DELIVERABLE

D6.6 Validation of pre-operational access phase to selected SERIES datasets

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Summary

This deliverable is written within the framework of the project "Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe – SERA" (Project no: 730900), funded by the Horison2020, INFRAIA-01-2016-2017 Programme. Main objective of this deliverable is to describe the pre-operational access phase of selected SERIES datasets through the existing EPOS service as a new Thematic Core Service (TCS).

1 Background

1.1 Integrated data banks and services for seismic risk reduction

The SERIES project (Seismic Engineering Research Infrastructures for European Synergies) represents the most significant effort in Europe towards the interoperability of earthquake engineering experimental data. Two European organisations, ORFEUS (Observatories and Research Facilities for European Seismology) and EMSC (European Mediterranean Seismological Centre), have been collecting and sharing seismological data. The ambition of EPOS (European Plate Observing System) is to set up a virtual environment which federates the handling of research data and services by existing scientific data infrastructures and provides a one-stop-shop for seamless access to services supporting the research community along the data life cycle.

Nevertheless, the two adjacent scientific disciplines of earthquake engineering and seismology have not yet interfaced their data structures, lacking an interoperable data-sharing structure. The SERA project (Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe) aims at creating a roadmap for integrating the most important databanks and related informatics services of the two research communities in Europe, i.e. SERIES and EPOS, so as to promote multi-disciplinary science, facilitate innovation and reduce the risk posed by natural and anthropogenic earthquakes.

Considering the large number of disciplines involved in the EPOS project (seismology, earthquake engineering, near-fault observation, geotechnical engineering, etc.), a large amount of heterogeneous data was produced in the past and is going to be produced for better understating the various phenomena. Different data management practices and access policies applied by the data providers generate complex ecosystems of poorly interoperable data infrastructures. Resulting data silos slow down the circulation of knowledge and prevent cross-fertilisation of interdisciplinary research which is essential for increasing the interaction within adjacent scientific disciplines.

The EPOS and SERIES projects have several similarities and some differences (Atakan, et al., 2018). The most important similarity is their principal mission, i.e. the development of interoperable data-sharing structures for the respective scientific communities and the provision of a single tool to make integrated use of data and data products provided by different European research infrastructures. However, the nature of the two projects is different. EPOS targets an integration of heterogeneous data coming from several communities in solid Earth science into a single and distributed infrastructure and facilitating access through a single online environment. On the contrary, SERIES is a domain-specific infrastructure (representing the earthquake engineering experimental research community) that stores data in independent, distributed sources and provides a single uniform user interface to access them.

In both platforms' architecture, data are received from external data providers/centres, as shown in Figure 1. The external data centres share existing data with the corresponding central access point. In the case of EPOS, the external data centres are the national research infrastructures and data centres. In the SERIES platform, the data providers are the partner research infrastructures which send their data to update the SERIES central database.
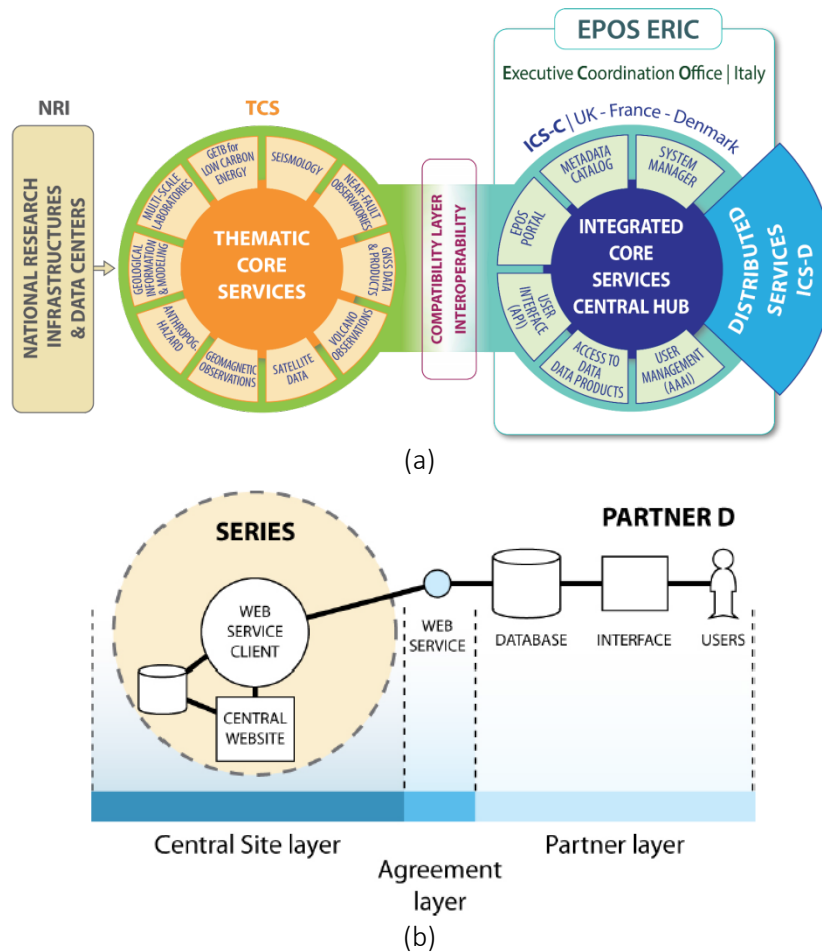
(a)

(b)

Figure 1: Architecture of the EPOS (a) and SERIES (b) platform

A notable difference though, stemming from the wide range of scientific domains that relate to the EPOS project (e.g. seismology, multi-scale laboratories, near-fault observatories, etc.), is that an intermediate layer exists between the data providers and the central database, namely the Thematic Core Services. In this regard, SERIES being a thematic community service (i.e. the earthquake engineering community) can be compared to a TCS where the relevant data and products are already integrated and made available through a data gateway (the SERIES Data Access Portal). Similar TCS-level data gateways exist in EPOS, such as ORFEUS and EMSC in the TCS Seismology.

Moreover, both systems are based on a Service-Oriented Architecture. While EPOS requires that DDSS (data, data products, services and software) provided by the national research infrastructures in each scientific community is exposed through a web service in the TCS layer, in SERIES each partner exposes their data through a web service towards the Central Site.

With regards to the metadata models, a direct comparison is not straightforward due to the differences and specificities in the nature and architecture of each platform. The EPOS metadata model (EPOS-DCAT-AP) follows a different approach that the SERIES Exchange Data Format (EDF). The SERIES EDF follows a hierarchical organization with four level entities: Project, Specimen, Experiment & Computation and Signal. On the other hand, EPOS is a "hyper-data" provider for multi-disciplinary data. The data provided are "heterogeneous", having one format per thematic domain (i.e. per TCS). In the EPOS-TCS data model, the entities are Person, Organization, RIs, DDSS, Instrument, AAAI, Other.

The main objectives of the integration of databanks and services from SERIES and EPOS are to improve access to earthquake engineering and seismology data and services and facilitate cross-

discipline collaboration. This integration will strengthen the SERA advanced community of earthquake engineering and seismology and more in general the community of earthquake hazard and risk mitigation. This effort will serve the needs of the individual communities and, more important, improve the interoperability of the data exchange services aiming at smarter access, integrated data and knowledge that is needed to develop innovative technologies for the reduction of the vulnerability of the built environment to earthquakes and the mitigation of seismic risk.

The roadmap for the integration of databanks and access services from the EPOS and SERIES platforms, as stated in Deliverable D6.5 (Alessio Caverzan, 2019), follows the most immediate approach in realizing the integration, namely to consider the SERIES database as the first service of a new Earthquake Engineering Thematic Core Service within the EPOS architecture. By following this approach, SERIES will initially provide, through EPOS, integrated access to key data and experimental results produced at the most advanced European experimental facilities for earthquake engineering and among the best worldwide. In its mature phase the integration process will provide advanced interoperability within the earthquake engineering community itself, with the sibling TCS seismology and other TCSs, and with international partners. This objective will be guaranteed by means of the implementation of new services and tools for improving user accessibility and experience.

In Section **Error! Reference source not found.** the steps taken towards implementing the pre-operational testing infrastructure are presented.

2 Technical Readiness Assessment

For the scope of the pre-operational access service, access to selected SERIES datasets has been provided via EPOS, in order to allow validation of identified access technologies for further implementation in EPOS.

2.1 Pre-operational access phase

The roadmap (Alessio Caverzan, 2019) towards the realization of interoperability between EPOS and SERIES included the following major phases:

1. Identification of specific datasets to be selected for the validation of EPOS-SERA interoperability. The identified datasets should be such that cover the range of datasets that are desirable or meaningful to be shared with EPOS. Furthermore, targeted modifications need to be applied to the selected datasets to overcome the discrepancies identified in Deliverable 6.5 (Alessio Caverzan, 2019), such as lack of global identifiers for Persons or Organizations in the SERA EDF.

2. Development, deployment and evaluation of the pilot TCS metadata retrieval web service, hosted in the SERIES Central Site.

3. Development, deployment and evaluation of the TCS data publication service.

4. Production of the TTL-description (Turtle files) for the TCS metadata retrieval web service.

2.1.1 Identification of specific datasets to be selected for the validation of EPOS-SERA interoperability

In order to validate the EPOS-SERA interoperability, specific representative datasets needed to be selected. Representative datasets were specified as those that make use of the largest possible subset of the constructs available in the SERIES EDF (Exchange Data Format – the SERIES metadata format). Within the SERIES database there is a variety of different projects provided by several partners. The projects in the database share the same metadata structure, although not all projects make full use of the SERIES EDF metadata format constructs. Such projects are for example those that are related with literature reviews (e.g. the projects "Literature RC Walls", "Literature RC Columns"). These projects mostly accumulate data from several resources and their role is mostly aggregative, while they miss metadata for EDF constructs such as videos, images, experimental documents, etc. This type of projects was excluded for the preoperational service activity, but after the EPOS-SERA interoperability is achieved, these projects could be added in future operations. For the purpose of the EPOS-SERA interoperability, we selected the two most representative projects; "Pseudodynamic Tests on 4-storey Nonductile Frames with RC Infilling of the Bay" and "Seismic Performance Assessment and Rehabilitation of Existing Buildings". These projects were selected because they omit only a small number SERIES EDF constructs in their metadata content. Both projects have a reasonable number of specimens and experiments.

Due to the requirements of the EPOS-DCAT-AP format, some modifications were performed in the SERIES Central Database. The purpose of these modifications was to include metadata that is not captured by the SERIES EDF, but which is necessary for EPOS. The modifications consisted in adding two additional metadata tables that contain unique identifiers related to project personnel (such as ORCID iD) and organizations (such as PIC). Subsequently, the corresponding metadata for the persons and organizations involved in the two selected projects was stored in the database.

Besides the above modifications, no other changes were needed on the datasets. This is expected to apply also for the future inclusion of more SERIES projects in the TCS E/ENG.

2.1.2 TCS Metadata Retrieval service

The final architecture requires a single web service, the TCS Metadata Retrieval service (see Figure 2). The service makes available to EPOS the metadata which reside in the SERIES Central Site and which have been chosen to be available through the EPOS ICS-C interface. The data corresponding to these metadata are accessible through a URI that is published in the ICS-C interface upon user request, and which points directly to the community (lab) database which holds the requested data.
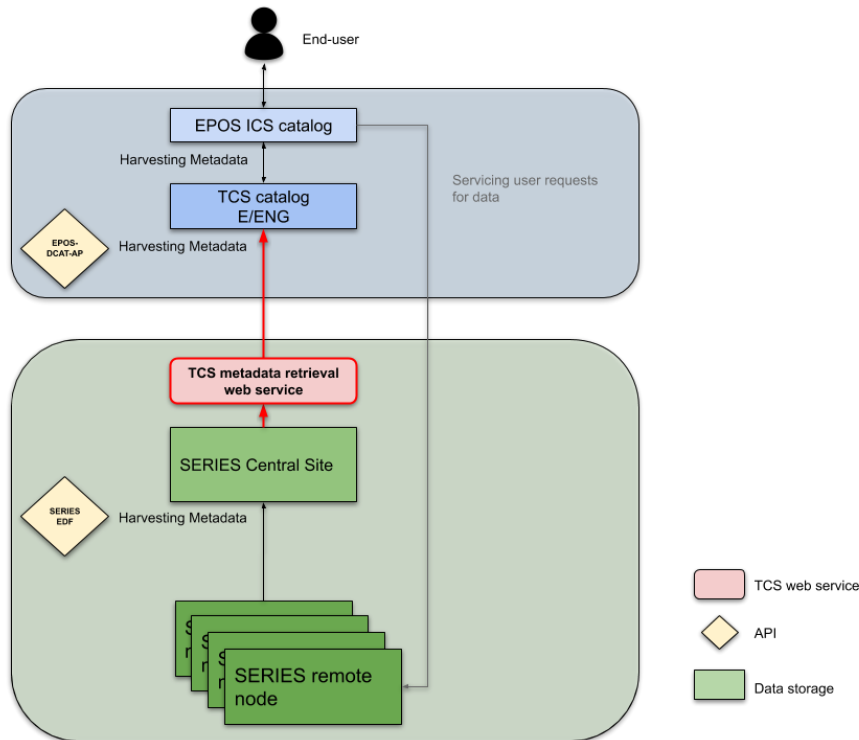
Figure 2. The TCS E/ENG webservice in relation to the ICS-C.

The TCS Metadata Retrieval service runs currently on the UPatras data services infrastructure at the University of Patras, Greece. As stated in section 2.1.1, the metadata catalogue that it publishes to EPOS, corresponds to a subset of the SERIES projects that are currently available through the Data Access Portal (DAP) of the SERIES Central Site. The metadata catalogue is extendable, i.e. it can publish an arbitrary set of SERIES projects, or the whole set, that are available in the SERIES Central Site. The current subset, as the most representative case, was chosen for the purpose of validating the feasibility of the selected approach and serves as a proof of concept.

Web service readiness

The TCS Metadata Retrieval service is available for machine-readable access via a dedicated web service. The TCS Metadata Retrieval web service, described in Web Services Description Language (WSDL – an XML-based interface description language used for describing the functionality offered by a web service), is up and running and has passed an initial readiness assessment. The web service comprises the single point of access for publishing E/ENG community metadata through the ICS-C portal. The metadata harvesting process can be automated and performed in scheduled intervals, without manual intervention, i.e. data updates at the underlying DDSS levels can be automatically propagated to the ICS via the service. The web service can be queried on the metadata that SERIES choose to publish via the EPOS-ICS-C, in accordance to the EPOS-DCAT-AP specifications. The webservice formulates its response in XML format, according to the EPOS-DCAT-AP RDF format (Turtle file – TTL format), as described at https://github.com/seriescentralnode/EPOS-DCAT-AP/blob/master/TCS_Epos_SERIES.ttl.

Development, deployment and evaluation of the TCS data publication service

The TCS Metadata Publication service has been implemented as standard conforming web service. It contains two operations:

- `getProjectMetadata(String projectId)`. Returns an XML representation of the project metadata. Project metadata contains descriptive metadata related to the project, the

available download URLs for any project-related documents, videos, or images, and the ids of all specimens that are related with this project. The specimen ids can be used to retrieve further metadata, by calling the second operation:

- `getSpecimenMetadata(String specimenId)`. Returns an XML representation of the specimen metadata. Specimen metadata contains descriptive metadata related to a specimen (texts, images, videos). Each specimen is related to a number of experiments that have been conducted on said specimen. For each experiment, the operation provides its corresponding descriptive metadata, as well as the available download URLs. Furthermore, URLs are provided for the data that have been generated by said experiment.

The TCS Metadata Retrieval web service was deployed on a development server, that contains a copy of the SERIES Central Site and the SERIES Database. Endpoints for the TCS Metadata Retrieval web service were published, by providing to EPOS the relevant TTL (turtle) file.

For the integration tests, the TTL file was imported in the EPOS catalogue. Once the ingestion phase started, EPOS polled the TCS Metadata Retrieval web service, which provided the SERIES metadata. The EPOS test environment succeeded in showing the TCS E/ENG metadata in the end-user GUI. This confirms that TCS E/ENG metadata can be integrated in the EPOS system.

Integration tests were performed in cooperation with EPOS (INGV). In the end, the preparations for the pre-operational service activity were easier realized than it was anticipated. Initially, the process on how to construct the TCS web service seemed opaque. The documentation that is made available by EPOS is abundant though, and EPOS has demonstrably put significant effort in providing it. Although it is sometimes overly technical and difficult to parse, the examples and tools that EPOS makes available via its Github presence, as well as the engagement of the relevant EPOS personnel helped overcome the issues that came up. Some EPOS tools have not yet been fully developed (i.e. the EPOS ICS-C data viewer), so testing against those features was not possible. EPOS provides a tool to specifically help with the definition of the Turtle files (TTL), the EPOS-DCAT-AP Metadata Editor (https://github.com/epos-eu/EPOS-DCAT-AP-Metadata-Editor/tree/master/public), which, while no longer operational online, is nonetheless accessible via the EPOS Github repository and thus was operated locally. Finally, some scheduling conflicts led to minor delays in the realization of the final ingestion tests.

2.1.3 TCS data publication service

In Deliverable D6.5 (Alessio Caverzan, 2019), the architecture of the TCS E/ENG was originally designed as comprising of two web services:

a) the TCS Metadata Retrieval web service, which is the service that the EPOS-ICS queries and retrieves the TCS E/ENG metadata from, and

b) the TCS Data Publication web service, which provides the actual data that end-user might request, by forwarding user requests for data to the remote E/ENG nodes where the data is hosted.

In the originally envisioned architecture, as described in D6.5, and which was realized in prototype stage, the 1st service would provide metadata to EPOS-ICS and, once and if the end-user would decide to download actual data, the 2nd web service would provide a temporary endpoint URL to download these data from. This approach was based on a two-stage protocol, where the EPOS ICS-C would in the first stage retrieve the metadata of each project of the SERIES database and, in the next stage, would request from a different web service the download URL for the selected metadata.

During the realization of the pre-operational service, and after consultation with EPOS, it was chosen to merge the functionality of the TCS Data Publication web service into the TCS Metadata Retrieval web service. In the final implementation, the TCS Metadata Retrieval service is the single and only web service that is necessary for integration with the EPOS Integrated Core Services – Central (ICS-C).

In this, finally realized, pre-operational service activity architecture, the endpoint URLs for actual data are provided by the Metadata Retrieval web service, as part of the metadata that are ingested by EPOS.

Having a single web service instead of two, allows for a simpler and more robust architecture, without losing functionality. In the final implementation of the pre-operational service, all end-user requests for data that are initiated via the EPOS ISC-C are addressed directly to the laboratory databases that hold the requested data. The URLs that point to them are provided to the EPOS ICS during the metadata ingestion phase. Should in the future arise the necessity for temporary, on-the-fly generated endpoint URLs, this could be still be implemented within the TCS E/ENG, without disrupting the current interface between EPOS and the TCS/ENG.

2.1.4 TTL-description for the TCS metadata retrieval web service

Data are disseminated through established DDSS. The SERIES project data that is provided via the TCS is structured in two levels, partially reflecting SERIES's own metadata structure: (a) Projects, (b) Specimens. SERIES contains projects, which contain specimens, and, for each specimen, URI endpoints are provided which point to the actual experiment datasets. This results in the representation of TCS E/ENG in the EPOS ICS-C in two levels: in the first level the SERIES projects are listed, and in the second level, specimens are listed for each project.

The corresponding TTL definition can be found at https://github.com/seriescentralnode/EPOS-DCAT-AP/blob/master/TCS_Epos_SERIES.ttl. All the datasets that are shared via EPOS are shared as part of this DDSS.
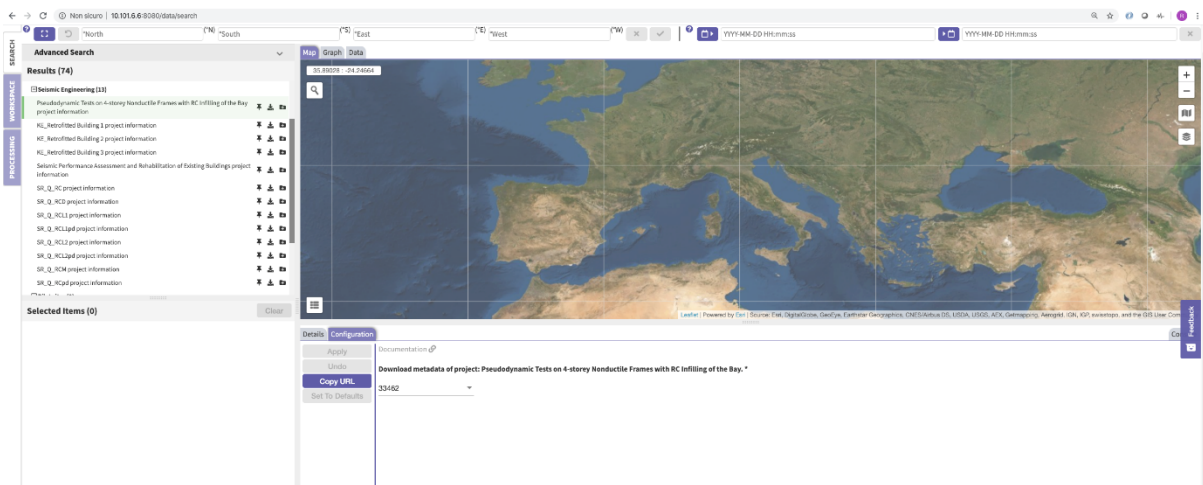
Figure 3. View of the ingested SERIES metadata in the EPOS-ICS development portal. Note that the hierarchy presented in the left hand side panel has been updated to reflect the hierarchy Project>Specimen.

The TTL exposes two operations (see section 2.1.2), one that retrieves SERIES project metadata (to populate the Projects level), and one that exposes specimen metadata (corresponding the Specimens level) along with download URLs for specific data (i.e. signals that relate to a specific specimen).

Since the scope of the current task targets at validating the pre-operational service activity, scheduling and automation has not been implemented. That means, the TTL file that has been made available to EPOS reflects only a subset of the project metadata that are available through EPOS and is not updated automatically.

Provisions for automatic generation of the Turtle file have been made. Currently, TTL files can be generated on demand, by running a configurable process, which allows the targeted generation of a properly formatted TTL. In future, this would allow the integration of a relevant tool into the SERIES Data Access Portal that would allow the SERIES end-users (i.e. partner laboratories) to choose which datasets they wish to be published via EPOS ICS-C.

Details	Configuration	
Name	Pseudodynamic Tests on 4-storey Nonductile Frames with RC Infilling of the Bay project information	
Description	Enables to download information/report about the project	
Spatial Coverage	*Unspecified*	
Temporal Coverage	2010-01-01T11:01:00+00:00 - unspecified	
Digital Object Identifier	*Unspecified*	
Service Provider	University of Patras	
Service Description	Access to SERIES metadata	
License	*Unspecified*	
Endpoint	http://150.140.186.204:53361/TCS_Metadata_Retrieval_WS/WebService.asmx/project_reports	
Documentation	*Unspecified*	
Data provider(s)	University of Patras	
Internal ID	WP17-DDSS-P0	

Figure 4. View of the Details tab. In this example, the user chose a Project and the URI to the relevant project report is returned.

Operational Readiness

The TCS Metadata Retrieval web service is completed and operational (Figure 3, Figure 4). Within the TCS, the chain of data publication, i.e. description of data through the appropriate metadata format, discovery and dissemination via the ICS-C, is fully supported.

Datasets published in E/ENG community repositories are described though the SERIES Exchange Data Format (EDF) and a subset of these (chosen for the purposes of the pre-operational service activity), is made available through the TCS Metadata Retrieval. Through the exchange of metadata about these datasets with the ICS-C, the datasets are made discoverable to EPOS users. The whole metadata catalogue is also accessible through the DAP GUI (SERIES Data Access Portal), and as such it provides the user with refined search functionalities.

3 The way ahead

The finally implemented TCS E/ENG data services are comprised of a single main web service, i.e. the TCS Metadata Retrieval service. The functionality of the second web service that was specified in the Roadmap, the TCS Data Publication service, has been included in the TCS Metadata Retrieval service. This allows for a more simplified architecture, while preserving functionality, i.e. the final TCS Metadata Retrieval service publishes endpoints through which the relevant datasets can be accessed.

Although the Roadmap for the integration of data banks and access services from the earthquake engineering (SERIES) and seismology (EPOS) research infrastructures (Alessio Caverzan, 2019) put forward a strategy to achieve said integration, the numerous tasks cannot be performed integrally in the time frame of the SERA project, as has been also noted in the roadmap. An example of such a task is to make a tool available to the SERIES partners to choose and control which projects/specimens/experiment data are made available to EPOS via the TCS E/ENG.

Within the frame of the SERA project, the short-term goals have been fulfilled, i.e. it has been demonstrated that technically the SERIES metadata can be ingested into the EPOS test environment. The pre-operational access service is thus available for further validation and involvement of the user community and for further integration in EPOS. The TCS Metadata Retrieval service is available and accessible (following open access and FAIR principles) in our domain specific portal. The service

follows the defined protocols (EPOS-DCAT-AP) where the data provided can be searched and accessed using specific query parameters, and further can be displayed in a desired way.

Next step activities (mid-term) include a review of how the newly developed services and products will be fully compatible with the requirements of EPOS, at the technical, legal, governance and financial levels. These activities will also aim at expanding the access to and collection of data and at performing an in-depth study of the full range of data to characterise the level of maturity of the DDSS elements and prepare for moving to the next stage, i.e. full data integration. In this stage, necessary steps are

- The formation of a dedicated group in TCS-E/ENG, with wider participation, to verify whether the range of services of the TCS within EPOS is adequate.
- Preparation of a Technical Readiness Assessment report, as required by EPOS (requires complete internal verification + external validation by both the TCS E/ENG and a mixed group composed of both TCS and ICS members and external validation of the technical readiness of the TCS services).

Having completed the pre-operational access phase and verified the feasibility of the SERIES-EPOS integration, the technical aspects and procedures outlined above describe a path to follow for the complete and effective integration of the SERIES databanks and services into EPOS. However, it has to be noted that an effective and complete integration needs a deep analysis of the technical, legal, governance and financial aspects to be conducted by the scientific advisory body of the EPOS Board of Governmental Representatives with the support of an External Evaluation Panel and by the SERA partners and other interested infrastructures that offer access to earthquake engineering DDSS. The necessary steps include:

- TCS Governance Readiness (requires external validation and the establishment of a formal TCS-Consortium with appropriate representation from the underlying data provider community, a TCS governing board, and the selection of the leading institution and the chairperson for the governing board).
- TCS Legal Readiness (requires external validation, the signing of the TCS Consortium Agreement by TCS Consortium members, and legal documents making sure that the data provider institutions give their consent for redistribution of their data through both domain specific portals and later in EPOS-ICS).
- TCS Financial Readiness (requires external validation and that the financial aspects of the TCS services in concern are defined clearly in the cost-book of EPOS services, including both in-kind contributions as well as expected dependency from other financial resources.

In the long-term perspective it is foreseen to provide a critical contribution to the successful construction and validation of EPOS, by developing major building blocks for the provision of key advanced services in earthquake engineering and seismology. Moreover, by including access to research infrastructures, laboratories and data centres established outside Europe, it will be possible to improve the international dimension of EPOS and increase its overall impact. At the end of the long-term period, the services developed by the earthquake engineering community will be mature to constitute a fully-integrated Thematic Core Service in EPOS. This new TCS will be a new important pillar of EPOS that will provide access to data, services and infrastructures that are important for other Thematic Core Services and the society at large.

4   References

Alessio Caverzan, C. S. (2019). *D6.5 Roadmap for the integration of data banks and access services from the earthquake engineering (SERIES) and seismology (EPOS) research infrastructures.*

Atakan, K., Athanasopoulou, A., Avouris, N., Bousias, S., Lamata Martinez, I., Pegon, P., . . . Tsionis, G. (2018). *Deliverable 6.4: Review of current SERIES and EPOS databases.*

Paciello, R., Trani, L., & Bailo, D. (18 January 2019). *EPOS-DCAT-AP: an extension of the DCAT Application Profile for Research Infrastructures in the solid-Earth domain.* EPOS.

Glossary

AAAI: Authentication – Authorization – Accounting – Infrastructure

CDV: Celestina Data Viewer

DDSS: Data, Datasets, Software and Services

EMSC: European Mediterranean Seismological Centre

EPOS: European Plate Observation System

EPOS-ICS-C: EPOS Integrated Core Services - Central

EPOS-DCAT-AP: EPOS Data Catalog Application Profile

FAIR: Findability, Accessibility, Interoperability, Reusability

ORCID: Open Researcher and Contributor ID

ORFEUS: Observatories and Research Facilities for European Seismology

PIC: Participant Identification Code

RDF: Resource Description Framework

RI: Research Infrastructure

SERIES: Seismic Engineering Research Infrastructures for European Synergies

SERIES DAP: SERIES Data Access Portal

SERIES EDF: SERIES Exchange Data Format

TCS: Thematic Core Services

TTL: Terse RDF Triple Language (Turtle)

WSDL: Web Services Description Language

Appendix – TTL for the TCS metadata retrieval WS

(Most current version is accessible in https://github.com/seriescentralnode/EPOS-DCAT-AP/blob/master/TCS_Epos_SERIES.ttl)

```
@prefix adms: <http://www.w3.org/ns/adms#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix epos: <https://www.epos-eu.org/epos-dcat-ap#> .
@prefix dc: <http://purl.org/dc/elements/1.1/> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix vcard: <http://www.w3.org/2006/vcard/ns#> .
@prefix hydra: <http://www.w3.org/ns/hydra/core#> .
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        schema:email "ilstrepelias@upatras.gr";
        schema:availableLanguage "en" ;
        schema:contactType "scientificContact";
.
<http://orcid.org/0000-0001-8431-1030> a schema:Person;
        schema:identifier [ a schema:PropertyValue;
            schema:propertyID "orcid";
            schema:value "0000-0001-8431-1030";
        ];
        schema:familyName "Palios";
        schema:givenName "Xenofon";
        schema:address [ a schema:PostalAddress ;
            schema:streetAddress "Department of Civil Engineering, University of Patras" ;
            schema:addressLocality "Rio Achaia" ;
            schema:postalCode "26500" ;
            schema:addressCountry "Greece" ;
        ];
        schema:email "xenpal@upatras.gr" ;
```

```
        schema:telephone "-" ;
        schema:url  "http://www.strulab.civil.upatras.gr/node/791"^^xsd:anyURI ;
        schema:qualifications "Local Coinvestigator" ;
        schema:affiliation <PIC:999894528> ;
        schema:contactPoint <http://orcid.org/0000-0001-8431-1030/legalContact> ;
        schema:contactPoint <http://orcid.org/0000-0001-8431-1030/scientificContact> ;
        schema:contactPoint <http://orcid.org/0000-0001-8431-1030/financialContact> ;
.
<http://orcid.org/0000-0002-1302-2175> a schema:Person;
        schema:identifier [ a schema:PropertyValue;
            schema:propertyID "orcid";
            schema:value "0000-0002-1302-2175";
        ];
        schema:familyName "Fardis";
        schema:givenName "Michael";
        schema:address [ a schema:PostalAddress ;
            schema:streetAddress "Department of Civil Engineering, University of Patras" ;
            schema:addressLocality "Rio Achaia" ;
            schema:postalCode "26500" ;
            schema:addressCountry "Greece" ;
        ];
        schema:email "fardis@upatras.gr" ;
        schema:telephone "+30 2610996508" ;
        schema:url  "http://www.civil.upatras.gr/el/Proswpiko/MelhDEP/?PageNo=3&EntityID=89d1a5b5-
5531-45df-9cbd-9e1d53846d7d"^^xsd:anyURI ;
        schema:qualifications "Principal Investigator" ;
        schema:affiliation <PIC:999894528> ;
        schema:contactPoint <http://orcid.org/0000-0002-1302-2175/legalContact> ;
        schema:contactPoint <http://orcid.org/0000-0002-1302-2175/scientificContact> ;
        schema:contactPoint <http://orcid.org/0000-0002-1302-2175/financialContact> ;
.
<http://orcid.org/0000-0002-8616-334X> a schema:Person;
        schema:identifier [ a schema:PropertyValue;
            schema:propertyID "orcid";
            schema:value "0000-0002-8616-334X";
        ];
        schema:familyName "Bousias";
        schema:givenName "Stathis";
        schema:address [ a schema:PostalAddress ;
            schema:streetAddress "Department of Civil Engineering, University of Patras" ;
            schema:addressLocality "Rio Achaia" ;
            schema:postalCode "26500" ;
            schema:addressCountry "Greece" ;
        ];
        schema:email "sbousias@upatras.gr" ;
        schema:telephone "+30 2610996588" ;
        schema:url  "http://www.civil.upatras.gr/en/Proswpiko/MelhDEP/entry/BousiasStathis/?PageNo=0"^
^xsd:anyURI ;
```

```
        schema:qualifications "Principal Investigator" ;
        schema:affiliation <PIC:999894528> ;
        schema:contactPoint <http://orcid.org/0000-0002-8616-334X/legalContact> ;
        schema:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        schema:contactPoint <http://orcid.org/0000-0002-8616-334X/financialContact> ;
.
<http://orcid.org/0000-0003-0048-8344> a schema:Person;
        schema:identifier [ a schema:PropertyValue;
            schema:propertyID "orcid";
            schema:value "0000-0003-0048-8344";
        ];
        schema:familyName "Strepelias";
        schema:givenName "Ilias";
        schema:address [ a schema:PostalAddress ;
            schema:streetAddress "Department of Civil Engineering, University of Patras" ;
            schema:addressLocality "Rio Achaia" ;
            schema:postalCode "26500" ;
            schema:addressCountry "Greece" ;
        ];
        schema:email "ilstrepelias@upatras.gr" ;
        schema:telephone "-" ;
        schema:url  "http://www.strulab.civil.upatras.gr/node/792"^^xsd:anyURI ;
        schema:qualifications "Local Coinvestigator" ;
        schema:affiliation <PIC:999894528> ;
        schema:contactPoint <http://orcid.org/0000-0003-0048-8344/legalContact> ;
        schema:contactPoint <http://orcid.org/0000-0003-0048-8344/scientificContact> ;
        schema:contactPoint <http://orcid.org/0000-0003-0048-8344/financialContact> ;
.
<epos:SeismicEngineering> a skos:ConceptScheme;
        dct:title "Seismic Engineering";
        dct:description "It contains the projects of Seismic Engineering (SERIES).";
.

<PIC:999894528> a schema:Organization;
        schema:identifier [ a schema:PropertyValue;
            schema:propertyID "PIC";
            schema:value 999894528;
        ];
        schema:legalName "University of Patras";
        schema:address [ a schema:PostalAddress ;
            schema:streetAddress "University Campus" ;
            schema:addressLocality "Rio Achaia" ;
            schema:postalCode "26504" ;
            schema:addressCountry "Greece" ;
        ];
        schema:logo "https://www.upatras.gr/sites/www.upatras.gr/files/upatras_logo.jpg"^^xsd:anyURI ;
        schema:url "http:www.series.upatras.gr"^^xsd:anyURI;
        schema:email "rectorate@upatras.gr" ;
```

```
        schema:telephone "+30 2610996683" ;
        schema:contactPoint <http://orcid.org/0000-0002-8616-334X/legalContact> ;
        schema:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        schema:contactPoint <http://orcid.org/0000-0002-8616-334X/financialContact> ;
.


<epos:PseudodynamicTestson4-storeyNonductileFrameswithRCInfillingoftheBay> a skos:Concept;
        skos:inScheme <epos:SeismicEngineering>;
        skos:prefLabel "Pseudodynamic Tests on 4-
storey Nonductile Frames with RC Infilling of the Bay";
.


<SERIES/dataset/project/1> a dcat:Dataset;
        dct:title "Pseudodynamic Tests on 4-storey Nonductile Frames with RC Infilling of the Bay";
        dct:identifier "SERIES/dataset/project/1";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-P0";
        ];
        dct:description "Summary with the main focus on Retrofit technique Experimental technique Mode
l Calibration";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2010-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:PseudodynamicTestson4-storeyNonductileFrameswithRCInfillingoftheBay>;
        dcat:keyword "KANEPE", "OASP";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/project/1>;
.


<SERIES/distribution/project/1> a dcat:Distribution;
    dct:identifier "SERIES/distribution/project/1";
    dct:title "Pseudodynamic Tests on 4-
storey Nonductile Frames with RC Infilling of the Bay project information";
    dct:description "Enables to download information/report about the project";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/project_reports/1>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/project_reports/1> a hydra:Operation;
```

```
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/projec
t_reports?project_id={?project_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "project_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of project: Pseudodynamic Tests on 4-
storey Nonductile Frames with RC Infilling of the Bay. ";
            schema:defaultValue "1";
                http:paramValue "1";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.


<SERIES/dataset/specimen/1> a dcat:Dataset;
        dct:title "KE_Retrofitted Building 1";
        dct:identifier "SERIES/dataset/specimen/1";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S0";
        ];
        dct:description "Summary with the main focus on Retrofit technique Experimental technique Mode
l Calibration";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2010-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:PseudodynamicTestson4-storeyNonductileFrameswithRCInfillingoftheBay>;
        dcat:keyword "KE_Retrofitted Building 1";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1>;
.


<SERIES/distribution/specimen/1> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1";
    dct:title "KE_Retrofitted Building 1 project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1>;
```

```
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: KE_Retrofitted Building 1. ";
            schema:defaultValue "1";
                http:paramValue "1";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.


<SERIES/dataset/specimen/2> a dcat:Dataset;
        dct:title "KE_Retrofitted Building 2";
        dct:identifier "SERIES/dataset/specimen/2";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S1";
        ];
        dct:description "Summary with the main focus on Retrofit technique Experimental technique Mode
l Calibration";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2010-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:PseudodynamicTestson4-storeyNonductileFrameswithRCInfillingoftheBay>;
        dcat:keyword "KE_Retrofitted Building 2";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/2>;
.


<SERIES/distribution/specimen/2> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/2";
    dct:title "KE_Retrofitted Building 2 project information";
    dct:description "Enables to download information/report about the specimen";
```

```
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/2>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.

<SERIES/webservice/series_epos_platform/specimen_reports/2> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: KE_Retrofitted Building 2. ";
            schema:defaultValue "2";
                http:paramValue "2";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.

<SERIES/dataset/specimen/4> a dcat:Dataset;
        dct:title "KE_Retrofitted Building 3";
        dct:identifier "SERIES/dataset/specimen/4";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S2";
        ];
        dct:description "Summary with the main focus on Retrofit technique Experimental technique Mode
l Calibration";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2010-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:PseudodynamicTestson4-storeyNonductileFrameswithRCInfillingoftheBay>;
        dcat:keyword "KE_Retrofitted Building 3";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/4>;
.

<SERIES/distribution/specimen/4> a dcat:Distribution;
```

```
    dct:identifier "SERIES/distribution/specimen/4";
    dct:title "KE_Retrofitted Building 3 project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/4>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/4> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: KE_Retrofitted Building 3. ";
            schema:defaultValue "4";
                http:paramValue "4";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.


<epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings> a skos:Concept;
        skos:inScheme <epos:SeismicEngineering>;
        skos:prefLabel "Seismic Performance Assessment and Rehabilitation of Existing Buildings";
.


<SERIES/dataset/project/8> a dcat:Dataset;
        dct:title "Seismic Performance Assessment and Rehabilitation of Existing Buildings";
        dct:identifier "SERIES/dataset/project/8";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-P1";
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
```

```
        dcat:keyword "SPEAR", "EU";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/project/8>;
.


<SERIES/distribution/project/8> a dcat:Distribution;
    dct:identifier "SERIES/distribution/project/8";
    dct:title "Seismic Performance Assessment and Rehabilitation of Existing Buildings project informa
tion";
    dct:description "Enables to download information/report about the project";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/project_reports/8>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/project_reports/8> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/projec
t_reports?project_id={?project_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "project_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of project: Seismic Performance Assessment and Rehabilit
ation of Existing Buildings. ";
            schema:defaultValue "8";
                http:paramValue "8";
                hydra:required "true"^^xsd:boolean;
                ];
    ] ;
.


<SERIES/dataset/specimen/1401> a dcat:Dataset;
        dct:title "SR_Q_RC";
        dct:identifier "SERIES/dataset/specimen/1401";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S3";
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
```

```
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];

        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RC";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1401>;
.


<SERIES/distribution/specimen/1401> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1401";
    dct:title "SR_Q_RC project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1401>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1401> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RC. ";
            schema:defaultValue "1401";
                http:paramValue "1401";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.


<SERIES/dataset/specimen/1402> a dcat:Dataset;
        dct:title "SR_Q_RCD";
        dct:identifier "SERIES/dataset/specimen/1402";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S4";
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
```

```
        schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
    ];
    dct:spatial [ a dct:Location;
        locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
    dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
    dcat:keyword "SR_Q_RCD";
    dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
    dct:publisher <PIC:999894528>;
    dcat:distribution <SERIES/distribution/specimen/1402>;
.


<SERIES/distribution/specimen/1402> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1402";
    dct:title "SR_Q_RCD project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1402>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1402> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCD. ";
            schema:defaultValue "1402";
                http:paramValue "1402";
                hydra:required "true"^^xsd:boolean;
                ];
    ] ;
.


<SERIES/dataset/specimen/1403> a dcat:Dataset;
    dct:title "SR_Q_RCL1";
    dct:identifier "SERIES/dataset/specimen/1403";
    adms:identifier [ a adms:Identifier;
        adms:schemaAgency "DDSS-ID";
        skos:notation "WP17-DDSS-S5";
    ];
    dct:description "Summary with the main focus on Retrofit technique";
```

```
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RCL1";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1403>;
.


<SERIES/distribution/specimen/1403> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1403";
    dct:title "SR_Q_RCL1 project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1403>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1403> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCL1. ";
            schema:defaultValue "1403";
                http:paramValue "1403";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.


<SERIES/dataset/specimen/1404> a dcat:Dataset;
        dct:title "SR_Q_RCL1pd";
        dct:identifier "SERIES/dataset/specimen/1404";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S6";
```

```
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RCL1pd";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1404>;
.


<SERIES/distribution/specimen/1404> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1404";
    dct:title "SR_Q_RCL1pd project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1404>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1404> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCL1pd. ";
            schema:defaultValue "1404";
                http:paramValue "1404";
                hydra:required "true"^^xsd:boolean;
                ];
        ] ;
.


<SERIES/dataset/specimen/1405> a dcat:Dataset;
        dct:title "SR_Q_RCL2";
        dct:identifier "SERIES/dataset/specimen/1405";
        adms:identifier [ a adms:Identifier;
```

```
        adms:schemaAgency "DDSS-ID";
        skos:notation "WP17-DDSS-S7";
    ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RCL2";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1405>;
.


<SERIES/distribution/specimen/1405> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1405";
    dct:title "SR_Q_RCL2 project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1405>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1405> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCL2. ";
            schema:defaultValue "1405";
                http:paramValue "1405";
                hydra:required "true"^^xsd:boolean;
                ];
    ] ;
.


<SERIES/dataset/specimen/1406> a dcat:Dataset;
        dct:title "SR_Q_RCL2pd";
```

```
        dct:identifier "SERIES/dataset/specimen/1406";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S8";
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RCL2pd";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1406>;
.


<SERIES/distribution/specimen/1406> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1406";
    dct:title "SR_Q_RCL2pd project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1406>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1406> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCL2pd. ";
            schema:defaultValue "1406";
                http:paramValue "1406";
                hydra:required "true"^^xsd:boolean;
                ];
    ] ;
.
```

```
<SERIES/dataset/specimen/1407> a dcat:Dataset;
        dct:title "SR_Q_RCM";
        dct:identifier "SERIES/dataset/specimen/1407";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S9";
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RCM";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1407>;
.


<SERIES/distribution/specimen/1407> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1407";
    dct:title "SR_Q_RCM project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1407>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.


<SERIES/webservice/series_epos_platform/specimen_reports/1407> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCM. ";
            schema:defaultValue "1407";
                http:paramValue "1407";
                hydra:required "true"^^xsd:boolean;
                ];
    ] ;
```

```
.

<SERIES/dataset/specimen/1408> a dcat:Dataset;
        dct:title "SR_Q_RCpd";
        dct:identifier "SERIES/dataset/specimen/1408";
        adms:identifier [ a adms:Identifier;
            adms:schemaAgency "DDSS-ID";
            skos:notation "WP17-DDSS-S10";
        ];
        dct:description "Summary with the main focus on Retrofit technique";
        dct:created "2019-11-02T00:00:00Z"^^xsd:date;
        dct:temporal [ a dct:PeriodOfTime;
            schema:startDate "2001-01-01T00:00:00Z"^^xsd:date;
        ];
        dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
        dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
        dcat:keyword "SR_Q_RCpd";
        dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
        dct:publisher <PIC:999894528>;
        dcat:distribution <SERIES/distribution/specimen/1408>;
.

<SERIES/distribution/specimen/1408> a dcat:Distribution;
    dct:identifier "SERIES/distribution/specimen/1408";
    dct:title "SR_Q_RCpd project information";
    dct:description "Enables to download information/report about the specimen";
    dct:type "http://publications.europa.eu/resource/authority/distribution-
type/WEB_SERVICE"^^xsd:anyURI;
    dct:conformsTo <SERIES/webservice/series_epos_platform>;
    dcat:accessURL <SERIES/webservice/series_epos_platform/specimen_reports/1408>;
    dct:format "http://publications.europa.eu/resource/authority/file-type/XML"^^xsd:anyURI;
.

<SERIES/webservice/series_epos_platform/specimen_reports/1408> a hydra:Operation;
    hydra:method "GET"^^xsd:string;
    hydra:returns "application/xml";
    hydra:property[ a hydra:IriTemplate;
        hydra:template "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx/specim
en_reports?specimen_id={?specimen_id}"^^xsd:string;
            hydra:mapping[ a hydra:IriTemplateMapping;
                hydra:variable "specimen_id"^^xsd:string;
                rdfs:range "xsd:string";
                rdfs:label "Download metadata of specimen: SR_Q_RCpd. ";
            schema:defaultValue "1408";
                http:paramValue "1408";
                hydra:required "true"^^xsd:boolean;
```

```
                ];
        ] ;
.


<SERIES/webservice/series_epos_platform> a epos:WebService;
    schema:identifier "SERIES/webservice/series_epos_platform";
    schema:description "Access to SERIES metadata";
    schema:name "Access to SERIES metadata";
    dcat:contactPoint <http://orcid.org/0000-0002-8616-334X/scientificContact> ;
    hydra:entrypoint "http://www.dap.series.upatras.gr/TCS_Metadata_Retrieval/WebService.asmx"^^xsd:an
yURI;
    schema:provider <PIC:999894528>;
    dct:spatial [ a dct:Location;
            locn:geometry "POINT(21.7780958 38.2868967)"^^gsp:wktLiteral;
];
    schema:datePublished "2019-11-20T00:00:00Z"^^xsd:dateTime;
    schema:dateModified "2019-01-01T00:00:00Z"^^xsd:dateTime ;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/project_reports/1>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/2>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/4>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/project_reports/8>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1401>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1402>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1403>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1404>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1405>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1406>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1407>;
    hydra:supportedOperation <SERIES/webservice/series_epos_platform/specimen_reports/1408>;
    dcat:theme <epos:PseudodynamicTestson4-storeyNonductileFrameswithRCInfillingoftheBay>;
    dcat:theme <epos:SeismicPerformanceAssessmentandRehabilitationofExistingBuildings>;
    schema:keywords "signal metadata","experiments","specimens","projects","document repository";
.
```

Contact

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