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

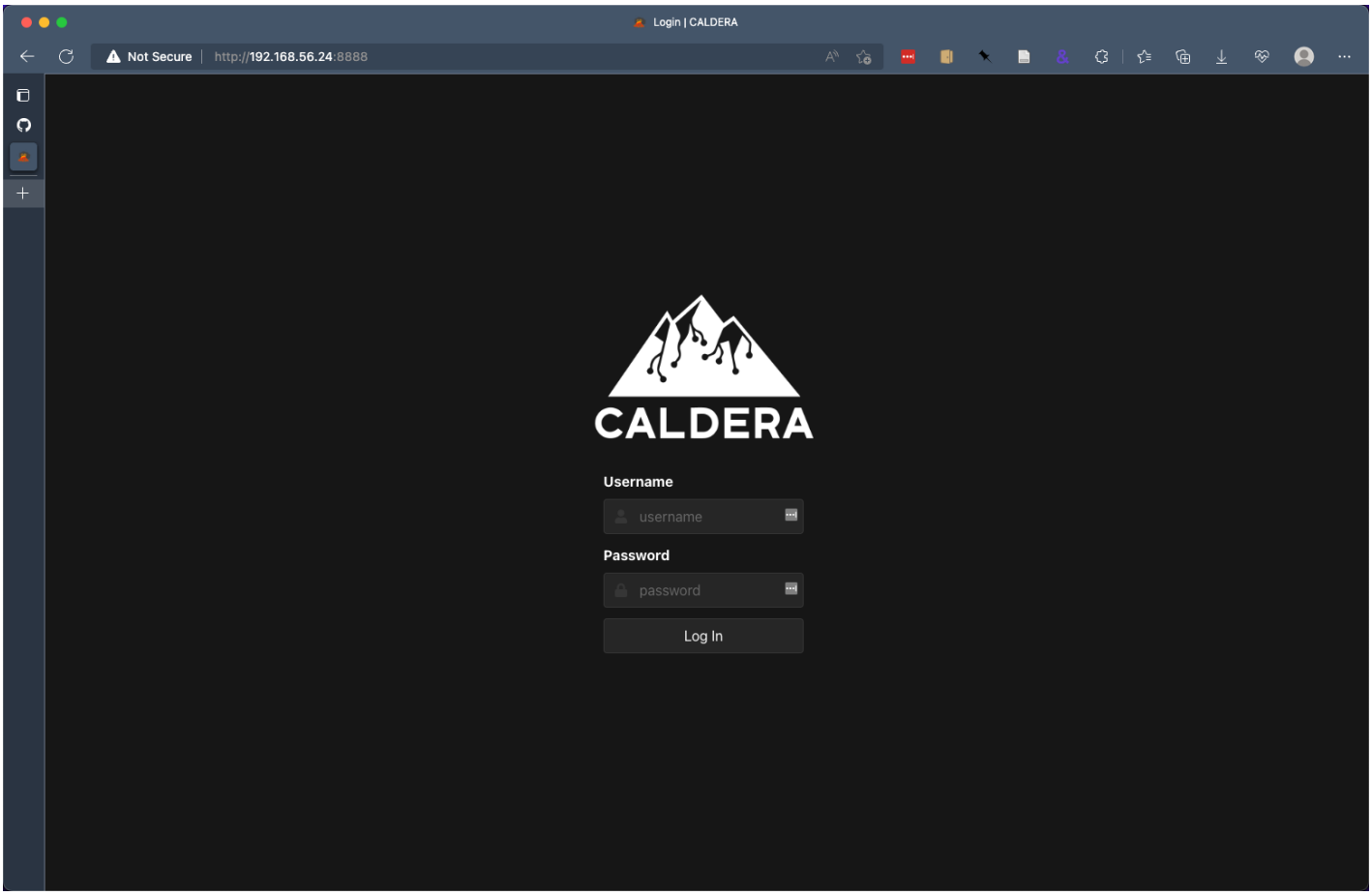
NOTE: Assumes user has setup Vagrant and Virtualbox. Vagrant provides a straightforward workflow to create a reusable, repeatable environment shareable by vagrant users.

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
```

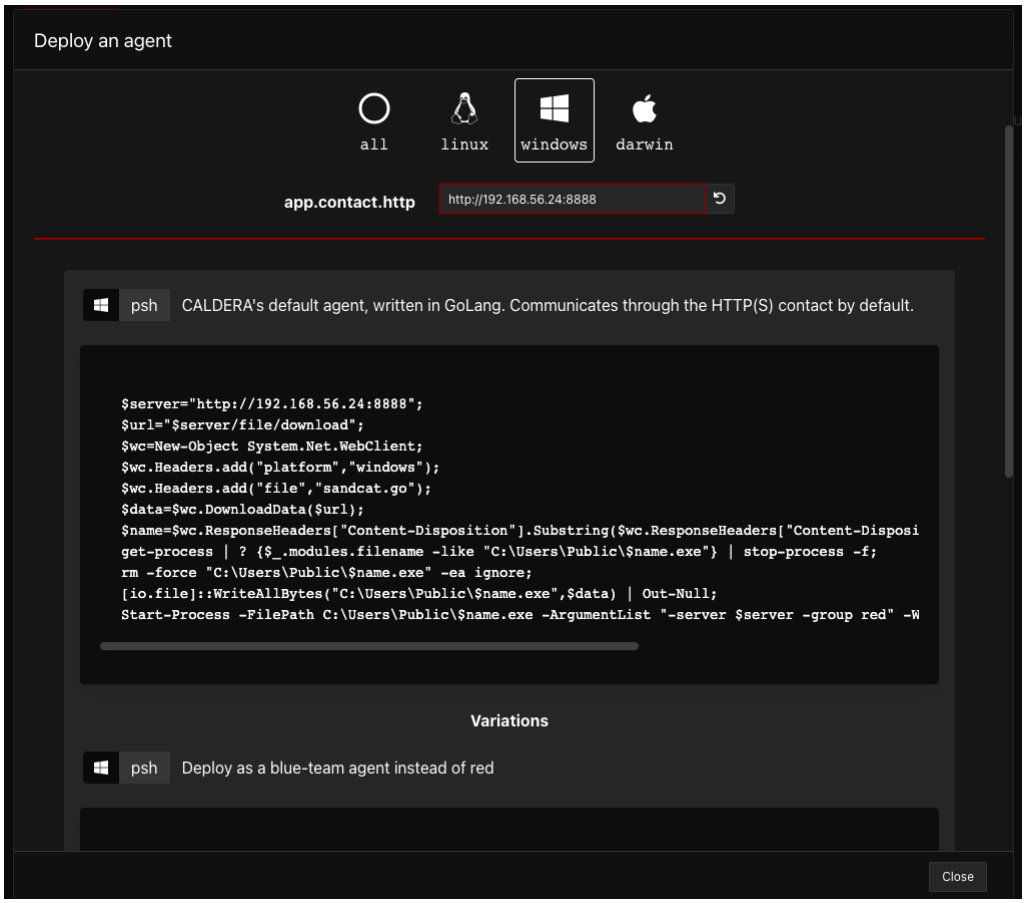
Setup Windows Guest

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.

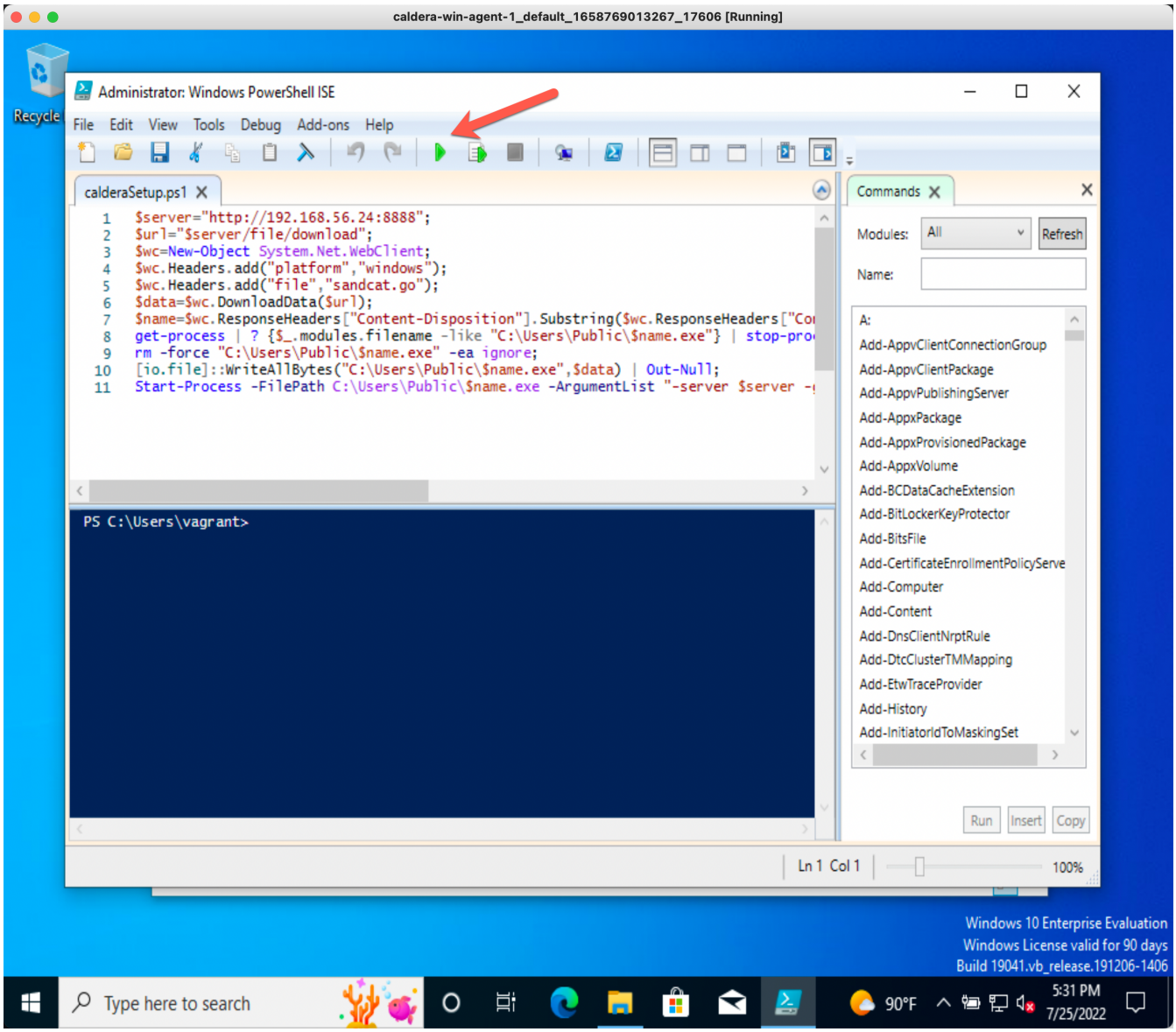
1. Open a separate terminal, and navigate to the `cloud-analytics/emulation/caldera-win-agent-1` directory.
2. Run `vagrant up`
3. After the Windows system is fully booted, continue with the next section to add the Windows system as a Caldera agent.

Add Windows VM as Caldera Agent

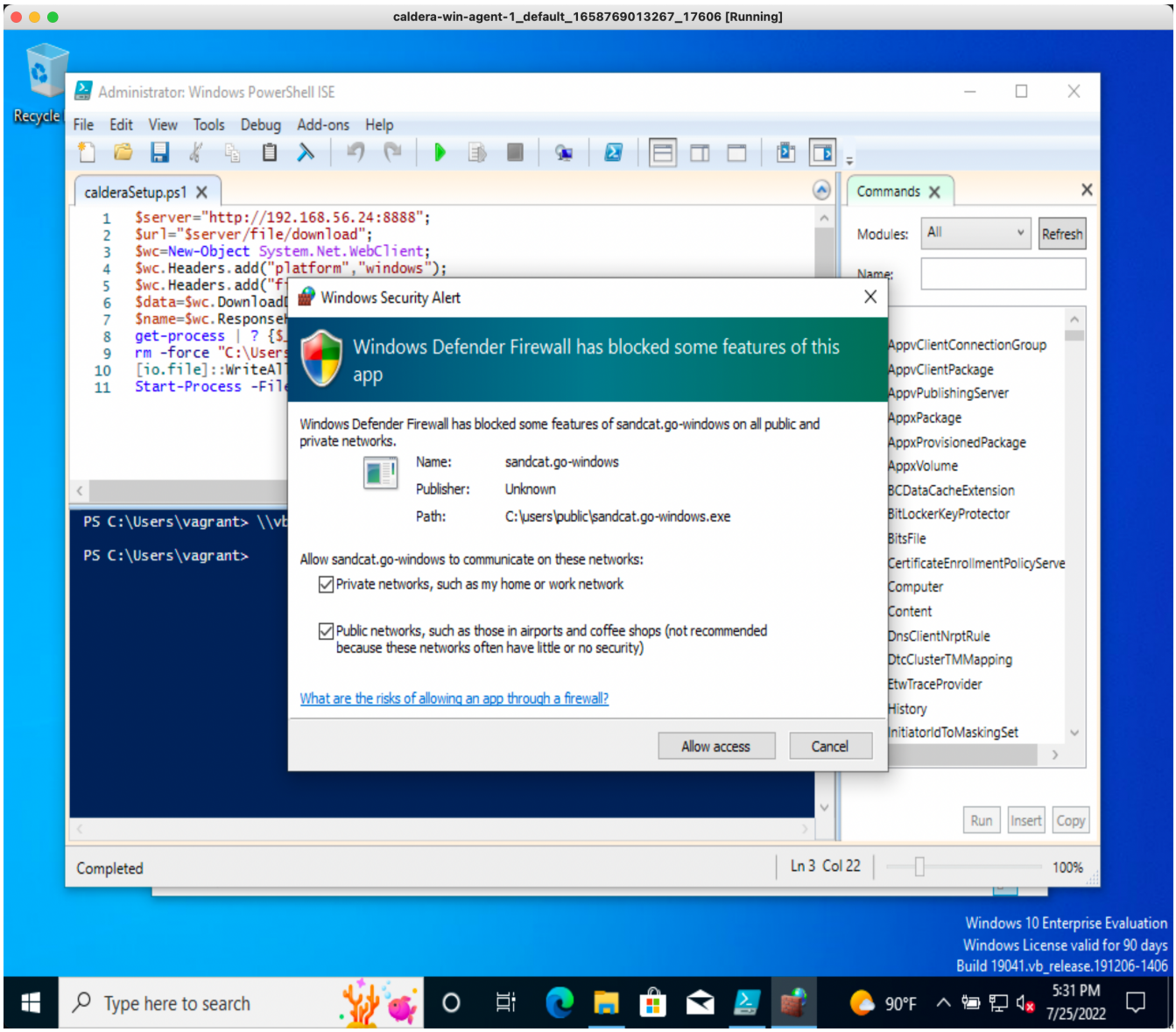
1. Within Caldera, navigate to the `Campaigns -> agents` section.
2. Click the `Deploy an Agent` button.
3. Select `Sandcat` from the dropdown menu.
4. Select `windows` under `Platform`.
5. Edit the `app.contact.http` setting from `http://0.0.0.0:8888` to the URL printed out earlier on the terminal when 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. 

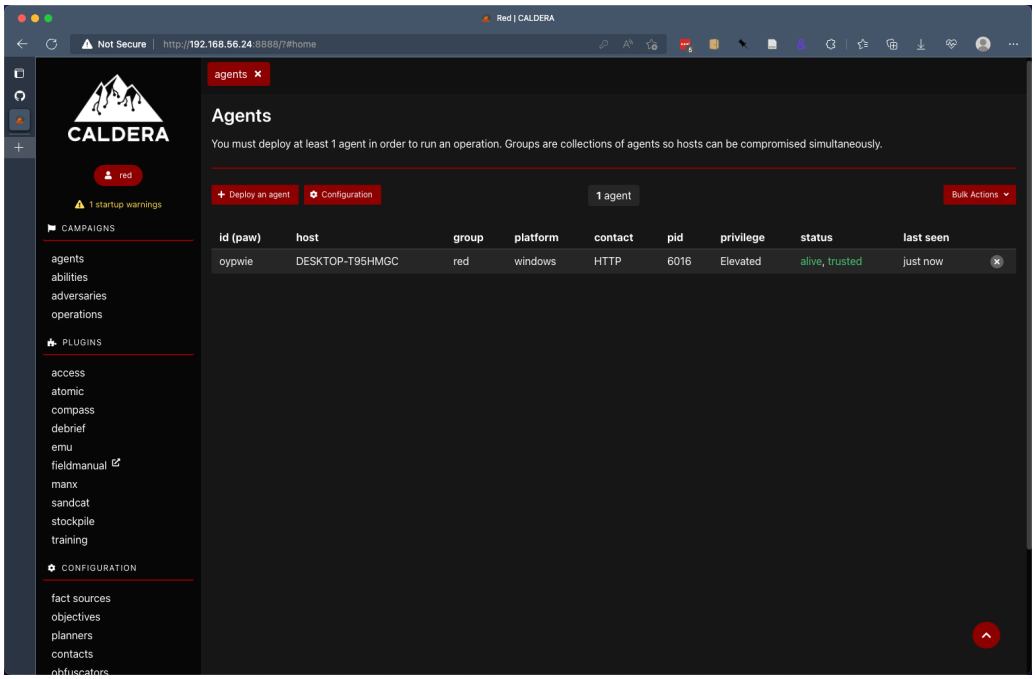
14. You should be logged in to a Windows VM. Use the Virtualbox -> View menu if you need to modify the display settings.
15. If needed, the default Windows username and password are `vagrant` and `vagrant`, respectively.
16. From within the Windows guest, from the Start Menu, open the `Windows Powershell 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. 

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. 

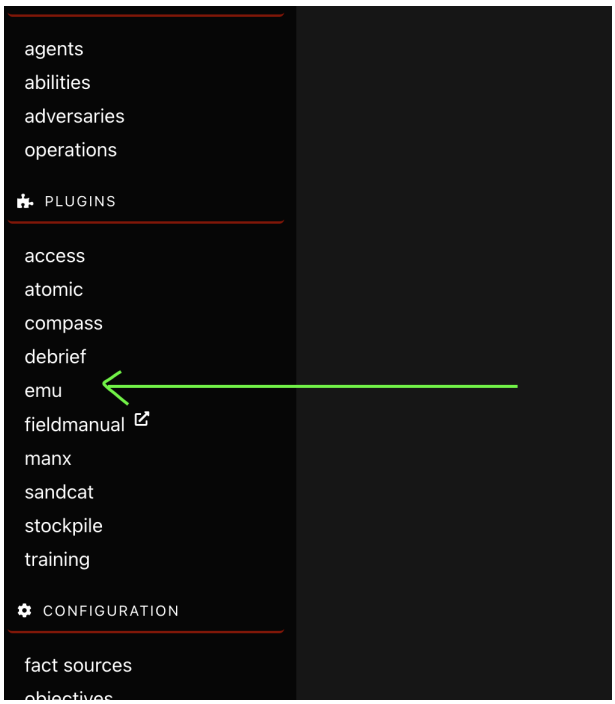
21. Navigate back to the `Caldera` agents webpage on your host computer, and the new Windows agent should show in the `Agents` list.

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 Adversary 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. For vagrant users, `CALDERA_HOME=/home/vagrant/caldera`).
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 aep{1,-gcp1}/Emulation_Plan/yaml/`
3. `cp /path/to/aep1.yaml ./aep1/Emulation_Plan/yaml/`
4. `cp /path/to/aep-gcp1.yaml ./aep-gcp1/Emulation_Plan/yaml/`

Activate New Adversary Emulation Plan

After completing one of the above versions, restart Caldera. If using vagrant, run either `sudo systemctl restart caldera.service` from the vagrant ssh command line interface, or run `vagrant reload` from your host system.

Validate

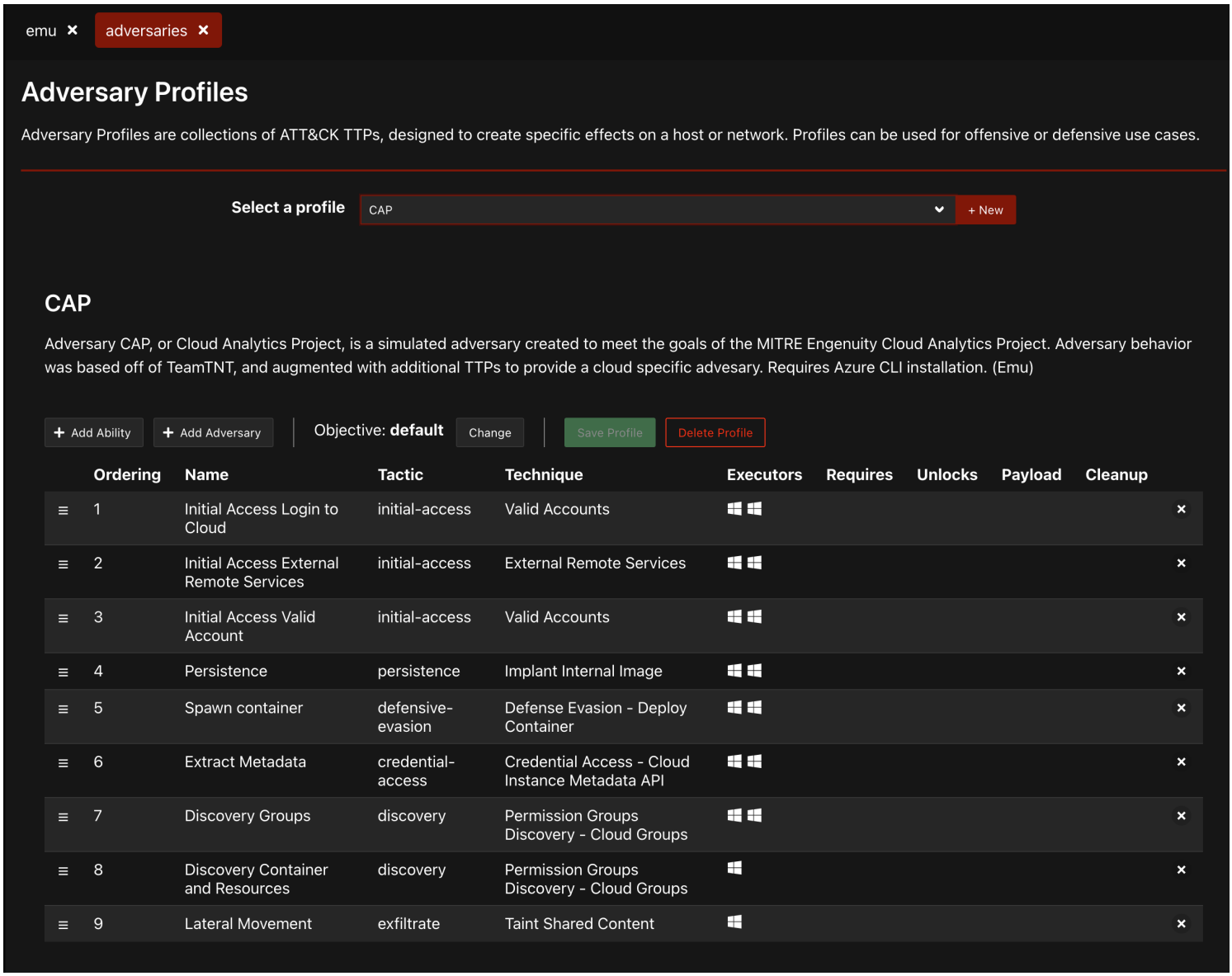
NOTE: The Cloud Analytics adversary names are currently CAP, short for Cloud Analytics Project, and CAPGCP, Cloud Analytics Project Google Cloud Platform.

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.

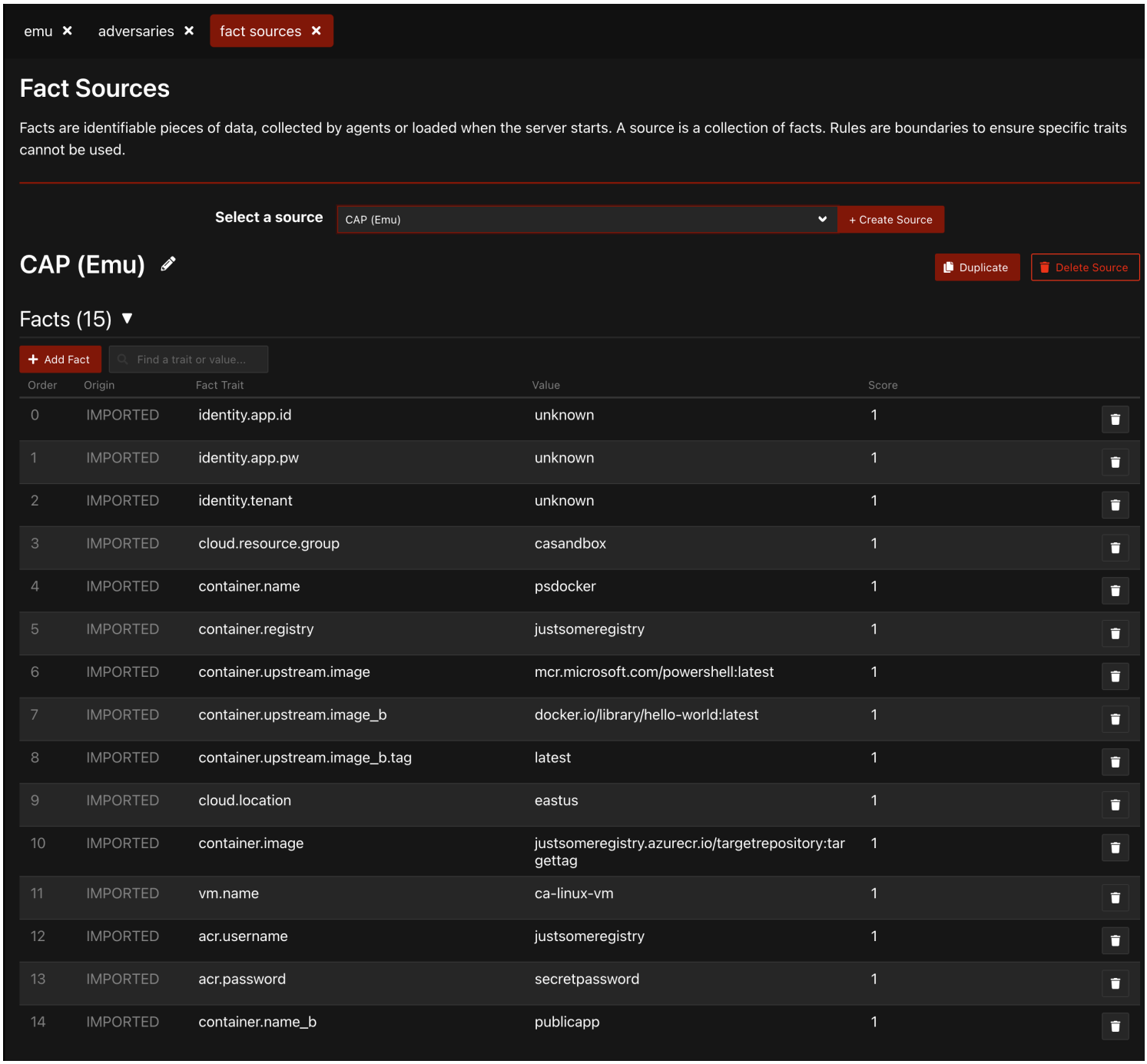


Fact Sources

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`.

5. NOTE: It is **strongly** recommended to pre-install the gcloud CLI on the Windows agent prior to executing the GCP Adversary Emulation Plan, as it may timeout when run via Caldera depending on available system resources. Reboot the Windows agent after installing the gcloud CLI.

References

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