Deliverable

Project Acronym: **LoCloud**

Grant Agreement number: **325099**

Project Title: **Local content in a Europeana cloud**

D3.5. Historical place names service

Revision: v 1.2

Authors:

Rimvydas Laužikas — Vilnius University Faculty of Communication
Justinas Jaronis — VšĮ „Atviro kodo sprendimai“
Ingrida Vosyliūtė — Vilnius University Faculty of Communication

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	**Public**	**x**
C	**Confidential, only for members of the consortium and the Commission Services**	

Revision History

Revision	Date	Author	Organisation	Description
0.1	2014-08-25	Rimvydas Laužikas	VUKF	Introduction
0.1	2014-08-25	Justinas Jaronis	AKS	Description of API methods. First draft sent to project partners.
0.2	2014-08-29	Rimvydas Laužikas, Ingrida Vosyliūtė	VUKF	Text revision after comments and remarks by Kate Fernie and Gerda Koch. Second draft sent to project partners.
0.2	2014-08-29	Justinas Jaronis	AKS	Text revision after comments and remarks. Second draft sent to project partners.
1.0	2014-08-31	Rimvydas Laužikas	VUKF	Ver. 1.0
1.1	2014-09-03	Justinas Jaronis	AKS	Added search web service documentation and example usage instructions via web browser.
1.1.	2014-09-03	Rimvydas Laužikas	VUKF	Revised Executive summary, added Conclusion.
1.2	2014-09-08	Rimvydas Laužikas	VUKF	Text revision after comments and remarks from Jeff Malliet, Holly Wright, Sólborg Una Pálsdóttir,, added Use cases.
1.2	2014-09-06	Justinas Jaronis and Ingrida Vosyliūtė	AKS VUKF	Text revision after comments and remarks.
1.2	2014-11-18	Ingrida Vosyliūtė	VUKF	Text revision after microservice testing phase.

Change Log

V1.0 (2014-08-26) Initial release.
V1.1 (2014-09-02) Additional search method.
V1.2 (2014-11-18) Final version.

Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Contents

1. Executive summary

The aim of Task 3.5 is to develop a prototype application to enable local cultural institutions to collaborate in the development of a historical place name thesaurus and to enrich the harvested/ingested metadata. This application is based on the results of the CARARE (Connecting Archaeology and Architecture into Europeana project[1].

This deliverable describes the LoCloud Historic Place Names service (HPN), including the methodology for their development, and specifies their corresponding APIs. It also provides the documentation for the HPN services. These services are semi-automatic historical geo-information management functions and web services, designed for aggregation and re-use of digital heritage information.

The HPN service is available at: http://hpn.aksprendimai.lt/unitedgeo/.

1 The CARARE (Connecting Archaeology and Architecture in Europeana) project: <http://www.carare.eu/>.

2. Overview

Historical Place Names are not contemporary place names, they are place names that existed in history and are mentioned in different historical sources, like historical written sources (textual information), historical maps (cartographical information) and visual items (iconographical information portrayed in landscape paintings, town panoramas, etc.). Thus a Historical Place Name is described as a place appellation, which could refer to several places, because its application may have changed over time (the concept of the place name is described in CIDOC-CRM, E48. Place name[2]) and also may refer to time as a historical identifier which may discern several places (the concept is described in CIDOC-CRM, E4. Period) and (or) as a kind of immovable heritage ("as non-material products of our minds", described under E28 Conceptual Object in CIDOC-CRM[3]).

HPN services enable local geocoded spatial name data to be uploaded to serve two distinct purposes:

- to contribute to the development of a LoCloud HPN Thesaurus and geoparser tool which allows high-resolution geocoding of local cultural heritage resources, monuments etc.;
- to supplement information about cultural heritage content in Europeana – historical place names often carry a significant amount of local, national and European history, which is important to understand the cultural context of local information, and to bridge national historical narratives with the European multi-narrative.

The HPN services are developed on a HPN Thesaurus based on the relevant aspects of the CARARE metadata schema[4] developed by the CARARE project. The schema enables aggregation, storage and long-term preservation of historical geo-information. The principal HPN service schema is presented in Fig. 1 below.

---

[2] CIDOC-CRM. The CIDOC (International Council of Museum International Committee for Documentation) Conceptual Reference Model (CRM). 2011. The version 5.0.4 of the reference document. Internet access: <http://www.cidoc-crm.org>.

[3] CIDOC-CRM. The CIDOC (International Council of Museum, International Committee for Documentation) Conceptual Reference Model (CRM). 2011. The version 5.0.4 of the reference document. Internet access: <http://www.cidoc-crm.org>.

4 Fernie, K., d'Andrea, A., Zakrajsek, F., Ronzino, P., Koutsoudis, A., Chamzas, C., Papatheodorou, C., Carlisle, P., Ertmann-Christiansen, C., Masci, M. E., Mamo, O., Justrell, B., Clemens, S. O., Tzouvaras, V., Gavrilis, D., Angelis, S., Kakali, C., Tsakonas, G., Constantopoulos, P., Dallas, C., Pálsdóttir, S. ,U., Patsatzi, S., Larsen, L. I., Pletinckx, D., Drosopoulos, N., Vaitkevičius, V., Laužikas, R., Grayson, G., Stead, S., 2013. The CARARE Metadata Schema. Internet access: <http://www.carare.eu/eng/Resources/CARARE-Documentation/CARARE-metadata-schema>.

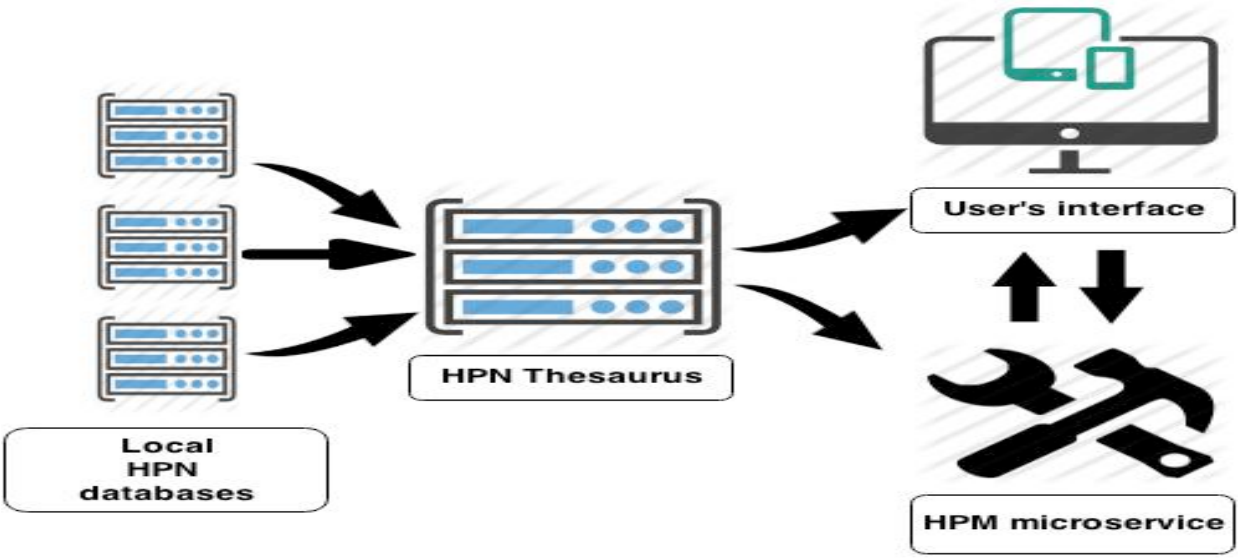

Fig. 1. Principal schema of HPN services

The HPN Thesaurus is a controlled vocabulary that can be used to aggregate, preserve and improve the interoperability and semantics between historical geo-information and contemporary geo-data, as well as a source of historical geo-information, which could be accessed in the descriptive information of cultural heritage objects. The HPN Thesaurus could be used as a data standard for documenting and/or cataloguing information. It functions as a controlled vocabulary and provides an authority control suggested by the cataloguer or indexer, including preferred names/terms and synonyms for places, structure and classification schemes, etc. It could also serve as a browsing assistant within Europeana, LoCloud and CARARE databases (the search is based on the knowledgebase that shows semantic links and paths between historical and contemporary places). HPN services could be used as a research tool that provides information and contextual knowledge about historical place names and other places.

The HPN Thesaurus is considered to be a qualification of the CARARE metadata schema at the conceptual level (“Heritage Asset Identification Set”à global type “Spatial” à “Historical name”). The strength of HPN Thesaurus lies in its ability to collect a full range of historical geo-information about digitised and born-digital cultural heritage objects, as well as related events and their representations, thus supporting different kinds of HPN services and user cases.

HPN services are oriented towards providers and aggregators rather than end users.

HPN services perform the following functions:

1. **Crowdsourcing and enrichment of provider's and aggregator's historical geodata:**
The Service automatically transfers historical geo-data from local/international databases and information systems to the HPN Thesaurus. It also includes the possibility to provide historical geo-data manually via a user interface. The system has been connected with the semantic mapping and transfer of historic geo-data from local systems to the LoCloud HPN Thesaurus.

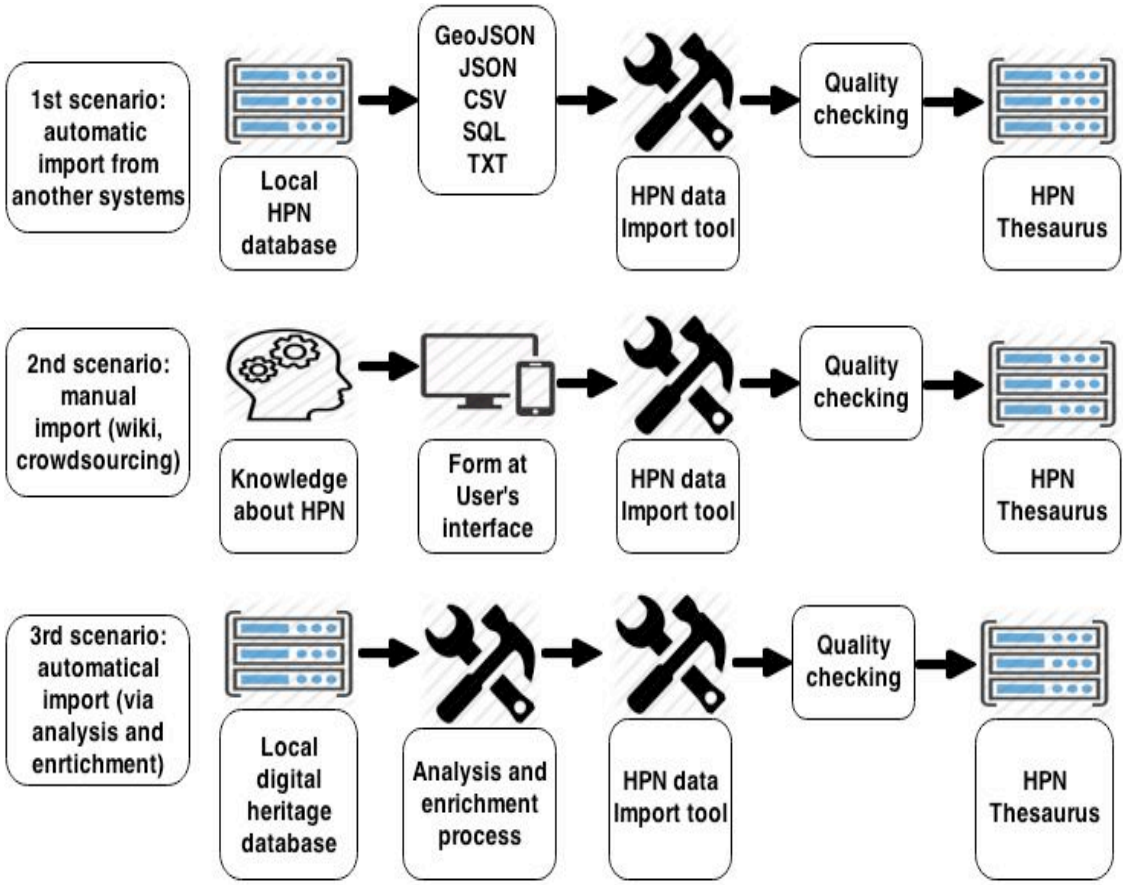

Fig. 2. HPN Thesaurus enrichment scenarios

The HPN geo-data is imported in GeoJSON, JSON, CSV, SQL, TXT formats and matched with other historical geo-data in the HPN Thesaurus using an automatic HPN Data Import Tool. After the matching, a manual quality check is carried out, and then the new HPN are added to the HPN Thesaurus. Similar procedures are used for other HPN enrichment scenarios (presented in Fig. 2). The process ensures interoperability between different historical geo-data sets and also allows the creation tools that enable crowdsourcing and wiki usage in the LoCloud HPN field.

2. **HPN geodata visualization:** The service is able to show historic place names on a contemporary map as interactive clustered map with zoom function (presented in Fig. 3).

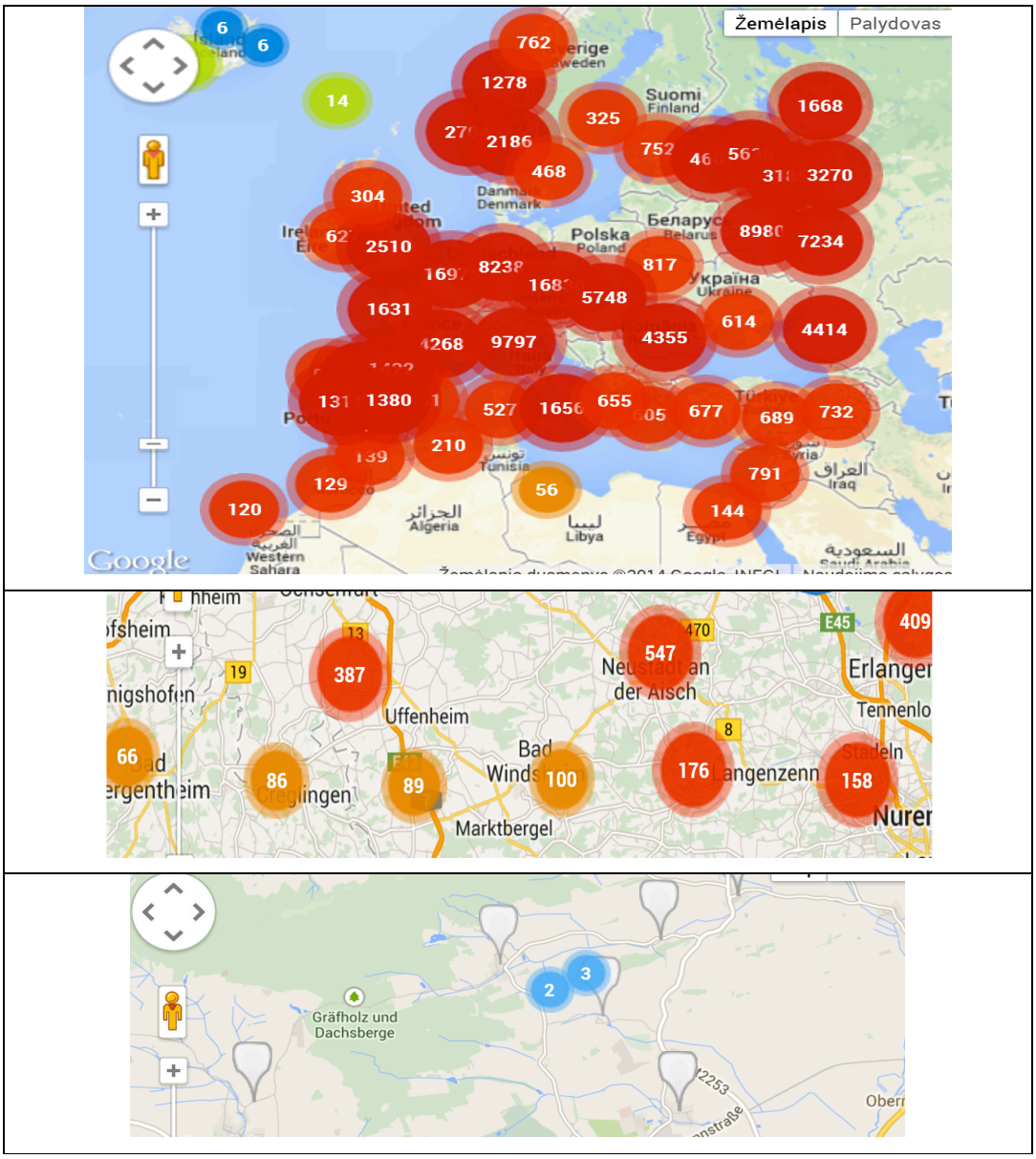

Fig. 3. Clustered map example, showing zoom detail at three levels

3. **HPN interoperability provision:** The interoperability service automatically checks transferred data and links local geonames with contemporary geonames during the metadata harvesting process, as well as connecting geo-names with coordinates. It connects various forms of historic (including multilingual) place names in local systems with contemporary place names and GIS data (as X and Y coordinates) stored in the HPN

Thesaurus (connects historic name with current name or/and administrative dependences, or connects different variations of the same place name, etc.). The service is based on the integrated algorithm that rationalises and reconciles similar place names, estimating similarities between names and geographic coordinates. The algorithm also performs an accuracy check (e.g. if a name and relevant coordinates are exact, it is ranked at 100%; if the name is exact, but the coordinates deviate by 50%, it would be 75%; if the name is not exact and the coordinates do not match the allowed deviation, it will be 0%). The interface allows users to see, correct and perform quality checks, based on the result of the reconciliation algorithm for each LoCloud partner. Users have the ability to log in and visualise a list with the percentage of accuracy. The whole process of analysis and enrichment is presented in Fig. 4.

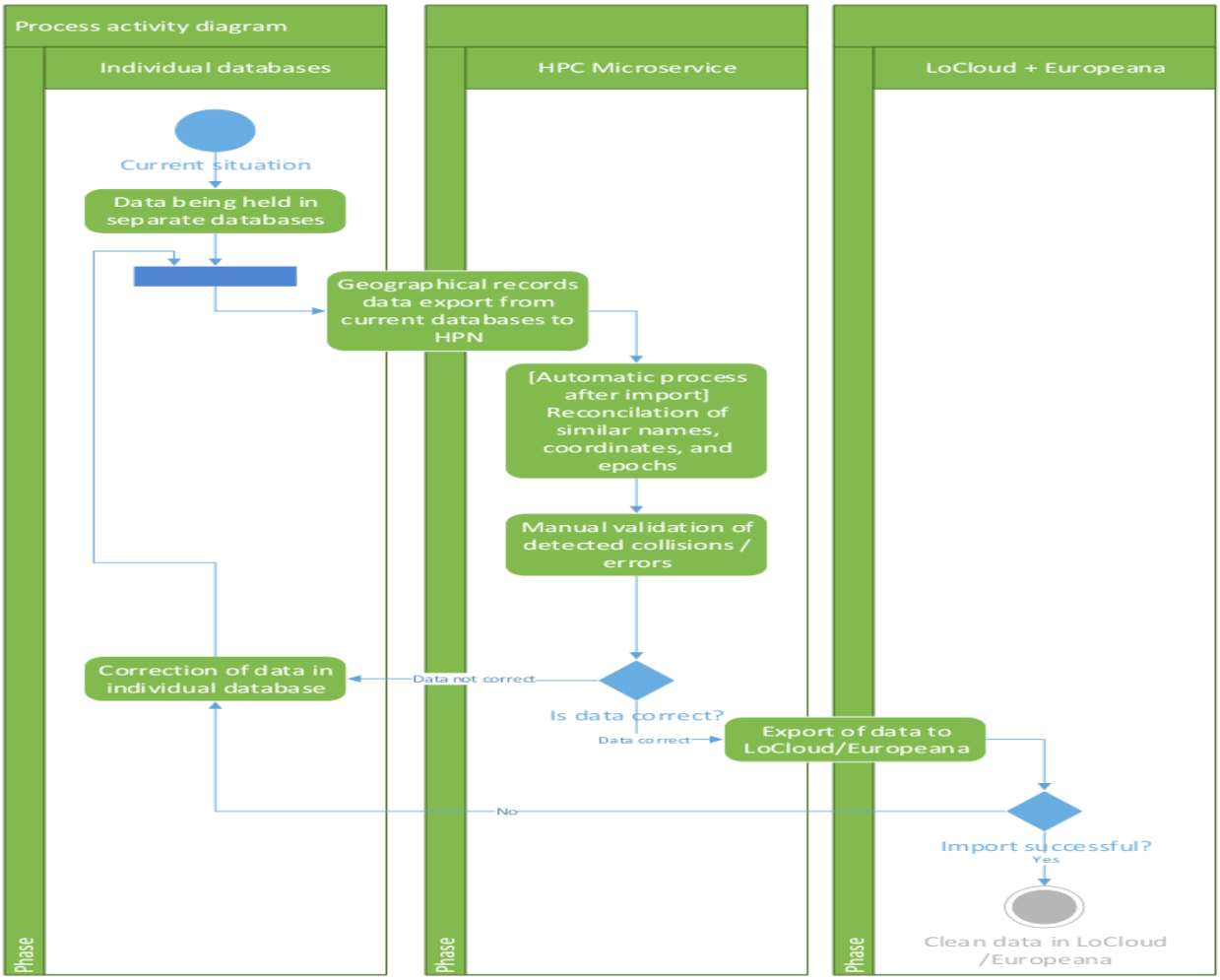

Fig. 4. Analysis and enrichment process

Use cases

The aim of use cases is to explain what can a user do with this service. The selected user cases are the case of local history researcher and the case of administrator of digital heritage database in local memory institution.

1. Local history researcher. Local history as the study of history in a geographically local context and it is important for local memory institutions, communities, local cultural industries and individuals (e.g. in context of genealogical investigations). Historical space (place names) is an important empirical material for Local history investigations. Usually research raises various problems or different sets of problems (especially for non-profit investigators) such as historical changes of place names, the variety of languages, writing styles and lexical formats that place names were written over time, as well as the extinction of many of historical place names thus making their precise location hard to find or make interconnections between historical and current place-names. LoCloud HPN services enable local history researcher to:
    - verify the availability of historical place name at LoCloud HPN Thesaurus;
    - in case the historical place name is available – to interconnect historical place name with contemporary place names its linguistic variations and geographical coordinates (to localize);
    - in case the historical place name is not available – to use his knowledge for crowdsourcing and to propose the historical place name as new place name for LoCloud HPN Thesaurus.

2. Administrator of digital heritage database in local memory institution. Local institutions usually are budget-limited institutions that cannot afford to invest in development of high quality computer infrastructure. Historical geodata and HPN services could be understudied as expensive and highly specialized information services. HPN Thesaurus development also requires high quality and long lasting research of history and historical geography. It also requires an inter-institutional cooperation and joint intellectual forces which allows to save resources and develop better information products. LoCloud HPN services enable administrator of digital heritage database in local memory institution to:

- automatically analyse and enrich historical geo-data in local system with information about interconnected contemporary place names, different historical and linguistic place name forms and geographical coordinates);
- export selected LoCloud HPN Thesaurus data sets in computer understandable format and integrate it into the local information system in case local institution already have HPN collections - to crowdsource its knowledge and to supplement LoCloud HPN Thesaurus with local data by sending it in computer understandable format.

For more detailed description how to use HPN microservice and step by step instructions see HPN user documentation: http://hpn.aksprendimai.lt/unitedgeo/documentation/

Development methodology

The Faculty of Communication of Vilnius University in cooperation with VšĮ „Atviro kodo sprendimai“, the Digital Curation Unit of the Institute for the Management of Information Systems of Athena Research and Innovation Centre in Information Communication & Knowledge Technologies, Angewandte Informationstechnik Forschungsgesellschaft mbH, Universidad del País Vasco and Javni Zavod Republike Slovenije za Varstvo Kulturne Dediscine have developed an application to enable local cultural institutions to collaborate in the development of HPN services building on the results of the CARARE project.

Agile Unified Process methodology was used for the development of HPN services:

- **Initiation**. The HPN service needs analysis and initiation were performed during the preparation of LoCloud project proposal, and described in project documentation. These ideas are based on the scientific investigations performed by Vilnius University Faculty of Communication researchers in 2005-2011[5].

- **Requirements analysis and concept development**. An investigation of existing HPN projects, databases and information systems was performed as part of “LoCloud 1.4.1

[5] Laužikas, R., Digitization of cultural heritage: model of an integral, three-dimensional spatio-temporal thesaurus // Archeologia e calcolatori. T. 16. Firenze, 2005. p. 208-227. Laužikas, R., Vaitkevičius, V., Connecting geography, chronology, and biographies – framing new Lithuanian standards. // Standardisation and innovation in information technology (SIIT 2011) : proceedings of the 7th International Conference, 28-30 September 2011, Berlin / edited by Knut Blind, Kai Jakobs. Aachen : Mainz publishers, 2011. p. 127-138.

Content evaluation and planning survey" and (additionally) web survey. HPN services were built according to good practices within this research area (see Table 1). Based on this investigation, a new concept was developed during the LoCloud project face-to-face meetings in Oslo (Norway) and London (United Kingdom), and a series of LoCloud project WP3 Skype meetings performed every 2 weeks during the 10th-21st project months. More detailed results of the HPN services concept development were described in the "LoCloud Historical place name services specification".

Table 1. Investigated HPN products and comparison between another products and LoCloud HPN services[6]

No	Product name	Country	URL	Content						Functions				
				Content coverage	Contemporary place names	Historical place names	Place names in different languages	Coordinates	Chronological data	Search HPN	Propose HPN	Send HPN set	Get HPN set	Automatical enrichment tools
1.	Canadian Geographical Names Data Base	Canada	http://www.geobase.ca/geobase/en/index.html	Canada	+	±	±	+	—	±	—	—	±	—
2.	Code Officiel Géographique	France	http://www.insee.fr/fr/methodes/nomenclatures/cog/	France	+	±	—	+	±	—	—	—	±	—
3.	Databáze sídelních lokalit Čech, Moravy a Slezska	Czech Republic	http://gis.up.npu.cz/	Czech Republic	+	+	±	+	+	+	—	—	+	—
4.	Digital Exposure of English Place-names' (DEEP) project	UK	http://englishplacenames.cerch.kcl.ac.uk/	UK	+	+	±	+	—	+	—	—	+	—
5.	GeoNames	International	http://www.geonames.org/	world	+	+	+	+	—	+	—	—	+	—
6.	Getty Thesaurus of Geographic names	USA	http://www.getty.edu/research/tools/vocabularies/tgn/	world	+	+	+	+	±	+	—	—	±	—

[6] Legend: + - data/function is available; ± - data/function is partially available; — - data/function is not available.

No	Product name	Country	URL	Content						Functions				
7.	Google Ancient Places project	International	http://googleancientplaces.wordpress.com/	Antique Greek and Roman world	+	+	±	+	±	—	—	—	+	—
8.	Great Britain Historical Geographical Information System	UK	http://www.port.ac.uk/research/gbhgis/	UK	+	+	±	+	+	+	—	—	+	—
9.	Historische Ortsnamen Web-Anwendungen	Germany	http://www.geodatenzentrum.de/geodaten/gdz_rahmen.gdz_div?gdz_spr=deu&gdz_akt_zeile=3&gdz_anz_zeile=5&gdz_user_id=0	Historical Germany	+	+	±	±	+	+	—	—	—	—
10.	IS "Aruodai" geografijos duomenų bankas	Lithuania	http://www.aruodai.lt/	Lithuania	+	+	**±**	**±**	**±**	+	—	—	—	**—**
11.	Istoriniu vietovardžių duomenų bazė	Lithuania	http://www.lki.lt/tevi/	Lithuania	+	+	**±**	**±**	+	+	—	—	**±**	—
12.	Lietuvos vietovardžių geoinformacinė duomenų bazė	Lithuania	http://lvvgdb.lki.lt/vietovardziai/Default.aspx?pid=1	Lithuania	+	+	**±**	+	**±**	+	—	—	**±**	—
13.	**LoCloud HPN services**	**EU**	**http://hpn.aksprendimai.lt/unitedgeo**	**world**	**+**	**+**	**+**	**+**	**±**	**+**	**+**	**+**	**+**	**+**
14.	Pelagios / Pleiades project	International	http://pelagios-project.blogspot.com/	Antique Greek and Roman world	+	+	**±**	+	+	+	—	—	+	—
15.	Bunachar Logainmneacha na hÉireann	Ireland	http://www.logainm.ie/	Ireland	+	—	**±**	+	—	—	—	—	—	—
16.	Rijksdienst voor het Cultureel Erfgoed (RCE)	Netherlands	http://www.metatopos.eu/	Netherlands	+	**±**	**—**	**±**	—	**±**	—	—	—	—
17.	The Europeana Connect Geoparser Prototype	EU	http://europeana-geo.isti.cnr.it/geoparser	—	—	—	—	—	—	±	—	—	±	±
18.	The Europeana Gazetteer Prototype	EU	http://europeana-geo.isti.cnr.it/gazetteer	world	+	±	+	+	—	+	—	—	±	+

No	Product name	Country	URL	Content						Functions				
19.	The Finnish Spatio-temporal Ontology	Finland	https://onki.fi/en/browser/overview/sapo	Finland	+	+	±	+	+	+	—	—	—	—
20.	The Historical Gazetteer of England's Place-Names	UK	http://placenames.org.uk/	UK	+	+	—	+	+	+	—	—	—	—
21.	The Old Maps Online Portal	International	http://www.oldmapsonline.org/#bbox=-110.00061,-51.981497,119.921265,72.001067&q=&datefrom=1000&dateto=2010	world	+	+	+	+	+	+	—	—	—	—
22.	The Place Name Archives at Norway	Norway	http://www.dokpro.uio.no/engelsk/place_names.html	Norway	+	+	±	±	±	+	—	—	—	—
23.	Vientisas istorinių vietovardžių, asmenvardžių ir istorinės chronologijos tezauras	Lithuania	http://www.epaveldas.lt/tezauro-paieska	Lithuania	+	+	+	—	±	+	—	—	—	—

- **Planning**. A working plan was developed during the LoCloud project meeting in London (December 2013) and approved during LoCloud project WP3 Skype meetings performed every 2 weeks during the 10th-21st project months. A more detailed result of this stage was described in "LoCloud Historical place name services timeable".
- **Design**. HPN services were designed by Rimvydas Laužikas (Vilnius University Faculty of Communication), Justinas Jaronis and Jelena Kutalovskaja (VšĮ „Atviro kodo sprendimai"). Design solutions were discussed and approved during the LoCloud project WP3 Skype meetings performed every 2 weeks during the 10th-21st project months.
- **Development**. HPN services were developed by Justinas Jaronis and Jelena Kutalovskaja (VšĮ „Atviro kodo sprendimai").
- **Testing**. HPN services are being tested according to the proposed testing schema (see Table 2).

Table 2. Testing schema of the HPN services.

Task	Test coverage	Test responsibility
Building HPN geo-data Import Tool	HPN data import possibilities	Responsible institution: VUKF Participants: partners which had developed local HPN databases and have exported existing geo-data during the LoCloud project: Province Limburg database (erfgoedplus.be, Belgium), CZ_RETRO database (Czech Republic), FRS collections (Italy) and VEKAM database (Turkey).
Semantic mapping and data transfer of historic geodata from local systems to LoCloud HPN database	Checking the quality of the imported data	Responsible institution: VUKF Participants: partners who have exported existing geo-data during the LoCloud project: Province Limburg database (erfgoedplus.be, Belgium), CZ_RETRO database (Czech Republic), FRS collections (Italy) and VEKAM database (Turkey).
Building Analysis and Enrichment Tool	Analysis and enrichment quality	Responsible institution: VUKF Participants: all partners and particularly test group (province Limburg, CUT, Future Library, FRS, VUKF, RCE, NRA, BGB, PrifUK KAEG, ABMR, HU, AIT).
Building User interface	User interface usability	Responsible institution: VUKF Participants: all partners and particularly test group (province Limburg, CUT, Future Library, FRS, VUKF, RCE, NRA, BGB, PrifUK KAEG, ABMR, HU, AIT).
Connecting HPN database/service with LoCloud repository (Europeana) and other LoCloud micro services	Interoperability between HPN database and LoCloud repository	Responsible institution: VUKF Participants: partners of WP3 in Task 3.2. Geolocation enrichment services (AVINET, IPCHS), and Task 3.4. Vocabularies and languages (AIT) and Athena RC .

Testing services	Full system and services testing	Responsible institution: VUKF Participants: all partners and particularly test group (2Culture Associates, AIT, Provincie Limburg and the representative of Europeana).

- **Implementation**. Implementation of this project is achieved by custom Django application, named "united_geonames". After adding this app to Your django project, it provides:

1. *collectunitedgeo* management command
2. Admin interface to view and confirm place matches;
3. united_geo.urls to include to Your urls.py to access both user interface and web service URLs in Your project.

This application is intended to use with PosgreSQL 9.2 database with following extensions:

- PostGIS (http://postgis.net/)
- Kmeans (http://pgxn.org/dist/kmeans/)
- PG Similarity (http://pgsimilarity.projects.pgfoundry.org/

This application uses these main Django applications:

- Django-Cities for simplified integration with GeoNames;
- Django-Rest-Framework for web service interface;
- AnyCluster for server side-clustered map interface;
- CrispyForms, Bootstrap for customizable and responsive web interface

The idea of this app is to have aggregator model *united_geonames* that has single record for each distinct historical place name. Then each imported database is linked with existing geoname as a synonim, or created new united geoname, if synonim in the database does not exist. This way this system links all imported databases to each other.

Matching algorithm

The most important part of this service is matching algorithm.

Geographic synonim matching is implemented this way:

1. United geoname has one or more synonims with point coordinates;
2. If synonims coordinates differ, they make a line (if two different synonims) or polygon (if three or more). This shape is evaluated each time any synonim of the place changes (using

post_save signal on *UnitedGeoNameSynonim* model*)*, and it's centroid is updated in united_geoname model.

3. If *run_matching* method receives *coordinates* as the keyword argument, it searches for nearest places using centroid in *united_geonames* model. We are using Postgresql 9.2 GIST indexes to speed up the lookup. When creating log, distance ranking between place and existing geoname is calculated using this formula:

$$GD = \frac{DISTANCE}{TRESHOLD}$$

Where GD is geographical_distance field saved in database, and TRESHOLD is UNITED_GEONAMES_MAXIMUM_TRESHOLD settings variable.
In this case, also *ngram_distance* field is calculated using *ngram.Ngram.searchitem()* method compared between place being matched and near place.

4. If run_matching method does not receive coordinates, it relies on following keyword arguments: First three arguments represent official spatial names (currently present in GeoNames official country, region and subregion names):
4. country
5. region
6. subregion
7. name
5. If any of these arguments are None type, or none matches to them are not found in UnitedGeoNames table, they are dismissed.
6. Matching query is prepaired using rest of the arguments.
7. If required, additional name matching by Ngram algorithm can be enabled using UNITED_GEONAMES_MATCH_MY_NGRAM setting. But, overlooking current results, with such databases as Aruodai or Stedsnav Norge, all matchable places have exact matches in GeoNames, and this setting just makes much more false matches, and with Pleiades Ngram algorithm is not applicable.

Custom plugins development

Custom plugins are responsible for custom data normalization and handling, synonims mapping and temporal information normalization.
Custom plugins have to be implemented in united_geonames/plugins/*your_database*.py.
Afterwards, they are supplied with this management command:

./manage.py collectunitedgeo <*your_database*>

Then HPN picks *plugin* class from united_geonames/plugins/*your_database*.py modules, creates its instance and executes it's create_matching_log_entries_for_similar_models() method.

This *plugin* class should extend UnitedGeoNamePlugin class and provide this most important following method:

```
class plugin(UnitedGeoNamePlugin):

    class Meta:

        model = your_app.your_model
    def create_matching_log_entries_for_similar_models(self, create_missing_log):
        for place in self.Meta.model.objects.all().iterator():
            matched_log = self.run_matching(place, place.name, place.coordinates, place.region,
place.subregion, create_missing_log, place.country)
```

UnitedGeoNamePlugin run_matching() finds related geonames plugin and is responsible for managing matching log.

3. Getting started

Operating system

Linux with Virtualenv and Django support

Authentication

HTTP Basic or anonymous (during testing period)

To request user name, contact Justinas Jaronis (justinas.jaronis@aksprendimai.lt)

Base URL

http://hpn.aksprendimai.lt/api/hpn

4. API Reference

Get this user registered place names

Request

Method	URL
GET	http://hpn.aksprendimai.lt/api/hpn/

Response

Status	Response
200	**Array of this User place names.** Example response: [{ "id": 43, "name": "Vilnius", "region": "", "subregion": "", "coordinates": "POINT (25.2713012695312464 54.6639583778858338)" },] Response object details are described in the table below.

Key	Datatype	Description
Id	Integer	Identifier of Submitted place name
name	Text	Name of place
region	Text	Region of place (analogue to region in GeoNames)
subregion	Text	Subregion of place (analogue to subregion in GeoNames)
coordinates	Point	WGS84 coordinates of place name

Example usage via web browser: To use registered place listing web service, just open http://hpn.aksprendimai.lt/api/hpn. If we want to get result not in nicely-formatted HTML (thanks to DjangoRestFramework) but in raw JSON, we either need to add "Accept: application/json" header to the request, or provide "format=json" as GET parameter.

Register new User place name

Request

Method	URL
POST	http://hpn.aksprendimai.lt/api/hpn/

Parameters must be passed as JSON payload.

Parameter	Datatype	Description
name	Text	Name of place
region	Text	Region of place (analogue to region in GeoNames)
subregion	Text	Subregion of place (analogue to subregion in GeoNames)
coordinates	Point	WGS84 coordinates of place name

Response

Status	Response
200	**Registered object information with array of matched geonames in database** Example response: { "object_id": 56, "start_date": "2014-08-26T09:42:54.942", "matching_log_id": 10083, "number_of_alternatives": 1,

```
"matching_index": 62.5,
"display_for_users": [
    1
],
"matched_places": [
    {
        "id": 112,
        "matchinglogmatch_id": 10083,
        "geographical_distance": null,
        "ngram_distance": 0.625,
        "percentage": 31.25,
        "remark": null,
        "best_match": true,
            "synonims": [
            {
                "id": 16,
                "united_geoname": 16,
                "name": "Var\u0117na",
                "region": "Alytaus Apskritis",
                "subregion": null,
                "content_type": 339,
                "object_id": 593406,
                "synonim_name": "",
                "synonim_content_type": null,
                "synonim_object_id": null,
                "identifier": "",
                "coordinates": "POINT (24.5666699999999985
54.2166700000000006)"
            },
            {
                "id": 1316964,
                "united_geoname": 16,
                "name": "Var\u0117na",
                "region": null,
```

```
                "subregion": null,
                "content_type": 339,
                "object_id": 593406,
                "coordinates": null
            }
        ]
    }
  ]
}
```


The meanings of JSON structure described in tables below.

Table 3: Description of root JSON object of submitted place name

Property	Datatype	Description
object_id	Integer	Identifier of created UserGeoName object.
start_date	Datetime	Date of matching job start
matching_log_id	Integer	Identifier of matching job
number_of_alternatives	Integer	Number of alternatives found
matching_index	Float	Score of best match (evaluating both spatial and lexical accuracies – it's a sum of these.)
display_for_users	Array of integfers	Users who can see this object.
matched_places	Array	Array of matched GeoNames objects. Properties of this object described in the table below.

Table 4: Description of matching log match object

Key	Datatype	Description
Id	Integer	Matched GeoName ID
matchinglogmatch_id	Integer	(Internal) Id of matching log line
geographical_distance	Float	Geographic accuracy in percentage (100% - place being matched is inside polygon or is exact with this synonym; 0% - place is 1km or more away from this synonym)
ngram_distance	Float	Lexical accuracy in percentage using N-Grams (100% - exact, 0%- not similar)
percentage	Float	Percentage score of this match (geographical_distance + ngram_distance)/2 * 100%
remark	Text	Text remark about this match
best_match	Boolean	Is this match selected as best? (according to Geographical and lexical distance among other matches)
synonyms	Array	Array of already existing synonyms of this place names (described in the table below)

Table 5: Description of synonyms JSON

Key	Datatype	Description
Id	Integer	GeoName Synonym Identifier
name	Text	Main name of place
region	Text	Region of place (analogue to region in GeoNames)
subregion	Text	Subregion of place (analogue to subregion in GeoNames)
coordinates	Point	WGS84 coordinates of place name

content_type	Integer	ID of internal original Place name source content type (e.g. 339 for GeoNames, 157 for Aruodai place names and so on) TBD: provides web service to get all content types)
object_id	Integer	ID of internal original Place name source content type (e.g. 339 for GeoNames, 157 for Aruodai place names and so on) TBD: provides web service to get all content types)

Example usage via web browser: To submit new place, You need to go with a browser http://hpn.aksprendimai.lt/api/hpn/search and post JSON request body to the box below. For example, if we seek for Paris by name, we submit this:

```
{
    "name": "Paris",
    "region": "",
    "subregion": "",
    "coordinates": null
}
```

We will get list of cities with name similar to Paris. If we want to get result not in nicely formatted HTML (thanks to DjangoRestFramework) but in raw JSON, we either need to add "Accept: application/json" header to the request, or provide "format=json" as GET parameter.

Search for existing place names (Without creating matching log)

Request

Method	URL
POST	http://hpn.aksprendimai.lt/api/hpn/search

Parameter	Datatype	Description
start_from	Integer	From which record we should start numbering. Default=0
limit	Integer	How many records to display. Default=100
name	**Text**	**Name of place**
region	Text	Region of place (analog to region in GeoNames)
subregion	Text	Subregion of place (analog to subregion in GeoNames)
coordinates	Point	WGS84 coordinates of place name

Response

Status	Response
200	**Array of this User place names.** Example response: [{ "synonims": [{ "id": 27389, "united_geoname": 9548, "name": "Paris", "content_type": 339,

```
            "object_id": 6942553,
            "synonim_name": "",
            "synonim_content_type": null,
            "synonim_object_id": null,
            "identifier": "",
            "coordinates": "POINT (-80.3833300000000008
43.2000000000000028)"
          }
       ],
       "id": 9548,
       "main_name": "Paris",
       "region": "Ontario",
       "subregion": null,
       "country": "Canada",
       "centroid": "POINT (-80.3833300000000008 43.2000000000000028)"
    },
    …..
]
```


Response object details are described in the table below.

Table 6: Description of search results JSON

Key	Datatype	Description
Id	Integer	GeoName Identifier
main_name	Text	Main name of place
region	Text	Region of place (analogue to region in GeoNames)
subregion	Text	Subregion of place (analogue to subregion in GeoNames)
centroid	Point	WGS84 coordinates of centroid polygon, made of Synonim coordinates.
Synonims	Array	Array of synonyms JSON, described in “Table 5: Description of synonyms JSON”

Example usage via web browser: go to http://hpn.aksprendimai.lt/api/hpn/search, and write this JSON body in request body box:

```
{
   "name": "Paris"
}
```

After clicking button “POST”, You will see search results. To narrow down the results, please provide more arguments (country, region, subregion..)

If we want to get result not in nicely-formatted HTML (thanks to DjangoRestFramework) but in raw JSON, we either need to add "Accept: application/json" header to the request, or provide "format=json" as GET parameter.

HTML Status Codes

All status codes are standard HTTP status codes. The below ones are used in this API.

2XX - Success of some kind

4XX - Error occurred in client’s part

5XX - Error occurred in server’s part

Table 7: HTTP return codes

Status Code	Description
200	OK
400	Bad request
401	Authentication failure
403	Forbidden
404	Resource not found
405	Method Not Allowed
409	Conflict
412	Precondition Failed
413	Request Entity Too Large
500	Internal Server Error
501	Not Implemented
503	Service Unavailable

5. Conclusion and next steps

The Historic Place Names services prototype enables small and local cultural institutions to manage their historical geo-information, to collaborate in HPN knowledge crowdsourcing, to enrich and connect local collections by/with European and global HPN data sets, and to ensure better quality digitised heritage information in general.

The main outlooks (next steps) for development of the HPN infrastructure could be the enrichment of content of HPN Thesauri; the development of GIS data management models from contemporary point based model to polygon based model; the development of HPN "toolbox" (e.g. by historical maps creating tool, historical geo-information analysis tool and etc.); the enabling of interoperability between LoCloud HPN services and another similar tools (e.g. Pleiades Plus); the implementation of HPN services in Europeana (internet access: <http://europeana.eu>) and [maybe] in DARIAH-EU (Digital Research Infrastructure for the Arts and Humanities, Internet Access: <https://dariah.eu>) infrastructures.

References

1. CIDOC-CRM. The CIDOC Conceptual Reference Model (CRM). 2011. The version 5.0.4 of the reference document. Internet access: <http://www.cidoc-crm.org>.
2. Fernie, K., d'Andrea, A., Zakrajsek, F., Ronzino, P., Koutsoudis, A., Chamzas, C., Papatheodorou, C., Carlisle, P., Ertmann-Christiansen, C., Masci, M. E., Mamo, O., Justrell, B., Clemens, S. O., Tzouvaras, V., Gavrilis, D., Angelis, S., Kakali, C., Tsakonas, G., Constantopoulos, P., Dallas, C., Pálsdóttir, S. ,U., Patsatzi, S., Larsen, L. I., Pletinckx, D., Drosopoulos, N., Vaitkevičius, V., Laužikas, R., Grayson, G., Stead, S., 2013. *The CARARE Metadata Schema.* Internet access: <http://www.carare.eu/eng/Resources/CARARE-Documentation/CARARE-metadata-schema>.
3. Laužikas, R., Vaitkevičius, V., Connecting geography, chronology, and biographies – framing new Lithuanian standards. // Standardisation and innovation in information technology (SIIT 2011) : proceedings of the 7th International Conference, 28-30 September 2011, Berlin / edited by Knut Blind, Kai Jakobs. Aachen : Mainz publishers, 2011. ISBN 9781457720208. p. 127-138.
4. Laužikas, R., Digitization of cultural heritage: model of an integral, three-dimensional spatio-temporal thesaurus / Rimvydas Luažikas. // Archeologia e calcolatori. T. 16. Firenze, 2005. ISBN 8878144819. p. 208-227.

Glossary

Term	Description
Historical	Connected with the past and (or) with the study of history.
Historical geo-information	Historical information about places on the Earth's surface.
Historical place names	Place names, which exist in history (not contemporary place names) and are fixed in historical sources.
Micro service	Small, well-defined procedures/functions that perform a certain task.
User place name	Place name, which is or has been submitted by a User.
United Geographical Name	Already existing and confirmed place name in HPN database, having at least one synonym.
United Geographical Name Synonym	Synonym (spatial, lexical or both), that links currently existing United Geographical Name with Original Geographical Name
User	Person, who is using HPN for place name database enrichment.
Original Geographical Name	Record in external place names database (GeoName, Pleiades, Aruodai, Stedsnav Norge, etc.).
Matching Procedure	Algorithm that evaluates lexical and geographical distances between places and creates matching log entries.