WHO ADDED THAT USER TO THE GROUP?

A PRACTICAL EXAMPLE OF CYBER SECURITY AUTOMATION TO REVERT UNAUTHORIZED CHANGES IN YOUR IT ENVIRONMENT

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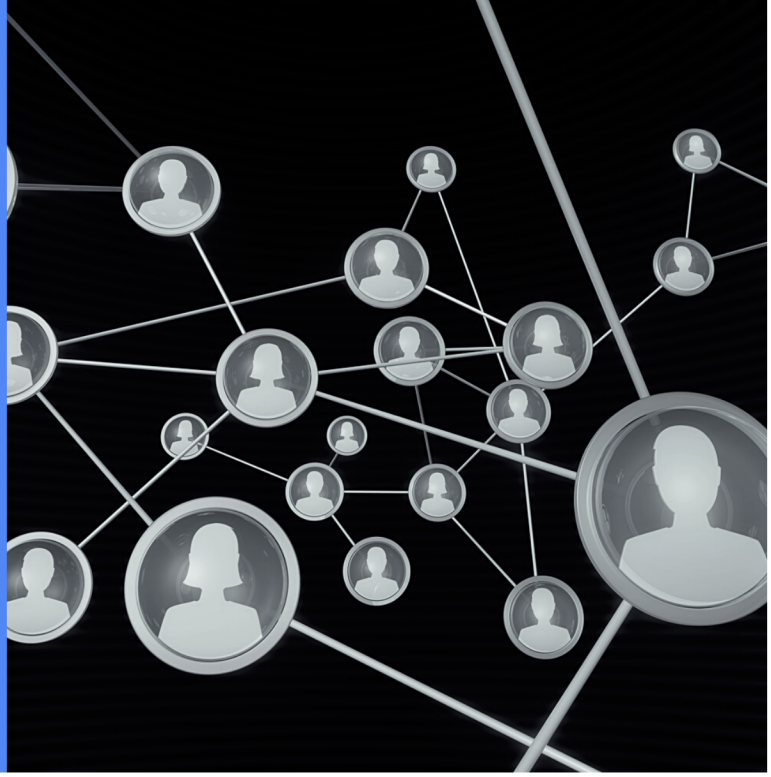
SECURITY AUTOMATION AND REVERTING UNAUTHORIZED CHANGES



In this white paper we will walk through a use case of auto-reverting unauthorized changes in your IT environment, namely Active Directory (AD) group changes done outside your Identity Management (IdM) system's request approval workflow process.

Many organizations have Identity Management (IdM) and/or Privileged Access Management (PAM) implementations in place. While some of these products do support native change detection, not all of these provide complete coverage. Besides, based on my two decades of experience in this field, there are always changes made outside the realm of these products.

Call it Shadow IT, out of band, or "I don't have the time or the patience to follow this new secure process my company has put in place" or the ever present "I like it doing the old way, my way" mentality.

Worse still there are still a lot of companies who neither have IdM nor PAM solutions in place. In all these scenarios, how do you then detect any and all unauthorized changes to your IT environment? Say for example, a highly privileged Active Directory (AD) group, like Domain Admins

Let's consider a typical enterprise which has an identity management solution in place. For our example we will pick SailPoint IdentityIQ (IIQ). Ideally all changes to all AD groups in the enterprise should follow the request approval workflow as provided by the SailPoint IIQ product.

But in our case, there are some senior engineers or administrators who still prefer to not follow the process. This can pose a security risk, especially when one of their accounts gets compromised allowing for lateral movement of privilege escalation (ransomwares love this). How do you identify these changes?

How do you hunt through the tons of logs and audit data and ensure only unauthorized changes are identified and responded to?

You definitely want to identify changes to privileged AD groups, but not be bothered when they follow the approval workflow as implemented in your organization.

You need a solution that can collect data from various sources and provide you the ability to correlate it. In our example, these sources would be SailPoint IIQ and Active Directory. You could replace this with any IdM solution and any privileged access store (databases, directory services etc.)

Active Directory: our first data source

Every organization should turn on Active Directory auditing. If you have not and need help, please feel free to reach out.

Once you have AD auditing in place, using Log Analytics agents to capture Security Event data from your domain controllers and sending it to Sentinel Log Analytics workspace is a pretty straight forward task.
More on this here: https://docs.microsoft.com/en-us/azure/sentinel/connect-windows-security-events.

Your Identity Management System: our second data source

Most identity management solutions including SailPoint IIQ write their audit data to databases. Once again, your IdM product configuration should include auditing changes to user's roles, entitlements, and access. While there isn't a database connector for Azure Sentinel, you can use any log forwarder like Logstash or Fluentd to ship your audit data to Sentinel.

This provides added functionality to filter what and how much data you are sending through. Certainly, helps you keep your cost down.

Fluentd: Our Log/Data Forwarder Configuration

For our example, we will use Fluentd which is pretty lightweight. There's a Fluent plugin for Azure Log Analytics we will be using here.

Our basic Fluent configuration would look like (our database is MySQL here):

```
<source>
 type mysql_appender
 # Set connection settings
for replicate source.
 host localhost
 username abcdefg
 password ******
 database myiiqdb

 # Set replicate query
configuration.
 query SELECT * from
spt_audit_event
 primary_key created #
specify incremental unique
key (default: id)
 interval 1m # execute query
interval (default: 1m)

 # Format output tag for
each events.
 tag sailpoint
limit 1000 # query limit
last_id -1 # specify
primary_key start
</source>

# converting sourced epoch
time to ISO 8601 time and
adding it the data
<filter sailpoint>
@type record_transformer
enable_ruby
<record>
timestamp
${Time.at(record["created"]/
1000.to_i).iso8601}
</record>
</filter>
# azure log analytics plugin
<match sailpoint>
@type azure-loganalytics
customer_id
**********************
shared_key
**********************
log_type SailPointIIQ
time_generated_field
timestamp
</match>
```

Correlate, Detect, Identify

By now you are pushing data from AD and SailPoint IIQ into the Sentinel Log Analytics workspace. Once data is in you need to correlate the two sources. For that you would need to write a KQL (Kusto Query Language) query:

```
SecurityEvent | where
Activity contains "A member
was added to a security-
enabled global group." |
extend MemberAndGroup =
strcat(MemberName, " : ",
TargetUserName) |
join kind=leftanti
(SailPointIIQ_CL | where
TimeGenerated > ago(5min) |
where action_s ==
"EntitlementAdd" |
project MemberAndGroup =
strcat(account_name_s, " :
",
substring(substring(attribut
e_value_s, 0,
indexof(attribute_value_s,
",")), 4)))
on MemberAndGroup
```

Let's see what we are doing here. We are filtering Security Events specific to a user being added to an AD group.

You could add additional filters to target a specific user/service account via the MemberName field, or a specific AD group, via the TargetUserName field.

Once we have that data, we are concatenating the user and group information into a new field named MemberAndGroup.

Then from the SailPointIIQ_CL custom log we are gathering all events generated in the past 5 minutes as there's usually a slight lag from when the "add user to group" command is executed on the IdM product side, here SailPoint IIQ, and when the user gets actually added to the group in AD. This action is represented by the EntitlementAdd value in the action_s audit data field.

You then similarly, concatenate the member and group information into the MemberAndGroup field.

The final step is doing a left anti join, to pick only those entries in the SecurityEvent data which do not have a corresponding EntitlementAdd action within the previous 5 minutes on the SailPoint IIQ side. This of course expects the time to be in the same time zone for both the sources. If that isn't the case, just add / subtract the time offset as needed.

Analyze: Create an Azure Sentinel Rule

Once you are satisfied with the query results we create a Sentinel Analytics rule. For our scenario, we will have this run every 5 minutes as a Scheduled Query to capture the data from the past 10 mins setting the threshold to more than 0 query results. You may want to group these results so multiple alerts are not generated.

We picked the data from the past 10 minutes to compensate for the lag between the action being initiated in the IdM product and then event being captured in AD.

You also would want an Incident created. You should group alerts so as to not generate multiple incidents. This is highly recommended when you see a lot of noise and SHTF scenarios as each incident will need to be responded to and closed. If all alerts are pointing to the same incident, group them.

For our use case that is highly unlikely, unless a privileged AD account is compromised, and malware starts adding or removing users to group all over the place.

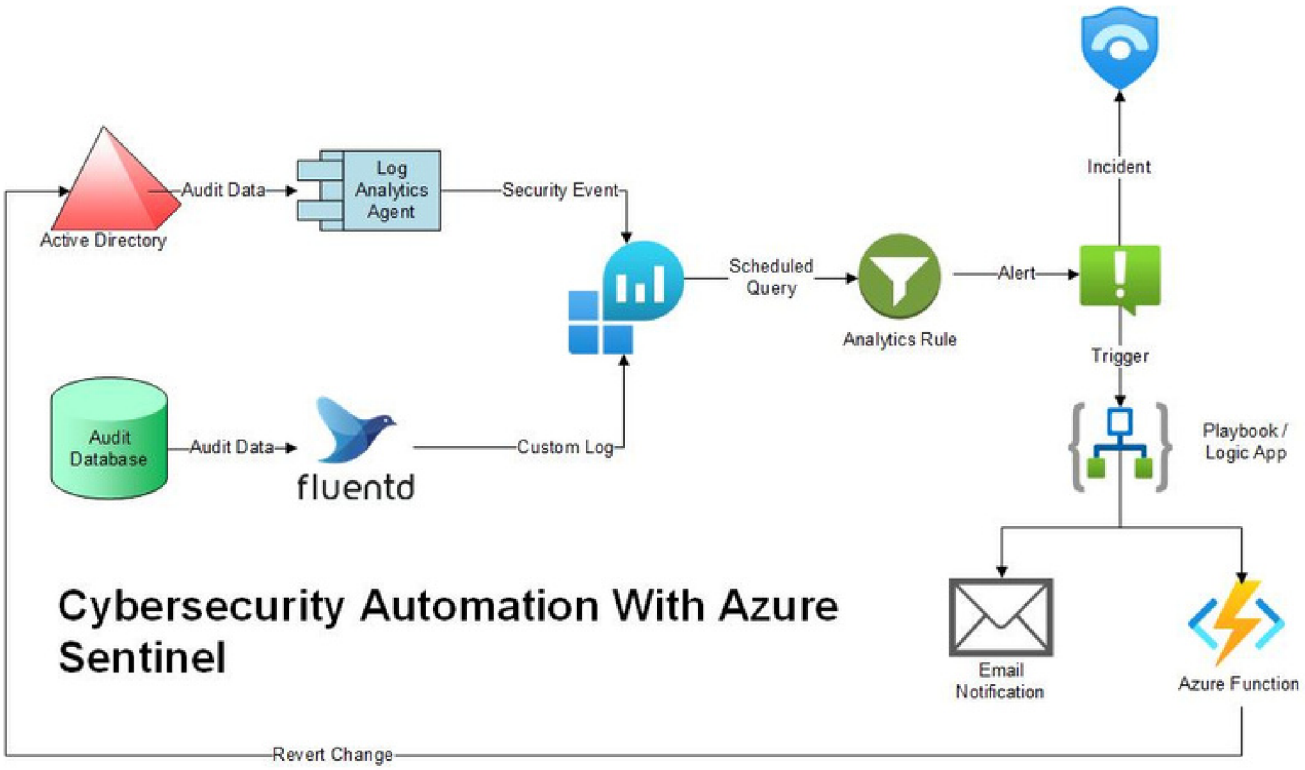
Getting flooded with email alerts or SMS notifications will not be pleasant in those scenarios and may help retain your sanity.

Alert and Revert: Automate Your Response

While creating the Analytics rule, you have the option to automate your response. Here, Sentinel Playbooks come in handy. These are no-code/low code Logic Apps. For our use case, we ended up sending an email alert with the incident details and reverting the change via an Azure Function App (PowerShell to the rescue; one domain controller was in the Azure Cloud).

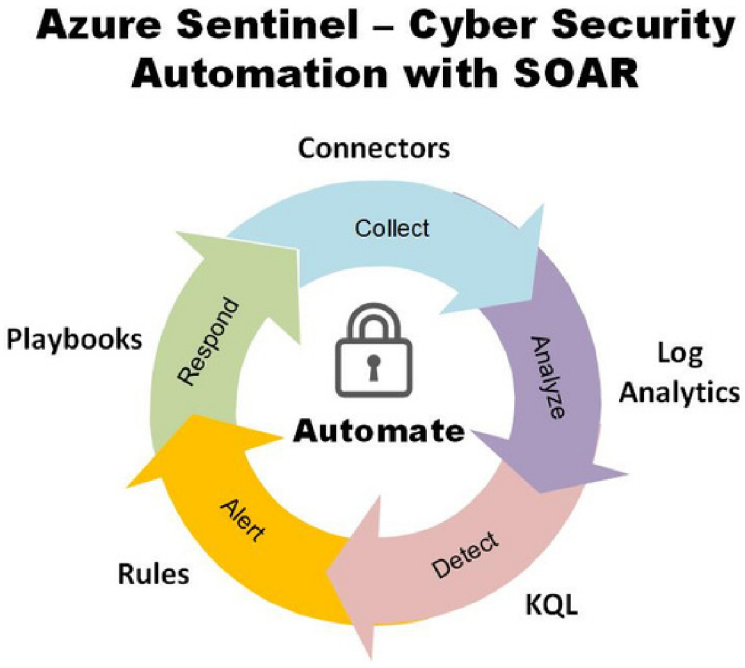
A few other examples of automated response would be:Creating a ServiceNow Ticket Initiating a Teams meetingLocking or disabling the user accountCalling your system administrators at 2AM etc.

The possibilities here are endless with the vast ever increasing list of connectors available for Logic Apps: https://docs.microsoft.com/en-us/connectors/connector-reference/



Conclusion

This white paper presented an example on how you can use the beauty of cyber security automation, namely SOAR (Security Orchestration, Automation and Response) to auto-revert unauthorized changes to your IR environment.



Similarly, you can not only correlate data from a wide array of sources, you can marry that with threat intelligence data and other security solutions, and automate how you respond to it, all the while utilizing the power of the cloud and making the system smarter by harnessing it's Artificial Intelligence / Machine Learning capabilities present in Microsoft Azure Sentinel. Other tools like Elasticsearch and Splunk provide similar capabilities too.

Have Questions?

If you want to close the loop with automated cybersecurity, feel free to contact us here: https://www.zephon.tech.