



Technical Architecture and Infrastructure Specification

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1. INTRODUCTION

Cedefop WebPortal offers to its visitor's information from various sources in a unified way. In addition to the information offered, value added services are also available to the registered and authenticated visitors. Hence, the system presents an enterprise Web gateway for a certain user community and not only. As such, it is designed and implemented as an Enterprise Content Management system taking into account complex information resources and Cedefop policies.

This document presents the architecture of WebPortal, trying to describe the hardware infrastructure, the Project Settings and the Content and Development architecture.

2. ARCHITECTURE OF WEBPORTAL

2.1. WebPortal network infrastructure

In the figure below is presented a high level Cedefop WebPortal architecture. In general, the figure presents the current RedDot setup with different modules used. Additionally, in the same figure various versions for pre-requisite software are specified (e.g. operating system, RDBMS, etc.).

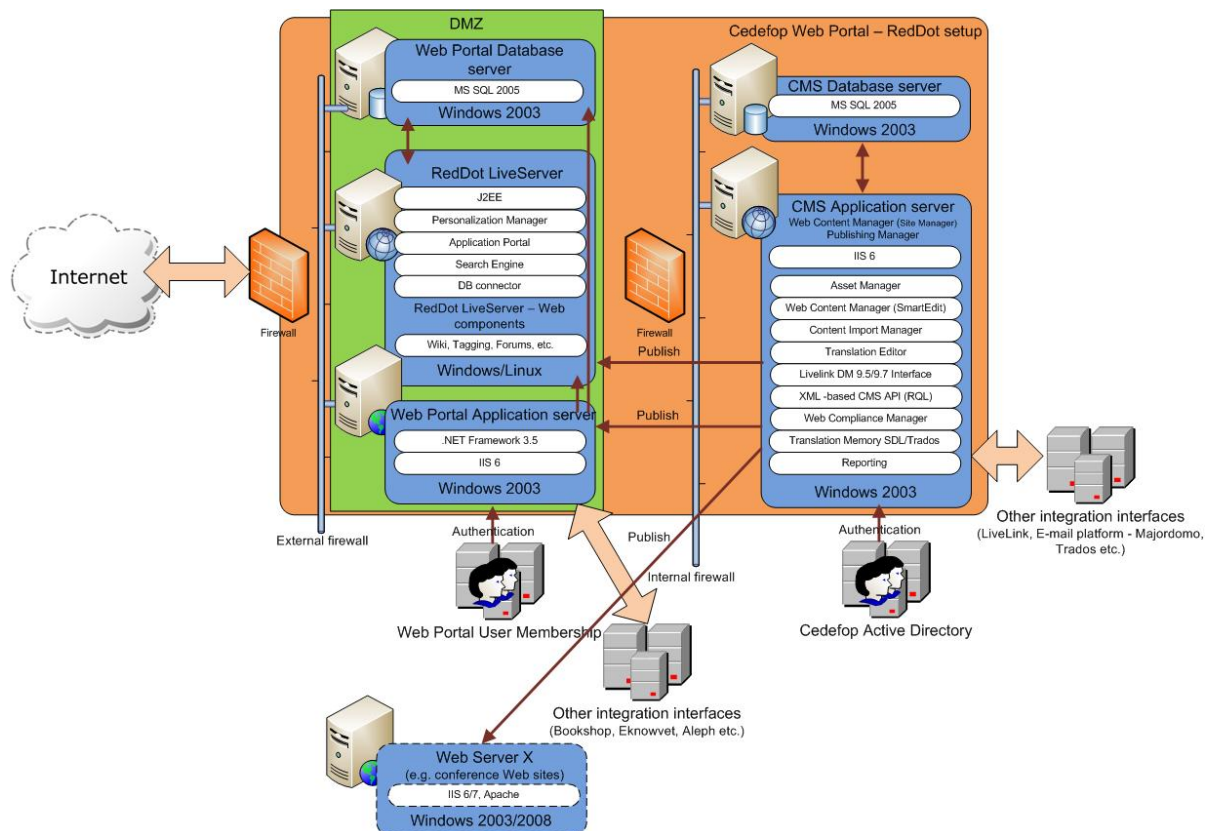


Figure 1 : Webportal architecture

Cedefop WebPortal network infrastructure generally consists of two (2) main areas:

- The organisation's internal Local Area Network (LAN), that hosts the CMS and the other content management and data collection modules

- The Demilitarised Zone (DMZ) that hosts the application components needed for the public (Internet) content presentation
- Integration with other systems (for both aforementioned areas)

2.2. Local area network

Cedefop's Local Area Network hosts the applications needed for the authoring and aggregation of the WebPortal content. As mentioned in the previous section, WebPortal information originates from different data sources that were populated by the use of different software applications.

2.2.1. RedDot CMS

The vast percentage of information presented at the WebPortal is input by Cedefop content contributors (authors and editors) through the RedDot CMS system. For this reason, the CMS is installed on a solid software and hardware platform where operational technical requirements are met.

Cedefop RedDot CMS is installed on 3 servers, the CMS Production server, the CMS Publishing Server and the CMS Database server.

2.2.2. RedDot CMS modules

RedDot modular architecture permits a completely customised installation of the CMS, consisting of the modules that are needed. In this respect, the Cedefop WebPortal utilises the following CMS modules.

2.2.2.1. Publishing Manager

The Publishing Manager takes individual data and metadata from the existing content life cycle and integrates them into complete Web sites. The Publishing Manager detects changes to the individual pages and publishes them as single pages. The module thus ensures that the published pages are consistent, regardless of which output format users select. Users can define a publishing job which can be executed manually by an authenticated user or as a job in a predefined schedule.

2.2.2.2. Web Content Manager - Site Manager

The Site Manager's ergonomic tree structure enhances the efficiency when configuring or maintaining complex sites. CMS administrators can easily create and manage templates, links, authorisations, users and workflows, making it possible to change project-specific settings flexibly and easily.

2.2.2.3. Asset Manager

The Asset Manager lets users save files in a structured format, retrieve them quickly, and use them uniformly. Metadata and version numbers simplify the management of all assets in a project. Additionally, the module offers to its users basic set of image editing functionality (e.g. crop, rotate, flip, or resize). Furthermore, there is functionality for displaying the usage of the selected file, whereby the user can see all the pages that the specific file is associated with and forecast the affects of a possible replacement or modification.

2.2.2.4. Web Content Manager - SmartEdit

The RedDot SmartEdit allows users to update and add content on Cedefop WebPortal pages. By clicking through the links and the Red Dots placed in different places within the page template, user are able to easily contribute content (HTML knowledge not required), by simply following the applied designed principles. Different Red Dots symbols placed inside SmartEdit, indicate different actions that user can perform while working with project's content: open page for editing (check out) and close page (check in), page locked by another user, access denied, edit element, add page, drop zone for drag-and-drop operations, keywords assignment and translation. These are some of the most used Red Dots indicators, helping users to create and finalise their content fast and easily.










Most used Red Dots	Explanation
 [Edit Homepage Right Area]	Open page for editing
 [Save Changes]	Close page
 [Edit all fields via Form]	Open form
 [Enter the title]	Simple text element – non mandatory
 [Enter the description]	Mandatory element
 [Manage Highlight item]	(Dynamic) Link
 [Manage Featured news.]	List
 [Enter the Subtitle]	No rights, access denied
 [Enter the project's image]	Page is draft by another user, access denied

Table 1 : Common RedDots

[Save Changes]
 [Edit all fields via Form]
 [Edit all Closed Lists via Form]

Subtype 1st level: [Select news subtypes] Press Releases
 Announcements Subtype: [Select announcements subtypes]
 Press Releases Subtype: [Select press releases] Cedefop
 Documents Subtype: [Select documents subtypes]

News Item Details [Select image]

Source:
 [Enter source] Cedefop

News Item

[Enter the title]

Press Release - Forecast shows jobs in Europe becoming more skills- and knowledge-intensive

Subtitle:

[Enter the subtitle]

[Enter the abstract]

Cedefop's latest forecast on the demand and supply of skills to 2020, presented today in Brussels at the European Commission conference New Skills for New Jobs: Action Now, foresees a steady rise in knowledge- and skill-intensive occupations.

[Enter the description]

The total number of job openings is expected to be around 80 million by 2020, with the biggest increase in high-level managerial, professional and technical occupations.

Those with higher qualifications will clearly be in the best position to take advantage of these developments. But the European economy will continue to need a broad basis of skills at intermediate level, especially those acquired within vocational education and training.

[Displayed in intranet] No

Countries: [Select country] Europe

Keywords: [Select Keywords] Not applicable

Themes: [Select themes] Identifying skills needs

Projects: [Select projects] Forecasting skill demand and supply

Networks: [Select Networks] Not applicable

Custom Content Groups: [Select Custom Content Groups]

Custom Keywords: [Enter Custom Keywords separated by comma]

[Select links] [Create and Connect Link]

Links

[Select attachments]

Attachments

EN [Download the press release in English](#) (33.19 Kb)

EL [Download the press release in Greek](#) (167.82 Kb)

Posted on: 04/02/2010

[Back to list](#)

Publication Date Start: [Enter the publication start date] 04/02/2010

Publication Date End: [Enter the publication end date]

NMS Item ID:

Last Editor: Michalis Ioannides

Submitter:

Submission date: 02/02/2010

Homepage Candidate: [Item is candidate for the homepage] Yes

Highlight at the Homepage: [Item is candidate for Highlight at the Homepage] No

Roles: [Select Roles]

Figure 2: CMS SmartEdit module - Example of a news item's creation

2.2.2.5. Translation Editor

The Translation Editor according to the workflow submits changes that have been made in one language to the appropriate (previously defined) users - translators. When a page is modified in one language variant and submitted to translation workflow, the predefined user assigned with Translator role will receive notification for the pages waiting for translation into the language that s/he is responsible. A window with special layout is available to the Translators, presenting a horizontally separated view where the top placeholder displays the selected content in the main language and the bottom placeholder displays the content in the translation language.

2.2.2.6. XML-based CMS API

The module represents an XML-based API. This allows developers to develop automated processes or advanced integrations.

2.2.2.7. Web Compliance Manager

RedDot Web Compliance Manager checks the WebPortal content, including the designed style sheets, for compliance with a wide range of quality standards. The validation check highlights non-compliance with accessibility or W3C guidelines, broken links, and custom standards in the source code, so they can be corrected easily during editing. In addition, the spellchecker could be included and it can use standard or custom dictionaries to ensure that only pages without errors are published.

2.2.2.8. Translation Memory SDL/Trados

The translation memory module may integrate CMS with Trados translation software.

2.2.2.9. Livelink Interface

The LiveLink interface module will integrate CMS with LiveLink Document Management system, in order to transfer the selected documents from LiveLink to CMS. Hence, the content from the LiveLink document library can be transferred to the Webportal in an automated manner and within its context. Users can easily control the documents and their corresponding metadata to be published online. This module is not operational yet.

2.3. Demilitarised zone (DMZ)

2.3.1. *WebPortal Database server*

WebPortal Database server is used for storing information and settings data required for the content delivery of the various pages. This information stored originates from the Local Area Network and more specifically from the RedDot CMS. The database software is SQL Server 2005.

2.3.2. *WebPortal Application server*

WebPortal Application server is the server used for delivering the WebPortal pages over internet. .

2.3.3. *RedDot LiveServer Application server*

This is the CMS Production server said above where the CMS is installed and used.

2.3.4. *RedDot Publishing server*

This is the server that deals with publishing jobs. This extra server has been created to separate the publishing jobs from the rest of the jobs in order to speed up the performance in both servers.

2.3.5. *RedDot LiveServer modules*

RedDot modular architecture permits a completely customised installation of LiveServer, consisting of the modules that are needed for the specific usage scenario. Cedefop makes use of the following LiveServer modules.

Search Engine

In addition to comprehensive out-of-the-box search functions, the integration of Verity search technology features a wide range of options for personalised search, using user profiles and authorisations. Pages with special access rights will be included in the results only for authenticated users who have access to these pages.

DB connector

This module will be used for exchanging data (reading and writing) with external relational databases.

Open API

This module allows custom made integration with any external Java application and allows exposure of the integration directly to the website as a custom element.

2.4. Integration with external applications

The following interfaces integrate with Cedefop WebPortal.

2.4.1.1. Trainees

Trainees' administration pages are hosted as a separate ASP.NET (??) application. Trainees' data reside at the METAL database server. The form page for new application submission is hosted as a WebPortal page on the WebPortal Application Server.

2.4.1.2. Bookshop

Bookshop's administration pages are available through RedDot CMS. Bookshop data reside both on the WebPortal database server and inside RedDot CMS. More specifically, order information is stored inside the database server, while the actual publication Content Items are inside the CMS.

2.4.1.3. ERO Project

The classic ASP ERO project's administration pages will be preserved and hosted on the ETV-3 web server, as they are currently. The same applies for ERO Project data (Paper

Base and Project Base) which will reside on the ETV-3 database server. Therefore, the whole set of ETV-3 (hardware, IIS, asp) will be preserved.

Switching from the classic ASP admin pages to CMS will not be fully automated. The co-existence of classic ASP administration pages and RedDot CMS is necessary until ERO administration pages are moved inside RedDot CMS.

2.4.1.4.Eurodoc archives

The classic ASP Eurodoc archives' administration pages will be preserved and hosted on the ETV-3 web server. Eurodoc archives data will reside on the ETV-3 database server.

2.4.1.5.Acquisitions list

The past Acquisitions lists are migrated inside the new newsletter section of the CMS. The new newsletter that is created for each one new Acquisition list is of type "VET Alert" and is created inside CMS.

2.4.1.6. Social Partners

The classic ASP Social Partners' administration pages will be preserved and hosted on the ETV-3 web server. Social Partners data (Sectoral Training) will reside on the ETV-3 database server.

2.4.1.7.TTnet FAQ entries

TTnet FAQ entries' administration pages will be available through RedDot CMS. The FAQ content type will be used for the representation of the current database entries. TTnet FAQ entries data will be presented as normal WebPortal pages served by the WebPortal Application Server.

2.4.1.8. Eknowvet

Eknowvet web application's administration pages are hosted as a separate classic ASP application on the web server where they were placed (194.26.22.36). The current classic ASP Eknowvet pages, that display database content from Eknowvet web application, appear in the form of a frame inside normal WebPortal pages.

2.4.1.9.Trados

Memories from Cedefop internal Trados installation will be accessed from inside the RedDot CMS by the use of the corresponding module.

2.4.1.10. Livelink

Files from Cedefop internal LiveLink installation will be accessed from inside the RedDot CMS by the use of the corresponding module. This is under implementation.

2.4.1.11. E-mail platform

The current email platform will be preserved. The information needed for the mass e-mail transmission will be made available from the new user membership system.

Our initial proposal considers maintaining the existing Majordomo functionality; however, the final platform will be further discussed with the users.

2.4.1.12. WebPortal User Membership

“Value added” services of the WebPortal are available to the registered and authenticated users. This system supports different levels of membership, for accessing different sets of additional functionality. For example Skillsnet users, enjoy the benefits of the simple registration enhanced with additional access to special Skillsnet pages.

Multiple registration forms exist, that request a different set of information from the user. For instance, the form for the simple user registration requires only the basic details, while the registration process of other levels of membership requires the user data for simple registration plus additional data fields. The informational fields needed for the simple registration are requested for every membership level. E-mail and password fields are examples of such fields.

Users’ management application is an external application written in ASP.NET. The access to the application is allowed to authorized CMS users and is done through the Management page of the RedDot CMS.

2.4.1.13. Active Directory integration

Integration with the MS Active Directory offers the ability to RedDot CMS to import all or a selection of the already existing Cedefop Active Directory users. When importing the users in the CMS, administrators have the ability to give them the desirable access level and roles. This integration interface is implemented for the CMS only.

2.4.1.14. Aleph

Cedefop’s Library Server is running on the Aleph system and on the IBM AIX/RS6000 server. The corresponding library content can be accessed (internally or from the internet) via a web interface (<http://libserver.cedefop.europa.eu>) hosted on an Apache server. The WebPortal presents information from Aleph in the form of links to these pages that open at separate new windows.

2.4.1.15. Extranets (Virtual Communities)

A set of links to the external Virtual Community web application is included inside WebPortal Homepage. Users that are registered in Webportal and in any Virtual community are able to access these two areas by sending their credentials only to the Webportal. Single sign on procedure automatically provides the credentials to the Virtual communities’ platform.

3. WEBPORTAL PROJECT STRUCTURE

3.1. Project variants

Project variants are the format in which the content of the project will be published. In Webportal the project variants are two: **ASPX** and **XML**. The ASPX files are those that

are displayed in public site, while XML files are used for database jobs, like retrieving content to update the Webportal database, indexing pages etc.

3.2. Language variants

A project can be created in one or more language variants. Cedefop Webportal is designed to have 3 language variants, **English**, **French** and **German**. Currently, only the English version is published, while the translation procedure is going to be in production.

3.3. Publishing Targets

Different publishing targets are assigned to each project variant defined in the Webportal project settings. In this philosophy, the:

- ASPX publishing target is: [\\194.26.23.58\e\\$\CedefopWebPortal](http://194.26.23.58/e$/CedefopWebPortal)
- XML publishing target is: [\\194.26.22.111\c\\$\WebportalXMLPublishing](http://194.26.22.111/c$/WebportalXMLPublishing)

3.4. Publication Structure

The publication structure lets the proper placement of published files, at the above publishing folders. According to this, a thematic approach has been followed in creation of the publishing folders. The publication structure begins with the language variant and builds under the language folder the whole structure of the project. This is done for all language variants of the project.

3.5. Packages

3.5.1. Authorization packages

Authorization packages (AP) are collections of users and groups, with certain rights assigned to them that are applied to specific areas of the project to control users' access to these areas. Access levels can be defined for each page or element of the project.

In Webportal project, specific APs have been created for every section (e.g. theme, project pages, statistics section etc) and allow only the authorized people to have editing access to these sections.

Apart from those APs, there is a need to control the creation and editing of content items. For example, there are groups of people that are allowed to create news and events items, but are not allowed to create publications, no matter where these news and events are going to be connected. To solve these problems, new APs, that control the access to the content items of the project, have been created.

Above all these, there is a Global Authorization package that allows full access to the whole project only to Administrators, and giving to anyone else only reading access.

3.5.2. Publication packages

Publication packages are used inside the project tree and guide every page to be published to the proper folder, set in the publication structure. In Webportal project, publication packages follow the thematic structure of the project.

3.5.3. Workflows

In addition to Authorization Packages, access to certain places is controlled using Workflows. APs configure where the user/group should have editing access or what menus will be able to see in order to make actions, while Workflows configure what reactions should be done and from whom, when certain actions are performed.

The types of Workflows are two: the Content and the Structural Workflows. As their names reveal, the Content Workflows (CW) catch actions that are performed in content elements, while the Structural Workflows (SW) catch structural changes (connections/disconnections to lists or links). The CWs follow the model of the Authorization packages, thus for every area that a specific Authorization package exists, there is a Workflow that catches the actions done by authorized people. The Structural Workflows can be applied to pages that hold structural elements, in order to add approval steps to structural changes.

4. CONTENT ARCHITECTURE

4.1. Pages Architecture

Webportal pages are constituted of different subpages and sections. Each page is constituted by 5 areas, top, left, central, right and bottom. The template that gathers the pieces and outputs the final page is called: “F2 - Foundation with 5 areas”.

In the following page the different pieces of a typical page in Webportal are illustrated. Top, central, right areas and footer are containers, while tools and navigation areas are sections which code is written inside the Foundation template, and their output depends on the page. The term “container” is used for a placeholder where one or more other pages can be connected. So, the F2 page is a basic platform with some fixed areas of code and some placeholders to connect other pieces of code. This structure forms a dynamic behaviour and outputs every different page of the Webportal.

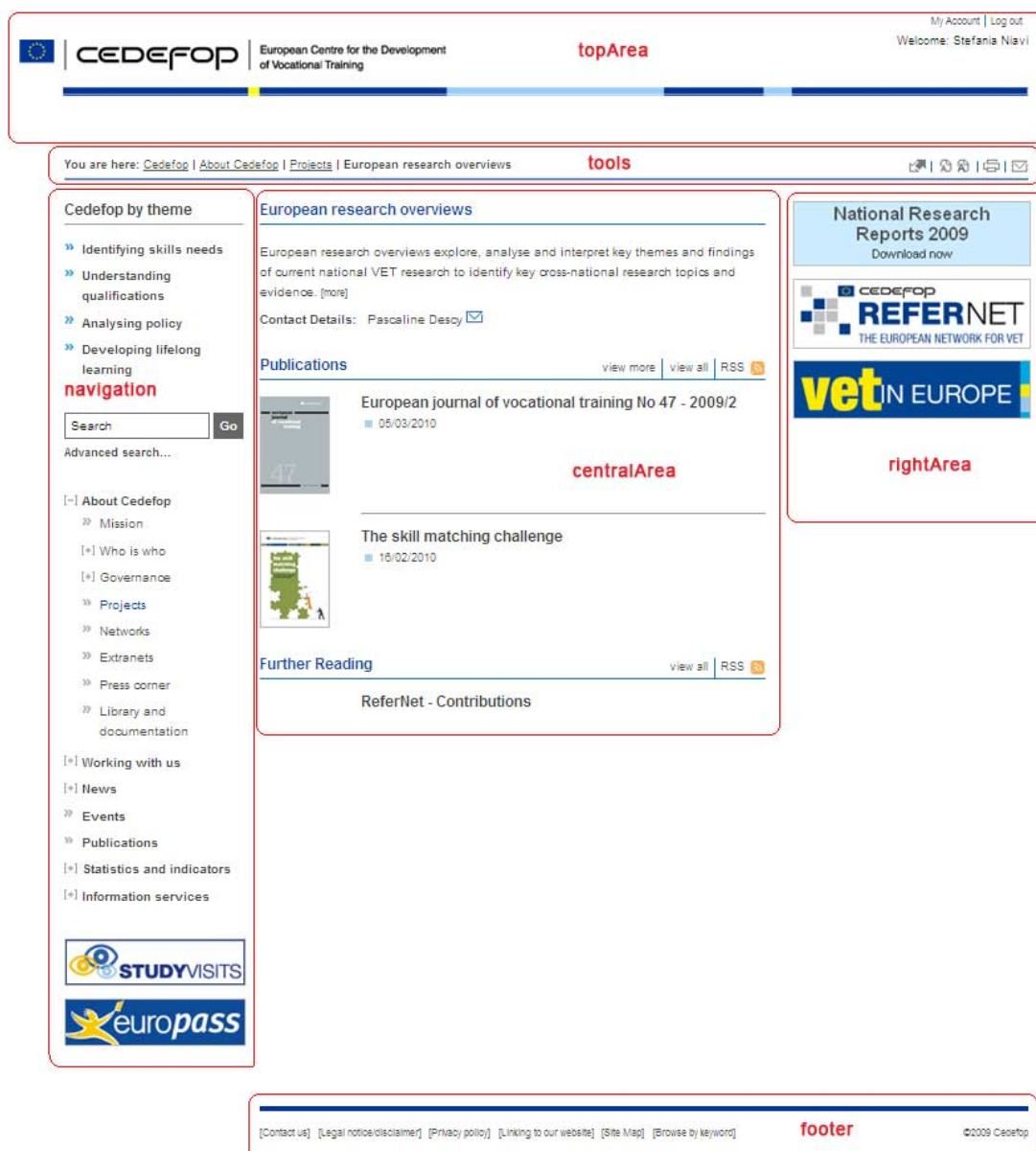


Figure 3 : Basic areas of a Webportal page

The central container is mandatory to have a page connected; otherwise a blank page will be displayed having content only to the rest of the above sections (topArea, tools, navigation and footer). The right area is not always required.

4.2. Templates

The determination of what content is included in each page and the way that this content is displayed is done by using templates. Templates are files inside RedDot that contain placeholders for content (e.g. text, dates), structural (e.g. lists, links) or info (e.g. page id) elements, surrounded by the proper HTML or ASP.NET code to control their appearance.

In Webportal project inside RedDot CMS, there are templates for every different page. These are divided in the following basic categories:

4.2.1. Admin Content Classes

These are the templates that form the pages in Project Administration page. This area is only inside RedDot SmartEdit and it is the place that new content items are created by Cedefop Editors.

4.2.2. Body Containers

Body Containers are the templates of every different type of pages that exist inside Webportal. They are divided into those that can be connected in central container and those that fit to the right container. Each of these templates has, in most cases, only one instance, as their structure is unique and applied to the page that is designed for.

4.2.3. Closed Lists

Closed Lists represent fixed selection values of predefined entries. The values to be selected will be available at the time of creation and/or editing of specific Content Items. Content editors will be able to select single or multiple values from a particular Closed List, as specified in the Content Type description.

The available Closed Lists are:

Closed Lists
ABB Activities
Announcement Subtypes
Areas
Article Subtype
Call/Vacancy Status
Cedefop Departments
Cedefop Involvement in Events
Cedefop Involvement in Networks
Cedefop Newsletter Types
Countries
Custom Content Groups
CVL Keywords
Documents Subtypes
Email Alerts Frequency
Event Status
Events Subtypes
Extranet Status
Hard Copy
Job Vacancy Subtypes
Languages
MTP
Networks
News Subtypes
Newsletters Types
Person Title
Press Releases Subtypes
Procurement Call Subtypes
Projects
Publication Order Status
Publication Series

Publication Topics
Roles
Skillsnet Area Approach of Research
Skillsnet Level of Research and Analysis
Themes

Table 2 : Closed Lists**4.2.4. Content Types**

The content of Webportal is structured in well defined objects, called Content Types. Each content type has been created for a specific purpose and has a unique set of elements that form a way to present its information. The basic principles/rules, that the analysis for creation of the content types was based on, are the following:

- a. Every web page could be a candidate for a Content Type prototype
- b. Content re-usage: In order for a web page to define (or belong to) a Content Type, the same content (from a business point of view) and the same set of attributes (metadata) related to the page (attributes like “publication date”, “country”, etc) should be found in other pages as well. That is, if the same structure and content is found in multiple pages, then this “structure + content” combination may define a Content Type.
- c. If there is need for some content to be searchable by the use of metadata (e.g. results filtered by “Theme”, “CVL keywords”, “countries” etc) or if the specific content has to appear on the “side” navigation as “related content”, it is a candidate for defining a Content Type.
- d. A page based on a Content Type should be strictly structured. It is also automatically formatted, in contrast with all the other pages that support variations (smaller or larger). The last pages are of “Generic HTML” type.
- e. If the set of metadata for 2 very similar pages (Content Type candidates) is different, then these pages define 2 different Content Types.

The available Content Types in Webportal are:

Content Types	Description
Article	Represents an article in the web portal
Bibliography	HTML page which include links grouped by categories
Download	A content item representing a file available for download.
Event	A content item which presents a forthcoming or past event.
Extranet	This Content Type represents information about an Extranet (VC).
Generic_HTML	A simple HTML content item
Generic_HTML_with_Sidebar	A simple HTML content item with an addition of a right area
Information_Resource	It is an HTML content item which describes and links to an information resource
Institution	A content item representing an Institution
Job_Vacancy	A content item which present a “Job Vacancy” announcement.
Link	A link to another web site or other section of the same

	website
Network	The "Network" Content Type content class
News	A content item which presents a news item.
Newsletter	The newsletter of the Web Portal
Person	Represents a person (or contact).
Procurement Call	A content item which present a "Procurement Call" announcement.
Project	A Cedefop project
Promo	A promotional banner, used in the right side of the pages
Publication	The details page of a publication
PublicationTranslation	A content item representing a translation of a Publication CI.
Theme	A theme is a page aggregating content on a specific VET area

Table 3 : Content Types

4.2.5. CSS

This is the main stylesheet used in all pages of Webportal for screen output. An instance of this template (Global Stylesheet) is connected to all Foundation pages.

There are 2 other used stylesheets, the "print.css", used for controlling a page that is going for printing and the "ui.datepicker.css" that is the main stylesheet [for jQuery UI date picker](#). The 2 last CSS files are not instances of the CSS template. These files are saved inside Asset Manager.

4.2.6. Foundation

The Foundation template, as said above, is the main template of Webportal that has the code to build the page containing all areas. Apart from this, Foundation template is responsible to have all references to external code that is used inside pages, as well as declarations of PreExecute and RDExecute mode.

4.2.7. Navigation

The Navigation Manager is a built-in tool of RedDot that is used to create dynamic navigation menus. This tool should be activated in each project's settings, in order to be operational. All types of navigation, called Navigation Areas, like menu, breadcrumb, sitemap etc. should be created inside Navigation Manager. Before doing this, it is important to create the Navigation templates. Navigation templates determine the functionality and appearance of each navigation level. Two different states are required, the "Selected" and the "Not selected". These templates are connected in every different Navigation Area that is created inside Navigation Manager.

4.2.8. Scripts

This section contains scripts used in various places of the project. Currently, only the functionality of Share tools, inside the tools area, has been a template under the section of scripts.

4.3. Assets

The pages of Cedefop WebPortal contain apart from standard HTML mark-up code and CSS styling various other multimedia or digital assets. These artefacts are displayed either as visual elements of a page (e.g. images) or as means of information delivery that a visitor can download and view locally (e.g. MSWord, PDF, PowerPoint).

All these digital assets files are stored in an organised file repository, in order to facilitate their effective management by the content authors and the developers.

4.3.1. File and Document Repositories

RedDot CMS provides a powerful tool for organising the WebPortal electronic files and documents, namely Asset Manager. Asset Manager is a specialised module (described also in 2.2.2) combining enhanced features with user friendly interface.

Inside the CMS, an Asset Manager folder is a specific folder type that allows CMS users with sufficient privileges to easily manage basic operations of editing files. The files can be organised in different folders.

Taking into account the structure of the Cedefop website, the following Asset Manager folders have been created and used:

- **Images – User Interface:** These are the files used for the web page layout and style. These files are being managed by the website development team and/or administrators. No access rights will be granted for this folder to content contributors (e.g. authors and editors). Files with extensions “jpg”, “jpeg”, “gif”, “png” are the only ones allowed to be placed inside the folder.
- **Images – Content Management:** These are the files used by the web managers (authors and editors) in order to enrich the Content Items with visual elements. Content managers and administrators are able to add/modify/delete images inside this folder. Files with extensions “jpg”, “jpeg”, “gif”, “png” are the only ones allowed.
- **Files – Content Management:** These are the files used by the contributors (e.g. authors and editors) in order to attach various files into their content items. These files can be Word documents (“.doc”), Power Point files (“.ppt”), and Acrobat documents (“.pdf”). Content managers and administrators are able to add/modify/delete files inside this folder. Files with extensions “doc”, “ppt”, “pdf” are the only ones allowed.

All the previous folders are stored on the file system and not inside the database. The versioning of files inside them are also enabled, in order to provide detailed history and rollback capabilities.

Further to the above listed folders, LiveLink will provide an additional file repository. Cedefop LiveLink installation already holds files presented inside the web pages. Of course, CMS and LiveLink will be integrated in such a way that LiveLink files will not be directly accessed via hyperlinks by Public Users. Using LiveLink integration module, they will be inserted inside the Asset Manager as snapshot copies.

Files uploaded by website visitors are not incorporated inside Asset Manager. These files are not going to be re-used and no versioning information is needed. For this reason, they are stored inside a specific user folder structure. The root folder is “Files – Public”.

Inside this folder and for each different section of the website where the users have the ability to upload files, separate folders exist, named after the section (e.g. “Trainees”, “Application2”, etc.).

4.4. Resource Files

Resource files are the repository of static information along the Webportal. A resource file is an XML file that contains the strings, like menus or static titles of sections, that it is going to be translated into different languages or paths to images. The resource file contains key/value pairs. Each pair is an individual resource.

It is needed to have a separate resource file for each language (for example, English and French) or for a language and culture (for example English [U.K.], English [U.S.]).

Resource files in ASP.NET have a .resx extension. At run time, the .resx file is compiled into an assembly, which is sometimes referred to as a satellite assembly. The .resx files are compiled dynamically, like ASP.NET Web pages, so, there is no need to create the resource assemblies. The compilation condenses several similar-language resource files into the same assembly.

There are 2 types of resource files, depending on their scope:

- The Global resource files, which means that the resource file can be read from any page or code that is in the Web site. These files are stored in the reserved folder App_GlobalResources at the root of the application. Any .resx file that is in the App_GlobalResources folder has global scope.
- The Local resource files, which store resources for a single ASP.NET Web page (.aspx, .ascx, or .master file). The Local resources are put in folders that have the reserved name App_LocalResources. Unlike the root App_GlobalResources folder, App_LocalResources folders can be in any folder in the application. The association of a set of resources files with a specific Web page is done using the name of the resource file.

5. WEBPORTAL EXTERNAL CODE

Apart from the code written inside templates, there is a lot of functionality written in ASP.NET code, outside RedDot. This code is organised in controls that are important for the construction of the pages. The compiled outputs of these controls have .dll extensions and called compiled assembly files. The first section of the Foundation’s template contains references to these source controls. The declaration of control files is done using the “@ Register” directive at the top of the calling page, referencing to this Assembly files.

There are 2 types of controls:

1. Those that the *.ascx code of the control is available, editable and relies inside the application’s folder. For this category, the code behind the control is compiled to assembly files (*.dll), which are stored in ~/bin folder of the application.

2. Those that only the compiled assembly file exists at the same location with the above case, but the code of the control is not available.