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Executive Summary

The purpose of this report is to provide the deployment document that describes the first iteration development of the Dynamic Knowledge Management (DKM) platform, which enables the WeldGalaxy Platform, in the context of the WeldGalaxy project.

This deliverable summarises the development performed in WP5 comprising the outputs from Task 5.2, Task 5.3, and Task 5.4, which aim at building the infrastructure and central building blocks of the WeldGalaxy Platform. Task 5.1 has been described separately in Deliverable 5.1: Information security and privacy development guidelines report, and Task 5.3 was described in Deliverable 5.3: Chat Bot developed – I.

The results of WP5 are a functional working DKM platform, iteration I, customised for the WeldGalaxy Platform. This version of the DKM, iteration I, includes setting up the overall infrastructure, hosting components, providing documented API layer, and working with MongoDB on the cloud.

The result of the WP5`'s iteration-I, is a functional working WeldGalaxy platform demonstrator, which shows the customized version of DKM for the WeldGalaxy Platform. This version of the DKM, iteration-I, includes setting up the overall infrastructure, hosting components, providing documented API layer, and working with MongoDB on EKON server and on the cloud. Moreover it provides the 1st round demonstrator that showcases main functionalities of the WeldGalaxy platform and the first integration approach of components.

This version of the DKM was presented at the 2019 CAE Conference, in Vicenza, Italy, 28-29 October 2019.

1. Introduction

The WeldGalaxy Platform is a dynamic knowledge-based business-to-business (B2B) online marketplace platform for global buyers (end-users/OEMs) and EU sellers (manufacturers/suppliers/distributors/service providers) in the welding sector. It aims to provide innovative web-based services that integrate several tools as services, comprising a chatbot and Knowledge Based Engineering (KBE) tool that streamlines the equipment selection process for end-users and simulation. It will also provide analytics of User Experience (UX) to optimise both the user interface (UI) design, UX/UI, and products on offer. The WeldGalaxy Platform will also connect with a Distributed Ledger Technology (DLT) Service to ensure that suppliers and end-users collaborate on a platform that makes their transactions secure, trustworthy, and transparent.

What is DKM?

Dynamic Knowledge Management (DKM) is a highly secured SaaS (Software as a Service) collaborative platform for knowledge construction and operation efficiency. The DKM provides virtual spaces (also known as domains), such as stores, working groups, projects, virtual classrooms, or ad hoc communities. Each domain comes with a comprehensive set of tools, such as private social networks, knowledge visualisation charts, shared calendars, document management, task management, vocabularies, and more. Beyond this set of tools, DKM provides a unique capability of page creation, which is a composition of local and remote resources, helping professional teams to manage, visualise, and locate their data efficiently.

DKM as the infrastructure foundation of Weld Galaxy

DKM as a platform brings together distinct and interdependent components (tools or other platforms) as consumable services, which are connected through Application Programming Interfaces (APIs); thus DKM is the infrastructure foundation for automated interactions between the different components. As reported in D1.2 and shown in Figure 1, the DKM holds and connects the Weld Galaxy architecture.

WP5 is the initial iteration for the Platform architecture, development and security, which will be followed by WP6 (Platform iteration 2).

D5.2 DKM Platform, a deliverable linked to other workpackages' output

As the DKM empowers the WeldGalaxy Platform, there is a set of features and capabilities which are designated and oriented towards the WeldGalaxy Platform. These are described in:

- WP15 - Integration, testing and debugging (Iteration 1 – Component testing and interoperability environment)

Deeper integration with the other components and maturing the overall platform is planned in:

- WP16: Integration, testing and debugging (Iteration 2 – Alpha Version); and,
- WP17: Integration, testing and debugging (Iteration 3 – Beta/Gamma Version)

Flow and development considerations will be elaborated throughout the report to clarify the rationale of the developments.

The report provides detailed descriptions of the DKM implemented functionality, including a detailed discussion about first phase technical organisation the various building blocks.

This report is part of a broader set of deliverables, which include:

- Deliverable 1.2: WeldGalaxy functional design specification report
- Deliverable 1.3: WeldGalaxy technical specification report
- Deliverable 2.4: WeldGalaxy WGDB design and development (I)
- Deliverable 5.1: Information security and privacy development guidelines report
- Deliverable 5.3: Chat Bot developed – I
- Deliverable 15.1: WeldGalaxy Testing and Experimental environment (I)

As part of the continuous development and deployment, the 1st round demonstrator for WeldGalaxy Platform is online available on a temporary link: <https://wg.dkm4u.eu/> (authentication is required).

During development, the online API documentation is available as:

- Swagger documentation
- Re-Doc documentation

2. Technical design and gap analysis

As described in D1.3: WeldGalaxy technical specification report, the design process aims to build a secure and sustainable platform that will develop and scale, during, and after the project. The parameters that were set forth as a guiding development principle are:

- Loosely coupled architecture
- Scalable design to meet big-data requirements
- Extensible design (future growth consideration)
- Support for aggregation of distributed data sources
- Designed to meet responsive web-application clients
- Secured access and communication between components

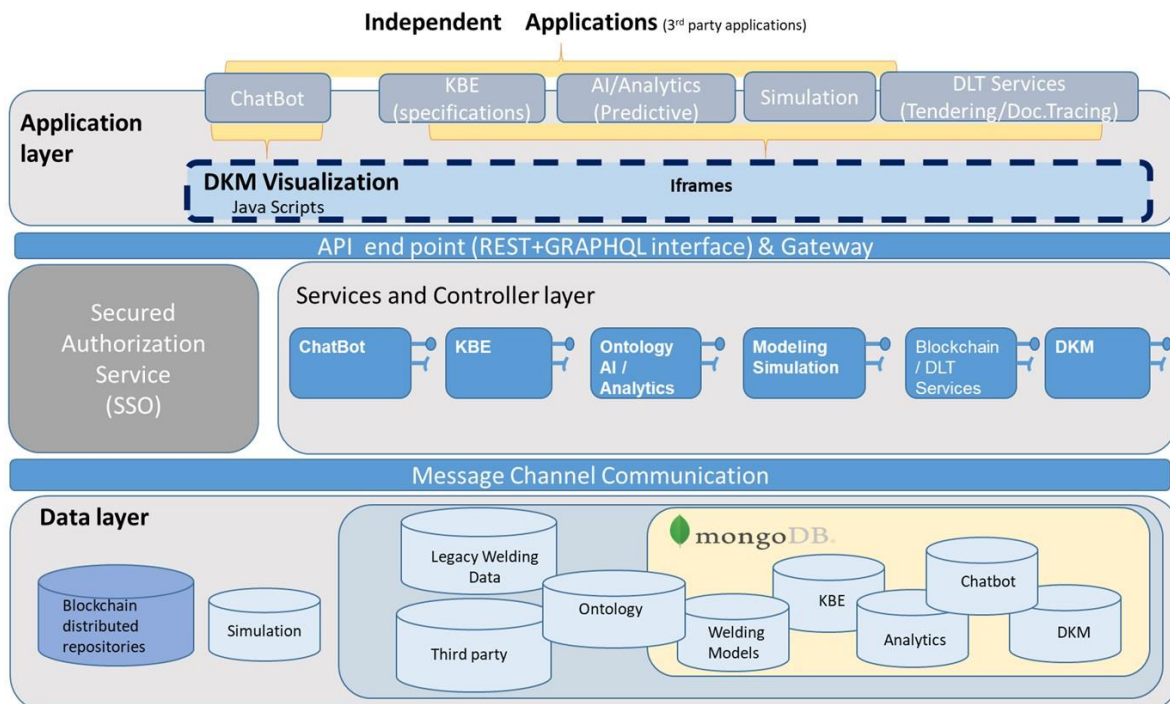


Figure 1: Architecture illustration

The following development decision has been taken and executed as guiding principles:

- All communications between components are via RESTful (Representational State Transfer) API.
- APIs will be online documented to facilitate development and integration
- API communication will be secured and run under SSL (Secure Sockets Layer).
- Client communication to the back-end server is via RESTful API.
- The client is designed as SPA (single page application) for enhanced web-responsiveness on desktop and mobile.
- The deployment will be enabled individually for each component, on IIS (Internet Information Services), dockers, and Kubernetes.
- Third-party components are to be hosted in the platform using secured iFrames or loaded via the well known component JavaScript (as in the Chatbot case).
- The data-layer is implemented in MongoDB.

3. The DKM: the Weld Galaxy infrastructure foundation

3.1. How DKM works?

The DKM works as a responsive, single-page web-application, which allows the user to securely sign in, and work in a single or several selected domains simultaneously. This includes building dynamic knowledge pages, creating blog posts, providing frequently asked questions (FAQs), generating events, and visualising relationships between entities in various contexts. As the DKM client is stateless, all communications with the DKM server are secured and operate as RESTful web-API.

3.2. Platform layout design

3.2.1. Overview

The layout design of the WeldGalaxy platform (Figure 2) is designed as a responsive layout supporting desktop, tablets, and mobile devices. Both navigation and today's bar are togglable and are hidden by default in tablet and mobile.

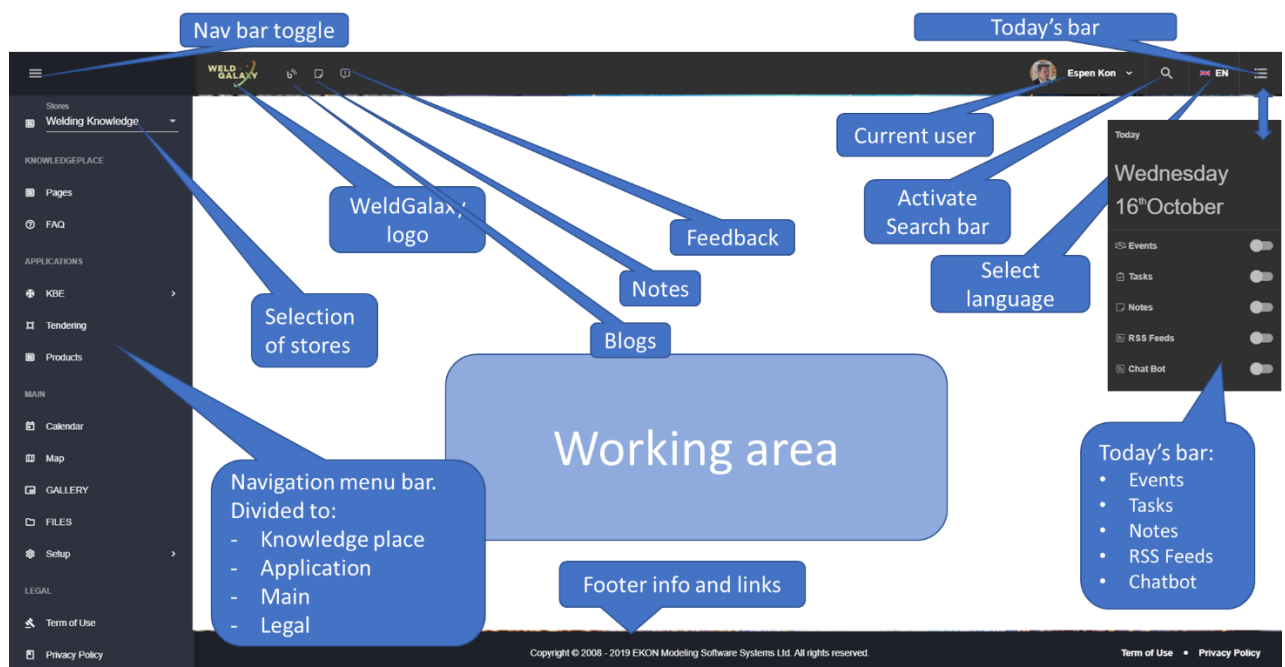
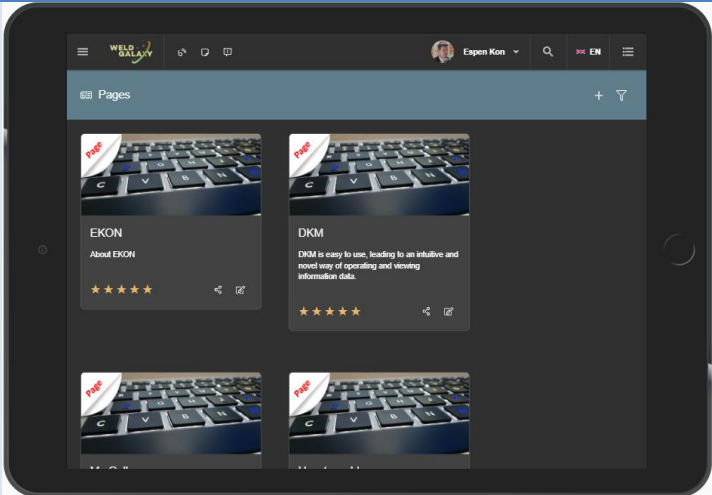
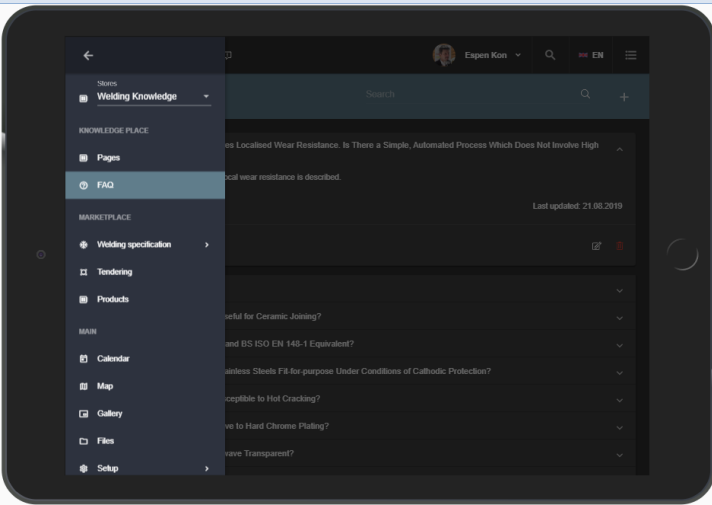
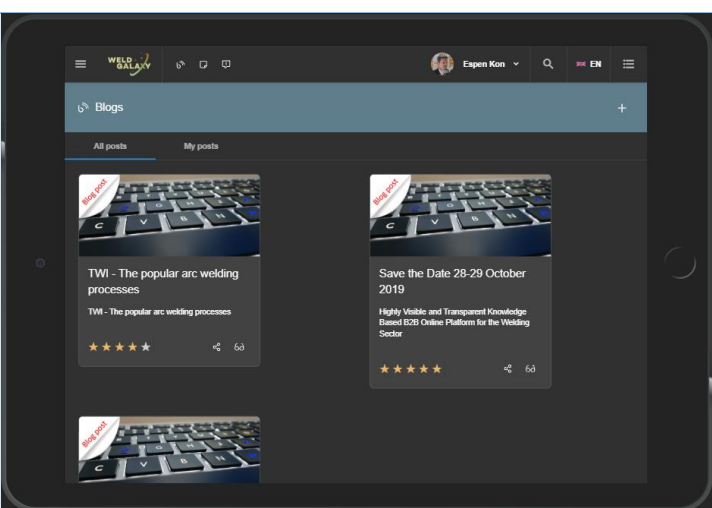


Figure 2: DKM Layout and menu illustration

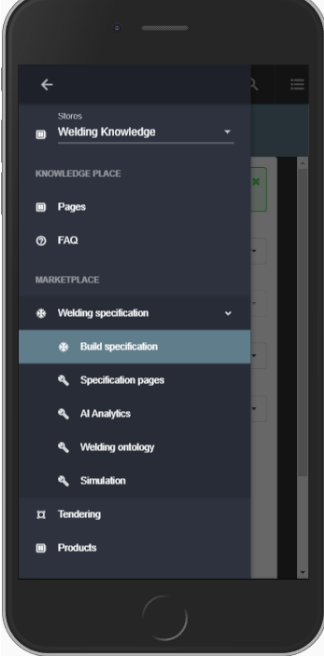
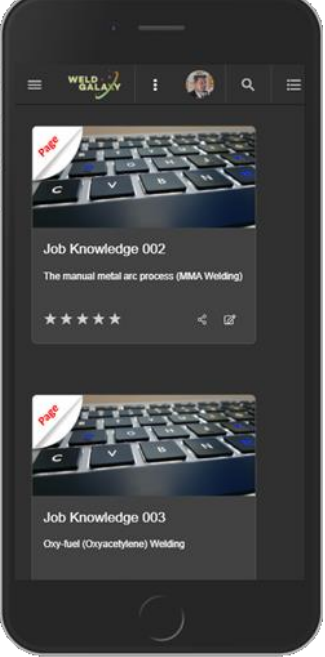
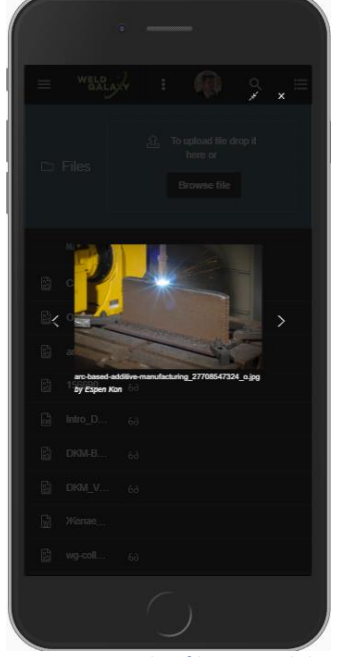
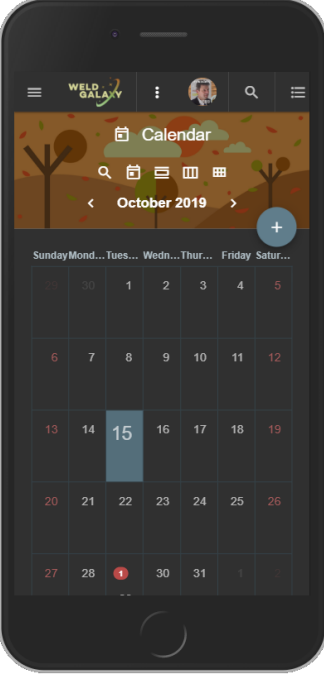
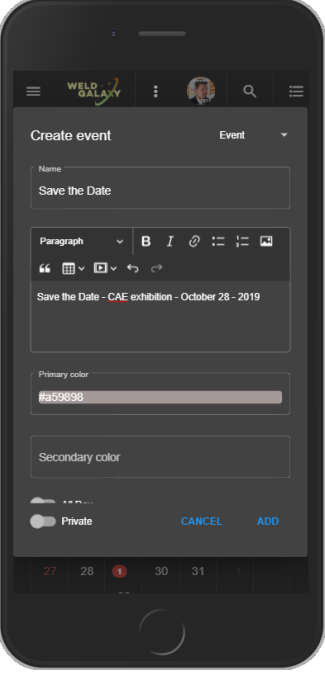
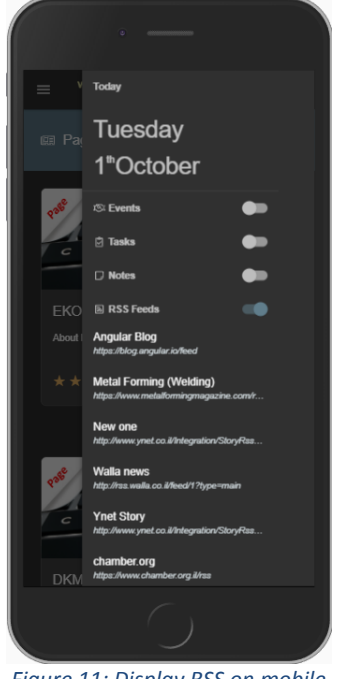
3.2.2. On tablet

Several screenshots are shown below demonstrating layout visibility on tablet:

Name	Screenshot
<p>Page list</p>	 <p style="text-align: center;"><i>Figure 3: Page list</i></p>
<p>FAQ</p>	 <p style="text-align: center;"><i>Figure 4: FAQ</i></p>
<p>Blog list</p>	 <p style="text-align: center;"><i>Figure 5: Blog list</i></p>

3.2.3. On mobile

Several screenshots are shown in Figures 6 to 11 demonstrating layout visibility on mobile:

Name	Screenshot	
Open navigation menu	Page list	Files display
		
<p>Figure 6: Open navigation menu on mobile</p>	<p>Figure 7: Mobile page list</p>	<p>Figure 8: Display files on mobile</p>
Calendar	Create new event	Display RSS from today's bar
		
<p>Figure 9: Calendar display on mobile</p>	<p>Figure 10: Create new event on mobile</p>	<p>Figure 11: Display RSS on mobile</p>


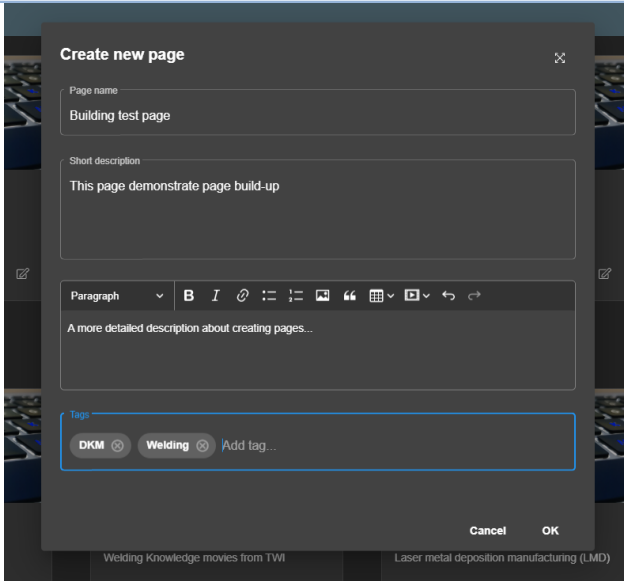
3.3. Dynamic page creation

The DKM page is designed to provide the capability to compose knowledge pages at several levels, enabling the user to define page layout dynamically by adding a set of elements to build up each knowledge page. Pages can be of free structure, composed by the administrative user, or saved as templates, to allow users to add pre-defined structured pages.

The elements are designed as small applications (properties) that visualise data and are effortless to plug into the page. This capability allows for a seamless build-up of knowledge pages.

3.4. Generic page build-up

All demonstrated functions below are visible to authenticated and authorised users.

Description	Screen shot
<p>From page header, click on + button to add a page.</p>	 <p style="text-align: center;"><i>Figure 12: Add page button</i></p>
<p>Open dialog form to create initial page data, which include:</p> <ul style="list-style-type: none"> • Page name • Short description (to be displayed on page lists) • Detailed description • Capability to add and assign tags to page 	 <p style="text-align: center;"><i>Figure 13: Create page dialog</i></p>

Initial layout on page creation:

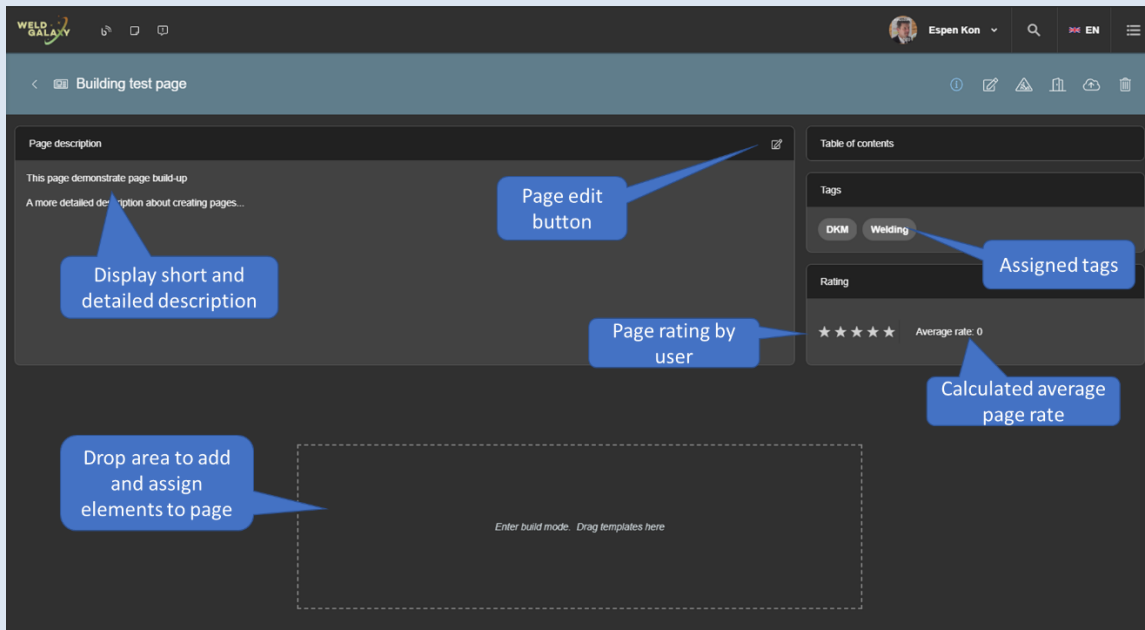


Figure 14: Create page layout

Page buttons provide the following capabilities:

- Toggle page header
- Edit page meta
- Build page mode
- Exit build page mode
- Save page
- Delete page

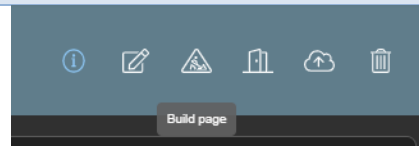


Figure 15: Page layout buttons

Drag elements to page

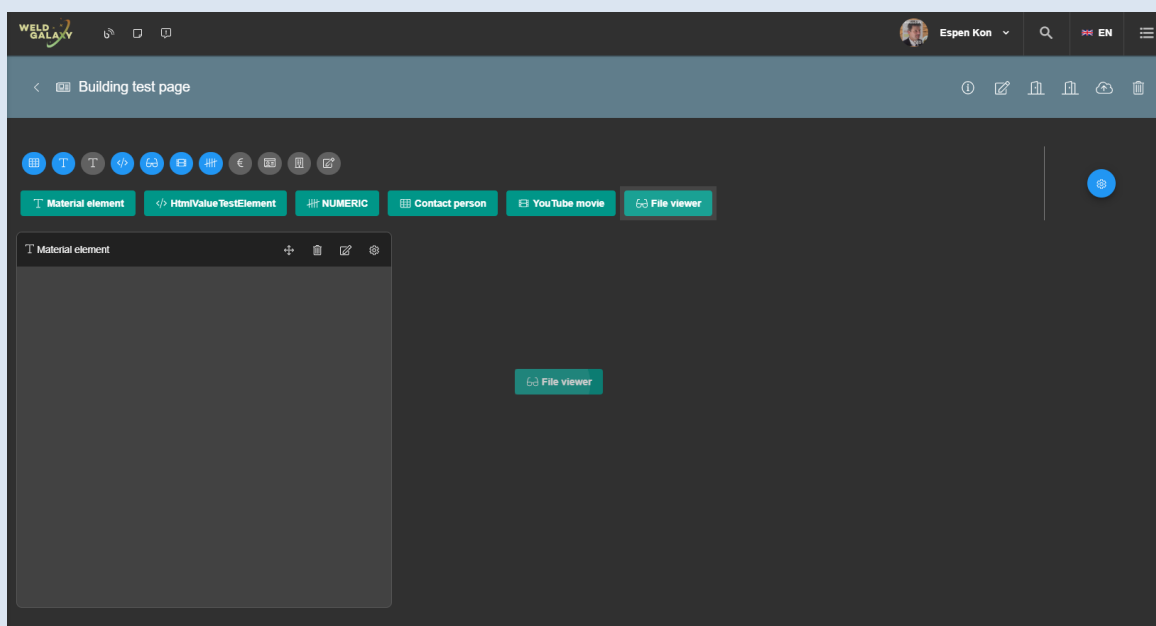


Figure 16: Page element's layout – drag & drop

Resize and place elements in page

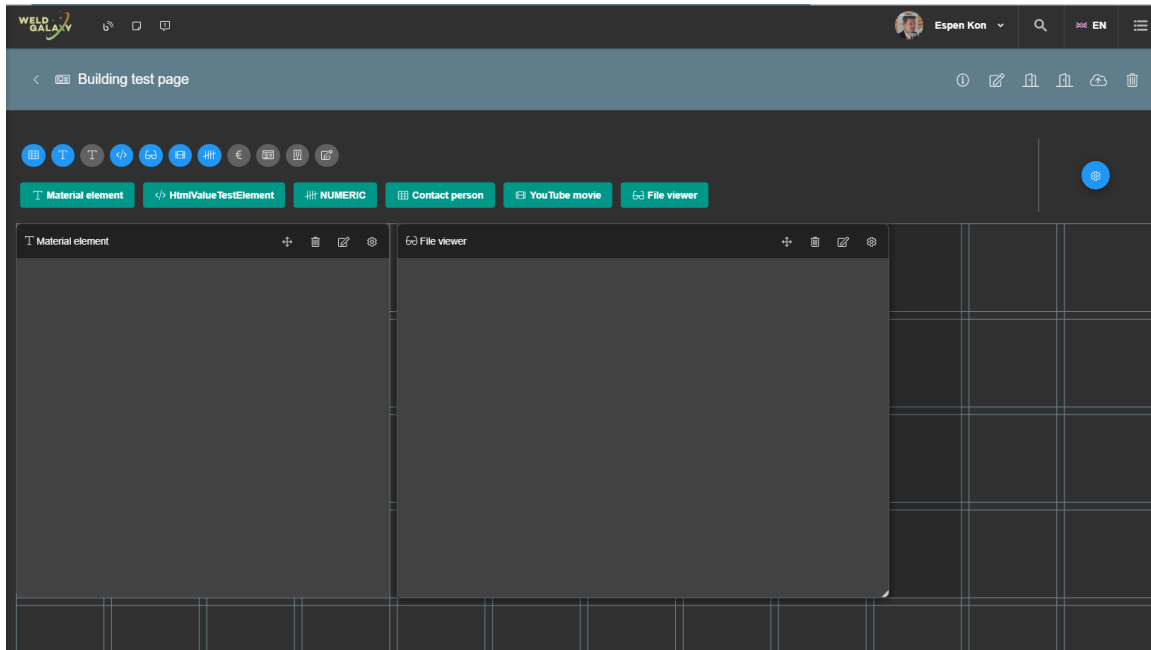


Figure 17: Page elements resizing

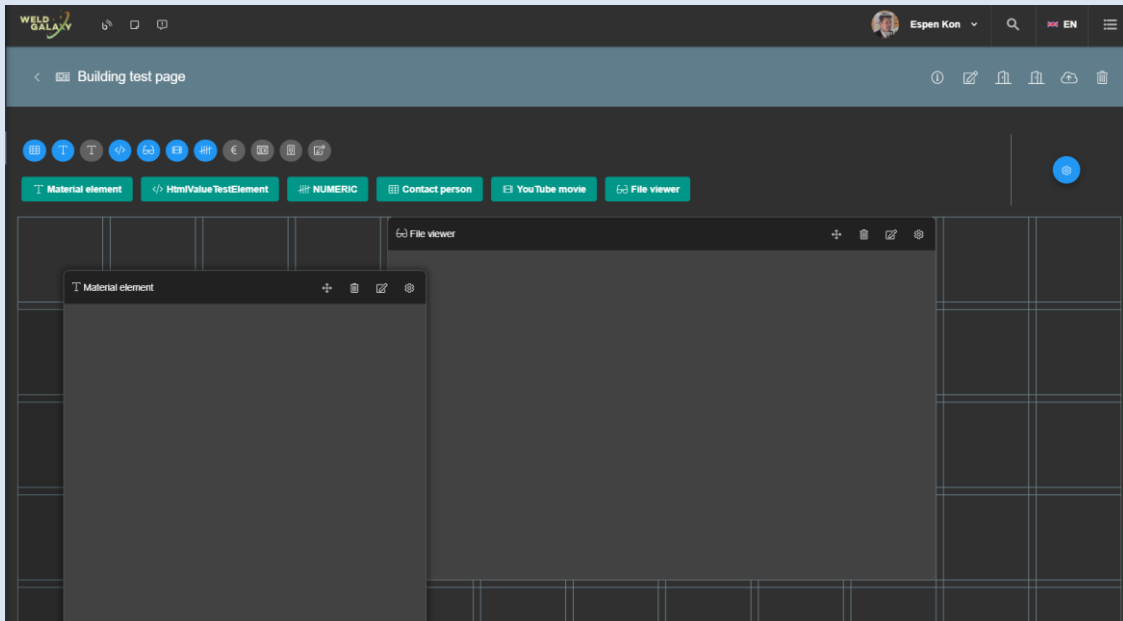


Figure 18: Page element's positioning

Edit file viewer:

- Add files to page; or
- Select file from file manager

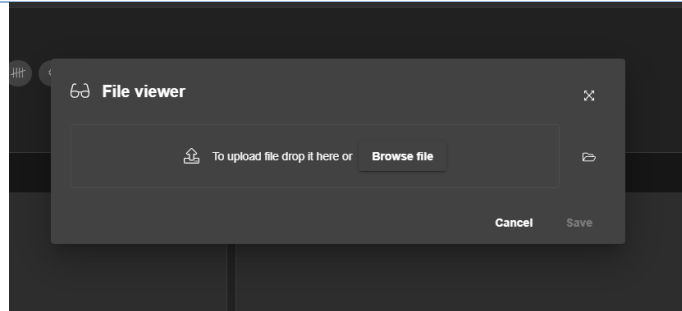


Figure 19: File viewer element – upload or select file

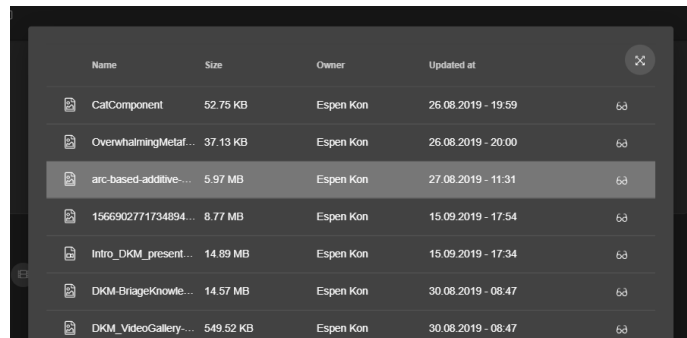


Figure 20: File viewer – list & select files

Page result displaying select file.
File display capabilities:

- Image
- PDF

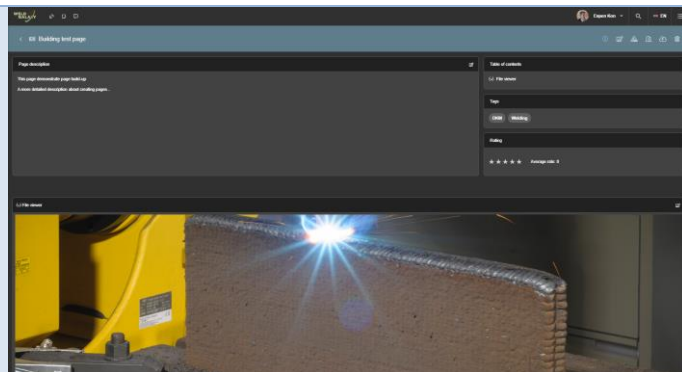


Figure 21: File viewer – display image

Other types of elements:

- Html inputs
- Other inputs (string, numeric)
- You Tube
- Custom elements

3.5.Job Knowledge Page sample

3.5.1. View mode

As described above, pages are composed from elements. Figure 22 shows an example of a Job Knowledge page in view mode.

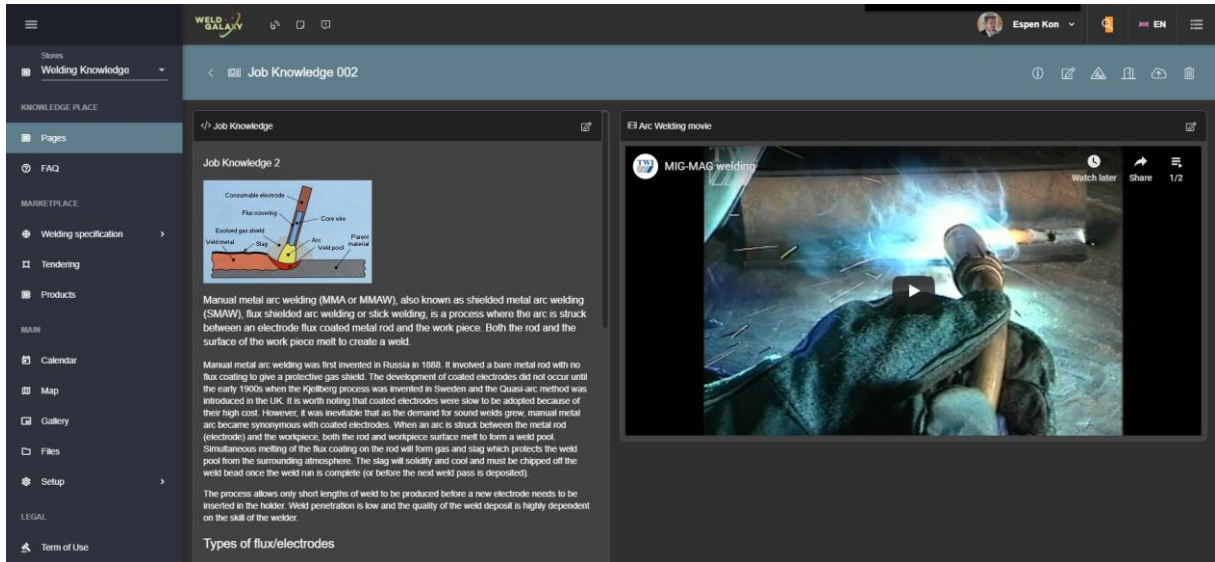


Figure 22: Job Knowledge page screenshot

3.5.2. Edit mode

As described above, pages are composed of elements. Figure 23 shows an example of a Job Knowledge page in edit mode.

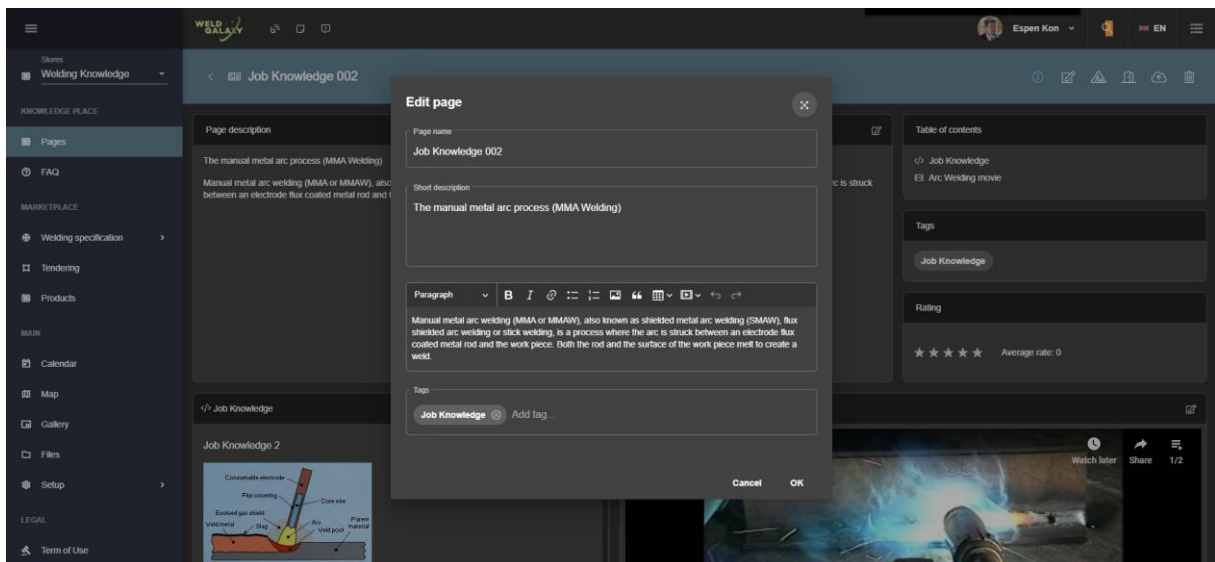


Figure 23: Page edit screenshot

3.6. DKM supporting utilities

3.6.1. FAQ (Frequently Asked Questions)

The FAQ model provides capability for the domain manger to manage (add, edit, list and remove) frequently asked questions.

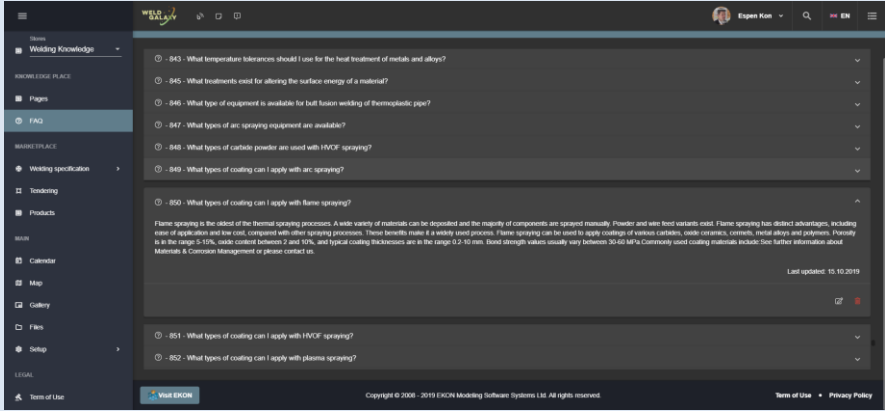
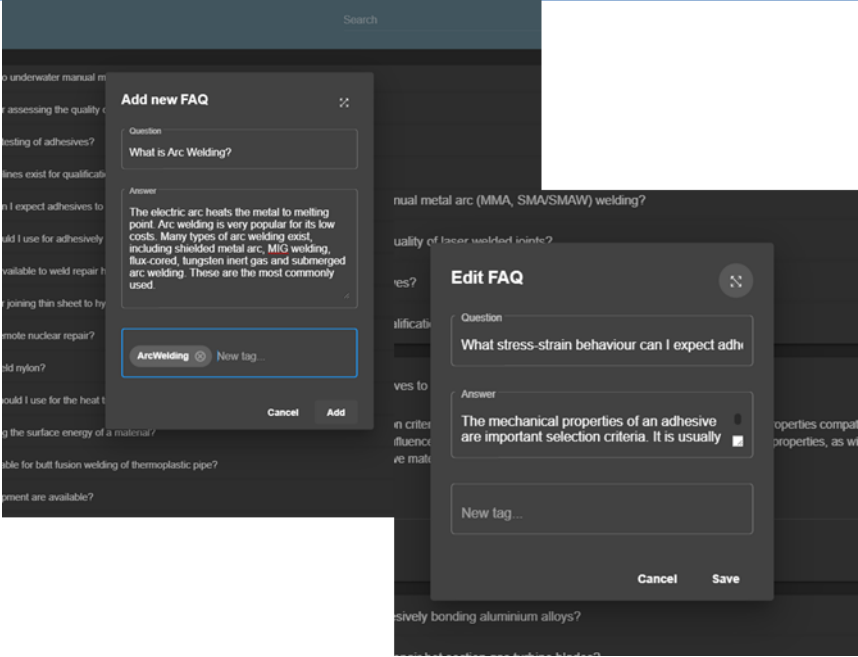
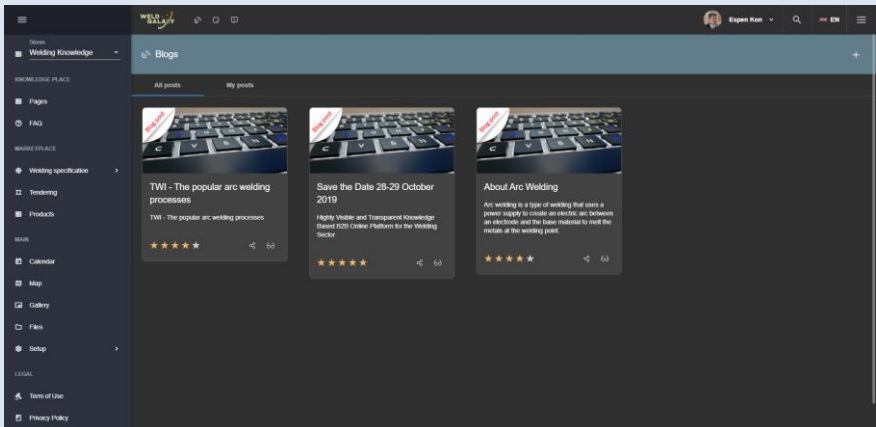
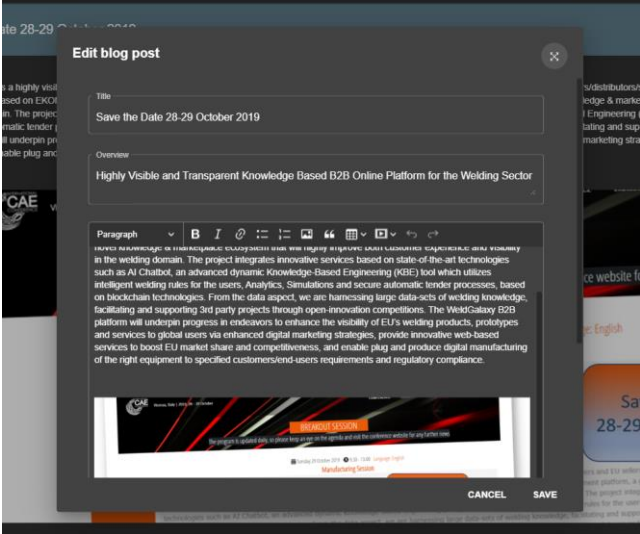

Description	Screen shot
List FAQ and with toggled answers	 <p>The screenshot shows a web application interface for listing FAQs. On the left is a navigation menu with categories like 'Welding Knowledge', 'Pages', 'FAQ', 'Working specification', 'Tendering', 'Products', 'Tools', 'Calendar', 'Map', 'Gallery', 'Files', and 'Setup'. The main content area displays a list of FAQ items, each with a question, an answer, and a toggle switch. One item is expanded to show the full answer text. At the bottom, there is a copyright notice for EXON and links for 'Terms of Use' and 'Privacy Policy'.</p>
Add / Edit FAQ	 <p>The screenshot displays two modal forms for managing FAQs. The 'Add new FAQ' form has a 'Question' field with the text 'What is Arc Welding?' and an 'Answer' field with a detailed explanation of arc welding. It includes a 'New tag...' input field with 'ArcWelding' selected and 'Add' and 'Cancel' buttons. The 'Edit FAQ' form has a 'Question' field with 'What stress-strain behaviour can I expect adhi...' and an 'Answer' field with 'The mechanical properties of an adhesive are important selection criteria. It is usually...'. It also features a 'New tag...' input field and 'Cancel' and 'Save' buttons.</p>

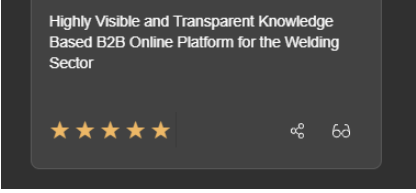
Figure 24: List FAQ with toggle

Figure 25: Add / Edit FAQ

3.6.2. Blogs

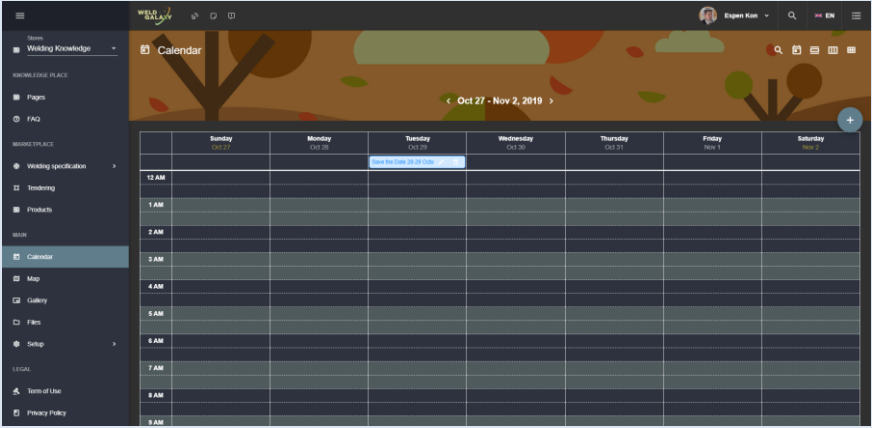
The Blog model provides the capability to add blogs which can serve vendors / domain owners.

Description	Screen shot
<p>List Blog posts as cards</p>	 <p style="text-align: center;"><i>Figure 26: Blog post list</i></p>
<p>Add / Edit Blog post</p>	 <p style="text-align: center;"><i>Figure 27: Add / Edit blog post</i></p>
<p>View Blog post</p>	 <p style="text-align: center;"><i>Figure 28: View blog post</i></p>

<p>Show average rating for Blog post</p>	 <p>Highly Visible and Transparent Knowledge Based B2B Online Platform for the Welding Sector</p> <p>★★★★★ 63</p> <p><i>Figure 29: Blog average rating</i></p>
--	--

3.6.3. Calendar

The Calendar model provides the capability to add events and tasks, and display them on a joint store / domain. Each item contains the capability to relate to documents (files) and pages.

Description	Screen shot
<p>Display calendar view in several views:</p> <ul style="list-style-type: none"> • Monthly • Weekly • Daily 	<div style="text-align: center;"> <p>Monthly view</p>  <p><i>Figure 30: Calendar monthly view</i></p> </div> <div style="text-align: center; margin-top: 20px;"> <p>Weekly view</p>  <p><i>Figure 31: Calendar weekly view</i></p> </div>

Daily view



Figure 32: Calendar daily view

Add / Edit Calendar item

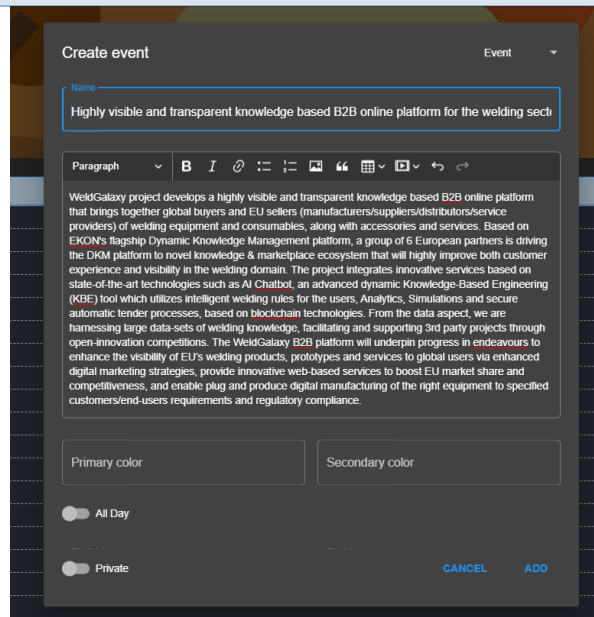
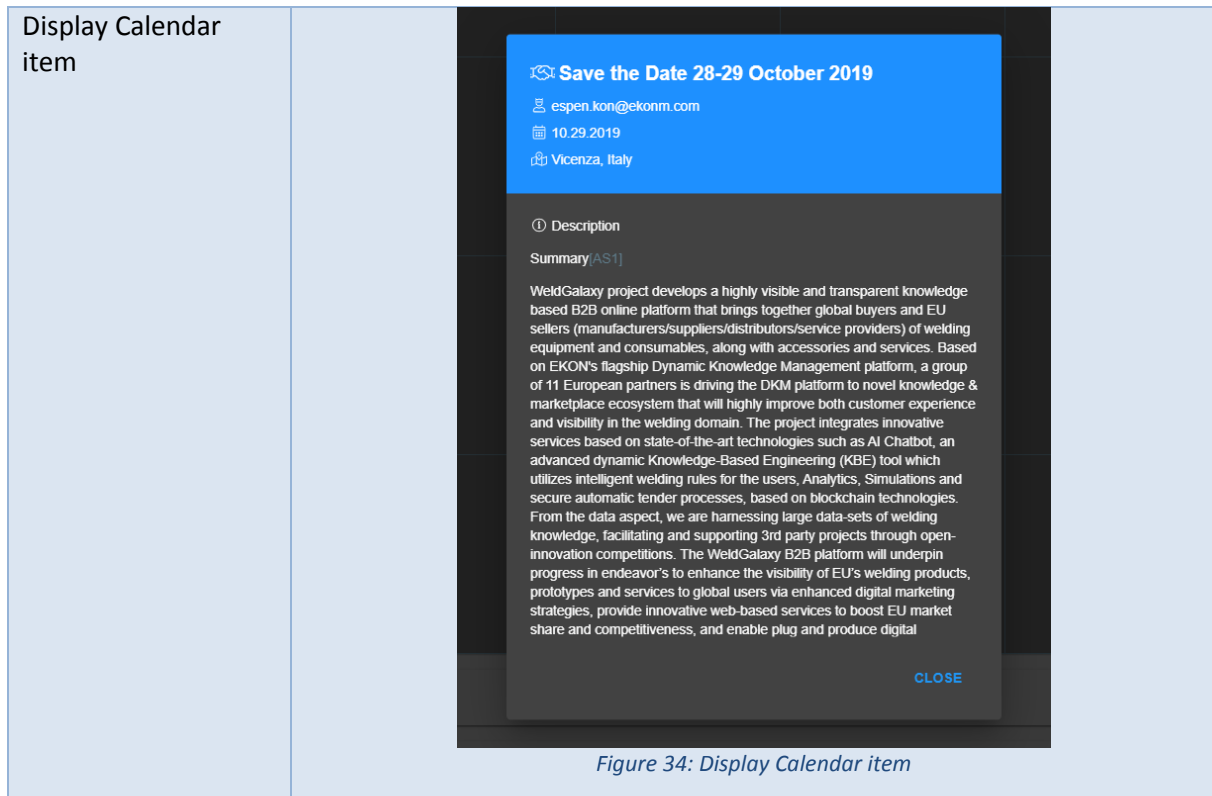


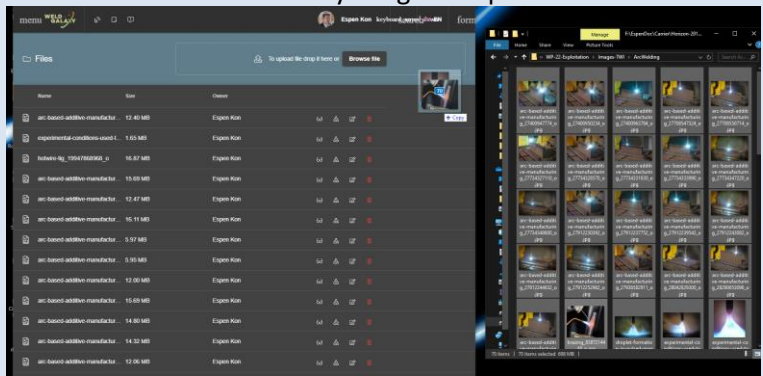
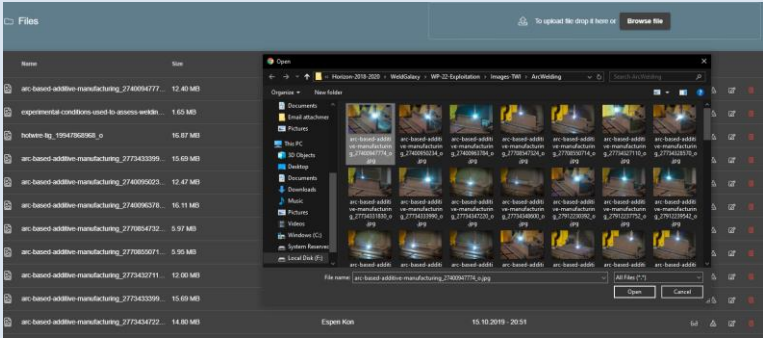
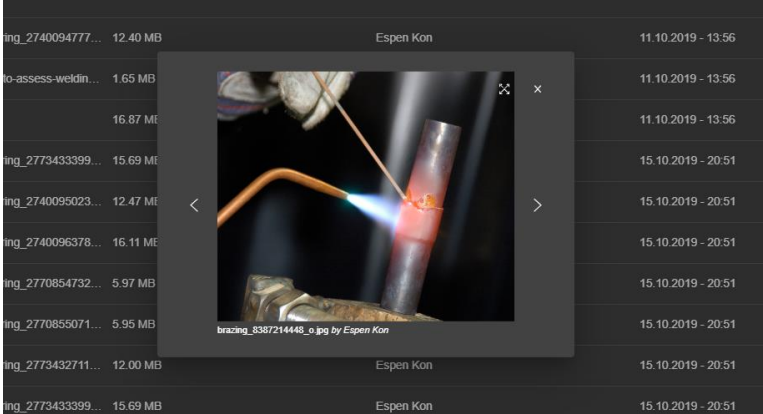

Figure 33: Add / Edit Calendar item

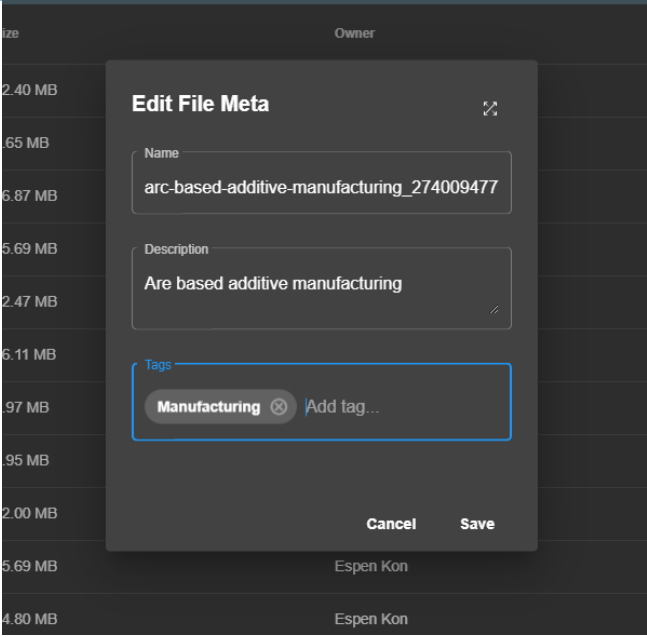
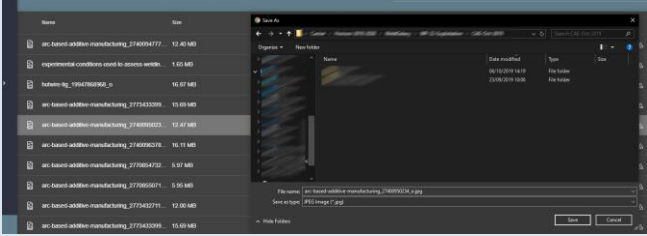
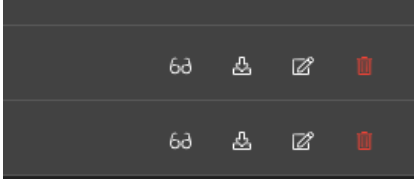


3.6.4. Files

The files model provides the capability to manage files (documents), view, and set up a relationship between documents, pages and events.

In the current iteration, images and a PDF (portable Document Format) viewer are provided.

Description	Screen shot
<p>Upload files:</p> <ul style="list-style-type: none"> • Drag & drop • User browser 	<p style="text-align: center;">Add by Drag & Drop</p>  <p style="text-align: center;"><i>Figure 35: Upload files by drag & drop</i></p> <p style="text-align: center;">Add by browsing</p>  <p style="text-align: center;"><i>Figure 36: Upload files by browsing</i></p>
<p>Display viewable files:</p> <ul style="list-style-type: none"> • Images • PDF 	 <p style="text-align: center;"><i>Figure 37: View files – images</i></p>  <p style="text-align: center;"><i>Figure 38: View files - PDFs</i></p>

<p>Edit file description</p>	 <p style="text-align: center;"><i>Figure 39: Edit file description</i></p>
<p>Download files</p>	 <p style="text-align: center;"><i>Figure 40: File download</i></p>
<p>File actions buttons:</p> <ul style="list-style-type: none"> • View • Download • Edit • Delete 	 <p style="text-align: center;"><i>Figure 41: File action buttons</i></p>

3.6.5. Today's notification bar – view

Description	Screenshots
<p>3.6.5.1. Overview</p> <p>The purpose of 'Today's bar' is to aggregate daily related topics that can engage the user. It includes the capability to enable/disable user's daily relevant notification:</p> <ul style="list-style-type: none"> • Events • Tasks • Notes • RSS Feeds¹ • Chatbot 	 <p>Today Wednesday 16th October</p> <p>Events <input type="checkbox"/></p> <p>Tasks <input type="checkbox"/></p> <p>Notes <input type="checkbox"/></p> <p>RSS Feeds <input type="checkbox"/></p> <p>Chat Bot <input type="checkbox"/></p> <p><i>Figure 42: Today's bar options</i></p>
<p>3.6.5.1. Events</p> <p>The events are defined in the calendar. Today's will display the current daily events.</p> <p>Use a switch to toggle between open and closed lists..</p>	 <p>Events <input checked="" type="checkbox"/></p> <p>Save the Date 28-29 October 2019 29.10.2019 at 00:00</p> <p><i>Figure 43: Today's bar events option</i></p>
<p>By selecting an event, event information is displayed in a popup</p>	 <p>Save the Date 28-29 October 2019 espen.kon@ekonm.com 10.29.2019 Vicenza, Italy</p> <p>Description Summary AS1</p> <p>WeldGalaxy project develops a highly visible and transparent knowledge based B2B online platform that brings together global buyers and EU sellers (manufacturers/suppliers/distributors/service providers) of welding equipment and consumables, along with accessories and services. Based on EKON's flagship Dynamic Knowledge Management platform, a group of 11 European partners is driving the DKM platform to novel knowledge & marketplace ecosystem that will highly improve both customer experience and visibility in the welding domain. The project integrates innovative services based on state-of-the-art technologies such as AI Chatbot, an advanced dynamic Knowledge-Based Engineering (KBE) tool which utilizes intelligent welding rules for the users, Analytics, Simulations and secure automatic tender processes, based on blockchain technologies. From the data aspect, we are harnessing large data-sets of welding knowledge, facilitating and supporting 3rd party projects through open-innovation competitions. The WeldGalaxy B2B platform will underpin progress in endeavor's to enhance the visibility of EU's welding products, prototypes and services to global users via enhanced digital marketing strategies, provide innovative web-based services to boost EU market share and competitiveness, and enable plug and produce digital</p> <p>CLOSE</p> <p><i>Figure 44: Event view screenshot</i></p>
<p>3.6.5.2. Tasks</p> <p>See plans for next iteration at the end of this report.</p>	

¹ <https://en.wikipedia.org/wiki/RSS>

3.6.5.3. Notes

The user can define private notes for personal usage. These are designed for work-related topics. Today's will display the current daily notes.

A switch is provided to toggle between open and closed lists.

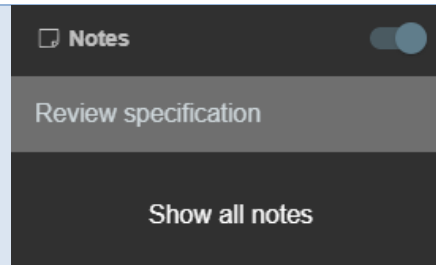


Figure 45: Today's notes list screenshot

By selecting a note, the note dialog opens for review and editing in a popup.

Show all notes will redirect to the user's notes.

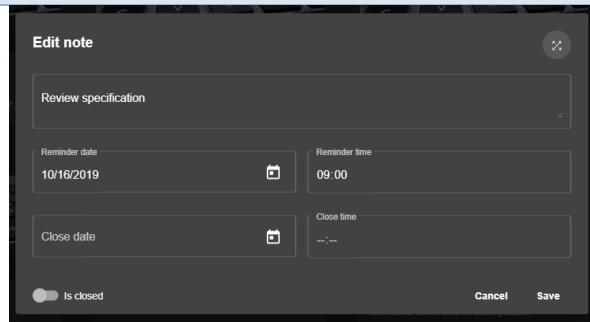


Figure 46: Edit note screenshot

3.6.5.4. RSS Views

Provides users the capability to view relevant notifications from different sources within the platform.

By selecting an RSS source, a dialog opens, displaying feeds list in a popup.

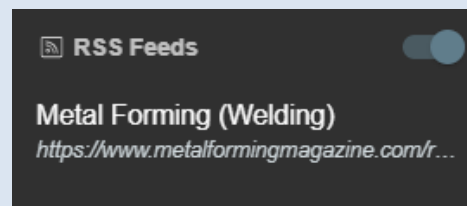


Figure 47: Today's RSS screenshot

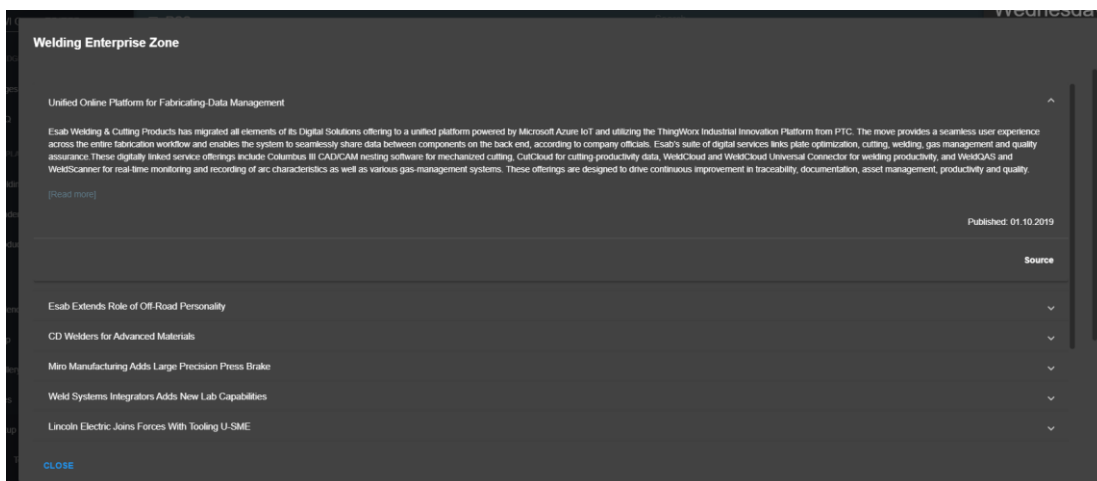


Figure 48: RSS view screenshots

3.6.5.5. Chatbot

Elaborated in:

- D15.1: WeldGalaxy Testing and Experimental environment-I
- D5.3: Chat Bot developed – I

4. Platform configuration setup

4.1. Page templates

Manage page templates.

4.2. Domains / Stores

Manage domains. Domains may be Stores, Departments, Groups and so on.

- Add / Edit domain
- List domains
- Domain dashboard – in process, to be continued in WP6 and WP16

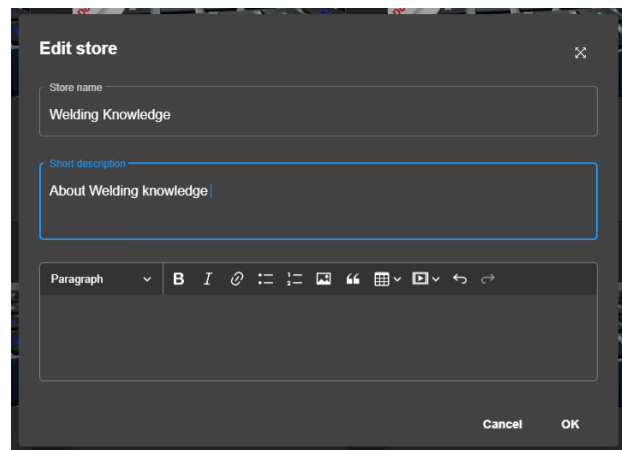


Figure 49: Edit domain screenshot

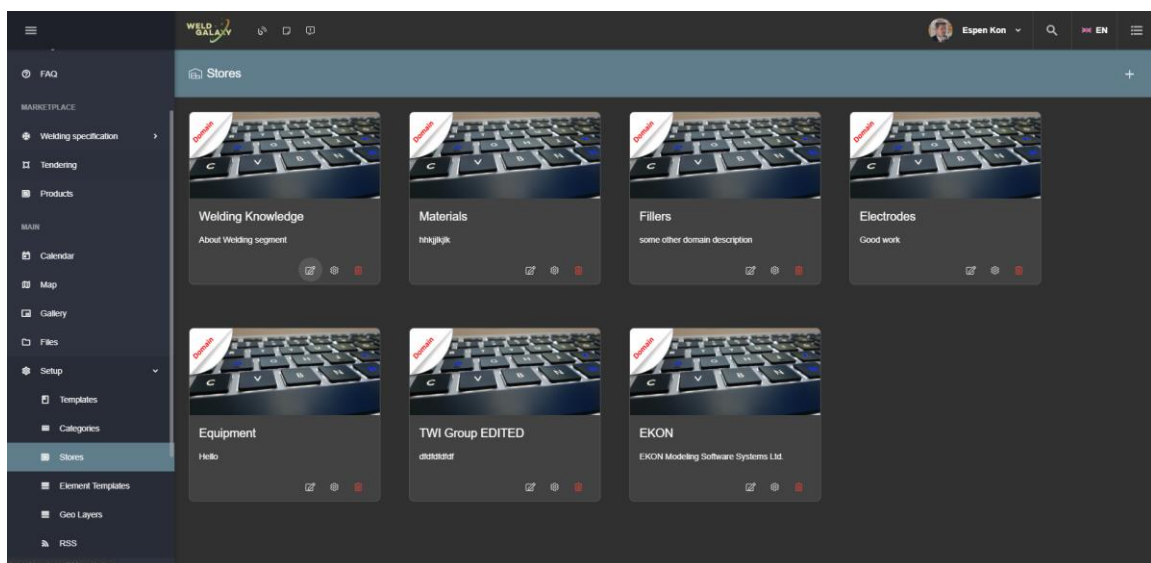


Figure 50: List domains screenshot

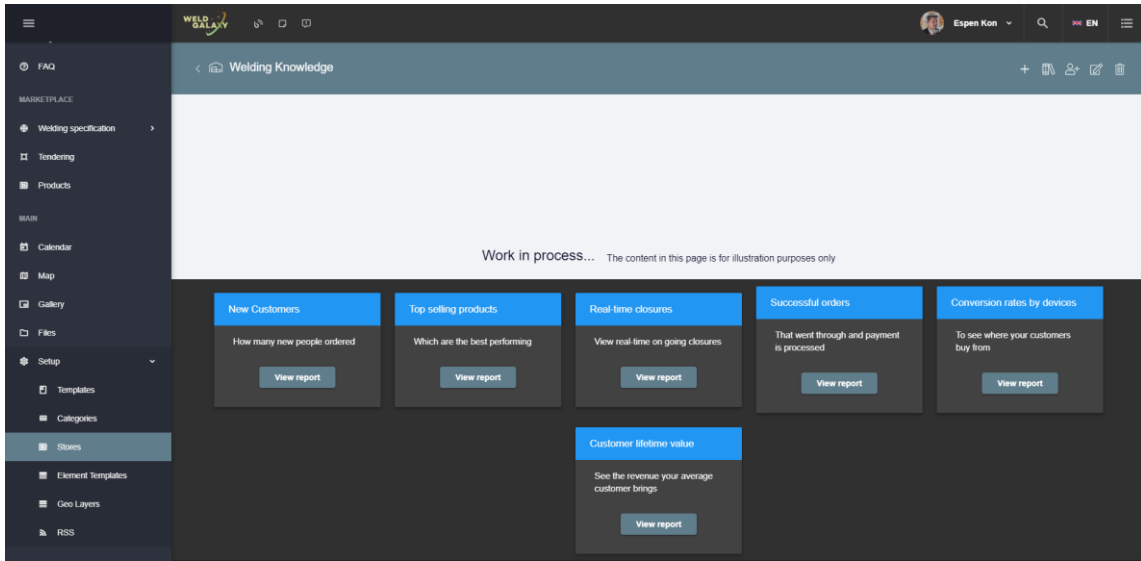


Figure 51: Domain dashboard screenshot

4.3.Element templates

Manage page elements as the building block for a page composition.

- Add / edit element
- Display elements

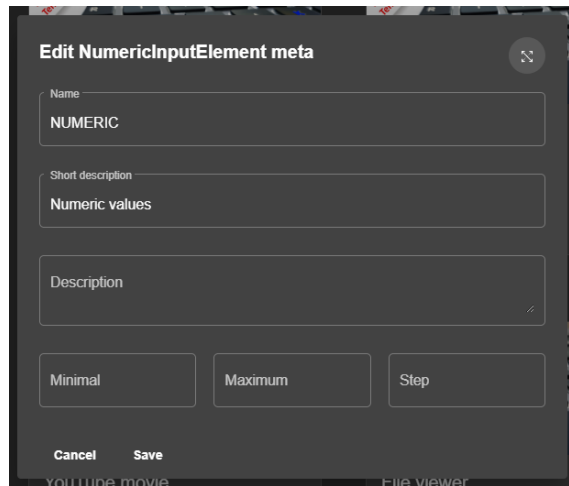


Figure 52: Add/Edit element screenshot

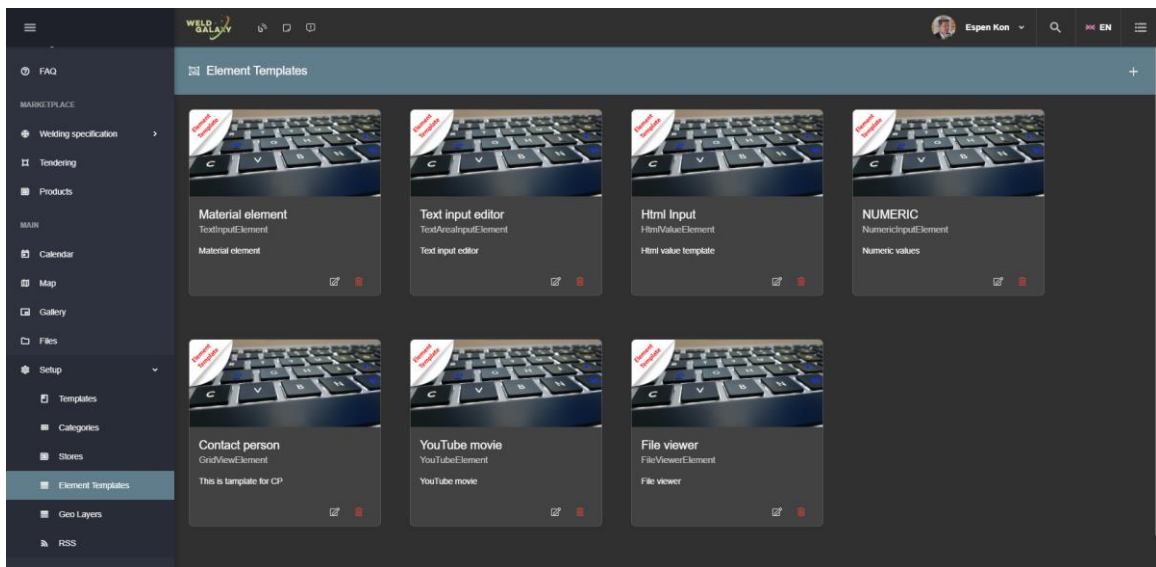
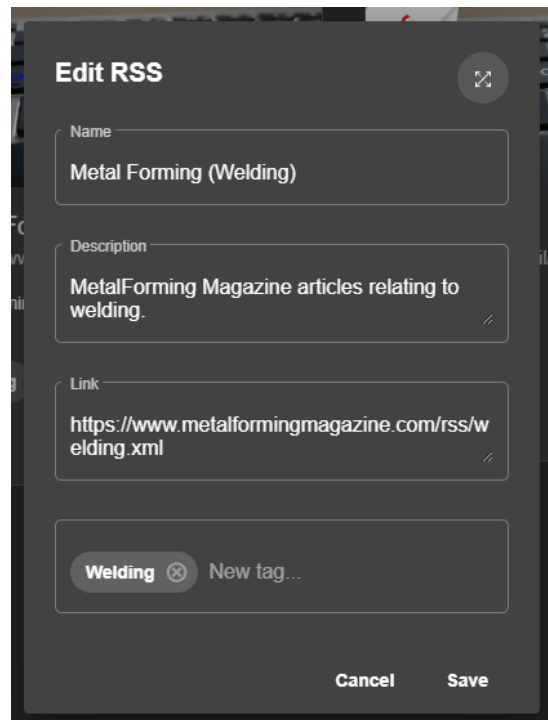


Figure 53: List elements screenshot

4.4.RSS setup

Manage RSS sources:

- Add / edit RSS source
- Display RSS feed



Edit RSS

Name
Metal Forming (Welding)

Description
MetalForming Magazine articles relating to welding.

Link
https://www.metalformingmagazine.com/rss/welding.xml

Welding New tag...

Cancel Save

Figure 54: Add/edit RSS screenshot

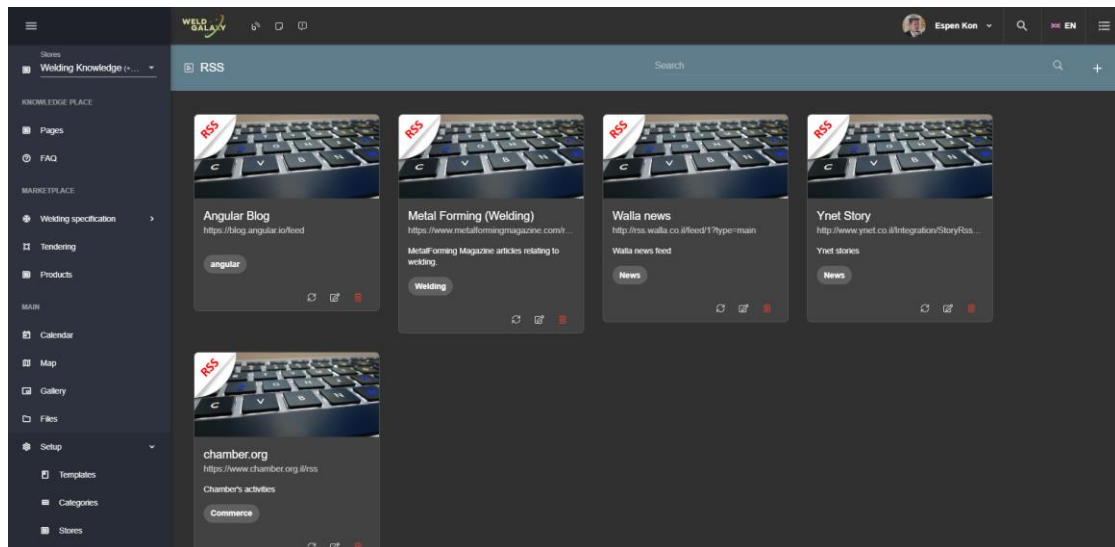


Figure 55: List RSS cards screenshot

5. Component development

5.1.Overview

The different WeldGalaxy components are being developed in parallel but withongoing meetings to synchronise not only developments but also allow testing integration and interoperability (through WP15).

5.2. Knowledge Based Engineering (KBE) interface

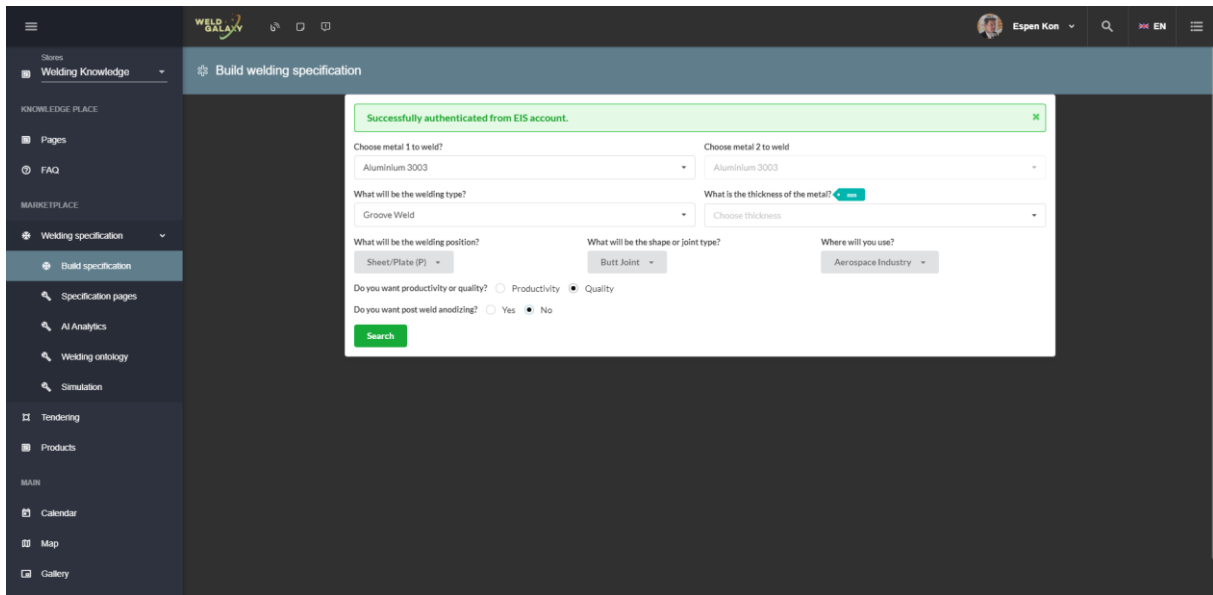


Figure 56: KBE interface for parameters input

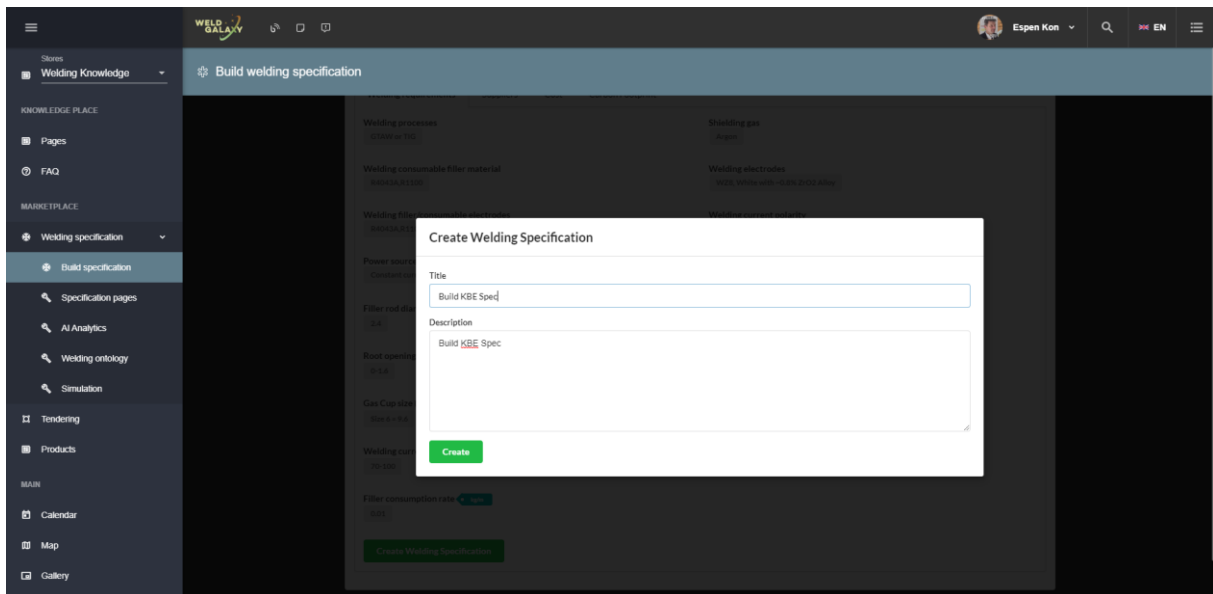


Figure 57: Bild KBE Specification

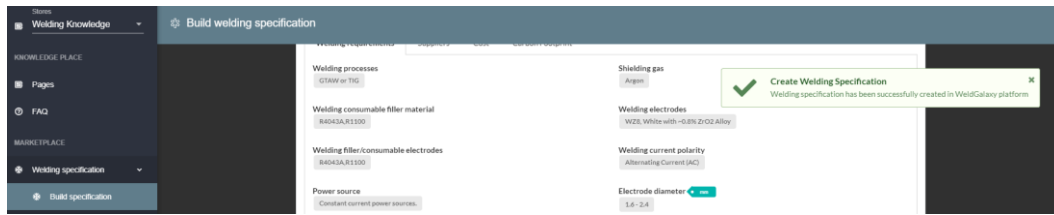


Figure 58: KBE Specification Created

5.3. Chatbot

The development of the Chatbot is described in detail in Deliverable 5.3: Chatbot Delivered (Iteration I). The following section illustrates how the Chatbot is hosted in the DKM.

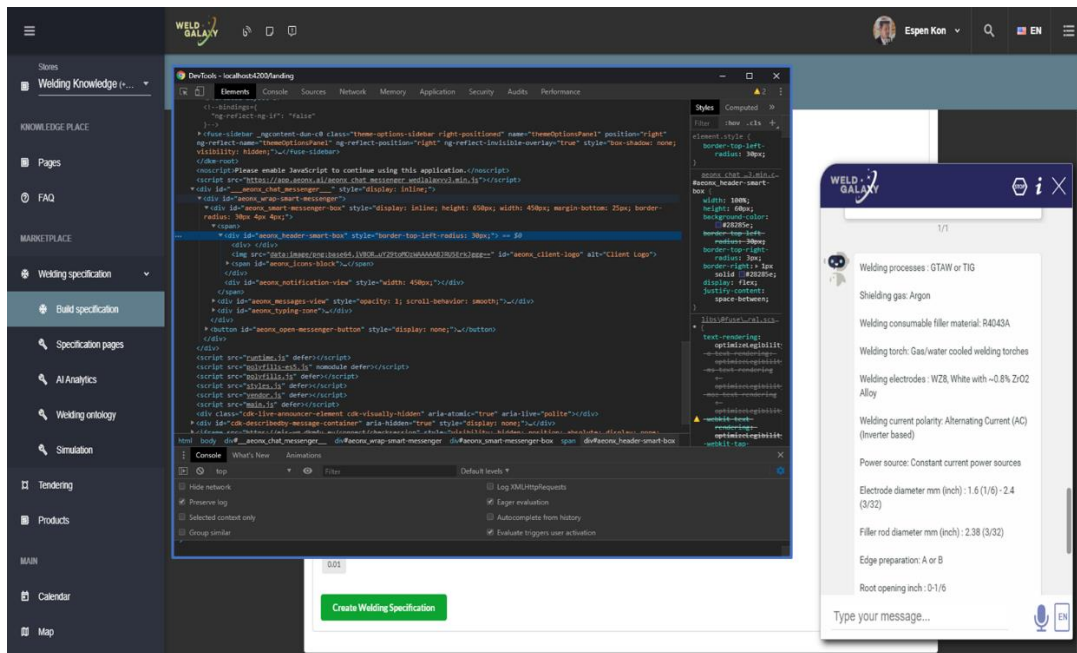


Figure 59: Chatbot embedding development sample

5.4. Analytics interface

As noted in D1.2 and D1.3, the Analytics module will provide feedback on the usage of the Weld Galaxy platform and its components (based on their output), as well as the materials' knowledge base.

Python was chosen as the base programming language for WeldGalaxy analytic tools; developments will be supported by several libraries. Flask microframework will be used to create web applications and from the use of extensions an API based on Flask will be created for the extraction of datasets, the Mongoengine² will be used to work with the MongoDB engine and we will support data analytics visualisation tools by using DASH. The Analytic API to communicate with other Weld Galaxy components is presented in WP15.

² <http://mongoengine.org>

5.5.(Distributed Ledger Technology (DLT) services

The visualisation of the DLT Service is provided in an iFrame, allowing users functionality such as generating tenders, displaying a tender's status, and more. Further elaboration of the DLT Services is in Deliverables D7.2 and D7.3.

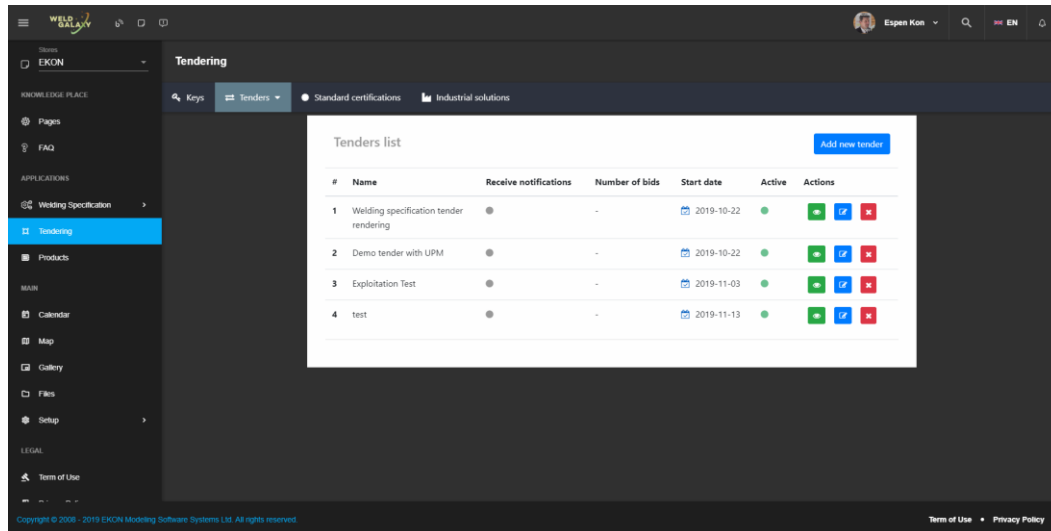


Figure 60: DLT Service for tender

5.6.Simulation tool

The interface between the DKM platform and the Computational Welding Mechanics (CWM) simulation engine has not been developed yet as it is scheduled for iteration 2. However, it is planned that the input information – welding parameters, choice of template geometry, materials, etc – will come from either the KBE tool or by direct input to the DKM, depending on the end-user's choice. Visualisation of simulation results will be via static pictures from pre-determined viewing angles. The values of simulation results will be passed to both the KBE and directly to the DKM.

The following image illustrates the Simulation Engine in the WeldGalaxy Platform for a Double-V Butt Joint Weld template. See deliverable 10.3: Report on Welding Templates & Meta modeling.

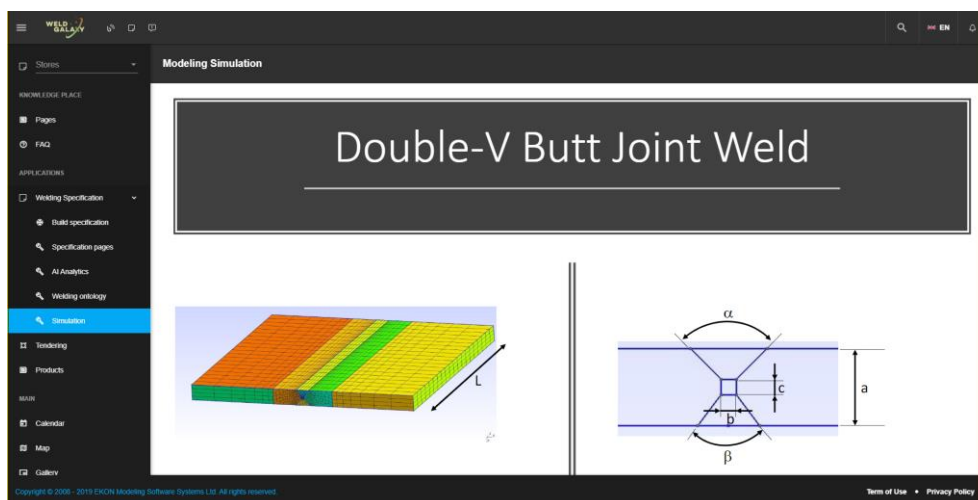


Figure 61: Simulation Engine illustration

5.7. Ontology End points (GraphQL): supporting the data layer

The ontology end points are based on the Weld Galaxy ontology created for having a formal vocabulary that defines a shared conceptualisation on welding processes. This describes the concepts and relationships in the welding domain based on the knowledge of the sector accumulated by TWI. To create the ontologies, we used the Protégé editor, which allowed generation **and** visualisation of the ontologies, using WebProtégè to export via a URL (Uniform Resource Locator). This visualisation can be included within an iFrame in the platform.

As commented in deliverable D1.3 the ontologies have been defined using OWL (Web Ontology Language), comprising Individuals, Properties, and Classes corresponding to the Protégé frames Instances, Slots and Classes. We will make semantics available to developers and the different WeldGalaxy subsystems (e.g. KBE, Chatbot, etc) using JSON-LD and GraphQL, so data will be served to the front end and other clients via the GraphQL API. The GraphQL services are created by defining types and fields on those types, then providing functions for each field on each type.

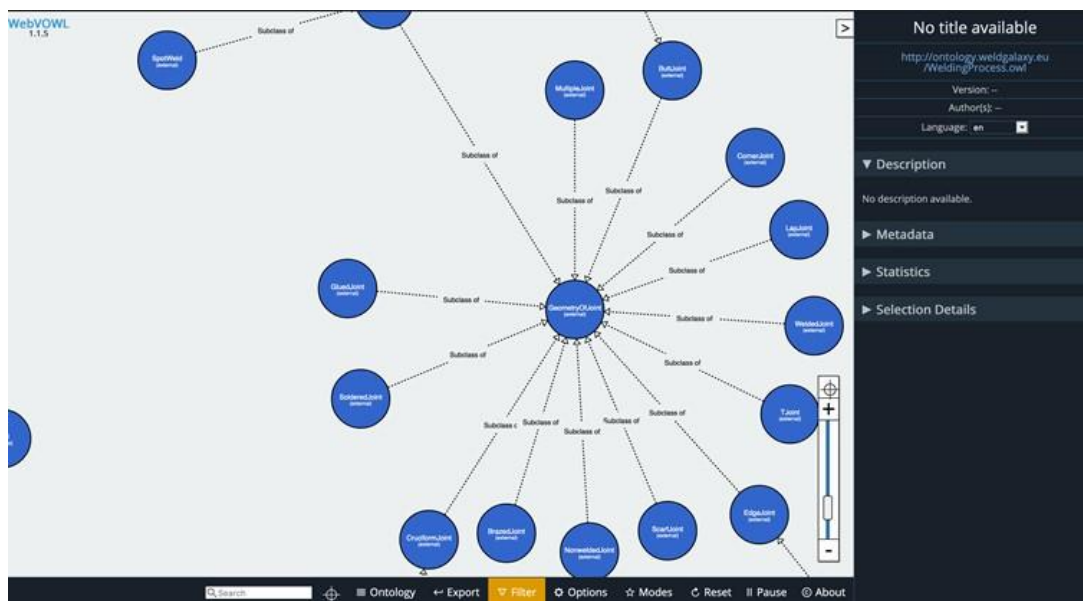


Figure 62: Welding Process WebProtégè visualisation

```

1 query {
2   pages {
3     id
4     name
5     description
6     tags
7     isTemplate
8     domains
9   }
10 } # Write your query or mutation here
11

```

```

{
  "id": "35b79b26-f3fb-4110-b97c-2a95db2cf8f6",
  "name": "Job Knowledge 026",
  "description": null,
  "tags": [
    "Job Knowledge",
    "Health"
  ],
  "isTemplate": false,
  "domains": null
},
{
  "id": "18964beb-0228-433e-896e-bfd55a0b10da",
  "name": "Job Knowledge 027",
  "description": null,
  "tags": [
    "Job Knowledge"
  ],
  "isTemplate": false,
  "domains": null
}

```

Figure 63: GraphQL UI - sample

6. W3C Web Content Accessibility Guidelines

The DKM user interface is designed to support accessibility to allows users of diverse abilities to navigate, understand, and use the DKM UI. The user interface of the DKM is based on Material Design³, including implementation and guidelines for accessibility support. During the UX phase, in iteration II, the accessibility guidelines will be followed and fully implemented.

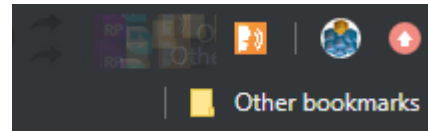
Also, the DKM UI already supports a screen-reader, ensuring that focused areas are highlighted and read clearly. During iteration I of the development, we have tested the screen-reader functionality using ChromeVox⁴. This will be finetuned further during iteration II of the development.



ChromeVox icon, displayed on the top of the browser.

ChromeVox option allows customisation of the screen-reader, to meet the user's accessibility needs.

In the screen-shots below, focused areas are highlighted with an orange rectangle, and the screen-reader, loads and reads the content.



ChromeVox Options

53.0.2784.6

- Enable verbose descriptions.
- Place cursor between characters when editing text (like Mac OS X).
- Use the mouse to change focus.
- Enhance specific sites (like Google Search).
- Display an item's context before other information (such as its name).

Voices

Change the current voice by selecting an option from the list below.

Microsoft David Desktop - English (United States)

Keyboard shortcuts

Change the current keymap by selecting an option from the list below.

Classic keymap Reset current keymap

Customize keyboard shortcuts for frequently used commands by typing them into the corresponding fields below.

Modifier Keys

- | | |
|----------------------|--------------------------------------|
| <input type="text"/> | ChromeVox modifier key |
| Insert | Enable/Disable sticky mode |
| Ctrl+Semicolon | Prefix key |
| ChromeVox+Escape | Pass through key |
| ChromeVox+A>A | Toggle ChromeVox active or inactive. |

Controlling Speech

- | | |
|------------------------|-------------------------|
| Ctrl | Stop speech |
| ChromeVox+Open brack) | Decrease rate of speech |
| ChromeVox+Close brack) | Increase rate of speech |

Figure 64: ChromeVox setting screenshot

³ <https://material.io>

⁴ <https://chrome.google.com/webstore/detail/chromevox-classic-extensi/kgejglhpjiefppelpmljglcbhoiplfn>

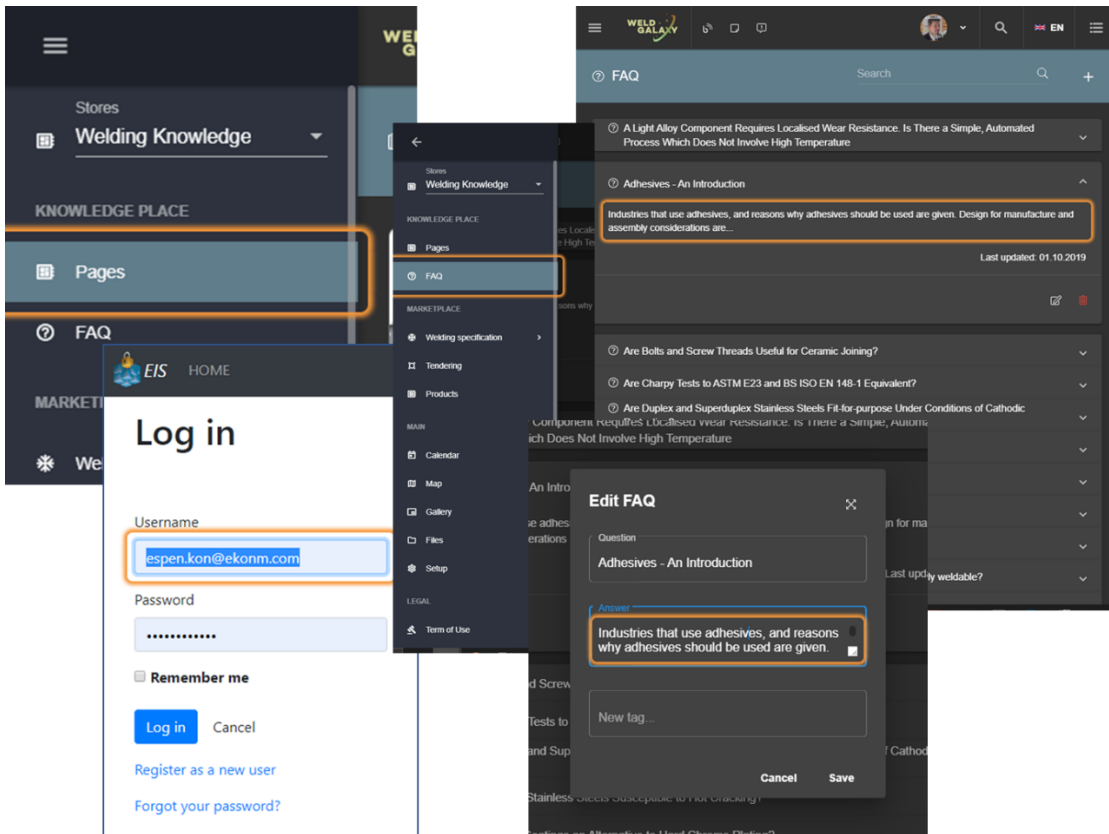


Figure 65: Rendering with ChromeVox sample screenshots

7. EIS (EKON Identity Service)

7.1.Overview

The development of the EIS is based on C# MVC using Razor. It serves as the Identity service for any type of resource access, users and APIs, assuring secured and authorised access.

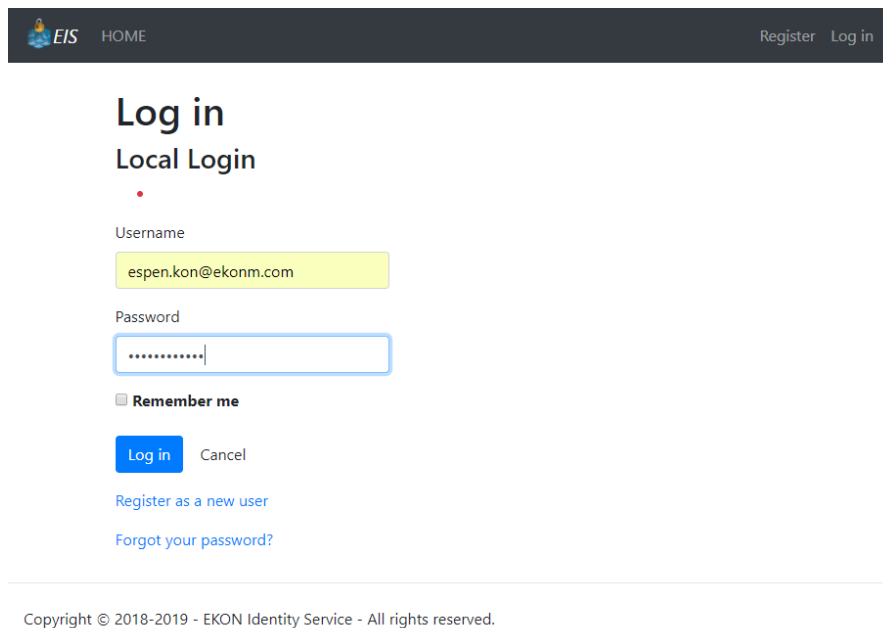
7.2.Matrix template for access and authorisation

As the final detailed definition of business roles will be defined in the next iteration, the following infrastructure is defined:

- Claim types assigned to user and APIs
- At the application level, the definition of access level for each page, defined as:
 - Visibility – who can see what
 - Editability – who can edit what

7.3.Screen samples

This section shows some screenshots of the EIS. Any login, from any client or user, is re-directed to login via EIS.



EIS HOME Register Log in

Log in

Local Login

•

Username
espen.kon@ekonm.com

Password
.....

Remember me

[Log in](#) [Cancel](#)

[Register as a new user](#)

[Forgot your password?](#)

Copyright © 2018-2019 - EKON Identity Service - All rights reserved.

Figure 66: EIS Login screenshot

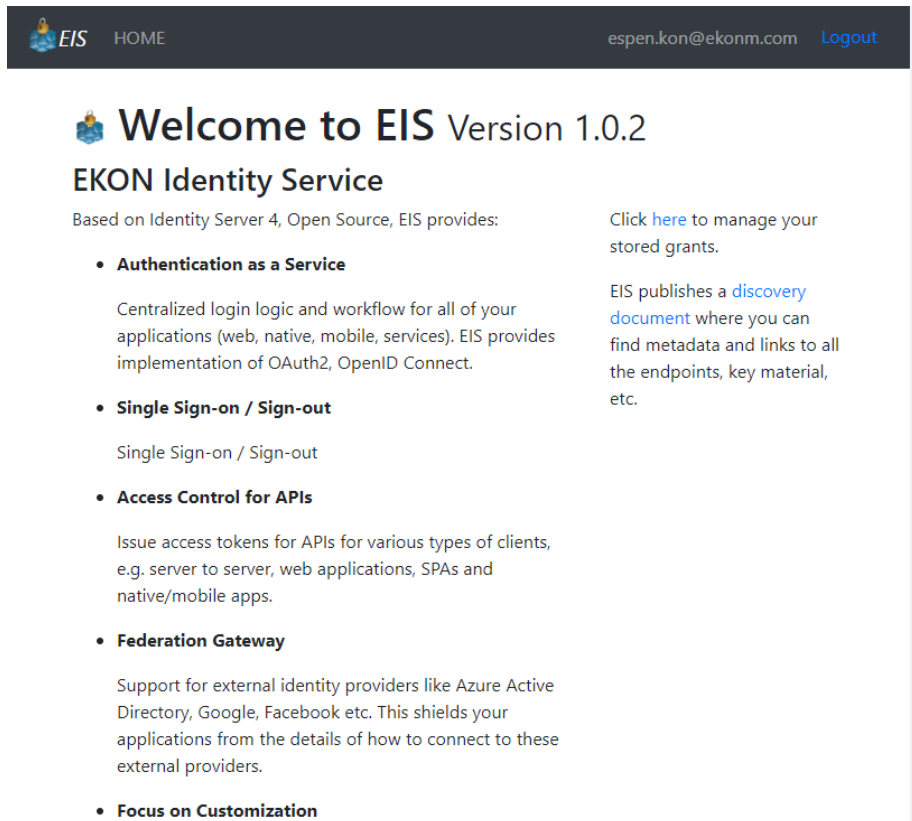


Figure 67: EIS Home screenshot

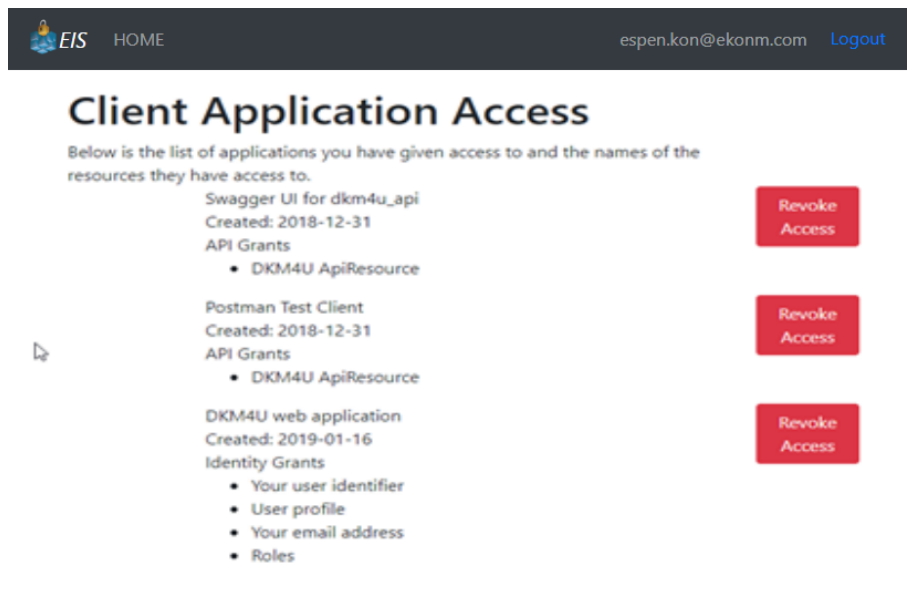


Figure 68: EIS Client application access details screenshot

8. 1st round Deployment

This section with the above description of the development and deployment of the components over the DKM platform, provides the document for the initiation of the WeldGalaxy integration and deployment.

8.1. Development for deploying the 1st mock-up and demonstrator

The deployment strategy during the development is a micro-service base, enabling each partner to deploy its own components on self-owned domains, providing secured API access.

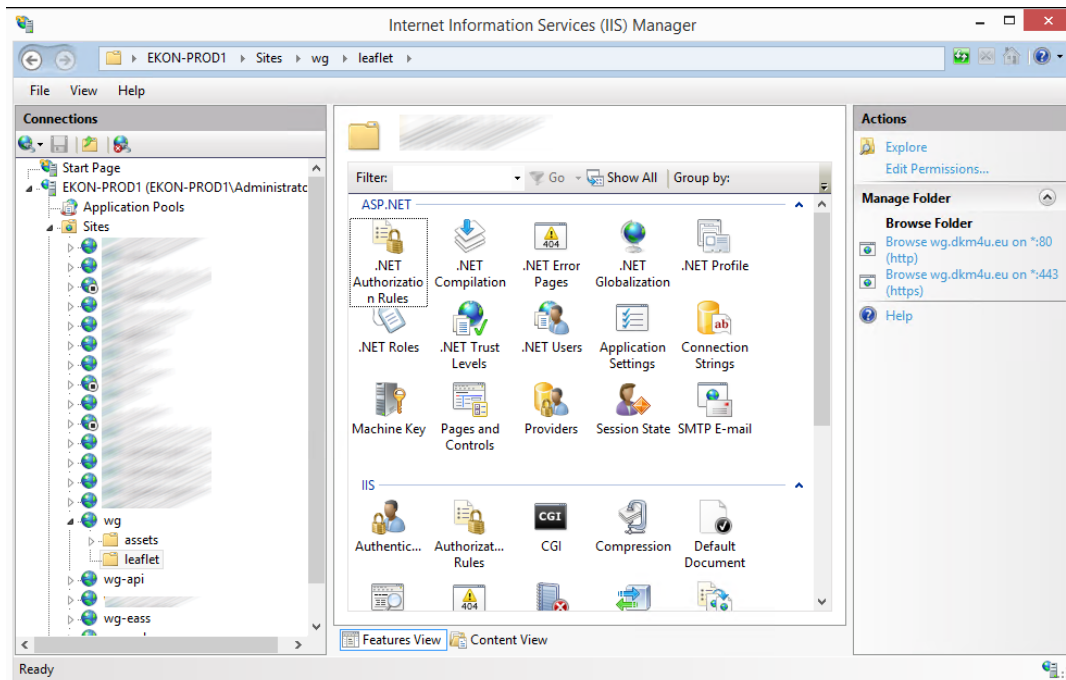


Figure 69: IIS deployment on EKON Server's for development

8.2. MongoDB

During the development stage, iteration one, the DKM database infrastructure was deployed hosting it on EKON's servers to support the platform development and 1st round demonstrator (as well as mockup).

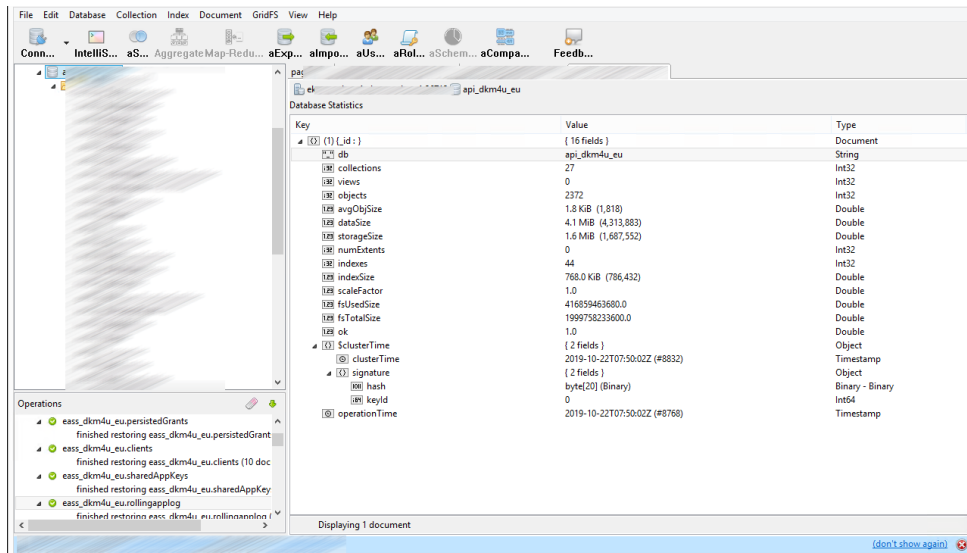


Figure 70: MongoDB client - sample

8.3.Secured development and on-line monitoring

The development process of the DKM and the WeldGalaxy Platform follows the D5.1: Information security and privacy development guidelines report, which is based on Top-10 OWASP guidelines. In addition to the secured development practice, we performed a regular on-line penetration test to discover vulnerabilities and mitigate those during the development stages, using Open Source tools such as Arachni-Scanner⁵.

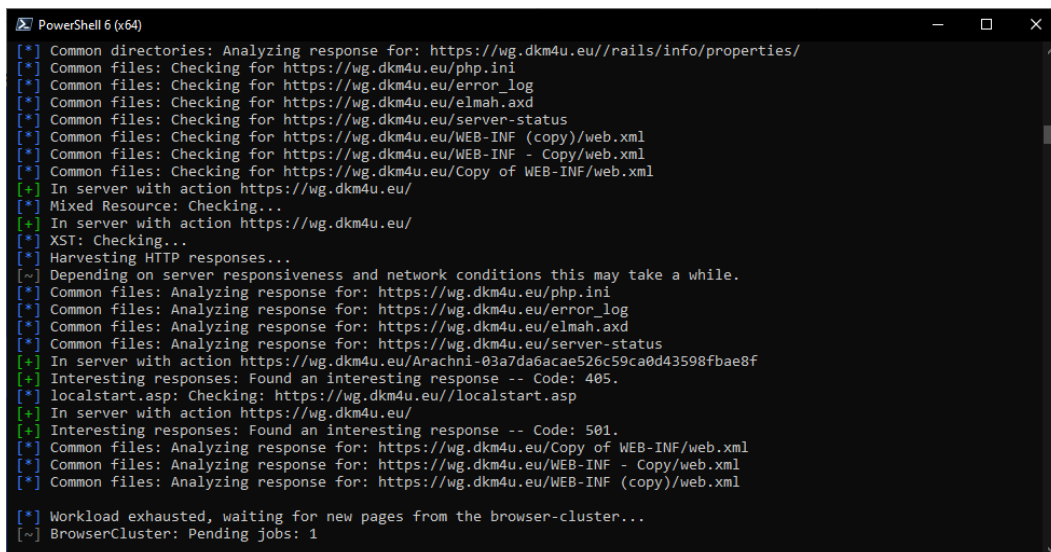


Figure 71: Penetration tests running Arachni-Scanner snippets

⁵ <https://www.arachni-scanner.com>


```

PowerShell 6 (x64)
Cyber-criminals will almost always perform this simple test as it will give a
very quick indication of any high-risk methods being permitted by the server.

Arachni discovered that several methods are supported by the server.

[~] Tags: http, methods, options
[~] References:
[~] Apache.org - http://httpd.apache.org/docs/2.2/mod/core.html#limitexcept

[~] URL:      https://wg.dkm4u.eu/
[~] Element:  server

[~] Proof:    "OPTIONS, TRACE, GET, HEAD, POST"

[~] Referring page: https://wg.dkm4u.eu/

[~] Affected page: https://wg.dkm4u.eu/
[~] HTTP request
[~] OPTIONS / HTTP/1.1
Host: wg.dkm4u.eu
Accept-Encoding: gzip, deflate
User-Agent: Arachni/v1.5.1
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.8,he;q=0.6
X-Arachni-Scan-Seed: 03a7da6acae526c59ca0d43598fbae8f

[+] Plugin data:

```

Figure 72: Penetration tests running Arachni-Scanner snippets

Further SaaS penetration testing has been performed with a focus on OWASP (Open Web Application Security Project) security guidelines, with tools such as AppTrana⁶.

8.1.1st Round demonstrator deployment

Once the DKM services were developed and deployed, integration to have a first demonstrator was implemented. We started with KBE, DLT services and some intermediate data to generate the 1st deployment, test and experiment with data (see D15.1). This first deployment aimed at providing a showcase for events (it was shown at CAE Exhibition October 2019) as well as to get feedback and insights from potential users (from both demand and supply side in the marketplace).

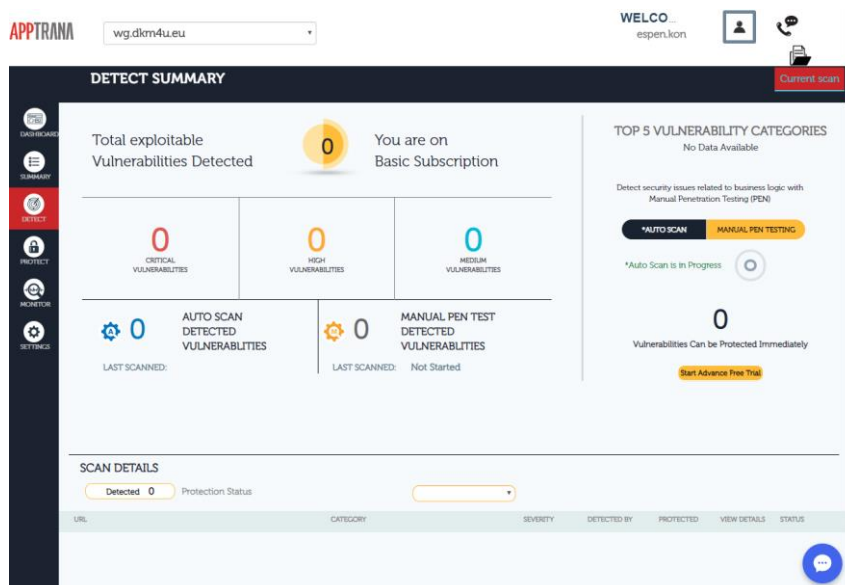


Figure 73: Penetration tests running AppTrana snippets

⁶ <https://portal.apptrana.com>

9. Next steps: moving to the next iteration

The development and enhancement of the DKM will continue in WP6 - Platform architecture, development & security (Iteration 2).

Through workshops, users' feedback, and initiating the Open Calls, additional inputs will be gathered and might change working priorities.

Currently, we plan to include:

- Improvements and bug fixes following testing and users' feedback:
 - Continue development of Marketplace features including products, services, and vendors' marketplace management
- Adding features such as:
 - Maps, to allow geolocation context to the knowledge
 - Task management
 - Management of Push Notifications
 - Enhanced knowledge graph visualisation
 - Domain/store galleries
 - Platform related user interface for User Management
 - Domain and user dashboard
 - Server push notifications
- UX/UI improvements