Grant Agreement: 644047

Integrated Tool chain for model-based design of CPSs

HUBCAP Collaboration Platform v4

Technical Note Number: D5.5

Version: 1.0

Type: Other

Date: June 2022

Public Document

HUBCAP (au.dk)

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Document History

Ver.	Date	Author	Description
0.1	16-05-2022	Pietro Greco, Giuseppe Veneziano	ToC and initial material
0.1	24-06-2022	Bogdan Pirvu, Dario Pietraroia	Peer Review
0.2	24-06-2022	Angelo Marguglio	Internal Review
0.3	29-06-2022	Pietro Greco, Giuseppe Veneziano	Refinements
1.0	30-06-2022	AU-TEAM	Document ready for submission

List of Definitions (HUBCAP contextualized)

Term	Definition
Catalogue	Set of entries available in the Collaboration Portal describing CPS tools or models, Guidelines, DIH Services, Companies and Success Stories
Collaboration Platform	Platform resulting from the combination of the *Collaboration Portal* and *Sandboxing Middleware*
Collaboration Portal	It is the entry point of the Collaboration Platform. It provides access to a set of functionalities and assets conceived to foster collaboration among project stakeholders. It is based on a ENGIT asset called DIHIWARE.
Model	Archive containing files and directories implementing a CPS model usable inside a sandbox
Operating System	A minimal installation of a Linux or Windows OS ready-to-use inside a sandbox for installing a CPS tool
Repository	List of sandbox-instantiable operating systems, tools and models
Sandbox	Isolated set of running tools, operating systems and models featuring a dedicated local network and a shared storage
Sandbox Viewer	Web page through which it is possible to interact with all the sandbox components
Sandboxing Middleware	Provides a protected environment where CPS tools and models can be safely evaluated inside sandboxes
System Interactive Mode	Every day the HSM switches between two modes: interactive and batch. During the first one a HSM user can interact with a sandbox via the sandbox viewer.
Tool	CPS Software for Model Based Design which has been added to the Tools Repository

List of Acronyms

Acronym	Description
CPS	Cyber Physical Systems
CTA	Call to Action
DIH	Digital Innovation Hub
HCP	HUBCAP Collaboration Portal
HSM	HUBCAP Sandboxing Middleware
IDM	Identity Manager
IPR	Intellectual Property Rights
KPI	Key Performance Indicator
LTS	Long Term Support
MBD	Model-based Design
OAUTH	Open Authorization
OC	Open Call
OIDC	OpenID Connect
OS	Operating System
OSP	One Session Passphrase
PC	Personal Computer
REST	Representational State Transfer
SBM	System Batch Mode
SIM	System Interactive Mode
SME	Small and Medium size Enterprise
UI	User Interface
UIS	User Interactive Session
VM	Virtual Machine
WBS	Work Breakdown Structure

Abstract

This report describes the main results achieved in the last six months of work and in particular focuses on the incremental changes made to the HUBCAP Collaboration Platform (Figure 1) to obtain the new, current **release 4.**

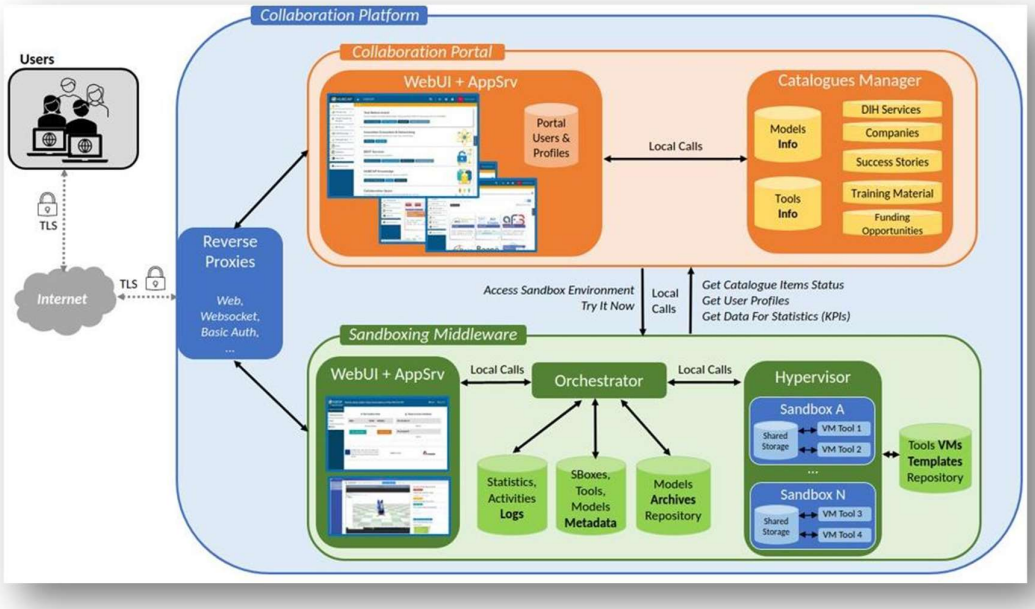

Figure 1 - Collaboration Platform Architectural Overview from D5.4

A **first substantial result** was the **upgrade** of the **Collaboration Portal** subsystem to the latest version of the underlying DIHIWARE environment in order to:

- **solve** the issues identified in the previous release,
- **respond** to user feedback, and
- **provide** a revised and modern user interface.

The main solutions offered in release 4 - grouped along with the corresponding identified issues / improvement opportunities - are shown in the following table (Table 1):

Identified Issues and/or Improvement Opportunities	Solutions in new release 4
Tools and Models Catalogues Search function	• A structured content filtering allows to search by a combination of matching criteria for **specific fields of models and tools catalogues entries** • A simpler and more efficient **plain text search** functionality is **embedded in the models and tools catalogues user interface**
Forms robustness and clarity	• The data entry forms of models and tools catalogues have been hardened and now offer a **more robust**, **reliable** and **clear** way of entering data
User Interface	• An improved, more **modern user interface has been implemented**
Content Organization	• Some **easier to use viewers** for various content (e.g., Figure 16 - DIH Services catalogue) have been integrated in the new pages' layout

Table 1 - Summary of the identified issues / improvement opportunities with corresponding solutions

In addition to this software upgrade - since the new DIHIWARE version is not backward compatible - it was necessary also to **migrate all the pre-existent data** from the old portal to the new one.

A **second remarkable result**, coming from a great deal of work done on platform **sustainability**, was the agreement and the planning of the creation – during the next six months - of a **replication package**, which will allow the instantiation of a "replica" of the HUBCAP Collaboration Platform surviving after the end of the project on a server managed by a HUBCAP Community.

Other notable results are related to the **Sandboxing Middleware,** whose

- **TLS configuration** has been updated to reflect the latest security standards and maintain a high-level ranking, as verified via the Qualys SSL Labs tool, and

- **interactive access time slot** extended from 10 hours per day to **24/7** after completing the HSM fine-tuning.

Finally, also important is the **work approach** followed to achieve these results, based on paying a lot of attention to end-users, DIHs and OC Winners' **feedback** and on discussing in **ad-hoc multi-lateral** meetings the best answer to users' needs.

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1 Introduction

This report details improvements, new and revised functionalities, initiatives to support users and other novelties introduced by this release 4. In particular:

- Section 1.1 (Sustainability) describes the initial work on **sustainability** as well as the first outcomes
- Section 1.2 (Upgrade to the new Collaboration Portal and Data Migration) details requirements, challenges and solutions for performing these processes
- Section 2.1 (Basic Collaboration and Social Functionalities) goes through the native Liferay widgets, namely: Blog, Forum, Wiki, Calendar and Documents and Media, providing for each of them a short description
- Section 2.2 (Catalogues Manager) illustrates:
    - The updated tools and models catalogues
    - The D-BEST Services catalogue now featuring an improved, **more powerful** and **easier to use** viewer
    - The new Success Stories catalogue, important to inform the community about the **results achieved by the HUBCAP users** through the platform
    - The new co-editor capability offered for models and tools catalogues entries by the Catalogue Manager
- Section 2.3 (User Support) presents a few initiatives to **better support the platform users**:
    - Quick references to the online HSM User Manual, where users can find everything they need to be able to run the experiments fruitfully
    - A prototype for a visualisation tree intended to guide users in the adoption of the CPS assets and/or MDB techniques best suited to their needs
- Section 2.4 (FIWARE Keyrock IDM (IDentity Manager)) describes the HUBCAP Collaboration Platform **authentication** and **authorization rules enforcer**
- Section 3 (HUBCAP Sandboxing Middleware) overviews the **main updates** to the HUBCAP Sandboxing Middleware and support given to its users

- Section 4 (KPIs (Key Performance Indicators)) depicts the **addition of charts** to other KPIs reports and a **new filtering module** for charts
- Section 5 (Next Steps) closes the document by anticipating the creation of a **"replication package"** particularly important to the **future sustainability** of the HUBCAP achievements

1.1 Sustainability

The initial work on **sustainability** has involved some of the WP5 partners as well as other WPs members and external stakeholders. The effort, channelled through a dedicated taskforce, has been multifaceted and traversed different types of activities aiming to find synergies and ways forward. In particular:

- ENGIT and AU performed a **technical pre-analysis** of the assets of other European projects to evaluate any collaboration/integration possibilities
- ENGIT **depicted an initial Work Breakdown Structure** (Figure 2)

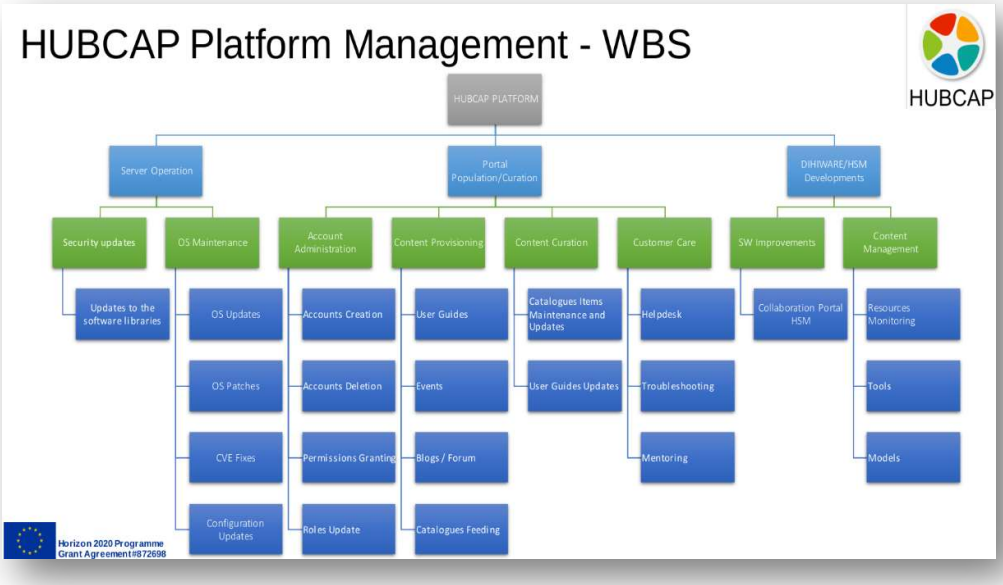


Figure 2 - An initial Work Breakdown Structure

to better detect the roles needed to manage a community-led HUBCAP platform from an administrative perspective

- ENGIT **participated in many multi-lateral meetings** with project partners, OC winners and external stakeholders to evaluate different ways for going forward

- ENGIT **planned the creation of a replication package** able to allow the instantiation of another HUBCAP Collaboration Platform - managed by a HUBCAP Community – to exploit the outcomes of the project also after its end.

1.2 Upgrade to the new Collaboration Portal and Data Migration

One of the main achievements of this new release is the **upgrade** of the **Collaboration Portal** subsystem to the latest version of the underlying DIHIWARE environment. This goal, particularly challenging due to the lack of backward compatibility of the new DIHIWARE version, has been achieved through careful planning, testing and putting emphasis on the design of data migration. After the completion of these activities, the users were able to move smoothly and transparently to the new release enjoying enhanced functionalities without losing the previous contents.

1.2.1 Some details about the Collaboration Portal upgrade and data migration

The upgrade and data migration of the Collaboration Portal was challenging because of

- the **pre-existent data** to keep (e.g., the catalogues contents and the users' info with their roles and permissions for the different parts of the platform, included the HSM)
- the **deep coupling** between **Collaboration Portal** and **Sandboxing Middleware** (e.g., specific HSM users' profiles, cross-links between HSM Repositories and HCP Catalogues, Try It Now functionality, and so on)
- the **different representations** of some internal data.

Data-wise, the migration to the new version posed the main requirement of keeping unaltered all the users' contents and roles.

Functionalities-wise, the most important aspect was to maintain operational the interaction between the Collaboration Portal (HCP) and the Sandboxing Middleware (HSM).

Users-wise, all the just mentioned processing had to be completed in a transparent way without requiring any intervention from the HUBCAP Platform clients.

As for the user-provided **content**, effort has been put into transferring the catalogue entries to the new instance ensuring that the updated catalogues internal structures and forms fields would not cause any issues nor hinder future users updates to these entries.

As far as **authorization rules** are concerned, the migration of existing roles and permissions made it necessary to implement some data conversion procedures aimed

at ensuring that all the information required was correctly transferred to the new and updated instance of Identity Manager (section 2.4).

Finally, regarding the **interactions between HCP and HSM**, it was necessary to rewrite some of the parts of the backend software aligning it to the new internal mechanisms and standards.

2 HUBCAP Collaboration Portal: Key Updates and Features Delivered in Release 4

The latest version of the Collaboration Portal subsystem offers several improvements at various levels through the upgrade of its main sub-components:

- **Liferay**
- **Catalogues Manager**
- **Identity Manager**

The **Liferay portal** (https://liferay.dev/) is the HUBCAP Collaboration Portal base building block. The new Liferay 7 Community Edition **natively** offers a wide range of more reliable and robust widgets. A selection of the most popular ones – shipped in the original Liferay implementation - has been provided ready to use in release 4 of the HUBCAP Collaboration Portal.

The **Catalogues Manager,** developed by ENGIT and integrated into the HUBCAP Platform, is the main persistence layer of the HUBCAP Collaboration Portal. Here is where information about DIHs, Companies, Tools and Models metadata, Success Stories and Guidelines are stored. The latest release provides enhanced search functions, data entry forms, views and co-editing capabilities.

The **Identity Manager (IDM)**, provided by FIWARE Keyrock (https://www.fiware.org/), manages the authentication rules. This version provides good support and a handily configuration of the OpenID Connect authentication layer.

The following sub-sections go through the native Liferay widgets, the improvements to the Catalogue Manager as well as the new and revised D-BEST Services and Success Stories catalogues. After a description of a few initiatives to better support users, the Section 2 is closed by a short description of the IDM component.

2.1 Basic Collaboration and Social Functionalities

2.1.1 Liferay Social functionalities

The Liferay framework offers natively several social functionalities conceived to encourage collaboration, networking and knowledge sharing. The most popular of these functionalities - provided ready-to-use in release 4 of the HUBCAP Collaboration Portal - are described briefly in the following paragraphs.

2.1.1.1 Liferay Blog

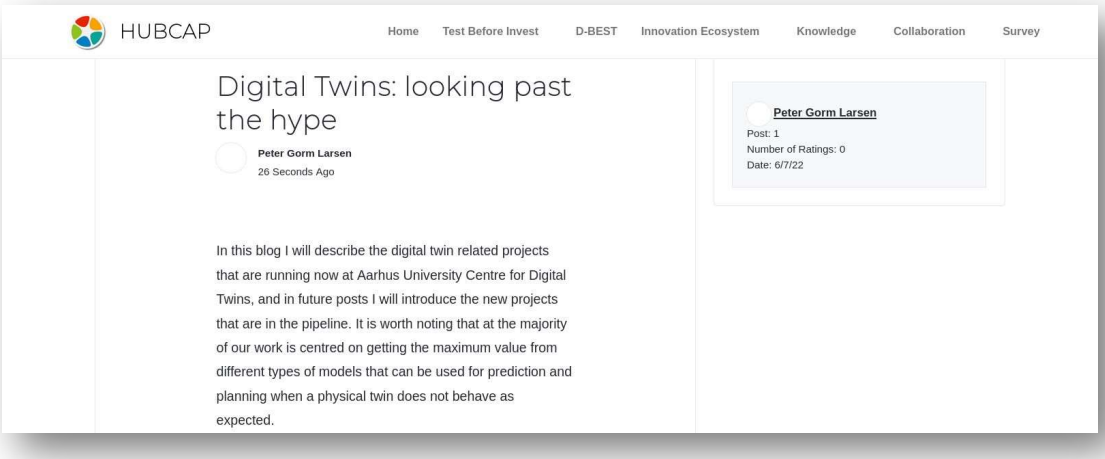


Figure 3 - Sample Blog Post

The **Blog section,** available under the Collaboration tab of the top navigation bar, is an excellent way to reach out to other users to share achievements, trends, research results and new initiatives, encouraging at the same time discussions.

Blog posts authors are provided with a rich set of HTML-enabled editing tools through which they can create and edit articles fully controlling the way they are presented to readers (Figure 4).

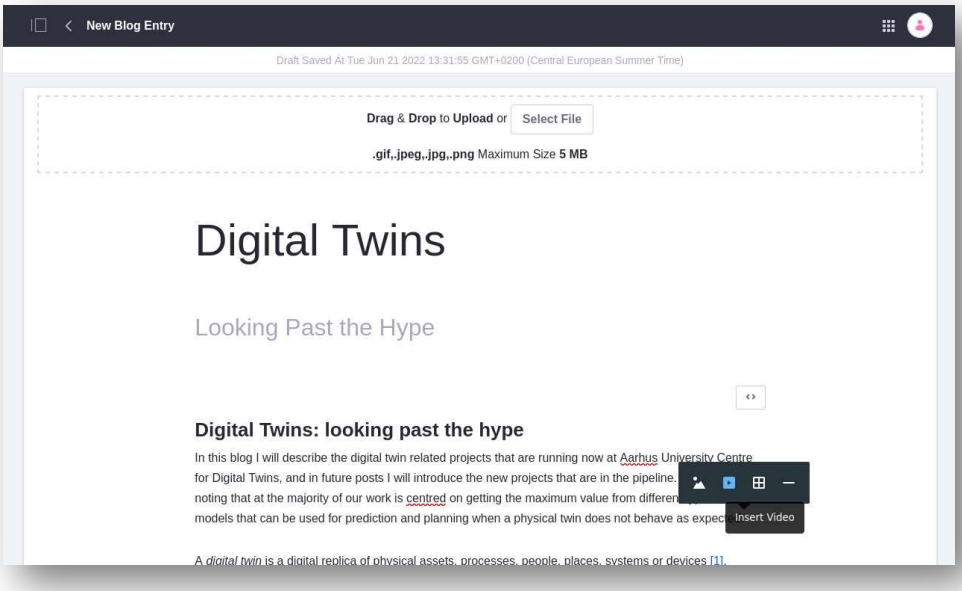


Figure 4 - New Blog Entry author's panel

Readers, on the other hand, can like or dislike blog posts, comment, reply, subscribe to new posts or comments, and much more (Figure 5).

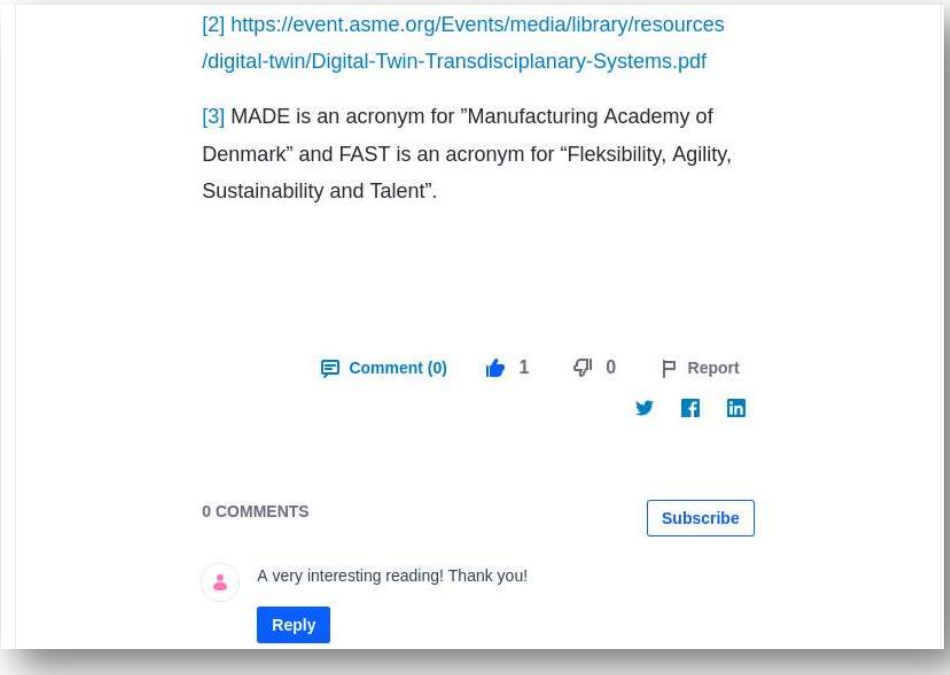


Figure 5 - A detail of the social functionalities available in the Blog section

2.1.1.2 Liferay Message Boards

The **Forum section**, also available under the Collaboration tab of the top bar, it is one of the main centres of discussion and networking. Here, users can interact with each other asking for help, suggestions, discussing and organizing activities, initiatives, and more in general express their opinions on a range of topics related to the Cyber-Physical Systems and Model-based Design world.

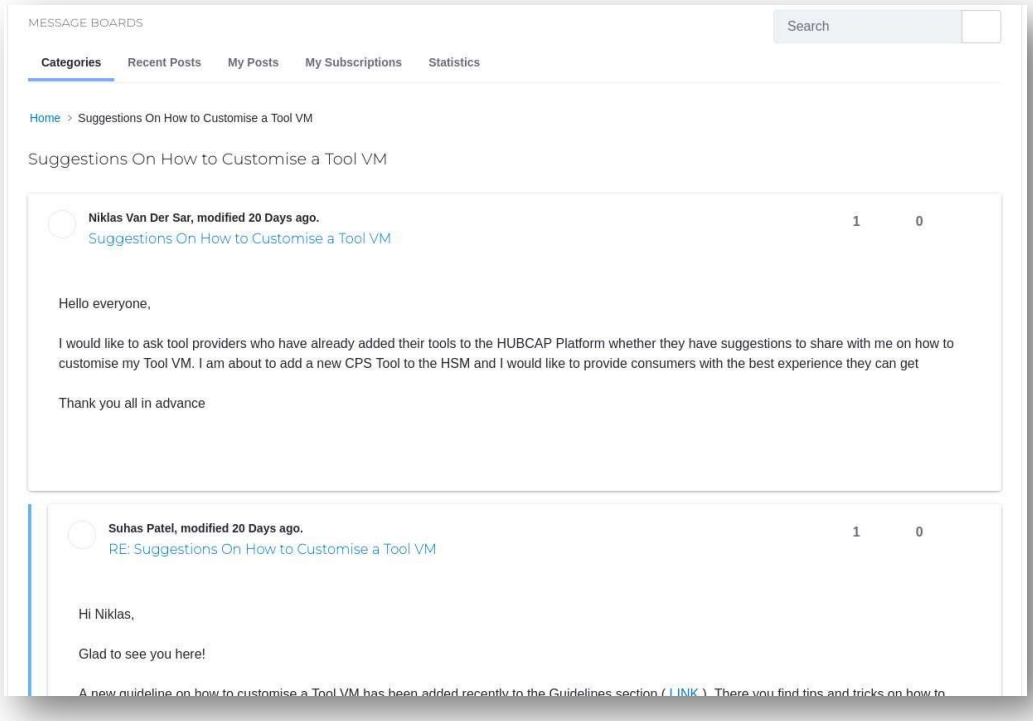


Figure 6 - Sample thread in Forum section

Here, threads authors are offered a BBCode (Bulletin Board Code)-enabled WYSIWYG editor through which they can lay out and publish their initial post, adding links, images and attachments (Figure 7).

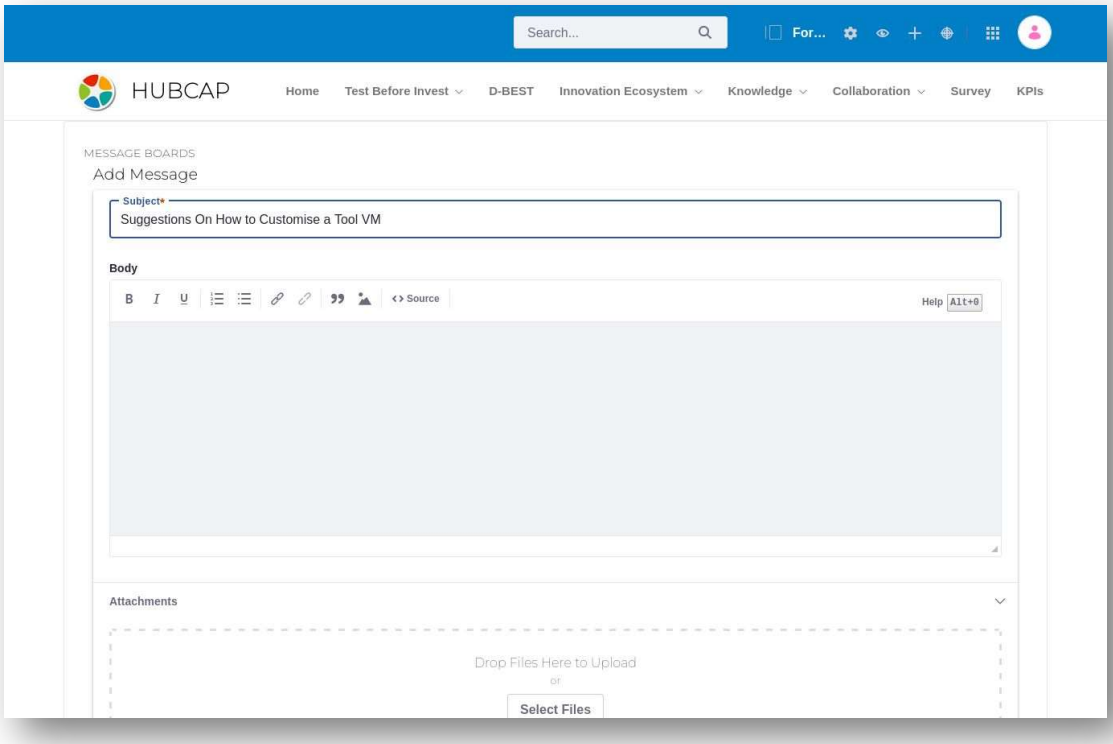


Figure 7 - Add Message panel (Forum Section)

After publishing, other users will be able to reply, like or dislike, subscribe to changes and comments.

2.1.1.3 Liferay Wiki

The Wiki, shown in Figure 8 and available under the Collaboration tab of the top bar, allows users to collaboratively build a repository of information, creating pages and linking them to each other. Like most of the known wiki tools, the application allows users to create parent and child pages, so they can arrange structured content and navigate it. Enabled users can post comments and reply to comments staying updated by subscribing to a specific topic and getting a notification whenever a change occurs.

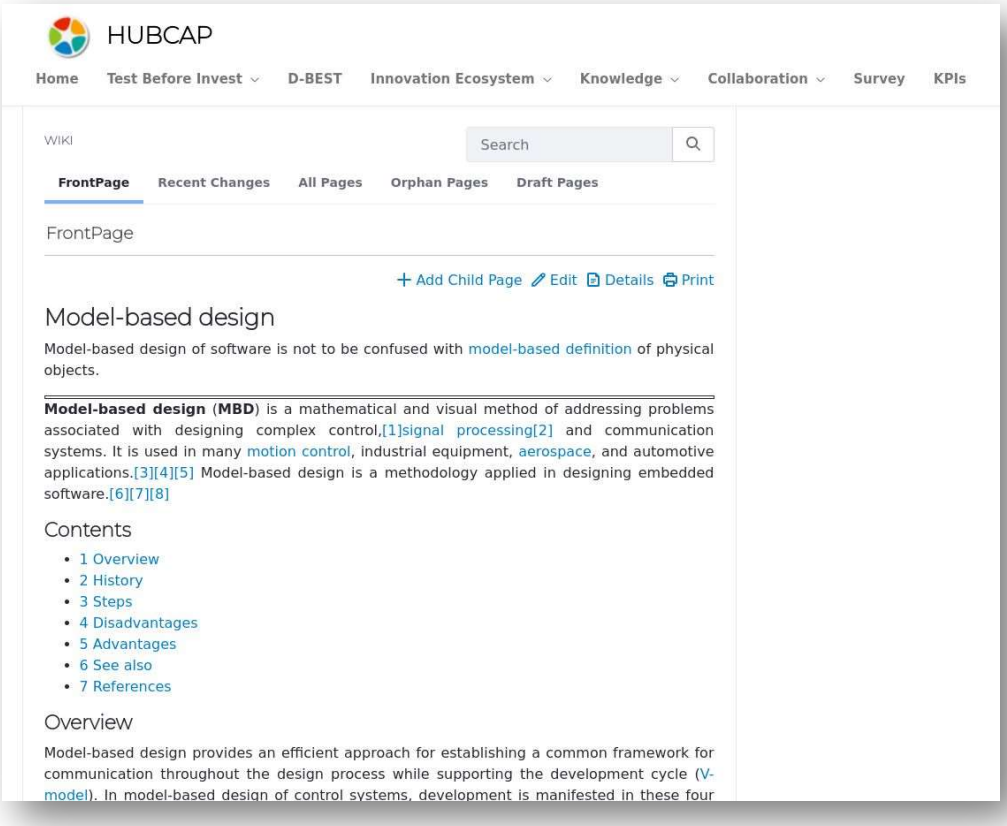


Figure 8 - Wiki section

In this case, wiki pages authors are provided with a Creole Syntax-enabled editor and have the possibility to add attachments (Figure 9).

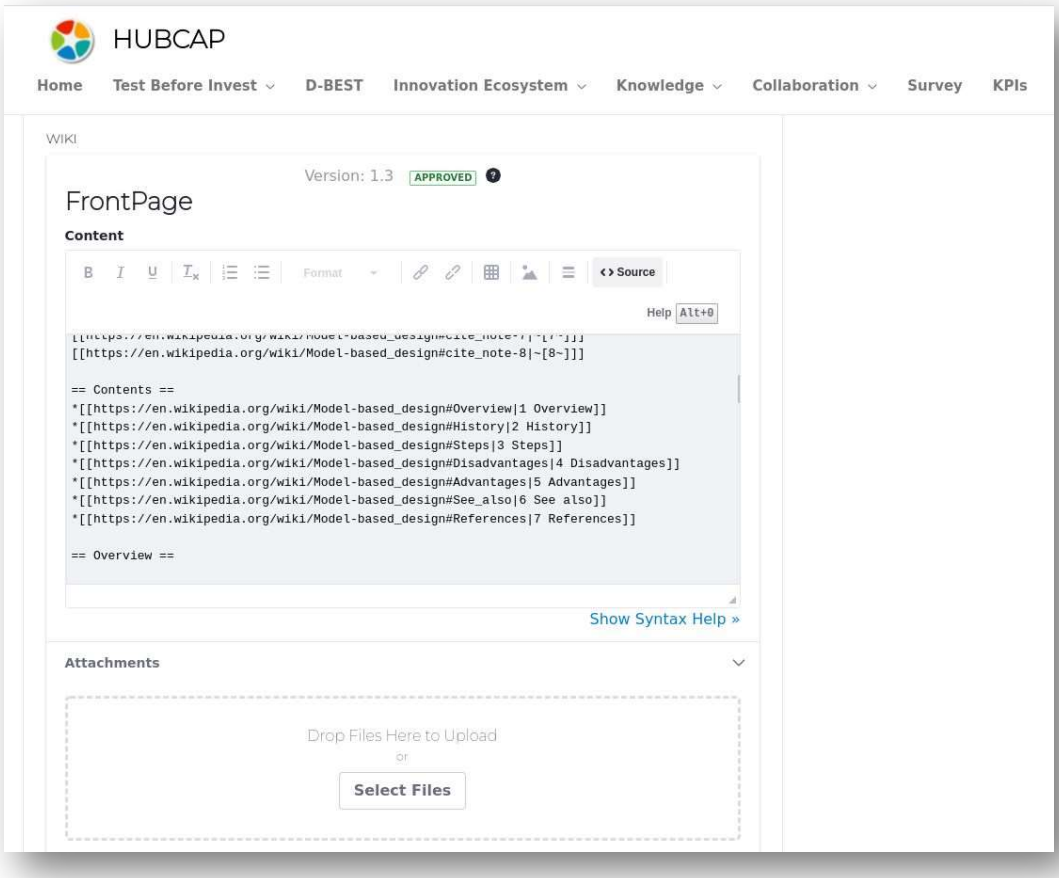


Figure 9 - Wiki page editing panel

2.1.1.4 Liferay Calendar

The **Events section**, available under the Knowledge tab of the top bar, allows to access to a Calendar through which it is possible to define and publish events of interest for the community (Figure 10).

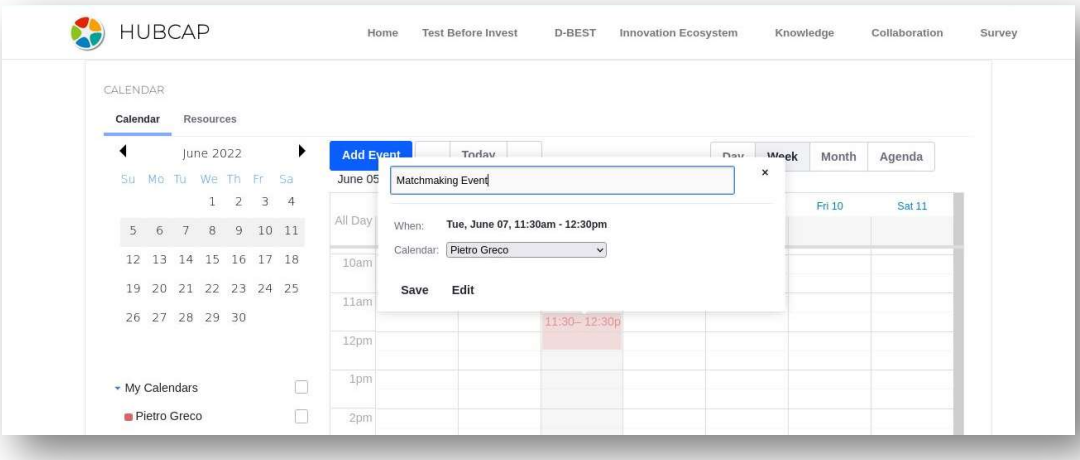


Figure 10 - Calendar in the Events section

2.1.1.5 Liferay Documents and Media

The **Papers & Publications section**, available under the Knowledge tab of the top bar, gathers papers, articles and other content produced by the HUBCAP community as part of the work done for public conferences and other dissemination activities. Figure 11 below:

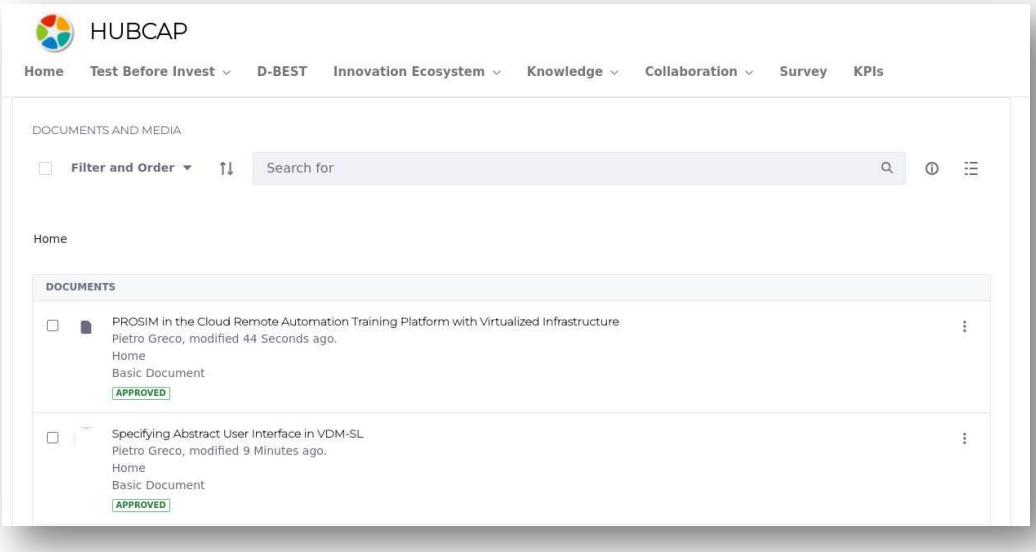


Figure 11 - Documents and Media widget where Papers and publications are stored

The users can read the papers online, download, comment and subscribe to changes (Figure 12).

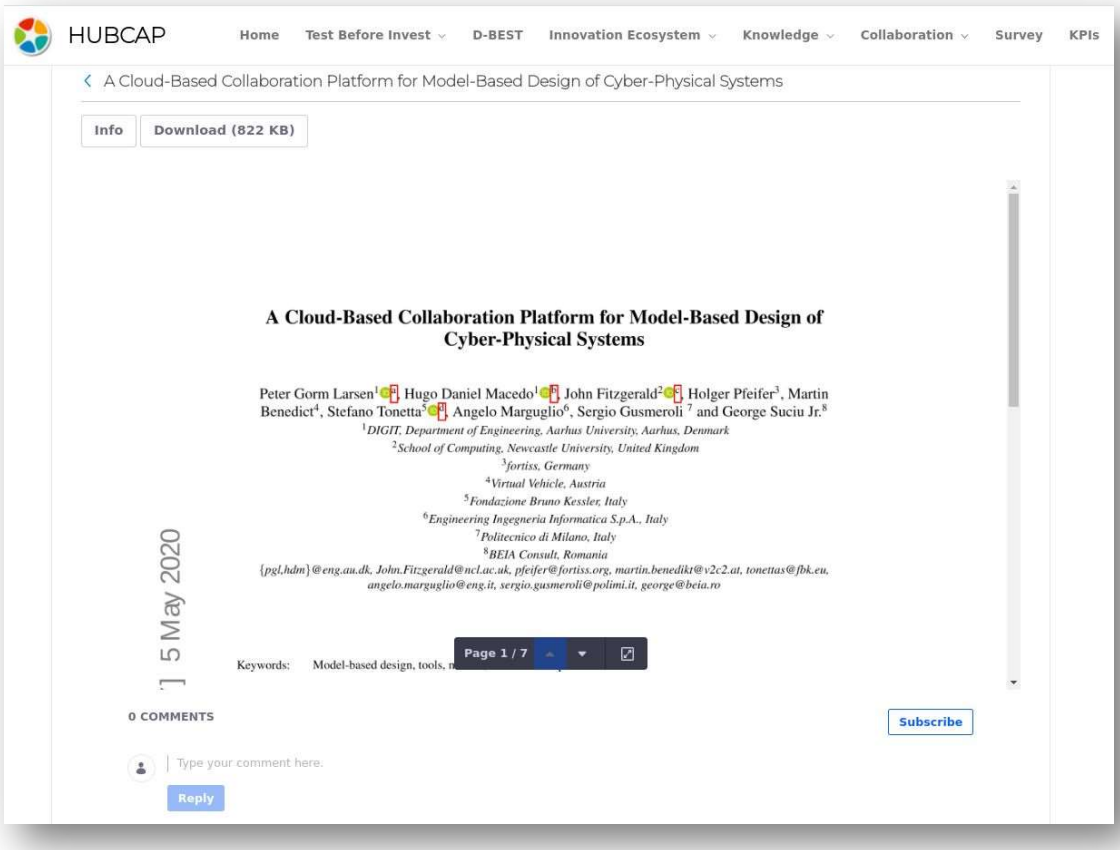


Figure 12 - Documents and Media embedded viewer

2.2 Catalogues Manager

2.2.1 Updated Tools and Models Catalogues

2.2.1.1 Improved Catalogues Search Function

Based on the feedback received from end-users, project partners and survey respondents, release 4 of the HUBCAP Collaboration Portal offers an improved search functionality **specific and embedded in the Catalogue Manager** and available for ***Tools, Models, DIHs and Companies catalogues***. Now users can search for the items of interest through a simple plain text search bar. It is sufficient to add a keyword to retrieve the results wanted. In addition, it is also possible to search by specific fields corresponding to specific items metadata. For instance, a user can specifically search by Name, Maturity Level, Licence Type, Provider also deciding whether to combine the conditions using Boolean operators, as shown in the following figure (Figure 13):

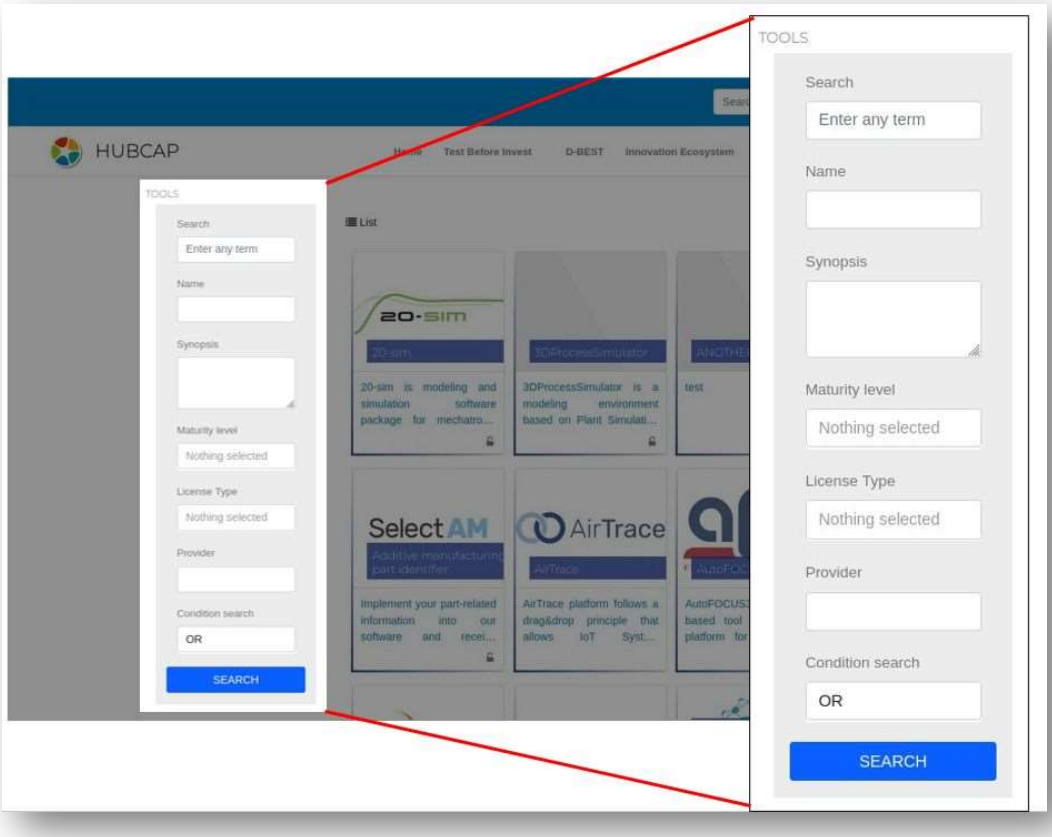


Figure 13 - Enhanced search functionality for models and tools catalogues

2.2.1.2 Improvements to the Tools and Models Catalogues Entry Forms

Improvements to the Model-based Techniques field and terms

Based on the feedback from WP6, the Model-based Techniques field available for Models and Tools Catalogues has undergone two major improvements:

- It has been split into three fields (Figure 14):
  - Model-based Techniques
  - Model Type
  - Models Languages, and
- The terms available for *the Model-based Techniques* field as well as those for the new *Model Types* and *Model Languages* fields have been normalized

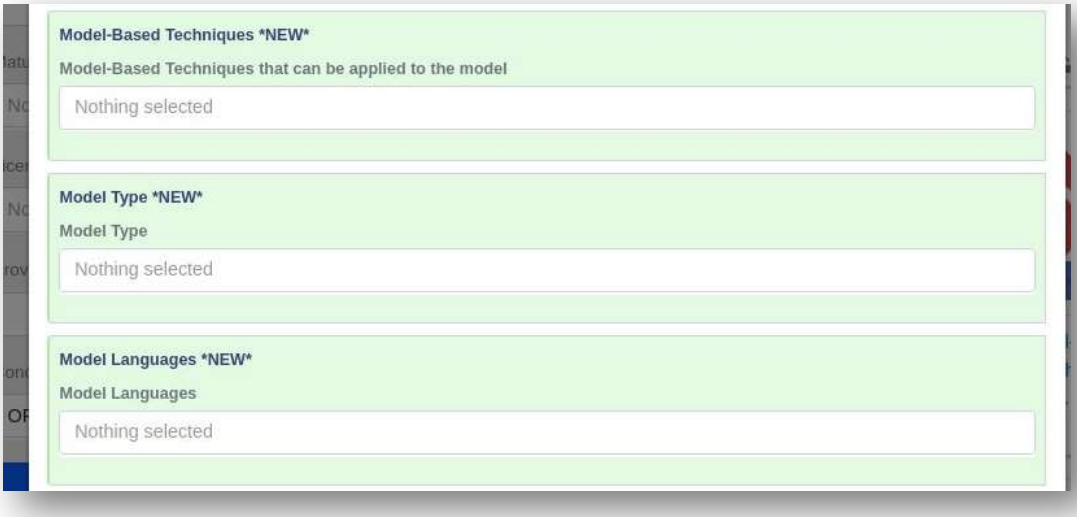


Figure 14 - Splitting of Model-based techniques field

This enables a better, more structured and homogenous classification of tools and models.

Improvements to the Models and Tools Catalogues Data Entry Forms

The old *Model-based techniques* text field and the new *Model Types* and *Model Languages* fields now feature multi-selection combo boxes through which users can select the available terms from a predefined normalized list. These fields are now also

equipped with an **autocomplete-enabled** search bar, making it **easier** and **faster** to find specific terms. See Figure 15 below.

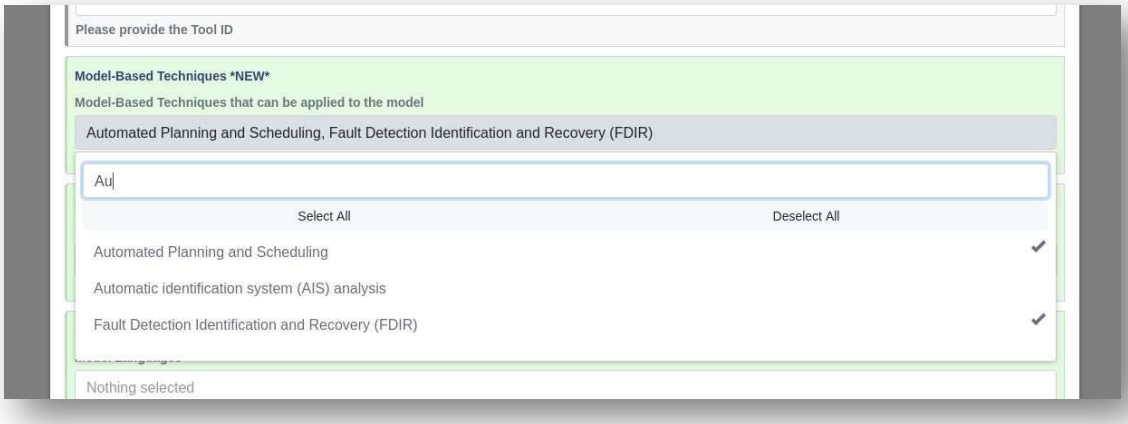


Figure 15 - Detail of the improved multi-selection combo boxes, also showing autocomplete-enabled search

2.2.2 D-BEST Services Catalogue

As for the BEST Services Catalogue two updates can be found in the new release:

1. Addition of the "D" Data Section, hence this catalogue is now referred to as D-BEST catalogue
2. Improved D-BEST Services viewer (Figure 16)

The **new *Data* category** collects all those services belonging to sub-categories such as:

- Data Acquisition and Sensing
- Data Processing and Analysis
- Decision Making
- Physical-human Action and Interaction
- Data Sharing

The ***new D-BEST Services viewer*** gives users the possibility to browse services by sub-categories: Data, Business, Ecosystem, Skill and Technology, or by the offering DIH (see combo box in the Figure 16 below).

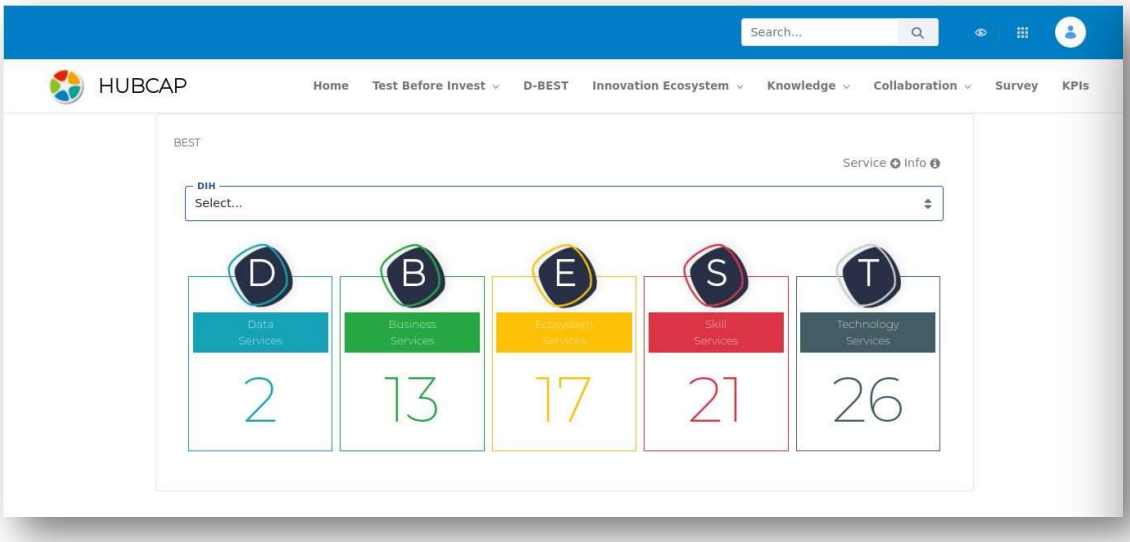


Figure 16 - New D-BEST Services Visualisation

Once selected a particular category, users are offered the list of corresponding services as well as search functionalities. Specifically, the services can be filtered:

1. By selecting the offering DIH through the corresponding combo box at the top
2. By hiding services of a specific sub-category (by default all sub-categories are shown)
3. By using the Search bar just below the list of sub-categories

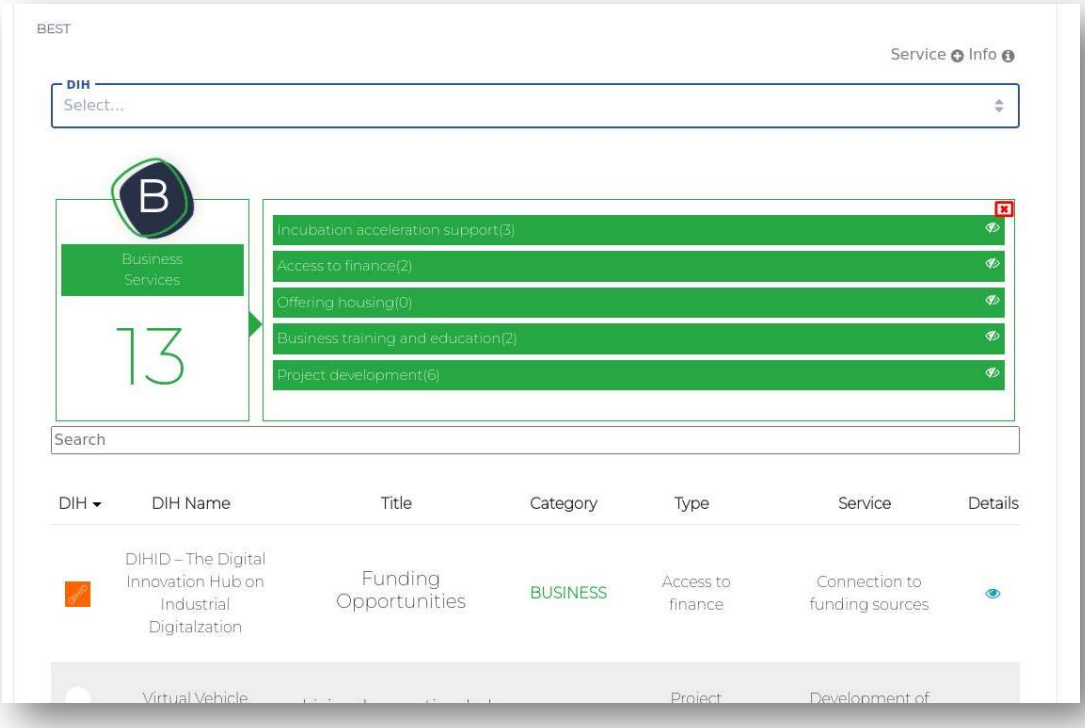


Figure 17 - List of services for the Business category

By clicking on the “eye” icon alongside a particular service in the list, users are shown a service details dialog (Figure 18)

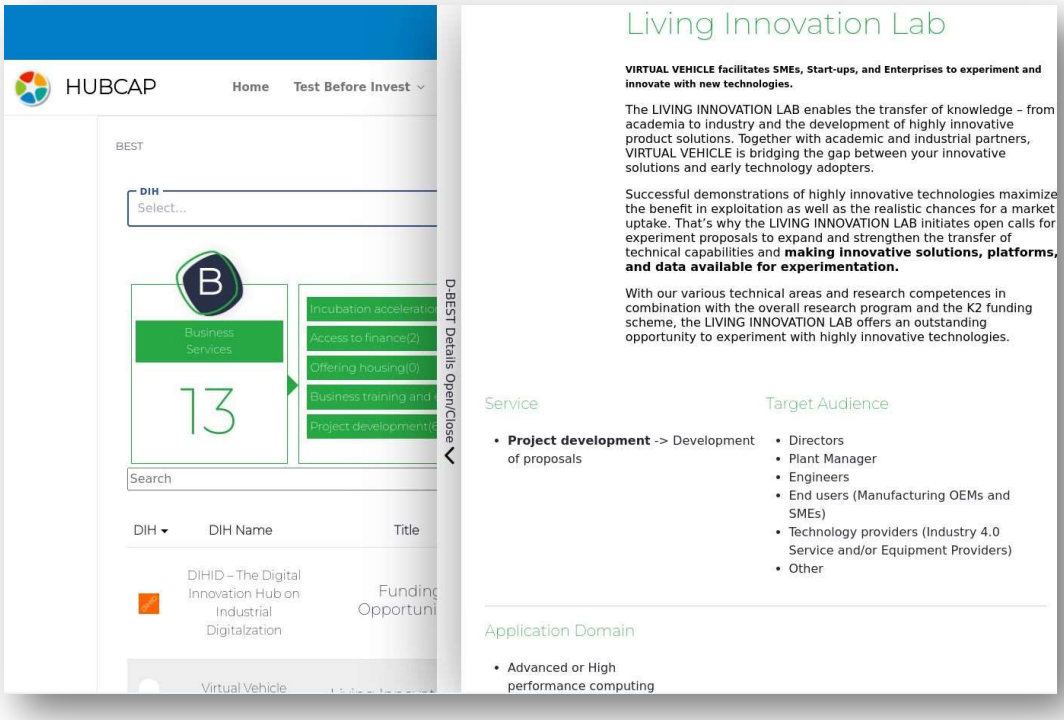


Figure 18 - Service details panel

2.2.3 Success Stories Catalogue

The new release also introduces a new catalogue collecting success stories from OC Winners and not only that through the HUBCAP Collaboration Platform functionalities managed to achieve valuable results. Figure 19 show the list of success stories

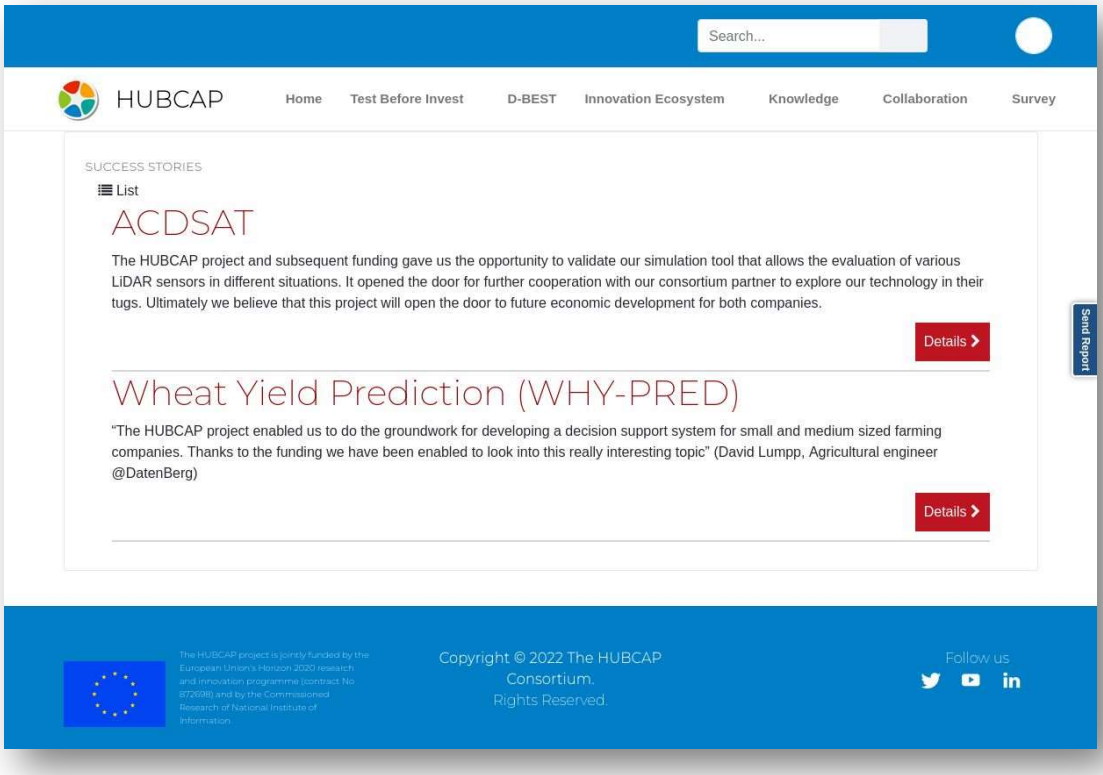


Figure 19 - List of Success Stories

New success stories can be added through a form that allows to gather information such as Title, Location, and so on.

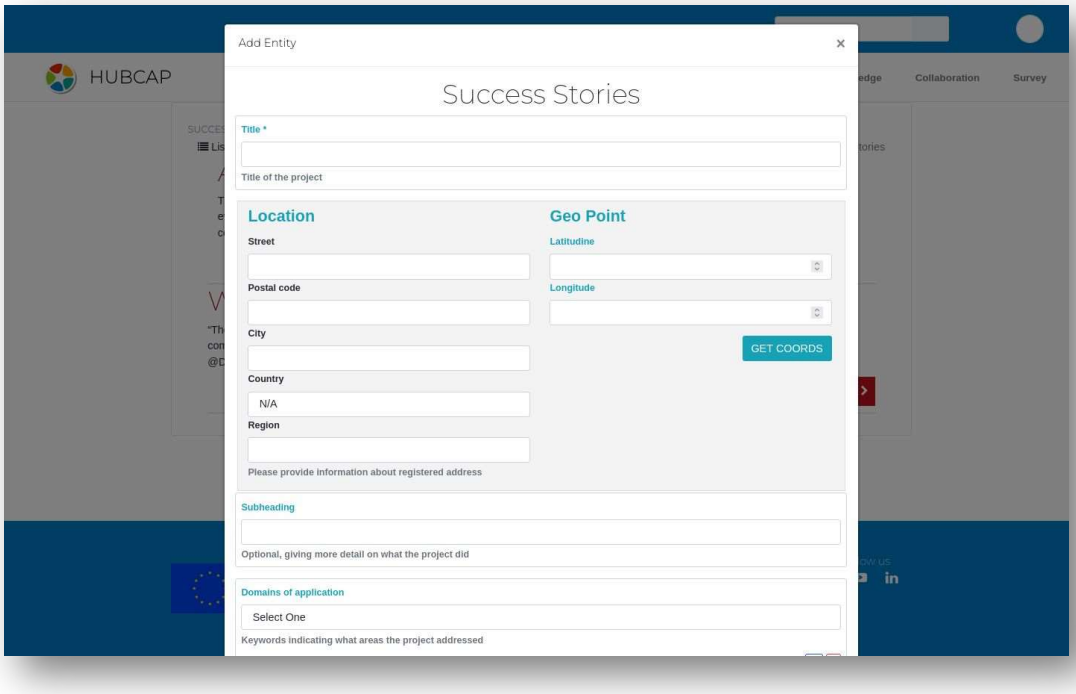


Figure 20 - Form for adding of a new Success Story

Once entered all the information required, the success stories details will be available to all the other users (Figure 21).

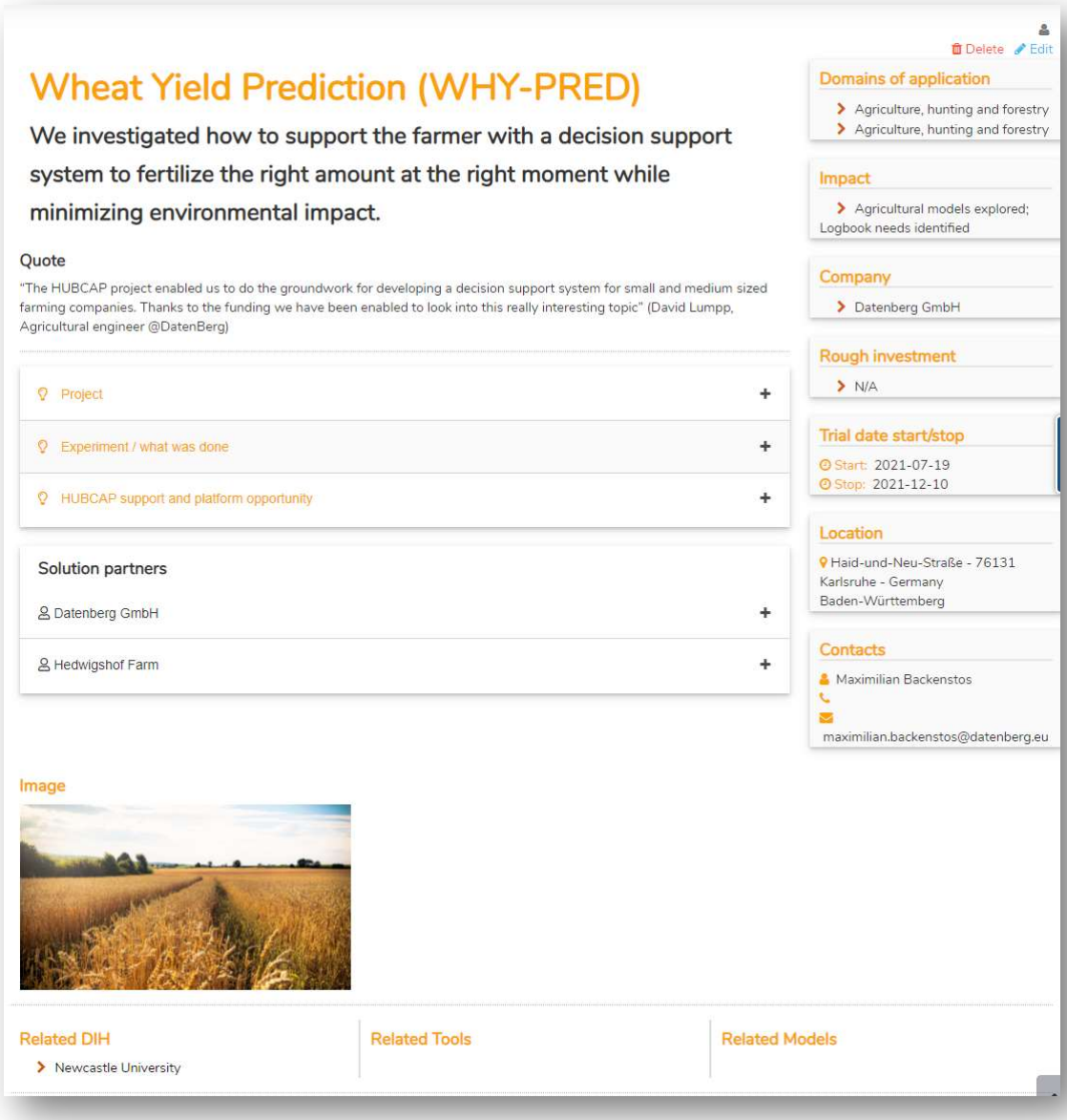


Figure 21 - Success story as it appears to the viewing users

2.2.4 New Co-editor capability for catalogues entries

The latest version of the Catalogues Manager introduces a **co-editor capability** that allows the author of a catalogue entry to grant other users permissions to modify that entry (Figure 22). In that way, it will be **easier for collaborating users** to update the entries they are working on together.

Figure 22 - Panel available in the catalogues data entry forms for entering co-editors

2.3 User Support

In this release 4 of the HUBCAP Platform, effort has also been put into increasing the level of user support. The following sections show two of the initiatives.

2.3.1 User Manuals

The new Portal home page now features two links (Figure 23) pointing to the Sandboxing Middleware online user manual introduced in the previous release.

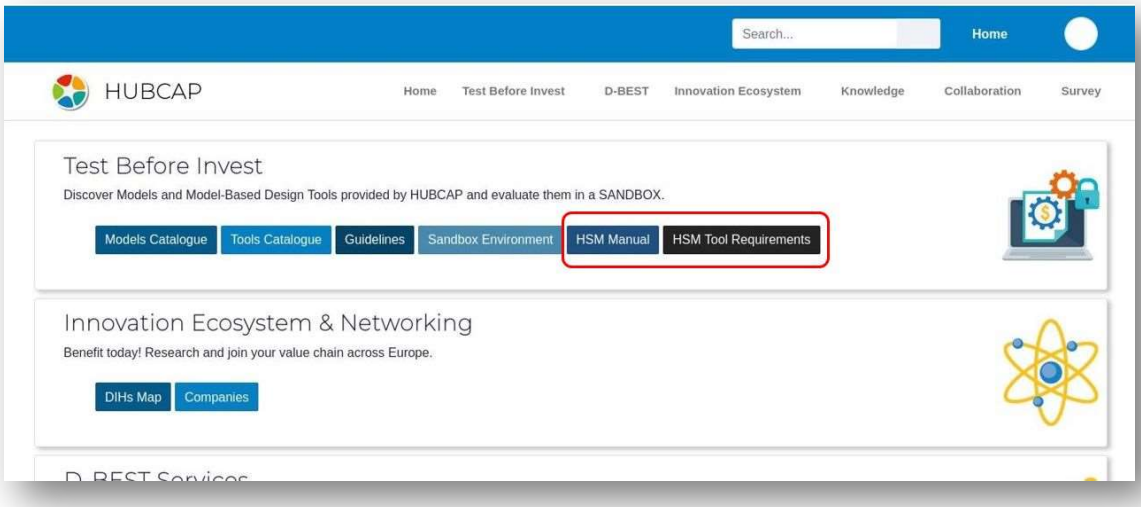


Figure 23 - New Collaboration Portal home page featuring two new links to the HSM online manual

The first link, “HSM Manual”, points to the manual table of contents allowing users to find the information they need and available across the various sections. To this regard, the **online manual** also **offers a full-text search** function, making it **even easier to identify the content of interest** (Figure 24).

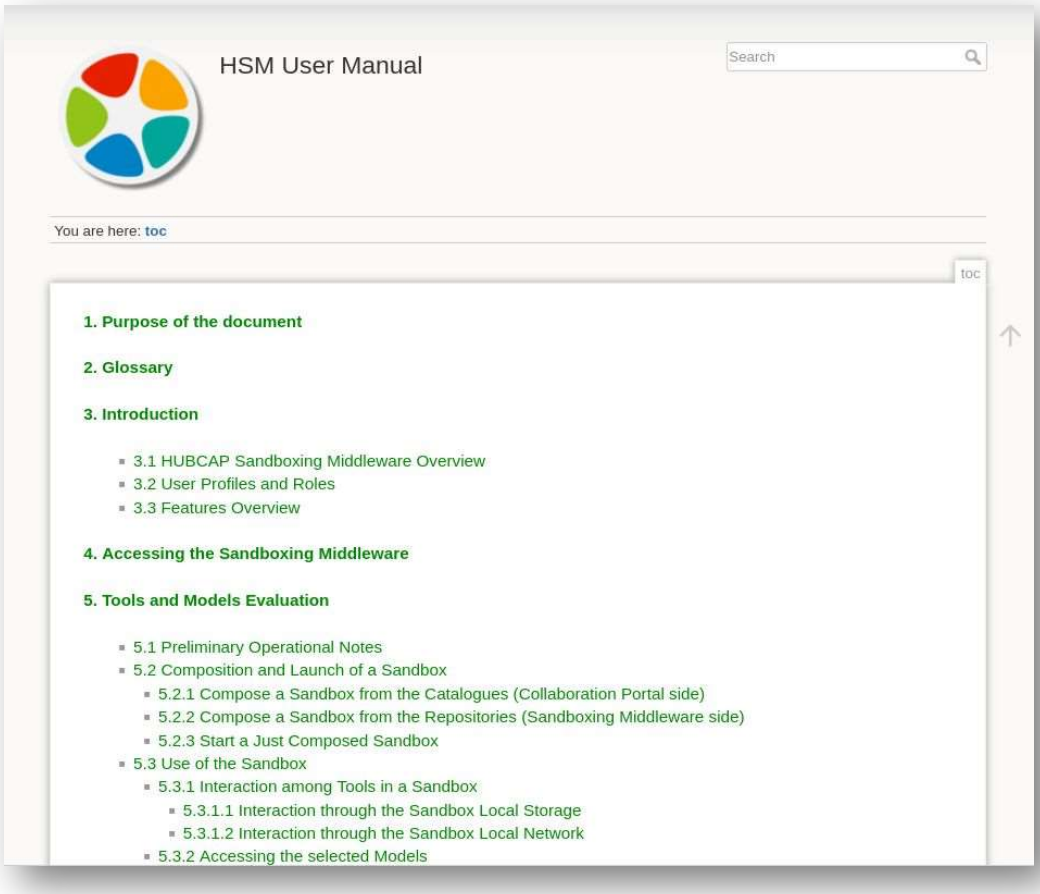
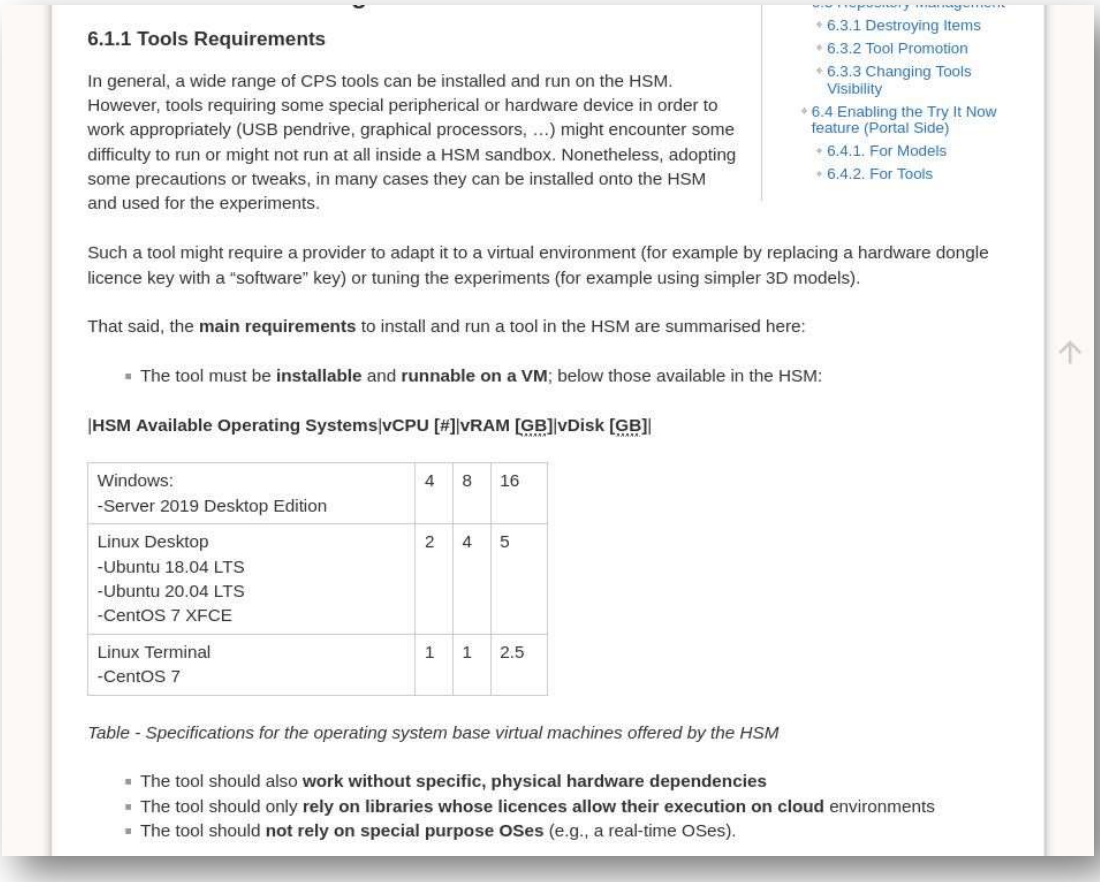


Figure 24 - Online HSM User Manual table of content

The second link, “HSM Tools Requirements”, instead points to the specific “Tools requirements” sub-section of the user manual. The purpose of it is to make **easily and readily available to tool providers users** the requirements that their tools should meet in order to run within the Sandboxing Middleware at their full potential. See Figure 25 below:



6.1.1 Tools Requirements

In general, a wide range of CPS tools can be installed and run on the HSM. However, tools requiring some special peripherical or hardware device in order to work appropriately (USB pendrive, graphical processors, ...) might encounter some difficulty to run or might not run at all inside a HSM sandbox. Nonetheless, adopting some precautions or tweaks, in many cases they can be installed onto the HSM and used for the experiments.

- 6.3.1 Destroying Items
- 6.3.2 Tool Promotion
- 6.3.3 Changing Tools Visibility
- 6.4 Enabling the Try It Now feature (Portal Side)
- 6.4.1. For Models
- 6.4.2. For Tools

Such a tool might require a provider to adapt it to a virtual environment (for example by replacing a hardware dongle licence key with a "software" key) or tuning the experiments (for example using simpler 3D models).

That said, the **main requirements** to install and run a tool in the HSM are summarised here:

- The tool must be **installable** and **runnable on a VM**; below those available in the HSM:

|**HSM Available Operating Systems**|**vCPU [#]**|**vRAM [GB]**|**vDisk [GB]**|

Windows: -Server 2019 Desktop Edition	4	8	16
Linux Desktop -Ubuntu 18.04 LTS -Ubuntu 20.04 LTS -CentOS 7 XFCE	2	4	5
Linux Terminal -CentOS 7	1	1	2.5

Table - Specifications for the operating system base virtual machines offered by the HSM

- The tool should also **work without specific, physical hardware dependencies**
- The tool should only **rely on libraries whose licences allow their execution on cloud** environments
- The tool should **not rely on special purpose OSes** (e.g., a real-time OSes).

Figure 25 - Tools Requirements section of the HSM User Manual

In case their tools did not meet the requirements, the section also offers some suggestions on how to tune tools, models or experiments.

2.3.2 Visualisation Tree: a first integration

Another initiative aims to **guide users in the adoption of CPS Tools and Models** leveraging a visualisation tree able to describe and take the user through the various sub-disciplines of Model-based design in order to eventually reach tools and models to experiment with. As the users navigate through the nodes of this tree, they get more information about what they might need for their purposes. The current release of the HUBCAP Collaboration Portal offers an implementation prototype available to a restricted set of users (Figure 26):

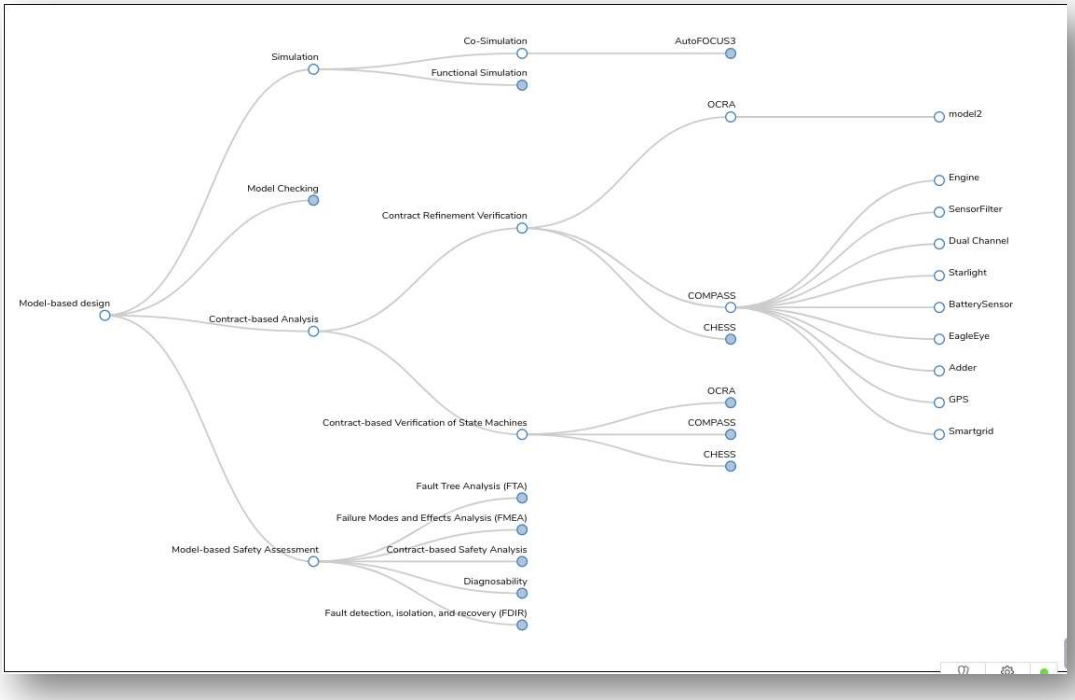


Figure 26 - Prototype of visualisation tree

2.4 FIWARE Keyrock IDM (IDentity Manager)

The enforcing of authentication rules is delegated to the FIWARE Keyrock (https://www.fiware.org/) Identity Manager integrated in the HUBCAP Collaboration Portal.
When users want to access the HUBCAP Collaboration Platform, they authenticate against the IDM. In fact, when from the welcome page, they click on 'Sign in':

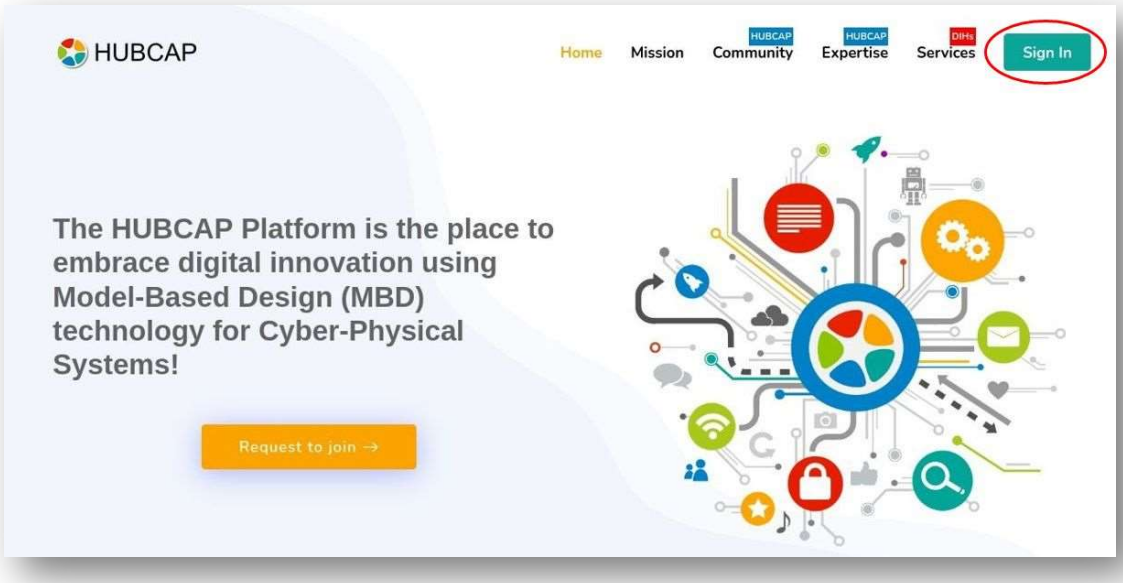


Figure 27 - HUBCAP Collaboration Platform welcome page

they are prompted to enter their credentials in the IDM login page (Figure 28)

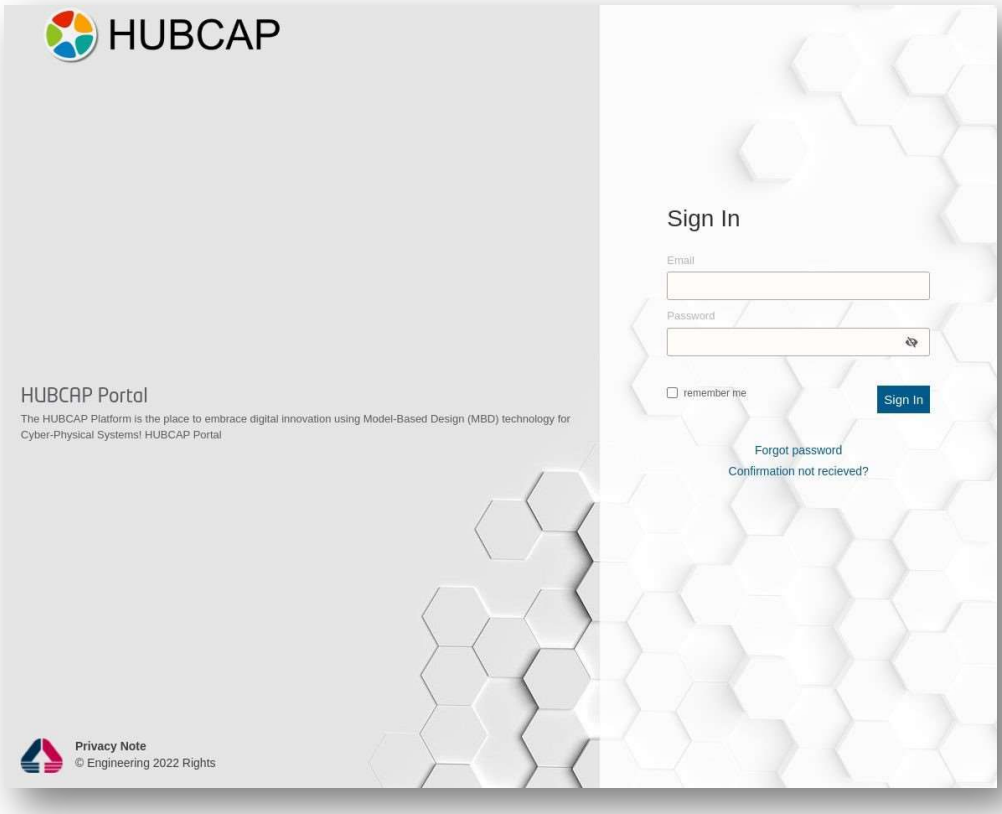


Figure 28 - FIWARE Keyrock home page with login form

After signing in, users will be redirected to the HUBCAP Collaboration Portal home page (Figure 29):

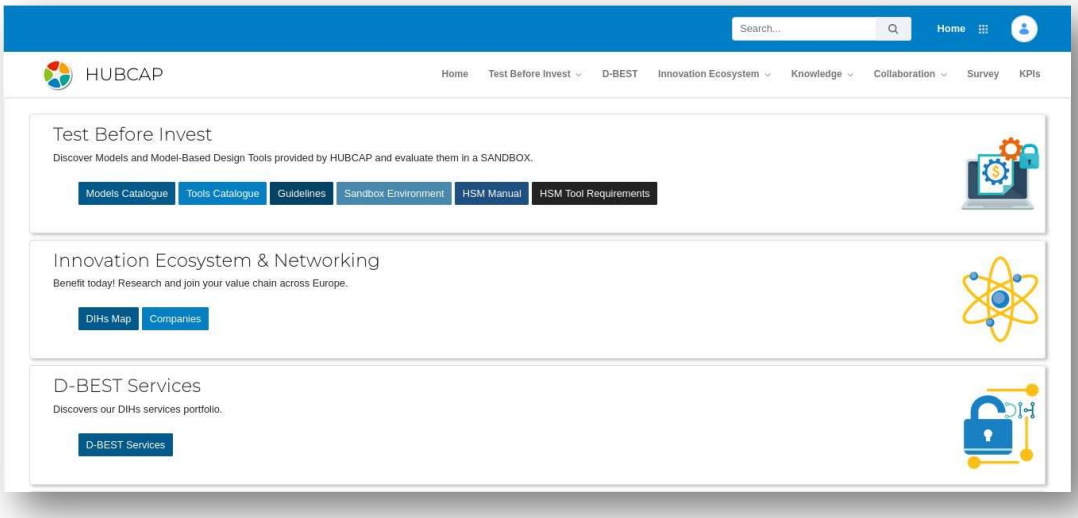


Figure 29 - Collaboration Portal home page

The component has been configured to satisfy different HUBCAP requirements and offers to a platform administrator functionalities such as:

- Users account registration
- Organizations registration
- Association of the users to organizations
- Users' roles definition
- Registration of applications as clients in the OAuth 2.0 architecture (https://oauth.net/)
- **OIDC-secured users authentication** (https://openid.net/connect/)

3 HUBCAP Sandboxing Middleware

3.1 Security: Updated TLS Configurations

As for the HUBCAP Sandboxing Middleware, the TLS configurations of the public entry points have been updated in order to keep the ranking previously achieved and verified by the Qualys SSL Labs tool. This online service performs a deep analysis of the configuration of any SSL web server issuing an overall rating and providing details on the quality of the configuration (Figure 30).

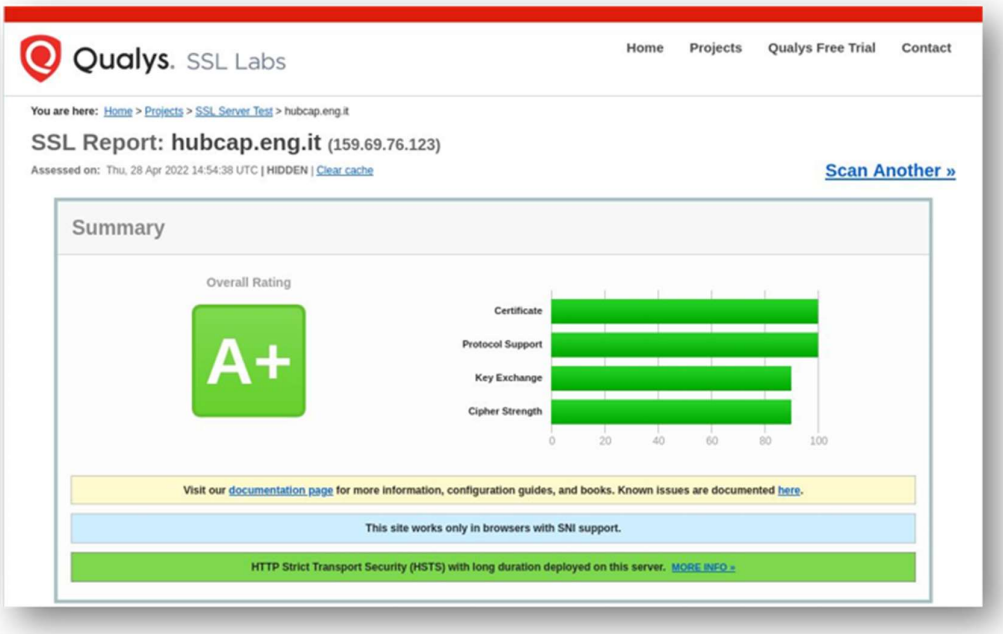


Figure 30 - A+ ranking verified through the Qualys SSL Labs tool

3.2 Interactive Mode Time Slot Extension

Moreover, the previous time slot available for users to access the Sandboxing Middleware has been **extended from 10 hours per day to 24/7,** thus removing any kind of pre-existing functional restriction and allowing users to perform their experiments at any time.

3.3 User Management

Throughout the period covered by this report, ENGIT also supported other partners in users management, in particular by **creating new users accounts** and **granting permissions** as required by other WPs leaders.

4 KPIs (Key Performance Indicators)

4.1 New Charts for Other KPI Reports

New charts have been added to the following KPI reports:

- **HUBCAP Sandboxing Middleware (HSM)**
  - HSM Resources Usage per User and Billing
  - HSM Sandboxes Activities Summary
  - HSM Instantiated Operating Systems - Trend
  - HSM Instantiated Tools - Trend
  - HSM Instantiated Models - Trend
  - HSM Tools Connections as Guest – Trend
- **HUBCAP Collaboration Portal (HCP)**
  - HCP Catalogues - Created Entries Trend
  - HCP Catalogues - Entries For Authors Synopsis
  - HCP Catalogues - Entries For Authors Trend

The complete set of KPIs reports - organised in sub-categories - is available to authenticated users on the Collaboration Portal at the following URL: Platform KPIs

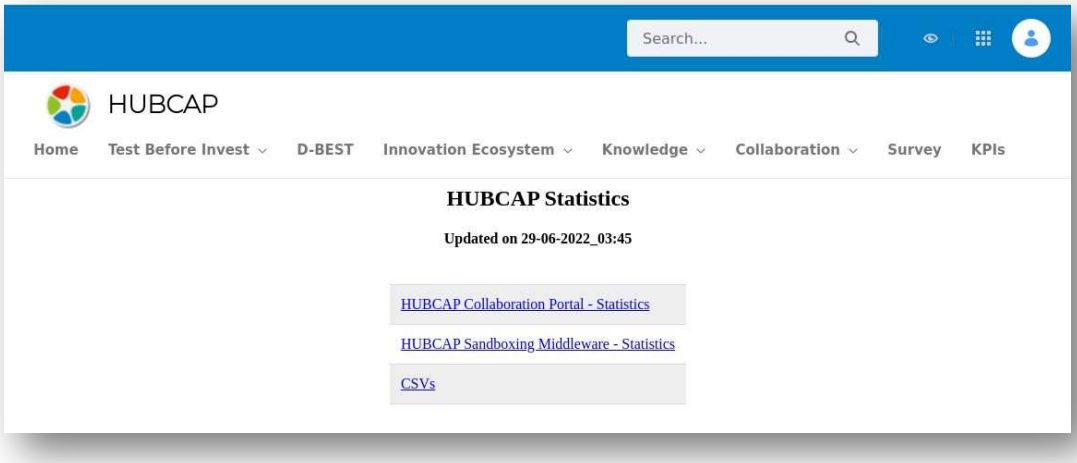
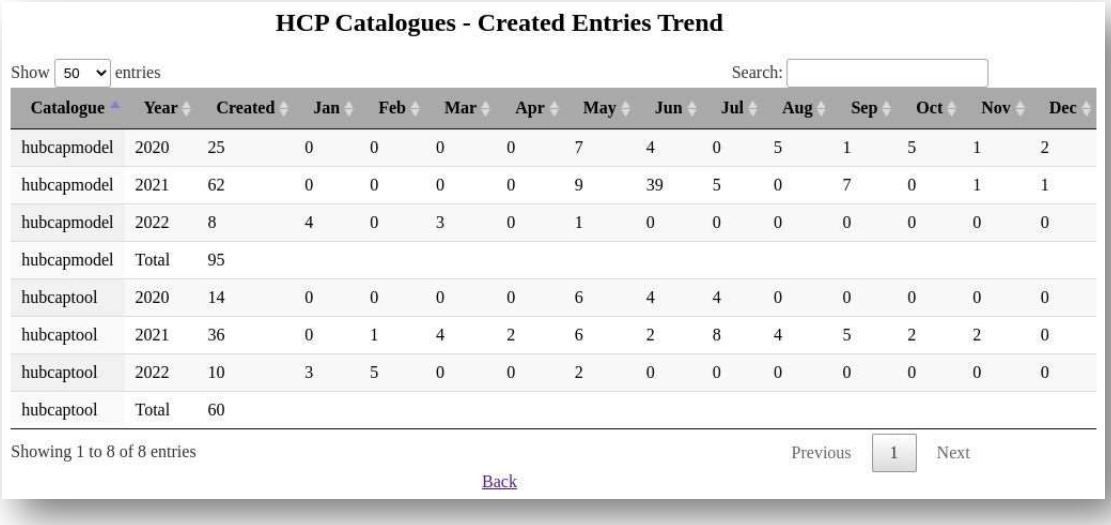


Figure 31 - Platform KPIs section

From there (Figure 31), users can access reports on the Collaboration Portal and Sandboxing Middleware in both **tabular with charts** and **CSV** formats (Figure 32, Figure 33 and Figure 34).



HCP Catalogues - Created Entries Trend

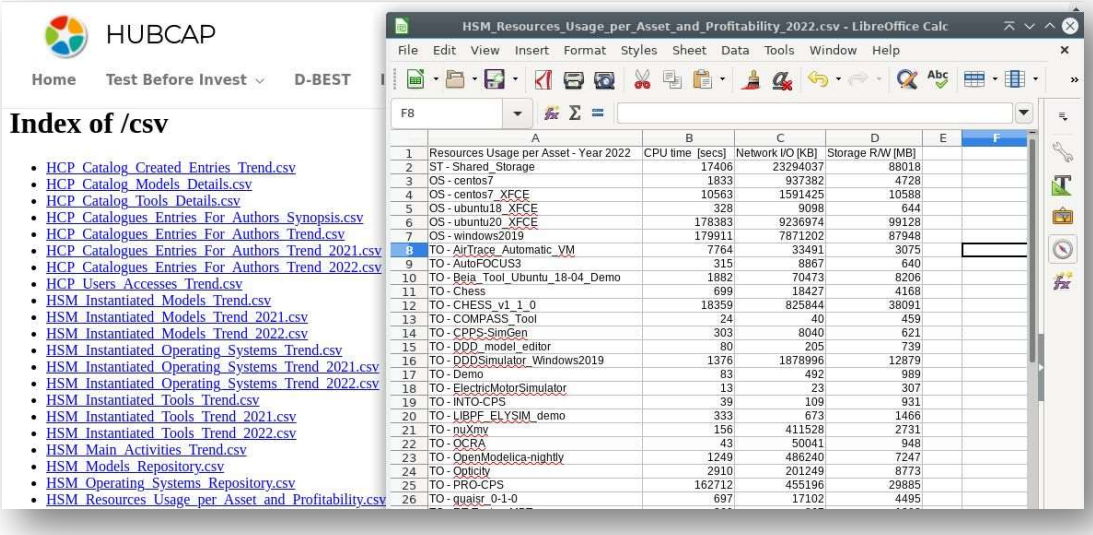
Show 50 entries Search:

Catalogue	Year	Created	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
hubcapmodel	2020	25	0	0	0	0	7	4	0	5	1	5	1	2
hubcapmodel	2021	62	0	0	0	0	9	39	5	0	7	0	1	1
hubcapmodel	2022	8	4	0	3	0	1	0	0	0	0	0	0	0
hubcapmodel	Total	95												
hubcaptool	2020	14	0	0	0	0	6	4	4	0	0	0	0	0
hubcaptool	2021	36	0	1	4	2	6	2	8	4	5	2	2	0
hubcaptool	2022	10	3	5	0	0	2	0	0	0	0	0	0	0
hubcaptool	Total	60												

Showing 1 to 8 of 8 entries Previous 1 Next

Back

Figure 32 - Example of tabular view for a KPI Report



HUBCAP

Home Test Before Invest D-BEST

Index of /csv

- HCP_Catalog_Created_Entries_Trend.csv
- HCP_Catalog_Models_Details.csv
- HCP_Catalog_Tools_Details.csv
- HCP_Catalogues_Entries_For_Authors_Synopsis.csv
- HCP_Catalogues_Entries_For_Authors_Trend.csv
- HCP_Catalogues_Entries_For_Authors_Trend_2021.csv
- HCP_Catalogues_Entries_For_Authors_Trend_2022.csv
- HCP_Users_Accesses_Trend.csv
- HSM_Instantiated_Models_Trend.csv
- HSM_Instantiated_Models_Trend_2021.csv
- HSM_Instantiated_Models_Trend_2022.csv
- HSM_Instantiated_Operating_Systems_Trend.csv
- HSM_Instantiated_Operating_Systems_Trend_2021.csv
- HSM_Instantiated_Operating_Systems_Trend_2022.csv
- HSM_Instantiated_Tools_Trend.csv
- HSM_Instantiated_Tools_Trend_2021.csv
- HSM_Instantiated_Tools_Trend_2022.csv
- HSM_Main_Activities_Trend.csv
- HSM_Models_Repository.csv
- HSM_Operating_Systems_Repository.csv
- HSM_Resources_Usage_per_Asset_and_Profitability.csv

HSM_Resources_Usage_per_Asset_and_Profitability_2022.csv - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

F8

	A	B	C	D	E	F
1	Resources Usage per Asset - Year 2022	CPU time [secs]	Network I/O [KB]	Storage R/W [MB]		
2	ST - Shared_Storage	17406	23294037	88018		
3	OS - centos7	1833	937382	4728		
4	OS - centos7_XFCE	10563	1591425	10588		
5	OS - ubuntu18_XFCE	328	9098	644		
6	OS - ubuntu20_XFCE	178383	9236974	99128		
7	OS - windows2019	179911	7871202	87948		
8	TO - AirTrace_Automatic_VM	7764	33491	3075		
9	TO - AutoFOCUS3	315	8867	640		
10	TO - Beija_Tool_Ubuntu_18-04_Demo	1882	70473	8206		
11	TO - Chess	699	18427	4168		
12	TO - CHESS_v1_1_0	18359	825844	38091		
13	TO - COMPASS_Tool	24	40	459		
14	TO - CPPS-SimGen	303	8040	621		
15	TO - DDD_model_editor	80	205	739		
16	TO - DDDSimulator_Windows2019	1376	1878996	12879		
17	TO - Demo	83	492	989		
18	TO - ElectricMotorSimulator	13	23	307		
19	TO - INTO-CPS	39	109	931		
20	TO - LIBPF_ELYSIM_demo	333	673	1466		
21	TO - nuXmv	156	411528	2731		
22	TO - OCRA	43	50041	948		
23	TO - OpenModelica-nightly	1249	486240	7247		
24	TO - Opticity	2910	201249	8773		
25	TO - PRO-CPS	162712	455196	29885		
26	TO - quaisr_0-1-0	697	17102	4495		

Figure 33 - Example of KPI Report in CSV format

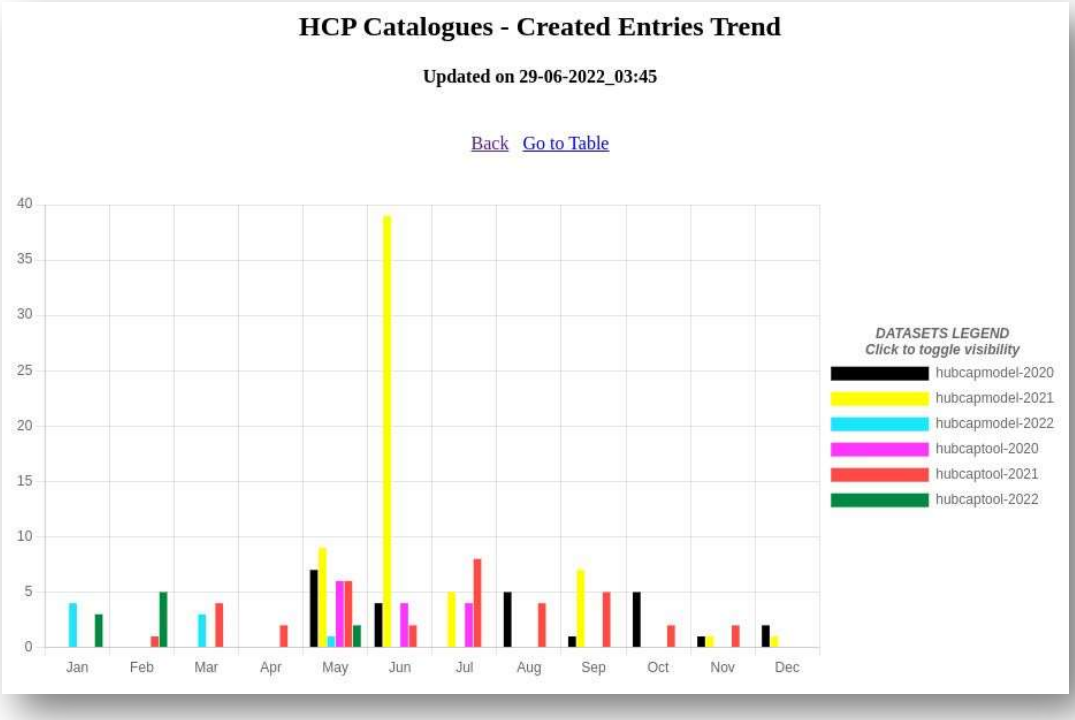


Figure 34 - Example of chart where users can toggle the visibility of specific datasets and hover bars to view punctual values

4.2 Improvements to Charts

Another chart-related functionality added to this release allows users to **filter chart content** (Figure 35). Given one of the charts provided with such module, the data displayed can be filtered by:

1. Selecting a column by which to filter
2. Selecting a match operator among: *startsWith, contains, >,* < and =
3. Entering the filtering value and clicking on “Filter”

Figure 35 - Filtering module conditions fields

It is also possible to add other filtering conditions by clicking on the “+” button. The conditions will be joined in a wider expression through AND operators (Figure 36). The specific single condition can be removed by clicking on the “x” button.

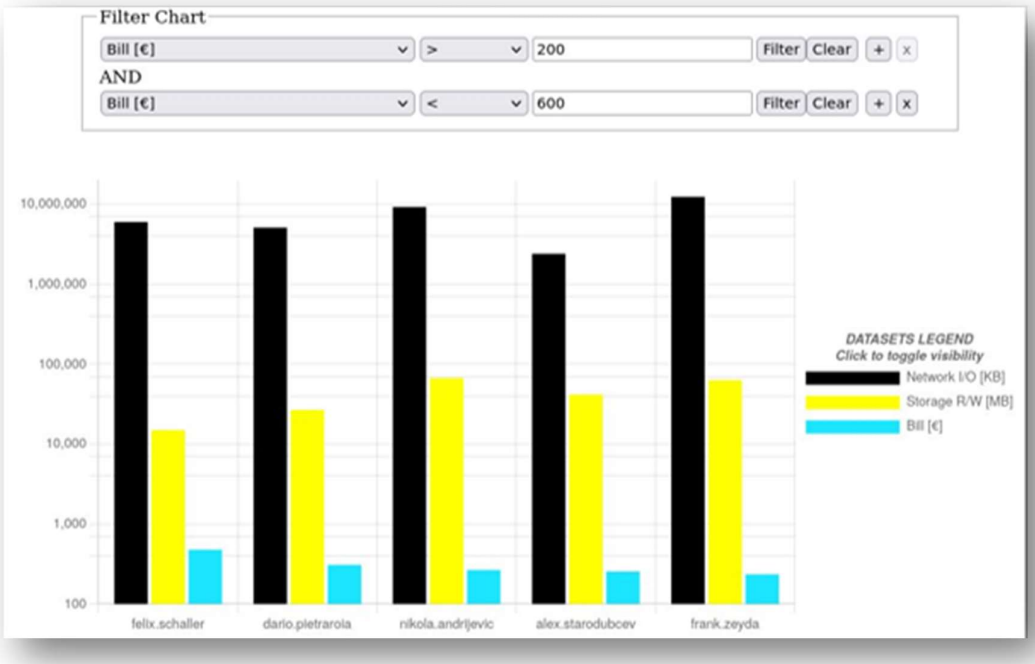


Figure 36 - Chart data filtered by two conditions on the same field

Finally, through the "Clear" button, it is possible to reset all the conditions and have the original data displayed in the chart.

5 Next Steps

The next months' WP5 effort will be mainly dedicated to support the sustainability of the HUBCAP Project by creating a **replication package**.

This package – intended as a set of procedures, instructions and software components – will allow the installation and configuration of a new clean HUBCAP Platform instance on a different server. In fact, the current HUBCAP Platform - composed of many sub-systems and sub-components – has been installed and configured manually throughout two and a half years and various refinement iterations, and depend on specific lower-level host server characteristics and configurations.

The replication package creation is not a trivial task and a first, rough plan has been designed to describe the activities that ENGIT will focus on for this purpose. Considering the complexity of the HUBCAP Platform, WP5 decided to organise the **work in phases** in order to develop and test the various package components incrementally and respecting the sequential dependencies among tasks. As a result, this should ease the trouble-shooting procedures, reducing the chances of unexpected outcomes.

In the final phases, the AU partner will play the peer **beta tester** role - ENGIT being the internal “producer” - checking the replication package installation in a completely “fresh” host machine.