

STATUS OF JUPYTERHUB @ MAX IV

MAX IV & NBI COMPUTE MEETING

2019-05-09

JASON BRUDVIK

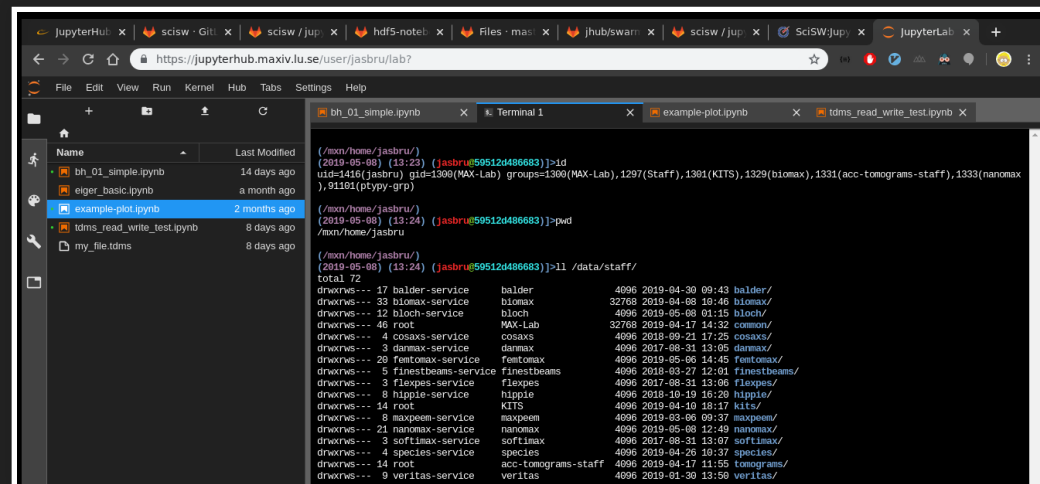
INSTALLATION GOALS

- Notebooks for all!
- CAS
- AD
- Data & home
- Simple



NBI SETUP → MAX IV SETUP

- Tak Rasmus!
- Docker Swarm
- Resource limits
- CAS, AD
- Create user
- Permissions
- Data, home, group directories
- Customized notebooks



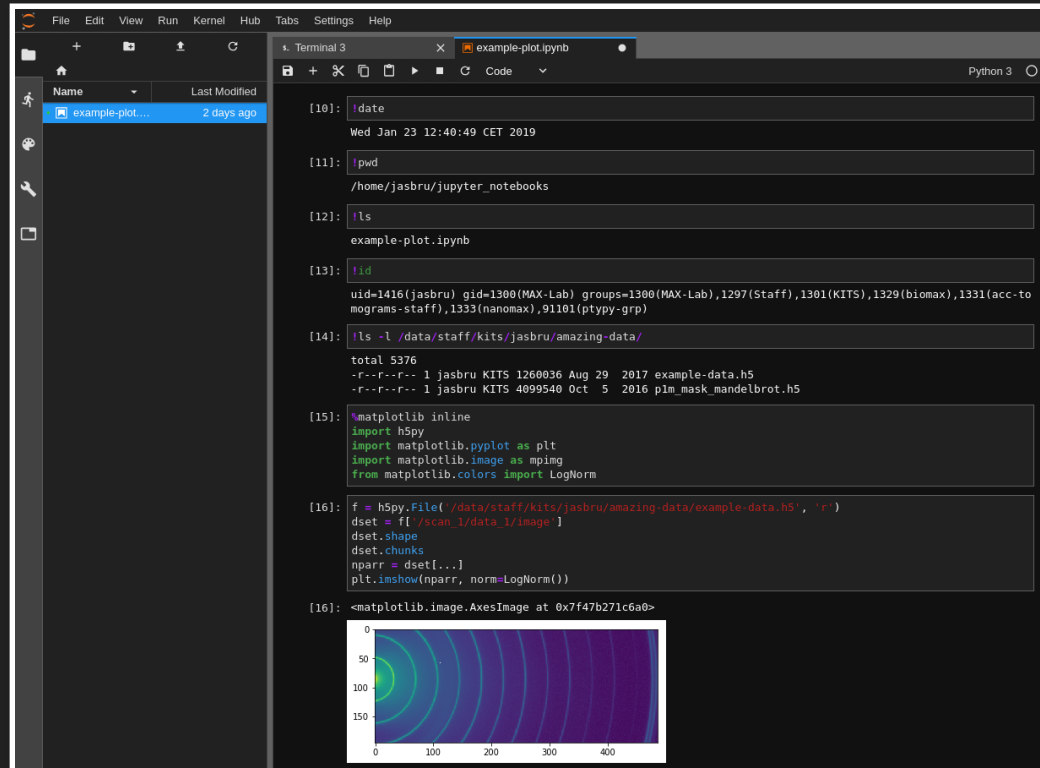
The screenshot shows a JupyterLab interface with a terminal window open. The terminal displays the output of the `cat /etc/passwd` command, showing system users and regular users. The system users listed are `balder-service`, `biomax-service`, `bloch-service`, `root`, `danmax-service`, `fentomax-service`, `finestbeams-service`, `flexpes-service`, `hippie-service`, `root`, `maxpelem-service`, `nanomax-service`, `softlimax-service`, `species-service`, `root`, and `veritas-service`. The regular users listed are `balder`, `biomax`, `bloch`, `MAX-Lab`, `danmax`, `fentomax`, `finestbeams`, `flexpes`, `hippie`, `kits`, `maxpelem`, `nanomax`, `softlimax`, `species`, `acc-tomograms-staff`, and `veritas`.

```
(/usr/home/jasbru/)
(2019-05-08) (13:23) ([jasbru@595124486683])>id
uid=3416(jasbru) gid=1309(MAX-Lab) groups=1309(MAX-Lab),1297(Staff),1301(KITS),1329(biomax),1331(acc-tomograms-staff),1333(nanomax),91181(ptypy-grp)

(/usr/home/jasbru/)
(2019-05-08) (13:24) ([jasbru@595124486683])>pwd
/usr/home/jasbru

(/usr/home/jasbru/)
(2019-05-08) (13:24) ([jasbru@595124486683])>ll /data/staff/
total 72
drwxrws--- 17 balder-service balder 4096 2019-04-30 09:43 balder/
drwxrws--- 33 biomax-service biomax 32768 2019-04-08 19:46 biomax/
drwxrws--- 12 bloch-service bloch 4096 2019-05-08 01:15 bloch/
drwxrws--- 46 root MAX-Lab 32768 2019-04-17 14:32 common/
drwxrws--- 4 cosax-service cosax 4096 2018-09-21 17:25 cosax/
drwxrws--- 3 danmax-service danmax 4096 2017-08-31 13:05 danmax/
drwxrws--- 29 fentomax-service fentomax 4096 2019-05-06 14:45 fentomax/
drwxrws--- 5 finestbeams-service finestbeams 4096 2018-03-27 12:01 finestbeams/
drwxrws--- 3 flexpes-service flexpes 4096 2017-08-31 13:06 flexpes/
drwxrws--- 8 hippie-service hippie 4096 2018-10-19 16:28 hippie/
drwxrws--- 14 root KITS 4096 2019-04-10 18:17 kits/
drwxrws--- 8 maxpelem-service maxpelem 4096 2019-05-06 09:37 maxpelem/
drwxrws--- 21 nanomax-service nanomax 4096 2019-05-08 12:45 nanomax/
drwxrws--- 3 softlimax-service softlimax 4096 2017-08-31 13:07 softlimax/
drwxrws--- 4 species-service species 4096 2019-04-26 10:37 species/
drwxrws--- 14 root acc-tomograms-staff 4096 2019-04-17 11:55 tomograms/
drwxrws--- 9 veritas-service veritas 4096 2019-01-30 13:59 veritas/
```

EXAMPLE NOTEBOOK



The screenshot displays a Jupyter Notebook interface with a terminal window open. The terminal shows the execution of several commands and the resulting output. The code in the notebook cells includes importing h5py, matplotlib, and numpy, loading data from an HDF5 file, and displaying a heatmap.

```
[10]: !date
Wed Jan 23 12:40:49 CET 2019

[11]: !pwd
/home/jasbru/jupyter_notebooks

[12]: !ls
example-plot.ipynb

[13]: !id
uid=1416(jasbru) gid=1300(MAX-Lab) groups=1300(MAX-Lab),1297(Staff),1301(KITS),1329(biomax),1331(acc-to-mograns-staff),1333(nanomax),91101(ptypy-grp)

[14]: !ls -l /data/staff/kits/jasbru/amazing-data/
total 5376
-r--r--r-- 1 jasbru KITS 1268036 Aug 29 2017 example-data.h5
-r--r--r-- 1 jasbru KITS 4099540 Oct 5 2016 plm_mask_mandelbrot.h5

[15]: %matplotlib inline
import h5py
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
from matplotlib.colors import LogNorm

[16]: f = h5py.File('/data/staff/kits/jasbru/amazing-data/example-data.h5', 'r')
dset = f[ '/scan_1/data_1/image' ]
dset.shape
dset.chunks
nparr = dset[...]
plt.imshow(nparr, norm=LogNorm())

[16]: <matplotlib.image.AxesImage at 0x7f47b271c6a8>
```

The plot shows a heatmap with a color scale from 0 to 150 on the y-axis and 0 to 400 on the x-axis. The plot displays a series of concentric, curved lines, likely representing a contour plot or a heatmap of a specific data set.

INSTALLATION

- Initial / temporary
- VM
- 8 CPU cores
- 32 GB RAM
- Dedicated server in future

```
1 [ 0.7%] Tasks: 79, 302 thr: 1 running
2 [ 0.0%] Load average: 0.07 0.05 0.05
3 [ 0.0%] Uptime: 12 days, 01:02:30
4 [ 0.7%]
5 [ 0.0%]
6 [ 0.0%]
7 [ 0.7%]
8 [ 0.0%]
Mem [ 3.796/31.20]
Swap [ 0K/5.00K]
```

PID	USER	PR	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
1	root	20	0	186M	4368	2632	S	0.0	0.0	0:11.46	/usr/lib/systemd/systemd --switched-root
10241	root	20	0	1309M	122K	39352	S	0.7	0.4	10:30:17	/usr/bin/dockerd
113339	root	20	0	178M	2856	1612	S	0.0	0.0	0:00:42	/usr/bin/docker-proxy -proto tcp
113344	root	20	0	178M	2856	1612	S	0.0	0.0	0:00:00	/usr/bin/docker-proxy -proto tc
113348	root	20	0	178M	2856	1612	S	0.0	0.0	0:00:00	/usr/bin/docker-proxy -proto tc
113342	root	20	0	178M	2856	1612	S	0.0	0.0	0:00:00	/usr/bin/docker-proxy -proto tc
113341	root	20	0	178M	2856	1612	S	0.0	0.0	0:00:00	/usr/bin/docker-proxy -proto tc
113340	root	20	0	178M	2856	1612	S	0.0	0.0	0:00:41	/usr/bin/docker-proxy -proto tc
113027	root	20	0	1309M	122K	39352	S	0.0	0.4	12:59:05	/usr/bin/dockerd
113026	root	20	0	1309M	122K	39352	S	0.0	0.4	18:28:46	/usr/bin/dockerd
113025	root	20	0	1309M	122K	39352	S	0.0	0.4	20:09:12	/usr/bin/dockerd
79447	root	20	0	1309M	122K	39352	S	0.0	0.4	15:44:09	/usr/bin/dockerd
62722	root	20	0	1309M	122K	39352	S	0.0	0.4	0:00:00	/usr/bin/dockerd
62721	root	20	0	1309M	122K	39352	S	0.0	0.4	3:23:64	/usr/bin/dockerd
62720	root	20	0	1309M	122K	39352	S	0.0	0.4	3:51:70	/usr/bin/dockerd
62719	root	20	0	1309M	122K	39352	S	0.0	0.4	1:50:08	/usr/bin/dockerd
62718	root	20	0	1309M	122K	39352	S	0.0	0.4	0:00:00	/usr/bin/dockerd
62717	root	20	0	1309M	122K	39352	S	0.0	0.4	0:00:00	/usr/bin/dockerd
61255	root	20	0	1309M	122K	39352	S	0.0	0.4	4:39:62	/usr/bin/dockerd
56789	root	20	0	1309M	122K	39352	S	0.0	0.4	23:28:02	/usr/bin/dockerd
46297	root	20	0	1309M	122K	39352	S	0.0	0.4	18:06:11	/usr/bin/dockerd
40830	root	20	0	1309M	122K	39352	S	0.0	0.4	28:43:28	/usr/bin/dockerd
27381	root	20	0	1309M	122K	39352	S	0.0	0.4	27:41:71	/usr/bin/dockerd
23774	root	20	0	1309M	122K	39352	S	0.0	0.4	14:24:53	/usr/bin/dockerd
21028	root	20	0	1309M	122K	39352	S	0.0	0.4	29:24:02	/usr/bin/dockerd

RESOURCE USAGE

- Not much yet
- <25 users
- Resource limits
- More testing



FUTURE

- Match cluster, beamline environments
- HDF5 view integration
- Dedicated hardware
- Improve mobile interface
- Promote to users and staff



SUMMARY

- So far so good
- Try it:
 - jupyterhub.maxiv.lu.se
- Code:
 - gitlab.maxiv.lu.se/scisw/
 - gitlab.com/MAXIV-SCISW/
- Contact:
 - Jason.Brudvik@maxiv.lu.se
 - Zdenek.Matej@maxiv.lu.se

