

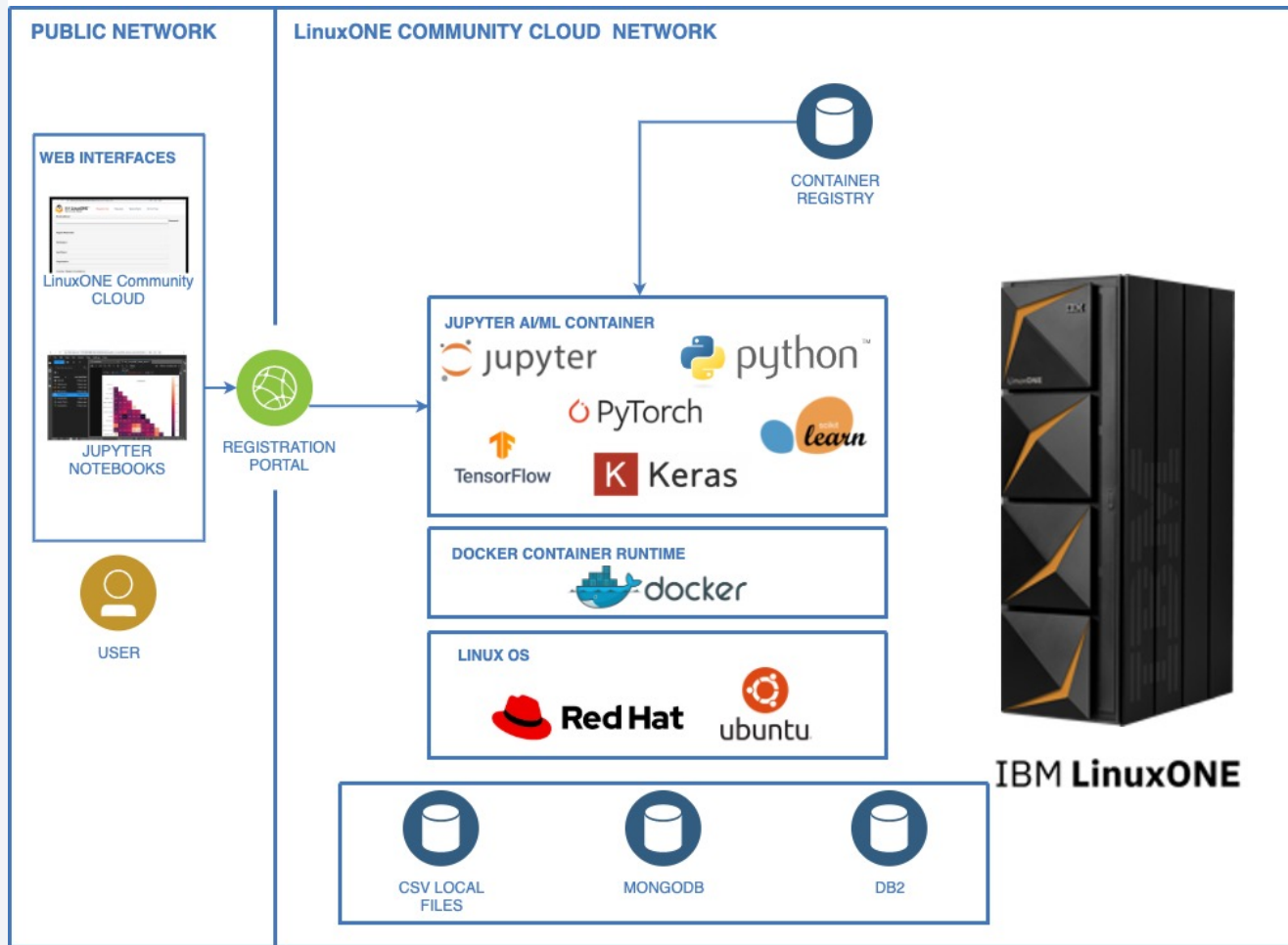
Explore AI/ML using the LinuxONE Machine Learning Lab

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AI/ML LAB Environment - For this Event!!!



Get a Linux VM in IBM LinuxONE Community Cloud

(Ref detail instructions in github)

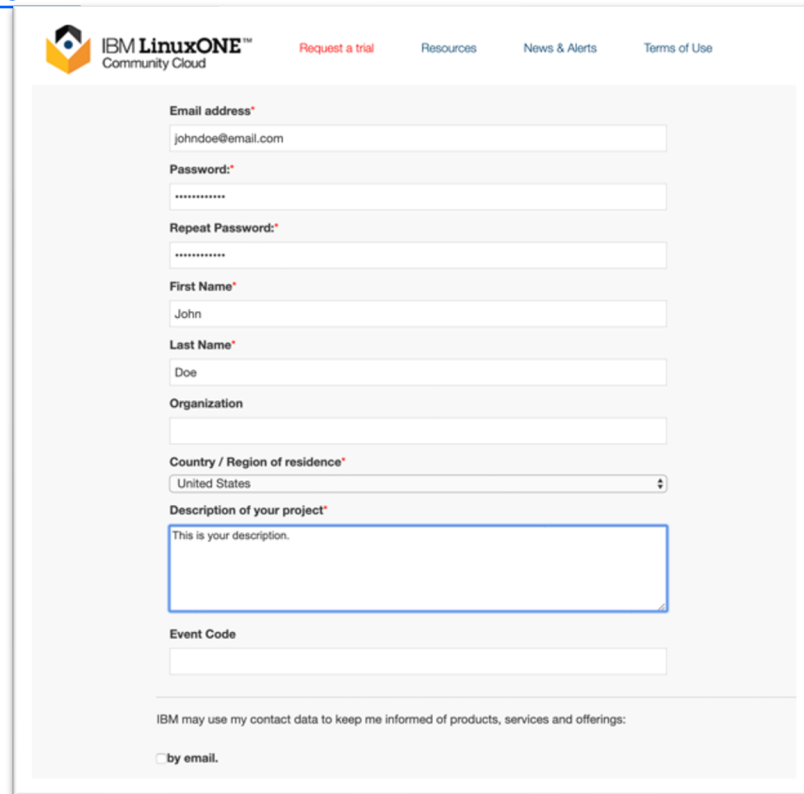
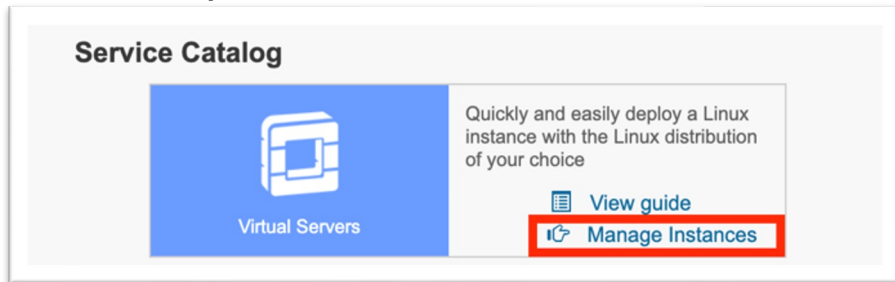
<https://github.com/linuxone-community-cloud/jupyter-lab-ml>

1. Register in LinuxONE Community Cloud

- Event code: **SSTARSL1CC**

- Instructions: <https://ibm.biz/BdPcL8>

2. Create your Ubuntu 20.04 instance

The image shows a screenshot of the registration form on the IBM LinuxONE Community Cloud website. The form is titled 'IBM LinuxONE Community Cloud' and includes links for 'Request a trial', 'Resources', 'News & Alerts', and 'Terms of Use'. The form fields are: 'Email address*' (with the example 'johndoe@email.com'), 'Password*', 'Repeat Password*', 'First Name*' (with the example 'John'), 'Last Name*' (with the example 'Doe'), 'Organization', 'Country / Region of residence*' (with a dropdown menu showing 'United States'), 'Description of your project*' (with a text area containing 'This is your description.'), and 'Event Code'. At the bottom, there is a checkbox for 'by email.' and a statement: 'IBM may use my contact data to keep me informed of products, services and offerings:'.

Bring up Jupyter Lab container

3. Open a secure shell connection and install docker runtime

```
ssh -i <your_key>.pem linux1@148.100.xx.xx  
curl -fsSL https://get.docker.com -o get-docker.sh && sudo sh get-docker.sh  
sudo usermod -aG docker $USER; newgrp docker  
sudo systemctl start docker  
exec bash # or exit and reconnect via ssh
```

4. Start Jupyter Lab container on the port 38888

```
docker login -u l1cc registry.linuxone.cloud.marist.edu Password: LinuxONE (0 is zero).  
docker run -p 38888:8888 --name notebook -v /home/linux1/jupyter:/home/jovyan/shared \  
-d registry.linuxone.cloud.marist.edu/jupyterlab-image-s390x:latest jupyter lab --ServerApp.token='L1Hackathon'
```

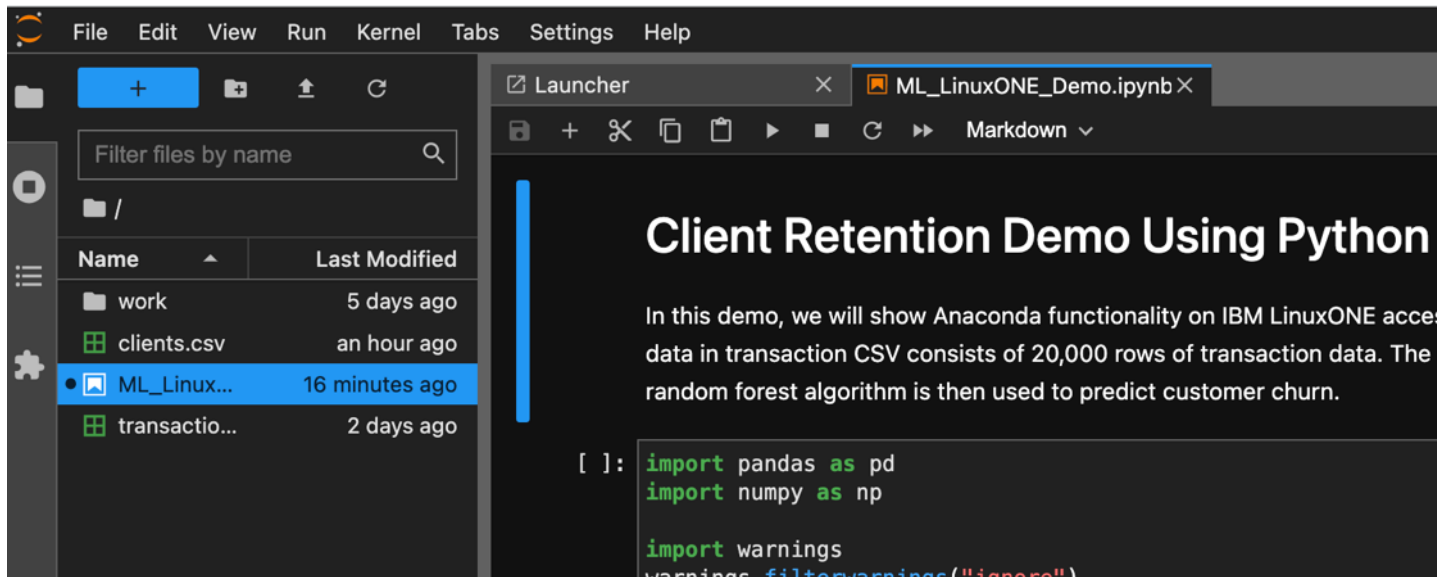
Open Jupyter Lab IDE and run a sample notebook

5. Open Jupyter Lab in the Browser using the public IP address of your instance

URL: <http://148.100.X.X:38888>

Password: L1Hackathon

6. Run Demo notebook ML_LinuxONE_Demo.ipynb



List of Pre-installed Packages

absl-py==0.15.0 altair==4.2.0 anyio==3.5.0 appdirs==1.4.3 argon2-cffi==21.3.0 argon2-cffi-bindings==21.2.0 asttokens==2.0.5 astunparse==1.6.3 attrs==21.4.0 Babel==2.9.1 backcall==0.2.0 beautifulsoup4==4.10.0 bleach==4.1.0 bokeh==2.4.2 Bottleneck==1.3.4 cachetools==5.0.0 certifi==2021.10.8 cffi==1.15.0 charset-normalizer==2.0.12 cloudpickle==2.0.0 cyclical==0.11.0 Cython==0.29.28 dask==2022.2.1 debugpy==1.6.0 decorator==5.1.1 defusedxml==0.7.1 dill==0.3.4 distlib==0.3.0 entrypoints==0.4 executing==0.8.3 filelock==3.0.12 flatbuffers==1.12 fonttools==4.31.2 fsspec==2022.2.0 gast==0.4.0 google-auth==2.6.0 google-auth-oauthlib==0.4.6 google-pasta==0.2.0 grpcio==1.44.0 h5py==3.1.0 idna==3.3 imageio==2.16.1 importlib-metadata==4.11.3 importlib-resources==5.4.0 ipykernel==6.9.2 ipympl==0.8.8 ipython==8.1.1 ipython-genutils==0.2.0 ipywidgets==7.6.5 jedi==0.18.1 Jinja2==3.1.0 joblib==1.1.0 json5==0.9.6 jsonschema==4.4.0 jupyter-client==7.1.2 jupyter-core==4.9.2 jupyter-server==1.13.5 jupyterlab==3.3.0 jupyterlab-pygments==0.1.2 jupyterlab-server==2.11.2 jupyterlab-widgets==1.1.0 keras==2.8.0 Keras-Preprocessing==1.1.2 kiwisolver==1.4.0 llvmlite==0.36.0 locket==0.2.1 Markdown==3.3.6 MarkupSafe==2.1.1 matplotlib==3.5.1 matplotlib-inline==0.1.3 mistune==0.8.4 more-itertools==4.2.0 mpmath==1.2.1 nbclassic==0.3.7 nbclient==0.5.13 nbconvert==6.4.4 nbformat==5.2.0 nest-asyncio==1.5.4 networkx==2.7.1 notebook==6.4.10 notebook-shim==0.1.0 numba==0.53.1 numexpr==2.8.1 numpy==1.22.3 oauthlib==3.2.0 onnx==1.11.0 onnxconverter-common==1.9.0 opt-einsum==3.3.0 packaging==21.3 pandas==1.4.1 pandocfilters==1.5.0

parso==0.8.3 partd==1.2.0 patsy==0.5.2 pexpect==4.8.0 pickleshare==0.7.5 Pillow==9.0.1 portpicker==1.5.0 prometheus-client==0.13.1 prompt-toolkit==3.0.28 protobuf==3.19.4 psutil==5.9.0 ptyprocess==0.7.0 pure-eval==0.2.2 pyasn1==0.4.8 pyasn1-modules==0.2.8 pycparser==2.21 Pygments==2.11.2 pyparsing==3.0.7 pyrsistent==0.18.1 python-dateutil==2.8.2 pytz==2022.1 PyWavelets==1.3.0 PyYAML==5.3.1 pyzmq==22.3.0 requests==2.27.1 requests-oauthlib==1.3.1 rsa==4.8 scikit-image==0.19.2 scikit-learn==1.0.2 scipy==1.8.0 seaborn==0.11.2 Send2Trash==1.8.0 six==1.15.0 skl2onnx==1.11 sniffio==1.2.0 soupsieve==2.3.1 SQLAlchemy==1.4.31 stack-data==0.2.0 statsmodels==0.13.2 sympy==1.9 tensorboard==2.8.0 tensorboard-data-server==0.6.1 tensorboard-plugin-wit==1.8.1 tensorflow==2.5.0 tensorflow-estimator==2.5.0 termcolor==1.1.0 terminado==0.13.3 testpath==0.6.0 threadpoolctl==3.1.0 tifffile==2022.3.16 toolz==0.11.2 torch==1.8.1 tornado==6.1 traitls==5.1.1 typing_extensions==4.1.1 urllib3==1.26.8 virtualenv==20.0.17 wcwidth==0.2.5 webencodings==0.5.1 websocket-client==1.3.1 Werkzeug==2.0.3 widgets-nbextension==3.5.2 wrapt==1.12.1 xlrd==2.0.1 zipp==3.7.0

FAQs

1. Docker gives permission error. How to resolve it?

e.g. docker: Got permission denied while trying to connect to the Docker daemon socket at [unix:///var/run/docker.sock](#)

After a fresh installation of docker, it configures permissions and environment. For some settings to take an effect, you need to reload the shell (exec bash) or reestablish the ssh session.

2. Jupyter Lab gives permission error for the "shared" folder

The folder is mounted from the host. Need to make sure that the user with uid 1000 has write access to it. E.g. Run this command on the Linux instance

```
sudo chown -R 1000:1000 /home/linux1/jupyter
```

FAQs (cont.)

3. Cannot get my jupyter lab container working. How to re-deploy it?

```
docker logs notebook  
docker rm -f notebook  
docker run ....
```

4. How can I get a list of files uploaded to IBM Z environment?

In Jupiter notebook, type:

```
import glob  
print(glob.glob("*.csv"))
```

5. How can I install a missing package from pypi?

```
import sys  
!{sys.executable} -m pip install tensorflow_datasets
```

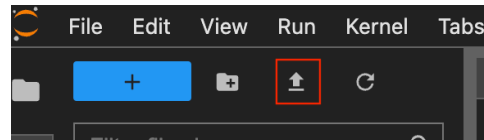

FAQs (cont.)

6. How can I upload my data and notebook to IBM LinuxONE environment

Upload files in the Jupyter Lab interface.

CSV files are supported.

Max file size is 200MB.



7. Where can I see the list of available packages?

<https://github.com/linuxone-community-cloud/jupyter-lab-ml/blob/main/packages.txt>

Or in Jupiter notebook, type:

```
import pkg_resources

for i in pkg_resources.working_set:
    print(i)
```

Suggestions on where to source data

[kaggle.com](https://www.kaggle.com) - public datasets for machine learning

data.gov - government organizations provide all of its data to public

US Bureau of labor statistics.

- Unemployment rates
- Compensation
- Price index

Federal Reserve

- Household debt
- Consumer finances
- Lending rates

Public datasets in the cloud

Universities

- UCI
- UC Davis

Covid:

- CDC data (includes vaccine info) - <https://covid.cdc.gov/covid-data-tracker/>
- Vaccination in other countries - <https://ourworldindata.org/covid-vaccinations>
- ESRI data on hospital resources

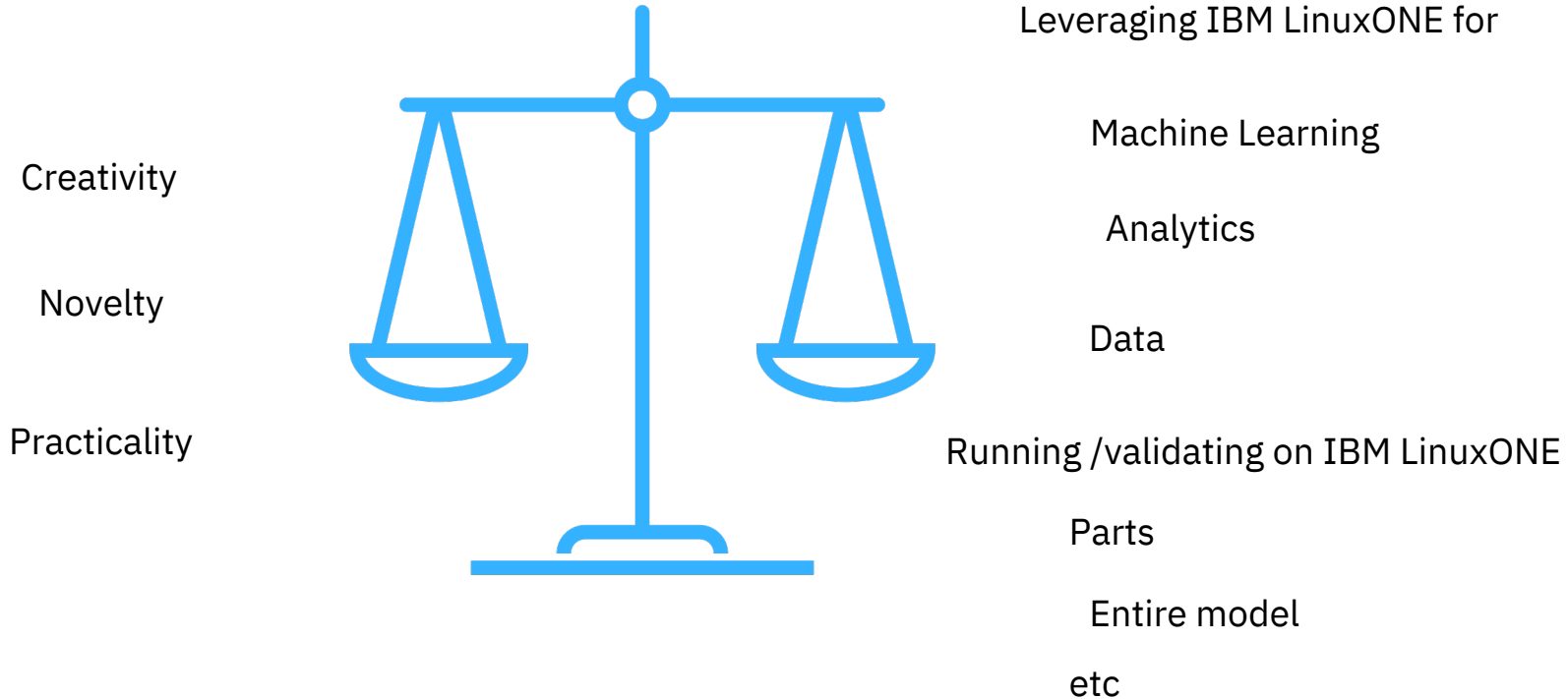
Medical:

Center for medicaid and medicare - <https://www.cms.gov/OpenPayments/Explore-the-Data/Dataset-Downloads>

Mental Health:

https://www.cdc.gov/mentalhealth/data_publications/index.htm

Criteria for the ML on IBM LinuxONE Challenge



Thank you !

Important Links:

Registration in LinuxONE Community Cloud

- Event code (put in project description): **SSTARSL1CC**
- Instructions: <https://ibm.biz/BdPcL8>

Accessing VM with Jupyter Lab ML

<https://github.com/linuxone-community-cloud/jupyter-lab-ml>

- Docker repo credentials: u: l1cc p: **LinuxONE** (0 is zero).
- Jupyter Lab token: **L1Hackathon**

