



# PaNOSC & ExPaNDS Annual Meeting

## WP status and roadmap: WP4/4 PaN data analysis services

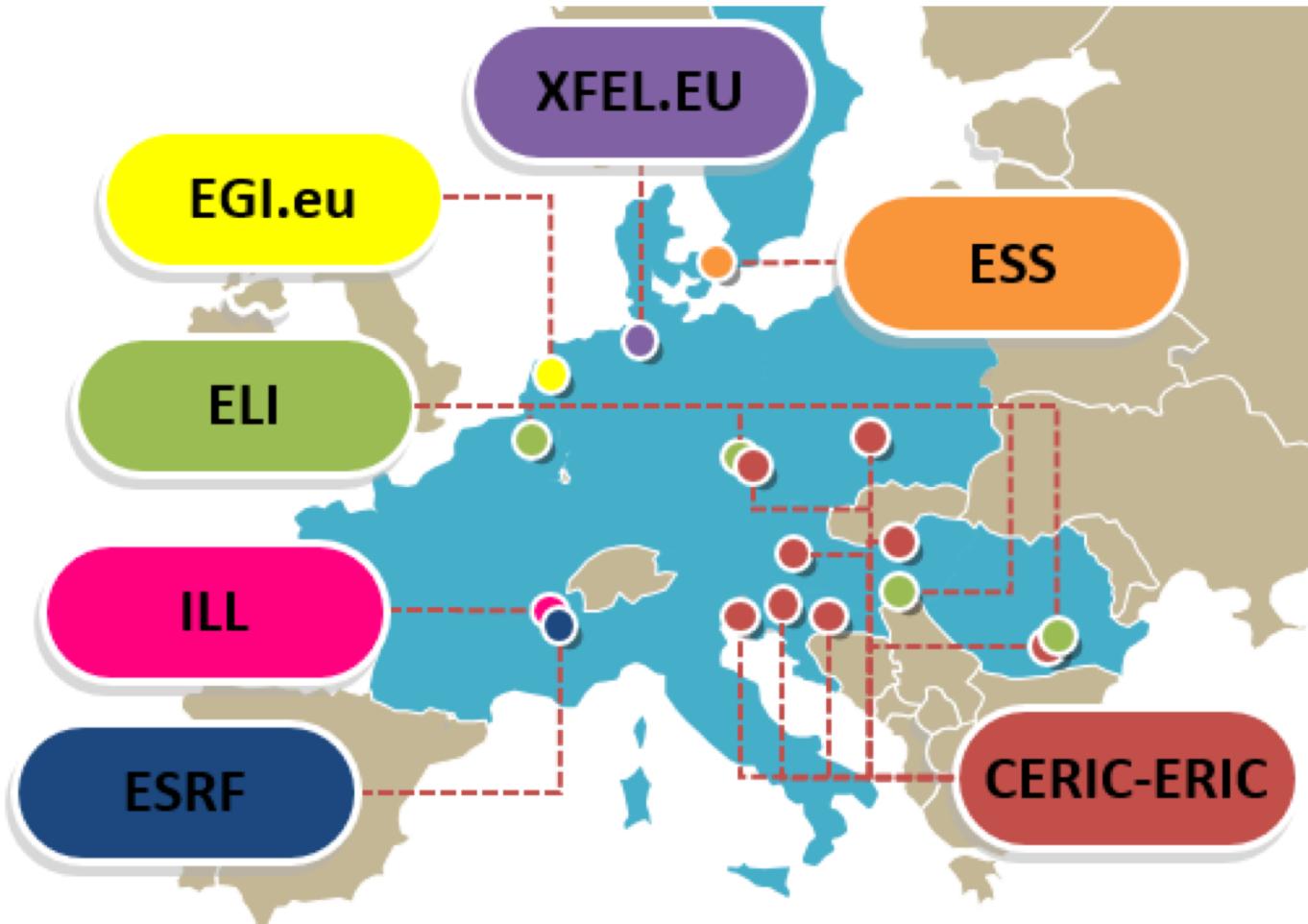
10<sup>th</sup> November, 2020

Author: Sandor Brockhauser on behalf of PaNOSC WP4



PaNOSC and ExPaNDS projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements 823852 and 857641, respectively.

# PaNOSC Facilities



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# PaNOSC - WP4

- Pioneer **data analysis and visualisation** cloud services for photon and neutron science  
(with WP5, give life to *PaNOSC portal* and enable the use of PaN data)



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- Pioneer **data analysis and visualisation** cloud services for photon and neutron science  
(with WP5, give life to *PaNOSC portal* and enable the use of PaN data)
- Engage and work closely with the **community** and relevant **national facilities**  
(e.g. *ExPaNDS project*)



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- Work closely also together with other INFRAEOSC-4 cluster projects and **harmonize solutions** (e.g. *EGI Notebooks Service*)



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- Enable scientists to analyse publicly available PaN datasets in EOSC



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- Enable scientists to analyse publicly available PaN datasets in EOSC  
Enable scientists to analyse “their own” datasets before releasing from embargo



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# WP4 Status

## Tasks

- Task 4.1 Survey data analysis requirements and solutions at the partner sites (M1 - 12) DONE
- Task 4.2 Remote desktop based analysis services (M1-36). Ongoing
- Task 4.4 Jupyter ecosystem based data analysis services (M1-48) Ongoing
- Task 4.5 Deployment of remote analysis services at PaNOSC facilities (M13-48) Started
- Task 4.3 EOSC integration and common portal for remote data analysis services (M13-48) Started
- Task 4.6 Publicly accessible demonstrator (M36-48) Waiting



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# WP4 Status

## Deliverables and Milestones

- D4.1 Report on the current technical elements of data analysis at each partner site (M12) DONE
- D4.2 Prototype remote desktop and Jupyter service (M18) DONE
- *MS4.1 Prototype data analysis services completed (M18)* ACHIEVED
- D4.3 Remote desktop and Jupyter analysis service deployed at EOSC (M42) Prep.
- *MS4.2 Data analysis services accessible through EOSC (M42)* Ahead
- D4.4 Publicly accessible demonstrator (M48) Waiting



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# Data Analysis and Visualisation Tools

- CERIC: XRF Topography banchmark; PyMCA/Oasis containerisation; h5nuvola
- ESRF: h5web with HSDS, h5py, and hdf5plugin
- ESS: McStas, Mantid, SasViewer, and Scipp integration to Jupyter
- EuXFEL: Jupyter, h5glance, h5py, ipykernel, ipython, nbparametrise, nbconvert, nbval, extra-foam, extra-data, extra-geom, Spack, Binder, OSCVIDA
- ILL: HDFviewer



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# PaNOSC Portal

PaNOSC Darken Logout

## Search

Title

Techniques

- Reflectometry
- Spectroscopy
- Phase Contrast Imaging
- Soft diffraction
- Scattering
- UV VUV spectroscopy
- Photoemission microscopy
- Polarised reflectivity
- Microfluorescence
- Gamma spectroscopy
- Three-axis spectrometers
- X-ray excited optical luminescence
- Diffraction Imaging

[Search](#) [Reset](#)

## Documents

### Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas

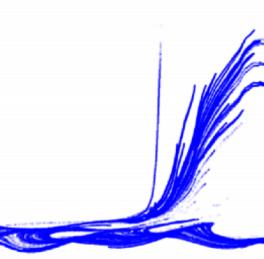
Valenta / ELI Esirkepov / KPSI

Relativistic mirrors can be realized with strongly nonlinear Langmuir waves excited by intense laser pulses in underdense plasma. On reflection from t...

Petr Valenta; (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/s0217751x19430103

Reflectometry

Type Publication  
Licence / Visibility MIT / Public  
Started on 03/10/2020  
Ended on 03/10/2020  
Released on 03/10/2020



### Laser-Driven Proton Acceleration from Cryogenic Hydrogen Target

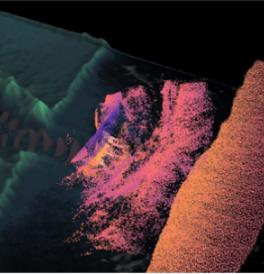
Reinhold / CERIC-ERIC Astraia / ESS

2D particle-in-cell simulation of the interaction of high-intensity laser pulse (parameters are relevant to L4 laser) with a cryogenic hydrogen target...

Dana Scully; (2020), Re-polarization of the aft quantum plasma collector, DOI:10.9563/lf.2015.87.012

X-ray excited optical luminescence

Type Proposal  
Licence / Visibility MIT / Public  
Started on 09/11/2017  
Ended on 03/21/2019  
Released on 01/01/2020



### Laser Produced Gamma Rays Trajectories

Type Proposal



## Environments

### tyu

Description dfg  
Status ACTIVE  
Plan jupyter\_small

[Power](#) [Restart](#) [Stop](#)

### default

Description aaa  
Status ACTIVE  
Plan jupyter\_medium

[Power](#) [Restart](#) [Stop](#)

### fghfghfgh

Description fg  
Status STOPPED  
Plan remote\_desktop\_small

[Power](#) [Restart](#) [Stop](#)

- <http://panosc.apps.okd2.ceric.fedcloud.eu/>



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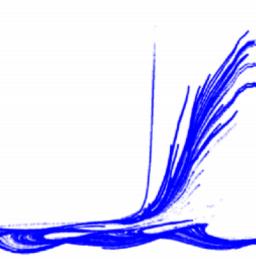
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Released on 03/10/2020

Tune 

## Environments

**tyu**  
Description dfg  
Status ACTIVE  
Plan jupyter\_small  


**default**  
Description aaa  
Status ACTIVE  
Plan jupyter\_medium  


PaNOSC	Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas
<p><b>Description</b> Relativistic mirrors can be realized with strongly nonlinear Langmuir waves excited by intense laser pulses in underdense plasma. On reflection from the relativistic mirror the incident light affects the mirror motion. The corresponding recoil effects are investigated analytically and with particle-in-cell simulations. It is found that if the fluence of the incident electromagnetic wave exceeds a certain threshold, the relativistic mirror undergoes a significant back reaction and splits into multiple electron layers. The reflection coefficient of the relativistic mirror as well as the factors of electric field amplification and frequency upshift of the electromagnetic wave are obtained.</p>	
Citation	Petr Valenta; (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/s0217751x19430103
Keywords	Reflectometry,
Type	Publication
Author	Petr Valenta
Other	Stuff

## Datasets

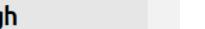
**PIC Simulation**  
LoKI @ ESS

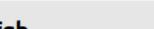
**PIC Simulation - EPOCH**  
LoKI @ ESS

**PIC Simulation - SMILEY**  
ODIN @ ESS

## Environments

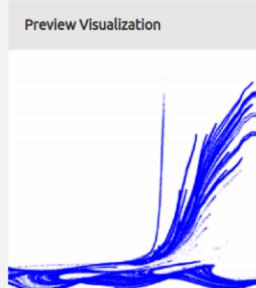
**tyu**  
Description dfg  
Status ACTIVE  
Plan jupyter\_small  


**fghfghfgh**  
Description fg  
Status STOPPED  
Plan remote\_desktop\_small  


**jhfg**  
on  
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ote\_desktop\_small  


**default**  
Description aaa  
Status ACTIVE  
Plan jupyter\_medium  


## Preview Visualization



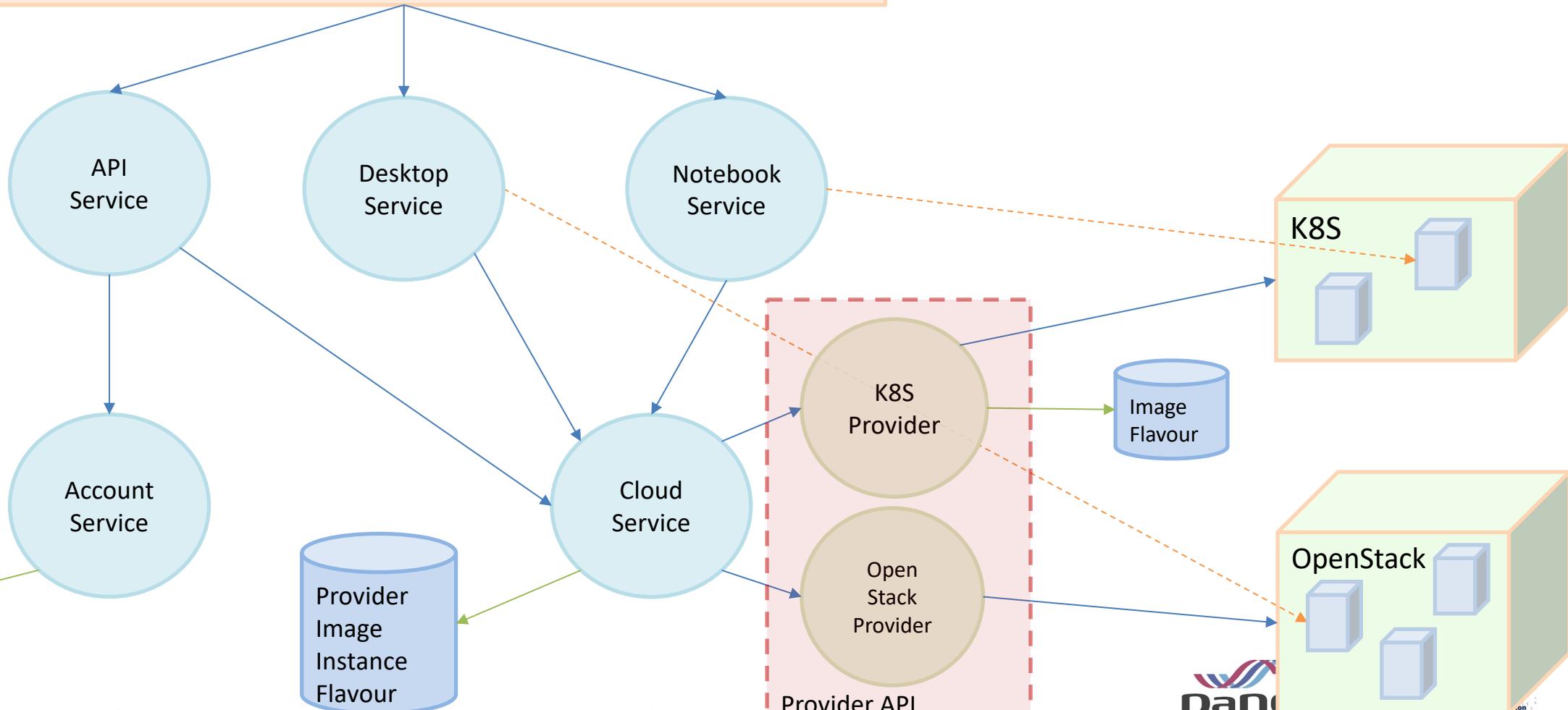
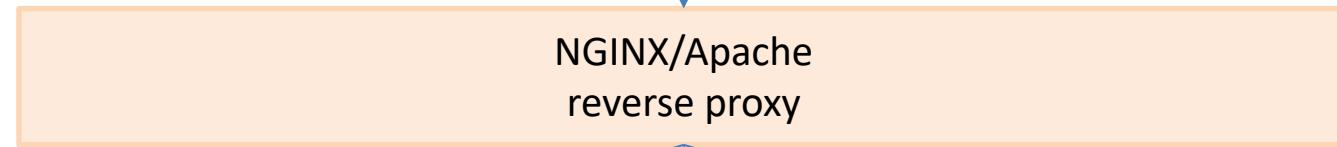
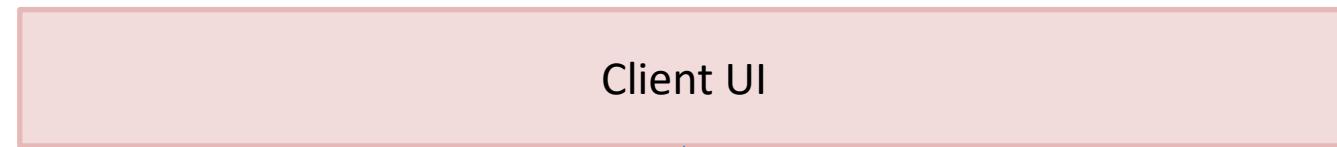
ExPANDS European Open Science Cloud Photon and Neutron Data Services

# PaNOSC Portal

The screenshot displays the PaNOSC (Pan-European Network of Supercomputing Centres) interface. The top navigation bar includes 'PaNOSC' on the left and 'Darken Logout' on the right. The main content area is divided into several sections:

- Search:** A form with a 'Title' input field and a list of 'Techniques': Reflectometry, Spectroscopy, Phase Contrast Imaging, Soft diffraction, Scattering, UV VUV spectroscopy, and Photoemission microscopy.
- Documents:** A list of publications. The first entry is "Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas" by Petr Valenta (2020). It includes a preview image of a simulation plot, publication details (Type: Publication, License: MIT / Public, Dates: Started 03/10/2020, Ended 03/10/2020, Released 03/10/2020), and a 'Tune' button.
- Datasets:** A section showing datasets related to PIC Simulation, including LoKI @ ESS (Status ACTIVE), LoKI @ ESS (Status ACTIVE), and ODIN @ ESS (Status ACTIVE).
- Environments:** A section showing environments like 'tyu' (Status ACTIVE) and 'jupyter' (Status ACTIVE). The 'jupyter' environment shows a Jupyter Notebook interface with code cells and output.
- Preview Visualization:** A section showing a visualization of particle trajectories, similar to the one in the 'Documents' section.
- Citation:** A table showing citation details: Petr Valenta; (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/s0217751x19430103.
- Keywords:** A table showing keywords: Reflectometry.
- Type:** A table showing type: Publication.
- Author:** A table showing author: Petr Valenta.
- Other:** A table showing other information: Stuff.

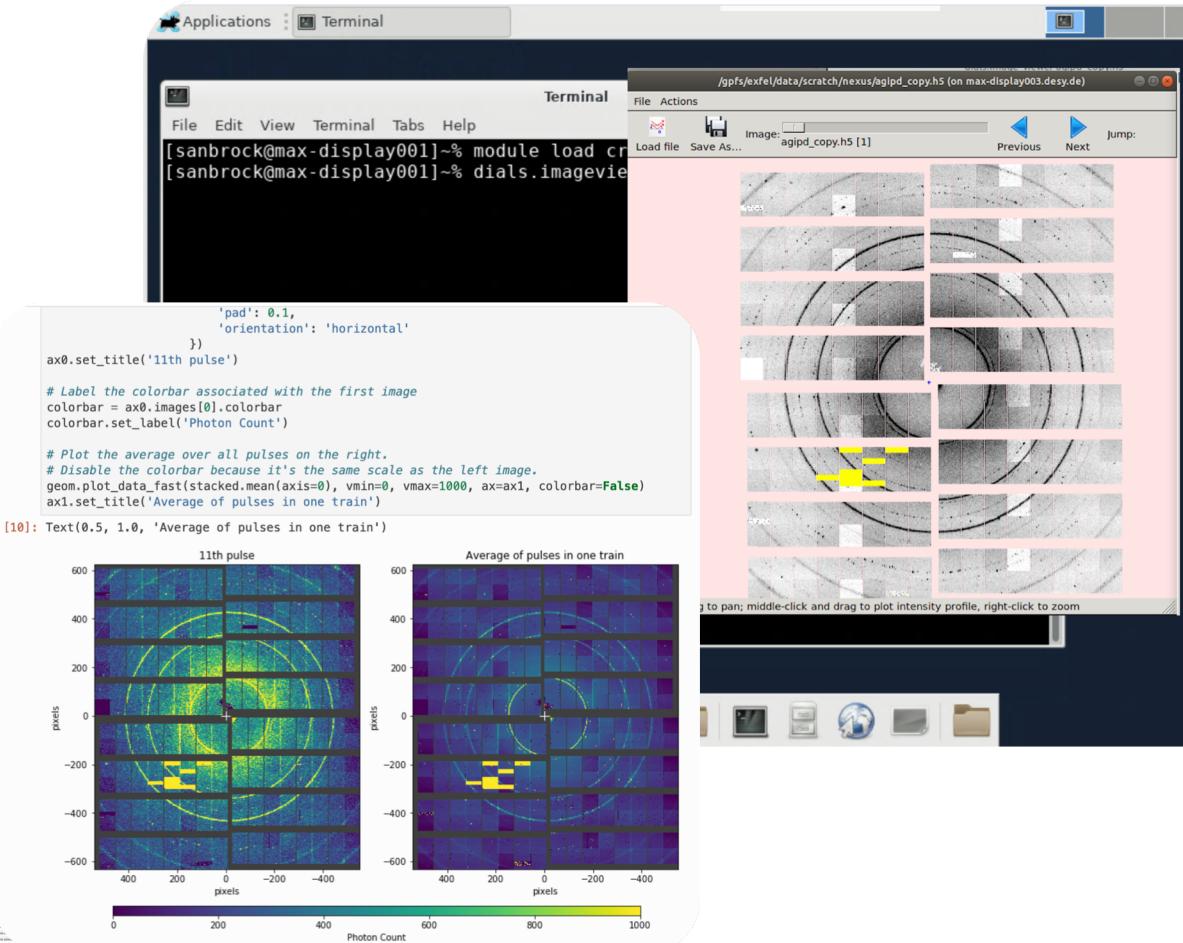
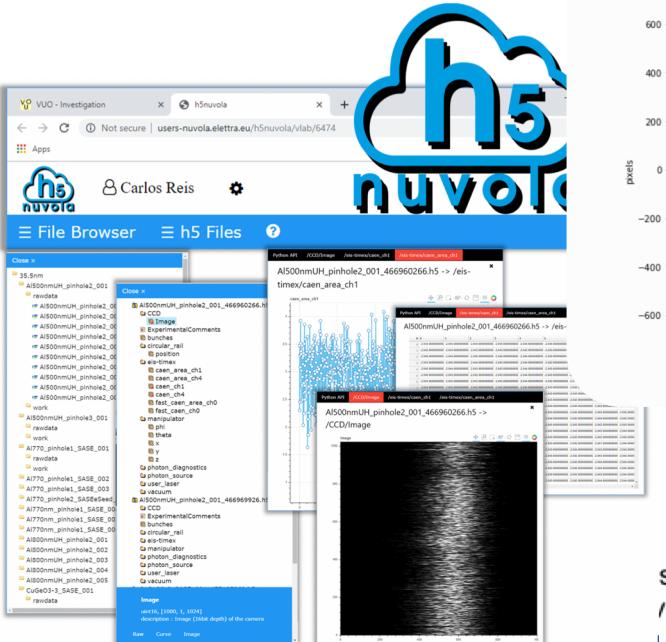
The bottom right corner features the logo for "photon and neutron open science cloud".



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# Data Analysis and Visualisation Microservices

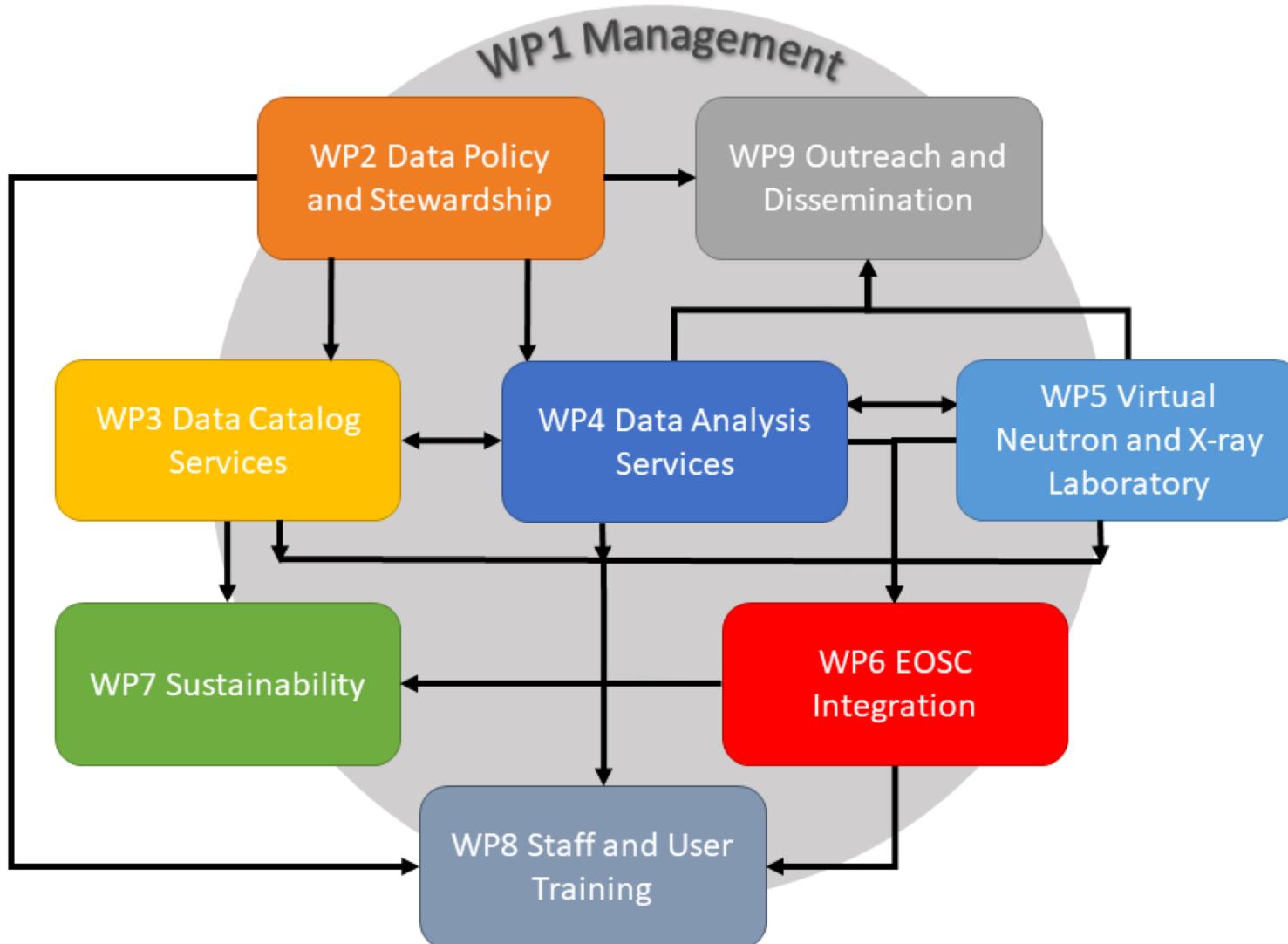
- Desktop Microservices
- Notebook Microservices
- Hdf Microservices
- Workflow Microservices



s Horizon 2020 research  
/ely.

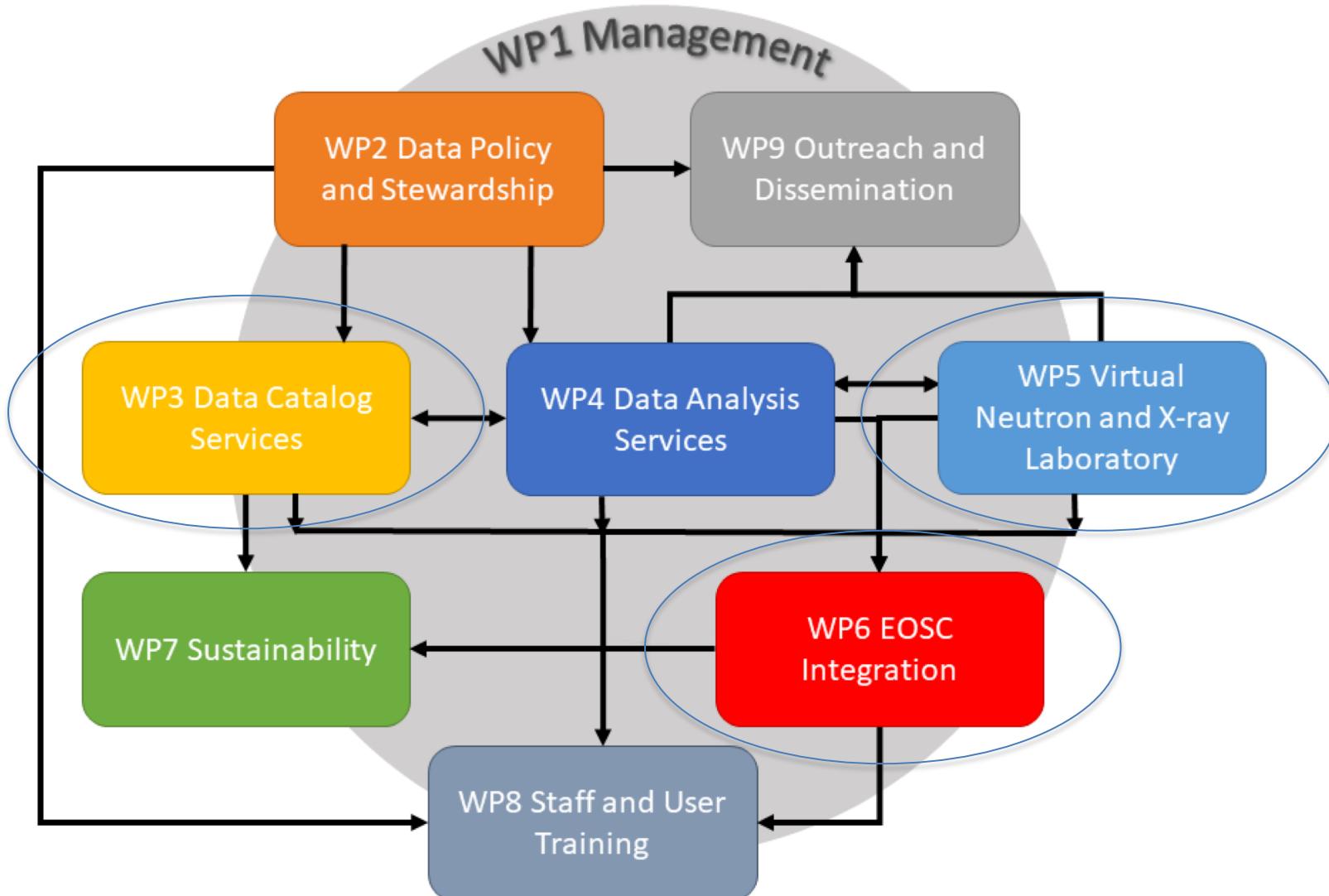


# Integration activities



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# WP 4 - KPIs

## 4.1.1 Percentage of facilities offering JupyterHub or remote desktop for analysis services

PARTNER	Before PaNOSC	M12	M18
CERIC-ERIC		0 (JupyterHub/Guacamole)	1
ELI		0 (JupyterHub/Lab)	1
ESS		1 (VNC) (JupyterHub)	1
EuXFEL		1 (FastX) (JupyterHub/FastX)	1
ESRF		0 (JupyterHub/NoMachine)	1
ILL		1 (VISA) (JupyterHub/VISA)	1
TOTAL	50.00%	66.67%	100.00%

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## WP 4 - KPIs

### 4.1.2 Number of unique users making use of JupyterHub or remote desktop for analysis services at partner facilities

PARTNER	Before PaNOSC	M12	M18
CERIC-ERIC	0	5	15
ELI	0	1	2
ESS	0	0	40
EuXFEL	0	150	175
ESRF	0	0	0
ILL	0	2	37
TOTAL	0	158	269

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# WP 4 - KPIs

## 4.1.3 Number of techniques available through remote services

PARTNER	Before PaNOSC	M12	M18
CERIC-ERIC	0	3	3
ELI	0	1	2
ESS	1	1	1
EuXFEL	0	2	2
ESRF	1	3	3
ILL	0	2	38
TOTAL	2	8	49

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## WP 4 – Next steps

- Cover more and more techniques
- Deploy the PaNOSC portal at each facility
- Develop and deploy more DA microservices  
(including visualisation and workflow services)
- Integrate WP3 Search API (connected to data catalogues at each partner)
- Integrate with WP6 AAI at each partner facility



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10-11 November 2020



# PaNOSC & ExPaNDS Annual Meeting

Thank you

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