



# Best Practice Guide

**48<sup>th</sup> VI-HPS Tuning Workshop**

Training, Twinning, and Mentoring

Organisers: CASTIEL2, EuroCC2

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## Executive Summary

This document outlines the best practices established and lessons learned during the 48<sup>th</sup> VI-HPS Tuning Workshop<sup>1</sup>, held as a hybrid event from 9-13 of February 2026. This hybrid High Performance Computing (HPC) focused event was organised within the CASTIEL 2<sup>2</sup> Work Package 3 and Performance Optimization and Productivity (POP) 3<sup>3</sup> partnership. The workshop was a five-day intensive programme targeting application developers in research and academic settings, providing instruction and hands-on experience across a suite of performance analysis and optimisation tools. This guide outlines the planning, preparation, delivery, and support stages of the event, reflecting on what contributed to its success and identifying opportunities for future improvement.



Figure 1: Phases of training lifecycle

## Objectives

The primary objective of this best practice guide is to highlight the strategies frameworks implemented over all the training lifecycle phases to deliver a successful hybrid HPC focused event within the CASTIEL 2 and POP3 partnership. This document considers some potential improvements or extensions that can be implemented in future iterations of a similar hybrid style HPC focused event.

## Background and Context

The main goal of 48<sup>th</sup> VI-HPS Tuning Workshop was to improve the participants ability to analyse, diagnose, and optimise the performance of parallel applications on modern HPC systems. It was targeted towards application developers in research and academic areas with prior knowledge of common performance analysis and diagnosis techniques. The content of the workshop focused on tools<sup>4</sup> developed under the POP3 project such as Modular Assembly Quality Analyzer and Optimizer ([MAQAO](#)) performance and analysis, [TALP](#) lightweight runtime performance monitoring, trace analysis and performance prediction with [Paraver/Extrac/Dimemas](#), [Score-P](#), [CUBE](#), and [Scalasca](#).

The workshop was structured as a five-day intensive programme delivered in hybrid format with the mornings reserved for theoretical instruction, and the afternoons for

<sup>1</sup> <https://hpc-portal.eu/training/short-courses/48th-vi-hps-tuning-workshop-mn5>

<sup>2</sup> <https://hpc-portal.eu/projects/castiel-2-coordination-and-support-action>

<sup>3</sup> <https://pop-coe.eu/>

<sup>4</sup> <https://pop-coe.eu/partners/tools>

hands-on practical learning. Teams were encouraged to participate with at least one team member attending in-person.

## Planning

Figure 2 presents the 48<sup>th</sup> VI-HPS Tuning Workshop timeline across the planning, preparation, delivery, and support stages. The planning phase represents the most extensive and resource-intensive stage, encompassing activities 1-4. As this was the 48<sup>th</sup> edition of the event, many of the planning steps were repeating from previous years, leading to an overall smooth planning stage. Likewise, the preparation stage (activities 5-7 of Figure 2) was uneventful. A key component of the preparation stage was a technical survey sent out to all registrants to better gauge the level and experience of each participant. The survey also required participants to state if their intention was to participate online or in person. Participants were informed that one team member per team would need to attend in person, ensuring a more effective training experience than a fully online session would allow. Exiting the preparation stage and entering the delivery stage in activity 8 Figure 2, the workshop was delivered in its hybrid format. Finally, the support stage was entered in activity 9, which involved sharing material with participants through an online repository and sending a post-training survey to understand the participants experience throughout the event.

Activity	Start	End	Days	2025	2025	2025	2025	2025	2025	2025	2026	2026
				Q2	Q3	Q3	Q3	Q4	Q4	Q4	Q1	Q1
				June	July	August	September	October	November	December	January	February
1 Define expectations & initial planning meetings	4-jun-25	30-jun-25	27	4 - 30 June								
2 MareNostrum registration & communication	1-jul-25	31-oct-26	62		1 July - 31 October							
3 Planning meeting with POP3 team	1-sep-25	30-sep-25	30				1 - 30 Sept.					
4 Agenda organisation & date confirmation	1-oct-25	31-oct-25	31					1 - 31 Oct.				
5 Registration preparation & pre-training survey	1-nov-25	30-nov-25	30						1 - 30 Nov.			
6 Registration collection	1-dic-25	20-dic-25	19							1 - 20 Dec.		
7 Communication with participants & trainers	8-ene-26	31-ene-26	23								8 - 31 Jan.	
8 Course delivery	1-feb-26	28-feb-26	29									9 - 13 Feb.
9 Post-training survey	1-feb-26	28-feb-26	29									16 Feb.

Figure 2: Timeline of 48<sup>th</sup> VI-HPS Tuning Workshop through all stages of training lifecycle.

## Preparation

During the preparation stage first contact was made with participants ensuring GDPR regulations by obtaining consent of personal information at registration. To ensure further GDPR compliance of the training for all participant, sessions were recorded such that no personal information of attendees is captured, allowing for easy compliant dissemination afterwards. Likewise, the information gathered in the technical survey was non-personal information and was only used to improve the training experience during the event.

The training required access to the MareNostrum<sup>5</sup> HPC resources at BSC premises, so the preparation of credentials and account setup was conducted beforehand and designed to only be active during the duration of the training.

## Delivery

The delivery of the training was conducted online over a 5-day period with Day 1 and Day 5 being half day sessions. The full schedule is shown in Table 1. A key highlight

<sup>5</sup> <https://www.res.es/es/sobre-la-res/nodos/marenostrum-5-bsc>

of this delivery was dividing morning and afternoon sessions into theoretical and hands-on sessions respectively. This allowed for in depth coverage of theoretical topics and ample time for participants to analyse their code and access the HPC resources. The *Appendix: Captures of Training Delivery* provides image captures of some training sessions throughout the workshop.

Table 1: 48<sup>th</sup> VI-HPS Tuning Workshop schedule

	Day 1	Day 2	Day 3	Day 4	Day 5
Morning 9:00 CET – Lunch Break	-	MAQAO performance analysis framework and hands-on exercises	BSC and JSC Tools for MPI + OpenMP	BSC and JSC tools for CPU + GPU	Demonstrations of additional POP3 tools
Lunch Break (CET)	-	13:30-14:30	12:30-13:30	13:30-14:30	-
Afternoon Lunch Break –17:00 CET	POP3 tools, performance assessments, hands-on test cases	Hands-on code analysing using POP3 tools	Hands-on code analysing using POP3 tools	Hands-on code analysing using POP3 tools	-

## Support

A key element of this hybrid training event was to impose that one member of each team must be an in-person attendee to ensure a smooth workshop for all participants. Trainers provided real-time support with the individuals online and in person, and doubts and technical issues could be resolved faster by having an in-person representative. Assistance was extended to participants post-workshop through the systematic sharing of session recordings on YouTube<sup>6</sup> and the continued availability of all training materials. Maintaining these resources in a centralised, open-access format ensures that the knowledge remains a permanent asset for the community. In addition, it ensures continuity for past and future iterations of the workshop, where future participants can access past workshop material. This approach also strengthens the long-term sustainability of the training programme by reducing repeated organisational effort, enabling the reuse and adaptation of materials, and supporting a self-sustaining community of practice that can evolve across future editions.

For better understanding the participants experience, a comprehensive post-training survey was conducted serving as an opportunity for participants to voice doubts and suggestions for future event iterations. For this specific event, feedback was highly positive.

## Improvement

As mentioned, participant feedback was positive with some suggestions for improvement received. This outcome reflects the maturity of the event as it is now in its 48<sup>th</sup> edition, and the cumulative refinement of its planning processes over many iterations. Some suggestions made by participants were to improve the pacing of the workshop by reducing some tool redundancy and distributing materials for participants in advance of the event. These suggestions can be taking into consideration for future

<sup>6</sup> <https://youtube.com/playlist?list=PL3YC0xyXoQu7NDSP1gfNrbsT3XF9NL2JS&si=Ni8IJbZxQdylMqFi>

iterations. Likewise, for future editions, efforts could be directed toward maximising outreach in the planning stage, with the goal of increasing participant numbers and supporting the continued growth and sustainability of the event.

## Impact

The 48<sup>th</sup> VI-HPS Tuning Workshop demonstrated meaningful reach across Europe, engaging 16 trainers from 6 centres across 5 European Union member states, with 11 participants attending onsite and 9 joining remotely. The hybrid format proved particularly effective for reinforcing both grassroots training capacity and broader cross-border collaboration. While most attendees were local and many were able to attend in person, the online component enabled European participation.

On a broader scale, all course information and pedagogical materials have been made open and accessible online. The recordings of each session are publicly available on YouTube and the HPC in Europe Portal<sup>7</sup> for anyone in the HPC community to engage with at their own pace. By adopting such an open-access model, future initiatives could ensure a legacy that extends far beyond the live event.

Further, this workshop was designed to align with specific professional competencies laid out in the HPC Certification Forum<sup>8</sup>. The skills obtained are outlined in Figure 3. As a measure of quality assurance, certificates were granted to participants who had a measured participation of over 80%, using the certificate template proposed under the CASTIEL 2 project. The skills obtained in this workshop contribute directly to the HPC application developer career path as defined in the Training Baseline 2<sup>9</sup>. By mapping course content to these established frameworks, future organisers could provide participants with clear certification pathways and recognised professional development milestones.

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<sup>7</sup> <https://hpc-portal.eu/training/short-courses/48th-vi-hps-tuning-workshop-mn5>

<sup>8</sup> <https://www.hpc-certification.org/wiki/skill-tree/b>

<sup>9</sup> [https://hpc-portal.eu/training\\_baseline/training-baseline-2](https://hpc-portal.eu/training_baseline/training-baseline-2)

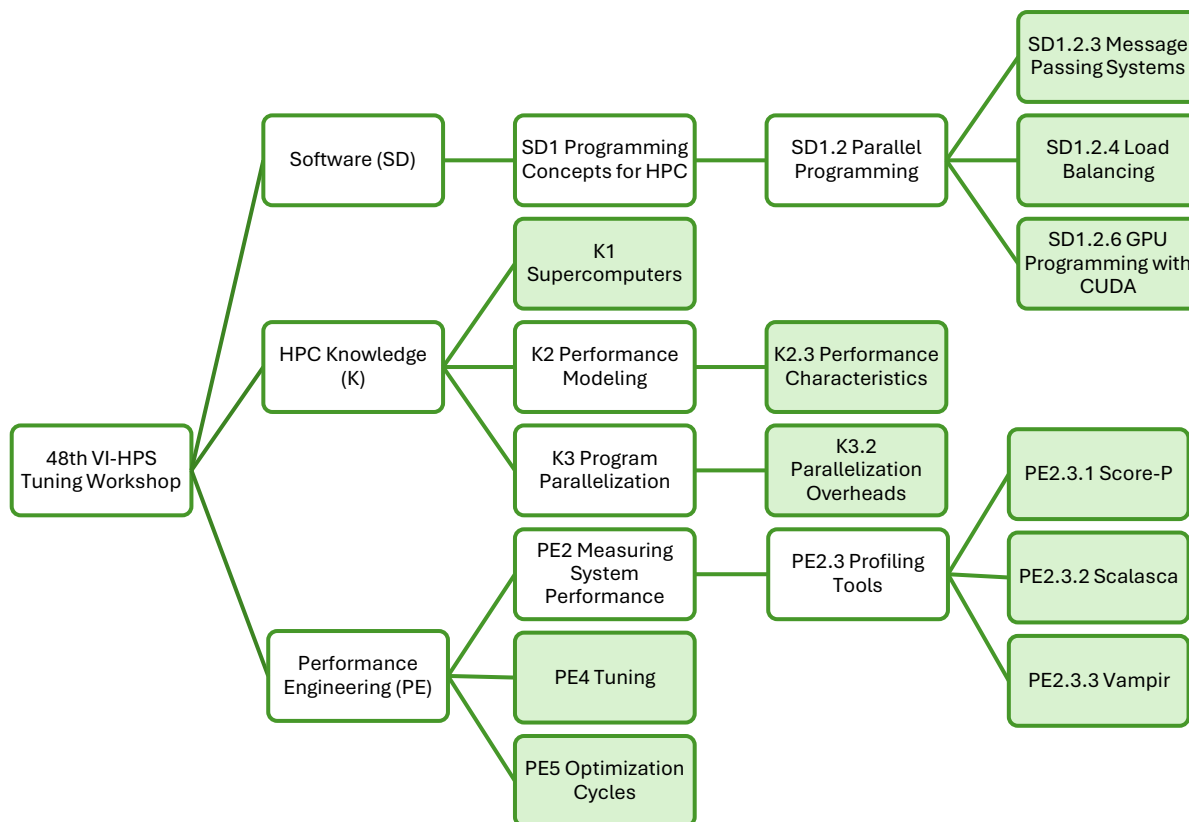


Figure 3: Skills obtained from HPC Certification Forum.

## Summary and Conclusions

The 48<sup>th</sup> VI-HPS Tuning Workshop successfully delivered a hybrid HPC-focused training programme to 20 participants across online and in-person formats, delivered by 16 trainers. The maturity of the event, in its 48<sup>th</sup> edition, was evident across all stages of the training lifecycle, from the smooth execution of the planning and preparation phases to the structured and effective delivery of both theoretical and hands-on content. Post-workshop support, including open-access recordings and centralised training materials, ensures that the impact of the event extends well beyond its five-day duration. Looking ahead, directing attention toward outreach and participant growth could further amplify the workshop's reach and contribution to the European HPC training community in future editions.

## Appendix: Captures of Training Delivery

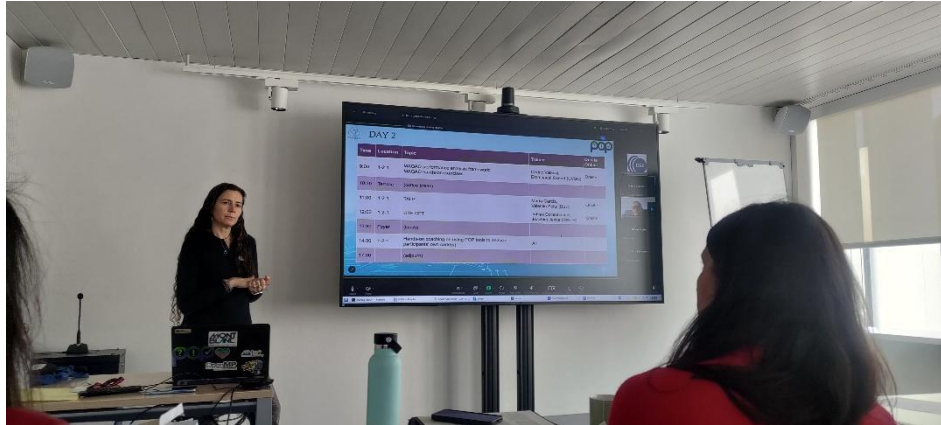


Figure 4: Marta Garcia introducing the workshop.



Figure 5: Valentin Seitz presenting the TALP tool, guiding participants through its capabilities for analysing and improving application performance.

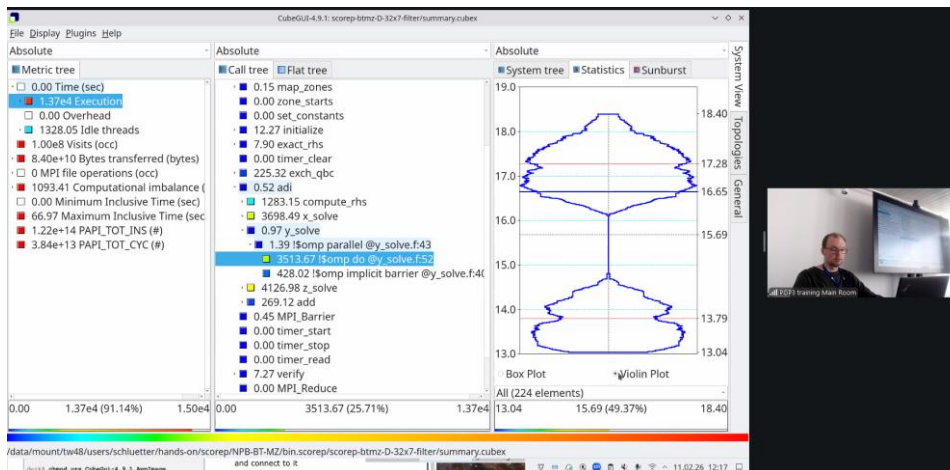


Figure 6: Hybrid session about Score-P and Cube with trainer Marc Schluetter.