

8.4 EISCAT_3D (CC)

Short description	EISCAT_3D
Type of community	Competence Centre
Community contact	Ingemar Häggström
Meetings	
Supporters	

- [Ambition](#)
- [User stories](#)
- [Use cases](#)
- [Requirements for EOSC-hub](#)
 - [Technical Requirements](#)
 - [Capacity Requirements](#)
- [Validation plan](#)

Ambition

EISCAT Scientific Association participates in the EOSC Hub WP8 Competence Centre with the aim of developing a data portal for users of the future radar system EISCAT_3D, which is planned to start operation during 2021-2022. The aim of the CC is to have a working prototype open for public access by M18 of EOSC-hub project (from Sept 2019).

User stories



Instruction

Requirements are based on a user story, which is an informal, natural language description of one or more features of a software system. User stories are often written from the perspective of an end user or user of a system. Depending on the community, user stories may be written by various stakeholders including clients, users, managers or development team members. They facilitate sensemaking and communication, that is, they help software teams organize their understanding of the system and its context. Please do not confuse user story with system requirements. A user story is an informal description of a feature; a requirement is a formal description of need (See section later).

User stories may follow one of several formats or templates. The most common would be:

"As a <role>, I want <capability> so that <receive benefit>"

"In order to <receive benefit> as a <role>, I want <goal/desire>"

"As <persona>, I want <what?> so that <why?>" where a persona is a fictional stakeholder (e.g. user). A persona may include a name, picture; characteristics, behaviours, attitudes, and a goal which the product should help them achieve.

Example:

"As provider of the Climate gateway I want to empower researchers from academia to interact with datasets stored in the Climate Catalogue, and bring their own applications to analyse this data on remote cloud servers offered via EGI."

EISCAT_3D will generate raw data at up to three radar sites (each with almost 10000 antennas) and has to make those data browsable and analysable for researchers, as well as archiving the data for the long-term. It is planned to archive around 2 PB per year. This primary mission is achieved by procuring sufficiently big storage and network capacities at a few data/compute centres (for back-up or load distribution). The data will be transferred to this/these locations after initial filtering and calibration at the data source(s). The data/compute centres are responsible for data archival, data curation, generation of derived data (level 1-2-3) and for sharing the data with scientists.

Data must be shared with scientists via a data portal and programming APIs. The EISCAT_3D Data Portal should offer the following main features:

- AAI, user login
- Data browser
- Data download
- Online computing (analyse data without downloading them, using cloud resources, reference applications or user's own software)

The CC is exploring the use of the following services within the framework of EOSC-Hub:

- Application and data catalogue portal with compute integration: DIRAC
- Metadata catalogue for high-level data: B2Find
- Metadata catalogue for low-level data: DIRAC
- Compute resources: EISCAT, cPouta cloud at CSC
- Data storage and transfer (datacompute centres): File transfer TBD, e.g. B2STAGE
- User SSO: EGI CheckIn and B2Access

No.	User stories
US1	Any researcher should be able to access the portal and browse metadata. The portal grants /denies access to data and processing based on affiliation. (Meta- data should be available for all researchers. The real data for authorised users only.)
US2	Authorised researchers should be able to select the EISCAT_3D data they are interested in for download or for analysis.
US3	Authorised researchers should be able to browse reference applications in the portal, select an application for use, feed their data in (from US2), visualise or download the analysis result.

Use cases



Instruction

A use case is a list of actions or event steps typically defining the interactions between a role (known in the Unified Modeling Language as an actor) and a system to achieve a goal.

Include in this section any diagrams that could facilitate the understanding of the use cases and their relationships.

Step	Description of action	Dependency on 3rd party services (EOSC-hub or other)
UC1	Authentication: <ol style="list-style-type: none"> 1. User enters into the portal. 2. Portal directs to SSO 3. Portal grants authorisation 	<ol style="list-style-type: none"> 1. Portal is running with metadata and file catalogue 2. EGICheckin <-> B2Access, EISCAT idp, other social IDPs
UC2	Data access: <ol style="list-style-type: none"> 1. User selects data 2. Portal accepts authorisation 3. Portal directs to data store 	<ol style="list-style-type: none"> 1. Dirac file catalogue 2. dirac sso 3. Dirac
UC3	Computation: <ol style="list-style-type: none"> 1. Data selected 2. Software selected /uploaded 3. Data staging at HPC 4. Processing of data 5. Results presented 	<ol style="list-style-type: none"> 1. Dirac 2. Dirac HPC 3. E.g. B2Stage 4. HPC, VMs and/or containers 5. Visualisation, B2drop, B2share

Requirements for EOSC-hub

Technical Requirements

Requirement ID	EOSC-hub service	GAP (Yes /No) + description	Requirement description	Source Use Case
RQ1	EOSC-hub AAI	Yes: Dirac	Dirac interface to EGICheckin	UC1
RQ2	Data staging	Yes: File system	Temporary file storage close to computing	UC3
RQ3	Cloud Compute	Yes: HPC	Run VMs and/or containers for portal and data processing	UC3
RQ4	PID/DOI service	Yes: Registry	Registration of digital objects: data collections (experiment, low high levels of data)	UC2,3
RQ5	EOSC-hub Check-in	Yes:Check-in	EISCAT community includes institutes in Japan and China. Currently, Checkin has been integrated into the EISCAT data portal based on DIRAC4EGI technology. However, google, facebook cannot be used in China thus users from there cannot yet login via Checkin. Other social logins are to be implemented, see GG US ticket: https://ggus.eu/index.php?mode=ticket_info&ticket_id=139172&come_from=submit	UC1

Capacity Requirements

EOSC-hub services	Amount of requested resources for CC development project	Time period	Envisaged future
Portal	2 VMs	30 yrs	Provider TBD, tendering or own resources
Stage	2 VMs 10 TB NB: the full EISCAT 3D system may require temporary storage on petabyte scale	5 yrs	EISCAT site storage or national providers (tendering TBD?)
Processing	2 VMs 10 cores NB, the full EISCAT 3D system will require much more capacity, the ultimate aim being realtime sub-beam imaging requiring some 500 TFLOPS/s	5 yrs	EISCAT site compute or HPC provider (tendering TBD?)

Validation plan

These are the required steps of validation to be performed by enrolling a number of external early adopters. The tasks follow UC1-UC3 above.

	Task	Description	Expected outcome
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1	User registration and authentication	<p>Users register for access with authentication through EGI Checkin, X.509 or social login.</p> <p>The users are added to VOMS groups or similar.</p>	Users are able to log in to portal.
2	Data search and access	Users browse the existing data archives.	Users can browse all data and access data according to embargo rules.
3	Software upload	Administrators add software to cloud computing; direct or as a container	New analysis software becomes available to portal users.
4	Job submission	Users select data and submit for processing with available software.	<p>Data are staged for analysis. Analysis VM starts.</p> <p>Users receive and download analysed data, e.g. plots or lag profiles.</p>