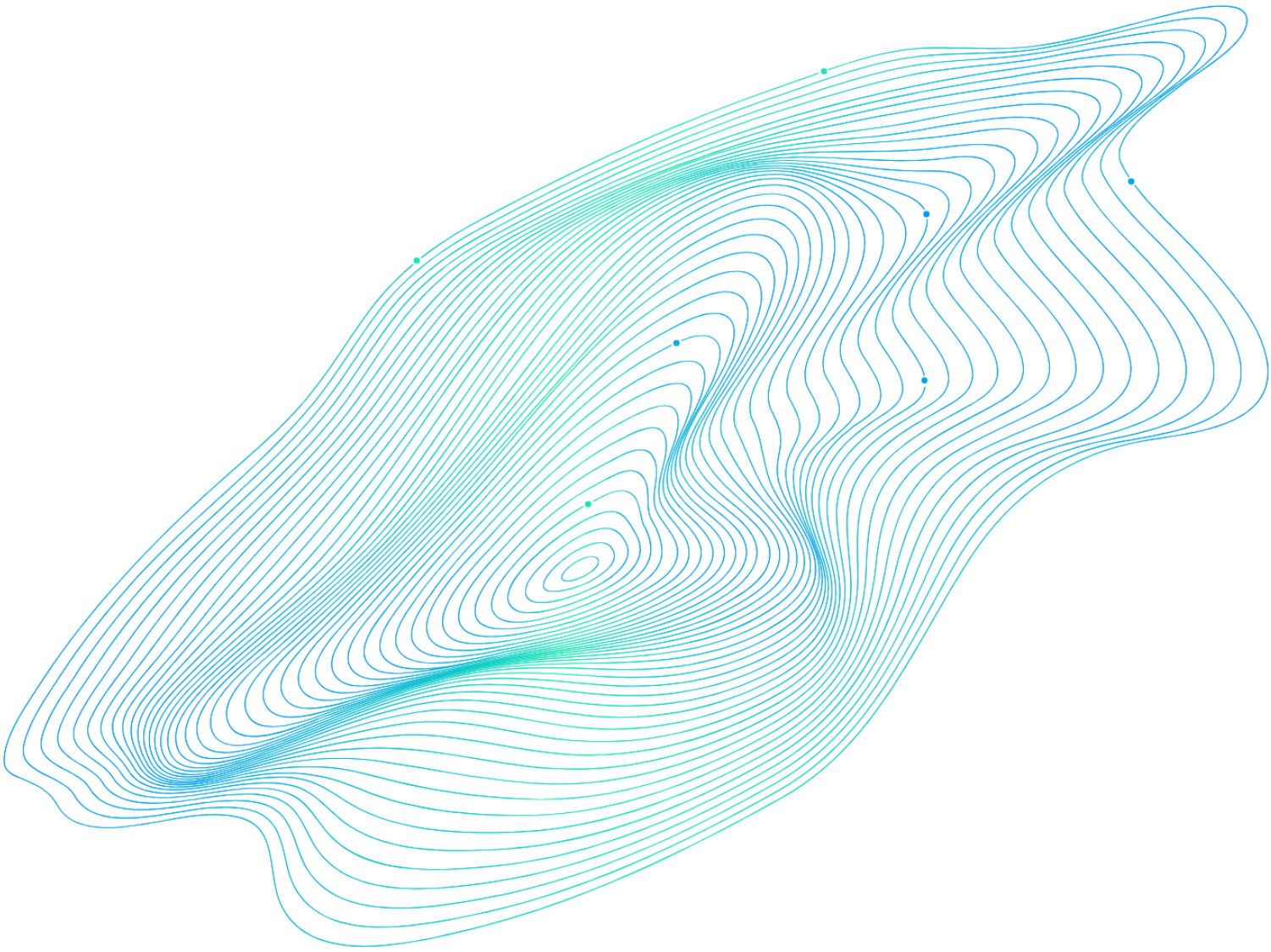
EPICURE

Unlocking European-level HPC Support

HIGH-LEVEL SPECIALISED APPLICATION SUPPORT SERVICE IN HIGH-PERFORMANCE COMPUTING (HPC)



Co-funded by the European Union

EuroHPC Joint Undertaking

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EPICURE

DELIVERABLE 4.1

Description of coordination layer between the participating teams and technical work packages



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Duration of the Project	48 months
Website	epicure-hpc.eu

Work Package	WP4 | Technical Coordination
Task	T4.2 Coordination of the technical work between the participating teams
Lead Authors	Lubomir Riha (IT4I@VSB)
Contributors	Ville Savolainen (CSC), David Vicente (BSC), Andrew Emerson (CINECA)
Peer Reviewers	Andre Pereira (INESC TEC), Emmanuel Ory (CSC)
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0.2	2024-07-04	Ville Savolainen (CSC), Emanuele Vitali (CSC), David Vicente (BSC), Andrew Emerson (CINECA)	Second version of the deliverable ready with partners contribution.
0.3	2024-07-17	Andre Pereira (INESC TEC), Emmanuel Ory (CSC)	Deliverable reviews.
0.4	2024-07-21	Lubomir Riha (IT4I@VSB)	Version of the deliverable based on the reviewers' and PMB comments.
1.0	2024-07-25	Lubomir Riha (IT4I@VSB)	Final version submitted to the portal

Glossary of Terms

Item	Description
EuroHPC JU	EuroHPC Joint Undertaking
PMB	Project Management Board
WP	Work Package
WPL	Work Package Leader
AST	Application Support Team

Keywords

Technical coordination, ASTs team forming, technical coordination processes and tools.

Executive Summary

The EPICURE project will establish Application Support Teams (ASTs) in existing and future EuroHPC Hosting Entities. This will be done in partnership with key support actions funded by the EuroHPC JU. The primary focus of ASTs will be to provide Level 2 and 3 application support. This includes application porting, optimization, and execution of key applications for a select number of projects, which have been allocated time through the peer-review process managed by the EuroHPC JU.

This document outlines the coordination layer between the participating teams and technical work packages (WP2, WP3), with WP4 being responsible for the technical coordination itself. It begins by explaining the technical coordination workflow and process, including the schedule of the technical periodic meetings. It then provides details on the tools used for technical coordination, such as the project accounting table, project monitoring reports, and expertise catalog. Lastly, it introduces two forms developed to collect user requirements for each project: Application Support Action Application and User Feedback Form.

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1. Introduction

The EuroHPC Joint Undertaking (JU) is deploying a European-wide High-performance Computing infrastructure comprising several supercomputers that range from small petascale to large high-end pre-exascale and exascale systems, topping the relevant global rankings.

To date, part of the Hosting Entities' responsibilities is providing support services to users whom EuroHPC JU selects to access the systems. These services are currently limited primarily to Level 1 support, which mostly entails help desk support for day-to-day operational issues and problems.

The EPICURE project aims to enhance this offering by establishing and operating a distributed but coordinated European-wide high-performance computing application support service to encourage the best possible uptake of the systems by European scientists and researchers.

The EPICURE project will implement Application Support Teams (ASTs) in current and future EuroHPC Hosting Entities, in collaboration with key support actions funded by the EuroHPC JU. ASTs will provide their services aiming primarily at Level 2 and 3 application support. This support focuses on application porting, optimisation, and execution of key applications for a selected number of projects, which have been allocated time by the peer-review process managed by the EuroHPC JU.

In this deliverable we describe the coordination layer between the participating teams and technical work packages (WP2, WP3) with WP4 responsible for the technical coordination itself. We start by describing the technical coordination workflow and process itself, including the agenda of the technical periodical meetings. Then we provide information on tools we use for technical coordination, including project accounting table, project monitoring reports and expertise catalog. Finally, we present two forms developed to: (1) collect user requirements for every project (Application Support Action Application) and, (2) collect user feedback.

2. Technical coordination workflow

Before the first set of projects was provided to EPICURE from the EuroHPC office, we established the procedure for handling technical coordination of projects.

Currently, the types of projects that can be granted EPICURE support are:

- **Regular Access projects,**
- **Extreme-scale projects,**
- **AI and Data-Intensive Applications.**

However, we envision that EPICURE support would also be very helpful to the other EuroHPC projects awarded, particularly in the **EuroHPC JU Call for Proposals for Development Access**.

The overall coordination workflow, depicted in Figure 1, is:

1. EuroHPC office provides a list of accepted projects that requested EPICURE support from a finished call for projects,
2. PIs of the projects are contacted by EPICURE WP4 staff and requested to fill out the Application Support Action Application (for more details, see Section 4). This step can be suppressed if the form is already filled out during the application for the EuroHPC project.
3. Once the PIs send the form back to EPICURE, the project is given a project ID, and it is entered into the EPICURE Accounting table on the project Wiki by WP4 staff. Initial information about the project are entered into the Accounting table based on information provided in the form.
4. Based on the form, we identify which work packages and tasks will be responsible for the technical work.
5. The project is assigned the Responsible partner. A Responsible partner is selected based on where the project gets its resources allocated by the EuroHPC JU office. (For instance, if the allocation of the resources is for CINECA, then the Responsible partner is also CINECA).
6. The Responsible partner selects an expert from its team who will be responsible for the projects. This person will:
    - Initiate the communication with the PI or the project's contact person and
    - secure the computational resources needed for EPICURE team members to support the project by submitting a project to the EuroHPC Benchmark or Development call.

7. During the regular WP2, WP3, and WP4 meetings, the new project is presented to all partners to form the cross-site team for a given project. The selection of collaborating partners is made based on the following criteria:
    - required expertise for the project,
    - availability of HPC experts with the given expertise within EPICURE's partners.
8. At this point, the project has its EPICURE team of experts, and the support activity has started.
9. Regular WP2, WP3, and WP4 meetings are organized every two weeks. During these meetings, updates about the project are provided to the WP4 leader and all WP4 participants by the *Responsible partner* on behalf of the EPICURE team.

    Before every meeting the Responsible partner: Before every meeting, the *Responsible partner*:
    - updates the Accounting table with up-to-date status of the project,
    - writes a short report on work from the previous meeting in the project Activity log.
10. During the regular meetings: If the project required WP2 support and that work is finished, EPICURE's support is either finished or the project is transferred to WP3 for further code optimization.

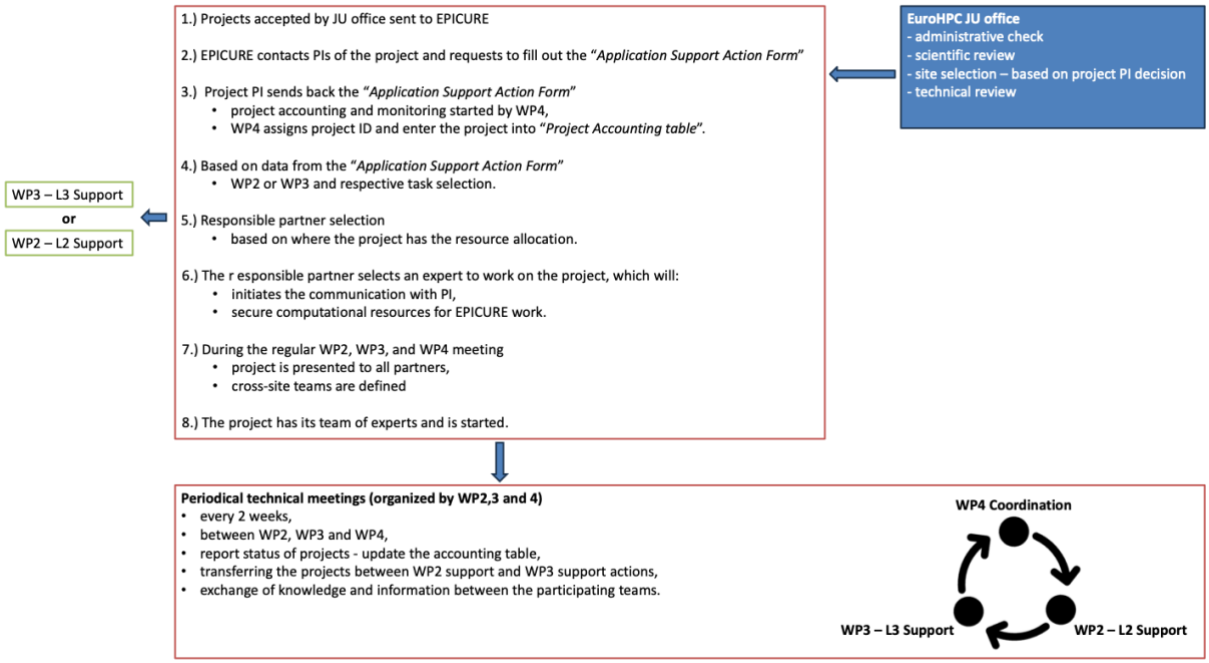


Figure 1. Main technical work coordination workflow

2.1 Periodic technical meetings

Periodic technical meetings are the key mechanism for technical coordination between WP2, WP3, and WP4. They are scheduled every two weeks (see Figure 3). The agenda of the meetings is shown in Figure 2 as described in the previous section.

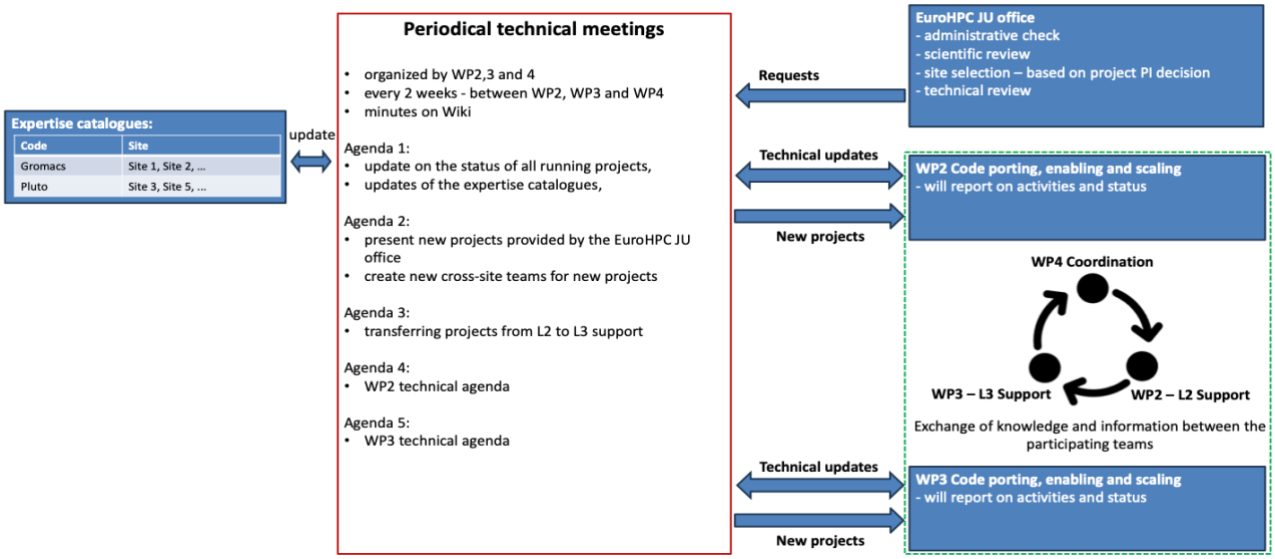


Figure 2. Periodic technical meetings structure

EPICURE has scheduled single technical meetings involving all WP2, WP3, and WP4 partners. This allows us to handle most technical issues in a single meeting. These meetings have the following agendas:

Agenda 1: The Responsible partner for each running project presents the current work status. This includes:

- verbal presentation of the status during the meeting,
- written update of the current status in the Accounting table (presented in Section 3.1),
- written update of the work done from the previous meeting (presented in Section 3.2).

Agenda 2: After the previous meeting, all new projects delivered by the EuroHPC JU office are presented and handled by WP4. This includes:

- presentation of the new project to all partners,
- confirmation of the Responsible partner per project,
- definition of the cross-site teams based on the availability and expertise of individual partner experts,
- selection of work package and task that handles the project.

Agenda 3: Transfer of the projects between WP2 and WP3. This step is done when WP2 reports that it has finished all tasks requested by the project PI and when either WP3 effort was originally allocated or deemed necessary based on WP2 activity. This includes:

- update the Accounting table that the WP2 part of the project has finished,
- create a new entry in the Accounting table that will keep information about WP3 activities,
- define a new Responsible expert from WP3,
- if needed, define a new team with the required expertise.

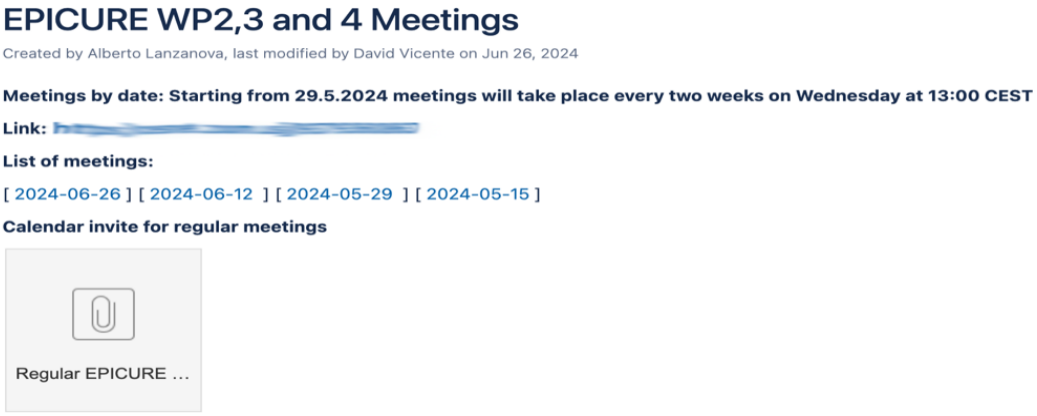
Agenda 4: WP2 technical agenda. This part is led by the WP2 leader and focuses coordination of WP2 activities.

Agenda 5: WP3 technical agenda. This part is led by the WP3 leader and focuses coordination of WP3 activities.

2.1.1 Periodical technical meeting minutes

A dedicated person is responsible for writing the meeting minutes during every technical meeting. The example of the minutes is shown in Figure 4. The minutes for every meeting contain:

- list of participants of the meeting,
- list of key action points to be done before the meeting,
- the minutes itself,
- action points resulting from the meeting.



EPICURE WP2,3 and 4 Meetings

Created by Alberto Lanzanova, last modified by David Vicente on Jun 26, 2024

Meetings by date: Starting from 29.5.2024 meetings will take place every two weeks on Wednesday at 13:00 CEST

Link: [redacted]

List of meetings:

[2024-06-26] [2024-06-12] [2024-05-29] [2024-05-15]

Calendar invite for regular meetings

Regular EPICURE ...

Figure 3. The regular schedule of the WP2,3 and 4 technical coordination meetings



2024-05-29

Time: 29.5.2024 13:00 CEST

Link: [redacted]

Attendees: ...

Main activities before the meeting

- **update the Project accounting table**
- **update the individual Project reports**
- **all lead partners** - contact the main contact of their assigned project
- **all lead partners** - secure computational resources for EPICURE work
- **non-lead partners** - check all projects and decide on which project you want to participate

Agenda and minutes:

- Review of current projects
  - Project #1 (Cineca):
  - Project #2 (BSC):
  - Project #3 (IZUM):
  - Project #4 (LUMI - UAntwerpen):
  - Project #5 (Cineca):
  - Project #6 (LUMI - KTH):
  - Project #7 (BSC):
  - Project #8 (LUMI - CSC):
  - Project #9 (BSC):
  - Project #10 (SofiaTech):
  - Project #11 (LuxProvide):
  - Project #12 (IT4I):

Action points:

- [ ] **OPEN - All - Fill out the expertise catalog**
- [ ] **OPEN - All - Review the D4.1 draft**

Figure 4. Template of the technical coordination meeting meetings

3. Technical coordination tools

The main tool we use for technical coordination is the project Wiki provided by the CSC (Eduuni-wiki at wiki.eduuni.fi). Figure 5 shows the structure of the WP4 subsection of the wiki, where the key tools for Technical coordination are:

- **EPICURE WP4 Participants** – list of all persons involved in WP4 (serve as a list for the mailing list),
- **EPICURE WP2,3 and 4 meetings** – described in Section 2.1,
- **Project Accounting** – contains the Accounting table described in Section 3.1,
- **Project #: Name of the project** – contains *Project monitoring reports* described in Section 3.2,
- **Expertise catalog** – contains a list of applications, programming models and tools that EPICURE experts are familiar with, as described in Section 3.3.

In addition, we create temporary pages for collecting input from all partners and putting them into documents under preparation, like deliverables and other reports.



Figure 5. List of tools/wiki pages of WP4 that are used for project monitoring and coordination

3.1 Projects Accounting table

The Accounting table *in Figure 6* is the main tool WP4 internally uses to monitor the progress of the individual active projects. It is updated before or during the regular WP2, 3, and 4 meetings with up-to-date information about projects' progress.

The WP4 leader or an assigned deputy makes the initial entry for the new project based on information provided by the PI in the *Application Support Action Application.* The table contains the following information:

- **EPICURE Project ID** – unique ID of the project for the EPICURE accounting,
- **EuroHPC Project ID** – ID of the original project,
- **EuroHPC project type** – a type of the EuroHPC project,
- **EuroHPC Site** – the site where the original project was awarded,
- **EuroHPC system** – system or partition name where the allocations is made,
- **Project Name** – the name of the EPICURE project,
- **Code** – name(s) of the code(s) used in the project,
- **Language** – programming language(s) of the code,
- **Parallelization** – parallelization model used by the code,
- **Main contact** – email of the project PI or other contact person,
- **Work package** – WP under which support is provided,
- **Task** – task under which support is provided,
- **Start Date** – the date when the EPICURE support has started,
- **End Date** – the date when the EPICURE support has finished,
- **Status of completion** (updated before regular WP4 meetings) – current status of the project,
- **Status of work** (short summary of work done up to date) – short description of the current status of the project,
- **Participating EPICURE partners** – list of partners that are working on the project,
- **EPICURE Experts** – names and email addresses of the EPICURE experts working on the project,
- **Final effort (PMs) by EPICURE partners** – when the project ends the real effort is recorded here,

- **Total PMs expected by the applicant from EPICURE** – collected from the *Application Support Action Application,* this is a project PI's vision of how much the EPICURE team should be involved,
- **Total PMs provided by the applicant** – the expected amount of effort contributed by the PI or its team into collaboration with the EPICURE team for this project,
- **Expected length and timeframe of the support in months** – project PI's vision on how long the EPICURE support should last,
- **Links** – miscellaneous links related to the project (project wiki page, code website or Git repository, etc.),
- **Notes** – any additional important notes or comments,
- **Form** – a PDF version of the Application Support Action Application filled out by the PI and sent to EPICURE during the AST request process.

EPICURE Project ID	EuroHPC Project ID	EuroHPC project type	EuroHPC Site	EuroHPC system	Project Name	Code	Language	Parallelization	Main contact	Work package	Task	Start Date	End Date
1		Regular Access	CINECA	Leonardo DCGP	Direct numerical simulation of wall-bounded turbulent flows with adverse and favorable pressure gradients	TBLDNS	Fortran	MPI, OpenMP, no GPU	[redacted]	WP2	T2.1	06.06.2024 (started)	
2		Extreme Scale	BSC	MareNostrum5 ACC	Design Principles for Non-Aromatic Fluorescence in Biology (DpNAFB)	WEST, Quantum Espresso (QE), WESTpy	Fortran90	MPI, OpenMP, CUDA	[redacted]	WP2	T2.1 T2.2	20.5.2024 (started)	20.8.2024 (expected)
2.1										WP3	T3.1 T3.2 T3.3		
3		Regular Access	IZUM (leading)	Vega	Anthropogenic Stressors and Future Changes of the North West European Shelf ecosystem	GETM-ERSEM	Fortran	MPI, no GPU	[redacted]	WP2	T2.1 T2.2	06.06.2024 (started)	
3													

EPICURE Project ID	End Date	Status of completion (updated before regular WP4 meetings)	Status of work (short summary of work done up to date).	Participating EPICURE partners	EPICURE Experts	Final effort (PMs) by EPICURE partners	Total PMs expected by the applicant from EPICURE	Total PMs provided by the applicant	Expected length and timeframe of the support in months	Links	Notes	Form
1		contacted (29/05/24)		CINECA	[redacted]		1	2	1	link repo: TBD Wiki: Project 1		
2	20.8.2024 (expected)	contacted (17/05/24)		BSC	[redacted]		1	1	2	link repo: WEST QE WESTpy Wiki: Project 2		
2.1												
3		Contacted (20/05/2024) (28/05/2024) Meeting (04/06/2024)		IZUM, IJS	[redacted]		1	0.5	3	link repo: GETM ERSEM Wiki: Project 3		
3				FZJ	[redacted]							

Figure 6. Example of the project Accounting table from the project Wiki

3.2 Project monitoring reports

Every EPICURE project has a dedicated page on the Wiki. Figure 7 shows the template provided to all EPICURE partners that serve as a skeleton of the report. The report has several parts:

- **Overview** – describes the team working on the project, its scientific purpose, and the work performed under EPICURE. This should be written in rather popular form for the general public. We plan this part to also serve as a dissemination tool, such as blog posts on the EPICURE website.
- **Expected timeline of the project** – describes the project's expected timeline and is updated with actual values at the end of the project.
- **Activity performed** – more technical description of the activities performed under the WP2 and WP3. This text is intended to be used in WP2 and WP3 deliverables.
- **Activity log** – is updated before every WP4 coordination meeting by the team working on the project. This serves as a progress monitoring tool.
- **Results and Improvements** – this part summarizes the project's results and achieved improvements. This will serve as input for the deliverables and technical reports, but we will also use this creation of success stories.
- **Lessons learned** – this text will serve as content for the Best Practice Guides that can be extracted from the individual projects. This will also be an important knowledge exchange platform inside the EPICURE project from which we can share what approaches achieved good results and what did not work as expected.

Project 0: Example project

<EuroHPC id> : <Project Title>
<IP of the project>
<EuroHPC Hosting Site>

Overview

Including:

- *Partners: EuroHPC hosting site, EPICURE partners working in the project, contact point from the Project.*
- *Brief description of the Project at scientific level (can be extracted from the project form)*
- *Brief description of the EPICURE technical optimization project and it's goals*

Expected timeline for the project and resources

Duration in months

Start date:

end date (expected, if not completed):

PM's assigned :

(Optional) Gantt chart with the phases of the work

Activity performed

Brief description of the technical work performed in the project (so far, if not completed).

Activity related to WP2

Activity related to WP3

Add any information that can help the reproducibility of the results for future projects. Compilation flags, Makefiles, singularity images used, link to the repositories, etc.

Activity log

New entry for every WP2,3,4 meeting - brief description of the technical work performed

1.5. 2024:

14.5. 2024:

28.5. 2024:

Results and improvements

The expected outcomes of the project, performance numbers, final conclusions, new features added to the code/project.

Lessons learned

Purpose of this section is to feed back into the EPICURE process, so consider:

What worked
What didn't work

This should cover all aspects of the project from the viewpoint of both the EuroHPC coordination and Epicure work.

Figure 7. Template for project monitoring reports

3.3 Expertise catalog

Another essential tool used for technical coordination is the expertise catalog. Experts working on the EPICURE project from all partners are listed in the catalog with their expertise. This information is useful to all *Responsible partners* to create the project team with the required expertise as well to any other expert that needs a consultation with someone who has more experience in a given field. Figure 8 shows an example of the "*Programming models expertise catalog*", but we have also established the "*Application expertise catalog*" and "*Tools expertise catalog*".

Site	Expert name	Workpackages	Programming languages	Programming models	Expertise strong	Expertise other	Email
CSC	[redacted]	WP2,WP3,WP4,WP5	C++, CUDA/HIP. Can also work with C, Fortran and Python but not really an expert with those languages	MPI, Multi-threaded, GPU	GPU programming	profile, deploy, optimize.	[redacted]
DeiC	[redacted]	WP2, WP3, WP4	Python	NumPy, CuPy, Dask	The Scientific Python ecosystem, e.g. NumPy, SciPy, Pandas, Dask, CuPy, Xarray, PyTorch, Scikit-Learn, Numba, Matplotlib, Seaborn, mpi4py.	Singularity/Docker containers	[redacted]
IT4I@VSB	[redacted]	WP2, WP3	C,C++, Python	MPI, OpenMP, CUDA	WP2: code deployment, compilation, benchmarking, ...	WP3: GPU programming in CUDA	[redacted]
INESCTEC	[redacted]	WP3,WP4,WP5	C. C++, CUDA, FORTRAN, Python	MPI, Multithread, GPU	Parallel Programming, benchmarking, Scientific Visualization	profile, deploy, optimize	[redacted]
INESCTEC	[redacted]	WP3, WP4, WP5	C, C++, Fortran, CUDA	MPI, Multithread, GPU	Parallel Programming, benchmarking, Scientific Computing, Heterogeneous Computing		[redacted]
INESCTEC	[redacted]	WP3, WP4, WP5	C/C++, Fortran, Python	MPI, OpenMP, OpenACC	Scientific Computing, Numerical Methods, Parallel Computing	Python wrapping of C and Fortran code	[redacted]
CINECA	[redacted]	WP2, WP5	FORTRAN, Python	MPI, Multithread, GPU	Parallel and heterogenous Programming, benchmarking, profiling	spack deployment on Leonardo	[redacted]
CINECA	[redacted]	WP3	C, C++, Python	MPI, OpenAcc, GPU	Parallel programming, Machine Learning, PyTorch		[redacted]
CINECA	[redacted]	WP3	FORTRAN, PYTHON, C	MPI, OpenAcc, OpenMP, GPU	Parallel programming	Profiling, Deploy	[redacted]
CINES	[redacted]	WP2, WP3	C, C++,CUDA, HIP	CPU Threads, SPMD and GPU SIMT via Kokkos, OpenMP, OpenMP target/OpenACC, MPI			[redacted]
CYFRONET	[redacted]		C, C++, Python, CUDA, SYCL	MPI,OpenMP	Parallel programming	debug, profile, deploy, benchmark	[redacted]
CYFRONET	[redacted]		C++, Python, Fortran	MPI, OpenMP	Parallel programming	debug, profile, deploy, benchmark	[redacted]
KTH	[redacted]	WP2	C,C++	MPI,OpenMP	Software Deployment - Spack, Easybuild		[redacted]
KTH	[redacted]	WP2,WP3	FORTRAN, C, CUDA, HIP	MPI, GPU	Parallel Programming, GPU Programming	Profile, Optimize	[redacted]
UAntwerpen	[redacted]	WP2, WP4, WP6				Software deployment on LUMI.	[redacted]
UAntwerpen	[redacted]	WP2, WP4	Python, C++, Fortran	MPI, multithread	parallel programming, node level performance engineering		[redacted]
BSC	[redacted]	WP2,WP3	C,C++, Fortran	MPI, OpenMP, AVX vectorization	parallel programming, node performance	memory access	[redacted]
BSC	[redacted]	WP2,WP3	C,C++, Fortran	MPI, OpenMP	parallel programming and performance analysis	Code deployment in MareNostrum 5 ACC and GPP	[redacted]
BSC	[redacted]	WP2,WP3	C,C++, CUDA, OPENACC	GPU	GPU porting and optimization		[redacted]

Figure 8. Example and structure of the expertise catalog

4. Application Support Action Application

The EPICURE team prepared an application that must be filled out by the PIs of the projects applying for EPICURE support. Based on this application a new project is created in the projects Accounting table, and a new EPICURE team is assembled across the partners to work on this project. It provides essential information on what type of expertise is expected from the EPICURE team.

One of the key features of the application from the technical coordination point of view is "*What type of support are you asking*:" section, where individual options directly correspond to the tasks in WP2 and WP3:

- T2.1 - Code Porting and project enabling,
- T2.2 - Performance improvements, benchmarking and performance analysis,
- T3.1 - Intra-node optimization,
- T3.2 - Inter-node optimization and scaling-out,
- T3.3 - Accelerator porting and optimization.

We require this form to be filled out by the PIs and provided back to WP4 before EPICURE can start working on the project. The template of the form is shown in Figure 9 to Figure 12.

EuroHPC EPICURE

Application Support Action Application

Name of the EuroHPC project that applies for EPICURE Support:

Title of the project:

EuroHPC site where the project is accepted:

Site name (where the EuroHPC project is allocated)**:**
Allocation size (node hours)**:**
Type of the project (Benchmark, Development, Regular, Extreme, AI)**:**

Popular abstract of the required support action:

Short description of what type of support you require from the application support team. It should be written in popular form, as it will be presented at the EPICURE website once application is accepted.

Principal Investigator of the EuroHPC project:

Person responsible for the project, that can add support team members to the project.
First name:
Last name:
Email:
Position/title:
Organization:
Research group:

Main contact:

Person responsible for the project, that can add support team members to the project.
First name:
Last name:
Email:

Figure 9. Application Support Action Application – part 1

About the code:

Name of the code:
Website:
License:
Open-source (YES/NO)**:**
If the code is open-source, where the source code can be found (Git repository, ...)**:**
Main programming language:
Number of active developers that will collaborate with EPICURE:
How is the code parallelized (OpenMP, MPI, ...)**:**
Does the code have GPU support (YES/NO)**:**
Which GPU programming model is used (Nvidia CUDA, AMD HIP, OpenMP offload, OpenACC, ...)**:**

If your code uses third-party libraries, please list them here:

Description of the software features/problem relevant to this application:

Describe your software focusing on the features that make it unique.
Include any technical details you relevant for this application.

Figure 10. Application Support Action Application – part 2

What type of support are you asking:

1.) Code porting and enabling to selected machine (YES/NO)**:**
Enable codes to be installed on EuroHPC systems in a way that they not only run correctly but do so as efficiently as possible. Improvements to the installation process like a proper selection of compiler flags and mathematical (and in some cases other) libraries. Minor code changes including adding compiler pragmas at selected places in the code to improve vectorization, or to lower the optimization level for a particular routine should the optimizer introduce bugs, without affecting the optimization level for the main part of the code.

2.) Performance improvements, benchmarking and performance analysis (YES/NO)**:**
Architecture-specific or system level improvements for selected EuroHPC machine, for example, improving the vectorization of application, include small improvements in terms of parallelization or selecting the best MPI implementation and set-up for each application. Performance and scalability work, the elaboration of performance analysis and benchmarking tasks to understand the weakness and strengths of the applications and the different options to improve their scalability and performance.
We expect that small changes in specific codes could be necessary, like code or library changes, to improve the I/O management that affects scalability and other small modifications in loops to permit extra vectorization in the code or reduce the cache misses. The modifications included in this task will be limited to very specific and limited changes in the code. For more demanding optimization select next options.

3.) Code optimization - Intra-node optimization (YES/NO)**:**
Optimization of applications at the node level with an attention to the vectorization and multithreading. For memory-bound applications, the proper memory usage, exploiting data locality and exploitation of HBM, where present.

4.) Code optimization - Inter-node optimization and scaling-out (YES/NO)**:**
Improving the scalability of applications. sing on the scalability of applications. Improve the parallel efficiency through the optimization of the communication patterns.

5.) Code optimization – GPU accelerator porting and optimization (YES/NO)**:**
Optimization of the usage of GPU devices. Performing/completing the porting of application kernels. Analyzing and optimizing the communication patterns between host and devices.

Figure 11. Application Support Action Application – part 3

Objectives and work plan:

Based on the type of support selected above, describe in more technical details what type of problem you code exhibits and what type of support work will be required from the EPICURE team.

In case of code optimization service describe the changes and improvements that you believe are necessary to reach optimal utilization of the selected EuroHPC system and its architecture.

Expected total amount of work from the EPICURE team

Provide the expected total amount of work required in terms of person-months. If needed be more specific what type of support is required from EPICURE.

Expected person months from EPICURE team (i.e. 2 PMs)**:**
Expected length and timeframe of the support (i.e. 6 months)**:**

I am aware that close and timely collaboration with EPICURE team is needed and I will provide it (YES/NO)**:**

Effort in person months to be dedicated by the project investigators (i.e. 2 PMs)**:**

Other comments related to the requested support:

Figure 12. Application Support Action Application – part 4

5. User feedback form

At the end of the project, a link to the user feedback form is sent to the project's primary contact. If the form hasn't been filled, a reminder is sent after two working weeks. The survey responses will be linked to the project information.

The form will ask the following questions:

How helpful was it for your team to participate in EPICURE? 1 (not at all) - 5 (very helpful)

Have your objectives been reached? (Yes/Partially/No/Not applicable)

1. Code porting and enabling to the selected machine.
2. Performance improvements, benchmarking, and performance analysis.
3. Code optimization – Intra-node optimization.
4. Code optimization – Inter-node optimization and scaling-out.
5. Code optimization – GPU accelerator porting and optimization.

Free text to explain

Regarding the support and processes from EPICURE:

1. What worked?

Free text to explain

2. What didn't work? How could it be improved?

Free text to explain

3. How much working/development time do you think you and your team members saved thanks to EPICURE support?

Free text to explain

4. How satisfied were you with the availability of and communication with the support staff? 1 (not at all) - 5 (very satisfied)

5. Did you learn or achieve something more than you originally requested support for?

Free text to explain

Would you recommend other research groups to apply for EPICURE support? 1 (not at all) - 5 (strongly)

6. Summary

This deliverable presents the technical coordination processes established within the EPICURE project. The main goal is to coordinate the technical work, starting with incoming projects from the EuroHPC JU office, forming the AST teams, and monitoring the project progress during their runtime.

We presented all the tools we have established for technical coordination, including the project accounting table, project monitoring reports, and expertise catalog.

We have also created two forms (Application Support Action Application and User feedback form) that help us collect user requirements per project before it starts and user satisfaction with EPICURE support at the end of the project.