

Large-scale EXecution for Industry & Society

Deliverable D9.3

Impact KPI and metrics achievement report and plan intermediate version



Co-funded by the Horizon 2020 Framework Programme of the European Union Grant Agreement Number 825532 ICT-11-2018-2019 (IA - Innovation Action)

DELIVERABLE ID TITLE	D9.3 Impact KPI and metrics achievement report and plan - intermediate version
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WORKPACKAGE ID TITLE	WP9 Impacts on Targeted Sectors
WORKPACKAGE LEADER	TESEO
DATE OF DELIVERY (CONTRACTUAL)	31/03/2020 (M15)
DATE OF DELIVERY (SUBMITTED)	27/04/2020 (M16)
VERSION STATUS	V1.1 Final
TYPE OF DELIVERABLE	R (Report)
DISSEMINATION LEVEL	PU (Public)
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DOCUMENT VERSION

VERSION	MODIFICATION(S)	DATE	AUTHOR(S)
0.1	Table of Contents (ToC)	21/01/2020	Florin Apopei (TESEO); Olivier Terzo (LINKS)
0.2	Initial contributions	03/02/2020	Alberto Scionti and Olivier Terzo (Links)
0.3	Communication section contribution	10/02/2020	Florin Apopei (TESEO)
0.4	Exploitation section initial contribution	14/02/2020	Florin Apopei (TESEO); Stephen Blair Chappell (BLABS)
0.5	Aeronautic Pilot related activities contribution	05/03/2020	Donato Magarielli and Ennio Spano (AVIO AERO)
0.6	Weather and climate Pilot related activities contribution	06/03/2020	Antonio Parodi (CIMA)
0.7	Earthquake and Tsunami Pilot related activities contribution	06/03/2020	Thierry Goubier (CEA)
0.8	Final adjustments	19/03/2020	Florin Apopei (TESEO)
0.9	Internal review	25/03/2020	Megi Sharikadze (LRZ) and Walter Etienne (ATOS)
0.92	Update of the deliverable according to reviewers' comments	01/04/2020	Florin Apopei (TESEO)
0.92	Proof reading	03/04/2020	David Blair Chappell (BLABS)
0.93	Final review by coordinator	16/04/2020	Katerina Slaninova and Jan Martinovic (IT4I)
0.94	Update according the comments from the final review	20/04/2020	Florin Apopei (TESEO)
1.0	Final check	22/04/2020	Katerina Slaninova (IT4I) and Jan Martinovic (IT4I)
1.1	Final update of Section 3.1	27/04/2020	Jan Martinovič (IT4I)



GLOSSARY

ACRONYM	DESCRIPTION
тос	Table of Contents
KPIS	Key performance indicators
ROS	Research Organisations
DDI	Distributed Data Infrastructure

TABLE OF PARTNERS

ACRONYM	PARTNER
Avio Aero	GE AVIO SRL
AWI	ALFRED WEGENER INSTITUT HELMHOLTZ ZENTRUM FUR POLAR UND MEERESFORSCHUNG
BLABS	BAYNCORE LABS LIMITED
Bull/Atos	BULL SAS
CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
СІМА	Centro Internazionale in Monitoraggio Ambientale - Fondazione CIMA
СҮС	CYCLOPS LABS GMBH
ECMWF	EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS
GFZ	HELMHOLTZ ZENTRUM POTSDAM DEUTSCHESGEOFORSCHUNGSZENTRUM GFZ
1T41	VYSOKA SKOLA BANSKA - TECHNICKA UNIVERZITA OSTRAVA / IT4Innovations National Supercomputing Centre
ITHACA	ASSOCIAZIONE ITHACA
LINKS	FONDAZIONE LINKS / ISTITUTO SUPERIORE MARIO BOELLA ISMB
LRZ	BAYERISCHE AKADEMIE DER WISSENSCHAFTEN / Leibniz Rechenzentrum der BAdW
NUM	NUMTECH
024	OUTPOST 24 FRANCE
TESEO	TESEO SPA TECNOLOGIE E SISTEMI ELETTRONICI ED OTTICI



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EXECUTIVE SUMMARY

The aim of this deliverable is to report on the current status of the LEXIS impact strategy after 15 months. This was achieved by analysing in detail the core components of the impact strategy (dissemination, communication, and exploitation). Subsequently, a roadmap for the next 15 months will be laid out.

Each of the following sections will describe the initiatives of the consortium and will summarize the status of the 7 KPIs for the period of the first 15 months of operation.

Description of the deliverable

Dissemination, communication, and exploitation activities cannot be one-off actions, but instead need to be continuously monitored to ensure the right strategic actions are executed.

This document will outline the situation of the project mid-way through the project's Impact strategy, highlighting the progress made and targets met in the first half of the project. Also described are two workshops taking place at the HiPEAC 2020 conference, the brand new version of the website, and the two joint booths shared with the European exascale projects and IT4I/LEXIS during the conference Supercomputing 2019.

The starting point for the analysis will be to go through the 7 KPIs, giving a complete overview of the actual status, and proposing a plan of action that targets the areas in need of improvement.

To assist consortium members in maximising the impact of the LEXIS project, a roadmap will be updated up for Dissemination, Communication, Exploitation, and Pilot-related activities.

Other opportunities in the next stages of the project include the publication of a 12-chapter book, increasing a cooperation with other H2020 projects, and engaging possible stakeholders during the Open Calls.



1 INTRODUCTION

In Deliverable D9.1 [1], the requirements for the components of the impact strategy, as well as actions to be taken for making the impact strategy effective, were outlined.

This Deliverable D9.3 reports the intermediate results achieved for each component of the impact strategy, outlines the recovery actions where needed, and provides a plan for the project going forward.

In this report, the following parts of the LEXIS impact strategy will be detailed:

- 1. Key Performance indicators (KPIs),
- 2. Dissemination,
- 3. Communication,
- 4. Exploitation,
- 5. Pilots related activities.

However, prior to the analysis of the impact strategy, this deliverable will take a look at the KPIs that the LEXIS project sets up to measure its own effectiveness. This will help the whole consortium to better understand how effective the LEXIS impact strategy was in the first half of the project. This will be achieved by analysing, one-by-one, the seven KPIs of the LEXIS project.

Table 1 below shows the KPIs which were selected to optimally measure the dissemination and communication activities of the LEXIS project.

КРІ	DESCRIPTION	EXPECTED VALUE
KPI_1	Project web site for public project outcomes dissemination and private use	Bounce rate < 30% for users that stay 30 seconds and more on the web page
KPI_2	Social media project promotion: creation and use of social media channels to disseminate project activities and results	User actions (new followers, comments) >= 250 for each social media account
KPI_3	Hosting blog within the web site to foster and stimulate interest in the project pilot and activities	>= 1 post/month
KPI_4	Scientific dissemination on peer-reviewed conferences and journals	>= 15 publications
KPI_5	Workshops organized by the project partners to show, to a broader audience, project activities, developed technical solutions and results	>= 3 over the project lifetime
KPI_6	Creation of a newsletter to facilitate the rapid communication of project activities and progresses	>= 100 subscriptions or induced clicks
КРІ_7	Exhibitions, fairs, workshops, conferences, and seminars participation	>= 3 each partner

Table 1 KPIs defined for evaluating the dissemination and communication activities.



KPI_1 - Project web site for public project outcomes dissemination and private use

The most appropriate way of measuring this KPI is to measure the data coming out from the principal communication channel of the LEXIS project: the website. To analyse all the data coming out from the website, the consortium uses Google Analytics as its principal tool and focuses in particular on Bounce rate. The frequency of measurement of this KPI is on a monthly basis and it permits us to analyse how much time the users of the LEXIS project remain on the website per single session of activity.

A representation of the Bounce rate since the launching of the LEXIS project website is given in Figure 1:



Figure 1 LEXIS bounce rate indicator at M15 of the project

Google Analytics has shown that 1,306 users have visited the website in 2,449 sessions with a bounce rate of 57.33%.

The bounce rate is far from the target value of 30%, but the Consortium expects this indicator to reach its target in the coming months due to upcoming major activities and events.

KPI_2 - Social media project promotion: creation and use of social media channels to disseminate project activities and results

The social media channels are the second most used tool to spread news about the LEXIS project. The target of this KPI is to get a minimum number of 250 user actions (new followers/comments) on each social media channel.

After 15 months of the project, the data statistics for each social media channel (at the contractual date of submission of this document, March 31, 2020) is reported:

- LinkedIn: 125 followers; 8,058 views
- Twitter: 83 followers; 93,074 views
- Facebook: 165 followers; 11,560 views

For all the social media channels except the YouTube channel, intermediate results are on target and on schedule with the expected outcome. The consortium hopes to improve these numbers thanks to upcoming large events and initiatives to be carried out by each partner and the project initiative itself. These include events attendance, workshops organisation, etc. To boost the numbers of the YouTube channel, a video of technical installation performed in IT4I and LRZ is under finalisation, and further videos will be created when important technical results are achieved. In particular, the results related to the LEXIS infrastructure and Pilots will be addressed.

KPI_3 - Hosting blog within the website to foster and stimulate interest in the project pilot activities

At the moment, this KPI is not reached yet as the project blog is still not implemented. The Consortium intention is to have it in place once the technological developments are ready. This in order that interest be fostered around pilot results, and around the project in general. Detailed updates will be given at the end of the project in Deliverable D9.10 [2].

KPI_4 - Scientific dissemination on peer-reviewed conferences and journals

Scientific dissemination is very important for the project, particularly for the research organisations. The LEXIS consortium has several Research Organisations (ROs) and they, together with the Supercomputing Centres, are striving to increase the quantitative outcomes related to this indicator. After 15 months of project runtime, this KPI has accumulated three contributions to peer-reviewed conferences and journals.

The expectation of the consortium is that efforts related to this KPI are stepped up once results from the platform and pilots come in, hitting the target of 15 peer-reviewed conferences and journals. Finally, by writing a 12-chapter book covering the whole project platform and its pilots, it is hoped that this KPI will continue to improve.

KPI_5 - Workshops organised by the partners to show, to a broader audience, project activities, developed technical solutions and results

A workshop is the right place to concretely demonstrate the progress of a project and its connected results. In this respect, the LEXIS consortium is fully focused on targeting important venues. The HiPEAC community is similarly focussed on this aim, with the organisation of specific workshops designed to present the progress and results of the project. Additionally, this will increase cooperation with other H2020 projects. The target of this KPI is to organise 3 workshops during the project lifetime by the project partners. After 15 months the following workshops have been organised:

- HeLP DC at HiPEAC 2019 conference in Valencia, Spain
- HeLP DC at HiPEAC 2020 conference in Bologna, Italy

The expectation of the whole consortium regarding this KPI is to achieve the number of the 3 workshops and eventually improve it by organising other workshops during the next months.

KPI_6 - Creation of a newsletter to facilitate the rapid communication of project activities and progresses

A newsletter is one communication tool that enables the dissemination of information regarding the project in an immediate and efficient manner. Information included relates to project progress, important achievements, challenges, timeline updates and lessons learnt. To this end, the LEXIS consortium has followed 2 different paths:

- 1. Using the existing newsletters of partners and implementing its own newsletter on the website as indicated in Table 2.
- 2. A LEXIS project newsletter: this was implemented in M15 of the project and shared with the LEXIS subscribers.



NO.	Main leader	Activity description	Date/Period	Type of audience	Size of audience
NL1	IT4I	IT4I <u>Newsletter</u> Q1/2019, page 8 - 9	April, 2019	Scientific Community, Public	NA
NL2	IT4I	IT4I <u>Newsletter</u> Q2/2019, page 24 & 32	August, 2019	Scientific Community, Public	NA
NL3	IT4I	IT4I <u>Newsletter</u> Q2/2019, page 25 & 33	August, 2019	Scientific Community, Public	1,054 e-mails
NL4	IT4I	University <u>Newsletter</u> , article: "LEXIS, the first Horizon 2020 project coordinated by VSB-TUO, has been launched"	04.10.2019	University employees & students	15,000
NL5	IT4I	University <u>Newsletter</u> , article: "IT4Innovations is a member of prestigious international organizations - BDVA and EUDAT CDI"	07.10.2019	University employees & students	15,000
NL6	IT4I	IT4I Internal Newsletter: Kick-off meeting will be held	11.01.2019	IT4I employees	200
NL7	IT4I	IT4I Internal Newsletter: The Lexis project was launched	18.01.2019	IT4I employees	200
NL8	IT4I	IT4I Internal Newsletter: Lexis project reward	15.03.2019	IT4I employees	200
NL9	IT4I	IT4I Internal Newsletter: Installing Lexis hardware	20.09.2019	IT4I employees	200
NL10	IT4I	IT4I Internal Newsletter: Lexis project presentation at CISIM 2019	27.09.2019	IT4I employees	200
NL11	LRZ	LRZ <u>Newsletter</u> : FAIR Research Data - Containers, services, and interfaces for data exchange	14.11.2019	Scientific Community, Public, LRZ/BADW employees	300 emails + web

Table 2 LEXIS project - newsletter statistics

The newsletter is on target and on schedule with the KPI of 100 subscriptions.

The expectation of the consortium is that the value of this KPI will improve, thanks to future initiatives planned, and the availability of results.

KPI_7 - Exhibitions, fairs, workshops, conferences, and seminars participation

Attending events, conferences, seminars or fairs is crucial to communicate to a wider and sectoral audience the project results and progress, as well as the next steps to be taken. In this respect, the whole LEXIS consortium is fully focused on communicating the LEXIS project to a wider and specialized audience, as can be seen in Table 3.



Partner	Number of Exhibitions, fairs, workshops, conferences, and seminars participation
Avio Aero	2
AWI	0
BLABS	3
Bull/Atos	4
CEA	1
СІМА	1
СҮС	2
ECMWF	1
GFZ	0
IT4I	13
ITHACA	0
LINKS	7
LRZ	4
NUM	0
024	0
TESEO	2

Table 3 LEXIS consortium events attendance

The expectation of the consortium is that this KPI will be achieved thanks to the availability of the results after the main co-design phase has ended, and due to the results coming out from the pilots and the platform development.



2 IMPACT THROUGH DISSEMINATION

Previous Deliverable D9.1 [1] pointed the focus on the strategies for communicating and disseminating LEXIS project per Se and related results. Focusing on the analysis of the dissemination results achieved so far (M4 - M15), LEXIS project has been successfully promoted among various communities through scientific publications and conferences, workshops and exhibitions attendance of the project partners. The organization of a workshop dedicated to LEXIS project and co-located with HiPEAC 2020 conference allowed us to get in contact with other projects related to the H2020 ICT-11- EU call, scope (a). In the following subsections, these results are described in depth along with the plan for the next half of the project (M16 - M30).

2.1 DISSEMINATION OF INTERMEDIATE RESULTS

During the first half of the project lifetime, dissemination activities generated interesting results. Such activities belong to three main categories: scientific publications (on high level conferences and journals); attendance of workshops, conferences and exhibitions; organization of dedicated workshops (also co-located with other relevant events).

Table 4 provides a list of the activities and related results achieved so far. Taking a look at this table, the dissemination activities grew over the time, as expected, since the work done in co-designing the LEXIS platform increased, as well as integration of selected technologies proceeded, thus allowing the partners to show a more mature platform.

From this viewpoint, we expect the number of scientific publications (also including posters) will further increment in the next half of the project lifetime. Nevertheless, some good results have been already achieved, with 3 papers and posters presented at conferences and the dedicated workshop organized in M13.

Concerning the former, LEXIS has been presented at The International Conference on Complex, Intelligent, and Software Intensive Systems CISIS 2019 (July 2019, Sydney, Australia) [3] while at The International Conference on Network-Based Information Systems NBiS 2019 (September 2019, Oita, Japan) [4], the Earthquake and Tsunami Large-Scale Pilot has been presented. Similarly, a more data-management focused work has been accepted for the presentation at the International Symposium on Grids and Clouds ISGC 2020 (August 2020, Taipei, Taiwan) [5].

Beside the scientific publications, several events (3 conferences with articles in proceedings, 2 booths, 5 participation to workshops, 15 participation to conferences/exhibitions) have been attended by partners, and used to actively disseminate the project activities and preliminary results, as well as to grow the potential stakeholders interested in using the LEXIS platform.

Concerning the organization of dedicated dissemination events, LEXIS partners (this activity was led by LINKS and IT4I) organized a workshop during the main HiPEAC conference (January 2020, Bologna, Italy) [6]. The event allowed us to get in contact with the other H2020 ICT-11 EU call, scope (a) projects, namely CYBELE, DeepHealth, and Evolve. As a major outcome of the workshop, a significant interest in collaborating and exchanging ideas and technical solutions with these projects emerged.

Event Type	Description
с	HPC, Cloud and Big-Data Convergent Architectures: The LEXIS Approach, CISIS-2019, 3rd-5th July, Sydney, Australia
С	Earthquake and tsunami workflow leveraging the modern HPC/cloud environment in the lexis project, NBIS 2019, 5th-7th September, Oita, Japan
с	HPC-Cloud-Big Data Convergent Architectures and Research Data Management: the LEXIS Approach, ISGC-2020, 23rd-28th August, Taipei, Taiwan (accepted for presentation)



В	IT4I/LEXIS booth, SuperComputing 2019 (SC19), 17th-22nd November 2019, Denver, USA
В	European exascale projects booth, SuperComputing 2019 (SC19), 17th-22nd November 2019, Denver, USA
PW	ICT- H2020 Consortium Building Workshop, 5th June 2019, Brussels, Belgium
PW	ITWSHPC19 - Italian Workshop on Parallel and High Performance Computing Technologies,5th September 2019, Bologna, Italy
PW	HeLP-DC: Workshop on Heterogeneous and Low-Power Data Center technologies (Workshop co-located with HiPEAC 2019), 21st-23rd January, Valencia, Spain
PW	Workshop on Cloud Storage Synchronization and Sharing Services - Supporting Keycloak in iRODS systems with OpenID authentication, 27th-29th January 2020, Copenhagen, Denmark
PW	Invited Talk: LEXIS: Large-scale EXecution for Industry and Society (BDVA 31st Activity Group meeting), 27th February, Brussels, Belgium
Ρ	10th International Conference on High-Performance and Embedded Architectures and Compilers (HiPEAC'2019), 21st-23rd January, Valencia, Spain
Ρ	The International Symposium on Grids and Clouds (ISGC) 2019, 31st March - 5th April, Taipei, Taiwan
Р	EuroHPC Summit Week, 13th-17th May 2019, Poznan, Poland
Ρ	HPCSE 2019 - High Performance Computing in Science and Engineering, 20th-23rd May, Karolinka, Czech Republic
Р	ISC Hiah Performance 2019. 16th-20th June. Frankfurt. Germany
•	
P	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, Australia
P P	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, Australia The 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, Japan
P P P	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, Australia The 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, Japan European Meteorological Society Annual meeting (EMS 2019), 9th-13th September, Copenhagen, Denmark
Р Р Р	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, Australia The 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, Japan European Meteorological Society Annual meeting (EMS 2019), 9th-13th September, Copenhagen, Denmark CISIM 2019 18th International Conference on Computer Information Systems and Industrial Management Applications, 19th-21st September, Belgrade, Serbia
Р Р Р	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, AustraliaThe 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, JapanEuropean Meteorological Society Annual meeting (EMS 2019), 9th-13th September, Copenhagen, DenmarkCISIM 2019 18th International Conference on Computer Information Systems and Industrial Management Applications, 19th-21st September, Belgrade, SerbiaEuropean Big Data Value Forum (2019), 14th-16th October, Helsinki, Finland
P P P P P	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, AustraliaThe 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, JapanEuropean Meteorological Society Annual meeting (EMS 2019), 9th-13th September, Copenhagen, DenmarkCISIM 2019 18th International Conference on Computer Information Systems and Industrial Management Applications, 19th-21st September, Belgrade, SerbiaEuropean Big Data Value Forum (2019), 14th-16th October, Helsinki, FinlandFirst International Symposium on Open Search Technology (2019),23rd-24th October, Garching, Germany
P P P P P P	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5th July, Sydney, AustraliaThe 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, JapanEuropean Meteorological Society Annual meeting (EMS 2019), 9th-13th September, Copenhagen, DenmarkCISIM 2019 18th International Conference on Computer Information Systems and Industrial Management Applications, 19th-21st September, Belgrade, SerbiaEuropean Big Data Value Forum (2019), 14th-16th October, Helsinki, FinlandFirst International Symposium on Open Search Technology (2019),23rd-24th October, Garching, GermanyThe International Conference for High Performance Computing, Networking, Storage, and Analysis, 17th-22nd November, Denver, USA
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P P P P P P P P	The 13th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2019), 3rd-5thJuly, Sydney, AustraliaThe 22nd International Conference on Network-Based Information Systems, 5th-7th September, Oita, JapanEuropean Meteorological Society Annual meeting (EMS 2019), 9th-13th September, Copenhagen, DenmarkCISIM 2019 18th International Conference on Computer Information Systems and Industrial Management Applications, 19th-21st September, Belgrade, SerbiaEuropean Big Data Value Forum (2019), 14th-16th October, Helsinki, FinlandFirst International Symposium on Open Search Technology (2019),23rd-24th October, Garching, GermanyThe International Conference for High Performance Computing, Networking, Storage, and Analysis, 17th-22nd November, Denver, USARDA Plenary 14, 23rd-25th October, Helsinki, FinlandInternational Conference on High-Performance and Embedded Architectures and Compilers (HiPEAC-2020), 20th- 22nd January, Bologna, Italy

 Table 4 List of events where LEXIS was disseminated (C: conferences with article in proceedings, B: booths, PW: participation to workshops, P: participation to conferences/exhibitions).



2.2 FUTURE DISSEMINATION ROADMAP

As the main co-design phase has been completed and the beta version of the LEXIS technologies is ready, the first pilots to testbeds integration and LEXIS pilot use-case workflows will continue with testing the platform. Also, other LEXIS workflows, coming from Open Calls, will allow us to enlarge the basis of applications running on the platform. The next half of project lifetime will offer more inputs for increasing the number of scientific publications and the number of events (conferences, workshops, etc.) to attend and organize. Specifically, we plan to target publications not only in relevant conferences/workshops but also on high-quality journals. Furthermore, the publication of a printed book is planned, where the contribution of the LEXIS project will be relevant.

The main form of dissemination is attendance at relevant and important events, providing an opportunity to interact with scientific and industrial communities. Furthermore, this enables us to disseminate information directly through dedicated project booths. Future events and conferences (SC, ISC, etc.) will see the LEXIS project involved in organising dissemination booths, disseminating pilot-related activity results, and cooperating with other H2020 projects.

One important aspect for the project concerns the impact on the society in general and, in particular, how the use-cases of the LEXIS pilots set the ground for a big impact on society. LEXIS aims at impacting on the industrial fabric, by being able to attract more use-cases related to aeronautics domain, as well as other domains (Healthcare, Manufacturing, Energy, etc.).

In such a context, WP5 has proven to be capable of setting the path in this direction, providing use-cases with high relevance for the aeronautic domain and showing the potentiality of the LEXIS platform for the industrial community. WP6 it is focused on improving the prediction and simulation of tsunamis, thus has a direct impact in saving lives. WP7 use-cases are focused on improving weather and climate forecasting with a vision regarding different societal applications, including smart farming.

As such, the activities aforementioned will target both scientific and industrial communities, but also aim to foster the interest of societal stakeholders to join and use the LEXIS platform. For instance, national civil protection bodies could benefit from the WP6 outcomes. Similarly, all the SMEs and other public bodies will benefit from the WP7 outcomes, as well as national civil protection bodies when wildfire and flood-specific use-cases are looked at. As such, the future dissemination activity will promote the LEXIS platform and its main outcomes towards these societal stakeholders.

Finally, all the aforementioned actions are intended to further foster the interest of the scientific community in the LEXIS platform for managing current and future complex workflows, with a focus on the convergence of HPC, Big Data and Cloud technological solutions. Similar to what has been done in the first half of the project, we also plan to organize dedicated workshops. Main targets for these activities will be the attendance of important events in 2021, such as ISC, SC, and HiPEAC conferences, and other relevant HPC events or some relevant and important venues closely associated with the three pilots.



3 IMPACT THROUGH COMMUNICATION

Communication tools have been selected and presented in Deliverable D9.1 [1]. The aim of this deliverable is to report on the work carried out on communication-based activities after 15 months of the project.

The subsections of this section will relate to the intermediate results reached for each of the selected communication channels and will provide a roadmap for future actions to improve the communication strategy of the LEXIS project.

3.1 COMMUNICATION INTERMEDIATE RESULTS

As communication aspects of the project have a similar importance to the LEXIS consortium as technical parts, when important results are achieved but not communicated outside the consortium, there is a risk that the desired interest around the project will not be generated.

To minimize this risk, several activities designed to communicate LEXIS outside the consortium have been performed. These include the development of:

- A website (maintenance, improvement, and update),
- Social media channels (Facebook, LinkedIn, Twitter),
- Paper-based communications activities and gadgets,
- Reporting activities.

A further breakdown of these activities now follows:

Website

By updating and maintaining the website following the launch of version 1, the WP9 partners have collected the user feedback to improve the quality and usability of the website.

The result of this phase was the production of a brand-new website, revised and improved in all its sections, with new selected icons and new infographics created for the pilots' section of the website. The work team chosen to create version 2 of the website was composed principally of people from TESEO, BLABS, LINKS, and IT4I, but the whole consortium has been involved in providing input.

A screenshot of the resulting website is given in Figure 2, but for a more complete understanding of what has been achieved, one can refer to the following link: <u>https://lexis-project.eu/web/</u>.





Figure 2 LEXIS project website homepage

The responsibility to maintain and update the website has been delegated to BLABS and TESEO, who have been given the role of a supervisor of the LEXIS website. In particular, the WP9 Leader is in charge of continuously updating the website with the latest news once it is available.

Social media channels

as presented in Deliverable D9.1 [1], the LEXIS project has a presence on the main social media accounts (Twitter, LinkedIn, Facebook and YouTube) so that an external audience can be targeted for messaging, and an increased awareness is generated about the project.

The management of these channels was mostly in the charge of the WP9 Leader, but other partners of the consortium actively participated in managing them by spreading regular news about the project - in particular, upcoming events participation, workshop organisation, and when other important targets were met (such as the technical installation at IT4I and LRZ).

The social media approach was not only to promote the project, but also to create a link with other H2020 projects (e.g Mont-Blanc, Evolve, CYBELE and DeepHealth). This was in order that a wider audience would be reached among similar project initiatives, as was done in the joint European Exascale projects during SC 2019 (MontBlanc, ASPIDE, Evolve, ExaQUte, FENIX, LEXIS, MAESTRO), and the cooperation during the 3rd edition of the HeLP-DC workshop at HiPEAC 2020 in last January held in Bologna, Italy.

The current status of each social media account is given as screenshots in Figure 3, Figure 4, and Figure 5:





Figure 4 LinkedIn homepage of LEXIS project





Figure 5 LEXIS Facebook homepage

Paper based communication activities and gadgets

As introduced by mock-ups in Deliverable D9.1 [1], the LEXIS consortium has used the following paper-based communication tools and gadgets:

- Poster,
- Leaflets,
- Brand manual,
- Press releases (all the press releases could be found on the LEXIS website),
- Pens,
- Bluetooth speakers,
- Branded shopping bags,
- Special prizes.

Photographs of each of the listed items are given in Figure 6, Figure 7, and Figure 8:



LEXIS: Large-scale EXecution for Industry & Society



Figure 6 LEXIS project posters



Figure 7 LEXIS project Brand Manual



Speaker





Shopping bag

T-Shirt

Figure 8 LEXIS project gadgets



In addition to this, during SC 2019, a three-day raffle was organised at the LEXIS and European exascale projects booths, and some special prizes were distributed, see Figure 9.



Figure 9 LEXIS project winners of the ruffle during SC 2019

Reporting activities

To properly follow and report on Lexis project progress, two excel spreadsheets were set up to collect all the information about communication and dissemination activities around the project done by each partner of the consortium.

The "communication" spreadsheet contains several sheets where to record all the information regarding:

- Project website,
- Social Media Channels,
- Blog,
- Newsletters,
- Press Releases,
- Press Monitoring,
- Other Activities.

The "dissemination" spreadsheet contains several sheets to record all the information regarding:

- Articles, books
- Proceedings,
- Booths,
- Participation to a workshop,
- Participation to a conference,
- Participation to other events,
- Organisation of an event,
- Other activities.

The two described spreadsheets have the important role of (1) being a double check on the dissemination and communication activities done by the consortium and (2) being an important visual indicator of the progress of each KPIs. This is because each sheet also contains information about the related KPI and can be checked by the



whole consortium. For this reason, all the partners of the consortium are required correctly record in the appropriate spreadsheet each kind of action done for the LEXIS project.

The result of this compilation will be a more easy and visual way to monitor the performance of each KPI, not only for WP9 leader, but for the whole consortium. This will increase the commitment of each partner to reach the common goal of fulfilling positively all the 7 KPIs.

In compliance with the communication plan, all the information recorded in the two excel spreadsheets are reported in the respective section of the website, according to the measurement frequency of its related KPI.

3.2 FUTURE COMMUNICATION ROADMAP

In this section, the focus is to describe what communication tools have been used since the beginning of the project and discuss the plans for achieving better results.

In particular, the intention of the consortium is to continue using the following communication tools to communicate the project activities:

- Website: as a principal communication tool by updating it with all relevant aspects of the project and updating it on regular basis.
- Social media channels: social media accounts have the same relevance as the website because every important goal of project result has to be communicated by using the social media audience.
- Paper-based tools: press releases, brochures, and posters will be used as paper- based communication tools to communicate the results achieved in the course of the project.
- Gadgets: will be used during important events where the project has a booth or during workshops.
- Other: prizes, raffles and other such initiatives (similar to the raffle carried out at the conference SC 2019, and during HiPEAC 2020, where a project bags, containing a kit of the available gadgets, were given to all the presenters of the workshop).

The website will be continuously maintained, improved and updated in accordance with the project timeline, for example the addition of a dedicated section for the LEXIS Open Call, which will contain all the details about the whole organisation, and instructions about third-party usage. The management process of the Open Call will provide the instruments to really increase the project awareness and its own results. The social media channels of the project will also be fed in parallel.



4 IMPACT THROUGH EXPLOITATION

We expect that a number of significant exploitation activities will take place during the later parts of the LEXIS project when results are available. Nevertheless, we recognise that it is crucial that the planning and roll out of these activities start well in advance of that.

To this end, in Deliverable D9.1 [1], each partner has already documented its intentions along with a list of which exploitable assets will be used.

In this current deliverable, however, we provide a brief update on progress and discuss the next steps that the partners will engage in.

4.1 EXPLOITATION INTERMEDIATE RESULTS

As part of the development of the exploitation activities, two actions were carried out:

- An in-depth training session at our recent F2F meeting where we reminded each partner what Exploitation is, and what is expected of each of them.
- Asking each partner to provide more detail of their plans by filling in a spreadsheet. The excel spreadsheet included the following information: LEXIS partner(s) name; Key contact; Activity title; Consortium/global; Commercial/non-commercial; Confidentiality; LEXIS Category; Start date; Duration; Status; Description; URL or Link to further details (optional); and Comments.

Table 5shows a summary of the initial exploitation plans. It is worth noting that:

- Of the 39 proposals, a third of them are in a commercial context, the remainder are non-commercial and not focussed on income generation.
- LEXIS partners have submitted one or more projects, with some partners joining in collaboration.
- Some of the projects are confidential and therefore the details are not available in a public context.

Description	Number
Number of proposals	39
Joint proposals	9
Commercial proposals	15

Table 5 Summary of initial exploitation proposals

The spread of the LEXIS categories within the proposals can be found in the table below. Two of the categories are much lower than the rest, and it is expected that the LEXIS partners will propose additional exploitation plans so that those categories are eventually better represented.



Category	Number	Category Description
LEXIS SERVICE	11	Exploitation of the LEXIS platform as an Operational Production - HPC/Big Data/HPDA Cloud based system
DEVELOPMENT PLATFORM	3	Exploitation of the LEXIS project as a Development Platform for designing new solutions for the Industries
TOOLS, METHODS AND TECHNOLOGIES	16	Exploitation of the Tools, Methods and Technologies developed along the LEXIS project
CONSULTING AND SERVICES	3	Exploitation via the development of a portfolio of new specialised Added Value Services

Table 6 Spread of activities between the different categories of the LEXIS technology

4.2 FUTURE ROADMAP

We recognise that Exploitation is a key indicator to the success and value of the LEXIS project and is determined to drive each of the partners to take full advantage of the opportunities in front of us.

In the next three months (M15 - M18), each of the partners will be asked to develop and mature their exploitation plans, due to the availability of results coming out from the LEXIS platform and pilots, with special regard to the:

- Logistics of how the plans will actually come into being,
- Purpose and benefits of the exploitation plan,
- Exploitation milestones (timeline of life beyond the LEXIS project),
- Details of any third parties/bodies/institutions that will be directly engaged.

5 IMPACT THROUGH PILOT RELATED ACTIVITIES

Pilots activities, as already introduced in Deliverable D9.1 [1], span the whole impact strategy, so the main purpose of this deliverable is to update the initial roadmap provided and set up the next 15 months roadmap. In this respect, for each of the three pilots the intermediate results will be provided, and the future roadmap given.

5.1 PILOTS INTERMEDIATE RESULTS

Pilots have a big relevance for the LEXIS project and one of the main targets of this deliverable is to check the status of the intermediate results, and their alignment with what has been planned in D9.1. For a clearer communication of the intermediate results, all three pilots with the updated situation at month 15 will be addressed in detail.

5.1.1 Aeronautics

Through the LEXIS Project, Avio Aero is looking to boost and promote a step-change in how to approach design tasks of aeronautical engines' critical parts, focusing on the improvement of the physical footprint driven by advanced and sophisticated Computational Fluid Dynamics (CFD) simulations, as well as the reduction/optimization of overall compute jobs' execution time. Having in mind these goals, the intermediate results up to now achieved are described in the following two sections.



Turbo-machinery test case

The Turbo-machinery use-case involves the implementation and the execution of (CPU-demanding, data-intensive and time-consuming) unsteady fluid-dynamic simulations of a multi-stage, Low-Pressure turbines. Such CFD computations rely on TRAF, an application software developed by the University of Florence that is specifically designed to assist turbo-machinery designers in solving steady/unsteady 3D, Reynolds-averaged Navier-Stokes equations.

With respect to a reference Turbo-machinery test bed, intermediate results are currently able to accelerate the execution speed of the CFD simulations by factors of 1.6x up to 2.6x. This is achieved by moving from an only CPU-based release of TRAF cod, to a newly developed GPU-enabled one. The results generated indicate that there is a good chance of getting closer to a 5x speed-up. Reaching this target by the end of the project would reduce the computational time of more complex turbo-machinery simulations from months to a few days.

Another topic related to speed up is the post-processing activity: a large amount of data is typically produced, and this sometimes generates important bottlenecks. To avoid such issues, and to enhance the user experience, a first automatic visualization of results via *Paraview* has been released.

Deliverable D5.1 [7] is being reviewed, perfectly on time with the LEXIS milestone.

Rotating parts test case

The second test bed included in the Aeronautics Large-scale pilot is focused on Gearboxes - a key component of Avio Aero's business.

The challenge is to introduce completely novel CFD numerical methods in the current design process to support traditional legacy expertise and face new challenges for modules optimization. The adopted SW, *nanoFluidX*, is a Smoothed Particle Hydrodynamics (SPH) simulation product by the *Altair* Company, conceived and optimized for use on clusters of Graphical Processing Units. The GPU revolution in scientific and engineering computing is rapidly progressing, and *nanoFluidX* is one of the pioneering commercial software packages which utilizes this technology, bringing significant speed increases to the analysis phase.

To achieve the target, a detailed test plan has been released first. Sub-case A foresees basic laboratory configuration, where parameters are numerically explored only one at a time. Intermediate results, relevant to this first step, provide evidence that the tuning of this new CFD methodology has been completed, working on a single wheel with oil jet lubrication (sub-case A), by successfully simulating mono-phase physical phenomena. The design practices, thus defined, will pave the way for the next phase of investigation. These phases are defined through the sub-cases B and C, leading to more complex Gearbox configurations.

Exploration on GPU dependency to optimize the computing running time has been already started. Deliverable D5.2 [8] is being reviewed, perfectly on time with the LEXIS milestone.

Communication and dissemination outcomes

Through initiatives led by either LEXIS partners or by Avio Aero itself, the Aeronautics Large-scale pilot had a significant communication and dissemination activity aimed at illustrating the objectives, the context and the intermediate results from the two presented Aeronautics test beds, which have produced the following outcomes:



- An abstract for a poster about Aeronautics Large-scale pilot at ITWSHPC 2019, Italian Workshop on Parallel and High Performance Computing Technologies, Bologna, September 5, 2019
- A paper with the following title "HPC, Cloud and Big-Data Convergent Architectures: The LEXIS Approach" at CISIS 2019, The 13th International Conference on Complex, Intelligent, and Software Intensive Systems University of Technology Sydney (UTS), Sydney, Australia July 3-5, 2019
- A poster about Aeronautics Large-scale pilots at SC 2019, The International Conference for High Performance Computing, Networking, Storage, and Analysis Colorado Convention Center, Denver, CO November 17–22, 2019
- Two power point presentations about new frontiers in next-generation engines, and the Aeronautics Largescale Pilot at the European Exascale projects booth, SuperComputing 2019 (SC19) - Colorado Convention Center, Denver, CO - November 17–22, 2019
- A poster with the following abstract "The LEXIS approach to Searching and Managing FAIR Research Data in Converged HPC-Cloud-Big Data Architectures" at the First International Symposium on Open Search Technology LRZ Garching, Germany 23-24 October 2019
- An abstract "Aeronautics Large-scale Pilot in Lexis: context, objectives and first outcomes" for a poster at PRACEdays20 at EuroHPC Summit Week (EHPCSW) 2020 - Porto Palácio Congress Hotel, Porto, Portugal -March 23-27, 2020

5.1.2 Earthquake and Tsunami

The Earthquake and Tsunami large scale pilot, as planned in Delivrable D9.1 [1], had a significant communication activity either through partners communications, or as the project itself. These included:

- An NBiS 2019 conference paper submission (as the pilot referenced in Deliverable D6.1 [9]) entitled "Earthquake and Tsunami Workflow Leveraging the Modern HPC/Cloud Environment in the LEXIS Project.", Goubier, Thierry, et al. International Conference on Network-Based Information Systems. Springer, Cham, 2019.
- Presentations by partners (posters).
- The HPC for urgent computing workshop, co-organized at SuperComputing 2019 the most important event for the HPC worldwide community. The workshop was accepted, and the accepted papers were published in the SC 2019 proceedings.

Current submissions include:

- The resubmission of the HPC for urgent computing workshop for SC 2020.
- Two posters from AWI and GFZ accepted at the European Geophysics Union general assembly.
- An invitation for an HPC for urgent computing panel at EuroHPC summit week.
- An invitation to present at the environmental computing workshop of ISGCC 2020 (reported due to the Covid-19 pandemic outbreak).

Furthermore, preliminary contacts were made with the Indonesian national agency for disaster management (BNPB), with the organisation of the planned workshop with the relevant civil authorities in Indonesia as a target.

5.1.3 Weather and Climate

The Weather and Climate pilot yielded significant results during the period among M4 and M15. In particular, the first version of the Weather and Climate Data API (WCDA) has been deployed by M15. Furthermore, the first version of the Weather and Climate workflows have been deployed on the LEXIS infrastructure. This refers in particular to the deployment of the workflows, including the WRF model (one-way coupled respectively with the RISICO forest fire risk model), as well as with the Continuum hydrological model.

These deployments have required a specific virtualization strategy for the involved models: the WRF Preprocessing System (WPS) has been virtualised by mean of a dedicated docker, as well as the Continuum and



RISICO models. Similarly, the Early Rainfall Detection System (ERDS) has been dockerized, whereas the ADMS (Atmospheric Dispersion Modelling System) has been virtualized using a virtual machine approach.

These achievements have been documented so far by means of (1) a poster [10] to the European Conference for Applied Meteorology and Climatology 2019, which is held at the Technical University of Denmark (DTU), (2) a conference paper at the Conference on Complex, Intelligent, and Software Intensive Systems (2019) [3], and (3) a conference paper at the American Meteorological Society Annual Meeting held in January in Boston, which is one of the most relevant event in the field.

5.2 PILOTS FUTURE ROADMAP

All the intermediate results described above will be used as a starting point in the continuation of efforts regarding communication, dissemination, and exploitation of results for each pilot. In the following sections, the future roadmap for each pilot will be outlined.

5.2.1 Aeronautics

The Aeronautical future roadmap is described here for all its test cases.

Turbo-machinery test case

Key topics to be addressed in the next months are:

- Investigate new TRAF GPU-based versions to get closer to KPI target (=5x, related to CPU-based TRAF version),
- Explore potential in HW/SW coupling, testing different HW architectures (use supercomputers at IT4I and LRZ) to verify impact on KPI's values, as stated in the LEXIS general objectives,
- Enhance the post-processing phase of TRAF-based simulation results.

Rotating parts test case

Key topics to be addressed in the next months are:

- Raise complexity step-by-step, always in view of ensuring physics fidelity and limiting computational time. Test Cases B and C will be faced in full accordance with the plan. Objective will be the full methodology validation,
- Explore LEXIS final technology potential in SW coupling: complete testing on different HP's as fixed by LEXIS general objectives (like what planned for the Turbo-machinery case),
- Preliminary proposed test plan running on different HPCs,
- Understand how to manage the big data (TB) provided from *nanofluidX* simulation outputs.

Communication and dissemination planning

Through initiatives lead by either LEXIS partners or by Avio Aero itself, the Aeronautics Large-scale pilot is planning to carry out a significant communication and dissemination activity focused at illustrating the objectives, the context, and the intermediate results from the two presented Aeronautics test beds.

More specifically, the Aeronautics Large-scale pilot is currently contributing to a poster with the following abstract "iRODS OpenID authentication mechanism: Software pipeline updates enabling the use of Keycloak" to be presented at the ISC High Performance 2020 - Frankfurt, Germany - June 21-25, 2020.



Moreover, referring to the already planned activities for communication and dissemination, the initial event roadmap defined in the Deliverable D9.1 [1]is confirmed. In addition to the initial roadmap, the following three events through 2020 and 2021 are planned:

- International CAE Conference and Exhibition,
- Dissemination event about "AERODYNAMICS-AEROACOUSTICS",
- Dissemination event about "HEAT TRANSFER & FLUID FLOW".

5.2.2 Earthquake and Tsunami

Planned activities for the Earthquake and Tsunami pilot are listed below:

- Ter@tec forum, June 2020 (submitted),
- SC 2020 (co-organisation of the HPC for urgent computing workshop submitted),
- Booth presence at ISC 2020, SC 2020, Ter@tec forum,
- Organisation of a workshop in Indonesia where we plan to invite the relevant civil agencies (BNPB, BKMG, BPPT), local universities (UI, IPB, ITB, UnDip, UGM) and international organisations involved in disaster management in Indonesia (IRD, World Bank),
- And organisation of a workshop in Japan.

5.2.3 Weather and Climate

In relation of the Weather and Climate Pilot, in the upcoming months, we plan to present a poster at the European Geoscience Union (EGU) General Assembly in May 2020 in Vienna (usually attended by more than 16 thousands scientists), and to submit an abstract to the forthcoming 17th Plinius Conference on Mediterranean Risks to be held in Rome, Italy 13–16 October 2020.

Furthermore, the pilot results will be presented to the Italian Civil Protection Department and other Civil Protection Regional entities in Italy.

Concerning the air-quality applications, the first pilot results obtained with LEXIS services will be presented during the POLLUTEC fair (main European fair on environment), Lyon, France, 1-4 December 2020.





6 LEXIS IMPACT ON HPC AND BIG DATA CONVERGENCE ECOSYSTEM

LEXIS has good relations with the key actors within the HPC and Big Data ecosystems, particularly within the European context. It will leverage these relationships to maximize potential impact on these different sectors. In addition to the high level impact of LEXIS which has been given so far, a potential impact detailed vision for each LEXIS technology will be given in the Deliverable D9.5 [11] which includes the assessment of each technology European market potential.

Specific entities with which the project has good relations, and maintains significant influence over, are the following:

- PRACE the Partnership for Advanced Computing in Europe: this organization is interested in progressing the interests of the HPC sector in Europe, and has an interest in supporting the promotion of solutions which can support easier access to HPC services within European organizations.
- BDVA the Big Data Value Association: this organization represents the perspectives of parties who are Interested in working with Big Data technologies, including storage, analytics, processing, etc.
- EUDAT EUDAT CDI is a pan-European network consisting of more than 25 research organisations, data and computing centres.
- ETP4HPC European Technology Platform for High Performance Computing: is a private, industry-led and non-profit association. Its main mission is to promote European HPC research and innovation in order to maximise the economic and societal benefit of HPC for European science, industry and citizens.
- EuroHPC The European High-Performance Computing is a public-private partnership in HPC, enabling the pooling of European Union (EU) level resources with the resources of participating EU Member States and participating associated states of the Horizon 2020 programme, as well as private stakeholders.

LEXIS will continue to maintain good relations with these organizations and use them as channels for disseminating the output of the project, with a view to having impact on the members of the respective organizations.

As entailed in the Deliverable D9.4 [12], LEXIS will run an Open Call as an opportunity to validate the LEXIS solution within a context which is not necessarily tied to the LEXIS pilots.

As well as validation via the Open Call and the impact on the organizations that will be involved within the Open Call, the LEXIS project will promote key aspects of its technology solutions such that they can be taken up by other entities - HPC centres in particular. This will be done via the following strategy:

- Promotion of aspects of the LEXIS technology solutions in various technical events,
- Demonstration of the use of the LEXIS portal at various events targeting the HPC and Big Data sectors,
- Release of key assets of the project as Open Source such that they can be experimented with by other interested parties,
- Recording of videos showing the workflow of using the LEXIS Portal.

7 CONCLUSIONS

This deliverable has updated the impact strategy in terms of communication, dissemination, exploitation, and pilot-related activities. It has presented the project's intermediate activities results, measured according to the 7 selected KPIs.

The document has also provided the future roadmap for each part of the impact strategy by entailing the future initiative planned and how the consortium intends to achieve their goals.

At this stage of the Covid-19 pandemic outbreak, the presented Consortium plan is not significantly affected, but we are not able to predict how Government decisions and environmental drivers could impact the project and the overall situation.

A further and final update of the Impact strategy, presenting the final results, will be given at the end of the project in Deliverable D9.10 [2].



- [1] LEXIS Deliverable, D9.1 Impact KPI and Metrics Achievement Report and Plan first version.
- [2] LEXIS Deliverable, D9.10 Impact KPI and Metrics Achievements Report and Plan final version.
- [3] A. Scionti and et. al, "HPC, Cloud and Big-Data Convergent Architectures: The LEXIS Approach," Advances in Intelligent Systems and Computing, vol. 993, pp. 200-212, 2020.
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- [8] LEXIS Deliverable, D5.2 Rotating Parts Use Case: Analysis of Results Run on State-of-Art HPC System.
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- [10] J. Hawkes, T. Quintino, A. Parodi, E. Danovaro, S. Siemen and F. Pappenberger, "Weather & Climate Data API for the Convergence of HPC and Cloud Workflows In LEXIS," [Online]. Available: https://meetingorganizer.copernicus.org/EMS2019/EMS2019-530-1.pdf.
- [11] LEXIS Deliverable, D9.5 Market Analysis of Converged HPC, Big Data and Cloud Ecosystems in Europe.
- [12] LEXIS Deliverable, D9.4 Open Call Framework and Stakeholders Engagement on Targeted Large-Scale Pilots first report.