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Deliverable D11.1 “Dissemination and standardisation plan”

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Abstract

This document constitutes deliverable D11.1 of the ARROWHEAD fPVN project.

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1. Introduction

The ARROWHEAD flexible Production Value Network (fPVN) project aims to offer self-governing and adaptable compatibility of data using machine-readable material for all fPVN partners. The emerging technology is expected to have a significant influence on production efficiency and adaptability.

Common project technology will enable the achievement of autonomous and evolvable interoperability supported by three foundational pillars:

- The microservices paradigm
- Application of widely recognized data models in industry
- Automated translation between the data models

Deliverable D11.1 “Dissemination and standardisation plan” represents the Initial dissemination and standardisation plan containing all planned dissemination and communication activities that are going to be implemented throughout the entire lifetime of the project. The Dissemination and Standardisation Plan provides important guidelines for both internal and external communication of the project and lists all planned communication and dissemination activities, tools and channels, and matches them with target stakeholder categories, aiming to reach targeted key performance indicators. The deliverable will include the support and coordination for the transfer of knowledge developed in ARROWHEAD fPVN collect, summarize and disseminate the standardization updates from the different industrial domains addressed during this period. Additionally this report addresses standardization as one of the innovation-support measures, aiming to bridge the gap between research and the market, by enabling the fast and easy transfer of research results to the European and international market. This document will be a reference framework for evaluating the impact of dissemination and standardisation activities for the first two years; and should be understood as a living document that will be updated and adjusted during the duration of the project, through the other WP11 reports, as follows:

- D11.2 – Dissemination and standardisation report Y1
- D11.3 – Dissemination and standardisation report Y2
- D11.4 – Final dissemination and standardisation report

2. Deliverable content

This deliverable describes the ARROWHEAD fPVN Dissemination, Communication and Standardisation Plan, which will include the following:

- introduction of the visual identity of the project (logo, templates, websites, social media, brochures, etc.)
- identification of the important phases, the progress, achievements and values of the ARROWHEAD fPVN project;
- description of the communication tools and channels, public engagement and internal communication
- identification of main dissemination channels, available events, in conformity with different stages of development of the platform;
- establishment of measurable targets and C&D monitoring & reporting rules.

The deliverable details ARROWHEAD fPVN outreach strategy and framework and outlines the project's envisaged D&C activities, along with their Key performance Indicators (KPIs).

In all C&D materials (online and offline) ARROWHEAD fPVN project consortium will display a simple funding statement, mentioning the European Union's support, according to Infrastructure and Environment Executive Agency (CINEA) recommendations¹, together with the following disclaimer:



Co-funded by
the European Union

ARROWHEAD fPVN project has received funding from the HORIZON JU Innovation Actions programme of the European Union under grant agreement No 101111977.

The contents of this publication are the sole responsibility of ARROWHEAD fPVN project consortium and do not necessarily reflect the opinion of the European Union. And finally, the copyright message to be used in all ARROWHEAD fPVN project publications (brochures, deliverables, reports):

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2.1 Project identity

2.1.1 Objectives

In order to extend the reach and the impact of the ARROWHEAD fPVN project to the full range of key stakeholders' categories (i.e. public entities, business environment, research & academia, and civil society), which share a common interest in the project main objective, a comprehensive and coordinated strategy/plan for communication, dissemination and standardisation have to be developed.

This Plan will allow to:

- Maximize project's scientific impact, enabling the value of results to be potentially wider than the original focus;
- Maximize project's technical impact: Rise stakeholders' level of awareness, understanding and acceptance related to the benefits of ARROWHEAD fPVN project;
- Make project results usable by others: research and academics, industries, other ongoing projects

2.1.2 Project Logo

A project logo, as shown in Figure 1, has been designed to help the external audience easily identify ARROWHEAD fPVN project and to increase the ARROWHEAD fPVN project visibility by providing a corporate identity from the very beginning of the project. The logo has been made available to the consortium to use for official communication purposes. It serves as

¹ https://cinea.ec.europa.eu/communication-toolkit_en

the basis for all further promotional materials, as well as the website, in order to ensure consistent branding across all D&C channels.



Figure 1 - ARROWHEAD fPVN logo

2.1.3 Project Power Point Presentation

This section presents ARROWHEAD fPVN Power Point Presentation, which aims to establish a strong visual presentation of the project. The ARROWHEAD fPVN Presentation initially provides general information for the project along with information about the project participants. The ARROWHEAD fPVN Vision, its Objectives and Concept are then described in a thorough way. Finally, the ARROWHEAD fPVN Use cases are presented. The ARROWHEAD fPVN Project Presentation, along with the Project Presentation Template, have been uploaded in the Project Repository and have been shared with all the partners. A snapshot of the Presentation Template is shown in Figure 2 2.





Figure 2 - ARROWHEAD fPVN Project Presentation Template

2.1.4 Project Factsheet

This current Section presents the ARROWHEAD fPVN Project Factsheet. The factsheet has been created as a one-page presentation of the project's major data, where project's key points are emphasised concisely.

A brief summary of the project is given, as well as some basic information about the project, such as the topic of the project, the start date and duration, the budget, the consortium composition and the name of the coordinating organisation.

Furthermore, the strategic objectives of the project are presented, while an overview of the Project's Use Cases is provided. Moreover, the logos of all Partners participating in the project are presented (in the form of clickable images that redirect to each specific partner's website address), along with acknowledgement of the EU Funding. Finally, on the upper right corner of the project, there are three clickable images that respectively redirect to the project website, the ARROWHEAD fPVN Twitter profile and the project's LinkedIn profile. The project Factsheet is uploaded on the Project's Repository and shared with all project Partners and is presented in Figure 3 3.



Figure 3 - ARROWHEAD fPVN Project Factsheet

2.1.5 Project Public Summary

The ARROWHEAD fPVN project, funded by Horizon 2020, seeks to enhance industrial productivity and flexibility in Europe by facilitating autonomous and adaptable information exchange across stakeholders in production value networks. The project encompasses a consortium of 43 collaborators hailing from 12 different nations, and encompasses diverse sectors including manufacturing, energy, and logistics.

The initiative has several major goals:

- The objective is to provide a framework for flexible production value networks (fPVN) that enables dynamic and adaptive collaboration across various actors and systems.
- The purpose is to offer content that can be understood by machines for the purpose of exchanging information and achieving semantic interoperability among stakeholders of fPVN.

- The objective is to apply and showcase the fPVN architecture in 10 industrial pilots spanning various sectors and geographies.
- The objective is to assess the effects and advantages of the fPVN framework on productivity, flexibility, resilience, and sustainability.

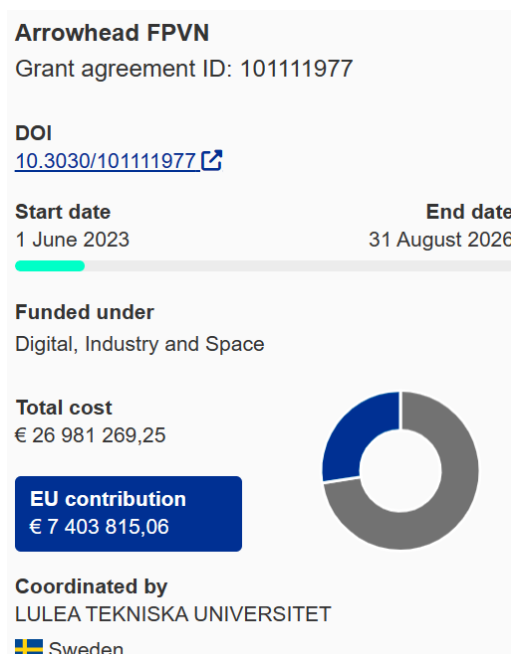


Figure 4 - ARROWHEAD fPVN Project ID

The project commenced in June 2023 and is scheduled to cover a duration of four years. Luleå University of Technology in Sweden is the coordinating institution for the project, which has a budget of 26.9 million euros.

2.2 Communication activities

Communication activities about the project and results, involve the use of available channels and tools by the project's partners to reach multiple audiences that include both the media and the public. ARROWHEAD FPVN's communication activities mainly aim to inform and reach out to society and show the benefits of the research work performed under the Horizon 2020 framework and specifically within the ARROWHEAD fPVN project.

This chapter presents the target audiences of ARROWHEAD fPVN's communication activities and highlights the communication channels that have been collectively and strategically chosen by the consortium in order to be effective and proportionate in scale to the actions and goal of the project.

2.2.1 Target Audiences

The main objectives of ARROWHEAD fPVN's communication strategy are: i) to create an active community of interested stakeholders and potential users and collect knowledge and requirements considered by the project; ii) to create awareness of the project among the full range of stakeholders impacted by the results activities and iii) to formulate adapted key

messages and prepare adapted communication material. Table 1 provides an outline of the target audiences of the project and their potential interest in ARROWHEAD fPVN activities.

Table 1 - ARROWHEAD fPVN Communication Target Audience groups

Target Group	Description	Interest in the project
SMEs and industry	Stakeholders from industry, network operators, SMEs and entrepreneurs, operating in the IoT domains	Promoting ARROWHEAD fPVN in operations and in their Research & Innovation (R&I) activities for new system development;
Research & Academia	Research and academic partners can use cutting-edge technologies and methods, collaborate with the highest industrial and academic partners, develop and validate innovative solutions, disseminate and exploit project results, and update their skills.	<p>The project enables academic and research partners:</p> <ul style="list-style-type: none"> • Use cutting-edge production value network technologies like microservices, data models, and interoperability frameworks. • Create a multidisciplinary and cross-sectoral network of excellence with prominent industry and academic partners from different disciplines and countries. • Develop and validate novel production value network solutions for real-world difficulties and use cases. • Create scientific publications, patents, and spin-offs from project results. • Improve their production value network skills, exposure, and reputation.
Clusters	European initiatives and clusters, research communities, associations, (e.g. Digital Business Innovation, Digital Agenda, Innovation Union, etc.)	<p>Inclusion of project's results to collaborative research activities (i.e., white papers);</p> <p>Communicate project's results to their members;</p> <p>Participation in project's events for knowledge exchange</p>
General Public	General public, end-users and anyone interested in the project	<p>Non-technical articles based on project's results;</p> <p>Stimulate innovation in unexpected groups of society</p>

2.2.2 Project website

The ARROWHEAD fPVN project website. The main objectives of the website is i) to promote the project’s public image and serve as a main online access point for the different target groups; ii) to serve as an information source, highlighting project objectives, activities, outcomes and relevant updates; and iii) to serve as a repository of information. The website (see Figure 5 5) is publicly accessible and also features a restricted area that is only accessible to project partners, the EC project scientific officer and the project review panel team. It is a fully functional and responsive web portal that contains comprehensive information on the ARROWHEAD fPVN aims and objectives with easy access and a friendly interface to retrieve information and any public material generated within the project, as well as materials gathered via the various work packages activities.

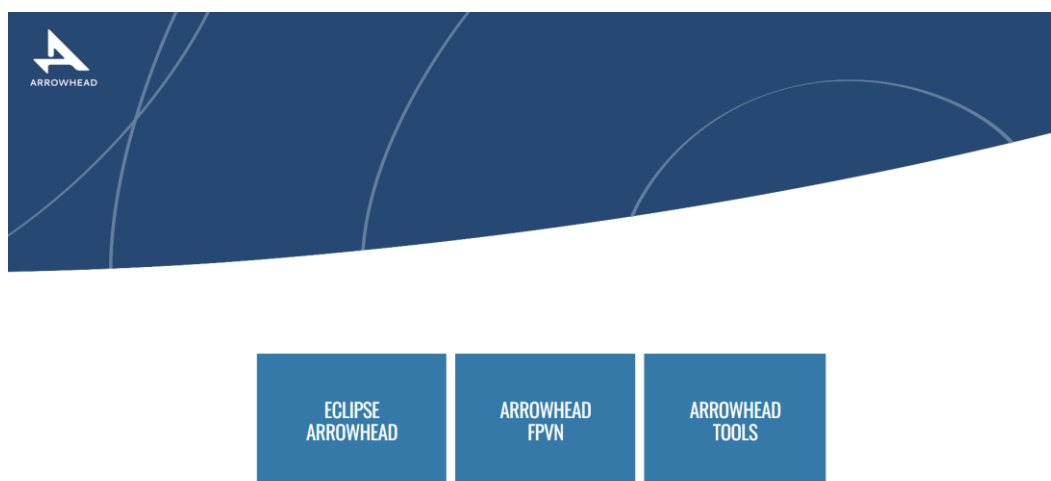


Figure 5 - ARROWHEAD FPVN Website Responsive Views

2.2.3 Social Media

ARROWHEAD fPVN project social media accounts, namely Twitter and LinkedIn page will be launch in the first phase of the project, as part of the communication tools that will be utilised within the project. These two ARROWHEAD fPVN social media channels will also be fully detailed in the Deliverable D11.2 “Dissemination and standardization report Y1”. The social media channels are specifically used to communicate and disseminate project progress and results in a way that is not overly technical and can be easily understood by non-specialists and the public audience.

2.2.3.1 X

ARROWHEAD fPVN’s X channel (<https://twitter.com/ARROWHEADTools>) was the first communication channel of the project. A screenshot of the X account can be seen in Figure 6 6. At the time OCTOBER 2023) ARROWHEAD fPVN X account has 213 followers and follows 193 accounts.

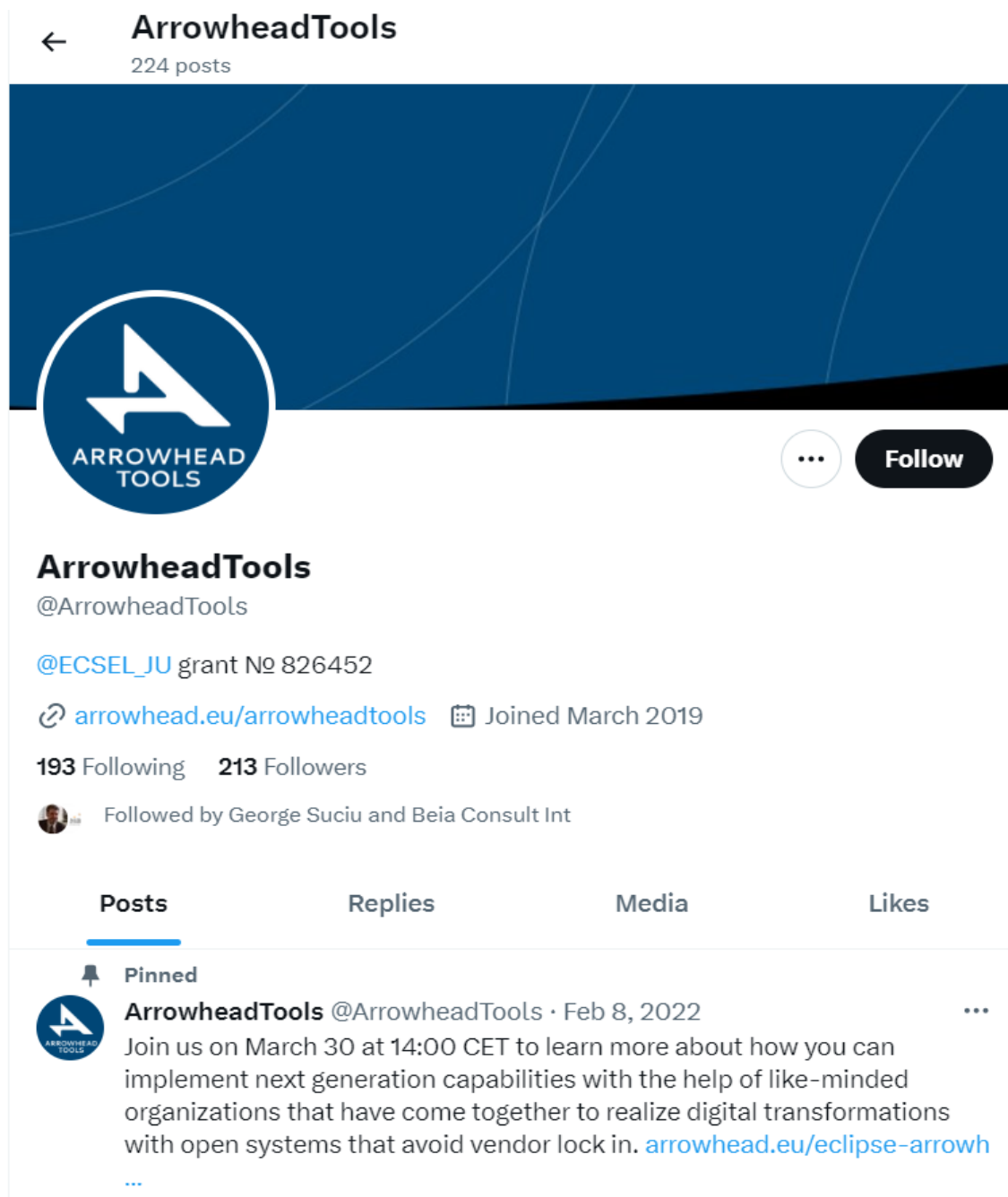


Figure 6 - ARROWHEAD fPVN X Page

2.2.3.2 **Linkedin**

ARROWHEAD fPVN's LinkedIn account, as shown in Figure 7 7 is a LinkedIn Page at the beginning. In the coming months we will try to increase the number of followers and make the project appreciated.

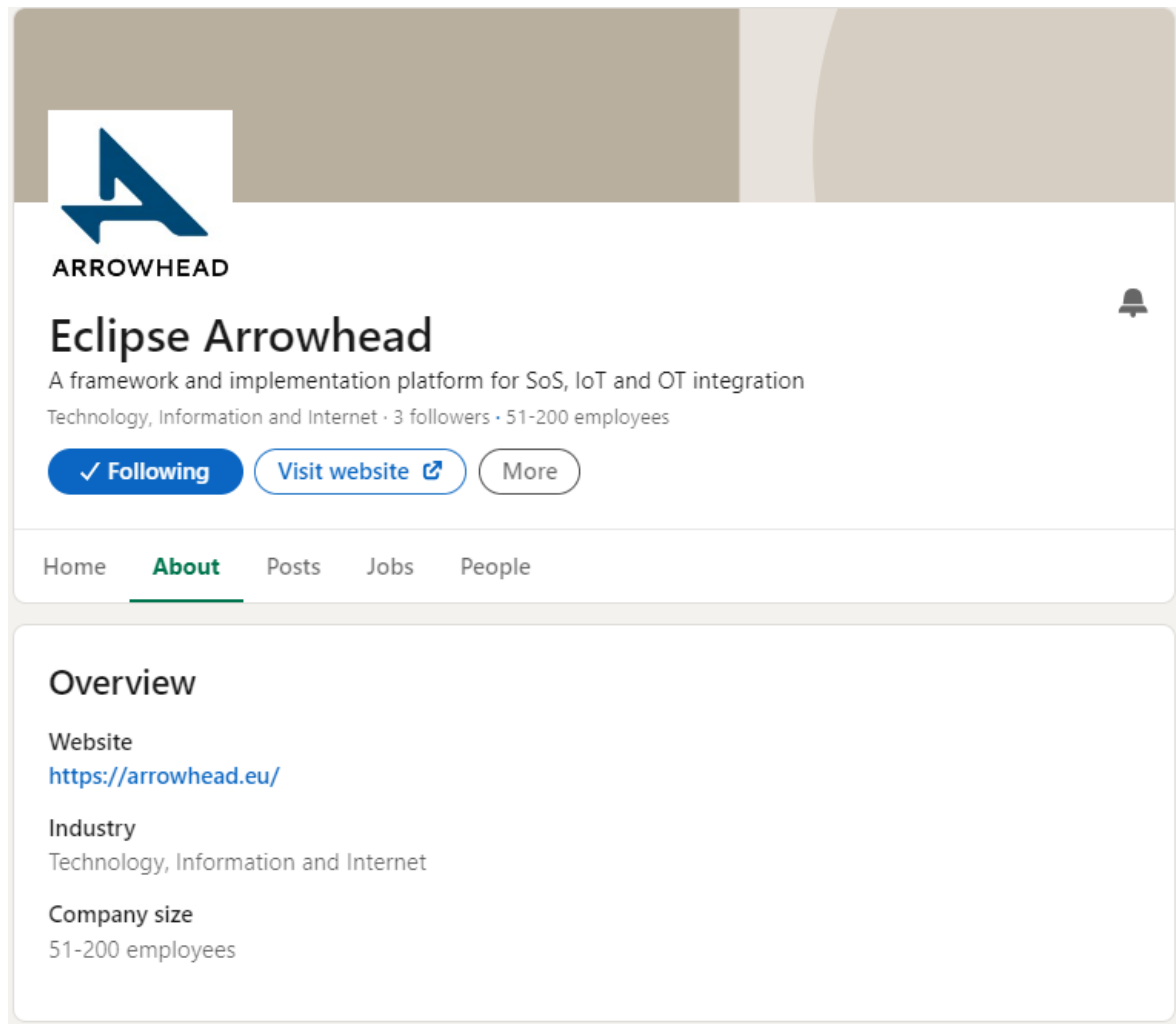


Figure 7 - ARROWHEAD fPVN LinkedIn Page

2.2.3.3 YouTube

ARROWHEAD fPVN's YouTube channel (<https://www.youtube.com/@ArrowheadProject>), as shown in Figure 8 8 is a YouTube Channel Pag. In the coming months we will try to increase the number of views and the number of subscribers, making the project appreciated.

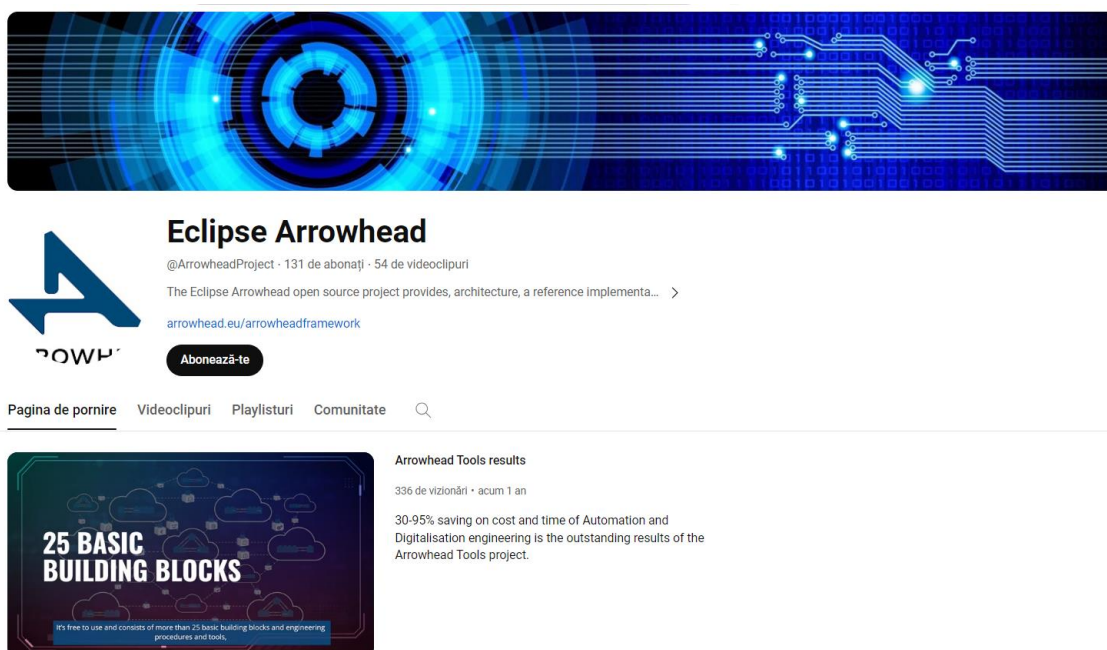


Figure 8 - ARROWHEAD fPVN YouTube channel

2.2.4 Promoting material

The promoting material that will be prepared in the scope of ARROWHEAD fPVN aims at properly presenting the project, the motivation behind carrying out its work, its technological framework and context of the field, as well as the objectives it intends to accomplish. Over the course of the project 3 technical brochures will be issued, providing information about the technical and scientific achievements of the project, while 3 non-technical brochures/ factsheets will be issued describing the potential project applications and services in a more accessible manner. A number of project flyers, posters and roll-up banners will also be created for display in conferences and in exhibition booths. The brochures will be also distributed to local universities, schools, city councils and other relevant organizations. The Project Factsheet has already been produced and is presented in the following subsection.

2.2.5 Press releases

The press release is a concise written communication that provides information to the media and the public about ARROWHEAD fPVN. It will be designed to generate media coverage and inform the public about the project.

2.2.6 Newsletters

Periodic Newsletters will be produced by ARROWHEAD fPVN with input and support from the project partners. The Newsletters will provide information on project progress and results as well as links to public deliverables, articles, news, events and support to the communication campaigns of the project partners. Newsletters will be made available on the project website, in order to improve visibility of the project via electronic means, while subscription to the newsletter will be possible from the website. Also, the newsletters will be

distributed to different mailing lists, to foster inter-communication with other relevant research actions, projects and technical communities at European, national and regional level.

2.3 Dissemination Activities

The overall aim of the ARROWHEAD fPVN's dissemination activities is to disclose project results that can be used by specific target audiences to progress their own work, i.e., to build upon the knowledge generated by ARROWHEAD fPVN, utilising the advancement of technology, science, industry and policy. Target audiences of the project have been identified as well as specific dissemination objectives, which will be tailored to the needs and profile of the target audience.

Also in the project Cloud, three documents (excel files) have been created to manage the dissemination activity, as participation in events, conferences and articles publication in journals - documents that will be updated continuously during the project period.

The dissemination activities will be supported by three main tools categories:

- Publications (Peer-reviewed publications in scientific journals)
- Events (a. Conferences to attend to; b. Workshops, demonstrations and webinars to organise and/or to attend to)
- Networking with other relevant Horizon projects sharing the same topic related to information interoperability

2.3.4 Publications

The research outcomes of the ARROWHEAD fPVN project will be published in high-impact, scientific (peer reviewed) journals and magazines. An indicative shortlist of high impact factor journals and magazines in which the ARROWHEAD fPVN partners will seek to publish articles are presented in Table 2 and Table 3 without however excluding the possibility to pursue other publications as well. The project partners can also publish to other scientific journals and magazines which focus on topics that are relevant to the activities of ARROWHEAD fPVN. We aim to publish articles of interest in well-known journals with a significant impact factor included in the first and second quartiles. Some of the Q1 impact factor journals in which we aim to publish papers are presented in Table 2.

Table 2 - Q1 impact factor journals

Nr.	Journals
1.	IEEE Internet of Things Journal
2.	IEEE Sensors Journal

Some of the Q2 impact factor journals in which we aim to publish papers are presented in Table 3.

Table 3 - Q2 impact factor journals

Nr.	Journals
1.	Sensors (MDPI)
2.	Internet of Things (MDPI)
3.	Applied Sciences (MDPI)

2.3.5 Events

ARROWHEAD fPVN consortium members will contribute to relevant international and national events by participating in exhibitions through booths, posters, flyers and presentations in order to raise the stakeholders' awareness and facilitate knowledge sharing, thus increasing the project impact. This will allow to ARROWHEAD fPVN partners to present thoroughly the project results and will be involved in workshops participation and organization. Participations in such events will leverage the engagement of ARROWHEAD fPVN with industrial actors as a vehicle to inform relevant stakeholders and incentivise the project's business plan and targeted outputs. An indicative list of targeted events, including conferences and exhibitions by ARROWHEAD fPVN is presented in Table 4.

Table 4 - Indicative list of Events

Event Name	Type of Event	URL
Smart City Expo World Congress	Exhibition	https://www.smartcityexpo.com/
European Conference on Networks and Communications (EuCNC)	Conference and Exhibition	https://eucnc.eu/
ITS World Congress	Exhibition	https://itsworldcongress.com/
Hannover Messe	Conference	https://www.hannovermesse.de/de/
Annual ARC Industry Forum	Conference	https://www.arcweb.com/events/arc-industry-forum-orlando
IEEE ICC	Conference	https://icc2021.ieee-icc.org/
GoTech World	Exhibition & Conference	https://www.online.gotech.world/
CFIHOS	Conference	F2F Meeting 2024. https://www.jip36-cfihos.org/
DEXPI PIDMIC	Conference	F2F Meeting June 2024
KnowledgeGraphAlliance (#KGA)	Events / Conference	https://ontocommons.eu/ https://industrycommons.net/kga-launch/

Table 5 - 2024 Conferences

Nr.	Conference	Location	Date
1.	7th Annual Digital Construction Summit	Prague, Czech Republic	08-09.02.2024
2.	Internet 2.0 Conference	Dubai, United Arab Emirates	20-22.02.2024
3.	5th Edition Windpower Data and Digital Innovation Forum	Berlin, Germany	05-06.03.2024
4.	QCon London International Software Development Conference	London, UK	08-10.04.2024
5.	Embedded World 2024	Nuernberg, Germany	09-11.04.2024
6.	ME-TECH 2024 - Middle East Technology Forum for Refining & Petrochemicals	Dubai, United Arab Emirates	07-09.05.2024
7.	21st International Conference on Software and Systems Reuse (ICSR 2024)	Limassol, Cyprus	10-12.06.2024
8.	28th International Conference on Engineering of Complex Computer Systems (ICECCS 2024)	Limassol, Cyprus	19-21.06.2024
9.	8th International Conference on Information Technology and Internet of Things (ITIOT 2024)	London, UK	21-23.06.2024
10.	World Conference on Web 3.0 & IOT	Frankfurt, Germany	16-18.09.2024
11.	4th Global Summit and Expo on Artificial Intelligence and Robotics (GSEAIR 2024)	Dubai, United Arab Emirates	23-25.09.2024
12.	International Conference on Industrial Internet of Things ICIOT	London, UK	23-24.09.2024
13.	International Conference on Data Analytics in Internet of Things ICDAIT	Rome, Italy	18-19.10.2024
14.	International Conference on Internet of Things, Cloud and Data Computing ICIOTCDC	London, United Kingdom	21-22.10.2024
15.	International Conference on Smart Sensor Networks and Internet of Things-Enabled Sensors ICSSNITES	Athens, Greece	21-22.10.2024
16.	International Conference on Predictive Maintenance and Internet of Things ICPMIOT	London, United Kingdom	21-22.10.2024
17.	International Conference on Privacy and Security in Internet of Things (ICPSIT)	Nicosia, Cyprus	4-5.11.2024

Nr.	Conference	Location	Date
18.	International Conference on Big Data and Internet of Things ICBDIOT	Venice, Italy	11-12.11.2024
19.	International Conference on Predictive Maintenance and Internet of Things ICPMIOT	Reykjavik, Iceland	15-16.11.2024
20.	International Conference on Biomedical Engineering and Internet of Things ICBEIOT	London, United Kingdom	9-10-12.2024
21.	International Conference on Internet of Things, Cloud and Data Computing ICIOTCDC	Istanbul, Turkey	20-21.12.2024
22.	International Conference on Industrial Internet of Things and Communication Networks ICIITCN on December 30-31	Paris, France	30-31.12.2024

The consortium will also consider planning and organising the events already envisaged within the project proposal, whether they are online or offline workshops, these events represent another communication and dissemination channel that will be exploited to the maximum during the entire duration of the project. Among the events organised by the consortium, a notable mention is the AIMS 5.0 and Arrowhead fPVN Innovation Technology workshop to be held from 23-25 January 2024 in Lulea, Sweden.

2.3.6 Networking

A strategic approach is emphasized to foster collaboration and expand the reach of the ARROWHEAD fPVN initiative. The focus lies on networking with relevant projects funded by the same programme HORIZON.2.4.2 - Key Digital Technologies, bringing together initiatives that share a common vision. This creates a vibrant ecosystem of like-minded projects, enabling knowledge sharing, resource pooling, and collaborative efforts towards achieving shared goals.

- Pan European network on advanced semiconductor packaging - Pack4EU (<https://cordis.europa.eu/project/id/101139933>)

The objectives of Pack4EU are twofold. Firstly, it aims to establish the "Pan European network on advanced semiconductor packaging". Secondly, it aims to provide guidance and deliver timely results through policy recommendations, known as the "Advanced Semiconductor Packaging Master Plan for Europe". This plan will address investments, pilot lines, competence centers, and other coordination actions dedicated to semiconductor packaging and the EU green deal. This project will be undertaken by a coalition consisting of all industry associations, including scientific ones, with the support of 40 related partners throughout the entire value chain. The primary objective of this group is to establish a comprehensive European definition of advanced semiconductor packaging, which will be accompanied by visual representations and a lexicon.

- SoFtwarE DefinEd vehicle suppoRt And coordinaTion project – FEDERATE (<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/892559663/project/101139749/program/43108390/details>)

FEDERATE seeks to unite all pertinent parties to expedite the advancement of an SDV Ecosystem, to cultivate a thriving European community, and coordinate the SDV research, development, and innovation efforts. The FEDERATE collaboration consists of prominent European original equipment manufacturers (OEMs), automotive suppliers, semiconductor companies, industry groups, and industrial self-driving vehicle (SDV) efforts, such as the Eclipse SDV Working Group. It is also backed by a scientific board. FEDERATE aims to establish a shared comprehension of the SDV program's vision and develop a coordinated guidance for present and future projects within the program. Furthermore, suggestions for upcoming calls are formulated in accordance with a Roadmap and Joint Vision Document for expediting SDV R&D&I, developed as a component of the CSA.

- High Performance, Safe, Secure, Open-Source Leveraged RISC-V Domain-Specific Ecosystems – ISOLDE (<https://www.isolde-project.eu/>)

The objective of the ISOLDE project is to provide substantial assistance to the digital transformation of all economic and societal sectors, accelerate the shift towards a green, climate-neutral, and digital Europe, enhance design capabilities, and achieve digital autonomy throughout the European Union. Upon project completion, we aim to have RISC-V processing systems and platforms with high performance, reaching at least TRL 7 for most building blocks. These systems will be demonstrated in key European application domains, including automotive, space, and IoT. It is expected that two years after the project ends, ISOLDE's high performance components will be utilized in industrial quality products. In order to accomplish this ambitious objective, a high-quality open-source platform will be offered to assist with development, verification, and maintenance. The ISOLDE project will meet the European digital sovereignty requirement by hosting customisable IPs on physically based servers in Europe.

- European ECOSystem for greeN Electronics – EECONe (<https://www.eecone.com/eecone/home/>)

EECONe's goal is to develop and implement end-of-life restrictions into product development and process design. EECONe is a pioneer in a zero-waste electronics industry. Reduce, Reliability, Repair, Reuse, Refurbish, Recycle will guide EECONe.

The EECONe project has four goals to achieve its ambitious vision:

- Define and design circular ECS with clear, simple, open tools. Provide producers with a comprehensive framework to evaluate their ecodesign options for the first time to promote European green transition leadership.
- Green ECS (Electronic Components Systems): Develop novel methods for reducing, repairing, reusing, refurbishing, and recycling to reduce e-waste and increase circularity in new electronics.
- Display green solutions' innovative potential, applicability, and versatility along the value chain.
- Awareness: Empower the 6R ECS generation with an environment.

- Industrial Data Ontology – IDO – ISO 23726 (<https://www.posccaesar.org/>).

Posc Caesar in Norway are running a project to develop the Industrial Data Ontology – IDO – ISO 23726-3 into a new ISO standard. A network / community built around this project is always free to join. DNV is the project coordinator and also convenor for the ISO work in TC184/SC4/WG26 (for more details about IDO please see section 2.5 in this Report).

The IDO project aims to establish a standardized framework for handling industrial data and information by developing the Industrial Data Ontology (IDO) together with a common vocabulary. This will be achieved by utilizing the Web Ontology Language (OWL). The objectives of the IDO project are the following:

- Facilitate the compatibility and seamless integration of industrial data across diverse domains and applications
- Establish a standardized vocabulary for things that exist across many industry sectors
- Employ Reference Data Libraries (RDLs) to leverage OWL DL
- Contribute to the field of automation systems and integration, as well as to the sustainable development goals of the United Nations.
- Initiate the initial phase of developing the ISO standard for Ontology Based Interoperability (ISO/NP 23726)

2.4 C&D implementation and evaluation

2.4.1 Implementation

The ARROWHEAD fPVN Dissemination and Communication Activities' Time plan is subdivided into four major phases, based on the experience acquired by related projects, other works and best practices. Each of the dissemination and communication phases has its own objectives, target audiences, channels and goals, corresponding and parallel to the project progress. Figure 9 9 portrays the four phases, their spans, and the type of information associated with each phase. As can be seen in the figure, ARROWHEAD fPVN is currently on the Awareness Creation Phase.

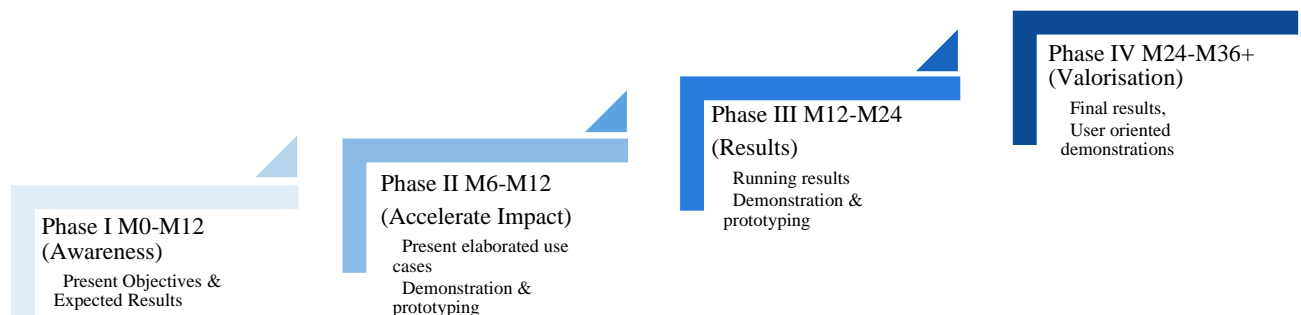


Figure 9 - ARROWHEAD fPVN Dissemination & Communication Phases

The D&C phases are presented in detail in Table 6.

Table 6 - ARROWHEAD FPVN Dissemination and Communication Phases and Planning

Type of Information	Target Audience	Channels	Goals
Phase 1 (Awareness Creation) M0 – M12			
Presentation of ARROWHEAD FPVN; Objectives of ARROWHEAD FPVN; Expected results of ARROWHEAD FPVN;	Industry, technological, research and academic communities; Potential end-users; International Stakeholders Group identified;	Web site; Social media channels (LinkedIn, Twitter, Research Gate); Brochure and poster; specialized events, workshops, exhibitions;	General visibility; Attracting potential collaborators; Attracting potential customers Attracting potential investors.
Phase 2 (Impact Acceleration) M6 – M12			
Presenting elaborated use cases of ARROWHEAD FPVN Demonstration and Prototype;	Potential end-users; Specific technological, research and academic communities;	Conferences, workshop; Publications in journals; Special session in congresses/conferences; Web site; Social media channels (LinkedIn, Twitter)	Increasing visibility on the outcomes and results of the project; Attracting potential collaborators.
Phase 3 (Results) M12 – M24			
Disseminating the results of ARROWHEAD Fpvn Demonstration and Prototype;	Potential end-users; Specific technological, research and academic communities.	Conferences, workshops, congress; Publications in journals; Special sessions in conferences; Web site; Social media channels (LinkedIn, Twitter).	Attracting potential investors; Attracting potential customers.
Phase 4 (Valorisation) M24 – M36 and >M36			
Final results of ARROWHEAD FPVN; User oriented demonstration;	Specific technological, research and academic communities; End-users and institutional organizations;	Web site; Demonstrations; Publications in journal or press; Industry Focused events; Client demonstrations.	Attracting potential customers, investors; Demonstrating results to existing customers

2.4.2 Evaluation

This section presents the success indicators of the aforementioned dissemination and communication activities of the project through measurable targets that will be evaluated and measured throughout the lifetime of ARROWHEAD fPVN, as shown in Table 7.

Table 7 - ARROWHEAD fPVN D&C Metrics, Success Indicators & Target Values

Communication/ Dissemination Means	Success Indicators	Target Values	Timeline
Project Website	Search Engine Optimization metrics	Online by month 1; Unique visitors from M12: 1000; from M36: 2000	Ready by M1; M1-M36
Social media	#of users/ followers	LinkedIn >200 followers; Twitter > 200 followers;	M1-M36
Newsletters	# of publications	Newsletters: >3	M1-M36; 1 Newsletter per year
Video Clips	# of video clips and views	Number of online video clips: >3; Number of video views: > 500	By M36
Factsheets/ Brochures	# of factsheets and hardcopies	Technical factsheets: 3; Non-technical factsheets: 3; Hardcopies: > 1000	M1-M36
Flyers/ Posters & roll-ups	# of flyers and banners	Project flyers: >3; Posters & roll-up banners: >3	M1-M36
Industrial exhibitions	# of exhibitions	Participation in industrial exhibitions, trade fairs: >10	M7 -M36
Scientific publications	#of publications	Journals/magazines >10; Conferences >20; Conference demonstrations: >6	M7-M36

Communication/ Dissemination Means	Success Indicators	Target Values	Timeline
Training	# of trainings over the course of the project	Online training tutorials: 3 Number of PhD schools: 2; Webinars: 2	M7-M36
Online Repository	Deliverables accepted by the European Commission	Number of publicly available deliverables: > 19	M1-M36
Networking	Engage in European and international networks for Interoperability	Participate in workshops and seminars > 15	M6-M36

2.4.3 Monitoring and reporting rules

In order to achieve the C&D success indicators set out in the previous chapter 2.4.5 Evaluation, partners shall take BEIA, as responsible for Communication & Dissemination, and the coordinator LULEA TEKNISKA UNIVERSITET informed about any project-relevant communication activities and initiatives undertaken. Both are available to discuss the content and/or the visual presentation of communication and dissemination materials.

All C&D activities should be reported periodically (at the beginning of each semester – M6, M12, M18, M24, M30, and before the final reporting period).

The dissemination of project results included in different reports/deliverables is permitted only after the report/deliverable was fully approved to go public by the project coordinator. To this aim, each partner shall keep BEIA and LULEA TEKNISKA UNIVERSITET informed about their dissemination activities. The key of the optimal implementation of this master plan will be the active involvement and constant reporting of each project partner.

The whole ARROWHEAD fPVN consortium is expected to contribute to the project communication and dissemination activities. Therefore, the consortium will be kept up to date of the key actions metrics and will provide their input. Project partners are also expected to bring in their local knowledge and connections for promoting the project results and organizing local workshops. Moreover, they are all expected to contribute to raise their visibility in the appropriate stakeholders' groups.

A continuous reporting process will be implemented; thus, each partner will periodically, according to the above mentioned, fill-in the Table below: Reporting summary of the communication, dissemination and networking activities.

Table 8 - Reporting summary of the communication, dissemination and clustering activities

Responsible partner	Date	Location	Type of activity Name of person	Title	Audience outreach	Proof
Partners' acronym	dd.mm.yyyy	Online / offline and where	Press-releases; Online articles, Publication in journals, Poster or powerpoint presentation; Social media; Videos; Events.	Topic of the contribution, Title of the article, Name of the event / video	Indicate approx. number of audience	Link, pictures

2.5 Standardization Activities

2.5.1 Objectives

Standardisation, as one of the innovation-support measures, is aiming to bridge the gap between research and the market and in ARROWHEAD fPVN project has as main objective to improve knowledge about reference data, data models, and semantic ontology's.

The contribution brought mainly by the Task 11.3 leader SEIIA, together with the other partners involved will be to collect and disseminate the work performed in the different Work packages of the project, including the impact the objectives have on the outcome of the uses-cases.

2.5.2 Standardization Landscape

The Figure 10 below shows the result of the survey that have been done by WP3 of standards and data models that are to be considered in the ARROWHEAD fPVN project.

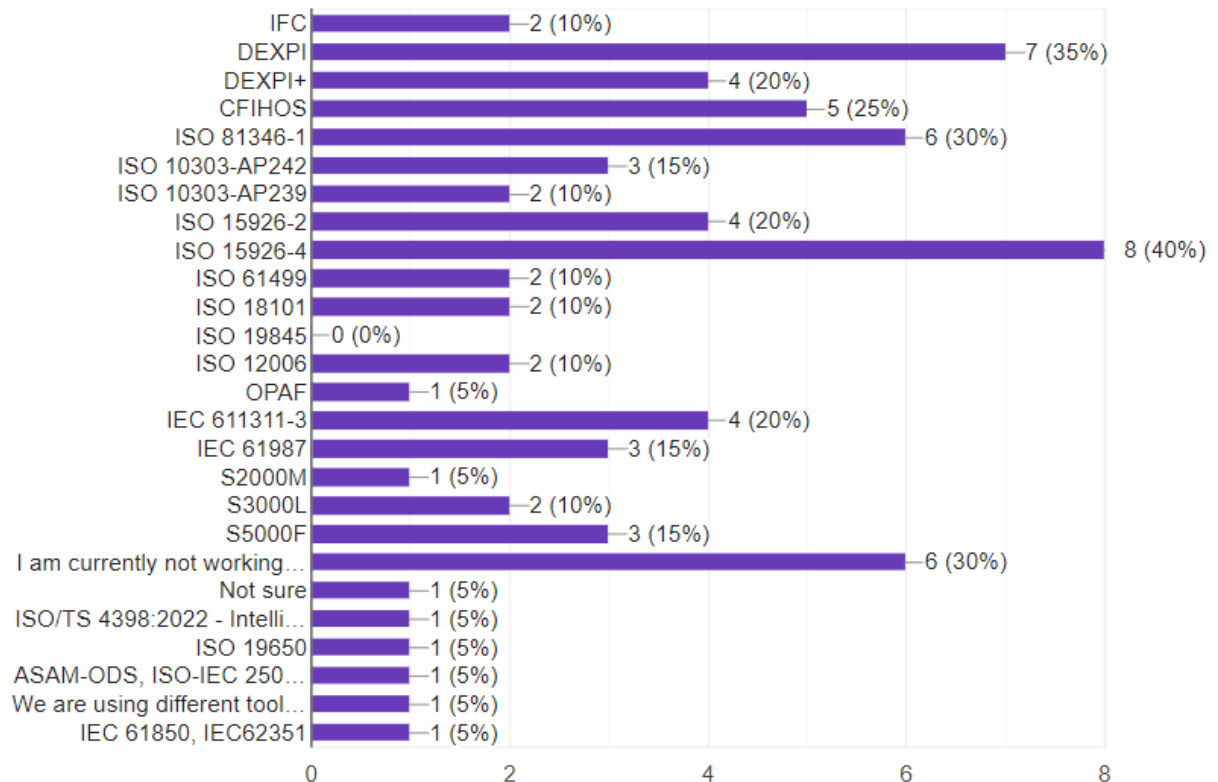


Figure 10 - Distribution of the standards and data models

From that survey you also could see that Figure 11 11 represents the relation between the respondents and the use cases. The majority of the respondents are interested in **Process industry**.

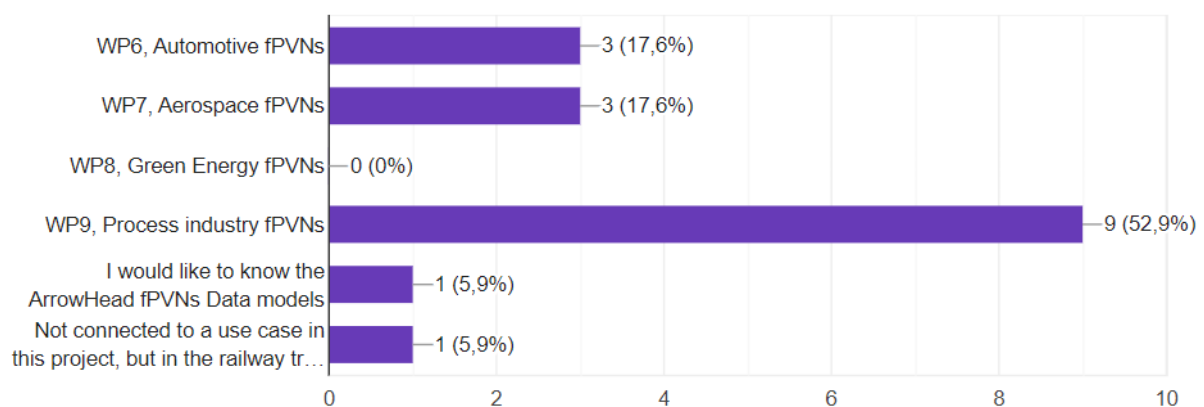


Figure 11 - Respondents' connection to the use cases

Concerning the Use-Case and connected standards there is this three to be worked on and some standards have an overlap between the domains. ISO 10303 as an example.

Automotive WP6:

- ASAM-ODS, ISO-IEC 25012

Aerospace WP7:

- ISO 10303-AP242, S5000F

Process industry WP9:

- DEXPI, DEXPI+, CFIHOS, ISO 15926-4, ISO 18101, IEC 61987, IEC 611311-3, ISO 81346-1, ISO 10303-AP242, ISO 15926-2, ISO 12006, S5000F, IFC, ISO 10303-AP239, S2000M, S3000L, ISO 19650, ISO 61499, OPAF

The list of standards to be considered is the following, according to WP3. If all of these standards will be used in the Use-Case WP, it is an aspect that will be decided in the future.

ISO 15926-4
DEXPI
DEXPI+
ISO 81346-1
CFIHOS
ISO 15926-2
IEC 611311-3
ISO 10303-AP242
ISO 10303-AP239
IFC
ISO 61499
ISO 12006
IEC 61987
S3000L
S5000F
ISO 18101
OPAF
S2000M
ISO/TS 4398:2022
ISO 19650
ASAM-ODS
ISO-IEC 25012
IEEE 1451 **Error! Bookmark not defined.**
IEC 61850
IEC 62351

One additional standard and opportunity in ARROWHEAD is the ongoing work to set a new official ISO standard. Industry Data Ontology – IDO. The name is ISO 23726-3. The work that ongoing is organized in TC184-SC4-WG26 and also in an Industry project managed by Posc Caesar I Norway.

What is ISO 23726-3 IDO?

Formerly known as 'ISO 15926-14 Data model adapted for OWL 2 Direct Semantics'

Scope: "An ontology for representing industrial data and information, building vocabularies, and managing asset models that employ reference data libraries and exploit OWL reasoning"

Derived from / inspired by:

- ISO 15926-2:2003
- ISO/IEC 21838-2:2021 – Basic Formal Ontology (BFO)

Formulated in the language of W3C OWL 2:

- Precise modelling
- Automated reasoning

54 classes, 92 semantic properties

Developed in Norwegian Energy (O&G) industry and applied in several others

Project scope

- Definitions and explanations for all ontology resources (classes and relations)
- Improvements of vocabulary and semantic constraints
- Cross-references to other standards and models
- Modelling examples and detailed use cases
- Alignment with ongoing projects and initiatives
 - The ISO/TC 184/SC4 work on Core terminology for industrial data
 - Industrial Ontologies Foundry (IOF) (Development of ISO/IEC 21838-2: Basic Formal Ontology (BFO) and other ontologies)
 - OntoCommons (EU project)
 - Industrial Digital Twin Association (IDTA)
 - Arrowhead fPVN (EU project)

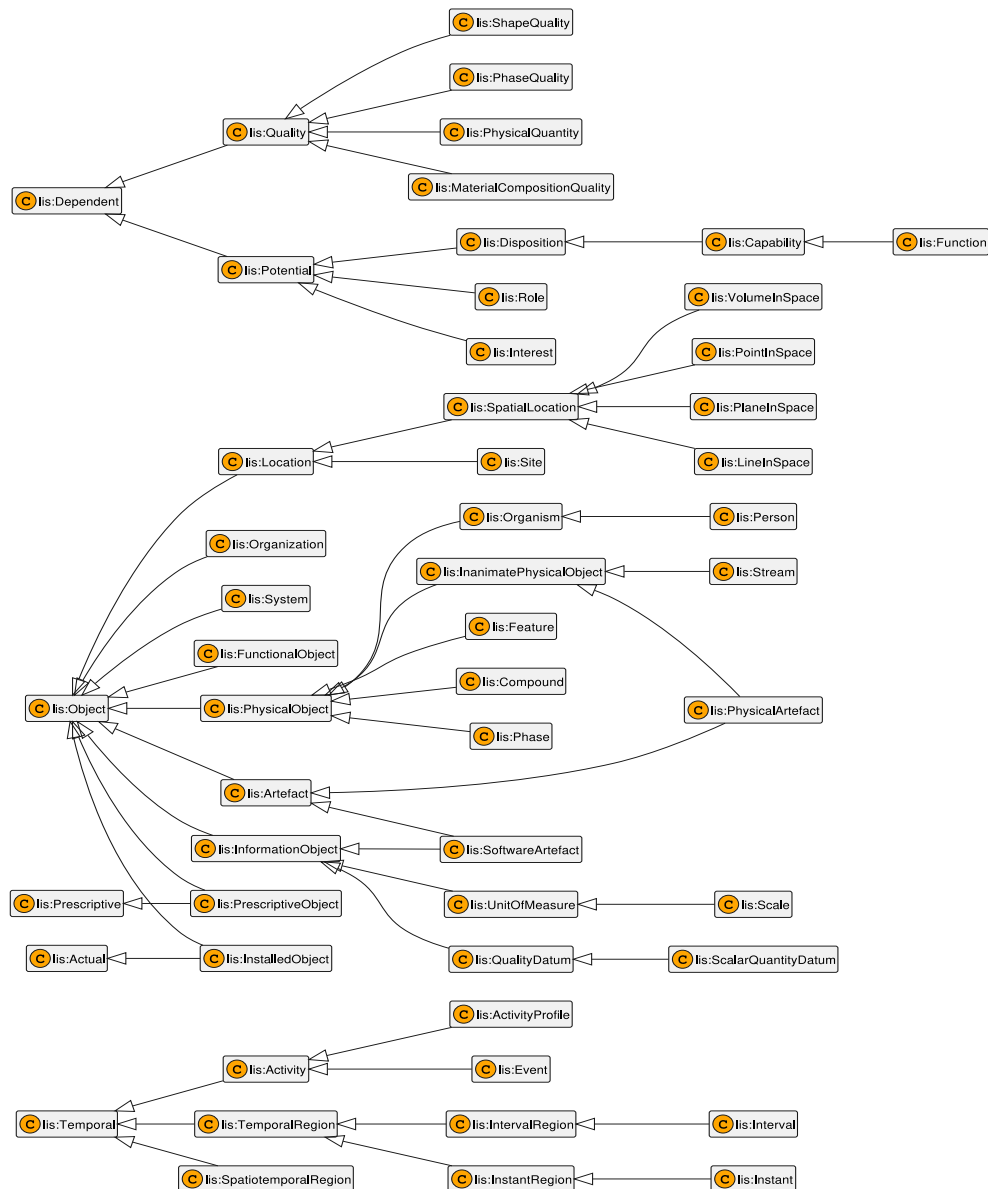


Figure 12 – Ontology flow

Several of the participating partners in ARROWHEAD project are active in the development of the IDO standard, such as:

- POSC Caesar Association (PCA) (Norway), as a main sponsor for the IDO project, participating in TC184-SC4-WG26 and is also WP3 Leader;
- SEIIA (Sweden) is participating in ISO Workgroup TC184-SC4-WG26 and leads WP11-3;
- Eurostep (Sweden) is participating in ISO Workgroup TC184-SC4-WG26 and are involved in WP4;
- LTU (Sweden) is developing Use-Case for IDO and in addition Use-Cases that are done based on IDO and ARROWHEAD Framework.

In a YouTube² video entitled “Swedish Use-Case in development of Industrial Top-Level Ontology 2023 10 18” Eurostep and LTU show some examples on IDO and also use of ARROWHEAD Framework.

The goals

ISO/IS 23726-3 IDO under ISO/TC 184/SC 4 ‘Automation systems and integration - Industrial data’

IDO is the initial part of ‘ISO 23726 Automation systems and integration – Ontology Based Interoperability’ (OBI).

Planned additional parts of OBI are:

- Part 1: General principles
- Part 2: Terms and definitions
- Part 4: Ontology for scheduling
- IDO Use Cases (TR or TS)?
- IMF (Information Modelling Framework) initiated in READI JIP?

2.5.3 Standardization Methodology

There are a huge number of standards and monitoring or analysing them all is not feasible or useful. As an example, as we could see in the survey above the ISO standards are dominating and they are hosting 25005 standards. In the picture below the contribution to the global Sustainable goals is presented.

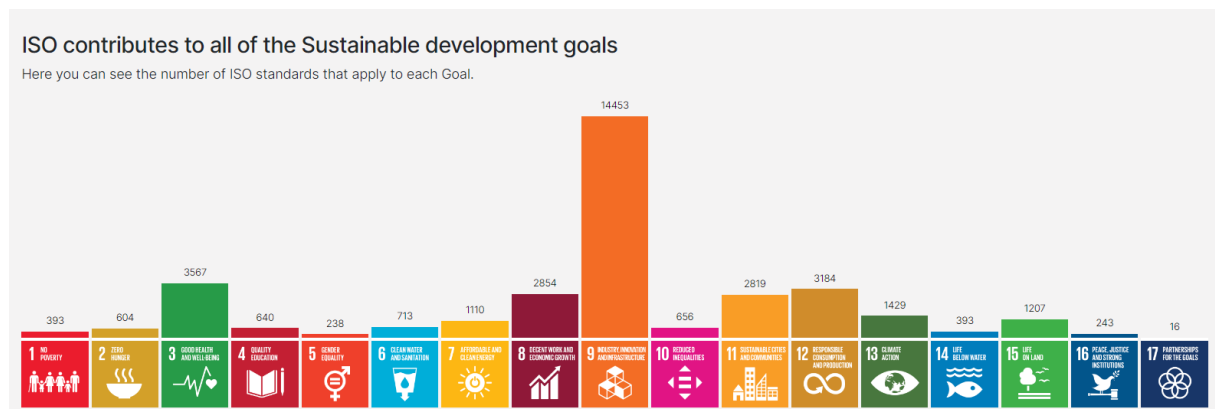


Figure 13 - The number of ISO standards for each goal

To get correct information about the work packages use of different standards, we participate in several WP meetings and use the material that the WP produce. Focus will be to work close to WP3 - Major industrial data models. But also, the Use-Cases WP are interesting to follow because the implementation and usage of the standards are of big interest to communicate in our dissemination role.

² <https://youtu.be/xcT0ejrjbfY>

In this planning face we have only analysed the number of standards and started getting more information about them during the continuing work in WP11-3.

Each used standard should have an analysis and presentation in our communication landscape, also the alignment between the standards is important to visualize. We need more alignment and, in the future, less standards that have the same approach and goal but from different domains. Domain crossing usage is an important topic to show in our work.

2.5.4 Standardization Organizations Monitoring

According to the listed standards in 3.1.6 we need to look into ISO and IEC but we need also get a better knowledge of other standard organizations and how they work and in what domain they focus.

2.5.5 Identification of potential contributions to SDOs

As several of participating partners in ARROWHEAD project also are active in standardization activities, we could have an impact on future development of standards. In the IDO project we could have a big impact where ARROWHEAD could contribute with one or more Use-Cases based on IDO and ARROWHEAD frameworks.

One activity that could get a better view on that impact ARROWHEAD project organisation have is to mate a survey with questions about the personal involvement in different standardization. Ongoing and new initiatives.

2.6 Innovations' Catalogue

This section provides an overview of the work to be done in the Task 11.4 – Arrowhead fPVN Innovation Catalogue. The main goal of the task is to create an Innovation Catalogue to showcase the project results in a common representation, facilitating outreaching and exploitation, but also the internal communication of the project developments.

For that purpose, this task will make use of the IoT-Catalogue.com for holding the data, and create the so-called Arrowhead fPVN Innovation Catalogue. The Arrowhead fPVN Innovation Catalogue will make possible to inspect applications and solutions realized using the Arrowhead Framework, and related technologies.

In addition to showcase the Arrowhead fPVN results, the ambition is to go back and collect, organize and curate data about the use cases (including their KPIs), and technological assets of the European Projects where the Arrowhead Framework is represented.

To carry out the task, Uninova will contribute to the collection of WP2 – Microservice paradigm (which will develop the first of the three building blocks) results and pilots, and Piaget will contribute to the collection and curation of data related to Arrowhead Innovations.

The section is structured as follows:

- **Methodology:** Presents the procedure to create and populate the Arrowhead fPVN Innovation Catalogue, as well as the tool behind it, the IoT-Catalogue.com.
- **Arrowhead fPVN Innovation Catalogue initial structure:** Contains the mock-up with the initial structure of the Arrowhead fPVN Innovation Catalogue, representing the integration of information on the Arrowhead website.

2.6.1 Methodology

In the methodology will present the procedure to creating and populating the Innovation Catalogue. The IoT-Catalogue.com will be used for holding the data and create the Innovation Catalogue. The IoT-Catalogue.com is a web-based catalogue for Internet-of-Things (IoT) solutions, which has an established way of modulating information about use cases, technological assets and more.

The IoT-Catalogue.com also offers the functionality to group information according to a specific theme, through initiatives. In this sense, an initiative named “Arrowhead Initiative” will be created to gather all the information related to Arrowhead Framework, namely projects, use cases and technological assets.

In order to populate the Arrowhead fPVN Innovation Catalogue, the first step will be to identify the projects associated with Arrowhead Framework, and its mandatory core systems and support core systems and services. Following the collection, organization and insertion of information about the use cases, which will include description, place(s), team, characterization (value propositions and ICT problems), solution(s) and KPIs. Through the solutions, the technological assets related to the Arrowhead Framework will be identified and characterized. The Arrowhead Framework will also be represented, with its systems and services, as well as its contribution for the solutions developed and applied to solve real problems.

The IoT-Catalogue.com has a widget tool that allows an easy integration of visual elements into external web pages. The information gathered in the Arrowhead Initiative will be integrated into the Arrowhead website, creating the Arrowhead fPVN Innovation Catalogue.

The work to be done in the context of task 11.4 is represented in the Figure 14 - Task 11.4 Roadmap

4. This deliverable presents the plan and design for Arrowhead fPVN Innovation Catalogue. The next step of the task will focus on the data.



Figure 14 - Task 11.4 Roadmap

2.6.1.1 IoT-Catalogue.com

The IoT-Catalogue.com is a web-based catalogue for Internet-of-Things (IoT) innovations, knowledge, and technologies, where the user can inspect solutions and technologies that might fit to their intents or analyse use cases similar to their projects. It is available at www.iot-catalogue.com. One added value is that the IoT-Catalogue.com has been developed by UNPARALLEL with support of funding from the European Union’s research and innovation programs. It was initiated in the context of the H2020 WAZIUP EU-Africa project as to catalogue and share the project’s IoT technological solutions and use cases. Since then, it has been further developed and scaled-up in EU RTD projects to showcase results and to promote synergies and reusability.

The IoT-Catalogue.com (Figure 15 - IoT-Catalogue.com functionalities

15) shows value propositions, to bring together the needs from the IoT and the application domains, highlighting the added value to the company/user. In addition, it shows ICT problems in easy-to-understand terms, describing issues needing a technological solution, i.e., different kind of functions needed to get the problems solved, where they will be applied and domain depicting its area of interest. The validation is a key aspect, which shows that the solutions work in the real world.

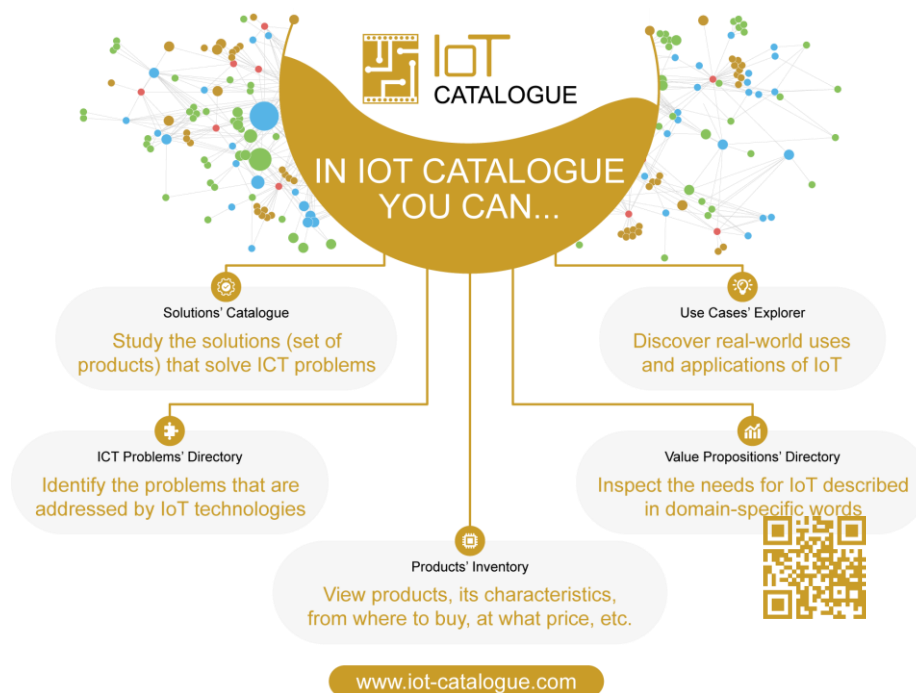


Figure 15 - IoT-Catalogue.com functionalities

The IoT-Catalogue.com has an established way of modulating its content. It has a specific data model to describe and characterize use cases and technological assets.

The use cases data model is structured to collect information about its objective and motivation, characterized in terms of value propositions, ICT problems, functions, targets, and domains. It also includes information about their places (where it occurs), who was involved, and the technologies that were used to address the ICT problems, and more.

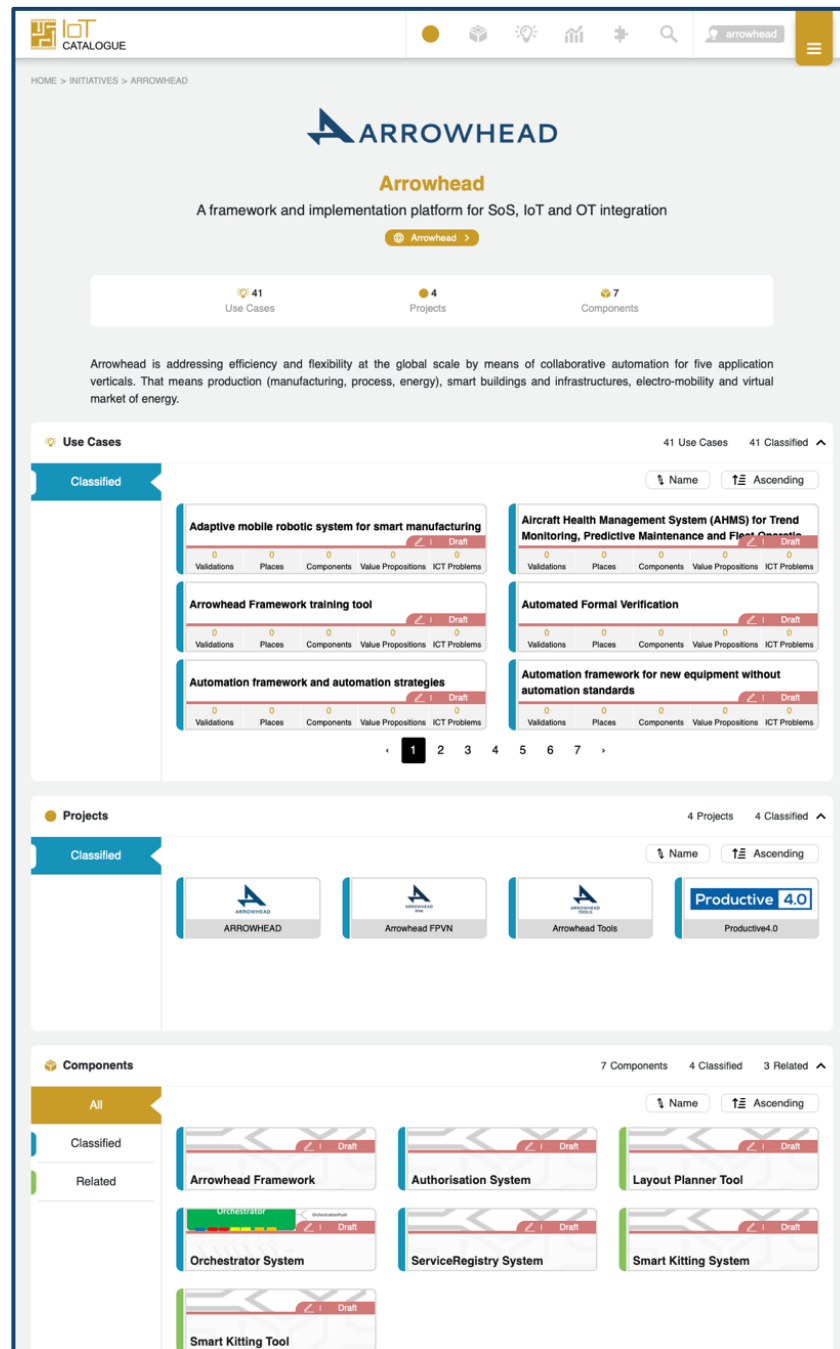
While the data model for technological assets is organized to support information about the legal aspects, the implementation requirements, business perspective, and much more, in addition to general information.

2.6.1.2 ARROWHEAD Initiative

As previously mentioned, one of the functionalities that the IoT-Catalogue.com offers is to group information according to a specific theme, through initiatives. The "Arrowhead Initiative" will be created on the IoT-Catalogue.com, represented in the Figure 16 - IoT-Catalogue.com - Arrowhead Initiative page

15. The Arrowhead Initiative page will contain an overview of the initiative, a brief description, and some statistics about the available content. The rest of the page will present the content, which is organized by use cases, projects and components, classified or related to the initiative. The information classified (in blue) will correspond to the use cases, projects and components directly involved with the Arrowhead Framework. In turn, the related information

(in green) will correspond to the use cases, projects and component linked to the classified information. For each section, it will be possible to filter the information, that is, show only what is classified or related, or show all. Another advantage of the IoT-Catalogue.com is the possibility of navigating through the information, by clicking on the cards. For example, it is possible explore where a component was applied, and which problems it helped solving, and the project where it was used or developed.



The screenshot displays the Arrowhead Initiative page on the IoT-Catalogue.com website. The page features a header with the Arrowhead logo and navigation icons. Below the header, a section titled "Arrowhead" describes it as a framework and implementation platform for SoS, IoT and OT integration. A summary bar shows 41 Use Cases, 4 Projects, and 7 Components. The main content area is divided into three sections: Use Cases, Projects, and Components. Each section has a "Classified" filter and a list of items. The Use Cases section lists items like "Adaptive mobile robotic system for smart manufacturing" and "Aircraft Health Management System (AHMS)". The Projects section lists "ARROWHEAD", "Arrowhead fPVN", "Arrowhead Tools", and "Productive 4.0". The Components section lists "Arrowhead Framework", "Authorisation System", "Layout Planner Tool", "Orchestrator System", "ServiceRegistry System", "Smart Kitting System", and "Smart Kitting Tool".

Figure 16 - IoT-Catalogue.com - Arrowhead Initiative page

The Arrowhead Initiative page will contain, for example the Arrowhead, Arrowhead Tools, Productive4.0 and Arrowhead fPVN projects, with the representative use case. The Arrowhead Framework will also be added to the initiative, with its mandatory core systems (Authorisation, Orchestrator and Service Registry) and support core systems and services, and also the related technologies.

In the following subsections, the project, use case and technological asset pages will be presented, as well as how the content will be organized and structured, with illustrative examples.

2.6.1.2.1 Project page

On the IoT-Catalogue.com, the Projects have their own page. The projects will be imported from Cordis³ to the IoT-Catalogue.com, with the description (motivation and objectives), and the participating entities. The

Figure 17 - Project page

17 shows an example of a project page, the Arrowhead Tools. The project title, logo, website and description are displayed at the top of the page. The project content will be distributed across the rest of the page, its use cases (with the location on the map), statistics, team (project consortium), and components (the technological assets developed and/or used in the solutions).

³ <https://cordis.europa.eu>

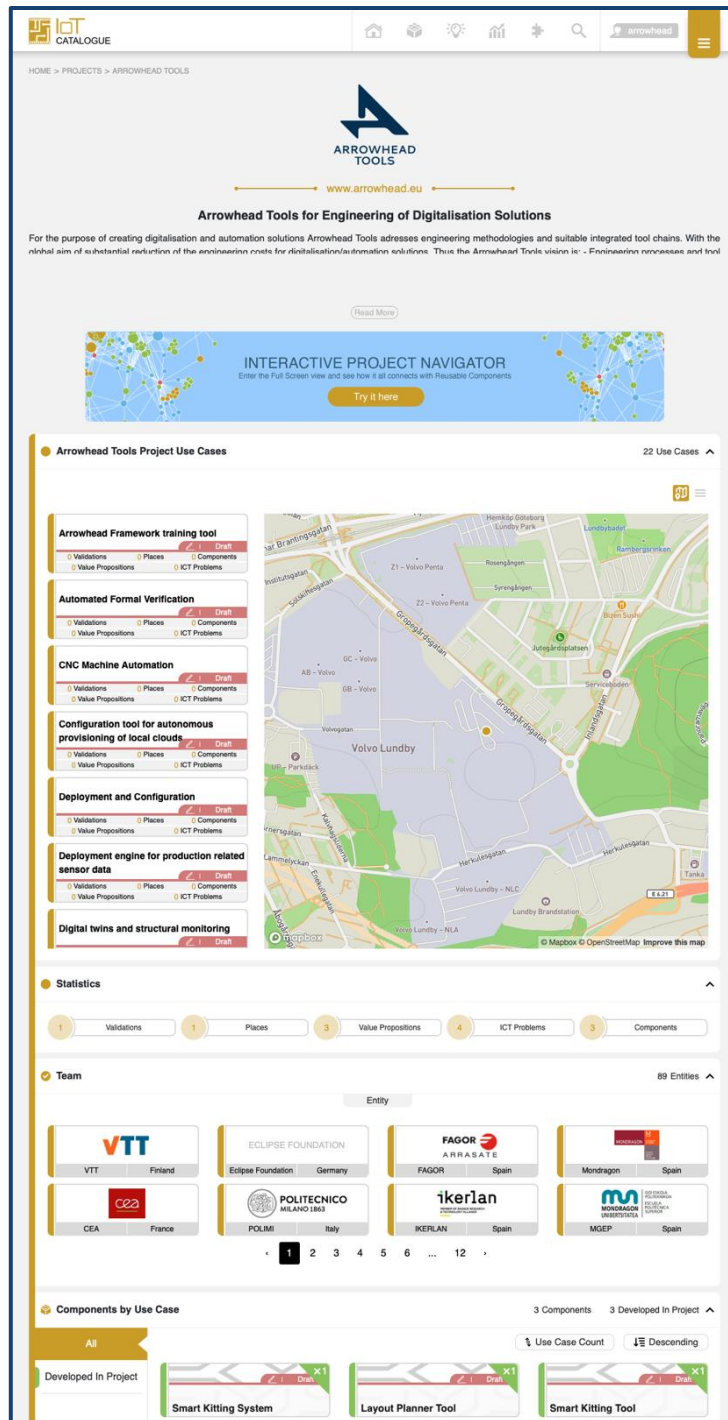


Figure 17 - Project page

2.6.1.2.2 Use case page

This page will contain information about the use case, including its title, description, places, team, characterization, and solution(s). The Figure 18 - Use Case page

18 shows an example of the use case page, the “Smart Kitting to Manage High Diversity”, which belongs to the Arrowhead Tools project. Following the example, at the top of the page a brief description will be provided with its aim and motivation. The available content will also be summarised in statistics, as well as the local where the solution(s) was validated will be represented on the map.

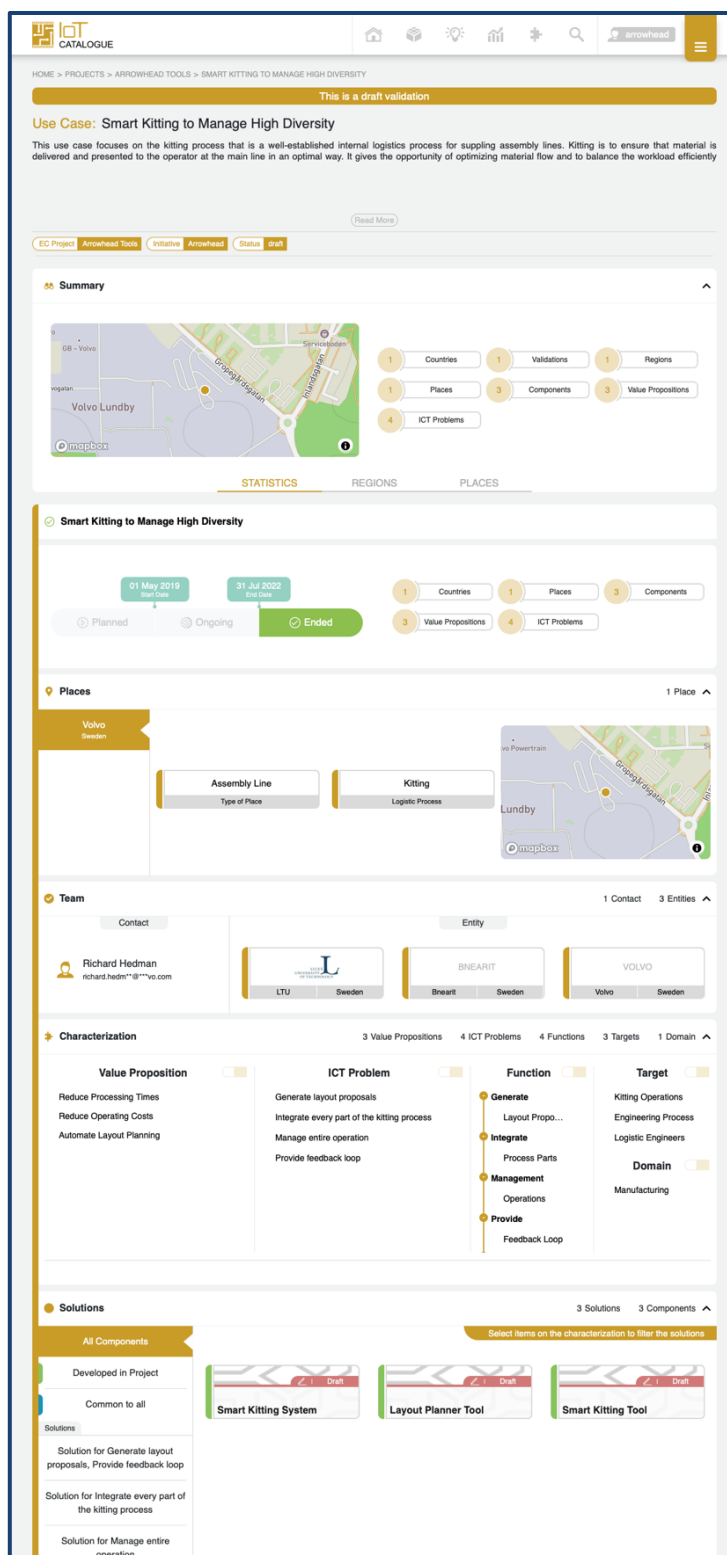


Figure 18 - Use Case page

2.6.1.2.2.1 Timeline & Statistics

The time of period in which the use case occurs will be presented graphically on a timeline. As shown in the Figure 19 - Use Case page - Timeline & Statistics

19, the use case occurred between 2019 (May 01) and 2022 (July 31). As well as statistics about the content are provided.

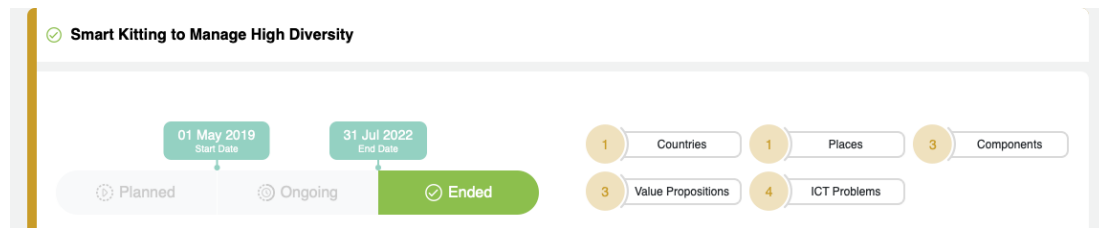


Figure 19 - Use Case page - Timeline & Statistics

The use case page is structured and organized into sections. Each section will be described below.

2.6.1.2.2.2 Places section

The places section (Figure 20 - Use Case page - Places

20) shows the location, in this case the point on the map, with some characterization about it, such as the type of place and process.

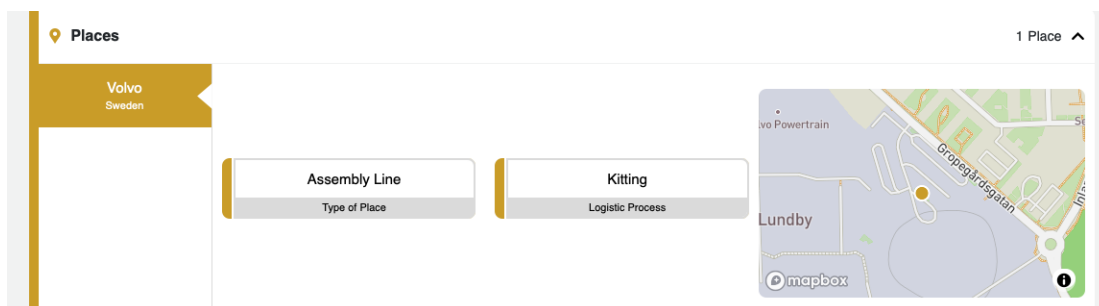


Figure 20 - Use Case page - Places

The entities (with the logo) involved are represented in the team section (Figure 21 - Use Case page - Team

21), which also includes contact information, providing the interested parties with the possibility of accessing more details about the results of the use case.

2.6.1.2.2.3 Team section

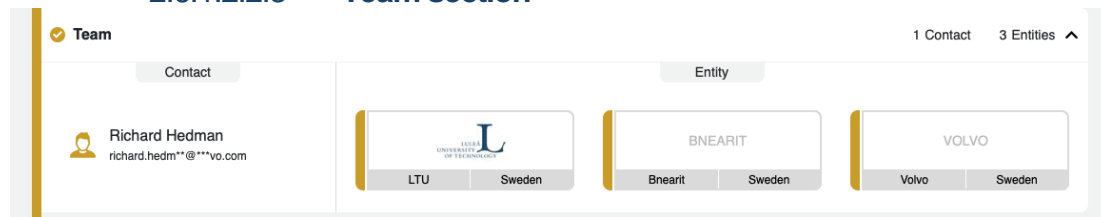


Figure 21 - Use Case page - Team

2.6.1.2.2.4 Characterization section

In the characterization section (Figure 22 - Use Case page - Characterization

22) the objectives (value propositions) related to the use case are displayed, as well as the technological problems (ICT problems), detailed through the functions, targets and domains.

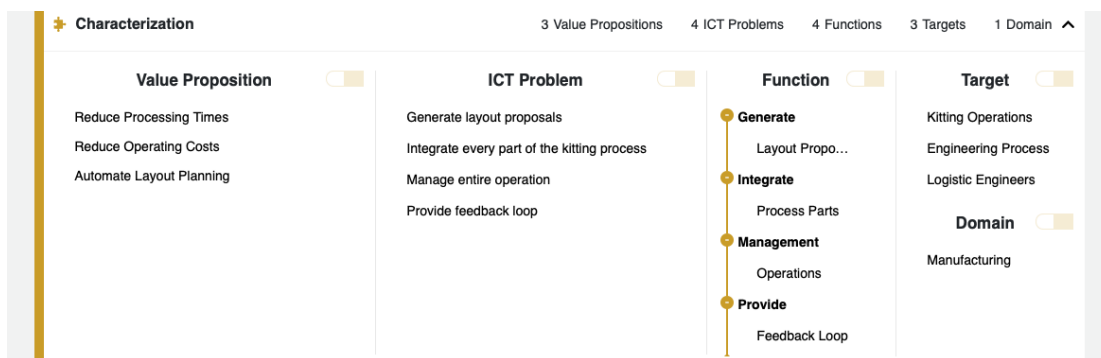


Figure 22 - Use Case page - Characterization

2.6.1.2.2.5 Solutions section

The solutions section (Figure 23 - Use Case page - Solutions

23) shows the technological asset(s) used to solve the technological problems to achieve the objectives, identified in the characterization section. As the example shows, different solutions can be applied. It is also possible to see the common components used between the solutions, selecting the option “Common to all” in blue, as represented in Figure 24 - Solution - Common to all option

24.

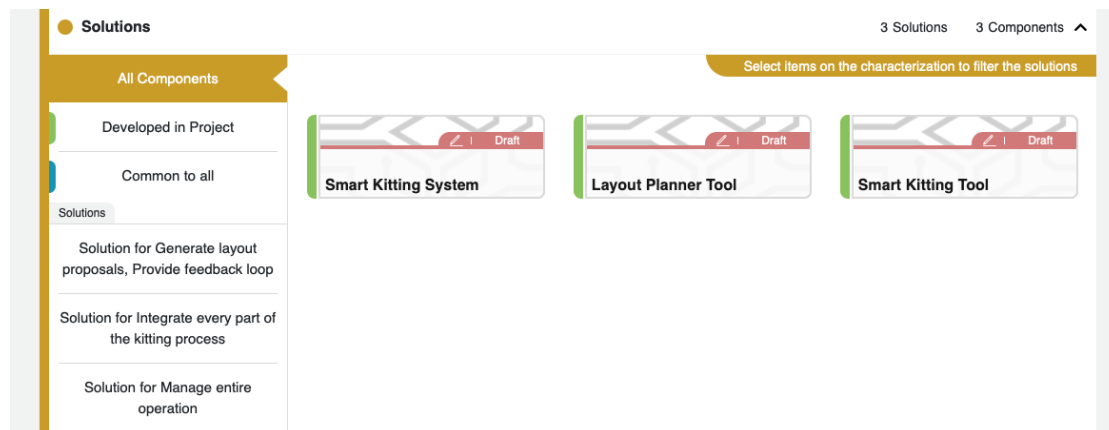


Figure 23 - Use Case page - Solutions

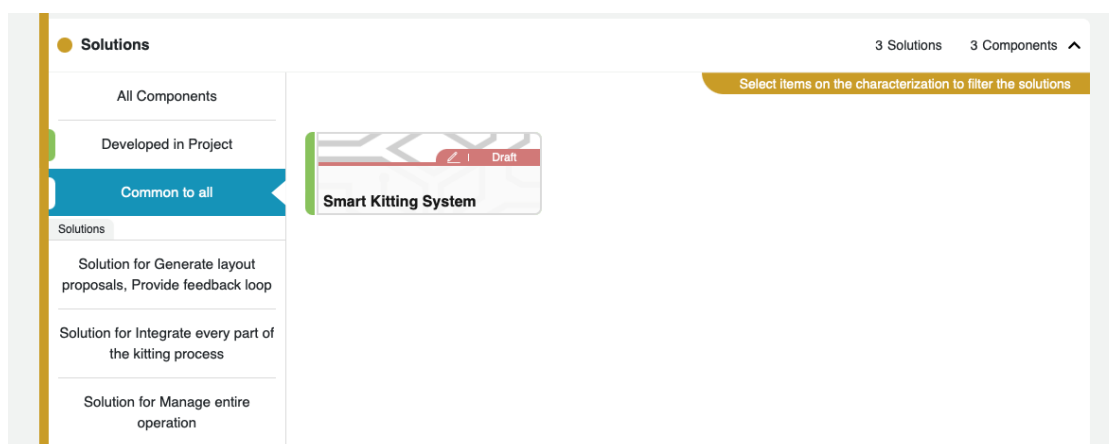


Figure 24 - Solution - Common to all option

2.6.1.2.2.6 Features

The features available in the use case page will be presented in the following subsections.

2.6.1.2.2.6.1 Explore information dynamically

The following figures show the dynamics within and between characterization and solutions sections. The relation between value propositions, ICT problems and solutions is bi-directional. This means that by selecting an item, it will show how it relates with the rest of the information.

Figure 25 - Characterization - Value Proposition selected

25 demonstrates that by clicking on a value proposition “Reduce Processing Times”, will highlight the ICT problems associated with it, including the functions, targets, and domain.

The ICT problem links both the characterization and solution sections. Since a solution corresponds to a component or a set of components used to solve an ICT problem or a set of ICT problems. As such, the solutions applied to address these ICT problems are also highlighted

in the solutions section, as well as showing the common components used (in purple) between them.

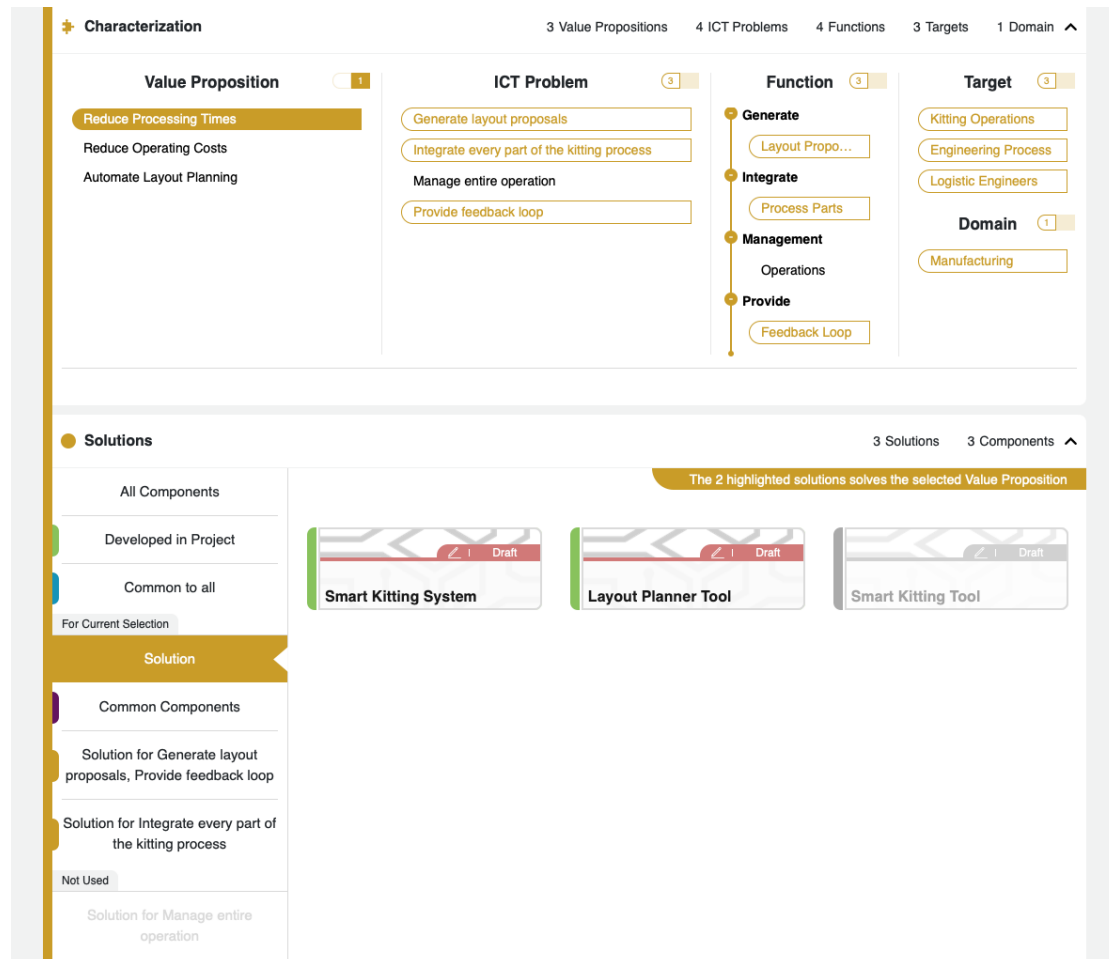


Figure 25 - Characterization - Value Proposition selected

In turn, in the Figure 26 - Characterization - ICT Problem selected

26, the ICT problem “Generate layout proposals” is selected and, in addition to the associated value propositions, its functions, that need to be fulfilled, the corresponding targets and domains will be highlighted. In the solution section, only the solution applied to solve this problem will be highlighted.

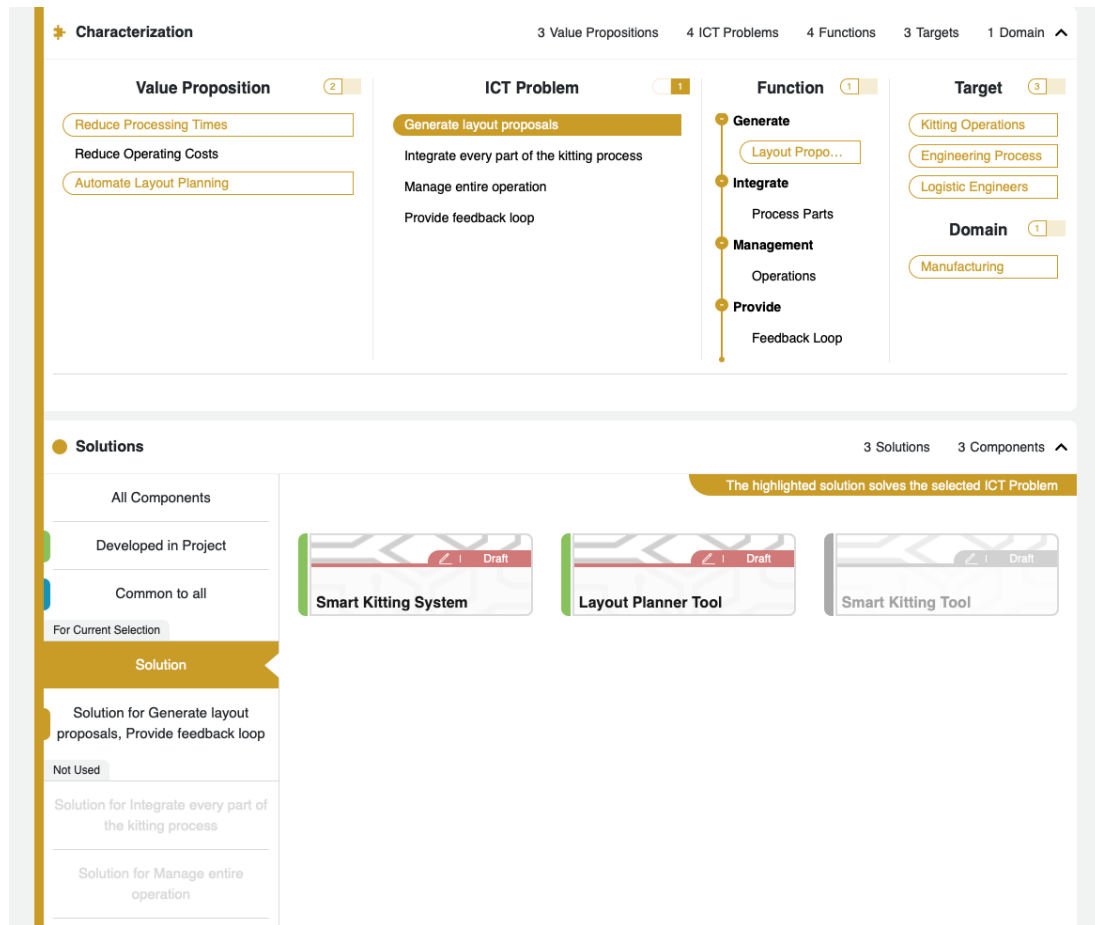


Figure 26 - Characterization - ICT Problem selected

As in the previous selection (characterization), when selecting one of the solutions on the sidebar (Figure 27 - Solutions - Solution selected

27) the ICT problems that it solves will be identified (in golden), as well as the components that belongs to that solution (in green), while those that don't belong will be greyed out.

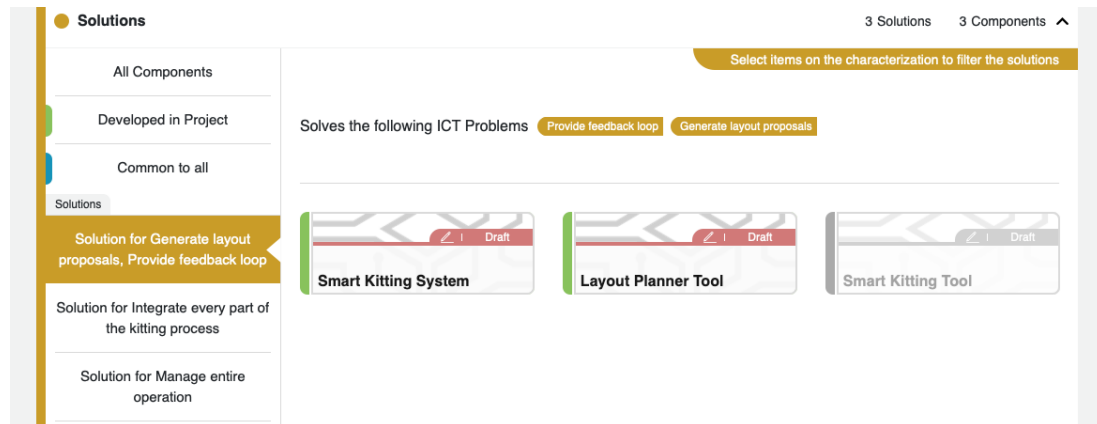


Figure 27 - Solutions - Solution selected

2.6.1.2.2.7 Performance & Impact feature

In the use case page, the Key Performance Indicators (KPIs) will be represented through the Performance & Impact feature. This feature will be presented using as example the NEMAK Light Metal Casting use case, which belongs to BOOST4.0 project. The information about BOOST4.0 is publicly available on the IoT-Catalogue.com⁴.

The KPIs information can be consulted in different views, namely graphic, card or evolution. However, the summary option is provided by default, displaying all the available KPIs (Figure 28 - Performance & Impact - Graphic view

28). This option corresponds to the graphic view. Pausing the on-screen indicator over a graph, a pop-up card is displayed with information about the KPI, its name, description, last measurement, target and more.

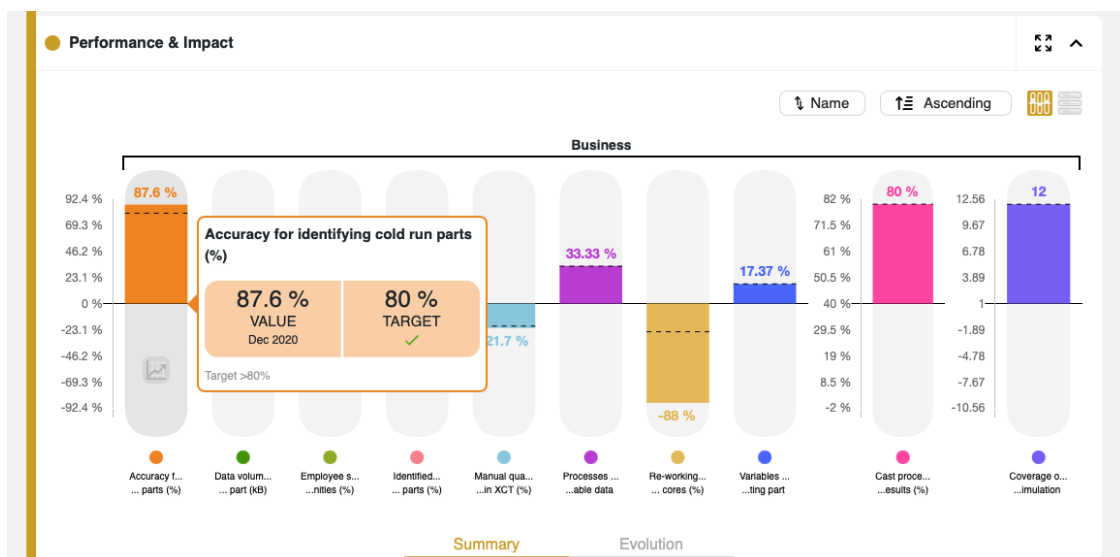


Figure 28 - Performance & Impact - Graphic view

⁴ <https://www.iot-catalogue.com/projects/5fabd0208f9b0029609943>

The KPI visualiser also support a card view, represented in Figure 29 - Performance & Impact - Card view

29, where each card corresponds to each KPI. The colour of the card is the same as the one shown in the graphic view. Clicking in the upper right corner of the card will change the view, redirecting to the evolution graphs.

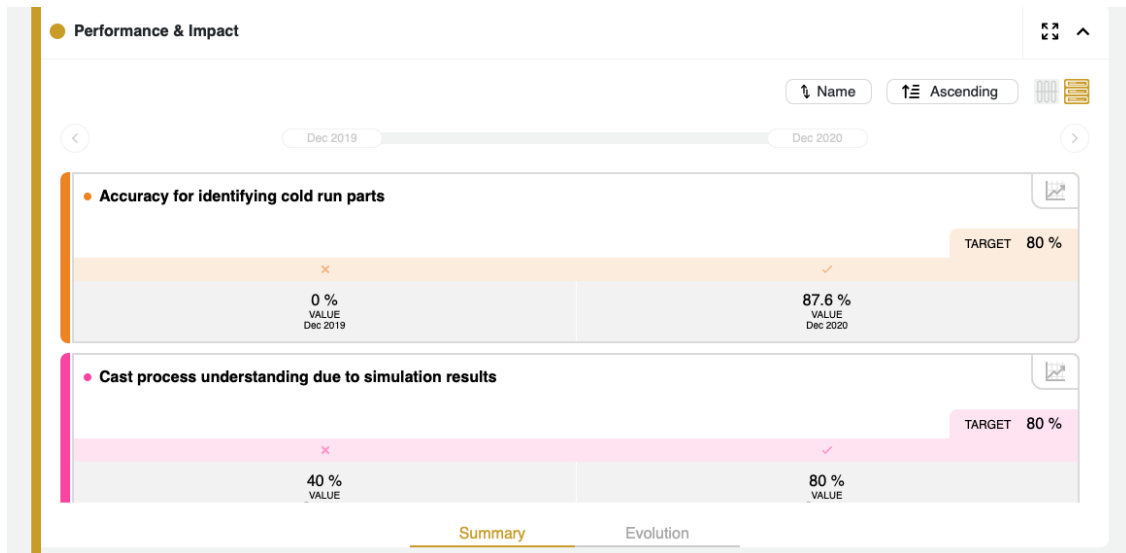


Figure 29 - Performance & Impact - Card view

As the name suggests, the Evolution view provides the measurement values over time for each KPI, as displayed in the Figure 30 - Performance & Impact - Evolution view

30.

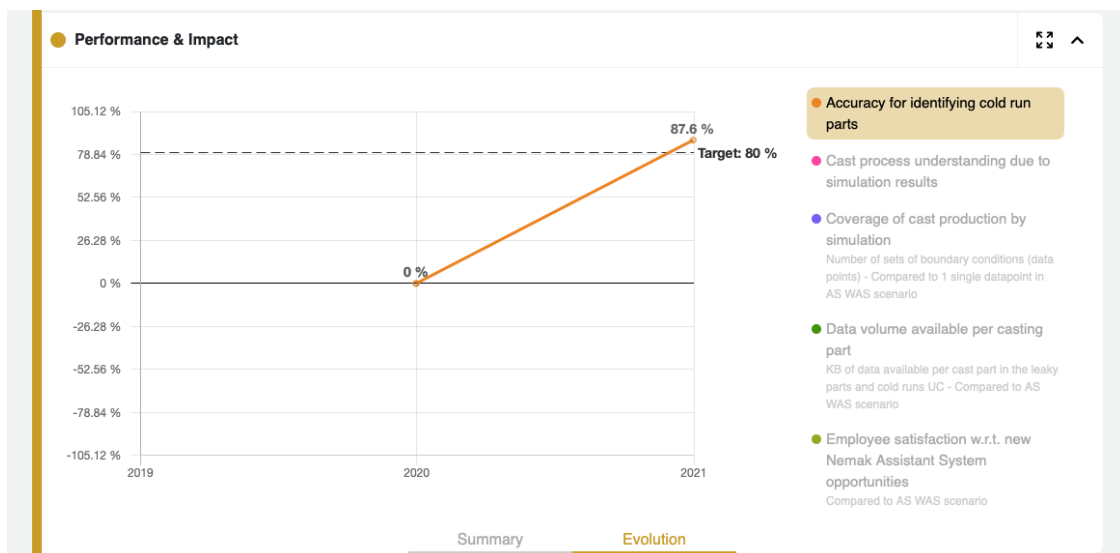


Figure 30 - Performance & Impact - Evolution view

The visualization of the KPIs can also be personalized in an advanced dashboard, as shown in the Figure 31 - Performance & Impact - Personalized view

31. It is possible to consult more than one type of view simultaneously, as well as combine multiple views to present the KPIs.

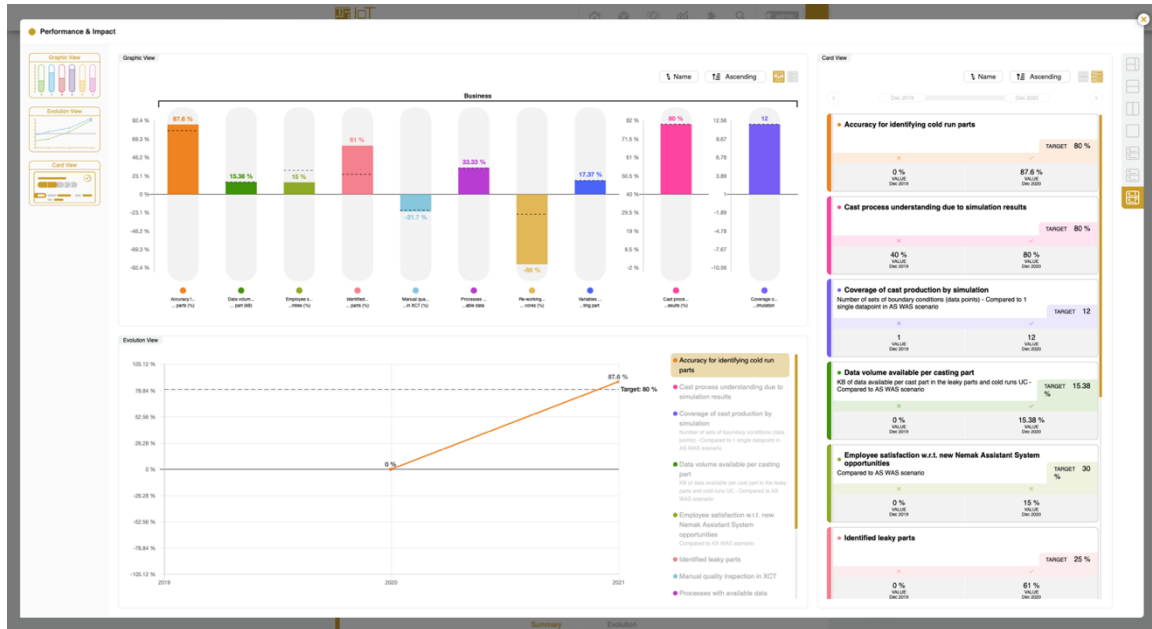
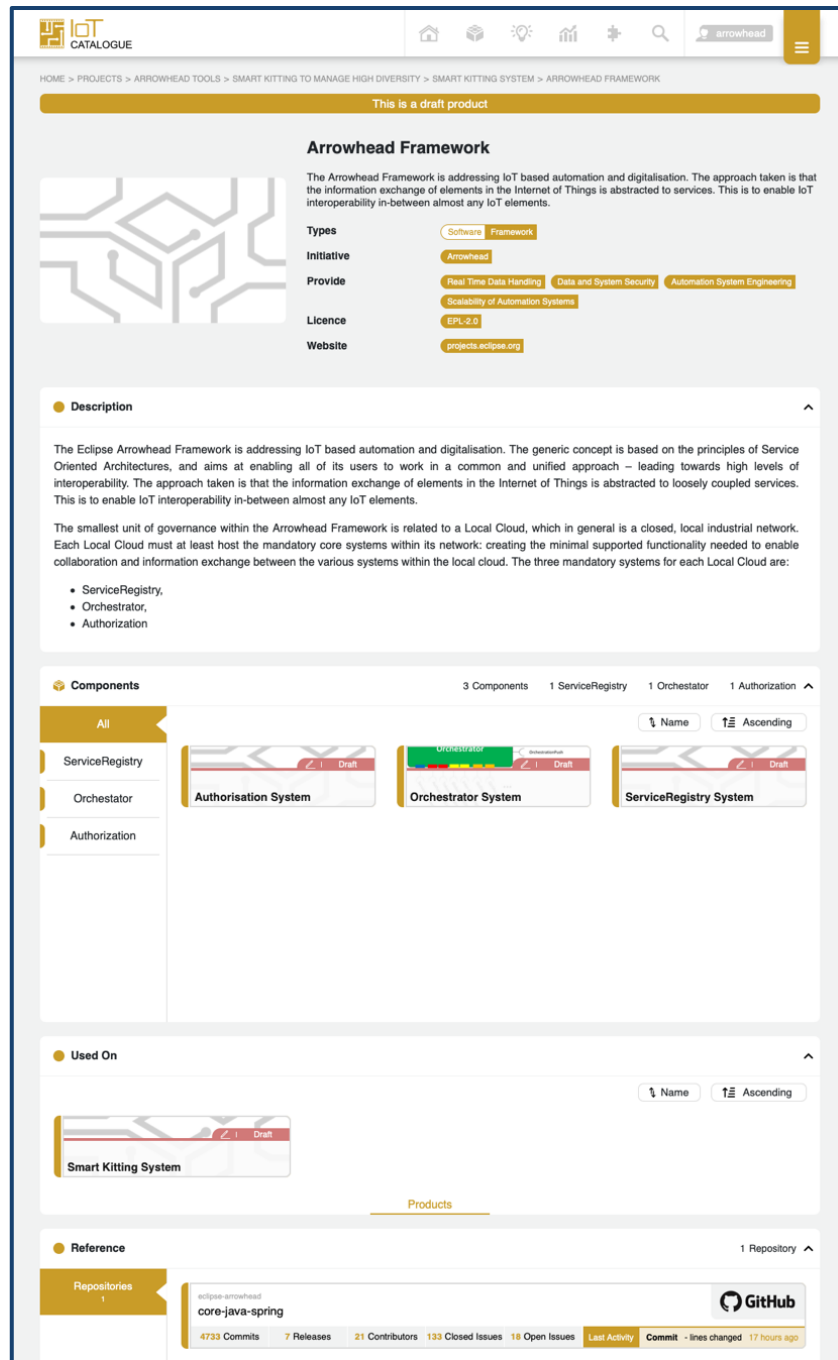


Figure 31 - Performance & Impact - Personalized view

2.6.1.2.3 Technological asset page

The Technological Asset page will contain relevant information about the technology. This includes general information, namely title, representative image, owner/developer, brief description, characterization, website, license, TRL, among other information. The description provides more detail about its functionalities. The information related with the technology will be displayed in the Components and Used On sections. The page also has a references section (at the end of the page) for useful documentation (such as instructions manuals, datasheets, publications GitHub) about the technology. As an example, the Figure 32 - Technological Asset page

32 shows the Arrowhead Framework page.



The screenshot displays the 'Arrowhead Framework' page within the 'IoT CATALOGUE'. The page is structured as follows:

- Header:** Includes the 'IoT CATALOGUE' logo, navigation icons, and a search bar.
- Breadcrumbs:** HOME > PROJECTS > ARROWHEAD TOOLS > SMART KITTING TO MANAGE HIGH DIVERSITY > SMART KITTING SYSTEM > ARROWHEAD FRAMEWORK.
- Status Bar:** A yellow bar indicating 'This is a draft product'.
- Section Header:** 'Arrowhead Framework'.
- Description:** A detailed paragraph explaining the framework's purpose in addressing IoT-based automation and digitalisation, based on Service Oriented Architectures (SOA) principles.
- Metadata:**
 - Types:** Software, Framework
 - Initiative:** Arrowhead
 - Provide:** Real Time Data Handling, Data and System Security, Automation System Engineering
 - Licence:** EPL-2.0
 - Website:** projects.eclipse.org
- Components:** A section showing three components: 'Authorisation System', 'Orchestrator System', and 'ServiceRegistry System'. Each component has a 'Draft' status indicator.
- Used On:** A section showing the 'Smart Kitting System' as a product that uses the framework.
- Reference:** A section showing the 'eclipse-arrowhead/core-java-spring' repository on GitHub, with statistics like 4733 Commits, 7 Releases, and 21 Contributors.

Figure 32 - Technological Asset page

Following the example, the Arrowhead Framework page, the information related to it will be displayed in the Components and Used on sections (Figure 33 - Technological Asset - Related information

33). The Components section will contain the technological assets related with the framework, for example the mandatory core systems. In the Used-On section will provide the components which use the framework, in the example, the Smart Kitting System is based on the Arrowhead Framework, as shown in the Figure 34 - Technological Asset - Used on

34.

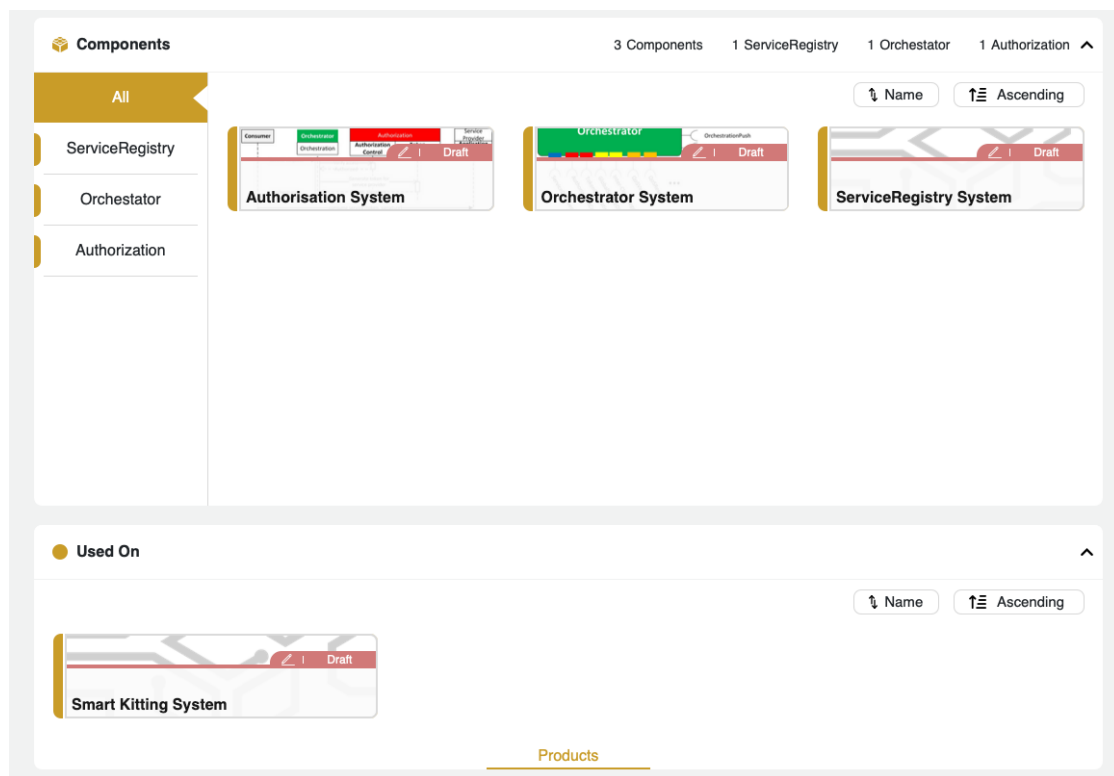


Figure 33 - Technological Asset - Related information

If the technological asset is used in the solution(s) of Use Case and/or is associated with the Project(s), this information will be displayed in the Used On section. The Smart Kitting System example, as shown in Figure 34 - Technological Asset - Used on

34, is used on the Smart Kitting to Manage High Diversity use case, which belongs to the Arrowhead Tools project.

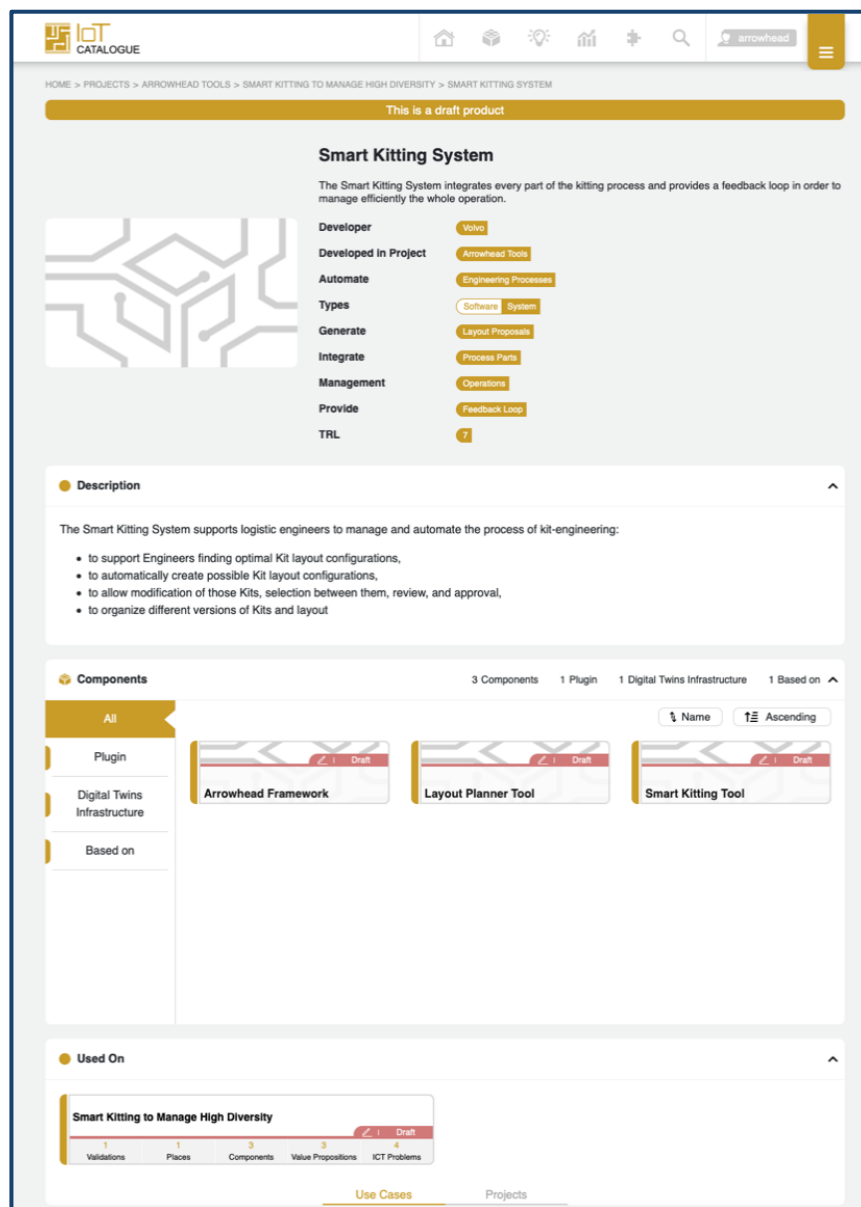


Figure 34 - Technological Asset - Used on

2.6.1.3 Integration of IoT-Catalogue.com information into ARROWHEAD website

The IoT-Catalogue.com has a widget tool that enables an easy integration of its visual elements into external web pages.

```
<script src="https://www.iot-catalogue.com/js/widgets.js"></script>
<div
  class="iotcat-component-slider"
  data-type="initiative"
  data-id="63569a8d570b8dfa22da9511"
  data-color="7499ac"
  data-background-color="F1F1F1"
  data-items-per-slide="12">Loading Components</div>
<div
  class="iotcat-usecase-slider"
  data-type="initiative"
  data-id="63569a8d570b8dfa22da9511"
  data-color="7499ac"
  data-background-color="F1F1F1"
  data-items-per-slide="12">Loading Use Cases</div>
```

Figure 35 - Widget Usage Sample

The integration has 2 Mandatory attributes, that are:

- data-type: Type of data, currently only "initiative" is available
- data-id: identifier of the data set

The integration also has Optional attributes, that are:

- data-color: Color used on the theme, defaults to the standard IoT-Catalogue theme color
- data-background-color: Background color of the widget, defaults to white
- data-items-per-slide: Number of items per slide, defaults to 6 for Use Cases and 8 for Components

The IoT-Catalogue.com widget tool will be used to integrate the information gathered in the Initiative Arrowhead into Arrowhead website, creating the Arrowhead fPVN Innovation Catalogue.

2.6.2 Arrowhead fPVN Innovation Catalogue initial structure

The aim of the Arrowhead fPVN Innovation Catalogue is to make possible to inspect, browse and analyse, applications and solutions realized making use of the Arrowhead Framework and related technologies. This will make possible to overlook reusability of

components, common technologies used in the use cases, digital innovations and more. The initial structure of the Arrowhead fPVN Innovation Catalogue is presented in the Figure 36 - Innovation Catalogue Mockup

36.

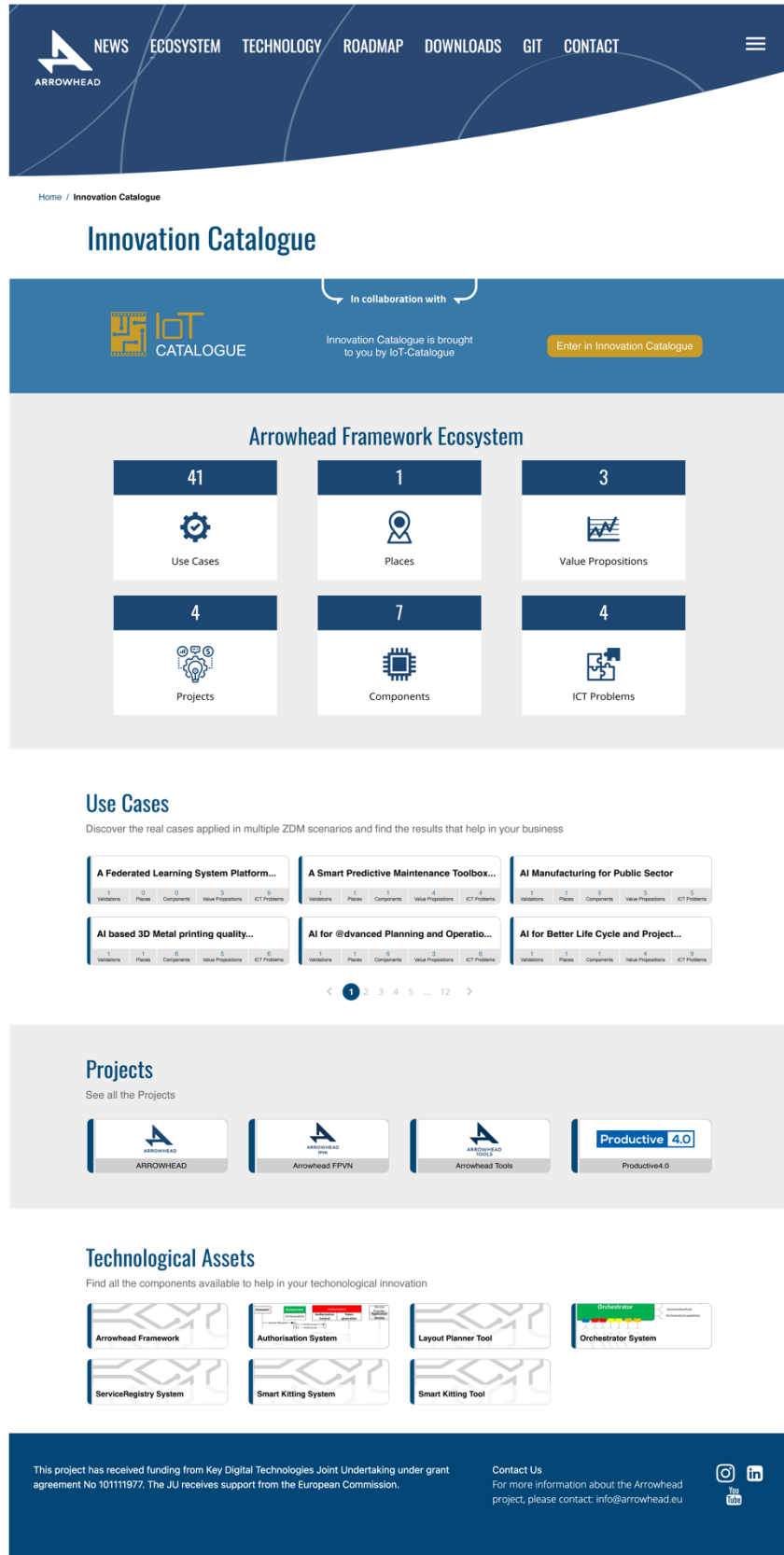


Figure 36 - Innovation Catalogue Mockup

3. Conclusions

This comprehensive Dissemination & Standardisation Plan started already to be implemented accordingly, and all the constant monitoring and reporting activities will be published periodically during the life-time of the project via the next deliverables of WP11, namely D11.2, D11.3 and D11.4.

4. Acronym list

SDO = Standards Development Organizations

5. Revision history

5.1 Contributing and reviewing partners

Contributions	Reviews	Participants	Representing partner
ToC	Octavian Fratu	Alex Vulpe	UPB
Section 1	Octavian Fratu	Cosmina Stalidi, Gloria Popescu, Alex Vulpe	UPB, Beia
Section 2.1	Octavian Fratu, Romulus Cheveresan	Cosmina Stalidi, Gloria Popescu, Cornelia Alexandru, Alex Vulpe	Beia, UPB
Section 2.2	Octavian Fratu, Romulus Cheveresan	Cosmina Stalidi, Gloria Popescu, Theodor Pintilie, Alex Vulpe	Beia, UPB
Section 2.3	Octavian Fratu, Romulus Cheveresan	Cosmina Stalidi, Gloria Popescu, Theodor Pintilie, Maria Sirbu-Dragan	Beia, UPB
Section 2.4	Octavian Fratu, Romulus Cheveresan	Cosmina Stalidi, Gloria Popescu, Theodor Pintilie	Beia, UPB
Section 2.5	Octavian Fratu	Erik Molin, Nils Sandsmark, Cosmina Stalidi	SEIIA, Beia, UPB
Section 2.6	Octavian Fratu, Bruno Almeida	Susana Lucena, Tiago Teixeira	UNP, UPB
Section 3, 4 and 5	Octavian Fratu	Cosmina Stalidi	Beia, UPB

5.2 Amendments

No.	Date	Version	Subject of Amendments	Author
1	2023-11-30	1.0	Adding YouTube channel	Octavian

5.3 Quality assurance

No	Date	Version	Approved by
1	2023-12-11	1.0	Jerker Delsing