



H2020-FETHPC-01-2016



DEEP-EST

DEEP - Extreme Scale Technologies

Grant Agreement Number: 754304

D7.2

Repository for training material

Final

Version: 1.0
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Date: 29.06.2018

Project and Deliverable Information Sheet

DEEP-EST Project	Project Ref. №: 754304	
	Project Title: DEEP - Extreme Scale Technologies	
	Project Web Site: http://www.deep-projects.eu	
	Deliverable ID: D7.22	
	Deliverable Nature: Other	
	Deliverable Level: PU *	Contractual Date of Delivery: 30 / 06 / 2018
		Actual Date of Delivery: 29 / 06 / 2018
EC Project Officer: Juan Pelegrín		

* - The dissemination levels are indicated as follows: PU = Public, fully open, e.g. web; CO = Confidential, restricted under conditions set out in Model Grant Agreement; CI = Classified, information as referred to in Commission Decision 2001/844/EC.

Document Control Sheet

Document	Title: Repository for training material	
	ID: D7.2	
	Version: 1.0	Status: Final
	Available at: http://www.deep-projects.eu	
	Software Tool: Microsoft Word	
	File(s): D7.2_Repository_training_material_v1.0	
Authorship	Written by:	E. Gellner (BADW-LRZ), S. Höfler-Thierfeldt (JUELICH)
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	Approved by:	BoP/PMT

Document Status Sheet

Version	Date	Status	Comments
1.0	29/06/2018	Final version	EC submission

Document Keywords

Keywords:	DEEP-EST, HPC, Exascale, Training, Workshop, Repository
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Executive Summary

The deliverable D7.2. Repository for training material describes in detail:

- what the DEEP projects are doing in the field of training and education and how training and education material is made publicly available,
- the open access strategy for scientific publications.

Global knowledge should be accessible and re-usable in digital form without financial, technical or legal barriers. That is why the DEEP-EST project strives for a systematic education and training programme and researchers within DEEP-EST aim at publishing their results in peer-reviewed journals and conference proceedings following the Open Access (OA) policy for EU-funded projects. This deliverable contains information on the training and education strategy within DEEP-EST, information about previous workshops and trainings, as well as information on the open access strategy.

1 Introduction

Communication and dissemination of the results achieved in DEEP-EST is one of the project's main objectives. Extensive measures are already being taken to maximise the project's impact in the European and global HPC community and beyond. Training and education are also part of the communication and dissemination strategy. Since knowledge should be accessible to others, in DEEP-EST we try to share our knowledge in different ways. This can be seen in information shared via the project webpage, but above all in training and education events that are organised for external target groups within DEEP-EST and material on internal trainings that are also available to an external audience.

It is important to understand that all partners within the project share their knowledge in the form of workshops, trainings, publications, etc. This means: although only three consortium partners share the main responsibility in this work package, the planned "training and education" activities are carried out by all partners in a concerted action. The three main responsible partners are BADW-LRZ for Tk7.1 Communication, UEDIN for Tk7.3 The early access programme and JUELICH for Tk7.4 The training and education programme and contributions to the execution of the open access strategy as part of Tk7.2

This document will give a detailed overview on the strategy of dissemination training and education results in Section 2, with focus on training and education and a detailed overview of workshops and trainings that have already taken place in Section 3. Section 4 deals with the open access strategy and Juelich Shared Electronic Resources (JuSER) as repository within DEEP-EST. Last but not least, Section 5 will give an outlook on next steps.

2 Dissemination of results

Disseminating the project results is a key element of the DEEP-EST communication strategy. The dissemination activities base on four pillars:

- **Conferences and other events:** Members actively and regularly take part in relevant (scientific) conferences, trade fairs, workshops and trainings to present their results as well as to share lessons learned and discuss best practices (more details in Section 3).

- **Publications:** The DEEP-EST researchers aim at publishing their approaches and results in peer-reviewed journals and conference proceedings following the Open Access (OA) policy for EU-funded projects (see Section 4 for details). The contents of the publications can also be 'education on concepts in general' / hands-on results gained from working with the DEEP-EST prototype and software environment.
- **Technical documentation:** Towards the end of the project, the technical documentation will be made available and an overview of DEEP-EST software will be made public via the website. Thus the documentation brings useful insights for all who want to test the DEEP-EST prototype.
- **Website and media channels:** The project website is the central hub for collecting and sharing dissemination material: Once accepted, all non-confidential deliverables will be published via the website, which will be a tremendous source of insights for researchers interested in DEEP-EST concepts and prototypes. Publications (scientific and non-scientific) as well as presentations and talks will also be included. The project's social media channels (Twitter, Facebook, LinkedIn) link to the website content to increase the visibility of the content.

Dissemination activities will continue after the end of the project, as results achieved during the last phase of the project will likely be published after its finalisation. The DEEP-EST prototype will remain being accessible to the application developers and its continuous use will be encouraged. Additionally, the consortium will strive to make the prototype available to external users, e.g. through contacts with PRACE or other projects. Such efforts will already start during the project with an early access programme directed at interested academic and industrial users. Educating and training potentially interested users outside of the consortium is therefore a critical task.

The visibility of EU funding is ensured: All scientific publications as well as all other dissemination, training and education material (e.g. posters, slides, use cases etc.) will include an acknowledgment sentence referring to the funding source and the specific project number and additionally carry the European flag if possible.

3 Education and training strategy

Education and training are key for the DEEP-EST outreach and exploitation strategy. Therefore, in close cooperation with WP1 and WP2 a systematic education and training programme is to be achieved.

The goal of the programme is twofold:

- **Internal:** Between the partners, targeted training sessions and workshops will ensure the exchange of knowledge and background relevant to the R&D activities of the consortium. Most training efforts will be directed at application developers. Despite the target group being internal, this will have relevance to external target groups as well as we intend to make most of the material available via the project website.
- **External:** Outside of the project, the consortium will educate and train stakeholders specific to their interests in DEEP-EST developments and their needs. It is crucial to train interested users as part of the early access programme. But efforts are not limited

to this target group. Educating the various target groups will help to raise interest and lay the basis for fruitful trainings and workshops. Taking part in workshops at events and conferences is especially important in this respect as it allows us to reach out to a much wider, potentially interested audience of application developers than we could potentially reach on our own.

In a first step, all course material is made available to project partners through the BSCW document-sharing platform. In a second step, where possible and where there are no copyright restrictions, we aim at sharing all training material externally as well (see Section 3.1 and 3.2 for details).

Due to their 'educating' function, it is important to make our target groups, in this case especially the scientific ones, aware of the publications and presentations given at conferences and workshops. Therefore, we collect and put online links to all peer-reviewed publications on the project website and where possible share for downloading the presentations (<http://www.deep-projects.eu/project/publications.html>). We also spread the word on the publications via our social media channels and will highlight it in the e-newsletter.

3.1 Sharing training material on the project website

After training materials have been shared internally on the BSCW platform, they are made available to external parties on the project website. To make them quick and easy to find, the "Training" category has been created (<http://www.deep-projects.eu/training.html>). The following can be found there:

- a calendar with past and upcoming trainings and the respective topic/focus,

DEEP Projects Project Co-Design Hardware Software Applications **Training**

Home > Training

Training

Global knowledge should be accessible and re-usable in digital form without financial, technical or legal barriers. The DEEP Projects strive for a systematic education and training programme and researchers within DEEP aim at publishing their results in peer-reviewed journals and conference proceedings following the Open Access (OA) policy for EU-funded projects. Find all past and future trainings in the following calendar

06 Jun 2018 **Introduction to Deep Learning Models**
City: Jülich, Deutschland
This course focuses on a recent machine learning method known as deep learning that emerged as a promising disruptive approach, allowing knowledge discovery [...]

23 Apr 2018 **Paraver tracing tools suite with hands-on exercises**
City: Garching bei München, Deutschland
This workshop organised by VI-HPS, LRZ & IT4Innovations as a PRACE training event will: give an overview of the VI-HPS programming tools suite explain the [...]

06 Mar 2018 **Parallel and Scalable Machine Learning**
City: Jülich, Deutschland
The course offers basics of analyzing data with machine learning and data mining algorithms in order to understand foundations of learning from large [...]

TRAINING
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Sources
USER M
Create A
Edit User
Logout
OUR TV
DEEP
CE
@
#ISC18 kid

Figure 1: Screenshot of calendar with past and upcoming trainings in the category training on the DEEP projects website

- an overview on all software developed in the project, where to get more information, where to download the latest releases and where to access the documentation,



























Programming Environment		
OmpSs		
ParaStation MPI		 
I/O Software		
BeeGFS		 
SIONlib		 
E10		N/A N/A
Resiliency		
OmpSs		
SCR	info to come	
libNAM		
Benchmarking & Tools		
JUBE		 
Extrae		 
Paraver		 
Dimemas		 

Figure 2: Overview on Software developed in the project with links to more information in the category training on the DEEP projects website

- an overview on all keynotes, talks, posters with educational character as well as training slides. This section not only includes the mentioned overview and the focus of the respective keynote, talk, poster and training, but also the respective material (if available) is attached as a PDF file or linked.

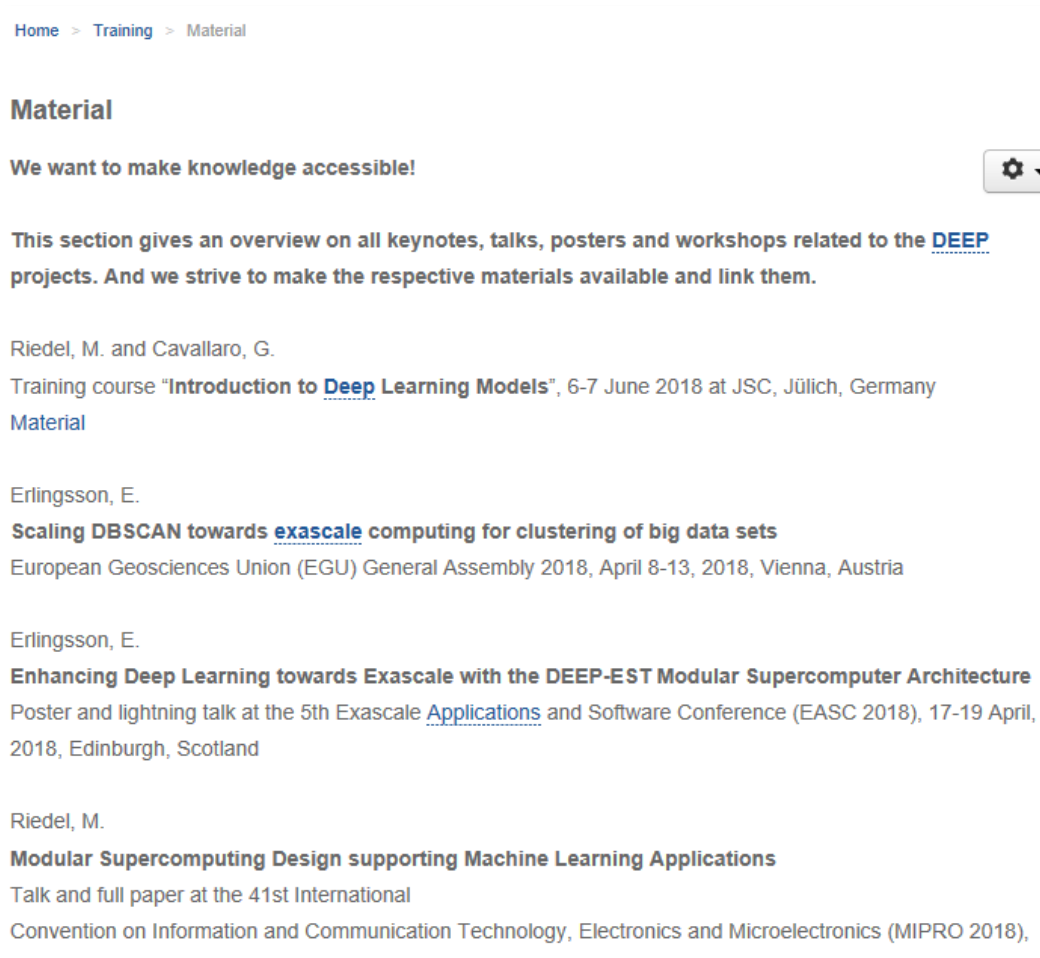


Figure 3: Screenshot of the training material section on the DEEP projects website

3.2 Sharing training material via JuSER

JuSER (Jülich Shared Electronic Resources) is the institutional repository of Forschungszentrum Jülich (<http://user.fz-juelich.de/>). This repository can be filled with all kinds of publications, from peer-reviewed journal articles, books, proceedings articles to posters, talks, and course materials. It is not only restricted to entries by Jülich authors, but can also be used to gather publications written by authors from other affiliations without any Jülich participation. Furthermore, JuSER is a feed to the EU repository Open Access Infrastructure for Research in Europe (OpenAIRE). Thus, it is predestined to work as a repository especially for EU projects. Entries with attached files also receive a persistent ID guaranteeing a long-lasting retrieval. Another advantage is that JuSER entries can be found via leading scientific search engines such as BASE or CORE and partly by Google Scholar. However, entries to the JuSER database can only be done by JUELICH personnel.

To share the training material of DEEP-EST via JuSER the course instructors will at first upload their material to the project-internal document-sharing platform BSCW, and then inform WP 7 contacts about the course details such as dates and places. A project member from JUELICH will then enter the data and files into the JuSER repository, making sure that the appropriate metadata specifying the DEEP-EST project are assigned and that the files are marked as open access. A typical JuSER entry for a lecture can be found at <http://hdl.handle.net/2128/18801>, specifying the training course “Parallel and Scalable Machine Learning” by Riedel et al. in March 2018. The green dot at the top of this marks the attached files of this entry as open access (see figure 4), the attached files are found at the bottom of the entry (see figure 5).

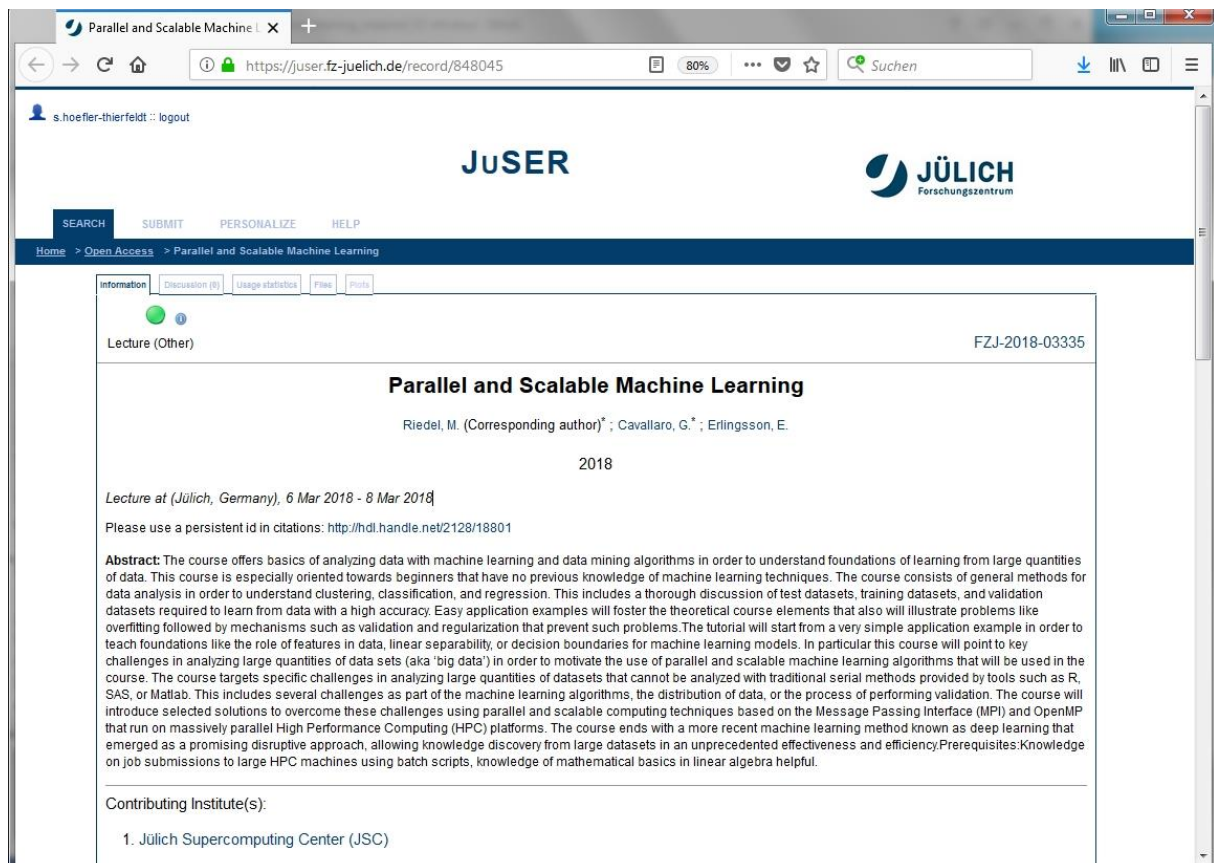


Figure 4: JuSER entry <http://hdl.handle.net/2128/18801> for the training course “Parallel and Scalable Machine Learning” from March 2018, upper part with title, authors, date, site, handle, and abstract.

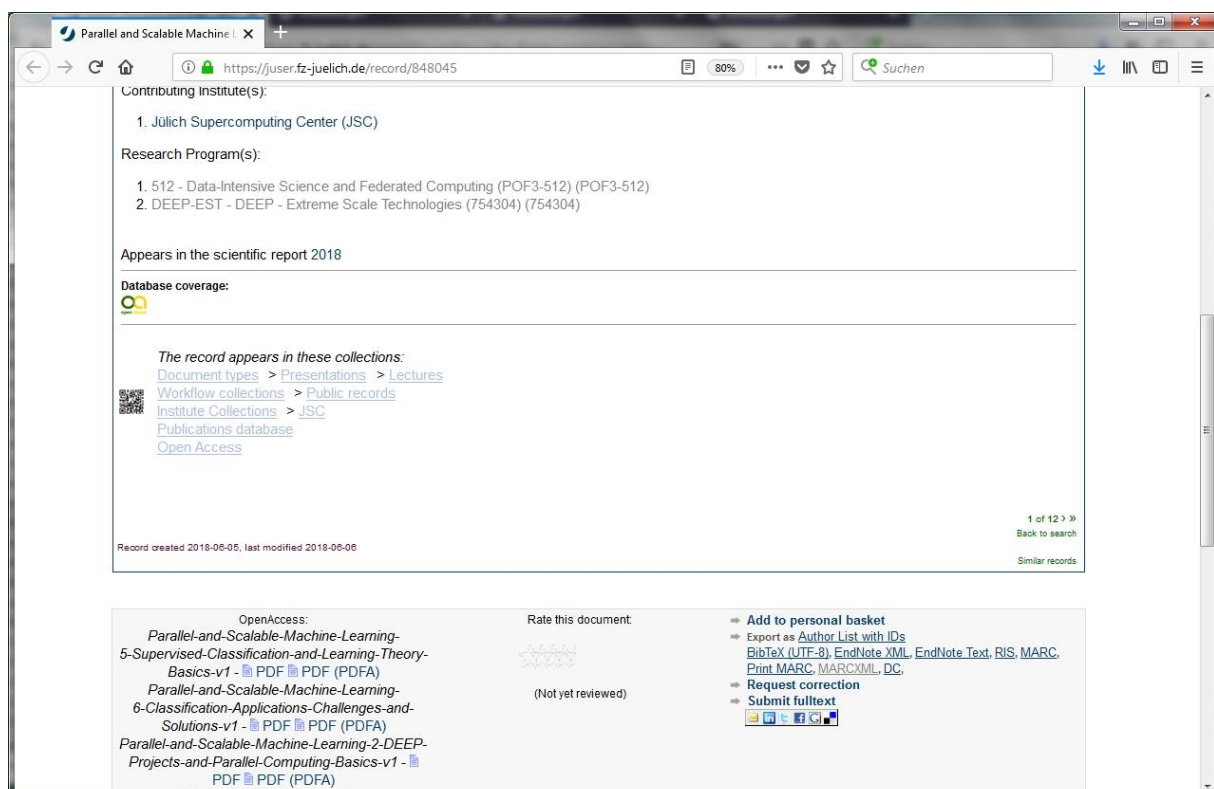


Figure 5: JuSER entry <http://hdl.handle.net/2128/18801> for the training course “Parallel and Scalable Machine Learning” from March 2018, lower part showing the assignment to the DEEP-EST project and the attached files which are open access.

3.3 Overview of previous trainings and workshops

The researchers in DEEP-EST are very keen to pass on their knowledge and to exchange ideas with each other in the form of internal trainings and external talks, workshops etc. The following table gives an overview of the number of activities in the area of training and education. A more detailed list of the activities with the topic, location and name of the project partner can also be found further down in this document.

Table 1: Numbers regarding intended training and educational activities

Training & educational activities	Metric to measure impact	KPI	Status
	Number of internal trainings	3-5 trainings 1/year, more if needed	4 trainings
	Number of external trainings & workshops	10 trainings & workshops	8 Workshops
	Number of external people reached	20/event	More than 20/event

More detailed overview on previous internal trainings and workshops for an external audience:

Table 2: Overview on training and educational activities

Internal training courses:	M. Riedel, G. Cavallaro and E. Erlingsson: Training course "Parallel and Scalable Machine Learning", 6-8 March 2018 at JSC, Jülich, Germany
	J. Giménez and L. Mercadal: Training course "Paraver tracing tools suite with hands-on exercises" at VI-HPS Tuning Workshop @LRZ, 23-27 April 2018 at LRZ, Garching, Germany
	M. Riedel, G. Cavallaro: Training course "Introduction to Deep Learning Models", 6-7 June 2018 at JSC, Jülich, Germany
	H. Neukirchen, M. Riedel: Training Course "Nordic High Performance Computing & Applications Workshop", 13-15 June 2018 at University of Iceland, Reykjavík
Talks at Workshops:	Talk V. Khristenko (CERN): "HEP Data Processing with Apache Spark" at CERN Hadoop User Forum
	Talk N. Eicker (JUELICH) Workshop "Exascale I/O for Unstructured Grids (EIUG)" 26. September 2017 at DKRZ Hamburg

	Talk N. Eicker (JUELICH) EoCoE Workshop “Scientific Applications towards Exascale” 05. October 2017 at Montpellier, France
	Talk M. Nuessle (Extoll), at HP-CAST SC17
	J. Romein (ASTRON) participated at Intel Developers Workshop
	E. Suarez (JUELICH), “The DEEP/-ER architecture: a modular approach to extreme-scale computing”, Presentation at E-CAM Workshop, 6-7 July 2017, Barcelona
	E. Suarez (JUELICH), “Modular Supercomputing: An overview of computing architecture evolution at JSC”, Presentation at the 9th Bethe Center Workshop, 2-6 October 2017 Bonn
	M. Riedel (UoI), about parallel & scalable machine & deep learning as part of the Joint Laboratory for Extreme-Scale Computing (JLECS) at BSC

4 Open Access

Open Access describes the goal of making global knowledge accessible and re-usable in digital form without financial, technical or legal barriers. In particular, this refers to the practice of providing online access to scientific information, be it peer-review scientific research articles or research data.

As stressed already in the DoA, the consortium fully supports the open access (OA) strategy put forward by the EC for H2020 research projects and will strive for OA in all publications. Budget has already been allocated within the proposed dissemination budget, to pursue a gold open access strategy and make scientific, peer-reviewed articles resulting from the project accessible upon publication. In cases where the journal only allows for the ‘green’ access model, the researchers themselves will be responsible for self-archiving their articles, as most institutions in the consortium already dispose of their own repositories.

All scientific publications need to be entered into a repository that contains the publication in a machine-readable electronic copy. The recommended entry point is the Open Access Infrastructure for Research in Europe (OpenAIRE) repository. However, other repositories at universities and research institutions provide their data to OpenAIRE and feed the OpenAIRE repository on a regular basis. That means that in many cases authors do not need to login to OpenAIRE itself, but can use the repositories at their institutions, provided the correct metadata specifying the corresponding EU project is given. To keep all publications of DEEP-EST together in one place, it is recommended to project partners to use JuSER, the institutional repository of Forschungszentrum Jülich, for DEEP-EST related scientific, peer-reviewed publications (see information on JuSER as repository for publications in Section 4.1.) The official project website announces all DEEP-EST publications linking to the corresponding repositories.

The Open Access guidelines are collected in a fact sheet and are accessible to all partners, including information on which journals are open access or hybrid and how to handle negotiations with publishers (see Annex A). The DEEP-EST partners inform WP7 when they have submitted project-related papers for publication and of the acceptance or rejection of these. Furthermore, there is a table in which all partners enter their updates on publications and status. This table is accessible to each project partner and changes can be viewed in real time. This allows WP7 to keep the list of publications on the project website up to date.

Table 3: KPI and status publications in peer-reviewed journals/scientific conferences

Publications in peer-reviewed journals / scientific conferences	Metric to measure impact	KPI	Status
	No of submissions	15 Conferences: Year 2-3 Journals: Year 2-3 (and after the end of the project)	8 publications

4.1 Using JuSER as repository for publications within DEEP-EST

As mentioned in the section before, the institutional repository of Forschungszentrum Jülich - called JuSER – is recommended to collect all DEEP-EST publications in one place. JuSER feeds the European OpenAIRE repository and is able to gather publications not only by authors from Jülich, but also by authors from other affiliations without any Jülich participation. Thus, it is predestined to work as a repository especially for EU projects.

To have publications entered to JuSER project partners just need to get in touch with WP7. The authors will provide the information about the publication, - usually the normal publication reference (authors, title, journal or proceedings title, volume, pages, DOI if available) would be sufficient, - and the PDF file of the final peer-reviewed manuscript. A project member from JUELICH will then enter the data and files into the JuSER repository, making sure that the appropriate metadata specifying the DEEP-EST project are assigned. After that, a staff member of the Central Library of Forschungszentrum Jülich will officially check whether the PDF file can be made accessible in open access mode at once or after some months according to the embargo regulations of the publisher. A typical JuSER entry for a publication with open access to the full text can be found at <https://juser.fz-juelich.de/record/841397> showing a contribution to a conference proceedings by a DEEP-EST project partner (Book, M.; Riedel, M.; Neukirchen, H.; Götz, M.: Facilitating collaboration in high-performance computing projects with an interaction room, Proceedings of the 4th ACM SIGPLAN International Workshop on Software Engineering for Parallel Systems, 46-47 (2017)).

5 Outlook

We have already created a good basis for training and education in DEEP-EST: Four trainings have already taken place and an active participation in eight workshops. All project partners are eager to share their knowledge and provide their training materials. For the future the goal is to extend the training and workshop activities. Accordingly, in project year two and three, it

is considered to have additional workshops and training sessions for example at the ISC trade fair, at the European HPC Summit Week or if possible at symposia like e.g. EASC (Exascale Application and Software Conference).

The DEEP-EST researchers will continue to aim at publishing their approaches and results in peer-reviewed journals and conference proceedings following the Open Access (OA) policy for EU-funded projects.

All scientific publications as well as all other dissemination, training and education material will be available on the project website - in the training category - and via the repository JuSER. The website will also keep interested parties informed about all upcoming trainings and workshops. Last but not least, further training and education efforts will be needed for T7.3 the early access program and will be organized in close collaboration between all task leaders in WP7 as well as WP1 and WP2.

Annex A

A.1 Guideline document on Open Access

General background information and guidelines for DEEP-EST

What does Open Access mean?

Open Access describes the goal of making global knowledge **accessible** and **re-usable** in digital form without financial, technical or legal barriers. In particular, this refers to the practice of providing online access to **scientific information**, be it peer-review scientific research articles or research data (data underlying publications, curated data and/or raw data). [1]

Types of Open Access

Open Access Journals	Gold Open Access	The Publisher's version is directly open access on the Publisher's website under a free licence . No additional fee for open access publication for the author. There might be publication fees (Article Processing Charges) for the author.
Subscription Journals	Closed Access	The Publisher's version is directly accessible for subscribers on the Publisher's website . Reader / Library pays for reading. No additional fee for closed access publication for the author. There might be publication fees for the author. There might be fees for re-use , e.g. of figures.
	Hybrid Open Access	The Publisher's version is directly open access on the Publisher's website . Additional fee for hybrid open access publication for the author. There might be publication fees for the author. There might be fees for re-use , e.g. of figures.
	Green Open Access Self-Archiving	Post-Print or Publisher's version is directly or after an embargo period open access on a repository . No additional fee for green open access publication for the author. There might be publication fees for the author. There might be fees for re-use , e.g. of figures.

Fig. 1: Open Access Possibilities [2]

Open Access in Horizon 2020 Projects

Horizon 2020 projects are obliged to publish any peer-reviewed publication with open access. The main possibilities are gold, hybrid or green open access.

- **Gold open access:** An article is immediately published in open access mode. Article process charges are usually borne by the author's research institution.
- **Green open access (Self-archiving):** The author, or a representative, archives the published article or the final peer-reviewed manuscript (i.e. the last version of the document that was sent to the publisher) in an online repository before, at the same time as, or after publication. Some publishers request that open access may be granted only after an embargo period has elapsed.

- **Hybrid open access:** Researchers can also publish in hybrid journals that both sell subscriptions and offer the option of making individual articles openly accessible.

Further details may be found at [1].

All scientific publications need to be entered into a repository that contains the publication in a machine-readable electronic copy. The recommended entry point is the Open Access Infrastructure for Research in Europe (OpenAIRE) repository [3]. However, other repositories at universities and research institutions provide their data to OpenAIRE and feed the OpenAIRE repository on a regular basis. That means that in many cases authors do not need to login to OpenAIRE itself, but can use the repositories at their institutions, provided the correct metadata specifying the corresponding EU project is given. To find out which institutional repositories feed the OpenAIRE repository visit <https://www.openaire.eu/search/data-providers>

Using JuSER as repository within DEEPprojects

The institutional repository of Forschungszentrum Jülich - called JuSER - feeds the European OpenAIRE repository. JuSER is able to gather publications not only by authors from Jülich, but also by authors from other affiliations without any Jülich participation. Thus, it is predestined to work as a repository especially for EU projects. To keep all publications of DEEPprojects together in one place, we strongly recommend project partners to use JuSER for DEEP-EST related scientific, peer-reviewed publications. Please get in touch with WP7 (Sabine Hoefler-Thierfeldt at s.hoefler-thierfeldt@fz-juelich.de), to have your publications entered to JuSER. Information needed is the normal publication reference (authors, title, journal or proceedings title, volume, pages) and the pdf file of final peer-reviewed manuscript.

Costs for the Author

For all publishing models there may be costs involved for the author. Within the DEEP-EST project, we have set aside money within the dissemination budget to cover for these costs.

Workflow

- When submitting your paper, please inquire the possibility of making the publication open access.
- Inform WP7 either via email or e.g. in a ToW call (Sabine Hoefler-Thierfeldt at s.hoefler-thierfeldt@fz-juelich.de and Eva Gellner at eva.gellner@lrz.de).
- Keep WP7 updated about acceptance of paper.
- If open access is possible and costs are involved, get in touch with Eva Gellner to clarify financing process. Get in touch with Sabine Höfler-Thierfeldt to make the publication available via JuSER.

References

- [1] Guideline to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020, Version 3.2, 21 March 2017, http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
- [2] Frick, Claudia: Open Access Week on Tour, Presentation at Jülich Supercomputing Centre on 21 November 2017
- [3] OpenAIRE: <https://www.openaire.eu/>

List of Acronyms and Abbreviations

A

ASTRON: Netherlands Institute for Radio Astronomy, Netherlands

B

BADW-LRZ: Leibniz-Rechenzentrum der Bayerischen Akademie der Wissenschaften. Computing Centre, Garching, Germany

BoP: Board of Partners for the DEEP-EST project

BSC: Barcelona Supercomputing Centre, Spain

BSCW: Repository used in the DEEP-EST project to share all project documentation.

C

CA: Consortium Agreement

CERN: European Organisation for Nuclear Research / Organisation Européenne pour la Recherche Nucléaire, International organisation

D

DEEP: Dynamical Exascale Entry Platform (project FP7-ICT-287530)

DEEP-EST: DEEP - Extreme Scale Technologies

DoA: Description of Action

E

EC: European Commission

EEP: European Exascale Projects

EU: European Union

Exascale: Computer systems or Applications, which are able to run with a performance above 10^{18} Floating point operations per second

EXTOLL: High speed interconnect technology for HPC developed by UHEI

F

FP7: European Commission 7th Framework Programme

G

H

H2020: Horizon 2020

HPC: High Performance Computing

I

IC:	Innovative Council
Intel:	Intel Germany GmbH, Feldkirchen, Germany
I/O:	Input/Output. May describe the respective logical function of a computer system or a certain physical instantiation

J

JUELICH:	Forschungszentrum Jülich GmbH, Jülich, Germany
JuSER:	Juelich Shared Electronic Resources

K

KPI:	Key Performance Indicator
-------------	---------------------------

L**M****N**

NCSA:	National Centre for Supercomputing Applications, Bulgaria
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O

OA:	Open Access
OpenAIRE:	Open Access Infrastructure for Research in Europe

P

Paraver:	Performance analysis tool developed by BSC
PMT:	Project Management Team of the DEEP-EST project
PRACE:	Partnership for Advanced Computing in Europe (EU project, European HPC infrastructure)

Q**R**

R&D:	Research and Development
-----------------	--------------------------

S**T**

Tk: Task, Followed by a number, term to designate a Task inside a Work Package of the DEEP-EST project

U

UEDIN: University of Edinburgh, UK

UHEI: Ruprecht-Karls-Universitaet Heidelberg, Germany

Uol: Háskóli Íslands – University of Iceland, Iceland

V

W

WP: Work package

X

Y

Z