



CLARIN:EL

Notes Before Completing the Application

We have read and understood the notes concerning our application submission.

True

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

CORE TRUSTWORTHY DATA REPOSITORIES REQUIREMENTS

Background & General Guidance

Glossary of Terms

BACKGROUND INFORMATION

Context

R0. Please provide context for your repository.

Repository Type. Select all relevant types from:

Domain or subject-based repository, Institutional repository

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

Brief Description of Repository

- Domain or subject-based repository

CLARIN:EL (<https://inventory.clarin.gr/>) is the National Infrastructure for Language Resources and Technologies in Greece. CLARIN:EL's mission is to collect, document, curate and distribute digital language resources, language technology tools and certified online language processing services mainly (but not exclusively) for the Greek language. Resources, tools and services are contributed by the members of the national network (research institutions and universities).

- Institutional repository

CLARIN:EL is hosted by the Department of Natural Language Processing and Language Infrastructures of the Institute for Language and Speech Processing (ILSP) , one of the institutes of the Athena Research Centre (ATHENA RC) . The goal of ATHENA/ILSP is the development of Language Technology in Greece. To this end, it has brought together experts from related disciplines, such as computational linguistics, psycholinguistics and cognitive sciences, computer science, machine learning, data science, signal processing, statistics etc.

CLARIN:EL repository aggregates the resources provided by the organizations-members of the national network (see paragraph Insource/Outsource Partners below). Each organization-member owns and is responsible for the respective subset of the repository which hosts the resources provided by the organization-member. Legal ownership, licensing decisions and metadata description and uploading of resources is the responsibility of each member. Maintenance of the infrastructure, storage, services provision (besides the tasks related to its own resources) is the responsibility of ATHENA/ILSP.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

Brief Description of the Repository's Designated Community.

– Brief Description of the Designated Community

CLARIN:EL's designated community consists of researchers, academics, students and educators, language professionals, citizen scientists and the general public, whose activities fall into the fields of Language studies, Digital Humanities and Social Sciences, Cultural Heritage, Language Technology, Artificial Intelligence, Computer Science, Cognitive Science, etc. and who need access to language data of a variety of types (datasets, lexical resources, grammar modules), media types (text audio, video), domains (law, medicine, history etc.) as well as processing tools/services to analyze and process the data.

The main language of interest is Modern Greek; this, however, does not exclude other languages.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

Level of Curation Performed. Select all relevant types from:

- A. Content distributed as deposited, B. Basic curation – e.g. brief checking; addition of basic metadata or documentation, C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

Comments

Resources stored at CLARIN:EL are distributed as deposited, following a procedure of acceptance.

Basic curation covers:

(a) automatic checking of metadata completeness and well-formedness. Metadata can be submitted to the repository through the specially designed metadata editor as well as by uploading of XML files. Distinct procedures are applied in each case of metadata submission.

- The metadata editor guides the curators towards complete descriptions (and uploading) of their resources through iterative checks that make sure that all obligatory elements are completed, safeguards well-formedness through the use of controlled vocabularies (where applicable), and aids the curator by the provision of examples and tips for free text fields.
- Automatic checking of the submitted XML files guarantees their completeness and well-formedness.

(b) once the metadata description is finalized and automatically checked, there are two rounds of manual assessment: a

first round of metadata and legal validation (performed by assigned validators), followed by the final approval of the supervisor, which signals the publication of the resource at the repository. The second round of validation is performed by ATHENA/ILSP curators and validators.

(c) The dataset(s) associated with a metadata record are automatically checked in order to assess their conformity with technical specifications as regards format and processability (interoperability with processing services).

Enhanced curation covers:

(a) conversion of tools to web services and integration thereof into the CLARIN:EL infrastructure as parts of workflows.

This conversion is performed by the repository staff in close collaboration with the tool developers.

(b) in the case of a new version of the metadata schema, the conversion of metadata descriptions to the updated version and the seamless to the providers migration to the new version has been undertaken by the repository staff.

Reviewer Entry

Reviewer 1

Comments:

accept

Reviewer 2

Comments:

Accept

Insource/Outsource Partners. If applicable, please list them.

CLARIN:EL repository is developed, technically and administratively managed and maintained by ATHENA/ILSP; its technical infrastructure (servers, clusters etc.) reside at the premises of ATHENA RC.

Partners – members of the national network are Academic and Research Institutions. Currently (October 2021) the network comprises 12 members (besides the Coordinator ATHENA/ILSP), with geographic coverage of most of the country. Each organization designates a staff member (Professor or Associate Professor) as Scientific Responsible of the respective repository. For each organization, the following links are provided: the home page of the organization, and (where appropriate) the page of the specific department or laboratory that acts as the CLARIN:EL node.

1. Aristotle University of Thessaloniki, <https://www.auth.gr/en/>, School of French Language and Literature, <https://www.frl.auth.gr/index.php/en/>, <http://apollonis.frl.auth.gr/index.php/en/>
2. Athens University of Economics, <https://aueb.gr/en>, Dept. of Informatics <https://www.dept.aueb.gr/en/cs>
3. Centre for the Greek Language, <https://greeklanguage.gr/en/?v=f214a7d42e0d>
4. Ionian University, <https://ionio.gr/en/>, Department of Archives, Library Science and Museology, <https://ilam.ionio.gr/en/>
5. National and Kapodistrian University of Athens, <https://en.uoa.gr/>, Linguistics Dept., <http://www.phil.uoa.gr/tomeis/tomeas-glwssologias/glwssologia.html>
6. National Centre for Scientific Research “Demokritos”, <http://www.demokritos.gr/>, Institute of Informatics & Telecommunications, <http://www.demokritos.gr/institute/institute-of-informatics-telecommunications/>
7. National Centre for Social Research, <https://www.ekke.gr/en>, Institute of Social Research, https://www.ekke.gr/en/centre/socres_institute/
8. Panteion University of Social and Political Sciences, <https://www.panteion.gr/en/>, Dept. of Political Science and History,

<https://polhist.panteion.gr/index.php?lang=en>

9. University of Crete, <https://en.uoc.gr/>, Dept. Of Philology, <https://www.philology.uoc.gr/en/>

10. University of the Aegean, <http://www.aegean.gr/>, Mediterranean Studies Department, <https://dms.aegean.gr/en/>

11. University of West Attica, <https://www.uniwa.gr/en/>, Dept. of Archival, Library & Information Studies, <https://alis.uniwa.gr/en/homepage>

12. GRNET S.A. – National Infrastructures for Research and Technology, <https://grnet.gr/en/>

The partners join the national network in order to provide their language resources and/or tools/services to the community and to get access to the resources and tools/services of the other members. Institutions join the network after approval of their application for membership by the CLARIN:EL General Assembly

(<https://www.clarin.gr/en/join/process-organisations>), following which they sign the Statutes that bind them as regards their rights and responsibilities (Statutes in Greek: <https://www.clarin.gr/sites/default/files/%CE%9A%CE%B1%CF%84%CE%B1%CF%83%CF%84%CE%B1%CF%84%CE%B9%CE%BA%CF%8C%CE%B4%CE%B9%CE%BA%CF%84%CF%8D%CE%BF%CF%85CLARINELv2.pdf>; selected articles translated into English: <https://docs.google.com/document/d/1dkDyGKIWz8o6AjnWvBiEBuRq6AqqE6A/edit?usp=sharing&oid=105312417803105848467&rtpof=true&sd=true>). The contribution of each partner depends on their respective expertise: all partners provide Language Resources or Language Processing Services they have developed, while ATHENA/ILSP additionally provides the technical infrastructure for the storage and running of the services (hardware and technical support by ATHENA staff), maintenance of the repositories as well as general management of CLARIN:EL; GRNET does not provide language resources but computational resources and services, detailed below.

GRNET S.A., the National Infrastructures for Research and Technology network, is the AAI federation provider for CLARIN:EL, providing user authentication services to the network; it also acts as back-up storage facility (security copies facility). GRNET (<https://grnet.gr/en/company/>) is state-owned, and one of the largest public sector technology companies in Greece. Established in 1998, since August 2019 it operates under the auspices of the Ministry of Digital Governance, and provides free networking, cloud computing, HPC, data management services and e-Infrastructures and services to academic and research institutions, to educational bodies at all levels, and to all agencies of the public sector. The complete list of services offered to the research community are described here <https://grnet.gr/en/research/>; from these, GRNET offers CLARIN:EL the following services:

- Computing and storage services (<https://grnet.gr/en/services/computing-and-storage-services/>),
- Identification (AAI) and security services (<https://grnet.gr/en/services/delos/>), and
- Persistent Identifiers Service (<https://grnet.gr/en/services/computing-and-storage-services/pid-service/>).

The tasks of GRNET are detailed in the Network statutes signed by all members; the relevant section has been translated into English and can be found here <https://docs.google.com/document/d/1dkDyGKIWz8o6AjnWvBiEBuRq6AqqE6A/edit?usp=sharing&oid=105312417803105848467&rtpof=true&sd=true> (section 4.2.3).

A more detailed description of AAI services is available on the GRNET website

(<https://aai.grnet.gr/static/policy/policy-en.pdf>) and <http://aai.grnet.gr/help/>. GRNET offers these services to all research organizations, therefore, no separate Service Level Agreement was needed for CLARIN:EL. Furthermore, as GRNET is a member of the CLARIN:EL network, this is not a case of outsourcing.

All development, maintenance and management tasks are undertaken by the network partners, as depicted in the

CLARIN:EL insourcing diagram

(https://drive.google.com/file/d/1IVQmInHAL7QAp_AjjoKnisAgA8LL0sRD/view?usp=sharing).

The only task outsourced to third parties was the evaluation of compliance of the CLARIN:EL procedures to GDPR stipulations; this task was assigned under contract to a company specializing on the issue

(<https://www.ecompliancegdp.com/>) and CLARIN:EL has been certified as GDPR-compliant in all its procedures.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

Summary of Significant Changes Since Last Application (if applicable).

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

Other Relevant Information.

National role: CLARIN:EL is part of the National Roadmap for Research Infrastructures

(http://www.gsrt.gr/News/Files/New987/road-map-web_version_final.pdf, published in 2014); currently, it forms part of the APOLLONIS national infrastructure for digital arts and humanities and language technology and innovation, together with DARIAH/DYAS (<https://apollonis-infrastructure.gr/>, pages only in Greek). CLARIN:EL hosts a total of 588 resources (corpora, lexica, tools/services and language models), and has been accessed more than 12,247 times in 2021, which corresponds to an increase of 713.75% as compared to 2017.

CLARIN:EL has been continuously funded since 2008, by the Greek government (through a series of national projects) and by the EU (see R1).

International role: CLARIN:EL is the Greek part of the CLARIN ERIC European Infrastructure (<https://www.clarin.eu/>); it is listed in the CLARIN ERIC Participating Consortia page <https://www.clarin.eu/content/participating-consortia>, and in the CLARIN Centres page <https://www.clarin.eu/content/overview-clarin-centres>.

CLARIN:EL is listed in re3data.org (<http://doi.org/10.17616/R3CV2K>).

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

ORGANIZATIONAL INFRASTRUCTURE

1. Mission/Scope

R1. The repository has an explicit mission to provide access to and preserve data in its domain.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

ATHENA/ILSP's mission and vision are presented in its website (https://www.athenarc.gr/en/vision_strategy, <https://www.athenarc.gr/en/ilsp/>), where activities related to language resources and processing services collection, preservation, deployment and distribution are explicitly mentioned.

CLARIN:EL's mission (as presented in the portal, <https://www.clarin.gr/en/about/what-is-clarin>) is to collect, document, curate, deploy and distribute digital language resources, language technology tools and language processing services. CLARIN:EL ensures the digital preservation of the Greek language, supporting the creation, curation, sharing and reuse of Greek language resources, tools and services and their deployment, its activities also cover multilingual resources and services containing Greek.

It offers access to:

- language data of various language modalities (written, spoken, multimodal, sign, lexical/conceptual, etc.) and in various media (text, audio, video, etc.)
- language processing tools and web services (such as tokenizers, part of speech taggers, dependency parsers, annotation platforms, etc.)
- the metadata of all resources made available through the infrastructure.

Access to the CLARIN:EL Infrastructure is open to the entire academic and research community, the industry, but also to the general public, in accordance with Open Data Principles and FAIR Data Principles.

ATHENA RC has received the mandate from the General Secretariat for Research and Innovation / Ministry of Development to represent Greece at the CLARIN ERIC research infrastructure and to coordinate the effort to implement the national research infrastructure for Language Resources and Technologies (see the letter of the Greek Secretary General for Research and Technology applying for Greece's participation in CLARIN ERIC and nominating ATHENA RC as representative, <https://drive.google.com/file/d/1150epzL3EDWwAKg6lvNXjTUJTNX09h4n/view?usp=sharing>). CLARIN:EL has been accepted as member of the General Assembly of CLARIN ERIC in February 2015.

Level of approval and commitment within the organization (historically)

The commitment of the organization led to continuous funding of CLARIN:EL (https://www.athenarc.gr/en/projects?field_project_type_tid=All&field_status_value_i18n=All&field_project_start_year_value%5Bvalue%5D%5Byear%5D=&combine=CLARIN); initially for the preparation of the participation of Greece at the European level (CLARIN PREP, 2008-10), and subsequently through a series of projects at the national level, which catered for the specifications and designing of the platform, subsequently for the development, and finally for the operation and maintenance of CLARIN:EL (https://www.athenarc.gr/en/projects?field_project_type_tid=All&field_status_value_i18n=All&field_project_start_year_value%5Bvalue%5D%5Byear%5D=&combine=APOLLONIS), until the end of 2021. Currently we have secured funding through the Hellenic Foundation for Research and Innovation for at least mid-term (2022-23) sustainability of the repository. The promised for 2022 (but not yet announced) continuation of funding of the National Roadmap of Research Infrastructures guarantees the long-term sustainability of CLARIN:EL.

The CLARIN:EL network is the association of Greek Organizations participating and cooperating for the construction, operation and maintenance of the CLARIN:EL and the provision of language resources and tools/services. The Network's Statutes bind the members and describe their rights and responsibilities. Each Member Organization appoints a Scientific Responsible of its Repository – subset of CLARIN:EL, who represents the Organization at the General Assembly. Member organizations contribute to the infrastructure by providing resources and/or tools/services to the repository. GRNET provides technical services (see R0) and ATHENA/ILSP coordinates the Network, provides technical services and support and also provides languages resources and language processing services (see CLARIN:EL insourcing diagram, https://drive.google.com/file/d/1IVQmInHAL7QAp_AjjoKnisAgA8LL0sRD/view?usp=sharing).

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

2. Licenses

R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

Processes and activities taking place inside the CLARIN:EL Research Infrastructure are stipulated by a set of legal document templates designed to help all stakeholders (resource owners, providers and end-users) work in a friendly and transparent environment. Legal rights are protected both at the level of provision and at the level of use, by the following legal documents:

- CLARIN:EL Network Statutes (<https://www.clarin.gr/sites/default/files/%CE%9A%CE%B1%CF%84%CE%B1%CF%83%CF%84%CE%B1%CF%84%CE%B9%CE%BA%CF%8C%CE%B4%CE%B9%CE%BA%CF%84%CF%8D%CE%BF%CF%85CLARINELv2.pdf>, in Greek): state the code of conduct and the responsibilities and rights of organizations - CLARIN:EL Network members/providers of resources and tools/services.
- Terms of Service (<https://www.clarin.gr/en/content/terms-service>), applies to all users, registered or unregistered, of the CLARIN:EL Research Infrastructure; this includes measures on misuse of services and notification regarding IPR infringement, among which the Notice and Take Down Policy, according to which resources are removed from the repository in case of breach of the Terms.
- Privacy Policy (<https://www.clarin.gr/en/content/privacy-policy-summary>): describes how CLARIN:EL collects and uses users' personal data and the measures taken to ensure data protection. It specifies what types of data are collected, for

what purposes and for how long, cookies policy and linked services, third party sites and informs the users about their rights and cases of disclosure of personal data.

- Licenses for resource use: all resources deposited at CLARIN:EL repository must have a clear legal status and the appropriate license must be selected by the provider. CLARIN:EL favors and promotes Open Licenses; however, distribution and/or use restrictions on legacy data are respected. Clearance of IPR and selection of the appropriate license is the responsibility of the resource provider. The repository offers a variety of standard licenses for the provider to select from, when depositing the resource; it also offers help on the selection (in case the provider is uncertain what license to choose) through the Legal Helpdesk (<https://www.clarin.gr/en/support>).

The License of a resource is included within its metadata description; the relevant element is one of the mandatory metadata elements accompanying a dataset, which means that a resource cannot be deposited unless the license type is filled in; the inclusion of a proper license value is also checked during the validation process. Based on the value of this element, the infrastructure permits (or not) downloading and processing of a resource. Open resources are free for anyone (registered or unregistered user), while restricted resources are only available to authenticated users, who need to accept the license terms in order to use the resource. If the license demands contacting the resource owner, the repository provides the relevant contact details to the user.

Processing of resources with CLARIN:EL workflows and tools/services is available only to registered users. Attribution requirements or conditions of use (Share Alike, No Redistribution etc.) are also defined by the resource provider. Metadata descriptions are freely available to all, under Creative Commons Attribution 4.0 International (CC BY 4.0) license.

The treatment of personal /sensitive data is detailed in R4 on Confidentiality and Ethics.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

3. Continuity of access

R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.

Compliance Level:

3 – The repository is in the implementation phase

Reviewer Entry

Reviewer 1

Comments:

3 – The repository is in the implementation phase
accept

Reviewer 2

Comments:

3 – The repository is in the implementation phase
Accept level 3

Response:

CLARIN:EL has been developed and is maintained by the Coordinator of the Network, namely ATHENA/ILSP, as stated in the CLARIN:EL Network Statutes. ATHENA/ILSP provides (a) the management and development teams for CLARIN:EL, (b) repository creation and management software, (c) user support services (technical and legal), and (d) maintenance of the central inventory and of the whole infrastructure. Each organization member of CLARIN:EL, as stated in the Statutes, is responsible for the resources and/or services deposited at CLARIN:EL; this entails clearance of IPR issues, assuring the legal base for the processing of any personal data contained in the resources, provision of the resources with a clear license (preferably one of the open licenses proposed by the repository), description of the resources using the common metadata schema of the infrastructure and keeping the descriptions always up-to-date, and adoption of the standards and best practices proposed by the repository.

The organizations providing technical (hardware and software) services to CLARIN:EL (ATHENA/ILSP and GRNET) are responsible for the provision of computer power and storage, assurance of the continuous and seamless functioning of the infrastructure, provision of AAI services for the users and PID services to the resources. AAI provision is provided by GRNET (<https://grnet.gr/en/company/>), due to its national role: the National Infrastructures for Research and Technology S.A. is a public sector technology company in Greece, operating under the auspices of the Ministry of Digital Governance. GRNET provides networking, cloud computing, HPC, data management services and e-Infrastructures and services to academic and research institutions, to educational bodies at all levels, and to all agencies of the public sector, for free. Both ATHENA/ILSP (functioning under the Ministry of Development) and GRNET SA (functioning under the Ministry of Digital Governance) are public sector bodies, with permanent staff, whose salaries are covered by the Government. The ATHENA/ILSP staff working for CLARIN:EL development, maintenance and management consists of 4 permanent staff (researchers) and 10 contract-based associate researchers. The coverage of the permanent staff's salaries by the Government is a form of indirect funding of CLARIN:EL; this provides a minimum guarantee of the continuation of services provision. Besides this, funding of CLARIN:EL is project-based.

As regards the continuity in the provision of resources, all member organizations joining the network supporting CLARIN:EL sign the CLARIN:EL Statutes, in which they declare that their main purpose is to “collect, document, maintain, manage and make available Greek Language Resources and Technologies (LRTs) through the Infrastructure”. In case a member leaves the network, the resources already provided remain at the repository and are undertaken by one of the

other members.

The Statutes remain in force until the dissolution of the Network; any amendment of the Statutes and the dissolution of the Network require the approval of the General Assembly by absolute majority (<https://docs.google.com/document/d/1dkDyGIKIWz8o6AjnWvBiEBuRq6AqqE6A/edit?usp=sharing&oid=105312417803105848467&rtpof=true&sd=true>, Article 10).

As regards funding, previous and future (mid-term, guaranteed for the next two years) please see R1. Long-term funding is expected from the next programmatic period concerning the National Research Infrastructures Roadmap, due to be published in 2022. Given that CLARIN:EL has received the continuous administrative and financial support of the Ministry of Development and has been part of the National Roadmap during all previous phases, it is considered highly unlikely that the funding will cease after 2023. However, in the unfortunate case of cessation of national funding, CLARIN:EL will resort to three alternative (or even combined) solutions:

- Supporting the financing of CLARIN:EL through other national or EU projects
- Distribution of CLARIN:EL resources by the depositors themselves through other channels (i.e., their own institutional repositories)
- Distribution of CLARIN:EL resources through partners of CLARIN ERIC.

For technical measures taken to ensure continuous provision of CLARIN:EL services cf. R15 and R16.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept on level 3 since there is no formal written agreement between CLARIN:EL and another organisation that would guarantee to take over the responsibility in the case of discontinuity.

4. Confidentiality/Ethics

R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository
Accept

Response:

CLARIN:EL provides storage, computational resources, cataloguing, curation, maintenance and distribution of resources and processing services; the CLARIN:EL repository is responsible for adhering to disciplinary and ethical norms for the specific activities. The responsibility of adherence to disciplinary and ethical norms for collection/ creation and description of resources belongs to the resource provider. Most resources deposited at CLARIN:EL have not raised confidentiality and disclosure issues; however, there are procedures and measures in place, catering for compliance with disciplinary and ethical norms. Additionally, CLARIN:EL provides legal aid to depositors uncertain how to treat, describe and distribute resources including personal/sensitive data.

Each organization joining CLARIN:EL nominates a Scientific Responsible who signs the Network Statutes, by which s/he declares that s/he undertakes the responsibility for all resources and/or services deposited at CLARIN:EL repository; this entails: clearance of IPR issues, clearance of the legal base for processing of any personal data contained in the resources, provision of the resources with a clear license (preferably one of the open licenses proposed by CLARIN:EL), description of the resources using the common metadata schema of the infrastructure, keeping the descriptions always up-to-date, and adoption of the proposed standards and best practices (article 4.2 of the Statutes, <https://docs.google.com/document/d/1dkDyGIKIWz8o6AjnWvBiEBuRq6AqqE6A/edit?usp=sharing&oid=105312417803105848467&rtfpof=true&sd=true>, translated into English).

The signature of the Statutes explicitly binds not just the signatory, but also all persons affiliated to the organization; the Scientific Responsible informs them about their responsibilities and the correct use of CLARIN:EL. This means that the depositor does not have to sign a separate depositor's agreement; unless s/he does not belong to an organization (University or Research Center) and has joined the network as individual. In this case, s/he does need to sign a depositor's agreement, declaring that s/he owns or has the rights over the resource, has complied with research ethics in the phases of collection of the data and has the right to distribute it (see Depositor's Agreement, https://www.clarin.gr/sites/default/files/CLARIN_EL%20Depositors%20Agreement.pdf).

During metadata encoding, providers (either belonging to a member organization or individual members) are requested to state whether their datasets contain sensitive or personal data and if they have applied anonymization tools.

CLARIN:EL provides guidance on legal and ethical issues to providers via its help desk (legal-helpdesk@clarin.gr).

Research Ethics: CLARIN:EL users' behavior is monitored by two legal instruments:

- a. the CLARIN:EL statutes, which include a section specifying the rights and responsibilities of the members (see above) and
- b. the CLARIN:EL Terms of Service (<https://www.clarin.gr/en/content/terms-service>), which include a dedicated Article on

Research Ethics, which specifies that “You agree to observe best practices regarding research ethics. This includes indicatively treating colleagues, stakeholders, customers, suppliers and the public respectfully and professionally, taking into account confidentiality when appropriate, respecting cultural differences and having an open and explicit relationship with government, the public, the private sector and other funders.”

Besides this, the CLARIN:EL Terms of Service include an article titled “CLARIN:EL services and notification regarding IPR infringement”; this article specifies which actions constitute violations of CLARIN:EL policy and which are the resulting reactions of CLARIN:EL (limiting access, removing content, etc.).

All legal instruments deployed by CLARIN:EL are presented in the relevant webpage of the portal (<https://www.clarin.gr/en/support/legal>).

If a rights holder is concerned that s/he has found Language Resources (LRs) on the CLARIN:EL repository for which s/he has not given permission, granted a license or which is not covered by a limitation or exception in national law, such rights holder is asked to contact CLARIN:EL through the CLARIN:EL Legal Helpdesk. Upon receipt of notification the ‘Notice and Take Down’ procedure is invoked (<https://www.clarin.gr/en/content/terms-service>); if the complaint is valid, the LR will be temporarily removed from the CLARIN:EL inventory and CLARIN:EL will notify the individual or organization who deposited the material that the material is subject to a complaint, under what allegations, and will be encouraged to assuage the complaints concerned and to resolve the issue swiftly and amicably and to the satisfaction of both parties, with the following possible outcomes: (a) The resource is replaced on the CLARIN:EL inventory unchanged, (b) The LR is replaced on the CLARIN:EL inventory with changes, and (c) The LR is permanently removed from the CLARIN:EL inventory; if the complaint is valid, the LR will be temporarily removed from the CLARIN:EL inventory and CLARIN:EL will notify the individual or organization who deposited the material that the material is subject to a complaint, under what allegations, and will be encouraged to assuage the complaints concerned and to resolve the issue swiftly and amicably and to the satisfaction of both parties, with the following possible outcomes: (a) The resource is replaced on the CLARIN:EL inventory unchanged, (b) The LR is replaced on the CLARIN:EL inventory with changes, and (c) The LR is permanently removed from the CLARIN:EL inventory.

The CLARIN ERIC Legal and Ethics Committee (<https://www.clarin.eu/governance/legal-issues-committee>) provides useful material concerning the CLARIN licensing framework(<https://www.clarin.eu/content/clarin-licensing-framework>), relevant material (<https://www.clarin.eu/content/legal-information-platform>) and useful links on Legal and Ethical Issues (<https://www.clarin.eu/content/useful-links-legal-and-ethical-issues>); this material is available to CLARIN:EL and its users.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

5. Organizational infrastructure

R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.

Compliance Level:

3 – The repository is in the implementation phase

Reviewer Entry

Reviewer 1

Comments:

3 – The repository is in the implementation phase
accept

Reviewer 2

Comments:

3 – The repository is in the implementation phase
Accept level 3

Response:

CLARIN:EL is hosted by ATHENA/ILSP, the Institute coordinating the network of organizations participating in the project. ATHENA/ILSP, founded in 1991, belongs to ATHENA RC, which functions under the auspices of the General Secretariat of Research and Innovation of the Ministry of Development; this ensures long-term stability of the organization (first of all) but also of the administrative (i.e. personnel), operational (i.e. procedures in place) and physical (i.e. hardware) infrastructure.

CLARIN:EL is listed in the National Roadmap of Research Infrastructures of Greece, created by the General Secretariat of Research and Innovation (<http://www.gsrt.gr/>, the national funding agency for research and technology); this means that CLARIN:EL has been recognized as one of the Research Infrastructures that the country has selected for funding. The current funding project has been running since November 2017 and ended in October 2021; the cessation of further funding of these infrastructures is deemed unlikely. However, we have already secured funding by the Hellenic Foundation for Research and Innovation (<https://www.elidek.gr/en/homepage/>) for a new project, catering for maintaining and extending CLARIN:EL for the next two years (2022-23).

CLARIN:EL is designed, developed, maintained and managed by an administrative/development team (<https://www.clarin.gr/en/about/team>) that is employed by ATHENA/ILSP; the same team is also responsible for enriching, curating and maintaining the resources and services of ATHENA/ILSP. The ATHENA/ILSP team (14 members, 4 of which permanent, 13 Research and Development staff and one Administrative support staff) has substantive/multi-year expertise in project management, software engineering, user interfaces, natural language processing, language resources, metadata modelling, data curation and research infrastructures (successfully completed or currently running

projects include ELRC-SHARE (<https://elrc-share.eu/>), OpenMinTed (<http://openminded.eu/>), META-SHARE (<http://www.meta-share.org/>) and ELG (<https://www.european-language-grid.eu/>); the above expertise coupled with long and established experience in team working render the team well-qualified to undertake the maintenance of the platform for the next years.

All members of the team are continuously trained through seminars/webinars/workshops provided in-house or by CLARIN:EL network members or by CLARIN ERIC. Participation in summer schools, workshops and conferences is encouraged and financed by CLARIN:EL. For the training of new staff, informative material has been created, such as video tutorials, presentations, and detailed online documentation (<https://clarin-platform-documentation.readthedocs.io/en/latest/>). The documentation was written using readthedocs, an open-source free software documentation hosting platform (<https://readthedocs.org/>).

The whole CLARIN:EL platform is deployed at the computing/hardware infrastructure of ATHENA/ILSP (for more information about the hardware setup and the cluster see R15 & R16), which is equipped with powerful physical machines, monitored and protected with the appropriate mechanisms/protocols; dedicated trained staff is responsible for the maintenance of the infrastructure.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept on compliance level 3

6. Expert guidance

R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either inhouse or external, including scientific guidance, if relevant).

Compliance Level:

3 – The repository is in the implementation phase

Reviewer Entry

Reviewer 1

Comments:
3 – The repository is in the implementation phase
accept

Reviewer 2

Comments:

3 – The repository is in the implementation phase

Accept level 3

Response:

As already mentioned in R5, the administrative/development team of CLARIN:EL has substantive/multi-year expertise in software engineering, user interfaces, natural language processing, language resources, metadata modelling, data curation and research infrastructures.

Besides the knowledge of the core team, the network members provide valuable expertise. The CLARIN:EL network (<https://www.clarin.gr/en/about/clarinel-network>) currently comprises 13 member organizations (Universities and Research Institutes), geographically spread over the country, and thematically covering the various disciplines of CLARIN:EL: (Digital) Humanities, Social and Political Sciences and Language Technology. The researchers that participate in the CLARIN:EL network (<https://www.clarin.gr/en/about/team>) are active users of the platform (often simultaneously resource providers and end-users), contributing resources such as datasets and Natural Language Processing services. Some of these services have been integrated to the platform and can be used directly on CLARIN:EL datasets.

Most of the users are experts in their fields and are staff members in Greek universities or research institutes; they provide valuable feedback and advice as regards user requirements, standards and best practices in their scientific fields, evaluation of the platform, assessment of the metadata schema descriptive adequacy. Feedback from the Designated Community is received through the CLARIN:EL helpdesks (<https://www.clarin.gr/en/support/helpdesks>) and dedicated events (webinars, questionnaires, focus groups); questionnaires and polls during webinars and online courses have been deployed for measuring user satisfaction, evaluation of the platform, but also for collecting ideas for improvement. Valuable comments from users have been taken into account for the recent revision of the platform, which led to CLARIN:EL version3.

CLARIN:EL participates in various CLARIN ERIC committees and task forces (Legal and Ethical Issues Committee, National Coordinators' Forum, Standards Committee, Standing Committee for CLARIN Technical Centres, User Involvement Committee); through this channel we get feedback from the other national CLARIN consortia and we keep up with the latest updates on guidelines, specifications and best practices related to CLARIN ERIC.

The Statutes of the CLARIN:EL network foresee the creation a Scientific Advisory Committee, whose role is to provide expert advice to the members of the network. However, this Committee has not been set up yet. This is planned to be completed in the next phase.

Reviewer Entry

Reviewer 1

Comments:

accept

Reviewer 2

Comments:

Accept on compliance level 3

DIGITAL OBJECT MANAGEMENT

7. Data integrity and authenticity

R7. The repository guarantees the integrity and authenticity of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository
Accept

Response:

CLARIN-EL takes measures to check and ensure authenticity, provenance, relations within and between datasets, including versions of the same data. Specifically:

Integrity: The data that are stored in the CLARIN-EL repository are compressed files. A MD5 checksum is issued for each compressed data file on ingestion into CLARIN-EL. Checksums are routinely validated to verify that digital objects do not change overtime.

Provenance information: Provenance information is kept as soon as the record is created. The depositor's, the validators' and the supervisor's credentials, contact information, rejection comments - if they exist - and timestamps are kept to ensure that the repository staff can verify who and when submitted, reviewed and approved the publication of the item.

Depositor authentication: The depositors must be registered users. A registered user in CLARIN:EL can either use his/her academic account or register with his/her personal email. In case of using the academic account, the identity of the user is authenticated by his/her academic institution, which is a member of the GRNET AAI Federation (<https://aai.grnet.gr/>) or the CLARIN ERIC Federation (<https://www.clarin.eu/content/service-provider-federation>).

Documentation of completeness: Resource submission is a form-based process through a specially designed metadata editor. The forms apply the standardized CLARIN:EL metadata schema (henceforth CLARIN-SHARE), which entails that

the depositor cannot submit the resource until the mandatory metadata information has been filled in (<https://clarin-platform-documentation.readthedocs.io/en/stable/all/Appendix/Full.html>). In this sense, adherence to the CLARIN-SHARE is safeguarded. After the submission of the data and its metadata, legal and metadata validation takes place, performed by two validators who are assigned by the supervisor to check the resource. Upon approval, the supervisor of the depositor has the authority to publish the resource. Thus, every resource receives curatorial review by two validators and a supervisor, ensuring that metadata and data that are incomplete or not ready for use are not accepted to the repository. On every step of the record lifecycle, from ingestion to approval, users involved in the process are informed (upon completion of every step) through email and also on the repository dashboard.

Record Relations: CLARIN-SHARE provides metadata elements that define relations between records, such as relations to other versions, to similar datasets, reference to the whole dataset if the described dataset is part of a bigger dataset, etc. The relation can either refer to a dataset that resides within the CLARIN:EL repository or to an external dataset.

Curation log: Every change applied to the metadata is logged, keeping also the information by whom, when and in which metadata element the change was made. A change in the data files is applicable only as replacement, keeping also the relevant information of whom and when. During metadata encoding, and while in draft mode, changes in both metadata and data are permitted only to the depositor/curator, until the approval by the validators. As soon as the record is approved by the validators and published by the supervisor, only the supervisor and the infrastructure administrators have the authority to apply changes on the record. Published resources cannot be edited by anyone; the supervisor has to unpublish the resource, edit it and re-publish it. The roles of curator, validator and supervisor are assigned by each organization supervisor to its members; their rights are explained in the relevant documentation page (https://clarin-platform-documentation.readthedocs.io/en/stable/all/1_BasicConcepts/Users.html?highlight=roles#types-of-registered-users) and regular training sessions are organized for their support.

Versioning: Each published resource receives a PID. A new version is welcomed in CLARIN:EL by copying the metadata of the previous release and altering the version number and date of the new record, as well as adding the relationship between the versions in the metadata. Upon that new version record, the depositor can make more changes through the editor forms and upload the new data. The rest of the workflows that are needed for publishing the record remain the same as if it was a new record. The new version gets its own PID and the data users can access all versions of the dataset in CLARIN:EL. A concept PID is also added when a record is published. The concept PID represents all versions of the record, i.e. the concept of the data and the ensemble of the versions; it resolves on the latest versioned record.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

8. Appraisal

R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository
Accept

Response:

Data Collection policy (<https://www.clarin.gr/sites/default/files/CLARINELDataCollectionPolicy.pdf>): the repository collects data relevant to the mission and objectives of CLARIN:EL, i.e., language data and language processing tools/services, mostly for Greek but not excluding other languages, useful for research and development in all scientific fields dealing with language. CLARIN:EL supports Language Technology research and development for Greek with the aim to improve digital readiness of Greek. Data not falling within the mission profile are re-directed to the appropriate infrastructures (if existent).

Who can deposit: Providers can be legal or physical entities. Academic or Research Organizations can join the CLARIN:EL network and set-up their repository; researchers affiliated to these organizations can deposit their resources (data or language processing services). Individual researchers, not affiliated to a University or Research Center, can deposit their resources to the Hosted Resources Repository.

Metadata: the CLARIN:EL repository adheres to CLARIN-SHARE schema (https://clarin-platform-documentation.readthedocs.io/en/latest/Documentation/CLARIN-SHARE_schema.html), a revised version of the META-SHARE model. The schema is structured in 3 tiers of metadata elements: mandatory, recommended and optional. In order for a resource to be submitted for storage at the CLARIN:EL repository, it has to adhere to this common schema, which is compatible to CMDI (Component MetaData Infrastructure, <https://www.clarin.eu/content/component-metadata>) and DC (Dublin Core, <https://dublincore.org/>), both broadly used standards in the community for metadata vocabularies, concept schemes and other metadata artefacts. For more details see R13.

The description of a resource is not considered complete, and the resource cannot be uploaded, unless all mandatory metadata elements (https://clarin-platform-documentation.readthedocs.io/en/stable/all/3_Creating/Mandatory.html?highlight=mandatory#mandatory-metadata) have been filled-in by the provider. Relevant automatic checks are performed by the platform during encoding; this ensures the completeness and sufficiency of metadata descriptions for interoperability and long-term preservation.

The metadata schema is converted to CMDI profiles, catering for compatibility and interoperability with the CLARIN ERIC requirements, and thus facilitating harvesting by CLARIN ERIC Virtual Language Observatory (<https://www.clarin.eu/content/virtual-language-observatory-vlo>).

The repository accepts data in various modalities (text, audio, video, image) and therefore specifies the appropriate formats for each type. The principles governing data collection by CLARIN:EL are laid down in the Data Collection policy document (<https://www.clarin.gr/sites/default/files/CLARINELDataCollectionPolicy.pdf>); the document specifies the types of data and the relevant formats accepted, in accordance with the mission and the scope of CLARIN:EL, the licensing scheme proposed to the providers, and the responsibilities of each participating organization, with the aim to ensure the appropriateness of data deposited, the interoperability between data and services, and the long-term archiving of data and services.

CLARIN:EL offers depositors a list of recommended data formats. Depositors are encouraged to submit data in formats that are acknowledged as standards or best practices, and moreover, suitable for particular types of research (e.g., while PDF/A is an excellent choice for documentation, it is not suitable for textual source data intended for language processing). Furthermore, depositors are advised that, in order for their data to be processable by the CLARIN:EL integrated services (<https://inventory.clarin.gr/workflows/>), they have to be in specific format(s); these are detailed in the relevant documentation (Recommended File formats, <https://www.clarin.gr/sites/default/files/CLARINELRecommendedFormats.pdf>) and also reminded to the user by the system during the resource description and uploading phase. Resources relevant as regards content, but deposited in non-preferred formats are accepted (if adequately described), but marked as non-processable.

Archival policy: the Preservation Policy Document

(<https://www.clarin.gr/sites/default/files/CLARINELPreservationPolicy.pdf>) provides CLARIN:EL's long-term archiving policy, explains the Resource Life-Cycle, the access principles, and the responsibilities of the CLARIN:EL members. CLARIN:EL staff are trained in issues related to appropriate licensing schemes, GDPR and personal and sensitive data protection, FAIR principles and their application to language resources and language technology, Open Access and the Open Science paradigm.

References:

1. Data Collection policy: <https://www.clarin.gr/sites/default/files/CLARINELDataCollectionPolicy.pdf>
2. Preservation Policy: <https://www.clarin.gr/sites/default/files/CLARINELPreservationPolicy.pdf>
3. Recommended file formats: <https://www.clarin.gr/sites/default/files/CLARINELRecommendedFormats.pdf>
4. Deposition documentation:

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

9. Documented storage procedures

R9. The repository applies documented processes and procedures in managing archival storage of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

CLARIN:EL has developed procedures which ensure that hardware, software and storage media containing archival copies of digital content are managed in accordance with security control, data protection and recovery standards. The main principles of long-term preservation and permanent storage facilities are outlined in the Preservation Policy documentation (<https://www.clarin.gr/sites/default/files/CLARINELPreservationPolicy.pdf>). The Preservation Policy adheres to the terminology and preservation practices by the Open Archival Information System (OAIS) Reference Model.

To ensure the completeness, accuracy and usability of the metadata, all deposited resources undergo the following metadata quality checks (automatic and manual, by human validators): completeness of required and optional metadata, documentation, links to related materials, file format, privacy issues. For more details regarding quality control see R11 and R12. Once the dataset is approved, the resource is accepted and will be subsequently published and archived for

long-term preservation.

To ensure the integrity of the data, and their accessibility over time, for every deposited file a checksum (MD5 type) is generated at the time of ingestion. Checks are performed automatically and regularly to detect corruptions, prevent instantly their replication and restore the correct non-corrupted version.

Data files are stored in a directory of a Network-attached Storage (NAS) through NFS (Network File System). On the other hand, the metadata are stored in a PostgreSQL database. The database files are backed up in NAS once a day.

Moreover, the NAS has backup storage to another server and can be accessed and restored when required.

The NAS and the backup server are part of the computing/hardware infrastructure of the ATHENA/ILSP. The facilities include 24/7/365 connectivity to public networks at a sufficient bandwidth, heat and fire protection system and physical access control to the hardware only by experienced staff. The NAS uses RAID 5 that offers a good balance of disk performance and redundancy/data protection. Moreover, as an extra measure for data protection we have set up a procedure that backups CLARIN:EL data and metadata to an external server (i.e. not a part of the ATHENA/ILSP hardware infrastructure) hosted by GRNET. The scripts and the procedures that perform the backups are regularly checked by administrators and they are updated if needed.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

10. Preservation plan

R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Accept

Response:

Each organization member of CLARIN:EL is responsible for the resources and/or language processing services deposited at CLARIN:EL repository. As already mentioned in R4, the responsibility of each member includes clearance of IPR issues of the resources to be deposited, assuring the legal base for the processing of personal data contained in the resources, provision of the resources with a clear license granting the repository the non-exclusive right to store and preserve the resources, describing the resources using CLARIN-SHARE, keeping the descriptions always up-to-date, and adopting the standards and best practices proposed by the repository. The signature of the Statutes explicitly binds not just the signatory (i.e. the representative of each Organization), but transfers all rights and obligations to all persons affiliated to the organization. This means that each depositor does not have to sign a separate depositor's agreement, provided s/he belongs to one of the CLARIN:EL member organizations. If s/he does not belong to an organization (University or Research Center) and has joined the network as individual, s/he needs to sign a depositor's agreement (https://www.clarin.gr/sites/default/files/CLARIN_EL%20Depositors%20Agreement.pdf) declaring that s/he owns or has the rights over the resource, has complied with research ethics in the phases of collection of the data and has the right to distribute the resource.

The Depositor's agreement clearly lists the responsibilities and the rights of CLARIN:EL and the depositor, and is available on the CLARIN:EL portal, together with the guidelines for deposition (<https://www.clarin.gr/en/services/share>) of resources. The depositor maintains the copyright on the deposited data as well as on the corresponding documentation. CLARIN:EL has the rights to copy, transform and store the items, as well as to provide access to them. Depositors are encouraged to choose sustainable file formats defined in the Recommended File Formats documentation (<https://www.clarin.gr/sites/default/files/CLARINELRecommendedFormats.pdf>). It is highly recommended to provide data in a standard format, which is most suitable for the type of the data and the type of research for which it is intended. In the document, special reference has been made to the data format of datasets accepted as input by the CLARIN:EL integrated services (<https://inventory.clarin.gr/workflows/>).

The Coordinating organization (ATHENA/ILSP), as declared in the Statutes, is responsible for the provision of repository management software, for user support services (technical and legal), for maintaining the Central inventory, for the preservation of the resources deposited, and in general for the smooth operation of the infrastructure.

CLARIN:EL does not alter the content of the deposited resources for any reason. In case of migration due to modifications in the metadata schema (which took place in 2021) automatic procedures have been adopted aiming at the conversion of all resources' descriptions to the new version. Additionally, appropriate documentation has been written, aiding depositors to manually check and validate the automatically produced new descriptions of their resources. Accordingly, should format migrations be needed due to technological evolutions, the same procedure will be followed. In case the depositor is no longer available, the relevant resources will be checked by ATHENA/ILSP curators and validators.

In our Preservation Policy (<https://www.clarin.gr/sites/default/files/CLARINELPreservationPolicy.pdf>) we describe in detail the preservation workflow, the specific preservation actions taken on the data & metadata we store, in order to maintain their integrity and ensure their accessibility over time, and the responsibilities of the members. The technical side of preservation (data storage, backups, security etc.) is the responsibility of ATHENA/ILSP with the help of GRNET. The content side of preservation is undertaken by the CLARIN:EL members (providers) with the help of ATHENA/ILSP curators and validators.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

11. Data quality

R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

Metadata quality checks are performed at three stages:

(a) Automatic validation of metadata at the time of encoding, via the specially designed metadata editor

(b) Manual validation by the validators and the supervisor of the specific organization-CLARIN:EL member at the time of submission of a resource for publication, and

(c) Final manual validation by the ATHENA/ILSP validators, at regular intervals (once monthly).

These quality validation stages are elaborated below.

The CLARIN:EL team has carefully designed and implemented a web-based metadata editor which helps the providers to document a resource with a rich set of metadata elements (distinguished into mandatory, recommended or optional). The editor provides hints/help texts for what should be filled-in, and produces validation reports with what should be corrected or added. Validation checks are also performed at the time of encoding, in cases of controlled vocabularies, where the users must select one out of a set of given values.

In addition, each resource undergoes a submission process in which validators manually check the metadata and data; in case a validator approves a resource, it is forwarded to the supervisor for final approval and publication in the repository. If the validator rejects a resource, this is returned to the curator for correction, together with the validator's comments and reasons for rejection. After correcting the resource, the curator re-submits it for validation and a new cycle begins.

Once a resource is deposited at CLARIN:EL (after having successfully passed through all automatic and manual checks mentioned above), it is additionally checked manually by experienced ATHENA/ILSP curators and validators; in case of errors, deficiencies or inconsistencies, the depositor is notified to correct the resource description. This process ensures quality and completeness to a great extent.

User support caters for providers of resources and for end-users:

(a) The online documentation

(https://clarin-platform-documentation.readthedocs.io/en/stable/all/0_Introduction/AboutClarin.html) created and made publicly available aims at the support of both providers and end users: it describes the functionalities of the platform, including information on the submission process and the metadata editor, but also information about searching and browsing the catalog, downloading the resources, using the language processing workflows, etc.

(b) For the support of end users, various video tutorials have been created

(<https://www.clarin.gr/en/support/user-manuals>), covering issues from how to register to CLARIN:EL to how to process data with CLARIN:EL NLP tools/services.

Attribution and citation of resources is crucial for the quality of the services provided by CLARIN:EL to providers and end-users alike. The metadata editor foresees specific elements for the attribution and the citation of a resource, as well as for the addition of any documentation or related scientific publications the depositor considers useful (see also R12 and R13). Thus, the depositor can inform the user how they wish to be attributed and how the resource should be cited and can provide the user with additional documentation. The citation and attribution texts are created automatically based on the metadata elements of the resource, following the DataCite recommendations (<https://datacite.org/cite-your-data.html>, for citation) and those of Creative Commons (<https://creativecommons.org/use-remix/attribution/>, for attribution).

Each resource deposited in CLARIN:EL is assigned a PID, and users are encouraged to use it for reference to the

resource.

Rating the resources by the users has not been implemented, in order not to discourage resource submission by hesitant providers. Users can convey their comments, feedback or criticism through the designated Helpdesks (technical, legal and metadata helpdesk) that are at their disposal (<https://www.clarin.gr/en/support/helpdesks>) or contact the resource contact person directly (contact mail is part of the resource metadata).

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

12. Workflows

R12. Archiving takes place according to defined workflows from ingest to dissemination.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

The data handling workflow is articulated in the following way:

- User authorization

(https://clarin-platform-documentation.readthedocs.io/en/stable/all/1_BasicConcepts/RegisterAsUser.html): the prospective depositor is directed to the Registration page, since only registered and authenticated users are permitted to deposit resources.

- **Data upload and metadata creation:** The submitter describes the resource in the editor forms (https://clarin-platform-documentation.readthedocs.io/en/stable/all/1_BasicConcepts/RegisterAsUser.html), which adhere to the standardized CLARIN-SHARE schema (<https://clarin-platform-documentation.readthedocs.io/en/stable/all/Appendix/Full.html?highlight=schema>); s/he then uploads the data (https://clarin-platform-documentation.readthedocs.io/en/stable/all/3_Creating/Editor.html#step-2-upload-the-resource-data). CLARIN-SHARE appropriately implements the CLARIN:EL policies that the data and metadata must meet. It includes mandatory elements (https://clarin-platform-documentation.readthedocs.io/en/stable/all/3_Creating/Editor.html#step-2-upload-the-resource-data), which the submitter must fill in, in order to successfully submit the resource. The submitter is supported and monitored during editing by automated validation checks (e.g. email validation, semantic version conformance) and metadata completeness controls. The submitter can get support via the provided helpdesks. After describing the resource, the submitter indicates the file to be uploaded.
- **Quality control / Quality assurance** (https://clarin-platform-documentation.readthedocs.io/en/stable/all/4_Managing/Managing.html#validate): Metadata and legal validators, assigned by the supervisor of the submitter, inspect the consistency and completeness of the metadata, validate their accuracy as regards the related data files, and check the legal information. If they have an objection, they log it, and the submitter has to edit the metadata record accordingly. Then the resource is forwarded to the supervisor for final approval and publication on the CLARIN:EL inventory (https://clarin-platform-documentation.readthedocs.io/en/stable/all/4_Managing/Managing.html#publish). When the resource gets published, the depositor is informed via email and also through the platform's dashboard. At the stage of publication, the metadata and the data cannot be changed (https://clarin-platform-documentation.readthedocs.io/en/stable/all/4_Managing/Managing.html#i-per-resource-status-and-user-type). If a case for modification of published resource arises, the supervisor of the submitter or the administrators of CLARIN:EL unpublish the record, edit it and re-publish it.
- **Discovery and Access:** A persistent identifier is assigned to the resource and the resource is publicly available, while the data are accessible according to the specified license. The metadata record is fully indexed and freely accessible by the CLARIN:EL repository (<https://inventory.clarin.gr/search/>), but also via a OAI-PMH protocol interface and a REST API. For details concerning discovery please see R13. Resources are downloadable only if their license permits it. Legal and technical restrictions on resources are specified by the provider via the relevant metadata elements, based on which the repository controls the resource's access policy (downloading, access through interface, contacting the provider etc., see https://clarin-platform-documentation.readthedocs.io/en/stable/all/1_BasicConcepts/Accessible.html#when-is-the-content-of-a-resource-accessible). Moreover, to cater for proper citation of CLARIN:EL resources, a ready-to-copy citation snippet is provided to users via the UI (see R13).
- **Preservation:** The system guarantees long-term preservation of the submitted data and metadata using services such as migration, logging of entries, secure-backup, disaster recovery mechanisms (for details please see Preservation Policy document, <https://www.clarin.gr/sites/default/files/CLARINELPreservationPolicy.pdf>).

The data handling workflow has been carefully designed to maximize the validity of the metadata and data, to ensure their long-term preservation, discovery and identification. CLARIN:EL is responsible for the maintenance, review and revision of all its policies and documentation, including the data handling workflow (whenever required). Changes in the workflows are reflected in the relevant documentation.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

13. Data discovery and identification

R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

The CLARIN:EL repository presents all resources in one central inventory (<https://inventory.clarin.gr/>), which enables data discovery by offering browse and search functionalities (i.e., keyword and faceted search, https://clarin-platform-documentation.readthedocs.io/en/stable/all/2_Navigating/Browse.html & https://clarin-platform-documentation.readthedocs.io/en/stable/all/2_Navigating/Search.html). This is achieved by indexing (via ElasticSearch) the metadata that are provided for each resource.

The faceted search uses metadata elements as filters; the selection of the appropriate metadata was guided by standard practices of the Designated Communities, collected from the CLARIN:EL users.

CLARIN:EL uses the ePIC service (<https://epic.grnet.gr/>) provided by GRNET, in order to assign to each resource a persistent identifier (PID), a.k.a. a handle, which is a permanent reference to it. PID stands for “persistent identifier”, a term usually used in the context of digital objects accessible over the Internet.

In CLARIN:EL, each resource is given a PID upon being published. Moreover, to help proper attribution, each record has a citation text snippet on the landing page. This data citation is generated automatically, and the format is as follows: Creator(s). (Publication Year). Resource title. Version. Resource Type. Publisher. PID.

The resource type is a concatenation of the type of the resource (Corpus, Lexical/Conceptual Resource, ML Model, N-gram model, Tool/Service) and the media type (Text, Text Numerical, Image, Audio, Video).

CLARIN:EL provides an OAI endpoint (https://inventory.clarin.gr/catalogue_backend/api/oai-pmh/) for metadata harvesting in XML format that follows one of the following schemas:

- CLARIN-SHARE is the metadata schema of CLARIN, it provides a rich set of elements and was developed for the creation of the metadata descriptions of all CLARIN resources. (Harvesting endpoint: https://inventory.clarin.gr/catalogue_backend/api/oai-pmh/?verb=ListRecords&metadataPrefix=clarin-share)
- Dublin Core (DC, <https://dublincore.org/>) is one of the simplest but most widely used metadata schemas. Originally developed to describe web resources, DC consists of 15 “core” metadata elements (Harvesting endpoint: https://inventory.clarin.gr/catalogue_backend/api/oai-pmh/?verb=ListRecords&metadataPrefix=oai_dc)
- Component Metadata Infrastructure (CMDI, <https://www.clarin.eu/content/component-metadata>). Metadata for language resources and tools exists in various formats. Often these descriptions contain specialized information for a specific research community (e.g. headers for text, for multimedia collections). To overcome this problem the CMDI has been created, providing a framework to describe and reuse metadata blueprints. Description building blocks ('components', consisting of metadata elements in meaningful clusters) can be grouped into a ready-made description format (a 'profile'). Both are stored and shared with other users in the Component Registry (<https://www.clarin.eu/content/component-registry-documentation>) to promote reuse. Each metadata record is then encoded as an XML file, including a link to the profile on which it is based. More information about CMDI can be found here <https://www.clarin.eu/content/component-metadata>. (Harvesting endpoint: https://inventory.clarin.gr/catalogue_backend/api/oai-pmh/?verb=ListRecords&metadataPrefix=CMDI)
- EDM: Europeana Data Model (<https://pro.europeana.eu/page/edm-documentation>) transcends domain-specific metadata standards, and accommodates the range and richness of community standards such as LIDO for museums (<https://cidoc.mini.icom.museum/working-groups/lido/lido-overview/about-lido/what-is-lido/>), EAD (Encoded Archival Description <https://www.loc.gov/ead/>) for archives or METS for digital libraries (<https://www.loc.gov/standards/mets/mets-schemadocs.html>). EDM is a data model for Europe's cultural heritage data and enables data enrichment from a range of selected authoritative sources. It may link across language, domain and institutional views through alignment to both authoritative vocabularies (persons, object types, places, periods) and to other rich resources such as DBpedia. (Harvesting endpoint: https://inventory.clarin.gr/catalogue_backend/api/oai-pmh/?verb=ListRecords&metadataPrefix=EDM-apollois).
- The Open Language Archives Community (OLAC), is an initiative to create a unified way of searching online databases of language resources for linguistic research. The OLAC metadata set is based on the complete set of Dublin Core metadata terms (DCMT), but the format allows for the use of extensions to express community-specific qualifiers. (Harvesting endpoint: https://inventory.clarin.gr/catalogue_backend/api/oai-pmh/?verb=ListRecords&metadataPrefix=olac).

Through the OAI endpoint, CLARIN:EL is already being harvested by (a) CLARIN ERIC Virtual Language Observatory (<https://vlo.clarin.eu/>) in CMDI format, and (b) APOLLONIS (<https://apollonis-infrastructure.gr/what-we-offer/services-and-tools/>) in EDM format. APOLLONIS is the national umbrella infrastructure (where CLARIN:EL lives together with DARIAH-GR/DYAS, the Greek National Digital Research Infrastructure for the Arts and Humanities).

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

14. Data reuse

R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

CLARIN:EL has developed its own metadata schema CLARIN-SHARE, based on the META-SHARE schema. For each type of resource (e.g. corpus, tool/service, lexical/conceptual resource) the schema requires a set of mandatory metadata to be filled in; the schema also includes a set of recommended metadata and finally a set of optional metadata. The

metadata provide information on all aspects of a resource: descriptive information (title, free text description), creation/provenance (creator(s), funder(s), funding project(s), source of metadata records for datasets extracted and/or adapted/converted from datasets available in other repositories, etc.), classification features (resource type, time and geographic coverage, domain, intended use), technical features (size, format, level of annotation, if any, etc.), distribution information (mode of access, license, access/use conditions, attribution, etc.). The level of mandatoryness for each element has been decided with the aim to support findability and interoperability with other resources, as well as help users understand the main features of the contents of the dataset before accessing it.

The metadata are exploited from the repository (catalogue) application in various ways so that a user can easily find the desired resource; i.e., faceted search, keyword search. The landing page of the resource displays all the metadata the depositor has provided; this covers at least all mandatory elements.

To foster the reusability of data, CLARIN:EL exposes the metadata for harvesting, thus extending their discovery through other catalogues. To this end, it has developed converters into various metadata schemas, favored by the community (e.g. CMDI) and generic ones (e.g. DC, OLAC). In this way, the resources can be harvested by CLARIN ERIC Virtual Language Observatory, VLO (VLO harvesting uses CMDI) and other repositories and infrastructures (for details see also R13).

Regarding the actual access to and deployment of the datasets by access and processing tools and applications, CLARIN:EL encourages the use of open formats widely used by the community, following the CLARIN recommended formats (<https://www.clarin.eu/faq/what-standards-are-recommended-clarin>) such as, e.g., XML for textual data. The actual data of the resource are uploaded as a compressed file (e.g. zip, tar.gz). The compressed file may contain files in any format; however, resources uploaded in a number of widely known formats such as XCES (<https://www.clarin.eu/category/glossary/xces>), Translation Memory Exchange (TMX, <http://xml.coverpages.org/tmxSpec971212.html>), MOSES (<http://statmt.org/moses/>), and plain text are automatically processable by the NLP services integrated to the CLARIN:EL platform. Users see the benefits of integrating the processed outputs in their research workflows and are thus inclined to adopt the recommended formats.

However, given that many resources originate from disciplines accustomed to different formats (e.g. Social Sciences applying quantitative methods work a lot with spreadsheets while Digital Humanities use pdf or image files of scanned manuscripts and printed material), CLARIN:EL offers the option to store both formats of a dataset (original and converted), related to each other. In this way, the connection between raw converted data is maintained.

As regards proactive measures related to possible evolution of formats, we are actively involved in standardization initiatives (e.g. in the framework of ISO technical committees and W3C communities, such as LD4LT (Linked Data For Language Technology Community Group, <https://www.w3.org/community/ld4lt/>) and Ontolex (Lexicon Model for Ontologies, <https://www.w3.org/2016/05/ontolex/>), keeping constantly abreast with emerging standards and best practices and adopting them as fit for the resources stored in the repository.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

TECHNOLOGY

15. Technical infrastructure

R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

The CLARIN:EL repository is based on the META-SHARE repository software (available through GitHub <https://github.com/metashare/META-SHARE>), with many improved architectural choices, new functionalities and new features. The whole CLARIN:EL platform consists of several applications. The most important ones are:

- The PostgreSQL database system
- ElasticSearch for indexing
- The catalogue (repository) backend (built using Django web framework) that offers REST services for a) managing resources metadata (import, create, update, delete), b) authorizing access to the resources (datasets, tools/services, lexical conceptual resources) etc.
- The respective catalogue (repository) UI that consists of web pages for a) searching, browsing the catalogue, b) a

metadata editor for creating/updating metadata c) admin pages for validating resource etc. The catalogue UI is powered by the REST services offered by the catalogue backend.

- The NLP services that have been integrated to the CLARIN:EL platform
- A workflow manager (built with java) that is responsible for executing workflows of NLP services.
- A scheduler that decides where and when a user's processing request (i.e., a workflow on some input dataset) will be executed; the scheduler is needed to avoid overloading of the CLARIN:EL platform.
- An nginx server that is the gateway for all the above applications and services.

The CLARIN:EL platform is based on popular open-source software/tools with large supporting communities (e.g. Keycloak, PostgreSQL, Elasticsearch, Spring, Django). The implementation of all software components/applications that were needed (e.g. repository/catalogue backend) was done in-house by the CLARIN:EL development team which has all the required technical knowledge to maintain and extend the software.

The code of the applications that were developed as well as the scripts that install the whole CLARIN:EL platform are kept in a dedicated (non-publicly accessible) group of repositories/projects at Gitlab.

All the above applications run as containers at a Kubernetes cluster which has been installed on a set of VMs, created with Hyper-V, a virtualization software. For the production instance of CLARIN:EL we have allocated 7 VMs, all of which live at the same physical machine that has the following hardware specifications:

- Dell PowerEdge R440 Rack Server
- Dual Intel Xeon Silver
- 128 GB RAM
- 300 GB RAID SAS for system
- 4.5 TB RAID SAS for storage
- Dual redundant power supply

6 VMs have the following specifications:

- CPU: 8 processors
- RAM: 8 GB
- HDD: 200 GB
- OS: Ubuntu 18.04

and 1 has

- CPU: 8 processors
- RAM: 16 GB
- HDD: 200 GB
- OS: Ubuntu 18.04

In Kubernetes, by design, when a VM/node fails, the cluster scheduler tries to move the containers that run on the failed node to other ones. This ensures (to some extent) robustness and protection from VM failures/disasters.

The physical machine that hosts CLARIN:EL has redundant power supplies and is equipped with ECC (Error correction code) memories. Also, it is connected to a UPS (uninterruptible power supply) unit that is used to address a power outage. The machine lives in a computer room at ATHENA/ILSP, which is linked to the outside world with a 1Gbps link. Internet is

provided by GRNET. The computer rooms of ATHENA/ILSP are interconnected through a 1Gbps link. More information about networks, security measures etc. in R16.

Disaster plan: CLARIN:EL software stack (kubernetes, database, ElasticSearch, UI etc.) is deployed via a set of scripts which are hosted in a version control system (GitLab). In case of disaster/failure CLARIN:EL can be easily redeployed with these scripts, given a set of VMs and the backup. Several backups of all data & metadata are made, including an off-site copy at GRNET. For more information please see R16.

Long term preservation: the CLARIN:EL repository implements the functions of the Open Archival Information System reference model (<http://www.oais.info/>).

More information can be found in the Preservation Policy Document (<https://www.clarin.gr/sites/default/files/CLARINELPreservationPolicy.pdf>).

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

16. Security

R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository
accept

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository
Accept

Response:

CLARIN:EL Network is coordinated by ATHENA/ILSP. The CLARIN:EL team cooperates with the IT administrators of ATHENA Research Center (<https://www.athenarc.gr/en>) who are responsible for providing the technical infrastructure (physical machines, networks, firewall etc.). There is no need for a Service Level Agreement between ATHENA and CLARIN:EL, since ATHENA/ILSP is the organization responsible for hosting the CLARIN:EL infrastructure.

CLARIN:EL takes the following measures to ensure data integrity, security and robustness.

- CLARIN:EL's databases (PostgreSQL) which are used for persistent metadata records, authorization/access information, user accounts etc. are backed up (via NFS) on a daily basis at a dedicated space (directory) to a NAS (Network-attached storage) server. Data that are not persistent to CLARIN:EL's databases (i.e., datasets, lexical resources etc.) are also stored at the aforementioned dedicated space on the NAS server.
- All the applications that constitute the CLARIN:EL platform are containers that run at a Kubernetes cluster that has been installed on a number of nodes (VMs). In Kubernetes, by design, when a VM/node fails the cluster scheduler tries to move the containers that run on the failed node to other ones. This ensures robustness at some extent.
- For authentication we adopted Keycloak, an open-source identity and access management solution. There is a strong community (Red Hat) that develops and uses Keycloak which ensures that new versions of the software will regularly be released, which address security vulnerabilities or provide new features.
- As already mentioned (in R15), CLARIN:EL's production instance is deployed at VMs on a physical machine that is part of the hardware infrastructure of ATHENA/ILSP. Development and maintenance of CLARIN:EL physical machine and VMs is performed by a qualified IT administrator of ATHENA/ILSP. Hence, CLARIN:EL platform is protected by the security/maintenance protocols and mechanisms that have been set up for this infrastructure and that are also used for all the other applications/services/VMs that live in it. Also, CLARIN:EL has sufficient network bandwidth.
- Security measures of ATHENA/ILSP include the following:
 - o Physical access to the building of ATHENA/ILSP is limited to holders of a magnetic security card or through a reception desk. The access to computer/server rooms is limited to IT administrators.
 - o All computer rooms of ATHENA/ILSP are supported by an appropriate air conditioning system.
 - o There are fire protection measures (e.g., smoke detectors, fire alarm, fire extinguishers, etc.)
 - o For ensuring IT security there is a firewall for limiting access to VMs, specific ports, services etc.; e.g., SSH access is not allowed from external IPs (VPN should be used in this case). Specifically for firewall we use Cisco Adaptive Security Device Manager (<https://www.cisco.com/c/en/us/products/security/adaptive-security-device-manager/index.html>) which runs on a "Cisco ASA 5525-X Adaptive Security Appliance" (<https://www.cisco.com/c/en/us/support/security/asa-5525-x-adaptive-security-appliance/model.html>).
 - o There are mechanisms in place that monitor the status of servers and services continuously (24/7).
 - o A 1Gbps link is provided to the outside world. The link is provided by GRNET (Greek Research and Technology Network, <https://grnet.gr/en/>), one of the partners of CLARIN:EL. GRNET provides Internet connectivity, high-quality e-Infrastructures and various services to the Greek Educational, Academic and Research community (see also R0).
 - o The server rooms are connected through a 1Gbps link which in the next months is planned to be upgraded to 10Gbps.
 - o There is a backup procedure that runs regularly (once a day) and creates backups from the NAS server (mentioned above) to another server in ATHENA/ILSP.
 - o The only person with access (a) to the physical machine used for CLARIN:EL's production instance and (b) to the virtualization software (i.e. Hyper-V) used for creating and managing CLARIN:EL's VMs, is an IT administrator, permanent

staff at ATHENA/ILSP.

Additionally to the measures of ATHENA/ILSP, CLARIN:EL has put in place the following:

- o The specific physical server that hosts CLARIN:EL has redundant power supplies and is equipped with ECC (Error correction code) memories. Also, it is connected to a UPS (uninterruptible power supply) unit.
- o There is a second backup procedure (except the one described above) that runs regularly and creates backups from the NAS server to another server at GRNET (off-site backup/copy).
- o The CLARIN:EL repository is secured via a https connection and a "SSL" encryption layer. This is implemented in the CLARIN:EL nginx server (see R15) which acts as a gateway to all CLARIN:EL services except the portal. The portal (<https://www.clarin.gr/en>) is also secured with a https connection.
- o To ensure the integrity of the data, for every deposited file a checksum (MD5) is generated upon ingestion of the data. Checks are performed automatically and regularly to detect corruptions, prevent instantly their replications and restore the correct non-corrupted version.
- o As regards protection of personal and sensitive data CLARIN:EL has been certified by an independent company (<https://www.ecompliancegdpr.com/>) as GDPR-compliant in all its procedures.

Reviewer Entry

Reviewer 1

Comments:
accept

Reviewer 2

Comments:
Accept

APPLICANT FEEDBACK

Comments/feedback

These Requirements are not seen as final, and we value your input to improve the CoreTrustSeal certification procedure. Any comments on the quality of the Requirements, their relevance to your organization, or any other contribution, will be considered as part of future iterations.

Response:

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

My recommendation to the Board is to accept the application.