

# 隼 HAYABUSA

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## About Hayabusa

Hayabusa is a **Windows event log fast forensics timeline generator** and **threat hunting tool** created by the [Yamato Security](#) group in Japan. Hayabusa means "peregrine falcon" in Japanese and was chosen as peregrine falcons are the fastest animal in the world, great at hunting and highly trainable. It is written in [Rust](#) and supports multi-threading in order to be as fast as possible. We have provided a [tool](#) to convert [Sigma](#) rules into Hayabusa rule format. The Sigma-compatible Hayabusa detection rules are written in YML in order to be as easily customizable and extensible as possible. Hayabusa can be run either on single running systems for live analysis, by gathering logs from single or multiple systems for offline analysis, or by running the [Hayabusa artifact](#) with [Velociraptor](#) for enterprise-wide threat hunting and incident response. The output will be consolidated into a single CSV timeline for easy analysis in Excel, [Timeline Explorer](#), [Elastic Stack](#), [Timesketch](#), etc...

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## Main Goals

### Threat Hunting and Enterprise-wide DFIR

Hayabusa currently has over 2600 Sigma rules and over 130 Hayabusa built-in detection rules with more rules being added regularly. It can be used for enterprise-wide proactive threat hunting as well as DFIR (Digital Forensics and Incident Response) for free with [Velociraptor's Hayabusa artifact](#). By combining these two open-source tools, you can essentially retroactively reproduce a SIEM when there is no SIEM setup in the environment. You can learn about how to do this by watching [Eric Capuano's Velociraptor walkthrough here](#).

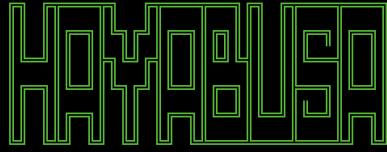
### Fast Forensics Timeline Generation

Windows event log analysis has traditionally been a very long and tedious process because Windows event logs are 1) in a data format that is hard to analyze and 2) the majority of data is noise and not useful for investigations. Hayabusa's goal is to extract out only useful data and present it in a concise as possible easy-to-read format that is usable not only by professionally trained analysts but any Windows system administrator. Hayabusa hopes to let analysts get 80% of their work done in 20% of the time when compared to traditional Windows event log analysis.

## Screenshots

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### Startup



by Yamato Security

Analyzing event files: 574

Total file size: 148.0 MB

Loading detections rules. Please wait.

Excluded rules: 15

Noisy rules: 5 (Disabled)

Experimental rules: 1574 (61.58%)

Stable rules: 212 (8.29%)

Test rules: 770 (30.13%)

Hayabusa rules: 134

Sigma rules: 2422

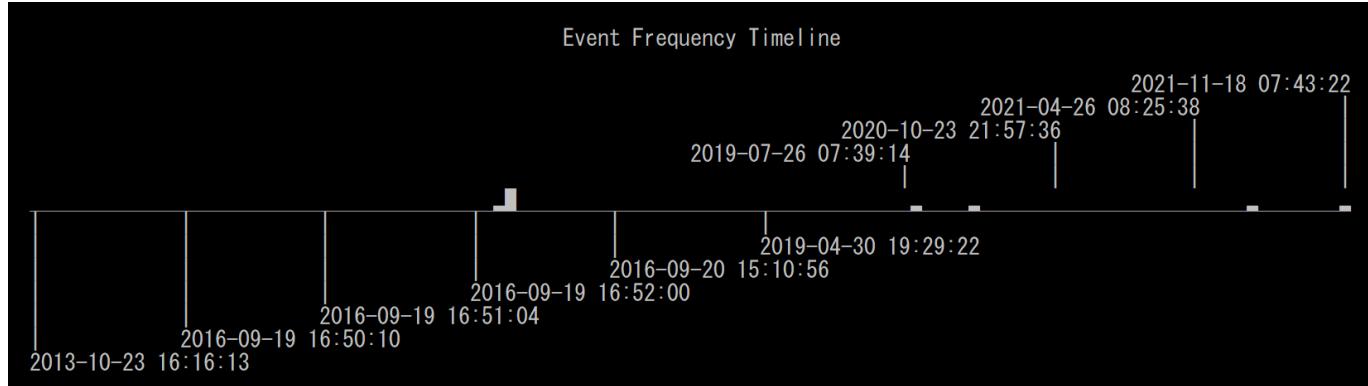
Total enabled detection rules: 2556

316 / 574 [=====>-----] 55.05 % 8s

## Terminal Output

```
2021-12-13 17:21:30.845 +09:00 || fs03vuln.offsec.lan || Sec || 5145 || info || 1176260 || NetShare File Access || User: admmig | ShareName: \\*\C$ | SharePath: \??\C:\ | Path: Windows\System32\Drivers\etc | IP-Addr: 10.23.23.9 | LID: 0x8ca6e1d
2021-12-13 21:55:45.250 +09:00 || rootdc1.offsec.lan || Sys || 7045 || info || 1467331 || Svc Installed || Svc: BT0BTO | Path: %COMSPEC% /Q /c echo cd ^> \\127.0.0.1\C$\_output 2^>^&1 > %TEMP%\execute.bat & %COMSPEC% /Q /c %TEMP%\execute.bat & del %TEMP%\execute.bat | Acct: Local System | StartType: demand start
2021-12-13 21:55:45.250 +09:00 || rootdc1.offsec.lan || Sys || 7045 || crit || 1467331 || smbexec.py Service Installation || Svc: BT0BTO | Path: %COMSPEC% /Q /c echo cd ^> \\127.0.0.1\C$\_output 2^>^&1 > %TEMP%\execute.bat & %COMSPEC% /Q /c %TEMP%\execute.bat & del %TEMP%\execute.bat | Acct: LocalSystem | StartType: demand start
2021-12-13 21:55:45.250 +09:00 || - - - - low || Rare Service Installations || [condition] count() by ServiceName < 5 in timeframe [result] count:1 ServiceName:BT0BTO timeframe:7d
2021-12-13 21:55:45.250 +09:00 || rootdc1.offsec.lan || Sec || 4697 || info || 236864754 || Svc Installed || Svc: BT0BTO | Path: %COMSPEC% /Q /c echo cd ^> \\127.0.0.1\C$\_output 2^>^&1 > %TEMP%\execute.bat & %COMSPEC% /Q /c %TEMP%\execute.bat & del %TEMP%\execute.bat | User: adm mig | SvcAccount: LocalSystem | SvcType: 0x10 | SvcStartType: 3 | LID: 0x2cff42b44
2021-12-14 23:42:48.182 +09:00 || rootdc1.offsec.lan || Sec || 4776 || info || 237294513 || NTLM Logon To Local Account || User: hack1 | Comp: attacker | Status: 0x0
2021-12-14 23:42:48.182 +09:00 || rootdc1.offsec.lan || Sec || 4624 || info || 237294514 || Logon (Type 3 Network) || User: hack1 | Comp: attacker | IP-Addr: 10.23.123.11 | LID: 0x308fabb0c
2021-12-14 23:42:48.182 +09:00 || rootdc1.offsec.lan || Sec || 4624 || med || 237294514 || Pass the Hash Activity 2 || User: hack1 | Comp: attacker | IP-Addr: 10.23.123.11 | Proc: - | LID: 0x308fabb0c
2021-12-14 23:42:48.690 +09:00 || rootdc1.offsec.lan || Sec || 4776 || info || 237294516 || NTLM Logon To Local Account || User: hack1 | Comp: | Status: 0x0
2021-12-14 23:42:48.690 +09:00 || rootdc1.offsec.lan || Sec || 4624 || info || 237294517 || Logon (Type 3 Network) || User: hack1 | Comp: - | IP-Addr: 10.23.123.11 | LID: 0x308fb82ad
2021-12-14 23:42:48.693 +09:00 || rootdc1.offsec.lan || Sec || 5140 || info || 237294519 || NetShare Access || User: hack1 | ShareName: \\*\IPC$ | SharePath: | IP-Addr: 10.23.123.11 | LID: 0x308fb82ad
2021-12-14 23:42:48.908 +09:00 || rootdc1.offsec.lan || Sec || 4781 || high || 237294532 || Suspicious Computer Account Name Change CVE-2021-42287 || OldTgtUser: compnay-88$ | NewTgtUser: rootdc1 | TgtSID: S-1-5-21-4230534742-2542757381-3142984815-1296 | User: hack1 | SID: S-1-5-21-4230534742-2542757381-3142984815-1234 | Domain: OFFSEC | TgtDomain: OFFSEC | PrivList: - | LID: 0x308fabb0c
2021-12-14 23:42:48.908 +09:00 || rootdc1.offsec.lan || Sec || 4781 || high || 237294532 || Suspicious Computer Account Name Change CVE-2021-42287 || OldTgtUser: compnay-88$ | NewTgtUser: rootdc1 | TgtSID: S-1-5-21-4230534742-2542757381-3142984815-1296 | User: hack1 | SID: S-1-5-21-4230534742-2542757381-3142984815-1234 | Domain: OFFSEC | TgtDomain: OFFSEC | PrivList: - | LID: 0x308fabb0c
2021-12-14 23:42:49.222 +09:00 || rootdc1.offsec.lan || Sec || 4768 || info || 237294534 || Kerberos TGT Requested || User: rootdc1 | Svc: krbtgt | IP-Addr: ::ffff:10.23.123.11 | Status: 0x0 | PreAuthType: 2
```

## Event Frequency Timeline (-V option)



## Results Summary

Results Summary:													
Events with hits / Total events: 19,545 / 76,967 (Data reduction: 57,422 events (74.61%))													
Total   Unique detections: 32,684   554													
Total   Unique critical detections: 46 (0.14%)   18 (3.25%)													
Total   Unique high detections: 6,141 (18.79%)   250 (45.13%)													
Total   Unique medium detections: 1,472 (4.50%)   156 (28.16%)													
Total   Unique low detections: 6,771 (20.72%)   76 (13.72%)													
Total   Unique informational detections: 18,254 (55.85%)   54 (9.75%)													
Dates with most total detections: critical: 2019-07-19 (15), high: 2016-09-20 (3,656), medium: 2019-05-19 (165), low: 2016-09-20 (3,780), informational: 2016-08-19 (2,105)													
Top 5 computers with most unique detections: critical: MSEdgeWIN10 (6), IEWIN7 (3), FS03.offsec.lan (2), rootdc1.offsec.lan (2), srvdefender01.offsec.lan (2) high: MSEdgeWIN10 (109), IEWIN7 (70), FS03.offsec.lan (31), fs03vuln.offsec.lan (27), IE10Win7 (23) medium: MSEdgeWIN10 (62), IEWIN7 (38), FS03.offsec.lan (16), IE10Win7 (15), PC01.example.corp (14) low: MSEdgeWIN10 (35), IEWIN7 (18), FS03.offsec.lan (16), fs03vuln.offsec.lan (13), IE10Win7 (11) informational: MSEdgeWIN10 (18), IEWIN7 (17), fs01.offsec.lan (16), PC01.example.corp (13), IE8Win7 (12)													
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PwSh Pipeline Exec (680)	Logon (Type 3 Network) (228)												
NetShare Access (433)	File Created (210)												
Elapsed Time: 00:00:28.827													

## HTML Results Summary (**-H** option)

## General Overview

- Start time: 2022/10/02 03:16
- Excluded rules: 12
- Noisy rules: 5 (Disabled)
- Experimental rules: 2036 (67.24%)
- Stable rules: 213 (7.03%)
- Test rules: 779 (25.73%)
- Hayabusa rules: 138
- Sigma rules: 2890
- Total enabled detection rules: 3028
- Elapsed Time: 00:00:23.844

## Results Summary

- Saved alerts and events: 19,545
- Total events analyzed: 76,967
- Data reduction: 57,422 events (74.61%)
- Dates with most total detections:
  - critical: 2019-07-19 (15)
  - high: 2016-09-20 (3,656)
  - medium: 2019-05-19 (165)
  - low: 2016-09-20 (3,780)
  - informational: 2016-08-19 (2,105)

**Computers with most unique critical detections:**

- MSEDGEWIN10 (6)
- IEWIN7 (3)
- srvdefender01.offsec.lan (2)
- FS03.offsec.lan (2)
- rootdc1.offsec.lan (2)
- alice.insecurebank.local (1)
- IE10Win7 (1)
- DC1.insecurebank.local (1)
- win10-02.offsec.lan (1)
- fs01.offsec.lan (1)
- fs03vuln.offsec.lan (1)
- DESKTOP-PIU87N6 (1)

**Computers with most unique high detections:**

- MSEDGEWIN10 (112)
- IEWIN7 (72)

**Top critical alerts:**

- [Sticky Key Like Backdoor Usage](#) (10)
- [Meterpreter or Cobalt Strike Getsystem Service Installation](#) (6)
- [Active Directory Replication from Non Machine Account](#) (6)
- [Windows Defender Alert](#) (4)
- [WannaCry Ransomware](#) (4)
- [Dumpert Process Dumper](#) (3)
- [SystemNightmare Exploitation Script Execution](#) (2)
- [Mimikatz MemSSP Default Log File Creation](#) (2)
- [Suspicious LSASS Process Clone](#) (2)
- [TrustedPath UAC Bypass Pattern](#) (2)
- [SMB Relay Attack Tools](#) (1)
- [smbexec.py Service Installation](#) (1)
- [Malicious Named Pipe](#) (1)
- [CobaltStrike Service Installations in Registry](#) (1)
- [Lsass Memory Dump via Comsvcs DLL](#) (1)

**Top high alerts:**

- [Metasploit SMB Authentication](#) (3,562)
- [Malicious Svc Possibly Installed](#) (271)

## Analysis in Excel

Time	Computername	EventID	Level	Alert	Details
2021-05-03 17:58:38.774 +09:00	webiis01.offsec.lan	4624	informational	Logon Type 3 - Network	User: adminmig : Workstation: - : IP Address: 10.23.23.9 : Port: 62234 : LogonID: 0x258b9ee5
2021-05-03 17:58:38.775 +09:00	webiis01.offsec.lan	4624	informational	Logon Type 3 - Network	User: adminmig : Workstation: - : IP Address: 10.23.23.9 : Port: 62235 : LogonID: 0x258b9ef8
2021-05-03 17:58:38.775 +09:00	webiis01.offsec.lan	4624	informational	Logon Type 3 - Network	User: adminmig : Workstation: - : IP Address: 10.23.23.9 : Port: 62236 : LogonID: 0x258b9efd
2021-05-03 21:06:57.954 +09:00	win10-02.offsec.lan	1	high	Process Creation Sysmon Rule Alert	Rule: technique_id=T1059,technique_name=Command-Line Interface : Command: C:\windows\sysmon.exe
2021-05-03 21:06:57.954 +09:00	win10-02.offsec.lan	1	critical	Sticky Key Like Backdoor Usage	
2021-05-15 05:39:33.214 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: adminmig
2021-05-19 06:18:40.607 +09:00	rootdc1.offsec.lan	150	critical	DNS Server Error Failed Loading the ServerLevelPluginDLL	
2021-05-19 06:18:40.607 +09:00	rootdc1.offsec.lan	150	high	Possible CVE-2021-1675 Print Spooler Exploitation	
2021-05-19 06:18:40.607 +09:00	rootdc1.offsec.lan	150	critical	Mimikatz Use	
2021-05-19 06:23:27.038 +09:00	rootdc1.offsec.lan	150	critical	DNS Server Error Failed Loading the ServerLevelPluginDLL	
2021-05-19 06:23:27.038 +09:00	rootdc1.offsec.lan	150	high	Possible CVE-2021-1675 Print Spooler Exploitation	
2021-05-19 06:23:27.038 +09:00	rootdc1.offsec.lan	150	critical	Mimikatz Use	
2021-05-19 06:30:17.318 +09:00	rootdc1.offsec.lan	4688	high	Possible CVE-2021-1675 Print Spooler Exploitation	
2021-05-19 06:30:17.318 +09:00	rootdc1.offsec.lan	4688	critical	Mimikatz Use	
2021-05-19 06:30:17.318 +09:00	rootdc1.offsec.lan	4688	high	Relevant Anti-Virus Event	
2021-05-19 06:33:49.548 +09:00	rootdc1.offsec.lan	770	critical	DNS Server Error Failed Loading the ServerLevelPluginDLL	
2021-05-19 06:33:49.548 +09:00	rootdc1.offsec.lan	770	high	Possible CVE-2021-1675 Print Spooler Exploitation	
2021-05-19 06:33:49.548 +09:00	rootdc1.offsec.lan	770	high	Relevant Anti-Virus Event	
2021-05-19 06:33:49.548 +09:00	rootdc1.offsec.lan	770	critical	Mimikatz Use	
2021-05-20 21:49:31.863 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: adminmig
2021-05-20 21:49:46.875 +09:00	fs01.offsec.lan	4648	informational	Explicit Logon	Source User: FS01\$ : Target User: sshd_5848 : IP Address: - : Process: C:\Program Files\OpenSSH\OpenSSH-7.4p1-1.1.0.1-1~1\sshd.exe : Port: 22 : LogonID: 0x3c569ed
2021-05-20 21:49:46.876 +09:00	fs01.offsec.lan	4624	low	Logon Type 5 - Service	User: sshd_5848 : Workstation: - : IP Address: - : Port: - : LogonID: 0x3c569ed
2021-05-20 21:49:46.876 +09:00	fs01.offsec.lan	4672	informational	Admin Logon	User: sshd_5848 : LogonID: 0x3c569ed
2021-05-20 21:49:52.315 +09:00	fs01.offsec.lan	4776	informational	NTLM Logon to Local Account	User: NOUSER : Workstation FS01 : Status: 0xc0000064
2021-05-20 21:49:52.315 +09:00	fs01.offsec.lan	4625	informational	Logon Failure - Username does not exist	User: NOUSER : Type: 8 : Workstation: FS01 : IP Address: - : SubStatus: 0xc0000064 : AuthP

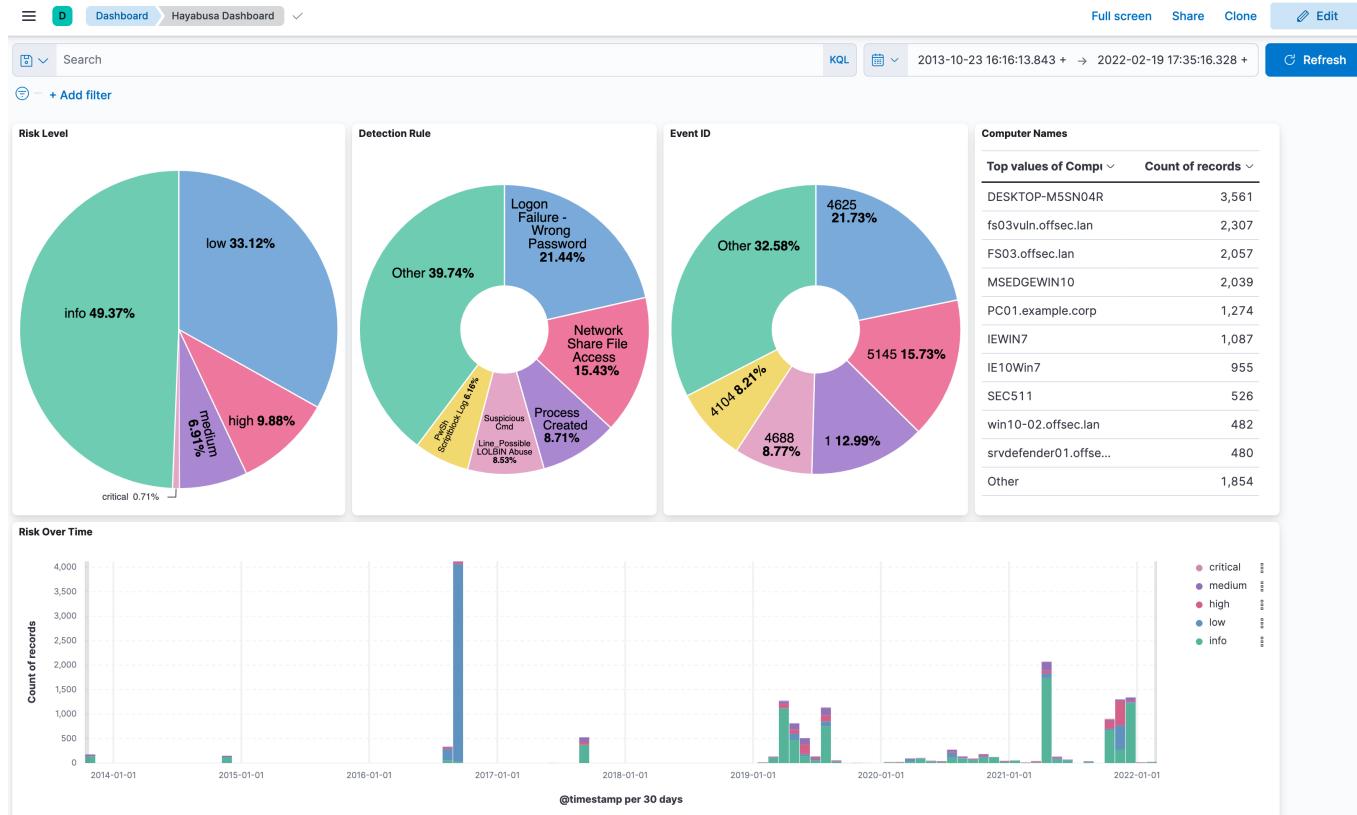
## Analysis in Timeline Explorer

Time	Computername	Eventid	Level	Alert	Details
2021-05-22 05:43:18.227 +09:00	fs01.offsec.lan	4648	informational	Explicit Logon	Source User: FS01\$ : Target User: admmig
2021-05-22 05:43:22.562 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:49.345 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:50.131 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:50.607 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:50.866 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admmig@offsec.lan : Type: 8 : Wor
2021-05-23 06:56:57.685 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: admmig
2021-05-23 06:57:11.842 +09:00	fs01.offsec.lan	4688	high	Relevant Anti-Virus Event	
2021-05-23 06:57:11.842 +09:00	fs01.offsec.lan	4688	critical	Mimikatz Use	
2021-05-26 22:02:27.149 +09:00	mssql01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admmig : Workstation: - : IP Addr
2021-05-26 22:02:27.155 +09:00	mssql01.offsec.lan	5145	medium	DCERPC SMB Spoolss Named Pipe	
2021-05-26 22:02:27.155 +09:00	mssql01.offsec.lan	5145	critical	CVE-2021-1675 Print Spooler Exploitation IPC Access	
2021-05-26 22:02:29.726 +09:00	mssql01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admmig : Workstation: - : IP Addr
2021-05-26 22:02:29.734 +09:00	mssql01.offsec.lan	5145	medium	DCERPC SMB Spoolss Named Pipe	
2021-05-26 22:02:29.734 +09:00	mssql01.offsec.lan	5145	critical	CVE-2021-1675 Print Spooler Exploitation IPC Access	
2021-05-26 22:02:34.373 +09:00	mssql01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admmig : Workstation: - : IP Addr
2021-05-26 22:02:34.375 +09:00	mssql01.offsec.lan	5145	medium	DCERPC SMB Spoolss Named Pipe	
2021-05-26 22:02:34.379 +09:00	mssql01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admmig : Workstation: - : IP Addr
2021-05-26 22:02:34.380 +09:00	mssql01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admmig : Workstation: - : IP Addr
2021-05-27 05:24:46.570 +09:00	rootdc1.offsec.lan	4768	medium	Possible AS-REP Roasting	Possible AS-REP Roasting
2021-05-27 05:24:46.570 +09:00	rootdc1.offsec.lan	4768	informational	Kerberos TGT was requested	User: admin-test : Service: krbtgt : IP
2021-06-01 23:06:34.542 +09:00	fs01.offsec.lan	4720	medium	Local user account created	User: WADGUtilityAccount : SID:S-1-5-21-1081258321-3780
2021-06-01 23:08:21.225 +09:00	fs01.offsec.lan	4720	medium	Local user account created	User: elie : SID:S-1-5-21-1081258321-3780
2021-06-03 21:17:56.988 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: admmig
2021-06-03 21:18:12.941 +09:00	fs01.offsec.lan	4672	informational	Admin Logon	User: admmig : LogonID: 0x322e5b7
2021-06-03 21:18:12.942 +09:00	fs01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admmig : Workstation: - : IP Addr
2021-06-04 03:34:12.672 +09:00	fs01.offsec.lan	4104	high	Windows Firewall Profile Disabled	
2021-06-04 04:17:44.873 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: admmig

## Critical Alert Filtering and Computer Grouping in Timeline Explorer

Computername ▾					
Line	Tag	Time	Eventid	Level	Alert
▼ =	■	2021-05-26 22:02:34.375 +09:00	5145	= critical	
▶ Computername: 01566s-win16-ir.threebeesco.com (Count: 1)					
▶ Computername: alice.insecurebank.local (Count: 3)					
△ Computername: DC1.insecurebank.local (Count: 18)					
5540	■	2019-03-26 06:28:45.026 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5539	■	2019-03-26 06:28:45.026 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5538	■	2019-03-26 06:28:45.026 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5537	■	2019-03-26 06:28:45.026 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5536	■	2019-03-26 06:28:45.025 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5535	■	2019-03-26 06:28:45.025 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5534	■	2019-03-26 06:28:45.025 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5533	■	2019-03-26 06:28:45.025 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5532	■	2019-03-26 06:28:45.025 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5531	■	2019-03-26 06:28:45.024 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5530	■	2019-03-26 06:28:45.024 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5529	■	2019-03-26 06:28:45.024 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5528	■	2019-03-26 06:28:45.023 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5527	■	2019-03-26 06:28:45.023 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5526	■	2019-03-26 06:28:45.023 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5525	■	2019-03-26 06:28:45.023 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5524	■	2019-03-26 06:28:45.022 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
5523	■	2019-03-26 06:28:45.022 +09:00	5136	critical	Powerview Add-DomainObjectAcl DCSync AD Extend Right
▶ Computername: DESKTOP-PIU87N6 (Count: 1)					

## Analysis with the Elastic Stack Dashboard



Top 10 Alerts							Top 10 Critical Alerts							Top 10 High Alerts						
Top values of RuleTitle		info	Count	low	Count	high	Count	medium	Count	critical	Count	Top values of RuleTitle		Count of records	Top values of RuleTitle		Count of records			
Network Share File Access		2,564	-	-	-	-	-	Mimikatz Use		33		Malicious Service Possibly Inst...		271						
Process Created		1,447	-	-	-	-	-	Powershell Add-DomainObjectAcl...		22		Suspicious Service Installed		257						
PwSh Scriptblock Log		1,024	-	-	-	-	-	Sticky Key Like Backdoor Usage		8		System Log File Cleared		97						
PwSh Pipeline Execution		680	-	-	-	-	-	Active Directory Replication from ...		6		Suspicious Remote Thread Crea...		94						
Network Share Access		433	-	-	-	-	-	EfsPotato Named Pipe		6		Accessing WinAPI in PowerShe...		93						
Other		2,058	223	831	594	4:	4:	WannaCry Ransomware		4		Relevant Anti-Virus Event		71						
Logon Failure - Wrong Password		-	3,564	-	-	-	-	CobaltStrike Service Installations		3		Security Log Cleared		66						
Suspicious Cmd Line_Possible_LOLBIN ...		-	1,418	-	-	-	-	DNS Server Error Failed Loading t...		3		Process Created_Sysmon Alert		60						
Process Access		-	154	-	-	-	-	Dumpert Process Dumper		3		Disabling Windows Event Audit...		42						
Image Loaded_Sysmon Alert		-	108	-	-	-	-	LSASS Access from Non System ...		3		Malicious PowerShell Keywords		30						
Process Start From Suspicious Folder		-	39	-	-	-	-	Other		27		Other		562						

**Hayabusa Discover** (16622 documents)

Time	Computer	EventID	Level	MitreAttack	RuleTitle	Details
> 2022-02-19 17:35:16.328 +00:00	DESKTOP-TTEQ6PR	7	info	Persis   Evas   Pr ivEsc	Windows Spooler Service Suspicious Binary Load	-
> 2022-02-19 17:35:16.301 +00:00	DESKTOP-TTEQ6PR	11	info	-	File Created	Path: C:\Windows\System32\spool\drivers\x64\4\Test.dll   Process: C:\Users\win10\Desktop\SpoolPool-main\SpoolPool.exe   PID: 1232   PUUID: 0BDAA6306-2A54-6211-0B01-000000001000
> 2022-02-19 17:35:16.301 +00:00	DESKTOP-TTEQ6PR	11	medium	-	Rename Common File to DLL	-
> 2022-02-19 17:35:16.207 +00:00	DESKTOP-TTEQ6PR	1	info	-	Process Created	Cmd: "C:\Users\win10\Desktop\SpoolPool-main\SpoolPool.exe" -d11 C:\ProgramData\Test.dll   Process: C:\Users\win10\Desktop\SpoolPool-main\SpoolPool.exe   User: DESKTOP-TTEQ6PR\win10   Parent Cmd: "C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe" -noexit -command Set-Location -LiteralPath "C:\Users\win10\Desktop\SpoolPool-main"   L ID: 0x277ef   PID: 1232   PUUID: 0BDAA6306-2A54-6211-0B01-000000001000
> 2022-02-19 17:35:16.207 +00:00	DESKTOP-TTEQ6PR	1	low	Exec	Process Start From Suspicious Folder	-
> 2022-02-16 19:37:20.934 +00:00	01566s-win16-ir.t hreebeesco.com	5145	info	Collect	Network Share File Access	User: samir   Share Name: \\*\ICS   Share Path: \?\C:\   Path: Users\PSECURITY   IP Addr: 172.16.66.36   LID: 0x567758

## Analysis in Timesketch

2019-05-08T02:10:43	<input type="checkbox"/> Active Directory Replication from Non Machine Account	User: Administrator   ObjSvr: DS   ObjName: %{c6faf700-bfe4-452a-a766-424f84c29583}   OpType: Object Access   HID: 0x0   LID: 0x40c6511	4662	DC1.insecurebank.local	Sec	T1003.006
2019-05-08T02:10:43	<input type="checkbox"/> Active Directory Replication from Non Machine Account	User: Administrator   ObjSvr: DS   ObjName: %{c6faf700-bfe4-452a-a766-424f84c29583}   OpType: Object Access   HID: 0x0   LID: 0x40c6511	4662	DC1.insecurebank.local	Sec	T1003.006
2019-05-08T02:10:43	<input type="checkbox"/> Active Directory Replication from Non Machine Account	User: Administrator   ObjSvr: DS   ObjName: %{c6faf700-bfe4-452a-a766-424f84c29583}   OpType: Object Access   HID: 0x0   LID: 0x40c6511	4662	DC1.insecurebank.local	Sec	T1003.006
4 days						
2019-05-12T12:52:43	<input type="checkbox"/> Meterpreter or Cobalt Strike Getsystem Service Installation	Svc: WinPwnage   Path: %COMSPEC% /c ping -n 1 127.0.0.1 >nul && echo 'WinPwnage' > \\.\pipe\WinPwnagePipe   Acct: LocalSystem   StartType: demand start	7045	IEWIN7	Sys	T1134.001 : T1134.002
39 days						
2019-06-21T07:35:37	<input type="checkbox"/> Dumpert Process Dumper	Path: C:\Windows\Temp\dumpert.dmp   Process: C:\Users\administrator\Desktop\x64\O utfleck-Dumpert.exe   PID: 3572   PGUID: ECAD0485-88C9-5D0C-0000-0010348C1D00	11	alice.insecurebank.local	Sysmon	T1003.001

## Analyzing Sample Timeline Results

You can check out a sample CSV timeline [here](#).

You can learn how to analyze CSV timelines in Excel and Timeline Explorer [here](#).

You can learn how to import CSV files into Elastic Stack [here](#).

You can learn how to import CSV files into Timesketch [here](#).

## Features

- Cross-platform support: Windows, Linux, macOS.
- Developed in Rust to be memory safe and faster than a hayabusa falcon!
- Multi-thread support delivering up to a 5x speed improvement.
- Creates a single easy-to-analyze CSV timeline for forensic investigations and incident response.
- Threat hunting based on IoC signatures written in easy to read/create/edit YML based hayabusa rules.
- Sigma rule support to convert sigma rules to hayabusa rules.
- Currently it supports the most sigma rules compared to other similar tools and even supports count rules and new aggregators such as [|equalsfield](#).
- Event ID metrics. (Useful for getting a picture of what types of events there are and for tuning your log settings.)
- Rule tuning configuration by excluding unneeded or noisy rules.
- MITRE ATT&CK mapping of tactics.

- Rule level tuning.
- Create a list of unique pivot keywords to quickly identify abnormal users, hostnames, processes, etc... as well as correlate events.
- Output all fields for more thorough investigations.
- Successful and failed logon summary.
- Enterprise-wide threat hunting and DFIR on all endpoints with [Velociraptor](#).
- Output to CSV, JSON or JSONL and HTML Summary Reports.
- Daily Sigma rule updates.

## Downloads

---

Please download the latest stable version of Hayabusa with compiled binaries or compile the source code from the [Releases](#) page.

## Git cloning

---

You can `git clone` the repository with the following command and compile binary from source code:

**Warning:** The main branch of the repository is for development purposes so you may be able to access new features not yet officially released, however, there may be bugs so consider it unstable.

```
git clone https://github.com/Yamato-Security/hayabusa.git --recursive
```

Note: If you forget to use `--recursive` option, the `rules` folder, which is managed as a git submodule, will not be cloned.

You can sync the `rules` folder and get latest Hayabusa rules with `git pull --recurse-submodules` or use the following command:

```
hayabusa-1.7.1-win-x64.exe -u
```

If the update fails, you may need to rename the `rules` folder and try again.

**Caution:** When updating, rules and config files in the `rules` folder are replaced with the latest rules and config files in the [hayabusa-rules](#) repository. Any changes you make to existing files will be overwritten, so we recommend that you make backups of any files that you edit before updating. If you are performing level tuning with `--level-tuning`, please re-tune your rule files after each update. If you add **new** rules inside of the `rules` folder, they will **not** be overwritten or deleted when updating.

## Advanced: Compiling From Source (Optional)

---

If you have Rust installed, you can compile from source with the following command:

```
cargo build --release
```

You can download the latest unstable version from the main branch or the latest stable version from the [Releases](#) page.

Be sure to periodically update Rust with:

```
rustup update stable
```

The compiled binary will be outputted in the `./target/release` folder.

## Updating Rust Packages

You can update to the latest Rust crates before compiling:

```
cargo update
```

Please let us know if anything breaks after you update.

## Cross-compiling 32-bit Windows Binaries

You can create 32-bit binaries on 64-bit Windows systems with the following:

```
rustup install stable-i686-pc-windows-msvc
rustup target add i686-pc-windows-msvc
rustup run stable-i686-pc-windows-msvc cargo build --release
```

## macOS Compiling Notes

If you receive compile errors about openssl, you will need to install [Homebrew](#) and then install the following packages:

```
brew install pkg-config
brew install openssl
```

## Linux Compiling Notes

If you receive compile errors about openssl, you will need to install the following package.

Ubuntu-based distros:

```
sudo apt install libssl-dev
```

Fedora-based distros:

```
sudo yum install openssl-devel
```

## Cross-compiling Linux MUSL Binaries

On a Linux OS, first install the target.

```
rustup install stable-x86_64-unknown-linux-musl
rustup target add x86_64-unknown-linux-musl
```

Compile with:

```
cargo build --release --target=x86_64-unknown-linux-musl
```

The MUSL binary will be created in the [./target/x86\\_64-unknown-linux-musl/release/](#) directory. MUSL binaries are about 15% slower than the GNU binaries, however, they are more portable across different versions and distributions of linux.

## Running Hayabusa

### Caution: Anti-Virus/EDR Warnings and Slow Runtimes

You may receive an alert from anti-virus or EDR products when trying to run hayabusa or even just when downloading the [.yml](#) rules as there will be keywords like [mimikatz](#) and suspicious PowerShell commands in the detection signature. These are false positives so will need to configure exclusions in your security products to allow hayabusa to run. If you are worried about malware or supply chain attacks, please check the hayabusa source code and compile the binaries yourself.

You may experience slow runtime especially on the first run after a reboot due to the real-time protection of Windows Defender. You can avoid this by temporarily turning real-time protection off or adding an exclusion to the hayabusa runtime directory. (Please take into consideration the security risks before doing these.)

### Windows

In a Command/PowerShell Prompt or Windows Terminal, just run the appropriate 32-bit or 64-bit Windows binary.

Example: [hayabusa-1.7.1-windows-x64.exe](#)

## Linux

You first need to make the binary executable.

```
chmod +x ./hayabusa-1.7.1-linux-x64-gnu
```

Then run it from the Hayabusa root directory:

```
./hayabusa-1.7.1-linux-x64-gnu
```

## macOS

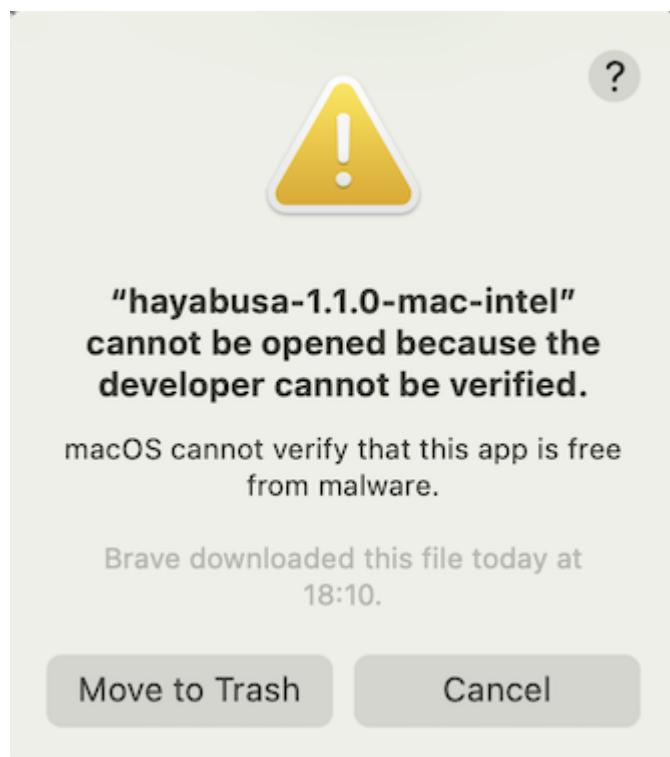
From Terminal or iTerm2, you first need to make the binary executable.

```
chmod +x ./hayabusa-1.7.1-mac-intel
```

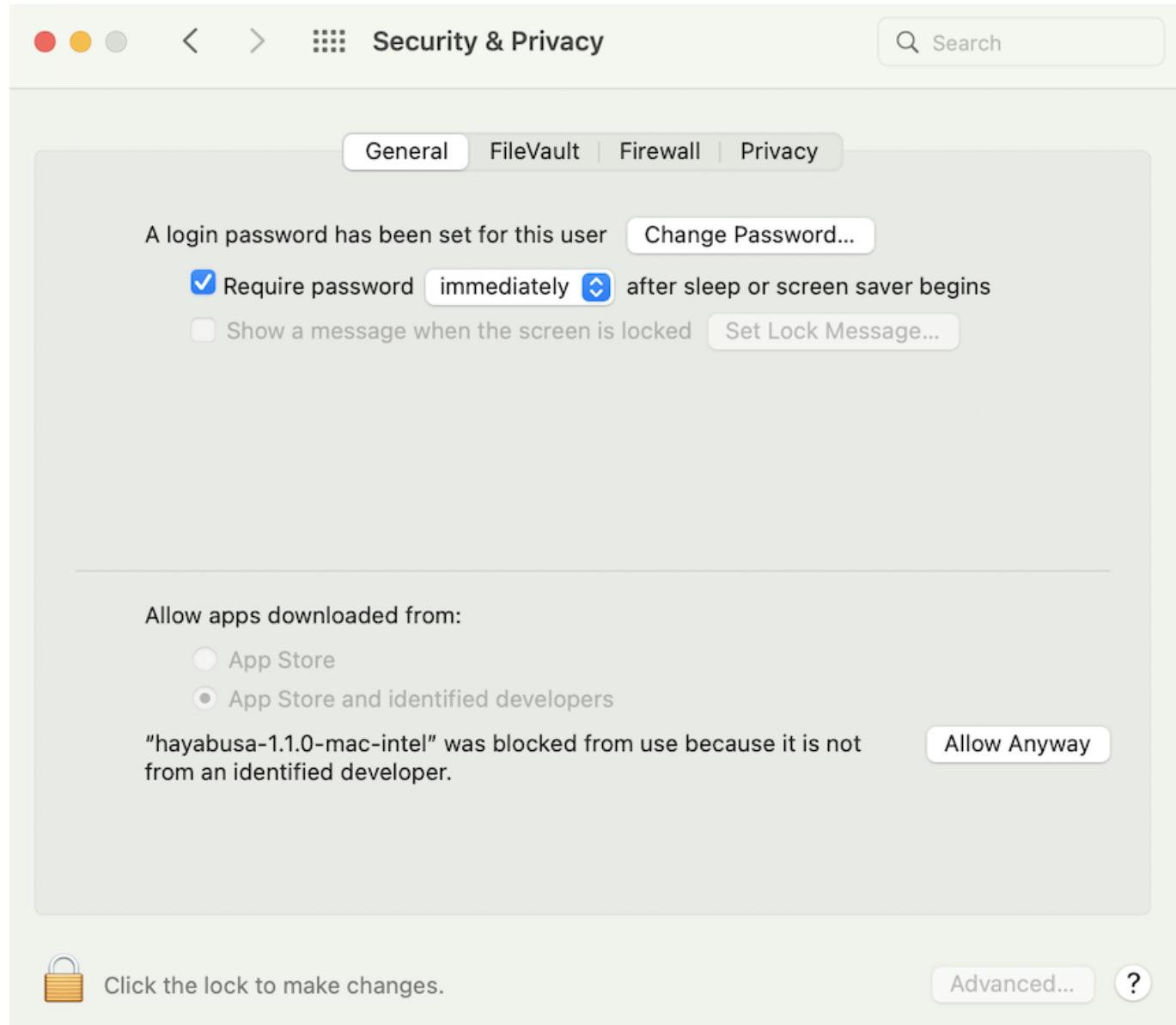
Then, try to run it from the Hayabusa root directory:

```
./hayabusa-1.7.1-mac-intel
```

On the latest version of macOS, you may receive the following security error when you try to run it:



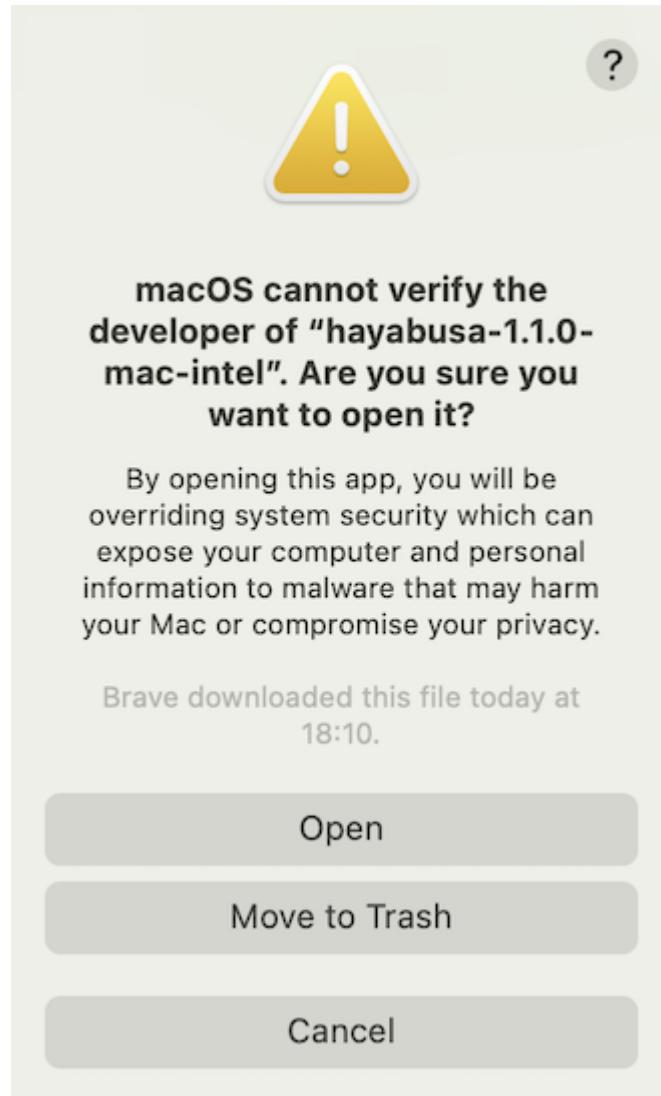
Click "Cancel" and then from System Preferences, open "Security & Privacy" and from the General tab, click "Allow Anyway".



After that, try to run it again.

```
./hayabusa-1.7.1-mac-intel
```

The following warning will pop up, so please click "Open".



You should now be able to run hayabusa.

## Usage

---

### Main commands

- default: Create a fast forensics timeline.
- `--level-tuning`: Custom tune the alerts' `level`.
- `-L, --logon-summary`: Print a summary of logon events.
- `-P, --pivot-keywords-list`: Print a list of suspicious keywords to pivot on.
- `-M, --metrics`: Print metrics of the number and percentage of events based on Event ID.
- `--set-default-profile`: Change the default profile.
- `-u, --update`: Sync the rules to the latest rules in the [hayabusa-rules](#) GitHub repository.

### Command Line Options

```
USAGE:  
hayabusa.exe <INPUT> [OTHER-ACTIONS] [OPTIONS]
```

```
INPUT:
```

-d, --directory <DIRECTORY>	Directory of multiple .evtx files
-f, --file <FILE>	File path to one .evtx file
-l, --live-analysis	Analyze the local
C:\Windows\System32\winevt\Logs folder	
<b>ADVANCED:</b>	
-c, --rules-config <DIRECTORY> directory (default: ./rules/config)	Specify custom rule config
-Q, --quiet-errors save error logs	Quiet errors mode: do not
-r, --rules <DIRECTORY/FILE> directory or file (default: ./rules)	Specify a custom rule
-t, --thread-number <NUMBER> optimal number for performance	Thread number (default: optimal number for performance)
--target-file-ext <EVTX_FILE_EXT>... file extensions (ex: evtx_data) (ex: evtx1 evtx2)	Specify additional target
<b>OUTPUT:</b>	
-H, --html-report <FILE> results.html	Save detail Results Summary in html (ex: results.html)
-j, --json o results.json	Save the timeline in JSON format (ex: -j -o results.json)
-J, --jsonl o results.jsonl	Save the timeline in JSONL format (ex: -J -o results.jsonl)
-o, --output <FILE> results.csv	Save the timeline in CSV format (ex: results.csv)
-P, --profile <PROFILE> verbose, verbose-all-field-info, verbose-details-and-all-field-info	Specify output profile (minimal, standard, verbose, verbose-all-field-info, verbose-details-and-all-field-info)
<b>DISPLAY-SETTINGS:</b>	
--no-color	Disable color output
--no-summary	Do not display result summary
-q, --quiet banner	Quiet mode: do not display the launch
-v, --verbose	Output verbose information
-V, --visualize-timeline	Output event frequency timeline
<b>FILTERING:</b>	
-D, --deep-scan all events (slower)	Disable event ID filter to scan
--enable-deprecated-rules	Enable rules marked as deprecated
--exclude-status <STATUS>... (ex: experimental) (ex: stable test)	Ignore rules according to status
-m, --min-level <LEVEL> informational	Minimum level for rules (default: informational)
-n, --enable-noisy-rules	Enable rules marked as noisy
--timeline-end <DATE> (ex: "2022-02-22 23:59:59 +09:00")	End time of the event logs to load
--timeline-start <DATE> load (ex: "2020-02-22 00:00:00 +09:00")	Start time of the event logs to load
<b>OTHER-ACTIONS:</b>	
--contributors	Print the list of contributors
-L, --logon-summary	Print a summary of successful

```

and failed logons
    --level-tuning [<FILE>]           Tune alert levels (default:
./rules/config/level_tuning.txt)
    -M, --metrics                      Print event ID metrics
    -p, --pivot-keywords-list          Create a list of pivot keywords
    --set-default-profile <PROFILE>    Set default output profile
    -u, --update-rules                 Update to the latest rules in
the hayabusa-rules github repository

```

#### TIME-FORMAT:

--European-time	Output timestamp in European time format
(ex: 22-02-2022 22:00:00.123 +02:00)	
--RFC-2822	Output timestamp in RFC 2822 format (ex:
Fri, 22 Feb 2022 22:00:00 -0600)	
--RFC-3339	Output timestamp in RFC 3339 format (ex:
2022-02-22 22:00:00.123456-06:00)	
--US-military-time	Output timestamp in US military time format
(ex: 02-22-2022 22:00:00.123 -06:00)	
--US-time	Output timestamp in US time format (ex: 02-
22-2022 10:00:00.123 PM -06:00)	
-U, --UTC	Output time in UTC format (default: local time)

## Usage Examples

- Run hayabusa against one Windows event log file with default standard profile:

```
hayabusa-1.7.1-win-x64.exe -f eventlog.evtx
```

- Run hayabusa against the sample-evtx directory with multiple Windows event log files with the verbose profile:

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -P verbose
```

- Export to a single CSV file for further analysis with excel, timeline explorer, elastic stack, etc... and include all field information (Warning: your file output size will become much larger with the **verbose-details-and-all-field-info** profile!):

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -o results.csv -P verbose-details-and-all-field-info
```

- Save the timeline in JSON format:

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -o results.json -j
```

- Only run hayabusa rules (the default is to run all the rules in `-r .\rules`):

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\hayabusa -o results.csv
```

- Only run hayabusa rules for logs that are enabled by default on Windows:

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\hayabusa\default -o results.csv
```

- Only run hayabusa rules for sysmon logs:

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\hayabusa\sysmon -o results.csv
```

- Only run sigma rules:

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\sigma -o results.csv
```

- Enable deprecated rules (those with `status` marked as `deprecated`) and noisy rules (those whose rule ID is listed in `.\rules\config\noisy_rules.txt`):

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx --enable-noisy-rules --enable-deprecated-rules -o results.csv
```

- Only run rules to analyze logons and output in the UTC timezone:

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\hayabusa\default\events\Security\Logons -U -o results.csv
```

- Run on a live Windows machine (requires Administrator privileges) and only detect alerts (potentially malicious behavior):

```
hayabusa-1.7.1-win-x64.exe -l -m low
```

- Create a list of pivot keywords from critical alerts and save the results. (Results will be saved to **keywords–Ip Addresses.txt**, **keywords–Users.txt**, etc...):

```
hayabusa-1.7.1-win-x64.exe -l -m critical -p -o keywords
```

- Print Event ID metrics:

```
hayabusa-1.7.1-win-x64.exe -f Security.evtx -M
```

- Print logon summary:

```
hayabusa-1.7.1-win-x64.exe -L -f Security.evtx -M
```

- Print verbose information (useful for determining which files take long to process, parsing errors, etc...):

```
hayabusa-1.7.1-win-x64.exe -d .\hayabusa-sample-evtx -v
```

- Verbose output example:

```
Checking target evtx FilePath: "./hayabusa-sample-
evtx/YamatoSecurity/T1027.004_0bfuscated Files or Information\u{a0}Compile
After Delivery/sysmon.evtx"
1 / 509 [>-----
-----]
-] 0.20 % 1s
Checking target evtx FilePath: "./hayabusa-sample-
evtx/YamatoSecurity/T1558.004_Steal or Forge Kerberos Tickets AS-REP
Roasting/Security.evtx"
2 / 509 [>-----
-----]
-] 0.39 % 1s
Checking target evtx FilePath: "./hayabusa-sample-
evtx/YamatoSecurity/T1558.003_Steal or Forge Kerberos
Tickets\u{a0}Kerberoasting/Security.evtx"
3 / 509 [>-----
-----]
-] 0.59 % 1s
Checking target evtx FilePath: "./hayabusa-sample-
evtx/YamatoSecurity/T1197_BITS Jobs/Windows-BitsClient.evtx"
4 / 509 [=>-----
-----]
-] 0.79 % 1s
Checking target evtx FilePath: "./hayabusa-sample-
```

```
evtx/YamatoSecurity/T1218.004_Signed Binary Proxy  
Execution\u{a0}InstallUtil/sysmon.evtx"  
5 / 509 [=-----  
-----  
-] 0.98 % 1s
```

- Output to a CSV format compatible to import into [Timesketch](#):

```
hayabusa-1.7.1-win-x64.exe -d ../hayabusa-sample-evtx --RFC-3339 -o  
timesketch-import.csv -P timesketch -U
```

- Quiet error mode: By default, hayabusa will save error messages to error log files. If you do not want to save error messages, please add `-Q`.

## Pivot Keyword Generator

You can use the `-p` or `--pivot-keywords-list` option to create a list of unique pivot keywords to quickly identify abnormal users, hostnames, processes, etc... as well as correlate events. You can customize what keywords you want to search for by editing `./config/pivot_keywords.txt`. This is the default setting:

```
Users.SubjectUserName  
Users.TargetUserName  
Users.User  
Logon IDs.SubjectLogonId  
Logon IDs.TargetLogonId  
Workstation Names.WorkstationName  
Ip Addresses.IpAddress  
Processes.Image
```

The format is `KeywordName.FieldName`. For example, when creating the list of `Users`, hayabusa will list up all the values in the `SubjectUserName`, `TargetUserName` and `User` fields. By default, hayabusa will return results from all events (informational and higher) so we highly recommend combining the `--pivot-keyword-list` option with the `-m` or `--min-level` option. For example, start off with only creating keywords from `critical` alerts with `-m critical` and then continue with `-m high`, `-m medium`, etc... There will most likely be common keywords in your results that will match on many normal events, so after manually checking the results and creating a list of unique keywords in a single file, you can then create a narrowed down timeline of suspicious activity with a command like `grep -f keywords.txt timeline.csv`.

## Logon Summary Generator

You can use the `-L` or `--logon-summary` option to output logon information summary (logon usernames and successful and failed logon count). You can display the logon information for one evtx file with `-f` or multiple evtx files with the `-d` option.

# Testing Hayabusa on Sample Evtx Files

---

We have provided some sample evtx files for you to test hayabusa and/or create new rules at  
<https://github.com/Yamato-Security/hayabusa-sample-evtx>

You can download the sample evtx files to a new `hayabusa-sample-evtx` sub-directory with the following command:

```
git clone https://github.com/Yamato-Security/hayabusa-sample-evtx.git
```

## Hayabusa Output

---

### Profiles

Hayabusa has 5 pre-defined profiles to use in `config/profiles.yaml`:

1. `minimal`
2. `standard` (default)
3. `verbose`
4. `all-field-info`
5. `all-field-info-verbose`
6. `super-verbose`
7. `timesketch-minimal`
8. `timesketch-verbose`

You can easily customize or add your own profiles by editing this file. You can also easily change the default profile with `--set-default-profile <profile>`.

#### 1. `minimal` profile output

```
%Timestamp%, %Computer%, %Channel%, %EventID%, %Level%, %RuleTitle%, %Details%
```

#### 2. `standard` profile output

```
%Timestamp%, %Computer%, %Channel%, %EventID%, %Level%, %RecordID%, %RuleTitle%,  
%Details%
```

#### 3. `verbose` profile output

```
%Timestamp%, %Computer%, %Channel%, %EventID%, %Level%, %MitreTactics, %MitreTags%,  
%OtherTags%, %RecordID%, %RuleTitle%, %Details%, %RuleFile%, %EvtxFile%
```

#### 4. `all-field-info` profile output

Instead of outputting the minimal `details` information, all field information in the `EventData` section will be outputted.

%Timestamp%, %Computer%, %Channel%, %EventID%, %Level%, %RecordID%, %RuleTitle%,  
 %AllFieldInfo%, %RuleFile%, %EvtxFile%

## 5. **all-field-info-verbose** profile output

**all-field-info** profile plus tag information.

%Timestamp%, %Computer%, %Channel%, %EventID%, %Level%, %MitreTactics, %MitreTags%,  
 %OtherTags%, %RecordID%, %RuleTitle%, %AllFieldInfo%, %RuleFile%, %EvtxFile%

## 6. **super-verbose** profile output

**verbose** profile plus all field information. (Warning: this will usually double the output file size!)

%Timestamp%, %Computer%, %Channel%, %EventID%, %Level%, %MitreTactics, %MitreTags%,  
 %OtherTags%, %RecordID%, %RuleTitle%, %Details%, %RuleFile%, %EvtxFile%, %AllFieldInfo%

## 7. **timesketch-minimal** profile output

The **verbose** profile that is compatible with importing into [Timesketch](#).

%Timestamp%, hayabusa, %RuleTitle%, %Computer%, %Channel%, %EventID%, %Level%,  
 %MitreTactics, %MitreTags%, %OtherTags%, %RecordID%, %Details%, %RuleFile%, %EvtxFile%

## 8. **timesketch-verbose** profile output

The **super-verbose** profile that is compatible with importing into [Timesketch](#).

%Timestamp%, hayabusa, %RuleTitle%, %Computer%, %Channel%, %EventID%, %Level%,  
 %MitreTactics, %MitreTags%, %OtherTags%, %RecordID%, %Details%, %RuleFile%, %EvtxFile%,  
 %AllFieldInfo%

## Profile Comparison

The following benchmarks were conducted on a 2018 MBP with 7.5GB of evtx data.

Profile	Processing Time	Output Filesize
minimal	16 minutes 18 seconds	690 MB
standard	16 minutes 23 seconds	710 MB
verbose	17 minutes	990 MB
timesketch-minimal	17 minutes	1015 MB
all-field-info-verbose	16 minutes 50 seconds	1.6 GB
super-verbose	17 minutes 12 seconds	2.1 GB

## Profile Field Aliases

Alias name	Hayabusa output information
------------	-----------------------------

Alias name	Hayabusa output information
%Timestamp%	Default is <code>YYYY-MM-DD HH:mm:ss.sss +hh:mm</code> format. <code>&lt;Event&gt;&lt;System&gt;&lt;TimeCreated SystemTime&gt;</code> field in the event log. The default timezone will be the local timezone but you can change the timezone to UTC with the <code>--UTC</code> option.
%Computer%	The <code>&lt;Event&gt;&lt;System&gt;&lt;Computer&gt;</code> field.
%Channel%	The name of log. <code>&lt;Event&gt;&lt;System&gt;&lt;Channel&gt;</code> field.
%EventID%	The <code>&lt;Event&gt;&lt;System&gt;&lt;EventID&gt;</code> field.
%Level%	The <code>level</code> field in the YML detection rule. ( <code>informational, low, medium, high, critical</code> )
%MitreTactics%	MITRE ATT&CK <a href="#">tactics</a> (Ex: Initial Access, Lateral Movement, etc...).
%MitreTags%	MITRE ATT&CK Group ID, Technique ID and Software ID.
%OtherTags%	Any keyword in the <code>tags</code> field in a YML detection rule which is not included in <code>MitreTactics</code> or <code>MitreTags</code> .
%RecordID%	The Event Record ID from <code>&lt;Event&gt;&lt;System&gt;&lt;EventRecordID&gt;</code> field.
%RuleTitle%	The <code>title</code> field in the YML detection rule.
%Details%	The <code>details</code> field in the YML detection rule, however, only hayabusa rules have this field. This field gives extra information about the alert or event and can extract useful data from the fields in event logs. For example, usernames, command line information, process information, etc... When a placeholder points to a field that does not exist or there is an incorrect alias mapping, it will be outputted as <code>n/a</code> (not available). If the <code>details</code> field is not specified (i.e. sigma rules), default <code>details</code> messages to extract fields defined in <code>./rules/config/default_details.txt</code> will be outputted. You can add more default <code>details</code> messages by adding the <code>Provider Name, EventID</code> and <code>details</code> message you want to output in <code>default_details.txt</code> . When no <code>details</code> field is defined in a rule nor in <code>default_details.txt</code> , all fields will be outputted to the <code>details</code> column.
%AllFieldInfo%	All field information.
%RuleFile%	The filename of the detection rule that generated the alert or event.
%EvtxFile%	The evtx filename that caused the alert or event.

You can use these aliases in your output profiles, as well as define other [event key aliases](#) to output other fields.

## Level Abbreviations

In order to save space, we use the following abbreviations when displaying the alert `level`.

- `crit:critical`
- `high:high`
- `med :med`

- `low` : low
- `info`: informational

## MITRE ATT&CK Tactics Abbreviations

In order to save space, we use the following abbreviations when displaying MITRE ATT&CK tactic tags. You can freely edit these abbreviations in the `./config/output_tag.txt` configuration file. If you want to output all the tags defined in a rule, please specify the `--all-tags` option.

- `Recon` : Reconnaissance
- `ResDev` : Resource Development
- `InitAccess` : Initial Access
- `Exec` : Execution
- `Persis` : Persistence
- `PrivEsc` : Privilege Escalation
- `Evas` : Defense Evasion
- `CredAccess` : Credential Access
- `Disc` : Discovery
- `LatMov` : Lateral Movement
- `Collect` : Collection
- `C2` : Command and Control
- `Exfil` : Exfiltration
- `Impact` : Impact

## Channel Abbreviations

In order to save space, we use the following abbreviations when displaying Channel. You can freely edit these abbreviations in the `./rules/config/channel_abbreviations.txt` configuration file.

- `App` : Application
- `AppLocker` : Microsoft-Windows-AppLocker/\*
- `BitsCli` : Microsoft-Windows-Bits-Client/Operational
- `CodeInteg` : Microsoft-Windows-CodeIntegrity/Operational
- `Defender` : Microsoft-Windows-Windows Defender/Operational
- `DHCP-Srv` : Microsoft-Windows-DHCP-Server/Operational
- `DNS-Svr` : DNS Server
- `DvrFmwk` : Microsoft-Windows-DriverFrameworks-UserMode/Operational
- `Exchange` : MSExchange Management
- `Firewall` : Microsoft-Windows-Windows Firewall With Advanced Security/Firewall
- `KeyMgtSvc` : Key Management Service
- `LDAP-Cli` : Microsoft-Windows-LDAP-Client/Debug
- `NTLM` : Microsoft-Windows-NTLM/Operational
- `OpenSSH` : OpenSSH/Operational
- `PrintAdm` : Microsoft-Windows-PrintService/Admin
- `PrintOp` : Microsoft-Windows-PrintService/Operational
- `PwSh` : Microsoft-Windows-PowerShell/Operational
- `PwShClassic` : Windows PowerShell
- `RDP-Client` : Microsoft-Windows-TerminalServices-RDPClient/Operational

- **Sec** : Security
- **SecMitig** : Microsoft-Windows-Security-Mitigations/\*
- **SmbCliSec** : Microsoft-Windows-SmbClient/Security
- **SvcBusCli** : Microsoft-ServiceBus-Client
- **Sys** : System
- **Sysmon** : Microsoft-Windows-Sysmon/Operational
- **TaskSch** : Microsoft-Windows-TaskScheduler/Operational
- **WinRM** : Microsoft-Windows-WinRM/Operational
- **WMI** : Microsoft-Windows-WMI-Activity/Operational

## Other Abbreviations

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The following abbreviations are used in rules in order to make the output as concise as possible:

- **Acct** -> Account
- **Addr** -> Address
- **Auth** -> Authentication
- **Cli** -> Client
- **Cmd** -> Command
- **Comp** -> Computer
- **Conn** -> Connection
- **Dir** -> Directory
- **Dst** -> Destination
- **Exec** -> Execution
- **Grp** -> Group
- **LID** -> Logon ID
- **Net** -> Network
- **Obj** -> Object
- **Proto** -> Protocol
- **Sig** -> Signature
- **Susp** -> Suspicious
- **Src** -> Source
- **Svc** -> Service
- **Svr** -> Server
- **Tgt** -> Target
- **Op** -> Operation
- **Pkg** -> Package
- **Priv** -> Privilege
- **Proc** -> Process
- **PID** -> Process ID
- **PGUID** -> Process GUID (Global Unique ID)
- **Ver** -> Version

## Progress Bar

The progress bar will only work with multiple evtx files. It will display in real time the number and percent of evtx files that it has finished analyzing.

## Color Output

The alerts will be outputted in color based on the alert `level`. You can change the default colors in the config file at `./config/level_color.txt` in the format of `level, (RGB 6-digit ColorHex)`. If you want to disable color output, you can use `--no-color` option.

## Results Summary

Total events, the number of events with hits, data reduction metrics, total and unique detections, dates with the most detections, top computers with detections and top alerts are displayed after every scan.

### Event Frequency Timeline

If you add `-V` or `--visualize-timeline` option, the Event Frequency Timeline feature displays a sparkline frequency timeline of detected events. Note: There needs to be more than 5 events. Also, the characters will not render correctly on the default Command Prompt or PowerShell Prompt, so please use a terminal like Windows Terminal, iTerm2, etc...

## Hayabusa Rules

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Hayabusa detection rules are written in a sigma-like YML format and are located in the `rules` folder. In the future, we plan to host the rules at <https://github.com/Yamato-Security/hayabusa-rules> so please send any issues and pull requests for rules there instead of the main hayabusa repository.

Please read [the hayabusa-rules repository README](#) to understand about the rule format and how to create rules.

All of the rules from the hayabusa-rules repository should be placed in the `rules` folder. `informational` level rules are considered `events`, while anything with a `level` of `low` and higher are considered `alerts`.

The hayabusa rule directory structure is separated into 3 directories:

- `default`: logs that are turned on in Windows by default.
- `non-default`: logs that need to be turned on through group policy, security baselines, etc...
- `sysmon`: logs that are generated by `sysmon`.
- `testing`: a temporary directory to put rules that you are currently testing.

Rules are further separated into directories by log type (Example: Security, System, etc...) and are named in the following format:

- Alert format: `<EventID>_<EventDescription>_<AttackDescription>.yml`
- Alert example: `1102_SecurityLogCleared_PossibleAntiForensics.yml`
- Event format: `<EventID>_<EventDescription>.yml`
- Event example: `4776_NTLM-LogonToLocalAccount.yml`

Please check out the current rules to use as a template in creating new ones or for checking the detection logic.

## Hayabusa v.s. Converted Sigma Rules

Sigma rules need to first be converted to hayabusa rule format explained [here](#). Almost all hayabusa rules are compatible with the sigma format so you can use them just like sigma rules to convert to other SIEM formats. Hayabusa rules are designed solely for Windows event log analysis and have the following benefits:

1. An extra `details` field to display additional information taken from only the useful fields in the log.
2. They are all tested against sample logs and are known to work.

Some sigma rules may not work as intended due to bugs in the conversion process, unsupported features, or differences in implementation (such as in regular expressions).

3. Extra aggregators not found in sigma, such as `|equalsfield`.

**Limitations:** To our knowledge, hayabusa provides the greatest support for sigma rules out of any open source Windows event log analysis tool, however, there are still rules that are not supported:

1. Rules that use regular expressions that do not work with the [Rust regex crate](#)
2. Aggregation expressions besides `count` in the [sigma rule specification](#).
3. Rules that use `|near` or `|base64offset|contains`.

## Detection Rule Tuning

Like firewalls and IDSes, any signature-based tool will require some tuning to fit your environment so you may need to permanently or temporarily exclude certain rules.

You can add a rule ID (Example: `4fe151c2-ecf9-4fae-95ae-b88ec9c2fca6`) to `./rules/config/exclude_rules.txt` in order to ignore any rule that you do not need or cannot be used.

You can also add a rule ID to `./rules/config/noisy_rules.txt` in order to ignore the rule by default but still be able to use the rule with the `-n` or `--enable-noisy-rules` option.

## Detection Level Tuning

Hayabusa and Sigma rule authors will determine the risk level of the alert when writing their rules. However, the actual risk level will differ between environments. You can tune the risk level of the rules by adding them to `./rules/config/level_tuning.txt` and executing `hayabusa-1.7.1-win-x64.exe --level-tuning` which will update the `level` line in the rule file. Please note that the rule file will be updated directly.

`./rules/config/level_tuning.txt` sample line:

```
id,new_level
00000000-0000-0000-0000-000000000000,informational # sample level tuning
line
```

In this case, the risk level of the rule with an `id` of `00000000-0000-0000-0000-000000000000` in the rules directory will have its `level` rewritten to `informational`.

## Event ID Filtering

By default, events are filtered by ID to improve performance by ignoring events that have no detection rules. The IDs defined in [./rules/config/target\\_event\\_IDs.txt](#) will be scanned. If you want to scan all events, please use the [-D, --deep-scan](#) option.

## Other Windows Event Log Analyzers and Related Resources

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There is no "one tool to rule them all" and we have found that each has its own merits so we recommend checking out these other great tools and projects and seeing which ones you like.

- [APT-Hunter](#) - Attack detection tool written in Python.
- [Awesome Event IDs](#) - Collection of Event ID resources useful for Digital Forensics and Incident Response
- [Chainsaw](#) - Another sigma-based attack detection tool written in Rust.
- [DeepBlueCLI](#) - Attack detection tool written in Powershell by [Eric Conrad](#).
- [Epagneul](#) - Graph visualization for Windows event logs.
- [EventList](#) - Map security baseline event IDs to MITRE ATT&CK by [Miriam Wiesner](#).
- [Mapping MITRE ATT&CK with Window Event Log IDs](#) - by [Michel de CREVOISIER](#)
- [EvtxECmd](#) - Evtx parser by [Eric Zimmerman](#).
- [EVTXtract](#) - Recover EVTX log files from unallocated space and memory images.
- [EvtxToElk](#) - Python tool to send Evtx data to Elastic Stack.
- [EVTX ATTACK Samples](#) - EVTX attack sample event log files by [SBousseaden](#).
- [EVTX-to-MITRE-Attack](#) - EVTX attack sample event log files mapped to ATT&CK by [Michel de CREVOISIER](#)
- [EVTX parser](#) - the Rust evtx library we use written by [@OBenamram](#).
- [Grafiki](#) - Sysmon and PowerShell log visualizer.
- [LogonTracer](#) - A graphical interface to visualize logons to detect lateral movement by [JPCERTCC](#).
- [RustyBlue](#) - Rust port of DeepBlueCLI by Yamato Security.
- [Sigma](#) - Community based generic SIEM rules.
- [SOF-ELK](#) - A pre-packaged VM with Elastic Stack to import data for DFIR analysis by [Phil Hagen](#)
- [so-import-evtx](#) - Import evtx files into Security Onion.
- [SysmonTools](#) - Configuration and off-line log visualization tool for Sysmon.
- [Timeline Explorer](#) - The best CSV timeline analyzer by [Eric Zimmerman](#).
- [Windows Event Log Analysis - Analyst Reference](#) - by Forward Defense's Steve Anson.
- [WELA \(Windows Event Log Analyzer\)](#) - The swiff-army knife for Windows event logs by [Yamato Security](#)
- [Zircolite](#) - Sigma-based attack detection tool written in Python.

## Windows Logging Recommendations

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In order to properly detect malicious activity on Windows machines, you will need to improve the default log settings. We have created a separate project to document what log settings need to be enabled as well as

scripts to automatically enable the proper settings at <https://github.com/Yamato-Security/EnableWindowsLogSettings>.

We also recommend the following sites for guidance:

- [JSCU-NL \(Joint SIGHT Cyber Unit Netherlands\) Logging Essentials](#)
- [ACSC \(Australian Cyber Security Centre\) Logging and Fowarding Guide](#)
- [Malware Archaeology Cheat Sheets](#)

## Sysmon Related Projects

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To create the most forensic evidence and detect with the highest accuracy, you need to install sysmon. We recommend the following sites and config files:

- [TrustedSec Sysmon Community Guide](#)
- [Sysmon Modular](#)
- [SwiftOnSecurity Sysmon Config](#)
- [SwiftOnSecurity Sysmon Config fork by Neo23x0](#)
- [SwiftOnSecurity Sysmon Config fork by ion-storm](#)

## Community Documentation

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### English

- 2022/06/19 [Velociraptor Walkthrough and Hayabusa Integration](#) by [Eric Capuano](#)
- 2022/01/24 [Graphing Hayabusa results in neo4j](#) by Matthew Seyer (@forensic\_matt)

### Japanese

- 2022/01/22 [Visualizing Hayabusa results in Elastic Stack](#) by @kzzzo2
- 2021/12/31 [Intro to Hayabusa](#) by itiB (@itiB\_S144)
- 2021/12/27 [Hayabusa internals](#) by Kazuminn (@k47\_um1n)

## Contribution

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We would love any form of contribution. Pull requests, rule creation and sample evtx logs are the best but feature requests, notifying us of bugs, etc... are also very welcome.

At the least, if you like our tool then please give us a star on Github and show your support!

## Bug Submission

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Please submit any bugs you find [here](#). This project is currently actively maintained and we are happy to fix any bugs reported.

If you find any issues (false positives, bugs, etc...) with Hayabusa rules, please report them to the hayabusa-rules github issues page [here](#).

If you find any issues (false positives, bugs, etc...) with Sigma rules, please report them to the upstream SigmaHQ github issues page [here](#).

## License

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Hayabusa is released under [GPLv3](#) and all rules are released under the [Detection Rule License \(DRL\) 1.1](#).

## Twitter

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You can receive the latest news about Hayabusa, rule updates, other Yamato Security tools, etc... by following us on Twitter at [@SecurityYamato](#).