The POP Centre of Excellence

in High Performance Computing

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EU H2020 Centre of Excellence (CoE)

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Performance Optimisation and Productivity

A Centre of Excellence in HPC

- Promotes best practices in parallel programming
  - Improving Parallel Software can add a lot of value: Reduced expenditure, faster results, novel solutions
  - **The POP Methodology -** a systematic approach to performance optimization building a quantitative picture of application behavior

- Free services for all EU/UK academic and industrial codes and users
  - Suggestions on improving code performance, described in a ***Performance Assessment***
  - Practical help with code refactoring through a ***Proof of Concept***

- A Team with
  - Excellence in performance tools and tuning
  - Excellence in programming models and practices
  - R & D background in real academic and industrial use cases

For further information, visit: https://www.pop-coe.eu pop@bsc.es @POP_HPC youtube.com/POPHPC

POP Performance Monitoring Tools

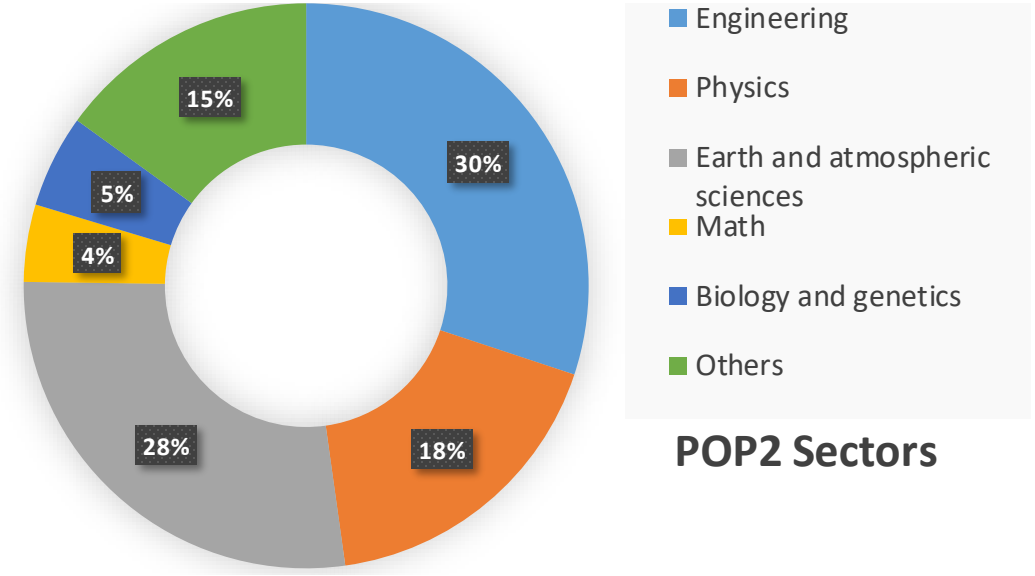
Developing open-source tools

- **Extrae (tracing), Paraver (visualisation) & Dimemas**
  - https://tools.bsc.es
- **Score-P (profiling and tracing), Scalasca (Post Processing) & Cube (visualisation)**
  - https://www.scalasca.org
- MAQAO: synthetic reports and hints with a focus on core performance
  - http://www.maqao.org
- PyPOP: automated generation of POP metrics from Extrae traces
  - https://github.com/numericalalgorithmsgroup/pypop

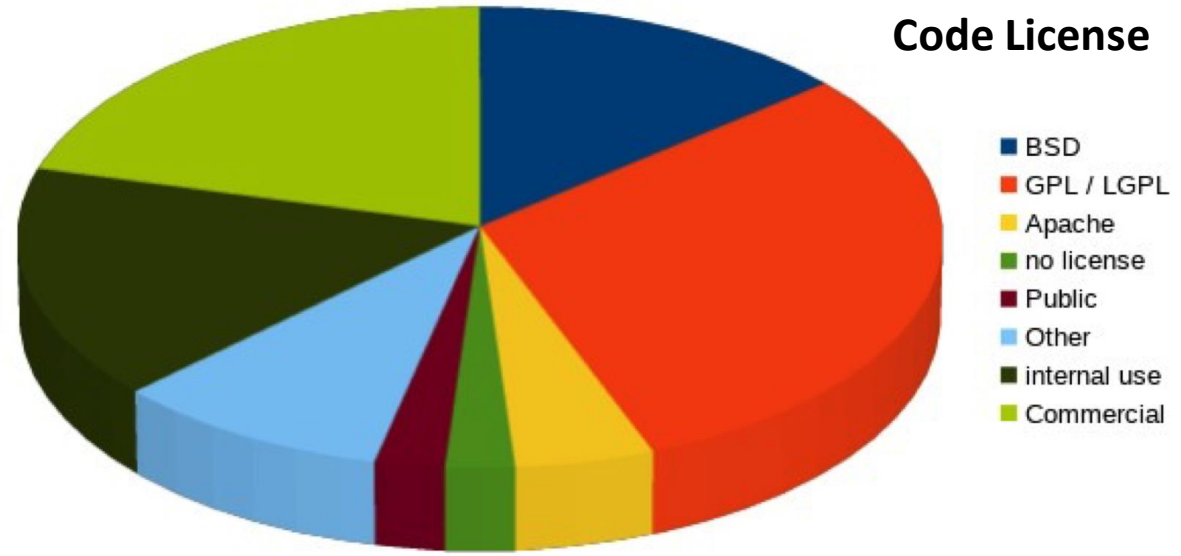
For more help on how to use these tools and calculate the POP metrics

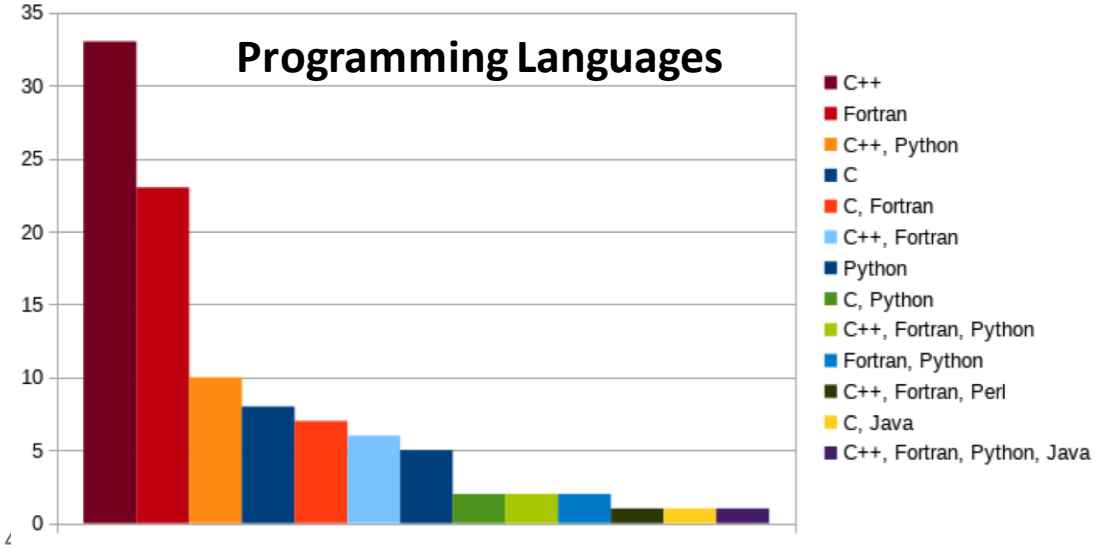
- See the POP website learning material & online training
  - https://pop-coe.eu/further-information/learning-material
  - https://pop-coe.eu/further-information/online-training

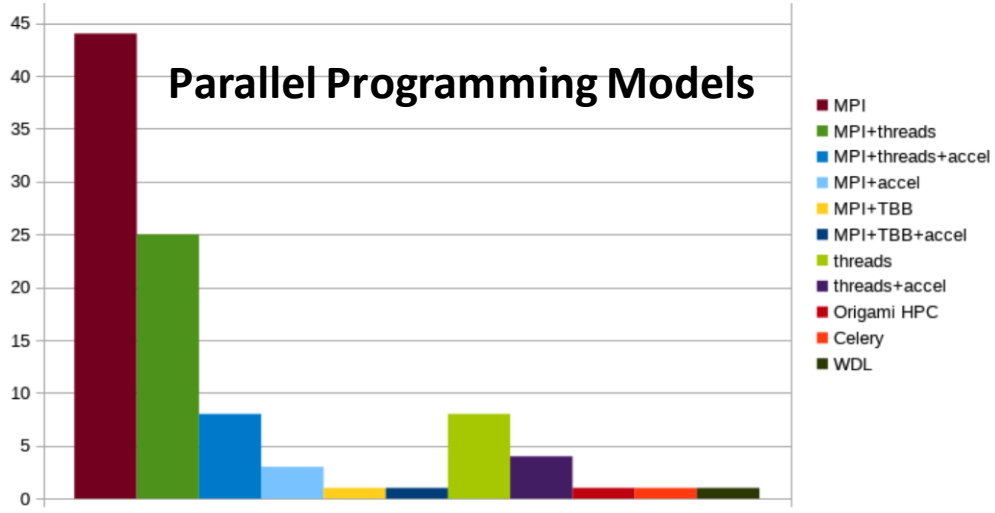
POP2 Services & HPC Codes



POP2 Sectors







Source: POP2 D5.1 First Report on Analysis

Some Success Stories

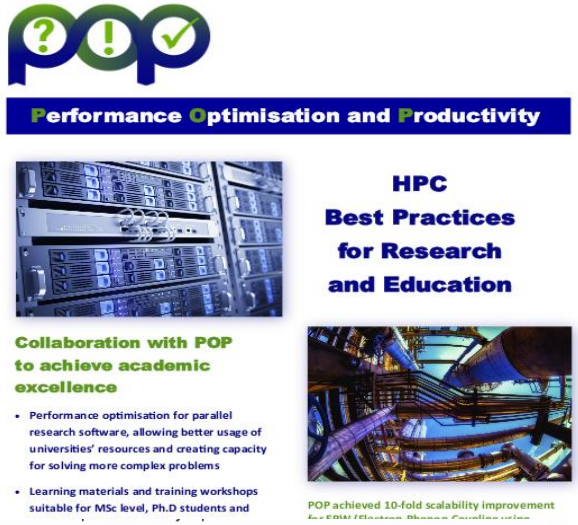
- More than 350 services since 2015 across all domains
  - e.g. engineering, earth & atmospheric sciences, physics, biology and genetics
- See ⇨ https://pop-coe.eu/blog/tags/success-stories

- Performance Improvements for SCM's ADF Modeling Suite
- **3x Speed Improvement** for zCFD Computational Fluid Dynamics Solver
- **25% Faster time-to-solution** for Urban Microclimate Simulations
- **2x performance improvement** for SCM ADF code
- Proof of Concept for BPMF leads to around **40% runtime reduction**
- POP audit helps developers **double their code performance**
- **10-fold scalability improvement** from POP services
- POP performance study improves performance **up to a factor 6**
- POP Proof-of-Concept study leads to **nearly 50% higher performance**
- POP Proof-of-Concept study leads to **10X performance improvement** for customer

POP invests in training HPC experts

Tutorials & workshops

- At key HPC conferences, for customers & in cooperation with other HPC initiatives
- Teaching methods:
  - from lecturing & demonstrating to bring-your-own-code activities
  - From half- or one-day conference tutorials to tuning workshops lasting up to a week



POP Online training course

- A series of self-study modules
  - For those with limited experience in performance analysis of HPC applications
- Freely Available at https://pop-coe.eu/further-information/online-training

Online Content

POP Website

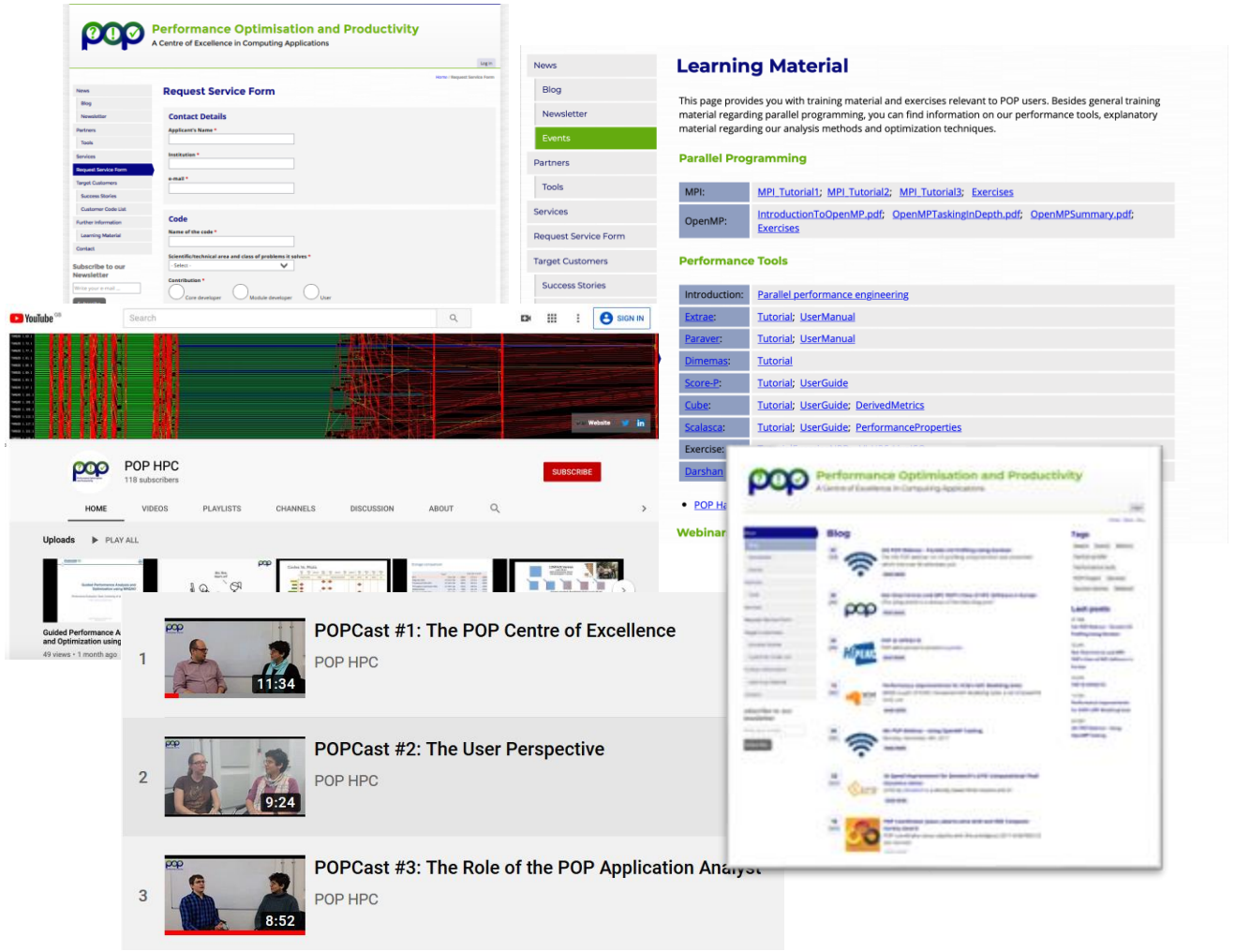
www.pop-coe.eu

- All the information you need to access POP services
  - **https://pop-coe.eu/services**
- Blogs
- More Learning Materials
- Newsletter
  - subscribe and see past issues

YouTube Channel

https://www.youtube.com/pophpc

- Past Webinars
- POPCasts



WHPC: Women in HPC

- Membership
  - Individual
  - Chapters & affiliates
- Workshops at ISC & SC
- See https://womeninhpc.org/

nag®

WHPC

Chapter

Performance Optimisation and Productivity

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Contact:

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