## EUROPEAN LANGUAGE GRID

## The European Language Grid and European Language Equality Projects

Prof. Dr. Georg Rehm (DFKI GmbH, Germany) Coordinator ELG, Co-coordinator ELE

16-11-2021 ELG NCC Workshop Denmark – Danish Language Technology Conference 2021 http://www.european-language-grid.eu http://www.european-language-equality.eu

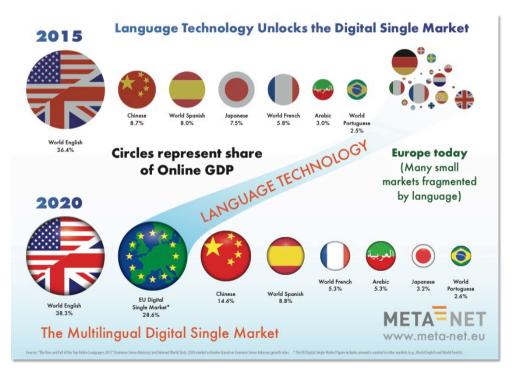


### EUROPEAN LANGUAGE EQUALITY

## **Point of Departure: Multilingualism in Europe**

- Multilingualism is at the heart of the European idea
- 24 official EU languages they all have the same status
- Dozens of co-official, regional and minority languages as well as languages of immigrants and trade partners
- Many economic, social and technical challenges
  - The Digital Single Market needs to be multilingual
  - Cross-border, cross-lingual, cross-cultural communication
  - Fragmentation of the LT market and landscape









### META FORUM 2010

### T4ME



### T4ME

EU-funded project (Seventh Framework Programme) working on technologies for the Multilingual European Information Society

### META-NET

Established in 2010, META-NET is a network of Excellence consisting of 60 research centres from 34 countries, building the technological foundations of a multilingual European information society

### META-FORUM 2010

2010

"Challenges for Multilingual Europe" (November 17/18, 2010)



### META-NORD

EU-funded (ICT PSP) Project to establish an open linguistic infrastructure in the Baltic and Nordic countries (2011 - 2013)

2011

2012

### METANET4U

EU-funded project (ICT Policy Support Programme) METANET4U **\*** to enhance the European Linguistic Infrastructure (2011 - 2013)



### CESAR EU-funded project (ICT Policy Support Programme) functioning as a part of META-NET to standardise

language resources and tools (2011 - 2013)

### META-FORUM 2011

Conference "Solutions for Multilingual Europe" (Budapest – June 27/28, 2011)







### META-FORUM 2012

Conference "A Strategy for Multilingual Europe" (Brussels – June 20/21, 2012)

### META-NET White Papers

Release of 32 volumes on 31 languages, revealing that there is a severe threat of digital extinction for at least 21 European languages 2013 (December 2012)

### "State of the Art of Machine Translation -Current Challenges and Future Opportunities 2014

Workshop on "State of the Art of Machine Translation", commissioned by the EU Parliament (December 2013)

### META-SHARE

Initiated in 2013. META-SHARE has functioned as an open and secure network of repositories for sharing and exchanging language data, tools and services

### Strategic Research Agenda for Multilingual Europe 2020

Launch of the Strategic Research Agenda for Multilingual Europe 2020 (January 2013)

### META-FORUM 2013

Conference "Connecting Europe for New Horizons" (Berlin - September 19/20, 2013)





### CRACKER

EU-funded project CRACKER (Horizon2020) pushing towards an improvement of MT research in terms of efficiency and effectiveness (2015 – 2017)

### **Cracking the Language Barrier Federation**

Founded in 2015, the federation has been assembling European research and innovation projects as well as all related community organisations working on multilingual technologies

### META-FORUM 2015

Conference "Technologies for the Multilingual Digital Single Market" (Riga – April 27, 2015)

### Strategic Agenda for the Multilingual Digital Single Market (Version 0.5)

Launch of the Strategic Agenda for the Multilingual Digital Single Market titled "Technologies for Overcoming Language Barriers towards a truly integrated European Online Market" (April 2015)

### **Riga Summit on the Multilingual Digital Single Market**

Summit "Shape the future of the multilingual digital single market" (April 27–29,2015)

### Strategic Research and Innovation Agenda (Version 0.9)

Launch of the Strategic Research and Innovation Agenda titled "Language as a Data Type and Key Challenge for Big Data" (July 2016)

### META-FORUM 2016

Conference "Beyond Multilingual Europe" (Lisbon – July 4/5, 2016)





META FORUM 2016



"Language Equality in the Digital Age"

Workshop on "Language Equality in the Digital Age", commissioned by the EU Parliament's Science and Technology Options Assessment Committee (STOA) (January 2017)

### "Language equality in the digital age: Towards a Human Language Project"

Launch of the study on "Language equality in the digital age: Towards a Human Language Project", commissioned by the EU Parliament (March 2017)

### META-FORUM 2017

**2016** 

Conference "Towards a Human Language Project" (Brussels – November 13/14, 2017)

### Strategic Research and Innovation Agenda (V1.0)

Launch of the Strategic Research and Innovation Agenda titled "Language Technologies for Multilingual Europe – Towards a Human 2015 Language Project" (December 2017)

2017



**ELG Final Proposal Submission** 

Final submission on Feb. 20. 2018

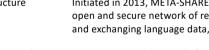
















### **EUROPEAN** LANGUAGE GRID

2019-2022



### **EUROPEAN** LANGUAGE EOUALITY

2021-2022









## **European Parliament Resolution (2018)**

EP Resolution "Language equality in the digital age" P8 TA(2018)0332 – partially based on the STOA study

Voting (11 Sept. 2018): **592 yes** – 45 no

**Recommendations addressed by European Language Grid:** 

- 29. Create a European LT platform for sharing of services
- 41. Enable and empower European SMEs to use LTs
- 26. ICT integrators should be given economic incentives for LT
- 27. Europe has to secure its leadership in language-centric AI
- 32. Set up LT financing platform; emphasise R&D in Deep NLU
- 40. Develop investment instruments and accelerator programs

European Parliament 2014-2019

> TEXTS ADOPTED Provisional edition

P8 TA-PROV(2018)0332

Language equality in the digital age

European Parliament resolution of 11 September 2018 on language equality in the digital age (2018/2028(INI))

The European Parliament,

- having regard to Articles 2 and 3(3) of the Treaty on the Functioning of the European Union (TFEU).
- having regard to Articles 21(1) and 22 of the Charter of Fundamental Rights of the European Union.
- having regard to the 2003 UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage,
- having regard to Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information<sup>1</sup>,
- having regard to Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the re-use of public sector information<sup>2</sup>,
- having regard to Decision (EU) 2015/2240 of the European Parliament and of the Council of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector<sup>3</sup>,
- having regard to the Council resolution of 21 November 2008 on a European strategy for multilingualism  $(2008/C 320/01)^4$ .
- having regard to the Council decision of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and

- OJ L 345, 31.12.2003, p. 90. OJ L 175, 27.6.2013, p. 1. OJ L 318, 4.12.2015, p. 1.
- <sup>4</sup> OJ C 320, 16.12.2008, p. 1



## **EUROPEAN** LANGUAGE GRID



## **Objectives** (Selection)

- 1. Establish the ELG as the primary Language Technology platform and market place in Europe to tackle the fragmentation of the European LT landscape.
- 2. ELG as a platform for commercial and non-commercial, industry-related LTs (functional and non-functional).
- 3. Enable the European LT community to upload services and data sets, to deploy them and to connect with, and make use of those resources made available by others.
- 4. Enable businesses to grow and benefit from scaling up.
- 5. Unleash enormous potential for innovation.





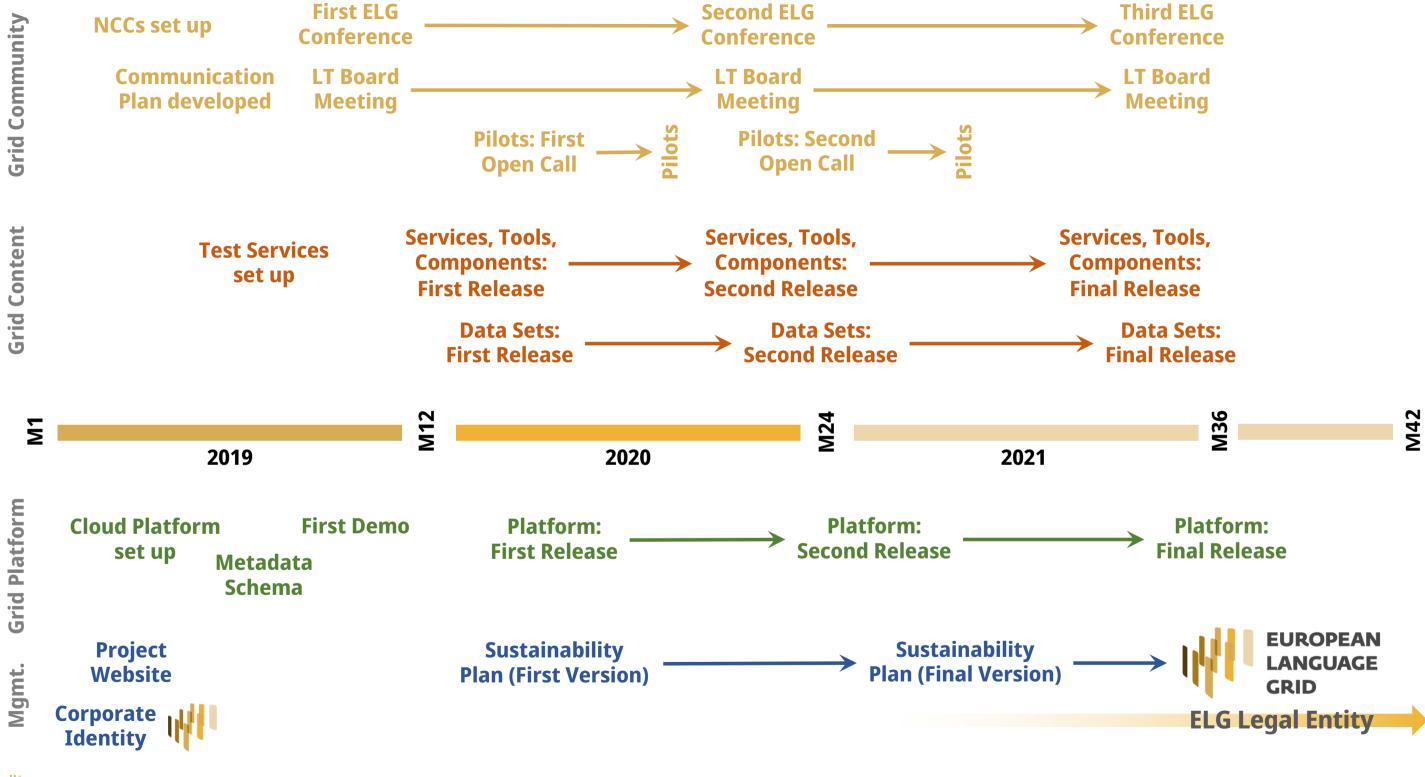








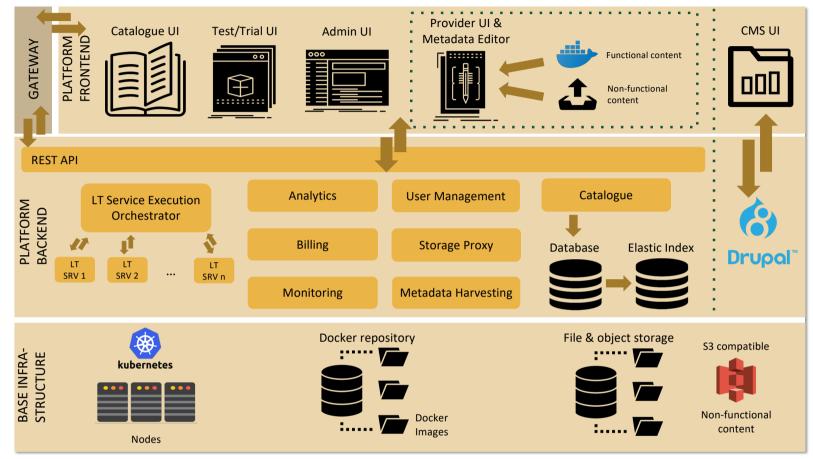




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## **European Language Grid – Current State of Play (November 2021)**

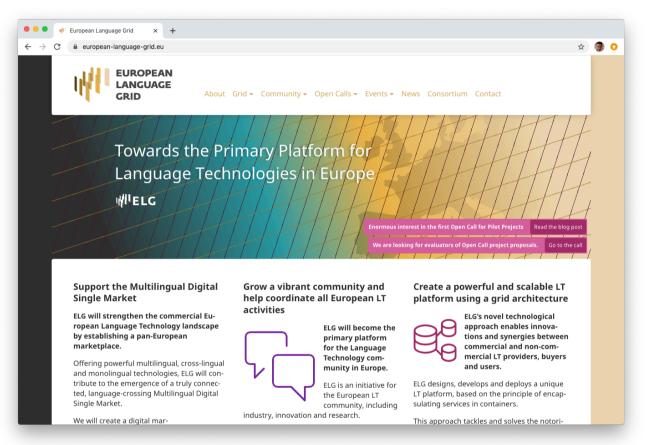
- User registration, authentication, authorisation
- User categories, respective rights and policies
- LT metadata upload
- Metadata conversion and harvesting
- LT service registration, integration
- LT service try out and execution
- LT data browsing, searching, downloading
- Current state of play ELG Release 2 (Nov. 2021):
  - 450 functional services and tools
  - 3563 corpora and data sets
  - 948 lexical/conceptual resources
  - 27 language descriptions, grammars, models
  - 1789 organisations (research orgs., companies)



Users can connect to the ELG cloud platform via ELG APIs, remote APIs, ELG GUI, Python SDK, download of containers or source code.

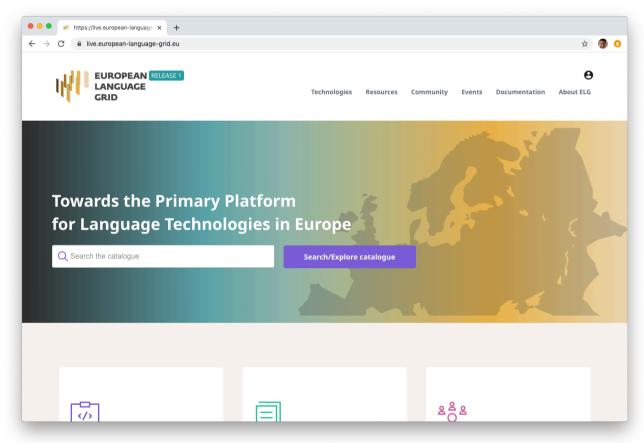
ELG Release 3 to be made available in early 2022.

## **European Language Grid – Quick Demo**



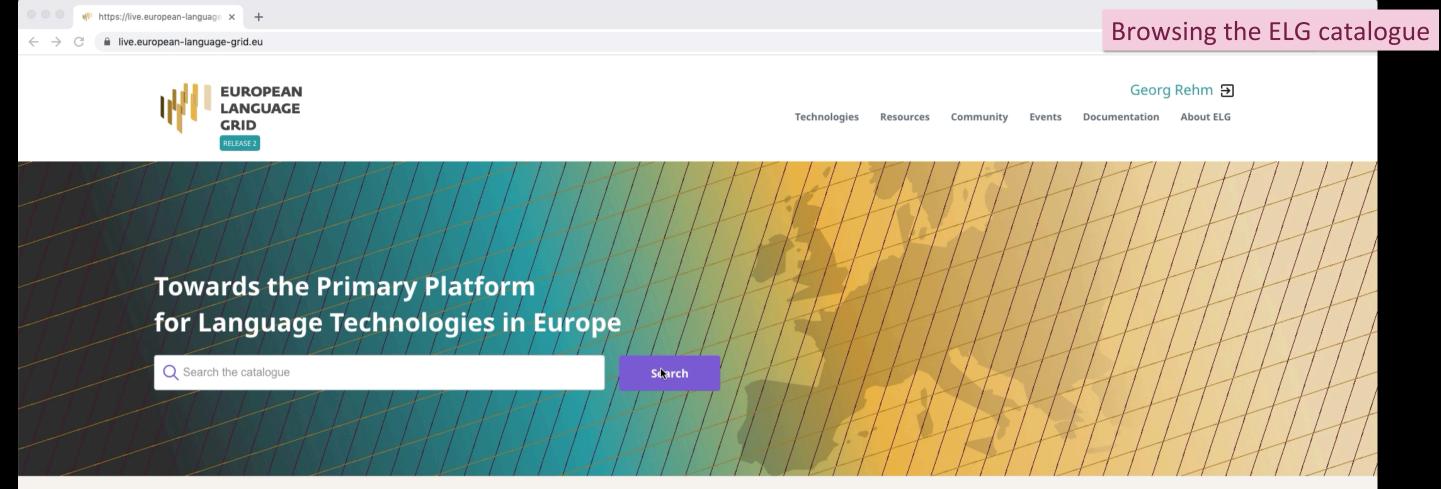
### https://www.european-language-grid.eu

- ELG project website •
- Typical information about our EU project plus a lot of additional content ٠ (events, open calls, community, NCCs etc.)
- The whole content of the project website will be integrated into the ٠ European Language Grid website (proper) in the second half of 2021



### https://live.european-language-grid.eu

- The actual European Language Grid platform and website
- The next revision of the ELG project website (left) will include dynamic content that will be pulled from the ELG repository (right), e.g., languages, number of services, categories of services etc.





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### Language technologies

LT services, tools, components, downloadable or deployhed directly through the grid

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### Language data and resources

The collection of data sets, corpora, language models and other language resources

**View Resources** 



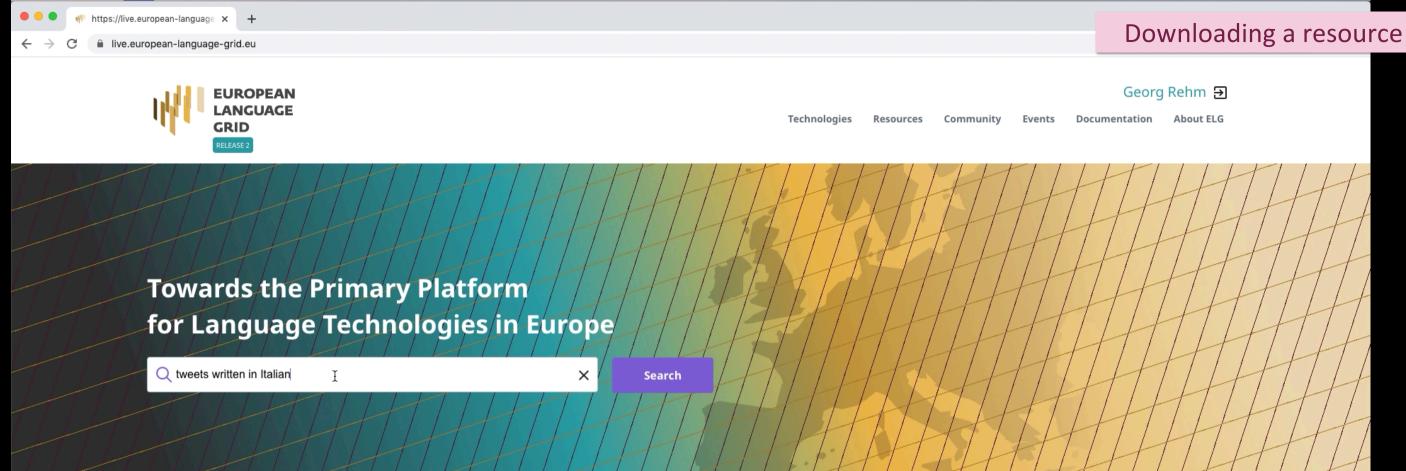
### Community

Organizations, projects, events etc in European Language technology field

**Explore Community** 

**Browse Technologies** 

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### Language technologies

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LT services, tools, components, downloadable or deployhed directly through the grid

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**Explore Community** 

**Browse Technologies** 

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UEDIN-MT-DeEn	Search	?						

Language resources &		140 search results for UEDIN-MT-DeEn	
technologies	~		
<u> </u>		👫 UEDIN Machine Translation Service for German to English	111 views
Service functions	~	1.0.0	2131 times used
		A machine translation (MT) service for German-to-English translation based on	ELG-compatible service
Languages	~	the Marian machine translation framework. The translation model is a basic	
Langaages	Ť	transformer model trained on ca 13.3M sentence pairs using Marian N $\checkmark$	
Linnan		Keywords: Machine Translation · German · English · Neural machine translation	
Licences	~	Languages: German · English	
		Licence: Creative Commons Attribution Share Alike 4.0 International	
Conditions of use for data	~		
		K UEDIN Machine Translation Service for Czech to English	25 views
Related entities	~	1.0.0	152 times used
		An ensemble of 3 transformer-base models trained on WMT'19 data as a sys-	ELG-compatible service
		tem for generating back-translations.	
		Keywords: Machine Translation $\cdot$ Czech $\cdot$ English $\cdot$ Neural machine translation	
		Languages: English · Czech	
		Licence: Creative Commons Attribution Share Alike 4.0 International	
		👫 UEDIN Machine Translation Service for English to German	62 views
		1.0.0	570 times used
		A machine translation (MT) service for English-to-German translation based on	ELG-compatible service
		the Marian machine translation framework. The translation model is a basic	
		transformer model trained on ca 13.3M sentence pairs using Marian N ${\scriptstyle\checkmark}$	
		Keywords: Machine Translation · German · English · Neural machine translation	
		Languages: German · English	

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### Testing an MT service

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Search for services, to	ools, datasets	organizations	Search	?		
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		Keyword: corpus				
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### ting a dependency parser

## Some statistics on ingested LRs that are publicly visible

Repository	Corpora	Lexical/Conceptual Resources	Models & Computational grammars	
ELRA	635	545	_	
ELRC-SHARE	1249	50	_	
META-SHARE	52	12	7	
ELRA-SHARE-LRs	92	33	1	
LINDAT/CLARIAH-CZ	274	79	—	
CLARIN.SI	140	78	_	
CLARIN.PL	239	15	—	
Quantum Stat	255	5	_	
Zenodo	137	99	24	
Tudatalib	1	—	—	
HuggingFace	385	_	_	
Others	72	28	5	
TOTAL	3531	944	37	

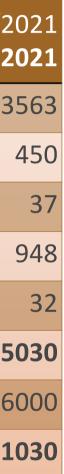
\*approx. 400 ingested resources are still under validation

Total	
	1180
	1299
	71
	126
	353
	218
	254
	260
	*260
	1
	385
	105
	4512

## **Resource Types**

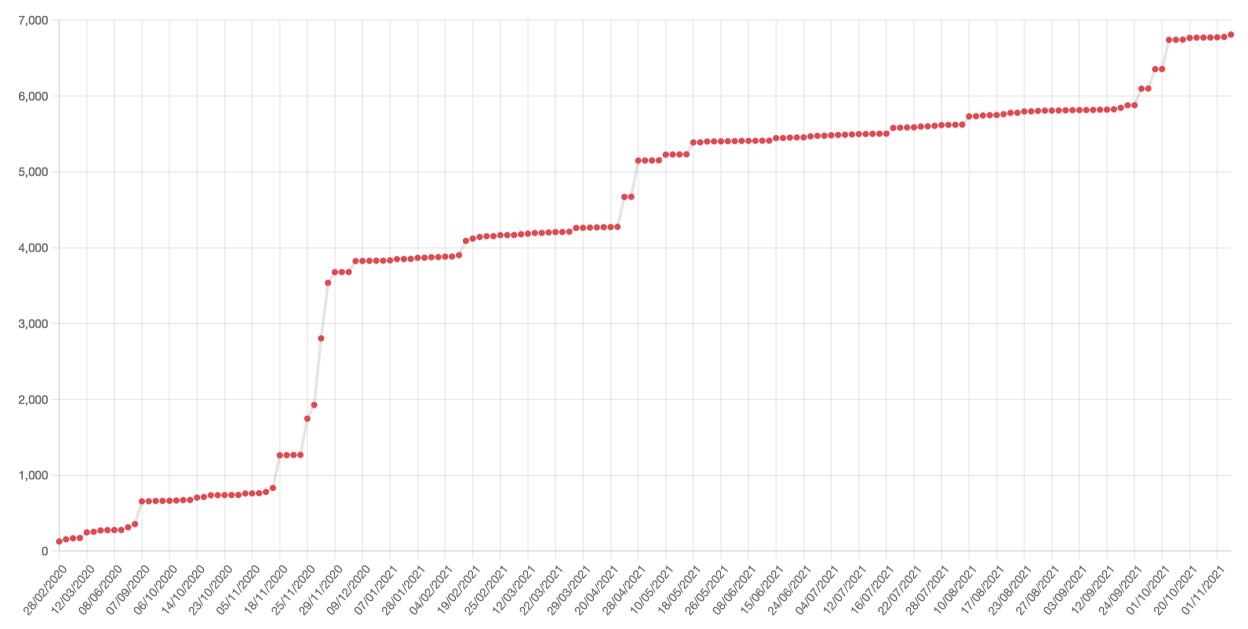


	01/12/2020 META-FORUM 2020	12/11/2 META-FORUM 2
Corpora	1851	3
Tools/Services	173	
Language Descriptions	7	
Lexical Conceptual Resources	728	
Projects	24	
Total	3679	5
Additional resources collected by ELE	_	approx. 6
Total (online soon)	3679	11





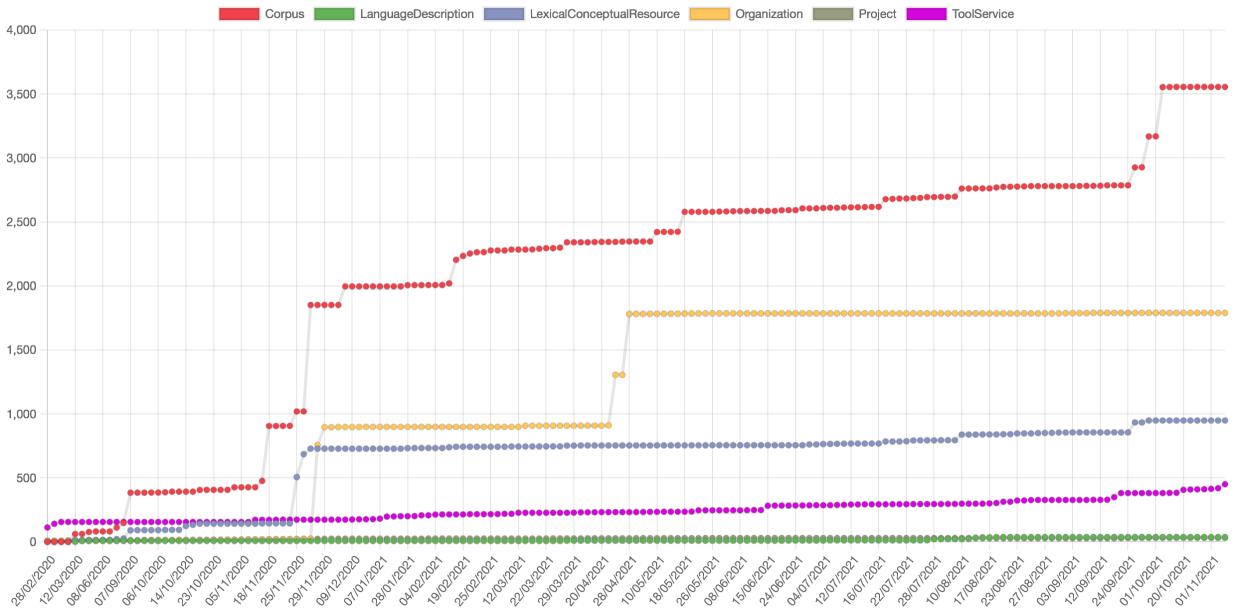
## **Number of Resources over Time**



**ELG** European Language Grid

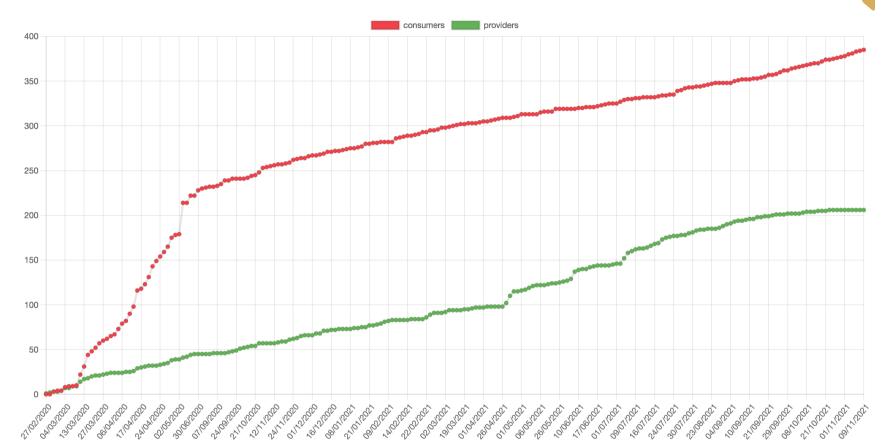


## Number of Resources and Resource Types over Time



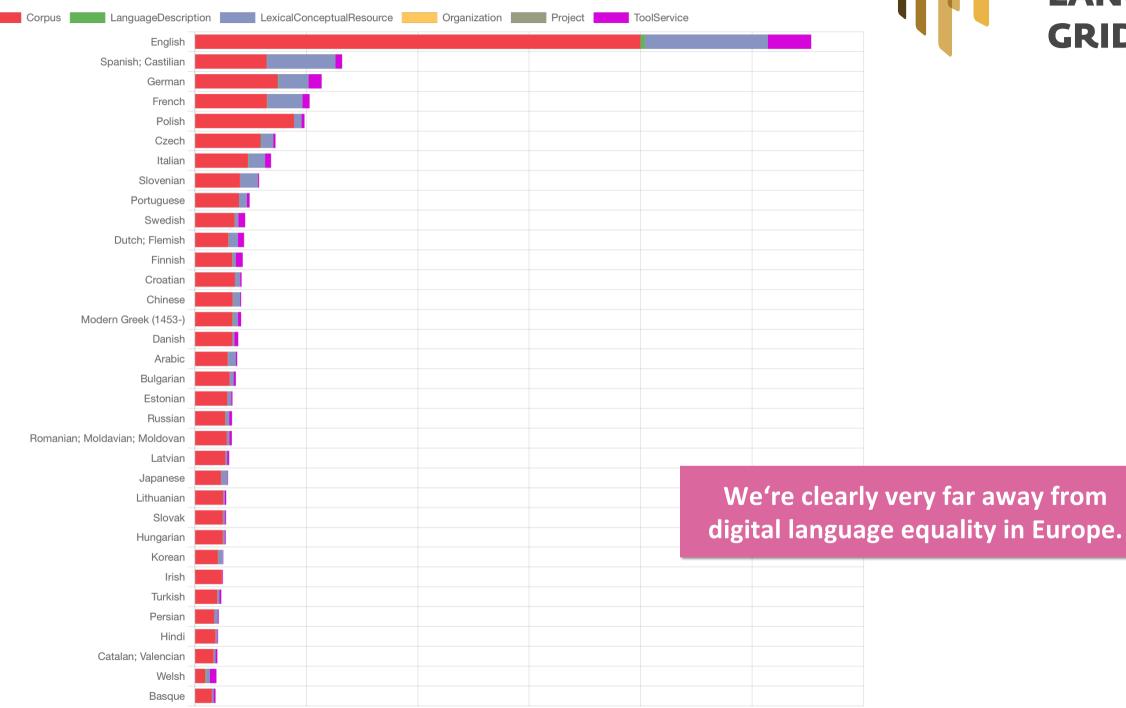
**ELG** European Language Grid

## **Number of Users**



	01/12/2020 <b>META-FORUM 2020</b>	28/10/2021 <b>META-FORUM 2021</b>
Consumers	283	385
Providers	50	206
Total	333	591

## Languages of the Resources



## **European Language Grid – What can you do with it?**

- **Data consumers** can search and browse the ELG catalogue
  - for different types of data, language processing services, projects and organisations
  - download data (depending on access conditions)
- Service consumers can try out and test language processing services
  - call a service from the command line, integrate it into workflow
  - view code samples
  - current API support: MT, IE, ASR, TTS, text classification



- Data and service consumers can use a Python-based API for accessing the ELG catalogue, searching and directly fetching datasets to feed them into, e.g., their model training pipeline
- Data providers can upload resources and register metadata descriptions using a semantic schema
  - a dashboard provides an overview of own resources including their status (draft  $\rightarrow$  published)
- Language Technology providers can provide their service/tool as a Docker container
  - Different options: (a) Docker image in ELG, can be run from ELG; (b) Docker image in ELG as proxy talks to remote service

	Entity	
Dataset (Corpus)	rinoutor	Document Publication Annotation Manual User Manual Person Satellite Entity Technologies Res
Tool Beta		
TOOL/SERVICE	DISTRIBUTION	

# Example: Integration of the results of the project QURATOR into the ELG platform.

What does that mean?

- We created a page for the QURATOR project in the ELG catalogue
- We created for all QURATOR partners, too
- Two QURATOR services have already been made available through the ELG platform their metadata records are associated with QURATOR
- More QURATOR resources will be made available in the future

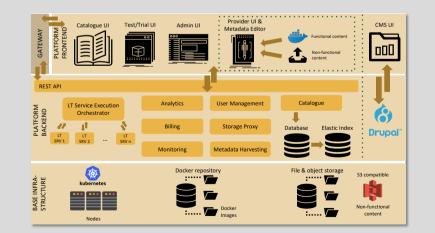




**3pc** Neue Kommunikation

















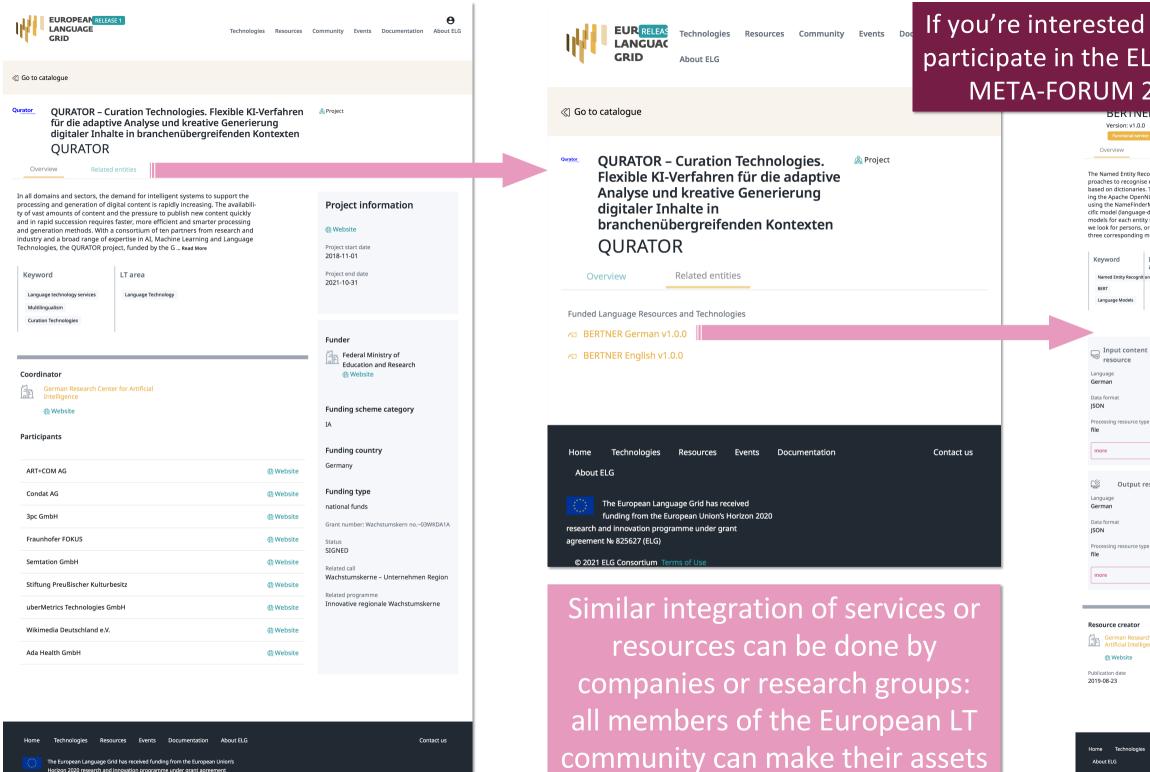
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Deutsches Forschungszentrum für Künstliche Intelligenz GmbH





available via the ELG platform!

The European Language Grid has received funding from the European Union Horizon 2020 research and innovation programme under grant agree № 825627 (ELG)

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### If you're interested in more details, please participate in the ELG tutorial tomorrow at META-FORUM 2021 (11:00-12:30).

### The Named Entity Recognition we are using two different approaches to recognise entities; (1) based on models and (2) Resource provider based on dictionaries. This module has been implemented using the Apache OpenNLP tool. The model based approach is using the NameFinderME module that is provided with a specific model (language-dependent). We have trained separate models for each entity type we distinguish. This means that we look for persons, organisations and locations serially, with @ Website three corresponding models applied consecutivel ... Read More Funded by Intended application Named Entity Recognition R Website 🗳 Function Named Entity Recognitio Language dependent true Output resource Evaluated: fals TRI · TRI 3

Contact us

ne European Language Grid has received funding from the European Union's Horizon 202

About ELG

## **Stakeholders and Users**

## **Companies** that

- ... *develop* Language Technologies 0
- ... *integrate* Language Technologies 0
- ... *purchase* Language Technologies 0 Universities and research centres that
- ... *develop* Language Technologies 0
- ... *use* Language Technologies



META-FORUM 2019 (8/9 October) – Brussels, Belgium

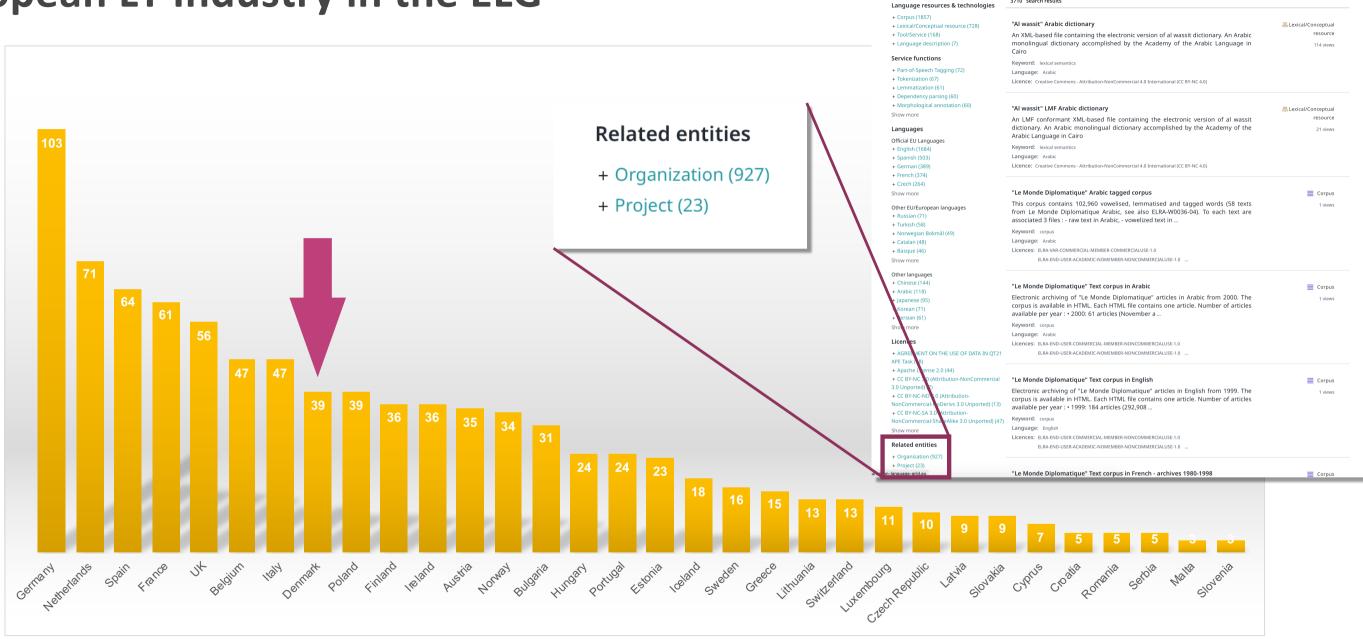
**Public administrations** that *purchase* or *use* Language Technologies **Other organisations** (e.g., NGOs) that *purchase* or *use* Language Technologies **Funding agencies** that support the development of Language Technologies



3710 search results

Clear all filters 🛞

## **European LT Industry in the ELG**



Θ

## **Stakeholders and Users and Collaborators**

- ELG Open Calls: 15 pilot projects
- Six ICT-29b research and innovation projects
- ELE European Language Equality
- AI4EU European AI on demand platform
- Related projects: ELRC, Elexis, Lynx, MeMAD, Fandango, CEF INEA projects (MAPA, NTEU etc.) etc.
- Core networks: META-NET, LT Innovate
- Additional initiatives: CLAIRE, AI PPP, ECSPM, EFNIL, BDVA, NPLD, CLARIN, W3C, NGI, RDA, EOSC, OpenAIRE etc., ICT-48 projects





























### **H**ELG European Language Grid

## **Community: NCCs and LTC**

## **32 National Competence Centres (NCCs)**

- Strong international network of national networks to 0 broaden ELG's reach, identify content for the ELG and interest companies in using the ELG.
- Main goal: *support the mission of the ELG project*. 0

### **European LT Council (LTC)** (work in progress)

- A pan-European body i **EUROPEAN** tegic LT-related matters LANGUAGE can be discusse EQUALITY
- Main goal: represent and support European LT community.







tre for Translation Studies, University of Vienr

stational Linguistics and Psycholinguistics. University

itute for Bulgarian Language, Bulgarian Academ

ute of Formal and Applied Linguistics, Charles L

- Austria: Dagmar Gromann, Zentrum für 1. Translationswissenschaft, Universität Wien
- Belgium: Walter Daelemans, Comp. Ling. and 2. Psycholing. Res. Centre (CLiPS), University of Antwerp
- Bulgaria: Svetla Koeva, Bulgarian Academy of 3. **Sciences**
- **Croatia:** Marko Tadic, Inst. of Linguistics, Faculty 4. of Hum. and Social Science, University of Zagreb
- **Cyprus:** Dora Loizidou, University of Cyprus 5.
- Czech Republic: Jan Hajic, Inst. of Formal and 6. Applied Linguistics, Charles University in Prague
- Denmark: Bolette Sandford Pedersen, Centre for 7. Lang. Technology, Department of Nordic Research, University of Copenhagen
- Estonia: Kadri Vare, Department of Language, 8. Estonian Ministry of Education and Resear
- Finland: Krister Linden, Department of Modern 9. Languages, University of Helsinki
- France: François Yvon, CNRS-LIMSI 10.
- 11. Germany: Georg Rehm, Speech and Language Technology Lab, DFKI
- 12. Greece: Maria Gavriilidou, ILSP, R.C. "Athena"

- Hungary: Tamás Várárdi, Research Institute for 13. Linguistics, Hungarian Academy of Sciences
- Iceland: Eirikur Rögnvaldsson, School of 14. Humanities, University of Iceland
- Ireland: Andy Way, ADAPT Centre and School of 15. Computing, Dublin City University
- **Italy:** Bernardo Magnini, Human Language 16. Technology, Fondazione Bruno Kessler (FBK)
- Latvia: Inguna Skadina, Institute of Mathematics 17. and Computer Science, University of Latvia
- Lithuania: Albina Auksoriūtė, Institute of the 18. Lithuanian Language
- Luxembourg: Dimitra Anastasiou, Luxembourg 19. Institute of Science and Technology
- Malta: Michael Rosner, Department Intelligent 20. Computer Systems, University of Malta
- Netherlands: Jan Odijk, Utrecht Institute of 21. Linguistics, Universiteit Utrecht
- Norway: Kristine Eide, The Language Council of 22. Norway – Språkrådet
- **Poland:** Maciej Ogrodniczuk, Institute of 23. **Computer Science, Polish Academy of Sciences**

24.

- 25. Sciences
- 26. Belgrade University (UBG)
- 27.
- 28.
- 29.
- 30. Technology
- 31. Institute
- 32. We science, University of Sheffield



Portugal: António Branco, Department of Informatics, University of Lisbon

Romania: Dan Tufis, Research Institute for Artificial Intelligence, Romanian Academy of

Serbia: Cvetana Krstev, Faculty of Mathematics,

Slovakia: Radovan Garabik, Ludovit Stur Institute of Linguistics, Slovak Academy of Sciences

Slovenia: Simon Krek, Jozef Stefan Institute

**Spain:** Marta Villegas, Barcelona Supercomputing

Sweden: Jens Edlund, Speech, Music & Hearing/Språkbanken Tal, KTH Royal Institute of

Switzerland: Hervé Bourlard, Idiap Research

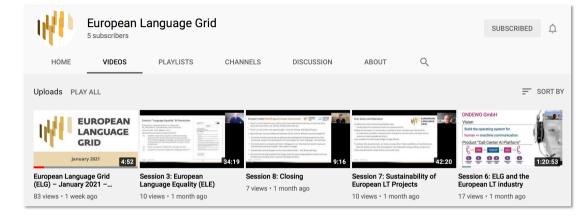
UK: Kalina Bontcheva, Department of Computer

## **META-FORUM Conference Series**

META-FORUM 2022 – June 08-10, Brussels, Belgium Save the date! **META-FORUM 2021** – November 15-17, *virtual conference* Using the European Language Grid **META-FORUM 2020** – December 01-03, virtual conference **Piloting the European Language Grid** META-FORUM 2019 – October 08/09, Brussels, Belgium **Introducing the European Language Grid** META-FORUM 2017 – November 13/14, Brussels, Belgium **Towards a Human Language Project** META-FORUM 2016 – July 04/05, Lisbon, Portugal **Bevond Multilingual Europe** META-FORUM 2015 – April 27, Riga, Latvia **Technologies for the Multilingual Digital Single Market** META-FORUM 2013 – September 19/20, Berlin, Germany **Connecting Europe for New Horizons META-FORUM 2012** – June 20/21, Brussels, Belgium A Strategy for Multilingual Europe **META-FORUM 2011** – June 27/28, Budapest, Hungary **Solutions for Multilingual Europe META-FORUM 2010** – November 17/18, Brussels, Belgium **Challenges for Multilingual Europe** 

The ELG YouTube channel provides recordings of all sessions of META-FORUM 2020 and also META-FORUM 2021 plus several other videos – like and subscribe!

https://www.youtube.com/channel/UCarEHmsWT2JslcvvWkbhL4A





## **Open Calls for Pilot Projects**

Two open calls for pilot projects

- Open Call #1: 03/04 2020
- Open Call #2: 10/11 2020

Pilot projects shall

- Type A: broaden ELG's portfolio or
- Type B: demonstrate usefulness of ELG

Up to €200,000 per project Approx. €2,000,000 FSTP in total Available in Open Call #1: 1.3M€ Available in Open Call #2: 585k€ Project duration: 9-12 months Eligibility: SMEs, research organisations

## **Open Call #1 – Statistics**

**110 project proposals evaluated** 

• **Type A:** 79 – **Type B:** 31 proposals

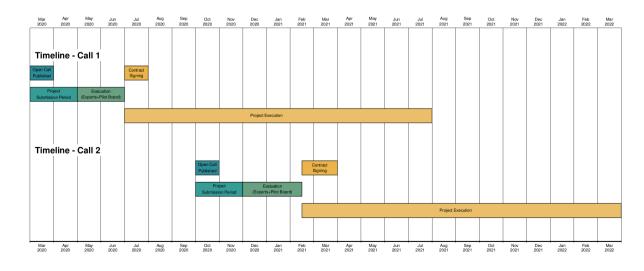
Total amount requested: 16.9M€

 $\rightarrow$  10 projects selected

## **Open Call #2 – Statistics**

**106 project proposals evaluated** 

 $\rightarrow$  5 projects selected



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29

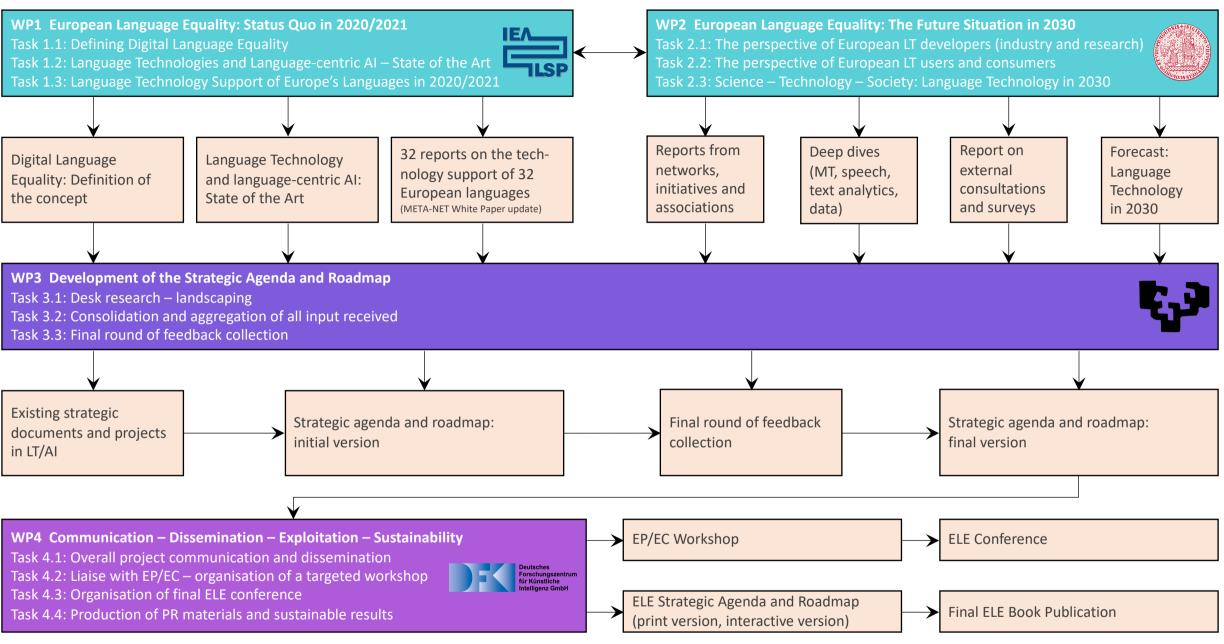
	Fondazione Bruno Kessler	European Clinical Case Corpus 🗹	IT	139,370€
	Lingsoft, Inc.	Lingsoft Solutions as Distributable Containers 🗹	FI	140,625€
	Coreon GmbH	MKS as Linguistic Linked Open Data 🖌	DE	167,375€
#1	Elhuyar Fundazioa	Basque-speaking smart speaker based on Mycroft AI 🗹	ES	117,117€
Call #	Universita' Degli Studi di Torino	Italian EVALITA Benchmark Linguistic Resources, NLP Services and Tools 🗹	IT	126,125€
Open (	University of Helsinki	Open Translation Models, Tools and Services 🗹	FI	154,636€
0	University of Vienna	Extracting Terminological Concept Systems from Natural Language Text 🗹	AT	132,977€
	University of Turku	Textual paraphrase dataset for deep language modelling 🗹	FI	166,085€
	Weber Consulting KG	Virtual Personal Assistant Prototype 🖌	AT	87,445€
	FZI Research Center for IT	Streaming Language Processing in Manufacturing 🗹	DE	132,160€
	Institute for Bulgarian Language	Multilingual Image Corpus 2021	BG	110,960€
II #2	EDIA BV	CEFR Labelling and Assessment Services	NL	137,560€
Open Call	University of West Bohemia	Motion Capture 3D Sign Language Resources	CZ	85,421€
	Sapienza University of Rome	Universal Semantic Annotator	IT	113,228€
	Sign Time GmbH	Sign language explanations for terms in a text	AT	137,227€

## **ELG's Sister Project European Language Equality (ELE)**





**Consortium:** 52 partners from all over Europe **Coordinator:** ADAPT Centre (Dublin City University) **Objective:** *development of a strategic research, innovation* and deployment agenda to achieve digital language equality in Europe by 2030 **Runtime:** 18 months – ELE & ELG will both finish in June 2022 Start on 1 January 2021 **PP/PA** (*not* Horizon 2020) – Pilot Project/Preparatory Action **Budget:** 1,8M€ (Coordination and Support Action) *Nov. 2021: more than halfway through ...* http://www.european-language-equality.eu



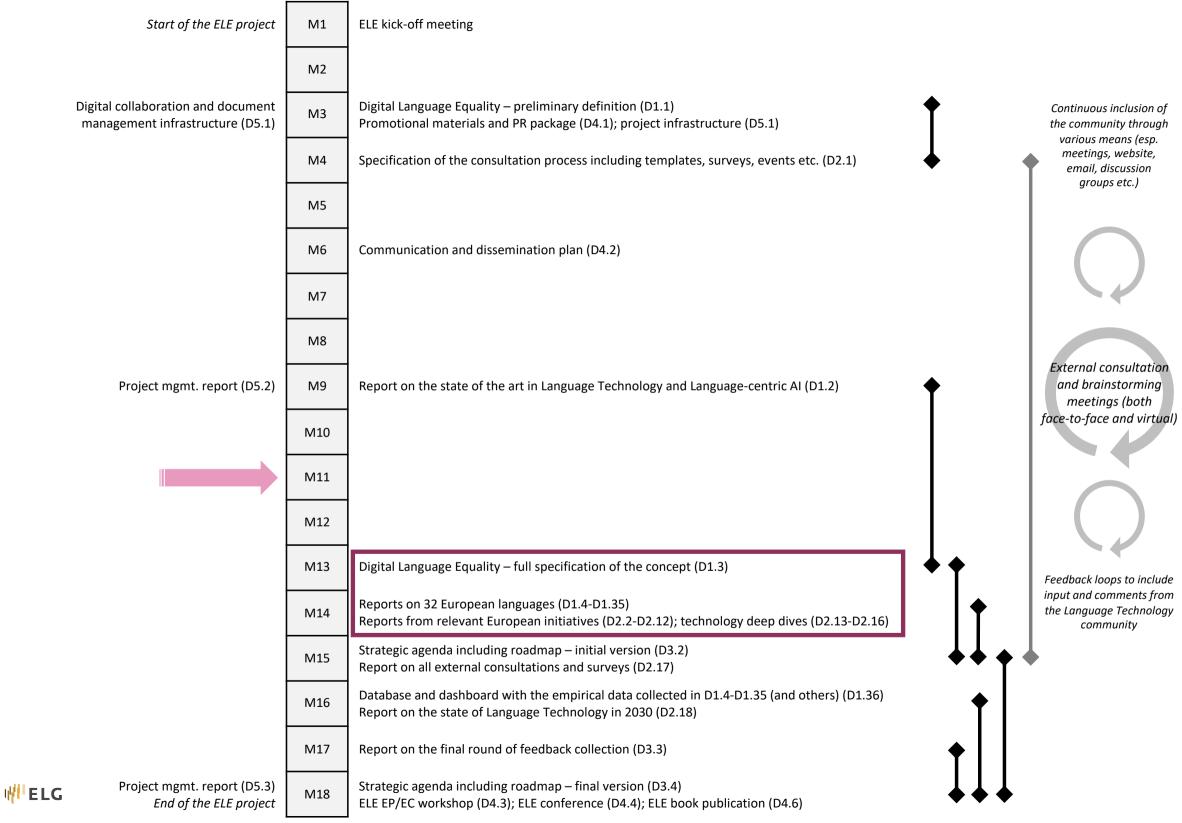
WP5 Project Management Task 5.1: Overall project management including Project Management Office Task 5.2: Digital collaboration and document management infrastructure





EUROPEAN LANGUAGE EQUALITY

## Work Packages and main Deliverables





## Timeline



About 🗸 Strategic Agenda Deliverables Events Nev

## META FORUM 202

Developing an agenda and a roadma for achieving full digital language equality in Europe by 2030

### Using the European Language Grid

15-17 November 2021

### If you're interested in more news regarding the ELE project, please join us tomorrow morning for the ELE session (09:00-10:30).

Register for free at https://meta-forum.eu

### Overview

With a large and all-encompassing consortium consisting of 52 partners covering all European countries, research and industry and all major pan-European initiatives, the European Language Equality (ELE) project develops a strategic research, innovation and implementation agenda as well as a roadmap for achieving full digital lan-

E/LE/

### Results

The main tangible results to be produced by the ELE project are as follows:

• The research partners will prepare updates of the 32 META-NET White Papers, which will also include the results of an enormous and exhaustive data collection procedure that will provide a detailed, empirical and dynamic map of technology

### Motivation

The ELE project is a direct response to the resolution "Language equality in the digital age", which was passed by the European Parliament in a landslide vote – 592 votes in favour and only 45 against – in September 2018. The report provides more than 40 recommendations, including:

### https://european-language-equality.eu





## **Current State of Play in the Project**

- **Digital Language Equality:** concept defined, dozens of *technological* and *contextual factors* longlisted, currently working on the selection of factors and the DLE formula
- Surveys conducted, now in the analysis phase Citizen survey currently prepared for launch
- **Update of META-NET White Papers**, especially regarding the overview and qualitative analysis of  $\bullet$ technology support for Europe's languages – plus: dynamic and fully empirical dashboard
- **Collection of LRs/LTs:** with the whole ELE consortium we collected 6000+ additional records
- **ELG:** these 6000+ records will be included in ELG, arriving at approx. *11,000 resources* in total  ${}^{\bullet}$
- **Dynamic DLE computation:** based on these 11,000 metadata records we can compute and visualise the DLE metric for all European languages through a dedicated dashboard in ELG
- **Continuously:** this approach enables us to monitor the development of DLE in Europe over time
- ELG: Making a new resource available through ELG will increase the DLE metric for that language  $\bullet$
- Almost all analyses to be ready in approx. April 2022 ELE book to be published in June 2022



## **Summary and Next Steps**



- Establish ELG as the primary platform and marketplace for Language Technology in Europe.
- An initiative *from* the European LT community *for* the European LT community.
- European LT landscape is **highly fragmented**: ELG aims to provide just the right **umbrella platform**.
- Global market size by 2025 is enormous: we want the European LT community to be a key player.
- We want to increase the visibility and reach of all members of the European LT landscape.
- ELG is a long-term initiative: we will establish a **legal entity** for sustainability, which will operate and maintain the technology platform for the whole LT community as a joint marketplace.
- Contribute to **Digital Language Equality** in Europe by giving all our languages one virtual home and umbrella platform that collects **all** services and resources (**ELE**).
- Next steps: validation of ELG products; attach more data repositories; include ELG in relevant infrastructures (e.g., NFDI, GAIA-X); raise awareness of LT for Europe; organise META-FORUM 2022; develop ELG Release 3 (early 2022); establish the ELG legal entity (2022).

### EUROPEAN LANGUAGE GRID

### ANGUAGE EOUALITY

### European Language Grid: An Overview

Georg Rehm<sup>1</sup>, Maria Berger<sup>1</sup>, Ela Elsholz<sup>1</sup>, Stefanie Hegele<sup>1</sup>, Florian Kintzel<sup>1</sup>, Katrin Marheinecke<sup>1</sup>, Stelios Piperidis<sup>2</sup>, Miltos Deligiannis<sup>2</sup>, Dimitrios Galanis<sup>2</sup>, Katerina Gkirtzou<sup>2</sup>, Penny Labropoulou<sup>2</sup>, Kalina Bontcheva<sup>3</sup> David Jones<sup>3</sup> Jan Roberts<sup>3</sup> Jan Haijič<sup>4</sup> Jana Hamrlová<sup>4</sup> Lukáš Kačena<sup>4</sup> Khalid Choukri<sup>5</sup> Victoria Arranz<sup>5</sup> Andreis Vasilievs<sup>6</sup>, Orians Anvari<sup>6</sup>, Andis Lagzdinš<sup>6</sup>, Jūlija Melnika<sup>6</sup>, Gerhard Backfried<sup>7</sup>, Erinc Dikici<sup>7</sup>, Miroslav Janosik<sup>7</sup>, Katja Prinz<sup>7</sup>, Christoph Prinz<sup>7</sup>, Severin Stampler<sup>7</sup>, Dorothea Thomas-Aniola<sup>7</sup>, José Manuel Gómez Pérez<sup>8</sup>, Andres Garcia Silva<sup>8</sup>, Cristian Berrío<sup>8</sup>, Ulrich Germann<sup>9</sup>, Steve Renals<sup>9</sup>, Ondrei Kleich<sup>9</sup>

<sup>1</sup> DFKI GmbH, Germany • <sup>2</sup> ILSP/Athena RC, Greece • <sup>3</sup> University of Sheffield, UK • <sup>4</sup> Charles University, Czech Republic • 5 Evaluations and Language Resources Distribution Agency (ELDA), France • 6 Tilde, Latvia • <sup>7</sup> SAIL LABS Technology GmbH, Austria • <sup>8</sup> Expert System Iberia SL, Spain • <sup>9</sup> University of Edinburgh, UK Corresponding author: Georg Rehm - georg.rehm@dfki.de

Abstract

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Making Metadata Fit for Next Generation	Language Technology Platforms:
The Metadata Schema of the Eu	ropean Language Grid

### Penny Labropoulou<sup>1</sup>, Katerina Gkirtzou<sup>1</sup>, Maria Gavriilidou<sup>1</sup>, Miltos Deligiannis<sup>1</sup>. Dimitrios Galanis<sup>1</sup>, Stelios Piperidis<sup>1</sup>, Georg Rehm<sup>2</sup>, Maria Berger<sup>2</sup>, Valérie Mapelli<sup>3</sup>, Mickaël Rigault<sup>3</sup>, Victoria Arranz<sup>3</sup>, Khalid Choukri<sup>3</sup>, Gerhard Backfried<sup>4</sup>, José Manuel Gómez Pérez<sup>5</sup>, Andres Garcia Silva<sup>5</sup>

<sup>1</sup>ILSP/Athena RC, Greece, <sup>2</sup>DFKI GmbH, Germany, <sup>3</sup>Evaluations and Language Resources Distribution Agency (ELDA), France, <sup>4</sup>SAIL LABS Technology GmbH, Austria, <sup>5</sup>Expert System Iberia SL, Spain

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### Abstract

The current scientific and technological landscape is characterised by the increasing availability of data resources and processing tools and services. In this setting, metadata have emerged as a key factor facilitating management, sharing and usage of such digital assets. In this paper we present ELG-SHARE, a rich metadata schema catering for the description of Language Resources and Technologies (processing and generation services and tools, models, corpora, term lists, etc.), as well as related entities (e.g., organizations, projects, supporting documents, etc.). The schema powers the European Language Grid platform that aims to be the primary hub and marketplace for industry-relevant Language Technology in Europe. ELG-SHARE has been based on various metadata schemas, vocabularies, and tologies, as well as related recomme tions and guidelines

Keywords: metadata, language technology, language technology services, language resources

### 1. Introduction

The rise of data-driven approaches that use Machine Learning (ML), and especially the breakthroughs in the Deep Learning field, has put data into a central place in all scientific and technological areas, Natural Language Processing (NLP) being no exception. Datasets and NLP tools and services are made available through various repositories (institutional, disciplinary, general purpose, etc.), which makes it hard to find the appropriate resources for one's purposes. Even if they are brought together in one catalogue, such as the European Open Science Cloud1 or the Google dataset search service2, the difficulty of spotting the right resources and services among thousands still remains. Metadata plays an instrumental role in solving this puzzle, as it becomes the intermediary between consumers (humans and machines) and digital resources

In addition, in the European Union, with the 24 official and many additional languages, multilingualism, cross-lingual and cross-cultural communication in Europe as well as an inclusive Digital Single Market3 can only be enabled and firmly established through Language Technologies (LT). The boosting of the LT domain is thus of utmost importance. To this end, the European LT industry needs to be strengthened, promote its products and services, integrate them into applications, and collaborate with academia into advancing research and innovation, and bringing research outcomes to a mature level of entering the market. The European Language Grid (ELG) project4 aims to drive forward the European LT sector by creating a platform and establishing it as the primary hub and marketplace for the LT community. The ELG is developed to be a scalable

1https://www.eosc-portal.eu nttps://toolbox.google.com/dat https://ec.europa.eu/digital-single-market/en <sup>4</sup>https://www.european-language-grid.eu

cloud platform, providing in an easy-to-integrate way, access to hundreds of commercial and non-commercial LTs for all European languages, including running tools and services as well as data resources. Discovery of and access to these resources can only be achieved through an appropriate metadata schema. We present here the ELG-SHARE schema, which is used for the description of LT-related resources shared through the ELG platform and its contribution to the project goals

### 2. Objectives

The ELG project (Rehm et al., 2020a) aims to foster European LT by addressing the fragmentation that hinders its development; see indicatively (Rehm and Hegele, 2018; Rehm et al 2016). To this end, it builds a platform dedicated to the distribution and deployment of Language Resources and Technologies (LRT), aspiring to establish it as the primary platform and marketplace for industry-relevant LT in Europe. The promotion of LT stakeholders and activities and growth of their visibility and outreach is also one of its goals. Together with complementary material in the portal (e.g., training material, information on events, job offerings, etc.), ELG offers a comprehensive picture of the European LT sector.

The ELG platform5 will offer access to hundreds of commercial and non-commercial LTs and ancillary data LRs for all European languages and more; these include processing and generation services, tools, applications for written and spoken language, corpora, lexicons, ontologies, term lists, models, etc. All resources are accessed through their descriptions in the ELG catalogue. LRT providers can describe, upload, and integrate their assets in ELG, and LRT

<sup>5</sup>The ELG platform has just been launched (alpha release) and will continue to be updated with new resources and functionaliti (official release dates are on April of 2020, 2021 and 2022.

### The European Language Technology Landscape in 2020: Language-Centric and Human-Centric AI for Cross-Cultural Communication in Multilingual Europe

Georg Rehm<sup>1</sup>, Katrin Marheinecke<sup>1</sup>, Stefanie Hegele<sup>1</sup>, Stelios Piperidis<sup>2</sup>, Kalina Bontcheva<sup>3</sup>, Jan Hajič<sup>4</sup>, Khalid Choukri<sup>5</sup>, Andrejs Vasiljevs<sup>6</sup>, Gerhard Backfried<sup>7</sup>, Christoph Prinz<sup>7</sup>, José Manuel Gómez Pérez<sup>8</sup>, Luc Meertens<sup>9</sup>, Paul Lukowicz<sup>1</sup>, Josef van Genabith<sup>1</sup>, Andrea Lösch<sup>1</sup>, Philipp Slusallek<sup>1</sup>, Morten Irgens<sup>10</sup>, Patrick Gatellier<sup>11</sup>, Joachim Köhler<sup>12</sup>, Laure Le Bars<sup>13</sup>, Dimitra Anastasiou<sup>14</sup>, Albina Auksoriüte<sup>15</sup>, Núria Bel<sup>16</sup>, António Branco<sup>17</sup> Gerhard Budin<sup>18</sup>, Walter Daelemans<sup>19</sup>, Koenraad De Smedt<sup>20</sup>, Radovan Garabík<sup>21</sup>, Maria Gavriilidou<sup>2</sup>, Dagmar Gromann<sup>18</sup>, Svetla Koeva<sup>22</sup>, Simon Krek<sup>23</sup>, Cvetana Krstev<sup>24</sup>, Krister Lindén<sup>25</sup>, Bernardo Magnini<sup>26</sup>, Jan Odijk<sup>27</sup> Maciej Ogrodniczuk<sup>28</sup>, Eiríkur Rögnvaldsson<sup>29</sup>, Mike Rosner<sup>30</sup>, Bolette Sandford Pedersen<sup>31</sup>, Inguna Skadina<sup>31</sup> Marko Tadić<sup>33</sup>, Dan Tufiş<sup>34</sup>, Tamás Váradi<sup>35</sup>, Kadri Vider<sup>36</sup>, Andy Way<sup>37</sup>, François Yvon<sup>38</sup>

<sup>1</sup> DFKI GmbH, Germany • <sup>2</sup> ILSP/Athena RC, Greece • <sup>3</sup> University of Sheffield, UK • <sup>4</sup> Charles University, Czech Republic • 5 ELDA, France • 6 Tilde, Latvia • 7 SAIL LABS Technology GmbH, Austria • 8 Expert System Iberia SL, Spain • 9 CrossLang, Belgium • 10 Oslo Metropolitan University, Norway • 11 Thales Group, France •

European Language Grid:
A Joint Platform for the European Language Technology Community
Georg Rehm <sup>1</sup> , Stelios Piperidis <sup>2</sup> , Kalina Bontcheva <sup>3</sup> , Jan Hajič <sup>4</sup> , Victoria Arranz <sup>5</sup> ,

Andrejs Vasiljevs<sup>6</sup>, Gerhard Backfried<sup>7</sup>, José Manuel Gómez-Pérez<sup>8</sup>, Ulrich Germann<sup>9</sup>, Rémi Calizzano<sup>1</sup>, Nils Feldhus<sup>1</sup>, Stefanie Hegele<sup>1</sup>, Florian Kintzel<sup>1</sup>, Katrin Marheinecke<sup>1</sup>, Julián Moreno-Schneider<sup>1</sup>, Dimitrios Galanis<sup>2</sup>, Penny Labropoulou<sup>2</sup>, Miltos Deligiannis<sup>2</sup>, Katerina Gkirtzou<sup>2</sup>, Athanasia Kolovou<sup>2</sup>, Dimitris Gkoumas<sup>2</sup>, Leon Voukoutis<sup>2</sup>, Ian Roberts<sup>3</sup>, Jana Hamrlová<sup>4</sup>, Dušan Variš<sup>4</sup>, Lukáš Kačena<sup>4</sup>, Khalid Choukri<sup>5</sup>, Valérie Mapelli<sup>5</sup>, Mickaël Rigault<sup>5</sup>, Jūlija Melnika<sup>6</sup>, Miroslav Jánošík<sup>7</sup>, Katia Prinz<sup>7</sup>, Andrés García-Silva<sup>8</sup>, Cristian Berrío<sup>8</sup>, Ondrej Klejch<sup>9</sup>, Steve Renals

<sup>1</sup>DFKI GmbH, Berlin, Germany; <sup>2</sup>R. C. Athena, ILSP, Greece; <sup>3</sup>University of Sheffield, UK; <sup>4</sup>Charles University, Czechia; <sup>5</sup>ELDA, France; <sup>6</sup>Tilde, Latvia; <sup>7</sup>HENSOLDT Analytics, Austria; 8Expert System, Spain; 9University of Edinburgh, UK

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platform for LT in Europe. It will provide one

umbrella platform for all LTs developed by the

European LT landscape, including research and

industry, addressing a gap that has been repeat-

edly raised by the European LT community for

many years (Rehm and Uszkoreit 2013: Rehm

et al., 2016b; STOA, 2017; Rehm, 2017; Rehm and

Hegele, 2018; European Parliament, 2018). ELG

is meant to be a virtual home and marketplace for

all products services and organisations active in

the LT space in Europe (Rehm et al., 2020a). The

platform can be used by all stakeholders

case, share and distribute their products,

tools and resources. At the end of the EU

ELG (2019-2022), which will establish a

tity in early 2022, the platform will provid

to approx. 1300 commercial and non-com

tools and services for all European langu

ported and, thus, in danger of digital language ex-

Section 2 gives an overview of the ELG plat-

form and related activities. Section 3 touches upon

related work. Section 4 concludes the paper.

### Abstract

Europe is a multilingual society, in which dozens of languages are spoken. The only option to enable and to benefit from multilingualism is through Language Technologies (LT), i. e., Natural Language Processing and Speech Technologies. We describe the European Language Grid (ELG), which is targeted to evolve into the primary platform and marketplace for LT in Europe by providing one umbrella platform for the European LT landscape including research and industry, enabling all stakeholders to upload, share and distribute their services, products and resources. At the end of our EU project, which will establish a legal entity in 2022, the ELG will provide access to anprox, 1300 services for all European languages as well as thousands of data sets.

### 1 Introduction

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Europe is a multilingual society with 24 EU Mem- ELG will enable the European LT comm ber State languages and dozens of additional lan- deposit and upload their technologies and guages including regional and minority languages and to deploy them through the grid T and languages spoken by immigrants, trade part- is also meant to support *digital langua* ners and tourists. The only option to enable and ity in Europe (STOA, 2017; European Pa to benefit from multilingualism is through Lan- 2018), i. e., to create a situation in which guage Technologies (LT) including Natural Lan- guages are supported through technologies guage Processing (NLP) and Speech Technologies well. The current imbalance is character (Rehm, 2017). While the European LT landscape stark predominance of LTs for English, is world class, it is also massively fragmented most all other languages are only marginar (Vasiljevs et al., 2019; Rehm et al., 2020d).

We describe Release 2 of the European Lan-tinction (Rehm and Uszkoreit 2012; Kornai 2013; guage Grid (ELG) cloud platform.<sup>1</sup> This scal- Rehm et al., 2014, 2016a; ELRC, 2019). able system is targeted to evolve into the primary

<sup>1</sup>https://www.european-language-grid.eu. We provide a screencast demo video at https://youtu.be/LD6QadkkZiM.

### Towards an Interoperable Ecosystem of AI and LT Platforms: A Roadmap for the Implementation of Different Levels of Interoperability

Georg Rehm<sup>1</sup>, Dimitrios Galanis<sup>2</sup>, Penny Labropoulou<sup>2</sup>, Stelios Piperidis<sup>2</sup>, Martin Welß<sup>3</sup>, Ricardo Usbeck<sup>3</sup>, Joachim Köhler<sup>3</sup>, Miltos Deligiannis<sup>2</sup>, Katerina Gkirtzou<sup>2</sup>, Johannes Fischer<sup>4</sup>, Christian Chiarcos<sup>5</sup>, Nils Feldhus<sup>1</sup>, Julián Moreno-Schneider<sup>1</sup>, Florian Kintzel<sup>1</sup>, Elena Montiel<sup>6</sup>, Víctor Rodríguez Doncel<sup>6</sup>, John P. McCrae<sup>7</sup>, David Laqua<sup>3</sup>, Irina Patricia Theile<sup>3</sup>, Christian Dittmar<sup>4</sup>, Kalina Bontcheva<sup>8</sup>, Ian Roberts<sup>8</sup>, Andrejs Vasiljevs<sup>9</sup>, Andis Lagzdiņš<sup>9</sup> <sup>1</sup> DFKI GmbH, Germany • <sup>2</sup> ILSP/Athena RC, Greece • <sup>3</sup> Fraunhofer IAIS, Germany • <sup>4</sup> Fraunhofer IIS, Germany •

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## Coming up:

well as thousands of language resource European Language Equality book (2022) **Plus: ELG Online Documentation** 

5 Goethe University Frankfurt, Germany • 6 Universidad Politécnica de Madrid, Spain • 7 National University of Ireland Galway, Ireland • 8 University of Sheffield, UK • 9 Tilde, Latvia Corresponding author: Georg Rehm - georg.rehm@dfki.de

Abstract

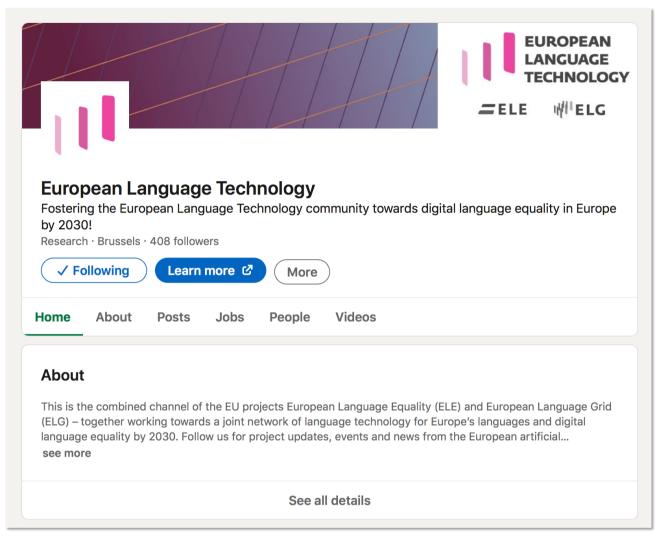
LREC 2020 Workshop e Resources and Evaluation Conference 11-16 May 2020

2020 – 1st International Workshop on anguage Technology Platforms

### PROCEEDINGS

# European Language Grid book (2022)

Edited by: Georg Rehm, Kalina Bontcheva, Khalid Choukri, Jan Hajič, Stelios Piperidis, Andrejs Vasiljevs



https://www.linkedin.com/company/european-language-technology

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https://www.european-language-technology.eu

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<ul> <li>@EuroLangTech</li> <li>The channel of the EU projects European Language Equality and European Grid, fostering the LT community towards digital language equality by 203</li> <li>@ Europe  european-language-technology.eu III Joined June 2021</li> <li>902 Following 303 Followers</li> </ul>	@EuroLangTech The channel of the EU projects European Language Equality and European Grid, fostering the LT community towards digital language equality by 203 (•) Europe & european-language-technology.eu III Joined June 2021 902 Following 303 Followers EUROPEAN LANGUAGE TECHNOLOGY Welcome to European Language Technology							ELE	
Grid, fostering the LT community towards digital language equality by 203 © Europe & european-language-technology.eu III Joined June 2021 902 Following 303 Followers EUROPEAN LANGUAGE	Grid, fostering the LT community towards digital language equality by 203 © Europe & european-language-technology.eu III Joined June 2021 902 Following 303 Followers EUROPEAN LANGUAGE TECHNOLOGY Welcome to European Language Technology				e Techr	ology			
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European Language Technology is the combined communication channel for the sister projects European Language Grid (ELG) and European Language Equality (ELE) – funded by the European Commission.

For further information about either project – their goals, consortium partners, and contact details etc. – please click below:

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### DPEAN SUAGE NOLOGY

ELG

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Language !

### EUROPEAN LANGUAGE TECHNOLOGY

### EUROPEAN LANGUAGE GRID



EUROPEAN LANGUAGE EQUALITY



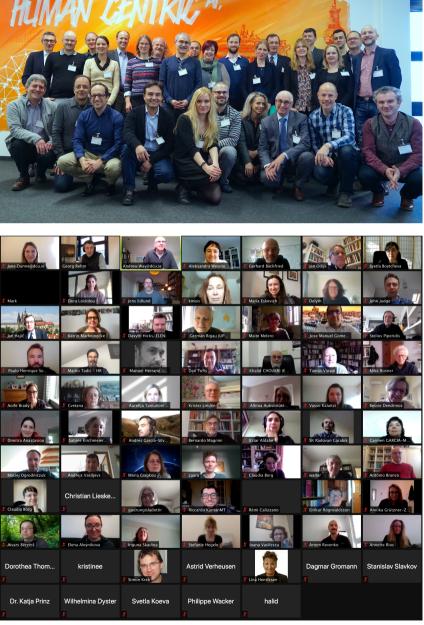
With many thanks to all colleagues in the ELG and ELE teams and consortia!

## **Thank you!**

EUROPEAN LANGUAGE TECHNOLOGY

EUROPEAN LANGUAGE EQUALITY

EUROPEAN LANGUAGE GRID



The European Language Grid has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement № 825627 (ELG).

Prof. Dr. Georg Rehm (DFKI GmbH, Germany) Coordinator ELG, Co-coordinator ELE

16-11-2021 ELG NCC Workshop Denmark – Danish LT Conference 2021 http://www.european-language-grid.eu http://www.european-language-equality.eu