Opening Up the Natural History Heritage for Europeana

COMPONENT REPORT

Project Acronym: **OpenUp!**

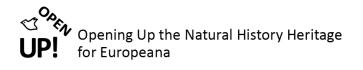**Grant Agreement No:** **270890**

Project Title: **Opening up the Natural History Heritage for Europeana**

C7.1.2 Network Helpdesks Strategy and Coordination

Revision: Final

Authors:

Pere Roca Ristol	**MNHN**
Boris Jacob	**MRAC**
Anne-Sophie Archambeau	**MNHN**
Franck Theeten	**MRAC**
James Davy	**NBGB**
Patricia Mergen	**MRAC**

0 REVISION AND DISTRIBUTION HISTORY AND STATEMENT OF ORIGINALITY

Revision History

Revision	Date	Author	Organisation	Description
Draft 1	2011-12-21	P. Roca Ristol	MNHN	First draft
Draft 2	2012-01-13	P. Roca Ristol, B. Jacob, A. Archambeau, F. Theeten, J. Davy	MNHN, MRAC, MNHN, MRAC, NBGB	Incorporating ideas from lead of WP4, WP5, WP7 & TMG.
Draft 3	2012-03-07	P. Roca Ristol, B. Jacob	MNHN, MRAC	Update with findings of the Workshop content provision (2012-01-13). Finalizing tentative version.
Draft 4	2012-04-26	B. Jacob , P. Roca Ristol, J. Davy, A. Archambeau, J. Jogeva	MRAC, MNHN, NBGB, MNHN, UT-NHM	Update with findings of ODG meeting (2012-03-19) and Annual Review Meeting.
Draft 4	2012-04-26	P. Mergen	MRAC	Proofreading and comments
Final	2012-05-04	W. Berendsohn	BGBM	Proofreading and minor corrections

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This deliverable contains original unpublished work except where clearly indicated otherwise.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.
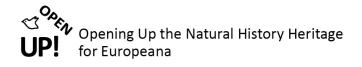
Distribution

Recipient	Date	Version	Accepted YES/NO
WP7 members	2012-01-02	Draft 1	N.A.
Work Package leaders WP4, WP5, WP7 & TMG	2012-01-09	Draft 1	N.A.
Work Package Leader (P. Mergen, WP7)	2012-04-26	Draft 4	Yes
Project Coordinator (W. Berendsohn, BGBM)	2012-05-04	Final	Yes

Table of Contents

1 INTRODUCTION

In this Component 7.1.2 the strategy and coordination of the OpenUp! Helpdesk Facility and the Helpdesk Network will be described. The Helpdesk online facility is accessible at http://openup.helpdesk.africamuseum.be, it is maintained and managed by the RMCA and the NBGB within Work Package 7 of the OpenUp! project. It supports users within and beyond the OpenUp! consortium with access to guidelines, documentation, question and answer forums, and a dispatching system.

In order to facilitate that support a network of key staff has been set up that includes staff from the other OpenUp! Work Packages, as well as Helpdesk infrastructures, institutions, networks, and online communities.

The component is structured in four main parts dealing with the different aspects of the Helpdesks strategy and coordination, namely: Helpdesk target users; Collaboration and Synergies; Helpdesk functionalities and tools & Maintenance, Sustainability, Outlook.

It builds upon the work that has been done so far in the three tracks WP7 works on: The establishment of the Helpdesk online Facility, the identification and enhancement of documentation, and the outreach to attract new content providers.

In July 2011 a group of key staff for the Helpdesk has been initially identified[1]. A test version of the Online Helpdesk has been up and running since the start of the Project in March 2011 and questions have been answered via the forums. This content has been updated and published as the first version of the OpenUp! Guidelines[2] in March 2012.

That same month the last testing on the technical aspects of the Helpdesk had been finished and the Helpdesk went live[3], followed by the finalization of the Dispatching System in April[4].

An initial set of 274 documents about OpenUp! core technology and standards, but also about related issues like IPR, Project Management, Digitisation, etc. have been identified[5] and are in the process of being further analysed.

Finally, in the preparation of the first Review Meeting possible new content providers have been identified and a monitoring tool for the BioCASe installations has been developed in collaboration with the German GBIF node for Paleontological data. This April a list of criteria and benefits to become associated partner has been established[6], directly preparing the outreach activities to new content providers.

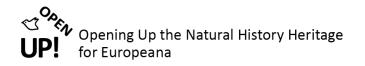[1] See C7.1.1 Key staff for the Helpdesk Network identified

[2] See C7.1.4 Guidelines for users and content providers v.1

[3] See MS08 Online helpdesk infrastructure installed and functional

[4] See C7.1.3 Dispatching system to answer questions timely operational

[5] See C7.2.1 Identification of existing documentation

[6] See C7.3.1. List of criteria and benefits to become OpenUp! associated partners established

The outcomes of all these efforts have also been used to enhance content for and technology of the Helpdesk, making it the most important source and tool to assure that key performance indicators of the Project are met, namely[7]:

- to provide 1,100,000 multimedia objects through the Europeana[8] OAI-PMH harvesting interface,

- to extend participation in content provision beyond the original consortium by 10 new content providers, and

- making the structures sustainable by integrating them into the established institutional framework and the existing networks in the domain, and increasing the number of institutions actively supporting the OpenUp! Helpdesk by six by the end of the project.

2 HELPDESK TARGET USERS

In general the activities of WP7 and the Helpdesk target both partners of the OpenUp! consortium, as well as possible associated partners. All need to be able to find information, documentation and help in relation to the aims and means of the OpenUp! project.

Two user groups mentioned in the Description of Work (DoW) are of primarily interest to the Helpdesk activities in setting up technology and leveraging data and content (the other eight are user groups interested in the published content, not in content provision, and are thus covered by the activities of the Dissemination and Awareness activities of Work Package 8):[9]
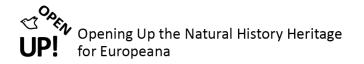
− European natural history collections, incl. botanic gardens:
  o Needs: Means to make multimedia data of their extensive collections available online
  o Involvement & Role: Content provider and - as in the case of the consortium - also in many cases technology provider; targets of dissemination and awareness activities (website, promotional material)
− Scientists (specifically in taxonomy, ecology, biodiversity conservation, and sustainable land management):
  o Needs: Means to make multimedia data of their respective field of research online available; information gain on current and lost biodiversity
  o Involvement & Role: Targets of dissemination and awareness activities (website, promotional material); future content providers

This shows the multidisciplinary nature of the project, as IT personnel, collections managers and scientists work together to leverage the natural history content and making it available to Europeana and GBIF. With regard to the Helpdesk support this means a distinction between technical and non-technical information needs. OpenUp! also brings together two different domains – general public and scientific communities – and with that also the dedicated staff or departments in participating institutions serving these domains, like scientific communication, outreach and dissemination, and on a broader scale educational and decision making.

---

[7] See OpenUp! Description of Work, Annex I : Part B. p. 70

[8] Europeana: http://europeana.org

[9] See: Description of Work, Annex I : Part B, p. 29 : Target user groups.

Based on that we identified five user groups with special information needs, which the OpenUp! Helpdesk will adhere to:

1. Scientists
2. Collections Manager / Technicians
3. PR department / Communication / Education
4. Legal department / legal advisor
5. Direction / policy makers

In order for users to interact with the OpenUp! Helpdesk Facility and get in contact with the network a few easy steps have to be taken:

1. Register to the helpdesk at http://open-up.cybertaxonomy.africamuseum.be/user/register and log in.

2. Issue a question to the network of experts using the dispatching system, post a comment in the forum or e-mail us to openup.helpdesk@africamuseum.be

3. Consult the latest version of the Guidelines for users and content providers and find documentation of related projects and initiatives.

3 COLLABORATION AND SYNERGIES

To be able to support these different user groups the Helpdesk needs strategic partnerships within and beyond the OpenUp! consortium, with individual experts, helpdesk infrastructures, organisations and institutions.

Partners of WP 7 are MRAC (Tervuren), ZFMK (Bonn), RBINS (Brussels), GBIF (Secretariat), UCPH (Copenhagen), UH (Helsinki), NBGB (Meise), MNHN (Paris), and UT-NHM (Tartu).

Together with WP8 we collaborate in the Outreach and Dissemination Group (ODG). In the first year of the project we also identified synergies and started cooperating with the Content provision Work Packages 4 and 5, the Technology Management Group (TMG), the IPR group in WP1. Since publishing of C7.1.1 both the IPR group from the Royal Botanic Gardens, Kew, and the experts for outreach and dissemination from the Národní Muzeum (Prague) have been connected to the expert dispatching system of the Helpdesk.

In turn with WP8, WP7 chairs the monthly ODG teleconferences, where partners get an update on the work done and discuss future tasks and possible collaborations with respect to outreach to users and possible new content providers. The notes of the call are later distributed as ODG News to all project participants to inform them and to find synergies with the communication and outreach staff or departments within their own institutions. In the ODG we also collaborate on the content for the Helpdesk and the Project Website.

At the Workshop on content provision, January 13th 2012 in Berlin, a stronger collaboration between the content providing WP4 and WP5, and the Helpdesk has been initiated[10]. Besides the standard tasks of

---

[10] See: http://open-up.eu/content/content-provider-communication-workflow (login required)

supporting the installation of the BioCASe Provider Software and the mapping of databases to the ABCD(EFG) schema on content provider side a new task is to help monitoring the progress of the installation and the mapping (See Appendix Figure 1 Content Provider – Communication Workflow 1st Phase & Figure 2 Content Provider – Communication Workflow 2nd Phase). In cooperation with the German Paleontology GBIF Node at the Museum für Naturkunde Berlin, we developed a tool to monitor the BioCASe installations of our partners. This BioCASe Monitor Service[11] helps in planning the content provision and the communication between WP4, WP5, WP7, and the content providers.

We also participated in or started collaboration with institutions, networks and projects mentioned in the DoW, but beyond the OpenUp! consortium.

The OpenUp! Helpdesk collaborates with the GBIF nodes[12] and the GBIF Helpdesk[13] in supporting content providers in mobilization and publishing of the information about the occurrence of organisms to GBIF. There is also collaboration in technical aspects, based on the GBIF Helpdesk we decided to use the same Drupal module for the dispatching system[14]. Helpdesk staff is also present on the GBIF Community Site[15].

The BioCASe helpdesk[16] and the OpenUp! Helpdesk are closely working together in supporting partners to set up and configure the BioCASe provider software and map the data to ABCD. The BioCASe[17] provider software is used as a technical solution to simultaneously provide data to GBIF and enriched metadata and multimedia content to Europeana.

Members of the Helpdesk key staff are involved in Biodiversity Information Standards (TDWG)[18] organization, disseminating standards as ABCD and enhancing them on an international level. They are also present in CETAF[19], the Consortium of European Taxonomic Facilities, which promotes research in biology and palaeobiology as well as cooperation among the European natural history institutions. The Europeana Network[20] (formerly Council of Content Providers and Aggregators, CCPA) is another important network Wp7 is involved in. It is an open forum for experts across Europe, for content providers and aggregators and for providers of technical, legal and strategic knowledge.[21]

Besides that Helpdesk staff collaborates with different projects like BHL-Europe[22], Natural Europe[23], SYNTHESYS[24], EDIT[25], and STERNA[26].

---

[11] Accessible at http://edit.africamuseum.be/biocasemonitor/

[12] Global Biodiversity Information Facility nodes: http://www.gbif.org

[13] Global Biodiversity Information Facility Helpdesk: http://www.gbif.org/participation/helpdesk/

[14] See: D10-D7.1.3 Dispatching system to answer questions timely operational

[15] GBIF Community Site: http://community.gbif.org

[16] BioCASe Helpdesk: http://www.biocase.org/help_desk/index.shtml

[17] BioCASe: http://www.biocase.org/

[18] Biodiversity Information Standards (TDWG): http://www.tdwg.org/

[19] Consortium of European Taxonomic Facilities: http://www.cetaf.org

[20] Europeana Network: http://pro.europeana.eu/web/guest/about/network

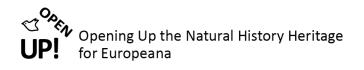[21] See: C7.3.1. List of criteria and benefits to become OpenUp! associated partners established

[22] Biodiversity Heritage Library for Europe: http://www.bhl-europe.eu/

[23] Natural Europe: http://www.natural-europe.eu/

[24] Synthesis of Systematic Resources: http://www.synthesys.info/

[25] European Distributed Institute of Taxonomy: http://www.e-taxonomy.eu/

4 HELPDESK FUNCTIONALITIES AND TOOLS

The Helpdesk Facility of the OpenUp! project aims to provide all the necessary information and support to OpenUp! content providers and possible new partners. Several tools and functionalities of the Helpdesk facility at http://openup.helpdesk.africamuseum.be/ support this aim.

Users can find the most important and most current information related to OpenUp! directly on the main webpage via the first level hyperlinks: find initial information at the **FAQ,** consult the **Guidelines** or other **documentation**, issue a ticket to the **dispatching system**, or post an issue to the **Forums.**

Beside these main tools, the Helpdesk provides much more functionalities to ease the interaction between user and Helpdesk Facility, as well as between users, like: subscriptions, web forms, and single sign-on.

4.1 FAQ

The FAQ section is meant to give some initial information about the project's aims, means and partnerships for people who are not part of the project yet. The section has been done in collaboration between WP7 and WP8 and is based on the work done for the OpenUp! Newsletter #1[27]. The FAQ section will be further enhanced and used for the outreach campaign to attract additional associated partners.

4.2 Guidelines and Documentation system

The last version of the OpenUp! guidelines is accessible via a first level link on the Helpdesks homepage. Version 1 of the Guidelines is already published, and will be updated as the project evolves.
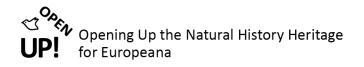
Besides that more than 274 documents have been identified as either interesting for the current work of the content providers in OpenUp! or interesting for the natural history and biodiversity informatics domain. The full list of documents is stored in a Google spreadsheet that is integrated into the Helpdesk[28] or directly in Google docs[29]. This amount of documents is not easily to browse through and one of the on-going tasks of WP7 is to analyse these documents, validate their importance for the work in OpenUp! and, if necessary, enrich and update the OpenUp! documentation. Documents that have been found useful for the direct aims of the project are sorted under subjects like *BioCASe*, *GBIF* and *Europeana* and listed under the first level link *Documentation*.

---

[26] Semantic Web-based Thematic European Reference Network Application: http://www.sterna-net.eu/

[27] See: Frank, J. & Jacob, B.: Questions and Answers. In: OpenUp! Newsletter #1 p.6 and the corresponding forum posts on the OpenUp! Helpdesk.

[28] URL: http://open-up.cybertaxonomy.africamuseum.be/full_page/existing_documentation_identified

[29] URL: https://docs.google.com/spreadsheet/ccc?key=0AoIrOUcsTAbidGVma0tTLWZBVEZqZWRIUU1NTDllTlE#gid=0

4.3 Dispatching system

The Dispatching system has been set up to timely answer questions of providers and users. Users of the Helpdesk can issue a ticket at the homepage link "Get support here"[30] which gets dispatched by moderators of the Helpdesk to experts, who can answer the questions. Question and answer will be reused in the Q and A forum, as well as in the OpenUp! guidelines and other documentation.

The full functionality of the OpenUp! Helpdesk Dispatching system is described in D10-D7.1.3 (Dispatching system to answer questions timely operational).[31]

4.4 Forums

In contrast to the dispatching system, where questions can be issued to experts directly, the Forums provide an easy way to discuss with or post a question to all Helpdesk users and experts. Currently the Forum is split into the following categories:

1. General Forum
2. Projects (OpenUp!, Europeana, BioCASE, GBIF)
3. Technical Questions (File formats, Database Systems, BioCASE provide software...)
4. Copyright and IPR questions

At the beginning of the OpenUp Helpdesk development, the Question and Answers and the Forum was populated with some generic questions (*'What's OpenUp?'*...) and some others more technical (*'BioCASe provider software'*...) that OpenUp! Helpdesk staff assumed could be of interest for OpenUp! content providers.

The editorial workflow of posting to and answering questions in the Forums is now integrated with the dispatching system, meaning, that if questions have been answered via the dispatching system, these information can also be made available in the forums and later in an update of the OpenUp! guidelines.

All Forums are available for reading for everyone, but only registered users can create new posts. So, to start editing the Forum you must register and log in into the system. The Forums are also connected to the subscription system, allowing for users to get notified, if a post they created got commented on.
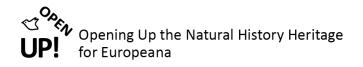
4.5 Subscriptions

The Subscriptions interface is one of the most useful tools on the site. It allows registered users to be notified via e-mail when content they might be interested in is posted or updated on the site. It runs on key words. The user can subscribe to key words, content types (Pages, Files, Forums, etc.), or authors (other users).

The subscriptions box is always shown on the lower left column of the website when viewing an item that can be subscribed to. It is also possible to create a new subscription from the My Account, Notifications page.

---

[30] URL: http://open-up.cybertaxonomy.africamuseum.be/node/add/support-ticket

[31] Available at: http://open-up.eu/sites/open-up.eu/files/u2/D10_D713_Dispatching_system_operational_MNHN.pdf

4.6 Webforms

The webforms are a tool to create surveys used to collect information on a target user group. A set of questions can be posed in a variety of formats which include, but are not limited to, true/false, multiple choice, grid based, free text, or formatted text (e-mails, phone numbers, etc.). And fields or questions can be made mandatory.

The results can be visualised within the site in a table, or they can be exported as a CSV (comma separated values) or a Microsoft Excel file. The webforms also support e-mail notifications for the end users, specified e-mails, or the webform creator.

Web forms on the OpenUp! Helpdesk have been used to organize the first BioCASe training in Berlin in 2011 and the Annual Review meeting 2012 in Paris.

4.7 Other Features

There are several other features that are apparent across the site which deserve mention:

Login: the login system uses OpenID along with the Drupal registration form. After creating an account, a user can add their OpenID's from many main stream sources. Including but not limited to: Google, Yahoo, AOL, Facebook, Wordpress, Blogger, Verisign, and Myopenid. With the integration of OpenID in the WP8 hosted Scratchpads based OpenUp! Project website at www.open-up.eu this will allow for a seamless interaction between the two sides and ease the workflow for the users.

Text formatting - All text input areas (Forums, Pages, Descriptions) can be fully formatted for better visual representation.

QR Codes - Each item on the webpage (Files, Pages, Forum Topics, etc.) has a QR code that can be found in the lower left of the site. This links to that page on the site and can be used for referencing purposes.
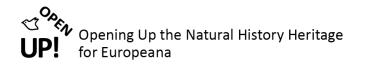
Print, PDF, E-mail - Each item on the webpage (Files, Pages, Forum Topics, etc.) also contains links in the upper right of the site, which offer the function to print the page, to save it as a PDF or to send it via e-mail.

User Messaging - Users can open private group conversations using a messaging system that includes e-mail integration.

Content Tracking - Pages keep a log of who visits them, users also get a log of the pages they have visited.

5 MAINTENANCE & SUSTAINABILITY

The OpenUp! Helpdesk infrastructure is based on Drupal version 6, a well-known free and Open Source Content Management System (CMS), which has one of the largest online communities of developers and contributors. The Helpdesk is hosted and managed at the Musée Royal de l'Afrique Centrale (MRAC) and the National Botanic Garden of Belgium (NBGB), who are responsible of the maintenance and updates. We adapted the system to our needs by using a multi-domain installation, which consists of one overarching structure which we call *Cybertaxonomy Portal* with several sub-domains, for different

projects like Synthesys, CABIN, EU-CoM, EDIT, the OpenUp! Helpdesk being one of them[32]. This makes continued support much easier as the sites are hosted on the same server and any improvements, maintenance, or upgrades are applied to all sites as needed.

Over 100 different modules are used in the OpenUp! Helpdesk, which are maintained by the Drupal user community. When a new update is released it is first tested on our test server before being added to the live server. Each of these modules is usually broken into several functions, some of which require external PHP libraries.

On average there are approximately 5 updates to apply a month, some more advanced than others, sometimes requiring additional modules to be installed. Drupal releases a minor version update on average, once every 6 months. The site must be taken offline for a few hours (usually on the weekend) to apply the update. Any other updates can be applied to the live site and also normally occur on weekends.

6 OUTLOOK

Until now there has been no need to program new functions within the site as modules are found to suit all purposes so far. This has saved a lot of time to the implementation of the Helpdesk and helped focusing more on the design and user needs definition. However, occasionally a new module is found to be incompatible with other modules on the site. This requires bug fixing. In the event a problem can be fixed, the maintainers of the module are informed, and the code is added to the release version of the module in question. If an issue cannot be resolved, or becomes too complicated to resolve, an alternative module must be found. This is an on-going process and it also involves testing and implementing of new modules that make the current functionality more easy to use.
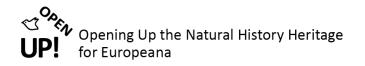
One aspect in that regard that is currently being evaluated is adapting the theme of the Helpdesk to make it more user friendly. The current theme Garland has been originally implemented because it is also used on the OpenUp! project website at www.open-up.org. It does not allow for expanding menus, or too many menu items, thus restricts the possibilities. With the update of the Scratchpads, which is the basis of the project website, also the theme will change. As the Project Website is based on Drupal 7, it is unlikely that the Helpdesk can use the same theme. But as there will be a new version on the Drupal 7 based Scratchpads, the Drupal 6 infrastructure will need to adapt the theme according to the corporate design, allowing it to be more user-friendly and more adaptable for the different user groups (See Helpdesk Target users). The integration of the OpenID login system into the Project Website will allow for a seamless interaction of users, who have are registered at both sites.

On the content side further work is planned on making updated existing and the newly produced documentation available on the Helpdesk in different languages[33]. The Outreach campaign to attract additional associated partners[34] is prepared and three major steps on this way are an information

---

[32] See: Cael, G.; Davy, J.; Jacob, B.; Mergen, P.: The Royal Museum for Central Africa Cybertaxonomy portal and its subdomains: an interconnected helpdesk system and information management tool. Abstract for the 2011 Biodiversity Information Standards (TDWG) conference. https://mbgserv18.mobot.org/ocs/index.php/tdwg/2011/paper/view/155

[33] Upcoming documents in year 2 and 3: D21 C7.2.4 Availability of newly produced documentation on the helpdesk website & C7.2.5 Availability of complete documentation of OpenUp services in diff. languages on the helpdesk website

[34] Upcoming milestone in year 3: MS12 Outreach campaign to attract additional associated partners started

package for new content providers[35], a standardized procedure for associated partners[36] and the second OpenUp! tutorial and training session for providers and associated partners[37].

The next short term goal is to support the content providing work packages in achieving the Milestones to have Local botanical and zoological provider software and metadata mapping functional for all content data sources[38].

7 LIST OF REFERENCES

C7.1.1 Key staff for the Helpdesk Network identified (2011): Jacob, B.: http://open-up.eu/sites/open-up.eu/files/u2/C711_Key_staff_helpdesk_Final%20Version_Updated.pdf

C7.1.4 Guidelines for users and content providers v.1 (2012): Theeten, F.; Roca Ristol, P.; Jacob, B.; Jõgeva, J.: http://open-up.cybertaxonomy.africamuseum.be/file/722/download/739

C7.2.1 Identification of existing documentation (2012): Jõgeva, J.; Jacob, B.; Archambeau, A. ; Roca Ristol, P.; Theeten, F.; Koivula, H.; Mergen, P.: http://open-up.cybertaxonomy.africamuseum.be/file/819/download/840

C7.3.1. List of criteria and benefits to become OpenUp! associated partners established (2012): Koivula, H.; Jacob, B.; Archambeau, A.; Mergen, P.: http://open-up.cybertaxonomy.africamuseum.be/file/823/download/844

D10-D7.1.3 Dispatching system to answer questions timely operational (2012): James Davy, J.; Jacob, B.; Roca Ristol, P.; Archambeau, A.; Jogeva, J; Smirnova, L. & Mergen, P.: http://open-up.eu/sites/open-up.eu/files/u2/D10_D713_Dispatching_system_operational_MNHN.pdf

MS08 - Online helpdesk infrastructure installed and functional (2012): Jacob, B. & Davy, J.: http://open-up.eu/sites/open-up.eu/files/u2/MS08_Online_helpdesk_infrastructure_installed_and_functional_MRAC_bj.pdf

OpenUp! Description of Work, Annex I : Part B

Questions and Answers (2011). In: OpenUp! Newsletter #1 p.6 and the corresponding forum posts on the OpenUp! Helpdesk. Frank, J. & Jacob, B.: http://open-up.eu/sites/open-up.eu/files/1stNewsletter%20Low-Ress%20interactive_0_0.pdf
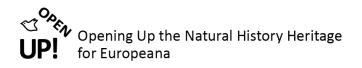
The Royal Museum for Central Africa Cybertaxonomy portal and its subdomains: an interconnected helpdesk system and information management tool. Abstract for the 2011 Biodiversity Information Standards (TDWG) conference. Cael, G.; Davy, J.; Jacob, B. & Mergen, P. (2011): https://mbgserv18.mobot.org/ocs/index.php/tdwg/2011/paper/view/155

---

[35] Upcoming document in year 2: C8.4.5 New providers information package

[36] Upcoming document in year 3: D19 C7.3.4 Standard procedure for associated partners operational

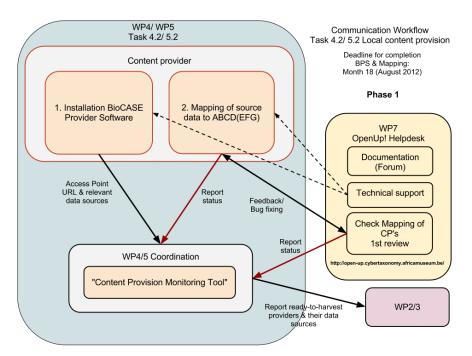[37] Upcoming document in year 3: C7.3.5 Second OpenUp! tutorial and training session for providers from associated partners

[38] Upcoming milestones in year 2: D12 / MS09 / C4.2.0 Local zoological provider software and metadata mapping functional for all content data sources & D13 / MS10 / C5.2.0 Local botanical provider software and metadata mapping functional for all content data sources

8 APPENDIX

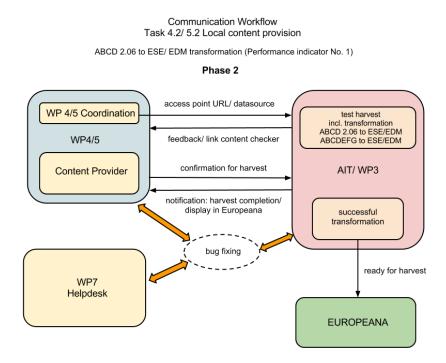*Figure 1 Content Provider – Communication Workflow 1st Phase (by Jana Hoffmann, MFN)*

Figure 2 Content Provider – Communication Workflow 2nd Phase (by Matus Kempa, IBSAS)