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APARSEN
**Alliance for Permanent Access to the Records of Science
Network**

Instrument: Network of Excellence

Thematic Priority: ICT 6-4.1 – Digital Libraries and Digital Preservation

**D13.1 REPORT ABOUT
STANDARDISATION ACTIVITIES:
PROGRESS TO YEAR 2**

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Abstract:

Based on the structure of deliverable D13.1 this intermediate report gives an overview about the database, which has been implemented in this period to store the preservation-related standards and projects which have been collected in year one of the project and laid out in deliverable D13.1 in month 14. All further investigations in WP13 regarding standards, formats and projects will end up being entered into that database. The document describes the setup, the main forms and the description of all fields of the database as it is implemented now; the document does not describe the data model “behind the scenes”, as this might be extended or adopted throughout the projects lifetime.

The information will be published on the public website as web forms.

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Author(s) Hans-Ulrich Heidbrink, Andreas Hundsdörfer (ICT); Holger Brocks (FTK)

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Project coordinator: Simon Lambert/David Giaretta

Address:	STFC, Rutherford Appleton Laboratory Chilton, Didcot, Oxon OX11 0QX, UK
Phone:	+44 1235 446235
Fax:	+44 1235 446362
Mobile:	+44 (0) 7770326304
E-mail:	simon.lambert@stfc.ac.uk / david.giaretta@stfc.ac.uk

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1 INTRODUCTION

The intention of this document is to give an overview of existing common standards within digital preservation and in which contexts these are applicable. Firstly, common standards are surveyed and commented. Next, a number of user categories are listed followed by a decision tree providing help to find which standards are useful or applicable for different user categories. Following, there is a visualization of common standards' coverage and overlaps, and finally a checklist providing guidance for selection of common standards and procurement of digital preservation technology.

The document starts with an introductory part (section 1) highlighting the role of the Virtual Center of Excellence, reiterating the objective of WP13, explaining the methodology on how this document will be expanded over the remaining project duration and finally in this section the timetable for all 4 periods.

In version 1 of this deliverable covering Year 1 of the project section 2 gave an extensive overview about common digital preservation standards, recommendations and initiatives. This overview has been removed in this version of the document. Instead section 2 is to give an overview of the database, which has been implemented in this period, to switch from a document-based collection of standards and projects – as documented in deliverable D13.1 – to a database approach. The database, which has been chosen, is OpenOffice.org BASE, as this is available free-of-charge on MS Windows, Linux and MacOS.

At the end of period 2 and beginning of period 3 all standards and projects documented in D13.1 will be loaded into this database and all additional findings will then solely be entered into the database.

In future versions of this document section 3 will present the commercial and open source software solutions [for ???] available in the market.

Persistent identifiers and file formats are presented in section 4.

Finally in section 5 the future work activities for the next 2 years are scratched out as placeholders resp. headlines.

The appendix *Links to Multimedia and document oriented File formats* has been removed according to the recommendation of the M16 review report. An appendix has been added with installation instructions of OpenOffice.org and the APARSEN WP13 database.

1.1 PURPOSE AND SCOPE

During the APARSEN project this intermediate deliverable will be extended and improved to describe, specify and establish the tasks as they are:

- Collection of preservation standards used in the different communities
- Collection of preservation projects with standardisation activities and their respective results
- Identification of communities applying preservation standards in their repositories
- Assessment of the scope of preservation standards related to the OAIS model
- Build-up of a common standards repository with community oriented search criteria
- Including information about current productive use of the standards in the related communities their purpose of use and related SWOT analysis based positioning
- Certification criteria, procedures and services offered by any member of the community
- Cross-community synergy analysis
- Establishment of a decision tree for the applicability and perspective use of current standards
- Community related gap analysis

- Requirements for missing standards to fill the existing gaps

The following document is an intermediate snapshot of the initial investigation and cannot be seen as complete. Each year this document will be updated and accompanied by structure, describing meta data, links and content that allows to have a common view on established preservation standards in the different communities, feedback from the users, selection criteria along a given decision tree and search capabilities to identify similarities or alternate use models. The final result will give access to the standards repository, clear out existing gaps in the preservation process of the involved communities and will give recommendation and requirements to fill those gaps.

1.2 THE ROLE OF A VCOE FOR STANDARDIZATION

The establishment of a community spanning database can only be performed if all aspects of preservation are concentrated in one single place. Most of the standard related information was established in various research projects and standardization tasks but there is no organization established that combines all communities and networks that have contributed. Therefore it is mandatory that a VCoE (Virtual Centre of Excellence) as an open network of networks combines all the standard related knowledge, the applicable validation and certification procedures, represents a common mind for services related to reservation and maintains the infrastructure that APARSEN members are generating. Additionally this VCoE needs to be open to associations and standardisation bodies that are not yet part of the APARSEN network of excellence but are able and willing to contribute to a common data base containing all known references, links and established open documents related to preservation standards. For this it is mandatory that there are no hurdles or fees to take part in the VCoE activities, also for organisations not participating in the APARSEN network. The VCoE should be open for other associations or potentially contributing standardization bodies and establish in this way an open accessible exchange and information platform for everybody.

The required business models will be evaluated and established in APARSEN work package "Business cases" (WP36).

1.3 OBJECTIVES

The following objectives are taken from the WP13 description in the Description of Work (DoW) document and covers already the DoW-update performed at the end of period 2/beginning of period 2:

To identify common standards - either existing or required new ones - which will enhance the accessibility of information via the interoperability of the systems managed by the partners and the community at large. In the case of new standards this will identify possible routes for standardisation, addressing the cost benefit trade off of the alternatives (see for example international standards versus community standards).

Task 1310 Analysis of current standards

This task will produce an analysis of standards in use for their digital preservation activities by partners, communities and identification of commonalities and differences.

We will take advantage of our links, funded outside the NoE, to on-going global discipline-specific initiatives such as:

- *the Group for Earth Observation's Standards and Interoperability Forum (SIF) and in particular to the European branch of it European SIF.*
- *Consultative Committee for Space Data Systems - CCSDS which has adopted a reference model for Open Archival Information Systems*
- *The ESA HMA project which has standardised via the Open Geospatial Consortium ground segment interfaces, including authorisation services, online data access services*

- *The Open Archive Initiative which promotes the interoperability standards for content access*
- *The Open Search mass market approach to search sharing and information access*
- *SCIDIP-ES for science data preservation*
- *Requirements for the preservation of Design and Engineering data resulting from the on-going activities in the SHAMAN project and other European initiatives (e.g. LOTAR (Long Term Archiving and Retrieval) – EN9300; STEP (Standard for the Exchange of Product Model Data))*

Other disciplines represented in the consortium have similar links.

Task 1320 Identification of new standards required

This task will identify areas where common standards would be of benefit. The task will rely on the methodology for interoperability analysis at level of system of systems developed within the GIGAS Support Action with the participation of GEO, GMES initiatives and the INSPIRE directive.

Another discipline-specific study we can take advantage of is based on the High-Energy Physics community which, through the DPHEP initiative, is exploring technical issues in data preservation, and aims to define standards for the field where none exist yet.

We have links to similar discipline-specific studies for example in the domain of enhanced publications.

An important area where we can have an impact is engineering. In order to get industrial acceptance preservation systems need to be structured and built that allow exchange of engineering data in heterogeneous organisations with different Product Lifecycle Management systems and services as data source for preservation activities. Common standards and archiving policies are essential for the wide acceptance and interoperability. Existing design and manufacturing standards need to be extended to allow preservation in all stages of the design and release process.

This activity includes the analysis of on-going standardisation in the LOTAR consortium performed with participation of industrial consortia partners and in organizations like the ProSTEP iViP organization that represents aerospace, automotive and high-tech industries as well as international PLM and CAD tool vendors; the VDA association (Association of the Automotive industries) and the AIA (Aerospace Industries Association) These organizations are key for recommendations to extend the current ISO standards for 10303 (STEP) and 14721 (OAIS) and the CAD interoperability standards in the CAX-IF workgroups as well as to support standardisation of PLM processes in the related PLM-Services group. Outside these European industrial organisations results related to engineering preservation coming out of the SHAMAN project and national projects like the JISC-funded SCARP project will be included.

Concerning LOTAR, a roadmap will be developed for standardisation of long living engineered parts ranging from formats used in PLM applications to formats and processes for long term preservation. We will establish liaisons with standardization bodies and stakeholders, with a view to information sharing and consensus building for the agreement on the roadmap between industry, vendors and research communities

1.4 METHODOLOGY AND ALIGNMENT

The D13.1 document will evolve during 4 years, by incremental additions and improvements. The methodology we will use is based on mainly qualitative methods. The initial planning is to firstly find out what is state-of-art, and use that as well as recent developments to guide/support organizations in

their process of getting an overview of as well as later selection of digital preservation standards. Below are the initially planned steps in the methodology to reach the research objectives:

- Literature review and survey of state-of-art + analysis
- Gap analysis
- Case studies
- Development of criteria for selection of standard using a decision tree

Work package 13 will work with other work packages to spread excellence as well as to gather feedback from internal as well as external stakeholders. Those are in particular:

- WP11, Common vision – VCoE building using common standards
- WP15, Internal events - To discuss the outcomes within the APARSEN project and to get feedback
- WP16, Common Tools – to discuss the relation of standards and projects in WP13 with tools identified in WP16
- WP 22, WP24 – to discuss Identifiers, Citability, Authenticity and Provenance
- WP41, WP44, WP45 and WP46 – these work packages will be used for communicating WP13 results/findings on common standards and gathering feedback related to these results/findings

1.5 TIMETABLE

The work package 13 started in month 4 and has a duration period until month 48. For each finalized project year an interim report gets generated followed by the final report in month 48. Therefore the entire work packed activities have been split in four sections with specific areas of research and investigations.

Year 1- Review of existing standards, recommendations and projects with standardization activities

In this period desktop based research with the focus on standards had been performed as described in this intermediate deliverable D13.1. The research activities got the focus on generic standards, communities and EU and non EU funded projects or initiatives from preservation related to processes and file formats. Most time had been spent to review the variety of documents, recommendations and initiatives. This ground work which still makes no claim to be complete is the basis for the investigation of the second year period.

Year 2 – Adding more standards especially in the engineering domain; moving the investigation results from document into a database approach

In this reporting period (Y2) we have investigated additional standards, projects etc., which have not been looked at in period 1 and also additional domains (such as publishing, open source and commercial solutions). These activities will continue throughout the project. Significant effort has been spent on standards and project in the design and engineering domain.

The project also started to set-up a taxonomy in order to structure the register of standards identified in the community at large. The taxonomy design is guided by the goal to provide an overview on the continuously growing index and to support practitioners, researchers and students in retrieving standards of relevance to their task. The taxonomy features multiple schemes. Categories are derived from or are mapped onto international classification schemes or common practice in the community at large, respectively.

Furthermore a “database”-like approach has been established and we have already started to load the standards documented in D13.1 into that database, to make that information available in the VCoE and

as the preparation for period 3, namely to work out a solution for a user to search e.g. over a kind of “decision tree” (see section 2 for more details).

Year 3 - Decision tree

With the results of the year two investigations and the migration of the findings of the first two years into the database, it is intended to generate decision trees which summarize the required standards for each domain in each step in the preservation activity following the OAIS model approach. Identifying the domain and the related preservation problem related standards out of a link enabled repository will help the user to find the needs or applicable standards and detailed standard descriptions to get compliant with the already established preservation standards or to gain know-how about communities or projects which are related to the requirement given by the users and collaborating APARSEN partners.

Year 4 Recommender service and GAP analysis

In the last year a kind of recommender service will be improved and areas lacking in preservation oriented standards and recommendations for future standardization activities related to the result of a GAP analysis that will be performed during this last period, will be documented. This is the main part of the final deliverable.

2 OVERVIEW ABOUT COMMON DIGITAL PRESERVATION STANDARDS, RECOMMENDATIONS AND INITIATIVES

In deliverable D13.1 this section gave an overview on common digital preservation standards as well as summarized on-going and past projects and initiatives related to digital preservation. The contents has now been removed from the document and already in part be migrated to a database. The migration is expected to be completed at end of the first quarter of period 3 and the results of all further investigations in period 3 and 4 will only be entered into the database.

The database application is OpenOffice.org BASE. The main goal for moving to a database now was to lay the groundwork for a searchable approach, where we can collect information in an intelligent way using all the benefits of a database (e.g. queries) to enable the work in period 3, namely implement those decision trees for users and to be able to hand it over to the VCoE for further usage. Section 2.1 gives an overview about the data model, which can/will be extended on an “as needed” base. The installation of OpenOffice.org is described in appendix [number] of this document.

Depending on the decision for the VCoE on whether to use a database or a content management system later on, the contents of this database can be easily exported and migrated into such a target environment. The following screen shot is showing the StandardForm with a sample entry.

The screenshot shows the 'StandardForm' window in OpenOffice.org Base, editing a record in the 'APARSEN-WP13-Standards-hhk3-TEST.odt' database. The form is titled 'StandardForm - OpenOffice.org Base: Database Form'.

Form Fields and Values:

- Detailed Name:** METS - Metadata Encoding and Transmission Standard
- Subject:** Communication Protocol
- Name/Version:** METS | 1.1
- NormIdentifier:** LoC
- Domain:** Library Institutions
- Related to:** MARC 21
- Segment:** Government
- Body:** Library of Congress
- Scope:** Worldwide
- License:** Open Standard
- Status:** Published
- License Fee:** ☐ Documentation Fee: ☐ De-Facto Standard: ☐ Formal Standard: ☒
- Description:** Maintaining a library of digital objects requires maintaining metadata about those objects. The metadata necessary for successful management and use of digital objects is both more extensive than and different from the metadata used for managing collections of printed works and other physical materials. While a library may record descriptive metadata regarding a book in its collection, the book will not dissolve into a series of unconnected pages if the library fails to record structural metadata regarding the book's organization, nor will scholars be unable to evaluate the book's worth if the library fails to note that the book was produced using a Ryobi offset press. The same cannot be said for a digital version of the same book. Without structural metadata, the page image or text files comprising the digital work are of little use, and without technical metadata regarding the digitization process, scholars may be unsure of how accurate a reflection of the original the digital version provides. For internal management purposes, a library must have access to appropriate technical metadata in order to periodically refresh and migrate the data, ensuring the durability of valuable resources.
- Link Description:** <http://www.loc.gov/standards/mets/>
- Implemented at:**

Implementation	
<input checked="" type="checkbox"/>	Library of Congress

Record Information: Record 1 of 10. The status bar at the bottom shows 'Page 1 / 1', 'Default', and 'STD'.

Figure 1: Standard form to edit database entries

2.1 DESCRIPTION OF THE DATABASE FIELDS

2.1.1 Standard Form

Detailed Name – Long name of Standard or Project

Name/Version – Short name of Standard or Project and current version

NormIdentifier – pick list of international or national standards, where this belongs to

Possible Selections (examples, extendable):

DIN, ISO, BS, MPEG, RFC, ISO, STEP, NIST, Other, LOC, <no entry>

Related to – another standard or project can be entered, where this one relates to

Body – pick list of bodies this standard or project belongs to / is referred to by NormIdentifier

Possible Selections (examples, extendable):

Library of Congress, Deutsches Institut für Norming (DIN), International Organization for Standardization (ISO), British Standard (BS), DOI Foundation, <no entry>

License – pick list of the supported license model used by this standard

Possible Selections (examples, extendable):

Apache License, Version 2.0, BSD 3-Clause License, BSD 2-Clause License, GNU General Public License Version 2, GNU General Public License, version 3, MIT License, Mozilla Public License 2.0, Eclipse Public License 1.0, GNU Lesser General Public License, version 2.1, GNU Lesser General Public License, version 3.0, Open Standard, <no entry>

License Fee – check box, if a license fee is required to use this standard

Documentation Fee – check box, if a documentation fee is required to access this standard (e.g. for ISO)

Subject – a selection of subjects this entry belongs to

Possible Selections (examples, extendable):

Metadata Dictionary, Communication Protocol, File Format, Process, Certification, Form Factor, Management System, Archiving Format, Ingest (Planning), Archive, Access, Security, Authenticity, Persistence, Identity, Common Model, Other

Domain - a selection of application domains this entry belongs to

Possible Selections (examples, extendable):

Industrial Design, High Energy Physics, Construction, Architecture, Medical, Biology, Chemistry, Earth Science, Astronomy, Library Institutions, Memory Institutions, IT Software, Records Management, Storage Institutions Audio, Storage Institutions Video, Social Science and Humanities, Financial Institutions / E-Commerce, Digital Publishing, Other, <no entry>

Segment – a selection of sub-domains this entry belongs to, to make **Domain** more precise

Possible Selections (examples, extendable):

Geography, Geodesy, Vulcanology, Oceanography, Climate Weather, Biosphere, Cartography, Mineralogy, Glaciology, Aerospace, Automotive, Machinery, Construction, Electronics, Cabling, Traffic Technology, Software, Ship Building, Power Generation, Telecommunication, Government, Other, <no entry>

Scope – select the “geographical” scope of this entry

Possible Selections (examples, extendable):

National, Europewide, Worldwide, Other

Status – a selection of states for this entry

Possible Selections (examples, extendable):

Proposal, Recommendation, White Paper, Requirement, Submission, Published, Other

De-Facto Standard - check box, if this entry is not a registered standard, but widely seen by communities as a “must use” / “ must support”

Formal Standard - check box, if this entry is a registered standard

Description – enter detailed description and background information etc. for this entry

Link Description – enter a URL pointing to the main website for this standard or project

Implementation – enter name of the company or institute which has used this standard to e.g. develop software or implement processes

2.1.2 Impact Form

The screenshot shows a database form titled 'APARSEN-WP13-Standards-hhk3-TEST.odt : ImpactForm - OpenOffice...'. The form contains the following fields:

- Implementation:** A dropdown menu with 'Library of Congress' selected.
- Impact:** A large text area for describing the impact.
- ImpactURL:** A text box for the URL of the impact.
- Organization:** A text box with 'Library of Congress' entered.
- OrganizationURL:** A text box for the organization's URL.
- StandardID:** A text box with '0' entered.

The status bar at the bottom shows 'Record 1 of 1' and 'Page 1 / 1'.

Figure 2: Impact form to edit database entries

Implementation – a selection of implementations to choose from

Possible Selections (examples, extendable):

Library of Congress, DataCite, Californian medical Library, The National Archives UK, US Department of Defense, German Ministry of Interior, To be described, Unknown, <no entry>

Impact – impact of the implementation on the organization or processes

ImpactURL – URL where the organization has stated such impact in detail

Organization – name of the organization

OrganizationURL – URL of the organization

StandardID – ID of the implemented standard

2.1.3 Sample Print Output

APARSEN-WP13-Standards-hhk3-TEST.odt : StandardDruck - OpenOffice.org Base: Database Form

File Edit View Insert Format Table Tools Window Help

METS - Metadata Encoding and Transmission Standard METS 1.9.1 LoC

Link to detailed description <http://www.loc.gov/standards/mets/>

Brief Description and Overview De-Facto Standard ☐ Formal Standard ☒

Maintaining a library of digital objects requires maintaining metadata about those objects. The metadata necessary for successful management and use of digital objects is both more extensive than and different from the metadata used for managing collections of printed works and other physical materials. While a library may record descriptive metadata regarding a book in its collection, the book will not dissolve into a series of unconnected pages if the library fails to record structural metadata regarding the book's organization, nor will scholars be unable to evaluate the book's worth if the library fails to note that the book was produced using a Ryobi offset press. The same cannot be said for a digital version of the same book. Without structural metadata, the page image or text files comprising the digital work are of little use, and without technical metadata regarding the digitization process, scholars may be unsure of how accurate a reflection of the original the digital version provides. For internal management purposes, a library must have access to appropriate technical metadata in order to periodically refresh and migrate the data, ensuring the durability of valuable resources.

Applicability, Usage, History, License

Application Domain	Library Institutions	Subject	Communication Protocol
Application Segment	Government	Status	Published
Body	Library of Congress	Scope	Worldwide
License Model	Open Standard	LicenseFee	<input type="checkbox"/> DocumentationFee <input type="checkbox"/>
Affiliated with/Derived from	MARC 21		

Impact

Organization	Library of Congress
ImpactURL	
Implementation for	Library of Congress
Impact Generated	

Record 1 of 10

Page 1 / 1 Default STD 100%

Figure 3: Standard form to print database entries

3 PRESERVATION SOLUTIONS (SOFTWARE APPLICATIONS)

3.1.1 Commercial Sector

3.1.2 Open Source Sector

Note: Initial activities have been performed in WP16 and will continue there throughout the project!

4 PERSISTENT IDENTIFIERS, FILE FORMATS AND OTHERS

4.1 PERSISTENT IDENTIFIERS

Persistent Identifier are used to address clearly indicated and permanent digital resources. Contrary to normal Web-URL they distinguish between identification and address of a resource. Using resolver technologies it can be ensured that access to resources can still happen even if the physical storage location has changed. Currently no standard is finalized but there several requests for comment visible. Most of them deal with Uniform Resource names (URN) and universally unique Identifiers (UUID)

A UUID is an identifier that is unique across both space and time, with respect to the space of all UUIDs. Since a UUID is a fixed size and contains a time field, it is possible for values to rollover (around A.D. 3400, depending on the specific algorithm used). A UUID can be used for multiple purposes, from tagging objects with an extremely short lifetime, to reliably identifying very persistent objects across a network.

The internal representation of a UUID is a specific sequence of bits in memory. To accurately represent a UUID as a URN, it is necessary to convert the bit sequence to a string representation.

The status of ongoing activities is covered in the document “Overview and studies on persistent identifier infrastructure commissioned by Knowledge Exchange and Prototype development of Meta Resolver Solution commissioned by SURFfoundation Part4”. The PersID project defines it work as follows:

“The PersID project, to successfully establish a reliable and internationally interoperable persistent identification infrastructure, aims to realize a trusting community, non-proprietary ownership of the PID system and the capability to anticipate on relevant future services.

These conditions for satisfactory international performance are best met by the URN-NBN option, because of the good experience with current national solutions, its inclusiveness (other PID systems can be resolved as well) and - being defined by IETF internet standards - its independence from vendors or technology platforms.

The current RFCs concerned with URNs and especially URN-NBNs were established in 1997. Since then the internet has changed and developed as well as function and usage of URNs. Therefore the PersID partners have an interest and in their policy agree to contribute to the updating and refinement of relevant RFCs and to comply to existing and future URN and URN-NBN related standards.”

http://www.persid.org/downloads/finalreports/PersID_Report_Part_4_final.pdf

The mentioned RFCs can be found using the following links:

[RFC 2141 - URN Syntax](#)

[RFC 1737 - Functional Requirements for Uniform Resource Name](#)

[RFC 2169 - A Trivial Convention for using HTTP in URN Resolution](#)

[RFC 2276 - Architectural Principles of Uniform Resource Name Resolution](#)

[RFC 2483 - URI Resolution Services Necessary for URN Resolution](#)

[RFC 2288 - Using Existing Bibliographic Identifiers as Using Existing Bibliographic Identifiers](#)
[RFC 3044 - Using International Serials Number as URN](#)
[RFC 3187 - Using International Standard Book Numbers as URN](#)
[RFC 3188 - Using National Bibliography Numbers as URN](#)
[RFC 3406 - URN Namespace Definition Mechanisms](#)
[RFC 4122 - A Universally Unique Identifier \(UUID\) URN Namespace](#)
[RFC 4246 - International Standard Audiovisual Number](#)

Note: The contents of this section will be migrated into the database in period 3 and further investigations will be performed.

4.2 COMMON FILE FORMAT STANDARDS USED IN PRESERVATION SYSTEMS

To re-use content information under authenticity aspects it is mandatory to get detailed information about the file formats and codecs which were used to generate the content that has been preserved. The formats can be split in three sections:

- Documents and multimedia files
- Office and data base oriented files
- Engineering and CAD formats

While digital born office formats normally as standard function of the used office program can be converted in standardized file formats like PDF or PDF-A non- digital born document are typically preserved with scanning procedures which in the most cases produce some version of TIFF formats.

In Engineering and design the LOTAR consortium works currently (since 2008) in enabling existing STEP standards to be used for preservation of CAD models and product life cycle information. More information is available in the section 2.2.4 of this document.

For the visualization of the multimedia and office content either format oriented viewers, in some cases also the authoring systems (if still available) or multivalent technologies like the FAB4 browser as established in the SHAMAN project can be used. In the Engineering world STEP or J-T viewers or interfaces for the currently by the LOTAR consortium extended STEP formats will allow permanent access to engineering content.

The US Library of Congress has published a wide list of file formats for preservation artefacts, documents and codes which can be subject for long term preservation.

5 FUTURE WORK

5.1 ASSESSMENT FRAMEWORK FOR COMMON STANDARDS

The analysis of current standards in use for digital preservation activities needs to be based on common assessment dimensions which can be applied across communities. These assessment dimensions for the identification of commonalities and differences are derived from and aligned with the integration and research activities which are being conducted within APARSEN. Hence the initial structuring necessarily correlates with the (non-orthogonal!) topic areas expressed in Joint Programme of Activities in the Description of Work. Based on the findings of the respective APARSEN work packages the initial assessment framework will be refined in later iterations of this deliverable.

5.1.1 Trust

Trust refers to the authenticity of digital data and the environments in which it is preserved. This encompasses the certification of repositories as well as the reputation of both – data and people.

Relevant criteria for *Trust* include, but are not limited to

- Authenticity
- Provenance
- Data quality
- Audit and certification
- ...

5.1.2 Sustainability

Sustainability is concerned with economic, legal, and social issues in addition to the construction of business cases and cost/benefit analyses for digital preservation. Brokerage services deal with the handover of digital holdings at the technical and organizational level.

Relevant criteria for *Sustainability* include, but are not limited to

- Brokerage services
- Business cases
- Cost/benefit analysis
- Storage solutions
- Transfer of custody
- ...

5.1.3 Usability

Maintaining usability corresponds to ensuring intelligibility and to enabling interoperability of digital data between organizations and across domains by providing appropriate representation information. This can be supported by setting up a structured repository of common tools and software together with additional required documentation.

Relevant criteria for *Usability* include, but are not limited to

- File formats
- Context, semantics
- Interoperability
- Common tools

- Preservation planning
- ...

5.1.4 Access

Access deals with persistent identifiers for data sets and links those to the identification of publications and other entities such as researchers. This is linked to digital rights and access management as well as issues related to the governance of data.

Relevant criteria for *Access* include, but are not limited to

- Persistent identifiers
- Policies and governance
- IPR, Access rights
- Finding aids, metadata
- ...

5.2 INITIAL ANALYSIS OF CURRENT STANDARDS

5.3 COMMUNALITIES AND OVERLAPS IN CURRENT STANDARDS

5.4 AREAS OF MISSING STANDARDIZATION ACTIVITIES

5.5 RECOMMENDATION FOR FURTHER STANDARDIZATION ACTIVITIES IN THE AREA OF DIGITAL PRESERVATION

5.6 CHECKLIST FOR SELECTION OF COMMON STANDARDS AND PROCUREMENT OF DIGITAL PRESERVATION TECHNOLOGY

5.7 STANDARDS OBSERVATORY

Note: The activities in this chapter will continue in year 3 and will be worked on throughout the project!

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List of Abbreviations

2D	two-dimensional
3D	three-dimensional
ABCD	Access to Biological Collections Data
ACI	Approval Content Information
AIA	Aerospace Industries Association
AIP	Archival Information Package
ANSI	American National Standards Institute
AP	Application Protocol (see STEP)
API	application programming interface
CAD	Computer Aided Design
CASPAR	Cultural, Artistic and Scientific knowledge for Preservation, Access and Retrieval
CAX-IF	CAX Implementor Forum
CGM	Computer Graphics Metafile
CPM	Collaborative project management
CRM	Customer Relationship Management
CWM	Common Warehouse Metamodel
DCC	Digital Curation Centre
DCMI	Dublin Core Metadata Initiative
DDI	Data Documentation Initiative
DIF	Directory Interchange Format

DIP	Dissemination Information Package
DMS	document management systems
DP	digital preservation
DPE	Digital Preservation Europe
DRAMBORA	Digital Repository Audit Method Based on Risk Assessment
DwC	Darwin Core
DXF	Data eXchange Format
EAD	Encoded Archival Description
ECAD	Electronic and Electrical Computer Aided Design
EDA	Electronic Design Automation
EDIF	Electronic Design Interchange Format
e-GIF	eGovernment Interoperability Framework
EML	Ecological Metadata Language
ERP	Enterprise Resource Planning
FGDC	Federal Geographic Data Committee
GD&T	Geometric Dimensioning and Tolerance
GEM	Gateway to Educational Materials
GIS	geographic information system
GML	Geography Mark-up Language
HPGL	Hewlett Packard Graphical language
IAQG	International Aerospace Quality Group
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IGES	Initial Graphic Exchange Standard
IMS	Instructional Management Systems
IP	information package
ISO	International Standards Organization
LMER	Long-term preservation Metadata for Electronic Resources
LOTAR	LOng Term Archiving And Retrieval
MCAD	Mechanical Computer Aided Design
METS	Metadata Encoding and Transmission Standard
MIX	Metadata for Images in XML
MODS	Metadata Object Description Schema

MOF	Meta object facility
NARA	National Archives and Records Administration
nestor	Network of Expertise in Long-Term Storage and Long-Term availability of Digital Resources in Germany
NISO	National Information Standards Organization
NoE	Network of Excellence
OAIS	Open archival information system
OCLC	Online computer Library Center
OMG	Object Management Group
ONIX	ONline Information eXchange
OSD	Object-based Storage Device
PAIS	A Producer-Archive Interface Standard
PCB	Printed Circuit Board
PDF	Portable Document Format
PDI	Preservation Description Information
PDM	Product Data Management
PI	packaging information
Planets	Preservation and Long-term Access through Networked Services
PLM	Product Lifecycle Management
PREMIS	PREservation Metadata Implementation Strategies
PRONI	Public Record Office of Northern Ireland
RA	reference architecture
RDBMS	relational database management system
RLG	Research Libraries Group
SCM	supply chain management
SCORM	Sharable Content Object Reference Model
SIP	Submission Information Package
SOA	Service-Oriented Architecture
STEP	STandard for the Exchange of Product Data (ISO 10303)
TEI	Text Encoding Initiative
TIFF	Tagged Image File Format
TRAC	Trustworthy Repositories Audit & Certification: Criteria and Checklist
TSC	Technical Steering Committee

UML	Unified Modeling Language
URL	Uniform Resource Locator
VCoE	Virtual Center of Excellence
VDA	Verband der Automobilindustrie (German Association of the Automotive Industry)
VIM	vendor interface module
W3C	World Wide Web Consortium
XMI	XML Metadata Interchange
XMP	Extensible Metadata Platform

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APPENDIX - The Database for projects and standards: Installation Instructions (example for MS Windows)

Note that the database will be published on the public website in due course.

Prerequisites:

- Oracle Corporation Java Runtime Environment Version 1.7.x or higher
- OpenOffice.org Version 3.4.x or higher
- An APARSEN WP13 database -> APARSEN-WP13-Standards.odt

Installation Steps:

1. Make sure you have the Java Runtime Environment installed on your system
2. Download OpenOffice from <http://www.openoffice.org>
3. In your file browser (e.g. Windows Explorer on Microsoft Windows) navigate to the download location and double-click the downloaded executable
4. Follow the installation instructions
5. After successful installation double-click the OpenOffice icon on your Windows desktop. You will get an overview window on your screen, where you see all OpenOffice applications.

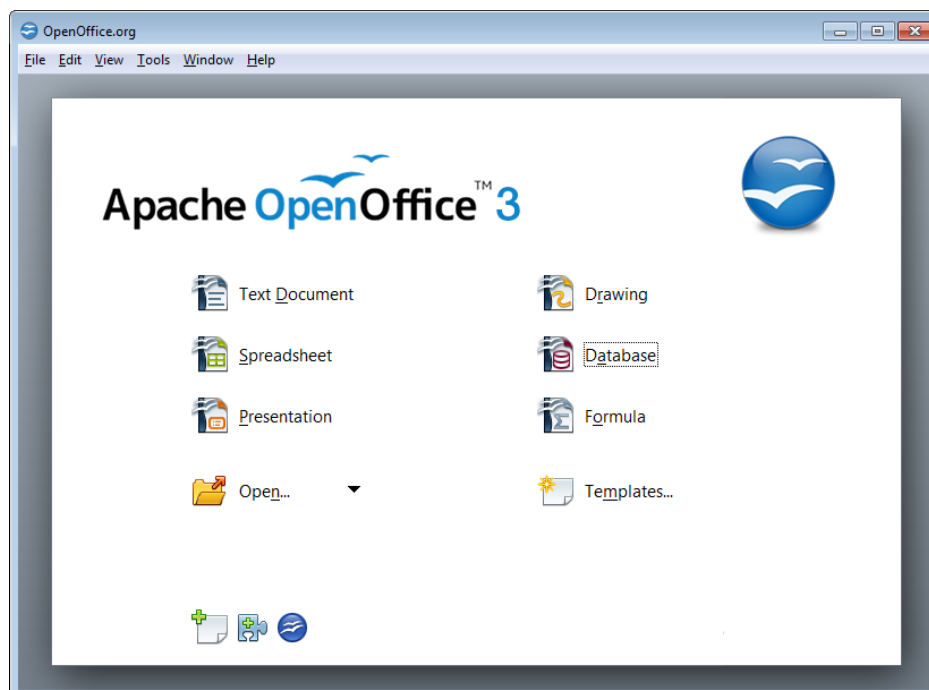


Figure 4: OpenOffice Main Window

or

Select “Start(menu) -> Programs -> OpenOffice.org 3.4.x -> OpenOffice.org Base” on your desktop.

6. The APARSEN database contains macros. To enable macros go to **Tools -> Options -> OpenOffice.org -> Security** and click the **Macro Security** button

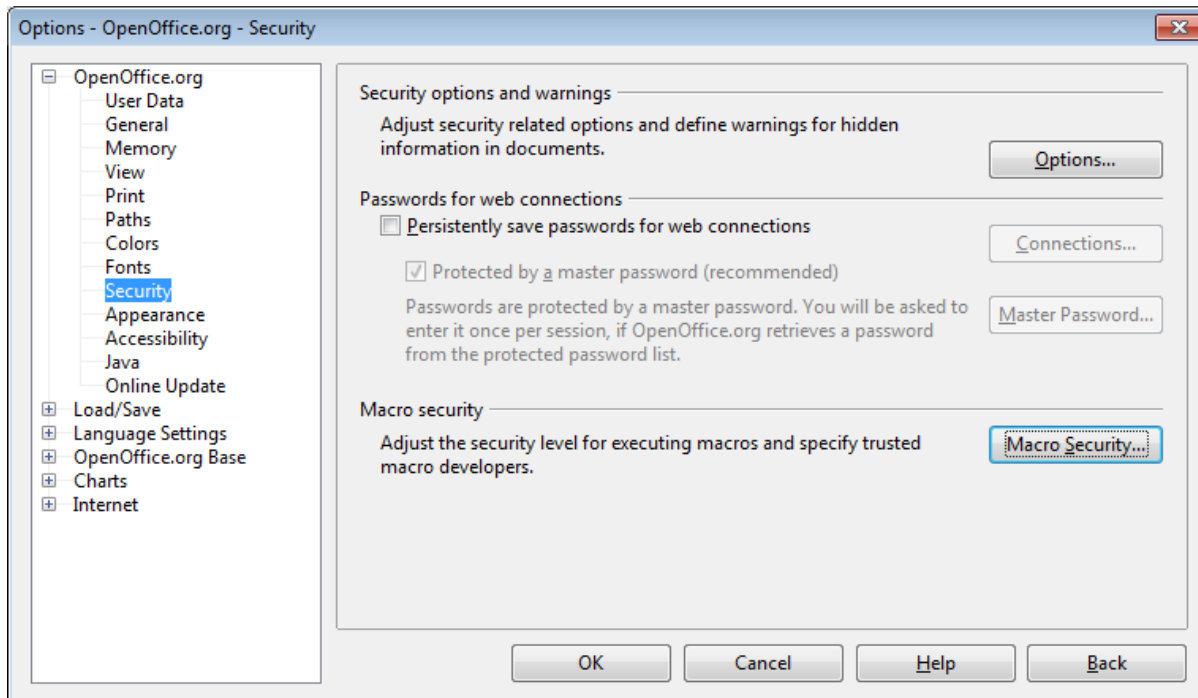


Figure 5: Security window to enable macros

7. Set the security level to **Medium**
Click the **OK** button to close the window and click the **Database** icon in the main window of OpenOffice.org to launch the **Base** modul. You will see the following screen:

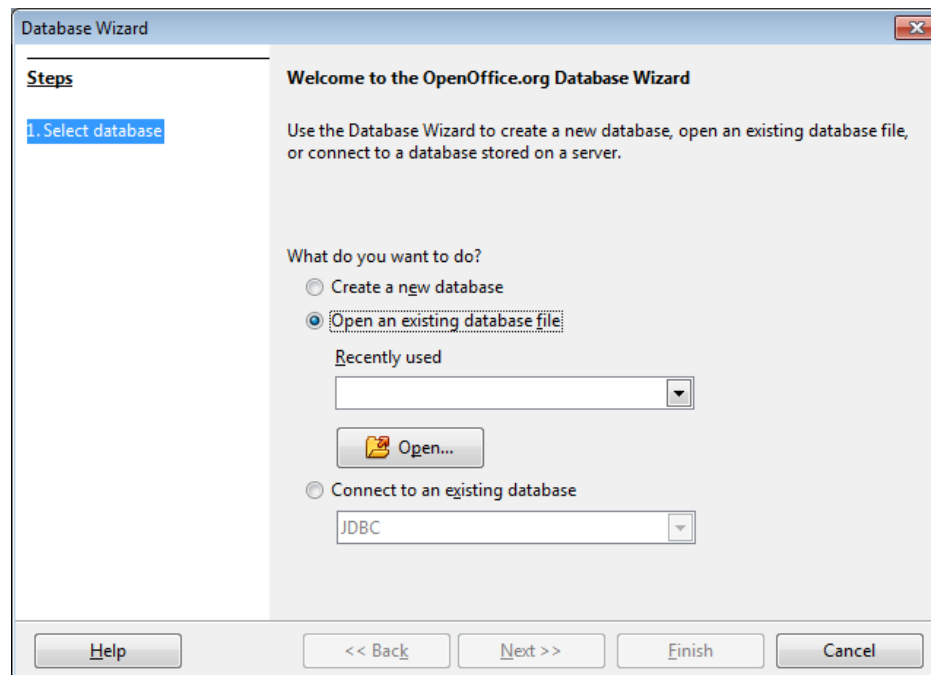


Figure 6: Database selection window

8. Click the **Open** button, navigate to and select the APARSEN-WP13-Standards database.
9. Click the **Finish** button. You will see the following screen:

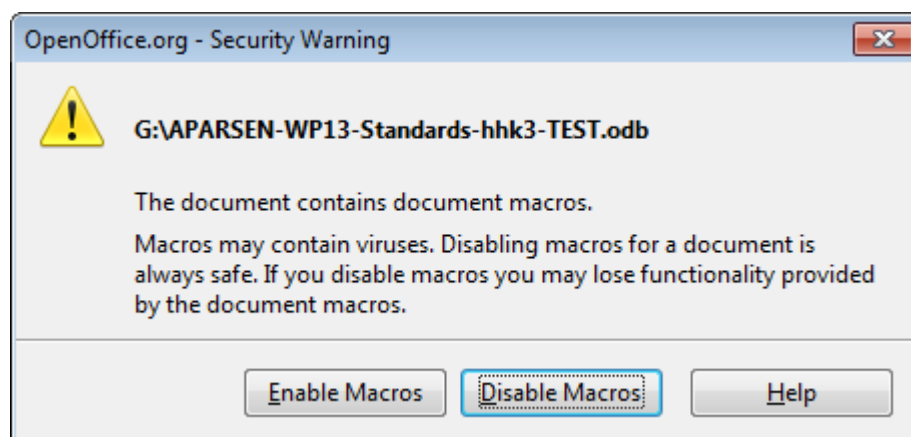


Figure 7: Security warning window for macros

10. Click the **Enable Macros** button and the main window of the database application will be launched

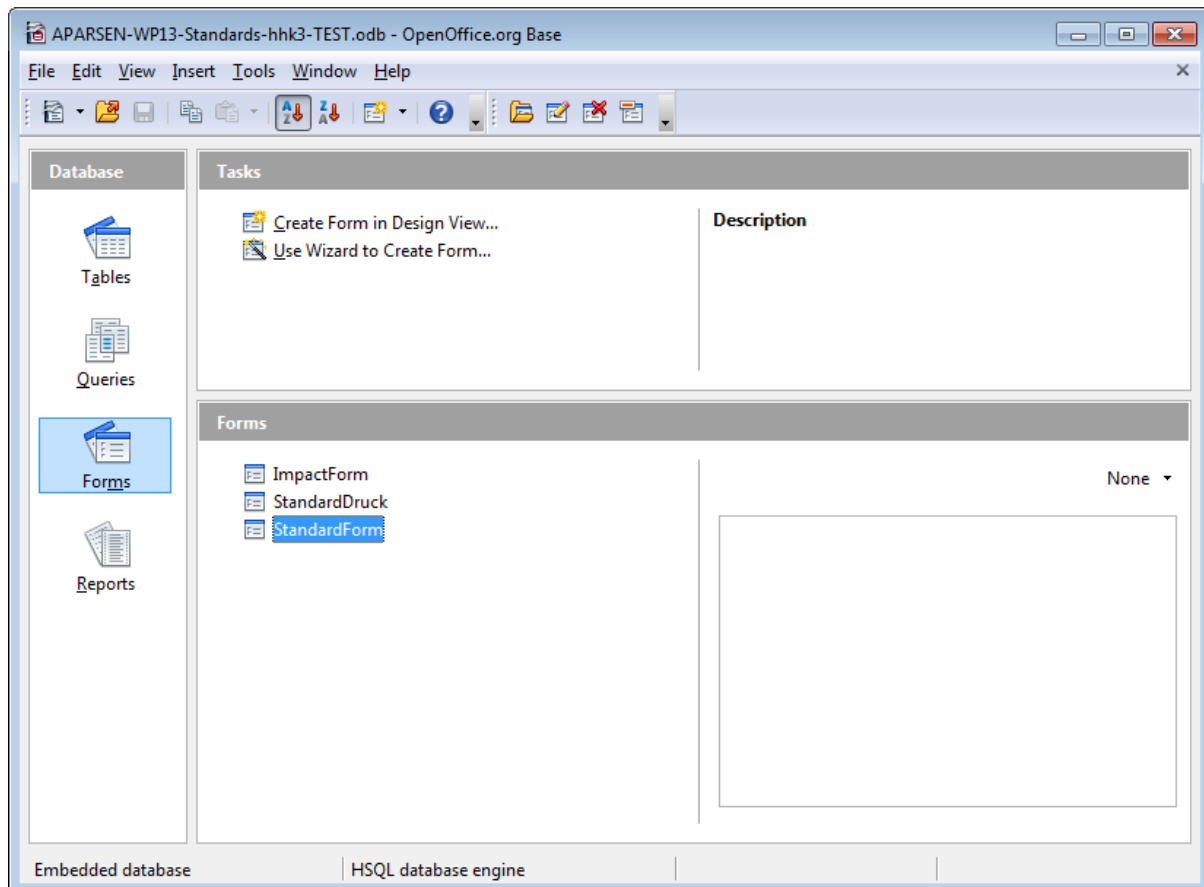


Figure 8: Initial database application window

11. Select the **Forms** icon on the left in the Database sub-window and double-click **StandardForm** in the Forms sub-window. You will see the following window, in which you can browse thru the records to see or edit information or create new records (see section 2 for details)