E-Infrastructure Board: Status

Update since last ET Monthly meeting

Einstein Telescope Annual Meeting

For the ET-EIB – patrice.verdier@in2p3.fr

EGO – Nov. 15th, 2022

«…to design, create and operate an evolving, efficient and functional e-infrastructure environment at a reasonable cost for the collaboration. Initially the focus will be the development of a Computing Model for the ET »

- Prepare a plan of the studies and activities that need to be undertaken for the development of the ET computing.

- Propose a computing model and its updates to the collaboration.

Out of scope: actual science code, physics and engineering tools

Data transfer and storage: safely and efficiently transfer all data to custodial storage and processing centres, including low-latency transfers

Software packaging and distribution: manage software lifecycle, and make packages available ubiquitously

Computing power: provide and manage computing resources (HTC and HPC) for the processing of data, in all computing domains

Data distribution: make data available to worker nodes in computing centres anywhere, and possibly also to single workstations, including support to public releases of data

High-availability service management: provide a platform for running the collaboration's services (e.g. alert generation services, event databases,...)

Data cataloguing and bookkeeping: organise all data and metadata and provide querying and discovering capabilities

Job lifecycle management: provide a uniform job submission and runtime environment to research groups

High-level workload management: keep a database of all jobs and allow the enforcement of priorities and scheduling strategies; provide support for organized large-scale data processing campaigns

Monitoring and accounting: monitor local and distributed computing, checking performance and looking for issues, and provide reliable accounting both at the user/job and site level

Authentication, Authorisation and Identity management: provide consistent AAI across all domains and activities.

Collaboration services: provide tools for efficient collaboration management, coordination, and outreach (e.g. document repositories, collaborative tools, administrative databases, communications,...)

Computing support: provide a support infrastructure for all computing activities

Division 1: Software, frameworks, and data challenge support

Division 2: Services and Collaboration Support

Division 3: Computing and data model, Resource Estimation

Division 4: Multimessenger alerts infrastructure

TTG: Technology Tracking working Group

Division 1: Software, frameworks, and data challenge support

Scope: Define the software frameworks for ET computing workflows, the middleware for infrastructure, workload and data management. Develop software quality best practices and support their adoption with training and enforcement policies. Support code development in all computing domains. Provide computing support for mock-data challenges.
Chair : proposed to EB+CB - **Andres Tanasijczuk, Université Catholique de Louvain**

- Main current activity: gathering information about needs for upcoming mock data challenges (MDC)

  o **General plan:** provide a minimal data distribution infrastructure for the first MDC and survey actual use cases and workflows. Use following MDCs to iteratively provide more complete infrastructure prototypes

  o Several meetings to date with OSB:
    Data (few TB) will be provided through CVMSF and a stashcache hierarchy
    Provide documentation through ET wiki

Scope: IT services needed for the administrative management of the Collaboration, communication and collaboration within the Collaboration and outside.

Chair: Antonella Bozzi, EGO

- Following the work on the development of the ET Members Database (ETMD), modifying the app in order to meet the requirements, the Division has been busy in the population of the database:
  - processing and integration of information provided by the RU Leaders in the RU-submission
  - rollout of the application to the RU Leaders, to add email addresses and other metadata to their RU member profiles, as well as providing the EGO IT Department with the information relating to their institutions
  - ETMD is operational : info from RU leaders have to be completed

    https://apps.et-gw.eu/etmd/?c=1

- Note that the ETMD is already being used for the management of the Active Directory accounts for access to the ET web services

Scope: develop the ET Computing Model. Provide a running estimate of the computing resources needed for all computing domains.

- **Chair: Gonzalo Merino, PIC**

- Members from several institutions have expressed interest: U. Geneva, CC-IN2P3, RWTH, Wigner, CAMK, BSC, UB. Open to anyone in the collaboration. Please contact us if you want to contribute

- Develop a WBS for the preparation of the Computing Model and Cost Estimates
- Collaborate with OSB to define the initial activities to evaluate actual computing needs
- Liaise with ET-PP WP8 and the Numerical Relativity community
- The overall architecture of the e-Infrastructure, possibly as a few separate systems (e.g. instrument control and DAQ, low-latency, and offline)
- A documented way of evaluating the required computing power and storage space from the evolving scientific program of the collaboration: estimate the involved costs and growth timelines
- Descriptions of the data flows (=> network performances), of the user experience and workflows, and of the tools chosen or to be developed to provide all the required functionalities (foundation libraries, frameworks, middleware,...)

Scope: Design and develop the infrastructure needed for multi-messenger trigger management and distribution. Follow the development of software tools for low-latency computing.

Chair: Steven Schramm, Université de Genève

- Requires close cooperation with other observatories/collaborations/networks
  - Multi-messenger community is already putting tools/frameworks in place to support alerts, and we need to be involved in this process now to ensure that ET's needs are represented
  - Multi-messenger Astrophysics Workshops, Oct 10-12 at EGO (https://indico.ego-gw.it/event/199/) following the one from Jan 2022 (https://indico.in2p3.fr/event/25290/)
    First event covered alert systems, brokers, and software for data analysis.
    Second event provided an outlook of different messenger telescopes/observatories, and consortia
    supporting them, for the years ahead
- A diverse set of expertise is needed to prepare the alert infrastructure
  - People with backgrounds in other messenger domains are also very welcome to join
- Please get in touch if you want to contribute!

Scope: track the evolution of hardware, middleware and software technologies

Chair: Sara Vallero, INFN Torino

- The working group is a coordinated cross-division effort
  - We aim at involving (at least) one representative per division
- Activities:
  - Review and present to the EIB promising new technologies of possible benefit for the different divisions' activities
  - Review and present to the EIB strategies and tools to enhance environmental sustainability
  - Work in synergy with the other EIB divisions to realise Proof of Concept solutions based on new technologies of interest
- The latter activity will leverage, among others, the ET R&D cluster that will be made available at INFN-Torino in the following months
  - The cluster will be funded by the ETIC (ET Infrastructure Consortium) PNRR project

EIB Chairs: Stefano Bagnasco (INFN), PV (IP2I Lyon - IN2P3)

WP8 leaders: Achim Stahl (U. Aachen), Sergi Girona (BSC) + Nadia Tonello (BSC)

- Joint WP8+EIB weekly call for coordination

- EIB is defining the division chairs and the full organigram is now almost ready (one CB approval in progress)

- Liaison with OSB Div. 10: **John Veitch, University of Glasgow**
  o Especially to prepare the MDC (objectives, needs, code performances, computing and data requirements)

Objectives

- **Definition of the computing and data model** of the Einstein Telescope, including the definition of the workflow and estimation of the resources.
- **Data Access** – technical guidelines and principles for implementing the data access policies

Activities

1 FTE hired at BSC, 1 open position at UniGe
Regular participation to meeting for coordination with EiB
Organization of the job tasks with tasks leaders (CNRS, UniGe, BSC, INFN) has just started.

M 8.1	Workflows Requirements collection and constraints: computing and data	Workshop	Sept '23
D 8.1	Computing and Data Requirements	Deliverable	Mar'24

- Computing is not as pressing as other activities, but some things need to be done soon
  - Collaboration services
  - MDC support
  - Multimessenger infrastructure coordination
  - …
- Still limited by person-power
  - ETIC in Italy will provide o(1FTE)
  - Skilled person-power for computing is always a challenge: All help welcome !
- The goal is to deliver an efficient computing & software infrastructure for ET users:
  - EIB and ET-PP WP8 are starting working on the definition of the computing model
  - Get closer to existing computing expertise developed for LIGO-Virgo within IGWN
  - Distributed computing network => develop participations and links with European T1 CCs
  - Provide a software framework allowing traceability and reproducibility, efficient job submission and data access