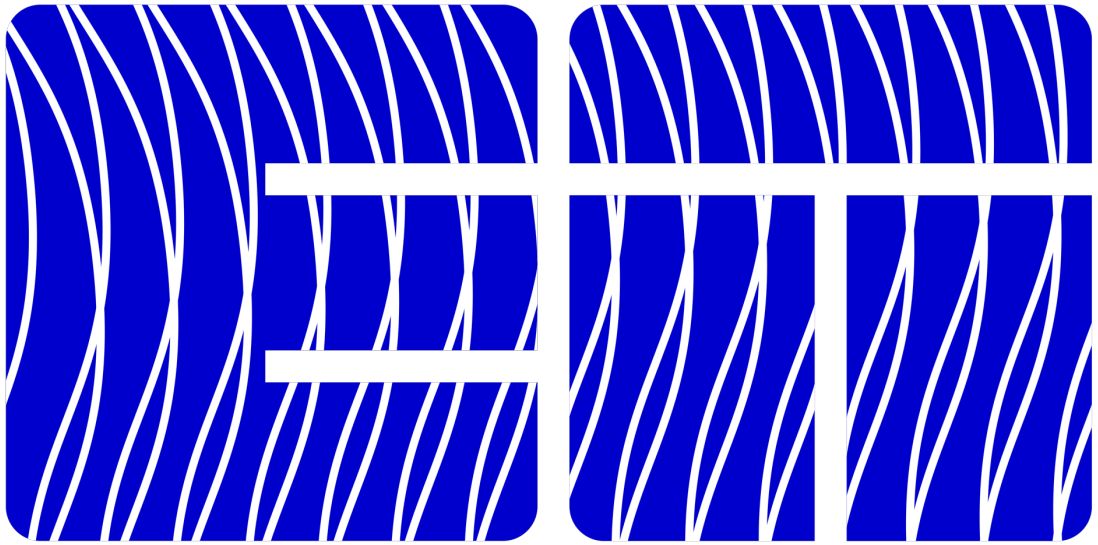


# ET-PP Annual Meet 22-24 July 2025

## WP8 Computing and data model

## Parallel Session: ETO-WP6-WP8

Computing and Data Access Policy
& ET DMP (D6.6, D8.1, D8.2,D8.3)

Nadia Tonello (BSC), Achim Stahl (DESY), Michele Punturo (INFN)

23th July 2025

EINSTEIN TELESCOPE

# EiB-WP8 organization Chairs: Stefano Bagnasco (INFN Torino), Patrice Verdier (IP2I-IN2P3)

ET-PP

**ET-PP WP8 Task 8.1**
**T0 data center**
Patrice Verdier (IP2I-IN2P3)

**Task 8.2**
**Computing and Data Model**
Paul Laycock (Geneva)

**Task 8.3**
**Resources**
Silvio Pardi (INFN Napoli)

**Task 8.4**
**Data Access Implementation**
Nadia Tonello, Oscar Reina (BSC)

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**Division 1:**
**Software, frameworks, and data challenge support**
Andres Tanasijczuk (UC Louvain)

**Division 2:**
**Services and Collaboration Support**
Antonella Bozzi (EGO)

ET-EiB

**Division 3:**
**Computing and data model, Resource Estimation**
Gonzalo Merino (PIC)

**Division 4:**
**Multimessenger alerts infrastructure**
Steven Schramm (Université de Genève)

**TTG: Technology Tracking working Group**
Sara Vallero (INFN Torino)

# EiB - ETPP WP8, our 2025 in a nutshell

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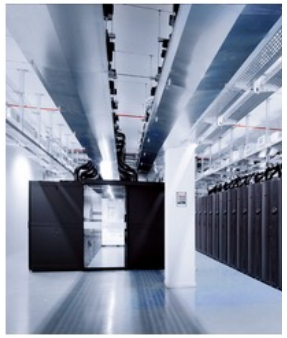
GWSC GRAVITATIONAL WAVE SCIENCE CENTER
UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES

cnrs

CCIN2P3

IP2I

- Feb 18-20th - Einstein Telescope data analysis workshop https://agenda.infn.it/event/44693/overview
- **March 5th - D8.1 Computing and Data Reqs. Resubmission**

- **ET-PP Midterm review, May 15th 2025**

- May 21&22 - Pre-Merger & Low Latency workshop https://indico.ego-gw.it/event/852/overview
  May 26-30 - XV Einstein Telescope Symposium in Bologna https://indico.ego-gw.it/event/819/
- Workshop on Online Infrastructure, Computing and Data Model 30th June, 1st July, Lyon, France https://indico.ego-gw.it/event/820/
- **ET-PP RP2 Midterm review REPORT, 3rd July 2025**
- **ET-PP Annual Meeting**
  22-24 July 2025 Barcelona. **https://indico.ifae.es/event/2183/overview**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23th July 2025

# ET-PP WP8 Milestones & Deliverables

WP8 milestones

| | Workshops | WPs | Due date | |
|---|---|---|---|---|
| M8.1 | Workflows Requirements collection and constraints: computing and data | | Sep 2023 | Oct 2023 |
| M8.2 | Computing infrastructures availability for ET workflows, characteristics and sustainability | WP9 | Aug 2024 | July 2024 |
| M8.3 | On site infrastructure, computing and data model | WP6 | Aug 2025 | |
| M8.4 | Low latency and offline workflows and computing model | WP6 | Dec 2025 | |
| M8.5 | Data management, access, policy and implementation | WP2, WP6 | July 2026 | |

WP8 Deliverables

| | | Lead | Due date | |
|---|---|---|---|---|
| D8.1 | Computing and Data Requirements | UniGe | Feb 2024 | Feb 2024 |
| D8.2 | Computing and Data Model | UniGe | Feb 2026 | |
| D8.3 | Data Access Implementation Guidelines | IFAE | July 2026 | |

**EC RP1 received**

**Deliverable 8.1** (Computing and Data requirements) Changes requested (submitted 05-03-2025 [1])

**EC RP2 received** [2]
**Further review required**

**Deliverable 8.1 IN REWRITING**
**Deliverable 8.2 IN PROGRESS**

[1] Available at TDS at https://apps.et-gw.eu/tds/?r=19444
[2] WP8 report and review materials available at https://indico.ifae.es/event/2128/

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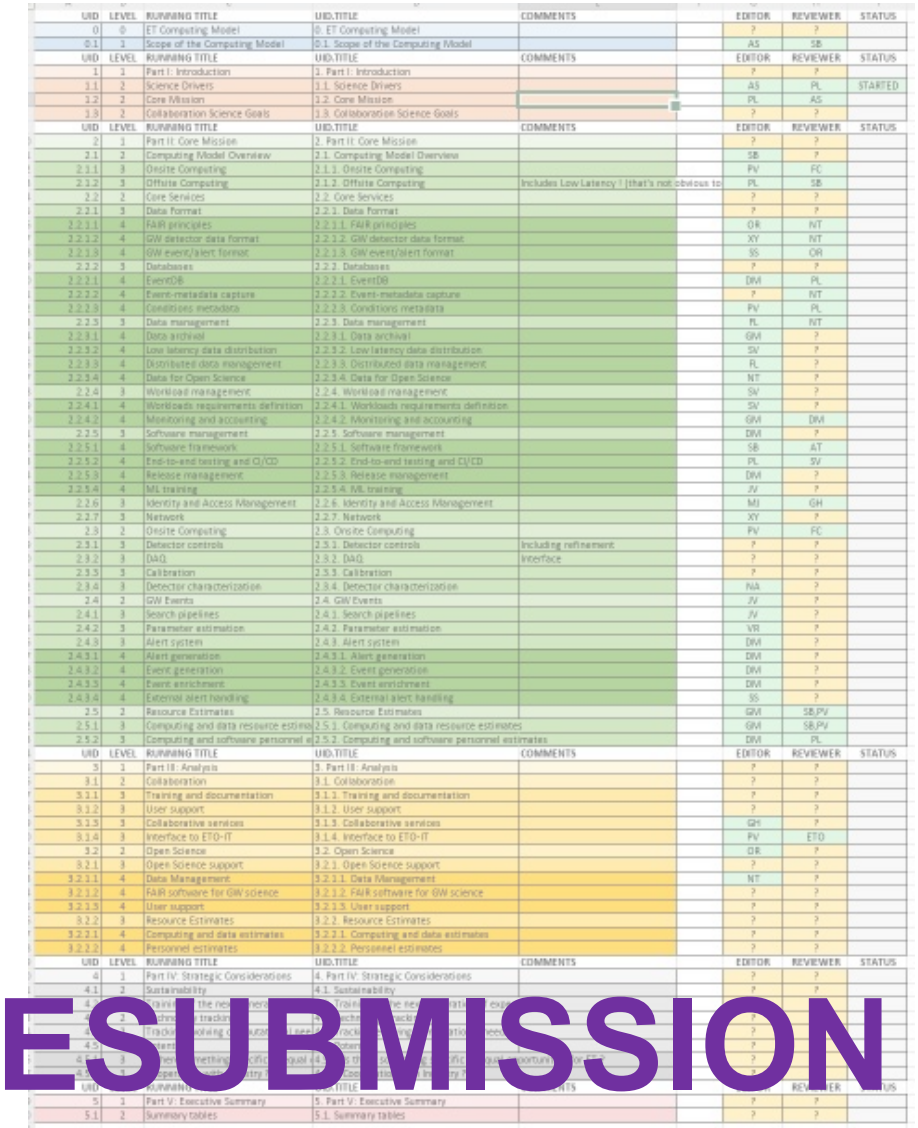
# ET-PP WP8 D8.2 Computing and Data Model.

## D8.2 preparation: Timeline (suggested in ET Symposium WG)

- **July 22nd ET-PP** - we have a full template, no missing pieces, editors assigned
- **Mid-September** we have an editors writing meeting
- **End of October** we release a draft to external reviewers
  They have 2 weeks

## Release to ET collaboration by the end of the year

- ***Editor assignment & Progress tracking (B2DROP)***
- Collaborative document edition set up (Overleaf-CERN)
- TBD at Lyon Workshop on Onsite Infrastructure, Computing and Data Model. **https://indico.ego-gw.it/event/820/**



**AFTER D8.1 RESUBMISSION**

# ET-PP WP8 D8.2 Computing and Data Model.

## D8.2 preparation: Timeline (suggeste

- **July 22nd ET-PP** - we have a full ten
  editors assigned
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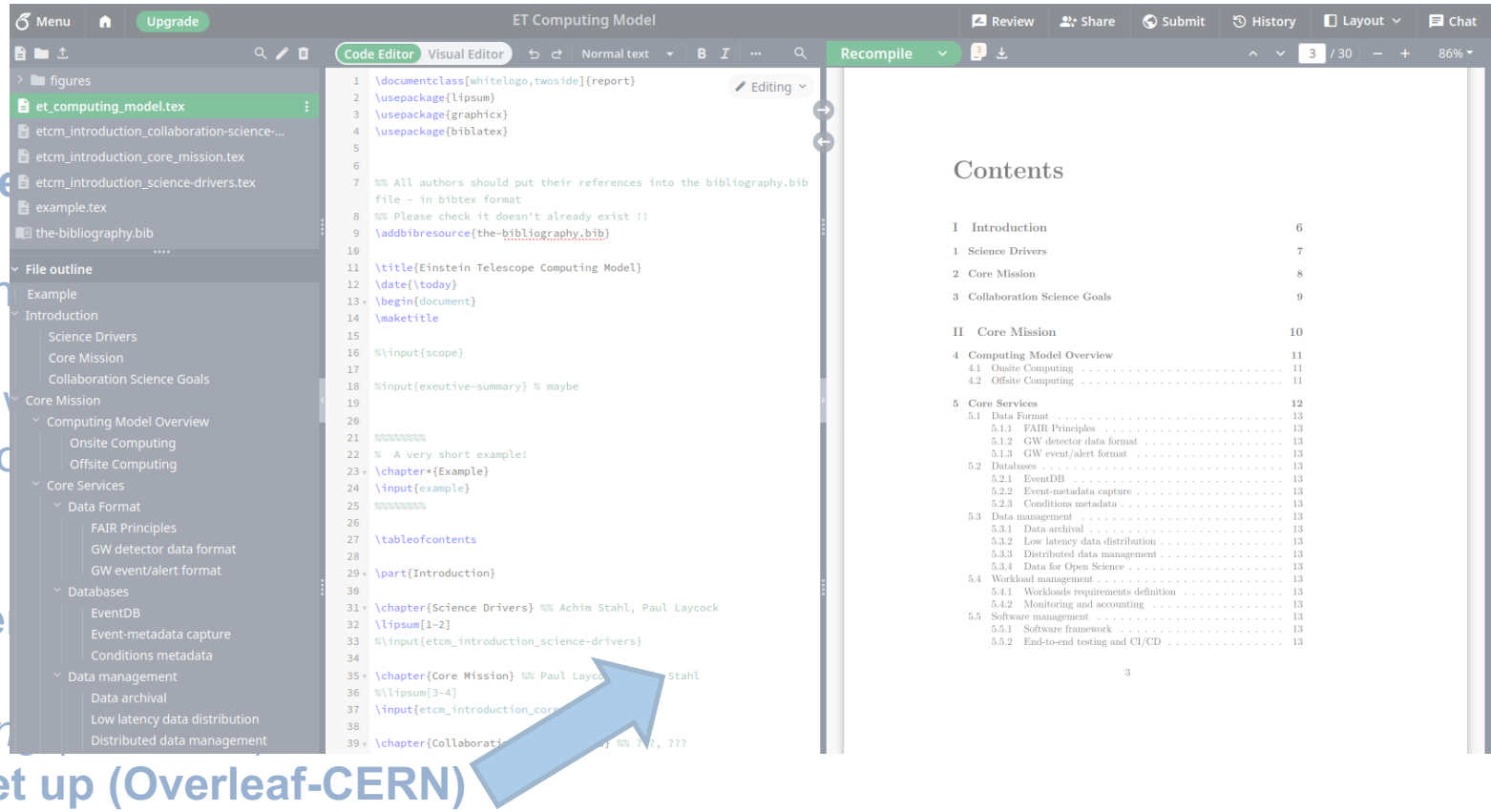
## Release to ET collaboration by the e

- *Editor assignment & Progress trackin*
- **Collaborative document edition set up (Overleaf-CERN)**
- TBD also at Lyon Workshop on Onsite Infrastructure, Computing and Data Model. **https://indico.ego-gw.it/event/820/**

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# AFTER D8.1 RESUBMISSION

# And not to forget: Actions from ET Data Analysis Workshop (Bologna, February 2025)

Call for Computing Resources

**Data and Metadata Requirements**

FAIR for Software

## TODO LIST

- Define a (set of) standard software distribution(s) [Elena]
- Provide a CVMFS repository for distribution (and policies for inclusion) [Stefano]
- Call for computing resources requests (also for MDC datasets production) [Stefano]
- ET Computing Cloud MoU [Stefano, Elena]
- Data/metadata catalogue (annotations) [Paul]
  - or at least (for the time being) clear and permanent association between config file(s) and dataset
  - Define the requirements for metadata {Oscar]
- New MDC production code review for modularity [Anuradha]
- Prioritized list of requested datasets [Tania & Gianluca]
  - Resources (CPU, storage, personpoiwer for development & running)
  - Strategies for reuse and "modular" generation
- Set up MDC analysis Code working group [Paul]
- Start definition of best practices for code [Andres]
- Organize MDC timeline definition meetings (or whatever) [Stefano]
- Define a plan for user-facing portal (docs, tutorials, data and code repos, à la GWOSC) [Alberto]
- ETAP/MADDEN/ETIC/whatever coordination (workshop?) [Federica]
- "Baseline" technology Q&A-based seminars [Sara]

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**AFTER D8.1 & D8.2 SUBMISSION**

# And not to forget: Actions from ET Data Analysis Workshop (Bologna, February 2025)

**1) Catalog of Computing & Storage resources at BSC for ET / ET-PP**
- Via ET-PP RES project (Red Española de Supercomputación)
- VMs & HMS (disk/tape) storage plan (100TB 2025, 200TB 2026)

**2) Data and Metadata requirements**
- Based on data and metadata catalogue and/or association between config files and datasets
- Real and Simulated Data (MDC)
- "[LVK] Gravitational Wave detectors analyze their data together"
- NOW: Requirements for GW strain data release (As requested for D8.1)

**3) FAIR best practices for ET / GW**
- Taking into account FAIR for both Research Data & Sofware Management (**DOING**)
- Abstract submitted to XV ET Symposium: *Towards a FAIR Learning Path for ET* (**DONE**)
- NOW: Requirements for GW strain data release (As requested for D8.1)

**AFTER D8.1 & D8.2 SUBMISSION**

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# And now for something completely different…

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# ET-PP WP8 D8.1 CDR EC RP2 Revision summary (1/3)

**Review report 'cover letter'.**
*Remarks to be taken into account (or packages may be declared void (!))*

*...the requirement to clarify the intentions of ET-PP on the ET data handling in Deliverable 8.1. It has been promised in the* ***Description of Action*** *that the* ***ET data management*** [1] *(an ET-PP deliverable) would follow* ***FAIR principles on open data****. When the question was posed directly during the review meeting, the consortium* ***refused to give a clear answer on the data retention period, which is simply not acceptable*** [2]*. Some more detailed arguments are given in the scientific review...*

*...[reviewer's] requests for re-opening some deliverables and milestone documents and revising them to give more substance is expected to be* ***fully followed****...*
*The* ***deadline*** *for this revision to finish is hereby set to* ***10 September****.*

[1] ET Data Management (Plan). D6.6 WP6. Due by the end of the ET-PP project (month 46)
[2] ET Data release/retention policy. **To be released.**

# ET-PP WP8 D8.1 CDR EC RP2 Revision summary (2/3)

**Report recommendations:**

*The **plans for low-latency release of gravitational wave strain data (or lack thereof) have to be provided**. I repeat that a commitment (or not) to low-latency data releases has huge implications on the rules governing the ET Collaboration, so **the endorsement (or not) of low-latency data releases must be addressed**. Plans are also necessary to **harmonise the data-sharing policies of ET and its partner, the Cosmic Explorer** which read : "released as open data as quickly as possible (i.e., as close to real time as possible)", and with "no reserved science [..] for any group or collaboration" (Section 9.2 of the Cosmic Explorer Horizon Study, **https://arxiv.org/pdf/2109.09882.pdf)**.*

*In terms of compliance with the DoA this **refusal to address this request is at odds with task 8.4: "Data Access Implementation"** / coordinator BSC: guidelines for the data policy compliance, relevant to the data storage, access, process and distribution, on all relevant time scales, respecting the EU policies on open data.*

# ET-PP WP8 D8.1 CDR EC RP2 Revision summary (3/3)

**Report review: WP8 Deviations from Objectives and Work Plan**

*Deliverable D8.1. Computing and Data requirements was* ***evaluated in Oct 2024 review****. We* ***requested some revisions****. Some where taken into account,* ***some only partially****, such as the arguments for* ***using a factor 5 in estimating ET data requirements*** *based on LIGO/Virgo detectors.* [3]
***The description of how to handle low latency gravitational wave data releases is completely lacking****, and this would be a* ***significant deviation*** *from the current mode of operation, where data is released years after it is acquired.* ***So a plan is needed.*** [4]

[3] ...the **rationale for using a factor 5** in estimating ET data requirements based on LIGO/Virgo detectors **should be clearly presented**.

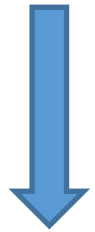
[4] The plans for **low latency [data]** production and **public dissemination** of **calibrated** data, data **quality flags**, and their **revisions**, is lacking. **The report must include this**.

# ET-PP WP8 D8.1 Computing and Data Requirements RP2 REVIEW REPORT, ACTION PLAN

- **We must address the points as stated by the Officer / Referees, specially addressing the Data Release comments but also adhere to our original plan & project timelines ***
  - ET-PP **Data Mananagement Plan** (D6.6, WP6) is due by the end of ET-PP (month 46).
  - ET Open Data release policy is beyond scope of ET-PP, **interactions between ET-PP WPs and ET needed**.
    - **ET-PP Annual meeting, Barcelona 22-24 July 2025 (HERE WE ARE)**

*** ET-PP Milestones & Deliverables**

- D8.2 Computing and Data Model, WP8, month 42
- D6.6 Data Management Plan and Data Access Policy, WP6, month 46
- D8.3 Data Access Implementation, WP8, month 47



# ET-PP WP8 D8.1 Computing and Data Requirements RP2 REVIEW REPORT, ACTION PLAN

- **Meanwhile, our plan for D8.1 amendment (thx EiB Stefano, Steven, Patrice et al.)**
  - **Draft a response** to the reviewers in order to transmit them our approach and plans
  - **Prepare an update to D8.1** with further info and justification of the **5-factor** scaling
  - **Prepare an update to D8.1** with **plan and associated requirements estimation** for **public release** of **GW strain data and metadata** for the Einstein Telescope based on **two potential public data release policies:**
    - **Cosmic Explorer like (aka full public immediate release)**. Proposed model by CE Horizon study, with “as close to real-time as possible” & unrestricted public data release [5]
    - **LIGO/Virgo/Kagra like (aka embargo)**. Current solution in use by LVK using 18-24month embargo period and GWOSC infrastructure [6]

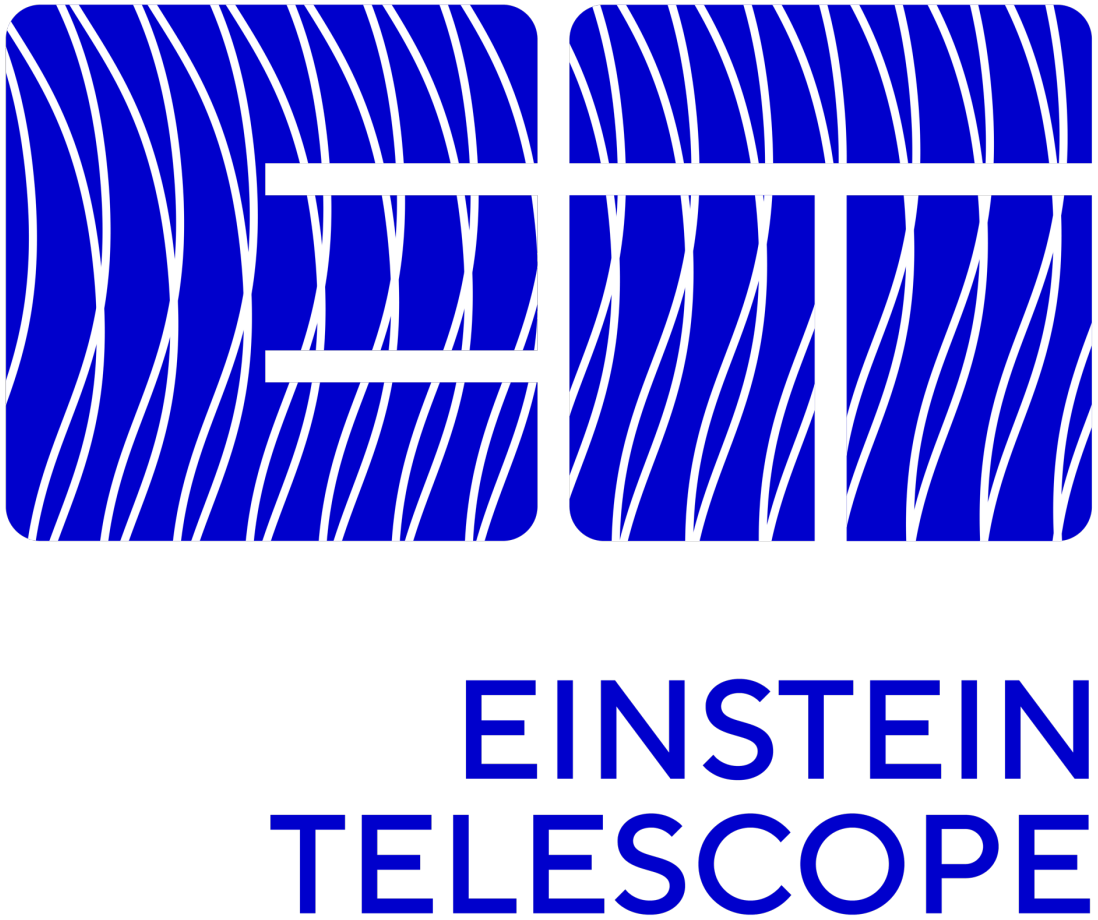
**ET-PP WP8 + EiB**
**IN PROGRESS**
**FULL PRIORITY**

[5] https://dcc.cosmicexplorer.org/public/0163/P2100003/007/ce-horizon-study.pdf
[6] https://dcc.ligo.org/LIGO-M1000066/public

# The CE conundrum

- «as close to real-time as possible»: does this mean also immediate, public LL data release?
  - Probably not, but…
  - “LL data” means streaming, non-persistent data with o(sec) latency + o(hours) buffer
  - “aggregated” h(t) are the same data repacked with o(minutes) latency to origin server
  - reviewer comment is ambiguous (as is CE text)
  - Should we foresee subscribable LL data streams e.g., for multimodal searches?
- «Since the number of Cosmic Explorer control and data channels will be similar to that of Advanced LIGO, we expect data rates of 2 Tb per day of detector operation. Storage and dissemination of data of this scale is a solved problem with current technology».
  - Are they seriously planning to directly distribute raw data?
- «Approximately 10 FTEs will be needed to perform tasks related to data preparation, alert generation, data curation, and user community support during the operations phase of the project».
  - Our take: this is plain wrong (BTW, if this is the case there is no collaboration data analysis to take care of)
  - If we do not mention it they will tell us we did not mention it
  - If we do mention it the number will haunt us… 10? 15-20? 17.5? 59?

| | | |
|---|---|---|
| **Public data only** | **17,5** | **4,66** |
| **Private analysis only** | **55,5** | **37,94** |
| **All public data** | **59** | **27,92** |
| **All private analysis** | **97** | **61,2** |
| **Both** | **40,4** | **21,36** |
| **Grand total** | **178,1** | **88,3** |




# ET-PP WP8 Report

Computing and data model

Anything else ?

Questions ?

**THANK YOU !**

23th July 2025