|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CTI reports | Entities | | | | | | | | | |
| Ground-truth | AttacKG | | | Extractor | | | ASG | | |
| Carbanak | 12 | TP | FP | FN | TP | FP | FN | TP | FP | FN |
| 8 | 13 | 4 | 8 | 14 | 4 | 9 | 8 | 3 |
| p | R | F1 | P | R | F1 | P | R | F1 |
| 0.381 | 0.667 | 0.485 | 0.364 | 0.667 | 0.470 | 0.529 | 0.75 | 0.620 |
| ccleaner | 12 | 4 | 1 | 8 | 7 | 10 | 5 | 10 | 8 | 2 |
| 0.800 | 0.333 | 0.470 | 0.412 | 0.583 | 0.483 | 0.556 | 0.833 | 0.667 |
| DeputyDog | 6 | 4 | 4 | 2 | 4 | 3 | 2 | 5 | 4 | 1 |
| 0.500 | 0.667 | 0.572 | 0.571 | 0.667 | 0.615 | 0.556 | 0.833 | 0.667 |
| DustySky | 10 | 6 | 7 | 4 | 6 | 4 | 4 | 7 | 8 | 3 |
| 0.462 | 0.600 | 0.522 | 0.600 | 0.600 | 0.600 | 0.467 | 0.700 | 0.560 |
| hc attack | 13 | 5 | 3 | 8 | 8 | 11 | 8 | 10 | 6 | 3 |
| 0.625 | 0.385 | 0.476 | 0.421 | 0.500 | 0.457 | 0.625 | 0.769 | 0.690 |
| Information gather and exfiltration (Host A) | 18 | 3 | 5 | 15 | 4 | 5 | 14 | 16 | 2 | 2 |
| 0.375 | 0.167 | 0.231 | 0.444 | 0.222 | 0.296 | 0.889 | 0.889 | 0.889 |
| In-memory attack with firefox (Host B) | 9 | 5 | 4 | 4 | 5 | 10 | 4 | 7 | 5 | 2 |
| 0.556 | 0.556 | 0.551 | 0.333 | 0.556 | 0.416 | 0.583 | 0.778 | 0.667 |
| njRAT | 14 | 8 | 10 | 6 | 6 | 9 | 8 | 8 | 10 | 6 |
| 0.444 | 0.571 | 0.500 | 0.400 | 0.429 | 0.414 | 0.444 | 0.571 | 0.500 |
| OceanLotus | 16 | 6 | 11 | 10 | 5 | 6 | 11 | 8 | 11 | 8 |
| 0.353 | 0.375 | 0.364 | 0.455 | 0.313 | 0.370 | 0.421 | 0.500 | 0.457 |
| Uroburos | 12 | 5 | 6 | 7 | 5 | 5 | 10 | 7 | 6 | 5 |
| 0.455 | 0.417 | 0.435 | 0.500 | 0.333 | 0.400 | 0.538 | 0.583 | 0.560 |
| **Overall presicion** | 1.000 | 0.495 | | | 0.450 | | | 0.561 | | |
| **Overall Recall** | 1.000 | 0.474 | | | 0.487 | | | 0.721 | | |
| **Overall F-1 Score** | 1.000 | 0.461 | | | 0.452 | | | 0.628 | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CTI reports | Dependencies | | | | | | | | | |
| Ground-truth | AttacKG | | | Extractor | | | ASG | | |
| Carbanak | 12 | TP | FP | FN | TP | FP | FN | TP | FP | FN |
| 6 | 12 | 6 | 6 | 20 | 6 | 8 | 10 | 4 |
| P | R | F1 | P | R | F1 | P | R | F1 |
| 0.333 | 0.500 | 0.400 | 0.231 | 0.500 | 0.316 | 0.444 | 0.667 | 0.533 |
| ccleaner | 13 | 3 | 3 | 10 | 6 | 6 | 7 | 9 | 8 | 4 |
| 0.500 | 0.231 | 0.315 | 0.500 | 0.462 | 0.480 | 0.529 | 0.692 | 0.600 |
| DeputyDog | 5 | 3 | 6 | 2 | 3 | 3 | 2 | 4 | 3 | 1 |
| 0.333 | 0.600 | 0.428 | 0.500 | 0.600 | 0.545 | 0.571 | 0.800 | 0.667 |
| DustySky | 10 | 6 | 8 | 4 | 5 | 3 | 11 | 7 | 7 | 3 |
| 0.429 | 0.600 | 0.500 | 0.625 | 0.313 | 0.416 | 0.500 | 0.700 | 0.583 |
| hc attack | 16 | 4 | 4 | 12 | 6 | 7 | 13 | 10 | 12 | 6 |
| 0.500 | 0.250 | 0.333 | 0.462 | 0.316 | 0.375 | 0.455 | 0.625 | 0.527 |
| Information gather and exfiltration (Host A) | 19 | 2 | 3 | 17 | 3 | 4 | 16 | 17 | 3 | 2 |
| 0.400 | 0.105 | 0.166 | 0.429 | 0.158 | 0.231 | 0.850 | 0.895 | 0.872 |
| In-memory attack with firefox (Host B) | 11 | 3 | 5 | 8 | 4 | 8 | 7 | 7 | 9 | 4 |
| 0.375 | 0.273 | 0.315 | 0.333 | 0.364 | 0.348 | 0.438 | 0.636 | 0.519 |
| njRAT | 15 | 7 | 23 | 8 | 5 | 14 | 10 | 7 | 10 | 8 |
| 0.233 | 0.467 | 0.310 | 0.263 | 0.333 | 0.294 | 0.412 | 0.467 | 0.437 |
| OceanLotus | 21 | 6 | 11 | 15 | 4 | 11 | 17 | 7 | 9 | 14 |
| 0.353 | 0.286 | 0.318 | 0.267 | 0.190 | 0.223 | 0.438 | 0.333 | 0.379 |
| Uroburos | 15 | 4 | 7 | 11 | 4 | 3 | 11 | 6 | 5 | 9 |
| 0.364 | 0.267 | 0.307 | 0.571 | 0.267 | 0.363 | 0.545 | 0.400 | 0.461 |
| **Overall presicion** | 1.000 | 0.382 | | | 0.418 | | | 0.518 | | |
| **Overall Recall** | 1.000 | 0.358 | | | 0.350 | | | 0.622 | | |
| **Overall F-1 Score** | 1.000 | 0.339 | | | 0.359 | | | 0.558 | | |