

DELIVERABLE

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D2.5. Lightweight Digital Library Prototype (LoCloud Collections Service)

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Executive Summary

This report presents the prototype of LoCloud Collections system, deliverable D2.5 of the LoCloud project. The main aim of LoCloud Collections (initially named Lightweight Digital Library) is to provide small cultural institutions with the possibility to host their digitized collections (metadata as well as content) very easily in the cloud, and make that data widely available on the internet, and in particular to Europeana.

The developed service prototype is available on-line at <https://locloudhosting.net/> and can be used by anyone to create new digital library in just a few minutes. The service was designed by PSNC and ATHENA, in consultation with LoCloud content providing partners. Implementation was done mostly by PSNC, with the support of ATHENA, especially in the features related to MORE integration. All project partners were involved in testing of the system and many of them provided also user interface translations.

This report starts with an introduction that presents the main high-level motivations behind the service. The second chapter presents an analysis of the requirements collected from LoCloud content providers and a technology analysis, which justifies some of the most crucial software decisions. The third chapter describes in detail the developed prototype and focuses on demonstrating that the requirements are met by what the prototype currently offers. The fourth chapter contains initial end-user feedback gathered in the alpha stage of LoCloud Collections development. The report ends with description of links between LoCloud Collections and other LoCloud services, and plans for the future. These plans assume that in February/March 2015 version 1.0 of the service will be made available to any interested cultural heritage institution or organisation as well as to private collectors etc. The last year of the project to February/March 2016 will be devoted to getting ready for service self-sustainability.

This report is extended by two annexes: The first one contains a basic user guide, which is a nice overview of what the service currently offers. The second annex contains examples of UI designs made for the LoCloud Collections service and their behavior on different types of devices.

1. Introduction

During the past several years, collaboration by cultural institutions with IT companies allowed these companies to develop software solutions which meet requirements of such institutions and allowed for wide, on-line promotion of their collections and collaboration with Europeana (<http://www.europeana.eu>). However, to exist on the Internet cultural institutions had to invest in proper IT infrastructure. This was possible for big institutions, which have sufficient and stable funding. Smaller cultural institutions have been digitizing their collections often at their own cost or with the support of small grants, but they could not afford to ensure constant on-line access to these resources. The result was that unique local heritage remained hidden and the only chance to discover it was to visit such a regional museum or private archive in person.

Thanks to the widespread availability of cloud technologies, this situation can be changed. IT infrastructure no longer has to be owned and in turn this means that major upfront investments are not needed. Virtually anyone can easily buy access to a server in one of public clouds offered by many companies worldwide. The charge for using such a server is based on the actual consumption of its resources, so if someone needs a small digital place to publish its business profile it can be done really cheaply at a comparable cost to buying a cup of coffee once per month.

Another challenge for small heritage institutions is the availability of IT personnel, who are able to set up and maintain a cloud-based server to serve the needs of such institution. High demand for IT professionals in the labor market results in high salaries in this sector and low availability of potential employees. For small institution it is practically not possible (and probably not needed) to have a dedicated full time IT administrator or software developer. There are companies utilizing this fact and offering remote administration services, but in most cases they are not really interested in going into the details of cultural heritage software systems nor into the specifics of initiatives like collaboration with Europeana. The end result of this situation is that often the on-line visibility of small heritage institutions is limited to a few static pages with general description, contact details and photos of selected items from their collection.

The design and development of LoCloud's Lightweight Digital Library was aimed to deliver an on-line service which would utilize the potential offered by cloud technologies to provide small cultural institutions a professional, but also a very economical solution allowing the smallest institutions to exist with their collections on the Internet, without the need of having an IT expert on site. This service allows the quick and easy creation of a new digital library, museum or archive and publishing of its data to Europeana. It is available in a so-called Software-as-a-Service model. This means that using LoCloud Lightweight Digital Library does not require institutions to own IT infrastructure and the payment for the service is periodic and depends on the extent of the resources used on LoCloud's platform, i.e. on the total amount of data which can be made available on-line by particular institution.

The design work was done by PSNC and ATHENA, in consultation with LoCloud content providing partners. Implementation was done mostly by PSNC, with the support of ATHENA, especially in the features related to MORE integration. All project partners were involved in testing of the system and many of them provided also user interface translations (detailed list of languages available in section "3.12. Multilingualism").

In the following sections, this report describes how user requirements for the service were defined and how the technology analysis was done. It also provides information about selected details of the implementation of the prototype and the initial user feedback collected during LoCloud training workshops. Finally, the report contains an overview of the links between LoCloud Lightweight

Digital Library and other LoCloud services and future plans related to service development and sustainability.

During the development the project took the decision to name the service LoCloud Collections, to make the name shorter, more marketable and to create a brand identity without overly close associations with the library environment only. **Later on in this report LoCloud Lightweight Digital Library is referred as LoCloud Collections.**

2. User Requirements and Technology Analysis

Initial user requirements for LoCloud Collections system were collected during three content providers workshops organized by the project in August and September 2013 in Copenhagen, York and Madrid. During these workshops PSNC presented some initial ideas regarding the LoCloud Collections service¹ and these were discussed with project partners. The following potential user groups were identified:

1. Small and medium memory institutions lacking in IT support and resources in general.
2. Institutions with a working repository, looking for a way of cutting costs.
3. Hobbyists and individual professionals with no knowledge about digital library standards and Europeana but with an interest in managing their digital collections.
4. Large supporting organizations (National Research and Education Networks, domain aggregators) interested in supporting small organizations within their domain/country.
5. End-users who are interested in local heritage and require intuitive user interface.

Another outcome of these discussions was a list of general requirements, which are summarized below:

1. Very easy to use, at least for basic features, with no IT staff required to start using the service.
2. Supports a way to deposit and retrieve at least 4 basic objects types:
 - a. Photographs,
 - b. Textual documents (multiple pages),
 - c. Audio content,
 - d. Video content.
3. Multilingual interface to increase accessibility of collections.
4. More affordable than self-hosted digital library.
5. Support for migration from major digital libraries systems would be appreciated.
6. Should be able to handle significant traffic.
7. Look and Feel of the institution's website should be customizable.
8. Should allow for restricted access to given to (specified) resources.
9. Should support batch upload to allow users to move from their own portfolio to the new LoCloud-based repository.
10. Should be scalable in terms of storage and traffic.
11. Support for the creation of high quality metadata, including:
 - a. Geolocation,
 - b. Controlled vocabularies.
12. Provided with documentation and (optional) support in local language.
13. Out-of-the-box integration with the LoCloud aggregation infrastructure.
14. Content stored in LoCloud Collections can be downloaded when subscription will expire or when customer decides to go somewhere else.

¹ <http://locloud.eu/Media/Files/Presentation-Files/The-LoCloud-lightweight-digital-library-and-alternative-content-sources>

15. Batch upload of items should allow users to enter metadata values which are the same for all uploaded objects e.g. newspapers.

The final list of key high-level requirements/features for LoCloud Collections was defined in the following way:

1. **Easy and fast start** – after registering in the service and filling in a simple form, the user should be able to start making collections available on-line in just few minutes.
2. **Powerful, yet easy to use** – the service should offer a digital collections management system that is easy to use (no need for a long training nor a lot of manuals reading), but will also have more advanced features for more demanding/expert users.
3. **Support for many different collections** – the user should be able to put on-line many different collections in one account.
4. **Support for many data formats** – the user should be able to publish photos, scans, text documents, as well as audio and video materials.
5. **The possibility to adjust the end-user interface** – users should be able to choose one of predefined graphical templates, and then adjust it for their needs, e.g. by adding corporate logos, choosing colour schemes and other customizations etc.
6. **The possibility to adjust the metadata schema** – the user should be able to adjust the metadata schema for local needs, incl. defining vocabularies for certain metadata elements. The system should offer support the provision of geolocations in the metadata.
7. **Batch upload of data** – users of LoCloud collections should be able to make batch uploads of data – both metadata and content, to facilitate uptake of this service and migration from other local systems.
8. **Access to documentation and support** – support for LoCloud Collections users should be provided via the portal available at <http://support.locloud.eu/>.
9. **Fees dependent on the use of resources** – assuming a business model that requires payment of fees, the level of fees for using the LoCloud Collections service should be defined by the chosen pricing plan which corresponds to the amount of system resources consumed by the user.
10. **No need to make large financial investments** – using LoCloud Collections should not require users to invest in hardware or software before starting to make their collections available on-line.
11. **Multilingualism** – Taking into account that LoCloud project is aimed to very small heritage institutions, the presented collections will probably have very local or at regional scope. In such context it is very important to be able to provide the user interface in the local language as well. LoCloud Collections should be fully prepared for having multilingual user interface.
12. **Compatibility with Europeana** – using LoCloud Collections should assure that there will be no technical issues in providing information about collections to Europeana (via the LoCloud aggregation infrastructure).
13. **Access to advanced statistics about usage of collections** – Institutions who makes collections available on-line are interested in information about how they are used. LoCloud Collections should offer access to a dedicated analytical service, in which detailed information about the visitors traffic is automatically collected (with respect to users privacy).
14. **Scalability** – The user should be able to change the amount of available system resources at any time, adjusting the storage space that is available for actual needs, starting with the smallest pricing plan and gradually increasing the available storage space, as the digital collections grow.
15. **Constant access** – the system should be able to guarantee that collections will be available on-line almost all the time (aiming at ~99.9% of service availability).

16. **Increased data safety** – putting digital collections to LoCloud Collections should give users one more backup copy, which can be used in case of problems with data stored locally, therefore the data in LoCloud Collections should be safe.
17. **Visibility in search engines** – websites based on LoCloud Collections should be ready for automated crawling and indexing by robots, so that people can find collections and items in these collections on Google and other popular search engines.
18. **Openness** – LoCloud Collections should be based on open source code, so that the users are sure that if at some time in the future they would like to stop using LoCloud Collections, they can download their data and use the same software to make their data available on-line somewhere else. In addition each collection in LoCloud Collections should make data available via an open API and OAI-PMH protocol.

The above requirements were used for analysis of the available technologies, tools and frameworks which could be used to develop a light-weight digital library system for LoCloud. The following systems were taken into account: DSpace (<http://dspace.org/>), E-Prints (<http://www.eprints.org/>), Omeka (<http://omeka.org/>).

The following criteria were used to decide which system should be the basis for LoCloud’s planned development:

Criteria	DSpace	E-Prints	Omeka
Is open-source?	YES	YES	YES
Is widely known with stable users community?	YES	YES	YES
Years of last two releases	2014 2014	2013 2011	2014 2014
Technology stack	Java	Perl	PHP
Main purpose / background	Institutional repositories, general purpose	Institutional repositories	Cultural heritage institutions
Is widely offered as hosted service?	Some service providers available	Some service providers available	Many
Supports key features defined during users workshops?	Yes, after some customisation	Yes, after some customisation	Yes, after some customisation

All three systems are well-known open source solutions with stable user and developer communities, although it seems that E-Prints software is no longer very actively developed. Each three systems have different technology stacks: DSpace is the heaviest one (which is problematic for SaaS where many instances will be set up on shared resources), E-Prints and Omeka have similarly light stacks, but PHP hosting is in general more popular among the cheap web hosting options. PHP is also the basis of many popular CMS systems. Only Omeka was initially developed for the cultural heritage sector, but DSpace has become more and more general and so it could be also used for such collections. Omeka is provided as hosted service by its creators (Corporation for Digital Scholarship²) but also by many other companies in “one-click install mode”³. There are also companies who offer DSpace and E-Prints as a hosted service, but their availability is far from being “one-click”⁴ and the pricing is very high⁵ when compared to native Omeka.net offering

² <http://digitalscholar.org/>

³ <http://omeka.org/blog/2014/10/22/omeka-one-click-installs/>

⁴ E.g. site <http://www.openrepository.com/> offers access to a dedicated pilot DSpace in “just” two weeks.

(<http://omeka.net>). Finally the functional analysis of all three systems showed that in general each of them fulfilled the requirements collected during the content providers' workshops, but in that each case some customisation would be needed.

The final decision after this review was to use Omeka, because it seemed to be the most suitable choice for small cultural institutions in terms of its functional scope, technical “lightness”, ease of setup and hosting costs. After making this decision, main development for LoCloud was divided in two threads:

- Adjusting Omeka to suit the needs of LoCloud users,
- Building hosting environment which would allow quick and easy setup of new Omeka instances for its users and management of such instances.

The next chapter describes the prototype implementation of LoCloud Collections in the state achieved by the end of November 2014.

⁵ E.g. site <http://dspace-direct.org/pricing> offers DSpace installations with a cost of \$50 / 1GB / year in the smallest set up of 75GB.

3. Prototype Implementation

3.1. Introduction

The prototype implementation of the LoCloud Collections service is available on-line at <https://locloudhosting.net/> (Figure 1). This website allows anyone to register and create and manage their own digital library. Figure 2 shows an example of such a digital library made by Poznańskie Towarzystwo Przyjaciół Nauk (a small cultural heritage institution from Poland) available at: <https://ptpn.locloudhosting.net/>.

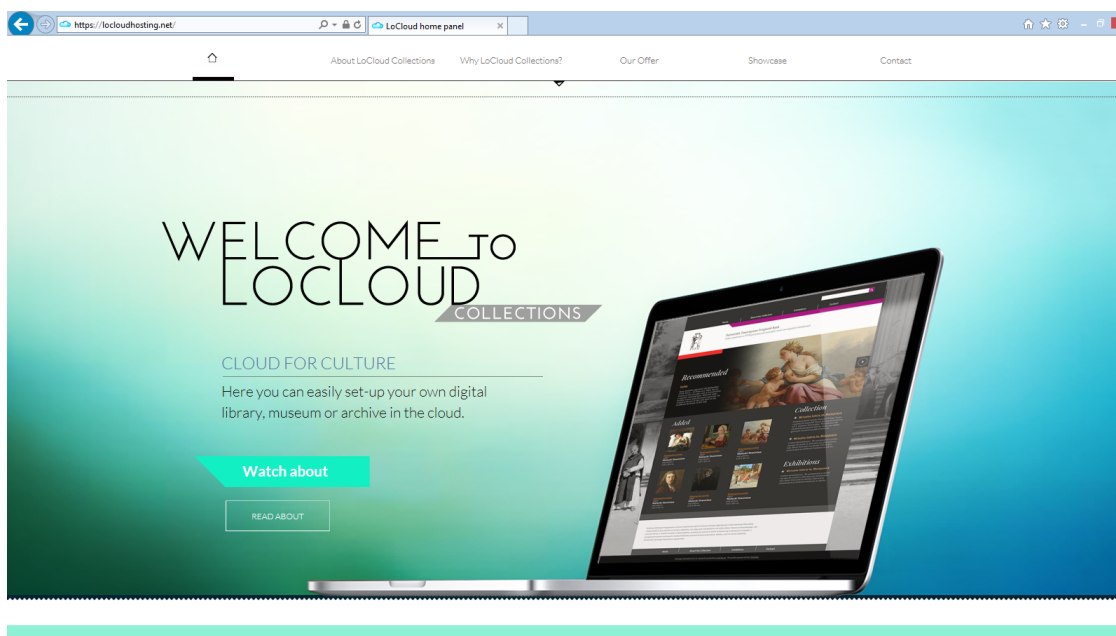


Figure 1. LoCloud Collections main page (<https://locloudhosting.net/>).

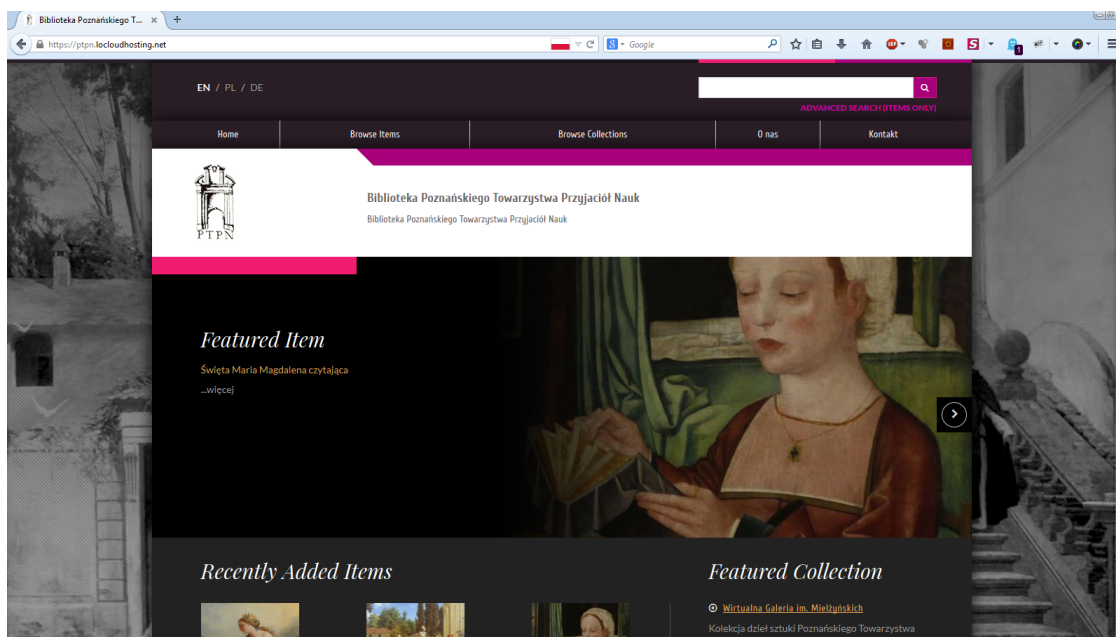


Figure 2. Example digital library created in LoCloud Collections (<https://ptpn.locloudhosting.net/>).

A functional overview of the service, including screenshots, is presented in “

Annex 1. LoCloud Collections: Basic User Guide”. The rest of this report is written with assumption that the reader is aware about the basics of LoCloud Collections system presented in the Annex 1.

The list of initial requirements from Section 2 is repeated below as section headers. For each requirement an explanation is presented to describe how the current prototype fulfills the requirement.

3.2. *Easy and fast start*

When users enter the main page of LoCloud Collections they need to complete only a few steps to have their first digital library up and running:

- Fill in the registration form
- Receive an account activation e-mail
- Activate the account by click on the activation link in the e-mail
- Log in to LoCloud Collections with the newly activated account
- Start the digital library creation wizard
- Fill in the form with basic details of the digital library that is being created
- Fill in the form with name and address of the entity that will be responsible for this digital library

The entire procedure takes about 5 minutes (assuming no unexpected delays in e-mail communication). After that users wait for around 2 minutes, while the digital library is created; they then get access to the administrative panel of the digital library where they can begin customizing it and uploading data to be published.

3.3. *Powerful, yet easy to use*

Digital libraries created within LoCloud Collections are based on Omeka software. This software is intuitive and easy to use and a user can start putting content on-line within just a few minutes of looking around the system⁶. More advanced functionality is provided to Omeka by additional plugins. To facilitate the use of such functionality, in LoCloud Collections over a dozen plugins are preinstalled and preconfigured by default when a library is created. These plugins were chosen by PSNC staff while developing LoCloud Collections and tested to make sure they work properly. The pre-configuration allows users to benefit from the functionality of the plugin without needing to go into the details at the beginning. Later on, when the users are more experienced, they can check how each plugin is configured and adapt its settings if required. Users can also request to have more plugins installed if needed.

3.4. *Support for many different collections*

Omeka allows for many different collections in one installation⁷. This means that if a user of LoCloud Collections service would like to organize items into distinct collections, this is possible. If

⁶ The official Omeka introductory video lasts 4 minutes, which is enough to show how to deal with items in Omeka as well as do basic configuration of that system: <http://vimeo.com/55973380>

⁷ See <http://vimeo.com/102040465>

the nature of the items is so diverse that a single Omeka installation with these items divided into collections is not desirable, LoCloud Collections allows users to have several Omeka installations within a single user account. Thereby LoCloud Collections adds an additional layer on top of Omeka, which makes it possible to use completely separate on-line collections systems.

3.5. Support for many data formats

Omeka in general does not limit the types of data formats that a user can upload. Everything uploaded to Omeka is returned to end users browsing public Omeka interface in the same form. For this reason it is recommended to upload data formats that are widely supported in browsers (e.g. JPEG, PDF, MP3, Ogg Theora Vorbis).

Limitations can be introduced on the level of the Omeka administrative interface for security reasons, for example it is possible to block the possibility of hosting executable files.

3.6. The possibility to adjust end-user interface

The Omeka system allows administrators to choose between predefined visual themes and then configure its properties and customize it (see the “Appearance” section in Annex 1 for details). Three standard Omeka themes have been chosen for inclusion in LoCloud Collections and four additional themes were designed and are also available (presented in “Annex 2. Designs made for LoCloud Collections”).

There were two reasons for designing the new themes. The original themes were rather basic and could not match the tastes of collection curators looking for a more sophisticated surrounding for their collections. In addition the original themes were not designed according to responsive web design principles, so using them to present collections on mobile devices did not give satisfactory results. Example of responsive behavior of new designs is presented in section “Responsive behaviour of new designs” in Annex 2.

3.7. The possibility of adjusting the metadata schema

The possibility of adjusting the metadata schema is implemented in a standard Omeka feature that allows the Dublin Core Metadata Element Set to be extended with custom metadata elements grouped in item types. The Omeka administrator can define item types (like photo, song, map etc.) and add custom fields for each item of that type. Editors then have the possibility of describing each item with DCMES elements and in addition with elements specific to the chosen item type.

A number of Omeka plugins have been added to LoCloud Collections to make the metadata-related features more advanced. These include:

- Dublin Core Extended – introduces all Dublin Core Terms significantly extending the initial set defined by the simple Dublin Core Metadata Element Set.
- Geolocation – allows editors to find a location on a map and assign it to a specific item in a collection. Such locations can then be used to explore items on the map or to do spatial searches.
- Hide Elements – allows administrators to make chosen metadata elements invisible to public users and/or for privileged users. This means that on the one hand unused metadata schema elements are not presented to anyone, and on the other hand metadata elements which may contain internal information are visible only to editors.

- Simple Vocab – allows administrators to predefine vocabulary terms (simple lists of values) for each metadata element, making easier for editors to generate consistent metadata.

A new plugin was developed by PSNC, called “Geolocation to DC field”. This plugin makes sure that the geolocation assigned to an item using the map feature is visible not only in the visual user interface but also propagates the “Spatial” Dublin Core term, so that it can be used outside of Omeka, when the data is exported or harvested.

3.8. Batch upload of data

Two Omeka plugins were considered to assure batch upload functionality: CSV Import and OAI-PMH Harvester. The first allows users to import data provided in spreadsheet-like format. During the import the administrator must assign CSV columns to proper metadata elements. If the CSV file contains a column with a URL providing a link to digital files (e.g. images, text documents, etc), Omeka will upload these files. The OAI-PMH Harvester plugin is to some extent similar, but instead of using a CSV file, it gets data directly from the OAI-PMH interface of a repository.

It was assumed that for the purpose of LoCloud project it makes more sense to use just the CSV Import plugin, because the potential users of LoCloud Collections are supposed to be small organizations without their own OAI-PMH-enabled on-line repositories. It is much more probable that such organizations will use spreadsheet or simple database to manage their collections, which should be very easy to transform to a CSV file.

3.9. Access to documentation and support

Access to the documentation and support for LoCloud Collections is made available through the LoCloud Support Center at <https://support.locloud.eu/>. Currently this portal offers:

- LoCloud Collections documentation (divided into basic and advanced sections): <http://support.locloud.eu/LoCloud%20Collections>
- LoCloud Collections Questions & Answers (FAQ): <https://support.locloud.eu/qna/questions/locloud-collections>
- Help desk (for all LoCloud services): <https://support.locloud.eu/osticket/>

In the first half of 2015 the project plans to add an e-learning course about LoCloud Collections (<http://support.locloud.eu/courses/>) and a training video (Figure 3).



Figure 3. Example frame from LoCloud Collections training video.

3.10. Fees dependent on the use of resources

One of the main benefits of using a public cloud is the possibility to pay just for the resources that are actually used. The same approach is taken in LoCloud Collections. Having in mind that there are likely to be no IT staff in a small cultural institution that could understand even the average complexity of a cloud pricing model, it was decided that the model for LoCloud Collections has to be as easy as those of mass services like DropBox or Google Drive, where the storage space is the only parameter considered and there are several pricing plans to choose. It is significantly simpler when compared with the very basic Amazon Web Services Calculator, which requires 5 more parameters to be provided including the number of requests and the volume of data transfer.

LoCloud Collection is offered with a number of pricing plans - currently 4, varying between 500 MB and 5GB, but a new 25 GB plan will be added soon. Institutions can change their plan according to their need for resources very easily and at any time by using the simple form presented on Figure 3. Additionally, the LoCloud Collections system monitors the real usage of resources, so administrators can easily check if there is a need to consider changing plan (Figure 4). Finally, each change of storage plan is recorded and presented to administrators in their user panel, in the details view of the particular digital collection (Figure 5).

At the time of finalizing this report (November/December 2014) it was decided that the LoCloud Collections service will be free until the end of LoCloud project. “December 2015” is being promoted as the end of the free period, but this is just because it is much easier to remember (the end of 2015 than end of February 2016). After then, if no other sustainability solution is established, a basic fee will be introduced beginning at no more than 1.99 EUR / 1 GB / 1 month.

PRICING

Current pricing plan	Size S: Up to 500 MB of storage space
----------------------	---------------------------------------

CHOOSE PRICING PLAN FROM THE LIST BELOW:

Size	S	Up to 500 MB of storage space	FREE
Size	M	Up to 1 GB of storage space	FREE TO DEC 2015*
Size	L	Up to 2 GB of storage space	FREE TO DEC 2015*
Size	XL	Up to 5 GB of storage space	FREE TO DEC 2015*

[* Click here for more details](#)

cancel save

Figure 4. Changing storage plans in LoCloud Collections.

YOUR USAGE

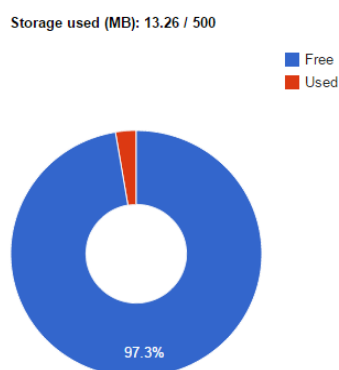


Figure 5. Resource usage reporting for a digital library hosted in LoCloud Collections.

PRICING PLAN HISTORY:

Pricing plan	Subscription time
L	2014-12-08 23:54:29.0
S	2014-12-08 23:54:35.0
M	2014-11-12 14:51:38.0
S	2014-10-23 11:33:53.0

Figure 6. History of pricing plan changes.

3.11. No need to make large financial investments

Users of LoCloud Collections do not have to make any significant financial investments because the system is offered in the Software-as-a-Service model. This means that the Collection is running on a cloud environment hosted by PSNC and users are accessing it (and utilizing PSNC's infrastructure) via a network connection.

To make the take-up of the service even easier and less risky from the financial point of view, it was decided to make an introductory free storage plan with 500 MB of available space, so that anyone can try LoCloud Collection . This should be enough to test the service and 500 MB may be enough for the production use of the system by really small institutions.

3.12. Multilingualism

Omeka software is prepared for localization. Translations are done by the community of Omeka users with the Transifex service (<https://www.transifex.com/projects/p/omeka/>).

One limitation of the official Omeka distribution is that it presents the interface in a language defined in a static configuration file. An Omeka administrator with access to Omeka files can set the proper language, but Omeka users are not able to change it. During the development of LoCloud Collections all visual themes installed for Omeka were modified to allow for runtime changes of the end-user interface. The language switch was placed in the header of the theme (Figure 6).

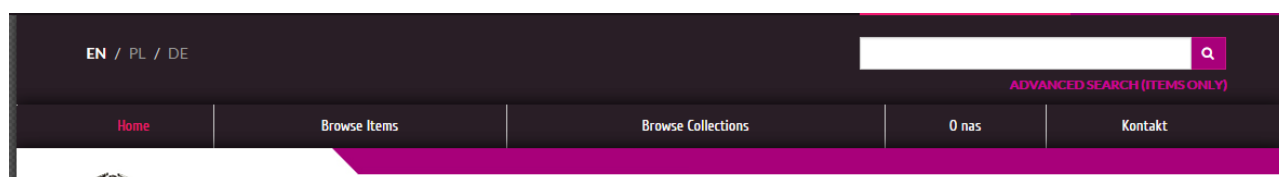


Figure 7. Runtime language switch added to Omeka themes (top-left corner).

Multilinguality in the main portal of LoCloud Collections has also been implemented (Figure 7). LoCloud project partners were asked to provide translations of the interface in their languages. At the time of writing translations in 15 languages have been provided: English, Polish, Greek, Italian, Serbian, Spanish, Icelandic, Bulgarian, Slovakian, Portuguese, Croatian, Norwegian, French, Romanian and Slovenian.

The default language is set up on the basis of user preferences set in the web browser.

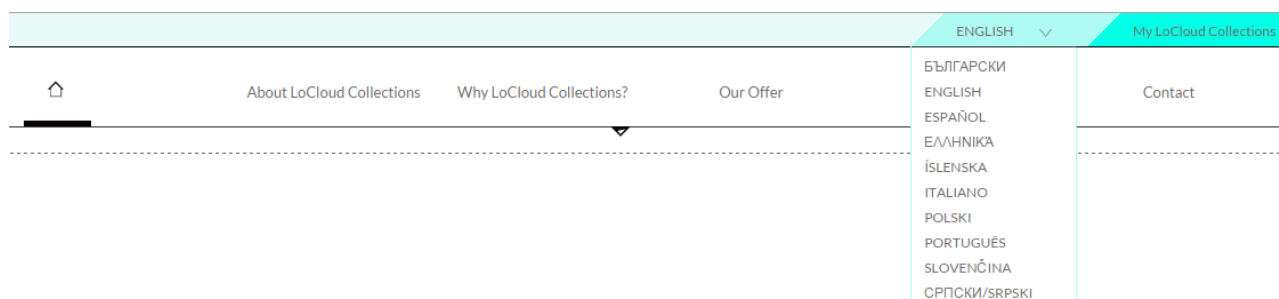


Figure 8. Runtime language switch in main LoCloud Collections portal.

3.13. Compatibility with Europeana

Compatibility with Europeana is achieved by integration between LoCloud Collections and other elements of LoCloud infrastructure, especially with the MORE Aggregator. In the detailed view of each digital library hosted by LoCloud Collections the user has an option named “MORE AGGREGATOR” (Figure 8), this allows users to establish a direct connection between this specific Omeka installation and the MORE aggregator. The connection is based on the OAI-PMH protocol

and periodic metadata harvesting. The mapping and processing of metadata to EDM (Europeana's preferred metadata format) is configured in the MORE aggregator interface. Data from MORE is then delivered directly to Europeana via periodic harvesting.

ADVANCED OPERATIONS



Figure 9. Advanced operations in digital library details view including the connection with the MORE aggregator.

3.14. Access to advanced statistics about usage of collections

To provide advanced statistics about the usage of collections hosted in LoCloud Collections an open source web analytics software package called Piwik (<http://piwik.org/>) was integrated. A dedicated installation of Piwik was set up and is available at <https://locloudhosting.net/piwik/>. Each time a new user is registered in LoCloud Collections, s/he is automatically registered (with the same username and password) in Piwik. Each time a new digital collections is added/removed from LoCloud Collections it is also added/removed in the Piwik monitoring mechanisms.

The monitoring of a single LoCloud Collections instance is implemented with a custom Piwik plugin developed by PSNC. This plugin automatically sends all traffic information from Omeka to Piwik, excluding traffic generated by administrators logged in to the Omeka admin panel.

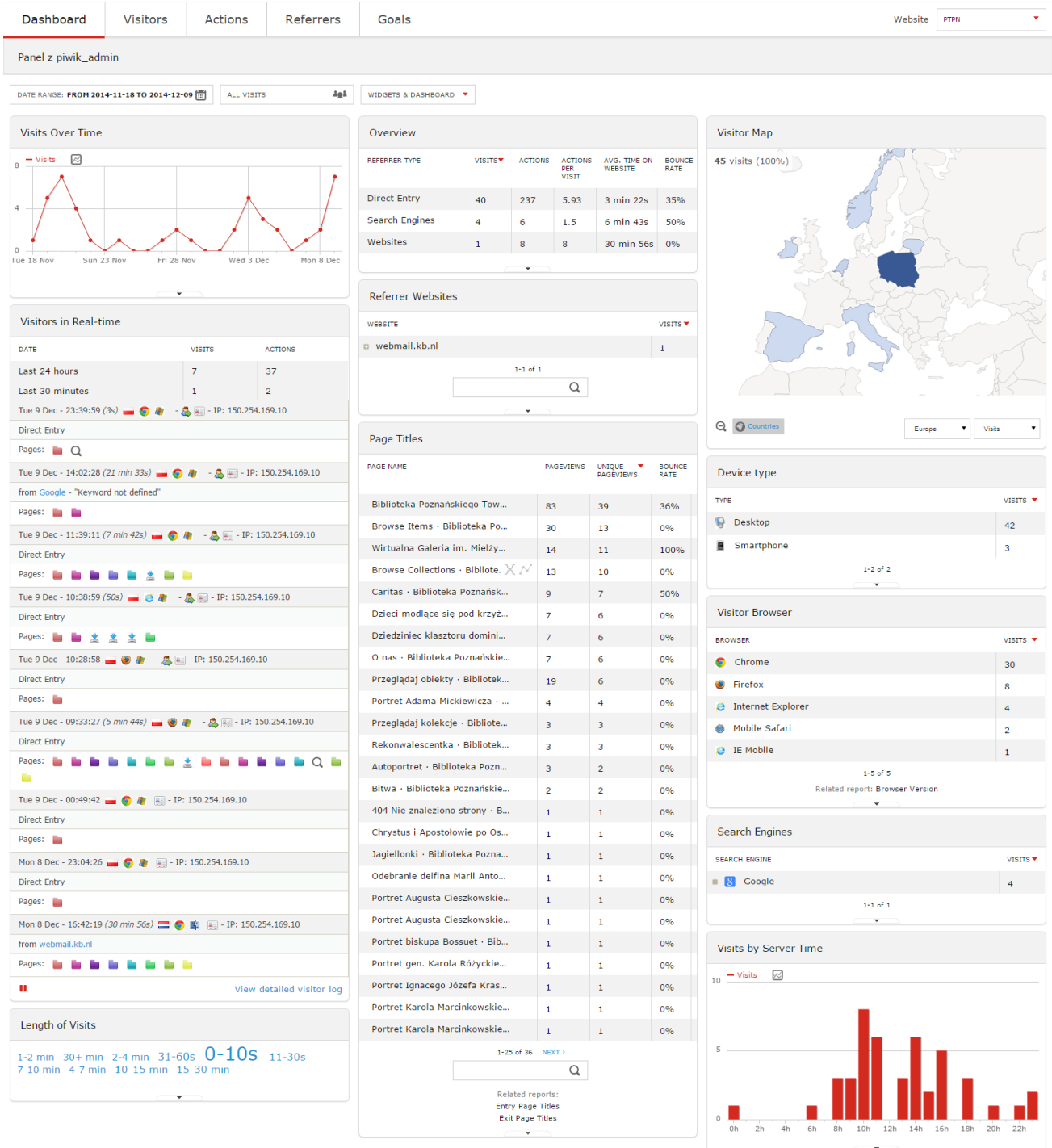


Figure 10. Piwik statistics dashboard for one of installation of LoCloud Collections.

From the point of view of a LoCloud Collections administrator who manages a digital library, the detailed view of the library, in LoCloud Collections user panel, shows basic traffic statistics including:

- A chart showing daily number of visits during last 30 days,
- Detailed traffic statistics (over 10 parameters) of visits during last week,
- The geographical distribution of visitors during last week.

Additionally, below these statistics a link is provided to a multilingual Piwik installation (Figure 10) where the user can get access to a lot of other traffic information, including:

- A real time view of visitors and their actions,
- Statistics about time spent on the website,
- The popularity of items hosted in the Coleccion (including a chart of item views over time),
- Traffic sources,
- Internal search queries.

3.15. Scalability

The scalability of LoCloud Collections is ensured on two levels. First, from the point of view of institutions, the system is scalable because the administrator can increase the amount of available disk space at any time and immediately (see “Fees dependent on the use of resource” above). Nor do institutions need to worry about increasing traffic.

The second level is the technical scalability implemented in the architecture of LoCloud Collections, which makes possible to offer scalability as a feature for institutions. The current technical infrastructure of the LoCloud Collections service offers more than 200 TB of data, which means that it can host around 10,000 digital libraries of 20 GB each, or 100,000 digital libraries of 2 GB each. This is also described in more detail below in the paragraphs describing the high availability of the system.

3.16. Constant access

To ensure high availability for the LoCloud Collections service, the technical architecture of the system was designed and implemented in a way that allows the system to be scaled and kept running even if single servers are down (Figure 11).

All the servers used for hosting LoCloud Collections service run in PSNC’s virtualized server environment (private cloud). Access to these servers is protected by a load balancer/firewall, which distributes the incoming traffic to several front-end servers. These servers host the main LoCloud Collections service and are used as a proxy to access deeper layers of the system, which contain Omeka installations and the traffic monitoring service. All services use the same database cluster, which is also part of the LoCloud Collections technical environment.

Figure 11 shows four scalable groups of servers (front-end, Omeka, traffic monitoring and database). The number of virtual servers in the Figure corresponds to the actual number of servers used for hosting the prototype implementation at the end of November 2014. The ‘...’ sign represents the possibility to add new virtual machines in each of the groups increasing the capacity of the system both in terms of storage and the traffic that can be handled.

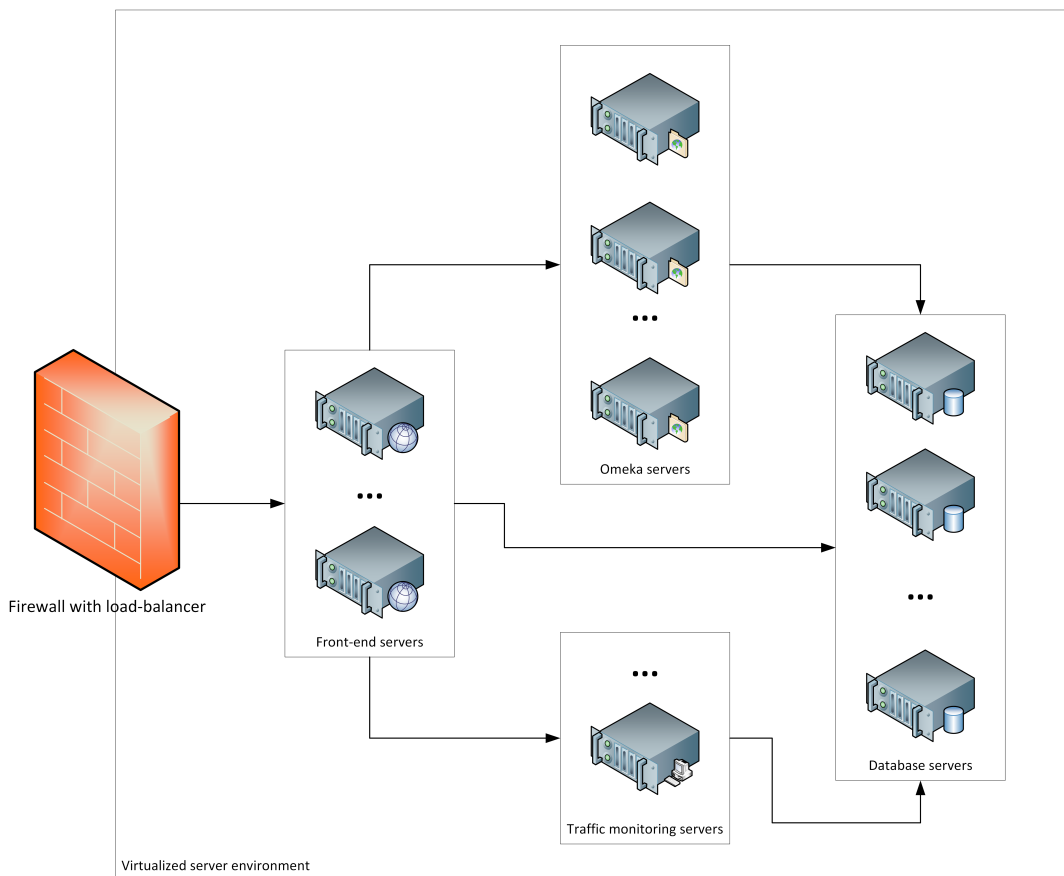


Figure 11. Deployment architecture of LoCloud Collections.

3.17. Increased data safety

All data hosted in LoCloud Collections, as well as data necessary to administer the service, is incrementally backed up once a day (at 1:25 AM). Additionally once a month, on the last day of month, a full backup is made, which is then the baseline for further incremental backups. Backup copies are stored in Universal Archiving Service (<https://storage.pionier.net.pl/>), provided by PSNC and partners as one of offerings of the Polish National Research and Education Network PIONIER.

3.18. Visibility in search engines

Omeka software is designed in a way that is compatible with the indexing of websites done automatically by search engine crawlers. Figure 12 shows the results of a search for a painting by name in Google (incognito mode). First result is Wikipedia, then 2 results from LoCloud Collections and then other results.

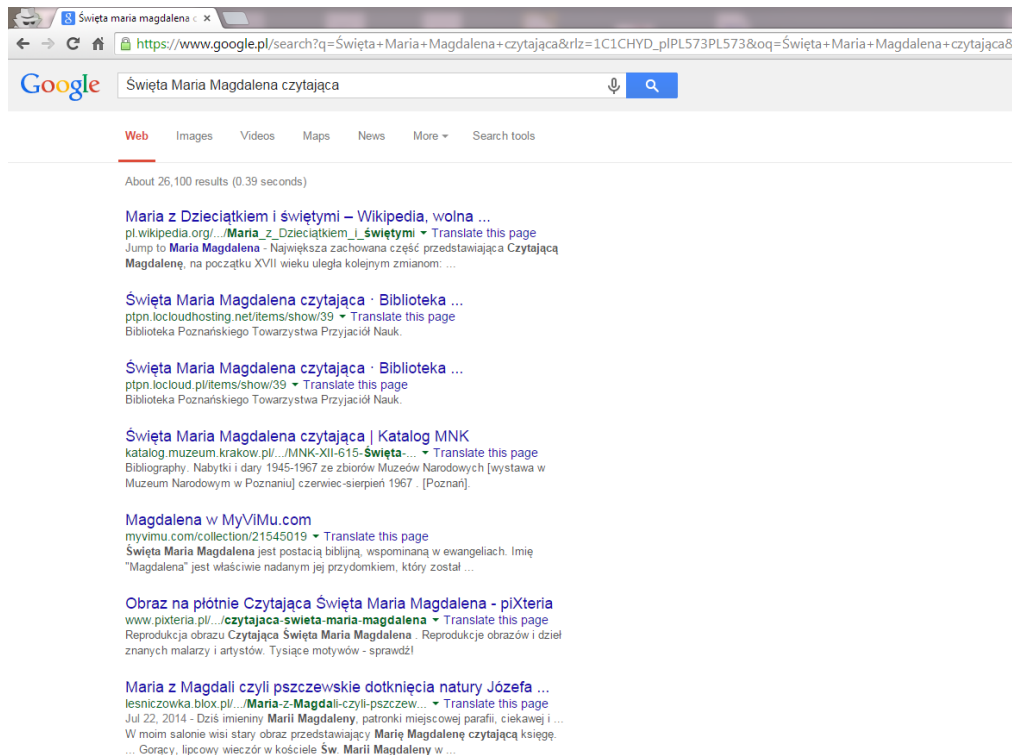


Figure 12. Google search results for a painting by name (Holy Maria Magdalena reading) with LoCloud Collections on the second place and third place (screenshot taken on Nov 30, 2014).

The above results were achieved just on the basis of what Omeka offers. In the future it is planned to extend Omeka with plugins for collaboration with advanced indexing tools like Google Webmaster Tools or Bing Webmaster Tools. This should increase both the speed of indexing and provide in depth information about the indexing status.

3.19. Openness

In the LoCloud Collections service single digital libraries are based on open source Omeka software. Each Omeka is preconfigured with the OAI-PMH protocol, allowing automated and open access to stored metadata and data – for the purpose of Europeana as well as for other aggregators and services. In addition to this, Omeka offers a REST API which gives even more possibilities than the OAI-PMH interface and can be used for building applications on top of Omeka or to integrate Omeka with other tools.

Finally, by the end of the LoCloud project, before the usage fees are introduced, end users will be offered the possibility to download a complete dump of their data (this will continue to be available as a feature of the system). This should ensure all potential LoCloud Collections users, starting to share data on-line with this service are not going to find themselves in any kind of vendor lock-in or closed data silos.

3.20. Summary

All of the initial high level requirements defined for LoCloud Collections service were implemented in the prototype described in this report. Some of these requirements are fully developed, while a few are still in basic form but these can be improved further in the future. The next chapter of this report shows the initial end-user feedback collected during the last stage of prototype development and during two LoCloud training workshops.

4. Initial End-User Feedback

The first internal prototype of the LoCloud Collections service was made available in September 2014. In the period between September and November 2014 a number of project partners tested the prototype system and provided their feedback via e-mail or via the help desk in the LoCloud Support Centre. Two training workshops were also organized in that period (Bordeaux in October and Poznań in November), which also allowed interesting end user feedback to be gathered and at least partially addressed during the development.

Some most interesting feedback is presented below - and commented if needed:

- **The service seems to be user friendly and intuitive to use.**
- **It would be nice to have more new themes for Omeka UI** – 4 themes were designed, currently one is implemented and available, other ones will be made available before the end of the project.
- **Interface translations are necessary to ensure wider adoption of the service** – translations have been developed in collaboration with partners interested in promoting the service in their country.
- **The business/sustainability model and pricing must be announced as soon as possible, even if the service will be free for one more year, because lack of such information stops people from investing their time in testing service** – to clarify that as soon as possible, the maximum cost was calculated and set to the level of 1.99 EUR / 1 GB / 1 month. The initial response to that cost is that it should be acceptable for small institutions.
- **A few partners in the project consortium are already using Omeka on their own servers and they would be interested in reusing some of Omeka developments done for LoCloud Collections** – these developments will be shared as open source before the end of the project.
- **Two partners raised the need for digital content to be stored in IT infrastructure hosted in the country of the content's origin** – the architecture of the LoCloud Collections service is distributed and can be extended with additional clusters of servers for Omeka installations in specific countries, which will be managed by LoCloud Collections central service. If there are partners interested in starting such collaboration, PSNC will support that.
- **Integration with LoCloud services should be as seamless as possible from the end user point of view** – not all requirements can be met because of security reasons (for example, sometimes it will be necessary to have separate user accounts for separate services), but several things were done to improve the user experience when switching between services – especially between LoCloud Collections and MORE.
- **Public collection days (like Europeana 1914-1918) could utilize LoCloud Collections as platform for hosting collected content** – additional plugins allowing contribution of content by users and moderation of uploaded content should be installed in Omeka to fully facilitate such use. This will be investigated in more detail.
- **Integration with external on-line vocabularies would be a very nice feature.**

5. Links with other LoCloud Services and Europeana

LoCloud Collections is linked to other LoCloud services in the following way:

Service type	Service name	Linking description
WP2: Aggregation Infrastructure	MORE (repository)	LoCloud Collections is integrated with MORE. Users of LoCloud Collections can establish connection with MORE using a dedicated option in the digital library details panel. Also from the MORE perspective, users can easily add LoCloud Collections hosted Omeka installations as new data sources.
	MINT (ingestion tool)	Omeka hosted in LoCloud Collections can be harvested to MINT using preconfigured OAI-PMH interface. Harvested data can be then processed (mapped) and delivered further to MORE or Europeana.
WP3: Microservices	Geolocation Enrichment Tools	Geolocation Enrichment Tools can be considered as interesting replacement for Map plugin built in in Omeka, which is based just on Google Maps. Features offered by Geolocation Enrichment Tools are much more sophisticated, but efficient integration with LoCloud Collections requires in this case more effort.
	Historical Placenames Service	Geolocation Enrichment Tools can be considered as interesting extension for Map plugin built in in Omeka. The built in plugin gives access only to currently existing geographical locations, while the HPN could extend that by adding the historical data.
	Vocabulary Service	Omeka provides very basic support for vocabularies – just plain lists of values. Vocabulary Service offers much more sophisticated capabilities and also has an API which could be used for integration.

In general, integration with aggregation infrastructure developed in WP2 of the projects is done and integration with selected microservices was left for a later stage, when LoCloud Service will be more mature and will leave the prototype stage. More detailed future plans are presented in the next section of this report.

6. Future Plans

Alpha release of LoCloud Collections service was made in September 2014. It allowed to get initial feedback from end users (mostly project partners) and to execute trainings planned for the last quarter of 2014. At the end of November beta release of the service was made with many improvements and new features including usage monitoring, better multi-linguality support, a plug-in to further integrate MORE and many more. Future plans include two more releases of the service before the end of the project:

- Release 1.0 – February/March 2015 – this release will be focused on resolving all know open problems (collected and tracked via Helpdesk service in LoCloud Support Center and via PSNC internal issue tracker) and making sure that the service is a production quality offering which can be widely promoted as one of the project outcomes.
- Release 2.0 – February/March 2016 – this release will be focused on preparation of LoCloud Collections system for self-sustainable operation after the end of the project. Changes made in this release may be related to the sustainability model developed for the project outcomes, as well as to the minimisation of human effort necessary to keep the service running.

All future releases will be made available under the same address: <https://locloudhosting.net/>.

One of the key tasks for the LoCloud project consortium for the last year of the project is to work on sustainability. As a part of this effort, current users of LoCloud collections are and will be consulted for pricing plans and fees levels, as well as for potential portfolio of added services (e.g. providing custom website template designs).

Annex 1. LoCloud Collections: Basic User Guide

Remarks:

- This guide is available at LoCloud Support Centre where it is regularly updated: <http://support.locloud.eu/tiki-index.php?page=LoCloud+Collections%3A+Basic+User+Guide>
- Documentation for advanced features is available at : <http://support.locloud.eu/tiki-index.php?page=LoCloud+Collections%3A+Advanced+Features>

1. Registration

In order to create your own digital collection with LoCloud Collections and Omeka, firstly you have to create a new account. The registration icon is located in the right upper corner of the homepage of the website.

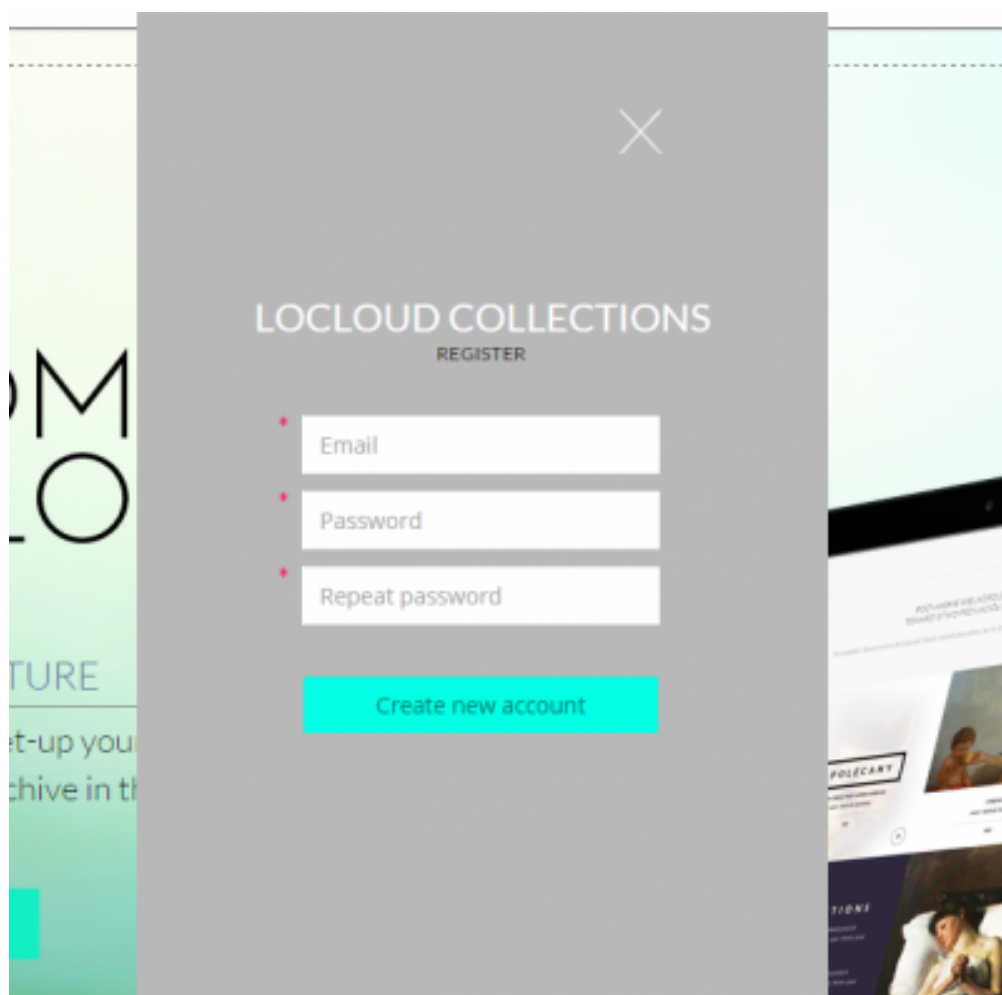


Illustration 1. Registration form

After filling the registration form with your e-mail address and a password, you will receive a confirmation e-mail:

```
Welcome to LoCloud Collections!  
This email was sent to you because you created an account in LoCloud Collections system.
```

Before you could start using our service, we need to verify your email.

Click here to verify your account or copy this URL into your browser:
[https://locloudhosting.net/users/registration-confirmation?key=\(...\)](https://locloudhosting.net/users/registration-confirmation?key=(...))

In case of any problems please contact us:
<https://locloudhosting.net/contact/>

Regards,
LoCloud Collections Team

After getting this e-mail you have to activate your account by following the verification link, which will cause redirection to the homepage and activation of the account.

Then you can log in and start creating a new digital collection.

2. Start Your Own Digital Collection

After logging into your LoCloud home panel (**Illustration 2**) you have a possibility to 'Create a new digital collection' available at the main page below the 'User account details', 'Account setting' and 'Billing' options.



Illustration 2. Your administration panel and the list of your collections.

Clicking the 'create a new collection' button leads to the screen visible in the **Illustration 3**.

CREATE DIGITAL LIBRARY

Enter name for your digital library

Library name

Enter user account name to manage the digital library

admin

Enter password

Password

Repeat password

Repeat password

I want the following subdomain in locloudhosting.net

http:// Digital library domain locloudhosting.net

Choose pricing plan from the list below:

Size	S	Up to 500 MB of storage space	FREE
Size	M	Up to 1 GB of storage space	FREE TO DEC 2015*
Size	L	Up to 2 GB of storage space	FREE TO DEC 2015*
Size	XL	Up to 5 GB of storage space	FREE TO DEC 2015*

* Click here for more details

You chose pricing plan: --

Create library >

Illustration 3. Enter general information about your collection.

You have to enter some basic information about your new collection: collection name; user account name; subdomain. All collections are created and hosted in the 'locloudhosting.net' domain; the subdomain is an individual name for a particular collection.

Afterwards you choose the size/payment option and enter some billing information. There are several pricing plans, which depend on the planned storage space of the collection.

BILLING INFORMATION

Company/organisation name or name and surname in case of private persons:

Company name

Name and surname:

Name and surname

Address:

Address

Country:

Aruba

VAT number (if applicable):

VAT number

Telephone:

Telephone

I confirm that all the above information is true and that I am authorised to incur obligations in the name of above entity.

I understand that providing false billing data is against the terms of service and may result in immediate digital library shutdown and loss of all uploaded materials

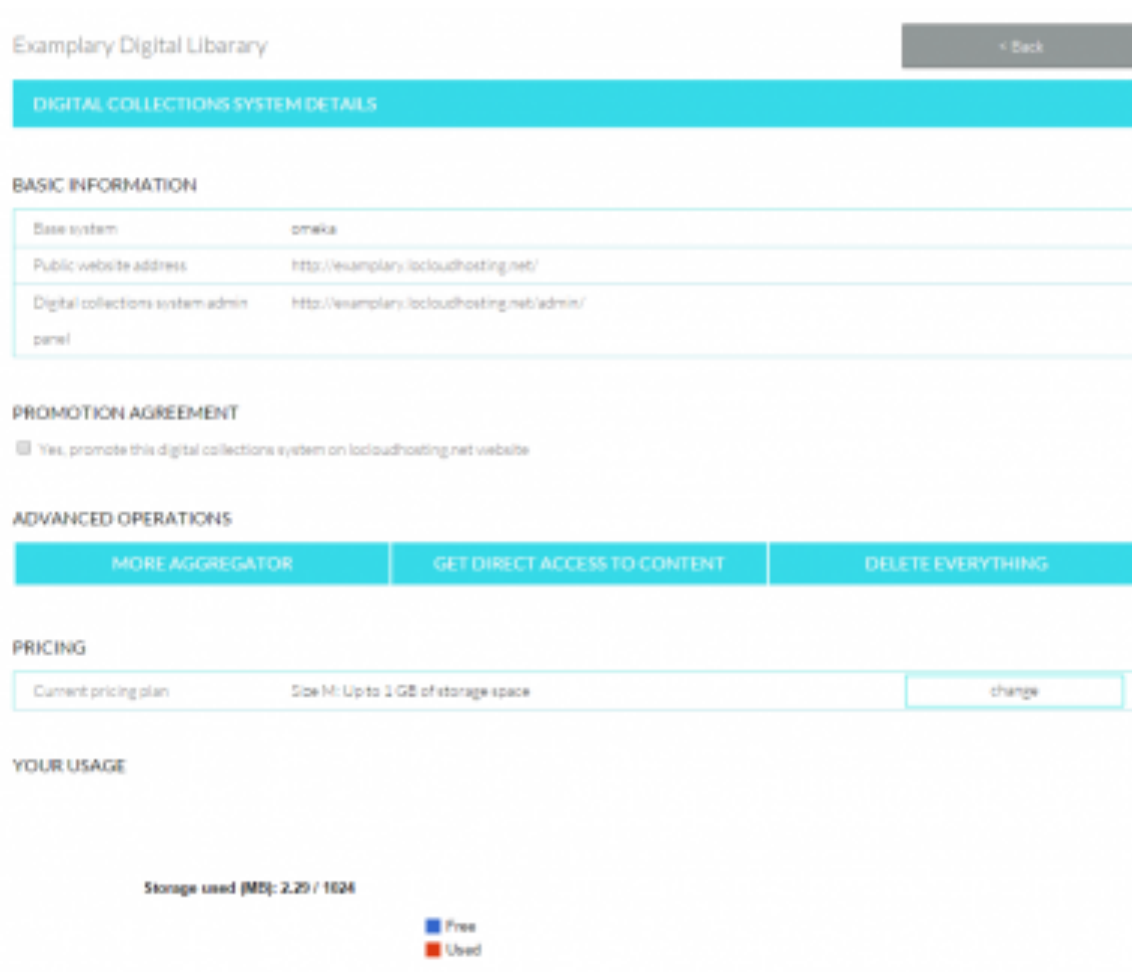
[← Back](#) [Create a new digital library!](#)

Illustration 4. Billing information.

Now your collection is ready to start.

3. Administration Panel

Next to the name of each of your collections listed in the LoCloud home panel you can find a 'details' button. Clicking this button takes you to the screen shown in **Illustration 5** containing **Digital Collection Details**: Basic Information, Advanced Options, Pricing and Your Usage.



Exemplary Digital Library < Back

DIGITAL COLLECTIONS SYSTEM DETAILS

BASIC INFORMATION

Base system	omeka
Public website address	http://exemplary.locloudhosting.net/
Digital collections system admin panel	http://exemplary.locloudhosting.net/admin/

PROMOTION AGREEMENT

Yes, promote this digital collections system on locloudhosting.net website

ADVANCED OPERATIONS

[MORE AGGREGATOR](#) [GET DIRECT ACCESS TO CONTENT](#) [DELETE EVERYTHING](#)

PRICING

Current pricing plan Size M: Upto 1 GB of storage space [change](#)

YOUR USAGE

Storage used (MB): 2.29 / 1024

■ Free
■ Used

Illustration 5. Digital collection details

Basic Information:

- 'Basic system' presents the current system of your digital collection.
- 'Public website address' is the URL under which your digital collection is available for public users.
- 'Digital collection admin panel' is the link leading to your Omeka administration panel

Promotion Agreement - if you mark this, your digital collections system will be promoted on the locloudhosting.net website.

Advanced Operations:

- **MORE Aggregator** - a part of the LoCloud project infrastructure that allows easy delivery of data to Europeana. You will be redirected to MORE where you can setup and manage the harvesting of metadata from your digital collections system.

- **Get Direct Access to Content** - it is possible to access the content of your collection and to download it in files form.
- **Delete Everything** - if you click this button, after a warning message and confirmation, your collection will be deleted!

In **'Pricing'** you can see and change your current chosen pricing program. **'Your usage'** shows the amount of storage you use in your collection.

Another tab available in your LoCloud admin panel is **'Account Settings'**, this is located between **'User account details'** and **'Billing'**. After selecting this option you will see the screen depicted in **Illustration 6**.

USER ACCOUNT DETAILS		ACCOUNT SETTINGS		BILLING	
Email	bognaw@man.poznan.pl	edit			
Password	*****	edit			
Company	PCSS	edit			
Name and surname	Jan Kowalski	edit			
VAT Number		edit			
Address	Poznan	edit			
Telephone number	555 777 555	edit			
Country	POL	edit			

Owned libraries

Owned digital libraries				
Name	url	Other	Storage used	
Example Digital Library	http://example.locloud.pl/	L	412 097 152 [KB]	details

Create a new digital library

Illustration 6. Account settings where you can edit your personal settings (e-mail, password, company, username, vat number, address, phone number, country)

4. Omeka - Administration Panel

4.1. Logging in

The link to this panel is listed in your Digital Collection Details in your LoCloud Collections administration panel. You specify the Login and password during the process of creating your digital collection. If you do not remember your password you should use the 'lost your password' option (located on the bottom of the login box) giving the same the e-mail address used while registering in LoCloud Collections.



Illustration 7. Login to Omeka Administration panel for your collection



Illustration 8. Your administrator's dashboard in Omeka.

From this level, you can add single objects and also create defined collections. If you plan to create collections, it is better to do this first before adding items, because you can assign items to an existing collection during their creation. The other way round you have to edit each existing item to put it into a newly created collection.

4.2. Basic configuration of your collection

Metadata

The first thing you should do after establishing a new digital collection is to compose a proper metadata scheme suitable to your needs. Dublin Core is the basic metadata scheme for items and collections in Omeka (with fifteen properties for use in resource description in the standard version).

Omeka offers you a few facilities to make your administration faster and efficient.

There is also the possibility to add constant comments/instructions to properties in your collection's metadata element set. This is useful for you as an administrator to give instructions to the editors of the collection about entering metadata properties. It is also possible to drag the elements to change their place in the preferred display order. You can add a comment to any property and click '**Save changes**' so as to make your comment visible. This option is available in '**Settings**' tab in the top bar of the administration panel.

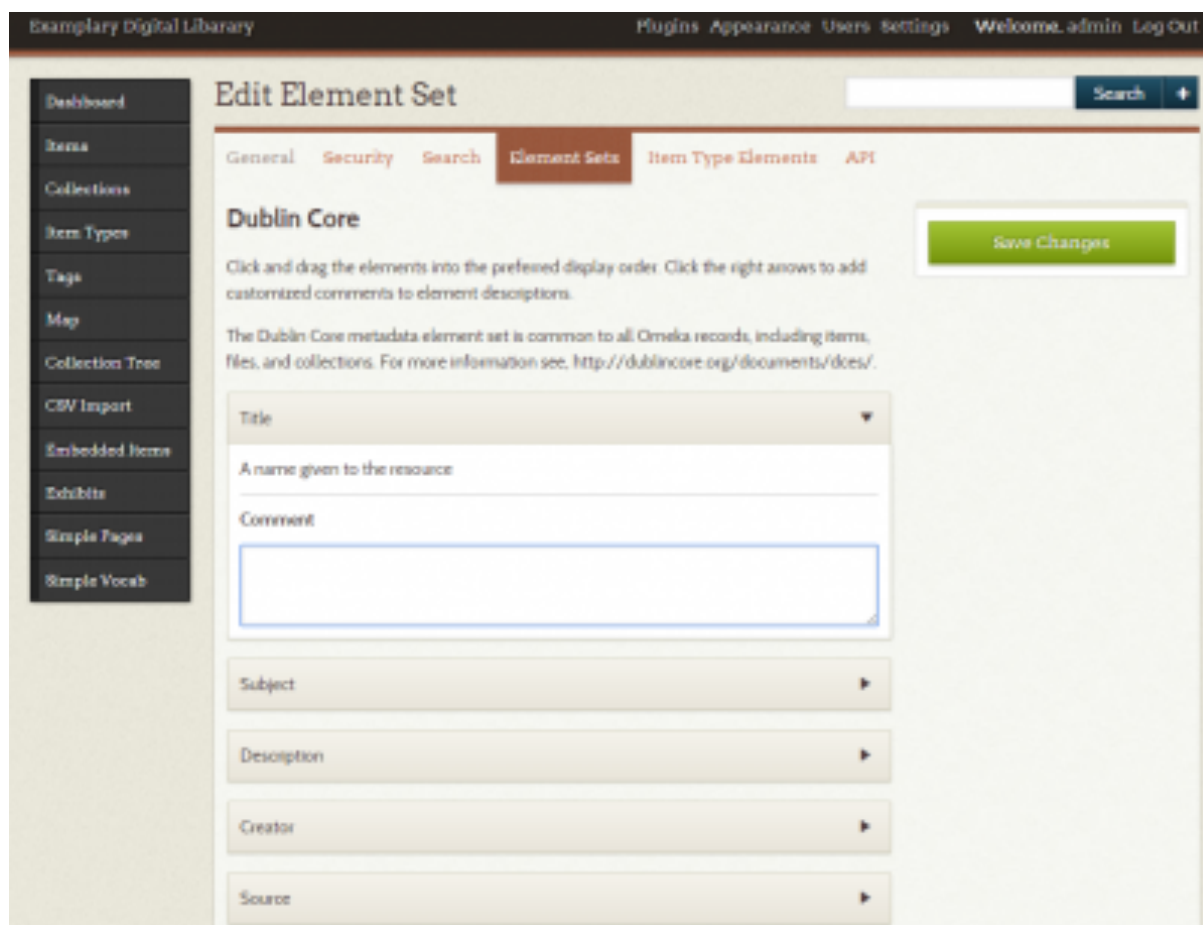


Illustration 9. Edition and personalization of metadata element sets

The last facility is a '**Simple vocab**' function, which is available in the left menu. You can use this to add chosen vocabulary terms to selected elements in the metadata element set. These terms will be

visible for editors to choose in your collection's metadata element set. Enter the custom vocabulary terms for the given element one per line and then confirm by using the 'Add/Edit Vocabulary' button.

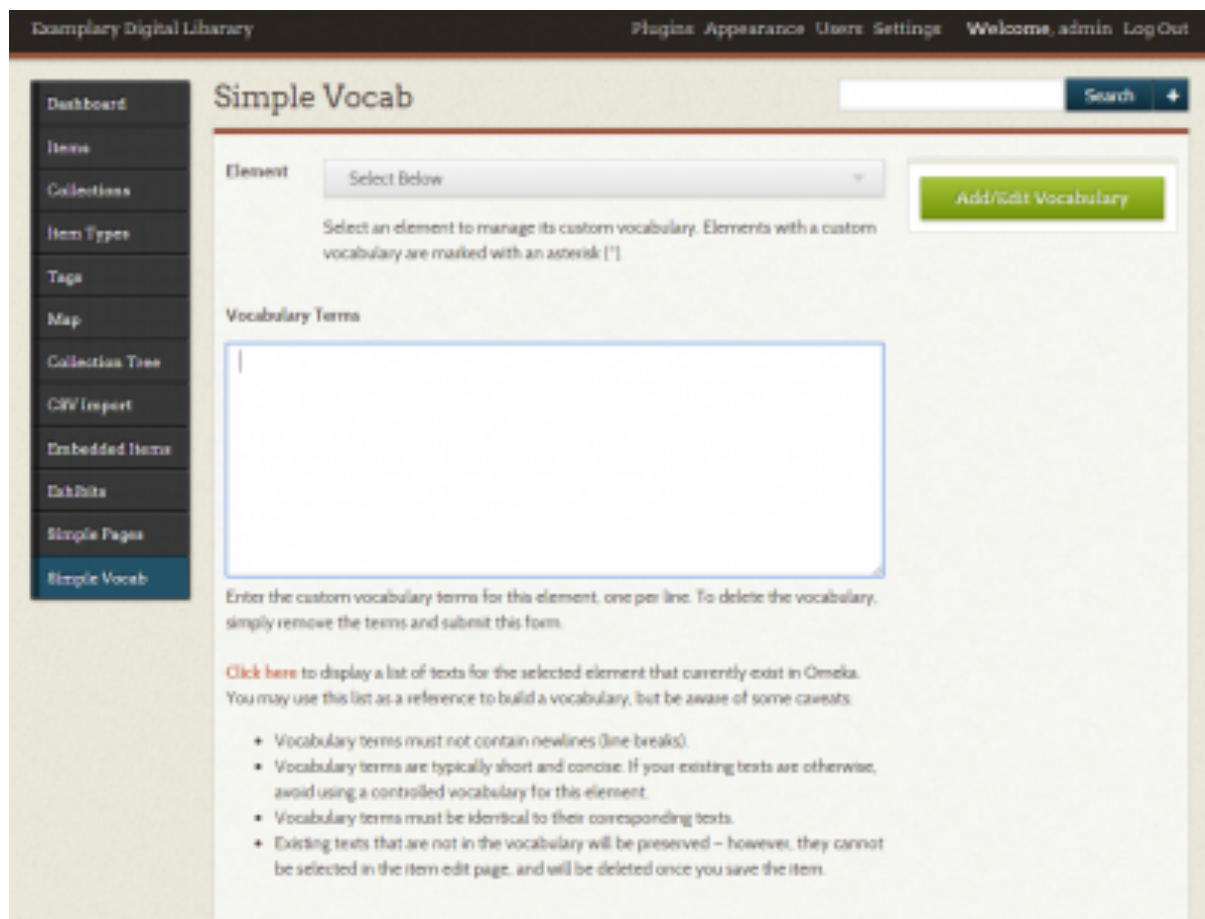


Illustration 10. Adding vocabulary terms in **Simple Vocab** function.

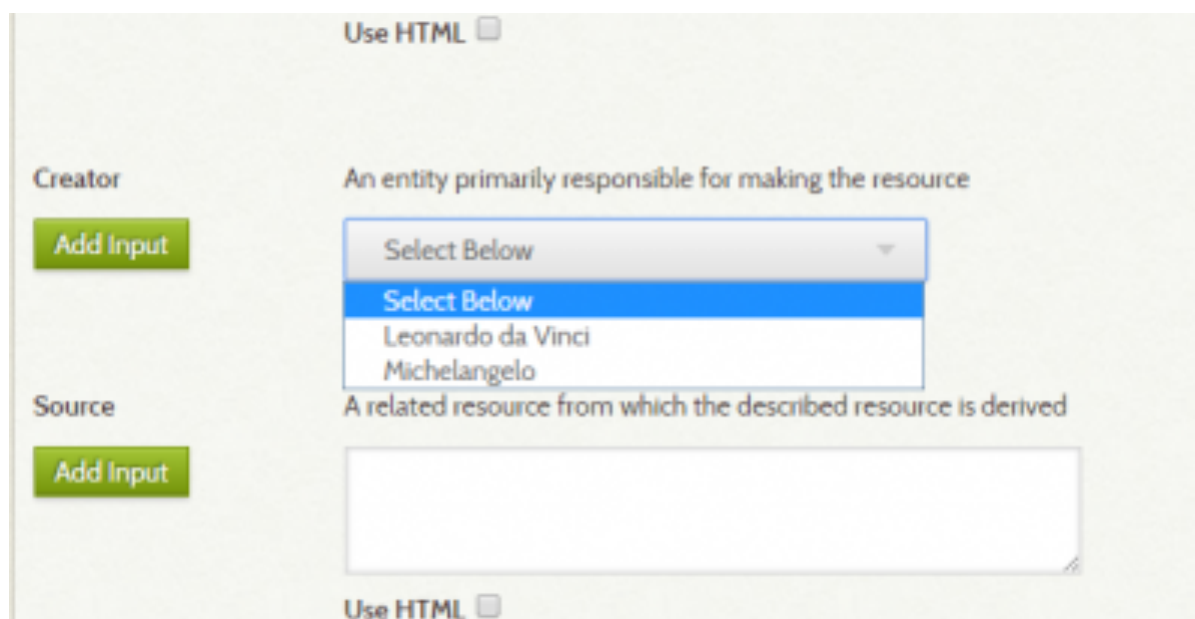


Illustration 11. An example of **Simple Vocab** usage. Two vocabulary terms have been added as options to the creator element in the collection's metadata set.

Creating collections

As mentioned before, for most users the best next step is creation of collection/collections. This tab is a third option in the left side bar of the admin panel. The first thing you do is to add the metadata of the new collection, then, optionally (if appropriate and there is an existing parent collection) select a parent collection for a sub-collection. You can also choose whether your collection is to be public and/or featured just after it has been added.

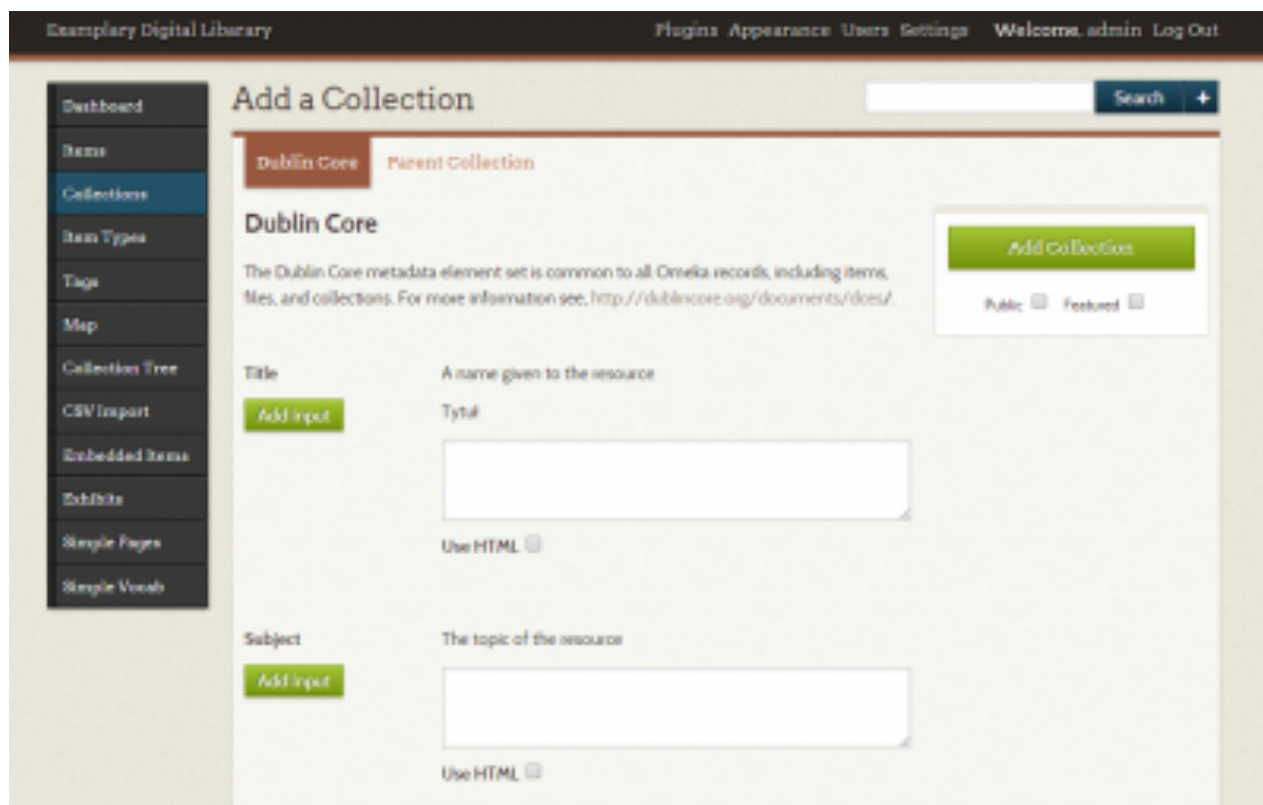


Illustration 12. Adding metadata to the new collection.

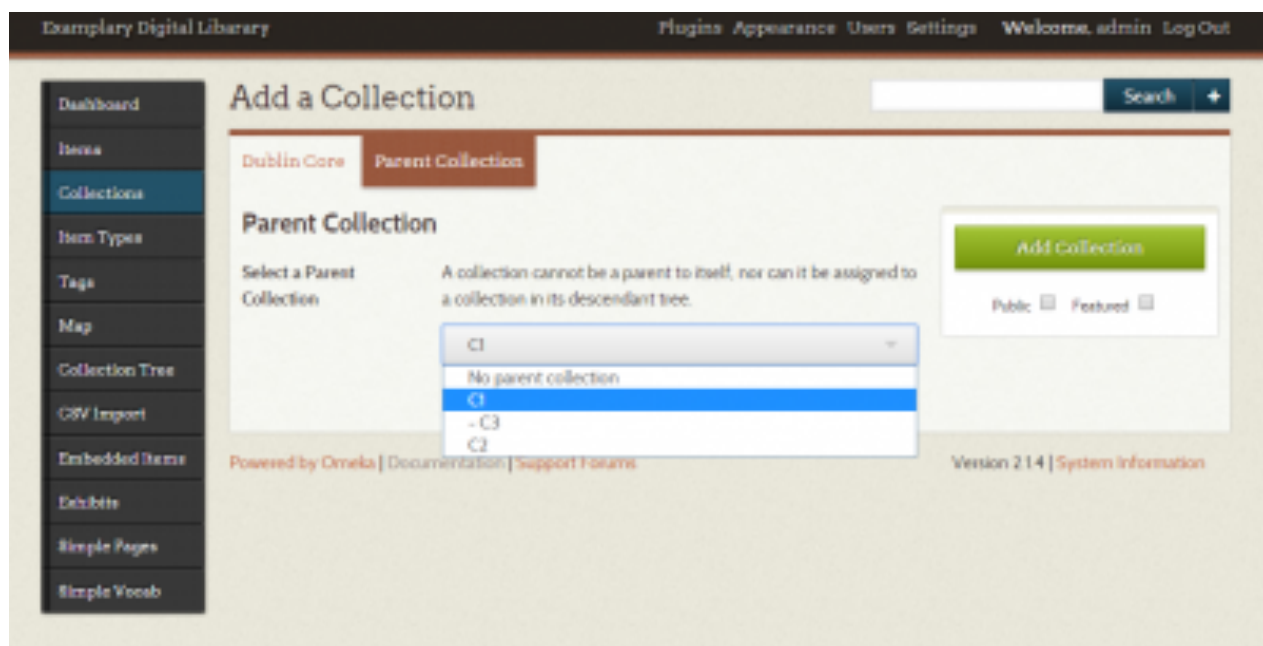


Illustration 13. Choosing a parent collection.



Illustration 14. List of collections.

Appearance

The last step in the basic configuration of your collection is selecting the appearance of its website. The main link to this option is located in the top bar of the administration panel. There are two basic subsections of this tab - **'Themes'** and **'Navigation'**.

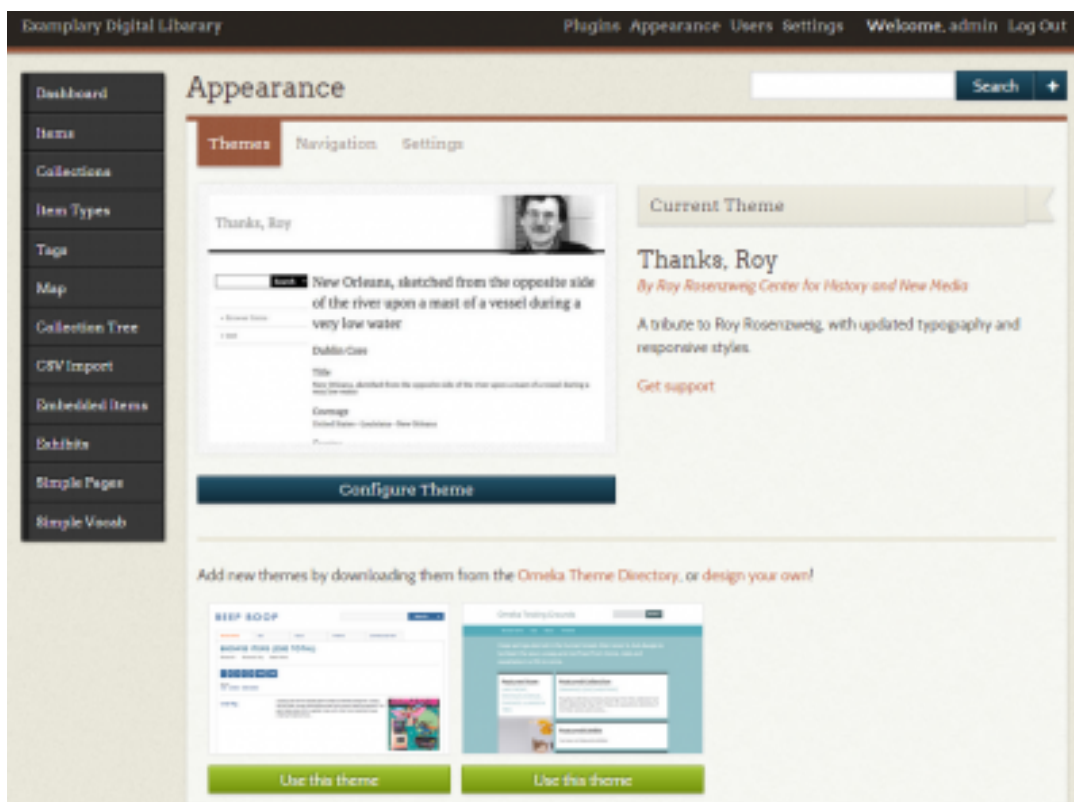


Illustration 15. How to change the theme of your collection.

At the beginning you can preview and change the theme used to control the appearance of your collection website. You can choose an existing theme, download a new themes from the [Omeka Theme Directory](#) or [to learn how to design your own theme](#).

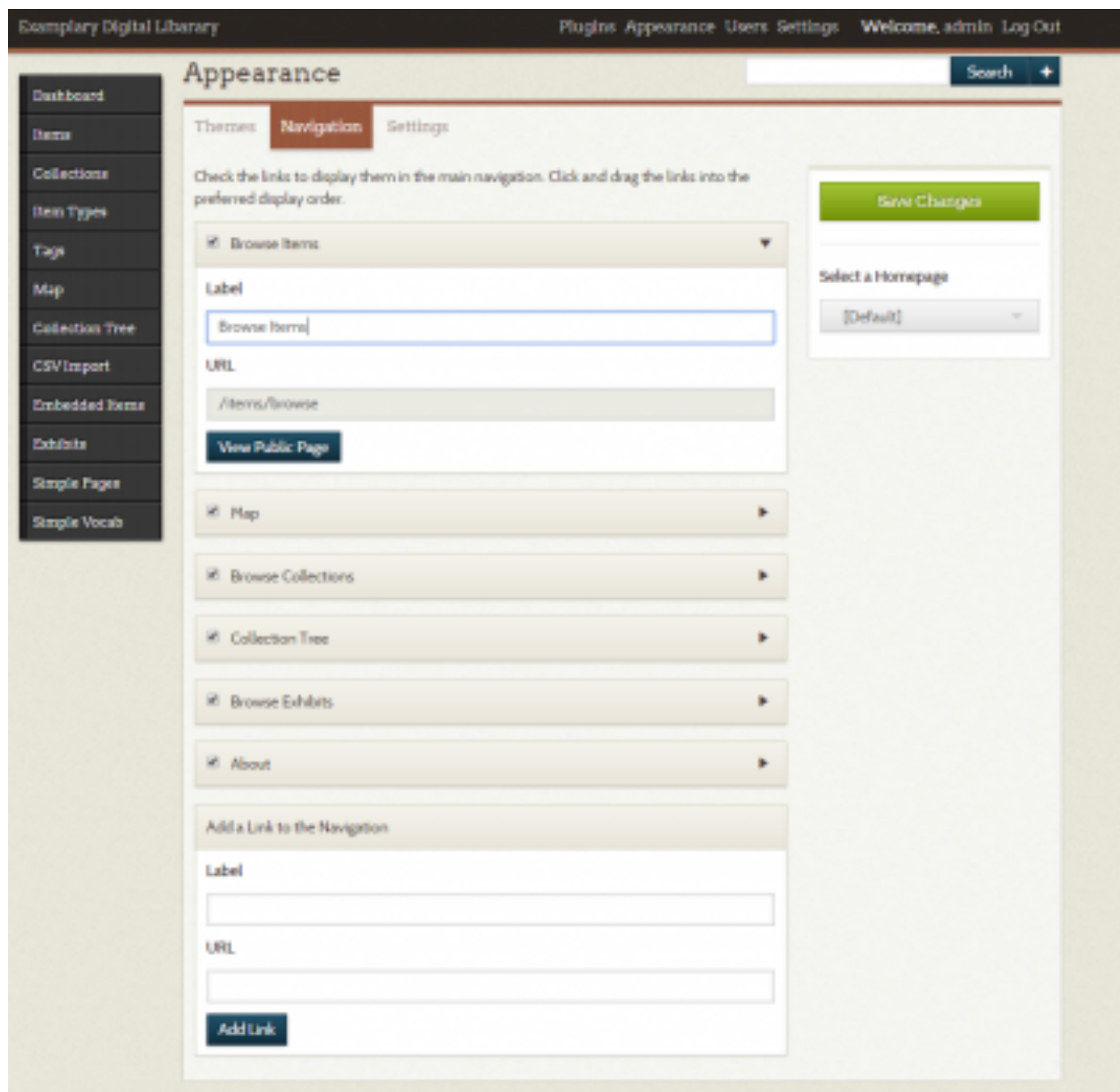


Illustration 16. Navigation of the collection's appearance.

In 'Navigation' you can change the order of the links available on your collection's website and add new ones; you can also change their names/labels and URLs. Likewise, you can choose a homepage for your collection.

Another facility is the 'Simple pages' option, where you can add pages and subpages to the main horizontal menu bar in your collection. You can also edit and delete existing pages. In the administration panel you can view the pages in a list or in a hierarchy view.

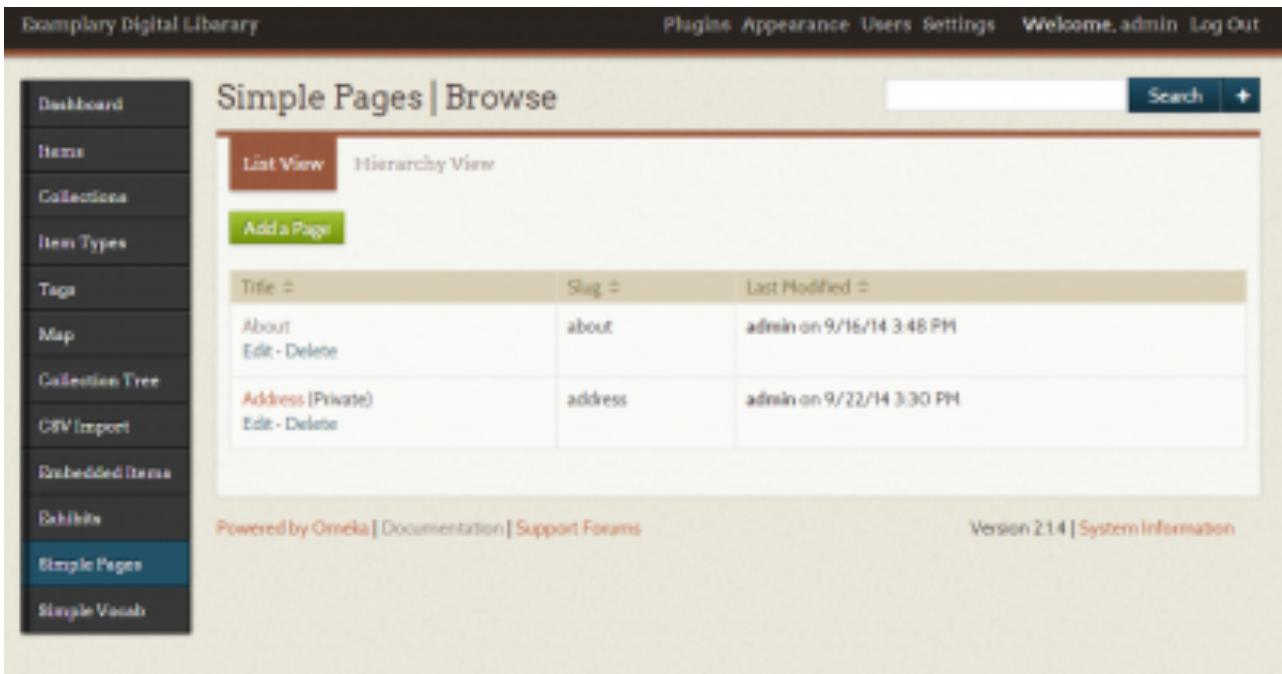


Illustration 17. List of added pages

If you choose the 'Add page' option, the first step is to write the name of the page, then create a slug (part of page's URL) and add the content for the page. On the right bar you can mark whether the page you created belongs to another parent page and if so, you can change the order of subpages with the same parent. You should also mark if the page is to be published immediately after creation.



Illustration 18. Adding a new page to the list.

4.3. Add your items

After doing the basic configuration of your collection, you can add items. The **'Items'** button is in the left side menu. At the beginning your items list is empty, to add items you should click the **'Add an item'** button.

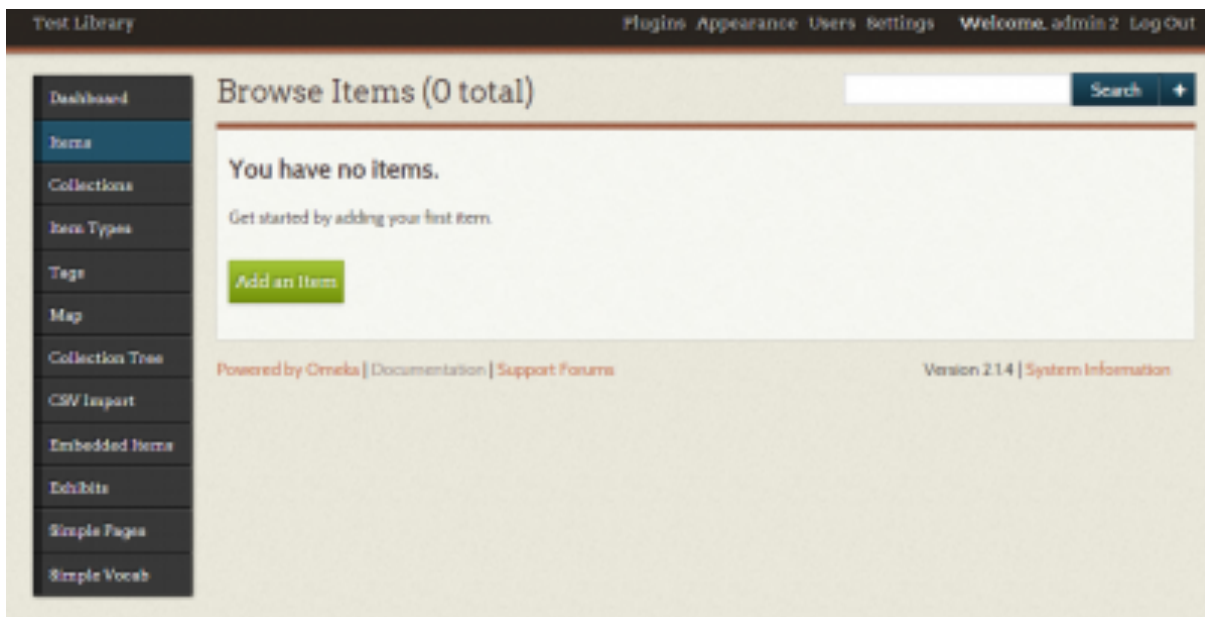



Illustration 19. Empty list of items.

Firstly, as in creating collections, you input values to the [Dublin Core](#)  metadata elements. You can also **'Add input'** values for each property, the same as in adding collections.

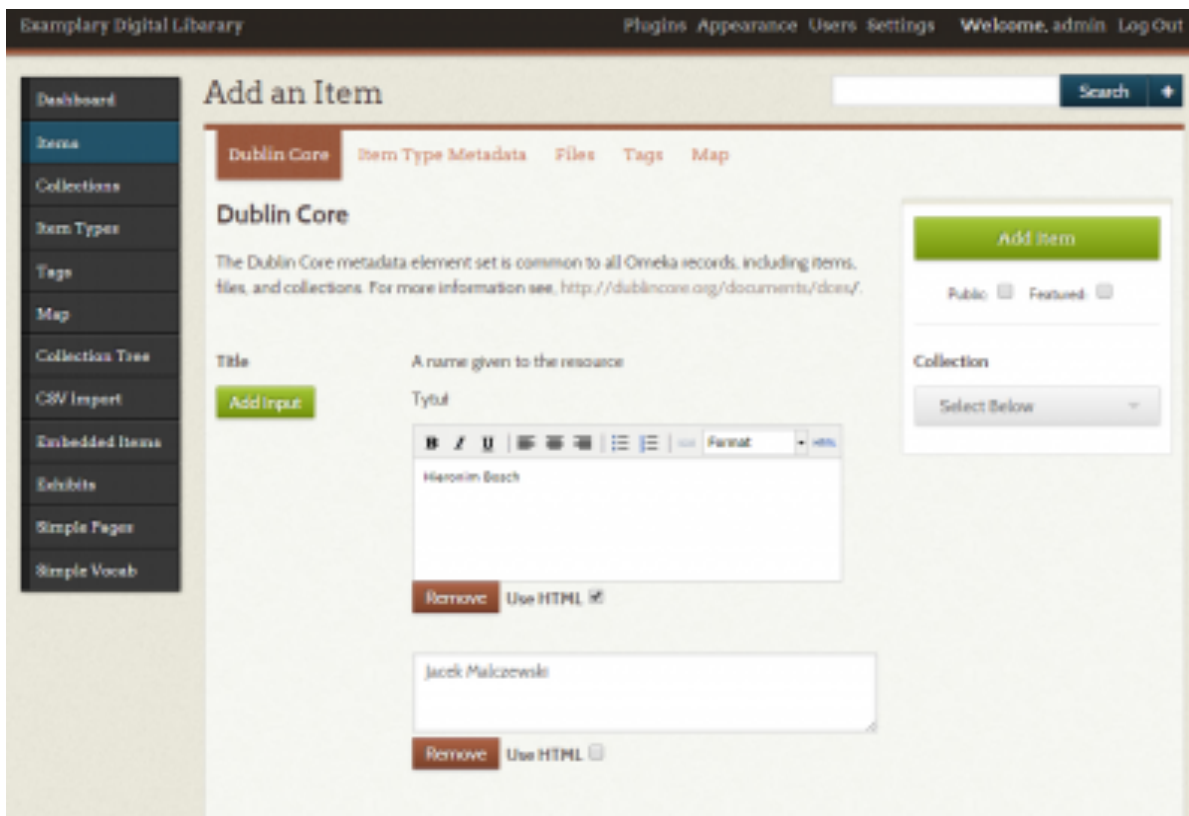


Illustration 20. Add input values to properties of Dublin Core metadata in your collection.

The next step is adding files to the item. Click on the Files tab to add an image, text, sound or video file to the item. The maximum size of each file is 200MB but there is no limit to the number of files you can add to each item (subject to your billing plan). Once the files have been added you can mark whether the item public (visible in your collection website after publishing) or to be featured (recommended on the home page). You can also select a collection or sub-collection in which you want to put your item.

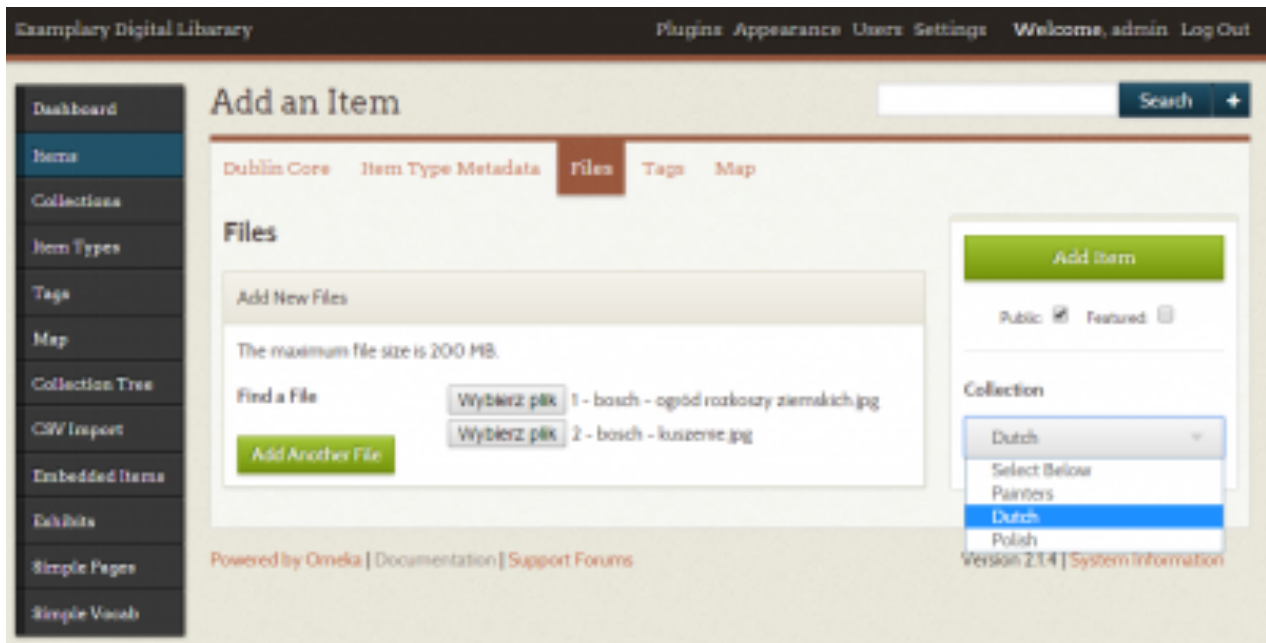


Illustration 21. Adding files to a new item in your collection.

There is an option to mark your item on a map - you can define the location of a place related somehow to the object on a world map. It can be the place where the object was created, where it was found, the place depicted by the object etc. It is your choice.

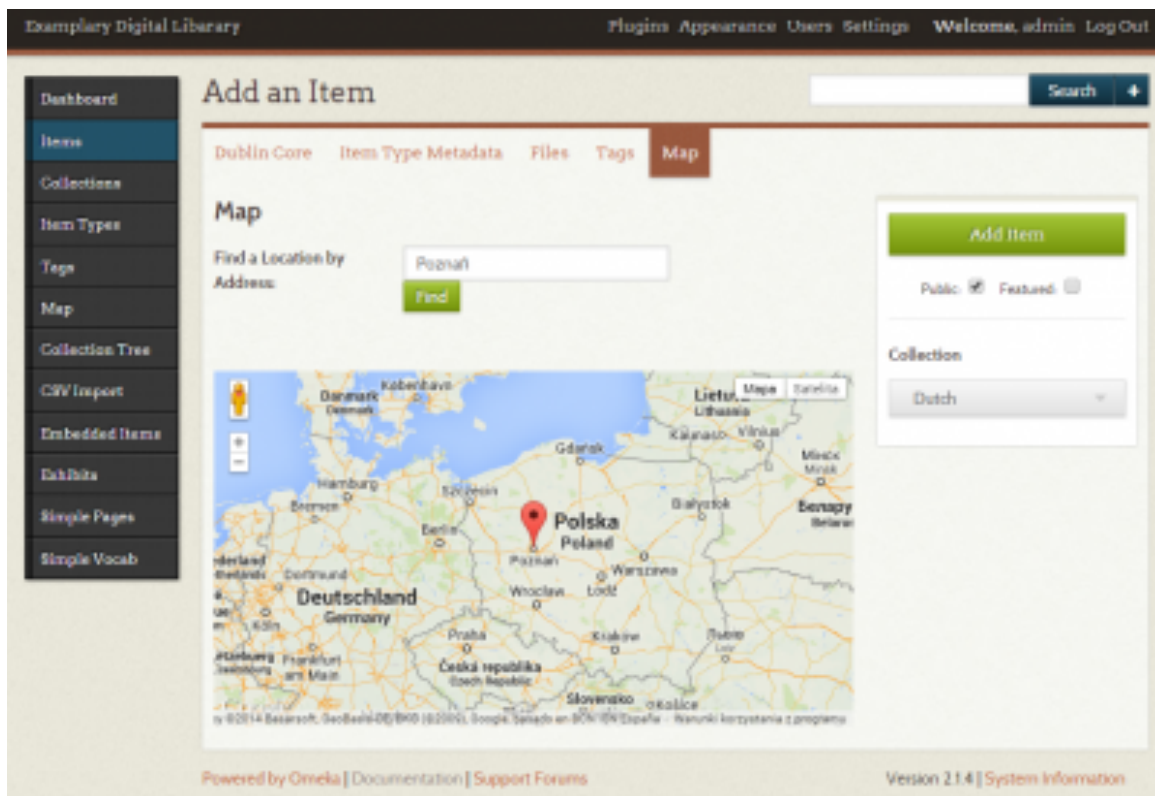


Illustration 22. Locate your item on the map.

Once you have finished inputting the details and adding files to a new item and you have clicked 'Add item', you can see it on your items list. If you made it public you will also see it in the users interface of your collection.

It is possible to edit, show details, delete or search for individual items in the Admin interface.

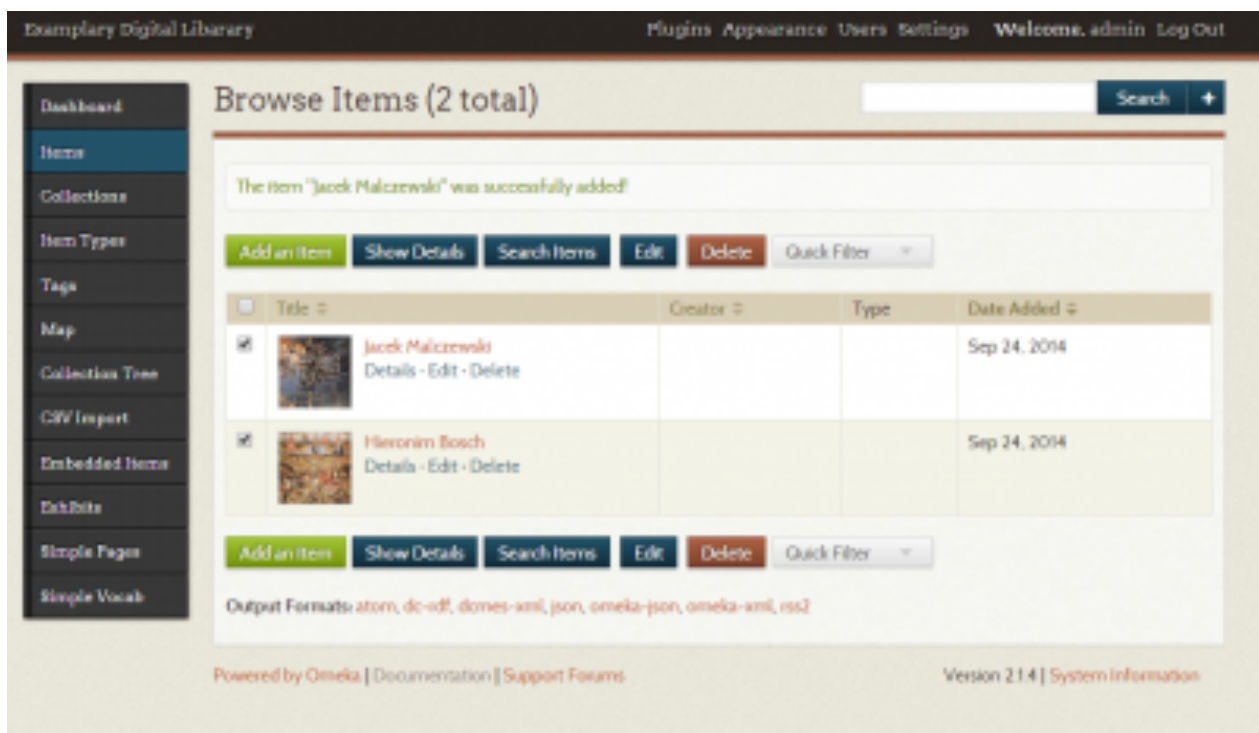


Illustration 23. Browse through your items.

After adding items publicly, you can also view them in user's interface (your collection's public website).

5. Omeka - User's Interface

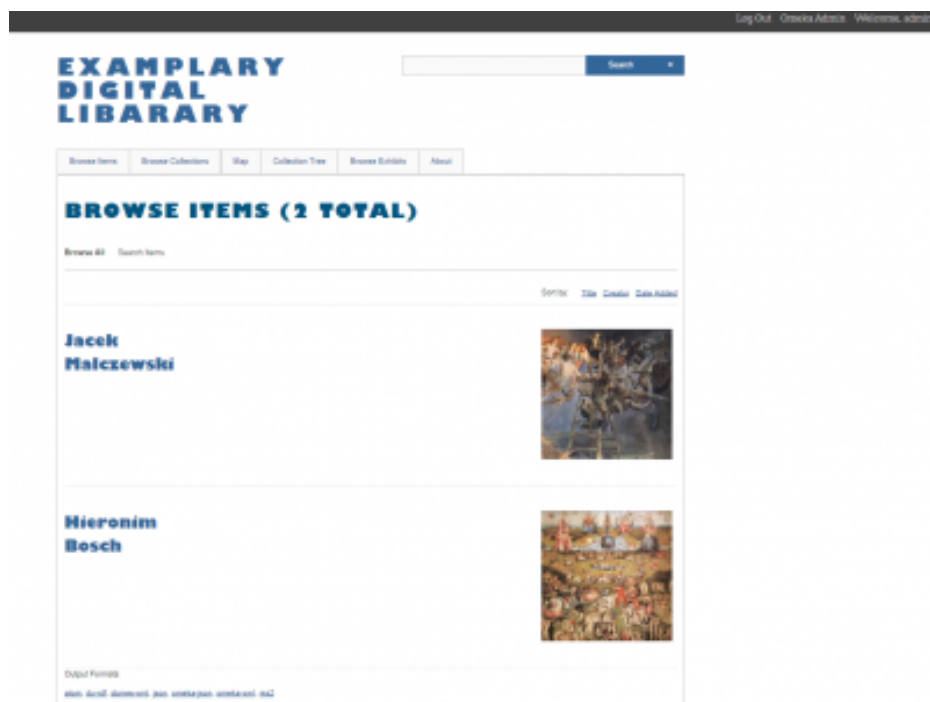


Illustration 24. Omeka user's interface (one of available themes).

There are three ways of searching for items in the digital collection. The first one is a simple search by one word or a phrase. In second possibility is the '+' option next to the simple search (although it may look a bit different, depending on the chosen theme). It offers few filters of query and records type. The last way is the advanced search located in '**Browse items**' tab. There is a range of filters and specific fields which you can use for searching any exact items (i.e. type, collection, user, metadata values).

EXAMPLARY DIGITAL LIBRARY

Browse Items
Browse Collections
Map
Collection Tree
Browse Exhibits

SEARCH ITEMS

Browse All Search Items

Search for Keywords

Filter by Specific Fields

Select Below

Select Below

[Add a Field](#)

Search by a range of IDs (example: 1-4, 155, 76)

Search By Collection

Select Below

Search By Type

Select Below

Search By User

Select Below

Search By Tags

Publication Public

Select Below

Featured/Non-Featured

Select Below

Search
+

Search using this query type

- Keyword
- Boolean
- Exact match

Search only these record types

- Item
- File
- Collection

[Advanced Search \(Items only\)](#)

Illustration 25. Advanced search in the collection.

In the 'Browse collections' tab you can choose a collection that you want to browse. You can sort the results by a title, creator or the date that the item was added. 'Collection tree' shows you a tree of available collections and their sub-collections. There is also a possibility to find items by looking for them on a map. The visibility of basic menu options depends on your choice, and as it has been already presented (see Illustration 16), you can add your own ones in the administration panel.

BROWSE ITEMS (2 TOTAL)

[Browse All](#) [Search Items](#)

Collection: Polish Painters

Sort by: [Title](#) [Creator](#) [Date Added](#)

Jan Matejko



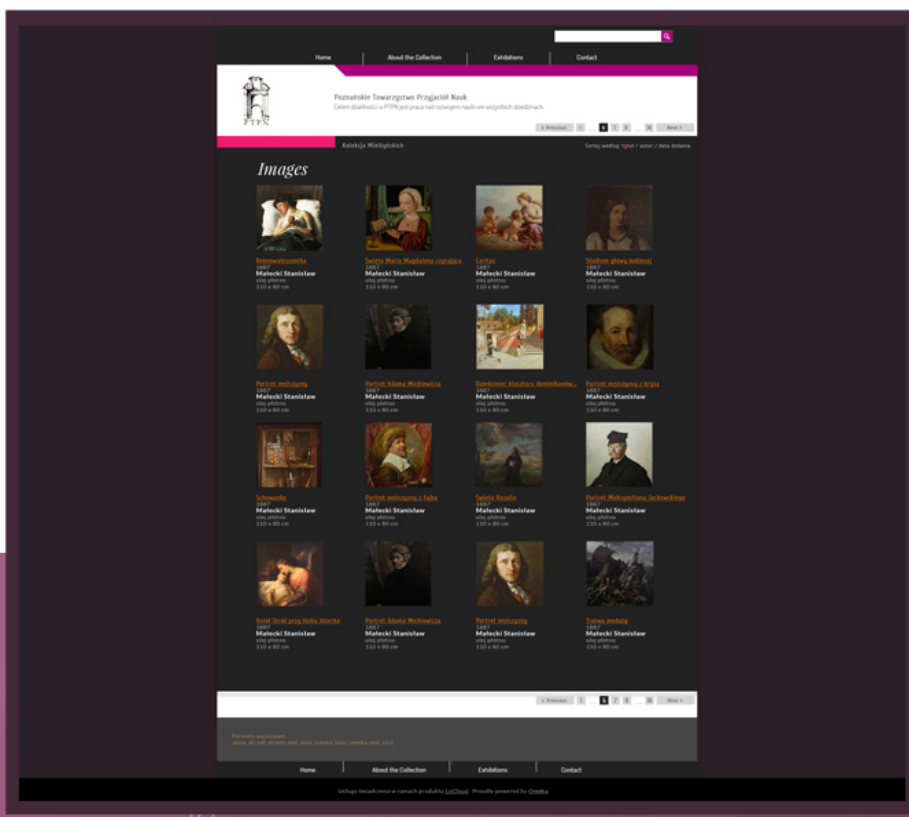
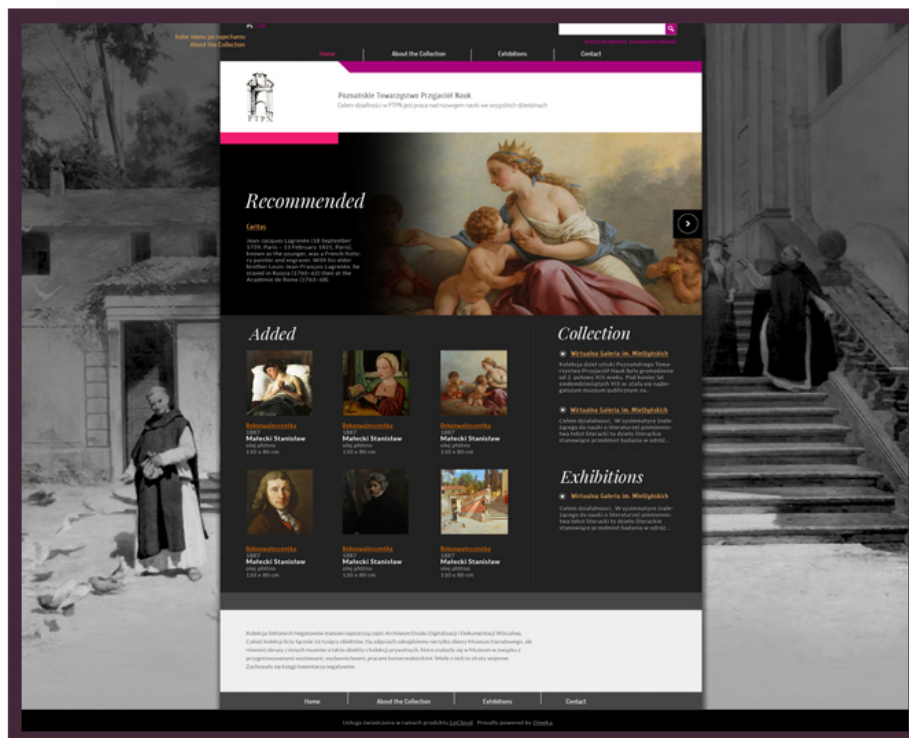
**Jacek
Malczewski**



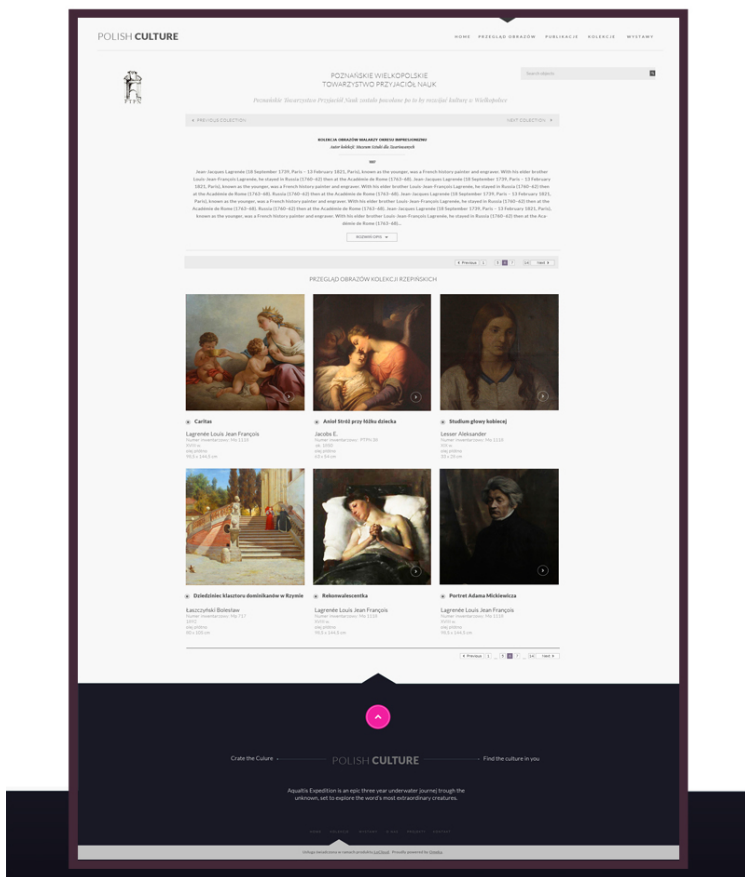
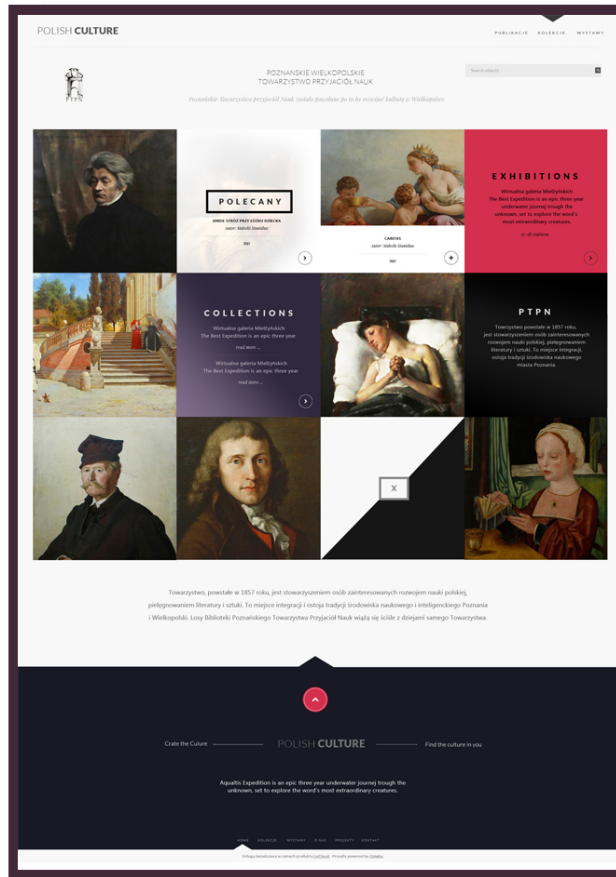
Illustration 26. Browsing through the items in a collection

Annex 2. Designs made for LoCloud Collections websites

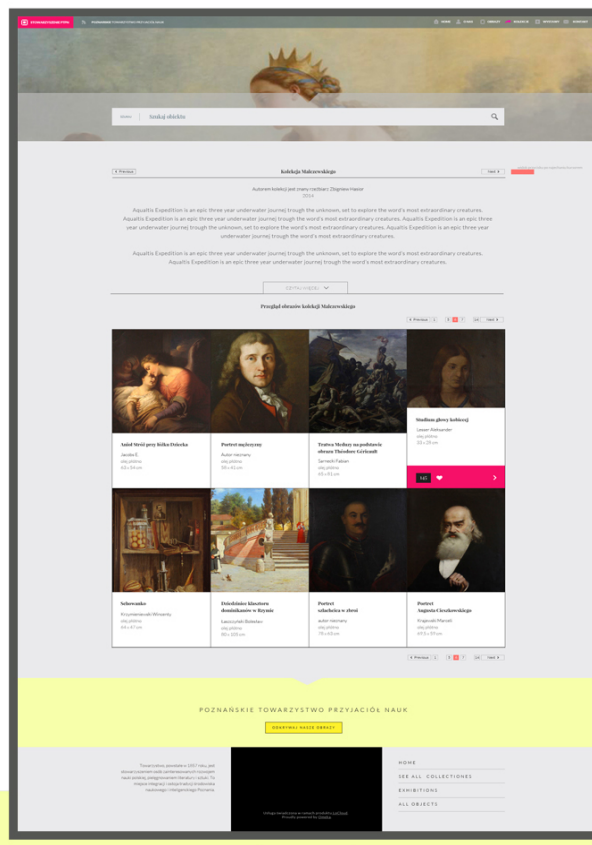
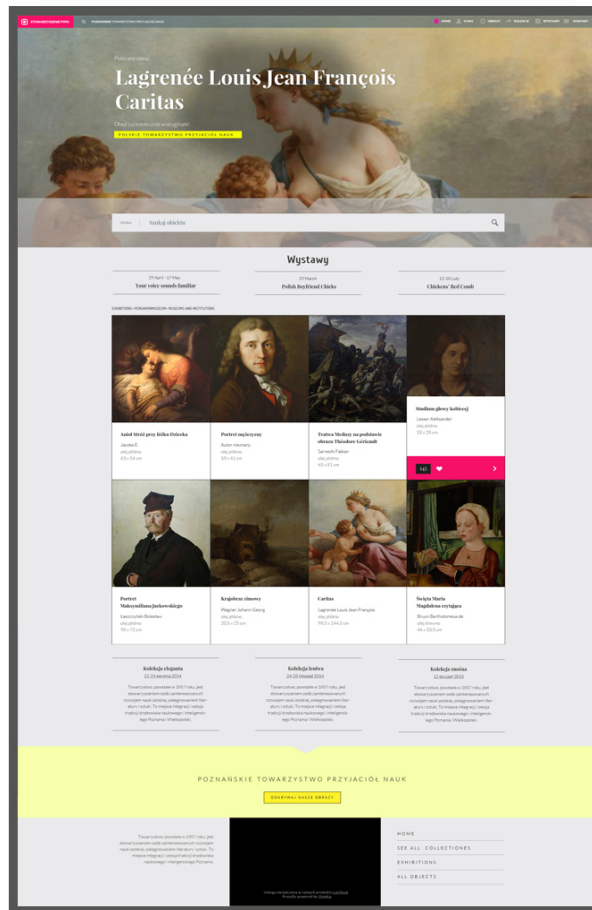
Design 1



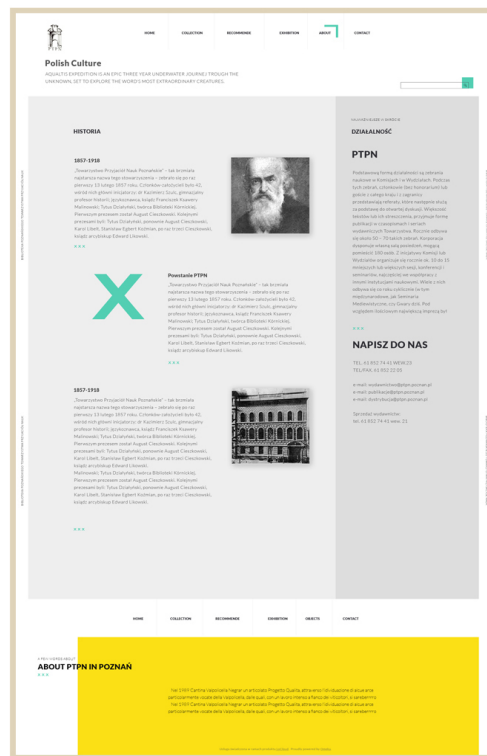
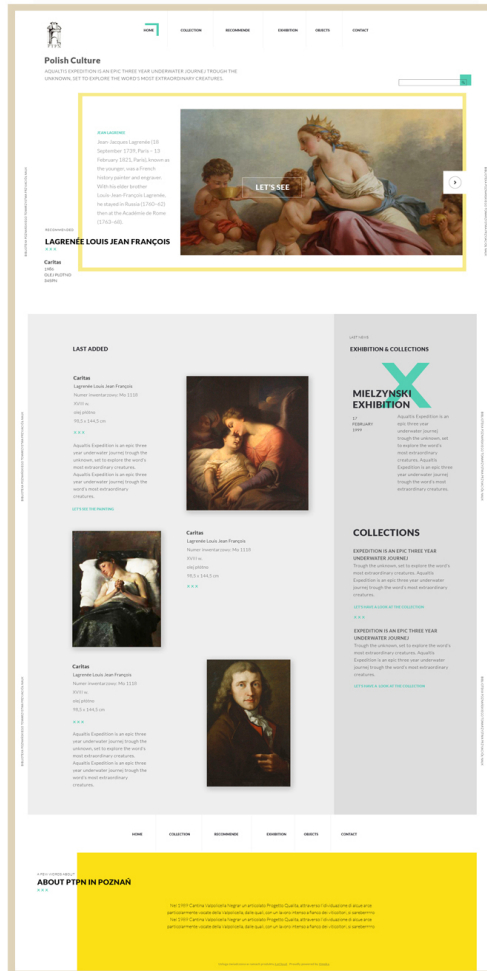
Design 2



Design 3

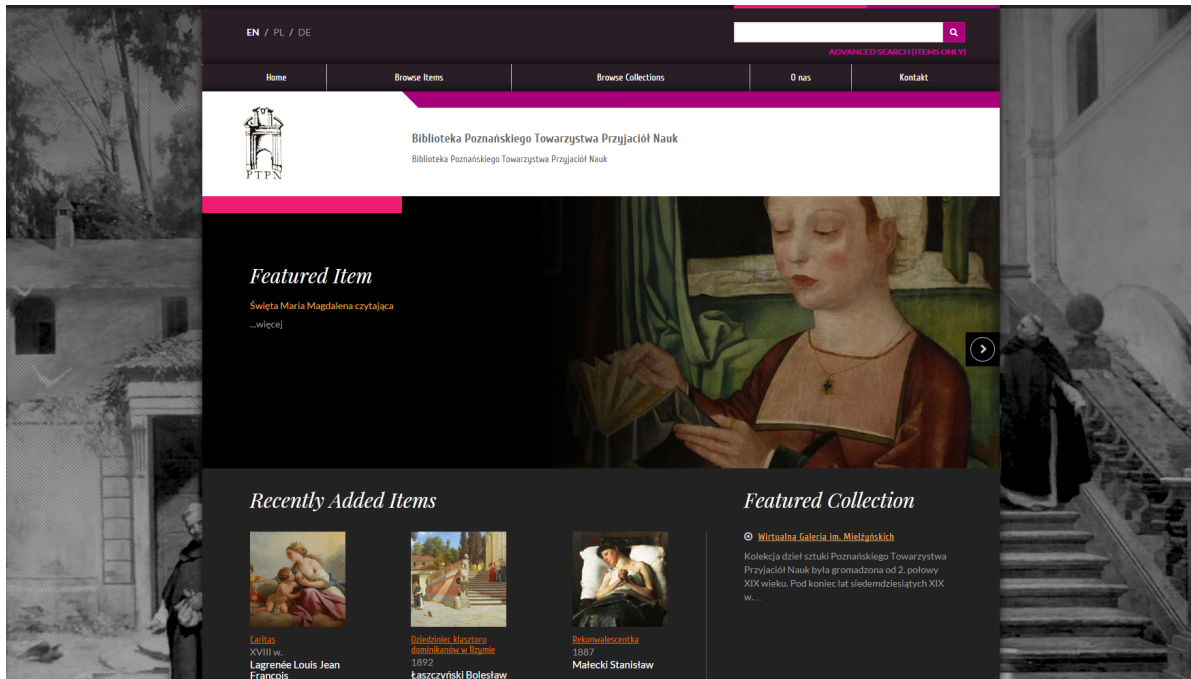


Design 4

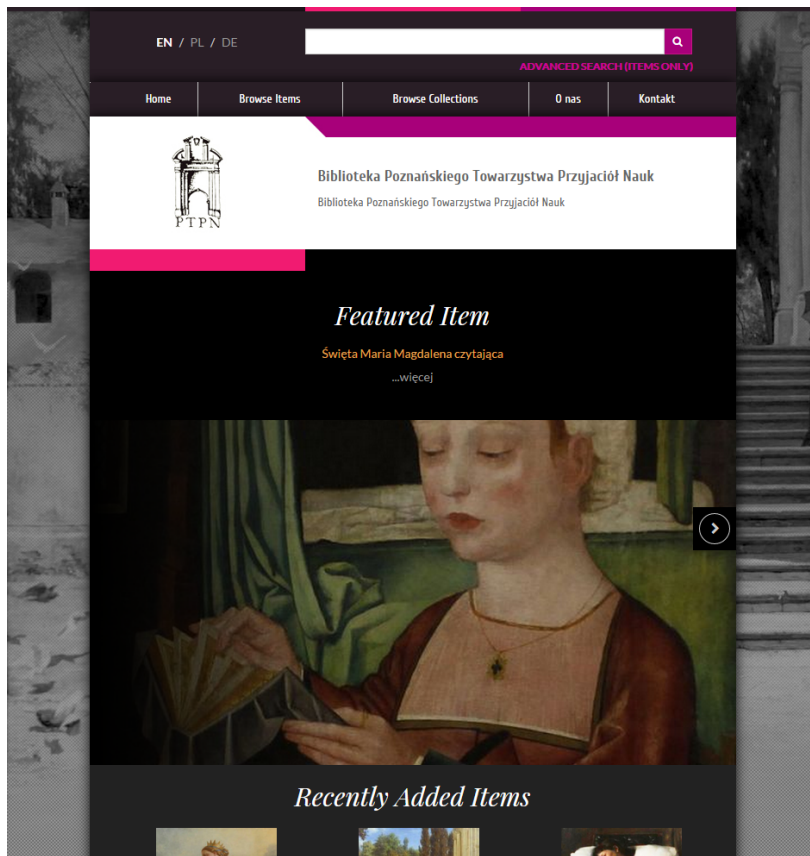


Responsive behaviour of new designs

Desktop view



Tablet view



Mobile view

