FarmLab
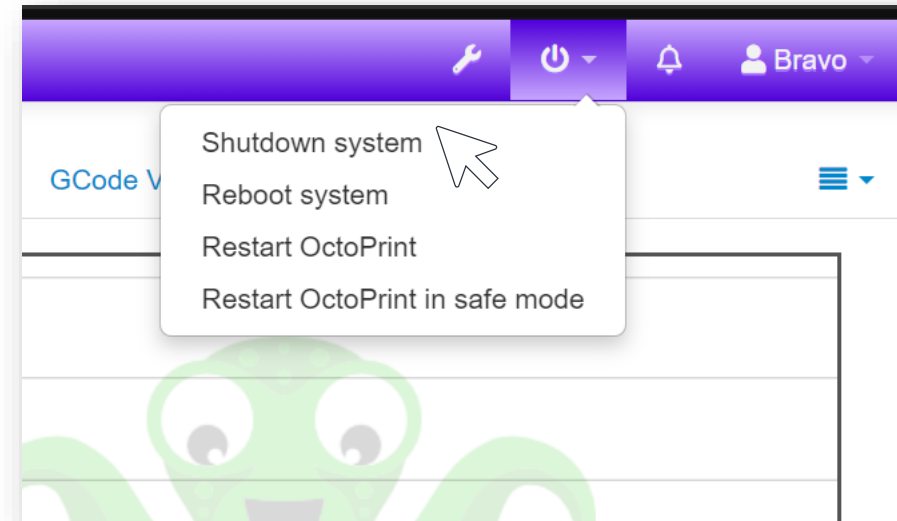## 3D PRINTER MANAGER

Quick Guide

FIRST RECOMMENDATIONS

Never shut down the raspberries by **disconnecting** the power supply unit without shutting down the system first! This will result in data corruption and malfunction of the SD-Card.

Always shut down the system from OctoPrint first and then disconnect the power supply unit once the server is no longer available.
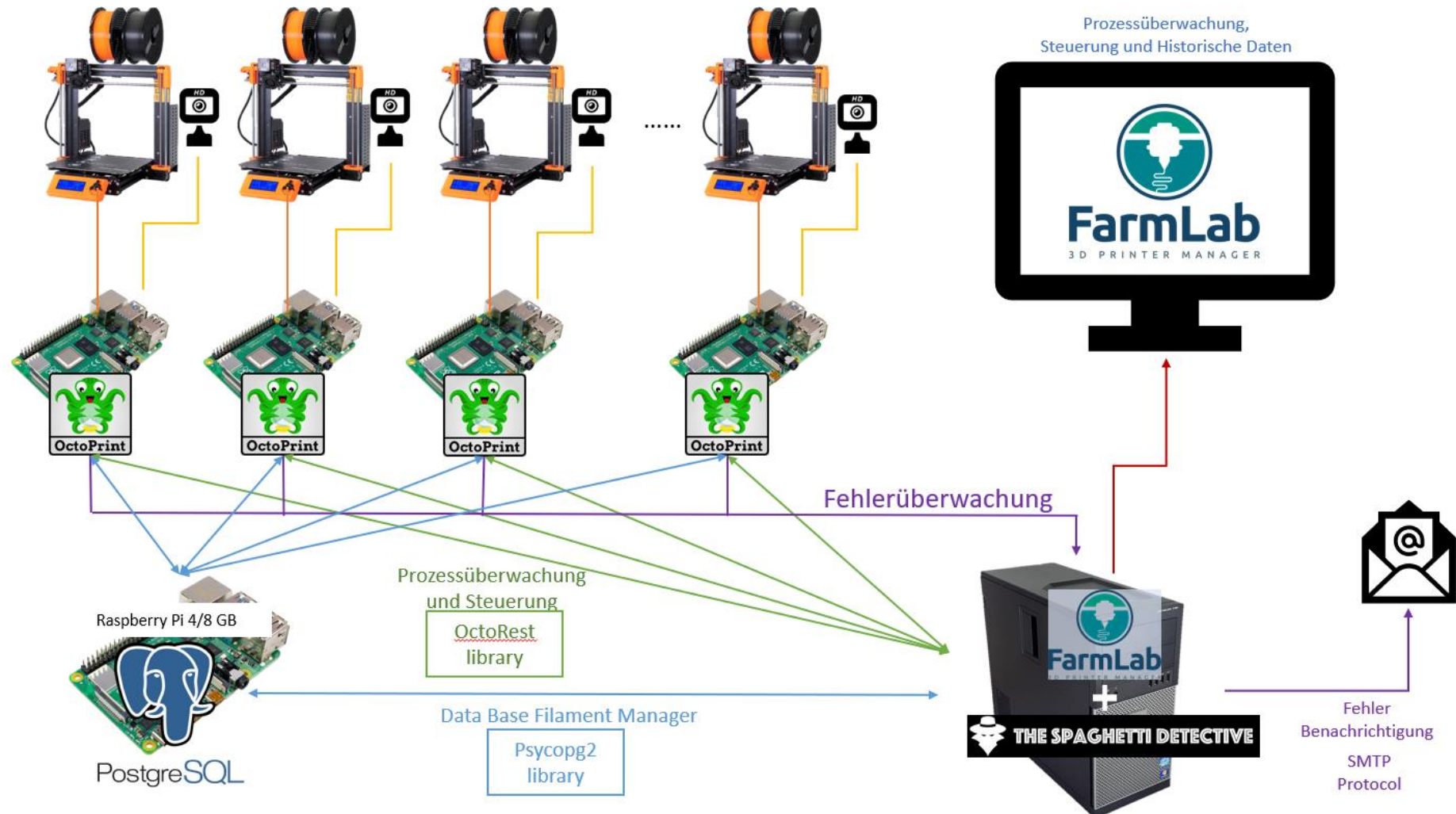
FIRST RECOMMENDATIONS

```
login as: pi
pi@172.22.95.240's password:
```

→

```
pi@octopi:~ $ sudo shutdown now
```

Alternatively, you can SSH into the system of the Raspberry Pi with PuTTY and write the following command:
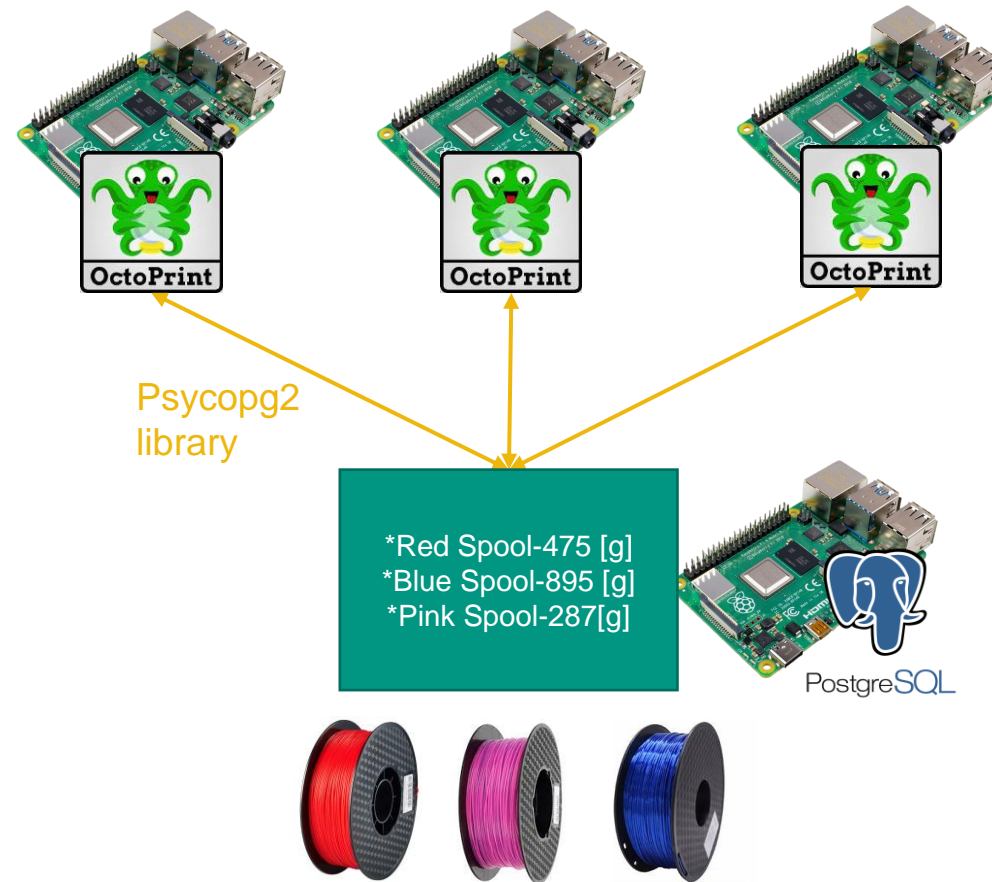
- sudo shutdown now

Never shut down the raspberries by **disconnecting** the power supply unit!
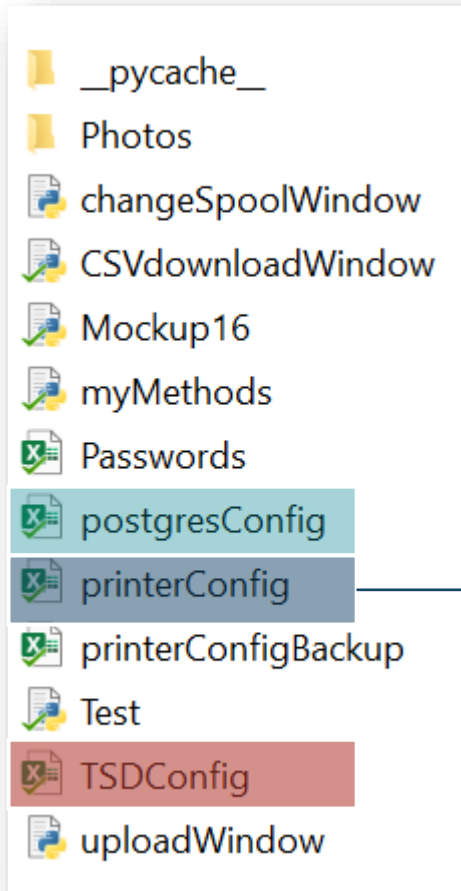
STRUCTURE OF FARMLAB

POSTGRESQL-SERVER

. Information about the Spools (Type of material, remaining material, printer, etc.) is saved in the PostgreSQL database.

Psycopg2 library

*Red Spool-475 [g]
*Blue Spool-895 [g]
*Pink Spool-287[g]

GETTING STARTED

Add your printers to the system

FarmLab reads credentials from 3 different configuration files:

- **postgresConfig** has the credentials to connect the system to the PostgreSQL database.
- **printerConfig** has the credentials to connect to each OctoPrint instance
- **TSDConfig** has the credentials to connect to the "The Spaghetti Detective" server

To add new printers to the system, **only the printerConfig file** should be changed.

GETTING STARTED

Add your printers to the system

printerConfig-file

	A	B	C	D
1	NAME	IP	API-KEY	POSTGRES-ID
2	Alpha	http://172.22.95.240	5B6B62963F054A20AFBFECF15E3CE1D0	13418398-dda6-11eb-a4ef-e45f01155c5f
3	Bravo	http://172.22.95.241	CF52343D331148BD927B5DD5A0FC5C14	2e2f1904-dda6-11eb-bbe2-e45f01155c43
4	Charlie	http://172.22.95.242	C9480239A77E4BB896B3CE15B6623714	2b306d84-dda6-11eb-8831-e45f01155af4
5	Delta	http://172.22.95.243	3C745D0104B14534A57B047AF2858354	46982206-dda6-11eb-a0ee-e45f01155e2a
6				

In order to connect a printer to the system, FarmLab needs the **IP-address** of the raspberry pi where OctoPrint is running, an **Application Key** and a **Postgres-ID**. The name in the file can be changed freely. FarmLab reads these credentials from the **printerConfig file**.
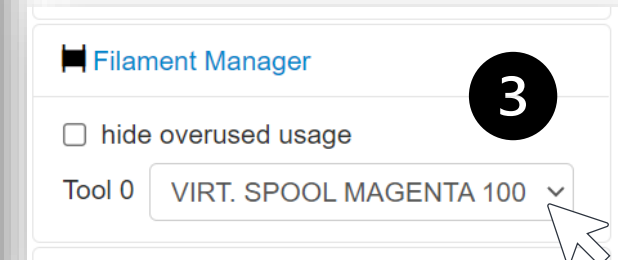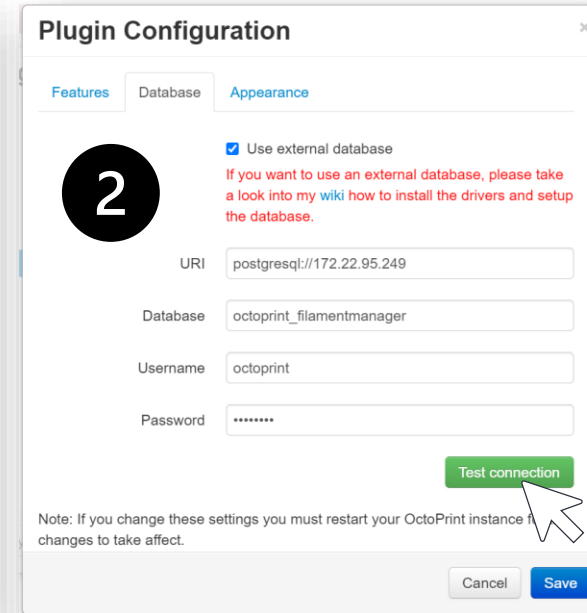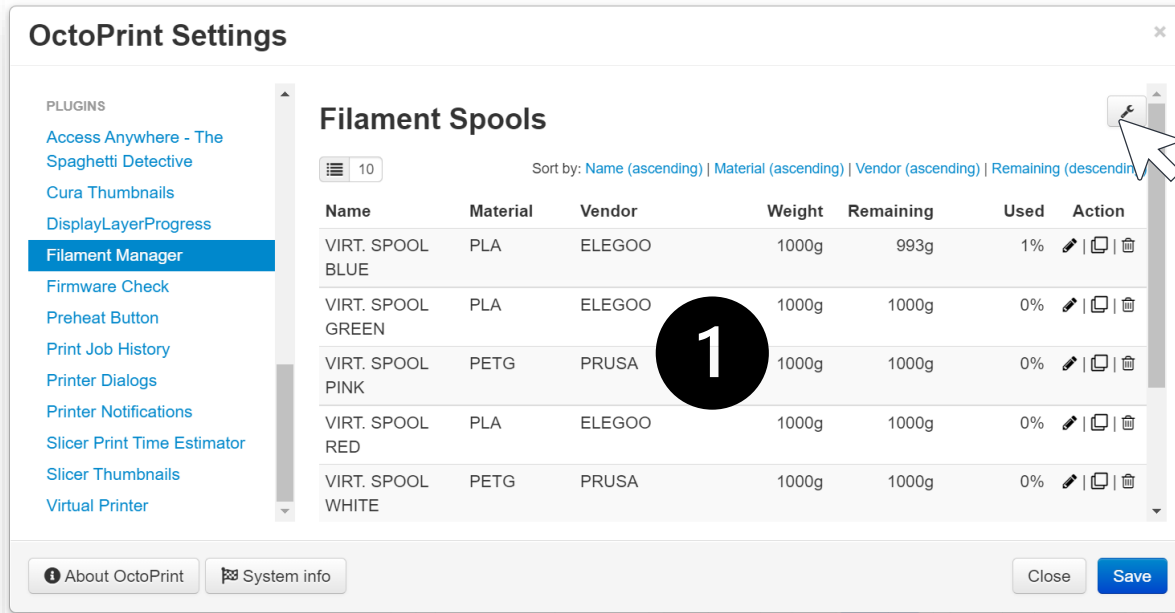
Application Key

APPLICATION KEY

Generate an **Application Key** for each instance you want to connect with FarmLab and copy it in the printerConfig file.

Postgres-ID

POSTGRES-ID

In order to know the **Postgres-ID** of a printer we make the following:
- Make sure OctoPrint is connected to the external PostgreSQL data base (1 and 2).
- Then go back to the main page and select a spool that is **not being used by another printer** and remember its name (3).

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POSTGRES-ID

Add your printers to the system

```
Server [localhost]: 172.22.95.249
Database [postgres]: octoprint_filamentmanager
Port [5432]: 5432
Username [postgres]: octoprint
Password for user octoprint:
```
(4)

tool	client_id	name	material	weight	used
0	2b306d84-dda6-11eb-8831-e45f01155af4	VIRT. SPOOL YELLOW	PETG	1000	15.2483
1	46982206-dda6-11eb-a0ee-e45f01155e2a	VIRT. SPOOL GREEN	PLA	1000	0
3	46982206-dda6-11eb-a0ee-e45f01155e2a	VIRT. SPOOL RED	PLA	1000	0
0	2e2f1904-dda6-11eb-bbe2-e45f01155c43	VIRT. SPOOL BLUE	PLA	1000	6.53997
1	2e2f1904-dda6-11eb-bbe2-e45f01155c43	VIRT. SPOOL GREEN	PLA	1000	0
2	2e2f1904-dda6-11eb-bbe2-e45f01155c43	VIRT. SPOOL PINK	PETG	1000	0
3	2e2f1904-dda6-11eb-bbe2-e45f01155c43	VIRT. SPOOL RED	PLA	1000	0
4	2e2f1904-dda6-11eb-bbe2-e45f01155c43	VIRT. SPOOL WHITE	PETG	1000	0
0	46982206-dda6-11eb-a0ee-e45f01155e2a	VIRT. SPOOL YELLOW	PETG	1000	15.2483
4	46982206-dda6-11eb-a0ee-e45f01155e2a	VIRT. SPOOL YELLOW	PETG	1000	15.2483
0	332c54f8-e571-11eb-8484-e45f01155cb0	VIRT. SPOOL RED	PLA	1000	0
2	46982206-dda6-11eb-a0ee-e45f01155e2a	VIRT. SPOOL YELLOW	PETG	1000	15.2483
	13418398-dda6-11eb-a4ef-e45f01155c5f	VIRT. SPOOL MAGENTA	PETG	1000	0

(13 rows)

Open PSQL and connect to the server with your credentials (4), and type the following:

- SELECT selections.tool, selections.client_id, spools.name, profiles.material,spools.weight,spools.used FROM profiles JOIN spools ON profile_id=profiles.id JOIN selections ON spool_id=spools.id ORDER BY client_id, tool;

You will see a table that looks like number 5. Search for the printer that is using the spool you selected in step 3. The **client_id** is the number you have to **copy on the printerConfig file as POSTGRES-ID.**
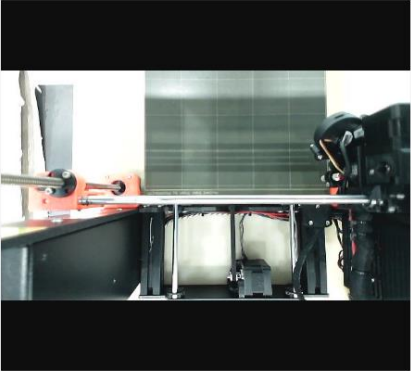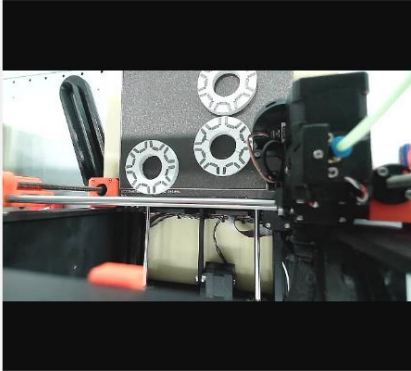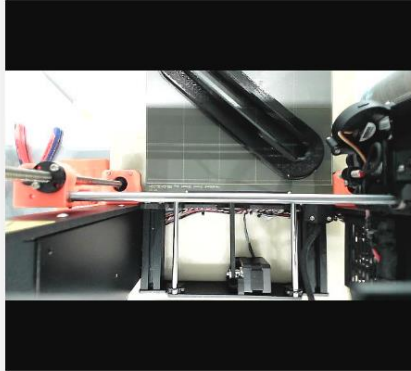
2 of 2

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FarmLab

FARMLAB

If the credentials are right, you can now start FarmLab.
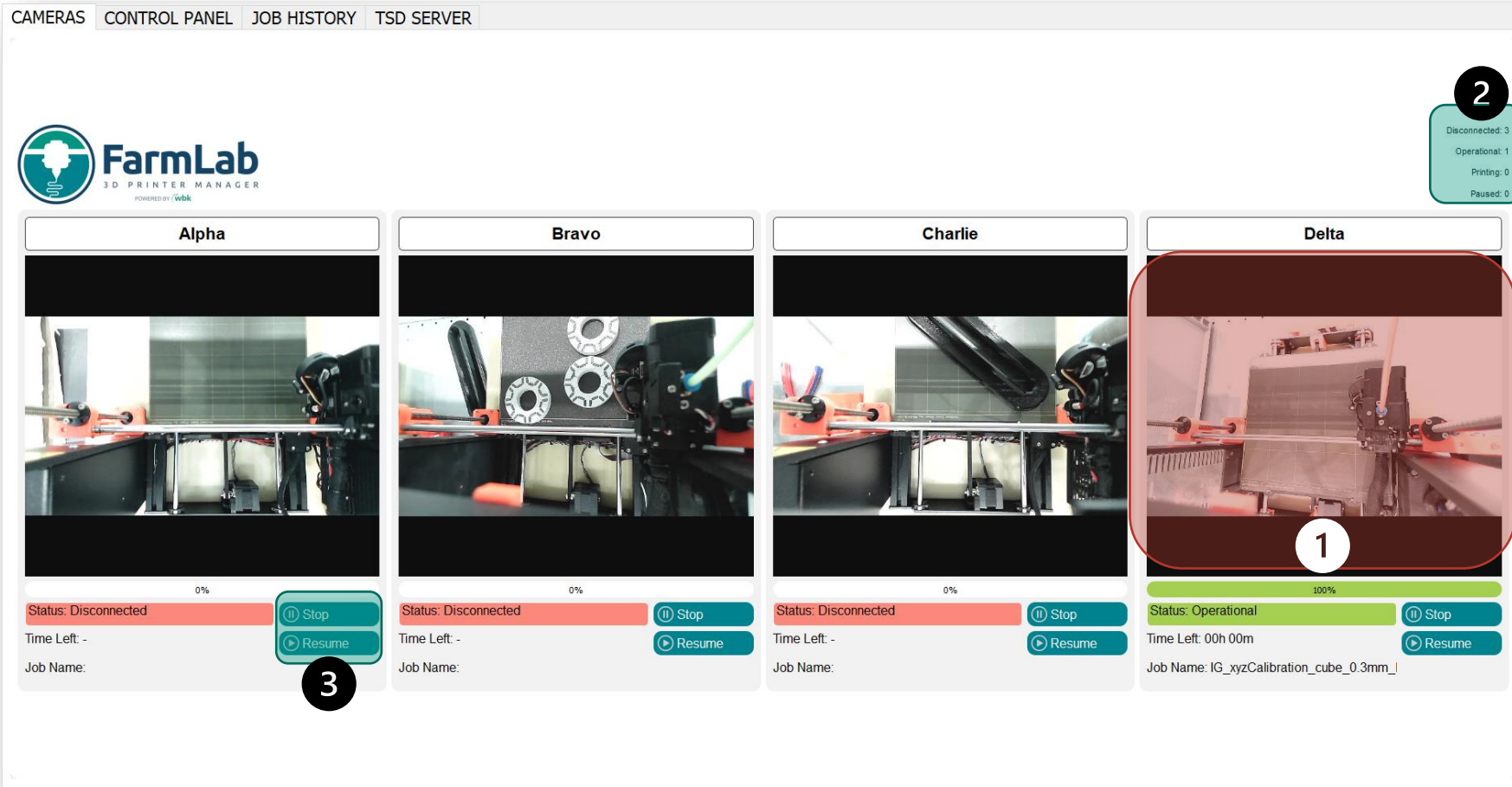
FarmLab consists **of 4 different modules:**
1. Cameras
2. Control Panel
3. Job History
4. TSD-Server

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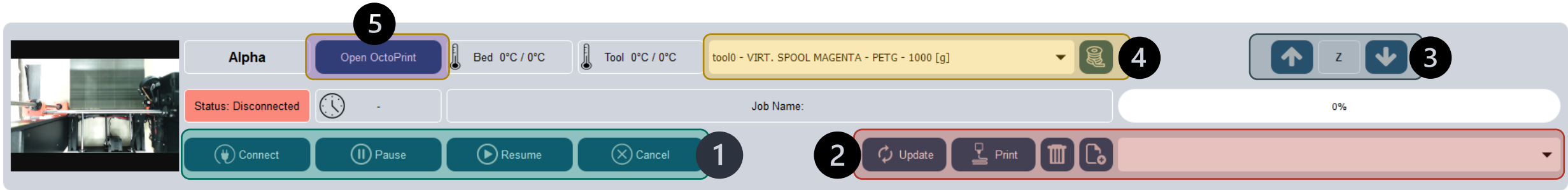
FarmLab
Cameras

FARMLAB - CAMERAS

The **cameras module** presents a big picture of the stream of the **webcams** from octoprint.
An **overview** of the printers (2) is also presented to the user. There the user can see how many printers have a specific status.
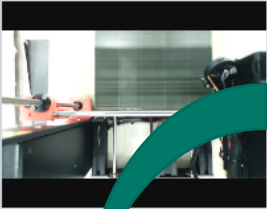Also, **basic controls** (3) are available.

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FarmLab
Control Panel

FARMLAB – CONTROL PANEL

The control panel offers 5 different types of controls:

1. Printer controls to pause, resume and cancel the print job. Also, a connection between the printer and OctoPrint can be stablished by pressing the "connect" button.
2. File management controls. From here G-Code can be uploaded or deleted for each OctoPrint instance. Also, you can select and print a file stored in OctoPrint.
3. With the printhead controls the user can move the Z-axis of the printer.
4. Filament manager controls to change the spools being used by the printer.
5. A button that open the server of OctoPrint in a web browser.

Furthermore, the main state variables are presented to the user, like temperature, remaining time, status, etc.

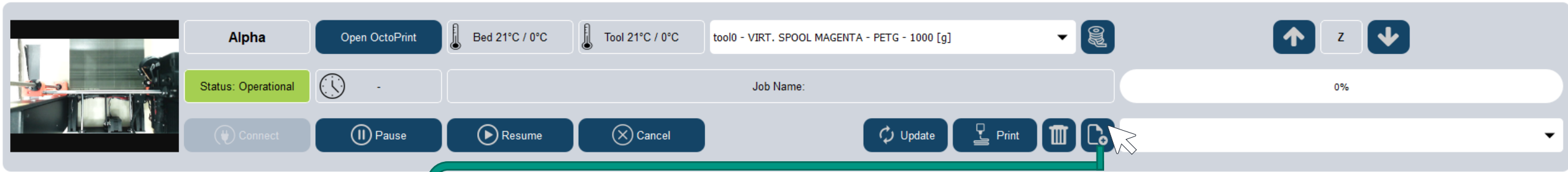# FARMLAB – UPLOAD G-CODE AND START A PRINT JOB

- Start the process by stablishing a connection between OctoPrint and the printer by clicking the "Connect"-button. Sometimes this process can take several seconds.

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# FARMLAB – UPLOAD G-CODE AND START A PRINT JOB

- Once the printer is operational, click the upload button. A window to upload your G-Code is going to open. Search your desired G-Code with the "Browse" button and the upload it.

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FARMLAB – UPLOAD G-CODE AND START A PRINT JOB
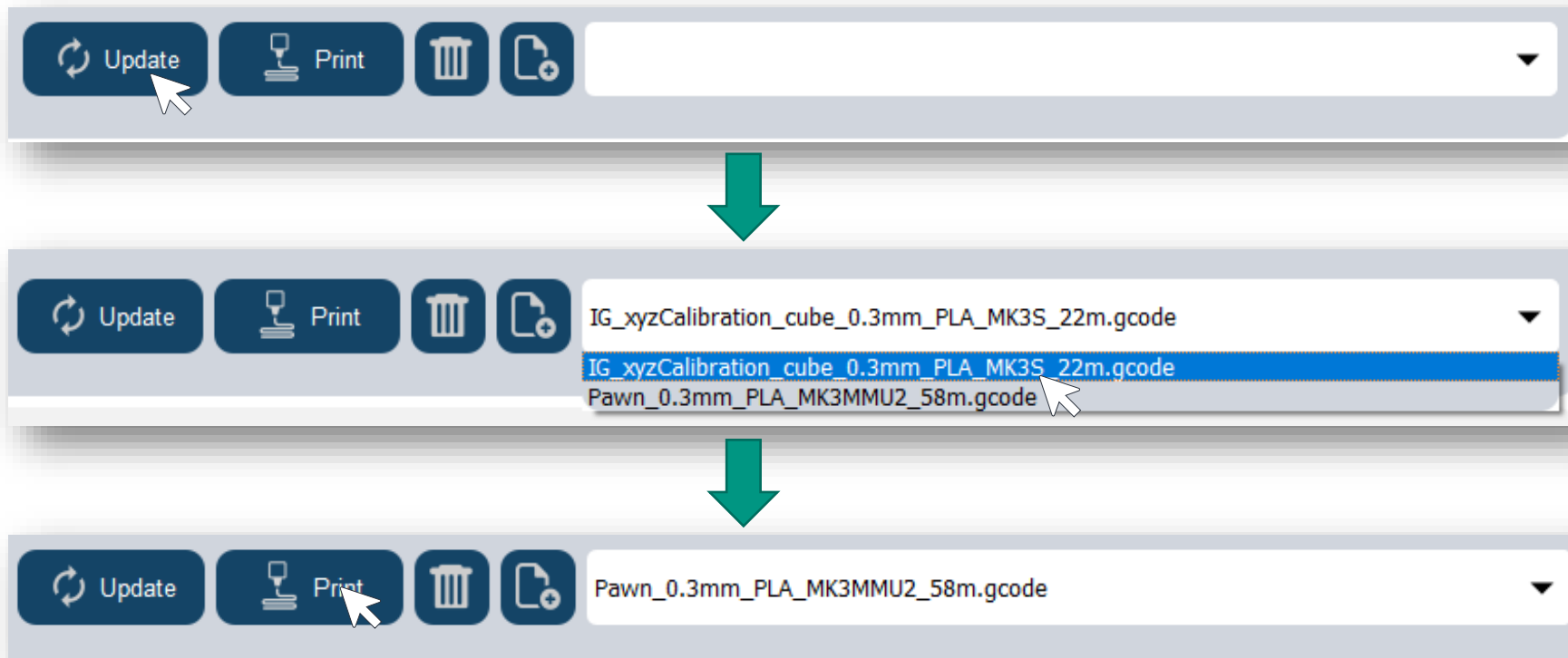
- Now press the "Update" button, then open the combo-box and select your desired file and press "Print".

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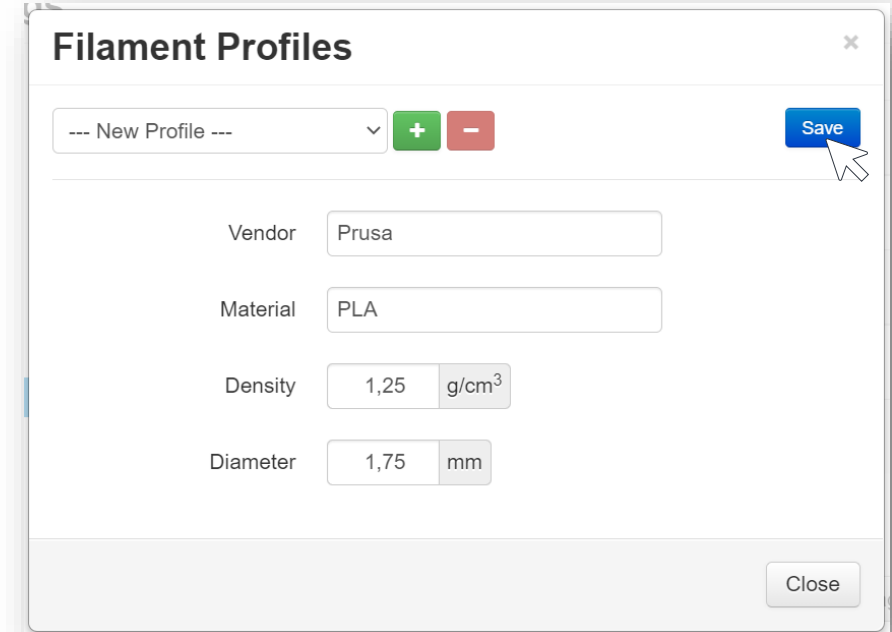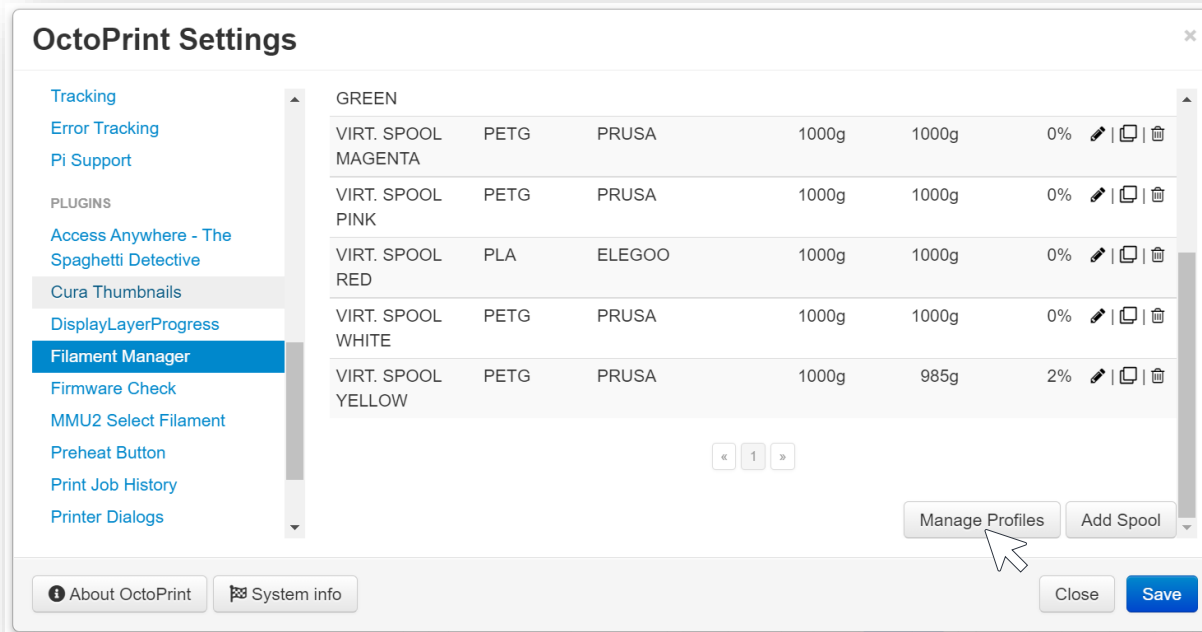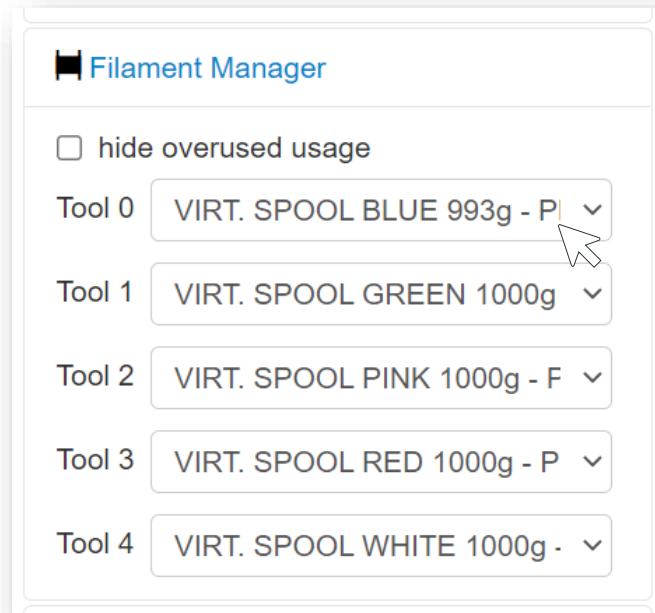
- In the OctoPrint Settings go to "Filament Manager" and create a new profile. Fill the dialog window and save the profile.

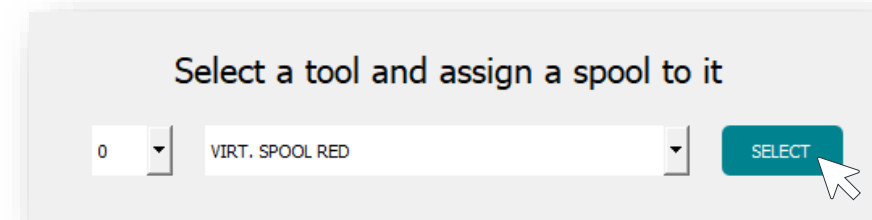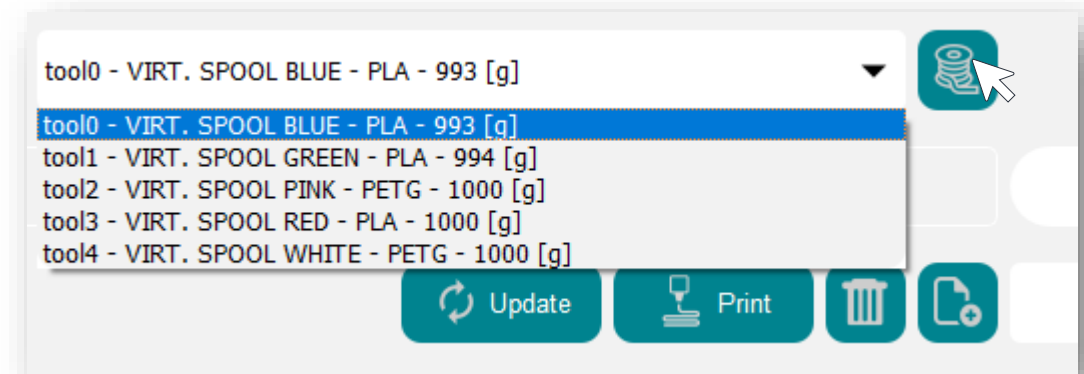# FARMLAB – CREATE SPOOLS AND CHANGE SPOOL IN USE
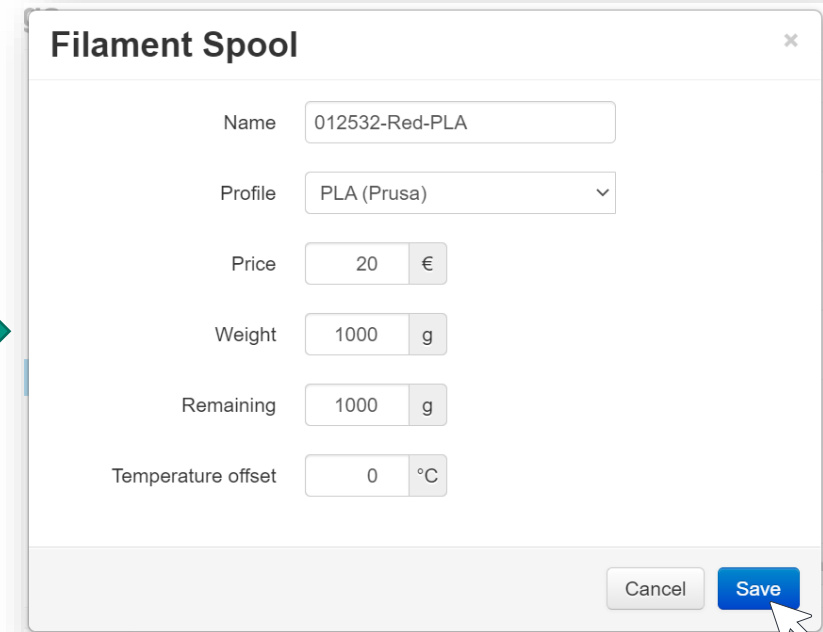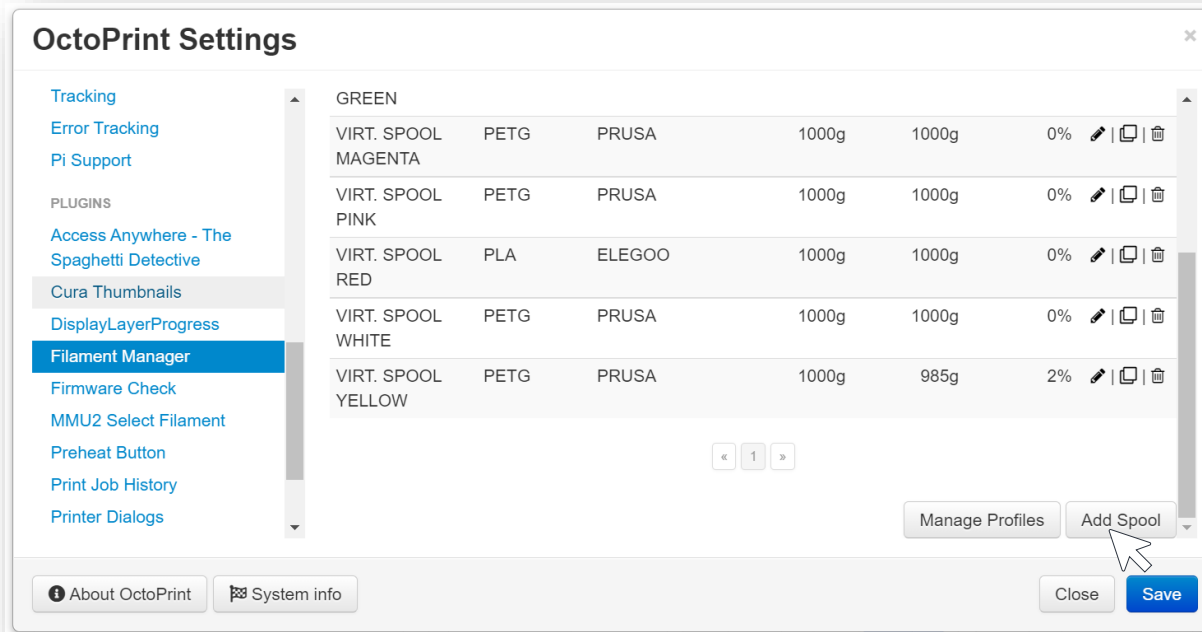
- Click "Add Spool" and fill the dialog window with the information of the new spool. Finally click "Save".

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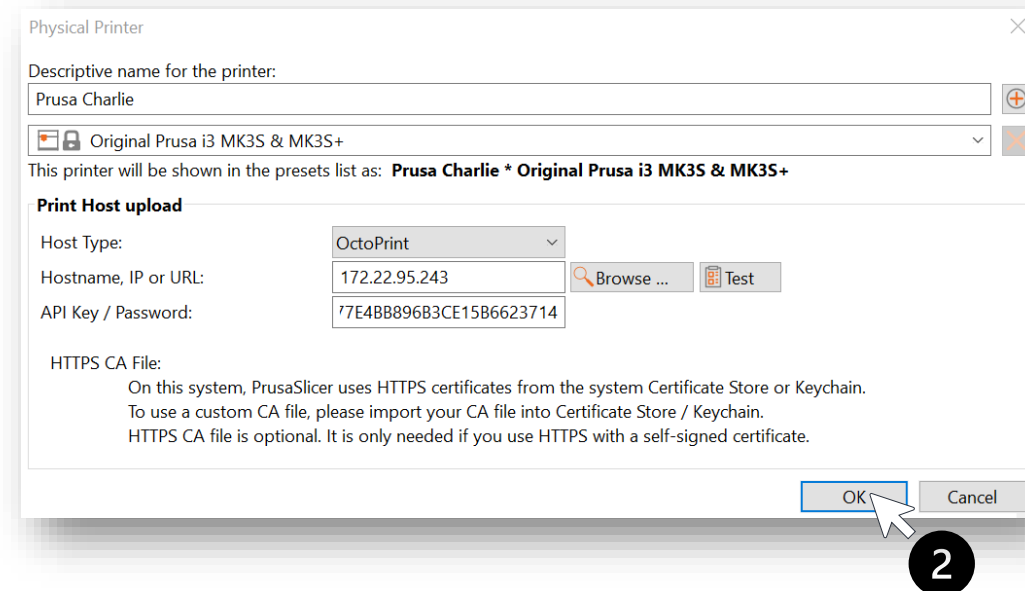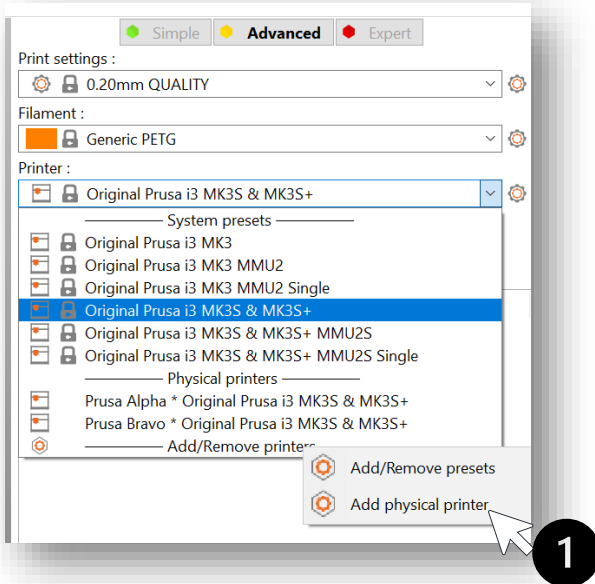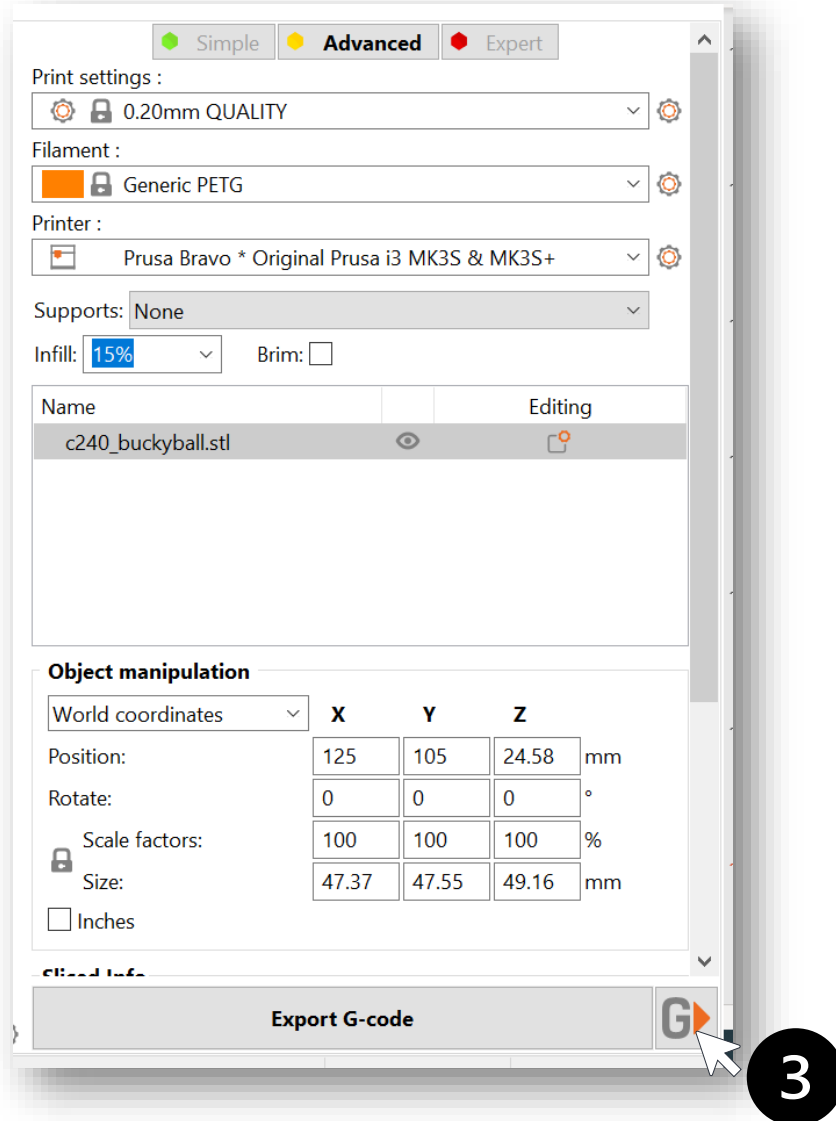# FARMLAB – CREATE SPOOLS AND CHANGE SPOOL IN USE

OR

- If you want to change the spools being used by a printer, you can do so directly in OctoPrint (left) or in the dashboard of FarmLab (right) by clicking the button with the spool icon. For multi-material printers, you can select a spool for each tool the printer has.

CONNECT PRUSA-SLICER WITH FARMLAB

To send G-Code directly to each octoprint instance we have to connect PrusaSlicer with each OctoPrint instance. For this go to printer, then click "Add/Remove printers" and then "Add physical printer" (step 1). Then fill the dialog with the corresponding credentials (Step 2).

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CONNECT PRUSA SLICER WITH FARMLAB

Now upload the STL-file you want to slice to the PrusaSlicer. Select the printer you want to send the G-Code to and then slice the model. Then press the "G" button in order to send the G-Code to the selected OctoPrint instance (Step 3).

Finally, go to the control panel of FarmLab, update the combo-box and search for the uploaded file (step 4).

FarmLab

Job History

FARMLAB – JOB HISTORY

FarmLab helps you retrieve **historical data from the printers** in the form of a CSV file. You can either download the **data for each printer individually** by clicking the button "Import CSV" under the name of a specific printer or download the **data for all the printers** by clicking the button under "All printers."

FARMLAB – JOB HISTORY

FarmLab downloads the CSV-files through your web browser. Therefore, you have to **click "Remember me"** when logging into OctoPrint on your web browser. Also, you have to enable the option to **"Ask where to save each file before downloading"** in your web browser. If something is not right, the browser will show the following message:
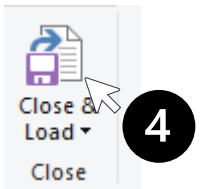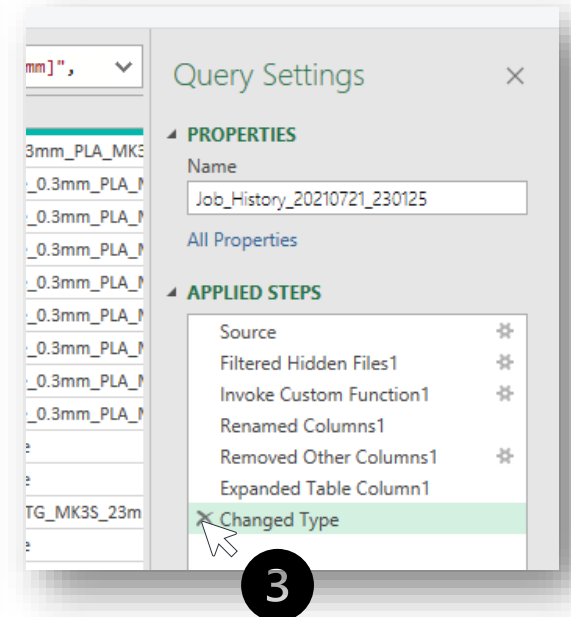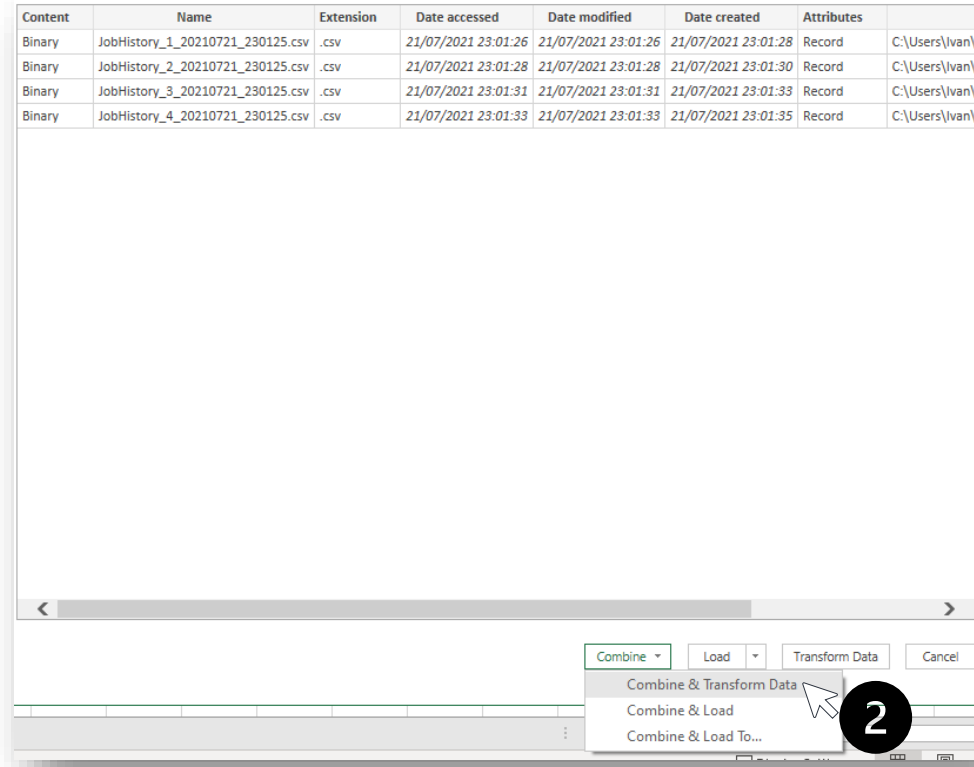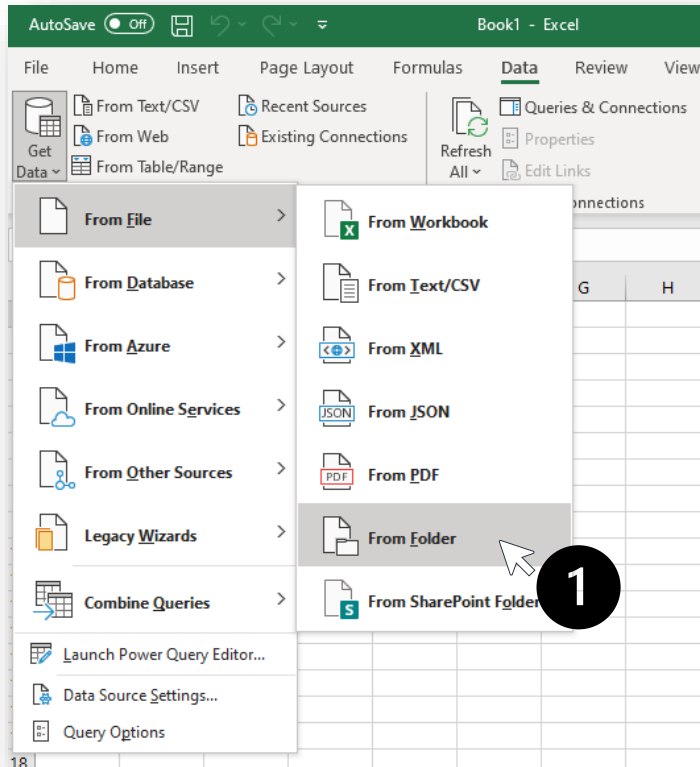
- {"error":"You don't have the permission to access the requested resource. It is either read-protected or not readable by the server."}

READ CSV-FILES
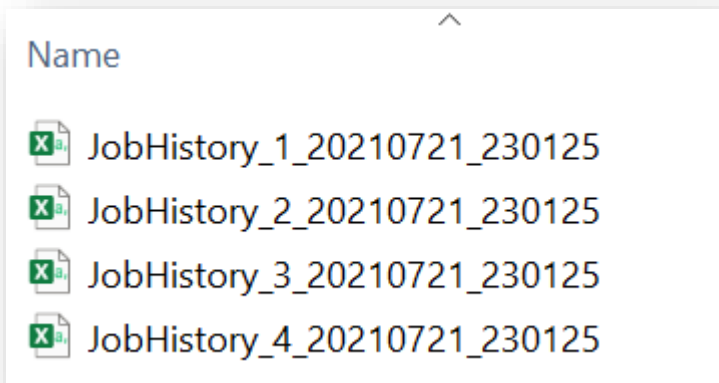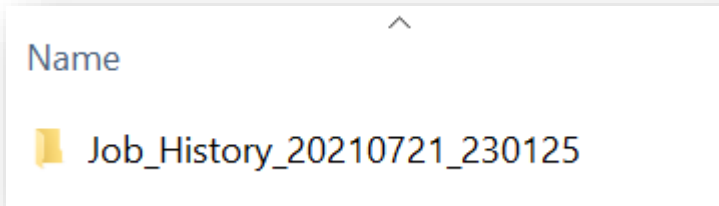
When downloading historical data via FarmLab, a new folder called **Job_History_date_time** will be created with a **CSV-File** for each printer.
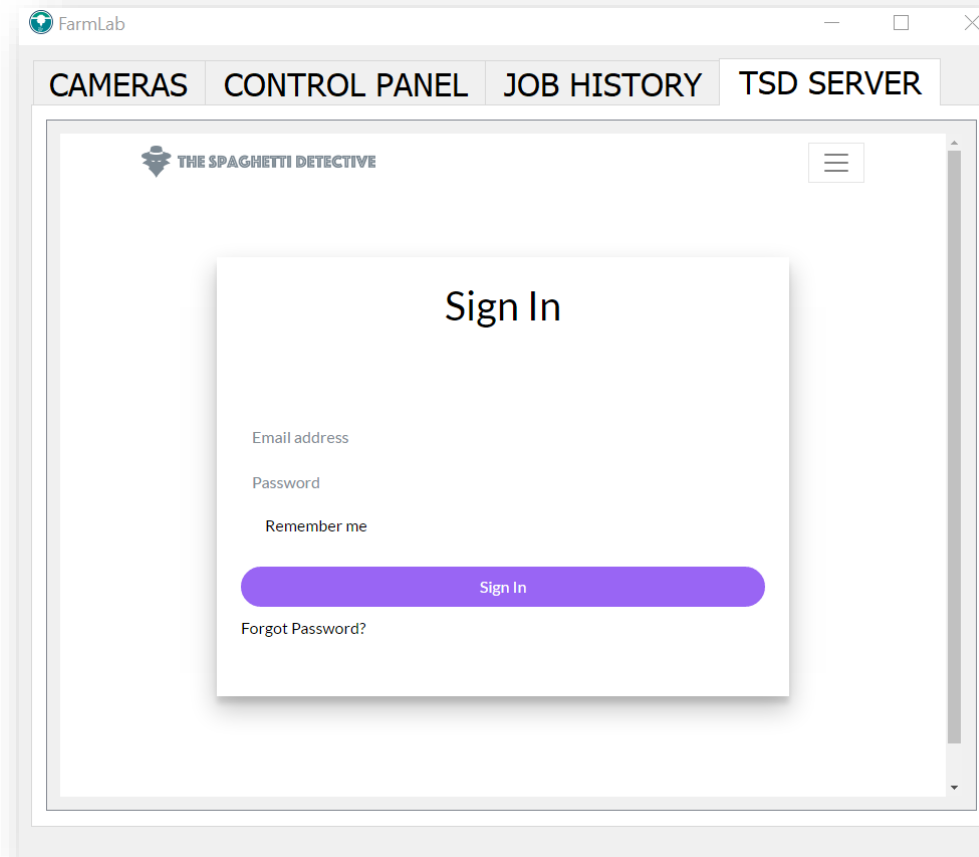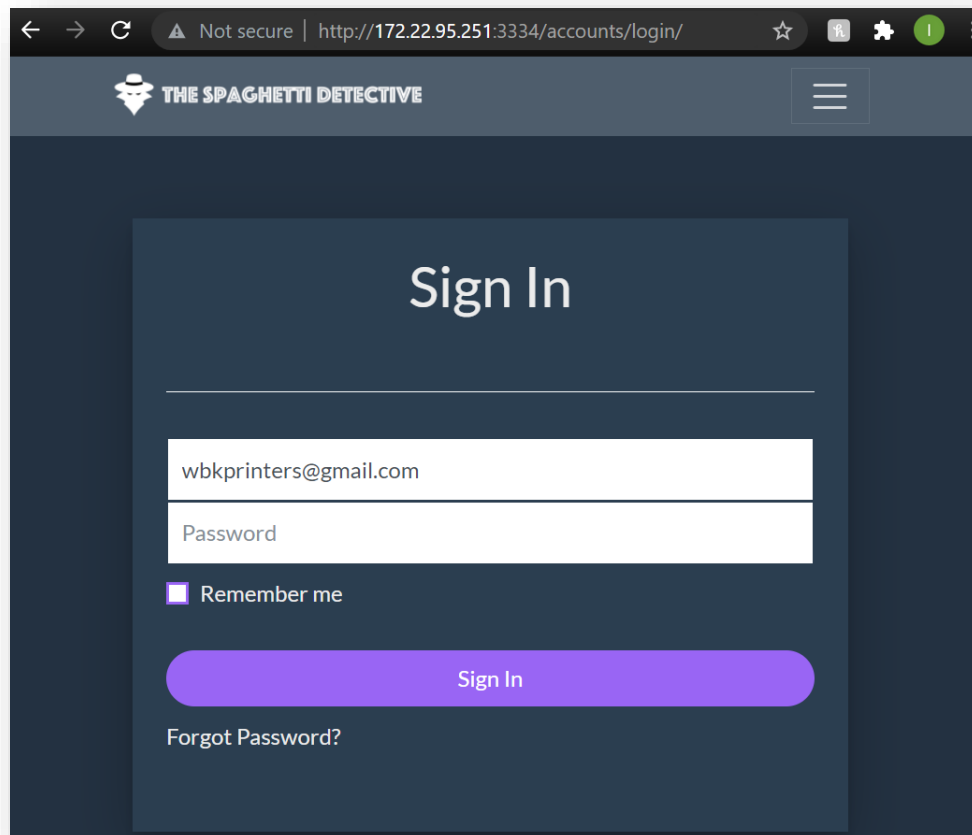
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READ CSV-FILES

In order to open the CSV-files of the printers, go to excel, then click "Data", "Get Data", "From File", "From Folder" (**Step 1**). Select and open the folder where the CSV-files where stored. Next, click on "Combine & Transform Data" (**Step 2**) and in the next window click "OK". After that, we have to prevent excel to change the type of the data in the cells by clicking the X in "Changed Type" (**Step 3**). Finally click "Close & Load" on the top left (**Step 4**).

FarmLab

The Spaghetti Detective Server

TSD-SERVER

You can access the TSD-server directly from FarmLab or via your web browser by typing the **IP-address of the server and the port** e.g., 172.22.95.251:3334

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