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Coordination of the HPC strategy



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Final Evaluation Report of the HPC Job Centre

Final

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References and Applicable Documents

List all external documents referenced in this document

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- [2] <https://exdci.eu/jobs-and-training/job-portal/>
- [3] <http://www.prace-ri.eu/>
- [4] <http://www.etp4hpc.eu>
- [5] <https://exdci.eu/collaboration/fethpc>
- [6] <https://exdci.eu/collaboration/coe>

List of Acronyms and Abbreviations

BSC	Barcelona Supercomputing Center
CoE	Centres of Excellence for Computing Applications
D	Deliverable

EC	European Commission
ETP4HPC	European Technology Platform for High Performance Computing
EU	European Union
EXDCI	European Extreme Data and Computing Initiative
FET	Future and Emerging Technologies
HPC	High Performance Computing
ISC	ISC High Performance – the HPC Event (formerly the International Supercomputing Conference)
IT	Information Technology
M	Month
PRACE	Partnership for Advanced Computing in Europe
STEM	Science, Technology, Engineering and Mathematics
WP	Work Package

Executive Summary

The shortage of personnel with expertise in High Performance Computing (HPC) skills has been identified as a barrier to increasing the uptake of HPC in academia and industry, which in turn represents a major risk to European competitiveness.

This issue is the focus of **EXDCI Work Package 5, Talent Generation and Training for the Future**, the goals of which are to support talent generation, facilitate HPC staff recruitment, and identify and meet future training needs.

The EXDCI Job Portal was developed in **Task 5.2 Facilitating HPC Staff Recruitment**, with the dual aims of making it easier for job-seekers to find vacancies in the HPC sector, as well as for employers to be able to fill their vacancies.

This deliverable, *D5.7 Final Evaluation Report of the HPC Job Centre*, is a follow-up deliverable to *D5.2 Initial Evaluation Report of the HPC Job Centre*. It summarises the work done for the second stage of development of the EXDCI Job Portal, reviews the use that has been made of the portal, and makes recommendations for its long-term sustainability.

The EXDCI Job Portal can be found at <https://exdci.eu/jobs-and-training/job-portal/>.

1 Introduction

One of the acknowledged barriers to increasing the uptake of HPC in academia and industry is the shortage of skilled personnel.

One of the goals of Task 5.2, Facilitating HPC Staff Recruitment, was to establish an “HPC Job Centre” portal, to help employers who are recruiting staff in the field of HPC to find the most suitable candidates, as well as to help job-seekers looking for HPC-related jobs to find available vacancies.

The EXDCI Job Portal¹ lists HPC-related vacancies from both the academic and commercial sectors across Europe, and sometimes beyond, and provides links to external sites where jobs are listed, e.g. the HPCWire Job Bank². It also includes sample job descriptions, to guide employers in the writing of their job specifications, to help them to recruit staff with the required HPC skills.

The portal was launched in November 2016, and a previous deliverable, *D5.2 Initial Evaluation Report of the HPC Job Centre*, discussed the initial specification of the Job Portal, and the first phase of development.

This deliverable gives an update on the second phase of development, provides some statistics relating to the use of the portal, and provides details of the plans for the future of the portal.

The deliverable contains the following sections:

- 1 Introduction** – an overview of the purpose of the work done and the structure of this report.
- 2 EXDCI Job Portal development: second phase** – information about further development work carried out on the portal. This provides an update to D5.2, which was written just as the first phase was launched.
- 3 Usage of the Job Portal** – an overview of the steps that have been taken to publicise the existence of the Job Portal, and some statistics about the jobs advertised on the portal and the visitors to the website.
- 4 Plans for the continuation of the portal** – a look to the future, and how the Job Portal will continue at the end of this project.
- 5 Conclusions** – concluding remarks.

2 EXDCI Job Portal development: second phase

The first phase of the Job Portal was launched in November 2016. This comprised:

- Job vacancy listings on the main page:
<https://exdci.eu/jobs-and-training/job-portal>
- A catalogue of links to other sites listing job vacancies in HPC and related fields:
<https://exdci.eu/jobs-and-training/job-portal/more-hpc-job-vacancies>
- Employer guidance page, with suggested job advertisement structure and example job descriptions:
<https://exdci.eu/jobs-and-training/job-portal/employer-guidance>
- A link to the HPC Career Case Studies, aimed at people considering a career in HPC:
<https://exdci.eu/jobs-and-training/hpc-career-case-studies>

¹ <https://exdci.eu/jobs-and-training/job-portal/>

² <http://jobs.hpcwire.com/>

Anyone wishing to advertise a job vacancy on the portal at this point had to send a request via the online contact form. A member of the WP5 team would then create the job announcement, and email the recruiter to confirm that the vacancy had been posted.

In the second phase of development, the most significant change was the addition of a user account registration form for people external to the project. Once someone has an account on the system, they can log in and create their own job vacancy listings directly.

In order to create the account, a user needs to supply only their name and email address. There are also optional fields where the user can, if they wish, provide their organisation and country. This provides additional information which could be used to carry out analysis of portal users, but we adhere to the rule of not collecting unnecessary data and do not want to put users off from registering – the process should be as simple as possible.

When a registered user posts a vacancy, this still needs to be approved by someone from the EXDCI WP5 team, but this is a quick and easy process: an automatic email is generated and sent to EXDCI staff who can approve the announcement. We aim to approve announcements within one working day.

It is not only quicker for registered users to fill in the details of their vacancy themselves, but it also potentially improves the detail and accuracy of job listings. The employer should already be fully aware of exactly which skills are needed, the detailed conditions of the job, etc., whereas an EXDCI team member has to extract the relevant information from the job description provided, which may require a degree of interpretation and reading between the lines.

The user registration feature was implemented a little later than had been planned, due to the time taken to clarify some legal issues relating to the storage and processing of personal data, especially across different countries (given that the EXDCI website is hosted by BSC in Spain, while the EXDCI Project Management Office is based in Belgium).

The remaining changes made during the second stage of development were mainly related to the usability of the portal, and mostly addressed issues which had become apparent only when real data was entered. They were mainly changes to the form for entering job descriptions, and as such would not be obvious to visitors to the portal. They were all relatively small changes which simply aimed to make clearer which information should be provided in some parts of the form. These changes include:

- Adding extra options to some of the drop-down lists, for example:
 - the *Required Skills* list was significantly expanded, based on job vacancies advertised in the first few months, as too often the skills specified were not on the drop-down list.
- Changing certain field names and/or providing some explanatory notes next to some of the fields in the form, to provide more clarity, for example:
 - *Contract type* was expanded to *Contract type (e.g. full-time/part-time, permanent/fixed-term for n years, etc.)* to make it clearer what sort of information should be provided here.
 - *Certifications* was changed to *Technical certifications – please state whether required or preferred*. As this appears in the form before *Required Education or Background*, it was not obvious that this referred to technical certifications (e.g. Microsoft Certified Engineer) rather than e.g. university degrees.
 - The two fields *Job description for list* and *Job description* were changed to make it clearer exactly what these meant. The former was for information to be provided in the list of job vacancies on the main page of the Job Portal, and has now been changed to *Brief job summary to appear in list*, with an additional

note explaining that this is for the *Brief job summary to appear in list at <https://exdci.eu/jobs-and-training/job-portal>*. The *Job description* field, which was for the full job description to appear on the page for that specific vacancy, was changed to *Detailed job description*.

Another change implemented was an expansion of the navigation menu for registered users. The portal had been designed to hide all job advertisements with application deadlines in the past, but it only became apparent when using the portal for real cases that this could be a problem when trying to extend a deadline for a job offer which had already expired. There was no obvious way to find the expired announcement in order to edit the end date and make it live again, unless the user happened to have a note of the original job posting URL (e.g. in an email confirming that the job offer had been posted). The expanded navigation menu now allows registered users to see all of the announcements they have posted, whether or not they have expired, through the “My Job Offers” menu option. EXDCI team members who can approve announcements also have an “All Job Offers” menu option, and there is also a “List of pages” facility for easier navigation.

Most of the changes implemented in this second phase of development, then, have been to improve the experience of using the Job Portal to enter and update job announcements. From the external viewpoint, the main change has been the introduction of the user registration function.

3 Usage of the Job Portal

3.1 Publicising the Job Portal

The Job Portal has been publicised in a number of different ways.

An announcement was included on the EXDCI homepage, on the scrolling banner which runs through 3 recent project announcements (subsequently replaced with newer announcements).

Twitter has been used to publicise the portal, including announcements about which countries the current vacancies are in, the fact that users can register for an account to post their own vacancies, and – most recently – that the Job Portal is now more visible, being promoted on the homepage of the PRACE website, as discussed later in this report. Most of the tweets relating to the Job Portal have been retweeted and liked, and while this has mostly been done by people from within our network of contacts – though external to the project itself – we have seen some engagement from Twitter accounts further along the chain. For example, one tweet, which mentioned the ability to create an account to post vacancies, was “liked” by Big Data news, and also retweeted by a cybersecurity expert and part-time lecturer, to whom we had no obvious connection.

When job announcements have come to the team via other routes, we have offered to add them to the EXDCI Job Portal, hoping to raise awareness of the portal that way.

A mailing was sent to FETHPC projects and Centres of Excellence, to make them aware of the portal.

The portal was presented during the WP5 presentation given by Marjolein Oorsprong of PRACE at the European HPC Summit Week in Barcelona in May 2017. This generated some positive feedback on Twitter from people who attended. We also received an email from someone who had been in the audience, who wanted to discuss the best opportunities in HPC for someone with his profile. He also mentioned that following the WP5 presentation, he had visited the Job Portal and found a job there for which he was considering applying. We do not

know whether he did apply in the end, although we do know that he has since been successful in securing a relevant post elsewhere, using his Computational Fluid Dynamics background.

The portal was also mentioned during one of the presentations at the STEM Student Day Gala at ISC2017³.

It is also mentioned in the EXDCI 3-minute overview video.

3.2 Vacancies listed on the Job Portal

Over the period from November 2016 to November 2017, 51 job announcements have been posted on the Job Portal. These jobs have covered both academic posts (from studentships to professorships) and commercial / industrial posts, based in 11 European countries (Austria, Belgium, Cyprus, the Czech Republic, France, Germany, Ireland, Norway, Spain, Sweden and the UK). There was also one post advertising European Joint Doctorate posts, which could be based in various different European countries, and 2 posts for jobs in New Zealand. While the portal focuses on job opportunities within Europe, and we do not actively seek to identify vacancies elsewhere, we are happy to include relevant jobs in countries outside Europe.

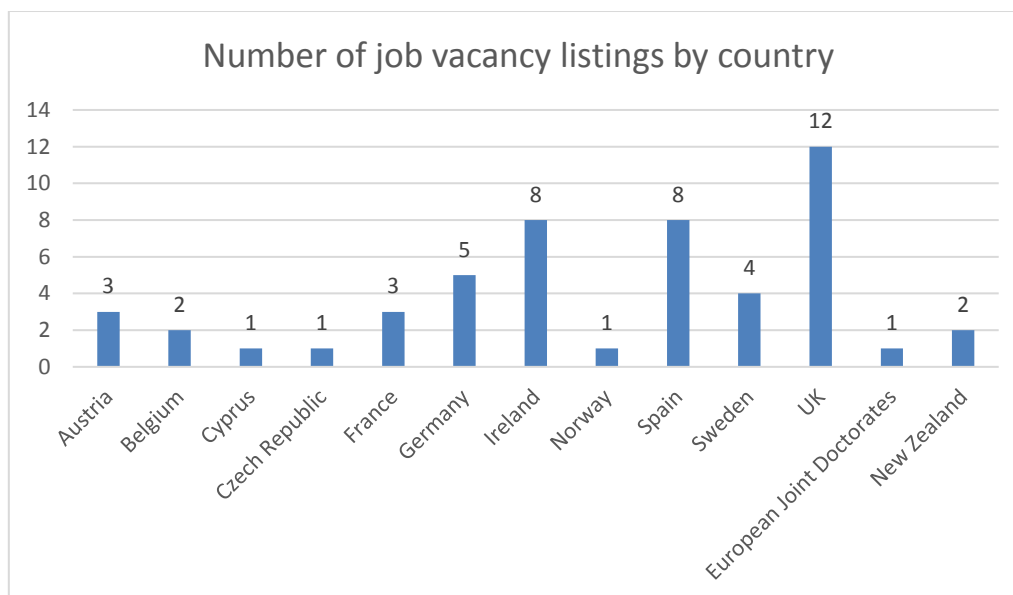


Figure 1 Job vacancy listings by country

It should be noted that the above numbers relate to one entry in the Job Portal. In some cases, a single entry is for more than one identical vacancy – up to 5 or 6 in some cases. This means that the total number of vacancies which have been advertised on the portal is higher than the number of listings. Where an organisation is advertising two jobs with different job descriptions at the same time, separate entries are of course made.

Since the user registration form was introduced in July 2017, 3 external users have so far registered and posted job offers. These users are from:

- TU Wien (Vienna University of Technology) in Austria
- ICHEC, the Irish Centre for High-End Computing in Ireland
- Appentra, a Spanish start-up for HPC software tools.

³ <http://isc-hpc.com/stem-student-day-gala.html>

3.3 Usage of the Job Portal

Traffic to the EXDCI website is monitored using Google Analytics. Some statistics follow.

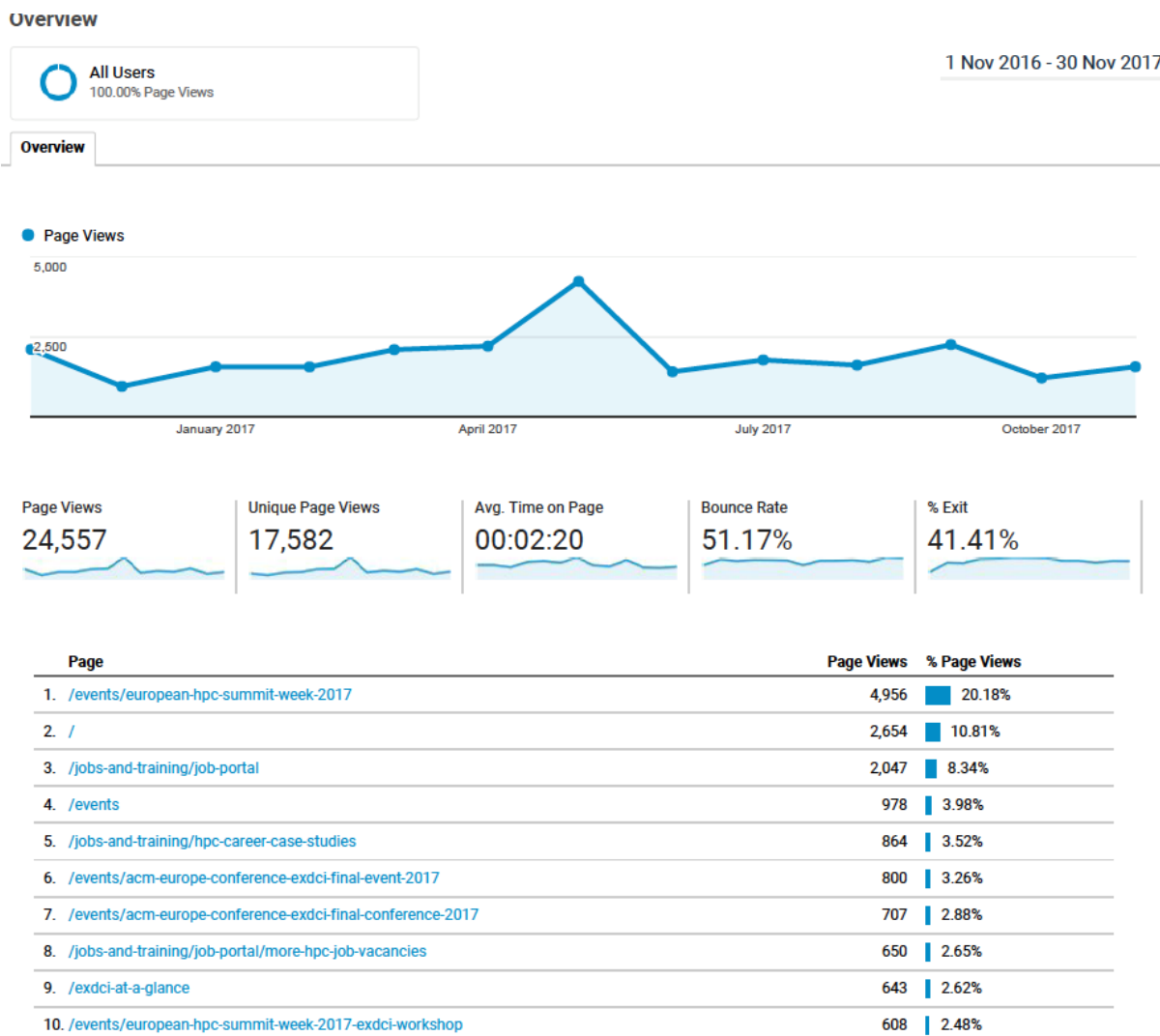


Figure 2 Website page views

This chart shows all the page views for the EXDCI website from November 2016, when the Job Portal launched, until November 2017. The Job Portal was viewed 2,047 times up until 30th November 2017, accounting for 8.34% of all page views. It ranks 3rd in terms of page views, behind only the homepage and the European HPC Summit Week 2017 page. As the EHPCSW is such a large-scale, high-profile event (which is reflected in the large peak in page views during May 2017), it is perhaps not surprising that the related page has received even more views than the EXDCI homepage itself.

We can see that the “More HPC Job Vacancies” page ranks 8th among the most viewed pages, ranking mainly behind events-related pages and the “HPC Career Case Studies” page, another page from the Jobs and Training section, which ranks 5th. It seems, then, that the HPC Careers Case Studies and More HPC Job Vacancies pages are of considerable interest to EXDCI webpage visitors.

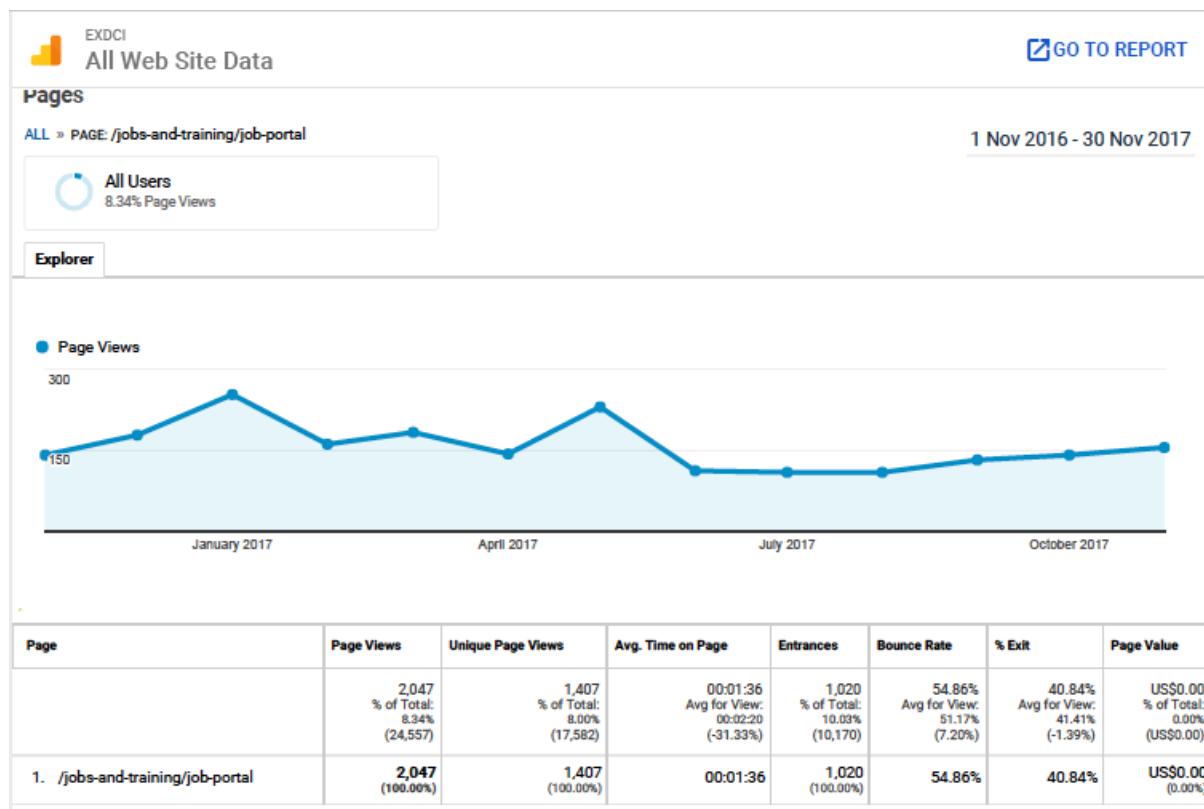


Figure 3 Job Portal page views

Figure 3 above shows the page views for the Job Portal page. This shows clear peaks in January, presumably as a result of the initial publicity for the portal, and May, when the European HPC Summit Week was held and the portal was presented during a conference. The activity dropped in the summer, but has been increasing steadily, if slowly, since then. With a more focused effort to publicise the portal, the number of users should continue to increase, hopefully leading to more of an exponential growth. The number of unique page views compared to the total number of page views shows that there is a reasonably high number of returning visitors, which suggests that those who visit do find it useful.

Figure 4 below shows the navigation summary for the Job Portal – the column on the left shows the page from which visitors had come, and the column on the right shows where they went next. It can be seen that people mainly come to the Job Portal from other pages in the Jobs and Training section of the website, and that they also almost always go on to another page within the Jobs and Training section afterwards. The two exceptions in the “next page path” are the EXDCI homepage and the Contact page, and webpage visitors going from the Job Portal to the Contact page are likely to have been people who submitted job vacancy details via the Contact form. This all suggests that people who visit the Jobs and Training pages find a number of things of interest, and tend to spend some time looking at different pages within that section.

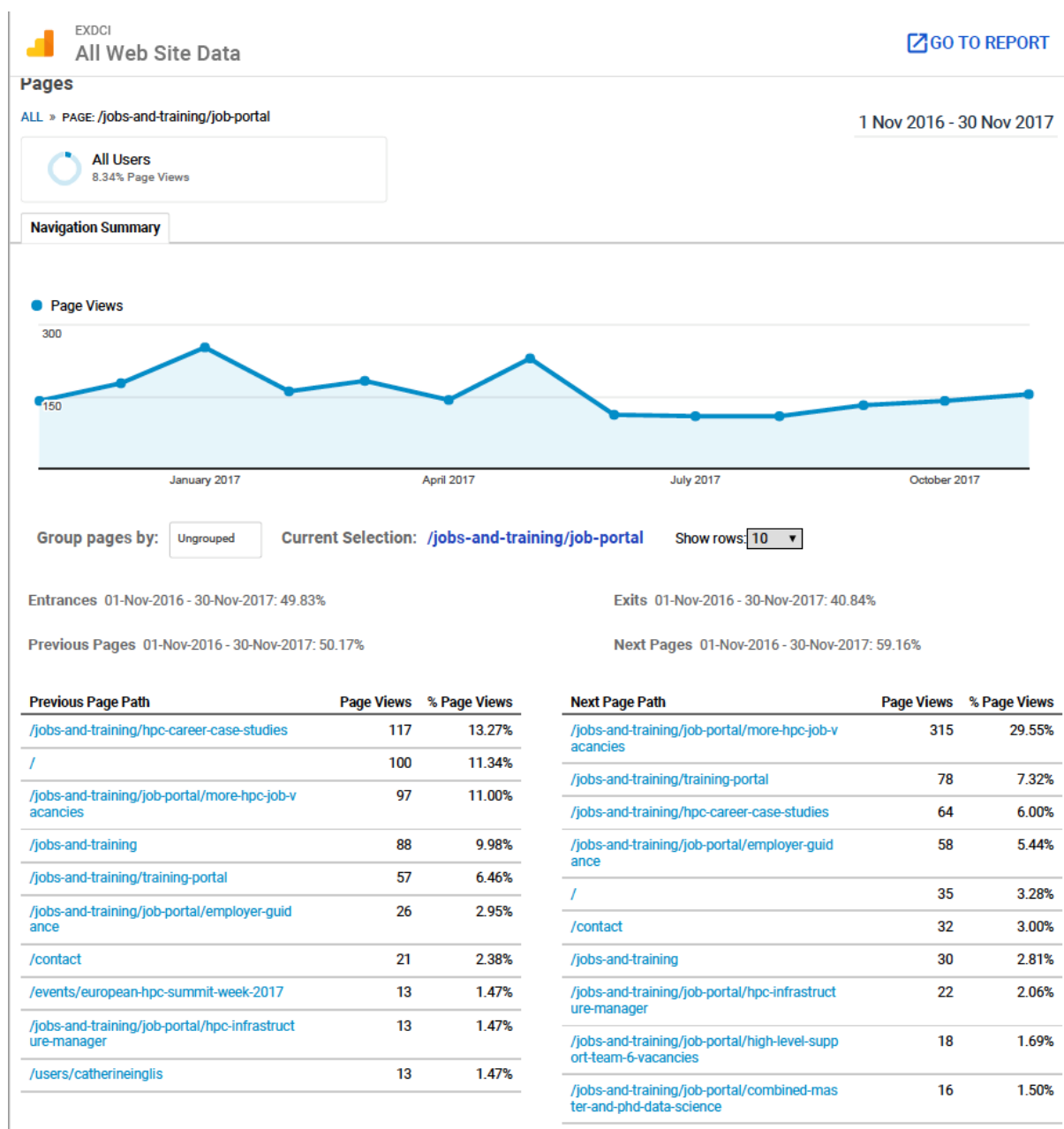


Figure 4 Navigation summary

We can see from the number of page views that the Job Portal is a well-visited part of the website. We would also like to try to understand how successful the portal has been, to see whether advertising jobs on the portal leads to an increase in quantity and/or quality of the applications received. However, this is not an easy task.

Firstly, applicants do not apply for jobs via EXDCI, so we cannot directly track the extent to which visits to the portal result in job applications, or whether these were successful.

Secondly, it is difficult to obtain such information from the organisations who advertised the posts, for a number of reasons. One reason for this is that organisations need to be very careful to comply with the laws surrounding processing of personal data, and they are generally very wary of passing information of this type to a third party, even when the data has been anonymised. Another problem is that every organisation has its own recruitment procedure, and this may or may not involve tracking where applicants had heard about the vacancy. Finally, even if an organisation does collect this data, it is often stored by the central human resources department, and not retained locally within the recruiting department,

meaning that the person who asked for the job to be advertised will also not have ever had access to this information. Therefore, unless anecdotally we hear that a successful job applicant found out about the post via the EXDCI Job Portal, it is very challenging to establish how effective advertising on the portal has been.

In November 2017, we sent an email questionnaire to every organisation who had advertised a post on the portal, asking whether they could send any anonymised statistics relating to where the job applicants and / or people offered the job had seen the post advertised, and whether there had been a noticeable increase in job applications after advertising on the portal, as well as any suggestions for improving the portal to increase its usefulness for both job-seekers and recruiters alike. However, no replies were received. It is hard to know whether this was, for example, because we had not contacted the correct person, or the person we contacted did not have any relevant information to pass us, or they were no longer interested in using the Job Portal or had forgotten what it was.

Therefore, our investigation of how useful the portal is as a tool for recruiting new staff remains inconclusive, although the portal does receive a reasonable amount of traffic and new jobs are still being added, which suggests that recruiters consider it to be an option worth trying, at the very least. When publicising job vacancies, usually the principle of advertising in as many places as possible is a wise one, and given that there is no cost involved, and the portal is reasonably visible to a relevant audience, being prominent on the PRACE webpage now too, there seems to be no strong reason for a recruiter to decide against using the portal. They only need to be aware of the possibility to advertise there.

4 Plans for the continuation of the portal

The EXDCI project finishes shortly, and while a proposal has been submitted to continue the project, a successful outcome is of course not guaranteed. Further, a direct continuation of this specific work package is not foreseen within the proposed EXDCI-2 project.

However, the Job Portal is the result of a considerable amount of work, and although it has been available for little more than a year at the time of writing this deliverable, with the user registration facility implemented only a few months ago, it has nevertheless become quite well established and new listings are added regularly. We believe awareness of the portal is continuing – and will continue – to grow.

In D5.2, the PRACE Jobs webpage was mentioned as an example of a page that was not particularly easy to use. At the time, the PRACE team was planning a complete redesign of their website, including the PRACE Jobs page and the PRACE Training Portal. As part of this redevelopment, the previous PRACE Jobs page⁴ now redirects to the EXDCI Job Portal.

The portal is also linked from the homepage of the PRACE website (bottom right button on the screenshot in Figure 5 PRACE homepage). This is an excellent linking together of the PRACE and EXDCI efforts to make HPC-related jobs more visible to job-seekers and assist organisations to recruit the right staff. It clearly benefits both parties, and raises the visibility of the EXDCI Job Portal considerably, as PRACE is a long-established and very well-known entity in European HPC.

⁴ <http://www.prace-ri.eu/job-offers>



Figure 5 PRACE homepage

At the time of writing this report, discussions are taking place between EXDCI and PRACE regarding the transfer of the Job Portal, together with its counterpart, the EXDCI Training Portal, to the PRACE website. It is hoped that this will be carried out during a proposed – though not yet approved – extension to the current EXDCI project. This would give a long-term future to both portals, meaning that the work that has been carried out in the current EXDCI project will not be lost, even although the related activity will not continue after the project ends.

As part of the process of transferring the portal to the PRACE webpage, we will also consider how to increase the likelihood of the page being found, e.g. by search engines, or through media such as Facebook or LinkedIn. Although section 3.1 describes a number of actions which have been taken so far to publicise the job portal, it is currently not easily found except by following a direct link, and job-seekers are unlikely to stumble across it by chance, for example when doing a web search for “HPC jobs in Europe” or similar.

5 Conclusions

In conclusion, we can see that the EXDCI Job Portal has become quite well established over a fairly short period of time. It is the third-most visited page on the EXDCI website, and has so far published 50 listings of vacancies in 12 countries, plus one announcement of (multiple) European Joint Doctorate positions.

The portal has now been linked from the PRACE webpage and the previous PRACE Jobs webpage redirects to the EXDCI Job Portal. This integration with PRACE and the resulting raised visibility can only serve to increase traffic to the Job Portal, increasing the likelihood of new vacancies being posted, which in turn should further increase the traffic to the portal. The portal now probably has enough critical mass to continue to grow steadily in use for the foreseeable future.

There are plans underway to guarantee the long-term future of the EXDCI Job Portal, along with the EXDCI Training Portal, by migrating the systems to the PRACE website. The details of this are currently being discussed, but it is hoped that a no-cost extension of EXDCI will be

approved, and that this will allow for the migration to be carried out. Methods of making the portal more easily found via web searches will be investigated, and will be implemented when the migration is complete.

It should be noted that a considerable part of the effort currently required to keep both portals up-to-date is spent on entering the details of new jobs and training courses. By encouraging all recruiters and trainers to create their own account and enter the details themselves, the work would be significantly reduced for the PRACE team taking over these portals. It will of course be possible for occasional job listings to be entered by the PRACE team in exceptional circumstances, but the aim would be to keep this to a minimum and encourage external people to register for their own account.

There would also be effort required to approve listings posted by external users, and to continue to raise awareness of the portal, as well as to maintain an overall watch on the portals to ensure that they are functioning correctly. It would also be worthwhile trying to establish some better methods of tracking the usefulness of the portal. Additionally, some small level of effort would be needed for technical support, to carry out modifications or fixes to the portal. Overall, though, the level of support needed for PRACE to host the portals would be relatively low when taken in the context of support for the entire PRACE website.

This continuation plan is vital to ensure the long-term success of this valuable resource for the HPC community.

6 Annex

6.1 List of jobs advertised on the EXDCI Job Portal

Job title	Institute	Country
Junior HPC Specialist	VŠB – Technical University of Ostrava	Czech Republic
OpenMP/OmpSs Runtime Infrastructure Developer	BSC - Barcelona Supercomputing Center	Spain
Alan Turing Institute Research Fellowship	Alan Turing Institute	UK
HPC System Administrator	University of Cambridge	UK
Training Programme Manager	Nordic e-Infrastructure Collaboration (NeIC)	Norway
HPC Application Performance Analyst	HLRS	Germany
Bioinformatics and Big Data researchers	Aragonese Agency for Research and Development (ARAID) and Aragon Health Sciences Institute (IACS)	Spain
Early Stage Researcher - Big Storage	Seagate	UK
PhD fellowship in Lattice QCD	HPC-LEAP - the European Joint Doctorate Program in High Performance Computing in Life sciences, Engineering and Physics	Cyprus / Germany
Combined Master and PhD in Pervasive Parallelism	University of Edinburgh	UK
Combined Master and PhD in Data Science	University of Edinburgh	UK
Full Professor in High Performance Computing	Umeå University	Sweden
Research Performance Engineer	ICHEC - Irish Centre for High-End Computing	Ireland
System Developer	Umeå University	Sweden
System Engineer	Umeå University	Sweden
HPC and Infrastructure Manager	Cenaero	Belgium
Systems Developer / Administrator	University of Edinburgh	UK
Computational Scientist / Researcher	ICHEC - Irish Centre for High-End Computing	Ireland
System Administrator	ICHEC - Irish Centre for High-End Computing	Ireland
Computational Scientist (READEX project)	ICHEC - Irish Centre for High-End Computing	Ireland
PhD studentship on Blockchain Technologies and Applications	University of Stirling	UK
Data Analytics Specialist	NeSI - New Zealand e-Science Infrastructure	New Zealand
Systems Integrator	NeSI - New Zealand e-Science Infrastructure	New Zealand
Application Expert	PDC supercomputing centre, KTH Royal Institute of Technology	Sweden

Computational Scientist / Researcher (ESCAPE project)	ICHEC - Irish Centre for High-End Computing	Ireland
Research Performance Engineer	ICHEC - Irish Centre for High-End Computing	Ireland
Data Architect	LRZ - Leibniz Supercomputing Centre	Germany
C++ Developer	BSC - Barcelona Supercomputing Center	Spain
PhD position	UPV - Universitat Politècnica de València	Spain
Computational Scientist / Researcher	ICHEC - Irish Centre for High-End Computing	Ireland
Professorship in Data Management	TU Graz - Graz University of Technology	Austria
IT Specialist for Environmental Computing	LRZ - Leibniz Supercomputing Centre	Germany
Data Centre Manager	EPCC	UK
Researcher / Developer in Large-Scale Machine Learning	Fraunhofer ITWM Institute for Industrial Mathematics	Germany
PhD studentship in Computational Chemistry	ITQ Instituto de Tecnología Química UPV-CSIC	Spain
Data Architect	EPCC	UK
Systems Developer / Administrator	EPCC	UK
Applications Consultant (Data Science)	EPCC	UK
Applications Developer (Data Science)	EPCC	UK
Relationship Manager	VSC - Flemish Supercomputer Centre	Belgium
Research Professor in Data Science	BCAM - Basque Center for Applied Mathematics	Spain
Performance Computational Scientist	ICHEC - Irish Centre for High-End Computing	Ireland
PhD Studentship in Mathematics and/or Scientific Computing	JSC - Jülich Supercomputing Centre	Germany
PhD Fellowships for European Joint Doctorates	Various host institutes	Various European countries
High Level Support Team	BSC - Barcelona Supercomputing Center	Spain
PhD Student / Research Assistant: Computational Scientist for Hierarchical Data Structures	TU Wien - Vienna Institute of Technology	Austria
PhD Student / Research Assistant: Computational Scientist for Semiconductor Etching Physics	TU Wien - Vienna Institute of Technology	Austria
Software Engineer - C++, Qt	Appentra Solutions	Spain
Postdoc / Engineer: High Performance Computing Specialist	Maison de la Simulation	France
Postdoc / Engineer: High Performance Computing Specialist (different post)	Maison de la Simulation	France
Postdoc / Engineer: Numerical Simulation	Maison de la Simulation	France

Table 1 Jobs advertised on the Job Portal