Total amount of alerts: 113,572,849

- 10<sup>6</sup>

- 10<sup>5</sup>

- 10<sup>4</sup>

- 10<sup>3</sup>

- 10<sup>2</sup>

- 10<sup>1</sup>

|  |  | iotai  | amount of al                            | erts: 113,572                          | 2,849                           |                                |
|--|--|--|---|--|---------------------------------|--------------------------------|
| Entropy of destination IP addresses -  | 201  | 86   | 178                                     | 42                                     | 50                              | 217                            |
| Entropy of source IP addresses -   | 161  | 162  | 114                                     | 69                                     | 52                              | 130                            |
| Entropy of bi-directional flows -  | 216  | 108  | 216                                     | 42                                     | 67                              | 192                            |
| Entropy rate of destination IP addresses -   | 214  | 33   | 190                                     | 59                                     | 36                              | 189                            |
| Entropy rate of source IP addresses -  | 183  | 188  | 158                                     | 76                                     | 36                              | 211                            |
| Entropy rate of bi-directional flows -   | 218  | 141  | 219                                     | 59                                     | 36                              | 187                            |
| Entropy of packet sizes -  | 119  | 123  | 194                                     | 54                                     | 56                              | 31                             |
| Entropy rate of packet sizes -   | 154  | 124  | 191                                     | 39                                     | 58                              | 35                             |
| Entropy of ingress packet sizes -  | 72   | 187  | 160                                     | 179                                    | 214                             | 207                            |
| Entropy rate of ingress packet sizes -   | 197  | 150  | 208                                     | 149                                    | 220                             | 125                            |
| Entropy of egress packet sizes -   | 160  | 208  | 222                                     | 88                                     | 146                             | 207                            |
| Entropy rate of egress packet sizes -  | 135  | 217  | 218                                     | 222                                    | 218                             | 122                            |
| Entropy of destination IP addresses with SYN flag -  | 141  | 60   | 154                                     | 10                                     | 1                               | 31                             |
| Entropy of source IP addresses with SYN flag -   | 130  | 216  | 36                                      | 36                                     |                                 | 59                             |
| Entropy of bi-directional flows with SYN flag -  | 142  | 185  | 216                                     | 10                                     | 1                               | 42                             |
| K-means with NetFlow header fields -   | 17,151,246                                   | 19,549,046                                     | 7,421,142                               | 3,983,131                              | 1,820,776                       | 3,409,818                      |
| K-means with NetFlow entropy metrics -   | 220  | 124  | 210                                     | 200                                    | 164                             | 125                            |
| K-means with NetFlow combined feature set -  | 17,151,246                                   | 19,549,046                                     | 7,421,142                               | 3,983,131                              | 1,283,985                       | 3,409,818                      |
| K-means with telemetry measurements -  | 2,382  | 4,456  | 862                                     | 4,224                                  | 4,819                           | 1,689                          |
| K-means with telemetry entropy metrics -   | 77   | 148  | 151                                     | 54                                     | 92                              | 144                            |
| K-means with telemetry combined feature set -  | 2,382  | 4,456  | 862                                     | 4,224                                  | 4,819                           | 1,689                          |
| Random Forest with NetFlow header fields -   | 627,936                                      | 356,819  | 610,136                                 | 810,588                                | 533,329                         | 345,649                        |
| Random Forest with NetFlow header fields without IPs -   | 358,154                                      | 351,286  | 362,617                                 | 707,296                                | 531,241                         | 103,496                        |
| Random Forest with NetFlow entropy metrics -   | 330,134                                      | 331,200  | 40                                      | 54                                     | 50                              | 211                            |
| Random Forest with NetFlow combined feature set -  | 4  | 29   | 30                                      | 1,190                                  | 356,704                         | 250,537                        |
| Random Forest with NetFlow combined feature set without IPs -  | 7  | 29   | 44                                      | 371                                    | 127,879                         | 103,026                        |
| Random Forest with telemetry measurements -  | 647  | 4,030  |   | 1,182                                  | 3,688                           | 5,249                          |
| ·  |  |  | 3,094                                   |  |                                 |                                |
| Random Forest with telemetry entropy metrics -   | 230  | 18   | 96                                      | 24                                     | 28                              | 1                              |
| Random Forest with telemetry combined feature set -  | 7,081  | 1,695  | 4,658                                   | 463                                    | 5,206                           | 85                             |
| Bytes in NetFlow records -   | 217  | 22   | 37                                      | 125                                    | 132                             | 75                             |
| Packets in NetFlow records -   | 164  | 52   | 46                                      | 135                                    | 111                             | 206                            |
| Bi-directional flows in NetFlow records -  | 220  | 82   | 219                                     | 55                                     | 115                             | 64                             |
| Ingress bytes in telemetry measurements -  | 219  | 219  | 158                                     | 123                                    | 218                             | 74                             |
| Ingress packets in telemetry measurements -  | 219  | 217  | 131                                     | 154                                    | 221                             | 156                            |
| Egress bytes in telemetry measurements -   | 221  | 214  | 122                                     | 123                                    | 221                             | 221                            |
| Egress packets in telemetry measurements -   | 220  | 213  | 173                                     | 154                                    | 221                             | 197                            |
| Deviation score for egress queue size -  | 7,172  | 6,647  | 2,708                                   | 6,253                                  | 3,968                           |                                |
| Deviation score for egress bytes/s -   | 7,135  | 3,016  | 6,933                                   | 6,128                                  | 3,054                           | 2,758                          |
| Deviation score for egress packets/s -   | 6,095  | 3,798  | 7,100                                   | 6,052                                  | 2,838                           | 5,924                          |
| Deviation score for ingress bytes/s -  | 7,167  | 7,122  | 7,136                                   | 6,138                                  | 3,065                           | 5,904                          |
| Deviation score for ingress packets/s -  | 6,366  | 5,740  | 6,885                                   | 5,689                                  | 2,810                           | 6,382                          |
| Deviation score for egress queue size using maximum variance -   | 7,200  | 5,613  | 1,790                                   | 7,040                                  | 4,931                           |                                |
| Deviation score for egress bytes/s using maximum variance -  | 6,022  | 1,191  | 619                                     | 6,181                                  | 2,851                           | 741                            |
|  | 0,022  |  |   |  |                                 |                                |
| Deviation score for egress packets/s using maximum variance -  | 418  | 995  | 245                                     | 4,155                                  | 2,837                           | 951                            |
| Deviation score for egress packets/s using maximum variance -  Deviation score for ingress bytes/s using maximum variance -  |  |  | 245<br>2,330                            | 4,155<br>6,185                         | 2,837<br>2,668                  | 951<br>1,157                   |
|  | 418  | 995  |   |  |                                 |                                |
| Deviation score for ingress bytes/s using maximum variance -   | 418<br>6,009                                 | 995<br>7,124                                   | 2,330                                   | 6,185                                  | 2,668                           | 1,157                          |
| Deviation score for ingress bytes/s using maximum variance - Deviation score for ingress packets/s using maximum variance -  | 418<br>6,009<br>414                          | 995<br>7,124<br>2,947                          | 2,330<br>1,193                          | 6,185<br>4,030                         | 2,668<br>2,826                  | 1,157<br>834                   |
| Deviation score for ingress bytes/s using maximum variance -  Deviation score for ingress packets/s using maximum variance -  ICMP destination unreachable packets -   | 418<br>6,009<br>414<br>186                   | 995<br>7,124<br>2,947<br>199                   | 2,330<br>1,193<br>161                   | 6,185<br>4,030<br>40                   | 2,668<br>2,826<br>2             | 1,157<br>834<br>60             |
| Deviation score for ingress bytes/s using maximum variance -  Deviation score for ingress packets/s using maximum variance -  ICMP destination unreachable packets -  ICMP packets -                             | 418<br>6,009<br>414<br>186<br>78             | 995<br>7,124<br>2,947<br>199<br>80             | 2,330<br>1,193<br>161<br>76             | 6,185<br>4,030<br>40<br>78             | 2,668<br>2,826<br>2<br>47       | 1,157<br>834<br>60<br>68       |
| Deviation score for ingress bytes/s using maximum variance -  Deviation score for ingress packets/s using maximum variance -  ICMP destination unreachable packets -  ICMP packets -  ICMP ratio -               | 418<br>6,009<br>414<br>186<br>78<br>88       | 995<br>7,124<br>2,947<br>199<br>80<br>91       | 2,330<br>1,193<br>161<br>76<br>78       | 6,185<br>4,030<br>40<br>78<br>56       | 2,668<br>2,826<br>2<br>47       | 1,157<br>834<br>60<br>68       |
| Deviation score for ingress bytes/s using maximum variance -  Deviation score for ingress packets/s using maximum variance -  ICMP destination unreachable packets -  ICMP packets -  ICMP ratio -  Xmas flows - | 418<br>6,009<br>414<br>186<br>78<br>88<br>81 | 995<br>7,124<br>2,947<br>199<br>80<br>91<br>50 | 2,330<br>1,193<br>161<br>76<br>78<br>50 | 6,185<br>4,030<br>40<br>78<br>56<br>16 | 2,668<br>2,826<br>2<br>47<br>10 | 1,157<br>834<br>60<br>68<br>73 |