



# HAYABUSA

[ English ] | [ [日本語](#) ]



## 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](#), or [Elastic Stack](#).

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## Main Goals

### Threat Hunting and Enterprise-wide DFIR

Hayabusa currently has over 2400 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 Cupuano's Velociraptor walkthrough here](#).

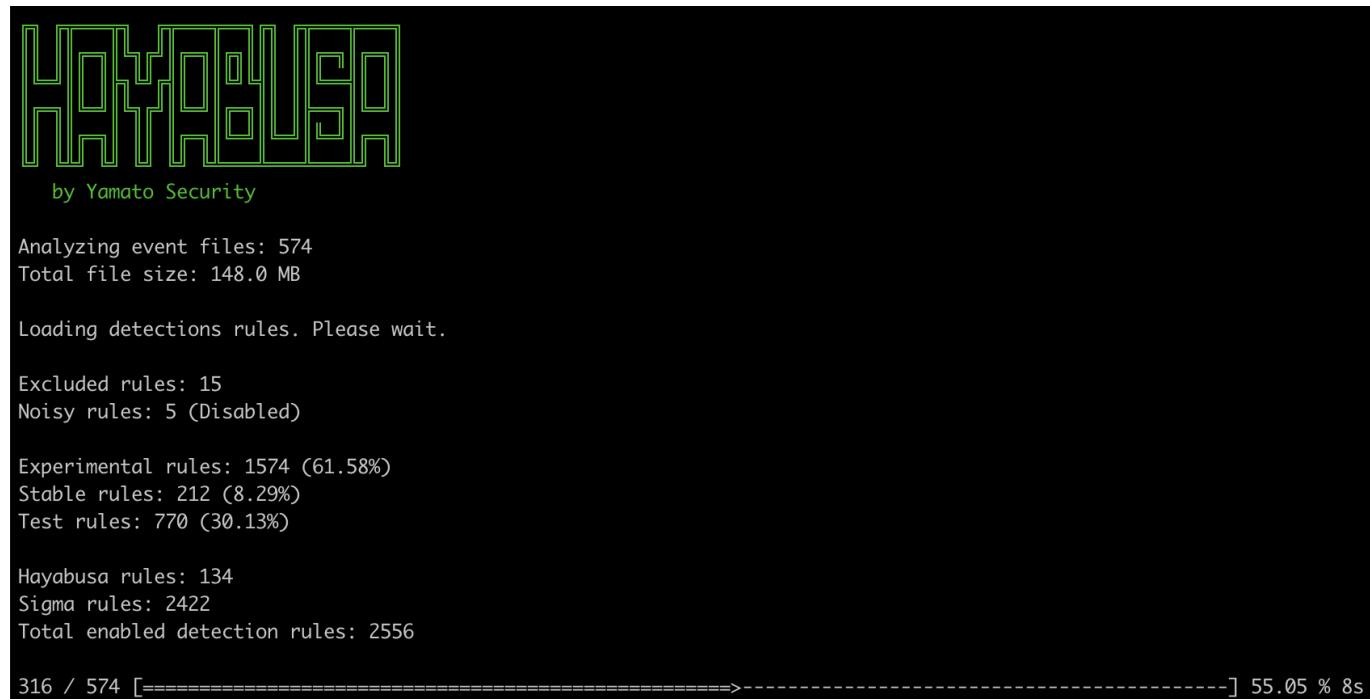
### Fast Forensics Timeline Generation

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



The screenshot shows the Hayabusa application interface during startup. At the top, the Hayabusa logo is displayed with the text "by Yamato Security" below it. The main window displays the following text:

```
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
```

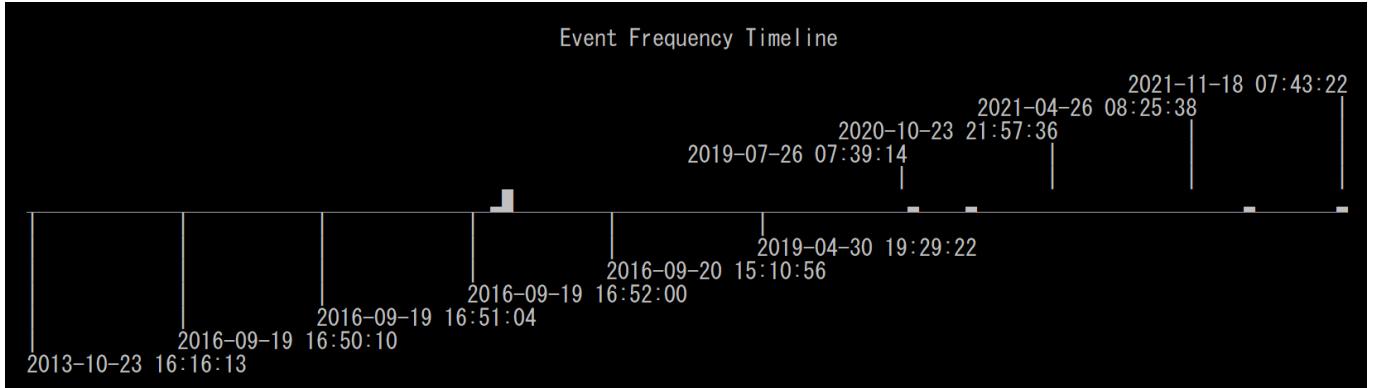
### Terminal Output

```

2021-12-08 02:33:01.680 +09:00 | MSEDGEWIN10 | Sysmon | 10 | high | 619520 | Credentials Dumping Tools Accessing LSASS Memory | Src Process: Z:\b\ouss\Downloads\MS1Selologon-master\x64\Debug\MS1Selologon.exe | TgtProcess: C:\Windows\system32\lsoss.exe | SrcUser: MSEDGEWIN10\IEUser | TgtUser: NT AUTHORITY\SYSTEM | Access: 0x1410 | SrcPID: 6072 | SrcPGUID: 747F3D96-9ACD-61AF-D501-000000000102 | TgtPID: 5268 | TgtPGUID: 747F3D96-9ACD-61AF-0701-000000000102
2021-12-08 02:33:08.723 +09:00 | MSEDGEWIN10 | Sec | 4688 | info | 32925 | Proc Exec | CmdLine: | Path: C:\Windows\System32\svchost.exe | PID: 0x24e0 | User: MSEDGEWIN10\$ | LID: 0x3e7
2021-12-09 22:41:50.714 +09:00 | fs03vuln.offsec.lan | Sec | 1102 | high | 1122929 | Security Log Cleared | User: hack1
2021-12-09 22:41:51.740 +09:00 | fs03vuln.offsec.lan | Sec | 4688 | info | 1122930 | Proc Exec | CmdLine: MSFRottenPotato.exe | Path: C:\TOOLS\MSFRottenPotato.exe | PID: 0x105c | User: hack1 | LID: 0x767a7ed
2021-12-09 22:41:51.740 +09:00 | fs03vuln.offsec.lan | Sec | 4688 | critical | 1122930 | SMB Relay Attack Tools | CmdLine: MSFRottenPotato.exe | Path: C:\TOOLS\MSFRottenPotato.exe | PID: 0x105c | User: hack1 | LID: 0x767a7ed
2021-12-09 22:41:53.761 +09:00 | fs03vuln.offsec.lan | Sec | 4688 | info | 1122932 | Proc Exec | CmdLine: "C:\Windows\System32\cmd.exe" | Path: C:\Windows\System32\cmd.exe | PID: 0xd88 | User: FS03VULNS | LID: 0x3e7
2021-12-09 22:41:53.761 +09:00 | fs03vuln.offsec.lan | Sec | 4688 | info | 1122933 | Proc Exec | CmdLine: \?>C:\Windows\system32\conhost.exe | Path: C:\Windows\System32\conhost.exe | PID: 0x1144 | User: FS03VULNS | LID: 0x3e7
2021-12-10 03:50:47.980 +09:00 | FS03.offsec.lan | Sec | 1102 | high | 825497 | Security Log Cleared | User: admig
2021-12-10 03:50:55.333 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825498 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d44d
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825500 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d4ed
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825502 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d4fe
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825504 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d51f
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825506 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d532
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825508 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d532
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825509 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d532
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825510 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d532
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825511 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2d532
2021-12-10 03:50:55.349 +09:00 | FS03.offsec.lan | Sec | 4672 | info | 825512 | Proc Exec | CmdLine: C:\Windows\system32\wbem\wmiprvse.exe -secured -Embedding | Path: C:\Windows\System32\wbem\WmiPrvSE.exe | PID: 0x560 | User: FS03\$ | LID: 0x3e7
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825521 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825526 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825530 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825531 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2d4ed
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825533 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2d4fe
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825535 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2d51f
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825537 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2d532
2021-12-10 03:50:55.958 +09:00 | FS03.offsec.lan | Sec | 4673 | med | 825538 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825538 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825540 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825541 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825542 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825543 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825544 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825545 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825546 | Process Ran With High Privilege | Process: C:\Windows\System32\wbem\WmiPrvSE.exe | User: hack1 | LID: 0x2a2d532
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825547 | Admin Logon | User: hack1 | PrivList: SeSecurityPrivilege SeBackupPrivilege SeRestorePrivilege SeTakeOwnershipPrivilege SeDebugPrivilege SeSystemEnvironmentPrivilege SeLoadDriverPrivilege SeImpersonatePrivilege | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825548 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825549 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825550 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2f10a
2021-12-10 03:50:56.052 +09:00 | FS03.offsec.lan | Sec | 4674 | info | 825551 | Logon (Type 3 Network) | User: hack1 | Comp: - | IP-Addr: 10.23.42.38 | LID: 0x2a2f10a
2021-12-10 03:51:16.683 +09:00 | FS03.offsec.lan | Sec | 4688 | low | 826320 | Susp CmdLine (Possible LOLBIN) | CmdLine: C:\Windows\system32\DllHost.exe /ProcessId:{AB8902B4-09CA-4B86-B78D-A8F59079A8D5} | Path: C:\Windows\System32\DllHost.exe /ProcessId:{AB8902B4-09CA-4B86-B78D-A8F59079A8D5} | PID: 0x9e8 | User: FS03\$ | LID: 0x3e7
2021-12-10 03:51:16.683 +09:00 | FS03.offsec.lan | Sec | 4688 | info | 826320 | Proc Exec | CmdLine: C:\Windows\system32\DllHost.exe /ProcessId:{AB8902B4-09CA-4B86-B78D-A8F59079A8D5} | Path: C:\Windows\System32\DllHost.exe /PID: 0x9e8 | User: FS03\$ | LID: 0x3e7
2021-12-10 04:54:03.261 +09:00 | fs03vuln.offsec.lan | PwSh | 4103 | info | 68901 | PwSh Pipeline Exec | Payload: CommandInvocation(Write-Verbose): "Write-Verbose" ParameterBinding(Write-Verbose): name="Message"; value="[[FS03\$]] using trustee username 'Everyone'" | Path: C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe | User: FS03\$ | LID: 0x3e7
2021-12-10 04:54:03.261 +09:00 | fs03vuln.offsec.lan | PwSh | 4104 | info | 68900 | PwSh Scriptblock Log | ScriptBlock: Add-RemoteRegBackdoor -ComputerName FS03 -Trustee 'S-1-1-0'
2021-12-10 04:54:03.370 +09:00 | fs03vuln.offsec.lan | PwSh | 4103 | info | 68902 | PwSh Pipeline Exec | Payload: CommandInvocation(Get-WmiObject): "Get-WmiObject" ParameterBinding(Get-WmiObject): name="Class"; value="Win32_Service" ParameterBinding(Get-WmiObject): name="Filter"; value="name='RemoteRegistry'" ParameterBinding(Get-WmiObject): name="ComputerName"; value="FS03\$"

```

## Event Frequency Timeline (–V option)



## Results Summary

```

Total events: 76846
Data reduction: 65008 events (84.60%)

Total detections: 19038
Total critical detections: 172
Total high detections: 2631
Total medium detections: 1414
Total low detections: 6450
Total informational detections: 8371

Unique detections: 517
Unique critical detections: 37
Unique high detections: 215
Unique medium detections: 143
Unique low detections: 73
Unique informational detections: 49

Date with most critical detections: 2020-08-02 (72)
Date with most high detections: 2021-11-03 (976)
Date with most medium detections: 2021-04-22 (152)
Date with most low detections: 2016-09-20 (3759)
Date with most informational detections: 2021-04-22 (1355)

Top 5 computers with most critical detections: MSEDGEWIN10 (14), rootdc1.offsec.lan (5), IEWIN7 (4), FS03.offsec.lan (4), svrdefender01.offsec.lan (3)
Top 5 computers with most high detections: MSEDGEWIN10 (93), IEWIN7 (61), FS03.offsec.lan (31), fs03vuln.offsec.lan (25), IE10Win7 (23)
Top 5 computers with most medium detections: MSEDGEWIN10 (57), IEWIN7 (32), IE10Win7 (16), FS03.offsec.lan (16), fs03vuln.offsec.lan (15)
Top 5 computers with most low detections: MSEDGEWIN10 (35), IEWIN7 (19), FS03.offsec.lan (17), fs03vuln.offsec.lan (12), fs01.offsec.lan (11)
Top 5 computers with most informational detections: MSEDGEWIN10 (18), IEWIN7 (16), fs01.offsec.lan (15), PC01.example.corp (12), FS03.offsec.lan (11)

Elapsed Time: 00:00:21.962

```

## 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: admimmig : 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: admimmig : 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: admimmig : 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\sys
2021-05-03 21:06:57.954 +09:00	win10-02.offsec.lan	1	critical	Sticky Key Like Backdoor Usage	
2021-05-19 06:33:21.214 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: admimmig
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 06:23:27.038 +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: admimmig
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\Open
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

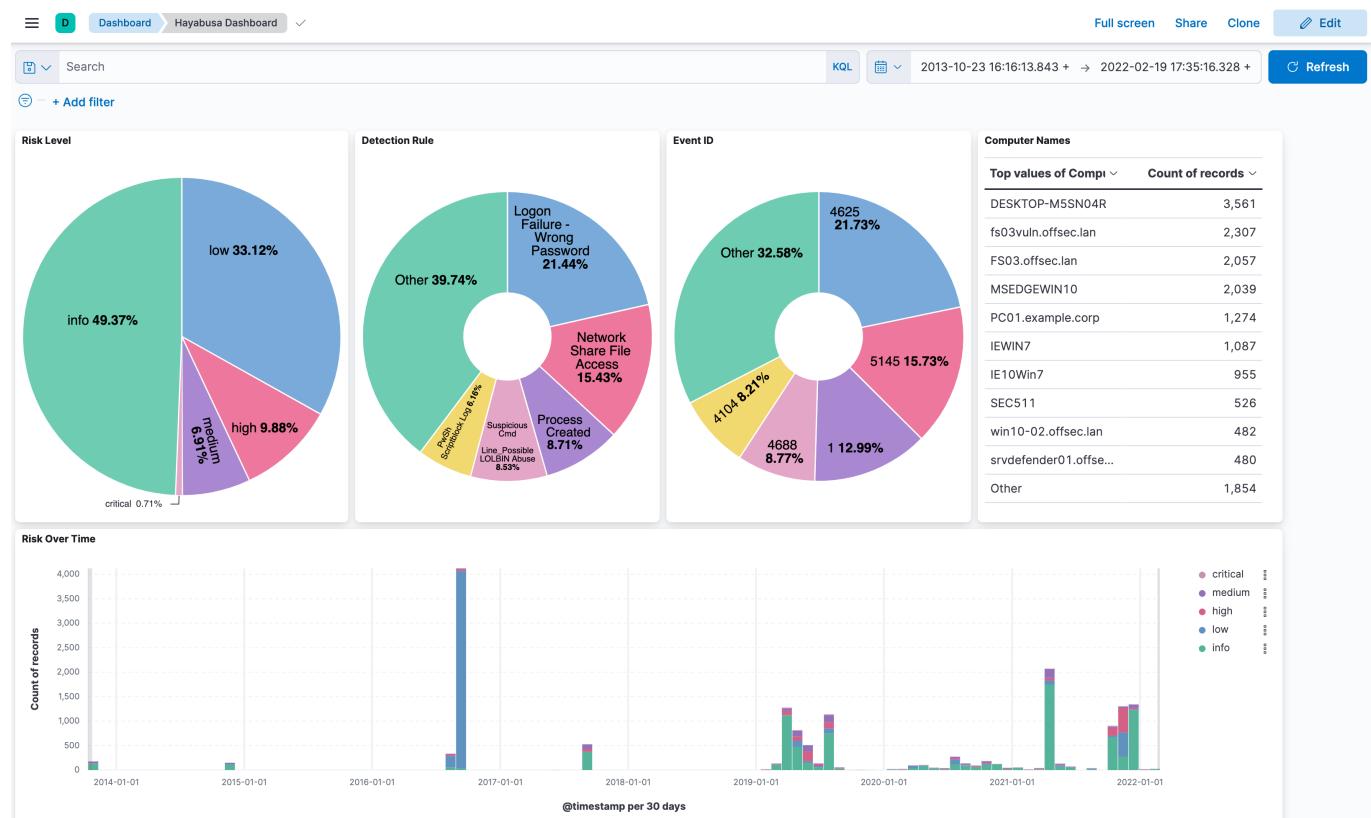
## Analysis in Timeline Explorer

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: admimmig
2021-05-22 05:43:22.562 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admimmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:49.345 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admimmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:50.131 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admimmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:50.607 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admimmig@offsec.lan : Type: 8 : Wor
2021-05-22 05:43:50.866 +09:00	fs01.offsec.lan	4625	low	Logon Failure - Wrong Password	User: admimmig@offsec.lan : Type: 8 : Wor
2021-05-23 06:56:57.685 +09:00	fs01.offsec.lan	1102	high	Security log was cleared	User: admimmig
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: admimmig : 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: admimmig : 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: admimmig : Workstation: - : IP Addr
2021-05-26 22:02:34.373 +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: admimmig : Workstation: - : IP Addr
2021-05-26 22:02:34.380 +09:00	mssql01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admimmig : 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-1-5-21-1
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: admimmig
2021-06-03 21:18:12.941 +09:00	fs01.offsec.lan	4672	informational	Admin Logon	User: admimmig : LogonID: 0x322e5b7
2021-06-03 21:18:12.942 +09:00	fs01.offsec.lan	4624	informational	Logon Type 3 - Network	User: admimmig : 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: admimmig

## Critical Alert Filtering and Computer Grouping in Timeline Explorer

Computername ▲						
Line	Tag	Time	Eventid	Level	▼	Alert
?	=	■	#0c	#0c	= critical	#0c
▶ 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	Count of records	
Network Share File Access	2,564	-	-	-	-	-	-	-	-	-	41	
Process Created	1,447	-	-	-	-	-	-	-	-	-	33	
PwSh Scriptblock Log	1,024	-	-	-	-	-	-	-	-	-	22	
PwSh Pipeline Execution	680	-	-	-	-	-	-	-	-	-	8	
Network Share Access	433	-	-	-	-	-	-	-	-	-	6	
Other	2,058	223	831	594	41	1	1	1	1	1	1	
Logon Failure - Wrong Password	-	3,564	-	-	-	-	-	-	-	-	4	
Suspicious Cmd Line_Possible LOLBIN ...	-	1,418	-	-	-	-	-	-	-	-	6	
Process Access	-	154	-	-	-	-	-	-	-	-	3	
Image Loaded_Sysmon Alert	-	108	-	-	-	-	-	-	-	-	3	
Process Start From Suspicious Folder	-	39	-	-	-	-	-	-	-	-	27	

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 17:35:16.381 +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: 08DA6306-2A54-6211-0B01-000000001000	
> 2022-02-19 17:35:16.381 +00:00	DESKTOP-TTEQ6PR	11	medium	-	Rename Common File to DL L File	-	
> 2022-02-19 17:35:16.207 +00:00	DESKTOP-TTEQ6PR	1	info	-	Process Created	Cmd: "C:\Users\win10\Desktop\SpoolPool-main\SpoolPool.exe" -dll 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'   LID: 0x277ef   PID: 1232   PUUID: 08DA6306-2A54-6211-0B01-000000001000	
> 2022-02-19 17:35:16.207 +00:00	DESKTOP-TTEQ6PR	1	low	Exec	Process Start From Suspicious Folder	-	
> 2022-02-16 10:37:20.934 +00:00	01866e-win16-ir.t hreberesco.com	5145	info	Collect	Network Share File Access	User: samir   Share Name: \\*\C\$   Share Path: \?\C\\$   Path: Users\SECURITY   IP Addr: 172.16.66.36   LID: 0x567756	

# 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](#).

## 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 log statistics. (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 (only in saved CSV files).
- 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](#).

# 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-1.4.1-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 clean
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
```

# Running Hayabusa

---

## Caution: Anti-Virus/EDR Warnings

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.

## Windows

In Command Prompt or Windows Terminal, just run the 32-bit or 64-bit Windows binary from the hayabusa root directory. Example: `hayabusa-1.4.1-windows-x64.exe`

## Linux

You first need to make the binary executable.

```
chmod +x ./hayabusa-1.4.1-linux-x64-gnu
```

Then run it from the Hayabusa root directory:

```
./hayabusa-1.4.1-linux-x64-gnu
```

## macOS

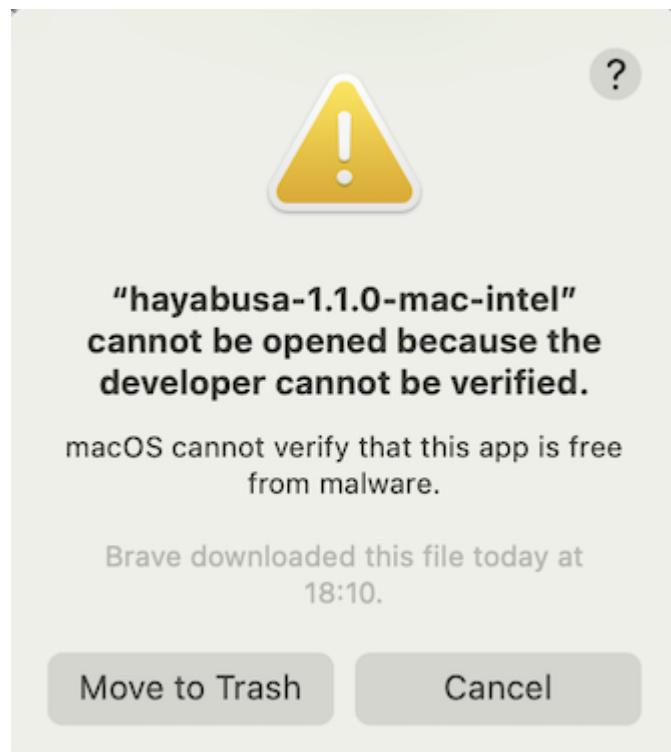
From Terminal or iTerm2, you first need to make the binary executable.

```
chmod +x ./hayabusa-1.4.1-mac-intel
```

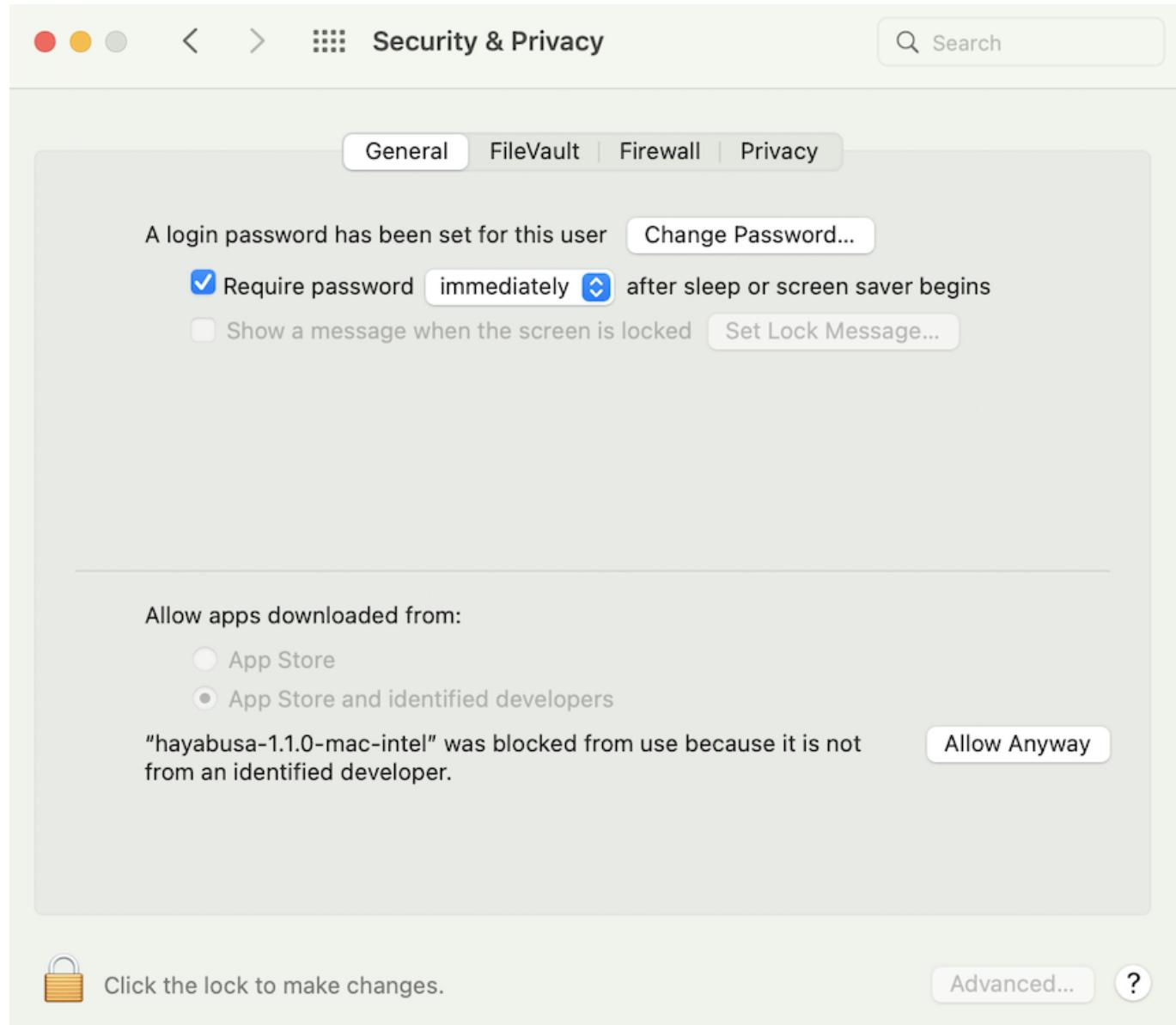
Then, try to run it from the Hayabusa root directory:

```
./hayabusa-1.4.1-mac-intel
```

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



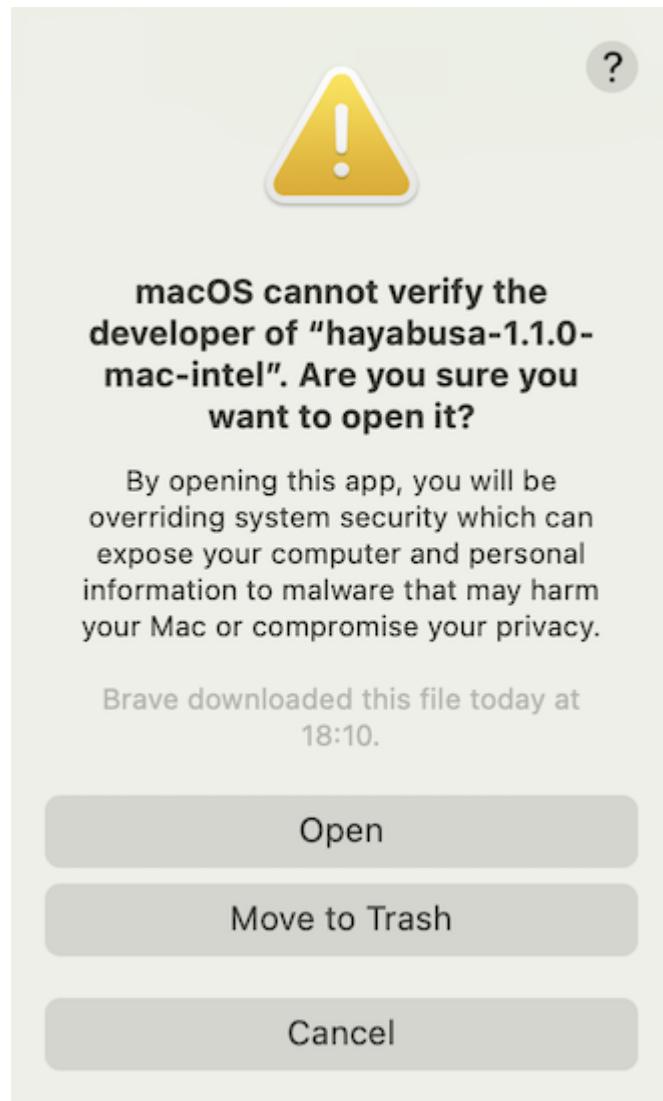
Click "Cancel" and then from System Preferences, open "Security & Privacy" and from the General tab, click "Allow Anyway".



After that, try to run it again.

```
./hayabusa-1.4.1-mac-intel
```

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



You should now be able to run hayabusa.

## Usage

---

### Command Line Options

#### USAGE:

```
hayabusa.exe -f file.evtx [OPTIONS] / hayabusa.exe -d evtx-directory [OPTIONS]
```

#### OPTIONS:

--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)

```

--target-file-ext <EVTX_FILE_EXT>...      Specify additional
target file extensions (ex: evtx_data) (ex: evtx1 evtx2)
--all-tags                                     Output all tags when
saving to a CSV file
-c, --rules-config <RULE_CONFIG_DIRECTORY>  Specify custom rule
config folder (default: ./rules/config)
--contributors                                Print the list of
contributors
-d, --directory <DIRECTORY>                 Directory of multiple
.evtx files
-D, --deep-scan                                Disable event ID filter
to scan all events
--enable-deprecated-rules                      Enable rules marked as
deprecated
--end-timeline <END_TIMELINE>                End time of the event
logs to load (ex: "2022-02-22 23:59:59 +09:00")
--exclude-status <EXCLUDE_STATUS>...          Ignore rules according
to status (ex: experimental) (ex: stable test)
-f, --filepath <FILE_PATH>                   File path to one .evt
file
-F, --full-data                                Print all field
information
-h, --help                                     Print help information
-l, --live-analysis                            Analyze the local
C:\Windows\System32\winevt\Logs folder
-L, --logon-summary                           Print a summary of
successful and failed logons
--level-tuning [<LEVEL_TUNING_FILE>]        Tune alert levels
(default: ./rules/config/level_tuning.txt)
-m, --min-level <LEVEL>                      Minimum level for rules
(default: informational)
-n, --enable-noisy-rules                      Enable rules marked as
noisy
--no-color                                    Disable color output
-o, --output <CSV_TIMELINE>                  Save the timeline in CSV
format (ex: results.csv)
-p, --pivot-keywords-list                    Create a list of pivot
keywords
-q, --quiet                                    Quiet mode: do not
display the launch banner
-Q, --quiet-errors                           Quiet errors mode: do
not save error logs
-r, --rules <RULE_DIRECTORY/RULE_FILE>      Specify a rule directory
or file (default: ./rules)
-R, --hide-record-ID                         Do not display
EventRecordID numbers
-s, --statistics                             Print statistics of
event IDs
--start-timeline <START_TIMELINE>          Start time of the event
logs to load (ex: "2020-02-22 00:00:00 +09:00")
-t, --thread-number <NUMBER>                Thread number (default:
optimal number for performance)
-u, --update-rules                           Update to the latest
rules in the hayabusa-rules github repository

```

-U, --UTC	Output time in UTC
format (default: local time)	
-v, --verbose	Output verbose
information	
-V, --visualize-timeline	Output event frequency
timeline	
--version	Print version
information	

## Usage Examples

- Run hayabusa against one Windows event log file:

```
hayabusa-1.4.1-win-x64.exe -f eventlog.evtx
```

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

```
hayabusa-1.4.1-win-x64.exe -d .\hayabusa-sample-evtx
```

- 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 **-F** enabled!):

```
hayabusa-1.4.1-win-x64.exe -d .\hayabusa-sample-evtx -o results.csv -F
```

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

```
hayabusa-1.4.1-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-1.4.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\hayabusa\default -o results.csv
```

- Only run hayabusa rules for sysmon logs:

```
hayabusa-1.4.1-win-x64.exe -d .\hayabusa-sample-evtx -r .\rules\hayabusa\sysmon -o results.csv
```

- Only run sigma rules:

```
hayabusa-1.4.1-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-1.4.1-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-1.4.1-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-1.4.1-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-1.4.1-win-x64.exe -l -m critical -p -o keywords
```

- Print Event ID statistics:

```
hayabusa-1.4.1-win-x64.exe -f Security.evtx -s
```

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

```
hayabusa-1.4.1-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
```

- 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
```

Note: You need to run the binary from the Hayabusa root directory.

## Hayabusa Output

---

When hayabusa output is being displayed to the screen (the default), it will display the following information:

- **Timestamp**: Default is `YYYY-MM-DD HH:mm:ss.sss +hh:mm` format. This comes from the `<Event><System><TimeCreated SystemTime>` field in the event log. The default timezone will be the local timezone but you can change the timezone to UTC with the `--utc` option.
- **Computer**: This comes from the `<Event><System><Computer>` field in the event log.
- **Channel**: The name of log. This comes from the `<Event><System><Channel>` field in the event log.
- **Event ID**: This comes from the `<Event><System><EventID>` field in the event log.
- **Level**: This comes from the `level` field in the YML detection rule. (`informational`, `low`, `medium`, `high`, `critical`) By default, all level alerts will be displayed but you can set the minimum level with `-m`. For example, you can set `-m high`) in order to only scan for and display high and critical alerts.
- **RecordID**: This comes from the `<Event><System><EventRecordID>` field in the event log. You can hide this output with the `-R` or `--hide-record-id` option.

- **Title**: This comes from the `title` field in the YML detection rule.
- **Details**: This comes from the `details` 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 `n/a` (not available). If the `details` field is not specified (i.e. sigma rules), default `details` messages to extract fields defined in `./rules/config/default_details.txt` will be outputted. You can add more default `details` messages by adding the `Provider Name`, `EventID` and `details` message you want to output in `default_details.txt`. When no `details` field is defined in a rule nor in `default_details.txt`, all fields will be outputted to the `details` column.

The following additional columns will be added to the output when saving to a CSV file:

- **MitreAttack**: MITRE ATT&CK tactics.
- **Rule Path**: The path to the detection rule that generated the alert or event.
- **File Path**: The path to the evtx file that caused the alert or event.

If you add the `-F` or `--full-data` option, a `RecordInformation` column with all field information will also be added.

## 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-Svr** : 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

## 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.

## 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...

## Dates with most total detections

A summary of the dates with the most total detections categorized by level (`critical`, `high`, etc...).

## Top 5 computers with most unique detections

The top 5 computers with the most unique detections categorized by level (`critical`, `high`, 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`.

## 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-1.4.1-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

As of version 1.4.1, 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 by default. 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 library we used 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 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:

- [Sysmon Modular](#)
- [TrustedSec Sysmon Community Guide](#)

## Community Documentation

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### English

- 2022/06/19 [Velociraptor Walkthrough and Hayabusa Integration](#) by [Eric Cupuano](#)
- 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](#).