



D3.3 Second Market Review Version 1.2

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Change Log

Version	Author	Description of Change
V0.1	Mike Dewar	Initial Draft
V1.0	Mike Dewar	Updated with comments from NAG POP team.
V1.1	Brian Wylie	Review clarifications and comments.
V1.2	Mike Dewar	Updated after review by Brian Wylie.

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Executive Summary

This is an update to D3.2, the First Market Review, delivered in Month 6. It reviews progress to date and sets out a strategy for business development in the final year of the project.

1. Introduction

In D3.2 we divided the kinds of organisations that might use POP into eight categories, and suggested that the way to find new leads was through a mixture of attending events, direct marketing, and targeted approaches to particular individuals and organisations. The project reviewers have subsequently encouraged us to prioritise targeting SMEs and ISVs. In the former case they felt that “*a significant code performance improvement can save computing time and increase their revenues*”, and in the latter that “*this may increase the impact of POP’s services, since ISVs’ customers would also benefit from improved code performance*”¹

Direct marketing has largely been accomplished through the website, social media and newsletter. We have also used existing channels such as partner newsletters and social media. While WP 3 has made substantial contributions to these, they fall under WP 7 and won’t be described further in this deliverable.

2. Current POP users

2.1 Organisation Types



¹ Both quotations from the interim report to the Consortium provided in July 2016.

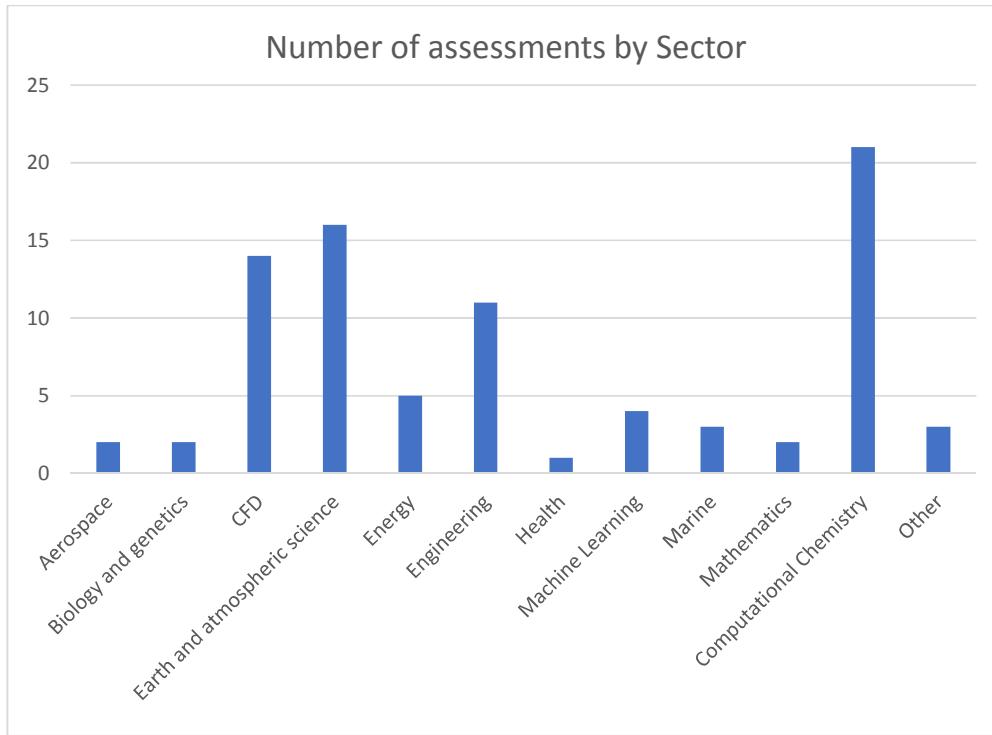
At the time of writing (February 2017), POP has performed 84 assessments (Audits or Performance Plans). The majority come from academic and research institutions, however we have performed 22 assessments on commercial codes, of which 19 came from SMEs and 17% from ISVs.

2.2 POP Assessments by Market Sector

We have categorised the codes analysed by POP as follows:

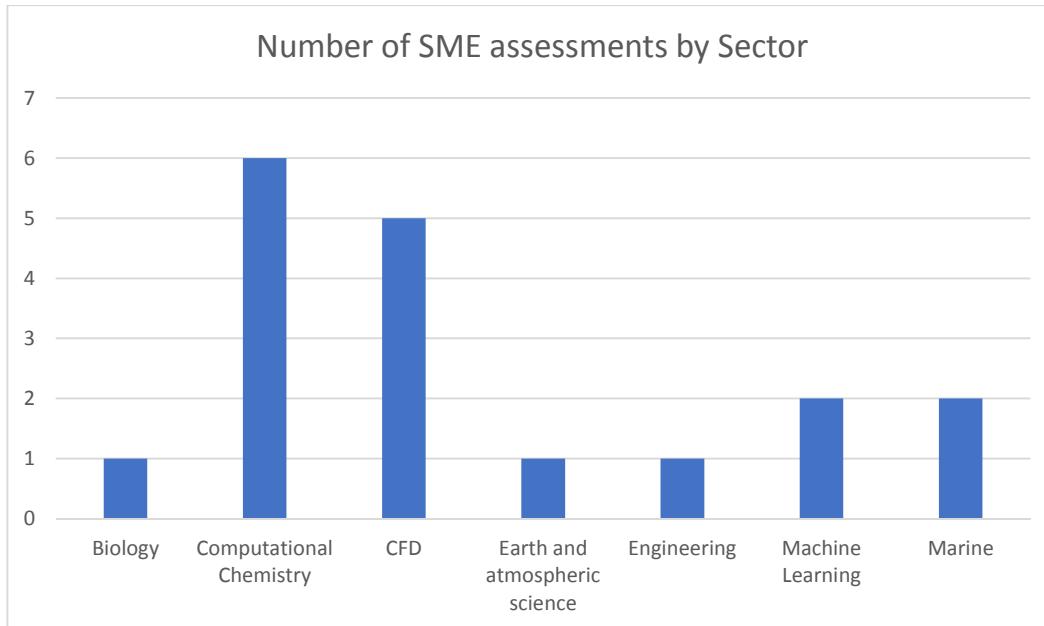
- **Aerospace:** Applications to solve scientific problems associated with the movement of airborne vehicles. Although the scientific methods these codes implement may be found in codes under other sectors (typically CFD), these codes are tailored to the aerospace domain e.g. through the choice of problem formulation or solver.
- **Biology and genetics:** Applications from the life sciences domain. POP audit examples include codes for protein structure and function prediction, and for genomics analysis.
- **Computational Fluid Dynamics:** General-purpose CFD applications that can be used in a variety of domains. For POP, this also includes a code that performs fluid modelling for computer graphics.
- **Computational chemistry:** Codes that model materials on the atomistic level, these are used in a wide range of domains, for example, Pharma, Oil and Gas, and Catalysis.
- **Earth and atmospheric science:** Codes that model physical processes in the environment with applications including meteorology, climate modelling and seismic activity.
- **Energy:** Applications to solve scientific problems specific to the generation and distribution of energy. POP has audited code for plasma physics (used in the simulation of fusion reactors) and wind turbine modelling.
- **Engineering:** Applications for the computer-aided design and analysis of physical structures. POP has audited several finite-element based structural analysis codes, as well as a fire dynamics simulator.
- **Health:** Applications that focus on aiding the diagnosis and treatment of illness. For example, POP has audited a lung-modelling code.
- **Machine learning:** Codes that implement techniques such as neural networks or Bayesian statistics.
- **Marine:** Applications to solve scientific problems specific to the maritime domain, including particle transport and the action of waves on structures.
- **Mathematics:** Codes that implement generic mathematical kernels that can be applied in a wide range of scientific domains. POP has audited two codes that implement the Fast Multipole Method for n-body simulation.

- **Other:** Everything not covered in the previous sectors. Topics covered by POP audits that have been placed in this category include acoustics, a code parallelisation framework, and text processing.



It is unsurprising that Computational Chemistry, CFD and Engineering dominate as these are the main users of HPC in Europe. It is interesting that there are so many Earth and Atmospheric Science codes but this is in part due to contacts within the Consortium and the sectorial events that we have chosen to attend.

If we look just at SMEs we find that Computational Chemistry and CFD dominate.



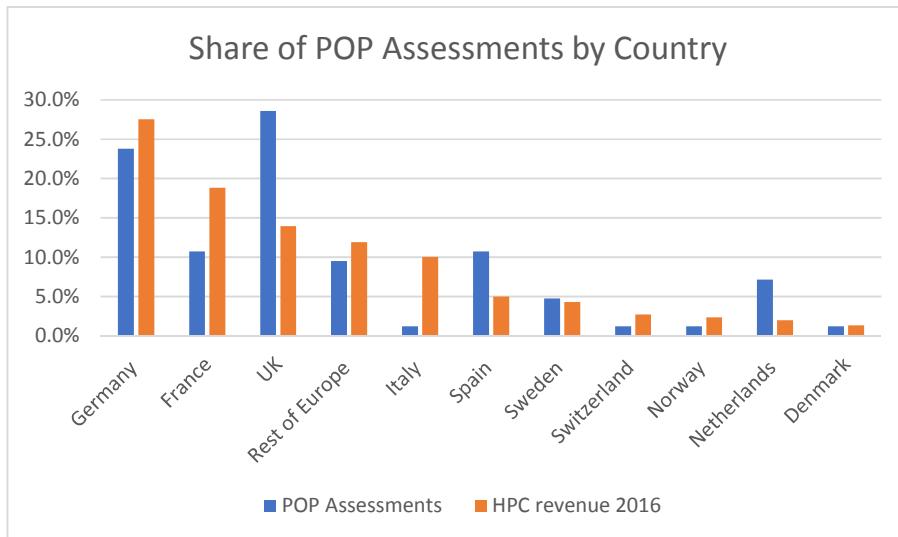
2.3 POP Assessments by Country

We have performed 84 assessments for applicants in 15 different countries as shown in the following table.

Country	Assessments
United Kingdom	24
Germany	20
France	9
Spain	9
Netherlands	6
Sweden	4
Belgium	3
Austria	2
Czech Republic	1
Denmark	1
Israel	1
Italy	1
Luxembourg	1
Norway	1
Switzerland	1

Between them the UK and Germany account for more than half the assessments performed, with France and Spain coming next. This to some extent reflects the make-up of the Consortium and the role of NAG, based in the UK, in business development for the project. However, it also reflects

where many users of HPC are in the EU and associated states. If we compare the share of assessments by country with the share of HPC revenue by country,² we can get a clearer picture of where we need to focus our efforts.

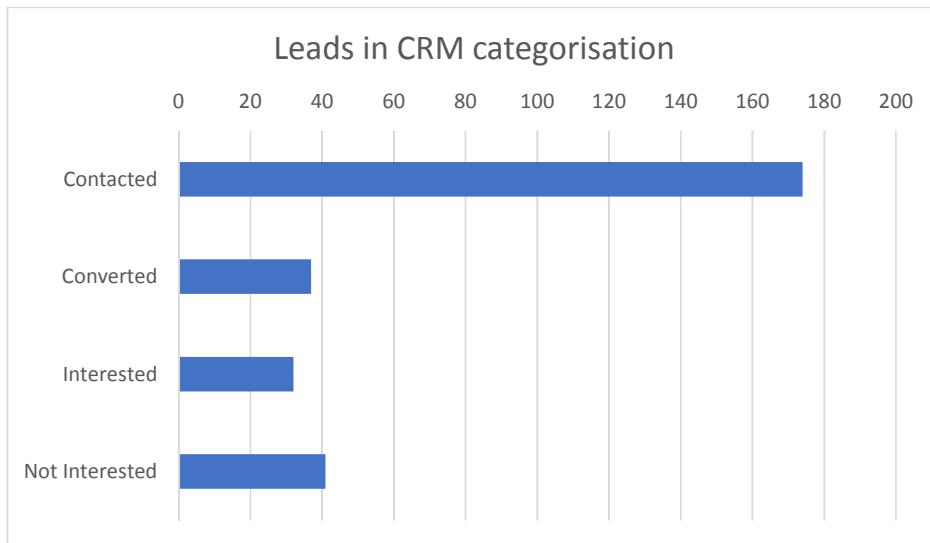


Clearly the UK is over-represented and we need to focus our efforts more on France and Italy. Generally we have reached out well to the rest of Europe, there is some slight over-representation in Spain and the Netherlands but that is mainly due to follow up work for a few customers. Considering one of the POP partners, TERATEC, is based in France we have quite low numbers. However, TERATEC are leading WP2 and, due to potential conflict with their role as customer advocates, do not have any time budgeted in WP3. We also note that language may present a barrier when trying to contact SMEs or attend events focussed towards countries for which the Consortium do not have native speakers.

3. POP Leads

We have a large number of leads in our CRM database, as follows:

² Gathered from the SMART 201/0021 Open Dataset for which the source is IDC 2015



As of February 24th 2017, we have collected 284 leads in total, of which 37 have been converted into users of the service and a further 32 have expressed an interest in POP. We have contacted 174 leads where we have yet to receive a response. The number of converted leads is lower than the number of assessments because some leads have had multiple codes analysed, some assessments took place before the CRM was set up and some users applied for the service without being directly contacted by one of the POP partners. In the latter two cases the users are recorded in the CRM system but do not have the status "converted".

3.1 Targeting industry

We have used a number of means to target potential industrial users of POP, and in particular SMEs. SMEs are difficult to meet at events, and often very focussed on their immediate business needs. BSC have acquired lists of Spanish companies and contacted them by telephone and email. NAG has used the public list of recipients of funding under the SME Instrument and the UK Government's *Knowledge Transfer Partnership* programme as sources of contacts. Also, professional social media, i.e. Twitter and LinkedIn, are now also being used to target SMEs and ISVs. This strategy has borne fruit: thirteen of our nineteen SME customers to date have signed up to POP services since October 2016.

We recognise that commercial organisations are very sensitive about intellectual property and have developed collateral to help allay those fears when we contact them, including message templates with assurances that we can sign NDAs to protect their IP and an anonymised audit report. We also stress the economic benefits of code improvement.

3.2 Events

We have attended a mixture of sectorial and general HPC events. In addition, POP collateral (roller banners, leaflets, business cards) have been available at other events attended by the partners. We have had a booth at one event but in general that is not affordable within the budget so we have aimed to give a talk or present a poster if possible. At conference-style meetings attending talks and following-up with presenters can be very fruitful.

Event	Sector
1st EoCoE/POP workshop	Energy
N8 HPC Network Event: New Approaches to Atomistic / Quantum Simulation of Materials	Materials
7th Blue Gene Extreme Scaling Workshop	All
Multicore@Siemens 2016	Manufacturing, Medicine, ...
Mobile World Congress	Mobile telecommunications
4th Exascale Applications & Software Conference	All
Cray XC40-Workshop on Optimization at Scale	All
parallel 2016	Parallel programming
ICME 2016	Materials, Engineering
2nd EoCoE/POP workshop	Energy
PRACEdays16	All
NAFEMS UK	Engineering
Hartree Summer School (HPC)	All
ISC 2016	All
TERATEC Forum 2016	All
High Performance Computing & Simulation Conference (HPCS 2016)	All
Introduction to Computational Fluid Dynamics	CFD

Research Software Engineers Conference 2016	Academic/government lab software development
EXDCI	All
7th International Industrial Supercomputing Workshop	All
HPC User Forum	All
Jara-HPC Symposium	Engineering, Materials and Neuroscience
HLRS results and review workshop	All
International CAE Conference	Engineering
17th Workshop on High Performance Computing in Meteorology	Earth and Climate Science
IoT Solutions World Congress	All
Advanced Engineering 2016	Engineering
Supercomputing 2016	All
SMART CITY EXPO	Machine learning, Energy, Engineering, ...
Computing Insights UK	All

4. Strategy for the remainder of POP

Broadly speaking our existing strategy is working and we will continue in very much the same vein. We will not repeat attendance at events unless the effort involved is very low, the event is a major one such as PRACE Days or ISC or there is a large industry presence.

We will continue to look for ways to identify and contact SMEs directly. We recognise that all partners need to think creatively about how to achieve this.

We will look to improve POP usage in countries not represented inside the Consortium, especially ones which are under-represented compared to their share of HPC revenue; in particular, France and Italy.

Finally, we will look to target infrastructure operators such as HPC centres, and through them their users. Early attempts to do this have had limited success, with the notable exception of our engagement with IT4Innovations in

the Czech Republic which isn't showing promise, but we believe this strategy could still work.

Acronyms and Abbreviations

- BSC – Barcelona Supercomputing Center
- CRM – Customer relationship management
- D – deliverable
- HLRS – High Performance Computing Centre (University of Stuttgart)
- HPC – High Performance Computing
- IP – Intellectual Property
- Juelich – Forschungszentrum Juelich GmbH
- POP – Performance Optimization and Productivity
- RWTH Aachen – Rheinisch-Westfälische Technische Hochschule Aachen
- USTUTT (HLRS) – University of Stuttgart
- WP – Work Package