Using Cloud Analytics with Caldera

Using the emu plugin for Caldera makes it easy, but it is not obvious how it works. The high level process is as follows:

NOTE: Caldera 4.0.0-beta was used for the following instructions. Not tested on other versions.

Initial Setup

Setup Caldera Server

NOTE: Assumes user has setup Vagrant and Virtualbox. Vagrant provides a straightforward workflow to create a reusable, repeatable environment shareable by vagrant users.

Within the `cloud-analytics/emulation/caldera-vagrant/` directory, of the Cloud Analytics project, there is a vagrant configuration which will install Caldera from scratch on a new virtual machine instance.

1. Open a terminal window, and change to the `caldera-vagrant` directory: `cd ./cloud-analytics/emulation/caldera-vagrant/`

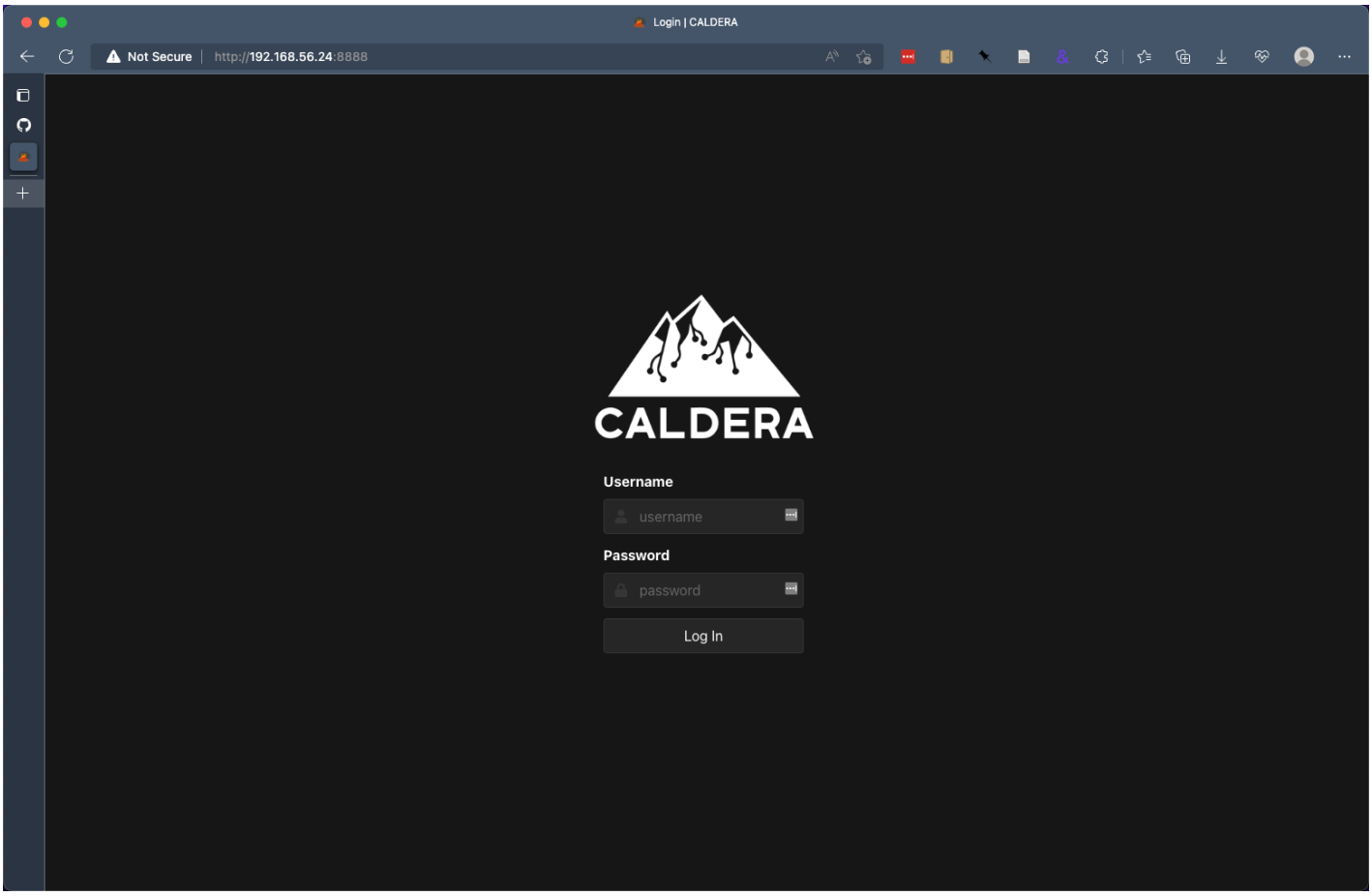
2. Run `vagrant up` to initialize the vagrant environment. How long this takes is highly dependent on your network connection. Vagrant will first perform a one-time download of the base box, `ubuntu/focal64`, and then provision the VM by installing and configuring Caldera.

3. Once Caldera is fully provisioned, you should see a banner similar to the following, with a URL to connect to the Caldera web interface.

4. **NOTE**: Due to a quirk in the Caldera 4.x beta, after vagrant is complete and the system boots up, you should wait approximately 3 minutes, then run `vagrant reload` from your host system to restart. Otherwise, Caldera may hang on plugin initialization and not fully startup the web interface. After waiting a few minutes and running

`vagrant reload`, Caldera should properly start on all startups going forward. If you encounter a `ERR_CONNECTION_REFUSED` in your browser, you have encountered this issue. Just run `vagrant reload` and the problem should be permanently fixed going forward.

```
############################################################
#                                                          #
#                                                          #
#                                                          #
#                                                          #
#   Connect to Caldera at http://192.168.56.24:8888
#                                                          #
#                                                          #
#                                                          #
#                                                          #
############################################################
```

5. Open a web browser and connect to Caldera at the URL specified in the terminal, as shown in the previous step. You should see a login screen similar to the following.
6. 

7. Login with the default credentials
8.
```
username: red
password: admin
```

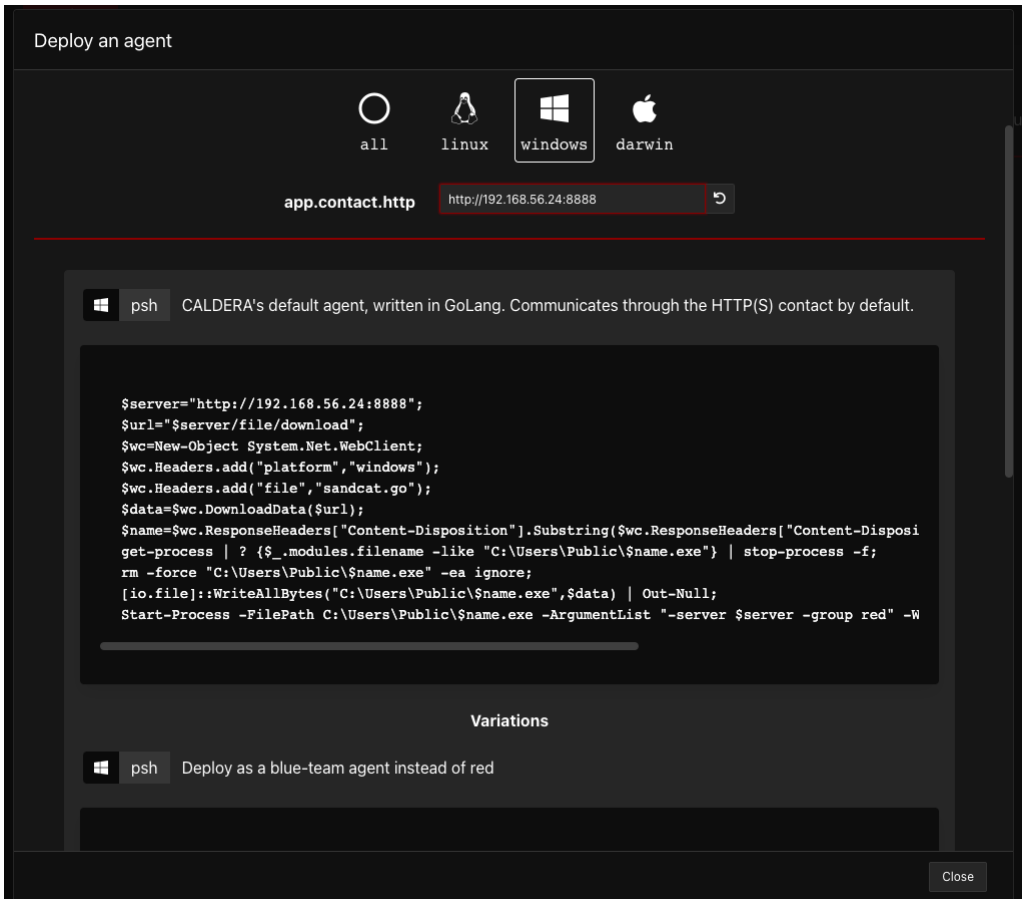
Setup Windows Guest

The Caldera server application will act as the emulation controller, however we need *Caldera Agents* to perform the actual executions. In this example, we will deploy a Windows VM using Vagrant. The Windows instance will use a temporary evaluation license by default. Make sure this meets your organizational licensing requirements or install an appropriate license as needed.

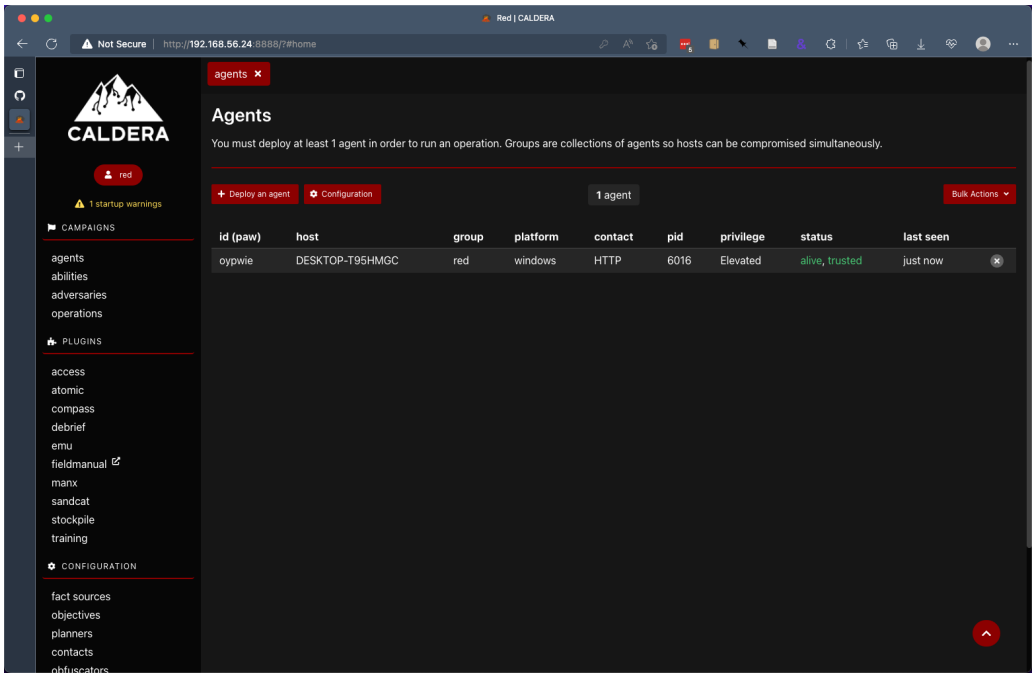
1. Open a separate terminal, and navigate to the `cloud-analytics/emulation/caldera-win-agent-1` directory.
2. Run `vagrant up`
3. After the Windows system is fully booted, continue with the next section to add the Windows system as a Caldera agent.

Add Windows VM as Caldera Agent

1. Within Caldera, navigate to the `Campaigns -> agents` section.
2. Click the `Deploy an Agent` button.
3. Select `Sandcat` from the dropdown menu.
4. Select `windows` under `Platform`.
5. Edit the `app.contact.http` setting from `http://0.0.0.0:8888` to the URL printed out earlier on the terminal when Caldera started up. In the earlier example, the URL is `http://192.168.56.24:8888`.
6.
7. Copy the PowerShell code from the first section, with the title of `CALDERA's default agent, written in GoLang.`
8. Create a new file in the `caldera-win-agent-1` directory, titled `calderaSetup.ps1`. That directory should now have two files, `Vagrantfile` and `calderaSetup.ps1`.
9. Open a GUI console session to the Windows VM.
10. Open the Virtualbox application.
11. Look in the list of VMs for a name that begins with `caldera-win-agent-1-`. Vagrant appends additional characters to the name, but you only have to match the initial section.
12. Select the VM on the left with a single click.
13. Click the green `Show` button in the toolbar in the top right.

i. 

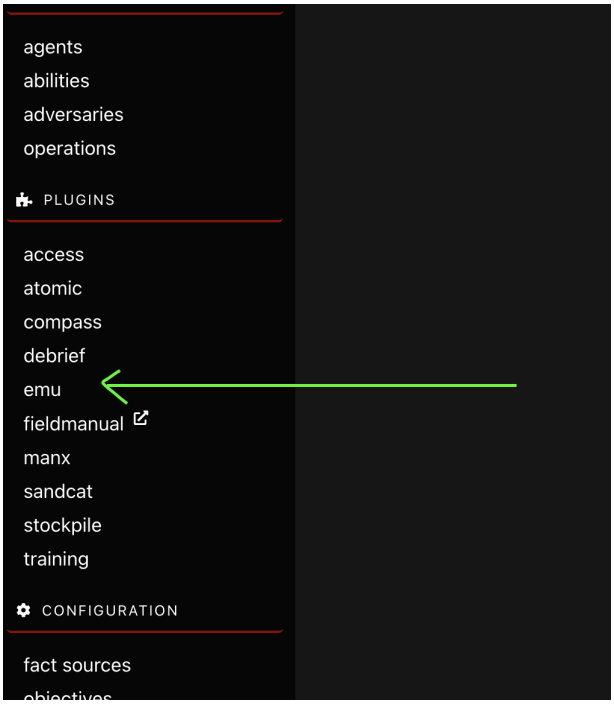
14. You should be logged in to a Windows VM. Use the Virtualbox -> View menu if you need to modify the display settings.
15. If needed, the default Windows username and password are `vagrant` and `vagrant`, respectively.
16. From within the Windows guest, from the Start Menu, open the `Windows Powershell ISE` application **as an Administrator**.
17. Select `File -> Open` from the menu, and navigate to `C:\vagrant\`.
18. Open the file `calderaSetup.ps1`.
19. Click the `Play` icon to run the script.
    i. ca-caldera-agent-3
20. Windows Firewall will generate a notification due to the network access. For the Windows Firewall prompt, check both boxes and click `Allow Access`.
    i. ca-caldera-agent_2
21. Navigate back to the `Caldera` agents webpage on your host computer, and the new Windows agent should show in the `Agents` list.

i. 

Post-Install Setup

Ensure EMU Plugin is Enabled

Make sure the emu plugin is enabled within Caldera. If not, navigate to *Configuration -> configuration-> Plugins*, and enable the emu plugin, and restart Caldera. When enabled, you should see `emu` on the left side menu.



Install New Advesary Emulation Plan

NOTE: If you are using the Vagrant Caldera setup installed earlier, read the following:

- You can ssh to the Caldera instance by `cd cloud-analytics/emulation/caldera-vagrant`, then running `vagrant ssh`.
- To copy the adversary emulation plan, copy the `aep1-package-caldera.tar.gz` package to the vagrant directory. For example, `cp cloud-analytics/emulation/aep1-package-caldera.tar.gz cloud-analytics/emulation/caldera-vagrant/`.

Option A: Install From AEP Archive

1. On the command line on the Caldera system, navigate to the following directory (`CALDERA_HOME` denotes the home directory of the Caldera installation).
2. `cd CALDERA_HOME/plugins/emu/data/adversary-emulation-plans`
3. Copy the attached file to the Caldera system, and decompress while in the directory in the previous step.
4. `tar -zxvf /path/to/aep1-package-caldera.tar.gz`
5. Vagrant users: If you followed the steps at the beginning of this section, you can run `tar -zxvf /vagrant/aep1-package-caldera.tar.gz`.
6. The resulting directory layout should look similar to the following:
7.
```
vagrant@ubuntu-focal:~/caldera/plugins/emu/data/adversary-emulation-plans$ tree aep1/
aep1/
└── Emulation_Plan
    └── yaml
        └── aep1.yaml

2 directories, 1 file
```

Option B: Create Directory Layout Manually

Alternatively, you can manually recreate the same structure.

1. `cd CALDERA_HOME/plugins/emu/data/adversary-emulation-plans`
2. `mkdir -p aep1/Emulation_Plan/yaml/`
3. `cp /path/to/aep1.yaml ./aep1/Emulation_Plan/yaml/`

Activate New Adversary Emulation Plan

After completing one of the above versions, restart Caldera.

Validate

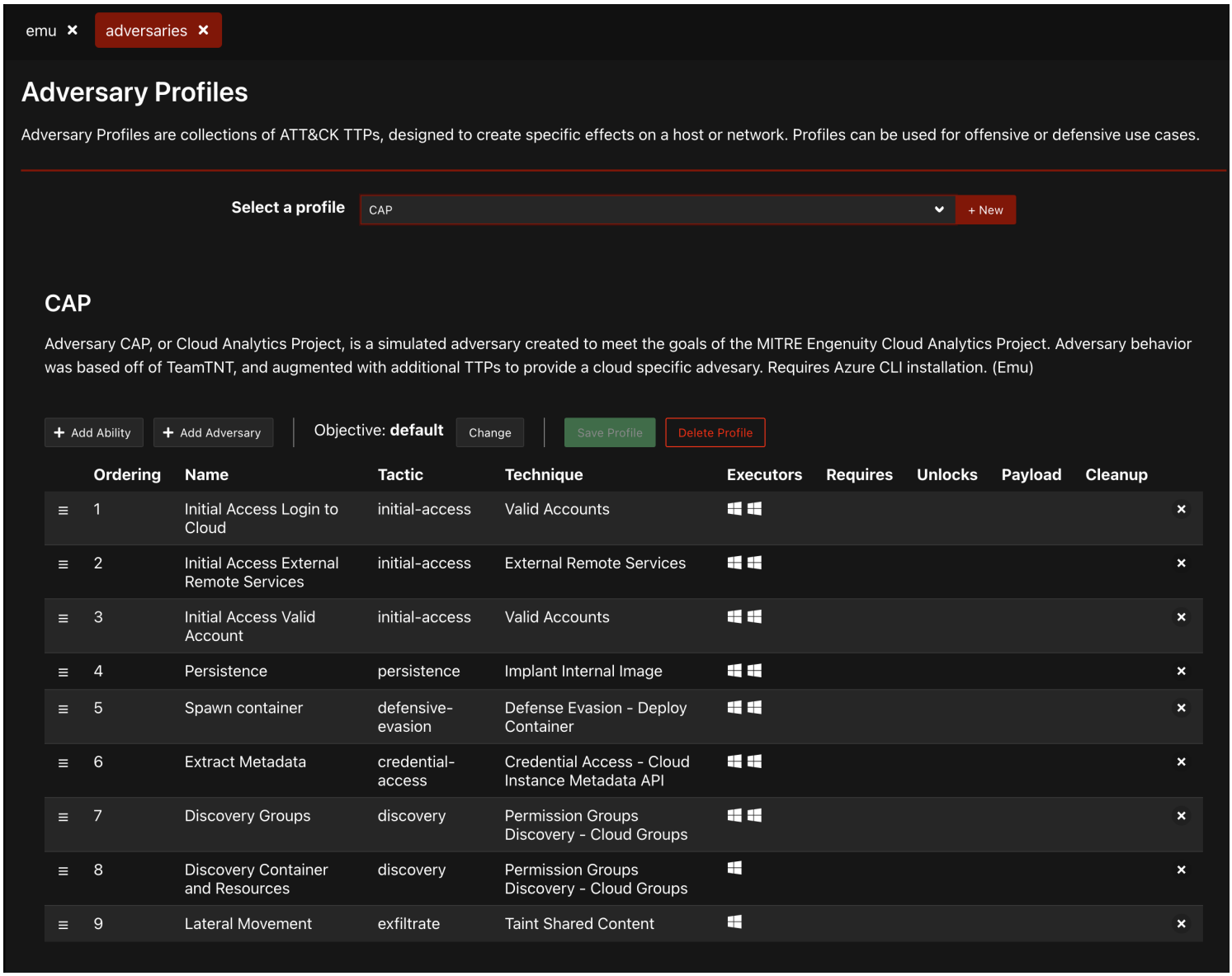
NOTE: The Cloud Analytics adversary name is currently CAP, short for Cloud Analytics Project.

Adversary Profile

Within Caldera, *Adversary Profiles* allow for collecting ATT&CK TTPs for a specific effect or scenario, such as an offensive or defensive scenario.

To validate the CAP profile is setup, within the Caldera web interface, navigate to *Plugins* -> *emu* -> *Adversaries* -> *Select a profile* -> ***CAP***.

A screen similar to the following should be displayed.

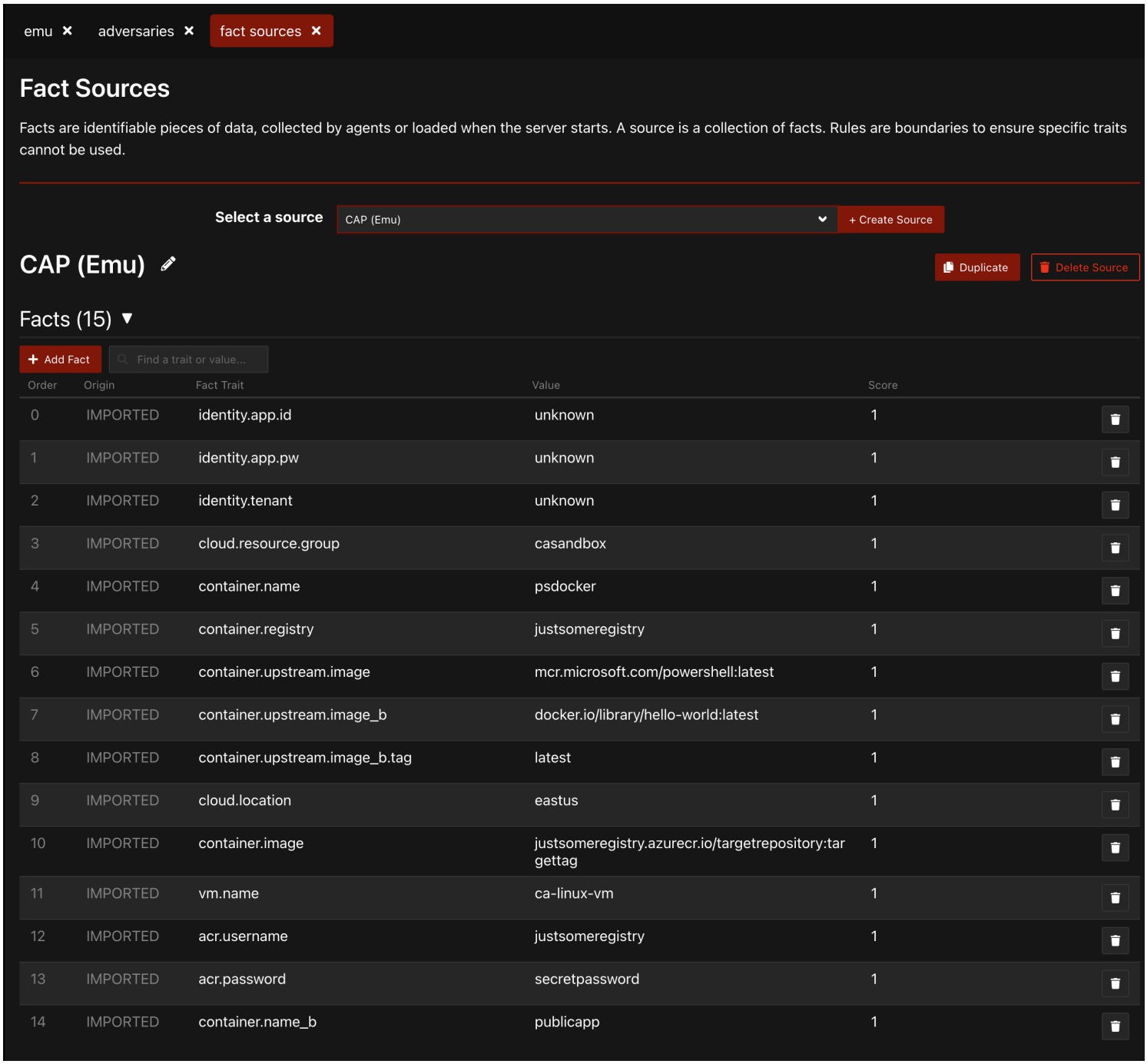


Fact Sources

Within Caldera, *Fact Sources* allow for using variables within an execution plan. Multiple fact source configurations can be setup for a profile, such as a fact source for the test environment. Along with Adversary Profiles, Fact Sources allow for executing predefined scenarios customized to a particular environment.

To validate the CAP Adversary Fact Source has been setup, within the Caldera web interface, navigate to *Configuration -> fact sources -> Select a source -> **CAP***.

A screen similar to the following should be displayed.



Google Cloud Auth Setup

For Google Cloud, perform the following setup steps prior to running the adversary emulation plan.

1. Setup a service account with appropriate permissions by following the Google Cloud documentation.
2. Save the service account key file as `key.json` within the `caldera-win-agent-1` directory, `cloud-analytics/emulation/caldera-win-agent-1/key.json`.
3. *[Optional]* If you used a different filename other than `key.json`, update within Caldera `FACTS` section, set the `identity.gcloud.key` value just the base filename. For example, if you used `sa.json` instead of `key.json`, set the fact to `sa.json`. Do **not** include the filepath.
4. Set the `identity.gcloud.account` variable to the Google Cloud service account name, such as `my-svc-account@mydomain.com`.

References

- Official Caldera documentation: https://caldera.mitre.org/