code academy
CS301

Wazuh installation

Student: Yagub Hajiyev

Table of content

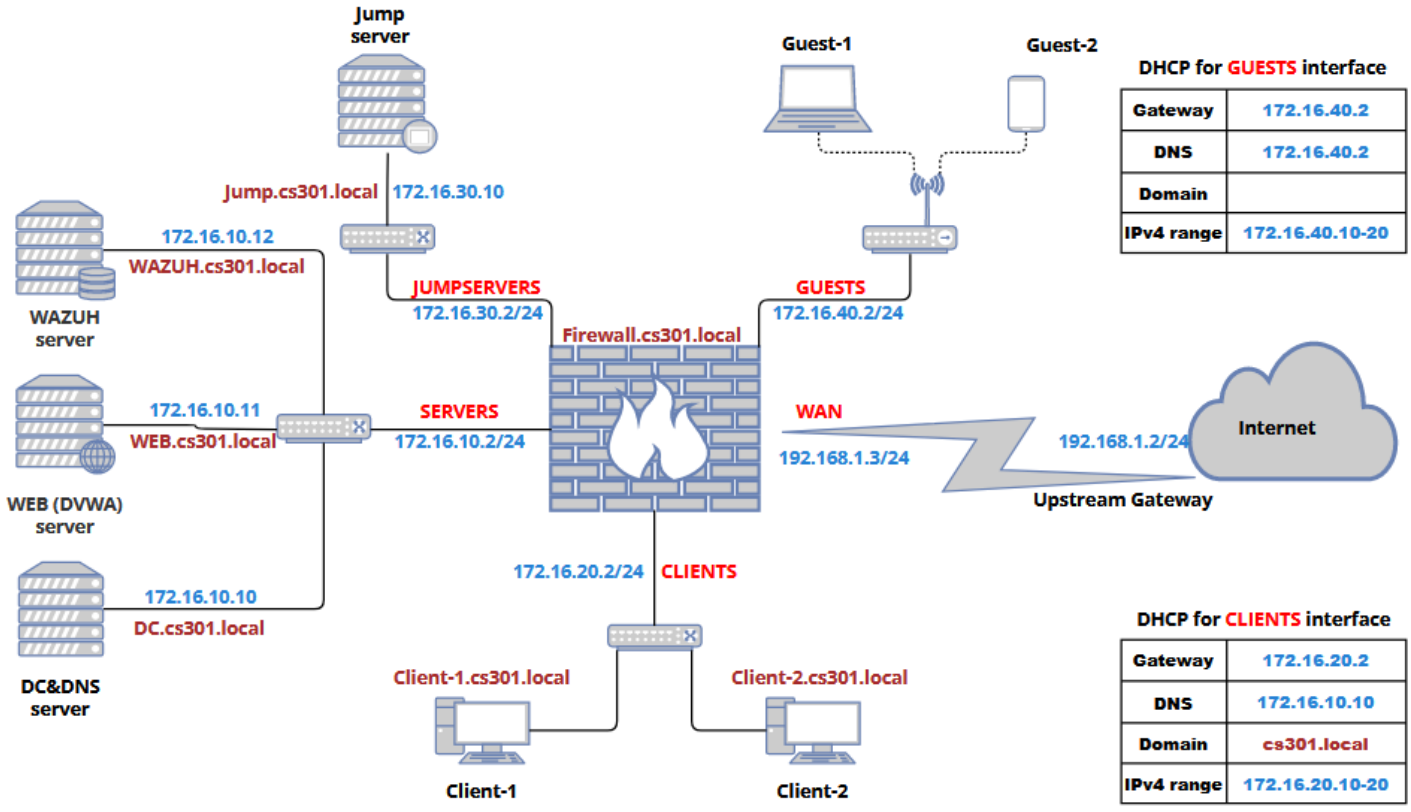
Table of content

Summary 3
1. Wazuh installation 4
2. Joining agents 7
2.1 Windows agent joining (DC) 7
2.2 Firewall joining (OPNsense) 9
2.3 Linux agent joining (WEB) 11
3. Testing agents 14
3.1 Testing DC 14
3.2 Testing OPNsense 15
4. Wazuh Proof of Concept 17
4.1 Blocking a known malicious actor 17
4.2 Responding to network attacks with Suricata and Wazuh XDR 20
4.3 Detecting malware using YARA integration 24
4.4 Detect threats on Windows by monitoring Sysmon events 30

Summary

Our infrastructure is consist of several networks and they are protected by network security solution, firewall. All endpoint devices generate security logs in their local environment and these logs has to be monitored to detect malicious activities. At this point, **SIEM** (Security Information Events Management) solutions help us to collect all of these logs from those devices and analyse them at the centrilized location.

We will implement **Wazuh** open source **SIEM** solution to control all system logs from connected devices. You can find much more detailed information about this tool on its official webpage, but as a short explaination **Wazuh** has a central service called **Wazuh Manager** and log collector service which is called **Wazuh Agent**. In our infrastructure, we need to add new server for **Wazuh** and assign it a static **IP** from **SERVERS** network. In following cappture, we will deploy **Wazuh** in this machine and later install agent services into our other devices one by one for joining them to cetral **Wazuh** server. After the setup, we will conduct several tasks on our infrastructure to learn diffirents security methods and discover **Wazuh** capabilities.



DHCP for GUESTS interface

Gateway	172.16.40.2
DNS	172.16.40.2
Domain	
IPv4 range	172.16.40.10-20

DHCP for CLIENTS interface

Gateway	172.16.20.2
DNS	172.16.10.10
Domain	cs301.local
IPv4 range	172.16.20.10-20

Adapter name	Interface name	Subnet IP	Host IP	Firewall IP
NAT	WAN	192.168.1.0/24	192.168.1.1	192.168.1.3
VMNET1	SERVERS	172.16.10.0/24	172.16.10.1	172.16.10.2
VMNET2	CLIENTS	172.16.20.0/24	172.16.20.1	172.16.20.2
VMNET3	JUMPSERVERS	172.16.30.0/24	172.16.30.1	172.16.30.2
VMNET4	GUESTS	172.16.40.0/24	172.16.40.1	172.16.40.2

Wazuh installation

In order to install **Wazuh** all we need to download installation script and run it with **root** privileges.

```
[root@wazuh ~]# curl -sO https://packages.wazuh.com/4.7/wazuh-install.sh
[root@wazuh ~]# ll
total 172
-rw-------. 1 root root   1034 Mar 31 08:30 anaconda-ks.cfg
-rw-r--r--. 1 root root   1261 Mar 31 08:49 initial-setup-ks.cfg
-rw-r--r--. 1 root root 165733 Apr 23 02:00 wazuh-install.sh
[root@wazuh ~]#
```

I installed **Wazuh** into **Oracle Linux** machine with 3Gb RAM and 2 core CPUs, but as default **Wazuh** doesn't let to setup in shuch a weak system and gives errors. We can overcome it with the help of **"-i"** (ignore) option as displayed in the figure. Once we run the script it install all configuration files and services authomatically. At the end of the installation **Wazuh** create a default user **admin** and it random password for us. This password is difficult to memorize, so we can replace it with our custom defined password.

```
[root@wazuh ~]# bash wazuh-install.sh -a -i
23/04/2024 02:01:26 INFO: Starting Wazuh installation assistant. Wazuh version: 4.7.3
23/04/2024 02:01:26 INFO: Verbose logging redirected to /var/log/wazuh-install.log
23/04/2024 02:01:41 WARNING: Hardware and system checks ignored.
23/04/2024 02:01:41 INFO: Wazuh web interface port will be 443.
23/04/2024 02:01:44 WARNING: The system has Firewalld enabled. Please ensure that traf
23/04/2024 02:01:48 INFO: Wazuh repository added.
23/04/2024 02:01:48 INFO: --- Configuration files ---
23/04/2024 02:01:48 INFO: Generating configuration files.
23/04/2024 02:01:50 INFO: Created wazuh-install-files.tar. It contains the Wazuh clust
23/04/2024 02:01:50 INFO: --- Wazuh indexer ---
23/04/2024 02:01:50 INFO: Starting Wazuh indexer installation.
23/04/2024 02:07:32 INFO: Wazuh indexer installation finished.
23/04/2024 02:07:33 INFO: Wazuh indexer post-install configuration finished.
23/04/2024 02:07:33 INFO: Starting service wazuh-indexer.
23/04/2024 02:08:49 INFO: wazuh-indexer service started.
23/04/2024 02:08:49 INFO: Initializing Wazuh indexer cluster security settings.
23/04/2024 02:09:15 INFO: Wazuh indexer cluster initialized.
23/04/2024 02:09:15 INFO: --- Wazuh server ---
23/04/2024 02:09:15 INFO: Starting the Wazuh manager installation.
23/04/2024 02:12:13 INFO: Wazuh manager installation finished.
23/04/2024 02:12:13 INFO: Starting service wazuh-manager.
23/04/2024 02:12:31 INFO: wazuh-manager service started.
23/04/2024 02:12:31 INFO: Starting Filebeat installation.
23/04/2024 02:12:56 INFO: Filebeat installation finished.
23/04/2024 02:13:02 INFO: Filebeat post-install configuration finished.
23/04/2024 02:13:02 INFO: Starting service filebeat.
23/04/2024 02:13:03 INFO: filebeat service started.
23/04/2024 02:13:03 INFO: --- Wazuh dashboard ---
23/04/2024 02:13:03 INFO: Starting Wazuh dashboard installation.
23/04/2024 02:16:29 INFO: Wazuh dashboard installation finished.
23/04/2024 02:16:29 INFO: Wazuh dashboard post-install configuration finished.
23/04/2024 02:16:29 INFO: Starting service wazuh-dashboard.
23/04/2024 02:16:29 INFO: wazuh-dashboard service started.
23/04/2024 02:17:44 INFO: Initializing Wazuh dashboard web application.
23/04/2024 02:17:45 INFO: Wazuh dashboard web application initialized.
23/04/2024 02:17:45 INFO: --- Summary ---
23/04/2024 02:17:45 INFO: You can access the web interface https://<wazuh-dashboard-ip>:443
    User: admin
    Password: O??aJ*K.P?+q9RKDyMKsnkEhJG3Xr4co
23/04/2024 02:17:45 INFO: Installation finished.
[root@wazuh ~]#
```

For changing the predefined password, we have to use another ready script.

```
[root@wazuh ~]# curl -so wazuh-passwords-tool.sh https://packages.wazuh.com/4.7/wazuh-passwords-tool.sh
[root@wazuh ~]# ll wazuh-passwords-tool.sh
-rw-r--r--. 1 root root 39641 Apr 23 02:23 wazuh-passwords-tool.sh
[root@wazuh ~]#
```

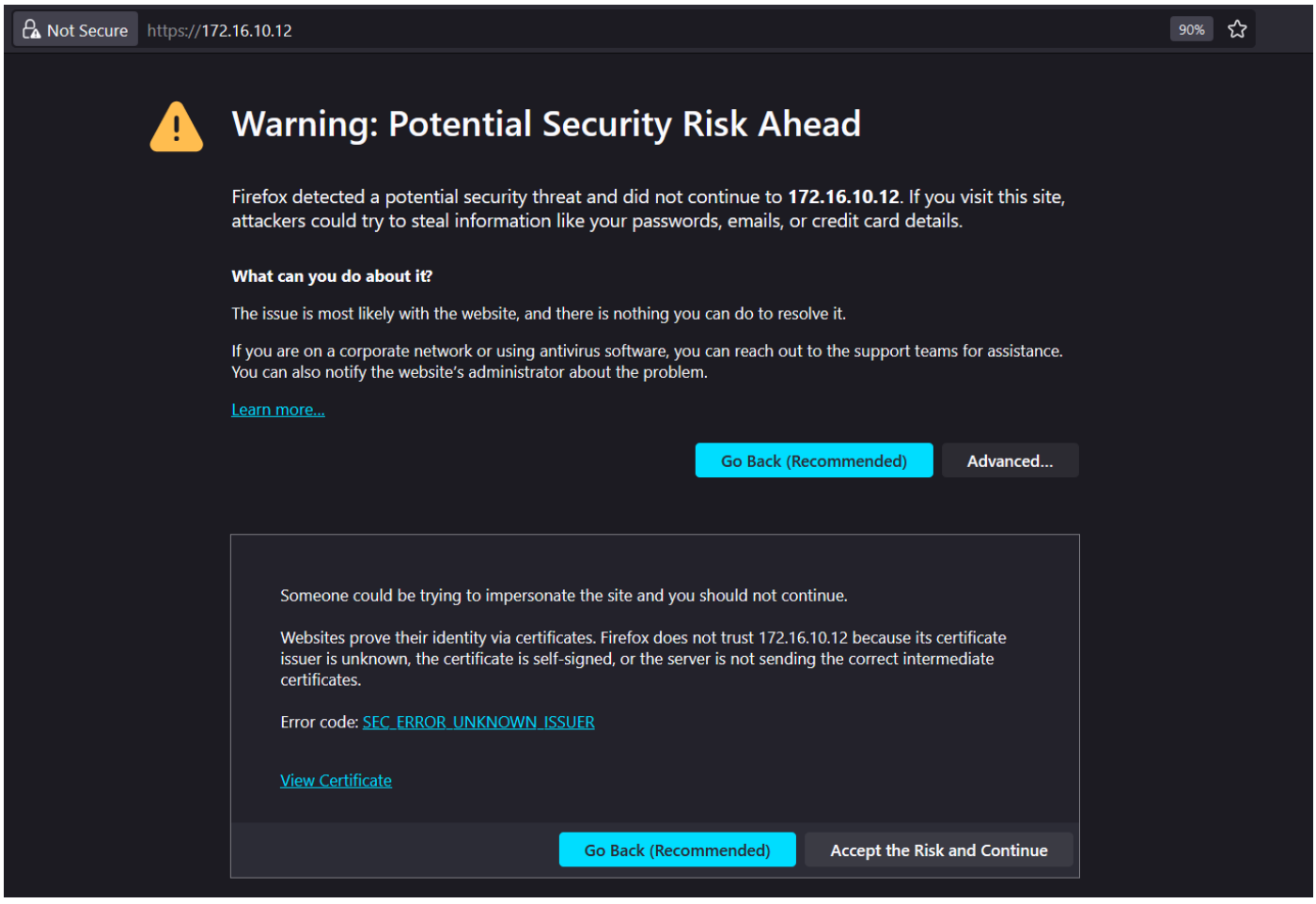
After downloading the script into your **Wazuh** server, execute it with **"-u <username>"** option to define the user (**admin** in this situation) whose password you want to change and **"-p <new_password>"** for defining new password.

```
[root@wazuh ~]# bash wazuh-passwords-tool.sh -u admin -p Salam123*
23/04/2024 02:25:16 INFO: Generating password hash
23/04/2024 02:26:03 WARNING: Password changed. Remember to update the password in the
Wazuh dashboard and Filebeat nodes if necessary, and restart the services.
[root@wazuh ~]#
```

In the next step we must add **Wazuh** ports (**1514** for agent connection, **1515** for agent enrollment and **443** for **Wazuh** web user interface) into our firewall.

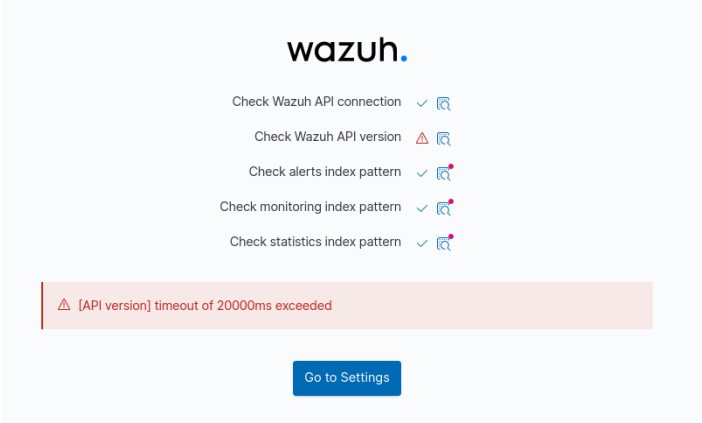
```
[root@wazuh ~]# firewall-cmd --list-ports

[root@wazuh ~]# firewall-cmd --add-port={1514/tcp,1515/tcp,443/tcp} --permanent
success
[root@wazuh ~]# firewall-cmd --reload
success
[root@wazuh ~]# firewall-cmd --list-ports
443/tcp 1514/tcp 1515/tcp
[root@wazuh ~]#
```

Now open your browser and go to the https://<Wazuh server IP> address.



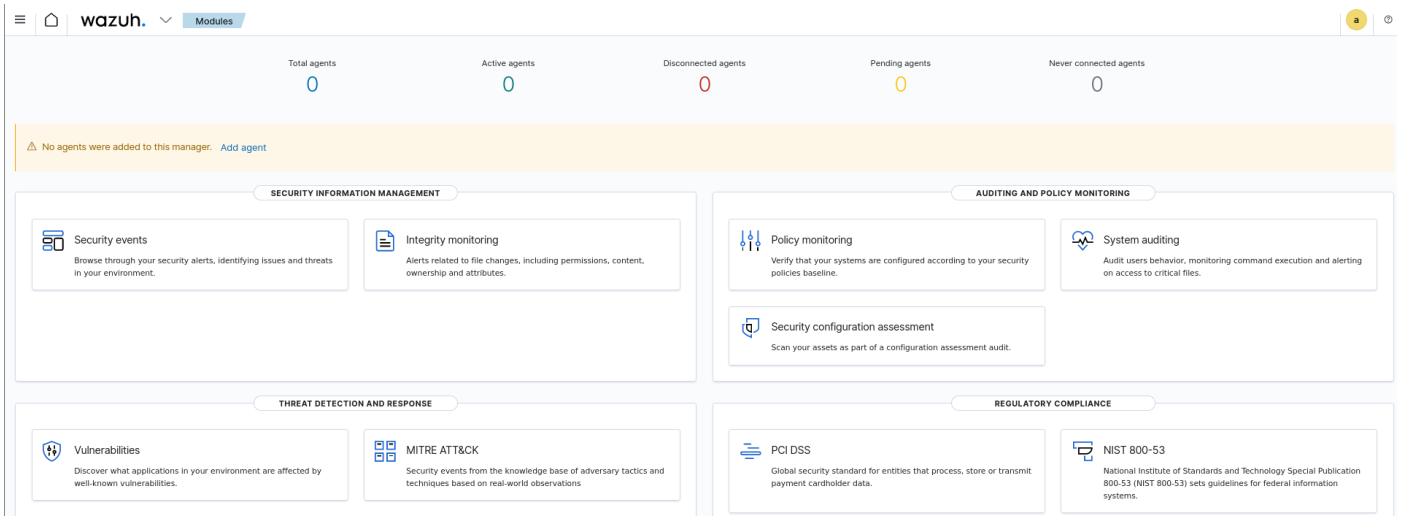
Insert your credentials (username: **admin**, password: **Salam123*** for this lab) and enter to the **GUI** interface.

NOTE: if you face with the error displayed below, just be patient and restart all **Wazuh** services.




```
[root@wazuh ~]# systemctl restart wazuh-manager.service wazuh-indexer wazuh-dashboard.service
```

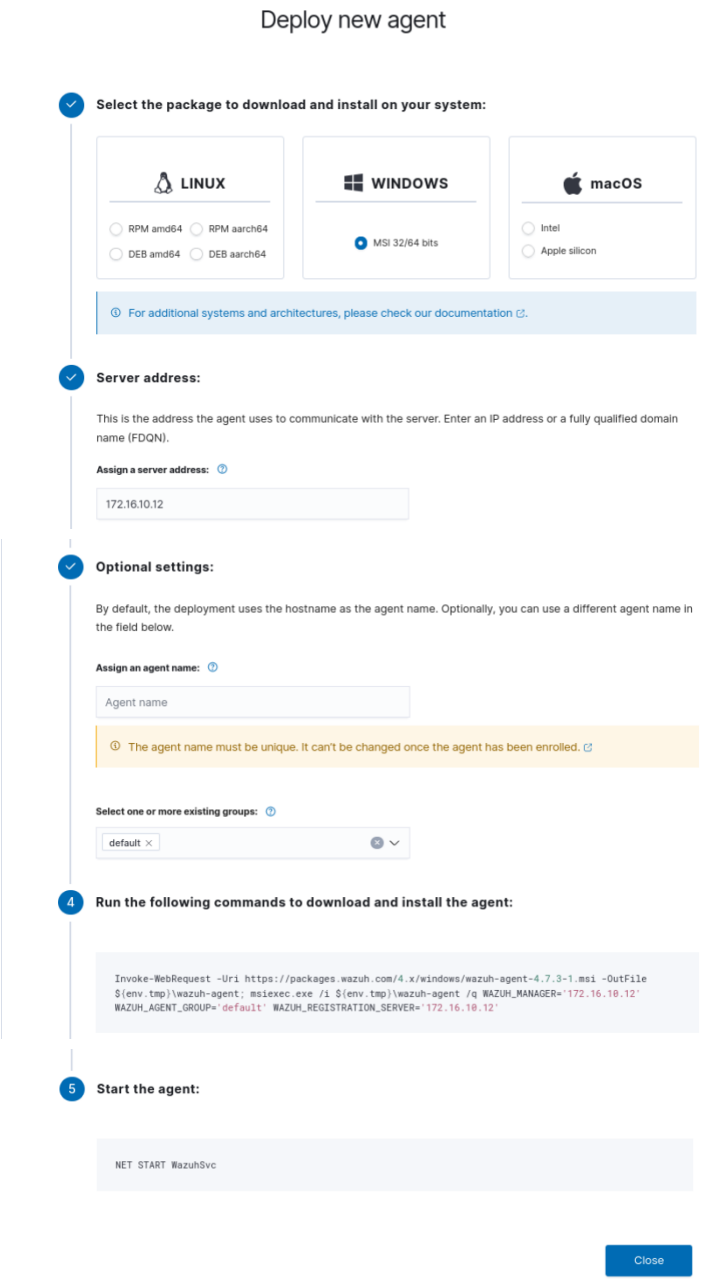
Once you open the **GUI**, the home page will meet you. This page contains some general information about our agents, shorcuts to monitoring and events windows etc. As you we doesn't have any connected agent yet, although the **Wazuh** server itself also has default agent in it to send machine logs into our **SIEM**. In the next capture we will add all machines into our **SIEM** as agents.



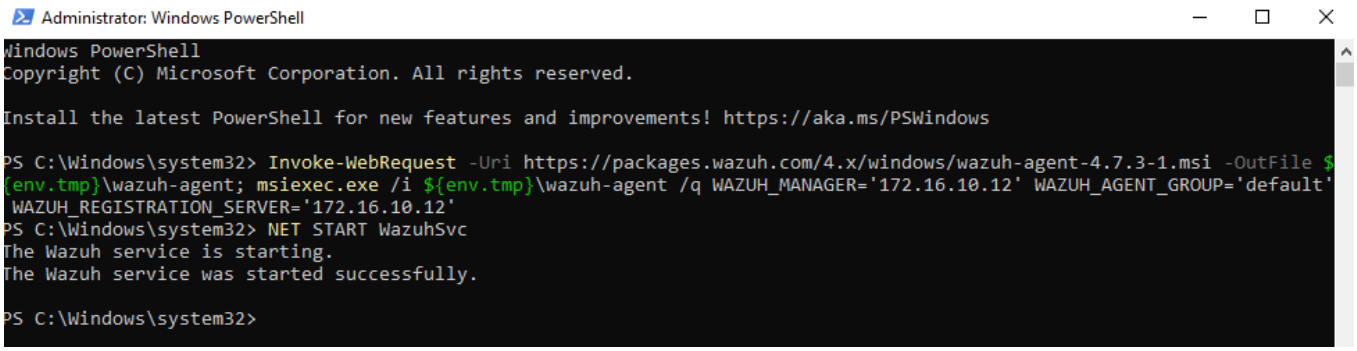
Joining agents

2.1 Windows agent joining (DC)

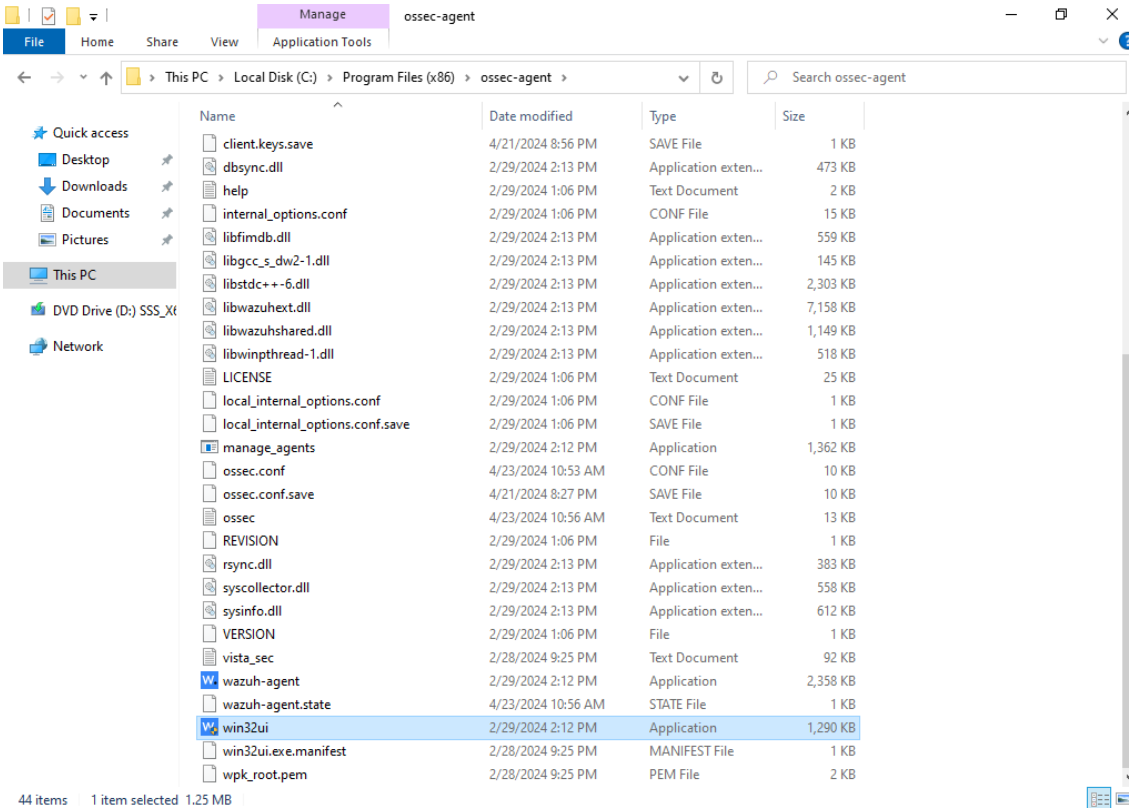
As you know we can integrate all systems into **Wazuh** as agents in our infrustructure. Lets begin with **DC** machine. In the home page press "**Add agent**" button, and it will carry you into agent deploy window. In the first step select **Windows** platform, next type you **Wazuh** server's **IP** address, in the third step leave it empty (then **Wazuh** will use machine's hostname as agent's name or you can define your custom name) and choose **default** group for initial configuration (all agents has to belong at least one group). In the fourth and fifth steps **Wazuh** will give us the installation script, we must run these scripts in our target (**DC** in this situation) to download agent service into this machine.

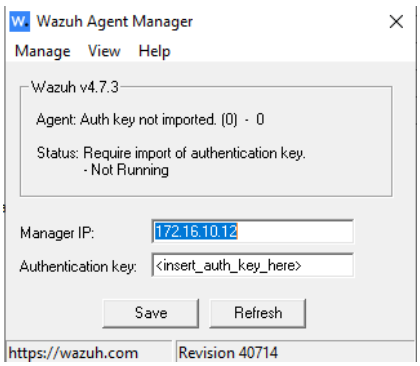


Go to the **DC** and run **Power Shell** as an administrator, then copy and paste the script which is given in the fourth step of agent deployment process. Once the agent service downloaded, run the second script to start **Wazuh** agent service.

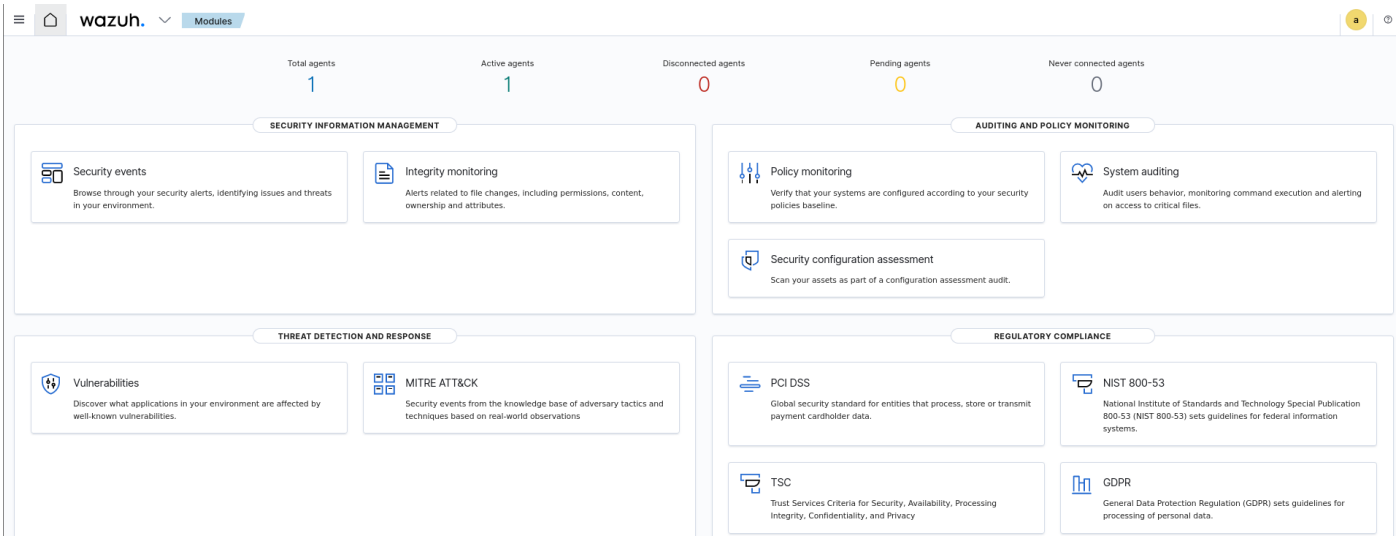


After successfully installing the agent service, we can control it with **GUI**. You can find its configuration and **".exe**" files under "**C:\Program files (x86)\ossec-agent**" path.

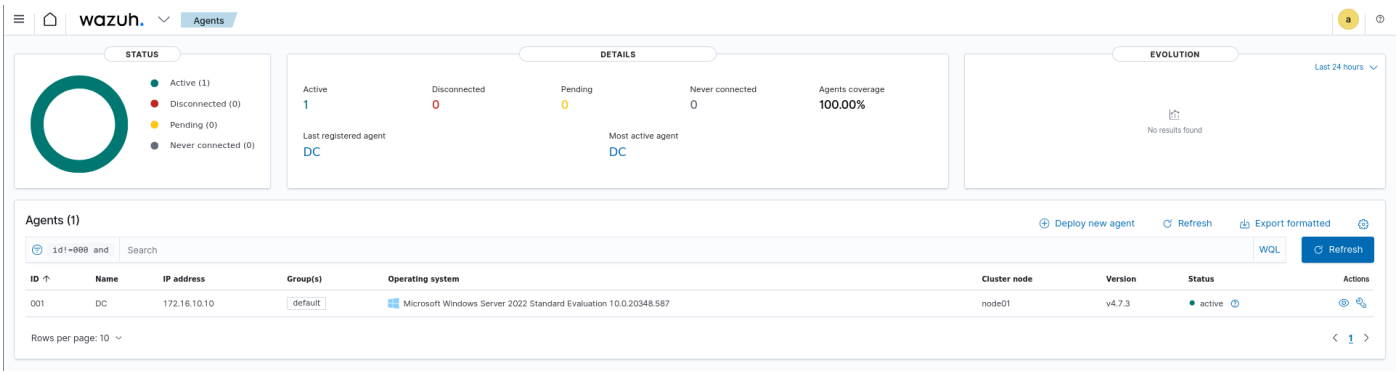




Go back to the **Wazuh** interface in your browser and observ the changes. You can see that our first agent added successfully into our **SIEM** and its status is active. Just click on the agent count (which is 1 here) to open the agents window for detailed information.



In this window, we can get much more information about agents and their status.

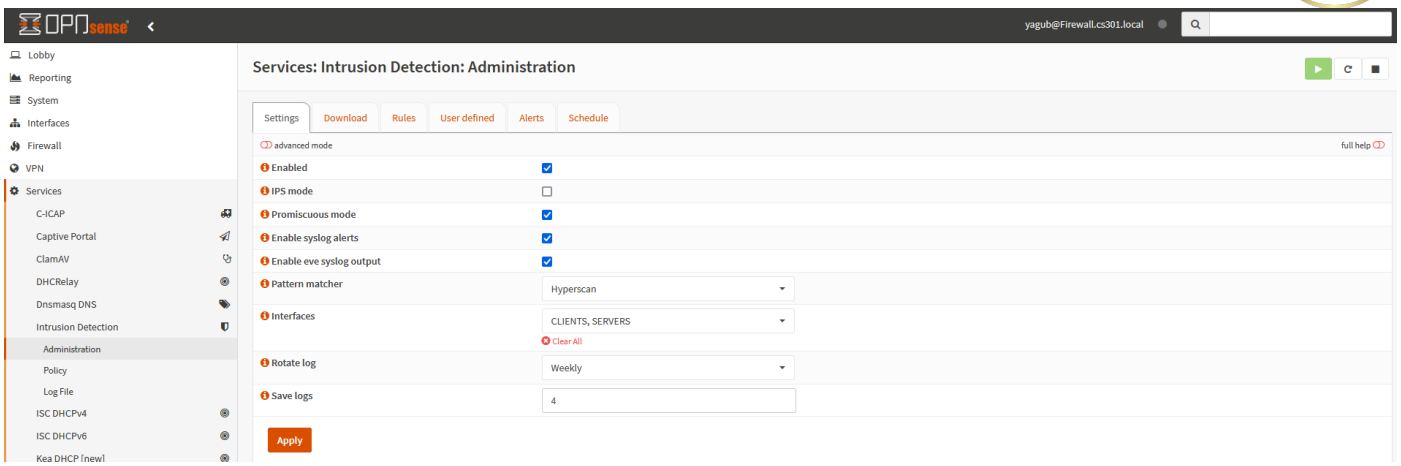


2.2 Firewall joining (OPNsense)

One of the most essential security tools is a firewall. We must joing it into our **SIEM**, because firewall logs are so precious for us, it stays in front of the whole infrastructure and control the all network traffic. So most of security events happen in the firewall environment and these events have to be monitored from the cetralized location.

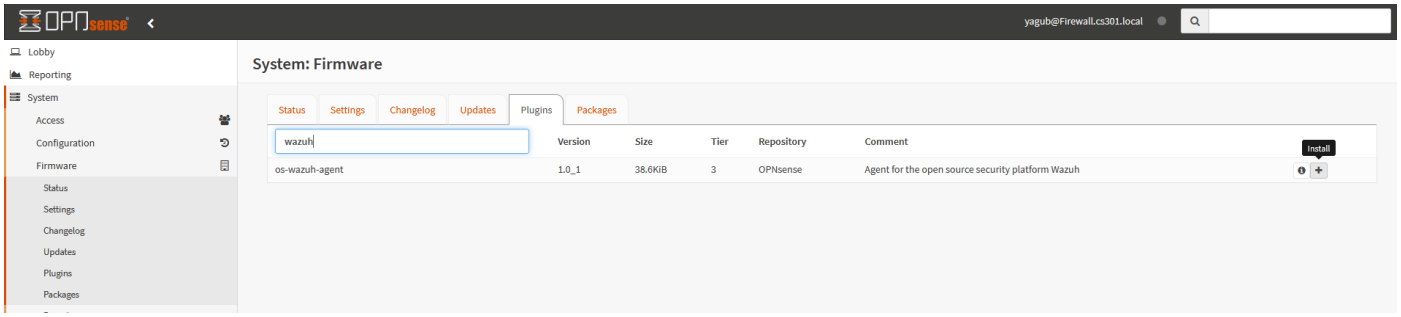
We had deployed an opensource firewall, **OPNsense**, in our infrastructure and this firewall uses plugins to manage the services in it. For simplycity, we will collect only **IDS** logs from our firewall. This also will minimize the load on our system, because gathering logs and managing them consume additional recources shuch as **RAM**, **CPU**, memory etc.

Before we install and configure the **Wazuh** plugin in it, open your firewall **GUI** and go to the "**Intrusion Detection**" service and make sure it is running in the **IDS** mode.

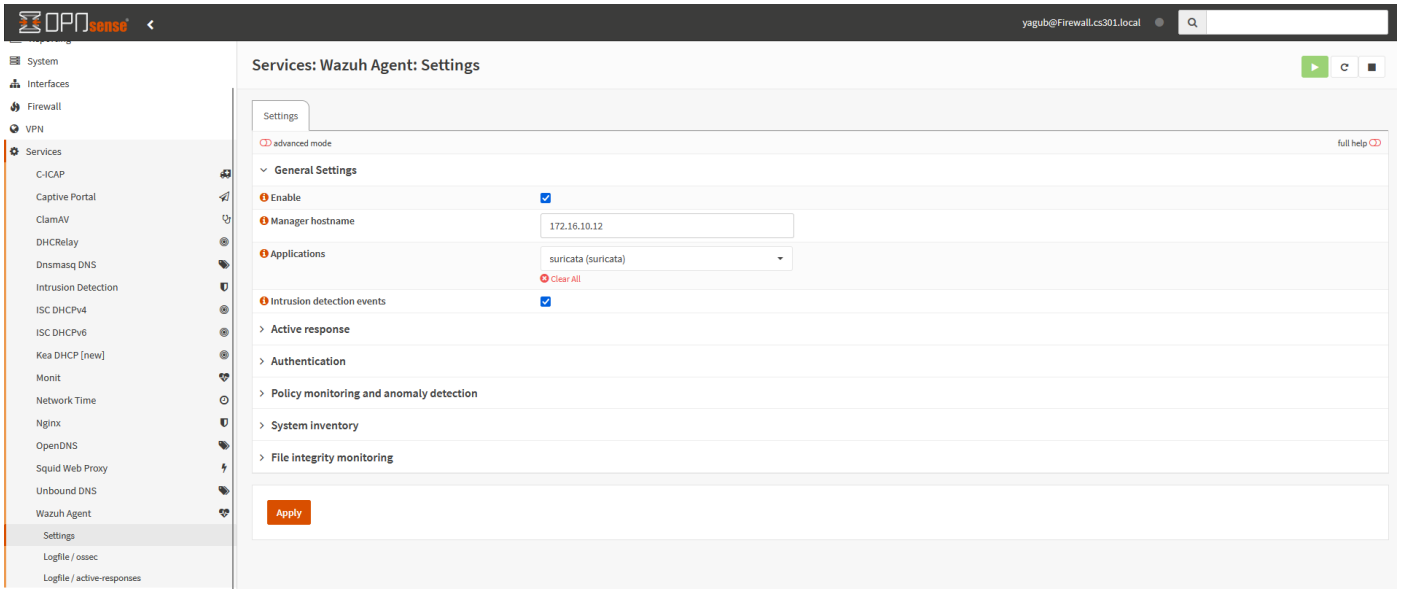


Later got to the **System=>Firmware=>Plugins** and search for wazuh, then install **os-wazuh-agent** plugin.

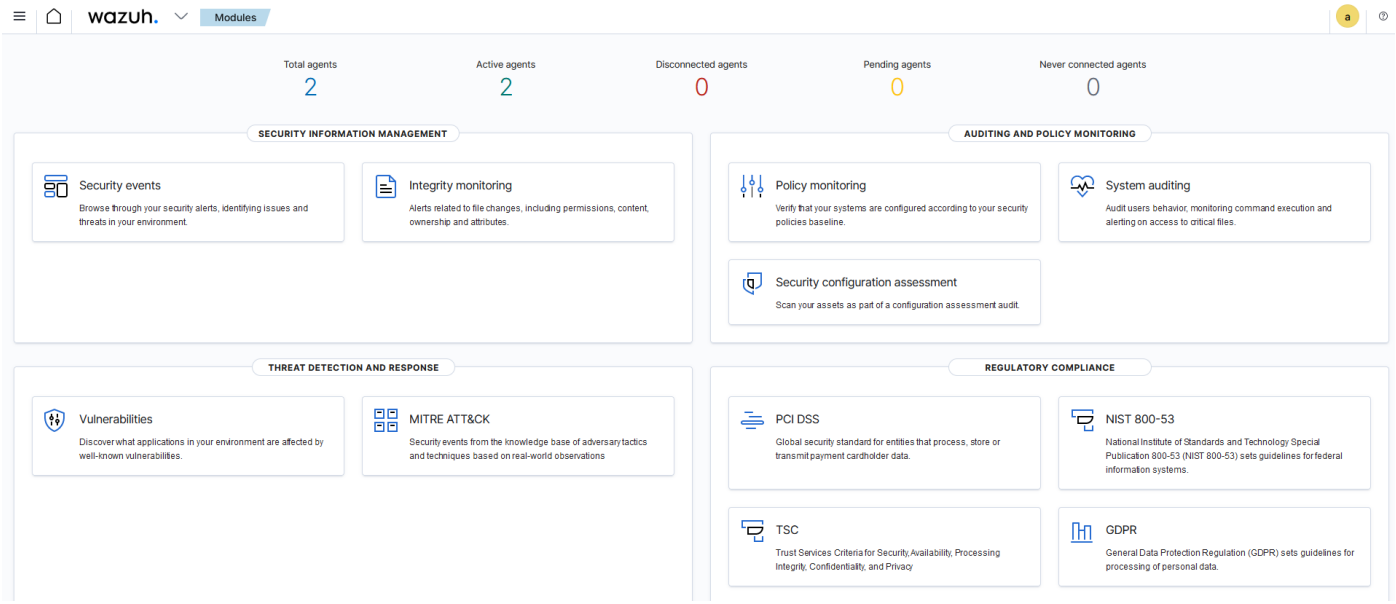
NOTE: make sure you checked updates, otherwise it will not find the plugin.

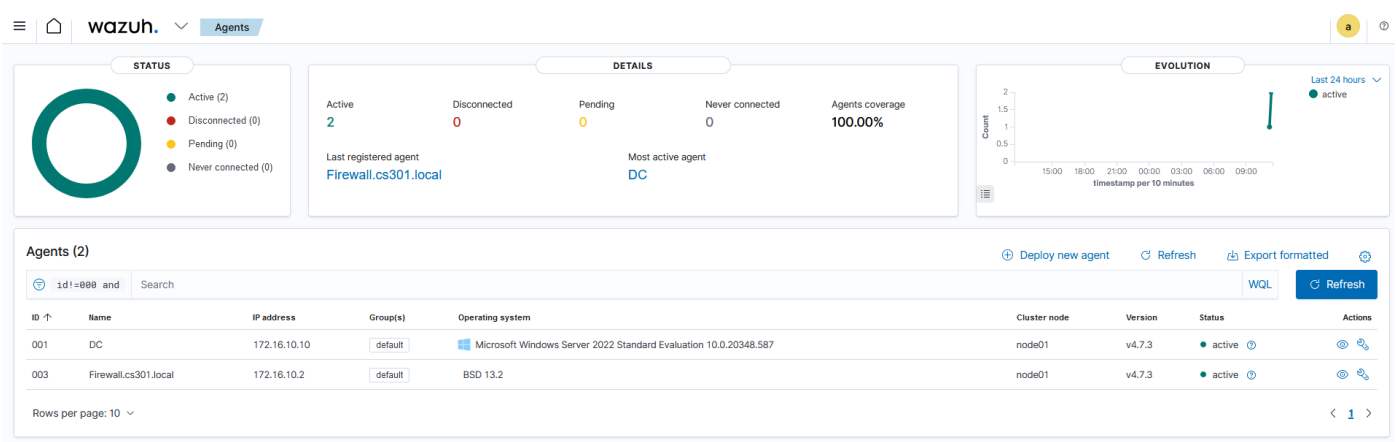


After installing service, go to the **Services=>Wazuh Agent=>Settings** section, enable the service, inserts the **Wazuh** server machine's **IP** address, select **suricata** in **Applications** option and enable **"Intrusion detection events**" option.



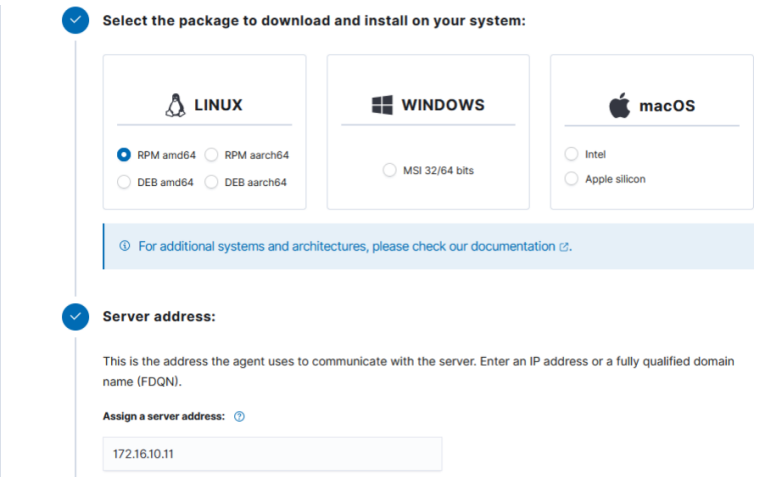
Once the service successfully started, go back to the Wazuh GUI in your browser and observe the changes. As you see in the figure, our second agent successfully joined into our Wazuh server and the total number of agent is 2.

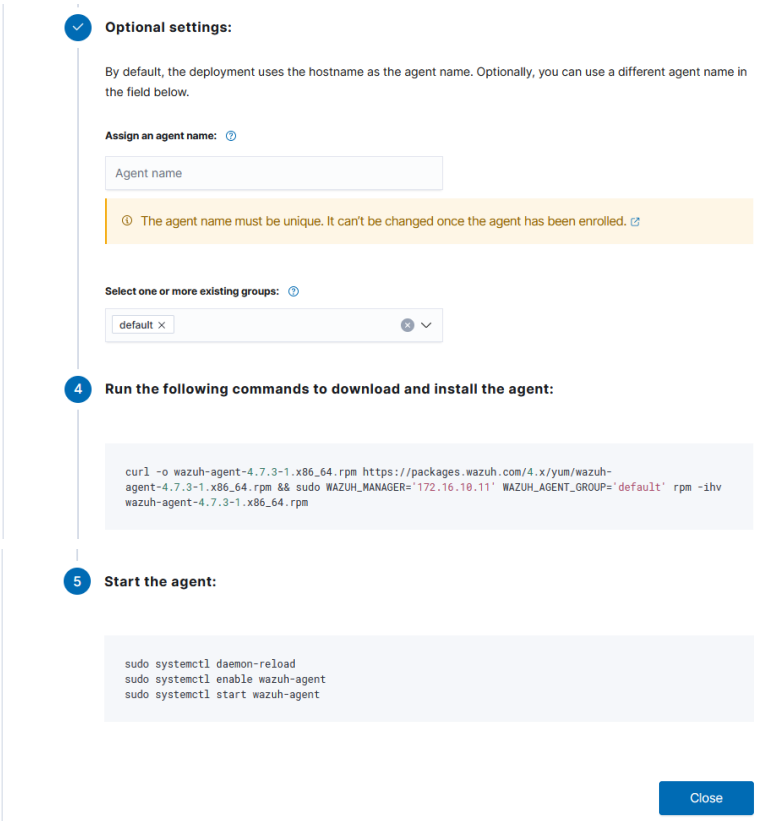




2.3 Linux agent joining (WEB)

In this section, we will add our web server as the next agent into our **SIEM** environment. As you know we had deployed our web server in the **Oracle Linux** machine, so this time we must install **Wazuh** agent for **Linux** platform. The installation process is similar with the **Windows**, select platform type, enter the **Wazuh** server address and select the **default** group.





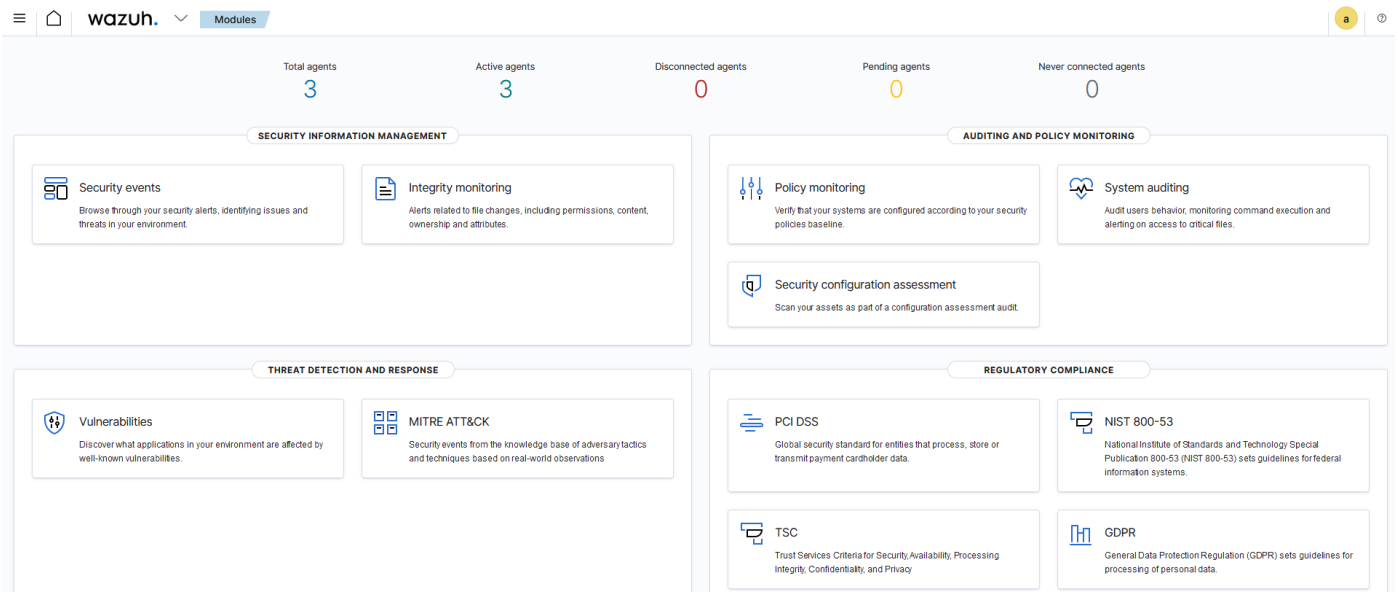
After generating installation script, go to the web server and open your terminal window and run the the script which is given in the fourth step with **root** privileges.

```
[root@web ~]# curl -o wazuh-agent-4.7.3-1.x86_64.rpm -k https://packages.wazuh.c
om/4.x/yum/wazuh-agent-4.7.3-1.x86_64.rpm && sudo WAZUH_MANAGER='172.16.10.11' W
AZUH_AGENT_GROUP='default' rpm -ihv wazuh-agent-4.7.3-1.x86_64.rpm
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 9247k  100 9247k    0     0  2816k      0  0:00:03  0:00:03 --:--:-- 2816k
warning: wazuh-agent-4.7.3-1.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID
29111145: NOKEY
Verifying...                          ################################# [100%]
Preparing...                          ################################# [100%]
        package wazuh-agent-4.7.3-1.x86_64 is already installed
[root@web ~]# ll wazuh-agent-4.7.3-1.x86_64.rpm
-rw-r--r-- 1 root root 9468952 Apr 23 11:56 wazuh-agent-4.7.3-1.x86_64.rpm
[root@web ~]#
```

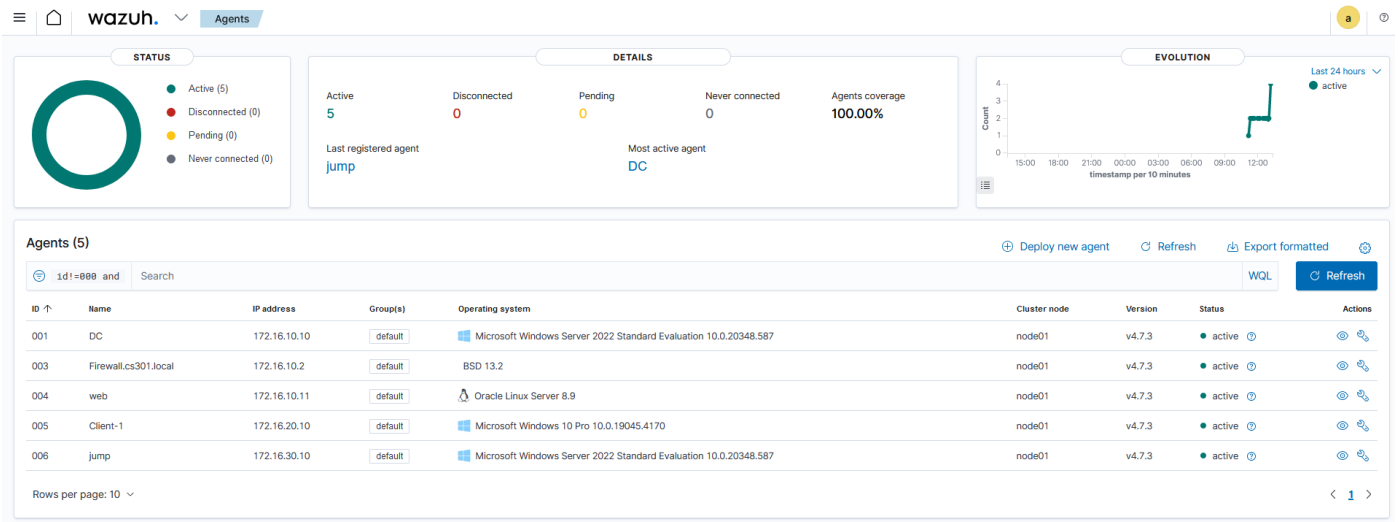
After installing agent package, enable and start the **wazuh-agent** service.

```
[root@web ~]# sudo systemctl enable wazuh-agent
[root@web ~]# sudo systemctl start wazuh-agent
[root@web ~]# systemctl status wazuh-agent.service
● wazuh-agent.service - Wazuh agent
   Loaded: loaded (/usr/lib/systemd/system/wazuh-agent.service; enabled; vendo
r>
   Active: active (running) since Tue 2024-04-23 11:58:33 +04; 34s ago
  Process: 8736 ExecStart=/usr/bin/env /var/ossec/bin/wazuh-control start (cod
```

Now go back to the **Wazuh GUI** in your browser and you will see that the third agent was joined successfully and the total number of agents is **3**.



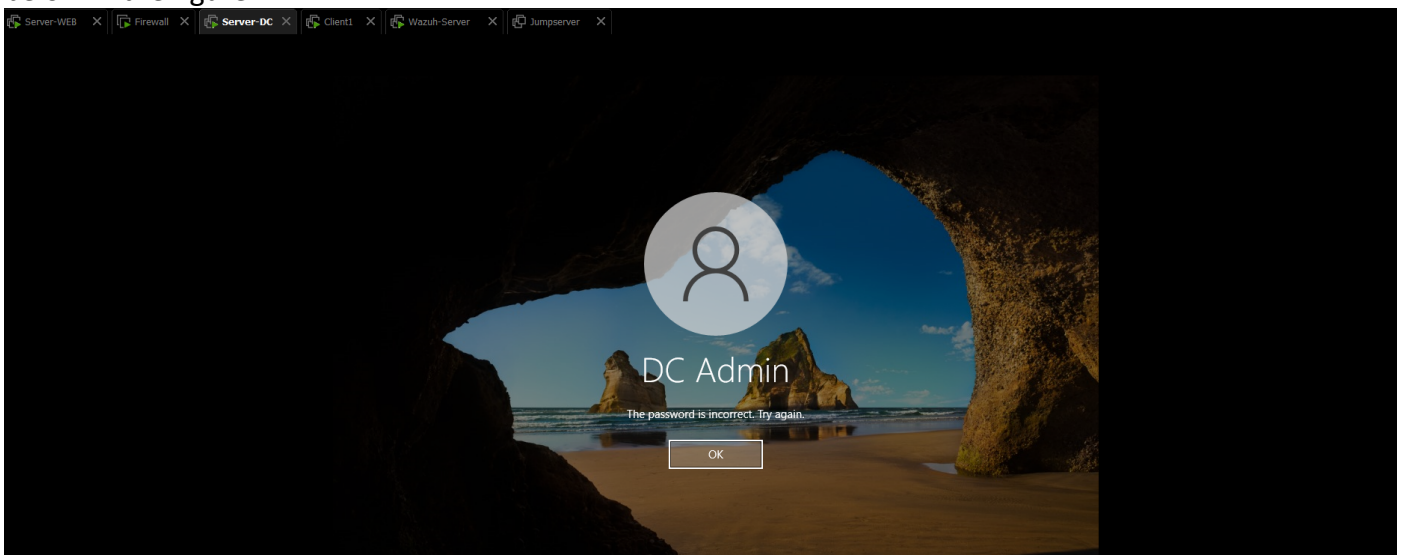
Follow the procedures and join rest of the machines into **SIEM** environment in our infrastructure.



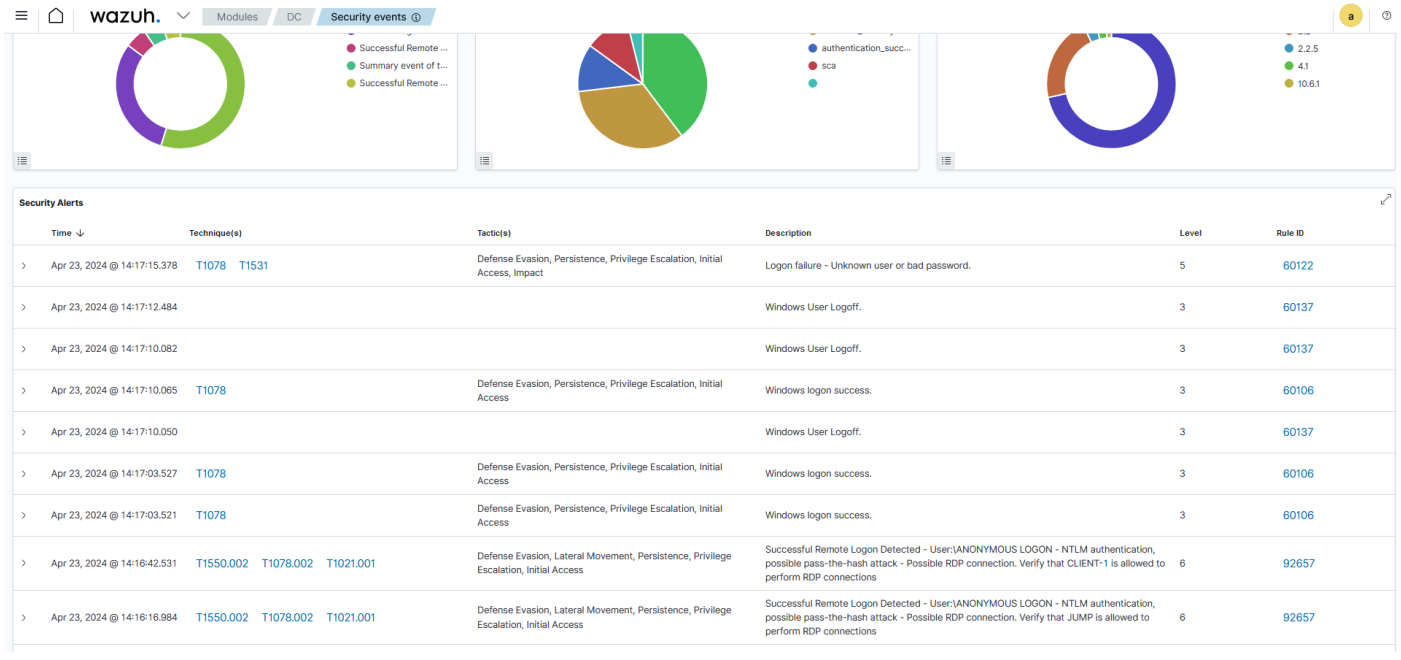
Testing agents

3.1 Testing DC

In order to test our **DC** agent if it sends security logs or not, just try to login with wrong credetials as shown below in the figure.



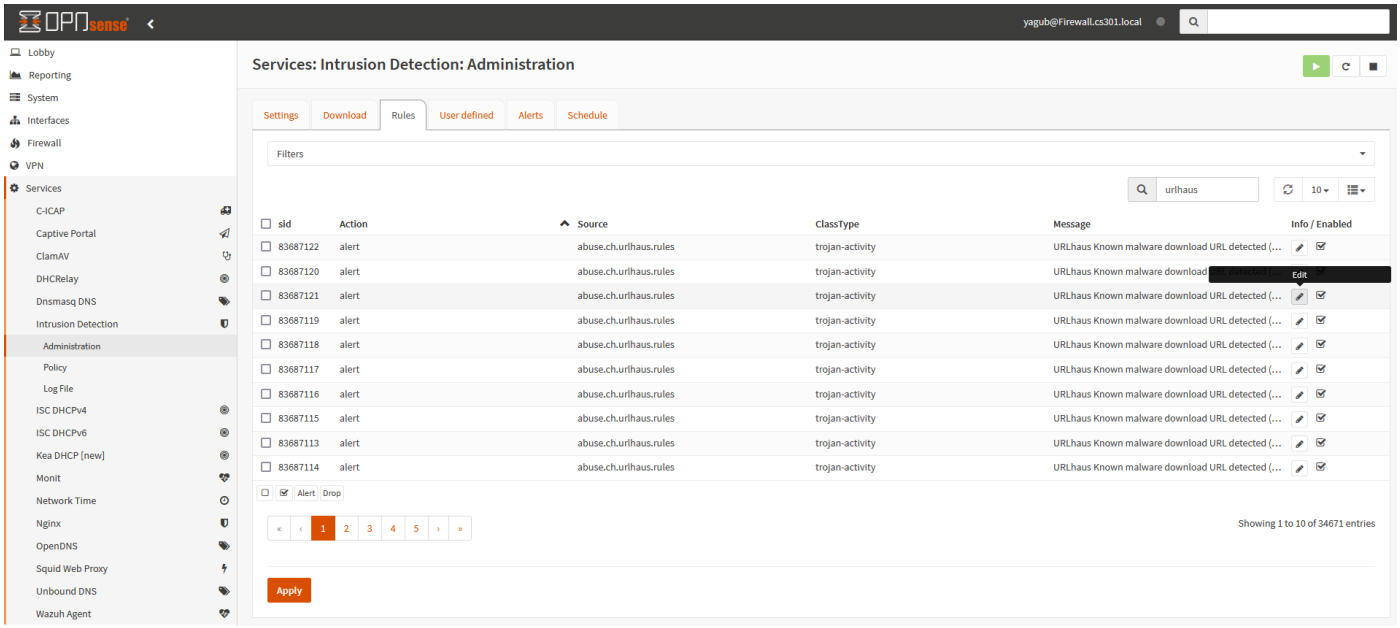
Now open you **Wazuh** server **GUI** in your browser and enter to the **DC** agent. Here open "**Security events**" and observe the logs. As you our unsuccessfull login attempt is displayed here.



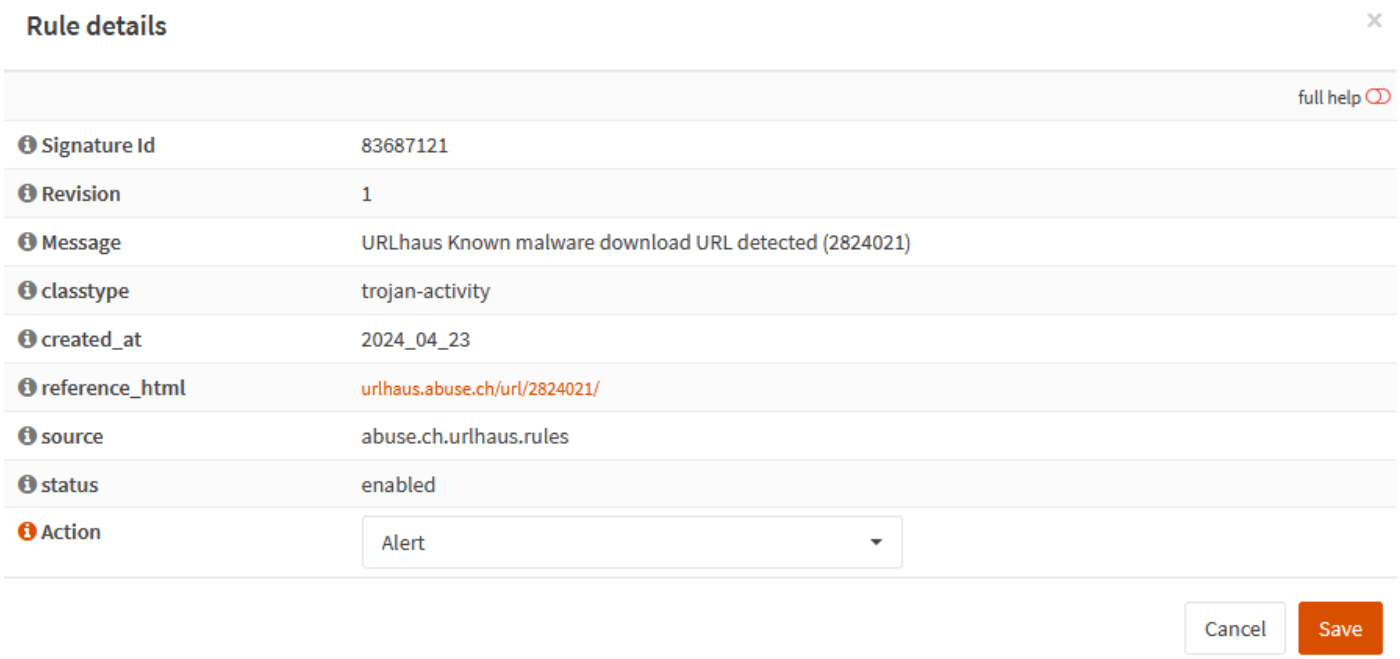
3.2 Testing OPNsense

In the previous capture we enabled **OPNsense IDS** mode and sent its security event to our **Wazuh** server, and in this capture we will test it.

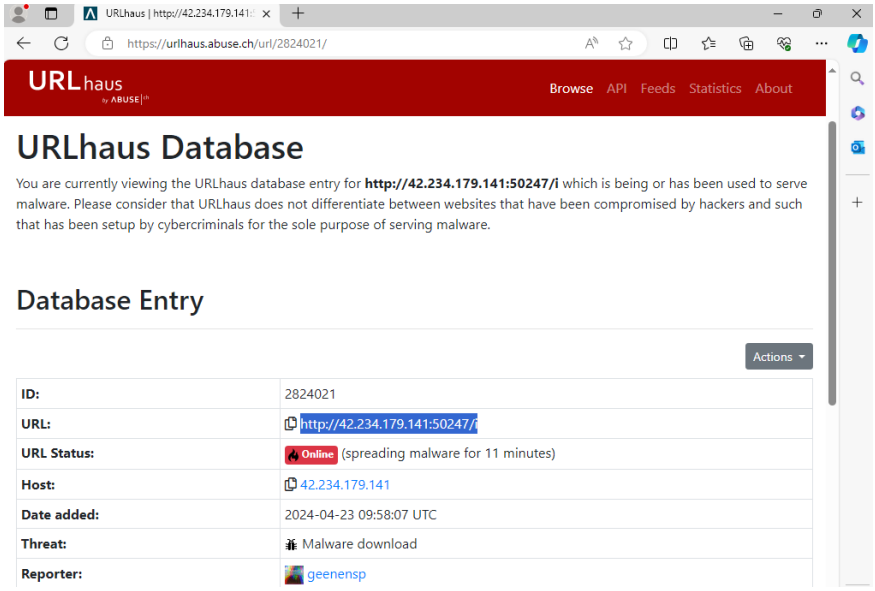
Open the firewall **GUI** environment and go to the **Services=>Intrusion Detection=>Rules** section, in the search box type **urlhaus** to filter only for **URLhaus** rules and press the any rule's edit button.



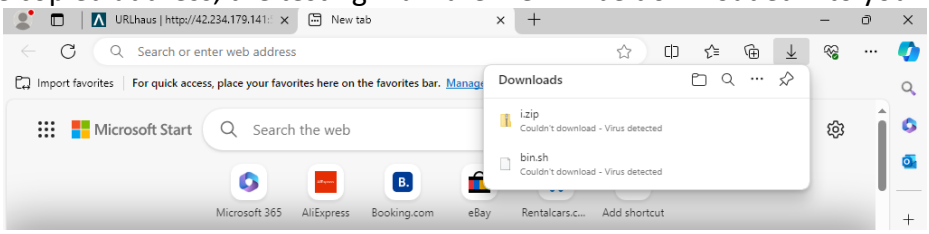
In the popped up window, copy the **referance_html** address and open it in any of machines from **SERVERS** or **CLIENTS** networks (we activated firewall **IDS** mode only these two networks) as shown in the figure.



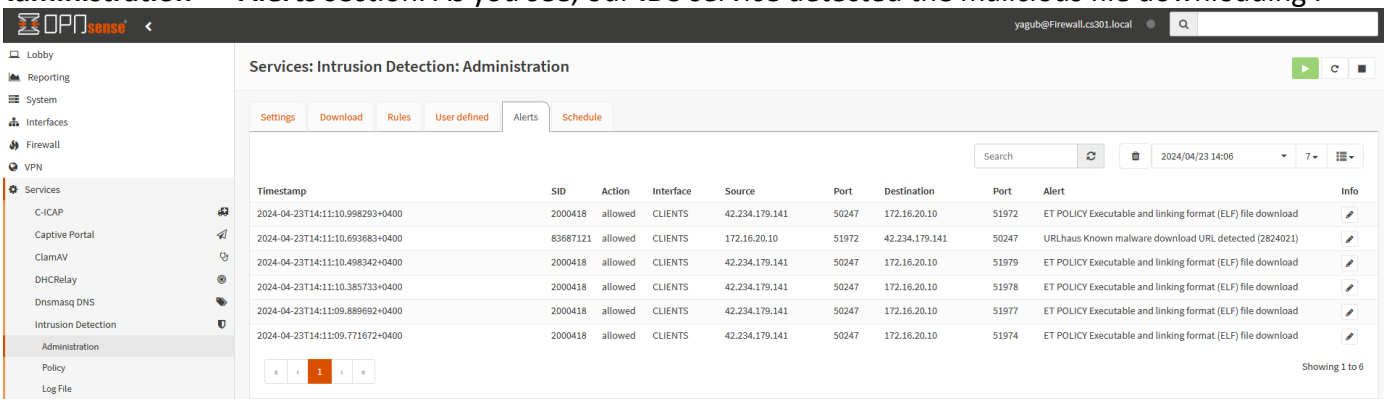
In the new page, copy the **URL** and open it in the new window.



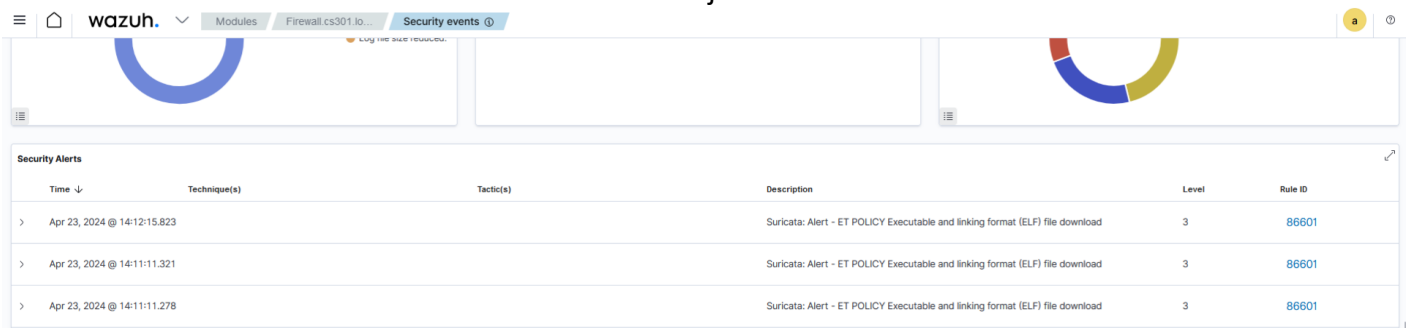
Once you go to the copied address, the testing malware file will be downloaded into your machine.



Then go back to your firewall **GUI** and observe the alerts in the **Services => Intrusion Detection => Administration => Alerts** section. As you see, our **IDS** service detected the malicious file downloading .



Now go back to the **Wazuh GUI** in your browser, and open the **Firewall** agent. In the agent window, open the "**Security events**" section and observe the logs. You can see that all alert logs are belong to our **IDS** service in **OPNsense** firewall. For detailed information just click on the rule.



Wazuh Proof of Concept

4.1 Blocking a known malicious actor

In this capture we will implement checklist feature into **Wazuh**, which will allow us to block malicious **IP**s in order to protect our web server.

Original article: https://documentation.wazuh.com/current/proof-of-concept-guide/block-malicious-actor-ip-reputation.html

As you know we have the web server in our infrastructure and we have to protect it from malicious actors. **Wazuh** lets us to add another security layer to make our infrastructure much more secure. This layer is checking **IP** addresses of clients who try to connect our web server, and block them if they are in our blacklist. In this lab, we will demonstrate it with two machines, one is our web server and the other one is the blocked source. First we will donwload a ready blacklist and appaned our malicious **IP** address in it.

All of **Wazuh** configuration files are located under **/var/ossec** path and checklists are placed in **/var/ossec/etc/lists** directory. We must download our blacklist here.

```
[root@wazuh ~]# curl  https://raw.githubusercontent.com/firehol/blocklist-ipsets/master/alienvault_reputation.ipset -o
 /var/ossec/etc/lists/alienvault_reputation.ipset -k
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  9495  100  9495    0     0   3561      0  0:00:02  0:00:02 --:--:--  3561
[root@wazuh ~]# ll /var/ossec/etc/lists/alienvault_reputation.ipset
-rw-r--r--. 1 root root 9495 Apr 28 11:53 /var/ossec/etc/lists/alienvault_reputation.ipset
```

This free blacklist contain public **IP** addresses of malicious actors around the world, but we will test this feature in our local environment. So we need to add our choosen machine's (attacker) **IP** into this checklist. In this situation our attacker's **IP** is **192.168.1.133**.

```
[root@wazuh ~]# tail -n 2 /var/ossec/etc/lists/alienvault_reputation.ipset
223.155.34.126
223.159.88.8
[root@wazuh ~]# echo "192.168.1.133" >> /var/ossec/etc/lists/alienvault_reputation.ipset
[root@wazuh ~]# tail -n 2 /var/ossec/etc/lists/alienvault_reputation.ipset
223.159.88.8
192.168.1.133
[root@wazuh ~]#
```

Our blacklist has to be in "**.cdb**" file format, oterwise **Wazuh** couldn't read it. For converting the "**.ipset**", we need to download a script tool called **iplist-to-cdblist.py**. The figure demonstrate the converting process, the **python3** binary must be used to run the donwloaded script.

```
[root@wazuh ~]# curl https://wazuh.com/resources/iplist-to-cdblist.py -o /tmp/iplist-to-cdblist.py -k
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  1570  100  1570    0     0   1227      0  0:00:01  0:00:01 --:--:--  1227
[root@wazuh ~]#  /var/ossec/framework/python/bin/python3 /tmp/iplist-to-cdblist.py /var/ossec/etc/lists/alienvault_rep
utation.ipset /var/ossec/etc/lists/blacklist-alienvault
[/var/ossec/etc/lists/alienvault_reputation.ipset] -> [/var/ossec/etc/lists/blacklist-alienvault]
[root@wazuh ~]# ll /var/ossec/etc/lists/blacklist-alienvault
-rw-r--r--. 1 wazuh wazuh 9320 Apr 28 11:57 /var/ossec/etc/lists/blacklist-alienvault
[root@wazuh ~]#
```

The next step is to define a rule to trigger the Wazuh defualt scripts to block the blacklist addresses. **Wazuh** system rules are located under **/var/ossec/etc/rules** path, and the default custom rule file is **local_rules.xml**. Open this file and add the rule shown in the figure.

```
[root@wazuh ~]# vim /var/ossec/etc/rules/local_rules.xml
```

```
<group name="attack,">
  <rule id="100100" level="10">
    <if_group>web|attack|attacks</if_group>
    <list field="srcip" lookup="address_match_key">etc/lists/blacklist-alienvault</list>
    <description>IP address found in AlienVault reputation database.</description>
  </rule>
</group>
"/var/ossec/etc/rules/local_rules.xml" 57L, 1739C written
```

After defining rule, we need to add our blacklist location into **Wazuh** configuration file, **ossec.conf** which is placed under **/var/ossec/etc/ossec.conf** path.

```
[root@wazuh ~]# vim /var/ossec/etc/ossec.conf
```

This information has to be in the **<ruleset>** block.

```
  <ruleset>
    <!-- Default ruleset -->
    <decoder_dir>ruleset/decoders</decoder_dir>
    <rule_dir>ruleset/rules</rule_dir>
    <rule_exclude>0215-policy_rules.xml</rule_exclude>
    <list>etc/lists/audit-keys</list>
    <list>etc/lists/amazon/aws-eventnames</list>
    <list>etc/lists/security-eventchannel</list>
    <list>etc/lists/blacklist-alienvault</list>
    <list>etc/lists/blacklist-alienvault</list>

    <!-- User-defined ruleset -->
    <decoder_dir>etc/decoders</decoder_dir>
    <rule_dir>etc/rules</rule_dir>
  </ruleset>

"/var/ossec/etc/ossec.conf" 413L, 11135C written
```

Inside this configuration file, we need to define the **Wazuh** server's defualt script **firewall-drop** to be activated by our custom rule (100100) which we added into the **local_rules.xml** file above. This informatoin has to be in the **<active-reponse>** block. **Wazuh**'s active response binaries are located under **/var/ossec/etc/active-response/bin** path.

```
<ossec_config>
  <active-response>
    <command>firewall-drop</command>
    <location>local</location>
    <rules_id>100100</rules_id>
    <timeout>60</timeout>
  </active-response>
</ossec_config>
"/var/ossec/etc/ossec.conf" 422L, 11334C written
```

After configuring all files, the **wazuh-manager** service must be restarted.

```
[root@wazuh ~]# systemctl restart wazuh-manager.service
```

The final step is testing our active response feature. Open attacker machine whose **IP** address is **192.168.1.133**, and run the curl command to send **GET** request to our web server.

NOTE: In our infrastructure, **WEB** server's **IP** address is **172.16.10.11** and it uses custom **VMNET1** adapter in the **SERVERS** network. All traffic with external networks goes through **172.16.10.1 IP** address and although we send requests from different **IP** addresses, only this address shown as a source address in the access

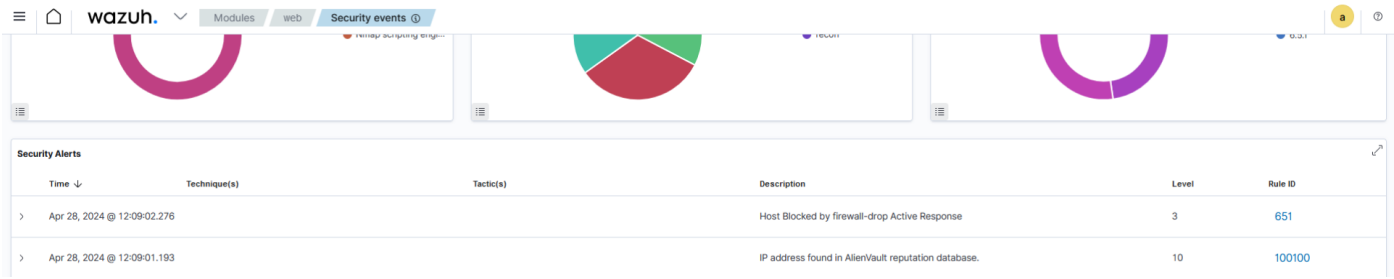
logs of web service. So in order to demonstrate only this lab, I added another network adapter to **WEB** server and hosted it in the **NAT** network with **192.168.1.138 IP** address.

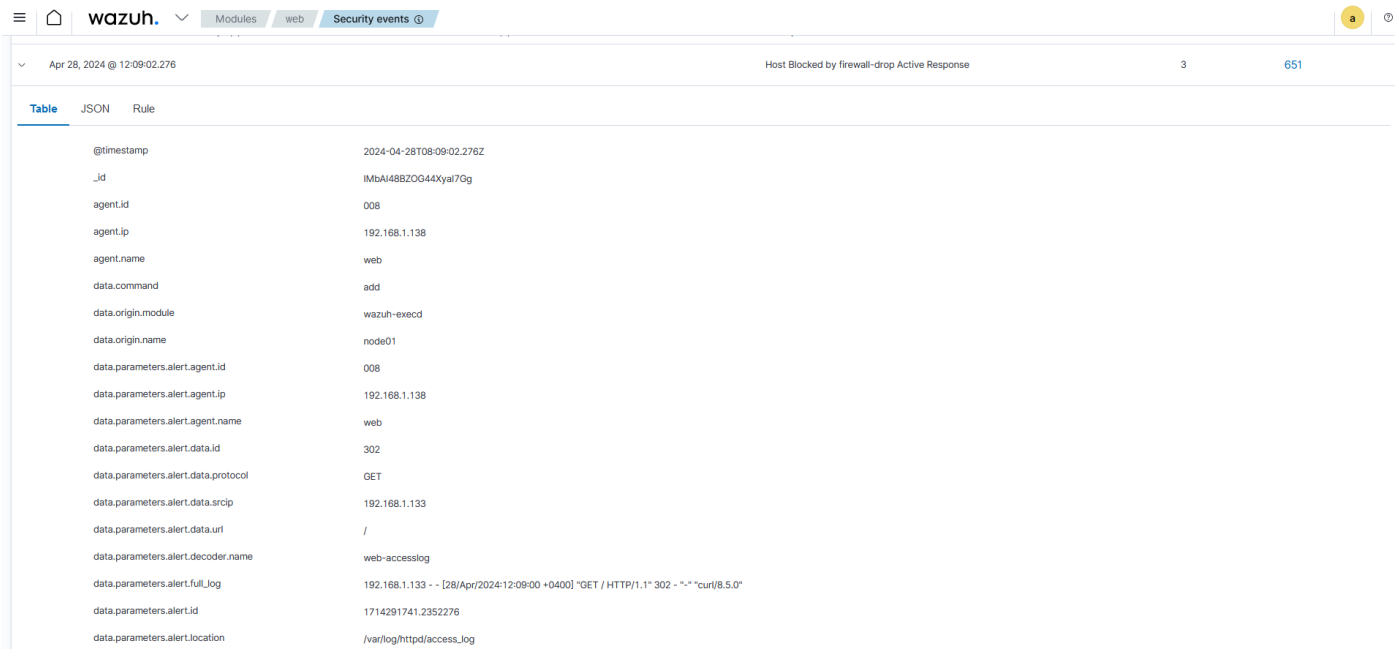
```
┌──(root㉿kali)-[~]
└─# hostname -I
192.168.1.133

┌──(root㉿kali)-[~]
└─# curl http://192.168.1.138
```

In the WEB agent, open **/var/log/httpd/access_log** file and observe the **HTTP GET** requests.

```
[root@web ~]# tail -n 1 /var/log/httpd/access_log
192.168.1.133 - - [28/Apr/2024:12:09:00 +0400] "GET / HTTP/1.1" 302 - "-" "curl/8.5.0"
```

We can see that our request is added to the access logs. Now open the **Wazuh GUI** in your browser and go to the **web** agent and open the "**Security events**".





Once we run the **curl** command, our **GET** request appeared in the **Apache2** access log with our attacker's **IP** address and in the next step Wazuh match this address with blacklist then trigger the active response script, **firewall-drop** and block the matched address.

4.2 Responding to network attacks with Suricata and Wazuh XDR

In firewall integration capture, we integrated firewall **IDS** feature to our **Wazuh SIEM** and monitored alerts via security events. This feature controlled two networks, **SERVERS** and **CLIENTS**, but, in this lab we will implement **Suricata** service to our web server in host based. **Suricata** will be integrated to **Wazuh** active response module, **XDR**, and any malicious action will be blocked by **XDR** in order to protect our web server.

Original article: https://wazuh.com/blog/responding-to-network-attacks-with-suricata-and-wazuh-xdr/

First we need to install **Suricata** to our server, but we will not critize this process in this lab. You can find full installation guide from the source below.

Suricata deploy: https://github.com/Yagub-Hajiyev/Lab_Setup/blob/710ab7546f9ca38f91f676be03bf526565c10615/Suricata_installation.pdf

After successfully deploying **Suricata** as **IDS**, we must download and new rules and add them to our **Suricata** service in order to detect malicious activities.

Rules: https://rules.emergingthreats.net/open/suricata-6.0.17/emerging.rules.tar.gz

In the lab we will use only **emerging-scan.rules** to detect **Nmap** scans and block the action with **Wazuh XDR** service. Download compressed file and extract it, then copy the ruleset into **Suricata** default rule path as displayed in the figure.

```
[root@web ~]# ll
total 4168
-rw-------. 1 root root    1034 Mar 31 16:30 anaconda-ks.cfg
-rw-r--r--  1 root root 4258851 Apr 27 21:39 emerging.rules.tar.gz
-rw-r--r--. 1 root root    1261 Mar 31 16:49 initial-setup-ks.cfg
[root@web ~]# tar -zxf emerging.rules.tar.gz
[root@web ~]# ll
total 4172
-rw-------. 1 root root    1034 Mar 31 16:30 anaconda-ks.cfg
-rw-r--r--  1 root root 4258851 Apr 27 21:39 emerging.rules.tar.gz
-rw-r--r--. 1 root root    1261 Mar 31 16:49 initial-setup-ks.cfg
drwxr-xr-x  2 root root    4096 Apr 27 00:29 rules
[root@web ~]# ll rules/emerging-scan.rules
-rw-r--r-- 1 root root 144847 Apr 27 00:29 rules/emerging-scan.rules
[root@web ~]# cp rules/emerging-scan.rules /var/lib/suricata/rules/
[root@web ~]# ll /var/lib/suricata/rules/
total 220
-rw-r--r-- 1 root suricata   3228 Apr 27 21:40 classification.config
-rw-r--r-- 1 root suricata 144847 Apr 27 22:40 emerging-scan.rules
-rw-r--r-- 1 root suricata  70386 Apr 27 21:40 suricata.rules
[root@web ~]#
```

Later open the suricata.yaml file and define the new rule name in the configuration, then restart the **suricata.service** to reload new configuration.

```
[root@web ~]# vim /etc/suricata/suricata.yaml
```

```
default-rule-path: /var/lib/suricata/rules

rule-files:
  - suricata.rules
```

```
default-rule-path: /var/lib/suricata/rules

rule-files:
  - suricata.rules
  - emerging-scan.rules
```

```
[root@web ~]# systemctl restart suricata.service
```

Now open the Wazuh server and create a new group, named Suricata, as shown in the figure. **Wazuh** has default scripts to manage agents and groups, and one of them is **agent_groups** binary. You can manage them also from **GUI** in your browser. After creating new group, use **manage_agents** binary to add our web server into that **Suricata** group.

```
[root@wazuh ~]# /var/ossec/bin/agent_groups -a -g Suricata -q
Group 'Suricata' created.
[root@wazuh ~]# /var/ossec/bin/manage_agents -l

Available agents:
   ID: 006, Name: jump, IP: any
   ID: 003, Name: Firewall.cs301.local, IP: any
   ID: 004, Name: web, IP: any
   ID: 005, Name: Client-1, IP: any
   ID: 007, Name: DC, IP: any

[root@wazuh ~]#  /var/ossec/bin/agent_groups -a -i 4 -g Suricata -q
Group 'Suricata' added to agent '004'.
[root@wazuh ~]#
```

Every group has its own configuration file, **agent.conf** which affect to all agents in it. As you know our default configuration file is **ossec.conf** and every agent has this file in its host. Now we will append new configuration to our **Suricata** group (where we have only one agent yet) to say reading **IDS** logs in **json** format.

```
[root@wazuh ~]# vim /var/ossec/etc/shared/Suricata/agent.conf
```

```
<agent_config>

  <localfile>
    <log_format>json</log_format>
    <location>/var/log/suricata/eve.json</location>
  </localfile>

  <!-- Shared agent configuration here -->

</agent_config>
```

In the next step, new decoder configurations has to be added to our default **local_decoder.xml** file to map source **IP** addresses from logs to our active response script, **firewall-drop**.

```
[root@wazuh ~]# vim /var/ossec/etc/decoders/local_decoder.xml
```

```
<decoder name="local_decoder_example">
    <program_name>local_decoder_example</program_name>
</decoder>

<decoder name="json">
  <prematch>^{\s*"</prematch>
</decoder>

<decoder name="json_child">
  <parent>json</parent>
  <regex type="pcre2">"src_ip":"([^"]+)"</regex>
  <order>srcip</order>
</decoder>

<decoder name="json_child">
  <parent>json</parent>
  <plugin_decoder>JSON_Decoder</plugin_decoder>
</decoder>
-- INSERT --
```

We need a custom rule for **Wazuh** active response module to trigger **firewall-drop** script on our **WEB** server agent. This rule will detect **Nmap** scan activities by help of **Suricata** and our **XDR** will block the malicious actor. Open the default custom rule file, **local_rules.xml**, in the **Wazuh** server and add the following rule to it.

```
[root@wazuh ~]# vim /var/ossec/etc/rules/local_rules.xml
```

```
  <rule id="100204" level="12">
    <if_sid>86600</if_sid>
    <field name="event_type">^alert$</field>
    <match>ET SCAN Nmap Scripting Engine User-Agent Detected (Nmap Scripting Engine)</match>
    <description>Nmap scripting engine detected. </description>
    <mitre>
      <id>T1595</id>
    </mitre>
  </rule>
</group>

"/var/ossec/etc/rules/local_rules.xml" 118L, 3760C written
```

Later open the **Wazuh** server configuration file, **ossec.conf**, and add the following active response block to trigger **firewall-drop** script and restart the **wazuh-manager** service for appliying new configuration.

```
[root@wazuh ~]# vim /var/ossec/etc/ossec.conf
```

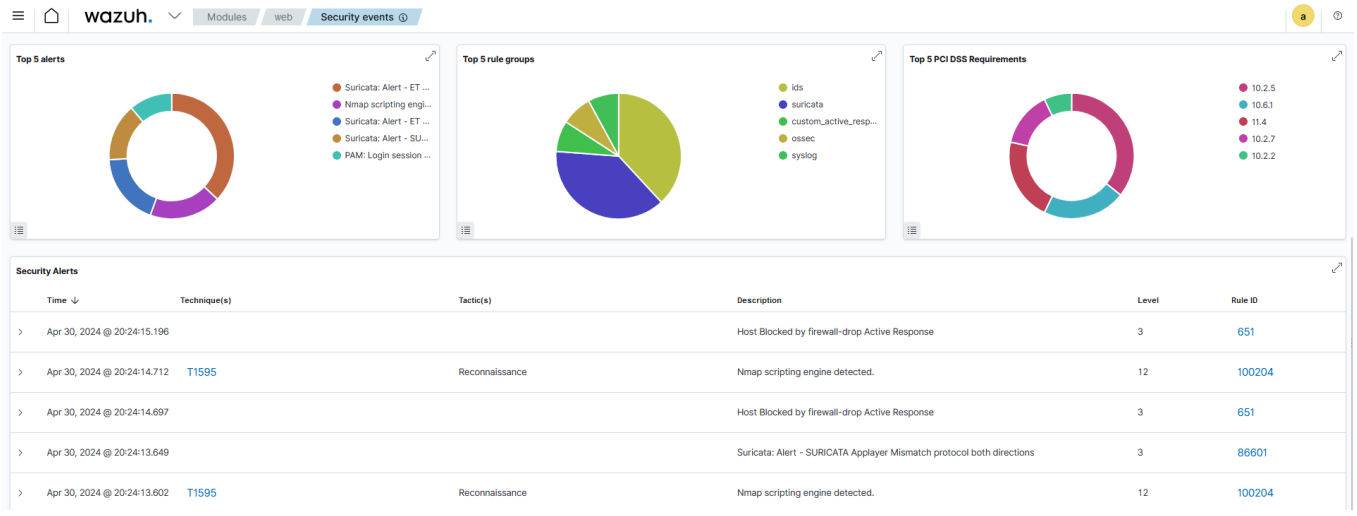
```
<ossec_config>
  <active-response>
    <command>firewall-drop</command>
    <location>local</location>
    <rules_id>100204</rules_id>
    <timeout>180</timeout>
  </active-response>
</ossec_config>

"/var/ossec/etc/ossec.conf" 461L, 12277C written
```

```
[root@wazuh ~]# vim /var/ossec/etc/ossec.conf
[root@wazuh ~]# systemctl restart wazuh-manager.service
[root@wazuh ~]#
```

Now we are ready to test our integration, go to your **Kali Linux** machine and first test your connectivity with the web server. Later run the Nmap scan with the script as shown below in the figure.

```
┌──(root㉿kali)-[~]
└─# nmap -sS --script=vuln 172.16.10.11
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-04-30 20:23 +04
Nmap scan report for 172.16.10.11
Host is up (0.00077s latency).
Not shown: 999 filtered tcp ports (no-response)
PORT   STATE SERVICE
80/tcp open  http
| http-cookie-flags:
|   /:
|     PHPSESSID:
|_      httponly flag not set
|_http-aspnet-debug: ERROR: Script execution failed (use -d to debug)
|_http-csrf: Couldn't find any CSRF vulnerabilities.
|_http-dombased-xss: Couldn't find any DOM based XSS.
|_http-vuln-cve2014-3704: ERROR: Script execution failed (use -d to debug)
|_http-stored-xss: Couldn't find any stored XSS vulnerabilities.

Nmap done: 1 IP address (1 host up) scanned in 242.25 seconds

┌──(root㉿kali)-[~]
└─#
```

Later open your **Wazuh GUI** and select the web server agent where you installed **Suricata** service and analyse the "**Security events**". You can see that the attacker machine is blocked by **Wazuh** active response module.



4.3 Detecting malware using YARA integration

YARA integration with **Wazuh** allows us to detect malwares based on their textual or binary patterns. **YARA** requires **Wazuh FIM** module to scan our selected directories in realtime. When we add or modify any file under **FIM** directory, **YARA** scans patterns with its rules and when it match any of files then it trigger **Wazuh** active response module and delete the matched file with **yara.sh** script.

Original article: **https://documentation.wazuh.com/current/proof-of-concept-guide/detect-malware-yara-integration.html**

In this lab, we will install **YARA** into our web server. Lets start with installing some required packages into our agent.

```
[root@web ~]# yum install -y make automake gcc autoconf libtool openssl-devel pkg-config jq
Last metadata expiration check: 6:08:11 ago on Sun 28 Apr 2024 11:19:51 AM +04.
Package pkgconf-pkg-config-1.4.2-1.el8.x86_64 is already installed.
Package jq-1.6-7.0.3.el8.x86_64 is already installed.
Dependencies resolved.
================================================================================================================================
 Package                         Architecture      Version                          Repository                    Size
================================================================================================================================
Installing:
 autoconf                        noarch            2.69-29.el8                      ol8_appstream                710 k
 automake                        noarch            1.16.1-8.el8                     ol8_appstream                713 k
 gcc                             x86_64            8.5.0-20.0.3.el8                 ol8_appstream                 23 M
 libtool                         x86_64            2.4.6-25.el8                     ol8_appstream                709 k
 make                            x86_64            1:4.2.1-11.el8                   ol8_baseos_latest            498 k
 openssl-devel                   x86_64            1:1.1.1k-12.el8_9                ol8_baseos_latest            2.3 M
Upgrading:
 libgcc                          x86_64            8.5.0-20.0.3.el8                 ol8_baseos_latest             91 k
 libgomp                         x86_64            8.5.0-20.0.3.el8                 ol8_baseos_latest            217 k
 openssl                         x86_64            1:1.1.1k-12.el8_9                ol8_baseos_latest            710 k
 openssl-libs                    x86_64            1:1.1.1k-12.el8_9                ol8_baseos_latest            1.5 M
Installing dependencies:
 cpp                             x86_64            8.5.0-20.0.3.el8                 ol8_appstream                 10 M
 glibc-devel                     x86_64            2.28-236.0.1.el8.7               ol8_baseos_latest             87 k
 isl                             x86_64            0.16.1-6.el8                     ol8_appstream                841 k
 keyutils-libs-devel             x86_64            1.5.10-9.el8                     ol8_baseos_latest             48 k
 krb5-devel                      x86_64            1.18.2-25.0.1.el8_8              ol8_baseos_latest            562 k
```

After installing packages, donwload the yara installation file from **GitHub** repository and decomress it such as in the figure.

```
[root@web ~]# curl -LO https://github.com/VirusTotal/yara/archive/v4.2.3.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:--  0:00:02 --:--:--     0
100 1258k    0 1258k    0     0   214k      0 --:--:--  0:00:05 --:--:--  410k
[root@web ~]# ll v4.2.3.tar.gz
-rw-r--r-- 1 root root 1288334 Apr 28 17:41 v4.2.3.tar.gz
[root@web ~]# tar -xvzf v4.2.3.tar.gz -C /usr/local/bin/ && rm -f v4.2.3.tar.gz
```

Later go into the decomressed **YARA** directory and run the following commands to install the tool.

```
[root@web ~]# cd /usr/local/bin/yara-4.2.3/
[root@web yara-4.2.3]# ./bootstrap.sh && ./configure && make && make install && make check
libtoolize: putting auxiliary files in AC_CONFIG_AUX_DIR, 'build-aux'.
libtoolize: copying file 'build-aux/ltmain.sh'
libtoolize: putting macros in AC_CONFIG_MACRO_DIRS, 'm4'.
libtoolize: copying file 'm4/libtool.m4'
libtoolize: copying file 'm4/ltoptions.m4'
```

```
PASS: test-arena
PASS: test-alignment
PASS: test-atoms
PASS: test-api
PASS: test-rules
PASS: test-pe
PASS: test-elf
PASS: test-version
PASS: test-bitmask
PASS: test-math
PASS: test-stack
PASS: test-re-split
PASS: test-async
PASS: test-exception
PASS: test-dotnet
============================================================================
Testsuite summary for yara 4.2.3
============================================================================
# TOTAL: 15
# PASS:  15
# SKIP:  0
# XFAIL: 0
# FAIL:  0
# XPASS: 0
# ERROR: 0
============================================================================
```

Run the the command **yara** and donwload it.

```
[root@web yara-4.2.3]# yara
bash: yara: command not found...
Install package 'yara' to provide command 'yara'? [N/y] y


 * Waiting in queue...
 * Loading list of packages....
The following packages have to be installed:
 yara-4.2.3-1.el8.x86_64        Pattern matching Swiss knife for malware researchers
Proceed with changes? [N/y] y


 * Waiting in queue...
 * Waiting for authentication...
 * Waiting in queue...
 * Downloading packages...
 * Requesting data...
 * Testing changes...
 * Installing packages...
yara: wrong number of arguments
Usage: yara [OPTION]... [NAMESPACE:]RULES_FILE... FILE | DIR | PID

Try `--help` for more options

[root@web yara-4.2.3]#
```

After the installation again run the command, **yara**, and make sure it works properly.

```
[root@web yara-4.2.3]# yara
yara: wrong number of arguments
Usage: yara [OPTION]... [NAMESPACE:]RULES_FILE... FILE | DIR | PID

Try `--help` for more options
[root@web yara-4.2.3]#
```

Create a direcories path **/tmp/yara/rules** and run the following commands to donwload **YARA** detection rules.

```
[root@web ~]#  mkdir -p /tmp/yara/rules
[root@web ~]# curl 'https://valhalla.nextron-systems.com/api/v1/get' \
l,applic> -H 'Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8' \
> -H 'Accept-Language: en-US,en;q=0.5' \
> --compressed \
> -H 'Referer: https://valhalla.nextron-systems.com/' \
> -H 'Content-Type: application/x-www-form-urlencoded' \
> -H 'DNT: 1' -H 'Connection: keep-alive' -H 'Upgrade-Insecure-Requests: 1' \
> --data 'demo=demo&apikey=1111111111111111111111111111111111111111111111111111111111111111&format=text' \
> -o /tmp/yara/rules/yara_rules.yar
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 2863k  100 2862k  100    93   816k     26  0:00:03  0:00:03 --:--:--  816k
[root@web ~]#
```

Now create a new script named **yara.sh** under **/var/ossec/active-response/bin** path, copy the example script from given article **link** and paste in it.

```
[root@web ~]# vim /var/ossec/active-response/bin/yara.sh
```

```
while [ ${size} -ne ${actual_size} ]; do
    sleep 1
    size=${actual_size}
    actual_size=$(stat -c %s ${FILENAME})
done

#------------------------ Analyze parameters -------------------------#

if [[ ! $YARA_PATH ]] || [[ ! $YARA_RULES ]]
then
    echo "wazuh-yara: ERROR - Yara active response error. Yara path and rules parameters are mandatory." >> ${LOG_FILE
}
    exit 1
fi

#--------------------------- Main workflow ---------------------------#

# Execute Yara scan on the specified filename
yara_output="$("${YARA_PATH}"/yara -w -r "$YARA_RULES" "$FILENAME")"

if [[ $yara_output != "" ]]
then
    # Iterate every detected rule and append it to the LOG_FILE
    while read -r line; do
        echo "wazuh-yara: INFO - Scan result: $line" >> ${LOG_FILE}
    done <<< "$yara_output"
fi

exit 0;
"/var/ossec/active-response/bin/yara.sh" [New] 51L, 1486C written                    51,7          Bot
```

Later assign the group owner script to **wazuh** and give the following permissions to run the script properly.

```
[root@web ~]# vim /var/ossec/active-response/bin/yara.sh
[root@web ~]# chown root:wazuh /var/ossec/active-response/bin/yara.sh
[root@web ~]# chmod 750 /var/ossec/active-response/bin/yara.sh
[root@web ~]# ll /var/ossec/active-response/bin/yara.sh
-rwxr-x--- 1 root wazuh 1486 Apr 28 17:53 /var/ossec/active-response/bin/yara.sh
[root@web ~]#
```

We will use **/tmp/yara/malware** directory to test our integration. First we need to define this path in our agent's configuration file to monitor activities with **FIM** integration. Open **ossec.conf** file and add the following **syscheck** block in it and restart the **wazuh-agent.service**.

```
[root@web ~]# vim /var/ossec/etc/ossec.conf
```

```
  <syscheck>
    <disabled>no</disabled>
    <directories realtime="yes">/tmp/yara/malware</directories>
  </syscheck>

</ossec_config>
"/var/ossec/etc/ossec.conf" 229L, 6250C written
```

```
[root@web ~]# vim /var/ossec/etc/ossec.conf
[root@web ~]# systemctl restart wazuh-agent.service
[root@web ~]#
```

At this point we are done with agent configuration, go to the **Wazuh** server and open **local_rules.xml** file and add following custom rules blocks in it shown in the figure below.

```
[root@wazuh ~]# vim /var/ossec/etc/rules/local_rules.xml
```

```
<group name="syscheck,">
  <rule id="100300" level="7">
    <if_sid>550</if_sid>
    <field name="file">/tmp/yara/malware/</field>
    <description>File modified in /tmp/yara/malware/ directory.</description>
  </rule>
  <rule id="100301" level="7">
    <if_sid>554</if_sid>
    <field name="file">/tmp/yara/malware/</field>
    <description>File added to /tmp/yara/malware/ directory.</description>
  </rule>
</group>

<group name="yara,">
  <rule id="108000" level="0">
    <decoded_as>yara_decoder</decoded_as>
    <description>Yara grouping rule</description>
  </rule>
  <rule id="108001" level="12">
    <if_sid>108000</if_sid>
    <match>wazuh-yara: INFO - Scan result: </match>
    <description>File "$(yara_scanned_file)" is a positive match. Yara rule: $(yara_rule)</description>
  </rule>
</group>
"/var/ossec/etc/rules/local_rules.xml" 112L, 3541C written                    112,8
```

In order to extraxt information from **YARA** scan results, open the **local_decoder.xml** file and add following configuration in it.

```
[root@wazuh ~]# vim /var/ossec/etc/decoders/local_decoder.xml
```

```
<decoder name="yara_decoder">
  <prematch>wazuh-yara:</prematch>
</decoder>

<decoder name="yara_decoder1">
  <parent>yara_decoder</parent>
  <regex>wazuh-yara: (\S+) - Scan result: (\S+) (\S+)</regex>
  <order>log_type, yara_rule, yara_scanned_file</order>
</decoder>
"/var/ossec/etc/decoders/local_decoder.xml" 52L, 1398C written
```

Open **Wazuh** server configuration file add the information shown in the figure and restart the **wazuh-manager.service**.

```
[root@wazuh ~]# vim /var/ossec/etc/ossec.conf
```

```
<ossec_config>
  <command>
    <name>yara_linux</name>
    <executable>yara.sh</executable>
    <extra_args>-yara_path /usr/local/bin -yara_rules /tmp/yara/rules/yara_rules.yar</extra_args>
    <timeout_allowed>no</timeout_allowed>
  </command>

  <active-response>
    <command>yara_linux</command>
    <location>local</location>
    <rules_id>100300,100301</rules_id>
  </active-response>
</ossec_config>
"/var/ossec/etc/ossec.conf" 462L, 12335C written
```

All configurations are done and we are ready to test our integrations. Create the /tmp/yara/malware directory which is monitored by **Wazuh FIM** module and new script for downloadin malware samples.

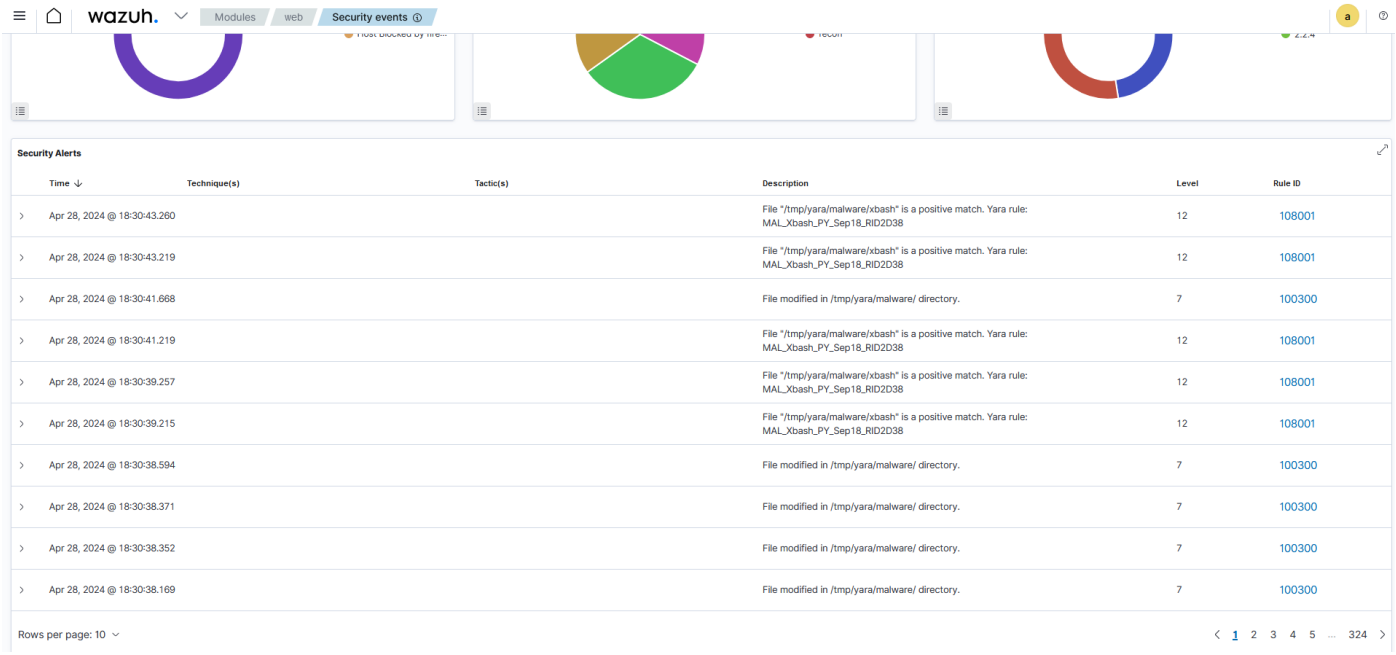
```
[root@web ~]# mkdir -p /tmp/yara/malware
[root@web ~]# vim /tmp/yara/malware/malware_downloader.sh
```

```
    # Mirai
    echo "# Mirai: https://en.wikipedia.org/wiki/Mirai_(malware)"
    echo "Downloading malware sample..."
    fetch_sample "https://wazuh-demo.s3-us-west-1.amazonaws.com/mirai" "/tmp/yara/malware/mirai" && echo "Done!" || ec
ho "Error while downloading."
    echo

    # Xbash
    echo "# Xbash: https://unit42.paloaltonetworks.com/unit42-xbash-combines-botnet-ransomware-coinmining-worm-targets
-linux-windows/"
    echo "Downloading malware sample..."
    fetch_sample "https://wazuh-demo.s3-us-west-1.amazonaws.com/xbash" "/tmp/yara/malware/xbash" && echo "Done!" || ec
ho "Error while downloading."
    echo

    # VPNFilter
    echo "# VPNFilter: https://news.sophos.com/en-us/2018/05/24/vpnfilter-botnet-a-sophoslabs-analysis/"
    echo "Downloading malware sample..."
    fetch_sample "https://wazuh-demo.s3-us-west-1.amazonaws.com/vpn_filter" "/tmp/yara/malware/vpn_filter" && echo "Do
ne!" || echo "Error while downloading."
    echo

    # Webshell
    echo "# WebShell: https://github.com/SecWiki/WebShell-2/blob/master/Php/Worse%20Linux%20Shell.php"
    echo "Downloading malware sample..."
    fetch_sample "https://wazuh-demo.s3-us-west-1.amazonaws.com/webshell" "/tmp/yara/malware/webshell" && echo "Done!"
 || echo "Error while downloading."
    echo
fi
"/tmp/yara/malware/malware_downloader.sh" [New] 46L, 1819C written                          46,2          Bot
```

Now run the new script to start attack emulation. This script will donwload malware sample into the **/tmp/yara/malware** directoy and our **FIM** module will trigger the custom rules which we append into the **local_rules.xml** file in previous configurations. Once the rulea will be activated, they will trigger the **yara.sh** script to compare the patterns of file with **YARA** rules.

```
[root@web ~]#  bash /tmp/yara/malware/malware_downloader.sh
WARNING: Downloading Malware samples, please use this script with  caution.
  Do you want to continue? (y/n)y

# Mirai: https://en.wikipedia.org/wiki/Mirai_(malware)
Downloading malware sample...
Done!

# Xbash: https://unit42.paloaltonetworks.com/unit42-xbash-combines-botnet-ransomware-coinmining-worm-targets-linux-win
dows/
Downloading malware sample...
Done!

# VPNFilter: https://news.sophos.com/en-us/2018/05/24/vpnfilter-botnet-a-sophoslabs-analysis/
Downloading malware sample...
Done!

# WebShell: https://github.com/SecWiki/WebShell-2/blob/master/Php/Worse%20Linux%20Shell.php
Downloading malware sample...
Done!

[root@web ~]#
```

After running the emulation script, go to the **Wazuh GUI** in your browser and monitor the events logs in the **web** agent's "**Security events**" section.

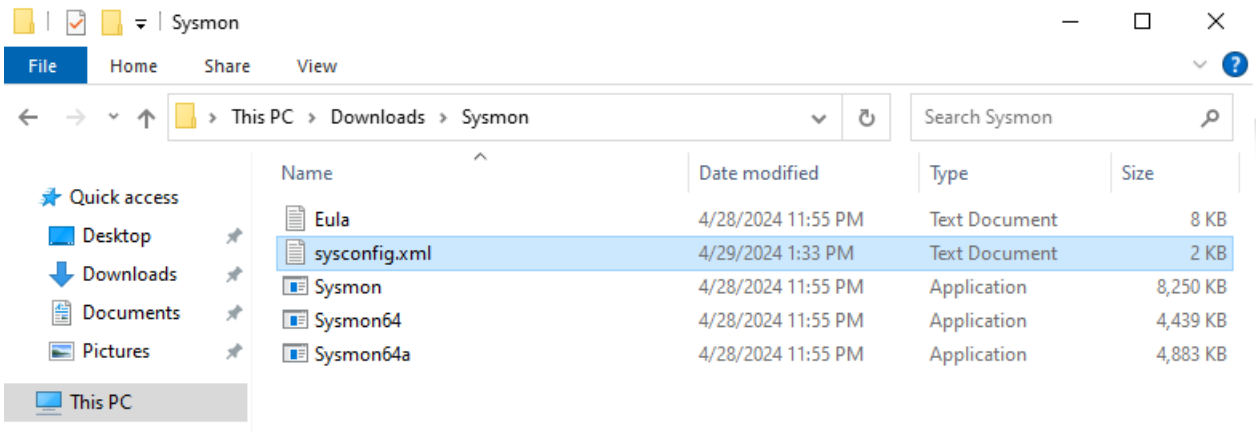


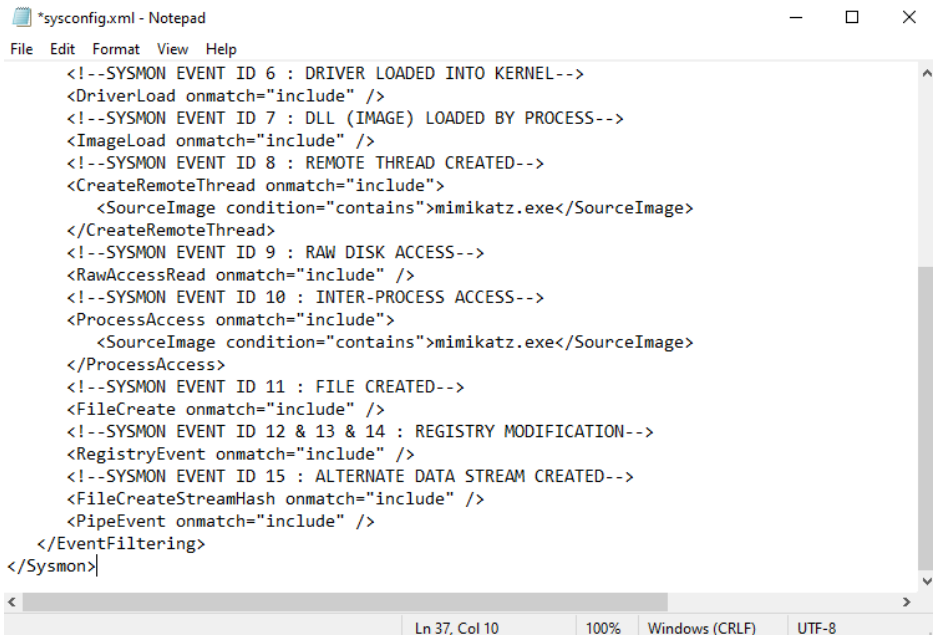
4.4 Detect threats on Windows by monitoring Sysmon events

Sysmon is a **Microsoft** endpoint log collection tool which record system activity and detect malicious activity in these event logs. In this lab we will integrate this service with our **Wazuh**, and monitor some anomalies through defined channels on **Sysmon**.

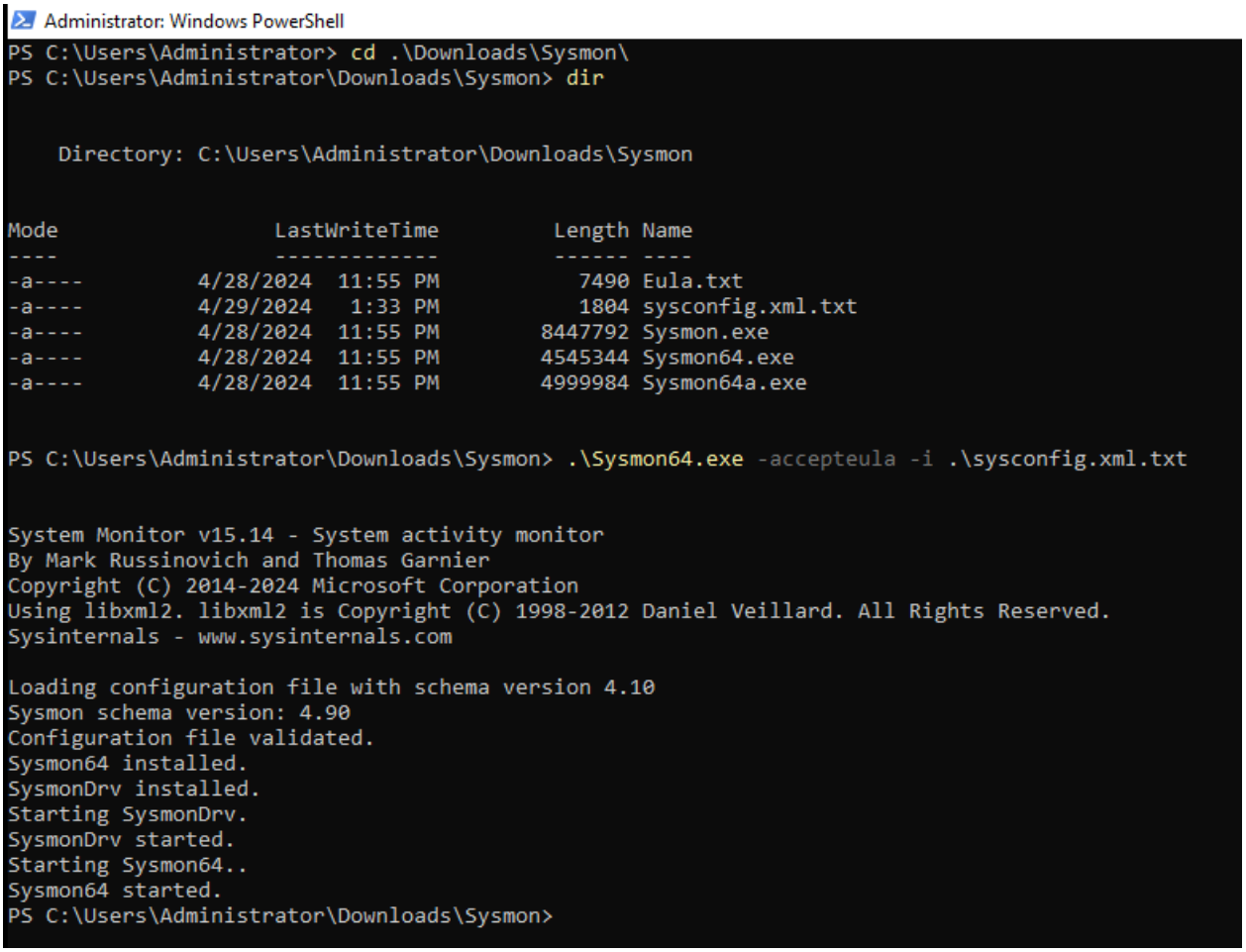
Original article: **https://wazuh.com/blog/learn-to-detect-threats-on-windows-by-monitoring-sysmon-events/**

We can download **Sysmon** files from **Microsoft** official **webpage**. After downlaoding it, unzip the compressed file, go into the folder and create the **sysconfig.xml** file for **Sysmon** configuration. Open the file and paste following configuration from original article.

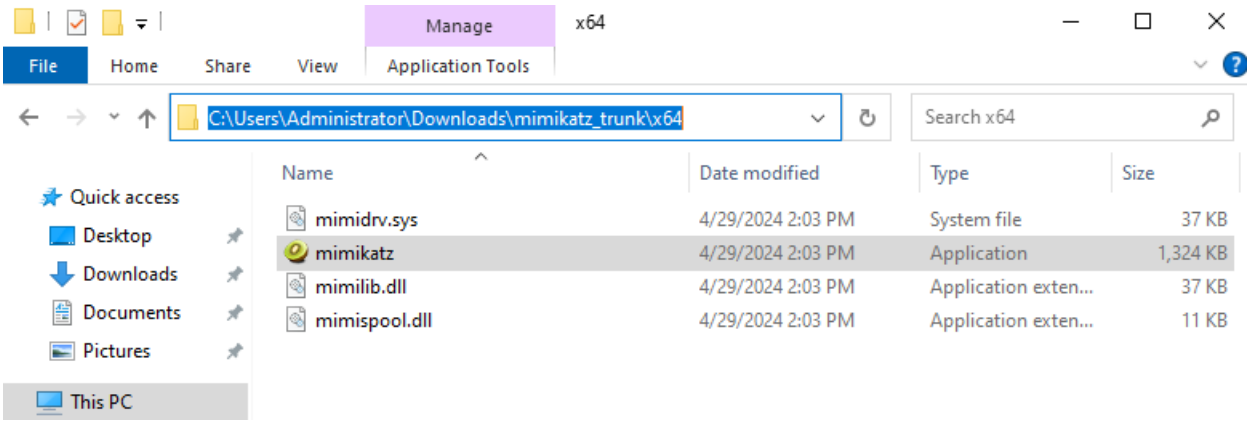




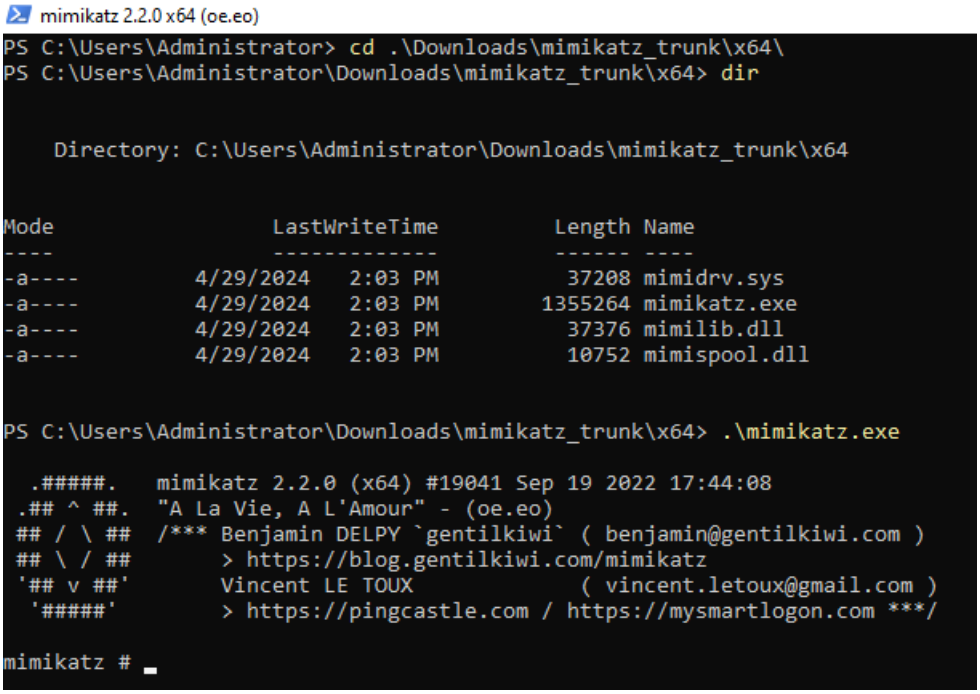
Later open **Power Shell** as an administrator and go into the downloaded folder and run "**.\Sysmon64.exe -accepteula -i .\sysconfig.xml**" command to install **Sysmon** tool into your **Windows** machine.



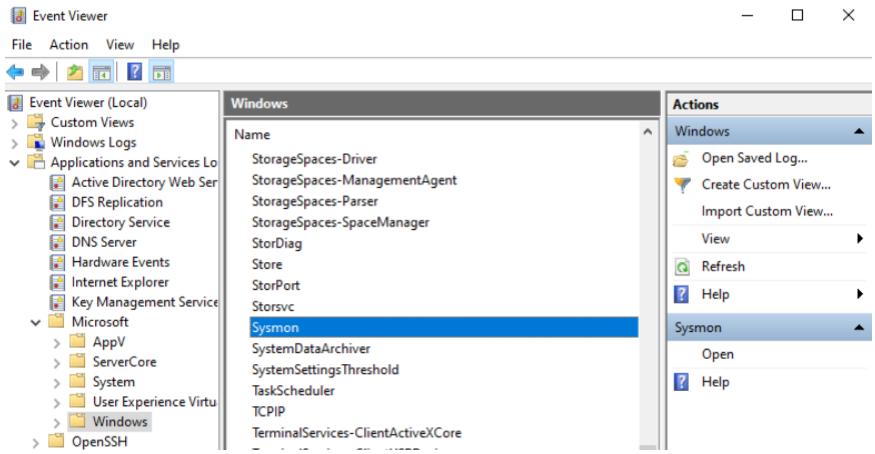
Our **Sysmon** service running properly and we are ready to test it. For this purpose we will use a post exploitation tool **Mimikatz** which dumps password hashes of users, **PIN**s, **Kerberos** tickets etc. Donwload the compressed file from followin link and decomress it.
Mimikatz tool: https://github.com/gentilkiwi/mimikatz/releases/

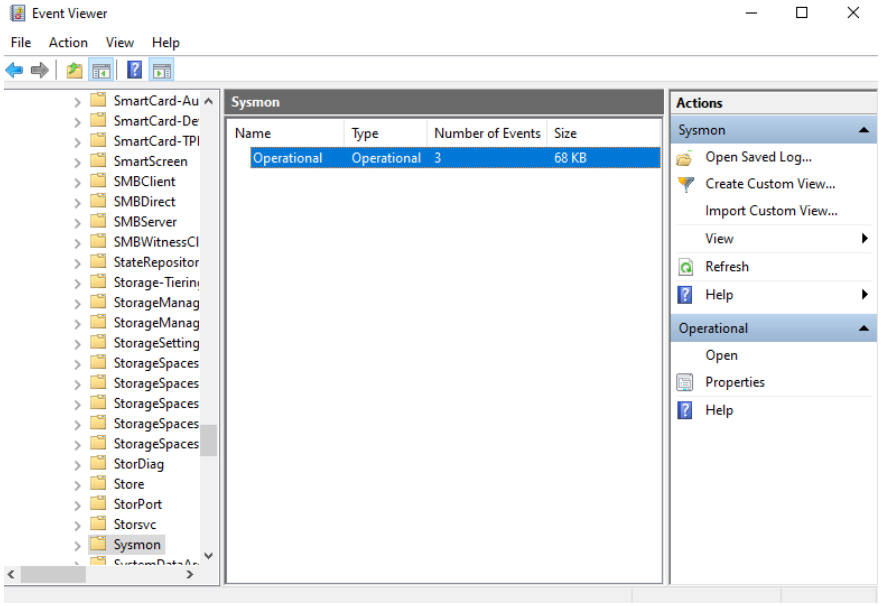


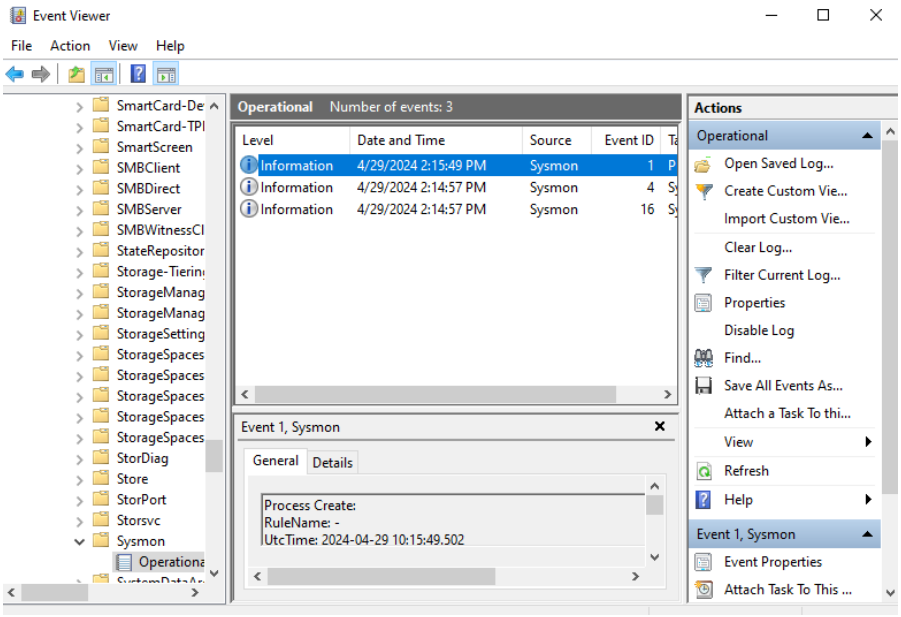
Later open your **Power Shell** as an administrator and change directory into the donwloaded **Mimikatz** folder and run the "**.\mimikatz.exe**" command to start **Mimikatz** tool.



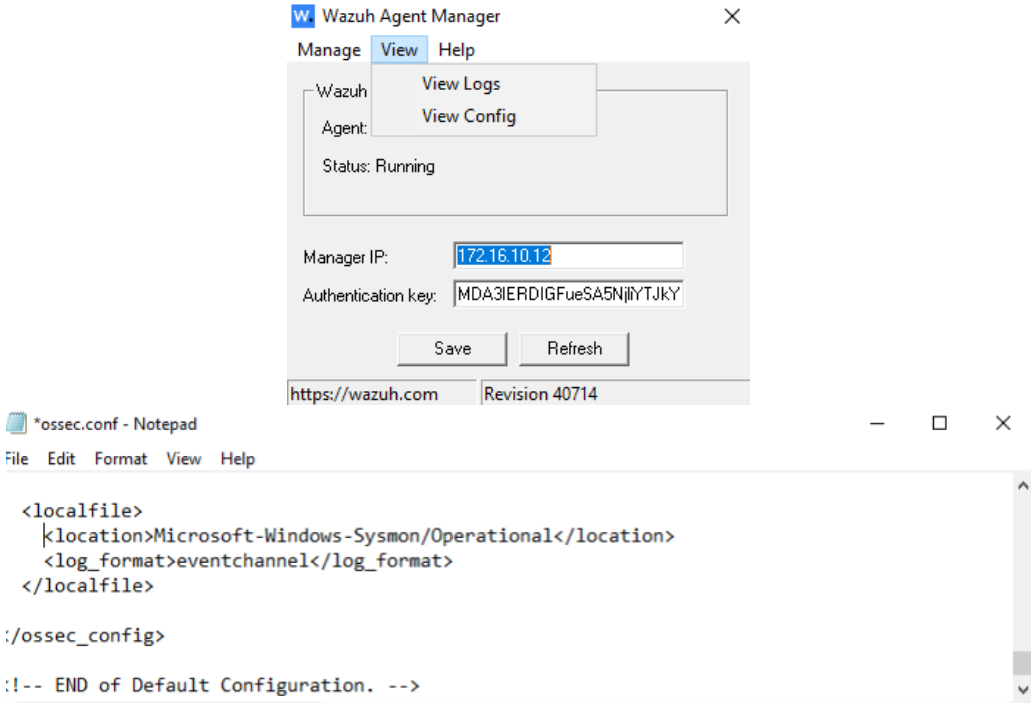
Once we run **Mimikatz** tool, the **Sysmon** tool will generate an informational logs about this action. This is a kind of anomalies because **Mimikatz** is well knows cyber attack tool and its signature easly can be detected by our monitoring tool, **Sysmon**. In order to analyse event logs, open "**Event Viewer**" on your **Windows** agent machine and go to the "**Applications and Service loga/Microsoft/Windows/Sysmon**" path in it and enter into the **Operational** section to see the generated logs. For the detailed information double click on the log, then you will see additional information about **Mimikatz** starting event.


Event Viewer
File Action View Help
Event Viewer (Local)
Custom Views
Windows Logs
Applications and Services Lo
Active Directory Web Ser
DFS Replication
Directory Service
DNS Server
Hardware Events
Internet Explorer
Key Management Service
Microsoft
AppV
ServerCore
System
User Experience Virtu
Windows
OpenSSH
Windows
Name
StorageSpaces-Driver
StorageSpaces-ManagementAgent
StorageSpaces-Parser
StorageSpaces-SpaceManager
StorDiag
Store
StorPort
Storsvc
Sysmon
SystemDataArchiver
SystemSettingsThreshold
TaskScheduler
TCPIP
TerminalServices-ClientActiveXCore
Actions
Windows
Open Saved Log...
Create Custom View...
Import Custom View...
View
Refresh
Help
Sysmon
Open
Help

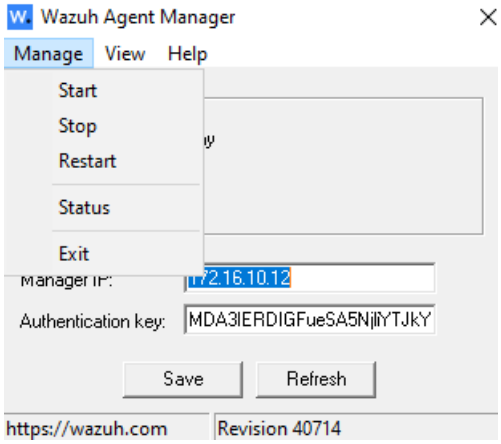

Event Viewer
File Action View Help
SmartCard-Au
SmartCard-De
SmartCard-TPI
SmartScreen
SMBClient
SMBDirect
SMBServer
SMBWitnessCl
StateRepositor
Storage-Tierin
StorageManag
StorageManag
StorageSetting
StorageSpaces
StorageSpaces
StorageSpaces
StorageSpaces
StorageSpaces
StorDiag
Store
StorPort
Storsvc
Sysmon
Sysmon
Name
Type
Number of Events
Size
Operational
Operational
3
68 KB
Actions
Sysmon
Open Saved Log...
Create Custom View...
Import Custom View...
View
Refresh
Help
Operational
Open
Properties
Help


Event Viewer
File Action View Help
SmartCard-De
SmartCard-TPI
SmartScreen
SMBClient
SMBDirect
SMBServer
SMBWitnessCl
StateRepositor
Storage-Tierin
StorageManag
StorageManag
StorageSetting
StorageSpaces
StorageSpaces
StorageSpaces
StorageSpaces
StorageSpaces
StorDiag
Store
StorPort
Storsvc
Sysmon
Operationa
Operational Number of events: 3
Level
Date and Time
Source
Event ID
Information
4/29/2024 2:15:49 PM
Sysmon
1
Information
4/29/2024 2:14:57 PM
Sysmon
4
Information
4/29/2024 2:14:57 PM
Sysmon
16
Event 1, Sysmon
General
Details
Process Create:
RuleName: -
UtcTime: 2024-04-29 10:15:49.502
Actions
Operational
Open Saved Log...
Create Custom Vie...
Import Custom Vie...
Clear Log...
Filter Current Log...
Properties
Disable Log
Find...
Save All Events As...
Attach a Task To thi...
View
Refresh
Help
Event 1, Sysmon
Event Properties
Attach Task To This ...

We monitored one of the anomalies related to **Mimikatz** on Windows agent machine, but the purpose of this lab is to observe events logs on our **SIEM**. As you remember, any integration needs a configuration change on **Wazuh** agent and server. Open **Windows** agent's configuration file and add following configuration block in it. You can do it by opening "**Wazuh Agent Manager**" tool and enter "**View Config**" option or open directly configuration file, **ossec.conf**, under **C:\Pprogram Files (x86)\ossec-agent** path.



After the configuration changes, restart your **Wazuh** agent service to apply.



Now we are done with agent configuration, go to the **Wazuh** server and open **local_rules.xml** file to add our custom rules to detect **Mimikatz** events and restart **wazuh-manager.service** to perform new rules.

```
[root@wazuh ~]# vim /var/ossec/etc/rules/local_rules.xml
```

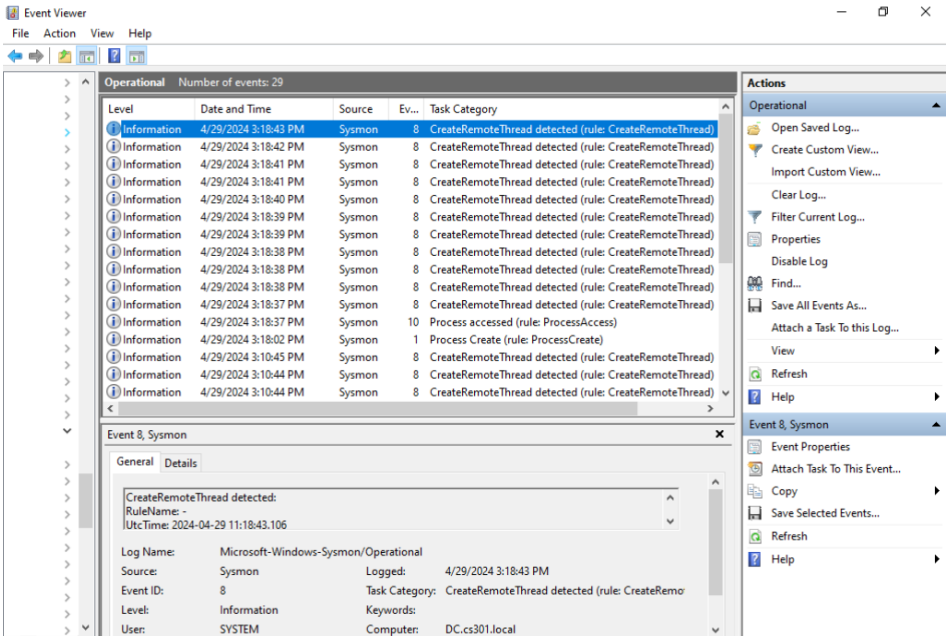
```
<group name="windows, sysmon, sysmon_process-anomalies,">
   <rule id="100010" level="12">
     <if_group>sysmon_event1</if_group>
     <field name="win.eventdata.image">mimikatz.exe</field>
     <description>Sysmon - Suspicious Process - mimikatz.exe</description>
   </rule>

   <rule id="100011" level="12">
     <if_group>sysmon_event8</if_group>
     <field name="win.eventdata.sourceImage">mimikatz.exe</field>
     <description>Sysmon - Suspicious Process mimikatz.exe created a remote thread</description>
   </rule>

   <rule id="100012" level="12">
     <if_group>sysmon_event_10</if_group>
     <field name="win.eventdata.sourceImage">mimikatz.exe</field>
     <description>Sysmon - Suspicious Process mimikatz.exe accessed $(win.eventdata.targetImage)</description>
   </rule>
</group>
"/var/ossec/etc/rules/local_rules.xml" 132L, 4341C written                                                116,18
```

```
[root@wazuh ~]# systemctl restart wazuh-manager.service
```

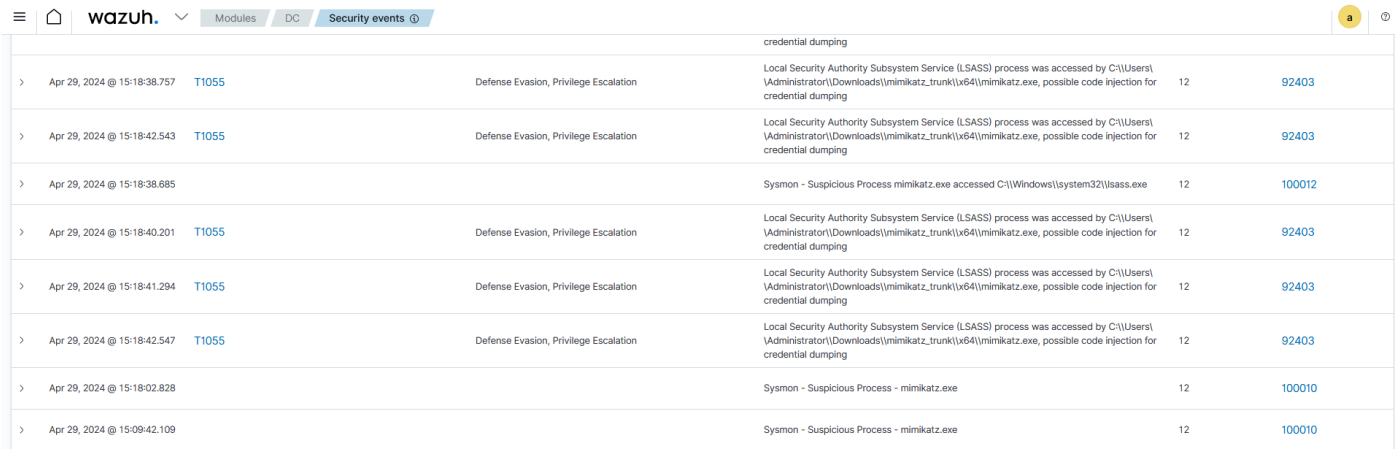
Again go back to the **Windows** agent and open **Power Shell** as an administrator, then run the following command "**.\mimikatz.exe**" in the downlaoded **Mimikatz** folder. Once the program started run "**lsadump::lsa /inject**" command to dump users password hashes.

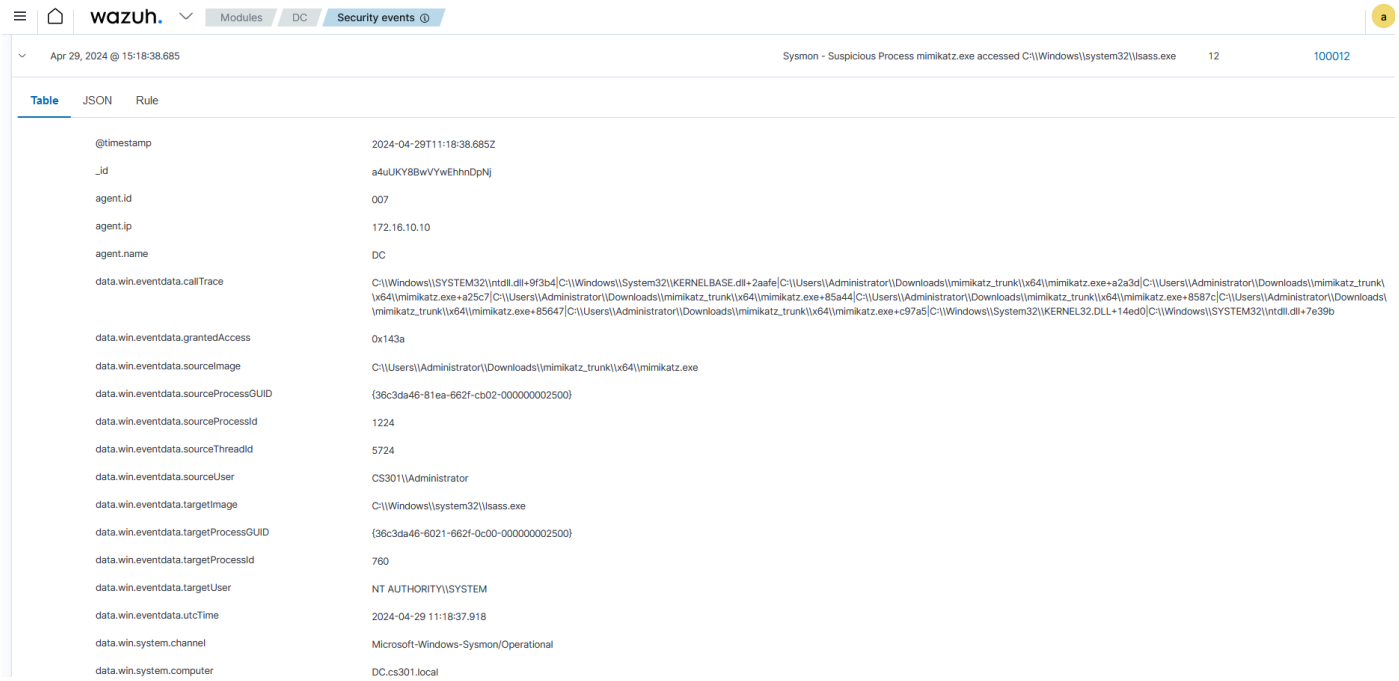
```
mimikatz 2.2.0 x64 (oe.eo)
PS C:\Users\Administrator\Downloads\mimikatz_trunk\x64> .\mimikatz.exe

  .#####.   mimikatz 2.2.0 (x64) #19041 Sep 19 2022 17:44:08
 .## ^ ##.  "A La Vie, A L'Amour" - (oe.eo)
 ## / \ ##  /*** Benjamin DELPY `gentilkiwi` ( benjamin@gentilkiwi.com )
 ## \ / ##       > https://blog.gentilkiwi.com/mimikatz
 '## v ##'       Vincent LE TOUX             ( vincent.letoux@gmail.com )
  '#####'        > https://pingcastle.com / https://mysmartlogon.com ***/

mimikatz # lsadump::lsa /inject
Domain : CS301 / S-1-5-21-1612885287-2075756089-633124396

RID  : 000001f4 (500)
User : Administrator

 * Primary
   NTLM : 15877a8a3ca26c04d5b00516e38633f8
```

In order to see the generated event logs, open "**Event Viewer**" in **Windows** machine and go to the **Sysmon** logs.



Now we can monitor the logs in our **SIEM**, go to the **Wazuh GUI** in your browser, select the attacke performed **Windows** agent and open "**Security events**" to see generated logs. For detailed information, just click on the any choosen log and compare it with the **Sysmon** logs in **Windows** agent itself.





As a result, we performed an attack amulation with **Mimikatz** in our local machine where the **Wazuh** agent is installed and redirected **Sysmon** logs from this agent to our **Wazuh** server in order to analyse and compare the content of logs with our defined custom rules. Once the our rules were matched with the **Mimikatz** signature, **Wazuh** displayed suspicious event alerts to us.