UDP Flood and SlowLoris Ping Flood and R.U.D.Y UDP Flood Ping Flood Blacknurse Slow Read SYN Flood SlowLoris R.U.D.Y **Kmas** 0.497 0.591 0.208 0.544 0.533 0.385 0.000 0.503 0.457 Entropy of destination IP addresses 0.000 0.292 0.591 0.353 0.000 0.570 Entropy of source IP addresses 0.000 0.584 0.487 0.505 0.503 0.477 0.000 0.217 0.629 0.550 0.000 0.509 0.504 0.555 0.481 0.592 Entropy of bi-directional flows 0.407 0.000 0.565 0.412 0.487 0.473 Entropy rate of destination IP addresses 0.236 0.583 0.000 0.555 0.585 Entropy rate of source IP addresses 0.000 0.285 0.623 0.552 0.478 0.000 0.492 0.527 0.529 0.517 0.579 0.000 0.238 0.517 0.570 0.455 0.000 0.547 0.499 0.556 0.437 Entropy rate of bi-directional flows 0.707 0.000 0.255 0.547 0.481 0.000 0.522 0.517 0.552 0.511 0.660 Entropy of packet sizes 0.663 0.519 0.482 0.472 0.000 0.505 0.494 0.575 0.514 Entropy rate of packet sizes 0.000 0.248 Entropy of ingress packet sizes 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Entropy rate of ingress packet sizes 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 - 0.8 Entropy of egress packet sizes 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Entropy rate of egress packet sizes 0.000 0.000 0.000 0.000 0.000 Entropy of destination IP addresses with SYN flag 0.000 0.222 0.023 0.340 0.054 0.073 0.364 0.004 0.277 0.264 0.260 Entropy of source IP addresses with SYN flag 0.000 0.305 0.024 0.332 0.031 0.073 0.359 0.011 0.284 0.248 0.296 0.000 0.278 0.024 0.319 0.046 0.073 0.394 0.004 0.304 0.265 0.329 Entropy of bi-directional flows with SYN flag K-means with NetFlow header fields 0.165 0.006 0.308 0.001 0.705 0.012 0.710 0.619 0.166 0.693 K-means with NetFlow entropy metrics 0.000 0.344 0.223 0.497 0.074 0.000 0.471 0.270 0.418 0.575 0.275 K-means with NetFlow combined feature set 0.713 0.710 0.610 0.638 0.330 0.165 0.006 0.228 0.001 0.008 0.166 K-means with telemetry measurements 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 K-means with telemetry entropy metrics 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 K-means with telemetry combined feature set 0.000 0.000 0.000 0.000 0.000 0.000 0.6 Random Forest with NetFlow header fields 0.202 0.509 0.332 0.243 0.167 0.327 0.000 0.290 0.486 0.496 0.083 0.312 0.352 0.623 0.159 1.000 0.509 0.396 0.396 0.593 Random Forest with NetFlow header fields without IPs 0.167 Random Forest with NetFlow entropy metrics 0.000 0.000 0.095 0.144 0.164 0.000 0.116 0.136 0.227 0.207 0.296 Random Forest with NetFlow combined feature set 0.000 0.000 0.000 0.053 0.000 0.000 0.052 0.000 0.000 0.167 0.000 Random Forest with NetFlow combined feature set without IPs 0.000 0.004 0.046 0.000 0.033 0.167 0.053 0.000 0.000 0.000 0.092 Random Forest with telemetry measurements 0.000 Random Forest with telemetry entropy metrics 0.474 0.000 Random Forest with telemetry combined feature set 0.000 0.158 0.249 0.328 0.330 0.000 0.315 0.374 0.000 0.290 0.566 0.506 0.421 0.000 0.449 0.432 0.467 0.693 Bytes in NetFlow records 0.000 0.582 0.496 0.396 0.000 0.454 0.433 0.369 0.471 0.720 Packets in NetFlow records 0.263 - 0.4 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Bi-directional flows in NetFlow records 0.000 Deviation score for egress queue size 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for egress bytes/s 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for egress packets/s 0.000 Deviation score for ingress bytes/s 0.000 0.000 0.000 0.000 0.000 Deviation score for ingress packets/s 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for egress queue size using maximum variance 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for egress bytes/s using maximum variance 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for egress packets/s using maximum variance 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for ingress bytes/s using maximum variance 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Deviation score for ingress packets/s using maximum variance 0.2 0.436 ICMP destination unreachable packets 0.451 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.021 0.000 0.549 0.689 0.179 0.778 0.339 0.351 ICMP packets 0.000 0.000 0.373 0.269 0.226 **ICMP** ratio 0.000 0.184 0.698 0.580 0.341 0.000 0.293 0.274 0.632 0.402 0.345 0.000 0.000 0.000 Xmas flows 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 SYN flows 0.000 0.018 0.000 0.019 0.000 0.645 0.043 0.000 0.015 0.010 0.032 Top 20 flows 0.250 0.034 0.002 0.098 0.000 0.484 0.002 0.243 0.290 0.017 0.409 Alert fusion: time 0.000 0.002 0.001 0.003 0.002 0.749 0.002 0.704 0.003 0.551 Alert fusion: packet sizes 0.000 0.776 0.297 0.898 0.578 0.000 0.385 0.327 0.783 0.783 0.398 Alert fusion: attack types 0.000 0.391 0.398 0.498 0.973 0.503 0.494 0.603 0.574 0.535 Alert fusion: ranking 0.652 0.000 0.677 0.651 0.628 0.636 0.563 0.543 0.692 0.656 0.652 - 0.0 0.026 0.141 0.193 0.234 0.155 0.127 0.203 0.195 0.220 0.209

0.297