

# A Proposal for Encoding Functions

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## Aim

Over the past two years, a subgroup of TS-EAS has been exploring an XML expression of the ICA content standard “International Standard for Describing Functions” (ISDF). First released in 2007, ISDF is based on models of functional description in use at international archival institutions as well as ISO standards for records management. ISDF aims to create a standardized description of business processes and other recordkeeping activities that documents the creation and use of records that are not met in the other ICA standards. Functions are an essential aspect of archival description that captures additional elements of the records' context, provenance, creation, and application. As such, archival functions complement descriptions of record creators (EAC-CPF) and the records themselves (EAD).

The development of an XML standard to express archival functions is intended to expand the suite of encoded archival standards and provide a mechanism to standardize description of functions of corporate bodies. The proposed XML standard is based on ISDF and places great importance on the incorporation of established schemas like EAC-CPF and EAD, adherence to recognized ontologies and metadata models, and flexible options for defining functions in relation to other entities. These strategies ensure consistency, interoperability, and adaptability, to enhance the schema's usability and enable seamless integration with existing practices and systems.

## Design principles

The proposed schema is designed to follow the TS-EAS design principles

[\[https://github.com/SAA-SDT/TS-EAS-subteam-notes/wiki/Design-Principles\]](https://github.com/SAA-SDT/TS-EAS-subteam-notes/wiki/Design-Principles),

which prioritize simplicity and connect community needs with the first principle. The goal is to create a schema that can be customized to meet local requirements without sacrificing interoperability. The schema is designed to be compatible with linked open data principles and responsive to related standards and changing technologies. This is accomplished by reusing data models from existing schemas such as EAC-CPF and EAD, and ensuring compatibility with external, widely-used ontologies and metadata models such as the newly-released Records in Contexts content model (RiC). The proposed Encoded Archival Functions XML schema (henceforth referred to as EAF) has been deliberately designed to offer various options for linking Function descriptions with external entities and provide a bridge between XML and graph data by including a mechanism for encoding semantic and relational data. It is our hope that this schema, along with the newly revised EAD and EAC-CPF schemas, will provide a path forward for institutions looking towards next-generation models such as RiC but not yet ready to move beyond XML into RDF-based databases.

## Functions

Functions provide essential information for an integrated description of the archival context. They describe the activities of corporate bodies that use and create records in ways that are not limited to the organizational structure. Identifying and processing functions can reveal unseen relationships between recordkeeping activities and the corporate bodies that create and maintain records. Including functions in the archival description, therefore, is essential in clarifying the provenance of groups of records. Functions comprise a required and well-known implement for describing, understanding, and managing groups of records. The analysis of organizational functions, known as functional analysis, is a technique used traditionally to evaluate and process archival materials, based on the relative importance of

activities performed within an organization.<sup>1</sup> Functional analysis results often set the priorities for records appraisal and processing and provide essential information to guide arrangement and description. ISDF coordinates this content in a standardized way, providing links to agents and archival records as well as providing guidance for how to structure the information for use in archival description.

The concept of functions is defined by ISO 30300:2020(en) as the group of activities aimed at achieving one or more goals of an organization. In a wider definition, functions correspond to any high-level purpose, responsibility, or task assigned to a corporate body by legislation, policy, or mandate. (ISDF, 2007). In both cases, functions are understood as sets of coordinated processes aimed at achieving a specific outcome. These processes can also be more granularly divided into sub-functions, business processes, activities, tasks, or transactions. For instance, a Fundraising campaign management activity (F – Activity) might be part of a Fundraising (F – Function) operation in an organization (Agent – Corporate body). The fundraising campaign management (F – Activity) is hierarchically related to the overall fundraising Fundraising (F – Function) but, at the same time, could also have an additional associative relationship with another activity such as Financial Accounting (F – Activity).<sup>2</sup>

Thus, functions within an organization are distinct from agents, be it a corporate body, a family, or a person. Functions are processes that develop beyond individuals, groups, or units of the organization. They are established to perform fundamental operations of the organization, which may change according to the evolution of organizational objectives. Functions may consist of a partnership of activities and units, and may not necessarily mirror the organizational chart. While the ISAAR-CPF and EAC-CPF standards help to provide a complete description of an agent/creator of records and establish relationships to specific records or groups of records, this approach cannot adequately document essential information about the cooperation between agents or units and decisions and processes

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<sup>1</sup> Society of American Archivists. (2020). Dictionary of Archives Terminology (DAT). Available at: <https://dictionary.archivists.org>

<sup>2</sup> International Council on Archives. (2016). ISDF: International Standard for Describing Functions, 1st ed, English, p.p 41-43). Available at: <https://www.ica.org/resource/isdf-international-standard-for-describing-functions/>

that cannot be not described in terms of an agent's history. While linking records to agent descriptions helps to illuminate roles and actions in relation to a record, it does not provide a comprehensive understanding of the stage in which they are related. Functions are often wider than a single agent's activities. Additionally, they are often developed to serve a specific organizational or personal objective or decision unrelated to the agent that ultimately creates the record.

Functions as described in ISDF do not merely operate as subject headings but are integral components of the archival context. Standardized descriptions of functions provide a more comprehensive and nuanced picture of a group of records by relating records and agents within the aspect of purpose, revealing the processes that link agents' actions and records creation. They provide essential contextual and structural information that supports the organization, management, and understanding of records within an archival system. By documenting functions and their relationships, ISDF ensures that the provenance and operational context of records are accurately represented, facilitating effective archival description and management. This has been a missing piece of the archival descriptive landscape that cannot be performed by merely describing records, agents, and their relationships.

## The standards

[ISDF \(1<sup>st</sup> edition, 2007\)](#) provides guidance for how to describe the functions linked to the creation and upkeep of records, applied by corporate bodies. Translated in multiple languages, the standard includes example records to illustrate its potential use.

ISDF suggests the creation of a descriptive authority metadata set per function that carries identity and context information. The suggested metadata set includes four areas of elements, following the structure of ICA's standards for archival and agents' description. The main body of description is developed in the Identity, Context, and Control areas. The Identity area defines the different form of names, the specific type, and the corresponding classification scheme if that applies. In the Context area, information about the history, the

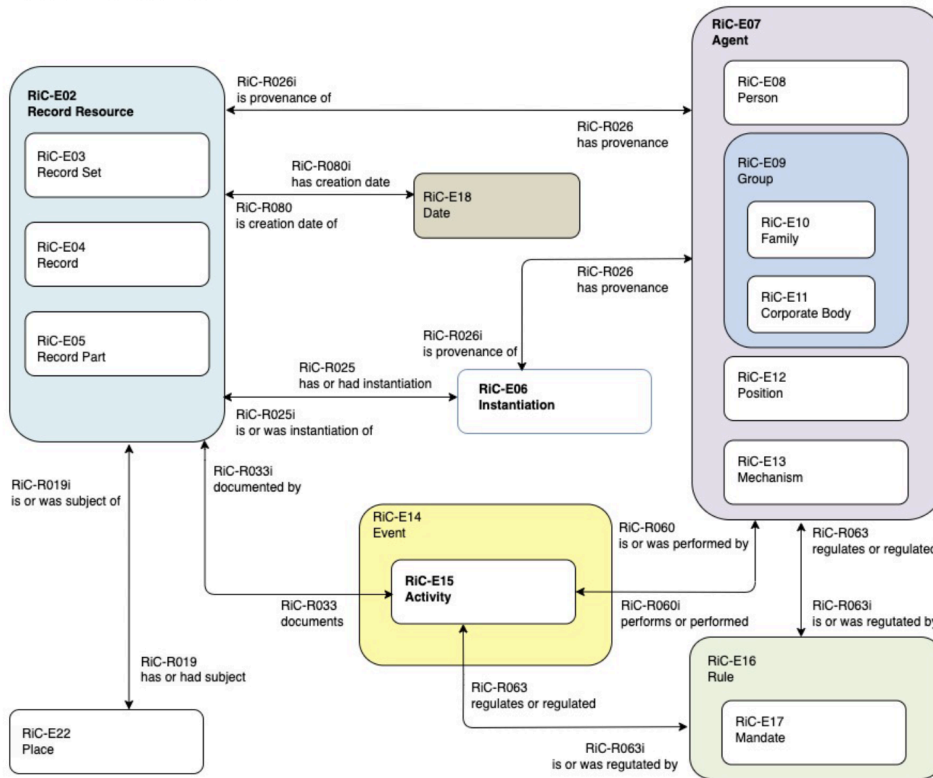
legal basis and the purpose, and the relevant date range of the function is recorded. The Control area records the administrative information of this metadata set. ISDF also provides a metadata section entitled the Relationship area (5.3) that relates the function to other functions to create a functions inventory. The standard also discusses how to establish external relations to other entities such as agents and records. The standard, therefore, provides two different mechanisms for documenting relationships between entities: one with other metadata sets describing other functions and another for relating them to agents and records. Translated into different languages, the standard includes examples authored by different members that illustrate the various ways these relationships can be established, resulting in no unified way to express relationships within ISDF. For samples of how functions are described and integrated into the archival context, please refer to the examples later in this document.

The new Records in Contexts standard (RiC) also offers a descriptive mechanism for documenting functions. RiC repurposes the familiar Event entity, common in preservation ontologies, to relate record resources to agents. The Event (or Activity) serves as an intermediary between Agents and record resources (which are evidence of the activity of an agent), documenting "why the activity is performed, the expected ends or outcomes, and how the activity fulfills the purpose."<sup>3</sup>

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<sup>3</sup> Records in Contexts - Conceptual Model Version 1.0 (2023), 33. Available at: <https://www.ica.org/resource/records-in-contexts-conceptual-model/>

RIC-CM v1.0: a global overview



Created by ICA-EGAD in September 2023.

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Some archival management systems have incorporated the concept of functions into their data models. The open source [Access to Memory \(AtoM\) archival management application](#) recognizes functions as one of the primary record types; their descriptive data organized in separated records, creates a separated inventory. Within AtoM, functions are related to each other, and at the same time linked to the relevant archival records (ISAD) and agents' records (ISAAR-CPF).

### View ISDF function

Student registration

Identity area	
Type	Function
Authorized form of name	Student registration
Other form(s) of name	Student enrollment
Context area	
Dates	1902 - Present
Description	Registration of students in full-time and part-time undergraduate and graduate academic programs. Excludes registration in continuing education programs.
Relationships area	
Related authority record	Authorized form of name: <a href="#">University of New Westminster Office of the Registrar</a> Nature of relationship: The Office of the Registrar has been the primary entity responsible for managing student registration Dates of the relationship: 1902 - Present
Related resource	Title: <a href="#">Student registration case files</a> Identifier: CA NWM-OR-S01 Nature of relationship: The files in this series capture the transactional activities carried out to support the function of student registration Dates of the relationship: 1914 - 1988
Control area	
Description identifier	Fn-007
Institution identifier	CA-NWA
Status	Revised
Level of detail	Partial
Language(s)	English
Script(s)	Latin

Image from AtOM

([https://www.accesstomemory.org/en/docs/2.8/\\_images/function-example.png](https://www.accesstomemory.org/en/docs/2.8/_images/function-example.png) )

## The work

The development of a new XML-based standard for expressing ISDF is being explored by a subteam to the Technical Subcommittee on Encoded Archival Standards, a group housed and supported by the Society of American Archivists (SAA) and overseen by the SAA Standards Committee.

## **Previous efforts (2013-2018)**

There have been multiple efforts to develop an XML serialization of ISDF, largely spearheaded by the Technical Subcommittee on Encoded Archival Standards.<sup>4</sup> A central goal of these efforts was to gather real world examples of ISDF descriptions and XML-based implementations of ISDF as well as defining the need, purpose, and goals of an XML schema for functions. A number of test documents were created early on to interpret ISDF and create an XML structure to support each test creator's need for an XML document to use. These early efforts focused on adapting one of these examples for broader use, but the examples varied widely in their application and significant questions remained about how ISDF data could be created consistently and accurately. For instance, functions described within descriptive contextual metadata are usually done by archivists without sufficient knowledge of the functions and activities of the corporate body. Additionally, there is no mechanism for capturing or reusing existing descriptions of functions and activities in an archival setting. This means that the proposed XML standard needed to be easy to use and bear familiarity with the already existing EAS standards EAD and EAC-CPF so archivists could create these examples manually. The team has also looked at software for creating archival description. Most of them only had a description field for giving a textual description of functions and activities rather than structured metadata fields for different elements. AtoM, which has a ISDF-based form to create this type of information as described earlier in the text, was the exception.

## **Current effort (2021- onwards)**

In 2021 the focus shifted from reworking current examples into a newly-conceived standard to an approach that attempts to reuse what already is available in existing models and ontologies while still supporting the conceptual structure and elements of the ISDF standard. A primary end goal for this work has been to support multiple options for describing and relating functions' entities depending upon local use cases and needs. It is also important that a new EAS standard follow the decided and guiding design principles created by TS-EAS

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<sup>4</sup> The most recent iteration of these efforts was in 2018. The committee included Kathy Wisser (chair), Erica Boudreau, Florence Clavaud, Claire Sibille-de Grimouard, and Joost van Koutrik.



and to be used for Encoded Archival Description (EAD) and Encoded Archival Context–Corporate Bodies, Persons and Families (EAC-CPF).

The central aim of this proposal and the accompanying examples, therefore, is to solicit comments from all types of users to make sure that the standard will be useful to a wide variety of implementers and support a range of use cases. This paper is released not as a final product, but as a work-in-progress that will benefit from further exploration and discussion.

### **Groundwork and exploration**

Previous research by TS-EAS members had not identified any full implementations that encode archival functions, so investigation of the examples offered by ISDF in its first editions was a primary starting point. Using the contents and the structure of these examples, group members attempted to translate them into XML and match them to existing EAD/EAC-CPF data models as well as linked data ontologies including the RiC content model. These included examples provided in the French, Spanish, and English ISDF editions. Moreover, searching for a real-life example of Functions' inclusion in archival practice, relevant information was retrieved from the Swedish best practice for archival description in [\*Guidance on the National Archives' regulations on record keeping\*](#) that enriched our encoding trials. These experiments revealed that even within the ISDF standard and the examples it provides, there was a lack of a unified understanding of the concept of function and an equitable application of the standard.

To ensure that the new encoding standard supports the variety of use cases we identified, we propose multiple options for managing the Functions descriptions. The first option is to create separate ISDF records for each function. The main body of description for each function includes elements such as type, identity, dates, events, history, and legislation. This main set of elements is related with other function(s), activity(ies), record(s), and agent(s) descriptions through the use of the relations element. These relationships described in each relation element mirror the relation elements in EAC-CPF and are declared as sub-joins within the same record. This option allows a series of interrelated records that provide a high level of granularity and flexibility to be developed. The second option treats related

functions as part of the description of the main function record. The interrelated functions and the hierarchy that connects them are reported as a compact set within a single function record, following the EAD components description.

Describing functions and activities will be new for some archival communities of practice and we hope that the creation of an XML-friendly version of this standard will encourage description of functions and activities and provide a mechanism to easily exchange the information in a format that can be used worldwide.

## **The ISDF descriptive structure**

### **IDENTITY AREA**

The Identity area in ISDF provides all information necessary to identify the function.

It records the type of function, the authorized form(s) of name, parallel and other form(s) of name, and the classification scheme indicator ID applicable.

Our approach follows the description of identities in EAC-CPF.

### **CONTEXT AREA**

The Context area includes the dates / date range of the function, the description of the function focusing on its purpose, the history of its performance including the changes applied over the time along with information about the relevant organizational units, and the regulatory / legal framework under which the function was performed.

Our approach follows the description of identities in EAC-CPF.

### **RELATIONSHIPS AREA**

The Relationships area in ISDF provides information on how the function under description is related to other function documents. This includes the authorized form(s) of name of the

related function, the type, and the category of the relationship to provide a hierarchical, temporal, or associative connection.

Our approach suggests two ways of relating function documents to each other. The first option is to create a function description for each function and relate them by reusing the relationship elements of EAF [Example 2]. The second option is to create the main function description and incorporate all the related functions of any type as part of its description. [Example 1]

## **CONTROL AREA**

The Control area in ISDF includes administrative information and maintenance management of the record created for the described function. This section contains information about the document itself, including identification, maintenance, and vocabularies used.

Our approach follows the definition of the Control area in the EAS standards (EAD and EAC-CPF).

## **RELATING FUNCTIONS TO CORPORATE BODIES, ARCHIVAL MATERIALS AND OTHER RESOURCES**

ISDF provides indications for the relations to the other entities but these are not included as an area in the document of the function's description but applied as additional linkage. Relating a function document to another type of entity such as archival records, corporate bodies records, or other resources requires the documentation of identifier and authorized form(s) of name/title of related resource, and information of the nature and the dates of the relationship.

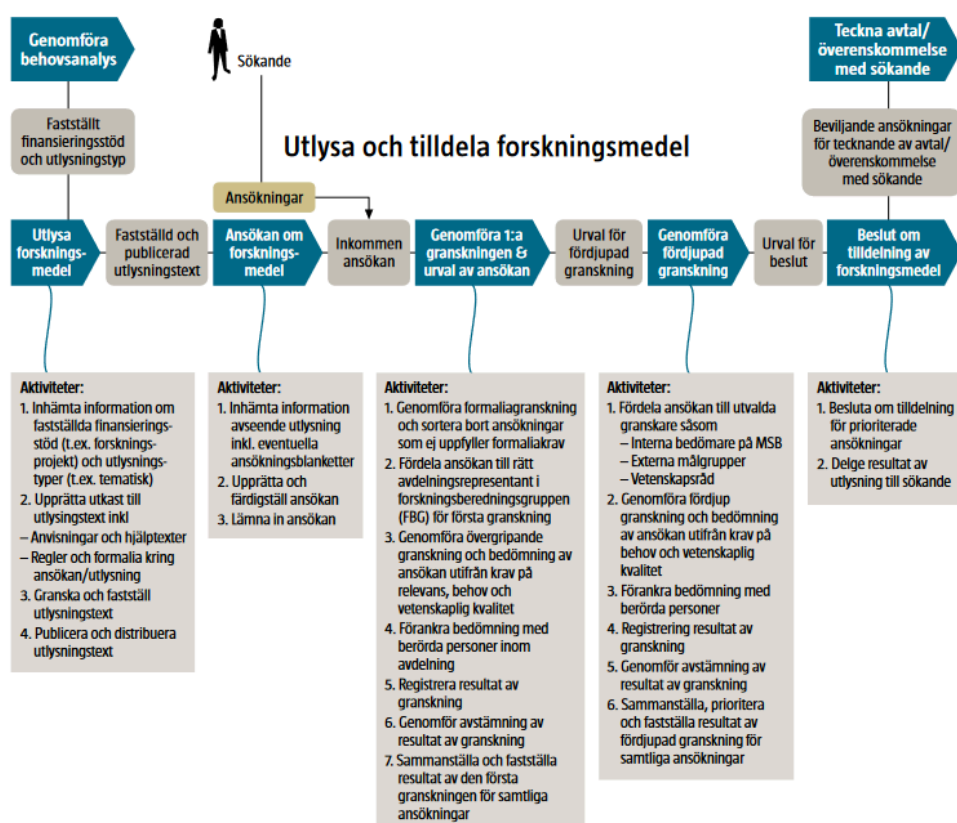
In order to relate a function to other entities (i.e., agents or records), our approach is to reuse the relations element in both the EAD and EAC-CPF standards to relate to other entities. [Example 2]. This approach is specifically designed to enable implementers to incorporate external vocabularies and ontologies (such as RiC) to describe these relationships.

# Prototyped examples

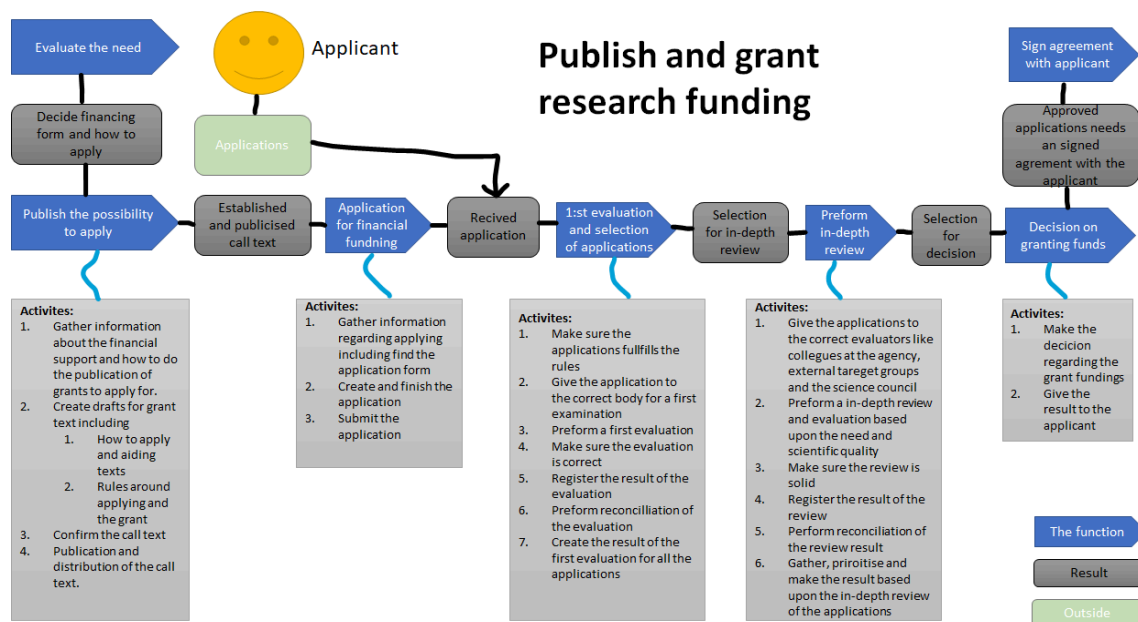
The examples below are a proof-of-concept for expressing ISDF in a standardized XML format. The examples provided as part of this proposal encode a process documented by the Swedish National Archives related to a grant application process; namely, the Swedish recommendation for publishing grant opportunities.

The full process is found here:

<https://riksarkivet.se/Media/pdf-filer/V%C3%A4gledning%20f%C3%B6r%20processorienterade%20informationskart%C3%A4ggning.pdf> (in Swedish)



We have translated the example into English:



Much of the information included in this diagram will not fit into EAD nor EAC-CPF for capturing functions and activities, particularly the steps in each process as well as the sequencing and relationships between each activity. In EAD and EAC-CPF the only option is to create a term and a note that describes the function; it is not possible to document activities within the function, add additional documentation, or relate them to other functions or entities. Current options within EAD and EAC-CPF treat functions as controlled access points that are descriptive of the record group as a whole rather than a foundational set of relationships that document the creation and use of the record throughout its lifecycle.

The EAC-CPF offers the following examples for encoding functions:

<https://eac.staatsbibliothek-berlin.de/schema/v2/eac.html#elem-function>

```
<function>
  <term>Estate ownership</term>

  <descriptiveNote>
    <p>Social, political, and cultural role typical of landed aristocracy in England. The first Viscount Campden amassed a large fortune in trade in London and purchased extensive estates, including Exton (Rutland), and Chipping Campden (Gloucestershire). The Barham Court (Kent) estate was the acquisition of the first Baron Barham, a successful admiral and naval administrator (First Lord of the Admiralty 1805).</p>
  </descriptiveNote>
</function>
```

```

<functions>
  <function>
    <term>Industrial or Scientific Research</term>
  </function>
  <function>
    <term>Analytical Services</term>
  </function>
  <function>
    <term>Advisory or Regulatory Body</term>
  </function>
</functions>

```

In short, describing functions separately from records or agent descriptions has the potential to create better and more complete archival context because we can precisely express how functions are connected to other records, agents, and each other using semantic relationships that establish connections and relationships between multiple descriptions.

The sample XML files provided below represent two example function descriptions and their accompanying EAD and EAC-CPF descriptions. Please note that the examples will not validate because no XML schema has been created as of yet. When the examples were created, EAD 4 was not yet available, so elements have been repurposed from EAD3 and EAD 2002. When the XML-schema is created, it will incorporate features that the EAD revision introduces including the option to use an locally defined value list. The value lists in the examples currently repurpose the TS-EAS suggested value list.

## [1] Example EAF

This example encodes Improve Quality of Fiction (Function) with an associated activity Grant Writing (Activity) performed by The Fictional Testing Center (Agent) that produces The Fictional Testing Center records (Body of Records). All connections between the EAF entities and to the other entities—the creator in the form of an EAC-CPF document and the finding aid in the form of an EAD document—is made in the relation section of the document.

The first XML document is the description of the function:

Function: Example Function Description.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White Paper examples/Example%20Function%20Description.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White%20Paper%20examples/Example%20Function%20Description.xml)

The second XML document is the description of the activity:

Activity: Example Activity Description.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White\\_Paper\\_examples/Example%20Activity%20Description.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White_Paper_examples/Example%20Activity%20Description.xml)

Of particular note in this example is the flexibility of the proposed construction to incorporate external vocabularies (in this case using properties from RiC) to describe the relationship to the other entities.

## [2] Example EAF with all the description in the file

This example encodes the whole function as well as its activities in a single XML-document. This is the counterpart to the example above that separates activities and functions into individual XML documents. The advantage of this approach is to minimize the number of documents an institution or system will have to maintain, but it loses the flexibility to reuse and associate activities with more than one function, agent, or record.

Function/Activity description: Example Process complex.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White\\_Paper\\_examples/Example%20Process%20complex.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White_Paper_examples/Example%20Process%20complex.xml)

Both approaches can also track and describe historical functions and activities that are no longer being used but still bear contextual relevance to the record group.

## [3] Example EAD

This example shows the finding aid where the documents created in the function/activity have been stored. What can be noted in these two EAD documents is that when EAD 2002 is used, the relationship(s) to the function/activities is recorded within the container list. In EAD3 it is possible to create a link to the function/activity description at different levels of the finding aid using the relations element. It is important to note that in both versions of EAD, it is currently possible to create a subject heading that references a function/activity in the form of its name, but this is an approach that limits the nuance and specificity available through EAF and relegates functions to subject classifications rather than descriptive archival entities.

EAD3 description: Example EAD3.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White\\_Paper\\_examples/Example%20EAD3.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White_Paper_examples/Example%20EAD3.xml)

EAD 2002 description: Example EAD2002.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White\\_Paper\\_examples/Example%20EAD2002.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White_Paper_examples/Example%20EAD2002.xml)

## [4] Example EAC-CPF

This example shows the agent who is performing the function/activity, which in this case is the record creator. As with EAD, EAC-CPF can describe functions and activities in a simple way with its terms, dates, places, and descriptive notes. It, however, is not a thorough way of describing a function/activity and limits the possibility to create a hierarchy of functions and activities performed collaboratively with additional agents.

EAC-CPF Description: Example EAC-CPF.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White\\_Paper\\_examples/Example%20EAC-CPF.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White_Paper_examples/Example%20EAC-CPF.xml)

## [5] All proposed EAF elements and attributes

This is an XML document with all the anticipated attributes and elements that would be included in a possible XML interpretation of ISDF. As noted earlier, the suggested value lists in this document are subject to change upon the release of EAD 4 and other changes proposed by TS-EAS to existing value lists. This document will be updated to align with these changes.

An XML draft of all possible elements and attributes that will be in an XML schema: Functions.xml

[https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White\\_Paper\\_examples/Functions.xml](https://github.com/SAA-SDT/TS-EAS-subteam-notes/blob/master/functions-subteam/White_Paper_examples/Functions.xml)

## Results

The proposed EAF XML standard is designed to be easily implemented. Throughout the new XML standard, we have tried to align elements and concepts with shared elements in all of the EAS standards, particularly those from the revised EAC-CPF. This ensures that dates, for example, are described in the same way as for EAC-CPF and EAD. The TS-EAS Functions Team has also placed special attention on how to make the XML description linked data-friendly and thus possible to be a stepping stone between an XML format for describing functions and activities and RDF-based ontologies such as Records in Contexts. Ontologies describing terms for functions, activities, and relationships with other entities such as those outlined in the Records in Contexts content model can be reused within EAF to ensure forward compatibility with evolving standards. Institutions with local ontologies and local vocabularies will also find it easy to reference those within the structure of this schema. The



semantic and relational elements in the EAF schema will also ensure relationships with domain-specific schemas such as PREMIS can be established and maintained. Additional recommendations for complementary ontologies will be part of the final documentation.

A full draft of the proposed XML standard to encode ISDF-related entities will be released later this year for local testing and feedback before it is finalized. The TS-EAS Functions Team is especially seeking use cases and feedback on this proposal so we can determine the feasibility and desire for a new complementary standard to EAD and EAC-CPF. We welcome comments from all types of institutions and practitioners, including those using software such as AtoM and ArchivesSpace. Please take some time to contribute to this effort and contribute your comments to our survey!