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# Using Puddle at H2O

*Release v1.2.0*

**H2O.ai**

**Oct 17, 2019**



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Welcome to Puddle at H2O, H2O.ai's platform for running Driverless AI and H2O-3. This document describes how to log in and user Puddle. Installation is not covered here. Those instructions are provided in the [Installation and Administration Guide](#).

### **Additional Resources**

- [Driverless AI Documentation](#)
- [H2O-3 Documentation](#)

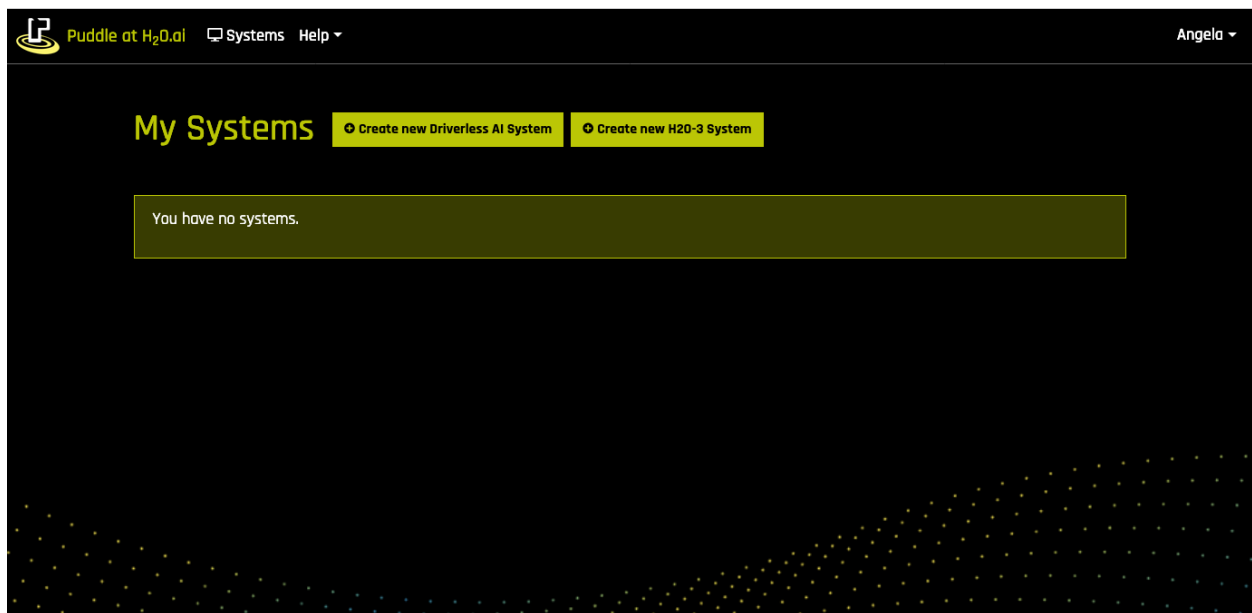
### **Have Questions?**

If you have questions about using Puddle, post them on the [H2O.ai Community Slack workspace](#) in the **#cloud** channel. If you have not signed up for the H2O.ai Community Slack workspace, you can do so here: <https://www.h2o.ai/community/>.



## STARTING PUDDLE AT H2O

Your admin will provide you with the URL for accessing Puddle. Sign in using one of the configured authentication providers. Upon success, the home page displays and shows any current systems. From this page, you can create a new Driverless AI and/or H2O-3 system.



### 1.1 Logging Out

Click on your username in the upper-right corner to log out of Puddle. You will then have the option to log out of the cloud environment as well.





## CREATE NEW DRIVERLESS AI SYSTEM

This section describes how to create a new Driverless AI system.

**Note:** You must have a Driverless AI license in order to run Driverless AI in Puddle. You can request a free 21-day trial license at <https://www.h2o.ai/try-driverless-ai/>.

1. Click **Create New Driverless AI System** on the Puddle Systems page.
  2. Specify the following options to create the system:
    - Driverless AI Version: Available versions are added by Admins.
    - System Name: System names must be between 1 and 64 characters and contain only lowercase characters, numbers, and hyphens. It must start with a letter and end only with a number or letter. This is blank by default.
    - System Type: Available system types are added by Admins.
- Note:** Your account settings may include a limit as to the number of systems of a certain type that you can run. If you exceed that limit then that option will not be available, and the least expensive option will then become the default.
- Disk Size: This can be 256GiB (default), 512GiB, or 1TiB.
  - Stopped If Idle For: This can be 30 min, 1 hour (default), 2 hours, 3 hours, 4 hours or never.
  - Tag: This shows the Tag(s) that will be applied to this system. Tags are created by Administrators and might include a default value. You can set the value here.

**Create New System on Microsoft Azure**

Version:  
1.7.0

System Name:  
[Empty]

System Type:  
CPU Large - \$0.768/h

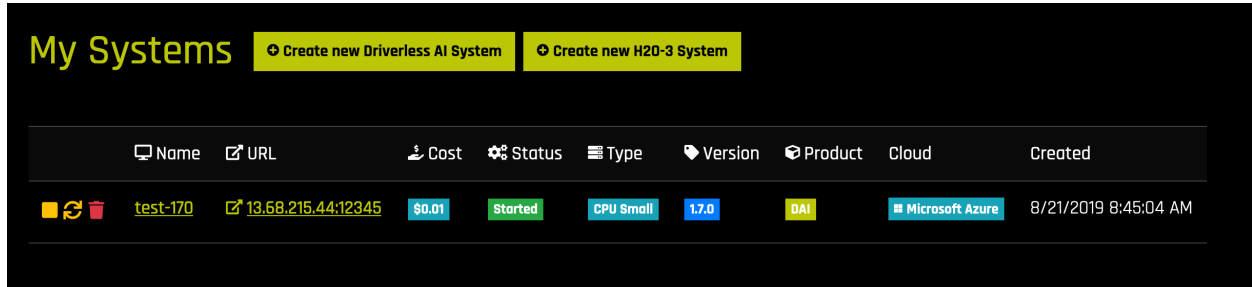
Disk size:  
256GB

Stopped If Idle For:  
1h

Submit Cancel

3. Click **Create System** when you are done. The system will begin provisioning. Note that this can take several minutes.

After the system has successfully started, it will appear on the My Systems page. At this point, you are ready to use Driverless AI.



## 2.1 Viewing Driverless AI Systems

Click on the Driverless AI System Name to view the configuration information and a list of current experiments.

Description	Dataset	Target	Score	TestScore	Scorer	Progress	Status	Accuracy	Time	Interpretability	Training Duration	Created
tosageha	CreditCard_...	default pay...	NA	NA	AUC	0%	In progress	6	3	7	20.33s	8/21/2019 8:58:50 AM

This page provides general system information and Driverless AI model information (if any models exist)

### 2.1.1 System Information

- The URL for launching Driverless AI
- The system status
- The Username and Password for starting Driverless AI

- An link to edit the config.toml file for that system
- The current session cost
- The total cost so far for this system
- The SSH command to run in order to securely access the system that is running Driverless AI. (See *SSH into the Driverless AI System* below for more information.)
- The time when the system will stop if remaining idle. You can also refresh this timer.
- The product name and version currently running on the system
- The system type and disk size
- The updated and created dates
- The cloud environment
- The system tag (if Admins have set up tags)

### 2.1.2 Experiment Information

For each experiment run on Driverless AI through Puddle, the following information displays:

- A description that includes the experiment key
- The training dataset used in the experiment
- The target column
- The validation score
- The test scorer
- The scorer used for the experiment
- The experiment progress and status
- The Accuracy, Time, and Interpretability options used for the experiment
- The amount time it took to complete the experiment (in seconds)
- The time when the experiment was created

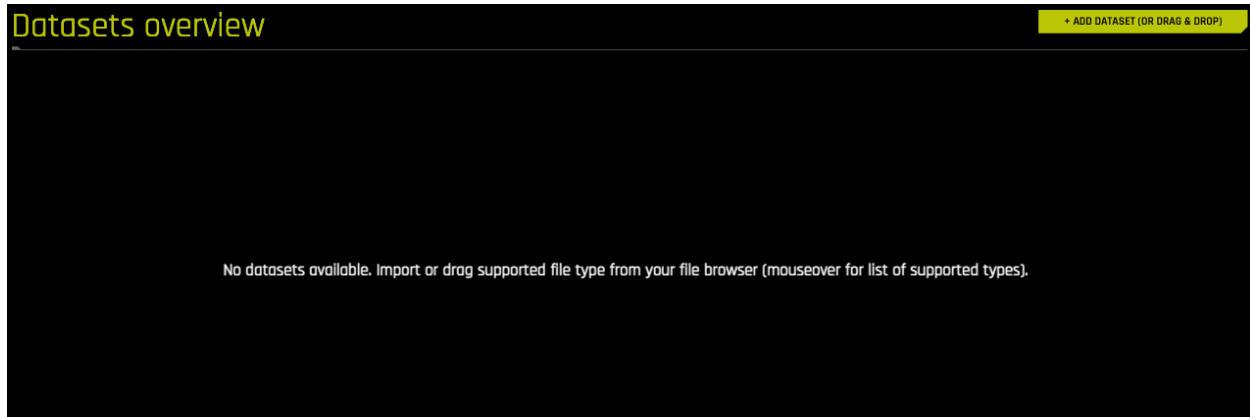
## 2.2 Starting Driverless AI

1. Click on the URL provided in the Driverless AI system page. This takes you to the DNS of the URL.
2. If this is your first time starting Driverless AI on this system, or if you have restarted the system, accept the license agreement.
3. You might have to enter the Username and Password that are provided on the Driverless AI system page.

URL	<a href="#">40.76.193.71:12345</a>
Status	Started
Username	h2oai
Password	h2oai

4. If this is your first time starting Driverless AI on this system, you might have to enter your license key. Note that if you do not have a license key, you can request a free 21-day trial license at <https://www.h2o.ai/try-driverless-ai/>.

Upon completion, Driverless AI will open on the Datasets Overview page. At this point, you can add or upload datasets and begin running experiments.



In Driverless AI, click on **Resources > Help** to view the Driverless AI User Guide. Additional documentation for Driverless AI is available at [docs.h2o.ai](https://docs.h2o.ai).

## 2.3 SSH into the Driverless AI System

Puddle provides the ability to SSH into a system that is running Driverless AI. There are two ways that you can SSH into a system:

1. *Using Your Azure ActiveDirectory Credentials*
2. *Using the Custom SSH Keys*

he method to use depends on which option is enabled in the configuration of your Puddle. If your SSH command starts with `ssh -l`, use the first option. If your SSH command starts with `ssh -i`, use the second option.

### 2.3.1 Using Your Azure ActiveDirectory Credentials

1. Select the system that you want to SSH into.
2. On your local machine, run the provided SSH command.
3. You will be prompted to continue the connection. Type `yes`.
4. After the URL is added to your list of known hosts, you will be provided with a login URL and password. The message will be similar to the following:

```
To sign in, use a web browser to open the page https://microsoft.com/
↪devicelogin
and enter the code AXXXXXXH to authenticate. Press ENTER when ready.
```

Open a browser and follow the instructions in the terminal message.

5. After you correctly enter your login and password in your browser, the following message will display.



Microsoft Azure Linux Virtual Machine Sign-In

You have signed in to the Microsoft Azure Linux Virtual Machine Sign-In application on your device. You may now close this window.

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Return to your terminal window and press Enter. Upon completion, you will receive a welcome message.

### 2.3.2 Using the Custom SSH Keys

1. Download the SSH private key using the download button to the left of the ssh command.



2. On your local machine execute `chmod 600 <ssh_key_file>` to set the correct permissions on the private key file.
3. On your local machine, run the provided SSH command. Please be sure to specify the correct path to the private key file in the SSH command.

## 2.4 Editing the config.toml File

In Driverless AI, the `config.toml` file allows you to specify system-wide configuration options. These options are specified using environment variables. Perform the following steps to edit the `config.toml` file. Note that a system reboot (🔄) is required when changes are made to the `config.toml` file.

There are two ways to open the `config.toml` editor:

- Click the **Edit config.toml** link in the Driverless AI System information table.



- Click the **Edit config.toml** button (⚙️) beside your system name on the Driverless AI System page.

1. Specify the environment variables that you want to include.
2. Click **Submit**.
3. Reboot the system.

A list of available environment variables is included in the Driverless AI documentation for the `config.toml` file. Note that this link points to the latest version of the `config.toml` file. The User Guide that's available in your system's Driverless AI under **Resources > Help** includes the `config.toml` file that matches your running Driverless AI version.



## 2.5 Stopping a System

Click the Stop button (■) to halt a system that is in a “Started” state. No information will be lost when a system is stopped.

## 2.6 Starting a System

Click on the Start button (▶) to start a system that is in a “Stopped” state. This will launch a new system with a new URL. All prior data will still be available from this URL.

## 2.7 Rebooting a System

Click the Reboot button (↻) to reboot a system that is in a “Started” state. This will stop the system and launch a new system with a new URL. All prior data will still be available from the new URL. The entire process can take several minutes. **Note:** A reboot is required when you change the config.toml file.




## 2.8 Deleting a System

Click the Delete button (■) to completely remove a system. A confirmation page will display asking if you are certain about deleting the system. Click **Yes** complete the delete. This request deletes the system and destroys all data that is

on the system.

## 2.9 Marking a System as Failed

This is a recovery option. Use this if your system is stuck (for example, in a “Starting…” state). Click the **Mark as**

**Failed** button () to mark a system as failing. After a system is marked as failed, you will be able to stop () or terminate () the system.

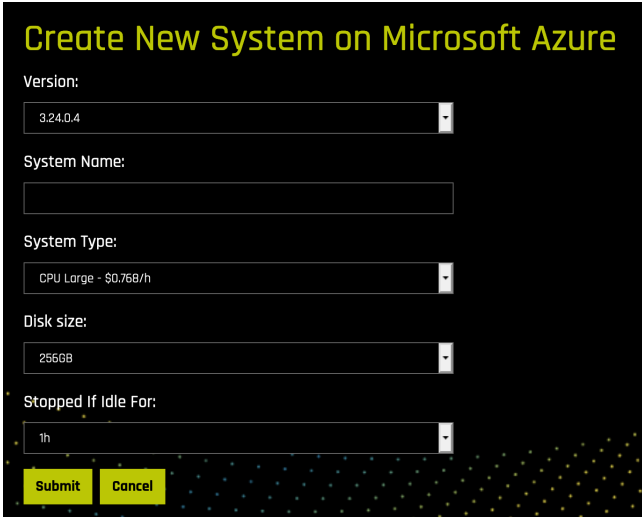




## CREATE NEW H2O-3 SYSTEM

This section describes how to create a new H2O-3 system. H2O-3 is open source and does not require a license.

1. Click **Create New H2O-3 System** on the Puddle Systems page.
2. Specify the following options to create the system:
  - H2O-3 Version: This defaults to the most current version of H2O-3.
  - System Name: This is blank by default.
  - System Type: Available system types are added by Admins.  
**Note:** Your account settings may include a limit as to the number of systems of a certain type that you can run. If you exceed that limit then that option will not be available, and the least expensive option will then become the default.
  - Disk Size: This can be 256GiB (default), 512GiB, or 1TiB.
  - Stopped If Idle For: This can be 30 min, 1 hour (default), 2 hours, 3 hours, 4 hours or never.
  - Tag: This shows the Tag(s) that will be applied to this system. Tags are created by Administrators and might include a default value. You can set the value here.



**Create New System on Microsoft Azure**

Version:  
3.24.0.4

System Name:  
[Empty field]

System Type:  
CPU Large - \$0.768/h

Disk size:  
256GB

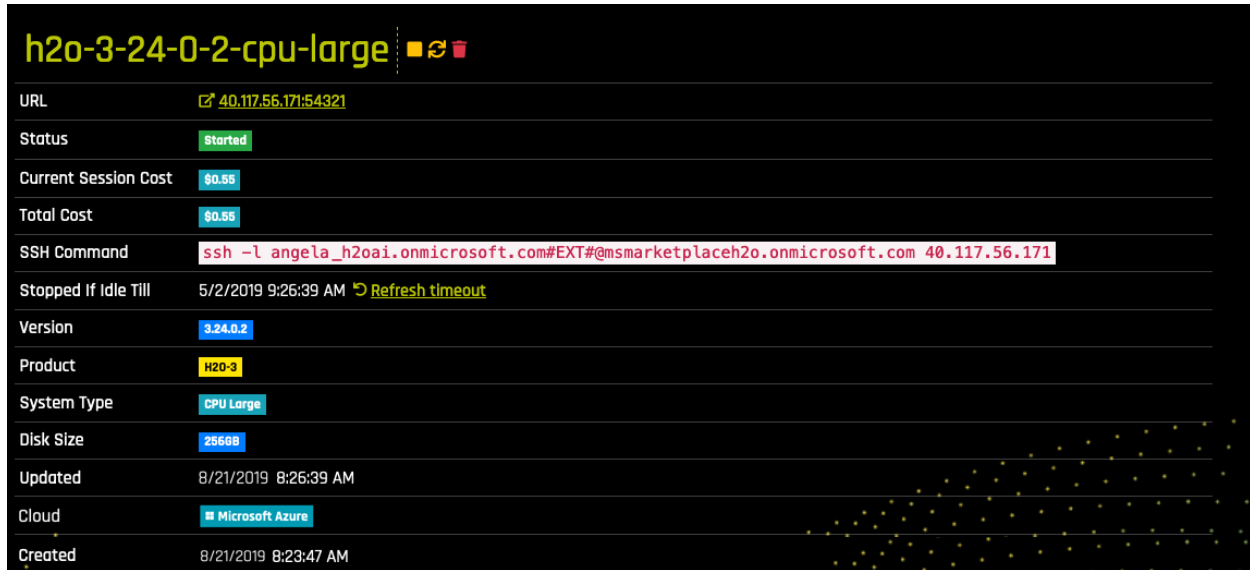
Stopped If Idle For:  
1h

Submit Cancel

3. Click **Create System** when you are done. The system will begin initializing. Note that this can take several minutes.

## 3.1 Viewing H2O-3 System Information

Click on the H2O-3 system to view its configuration information.



h2o-3-24-0-2-cpu-large	
URL	<a href="https://40.117.56.171:54321">40.117.56.171:54321</a>
Status	Started
Current Session Cost	\$0.55
Total Cost	\$0.55
SSH Command	<code>ssh -l angela_h2oai.onmicrosoft.com#EXT#@msmarketplaceh2o.onmicrosoft.com 40.117.56.171</code>
Stopped if Idle Till	5/2/2019 9:26:39 AM <a href="#">Refresh timeout</a>
Version	3.24.0.2
Product	H2O-3
System Type	CPU Large
Disk Size	256GB
Updated	8/21/2019 8:26:39 AM
Cloud	Microsoft Azure
Created	8/21/2019 8:23:47 AM

### 3.1.1 System Information

- The URL for launching H2O-3. Click on the URL to open Flow. This takes you to the DNS of the URL. **Note:** You can also download the H2O-3 Python or R clients from <https://www.h2o.ai/download/>, and use this URL to launch H2O-3 in either Python or R. But be sure that the H2O-3 version in Puddle and the version downloaded locally match, or you will receive a version mismatch error.
- The system status
- The current session cost
- The total session cost
- The SSH command to run in order to securely access the system that is running H2O-3. (See *SSH into the H2O-3 System* below for more information.)
- The time when the system will stop if remaining idle. You can also refresh this timer.
- The product name and version currently running on the system
- The system type and disk size
- The updated and created dates
- The cloud environment
- The system tag (if Admins have set up tags)

## 3.2 Starting H2O-3

After the system has completed initializing, you will be ready to use H2O-3. As indicated previously, H2O-3 can be started in Flow, Python, or R.

### 3.2.1 Starting H2O-3 in Flow

Click on the URL to launch H2O Flow. From Flow, you can begin adding datasets and building models. Refer to the Flow section in the [H2O-3 User Guide](#) for information on how to use H2O-3 in Flow.

### 3.2.2 Starting the H2O-3 Python Client

Perform the following steps to start the H2O-3 Python client. Run these commands in a Terminal window.

**Note:** These steps assume that the H2O-3 system created in Puddle is using the latest H2O-3 release. If your H2O-3 version in Puddle is not the latest, then refer to the [H2O-3 Prior Releases](#) page for information on downloading the H2O-3 Python client for your specific version.

1. Install dependencies (prepending with `sudo` if needed):

```
pip install requests
pip install tabulate
pip install "colorama>=0.3.8"
pip install future
```

**Note:** These are the dependencies required to run H2O. A complete list of dependencies is maintained in the following file: <https://github.com/h2oai/h2o-3/blob/master/h2o-py/conda/h2o/meta.yaml>.

2. Run the following command to remove any existing H2O module for Python.

```
pip uninstall h2o
```

3. Use `pip` to install this version of the H2O Python module.

```
pip install -f http://h2o-release.s3.amazonaws.com/h2o/latest_stable_Py.html_
↪h2o
```

**Note:** When installing H2O from `pip` in OS X El Capitan, users must include the `--user` flag. For example:

```
pip install -f http://h2o-release.s3.amazonaws.com/h2o/latest_stable_Py.html_
↪h2o --user
```

4. Initialize H2O in Python and optionally run a demo to see H2O at work. In the `h2o.init()` command, be sure to change `<h2o_3_system_address>` to the URL provided in Puddle for this H2O-3 system.

```
python
import h2o
h2o.connect(ip="<h2o_3_system_address>", port=54321)
h2o.demo("glm")
```

### 3.2.3 Starting the H2O-3 R Client

Perform the following steps to start the H2O-3 Python client. Run the commands in R, copying and pasting these commands one line at a time.

**Note:** These steps assume that the H2O-3 system created in Puddle is using the latest H2O-3 release. If your H2O-3 version in Puddle is not the latest, then refer to the [H2O-3 Prior Releases](#) page for information on downloading the H2O-3 R client for your specific version.

1. The following two commands remove any previously installed H2O packages for R.

```
if ("package:h2o" %in% search()) { detach("package:h2o", unload=TRUE) }  
if ("h2o" %in% rownames(installed.packages())) { remove.packages("h2o") }
```

2. Next, download packages that H2O depends on.

```
pkgs <- c("RCurl","jsonlite")  
for (pkg in pkgs) {  
  if (! (pkg %in% rownames(installed.packages()))) { install.packages(pkg) }  
}
```

3. Download and install the H2O package for R.

```
install.packages("h2o", type="source", repos=(c("http://h2o-release.s3.  
→amazonaws.com/h2o/latest_stable_R")))
```

4. Initialize H2O and optionally run a demo to see H2O at work. In the `h2o.init()` command, be sure to change `<h2o_3_system_address>` to the URL provided in Puddle for this H2O-3 system.

```
library(h2o)  
h2o.connect(ip="<h2o_3_system_address>", port=54321)  
demo(h2o.kmeans)
```

## 3.3 SSH into the H2O-3 System

Puddle provides the ability to SSH into a system that is running H2O-3. There are two ways that you can SSH into a system:

1. *Using Your Azure ActiveDirectory Credentials*
2. *Using the Custom SSH Keys*

The method to use depends on which option is enabled in the configuration of your Puddle. If your SSH command starts with `ssh -l`, use the first option. If your SSH command starts with `ssh -i`, use the second option.

### 3.3.1 Using Your Azure ActiveDirectory Credentials

1. Select the system that you want to SSH into.
2. On your local machine, run the provided SSH command.
3. You will be prompted to continue the connection. Type `yes`.
4. After the URL is added to your list of known hosts, you will be provided with a login URL and password. The message will be similar to the following:

```
To sign in, use a web browser to open the page https://microsoft.com/  
→devicelogin  
and enter the code AXXXXXXH to authenticate. Press ENTER when ready.
```

Open a browser and follow the instructions in the terminal message.

5. After you correctly enter your login and password in your browser, the following message will display.



Microsoft Azure Linux Virtual Machine Sign-In

You have signed in to the Microsoft Azure Linux Virtual Machine Sign-In application on your device. You may now close this window.

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Return to your terminal window and press Enter. Upon completion, you will receive a welcome message.

### 3.3.2 Using the Custom SSH Keys

1. Download the SSH private key using the download button to the left of the ssh command.



2. On your local machine execute `chmod 600 <ssh_key_file>` to set the correct permissions on the private key file.
3. On your local machine, run the provided SSH command. Please be sure to specify the correct path to the private key file in the SSH command.

## 3.4 Stopping a System

Click the Stop button (■) to halt a system that is in a “Started” state. No information will be lost when a system is stopped.

## 3.5 Starting a System

Click on the Start button (▶) to start a system that is in a “Stopped” state. This will launch a new system with a new URL. All prior data will still be available from this URL.

## 3.6 Rebooting a System




Click the Reboot button (↻) to reboot a system that is in a “Started” state. This will stop the system and launch a new system with a new URL. All prior data will still be available from the new URL. The entire process can take several minutes. **Note:** A reboot is required when you change the `config.toml` file.

## 3.7 Deleting a System

Click the Delete button (■) to completely remove a system. A confirmation page will display asking if you are certain about deleting the system. Click **Yes** complete the delete. This request deletes the system and destroys all data that is on the system.

## 3.8 Marking a System as Failed

This is a recovery option. Use this if your system is stuck (for example, in a “Starting…” state). Click the **Mark as**

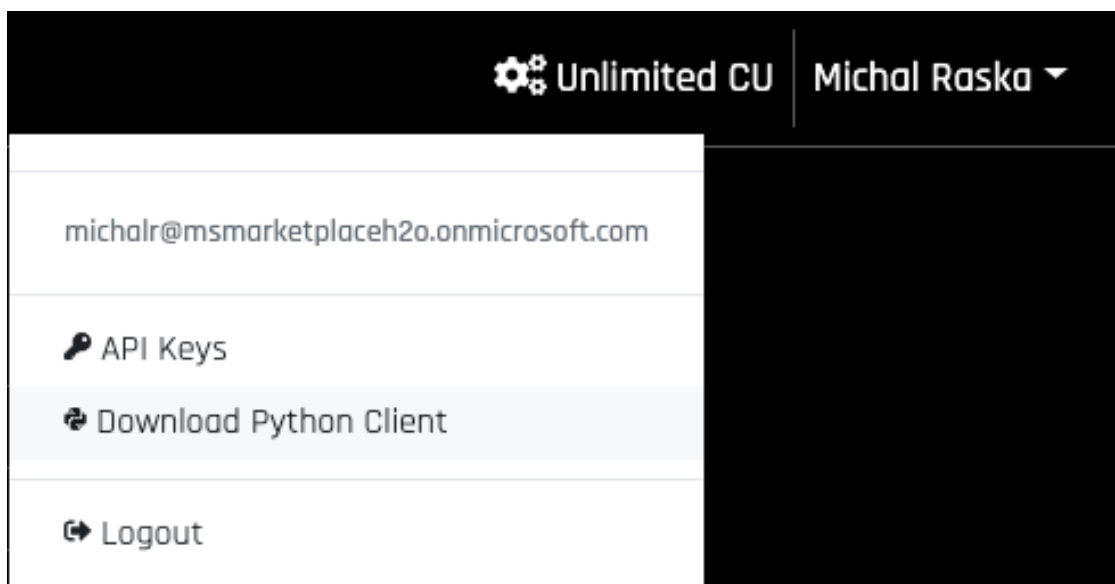
**Failed** button () to mark a system as failing. After a system is marked as failed, you will be able to stop () or terminate () the system.

## PYTHON CLIENT

This section describes how to obtain the Puddle Python Client and API Keys. Please consult the [Puddle Python Client User Guide](#) for information and demos about how to use the Puddle Python Client.

### 4.1 Downloading the Puddle Python Client

To download the Puddle Python Client, you need to be logged in to Puddle. Click the user menu in the top right-hand corner and select the **Download Python Client** option. This will download a *.whl* file with the client. For installation instructions please refer to the [Puddle Python Client User Guide](#).



### 4.2 Obtaining API Keys

To obtain the API Keys, which are required to use the Puddle Python Client, you need to be logged in to Puddle. Click the user menu in the top right-hand corner and select the **API Keys** option.

