

FINANCE AND PROCUREMENT

ANNEX K2

Technical Architecture and Information / content architecture of the Skills Panorama

1. SYSTEM ARCHITECTURE



At the core of the application is the **Drupal 7 CMS**, which takes care of all the basic and content management features of the application.

The Skills Panorama uses **MySQL as a database** for content metadata and configuration storage and the file system to save the actual documents. Other high level components are:

- **Apache Solr**: is the search engine used also to index contents.
- **Cedefop indicators web service under Apache Tomcat**: this is the web service in charge of providing indicators data. It also uses MySQL as data storage. The idea of using a web service is to provide open data features and to allow Drupal to obtain those data in the proper format regardless their original structure. It is used in two ways:
 - Drupal connects to the service in order to get the smart data.
 - Graphics are drawn by Highcharts using this service to obtain indicators parameters and values.
- **Highcharts/Highmaps**: it is the API used to show data as maps and graphics.

At this moment the main data sources and datasets are:

Datasets:

Cedefop Skills Forecast: Cedefop Skill Supply and Demand Forecasts provide comprehensive information on the future labour market trends in Europe. The forecasts refer to employment by sector, occupation, and qualification. The forecasts aim to act as an early warning mechanism to help to alleviate potential labour market imbalances and support different labour market actors in making informed decisions. <http://www.cedefop.europa.eu/en/events-and-projects/projects/forecasting-skill-demand-and-supply/data-visualisations>

Indicators:

- Future annual employment growth:
<http://skillspanorama.cedefop.europa.eu/en/indicators/future-annual-employment-growth>
- Future employment growth:
<http://skillspanorama.cedefop.europa.eu/en/indicators/future-employment-growth>
- Future employment needs:
<http://skillspanorama.cedefop.europa.eu/en/indicators/future-employment-needs>

European Skills and Jobs Survey: Cedefop's European skills and jobs (ESJ) survey provides insights into the match between the skills and jobs of adult workers in European countries. The analysis aims to inform a diverse audience of public vocational education and training (VET) and labour market policy-makers and the social partners, and to provide important lessons for policy-making geared towards tackling the phenomenon of skill mismatch in European job markets.

The ESJ survey was carried out by Cedefop in 2014 in all 28 EU Member States, collecting information on the match of the skills of about 49 000 EU workers.

Indicators:

- Under-skilling at hiring:
<http://skillspanorama.cedefop.europa.eu/en/indicators/under-skilling-hiring>
- Under-skilling:
<http://skillspanorama.cedefop.europa.eu/en/indicators/under-skilling>
- Skills obsolescence:
<http://skillspanorama.cedefop.europa.eu/en/indicators/skills-obsolescence>
- Skills under-utilisation:
<http://skillspanorama.cedefop.europa.eu/en/indicators/skills-under-utilisation>

Source: **Eurostat** (<http://ec.europa.eu/eurostat>)

Datasets:

Labour Force Survey

The European Union Labour Force Survey (EU LFS) is conducted in the 28 Member States of the European Union. The EU LFS is a large household sample survey providing quarterly results on labour participation of people aged 15 and over as well as on persons outside the labour force. All definitions apply to persons aged 15 years and over living in private households. Persons carrying out obligatory military or community service are not included in the target group of the survey, as is also the case for persons in institutions/collective households. (<http://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey>)

Note: Currently, all estimations presented are those of the Skills Panorama Team and not those of Eurostat or any of the national statistical authorities whose data have been used.

Indicators:

- Employed population by sector:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population-sector>
- Employed population by occupation:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population-occupation>
- Employment rate:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employment-rate>
- Unemployment rate:
<http://skillspanorama.cedefop.europa.eu/en/indicators/unemployment-rate>
- Employed population by country:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population-country>
- Employed population:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population>
- Population in education and training:
<http://skillspanorama.cedefop.europa.eu/en/indicators/population-education-and-training>
- Employees with no educational mismatch:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employees-no-educational-mismatch>
- Employees with ordinary educational mismatch:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employees-ordinary-educational-mismatch>
- Employed population in education and training:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population-education-and-training>
- Employees with severe educational mismatch:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employees-severe-educational-mismatch>

- Activity rate:
<http://skillspanorama.cedefop.europa.eu/en/indicators/activity-rate>
- Long-term unemployment rate:
<http://skillspanorama.cedefop.europa.eu/en/indicators/long-term-unemployment-rate>
- Part-time employment:
<http://skillspanorama.cedefop.europa.eu/en/indicators/part-time-employment>
- Working-age population:
<http://skillspanorama.cedefop.europa.eu/en/indicators/working-age-population>
- Young persons neither in employment nor education or training:
<http://skillspanorama.cedefop.europa.eu/en/indicators/young-persons-neither-employment-nor-education-or-training>
- Employed population by occupation and sector:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population-occupation-and-sector>
- Employed population by sector and occupation:
<http://skillspanorama.cedefop.europa.eu/en/indicators/employed-population-sector-and-occupation>
- Higher education mismatch:
<http://skillspanorama.cedefop.europa.eu/en/indicators/higher-education-mismatch>

National Accounts

National Accounts provide information to analyse the structure of economies and their development over time. The methodology applicable for data transmissions by EU countries from September 2014 onwards is defined by the European System of National and Regional Accounts 2010, ESA 2010. It is consistent with the world wide guidelines (SNA 2008) and replaces the previous system, ESA 95. This ensures the data used to formulate and monitor EU policies is comparable and coherent.

<http://ec.europa.eu/eurostat/web/national-accounts/overview>

Indicators:

- GDP: <http://skillspanorama.cedefop.europa.eu/en/indicators/gdp>

Source: **OECD** (<http://www.oecd.org/>)

Datasets:

PIAAC

- Level of proficiency in literacy
- <http://skillspanorama.cedefop.europa.eu/en/indicators/level-proficiency-literacy>
- Level of proficiency in numeracy
- <http://skillspanorama.cedefop.europa.eu/en/indicators/level-proficiency-numeracy>
- Level of proficiency in problem-solving
- <http://skillspanorama.cedefop.europa.eu/en/indicators/level-proficiency-problem-solving>
- Literacy average score
- <http://skillspanorama.cedefop.europa.eu/en/indicators/literacy-average-score>
- Numeracy average score
- <http://skillspanorama.cedefop.europa.eu/en/indicators/numeracy-average-score>
- Problem-solving average score
- <http://skillspanorama.cedefop.europa.eu/en/indicators/problem-solving-average-score>

PISA

The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. To date, students representing more than 70 economies have participated in the assessment. The most recently published results are from the assessment in 2012.

(<http://www.oecd.org/pisa/>)

Indicators:

- Low achieving pupils in mathematics:
<http://skillspanorama.cedefop.europa.eu/en/indicators/low-achieving-pupils-mathematics>
- Low achieving pupils in reading:
<http://skillspanorama.cedefop.europa.eu/en/indicators/low-achieving-pupils-reading>
- Low achieving pupils in science:
<http://skillspanorama.cedefop.europa.eu/en/indicators/low-achieving-pupils-science>

2.1. Indicators table

The database of indicators contains the following fields:

- Indicator code
- Country code
- Year (or year range)
- Gender
- Age (or age group)
- Sector code
- Occupation code
- Education level
- Working status
- Indicator absolute value
- Indicator percentage value
- Indicator increment value

2.2. Content types

Drupal CMS is based on a “**Content types**” data model, ensuring the contents will be managed in a structured way. This structure helps to keep the same Layout on all the contents, and help content managers to avoid errors when inserting and editing contents.

The main content types identified for the website are the following:

- Analytical highlights
- Blog articles
- Dashboards
- Datasets
- Events
- Experts
- News
- Skills
- Useful resources

Apart from those types, there will some other not specific for this application, like glossary terms, webforms, faqs

2.3. Dashboards

The Dashboards are complex content types which will include text edited in Drupal, and Dynamic charts created by the **Highcharts Library**. The objective of the use of Dashboards is the replication of analysis, in PDF format, allocated in the current website.

The skills panorama user experience consists of a series of dashboards to explore quantitative data. The existing types of dashboard are:

- 4 Skills theme dashboards (e.g. <http://skillspanorama.cedefop.europa.eu/en/skills-themes/matching-skills-and-jobs>)
- Sector dashboard (e.g. <http://skillspanorama.cedefop.europa.eu/en/sectors/primary-sector-utilities>)
- Sector > country / Country > sector dashboard (e.g. http://skillspanorama.cedefop.europa.eu/en/sectors/construction-1?field_countries_tid=17&edit-submit-businessservices=Apply)
- Occupation dashboard (e.g. <http://skillspanorama.cedefop.europa.eu/en/occupations/managers>)
- Occupation > country / Country > occupation dashboard (e.g. http://skillspanorama.cedefop.europa.eu/en/occupations/managers?field_countries_tid=7&edit-submit-businessservices=Apply)
- Country (e.g. <http://skillspanorama.cedefop.europa.eu/en/countries/eu>)
- Indicator (e.g. <http://skillspanorama.cedefop.europa.eu/en/indicators/under-skilling-hiring>)

Dashboards are created using a Drupal content type with the fields for each text block, and use Highcharts library for each Graph / Map.

- Dashboards contain a combination of quantitative and qualitative information (e.g. Analytical highlights, Useful resources, news, blog articles, etc.)
- Dashboards currently can contain up to 7 graphs (each graph can be selected and configured individually)
- Some dashboards contain up to 6 Smart data (Key facts). These are custom a dynamic presentations of quantitative data obtained obtained from the indicators database through a Json Call
- Dashboards can be filtered by a number of filters
- Filters are applied to both quantitative data and qualitative information

Datasets / Indicators are uploaded

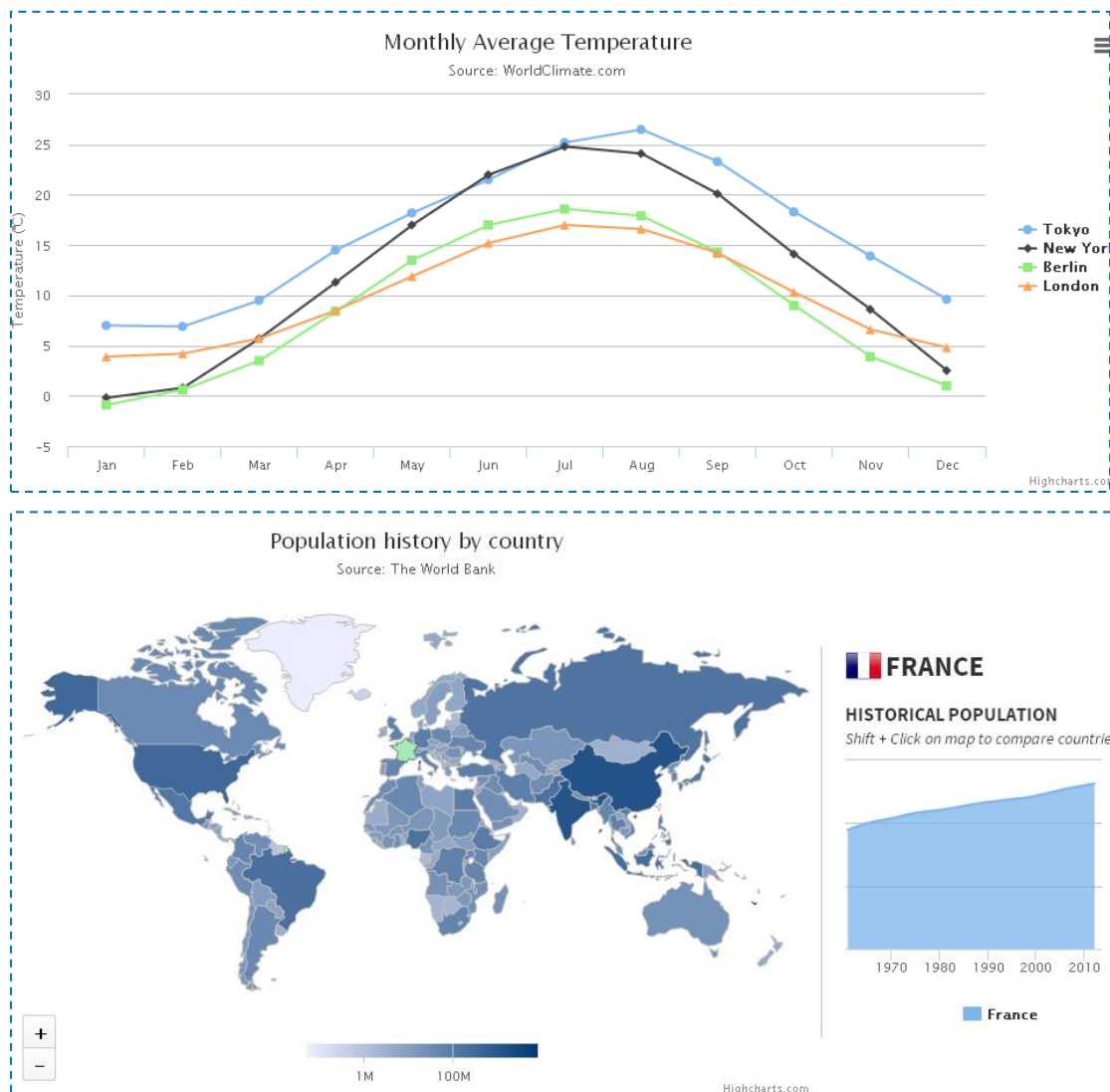
2.4. Highcharts (Graphical module)

Highcharts module for Drupal allows the display of several types of graphs. Because, Highcharts does not cover all the graph types needed for the Skills Panorama out-of-the-box, we have customized it to add more graph and all the filters needed. Also we will need to customize Highcharts so it will dynamically obtain data directly in the browser from the **Cedefop Rest Json service**, improving flexibility and response time as much as possible.

Example of charts created with Highcharts: <http://www.highcharts.com/demo>

Example of charts with maps created with Highcharts:

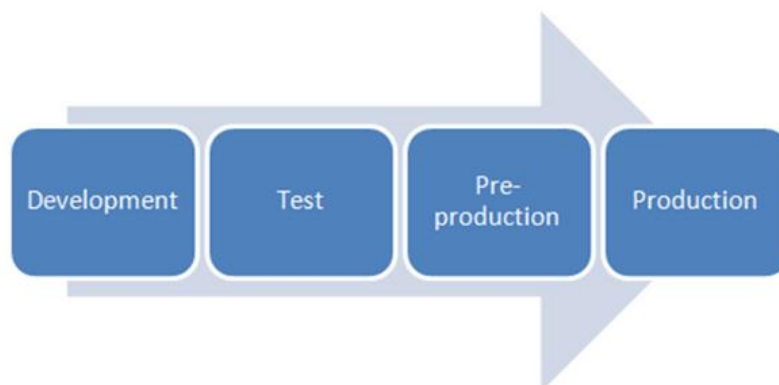
<http://www.highcharts.com/maps/demo>



3. DEPLOYMENT MODEL

Consists of four environments:

- **Development:** used by developers to perform **integration testing and unit testing**
- **Test:** used by the test team to perform the tests before **sprints and releases** deliveries
- **Staging:** Used by CEDEFOP to perform the **User Acceptance Testing**
- **Production:** Used by the final users



These environments, and the 4 different testing phases they represent, aim to guarantee the quality of the final website. These testing phases are:

- Unit testing
- Integration testing
- Sprints and releases testing
- User Acceptance Testing

Project management tools

- Atlassian JIRA is the project management tool used both for issue and bug tracking.
- A SharePoint space is used to store, organize and manage project documentation.

4. SOFTWARE ARCHITECTURE

Drupal tools:

- Drupal web server: Apache.
- Drupal database server: MySQL. Relational Database.
- Drupal application platform: PHP (Server-side scripting language).
- Drupal core: Drupal 7. Content Management System.
- Drupal search engine: Apache Solr.
- JDK7 (Java Development Kit, needed for Apache Solr and the Cedefop indicators web service).
- Tomcat (Web Server and servlet container, needed for the Cedefop indicators web service).
- Charts and Maps libraries: Highcharts and Highmaps

This is the structure for a Drupal web site with the addition of Apache Solr. Drupal 7 has been chosen for its stability, as it is, at the present time the most stable version of Drupal, its high level performance and for the high amount of available modules to extend its functionalities.

Role	Software Component	Comments
Operating system	Linux CentOS 6.5	
Web server	Apache httpd 2.2	
Application platform	PHP >= 5.4	Extensions: php-mysql, php-gd, php-xml, php-mbstring
Content management system	Drupal 7	does not need to be manually installed, as it is located on Github, together with the project source code
Relational database	MySQL 5.1	
Java runtime environment	Oracle JDK 7 Server VM 64bits	needed by the search engine
Servlet container	Apache Tomcat 7	needed by the search engine
Search engine	Apache Solr 4.9	
Repository	Subversion	
Deployment tool	Drush 6.3	
Scripting tool	Python	2.7 is recommended but 2.6 is enough for the moment
Charts and Maps	Highcharts Module	
oData export	oData php	
Olap Cube Tools	Pentaho Community edition 5.2	Using Mysql database

5. DRUPAL ADDITIONAL MODULES

Besides Drupal core functionality, a higher number of features can be added through the inclusion of modules, both contributed and custom:

- Contributed modules are those developed, tested and approved by Drupal, which provide functionalities beyond those contained inside its core. They require installation, configuration and, in some cases, customisation.
- Drupal custom modules are those specifically developed for this application.

5.1. Drupal contributed modules

The list of contributed modules used in Skills Panorama is:

AddToAny Module	It can be used to provide links to 3rd-party services for sharing contents.
Administration menú	It provides a theme-independent administration interface (aka. navigation, back-end).
Block Class	Block Class allows users to add classes to any block through the block's configuration interface.
Calendar	This module will display any Views date field in calendar formats, including CCK date fields, node created or updated dates, etc.
Common Functionality	Provides generic functions that are commonly used and provides functions that deal with common mistakes or common problems in Drupal.
CKEditor	This module will allow Drupal to replace textarea fields with the CKEditor - a visual HTML editor, usually called a WYSIWYG editor.
Comment Easy Reply	The Comment Easy Reply module tries to speed up the way users reply to existent comments, giving each comment a sequential number.
Comment Notify	Comment Notify is a lightweight tool to send notification e-mails to visitors about new, published comments on pages where they have commented. Comment Notify works for both registered and anonymous users.
Chaos tool suite	This suite is primarily a set of APIs and tools to improve the developer experience. It also contains a module called the Page Manager whose job is to manage pages.
Administer	It provides an interface for application administration.
Date	This package contains both a flexible date/time field type Date field and a Date API that other modules can use.
Devel	A suite of modules containing additional features for module developers and themers.
Drush	Drush is a command-line shell and scripting interface for Drupal.

Entity API	This module extends the entity API of Drupal core in order to provide a unified way to deal with entities and their properties. Additionally, it provides an entity CRUD controller, which helps simplifying the creation of new entity types.
Entity Soft Delete	Provides soft-deletion/trash bin functionality for Drupal. Content (node/comments/taxonomies/etc) is "soft-deleted" instead of deleted outright, and can be retained for a configurable span of time before being permanently purged. All this is opaque to end-users as all soft-deleted content is pervasively hidden from them, but administrators can access and restore soft-deleted content when necessary.
Entity Translation	Allows (fieldable) entities to be translated into different languages, by introducing entity/field translation for the new translatable field capability in Drupal 7.
Entity reference	Provides a field type that can reference arbitrary entities.
EU Cookie Compliance	This module intends to deal with the EU Directive on Privacy and Electronic Communications that comes into effect in the UK on 26th May 2012.
Facet API	The Facet API module allows site builders to easily create and manage faceted search interfaces.
Facet API Collapsible	It provides a facet API widget plugin for collapsible facets.
Features	The features module enables the capture and management of features in Drupal.
Feeds	Import or aggregate data as nodes, users, taxonomy terms or simple database records.
Feeds Tamper	Feeds Tamper provides a small plugin architecture for Feeds to modify data before it gets saved.
Multilingual feeds	It allows having feed content as multilingual.
Field collection	Provides a field-collection field, to which any number of fields can be attached.
Field Group	Fieldgroup will group fields together.
Field placeholder	Field Placeholder module gives support to add HTML5 placeholder attribute to field widget forms.
File Entity	File entity provides interfaces for managing files. It also extends the core file entity, allowing files to be fieldable, grouped into types, viewed (using display modes) and formatted using field formatters.
FitVids	Used to embed videos in the application.
Flag	Flag is a flexible flagging system that is completely customizable by the administrator. Using this module, the site administrator can provide any number of flags for nodes, comments, users, and any other type of entity. Some possibilities include bookmarks, marking important, friends, or flag as offensive.

Flex Slider	Flex Slider module integrates the Flex Slider library with Drupal and several contributed modules which allows you to build responsive, resizable slideshows. Meaning the slideshows automatically adapt to the size of the browser window or device.
Footer sitemap	Footer sitemap will output a block that may be placed into footer region to display a sitemap.
Google Analytics	Adds the Google Analytics web statistics tracking system to your website.
HMS Field	Displays an integer formatted as Hours, Minutes or Seconds.
Internationalization	This is a collection of modules to extend Drupal core multilingual capabilities and be able to build real life multilingual sites.
IMCE	IMCE is an image/file uploader and browser that supports personal directories and quota.
Job Scheduler	Simple API for scheduling tasks once at a predetermined time or periodically at a fixed interval.
jQuery Update	Upgrades the version of jQuery in Drupal core to a newer version of jQuery.
Language Switcher Dropdown	Language Switcher Dropdown is a very simple module that exposes a new block, similar to the default Language Switcher block provided by Locale module.
Legal	Displays Terms & Conditions to users who want to register, and requires that they accept the T&C before their registration is accepted.
Libraries API	The common denominator for all Drupal modules/profiles/themes that integrate with external libraries.
Link	The link module provides a standard custom content field for links.
Login Destination	The destination that a user is redirected to after logging in, registering to the site, using a one-time login link or logging out. The destination can be an internal page or an external URL.
Mail System	Provides an Administrative UI and Developers API for safely updating the mail_system configuration variable.
Media	The Media module provides an extensible framework for managing files and multimedia assets, regardless of where they are hosted.
Menu attributes	This simple module allows you to specify some additional attributes for menu items such as id, name, class, style, and rel.
Menu block	It provides configurable blocks of menu trees starting with any level of any menu.

Menu token	Menu Token module provides tokens that could be used in title or in path of menu items (links). For example, if you create a menu item with path: "user/[current-user:uid]", the url will be changed "on fly" to: "user/1" (assuming you are user 1).
Mime Mail	This is a Mime Mail component module (for use by other modules).
Modal forms	Modal forms make use of the modal feature in the ctools module to open some common forms in a modal window.
Module Filter	This module aims to accomplish is the ability to quickly find installed modules.
Mollom	Mollom is an intelligent content moderation web service. By monitoring content activity on all sites in the Mollom network, Mollom is in a unique position to determine if a post is potentially spam; not only based on the posted content, but also on the past activity and reputation of the poster.
Newsletter	It allows the creation and handling of newsletters.
Nodeblock	This module allows specifying content type(s) as being a block. This allows the content managers of the site to edit the block text and title without having to access the block administration page. Users only need edit access to that node in order to edit it.
Pathauto	The Pathauto module automatically generates URL/path aliases for various kinds of content (nodes, taxonomy terms, users) without requiring the user to manually specify the path alias.
Popup	The popup suite allows builders to popup tooltip-like text, nodes, blocks, menus, forms, views and php-generated content.
Translation template extractor	The Translation template extractor provides a web based and a command line Gettext translation template extractor interface for Drupal as well as a reusable API to look for translatable strings and translatability errors.
Publish button	It adds publish and unpublish buttons for a simpler editorial workflow.
Publish Content	This module enables granular publish and unpublish permissions which allows granting roles on your site the ability to publish or unpublish specific content types without having to give them the administer content permissions.
References	This project provides Drupal 7 versions of the 'node_reference' and 'user_reference' field types that were part of the CCK package in Drupal 6.
Search API	This module provides a framework for easily creating searches on any entity known to Drupal, using any kind of search engine.
Search API attachments	This module is an add-on to the Search API which allows the indexing and searching of attachments.

Search API Solr Search	This module provides a Solr backend for the Search API module.
Search API sorts	It provides custom sorts and a global sort block for Search API.
Search Autocomplete	This module allows adding autocomplete functionality to virtually any fields of a Drupal site.
Search API Multi Aggregate	This module provides a data alteration callback for Search API very similar to 'Aggregate Fields', but instead of reducing fields values into a single value, it keeps fields values "as is" so they are indexed into multi-valued indexes.
Security Kit	SecKit provides Drupal with various security-hardening options.
Service links	Service Links facilitates the adding of social networks links or javascript buttons within the content with a special focus on developers and themers interested to extend their number or customize their displaying.
ShareThis	Integration with the ShareThis social bookmarking utility on selected node types.
Simple hierarchical select	Simple hierarchical select defines a new form widget for taxonomy fields to select a term by "browsing" through the vocabularies hierarchy.
Simplified Social Share	It lets users share via their accounts on popular social networks such as Facebook, Google, Twitter, LinkedIn...
Site map	This module provides a site map that gives visitors an overview of the site. It can also display the RSS feeds for all blogs and categories.
Special menu items	Special menu items is a Drupal module that provides placeholder and separator menu items. A placeholder is a menu item which is not a link. It is useful with dynamic drop down menus where we want to have a parent menu item which is not linking to a page but just acting as a parent grouping some menu items below it.
Strongarm	Strongarm gives site builders a way to override the default variable values that Drupal core and contributed modules ship with.
Superfish	Superfish integrates jQuery Superfish plugin with Drupal menus.
Taxonomy CSV import/export	This module allows the import or export of taxonomies from or to a CSV (comma-separated values) file or with a copy-and-paste text.
Taxonomy menu	Transforms taxonomy vocabularies into menus.
Taxonomy Tools	Taxonomy Tools controls global access to taxonomy terms depending on the settings provided by the enabled taxonomy management tools. Also implements node access system to control access for nodes that are associated with taxonomy terms..

Thank You Commenter	It sends a mail to a person who comments on nodes.
Title	It allows the translation of Title fields.
Token	Tokens are small bits of text that can be placed into larger documents via simple placeholders, like %site-name or [user]. The Token module provides a central API for modules to use these tokens, and expose their own token values.
Custom Tokens	It gives the user the ability to create custom tokens for specific replacements that can improve other modules relying on the Drupal 7 token API or, for Drupal 6, the Token module.
Translation helpers	Translation helpers enables other modules to respond to changes in the "source translation" of a set of translated content. This functionality is useful for modules that track data by the "source translation".
Taxonomy Views Integrator	The TVI (Taxonomy Views Integrator) module allows selective overriding of taxonomy terms and/or vocabulary with the view of your choice. Using TVI you can easily create custom views to output all terms in X vocabulary.
Unpublish Button	This module provides an Unpublish button that will unpublish the currently published revision. The button exists on the node/%/edit form, and it performs actions on the currently published revision.
Universally Unique Identifier	This module provides an API for adding universally unique identifiers (UUID) to Drupal objects, most notably entities.
Variable	Variable module provides a registry for meta-data about Drupal variables and some extended Variable API and administration interface.
Video	Video module allows uploading video in any format, playing video in any format, transcoding video to H.246, Theora, VP8(Web compatible formats) using Zencoder or FFMPEG automatically creates video thumbnails, deliver videos from Cloud file systems, Mobile device compatibility.
Video Embed Field	Video Embed field creates a simple field type that allows embedding videos from YouTube and Vimeo and show their thumbnail previews simply by entering the video's url.
Viewing unpublished content	In Drupal 7, users are not allowed to view any unpublished content by default, not even content created by themselves. By enabling 'View own unpublished content', you grant users access to their own unpublished content.
Viewfield	Viewfield provides a field that holds a reference to a View and renders it whenever the entity containing the field is displayed.
Views	The Views module enables the creation and formatting of lists of contents.

Views PHP	This module allows the admin account (user 1) to add fields, filters and sorts to views which use PHP code. It also supports additional accounts when the core PHP Filter module is enabled.
Webform	Webform is the module for making forms and surveys in Drupal.
Webform Link	Adds a webform component that lets the user enter a URL. The module verifies that a valid URL is entered and displays the result as a link.
Workbench	Workbench provides overall improvements for managing content that Drupal does not provide out of the box.
Workbench Email	Provides a way for administrators to define email transitions and configurable email subject / messages between those transitions.
Workbench Moderation	Workbench Moderation adds arbitrary moderation states to Drupal core's "unpublished" and "published" node states, and affects the behavior of node revisions when nodes are published. Moderation states are tracked per-revision; rather than moderating nodes, Workbench Moderation moderates revisions.
X Autoload	xautoload is a comprehensive and yet highly efficient PHP class loading suite.
Drupal SEO Tools	The Drupal SEO Tools module integrates a suite of search engine reporting, analysis and optimization tools into Drupal.
Global Redirect	Global Redirect is a simple for SEO that makes sure users are going to the correct alias of a node.
Metatag	The Metatag module allows the provision of structured metadata, aka "meta tags", about a website.
XML sitemap	The XML sitemap module creates a sitemap that conforms to the sitemaps.org specification.

5.2. Drupal custom modules

The list of modules specifically designed for the Skills Panorama are:

cedefop_analytical_highlights	This module contains customisations needed to handle and show analytical highlights.
cedefop_blog	This module contains customisations needed to handle and show blogs and blog articles.
cedefop_browser_language	It removes the 'cache' setting from LOCALE_LANGUAGE_NEGOTIATION_BROWSER since the code that utilizes this setting will in fact prevent browser negotiation.
cedefop_comments	This module contains customisations needed to show comments.

cedefop_dashboard	It customises dashboard content type edition page.
cedefop_events	This module contains customisations needed to handle and show events.
cedefop_experts	This module contains customisations needed to handle and show experts.
cedefop_log	It handles log out.
cedefop_myprofile	This module contains customisations needed to handle and show user's page.
cedefop_news	This module contains customisations needed to handle and show news.
cedefop_solr_search_filters	This module contains customisations needed to handle and show search and search results.
cedefop_useful_resources	This module contains customisations needed to handle and show useful resources.
footermmap	This module queries the menu for pages and makes a dynamic sitemap at the bottom of the page.
responsive_menus	This module makes Drupal menus become responsive.

6. REFERENCES

<https://www.drupal.org/>
<https://www.mysql.com/>
<http://lucene.apache.org/solr/>
<http://tomcat.apache.org/>
<http://www.highcharts.com/>