



Exploring the X-ray Transient
and variable Sky

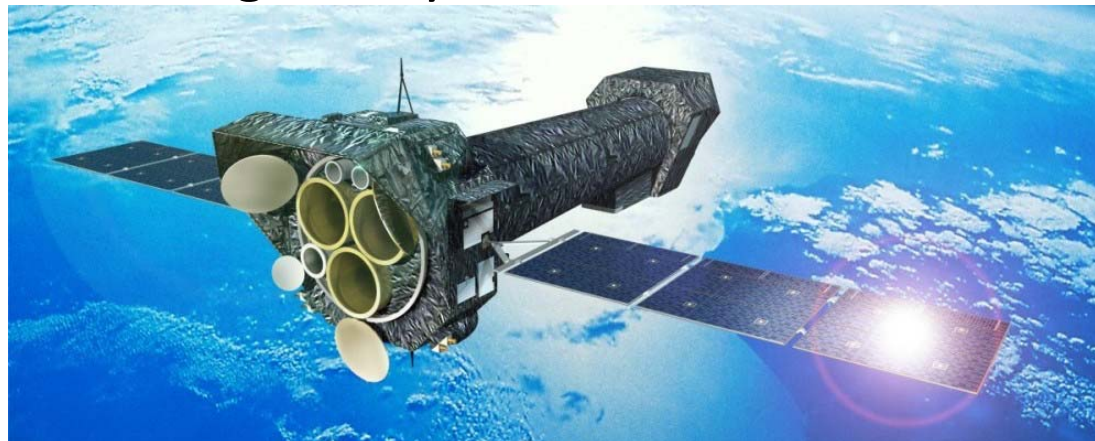
A Science Gateway for EXTras Using EGI Federated Cloud

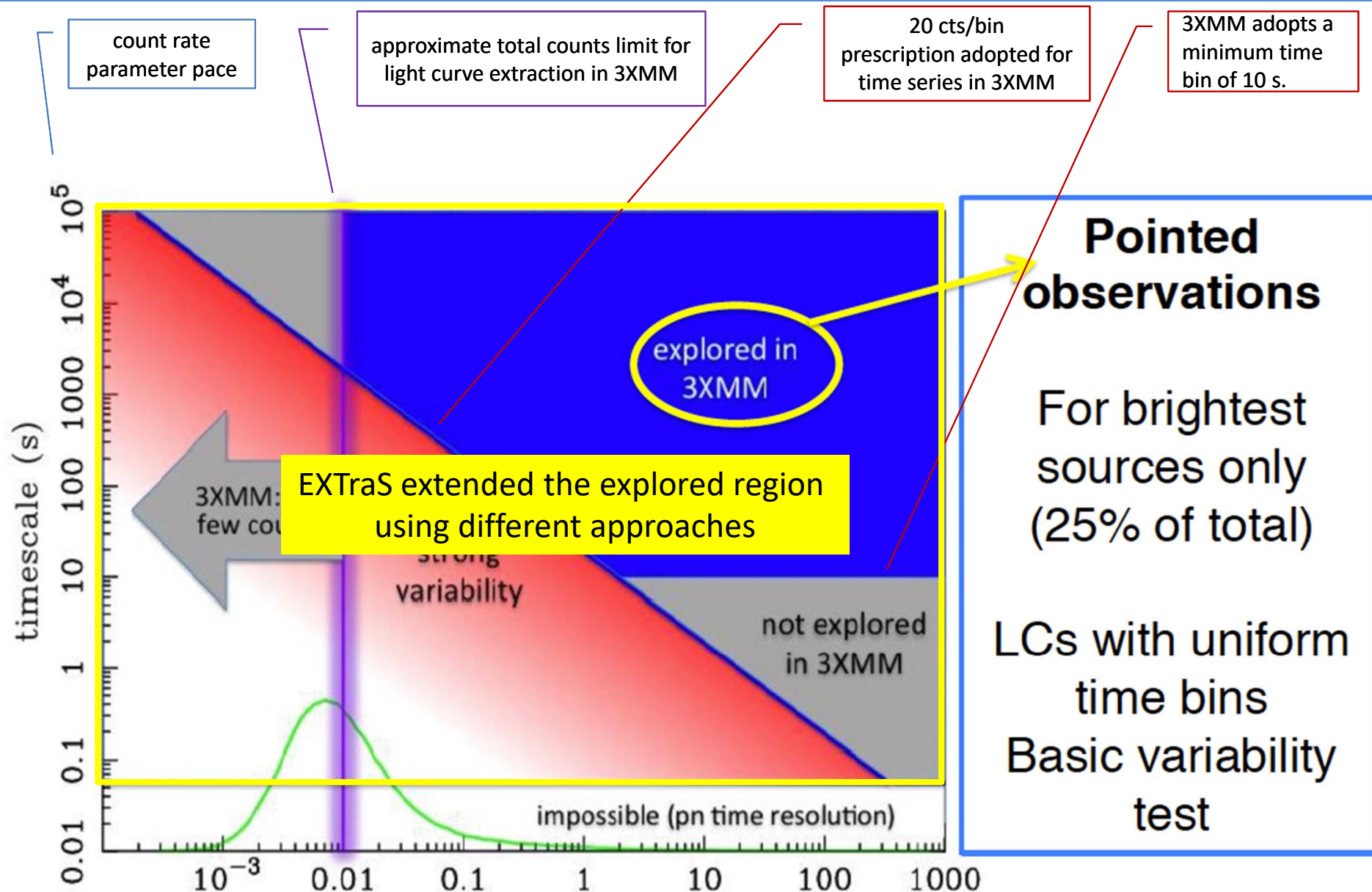
Daniele D'Agostino

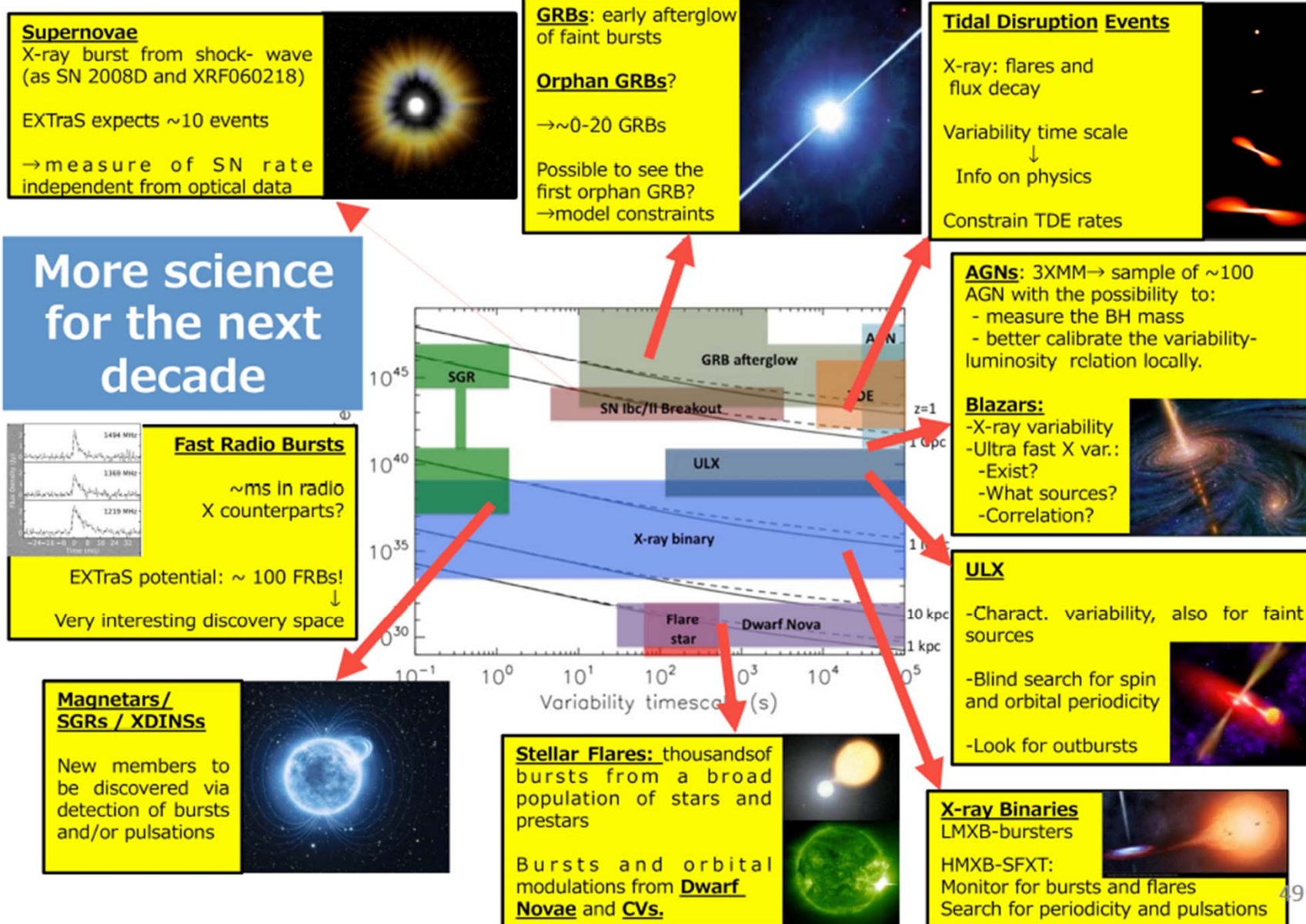


The “*Exploring the X-ray Transient and variable Sky*” project extracted all temporal domain information buried in the whole database collected by the EPIC cameras onboard the XMM-Newton mission, the most powerful tool to study variability of faint sources in the soft X-ray sky.

This included a search and characterisation of all kind of variabilities, both periodic and aperiodic, in hundreds of thousands of sources spanning more than eight orders of magnitude in time scale and six orders of magnitude in flux, as well as a search for fast transients, missed by standard image analysis.







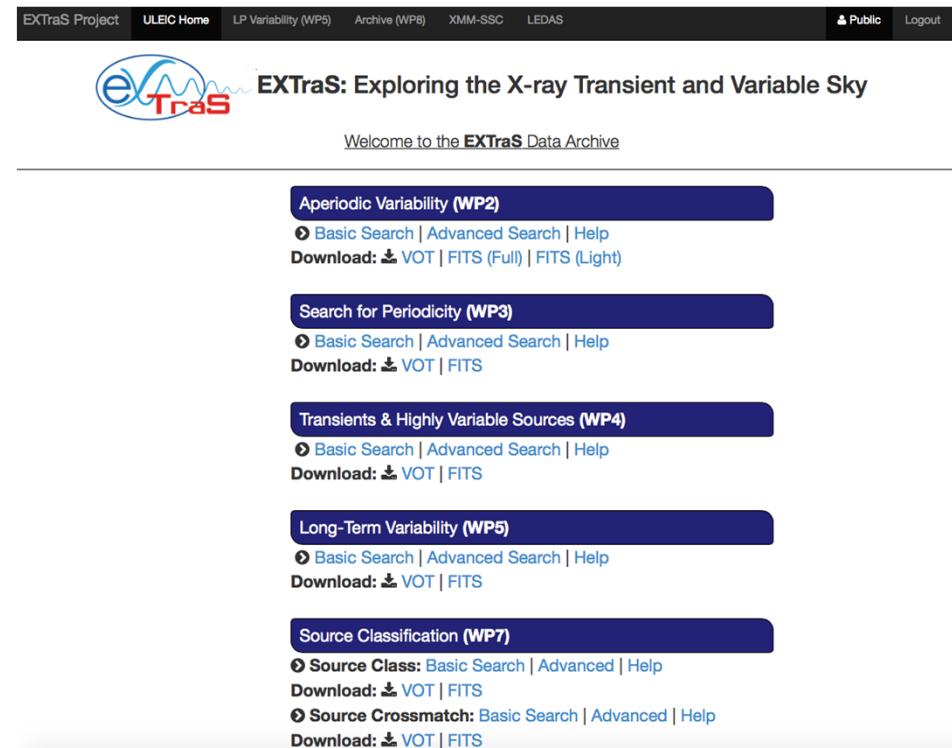
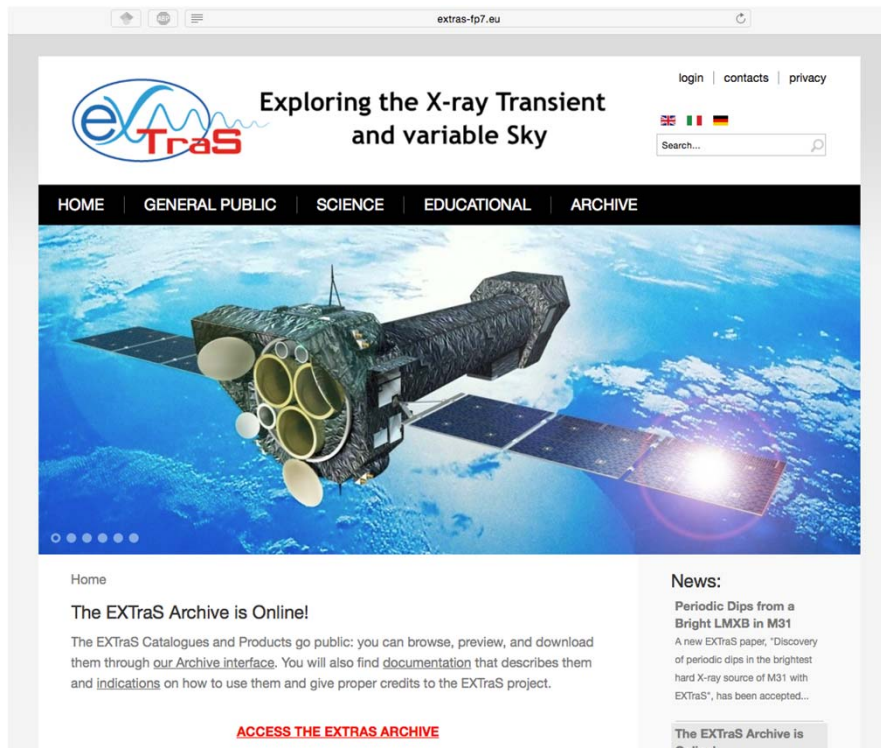


EXTraS



All results and products have been released to the scientific community through a web public data archive, together with new analysis tools

<http://www.extras-fp7.eu/>





The EXTraS Portal - Why



The fundamental purpose of astronomical software is to *allow* science to be done.

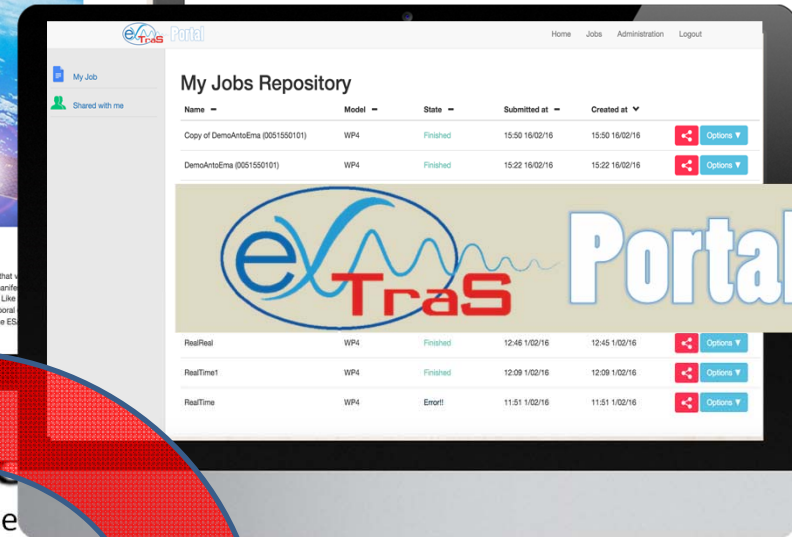
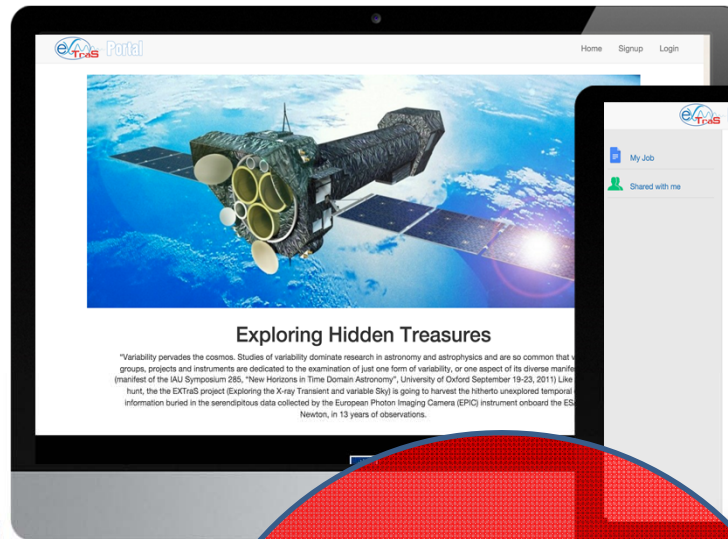
To repeat, the purpose of software is to allow us, the users, to do our jobs, which is to discover new and interesting things about the universe.

Thus, software is necessary (but not sufficient) to accomplish this goal.

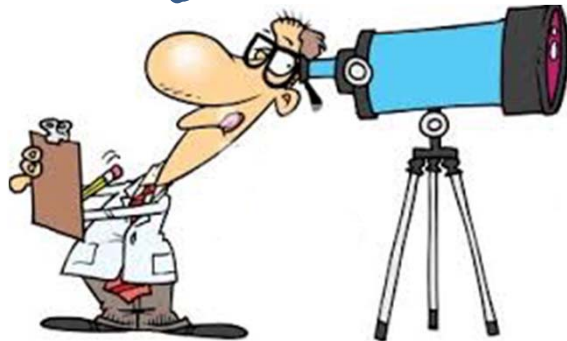
We must remember that **better software can be equivalent to bigger telescopes and new high tech instruments**. One gets more out of the data and more of the data can be useful.

I believe that if software were easier to use and more robust we would get a lot more science out of our present instruments.

R. Mushotzky, in Astronomical Data Analysis Software and Systems XX. 2011, ASP Conf. Proc., Vol. 442, p.235

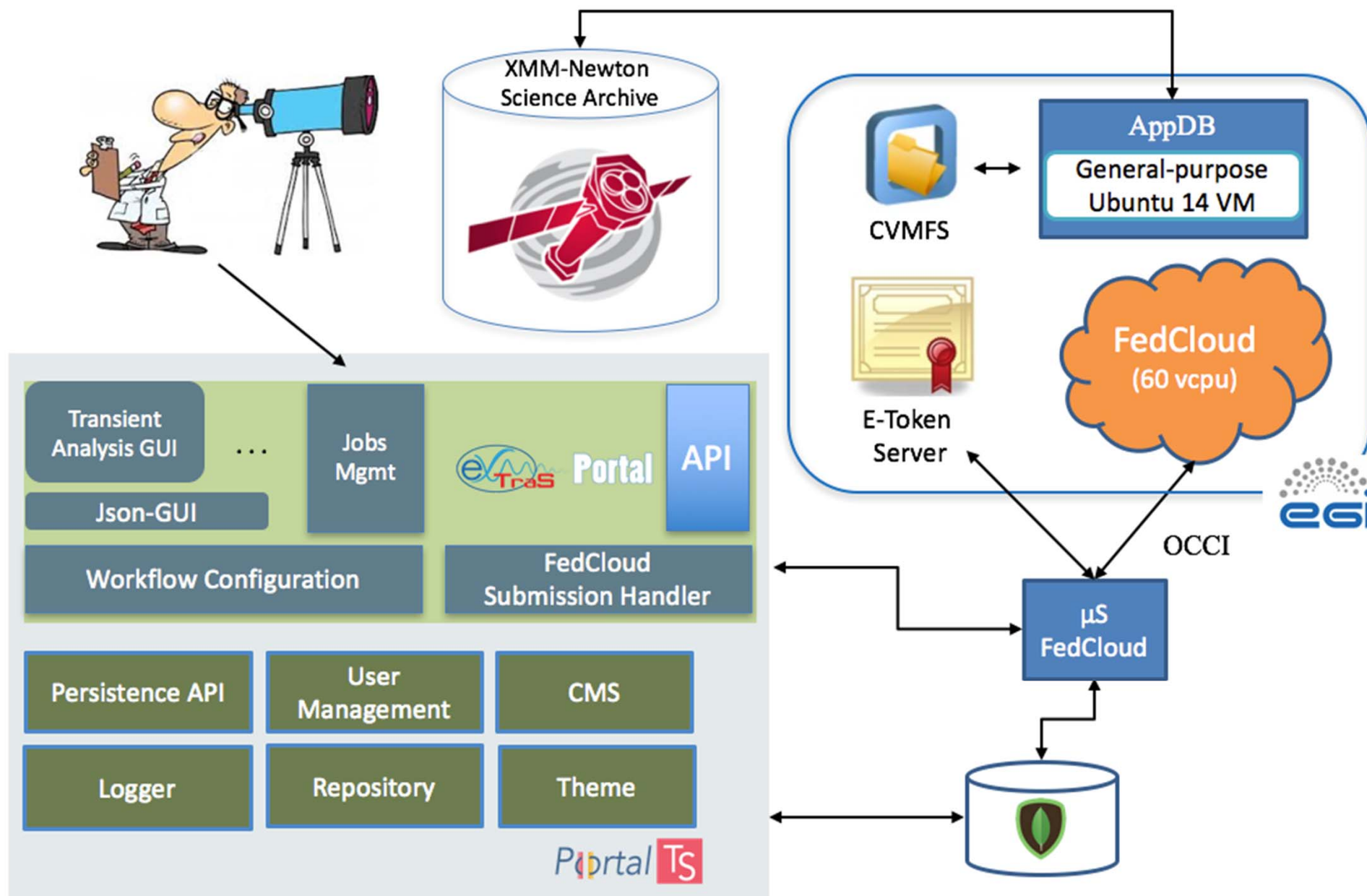


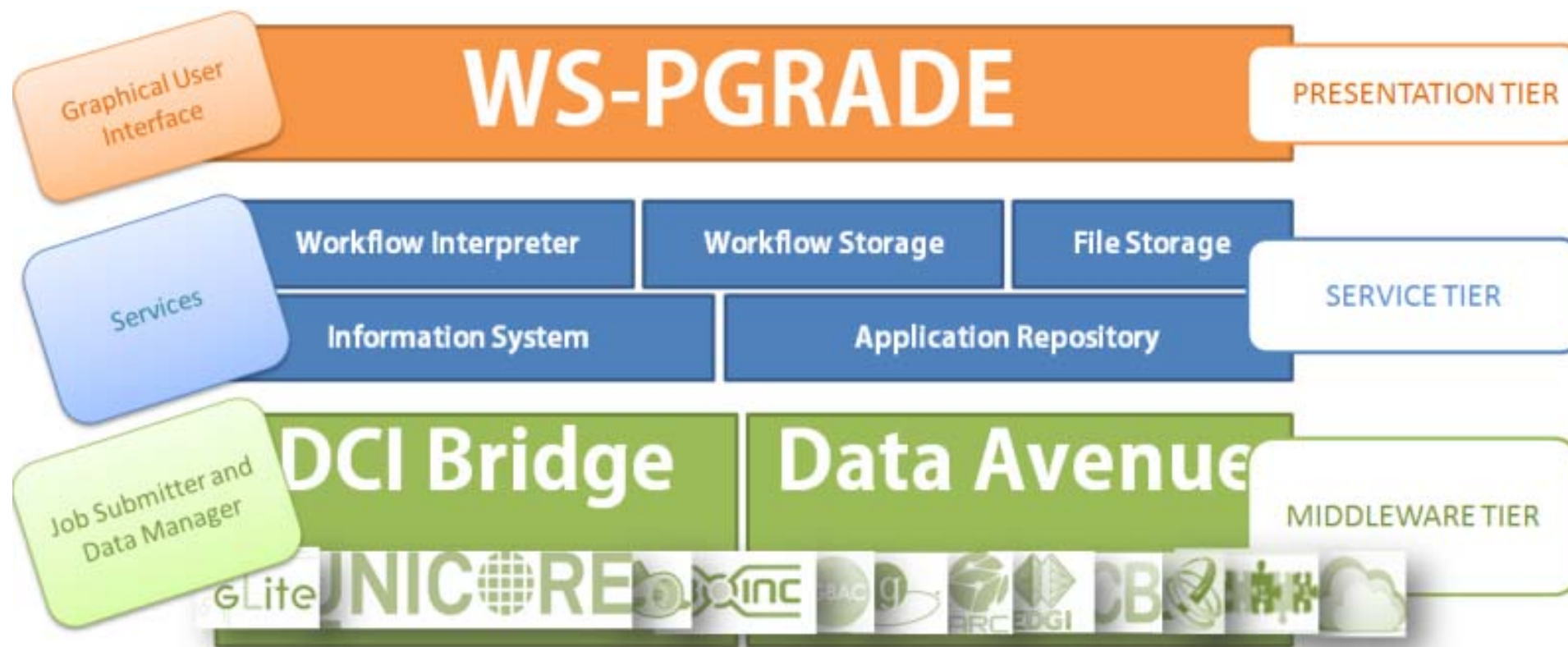
Nice. And now I want to analyse the last observation....



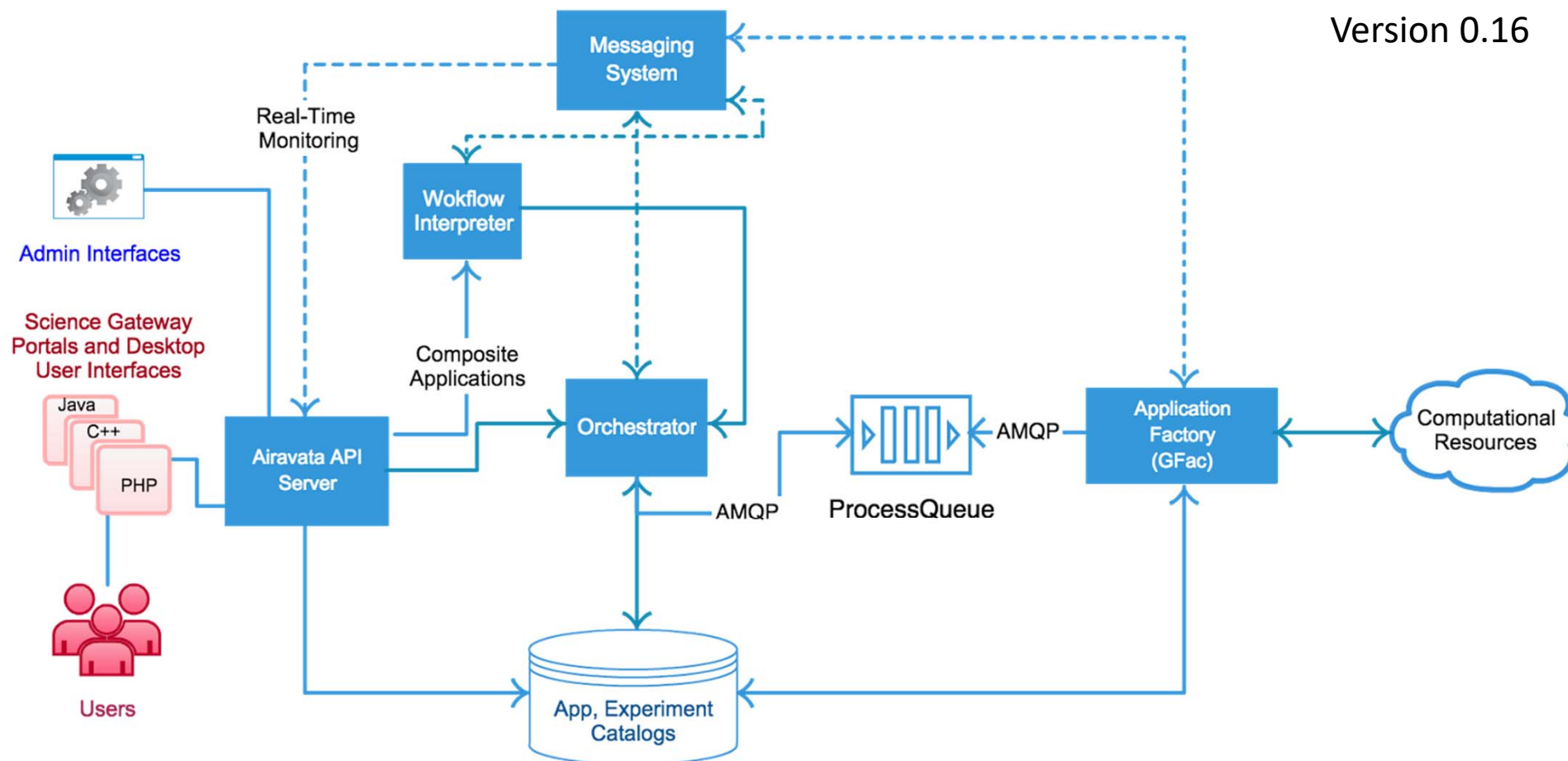
Load the data
Find the HW
Install the software and all the required libraries
Retrieve the input data
Configure the analysis
Submit and monitor it
Retrieve the results

Configure the analysis
Select the observation
Submit and monitor it
Download the results





Version 0.16



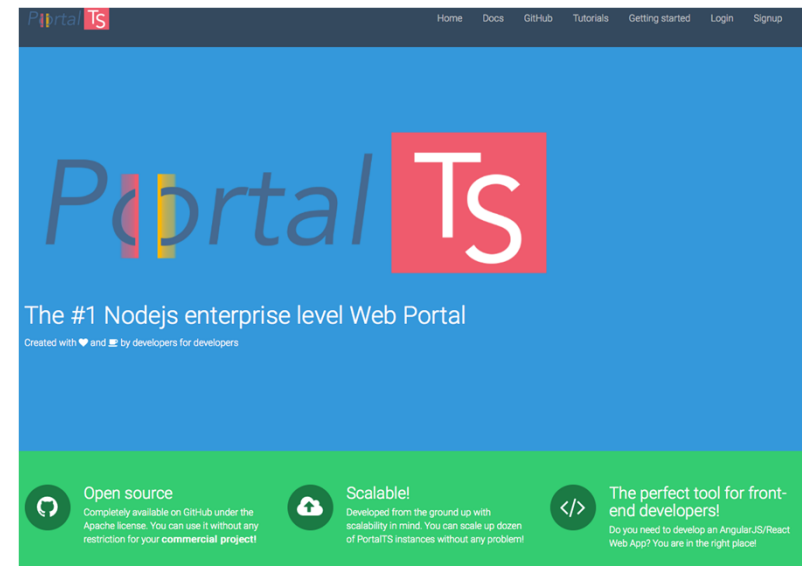
- Developing user interfaces that are useful for end user communities
- Managing domain-specific data and metadata
- Managing user identity, accounts, authorization...
- Getting community applications installed, running, and integrated with cyberinfrastructure middleware on a wide range of resources (clusters, Grid, Cloud...)
- Reliably running jobs and returning results
- Providing job status feedback and easily understandable error reports
- Operating gateway services at a high level of availability
- Operating trouble ticketing, support, and help desks



Ingredient 1: PortalTS



- PortalTS is an original Web Portal developed in Typescript using the NodeJS and Express frameworks.
- It is composed by reusable modules for standard features.
- A module is a component that implements and exposes a feature, but can also use features exposed by other modules
 - a set of web pages
 - a web service
 - a set of static files like css files, images
- According to the NodeJS philosophy, each module should be as simple as possible and implement a single functionality (i. e. a microservice).



A front-end library that allows the dynamic generation of full-featured form-based web interfaces including validation and constraints.

From a formal JSON configuration describing a list of inputs to a form frame interface.

TIME_INTERVAL_SELECTION

Fixed bins

The value is incompatible with the value of
TIME_INTERVAL_SELECTION_BAYESIAN

TIME_INTERVAL_SELECTION_BAYESIAN

Bayesian blocks

The value is incompatible with the value of TIME_INTERVAL_SELECTION

```
{
  "required": true,
  "parameterType": "select",
  "values": ["Fixed bins", "no"],
  "displayName": "TIME_INTERVAL_SELECTION",
  "dependencies": ["time_interval_selection_bayesian"],
  "isValid": if(dependencies['time_interval_selection_bayesian'].value
    == 'bayesian blocks' && parameter.value != 'no') {
    isValid.valid= false; isValid.message = 'The value is
    incompatible with Time_Interval_Selection_Bayesian';}"}
...
```



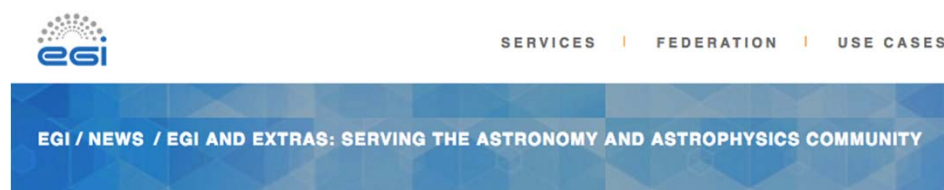
Ingredient 3: EGI



The EGI Federated Cloud is a IaaS-type cloud, made of academic private clouds and virtualised resources and built around open standards.

- EGI Applications Database (AppDB)
- E-Token Server (a dedicated VO and a robot certificate)
- CERN Virtual Machine File System infrastructure (CVMFS)
- Cloud resources

All is managed by a microservice developed as part of the EXTraS portal using OCCl.



EGI and EXTraS: serving the Astronomy and Astrophysics community

EGI is proud to announce an agreement (SLA) between a group of service providers and the EXTraS project (Exploring the X-ray Transient and variable Sky).

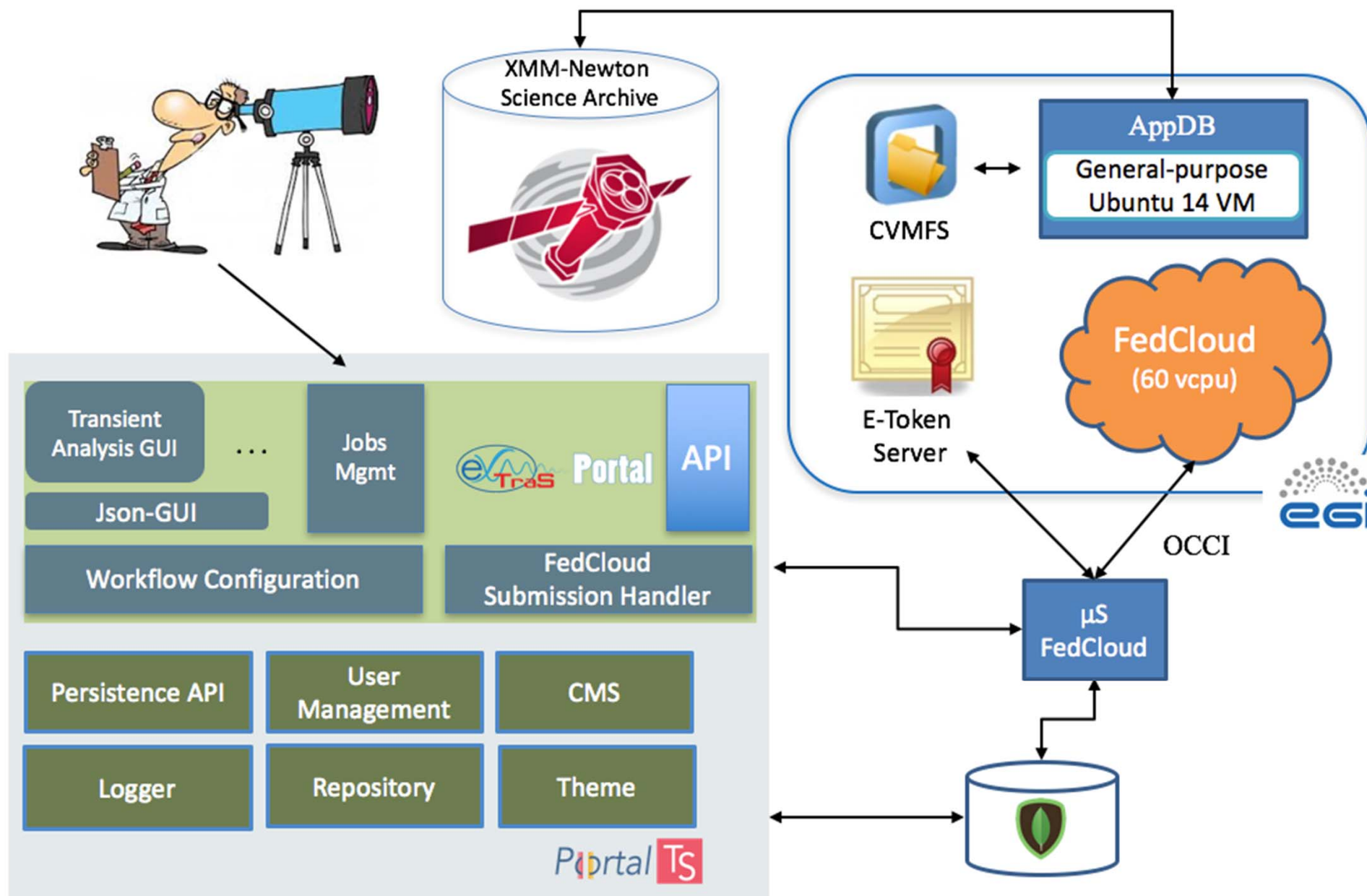
Thanks to the agreement with [EGI](#), EXTraS will be able to access [Cloud Compute](#) services needed for the project's activities.

The EGI service providers involved are:

[CYFRONET-Cloud](#) (Poland)

[RECAS-BARI](#) (Italy)

In total, the 2 providers offered 50 virtual CPU cores, 200 GB of memory and more than 1TB of storage.





Jobs Management



It provides users with the possibility to create, submit and manage the different analysis experiments based on the software developed within the EXTraS project.
In particular it provides the possibility to create a new analysis starting from an existing configuration or *share results* with other users.

Portal

Home Jobs Administration Help Logout

My Job

Shared with me

My Jobs Repository

Name ▾	Model ▾	State ▾	Submitted at ▾	Created at ▾		
validation PA v3	Periodicity Analysis	Finished	12:34 10/02/17	12:26 10/02/17		<div>Options ▾ Details New job from this Delete job</div>
validation PA v2	Periodicity Analysis	Finished	16:02 9/02/17	16:01 9/02/17		
validation PA	Periodicity Analysis	Finished	16:07 8/02/17	16:06 8/02/17		
validation TA	Transient Analysis	Finished	16:05 8/02/17	16:05 8/02/17		<div>Options ▾</div>

First < 1 2 > Last

Create a new Job



Workflow Management



HomeJobsAdministrationHelpLogout

My Job

Shared with me

TIME_INTERVAL_SELECTION_CATEGORY			
DELTA_TIME	1000		
CLOSE_TO_CATALOGUE_SOURCES	No		
SOFT_PROTONS_FILTER	No		
BARYCENTER	Yes		
POS_SYS_ERROR	2		
POS_SIGMA	3		
CATALOGUE_SOURCE_COUNTS	0		
MAX_TIME	50000		
REGION_SIZE	30		
PROBABILITY_THRESHOLD	0,0001		
SIGMA_THRESHOLD	5		
DELTA_TIME_CLOSE_TO_SOURCES	1000		

Perform a submission

Save configuration



Workflow Management



[Home](#) [Jobs](#) [Administration](#) [Help](#) [Logout](#)

Jobs Submission

TA - 0146420101 - WP4 Model

Input ID 0146420101

[Show Info](#)

[Add another input](#)

[Perform Submission!](#)

nxsa.esac.esa.int

XMM-Newton Science Archive

HOME

SEARCH

COMMAND & URL ACCESS

INTERACTIVE DATA ANALYSIS

TAP QUERIES

CATALOGUES & TOOLS

DOCUMENTATION

Sign in

Back to Search

Close all

Results #1

OBSERVATIONS (1)

EXPOSURES (20)

EPIC PPS SOURCES (288)

OM PPS SOURCES (2018)

3XMM-DR7 Cat (28)

Columns

Column units

Add to Basket

Save table as

Send table to

		Obs.ID	EPIC	RGS	Target	RA	DEC	Rev	Start
<input type="checkbox"/>		0146420101			NGC6388	17h 36m 20.44s	-44d 44' 39.9"	601	2003-03-2

Details for Observation 0146420101

Summary

Exposures

Publications

Obs. ID	0146420101
Revolution	601
Target	NGC6388
Exposures	3 EPIC, 15 OM, 2 RGS



Workflow Management



Index

My Job

Shared with me

Job Details

test 5 - Transient Analysis

Description:

InputId: 0146420101

[Parameter List](#)

[Realtime logs](#)

Comments

Post a new comment:

Post!

Index

My Job

Shared with me

Job Details

test 5 - Transient Analysis

Description:

InputId: 0655090431

[Download Output](#)

[Download Logs](#)

[Parameter List](#)

Comments

Post a new comment:

Post!

- New analysis tools
- Remote visualization
- Educational activities
- Data provenance

Data provenance refers to the ability to reconstruct all the history of a specific calculation, or scientific result, knowing all steps that brought to it and all parameters used in the intermediate calculations.

<http://portal.extras-fp7.eu/extrasWebApp#/details/58a2d69f03e71e6a79895bc1>



Thank you!



ronologia Segnalibri Sviluppo Finestra Aiuto

extras-fp7.eu

login | contacts | privacy

Search...

Exploring the X-ray Transient and variable Sky

HOME | GENERAL PUBLIC | SCIENCE | EDUCATIONAL | ARCHIVE

Home » Science » Contacts

Contacts

For general information about EXTras:

- Andrea De Luca (Project Coordinator) - deluca@iasf-milano.inaf.it
- Ruben Salvaterra (INAF/IASF Milano) - ruben.salvaterra@iasf-milano.inaf.it

For details about specific activities:

- **Aperiodic variability:** Andrea Belfiore - abelfiore@iasf-milano.inaf.it
- **Periodicity searches:** Gianluca Israel (INAF/OA Roma) - gianluca@oa-roma.inaf.it
- **Search for transients:** Andrea Tiengo (IUSS Pavia) - andrea.tiengo@iusspavia.it
- **Long-term variability:** Simon Rosen (University of Leicester) - srr11@leicester.ac.uk
- **Screening and validation:** Frank Haberl (MPE) - fwh@mpe.mpg.de
- **Multiwavelength characterization and classification:** Joern Wilms (ECAP) - joern.wilms@sternwarte.uni-erlangen.de
- **Archive management:** Duncan Law-Green (University of Leicester) - duncan.law-green@leicester.ac.uk
- **Dissemination:** Stefano Sandrelli (INAF/OA Brera) - stefano.sandrelli@brera.inaf.it
- **Science Gateway:** Daniele D'Agostino (CNR-IMATI) - dagostino@ge.imati.cnr.it

List of local coordinators in the EXTras partner institutions:

- **INAF:** Andrea De Luca - deluca@iasf-milano.inaf.it
- **IUSS Pavia:** Andrea Tiengo - andrea.tiengo@iusspavia.it
- **CNR-IMATI:** Daniele D'Agostino - dagostino@ge.imati.cnr.it
- **University of Leicester:** Mike Watson - mgw@leicester.ac.uk
- **MPE:** Frank Haberl - fwh@mpe.mpg.de
- **ECAP:** Joern Wilms - joern.wilms@sternwarte.uni-erlangen.de



Support

