HOLDMYBEER

Cause every great story starts with "Hold my beer"

DEC 05 2016
LEAVE A COMMENT

INCIDENT RESPONSE, SYSTEM ADMINISTRATION, TOOLS

PART 1: INSTALL/SETUP WAZUH WITH ELK STACK

If you have been following my blog you know that I am trying to increase my Incident Response(IR) skillz and experience. For a class project we had to create/improve a piece of software in the forensic community for Windows(Windows forensic class). From my short time of searching the internet I never found a guide to setting up a logging system for Windows from start to finsh. An effective logging system has an agent/collector, a log aggregator, a data visualizer, and a good alerting mechnism.

The following sytem I have setup has Wazuh(OSSEC fork) for log collection, Wazuh Management for a log aggregator, the ELK stack for data retention and vizualiztion, and elastalert for e-mail alerting. In this guide I will walk you through on how to setup an effective logging system for all operating systems but mainly Windows for free. Additionally, we will be discussing the type of things that should be logged depending on your enviornment. As final note I have included my github repo at the bottom if you want to automated scripts for all of this.

About/why Wazuh

Linux is without a doubt the easiest operating system for system administrators to administrate.

Wazuh components

- Wazuh HIDS: Performs log analysis, file integrity checking, policy monitoring, rootkits/malware detection and real-time alerting. The alerts are written in an extended JSON format, and stored locally on the box running as the OSSEC manager.
- Logstash: Is a data pipeline used for processing logs and other event data from a variety of systems. Logstash will read and process OSSEC JSON files, adding IP Geolocation information and modeling data before sending it to the Elasticsearch Cluster.
- Elasticsearch: Is the search engine used to index and store our OSSEC alerts. It can be deployed as a cluster, with multiple nodes, for better performance and data replication.
- Kibana: Kibana is a WEB framework used to explore all elasticsearch indexes. We will use it to analyze OSSEC alerts and to create custom dashboards for different use cases, including compliance regulations like PCI DSS or benchmarks like CIS.

Install/Setup Wazuh Manager

1. yum update -y && yum upgrade -y
2. yum install epel-release -y
3. yum install vim wget net-tools -y
4. yum install make gcc git
5. yum install openssl-devel
6. cd ~
7. mkdir ossec_tmp && cd ossec_tmp
8. git clone -b stable https://github.com/wazuh/wazuh.git ossec-wazuh
9. cd ossec-wazuh
10. sudo ./install.sh
    A. Enter “en” for english

```
which: no host in (/sbin:/bin:/usr/sbin:/usr/bin)

  ** Para instalação em português, escolha [br].
  ** 要使用中文进行安装，请选择 [cn].
  ** Fur eine deutsche Installation wohlen Sie [de].
  ** Για εγκατάσταση στα Ελληνικά, επιλέξτε [el].
  ** For installation in English, choose [en].
  ** Para instalar en Español , eliga [es].
  ** Pour une installation en français, choisissez [fr]
  ** A Magyar nyelvű telepítéshez válassza [hu].
  ** Per l'installazione in Italiano, scegli [it].
  ** 日本語でインストールします．選択して下さい．[jp].
  ** Voor installatie in het Nederlands, kies [nl].
  ** Aby instalować w języku Polskim, wybierz [pl].
  ** Для инструкций по установке на русском ,введите [ru].
  ** Za instalaciju na srpskom, izaberi [sr].
  ** Türkçe kurulum için seçin [tr].
  (en/br/cn/de/el/es/fr/hu/it/jp/nl/pl/ru/sr/tr) [en]:
```

    B. Enter “server” installation type

```
1- What kind of installation do you want (server, agent, local, hybrid or help)? server
```

    C. Accept default location for ossec install

D. Enter “n” for e-mail notification
E. Enter “y” to run integrity check daemon
F. Enter “y” to run rootkit detection
G. Enter “y” to run active response
H. Enter “n” to disable the firewall-drop response

```
1- What kind of installation do you want (server, agent, local, hybrid or help)? server

  - Server installation chosen.

2- Setting up the installation environment.

 - Choose where to install the OSSEC HIDS [/var/ossec]:

   - Installation will be made at  /var/ossec .

3- Configuring the OSSEC HIDS.

  3.1- Do you want e-mail notification? (y/n) [y]: n

   --- Email notification disabled.

  3.2- Do you want to run the integrity check daemon? (y/n) [y]: y

   - Running syscheck (integrity check daemon).

  3.3- Do you want to run the rootkit detection engine? (y/n) [y]: y

   - Running rootcheck (rootkit detection).
strings: '/usr/bin/mail': No such file

  3.4- Active response allows you to execute a specific
       command based on the events received. For example,
       you can block an IP address or disable access for
       a specific user.
       More information at:
       http://www.ossec.net/en/manual.html#active-response

   - Do you want to enable active response? (y/n) [y]: y

     - Active response enabled.

   - By default, we can enable the host-deny and the
     firewall-drop responses. The first one will add
     a host to the /etc/hosts.deny and the second one
     will block the host on iptables (if linux) or on
     ipfilter (if Solaris, FreeBSD or NetBSD).
   - They can be used to stop SSHD brute force scans,
     portscans and some other forms of attacks. You can
     also add them to block on snort events, for example.

   - Do you want to enable the firewall-drop response? (y/n) [y]: n
```

I. Enter “y” to add critical ip adrresses to servers and services
    i. The install should list your DNS servers. Be sure to add any additional server but I don’t have any in this network.
J. Accept default port for remote syslog port

```
   - Do you want to add more IPs to the white list? (y/n)? [n]: y
   - IPs (space separated):

  3.5- Do you want to enable remote syslog (port 514 udp)? (y/n) [y]: y

   - Remote syslog enabled.

  3.6- Setting the configuration to analyze the following logs:
    -- /var/log/messages
    -- /var/log/secure
    -- /var/log/maillog

 - If you want to monitor any other file, just change
   the ossec.conf and add a new localfile entry.
   Any questions about the configuration can be answered
   by visiting us online at http://www.ossec.net .


   --- Press ENTER to continue ---
```

K. Press “Enter” to build Wazuh manager from source

11. sudo /var/ossec/bin/ossec-control start
12. ps aux | grep ossec

```
+ grep ossec
root      12238  0.0  0.0  45220   972 ?        S    10:26   0:00 /var/ossec/bin/ossec-execd
ossec     12242  3.0  0.0  47316  3412 ?        S    10:26   0:00 /var/ossec/bin/ossec-analysisd
root      12246  0.0  0.0  43148   824 ?        S    10:26   0:00 /var/ossec/bin/ossec-logcollector
ossecr    12253  0.0  0.0  61792  1188 ?        Sl   10:26   0:00 /var/ossec/bin/ossec-remoted
root      12258  0.0  0.0  43324   552 ?        S    10:26   0:00 /var/ossec/bin/ossec-syscheckd
ossec     12262  0.0  0.0  45396   992 ?        S    10:26   0:00 /var/ossec/bin/ossec-monitord
root      12266  0.0  0.0 112648   940 pts/0    S+   10:26   0:00 grep ossec
[root@wazuhmoose ~]#
```

13. /var/ossec/bin/manage_agent
    A. Enter “A” to add agent
    B. Enter a name for the new node
    C. Accept default id
    D. Enter “y” to confirm the new agent

```
[root@wazuhmoose ~]# /var/ossec/bin/manage_agents


****************************************
* OSSEC HIDS v2.8 Agent manager.     *
* The following options are available: *
****************************************
   (A)dd an agent (A).
   (E)xtract key for an agent (E).
   (L)ist already added agents (L).
   (R)emove an agent (R).
   (Q)uit.
Choose your action: A,E,L,R or Q: A

- Adding a new agent (use '\q' to return to the main menu).
  Please provide the following:
   * A name for the new agent: ubuntuTestNode
   * The IP Address of the new agent: 129.21.254.13
   * An ID for the new agent[001]:
Agent information:
   ID:001
   Name:ubuntuTestNode
   IP Address:129.21.254.13

Confirm adding it?(y/n): y
Agent added with ID 001.
```

    E. Enter “E” to extract a key for an agent
    F. Enter an agent id
    G. Copy the agent key information

```
****************************************
* OSSEC HIDS v2.8 Agent manager.     *
* The following options are available: *
****************************************
   (A)dd an agent (A).
   (E)xtract key for an agent (E).
   (L)ist already added agents (L).
   (R)emove an agent (R).
   (Q)uit.
Choose your action: A,E,L,R or Q: E

Available agents:
   ID: 001, Name: ubuntuTestNode, IP: 129.21.254.13
Provide the ID of the agent to extract the key (or '\q' to quit): 001

Agent key information for '001' is:
MDAxIHVidW50dVRlc3ROb2RlIDEyOS4yMS4yNTQuMTMgNmVjZWMwODc5NDk1MWVkZDQ0MzJjYjRlY

** Press ENTER to return to the main menu.
```

Install/Setup Wazuh agent

Windows

1. Browse to “http://ossec.wazuh.com/windows/”
2. Download “ossec-win32-agent-*.exe”
3. Run installer to install the agent
4. Agent Manager

A. Enter “<Wazuh management IP addr>” for ossec server ip
B. Enter key for agent for authentication key

C. Select “Save”

5. Select Manage > Restart
6. Select Manage > Exit

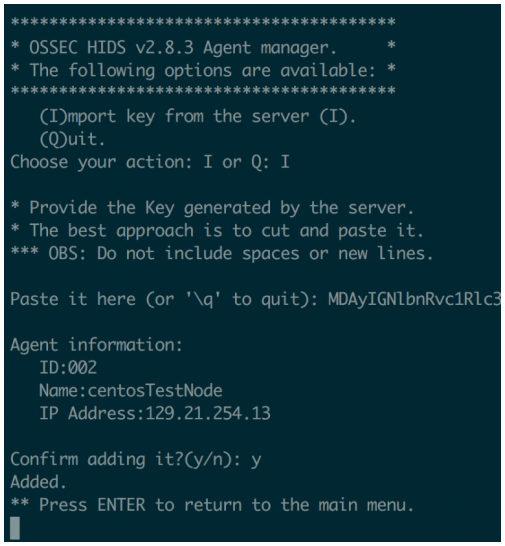
Ubuntu 14.04

1. sudo apt-key adv –fetch-keys http://ossec.wazuh.com/repos/apt/conf/ossec-key.gpg.key
2. sudo sh -c ‘echo -e “deb http://ossec.wazuh.com/repos/apt/ubuntu trusty main” >> /etc/apt/sources.list.d/ossec.list’
3. sudo apt-get update
4. sudo apt-get install ossec-hids-agent
    A. Enter Management node IP addr
5. sudo /var/ossec/bin/manage_agents
    A. Enter “I” to import key
    B. Enter the key from the management node
    C. Enter “y” to confirm adding the key

6. sudo /var/ossec/bin/ossec-control restart

CentOS

1. sudo echo '[wazuh] name = WAZUH OSSEC Repository – www.wazuh.com baseurl = http://ossec.wazuh.com/el/$releasever/$basearch gpgcheck = 1 gpgkey = http://ossec.wazuh.com/key/RPM-GPG-KEY-OSSEC enabled = 1 ' | tee /etc/yum.repos.d/wazuh.repo
2. sudo yum install ossec-hids
3. sudo /var/ossec/bin/manage_agents
    A. Enter "I" to import key
    B. Enter the key from the management node
    C. Enter "y" to confirm adding the key



4. sudo /var/ossec/bin/ossec-control restart

Adding new Wazuh agent

1. Go on to the management node
2. /var/ossec/bin/manage_agents

Install/Setup ELK stack

Install/Setup java

1. cd ~
2. wget –no-cookies –no-check-certificate –header "Cookie: gpw_e24=http%3A%2F%2Fwww.oracle.com%2F; oraclelicense=accept-securebackup-cookie" "http://download.oracle.com/otn-pub/java/jdk/8u60-b27/jdk-8u60-linux-x64.rpm"
3. sudo yum localinstall jdk-8u60-linux-x64.rpm
4. rm ~/jdk-8u60-linux-x64.rpm
5. export JAVA_HOME=/usr/java/jdk1.8.0_60/jre
6. Echo "export JAVA_HOME=/usr/java/jdk1.8.0_60/jre" >> /etc/profile

Install/Setup Logstash

1. sudo rpm –import https://packages.elasticsearch.org/GPG-KEY-elasticsearch
2. echo '[logstash-2.1]
   name=Logstash repository for 2.1.x packages

```
baseurl=https://packages.elastic.co/logstash/2.1/centos
gpgcheck=1
gpgkey=https://packages.elastic.co/GPG-KEY-elasticsearch
enabled=1
' | sudo tee /etc/yum.repos.d/logstash.repo
```

3. sudo yum install logstash
4. cd ~
5. git clone https://github.com/wazuh/wazuh
6. sudo cp ~/ossec_tmp/ossec-wazuh/extensions/logstash/01-ossec-singlehost.conf /etc/logstash/conf.d/
7. sudo cp ~/ossec_tmp/ossec-wazuh/extensions/logstash/01-ossec-singlehost.conf /etc/logstash/conf.d/
8. sudo cp ~/ossec_tmp/ossec-wazuh/extensions/elasticsearch/elastic-ossec-template.json /etc/logstash/
9. sudo curl -O "http://geolite.maxmind.com/download/geoip/database/GeoLiteCity.dat.gz"
10. sudo gzip -d GeoLiteCity.dat.gz && sudo mv GeoLiteCity.dat /etc/logstash/
11. sudo usermod -a -G ossec logstash

Install/Setup Elasticsearch

1. sudo rpm –import http://packages.elastic.co/GPG-KEY-elasticsearch
2. echo '[elasticsearch-2.x]
   name=Elasticsearch repository for 2.x packages
   baseurl=http://packages.elastic.co/elasticsearch/2.x/centos
   gpgcheck=1
   gpgkey=http://packages.elastic.co/GPG-KEY-elasticsearch
   enabled=1
   ' | sudo tee /etc/yum.repos.d/elasticsearch.repo
3. yum -y install elasticsearch
4. sed -i 's/# network.host: 192.168.0.1/network.host: localhost/g' /etc/elasticsearch/elasticsearch.yml
5. sed -i 's/# cluster.name: my-application/cluster.name: ossec/g' /etc/elasticsearch/elasticsearch.yml
6. sed -i 's/# node.name: node-1/node.name: ossec_node1/g' /etc/elasticsearch/elasticsearch.yml
7. echo "index.number_of_shards: 1
   index.number_of_replicas: 0
   " >> /etc/elasticsearch/elasticsearch.yml
8. sudo systemctl start elasticsearch
9. sudo systemctl enable elasticsearch
10. curl -XGET localhost:9200
11. curl -XGET 'http://localhost:9200/_cluster/health?pretty=true'
12. cd ossec_tmp/ossec-wazuh/extensions/elasticsearch/ && curl -XPUT "http://localhost:9200/_template/ossec/" -d "@elastic-ossec-template.json"
13. systemctl start logstash

Install/Setup Kibana

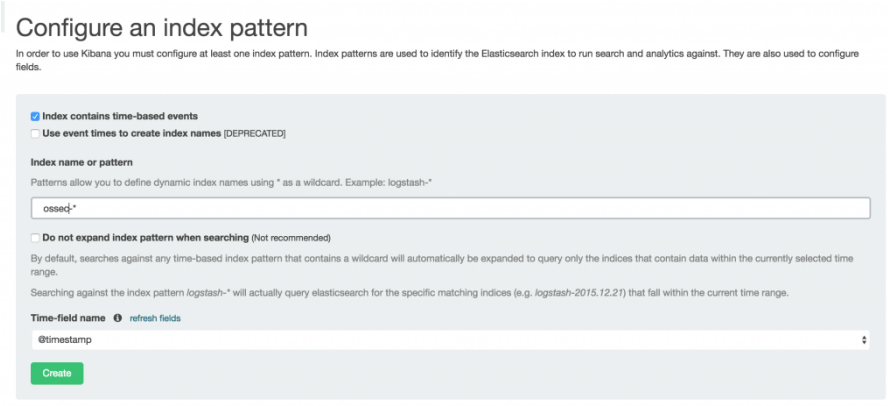
1. sudo rpm –import https://packages.elastic.co/GPG-KEY-elasticsearch
2. echo '[kibana-4.4]
   name=Kibana repository for 4.4.x packages
   baseurl=http://packages.elastic.co/kibana/4.4/centos
   gpgcheck=1
   gpgkey=http://packages.elastic.co/GPG-KEY-elasticsearch
   enabled=1
   ' | tee /etc/yum.repos.d/kibana.repo
3. yum -y install kibana
4. sed -i 's/# server.host: "0.0.0.0"/server.host: "localhost"/g' /opt/kibana/config/kibana.yml
5. systemctl enable kibana
6. systemctl start kibana

Install/Setup Nginx and Let's Encrypt

1. yum -y install epel-release
2. yum -y install nginx httpd-tools
3. yum install certbot -y
4. htpasswd -c /etc/nginx/htpasswd.users kibanaadmin
5. cp /etc/nginx/nginx.conf /etc/nginx/nginx.conf.bak
6. echo '# For more information on configuration, see:
   # * Official English Documentation: http://nginx.org/en/docs/
   # * Official Russian Documentation: http://nginx.org/ru/docs/user nginx;
   worker_processes auto;
   error_log /var/log/nginx/error.log;
   pid /run/nginx.pid;# Load dynamic modules. See /usr/share/nginx/README.dynamic.
   include /usr/share/nginx/modules/*.conf;events {
   worker_connections 1024;
   }http {
   log_format main '\$remote_addr – \$remote_user [\$time_local] "\$request" '
   '\$status \$body_bytes_sent "\$http_referer" '
   '"\$http_user_agent" "\$http_x_forwarded_for"';access_log /var/log/nginx/access.log
   main;sendfile on;
   tcp_nopush on;
   tcp_nodelay on;
   keepalive_timeout 65;
   types_hash_max_size 2048;include /etc/nginx/mime.types;
   default_type application/octet-stream;# Load modular configuration files from the
   /etc/nginx/conf.d directory.
   # See http://nginx.org/en/docs/ngx_core_module.html#include
   # for more information.
   include /etc/nginx/conf.d/*.conf;}
   ' | tee /etc/nginx/nginx.conf
7. echo 'server {
   listen 80;
   location ~ /.well-known {
   allow all;
   }

```
}
' | tee /etc/nginx/conf.d/letsencrypt.conf
```

8. systemctl start nginx
9. mkdir -p .well-known/acme-challenge
10. domain="<domain>"
11. certbot certonly -a webroot –webroot-path=/usr/share/nginx/html -d $domain
12. openssl dhparam -out /etc/nginx/ssl/dhparam.pem 2048
13. rm -rf /etc/nginx/conf.d/letsencrypt.conf
14. echo "server {listen 443 ssl;server_name "$domain";ssl_certificate
    /etc/letsencrypt/live/"$domain"/fullchain.pem;
    ssl_certificate_key /etc/letsencrypt/live/"$domain"/privkey.pem;
    ssl_dhparam /etc/nginx/ssl/dhparam.pem;ssl_protocols TLSv1 TLSv1.1 TLSv1.2;
    ssl_prefer_server_ciphers on;
    ssl_ciphers 'EECDH+AESGCM:EDH+AESGCM:AES256+EECDH:AES256+EDH';
    ssl_session_timeout 1d;
    ssl_session_cache shared:SSL:50m;
    ssl_stapling on;
    ssl_stapling_verify on;
    add_header Strict-Transport-Security max-age=15768000;location ~ /.well-known {
    allow all;
    }auth_basic 'Restricted Access';
    auth_basic_user_file /etc/nginx/htpasswd.users;location / {
    proxy_pass http://localhost:5601;
    proxy_http_version 1.1;
    proxy_set_header Upgrade \$http_upgrade;
    proxy_set_header Connection 'upgrade';
    proxy_set_header Host \$host;
    proxy_cache_bypass \$http_upgrade;
    }
    }
    " | tee /etc/nginx/conf.d/kibana.conf
15. systemctl enable nginx
16. systemctl restart nginx
17. setsebool -P httpd_can_network_connect 1
18. Browser to "https://<kibana domain>"
    A. Select "Index contains time-based events"
    B. Enter "ossec-*" for Index name or pattern
    C. Enter "@timestamp" for time-field-name



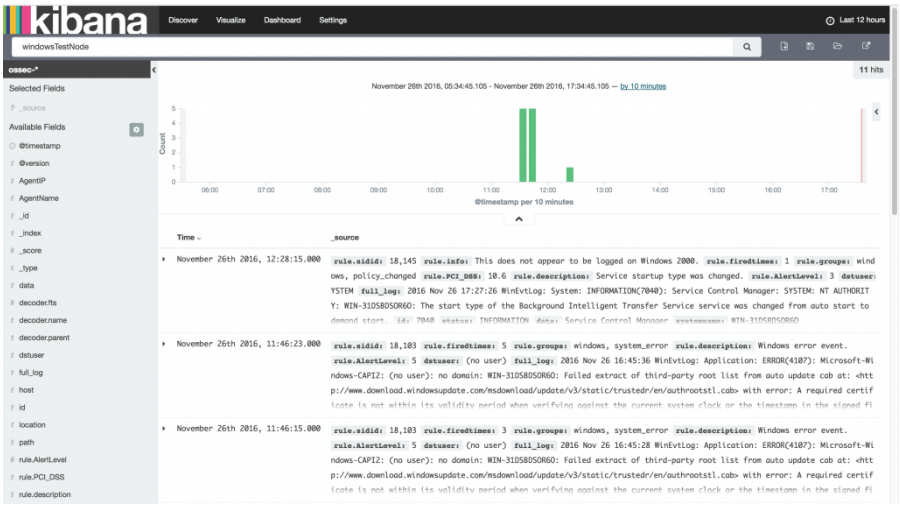
    D. Select "Create"

Setup FirewallD

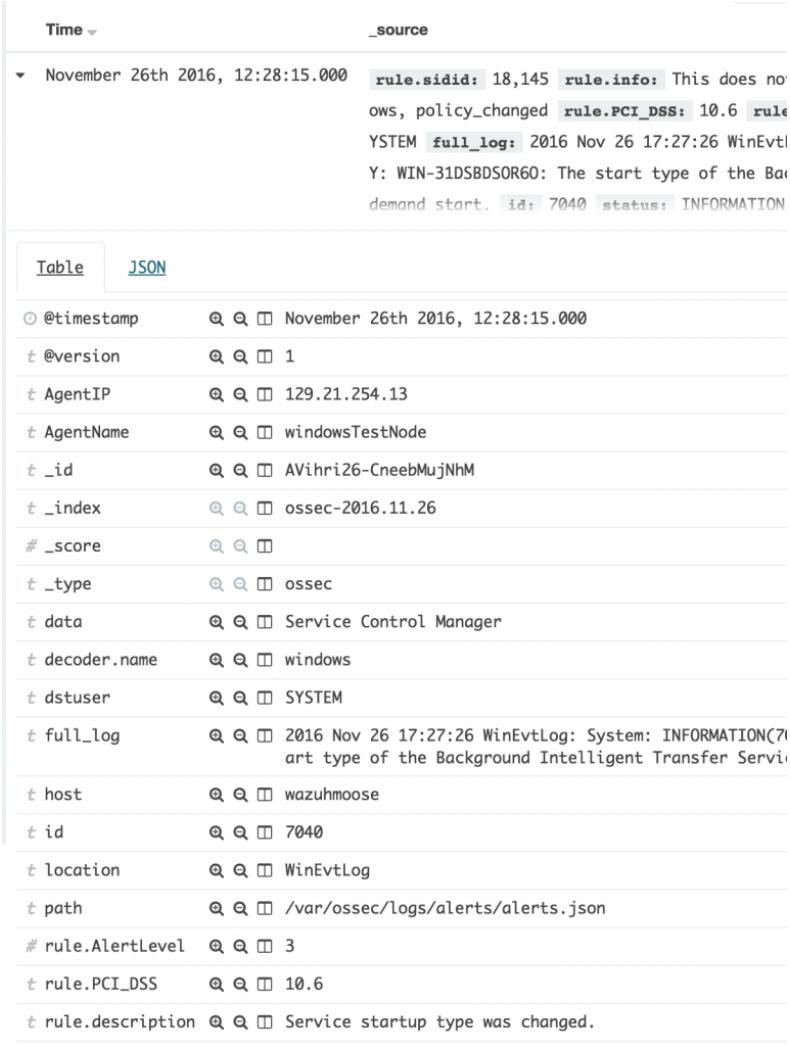
1. yum install firewalld -y
2. systemctl enable firewalld
3. systemctl start firewalld
4. firewall-cmd –zone=public –permanent –add-service=https
5. firewall-cmd –zone=public –permanent –add-service=ssh
6. firewall-cmd –permanent –zone=public –add-port=1514/udp
7. firewall-cmd –reload

Kibana Discover

1. Browser to “https://<kibana domain>”
2. Since I know the Wazuh Agent name I entered it into Kibana
    A. As you can see below within the past 12 hours I have had 12 events from this agent



    B. We can expand an event for more information



Time	_source
November 26th 2016, 12:28:15.000	rule.sidid: 18,145 rule.info: This does no ows, policy_changed rule.PCI_DSS: 10.6 rule YSTEM full_log: 2016 Nov 26 17:27:26 WinEvtl Y: WIN-31DSBDSOR6O: The start type of the Ba demand start. id: 7040 status: INFORMATION

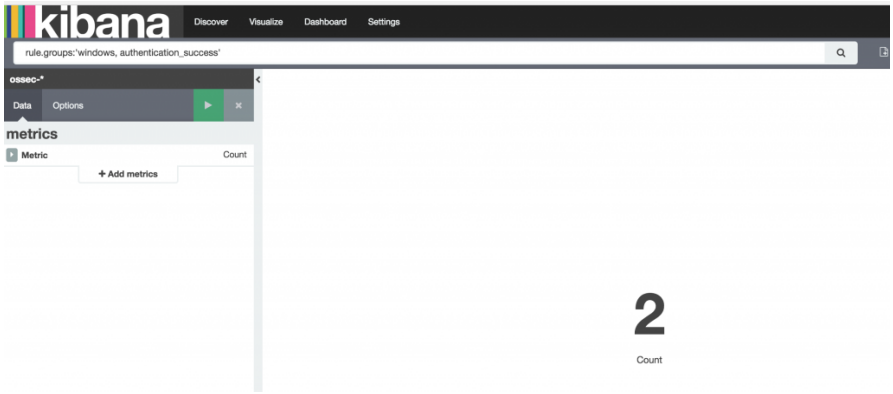
Table JSON

@timestamp	November 26th 2016, 12:28:15.000
@version	1
AgentIP	129.21.254.13
AgentName	windowsTestNode
_id	AVihri26-CneebMujNhM
_index	ossec-2016.11.26
_score	
_type	ossec
data	Service Control Manager
decoder.name	windows
dstuser	SYSTEM
full_log	2016 Nov 26 17:27:26 WinEvtLog: System: INFORMATION(7 art type of the Background Intelligent Transfer Servi
host	wazuhmoose
id	7040
location	WinEvtLog
path	/var/ossec/logs/alerts/alerts.json
rule.AlertLevel	3
rule.PCI_DSS	10.6
rule.description	Service startup type was changed.

Setup Kibana Dashboards

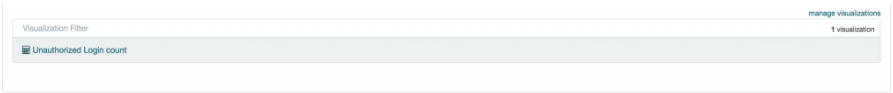
We are going to create some simple dashboards to get your feet wet with the visualization power of Kibana. On my WindowsTestNode I have entered the incorrect password to create some events. If you search for “rule.groups:’windows, authentication_success'” in the discover tab we get two hits. But I want a counter of how many incorrect login.

1. Select “visualize”
2. Select “Metric” for “new visualization”.
3. Select “From a new search” for search source
4. Enter “rule.groups:’windows, authentication_success'” into search

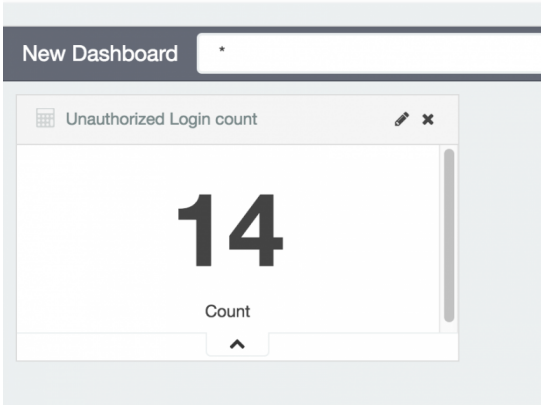


5. Select the save icon in the top right
6. Enter a name for the new visualization and hit save

7. Select “Dashboard” at the top
8. Select “+” to add
9. Select the new visualization you just made



10. Select save in the top right and give the dashboard a name

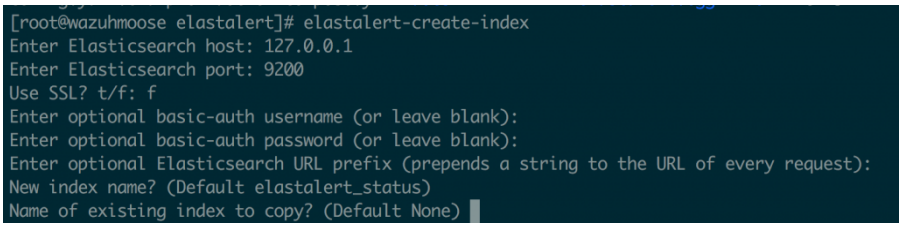


Setup e-mail alerting with elastalert

Install/Setup Elastalert

1. cd /opt
2. yum install python-devel -y python-pip
3. git clone https://github.com/Yelp/elastalert.git
4. cd elastalert/
5. easy_install -U setuptools
6. python setup.py install
7. elastalert-create-index
    A. Enter “127.0.0.1” for Elasticsearch host
    B. Enter “9200” for Elasticsearch port
    C. Enter “f” for SSL
    D. Leave user name blank
    E. Leave password blank

F. Leave prefix blank
G. Leave index name as default
H. Leave existing index blank



Setup ElastAlert and SystemD

1. vim /lib/systemd/system/elastalert.service
   A. Add

   ```
   [Unit]
   Description=elastalert
   After=multi-user.target[Service]
   Type=simple
   WorkingDirectory=/opt/elastalert
   ExecStart=/usr/bin/elastalert

   [Install]
   WantedBy=multi-user.target
   ```

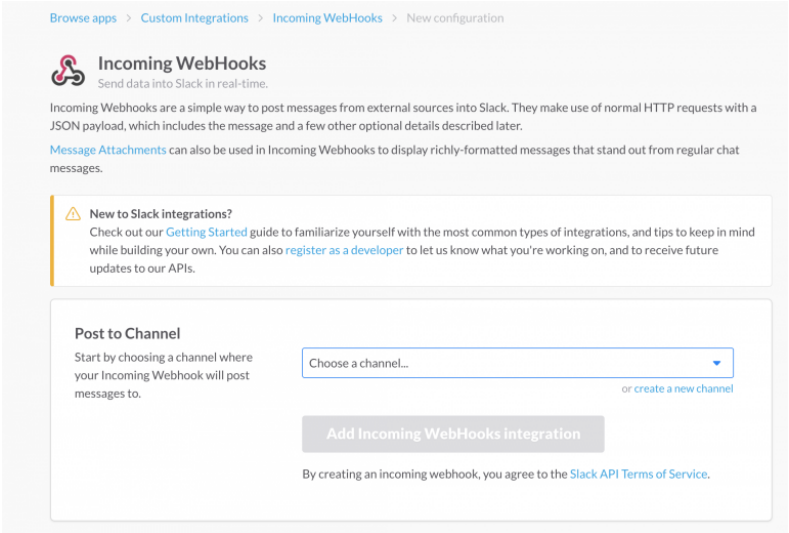
   B. Save, exit
2. systemctl enable elastalert
3. systemctl start elastalert
4. systemctl status elastalert
   A. You may get errors about multiple rules having the same name if you use the preexisting ruleset.

Setup e-mail notifications

1. yum remove sendmail -y
2. yum install postfix -y
3. postconf -e “mydomain = wazuh.student.rit.edu”
4. systemctl enable postfix
5. systemctl start postfix

Setup Slack notifications

1. Login into your slack account online
2. Then go to “https://<slack team>.slack.com/services/new/incoming-webhook “



3. Since it's jsut me for right now selected the channel for my user
    A. Feel free to add your own channel and use that
4. Select "Add incming webhooks integration"
5. The next page will provide you with a webhook link and bunch of features for your webhook.

Automatic Wazuh ruleset updating

1. Log onto the OSSEC management node
2. sudo mkdir -p /var/ossec/update/ruleset && cd /var/ossec/update/ruleset
3. sudo wget https://raw.githubusercontent.com/wazuh/ossec-rules/stable/ossec_ruleset.py
4. sudo chmod +x /var/ossec/update/ruleset/ossec_ruleset.py
5. sudo /var/ossec/update/ruleset/ossec_ruleset.py –help
    A. Only run this command if you want to see all the options for the updater
6. ./var/ossec/update/ruleset/ossec_ruleset.py
    A. Update decoders/rules/rootchecks
7. ./var/ossec/update/ruleset/ossec_ruleset.py -a
    A. Update and prompt menu to activate new Rules & Rootchecks:
8. ./var/ossec/update/ruleset/ossec_ruleset.py –backups list
    A. restore a backup
9. ./var/ossec/update/ruleset/ossec_ruleset.py -a
    A. Actually install all rule sets
10. sudo crontab -e
    A. Add "@weekly root cd /var/ossec/update/ruleset && ./ossec_ruleset.py -s"
    B. save,exit

Resources/Sources

- https://github.com/Benster900/ossecKibanaElkonWindows-475-2161_bornholm
- http://documentation.wazuh.com/en/latest/about.html
- http://documentation.wazuh.com/en/latest/ossec_reference.html
- http://wazuh-documentation.readthedocs.io/en/latest/ossec_ruleset.html
- http://elastalert.readthedocs.io/en/latest/running_elastalert.html

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