



D7.7: Final Report

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Contributions:
All project partners

Revision: Final



LoCloud is funded by the European Commission's
ICT Policy Support Programme





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1 Introduction

The LoCloud project (<http://www.locloud.eu>) is a Best Practice network funded under the European Commission's CIP-ICT-PSP programme. This report marks the end of a successful three-year project that ran from 1 March 2013 to the 29th February 2016.

2 Project objectives


LoCloud is a Best Practice Network of 32 partners funded under the CIP ICT-PSP Programme of the European Commission. Its overall goal is to explore the potential of cloud computing technologies for small and medium sized cultural institutions in publishing their digital resources available online and making them available to Europeana.

Small and medium sized cultural institutions hold a rich diversity of interesting content about the heritage of their local areas and regions. Their content has a particular relevance for Europeana's users interested in geographic localities as a starting point for exploration. But small and medium sized institutions typically have limited resources and access to technical support. LoCloud has pursued a close engagement with the small and medium sized cultural institutions, with the objectives of:

- Easing the task of enabling heritage organisations in making their contents accessible via Europeana, by using the cloud to provide services and tools that help to reduce technical, semantic and skills barriers.
- Make it easier for digital content emerging from small and medium cultural institutions, and collaborative crowdsourcing initiatives, to be made available to Europeana and in this way increasing the richness and representativeness of Europeana's record of local history.
- Improving the interoperability of content from across different domains (the 'heritage' sector, museums, libraries, archives, etc.) to provide a more coherent 'views' of the history and heritage of a given locality.
- Enabling the smallest institution (such as house museums, church archives, individual archives) to contribute their content to Europeana.
- Exploring the potential of cloud computing for aggregation, enrichment and re-use, with a special focus on geographic location.
- Explore and trial a cloud based architecture as a scalable platform for Europeana metadata aggregation and harvesting with higher efficiency and reduced maintenance costs.
- Develop a portal and support service to serve the needs of content providers.

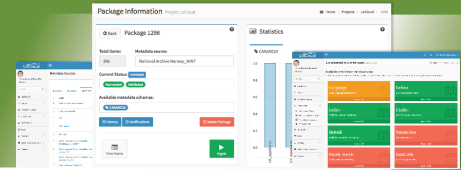
LoCloud: Beyond the Space

LoCloud Collections



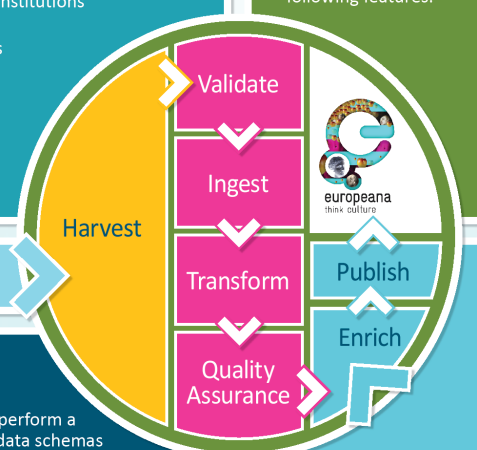
- Lightweight, out-of-the box repository
- Provided as a service
- Dedicated to small memory institutions
- Simple, easy to start
- Supports multiple collections
- Supports many data formats
- Customizable interface
- Online support
- Multilingual
- Compatible with Europeana
- Highly available

MORe



The services for harvest, Ingest, Validate, Transform, Enrich and Publish takes part in MORe, which has the following features:

- Enrichment micro-services
- Multiple input sources
- Curation oriented
- REST API support
- Many formats
- Easy to use
- Flexible
- Scalable



OAI-PMH

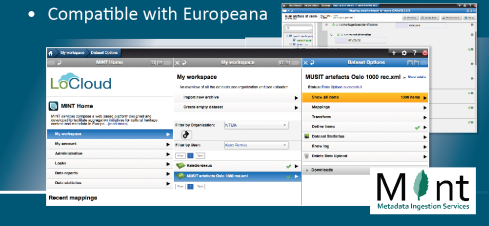
Enrichment Micro-services

Background Links

- Automatically links items in the collections to background information contained in DBpedia pages.
- REST service


MINT

- Provides users the ability to perform a mapping of their own metadata schemas to reference domain models (LIDO, EDM, Carare Schema)
- Follows a typical web based architecture
- Supports multiple organizations
- Compatible with Europeana




Geo-coding

- Facilitates geocoding of existing cultural heritage data without location information that can be resolved to coordinates
- REST API support



Vocabulary Matching

- Create, manage, publish, share, re-use of Ontologies, Taxonomies, Thesauri
- Multilingual vocabularies and format
- REST API support




Thesauri


- Automatically links relevant information from the metadata to relevant classes in a provided vocabulary.
- REST service

Historic Place Names

- Semi-automatic historical geo-information management functions
- Designed for aggregation and enhanced usage of digital heritage information.
- REST API support



Other Services



Web Service that uses a REST interface Communicates with Wikimedia commons and facilitates the exchange of information which include:

- Title
- Description
- Date
- Image (url)
- Source

LoCloud Crawler

A set of tools to automatically extract structured metadata from HTML web pages.

LoCloud is co-funded under the CIP ICT-PSP programme



www.locloud.eu



Poster illustrating the LoCloud services produced for the Europeana Tech conference, Paris, February 2015

3 Consortium

The LoCloud project brought together a consortium of 32 partners to achieve the project goals:

1. A scientific coordinator (National Archive of Norway -NRA) and a project manager (initially MDR partners and now 2Culture Associates).
2. A strong group of technical partners, each of whom has made important contributions to the development of Europeana, including AIT, Athena RC, AVINET, IPCHS, NTUA and PSNC.
3. A strong group of national and regional aggregation services and cultural institutions who played key roles in acting as pilot implementers of the cloud services produced by LoCloud, providing content for aggregation, working with smaller cultural institutions in their networks, and in dissemination on national and regional levels.
4. A group of partners with specific expertise in key aspects such as vocabularies.

21 EU Member States are represented in the consortium plus Iceland, Norway, Serbia and Turkey.



LoCloud network map

The list of project partners is below, further information about each partner is available on the project website at: <http://www.locloud.eu/About/Consortium>.

Austria	Angewandte Informationstechnik Forschungsgesellschaft Mbh (AIT)
Belgium	Provincie Limburg (Limburg)
Bulgaria	Pencho Slaveykov Regional Library (PSRL)
Croatia	Gradska Knjiznica Rijeka (GKR)
Cyprus	Cyprus University of Technology - Digital Heritage Lab (CUT)
Czech Republic	Narodni Pamatkovy Ustav (NPU)
Denmark	Kulturstyrelsen (KUAS)
France	Departement De La Gironde (CG33)
Germany	Universitaet Duisburg-Essen (UDE) (to July 2015)
Greece	Athena Research and Innovation Center in Information Communication & Knowledge Technologies (Athena RC) Future Library (Future Library) National Technical University of Athens (NTUA)
Iceland	Fornleifavernd Rikisins (AHAI)
Ireland	Discovery Programme (DP)
Italy	Fondazione Ranieri Di Sorbello (FRS)
Lithuania	Vilniaus Universitetas - Faculty of Communication (VUFK)
The Netherlands	Ministerie van onderwijs, cultuur en wetenschap - Rijksdienst voor het Cultureel Erfgoed (RCE)
Norway	Asplan Viak Interet (AVINET) National Archives of Norway (NRA)
Poland	Instytut Chemii Bioorganicznej PAN – Poznań Supercomputing and Networking Center (PSNC)
Portugal	Fundacao Museu Nacional Ferroviario Armando Ginestal Machado / National Railway Museum (FMNF)
Romania	Biblioteca Județeană „O.Goga” Cluj (BJC)
Slovakia	Univerzita Komenskeho v Bratislave (prifUK KAEG)
Slovenia	Javni Zavod Republike Slovenije Za Varstvo Kulturne Dediscine (IPCHS) Jara. Zavod za razvoj knjižnic (Jara)
Spain	Ministerio de Educacion, Cultura y Deporte (MECD) Universidad del Pais Vasco UPV/ EHU
Sweden	Stiftelsen Läns museet Västernorrland (ABMR)
Turkey	Hacettepe Universitesi (HU)
United Kingdom	2Culture Associates Ltd (from April 2014) (2Culture) MDR Partners Ltd (to April 2014) (MDR) University of York, Archaeology Data Service (UoY ADS)

4 Preparing: work package one

The main objective of work package one was planning and preparation for the work ahead. At the kick off meeting in Oslo, partners discussed the situation in each country and the potential of cloud services for content providers and aggregators. Following this meeting, KUAS coordinated a review of the state-of-the-art in cloud based content management and other services relevant to the needs of the project and to small and medium sized cultural institutions. LoCloud's content partners began to develop their action plans identifying the key players in the cultural sector in their country or region, existing infrastructures and potential content providers. The content to be provided by partners was appraised, the systems and metadata schemas in use identified as part of the action planning.

During three workshops, in Copenhagen, York and Madrid, partners contributed to a review of the existing infrastructures, the operational contexts of content providing institutions and attitudes towards adopting cloud and other solutions. A survey, carried out by Athena RC with UoY ADS, also gathered input from collections managers working in cultural institutions on the same topic.

A main outcome of these activities was the development of the user requirements specification for LoCloud's cloud-based infrastructure. Part of this specification included the adoption of the EDM, CARARE and LIDO metadata schemas as common standards. Each of these schemas was implemented in the LoCloud infrastructure, and metadata crosswalks were provided to enable metadata in CARARE and LIDO format to be transformed automatically to EDM.

5 Building: LoCloud Infrastructure and Services

The main objectives of work packages two and three were to specify, design and test the core LoCloud infrastructure and a set of micro-services using cloud-based technologies.

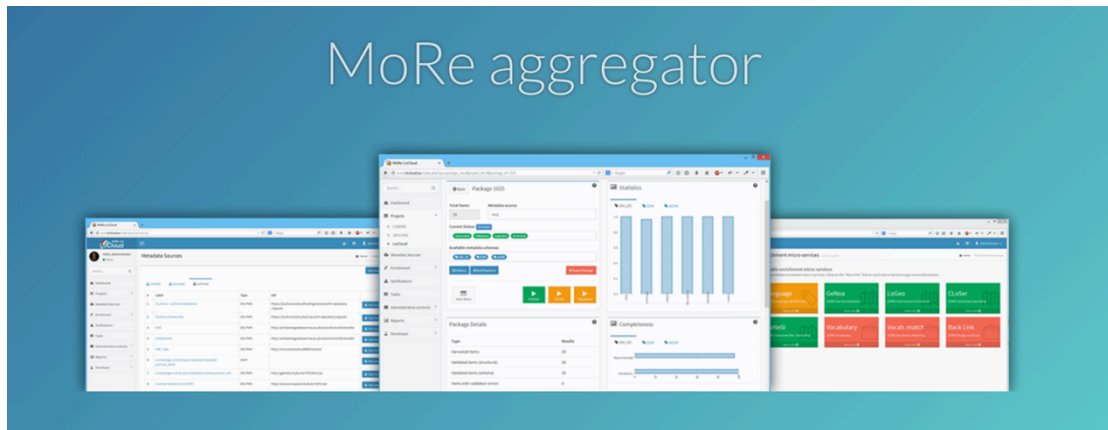
The LoCloud Aggregation infrastructure was implemented by work package two during 2013-15 with developments to the MINT and MORE services, and the establishment of LoCloud Collections as a new digital library platform for small cultural institutions. MORE provides the hub of the infrastructure with connections both MINT and LoCloud Collections and providing a central point of access to the micro-services developed by the project.

A series of cloud-based SaaS services and applications were developed in work package three also during 2013-15. The services include the Geolocation API, Geocoding application, Background link micro-service, Vocabulary mapping micro-service, Vocabulary service, Historic place names service, Wikimedia application and Crawler Ready Tagging Tools. These services were developed based on specifications established by the project, implemented on virtual machines in a cloud test lab where they were tested by LoCloud partners before being implemented into the LoCloud Aggregation infrastructure.

5.1 Work package two: MORE, MINT and LoCloud Collections

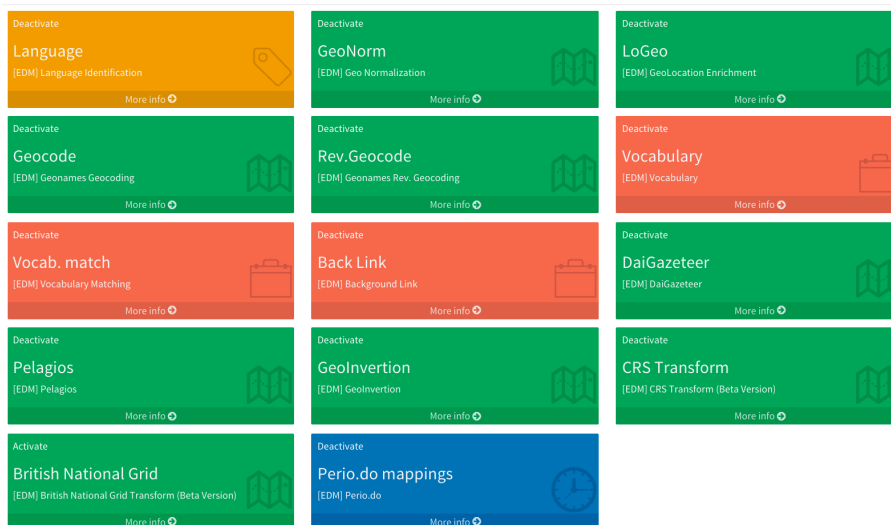
The MORE (<http://more.locloud.eu>) aggregator was established by Athena RC for LoCloud building on its experience in CARARE and other European and national projects. MORE has a scalable cloud-based architecture and provides services for harvesting, ingesting, validating, transforming, enriching and publishing metadata.

MORE has been used to ingest content from LoCloud's data providers in various metadata schemas from a variety of data-sources including MINT and LoCloud Collections. It has an intuitive and user-friendly interface, which can be used by non-technical users with minimal training. MORE offers a series of tools that allow users to enrich their content, to view statistics and validate their content before Europeana harvests it.



MORE user interfaces

One of the major achievements of the project is the incorporation of enrichment micro-services into MORE in a way which enables users to combine them in enrichment plans. This enables complex and powerful enrichment workflows to be run very simply.



Enrichment micro-services included in MORE

The enrichment services available in MORE perform tasks such as language identification, geo-normalization, geo-coding and reverse geo-coding, vocabulary matching enrichment, historic

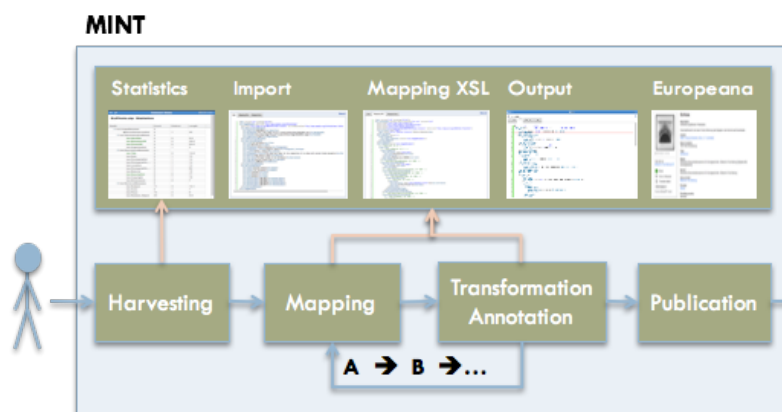
place names enrichment, time periods enrichment using Perio.do and Wikipedia/DBPedia enrichment. The various services perform specific tasks. The MORE enrichment plan editor allows users to specify the sequence of services to be executed on their dataset and any parameters, such as the languages to use.

#	Micro-Service	Schema	Parameters	Order	Actions
1	[EDM] Language Identification	EDM			
2	[EDM] Geo Normalization	EDM	delimiter=, invert=yes		
3	[EDM] Vocabulary	EDM	collection = Archaeology subject value=test operator=0		
4	[EDM] Vocabulary	EDM	collection = Archaeology		
5	[EDM] Vocabulary	EDM	collection = Croatia koncept		
6	[EDM] Vocabulary	EDM	collection = CG33		

MORE enrichment plan editor

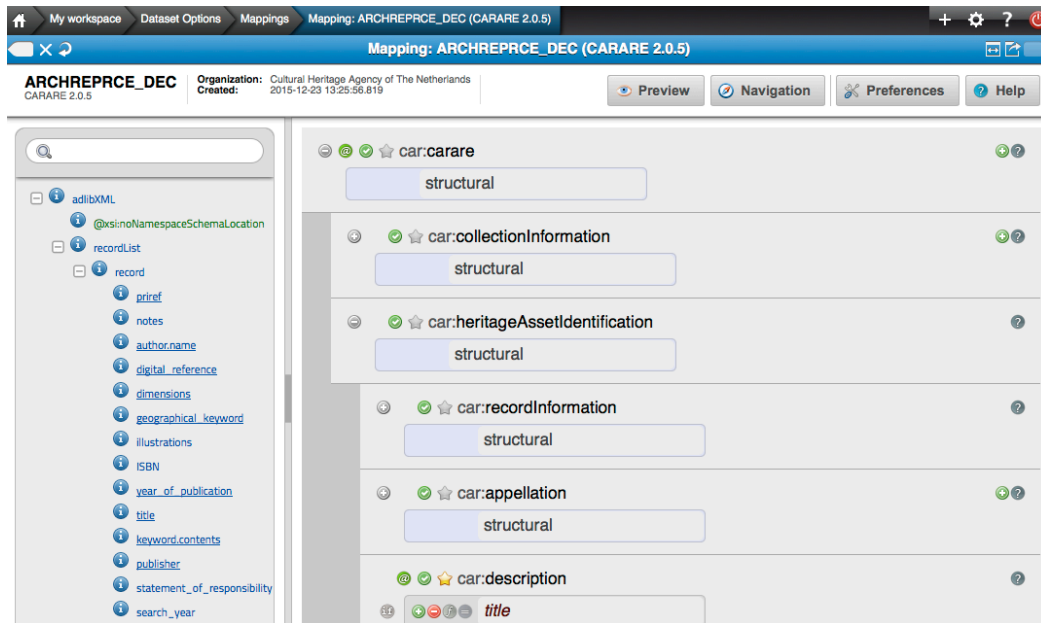
MORE forms the hub of the LoCloud aggregation workflow. There is a publishing pipeline from MINT (the metadata mapping and ingestion service) and from LoCloud Collections to MORE, which allows users of those services to take advantage of the enrichment services.

MINT (<http://mint-projects.image.ntua.gr/locloud/>) was established by NTUA for LoCloud building on their experience in several Europeana related projects. MINT is an online service that enables users to harvest datasets, establish mappings or crosswalks from the native schema to a reference schema (CARARE, LIDO or EDM schemas). Once mapped data can be transformed to the target schema and made available for publication to an external repository (MORE in the case of LoCloud) in a well-defined, machine understandable format.



MINT workflow

The MINT **mapping editor** provides a user-friendly interface where users can drag elements from the input schema to the target schema creating mappings and use the functionality to refine the outcomes by adding rules or constants. The tool formalizes the metadata crosswalk, while hiding the technical details and permitting semantic equivalences to emerge. The results are expressed in XSLT style sheets, which are stored and can be shared with other users to act as templates for use on their datasets.



The MINT mapping editor

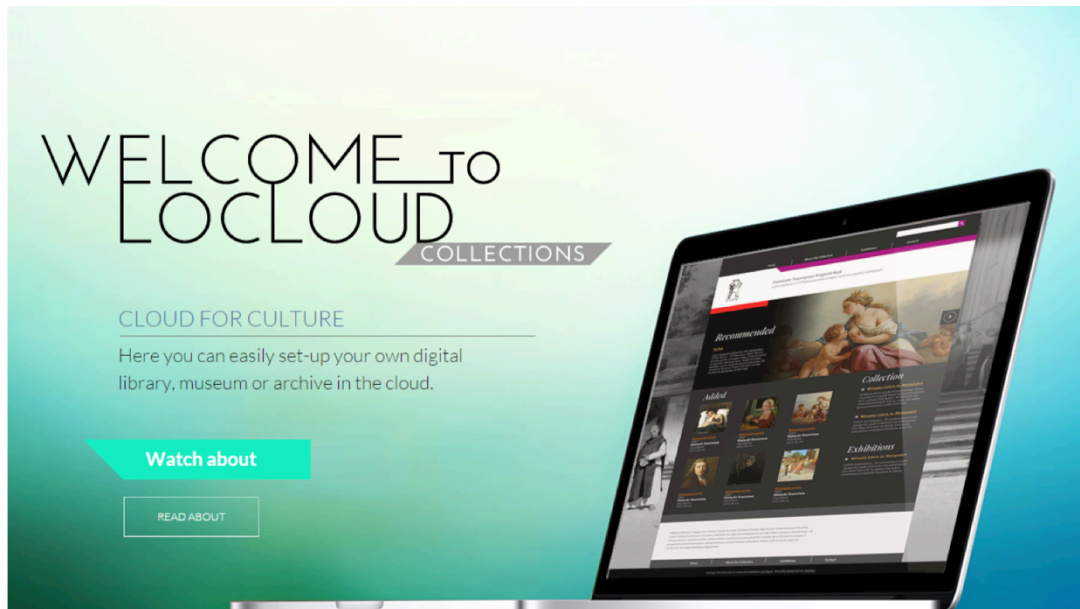
LoCloud Collections¹ was established by PSNC for LoCloud, building on work by the Roy Rosenzweig Center for History and New Media in the USA to develop Omeka². LoCloud Collections offers a lightweight, out of the box repository, provided as a cloud-based service with data storage on PSNC's infrastructure.

The service is designed with small memory institutions in mind and it is very simple and easy to set up a collection. Users can create metadata, upload content, design and customize a website, publish their items online and make them available for remote harvesting; and access detailed web statistics for their collections.

LoCloud Collections is multilingual and one of the achievements of the project has been the contribution made by partners to the translation of both the Omeka and LoCloud Collections interfaces. Cultural institutions can create the public interface to their collections online with their own brand identity and URL. LoCloud Collections is compatible with Europeana, exposing metadata in EDM format via the OAI-PMH protocol, and is integrated with MORE.

¹ <https://locloudhosting.net>

² <http://omeka.org/>



LoCloud Collections

5.2 Work package two: Crawler ready tagging tools

As part of work package two, AVINET developed an experimental set of tools that can be used to automatically extract structured metadata from HTML web pages. The tools use the crawling method of mainstream search engines. A web application enables URLs to be submitted for crawling, the crawl is then scheduled, completed, qualified EDM objects produced and the results indexed. Tests of the tools demonstrated that LoCloud’s Crawler Ready Tagging Tools are a viable way of aggregating an index of cultural heritage content. Europeana has expressed interest in this approach to generating an index for free-text searches.

LoCloud Crawler

Crawler Ready Tagging Tools (D2.6)

CRAWLER MENU

- Manage Collections
- Submit URL
- Submit Sitemap
- Manage Rules

TOOLS

- Search Demo

AUTHENTICATION

- Logout

Submit URLs for Crawling

On this page, you can submit a URL that the LoCloud Crawler will process and try to extract links to your digital objects.

Select the collection the URL belongs to

Select collection: Select collection

Enter a valid URL to submit

Base URL: Submit URL

Advanced options

Optionally, you can set a number of filters that determine how the crawler processes your links. Ignore these settings if you do not know what they means.

Follow URLs that contain:

Index URLs that contain:

Exclude URLs that contain:

Ignore query string parameters:

Delete existing URLs for collection:

Submit URL

URLs to be crawled for the collection

#	Crawler URL	Status	Actions

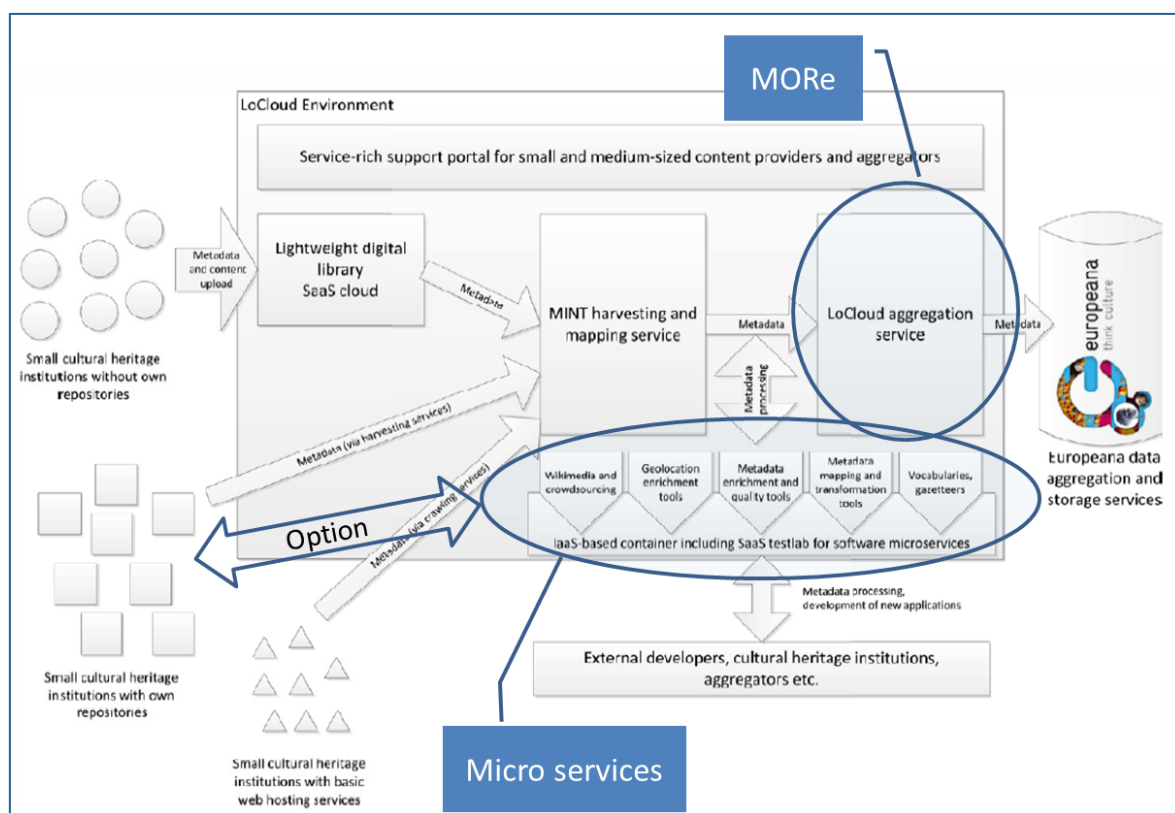
LoCloud Crawler web application

5.3 Work package three: Micro-services

In software development micro-services are individual, separately deployable components used to create highly flexible applications that can be continuously updated to meet business requirements and innovation. The advantages of using micro-services include scalability, more options for service implementation and reduced risk of the whole system failing (when micro-services run separately).

In LoCloud six development teams realized five groups of micro services including Geolocation enrichment tools, Metadata enrichment services, Vocabulary services, Historic place names services and a Wikimedia application.

The micro-services were implemented on virtual machines in a cloud test lab (using the OpenNebula cloud computing platform). Services were integrated in the MORE aggregation platform where they are being used by LoCloud partners. This is only one implementation scenario. Three of the services are available through dedicated online tools. The provision of APIs also means that services are available for integration in cataloguing applications and aggregation services.



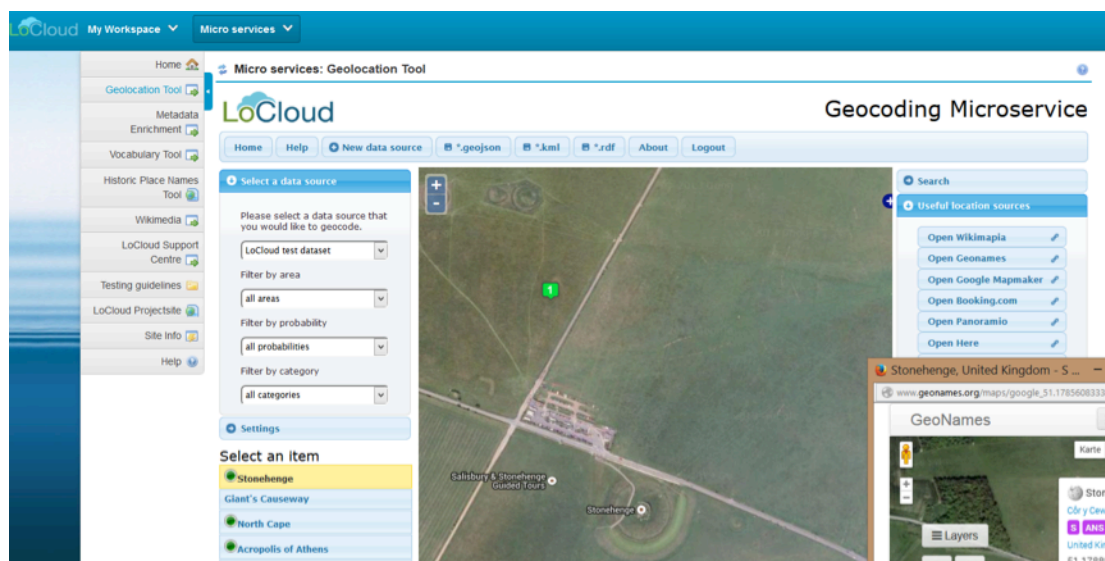
Micro-services in the LoCloud infrastructure

Geographic services and Historic place names

Two **Geolocation enrichment services** were developed in LoCloud (see [http://support.locloud.eu/Geolocation Enrichment Tools](http://support.locloud.eu/Geolocation%20Enrichment%20Tools)).

The first is a **Geolocation API (LoGeo)** developed by IPCHS that allows users to resolve a search term into candidate place names with spatial coordinates. The service is based on a wide range of geographical names sources including mainstream web sources, such as Google and GeoNames, and data collected from national geographical names registries in the home-countries of LoCloud partners.

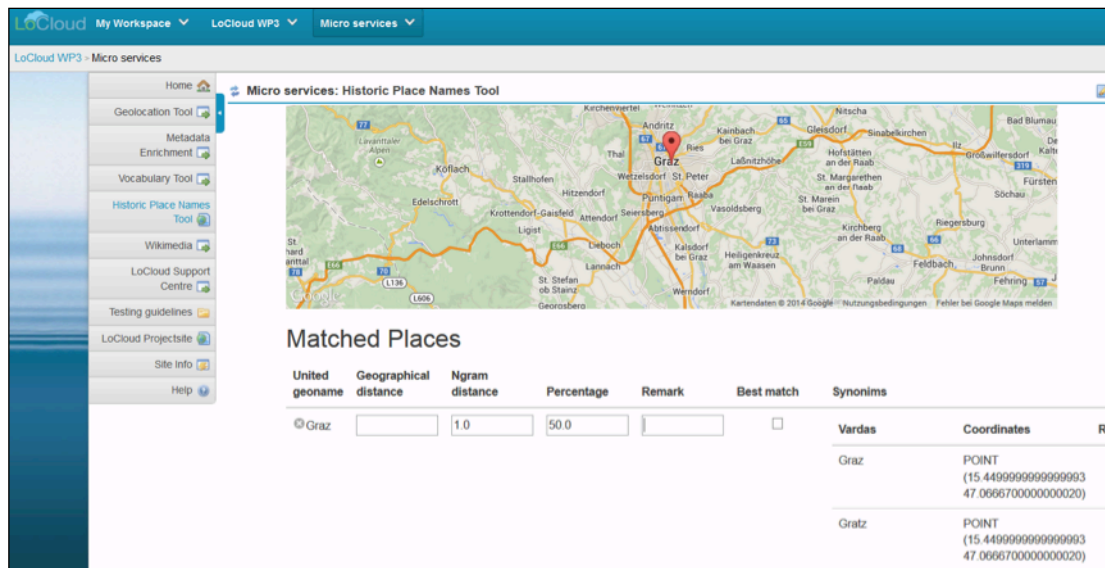
The **Geocoding application** developed by AVINET is an end-user oriented application that allows institutions to add geographical locations to any existing content in a controlled crowd-sourcing environment. Users can upload existing metadata records and add geographical coordinates via a map-based user interface and then load the augmented data back into their original production databases. The application implements the LoGeo API' search capabilities to suggest named locations for verification by the end-users.



LoCloud Geocoding application

The majority of information systems in heritage and the humanities use modern geographical data. However, digitization of the local heritage inevitably leads to historical geography and the need to resolve changes in place-names and administrative boundaries over time.

The **Historic Place Names Service** (see [http://support.locloud.eu/LoCloud Historical Placenames Microservice](http://support.locloud.eu/LoCloud%20Historical%20Placenames%20Microservice)) developed by VUKF aims to enable content institutions to collaborate in the development of a historic place names thesaurus. The service integrates historic place names data sets provided by LoCloud partners. It allows historic place names to be visualised on a map base, and exposes data so that it can be used for the enrichment of metadata records.



LoCloud Historical Place Names Service

Metadata enrichment

Metadata enrichment assists users by providing contextual information about a particular item or by offering choices to help categorizing items with relevant vocabularies. With the advent of information technology and the increased availability of cultural heritage online for the general public, there is an increasing need to improve browsing functionalities to improve the experience for end users.

Two metadata enrichment services were developed by UPV/EHU in LoCloud ([http://support.locloud.eu/LoCloud Enrichment Microservice](http://support.locloud.eu/LoCloud%20Enrichment%20Microservice)). The **Background links micro-service** automatically creates links from content items to background information in DBpedia. While the **Vocabulary matching micro-service** automatically assigns relevant concepts and terms from selected vocabularies to metadata records for cultural heritage items.

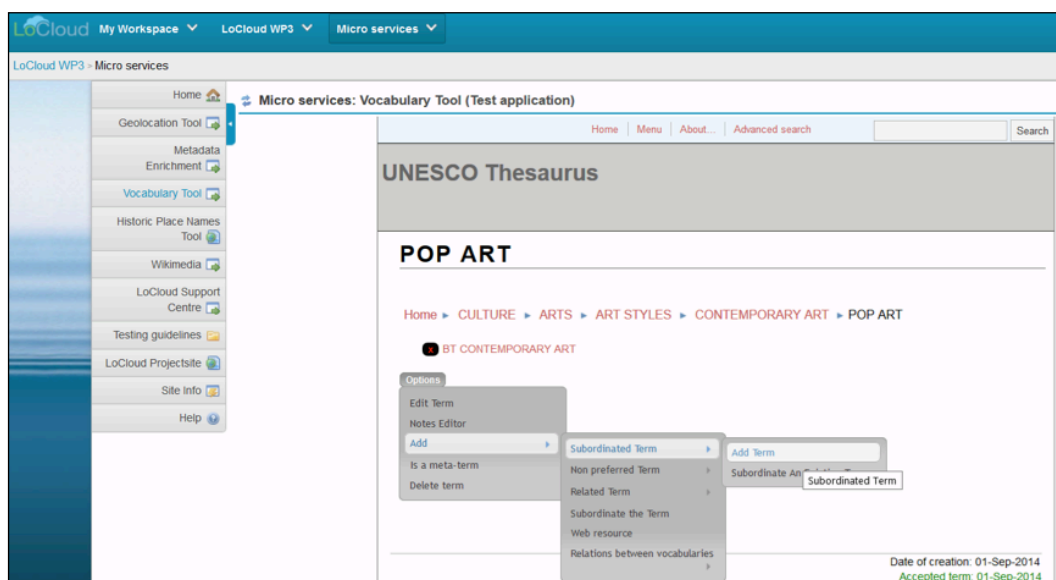
The Vocabulary matching micro-service consists of two modules. One module retrieves the vocabularies from LoCloud's Vocabulary service and creates an internal database with the concepts and lexicalizations in several languages. This module is executed on a regular basis so that the local database is synchronized and up to date with the vocabularies from the vocabulary service, whose concepts and terms are updated in a continuous fashion. The second module annotates cultural heritage items with appropriate concepts and terms found in the vocabularies.

Vocabulary Services

The Vocabulary services were developed by AIT for LoCloud (see [http://support.locloud.eu/LoCloud Vocabulary Microservice](http://support.locloud.eu/LoCloud_Vocabulary_Microservice)). The services enable local cultural institutions to collaborate in the development of multilingual vocabularies. The services are made available via a REST API and are integrated into MORE for use in metadata enrichment.

The service can be used online by cultural institutions or via its API for integration in content management systems.

The vocabulary application incorporates thirty-three vocabularies of which partners provided seventeen (including a series of fourteen vocabularies made available by UoY ADS, and three vocabularies made available by CG33 all in SKOS). AIT and the Discovery Programme have used the service to SKOSify four existing vocabularies, which are now also available for metadata enrichment.

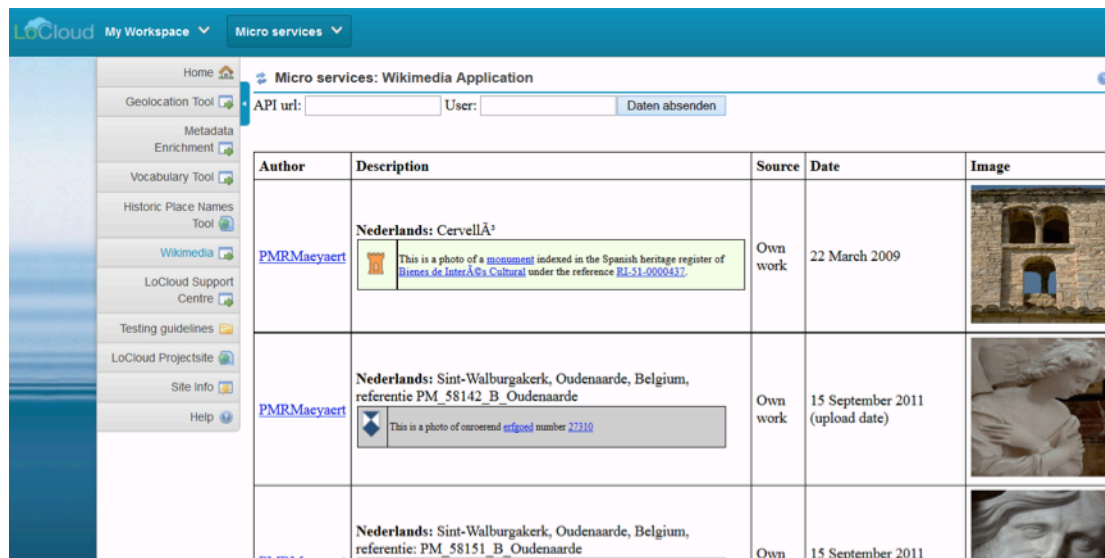


Vocabulary Service online application

Wikimedia application

Athena RC developed the Wikimedia application for harvesting metadata using the Wikimedia API (see <http://support.locloud.eu/Wikimedia>). It is designed to enable content published by independent photographers or small cultural institutions in Wikimedia commons to be provided to Europeana. The application was integrated in MORE for LoCloud and was successfully used to harvest content contributed by Paul Mayaert to Wikimedia for delivery to Europeana via LoCloud.

Wikimedia uses pages and micro-formats to store and categorize/annotate content. The metadata available from Wikimedia does not usually contain the minimum information needed to produce a record for Europeana. The Wikimedia application can be used to complete the information using non micro-format metadata and manually defined metadata to produce EDM records.



Wikimedia application in MORE

6 Enabling and supporting: Work package four

The objective of work package four was to enable and support small and medium sized institutions involved in providing content to Europeana by establishing a centre of expertise and support portal offering documentation, training materials and help desk services.

During 2014-15 AVINET, Athena RC and PSNC established a support portal and help desk for LoCloud. The portal (<http://support.locloud.eu>) provides users with access to the technical and user documentation for LoCloud services, to e-learning courses and training videos, and a means of lodging requests for help from the team via a ticket system. The portal also incorporates a question and answer service to provide access to frequently asked questions and also to enable registered users to share their expertise and experience of digitisation, metadata, vocabularies and of using particular systems.

Three training workshops were delivered during 2014-15 for LoCloud partners to introduce the new LoCloud services and to offer support in preparing their content for harvesting.



Participants at the training workshop in Bordeaux

A series of videos were produced in which each of the LoCloud services are described and demonstrated by the responsible partner. The videos are published in the support portal: <http://support.locloud.eu/tiki-index.php?page=Training%20Videos>.

PSNC developed an online training course giving a step-by-step guide to completing various tasks using LoCloud tools and services. The course, along with courses on digital repositories for small memory institutions and cooperation with Europeana, is available through the support portal: <http://support.locloud.eu/courses/>.

LoCloud E-learning Portal English (en) You are not logged in. (Log in)

LoCloud On-line Training Courses

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NAVIGATION

- Home
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- LoCloud On-line Training Courses License
- Courses

Site news

LoCloud E-learning Courses are now available
by Marcin Werla - Thursday, 3 September 2015, 6:03 AM

We are happy to inform you that final versions of LoCloud E-learning Courses are now available. Take a look below to see what you can learn here!

Remember that you need to register in order to participate in the courses.

In case of any questions, feel free to [contact us!](#)

Welcome to LoCloud project e-learning courses. This site is part of [LoCloud Support Center](#) dedicated to small memory institutions interested in making their collections available on-line on the internet and visible via Europeana.

LoCloud

LoCloud is co-funded under the CIP ICT-PSP programme.

Available courses

[LoCloud Services and Tools](#)

CALENDAR

February 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6

The training materials and videos developed by the by the project in English, have been used by partners to deliver training courses and hands-on workshops. The materials have been localised and translated into national languages for delivery to staff and volunteers working in small and medium sized cultural institutions in partners' countries.



Pencho Slaveykov Regional Library: Private Collector: *Picture of three men. Varna, 1902*

7 Content

LoCloud aimed to contribute to the body of content in Europeana for the local heritage by enabling smaller cultural institutions to contribute the rich diversity of content that they hold – from monument descriptions, historic buildings, maps, images, local history archives, museum objects to locally significant documents.

The project set out to deliver four million items of content to Europeana. The project's approach was to involve national and regional aggregators, and individual cultural organisations with the capacity to deliver their own collections and to involve small and medium sized institutions from their networks in the project.

The project has successfully delivered to Europeana 4,139,558 metadata records representing around 6.7 million digital objects. The content can be browsed in Europeana here:

[http://www.europeana.eu/portal/search?f\[PROVIDER\]\[\]=LoCloud](http://www.europeana.eu/portal/search?f[PROVIDER][]=LoCloud)



The screenshot shows the Europeana website interface. At the top, there is a navigation bar with 'Home', 'Collections', 'Browse', 'Exhibitions', and 'Blog'. A search bar is on the right. Below the navigation, there is a breadcrumb trail: 'Return to Home / Results / Item'. The main content area features a large image of a group of people, with a '+' icon below it. To the right of the image is a 'DOWNLOAD' button. Below the image, there is a table with the following information:

Title	Foto del Comitato Verrazzano	FIND OUT MORE
Description	Foto del Comitato Verrazzano presso Villa Vignamaggio a Greve (FI). Da sinistra: Bino Samminiatielli, Lea Lipinski, Lino Lipinski, Marilena De Vecchi, Uguccione Ranieri di Sorbello (in ginocchio), il sindaco di Greve Carlo Baldini; foto in bianco e nero.	Europeana is displaying this item via the Fondazione Ranieri Di Sorbello . Visit their site for more information.
Classifications	Subject: Fotografie , http://www.eionet.europa.eu/gemet/concept/13123 Concept: photography	CAN I USE IT? Yes with attribution 
		SHARE    

One of the items provided by LoCloud displayed in Europeana: Foto del Comitato Verrazzano, Fondazione Ranieri di Sorbello, CC BY

The content comprises of 329 separate collections from 27 countries representing content from 6-700 separate institutions (including a small number of private individuals). The institutions involved are very diverse in character:

- 85 state-funded local museums in Denmark,
- 245 small museums, special collections, church and other archives from Belgium,
- 528 archaeological units and local societies in the UK,
- 5 house museums and special local collections from Umbria in Italy
- 30 local museums and libraries in Spain,

- 60 institutions in Cyprus ranging from municipalities and communities, to the archives of the police force, post office and tourist board.

The items represented are as diverse as the organisations involved and range from local treasures to internationally renowned objects, from church registers to letters from famous artists, from photographs of historic monuments to 3D models, from still images of local life to video recordings of interviews, from maps and plans to drawings and paintings, and much more.

A few images from the content are illustrated in this report. A more detailed report illustrating the content provided by each partner is available at:

<http://www.locloud.eu/Resources>



Belgrade City Library: Belgrade above the Danube: Collection of maps between XVI and XIX century

8 WP6: Dissemination

The main aim of the project's dissemination strategy was to organise a large scale effort to increase Europeana's impact at the local level and to promote the availability of LoCloud's services to small and medium sized institutions and to aggregators throughout Europe.

The main channel for outreach and dissemination was the project website www.locloud.eu. The website provides general information about the project and its consortium members, news related to the project, access to resources (deliverables, reports and information about LoCloud Services) and to support, how to get involved in the project and contact details. In addition the website provided a channel for news, events and a platform to launch the LoCloud competition.

Social media like [Twitter](#), [LinkedIn](#), [YouTube](#) and [SlideShare](#) were used to support the project's dissemination activities. A newsletter was produced and distributed twice a year.

Various promotional materials were created and can be downloaded from the project website.

A short video was produced to provide an introduction to the project and its vision for developing cloud-based services for small and medium sized cultural institutions.



LoCloud video available at: <https://youtu.be/Vyo7Z4KClow>.

The LoCloud project organized two major workshops and a conference:

- Sharing Local Cultural Heritage through Europeana, ICOMOS General Assembly 2014, Florence, Italy, 11 November 2014, <http://www.locloud.eu/Events/LoCloud-ICOMOS-Workshop-2014>
- Sharing Local Cultural Heritage Online with LoCloud, workshop, Digital Heritage 2015, Granada, Spain: <http://www.locloud.eu/Events/LoCloud-Digital-Heritage-Workshop-2015>

- LoCloud final conference, Amersfoort, the Netherlands, 5th February 2016
<http://www.locloud.eu/Events/LoCloud-Conference>



Ole Myhre Hansen of NRA opening the LoCloud Conference

In addition to these major events the project organized workshops at:

- TPDL 2015, Poznan, Poland, 17th September 2015: <http://tpdl.dcu.gr/>
- EVA Jerusalem, Israel, 8th November 2015: <http://www.locloud.eu/Events/LoCloud-EVA-Minerva-Workshop-2015>

A Hackathon and Competition were run by the project during 2015 to invite developers to explore LoCloud's services and students, curators and others to explore their local history through Europeana.

- LoCloud Hackathon, Google Culture Institute, Paris, France, 11 February 2015, <http://more.locloud.eu/hackathon/index.php?op=home>
- My Local Heritage competition
<http://www.locloud.eu/LoCloud-Competition>

Partners organized workshops and a range of dissemination activities, translating press releases and sharing news and information in their local language to make sure that the project and its activities was known by small and medium cultural institutions and the culture sector in their country. Additionally a series of five workshops were organised in Bosnia and Herzegovina, Montenegro, Macedonia and Albania targeted at small cultural institutions starting out in digital libraries in those countries.

Analysis of the project's website statistics clearly shows the impact of the dissemination activities to promote the Hackathon, the Competition and project events during the final year of the project with a significant increase in visitor traffic to the site.

The full range of dissemination activities is described in D6.3 – Final Dissemination Report: <http://www.locloud.eu/Partner-Area/Deliverables/D6.3-Final-Dissemination-Report>

9 Sustainability and exploitation

Sustainability is the capacity of the project to continue and use its results after the end of the funding period. Sustainability has been on the agenda for LoCloud from the outset.

LoCloud's outcomes include a range of services that give cultural institutions and aggregators new tools to capture, enrich and share their data with online audiences and Europeana. These services have been used by the project to engage with cultural institutions and aggregation services whilst sourcing, preparing and adding new data to Europeana. In addition, LoCloud has provided documentation, training materials, online learning and helped to build the capacity amongst staff and volunteers working in cultural institutions on digitization projects.

There are two main aspects to sustainability for LoCloud:

- The tools and services developed by the project;
- The networking, support and training activities by partners amongst local cultural institutions in their regions.

LoCloud technical partners considered the sustainability of their **services** during the second half of 2015. Aspects such as the maintenance and development of the services, charging for services and the provision of support were considered. All of the partners are committed to continuing to distribute and maintain the services after the end of the project period. In general the partners plan to continue offering a level of service for free, up to a certain volume of data or number of users. Some partners are planning to offer charged-for premium versions of the service (with additional features, or for larger volumes of data and/or numbers of users). The developer partners have, in most cases, deposited code for community versions of the services under open licences to enable re-use.

LoCloud's data providing partners considered the future of data aggregation and their continued use of LoCloud services in early 2016. All are committed to continuing to deliver data to Europeana and to working with their local networks.

The project's sustainability and exploitation plan is available from <http://www.locloud.eu/Partner-Area/Deliverables/D6.5-Sustainability-and-Exploitation-Plan>

10 Evaluation and impact: Work package five

The main objective of work package five was to monitor the achievements of LoCloud and their impact on the user communities.

LoCloud's approach has been to provide a series of modular services that can be implemented by data providers, aggregators and developers. LoCloud has provided both SaaS (Software as a Service - services and tools available in the cloud) and IaaS (Infrastructure as a Service – infrastructure and storage in the cloud). The operational outcomes and impacts of LoCloud's SaaS and IaaS were evaluated during year three. LoCloud's technical developers, partners, aggregators, small and medium sized cultural institutions and Europeana were all consulted.

The findings of the evaluation show that LoCloud's approach of developing cloud-based micro-services has proved to be very flexible. It provides the perfect starting point for a joint market place scenario, and a good basis for further technical achievements and enhanced products. LoCloud's services are adapted for the wide cultural heritage community and have already received attention from institutions, aggregators, projects, developers and Europeana. Several of the services are being exploited by external organisations and projects.

Both cultural institutions and aggregators reported improvements in the process of providing content to Europeana as a result of using LoCloud's services.

There is an increase in the capacity of smaller cultural institutions to carry out digitisation and participate in Europeana as a direct result of LoCloud's work. The establishment of the support portal, documentation and training materials, and work by LoCloud's partners to rollout the support and training to their local partners in their national languages all contributed to this increase. For Europeana there is an increased availability of local cultural heritage content of higher quality as a result of LoCloud.

Work package five made a series of recommendations on the future development of cloud services based on the evaluation of LoCloud's outcomes. The recommendations highlight the importance of providing documentation that is specifically designed for users in smaller cultural institutions in their national languages, of continuing to offer support in the use of services and securing the sustainability of the services.

11 Concluding remarks

During the three years of the project LoCloud has explored the potential of cloud computing technologies for both providing infrastructure (IaaS) and software services (SaaS). The focus of the project has been on:

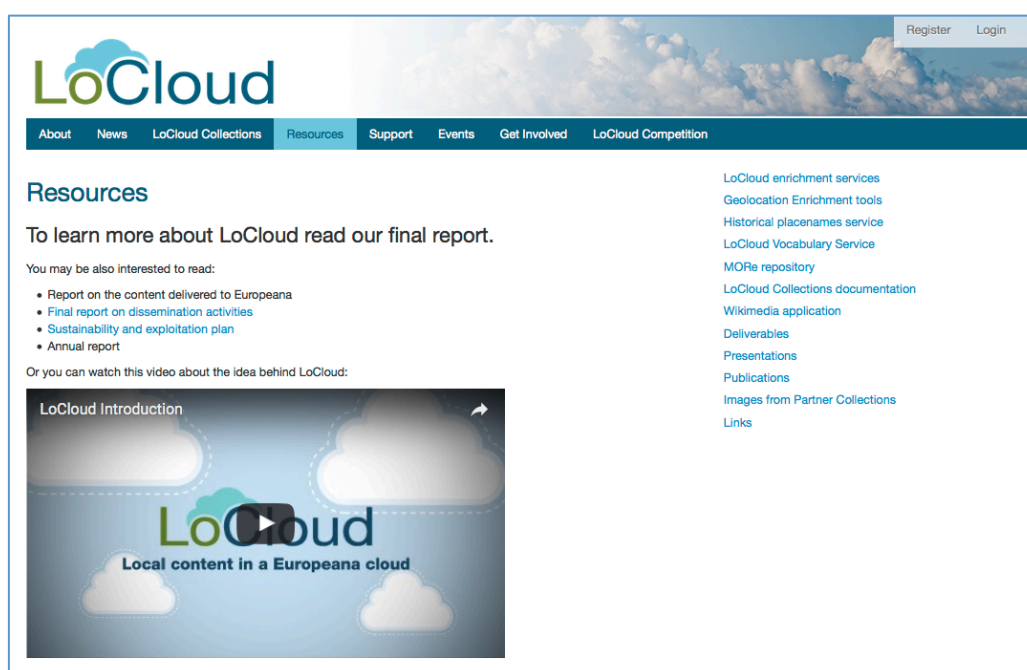
- Easy to use and cost effective light-weight digital library solution for cultural institutions;
- Easy to use metadata enrichment services;
- An improved framework for metadata aggregation; and
- Innovative metadata capture solutions.

LoCloud's outcomes include a range of services that give cultural institutions and aggregators new tools to capture, enrich and share their data with online audiences and Europeana. These services have been used by the project to engage with cultural institutions and aggregation services whilst sourcing, preparing and adding new data to Europeana. LoCloud has been highly successful in achieving its target of delivering four million items of cultural heritage to Europeana.

LoCloud's impact has not only been in terms of establishing technical services, but also through providing support and training for staff and volunteers working in small and medium sized cultural institutions. It has encouraged the use and creative re-use of Europeana's digital heritage content, particularly amongst students, through the "My Local Heritage" competition.

The feedback received by the project from end users indicates that LoCloud services are proving highly successful. They provide a good starting point for a one-stop-shop with integrated services that are accessible, understandable and usable for small institutions. The services, planned and designed with the needs of smaller institutions in mind, they have gained attention from larger institutions, research infrastructures, aggregators and Europeana.

For further information see: <http://www.locloud.eu/resources/>



The screenshot shows the LoCloud website's Resources page. At the top, there is a navigation bar with links for About, News, LoCloud Collections, Resources (highlighted), Support, Events, Get Involved, and LoCloud Competition. The main heading is "Resources". Below it, a text block says "To learn more about LoCloud read our final report." followed by a list of links: "Report on the content delivered to Europeana", "Final report on dissemination activities", "Sustainability and exploitation plan", and "Annual report". A video player is embedded with the title "LoCloud Introduction" and a play button. To the right, a vertical list of links includes: "LoCloud enrichment services", "Geolocation Enrichment tools", "Historical placenames service", "LoCloud Vocabulary Service", "MORe repository", "LoCloud Collections documentation", "Wikimedia application", "Deliverables", "Presentations", "Publications", "Images from Partner Collections", and "Links".