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Abstract

This deliverable describes the specification and implementation of the PROMISE evaluation infrastructure. It builds on previous D3.3 and adds the specification for the bibliometrics, expert profiling, and topic identification for scientific contributions. It also describes the mapping of the resources to RDF and linked data as well as the final re-design of the overall conceptual model. Finally, it discusses alternatives for component-based evaluation.
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Executive Summary

One of the continued objectives of PROMISE is to bring automation into the evaluation process and to foster access, exploitation, and re-use of the experimental data. This objective is pursued via the design and development of the evaluation infrastructure which acts as backbone for many of the PROMISE activities. The first specification of the Distributed Information Retrieval Evaluation Campaign Tool (DIRECT) evaluation infrastructure is reported in D3.3 [Agosti et al., 2012] and this deliverable builds upon and extends it.

Indeed, the goals of automation and exploitation of the experimental data have evolved during the life span of PROMISE and this deliverable reports the final version of the specification of the DIRECT evaluation infrastructure, describing how it has grown and matured to embrace new needs and more sophisticated requirements.

In particular, the current trends in semantic representation and enrichment of digital resources led to extensions of DIRECT with a Resource Description Framework (RDF) [W3C, 2004] model of the managed resources in order to expose them as linked data [Bizer et al., 2009; Heath and Bizer, 2011].

This RDF model played a pivotal role for extending the DIRECT conceptual model with the support of the semantic enrichment of the scientific literature produced by the evaluation activities throughout automatic expert profiling and topic identification, which are fully described in D3.6 [Bordea et al., 2013]. The RDF model also served the purpose of supporting the introduction of bibliometrics and the impact analysis conducted on the CLEF scientific production, which are reported in detail in D6.4 [Tsikrika et al., 2013].

Moreover, the possibility for component-based evaluation at different levels of granularity, i.e. ranging from sub-components or modules of an IR system to complex search applications based on Web services, has been explored and considered and the specification of the evaluation infrastructure now encompasses the Coordinated Information Retrieval Components Orchestration (CIRCO) framework [Ferro and Harman, 2010] for the asynchronous and XML-based evaluation of sub-components of IR systems.

Finally, the DIRECT infrastructure improved its support to the Visual Analytics (VA) environment which led both to a revision and enrichment of the tools to conduct the analysis of the experimental results, as reported in D5.4 [Angelini and Santucci, 2013], and to the introduction of the innovative Visual Analytics Tool for Experimental Evaluation (VATE²) system for performance, failure, and what-if analysis, reported in D4.5 [Angelini et al., 2013].
1 Introduction

This deliverable provides a detailed description and specification of the PROMISE evaluation infrastructure and complements the previous specification of it, reported in D3.3 [Agosti et al., 2012]. In particular, several new aspects are covered in the deliverable:

1. it describes the alternatives for the component-based evaluation and extends the conceptual model to embed the CIRCO framework for asynchronous and XML-based evaluation;

2. it introduces the support for the semantic enrichment of experimental data via expertise profiling and topic identification;

3. it adds the support for bibliometrics and impact analysis;

4. it reports a brand new RDF model for exposing the managed resources as linked data.

Besides these bigger achievements, the deliverable details the final re-design and tuning of the DIRECT conceptual model, of the REpresentational State Transfer (REST) API to access the resources, and the indexes for the advanced search functionalities.

The deliverable is organized as follows: Section 2 details the alternatives for the component-based evaluation; Section 3 describes the final re-designed conceptual schema and its several extensions; finally, Section 4 describes the newly introduced RDF models and provides examples of instantiations of it. Appendix A reports the XML schemas corresponding to the DIRECT conceptual model while Appendix B lists the RDF model corresponding to the managed resources; Appendix C specifies the REST API for managing and accessing the available resources as well as their representation in XML and JSON formats; Appendix D describes the query language derived from the search model previously described and details all the indexes that can be used for searching for resources.

2 Component-based Evaluation

Experimental evaluation, a key element of scientific endeavour, seeks to provide answers to research questions by obtaining, through objective measurement and systematic analysis, empirical evidence that support or falsify research hypotheses derived from theories, models, and methods put forward to address these questions. Experimentation under controlled conditions is thus integral to driving progress in science, particularly in disciplines of highly applied nature. Information retrieval is undeniably such a field, since it is geared towards the development of multimedia and multilingual systems that aim to meet the requirements of users in situations of information need, provide the desired performance in terms of effectiveness and efficiency, guarantee the required robustness and reliability, and operate with the necessary scalability; as such it has a rich tradition in experimental evaluation.

The Cranfield tests [Cleverdon, 1967] established the fundamental information retrieval evaluation paradigm: the comparative, effectiveness-oriented, laboratory-based evaluation of different
approaches to a given retrieval task. Cranfield-2, in particular, laid down the core principles for conducting such comparative evaluations by describing a methodology and introducing the necessary resources. In this archetype, (i) the design of the experiment is based on the decomposition of information retrieval systems in terms of performance factors, and, in particular, into components performing specific operations and into features (or devices [Cleverdon, 1967]) realising various retrieval methods within such components, so that the effect of each on performance, and in comparison against appropriate baselines, is clear, (ii) measurement is performed with the use of test collections and suitable evaluation measures, and (iii) rigorous analysis of experimental results requires macro and micro analysis, investigation of the effect of varying parameter values, failure analysis, and statistical significance testing.

Test collection-based evaluation remains prevalent today, despite its limitations [Ingwersen and Järvelin, 2005] and the criticism it has met. It is also the predominant paradigm in evaluation campaigns, including the following major international initiatives: TREC\(^1\), CLEF\(^2\), INEX\(^3\), NTCIR\(^4\), and FIRE\(^5\). This has motivated a considerable amount of research towards the issue of measurement in information retrieval evaluation, including the creation of reliable and reusable test collections for comparative evaluation and the development of appropriate evaluation measures [Müller et al., 2010; Voorhees and Harman, 2005]. Much less attention has though been paid to the other methodological issues, and to the experimental design in particular, [Metzler and Kurland, 2012; Moffat and Zobel, 2004; Robertson, 1981; Tague-Sutcliffe, 1997] being notable exceptions.

This section focuses on the issues arising from the adoption of the decompositional approach to information retrieval experimentation. This paradigm ensures a well-motivated comparative evaluation by (i) specifying and implementing the components concerning each retrieval method to be evaluated, (ii) formulating research hypotheses on the basis of methods viewed as alternatives to a particular retrieval operation, and (iii) testing these hypotheses by measuring the performance of complete systems with each of the alternative components embedded. This requirement of system-level experimentation for performing component-level evaluation may appear paradoxical, but it can actually be attributed to the long-standing inability of the field to establish criteria and identify variables at the component level that might correlate well with the overall performance at the system level, and, thus, be able to explain or predict it. Even if such criteria and variables were determined, the validation of the assumptions underlying any observed correlations would remain a challenge [Robertson, 1981]. This is due to the complex interactions among components that may result in non-additive effects on performance [Armstrong et al., 2009], whereby combinations of optimal components leads to sub-optimal results, and vice versa.

As a result, information retrieval experimentation currently requires to build a whole system even when the goal is to evaluate a single component; this is a severe constraint for a multiplicity of reasons. The most significant is the complexity of today’s information retrieval systems. These systems have progressively become more and more complicated since they have to manage increasing amounts of heterogeneous information and carry out retrieval tasks that cross media and language

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\(^1\)Text REtrieval Conference (http://trec.nist.gov/)
\(^2\)Cross-Language Evaluation Forum (http://www.clef-initiative.eu/)
\(^3\)Initiative for the Evaluation of XML retrieval (http://inex.mmci.uni-saarland.de/)
\(^4\)NTCIR Evaluation of Information Access Technologies (http://ntcir.nii.ac.jp/)
\(^5\)Forum for Information Retrieval Evaluation (http://www.isical.ac.in/~clia/)
barriers. Their design and development is thus challenging for the majority of researchers, since it requires the integration of components and technologies coming from different areas and domains and the availability of multidisciplinary competencies, which are rarely present within a single research group. The proliferation of open source information retrieval systems [Trotman et al., 2012] has greatly ameliorated this situation and has allowed many research groups to carry out large scale evaluation experiments, provided that they have access to sufficient computing resources and to specific configurations of computing environments. On the other hand, the broad range of retrieval methods of interest together with the continuous evolution of state-of-the-art make it difficult for such systems to both consider the whole spectrum of desired components, particularly those required in multimedia and multilingual settings, while also continuously integrating the state-of-the-art of their existing components. Efforts to address this limitation typically involve requests to the research community for the contribution of extensions and improvements. The modular architecture of most such systems make this practice possible, but the extent to which it has led to an increase in the supported retrieval functionalities is rather limited.

These difficulties in fulfilling the requirements for component-level evaluation have affected the way experimentation is being carried out by individual researchers and research groups and have had important ramifications for information retrieval research. The most grave has been the adoption of weak baselines based on the view that it is sufficient for researchers to demonstrate the effectiveness of their newly devised retrieval methods through improvements over simple baselines, rather than having to integrate the components that implement them in a state-of-the-art system, a costly and complex endeavour. This widespread practice is based on the assumption that improvements by components in isolation would be additive in combination. Research [Armstrong et al., 2009] using TREC data has shown though that this assumption does not always hold, casting doubts over the reliability of research conducted on such grounds. It has also laid bare the need within the information retrieval community for tools and frameworks that would support experimentation against the constantly evolving state-of-the-art, while individual researchers and research groups could focus only on the development of the components of interest to them.

2.1 Granularity aspects

As shown in Figures 5 and 11 in Section 3.5, components in an information retrieval system can be understood at various granularities, since they can belong one to another. In this case, three granularity levels are defined:

- **Component-level components.** These are the finest grained components. They provide one single feature, they perform one single action on the Information Units. They are normally run once per corpus. Examples are: tokenizers, stemmers, indexers.

- **System-level components.** These components use none, one or many of the component-level components and manage their output to perform a complex task. They can operate on a per corpus or per query basis.

- **Application-level components.** These components manage system-level and component-level components, and provide the final results to the User. They perform a task on a per query
basis. Examples are components that perform ranking and fusion of results.

The key factor for the analysis of component granularity is to determine whether they operate on a per corpus or a per query basis, since this will have an impact on the evaluation possibilities for each of them.

2.2 Approaches to Component Based Evaluation and related costs

Following the ideas from [Hanbury and Müller, 2010], two main approaches can be considered for component–based evaluation of information retrieval systems: intermediate output (offline approach) and webservices (online approach).

2.2.1 Use of intermediate output

Intermediate output requires a solid specification of the data format, for example the one described in the CIRCO, which is described in detail below. Each of the components of the IR pipeline provides an eXtensible Markup Language (XML)–based stream. These files can be reused by any of the components that follow in the pipeline, enabling a loosely–coupled, distributed, asynchronous evaluation of the components. The strengths of this approach lie first on its simplicity, since the only requirement is to convert the output to a given specification. Secondly, for the finest grained components, that act on a corpus basis, this is the only way of obtaining interoperability, since online computation on a whole corpus is not feasible. The most important drawback is that data storage costs grow rapidly with the number of steps in the pipeline and the number of users involved. A replication rate can be defined, considering all the possible combinations of all components at all steps of the pipeline:

\[
R = \prod_{s=1}^{S} C_s
\]

where the pipeline consists of \( S \) steps with \( C_s \) alternative components for each step. Even without considering the XML overheads, this introduces a non–negligible replication of the corpus. However, if this problem is managed, then no further computation is required.

The objective of the CIRCO framework [Ferro and Harman, 2010] is to allow for a distributed, loosely-coupled, and asynchronous experimental evaluation of Information Retrieval (IR) systems where:

- *distributed* highlights that different stakeholders can take part to the experimentation each one providing one or more components of the whole IR system to be evaluated;
- *loosely-coupled* points out that minimal integration among the different components is required to carry out the experimentation;
- *asynchronous* underlines that no synchronization among the different components is required to carry out the experimentation.
The CIRCO framework allows different research groups and industrial parties, each one with their own areas of expertise, to take part in the creation of collaborative experiments. This is a radical departure from today’s IR evaluation practice where each stakeholder has to develop (or integrate components to build) an entire IR system to be able to run a single experiment.

The base idea – and assumption – behind CIRCO to streamline the architecture of an IR system and represent it as a pipeline of components chained together. The processing proceeds by passing the results of the computations of a component as input to the next component in the pipeline without branches, i.e. no alternative paths are allowed in the chain.

To get an intuitive idea of the overall approach adopted in CIRCO, consider the example pipeline shown in Figure 1.

Figure 1: An example pipeline for an IR system.

The example IR system is constituted by the following components:

- tokenizer: breaks the input documents into a sequence of tokens;
- stop word remover: removes stop words from the sequence of tokens;
- stemmer: stems the tokens;
- indexer: weights the tokens and stores them and the related information in an index.

Instead of directly feeding the next component as usually happens in an IR system, CIRCO operates by requiring each component to input and output from/to XML [W3C, 2008] files in a well-defined format, as shown in Figure 2.

Figure 2: An example of CIRCO pipeline for an IR system.

These XML files can then be exchanged among the different stakeholders that are involved in the evaluation, allowing for an experimentation that is:

- distributed since different stakeholders can take part in the same experiment, each one providing his own component(s);
• **loosely-coupled** since the different components do not need to be integrated into a whole and running IR system but only need to communicate by means of a well-defined XML format;

• **asynchronous** since the different components do not need to operate all at the same time or immediately after the previous one but can exchange and process the XML files at different rates.

The choice of using an XML-based exchange format is due to the fact that the main other possibility, i.e. to develop a common Application Program Interface (API) IR systems have to comply with, presents some issues:

• the experimentation would not be **loosely-coupled**, since all the IR systems would have to be coded with respect to the same API;

• much more complicated solutions would be required for allowing the **distributed** and **asynchronous** running of the experiments, since you would need some kind of middleware for process orchestration and message delivery;

• multiple versions of the API in different languages should be provided to take into account the different technologies used to develop IR system;

• the integration with legacy code could be problematic and require a lot of effort;

• overall, stakeholders would be distracted from their main objective, which is running an experiment and evaluating a system.

### 2.2.2 Use of webservices

The use of webservices solves the data replication problem at the cost of computation replication. It also requires a specification of the message exchange format. Each of the components of the information retrieval system would be exposed through a webservice interface to other components.

Combination of various components can therefore be performed almost on the fly, with very quick set up. This is the optimal approach for all components that act on a query basis, since the data is not replicated and is accessed only when needed by each of the web services. The most important drawback is that data can be computed several times, one per each component accessing the webservice. The computation replication rate is equivalent to the data replication rate. However, if the number of components accessing each webservice can be estimated, this allows balancing storage and computation adding persistence layers to some webservices.

### 2.3 Evaluation protocol

As discussed in section 2.2, the costs of performing an exhaustive evaluation of all components grows rapidly with the complexity of the information retrieval system pipelines and the number of options for a given step, which is also related to the number of actors in the evaluation campaign.

However, this complexity can be reduced if we consider the following simplification to the general case: each information retrieval system to be evaluated can be described in terms of a pipeline
of various components, regardless of the actual implementation of these components. As a consequence, various information retrieval systems may share the pipeline specification although the implementation might differ. From now on, we will refer to each of the various specifications with the term system families. If in addition to this, a baseline implementation of each of the steps in a pipeline specification can be defined, the component-based evaluation is reduced to: (1) evaluating the impact of the various components of the same type in a given system family and also (2) evaluating the impact of the system family in the component performance.

The first case is represented in Figure 3. In this situation, the components are evaluated attending to how they affect the performance of the given system. As a result of this evaluation, the best components can be found for each of the pipeline positions of a given system family.

![Figure 3: Evaluation of all components of the same type for a given system family](image)

The second case deals with evaluating how a given component is affected by the pipeline specification. In this situation, a specific component is evaluated by testing its performance in all the system families that include a component of the same type. As a result of this evaluation the best system family can be found for a given component. This case is shown in Figure 4.

![Figure 4: Evaluation of all the system families with respect to a given component](image)

From the discussion above, we can define an evaluation protocol for component-based evalu-
1. According to a defined vocabulary, participants can register their pipeline specifications and their individual implementations for each of the steps.

2. For each of the component types present in all the registered pipelines, a baseline implementation is chosen. These implementations should be the simplest forms of dummy components.

3. Two different evaluations are run:

   **Full System Evaluation.** The full systems are evaluated with all the proposed implementations of the components. This evaluation does not change anything of the existing infrastructure, systems are evaluated according to the result lists for a set of experiments or queries. However, since systems are classified in families according to the component-based specifications, it will provide a ranked list of implementations for each of the system families, allowing fair comparison among systems of the same family, and providing insight on how the presence of certain components can modify the performance of the system.

   **Component Based Evaluation.** Each of the components registered by participants is evaluated in all system families that contain a component of the same type, but using the baseline implementation for the rest of the components. This addresses the two cases for component based evaluation discussed above: (1) by comparing all components of the same type in a system family and (2) by comparing the relative performance of the same component when it is included in different system specifications.

This protocol is based on the existing Conceptual Schema defined in Section 3. Therefore, the changes in the infrastructure are minimal. For instance, the pipeline specification or and the system families would be part of the Configuration concept, which needs to support the family concept. The evaluation is based on Experiments, however, the users are now required to submit Experiments using the existing baseline implementations of the components as explained in the evaluation protocol if they want to participate in the component–based evaluation. Components, including baseline implementations, can provided either with intermediate output for offline steps or with webservices for online steps.

The decision of using baseline components reduces the number of evaluations to perform, which would otherwise be unfeasible. This allows a research group to focus on one component, while being able to test the full pipeline using the existing baseline implementations for the rest of the components. Component–based evaluation would allow fair comparison of the various implementations of the same type, thanks to having standarized not only the retrieval corpus but also the baseline techniques for the rest of components.
3 Conceptual Schema Design

The first version of the conceptual schema of the PROMISE evaluation infrastructure has been extensively described in [Agosti et al., 2011] and its first consistent revision has been reported in [Agosti et al., 2012]. This section describes the final version of the conceptual schema which has been extensively re-designed along with the collaboration of all the PROMISE partners. This schema allows for a deep integration of the DIRECT infrastructure with the several needs of the PROMISE project (e.g. impact analysis, information extraction and enrichment, best practices, evaluation in the wild).

3.1 Resource Area

In the PROMISE infrastructure the term "resource" refers to a generic entity that concerns evaluation activities and with which a user or a group of users can interact. Resources can be actual data adopted in or produced by these activities (e.g. experimental collections or experiment results), as well as the evaluation activities and tasks carried out within them.

The Resource area has the following entities:

- **Resource**: it is the relationship that involves many resources of a generic evaluation activity. Every Resource entity has an attribute called scope that defines the extent of the resource taken into account; it is a controlled vocabulary: PUBLIC, PRIVATE, SHARED.

- **Namespace**: refers to a logical grouping of identifiers and allows the disambiguation of homonym identifiers belonging to different namespaces.

- **User**: a generic user of the infrastructure.

- **Role**: it indicates the role a user can assume in the evaluation infrastructure.

- **Group**: it is a set of users grouped together.

- **Concept**: a Concept is viewed as an idea or notion, a unit of thought. It can be used to define the type of relationships in a semantic environment or to create a taxonomy (for instance a taxonomy of metrics, or statistical tests, and so on).

The most important change in the Resource Area consists in the creation of the Concept entity, which groups together many previous entities present in D3.2 [Agosti et al., 2011] and serves the purpose of managing typed relationships between entities, e.g. to build taxonomies of terms, and, in some sense, resembles the idea of concept introduced by Simple Knowledge Organization System (SKOS) [W3C, 2009a,b].

As shown in Figure 5, a recursive relationship (i.e. Organizes) allows to link a Concept to another Concept, and also to create typed links. This relationship has an attribute called score which allows us to set the relationship strength among two resources. It is also important to underline that is linked with a high number of other entities from many other areas (examples will be provided in the next subsections).
The relationships between the Group, User and Role entities of this area (Figure 6) remain unchanged. A User can play none, one or more Role(s); for instance, a user can be both an organizer of an evaluation activity and a researcher that carries out the activity, i.e. a participant to the evaluation activity. A Role can be played by none, one or more users; for instance, an evaluation activity can have one or more participants, e.g. the researchers that are carrying out the experiments for writing a paper. A User can belong to none, one or more Groups; a Group does not necessarily contain a User.

Figure 6 reports also on the relationships between the User and the Concept resources. The Profiles relationship allows us to establish a relation between a user and a concept putting a score and a backward score on it. The relation between a user and a concept means that a user is “expert in” a specific concept (feature) and the strength of this relation is defined by the score (a double in the range \([0, 1]\)); the relation between a concept and a user means that a concept has an expert (a user) and the strength of this relation is defined by the backward score. This lets us define user profiles; for instance, we can say that “user A is an expert in information retrieval” where “user A” is a User and “information retrieval” is a Concept. The Profiles relationship has two attributes: score which allows us to represent the strength of the relation between a user and a concept, and backward score which allows us to represent the strength of the relation between a concept and a user. This means that the relationship between User and Concept is not symmetric; for instance, we can say that “User A is an expert in “information retrieval” with score 0.9 and this would mean that information retrieval is the main area of expertise for User A. On the other hand, there are people much more expert in information retrieval than User A, so the backward score could be only 0.1, and this would mean that User A is just one of the experts in information retrieval and that we expect to be able to find out other users with a higher expertise level (backward score) in the considered topic.
The associated ternary relationship allows us to define typed relationships between the users in the system. The score attribute defines the strength of the relationship between users. Furthermore, we can define a typed relationship because associated is connected to Concept. For instance, throughout the associated relationship we can say that “User A has similar expertise than User B”, where “has similar expertise than” is a concept defining the relationship type between the users.

3.2 Metadata Area

The Metadata area has two entities:

- Metadata: metadata is usually defined as “data over data” and it is used to describe the resources of the evaluation infrastructure. Metadata is itself a resource of the infrastructure and thus it can be recursively described by another metadata; this fact is modelled by means of the recursive relationship Relates on the Metadata entity, as shown in Figure 7.

- Metadata Set: it is a logical grouping of Metadata. The recursive relationship allows to create hierarchies of metadata sets.

This area keeps its two entities, Metadata and Metadata Set, and each one of them still has the same recursive relationship it had in the previous version of this work. The relationship between the two entities changes, though, from Owns to Is Stored As.

3.3 Evaluation Activity Area

The entities of this area are:
Evaluation Activity: it is any type of activity that aims at the evaluation of applications, systems, and methodologies for multimodal and multimedia information access and retrieval.

Campaign: it represents the different aspects of an evaluation forum, such as the different campaigns and the different editions of each campaign, the tracks along which the campaign is organized and the tasks in which each track is divided. Campaign is a public and shared activity that may be undertaken by, say, academic, commercial and governmental groups that are interested in the activity organized and structured by a third-party body. Participating groups share the data on which evaluation is based and the evaluation metrics, thus allowing comparison across the techniques adopted by the diverse groups.

Trial: it identifies an evaluation activity that may be actively run by, for example, a research group, a person or a corporate body for their own interest. It does not have a standard organization like the Campaign activity and the body that undertakes the activity defines its organization. In the evaluation infrastructure we assume that a Trial activity has to be organized in tasks. In a Trial activity there is room for defining heterogeneous organizations as well as new types of evaluation activities that may arise in the course of time.

Education: allows us to envision evaluation activities carried out for educational purposes.

Task: a Task refers to a specific piece of work that is undertaken within the evaluation activity and aims at testing a specific (research) hypothesis. An example is the ad-hoc task in an evaluation campaign, e.g. TREC or CLEF; the aim of the ad-hoc task is to test the ability of retrieval systems to retrieve accurate and complete ranked list of documents (i.e. information units in the DIRECT system) in response to a set of information need statements [Voorhees and Harman 2005]. The research hypothesis does not necessarily refer to the effectiveness of a retrieval technique, but it may concern the effect of a pooling strategy or a user-centric analysis of an application. e.g. a web portal, where the retrieval system may be only one of the constituting blocks. The definition of the Task entity is therefore more general than the
one adopted in traditional campaigns since the infrastructure aims at retaining and sharing information on a generic evaluation activity.

- **Track**: Tasks carried out within a campaign are grouped into Tracks.

The three former subclasses Campaign, Education and Trial, that were specializations of the Evaluation Activity entity, have now become three independent entities, linked to Evaluation Activity through Is a relationships. The Series entity has been removed and replaced by the Concept entity.

![Evaluation Activity Area relationships](image)

**Figure 8: Evaluation Activity Area relationships**

### 3.4 Experimental Collection Area

This area has the following entities:

- **Corpus**: is a set of informative resources, which allows us to perform a series of investigations in a research area; thus, a Corpus is composed by one or more Information Unit(s).
• **Ground Truth:** it is a general entity referring to a container of assessments. It can be the container of assessments obtained through new techniques different than traditional pooling.

• **Information Unit:** the Information Unit is the object on which the evaluated system acts, e.g. the object which is retrieved by the system under evaluation.

• **Pool Item:** this entity refers to relevance judgements, which are provided on an Information Unit in the Pool for a given Topic.

• **Topic:** this entity represents the materialization of an information need.

• **Topic Content:** it represents the actual content of a topic; it can have multiple languages and multiple media types.

The number of entities has decreased, if compared with the last version of this work. The entities that have been removed are: Experimental Collection which was a mere container of Topics, Corpora and Ground Truth, Topic Field, Topic Type, Relation, Relevance, and Pool. It is also useful to show the Concept entity in this schema, since the Relevance is included in it. The entity formerly named Document is now Information Unit because it is a more general concept which can be employed to envision wider representation of information; it is not connected to Corpus anymore.

Another difference between this version of the conceptual schema and the former one is the cardinality between some of the entities, especially between Experimental Collection and, respectively, Topic Group, Corpus and Ground Truth.

### 3.5 Experiment Area

The Experiment area entities are:

• **Experiment:** an Experiment is part of the data produced by a system under evaluation.

• **Run:** a Run is defined as a ranked list of information units for each topic in the experimental collection.

• **Guerrilla:** a Guerrilla experiment identifies an evaluation activity performed on corporate IR systems (e.g. a custom search engine integrated in a corporate Web site). In this case, the evaluation process is defined by a set of experimental activities aimed at assessing different aspects of the application such as the completeness of the index of an ad-hoc search engine or the effectiveness of the multilingual support. For this reason the evaluation metrics can differ from those used during a Run experiment, such as precision.

• **Living:** this entity deals with the specific experimental data resulting from the Living Retrieval Laboratories defined in Task 4.4, which will examine the use of operational systems as experimental platform on which to conduct user-based experiments to scale.

---

6 It can be stated that the Ground Truth entity, although absent in the former version of the schema, has taken the place of Pool, being linked to Experimental Activity through the same relationship Employs.
• Component: it is a building block of a running system. Each component may be composed by other components and the relationships between components are typed (see relates). It must be noted that the relationships between the components are defined in the context of a specific configuration.

• Configuration: the Configuration entity identifies the configuration of an Experiment. Each experiment may specify its configuration which is constituted by a list of components which can be related one to the other.

Experiment, Run and Guerrilla, formerly specifications of the Experiment entity, are proper entities, and each one of them is connected to Experiment through an Is a relationship. Figure 10 shows the relationships between entities in this area.
It is possible to point-out the work-flow in the experimental area for what it is concerned with the configuration:

Figure 10: Experiment Area relationships
• create a configuration;
• add the components to the configuration passing also the parameters (the setting) of the component in the context of the specific configuration;
• nest the components defining their relationships. It is important to notice that we can nest only the components previously added to the configuration;
• attach the configuration to the current experiment.

In this context a component may be either an application or a system. In Figure 11 we can see a possible organization of components into a configuration of an experiment.

### 3.6 Measurement Area

The Measurement area entities are:
3.7 Visual Analytics Area

The entities included in this area are:

- **Visualization**: it refers to the information used by the infrastructure to store and recover whichever visualization of the data that the users do.

- **Snapshot**: it stores the snapshots of a visualization.

The **Visualization Type** entity is now included in the **Concept** entity. Figure 13 shows the relationships that link the two entities of this area and the **Concept** entity.

3.8 Bibliographical Area

Since the **Venue** entity has been removed, the Bibliographical area has only one entity left: **Contribution** (see Figure 14). The **Contribution** entity refers to a piece of writing submitted for a publication. A
conference or a workshop paper, a journal article, a book, a technical report, a thesis or a manual are examples of contributions.

In Figure 14 we can see that Contribution is associated to a Concept that defines its type; e.g. a Contribution can be a generic Publication, a Working Note, or a Journal.

Every Contribution is associated to no, one or more authors (i.e. User) via the Author relationship and can be described by no, one or more Metadata via the describe relationship.

The relationship feature relates a Contribution to a Concept which defines its topic; for instance a Contribution can feature a Concept such as “Information retrieval”, this means that the given Contribution is about “Information retrieval” with a certain relevance score. This allows us to determine the topics of a Contribution and its relevance for a given topic. The relationship is related to allows for relating a Contribution to another Contribution with a typed relationship. This means that we can say that “Contribution A cites Contribution B” where cites is a Concept relating “Contribution A” with “Contribution B”.

The relationship bibliometric relates a Contribution to a Concept and a Metric. This allows us to say that “Contribution A has impact factor 1.3”; impact factor is defined as a Concept and 1.3 as the value of a Measure. The relationship bibliometric user has the same purpose but oriented to User (i.e. author); indeed, through this relationship we can express something like “User A has h-index 3”, where h-index is a Concept and 3 is the value of a Measure.

### 3.9 Component-based Evaluation Area

The conceptual model for the component-based evaluation is depicted in Figure 15. We rely on the notion of component Component introduced in Section 3.5. The basic idea is that a Component receives a sequence of objects, called Stream, as Input, elaborates and processes it, and produces another sequence of objects, as Output. The serialization to XML of this abstract notion of Stream is what will be actually exchanged among Components, according to what is shown in Figure 2.
More precisely, a Stream is a sequence of information Information Units, as introduces in Section 3.4. It can be used as Input for zero or more Components and it must be produced as Output by exactly one Component. In turn, a Component can have zero or more Streams as Input and produce zero or more Streams as Output. Note that this does not mean that a Component can process multiple Input Streams and produce multiple Output Streams at the same time. Indeed, the assumption of pipelining the architecture of an IR system without branches requires to process and produce only one Stream at time for each Component. The possibility of having more than one Stream for each Component is related to the fact that a Component can be Chained in different IR systems, i.e. the same Component can be re-used several times to build different systems. Therefore, in each system, the Component will process and produce a Stream, but always one at time.

When it comes to the processing of Streams and their XML serialization, we need to consider that the size of the produced XML files can become huge, even exceeding the maximum dimension for a file allowed by the file system. Therefore, we need to provide a mechanism for splitting a Stream into several pieces, that we call chunks according to the terminology adopted in the HyperText
Transfer Protocol (HTTP) protocol [Fielding et al., 1999] about the chunked transfer encoding used when huge amounts of information have to be exchanged.

Therefore, the Stream entity is characterized by the following attributes: Id is the unique identifier of the Stream; ChunkNumber is the number of the current chunk in a chunked Stream or 0 for a Stream that is not chunked; Chunked indicates whether the Stream is split into chunks or not; LastChunk indicates whether the current one is the last chunk of a chunked Stream; PreviousChunkDigest is the message digest of the previous chunk in a chunked Stream computed with the digest algorithm specified by DigestType. Typical digest algorithms are SHA-1 [Eastlake and Jones, 2001] and MD5 [Rivest, 1992].

As you can note, the attributes of the Stream entity are chosen so that you do not need to know in advance how many chunks will constitute a Stream but this can be incrementally handled while the processing goes on. The ChunkNumber attribute allows for re-ordering of the various Stream chunks; the PreviousChunkDigest and DigestType allow for checking the correctness and integrity of the previous Stream chunk upon receiving the next one; the LastChunk attribute indicates the end of a chunked Stream.

As anticipated above, the Information Unit entity represents a generic digital object that is being processed by a Component. Examples of Information Units are textual documents, images, audio files, and so on. An Information Unit is uniquely identified by its Id attribute and the Stream it belongs to, since the same Information Unit, i.e. the same digital object, in two different Streams will have different contents due to the different processing applied in each Stream. The MimeType attribute specifies the Multipurpose Internet Mail Extensions (MIME) media type [Freed and Borenstein, 1996a,b] of the Information Unit; this allows us to deal with multimedia resources in general, going beyond simple textual documents.

A Stream Contains zero or more Information Units while an Information Unit must be
Contained exactly into one Stream. As introduced above, this does not mean that a given Information Unit – for example, a textual document with identifier doc153 – cannot be processed into different Streams; on the contrary, it means that we distinguish when the same Information Unit takes part to different Streams – for example, doc153 in Stream stream10 is regarded as different from doc153 in Stream stream37 because it underwent two different kinds of processing, for example, stemming in stream10 and word de-compounding in stream37.

A Token represents an atom of information in an Information Unit. For example, in the case of textual documents, it can be a word or a noun phrase. A Token is identified by a unique identifier Id, while the Value attribute is the string representation of the Token. For example, in the case of textual documents, the Value of a Token can be the work the Token represents but, in the case of an image, it could be the string representation of bin of a color histogram, and so on.

On the Token entity, there is a recursive relationship, called Trace, whose purpose is allowing us to keep trace of previous versions of a given Token so that it is possible to re-construct the history of the different processing it has undergone. In this way, if a Component is not able to process the current form of a Token, it may try to fall-back to a previous form contained in the Trace; moreover, this could also be useful for debugging purposes to see how a token is modified as the processing goes on. Note that Trace is a many-to-many relationship since, in general, a Token can be originated by one or more Tokens, as in the case of two separate words that are merged into a noun phrase; in a similar way, a Token can originate one or more Tokens, as in the case of a compound word which generates a Token for each of its constituents words.

A Feature represents a characteristic or a property of a Token. Indeed, a Token is Characterized by one or more Features while each Feature must Characterize just one Token.

The Feature entity is qualified by the following attributes: a unique identifier called Id; a Name which defines the kind of Feature we are dealing with; a short Description providing additional information about the Feature; a Type which represents the data type of the Value of the Feature, e.g. string, number, date.

### 3.10 Inter-area Relationships

Aim of this subsection is to show how the different areas, that until now have been examined separately, interact.

Figure 16 shows the relationships between entities in the Evaluation Activity and Experimental Collection areas. Originally, in [Agosti et al., 2011], also the Resource area was included, but since the relationship that linked the User entity to Evaluation Activity and Task were removed, Figure 16 depicts entities coming from only two areas. According to the Is Used By relationship between Task and Experimental Collection a task may or may not use an experimental collection; this allows us to consider tasks where the activity is not based on an experimental test collection (e.g. a task of a trial evaluation activity that is connected to a guerrilla experiment type). Moreover, a task performed within an evaluation activity can exploit more than one experimental collection; for instance, this is the case of a trial evaluation activity where the same weighting scheme or the same methodology is tested across different experimental collections, e.g. TREC 7 and TREC 8 Ad-hoc Test Collection, and TREC2001 Web Track Ad-hoc
Test Collection. For tasks that involve a training phase and a test phase (e.g. the CLEF-IP Patent Classification task) the two phases are considered as distinct tasks.
Figure 17 shows the interactions between Evaluation Activity, Experimental Collection, Experiment and Resource areas. Each experiment refers to one and only one user-task pair. A task can use no, one or more topic fields, where some of the adopted fields can be mandatory: this is modelled by the attribute mandatory of relationship Uses Topic Field that involves the Task and the Topic Field entity.

A run Comprises at least one Run Item, where each Run Item refers to a specific run/topic/information unit triple; an information unit as well as a topic can be related to no, one or more run items through the Comprises relationship. Some of the runs retained in the infrastructure are adopted to constitute the pool: a run is pooled in no, one or more pools, while a pool is constituted by run items in at least one run. Lastly, the Is Assessor relationship states that a user can be an assessor for no, one or more pools, and that a pool must have at least one assessor.

Figure 18 concerns entities in the Measurement area and their relationship with entities of other areas, i.e. Evaluation Activity area, Experimental Collection area and Experiment area.

Figure 19, depicting relationships between entities in the Evaluation Activity, Experimental Collection, Measurement and Resource areas, is not very different from its former version. The only differences are caused by the substitutions of Statistical Analysis with Concept and of Pool with Ground Truth.

A statistical analysis (Concept entity) can produce a value for a specific statistical test; the Statistical Test value can be Elaborated From data in no, one or more Ground Truths, or Calculated From data from no, one or more Tasks, or Computed From an Experiment. Lastly, a Statistical Test value can be obtained by the test Conducted on no, one or more Measures.

Figure 20 depicts the relationship between the Visualization entity and entities in the Evaluation Activity, the Experimental Collection, the Experiment and the Measurement area. Every visualization can be related to no, one or more Tasks (see relationship ViTa), to no, one or more Pools (see relationship ViPo), to no, one or more Experiments (see relationship ViEx), to no, one or more Statistical Tests (see relationship ViSt). In this latest version of this work, Visualization has two more relationships: one with Measure (ViMe) and one with Estimate (ViEs).

Figure 21 depicts the relationship between the Contribution entity and the entities in the Evaluation Activity, the Experimental Collection, and the Experiment area. The basic rationale behind the introduction of these relationships is that a contribution can refer to data stored in the infrastructure: besides experimental collections and its constituting components (i.e. corpus, pool and topic group) a contribution can refer to no, one or more experiments, evaluation activities, tracks and tasks. That allows us to measure the impact of the PROMISE project both in terms of citations to papers on PROMISE related evaluation activities and citations on data that has resulted from such activities, e.g. experiments and experimental collections. Moreover, that can help identify previous works that exploit the same experimental collection or their constituting component, or concern similar tasks (i.e. experimental hypotheses to be tested).

With respect to the previous version of the conceptual model, Contribution now is related also to Concept by means of the labels association. This association allows us to associate a contribution with a topic of interest. labels has a score attribute that defines the weight of a contribution w.r.t. a given topic.
Figure 17: Relationships between entities in the Evaluation Activity, Experimental Collection, Experiment and Resource Areas

D3.5: Final Prototype of the Evaluation Infrastructure
Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
Figure 18: Relationships between entities in the Resource, Evaluation Activity, Experimental Collection, Experiment and Measurement Areas
Figure 19: Relationships between entities in the Evaluation Activity, Experimental Collection, Measurement and Resource Areas

Figure 20: Relationships between the Visualization entity and entities in the Evaluation Activity, Experimental Collection, Experiment and Measurement Areas
Figure 21: Relationships between the Contribution entity of the Bibliographical area and the entities in the Evaluation Activity, Experimental Collection and Experiment Areas
4 RDF Model for Experimental Evaluation

In order to expose the experimental data handled by DIRECT as Linked Open Data (LOD) and to enrich these data with semantic data available on the Web, we defined an RDF schema modeling the experimental evaluation workflow. In particular, this schema is required to enrich experimental data and to extract relevant information for expert profiling; for this reason it is partially reported also in D3.6\textsuperscript{7} [Bordea et al., 2013]. Furthermore, the RDF schema is important for enabling impact analysis over scientific contributions managed by DIRECT as reported in D6.4 [Tsikrika et al., 2013]. As a consequence the most relevant areas covered by this section are the resource area, the measurement area and the bibliographical area described in Section 3.

The names of classes and properties defined in the RDF schema are consisted with the names used in the conceptual model; for this reason we defined all the term in a common IMS namespace reported in Table 2. On the other hand, it is important to relate DIRECT terms with already existing

\textsuperscript{7}The RDF model concerning the resource area is reported also in D3.6 since it is needed to make that deliverable self-contained. However, in D3.6 it is further specialized to support the different kinds of links between contributions, authors and topics while here in D3.5 we stay at a more general level in this respect. Moreover, the description of the RDF model reported here in D3.5 covers also the measurement and bibliometrics areas which are not reported elsewhere, as well as it provides examples of instantiations.
Table 1: Main datatype properties of the resource management and contribution area classes reported in Figures 22 and 23. Namespace Identifiable Resource, Concept, Group, and Role are not reported because they have no additional datatype properties w.r.t. Resource. “ims” is the prefix for http://ims.dei.unipd.it/data/rdf/ pointing to DIRECT vocabulary terms.

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<td></td>
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<td>ims:score, ims:backward-score, ims:frequency</td>
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</tr>
<tr>
<td>User</td>
<td>ims:password, ims:first-name, ims:last-name, ims:affiliation, ims:e-mail,</td>
</tr>
<tr>
<td></td>
<td>ims:birth-date, ims:gender, ims:address, ims:city, ims:state, ims:zip,</td>
</tr>
<tr>
<td></td>
<td>ims:phone, ims:facsimile, ims:mobile, ims:voip-caller-id, ims:homepage</td>
</tr>
</tbody>
</table>

vocabularies in order to allow for our model to be discovered and used by third party actors; to this end, many terms in the IMS namespace are related to other terms in external vocabularies by means of the owl:sameAs property\(^8\). This approach allows us to be consistent with the model defined for the existing infrastructure and to be able to enrich our resources with third party semantics.

In the RDF schema (which is reported in the Appendix B) we consider a Resource as a generic class sharing the same meaning of resource in RDF [W3C, 2004] where “all things described by RDF are called resources. […] the class of everything.” In DIRECT a Resource represents the class of everything that exists in the IR experimental evaluation.

The resource management area models the more general and thick-grained resources involved in the evaluation workflow – i.e. users, groups, roles, namespaces, and concepts – and the relationships among them. Furthermore, it handles the provenance (by means of the so-called Provenance-Event class) of the data. All the classes of this area are defined as subclasses of the general Resource class and they are represented in Figure 22 along the properties connecting them; for sake of readability we omitted from the figure the datatype properties, reported in Table 1, which are non-essential for the comprehension of the model.

The User class represents the actors involved in the evaluation activities such as researchers conducting experiments, organizers of a campaign, assessors, data scientists, and authors of a scientific contributions. The function of a user in the evaluation workflow is defined by the Role class; moreover, the users can be grouped together via the Group class. A user can play none, one or more roles: for instance, a user can be both an organizer of a campaign and a researcher submitting experiments, i.e. a participant to the campaign. On the other hand, there are roles

---

\(^8\)http://www.w3.org/TR/owl-ref/
played by more than one user; for instance, a campaign can have one or more participants, e.g. the researchers that are carrying out the experiments for writing a paper. A group is a resource that arrange together users with some common characteristics; for instance, there could be a group formed by all the users belonging to a certain research group.

The Namespace class refers to a logical grouping of identifiers and allows the disambiguation of homonym identifiers belonging to different namespaces. For instance, users are associated with a namespace which in the case of researchers allows us to classify them on an affiliation basis or the terms of an ontology are associated to a namespace allowing us to disambiguate with homonym terms of another ontology. In the RDF model of DIRECT along with the general Resource we described above, there is another general class called Namespace Identifiable Resource as we can see in Figure 22; this is a subclass of Resource always associated to a namespace. Thus, in the RDF model of DIRECT there are two kinds of general resources, the first which has no namespace and the second which has one. Thus, in Figure 22 we can see that User, Group and Role have a namespace, whereas the Namespace itself and Provenance-Event classes have no namespace.

The Provenance-Event class is not related to a namespace because it does not need to be disambiguated given that it exists only in the context of DIRECT. Indeed, a provenance event keeps track of the full lineage of each resource managed by DIRECT since its first creation, allowing granted users to reconstruct its full history and modifications over time. As shown in Figure 22, Provenance-Event is a subclass of Resource and it is composed by two object properties and three datatype properties, where:

- **who**, is the property associating the provenance event with the user who caused the event;
- **what**, is the property associating the provenance event with the specific resource originated by the event – please note that every resource in the model can be related to a provenance event;
- **when**, is the datatype property associating the provenance event with the timestamp at which the event occurred;
- **why**, is the datatype property associating the provenance event with the motivation that originated the event, i.e. the operation performed by the system that led to a modification of the resource;
- **predicate**, is the datatype property associating the provenance event with the action carried out in the event, i.e. CREATED, READ, or DELETED.

Modeling provenance is central for the definition of expert profiles and topic extraction because it allows for guaranteeing the quality and integrity of the data produced by the evaluation workflow [Buneman, 2013]. As we discussed above, the data produced by experimental evaluation are not raw data, but they are the product of a series of transformations which involve inputs from scientists and experts of the field. Keeping what was done with the data is crucial if we want to verify the quality or if we want to reproduce the experiments [Buneman, 2013]; moreover, these data are used for scientific production which in turn are exploited for expert profiling, two activities that must rely
on high quality data. The Provenance-Event class allows us to record the five aspects (i.e. who, what, when, why and predicate) required for keeping the lineage of data [Cheney et al., 2009] and, consequently, the reliability of the information we extract and infer from these data.

In Figure 23 we can see the classes and the properties of the scientific production area. This part of the RDF model is central for the expert profiling activity because it handles scientific contributions, their relations with scientists and authors, and the scientific topics that can be extracted or inferred from them. In Figure 23 there are three main classes which are Concept, Contribution and Link.

Concept is defined as an idea or notion, a unit of thought; it is used to define the type of relationships in a semantic environment or to create a vocabulary (e.g. contribution types) and, in some sense, resembles the idea of concept introduced by SKOS [W3C, 2009a,b]. Concept is a subclass of Namespace Identifiable Resource and thus every instance of it has a namespace. In DIRECT every vocabulary we create or import is handled via the Concept class.

In Table 2 we can see all the vocabularies adopted in DIRECT for the Resource Management and the Scientific Production areas.

The Contribution class represents every publication concerning the scientific production phase of the evaluation workflow. We can see that it is related to Concept via the ims:contribution-type property.

The Link class connects two resources via the ims:has-source and ims:has-target properties with a typed relationship realized throughout a concept connected to the link via the ims:relation property. This allows us for creating a typed relationship between two generic resources involved in the evaluation workflow.

Link has two datatype properties: ims:score and ims:backward-score, which allow us to add weights on any typed relationship; both score and backward score are xsd:double in the interval...
Table 2: Namespaces and Prefixes of the vocabularies adopted in DIRECT for the Resource Management and the Scientific Production areas.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Namespace</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aktors</td>
<td><a href="http://www.aktors.org/ontology/portal#">http://www.aktors.org/ontology/portal#</a></td>
<td>Advanced Knowledge Technology reference ontology</td>
</tr>
<tr>
<td>bibo</td>
<td><a href="http://purl.org/ontology/bibo/">http://purl.org/ontology/bibo/</a></td>
<td>Bibliographic ontology</td>
</tr>
<tr>
<td>dcterms</td>
<td><a href="http://purl.org/dc/terms/">http://purl.org/dc/terms/</a></td>
<td>Dublin Core terms</td>
</tr>
<tr>
<td>foaf</td>
<td><a href="http://xmlns.com/foaf/0.1/">http://xmlns.com/foaf/0.1/</a></td>
<td>Friend of a friend</td>
</tr>
<tr>
<td>gn</td>
<td><a href="http://www.geonames.org/ontology#">http://www.geonames.org/ontology#</a></td>
<td>GeoNames Ontology</td>
</tr>
<tr>
<td>ims</td>
<td><a href="http://ims.dei.unipd.it/data/rdf/">http://ims.dei.unipd.it/data/rdf/</a></td>
<td>DIRECT vocabulary terms</td>
</tr>
<tr>
<td>owl</td>
<td><a href="http://www.w3.org/2002/07/owl#">http://www.w3.org/2002/07/owl#</a></td>
<td>OWL vocabulary terms</td>
</tr>
<tr>
<td>prov</td>
<td><a href="http://www.w3.org/ns/prov#">http://www.w3.org/ns/prov#</a></td>
<td>The ontology supporting the interchange of provenance on the web</td>
</tr>
<tr>
<td>rdf</td>
<td><a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#">http://www.w3.org/1999/02/22-rdf-syntax-ns#</a></td>
<td>RDF vocabulary terms</td>
</tr>
<tr>
<td>rdfs</td>
<td><a href="http://www.w3.org/2000/01/rdf-schema#">http://www.w3.org/2000/01/rdf-schema#</a></td>
<td>RDF Schema</td>
</tr>
<tr>
<td>swrc</td>
<td><a href="http://swrc.ontoware.org/ontology#">http://swrc.ontoware.org/ontology#</a></td>
<td>Semantic Web for Research Communities ontology</td>
</tr>
<tr>
<td>vann</td>
<td><a href="http://purl.org/vocab/vann/">http://purl.org/vocab/vann/</a></td>
<td>Vocabulary for annotating descriptions of vocabularies</td>
</tr>
<tr>
<td>vcard</td>
<td><a href="http://www.w3.org/2006/vcard/ns#">http://www.w3.org/2006/vcard/ns#</a></td>
<td>vCard electronic business card profile defined by RFC 2426</td>
</tr>
<tr>
<td>xsd</td>
<td><a href="http://www.w3.org/2001/XMLSchema#">http://www.w3.org/2001/XMLSchema#</a></td>
<td>XML Schema</td>
</tr>
</tbody>
</table>

[0, 1]. Indeed, we can establish a relation between user and concept with two scores on it in order to say that a user is expert in a given scientific topic. This lets us define expert profiles; for instance, we can say that “userY is an expert in Information Retrieval” where “userY” is an instance of the User class and “information retrieval” is a term defined as an instance of Concept; the score represents the strength of the relation between a user and a concept, and the backward score represents the strength of the relation between a concept and a user. This means that the relationship between User and Concept is not symmetric; for instance, we can say that “UserY” is an expert in “Information Retrieval” with score 0.9 and this means that information retrieval is the main area of expertise for the user. On the other hand, there are people more expert in information retrieval than “UserY”, so the backward score can be set to be only 0.1, and this would mean that “UserY” is just one of the experts in “Information Retrieval” and that we expect to find out other users with a higher expertise level (backward score) in the considered topic.

In Figure 24 we can see the RDF graph of the measurement area which allows us to model the metrics related to the users (such as the h-index of the authors of scientific contributions), experiments (e.g. precision and recall), contributions (e.g. bibliometrics like impact factor of a journal). Furthermore, this area is important for conducting impact analysis.

We can see that a Metric is a sub-class of Concept and that the specific class Bibliometric is a sub-class of Metric. A descriptive Statistic is associated to a Concept and a Metric respectively via the has-descriptive-statistic and ims:has-metric properties.
4.1 Examples of RDF Resources

The architecture of the infrastructure has been extended in order to return the resources also in RDF/XML\(^9\), Turtle\(^10\) and N3\(^11\) formats.

In this section we do not report the RDF serialization of all the resources handled by DIRECT, but we show a couple of examples of relevant resources adopted for the impact analysis reported in Deliverable 6.4: a sample contribution and a sample bibliometric resource. For each resource we report both the RDF/XML and the Turtle serialization.

In the following we show a sample contribution resource represented in RDF/XML and Turtle format.

---

\(^9\)[http://www.w3.org/TR/REC-rdf-syntax/]
\(^10\)[http://www.w3.org/TeamSubmission/turtle/]
\(^11\)[http://www.w3.org/TeamSubmission/n3/]
D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
RDF Turtle Representation of a sample Contribution
In the following we show a sample bibliometric resource represented in RDF/XML and Turtle format.

RDF\XML Turtle Representation of a sample Bibliometric resource

<rdf: RDF
xmlns: rdf = "http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns: bibo = "http://purl.org/ontology/bibo/"
xmlns: foaf = "http://xmlns.com/foaf/0.1/"
xmlns: owl = "http://www.w3.org/2002/07/owl#"
xmlns: dc = "http://purl.org/dc/terms/"
xmlns: ims = "http://ims.dei.unipd.it/data/rdf/"
xmlns: aktors = "http://www.aktors.org/ontology/portal1#"
xmlns: rdfs = "http://www.w3.org/2000/01/rdf-schema#"
xmlns: swrc = "http://swrc.ontoware.org/ontology#"
<ims: file-metadata rdf:nodeID="A0"/>

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Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
D3.5: Final Prototype of the Evaluation Infrastructure
ims:file-metadata _:b0 ;
ims:identifier "metric-1" .

ims:file-metadata _:b0 ;
ims:identifier "http%3A%2F%2Fims.dei.unipd.it%2F" ;
ims:prefix "ims" .
A XML Schemas

This appendix reports the XML schemas of the different managed resources.

The XML schema of DIRECT\(^{12}\), reported in Section A.1, relies on the XML schema of the ICI!\(^{13}\) library, reported in Section A.2, for the definition of some common resources.

A.1 DIRECT XML Schema

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2011 (x64) (http://www.altova.com) by Università degli Studi di Padova (Università degli Studi di Padova) -->
  <xs:annotation>
    <xs:documentation xml:lang="en">This schema provides the base elements and types used by the Distributed Information Retrieval Evaluation Campaign Tool (DIRECT).</xs:documentation>
    <xs:documentation xml:lang="en">Version 3.00.</xs:documentation>
    <xs:documentation xml:lang="en">Created on 2005-10-05</xs:documentation>
    <xs:documentation xml:lang="en">Last modified on 2012-11-21</xs:documentation>
    <xs:documentation xml:lang="en">Authored by Nicola Ferro (ferro@dei.unipd.it)</xs:documentation>
    <xs:documentation xml:lang="en">Authored by Ivano Masiero (masiero@dei.unipd.it)</xs:documentation>
    <xs:documentation xml:lang="en">Authored by Simone Peruzzo (peruzzos@dei.unipd.it)</xs:documentation>
    <xs:documentation xml:lang="en">Authored by Gianmaria Silvello (silvello@dei.unipd.it)</xs:documentation>
  </xs:annotation>
  <xs:include schemaLocation="http://ims.dei.unipd.it/data/xml/ici.3.10.xsd">
    <xs:annotation>
      <xs:documentation xml:lang="en">Imports the schema for the IMS Component Integrator (ICI) library.</xs:documentation>
    </xs:annotation>
  </xs:include>
  <xs:include schemaLocation="http://ims.dei.unipd.it/data/xml/fast.3.10.xsd">
    <xs:annotation>
      <xs:documentation xml:lang="en">Imports the schema for the Flexible Annotation Semantic Tool (FAST) service.</xs:documentation>
    </xs:annotation>
  </xs:include>
  <xs:element name="task" substitutionGroup="ims:resource">
```

\(^{12}\)http://ims.dei.unipd.it/data/xml/direct.3.00.xsd
\(^{13}\)http://ims.dei.unipd.it/data/xml/ici.3.10.xsd
<xs:documentation xml:lang="en">Represents a piece of work that is undertaken within an evaluation activity and aims at testing a specific (research) hypothesis.</xs:documentation>
</xs:annotation>
</xs:complexType>
</xs:element>

<xs:complexType>
<xs:complexContent>
<xs:extension base="ims:identifiable - timestamp - traceable - controllable - resource - type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="1"/>
<xs:element ref="ims:experimental - collection" minOccurs="0"/>
<xs:element ref="ims:evaluation - activity" minOccurs="0"/>
<xs:element ref="ims:track" minOccurs="0"/>
</xs:sequence>
<xs:attribute ref="ims:description"/>
<xs:attribute name="maximum - experiments - allowed" type="xs:int"/>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:sequence>
<xs:element ref="ims:links" minOccurs="0"/>
</xs:sequence>
<xs:attribute name="name"/>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:element>
<xs:attribute name="name"/>
</xs:complexType>
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</xs:element>
<xs:attribute name="end - date" type="xs:date"/>
</xs:complexType>
</xs:element>
<xs:attribute name="type"/>
</xs:complexType>
</xs:element>
<xs:simpleType>
  <xs:restriction base="xs:token">
    <xs:enumeration value="CAMPAIGN">
      <xs:documentation xml:lang="en">Represents a public and shared activity conducted in an evaluation forum, such as TREC or CLEF.</xs:documentation>
    </xs:enumeration>
    <xs:enumeration value="TRIAL">
      <xs:documentation xml:lang="en">Represents an activity run by a person, a research group, or a corporate body for their own interests and not necessarily public or shared.</xs:documentation>
    </xs:enumeration>
    <xs:enumeration value="EDUCATION">
      <xs:documentation xml:lang="en">Represents an activity which is carried out for educational purposes.</xs:documentation>
    </xs:enumeration>
    <xs:enumeration value="EVALUATION_ACTIVITY"/>
    <xs:enumeration value=""/>
  </xs:restriction>
</xs:simpleType>

<xs:element name="track" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a group of tasks carried within an evaluation activity of type campaign.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
      <xs:sequence>
        <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="ims:evaluation-activity" minOccurs="0"/>
      </xs:sequence>
      <xs:attribute ref="ims:description"/>
      <xs:attribute name="submission-deadline" type="xs:date"/>
      <xs:annotation>
        <xs:documentation>The deadline of the submissions for the track.</xs:documentation>
      </xs:annotation>
    </xs:extension>
  </xs:complexType>
</xs:element>

<xs:element name="direct" type="ims:ici-type">
  <xs:annotation>
    <xs:documentation>
      D3.5: Final Prototype of the Evaluation Infrastructure
    </xs:documentation>
  </xs:annotation>
</xs:element>
<xs:documentation xml:lang="en">Provides information about one or more resources of the DIRECT system.</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="application" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a running software application evaluated during a Guerrilla experiment</xs:documentation>
</xs:annotation>
</xs:complexType>
<xs:complexType>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="ims:configuration" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
<xs:attribute ref="ims:name"/>
<xs:attribute ref="ims:description"/>
</xs:extension>
</xs:complexType>
</xs:element>
<xs:element name="configuration" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents the configuration of a component, a system or an application under evaluation.</xs:documentation>
</xs:annotation>
</xs:complexType>
<xs:complexType>
<xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
<xs:sequence>
<xs:element name="parameters" minOccurs="0"/>
<xs:annotation>
<xs:documentation>The list of parameters associated to this configuration</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:sequence maxOccurs="unbounded">
<xs:element ref="ims:parameter"/>
</xs:sequence>
</xs:complexType>
<xs:complexType>
<xs:element>
<xs:complexType>
<xs:sequence>
<xs:attribute ref="ims:description"/>
</xs:complexType>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:complexType>
<xs:element name="component" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a building block of a running system.</xs:documentation>
</xs:annotation>
</xs:complexType>
<xs:complexType>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element ref="ims:concept" minOccurs="0"/>
<xs:element ref="ims:configuration" minOccurs="0"/>
</xs:sequence>
<xs:attribute ref="ims:name"/>
<xs:attribute ref="ims:description"/>
</xs:extension>
</xs:complexType>
</xs:element>
<xs:element name="system" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a running software engine, which is under evaluation.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexContent>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="ims:configuration" minOccurs="0"/>
</xs:sequence>
<xs:attribute ref="ims:name"/>
<xs:attribute ref="ims:description"/>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
<xs:element name="experiment" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents part of the data produced by a system under evaluation.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexContent>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="ims:task" minOccurs="0"/>
<xs:element ref="ims:configuration" minOccurs="0"/>
</xs:sequence>
<xs:attribute ref="ims:description"/>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
<xs:element name="run" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a ranked list of documents for each topic in the experimental collection.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexContent>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="ims:task" minOccurs="0"/>
<xs:element ref="ims:configuration" minOccurs="0"/>
</xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
<xs:element name="topic-fields" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The list of topic fields employed by this run.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:concept"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element ref="ims:system" minOccurs="0"/>

<xs:attribute ref="ims:description"/>
<xs:attribute name="query-construction"/>
</xs:extension>
</xs:complexType>
</xs:element>

<xs:element name="guerrilla" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents an evaluation activity performed on corporate IR systems.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
        <xs:sequence>
          <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="ims:task" minOccurs="0"/>
          <xs:element ref="ims:configuration" minOccurs="0"/>
          <xs:element ref="ims:application" minOccurs="0"/>
          <xs:element name="metrics" minOccurs="0">
            <xs:annotation>
              <xs:documentation>The list of metrics and the values associated with this guerrilla.</xs:documentation>
            </xs:annotation>
            <xs:complexType>
              <xs:sequence minOccurs="0" maxOccurs="unbounded">
                <xs:element name="metric">
                  <xs:annotation>
                    <xs:documentation>A metric and the value associated with this guerrilla.</xs:documentation>
                  </xs:annotation>
                  <xs:complexType>
                    <xs:sequence>
                      <xs:element ref="ims:concept"/>
                      <xs:element name="value" type="xs:double">
                        <xs:annotation>
                          <xs:documentation>The value of the metric.</xs:documentation>
                        </xs:annotation>
                      </xs:element>
                    </xs:sequence>
                  </xs:complexType>
                </xs:element>
              </xs:sequence>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<xs:attribute ref="ims:description"/>
</xs:extension>
</xs:complexType>
</xs:element>
<xs:element name="living" substitutionGroup="ims:resource">
<xs:documentation>Represents the specific experimental data resulting from the Living Retrieval Laboratories.</xs:documentation>
</xs:annotation>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:element>
<xs:complexType name="identifiable - timestamp - traceable - parameterizable - resource - type">
<xs:annotation>
<xs:documentation>Represents an entity which is identified by means of a unique identifier, whose creation, last modification, and its parameters, if any.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:extension base="ims:identifiable - timestamp - traceable - resource - type">
<xs:sequence>
<xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
</xs:extension>
</xs:complexType>
</xs:element>
<xs:complexType name="parameter" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a parameter of a configuration.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexType base="ims:identifiable - resource - type">
<xs:extension base="ims:concept" minOccurs="0">
<xs:element name="value" type="xs:string" minOccurs="0">
<xs:documentation>The value of the parameter.</xs:documentation>
</xs:annotation>
</xs:element>
</xs:complexType>
</xs:complexType>
</xs:element>
<xs:element name="experiment - item" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents an item of an experiment.</xs:documentation>
</xs:annotation>
</xs:complexType>
<xs:extension base="ims:identifiable-resource-type">
<xs:sequence>
  <xs:element ref="ims:experiment" minOccurs="0"/>
</xs:sequence>
</xs:extension>
</xs:complexType>
</xs:element>
<xs:element name="run-item" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a component of a Run and relates a run with a document retrieved for a given topic.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexType>
<xs:extension base="ims:identifiable-resource-type">
<xs:sequence>
  <xs:element ref="ims:run" minOccurs="0"/>
  <xs:element ref="ims:topic" minOccurs="0"/>
  <xs:element ref="ims:information-unit" minOccurs="0"/>
</xs:sequence>
<xs:attribute name="rank" type="xs:int">
<xs:annotation>
<xs:documentation>The rank of the document associated to the run item in the ranked list.</xs:documentation>
</xs:annotation>
</xs:attribute>
<xs:attribute name="score" type="xs:double">
<xs:annotation>
<xs:documentation>The score provided by the system under evaluation to the document corresponding to the run item.</xs:documentation>
</xs:annotation>
</xs:attribute>
</xs:extension>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="corpus" substitutionGroup="ims:resource">
<xs:annotation>
<xs:documentation>Represents a set of informative units.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexType>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
<xs:sequence>
  <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
  <xs:element name="media-types" minOccurs="0" maxOccurs="unbounded">
<xs:annotation>
<xs:documentation>The list of media types of the corpus.</xs:documentation>
</xs:annotation>
</xs:complexType>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="media-type" type="xs:string" minOccurs="0" maxOccurs="unbounded">
<xs:annotation>
<xs:documentation>The media types of a corpus according to MIME (Multipurpose Internet Mail Extensions) standard.</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="languages" minOccurs="0" maxOccurs="unbounded">
  <xs:annotation>
    <xs:documentation>The list of languages of the corpus.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="language" type="xs:language" minOccurs="0" maxOccurs="unbounded">
  <xs:annotation>
    <xs:documentation>The languages of a corpus.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:attribute ref="ims:description"/>

<xs:element name="information-unit" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents the object on which the evaluated system acts, and which is retrieved by the system under evaluation.</xs:documentation>
  </xs:annotation>
  <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
    <xs:element ref="ims:corpus" minOccurs="0"/>
    <xs:element ref="ims:content" minOccurs="0"/>
    <xs:sequence>
      <xs:attribute ref="ims:language"/>
      <xs:attribute ref="ims:media-type"/>
      <xs:attribute ref="uri" type="xs:anyURI"/>
      <xs:annotation>
        <xs:documentation>A URI that represents a link to the information unit.</xs:documentation>
      </xs:annotation>
    </xs:sequence>
  </xs:extension>
</xs:element>

<xs:element name="topic" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents the materialization of an information need.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="topic-fields" minOccurs="0" maxOccurs="1"/>
The fields used in this topic.

A field used in this topic.

The list of contents of the topic field.

The content of a topic field.

The name of the resource.

Represents a set of topic, which are grouped together because they are used to address a research task carried out in an evaluation activity.
<xs:sequence>
    <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="topics" minOccurs="0">
        <xs:annotation>
            <xs:documentation>The list of topics which belongs to the topic group.</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="ground-truth" substitutionGroup="ims:resource">
        <xs:annotation>
            <xs:documentation>Represents a component of an evaluation collection.</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="ground-truth-item" substitutionGroup="ims:resource">
        <xs:annotation>
            <xs:documentation>Represents an item of a ground truth.</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="experimental-collection" substitutionGroup="ims:resource">
        <xs:annotation>
            <xs:documentation>Represents a logical entity that allows us to set up a traditional IR evaluation environment.</xs:documentation>
        </xs:annotation>
    </xs:element>
</xs:sequence>
<xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
  <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
  <xs:element ref="ims:topic-group" minOccurs="0"/>
  <xs:element name="corpora" minOccurs="0">
    <xs:annotation>
      <xs:documentation>The list of corpus that belongs to the experimental collection.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="ims:corpus" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute ref="ims:description"/>
    </xs:complexType>
  </xs:element>
</xs:extension>

<xs:element name="measure" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents the value of a metric calculated on some experiments handled by the infrastructure.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
        <xs:sequence>
          <xs:element ref="ims:concept" minOccurs="0"/>
          <xs:element ref="ims:experiment" minOccurs="0"/>
          <xs:element ref="ims:topic" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="value">
          <xs:annotation>
            <xs:documentation>The numerical value of the measure.</xs:documentation>
          </xs:annotation>
          <xs:attribute/>
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
                <xs:sequence>
                  <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute ref="ims:description"/>
              </xs:complexType>
            </xs:complexContent>
          </xs:complexType>
        </xs:attribute>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>

<xs:element name="pool" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents a container of assessments obtained through the pooling technique.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
        <xs:sequence>
          <xs:element ref="ims:links" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute ref="ims:description"/>
      </xs:complexType>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<xs:element name="pool-item" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents a relevance judgment, which is provided on an information unit in the pool for a given topic.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="estimate" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents the estimated numerical value of a descriptive statistic calculated by the infrastructure.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="metric" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The metric for this estimate.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:sequence>
  <xs:element ref="ims:concept" minOccurs="0"/>
</xs:sequence>

<xs:complexType>
  <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
    <xs:sequence>
      <xs:element ref="ims:run" minOccurs="0"/>
      <xs:element ref="ims:task" minOccurs="0"/>
      <xs:element ref="ims:topic" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:complexType>

<xs:element name="descriptive-statistic" minOccurs="0" maxOccurs="1">
  <xs:annotation>
    <xs:documentation>The descriptive statistic for this estimate.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:sequence>
  <xs:element ref="ims:concept" minOccurs="0"/>
</xs:sequence>

<xs:complexType>
  <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
    <xs:element name="value" type="xs:double">
      <xs:annotation>
        <xs:documentation>The numerical value of the estimate.</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:complexType>
</xs:complexType>
Represents an example of statistical analysis which can be carried out on the available data.
The experiment objects used to compute the metrics used in this test.

The visualization related to the statistical test.

Represents an entity which is identified by means of a unique identifier, whose creation, last modification, last access events can be traced, whose access permissions can be checked and its parameters, if any.

Represents a list of parameters used in a configuration.

Represents the information used by the infrastructure to store and recover whichever visualization of the data that the users do.
<xs:complexType>
  <xs:sequence maxOccurs="unbounded">
    <xs:element ref="ims:concept" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

<xs:element name="measures" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The measure objects used to compute the metrics used in this visualization.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:measure"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="estimates" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The estimate objects used to compute the metrics used in this visualization.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:estimate"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="snapshots" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The list of snapshot to which this visualization refers.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:snapshot"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="experiments" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The list of experiment to which this visualization refers.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:experiment"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="ground-truths" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The list of ground truth to which this visualization refers.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:ground-truth"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="tasks" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The list of task to which this visualization refers.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:task"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="statistical-tests" minOccurs="0">
  <xs:annotation>
    <xs:documentation>The list of statistical test to which this visualization refers.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="unbounded">
      <xs:element ref="ims:statistical-test"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="snapshot" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents the information used by the infrastructure to store and recover whichever Snapshot of the data that the users do.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
        <xs:sequence>
          <xs:element ref="ims:content" minOccurs="0"/>
          <xs:element ref="ims:visualization" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute ref="ims:media-type"/>
        <xs:attribute ref="ims:language"/>
      </xs:extension>
    </xs:complexType>
  </xs:element>
</xs:element>

<xs:element name="contribution" substitutionGroup="ims:resource">
  <xs:annotation>
    <xs:documentation>Represents a paper (e.g. a conference paper, a working note, a technical report, a journal paper) which has been published or that is publicly available and that its related.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
        <xs:sequence>
          <xs:element name="authors" minOccurs="0">
            <xs:annotation>
              <xs:documentation>The list of users that authors the contribution.</xs:documentation>
            </xs:annotation>
          </xs:element>
        </xs:sequence>
        <xs:attribute ref="ims:media-type"/>
        <xs:attribute ref="ims:language"/>
      </xs:extension>
    </xs:complexContent>
  </xs:element>
</xs:element>
A.2 ICI XML Schema

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2012 rel. 2 sp1 (x64) (http://www.altova.com) by Università degli Studi di Padova (Università degli Studi di Padova) -->
  <xs:annotation>
    <xs:documentation xml:lang="en">This schema provides the base elements and types used by the IMS Component Integrator (ICI) library.</xs:documentation>
  </xs:annotation>
  <xs:documentation xml:lang="en">Version 3.10</xs:documentation>
  <xs:documentation xml:lang="en">Created on 2006-08-02</xs:documentation>
  <xs:documentation xml:lang="en">Last modified on 2013-09-10</xs:documentation>
  <xs:documentation xml:lang="en">Author: Nicola Ferro (ferro@dei.unipd.it)</xs:documentation>
</xs:schema>
<xs:annotation>
  <xs:documentation xml:lang="en">Imports the schema for modified XCQL.</xs:documentation>
</xs:annotation>
</xs:import>

<xs:element name="ici" type="ims:ici-type">
  <xs:annotation>
    <xs:documentation xml:lang="en">Provides information about one or more objects of the ICI library.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="file-metadata">
  <xs:annotation>
    <xs:documentation xml:lang="en">Reports metadata describing the XML document at hand.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="thing" type="ims:resource-type">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a generic entity managed by the system.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="error" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents an error occurred in the system.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="thing" type="ims:resource-type">
  <xs:annotation>
    <xs:documentation xml:lang="en">Additional details which describe the occurred error.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="details" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Additional diagnostic and debug messages.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:sequence>
  <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
</xs:restriction>
</xs:complexContent>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="code" type="xs:hexBinary" use="required">
  <xs:annotation>
    <xs:documentation xml:lang="en">The unique code of the error.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="type" type="xs:token" use="required">
  <xs:annotation>
    <xs:documentation xml:lang="en">The type of the error.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute ref="ims:created"/>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
<xs:element name="namespace" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a namespace.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
        <xs:attribute name="prefix">
          <xs:annotation>
            <xs:documentation xml:lang="en">The prefix used for referring to the namespace.</xs:documentation>
          </xs:annotation>
        </xs:attribute>
        <xs:attribute ref="ims:description"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<xs:element name="user" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a user.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:namespace-identifiable-timestamp-traceable-resource-type">
        <xs:element name="groups" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">The groups to which the user belongs.</xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<xs:element name="roles" minOccurs="0">
    <xs:annotation>
        <xs:documentation xml:lang="en">The roles the user is acting in.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ims:role" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>

<xs:attribute name="password" type="xs:string">
    <xs:annotation>
        <xs:documentation xml:lang="en">The password of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:attribute name="first-name" type="xs:string">
    <xs:annotation>
        <xs:documentation xml:lang="en">The first name of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:attribute name="last-name" type="xs:string">
    <xs:annotation>
        <xs:documentation xml:lang="en">The last/family name of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:attribute name="affiliation" type="xs:string">
    <xs:annotation>
        <xs:documentation xml:lang="en">The affiliation of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:attribute name="e-mail" type="xs:string">
    <xs:annotation>
        <xs:documentation xml:lang="en">The e-mail of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:attribute name="birth-date" type="xs:date">
    <xs:annotation>
        <xs:documentation xml:lang="en">The birth date of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:attribute name="gender">
    <xs:annotation>
        <xs:documentation xml:lang="en">The gender of the user.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:simpleType>
    <xs:restriction base="xs:token">
        <xs:enumeration value="MALE"/>
    </xs:restriction>
</xs:simpleType>

<xs:element ref="ims:role" maxOccurs="unbounded"/>
<xs:enumeration value="FEMALE">
  <xs:annotation>
    <xs:documentation xml:lang="en">The female gender.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
</xs:simpleType>
<xs:attribute>
  <xs:attribute ref="ims:language"/>
  <xs:attribute ref="ims:country"/>
  <xs:attribute name="address" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The address of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="city" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The city of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="state" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The state/province/region of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="zip" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The zip code of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="phone" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The telephone number of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="facsimile" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The facsimile number of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="mobile" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The mobile telephone number of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="voip-caller-id" type="xs:string">
    <xs:annotation>
      <xs:documentation xml:lang="en">The VoIP caller identifier of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
  <xs:attribute name="homepage" type="xs:anyURI">
    <xs:annotation>
      <xs:documentation xml:lang="en">The home page of the user.</xs:documentation>
    </xs:annotation>
  </xs:attribute>
</xs:attribute>
<xs:element name="role" substitutionGroup="ims:thing">

<xs:annotation>
  <xs:documentation xml:lang="en">Represents a role of users.</xs:documentation>
</xs:annotation>

<xs:complexType>
  <xs:complexContent>
    <xs:extension base="ims:namespace-identifiable-timestamp-traceable-resource-type">
      <xs:sequence>
        <xs:element name="users" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">The users acting in this role.</xs:documentation>
          </xs:annotation>
          <xs:complexType>
            <xs:sequence>
              <xs:element ref="ims:user" maxOccurs="unbounded"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:element>

<xs:element name="binary-object" substitutionGroup="ims:thing">

<xs:annotation>
  <xs:documentation xml:lang="en">Represents a binary object.</xs:documentation>
</xs:annotation>

<xs:complexType>
  <xs:complexContent>
    <xs:extension base="ims:namespace-identifiable-timestamp-traceable-access-controllable-resource-type">
      <xs:sequence>
        <xs:element ref="ims:content" minOccurs="0"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:element>

<xs:element name="digital-object" substitutionGroup="ims:thing">

<xs:annotation>
  <xs:documentation xml:lang="en">Represents a digital object.</xs:documentation>
</xs:annotation>

<xs:complexType>
  <xs:complexContent>
    <xs:extension base="ims:namespace-identifiable-timestamp-traceable-access-controllable-resource-type">
      <xs:attribute ref="ims:media-type"/>
      <xs:attribute ref="ims:language"/>
      <xs:attribute ref="ims:link"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:element>
<xs:element name="concept" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a concept "viewed as an idea or notion; a unit of thought"</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:namespace-identifiable-timestamp-traceable-resource-type">
        <xs:sequence>
          <xs:element name="description" minOccurs="0">
            <xs:annotation>
              <xs:documentation xml:lang="en">The description of the concept</xs:documentation>
            </xs:annotation>
            <xs:complexType mixed="true">
              <xs:complexContent>
                <xs:restriction base="xs:anyType">
                  <xs:sequence>
                    <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
                  </xs:sequence>
                </xs:restriction>
              </xs:complexContent>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>
</xs:complexContent>
</xs:complexType>
</xs:element>

<xs:element name="group" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a group of users.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:namespace-identifiable-timestamp-traceable-resource-type">
        <xs:sequence>
          <xs:element name="users" minOccurs="0">
            <xs:annotation>
              <xs:documentation xml:lang="en">The users belonging to the group.</xs:documentation>
            </xs:annotation>
            <xs:complexType>
              <xs:complexContent>
                <xs:restriction base="ims:user">
                  <xs:sequence/>
                </xs:restriction>
              </xs:complexContent>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>
</xs:complexContent>
</xs:complexType>
</xs:element>
<xs:element name="result" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represent the results of a search.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:resource-type">
        <xs:sequence>
          <xs:element ref="ims:query" minOccurs="0"/>
          <xs:element ref="ims:resource-class" minOccurs="0"/>
          <xs:element name="items" minOccurs="0">
            <xs:annotation>
              <xs:documentation xml:lang="en">The items retrieved in these results.</xs:documentation>
            </xs:annotation>
            <xs:complexType>
              <xs:sequence>
                <xs:element name="item" maxOccurs="unbounded">
                  <xs:annotation>
                    <xs:documentation xml:lang="en">An item of the results.</xs:documentation>
                  </xs:annotation>
                  <xs:complexType>
                    <xs:attribute ref="ims:identifier" use="required"/>
                    <xs:attribute ref="ims:namespace"/>
                    <xs:attribute name="rank" type="xs:nonNegativeInteger" use="required"/>
                    <xs:annotation>
                      <xs:documentation xml:lang="en">The rank of the item.</xs:documentation>
                    </xs:annotation>
                    <xs:attribute name="score" use="required">
                      <xs:annotation>
                        <xs:documentation xml:lang="en">The score of the item. It must be in the [0, 1] interval.</xs:documentation>
                      </xs:annotation>
                      <xs:simpleType>
                        <xs:restriction base="xs:double">
                          <xs:minInclusive value="0.0"/>
                          <xs:maxInclusive value="1.0"/>
                        </xs:restriction>
                      </xs:simpleType>
                    </xs:attribute>
                    <xs:complexType>
                      <xs:element/>
                    </xs:complexType>
                  </xs:complexType>
                </xs:element>
              </xs:sequence>
              <xs:attribute ref="ims:created"/>
              <xs:attribute name="size" type="xs:nonNegativeInteger" use="required"/>
              <xs:annotation>
                <xs:documentation xml:lang="en">The size of the results, i.e. the number of items in the results.</xs:documentation>
              </xs:annotation>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<xs:element name="query" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a query to be searched for.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:resource-type">
        <xs:sequence>
          <xs:element name="cql" type="xs:string">
            <xs:annotation>
              <xs:documentation xml:lang="en">The CQL representation of the query.</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element ref="ims:resource-class" minOccurs="0"/>
          <xs:element ref="xcql:xcql" minOccurs="0">
            <xs:annotation>
              <xs:documentation xml:lang="en">The XCQL representation of the query together with its results, if any.</xs:documentation>
            </xs:annotation>
          </xs:element>
        </xs:sequence>
        <xs:attribute ref="ims:created"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>

<xs:element name="log-event" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a log event.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:serially-identifiable-resource-type">
        <xs:sequence>
          <xs:element name="message" minOccurs="0">
            <xs:annotation>
              <xs:documentation xml:lang="en">The message describing this log event.</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:complexType mixed="true">
            <xs:complexContent>
              <xs:restriction base="xs:anyType">
                <xs:sequence>
                  <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute ref="ims:language"/>
              </xs:restriction>
            </xs:complexContent>
          </xs:complexType>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>

<xs:element ref="ims:user" minOccurs="0"/>
<xs:element name="action" type="xs:token" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">The action performed by the user when this log event was originated.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="ip" type="xs:string" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The IP address of the host causing this log event.</xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="resource" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The resource whose access is causing this log event.</xs:documentation>
</xs:annotation>
<xs:complexType>
  <xs:complexContent>
    <xs:extension base="ims:namespace-identifiable-resource-type">
      <xs:sequence>
        <xs:element ref="ims:resource-class" minOccurs="0"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:element>

<xs:element name="thread" type="xs:string" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The name of the thread which generated this log event.</xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="class-name" type="xs:string" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The name of the class which generated this log event.</xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="method" type="xs:string" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The name of the method which generated this log event.</xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="line-number" type="xs:positiveInteger" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The line number in the source code of the class which generated this log event.</xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="class-file" type="xs:string" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The name of the file containing the class which generated this log event.</xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="throwable" minOccurs="0">
<xs:annotation>
  <xs:documentation xml:lang="en">The information about the exception that caused this log event.</xs:documentation>
</xs:annotation>
</xs:element>
<xs:restriction base="xs:anyType">
  <xs:sequence>
    <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:restriction>
</xs:complexContent>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute ref="ims:created"/>
<xs:attribute name="level">
  <xs:documentation xml:lang="en">The level of a log event.</xs:documentation>
</xs:annotation>
</xs:restriction>
</xs:complexType>
</xs:attribute>

<xs:restriction base="xs:token">
  <xs:enumeration value="TRACE">
    <xs:annotation>
      <xs:documentation xml:lang="en">Designates the finest-grained informational events.</xs:documentation>
    </xs:annotation>
  </xs:restriction>
  </xs:enumeration>
</xs:annotation>
</xs:enumeration>
<xs:enumeration value="DEBUG">
  <xs:annotation>
    <xs:documentation xml:lang="en">Designates fine-grained informational events that are most useful to debug an application.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
<xs:enumeration value="INFO">
  <xs:annotation>
    <xs:documentation xml:lang="en">Designates informational messages that highlight the progress of the application at coarse-grained level.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
<xs:enumeration value="WARN">
  <xs:annotation>
    <xs:documentation xml:lang="en">Designates potentially harmful situations.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
<xs:enumeration value="ERROR">
  <xs:annotation>
    <xs:documentation xml:lang="en">Designates error events that might still allow the application to continue running.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
<xs:enumeration value="FATAL">
  <xs:annotation>
    <xs:documentation xml:lang="en">Designates very severe error events that will presumably lead the application to abort.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
</xs:restriction>
</xs:complexType>
</xs:attribute>
<xs:element name="metadata-set" substitutionGroup="ims:thing">
    <xs:annotation>
        <xs:documentation xml:lang="en">Represents a set of metadata resources. Metadata sets can be nested.</xs:documentation>
    </xs:annotation>
</xs:element>

<xs:element name="supersets" minOccurs="0">
    <xs:annotation>
        <xs:documentation xml:lang="en">The super-sets of this metadata set.</xs:documentation>
    </xs:annotation>
</xs:element>

<xs:element name="subsets" minOccurs="0">
    <xs:annotation>
        <xs:documentation xml:lang="en">The sub-sets of this metadata set.</xs:documentation>
    </xs:annotation>
</xs:element>

<xs:attribute name="name" type="xs:token">
    <xs:annotation>
        <xs:documentation xml:lang="en">The name of the metadata set.</xs:documentation>
    </xs:annotation>
</xs:attribute>

<xs:element name="metadata" substitutionGroup="ims:thing">
    <xs:annotation>
        <xs:documentation xml:lang="en">Represents a metadata.</xs:documentation>
    </xs:annotation>
</xs:element>

<xs:element name="metadata-sets" minOccurs="0">
    <xs:annotation>
        <xs:documentation xml:lang="en">The metadata sets to which this metadata
belongs.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:sequence>
<xs:element ref="ims:metadata-set" maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="fields" minOccurs="0">
<xs:annotation>
<xs:documentation xml:lang="en">The fields of this metadata.</xs:documentation>
</xs:annotation>
<xs:complexType mixed="true">
<xs:complexContent>
<xs:restriction base="xs:anyType">
<xs:sequence>
<xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
</xs:restriction>
</xs:complexContent>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:anyAttribute namespace="##any" processContents="lax">
<xs:annotation>
<xs:documentation xml:lang="en">Additional attributes of the metadata record, if any.</xs:documentation>
</xs:annotation>
</xs:anyAttribute>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
</xs:complexType>
<xs:element name="provenance-event" substitutionGroup="ims:thing">
<xs:annotation>
<xs:documentation xml:lang="en">An event describing a fact about the provenance of a resource.</xs:documentation>
</xs:annotation>
<xs:complexType>
<xs:complexContent>
<xs:extension base="ims:serially-identifiable-resource-type">
<xs:sequence>
<xs:element name="when" type="xs:dateTime">
<xs:annotation>
<xs:documentation xml:lang="en">The timestamp at which the event occurred.</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="who">
<xs:annotation>
<xs:documentation xml:lang="en">The user who caused the event.</xs:documentation>
</xs:annotation>
</xs:element>
</xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
</xs:element>
<xs:element name="predicate">
  <xs:annotation>
    <xs:documentation xml:lang="en">The action carried out in the event.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:token">
      <xs:enumeration value="CREATED">
        <xs:annotation>
          <xs:documentation xml:lang="en">Indicates the a user created a resource.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="READ">
        <xs:annotation>
          <xs:documentation xml:lang="en">Indicates the a user read a resource.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="UPDATED">
        <xs:annotation>
          <xs:documentation xml:lang="en">Indicates the a user updated a resource.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="DELETED">
        <xs:annotation>
          <xs:documentation xml:lang="en">Indicates the a user deleted a resource.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="ACCESSED">
        <xs:annotation>
          <xs:documentation xml:lang="en">Indicates the a user accessed a resource.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<xs:element name="what">
  <xs:annotation>
    <xs:documentation xml:lang="en">The resource originated by the event.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ims:thing"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="why" type="xs:token">
  <xs:annotation>
    <xs:documentation xml:lang="en">The motivation that originated the event.</xs:documentation>
  </xs:annotation>
</xs:element>

</xs:extension>
</xs:complexType>
<xs:complexType>
  <xs:element name="resource-class" type="xs:token"/>
  <xs:annotation>
    <xs:documentation xml:lang="en">The type of resource retrieved in a search.</xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="owner">
  <xs:annotation>
    <xs:documentation xml:lang="en">The owner of a resource.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ims:user"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="access-permission">
  <xs:annotation>
    <xs:documentation xml:lang="en">The access permission of a group to a resource.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:token">
      <xs:enumeration value="DENIED"/>
      <xs:annotation>
        <xs:documentation xml:lang="en">Denotes that access is denied.</xs:documentation>
      </xs:annotation>
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<xs:element name="resource">
  <xs:annotation>
    <xs:documentation xml:lang="en">A resource which is held by another resource.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ims:thing"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="resources">
  <xs:annotation>
    <xs:documentation xml:lang="en">A set of resources.</xs:documentation>
  </xs:annotation>
</xs:element>
767  <xs:annotation>
768      <xs:complexType>
769          <xs:sequence>
770              <xs:element ref="ims:thing" maxOccurs="unbounded"/>
771          </xs:sequence>
772      </xs:complexType>
773  </xs:element>
774  <xs:element name="metric">
775      <xs:annotation>
776          <xs:documentation xml:lang="en">The metric for a measure, i.e. the measurement function (JCGM 200:2008 VIM 2.49).</xs:documentation>
777      </xs:annotation>
778      <xs:complexType>
779          <xs:sequence>
780              <xs:element ref="ims:concept"/>
781          </xs:sequence>
782      </xs:complexType>
783  </xs:element>
784  <xs:element name="measure" substitutionGroup="ims:thing">
785      <xs:annotation>
786          <xs:documentation xml:lang="en">The numerical quantity value of a measurement result.</xs:documentation>
788      </xs:annotation>
789      <xs:complexType>
790          <xs:complexContent>
791              <xs:extension base="ims:identifiable-resource-type">
792                  <xs:sequence>
793                      <xs:element ref="ims:resource" minOccurs="0"/>
794                      <xs:element ref="ims:metric" minOccurs="0"/>
795                  </xs:sequence>
796                  <xs:attribute ref="ims:created"/>
797                  <xs:attribute ref="ims:value"/>
798                  <xs:attribute ref="ims:year"/>
799              </xs:extension>
800          </xs:complexContent>
801      </xs:complexType>
802  </xs:element>
803  <xs:element name="measures">
804      <xs:annotation>
805          <xs:documentation xml:lang="en">A set of measures.</xs:documentation>
806      </xs:annotation>
807      <xs:complexType>
808          <xs:sequence>
809              <xs:element ref="ims:measure" maxOccurs="unbounded"/>
810          </xs:sequence>
811      </xs:complexType>
812  </xs:element>
813  <xs:element name="descriptive-statistic">
814      <xs:annotation>
815          <xs:documentation xml:lang="en">The descriptive statistic used for computing the aggregated value of a statistic.</xs:documentation>
816      </xs:annotation>
817      <xs:complexType>
818          <xs:sequence>
819              <xs:element ref="ims:concept"/>
820          </xs:sequence>
821      </xs:complexType>
822  </xs:element>
<xs:complexType>
  <xs:element name="statistic" substitutionGroup="ims:thing">
    <xs:annotation>
      <xs:documentation xml:lang="en">The numerical data relating to an aggregate of individuals.</xs:documentation>
    </xs:annotation>
  </xs:complexType>

  <xs:complexType>
    <xs:complexContent>
      <xs:extension base="ims:identifiable-resource-type">
        <xs:sequence>
          <xs:element ref="ims:resource" minOccurs="0"/>
          <xs:element ref="ims:descriptive-statistic" minOccurs="0"/>
          <xs:element ref="ims:metric" minOccurs="0"/>
          <xs:element ref="ims:measures" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute ref="ims:created"/>
        <xs:attribute ref="ims:value"/>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>

  <xs:element name="statistics">
    <xs:annotation>
      <xs:documentation xml:lang="en">A set of statistics.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:complexContent>
        <xs:sequence>
          <xs:element ref="ims:measure" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>

  <xs:element name="contribution" substitutionGroup="ims:thing">
    <xs:annotation>
      <xs:documentation>Represents a paper (e.g. a conference paper, a working note, a technical report, a journal paper).</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="ims:identifiable-timestamp-traceable-access-controllable-resource-type">
          <xs:sequence>
            <xs:element ref="ims:concept" minOccurs="0"/>
            <xs:element name="authors" minOccurs="0"/>
          </xs:sequence>
          <xs:documentation>The list of users that authors the contribution.</xs:documentation>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>

  <xs:element name="publisher" minOccurs="0">
    <xs:complexType>
      <xs:sequence maxOccurs="unbounded">
        <xs:element ref="ims:user"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:element>
<xs:documentation xml:lang="en">The publisher of the contribution.</xs:documentation>
</xs:annotation>
<xs:complexType>
  <xs:sequence minOccurs="0">
    <xs:element ref="ims:user"/>
  </xs:sequence>
</xs:complexType>
</xs:element>
<xs:element ref="ims:countries" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">The countries of the authors of the contribution at the moment of writing it.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="affiliations" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">The affiliations of the authors of the contribution at the moment of writing it.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="affiliation" type="xs:string" maxOccurs="unbounded">
        <xs:annotation>
          <xs:documentation xml:lang="en">An affiliation of an author of the contribution.</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element ref="ims:content" minOccurs="0"/>
<xs:attribute name="title" type="xs:string">
  <xs:annotation>
    <xs:documentation>The title of the contribution.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="pages" type="xs:string">
  <xs:annotation>
    <xs:documentation>Additional information about the contribution.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="additional-information" type="xs:string">
  <xs:annotation>
    <xs:documentation>Additional information about the contribution.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute name="year" type="xs:gYear">
  <xs:annotation>
    <xs:documentation>The year of the contribution.</xs:documentation>
  </xs:annotation>
</xs:attribute>
<xs:attribute ref="ims:link"/>
<xs:attribute ref="ims:media-type"/>
<xs:attribute ref="ims:language"/>
<xs:attribute name="copyrighted" type="xs:boolean">
  <xs:annotation>
    <xs:documentation xml:lang="en">Indicates whether the content of the contribution is copyrighted.</xs:documentation>
  </xs:annotation>
</xs:attribute>
</xs:attribute>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:annotation>
</xs:documentation>
contribution is copyrighted.</xs:documentation>
</xs:element>
</xs:complexType>
</xs:element>
</xs:complexType>
</xs:element>
<xs:element name="parameter" substitutionGroup="ims:thing">
  <xs:documentation xml:lang="en">A parameter of a resource.</xs:documentation>
</xs:element>
<xs:complexType>
  <xs:extension base="ims:identifiable-resource-type">
    <xs:sequence>
      <xs:element ref="ims:resource" minOccurs="0"/>
      <xs:element ref="ims:concept"/>
      <xs:annotation>
        <xs:documentation xml:lang="en">The name of the parameter.</xs:documentation>
      </xs:annotation>
    </xs:sequence>
    <xs:attribute />
  </xs:complexType>
</xs:element>
<xs:element name="value">
  <xs:annotation>
    <xs:documentation xml:lang="en">The value of the parameter.</xs:documentation>
  </xs:annotation>
  <xs:complexType mixed="true">
    <xs:complexContent>
      <xs:restriction base="xs:anyType">
        <xs:sequence>
          <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:restriction>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
<xs:element name="parameters">
  <xs:annotation>
    <xs:documentation xml:lang="en">The list of parameters of a resource.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="snapshot" substitutionGroup="ims:thing">
  <xs:documentation>Represents a snapshot of a visualization.</xs:documentation>
</xs:element>
<xs:complexType>
  <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
    <xs:sequence/>
  </xs:complexType>
</xs:element>
<xs:sequence>
  <xs:element ref="ims:visualization" minOccurs="0"/>
  <xs:element ref="ims:content" minOccurs="0"/>
</xs:sequence>
<xs:element name="visualization" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a visualization.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:extension base="ims:identifiable-timestamp-traceable-resource-type">
      <xs:sequence>
        <xs:element ref="ims:concept" minOccurs="0"/>
        <xs:element ref="ims:resources" minOccurs="0"/>
        <xs:element ref="ims:measures" minOccurs="0"/>
        <xs:element ref="ims:parameters" minOccurs="0"/>
      </xs:sequence>
      <xs:attribute ref="ims:description"/>
    </xs:extension>
  </xs:complexType>
</xs:element>
<xs:element name="statistical-test" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">Represents a statistical test.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:extension base="ims:identifiable-resource-type">
      <xs:sequence>
        <xs:element ref="ims:concept" minOccurs="0"/>
        <xs:element ref="ims:resources" minOccurs="0"/>
        <xs:element ref="ims:measures" minOccurs="0"/>
        <xs:element ref="ims:parameters" minOccurs="0"/>
      </xs:sequence>
      <xs:attribute ref="ims:created"/>
      <xs:attribute ref="ims:description"/>
    </xs:extension>
  </xs:complexType>
</xs:element>
<xs:element name="link" substitutionGroup="ims:thing">
  <xs:annotation>
    <xs:documentation xml:lang="en">A link among two resources.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:extension base="ims:identifiable-resource-type">
      <xs:sequence>
        <xs:element ref="ims:thing">
          <xs:annotation>
            <xs:documentation xml:lang="en">The resource which is acting as source of a link.</xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexType>
</xs:element>
The relation among the source and target resources comprising the link.

The resource which is acting as target of a link.

The list of links among two resources.

The list of groups which share a resource with their access permissions.

A sharing of the resource with a group.
<xs:documentation xml:lang="en">The content of a resource.</xs:documentation>

<xs:complexType mixed="true">
  <xs:complexContent>
    <xs:restriction base="xs:anyType">
      <xs:sequence>
        <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="content-transfer-encoding">
        <xs:documentation xml:lang="en">It specifies what sort of encoding transformation the body was subjected to and hence what decoding operation must be used to restore it to its original form.</xs:documentation>
      </xs:attribute>
    </xs:restriction>
  </xs:complexContent>
</xs:complexType>

<xs:attribute name="identifier" type="xs:token">
  <xs:documentation xml:lang="en">The unique identifier of a resource.</xs:documentation>
</xs:attribute>

<xs:attribute name="serial-identifier" type="xs:positiveInteger">
  <xs:documentation xml:lang="en">The unique serial identifier of a resource.</xs:documentation>
</xs:attribute>

<xs:attribute name="uri" type="xs:anyURI">
  <xs:documentation xml:lang="en">The full URI to access a resource.</xs:documentation>
</xs:attribute>
<xs:attribute name="scope">
  <xs:annotation>
    <xs:documentation xml:lang="en">The scope of a resource.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="PRIVATE">
        <xs:annotation>
          <xs:documentation xml:lang="en">Denotes private resources.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="SHARED">
        <xs:annotation>
          <xs:documentation xml:lang="en">Denotes shared resources.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="PUBLIC">
        <xs:annotation>
          <xs:documentation xml:lang="en">Denotes public resources.</xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>

<xs:attribute name="media-type" type="ims:media-typeT">
  <xs:annotation>
    <xs:documentation xml:lang="en">The media type of an object according to MIME (Multipurpose Internet Mail Extensions) standard.</xs:documentation>
  </xs:annotation>
</xs:attribute>

<xs:element name="media-types">
  <xs:annotation>
    <xs:documentation xml:lang="en">The MIME media types of a resource.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="media-type" type="ims:media-typeT" maxOccurs="unbounded">
        <xs:annotation>
          <xs:documentation xml:lang="en">A MIME media type of a resource.</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:attribute name="score">
  <xs:annotation>
    <xs:documentation xml:lang="en">The score of either a result item or a link from source to target.</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:double">
      <xs:minInclusive value="0.0"/>
      <xs:maxInclusive value="1.0"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>

<xs:attribute name="backward-score">
  <xs:annotation>
  </xs:annotation>
</xs:attribute>
The score of a link from target to source.

A URI that represents a link to a resource.

The frequency of a link between resources.

The year to which a resource refers to.

A value of a resource, e.g. the numerical quantity value of the measure or the estimate of a statistic.

Represents an entity which has identity.

Represents an entity which is identified by means of a unique identifier.

Represents an entity which is identified by means of a unique identifier and whose creation, last modification, and last access events can be traced.
<xs:complexType name="identifiable - timestamp - traceable - access - controllable - resource - type">
    <xs:annotation>
        <xs:documentation xml:lang="en">Represents an entity which is identified by means of a unique identifier and namespace, whose creation, last modification, and last access events can be traced, and whose access permissions can be checked.</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="ims:identifiable - timestamp - traceable - resource - type">
            <xs:sequence>
                <xs:element ref="ims:owner" minOccurs="0"/>
                <xs:element ref="ims:sharing" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute ref="ims:scope"/>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:complexType name="namespace - identifiable - resource - type">
    <xs:annotation>
        <xs:documentation xml:lang="en">Represents an entity which is identified by means of a unique identifier and namespace.</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="ims:resource - type">
            <xs:attribute ref="ims:namespace"/>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:complexType name="namespace - identifiable - timestamp - traceable - resource - type">
    <xs:annotation>
        <xs:documentation xml:lang="en">Represents an entity which is identified by means of a unique identifier and namespace and whose creation, last modification, and last access events can be traced.</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="ims:identifiable - timestamp - traceable - resource - type">
            <xs:attribute ref="ims:namespace"/>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:complexType name="namespace - identifiable - timestamp - traceable - access - controllable - resource - type">
    <xs:annotation>
        <xs:documentation xml:lang="en">Represents an entity which is identified by means of a unique identifier and namespace, whose creation, last modification, and last access events can be traced, and whose access permissions can be checked.</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="ims:identifiable - timestamp - traceable - access - controllable - resource - type">
            <xs:attribute ref="ims:namespace"/>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:complexType name="serially - identifiable - resource - type">
<xs:annotation>
  <xs:documentation xml:lang="en">Represents an entity which is identified by means of a unique identifier and a serial identifier.</xs:documentation>
</xs:annotation>

<xs:complexType>
  <xs:extension base="ims:resource-type">
    <xs:attribute ref="ims:serial-identifier"/>
  </xs:extension>
</xs:complexType>

<xs:complexType name="ici-type">
  <xs:documentation xml:lang="en">Contains the representation of one or more resources.</xs:documentation>
</xs:complexType>

<xs:complexType name="countryT">
  <xs:documentation xml:lang="en">The country of a resource.</xs:documentation>
  <xs:restriction base="xs:token">
    <xs:pattern value="[A-Z]{2,3} />
  </xs:restriction>
</xs:complexType>

<xs:complexType name="languageT">
  <xs:documentation xml:lang="en">The language of a resource.</xs:documentation>
  <xs:restriction base="xs:language">
    <xs:pattern value="[a-z]{2,3} />
  </xs:restriction>
</xs:complexType>

<xs:complexType name="media-typeT">
  <xs:documentation xml:lang="en">The media type of an object according to MIME (Multipurpose Internet Mail Extensions) standard.</xs:documentation>
  <xs:restriction base="xs:string">
    <xs:pattern value="(text|image|audio|video|application|message|multipart)\/(.*?)(;\?)+"/>
  </xs:restriction>
</xs:complexType>
The following schema is a modification of the XCQL Schema\textsuperscript{14}, defined as XML representation of Contextual Query Language (CQL) queries [OASIS Search Web Services Technical Committee, 2012].

\begin{verbatim}
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2011 rel. 2 sp1 (http://www.altova.com) by Università degli Studi di Padova (Università degli Studi di Padova) -->
  <xs:annotation>
    <xs:documentation xml:lang="en">This schema extends the XCQL schema to provide support for representing search results within an XML representation of a CQL query.</xs:documentation>
    <xs:documentation xml:lang="en">Created on 2010-10-02</xs:documentation>
    <xs:documentation xml:lang="en">Last modified on 2012-04-17</xs:documentation>
    <xs:documentation xml:lang="en">Authored by Nicola Ferro (ferro@dei.unipd.it)</xs:documentation>
    <xs:documentation xml:lang="en">Copyright (c) 2006-2012 - Information Management Systems (IMS) Research Group (http://ims.dei.unipd.it/) - Department of Information Engineering (http://www.dei.unipd.it/) - University of Padua (http://www.unipd.it/)</xs:documentation>
  </xs:annotation>
  <xs:import namespace="http://ims.dei.unipd.it/" schemaLocation="ici.3.10.xsd">
    <xs:annotation>
      <xs:documentation xml:lang="en">Imports the schema of the IMS Component Integrator (ICI) library to include search results in the query representation.</xs:documentation>
    </xs:annotation>
  </xs:import>
  <xs:redefine schemaLocation="http://docs.oasis-open.org/search-ws/searchRetrieve/v1.0/cs01/schemas/xcql.xsd">
    <xs:complexType name="searchClauseDefinition">
      <xs:complexContent>
        <xs:extension base="xcql:searchClauseDefinition">
          <xs:sequence minOccurs="0">
            <xs:element ref="ims:result"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="tripleDefinition">
      <xs:complexContent>
        <xs:extension base="xcql:tripleDefinition">
          <xs:sequence minOccurs="0">
            <xs:element ref="ims:result"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:redefine>
</xs:schema>
\end{verbatim}

\textsuperscript{14}http://www.loc.gov/standards/sru/oasis/schemas/xcql.xsd
This appendix reports the RDF schemas of the different managed resources.\(^\text{15}\)

\[\begin{align*}
@prefix ims: & <http://ims.dei.unipd.it/data/rdf/> . \\
@prefix dcterms: & <http://purl.org/dc/terms/> . \\
@prefix foaf: & <http://xmlns.com/foaf/0.1/> . \\
@prefix owl: & <http://www.w3.org/2002/07/owl#> . \\
@prefix rdf: & <http://www.w3.org/1999/02/22-rdf-syntax-ns#> . \\
@prefix rdfs: & <http://www.w3.org/2000/01/rdf-schema#> . \\
@prefix xsd: & <http://www.w3.org/2001/XMLSchema#> . \\
@prefix swrc: & <http://swrc.ontoware.org/ontology#>. \\
@prefix aktors: & <http://www.aktors.org/ontology/portal#>. \\
@prefix bibo: & <http://purl.org/ontology/bibo/>. \\
@prefix gn: & <http://www.geonames.org/ontology#>. \\
@prefix vann: & <http://purl.org/vocab/vann/>. \\
@prefix vcard: & <http://www.w3.org/2006/vcard/ns#>. \\
@prefix prov: & <http://www.w3.org/ns/prov#> . \\
\end{align*}\]

### ICI

# ICI Classes

ims:Resource

  rdf:type rdfs:Class;
  rdfs:label "Resource";
  rdfs:comment "A generic IMS resource".

ims:Namespace-Identifiable-Resource

  rdf:type rdfs:Class;
  rdfs:label "Namespace Identifiable Resource";
  rdfs:comment "A generic IMS resource identified by the pair (UUID, Namespace)";
  rdfs:subClassOf ims:Resource.

ims:Timestamp-Traceable-Resource

  rdf:type rdfs:Class;
  rdfs:label "Timestamp Traceable Resource";
  rdfs:comment "A generic IMS resource identified by an UUID which has timestamps associated";
  rdfs:subClassOf ims:Resource.

ims:Timestamp-Traceable-Namespace-Identifiable-Resource

  rdf:type rdfs:Class;
  rdfs:label "Timestamp Traceable Namespace Identifiable Resource";
  rdfs:comment "A generic IMS resource identified by the pair (UUID, Namespace) which has timestamps associated";
  rdfs:subClassOf ims:Namespace-Identifiable-Resource.

ims:Timestamp-Traceable-Access-Controllable-Resource

  rdf:type rdfs:Class;
  rdfs:label "Timestamp Traceable Namespace Identifiable Resource";
  rdfs:comment "A generic IMS resource identified by an UUID which has timestamps associated and an owner";
  rdfs:subClassOf ims:TimestampTraceableResource.

ims:Timestamp-Traceable-Namespace-Identifiable-Access-Controllable-Resource

  rdf:type rdfs:Class;
  rdfs:label "Timestamp Traceable Namespace Identifiable Resource";\(^{15}\)

\[^{15}\text{http://ims.dei.unipd.it/data/rdf/ici.3.10.ttl}\]
rdfs:comment "A generic IMS resource identified by the pair (UUID, Namespace) which has timestamps associated and an owner";

rdfs:subClassOf ims:Namespace-Identifiable-Timestamp-Traceable-Resource.

# ICI Properties

ims:identifier rdf:type rdf:Property;
ims:domain ims:Resource;
ims:range xsd:string.

ims:namespace rdf:type rdf:Property;
ims:domain ims:Namespace-Identifiable-Resource;
ims:range xsd:string.

ims:file_metadata rdf:type rdf:Property;
ims:domain ims:Resource;
ims:range xsd:Resource;
ims:comment "The property defining the relationship between a resource and a blank node (pseudo-resource), containing the metadata information of this resource".

ims:owner rdf:type rdf:Property;
ims:domain ims:Resource;
ims:range ims:User;
ims:comment "The owner of the resource".

# datatype definitions

:userGender

a owl:DatatypeProperty;

rdfs:label "The gender of the user"^^xsd:string;

rdfs:range [ a rdfs:Datatype;

owl:oneOf ("MALE"^^xsd:string "FEMALE"^^xsd:string)

].

:provenancePredicate

a owl:DatatypeProperty;

rdfs:label "The action carried out in the event."^^xsd:string;

rdfs:range [ a rdfs:Datatype;

owl:oneOf ("CREATED"^^xsd:token "READ"^^xsd:token "UPDATED"^^xsd:token "DELETED"^^xsd:token "ACCESSED"^^xsd:token)

].

# Classes

ims:Namespace rdf:type rdfs:Class;
ims:label "Namespace";
ims:comment "the class of representing a Namespace";
ims:subClassOf ims:Timestamp-Traceable-Resource.

ims:User rdf:type rdfs:Class;
ims:label "User";
ims:comment "Represents a user.";
rdfs:subClassOf ims:Namespace - Identifiable - Timestamp - Traceable - Resource.
ims:Role
rdfs:type rdfs:Class;
ims:Group
rdfs:type rdfs:Class;
ims:Concept
rdfs:type rdfs:Class;
ims:Metadata-Set
rdfs:type rdfs:Class;
ims:Metadata
rdfs:type rdfs:Class;
ims:Contribution
rdfs:type rdfs:Class;
ims:Binary-Object
rdfs:type rdfs:Class;
ims:Digital-Object
rdfs:type rdfs:Class;
ims:Measure
rdfs:type rdfs:Class;
ims:Metric
rdfs:type rdfs:Class;

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
rdfs:comment "The metric for a measure, i.e. the measurement function (JCGM 200:2008 VIM 2.49).";
ims:subClassOf ims:Concept.

ims:Bibliometrics
dff:type rdfs:Class;
ims:class rdfs:"Bibliometrics";
rdfs:comment "Represents the bibliometrics for a given resource, e.g. a Contribution";
ims:subClassOf ims:Measure.

ims:Parameter
dff:type rdfs:Class;
ims:label "Parameter";
rdfs:comment "A parameter of a resource.";
ims:subClassOf ims:Resource.

ims:Statistic
dff:type rdfs:Class;
ims:label "Statistic";
rdfs:comment "The numerical data relating to an aggregate of individuals.";
ims:subClassOf ims:Resource.

ims:Provenance-Event
dff:type rdfs:Class;
ims:label "Provenance Event";
rdfs:comment "An event describing a fact about the provenance of a resource.";
ims:subClassOf ims:Resource.

ims:Link
dff:type rdfs:Class;
ims:label "Link";
rdfs:comment "A link among two resources.";
ims:subClassOf ims:Resource.

# Properties

ims:is-namespace-of
dff:type rdf:Property;
ims:domain ims:Namespace;
ims:range ims:Resource.

ims:has-namespace
dff:type rdf:Property;
ims:domain ims:Namespace-Identifiable-Resource;
ims:range ims:Namespace.

ims:is-shared-by
dff:type rdf:Property;
ims:domain ims:Resource;
ims:range ims:Group.

ims:has-metadata
dff:type rdf:Property;
ims:domain ims:Resource;
ims:range ims:Metadata.

ims:is-binary-object-of
dff:type rdf:Property;
rdfs:comment "The relation between a binary object and a resource."

IMS:has-binary-object
rdf:type rdf:Property;
rdfs:comment "The binary object of this resource."

IMS:is-digital-object-of
rdf:type rdf:Property;
rdfs:comment "The relation between a digital object and a resource."

IMS:has-digital-object
rdf:type rdf:Property;
rdfs:comment "The digital object of this resource."

IMS:has-measure
rdf:type rdf:Property;
rdfs:comment "It relates a generic Resource to a Measure."

IMS:has-parameter
rdf:type rdf:Property;
rdfs:comment "It relates a generic Resource to a Parameter."

IMS:has-statistic
rdf:type rdf:Property;
rdfs:comment "It relates a generic Resource to a Statistic."

# User Properties

IMS:has-group
rdf:type rdf:Property;

IMS:has-role
rdf:type rdf:Property;

# Role Properties

IMS:is-role-of
rdf:type rdf:Property;
# Group Properties

ims:is-group-of

rdf:type rdf:Property;

rdfs:domain ims:Group;

rdfs:range ims:User.

# Metadata-Set Properties

ims:subset

rdf:type rdf:Property;

rdfs:domain ims:Metadata-Set;

rdfs:range ims:Metadata-Set;

rdfs:comment "The sub-sets of this metadata set."

ims:superset

rdf:type rdf:Property;

rdfs:domain ims:Metadata-Set;

rdfs:range ims:Metadata-Set;

rdfs:comment "The super-sets of this metadata set."

ims:has-metadata

rdf:type rdf:Property;

rdfs:domain ims:Metadata-Set;

rdfs:range ims:Metadata;

rdfs:comment "The metadata contained in this metadata set."

# Metadata Properties

ims:belongs-to

rdf:type rdf:Property;

rdfs:domain ims:Metadata;

rdfs:range ims:Metadata-Set;

rdfs:comment "The metadata sets containing this metadata."

ims:is-metadata-of

rdf:type rdf:Property;

rdfs:comment "The metadata describing a resource."

rdfs:domain ims:Metadata;

rdfs:range ims:Resource.

# Contribution Properties

swrc:has-author

rdf:type rdf:Property;

rdfs:comment "A user who authors the contribution."

rdfs:domain ims:Contribution;

rdfs:range ims:User.

ims:publisher

rdf:type rdf:Property;

rdfs:comment "A user who publishes the contribution."

rdfs:domain ims:Contribution;

rdfs:range ims:User.

ims:contribution-type

rdf:type rdf:Property;

rdfs:comment "The type of a contribution."

rdfs:domain ims:Contribution;

rdfs:range ims:Concept.
ims:parameter-type
rdf:type rdf:Property;
rdfs:comment "The type of a parameter";
rdfs:domain ims:Parameter;
rdfs:range ims:Concept.

# Metric properties

ims:is-metric-for
rdf:type rdf:Property;
rdfs:comment "It relates a Metric to a Measure.";
rdfs:domain ims:Metric;
rdfs:range ims:Measure.

# Measure properties

ims:has-metric
rdf:type rdf:Property;
rdfs:comment "It relates a Measure to a Metric.";
rdfs:domain ims:Measure;
rdfs:range ims:Metric.

# Measure properties

ims:is-parameter-of
rdf:type rdf:Property;
rdfs:comment "It relates a Parameter to a generic resource.";
rdfs:domain ims:Parameter;
rdfs:range ims:Resource.

ims:parameter-type
rdf:type rdf:Property;
rdfs:comment "It relates a Parameter to a Concept (type).";
rdfs:domain ims:Parameter;
rdfs:range ims:Concept.

# Statistic properties

ims:is-statistic-of
rdf:type rdf:Property;
rdfs:comment "It relates a Statistic to a Resource.";
rdfs:domain ims:Statistic;
rdfs:range ims:Resource.

ims:has-descriptive-statistic
rdf:type rdf:Property;
rdfs:comment "The descriptive statistic used for computing the aggregated value of a statistic.";
rdfs:domain ims:Statistic;
rdfs:range ims:Concept.

ims:has-metric
rdf:type rdf:Property;
rdfs:comment "It relates a Statistic to a Metric.";
ims:domain ims:Statistic;
rdfs:range ims:Metric.
ims:has-measure
rdfs:domain ims:Statistic;
rdfs:range ims:Measure.

# Provenance - Event Properties
ims:who
rdfs:domain ims:Provenance - Event;
rdfs:range ims:User;
owl:sameAs prov:wasAttributedTo;
owl:sameAs prov:wasAssociatedWith:
owl:sameAs prov:actedOnBehalfOf.
ims:what
rdfs:domain ims:Provenance - Event;
rdfs:range ims:Resource;
owl:sameAs prov:Entity.

# Link Properties
ims:has-source
rdfs:domain ims:Link;
rdfs:range ims:Resource.
ims:has-target
rdfs:domain ims:Link;
rdfs:range ims:Resource.
ims:relation
rdfs:domain ims:Link;
rdfs:range ims:Concept.

# Resource Datatype Properties
ims:identifier
rdfs:domain ims:Resource;
rdfs:range xsd:string.
ims:created
rdfs:domain ims:Resource;
rdfs:range xsd:date.

D3.5: Final Prototype of the Evaluation Infrastructure
rdfs:domain ims:Resource;
rdfs:range xsd:dateTime.

ims:last-modified
rdfs:domain ims:Resource;
rdfs:range xsd:dateTime.

ims:description
rdfs:domain ims:Resource;
rdfs:range xsd:string.

ims:name
rdfs:domain ims:Resource;
rdfs:range xsd:string.

ims:content
rdfs:domain ims:Resource;
rdfs:range xsd:string.

ims:content-transfer-encoding
rdfs:domain ims:Resource;
rdfs:range xsd:string.

ims:language
rdfs:domain ims:Resource;
rdfs:range xsd:token.

ims:country
rdfs:domain ims:Resource;
rdfs:range xsd:string.

ims:prefix
rdfs:domain ims:Namespace;
rdfs:range xsd:string.

# Namespace Datatype Properties

# User Datatype Properties

# Namespace Datatype Properties

# User Datatype Properties
ims:password
rdfs:type owl:DatatypeProperty;
rdfs:comment "The password of the user."
ims:password
rdfs:domain ims:User;
rdfs:range xsd:string.
ims:first-name
rdfs:type owl:DatatypeProperty;
rdfs:comment "The first name of the user."
ims:first-name
rdfs:domain ims:User;
rdfs:range xsd:string;
owl:sameAs foaf:givenName.
ims:last-name
rdfs:type owl:DatatypeProperty;
rdfs:comment "The last/family name of the user."
ims:last-name
rdfs:domain ims:User;
rdfs:range xsd:string;
owl:sameAs foaf:familyName.
ims:affiliation
rdfs:type owl:DatatypeProperty;
rdfs:comment "The affiliation of the user."
ims:affiliation
rdfs:domain ims:User;
rdfs:range xsd:string;
owl:sameAs foaf:Organization.
ims:e-mail
rdfs:type owl:DatatypeProperty;
rdfs:comment "The e-mail of the user."
ims:e-mail
rdfs:domain ims:User;
rdfs:range xsd:string;
owl:sameAs foaf:mbox.
ims:birth-date
rdfs:type owl:DatatypeProperty;
rdfs:comment "The birth date of the user."
ims:birth-date
rdfs:domain ims:User;
rdfs:range xsd:date;
owl:sameAs foaf:birthDay.
ims:gender
rdfs:type owl:DatatypeProperty;
rdfs:comment "The affiliation of the user."
ims:gender
rdfs:domain ims:User;
rdfs:range :userGender;
owl:sameAs foaf:gender.
ims:address
rdfs:type owl:DatatypeProperty;
rdfs:comment "The address of the user."
ims:address
rdfs:domain ims:User;
rdfs:range xsd:string;
owl:sameAs vcard:streetAddress.
ims:city
rdfs:type owl:DatatypeProperty;
rdfs:comment "The city of the user."
rdfs:domain ims:User
rdfs:range xsd:string
owl:sameAs vcard:locality.

ims:state
rdf:type owl:DatatypeProperty;
rdfs:comment "The state of the user."
rdfl:domain ims:User
rdfs:range xsd:string
owl:sameAs vcard:region.

ims:zip
rdf:type owl:DatatypeProperty;
rdfs:comment "The zip code of the user."
rdfl:domain ims:User
rdfs:range xsd:string
owl:sameAs vcard:postalCode.

ims:phone
rdf:type owl:DatatypeProperty;
rdfs:comment "The phone of the user."
rdfl:domain ims:User
rdfs:range xsd:string
owl:sameAs vcard:telephone.

ims:facsimile
rdf:type owl:DatatypeProperty;
rdfs:comment "The facsimile number of the user."
rdfl:domain ims:User
rdfs:range xsd:string
owl:sameAs vcard:telephone.

ims:mobile
rdf:type owl:DatatypeProperty;
rdfs:comment "The mobile of the user."
rdfl:domain ims:User
rdfs:range xsd:string
owl:sameAs vcard:cell.

ims:voip-caller-id
rdf:type owl:DatatypeProperty;
rdfs:comment "The voip-caller-id of the user."
rdfl:domain ims:User
rdfs:range xsd:token.

ims:homepage
rdf:type owl:DatatypeProperty;
rdfs:comment "The homepage of the user."
rdfl:domain ims:User
rdfs:range xsd:anyURI.

# Contribution Datatype Properties
ims:affiliation
rdf:type owl:DatatypeProperty;
rdfs:comment "An affiliation of an author of the contribution."
rdfl:domain ims:User
rdfs:range xsd:string;
owl:sameAs foaf:Organization.
# Link DataType properties

imso:score

rdf: type owl:DatatypeProperty;

dominimso:Link;
dominationso:double.

imso:backward-score

rdf: type owl:DatatypeProperty;

dominimso:Link;
dominationso:double.

imso:frequency

rdf: type owl:DatatypeProperty;

dominimso:Link;
dominationso:positiveInteger.

# Bibliographic taxonomy

imso:is-a

rdf: type rdf:Property;

dominimso:Concept;
dominationso:Concept.
C  RESTful WebService

As discussed in the previous section, the DIRECT is accessible to client applications by means of a RESTful Web Service [Fielding and Taylor, 2002; Richardson and Ruby, 2007]. The DIRECT RESTful Web Service offers several API build around the following main resources:

- **namespace**: manages all the operations related to namespaces and their provenance;
- **role**: manages all the operations related to roles of users and their provenance;
- **group**: manages all the operations related to groups of users and their provenance;
- **user**: manages all the operations related to users and their provenance;
- **concept**: manages all the operations related to concepts and their provenance;
- **log event**: manages all the operations related to log events;
- **metadata**: the metadata managed by the system;
- **metadata set**: sets grouping metadata according to various criteria;
- **application**: identifies a running software application which can be evaluated by an evaluation activity;
- **component**: represents a building block of a running system;
- **configuration**: identifies the configuration of a component, a system or an application under evaluation;
- **contribution**: refers to a paper (e.g., a conference paper, a working note, a technical report, a journal paper);
- **corpus**: represents a set of informative units, which allows us to perform a series of investigations in a research area;
- **estimate**: represents the value of a metric (which is represented by means of a concept) calculated on some experiment handled by the infrastructure;
- **evaluation activity**: represents any type of activity aiming at the evaluation of applications, systems, or methodologies for information access;
- **campaign**: represents a traditional evaluation activity divided into tracks and tasks;
- **education**: represents an evaluation activity carried out for educational purposes;
- **trial**: represents an evaluation activity that may be actively run by a research group, a person or a corporate body for their own interest;
- **experimental Collection**: represents a logical entity that allows us to set up a traditional IR evaluation environment composed by a corpus, a set of topics and a set of relevance judgments;

- **experiment**: represents a part of the data produced by a system under evaluation;

- **experiment item**: represents an item of an experiment, that is a retrieved information unit for a given topic;

- **ground truth**: represents a container of assessments obtained through the pooling technique;

- **ground truth item**: represents a single item of a ground truth;

- **guerrilla**: represents an innovative step in the experimental evaluation panorama. The main purpose is to perform application-centric evaluation;

- **information unit**: represents the object on which the evaluated system acts; e.g., the object which is retrieved by the system under evaluation;

- **measure**: represents the value of a metric calculated on some experiment handled by the infrastructure;

- **pool**: represents a container of assessments obtained through the pooling technique;

- **run**: represents a part of the data produced by a system under evaluation;

- **run item**: represents an item of an experiment of type run, that is a retrieved information unit for a given topic;

- **snapshot**: stores the snapshot of a visualization;

- **statistical test**: represents mechanism for making quantitative decisions about a process or processes;

- **system**: represents a running software engine, which is under evaluation;

- **task**: represents a piece of work that is undertaken within an evaluation activity and aims at testing a specific (research) hypothesis;

- **topic group**: represents a set of topics, which are grouped together because they are used to address a research task carried out in an evaluation activity;

- **topic**: represents the materialization of an information need;

- **track**: represents a group of tasks carried within a campaign;

- **visualization**: refers to the information used by the infrastructure to store and recover whichever visualization of the data that the users do;
• **search**: manages the search of resources according to queries which comply with the DIRECT CQL Context Set, described later on in Section D;

• **list**: manages the search and listing of resources according to queries which comply with the DIRECT CQL Context Set, described later on in Section D.

The API for accessing the various resources are described in detail in the following. Each section presents: the Uniform Resource Identifier (URI) [Berners-Lee et al., 2005] to be used to refer to the desired resource; the method to be used to access the resource (GET, POST, PUT, DELETE, HEAD); the request parameters; the response HTTP status code [Fielding et al., 1999] and body for the different possible cases.

As discussed in Section ?? about the Access Control Infrastructure, some resources are publicly available, some others require authentication before being accessed. The DIRECT RESTful Web Service makes use of the basic HTTP authentication scheme [Fielding et al., 1999; Franks et al., 1999].

If you try to access a resource that needs authentication, you will receive, as response, an authentication challenge with HTTP status code 401 – Unauthorized asking you for a user name and password.

Remember that DIRECT uniquely identifies users by means of their unique identifier and namespace: such information must be provided in the user name field of the HTTP Basic Authentication Scheme. To separate between the unique user identifier and the namespace, you should use the ; (semicolon) symbol.

Therefore, the user name must be provided with the following syntax:

```
user-identifier;namespace
```

Moreover, since the namespace is usually identified by means of an URI which may contain characters that needs to be escaped, the proper URI encoding has to be performed according to [Berners-Lee et al., 2005]. Consider the following example: for the user `direct` in the namespace `http://direct.dei.unipd.it/`, you should use as user name field for the HTTP Basic Authentication Scheme:

```
direct;http%3A%2F%2Fdire%25E9t%25E9;Eden%25E9t%25E9
```

Finally, note that all the URI presented in the following sections are relative to a base URI which depends on the installation of the DIRECT system. Therefore, these URI needs to be appended to the base URI.

All the resources supports two input and output formats: XML [W3C, 2006, 2008] and JavaScript Object Notation (JSON) [Crockford, 2006]. This can be set by using the standard HTTP headers: Content-Type for specifying the input format and Accept for the desired output format followed by either application/xml or application/json MIME media types.

The remainder of this section is organized as follows: Section ?? describes the optimistic locking mechanism adopted by the DIRECT annotation service; Section C.1 explains the error messages returned by the systems and provides an example of the representation in XML and JSON; Sections
from C.2 to C.41 describe the different resources managed by the DIRECT annotation service and for each resource provide the API for accessing it as well as an example of its representation in XML and JSON.

C.1 Error Messages

Table 3 summarizes the error conditions reported by the system. These error conditions are common across all the resources managed by the system.

For each error condition, the table contains:

• the HTTP status code;
• the Error Code;
• a short description.

For each error condition, the response body contains detailed diagnostic messages further explaining it.

<table>
<thead>
<tr>
<th>HTTP Status Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 – Bad Request</td>
<td>C2002 – INVALID_PARAMETER</td>
<td>An invalid parameter (null, empty, missing, ...) has been provided</td>
</tr>
<tr>
<td>400 – Bad Request</td>
<td>C2003 – MALFORMED_REPRESENTATION</td>
<td>A malformed representation of a resource (not well-formed, not valid, ...) has been provided</td>
</tr>
<tr>
<td>401 – Unauthorized</td>
<td>C3000 – AUTHENTICATION_REQUIRED</td>
<td>An attempt to access a resource without the required authentication has been performed</td>
</tr>
<tr>
<td>403 – Forbidden</td>
<td>C3001 – INSUFFICIENT_ACCESS_RIGHTS</td>
<td>An attempt to access a resource with insufficient access rights has been performed</td>
</tr>
<tr>
<td>404 – Not Found</td>
<td>C4003 – NOT_FOUND_RESOURCE</td>
<td>An attempt to refer to an inexistent resource has been performed</td>
</tr>
<tr>
<td>405 – Method Not Allowed</td>
<td>C1001 – UNSUPPORTED_OPERATION</td>
<td>An unsupported operation has been requested</td>
</tr>
<tr>
<td>406 – Not Acceptable</td>
<td>C2000 – UNSUPPORTED_OUTPUT_FORMAT</td>
<td>An unsupported output format has been requested</td>
</tr>
<tr>
<td>409 – Conflict</td>
<td>C4002 – DUPLICATED_RESOURCE</td>
<td>An attempt to create an already existing resource has been performed</td>
</tr>
<tr>
<td>HTTP Status Code</td>
<td>Error Code</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>409 – Conflict</td>
<td>C4004 NOT_MODIFIABLERESOURCE</td>
<td>An attempt to update or delete a resource that cannot be modified has been performed</td>
</tr>
<tr>
<td>409 – Conflict</td>
<td>C4005 CONCURRENT_RESOURCE_MODIFICATION</td>
<td>An attempt to update a resource that has been concurrently updated has been performed</td>
</tr>
<tr>
<td>415 – Unsupported Media Type</td>
<td>C2001 UNSUPPORTED_INPUT_FORMAT</td>
<td>An unsupported input format has been provided</td>
</tr>
<tr>
<td>500 – Internal Server Error</td>
<td>C1000 INTERNAL_ERROR</td>
<td>An error internal to the system has occurred</td>
</tr>
</tbody>
</table>

Table 3: Error messages and status codes.

C.1.1 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:error ims:identifier="7d500ee98-9bb4-4952-aef4-141e4fada491" ims:code="0C4001"
ims:type="INVALIDRESOURCE" ims:created="2012-08-01T19:09:30.852+02:00">
<ims:details ims:language="eng">
invalid resource
</ims:details>
</ims:diagnostic>
```

D3.5: Final Prototype of the Evaluation Infrastructure

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C.1.2 JSON Representation

```
{
  "direct":{
    "error":{
      "identifier":"7d50ee98-9bb4-4952-a6f4-141e4fad8491",
      "code":"C4001",
      "type":"INVALID_RESOURCE",
      "created":"2012-08-01T19:09:30.852+02:00",
      "details":{
        "language":"eng",
        "details":"invalid resource"
      },
        setUpBeforeClass(ErrorRepresentation.java:45)\n        at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)\n        at sun.reflect.NativeMethodAccessorImpl.
        runReflectiveCall(FrameworkMethod.java:45)\n        at org.junit.internal.runners.model.ReflectiveCallable.
        run(ReflectiveCallable.java:15)\n        at org.junit.runners.model.FrameworkMethod.
        invokeExplosively(FrameworkMethod.java:42)\n        at org.junit.internal.runners.statements.RunBefores.
        runJUnit4TestReference.java:50)\n        at org.eclipse.jdt.internal.junit.runner.TestExecution.
        run(TestExecution.java:38)\n        at org.eclipse.jdt.internal.junit.runner.RemoteTestRunner.
        main(RemoteTestRunner.java:197)"
    }
  }
}
```

C.2 Log Event Resource

C.2.1 API
<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ_LOG_EVENT</td>
<td>GET</td>
<td>/log-event/{id}</td>
</tr>
<tr>
<td>LIST_LOG_EVENTS</td>
<td>GET</td>
<td>/log-event/last/{n}</td>
</tr>
</tbody>
</table>

Table 4: API for accessing the log event resource.

where \(\{id\}\) is the unique identifier of the log event and \(\{n\}\) is the number of log event to be listed.

C.2.2 XML Representation

```xml
<?xml version ="1.0" encoding="UTF-8"?>
<ims:log-event ims:serial-identifier="1000" ims:level ="INFO"
ims:created="2012-08-01T19:18:04.987+02:00">
  <ims:message>
    message
  </ims:message>
  <ims:user ims:identifier="user-1" ims:namespace="http://ims.dei.unipd.it/" />
  <ims:action>AUTHENTICATE_USER</ims:action>
  <ims:ip>127.0.2.1</ims:ip>
  <ims:resource ims:identifier="resource 1"
ims:namespace="http://www.openarchives.org/OAI/2.0/oai_dc/">
    <ims:resource-class>resource class 1</ims:resource-class>
  </ims:resource>
  <ims:thread>thread 1</ims:thread>
  <ims:class-name>class 1</ims:class-name>
  <ims:method>method 1</ims:method>
  <ims:line-number>37</ims:line-number>
  <ims:class-file>file 1</ims:class-file>
</ims:log-event>
```

D3.5: Final Prototype of the Evaluation Infrastructure

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```java
at java.lang.reflect.Method.invoke(Method.java:597)
at org.junit.runners.model.FrameworkMethod$1.runReflectiveCall(FrameworkMethod.java:45)
at org.junit.internal.runners.model.ReflectiveCallable.run(ReflectiveCallable.java:15)
at org.junit.runners.model.FrameworkMethod.invokeExplosively(FrameworkMethod.java:42)
at org.junit.internal.runners.model.statements.RunBefore.evaluate(RunBefore.java:27)
at org.junit.runners.ParentRunner.run(ParentRunner.java:300)
at org.eclipse.jdt.internal.junit4.runner.JUnit4TestReference.run(JUnit4TestReference.java:50)
at org.eclipse.jdt.internal.junit4.runner.RemoteTestRunner.main(RemoteTestRunner.java:197)
</ims:throwable>
</ims:log-event>
</ims:direct>

C.2.3 JSON Representation

```json
{
  "direct": {
    "log-event": {
      "serial-identifier": 1000,
      "level": "INFO",
      "created": "2012-08-01T19:18:04.987+02:00",
      "message": "message",
      "user": {
        "identifier": "user-1",
        "namespace": "http://ims.dei.unipd.it/
      },
      "action": "AUTHENTICATE_USER",
      "resource": {
        "identifier": "resource 1",
        "namespace": "http://www.openarchives.org/OAI/2.0/oai_dc/",
        "resource-class": "resource class 1"
      },
      "ip": "127.0.2.1",
      "thread": "thread 1",
      "class-name": "class 1",
      "method": "method 1",
      "line-number": 37,
      "class-file": "file 1",
    }
  }
}```
C.3 Namespace Resource

### C.3.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_NAMESPACE</td>
<td>POST</td>
<td>/namespace</td>
</tr>
<tr>
<td>READ_NAMESPACE</td>
<td>GET</td>
<td>/namespace/{id}</td>
</tr>
<tr>
<td>UPDATE_NAMESPACE</td>
<td>PUT</td>
<td>/namespace/{id}</td>
</tr>
<tr>
<td>DELETE_NAMESPACE</td>
<td>DELETE</td>
<td>/namespace/{id}</td>
</tr>
<tr>
<td>LIST_NAMESPACES</td>
<td>GET</td>
<td>/namespace</td>
</tr>
<tr>
<td>LIST_NAMESPACE_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/namespace/{id}/provenance</td>
</tr>
</tbody>
</table>

Table 5: API for accessing the namespace resource.

where \{id\} is the unique identifier of the namespace.

### C.3.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:namespace ims:identifier="http://www.ns1.com/" ims:prefix="ns1"
    ims:description="namespace 1"
    ims:created="2012-08-01T18:52:28.193+02:00"
    ims:last-modified="2012-08-01T18:52:28.193+02:00" />
</ ims: direct>
```
C.3.3 JSON Representation

```json
{
  "direct":{
    "namespace":{
      "identifier":"http://www.ns1.com/",
      "prefix":"ns1",
      "description":"namespace 1",
      "created":"2012-08-01T18:52:28.193+02:00",
      "last-modified":"2012-08-01T18:52:28.193+02:00"
    }
  }
}
```

C.4 Concept Resource

C.4.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_CONCEPT</td>
<td>POST</td>
<td>/concept</td>
</tr>
<tr>
<td>READ_CONCEPT</td>
<td>GET</td>
<td>/concept/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_CONCEPT</td>
<td>PUT</td>
<td>/concept/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_CONCEPT</td>
<td>DELETE</td>
<td>/concept/{id};{ns}</td>
</tr>
<tr>
<td>LIST_CONCEPTS</td>
<td>GET</td>
<td>/concept</td>
</tr>
<tr>
<td>LISTRELATED_CONCEPTS</td>
<td>GET</td>
<td>/concept/{id};{ns}/link</td>
</tr>
</tbody>
</table>
| RELATE_CONCEPT             | GET, PUT, POST | /concept/{source-id};
                            | {source-ns}/link/{target-id};{target-ns}/
                            | relation/{relation-id};{relation-ns}[/strength/{score}] |
| UNRELATE_CONCEPT           | DELETE      | /concept/{source-id};
                            | {source-ns}/link/{target-id};
                            | {target-ns}               |
| LISTCONCEPTS_PROVENANCEEVENTS | GET        | /concept/{id};{ns}/provenance       |
| LIST_USER_FEATURES         | GET         | /concept/featured-user/{id};{ns}  |
| ADD_MEASURE                | GET, POST, PUT | /concept/{id};{ns}/measure         |
| READ_MEASURE               | GET         | /concept/measure/{id}              |
| REMOVE_MEASURE             | DELETE      | /concept/measure/{id}              |
| LISTCONTRIBUTIONFEATURES   | GET         | /concept/featured-contribution/{id} |
| LISTCONTRIBUTIONFEATURES   | GET         | /concept/featured-contribution/{id} |
| LISTMEASURES               | GET         | /concept/{id};{ns}/measure         |
where \{id\} is the unique identifier of the concept and \{ns\} is the namespace to which the concept belongs. When relating/unrelating concepts, \{source-id\} and \{source-ns\} are the identifier and namespace of the source concept; \{target-id\} and \{target-ns\} are the identifier and namespace of the target concept; \{relation-id\} and \{relation-ns\} are the identifier and namespace of the concept expressing the relation between the source and target concepts. When relating two concepts, if a score is provided, it will express the strength of the relation between the two concepts; if no score is provided, it will default to 1; scores should be in the range \([0, 1]\). This allows us to create taxonomies and knowledge organization systems of concepts, if needed.

C.4.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:concept ims:identifier="c1" ims:namespace="http://ims.dei.unipd.it/"
ims:description="concept 1"
ims:created="2012-11-22T19:01:34.064+02:00"
ims:last-modified="2012-11-22T19:01:34.064+02:00">
<ims:links>
<ims:link ims:score="8.9361187812E-1">
<ims:concept ims:identifier="author"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
<ims:concept ims:identifier="IS_A"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:relation>
<ims:concept ims:identifier="c1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:link>
<ims:link ims:score="1.405708327E-1">
<ims:concept ims:identifier="reviewer"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
<ims:concept ims:identifier="OWNS_A"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:relation>
<ims:concept ims:identifier="c1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:link>
<ims:link ims:score="3.759954505E-1">
<ims:concept ims:identifier="c1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
</ims:link>
```
C.4.3 JSON Representation

```json
```
C.5 Group Resource

C.5.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_GROUP</td>
<td>POST</td>
<td>/group</td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ_GROUP</td>
<td>GET</td>
<td>/group/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_GROUP</td>
<td>PUT</td>
<td>/group/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_GROUP</td>
<td>DELETE</td>
<td>/group/{id};{ns}</td>
</tr>
<tr>
<td>LIST_GROUPS</td>
<td>GET</td>
<td>/group</td>
</tr>
<tr>
<td>LIST_GROUP_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/group/{id};{ns}/provenance</td>
</tr>
</tbody>
</table>

Table 7: API for accessing the group resource.

where \{id\} is the unique identifier of the group and \{ns\} is the namespace to which the group belongs.

C.5.2 XML Representation

```xml
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
             xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
             xsi:schemaLocation="http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:group ims:identifier="g1" ims:namespace="http://ims.dei.unipd.it/"
             ims:created="2012-08-01T19:24:40.991+02:00"
             ims:last-modified="2012-08-01T19:24:40.991+02:00">
    <ims:users>
      <ims:user ims:identifier="user-1" ims:namespace="http://ims.dei.unipd.it/" />
      <ims:user ims:identifier="user-2" ims:namespace="http://ims.dei.unipd.it/" />
      <ims:user ims:identifier="user-3" ims:namespace="http://ims.dei.unipd.it/" />
    </ims:users>
  </ims:group>
</ims:direct>
```

C.5.3 JSON Representation

```json
{
  "direct": {
    "group": {
      "identifier": "g1",
      "namespace": "http://ims.dei.unipd.it/",
      "description": "group 1",
      "created": "2012-08-01T19:24:40.991+02:00",
      "last-modified": "2012-08-01T19:24:40.991+02:00",
      "users": [
        {
          "user": {
            "identifier": "user-1",
            "namespace": "http://ims.dei.unipd.it/"
          }
        },
        {
          "user": {
            "identifier": "user-2",
            "namespace": "http://ims.dei.unipd.it/"
          }
        },
        {
          "user": {
            "identifier": "user-3",
            "namespace": "http://ims.dei.unipd.it/"
          }
        }
      ]
    }
  }
}
```
C.6 Role Resource

C.6.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_ROLE</td>
<td>POST</td>
<td>/role</td>
</tr>
<tr>
<td>READ_ROLE</td>
<td>GET</td>
<td>/role/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_ROLE</td>
<td>PUT</td>
<td>/role/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_ROLE</td>
<td>DELETE</td>
<td>/role/{id};{ns}</td>
</tr>
<tr>
<td>LIST_ROLES</td>
<td>GET</td>
<td>/role</td>
</tr>
<tr>
<td>LIST_ROLE_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/role{id};{ns}/provenance</td>
</tr>
</tbody>
</table>

Table 8: API for accessing the role resource.

where {id} is the unique identifier of the role and {ns} is the namespace to which the role belongs.

C.6.2 XML Representation

```xml
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
             xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
             xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:role ims:identifier="r1" ims:namespace="http://ims.dei.unipd.it/"
            ims:description="role 1"
            ims:created="2012-08-01T19:24:40.991+02:00"
            ims:last-modified="2012-08-01T19:24:40.991+02:00">
    <ims:users>
      <ims:user ims:identifier="user-1" ims:namespace="http://ims.dei.unipd.it/" />
      <ims:user ims:identifier="user-2" ims:namespace="http://ims.dei.unipd.it/" />
      <ims:user ims:identifier="user-3" ims:namespace="http://ims.dei.unipd.it/" />
    </ims:users>
  </ims:role>
</ims:direct>
```

C.6.3 JSON Representation

```json
{
  "direct":{
    "role":{
      "identifier":"r1",
```
C.7 User Resource

C.7.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_USER</td>
<td>POST</td>
<td>/user</td>
</tr>
<tr>
<td>READ_USER</td>
<td>GET</td>
<td>/user/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_USER</td>
<td>PUT</td>
<td>/user/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_USER</td>
<td>DELETE</td>
<td>/user/{id};{ns}</td>
</tr>
<tr>
<td>CHANGE_USER_PASSWORD</td>
<td>PUT</td>
<td>/user/{id};{ns}/changePassword</td>
</tr>
<tr>
<td>AUTHENTICATE_USER</td>
<td>GET, PUT, POST, OPTIONS, HEAD</td>
<td>/user/authenticate</td>
</tr>
<tr>
<td>ADD_USER_TO_GROUP</td>
<td>GET, PUT, POST</td>
<td>/user/{id};{ns}/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>REMOVE_USER_FROM_GROUP</td>
<td>DELETE</td>
<td>/user/{id};{ns}/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>ADD_USER_TO_ROLE</td>
<td>GET, PUT, POST</td>
<td>/user/{id};{ns}/subscriber/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>REMOVE_USER_FROM_ROLE</td>
<td>DELETE</td>
<td>/user/{id};{ns}/subscriber/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>LIST_USERS</td>
<td>GET</td>
<td>/user/</td>
</tr>
<tr>
<td>LIST_USER_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/user/{id};{ns}/provenance</td>
</tr>
<tr>
<td>RELATE_USER</td>
<td>GET, POST, PUT</td>
<td>/user/{id};{ns}/link/{id};{ns}/relation/{id};{ns}/score/{value}</td>
</tr>
<tr>
<td>UNRELATE_USER</td>
<td>DELETE</td>
<td>/user/{id};{ns}/link/{id};{ns}</td>
</tr>
<tr>
<td>LISTRELATED_USERS</td>
<td>GET</td>
<td>/user/{id};{ns}/link</td>
</tr>
<tr>
<td>ADD_FEATURE_TO_USER</td>
<td>GET, POST, PUT</td>
<td>/user/{id};{ns}/feature/{id};{ns}/score/{value}/backward-score/{value}</td>
</tr>
<tr>
<td>REMOVE_FEATURE_FROM_USER</td>
<td>DELETE</td>
<td>/user/{id};{ns}/feature/{id};{ns}</td>
</tr>
<tr>
<td>LISTFEATURED_USERS</td>
<td>GET</td>
<td>/user/feature/{id};{ns}</td>
</tr>
<tr>
<td>ADD_MEASURE</td>
<td>GET, POST, PUT</td>
<td>/user/measure/{id}</td>
</tr>
<tr>
<td>READ_MEASURE</td>
<td>GET</td>
<td>/user/measure/{id}</td>
</tr>
<tr>
<td>REMOVE_MEASURE</td>
<td>DELETE</td>
<td>/user/measure/{id}</td>
</tr>
<tr>
<td>LISTMEASURES</td>
<td>GET</td>
<td>/user/{id};{ns}/measure</td>
</tr>
<tr>
<td>ADD_STATISTIC</td>
<td>GET, POST, PUT</td>
<td>/user/{id};{ns}/statistic</td>
</tr>
<tr>
<td>READ_STATISTIC</td>
<td>GET</td>
<td>/user/statistic/{id}</td>
</tr>
<tr>
<td>REMOVE_STATISTIC</td>
<td>DELETE</td>
<td>/user/statistic/{id}</td>
</tr>
<tr>
<td>LIST_STATISTICS</td>
<td>GET</td>
<td>/user/{id};{ns}/statistic</td>
</tr>
</tbody>
</table>

Table 9: API for accessing the user resource.

where {id} is the unique identifier of the user and {ns} is the namespace to which the user belongs while {owner-id} and {owner-ns} are the identifier and namespace of the group/role to which the user belongs.

C.7.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<ims : direct xmlns : ims :="http :// ims . dei . unipd .it/"
  xmlns : xsi :="http :// www .w3. org /2001/XMLSchema-instance"
  xsi :schemaLocation="http :// ims . dei . unipd .it/ http :// ims . dei . unipd .it/data/xml/direct.3.00.xsd">
  <ims :user ims :identifier="u1" ims :namespace="http :// ims . dei . unipd .it/"
    ims :first-name="firstName" ims :last-name="lastName"
    ims :affiliation="affiliation" ims :e-mail="email@email . org"
    ims :gender="MALE"
    ims :birth-date="2012-08-01" ims :address="address" ims :city="city" ims :state="state" ims :zip="zip"
</ims : user>
</ims : direct>
```
C.7.3 JSON Representation

```json
{
  "direct":{
    "user":{
      "identifier":"u1",
      "namespace":"http://ims.dei.unipd.it/",
      "first-name":"firstName",
      "last-name":"lastName",
      "affiliation":"affiliation",
      "e-mail":"email@email.org",
      "birth-date":"2012-08-01",
      "gender":"MALE",
      "address":"address",
      "city":"city",
      "state":"state",
      "zip":"zip",
      "country":"ITA",
      "language":"ita",
      "phone":"123456",
      "facsimile":"123456",
      "mobile":"123456",
      "voip-caller-id":"voipCallerId",
      "homepage":"www.homepage.com",
      "created":"2012-08-01T19:33:41.893+02:00",
      "last-modified":"2012-08-01T19:33:41.893+02:00",
      "groups":{
        "group":{
          "identifier":"group-1",
          "namespace":"http://ims.dei.unipd.it/"
        }
      },
      "group":{
        "identifier":"group-2",
        "namespace":"http://ims.dei.unipd.it/"
      }
    }
  }
}```
C.8 Metadata Set Resource

C.8.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_METADATA_SET</td>
<td>POST</td>
<td>/metadata-set</td>
</tr>
<tr>
<td>READ_METADATA_SET</td>
<td>GET</td>
<td>/metadata-set/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_METADATA_SET</td>
<td>PUT</td>
<td>/metadata-set/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_METADATA_SET</td>
<td>DELETE</td>
<td>/metadata-set/{id};{ns}</td>
</tr>
<tr>
<td>INCLUDE_SUBSET_INTO_SUPerset</td>
<td>GET, PUT, POST</td>
<td>/metadata-set/{id};{ns}/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>EXCLUDE_SUBSET_FROM_SUPerset</td>
<td>DELETE</td>
<td>/metadata-set/{id};{ns}/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>LIST_METADATA_SETS</td>
<td>GET</td>
<td>/metadata-set</td>
</tr>
<tr>
<td>LIST_METADATA_SET_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/metadata-set/{id};{ns}/provenance</td>
</tr>
<tr>
<td>SHARE_METADATA_SET</td>
<td>GET, POST, PUT</td>
<td>/metadata-set/{id}/share/{sharer-id};{sharer-ns}/permission/{access-permission}</td>
</tr>
</tbody>
</table>
Table 10: API for accessing the metadata set resource.

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNSHARE_METADATA_SET</td>
<td>DELETE</td>
<td>/metadata-set/{id}/share/{sharer-id};{sharer-ns}</td>
</tr>
</tbody>
</table>

where \{id\} is the unique identifier of the metadata set and \{ns\} is the namespace to which the metadata set belongs while \{owner-id\} and \{owner-ns\} are the identifier and namespace of the super-set to which the metadata set belongs.

C.8.2 XML Representation

```
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:metadata-set ims:identifier="ms1" ims:namespace="http://ims.dei.unipd.it/"
ims:name="set1", ims:description="metadata set 1",
ims:scope="PUBLIC", ims:created="2012-08-02T13:50:29.143+02:00",
ims:last-modified="2012-08-02T13:50:29.143+02:00">
<ims:supersets>
<ims:metadata-set ims:identifier="superset-1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:metadata-set ims:identifier="superset-2"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:supersets>
</ims:metadata-set>
</ims:direct>
```

C.8.3 JSON Representation

```
{
   "direct":{
      "metadata-set":{
         "identifier":"ms1",
         "namespace":"http://ims.dei.unipd.it/",
         "name":"set1",
         "description":"metadata set 1",
         "scope":"PUBLIC",
         "created":"2012-08-02T13:50:29.143+02:00",
         "last-modified":"2012-08-02T13:50:29.143+02:00",
         "supersets":[
            {
               "metadata-set":{
                  "identifier":"superset-1",
                  "namespace":"http://ims.dei.unipd.it/"
               }
            }
         ]
      }
   }
```

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C.9 Metadata Resource

C.9.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_METADATA</td>
<td>POST</td>
<td>/metadata</td>
</tr>
<tr>
<td>READ_METADATA</td>
<td>GET</td>
<td>/metadata/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_METADATA</td>
<td>PUT</td>
<td>/metadata/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_METADATA</td>
<td>DELETE</td>
<td>/metadata/{id};{ns}</td>
</tr>
<tr>
<td>ADD_METADATA_TO_METADATA_SET</td>
<td>GET, PUT, POST</td>
<td>/metadata/{id};{ns}/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>REMOVE_METADATA_FROM_METADATA_SET</td>
<td>DELETE</td>
<td>/metadata/{id};{ns}/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>LIST_METADATA_BELONGING_TO_METADATA_SET</td>
<td>GET</td>
<td>/metadata/member/{owner-id};{owner-ns}</td>
</tr>
<tr>
<td>LIST_METADATA</td>
<td>GET</td>
<td>/metadata</td>
</tr>
<tr>
<td>LIST_METADATA_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/metadata/{id};{ns}/provenance</td>
</tr>
<tr>
<td>SHARE_METADATA</td>
<td>GET, POST, PUT</td>
<td>/metadata/{id}/share/{sharer-id};{sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>UNSHARE_METADATA</td>
<td>DELETE</td>
<td>/metadata/{id}/share/{sharer-id};{sharer-ns}</td>
</tr>
</tbody>
</table>

Table 11: API for accessing the metadata resource.

where {id} is the unique identifier of the metadata set and {ns} is the namespace to which the metadata set belongs while {owner-id} and {owner-ns} are the identifier and namespace of the metadata set to which the metadata belongs.

C.9.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:metadata xmlns:dc="http://purl.org/dc/elements/1.1/"
 xmlns:dmy="http://www.dummy.org/"
 xmlns:identifier="md1" xmlns:namespace="http://ims.dei.unipd.it/"
 xmlns:language="eng" xmlns:scope="PUBLIC"
 xmlns:created="2012-08-02T14:04:33.995+02:00"
 xmlns:last-modified="2012-08-02T14:04:33.995+02:00"
 dc:subject="a subject attribute"
 dc:contributor="a contributor attribute">
<ims:metadata-sets>
<ims:metadata-set ims:identifier="metadata-set-1"
 ims:namespace="http://ims.dei.unipd.it/"/>
<ims:metadata-set ims:identifier="metadata-set-2"
 ims:namespace="http://ims.dei.unipd.it/"/>
</ims:metadata-sets>
<ims:fields>
<dc:type>
a type field
</dc:type>
<dc:type>
another type field
</dc:type>
<dc:type>
a type field
</dc:type>
<dc:type>
another type field
</dc:type>
<dc:identifier>
an identifier field
</dc:identifier>
<dc:coverage>
a coverage field
</dc:coverage>
<dc:title>
a title field
</dc:title>
<dc:title>
another title field
</dc:title>
```
C.9.3 JSON Representation

```json
{
  "direct": {
    "metadata": {
      "identifier": "md1",
      "namespace": "http://ims.dei.unipd.it/",
      "language": "aar",
      "created": "2012-08-02T14:04:33.995+02:00",
      "last-modified": "2012-08-02T14:04:33.995+02:00",
      "scope": "PUBLIC",
      "schemas": [
        { "dc": "http://purl.org/dc/elements/1.1/"
        },
        { "dmy": "http://www.dummy.org/"
        }
      ],
      "attributes": [
        { "subject": {
          "schema": "dc",
          "value": "a subject attribute"
        }
        },
        { "contributor": {
          "schema": "dc",
          "value": "a contributor attribute"
        }
        }
      ]
    }
  }
}
```
"metadata-sets": [
  "metadata-set": {
    "identifier": "metadata-set-1",
    "namespace": "http://ims.dei.unipd.it/"
  },
  "metadata-set": {
    "identifier": "metadata-set-2",
    "namespace": "http://ims.dei.unipd.it/"
  }
], "fields": [
  "type": {
    "schema": "dc",
    "value": "a type field"
  },
  "type": {
    "schema": "dc",
    "value": "another type field"
  },
  "type": {
    "schema": "dc",
    "value": "a type field"
  },
  "type": {
    "schema": "dc",
    "value": "another type field"
  },
  "identifier": {
    "schema": "dc",
    "value": "an identifier field"
  },
  "coverage": {
    "schema": "dc",
    "value": "a coverage field"
  },
  "title": {
    "schema": "dc",
    "value": "a title field"
  }
]
D3.5: Final Prototype of the Evaluation Infrastructure

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C.10 Search Resource

C.10.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEARCH</td>
<td>POST</td>
<td>/search</td>
</tr>
<tr>
<td>SEARCH</td>
<td>GET</td>
<td>/search?query={query}</td>
</tr>
<tr>
<td>SEARCH</td>
<td>GET</td>
<td>/search/{query}</td>
</tr>
</tbody>
</table>

Table 12: API for accessing the search resource.

where \{query\} is the query expressed using the query language discussed in Section D. In the GET version you need to URI encode the \{query\} parameter while in the POST version you send the query as body of the HTTP entity.

The next two sections show an example of the representation of the results.

C.10.2 XML Representation
C.10.3 JSON Representation

```json
{
    "direct":{
        "result":{
            "identifier":"dea70afa-9897-4acc-a96c-4e70cddf256e",
            "created":"2012-08-02T10:26:48.482+02:00",
            "size":3,
            "query":{
                "identifier":"63a49b47-74a4-4eab-b24d-e77d1ab68102",
                "created":"2012-08-02T10:26:48.482+02:00",
                "cql":"ichi.namespace.created > 1970-01-01",
                "resource-class":"it.unipd.dei.ims ici.resource.Namespace",
                "items":[
                    {
                        "item":{
                            "identifier":"3a8dd857-ca03-437f-869b-711a0839f0d2",
                            "rank":0,
                            "score":1.0
                        }
                    },
                    {
                        "item":{
                            "identifier":"e98045ff-fabf-499b-97e8-dc5f0eeabfd5",
                            "rank":1,
                            "score":0.9
                        }
                    },
                    {
                        "item":{
                            "identifier":"f97a5456-ccfe-4523-aec3-67bc3c9f9b71",
                            "rank":2,
                        }
                    }
                ]
            }
        }
    }
}
```
C.11 List Resource

C.11.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEARCH POST</td>
<td>POST</td>
<td>/list</td>
</tr>
<tr>
<td>SEARCH GET</td>
<td>GET</td>
<td>/list?query={query}</td>
</tr>
<tr>
<td>SEARCH GET</td>
<td>GET</td>
<td>/list/{query}</td>
</tr>
</tbody>
</table>

Table 13: API for accessing the list resource.

where \{query\} is the query expressed using the query language discussed in Section D. In the GET version you need to URI encode the \{query\} parameter while in the POST version you send the query as body of the HTTP entity.

The list resource works the same way as the search resource but, instead of returning a list of result items together with their score and rank, it directly returns the resources which correspond to the query.

C.12 Application Resource

Identifies a running software Application which can be evaluated by an evaluation activity such as a Guerrilla Experiment.

C.12.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_APPLICATION</td>
<td>POST</td>
<td>/application</td>
</tr>
<tr>
<td>READ_APPLICATION</td>
<td>GET</td>
<td>/application/{id}</td>
</tr>
<tr>
<td>UPDATE_APPLICATION</td>
<td>PUT</td>
<td>/application/{id}</td>
</tr>
<tr>
<td>DELETE_APPLICATION</td>
<td>DELETE</td>
<td>/application/{id}</td>
</tr>
<tr>
<td>LIST_APPLICATIONS</td>
<td>GET</td>
<td>/application</td>
</tr>
<tr>
<td>LIST_APPLICATIONS_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/application/{id}/provenance</td>
</tr>
<tr>
<td>ADD_COMPONENT_TO_APPLICATION</td>
<td>POST</td>
<td>/application/{id}/component/{id}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>REMOVE_COMPONENT_FROM_APPLICATION</td>
<td>DELETE</td>
<td>/application/{id}/component/{id}</td>
</tr>
<tr>
<td>LIST_COMPONENT_FROM_APPLICATION</td>
<td>GET</td>
<td>/application/{id}/component</td>
</tr>
<tr>
<td>ADD_CONFIGURATION_TO_APPLICATION</td>
<td>POST</td>
<td>/application/{id}/configuration/{id}</td>
</tr>
<tr>
<td>REMOVE_CONFIGURATION_FROM_APPLICATION</td>
<td>DELETE</td>
<td>/application/{id}/configuration</td>
</tr>
<tr>
<td>READ_CONFIGURATION_FROM_APPLICATION</td>
<td>GET</td>
<td>/application/{id}/configuration</td>
</tr>
<tr>
<td>ADD_SYSTEM_TO_APPLICATION</td>
<td>POST</td>
<td>/application/{id}/system/{id}</td>
</tr>
<tr>
<td>REMOVE_SYSTEM_FROM_APPLICATION</td>
<td>DELETE</td>
<td>/application/{id}/system/{id}</td>
</tr>
<tr>
<td>LIST_SYSTEM_FROM_APPLICATION</td>
<td>GET</td>
<td>/application/{id}/system</td>
</tr>
<tr>
<td>SHARE_APPLICATION</td>
<td>GET, POST, PUT</td>
<td>/application/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_APPLICATION</td>
<td>DELETE</td>
<td>/application/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
</tbody>
</table>

Table 14: API for accessing the application resource.

where {id} is the unique identifier of the application.

The next two sections show an example of the representation of the results.

C.12.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
  <ims:application>
    <ims:identifier>app-1</ims:identifier>
    <ims:description>Description of app 1</ims:description>
    <ims:name>Name of app 1</ims:name>
    <ims:scope>SHARED</ims:scope>
    <ims:created>2012-09-13T17:25:37.378+02:00</ims:created>
    <ims:modified>2012-09-13T17:25:37.378+02:00</ims:modified>
    <ims:owner/>
  </ims:application>
</ims:direct>
```
<ims:user
  ims:identifier="user-1"
  ims:namespace="http://ims.dei.unipd.it/" />
</ims:owner>
<ims:shareings>
  <ims:sharing>
    <ims:group
      ims:identifier="group-1"
      ims:namespace="http://ims.dei.unipd.it/" />
    <ims:access-permission>DENIED</ims:access-permission>
  </ims:sharing>
  <ims:sharing>
    <ims:group
      ims:identifier="group-2"
      ims:namespace="http://ims.dei.unipd.it/" />
    <ims:access-permission>READ_ONLY</ims:access-permission>
  </ims:sharing>
  <ims:sharing>
    <ims:group
      ims:identifier="group-3"
      ims:namespace="http://ims.dei.unipd.it/" />
    <ims:access-permission>READ_WRITE</ims:access-permission>
  </ims:sharing>
</ims:shareings>
<ims:links>
  <ims:link>
    <ims:metadata
      ims:identifier="md-1"
      ims:namespace="http://ims.dei.unipd.it/" />
    <ims:relation>
      <ims:concept
        ims:identifier="isPartOf"
        ims:namespace="http://ims.dei.unipd.it/" />
      <ims:application ims:identifier="app-1" />
    </ims:link>
    <ims:link>
      <ims:metadata
        ims:identifier="md-2"
        ims:namespace="http://ims.dei.unipd.it/" />
      <ims:relation>
        <ims:concept
          ims:identifier="isCopyrightOf"
          ims:namespace="http://ims.dei.unipd.it/" />
        <ims:application ims:identifier="app-1" />
      </ims:link>
      <ims:link>
        <ims:metadata
          ims:identifier="md-3"
          ims:namespace="http://ims.dei.unipd.it/" />
        <ims:relation>
          <ims:concept
            ims:identifier="isDescriptionOf"
            ims:namespace="http://ims.dei.unipd.it/" />
          <ims:application ims:identifier="app-1" />
        </ims:link>
        <ims:links
          ims:configuration ims:identifier="cnf-1" />
      </ims:link>
    </ims:links>
</ims:configuration>
C.12.3 JSON Representation

```json
{
  "direct":{
    "application":{
      "identifier":"app-1",
      "name":"Name of app 1",
      "description":"Description of app 1",
      "scope":"SHARED",
      "created":"2012-09-14T10:04:05.310+02:00",
      "last-modified":"2012-09-14T10:04:05.310+02:00",
      "owner":{
        "user":{
          "identifier":"user-1",
          "namespace":"http://ims.dei.unipd.it/
        }
      },
      "sharings":[
        "sharing":{
          "group":{
            "identifier":"group-1",
            "namespace":"http://ims.dei.unipd.it/
          },
          "access-permission":"DENIED"
        },
        "sharing":{
          "group":{
            "identifier":"group-2",
            "namespace":"http://ims.dei.unipd.it/
          },
          "access-permission":"READ_ONLY"
        },
        "sharing":{
          "group":{
            "identifier":"group-3",
            "namespace":"http://ims.dei.unipd.it/
          },
          "access-permission":"READ_WRITE"
        }
      ],
      "links":{
        "link":{
          "metadata":{
            "identifier":"md-1",
            "namespace":"http://ims.dei.unipd.it/
          },
          "relation":{
            "concept":{
              "identifier":"isPartOf",
              "namespace":"http://ims.dei.unipd.it/
            }
          }
        }
      }
    }
  }
}
```
### C.13 Component Resource

Represents a building block of a running System.

#### C.13.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_COMPONENT</td>
<td>POST</td>
<td>/component</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>READ_COMPONENT</td>
<td>GET</td>
<td>/component/{id}</td>
</tr>
<tr>
<td>UPDATE_COMPONENT</td>
<td>PUT</td>
<td>/component/{id}</td>
</tr>
<tr>
<td>DELETE_COMPONENT</td>
<td>DELETE</td>
<td>/component/{id}</td>
</tr>
<tr>
<td>LIST_COMPONENTS</td>
<td>GET</td>
<td>/component</td>
</tr>
<tr>
<td>LIST_COMPONENTS_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/component/{id}/provenance</td>
</tr>
<tr>
<td>ADD_CONFIGURATION_TO_COMPONENT</td>
<td>POST</td>
<td>/component/{id}/configuration</td>
</tr>
<tr>
<td>REMOVE_CONFIGURATION_FROM_COMPONENT</td>
<td>DELETE</td>
<td>/component/{id}/configuration</td>
</tr>
<tr>
<td>READ_CONFIGURATION_FROM_COMPONENT</td>
<td>GET</td>
<td>/component/{id}/configuration</td>
</tr>
<tr>
<td>SHARE_COMPONENT</td>
<td>GET, POST,</td>
<td>/component/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_COMPONENT</td>
<td>DELETE</td>
<td>/component/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
</tbody>
</table>

Table 15: API for accessing the component resource.

where \{id\} is the unique identifier of the component.

The next two sections show an example of the representation of the results.

**C.13.2 XML Representation**

```xml
<ims:component
ims:identifier="cmp-1"
ims:created="2012-09-13T17:32:16.787+02:00"
ims:last-modified="2012-09-13T17:32:16.787+02:00"
ims:name="Name of component"
ims:description="Description of the component"
ims:scope="SHARED">
<ims:owner>
<ims:user
ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:owner>
</ims:component>
```
<ims:sharing>
  <ims:group>
    <ims:identifier>group-1</ims:identifier>
    <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    <ims:access-permission>DENIED</ims:access-permission>
  </ims:group>
</ims:sharing>

<ims:sharing>
  <ims:group>
    <ims:identifier>group-2</ims:identifier>
    <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    <ims:access-permission>READ_ONLY</ims:access-permission>
  </ims:group>
</ims:sharing>

<ims:sharing>
  <ims:group>
    <ims:identifier>group-3</ims:identifier>
    <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    <ims:access-permission>READ_WRITE</ims:access-permission>
  </ims:group>
</ims:sharing>

<ims:links>
  <ims:link>
    <ims:metadata>
      <ims:identifier>md-1</ims:identifier>
      <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    </ims:metadata>
    <ims:relation>
      <ims:concept>
        <ims:identifier>isDescriptionOf</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:concept>
    </ims:relation>
    <ims:component ims:identifier="cmp-1"/>
  </ims:link>
  <ims:link>
    <ims:metadata>
      <ims:identifier>md-2</ims:identifier>
      <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    </ims:metadata>
    <ims:relation>
      <ims:concept>
        <ims:identifier>isCopyrightOf</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:concept>
    </ims:relation>
    <ims:component ims:identifier="cmp-1"/>
  </ims:link>
  <ims:link>
    <ims:metadata>
      <ims:identifier>md-3</ims:identifier>
      <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    </ims:metadata>
    <ims:relation>
      <ims:concept>
        <ims:identifier>isAdministrationOf</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:concept>
    </ims:relation>
    <ims:component ims:identifier="cmp-1"/>
  </ims:link>
</ims:links>

<ims:concept ims:identifier="cnc-1" ims:namespace="http://ims.dei.unipd.it/"/>
<ims:configuration ims:identifier="cnf-1"/>
</ims:component>

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C.13.3 JSON Representation

```json
1 { 2     "direct":{ 3         "component":{ 4             "identifier":"cmp -1", 5             "name":"Name of component", 6             "description":"Description of the component", 7             "scope":"SHARED", 8             "created":"2012-09-13T17:32:16.787+02:00", 9             "last - modified":"2012-09-13T17:32:16.787+02:00", 10             "owner":{ 11                 "identifier":"user -1", 12                 "namespace":"http://ims.dei.unipd.it/" 13             } 14         }, 15         "sharings":[
16             { 17                 "sharing":{
18                     "group":{
19                         "identifier":"group -1", 20                         "namespace":"http://ims.dei.unipd.it/" 21                     }, 22                     "access - permission":"DENIED" 23                 } 24             },
25             { 26                 "sharing":{
27                     "group":{
28                         "identifier":"group -2", 29                         "namespace":"http://ims.dei.unipd.it/" 30                     }, 31                     "access - permission":"READONLY" 32                 } 33             },
34             { 35                 "sharing":{
36                     "group":{
37                         "identifier":"group -3", 38                         "namespace":"http://ims.dei.unipd.it/" 39                     }, 40                     "access - permission":"READ_WRITE" 41                 } 42             } 43         }, 44         "links":[
45             { 46                 "link":{
47                     "metadata":{
48                         "identifier":"md -1", 49                         "namespace":"http://ims.dei.unipd.it/" 50                     }, 51                     "relation":{
52                         "concept":{
53                             "identifier":"isDescriptionOf", 54                             "namespace":"http://ims.dei.unipd.it/" 55                         } 56                     } 57                 }, 58                 "component":{
```

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
C.14 Configuration Resource

Identifies the configuration of a component, a system or an application under evaluation.

C.14.1 API
Table 16: API for accessing the configuration resource.

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_CONFIGURATION</td>
<td>POST</td>
<td>/configuration</td>
</tr>
<tr>
<td>READ_CONFIGURATION</td>
<td>GET</td>
<td>/configuration/{id}</td>
</tr>
<tr>
<td>UPDATE_CONFIGURATION</td>
<td>PUT</td>
<td>/configuration/{id}</td>
</tr>
<tr>
<td>DELETE_CONFIGURATION</td>
<td>DELETE</td>
<td>/configuration/{id}</td>
</tr>
<tr>
<td>LIST_CONFIGURATIONS</td>
<td>GET</td>
<td>/configuration</td>
</tr>
<tr>
<td>LIST_CONFIGURATION_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/configuration/{id}/provenance</td>
</tr>
</tbody>
</table>

where {id} is the unique identifier of the configuration.

The next two sections show an example of the representation of the results.

C.14.2 XML Representation

```xml
<ims:direct
xmlns:ims="http://ims.dei.unipd.it/"
xmns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:configuration
ims:identifier="c1"
ims:description="description of the configuration"
ims:created="2012-09-13T17:59:35.603+02:00"
ims:last-modified="2012-09-13T17:59:35.603+02:00">
<ims:parameters>
<ims:parameter>
<ims:concept
ims:identifier="parameterA"
ims:namespace="http://direct.dei.unipd.it/"/>
<ims:value>value A</ims:value>
</ims:parameter>
<ims:parameter>
<ims:concept
ims:identifier="parameterB"
ims:namespace="http://direct.dei.unipd.it/"/>
<ims:value>value B</ims:value>
</ims:parameter>
<ims:parameter>
<ims:concept
ims:identifier="parameterC"
ims:namespace="http://direct.dei.unipd.it/"/>
<ims:value>value C</ims:value>
</ims:parameter>
</ims:parameters>
</ims:configuration>
</ims:direct>
```

C.14.3 JSON Representation

```json
{

```
C.15 Contribution Resource

Refers to a paper (e.g., a conference paper, a working note, a technical report, a journal paper) which has been published or that is publicly available and that its related.

C.15.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_CONTRIBUTION</td>
<td>POST</td>
<td>/contribution</td>
</tr>
<tr>
<td>READ_CONTRIBUTION</td>
<td>GET</td>
<td>/contribution/{id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTIONS</td>
<td>GET</td>
<td>/contribution</td>
</tr>
<tr>
<td>UPDATE_CONTRIBUTION</td>
<td>PUT</td>
<td>/contribution/{id}</td>
</tr>
<tr>
<td>DELETE_CONTRIBUTION</td>
<td>DELETE</td>
<td>/contribution/{id}</td>
</tr>
<tr>
<td>READ_CONTRIBUTION_CONTENT</td>
<td>GET, POST</td>
<td>/contribution/{id}/content</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>UPDATE_CONTRIBUTION_CONTENT</td>
<td>PUT</td>
<td>/contribution/{id}/content</td>
</tr>
<tr>
<td>SHARE_CONTRIBUTION_WITH_GROUPS</td>
<td>GET, POST, PUT</td>
<td>/contribution/{id}/share/{id};{ns}/permission/{id}</td>
</tr>
<tr>
<td>UNSHARE_CONTRIBUTION_WITH_GROUPS</td>
<td>DELETE</td>
<td>/contribution/{id}/share/{id};{ns}</td>
</tr>
<tr>
<td>ADD_METADATA_TO_CONTRIBUTION</td>
<td>GET, POST, PUT</td>
<td>/contribution/{id}/metadata/{id};{ns}/relation/{id};{ns}/score/{value}</td>
</tr>
<tr>
<td>REMOVE_METADATA_FROM_CONTRIBUTION</td>
<td>DELETE</td>
<td>/contribution/{id}/metadata/{id};{ns}</td>
</tr>
<tr>
<td>LIST_METADATARELATED_TO_CONTRIBUTION</td>
<td>GET</td>
<td>/contribution/{id}/metadata</td>
</tr>
<tr>
<td>ADD_MEASURE_TO_CONTRIBUTION</td>
<td>POST, PUT</td>
<td>/contribution/{id}/measure</td>
</tr>
<tr>
<td>READ_MEASURE_OF_CONTRIBUTION</td>
<td>GET</td>
<td>/contribution/measure/{id}</td>
</tr>
<tr>
<td>REMOVE_MEASURE_FROM_CONTRIBUTION</td>
<td>GET</td>
<td>/contribution/measure/{id}</td>
</tr>
<tr>
<td>LIST_MEASURE_OF_CONTRIBUTION</td>
<td>GET</td>
<td>/contribution/{id}/measure</td>
</tr>
<tr>
<td>RELATE_CONTRIBUTION_TO_CONTRIBUTION</td>
<td>POST, PUT</td>
<td>/contribution/{id}/link/{id}/relation/{id};{ns}/score/{value}/frequency/{value}</td>
</tr>
<tr>
<td>UNRELATE_CONTRIBUTION_FROM_CONTRIBUTION</td>
<td>DELETE</td>
<td>/contribution/{id}/link/{id}</td>
</tr>
<tr>
<td>LISTRELATEDCONTRIBUTIONS</td>
<td>GET</td>
<td>/contribution/{id}/link</td>
</tr>
<tr>
<td>ADDFEATURE_TO_CONTRIBUTION</td>
<td>GET, POST, PUT</td>
<td>/contribution/{id}/feature/{id};{ns}/score/{value}</td>
</tr>
<tr>
<td>REMOVEFEATURE_FROM_CONTRIBUTION</td>
<td>DELETE</td>
<td>/contribution/{id}/feature/{id};{ns}</td>
</tr>
<tr>
<td>LISTFEATUREDCONTRIBUTIONS</td>
<td>GET</td>
<td>/contribution/feature/{id};{ns}</td>
</tr>
</tbody>
</table>
The next two sections show an example of the representation of the results.

### C.15.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
xmlns:ims="http://ims.dei.unipd.it/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:contribution
ims:identifier="ctb-1"
ims:created="2012-09-13T18:00:44.675+02:00"
ims:last-modified="2012-09-13T18:00:44.675+02:00"
ims:title="title of ctb 1"
ims:year="2012"
ims:media-type="application/xml"
ims:language="ita">
<ims:authors>
<ims:user
ims:identifier="u1"
ims:namespace="http://ims.dei.unipd.it/"/>
<ims:user
ims:identifier="u2"
ims:namespace="http://ims.dei.unipd.it/"/>
<ims:user
ims:identifier="u3"
ims:namespace="http://ims.dei.unipd.it/"/>
</ims:authors>
<ims:links>
<ims:link
ims:metadata
ims:identifier="md-1"
ims:namespace="http://ims.dei.unipd.it/"/>
<ims:relation>
<ims:concept
ims:identifier="isDescriptionOf"
ims:namespace="http://ims.dei.unipd.it/"/>
</ims:relation>
</ims:links>
</ims:contribution>
</ims:direct>
```
C.15.3 JSON Representation

```json
{
  "direct":{
    "contribution":{
      "identifier":"ctb-1",
      "created":"2012-09-13T18:00:44.675+02:00",
      "last-modified":"2012-09-13T18:00:44.675+02:00",
      "title":"title of ctb 1",
      "year":"2012",
      "authors":[
        {
          "user":{
            "identifier":"u1",
            "namespace":"http://ims.dei.unipd.it/"
          }
        },
        {
          "user":{
            "identifier":"u2",
            "namespace":"http://ims.dei.unipd.it/"
          }
        },
        {
          "user":{
            "identifier":"u3",
            "namespace":"http://ims.dei.unipd.it/"
          }
        }
      ],
      "media-type":"application/xml",
      "language":"ita",
      "content":{
        "content":"Flexible and Independent Graphical Application"
      },
      "links":{
        "link":{
          "metadata":{
            "identifier":"md-1",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "relation":{
            "concept":{
              "identifier":"isDescriptionOf",
              "namespace":"http://ims.dei.unipd.it/"
            },
            "contribution":{
              "identifier":"ctb-1"
            }
          }
        }
      }
    }
  }
}
```
D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
C.16 Corpus Resource

Represents a set of informative units, which allows us to perform a series of investigations in a research area.

C.16.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_CORPUS</td>
<td>POST</td>
<td>/corpus</td>
</tr>
<tr>
<td>READ_CORPUS</td>
<td>GET</td>
<td>/corpus/{id}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>UPDATE_CORPUS</td>
<td>PUT</td>
<td>/corpus/{id}</td>
</tr>
<tr>
<td>DELETE_CORPUS</td>
<td>DELETE</td>
<td>/corpus/{id}</td>
</tr>
<tr>
<td>LIST_CORPORA</td>
<td>GET</td>
<td>/corpus</td>
</tr>
<tr>
<td>CREATE_CORPUS_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/corpus/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_CORPUS_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/corpus/provenance/{year}</td>
</tr>
<tr>
<td>LIST_CORPUS_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/corpus/{id}/provenance</td>
</tr>
<tr>
<td>ADD_INFORMATION_UNIT_TO_CORPUS</td>
<td>POST</td>
<td>/corpus/{id}/information-unit/{id}</td>
</tr>
<tr>
<td>REMOVE_INFORMATION_UNIT_FROM_CORPUS</td>
<td>DELETE</td>
<td>/corpus/{id}/information-unit/{id}</td>
</tr>
<tr>
<td>LIST_INFORMATION_UNIT_FROM_CORPUS</td>
<td>GET</td>
<td>/corpus/{id}/information-unit</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_CORPUS</td>
<td>POST</td>
<td>/corpus/{id}/contribution/{id}</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_CORPUS</td>
<td>DELETE</td>
<td>/corpus/{id}/contribution/{id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_CORPUS</td>
<td>GET</td>
<td>/corpus/{id}/contribution</td>
</tr>
<tr>
<td>SHARE_CORPUS</td>
<td>GET, POST,</td>
<td>/corpus/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_CORPUS</td>
<td>DELETE</td>
<td>/corpus/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_CORPUS</td>
<td>GET, POST, PUT</td>
<td>/corpus/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_CORPUS</td>
<td>GET, POST, PUT</td>
<td>/corpus/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_CORPUS</td>
<td>DELETE</td>
<td>/corpus/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_CORPUS</td>
<td>DELETE</td>
<td>/corpus/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
</tbody>
</table>

Table 18: API for accessing the corpus resource.

where \( \{id\} \) is the unique identifier of the corpus.

The next two sections show an example of the representation of the results.

C.16.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:corpus
ims:identifier="c1"
ims:description="Description of corpus, e.g. Wall Street Journal, 1987"
ims:scope="SHARED"
ims:created="2012-09-13T18:04:03T+02:00"
ims:last-modified="2012-09-13T18:04:03T+02:00">
<ims:owner>
<ims:user
ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:owner>
<ims:sharings>
<ims:sharing>
<ims:group
ims:identifier="group-1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:sharing>
</ims:sharings>
</ims:corpus>
</ims:direct>
```
< ims : access - permission > DENIED </ ims : access - permission >
</ ims : sharing >
< ims : sharing >
< ims : group >
 ims : identifier = " group -2 "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
< ims : access - permission > READ ONLY </ ims : access - permission >
</ ims : sharing >
< ims : sharing >
< ims : group >
 ims : identifier = " group -3 "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
< ims : access - permission > READ_WRITE </ ims : access - permission >
</ ims : sharing >
</ ims : sharings >
< ims : links >
< ims : link >
< ims : metadata >
 ims : identifier = " md -1 "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
< ims : relation >
 ims : identifier = " isDescriptionOf "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
</ ims : relation >
< ims : corpus >
 ims : identifier = " c1 " />
</ ims : link >
< ims : link >
< ims : metadata >
 ims : identifier = " md -2 "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
< ims : relation >
 ims : identifier = " isCopyrightOf "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
</ ims : relation >
< ims : corpus >
 ims : identifier = " c1 " />
</ ims : link >
< ims : link >
< ims : metadata >
 ims : identifier = " md -3 "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
< ims : relation >
 ims : identifier = " isAdministrationOf "
 ims : namespace = " http :// ims . dei . unipd .it/ " />
</ ims : relation >
< ims : corpus >
 ims : identifier = " c1 " />
</ ims : link >
</ ims : links >
< ims : media - types >
< ims : media - type > application/atom+xml; charset=ISO-8859-1 </ ims : media - type >
< ims : media - type > application/json </ ims : media - type >
</ ims : media - types >
< ims : languages >
< ims : language > ita </ ims : language >
< ims : language > eng </ ims : language >
< ims : language > fra </ ims : language >
</ ims : languages >
</ ims : corpus >

D3.5: Final Prototype of the Evaluation Infrastructure
C.16.3 JSON Representation

{  
  "direct":{
    "corpus":{
      "identifier":"c1",
      "description":"Description of corpus, e.g. Wall Street Journal, 1987",
      "scope":"SHARED",
      "created":"2012-09-13T18:02:04.035+02:00",
      "last-modified":"2012-09-13T18:02:04.035+02:00",
      "owner":{
        "user":{
          "identifier":"user-1",
          "namespace":"http://ims.dei.unipd.it/
        }
      },
      "sharings":[
        {
          "sharing":{
            "group":{
              "identifier":"group-1",
              "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"DENIED"
          }
        },
        {
          "sharing":{
            "group":{
              "identifier":"group-2",
              "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"READ_ONLY"
          }
        },
        {
          "sharing":{
            "group":{
              "identifier":"group-3",
              "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"READ_WRITE"
          }
        }
      ],
      "links":{
        "link":{
          "metadata":{
            "identifier":"md-1",
            "namespace":"http://ims.dei.unipd.it/
          },
          "relation":{
            "concept":{
              "identifier":"isDescriptionOf",
              "namespace":"http://ims.dei.unipd.it/
            }
          }
        }
      }
    }
  }
}

--

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
"corpus": {  
  "identifier": "c1"
},
"link": {  
  "metadata": {  
    "identifier": "md-2",
    "namespace": "http://ims.dei.unipd.it/"
  },  
  "relation": {  
    "concept": {  
      "identifier": "isCopyrightOf",
      "namespace": "http://ims.dei.unipd.it/"
    }
  },  
  "corpus": {  
    "identifier": "c1"
  }
},
"link": {  
  "metadata": {  
    "identifier": "md-3",
    "namespace": "http://ims.dei.unipd.it/"
  },  
  "relation": {  
    "concept": {  
      "identifier": "isAdministrationOf",
      "namespace": "http://ims.dei.unipd.it/"
    }
  },  
  "corpus": {  
    "identifier": "c1"
  }
},
"languages": [  
  {  
    "language": "ita"
  },  
  {  
    "language": "eng"
  },  
  {  
    "language": "fra"
  }
],
"media-types": [  
  {  
    "media-type": "application/atom+xml; charset=ISO-8859-1"
  },  
  {  
    "media-type": "application/json"
  }
]
### C.17 Estimate Resource

Represents the value of a Metric (which is represented by means of a Concept) calculated on some Experiment handled by the infrastructure.

### C.17.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_ESTIMATE</td>
<td>POST</td>
<td>/estimate</td>
</tr>
<tr>
<td>READ_ESTIMATE</td>
<td>GET</td>
<td>/estimate/{id}</td>
</tr>
<tr>
<td>READ_ESTIMATE</td>
<td>GET</td>
<td>/task/{tskid}/topic/{tpcid}/descriptive-statistic/{dsid};{dsns}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
<tr>
<td>READ_ESTIMATE</td>
<td>GET</td>
<td>/run/{runid}/descriptive-statistic/{dsid};{dsns}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
<tr>
<td>UPDATE_ESTIMATE</td>
<td>PUT</td>
<td>/estimate/{id}</td>
</tr>
<tr>
<td>DELETE_ESTIMATE</td>
<td>DELETE</td>
<td>/estimate/{id}</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/topic/{tpcid}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/descriptive-statistic/{dsid};{dsns}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/topic/{tpcid}/descriptive-statistic/{dsid};{dsns}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
</tbody>
</table>
### Table 19: API for accessing the estimate resource.

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/task/{tskid}/topic/{tpcid}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/descriptive-statistic/{dsid};{dsns}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/run/{runid}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/run/{runid}/descriptive-statistic/{dsid};{dsns}/estimate</td>
</tr>
<tr>
<td>LIST_ESTIMATES</td>
<td>GET</td>
<td>/run/{runid}/metric/{mtcid};{mtcns}/estimate</td>
</tr>
<tr>
<td>CREATE_ESTIMATE_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/estimate/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_ESTIMATE_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/estimate/provenance/{year}</td>
</tr>
<tr>
<td>LIST_ESTIMATE_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/estimate/{id}/provenance</td>
</tr>
</tbody>
</table>

where {id} is the unique identifier of the estimate.

The next two sections show an example of the representation of the results.

#### C.17.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
  xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:estimate
    ims:identifier="est-1"
    ims:value="0.1"
    ims:created="2012-09-13T18:04:32.133+02:00"
    ims:last-modified="2012-09-13T18:04:32.133+02:00">
    <ims:concept
      ims:identifier="ds-1"
      ims:namespace="http://ims.dei.unipd.it/"/>
    </ims:concept>
    <ims:concept
      ims:identifier="mtc-1"
      ims:namespace="http://ims.dei.unipd.it/"/>
  </ims:estimate>
</ims:direct>
```
C.17.3 JSON Representation

```json
{
    "direct":{
        "estimate":{
            "identifier":"est-1",
            "created":"2012-09-13T18:04:32.133+02:00",
            "last-modified":"2012-09-13T18:04:32.133+02:00",
            "value":"0.1",
            "descriptive-statistic":{
                "concept":{
                    "identifier":"ds-1",
                    "namespace":"http://ims.dei.unipd.it/"
                }
            },
            "metric":{
                "concept":{
                    "identifier":"mtc-1",
                    "namespace":"http://ims.dei.unipd.it/"
                }
            },
            "run":{
                "identifier":"run-1"
            },
            "task":{
                "identifier":"tsk-1"
            },
            "topic":{
                "identifier":"tpc-1"
            }
        }
    }
}
```

C.18 Evaluation Activity Resource

Represents any type of activity aiming at the evaluation of applications, systems, or methodologies for information access.

C.18.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_EVALUATION-ACTIVITY</td>
<td>POST</td>
<td>/evaluation-activity</td>
</tr>
<tr>
<td>READ_EVALUATION-ACTIVITY</td>
<td>GET</td>
<td>/evaluation-activity/{id};{ns}</td>
</tr>
<tr>
<td>READ_EVALUATION-ACTIVITY</td>
<td>GET</td>
<td>/task/{id}/evaluation-activity</td>
</tr>
<tr>
<td>READ_EVALUATION-ACTIVITY</td>
<td>GET</td>
<td>/track/{id}/evaluation-activity</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>UPDATE_EVALUATION-ACTIVITY</td>
<td>PUT</td>
<td><code>/evaluation-activity/{id};{ns}</code></td>
</tr>
<tr>
<td>DELETE_EVALUATION-ACTIVITY</td>
<td>DELETE</td>
<td><code>/evaluation-activity/{id};{ns}</code></td>
</tr>
<tr>
<td>LIST_EVALUATION-ACTIVITIES</td>
<td>GET</td>
<td><code>/evaluation-activity</code></td>
</tr>
<tr>
<td>CREATE_EVALUATION_ACTIVITY_PROVENANCE_PARTITION</td>
<td>GET</td>
<td><code>/evaluation-activity/provenance/{year}</code></td>
</tr>
<tr>
<td>DETACH_EVALUATION_ACTIVITY_PROVENANCE_PARTITION</td>
<td>GET</td>
<td><code>/evaluation-activity/provenance/{year}</code></td>
</tr>
<tr>
<td>LIST_EVALUATION_ACTIVITY_PROVENANCE_EVENTS</td>
<td>GET</td>
<td><code>/evaluation-activity/{id};{ns}/provenance</code></td>
</tr>
<tr>
<td>ADD_TRACK_TO_EVALUATION_ACTIVITY</td>
<td>GET, PUT, POST</td>
<td><code>/evaluation-activity/{id};{ns}/track/{id}</code></td>
</tr>
<tr>
<td>REMOVE_TRACK_FROM_EVALUATION_ACTIVITY</td>
<td>DELETE</td>
<td><code>/evaluation-activity/{id};{ns}/track/{id}</code></td>
</tr>
<tr>
<td>ADD_TASK_TO_EVALUATION_ACTIVITY</td>
<td>POST</td>
<td><code>/evaluation-activity/{id};{ns}/task/{id}</code></td>
</tr>
<tr>
<td>REMOVE_TASK_FROM_EVALUATION_ACTIVITY</td>
<td>DELETE</td>
<td><code>/evaluation-activity/{id};{ns}/task/{id}</code></td>
</tr>
<tr>
<td>SHARE_EVALUATION_ACTIVITY</td>
<td>GET, POST, PUT</td>
<td><code>/evaluation-activity/{id};{ns}/share/ {sharer-id}; {sharer-ns}/ permission/ {access-permission}</code></td>
</tr>
<tr>
<td>UNSHARE_EVALUATION_ACTIVITY</td>
<td>DELETE</td>
<td><code>/evaluation-activity/{id};{ns}/share/ {sharer-id}; {sharer-ns}</code></td>
</tr>
<tr>
<td>RELATE_METADATA_TO_EVALUATION_ACTIVITY</td>
<td>GET, POST, PUT</td>
<td><code>/evaluation-activity/{source-id}; {source-ns}/ link/{target-id}; {target-ns}/ relation/ {relation-id}; {relation-ns}</code></td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_EVALUATION_ACTIVITY</td>
<td>GET, POST, PUT</td>
<td>/evaluation-activity/{source-id}; {source-ns}/link/{target-id}; {target-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_EVALUATION_ACTIVITY</td>
<td>DELETE</td>
<td>/evaluation-activity/{source-id}; {source-ns}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_EVALUATION_ACTIVITY</td>
<td>DELETE</td>
<td>/evaluation-activity/{source-id}; {source-ns}/link/{target-id}; {target-ns}</td>
</tr>
</tbody>
</table>

Table 20: API for accessing the evaluation-activity resource.

where \{id\} is the unique identifier of the evaluation-activity and \{ns\} is the namespace to which the evaluation-activity belongs.

The next two sections show an example of the representation of the results.

C.18.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
  xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:evaluation-activity
    ims:identifier="ea-1"
    ims:namespace="http://ims.dei.unipd.it/"
    ims:name="Name of evaluation activity 1"
    ims:description="Description of evaluation activity, e.g. CLEF 2012"
    ims:status="AVAILABLE"
    ims:scope="SHARED"
    ims:created="2012-09-13T18:12:34.954+02:00"
    ims:last-modified="2012-09-13T18:12:34.954+02:00">
    <ims:owner>
      <ims:user
        ims:identifier="user-1"
        ims:namespace="http://ims.dei.unipd.it/"/>
    </ims:owner>
    <ims:sharings>
```

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
C.18.3 JSON Representation

```json
{
  "ims:sharing": {
    "ims:group": {
      "ims:identifier": "group-1",
      "ims:namespace": "http://ims.dei.unipd.it/"
    },
    "ims:access-permission": "DENIED"
  },
  "ims:sharing": {
    "ims:group": {
      "ims:identifier": "group-2",
      "ims:namespace": "http://ims.dei.unipd.it/"
    },
    "ims:access-permission": "READ_ONLY"
  },
  "ims:sharing": {
    "ims:group": {
      "ims:identifier": "group-3",
      "ims:namespace": "http://ims.dei.unipd.it/"
    },
    "ims:access-permission": "READ_WRITE"
  }
}
```

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
"direct":{
  "evaluation-activity":{
    "identifier":"ea-1",
    "namespace":"http://ims.dei.unipd.it/",
    "name":"Name of evaluation activity 1",
    "description":"Description of evaluation activity, e.g. CLEF 2012",
    "status":"AVAILABLE",
    "scope":"SHARED",
    "created":"2012-09-13T18:34:954+02:00",
    "last-modified":"2012-09-13T18:34:954+02:00",
    "owner":{
      "user":{
        "identifier":"user-1",
        "namespace":"http://ims.dei.unipd.it/
      },
      "sharings":[
        {"sharing":{
          "group":{
            "identifier":"group-1",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "access-permission":"DENIED"
        },
        {"sharing":{
          "group":{
            "identifier":"group-2",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "access-permission":"READ_ONLY"
        },
        {"sharing":{
          "group":{
            "identifier":"group-3",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "access-permission":"READ_WRITE"
        }
      ],
      "links":{
        "link":{
          "metadata":{
            "identifier":"md-1",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "relation":{
            "concept":{
              "identifier":"isDescriptionOf",
              "namespace":"http://ims.dei.unipd.it/"
            }
          }
        },
        "evaluation-activity":{
          "identifier":"ea-1"
C.19 Campaign Resource

Deals with the different aspects of an evaluation forum, such as the different campaigns and the different editions, the tracks along which the campaign is organized and the tasks in which each track is divided. A peculiar characteristic of a Campaign is to be a public and shared activity that may be undertaken by academic, commercial and governmental groups that are interested in the activity organized and structured by a third-party body. The concept of campaign derives from the traditional IR view of an evaluation activity on which basis the major international evaluation initiatives (e.g. TREC, CLEF and NTCIR) rely.

C.19.1 API
<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_CAMPAIGN</td>
<td>POST</td>
<td>/campaign</td>
</tr>
<tr>
<td>READ_CAMPAIGN</td>
<td>GET</td>
<td>/campaign/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_CAMPAIGN</td>
<td>PUT</td>
<td>/campaign/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_CAMPAIGN</td>
<td>DELETE</td>
<td>/campaign/{id};{ns}</td>
</tr>
<tr>
<td>LIST_CAMPAIGNS</td>
<td>GET</td>
<td>/campaign</td>
</tr>
<tr>
<td>LIST_CAMPAIGN_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/campaign/{id};{ns}/provenance</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_CAMPAIGN</td>
<td>POST</td>
<td>/campaign/{id};{ns}/contribution/{id}</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_CAMPAIGN</td>
<td>DELETE</td>
<td>/campaign/{id};{ns}/contribution/{id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_CAMPAIGN</td>
<td>GET</td>
<td>/campaign/{id};{ns}/contribution/{id}</td>
</tr>
<tr>
<td>ADD_TASK_TO_CAMPAIGN</td>
<td>POST</td>
<td>/campaign/{id};{ns}/task/{id}</td>
</tr>
<tr>
<td>REMOVE_TASK_FROM_CAMPAIGN</td>
<td>DELETE</td>
<td>/campaign/{id};{ns}/task/{id}</td>
</tr>
<tr>
<td>LIST_TASK_FROM_CAMPAIGN</td>
<td>GET</td>
<td>/campaign/{id};{ns}/task</td>
</tr>
<tr>
<td>ADD_TRACK_TO_CAMPAIGN</td>
<td>POST</td>
<td>/campaign/{id};{ns}/track/{id}</td>
</tr>
<tr>
<td>REMOVE_TRACK_FROM_CAMPAIGN</td>
<td>DELETE</td>
<td>/campaign/{id};{ns}/track/{id}</td>
</tr>
<tr>
<td>LIST_TRACK_FROM_CAMPAIGN</td>
<td>GET</td>
<td>/campaign/{id};{ns}/track</td>
</tr>
<tr>
<td>SHARE_TRACK</td>
<td>GET, POST, PUT</td>
<td>/track/{id};{ns}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_TRACK</td>
<td>DELETE</td>
<td>/track/{id};{ns}/share/{sharer-id}; {sharer-ns}</td>
</tr>
</tbody>
</table>

Table 21: API for accessing the campaign resource.

where {id} is the unique identifier of the campaign and {ns} is the namespace to which the campaign belongs.

The next two sections show an example of the representation of the results.
C.19.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:campaign xmlns:ims="http://ims.dei.unipd.it/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:identifier>c-1</ims:identifier>
  <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
  <ims:name>"Name of campaign 1"</ims:name>
  <ims:description>"Description of campaign 1"</ims:description>
  <ims:status>AVAILABLE</ims:status>
  <ims:scope>SHARED</ ims:scope>
  <ims:created>"2012-09-13T18:12:34.955+02:00"</ims:created>
  <ims:last-modified>"2012-09-13T18:12:34.955+02:00"</ims:last-modified>
  <ims:owner>
    <ims:user>
      <ims:identifier>user-1</ims:identifier>
      <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    </ims:user>
  </ims:owner>
  <ims:sharings>
    <ims:sharing>
      <ims:group>
        <ims:identifier>group-1</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:group>
      <ims:access-permission>DENIED</ims:access-permission>
    </ims:sharing>
    <ims:sharing>
      <ims:group>
        <ims:identifier>group-2</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:group>
      <ims:access-permission>READ_ONLY</ims:access-permission>
    </ims:sharing>
    <ims:sharing>
      <ims:group>
        <ims:identifier>group-3</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:group>
      <ims:access-permission>READ_WRITE</ims:access-permission>
    </ims:sharing>
  </ims:sharings>
  <ims:links>
    <ims:link>
      <ims:metadata>
        <ims:identifier>md-1</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:metadata>
      <ims:relation>
        <ims:concept>
          <ims:identifier>isDescriptionOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:relation>
    </ims:link>
    <ims:link>
      <ims:metadata>
        <ims:identifier>md-2</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:metadata>
      <ims:relation>
        <ims:concept>
          <ims:identifier>isCopyrightOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:relation>
    </ims:link>
  </ims:links>
</ims:campaign>
```
C.19.3 JSON Representation

```json
{
  "direct":{
    "campaign":{
      "identifier":"c-1",
      "namespace":"http://ims.dei.unipd.it/",
      "name":"Name of campaign 1",
      "description":"Description of campaign 1",
      "status":"AVAILABLE",
      "scope":"SHARED",
      "created":"2012-09-13T18:12:34.955+02:00",
      "last-modified":"2012-09-13T18:12:34.955+02:00",
      "owner":{
        "identifier":"user-1",
        "namespace":"http://ims.dei.unipd.it/"
      },
      "sharings":[
        { "sharing":{
          "group":{
            "identifier":"group-1",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "access-permission":"DENIED"
        },
        { "sharing":{
          "group":{
            "identifier":"group-2",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "access-permission":"READ_ONLY"
        }
      ]
    }
  }
}
```
"identifier":"group-3",
"namespace":"http://ims.dei.unipd.it/
},
"access-permission":"READ_WRITE"
}
"
"links":[
  {
    "link":{
      "metadata":{
        "identifier":"md-1",
        "namespace":"http://ims.dei.unipd.it/
      },
      "relation":{
        "concept":{
          "identifier":"isDescriptionOf",
          "namespace":"http://ims.dei.unipd.it/
        }
      },
      "evaluation-activity":{
        "identifier":"c-1"
      }
    }
  },
  {
    "link":{
      "metadata":{
        "identifier":"md-2",
        "namespace":"http://ims.dei.unipd.it/
      },
      "relation":{
        "concept":{
          "identifier":"isCopyrightOf",
          "namespace":"http://ims.dei.unipd.it/
        }
      },
      "evaluation-activity":{
        "identifier":"c-1"
      }
    }
  },
  {
    "link":{
      "metadata":{
        "identifier":"md-3",
        "namespace":"http://ims.dei.unipd.it/
      },
      "relation":{
        "concept":{
          "identifier":"isAdministrationOf",
          "namespace":"http://ims.dei.unipd.it/
        }
      },
      "evaluation-activity":{
        "identifier":"c-1"
      }
    }
  }
]

D3.5: Final Prototype of the Evaluation Infrastructure
Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
### C.20 Education Resource

Represents an evaluation activity carried out for educational purposes.

#### C.20.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_EDUCATION</td>
<td>POST</td>
<td>/education</td>
</tr>
<tr>
<td>READ_EDUCATION</td>
<td>GET</td>
<td>/education/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_EDUCATION</td>
<td>PUT</td>
<td>/education/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_EDUCATION</td>
<td>DELETE</td>
<td>/education/{id};{ns}</td>
</tr>
<tr>
<td>LIST_EDUCATIONS</td>
<td>GET</td>
<td>/education</td>
</tr>
<tr>
<td>LIST_EDUCATION_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/education/{id};{ns}/provenance</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_EDUCATION</td>
<td>POST</td>
<td>/education/{id};{ns}/contribution/ {id}</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_EDUCATION</td>
<td>DELETE</td>
<td>/education/{id}; {ns}/contribution/ {id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_EDUCATION</td>
<td>GET</td>
<td>/education/{id};{ns}/contribution</td>
</tr>
<tr>
<td>ADD_TASK_TO_EDUCATION</td>
<td>POST</td>
<td>/education/{id};{ns}/task/{id}</td>
</tr>
<tr>
<td>REMOVE_TASK_FROM_EDUCATION</td>
<td>DELETE</td>
<td>/education/{id};{ns}/task/{id}</td>
</tr>
<tr>
<td>LIST_TASK_FROM_EDUCATION</td>
<td>GET</td>
<td>/education/{id};{ns}/task</td>
</tr>
<tr>
<td>SHARE_EDUCATION</td>
<td>GET, POST, PUT</td>
<td>/education/{id};{ns}/share/ {sharer-id};{sharer-ns}/ permission/ {access-permission}</td>
</tr>
<tr>
<td>UNSHARE_EDUCATION</td>
<td>DELETE</td>
<td>/education/{id};{ns}/share/ {sharer-id}; {sharer-ns}</td>
</tr>
</tbody>
</table>
Table 22: API for accessing the education resource.

where \{id\} is the unique identifier of the education and \{ns\} is the namespace to which the education belongs.

The next two sections show an example of the representation of the results.

C.20.2 XML Representation

```xml
<?xml version='1.0' encoding='UTF-8'?>
<ims:direct
  xmlns:ims='http://ims.dei.unipd.it/
  xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance'
  xsi:schemaLocation='http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd'>
  <ims:education
    ims:identifier='edu-1'
    ims:namespace='http://ims.dei.unipd.it/
    ims:name='Name of education 1'
    ims:description='Description of education 1'
    ims:status='AVAILABLE'
    ims:scope='SHARED'
    ims:created='2012-09-13T18:12:34.955+02:00'
    ims:last-modified='2012-09-13T18:12:34.955+02:00'>
    <ims:owner>
      <ims:identifier='user-1'
        ims:namespace='http://ims.dei.unipd.it/' />
    </ims:owner>
    <ims:sharings>
      <ims:sharing>
        <ims:group
          ims:identifier='group-1'
          ims:namespace='http://ims.dei.unipd.it/' />
        <ims:access-permission>DENIED</ims:access-permission>
      </ims:sharing>
      <ims:sharing>
        <ims:group
          ims:identifier='group-2'
          ims:namespace='http://ims.dei.unipd.it/' />
        <ims:access-permission>READ_ONLY</ims:access-permission>
      </ims:sharing>
      <ims:sharing>
        <ims:group
          ims:identifier='group-3'
          ims:namespace='http://ims.dei.unipd.it/' />
        <ims:access-permission>READ_WRITE</ims:access-permission>
      </ims:sharing>
    </ims:sharings>
    <ims:links>
      <ims:link>
        <ims:metadata
          ims:identifier='md-1'
          ims:namespace='http://ims.dei.unipd.it/' />
      </ims:link>
      <ims:concept
```
C.20.3 JSON Representation

```json
{
   "direct":{
      "education":{
         "identifier":"edu-1",
         "namespace":"http://ims.dei.unipd.it/",
         "name":"Name of education 1",
         "description":"Description of education 1",
         "status":"AVAILABLE",
         "scope":"SHARED",
         "created":"2012-09-13T18:12:34.955+02:00",
         "last-modified":"2012-09-13T18:12:34.955+02:00",
         "owner":{
            "identifier":"user-1",
            "namespace":"http://ims.dei.unipd.it/
         }
      },
      "sharings":[
         {"sharing":{
            "group":{
               "identifier":"group-1",
               "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"DENIED"
         }
      ]
   }
}
```
{  
  "sharing": {
    "group": {
      "identifier": "group-2",
      "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "READONLY"
  },
  "sharing": {
    "group": {
      "identifier": "group-3",
      "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "READWRITE"
  }
},
"links": [
  {  
    "link": {
      "metadata": {
        "identifier": "md-1",
        "namespace": "http://ims.dei.unipd.it/"
      },
      "relation": {
        "concept": {
          "identifier": "isDescriptionOf",
          "namespace": "http://ims.dei.unipd.it/"
        },
        "evaluation-activity": {
          "identifier": "edu-1"
        }
      }
    },
    {  
      "link": {
        "metadata": {
          "identifier": "md-2",
          "namespace": "http://ims.dei.unipd.it/"
        },
        "relation": {
          "concept": {
            "identifier": "isCopyrightOf",
            "namespace": "http://ims.dei.unipd.it/"
          },
          "evaluation-activity": {
            "identifier": "edu-1"
          }
        }
      },
      {  
        "link": {
          "metadata": {
            "identifier": "md-3",
            "namespace": "http://ims.dei.unipd.it/"
          }
        }
      }
    }
  }
]
C.21 Trial Resource

Represents an evaluation activity that may be actively run by a research group, a person or a corporate body for their own interest.

C.21.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_TRIAL</td>
<td>POST</td>
<td>/trial</td>
</tr>
<tr>
<td>READ_TRIAL</td>
<td>GET</td>
<td>/trial/{id};{ns}</td>
</tr>
<tr>
<td>UPDATE_TRIAL</td>
<td>PUT</td>
<td>/trial/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_TRIAL</td>
<td>DELETE</td>
<td>/trial/{id};{ns}</td>
</tr>
<tr>
<td>LIST_TRIALS</td>
<td>GET</td>
<td>/trial</td>
</tr>
<tr>
<td>LIST_TRIAL_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/trial/{id};{ns}/provenance</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_TRIAL</td>
<td>POST</td>
<td>/trial/{id};{ns}/contribution/{id}</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_TRIAL</td>
<td>DELETE</td>
<td>/trial/{id};{ns}/contribution/{id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_TRIAL</td>
<td>GET</td>
<td>/trial/{id};{ns}/contribution</td>
</tr>
<tr>
<td>ADD_TASK_TO_TRIAL</td>
<td>POST</td>
<td>/trial/{id};{ns}/task/{id}</td>
</tr>
<tr>
<td>REMOVE_TASK_FROM_TRIAL</td>
<td>DELETE</td>
<td>/trial/{id};{ns}/task/{id}</td>
</tr>
<tr>
<td>LIST_TASK_FROM_TRIAL</td>
<td>GET</td>
<td>/trial/{id};{ns}/task</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>SHARE_TRAIL</td>
<td>GET, POST, PUT</td>
<td>/trial/{id};{ns}/share/{sharer-id};{sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_TRIAL</td>
<td>DELETE</td>
<td>/trial/{id};{ns}/share/{sharer-id};{sharer-ns}</td>
</tr>
</tbody>
</table>

Table 23: API for accessing the trial resource.

where {id} is the unique identifier of the trial and {ns} is the namespace to which the trial belongs.

The next two sections show an example of the representation of the results.

C.21.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
xmlns:ims="http://ims.dei.unipd.it/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:trial
ims:identifier="t-1"
ims:namespace="http://ims.dei.unipd.it/"
ims:name="Name of trial 1"
ims:description="Description of trial 1"
ims:status="AVAILABLE"
ims:scope="SHARED"
ims:created="2012-09-13T18:12:34.955+02:00"
ims:last-modified="2012-09-13T18:12:34.955+02:00">
<ims:owner>
<ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:owner>
<ims:sharings>
<ims:sharing>
<ims:group
ims:identifier="group-1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>DENIED</ims:access-permission>
</ims:sharing>
<ims:sharing>
<ims:group
ims:identifier="group-2"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>READ_ONLY</ims:access-permission>
</ims:sharing>
<ims:sharing>
<ims:group
ims:identifier="group-3"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:sharing>
</ims:sharings>
</ims:trial>
</ims:direct>
```

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
C.21.3 JSON Representation

```json
1 {
2   "direct":{
3     "trial":{
4       "identifier": "t-1",
5       "namespace": "http://ims.dei.unipd.it/",
6       "name": "Name of trial 1",
7       "description": "Description of trial 1",
8       "status": "AVAILABLE",
9       "scope": "SHARED",
10      "created": "2012-09-13T18:12:34.955+02:00",
11      "last-modified": "2012-09-13T18:12:34.955+02:00",
12      "owner":{
13        "identifier": "user-1",
14        "namespace": "http://ims.dei.unipd.it/
15     }
16   },
17 }
```
"sharings": [
    {
        "sharing": {
            "group": {
                "identifier": "group-1",
                "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "DENIED"
        }
    },
    {
        "sharing": {
            "group": {
                "identifier": "group-2",
                "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "READ_ONLY"
        }
    },
    {
        "sharing": {
            "group": {
                "identifier": "group-3",
                "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "READ_WRITE"
        }
    }
],
"links": [
    {
        "link": {
            "metadata": {
                "identifier": "md-1",
                "namespace": "http://ims.dei.unipd.it/"
            },
            "relation": {
                "concept": {
                    "identifier": "isDescriptionOf",
                    "namespace": "http://ims.dei.unipd.it/"
                },
                "evaluation-activity": {
                    "identifier": "t-1"
                }
            }
        },
    },
    {
        "link": {
            "metadata": {
                "identifier": "md-2",
                "namespace": "http://ims.dei.unipd.it/"
            },
            "relation": {
                "concept": {
                    "identifier": "isCopyrightOf",
                    "namespace": "http://ims.dei.unipd.it/"
                },
                "evaluation-activity": {
                    "identifier": "t-2"
                }
            }
        },
    }
]
C.22 Experimental Collection Resource

Represents a logical entity that allows us to set up a traditional IR evaluation environment.

C.22.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_EXPERIMENTAL_COLLECTION</td>
<td>POST</td>
<td>/experimental-collection</td>
</tr>
<tr>
<td>READ_EXPERIMENTAL_COLLECTION</td>
<td>GET</td>
<td>/experimental-collection/ {id}</td>
</tr>
<tr>
<td>UPDATE_EXPERIMENTAL_COLLECTION</td>
<td>PUT</td>
<td>/experimental-collection/ {id}</td>
</tr>
<tr>
<td>DELETE_EXPERIMENTAL_COLLECTION</td>
<td>DELETE</td>
<td>/experimental-collection/ {id}</td>
</tr>
<tr>
<td>LIST_EXPERIMENTAL_COLLECTION</td>
<td>GET</td>
<td>/experimental-collection</td>
</tr>
<tr>
<td>LIST_EXPERIMENTAL_COLLECTION_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/experimental-collection/ {id}/provenance</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_EXPERIMENTAL_COLLECTION</td>
<td>POST</td>
<td>/experimental-collection/ {id}/contribution/{id}</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_EXPERIMENTAL_COLLECTION</td>
<td>DELETE</td>
<td>/experimental-collection/ {id}/contribution/{id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_EXPERIMENTAL_COLLECTION</td>
<td>GET</td>
<td>/experimental-collection/ {id}/contribution</td>
</tr>
<tr>
<td>ADD_CORPUS_TO_EXPERIMENTAL_COLLECTION</td>
<td>POST</td>
<td>/experimental-collection/ {id}/corpus/{id}</td>
</tr>
<tr>
<td>REMOVE_CORPUS_FROM_EXPERIMENTAL_COLLECTION</td>
<td>DELETE</td>
<td>/experimental-collection/ {id}/corpus/{id}</td>
</tr>
</tbody>
</table>
Table 24: API for accessing the experimental-collection resource.

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST_CORPUS_FROM_EXPERIMENTAL_COLLECTION</td>
<td>GET</td>
<td>/experimental-collection/{id}/corpus</td>
</tr>
<tr>
<td>ADD_TASK_TO_EXPERIMENTAL_COLLECTION</td>
<td>POST</td>
<td>/experimental-collection/{id}/task/{id}</td>
</tr>
<tr>
<td>REMOVE_TASK_FROM_EXPERIMENTAL_COLLECTION</td>
<td>DELETE</td>
<td>/experimental-collection/{id}/task/{id}</td>
</tr>
<tr>
<td>LIST_TASK_FROM_EXPERIMENTAL_COLLECTION</td>
<td>GET</td>
<td>/experimental-collection/{id}/task</td>
</tr>
<tr>
<td>ADD_TOPIC_GROUP_TO_EXPERIMENTAL_COLLECTION</td>
<td>POST</td>
<td>/experimental-collection/{id}/topic-group/{id}</td>
</tr>
<tr>
<td>REMOVE_TOPIC_GROUP_FROM_EXPERIMENTAL_COLLECTION</td>
<td>DELETE</td>
<td>/experimental-collection/{id}/topic-group/{id}</td>
</tr>
<tr>
<td>LIST_TOPIC_GROUP_FROM_EXPERIMENTAL_COLLECTION</td>
<td>GET</td>
<td>/experimental-collection/{id}/topic-group</td>
</tr>
<tr>
<td>SHARE_EXPERIMENTAL_COLLECTION</td>
<td>GET, POST, PUT</td>
<td>/experimental-collection/{id}/share/{sharer-id};{sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_EXPERIMENTAL_COLLECTION</td>
<td>DELETE</td>
<td>/experimental-collection/{id}/share/{sharer-id};{sharer-ns}</td>
</tr>
</tbody>
</table>

where {id} is the unique identifier of the experimental-collection.

The next two sections show an example of the representation of the results.

C.22.2 XML Representation

```xml
<ims:direct xmlns:ims="http://ims.dei.unipd.it/">
  <ims:identifier>ec-1</ims:identifier>
  <ims:description>description of experimental collection</ims:description>
  <ims:scope>SHARED</ims:scope>
  <ims:created>2012-09-13T18:25:15.595+02:00</ims:created>
  <ims:last-modified>2012-09-13T18:25:15.595+02:00</ims:last-modified>
  <ims:owner>
    <ims:identifier>user-1</ims:identifier>
    <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
  </ims:owner>
  <ims:sharings>
    <ims:sharing>
      <ims:group>
        <ims:identifier>group-1</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:group>
      <ims:access-permission>DENIED</ims:access-permission>
    </ims:sharing>
  </ims:sharings>
</ims:direct>
```
< ims : sharing >
  < ims : group 
    ims : identifier = "group-2" 
    ims : namespace = "http :// ims . dei . unipd .it/" />
  < ims : access - permission > READ_ONLY </ ims : access - permission >
</ ims : sharing >

< ims : sharing >
  < ims : group 
    ims : identifier = "group-3" 
    ims : namespace = "http :// ims . dei . unipd .it/" />
  < ims : access - permission > READ_WRITE </ ims : access - permission >
</ ims : sharing >

< ims : links >
  < ims : link >
    < ims : metadata 
      ims : identifier = "md-1" 
      ims : namespace = "http :// ims . dei . unipd .it/" />
    < ims : relation >
      < ims : concept 
        ims : identifier = "isDescriptionOf" 
        ims : namespace = "http :// ims . dei . unipd .it/" />
    </ ims : relation >
    < ims : experimental - collection 
      ims : identifier = "ec-1" />
  </ ims : link >

  < ims : link >
    < ims : metadata 
      ims : identifier = "md-2" 
      ims : namespace = "http :// ims . dei . unipd .it/" />
    < ims : relation >
      < ims : concept 
        ims : identifier = "isCopyrightOf" 
        ims : namespace = "http :// ims . dei . unipd .it/" />
    </ ims : relation >
    < ims : experimental - collection 
      ims : identifier = "ec-1" />
  </ ims : link >

  < ims : link >
    < ims : metadata 
      ims : identifier = "md-3" 
      ims : namespace = "http :// ims . dei . unipd .it/" />
    < ims : relation >
      < ims : concept 
        ims : identifier = "isAdministrationOf" 
        ims : namespace = "http :// ims . dei . unipd .it/" />
    </ ims : relation >
    < ims : experimental - collection 
      ims : identifier = "ec-1" />
  </ ims : link >
</ ims : links >

< ims : topic - group 
  ims : identifier = "tg1" />
< ims : corpora >
  < ims : corpus 
    ims : identifier = "c1" />
  < ims : corpus 
    ims : identifier = "c2" />
  < ims : corpus 
    ims : identifier = "c3" />
  < ims : corpus 
    ims : identifier = "c4" />
</ ims : corpora >

< ims : ground - truth 
  ims : identifier = "gt1" />
< ims : experimental - collection >
C.22.3 JSON Representation

```json
{
  "direct":{
    "experimental-collection":{
      "identifier":"ec-1",
      "description":"description of experimental collection",
      "scope":"SHARED",
      "created":"2012-09-13T18:25:15.595+02:00",
      "last-modified":"2012-09-13T18:25:15.595+02:00",
      "owner":{
        "identifier":"user-1",
        "namespace":"http://ims.dei.unipd.it/"
      },
      "sharings":[
        {
          "sharing":{
            "group":{
              "identifier":"group-1",
              "namespace":"http://ims.dei.unipd.it/"
            },
            "access-permission":"DENIED"
          },
          "sharing":{
            "group":{
              "identifier":"group-2",
              "namespace":"http://ims.dei.unipd.it/"
            },
            "access-permission":"READ_ONLY"
          },
          "sharing":{
            "group":{
              "identifier":"group-3",
              "namespace":"http://ims.dei.unipd.it/"
            },
            "access-permission":"READ_WRITE"
          }
        }
      ],
      "links":{
        "link":{
          "metadata":{
            "identifier":"md-1",
            "namespace":"http://ims.dei.unipd.it/"
          },
          "relation":{
            "concept":{
              "identifier":"isDescriptionOf",
              "namespace":"http://ims.dei.unipd.it/"
            }
          }
        }
      }
    }
  }
}
```
"experimental-collection":{
  "identifier":"ec-1"
}
},
"link":{
  "metadata":{
    "identifier":"md-2",
    "namespace":"http://ims.dei.unipd.it/
  },
  "relation":{
    "concept":{
      "identifier":"isCopyrightOf",
      "namespace":"http://ims.dei.unipd.it/
    }
  }
},
"experimental-collection":{
  "identifier":"ec-1"
}
},
"link":{
  "metadata":{
    "identifier":"md-3",
    "namespace":"http://ims.dei.unipd.it/
  },
  "relation":{
    "concept":{
      "identifier":"isAdministrationOf",
      "namespace":"http://ims.dei.unipd.it/
    }
  }
},
"experimental-collection":{
  "identifier":"ec-1"
}
},
"topic-group":{
  "identifier":"tg1"
},
"corpora":[
  {
    "corpus":{
      "identifier":"c1"
    }
  },
  {
    "corpus":{
      "identifier":"c2"
    }
  },
  {
    "corpus":{
      "identifier":"c3"
    }
  }
]
C.23 Experiment Resource

Represents a part of the data produced by a system under evaluation.

C.23.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_EXPERIMENT</td>
<td>POST</td>
<td>/experiment</td>
</tr>
<tr>
<td>READ_EXPERIMENT</td>
<td>GET</td>
<td>/experiment/{id}</td>
</tr>
<tr>
<td>UPDATE_EXPERIMENT</td>
<td>PUT</td>
<td>/experiment/{id}</td>
</tr>
<tr>
<td>DELETE_EXPERIMENT</td>
<td>DELETE</td>
<td>/experiment/{id}</td>
</tr>
<tr>
<td>LIST_EXPERIMENTS</td>
<td>GET</td>
<td>/experiment</td>
</tr>
<tr>
<td>LIST_EXPERIMENT_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/experiment/{id}/provenance</td>
</tr>
<tr>
<td>ADD_CONFIGURATION_TO_EXPERIMENT</td>
<td>POST</td>
<td>/experiment/{id}/configuration/{id}</td>
</tr>
<tr>
<td>REMOVE_CONFIGURATION_FROM_EXPERIMENT</td>
<td>DELETE</td>
<td>/experiment/{id}/configuration/{id}</td>
</tr>
<tr>
<td>READ_CONFIGURATION_FROM_EXPERIMENT</td>
<td>GET</td>
<td>/experiment/{id}/configuration/{id}</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_EXPERIMENT</td>
<td>POST</td>
<td>/experiment/{id}/contribution/{id}</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_EXPERIMENT</td>
<td>DELETE</td>
<td>/experiment/{id}/contribution/{id}</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_EXPERIMENT</td>
<td>GET</td>
<td>/experiment/{id}/contribution/{id}</td>
</tr>
<tr>
<td>ADD_EXPERIMENT_ITEM_TO_EXPERIMENT</td>
<td>POST</td>
<td>/experiment/{id}/experiment-item/{id}</td>
</tr>
<tr>
<td>REMOVE_EXPERIMENT_ITEM_FROM_EXPERIMENT</td>
<td>DELETE</td>
<td>/experiment/{id}/experiment-item/{id}</td>
</tr>
<tr>
<td>LIST_EXPERIMENT_ITEM_FROM_EXPERIMENT</td>
<td>GET</td>
<td>/experiment/{id}/experiment-item/{id}</td>
</tr>
</tbody>
</table>
Table 25: API for accessing the experiment resource.

where \{id\} is the unique identifier of the experiment.

The next two sections show an example of the representation of the results.

**C.23.2 XML Representation**

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
  xmlns:ims="http://ims.dei.unipd.it/
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:experiment
    ims:identifier="exp-1"
    ims:description="Description of experiment, e.g. experiment submitted to TREC7"
    ims:scope="SHARED"
    ims:created="2012-09-13T18:27:29.748+02:00"
    ims:last-modified="2012-09-13T18:27:29.748+02:00"/>
  <ims:owner
    ims:identifier="user-1"
    ims:namespace="http://ims.dei.unipd.it/"/>
</ims:direct>
```
<ims:sharing>
    <ims:sharing>
        <ims:group
            ims:identifier="group-1"
            ims:namespace="http://ims.dei.unipd.it" />
        <ims:access-permission>DENIED</ims:access-permission>
    </ims:sharing>
    <ims:sharing>
        <ims:group
            ims:identifier="group-2"
            ims:namespace="http://ims.dei.unipd.it" />
        <ims:access-permission>READ_ONLY</ims:access-permission>
    </ims:sharing>
    <ims:sharing>
        <ims:group
            ims:identifier="group-3"
            ims:namespace="http://ims.dei.unipd.it" />
        <ims:access-permission>READ_WRITE</ims:access-permission>
    </ims:sharing>
</ims:sharing>

<ims:links>
    <ims:link
        ims:metadata
            ims:identifier="md-1"
            ims:namespace="http://ims.dei.unipd.it" />
        <ims:relation>
            <ims:concept
                ims:identifier="isDescriptionOf"
                ims:namespace="http://ims.dei.unipd.it" />
        </ims:relation>
        <ims:experiment ims:identifier="exp-1" />
    </ims:link>
    <ims:link
        ims:metadata
            ims:identifier="md-2"
            ims:namespace="http://ims.dei.unipd.it" />
        <ims:relation>
            <ims:concept
                ims:identifier="isCopyrightOf"
                ims:namespace="http://ims.dei.unipd.it" />
        </ims:relation>
        <ims:experiment ims:identifier="exp-1" />
    </ims:link>
    <ims:link
        ims:metadata
            ims:identifier="md-3"
            ims:namespace="http://ims.dei.unipd.it" />
        <ims:relation>
            <ims:concept
                ims:identifier="isAdministrationOf"
                ims:namespace="http://ims.dei.unipd.it" />
        </ims:relation>
        <ims:experiment ims:identifier="exp-1" />
    </ims:link>
</ims:links>

<ims:task ims:identifier="task-1" />
<ims:configuration ims:identifier="configuration-1" />
</ims:experiment>
C.23.3 JSON Representation

```json
{
  "direct":{
    "experiment":{
      "identifier":"exp-1",
      "description":"Description of experiment, e.g. experiment submitted to TREC7",
      "scope":"SHARED",
      "created":"2012-09-13T18:27:29.748+02:00",
      "last-modified":"2012-09-13T18:27:29.748+02:00",
      "owner":{
        "identifier":"user-1",
        "namespace":"http://ims.dei.unipd.it/"
      }
    },
    "sharings":{
      "sharing":{
        "group":{
          "identifier":"group-1",
          "namespace":"http://ims.dei.unipd.it/"
        },
        "access-permission":"DENIED"
      }
    }
  }
}
```

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C.24 Experiment Item Resource

Represents an item of an Experiment, that is a retrieved information unit for a given Topic.

C.24.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_EXPERIMENT-ITEM</td>
<td>POST</td>
<td>/experiment-item</td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ_EXPERIMENT-ITEM</td>
<td>GET</td>
<td>/experiment-item/{id}</td>
</tr>
<tr>
<td>UPDATE_EXPERIMENT-ITEM</td>
<td>PUT</td>
<td>/experiment-item/{id}</td>
</tr>
<tr>
<td>DELETE_EXPERIMENT-ITEM</td>
<td>DELETE</td>
<td>/experiment-item/{id}</td>
</tr>
<tr>
<td>LIST_EXPERIMENT-ITEMS</td>
<td>GET</td>
<td>/experiment-item</td>
</tr>
<tr>
<td>LIST_EXPERIMENT-ITEM_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/experiment-item/{id}/provenance</td>
</tr>
</tbody>
</table>

Table 26: API for accessing the experiment-item resource.

where {id} is the unique identifier of the experiment-item.

The next two sections show an example of the representation of the results.

C.24.2 XML Representation

```xml
<ims:direct
    xmlns:ims="http://ims.dei.unipd.it/"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
    <ims:experiment-item ims:identifier="ei-1">
        <ims:experiment ims:identifier="exp-1"/>
    </ims:experiment-item>
</ims:direct>
```

C.24.3 JSON Representation

```json
{
    "direct":{
        "experiment-item":{
            "identifier":"ei-1",
            "experiment":{
                "identifier":"exp-1"
            }
        }
    }
}
```

C.25 Ground Truth Resource

Represents a container of assessments obtained through the pooling technique.

C.25.1 API
<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_GROUND-TRUTH</td>
<td>POST</td>
<td>/ground-truth</td>
</tr>
<tr>
<td>READ_GROUND-TRUTH</td>
<td>GET</td>
<td>/ground-truth/{id}</td>
</tr>
<tr>
<td>UPDATE_GROUND-TRUTH</td>
<td>PUT</td>
<td>/ground-truth/{id}</td>
</tr>
<tr>
<td>DELETE_GROUND-TRUTH</td>
<td>DELETE</td>
<td>/ground-truth/{id}</td>
</tr>
<tr>
<td>LIST_GROUND-TRUTHS</td>
<td>GET</td>
<td>/ground-truth</td>
</tr>
<tr>
<td>LIST_GROUND-TRUTH_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/ground-truth/{id}/provenance</td>
</tr>
<tr>
<td>ADD_CONTRIBUTION_TO_GROUND-TRUTH</td>
<td>POST</td>
<td>/ground-truth/{id}/contribution</td>
</tr>
<tr>
<td>REMOVE_CONTRIBUTION_FROM_GROUND-TRUTH</td>
<td>DELETE</td>
<td>/ground-truth/{id}/contribution</td>
</tr>
<tr>
<td>LIST_CONTRIBUTION_FROM_GROUND_TRUTH</td>
<td>GET</td>
<td>/ground-truth/{id}/contribution</td>
</tr>
<tr>
<td>ADD_GROUND_TRUTH_ITEM_TO_GROUND_TRUTH</td>
<td>POST</td>
<td>/ground-truth/{id}/ground-truth-item/{id}</td>
</tr>
<tr>
<td>REMOVE_GROUND_TRUTH_ITEM_FROM_GROUND_TRUTH</td>
<td>DELETE</td>
<td>/ground-truth/{id}/ground-truth-item/{id}</td>
</tr>
<tr>
<td>LIST_GROUND_TRUTH_ITEM_FROM_GROUND_TRUTH</td>
<td>GET</td>
<td>/ground-truth/{id}/ground-truth-item/{id}</td>
</tr>
<tr>
<td>ADD_STATISTICAL_TEST_TO_GROUND-TRUTH</td>
<td>POST</td>
<td>/ground-truth/{id}/statistical-test/{id}</td>
</tr>
<tr>
<td>REMOVE_STATISTICAL_TEST_FROM_GROUND-TRUTH</td>
<td>DELETE</td>
<td>/ground-truth/{id}/statistical-test/{id}</td>
</tr>
<tr>
<td>LIST_STATISTICAL_TEST_FROM_GROUND_TRUTH</td>
<td>GET</td>
<td>/ground-truth/{id}/statistical-test</td>
</tr>
<tr>
<td>SHARE_GROUND_TRUTH</td>
<td>GET, POST, PUT</td>
<td>/ground-truth/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_GROUND_TRUTH</td>
<td>DELETE</td>
<td>/ground-truth/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
</tbody>
</table>

Table 27: API for accessing the ground-truth resource.

where {id} is the unique identifier of the ground-truth.
The next two sections show an example of the representation of the results.

C.25.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<ims:direct

xmlns:ims="http://ims.dei.unipd.it/
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:ground-truth

ims:identifier="gt1"
ims:description="Description of ground truth"
ims:scope="SHARED"
ims:created="2012-09-13T18:30:01.195+02:00"
ims:last-modified="2012-09-13T18:30:01.196+02:00">
<ims:owner>

ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/"
</ims:owner>
<ims:sharings>
<ims:sharing>

ims:identifier="group-1"
ims:namespace="http://ims.dei.unipd.it/"
<ims:access-permission>DENIED</ims:access-permission>
</ims:sharing>
<ims:sharing>

ims:identifier="group-2"
ims:namespace="http://ims.dei.unipd.it/"
<ims:access-permission>READ_ONLY</ims:access-permission>
</ims:sharing>
<ims:sharing>

ims:identifier="group-3"
ims:namespace="http://ims.dei.unipd.it/"
<ims:access-permission>READ_WRITE</ims:access-permission>
</ims:sharing>
</ims:sharings>
<ims:links>
<ims:link>

ims:identifier="md-1"
ims:namespace="http://ims.dei.unipd.it/"
<ims:relation>
<ims:concept

ims:identifier="isDescriptionOf"
ims:namespace="http://ims.dei.unipd.it/"
</ims:concept>
</ims:relation>
</ims:link>
<ims:link>

ims:identifier="md-2"
ims:namespace="http://ims.dei.unipd.it/"
<ims:relation>
<ims:concept

ims:identifier="isCopyrightOf"
</ims:concept>
</ims:relation>
</ims:link>
</ims:links>
</ims:ground-truth>
</ims:direct>
```
C.25.3 JSON Representation

```json
{
  "direct": {
    "ground-truth": {
      "identifier": "gt1",
      "description": "Description of ground truth",
      "scope": "SHARED",
      "created": "2012-09-13T18:30:01.195+02:00",
      "last-modified": "2012-09-13T18:30:01.196+02:00",
      "owner": {
        "user": {
          "identifier": "user-1",
          "namespace": "http://ims.dei.unipd.it/
        }
      },
      "sharings": [
        {
          "sharing": {
            "group": {
              "identifier": "group-1",
              "namespace": "http://ims.dei.unipd.it/
            }
          },
          "access-permission": "DENIED"
        },
        {
          "sharing": {
            "group": {
              "identifier": "group-2",
              "namespace": "http://ims.dei.unipd.it/
            }
          },
          "access-permission": "READ_ONLY"
        },
        {
          "sharing": {
            "group": {
              "identifier": "group-3",
              "namespace": "http://ims.dei.unipd.it/
            }
          }
        }
      ]
    }
  }
}
```
"access-permission":"READ_WRITE"
}
},
"links": [
{
"link": {
"metadata": {
"identifier": "md-1",
"namespace": "http://ims.dei.unipd.it/"
},
"relation": {
"concept": {
"identifier": "isDescriptionOf",
"namespace": "http://ims.dei.unipd.it/"
}
},
"ground-truth": {
"identifier": "gt1"
}
},
{
"link": {
"metadata": {
"identifier": "md-2",
"namespace": "http://ims.dei.unipd.it/"
},
"relation": {
"concept": {
"identifier": "isOwnershipOf",
"namespace": "http://ims.dei.unipd.it/"
}
},
"ground-truth": {
"identifier": "gt1"
}
},
{
"link": {
"metadata": {
"identifier": "md-3",
"namespace": "http://ims.dei.unipd.it/"
},
"relation": {
"concept": {
"identifier": "isAdministrativeOf",
"namespace": "http://ims.dei.unipd.it/"
}
},
"ground-truth": {
"identifier": "gt1"
}
}]}
C.26 Ground Truth Item Resource

Represents an item of a GroundTruth.

C.26.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_GROUND_TRUTH_ITEM</td>
<td>POST</td>
<td>/ground-truth-item</td>
</tr>
<tr>
<td>READ_GROUND_TRUTH_ITEM</td>
<td>GET</td>
<td>/ground-truth-item/{id}</td>
</tr>
<tr>
<td>UPDATE_GROUND_TRUTH_ITEM</td>
<td>PUT</td>
<td>/ground-truth-item/{id}</td>
</tr>
<tr>
<td>DELETE_GROUND_TRUTH_ITEM</td>
<td>DELETE</td>
<td>/ground-truth-item/{id}</td>
</tr>
<tr>
<td>LIST_GROUND_TRUTH_ITEMS</td>
<td>GET</td>
<td>/ground-truth-item</td>
</tr>
<tr>
<td>LIST_GROUND_TRUTH_ITEM_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/ground-truth-item/{id}/provenance</td>
</tr>
</tbody>
</table>

Table 28: API for accessing the ground-truth-item resource.

where {id} is the unique identifier of the ground-truth-item.

The next two sections show an example of the representation of the results.

C.26.2 XML Representation

```
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
            xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:ground-truth ims:identifier="gti1">
    <ims:concept ims:identifier="assessment1" ims:namespace="http://ims.dei.unipd.it/"/>
    <ims:user ims:identifier="user-1" ims:namespace="http://ims.dei.unipd.it/"/>
  </ims:ground-truth>
</ims:direct>
```

C.26.3 JSON Representation

```
{
  "direct":{
```

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
C.27 Guerrilla Resource

The Guerrilla Resource is defined in Section ?? at page ?? as a use case to show how the DIRECT system handles innovative experiment types.

C.28 Information Unit Resource

Represents the object on which the evaluated system acts; e.g., the object which is retrieved by the system under evaluation.

C.28.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_INFORMATION_UNIT</td>
<td>POST</td>
<td>/information-unit</td>
</tr>
<tr>
<td>READ_INFORMATION_UNIT</td>
<td>GET</td>
<td>/information-unit/ {id}</td>
</tr>
<tr>
<td>READ_INFORMATION_UNIT</td>
<td>GET</td>
<td>/information-unit/ {id}/content</td>
</tr>
<tr>
<td>UPDATE_INFORMATION_UNIT</td>
<td>PUT</td>
<td>/information-unit/ {id}</td>
</tr>
<tr>
<td>DELETE_INFORMATION_UNIT</td>
<td>DELETE</td>
<td>/information-unit/ {id}</td>
</tr>
<tr>
<td>LIST_INFORMATION_UNITS</td>
<td>GET</td>
<td>/information-unit</td>
</tr>
<tr>
<td>LIST_INFORMATION_UNITS</td>
<td>GET</td>
<td>/corpus/{id}/information-unit</td>
</tr>
<tr>
<td>CREATE_INFORMATION_UNIT_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/information-unit/ provenance/{year}</td>
</tr>
<tr>
<td>DETACH_INFORMATION_UNIT_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/information-unit/ provenance/{year}</td>
</tr>
</tbody>
</table>
where \{id\} is the unique identifier of the information-unit.

The next two sections show an example of the representation of the results.

### C.28.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims : direct
xmlns : ims = "http :// ims . dei . unipd .it/
xmlns : xsi = "http :// www .w3. org /2001/XMLSchema-instance"
xsi : schemaLocation = "http :// ims . dei . unipd .it/ http :// ims . dei . unipd .it/data/xml/direct.3.00.xsd">
<ims : information - unit
ims : identifier = "iu1"
ims : created = "2012-09-13T18:31:22.810+02:00"
ims : last- modified = "2012-09-13T18:31:22.810+02:00"
ims : media-type = "application/xml"
ims : language = "ita"
ims : uri = "http :// www . uri1 . com/">
<ims : corpus ims : identifier = "c1" />
<ims : content>
<DOC>
<DOCNO >FT911 -3</DOCNO >
<PROFILE >AN - BEOA7AAIFT</PROFILE >
<DATE >910514</DATE >
<HEADLINE >FT 14 MAY 91 - International Company News : Contigas plans DM900m east German project</HEADLINE >
</DOC>
</ims : content>
</ims : information - unit>
</ims : direct>
```

### C.28.3 JSON Representation

```json
{
"direct":{
 "information-unit":{
 "identifier":"iu1",
 "created":"2012-09-13T18:31:22.810+02:00",
 "last-modified":"2012-09-13T18:31:22.810+02:00",
 "media-type":"application/xml",
 "language":"ita",
 "uri":"http :// www . uri1 .com/",
 "corpus":{
 "identifier":"c1"
 },
"content":{"<DOC><DOCNO>FT911 -3</DOCNO>
 <PROFILE>AN - BEOA7AAIFT</PROFILE >
 <DATE>910514</DATE >
 <HEADLINE >FT 14 MAY 91 - International Company News : Contigas plans DM900m east German project</HEADLINE >
</DOC>
</ims : content>
</ims : information - unit>
```
C.29 Measure Resource

Represents the value of a Metric (which is represented by means of a Concept) calculated on some Experiment handled by the infrastructure.

C.29.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_MEASURE</td>
<td>POST</td>
<td>/measure</td>
</tr>
<tr>
<td>READ_MEASURE</td>
<td>GET</td>
<td>/measure/{id}</td>
</tr>
<tr>
<td>READ_MEASURE</td>
<td>GET</td>
<td>/run/{runid}/topic/{tpcid}/metric/{mtcid}/measure</td>
</tr>
<tr>
<td>UPDATE_MEASURE</td>
<td>PUT</td>
<td>/measure/{id}</td>
</tr>
<tr>
<td>DELETE_MEASURE</td>
<td>DELETE</td>
<td>/measure/{id}</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/task/{tskid}/topic/{tpcid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/task/{tskid}/metric/{mtcid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/run/{runid}/topic/{tpcid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/experiment/{expid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/experiment/{expid}/metric/{mtcid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/run/{expid}/metric/{mtcid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/task/{tskid}/measure</td>
</tr>
<tr>
<td>LIST_MEASURES</td>
<td>GET</td>
<td>/task/{tskid}/topic/{tpcid}/metric/{mtcid}/measure</td>
</tr>
<tr>
<td>CREATE_MEASURE_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/measure/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_MEASURE_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/measure/provenance/{year}</td>
</tr>
<tr>
<td>LIST_MEASURE_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/measure/{id}/provenance</td>
</tr>
</tbody>
</table>

Table 30: API for accessing the measure resource.

where \{id\} is the unique identifier of the measure.

The next two sections show an example of the representation of the results.

C.29.2 XML Representation

```
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/">
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
```
C.29.3 JSON Representation

```json
{
"direct":{
"measure":{
"identifier":"m-1",
"created":"2012-09-13T18:32:37.874+02:00",
"last-modified":"2012-09-13T18:32:37.874+02:00",
"value":"0.1",
"concept":{
"identifier":"mtc-1",
"namespace":"http://ims.dei.unipd.it/"
},
"experiment":{
"identifier":"exp-1"
},
"topic":{
"identifier":"tpc-1"
}
}
}
```

C.30 Pool Resource

Represents a container of assessments obtained through the pooling technique.

C.30.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_POOL</td>
<td>POST</td>
<td>/pool</td>
</tr>
<tr>
<td>READ_POOL</td>
<td>GET</td>
<td>/pool/{id}</td>
</tr>
<tr>
<td>UPDATE_POOL</td>
<td>PUT</td>
<td>/pool/{id}</td>
</tr>
<tr>
<td>DELETE_POOL</td>
<td>DELETE</td>
<td>/pool/{id}</td>
</tr>
<tr>
<td>LIST_POOLS</td>
<td>GET</td>
<td>/pool</td>
</tr>
<tr>
<td>LIST_POOL_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/pool/{id}/provenance</td>
</tr>
<tr>
<td>ADD_POOL_ITEM_TO_POOL</td>
<td>POST</td>
<td>/pool/{id}/pool-item/{id}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>REMOVE_POOL_ITEM_FROM_POOL</td>
<td>DELETE</td>
<td>/pool/{id}/pool-item/{id}</td>
</tr>
<tr>
<td>LIST_POOL_ITEM_FROM_POOL</td>
<td>GET</td>
<td>/pool{id}/pool-item</td>
</tr>
<tr>
<td>ADD_RUN_TO_POOL</td>
<td>POST</td>
<td>/pool/{id}/run/{id}</td>
</tr>
<tr>
<td>REMOVE_RUN_FROM_POOL</td>
<td>DELETE</td>
<td>/pool/{id}/run/{id}</td>
</tr>
<tr>
<td>LIST_RUN_FROM_POOL</td>
<td>GET</td>
<td>/pool/{id}/run</td>
</tr>
<tr>
<td>SHARE_POOL</td>
<td>GET, POST, PUT</td>
<td>/pool/{id}/share/ {sharer-id}; {sharer-ns}/ permission/ {access-permission}</td>
</tr>
<tr>
<td>UNSHARE_POOL</td>
<td>DELETE</td>
<td>/pool/{id}/share/ {sharer-id}; {sharer-ns}</td>
</tr>
</tbody>
</table>

Table 31: API for accessing the pool resource.

where {id} is the unique identifier of the pool.

The next two sections show an example of the representation of the results.

C.30.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:
direct
xmlns:ims="http://ims.dei.unipd.it/
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:
pool
ims:identifier="gt1"
ims:description="Description of pool 1"
ims:scope="SHARED"
ims:created="2012-09-13T18:35:28.262+02:00"
ims:last-modified="2012-09-13T18:35:28.262+02:00">
<ims:
owner>
<ims:
user
ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:
owner>
<ims:
sharings>
<ims:
sharing>
<ims:
group
ims:identifier="group-1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:
access-permission>DENIED</ims:
access-permission>
</ims:
sharing>
<ims:
sharing>
<ims:
group
ims:identifier="group-2"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:
sharing>
</ims:
sharings>
</ims:
pool>
</ims:
direct>
```
C.30.3 JSON Representation

```json
{
  "direct": {
    "pool": {
      "identifier": "gt1",
      "description": "Description of pool 1",
      "scope": "SHARED",
      "created": "2012-09-13T18:35:28.262+02:00",
      "last-modified": "2012-09-13T18:35:28.262+02:00",
      "owner": {
        "identifier": "user-1",
```
"namespace": "http://ims.dei.unipd.it/
"sharing": ["
    "group": {
        "identifier": "group-1",
        "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "DENIED"
},

"sharing": {
    "group": {
        "identifier": "group-2",
        "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "READ_ONLY"
},

"sharing": {
    "group": {
        "identifier": "group-3",
        "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "READ_WRITE"
},
"links": [
    "link": {
        "metadata": {
            "identifier": "md-1",
            "namespace": "http://ims.dei.unipd.it/"
        },
        "relation": {
            "concept": {
                "identifier": "isDescriptionOf",
                "namespace": "http://ims.dei.unipd.it/"
            }
        },
        "pool": {
            "identifier": "gt1"
        }
    },
    "link": {
        "metadata": {
            "identifier": "md-2",
            "namespace": "http://ims.dei.unipd.it/"
        },
        "relation": {
            "concept": {
                "identifier": "isCopyrightOf",
                "namespace": "http://ims.dei.unipd.it/"
            }
        },
        "pool": {
            "identifier": "gt1"
        }
    }
]
C.31 Pool Item Resource

Represents a relevance judgement provided on an Information Unit in the Ground Truth in the context of a given Topic.

C.31.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_POOL-ITEM</td>
<td>POST</td>
<td>/pool-item</td>
</tr>
<tr>
<td>READ_POOL-ITEM</td>
<td>GET</td>
<td>/pool-item/{id}</td>
</tr>
<tr>
<td>UPDATE_POOL-ITEM</td>
<td>PUT</td>
<td>/pool-item/{id}</td>
</tr>
<tr>
<td>DELETE_POOL-ITEM</td>
<td>DELETE</td>
<td>/pool-item/{id}</td>
</tr>
<tr>
<td>LIST_POOL-ITEMS</td>
<td>GET</td>
<td>/pool-item</td>
</tr>
<tr>
<td>LIST_POOL-ITEM_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/pool-item/{id}/provenance</td>
</tr>
</tbody>
</table>

Table 32: API for accessing the pool-item resource.

where \{id\} is the unique identifier of the pool-item.

The next two sections show an example of the representation of the results.
C.31.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
xmlns:ims="http://ims.dei.unipd.it/"
xnxs:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:pool-item
ims:identifier="pi1"
ims:created="2012-09-13T18:33:41.787+02:00"
ims:last-modified="2012-09-13T18:33:41.787+02:00">
<ims:pool ims:identifier="gt1" />
<ims:user
ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:concept
ims:identifier="assessment1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:topic ims:identifier="t1" />
<ims:information-unit ims:identifier="iu1" />
</ims:pool-item>
</ims:direct>
```

C.31.3 JSON Representation

```json
{
"direct":{
"pool-item":{
"identifier":"pi1",
"created":"2012-09-13T18:33:41.787+02:00",
"last-modified":"2012-09-13T18:33:41.787+02:00",
"pool":{
"identifier":"gt1"},
"user":{
"identifier":"user-1",
"namespace":"http://ims.dei.unipd.it/" },
"concept":{
"identifier":"assessment1",
"namespace":"http://ims.dei.unipd.it/" },
"topic":{
"identifier":"t1" },
"information-unit":{
"identifier":"iu1" }
}
}
```

C.32 Run Resource

Represents a part of the data produced by a system under evaluation.

C.32.1 API
<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_RUN</td>
<td>POST</td>
<td>/run</td>
</tr>
<tr>
<td>READ_RUN</td>
<td>GET</td>
<td>/run/{id}</td>
</tr>
<tr>
<td>UPDATE_RUN</td>
<td>PUT</td>
<td>/run/{id}</td>
</tr>
<tr>
<td>DELETE_RUN</td>
<td>DELETE</td>
<td>/run/{id}</td>
</tr>
<tr>
<td>LIST_RUNS</td>
<td>GET</td>
<td>/run</td>
</tr>
<tr>
<td>LIST_RUNS</td>
<td>GET</td>
<td>/task/{id}/run</td>
</tr>
<tr>
<td>LIST_RUNS</td>
<td>GET</td>
<td>/system/{sysid}/run</td>
</tr>
<tr>
<td>CREATE_RUN_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/run/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_RUN_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/run/provenance/{year}</td>
</tr>
<tr>
<td>LIST_RUN_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/run/{id}/provenance</td>
</tr>
<tr>
<td>ADD_ESTIMATE_TO_RUN</td>
<td>POST</td>
<td>/run/{id}/estimate/{id}</td>
</tr>
<tr>
<td>REMOVE_ESTIMATE_FROM_RUN</td>
<td>DELETE</td>
<td>/run/{id}/estimate/{id}</td>
</tr>
<tr>
<td>LIST_ESTIMATE_FROM_RUN</td>
<td>GET</td>
<td>/run/{id}/estimate</td>
</tr>
<tr>
<td>ADD_RUN_ITEM_TO_RUN</td>
<td>POST</td>
<td>/run/{id}/run-item/{id}</td>
</tr>
<tr>
<td>REMOVE_RUN_ITEM_FROM_RUN</td>
<td>DELETE</td>
<td>/run/{id}/run-item/{id}</td>
</tr>
<tr>
<td>LIST_RUN_ITEM_FROM_RUN</td>
<td>GET</td>
<td>/run/{id}/run-item</td>
</tr>
<tr>
<td>SHARE_RUN</td>
<td>GET, POST,</td>
<td>/run/{id}/share/</td>
</tr>
<tr>
<td></td>
<td>PUT</td>
<td>{sharer-id}; {sharer-ns}/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>permission/ {access-permission}</td>
</tr>
<tr>
<td>UNSHARE_RUN</td>
<td>DELETE</td>
<td>/run/{id}/share/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{sharer-id}; {sharer-ns}</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_RUN</td>
<td>GET, POST, PUT</td>
<td>/run/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_RUN</td>
<td>GET, POST, PUT</td>
<td>/run/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_RUN</td>
<td>DELETE</td>
<td>/run/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_RUN</td>
<td>DELETE</td>
<td>/run/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
</tbody>
</table>

Table 33: API for accessing the run resource.

where \{id\} is the unique identifier of the run.

The next two sections show an example of the representation of the results.

C.3.2.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
  xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:run
    ims:identifier="r-1"
    ims:description="Description of Run, e.g. att98atdc"
    ims:query-construction="Query Construction, e.g. title filtered run-0.282"
    ims:scope="SHARED"
    ims:created="2012-09-13T18:38:00.653+02:00"
    ims:last-modified="2012-09-13T18:38:00.653+02:00">
    <ims:owner
      ims:identifier="user-1"
      ims:namespace="http://ims.dei.unipd.it/" />
    <ims:sharing>
      <ims:group
        ims:identifier="group-1" />
```
<ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
<ims:access-permission>DENIED</ims:access-permission>
</ims:sharing>
<ims:group>
  <ims:identifier>group-2</ims:identifier>
  <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
  <ims:access-permission>READ_ONLY</ims:access-permission>
</ims:sharing>
<ims:sharing>
  <ims:group>
    <ims:identifier>group-3</ims:identifier>
    <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    <ims:access-permission>READ_WRITE</ims:access-permission>
  </ims:group>
</ims:sharing>
<ims:sharing>
  <ims:links>
    <ims:link>
      <ims:metadata>
        <ims:identifier>md-1</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:metadata>
      <ims:relation>
        <ims:concept>
          <ims:identifier>isDescriptionOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:relation>
      <ims:run ims:identifier="r-1"/>
    </ims:link>
    <ims:link>
      <ims:metadata>
        <ims:identifier>md-2</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:metadata>
      <ims:relation>
        <ims:concept>
          <ims:identifier>isCopyrightOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:relation>
      <ims:run ims:identifier="r-1"/>
    </ims:link>
    <ims:link>
      <ims:metadata>
        <ims:identifier>md-3</ims:identifier>
        <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
      </ims:metadata>
      <ims:relation>
        <ims:concept>
          <ims:identifier>isAdministrationOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:relation>
      <ims:run ims:identifier="r-1"/>
    </ims:link>
  </ims:links>
</ims:sharing>
C.32.3 JSON Representation

```json
{
  "direct":{
    "run":{
      "identifier":"r-1",
      "description":"Description of Run, e.g. att98atdc",
      "query-construction":"Query Construction, e.g. title filtered run-0.282",
      "scope":"SHARED",
      "created":"2012-09-13T18:38:00.653+02:00",
      "last-modified":"2012-09-13T18:38:00.653+02:00",
      "owner":{
        "identifier":"user-1",
        "namespace":"http://ims.dei.unipd.it/
      },
      "sharings":[
        {
          "sharing":{
            "group":{
              "identifier":"group-1",
              "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"DENIED"
          }
        },
        {
          "sharing":{
            "group":{
              "identifier":"group-2",
              "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"READ_ONLY"
          }
        },
        {
          "sharing":{
            "group":{
              "identifier":"group-3",
              "namespace":"http://ims.dei.unipd.it/
            },
            "access-permission":"READ_WRITE"
          }
        }
      ],
      "links":{
        "link":{
          "metadata":{
            "identifier":"md-1",
            "namespace":"http://ims.dei.unipd.it/
          },
          "relation":{
            "concept":{
```
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C.33 Run Item Resource

Represents an item of an Experiment of type Run, that is a retrieved information unit for a given Topic.

C.33.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_RUN_ITEM</td>
<td>POST</td>
<td>/run-item</td>
</tr>
<tr>
<td>READ_RUN_ITEM</td>
<td>GET</td>
<td>/run-item/{id}</td>
</tr>
<tr>
<td>UPDATE_RUN_ITEM</td>
<td>PUT</td>
<td>/run-item/{id}</td>
</tr>
<tr>
<td>DELETE_RUN_ITEM</td>
<td>DELETE</td>
<td>/run-item/{id}</td>
</tr>
<tr>
<td>LIST_RUN_ITEMS</td>
<td>GET</td>
<td>/run-item</td>
</tr>
<tr>
<td>LIST_RUN_ITEM_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/run-item/{id}/provenance</td>
</tr>
</tbody>
</table>

Table 34: API for accessing the run-item resource.

where {id} is the unique identifier of the run-item.

The next two sections show an example of the representation of the results.

C.33.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
  xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:run-item
    ims:identifier="ri1"
    ims:rank="4"
    ims:score="5.4">
    <ims:run
      ims:identifier="run-1"/>
    <ims:topic
      ims:identifier="tpc-1"/>
    <ims:information-unit
      ims:identifier="iu-1"/>
  </ims:run-item>
</ims:direct>
```
C.33.3 JSON Representation

```json
{
  "direct":{
    "run-item":{
      "identifier":"ri1",
      "rank":"4",
      "score":"5.4",
      "run":{
        "identifier":"run-1"
      },
      "topic":{
        "identifier":"tpc-1"
      },
      "information-unit":{
        "identifier":"iu-1"
      }
    }
  }
}
```

C.34 Snapshot Resource
Stores the snapshot of a visualization.

C.34.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD_SNAPSHOT_TO_VISUALIZATION</td>
<td>POST</td>
<td>/snapshot</td>
</tr>
<tr>
<td>READ_SNAPSHOT</td>
<td>GET</td>
<td>/snapshot/{sid}</td>
</tr>
<tr>
<td>UPDATE_SNAPSHOT</td>
<td>PUT</td>
<td>/snapshot/{sid}</td>
</tr>
<tr>
<td>UPDATE_SNAPSHOT</td>
<td>PUT, POST,</td>
<td>/snapshot/{sid}/</td>
</tr>
<tr>
<td></td>
<td>DELETE</td>
<td>content</td>
</tr>
<tr>
<td>DELETE_SNAPSHOT</td>
<td>DELETE</td>
<td>/snapshot/{sid}</td>
</tr>
</tbody>
</table>

Table 35: API for accessing the snapshot resource.

where {sid} is the unique identifier of the snapshot.

C.34.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct xmlns:ims="http://ims.dei.unipd.it/"
            xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">

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C.34.3 JSON Representation

```json
{
    "direct":{
        "snapshot":{
            "identifier":"sn-1",
            "created":"2012-09-13T18:39:07.632+02:00",
            "last-modified":"2012-09-13T18:39:07.632+02:00",
            "media-type":"application/x-gzip",
            "language":"aze",
            "content":{
                "content-transfer-encoding":"base64",
                "content":"PGNvbnRlbnQ+c25hcHNob3QgaW1hZ2U8L2Nvb2RlbmQ+
            }
        }
    }
}
```

C.34.4 Basic Usage

The basic usage is intended for the cases in which snapshots is reasonably small size.

**Creation**  To create the snapshot, you have to POST at the following URI:

```
/snapshot
```

You may decide to not specify the identifier for the snapshot. In that case the system will automatically set a type 4 UUID! ([ iso/ief-8344-8, 2008; leach et al., 2005 ] ) for the visualization and each of its snapshots.

**Reading**  To read a whole snapshot, you have to GET the following URI:

```
/snapshot/{sid}/content
```

**Update**  To update a snapshot, you have to PUT at the following URI:

```
/snapshot/{sid}
```
Deletion  To delete a whole snapshot, you have to DELETE the following URI:

/snapshot/{sid}

C.34.5  Advanced Usage

The advanced use stems from the consideration that the payload of a snapshot can be of considerable size. The basic idea here is to allow to create, read, update, and delete snapshots avoiding the XML or JSON wrapping.

Creation  To create a snapshot with empty content, you have to POST at the following URI:

/snapshot

as in the XML example below.

[********** TO BE ADDED **********]

Then, to add the actual payload of a snapshot, you have to POST at the following URI:

/snapshot/{sid}/content

directly in binary format and specifying its MIME media type in the HTTP headers.

Reading  To read a snapshot, you have to GET the following URI:

/snapshot/{sid}

and it will return a representation of the snapshot without its payload, as in the XML example below.

[********** TO BE ADDED **********]

Then, you can read the actual content of snapshot separately via a GET at the following URI:

/snapshot/{sid}/content

Update  To update a snapshot but not its content, you have to PUT at the following URI:

/snapshot/{sid}

a representation of the snapshot where the content element is not present, as in the XML example below.

[********** TO BE ADDED **********]

To update the content of one a snapshot, you have to PUT at the following URI:
/snapshot/{sid}/content

the actual payload of the snapshot, directly in binary format and specifying its MIME media type in the HTTP headers.

If you perform a DELETE on the same URI, you will empty the content of the snapshot but not delete the snapshot itself.

Deletion To delete a snapshot, you have to DELETE the following URI:

`/snapshot/{sid}`

C.35 Statistical Test Resource

Represents mechanism for making quantitative decisions about a process or processes.

C.35.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_STATISTICAL_TEST</td>
<td>POST</td>
<td>/statistical-test</td>
</tr>
<tr>
<td>READ_STATISTICAL_TEST</td>
<td>GET</td>
<td>/statistical-test/{id}</td>
</tr>
<tr>
<td>UPDATE_STATISTICAL_TEST</td>
<td>PUT</td>
<td>/statistical-test/{id}</td>
</tr>
<tr>
<td>DELETE_STATISTICAL_TEST</td>
<td>DELETE</td>
<td>/statistical-test/{id}</td>
</tr>
<tr>
<td>LIST_STATISTICAL_TESTS</td>
<td>GET</td>
<td>/statistical-test</td>
</tr>
<tr>
<td>LIST_STATISTICAL_TESTS</td>
<td>GET</td>
<td>/task/{id}/statistical-test</td>
</tr>
<tr>
<td>LIST_STATISTICAL_TESTS</td>
<td>GET</td>
<td>/ground-truth/{id}/statistical-test</td>
</tr>
<tr>
<td>LIST_STATISTICAL_TESTS</td>
<td>GET</td>
<td>/experiment/{id}/statistical-test</td>
</tr>
<tr>
<td>CREATE_STATISTICAL_TEST_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/statistical-test/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_STATISTICAL_TEST_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/statistical-test/provenance/{year}</td>
</tr>
<tr>
<td>LIST_STATISTICAL_TEST_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/statistical-test/{id}/provenance</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>SHARE_STATISTICAL_TEST</td>
<td>GET, POST, PUT</td>
<td><code>/statistical-test/{id}/share/{sharer-id};{sharer-ns}/permission/{access-permission}</code></td>
</tr>
<tr>
<td>UNSHARE_STATISTICAL_TEST</td>
<td>DELETE</td>
<td><code>/statistical-test/{id}/share/{sharer-id};{sharer-ns}</code></td>
</tr>
</tbody>
</table>

where `{id}` is the unique identifier of the statistical-test.

The next two sections show an example of the representation of the results.

### C.35.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
  xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:statistical-test
    ims:identifier="st-1"
    ims:created="2012-09-13T18:43:54.399+02:00"
    ims:last-modified="2012-09-13T18:43:54.399+02:00"
    ims:scope="SHARED">
    <ims:owner>
      <ims:user
        ims:identifier="user-1"
        ims:namespace="http://ims.dei.unipd.it/"/>
    </ims:owner>
    <ims:sharings>
      <ims:sharing>
        <ims:group
          ims:identifier="group-1"
          ims:namespace="http://ims.dei.unipd.it/"/>
        <ims:access-permission>DENIED</ims:access-permission>
      </ims:sharing>
      <ims:sharing>
        <ims:group
          ims:identifier="group-2"
          ims:namespace="http://ims.dei.unipd.it/"/>
        <ims:access-permission>READ_ONLY</ims:access-permission>
      </ims:sharing>
      <ims:sharing>
        <ims:group
          ims:identifier="group-3"
          ims:namespace="http://ims.dei.unipd.it/"/>
        <ims:access-permission>READ_WRITE</ims:access-permission>
      </ims:sharing>
    </ims:sharings>
  </ims:statistical-test>
</ims:direct>
```

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C.35.3 JSON Representation

```json
{
  "direct":{
    "statistical-test":{
      "identifier":"st-1",
      "created":"2012-09-13T18:40:32.055+02:00",
      "last-modified":"2012-09-13T18:40:32.055+02:00",
      "concept":{
        "identifier":"test type, e.g. t-test",
        "namespace":"http://ims.dei.unipd.it/
      },
      "parameters":[
        {
          "parameter":{
            "concept":{
              "identifier":"parameterA",
              "namespace":"http://direct.dei.unipd.it/
            },
            "value":"value 1"
          }
        },
        {
          "parameter":{
            "concept":{
              "identifier":"parameterB",
              "namespace":"http://direct.dei.unipd.it/
            },
            "value":"value 2"
          }
        },
        {
          "parameter":{
            "concept":{
              "identifier":"parameterC",
              "namespace":"http://direct.dei.unipd.it/
            },
            "value":"value 3"
          }
        }
      ],
      "metrics":[
        {
          "concept":{
            "identifier":"Mean average precision",
            "namespace":"http://ims.dei.unipd.it/
          }
        },
        {
          "concept":{
            "identifier":"Fall-out",
            "namespace":"http://ims.dei.unipd.it/
          }
        },
        {
          "concept":{
            "identifier":"F-measure",
            "namespace":"http://ims.dei.unipd.it/
          }
        }
      ]
    }
  }
}
```
"ground-truths": [
  {
    "ground-truth": {
      "identifier": "gt-1"
    }
  },
  {
    "ground-truth": {
      "identifier": "gt-2"
    }
  },
  {
    "ground-truth": {
      "identifier": "gt-3"
    }
  }
],
"tasks": [
  {
    "task": {
      "identifier": "tsk-1"
    }
  },
  {
    "task": {
      "identifier": "tsk-2"
    }
  },
  {
    "task": {
      "identifier": "tsk-3"
    }
  }
],
"measures": [
  {
    "measure": {
      "identifier": "meas-1"
    }
  },
  {
    "measure": {
      "identifier": "meas-2"
    }
  },
  {
    "measure": {
      "identifier": "meas-3"
    }
  }
],
"experiments": [
  {
    "experiment": {
      "identifier": "exp-1"
    }
  }
]
C.36 System Resource

Represents a running software engine, which is under evaluation.

C.36.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_SYSTEM</td>
<td>POST</td>
<td>/system</td>
</tr>
<tr>
<td>READ_SYSTEM</td>
<td>GET</td>
<td>/system/{id}</td>
</tr>
<tr>
<td>READ_SYSTEM</td>
<td>GET</td>
<td>/run/{runid}/system</td>
</tr>
<tr>
<td>UPDATE_SYSTEM</td>
<td>PUT</td>
<td>/system/{id}</td>
</tr>
<tr>
<td>DELETE_SYSTEM</td>
<td>DELETE</td>
<td>/system/{id}</td>
</tr>
<tr>
<td>READ_SYSTEM FROM_RUN</td>
<td>GET</td>
<td>/system/{id}/run</td>
</tr>
<tr>
<td>LIST_SYSTEMS</td>
<td>GET</td>
<td>/system</td>
</tr>
<tr>
<td>LIST_SYSTEMS</td>
<td>GET</td>
<td>/component/{cmpid}/system</td>
</tr>
<tr>
<td>LIST_SYSTEMS</td>
<td>GET</td>
<td>/application/{appid}/system</td>
</tr>
<tr>
<td>CREATE_SYSTEM_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/system/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_SYSTEM_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/system/provenance/{year}</td>
</tr>
<tr>
<td>LIST_SYSTEM_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/system/{id}/provenance</td>
</tr>
<tr>
<td>ADD_APPLICATION_TO_SYSTEM</td>
<td>POST</td>
<td>/system/{id}/application/{id}</td>
</tr>
<tr>
<td>REMOVE_APPLICATION_FROM_SYSTEM</td>
<td>DELETE</td>
<td>/system/{id}/application/{id}</td>
</tr>
<tr>
<td>ADD_COMPONENT_TO_SYSTEM</td>
<td>POST</td>
<td>/system/{id}/component/{id}</td>
</tr>
<tr>
<td>REMOVE_COMPONENT_FROM_SYSTEM</td>
<td>DELETE</td>
<td>/system/{id}/component/{id}</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD_CONFIGURATION_TO_SYSTEM</td>
<td>POST</td>
<td>/system/{id}/configuration/{id}</td>
</tr>
<tr>
<td>REMOVE_CONFIGURATION_FROM_SYSTEM</td>
<td>DELETE</td>
<td>/system/{id}/configuration/{id}</td>
</tr>
<tr>
<td>ADD_RUN_TO_SYSTEM</td>
<td>POST</td>
<td>/system/{id}/run/{id}</td>
</tr>
<tr>
<td>REMOVE_RUN_FROM_SYSTEM</td>
<td>DELETE</td>
<td>/system/{id}/run/{id}</td>
</tr>
<tr>
<td>SHARE_SYSTEM</td>
<td>GET, POST, PUT</td>
<td>/system/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_SYSTEM</td>
<td>DELETE</td>
<td>/system/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_SYSTEM</td>
<td>GET, POST, PUT</td>
<td>/system/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_SYSTEM</td>
<td>GET, POST, PUT</td>
<td>/system/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_SYSTEM</td>
<td>DELETE</td>
<td>/system/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_SYSTEM</td>
<td>DELETE</td>
<td>/system/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
</tbody>
</table>

Table 37: API for accessing the system resource.

where {id} is the unique identifier of the system.

The next two sections show an example of the representation of the results.
C.36.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct>
  xmlns:ims="http://ims.dei.unipd.it/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:system>
    <ims:identifier>sys-1</ims:identifier>
    <ims:name>Name of sys-1</ims:name>
    <ims:description>Description of sys-1</ims:description>
    <ims:scope>SHARED</ims:scope>
    <ims:created>2012-09-13T18:41:29.831+02:00</ims:created>
    <ims:last-modified>2012-09-13T18:41:29.831+02:00</ims:last-modified>
    <ims:owner>
      <ims:identifier>user-1</ims:identifier>
      <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
    </ims:owner>
    <ims:shareings>
      <ims:sharing>
        <ims:group>
          <ims:identifier>group-1</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:group>
        <ims:access-permission>DENIED</ims:access-permission>
      </ims:sharing>
      <ims:sharing>
        <ims:group>
          <ims:identifier>group-2</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:group>
        <ims:access-permission>READ_ONLY</ims:access-permission>
      </ims:sharing>
      <ims:sharing>
        <ims:group>
          <ims:identifier>group-3</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:group>
        <ims:access-permission>READ_WRITE</ims:access-permission>
      </ims:sharing>
    </ims:shareings>
    <ims:links>
      <ims:link>
        <ims:metadata>
          <ims:identifier>md-1</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:metadata>
        <ims:concept>
          <ims:identifier>isPartOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:link>
      <ims:link>
        <ims:metadata>
          <ims:identifier>md-2</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:metadata>
        <ims:concept>
          <ims:identifier>isCopyrightOf</ims:identifier>
          <ims:namespace>http://ims.dei.unipd.it/</ims:namespace>
        </ims:concept>
      </ims:link>
    </ims:links>
  </ims:system>
</ims:direct>
```
C.36.3 JSON Representation

```json
{
    "direct": {
        "system": {
            "identifier": "sys-1",
            "created": "2012-09-13T18:41:29.831+02:00",
            "last-modified": "2012-09-13T18:41:29.831+02:00",
            "name": "Name of sys-1",
            "description": "Description of sys-1",
            "scope": "SHARED",
            "owner": {
                "user": {
                    "identifier": "user-1",
                    "namespace": "http://ims.dei.unipd.it/
                }
            },
            "sharings": [
                {
                    "sharing": {
                        "group": {
                            "identifier": "group-1",
                            "namespace": "http://ims.dei.unipd.it/
                        },
                        "access-permission": "DENIED"
                    }
                },
                {
                    "sharing": {
                        "group": {
                            "identifier": "group-2",
                            "namespace": "http://ims.dei.unipd.it/
                        },
                        "access-permission": "READ_ONLY"
                    }
                },
                {
                    "sharing": {
                        "group": {
                            "identifier": "group-3",
                            "namespace": "http://ims.dei.unipd.it/
                        }
                    }
                }
            ]
        }
    }
}
```
"access-permission": "READ_WRITE"
}
}
"links": [
{
"link": {
"metadata": {
"identifier": "md-1",
"namespace": "http://ims.dei.unipd.it/
},
"relation": {
"concept": {
"identifier": "isPartOf",
"namespace": "http://ims.dei.unipd.it/
}
},
"system": {
"identifier": "sys-1"
}
}
},
{
"link": {
"metadata": {
"identifier": "md-2",
"namespace": "http://ims.dei.unipd.it/
},
"relation": {
"concept": {
"identifier": "isCopyrightOf",
"namespace": "http://ims.dei.unipd.it/
}
},
"system": {
"identifier": "sys-1"
}
}
},
{
"link": {
"metadata": {
"identifier": "md-3",
"namespace": "http://ims.dei.unipd.it/
},
"relation": {
"concept": {
"identifier": "isDescriptionOf",
"namespace": "http://ims.dei.unipd.it/
}
},
"system": {
"identifier": "sys-1"
}
}
},
"configuration": {
"configuration": {
"identifier": "cnf-1"
}
C.37 Task Resource

 Represents a piece of work that is undertaken within an EvaluationActivity and aims at testing a specific (research) hypothesis.

C.37.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_TASK</td>
<td>POST</td>
<td>/task</td>
</tr>
<tr>
<td>READ_TASK</td>
<td>GET</td>
<td>/task/{id}</td>
</tr>
<tr>
<td>READ_TASK</td>
<td>GET</td>
<td>/run/{id}/task</td>
</tr>
<tr>
<td>UPDATE_TASK</td>
<td>PUT</td>
<td>/task/{id}</td>
</tr>
<tr>
<td>DELETE_TASK</td>
<td>DELETE</td>
<td>/task/{id}</td>
</tr>
<tr>
<td>LIST_TASKS</td>
<td>GET</td>
<td>/task</td>
</tr>
<tr>
<td>LIST_TASKS</td>
<td>GET</td>
<td>/campaign/{id};{ns}/task</td>
</tr>
<tr>
<td>LIST_TASKS</td>
<td>GET</td>
<td>/track/{id}/task</td>
</tr>
<tr>
<td>LIST_TASKS</td>
<td>GET</td>
<td>/experimental-collection/{id}/task</td>
</tr>
<tr>
<td>CREATE_TASK_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/task/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_TASK_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/task/provenance/{year}</td>
</tr>
<tr>
<td>LIST_TASK_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/task/{id}/provenance</td>
</tr>
<tr>
<td>ADD_TOPIC_FIELD_TO_TASK</td>
<td>POST</td>
<td>/task/{id}/topic-field/{id};{ns}</td>
</tr>
<tr>
<td>REMOVE_TOPIC_FIELD_FROM_TASK</td>
<td>DELETE</td>
<td>/task/{id}/topic-field/{id};{ns}</td>
</tr>
<tr>
<td>LIST_TOPIC_FIELD_FROM_TASK</td>
<td>GET</td>
<td>/task/{id}/topic-field</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>SHARE_TASK</td>
<td>GET, POST, PUT</td>
<td>/task/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_TASK</td>
<td>DELETE</td>
<td>/task/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_TASK</td>
<td>GET, POST, PUT</td>
<td>/task/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_TASK</td>
<td>DELETE</td>
<td>/task/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
</tbody>
</table>

Table 38: API for accessing the task resource.

where \{id\} is the unique identifier of the task.

The next two sections show an example of the representation of the results.

C.3.7.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:task
  xmlns:ims="http://ims.dei.unipd.it/
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
  <ims:identifier>"tsk-1"</ims:identifier>
  <ims:created>"2012-09-13T18:46:19.914+02:00"</ims:created>
  <ims:last-modified>"2012-09-13T18:46:19.915+02:00"</ims:last-modified>
  <ims:description>"Description of task, e.g. diversity task"</ims:description>
</ims:task>
```
<ims:max-experiments-allowed="100">
<ims:scope="SHARED">
<ims:owner>
<ims:user>
<ims:identifier="user-1"
<ims:namespace="http://ims.dei.unipd.it/" />
</ims:owner>
<ims:sharings>
<ims:sharing>
<ims:group>
<ims:identifier="group-1"
<ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>DENIED</ims:access-permission>
</ims:sharing>
<ims:sharing>
<ims:group>
<ims:identifier="group-2"
<ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>READ_ONLY</ims:access-permission>
</ims:sharing>
<ims:sharing>
<ims:group>
<ims:identifier="group-3"
<ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>READ_WRITE</ims:access-permission>
</ims:sharing>
</ims:sharings>
<ims:links>
<ims:link>
<ims:metadata>
<ims:identifier="md-1"
<ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
<ims:concept>
<ims:identifier="isDescriptionOf"
<ims:namespace="http://ims.dei.unipd.it/" />
</ims:concept>
<ims:task ims:identifier="tsk-1" />
</ims:link>
<ims:link>
<ims:metadata>
<ims:identifier="md-2"
<ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
<ims:concept>
<ims:identifier="isCopyrightOf"
<ims:namespace="http://ims.dei.unipd.it/" />
</ims:concept>
<ims:task ims:identifier="tsk-1" />
</ims:link>
<ims:link>
<ims:metadata>
<ims:identifier="md-3"
<ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
<ims:concept>
<ims:identifier="isAdministrationOf"
<ims:namespace="http://ims.dei.unipd.it/" />
</ims:concept>
<ims:task ims:identifier="tsk-1" />
</ims:link>
</ims:links>
C.37.3 JSON Representation

```json
{
  "direct": {
    "task": {
      "identifier": "tsk-1",
      "created": "2012-09-13T18:46:19.914+02:00",
      "last-modified": "2012-09-13T18:46:19.915+02:00",
      "description": "Description of task, e.g. diversity task",
      "scope": "SHARED",
      "owner": {
        "user": {
          "identifier": "user-1",
          "namespace": "http://ims.dei.unipd.it/"
        }
      },
      "sharings": [
        { "sharing": {
            "group": {
              "identifier": "group-1",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "DENIED"
          }
        },
        { "sharing": {
            "group": {
              "identifier": "group-2",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "READ_ONLY"
          }
        },
        { "sharing": {
            "group": {
              "identifier": "group-3",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "READ_WRITE"
          }
        }
      ],
      "links": {
        "link": {
          "text": "D3.5: Final Prototype of the Evaluation Infrastructure"
        }
      }
    }
  }
}
```
"metadata":{
    "identifier":"md-1",
    "namespace":"http://ims.dei.unipd.it/"
},
"relation":{
    "concept":{
        "identifier":"isDescriptionOf",
        "namespace":"http://ims.dei.unipd.it/"
    },
    "task":{
        "identifier":"tsk-1"
    }
},
"link":{
    "metadata":{
        "identifier":"md-2",
        "namespace":"http://ims.dei.unipd.it/"
    },
    "relation":{
        "concept":{
            "identifier":"isCopyrightOf",
            "namespace":"http://ims.dei.unipd.it/"
        },
        "task":{
            "identifier":"tsk-1"
        }
    }
},
"link":{
    "metadata":{
        "identifier":"md-3",
        "namespace":"http://ims.dei.unipd.it/"
    },
    "relation":{
        "concept":{
            "identifier":"isAdministrationOf",
            "namespace":"http://ims.dei.unipd.it/"
        },
        "task":{
            "identifier":"tsk-1"
        }
    }
},
"campaign":{
    "identifier":"c-1",
    "namespace":"http://ims.dei.unipd.it/"
},
"track":{
    "identifier":"trk-1"
},
"experimental-collection":{
    "identifier":"ec-1"
}
C.38 Topic Group Resource

Represents a set of topics, which are grouped together because they are used to address a research task carried out in an evaluation activity.

C.38.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_TOPIC_GROUP</td>
<td>POST</td>
<td>/topic-group</td>
</tr>
<tr>
<td>READ_TOPIC_GROUP</td>
<td>GET</td>
<td>/topic-group/{id}</td>
</tr>
<tr>
<td>UPDATE_TOPIC_GROUP</td>
<td>PUT</td>
<td>/topic-group/{id}</td>
</tr>
<tr>
<td>DELETE_TOPIC_GROUP</td>
<td>DELETE</td>
<td>/topic-group/{id}</td>
</tr>
<tr>
<td>LIST_TOPIC_GROUPS</td>
<td>GET</td>
<td>/topic-group</td>
</tr>
<tr>
<td>CREATE_TOPIC_GROUP_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/topic-group/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_TOPIC_GROUP_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/topic-group/provenance/{year}</td>
</tr>
<tr>
<td>LIST_TOPIC_GROUP_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/topic-group/{id}/provenance</td>
</tr>
<tr>
<td>ADD_TOPIC_TO_TOPIC_GROUP</td>
<td>POST</td>
<td>/topic-group/{id}/topic/{id}</td>
</tr>
<tr>
<td>REMOVE_TOPIC_FROM_TOPIC_GROUP</td>
<td>DELETE</td>
<td>/topic-group/{id}/topic/{id}</td>
</tr>
<tr>
<td>SHARE_TOPIC_GROUP</td>
<td>GET, POST, PUT /topic-group/{id}/share/{sharer-id};{sharer-ns}/permission/{access-permission}</td>
<td></td>
</tr>
<tr>
<td>UNSHARE_TOPIC_GROUP</td>
<td>DELETE</td>
<td>/topic-group/{id}/share/{sharer-id};{sharer-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_TOPIC_GROUP</td>
<td>GET, POST, PUT /topic-group/{source-id}/link/{target-id};{target-ns}/relation/{relation-id};{relation-ns}</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_TOPIC_GROUP</td>
<td>GET, POST,</td>
<td>/topic-group/</td>
</tr>
<tr>
<td></td>
<td>PUT</td>
<td>{source-id}/link/{target-id};</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{target-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_TOPIC_GROUP</td>
<td>DELETE</td>
<td>/topic-group/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{source-id}/link/{target-id};</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{target-ns}/relation/{relation-id};</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_TOPIC_GROUP</td>
<td>DELETE</td>
<td>/topic-group/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{source-id}/link/{target-id};</td>
</tr>
<tr>
<td></td>
<td></td>
<td>{target-ns}</td>
</tr>
</tbody>
</table>

Table 39: API for accessing the topic-group resource.

where \{id\} is the unique identifier of the topic-group.

The next two sections show an example of the representation of the results.

C.38.2 XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
 xmlns:ims="http://ims.dei.unipd.it/
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:topic-group
 ims:identifier="tg-1"
 ims:description="description of topic group 1"
 ims:scope="SHARED"
 ims:created="2012-09-13T18:47:21.387+02:00"
 ims:last-modified="2012-09-13T18:47:21.387+02:00">
<ims:owner>
 <ims:identifier="user-1"
 ims:namespace="http://ims.dei.unipd.it/"/>
</ims:owner>
<ims:sharings>
<ims:sharing>
 <ims:identifier="group-1"
 ims:namespace="http://ims.dei.unipd.it/"/>
 < ims:access-permission>DENIED</ims:access-permission>
</ims:sharing>
<ims:sharing>
 <ims:identifier="group-2"
 ims:namespace="http://ims.dei.unipd.it/"/>
</ims:sharing>
</ims:sharings>
</ims:topic-group>
</ims:direct>
```
C.38.3 JSON Representation

```json
{
    "direct": {
        "topic-group": {
            "identifier": "tg-1"
        }
    },
    "topics": [
        {
            "topic": {
                "identifier": "t1"
            }
        },
        {
            "topic": {
                "identifier": "t2"
            }
        },
        {
            "topic": {
                "identifier": "t3"
            }
        },
        {
            "topic": {
                "identifier": "t4"
            }
        }
    ]
}
```
"created": "2012-09-13T18:47:21.387+02:00",
"last-modified": "2012-09-13T18:47:21.387+02:00",
"description": "description of topic group 1",
"scope": "SHARED",
"owner": {
  "user": {
    "identifier": "user-1",
    "namespace": "http://ims.dei.unipd.it/"
  }
},
"sharings": [
  "sharing": {
    "group": {
      "identifier": "group-1",
      "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "DENIED"
  },
  "sharing": {
    "group": {
      "identifier": "group-2",
      "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "READ_ONLY"
  },
  "sharing": {
    "group": {
      "identifier": "group-3",
      "namespace": "http://ims.dei.unipd.it/"
    },
    "access-permission": "READ_WRITE"
  }
],
"links": [
  "link": {
    "metadata": {
      "identifier": "md-1",
      "namespace": "http://ims.dei.unipd.it/"
    },
    "relation": {
      "concept": {
        "identifier": "isDescriptionOf",
        "namespace": "http://ims.dei.unipd.it/"
      },
      "topic-group": {
        "identifier": "tg-1"
      }
    }
  }
]
C.39  Topic Resource

Represents the materialization of an information need.

C.39.1  API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_TOPIC</td>
<td>POST</td>
<td>/topic</td>
</tr>
<tr>
<td>READ_TOPIC</td>
<td>GET</td>
<td>/topic/{id}</td>
</tr>
<tr>
<td>UPDATE_TOPIC</td>
<td>PUT</td>
<td>/topic/{id}</td>
</tr>
<tr>
<td>DELETE_TOPIC</td>
<td>DELETE</td>
<td>/topic/{id}</td>
</tr>
<tr>
<td>CREATE_TOPIC_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/topic/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_TOPIC_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/topic/provenance/{year}</td>
</tr>
<tr>
<td>LIST_TOPICS</td>
<td>GET</td>
<td>/topic</td>
</tr>
<tr>
<td>LIST_TOPIC_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/topic/{id}/provenance</td>
</tr>
<tr>
<td>ADD_TOPIC_FIELD_TO_TOPIC</td>
<td>POST</td>
<td>/topic/{id}/topic-field</td>
</tr>
<tr>
<td>UPDATE_TOPIC_FIELD_FROM_TOPIC</td>
<td>PUT</td>
<td>/topic/{id}/topic-field/{id};{ns}</td>
</tr>
<tr>
<td>DELETE_TOPIC_FIELD_FROM_TOPIC</td>
<td>DELETE</td>
<td>/topic/{id}/topic-field/{id};{ns}</td>
</tr>
<tr>
<td>READ_TOPIC_FIELD_FROM_TOPIC</td>
<td>GET</td>
<td>/topic/{id}/topic-field/{id};{ns}</td>
</tr>
</tbody>
</table>

Table 40: API for accessing the topic resource.

where {id} is the unique identifier of the topic.

The next two sections show an example of the representation of the results.

C.39.2  XML Representation

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ims:direct
 xmlns:ims="http://ims.dei.unipd.it/
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:identifier=tpc-1>
```
C.39.3 JSON Representation

```json
{
  "direct": {
    "topic": {
      "identifier": "tpc-1",
      "created": "2012-09-13T18:48:25.056+02:00",
      "last-modified": "2012-09-13T18:48:25.056+02:00",
      "topic-fields": [
        {
          "topic-field": {
            "concept": {
              "identifier": "isFieldOf",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "topic-field-contents": [
              {
                "topic-field-content": {
                  "media-type": "application/json",
                  "language": "abk",
                  "content": "<title>title A</title>"
                }
              },
              {
                "topic-field-content": {
                  "media-type": "application/pdf",
                  "language": "ada",
                  "content": "PGRlc2M+ZGVzY3JpcHRpb248L2Rlc2M+

                  "content": "PHRpdGxlPnRpdGxlIEI8L3RpdGxlPg=="
                }
              }
            ]
          }
        },
        {
          "topic-field": {
            "concept": {
              "identifier": "isFieldOf2",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "topic-field-contents": [
              {
                "topic-field-content": {
                  "media-type": "application/msword",
                  "language": "bik",
                  "content": "PHRpdGxlPnRpdGxlIEI8L3RpdGxlPg=="
                }
              }
            ]
          }
        }
      ]
    }
  }
}```
C.40 Track Resource

Represents a group of Tasks carried within an Evaluation Activity of type campaign.

C.40.1 API

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_TRACK</td>
<td>POST</td>
<td>/track</td>
</tr>
<tr>
<td>READ_TRACK</td>
<td>GET</td>
<td>/track/{id}</td>
</tr>
<tr>
<td>READ_TRACK</td>
<td>GET</td>
<td>/task/{id}/track</td>
</tr>
<tr>
<td>UPDATE_TRACK</td>
<td>PUT</td>
<td>/track/{id}</td>
</tr>
<tr>
<td>DELETE_TRACK</td>
<td>DELETE</td>
<td>/track/{id}</td>
</tr>
<tr>
<td>LIST_TRACKS</td>
<td>GET</td>
<td>/track</td>
</tr>
<tr>
<td>Action</td>
<td>HTTP Method</td>
<td>URI</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>CREATE_TRACK_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/track/provenance/{year}</td>
</tr>
<tr>
<td>DETACH_TRACK_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/track/provenance/{year}</td>
</tr>
<tr>
<td>LIST_TRACK_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/track/{id}/provenance</td>
</tr>
<tr>
<td>ADD_TASK_TO_TRACK</td>
<td>GET, POST, PUT</td>
<td>/track/{id}/task/{id}</td>
</tr>
<tr>
<td>REMOVE_TASK_FROM_TRACK</td>
<td>DELETE</td>
<td>/track/{id}/task/{id}</td>
</tr>
<tr>
<td>LIST_TASK_FROM_TRACK</td>
<td>GET</td>
<td>/track/{id}/task</td>
</tr>
<tr>
<td>SHARE_TRACK</td>
<td>GET, POST, PUT</td>
<td>/track/{id}/share/{sharer-id}; {sharer-ns}/permission/{access-permission}</td>
</tr>
<tr>
<td>UNSHARE_TRACK</td>
<td>DELETE</td>
<td>/track/{id}/share/{sharer-id}; {sharer-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_TRACK</td>
<td>GET, POST, PUT</td>
<td>/track/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>RELATE_METADATA_TO_TRACK</td>
<td>GET, POST, PUT</td>
<td>/track/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_TRACK</td>
<td>DELETE</td>
<td>/track/{source-id}/link/{target-id}; {target-ns}/relation/{relation-id}; {relation-ns}</td>
</tr>
<tr>
<td>UNRELATE_METADATA_FROM_TRACK</td>
<td>DELETE</td>
<td>/track/{source-id}/link/{target-id}; {target-ns}</td>
</tr>
</tbody>
</table>

Table 41: API for accessing the track resource.
where \{id\} is the unique identifier of the track.

The next two sections show an example of the representation of the results.

### C.40.2 XML Representation

```
<?xml version="1.0" encoding="UTF-8" ?>
<ims:direct
xmlns:ims="http://ims.dei.unipd.it/">
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ims.dei.unipd.it/ http://ims.dei.unipd.it/data/xml/direct.3.00.xsd">
<ims:track
ims:identifier="trk-1"
ims:created="2012-09-13T18:49:42.367+02:00"
ims:last-modified="2012-09-13T18:49:42.367+02:00"
ims:description="Description of track, e.g. CLEF 2012 Ad-Hoc Track"
ims:submission-deadline="2012-09-13"
ims:scope="SHARED">
<ims:owner>
<ims:user
ims:identifier="user-1"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:owner>
<ims:sharings>
<ims:sharing>
<ims:group
ims:identifier="group-1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>DENIED</ims:access-permission>
</ims:sharing>
<ims:sharing>
<ims:group
ims:identifier="group-2"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>READ_ONLY</ims:access-permission>
</ims:sharing>
<ims:sharing>
<ims:group
ims:identifier="group-3"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:access-permission>READ_WRITE</ims:access-permission>
</ims:sharing>
</ims:sharings>
<ims:links>
<ims:link
ims:identifier="md-1"
ims:namespace="http://ims.dei.unipd.it/" />
<ims:relation>
<ims:concept
ims:identifier="isDescriptionOf"
ims:namespace="http://ims.dei.unipd.it/" />
</ims:relation>
</ims:link>
</ims:links>
```

---

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
C.40.3 JSON Representation

```json
{
  "direct": {
    "track": {
      "identifier": "trk-1",
      "description": "Description of track, e.g. CLEF 2012 Ad-Hoc Track",
      "submission-deadline": "2012-09-13",
      "scope": "SHARED",
      "created": "2012-09-13T18:49:42.367+02:00",
      "last-modified": "2012-09-13T18:49:42.367+02:00",
      "owner": {
        "user": {
          "identifier": "user-1",
          "namespace": "http://ims.dei.unipd.it/"
        }
      },
      "sharings": [
        {
          "sharing": {
            "group": {
              "identifier": "group-1",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "DENIED"
          }
        },
        {
          "sharing": {
            "group": {
              "identifier": "group-2",
              "namespace": "http://ims.dei.unipd.it/"
            },
            "access-permission": "READ_ONLY"
          }
        }
      ]
  }
}
```
},
  "sharing":{
    "group":{
      "identifier":"group-3",
      "namespace":"http://ims.dei.unipd.it/
    },
    "access-permission":"READ_WRITE"
  }
],
"links":{
  "link":{
    "metadata":{
      "identifier":"md-1",
      "namespace":"http://ims.dei.unipd.it/
    },
    "relation":{
      "concept":{
        "identifier":"isDescriptionOf",
        "namespace":"http://ims.dei.unipd.it/
      }
    },
    "track":{
      "identifier":"trk-1"
    }
  }
],
"link":{
  "metadata":{
    "identifier":"md-2",
    "namespace":"http://ims.dei.unipd.it/
  },
  "relation":{
    "concept":{
      "identifier":"isCopyrightOf",
      "namespace":"http://ims.dei.unipd.it/
    }
  },
  "track":{
    "identifier":"trk-1"
  }
},
"link":{
  "metadata":{
    "identifier":"md-3",
    "namespace":"http://ims.dei.unipd.it/
  },
  "relation":{
    "concept":{
      "identifier":"isAdministrationOf",
      "namespace":"http://ims.dei.unipd.it/
    }
  },
  "track":{
    "identifier":"trk-1"
C.41 Visualization Resource

Refers to the information used by the infrastructure to store and recover whichever visualization of the data that the users do.

C.41.1 API

<table>
<thead>
<tr>
<th>Actionemarks</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE_VISUALIZATION</td>
<td>POST</td>
<td>/visualization</td>
</tr>
<tr>
<td>READ_VISUALIZATION</td>
<td>GET</td>
<td>/visualization/{id}</td>
</tr>
<tr>
<td>UPDATE_VISUALIZATION</td>
<td>PUT</td>
<td>/visualization/{id}</td>
</tr>
<tr>
<td>DELETE_VISUALIZATION</td>
<td>DELETE</td>
<td>/visualization/{id}</td>
</tr>
<tr>
<td>LIST_VISUALIZATIONS</td>
<td>GET</td>
<td>/visualization</td>
</tr>
<tr>
<td>CREATE_VISUALIZATION_PROVENANCE_PARTITION</td>
<td>GET</td>
<td>/visualization/ provenance/{year}</td>
</tr>
<tr>
<td>DETACH_VISUALIZATION_PROVENANCE_PARTITION</td>
<td>DELETE</td>
<td>/visualization/ provenance/{year}</td>
</tr>
<tr>
<td>LIST_VISUALIZATION_PROVENANCE_EVENTS</td>
<td>GET</td>
<td>/visualization/ provenance</td>
</tr>
<tr>
<td>SHARE_VISUALIZATION</td>
<td>GET, PUT, POST</td>
<td>/visualization/{id}/ share/{sharer-id}; {sharer-ns}/permission/ {access-permission}</td>
</tr>
<tr>
<td>UNSHARE_VISUALIZATION</td>
<td>DELETE</td>
<td>/visualization/{id}/ share/{sharer-id}; {sharer-ns}</td>
</tr>
<tr>
<td>ADD_SNAPSHOT_TO_VISUALIZATION</td>
<td>POST</td>
<td>/visualization/{id}/ snapshot</td>
</tr>
<tr>
<td>READ_SNAPSHOT</td>
<td>GET</td>
<td>/visualization/{id}/ snapshot/{sid}</td>
</tr>
</tbody>
</table>
Table 42: API for accessing the visualization resource.

<table>
<thead>
<tr>
<th>Action</th>
<th>HTTP Method</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ_SNAPSHOT</td>
<td>GET</td>
<td>/visualization/{id}/snapshot/{sid}/content</td>
</tr>
<tr>
<td>UPDATE_SNAPSHOT</td>
<td>PUT</td>
<td>/visualization/{id}/snapshot/{sid}</td>
</tr>
<tr>
<td>DELETE_SNAPSHOT</td>
<td>DELETE</td>
<td>/visualization/{id}/snapshot/{sid}</td>
</tr>
<tr>
<td>UPDATE_SNAPSHOT</td>
<td>POST, PUT</td>
<td>/visualization/{id}/snapshot/{sid}/content</td>
</tr>
<tr>
<td>UPDATE_SNAPSHOT</td>
<td>DELETE</td>
<td>/visualization/{id}/snapshot/{sid}/content</td>
</tr>
<tr>
<td>READ_VISUALIZATION_FROM_TASK</td>
<td>GET</td>
<td>/task/{id}/content</td>
</tr>
<tr>
<td>READ_VISUALIZATION_FROM_GROUND_TRUTH</td>
<td>GET</td>
<td>/ground-truth/{id}/content</td>
</tr>
<tr>
<td>READ_VISUALIZATION_FROM_EXPERIMENT</td>
<td>GET</td>
<td>/experiment/{id}/content</td>
</tr>
<tr>
<td>READ_VISUALIZATION_FROM_RUN</td>
<td>GET</td>
<td>/run/{id}/content</td>
</tr>
</tbody>
</table>

Table 42: API for accessing the visualization resource.

where {id} is the unique identifier of the visualization; {sharer-id} and {sharer-ns} are the identifier and namespace of the group which shares the visualization; {access-permission} is the access permission to the visualization for the group, namely DENIED, READ_ONLY, READ_WRITE; {sid} is the identifier of a snapshot.

C.4.1.2 XML Representation

```xml
<?xml version="1.0" encoding="utf-8" ?>
    <ims:owner>
      <ims:user ims:identifier="user-1" ims:namespace="http://ims.dei.unipd.it/" />  
      <ims:sharings>
        <ims:sharing>
          <ims:group ims:identifier="group-1" ims:namespace="http://ims.dei.unipd.it/" />
          <ims:access-permission>DENIED</ims:access-permission>
        </ims:sharing>
        <ims:sharing>
          <ims:group ims:identifier="group-2" ims:namespace="http://ims.dei.unipd.it/" />
          <ims:access-permission>READ_ONLY</ims:access-permission>
        </ims:sharing>
        <ims:sharing>
          <ims:group ims:identifier="group-3" ims:namespace="http://ims.dei.unipd.it/" />
          <ims:access-permission>READ_WRITE</ims:access-permission>
        </ims:sharing>
      </ims:sharings>
      <ims:parameters>
        <ims:concept ims:identifier="parameterA" ims:namespace="http://direct.dei.unipd.it/" />  
      </ims:parameters>
    </ims:owner>
  </ims:visualization>
</ims:direct>
```

C.41.3 JSON Representation

```json
{
  "direct": {
    "visualization": {
      "D3.5: Final Prototype of the Evaluation Infrastructure
      Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
    }
  }
}```
"identifier":"v-1",
"created":"2012-09-13T18:50:45.531+02:00",
"last-modified":"2012-09-13T18:50:45.531+02:00",
"parameters":[
  {
    "parameter":{
      "concept":{
        "identifier":"parameterA",
        "namespace":"http://direct.dei.unipd.it/
      },
      "value":"value 1"
    },
  },
  {
    "parameter":{
      "concept":{
        "identifier":"parameterB",
        "namespace":"http://direct.dei.unipd.it/
      },
      "value":"value 2"
    },
  },
  {
    "parameter":{
      "concept":{
        "identifier":"parameterC",
        "namespace":"http://direct.dei.unipd.it/
      },
      "value":"value 3"
    }
  }
],
"concept":{
  "identifier":"type-l, eg. Scatterplot",
  "namespace":"http://ims.dei.unipd.it/
},
"measures":[
  {
    "measure":{
      "identifier":"meas-1"
    }
  },
  {
    "measure":{
      "identifier":"meas-2"
    }
  },
  {
    "measure":{
      "identifier":"meas-3"
    }
  }
],
"estimates":[
  {
    "estimate":{
      "identifier":"est-1"
    }
  }
]
"estimate":{
    "identifier":"est-2"
},
"estimate":{
    "identifier":"est-3"
},
"snapshots":[
    {"snapshot":{
        "identifier":"snp-1"
    }},
    {"snapshot":{
        "identifier":"snp-2"
    }},
    {"snapshot":{
        "identifier":"snp-3"
    }}
],
"experiments":[
    {"experiment":{
        "identifier":"exp-1"
    }},
    {"experiment":{
        "identifier":"exp-2"
    }},
    {"experiment":{
        "identifier":"exp-3"
    }}
],
"ground-truths":[
    {"ground-truth":{
        "identifier":"gt-1"
    }},
    {"ground-truth":{
        "identifier":"gt-2"
    }},
    {"ground-truth":{
        "identifier":"gt-3"
    }}
]
C.41.4 Basic Usage

The basic usage is intended for the cases in which the visualization consists mainly snapshots of reasonably small size. This means that the visualization can be processed as a whole.

**Creation**  To create the visualization, you have to POST at the following URI:

```
/visualization
```

You may decide to not specify the identifier for the visualization and for the snapshots contained in the visualization. In that case the system will automatically set a type 4 UUID [ISO/IEC 9834-8, 2008; Leach et al., 2005] for the visualization and each of its snapshots.

Note that, even if you create a shared visualization, this is not automatically shared with the groups at creation time but, for each group you want to share the visualization with, you need a separate call to the following URI:

```
/visualization/{id}/share/{sharer-id};{sharer-ns}/permission/{access-permission}
```
Reading  To read a whole visualization, you have to GET the following URI:

/visualization/{id}/content

Update  To update the scope and/or the owner and/or the parameters of an visualization, you have to PUT at the following URI:

/visualization/{id}

To update one of the snapshots of the visualization, you have to PUT at the following URI:

/visualization/{id}/snapshot/{sid}

Deletion  To delete a whole visualization, you have to DELETE the following URI:

/visualization/{id}

C.41.5  Advanced Usage

The advanced use stems from the consideration that the payload of a snapshot can be of considerable size, and so a more efficient way of dealing with this use of visualizations is needed. The basic idea here is to allow to create, read, update, and delete the visualization and snapshots separately and, when possible, to avoid the XML or JSON wrapping.

Creation  To create the visualization, without any snapshot, you have to POST at the following URI:

/visualization

a visualization where its representation does not contain any snapshots, as in the XML example below.

[********** TO BE ADDED **********]

Then, to add each snapshot separately to the visualization, you have to POST at the following URI:

/visualization/{id}/snapshot

a representation of a snapshot, as in the XML example below.

[********** TO BE ADDED **********]

If the payload of your snapshot is really huge, you may decide to add the snapshot to the visualization via a POST at the following URI:

/visualization/{id}/snapshot
using representation of a snapshot without the content element, as in the XML example below.

[********** TO BE ADDED **********]

and then upload the actual payload of the snapshot, directly in binary format and specifying its MIME media type in the HTTP headers, via a PUT or POST at the following URI:

/visualization/{id}/snapshot/{sid}/content

Reading  To read an visualization, you have to GET the following URI:

/visualization/{id}

and it will return a representation of the visualization where all its snapshots are listed without reporting their content, as in the XML example below.

[********** TO BE ADDED **********]

Then, you can read the actual content of each snapshot separately via a GET at the following URI:

/visualization/{id}/snapshot/{sid}/content

Update  To update the scope and/or the owner and/or parameters of an visualization, you have to PUT at the following URI:

/visualization/{id}

To update one of the snapshots of the visualization but not its content, you have to PUT at the following URI:

/visualization/{id}/snapshot/{sid}

a representation of the snapshot where the content element is not present, as in the XML example below.

[********** TO BE ADDED **********]

To update the content of one of the snapshots of the visualization, you have to POST or PUT at the following URI:

/visualization/{id}/snapshot/{sid}/content

the actual payload of the snapshot, directly in binary format and specifying its MIME media type in the HTTP headers.

If you perform a DELETE on the same URI, you will empty the content of the snapshot but not delete the snapshot itself.
Deletion  To delete a snapshot of an visualization, you have to DELETE the following URI:

    /visualization/{id}/snapshot/{sid}

To delete a whole visualization, you have to DELETE the following URI:

    /visualization/{id}
D The CQL Context Set

The DIRECT Context Set (version 1.0) has been defined in order to provide a uniform query syntax to DIRECT by using the Contextual Query Language (CQL) [OASIS Search Web Services Technical Committee, 2012], developed and maintained by the Library of Congress in the context of the Z39.50 Next Generation (ZING) project.

The DIRECT Context Set implements all the search capabilities discussed in Section ??.

DIRECT provides conformance to CQL up to Level 2, since:

- Level 0:
  1. it is able to process a term-only query;
  2. if an unsupported query is supplied, it is able to respond with a diagnostic to say that the query is not supported;

- Level 1:
  1. it supports Level 0;
  2. it is able to parse both:
     (a) search clauses consisting of “index relation searchTerm”; and
     (b) queries where search terms are combined with Boolean operators;
  3. it supports both (a) and (b) above;

- Level 2:
  1. it supports Level 1;
  2. it is able to parse all of CQL and respond with appropriate diagnostics for the parts not supported.

D.1 Indexes

This section describes the indexes available in the DIRECT context set for searching and accessing the different resources managed by the system.

In the following there is a table summarizing all the indexes available for a given resource. The table contains:

- the full index name and an alias that can be used for convenience in writing queries;
- the type of the index – whether exact or best match;
- the relations allowed for the index;
- the wildcards that can be used with the index, if any;
- a short description of the matching criteria of the index.

This is presented in Sections from D.1.1 to D.1.6.
# D.1.1 Log Event Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.logEvent. identifier</td>
<td>ici.le.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches log events with respect to their identifier (a positive integer)</td>
</tr>
<tr>
<td>ici.logEvent. level</td>
<td>ici.le.level</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches metadata sets with respect to their level, which is defined as the following enumeration: TRACE, DEBUG, INFO, WARN, ERROR, FATAL</td>
</tr>
<tr>
<td>ici.logEvent. created</td>
<td>ici.le.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches log events with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici.logEvent. thread</td>
<td>ici.le.thread</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the thread generating them</td>
</tr>
<tr>
<td>ici.logEvent. className</td>
<td>ici.le.clName</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the name of the class generating them</td>
</tr>
<tr>
<td>ici.logEvent. classFileName</td>
<td>ici.le.clsFileName</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the name of the file of the class generating them</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>---------------</td>
<td>-----------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.logEvent. classLine</td>
<td>ici.le. clsLine</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches log events with respect to the line of the file of the class generating them (a positive integer)</td>
</tr>
<tr>
<td>ici.logEvent. methodName</td>
<td>ici.le. methodName</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the name of the method generating them.</td>
</tr>
<tr>
<td>ici.logEvent. ip</td>
<td>ici.le.ip</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches log events with respect to IP address of the client generating them.</td>
</tr>
<tr>
<td>ici.logEvent. user.identifier</td>
<td>ici.le.u.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the identifier of the user generating them.</td>
</tr>
<tr>
<td>ici.logEvent. user.namespace.identifier</td>
<td>ici.le.u.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the identifier of the namespace of the user generating them.</td>
</tr>
<tr>
<td>ici.logEvent. action</td>
<td>ici.le. action</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the action generating them.</td>
</tr>
<tr>
<td>ici.logEvent. resource. identifier</td>
<td>ici.le.r.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the identifier of the resource involved by them.</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>-----------</td>
<td>-----------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.logEvent.resource.namespace.identifier</td>
<td>ici.le.r.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the identifier of the namespace of the resource involved by them</td>
</tr>
<tr>
<td>ici.logEvent.resource.class</td>
<td>ici.le.cls</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches log events with respect to the class of the resource involved by them</td>
</tr>
<tr>
<td>ici.logEvent.message</td>
<td>ici.le.msg</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches log events with respect to their message</td>
</tr>
<tr>
<td>ici.logEvent.exception</td>
<td>ici.le.ex</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches log events with respect to the exception described in them</td>
</tr>
<tr>
<td>ici.logEvent.general</td>
<td>ici.le.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches log events with respect to the content of all their attributes</td>
</tr>
</tbody>
</table>

Table 43: Indexes for searching the log event resource.

D.1.2 Namespace Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.namespace.identifier</td>
<td>ici.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches namespaces with respect to their identifier</td>
</tr>
<tr>
<td>ici.namespace.prefix</td>
<td>ici.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches namespaces with respect to their prefix</td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.namespace. description</td>
<td>ici.ns.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches namespaces with respect to their description</td>
</tr>
<tr>
<td>ici.namespace. general</td>
<td>ici.ns.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches namespaces with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici.namespace. created</td>
<td>ici.ns. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches namespaces with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici.namespace. lastModified</td>
<td>ici.ns. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches namespaces with respect to their last modification timestamp</td>
</tr>
</tbody>
</table>

Table 44: Indexes for searching the namespace resource.

**D.1.3 Concept Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.concept. identifier</td>
<td>ici.c.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to their identifier</td>
</tr>
<tr>
<td>ici.concept. namespace. identifier</td>
<td>ici.c.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>ici.concept. namespace. prefix</td>
<td>ici.c.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the prefix of their namespace</td>
</tr>
<tr>
<td>ici.concept. description</td>
<td>ici.c.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches concepts with respect to their description</td>
</tr>
<tr>
<td>ici.concept. general</td>
<td>ici.c.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches concepts with respect to the content of all their attributes</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.concept.created</td>
<td>ici.c.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;,</td>
<td>No</td>
<td>Matches concepts with respect to their creation timestamp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;, &lt;, &gt;=, &lt;=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.concept.lastModified</td>
<td>ici.c. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;,</td>
<td>No</td>
<td>Matches concepts with respect to their last modification timestamp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;, &lt;, &gt;=, &lt;=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.concept.source.identifier</td>
<td>ici.c.s.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the concepts that</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>are linking to this concept, i.e. they act as source in a relation with</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>this concept</td>
</tr>
<tr>
<td>ici.concept.source.namespace.identifier</td>
<td>ici.c.s.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the namespace of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>concepts that are linking to this concept, i.e. they act as source in a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>relation with this concept</td>
</tr>
<tr>
<td>ici.concept.source.namespace.prefix</td>
<td>ici.c.s.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the prefix of the namespace of the concepts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>that are linking to this concept, i.e. they act as source in a relation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with this concept</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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<td>-------------</td>
</tr>
<tr>
<td>ici.concept. source. relation. identifier</td>
<td>c.s.r.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the relation of the concepts that are linking to this concept, i.e. they act as source in a relation with this concept.</td>
</tr>
<tr>
<td>ici.concept. source. relation. namespace. identifier</td>
<td>c.s.r.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the namespace of the relation of the concepts that are linking to this concept, i.e. they act as source in a relation with this concept.</td>
</tr>
<tr>
<td>ici.concept. source. relation. namespace. prefix</td>
<td>c.s.r.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the namespace of the relation of the concepts that are linking to this concept, i.e. they act as source in a relation with this concept.</td>
</tr>
<tr>
<td>ici.concept. source. relation.score</td>
<td>ici.u.s.r. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches source concepts with respect to the score of the relation between a source concept and the target one.</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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<td>-------------</td>
</tr>
<tr>
<td>ici.concept. target. namespace. identifier</td>
<td>ici.c.s.ns. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the namespace of the concepts that are linked by this concept, i.e. they act as target in a relation with this concept</td>
</tr>
<tr>
<td>ici.concept. target. namespace. prefix</td>
<td>ici.c.s.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the prefix of the namespace of the concepts that are linked by this concept, i.e. they act as target in a relation with this concept</td>
</tr>
<tr>
<td>ici.concept. target. relation. identifier</td>
<td>c.s.r.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the relation of the concepts that are linked by this concept, i.e. they act as target in a relation with this concept</td>
</tr>
<tr>
<td>ici.concept. target. relation.score</td>
<td>ici.u.t.r. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches target concepts with respect to the score of the relation between a source concept and the target one</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.concept.measure.created</td>
<td>ici.c.m. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches concepts with respect to the associated measure creation timestamp</td>
</tr>
<tr>
<td>ici.concept.measure.value</td>
<td>ici.c.m.m. value</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concept with respect to their measure value</td>
</tr>
<tr>
<td>ici.concept.measure.year</td>
<td>ici.u.m.m. year</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concept with respect to their measure year</td>
</tr>
<tr>
<td>ici.concept.measure.metric.identifier</td>
<td>ici.c.m.m. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.concept.measure.metric.namespace.identifier</td>
<td>ici.c.m.m. m.m.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.concept.measure.metric.namespace.prefix</td>
<td>ici.c.m.m. m.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace prefix of the metric associated to them</td>
</tr>
<tr>
<td>ici.concept.featured.user.identifier</td>
<td>ici.c.featured.u.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the featured user</td>
</tr>
<tr>
<td>ici.concept.featured.user.namespace.identifier</td>
<td>ici.c.featured.u.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace identifier of the featured user</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
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<td>----------------------------------------</td>
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<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.concept. featured.user. namespace. prefix</td>
<td>ici.c. featured. u.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace prefix of the featured user</td>
</tr>
<tr>
<td>ici.concept. featured.user. score</td>
<td>ici.c. featured. u.score</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concepts with respect to the score of the relation between a concept and a user</td>
</tr>
<tr>
<td>ici.concept. featured.user. backwardScore</td>
<td>ici.c. featured.u.backwardScore</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concepts with respect to the score of the relation between a user and a concept</td>
</tr>
<tr>
<td>ici.concept. featured. contribution. identifier</td>
<td>ici.c. featured. cnt. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the featured contribution</td>
</tr>
<tr>
<td>ici.concept. featured. contribution. score</td>
<td>ici.c. featured. cnt.score</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concepts with respect to the score of the relation between a concept and a contribution</td>
</tr>
<tr>
<td>ici.concept. stastistic. created</td>
<td>ici.c.s. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &lt;=, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches concepts with respect to the associated statistic creation timestamp</td>
</tr>
<tr>
<td>ici.concept. stastistic. value</td>
<td>ici.c.s. value</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concept with respect to their statistic value</td>
</tr>
<tr>
<td>ici.concept. stastistic. year</td>
<td>ici.c.m.m. year</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches concept with respect to their statistic year</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
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<td>-------------</td>
</tr>
<tr>
<td>ici.concept. statistic. metric. identifier</td>
<td>ici.c.s.m. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.concept. statistic. metric. namespace. identifier</td>
<td>ici.c.s.m.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.concept. statistic. metric. namespace. prefix</td>
<td>ici.c.s.m.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace prefix of the metric associated to them</td>
</tr>
<tr>
<td>ici.concept. statistic. descriptiveStatistic. identifier</td>
<td>ici.c.s.ds. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the identifier of the descriptiveStatistic associated to them</td>
</tr>
<tr>
<td>ici.concept. statistic. descriptiveStatistic. namespace. identifier</td>
<td>ici.c.s.ds.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace identifier of the descriptiveStatistic associated to them</td>
</tr>
<tr>
<td>ici.concept. statistic. descriptiveStatistic. namespace. prefix</td>
<td>ici.c.s.ds.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches concepts with respect to the namespace prefix of the descriptiveStatistic associated to them</td>
</tr>
</tbody>
</table>

Table 45: Indexes for searching the concept resource.

D.1.4 Group Indexes
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.group. identifier</td>
<td>ici.g.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to their identifier</td>
</tr>
<tr>
<td>ici.group. namespace. identifier</td>
<td>ici.g.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>ici.group. namespace. prefix</td>
<td>ici.g.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the prefix of their namespace</td>
</tr>
<tr>
<td>ici.group. description</td>
<td>ici.g.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches groups with respect to their description</td>
</tr>
<tr>
<td>ici.group. general</td>
<td>ici.g.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches groups with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici.group.user. identifier</td>
<td>ici.g.u.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the identifier of the users belonging to them</td>
</tr>
<tr>
<td>ici.group.user.namespace. identifier</td>
<td>ici.g.u.ns. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the identifier of the namespace of the users belonging to them</td>
</tr>
<tr>
<td>ici.group.user.namespace. prefix</td>
<td>ici.g.u.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the prefix of the namespace of the users belonging to them</td>
</tr>
<tr>
<td>ici.group. created</td>
<td>ici.g.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches groups with respect to their creation timestamp</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
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<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>ici.group. lastModified</td>
<td>ici.g. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches groups with respect to their last modification timestamp</td>
</tr>
<tr>
<td>ici.group.user.identifier</td>
<td>ici.g.u.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the identifier of the users belonging to them</td>
</tr>
<tr>
<td>ici.group.user.namespace.identifier</td>
<td>ici.g.u.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the identifier of the namespace of the users belonging to them</td>
</tr>
<tr>
<td>ici.group.user.namespace.prefix</td>
<td>ici.g.u.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groups with respect to the prefix of the namespace of the users belonging to them</td>
</tr>
</tbody>
</table>

Table 46: Indexes for searching the group resource.

D.1.5 Role Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.role. identifier</td>
<td>ici.r.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to their identifier</td>
</tr>
<tr>
<td>ici.role.namespace.identifier</td>
<td>ici.r.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>ici.role.namespace.prefix</td>
<td>ici.r.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the prefix of their namespace</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.role. description</td>
<td>ici.r.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches roles with respect to their description</td>
</tr>
<tr>
<td>ici.role. general</td>
<td>ici.r.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches roles with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici.role.user. identifier</td>
<td>ici.r.u.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the identifier of the users belonging to them</td>
</tr>
<tr>
<td>ici.role.user. namespace. identifier</td>
<td>ici.r.u.ns. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the identifier of the namespace of the users belonging to them</td>
</tr>
<tr>
<td>ici.role.user. namespace. prefix</td>
<td>ici.r.u.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the prefix of the namespace of the users belonging to them</td>
</tr>
<tr>
<td>ici.role. created</td>
<td>ici.r. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches roles with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici.role. lastModified</td>
<td>ici.r. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches roles with respect to their last modification timestamp</td>
</tr>
<tr>
<td>ici.role.user. identifier</td>
<td>ici.r.u.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the identifier of the users belonging to them</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>--------------</td>
<td>------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.role.user.namespace.identifier</td>
<td>ici.r.u.ns.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the identifier of the namespace of the users belonging to them</td>
</tr>
<tr>
<td></td>
<td>id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.role.user.namespace.prefix</td>
<td>ici.r.u.ns.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches roles with respect to the prefix of the namespace of the users belonging to them</td>
</tr>
<tr>
<td></td>
<td>prefix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 47: Indexes for searching the role resource.

### D.1.6 User Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.user.identifier</td>
<td>ici.u.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their identifier</td>
</tr>
<tr>
<td>ici.user.namespace.identifier</td>
<td>ici.u.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>ici.user.namespace.prefix</td>
<td>ici.u.ns.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the prefix of their namespace</td>
</tr>
<tr>
<td></td>
<td>prefix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user.lastName</td>
<td>ici.u.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their last/family name</td>
</tr>
<tr>
<td></td>
<td>lastName</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user.firstName</td>
<td>ici.u.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their first name</td>
</tr>
<tr>
<td></td>
<td>firstName</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user.affiliation</td>
<td>ici.u.</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches users with respect to their affiliation</td>
</tr>
<tr>
<td></td>
<td>affiliation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.user.email</td>
<td>ici.u.email</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their email address</td>
</tr>
<tr>
<td>ici.user.country</td>
<td>ici.u.country</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their country expressed using ISO 3166-1:2006 three letters codes</td>
</tr>
<tr>
<td>ici.user.language</td>
<td>ici.u.lang</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their language expressed using ISO 639-2:1998 three letters codes</td>
</tr>
<tr>
<td>ici.user.birthDate</td>
<td>ici.u.birthDate</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches users with respect to their birth date</td>
</tr>
<tr>
<td>ici.user.gender</td>
<td>ici.u.gender</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches users with respect to their gender (MALE or FEMALE).</td>
</tr>
<tr>
<td>ici.user.address</td>
<td>ici.u.address</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches users with respect to their address</td>
</tr>
<tr>
<td>ici.user.city</td>
<td>ici.u.city</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their city</td>
</tr>
<tr>
<td>ici.user.state</td>
<td>ici.u.state</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their state/province/region</td>
</tr>
<tr>
<td>ici.user.zip</td>
<td>ici.u.zip</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their ZIP code</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------</td>
<td>---------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user.phone</td>
<td>ici.u.phone</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their telephone number</td>
</tr>
<tr>
<td>ici.user.facsimile</td>
<td>ici.u.facsimile</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their facsimile number</td>
</tr>
<tr>
<td>ici.user.mobile</td>
<td>ici.u.mobile</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their mobile telephone number</td>
</tr>
<tr>
<td>ici.user.voipCallerId</td>
<td>ici.u.voip</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their VoIP caller identifier</td>
</tr>
<tr>
<td>ici.user.homepage</td>
<td>ici.u.homepage</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to their home page address.</td>
</tr>
<tr>
<td>ici.user.general</td>
<td>ici.u.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches users with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici.user.group.identifier</td>
<td>ici.u.g.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the groups they belong to</td>
</tr>
<tr>
<td>ici.user.group.namespace.</td>
<td>ici.u.g.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the namespace of the groups they belong to</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user.group.namespace.prefix</td>
<td>ici.u.g.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the prefix of the namespace of the groups they belong to</td>
</tr>
<tr>
<td>ici.user.role.identifier</td>
<td>ici.u.r.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the roles they belong to</td>
</tr>
<tr>
<td>ici.user.role.namespace.identifier</td>
<td>ici.u.r.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the namespace of the roles they belong to</td>
</tr>
<tr>
<td>ici.user.role.namespace.prefix</td>
<td>ici.u.r.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the prefix of the namespace of the roles they belong to</td>
</tr>
<tr>
<td>ici.user.created</td>
<td>ici.u.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches users with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici.user.lastModified</td>
<td>ici.u.lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches users with respect to their last modification timestamp</td>
</tr>
<tr>
<td>ici.user.source.identifier</td>
<td>ici.u.s.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the source user they are related to</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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<tr>
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<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user. source. namespace.</td>
<td>ici.u.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace identifier of the source user they are related to</td>
</tr>
<tr>
<td>prefix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user. source. relation.</td>
<td>ici.u.s.r. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches source users with respect to the identifier of the relation connecting two users</td>
</tr>
<tr>
<td>identifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user. source. relation.</td>
<td>ici.u.s.r. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches source users with respect to the namespace identifier of the relation connecting two users</td>
</tr>
<tr>
<td>namespace. identifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user. source. relation.</td>
<td>ici.u.s.r. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches source users with respect to the namespace prefix of the relation connecting two users</td>
</tr>
<tr>
<td>namespace. prefix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user. source. relation.</td>
<td>ici.u.s.r. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;,</td>
<td>No</td>
<td>Matches source users with respect to the score of the relation connecting two users</td>
</tr>
<tr>
<td>score</td>
<td></td>
<td></td>
<td>&gt;, &lt;=, &gt;=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ici.user. target. identifier</td>
<td>ici.u.t. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the target user they are related to</td>
</tr>
<tr>
<td>target. identifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
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<td>--------------------</td>
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<td>-----------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user. target. namespace. identifier</td>
<td>ici.u.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace identifier of the target user they are related to</td>
</tr>
<tr>
<td>ici.user. target. namespace. prefix</td>
<td>ici.u.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace prefix of the target user they are related to</td>
</tr>
<tr>
<td>ici.user. target. relation. identifier</td>
<td>ici.u. target.r. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches target users with respect to the identifier of the relation connecting two users</td>
</tr>
<tr>
<td>ici.user. target. relation. namespace. identifier</td>
<td>ici.u.t.r. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches target users with respect to the namespace identifier of the relation connecting two users</td>
</tr>
<tr>
<td>ici.user. target. relation. namespace. prefix</td>
<td>ici.u.t.r. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches target users with respect to the namespace prefix of the relation connecting two users</td>
</tr>
<tr>
<td>ici.user. target. relation.score</td>
<td>ici.u.t.r. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, =&gt;</td>
<td>No</td>
<td>Matches target users with respect to the score of the relation connecting two users</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user. feature. concept. identifier</td>
<td>ici.u. feature. c.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users features with respect to the identifier of the concept defining the feature</td>
</tr>
<tr>
<td>ici.user. feature. concept. namespace. identifier</td>
<td>ici.u. feature. c.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users features with respect to the namespace identifier of the concept defining the feature</td>
</tr>
<tr>
<td>ici.user. feature. concept. namespace. prefix</td>
<td>ici.u. feature. c.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users features with respect to the namespace prefix of the concept defining the feature</td>
</tr>
<tr>
<td>ici.user. feature. concept. score</td>
<td>ici.u. feature. c.score</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, =&gt;</td>
<td>No</td>
<td>Matches users features with respect to the score of the user with respect to the feature</td>
</tr>
<tr>
<td>ici.user. feature. concept. backwardScore</td>
<td>ici.u. feature.c.backwardScore</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, =&gt;</td>
<td>No</td>
<td>Matches users features with respect to the score of the feature with respect to the user</td>
</tr>
<tr>
<td>ici.user. measure.created</td>
<td>ici.u. measure.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, =&gt;</td>
<td>No</td>
<td>Matches users with respect to the associated measure creation timestamp</td>
</tr>
<tr>
<td>ici.user. measure.value</td>
<td>ici.u. measure.value</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, =&gt;</td>
<td>No</td>
<td>Matches user with respect to their measure value</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
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<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user.measure.year</td>
<td>ici.u.measure.year</td>
<td>Exact Match</td>
<td>=, ==, &lt;, &gt;, &lt;=, &gt;=</td>
<td>No</td>
<td>Matches user with respect to their measure year</td>
</tr>
<tr>
<td>ici.user.metric.identifier</td>
<td>ici.u.metric.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.user.metric.namespace.identifier</td>
<td>ici.u.metric.ns.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.user.metric.namespace.prefix</td>
<td>ici.u.metric.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace prefix of the metric associated to them</td>
</tr>
<tr>
<td>ici.user.statistic.created</td>
<td>ici.u.s.created</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches users with respect to the associated statistic creation timestamp</td>
</tr>
<tr>
<td>ici.user.statistic.value</td>
<td>ici.u.s.value</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;, &gt;, &lt;, &gt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches user with respect to their statistic value</td>
</tr>
<tr>
<td>ici.user.statistic.year</td>
<td>ici.u.m.m.year</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;, &gt;, &lt;, &gt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches user with respect to their statistic year</td>
</tr>
<tr>
<td>ici.user.statistic.metric.identifier</td>
<td>ici.u.s.m.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt; &gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the metric associated to them</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici.user. statistic. metric. namespace. identifier</td>
<td>ici.u. s.m.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace identifier of the metric associated to them</td>
</tr>
<tr>
<td>ici.user. statistic. metric. namespace. prefix</td>
<td>ici.u.s.m.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace prefix of the metric associated to them</td>
</tr>
<tr>
<td>ici.user. statistic. descriptiveStatistic. identifier</td>
<td>ici.u.s.ds.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the identifier of the descriptiveStatistic associated to them</td>
</tr>
<tr>
<td>ici.user. statistic. descriptiveStatistic. namespace. identifier</td>
<td>ici.u.s.ds.ns.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace identifier of the descriptiveStatistic associated to them</td>
</tr>
<tr>
<td>ici.user. statistic. descriptiveStatistic. namespace. prefix</td>
<td>ici.u.s.ds.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches users with respect to the namespace prefix of the descriptiveStatistic associated to them</td>
</tr>
</tbody>
</table>

Table 48: Indexes for searching the user resource.

D.1.7 Metadata Set Indexes
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici. metadataSet. identifier</td>
<td>ici.ms.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to their identifier</td>
</tr>
<tr>
<td>ici. metadataSet. namespace. identifier</td>
<td>ici.ms.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>ici. metadataSet. namespace. prefix</td>
<td>ici.ms.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the prefix of their namespace</td>
</tr>
<tr>
<td>ici. metadataSet. name</td>
<td>ici.ms.name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to their name</td>
</tr>
<tr>
<td>ici. metadataSet. description</td>
<td>ici.ms.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches metadata sets with respect to their description</td>
</tr>
<tr>
<td>ici. metadataSet. general</td>
<td>ici.ms.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches metadata sets with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici. metadataSet. superset. identifier</td>
<td>ici.ms. superset.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of the supersets they belong to</td>
</tr>
<tr>
<td>ici. metadataSet. superset. name</td>
<td>ici.ms. superset. name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of the supersets they belong to</td>
</tr>
<tr>
<td>ici. metadataSet. superset. namespace. identifier</td>
<td>ici.ms. superset. ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of the namespace of the supersets they belong to</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>-----------------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici. metadataSet. superset. namespace. prefix</td>
<td>ici.ms. superset. ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the prefix of the namespaces they belong to</td>
</tr>
<tr>
<td>ici. metadataSet. subset. identifier</td>
<td>ici.ms. subset.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of the subsets belonging to them</td>
</tr>
<tr>
<td>ici. metadataSet. subset. name</td>
<td>ici.ms. subset.name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of the subsets belonging to them</td>
</tr>
<tr>
<td>ici. metadataSet. subset. namespace. identifier</td>
<td>ici.ms. subset.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the identifier of the subsets belonging to them</td>
</tr>
<tr>
<td>ici. metadataSet. subset. namespace. prefix</td>
<td>ici.ms. subset.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata sets with respect to the prefix of the subsets belonging to them</td>
</tr>
<tr>
<td>ici. metadataSet. created</td>
<td>ici.ms. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches metadata sets with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici. metadataSet. lastModified</td>
<td>ici.ms. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches metadata sets with respect to their last modification timestamp</td>
</tr>
</tbody>
</table>

Table 49: Indexes for searching the metadata set resource.

D.1.8 Metadata Indexes
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.metadata. identifier</td>
<td>ici.md.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to their identifier</td>
</tr>
<tr>
<td>ici.metadata. namespace. identifier</td>
<td>ici.md.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>ici.metadata. namespace. prefix</td>
<td>ici.md.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to the prefix of their namespace</td>
</tr>
<tr>
<td>ici.metadata. general</td>
<td>ici.md.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches metadata with respect to their textual content</td>
</tr>
<tr>
<td>ici.metadata. metadataSet. identifier</td>
<td>ici.md.ms.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to the identifier of the metadata sets they belong to</td>
</tr>
<tr>
<td>ici.metadata. metadataSet. name</td>
<td>ici.md.ms. name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to the name of the metadata sets they belong to</td>
</tr>
<tr>
<td>ici.metadata. metadataSet. namespace. identifier</td>
<td>ici.md.ms. ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to the identifier of the namespace of the metadata sets they belong to</td>
</tr>
<tr>
<td>ici.metadata. metadataSet. namespace. prefix</td>
<td>ici.md.ms. ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches metadata with respect to the prefix of the namespace of the metadata sets they belong to</td>
</tr>
</tbody>
</table>
### Table 50: Indexes for searching the metadata resource.

The following table summarizes indexes that concern all the metadata resources in the Simple Dublin Core (DC) format according to the Dublin Core Context Set [OASIS Search Web Services Technical Committee, 2012].

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.metadata.created</td>
<td>ici.md. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches metadata with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici.metadata.lastModified</td>
<td>ici.md. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches metadata with respect to their last modification timestamp</td>
</tr>
</tbody>
</table>

### Table 50: Indexes for searching the metadata resource.

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc.contributor</td>
<td>dc. contributor</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their contributor element</td>
</tr>
<tr>
<td>dc.coverage</td>
<td>dc.coverage</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their coverage element</td>
</tr>
<tr>
<td>dc.creator</td>
<td>dc.creator</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their creator element</td>
</tr>
<tr>
<td>dc.date</td>
<td>dc.date</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their date element</td>
</tr>
<tr>
<td>dc.description</td>
<td>dc. description</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their description element</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
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<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>dc.format</td>
<td>dc.format</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their format element</td>
</tr>
<tr>
<td>dc.identifier</td>
<td>dc. identifier</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their identifier element</td>
</tr>
<tr>
<td>dc.language</td>
<td>dc.language</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their language element</td>
</tr>
<tr>
<td>dc.publisher</td>
<td>dc.publisher</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their publisher element</td>
</tr>
<tr>
<td>dc.relation</td>
<td>dc.relation</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their relation element</td>
</tr>
<tr>
<td>dc.rights</td>
<td>dc.rights</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their rights element</td>
</tr>
<tr>
<td>dc.source</td>
<td>dc.source</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their source element</td>
</tr>
<tr>
<td>dc.subject</td>
<td>dc.subject</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their subject element</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>dc.title</td>
<td>dc.title</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their title element</td>
</tr>
<tr>
<td>dc.type</td>
<td>dc.type</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Dublin Core metadata with respect to their type element</td>
</tr>
</tbody>
</table>

Table 51: Indexes for searching the metadata resource according to the Dublin Core context set.

### D.1.9 Application Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. applications. identifier</td>
<td>direct.app. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches applications with respect to their identifier</td>
</tr>
<tr>
<td>direct. applications. description</td>
<td>direct.app. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches applications with respect to their description</td>
</tr>
<tr>
<td>direct. applications. name</td>
<td>direct.app. name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches applications with respect to their name</td>
</tr>
<tr>
<td>direct. applications. general</td>
<td>direct.app. gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches applications with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct. applications. created</td>
<td>direct.app. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches applications with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. applications. lastModified</td>
<td>direct.app. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches applications with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct. applications. configuration. identifier</td>
<td>direct.app. conf.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches applications with respect to the identifier of the configuration which they use.</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
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</tr>
<tr>
<td>direct. components. id</td>
<td>direct.cmp. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches components with respect to their identifier</td>
</tr>
<tr>
<td>direct. components. desc</td>
<td>direct.cmp. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>?</td>
<td>Matches components with respect to their description</td>
</tr>
<tr>
<td>direct. components. name</td>
<td>direct.cmp. name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches components with respect to their name</td>
</tr>
<tr>
<td>direct. components. gen</td>
<td>direct.cmp. gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>?</td>
<td>Matches components with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct. components. created</td>
<td>direct.cmp. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches components with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. components. lastModified</td>
<td>direct.cmp. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches components with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct. components. conf.id</td>
<td>direct.cmp. conf.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches components with respect to the identifier of the configuration which they use.</td>
</tr>
<tr>
<td>ici.components. ns.id</td>
<td>ici.cmp.ns. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches components with respect to the identifier of their namespace</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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</tr>
<tr>
<td>ici.components.namespace.prefix</td>
<td>ici.cmp.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches components with respect to the prefix of their namespace</td>
</tr>
</tbody>
</table>

Table 53: Indexes for searching the component resource.

## D.1.11 Configuration Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.configurations.identifier</td>
<td>direct.cnf. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches configurations with respect to their identifier</td>
</tr>
<tr>
<td>direct.configurations.description</td>
<td>direct.cnf. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches configurations with respect to their description</td>
</tr>
<tr>
<td>direct.configurations.general</td>
<td>direct.cnf. gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches configurations with respect to the content of all their attributes</td>
</tr>
</tbody>
</table>

Table 54: Indexes for searching the configuration resource.

## D.1.12 Contribution Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici.contributions.identifier</td>
<td>ici.cnt.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their identifier</td>
</tr>
<tr>
<td>ici.contributions.mediaType</td>
<td>ici.cnt. mediaType</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their media type</td>
</tr>
<tr>
<td>ici.contributions.language</td>
<td>ici.cnt. language</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their language</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ici. contributions. link</td>
<td>ici.cnt.link</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their link</td>
</tr>
<tr>
<td>ici. contributions. scope</td>
<td>ici.cnt.scope</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their scope</td>
</tr>
<tr>
<td>ici. contributions. description</td>
<td>ici.cnt.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches contributions with respect to their description</td>
</tr>
<tr>
<td>ici. contributions. title</td>
<td>ici.cnt.title</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their title</td>
</tr>
<tr>
<td>ici. contributions. content</td>
<td>ici.cnt.cont</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches contributions with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici. contributions. general</td>
<td>ici.cnt.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches contributions with respect to the content of all their attributes</td>
</tr>
<tr>
<td>ici. contributions. created</td>
<td>ici.cnt.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches contributions with respect to their creation timestamp</td>
</tr>
<tr>
<td>ici. contributions. lastModified</td>
<td>ici.cnt.lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches contributions with respect to their last modification timestamp</td>
</tr>
<tr>
<td>ici. contributions. owner. identifier</td>
<td>ici.cnt.owner. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their owner identifier</td>
</tr>
<tr>
<td>ici. contributions. owner. namespace. identifier</td>
<td>ici.cnt.owner.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their owner namespace identifier</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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</tr>
<tr>
<td>ici. contributions. owner. namespace. prefix</td>
<td>ici.cnt. owner. namespace. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their own namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. sharingGroup. identifier</td>
<td>ici.cnt. sharingGroup. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their sharing group identifier</td>
</tr>
<tr>
<td>ici. contributions. sharingGroup. ns. identifier</td>
<td>ici.cnt. sharingGroup. ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their sharing group namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. sharingGroup. namespace. prefix</td>
<td>ici.cnt. sharingGroup. namespace. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their sharing group namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. metadata. identifier</td>
<td>ici.cnt. metadata. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their metadata identifier</td>
</tr>
<tr>
<td>ici. contributions. metadata. ns. identifier</td>
<td>ici.cnt. metadata. ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their metadata namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. metadata. namespace. prefix</td>
<td>ici.cnt. metadata. namespace. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their metadata namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. metadata. relation. identifier</td>
<td>ici.cnt. metadata. relation. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their metadata relation identifier</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
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<tr>
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<td>ici.cnt. metadata. relation.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their metadata relation namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. metadata. relation. namespace. prefix</td>
<td>ici.cnt. metadata. relation. namespace. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their metadata relation namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. metadata. relation. score</td>
<td>ici.cnt. metadata. relation. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches contributions with respect to their metadata relation score</td>
</tr>
<tr>
<td>ici. contributions. contributionYear</td>
<td>ici.cnt. cntYear</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches contributions with respect to their year</td>
</tr>
<tr>
<td>ici. contributions. type.identifier</td>
<td>ici.cnt. type. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their type identifier</td>
</tr>
<tr>
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<td>ici.cnt. type.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their type namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. type.namespace. prefix</td>
<td>ici.cnt. type. namespace. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their type namespace prefix</td>
</tr>
<tr>
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<td>ici.cnt. author. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their author identifier</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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<tr>
<td>ici. contributions. author.</td>
<td>ici.cnt. author.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their author namespace identifier</td>
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<td>Exact Match</td>
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<td>* and ?</td>
<td>Matches contributions with respect to their author namespace prefix</td>
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<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their author first name</td>
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<td>firstName</td>
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<tr>
<td>ici. contributions. author.</td>
<td>ici.cnt. author. lastName</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their author last name</td>
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<tr>
<td>ici. contributions. publisher.</td>
<td>ici.cnt. publisher. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their publisher identifier</td>
</tr>
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<tr>
<td>ici. contributions. publisher.</td>
<td>ici.cnt. publisher. ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
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<tr>
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<td>ici.cnt. publisher. namespace.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their publisher namespace prefix</td>
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<td>ici.cnt.m. created</td>
<td>Exact Match</td>
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<td>Matches contributions with respect to their measure creation timestamp</td>
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<td>ici. contributions. measure.value</td>
<td>ici.cnt.m. value</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;=, &lt;=</td>
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<td>Matches contributions with respect to their measure value</td>
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<td>ici.cnt.m. year</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches contributions with respect to their measure year</td>
</tr>
<tr>
<td>ici. contributions. measure.metric.identifier</td>
<td>ici.cnt.m.m. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, * and ?</td>
<td></td>
<td>Matches contributions with respect to their measure metric identifier</td>
</tr>
<tr>
<td>ici. contributions. measure.metric.namespace.identifier</td>
<td>ici.cnt.m.m.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, * and ?</td>
<td></td>
<td>Matches contributions with respect to their measure metric namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. measure.metric.namespace.prefix</td>
<td>ici.cnt.m.m.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, * and ?</td>
<td></td>
<td>Matches contributions with respect to their measure metric namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. source.identifier</td>
<td>ici.cnt. source.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, * and ?</td>
<td></td>
<td>Matches contributions with respect to their source identifier</td>
</tr>
<tr>
<td>ici. contributions. source.relation.identifier</td>
<td>ici.cnt. source.relation.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, * and ?</td>
<td></td>
<td>Matches contributions with respect to their source relation identifier</td>
</tr>
<tr>
<td>ici. contributions. source.relation.namespace.identifier</td>
<td>ici.cnt. source.relation.ns.identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, * and ?</td>
<td></td>
<td>Matches contributions with respect to their source relation namespace identifier</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
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</tr>
<tr>
<td>ici. contributions. source. relation. namespace. prefix</td>
<td>ici.cnt. source. relation. ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their source relation namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. source. relation.score</td>
<td>ici.cnt. source. relation. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches contributions with respect to their source relation score</td>
</tr>
<tr>
<td>ici. contributions. source. relation. frequency</td>
<td>ici.cnt. source. relation. frequency</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches contributions with respect to their source relation frequency</td>
</tr>
<tr>
<td>ici. contributions. target. identifier</td>
<td>ici.cnt. target. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their target identifier</td>
</tr>
<tr>
<td>ici. contributions. target. relation. identifier</td>
<td>ici.cnt. target. relation. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their target relation identifier</td>
</tr>
<tr>
<td>ici. contributions. target. relation. namespace. identifier</td>
<td>ici.cnt. target. relation.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their target relation namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. target. relation. namespace. prefix</td>
<td>ici.cnt. target. relation. ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their target relation namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. target. relation.score</td>
<td>ici.cnt. target. relation. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches contributions with respect to their target relation score</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
<td>------------</td>
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<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>ici. contributions. target. relation. frequency</td>
<td>ici.cnt. target. relation. frequency</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches contributions with respect to their target relation frequency</td>
</tr>
<tr>
<td>ici. contributions. feature. concept. identifier</td>
<td>ici.cnt. feature. concept. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their feature concept identifier</td>
</tr>
<tr>
<td>ici. contributions. feature. concept. namespace. identifier</td>
<td>ici.cnt. feature. concept.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their feature concept namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. feature. concept. namespace. prefix</td>
<td>ici.cnt. feature. concept.ns. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their feature concept namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. feature. concept.score</td>
<td>ici.cnt. feature. concept. score</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their feature concept score</td>
</tr>
<tr>
<td>ici. contributions. statistic. created</td>
<td>ici.cnt.m. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches contributions with respect to their statistic creation timestamp</td>
</tr>
<tr>
<td>ici. contributions. statistic.value</td>
<td>ici.cnt.m. value</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches contributions with respect to their statistic value</td>
</tr>
<tr>
<td>ici. contributions. statistic.metric. identifier</td>
<td>ici.cnt.m.m. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their statistic metric identifier</td>
</tr>
</tbody>
</table>
### Table 55: Indexes for searching the contribution resource.

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ici. contributions. statistic. metric. namespace. identifier</td>
<td>ici.cnt. m.m.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their statistic metric namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. statistic. metric. namespace. prefix</td>
<td>ici.cnt.m.m.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their statistic metric namespace prefix</td>
</tr>
<tr>
<td>ici. contributions. statistic. descriptiveStatistic. identifier</td>
<td>ici.cnt.m.m. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their statistic descriptive identifier</td>
</tr>
<tr>
<td>ici. contributions. statistic. descriptiveStatistic. namespace. identifier</td>
<td>ici.cnt.m.m.ns. identifier</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their statistic descriptive namespace identifier</td>
</tr>
<tr>
<td>ici. contributions. statistic. descriptiveStatistic. namespace. prefix</td>
<td>ici.cnt.m.m.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches contributions with respect to their statistic descriptive namespace prefix</td>
</tr>
</tbody>
</table>

**D.1.13 Corpus Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.corpora. identifier</td>
<td>direct.crp. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches corpora with respect to their identifier</td>
</tr>
</tbody>
</table>

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
### Indexes for searching the corpus resource.

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.corpora. description</td>
<td>direct.crp. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches corpora with respect to their description</td>
</tr>
<tr>
<td>direct.corpora. general</td>
<td>direct.crp. gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches corpora with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct.corpora. created</td>
<td>direct.crp. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches corpora with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.corpora. lastModified</td>
<td>direct.crp. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches corpora with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct.corpora. lang</td>
<td>direct.crp. lang</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches corpora with respect to their language</td>
</tr>
<tr>
<td>direct.corpora. mediaType</td>
<td>direct.crp. mediaType</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches corpora with respect to their media Type</td>
</tr>
</tbody>
</table>

D.1.14 Estimate Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.estimates. identifier</td>
<td>direct.est. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their identifier</td>
</tr>
<tr>
<td>direct.estimates. value</td>
<td>direct.est. value</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches estimates with respect to their value</td>
</tr>
<tr>
<td>direct.estimates. created</td>
<td>direct.est. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches estimates with respect to their creation timestamp</td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.estimates. lastModified</td>
<td>direct.est. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;==, &lt;=</td>
<td>No</td>
<td>Matches estimates with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct.estimates. metric.identifier</td>
<td>direct.est. mtr.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their concepts (metrics) identifier</td>
</tr>
<tr>
<td>direct.estimates. metric.namespace.identifier</td>
<td>direct.est. mtr.ns</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their concepts (metrics) namespace identifier</td>
</tr>
<tr>
<td>direct.estimates. metric.namespace.prefix</td>
<td>direct.est. mtr.ns</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their concepts (metrics) namespace prefix</td>
</tr>
<tr>
<td>direct.estimates. descriptivestatistic.identifier</td>
<td>direct.est. dst.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their concepts (descriptive statistics) identifier</td>
</tr>
<tr>
<td>direct.estimates. descriptivestatistic.namespace.identifier</td>
<td>direct.est. dst.ns</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their concepts (descriptive statistics) namespace identifier</td>
</tr>
<tr>
<td>direct.estimates. descriptivestatistic.namespace.prefix</td>
<td>direct.est. dst.ns</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches estimates with respect to their concepts (descriptive statistics) namespace prefix</td>
</tr>
</tbody>
</table>
### Index Name | Alias | Type | Relations | Wildcards | Description
--- | --- | --- | --- | --- | ---
**direct.estimates.** task.identifier | direct.mtr. tsk.id | Exact Match | =, ==, <> * and ? | Matches estimates with respect to their tasks identifier
**direct.estimates.** topic.identifier | direct.mtr. tpc.id | Exact Match | =, ==, <> * and ? | Matches estimates with respect to their topics identifier
**direct.estimates.** experiment. identifier | direct.mtr. exp.id | Exact Match | =, ==, <> * and ? | Matches estimates with respect to their experiments identifier

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
</table>
| **direct.** evaluationactivities. id | direct.evl. id | Exact Match | =, ==, <> * and ? | Matches evaluation activities with respect to their identifier
| **direct.** evaluationactivities. namespace.identifier | direct.evl. id | Exact Match | =, ==, <> * and ? | Matches evaluation activities with respect to their namespace identifier
| **direct.** evaluationactivities. namespace.prefix | direct.evl. id | Exact Match | =, ==, <> * and ? | Matches evaluation activities with respect to their namespace prefix
| **direct.** evaluationactivities. description | direct.evl. desc | Best Match | =, ==, <> * | Matches evaluation activities with respect to their description
| **direct.** evaluationactivities. name | direct.evl. name | Exact Match | =, ==, <> * and ? | Matches evaluation activities with respect to their name

Table 57: Indexes for searching the estimate resource.

### D.1.15 Evaluation Activity Indexes
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. evaluationactivities. general</td>
<td>direct.evl. gen</td>
<td>Best Match</td>
<td>=, =, &lt;&gt;</td>
<td>*</td>
<td>Matches evaluation activities with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct. evaluationactivities. created</td>
<td>direct.evl. created</td>
<td>Exact Match</td>
<td>=, =, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches evaluation activities with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. evaluationactivities. lastModified</td>
<td>direct.evl. lastModified</td>
<td>Exact Match</td>
<td>=, =, &lt;&gt;, &gt;, &lt;, &gt;, &lt;=</td>
<td>No</td>
<td>Matches evaluation activities with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct. evaluationactivities. type</td>
<td>direct.evl. type</td>
<td>Exact Match</td>
<td>=, =, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches evaluation activities with respect to their type</td>
</tr>
<tr>
<td>direct. evaluationactivities. status</td>
<td>direct.evl. status</td>
<td>Exact Match</td>
<td>=, =, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches evaluation activities with respect to their status</td>
</tr>
</tbody>
</table>

Table 58: Indexes for searching the evaluation activity resource.

**D.1.16 Experimental Collection Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. experimentalcollections. identifier</td>
<td>direct. expcl.id</td>
<td>Exact Match</td>
<td>=, =, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experimental collections with respect to their identifier</td>
</tr>
<tr>
<td>direct. experimentalcollections. description</td>
<td>direct. expcl.desc</td>
<td>Best Match</td>
<td>=, =, &lt;&gt;</td>
<td>*</td>
<td>Matches experimental collections with respect to their description</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
<td>------</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>direct. experimentalcollections. general</td>
<td>direct. expcl.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches experimental collections with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct. experimentalcollections. created</td>
<td>direct. expcl. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches experimental collections with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. experimentalcollections. lastModified</td>
<td>direct. expcl. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches experimental collections with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct. experimentalcollections. groundtruth.identifier</td>
<td>direct. expcl. grdtrt.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experimental collections with respect to their ground truth identifier</td>
</tr>
<tr>
<td>direct. experimentalcollections. topicgroup.identifier</td>
<td>direct. expcl. tpcgrp.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experimental collections with respect to their topic group identifier</td>
</tr>
</tbody>
</table>

Table 59: Indexes for searching the experimental collection resource.

**D.1.17 Experiment Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. experiments. identifier</td>
<td>direct.exp. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experiments with respect to their identifier</td>
</tr>
<tr>
<td>direct. experiments. description</td>
<td>direct.exp. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches experiments with respect to their description</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------</td>
<td>--------------</td>
<td>----------------------------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>direct. experiments. general</td>
<td>direct.exp. gen</td>
<td>Best Match</td>
<td>&amp;=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches experiments with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct. experiments. created</td>
<td>direct.exp. created</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches experiments with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. experiments. lastModified</td>
<td>direct.exp. lastMod</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches experiments with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct. experiments. configuration. identifier</td>
<td>direct.exp. cnf.id</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experiments with respect to their configuration identifier</td>
</tr>
<tr>
<td>direct. experiments. task.identifier</td>
<td>direct.exp. tsk.id</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experiments with respect to their task identifier</td>
</tr>
<tr>
<td>direct. experiments. experimentType. identifier</td>
<td>direct.exp. exp.type.id</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experiments with respect to their experiment type identifier</td>
</tr>
<tr>
<td>direct. experiments. experimentType. namespace. identifier</td>
<td>direct.exp. exp.type.ns. id</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experiments with respect to their experiment type namespace identifier</td>
</tr>
<tr>
<td>direct. experiments. experimentType. namespace. prefix</td>
<td>direct.exp. exp.type.ns. prefix</td>
<td>Exact Match</td>
<td>&amp;=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches experiments with respect to their experiment type namespace prefix</td>
</tr>
</tbody>
</table>

Table 60: Indexes for searching the experiment resource.
### D.1.18 Ground Truth Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. groundTruth. identifier</td>
<td>direct.grt. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches groundTruth with respect to their identifier</td>
</tr>
<tr>
<td>direct. groundTruth. description</td>
<td>direct.grt. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches ground truths with respect to their description</td>
</tr>
<tr>
<td>direct. groundTruth. general</td>
<td>direct.grt. gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches ground truths with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct. groundTruth. created</td>
<td>direct.grt. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches ground truth with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. groundTruth. lastModified</td>
<td>direct.grt. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches ground truth with respect to their last modification timestamp</td>
</tr>
</tbody>
</table>

Table 61: Indexes for searching the ground truth resource.

### D.1.19 Pool Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.pool. identifier</td>
<td>direct.p.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches pools with respect to their identifier</td>
</tr>
<tr>
<td>direct.pool. description</td>
<td>direct.p. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches pools with respect to their description</td>
</tr>
<tr>
<td>direct.pool.general</td>
<td>direct.p.gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches pools with respect to the content of all their attributes</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-------------------------</td>
<td>------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>direct.pool.created</td>
<td>direct.p. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches pools with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.pool.lastModified</td>
<td>direct.p. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches pools with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct.pool.experimentalcollection.identifier</td>
<td>direct.p. expc.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches pools with respect to their experimental collection identifier</td>
</tr>
</tbody>
</table>

Table 62: Indexes for searching the pool resource.

D.1.20 Information Unit Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.informationUnit.identifier</td>
<td>direct.iu.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches Information Units with respect to their identifier</td>
</tr>
<tr>
<td>direct.informationUnit.description</td>
<td>direct.iu. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Information Units with respect to their description</td>
</tr>
<tr>
<td>direct.informationUnit.general</td>
<td>direct.iu. gen</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches Information Units with respect to the content of all their attributes</td>
</tr>
<tr>
<td>direct.informationUnit.created</td>
<td>direct.iu. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches Information Units with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.informationUnit.lastModified</td>
<td>direct.iu. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>No</td>
<td>Matches Information Units with respect to their last modification timestamp</td>
</tr>
</tbody>
</table>
Table 63: Indexes for searching the Information Unit resource.

### D.1.21 Measure Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. informationUnit.corpus. identifier</td>
<td>direct.iu. crp.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches Information Units with respect to their corpus identifier</td>
</tr>
<tr>
<td>direct.measures. identifier</td>
<td>direct.msr. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches measures with respect to their identifier</td>
</tr>
<tr>
<td>direct.measures. value</td>
<td>direct.msr. value</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches measures with respect to their value</td>
</tr>
<tr>
<td>direct.measures. created</td>
<td>direct.msr. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches measures with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.measures. lastModified</td>
<td>direct.msr. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches measures with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct.measures. metric.identifier</td>
<td>direct.msr. mtr.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches measures with respect to their concepts (metrics) identifier</td>
</tr>
<tr>
<td>direct.measures. metric.namespace. identifier</td>
<td>direct.msr. mtr.ns</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches measures with respect to their concepts (metrics) namespace identifier</td>
</tr>
<tr>
<td>direct.measures. metric.namespace. prefix</td>
<td>direct.msr. mtr.ns</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches measures with respect to their concepts (metrics) namespace prefix</td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure
Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.measures.topic.identifier</td>
<td>direct.msr.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches measures with respect to their topics identifier</td>
</tr>
<tr>
<td></td>
<td>tpc.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.measures.experiment.</td>
<td>direct.msr.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches measures with respect to their experiments identifier</td>
</tr>
<tr>
<td>identifier</td>
<td>exp.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 64: Indexes for searching the measure resource.

**D.1.22 Run Item Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.runItem.identifier</td>
<td>direct.rni.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches run items with respect to their identifier</td>
</tr>
<tr>
<td></td>
<td>id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.runItem.rank</td>
<td>direct.rni.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches run items with respect to their rank</td>
</tr>
<tr>
<td></td>
<td>rank</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.runItem.score</td>
<td>direct.rni.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches run items with respect to their score</td>
</tr>
<tr>
<td></td>
<td>score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.runItem.topic.identifier</td>
<td>direct.rni.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches run items with respect to their topics identifier</td>
</tr>
<tr>
<td></td>
<td>tpc.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.runItem.experiment.</td>
<td>direct.rni.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches run items with respect to their experiments identifier</td>
</tr>
<tr>
<td>identifier</td>
<td>exp.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.runItem.informationunit.</td>
<td>direct.rni.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches run items with respect to their information units identifier</td>
</tr>
<tr>
<td>identifier</td>
<td>iu.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 65: Indexes for searching the run item resource.

**D.1.23 Snapshot Indexes**
### Indexes for searching the snapshot resource.

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.snapshots.</td>
<td>direct.snp.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches snapshots with respect to their identifier</td>
</tr>
<tr>
<td>identifier</td>
<td>id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.snapshots.</td>
<td>direct.snp.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;,</td>
<td></td>
<td>Matches snapshots with respect to their creation timestamp</td>
</tr>
<tr>
<td>created</td>
<td>created</td>
<td></td>
<td>&lt;=</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>direct.snapshots.</td>
<td>direct.snp.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;,</td>
<td></td>
<td>Matches snapshots with respect to their last modification timestamp</td>
</tr>
<tr>
<td>lastModified</td>
<td>lastModified</td>
<td></td>
<td>&lt;=</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>direct.snapshots.</td>
<td>direct.snp.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches snapshots with respect to their visualization identifier</td>
</tr>
<tr>
<td>visualization.</td>
<td>vsl.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 66: Indexes for searching the snapshot resource.

### D.1.24 Statistical Test Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.statisticalTests.</td>
<td>direct.stt.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches statistical tests with respect to their identifier</td>
</tr>
<tr>
<td>identifier</td>
<td>id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.statisticalTests.</td>
<td>direct.stt.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;,</td>
<td></td>
<td>Matches statistical tests with respect to their creation timestamp</td>
</tr>
<tr>
<td>created</td>
<td>created</td>
<td></td>
<td>&lt;=</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>direct.statisticalTests.</td>
<td>direct.stt.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;,</td>
<td></td>
<td>Matches statistical tests with respect to their last modification timestamp</td>
</tr>
<tr>
<td>lastModified</td>
<td>lastModified</td>
<td></td>
<td>&lt;=</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>direct.statisticalTests.</td>
<td>direct.stt.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches statistical tests with respect to their visualization identifier</td>
</tr>
<tr>
<td>visualization.</td>
<td>vsl.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.statisticalTests.</td>
<td>direct.stt.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches statistical tests with respect to their statistical analysis iden</td>
</tr>
<tr>
<td>statisticalAnalysis.</td>
<td>vsl.id</td>
<td></td>
<td></td>
<td></td>
<td>tifier</td>
</tr>
</tbody>
</table>

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### Table 67: Indexes for searching the statistical test resource.

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. statisticalTests. statisticalAnalysis. namespace. identifier</td>
<td>direct.stt. vsl.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches statistical tests with respect to their statistical analysis namespace identifier</td>
</tr>
<tr>
<td>direct. statisticalTests. statisticalAnalysis. namespace.prefix</td>
<td>direct.stt. vsl.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches statistical tests with respect to their statistical analysis namespace prefix</td>
</tr>
</tbody>
</table>

### D.1.25 System Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.systems. identifier</td>
<td>direct.sys. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their identifier</td>
</tr>
<tr>
<td>direct.systems. name</td>
<td>direct.sys. name</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their name</td>
</tr>
<tr>
<td>direct.systems. description</td>
<td>direct.sys. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches systems with respect to their description</td>
</tr>
<tr>
<td>direct.systems. created</td>
<td>direct.sys. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches systems with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.systems. lastModified</td>
<td>direct.sys. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches systems with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct. statisticalTests. configuration. identifier</td>
<td>direct.sys. cnf.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their configuration identifier</td>
</tr>
</tbody>
</table>

Table 68: Indexes for searching the system resource.
### D.1.26 Task Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.tasks.identifier</td>
<td>direct.tsk. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches tasks with respect to their identifier</td>
</tr>
<tr>
<td>direct.tasks.description</td>
<td>direct.tsk. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches tasks with respect to their description</td>
</tr>
<tr>
<td>direct.tasks.created</td>
<td>direct.tsk. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches tasks with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.tasks.lastModified</td>
<td>direct.tsk. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches tasks with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct.tasks.type</td>
<td>direct.tsk. type</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches tasks with respect to their type</td>
</tr>
<tr>
<td>direct.tasks.evaluationActivity. identifier</td>
<td>direct.tsk. eva.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their evaluation activity identifier</td>
</tr>
<tr>
<td>direct.tasks.evaluationActivity. namespace.identifier</td>
<td>direct.tsk. eva.ns.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their evaluation activity namespace identifier</td>
</tr>
<tr>
<td>direct.tasks.evaluationActivity. namespace.prefix</td>
<td>direct.tsk.eva.ns.prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their evaluation activity namespace prefix</td>
</tr>
<tr>
<td>direct.tasks.track.identifier</td>
<td>direct.tsk. trk.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their track identifier</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
<td>----------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>direct.tasks.</td>
<td>direct.tsk.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches systems with respect to their experimental collection identifier</td>
</tr>
<tr>
<td>experimentalCollection.</td>
<td>expc.id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>identifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 69: Indexes for searching the task resource.

### D.1.27 Topic Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.topics.</td>
<td>direct.tpc.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches topics with respect to their identifier</td>
</tr>
<tr>
<td>identifier</td>
<td>id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.topics.</td>
<td>direct.tpc.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>created</td>
<td>created</td>
<td></td>
<td></td>
<td></td>
<td>Matches topics with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.topics.</td>
<td>direct.tpc.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>lastModified</td>
<td>lastModified</td>
<td></td>
<td></td>
<td></td>
<td>Matches topics with respect to their last modification timestamp</td>
</tr>
<tr>
<td>direct.topics.</td>
<td>direct.tpc.</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches topics with respect to their content</td>
</tr>
<tr>
<td>content</td>
<td>content</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>direct.topics.</td>
<td>direct.tpc.</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches topics with respect to their content</td>
</tr>
<tr>
<td>general</td>
<td>general</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 70: Indexes for searching the topic resource.

### D.1.28 Topic Group Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.</td>
<td>direct.tpcg.</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches topic groups with respect to their identifier</td>
</tr>
<tr>
<td>topicGroups.</td>
<td>id</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D3.5: Final Prototype of the Evaluation Infrastructure

Network of Excellence co-funded by the 7th Framework Programme of the European Commission, grant agreement n. 258191
### D.1.29 Track Indexes

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct.tracks.identifier</td>
<td>direct.trk.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>And ?</td>
<td>Matches tracks with respect to their identifier</td>
</tr>
<tr>
<td>direct.tracks.description</td>
<td>direct.trk.desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches tracks with respect to their description</td>
</tr>
<tr>
<td>direct.tracks.created</td>
<td>direct.trk.created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches tracks with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct.tracks.lastModified</td>
<td>direct.trk.lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;, &gt;=, &lt;=</td>
<td>No</td>
<td>Matches tracks with respect to their last modification timestamp</td>
</tr>
<tr>
<td>Index Name</td>
<td>Alias</td>
<td>Type</td>
<td>Relations</td>
<td>Wildcards</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------------</td>
<td>-----------------</td>
<td>--------------------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>direct.tracks. submissionDeadline</td>
<td>direct.track. subddl</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;</td>
<td>No</td>
<td>Matches tracks with respect to their submission deadline</td>
</tr>
<tr>
<td>direct.tracks. evalact.identifier</td>
<td>direct.track. evalact.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches tracks with respect to their evaluation activity identifier</td>
</tr>
<tr>
<td>direct.tracks. evalact.namespace. identifier</td>
<td>direct.track. evalact. namespace.id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches tracks with respect to their evaluation activity namespace identifier</td>
</tr>
<tr>
<td>direct.tracks. evalact.namespace. prefix</td>
<td>direct.track. evalact. namespace. prefix</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches tracks with respect to their evaluation activity namespace prefix</td>
</tr>
</tbody>
</table>

Table 72: Indexes for searching the track resource.

**D.1.30 Visualization Indexes**

<table>
<thead>
<tr>
<th>Index Name</th>
<th>Alias</th>
<th>Type</th>
<th>Relations</th>
<th>Wildcards</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct. visualizations. identifier</td>
<td>direct.vsl. id</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;</td>
<td>* and ?</td>
<td>Matches visualizations with respect to their identifier</td>
</tr>
<tr>
<td>direct. visualizations. description</td>
<td>direct.vsl. desc</td>
<td>Best Match</td>
<td>=, ==, &lt;&gt;</td>
<td>*</td>
<td>Matches visualizations with respect to their description</td>
</tr>
<tr>
<td>direct. visualizations. created</td>
<td>direct.vsl. created</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;</td>
<td>No</td>
<td>Matches visualizations with respect to their creation timestamp</td>
</tr>
<tr>
<td>direct. visualizations. lastModified</td>
<td>direct.vsl. lastModified</td>
<td>Exact Match</td>
<td>=, ==, &lt;&gt;, &gt;, &lt;</td>
<td>No</td>
<td>Matches visualizations with respect to their last modification timestamp</td>
</tr>
</tbody>
</table>

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Table 73: Indexes for searching the visualization resource.

D.2 Relations

The DIRECT context set does not define relations but relies on those defined in the grammar of CQL. Anyway, it gives the semantics of the relations defined:

- `=`
  This is the default relation and it is treated as equivalent to `==`.

- `==`
  This relation is used for exact equality matching. The term in the data is exactly equal to the term in the search.

- `<>`
  This relation means “not equal to” and matches anything which is not exactly equal to the search term.

- `<>`, `<=`, `>=`
  These relations retain their regular meanings as pertaining to ordered terms (less than, greater than, less than or equal to, greater than or equal to).

D.3 Relation Modifiers

The following relation modifiers are defined for the DIRECT context set:

- `limit=value`
  Specifies the maximum number of items to return.
  `value` can assume a positive integer numerical value.
• offset=value
  Specifies the number of items to skip before starting to return items.
  value can assume a positive integer numerical value.

As far as masking rules are concerned, the following wildcards characters apply to relations:

• a single asterisk (•) is used to mask zero or more characters. This can be applied with both
  exact and best match indexes.

• a single question mark (?) is used to mask a single character, thus N consecutive question-
  marks means mask N characters. This can be applied only with exact match indexes.

D.4 Boolean Operators

The DIRECT context set does not define Boolean operators, as these can only be defined by the
CQL grammar. Anyway, it gives the semantics of the Boolean operators defined:

• AND
  The combination of two sets of records with AND will result in the set of records that appear in
  both of the sets. Therefore, it is the intersection of the two sets.

• OR
  The combination of two sets of records with OR will result in the set of records that appear in
  either or both of the sets. Therefore, it is the union of the two sets.

• NOT
  The combination of two sets of records with NOT will result in the set of records that appear in
  the left set, but not in the right hand set. Therefore, it is the difference of the two sets. It cannot
  be used as a unary operator.

• PROX
  The PROX operator is not supported but it is parsed and appropriate diagnostic is provided in
  case of incorrect queries using it.

Note that only indexes with the same target resource can be combined by Boolean operators,
since the records in each set must be of the same type, i.e. namespaces can be combined with
namespaces and users can be combined with users while combining namespaces and users is not
allowed.

D.5 Boolean Modifiers

The following Boolean modifiers are defined for the DIRECT context set:

• match=value
  The kind of matching to be applied when computing the Boolean expression, according to the
  different match strategies discussed in Section ???. This modifier can be used only with the
AND, OR, and NOT boolean operators.

value can assume one of the following values:

- best: a best matching has to be performed;
- loose: a very approximate matching has to be performed;
- fuzzy: a fuzzy matching has to be performed;
- exact: a strict boolean matching has to be performed.

D.6 Examples

- `fast.annotation.general == giotto`
  Searches for annotations about Giotto.

- `fast.annotation.general ==/thread==half giotto`
  Searches for annotations about Giotto, taking into consideration also the annotations annotating them.

- `fast.annotation.general ==/limit==100 giotto`
  Searches for annotations about Giotto and returns only the first 100 items.

- `ici.user.email == “ferro@dei.unipd.it”`
  Searches for users whose e-mail address is ferro@dei.unipd.it.

- `ici.user.email == *ferro*`
  Searches for users whose e-mail address contains the substring ferro, e.g. (nicola.ferro, ferro.nicola).

- `ici.user.group.identifier == admin*`
  Searches for users who belong to groups whose identifier starts with admin.

- `ici.user.country == ITA`
  Searches for Italian users.

- `(ici.user.email == *ferro*) and/match==fuzzy (ici.user.country == ITA)`
  Searches for users whose e-mail address contains the substring ferro and may be Italian.

- `ici.logEvent.created >/limit==100 2011-05-01`
  Searches for last 100 log events created after 1st May 2011.

- `ici.logEvent.identifier >/limit==100 1`
  Searches for last 100 log events.
References


