



## CSC services for Finnish academic EO community

27.05.2025

Kylli Ek, CSC – IT center for Science



Non-profit state organization with special tasks



Turn over in 2023

**73,6** M€



**LUMI**

Owned together with EuroHCP JU and unique consortium of 10 countries – Belgium, Czech Republic, Denmark, Estonia, Finland, Iceland, Norway, Poland, Sweden and Switzerland.



Headquarters in Espoo,  
data center in Kajaani



Owned by the Finnish state (**70%**)  
and all Finnish higher education institutions (**30%**)



**670**  
employees  
(04.2024)

# Geoportti and Location Innovation Hub EDIH



## Geoportti – The Hub for for Finnish Geospatial Research and Education Resources

- A shared service for using geospatial data and geocomputing tools. Geoportti RI helps the researchers in Finland to use, to refine, to preserve and to share their geospatial resources.
- Coordinated by National Land Survey of Finland (NLS)

<https://www.geoportti.fi/>



## Location Innovation Hub (LIH) European Digital Innovation Hub (EDIH)

- Large network that consists of companies, research organizations and universities, as well as the public sector.
- Goal: to expand the use of geospatial data in services, new business and technologies, and produce new benefits and innovations for society based on them.
- Coordinated by NLS

<https://locationinnovationhub.eu/en/home/>

# CSC computing services



# CSC national computing services for Finnish academy



- Puhti and Mahti **supercomputers**
- Allas **S3 storage**
- cPouta **general cloud for VM**
- **Sensitive data** computing services
- Pukki for **PostGIS database**
- Free of charge for research and teaching
- 300+ geo-users
- <https://research.csc.fi/geocomputing>



## Computing services, EuroHPC LUMI

- For EU academy + 20% for companies
- Owned by 11 countries and EuroHPC
- Located in Finland
- LUMI supercomputer
  - Huge GPU machine, smaller CPU side
- LUMI-O S3 storage
- <https://www.lumi-supercomputer.eu/>



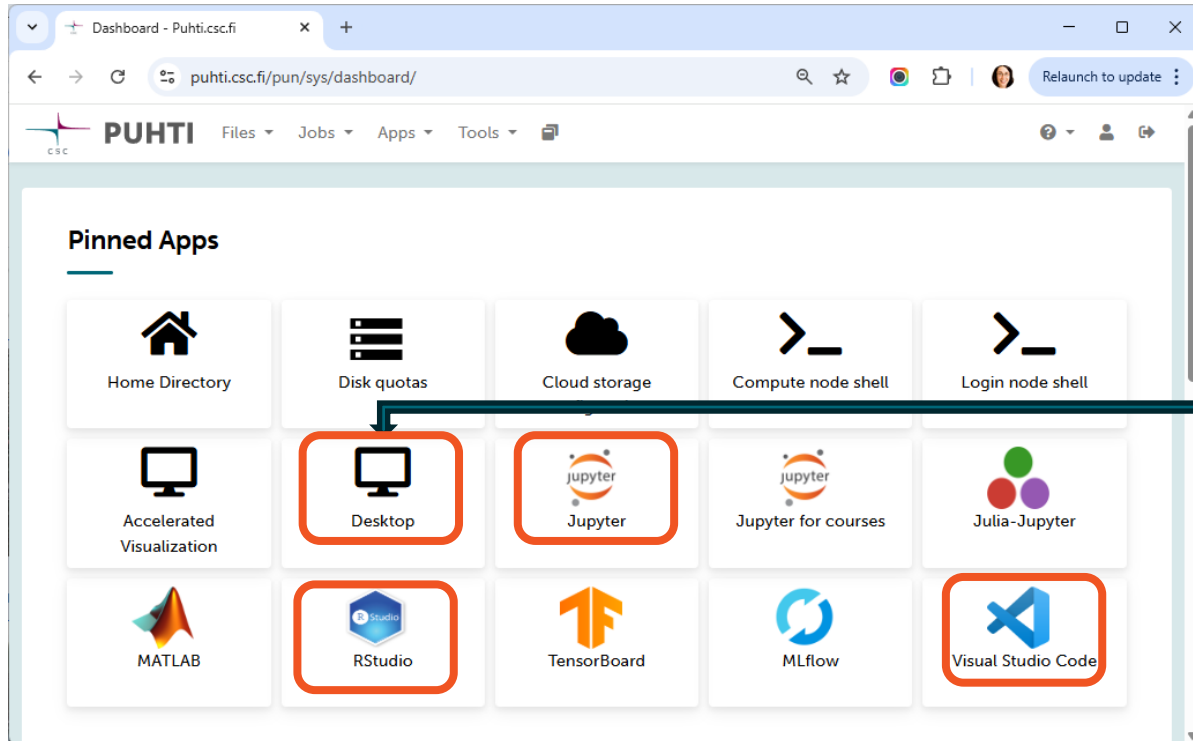
\*Available in LUMI

## Geospatial tools in Puhti (and LUMI)

- ArcGIS Python API
- CloudCompare
- **FORCE**
- GDAL/OGR\*
- GRASS GIS\*
- LasTools
- MatLab
- **OpenDroneMap**
- Orfeo Toolbox
- PCL
- PDAL\*
- **Python geospatial packages\***
- QGIS\*
- **R geospatial packages**
- SagaGIS\*
- **SNAP, Sen2cor, sen2mosaic**
- WhiteboxTools
- Zonation
- **Deep learning\*: pytorch, tensorflow, Jax**
- Workflow tools: Snakemake, NextFlow

[https://docs.csc.fi/apps/by\\_discipline/#geosciences](https://docs.csc.fi/apps/by_discipline/#geosciences)

# Supercomputer web interfaces




QGIS, GRASS, SagaGIS,  
CloudCompare, SNAP

# CSC Paituli STAC



# CSC Paituli STAC

- ~ 175 raster datasets
- Description: <https://paituli.csc.fi/stac.html>
- [STAC Browser Paituli STAC:lle](#)
- Example scripts:
  - [Python](#),
  - [R](#)

 sentinel

### Sentinel-1 11-days backscatter mosaics: VV and VH polarisation.

Sentinel-1 11-days backscatter mosaics: VV and VH polarisation. Resolution: 20m. Covered area: Finland. Original Sentinel-1 data from ESA Copernicus Sentinel...

10/1/2014, 12:00:00 AM UTC - 3/21/2023, 11:59:59 PM UTC



### Sentinel-2 11-days surface reflectance mosaics.

Sentinel-2 11-days surface reflectance mosaics. Resolution: 10m. Covered area: Finland. Original Sentinel-2 data from ESA Copernicus Sentinel Program, mosaic processing by...

2/1/2017, 12:00:00 AM UTC - 1/31/2023, 11:59:59 PM UTC



### Sentinel-2 NIR (B08) 07/2021

Sentinel-2 satellite image mosaics produced from data provided by MultiSpectral Instruments (MSI) onboard Sentinel-2A and -2B satellites (B08)

1/1/2021, 12:00:00 AM UTC - 12/31/2021, 12:00:00 AM UTC

### Sentinel-1 backscatter tiles: VV and VH polarisation.

Sentinel-1 backscatter tiles: VV and VH polarisation. Resolution: 20m. Covered area: Finland. Original Sentinel-1 data from ESA Copernicus Sentinel Program, processing ...

10/4/2014, 3:56:19 PM UTC - 3/23/2023, 4:31:08 PM UTC

### Sentinel-2 annual surface reflectance mosaics.

Sentinel-2 annual surface reflectance mosaics. Resolution: 10m. Covered area: Finland. Original Sentinel-2 data from ESA Copernicus Sentinel Program, mosaic processing by...

1/1/2017, 12:00:00 AM UTC - 12/31/2021, 11:59:59 PM UTC

### Sentinel-2 satellite image mosaic 07/2021

Sentinel-2 satellite image mosaics produced from data provided by MultiSpectral Instruments (MSI) onboard Sentinel-2A and -2B satellites (B02, B03, B04)

1/1/2021, 12:00:00 AM UTC - 12/31/2021, 12:00:00 AM UTC

### Sentinel-2 L2A

Sentinel-2 products, processed to Level-2A (Surface Reflectance), a selection of mostly cloud-free products from Finland. More information: <https://a3s.fi/sentinel-...>

5/10/2016, 12:00:00 AM UTC - 10/29/2021, 12:00:00 AM UTC



### Sentinel-2 SWIR (B11) 07/2021

Sentinel-2 satellite image mosaics produced from data provided by MultiSpectral Instruments (MSI) onboard Sentinel-2A and -2B satellites (B11)

1/1/2021, 12:00:00 AM UTC - 12/31/2021, 12:00:00 AM UTC

### Sentinel-1 daily backscatter mosaics: VV and VH polarisation.

Sentinel-1 daily backscatter mosaics: VV and VH polarisation. Resolution: 20m. Covered area: Finland. Original Sentinel-1 data from ESA Copernicus Sentinel...

1/3/2017, 12:00:00 AM UTC - 3/30/2023, 12:00:00 AM UTC

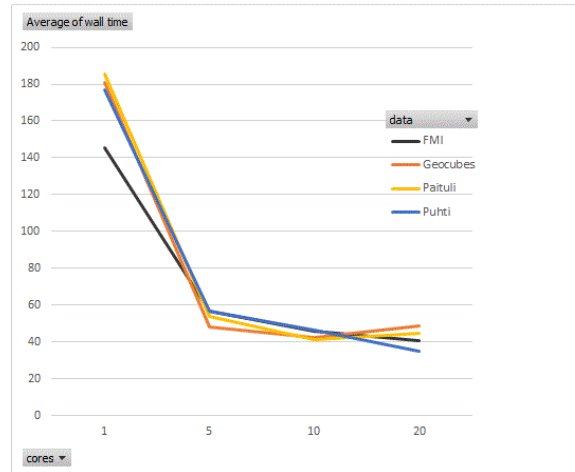
### Sentinel-2 monthly index mosaics: NDVI, NDBI, NDMI, NDSI, NDTI.

Sentinel-2 monthly index mosaics: NDVI, NDBI, NDMI, NDSI, NDTI. Resolution: 10m. Covered area: Finland. Available each year for April-October. Original Sentinel-2...

4/1/2016, 12:00:00 AM UTC - 10/31/2022, 11:59:59 PM UTC



- Current problem: parallelizing to more than 5-10 cores does not give any benefit
  - Likely limited by IO, but also from local parallel disk?



# Training and support



- EO-guide

- How to use CSC computing resources for EO data
- Where to find EO data, how to download
- Alternative computing services

- Geocomputing on the supercomputer

- Self-learning courses: Spatial analysis with R and Python GIS

- Using geospatial files directly from public repositories and S3 storage services, inc Allas

- Seminars, inc about EO, machine learning , point cloud analysis etc.



# Support

- CSC helps each computing project to get started and supports in technical questions.
- [servicedesk@csc.fi](mailto:servicedesk@csc.fi)