



Brief introduction about the status of ExPaNDS and PaNOSC

8th of October 2020



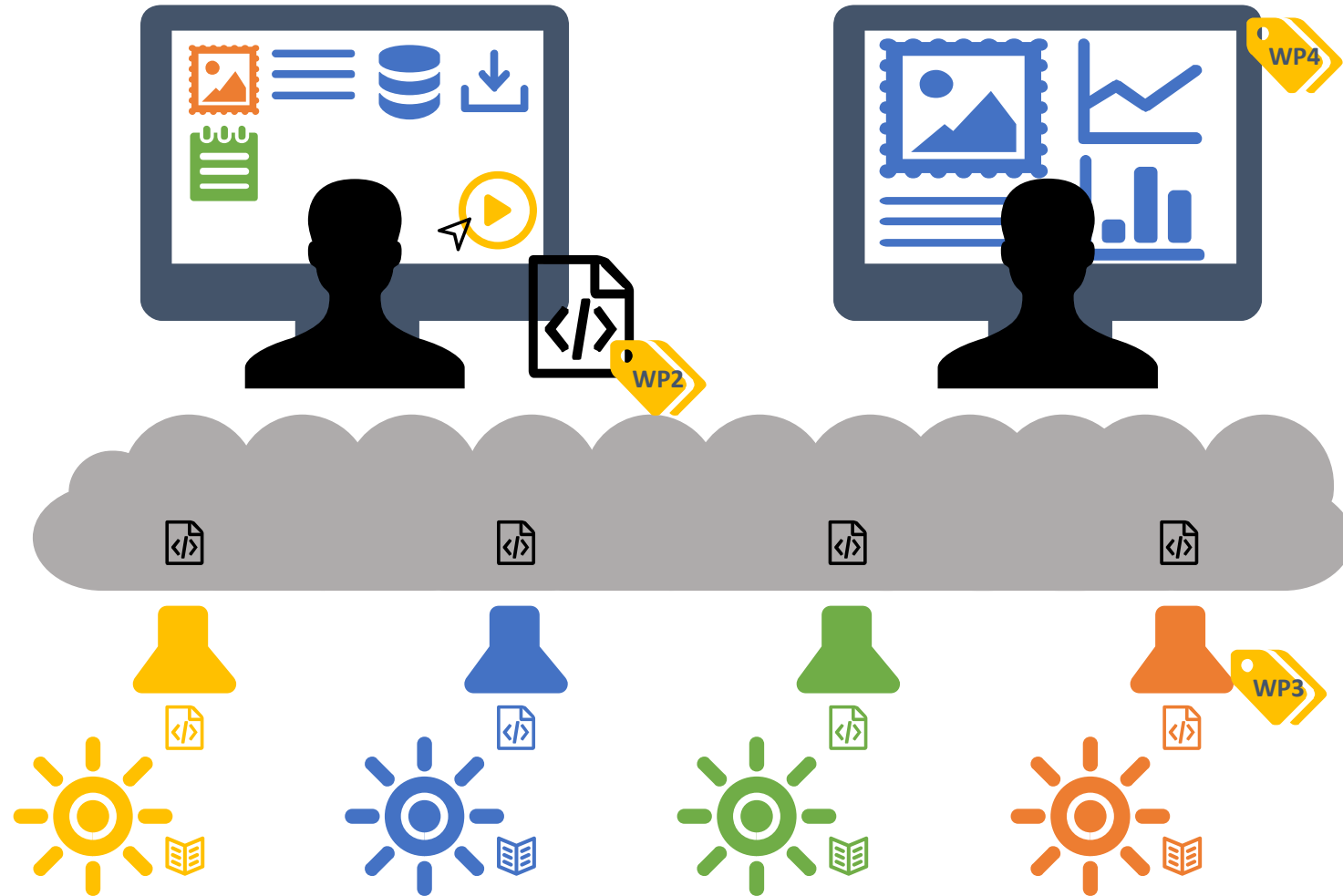
The ExPaNDS project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 857641.
The PaNOSC project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 823852.

Overview

- The purpose
- Identified challenges
- Goals of the workshop
- The Portal Architecture
- The technical talks
- Survey and wrap up
- Agenda



The purpose (the final product)



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First screen shot

PaNOSC Darken Login

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

Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas

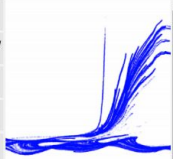
Valenta / ELI Esirkepov / KPSI

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

Petr Valenta; (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/50217751x19430103

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

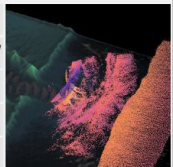
Reinhold / CERIC-ERIC Astraia / ESS

2D particle-in-cell simulation of the interaction of high-intensity laser pulse (parameters are relevant to L4 laser) with a cryogenic hydrogen target. Only protons with energy above 300 MeV at the end of the simulation are tracked and their position and energy are visualized. Two different groups of protons accelerated by different mechanisms can be distinguished from each other in space: Protons originated from the target interior and from the target rear side...

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

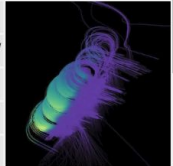
Viktor / ILL Achakos / ELI

An obliquely incident laser pulse pulls out electrons from a solid target during a process called 'J x B heating'. Some of these electrons are re-accelerated into the target while others totter in the complex electromagnetic fields in front of it...

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

Diffraction Imaging

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



Wake Wave Generation

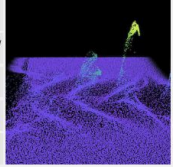
Chaya / ELI Hildt / CERIC-ERIC

This simulation represents intense laser beam focused on the rear side of the plasma target. Plasma is made of two types of particles - electrons and protons. In particle-in-cell simulations, we use macro-particles, where 1 macro-particle represents many real particles. Here you can see only electrons, protons are not interesting in this case since their weight is much higher (and therefore they do not move). Behind the laser pulse, plasma waves are excited (density spikes moving with the group velocity of the laser beam). Under certain conditions...

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

Soft diffraction

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



Time-resolvent spectroscopy - run 1-52

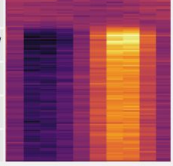
Beil / ESS Sanchez / ESS

RP4-SRS focuses on time-resolvent spectroscopy experiments in the full range of frequencies from IR to UV. Users can measure samples as varied as solid state crystals, or proteins in their natural environment. Time-resolved spectroscopy is the collection of techniques that are used to examine the dynamic processes of materials and chemicals upon illumination with a pulsed laser...

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

Spectroscopy

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




Two-color XUV+NIR femtosecond photoionization of neon in the near-threshold region

Beil / ESS Sanchez / ESS

Two-color XUV+NIR femtosecond photoionization of neon in the near-threshold region. The experiment is designed to study the dynamics of the photoionization process in the near-threshold region. The results show that the photoionization process is highly sensitive to the laser pulse duration and the intensity of the laser pulse.

Type: Proposal
Licence / Visibility: MIT / Public





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Identified challenges of both projects

- Minimum setup in place from each facility.
 - Data Catalogue?
 - IT Infrastructure?
 - Kubernetes?
 - Slurm?
 - Openshift?
- Integration of the Portal with each particular infrastructure.
 - Exposure of the metadata to the EOSC.
 - Kubernetes, OpenShift, Slurm, Jupyterhub....
- Sizing the service's capacity.
 - How much dedicated computing power would be optimal?
- How Data Policies (Embargo period?) fit into all this, and how should we implement it?



Goals of the workshop

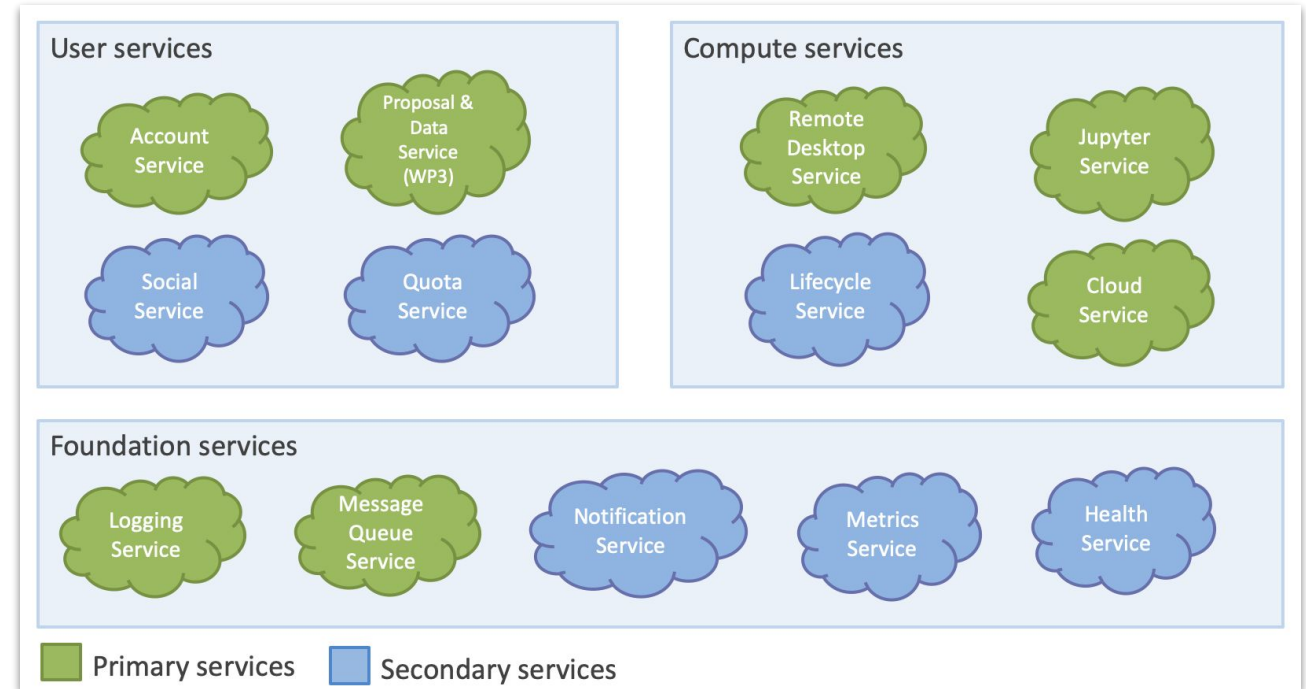
- Get to know each other.
 - ...and what we do.
- Understand both projects and our roles.
- Better understanding of the requirements for the implementation of a common portal at each facility.
- Learn from each other.
- How to organise ourselves to work together (next steps).



The Portal Architecture overview

Built on micro-services

- Micro-service architecture to enable
 - Separation of concerns
 - Flexible to take into account a partner's own needs and logic
 - Quicker to iterate
- Identified primary and secondary services
 - Validated by all partners
- Most services have been developed in NodeJs (TypeScript)
 - One Java service (remote desktop)
- Completed the first development iteration
- Documentation can be found [here](#)



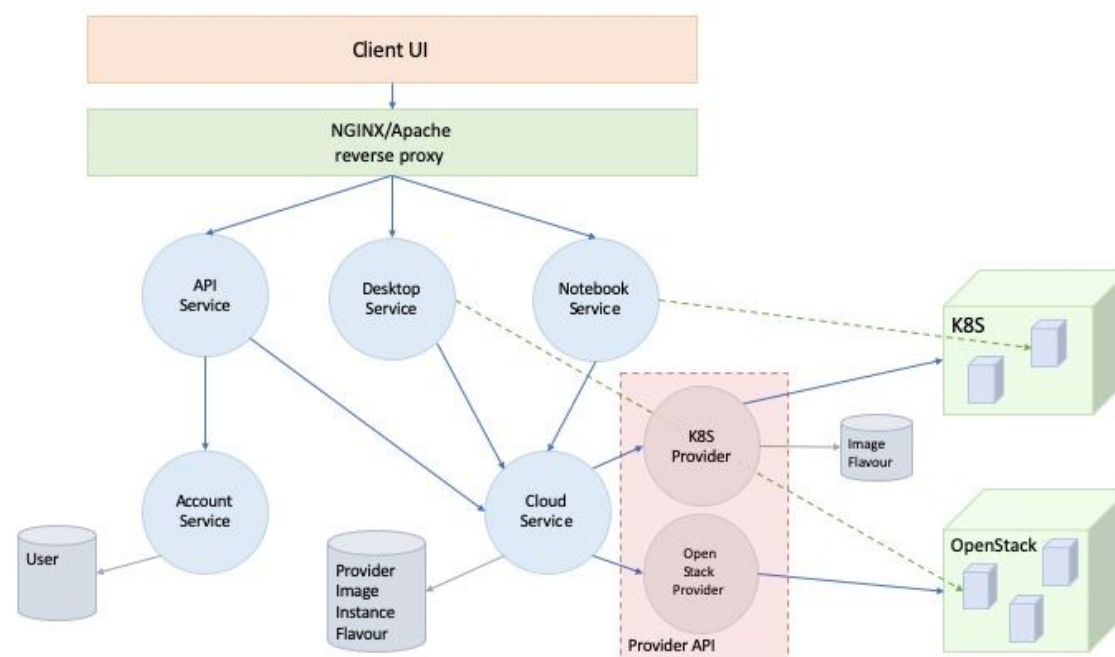
Portal IT1 micro-services

Service	Description
API Service	<ul style="list-style-type: none">● Provides the main point of entry to the PaNOSC Portal application and provides an authenticated facade to APIs of underlying micro services.
Account Service	<ul style="list-style-type: none">● Authenticates and authorises a user (OpenID Connect) and return an Account object with relevant attributes.● Provides information about the Roles of the connected user.
Cloud Service	<ul style="list-style-type: none">● Performs two main tasks<ul style="list-style-type: none">○ A catalogue of plans (image and flavour combinations for Remote Desktop and Notebook) and instances○ Proxy requests to concrete Cloud Providers
Cloud Provider	<ul style="list-style-type: none">● Each concrete virtualisation host (eg Kubernetes, Slurm, OpenStack, ProxMox) is represented by a Cloud Provider with an implementation specific to that platform.● Return a list of images/templates, a list of flavours and manage (create, start, stop, destroy) running instances.● A common API provides unified access to these providers from the Cloud Service.
Desktop Service	<ul style="list-style-type: none">● Acts as a relay between the Apache Guacamole guacd service on a running instance and a web-socket to the browser client.● Allows for sharing of desktops between different users● Manages different roles (owner, user, guest)
Notebook Service	<ul style="list-style-type: none">● Acts as a proxy to the Notebook Server on a running server.



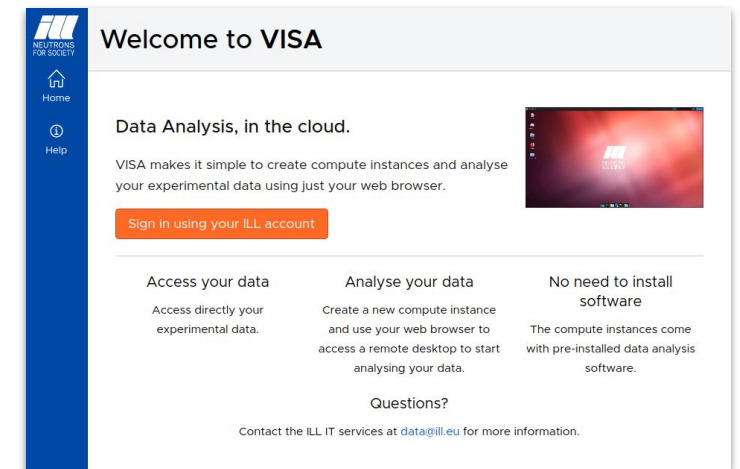
The Portal Architecture IT1

- Objective: API where authenticated user can create instances and access Remote Desktop/Jupyter services
 - Completed 27th March 2020
- Minimal micro-services developed
 - Many [use cases](#) have still not been covered
 - Much functionality is missing
 - Some micro-services are 1st iteration too
 - eg Account Service
 - Only Kubernetes cloud provider developed
- CLIs developed to test the application
- Deployed to K8S cluster using Helm Charts



The Portal Architecture status

- Development was put **on-hold** due to the COVID pandemic
 - Development effort at ILL was focused on enabling *Remote Experiments* in VISA
 - VISA is a data analysis portal developed at the ILL (before PaNOSC)
 - Experience and effort in VISA development will be transferred to Portal for the net benefit of all partners
- Documentation is available on the [PaNOSC confluence](#)
- Re-evaluation of Portal integration at the ILL
 - VISA is in production so transition to Portal needs to be seamless
 - Remote Experiments still needs to be possible due to travel restrictions
 - K8S not on the service roadmap
 - Re-evaluation of deployment strategy (docker-compose?)
 - Re-integrate experience (and code) from VISA into Portal design: **priority!**



The Portal Architecture next steps

- Converge VISA and Portal developments
 - Analyse how to integrate PaNOSC Portal into VISA and port latest VISA developments into the micro-service architecture
 - Decoupling VISA modules into micro-service architecture
 - Abstract away ILL business logic and re-use code
 - Enabling site-specific extensions to micro-services?
 - Convert API into GraphQL
- Develop OpenStack Cloud Provider (ILL) and Slurm (volunteers?!)
- Implement a simpler deployment strategy that is not coupled to Kubernetes
 - Maybe in parallel to the Helm Charts (volunteers?!)
- Develop *Proposal and Data Service*: connect to a WP3 FAIR Data API provider



Technical Presentations

- 17 talks (15 minutes each)
 - 12 + 3 (questions)
- Topics
 - Facility
 - Team and expertise
 - The Portal Architecture Test Experience
 - Facility needs for the Portal
 - COVID-19 and the impact on your team



Results of the survey and wrap up

- Results of the Survey:
 - Survey kindly processed by Sophie Servan.
 - Raw data will be available at the end of the workshop.
- Wrap up objectives:
 - Identify main ideas from all participants.
 - Address relevant questions.
 - Define next steps, including communication channels.



Agenda – 8th of October

- 15:15 - Brief introduction about the status of ExPaNDS and PaNOSC (J. Hall & D. Salvat)
- 15:30 - Daniel Salvat (ALBA)
- 15:45 - Andrea Lorenzon (CERIC-ERIC)
- 16:00 - Majid Ounsy (Soleil)
- 16:15 - Franz Lang (STFC)
- 16:30 - Leonardo Sala (PSI)
- 16:45 - Jakub Grosz (ELI)



Agenda – 9th of October

- 13:00 - Andy Goetz (ESRF)
- 13:15 - Uwe Konrad (HZDR)
- 13:30 - Lottie Greenwood (ESS)
- 13:45 - Zdenek Matej (MAXIV)
- 14:00 - Andrey Vukolov (ELETTRA)
- 14:15 - Christopher Reynolds (DLS)
- 14:30 - Coffee break
- 14:45 - Michael Schuh (DESY)
- 15:00 - Andrea Manzi (EGI)
- 15:15 - Robert Rosca (EuXFEL)
- 15:30 - Rolf Krahel / Heike Görzig (HZB)
- 15:45 - Jamie Hall (ILL)
- 16:00 - Open Discussion: Results on the survey
- 16:30 - Wrap up session





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