



Paslaugos dirbtinio intelekto platformai

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Istorija

- 2019 pabaigoj KTU IF atsirado bakalauro studijų programa “Dirbtinis intelektas”, priėmimas nuo 2020 rudens.
- 2021 pradžioje paleistos dvi mašinos su Jupyter programine įranga.
- 2021 vasarą paleistas penkių mašinų klasteris su GPU akseleratoriais

Jupyter



- Jupyter <https://jupyter.org/>
- The Littlest JupyterHub: <https://tljh.jupyter.org/en/latest/>
 - dip2.litnet.it – TLJH + Docker
 - dip4.litnet.it – TLJH
- Panaudoti Dell PowerEdge R6515 serveriai:
 - AMD EPYC 7502P 32-Core Processor
 - 250GB RAM
 - 2 x 8TB NVME SSD

Jupyter

The screenshot shows the Jupyter interface with a code cell containing the following code and output:

```
[1]: print(2*2)
```

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The interface includes a menu bar (File, Edit, View, Run, Kernel, Tabs, Settings, Help), a toolbar, and a sidebar with 'KERNEL SESSIONS' and 'TERMINAL SESSIONS' tabs. The status bar at the bottom indicates 'Python 3 | Idle' and 'Mem: 143.25 MB'.

The screenshot shows the Jupyter Launcher interface with the following categories and options:

- Notebook**: Python 3
- Console**: Python 3
- Other**: Terminal, Text File, Markdown File, Show Contextual Help

The status bar at the bottom indicates 'Python 3 | Idle' and 'Mem: 91.86 MB'.

The screenshot shows a terminal window with the following output:

```
jupyter-kespaul@dip4:~$ ls -al
total 60
drwxr-x--- 1 jupyter-kespaul jupyter-kespaul 298 Nov 30 15:06 .
drwxr-xr-x 1 root root 9674 Nov 18 16:28 ..
-rw----- 1 jupyter-kespaul jupyter-kespaul 100 Mar 18 2021 .bash_history
-rw-r--r-- 1 jupyter-kespaul jupyter-kespaul 220 Apr 4 2018 .bash_logout
-rw-r--r-- 1 jupyter-kespaul jupyter-kespaul 3771 Apr 4 2018 .bashrc
drwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 48 Dec 30 2020 .cache
drwx----- 1 jupyter-kespaul jupyter-kespaul 22 Dec 30 2020 .config
drwx----- 1 jupyter-kespaul jupyter-kespaul 34 Dec 30 2020 .gnupg
drwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 90 Nov 30 15:06 .ipynb_checkpoints
drwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 74 Dec 30 2020 .ipython
drwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 22 Dec 31 2020 .jupyter
drwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 10 Dec 30 2020 .local
drwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 16 Dec 30 2020 .npm
-rw-r--r-- 1 jupyter-kespaul jupyter-kespaul 807 Apr 4 2018 .profile
drwx----- 1 jupyter-kespaul jupyter-kespaul 30 Dec 30 2020 .ssh
drwx----- 1 jupyter-kespaul jupyter-kespaul 1156 Dec 30 2020 .viminfo
-rw-r--r-- 1 jupyter-kespaul jupyter-kespaul 72 Nov 30 15:06 Untitled.ipynb
-rwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 8296 Dec 30 2020 a.out
-rw-r--r-- 1 jupyter-kespaul jupyter-kespaul 66 Dec 30 2020 main.c
-rwxr-xr-x 1 jupyter-kespaul jupyter-kespaul 21 Dec 30 2020 testas.sh
jupyter-kespaul@dip4:~$
```

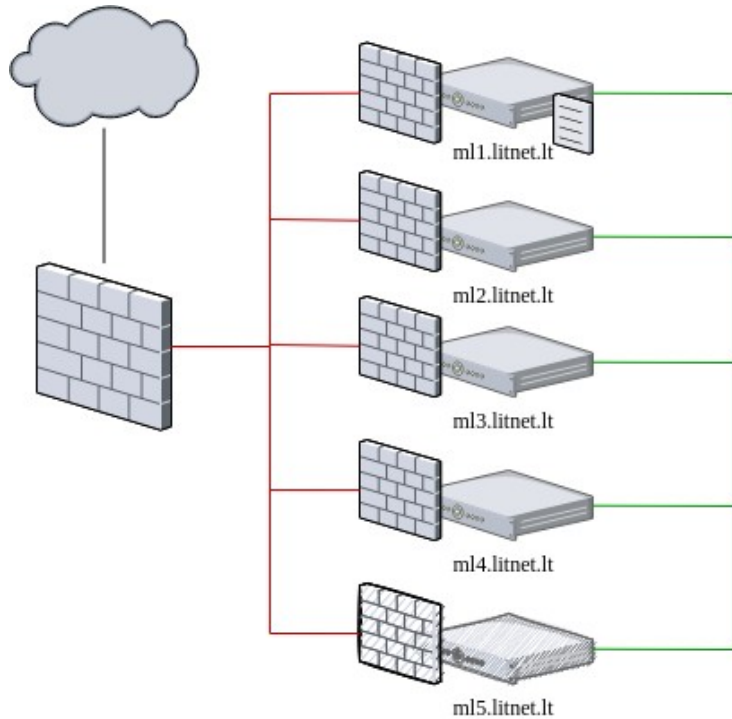
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jupyter-kespaul@dip4:~$
```

GPU klasteris

- 5x Dell PowerEdge R7525
 - 2x AMD EPYC 7452 32-Core CPU (iki 3.9GHz)
 - 512GB RAM
 - 2x 480GB SSD (480GB hwRAID1)
 - 2x 25Gbps LAN
 - Nvidia A100 GPU (40GB RAM, MIG palaikymas)
- Ubuntu 18.04LTS (kernel 5.4.0), CUDA

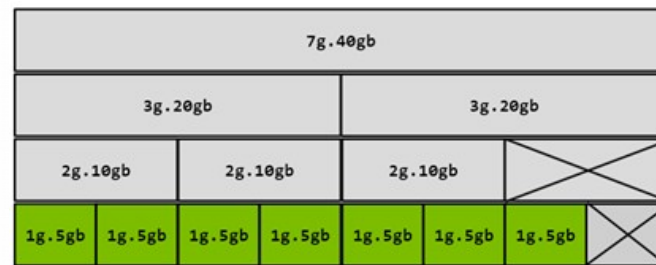
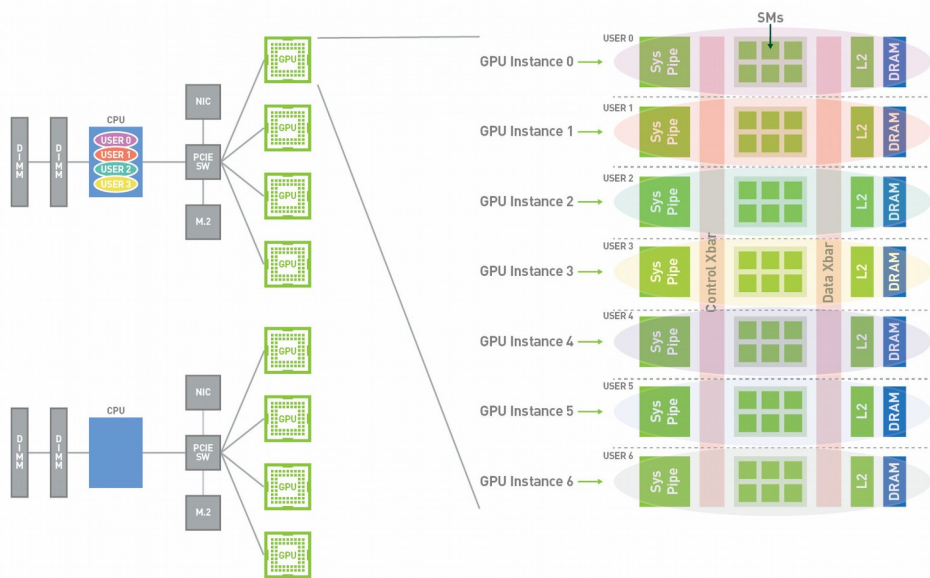
GPU klasteris



- Prisijungimas SSH raktais
- Apribotas priejimas iš/j internetą per isorini interfeisą
- Vidinis interfeisas neapribotas
- /home fiziškai ant m1 (NFS)
- m5 artimiausiu metu bus atjungtas

NVIDIA Multi-Instance GPU (MIG)

MULTI-INSTANCE GPU ("MIG")

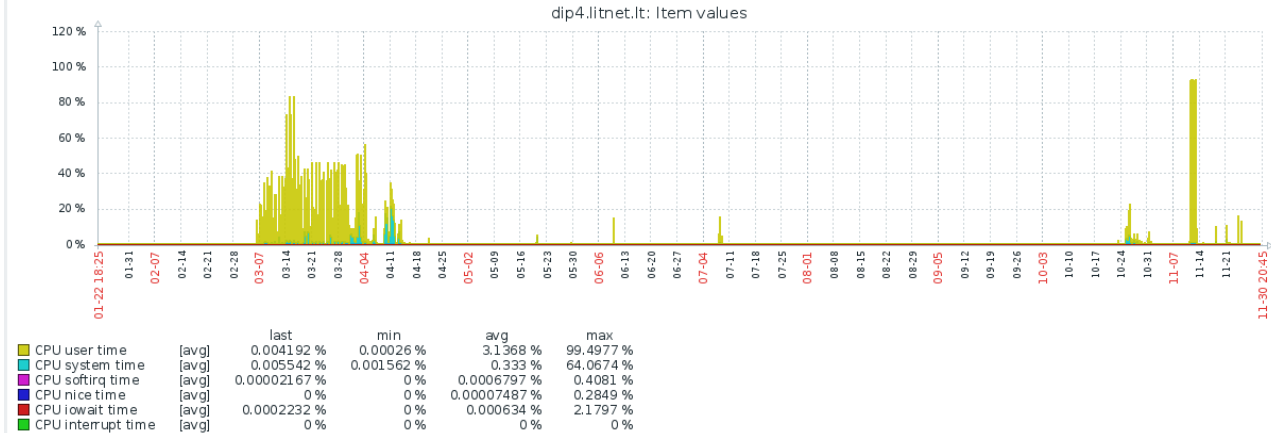
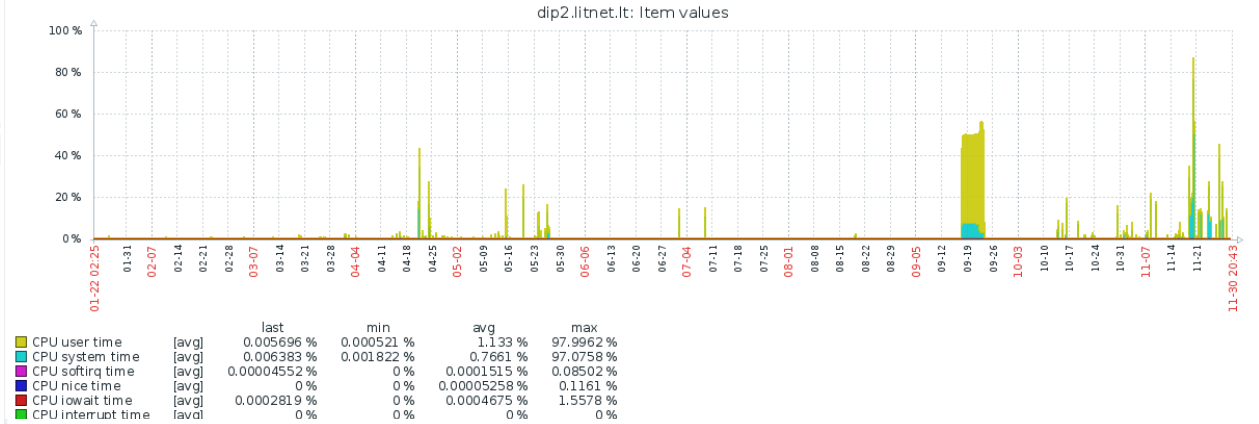


- 1 x 7g.40gb
or
- 2 x 3g.20gb
or
- 3 x 2g.10gb
or
- 7 x 1g.5gb

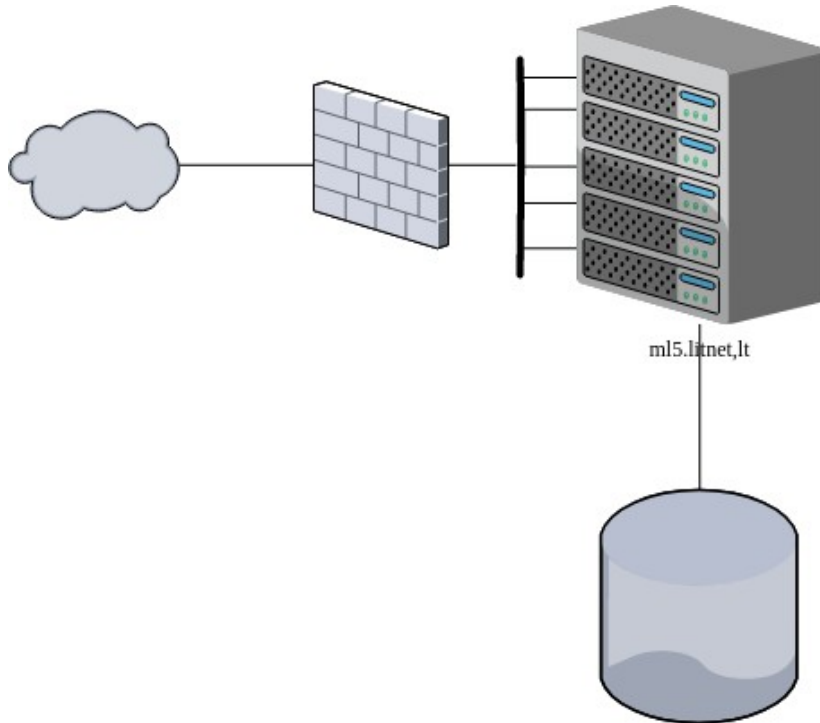
<https://docs.nvidia.com/datacenter/tesla/mig-user-guide/index.html>

Naudotojai / Taikymai

- Jupyter:
 - studentai / dėstytojai
- Klasteris
 - Comsol / Energetikos institutas, KTU
 - programinė įranga nenaudoja GPU
 - paskirstyti skaičiavimai (MPI)
 - CUDA / KTU



Perspektyva



- ml5 → Proxmox:
 - VM
 - LXC
 - CEPH (papildoma mašina)
- Virtualios Mašinos (ar konteineriai) su priskirtu GPU (arba GPU dalim) naudotojams

Kaip pradet?

KTU DIC: <https://dicentras.ktu.edu/>



Ačiū už dėmesį