ODM Multi-regional Open Data hub and visualisation portal

Table of Contents

1 Milestone 1 – Viability Research

1.1 Project specification

1.1.1 Versioning of this document

Author	Modification Date	Version details
Alex Corbi	04.08.2014	V1 – First draft
Alex Corbi	06.08.2014	V2 – Included details about integration with existing GeoServer.
Alex Corbi	12.08.2014	V3 – Changes after skype meeting, final calculation: - Removed "Implementing support for KMZ/SHP files" (2Days) from calculation in 1.2.10, GeoJSON and WMS/WFS are preferred. - Added "Tweaking Leaflet.js to match UI requirements" (0.5 Days) to calculation in 1.2.10 - Added "Installation and configuration of WPML translation plugin." (2Days) to calculation in 1.3.3 - Added "Implementing scripts for News archiving as XML Feeds" to calculation in 1.3.5 - Completed calculation for Milestone 5 - Replaced ODC with ODM in some parts of the document, including title and references to other documents.
Alex Corbi	14.06.2014	V4 – Added Fee calculation considering 1 Day = 334,50 USD

1.1.2 Glossary of terms

ODP: Open Data Platform

CMS: Content Management System

ODC: Open Development Cambodia

ODM: Open Development Mekong

1.1.3 Project's requirements

The requirements of the project have been drafted in the document **ODM Multi-regional Open Data hub and visualisation Portal**.

1.1.4 Use cases

Different Use Cases and application scenarios have been drafted and can be found in the document **ODM Actors_Users Matrix & Use Cases**.

1.1.5 Collaborative workflow

Since the creation of the platform is aimed to encourage and facilitate the collaboration between different organisations across the region, an open approach has to be adopted and a series of mechanisms and tools have to be implemented in order to achieve collaboration in the following levels:

Collaborative data aggregation

Datasets and other information resources will be uploaded to the central Data Hub module by different parties.

Collaborative improvement or modification of the platform

Since the technologies chosen as base for the development are Open Source, further modifications or improvements can be approached in a crowd-sourced manner. In order to make this possible, both the code of the Data Hub module and of the multilingual front-end as well as other tools or scripts developed within the project should be made available through a code repository. A good choice for this would be to use the widely-used platform **Github** (https://github.com/). On it, a public available repository should be setup. As part of of this task, an Organisation should be firstly created including one or several code repositories relating the project. Depending on the need of private repositories, the services offered by Github could be free (no private repositories) or chargeable. See Github pricing https://github.com/organizations/new

Documentation and collaborative knowledge base

In order to make this collaboration as effective as possible, best practices should be defined along with instructions for the development of extensions, modifications and new features. In order to set a solid foundation for a sustainable extension of the knowledge base, it would be also a good idea to setup a **wiki** where both documentation for users and developers is hosted and collaboratively extended.

Also, using the documentation features of Github for this purpose would be possible.

The documentation should include:

User guide for **data publishers**, including best practices on how to upload datasets to the Data Hub.
User guide for **Wordpress editors**.
Administrator guide for maintaining the **Wordpress multisite** installation.
Developer's guide, for collaborative improvement of both the front-end and the Data Hub components.

1.1.6 Architecture definition

The architecture of the platform consists mainly in a **Data Hub module** and a **multi-site front-end**. Both components will be integrated side-by-side in the architecture. Users will be able to access both directly or through internal links, navigation should be intuitive for the user while browsing through both components.
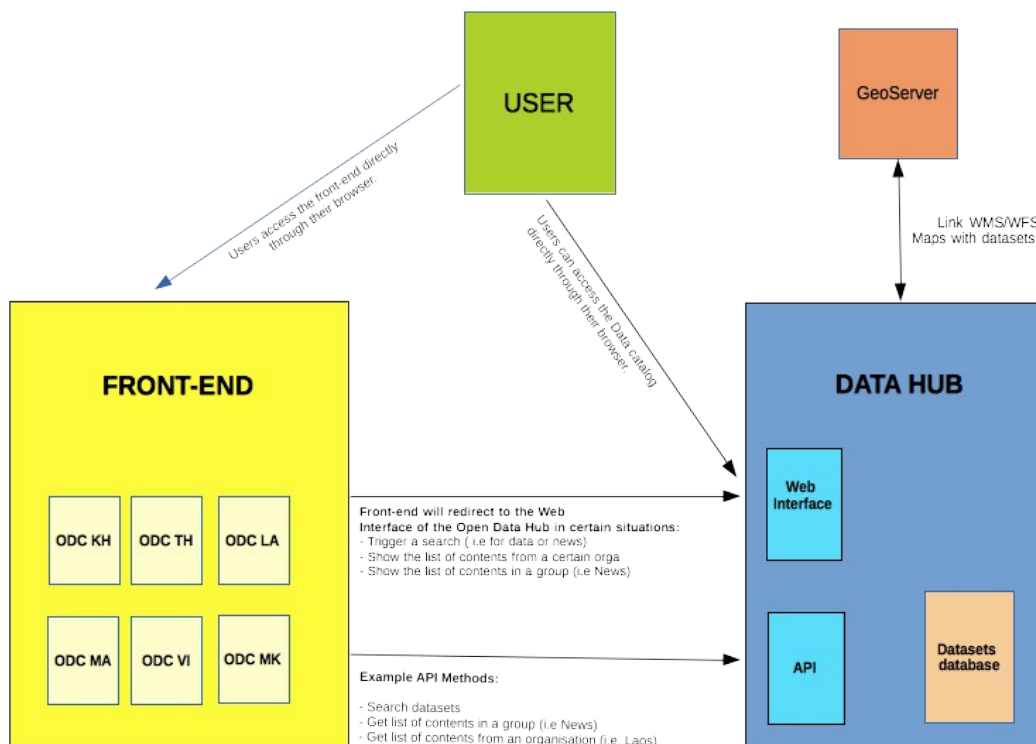

Diagram 1: Architecture of the platform.

1.2 Data Hub module

The Data Hub represents the principal component of the platform. It should make possible that collaborating organisations from the participating countries upload data, information and other resources in a structured manner. It should not only store the datasets and contents but also expose them for download to other users, through a web interface and through an API.

For this module, existing frameworks have been considered to be adopted and building the whole

technology solution from scratch discarded. Since using Open Source technologies is a major factor for the selection of the framework to adopt, this research has focused on **CKAN** (http://ckan.org). The Open Data platform developed and maintained by the OKFN and a relatively big community of developers worldwide.

CKAN has proven to be a valid platform for using as a base for fulfilling the requirements of the project. In the upcoming paragraphs, key issues will be analysed in detail together with the possible solutions that can be implemented based on the chosen ODP.

1.2.1 Hosting and installation of CKAN instance

ODC has a dedicated cloud server provided by DemandStorm, with a hard disk of 300 Gb, data transfer per month of 250 Gb, two-core CPU, and 4 Gb of RAM. The server runs the CentOS (version 6.5) distribution of Linux, with MySQL (version 5.6) for database handling and Python (version 2.6.6) also installed, along with Apache Tomcat (version 7.0.42) for handling Java Servlet and JavaServer Pages. Java (version 1.6.0_43) is installed as well for running certain applications.

CKAN requires a set of packages and modules that need to be provided by the chosen hosting solution. These are relatively specific to enterprise solutions and might only be offered by specialised providers.

Package	Description
Python	The Python programming language, v2.6 or 2.7
PostgreSQL	The PostgreSQL database system, v8.4 or newer
libpq	The C programmer's interface to PostgreSQL
pip	A tool for installing and managing Python packages
virtualenv	The virtual Python environment builder
Git	A distributed version control system
Apache Solr	A search platform
Jetty	An HTTP server (used for Solr).
OpenJDK 6 JDK	The Java Development Kit

Diagram 2: Packages needed for a CKAN installation.

See CKAN's required packages: http://docs.ckan.org/en/latest/maintaining/installing/install-from-source.html#install-the-required-packages

1.2.2 Storing different content types

The contents which will be stored in this module are basically all the types of contents available through the former ODC website: Datasets, Reports, News and Library publications. This involves storing information in several different formats and categorising each type of content accordingly.

Issue: Can the chosen ODP store not only Datasets but also Documents and News and Library publications? Does the chosen ODP allow all types of document to be uploaded?

Yes. Quoting http://blog.okfn.org/2012/06/19/ckan-science/: *"CKAN is agnostic about what kind of data can be published. A scientific paper might be catalogued as one dataset. The resources could be, for example: different versions of the printed paper (say, the author's TeX file, and a PDF); a link to the paper's page on a journal website; spreadsheets of experimental results; the source code you wrote to process the results; and others, such as separate image files of your graphs and diagrams."*

In the following example a dataset containing multitude of different formats can be observed: http://datahub.io/dataset/spain-national-budget-2008-2011

For each of the contents, there is the possibility to define and fill out Additional Information fields in order to categorize that information. Below there is an example of a Library publication present in the current ODC Library section. It contains a title and a description (i.e. Summary Notes) but also other data such as publisher, Authors, Bar code, etc...).

Diagram 3: Example of Library publications.

The **Additional fields** functionality provided by CKAN can be used in order to store this data in a structured manner. It allows a user adding a new dataset to the Data Hub to specify extra key-value fields which will be stored together with other information such as title, description or tags.

The counterpart of this generic approach where different type of contents share the same structure, is the lack of differentiation between them. Contents such as Library publications or news will be originally observed as the same kind of content and this could confuse the user.

Issue: How to differentiate visually between News, Reports & Library material?

Some kind of visual differentiation could be implemented in order for the user to fully understand the nature of the content. Also, contents with same type (Datasets, News, Reports, Publications,

etc...) should be group together. CKAN offers the possibility to create groups and assign datasets to them.
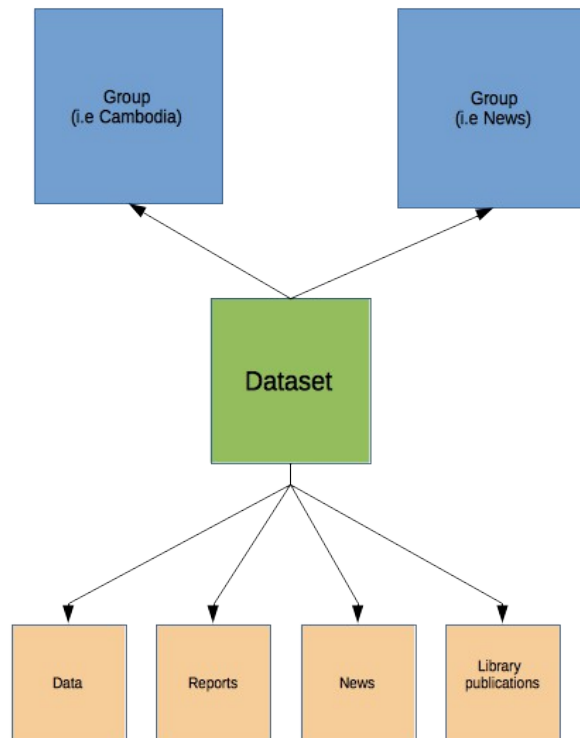
Diagram 3: Groups and datasets.

Datasets can be assigned to one or more groups, this would be a way of categorising information regarding the country they relate to (Cambodia, Laos, Vietnam...) or the nature of the content (Data, Reports, News, Library.....) Users can follow Groups in order to get notified when new datasets get added to them.

On the same line groups can be created to categorise the datasets in **topics** (I.e Environment, Demography, etc...), as it is the case in most of the existing Open Data Platforms.

1.2.3 Entities and Roles

CKAN also offers the possibility to define **Organisations** and assign **Users** to them. A user adding a new dataset in the platform can select which Organisation (between those he belong to) the dataset will be assigned to. Users can follow Organisations in order to get notified when new datasets get added to them.

CKAN's user management system gives also the possibility to specify different roles for users. A user can be either an **Admin**, an **Editor** or a **Member** within an Organisation. Each of the roles have different permissions and provide a certain level of hierarchy.

Diagram 4: Organisations and roles.

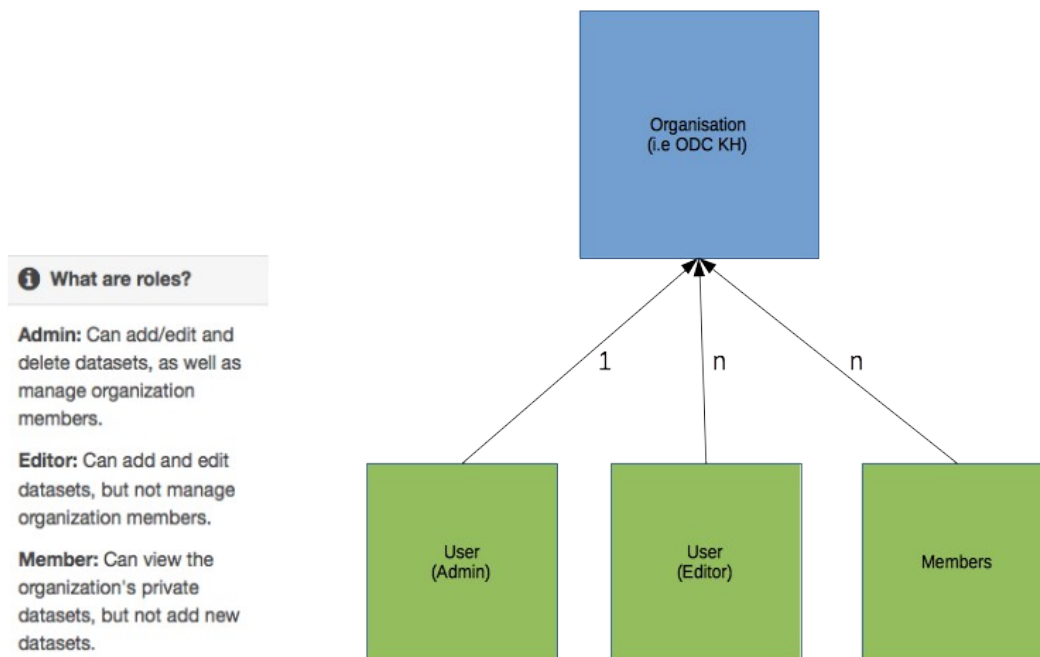Organisations could have **1+ Admins** and **1+ Editors**. Editors would be responsible for creating new datasets (which would be private by default) while the admins take care of reviewing and making them public in case the data is valid. Initially, pool of Admins and Editors will be created, then users should be able to register themselves.

It should be analysed if it is possible to define new Roles (i.e Users that can only upload datasets, not edit them) to cover new scenarios.

1.2.4 Geo-Referencing every dataset

If possible, every dataset or content stored in the Data Hub module should be geo-referenced. By doing this, information relating to a certain country or region would be easier to find. This can be archived in different ways:

One would be to **assign a group** to each content, as previously explained. The idea would be that a group gets created for each country or region and stores all the datasets related to that geography.

Second, using the functionalities of CKAN's **geo spatial extension**, see http://ckan.org/2013/10/12/geospatial-update-mapbox-pycsw-and-ckan-at-foss4g/, additional fields with geo spatial information can be added to each dataset.

1.2.5 Searching the contents

Once the amount of information on the Data Hub module increases considerably, finding specific information among a big catalog might become difficult.

When querying CKAN's search box, the title and description of the resources but also the

Additional Files will be inspected.

Issue: Does the chosen ODP support full-text search? Can search queries look into the content of the uploaded documents (PDFs, DOCs, ODTs, Plain-text)?

No, there is no Full-text search supported out-of-the-box.

Another possibility would be to use Google Search or DuckDuckGo for this. In this case, the structure of the site needs to be correctly exposed for search engines (site maps, etc..) but full-text search won't be supported through this.

1.2.6 Multilingual support

One of the main requirements consist on supporting several languages on the user interface across the different components of the platform. The Data Hub component's user interface should then be available in the different languages (English, Khmer, Vietnamese, Thai, Burmese,..). The user has the possibility to select the desired language anytime.

Issue: Does the chosen ODP support multiple languages on its UI? Can it be extended if a certain Language is not supported? Is it possible to define Metadata in different languages?

Quoting from CKAN's developers documentation: *"A CKAN administrator can also enter translations into CKAN's database for terms that may appear in the contents of datasets, groups or tags created by users. When a user is viewing the CKAN site, if the translation terms database contains a translation in the user's language for the name or description of a dataset or resource, the name of a tag or group, etc. then the translated term will be shown to the user in place of the original"*. This could be used for translating recurrent words such as those present on the taxonomy. See CKAN's multilingual extension: http://docs.ckan.org/en/latest/maintaining/multilingual.html. NOTE: The tested multilingual extension presented a Bug which should be fixed, see "Multilingual extension breaks homepage" in the "ODM Troubleshooting" document.

Also, CKAN provides with a method to translate the elements of the user interface, see http://docs.ckan.org/en/latest/contributing/i18n.html. CKAN offers support for many languages, but as the tests prove, for languages such as Khmer only a little amount of those elements are translated out-of-the box. The translation of the remaining UI elements is a necessary step towards multilingual support and involves a certain effort for the translation, see Milestone 2 – Implementation of centralised Data Hub.

Diagram 5: Partial translation for the Khmer language.

CKAN offers already support in its UI for 4 of the 6 Languages ODM is willing to provide to the users to some extent (English 100%, Khmer 10%, Vietnamese 10%, Burmese 10%) and no support for Lao and Thai which has to be implemented.

```
79   #: ckan/controllers/admin.py:48
80   msgid "Intro Text"
81   msgstr "អត្ថបទ ផ្ដើមសេចក្ដីណែនាំនៅនឆាង់"
82
83   #: ckan/controllers/admin.py:48
84   msgid "Text on home page"
85   msgstr "អត្ថបទសម្រើសរបាបទៀតឱ្យ"
86
87   #: ckan/controllers/admin.py:49
88   msgid "Custom CSS"
89   msgstr "Custom CSS"
90
91   #: ckan/controllers/admin.py:49
92   msgid "Customisable css inserted into the page header"
93   msgstr ""
94
```

Diagram 6: Translating String in CKAN.

Issue: URLs for datasets or tags cannot contain special characters (Khmer, Vietnamese, Thai) only latin alphabet.

This means that while creating new datasets, both the dataset URL and the Tags should be specified in English. Thanks to the multilingual extensions offered by CKAN, tags specified in English, will be shown in Khmer/Thai/Vietnamese charset for the users which selected that language, if the translation for that word is present in the database. SUGESTION: Provide translation for the whole taxonomy in all languages and define as part of the workflow that only those tags should be used while creating new datasets.

1.2.7 Email notification

CKAN offers the possibility for user to follow organisations, groups or datasets and receive email notifications when information gets updated. This is an important feature to consider and involves configuring CKAN with email server information. See Email notifications: http://docs.ckan.org/en/latest/maintaining/email-notifications.html#email-notifications

1.2.8 Reproducing ODC's taxonomy

CKAN offers the possibility to define a certain structure for Tags which could help reproducing ODC's existing taxonomy in order to categorise the contents and archive them more efficiently. It is the so called **Tag Vocabularies** (http://docs.ckan.org/en/latest/maintaining/tag-vocabularies.html) and implementing them involve extending CKAN's basic code. Alternatively, the Additional Fields could be used to include this information in each dataset.

1.2.9 Review System

A review/moderation mechanism should be implemented so administrators of the Data Hub make sure that no spam or inadequate contents are being published on the site,

<u>Issue: Does the chosen ODP provides a mechanism for an admin user to review/moderate data/content uploads? If not, is there any workaround?</u>

Quoting from CKAN's User Guide http://docs.ckan.org/en/latest/user-guide.html#users-organizations-and-authorization: *"A user in an organization can create a dataset owned by that organization. In the default setup, this dataset is initially private, and visible only to other users in the same organization. When it is ready for publication, it can be published at the press of a button. This may require a higher authorization level within the organization."*

The proposed methodology is that newly created Datasets/Contents will be set as private per default. The user with the admin role within each organisation would then make sure that the datasets are reviewed. In case the data and metadata is valid, the admin will make the dataset public. In the other case, the creator of the dataset will be contacted by the admin of the responsible organisation and asked to correct the information. This workflow should be correctly specified in the documentation.

1.2.10 Visualising datasets and other resources

As described previously, datasets available in the platform can contain any kind of document formats. Text documents and other contents but mainly numeric or geo-spatial data should be visualised within the platform.

<u>Issue: Does the chosen ODP offer any kind of visualisation for the uploaded datasets? Also for documents? Which ones?</u>

CKAN offers several options when it comes to present the data on the dataset's page. See CKAN's Data Viewer http://docs.ckan.org/en/latest/maintaining/data-viewer.html. On the same line, CKAN provides with the possibility of writing custom preview extensions, See milestone 4 – Development/Improvement of data visualisations.

A first analysis of the visualisation possibilities offered by CKAN obtained following results:

Image files (PNG, JPG, GIF) Are represented correctly within the dataset's page.

Plain text (TXT, HTML, XML, RDF) Are represented correctly within the dataset's page.

PDFFiles (PDF) Are represented correctly within the dataset's page. NOTE: There seems to be a problem when the PDFs are uploaded, this problem should be fixed. Please refer to the "Uploaded PDF Files are not visualised correctly" in the "ODM Troubleshooting" document.

Structured data (CSV, XLS) Are represented correctly within the dataset's page using the Recline Data Explorer, See http://docs.ckan.org/en/latest/maintaining/data-viewer.html#viewing-structured-data-the-data-explorer.

Also, relating to spatial data. There is an extension that needs to be installed and configured in order to display geo-spatial data within the dataset's page: See http://ckan.org/2013/10/12/geospatial-update-mapbox-pycsw-and-ckan-at-foss4g/

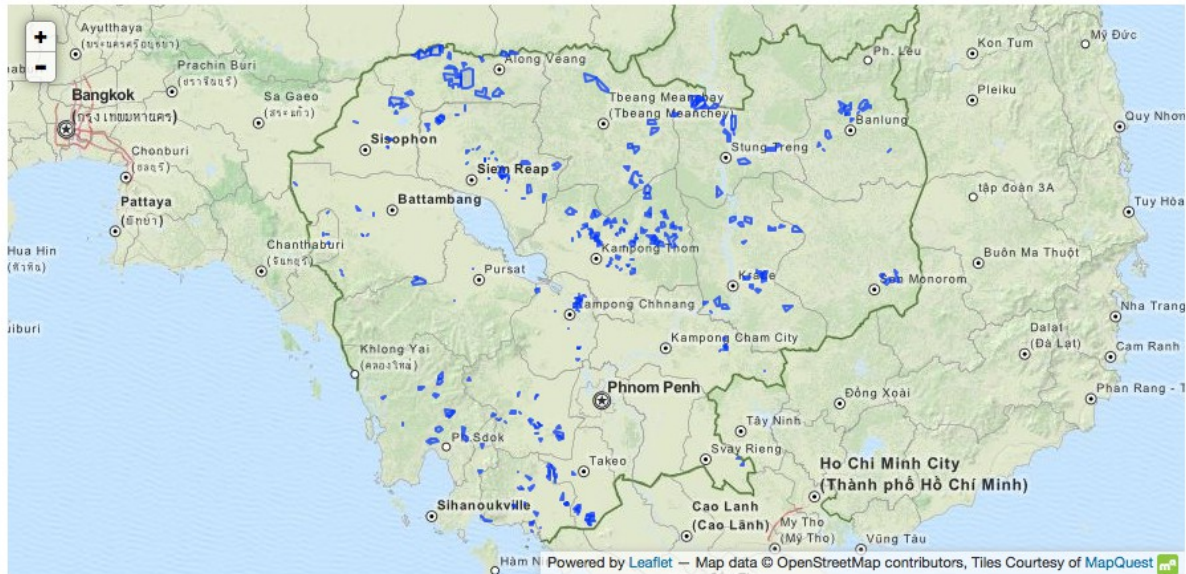**GeoJson** files are represented correctly.

Diagram 7: GeoJson file visualised on a Map (Leaflet mapping library).

Other (WMS, WFS, WCS) Considering that ODC is already maintaining a GeoServer instance which can serve maps, it is possible to link and visualise the different maps directly on the dataset's page. That means, that the Geo Server instance will be kept as part of the architecture. Map information will be still stored on the GeoServer in order to be served through WMS/WFS/WCS thus linked to datasets created in the Data Hub module.

Searchability of the GeoServer contents are currently an issue. The new development should tackle that by giving the data publisher the possibility to provide detailed metadata information related to the map, link it from GeoServer and publish it on the platform.

The map visualisation for WMS/WFS maps provided by CKAN Out-of-the-box might need some visual customisation so it fits the whole look-and-feel of the site. See Milestone 4 – Improvement of data visualisations.
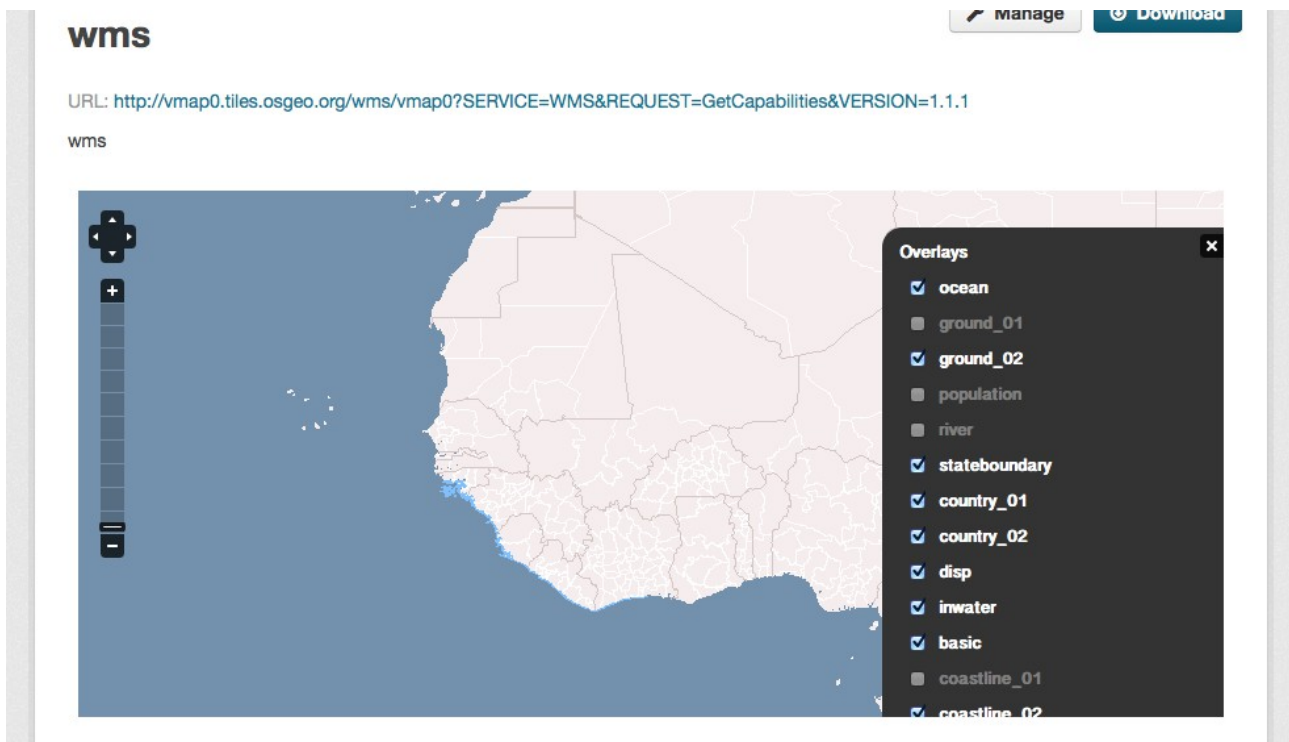
Diagram 8: WMS file visualised on a Map.

Other (KMZ, SHP) The current ODC website hosts already a great amount of maps in shapefile and KMZ format. Although there is not direct support on CKAN for this kind of files, there are possible solutions in order to visualise this formats:

An alternative would be to convert all the shapefiles to GeoJson format (See From Shapefile to JSON http://vallandingham.me/shapefile_to_geojson.html). GeoJson is much convenient since its visualisation on CKAN relies on **Leaflet.js**, an efficient and easy-to-customise javascript library for maps.

Also, It would be possible to extend the capabilities of the mapping library included in CKAN's **Geo Spatial extension** (http://docs.ckan.org/projects/ckanext-spatial/en/latest/) in order to visualise this kind of files.

Another alternative in order to visualise not supported formats would be to create html files with those visualisations and upload them as HTML files, the result would be transparent for the user but would involve converting all existing resources to standalone HTML files.

1.2.11 Restful API

In order to encourage third-parties to access, use and build applications on top of the data available in the Data Hub module, an **API** should be present in the architecture of the platform.

Issue: Does the chosen ODP provide with a Restful API? Can queries done through the API get the same results as those made through the UI?

CKAN offers a powerful API out-of-the box and gives the possibility for user to perform a great variety of operations, see CKAN API: http://docs.ckan.org/en/latest/api/index.html.

Examples of possible queries to the API would be:
- Query the available datasets using a text-search

- Obtain the list of datasets assigned to a certain group (News, Library, Cambodia...) in order to list datasets from a certain category.
- Insert new datasets programatically.

Also, documentation and instructions for third-party developers to correctly use the API should be generated. See

1.2.12 Customizing CKAN's UI

In order to provide a good user experience, the design and layout of the Data Hub module should be adapted to match the Multisite front-end.

CKAN offers the possibility to choose between 4 standard themes out-of-the-box and/or modify them. See CKAN Theming Guide: http://docs.ckan.org/en/latest/theming/index.html#theming-guide

The themes provided by CKAN are NOT mobile friendly or have a responsive layout.

1.2.13 Data migration

Existing datasets and mapping information available on ODC's current website must be migrated into the Data Hub. This involves not only datasets but also Reports, Maps, News and Library Publications.

Useful extensions and functionalities provided by CKAN

The following functionalities are offered by CKAN and should be consider to implement in the first or future development phases.

1.2.14 Page views tracking extension

Page views can be tracked in order to categorise Pages by popularity. See CKAN's Page View Tracking extension http://docs.ckan.org/en/latest/maintaining/tracking.html

1.2.15 Analytics tracking

Keep track of which pages are viewed and gather information such as country, language, etc of the user base. See CKAN's Google Analytics extension: https://github.com/ckan/ckanext-googleanalytics.

1.2.16 Linked Data

CKAN offers Linked Data support to some extent, which would be convenient for the future in case the platform would need to support it. See Linked Data & RDF
http://docs.ckan.org/en/latest/maintaining/linked-data-and-rdf.html

1.2.17 Embedding and sharing

Optimally, users should be able to share a certain dataset through social networks or embed a visualisation of data hosted on the Data Hub. CKAN offers a functionality to share the link to a certain dataset or resource on Facebook, Twitter and/or Google+. Currently, CKAN does not offer the possibility to embed content in other websites and in case wished, this functionality should be developed and implemented in the platform.

1.3 Multisite & Multilingual front-end

1.3.1 Hosting and installation of Wordpress multi-site instance

Wordpress will be the chosen technology for the different regional sites, since most of the partners are already familiar with it and considering that it is an Open Source, community supported and broadly used technology.

The requirements for the server hosting the Wordpress instances are the following:

PHP version 5.2.4 or greater
MySQL version 5.0 or greater

1.3.2 Single Site vs Multisite Wordpress approach

Issue: Should there be 1 single instance for all regions or 1 for each?
Maintaining one single instance of Wordpress per website could increase the costs considerably. A multisite approach should be preferred.

Since version 3.0 was released, Wordpress provides with a function that allows to create a "network" of sites while maintaining the same code base and the biggest part of the database structure, reducing complexity while updating the code or database of the front-end instances. See Create a Network http://codex.wordpress.org/Create_A_Network.

Each of the sites could be made accessible through its own subdomain (I.e cambodia.opendev.org, laos.opendev.org, …)

1.3.3 Multilingual support

Each of the 6 different sites to develop should support at least 2 languages: English and the local language. There are a few Wordpress plugins that tackle this scenario, being **WPML** (http://wpml.org/) the best alternative. Although there is a price for its license (79-195 USD) the features and available languages it offers would reduce development and translation costs considerably. Multilingual support on Wordpress installations is a challenging issue and usually a source for errors, specially after updates of the platform. That's why a maintained plugin with support should be preferred. WPML has support for Thai, Vietnamese and English out-of-the-box, a

translation for Khmer, Lao, Burmese should be done.

1.3.4 Common look-and-feel

The look and feel for the Multisite/Multilingual front-end should be designed. Mockups and graphic files should be provided.

Issues: Which Wordpress theme should be used? Which functionalities does it have to offer?

Considering the requirements and in order to provide a common layout for the different sites, a Wordpress template should be selected and customized. On Ian's report, JEO (http://oeco.github.io/jeo/) gets mentioned, a template that could be a valid starting point. However, other templates (free or premium) should be considered.

1.3.5 Interfacing the Data Hub

Since the Data Hub and the front-end instances will "live" side-by-side, there is the need to develop mechanisms in order to present, most of the times in the front-end, information extracted from the Data Hub component. This could be achieved either by linking directly to Data Hub's content or using the available API for extracting data and present it without having to leave the front-end.

Also, there is the need to archive certain contents generated on the WP side. Those would be news and reports created by the Wordpress editors that will be stored periodically on the Data Hub. The format to store this information would be XML Feeds. Articles' relevant information (title of news, description, metadata) would be generated and stored programatically in plain-text, no formatting or Images would be included. A link to the original article will be attached in the feed so the interoperability between platforms is guaranteed.

2. Milestone 2 – Implementation of centralised Data Hub

1.1. Project specification	Days	USD
1.1.5 Collaborative workflow Collaborative improvement or modification of the platform: Setting up Github code repository and organisation	0.5	167,25
1.2. Data Hub module		
1.2.1 Hosting and installation of CKAN instance Find a hosting solution that meets all the requirements of the platform. Installing and configuring CKAN	1 1	334,50 334,50
1.2.2 Storing different content types	0	0
1.2.3 Entities and Roles Creation of initial groups, organisations and users	0.25	83,625
1.2.4 Geo-Referencing every dataset Installing and configuring Geo-Spatial extension	0.5	167,25
1.2.5 Searching the contents	0	0

1.2.6 Multilingual support Preparation of a dictionary with the strings composing ODC's taxonomy in order for CKAN to translate the tags automatically. Translations will be done by ODM's Staff.	0.5	167,25
Preparation of a dictionary with the strings present in the UI. Translations will be done by ODM's Staff.	0.5	167,25
Implementing mechanism to automatically translate strings in dataset's description or metadata.	1	334,50
Extending current CKAN's translation files for the UI's strings.	2	669
Fixing Bug produced by the multilingual library	0.5	167,25
1.2.7 Email notification Configuring CKAN for send out email notifications	0.5	167,25
1.2.8 Reproducing ODC's taxonomy Generating Tag vocabularies programatically	0.5	167,25
Modifying CKAN's template to include Tag Vocabularies in dataset's pages.	1	334,50
1.2.9 Review System	0	0
1.2.10 Visualising datasets and other resources Fix problems with uploaded PDFs and CSVs	0.5	167,25
Tweaking Leaflet.js to match UI requirements	0.5	167,25
1.2.11 Restful API	0	0
1.2.12 Customizing CKAN's UI Modifying an existing Theme to match the UI requirements, layout proposed.	3	1003,5
1.2.13 Data migration Supporting ODC's Staff while migrating datasets, maps, reports, news and library publications from the current ODC site.	0.5	167,25
1.2.14 Page views tracking extension Configuring extension	0.5	167,25
1.2.15 Analytics tracking Configuring extension and linking to Google Analytics account.	0.5	167,25
1.2.16 Linked Data	0	0
1.2.17 Embedding and sharing Develop and integrate embed code generation for data visualisations	3	1003,5
10% Variable	2 Days	669
Total	20,25	6773,625

3. Milestone 3 – Implementation of multi-lingual front-end

1.3 Multisite & Multilingual front-end	Days	USD
1.3.1 Hosting and installation of Wordpress multisite instance		

Installation and configuration of Wordpress multisite instance with 6 subdomains	1.5	501,75
1.3.2 Single Site vs Multisite approach	0	0
1.3.3 Multilingual support Installation and configuration of WPML translation plugin. Preparation of a dictionary with the strings present in the UI for the non-available languages or missing strings. Translations will be done by ODM's Staff.	2 0.5	669 167,25
1.3.4 Common look-and-feel Research and choose a valid Wordpress theme to use as base layout, specified in the mockups. Modify HTML/CSS structure to fit the general look-and-feel, specified in the mockups. Develop scripts to present in the front-end data extracted from the Data Hub through the API.	1 3 2	334,50 1003,50 669
1.3.5 Interfacing the Data Hub Implementing scripts on the WP to expose data/information contained on the data hub. Implementing scripts for News archiving as XML Feeds	2 2	669 669
10% Variable	1.5 Day	501,75
Total	15.5 Days	5184,75

Costs for additional licenses or software	USD
License WPML Multilingual Wordpress plugin http://wpml.org	195
Total	195

4. Milestone 4 – Improvement of data visualisations

NOTE: Milestone 4 has less priority than Milestone 5.

4.1 Implementation of chart-like data visualisation	
TBD	?
4.2 Improvement of geospatial visualisations	
TBD	?
Total	?

5. Milestone 5 – Documentation and Training

5.1 Wiki	Days	USD
Installation and configuration of wiki platform. Creation of admin users and setup basic structure of information.	1	334,50
5.2 Documentation for users		
Draft instructions for users to browse, search and download contents from the site.	1	334,50
5.3 Documentation for data publishers		
Draft instructions and best-practices on how to upload new datasets to the Data Hub	1	334,50
5.4 Documentation for developers		
Draft instructions and best-practices on how to extend the platform, help fixing bugs, how to call the API, etc...	1	334,50
5.5 Translate the documentation for different languages		
Translate the documents to Khmer, Thai, Vietnamese, Burmese, etc... Translation would be done by ODM's staff members.	0	0
5.6 Training		
Workshop on how to use the platform targeted for collaborators.	3	1003,50
Total	7 Days	2341,50