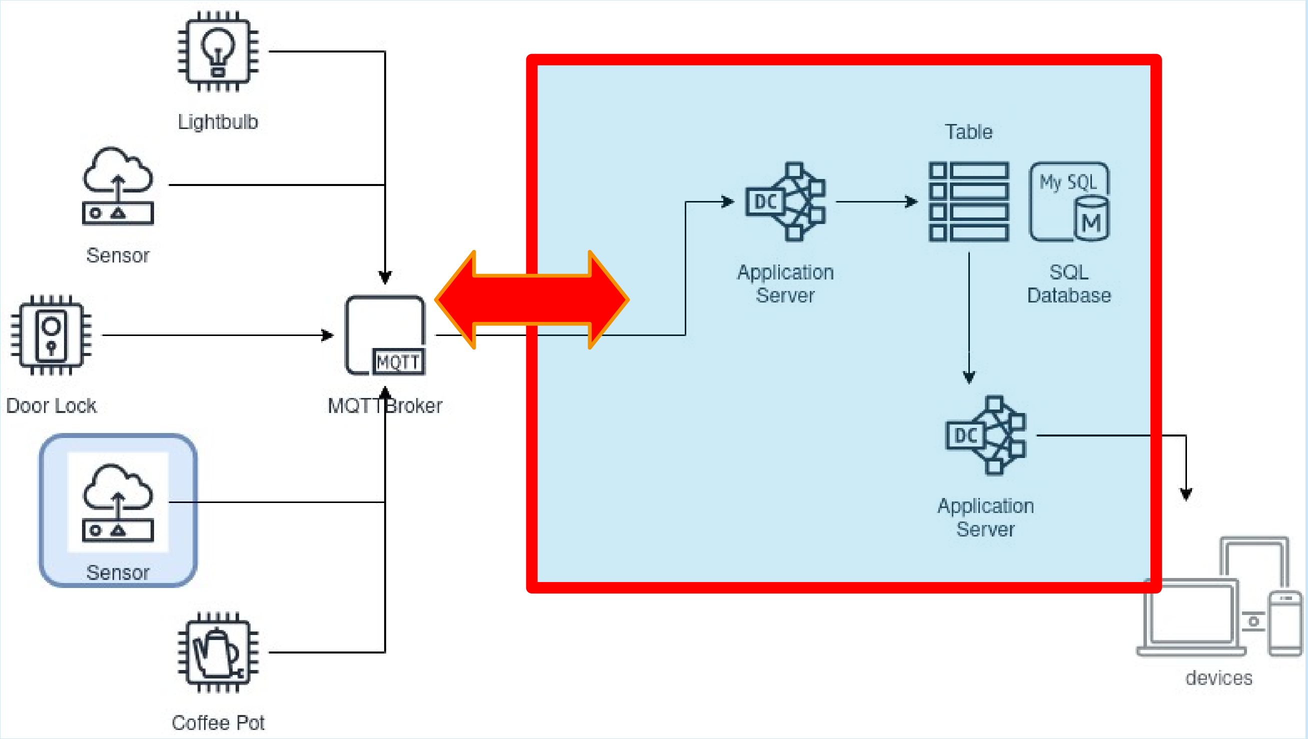
LAB Exercises Prepare VM on the Stratus Cloud

2024

IoT LAB – Cloud Services

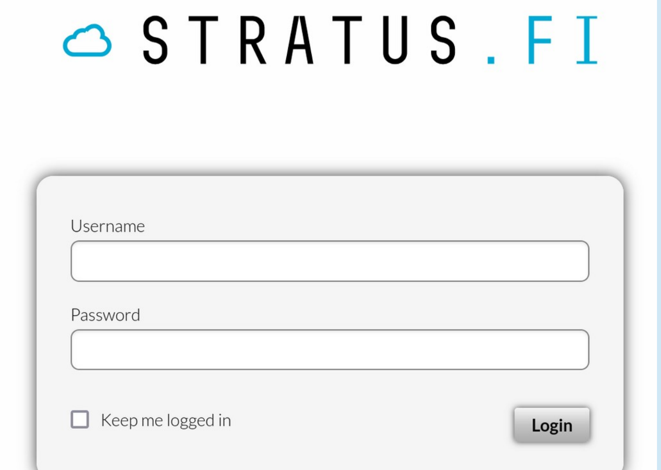


IoT LAB – today’s tasks

- Prepare virtual machine(s)
- Construct IP connectivity
- Install InfluxDB
- Install Grafana

Stratus.FI

- OpenNebula virtualization platform
- Open to all students from FI
- Pre-configured virtual machines
- Login to management the same as login to KYPO PCs
- https://stratus.fi.muni.cz/



STRATUS.FI

Username

Password

□ Keep me logged in

Stratus.FI

- Two ways to log into VM:
  - PKI
  - **password**

Using Stratus.FI with PKI

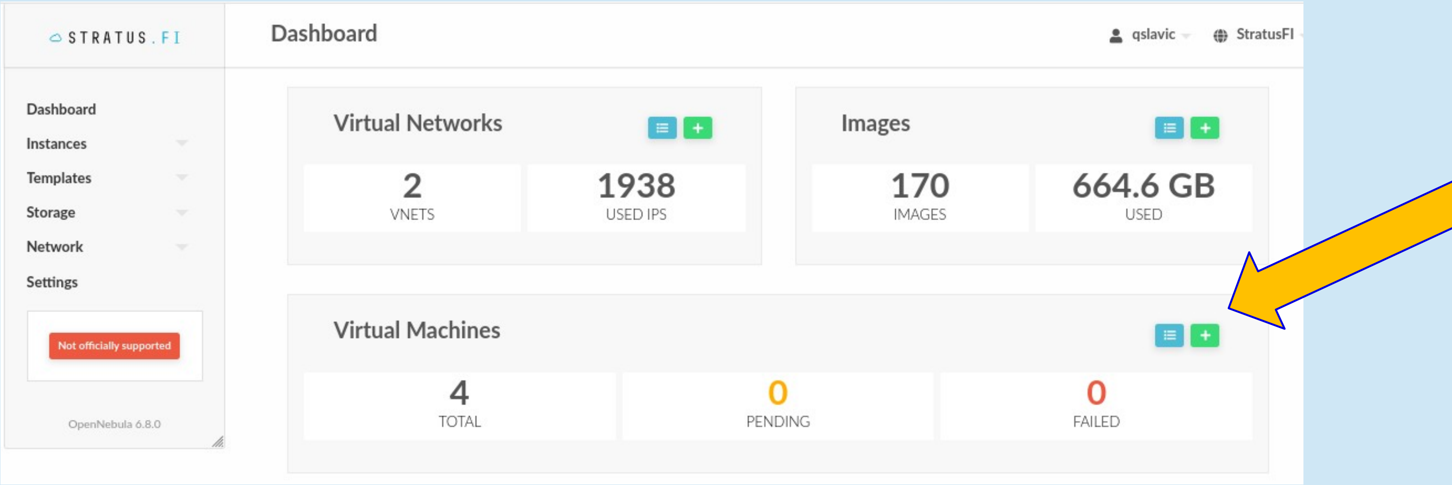
- Prepare ssh keys
- Linux
  - ssh-keygen -b 4096 -t rsa -f **Stratus**
  - PassPhrase preferably empty
  - Will generate files **Stratus** and **Stratus.pub**
- Windows
  - Puttygen

Using Stratus.FI with PKI

- Save your public key to Stratus
  - Login
  - Click your name → Settings → Auth → Public SSH Key
  - You can add new key if you already have one installed
- Create virtual machine

Create virtual machine

- Use template 1307 – Debian12[CVTFI]
  - Instantiate as persistent
  - Assign a name
  - Click Create
- Don’t use excessive resources



2 VNETS

1938 USED IPS

170 IMAGES

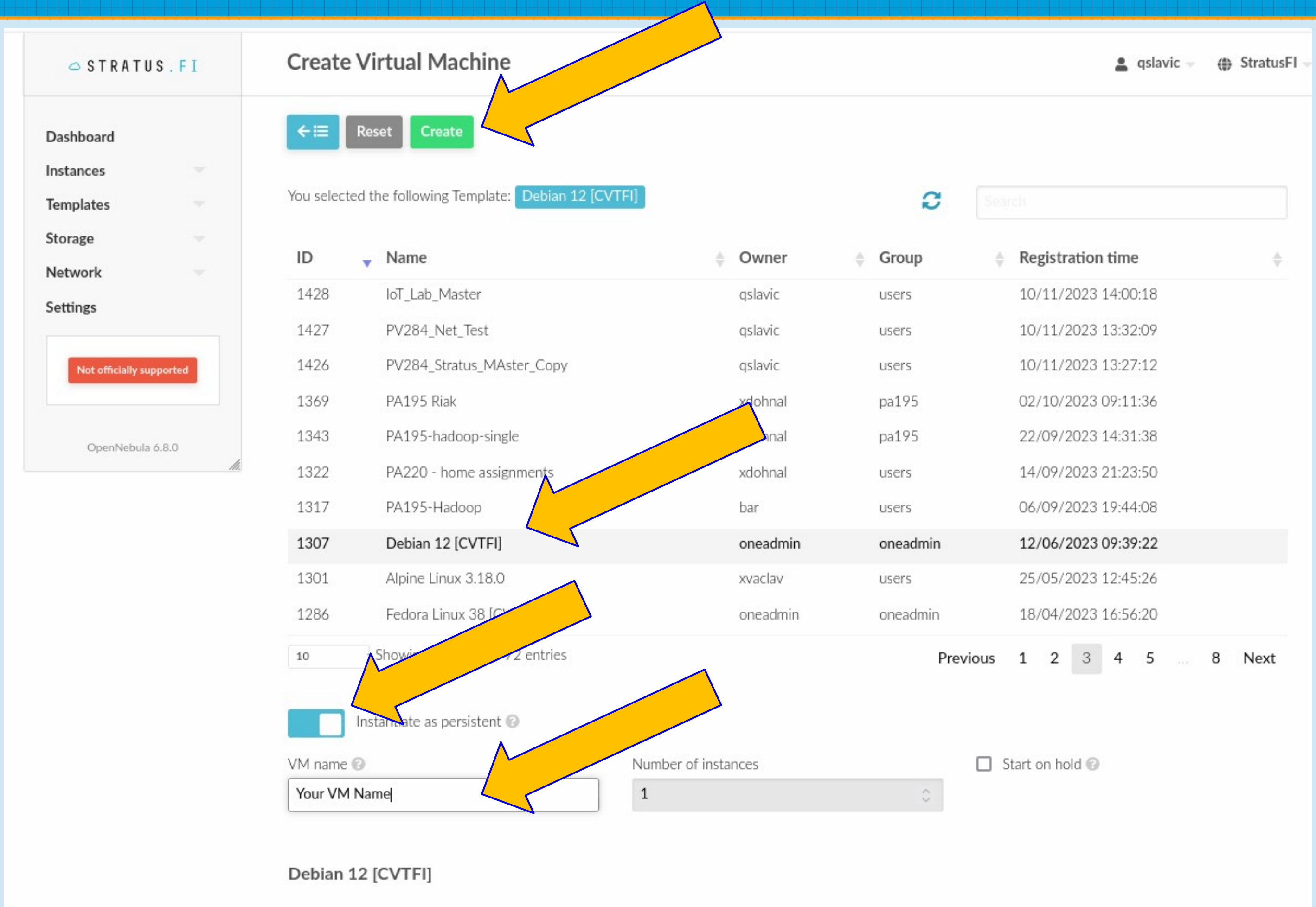
664.6 GB USED

4 TOTAL

0 PENDING

0 FAILED

Create virtual machine



Create Virtual Machine

You selected the following Template: Debian 12 [CVTFI]

ID	Name	Owner	Group	Registration time
1428	IoT_Lab_Master	qslavic	users	10/11/2023 14:00:18
1427	PV284_Net_Test	qslavic	users	10/11/2023 13:32:09
1426	PV284_Stratus_MAster_Copy	qslavic	users	10/11/2023 13:27:12
1369	PA195 Riak	xdohnal	pa195	02/10/2023 09:11:36
1343	PA195-hadoop-single	nal	pa195	22/09/2023 14:31:38
1322	PA220 - home assignments	xdohnal	users	14/09/2023 21:23:50
1317	PA195-Hadoop	bar	users	06/09/2023 19:44:08
1307	Debian 12 [CVTFI]	oneadmin	oneadmin	12/06/2023 09:39:22
1301	Alpine Linux 3.18.0	xvaclav	users	25/05/2023 12:45:26
1286	Fedora Linux 38 [C	oneadmin	oneadmin	18/04/2023 16:56:20

10 Showi 2 entries

Instantiate as persistent

VM name: Your VM Name

Number of instances: 1

□ Start on hold

Debian 12 [CVTFI]

Using Stratus.FI with password

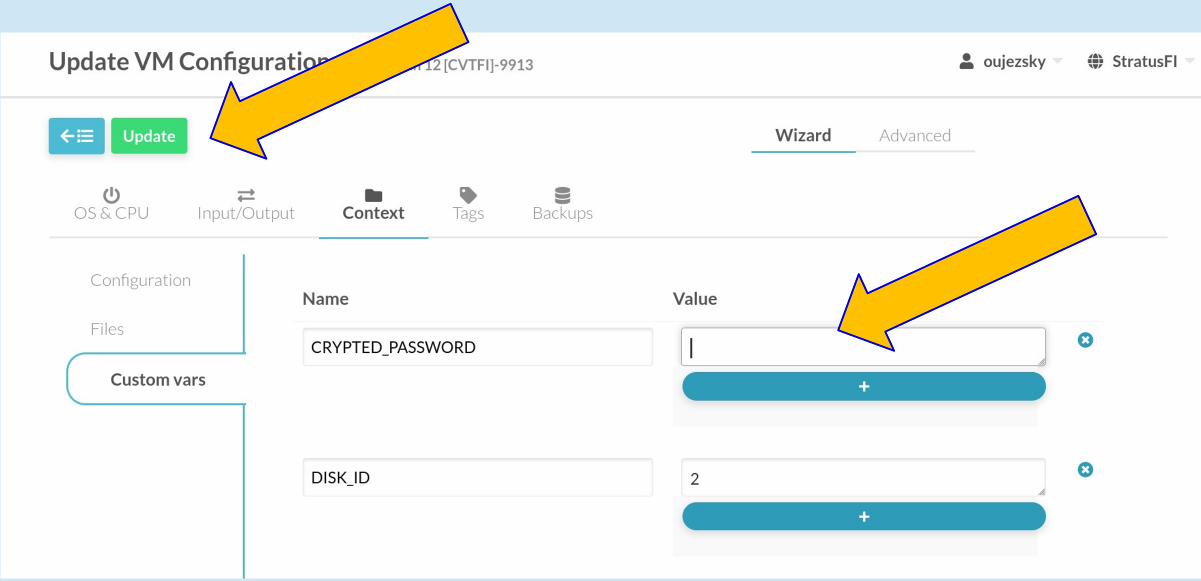
- Generate DES encrypted password
- Create the VM
- Install the root password
- Log-in via VNC
- Create an user
- Log-in via ssh and newly created user

Generate DES encrypted password

- Linux
  - mkpasswd -m des your_password
  - mkpasswd is part of the whois package
- Windows
  - Use some on-line Python interpreter, e.g., https://www.programiz.com/python-programming/online-compiler/
    - import crypt
    - hashed_password = crypt.crypt("your_password", "salt")
    - print(hashed_password)

Using Stratus.FI with password

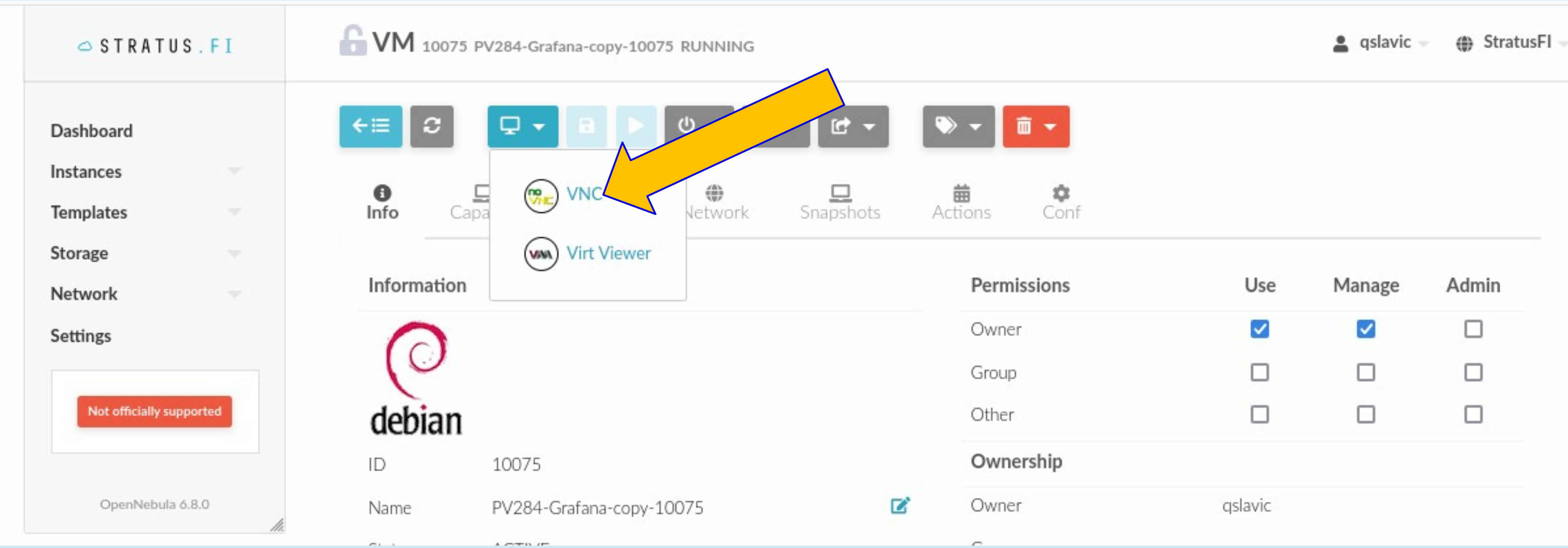
- Open the VM → Conf
- → Update Configuration
- → Context → Custom vars



Name	Value
CRYPTED_PASSWORD	
DISK_ID	2

Create a local user

- useradd -m your_username
- passwd your_username



VM 10075 PV284-Grafana-copy-10075 RUNNING

Information

debian

ID 10075

Name PV284-Grafana-copy-10075

Permissions	Use	Manage	Admin
Owner	☑	☑	☐
Group	☐	☐	☐
Other	☐	☐	☐

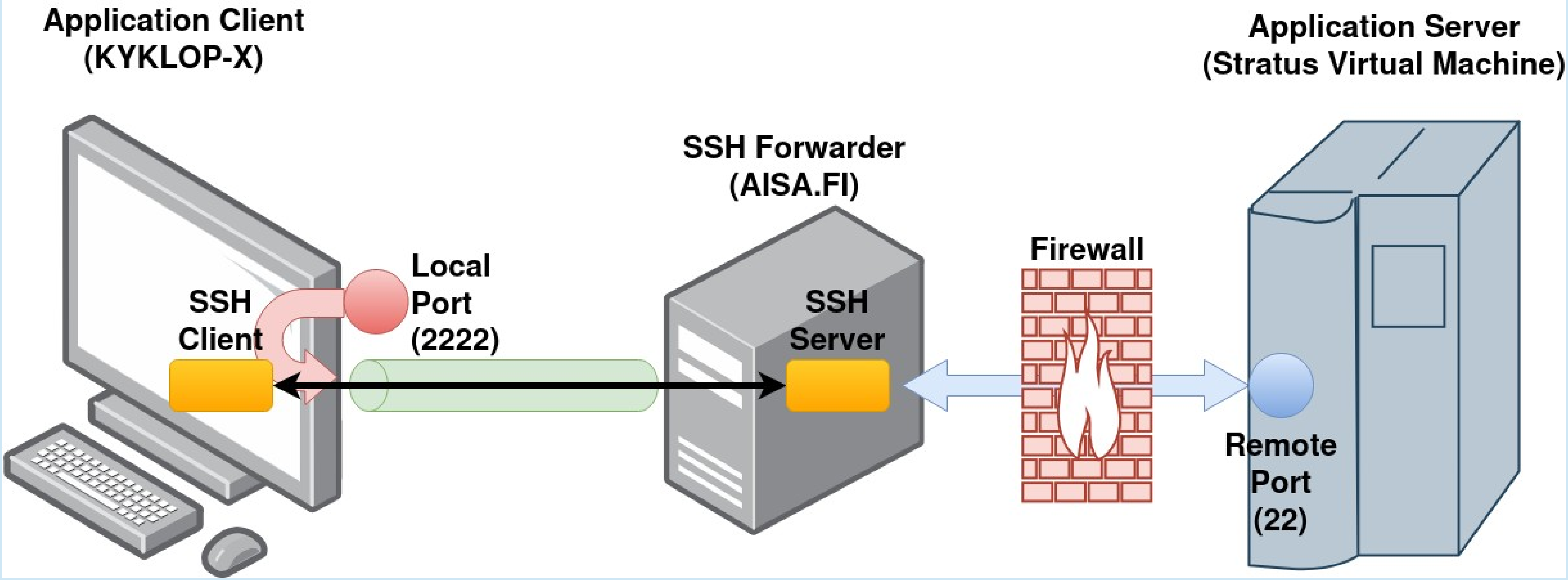
Ownership

Owner qslavic

Using Stratus.FI

- Now you can access the console from Stratus management interface
- Access is allowed from FI, not from KYPO LAB
- Similar situation is expected in real life as well
- Two way to overcame the fence:
  - SSH port forwarding
  - OpenVPN

SSH port forwarding



SSH port forwarding

- Mainly for web interface to your servers
- Example Linux
    - ssh ***-L 2222:Your_VM_IP_addr:22***
      -L 3000:*Your_VM_IP_addr:3000*
      -L 8086:Your_VM_IP_addr:8086 yourlogin@aisa.fi.muni.cz
    - ssh -i **Stratus** -p 2222 root@127.0.0.1
    - Web browser http://localhost:3000

SSH port forwarding – Windows Client

- Set host aisa.fi.muni.cz
- Side pannel → connection → SSH → Tunnel
- *Source port **2222***
- *Destination Your_VM_IP_addr:22 → Click add*
- *Source port 3000*
- *Destination Your_VM_IP_addr:3000 → Click add*
- *Source port 8086*
- *Destination Your_VM_IP_addr:8086 → Click add*
- Save the configuration
- Open a new putty window, **host = 127.0.0.1, port = 2222**

InfluxDB

- Follow the instructions on the web https://docs.influxdata.com/influxdb/v2/install/
- Or go directly to the download page https://www.influxdata.com/downloads/
- If the gpg package is missing, install it via ***apt-get install gpg***
- Don’t forget to start the influxdb: ***sudo service influxdb start***
- And check it’s running: ***sudo service influxdb status***

Grafana

- Follow the instructions on the web: https://grafana.com/docs/grafana/latest/setup-grafana/installation/debian/
- Get started with Grafana and InfluxDB: https://grafana.com/docs/grafana/latest/getting-started/get-started-grafana-influxdb/
- Login to Grafana: https:127.0.0.1:3000
- Default credentials: admin/admin

Create a database (bucket) in InfluxDB

- Open the InfluxDB UI: http://localhost:8086
- Create a Bucket (InfluxDB v2 uses "buckets" instead of databases):
  - Log in to the InfluxDB UI.
  - Go to Data > Buckets > Click Create Bucket.
  - Enter a name for the bucket. > Click Create to save the bucket.
- Set Up Authorization (Token):
  - Go to Data > Tokens.
  - Either create a new token or use the default one to authenticate your API calls.
  - Copy the token, you’ll need it for data interactions via the InfluxDB API or InfluxDB CLI.

Add InfluxDB as a Data Source in Grafana

- Log in to Grafana: Go to your Grafana instance (e.g., http://localhost:3000).
- Add Data Source:
  - In the left sidebar, click on Configuration > Data sources.
  - Click Add data source.
  - Select InfluxDB from the list.
- Configure InfluxDB Connection:
  - URL: Enter http://localhost:8086
  - Database Type: Choose InfluxQL or Flux based on your setup. InfluxDB v2 typically uses Flux as the query language.
  - Token: Paste the InfluxDB token you used to authenticate.
  - Organization: Enter the name of your InfluxDB organization.
  - Bucket: Select the bucket name where the sensor data is stored.
- Save & Test: Click Save & Test to ensure the connection is successful.

Now you have the cloud SW installed.
Next lab exercise we connect the RockPi
as data source.