

Implementation Fiji in a computing cluster

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Cluster computing

Old school

- **Computing cluster**
 - group of interconnected “classical” computers



Cluster computing

Now



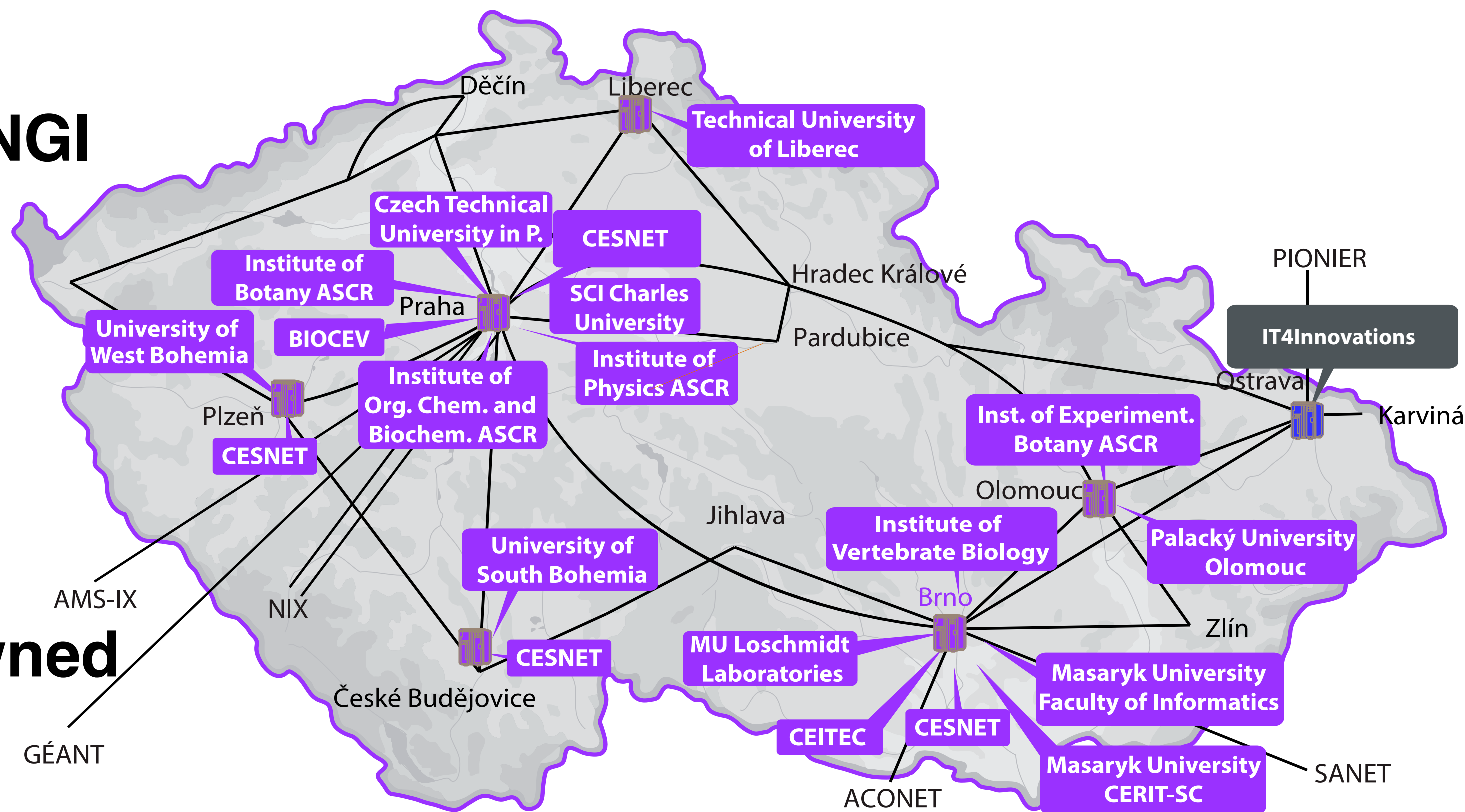
About MetaCentrum

■ **MetaCentrum**

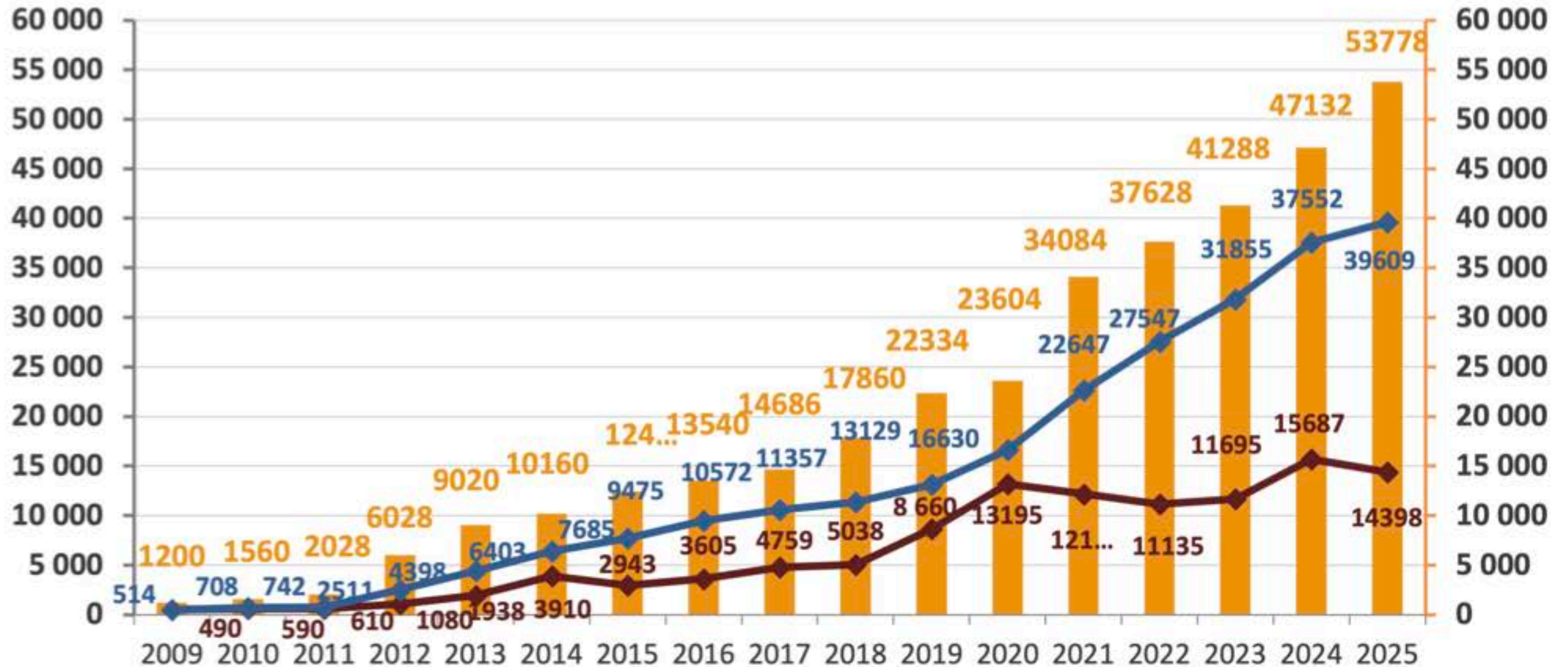
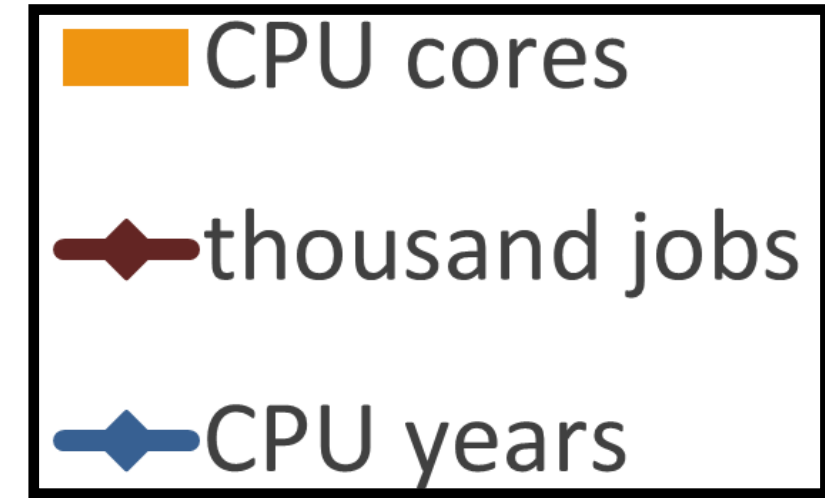
- **organization operating and managing distributed computing - National Grid Infrastructure (NGI)**
- **activity of the CESNET association (association of universities of the Czech Republic and the Czech Academy of Science)**
- **provides scientific computations, collaborative research and its support service**
- **integrated into European e-infrastructures EGI (grid), EOSC (European Open Scientific Cloud)**
- **completely free for students, academic staff of research institutions in Czech Republic (registration needed)**
- **24x7 service**

MetaCentrum NGI

- **Coordinator of national grid**
- **Assistance with:**
 - **purchase and integration computational resources into NGI**
 - **selection, installation and maintenance of the clusters**
 - **software maintenance**
 - **maintenance of user accounts**
 - **priority/exclusive access to owned clusters**



Number of CPUs, executed jobs and corresponding CPU years (PBS, Cloud, K8s, Sensitive Cloud)



MetaCentrum statistics of 2025

- 39,609 CPU years (upper paleolit)
- 4,621 users
- 14,402,000 executed jobs



Metacentrum services

- **Metacentrum services**
 - **individuals - computing, data processing**
 - **immediately accessible resources (registration needed)**
 - **free of charge (acknowledgements in publications)**
 - **projects - sharing data in a group**
 - **institutions - integrating resources to NGI (maintenance of HW, SW)**
 - **research, development, education**

MetaCentrum Resources

■ CPU

- ~ 53,000 CPU (x86_64)

- Intel, AMD

- Linux - Debian 12, CentOS

heterogenous environment

- nodes with:

- low number of cores (2x4-32 cores)

- average number of cores - SMP machines (32-128 cores)

- high number of cores

- 384 cores 6 TB RAM - SGI UV 2000

- 504 cores 10 TB RAM - HPE Superdome Flex

<https://metavo.metacentrum.cz/pbsmon2/hardware>

■ GPU

- 17 clusters, over 503 GPU cards (NVIDIA H100, A10, A40, A100, RTX A4000, RTX A5000, Tesla, GeForce)

- 8.5 PB disk space (working data), ca 3 TB/user,

- 33 PB S3 object storage, “unlimited”/user

<https://docs.metacentrum.cz/en/docs/computing/gpu-comput/clusters>



How to start

- **Employees and students of research or academic organizations in the Czech Republic**
- **Registration** (<https://metavo.metacentrum.cz/en/application/index.html>)
- **Rules of use** (<https://www.metacentrum.cz/en/about/rules/index.html>)
 - **science, research, education, development, (commercial)**
 - **free, acknowledgement in publications**
- **Read our documentation and troubleshooting**

<https://docs.metacentrum.cz>

<https://docs.metacentrum.cz/en/docs/computing/run-basic-job>

Acknowledgement for 2026

MetaCentrum official acknowledgement formula

Computational resources were provided by the e-INFRA CZ project (ID:90254), supported by the Ministry of Education, Youth and Sports of the Czech Republic.

Acknowledgement formula for ELIXIR CZ resources

Computational resources were provided by the ELIXIR-CZ project (ID:90255), part of the international ELIXIR infrastructure

In addition to the acknowledgement in the publication, do not forget to add the project number (ID:90254 for e-INFRA CZ and/or ID:90255 for ELIXIR-CZ) during the export of publication to the RIV system.

MetaCentrum environment

Grid computing

<https://docs.metacentrum.cz/computing/run-basic-job/>

- **Primarily for command line control**
- **Batch jobs**
 - long-time running (days, weeks, months)
 - Qsub assembler - https://metavo.metacentrum.cz/pbsmon2/qsub_pbspro
- **Interactive jobs**
 - **direct control**

<https://docs.metacentrum.cz/en/docs/software/graphical-access/software/graphical-access>

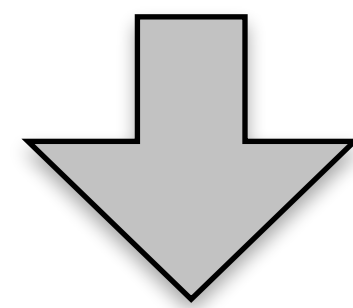
Graphical environment (Open OnDemand, X-windows, Remote desktop)

- **Open OnDemand - web base GUI, no scripting skills needed)**

Metacentrum environment

Frontends

- mainly virtual machines
- direct login without reservation (ssh, putty)
- for file/directory manipulation, basic unix operation, preparation of the batch jobs, submitting the jobs
- not for demanding activities (large data manipulation, computing, software compilation etc.)



submit the batch or interactive job

Computing nodes

- physically process the submitted jobs
- mainly for non-interactive work, jobs are assigned by PBS (scheduling system)
- exceptional direct login (manual deleting/transfer data after job failure)
- heterogenous environment (different number of cores per node, GPU cards...)

MetaCentrum environment

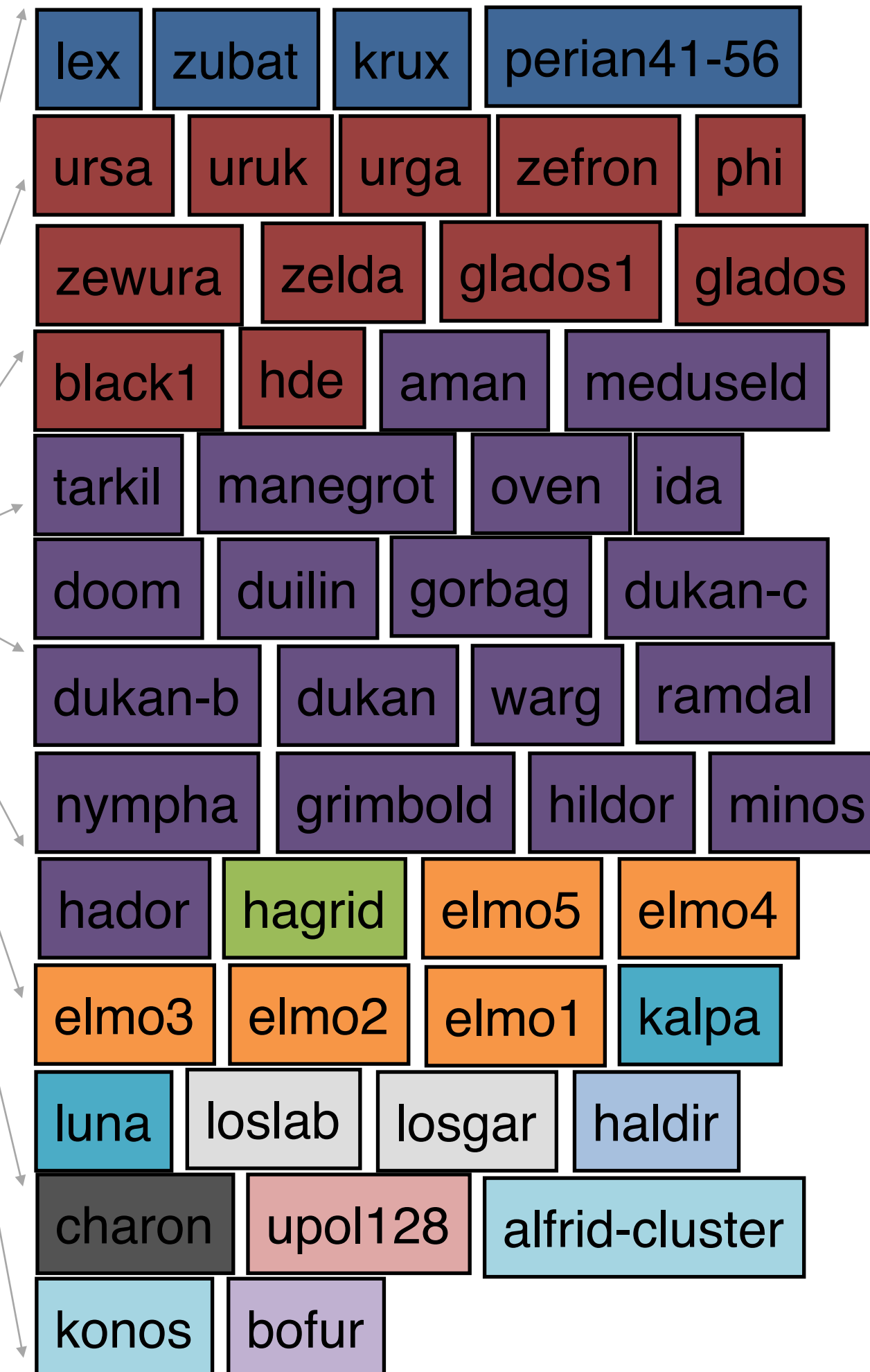
Frontends



PBS server

**PBS-pro
scheduler**

Computing nodes



ssh, kerberos
(linux, macOS)

putty
(Windows)

qsub



Metacentrum Software

- **modular subsystem** (<https://docs.metacentrum.cz/en/docs/software/modules>)
 - frontends/working nodes are “application-free environment”
 - applications/software are provided as modules, user specify which applications and versions will be used
- **~5000 modules** (computational chemistry, molecular modeling, bioinformatics, technical and material simulations, mathematical and statistical modeling, image video and sound processing, development tools and environments etc...)

Metacentrum Software

- **Basic module commands**
 - **module ava - all available modules**
 - **module ava fiji- all available versions of fiji**
 - **module add - add module to the environment (module add fiji/1.54h)**
 - **module list - list of loaded modules**
 - **module rm - unload module (module rm fiji/1.54)**
 - **module purge - unload all modules**

Data storages in MetaCentrum

- **Scratch storages** <https://docs.metacentrum.cz/en/docs/data/types-of-storage>
 - Fast storage for temporary files for running job
 - used only during computations
 - should be freed immediately after your job ends
 - automatically cleaned
- **Home directories**
 - disk arrays mounted as file systems to computational clusters and frontends
 - data storing between computation
 - several storages geographically distributed (Praha, Brno, Plzeň, Jihlava etc.)
- **Outside of MetaCentrum**
 - **Object storage** <https://docs.du.cesnet.cz/en/docs/introduction/introduction>
 - high capacities as well as longer-term data storage
 - Up to 10 TB/user, can be increased on individual request
 - accessed through S3 protocol
 - **National repository platform (NRP)**
 - Is being build
 - long-term data storage

Hands on

Running Fiji on Metacentrum clusters in Command Line Interface

Installation Fiji to Metacentrum clusters

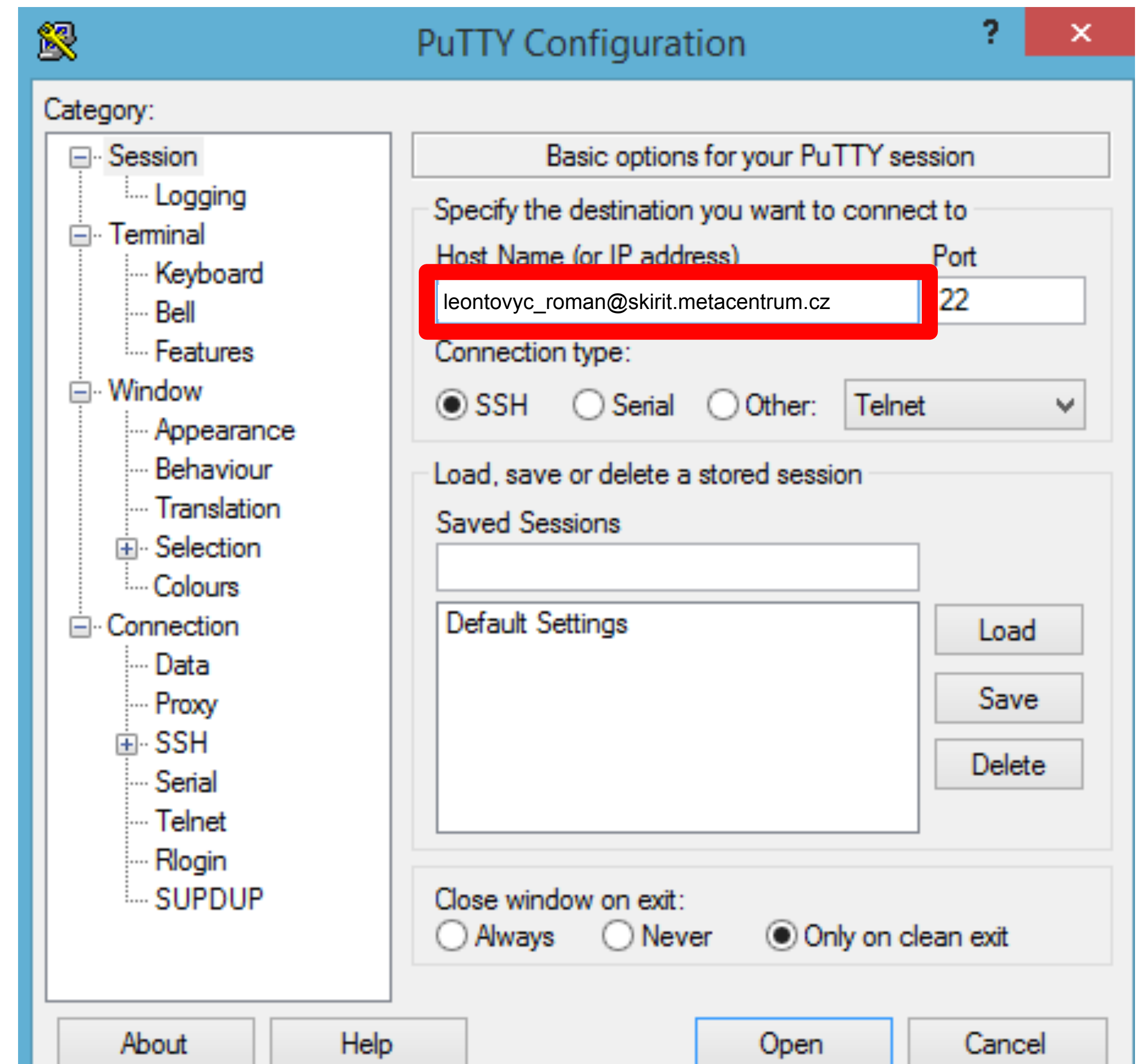
- Unix users
 - `ssh my_login@skirit.metacentrum.cz`

- Windows users

- Via [putty](#) (download [putty.exe](#))

putty.exe (the SSH and Telnet client itself)

64-bit x86:	putty.exe		(signature)
64-bit Arm:	putty.exe		(signature)
32-bit x86:	putty.exe		(signature)



1. Installation Fiji to Metacentrum clusters

#submit the intractive job

```
qsub -I -l walltime=2:0:0 -l select=1:ncpus=4:mem=8gb:scratch_local=30gb
```

#where we are

```
pwd
```

#make a working directory

```
mkdir fiji
```

#go to working directory

```
cd fiji
```

#download linux distribution of fiji

```
wget https://downloads.micron.ox.ac.uk/fiji_update/mirrors/fiji-stable/fiji-stable-linux64-jdk.zip
```

#decompress Fiji zip file

```
unzip fiji-stable-linux64-jdk.zip
```

#go to Fiji.app directory

```
cd Fiji.app
```

#look on the full path of Fiji installation

```
pwd
```

#/storage/praha5-elixir/home/leontovyc_roman/fiji/Fiji.app #change accordingly

#make an alias

```
alias ImageJ-linux64=./storage/praha5-elixir/home/leontovyc_roman/fiji/Fiji.app/ImageJ-linux64'
```

#run the Fiji application

```
ImageJ-linux64 --help
```

#update the Fiji <https://imagej.net/plugins/updater>

```
ImageJ-linux64 --update update
```

Run the simple script in Fiji

#Task: run the gaussian blurr on multiple raw images

#go to home directory

cd ~

#make working directory

mkdir fiji_work_dir

#go to working directory

cd fiji_work_dir

#make a input directory

mkdir input

#make a output directory

mkdir output

#copy the Fiji script here

cp /storage/brno2/home/leontovyc_roman/fiji_work_dir/input/dummy_image*.tif input

cp /storage/brno2/home/leontovyc_roman/fiji_work_dir/my_macro.ijm .

#run the macro script

ImageJ-linux64 --headless -batch my_macro.ijm "\$PWD/input/,\$PWD/output/"

Run the Fiji as the batch job

#go to your working directory

```
cd /storage/brno2/home/leontovyc_roman/fiji_work_dir
```

copy the batch job script to your working directory

```
cp /storage/brno2/home/leontovyc_roman/fiji_work_dir/fiji_script.sh .
```

#edit your batch job script according your directories

```
nano fiji_script.sh
```

#run the batch job

```
qsub fiji_script.sh
```

```
#!/bin/bash
#PBS -l walltime=00:10:00
#PBS -l select=1:ncpus=2:mem=4gb:scratch_local=10gb
#PBS -N fiji_name_job
#PBS -m abe
#PBS -M leontovyc.roman@seznam.cz

# set a DATADIR variable
DATADIR=/storage/brno2/home/leontovyc_roman/fiji_work_dir

# copy input file(s)
cp -r $DATADIR/input/ $SCRATCHDIR
cp $DATADIR/my_macro.ijm $SCRATCHDIR

# move into the scratch directory
cd $SCRATCHDIR

#make a outputdir
mkdir output_batch

# run the calculation
/storage/brno2/home/leontovyc_roman/fiji/Fiji.app/ImageJ-linux64 --headless -batch my_macro.ijm "$PWD/input/,$PWD/output_batch/"

#copy results
cp -r output_batch $DATADIR || export CLEAN_SCRATCH=false
# clean the scratch directory
clean_scratch
```

Job handling

Job monitoring

Command line

qstat -f job_ID **#e.g.** qstat -f 14291043.pbs-m1.metacentrum.cz

Graphical view

<https://metavo.metacentrum.cz/pbsmon2/jobs/detail>

Job extension

Command line (https://metavo.metacentrum.cz/en/news/novinka_2021_0013.html)

qextend 14291043.meta-pbs.metacentrum.cz 02:00:00

Job termination

qdel [14291043.meta-pbs.metacentrum.cz](https://metavo.metacentrum.cz/pbsmon2/jobs/detail)

OPEN ONDEMAND

Roman Leontovyč^{1,2}

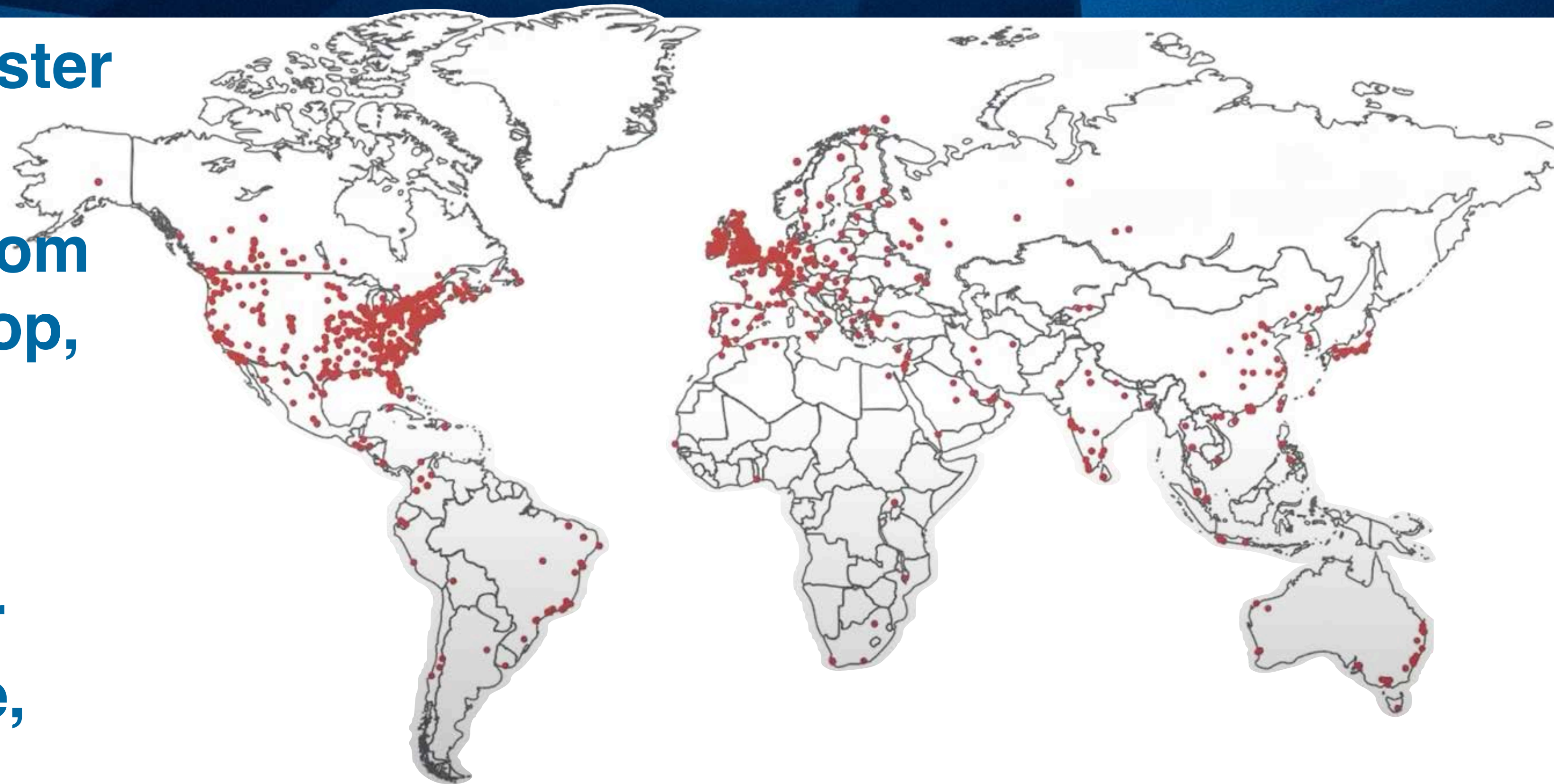
¹ MetaCentrum, CESNET z.s.p.o.

² Faculty of Science, Charles University

leontovr@natur.cuni.cz

Open OnDemand - introduction

- **Graphical, web-based cluster interface**
- **Web access to clusters from any device (desktop, laptop, mobile phone, tablet...)**
- **No installation needed**
- **Any modern web browser supported (Chrome, Edge, Safari, Opera...)**
- **Easy to use**
- **Developed in 2013, Ohio Supercomputing centre**

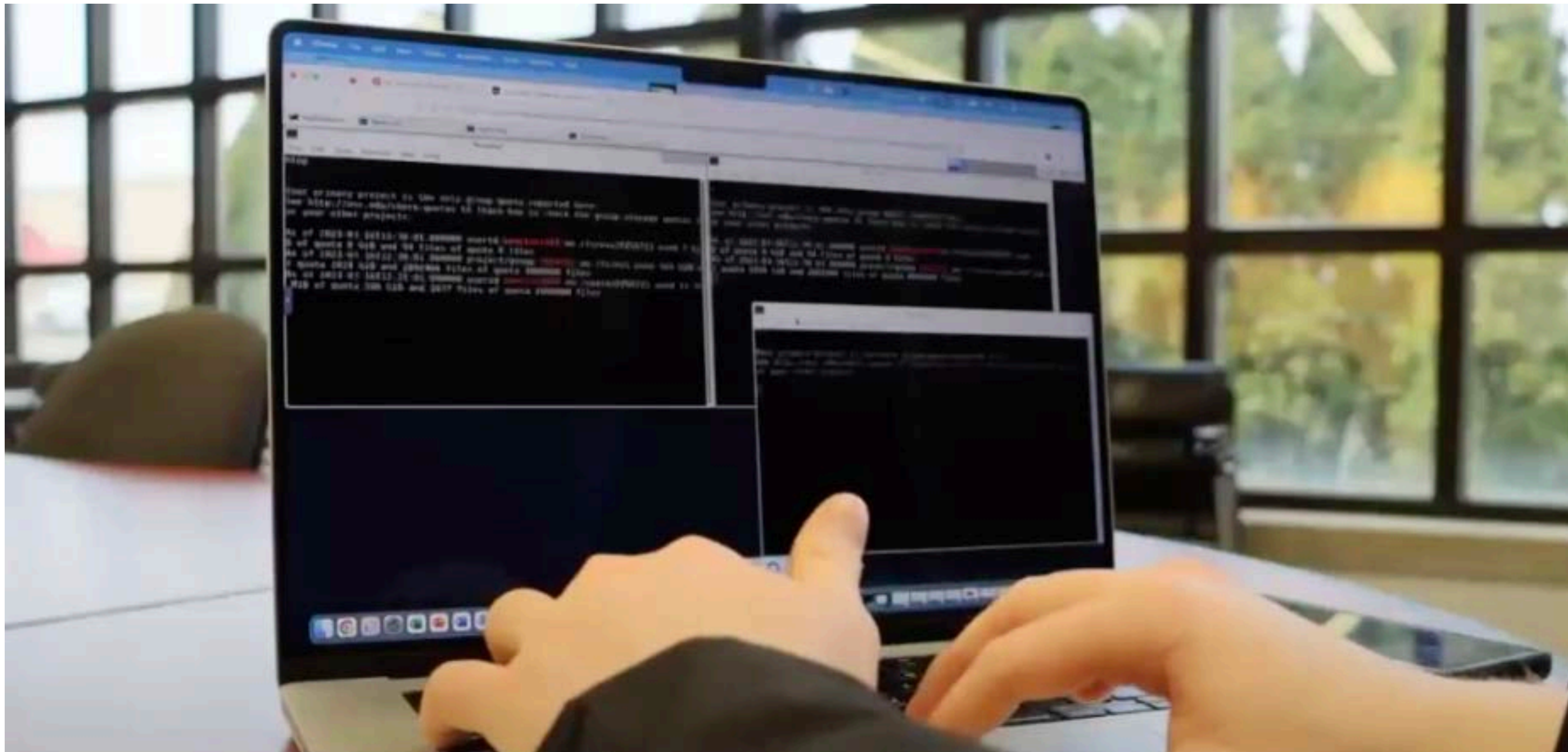


Deployed in 400 HPC centres

2100+
locations

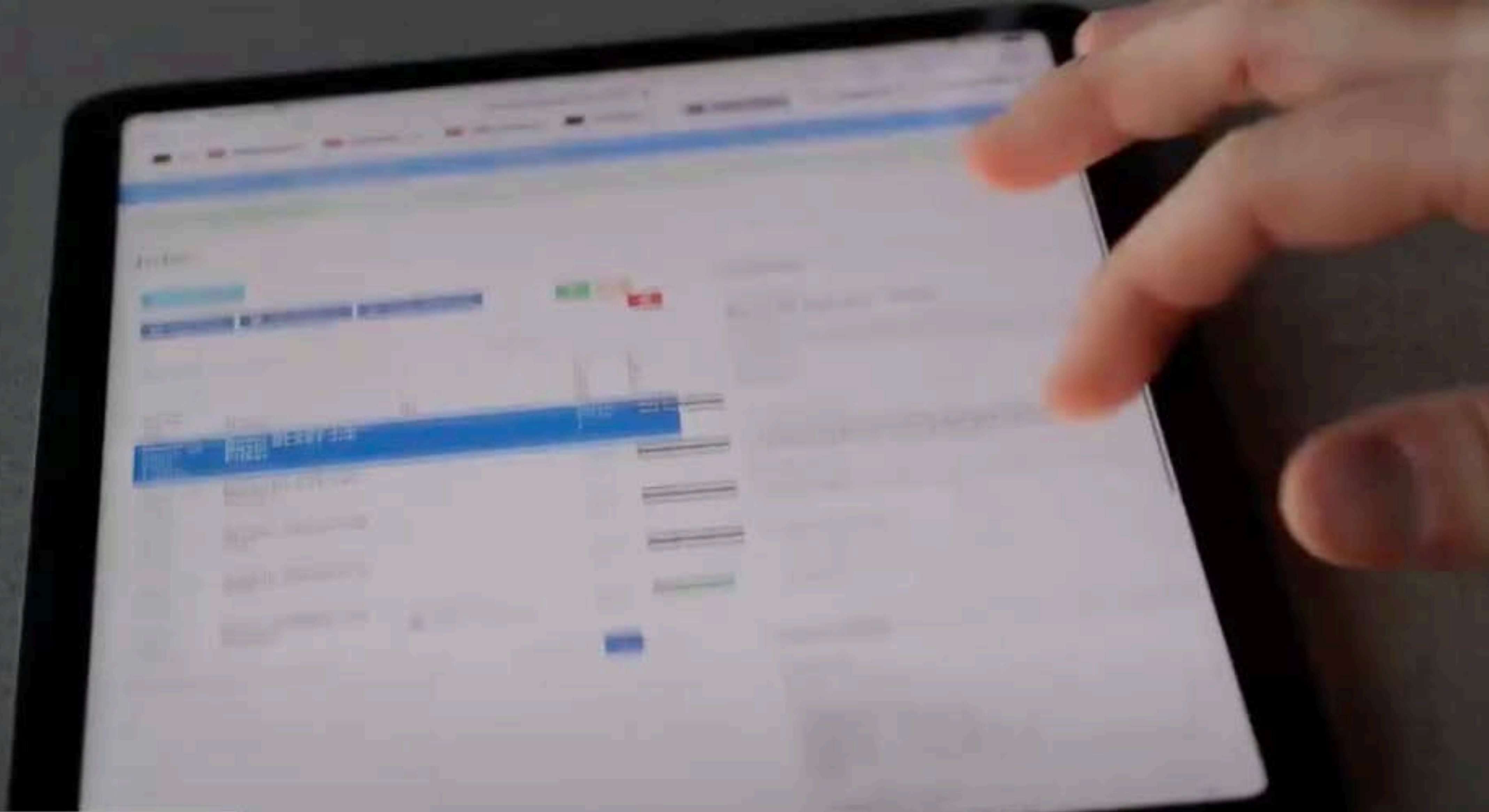
100
countries

6
continents



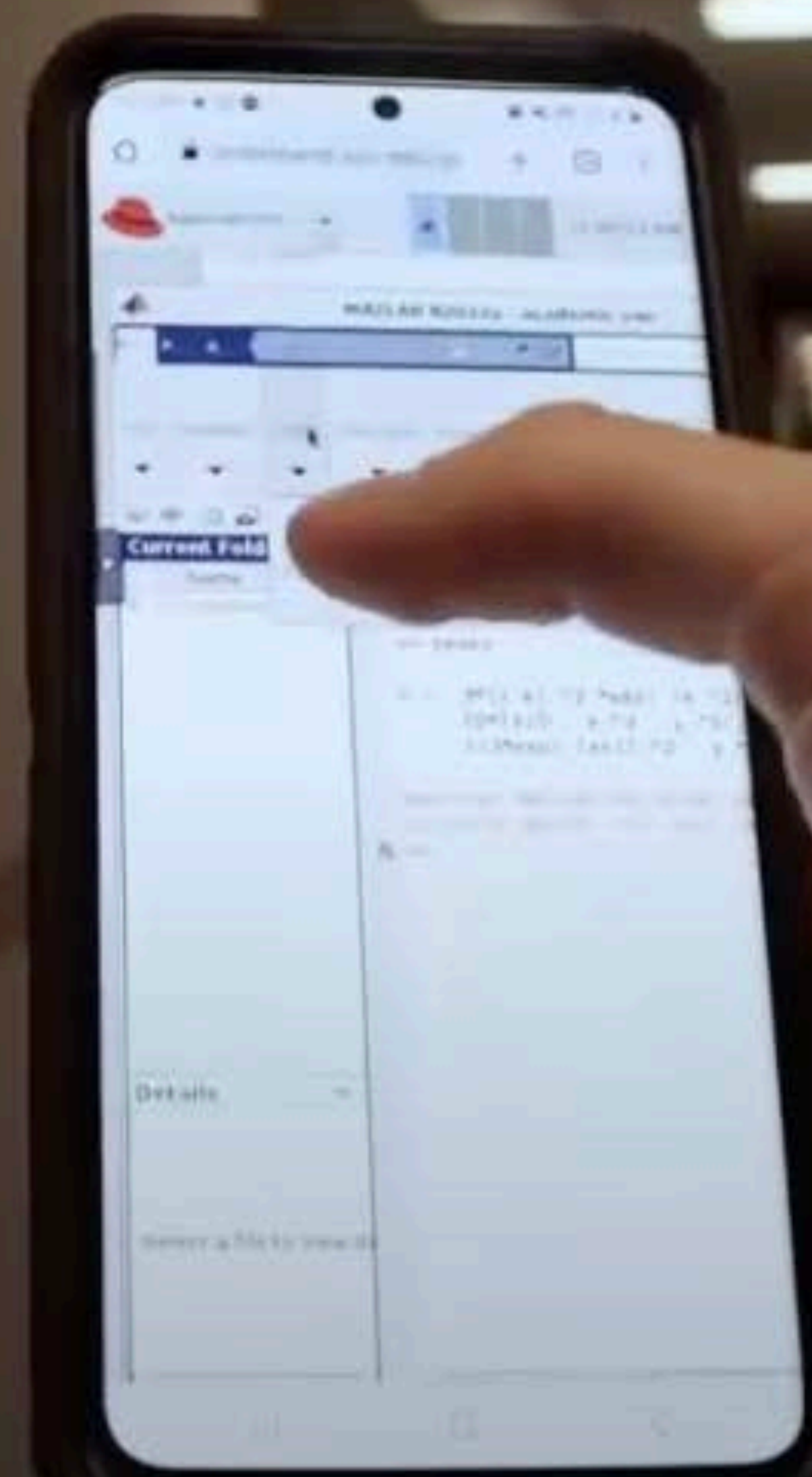
OPEN  **nDemand**

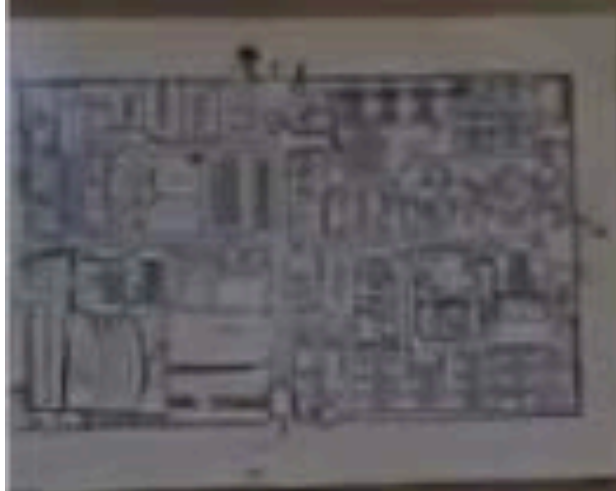
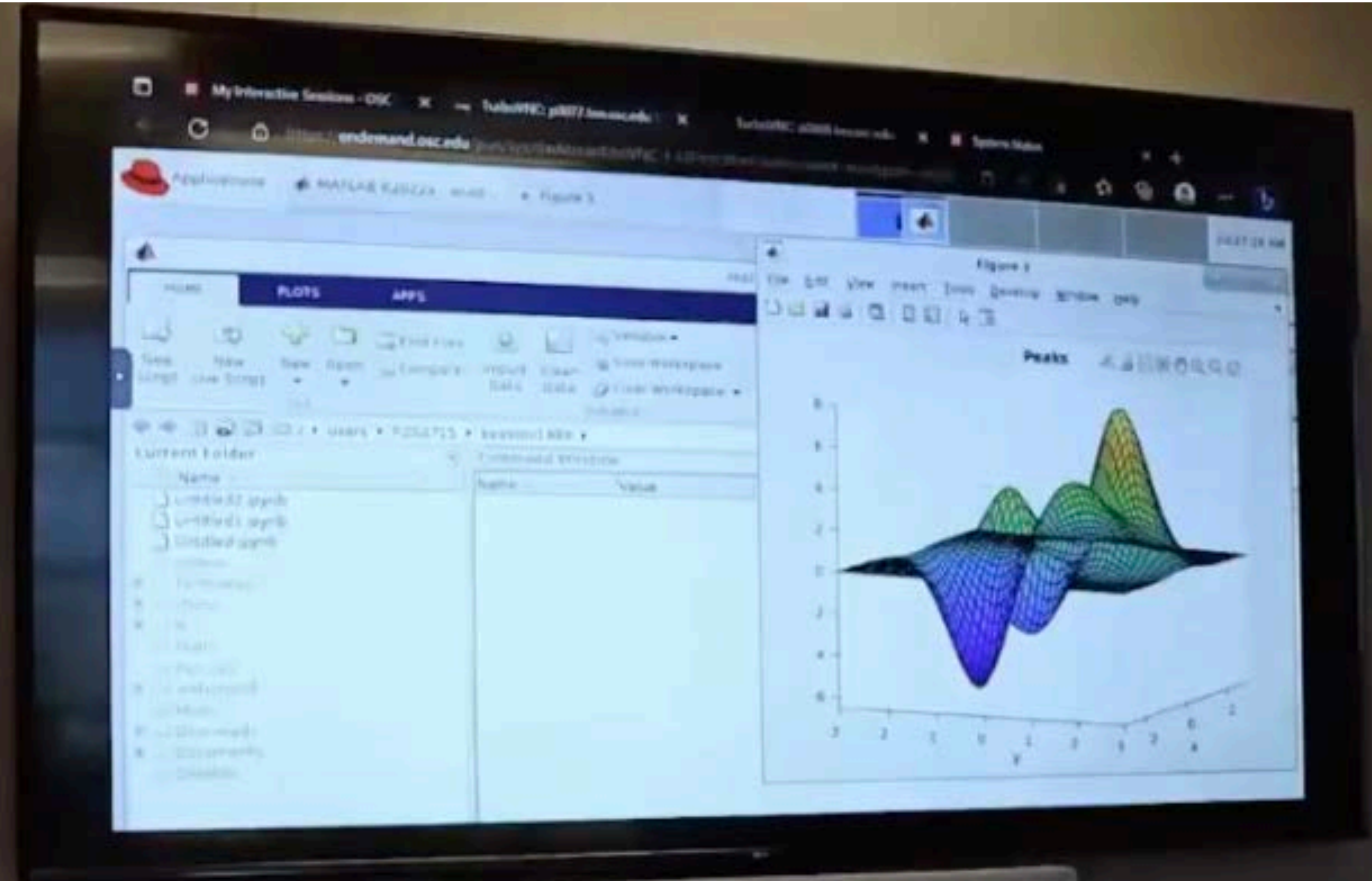
laptop



 **OnDemand**
tablet

OPEN  **nDemand**
cell phone

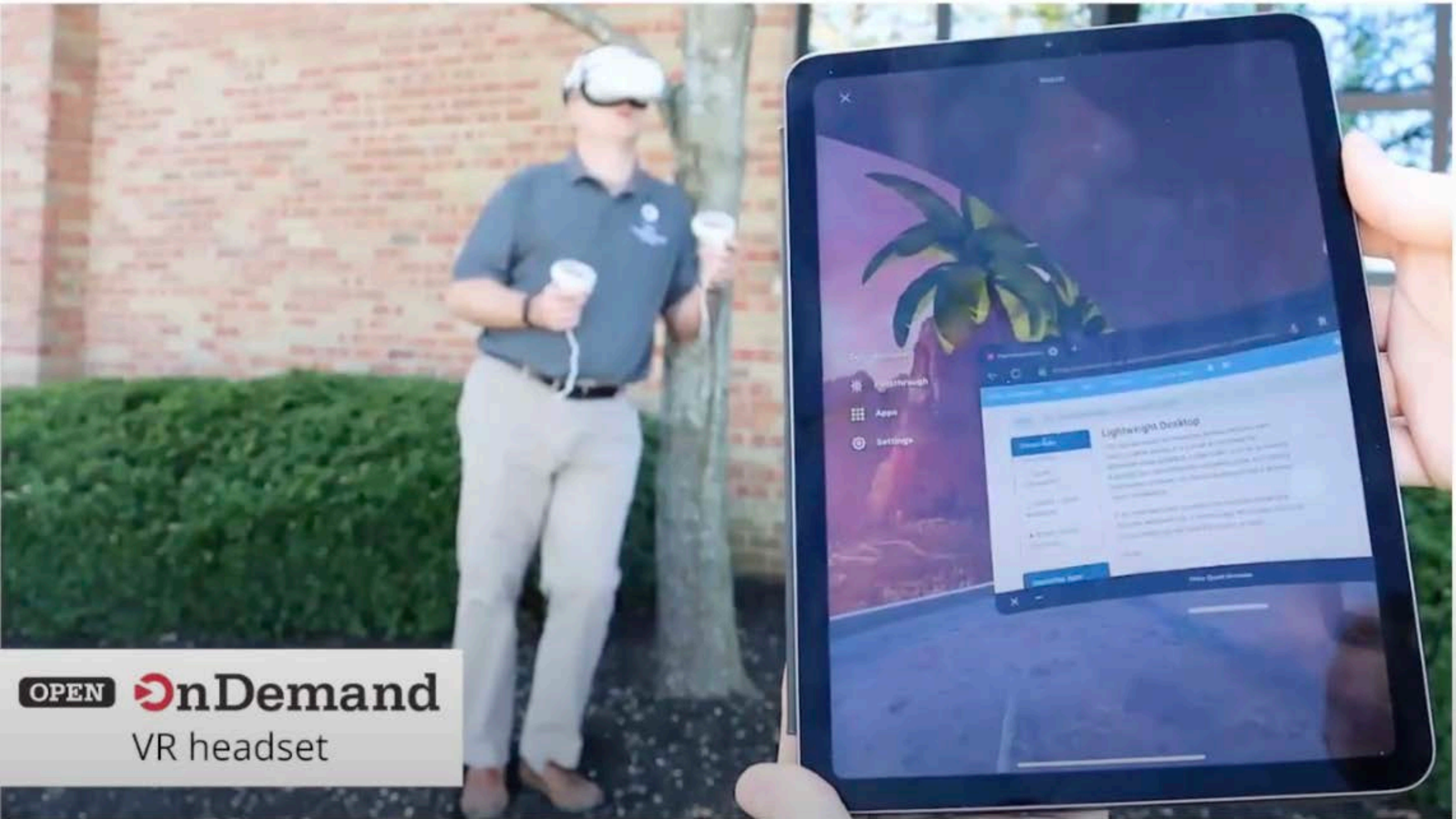




OPEN  **nDemand**
gaming console



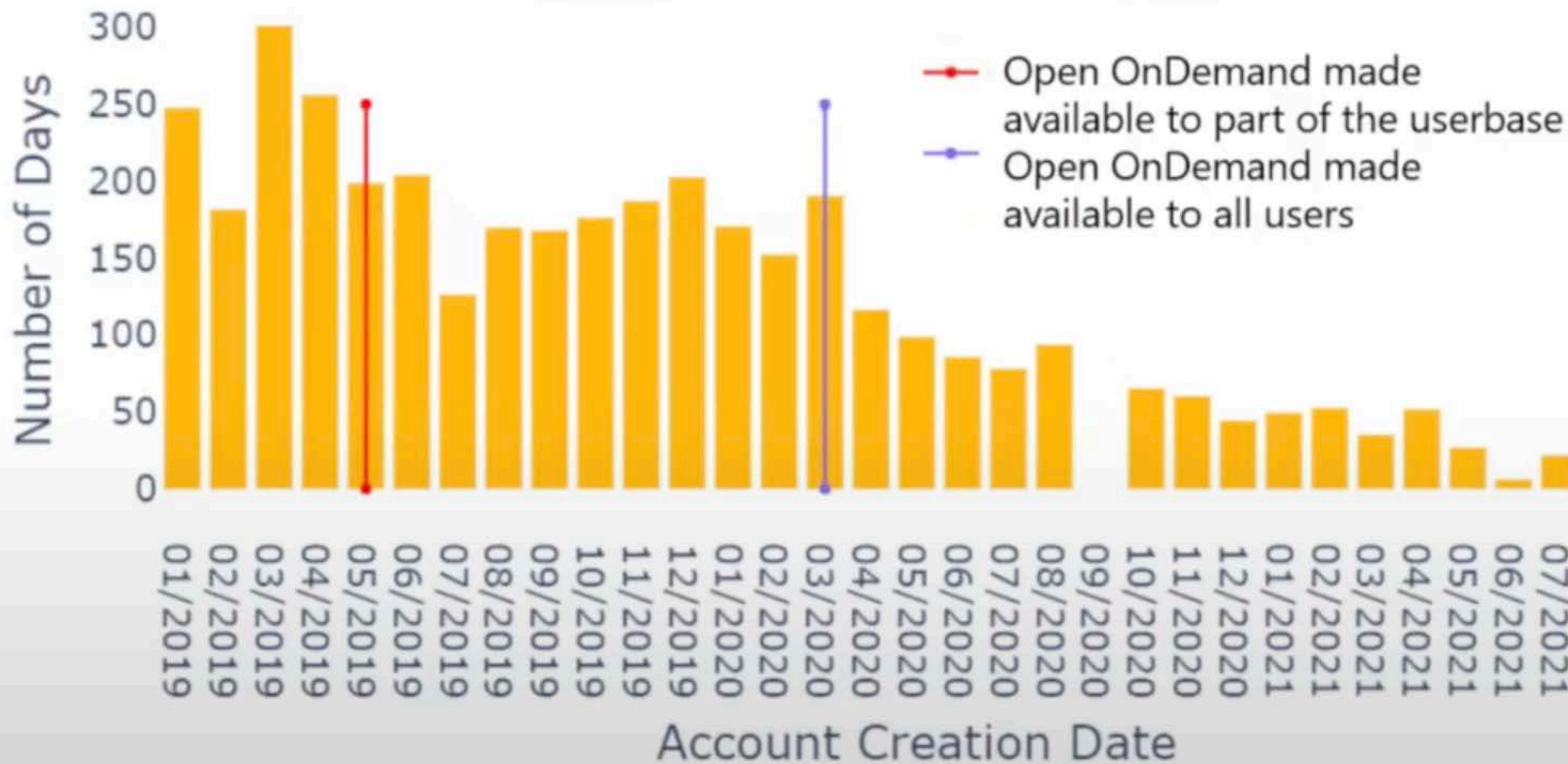
OPEN  **nDemand**
car dashboard



OPEN  **nDemand**
VR headset

Idaho national lab

Average Number of Days Between Account Creation to First Job Submission



Open Ondemand on Metacentrum

- **Running version - 3.1.7**
- **Access to MetaCentrum/CERIT-SC/ELIXIR computational resources and storages via web browser**
- **Shell (command line) access also possible**
- **e-INFRA CZ/Metacentrum login and Metacentrum password**
- **OOD documentation <https://osc.github.io/ood-documentation/latest/>**
- **Metacentrum documentation <https://docs.metacentrum.cz/ondemand>**

<https://ondemand.metacentrum.cz/pun/sys/dashboard>



Přihlášení k účtu ondemand.grid.cesnet.cz:443
Vaše přihlašovací údaje budou odeslány zabezpečeně.

leontovyc_roman

.....

Zapamatovat si heslo

Zrušit Přihlásit se

MetaCentrum Open OnDemand provides an integrated, single access point for HPC resources.

Selected applications - [all apps](#)



Jupyter
Lab/Notebook



RStudio



Matlab



FLUENT
Ansys Fluent



ENSIGHT
Ansys Enight



WORKBENCH
Ansys
Workbench



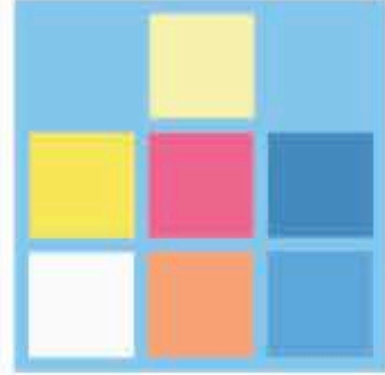
Frontend shell




Meta Desktop



Job Composer



BIOP Desktop

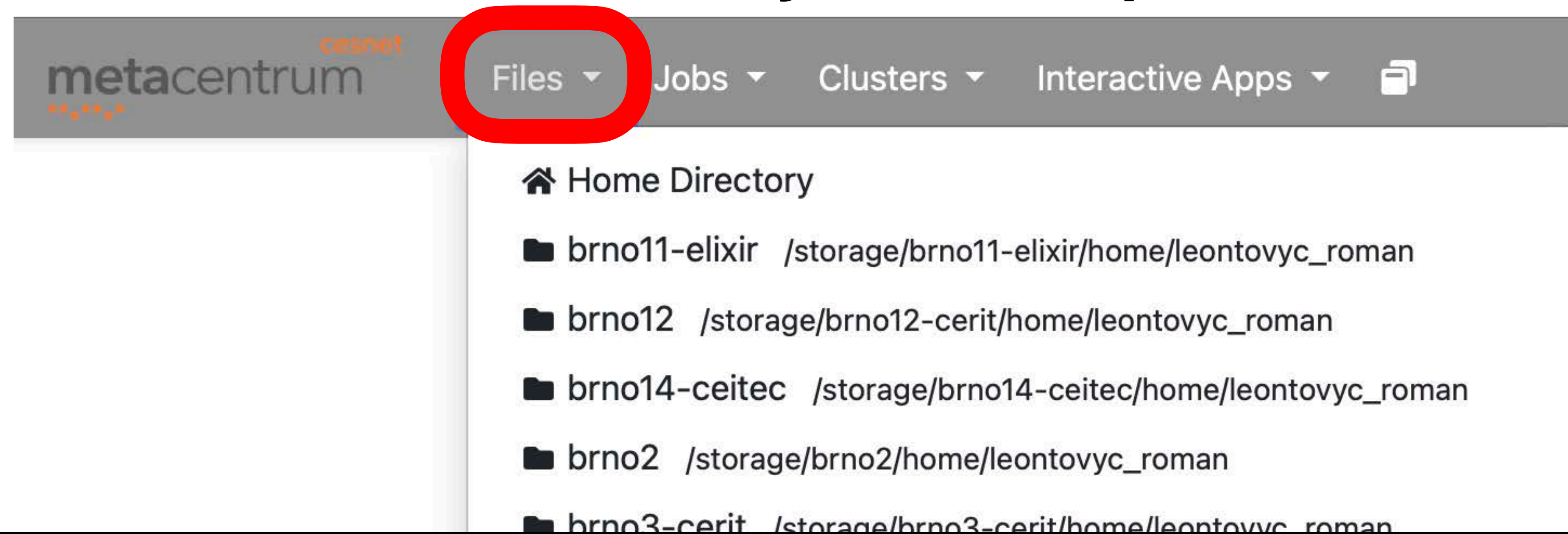


CLC Genomics
WB



VMD Desktop

File system in Open Ondemand



- **Classical file structure**
- **Access to all infrastructure storages**
- **Manipulation with the files/directories (create, view, rename, edit, delete, upload, download, etc)**
- **Drag and drop**

■ projects /storage/projects
■ projects2 /storage/projects2

Files

Action toolbar



>_ Open in Terminal | Refresh | + New File | + New Directory | Upload | Download | Copy/Move | Delete

Available storages

- Home Directory
- brno2
- brno12
- praha5-elixir
- brno11-elixir
- brno14-ceitec
- brno3-cerit
- budejovice1
- liberec3
- plzen1
- praha1

↑ / storage / brno2 / home / leontovyc_roman / Change directory Copy path

Show Owner/Mode Show Dotfiles Filter:

Showing 105 of 175 rows - 0 rows selected

<input type="checkbox"/>	Type ▲	Name	Size	Modified at
<input type="checkbox"/>	Folder	2.3.4	-	27. 5. 2024 12:35:35
<input type="checkbox"/>	Folder	ansys-2024	-	12. 6. 2024 14:45:03
<input type="checkbox"/>	Folder	brno8	-	23. 9. 2021 23:18:12
<input type="checkbox"/>	Folder	colabfold	-	23. 9. 2024 15:12:42

Drop-down menu



- Rename
- Download
- Delete

Jobs in Open Ondemand



- Analogous to a batch job

- Active jobs

- status of submitted jobs (queued, running, completed...)
- Informations about the job (cluster, walltime, job ID, CPU time, ...)

- Job composer

- tool for creating and submitting the jobs
 - From templates
 - Run existing previously submitted jobs
- handling the jobs (submit, delete, edit, stop)

Active jobs


Your Jobs ▾

All Clusters ▾

Active Jobs

Show entries

Filter:

ID	Name	User	Account	Time Used	Queue	Status	Cluster	Actions
> 9163251.pbs-m1.metacentrum.cz	sys-dashboard-sys-bc_desktop-metacentrum	leontovyc_roman		00:21:54	interactive	Running	Perian	

Job composer

[+ New Job](#)
[☆ Create Template](#)
[Edit Files](#)
[Job Options](#)
[Open Terminal](#)
[Submit](#)
[Stop](#)
[Delete](#)

 Show entries

 Search:

Created	Name	ID	Cluster	Status
May 8, 2024 11:29pm	(default) Metacentrum simple sequential job	9163197.pbs-m1.metacentrum.cz	Perian	Completed
April 29, 2024 9:03am	(default) Metacentrum simple sequential job		Perian	Not Submitted
April 11, 2023 2:40pm	(default) Metacentrum simple sequential job	15005996.meta-pbs.metacentrum.cz	Perian	Completed
April 6, 2023 1:28pm	Alphafold Metacentrum job	14933439.meta-pbs.metacentrum.cz	Perian	Completed
April 5, 2023 4:24pm	test_ondemand.sh		Perian	Not Submitted
April 5, 2023 4:15pm	Alphafold Metacentrum job		Perian	Not Submitted
February 6, 2023 8:43pm	(default) Metacentrum simple sequential job	14644331.meta-pbs.metacentrum.cz	Perian	Completed

Showing 1 to 7 of 7 entries

[Previous](#) [1](#) [Next](#)

Job Details

9163197.pbs-m1.metacentrum.cz

Job Name:

(default) Metacentrum simple sequential job

Submit to:

Perian

Account:

Not specified

Script location:

/storage/brno2/home/leontovyc_roman/ondemand/data/sys/myjobs/proje

Script name:

main_job.sh

Folder Contents:

[hello_world.o9163197](#)
[main_job.sh](#)
[output_file](#)

Submit Script

main_job.sh

Script contents:

```
#PBS -N hello_world
#PBS -l ncpus=1
#PBS -l walltime=24:00:00
#PBS -l mem=400mb
#PBS -j oe
##PBS -l scratch_local=1g

cd $PBS_0_WORKDIR
echo "Hello World" > output_file

echo "Created output_file with 'Hello World'"
```

[Open Editor](#)
[Open Terminal](#)
[Open Dir](#)

```
1 #PBS -N Alphafold-000-JOB
2 #PBS -q ondemand
3 #PBS -l select=1:ncpus=8:ngpus=1:mem=100gb:scratch_local=10gb:gpu_cap=cuda75
4 #PBS -l walltime=24:00:00
5 #PBS -m oe
6
7 cd $PBS_O_WORKDIR
8
9 #####
10 #change paths
11 OUTPUTS_DIR=./outputs
12 # here you can set one file, directory or wildcard for files inside dir, e.g. '/dir/ecto/ry/' will process all files in the
13 FASTA_INPUTS=/storage/brno11-elixir/projects/alphafold/example-fasta/seq.fasta
14 #####
15
16 # multimer example
17 #FASTA_INPUTS=/storage/brno11-elixir/projects/alphafold/example-fasta/multi.fasta
18
19 #choose one of the Alfafold prediction method
20 METHOD="AF_MONOMER_REDUCED_DBS"
21 #METHOD="AF_MULTIMER_FULL_DBS"
22 #METHOD="AF_MULTIMER_REDUCED_DBS"
23
24 # load methods
25 source ./lib.sh
26
27 # execute method
28 $METHOD
29
30 # copy results from scratch
31 mkdir -p $OUTPUTS_DIR
32 cp -r $SCRATCHDIR/* $OUTPUTS_DIR/ && rm -r $SCRATCHDIR/*
```

- Access to command-line interface of 5 different frontends
- Command line interface in web browser

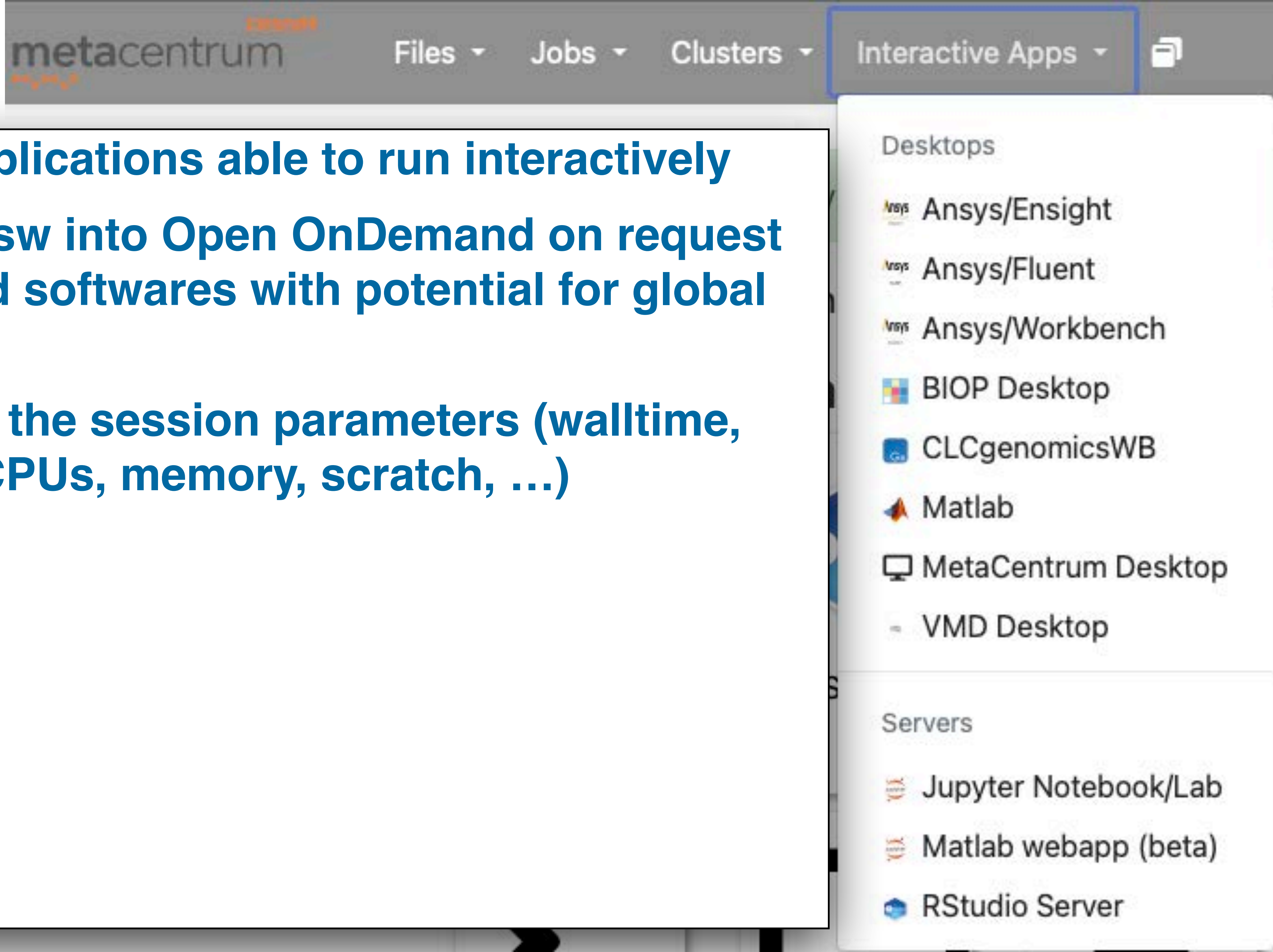
- >_ Perian Shell Access
- >_ Skirit Shell Access
- >_ Tarkil Shell Access
- >_ Zenith Shell Access
- >_ cerit-pbs zuphux Shell Access












```
Host: skirit.metacentrum.cz
Your Home Directories
-----
Avail |   DATA |   FILES | Backup | Storage
space | quota  used | quota  used |         |
-----
 82T  5.36T 136G    2M  329k  snap  brno11-elixir
 4.5P  none  107G   none  8.15k  snap  brno12-cerit
114T  none    0     none    2     snap  brno1-cerit
116T  4.29T 188G   2.5M  132k  snap  brno2
186T  none  48.8G   none  8.06k  snap  brno3-cerit
 30T  3.32T 261G    1M  2.89k  full  budejovice1
 33T  10.4  378M   none    17    -    liberec3-tul
505T  4.29T 4.00T    3M  674k  snap  plzen1
 24T  5.36T 1.03T  1.01M  241k  full  praha5-elixir
 94T  7.34G    8k   none    3     full  pruhonice1-ibot
211T  2.14T  461G    2M  46.8k  snap  vestec1-elixir

CPUs
-----
Free  Used  Total  Centre
1165  6539  7704   CERIT
1979  989   2968   ELIXIR
3696 15870 19566   META

Contact
-----
E-mail: meta@cesnet.cz
Web:    http://www.metacentrum.cz/

(BULLSEYE)leontovyc_roman@skirit:~$
```



- Desktops
 -  Ansys/Ensignt
 -  Ansys/Fluent
 -  Ansys/Workbench
 -  BIOP Desktop
 -  CLCgenomicsWB
 -  Matlab
 -  MetaCentrum Desktop
 -  VMD Desktop
- Servers
 -  Jupyter Notebook/Lab
 -  Matlab webapp (beta)
 -  RStudio Server

- **Different applications able to run interactively**
- **Installation sw into Open OnDemand on request (widely used softwares with potential for global use)**
- **Selection of the session parameters (walltime, number of CPUs, memory, scratch, ...)**

Interactive Apps

Desktops

 Ansys/Fluent Desktop

 **Matlab Desktop**

 MetaCentrum Desktop

 VMD Desktop

Servers

 Jupyter Notebook

 RStudio Server

Matlab Desktop version: f8a6b5a

This app will launch an interactive desktop on one or more compute nodes. You will have full access to the resources these nodes provide. This is analogous to an interactive batch job.

Number of hours

Number of CPUs on single node

Memory (GB)

GPUs

Scratch local (GB)

Session was successfully created. ✕


[Home](#) / [My Interactive Sessions](#)

Interactive Apps

Desktops

 Ansys/Fluent
Desktop

 Matlab Desktop

 MetaCentrum
Desktop

 VMD Desktop

Servers

 Jupyter Notebook

Matlab Desktop (14933502.meta-pbs.metacentrum.cz)

1 node | 4 cores | Running

Host: halmir2.metacentrum.cz

 Delete

Created at: 2023-04-06 13:59:46 CEST

Time Remaining: 43 minutes

Session ID: [802d5c28-0f32-43bd-ba42-84de4baaacd4](#)

Compression



0 (low) to 9 (high)

Image Quality



0 (low) to 9 (high)

[Launch Matlab Desktop](#)

[View Only \(Share-able Link\)](#)

MATLAB R2022b - academic use

HOME

PLOTS

APPS

Search Documentation

Sign In



New Script



New Live Script



New

FILE



Open



Find Files



Compare



Import Data



Clean Data



Variable



Save Workspace



Clear Workspace

VARIABLE

CODE

SIMULINK

ENVIRONMENT

RESOURCES

/ auto brno2 home leontovyc_roman

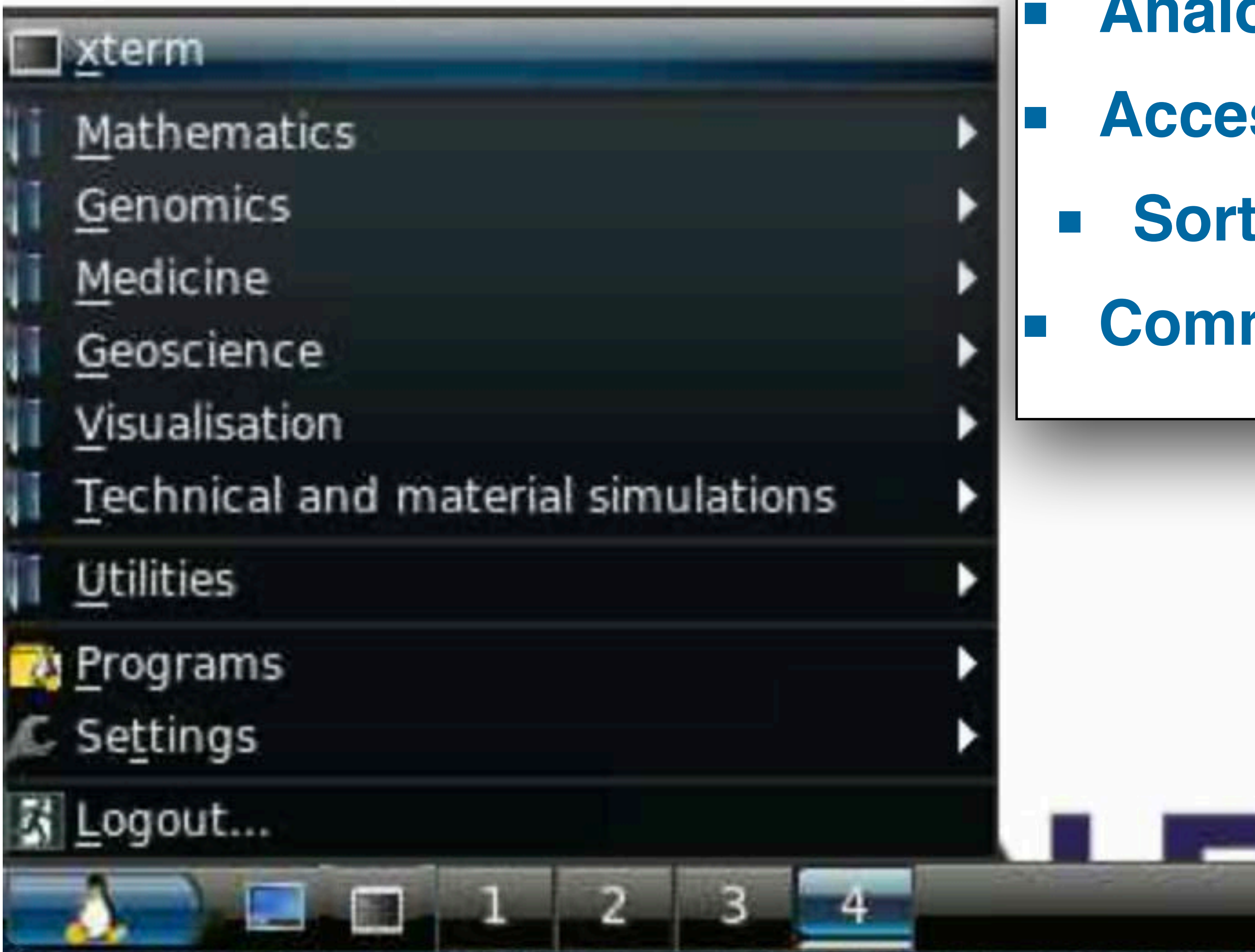
Current Folder

- Name
- biopython
- brno6
- brno8
 - CLC_Data
 - Downloads
- espresso_md
- gene_enriched
- hands-on
 - high_ethanol_yeast
 - high_ethanol_yeast_1
- Kegg_download
- korena
- korena_busco

Command Window

```
fx >> |
```

Metacentrum desktop



- Analogous to an interactive job
- Access to other GUI applications
 - Sorted by categories
- Command line control option

All available graphical applications

■ Mathematics

- Matlab
- Maple
- Wolfram Mathematica
- Scilab
- R

■ Genomics

- CLCbio Genomic Workbench
- Geneious
- SNP and AFLPPackage for Phylogenetic analysis
- Tablet
- FingerPrinted Contigs
- UEA sRNA Workbench

■ Medicine

- Freesurfer

■ Geoscience

- integrated data viewer

■ Visualisation

- Visit
- XCrysDen

■ Technical and material simulations

- Ansys 15, 16.1, 16.2, 17.1, 17.2, 18.0, 18.2

Conclusion



Command-line









GUI - Open OnDemand

- **Pros**
 - efficient for experienced users
 - good for large-scale data processing
 - **Cons**
 - high learning curve
 - not GUI applications friendly
- **Pros**
 - easy to use
 - GUI applications friendly
 - no installation needed
 - **Cons**
 - not as efficient as the command-line
 - challenging to submit the array jobs

Hands on

Running Fiji on Metacentrum clusters in OpenOndemand GUI

<https://ondemand.metacentrum.cz>

Interactive Apps
Desktops
 Ansys/Fluent
 Ansys/Workbench
 CLCgenomicsWB
 Matlab Desktop
 MetaCentrum Desktop
 VMD Desktop
Servers
 Jupyter Notebook
 RStudio Server

MetaCentrum Desktop

This app will launch an interactive desktop on one or more compute nodes. You will have full access to the resources these nodes provide. This is analogous to an interactive batch job.

Number of hours

Number of CPUs on single node

Memory (GB)

GPUs

Scratch local (GB)

* The MetaCentrum Desktop session data for this session

Run Fiji in Open OnDemand graphical user interface

#in web browser copy paste url

<https://ondemand.metacentrum.cz/>

#Launch MetaCentrum Desktop

#Set the resources

e.g. 2 hours, 2 CPUs, 8 GB memory, 0GPU, 20 GB scratch

Run Metacentrum desktop

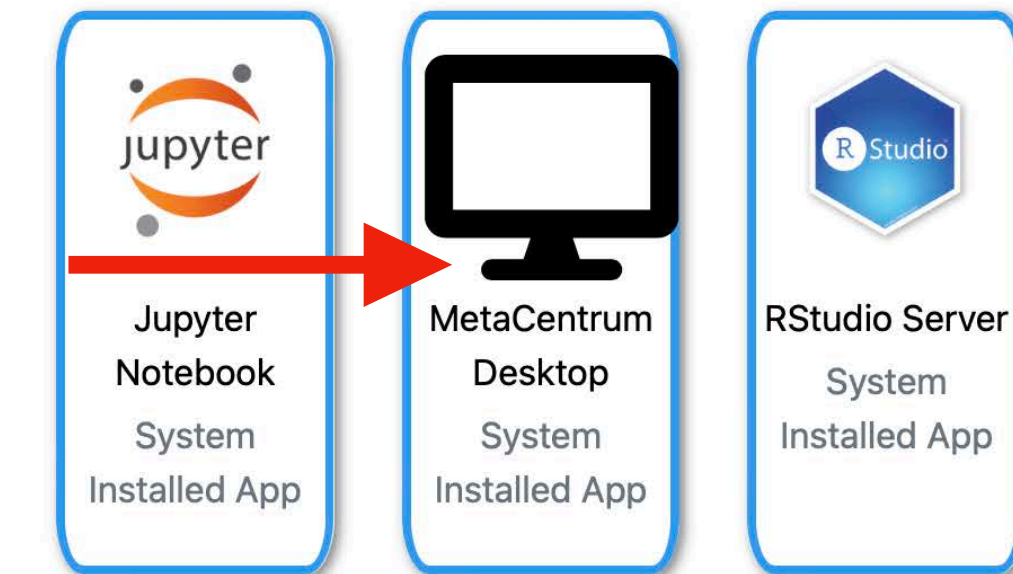
Run x term window (command line interface)

Run your Fiji installation

`/storage/brno2/home/leontovyc_roman/fiji/Fiji.app/ImageJ-linux64`

OnDemand provides an integrated, single access point for all c

Pinned Apps A featured subset of [all available ap](#)



Thank you for attention



stty rows 15 cols 138



```
leontovyc_roman — ssh leontovyc_roman@elmo.metacentrum.cz — 138x15

# move into the scratch directory
cd $SCRATCHDIR

#make a outputdir
mkdir output_batch

# run the calculation
/storage/brno2/home/leontovyc_roman/fiji/Fiji.app/ImageJ-linux64 --headless -batch my_macro.ijm "$PWD/input/, $PWD/output_batch/"

#copy results
cp -r output_batch $DATADIR || export CLEAN_SCRATCH=false
# clean the scratch directory
clean_scratch
(BOOKWORM)leontovyc_roman@aman5:~/fiji_work_dir$ /storage/brno2/home/leontovyc_roman/fiji/Fiji.app/ImageJ-linux64
```