", 4)
```

```
[ ]: # Klasy (w kolumnie Label): 0 - normal data (68424), 1 - attack data
df1 = pd.read_csv(r'\\.Normal_data_with_ddos.csv') # 48413 DDoS data
```

```
[ ]: df1
```

```
[ ]:
```

| | Flow ID | Src IP | Src Port | \ |
|--------|--|----------------|----------|---|
| 0 | 185.127.17.56-192.168.20.133-443-53648-6 | 185.127.17.56 | 443 | |
| 1 | 185.127.17.56-192.168.20.133-443-53650-6 | 192.168.20.133 | 53650 | |
| 2 | 192.168.20.133-192.168.20.2-35108-53-6 | 192.168.20.133 | 35108 | |
| 3 | 192.168.20.133-192.168.20.2-35108-53-6 | 192.168.20.2 | 53 | |
| 4 | 154.59.122.74-192.168.20.133-443-60900-6 | 192.168.20.133 | 60900 | |
| ... | ... | ... | ... | |
| 116832 | 192.168.20.134-199.128.37.150-0-0-0 | 199.128.37.150 | 0 | |
| 116833 | 192.168.20.134-204.43.184.74-0-0-0 | 204.43.184.74 | 0 | |
| 116834 | 192.168.20.134-83.216.215.83-0-0-0 | 83.216.215.83 | 0 | |
| 116835 | 8.0.6.4-8.6.0.1-0-0-0 | 8.6.0.1 | 0 | |
| 116836 | 137.66.2.7-4.0.0.0-0-0-0 | 137.66.2.7 | 0 | |

| | Dst IP | Dst Port | Protocol | Timestamp | \ |
|--------|----------------|----------|----------|------------------------|---|
| 0 | 192.168.20.133 | 53648 | 6 | 5/2/2020 13:58 | |
| 1 | 185.127.17.56 | 443 | 6 | 5/2/2020 13:58 | |
| 2 | 192.168.20.2 | 53 | 6 | 5/2/2020 13:58 | |
| 3 | 192.168.20.133 | 35108 | 6 | 5/2/2020 13:58 | |
| 4 | 154.59.122.74 | 443 | 6 | 5/2/2020 13:58 | |
| ... | ... | ... | ... | ... | |
| 116832 | 192.168.20.134 | 0 | 0 | 4/2/2020 15:20 | |
| 116833 | 192.168.20.134 | 0 | 0 | 4/2/2020 15:20 | |
| 116834 | 192.168.20.134 | 0 | 0 | 4/2/2020 15:20 | |
| 116835 | 8.0.6.4 | 0 | 0 | 31/12/2019 06:14:05 PM | |
| 116836 | 4.0.0.0 | 0 | 0 | 31/12/2019 06:14:01 PM | |

| | Flow Duration | Tot Fwd Pkts | Tot Bwd Pkts | TotLen Fwd Pkts | \ |
|--------|---------------|--------------|--------------|-----------------|---|
| 0 | 245230 | 44 | 40 | 124937 | |
| 1 | 1605449 | 107 | 149 | 1071 | |
| 2 | 53078 | 5 | 5 | 66 | |
| 3 | 6975 | 1 | 1 | 0 | |
| 4 | 190141 | 13 | 16 | 780 | |
| ... | ... | ... | ... | ... | |
| 116832 | 2 | 0 | 2 | 0 | |
| 116833 | 2 | 0 | 2 | 0 | |
| 116834 | 2 | 0 | 2 | 0 | |
| 116835 | 64815031 | 910748 | 1 | 0 | |
| 116836 | 70611188 | 19 | 1 | 0 | |

| | TotLen Bwd Pkts | Fwd Pkt Len Max | Fwd Pkt Len Min | Fwd Pkt Len Mean | \ |
|--------|-----------------|-----------------|-----------------|------------------|---|
| 0 | 1071 | 9100 | 0 | 2839.4773 | |
| 1 | 439537 | 517 | 0 | 10.0093 | |
| 2 | 758 | 66 | 0 | 13.2000 | |
| 3 | 0 | 0 | 0 | 0.0000 | |
| 4 | 11085 | 427 | 0 | 60.0000 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0 | 0 | 0 | 0.0000 | |
| 116833 | 0 | 0 | 0 | 0.0000 | |
| 116834 | 0 | 0 | 0 | 0.0000 | |
| 116835 | 0 | 0 | 0 | 0.0000 | |
| 116836 | 0 | 0 | 0 | 0.0000 | |

| | Fwd Pkt Len Std | Bwd Pkt Len Max | Bwd Pkt Len Min | Bwd Pkt Len Mean | \ |
|--------|-----------------|-----------------|-----------------|------------------|---|
| 0 | 1839.5083 | 517 | 0 | 26.7750 | |
| 1 | 67.4967 | 27300 | 0 | 2949.9128 | |
| 2 | 29.5161 | 638 | 0 | 151.6000 | |
| 3 | 0.0000 | 0 | 0 | 0.0000 | |
| 4 | 130.0429 | 2596 | 0 | 692.8125 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0.0000 | 0 | 0 | 0.0000 | |
| 116833 | 0.0000 | 0 | 0 | 0.0000 | |
| 116834 | 0.0000 | 0 | 0 | 0.0000 | |
| 116835 | 0.0000 | 0 | 0 | 0.0000 | |
| 116836 | 0.0000 | 0 | 0 | 0.0000 | |

| | Bwd Pkt Len Std | Flow Byts/s | Flow Pkts/s | Flow IAT Mean | \ |
|-----|-----------------|-------------|-------------|---------------|---|
| 0 | 109.1880 | 513835.9907 | 342.5356 | 2.9546e+03 | |
| 1 | 3012.5895 | 274445.3421 | 159.4569 | 6.2959e+03 | |
| 2 | 276.8263 | 15524.3227 | 188.4020 | 5.8976e+03 | |
| 3 | 0.0000 | 0.0000 | 286.7384 | 6.9750e+03 | |
| 4 | 794.1573 | 62401.0603 | 152.5184 | 6.7908e+03 | |
| ... | ... | ... | ... | ... | |

| | | | | |
|--------|--------|--------|--------------|------------|
| 116832 | 0.0000 | 0.0000 | 1000000.0000 | 2.0000e+00 |
| 116833 | 0.0000 | 0.0000 | 1000000.0000 | 2.0000e+00 |
| 116834 | 0.0000 | 0.0000 | 1000000.0000 | 2.0000e+00 |
| 116835 | 0.0000 | 0.0000 | 14051.5091 | 7.1167e+01 |
| 116836 | 0.0000 | 0.0000 | 0.2832 | 3.7164e+06 |

| | Flow IAT Std | Flow IAT Max | Flow IAT Min | Fwd IAT Tot | Fwd IAT Mean \ |
|--------|--------------|--------------|--------------|-------------|----------------|
| 0 | 7.9532e+03 | 64066 | -44 | 238564 | 5.5480e+03 |
| 1 | 5.6408e+04 | 859760 | -102 | 1332121 | 1.2567e+04 |
| 2 | 1.5185e+04 | 46232 | 19 | 50302 | 1.2576e+04 |
| 3 | 0.0000e+00 | 6975 | 6975 | 0 | 0.0000e+00 |
| 4 | 1.2933e+04 | 38521 | -54 | 86882 | 7.2402e+03 |
| ... | ... | ... | ... | ... | ... |
| 116832 | 0.0000e+00 | 2 | 2 | 0 | 0.0000e+00 |
| 116833 | 0.0000e+00 | 2 | 2 | 0 | 0.0000e+00 |
| 116834 | 0.0000e+00 | 2 | 2 | 0 | 0.0000e+00 |
| 116835 | 4.0770e+03 | 2399309 | -30 | 64700000 | 7.1067e+01 |
| 116836 | 2.2419e+06 | 11100000 | 1227799 | 67500000 | 3.7507e+06 |

| | Fwd IAT Std | Fwd IAT Max | Fwd IAT Min | Bwd IAT Tot | Bwd IAT Mean \ |
|--------|-------------|-------------|-------------|-------------|----------------|
| 0 | 1.0446e+04 | 64066 | 2 | 245230 | 6287.9487 |
| 1 | 8.3434e+04 | 861138 | 2 | 1603130 | 10831.9595 |
| 2 | 2.2522e+04 | 46251 | 67 | 52962 | 13240.5000 |
| 3 | 0.0000e+00 | 0 | 0 | 0 | 0.0000 |
| 4 | 1.3051e+04 | 38805 | 1 | 190141 | 12676.0667 |
| ... | ... | ... | ... | ... | ... |
| 116832 | 0.0000e+00 | 0 | 0 | 2 | 2.0000 |
| 116833 | 0.0000e+00 | 0 | 0 | 2 | 2.0000 |
| 116834 | 0.0000e+00 | 0 | 0 | 2 | 2.0000 |
| 116835 | 4.0759e+03 | 2399309 | -30 | 0 | 0.0000 |
| 116836 | 2.3018e+06 | 11100000 | 1227799 | 0 | 0.0000 |

| | Bwd IAT Std | Bwd IAT Max | Bwd IAT Min | Fwd PSH Flags | Bwd PSH Flags \ |
|--------|-------------|-------------|-------------|---------------|-----------------|
| 0 | 12986.4688 | 79070 | 29 | 0 | 0 |
| 1 | 73926.6524 | 861129 | 1 | 0 | 0 |
| 2 | 22052.0441 | 46258 | 405 | 0 | 0 |
| 3 | 0.0000 | 0 | 0 | 0 | 0 |
| 4 | 15949.0928 | 38521 | 1 | 0 | 0 |
| ... | ... | ... | ... | ... | ... |
| 116832 | 0.0000 | 2 | 2 | 0 | 0 |
| 116833 | 0.0000 | 2 | 2 | 0 | 0 |
| 116834 | 0.0000 | 2 | 2 | 0 | 0 |
| 116835 | 0.0000 | 0 | 0 | 0 | 0 |
| 116836 | 0.0000 | 0 | 0 | 0 | 0 |

| | Fwd URG Flags | Bwd URG Flags | Fwd Header Len | Bwd Header Len \ |
|---|---------------|---------------|----------------|------------------|
| 0 | 0 | 0 | 880 | 804 |

| | | | | |
|---|---|---|------|------|
| 1 | 0 | 0 | 2140 | 3004 |
| 2 | 0 | 0 | 100 | 124 |
| 3 | 0 | 0 | 20 | 20 |
| 4 | 0 | 0 | 260 | 344 |

| | | | | |
|--------|-----|-----|-----|-----|
| ... | ... | ... | ... | ... |
| 116832 | 0 | 0 | 0 | 0 |
| 116833 | 0 | 0 | 0 | 0 |
| 116834 | 0 | 0 | 0 | 0 |
| 116835 | 0 | 0 | 0 | 0 |
| 116836 | 0 | 0 | 0 | 0 |

| | Fwd Pkts/s | Bwd Pkts/s | Pkt Len Min | Pkt Len Max | Pkt Len Mean \ |
|---|------------|------------|-------------|-------------|----------------|
| 0 | 179.4234 | 163.1122 | 0 | 9100 | 1482.4471 |
| 1 | 66.6480 | 92.8089 | 0 | 27300 | 1714.4280 |
| 2 | 94.2010 | 94.2010 | 0 | 638 | 74.9091 |
| 3 | 143.3692 | 143.3692 | 0 | 0 | 0.0000 |
| 4 | 68.3703 | 84.1481 | 0 | 2596 | 395.5000 |

| | | | | | |
|--------|------------|--------------|-----|-----|--------|
| ... | ... | ... | ... | ... | ... |
| 116832 | 0.0000 | 1000000.0000 | 0 | 0 | 0.0000 |
| 116833 | 0.0000 | 1000000.0000 | 0 | 0 | 0.0000 |
| 116834 | 0.0000 | 1000000.0000 | 0 | 0 | 0.0000 |
| 116835 | 14051.4937 | 0.0154 | 0 | 0 | 0.0000 |
| 116836 | 0.2691 | 0.0142 | 0 | 0 | 0.0000 |

| | Pkt Len Std | Pkt Len Var | FIN Flag Cnt | SYN Flag Cnt | RST Flag Cnt \ |
|--------|-------------|-------------|--------------|--------------|----------------|
| 0 | 1933.2683 | 3.7375e+06 | 0 | 1 | 0 |
| 1 | 2713.4659 | 7.3629e+06 | 0 | 1 | 0 |
| 2 | 190.8075 | 3.6407e+04 | 0 | 1 | 0 |
| 3 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 4 | 661.6917 | 4.3784e+05 | 0 | 1 | 0 |
| ... | ... | ... | ... | ... | ... |
| 116832 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116833 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116834 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116835 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116836 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |

| | PSH Flag Cnt | ACK Flag Cnt | URG Flag Cnt | CWE Flag Count \ |
|--------|--------------|--------------|--------------|------------------|
| 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 |
| 3 | 0 | 1 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 |
| ... | ... | ... | ... | ... |
| 116832 | 0 | 0 | 0 | 0 |
| 116833 | 0 | 0 | 0 | 0 |
| 116834 | 0 | 0 | 0 | 0 |

| | | | | |
|--------|---|---|---|---|
| 116835 | 0 | 0 | 0 | 0 |
| 116836 | 0 | 0 | 0 | 0 |

| | ECE Flag Cnt | Down/Up Ratio | Pkt Size Avg | Fwd Seg Size Avg \ |
|---|--------------|---------------|--------------|--------------------|
| 0 | 0 | 0 | 1500.0952 | 2839.4773 |
| 1 | 0 | 1 | 1721.1250 | 10.0093 |
| 2 | 0 | 1 | 82.4000 | 13.2000 |
| 3 | 0 | 1 | 0.0000 | 0.0000 |
| 4 | 0 | 1 | 409.1379 | 60.0000 |

| | | | | |
|--------|-----|-----|--------|--------|
| ... | ... | ... | ... | ... |
| 116832 | 0 | 0 | 0.0000 | 0.0000 |
| 116833 | 0 | 0 | 0.0000 | 0.0000 |
| 116834 | 0 | 0 | 0.0000 | 0.0000 |
| 116835 | 0 | 0 | 0.0000 | 0.0000 |
| 116836 | 0 | 0 | 0.0000 | 0.0000 |

| | Bwd Seg Size Avg | Fwd Byts/b Avg | Fwd Pkts/b Avg | Fwd Blk Rate Avg \ |
|---|------------------|----------------|----------------|--------------------|
| 0 | 26.7750 | 0 | 0 | 0 |
| 1 | 2949.9128 | 0 | 0 | 0 |
| 2 | 151.6000 | 0 | 0 | 0 |
| 3 | 0.0000 | 0 | 0 | 0 |
| 4 | 692.8125 | 0 | 0 | 0 |

| | | | |
|--------|--------|-----|-----|
| ... | ... | ... | ... |
| 116832 | 0.0000 | 0 | 0 |
| 116833 | 0.0000 | 0 | 0 |
| 116834 | 0.0000 | 0 | 0 |
| 116835 | 0.0000 | 0 | 0 |
| 116836 | 0.0000 | 0 | 0 |

| | Bwd Byts/b Avg | Bwd Pkts/b Avg | Bwd Blk Rate Avg | Subflow Fwd Pkts \ |
|---|----------------|----------------|------------------|--------------------|
| 0 | 0 | 0 | 0 | 44 |
| 1 | 0 | 0 | 0 | 107 |
| 2 | 0 | 0 | 0 | 5 |
| 3 | 0 | 0 | 0 | 1 |
| 4 | 0 | 0 | 0 | 13 |

| | | | |
|--------|-----|-----|--------|
| ... | ... | ... | ... |
| 116832 | 0 | 0 | 0 |
| 116833 | 0 | 0 | 0 |
| 116834 | 0 | 0 | 0 |
| 116835 | 0 | 0 | 910748 |
| 116836 | 0 | 0 | 19 |

| | Subflow Fwd Byts | Subflow Bwd Pkts | Subflow Bwd Byts \ |
|---|------------------|------------------|--------------------|
| 0 | 124937 | 40 | 1071 |
| 1 | 1071 | 149 | 439537 |
| 2 | 66 | 5 | 758 |
| 3 | 0 | 1 | 0 |

| | | | |
|--------|-----|-----|-------|
| 4 | 780 | 16 | 11085 |
| ... | ... | ... | ... |
| 116832 | 0 | 2 | 0 |
| 116833 | 0 | 2 | 0 |
| 116834 | 0 | 2 | 0 |
| 116835 | 0 | 1 | 0 |
| 116836 | 0 | 1 | 0 |

| | Init Fwd Win Byts | Init Bwd Win Byts | Fwd Act Data Pkts | \ |
|--------|-------------------|-------------------|-------------------|---|
| 0 | -1 | 65535 | 41 | |
| 1 | -1 | 64240 | 4 | |
| 2 | -1 | 64240 | 1 | |
| 3 | -1 | 64239 | 0 | |
| 4 | -1 | 64240 | 3 | |
| ... | ... | ... | ... | |
| 116832 | -1 | -1 | 0 | |
| 116833 | -1 | -1 | 0 | |
| 116834 | -1 | -1 | 0 | |
| 116835 | -1 | -1 | 0 | |
| 116836 | -1 | -1 | 0 | |

| | Fwd Seg Size Min | Active Mean | Active Std | Active Max | Active Min | \ |
|--------|------------------|-------------|------------|------------|------------|---|
| 0 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 1 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 2 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 3 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 4 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| ... | ... | ... | ... | ... | ... | |
| 116832 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 116833 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 116834 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 116835 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 | |
| 116836 | 0 | 5.6393e+06 | 6.0924e+06 | 12600000 | 1227799 | |

| | Idle Mean | Idle Std | Idle Max | Idle Min | Label |
|--------|-----------|------------|----------|----------|-------|
| 0 | 0.0 | 0.0000e+00 | 0 | 0 | 0 |
| 1 | 0.0 | 0.0000e+00 | 0 | 0 | 0 |
| 2 | 0.0 | 0.0000e+00 | 0 | 0 | 0 |
| 3 | 0.0 | 0.0000e+00 | 0 | 0 | 0 |
| 4 | 0.0 | 0.0000e+00 | 0 | 0 | 0 |
| ... | ... | ... | ... | ... | ... |
| 116832 | 0.0 | 0.0000e+00 | 0 | 0 | 1 |
| 116833 | 0.0 | 0.0000e+00 | 0 | 0 | 1 |
| 116834 | 0.0 | 0.0000e+00 | 0 | 0 | 1 |
| 116835 | 0.0 | 0.0000e+00 | 0 | 0 | 1 |
| 116836 | 6750987.0 | 2.9197e+06 | 11100000 | 5103137 | 1 |

[116837 rows x 84 columns]

```
[ ]: df1.describe()
```

```
[ ]:
```

| | Src Port | Dst Port | Protocol | Flow Duration | Tot Fwd Pkts | \ |
|-------|-------------|-------------|-------------|---------------|--------------|---|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 1.1684e+05 | 116837.0000 | |
| mean | 21879.9805 | 5700.4316 | 6.6874 | 7.9813e+06 | 14.7100 | |
| std | 24087.3536 | 15566.5742 | 7.0494 | 2.6577e+07 | 2665.8347 | |
| min | 0.0000 | 0.0000 | 0.0000 | -1.5400e+02 | 0.0000 | |
| 25% | 0.0000 | 0.0000 | 0.0000 | 2.0000e+00 | 0.0000 | |
| 50% | 443.0000 | 53.0000 | 6.0000 | 2.4400e+03 | 1.0000 | |
| 75% | 46051.0000 | 443.0000 | 17.0000 | 8.3240e+03 | 1.0000 | |
| max | 65513.0000 | 60998.0000 | 17.0000 | 1.2000e+08 | 910748.0000 | |

| | Tot Bwd Pkts | TotLen Fwd Pkts | TotLen Bwd Pkts | Fwd Pkt Len Max | \ |
|-------|--------------|-----------------|-----------------|-----------------|---|
| count | 116837.0000 | 1.1684e+05 | 1.1684e+05 | 116837.0000 | |
| mean | 11.7173 | 1.9645e+03 | 2.4176e+04 | 249.4013 | |
| std | 180.7494 | 1.1947e+05 | 5.8808e+05 | 1110.8013 | |
| min | 1.0000 | 0.0000e+00 | 0.0000e+00 | 0.0000 | |
| 25% | 2.0000 | 0.0000e+00 | 0.0000e+00 | 0.0000 | |
| 50% | 2.0000 | 0.0000e+00 | 0.0000e+00 | 0.0000 | |
| 75% | 3.0000 | 4.2000e+01 | 6.2200e+02 | 42.0000 | |
| max | 34094.0000 | 3.1600e+07 | 1.0700e+08 | 64239.0000 | |

| | Fwd Pkt Len Min | Fwd Pkt Len Mean | Fwd Pkt Len Std | Bwd Pkt Len Max | \ |
|-------|-----------------|------------------|-----------------|-----------------|---|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0000 | |
| mean | 13.0582 | 89.5535 | 94.6916 | 936.0695 | |
| std | 52.6070 | 448.3130 | 555.5502 | 4830.3437 | |
| min | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |
| 25% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |
| 50% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |
| 75% | 30.0000 | 36.0000 | 0.0000 | 345.0000 | |
| max | 3900.0000 | 32119.5000 | 45423.8325 | 64239.0000 | |

| | Bwd Pkt Len Min | Bwd Pkt Len Mean | Bwd Pkt Len Std | Flow Byts/s | \ |
|-------|-----------------|------------------|-----------------|-------------|---|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 1.1684e+05 | |
| mean | 15.2244 | 193.1011 | 224.0320 | 1.9508e+05 | |
| std | 34.2332 | 575.7508 | 817.4183 | 1.1239e+06 | |
| min | 0.0000 | 0.0000 | 0.0000 | -2.6271e+05 | |
| 25% | 0.0000 | 0.0000 | 0.0000 | 0.0000e+00 | |
| 50% | 0.0000 | 0.0000 | 0.0000 | 4.1564e+00 | |
| 75% | 31.0000 | 186.3333 | 167.3091 | 1.1896e+05 | |
| max | 761.0000 | 22660.7227 | 32119.5000 | 8.6300e+07 | |

| | Flow Pkts/s | Flow IAT Mean | Flow IAT Std | Flow IAT Max | Flow IAT Min | \ |
|-------|-------------|---------------|--------------|--------------|--------------|---|
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | |
| mean | 6.3526e+05 | 3.1627e+05 | 8.2208e+05 | 3.1797e+06 | 2.1968e+04 | |

| | | | | | |
|-----|-------------|-------------|------------|-------------|-------------|
| std | 8.3569e+05 | 1.4636e+06 | 3.2238e+06 | 1.1415e+07 | 7.3446e+05 |
| min | -1.6949e+04 | -1.5400e+02 | 0.0000e+00 | -1.5400e+02 | -1.1570e+04 |
| 25% | 5.0441e+02 | 2.0000e+00 | 0.0000e+00 | 2.0000e+00 | 1.0000e+00 |
| 50% | 1.4493e+03 | 9.5367e+02 | 0.0000e+00 | 1.9680e+03 | 3.0000e+00 |
| 75% | 1.0000e+06 | 3.1470e+03 | 2.6495e+03 | 6.8360e+03 | 7.1000e+01 |
| max | 3.0000e+06 | 1.1900e+08 | 6.2400e+07 | 1.1900e+08 | 1.1900e+08 |

| | | | | | |
|-------|-------------|--------------|-------------|-------------|---------------|
| | Fwd IAT Tot | Fwd IAT Mean | Fwd IAT Std | Fwd IAT Max | Fwd IAT Min \ |
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 7.6600e+06 | 6.7630e+05 | 1.1064e+06 | 3.0362e+06 | 5.4238e+04 |
| std | 2.6316e+07 | 3.1671e+06 | 4.6894e+06 | 1.1294e+07 | 1.1689e+06 |
| min | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | -3.0000e+01 |
| 25% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 50% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 75% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| max | 1.2000e+08 | 1.1800e+08 | 8.4400e+07 | 1.1900e+08 | 1.1800e+08 |

| | | | | | |
|-------|-------------|--------------|-------------|-------------|---------------|
| | Bwd IAT Tot | Bwd IAT Mean | Bwd IAT Std | Bwd IAT Max | Bwd IAT Min \ |
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 7.4103e+06 | 5.0774e+05 | 9.7776e+05 | 2.9878e+06 | 2.0459e+04 |
| std | 2.5758e+07 | 2.2712e+06 | 4.0537e+06 | 1.1173e+07 | 7.2024e+05 |
| min | -1.5400e+02 | -1.5400e+02 | 0.0000e+00 | -1.5400e+02 | -1.5400e+02 |
| 25% | 1.0000e+00 | 1.0000e+00 | 0.0000e+00 | 1.0000e+00 | 1.0000e+00 |
| 50% | 3.0000e+00 | 3.0000e+00 | 0.0000e+00 | 3.0000e+00 | 2.0000e+00 |
| 75% | 4.8980e+03 | 2.6170e+03 | 2.4445e+03 | 4.2220e+03 | 2.7400e+02 |
| max | 1.2000e+08 | 6.5000e+07 | 6.8300e+07 | 1.1900e+08 | 6.5000e+07 |

| | | | | |
|-------|---------------|---------------|---------------|-----------------|
| | Fwd PSH Flags | Bwd PSH Flags | Fwd URG Flags | Bwd URG Flags \ |
| count | 116837.0 | 116837.0000 | 116837.0 | 116837.0 |
| mean | 0.0 | 0.0651 | 0.0 | 0.0 |
| std | 0.0 | 0.2467 | 0.0 | 0.0 |
| min | 0.0 | 0.0000 | 0.0 | 0.0 |
| 25% | 0.0 | 0.0000 | 0.0 | 0.0 |
| 50% | 0.0 | 0.0000 | 0.0 | 0.0 |
| 75% | 0.0 | 0.0000 | 0.0 | 0.0 |
| max | 0.0 | 1.0000 | 0.0 | 0.0 |

| | | | | | |
|-------|----------------|----------------|--------------|------------|---------------|
| | Fwd Header Len | Bwd Header Len | Fwd Pkts/s | Bwd Pkts/s | Pkt Len Min \ |
| count | 116837.0000 | 116837.0000 | 116837.0000 | 1.1684e+05 | 116837.0000 |
| mean | 133.6369 | 211.6137 | 3006.3801 | 6.3225e+05 | 12.4065 |
| std | 1953.4799 | 3727.6632 | 47274.7719 | 8.3393e+05 | 22.9663 |
| min | 0.0000 | 0.0000 | 0.0000 | 0.0000e+00 | 0.0000 |
| 25% | 0.0000 | 0.0000 | 0.0000 | 3.0441e+02 | 0.0000 |
| 50% | 8.0000 | 20.0000 | 0.2562 | 1.0826e+03 | 0.0000 |
| 75% | 20.0000 | 24.0000 | 244.9780 | 1.0000e+06 | 30.0000 |
| max | 360448.0000 | 681904.0000 | 1000000.0000 | 2.0000e+06 | 448.0000 |

| | Pkt Len Max | Pkt Len Mean | Pkt Len Std | Pkt Len Var | FIN Flag Cnt \ |
|-------|-------------|--------------|-------------|-------------|----------------|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 1.1684e+05 | 116837.0000 |
| mean | 1071.1880 | 148.6180 | 241.3291 | 6.6397e+05 | 0.0208 |
| std | 4917.8551 | 391.6154 | 778.2805 | 9.4256e+06 | 0.1426 |
| min | 0.0000 | 0.0000 | 0.0000 | 0.0000e+00 | 0.0000 |
| 25% | 0.0000 | 0.0000 | 0.0000 | 0.0000e+00 | 0.0000 |
| 50% | 31.0000 | 7.6000 | 12.6557 | 1.6017e+02 | 0.0000 |
| 75% | 379.0000 | 150.3333 | 163.3101 | 2.6670e+04 | 0.0000 |
| max | 64239.0000 | 18354.0000 | 31345.4224 | 9.8300e+08 | 1.0000 |

| | SYN Flag Cnt | RST Flag Cnt | PSH Flag Cnt | ACK Flag Cnt | URG Flag Cnt \ |
|-------|--------------|--------------|--------------|--------------|----------------|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0 |
| mean | 0.1155 | 0.0004 | 0.0651 | 0.1763 | 0.0 |
| std | 0.3196 | 0.0194 | 0.2467 | 0.3810 | 0.0 |
| min | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0 |
| 25% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0 |
| 50% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0 |
| 75% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0 |
| max | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0 |

| | CWE Flag Count | ECE Flag Cnt | Down/Up Ratio | Pkt Size Avg \ |
|-------|----------------|--------------|---------------|----------------|
| count | 116837.0 | 116837.0 | 116837.0000 | 116837.0000 |
| mean | 0.0 | 0.0 | 0.9565 | 165.8051 |
| std | 0.0 | 0.0 | 1.2297 | 414.5476 |
| min | 0.0 | 0.0 | 0.0000 | 0.0000 |
| 25% | 0.0 | 0.0 | 0.0000 | 0.0000 |
| 50% | 0.0 | 0.0 | 0.0000 | 9.5000 |
| 75% | 0.0 | 0.0 | 1.0000 | 189.5000 |
| max | 0.0 | 0.0 | 7.0000 | 21413.0000 |

| | Fwd Seg Size Avg | Bwd Seg Size Avg | Fwd Byts/b Avg | Fwd Pkts/b Avg \ |
|-------|------------------|------------------|----------------|------------------|
| count | 116837.0000 | 116837.0000 | 116837.0 | 116837.0 |
| mean | 89.5535 | 193.1011 | 0.0 | 0.0 |
| std | 448.3130 | 575.7508 | 0.0 | 0.0 |
| min | 0.0000 | 0.0000 | 0.0 | 0.0 |
| 25% | 0.0000 | 0.0000 | 0.0 | 0.0 |
| 50% | 0.0000 | 0.0000 | 0.0 | 0.0 |
| 75% | 36.0000 | 186.3333 | 0.0 | 0.0 |
| max | 32119.5000 | 22660.7227 | 0.0 | 0.0 |

| | Fwd Blk Rate Avg | Bwd Byts/b Avg | Bwd Pkts/b Avg | Bwd Blk Rate Avg \ |
|-------|------------------|----------------|----------------|--------------------|
| count | 116837.0 | 116837.0 | 116837.0 | 116837.0 |
| mean | 0.0 | 0.0 | 0.0 | 0.0 |
| std | 0.0 | 0.0 | 0.0 | 0.0 |
| min | 0.0 | 0.0 | 0.0 | 0.0 |
| 25% | 0.0 | 0.0 | 0.0 | 0.0 |
| 50% | 0.0 | 0.0 | 0.0 | 0.0 |

| | | | | |
|-----|-----|-----|-----|-----|
| 75% | 0.0 | 0.0 | 0.0 | 0.0 |
| max | 0.0 | 0.0 | 0.0 | 0.0 |

| | Subflow Fwd Pkts | Subflow Fwd Byts | Subflow Bwd Pkts | Subflow Bwd Byts \ |
|-------|------------------|------------------|------------------|--------------------|
| count | 116837.0000 | 1.1684e+05 | 116837.0000 | 1.1684e+05 |
| mean | 14.7100 | 1.9646e+03 | 11.7173 | 2.4182e+04 |
| std | 2665.8347 | 1.1944e+05 | 180.7494 | 5.8886e+05 |
| min | 0.0000 | 0.0000e+00 | 1.0000 | 0.0000e+00 |
| 25% | 0.0000 | 0.0000e+00 | 2.0000 | 0.0000e+00 |
| 50% | 1.0000 | 0.0000e+00 | 2.0000 | 0.0000e+00 |
| 75% | 1.0000 | 4.2000e+01 | 3.0000 | 6.2200e+02 |
| max | 910748.0000 | 3.1565e+07 | 34094.0000 | 1.0744e+08 |

| | Init Fwd Win Byts | Init Bwd Win Byts | Fwd Act Data Pkts \ |
|-------|-------------------|-------------------|---------------------|
| count | 116837.0 | 116837.0000 | 116837.0000 |
| mean | -1.0 | 16540.6892 | 2.2789 |
| std | 0.0 | 27976.4085 | 43.7252 |
| min | -1.0 | -1.0000 | 0.0000 |
| 25% | -1.0 | -1.0000 | 0.0000 |
| 50% | -1.0 | -1.0000 | 0.0000 |
| 75% | -1.0 | 64239.0000 | 1.0000 |
| max | -1.0 | 65535.0000 | 11180.0000 |

| | Fwd Seg Size Min | Active Mean | Active Std | Active Max | Active Min \ |
|-------|------------------|-------------|------------|------------|--------------|
| count | 116837.0 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 0.0 | 1.1060e+05 | 8.4034e+04 | 2.3323e+05 | 5.0161e+04 |
| std | 0.0 | 1.0549e+06 | 8.4923e+05 | 1.8990e+06 | 7.8740e+05 |
| min | 0.0 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 25% | 0.0 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 50% | 0.0 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 75% | 0.0 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| max | 0.0 | 1.0400e+08 | 6.8300e+07 | 1.0400e+08 | 1.0400e+08 |

| | Idle Mean | Idle Std | Idle Max | Idle Min | Label |
|-------|------------|------------|------------|------------|-------------|
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 116837.0000 |
| mean | 2.6406e+06 | 3.5382e+05 | 2.9675e+06 | 2.3280e+06 | 0.4144 |
| std | 1.0303e+07 | 2.6844e+06 | 1.1360e+07 | 9.7366e+06 | 0.4926 |
| min | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000 |
| 25% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000 |
| 50% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000 |
| 75% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 1.0000 |
| max | 1.1900e+08 | 7.3000e+07 | 1.1900e+08 | 1.1900e+08 | 1.0000 |

```
[ ]: # liczba rekordów w każdej klasie
print(pd.value_counts(df1['Label'], sort = False))# ilość rekordów w klasie 0
↳ (normalny przepływ) jest większa niż w klasie 1 (atak DDoS), co może wpłynąć
↳ na wyniki klasyfikacji
```

```
0    68424
1    48413
Name: Label, dtype: int64
```

```
[ ]: # Xn = df1.iloc[0:524].copy()
# Xa = df1.iloc[524:600].copy()
# df = pd.concat([Xn,Xa], ignore_index=True) #łączenie dwóch zbiorów danych w
    ↪ jeden
# print(pd.value_counts(df1['Label'], sort = False)) #sprawdzenie czy liczba
    ↪ rekordów w klasie 0 i 1 jest taka sama jak w oryginalnym zbiorze danych
```

```
[ ]: df1_cut = df1.drop(["Label","Src IP","Src Port","Dst IP","Dst
    ↪ Port","Protocol","Flow ID","Timestamp"], axis=1) #usuwanie kolumn, które nie
    ↪ będą brane pod uwagę w klasyfikacji
y1 = df1["Label"]
df1_cut
```

```
[ ]:
```

| | Flow Duration | Tot Fwd Pkts | Tot Bwd Pkts | TotLen Fwd Pkts | \ |
|--------|---------------|--------------|--------------|-----------------|---|
| 0 | 245230 | 44 | 40 | 124937 | |
| 1 | 1605449 | 107 | 149 | 1071 | |
| 2 | 53078 | 5 | 5 | 66 | |
| 3 | 6975 | 1 | 1 | 0 | |
| 4 | 190141 | 13 | 16 | 780 | |
| ... | ... | ... | ... | ... | |
| 116832 | 2 | 0 | 2 | 0 | |
| 116833 | 2 | 0 | 2 | 0 | |
| 116834 | 2 | 0 | 2 | 0 | |
| 116835 | 64815031 | 910748 | 1 | 0 | |
| 116836 | 70611188 | 19 | 1 | 0 | |

| | TotLen Bwd Pkts | Fwd Pkt Len Max | Fwd Pkt Len Min | Fwd Pkt Len Mean | \ |
|--------|-----------------|-----------------|-----------------|------------------|---|
| 0 | 1071 | 9100 | 0 | 2839.4773 | |
| 1 | 439537 | 517 | 0 | 10.0093 | |
| 2 | 758 | 66 | 0 | 13.2000 | |
| 3 | 0 | 0 | 0 | 0.0000 | |
| 4 | 11085 | 427 | 0 | 60.0000 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0 | 0 | 0 | 0.0000 | |
| 116833 | 0 | 0 | 0 | 0.0000 | |
| 116834 | 0 | 0 | 0 | 0.0000 | |
| 116835 | 0 | 0 | 0 | 0.0000 | |
| 116836 | 0 | 0 | 0 | 0.0000 | |

| | Fwd Pkt Len Std | Bwd Pkt Len Max | Bwd Pkt Len Min | Bwd Pkt Len Mean | \ |
|---|-----------------|-----------------|-----------------|------------------|---|
| 0 | 1839.5083 | 517 | 0 | 26.7750 | |
| 1 | 67.4967 | 27300 | 0 | 2949.9128 | |
| 2 | 29.5161 | 638 | 0 | 151.6000 | |

| | | | | |
|--------|----------|------|-----|----------|
| 3 | 0.0000 | 0 | 0 | 0.0000 |
| 4 | 130.0429 | 2596 | 0 | 692.8125 |
| ... | ... | ... | ... | ... |
| 116832 | 0.0000 | 0 | 0 | 0.0000 |
| 116833 | 0.0000 | 0 | 0 | 0.0000 |
| 116834 | 0.0000 | 0 | 0 | 0.0000 |
| 116835 | 0.0000 | 0 | 0 | 0.0000 |
| 116836 | 0.0000 | 0 | 0 | 0.0000 |

| | Bwd Pkt Len Std | Flow Byts/s | Flow Pkts/s | Flow IAT Mean | \ |
|--------|-----------------|-------------|--------------|---------------|---|
| 0 | 109.1880 | 513835.9907 | 342.5356 | 2.9546e+03 | |
| 1 | 3012.5895 | 274445.3421 | 159.4569 | 6.2959e+03 | |
| 2 | 276.8263 | 15524.3227 | 188.4020 | 5.8976e+03 | |
| 3 | 0.0000 | 0.0000 | 286.7384 | 6.9750e+03 | |
| 4 | 794.1573 | 62401.0603 | 152.5184 | 6.7908e+03 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0.0000 | 0.0000 | 1000000.0000 | 2.0000e+00 | |
| 116833 | 0.0000 | 0.0000 | 1000000.0000 | 2.0000e+00 | |
| 116834 | 0.0000 | 0.0000 | 1000000.0000 | 2.0000e+00 | |
| 116835 | 0.0000 | 0.0000 | 14051.5091 | 7.1167e+01 | |
| 116836 | 0.0000 | 0.0000 | 0.2832 | 3.7164e+06 | |

| | Flow IAT Std | Flow IAT Max | Flow IAT Min | Fwd IAT Tot | Fwd IAT Mean | \ |
|--------|--------------|--------------|--------------|-------------|--------------|---|
| 0 | 7.9532e+03 | 64066 | -44 | 238564 | 5.5480e+03 | |
| 1 | 5.6408e+04 | 859760 | -102 | 1332121 | 1.2567e+04 | |
| 2 | 1.5185e+04 | 46232 | 19 | 50302 | 1.2576e+04 | |
| 3 | 0.0000e+00 | 6975 | 6975 | 0 | 0.0000e+00 | |
| 4 | 1.2933e+04 | 38521 | -54 | 86882 | 7.2402e+03 | |
| ... | ... | ... | ... | ... | ... | |
| 116832 | 0.0000e+00 | 2 | 2 | 0 | 0.0000e+00 | |
| 116833 | 0.0000e+00 | 2 | 2 | 0 | 0.0000e+00 | |
| 116834 | 0.0000e+00 | 2 | 2 | 0 | 0.0000e+00 | |
| 116835 | 4.0770e+03 | 2399309 | -30 | 64700000 | 7.1067e+01 | |
| 116836 | 2.2419e+06 | 11100000 | 1227799 | 67500000 | 3.7507e+06 | |

| | Fwd IAT Std | Fwd IAT Max | Fwd IAT Min | Bwd IAT Tot | Bwd IAT Mean | \ |
|--------|-------------|-------------|-------------|-------------|--------------|---|
| 0 | 1.0446e+04 | 64066 | 2 | 245230 | 6287.9487 | |
| 1 | 8.3434e+04 | 861138 | 2 | 1603130 | 10831.9595 | |
| 2 | 2.2522e+04 | 46251 | 67 | 52962 | 13240.5000 | |
| 3 | 0.0000e+00 | 0 | 0 | 0 | 0.0000 | |
| 4 | 1.3051e+04 | 38805 | 1 | 190141 | 12676.0667 | |
| ... | ... | ... | ... | ... | ... | |
| 116832 | 0.0000e+00 | 0 | 0 | 2 | 2.0000 | |
| 116833 | 0.0000e+00 | 0 | 0 | 2 | 2.0000 | |
| 116834 | 0.0000e+00 | 0 | 0 | 2 | 2.0000 | |
| 116835 | 4.0759e+03 | 2399309 | -30 | 0 | 0.0000 | |
| 116836 | 2.3018e+06 | 11100000 | 1227799 | 0 | 0.0000 | |

| | Bwd IAT Std | Bwd IAT Max | Bwd IAT Min | Fwd PSH Flags | Bwd PSH Flags | \ |
|--------|-------------|-------------|-------------|---------------|---------------|---|
| 0 | 12986.4688 | 79070 | 29 | 0 | 0 | |
| 1 | 73926.6524 | 861129 | 1 | 0 | 0 | |
| 2 | 22052.0441 | 46258 | 405 | 0 | 0 | |
| 3 | 0.0000 | 0 | 0 | 0 | 0 | |
| 4 | 15949.0928 | 38521 | 1 | 0 | 0 | |
| ... | ... | ... | ... | ... | ... | |
| 116832 | 0.0000 | 2 | 2 | 0 | 0 | |
| 116833 | 0.0000 | 2 | 2 | 0 | 0 | |
| 116834 | 0.0000 | 2 | 2 | 0 | 0 | |
| 116835 | 0.0000 | 0 | 0 | 0 | 0 | |
| 116836 | 0.0000 | 0 | 0 | 0 | 0 | |

| | Fwd URG Flags | Bwd URG Flags | Fwd Header Len | Bwd Header Len | \ |
|--------|---------------|---------------|----------------|----------------|---|
| 0 | 0 | 0 | 880 | 804 | |
| 1 | 0 | 0 | 2140 | 3004 | |
| 2 | 0 | 0 | 100 | 124 | |
| 3 | 0 | 0 | 20 | 20 | |
| 4 | 0 | 0 | 260 | 344 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0 | 0 | 0 | 0 | |
| 116833 | 0 | 0 | 0 | 0 | |
| 116834 | 0 | 0 | 0 | 0 | |
| 116835 | 0 | 0 | 0 | 0 | |
| 116836 | 0 | 0 | 0 | 0 | |

| | Fwd Pkts/s | Bwd Pkts/s | Pkt Len Min | Pkt Len Max | Pkt Len Mean | \ |
|--------|------------|--------------|-------------|-------------|--------------|---|
| 0 | 179.4234 | 163.1122 | 0 | 9100 | 1482.4471 | |
| 1 | 66.6480 | 92.8089 | 0 | 27300 | 1714.4280 | |
| 2 | 94.2010 | 94.2010 | 0 | 638 | 74.9091 | |
| 3 | 143.3692 | 143.3692 | 0 | 0 | 0.0000 | |
| 4 | 68.3703 | 84.1481 | 0 | 2596 | 395.5000 | |
| ... | ... | ... | ... | ... | ... | |
| 116832 | 0.0000 | 1000000.0000 | 0 | 0 | 0.0000 | |
| 116833 | 0.0000 | 1000000.0000 | 0 | 0 | 0.0000 | |
| 116834 | 0.0000 | 1000000.0000 | 0 | 0 | 0.0000 | |
| 116835 | 14051.4937 | 0.0154 | 0 | 0 | 0.0000 | |
| 116836 | 0.2691 | 0.0142 | 0 | 0 | 0.0000 | |

| | Pkt Len Std | Pkt Len Var | FIN Flag Cnt | SYN Flag Cnt | RST Flag Cnt | \ |
|-----|-------------|-------------|--------------|--------------|--------------|---|
| 0 | 1933.2683 | 3.7375e+06 | 0 | 1 | 0 | |
| 1 | 2713.4659 | 7.3629e+06 | 0 | 1 | 0 | |
| 2 | 190.8075 | 3.6407e+04 | 0 | 1 | 0 | |
| 3 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 | |
| 4 | 661.6917 | 4.3784e+05 | 0 | 1 | 0 | |
| ... | ... | ... | ... | ... | ... | |

| | | | | | |
|--------|--------|------------|---|---|---|
| 116832 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116833 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116834 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116835 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |
| 116836 | 0.0000 | 0.0000e+00 | 0 | 0 | 0 |

| | PSH Flag Cnt | ACK Flag Cnt | URG Flag Cnt | CWE Flag Count | \ |
|--------|--------------|--------------|--------------|----------------|---|
| 0 | 0 | 1 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 1 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0 | 0 | 0 | 0 | |
| 116833 | 0 | 0 | 0 | 0 | |
| 116834 | 0 | 0 | 0 | 0 | |
| 116835 | 0 | 0 | 0 | 0 | |
| 116836 | 0 | 0 | 0 | 0 | |

| | ECE Flag Cnt | Down/Up Ratio | Pkt Size Avg | Fwd Seg Size Avg | \ |
|--------|--------------|---------------|--------------|------------------|---|
| 0 | 0 | 0 | 1500.0952 | 2839.4773 | |
| 1 | 0 | 1 | 1721.1250 | 10.0093 | |
| 2 | 0 | 1 | 82.4000 | 13.2000 | |
| 3 | 0 | 1 | 0.0000 | 0.0000 | |
| 4 | 0 | 1 | 409.1379 | 60.0000 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0 | 0 | 0.0000 | 0.0000 | |
| 116833 | 0 | 0 | 0.0000 | 0.0000 | |
| 116834 | 0 | 0 | 0.0000 | 0.0000 | |
| 116835 | 0 | 0 | 0.0000 | 0.0000 | |
| 116836 | 0 | 0 | 0.0000 | 0.0000 | |

| | Bwd Seg Size Avg | Fwd Byts/b Avg | Fwd Pkts/b Avg | Fwd Blk Rate Avg | \ |
|--------|------------------|----------------|----------------|------------------|---|
| 0 | 26.7750 | 0 | 0 | 0 | |
| 1 | 2949.9128 | 0 | 0 | 0 | |
| 2 | 151.6000 | 0 | 0 | 0 | |
| 3 | 0.0000 | 0 | 0 | 0 | |
| 4 | 692.8125 | 0 | 0 | 0 | |
| ... | ... | ... | ... | ... | |
| 116832 | 0.0000 | 0 | 0 | 0 | |
| 116833 | 0.0000 | 0 | 0 | 0 | |
| 116834 | 0.0000 | 0 | 0 | 0 | |
| 116835 | 0.0000 | 0 | 0 | 0 | |
| 116836 | 0.0000 | 0 | 0 | 0 | |

| | Bwd Byts/b Avg | Bwd Pkts/b Avg | Bwd Blk Rate Avg | Subflow Fwd Pkts | \ |
|---|----------------|----------------|------------------|------------------|---|
| 0 | 0 | 0 | 0 | 44 | |

| | | | | |
|--------|-----|-----|-----|--------|
| 1 | 0 | 0 | 0 | 107 |
| 2 | 0 | 0 | 0 | 5 |
| 3 | 0 | 0 | 0 | 1 |
| 4 | 0 | 0 | 0 | 13 |
| ... | ... | ... | ... | ... |
| 116832 | 0 | 0 | 0 | 0 |
| 116833 | 0 | 0 | 0 | 0 |
| 116834 | 0 | 0 | 0 | 0 |
| 116835 | 0 | 0 | 0 | 910748 |
| 116836 | 0 | 0 | 0 | 19 |

| | Subflow Fwd Byts | Subflow Bwd Pkts | Subflow Bwd Byts \ |
|--------|------------------|------------------|--------------------|
| 0 | 124937 | 40 | 1071 |
| 1 | 1071 | 149 | 439537 |
| 2 | 66 | 5 | 758 |
| 3 | 0 | 1 | 0 |
| 4 | 780 | 16 | 11085 |
| ... | ... | ... | ... |
| 116832 | 0 | 2 | 0 |
| 116833 | 0 | 2 | 0 |
| 116834 | 0 | 2 | 0 |
| 116835 | 0 | 1 | 0 |
| 116836 | 0 | 1 | 0 |

| | Init Fwd Win Byts | Init Bwd Win Byts | Fwd Act Data Pkts \ |
|--------|-------------------|-------------------|---------------------|
| 0 | -1 | 65535 | 41 |
| 1 | -1 | 64240 | 4 |
| 2 | -1 | 64240 | 1 |
| 3 | -1 | 64239 | 0 |
| 4 | -1 | 64240 | 3 |
| ... | ... | ... | ... |
| 116832 | -1 | -1 | 0 |
| 116833 | -1 | -1 | 0 |
| 116834 | -1 | -1 | 0 |
| 116835 | -1 | -1 | 0 |
| 116836 | -1 | -1 | 0 |

| | Fwd Seg Size Min | Active Mean | Active Std | Active Max | Active Min \ |
|--------|------------------|-------------|------------|------------|--------------|
| 0 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 1 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 2 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 3 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 4 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| ... | ... | ... | ... | ... | ... |
| 116832 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 116833 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 116834 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |

| | | | | | |
|--------|---|------------|------------|----------|---------|
| 116835 | 0 | 0.0000e+00 | 0.0000e+00 | 0 | 0 |
| 116836 | 0 | 5.6393e+06 | 6.0924e+06 | 12600000 | 1227799 |

| | Idle Mean | Idle Std | Idle Max | Idle Min |
|--------|-----------|------------|----------|----------|
| 0 | 0.0 | 0.0000e+00 | 0 | 0 |
| 1 | 0.0 | 0.0000e+00 | 0 | 0 |
| 2 | 0.0 | 0.0000e+00 | 0 | 0 |
| 3 | 0.0 | 0.0000e+00 | 0 | 0 |
| 4 | 0.0 | 0.0000e+00 | 0 | 0 |
| ... | ... | ... | ... | ... |
| 116832 | 0.0 | 0.0000e+00 | 0 | 0 |
| 116833 | 0.0 | 0.0000e+00 | 0 | 0 |
| 116834 | 0.0 | 0.0000e+00 | 0 | 0 |
| 116835 | 0.0 | 0.0000e+00 | 0 | 0 |
| 116836 | 6750987.0 | 2.9197e+06 | 11100000 | 5103137 |

[116837 rows x 76 columns]

```
[ ]: df1_cut.describe()
```

```
[ ]:
      Flow Duration  Tot Fwd Pkts  Tot Bwd Pkts  TotLen Fwd Pkts  \
count      1.1684e+05    116837.0000    116837.0000      1.1684e+05
mean       7.9813e+06      14.7100      11.7173      1.9645e+03
std        2.6577e+07     2665.8347     180.7494      1.1947e+05
min       -1.5400e+02      0.0000      1.0000      0.0000e+00
25%        2.0000e+00      0.0000      2.0000      0.0000e+00
50%        2.4400e+03      1.0000      2.0000      0.0000e+00
75%        8.3240e+03      1.0000      3.0000      4.2000e+01
max        1.2000e+08     910748.0000     34094.0000     3.1600e+07
```

| | TotLen Bwd Pkts | Fwd Pkt Len Max | Fwd Pkt Len Min | Fwd Pkt Len Mean | \ |
|-------|-----------------|-----------------|-----------------|------------------|---|
| count | 1.1684e+05 | 116837.0000 | 116837.0000 | 116837.0000 | |
| mean | 2.4176e+04 | 249.4013 | 13.0582 | 89.5535 | |
| std | 5.8808e+05 | 1110.8013 | 52.6070 | 448.3130 | |
| min | 0.0000e+00 | 0.0000 | 0.0000 | 0.0000 | |
| 25% | 0.0000e+00 | 0.0000 | 0.0000 | 0.0000 | |
| 50% | 0.0000e+00 | 0.0000 | 0.0000 | 0.0000 | |
| 75% | 6.2200e+02 | 42.0000 | 30.0000 | 36.0000 | |
| max | 1.0700e+08 | 64239.0000 | 3900.0000 | 32119.5000 | |

| | Fwd Pkt Len Std | Bwd Pkt Len Max | Bwd Pkt Len Min | Bwd Pkt Len Mean | \ |
|-------|-----------------|-----------------|-----------------|------------------|---|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0000 | |
| mean | 94.6916 | 936.0695 | 15.2244 | 193.1011 | |
| std | 555.5502 | 4830.3437 | 34.2332 | 575.7508 | |
| min | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |
| 25% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |
| 50% | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |

| | | | | |
|-----|------------|------------|----------|------------|
| 75% | 0.0000 | 345.0000 | 31.0000 | 186.3333 |
| max | 45423.8325 | 64239.0000 | 761.0000 | 22660.7227 |

| | Bwd Pkt Len Std | Flow Byts/s | Flow Pkts/s | Flow IAT Mean | Flow IAT Std \ |
|-------|-----------------|-------------|-------------|---------------|----------------|
| count | 116837.0000 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 224.0320 | 1.9508e+05 | 6.3526e+05 | 3.1627e+05 | 8.2208e+05 |
| std | 817.4183 | 1.1239e+06 | 8.3569e+05 | 1.4636e+06 | 3.2238e+06 |
| min | 0.0000 | -2.6271e+05 | -1.6949e+04 | -1.5400e+02 | 0.0000e+00 |
| 25% | 0.0000 | 0.0000e+00 | 5.0441e+02 | 2.0000e+00 | 0.0000e+00 |
| 50% | 0.0000 | 4.1564e+00 | 1.4493e+03 | 9.5367e+02 | 0.0000e+00 |
| 75% | 167.3091 | 1.1896e+05 | 1.0000e+06 | 3.1470e+03 | 2.6495e+03 |
| max | 32119.5000 | 8.6300e+07 | 3.0000e+06 | 1.1900e+08 | 6.2400e+07 |

| | Flow IAT Max | Flow IAT Min | Fwd IAT Tot | Fwd IAT Mean | Fwd IAT Std \ |
|-------|--------------|--------------|-------------|--------------|---------------|
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 3.1797e+06 | 2.1968e+04 | 7.6600e+06 | 6.7630e+05 | 1.1064e+06 |
| std | 1.1415e+07 | 7.3446e+05 | 2.6316e+07 | 3.1671e+06 | 4.6894e+06 |
| min | -1.5400e+02 | -1.1570e+04 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 25% | 2.0000e+00 | 1.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 50% | 1.9680e+03 | 3.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 75% | 6.8360e+03 | 7.1000e+01 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| max | 1.1900e+08 | 1.1900e+08 | 1.2000e+08 | 1.1800e+08 | 8.4400e+07 |

| | Fwd IAT Max | Fwd IAT Min | Bwd IAT Tot | Bwd IAT Mean | Bwd IAT Std \ |
|-------|-------------|-------------|-------------|--------------|---------------|
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 3.0362e+06 | 5.4238e+04 | 7.4103e+06 | 5.0774e+05 | 9.7776e+05 |
| std | 1.1294e+07 | 1.1689e+06 | 2.5758e+07 | 2.2712e+06 | 4.0537e+06 |
| min | 0.0000e+00 | -3.0000e+01 | -1.5400e+02 | -1.5400e+02 | 0.0000e+00 |
| 25% | 0.0000e+00 | 0.0000e+00 | 1.0000e+00 | 1.0000e+00 | 0.0000e+00 |
| 50% | 0.0000e+00 | 0.0000e+00 | 3.0000e+00 | 3.0000e+00 | 0.0000e+00 |
| 75% | 0.0000e+00 | 0.0000e+00 | 4.8980e+03 | 2.6170e+03 | 2.4445e+03 |
| max | 1.1900e+08 | 1.1800e+08 | 1.2000e+08 | 6.5000e+07 | 6.8300e+07 |

| | Bwd IAT Max | Bwd IAT Min | Fwd PSH Flags | Bwd PSH Flags | Fwd URG Flags \ |
|-------|-------------|-------------|---------------|---------------|-----------------|
| count | 1.1684e+05 | 1.1684e+05 | 116837.0 | 116837.0000 | 116837.0 |
| mean | 2.9878e+06 | 2.0459e+04 | 0.0 | 0.0651 | 0.0 |
| std | 1.1173e+07 | 7.2024e+05 | 0.0 | 0.2467 | 0.0 |
| min | -1.5400e+02 | -1.5400e+02 | 0.0 | 0.0000 | 0.0 |
| 25% | 1.0000e+00 | 1.0000e+00 | 0.0 | 0.0000 | 0.0 |
| 50% | 3.0000e+00 | 2.0000e+00 | 0.0 | 0.0000 | 0.0 |
| 75% | 4.2220e+03 | 2.7400e+02 | 0.0 | 0.0000 | 0.0 |
| max | 1.1900e+08 | 6.5000e+07 | 0.0 | 1.0000 | 0.0 |

| | Bwd URG Flags | Fwd Header Len | Bwd Header Len | Fwd Pkts/s \ |
|-------|---------------|----------------|----------------|--------------|
| count | 116837.0 | 116837.0000 | 116837.0000 | 116837.0000 |
| mean | 0.0 | 133.6369 | 211.6137 | 3006.3801 |
| std | 0.0 | 1953.4799 | 3727.6632 | 47274.7719 |

| | | | | |
|-----|-----|-------------|-------------|--------------|
| min | 0.0 | 0.0000 | 0.0000 | 0.0000 |
| 25% | 0.0 | 0.0000 | 0.0000 | 0.0000 |
| 50% | 0.0 | 8.0000 | 20.0000 | 0.2562 |
| 75% | 0.0 | 20.0000 | 24.0000 | 244.9780 |
| max | 0.0 | 360448.0000 | 681904.0000 | 1000000.0000 |

| | Bwd Pkts/s | Pkt Len Min | Pkt Len Max | Pkt Len Mean | Pkt Len Std \ |
|-------|------------|-------------|-------------|--------------|---------------|
| count | 1.1684e+05 | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0000 |
| mean | 6.3225e+05 | 12.4065 | 1071.1880 | 148.6180 | 241.3291 |
| std | 8.3393e+05 | 22.9663 | 4917.8551 | 391.6154 | 778.2805 |
| min | 0.0000e+00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 25% | 3.0441e+02 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 50% | 1.0826e+03 | 0.0000 | 31.0000 | 7.6000 | 12.6557 |
| 75% | 1.0000e+06 | 30.0000 | 379.0000 | 150.3333 | 163.3101 |
| max | 2.0000e+06 | 448.0000 | 64239.0000 | 18354.0000 | 31345.4224 |

| | Pkt Len Var | FIN Flag Cnt | SYN Flag Cnt | RST Flag Cnt | PSH Flag Cnt \ |
|-------|-------------|--------------|--------------|--------------|----------------|
| count | 1.1684e+05 | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0000 |
| mean | 6.6397e+05 | 0.0208 | 0.1155 | 0.0004 | 0.0651 |
| std | 9.4256e+06 | 0.1426 | 0.3196 | 0.0194 | 0.2467 |
| min | 0.0000e+00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 25% | 0.0000e+00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 50% | 1.6017e+02 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 75% | 2.6670e+04 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| max | 9.8300e+08 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| | ACK Flag Cnt | URG Flag Cnt | CWE Flag Count | ECE Flag Cnt \ |
|-------|--------------|--------------|----------------|----------------|
| count | 116837.0000 | 116837.0 | 116837.0 | 116837.0 |
| mean | 0.1763 | 0.0 | 0.0 | 0.0 |
| std | 0.3810 | 0.0 | 0.0 | 0.0 |
| min | 0.0000 | 0.0 | 0.0 | 0.0 |
| 25% | 0.0000 | 0.0 | 0.0 | 0.0 |
| 50% | 0.0000 | 0.0 | 0.0 | 0.0 |
| 75% | 0.0000 | 0.0 | 0.0 | 0.0 |
| max | 1.0000 | 0.0 | 0.0 | 0.0 |

| | Down/Up Ratio | Pkt Size Avg | Fwd Seg Size Avg | Bwd Seg Size Avg \ |
|-------|---------------|--------------|------------------|--------------------|
| count | 116837.0000 | 116837.0000 | 116837.0000 | 116837.0000 |
| mean | 0.9565 | 165.8051 | 89.5535 | 193.1011 |
| std | 1.2297 | 414.5476 | 448.3130 | 575.7508 |
| min | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 25% | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 50% | 0.0000 | 9.5000 | 0.0000 | 0.0000 |
| 75% | 1.0000 | 189.5000 | 36.0000 | 186.3333 |
| max | 7.0000 | 21413.0000 | 32119.5000 | 22660.7227 |

| Fwd Byts/b Avg | Fwd Pkts/b Avg | Fwd Blk Rate Avg | Bwd Byts/b Avg \ |
|----------------|----------------|------------------|------------------|
|----------------|----------------|------------------|------------------|

| | | | | |
|-------|----------|----------|----------|----------|
| count | 116837.0 | 116837.0 | 116837.0 | 116837.0 |
| mean | 0.0 | 0.0 | 0.0 | 0.0 |
| std | 0.0 | 0.0 | 0.0 | 0.0 |
| min | 0.0 | 0.0 | 0.0 | 0.0 |
| 25% | 0.0 | 0.0 | 0.0 | 0.0 |
| 50% | 0.0 | 0.0 | 0.0 | 0.0 |
| 75% | 0.0 | 0.0 | 0.0 | 0.0 |
| max | 0.0 | 0.0 | 0.0 | 0.0 |

| | Bwd Pkts/b Avg | Bwd Blk Rate Avg | Subflow Fwd Pkts | Subflow Fwd Byts \ |
|-------|----------------|------------------|------------------|--------------------|
| count | 116837.0 | 116837.0 | 116837.0000 | 1.1684e+05 |
| mean | 0.0 | 0.0 | 14.7100 | 1.9646e+03 |
| std | 0.0 | 0.0 | 2665.8347 | 1.1944e+05 |
| min | 0.0 | 0.0 | 0.0000 | 0.0000e+00 |
| 25% | 0.0 | 0.0 | 0.0000 | 0.0000e+00 |
| 50% | 0.0 | 0.0 | 1.0000 | 0.0000e+00 |
| 75% | 0.0 | 0.0 | 1.0000 | 4.2000e+01 |
| max | 0.0 | 0.0 | 910748.0000 | 3.1565e+07 |

| | Subflow Bwd Pkts | Subflow Bwd Byts | Init Fwd Win Byts \ |
|-------|------------------|------------------|---------------------|
| count | 116837.0000 | 1.1684e+05 | 116837.0 |
| mean | 11.7173 | 2.4182e+04 | -1.0 |
| std | 180.7494 | 5.8886e+05 | 0.0 |
| min | 1.0000 | 0.0000e+00 | -1.0 |
| 25% | 2.0000 | 0.0000e+00 | -1.0 |
| 50% | 2.0000 | 0.0000e+00 | -1.0 |
| 75% | 3.0000 | 6.2200e+02 | -1.0 |
| max | 34094.0000 | 1.0744e+08 | -1.0 |

| | Init Bwd Win Byts | Fwd Act Data Pkts | Fwd Seg Size Min | Active Mean \ |
|-------|-------------------|-------------------|------------------|---------------|
| count | 116837.0000 | 116837.0000 | 116837.0 | 1.1684e+05 |
| mean | 16540.6892 | 2.2789 | 0.0 | 1.1060e+05 |
| std | 27976.4085 | 43.7252 | 0.0 | 1.0549e+06 |
| min | -1.0000 | 0.0000 | 0.0 | 0.0000e+00 |
| 25% | -1.0000 | 0.0000 | 0.0 | 0.0000e+00 |
| 50% | -1.0000 | 0.0000 | 0.0 | 0.0000e+00 |
| 75% | 64239.0000 | 1.0000 | 0.0 | 0.0000e+00 |
| max | 65535.0000 | 11180.0000 | 0.0 | 1.0400e+08 |

| | Active Std | Active Max | Active Min | Idle Mean | Idle Std | Idle Max \ |
|-------|------------|------------|------------|------------|------------|------------|
| count | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 | 1.1684e+05 |
| mean | 8.4034e+04 | 2.3323e+05 | 5.0161e+04 | 2.6406e+06 | 3.5382e+05 | 2.9675e+06 |
| std | 8.4923e+05 | 1.8990e+06 | 7.8740e+05 | 1.0303e+07 | 2.6844e+06 | 1.1360e+07 |
| min | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 25% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 50% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |
| 75% | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 | 0.0000e+00 |

```
max      6.8300e+07  1.0400e+08  1.0400e+08  1.1900e+08  7.3000e+07  1.1900e+08
```

```
      Idle Min
count  1.1684e+05
mean   2.3280e+06
std     9.7366e+06
min     0.0000e+00
25%     0.0000e+00
50%     0.0000e+00
75%     0.0000e+00
max     1.1900e+08
```

```
[ ]: x_mean = np.transpose(pd.DataFrame(df1_cut.mean())) #średnia wartość dla każdej
      ↪ kolumny
      x_mean
```

```
[ ]:      Flow Duration  Tot Fwd Pkts  Tot Bwd Pkts  TotLen Fwd Pkts  \
0      7.9813e+06          14.71          11.7173          1964.5157

      TotLen Bwd Pkts  Fwd Pkt Len Max  Fwd Pkt Len Min  Fwd Pkt Len Mean  \
0      24175.7512          249.4013          13.0582          89.5535

      Fwd Pkt Len Std  Bwd Pkt Len Max  Bwd Pkt Len Min  Bwd Pkt Len Mean  \
0          94.6916          936.0695          15.2244          193.1011

      Bwd Pkt Len Std  Flow Byts/s  Flow Pkts/s  Flow IAT Mean  Flow IAT Std  \
0          224.032  195075.6787  635255.8243      316272.8206  822082.4506

      Flow IAT Max  Flow IAT Min  Fwd IAT Tot  Fwd IAT Mean  Fwd IAT Std  \
0      3.1797e+06    21967.5731    7.6600e+06    676296.2533    1.1064e+06

      Fwd IAT Max  Fwd IAT Min  Bwd IAT Tot  Bwd IAT Mean  Bwd IAT Std  \
0      3.0362e+06    54237.8257    7.4103e+06    507736.2959    977761.1249

      Bwd IAT Max  Bwd IAT Min  Fwd PSH Flags  Bwd PSH Flags  Fwd URG Flags  \
0      2.9878e+06    20459.4595              0.0          0.0651              0.0

      Bwd URG Flags  Fwd Header Len  Bwd Header Len  Fwd Pkts/s  Bwd Pkts/s  \
0              0.0          133.6369          211.6137    3006.3801    632250.3869

      Pkt Len Min  Pkt Len Max  Pkt Len Mean  Pkt Len Std  Pkt Len Var  \
0          12.4065          1071.188          148.618          241.3291    663969.0073

      FIN Flag Cnt  SYN Flag Cnt  RST Flag Cnt  PSH Flag Cnt  ACK Flag Cnt  \
0          0.0208          0.1155          0.0004          0.0651          0.1763

      URG Flag Cnt  CWE Flag Count  ECE Flag Cnt  Down/Up Ratio  Pkt Size Avg  \
```

```

0          0.0          0.0          0.0          0.9565          165.8051

  Fwd Seg Size Avg  Bwd Seg Size Avg  Fwd Byts/b Avg  Fwd Pkts/b Avg  \
0          89.5535          193.1011          0.0          0.0

  Fwd Blk Rate Avg  Bwd Byts/b Avg  Bwd Pkts/b Avg  Bwd Blk Rate Avg  \
0          0.0          0.0          0.0          0.0

  Subflow Fwd Pkts  Subflow Fwd Byts  Subflow Bwd Pkts  Subflow Bwd Byts  \
0          14.71          1964.5865          11.7173          24182.2356

  Init Fwd Win Byts  Init Bwd Win Byts  Fwd Act Data Pkts  Fwd Seg Size Min  \
0          -1.0          16540.6892          2.2789          0.0

  Active Mean  Active Std  Active Max  Active Min  Idle Mean  Idle Std  \
0  110598.653  84033.8749  233233.2046  50161.3883  2.6406e+06  353818.7073

  Idle Max  Idle Min
0  2.9675e+06  2.3280e+06

```

```

[ ]: x_max = np.transpose(pd.DataFrame(df1_cut.max())) #maksymalna wartość dla
      ↪każdej kolumny

```

```

[ ]: x_min = np.transpose(pd.DataFrame(df1_cut.min())) #minimalna wartość dla każdej
      ↪kolumny
x_min

```

```

[ ]:  Flow Duration  Tot Fwd Pkts  Tot Bwd Pkts  TotLen Fwd Pkts  \
0          -154.0          0.0          1.0          0.0

  TotLen Bwd Pkts  Fwd Pkt Len Max  Fwd Pkt Len Min  Fwd Pkt Len Mean  \
0          0.0          0.0          0.0          0.0

  Fwd Pkt Len Std  Bwd Pkt Len Max  Bwd Pkt Len Min  Bwd Pkt Len Mean  \
0          0.0          0.0          0.0          0.0

  Bwd Pkt Len Std  Flow Byts/s  Flow Pkts/s  Flow IAT Mean  Flow IAT Std  \
0          0.0 -262711.8644  -16949.1525          -154.0          0.0

  Flow IAT Max  Flow IAT Min  Fwd IAT Tot  Fwd IAT Mean  Fwd IAT Std  \
0          -154.0          -11570.0          0.0          0.0          0.0

  Fwd IAT Max  Fwd IAT Min  Bwd IAT Tot  Bwd IAT Mean  Bwd IAT Std  \
0          0.0          -30.0          -154.0          -154.0          0.0

  Bwd IAT Max  Bwd IAT Min  Fwd PSH Flags  Bwd PSH Flags  Fwd URG Flags  \
0          -154.0          -154.0          0.0          0.0          0.0

```

| | | | | | | | | | | | | | | |
|---|-----|-----|-------|-----|--------|-----|-----|--------|-----|-----|--------|-----|--------|-----|
| | Bwd | URG | Flags | Fwd | Header | Len | Bwd | Header | Len | Fwd | Pkts/s | Bwd | Pkts/s | \ |
| 0 | | | 0.0 | | | 0.0 | | | 0.0 | | 0.0 | | | 0.0 |

| | | | | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|---|
| | Pkt | Len | Min | Pkt | Len | Max | Pkt | Len | Mean | Pkt | Len | Std | Pkt | Len | Var | \ |
| 0 | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |

| | | | | | | | | | | | | | | | | |
|---|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|---|
| | FIN | Flag | Cnt | SYN | Flag | Cnt | RST | Flag | Cnt | PSH | Flag | Cnt | ACK | Flag | Cnt | \ |
| 0 | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |

| | | | | | | | | | | | | | | | |
|---|-----|------|-----|-----|------|-------|-----|------|-----|---------|-------|-----|------|-----|---|
| | URG | Flag | Cnt | CWE | Flag | Count | ECE | Flag | Cnt | Down/Up | Ratio | Pkt | Size | Avg | \ |
| 0 | | | 0.0 | | | 0.0 | | | 0.0 | | 0.0 | | | 0.0 | |

| | | | | | | | | | | | | | | | |
|---|-----|-----|------|-----|-----|-----|------|-----|-----|--------|-----|-----|--------|-----|---|
| | Fwd | Seg | Size | Avg | Bwd | Seg | Size | Avg | Fwd | Byts/b | Avg | Fwd | Pkts/b | Avg | \ |
| 0 | | | | 0.0 | | | | 0.0 | | | 0.0 | | | 0.0 | |

| | | | | | | | | | | | | | | | |
|---|-----|-----|------|-----|-----|--------|-----|-----|--------|-----|-----|-----|------|-----|---|
| | Fwd | Blk | Rate | Avg | Bwd | Byts/b | Avg | Bwd | Pkts/b | Avg | Bwd | Blk | Rate | Avg | \ |
| 0 | | | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | |

| | | | | | | | | | | | | | |
|---|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---|
| | Subflow | Fwd | Pkts | Subflow | Fwd | Byts | Subflow | Bwd | Pkts | Subflow | Bwd | Byts | \ |
| 0 | | | 0.0 | | | 0.0 | | | 1.0 | | | 0.0 | |

| | | | | | | | | | | | | | | | | | |
|---|------|-----|-----|------|------|-----|-----|------|-----|-----|------|------|-----|-----|------|-----|---|
| | Init | Fwd | Win | Byts | Init | Bwd | Win | Byts | Fwd | Act | Data | Pkts | Fwd | Seg | Size | Min | \ |
| 0 | | | | -1.0 | | | | -1.0 | | | | 0.0 | | | | 0.0 | |

| | | | | | | | | | | | | | |
|---|--------|------|--------|-----|--------|-----|--------|-----|------|------|------|-----|---|
| | Active | Mean | Active | Std | Active | Max | Active | Min | Idle | Mean | Idle | Std | \ |
| 0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |

| | | | | |
|---|------|-----|------|-----|
| | Idle | Max | Idle | Min |
| 0 | | 0.0 | | 0.0 |

```
[ ]: x_std = np.transpose(pd.DataFrame(df1_cut.std())) #odchylenie standardowe dla
      ↪każdej kolumny
      x_std
```

```
[ ]: Flow Duration Tot Fwd Pkts Tot Bwd Pkts TotLen Fwd Pkts \
0 2.6577e+07 2665.8347 180.7494 119469.3455

TotLen Bwd Pkts Fwd Pkt Len Max Fwd Pkt Len Min Fwd Pkt Len Mean \
0 588084.6298 1110.8013 52.607 448.313

Fwd Pkt Len Std Bwd Pkt Len Max Bwd Pkt Len Min Bwd Pkt Len Mean \
0 555.5502 4830.3437 34.2332 575.7508

Bwd Pkt Len Std Flow Byts/s Flow Pkts/s Flow IAT Mean Flow IAT Std \
0 817.4183 1.1239e+06 835691.9911 1.4636e+06 3.2238e+06
```

| | | | | | | | |
|---|-------------------|-------------------|-------------------|------------------|---------------|------------|---|
| | Flow IAT Max | Flow IAT Min | Fwd IAT Tot | Fwd IAT Mean | Fwd IAT Std | \ | |
| 0 | 1.1415e+07 | 734455.7095 | 2.6316e+07 | 3.1671e+06 | 4.6894e+06 | | |
| | Fwd IAT Max | Fwd IAT Min | Bwd IAT Tot | Bwd IAT Mean | Bwd IAT Std | \ | |
| 0 | 1.1294e+07 | 1.1689e+06 | 2.5758e+07 | 2.2712e+06 | 4.0537e+06 | | |
| | Bwd IAT Max | Bwd IAT Min | Fwd PSH Flags | Bwd PSH Flags | Fwd URG Flags | \ | |
| 0 | 1.1173e+07 | 720238.5491 | 0.0 | 0.2467 | 0.0 | | |
| | Bwd URG Flags | Fwd Header Len | Bwd Header Len | Fwd Pkts/s | Bwd Pkts/s | \ | |
| 0 | 0.0 | 1953.4799 | 3727.6632 | 47274.7719 | 833929.2923 | | |
| | Pkt Len Min | Pkt Len Max | Pkt Len Mean | Pkt Len Std | Pkt Len Var | \ | |
| 0 | 22.9663 | 4917.8551 | 391.6154 | 778.2805 | 9.4256e+06 | | |
| | FIN Flag Cnt | SYN Flag Cnt | RST Flag Cnt | PSH Flag Cnt | ACK Flag Cnt | \ | |
| 0 | 0.1426 | 0.3196 | 0.0194 | 0.2467 | 0.381 | | |
| | URG Flag Cnt | CWE Flag Count | ECE Flag Cnt | Down/Up Ratio | Pkt Size Avg | \ | |
| 0 | 0.0 | 0.0 | 0.0 | 1.2297 | 414.5476 | | |
| | Fwd Seg Size Avg | Bwd Seg Size Avg | Fwd Byts/b Avg | Fwd Pkts/b Avg | | \ | |
| 0 | 448.313 | 575.7508 | 0.0 | 0.0 | | | |
| | Fwd Blk Rate Avg | Bwd Byts/b Avg | Bwd Pkts/b Avg | Bwd Blk Rate Avg | | \ | |
| 0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| | Subflow Fwd Pkts | Subflow Fwd Byts | Subflow Bwd Pkts | Subflow Bwd Byts | | \ | |
| 0 | 2665.8347 | 119436.887 | 180.7494 | 588860.536 | | | |
| | Init Fwd Win Byts | Init Bwd Win Byts | Fwd Act Data Pkts | Fwd Seg Size Min | | \ | |
| 0 | 0.0 | 27976.4085 | 43.7252 | 0.0 | | | |
| | Active Mean | Active Std | Active Max | Active Min | Idle Mean | Idle Std | \ |
| 0 | 1.0549e+06 | 849226.4373 | 1.8990e+06 | 787399.9265 | 1.0303e+07 | 2.6844e+06 | |
| | Idle Max | Idle Min | | | | | |
| 0 | 1.1360e+07 | 9.7366e+06 | | | | | |

```
[ ]: x_var = np.transpose(pd.DataFrame(df1_cut.var())) #wariancja dla kazdej kolumny
x_var
```

```
[ ]: Flow Duration Tot Fwd Pkts Tot Bwd Pkts TotLen Fwd Pkts \
0 7.0632e+14 7.1067e+06 32670.3502 1.4273e+10

TotLen Bwd Pkts Fwd Pkt Len Max Fwd Pkt Len Min Fwd Pkt Len Mean \
0 3.4584e+11 1.2339e+06 2767.4946 200984.5507
```

| | | | | | | | |
|---|-------------------|-------------------|-------------------|------------------|---------------|------------|---|
| | Fwd Pkt Len Std | Bwd Pkt Len Max | Bwd Pkt Len Min | Bwd Pkt Len Mean | \ | | |
| 0 | 308635.9724 | 2.3332e+07 | 1171.9146 | 331488.9609 | | | |
| | Bwd Pkt Len Std | Flow Byts/s | Flow Pkts/s | Flow IAT Mean | Flow IAT Std | \ | |
| 0 | 668172.7314 | 1.2632e+12 | 6.9838e+11 | 2.1420e+12 | 1.0393e+13 | | |
| | Flow IAT Max | Flow IAT Min | Fwd IAT Tot | Fwd IAT Mean | Fwd IAT Std | \ | |
| 0 | 1.3031e+14 | 5.3943e+11 | 6.9251e+14 | 1.0031e+13 | 2.1991e+13 | | |
| | Fwd IAT Max | Fwd IAT Min | Bwd IAT Tot | Bwd IAT Mean | Bwd IAT Std | \ | |
| 0 | 1.2756e+14 | 1.3664e+12 | 6.6347e+14 | 5.1581e+12 | 1.6433e+13 | | |
| | Bwd IAT Max | Bwd IAT Min | Fwd PSH Flags | Bwd PSH Flags | Fwd URG Flags | \ | |
| 0 | 1.2483e+14 | 5.1874e+11 | 0.0 | 0.0608 | 0.0 | | |
| | Bwd URG Flags | Fwd Header Len | Bwd Header Len | Fwd Pkts/s | Bwd Pkts/s | \ | |
| 0 | 0.0 | 3.8161e+06 | 1.3895e+07 | 2.2349e+09 | 6.9544e+11 | | |
| | Pkt Len Min | Pkt Len Max | Pkt Len Mean | Pkt Len Std | Pkt Len Var | \ | |
| 0 | 527.4506 | 2.4185e+07 | 153362.6397 | 605720.5979 | 8.8841e+13 | | |
| | FIN Flag Cnt | SYN Flag Cnt | RST Flag Cnt | PSH Flag Cnt | ACK Flag Cnt | \ | |
| 0 | 0.0203 | 0.1022 | 0.0004 | 0.0608 | 0.1452 | | |
| | URG Flag Cnt | CWE Flag Count | ECE Flag Cnt | Down/Up Ratio | Pkt Size Avg | \ | |
| 0 | 0.0 | 0.0 | 0.0 | 1.5121 | 171849.6782 | | |
| | Fwd Seg Size Avg | Bwd Seg Size Avg | Fwd Byts/b Avg | Fwd Pkts/b Avg | \ | | |
| 0 | 200984.5507 | 331488.9609 | 0.0 | 0.0 | | | |
| | Fwd Blk Rate Avg | Bwd Byts/b Avg | Bwd Pkts/b Avg | Bwd Blk Rate Avg | \ | | |
| 0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| | Subflow Fwd Pkts | Subflow Fwd Byts | Subflow Bwd Pkts | Subflow Bwd Byts | \ | | |
| 0 | 7.1067e+06 | 1.4265e+10 | 32670.3502 | 3.4676e+11 | | | |
| | Init Fwd Win Byts | Init Bwd Win Byts | Fwd Act Data Pkts | Fwd Seg Size Min | \ | | |
| 0 | 0.0 | 7.8268e+08 | 1911.8968 | 0.0 | | | |
| | Active Mean | Active Std | Active Max | Active Min | Idle Mean | Idle Std | \ |
| 0 | 1.1129e+12 | 7.2119e+11 | 3.6063e+12 | 6.2000e+11 | 1.0615e+14 | 7.2062e+12 | |
| | Idle Max | Idle Min | | | | | |
| 0 | 1.2904e+14 | 9.4801e+13 | | | | | |


```
[ ]: x_median = np.transpose(pd.DataFrame(df1_cut.median())) #mediana dla kaŹdej
      ↪kolumny
      x_median
```

```
[ ]: Flow Duration Tot Fwd Pkts Tot Bwd Pkts TotLen Fwd Pkts \
0          2440.0          1.0          2.0          0.0

      TotLen Bwd Pkts Fwd Pkt Len Max Fwd Pkt Len Min Fwd Pkt Len Mean \
0          0.0          0.0          0.0          0.0

      Fwd Pkt Len Std Bwd Pkt Len Max Bwd Pkt Len Min Bwd Pkt Len Mean \
0          0.0          0.0          0.0          0.0

      Bwd Pkt Len Std Flow Byts/s Flow Pkts/s Flow IAT Mean Flow IAT Std \
0          0.0          4.1564          1449.2754          953.6667          0.0

      Flow IAT Max Flow IAT Min Fwd IAT Tot Fwd IAT Mean Fwd IAT Std \
0          1968.0          3.0          0.0          0.0          0.0

      Fwd IAT Max Fwd IAT Min Bwd IAT Tot Bwd IAT Mean Bwd IAT Std \
0          0.0          0.0          3.0          3.0          0.0

      Bwd IAT Max Bwd IAT Min Fwd PSH Flags Bwd PSH Flags Fwd URG Flags \
0          3.0          2.0          0.0          0.0          0.0

      Bwd URG Flags Fwd Header Len Bwd Header Len Fwd Pkts/s Bwd Pkts/s \
0          0.0          8.0          20.0          0.2562          1082.6416

      Pkt Len Min Pkt Len Max Pkt Len Mean Pkt Len Std Pkt Len Var \
0          0.0          31.0          7.6          12.6557          160.1667

      FIN Flag Cnt SYN Flag Cnt RST Flag Cnt PSH Flag Cnt ACK Flag Cnt \
0          0.0          0.0          0.0          0.0          0.0

      URG Flag Cnt CWE Flag Count ECE Flag Cnt Down/Up Ratio Pkt Size Avg \
0          0.0          0.0          0.0          0.0          9.5

      Fwd Seg Size Avg Bwd Seg Size Avg Fwd Byts/b Avg Fwd Pkts/b Avg \
0          0.0          0.0          0.0          0.0          0.0

      Fwd Blk Rate Avg Bwd Byts/b Avg Bwd Pkts/b Avg Bwd Blk Rate Avg \
0          0.0          0.0          0.0          0.0          0.0

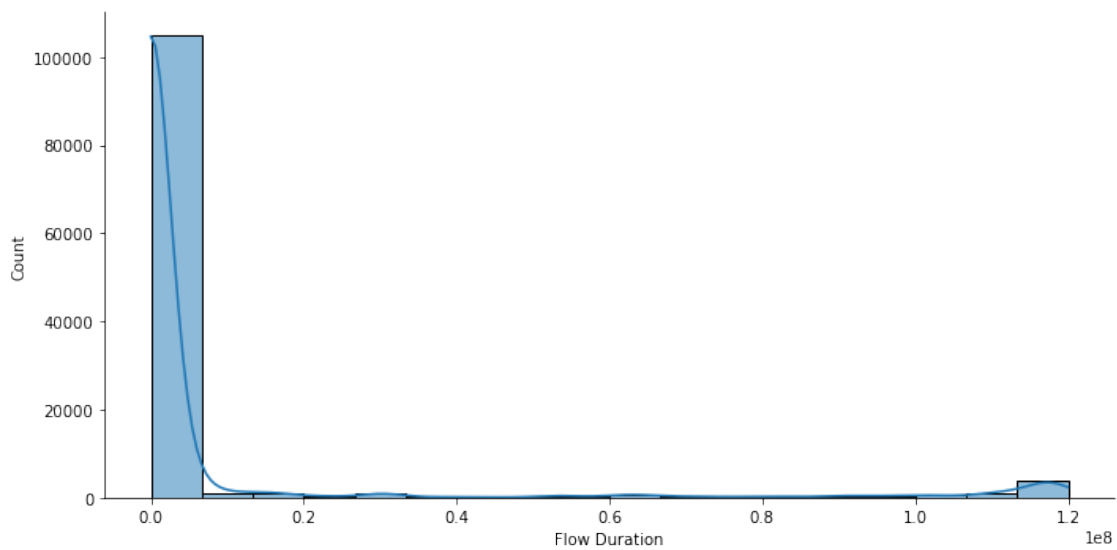
      Subflow Fwd Pkts Subflow Fwd Byts Subflow Bwd Pkts Subflow Bwd Byts \
0          1.0          0.0          2.0          0.0

      Init Fwd Win Byts Init Bwd Win Byts Fwd Act Data Pkts Fwd Seg Size Min \
```

| | | | | |
|---|-------------|------------|------------|------------|
| 0 | -1.0 | -1.0 | 0.0 | 0.0 |
| | Active Mean | Active Std | Active Max | Active Min |
| 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Idle Max | Idle Min | | |
| 0 | 0.0 | 0.0 | | |

```
[ ]: sn.displot(df1_cut['Flow Duration'],bins=18, kde=True,aspect=2) #histogram dla
      ↪ kolumny Flow Duration
```

```
[ ]: <seaborn.axisgrid.FacetGrid at 0x13d1689d610>
```



```
[ ]: sn.displot(df1_cut['Flow Duration'],bins=18, kde=True,aspect=2, kind='hist')
      ↪ #histogram dla kolumny Flow Duration
      plt.yscale('log')
      #plt.xscale('log')
```

