

# PANData ODI

WP8:Specification of a common authentication system

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1) pNexus API.

Develop a pHDF5 compliant Nexus API.

2) Investigate parallel file systems.

Investigate a small number of promising parallel (distributed) file systems with respect to stability, usability, operational costs and efforts support.

3) Investigate implementations on specific file systems

Investigate MPI-I/O implementations and pHDF5/pNexus on an even smaller number of preselected file systems

4) Coupling of advanced (pre-)processing engines.

Test the capability of the system to cope with multiple parallel data streams. This will contain for example explicit tests feeding a pHDF5-file consisting of a large number of individual images into a multi-core analysis engine.

5) Demonstration with WP5

- Find possibilities for applications
- Implement specific applications in the framework and demonstrate and evaluate the potential of this approach.

Eugen Wintersberger - [eugen.wintersberger@desy.de](mailto:eugen.wintersberger@desy.de) (HDF5/NeXus)  
Sven Sternberger - [sven.sternberger@desy.de](mailto:sven.sternberger@desy.de) (HPC, parallel filesystems)  
Frank Schluenzen - [frank.schluenzen@desy.de](mailto:frank.schluenzen@desy.de)  
Thorsten Kracht - [thorsten.kracht@desy.de](mailto:thorsten.kracht@desy.de) (for aspects of implementations for virtual labs)  
Felix Beckmann - [felix.beckmann@hzg.de](mailto:felix.beckmann@hzg.de) (running the HZG tomography beamlines at DESY)

## Diamond

Mark.Basham - [mark.basham@diamond.ac.uk](mailto:mark.basham@diamond.ac.uk) (Data Analysis Tomography and algorithms)  
Ulrik Pedersen - [ulrik.pedersen@diamond.ac.uk](mailto:ulrik.pedersen@diamond.ac.uk) (Controls, optimizing the data capture and pHDF writing)  
Tobias Richter - [tobias.richter@diamond.ac.uk](mailto:tobias.richter@diamond.ac.uk) (HDF structure, NCD, ARPES)  
Nick Rees (manager) - [nick.rees@diamond.ac.uk](mailto:nick.rees@diamond.ac.uk)  
Alun Ashton (manager) - [alun.ashton@diamond.ac.uk](mailto:alun.ashton@diamond.ac.uk)  
Bill Pulford (manager) - [Bill.Pulford@diamond.ac.uk](mailto:Bill.Pulford@diamond.ac.uk)  
Paul Gibbons(manager) - [Paul.Gibbons@diamond.ac.uk](mailto:Paul.Gibbons@diamond.ac.uk)

## SLS

Derek Feichtinger (<http://people.web.psi.ch/feichtinger/index.html>)

D8.1: Definition of pHDF5 capable Nexus implementation (Month 9) – Software

D8.2: Evaluation of Parallel file systems and MPI I/O implementations (Month 9) - Report

D8.3: Implementation of pNexus and MPI I/O on parallel file systems (Month 21) - Prototype

D8.5: Examination of Distributed parallel file system (Month 21) - Report

D8.6: Demonstrate capabilities on selected applications (Month 21) - Demonstrator

D8.7: Evaluation of coupling of prototype to multi-core architectures (Month 30) - Report

Specification	PCO4000	PCO-Edge	Pilatus6M	Excalibur
Frame	2D	2D	2D	2-3D
Scan Size	1D	1D	1-3D	1-2D
Data Rate	100MB/s	700MB/s	300MB	600MB/s
Status	Complete	In Development	100MB/s Complete	In Development

- Status
  - Single Process solution complete and included in EPICS areaDetector Distribution 1.7
  - Parallel writer project under active development.
    - Basic prototype under testing

- Store all frames as a single HDF5 NeXus formatted file.
  - Even from Parallel Hardware
- Store as N-dimensional datasets.
  - 2-3 Dimensions per frame
  - M Scan dimensions.
  - Selectable chunking to match post-processing requirements.
- Disk I/O performance to match detector readout speed.
  - Specifically for DLS Parallel Lustre systems
- Benchmarking test system for testing storage performance against new detector types.

- Data stored in a single HDF5 NeXus formatted file.
- Scalable performance across large numbers of processing nodes.
- Final Application which can be run as an MPI Job capable of :
  - Providing data slices to a user supplied library, through a simple API which eliminates the need for the developer to know pHDF5 or MPI.
  - Save data slices to an intermediate file format to facilitate exiting processing applications.
  - Benchmark parallel read performance on different cluster systems.

- Basic prototype system in place and good speeds achieved in testing.
  - Line speed/Lustre limits achieved with multiple aligned chunk reading.
  - Lower performance as expected with reading across chunks, which needs to be optimised with the writing process.
- Under Development
  - Complete API and Example processing libraries.
  - Ability to write back results to the same or a different file.



**Direct read from ICAT**

**NEXUS data elements**

**DAWN/SDA peak plotting**

**DAWN/SDA peak profile**

**NEXUS metadata**

Key	Value
NAME	2279.nxs
CREATION_TIME	2011-10-07 12:14:29
DESCRIPTION	unknown
UNIQUE_ID	
DATASET_ID	572402
LOCATION	/dis/l12/data/2011/cm2061-4/default
MODIFICATION_TIME	2011-10-07 12:14:29
VERSION	1.0
SIGNATURE	
ID	50852709
CHECKSUM	
FILE_SIZE	2998176
COMMAND	

Visible	Peak Position	FWHM	Area	Name
Green	49.83	0.45	42250.49	Gaussian
Green	72.82	0.52	986.19	Gaussian
Green	74.96	0.54	1838.64	Gaussian
Green	81.39	0.54	15363.79	Gaussian



