RSAConference2022
San Francisco & Digital | June 6 – 9

TRANSFORM

SESSION ID: PART2-T08

Confessions of a Sandbox: How AI is Disrupting Automated Threat Analysis

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Agenda

- Automated threat analysis
- Advanced threats and bypassing techniques
- The power of machine learning
- Takeaways

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Automated Threat Analysis

Automated Threat Analysis

The Sandbox:

A sandbox is a closed system that enables security professionals to watch the malware in action without the risk of letting it infect their system or escape into the enterprise network.

- Mimics an end-user operating environment
- Prevents accidental exposure to potential threats

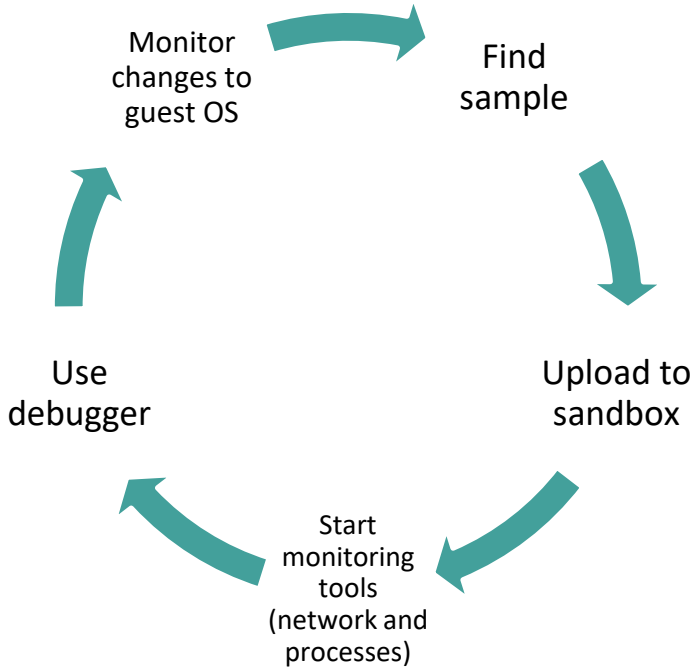
Automated Threat Analysis

The Tools

- Static analysis tools
- Network monitoring tools
- Process monitoring tools
- Debbuggers
- System level API hooks
- Machine learning
- YARA rules
- Etc.

Automated Threat Analysis

The Automation



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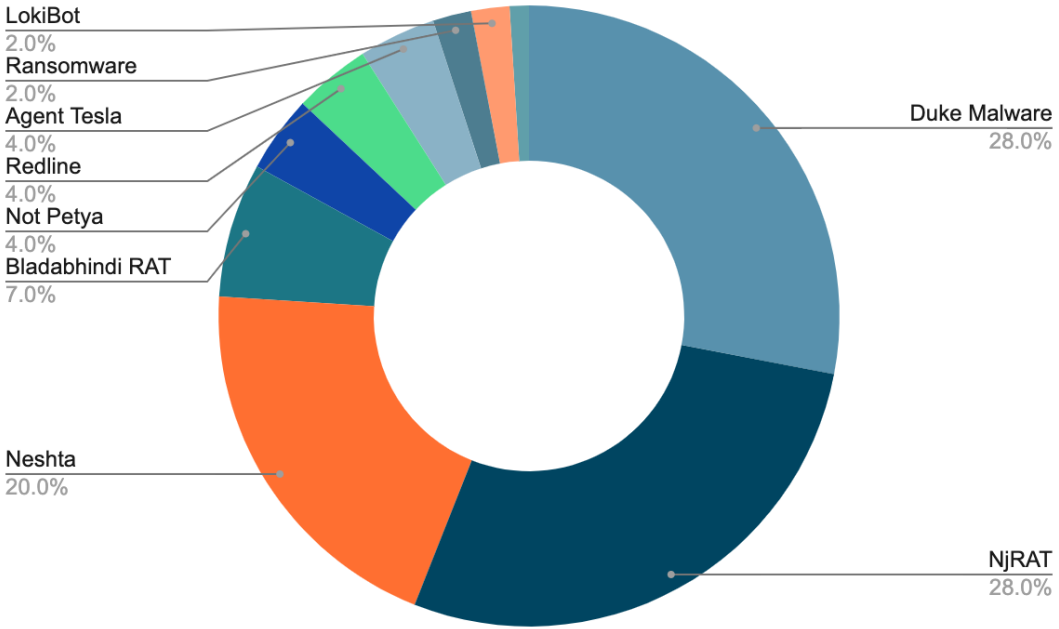
Bypass Techniques Used by Advanced Threats

Top 10 Malware Families Based on Hybrid Analysis Submissions



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Bypass Techniques Used by Advanced Threats

Masquerading (T1036)

- Manipulating features of their artifacts to make them appear legitimate or benign to users and/or security tools
- Secondary payloads that use (mis)spelling of common filenames
- Using lolbins (certutil, bitsadmin, etc.)

Software Packing (T1027)

- Used for compressing or encrypting an executable
- Decompressing code in memory (e.g. URLs unpacked in memory)

Lateral Tool Transfer (T1570)

- Transfering tools or other files between systems in a compromised environment
- Network connections to URLs to download and drop additional payloads, such as bitsadmin to download files

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The Power of Machine Learning

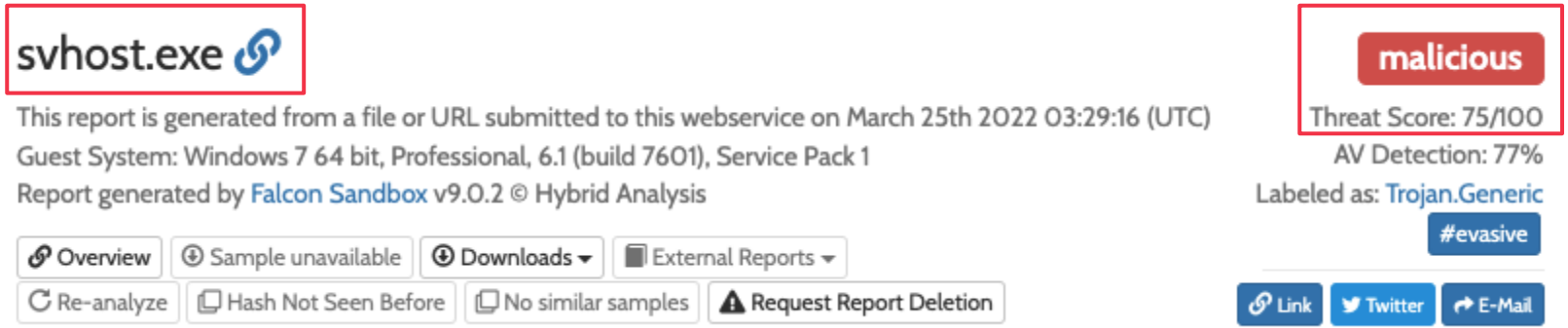
Disrupting Automated Threat Analysis

Disrupting Traditional Automated Threat Analysis

- Fast and reliable scanning results for:
  - binaries
  - memory dumps
  - URLs
- Comprehensive detonation report for IOCs

The Power of Machine Learning

Masquerading technique impersonating a legitimate binary



The Power of Machine Learning

Masquerading and Lolbin techniques used to drop additional tools

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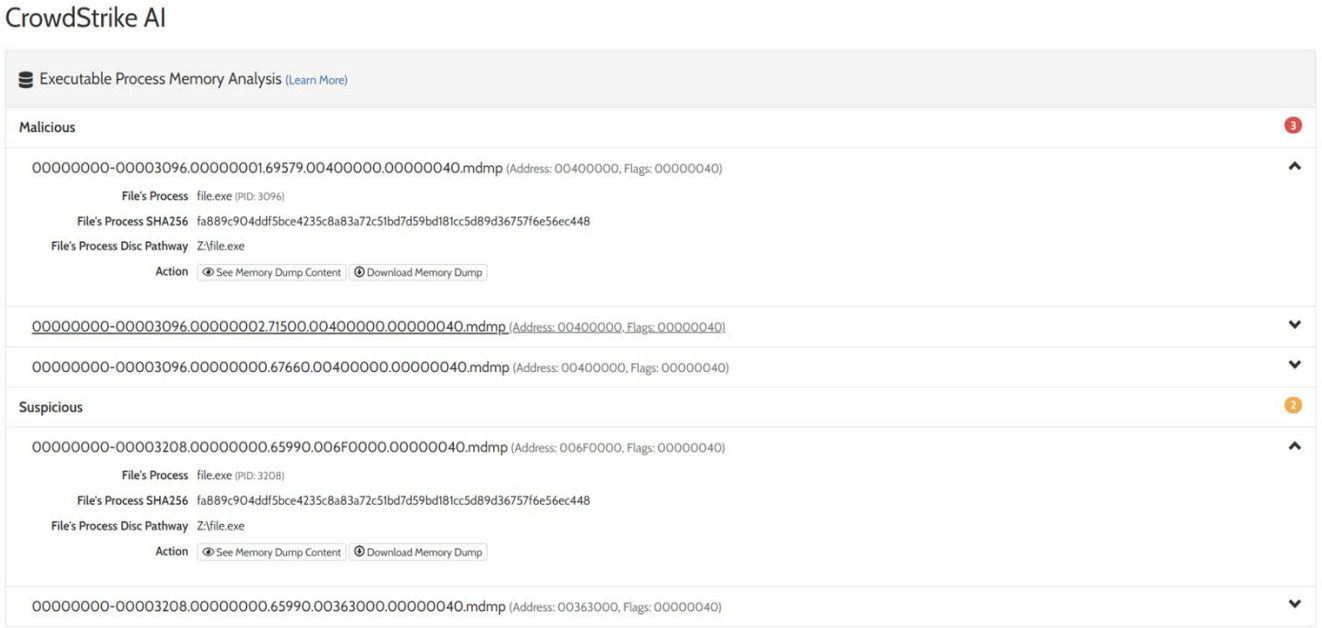
The Power of Machine Learning

Memory dump analysis using CrowdStrike AI



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The Power of Machine Learning

Memory dump analysis using CrowdStrike AI

Data Collection → Feature Extraction → Model Training → Prediction

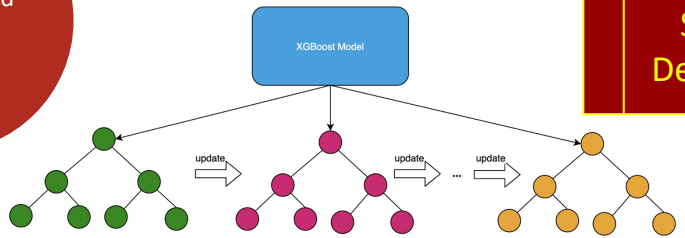
Memory Dumps

Pre-trained Embeddings

Opportunistic instruction decoding

Signals hand picked by experts

Transfer Learning



Memory Dumps from Sandbox Detonations

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Network activity analysis using CrowdStrike AI

Applying CrowdStrike AI to URLS extracted from:

- Extracted Strings section
- Network analysis section
- Submitted URLs (submitted by users for analysis)

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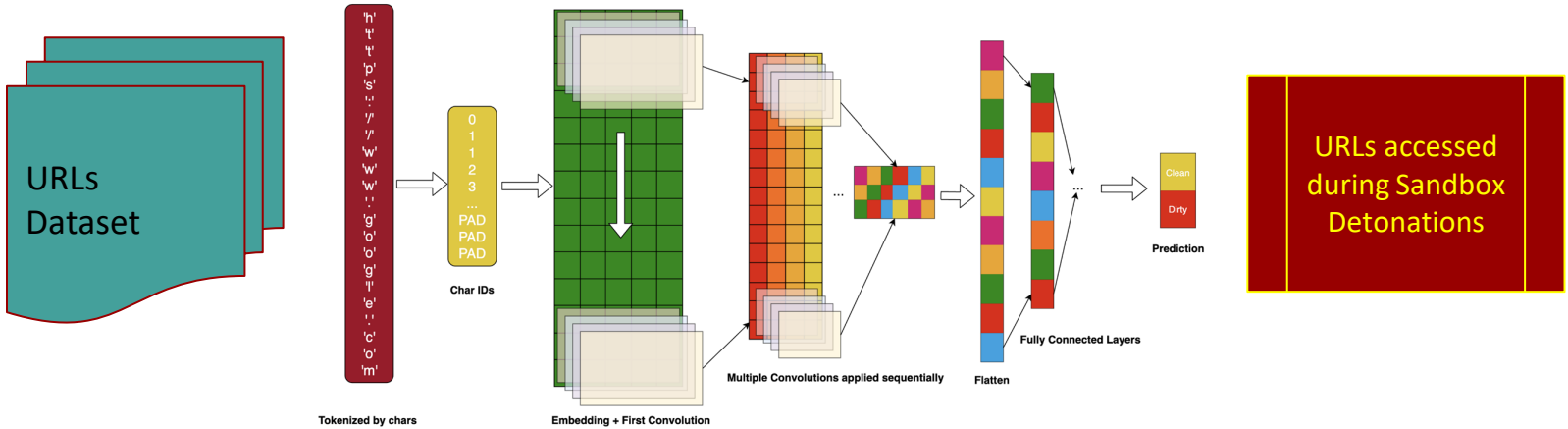
The Power of Machine Learning

URLs analysis using CrowdStrike AI

Data Collection | Model Training | Prediction



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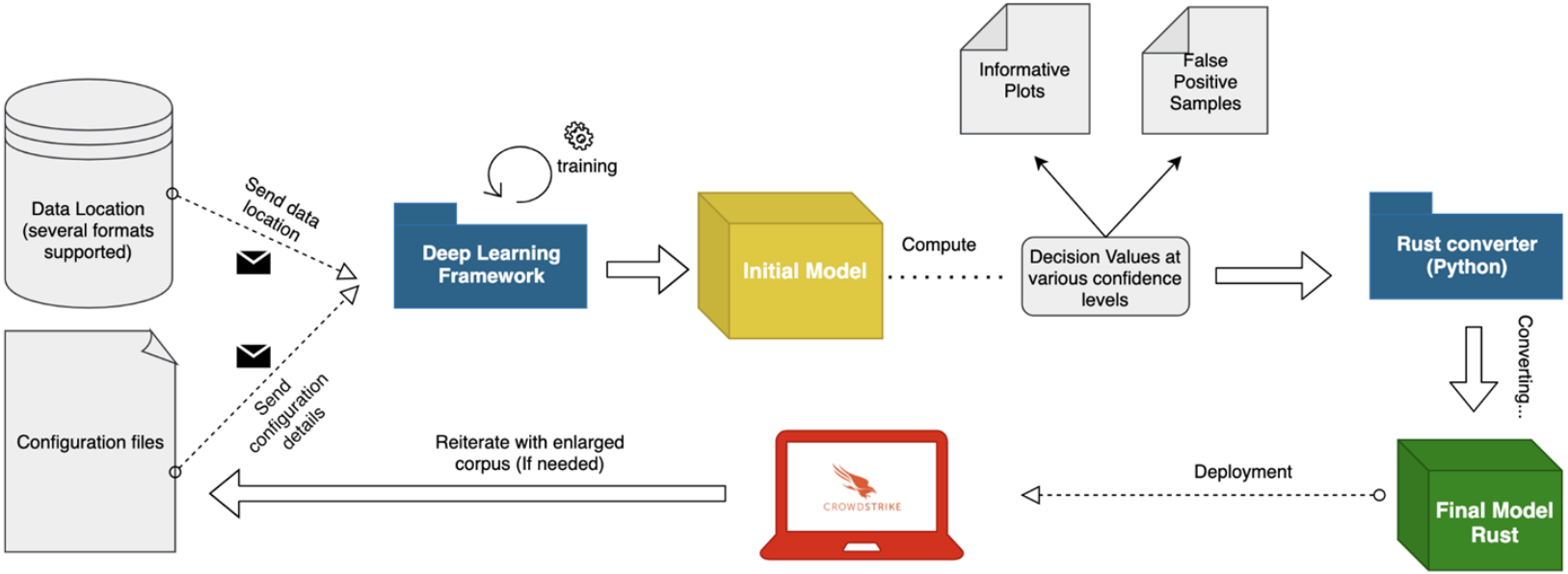
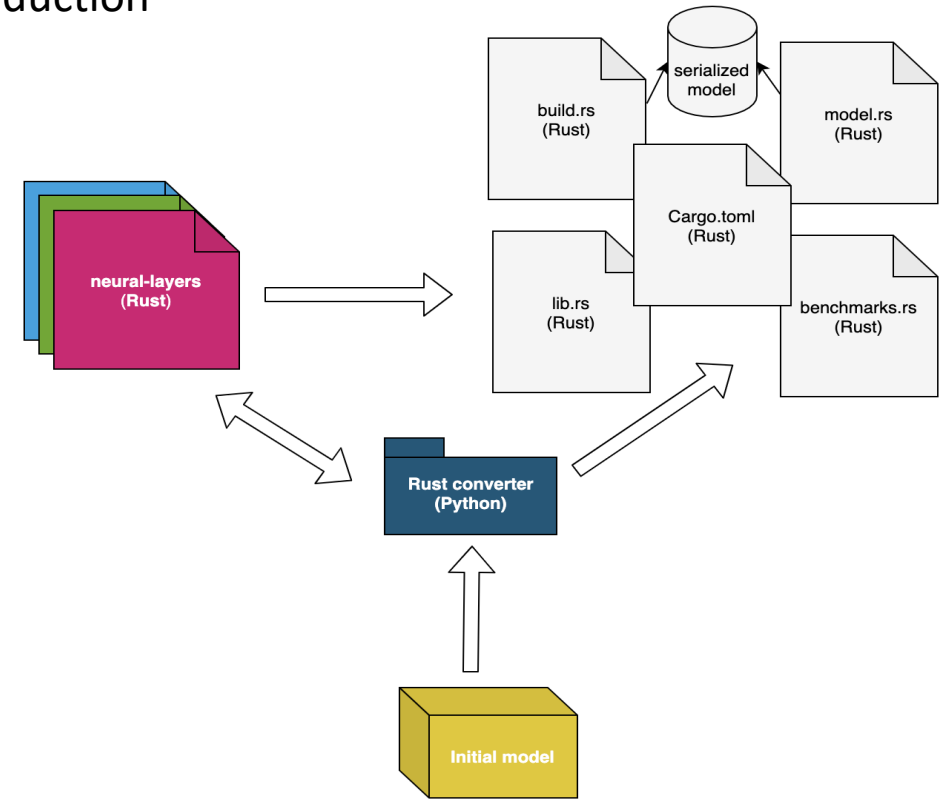
Performance Optimizations



The Power of Machine Learning

Attack Surface Reduction



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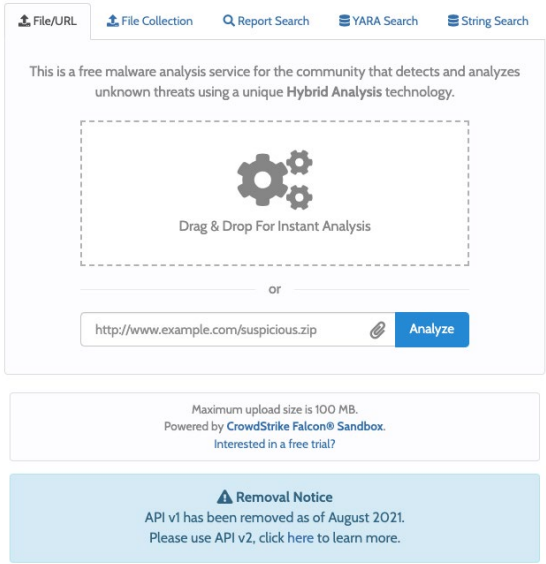
Video Demo

Disrupting Traditional Automated Threat Analysis



- Publicly available free tool for researchers and analysts community
- Supports URLs, Windows 7 32/64 bit, Linux, and Android static analysis
- QuickScan
  - Machine learning static analysis
  - Processes over 700K files daily
- Detonation report generator and post detonation actions
  - “Heuristic” Sandbox Threat Score
  - Behavioral signatures (hooks, handles, mutant, network, registry, binary, certificate, api, etc.)
  - Machine Learning for memory analysis, ransomware, and URLs
  - YARA processing
  - Network PCAP files
  - Screenshots
  - MITRE ATT&CK mapping
  - Process tree
  - Dropped files
  - etc.

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How do Researchers Feel About It?

"…what Hybrid has, what others haven't, is the reporting and the ease of which I can get samples out of it. From a pure IOC point of view, that's where Hybrid really stands up." - Mike, Security Architect

"The bit that I liked about hybrid, particularly was being able to YARA research on things and that's really good," - Nick, Security Architect

"With hybrid analysis everything was simple, I went into the documentation, I took my API key, I took the client from GitHub and I cloned it. Everything just works, no problem…" - John, Engineer

"And that is awesome that I can go in there and download samples. I absolutely love that," - Steve, IT Administrator

"All of the samples we've sent through have given us the MITRE attack labels that we need" - Joe, Test Engineer

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Takeaways

Takeaways

- Traditional automated threat analysis is more about IOCs than malicious assessment
- Advanced threats use sophisticated tactics to bypass traditional automated threat analysis tools
- Machine learning augments automated threat analysis, offering quick assessment and deep insights into malicious behaviour
- In the end, Machine Learning disrupts automated threat analysis by increasing its efficacy: easier, faster, more accurate … and free.

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Thank You

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Backup Slides

MITRE ATT&CK Technique Detection and Mapping

Execution

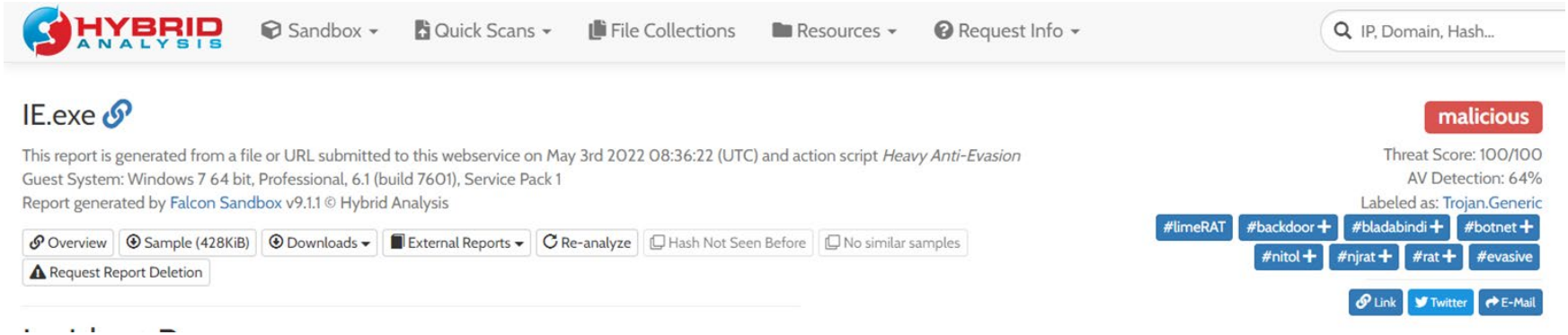
ATT&CK ID	Name	Tactics	Description	Malicious Indicators	Suspicious Indicators	Informative Indicators
T1204.002	Malicious File	• Execution	An adversary may rely upon a user opening a malicious file in order to gain execution. Learn more	• Document spawns new processes		
T1204	User Execution	• Execution	An adversary may rely upon specific actions by a user in order to gain execution. Learn more		• Contains embedded VBA macros with suspicious keywords • Contains embedded VBA macros with interesting strings	• Contains embedded VBA macros
T1059.003	Windows Command Shell	• Execution	Adversaries may abuse the Windows command shell for execution. Learn more			• Runs shell commands

Persistence

ATT&CK ID	Name	Tactics	Description	Malicious Indicators	Suspicious Indicators	Informative Indicators
T1137	Office	• Persistence	Adversaries may leverage Microsoft	• Contains embedded VBA		• Contains embedded

Backup Slides

User tags



Backup Slides

Suricata alerts

Suricata Alerts

Event	Category	Description	SID
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.ddns .net	2028675 %}
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.ddns .net	2028675 %}
54.254.238.33 -> local:49185 (TCP)	-	-	- %}
54.254.238.33 -> local:49185 (TCP)	Potentially Bad Traffic	ET HUNTING SUSPICIOUS Dotted Quad Host MZ Response	2021076 %}
54.254.238.33 -> local:49186 (TCP)	-	-	- %}
54.254.238.33 -> local:49186 (TCP)	Potentially Bad Traffic	ET HUNTING SUSPICIOUS Dotted Quad Host MZ Response	2021076 %}
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.ddnsking .com	2028676 %}
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.ddnsking .com	2028676 %}
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.3utilities .com	2028677 %}
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.3utilities .com	2028677 %}
local -> 8.8.8.8:53 (UDP)	Potentially Bad Traffic	ET POLICY DNS Query to DynDNS Domain *.bounceme .net	2028678 %}

Backup Slides