BROKERAGE AND MARKET PLATFORM FOR PERSONAL DATA

D6.8

Final communication, dissemination and standardization report

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D6.8 Final communication, dissemination and standardization report

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List of Acronyms

Acronym	Description
CA	Consortium Agreement
Dx.y	Deliverable x.y
MPC	Multi party computation
SSI	Self-sovereign identity
Tx.y	Task x.y
WP	Work Package
YX	Year X

Executive Summary

KRAKEN aims to provide a trustworthy and secure platform for personal data with state-of-the-art data protection methods that ensure both metadata and query data protection. The project has the potential to become the key platform for sharing, brokering and trading sensitive personal data with a user-centric approach. It is a cloud-based and privacy-friendly platform that provides for secure storage, management and sharing of self-sovereign identity information and other personal data.

Within Work Package 6 (WP 6) **Business Plan, Exploitation and sustainability**, the consortium supports the visibility of the project to specific and sectoral audiences with the aim of bringing the project and pilots to market. WP6 includes: Market analysis, exploitation and sustainability plan, dissemination, communication and standardization, and advisory board activities.

Although all tasks within WP6 are interrelated and coordinated, Task 6.3 (T6.3) **External Communication and standardization** and T6.4 **Dissemination of foreground knowledge** work in a particularly coordinated mode. This document reports on the project communication activities carried out so far, with a special focus on the last year of the project.

1 Introduction

1.1 Purpose of the document

This report focuses on the **communication, dissemination and standardization activities** carried out by all partners of the consortium during the project duration, with a main focus on the last project year, i.e., from December 2021 (M25) to November 2022 (M36) to evaluate our estimations and lines of work performance.

Further information on previous periods and details on the consortium's initial estimations can also be found in:

- **D6.1 Public Project web presence** (February 2020),
- **D6.2 Initial Market Analysis** (September 2020),
- **D6.6 Initial Communication Report** (September 2020), and
- **D6.7 Initial Communication, dissemination and standardization report** (November 2021).

Once analyzed which are KRAKEN's most efficient ways of reaching out stakeholders, potential users and general public, this document proposes specific approaches to achieve that.

1.2 Structure of the document

This document is structured as follows:

- Section 1: Introduction of the document (this section).
- Section 2: Communication Report from December 2021 (M25) to November 2022 (M36).
- Section 3: Dissemination report.
- Section 4: Standardization report.
- Section 5: Conclusions.

2 Communication Report

KRAKEN project is at the end of its journey, and this document describes the communication activities implemented during the project third year, following the plan designed at the beginning of the project. The communication activities have been carried out through two main channels: the project web and the social media presence on Twitter and LinkedIn.

Since December 2021, different communication actions have been carried out to reach stakeholders: potential users, citizens and institutions and achieve the objectives set out for the Year 3 (Y3) of the project (December 2021 – November 2022). These actions were mainly articulated through four communication campaigns:

- Cybersecurity month - October.
- Campaign about the project on LinkedIn.
- Campaign about the project on Twitter.
- Recruitment of UX testers for FBK.

The following Figure 1 summarizes the development and logic of the communication activities focused on enhancing the visibility of the project, generating awareness about its objectives and results aiming at engaging with the various targeted stakeholders and audiences identified at the beginning of the project.

As can be seen in the visual roadmap below (Figure 1), this is the final report.

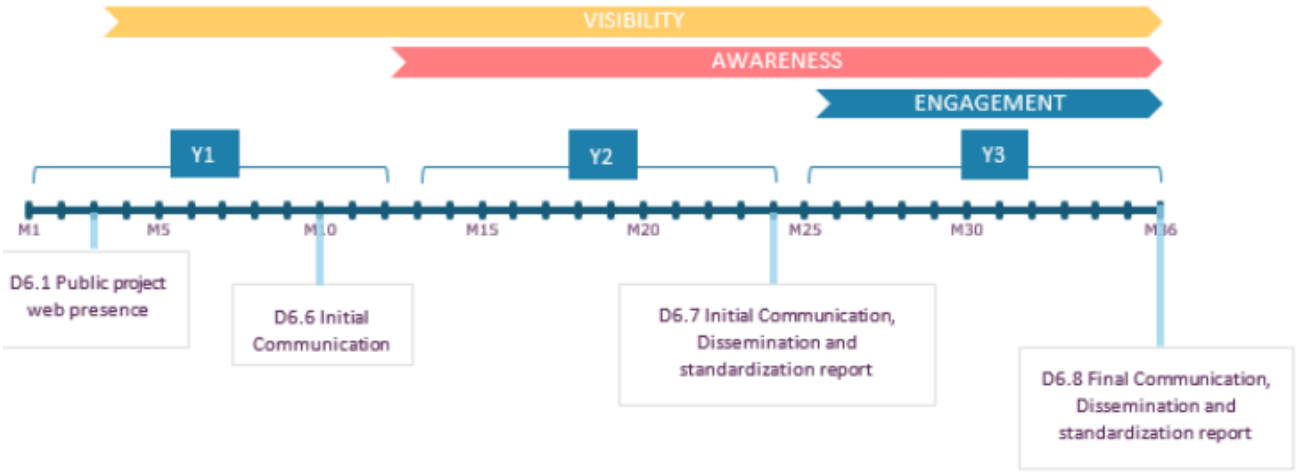


Figure 1: General Communication Plan

Year 3 activities have been addressed towards the engagement of project stakeholders. The roadmap represented in Figure 2: Y3 Communication Actions, provides an overview of the engagement stage and the various activities implemented in year 3 to achieve the commitment that was planned at the beginning of the project and to meet the objectives of the project communications plan. These activities include:

- Launch of newsletters
- Press releases
- Blog posts
- Social media campaigns on the pilots
- Continue to share information from previous years
- Cybersecurity campaign

- Updating of the website
- Participation in events and workshops

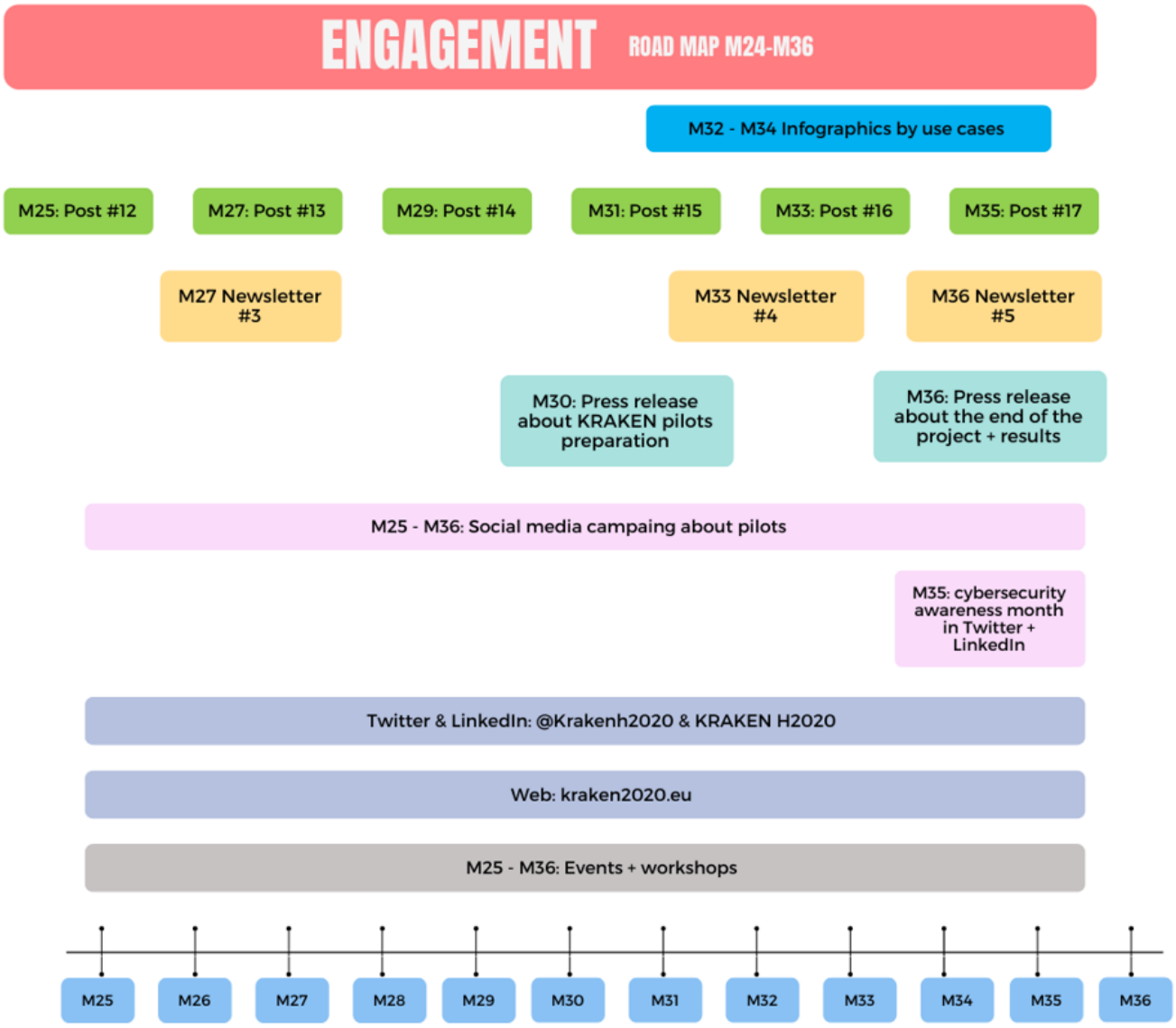


Figure 2: Y3 Communication Actions

2.1 Overview of KPIs

Most of the KPIs set for the Y3 (December 2021 - November 2022) have been achieved. **Details on the specific results are provided in the table below**.

ACTIVITY	Target KPI by November 2022	KPI achieved by November 2022
Social Media	> 500 followers (Twitter + LinkedIn)	**> 600 followers** **(Twitter + LinkedIn)**
	> 4000 impressions per month (Twitter + LinkedIn) =	> 7000 impressions per month (Twitter + LinkedIn) =

	40000 impressions Twitter + LinkedIn in Y3	**47464 impressions Twitter + LinkedIn in Y3**
	> 3 social media channels	> 3 social media channels (Twitter, LinkedIn & web)
Non-scientific technical publications	8 publications	**12 publications**
Communication & Promotional material	3 newsletters + 2 press releases	5 newsletters + 3 press releases
	2 infographics	**7 infographics**
Industry & Events	> 10 publications in conference	> 20 publications in conference
	> 1 Article in Journal	> 2 Article in Journal
Whitepapers	0	1
Project website	> 6000 visitors	> 9000 visitors
	< 70% bounce rate	78,58 % bounce rate

Table 1: Y3 overall performance

Table 1 shows an increase of the number of visitors of the project's website and in the number of social media followers. The number of interaction sin social media has grown.

It could be argued that **cybersecurity, self-sovereign identity, and e-health from a technical perspective have attracted the interest of business, industrial and technical profiles (**Table 2 for web profiles and Figure 3 for LinkedIn profiles**) who could be related to and/or interested in KRAKEN and its results**.

Categoría de afinidad (cobertura)	Adquisición			Comportamiento		
	Usuarios	Usuarios nuevos	Sesiones	Porcentaje de rebote	Páginas/sesión	Duración media de la sesión
	3.239 % del total: 33,66 % (9.623)	3.240 % del total:33,70 % (9.613)	3.474 % del total:34,18 % (10.165)	77,10 % Media de la vista: 78,70 % (-2,03 %)	1,56 Media de la vista:1,41 (10,39 %)	00:00:33 Media de la vista:00:00:28 (19,72 %)
1. Compradores/Compradores de valor	1.855 (3,71 %)	1.849 (3,71 %)	1.949 (3,68 %)	77,89 %	1,54	00:00:32
2. Tecnología/Tecnófilos	1.796 (3,59 %)	1.791 (3,59 %)	1.870 (3,53 %)	77,97 %	1,43	00:00:29
3. Estilos de vida y pasatiempos/Entusiastas de la vida ecológica	1.708 (3,41 %)	1.703 (3,41 %)	1.839 (3,47 %)	76,02 %	1,86	00:00:48
4. Medios y entretenimiento/Amantes del cine	1.694 (3,39 %)	1.690 (3,39 %)	1.808 (3,41 %)	76,27 %	1,71	00:00:42
5. Medios y entretenimiento/Amantes de la música	1.595 (3,19 %)	1.588 (3,18 %)	1.705 (3,22 %)	74,43 %	1,82	00:00:49

Table 2: Website users' professional profile

Figure 3: LinkedIn users' professional profile

It is important to highlight that the section of the web devoted to the **health pilot received a total of 308 unique visits** and **288 unique visits** aimed at learning about the progress of this pilot. The average time of visit is 2 minutes and 8 seconds, which indicates that each visitor took the necessary time to read and understand the information shared there.

Considering the whole pictures, the graph below represents the total of KRAKEN web visits by the end of year 2 (November 2021) and by the end of year 3 (November 2022)

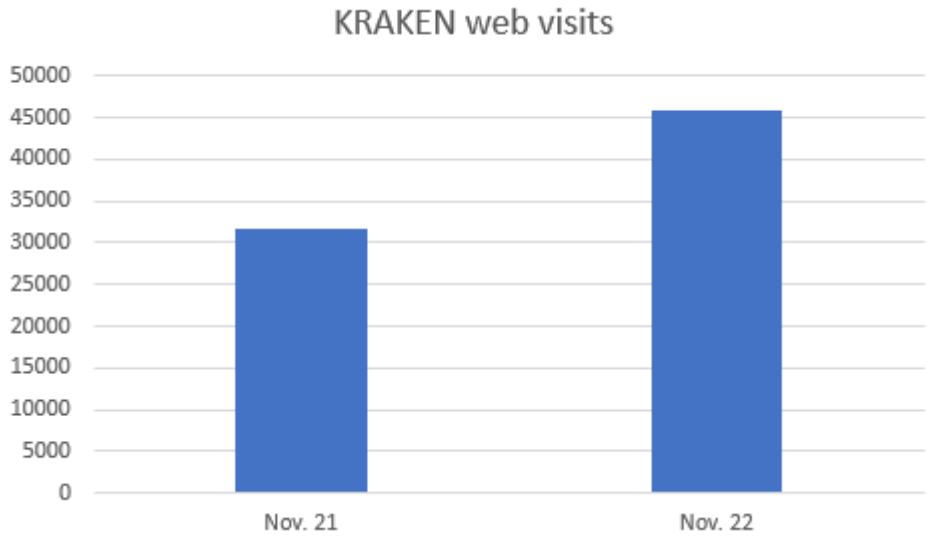


Figure 4: Increase of the number of KRAKEN web visits during the last year

The number of KRAKEN web visits has steadily increase along the project life. This has been achieved thanks to the type of publications posted on the website and the dissemination carried out on social networks. It was possible to generate an impact on publications, both scientific and non-scientific, managing to adjust to the interests of stakeholders.

The decisions taken during the Y3 have yielded results with more than 9.000 unique visitors.

2.2 Project website

KRAKEN continued to monitor the performance of its website, as well as making the necessary adjustments to achieve the objectives set for the end of Y3. **Thanks to the content planning and content communication and communication activities, the website had an updated value to offer.**

We monitored possible changes to optimise the user experience and made sure to provide up-to-date information on the performance and results of the project. One of the main challenges was to reduce the bounce rate by creating an open and eye-friendly space, as discussed in the previous report. Facilitating and simplifying the website was a priority to reduce load times and distractions to attract and increase the standard time per visitor and to consider visitors and how to highlight the new content to them.

KRAKEN website has significantly improved the total number of unique visitors. The number of new web visitor which was around 8,500 in year 2 increased to around 9,600 new visitors in year 3. The total number of the project web visitors during the whole life of the project amounts to around 25,000 The table below shows the whole picture:

WEB TRAFFIC RESULTS		
ACTIVITY	**KPI value Nov. 21 (Year 2) Feb. 19-Nov. 21**	**KPI value Nov. 22 (Year 3) Feb. 19 -Nov. 22**
Unique visitors	15,300	24,940
Bounce rate	77,18 % bounce rate	77,71% bounce rate
Number of pages views	31,577	45,970

Table 3: Website KPIs

KRAKEN kept monitoring the performance of the website and making the necessary adjustments in publications and ways of dissemination to achieve the objectives.

Thanks to the planning of content and communication activities, the website was kept up to date by providing material for its users to learn more about the project and find out about its latest news and developments. Monthly monitoring was carried out to detect what was working and, if necessary, to make changes to optimise the user experience through easy site navigation and a wide range of up-to-date information on project performance and results.

Despite the creation of eye-catching content for the website and the dissemination activities through the project's social networks the reduction of the bounce rate has not been achieved**.**

KRAKEN website has also increased its number of page views, which can be interpreted as a growing interest from users, a positive result of the efforts and feasibility of the communication strategy. As already clarified in this report, KRAKEN has adapted to ongoing developments to be accessible to the public in its Y3 engagement phase with a series of posts related to health and data protection.

In May 2022 there was a peak in visits to the website, as highlighted in red in the graph below (Figure 5). This is the result of the careful planning of content, especially events and articles in which KRAKEN participated and the dissemination of the second press release of the project.

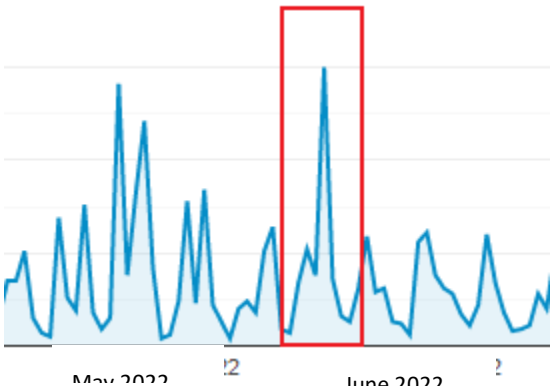


Figure 5: Number of web visitors

In the last year of the project, other peaks in visits to the website are evident (Figure 6), which shows how the **new content can considerably improve the popularity** of this space. May and June stand out for promoting content that alludes to KRAKEN's participation in different events, documents and marketing material, while October can be highlighted due to the relevance given to remembering who the project partners are and the campaign in the month of cyber security.

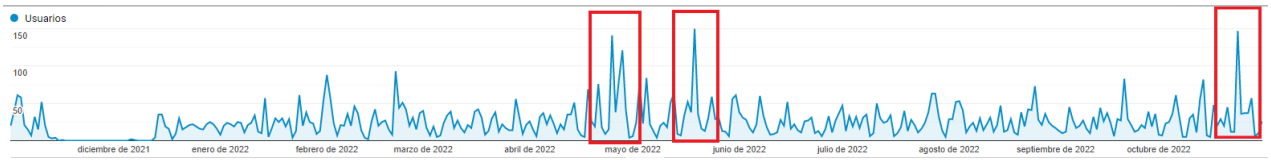


Figure 6: Number of web visitors Y3

The graph below (Figure 7) shows the total visitors of the three years of the project. A peak of visitors can be seen at the beginning of the project, when the project was starting and the pillars and objectives of the project were made known and, as mentioned above, in May and June 2022 because of the campaigns that were implemented at the time.

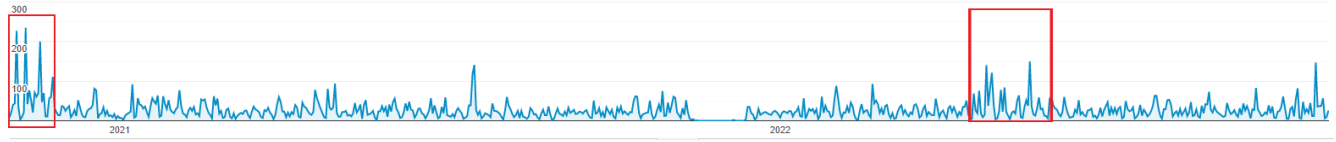
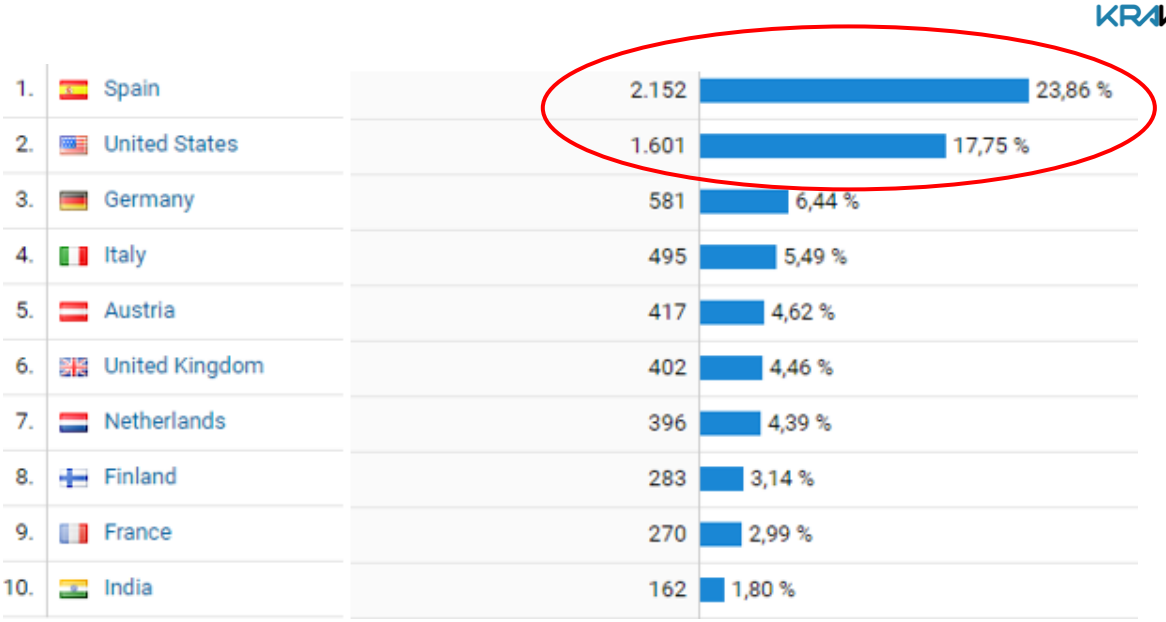


Figure 7: Number of web visitors Y2 and Y3

This information provides valuable insights into what kind of approaches worked best for good communication and dissemination actions.

Even though all of KRAKEN's content is in English, most of the visitors are from Spain, it is interesting to note that **17.75% of the visitors come from the United States** (Figure 8), which shows the possibilities of future collaborations or participation for the KRAKEN consortium beyond the European Union states.



1.	Spain	2.152	23,86 %
2.	United States	1.601	17,75 %
3.	Germany	581	6,44 %
4.	Italy	495	5,49 %
5.	Austria	417	4,62 %
6.	United Kingdom	402	4,46 %
7.	Netherlands	396	4,39 %
8.	Finland	283	3,14 %
9.	France	270	2,99 %
10.	India	162	1,80 %

Figure 8: Web visitors' countries

Third in this ranking is Germany, a country that does not participate in the KRAKEN consortium. The Netherlands and France also appear in this top 10 ranking, which is a pleasant surprise and indicates that the objectives and scope of the project are exceeding the expected limits. Finally, the country in the fourth position is Italy, which, compared to the previous report, drops one place**. It is important to note that India's inclusion in the ranking is a good indicator, considering the total population and potential growth of this nation.**

Tipo de usuario	Adquisición			Comportamiento		
	Usuarios	Usuarios nuevos	Sesiones	Porcentaje de rebote	Páginas/sesión	Duración media de la sesión
	8.976 % del total: 100,00 % (8.976)	9.006 % del total: 100,00 % (9.006)	9.530 % del total: 100,00 % (9.530)	78,80 % Media de la vista: 78,80 % (0,00 %)	1,41 Media de la vista: 1,41 (0,00 %)	00:00:28 Media de la vista: 00:00:28 (0,00 %)
1. New Visitor	**8.969** (97,17 %)	9.006 (100,00 %)	9.006 (94,50 %)	80,55 %	1,23	00:00:12
2. Returning Visitor	**261** (2,83 %)	0 (0,00 %)	524 (5,50 %)	48,85 %	4,50	00:05:01

Table 4: New visitors vs returning visitors Y3

In D6.7 initial communication, new visitors were 96.93%, but in Y3 there has been a slight increase to 97.17% (Table 4). Returning visitors performed better in Y2 at 3.07%, in Y3 their percentage decreased to 2.83%.

Table 4 shows that the standard duration of each session failed to improve, as returning visitors tend to spend less time on the website, with high **values such as 5 minutes and 01 second**. New visitors spend less time on the website (per session) while returning visitors spend more time checking details and exploring its different sections and content.

Tipo de usuario	Adquisición			Comportamiento		
	Usuarios	Usuarios nuevos	Sesiones	Porcentaje de rebote	Páginas/sesión	Duración media de la sesión
	19.079 % del total: 100,00 % (19.079)	18.877 % del total: 100,01 % (18.876)	20.093 % del total: 100,00 % (20.093)	79,60 % Media de la vista: 79,60 % (0,00 %)	1,52 Media de la vista: 1,52 (0,00 %)	00:00:31 Media de la vista: 00:00:31 (0,00 %)
1. New Visitor	**19.055** (97,07 %)	18.877 (100,00 %)	18.877 (93,95 %)	81,52 %	1,25	00:00:12
2. Returning Visitor	**575** (2,93 %)	0 (0,00 %)	1.216 (6,05 %)	49,84 %	5,74	00:05:26

Table 5: New visitors vs returning visitors Y1, Y2, Y3

Table 5 shows the new visitors vs returning visitors and their behaviour during the life of the project.

A total **of 19,079 new users and 575 returning users visited the KRAKEN website**. New users generated 20,093 sessions, while the returning users generated 1,216 sessions over the three years of the project, it means that each returning user generates more than 2 sessions while the new users generate one session each. The highest average session duration was by returning visitors with an average time of 05:26 minutes.

The analysis of the KRAKEN website's performance indicates which are the main sources, but also the way the visitors arrive to the web. Table 6 depicts that there are two sites that stand out from the rest of the list, as the last column refers to the standard duration per session.

Number three in the ranking shows that users spent two minutes and sixteen seconds per session on the "referring" page, a term that includes social media channels.

Number four is the homepage of the KRAKEN website, where users spent two minutes and twenty-nine seconds, indicating that users took enough time to read the available information and possibly consult other online materials before leaving the website.

Fuente/Medio	Adquisición			Comportamiento		
	Usuarios ↓	Usuarios nuevos	Sesiones	Porcentaje de rebote	Páginas/sesión	Duración media de la sesión
	8.976 % del total: 100,00 % (8.976)	9.006 % del total: 100,00 % (9.006)	9.530 % del total: 100,00 % (9.530)	78,80 % Media de la vista: 78,80 % (0,00 %)	1,41 Media de la vista: 1,41 (0,00 %)	00:00:28 Media de la vista: 00:00:28 (0,00 %)
1. (direct) / (none)	**5.695** (62,10 %)	5.694 (63,22 %)	5.835 (61,23 %)	77,04 %	1,35	00:00:19
2. google / organic	**2.328** (25,38 %)	2.254 (25,03 %)	2.391 (25,09 %)	84,19 %	1,33	00:00:18
3. t.co / referral	**200** (2,18 %)	187 (2,08 %)	248 (2,60 %)	66,13 %	2,45	00:02:16
4. KRAKEN / WEB	**144** (1,57 %)	133 (1,48 %)	180 (1,89 %)	72,78 %	2,18	00:02:29
5. KRAKENH2020 / WEB	**144** (1,57 %)	138 (1,53 %)	155 (1,63 %)	78,71 %	1,55	00:01:21
6. linkedin.com / referral	**119** (1,30 %)	110 (1,22 %)	138 (1,45 %)	61,59 %	2,07	00:01:45
7. baidu / organic	**84** (0,92 %)	83 (0,92 %)	84 (0,88 %)	100,00 %	1,00	00:00:00
8. ifly-drones.eu / referral	**79** (0,86 %)	54 (0,60 %)	82 (0,86 %)	85,37 %	1,20	00:00:04
9. Website KRAKEN / KRAKEN	**35** (0,38 %)	34 (0,38 %)	35 (0,37 %)	88,57 %	1,23	00:00:11
10. bing / organic	**25** (0,27 %)	23 (0,26 %)	25 (0,26 %)	96,00 %	1,00	00:00:01

Table 6: Traffic source Y3

It is interesting to note that number three in the ranking is the "benchmark" figure, a term that includes social media channels, with a time of two minutes and sixteen seconds, followed by the KRAKEN website, which shows that users spend two minutes and twenty-nine seconds per session. This means that not only did **visitors read the available information, but possibly consulted other online materials until closing the website completely.** It is reasonable to interpret that the key to this positive result is that KRAKEN obtained the support of the consortium partners to disseminate and promote the material displayed on the website.

Canales predeterminados	Adquisición		
	Sesiones ↓	% de nuevas sesiones	Usuarios nuevos
	12,07 % 9.530 frente a 10.838	19,97 % 94,50 % frente a 78,77 %	5,49 % 9.006 frente a 8.537
1. Direct	**34,94 %** 5.835 frente a 4.324	17,83 % 97,58 % frente a 82,82 %	59,01 % 5.694 frente a 3.581
2. Organic Search	**-56,81 %** 2.514 frente a 5.821	19,21 % 94,43 % frente a 79,21 %	-48,51 % 2.374 frente a 4.611

Table 7: Traffic sources Y3 direct vs organic

Table 7 shows how the number of sessions opened from direct sources other than social media, media or campaigns has increased (34,94%), which is another positive result, but in organic searches (meaning that KRAKEN was one of the first results for any query) there has been a decrease.

Canales predeterminados	Adquisición		
	Sesiones	% de nuevas sesiones	Usuarios nuevos
	10,04 % 20.093 frente a 22.335	23,77 % 93,94 % frente a 75,90 %	11,35 % 18.876 frente a 16.952
1. Direct	**56,90 %** 12.853 frente a 8.192	16,95 % 96,75 % frente a 82,73 %	83,49 % 12.435 frente a 6.777
2. Organic Search	**-58,20 %** 5.157 frente a 12.337	21,22 % 92,73 % frente a 76,49 %	-49,33 % 4.782 frente a 9.437

Table 8: Traffic sources total project direct vs organic

As can be seen in Table 8, over the course of the project, the number of sessions opened from **direct sources has increased by 56.90%.** This is a good closing indicator that confirms that KRAKEN was one of the first results on the web when queries related to the project or similar topics and terms were made.

To better understand the performance of the website in the Y3, figures from Y2 (Table 9) and the current year (Table 10) are included. The values show which pages were the most visited, the variations and which were preferred by visitors in the last 12 months and throughout the project, demonstrating that the strategies implemented succeeded in improving the website's KPIs.

Page	Page Views	Unique Page Views	Avg. Time on Page
	18,903 % of Total: 100.00% (18,903)	15,046 % of Total: 100.00% (15,046)	00:00:54 Avg for View: 00:00:54 (0.00%)
1. /	**4,328** (22.90%)	3,547 (23.57%)	00:01:14
2. /the_project/overview	**1,601** (8.47%)	1,483 (9.86%)	00:01:08
3. /the_project/consortium	**838** (4.43%)	798 (5.30%)	00:01:13
4. /advanced-uav-it-services	**818** (4.33%)	542 (3.60%)	00:00:30
5. /news_and_events	**721** (3.81%)	539 (3.58%)	00:00:33
6. /blog	**568** (3.00%)	391 (2.60%)	00:00:44
7. /estilo-2-style-2	**472** (2.50%)	11 (0.07%)	00:00:33
8. /pilots/health	**443** (2.34%)	415 (2.76%)	00:01:01
9. /resources/publications	**411** (2.17%)	332 (2.21%)	00:00:13
10. /the_project/objectives	**401** (2.12%)	383 (2.55%)	00:01:24

Table 9: Most visited pages Y2

|

Página	Vistas de una página	Número de vistas de página únicas	Promedio de tiempo en la página
	30.582 % del total: 100,00 % (30.582)	25.543 % del total: 100,00 % (25.543)	00:00:58 Media de la vista: 00:00:58 (0,00 %)
1. /	**6.760** (22,10 %)	5.838 (22,86 %)	00:01:12
2. /the_project/overview	**2.438** (7,97 %)	2.284 (8,94 %)	00:00:58
3. /advanced-uav-it-services	**1.386** (4,53 %)	1.105 (4,33 %)	00:00:29
4. /the_project/consortium	**1.120** (3,66 %)	1.075 (4,21 %)	00:01:25
5. /news_and_events	**1.072** (3,51 %)	837 (3,28 %)	00:00:27
6. /resources/work-package-deliverables	**850** (2,78 %)	728 (2,85 %)	00:00:35
7. /blog	**837** (2,74 %)	589 (2,31 %)	00:00:46
8. /pilots/health	**639** (2,09 %)	603 (2,36 %)	00:01:37
9. /resources/publications	**603** (1,97 %)	445 (1,74 %)	00:00:20
10. /i-fly-marketplace	**601** (1,97 %)	585 (2,29 %)	00:00:49

Table 10: Most visited pages Y3

The project overview (00:58), the consortium (1:25) and the health pilot (1:37) were the pages that kept users' attention for the longest time in the last year. The latter two remained among the pages that attracted the most attention from users since the previous year.

2.2.1 KRAKEN website updates

KRAKEN enriched the user experience with interactive and proactive content. The website was constantly updated thanks to the development of infographics corresponding to each use case, the demo videos of each of the pilots and the recruiter campaign for engaging testing users, that ran until September 2022.

The infographics were created for each use case in order to break down the information for each of them and make it much easier to digest for our stakeholders (e.g., Figure 9 for use case 1 and Figure 10 for use case 5).

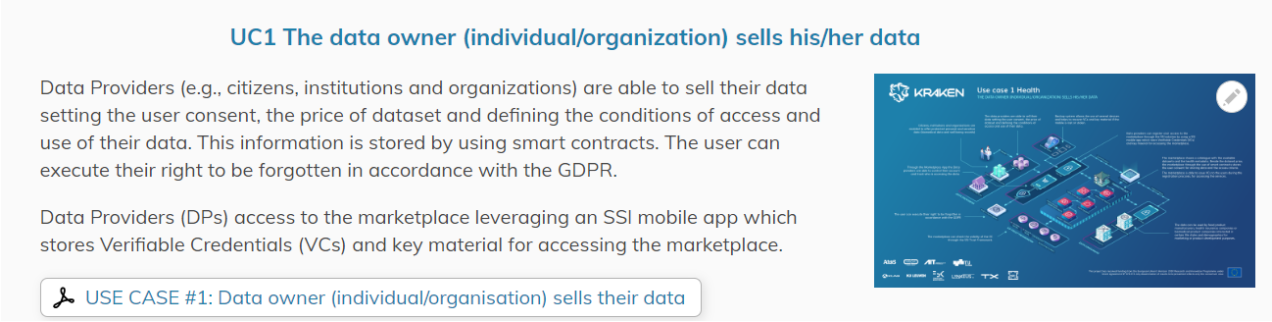


Figure 9: Infographics by use cases

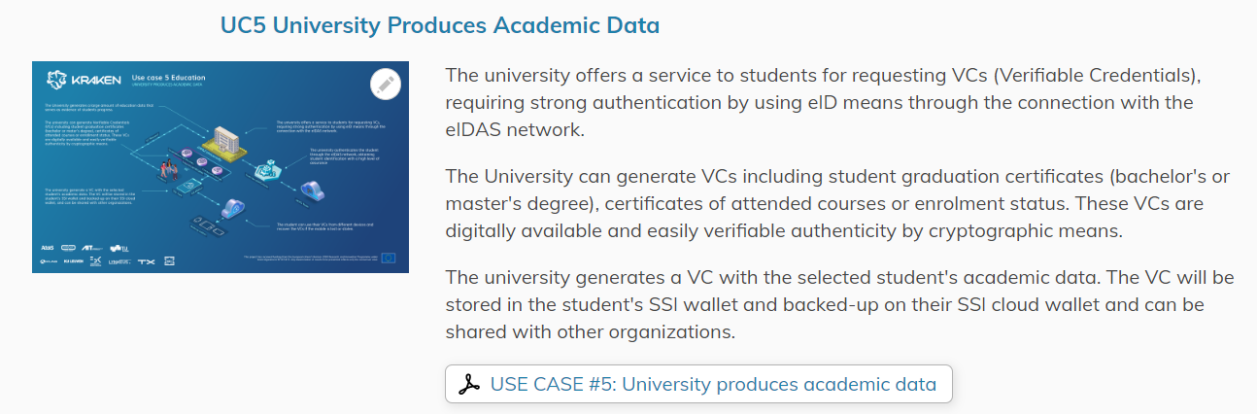


Figure 10: Infographics by use cases

The demo videos were recorded to verify and let users and target audience know that the pilots are, actually, achieving their initial objectives and to show the continuous work that is being done in the project to meet the needs of our customers (e.g., Figure 11 for use cases 5 and 6).

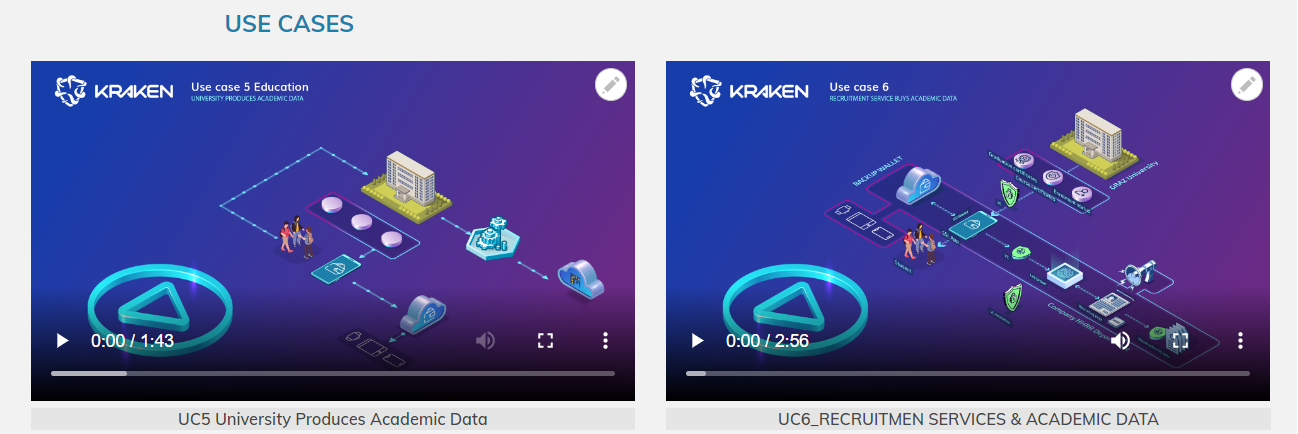


Figure 11: Video demo by use case

In addition, the call for recruiters' campaign (Figure 12) continued and ended in fall 2022. The results of the second evaluation round involved 30 people representing key target user groups in the healthcare domain (e.g., digital health researchers, blockchain and big data experts, project managers, and legal experts) and 5 students from the Technical University of Graz evaluating the KRAKEN solution for the education domain.

The results were positive for the project and the sustainability of the project from now on. More information will be provided within this report.

Figure 12: Recruiters' campaign

During Y2, a new section "Liaisons" was added to the project website with information about **external collaborations and cooperation initiatives (**Figure 13**)**, visible on the homepage, which also includes information about the advisory board, and during Y3 the networks increased significantly (achieving 11 liaisons among projects and collaborations with organizations).

We can mention several research projects such as Open Dei, Cybersec4Europe, Infinitech, and DE4A, among others. In terms of co-operations, in addition to BDVA since last year, we can include OASCities and Smart Cities Marketplace.

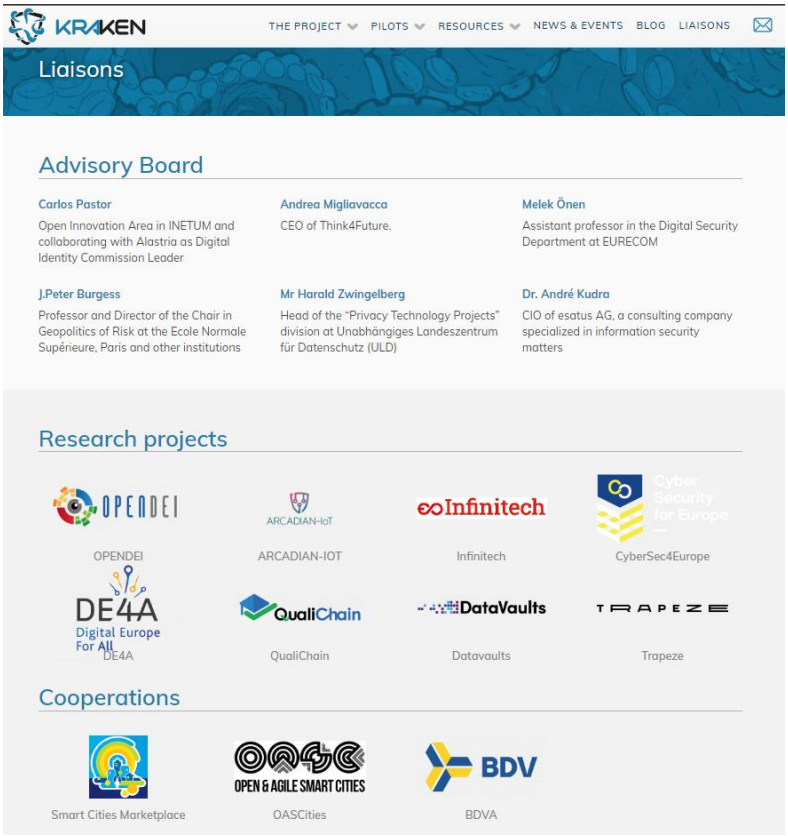


Figure 13: Liaisons section

In addition, the newsletter subscription button (Figure 14) was kept throughout Y3, as well as the web-based survey form (Figure 15) to find out the interests of potential users and stakeholders who would like to be part of the final phase of the project.

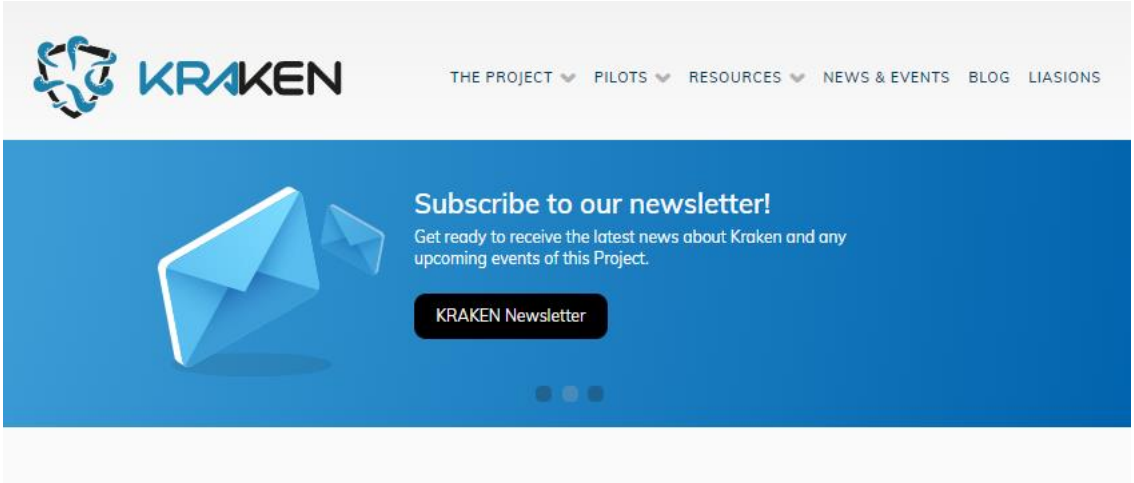


Figure 14: Call to action to subscribe on the web's main page

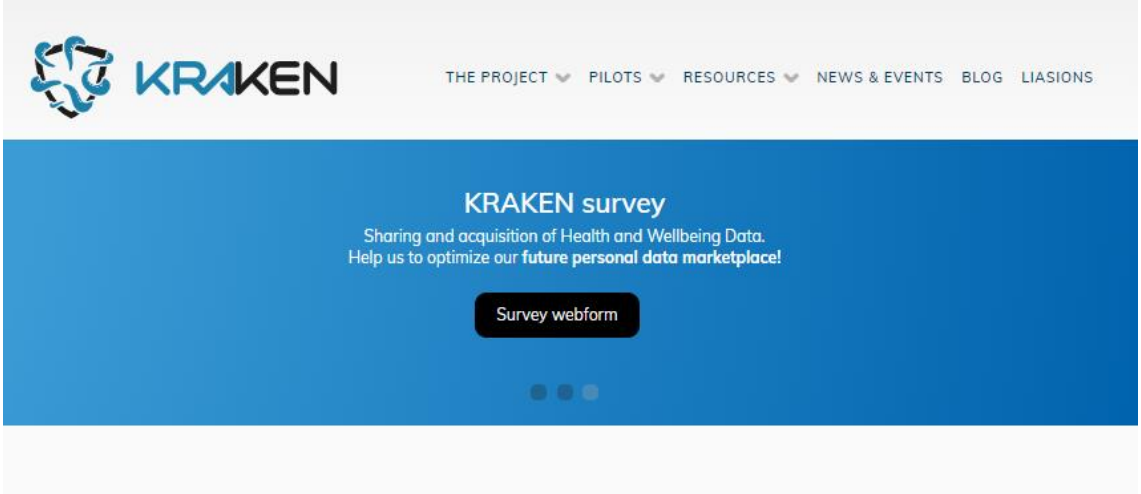


Figure 15: Call to action to KRAKEN's survey

2.3 Social Networks

In the third year there were three strands of social media work:

1. LinkedIn campaign to highlight pilots' relevant information and news and thus attract stakeholders and partnerships.
2. Twitter campaign to highlight pilots' relevant information and news and thus engage citizens, communities and users.
3. Twitter + LinkedIn campaigns in October 2022 to attract a broad audience of all types of profiles, but mostly technical and professional.

The frequency of the posts was as indicated below:

- Five to seven posts per week on LinkedIn.
- Five to seven posts per week on Twitter.

Table 11 depicts the summary of KRAKEN's presence on social networks showing that the **campaigns carried out to disseminate what KRAKEN is and its objectives, the promotion of events in which we participated, the publication of articles and the joint work with some partners were of great interest to our users** and managed to generate a positive impact and interest in our target audience.

In October 2022, for example, a cyber security campaign was launched on both social networks to raise awareness and provide advice on the importance of cyber security. It focused on providing relevant information to users to educate our audience on terminology and prevention.

	Twitter imoressions	Twitter Engagement rate	LinkedIn impressions	LinkedIn Engagement rate
M24 = NOV 2021	10,500	3,8%	1149	35
M25 = DEC 2021	5,717	4%	3680	32
M26 = JAN 2022	3,496	3,4%	1534	38
M27 = FEB 2022	6,934	6,5%	2517	43
M28 = MAR 2022	4,818	4,3%	614	27
M29 = APRIL 2022	2,488	3,7%	1139	34
M30 = MAY 2022	3,551	4,2%	1263	19
M31 = JUNE 2022	3,259	4,7%	684	21
M32 = JULY 2022	1,310	4%	850	53
M33 = AUG 2022	1,954	5,2%	1529	15
M34 = SEP 2022	3,571	7,7%	1282	7
M35 = OCT 2022	4,006	4,2%	1690	7

Table 11: Social media overview

Each of the social networks has a different audience and what works on Twitter does not always work on LinkedIn.

2.3.1 Twitter

Twitter Performance in Impressions and engagement' provides a broad overview of KRAKEN's performance on Twitter over the past 12 months, with **peaks in February 2022 (M27)** highlighting KRAKEN's First Market Test and Validation Report **and September 2022 (M34)** highlighting the cybersecurity campaign (Figure 16). Another milestone worth noting is that, although the number of impressions in August 2022 (M33) was low, there has been a pronounced increase in the engagement rate on Twitter, at **almost 5.2%** and above several previously shared content on this social media platform, it is important to note that this percentage was achieved in the summer season.

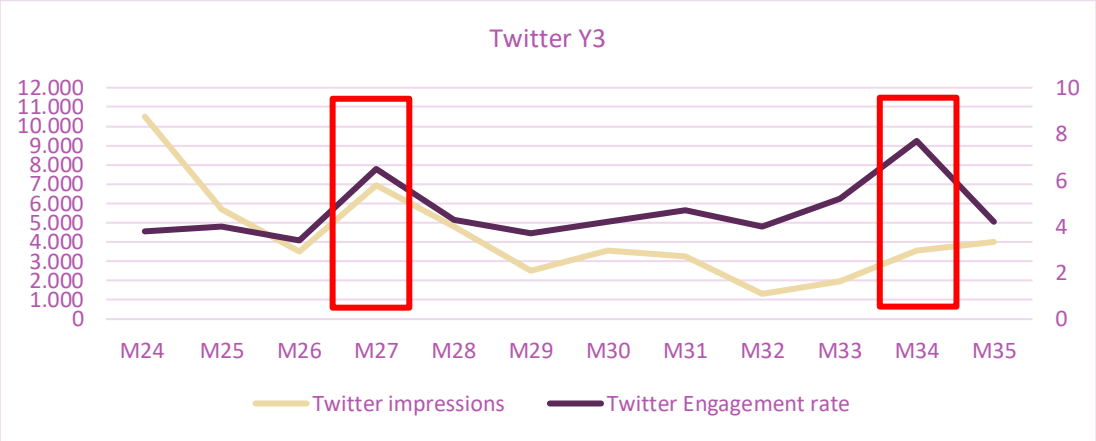


Figure 16: Twitter Performance on Impressions & Engagement

Figure 17 shows an example of the KRAKEN tweet.

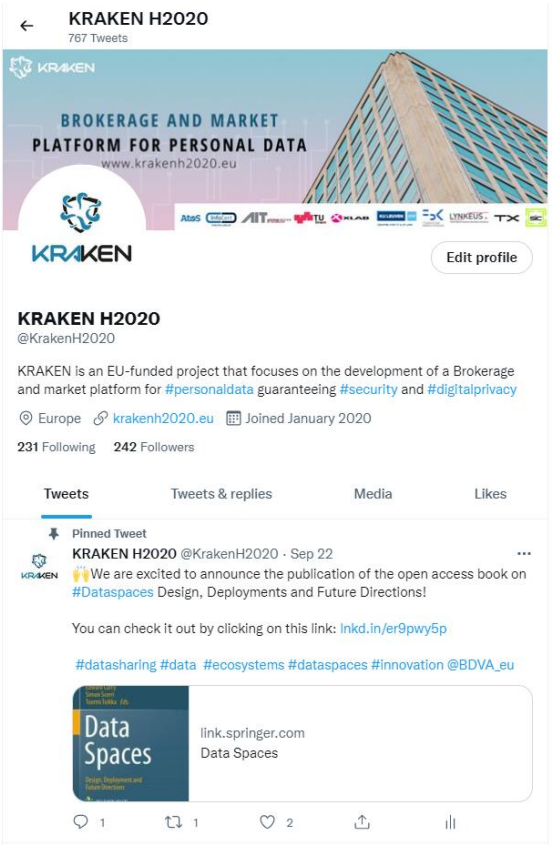


Figure 17: KRAKEN's Twit

The contribution of ARI Marcomm, the communications department of the Atos research and innovation centre, also helped to amplify the message, spread news about the project online and increase user engagement (Figure 18 and Figure 19).

Figure 18: contribution of ARI Marcomm, Atos Research & Innovation

Figure 19: contribution of ARI Marcomm, Atos Research & Innovation II

Figure 20 depicts the top tweets in September 2022.

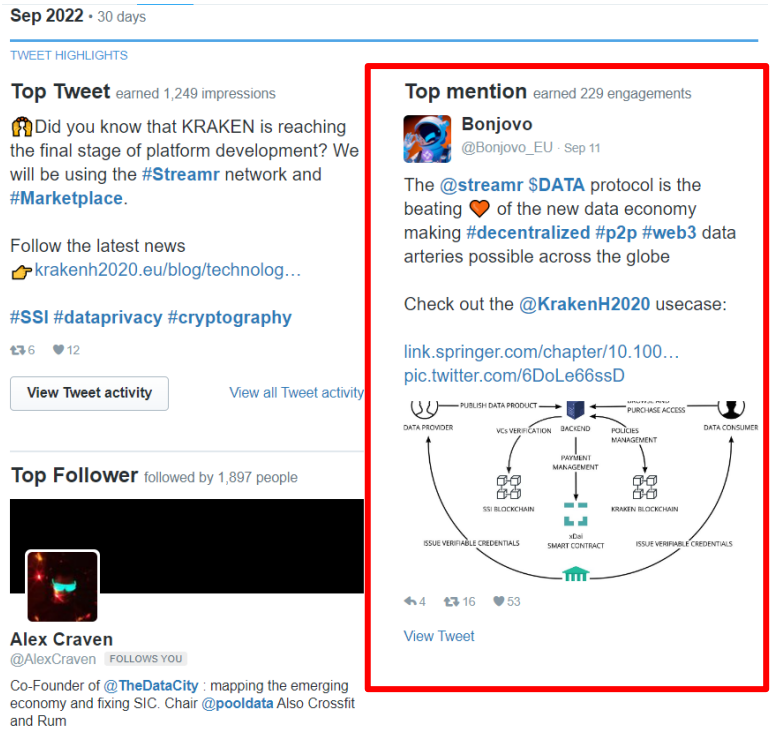


Figure 20: Top Tweets in September 2022

It is important to highlight the interaction with many of our users. They took the initiative to share our information (Figure 20: Top Tweets in September 2022), for example by disseminating the infographics produced for each of the use cases.

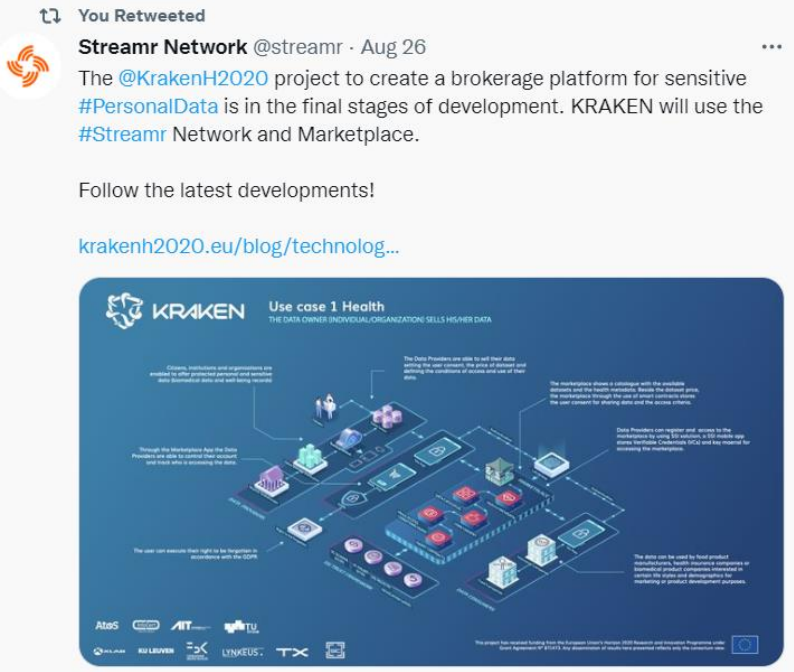


Figure 21: User share KRAKEN information

KRAKEN's **communications style and format have been adapted to Twitter by actively using visual language** (Figure 22) **and images** to capture the attention of users in their timeline, as well as mentioning key profiles that are related to the project or topics that may be of interest to their followers.

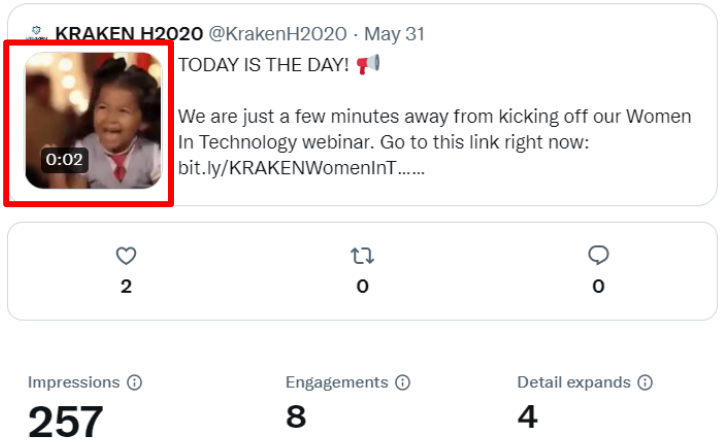


Figure 22: Webinar promotion on Twitter with an attractive message and calls to action

Mentions of other accounts (Figure 23) that could be a good ally for KRAKEN were used to generate collaborations and more engagement and interaction in our publications.

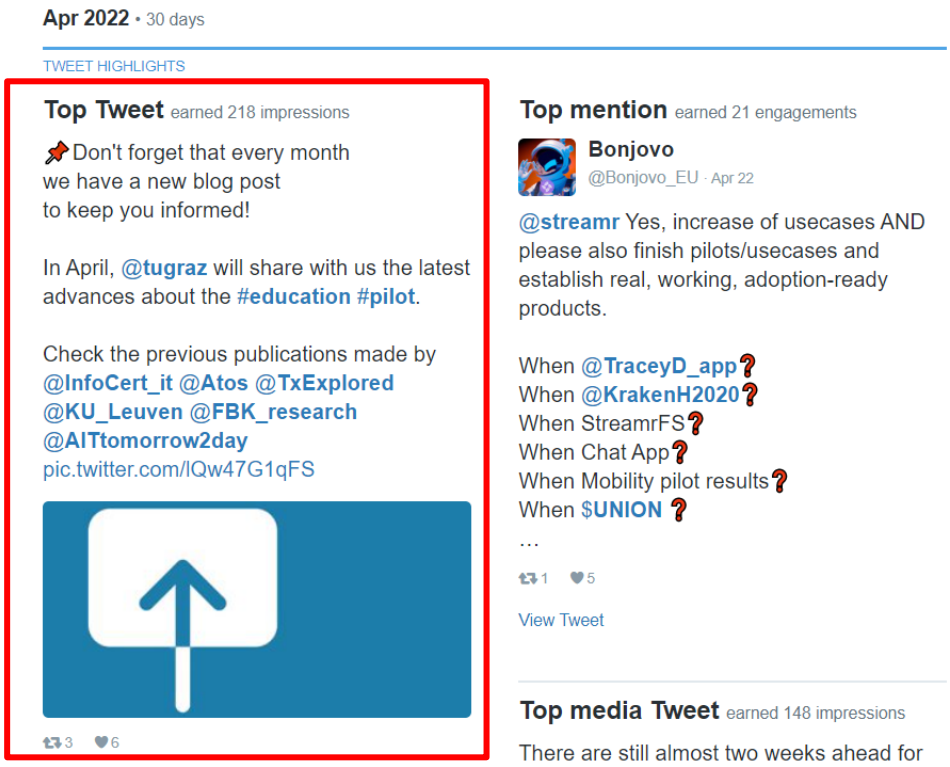


Figure 23: Promotion blog posts mentioning our partners

The use of key hashtags (Figure 24) also boosted the impact of the tweets on social networks. This strategy was implemented from the beginning of the project and maintained during the last year, achieving good results (more interaction and followers).

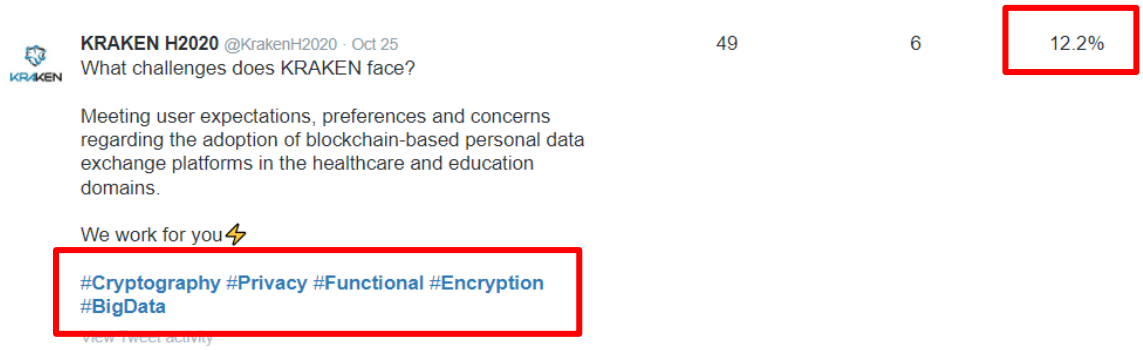


Figure 24: Tweet from October 25th, 20212

Over M24-M35 there is another key to measure KRAKEN's Twitter performance, as some followers can open to more spaces for future alliances and collaborations (Figure 25):

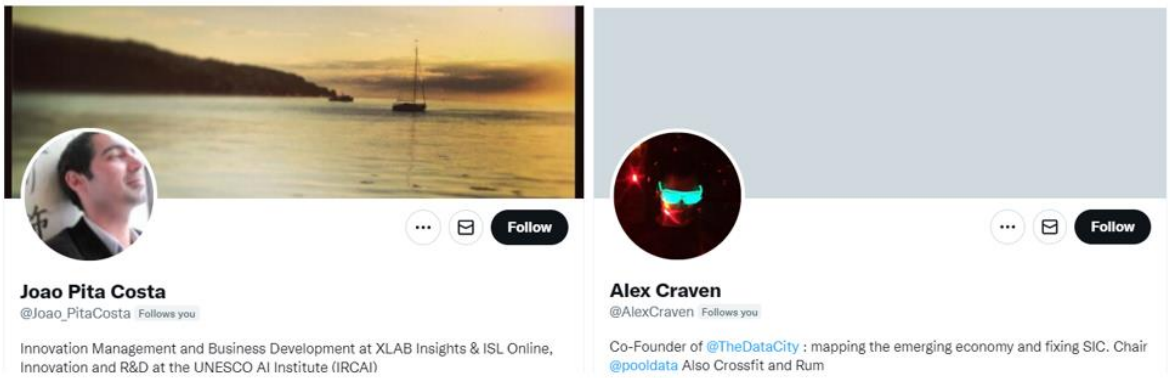


Figure 25: Top followers on Kraken's Twitter profile

2.3.2 LinkedIn

Next, we will take a closer look at LinkedIn, the second social network in the project (Figure 26).

Figure 26: KRAKEN's LinkedIn Profile

2.3.2.1 Overall LinkedIn performance

In Y1, LinkedIn had a discreet presence due to the more professional and formal communication on this platform. In Y2, as the project progressed in its core values and with more content to attract attention, it managed to attract more users interested in the project.

Finally, in Y3, in the final stretch of the project, it can be stated that the **values have significantly increased thanks to the content that was planned and disseminated to capture the attention of our target audience** (Figure 27). In December there was a significant peak due to the promotion of the workshop of the recorded session of the European Big Data Value Forum.

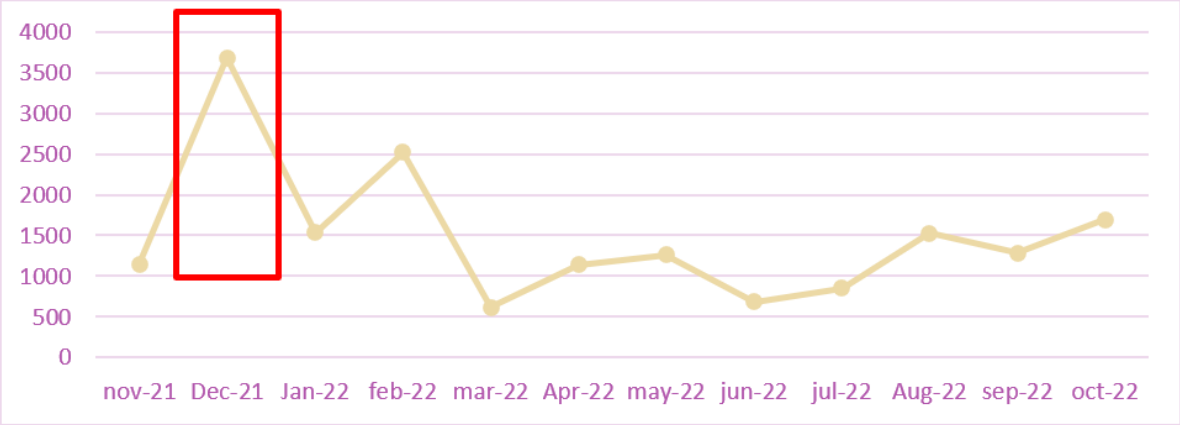


Figure 27: LinkedIn impressions performance in Y3

As can be observed in Figure 27: LinkedIn impressions performance in Y3 the summer has had an impact on LinkedIn impressions due to the holiday season. In September and October 2022, activity returned to normal levels even exceeding previous data with a clear increase.

Although KRAKEN has had a strong overall performance on LinkedIn, the interaction rate declined in March 2022 compared to previous months. However, after this decline, a high interaction rate was generated in the following months, except June which was the holiday season (Figure 28).

Figure 28: Interaction Rate M24-M35

A curious fact is that the number of followers on LinkedIn has had a considerable increase in summer, more precisely in the month of July 2022(Figure 29). **During the last year, KRAKEN managed to gain 145 new followers.**

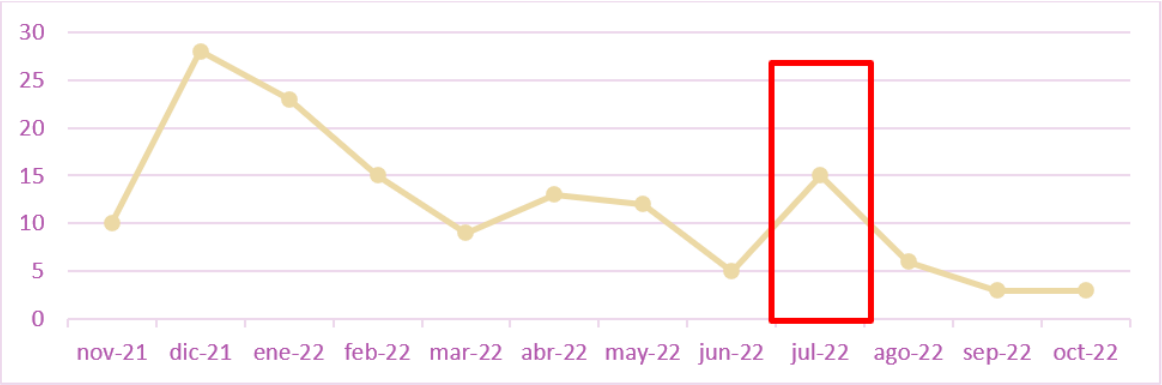


Figure 29: LinkedIn followers Y3

In terms of nationalities or locations of LinkedIn followers, there is a **predominance of those from the Helsinki area** (Figure 30), maintaining the pattern of the previous year.

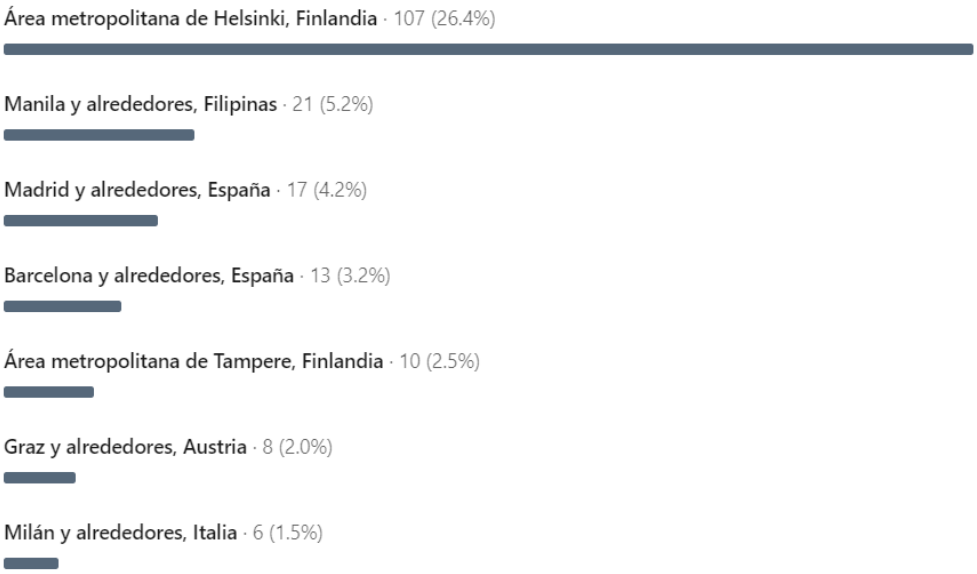


Figure 30: LinkedIn followers' locations

2.3.2.2 LinkedIn's top results

Going into more detailed results on LinkedIn, there were consistent results in this period, especially in the posts that have to do with new blog publications (partner contributions), the second press release, the promotion of the webinar *"Women in Technology behind data-sharing, privacy preservation and SSI"* and the article published in the journal Applied Sciences: *"Multidimensional study on the evaluation of users of the KRAKEN personal data exchange platform"* (**Figure 31**. These were the posts with the highest interaction rate.

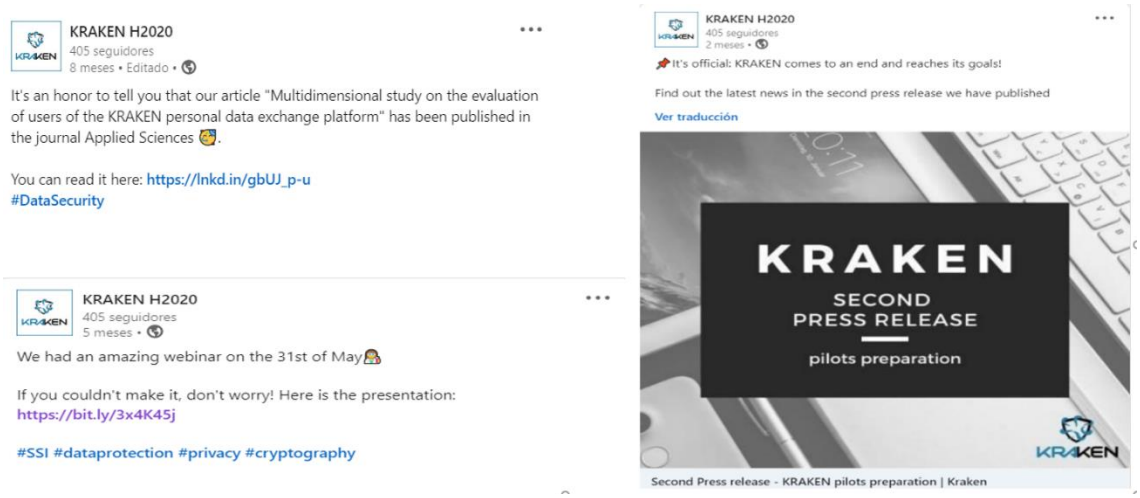


Figure 31: LinkedIn posts

Another LinkedIn campaign that had an impact was *"It's time to review! Who are KRAKEN's partners*?" (**Figure 32**) which alludes to remembering who are the partners that are part of the project and what they do in their respective sectors. In this case, the mention of our partner and the use of hashtags was key to achieving a high level of interaction around **4.5% interaction rate**.

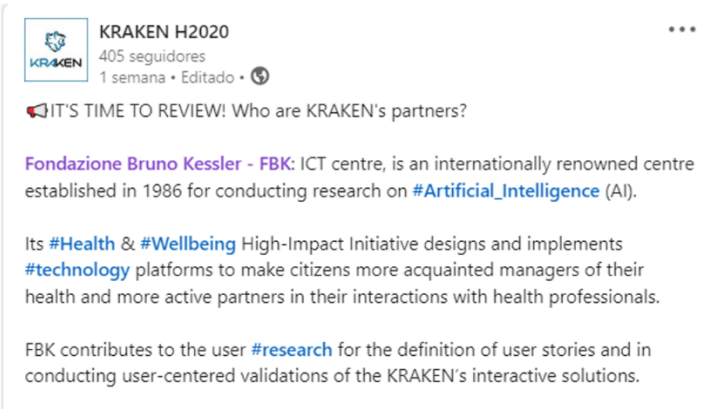


Figure 32: Posts that had the highest interaction rate

As well as the dissemination of infographics that were created to give more detail about each use case (Figure 33). In this case, a **12.5% interaction rate** was achieved.

Figure 33: LinkedIn post

These interaction rate percentages are the result of comments, reactions, shares, new followers, recommendations, and clicks divided by impressions. This was a resource used during Y3 to generate a high number of clicks to redirect social media users to the KRAKEN website.

2.4 Non-scientific technical publications

KRAKEN published regular and continuous blog posts, as well as news about participations and events, project updates and graphic material.

2.4.1 Blog

The blog section was central to this Y3, constantly updated with input from partners to let our users know about the project phases and latest developments.

The Table 12 shows the contents that have been published on a scheduled basis have a green icon. The following table details the final scientific publications.

YEAR	MONTH	PARTNER	TOPIC
2020	Jun	ATOS	Data protection in COVID times
2020	Jul	ICERT	Healthcare challenge in COVID times
2020	Aug	TX	Pharmaceutical Data Economies
2020	Oct	KUL	Legal framework in COVID times (series or articles published during the month)
2020	Dec	TX	Blockchain & SSI (podcast)
2021	Feb	FBK	Data protection conversation on Social Networks
2021	Apr	AIT	Cryptohraphy*
2021	Jun	SIC	Merketplace
2022	May	TUG	Educaction pilot
2022	Jul	XLAB	Privacy preserving analytics
2022	Aug	TX	Technology Exploration 'Backend/Fronted Development
2022	Sep	ICERT	Progress on exploitation and sustainability
2022	Sep	KUL	Ethical and legal aspects
2022	Nov	FBK	Second round on evaluation results
2022	Nov	Lynkeus	Health pilot
2022	Nov	ATOS	KRAKEN Innovations

Table 12: Post publications schedule Y3

The final non-scientific publications are listed in the following Table 13:

	YEAR	PARTNER	TOPIC
M7 = JUNE 2020	2020	Atos	Data protection and digital privacy in the age of the coronavirus'
M8 = JULY 2020	2020	INFOCERT S.p.A.	The healthcare challenge: balancing data security & sharing'
M9 = AUG 2020	2020	TX Technology Exploration	Pharmaceutical Data Economies and KRAKEN platform'
TOTAL Y1	**3**		
M11 = OCT 2020	2020	KU Leuven Centre for IP & IT Law	Privacy and data protection aspects of COVID-19 tracing and warning apps' Chapter I
			Privacy and data protection aspects of COVID-19 tracing and warning apps' - Chapter 2
M12 = NOV 2020	2020	TX Technology Exploration	TX Podcast: Developing a marketplace for health and education data with Atos
M14 = JAN 2021	2021	TX Technology Exploration	Recap of the year 2020 in KRAKEN

	YEAR	PARTNER	TOPIC
M15 = FEB 2021	2021	Fondazione Bruno Kessler	The design challenge: key drivers of consumers' adoption of data sharing platforms
M17 = APRIL 2021	2021	AIT	Secure computation on sensitive data in KRAKEN
M19 = JUNE 2021	2021	TX Technology Exploration	Making personal data accessible while strictly private - Design challenges in the KRAKEN project
M21 = AUG 2021	2020	KU Leuven Centre for IP & IT Law	Privacy and data protection aspects of COVID-19 tracing and warning apps' - Chapter 3
TOTAL Y2	**8**		
M25 = DEC 2021	2021	Fondazione Bruno Kessler	KRAKEN's first user's evaluation results
M26 = JAN 2022	2022	AIT	Increasing Privacy for Emerging Identity Management Models
M27 = FEB 2022	2022	SIC	Secure implementation of cryptographic components
M28 = MAR 2022	2022	LYNKEUS	Health pilot status
M29 = APRIL 2022	2022	TUG	Education pilot status
M30 = MAY 2022	2022	XLAB	Privacy-preserving analytics
M31 = JUNE 2022	2022	ICERT	Progress on exploitation and sustainability
M32 = JULY 2022	2022	TX Technology Exploration	Backend/Fronted Development
M34 = SEP 2022	2022	KUL	The KRAKEN marketplace and the Digital Services Act
M35 = OCT 2022	2022	Fondazione Bruno Kessler	The second round on evaluation results
M36 = NOV 2022	2022	Atos	KRAKEN Innovations
TOTAL Y3	**11**		

Table 13: Published posts in Y3

Y3 set out to publish a new blog post each month with the collaboration of the partners. Each of the project partners took on a theme according to their role within the project and provided the necessary

context and information to give readers and KRAKEN stakeholders an overview of the situation, progress and findings that were developed.

2.5 Marketing material

During the Y3 the main effort has been focussed on the creation of infographics, video recordings of the use cases and process and the production of newsletters.

2.5.1 Infographics

Infographics for the seven use cases described in the KRAKEN project plan have been created for dissemination and graphic description for both Health (4 infographics) and Education (3 infographics) pilots (Figure 34 and Figure 35).

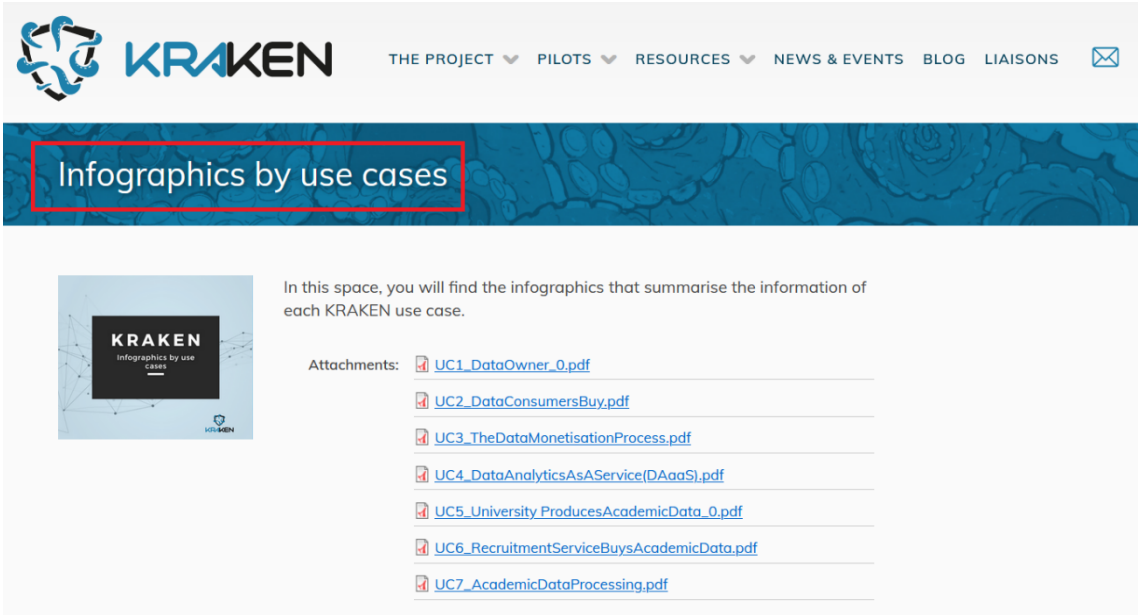


Figure 34: UCs' Infographics list

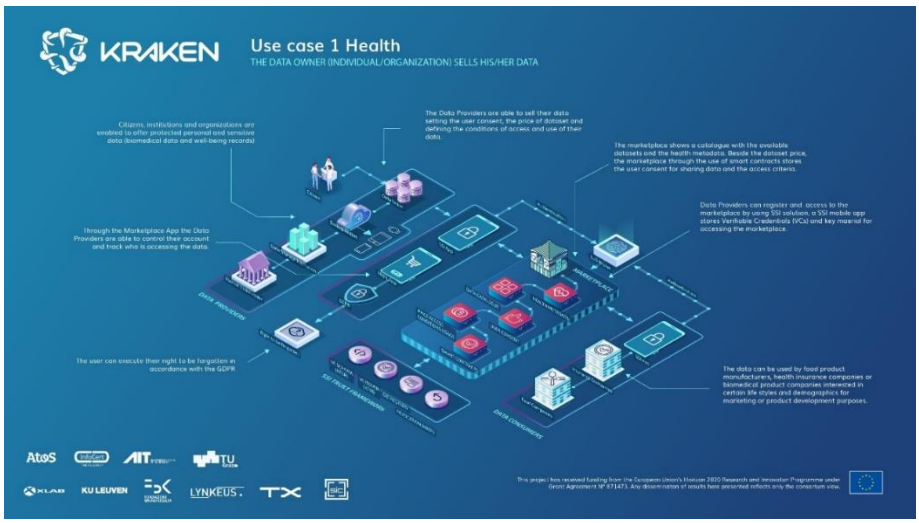


Figure 35: UC1 Infographic

This graphic material was promoted in different digital channels (Twitter, LinkedIn).

2.5.2 Demo Videos

During the test phase and validation of the KRAKEN platform, several videos showing the demonstration of the process related to the use cases and process designed for demonstrating the integration of the developed components during the KRAKEN lifetime, have been recorded. These demo/videos are placed in the Pilot's area for both pilot's Education and Health, on the KRAKEN web page (Figure 36). This visual material was promoted in different digital channels, as mentioned in previous sections:

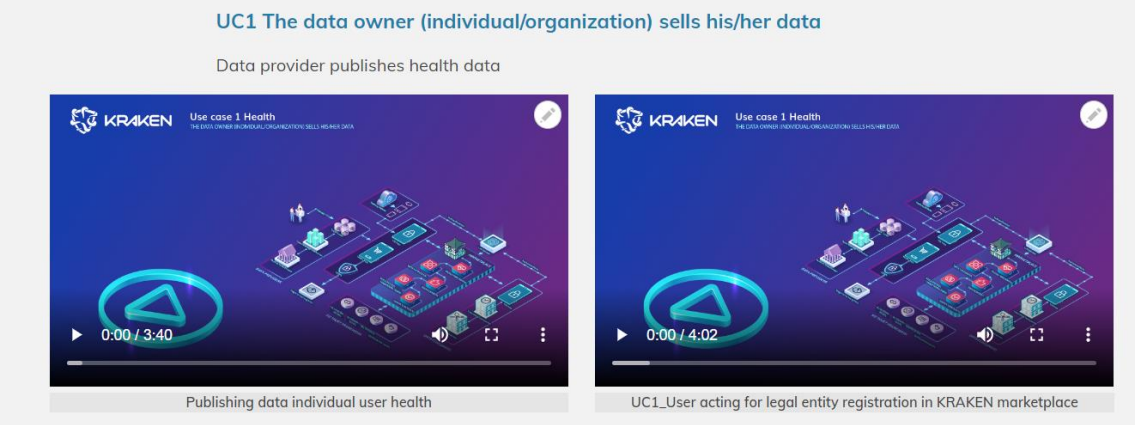


Figure 36: UCs' video demos

To boost marketing actions, KRAKEN's social media profiles pinned the most relevant posts to be the first to be consulted on its timeline and accounts. These posts were changed when deemed relevant.

2.5.3 Newsletter

KRAKEN published six newsletters overall (Figure 37 shows KRAKEN newsletter cover). There were times when the attention of digital users was lost, for example during the pandemic. As discussed in D6.7, it was decided to be more efficient and logical, spacing out the newsletter frequency to maximize its potential as valuable, targeted and limited content.

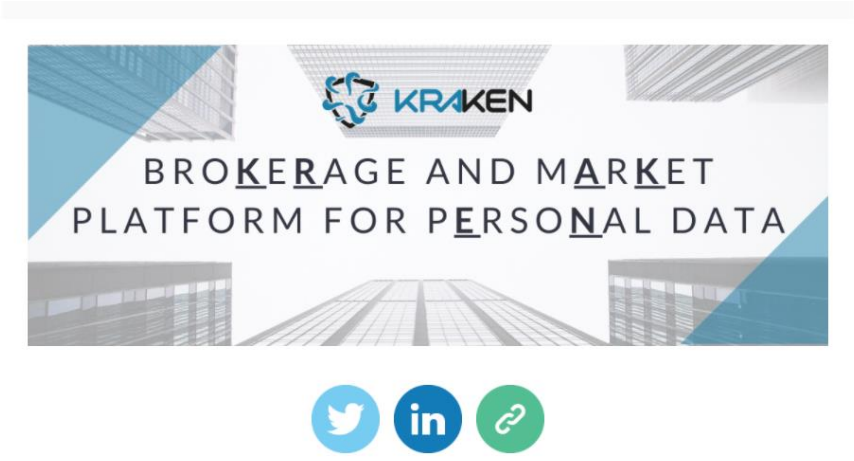


Figure 37: KRAKEN newsletter cover

KRAKEN's estimate is four newsletters until the end of the project:

- M25 Newsletter #3 Education Pilot Newsletter progresses.

- M31: Newsletter #4 Health Pilot Newsletter moves forward.
- M34: Newsletter #5 Newsletter Special edition focusing on Cybersecurity Awareness Month.
- M35: Newsletter #6 Newsletter Recap of Kraken's achievements and milestones.

The structure of the newsletter (Figure 38) is:

- Overview: A summary of the latest advances.
- KRAKEN's pillars: Self–sovereign identity.
- Education pilot.
- Communication & dissemination of material.
- Publications.

Figure 38: Newsletter table of content

To engage with the audience, **KRAKEN's newsletter includes visual material helping to understand its content** as it involves technical details (Figure 39):

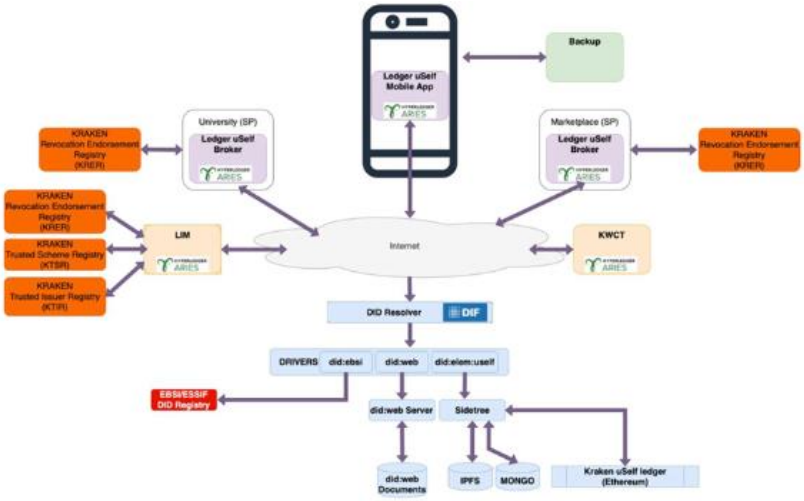


Figure 39: Newsletter's Self-sovereign Identity (SSI)

During the last year of the project the **newsletter was sent to 18,507 emails**, with the following data (Figure 40):

- **Open rate 30.4%** (decreased by 0.4% compared to Y2).
- **Total opens 11.977** (increased by 3.7% compared to Y2).
- **Click-through rate 31.7%** (increased by 10.9% compared to Y2).
- **Total clicks 5.872** (up 5.4 %compared to Y2).

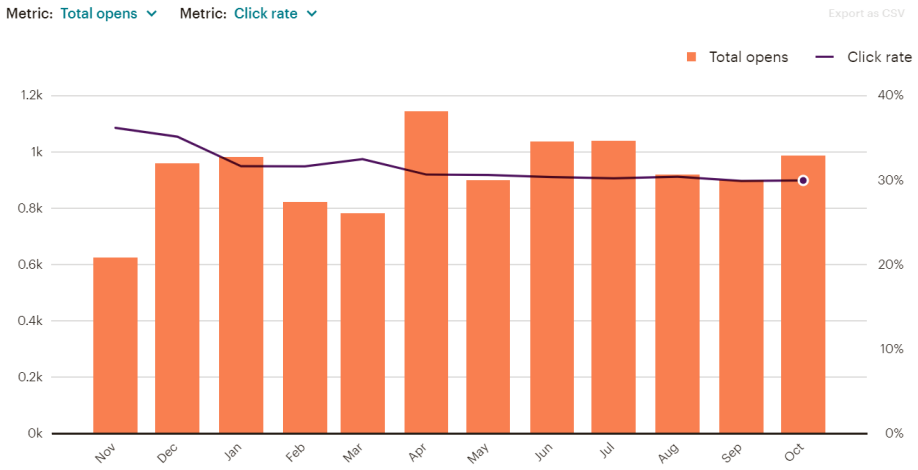


Figure 40: Total open VS click rate

The open rate indicates how many campaigns were delivered and opened by subscribers, while the click-through rate indicates how many campaigns were delivered and registered with at least one click (Figure 41).

We can deduce that the click-through rate is high compared to the number of delivered campaigns and the total open rate. We could say that a large number of our subscribers receive and open the newsletter to stay informed about what is going on in the project (Figure 41).

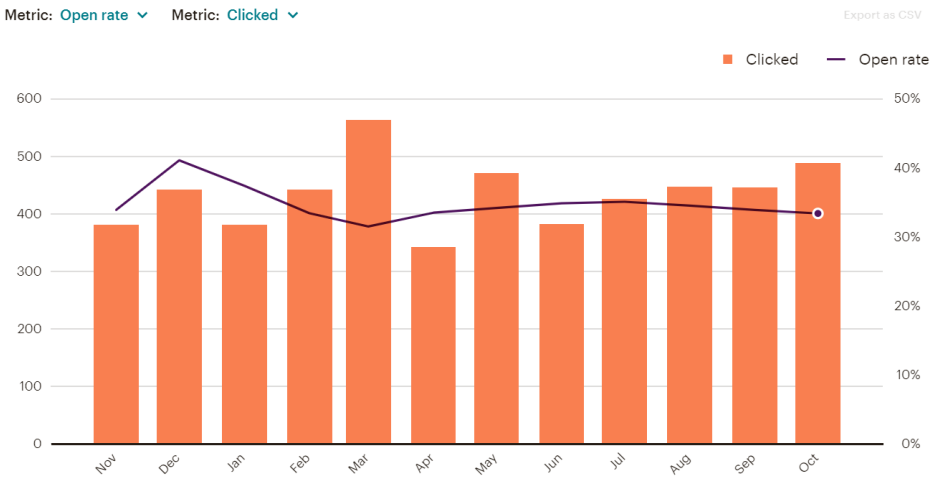


Figure 41: Open rate VS clicked

In terms of click-through and open rate, it can be affirmed that of all the subscribers, the vast majority click inside the newsletter to learn about the information that has been disseminated there. Each subscriber is interested and reads what is shared through this medium.

If the number of emails sent and the click-through rate range are taken into account, it is a good benchmark (Figure 42). It is high and indicates that users registered to the KRAKEN newsletter receive and log in to read the information.

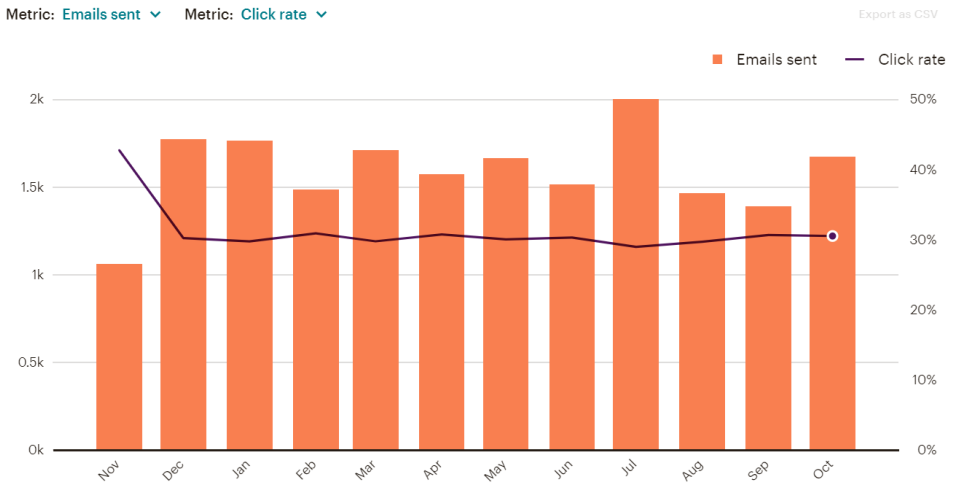


Figure 42: Email sent VS click rate

If we stop to analyse the opening rate and the total click-through rate, it can be seen that they are fairly even (Figure 43). It is a good indicator that, over the last year, users remained attentive and aware of the information offered through the newsletter.

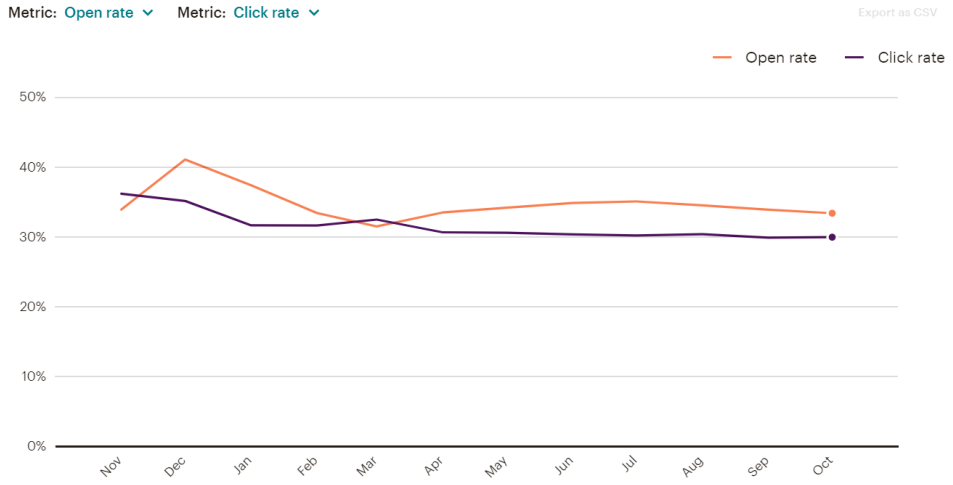


Figure 43: Open rate VS click rat

It should be noted that, due to changes in the design and analytics of the website, it was not possible to obtain more current data, such as a record of reader behaviour over the last 24 hours or the geographical location of subscribers.

In these latest newsletters, aspects such as events and workshops, but also crypto technologies and analytics were incorporated to inform subscribers about the latest developments, as well as the status of pilots, promotion of communication and dissemination material and the latest publications (Figure 44).

Figure 44: KRAKEN's newsletter Final Image

2.6 Events & workshops

Table 14 shows the events and workshops the KRAKEN partners attended during the life of the project.

	Industrial events		
	Date	**PARTNER**	**Title of the conference**
M5 = APRIL 2020	20/4/2020	AIT	The 3rd ZKPRoof Workshop, home edition
M6 = MAY 2020	20/05/2020	TX	HIMSS Europe Conference
	08/05/2020	Atos	Big Data PPP Personal Data Platforms: Empowering Citizens Leveraging their Data Power
M10 = SEP 2020	29/09/2020	LYNKEUS	Connect University Autumn School 2020
TOTAL Y1	**4**		
M11 = OCT 2020	21/10/2020	LYNKEUS	Atelier Blockchain pour la Santé
M12 = NOV 2020	11/11/2020	Atos	EBDVF 2020
	26/11/2020	Atos	Digital Show Atos
	09/11/2020 - 13/11/2020	AIT	ACM Conference on Computer and Communications Security (CCS)
	09/11/2020	AIT, TUG	CCSW 2020: The ACM Cloud Computing Security Workshop

	Industrial events		
	Date	**PARTNER**	**Title of the conference**
	27/11/2020	TUG, ATOS	Webinar on project synergies
M16 = MAR 2021	01-05/03/2021	AIT	Financial Crypto 2021
M19 = JUNE 2021	01-02/06/2021	TUG	Open Identity Summit
	22-24/06/2021	TUG	IFIP Sec
M22 = SEP 2021	30/09/2021	AIT	FITCE Congress for ICT Professionals
M23 = OCT 2021	18/10/2021	AIT	ECSEL Austria Conference 2021
M24 - NOV 2021	11/29/2021	AIT, ATOS, FBK, LYNKEUS	EBDVF 2021
	23/11/2021	ATOS	Data Platform Projects (ICT-13): Workshop 1
	29/11/2021	AIT, ATOS, FBK, LYNKEUS	Workshop: KRAKEN. User engagement with privacy-preserving data sharing platforms: challenges and opportunities
TOTAL Y2	**14**		
M25 = DEC 2021	14/12/2021	ATOS	KRAKEN & TRAPEZE webinar
M27 = FEB 2022	01/02/2022	ATOS	ICT-13 and other Data Platform projects BDVA/DAIRO workshop
	01/02/2022	ATOS INFOCERT	BDVA Data Platform Projects (ICT-13): Workshop 2
	01/03/2022	ATOS	The Federation of Data markets and the Importance of Data Sharing in the EU – a TRUSTS event

	Industrial events		
	Date	**PARTNER**	**Title of the conference**
M28 = MAR 2022	18/03/2021	ATOS	BDVA/DAIRO Activity Group meeting (AG43): SESSION 3:
	04/03/2021	ATOS	BDVA/DAIRO Activity Group meeting (AG43): Standardissation activities
M29 = APR 2022	13-15/04/2022	AIT	Real World Crypto 2022
	22/04/2021	ATOS	BDVA/DAIRO: Activity Group AG44
M30 = MAY 2022	21/05/2022	ATOS, FBK, KULEUVEN	KRAKEN: Women in technology behind data-sharing , privacy preservation and Self-Sovereign identity
	31/05/2022	AIT, ATOS	BDVA DaTa Week 2022
M31 = JUN 2022	24/06/2022	ATOS	Contribution from BDV PPP projects, community members and collaboration partners to Data/AI Standards and European rolling plan for ICT standardisation 2023 (data and AI)
M33 = AUG 2022	23-28/08/2022	AIT, TUG	4th Workshop on Security, Privacy, and Identity Management in the Cloud (SECPID 2022)
M34 = SEP 2022	22/09/2022	ATOS	Webinar: Dealing with Data Spaces. Security in dataspaces, KRAKEN use case

	Industrial events		
	Date	PARTNER	Title of the conference
M36 = NOV 2022	22/09/2022	ATOS	European BDV Forum 2022 Lessons learnt from Data Platforms projects: KRAKEN case
TOTAL Y3	**14**		
TOTAL	**32**		

Table 14: Industrial Events

Given the circumstances and the post-pandemic, most of the events took place online. KRAKEN has exceeded its estimates and has had an active and successful participation in many activities.

To mention a few events:

KRAKEN collaborated with FIWARE Foundation, IDSA and EUHubs4Data. KRAKEN was presented with Big Data Value Association (BDVA) as a link to engage with the European Federation of Data-Driven Innovation Centres on 23 November 2021. The project was also presented to organisations such as key speakers from Siemens and the Politecnico di Torino University. Some relevant topics were discussed during the meeting, such as the maturity level of the technology used in the deployment, the level of interoperability and the coordination of collaborations to achieve the objectives and overcome the challenges ahead for KRAKEN.

It is important to highlight the new partnerships that were generated, for example, KRAKEN and TRAPEZE begin to collaborate. The two projects worked together in December 2021 to brainstorm on synergy points regarding the privacy-enhancing semantic blockchain platform, the linked data paradigm, the data Marketplace and its best practices from the Data Intelligence Hub and how to empower citizens to reuse their personal information online in different domains and finally the realisation of sovereign identity principles.

On the other hand, in May 2022, a webinar was organized by Atos, in which KRAKEN gave visibility to women's technical domains, with the aim to mitigate the gender imbalance. The focus of the event was to highlight the work of women in technology behind data sharing, privacy preservation and SSI. Participants were project partners and professionals from outside the project. You can access to the recording visiting the web page here.

Additionally, the webinar "Dealing with Data Spaces. Security in dataspaces, KRAKEN use case" was held on 22 September. ATOS as project coordinator presented some security aspects covered by KRAKEN project to the data spaced, in the framework of the OPENDEI project in collaboration with IDSA. Topics related to security, data governance, environment and interoperability and the added value of dataspaces were presented.

Finally, the KRAKEN project as part of the Data Platform projects funded by the H2020-ICT-13, has been invited to the European Big Data Value Forum 2022. ATOS as project coordinator presented the main outcomes achieved during the last 3 years of project. The presentation was held on 22nd November under the “Lessons learnt from Data Platforms projects” session. The aim of the whole session was to transfer of knowledge and developed assets from the Data Platform projects (including KRAKEN) to the current Data Spaces Programme[1].

[1] https://european-big-data-value-forum.eu/2022-edition/programme/

2.7 Partners' contributions

Atos Research & Innovation

Atos has contributed to KRAKEN project activities during Y3 with support from its social media presence and website as listed in the below Table 15.

Communication activities			
Medium	**URL**	**Type**	**Title**
ARI Twitter	https://twitter.com/ARI_Atos/status/1507355915732795397	Social media	Promote article "Multidimensional study on the evaluation of users of the KRAKEN personal data exchange platform"
	https://twitter.com/ARI_Atos/status/1511680872201670656		
	https://twitter.com/ARI_Atos/status/1554763421123575808		Blog contribution
	https://twitter.com/ARI_Atos/status/1573213576952614912		Paper dissemination
	https://twitter.com/ARI_Atos/status/1573313737200500738		Paper dissemination
ARI Newsletter	Internal link	Newsletter	KRAKEN in Applied Sciences magazine
			KRAKEN and women in technology
			KRAKEN was present at BDVA Data Week 2022
			KRAKEN reaches its final stage.
			"Dataspaces: Design, Deployment and Future Directions"

Table 15: ARI's contributions

Moreover, **the Twitter profile of Atos Research and Innovation provided continuous support** by sharing content and retweeting KRAKEN's Twitter account (Figure 45: Twitter support from ARI-Marcomm and Figure 46: Twitter support from ARI-Marcomm).

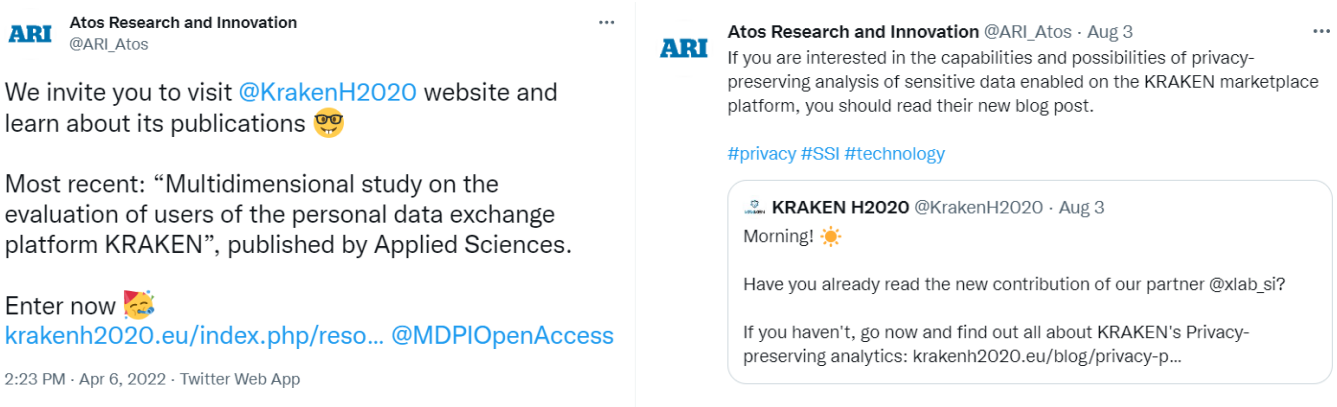


Figure 45: Twitter support from ARI-Marcomm

Figure 46: Twitter support from ARI-Marcomm

TUG – Graz University of Technology

TUG has published on the TUG web site the description of the KRAKEN project and the research outputs and activities performed in the context of the project (Table 16 and Figure 47).

Communication activities			
Medium	**URL**	**Type**	**Title**
TUG web page	https://graz.pure.elsevier.com/en/projects/eu-kraken-brokerage-and-market-platform-for-personal-data	Web page	Promote KRAKEN project, outcomes and activities performed
	https://www.tugraz.at/fileadmin/user_upload/Fakultaeten/INFBIO/Images/news/newsletter_archive/2020/20-29_CSBME_Newsletter_20200811.html		

Table 16: TUG's contributions

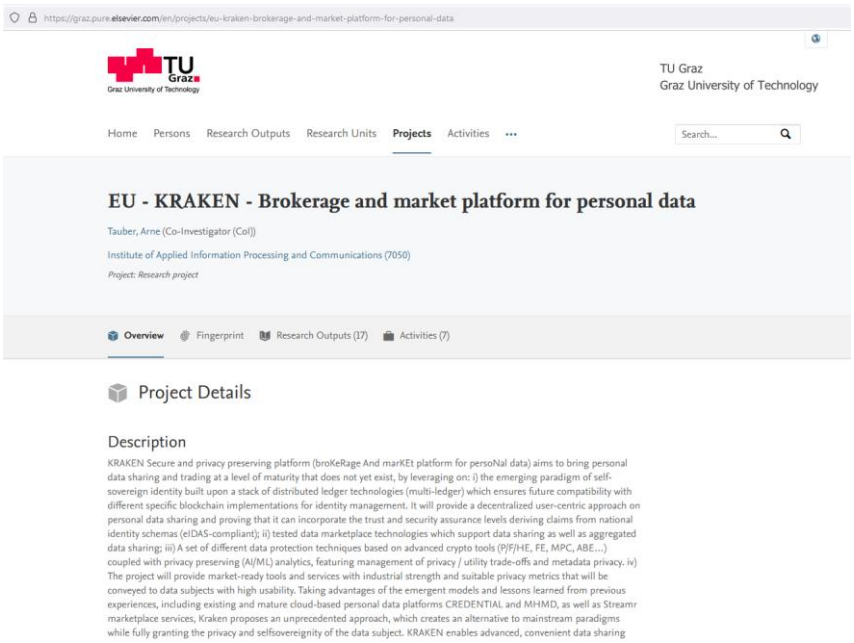


Figure 47: Screenshot of TUG web site

TX – Technology Exploration Oy

TX promotes on the TX web site how KRAKEN returns control of data to users with a marketplace for personal data (Table 17).

Communication activities			
Medium	**URL**	**Type**	**Title**
TX web page	https://tx.company/projects/kraken/	Web page	Promotes how KRAKEN returns control of data to users with a marketplace for personal data
	https://tx.company/blog/kraken-overcoming-the-challenge-of-privacy-in-data-marketplaces-with-mpc/		

Table 17: TX's contributions

INFOCERT

INFOCERT promotes on the INFOCERT web site the innovations developed in the KRAKEN project (Table 18).

Communication activities			
Medium	**URL**	**Type**	**Title**
INFOCERT web page	https://infocert.digital/the-eu-commission-listed-infocert-in-the-eu-innovation-radar-platform/	Web page	Promotes (qualified) digital signature based personal identity wallet for Project

	https://infocert.digital/research-development/		KRAKEN and derivation of identity credentials from DAS identity

Table 18: INFOCERT's contributions

FBK

FBK describes on the FBK web site the KRAKEN project (Table 19).

Communication activities			
Medium	**URL**	**Type**	**Title**
FBK web page	https://trentinosalutedigitale.com/en/blog/2022/05/25/kraken-project-pilots-preparation/	Web page	Brokering and marketing of personal data

Table 19: FBK's contributions

AIT

AIT promotes on the AIT web site the KRAKEN project (Table 20).

Communication activities			
Medium	**URL**	**Type**	**Title**
AIT web page	https://www.ait.ac.at/news-events/single-view/detail/6263?cHash=276e5ae81fe1b71aad50c102a44868f4	Web page	Innovation in personal data protection

Table 20: AIT's contributions

KUL

KUL provides on the KUL web site KRAKEN information and different blogs posted related with KRAKEN (Table 21).

Communication activities			
Medium	**URL**	**Type**	**Title**
KUL web page	https://www.law.kuleuven.be/citip/en/research/projects/ongoing/kraken	Web page	Project information
	https://www.law.kuleuven.be/citip/blog/the-new-european-digital-identity-proposal-and-data-protection-ii-trust-services/		Digital Identity proposal and data protection

	https://www.law.kuleuven.be/citip/blog/the-new-digital-identity-regulation-proposal/		New digital identity regulation proposal and EU data protection
	https://www.law.kuleuven.be/citip/blog/proposal-for-a-digital-identity-regulation/		Digital identity regulation
	https://www.law.kuleuven.be/citip/blog/shopping-for-data-the-emergence-of-privacy-aware-data-marketplaces-in-the-eu/		Privacy-aware data marketplace in the EU

Table 21: KUL's contributions

LYNKEUS

LYNKEUS provides on the LYNKEUS web site KRAKEN project description (Table 22).

Communication activities			
Medium	**URL**	**Type**	**Title**
LINKEUS web page	https://www.lynkeus.eu/projects	Web page	Project information

Table 22: LYNKEUS's contributions

XLAB

XLAB provides on the XLAB web site KRAKEN project description (Table 23).

Communication activities			
Medium	**URL**	**Type**	**Title**
XLAB web page	https://www.xlab.si/research/kraken/	Web page	Project information

Table 23: XLAB's contributions

3 Dissemination Report

The following section provides an overview of the project's activities carried out to disseminate the project's foreground knowledge. For a detailed overview of KRAKEN's target audience and venues, we refer to **D6.6 Initial Communication report**, delivered in September 2020.

3.1 Collaboration with Related Research Initiatives

KRAKEN has collaborated with other research initiatives in order to leverage synergies and to avoid duplication of work and research efforts. The following table provides a summary of joint previous and ongoing activities, listed in alphabetical order.

Collaboration with Related R&D Initiatives		
Project	**Link**	**Description of synergy**
Andaman7	https://www.andaman7.com/	KRAKEN organized a workshop with Andaman7 for exploring possible collaboration.
ARCADIAN-IoT	https://www.arcadian-iot.eu/	KRAKEN contributes to the Communication Task Force group, for a joined dissemination of the events, outcomes and news of the projects and collaborative initiatives.
BDVA	https://www.bdva.eu/	KRAKEN as member of the BDVA Data Spaces projects participated in several Task Force groups and Working Group meetings. Also, participation in several webinars, workshops and conferences organized by BDVA providing progress and outcomes developed in KRAKEN,
Comp4Drones	https://www.comp4drones.eu/	The collaboration with this ECSEL joint undertaking has led to joint publications on cryptographic building blocks
CREDENTIAL	https://credential.eu/	KRAKEN leverages parts of the results of the CREDENTIAL data exchange platform, and thus keeps close contact.
CyberSec4Europe	https://cybersec4europe.eu/	The collaboration with this pilot project for a European Cybersecurity Competence Network has led to joint publications as well as joint standardization activities within ISO/IEC JTC1/SC27.
CyberWatching	https://cyberwatching.eu/	KRAKEN has participated in the meeting of privacy projects held by Cyberwatching in order to find synergies and collaboration between European projects.

Collaboration with Related R&D Initiatives		
Project	**Link**	**Description of synergy**
DAGSAM	n/a	This study funded by the Swiss Federal Roads Office leveraged experience from KRAKEN regarding the applicability of MPC for large-scale outsourced statistics and computation.
DataVaults	https://www.datavaults.eu/	KRAKEN participated in several webinars and workshops organized by DataVaults, finding synergies between the health pilots.
DE4A	https://www.de4a.eu/	Digital Europe for All project shares technical aspects with KRAKEN related to digital wallets and SSI. Also, D34A collaborates in webinars organized by KRAKEN.
FENTEC	https://fentec.eu/	The collaboration with this H2020 project has led to joint publication on functional encryption schemes.
FlexProd	https://flexprod.at	Joint activities with FlexProd are mainly centered around the development of platform for secure and integrity-preserving multi-party computation, and standardization of such technologies.
Infinitech	https://www.infinitech-h2020.eu/	KRAKEN project organized webinar "Women in technology behind data-sharing, privacy preservation and SSI" where the privacy expert partner Gradiant contributed on privacy aspects.
MyHealthMyData	https://myhealthmydata.eu/	The KRAKEN consortium is in close contact with the MHMD consortium in order to leverage their platforms and results for the envisioned marketplace.
OASCities	https://oascities.org/	KRKAEN shared information about the Kraken project and exploring collaboration in personal data management.
OPENDEI	https://www.opendei.eu/	KRAKEN stablished close collaboration with this H2020 project contributing to the survey Building Blocks for Data Spaces, where KRAKEN assets could be included. Also, participation in the webinar Dealing with Data Spaces.

Collaboration with Related R&D Initiatives		
Project	**Link**	**Description of synergy**
PROFET	https://profet.at/	The collaboration with this national Austrian research initiative on cryptographic foundations for a future-proof Internet has led to joint publications.
QualiChain	https://qualichain-project.eu/	KRAKEN participated in the workshop organized by QualiChain for finding synergies with other projects such as DE4All.
Safe-DEED	https://safe-deed.eu/	The collaboration with this H2020 project has led to joint publications on cryptographic building blocks.
SECREDAS	https://secredas-project.eu/	The collaboration with this ECSEL joint undertaking has led to joint publications on cryptographic building blocks.
SlotMachine	https://www.frequentis.com/en/research/projects/slotmachine	Joint activities with SlotMachine are mainly centered around the development of platform for secure and integrity-preserving multi-party computation, and standardization of such technologies.
Smart Cities Marketplace	https://smart-cities-marketplace.ec.europa.eu/	KRAKEN participated in webinars organized by the OASCities initiative presenting KRAKEN assets which can contribute to support Cities Data Spaces
TRAPEZE	https://trapeze-project.eu/	TRAPEZE project and KRAKEN organized a joined webinar with the aim to find common points and future collaboration.

Table 24: Overview of collaboration with other R&D initiatives

3.2 Key Performance Indicators

In the following table we give an overview of the dissemination key performance indicators as specified in the project proposal and provide concrete results achieved by the project.

Dissemination KPIs		
Scientific publications	Number of peer-reviewed conference and journal Publications	27
	Proportion of joint publications of private and public consortium partners	33%
	Number of partners per publication[2]	1.67

[2] Not counting project-external co-authors.

Dissemination KPIs		
Interconnections with other projects	Number of liaisons with other R&D activities	22
	Number of joint publications with other research activities	>50%

Table 25: Dissemination KPI overview

3.3 Publications

In the following table we provide an overview of all scientific publications produced by KRAKEN project since the beginning of the project until its end. Note that due to the usual publication timelines, some of these accepted papers will only be published in the following weeks and months, and further papers are currently under submission or final preparation.

All publications are accessible via green or gold open access, or will be made available within the time period set out in the grant agreement.

KRAKEN Publications			
Title	**Authors**	**Beneficiaries**	**Venue**
Project Year 1			
Short-Lived Forward-Secure Delegation for TLS	Lukas Alber, Stefan More, Sebastian Ramacher	AIT, TUG	Cloud Computing Security Workshop – CCSW 2020
Lift-and-Shift: Obtaining Simulation Extractable Subversion and Updatable SNARKs Generically	Behzad Abdolmaleki, Sebastian Ramacher, Daniel Slamanig	AIT, external	ACM SIGSAC Conference on Computer and Communications Security – ACM CCS 2020
Privacy-preserving Analytics for Data Markets using MPC	Karl Koch, Stephan Krenn, Donato Pellegrino, Sebastian Ramacher	TUG, AIT, TX	Privacy and Identity Management 2020
Project Year 2			
CCA-Secure (Puncturable) KEMs from Encryption With Non-Negligible Decryption Errors	Valerio Cini, Sebastian Ramacher, Daniel Slamanig, Christoph Striecks	AIT	Advances in Cryptology - ASIACRYPT 2020
Trust Me If You Can: Trusted Transformation Between (JSON) Schemas to Support Global Authentication of Education Credentials	Stefan More, Peter Grassberger, Felix Hörandner, Andreas Abraham, Lukas Daniel Klausner	TUG	IFIP Advances in Information and Communication Technology – IFIP SEC 2021
An Attack on Some Signature Schemes Constructed From	Daniel Kales, Greg Zaverucha	TUG, external	Cryptology and Network Security – CANS 2020

KRAKEN Publications			
Title	**Authors**	**Beneficiaries**	**Venue**
Five-Pass Identification Schemes			
The recent case law of the CJEU on (joint) controllership: have we lost the purpose of 'purpose'?	Charlotte Ducuing, Jessica Schroers	KUL	Computerrecht: Tijdschrift voor Informatica, Telecommunicatie en Recht
Fine-Grained Forward Secrecy: Allow-List/Deny-List Encryption and Applications	David Derler, Sebastian Ramacher, Daniel Slamanig, Christoph Striecks	AIT, external	Financial Crypto – FC 2021
Updatable Signatures and Message Authentication Codes	Valerio Cini, Sebastian Ramacher, Daniel Slamanig, Christoph Striecks, Erkan Tairi	AIT, external	Public-Key Cryptography – PKC 2021
Multi-Party Revocation in Sovrin: Performance through Distributed Trust	Lukas Helminger, Daniel Kales, Sebastian Ramacher, Roman Walch	AIT, TUG	Topics in Cryptology – CT-RSA 2021
Banquet: Short and Fast Signatures from AES	Carsten Baum, Cyprien Delpech de Saint Guilhem, Daniel Kales, Emmanuela Orsini, Peter Scholl, Greg Zaverucha	TUG, external	Public-Key Cryptography – PKC 2021
SSI Strong Authentication using a Mobile-Phone Identity Wallet	Andreas Abraham, Christopher Schinnerl, Stefan More	TUG	International Conference on Security and Cryptography – SECRYPT 2021
Adapting the TPL Trust Policy Language for a Self-Sovereign Identity World	Stefan More, Lukas Alber, Sebastian Mödersheim, Anders Schlichtkrull	TUG	Open Identity Summit 2021
Privacy-Preserving eID Derivation to Self-Sovereign Identity Systems with Offline Revocation	Andreas Abraham, Karl Koch, Stefan More, Sebastian Ramacher, Miha Stopar	AIT, TUG, XLAB	Trust, Security and Privacy in Computing and Communications – TrustCom 2021
KRAKEN - Brokerage and Market Platform for Personal data	Andreas Abraham, Juan Carlos Perez Braun, Sebastian Ramacher	AIT, Atos, TUG	ERCIM NEWS
POSEIDON: A New Hash Function for Zero-Knowledge Proof Systems	Lorenzo Grassi, Dmitry Khovratovich, Christian Rechberger, Arnab Roy, Markus Schofnegger	TUG, external	USENIX Security Symposium – USENIX Security 2021

KRAKEN Publications			
Title	**Authors**	**Beneficiaries**	**Venue**
Project Year 3			
Issuer-Hiding Attribute-Based Credentials	Jan Bobolz, Fabian Eidens, Stephan Krenn, Sebastian Ramacher, Kai Samelin	AIT, external	Cryptology and Network Security – CANS 2021
Updatable Trapdoor SPHFs: Modular Construction of Updatable Zero-Knowledge Arguments and More	Behzad Abdolmaleki, Daniel Slamanig	AIT, external	Australasian Conference on Information Security and Privacy – ACISP 2021
Efficient Lattice-Based Inner-Product Functional Encryption	Jose Maria Bermudo Mera, Angshuman Karmakar, Tilen Marc, and Azam Soleimanian	XLAB, external	Public-Key Cryptography – PKC 2022
KRAKEN: a secure, trusted, regulatory compliant and privacy-preserving data sharing platform	Silvia Gabrielli, Stephan Krenn, Donato Pellegrino, Juan Carlos Pérez Baún, Pilar Pérez Berganza, Sebastian Ramacher, Wim Vandevelde	FBK, ATOS, AIT, TX, KUL	BDVA Book chapter on Data Platforms
Offline-verifiable Data from Distributed Ledger-based Registries	Stefan More, Jakob Heher, Clemens Walluschek	TUG	International Conference on Security and Cryptography – SECRYPT 2022
Multidimensional Study on Users' Evaluation of the KRAKEN Personal Data Sharing Platform	Silvia Gabrielli, Silvia Rizzi, Oscar Mayora, Stefan More, Juan Carlos Perez Baun, Wim Vandevelde	FBK, TUG, ATOS, KUL	Applied Sciences journal 2022, 12(7)
YOU SHALL NOT COMPUTE on my Data: Access Policies for Privacy-Preserving Data Marketplaces and an Implementation for a Distributed Market using MPC	Stefan More, Lukas Alber	TUG	International Conference on Availability, Reliability and Security – SECPID@ARES 2022
Extending Expressive Access Policies with Privacy Features	Stefan More, Sebastian Ramacher, Lukas Alber, Marco Herzl	AIT, TUG	Trust, Security and Privacy in Computing and Communications – TrustCom 2022

KRAKEN Publications			
Title	**Authors**	**Beneficiaries**	**Venue**
A Verifiable Multiparty Computation Solver for the Linear Assignment roblem And Applications to Air Traffic Management	Thomas Lorünser, Florian Wohner, Stephan Krenn	AIT	Cloud Computing Security Workshop – CCSW 2022
Accepted Publications to Appear after the End of the Project			
CRS-Updatable Asymmetric Quasi-Adaptive NIZK Arguments	Behzad Abdolmaleki, Daniel Slamanig	AIT, external	International Conference on Cryptology in India – INDOCRYPT 2022
KRAKEN: A Privacy-Preserving Data Market for Authentic Data	Karl Koch, Stephan Krenn, Tilen Marc, Stefan More, Sebastian Ramacher	AIT, TUG, XLAB	ACM Data Economy 2022

Table 26: List of KRAKEN publications

3.4 Theses Carried Out Within KRAKEN

Besides the aforementioned large body of research publications, also theses at different levels have been carried out within the KRAKEN project:

Theses Supervised Within KRAKEN			
Title	**Author**	**Type**	**Beneficiary**
A Short-Lived Answer to Full Delegation: Applying Time-Bound Identity-Based Signatures to TLS	Lukas Alber	MSc	TUG
A Trust Policy Language for the Self Sovereign Identity World	Bernhard Zenz	MSc (in progress)	TUG

Table 27: Overview of theses supervised within KRAKEN

4 Standardization Report

4.1 Overview of Standardization Bodies

In this section, we give an overview of standardization bodies monitored for potential relations to the KRAKEN project. The KRAKEN consortium continuously monitors the state of the project, the precise results suitable for standardization, as well as ongoing standardization activities in these bodies, in order to select the best-suited standardization bodies to approach. Furthermore, KRAKEN partners are closely following ongoing standardization efforts in order to use them in the KRAKEN development to ensure the highest level of compatibility possible. The

- ISO/IEC: The International Organization for Standardization/International Electrotechnical Commission is one of the most renowned standardization bodies worldwide. The two involved bodies seamlessly fit together and complement each other in terms of covered areas: while ISO is primarily focusing on guidelines to ensure, e.g., that materials, products, or processes fit their purpose, IEC is focusing on electro-technology. International standards produced by ISO/IEC are often used as key references for national but also European standards. For KRAKEN, we identified ISO/IEC JTC1/SC27 on “Information security, cybersecurity and privacy protection” as a relevant committee.
- ETSI: The European Telecommunications Standards Institute has members from more than 60 countries, and is publishing more than 2’500 standards annually, promoting a greater harmonization of (European) telecommunication systems. With relevance to KRAKEN, ETSI is also developing guidelines on personally identifiable information protection, or requirements on data protection and privacy, all addressed within the Security and the Interoperability clusters of ETSI.
- ITU-T: The International Telecommunication Union - Telecommunication Standardization Sector is covering numerous fields within telecommunication and information technology. Given ITU’s nature as a specialized agency of the United Nations, standards of developed by the ITU-T gain significant international attention. Relevant groups for KRAKEN contain, among others, the ITU-T Study Group 17: Security on privacy in cloud computing.
- IETF: The Internet Engineering Task Force is an open standards organization, developing and promoting voluntary and open Internet standards. All developments and contributions are carried out by volunteers on a non-profit basis. IETF standards could in particular be of interest to KRAKEN because of their Security working group, which is in particular addressing secure authentication and authorization mechanisms.
- W3C: The World Wide Web Consortium (W3C) is developing standards for the World Wide Web. The organization has more than 450 members, including commercial, educational and governmental entities. Of particular interest to KRAKEN are the standards on decentralized identifiers (DIDs), verifiable credentials (VC), and the ongoing projects on DID Communication and VC-Wallets.
- ZKProof: This community initiative to define standards related to zero-knowledge proofs of knowledge is of particular interest for the parts of KRAKEN related to end-to-end authenticity and verifiability.

Further standardization bodies include, e.g., OASIS (Organization for the Advancement of Structured Information Standards), CSA (Cloud Security Alliance), EuroCloud, or the OpenID Foundation, as well as national standardization organizations and mirror committees. However, after an initial internal assessment regarding suitability and alignment with the project’s contents, these are currently not under closer observation by the consortium.

4.2 Contributions to Standardization Projects

4.2.1 Editorships and Project Leads

The following table provides an overview of KRAKEN's contributions to international standardization efforts, where KRAKEN beneficiaries were leading or co-editing the standard under development. All listed activities are aiming at standardizing the cryptographic building blocks used within KRAKEN in order to increase compatibility and overcome implementation and integration obstacles of such enhanced techniques into real-world systems.

It is worth noting that all standardization activities listed in the following are to be understood as joint initiatives with other R&D projects, such as H2020 CyberSec4Europe, H2020 SlotMachine, or FFG FlexProd, cf. also 3.1. Furthermore, collaboration with numerous project-external partners and entities is necessary to reach the mandatory consensus in either of the working groups.

Standardization Activity			
Body	**Committee**	**Standard identifier**	**Name**
ISO/IEC	JTC1 / SC27 / WG2	ISO/IEC 4922-1	Information security — Secure multiparty computation — Part 1: General
		This standardization project provides the foundations (e.g., terminology, security models, etc.) for secure multiparty computation (MPC), one of the core primitives underlying the KRAKEN marketplace. It has started in early 2020 and is being edited by AIT and colleagues from the Japanese national body. In the October 2022 meeting, the technical work on the standard was finished, and it was decided to move the project to an international standard. Depending on the copy-editing process, publication is expected in early 2023.	
		ISO/IEC 4922-2	Information security — Secure multiparty computation — Part 2: Mechanisms based on secret sharing
		Started together with Part 1, this part is specifying specific MPC techniques based on secret sharing, as deployed within KRAKEN. The project is led by Japanese experts and is co-edited by AIT. In the October 2022 meeting, it was decided to move the project to DIS (Draft International Standard) stage, such that publication of the standard may be expected in late 2023/early 2024.	
		ISO/IEC 20008-2/AMD2	Information technology — Security techniques — Anonymous digital signatures — Part 2: Mechanisms using a group public key — Amendment 2
		This project standardizes certain digital group signature schemes, as deployed in the high-level architecture of the KRAKEN platform. The project, edited by experts of the French national body and co-edited by AIT, was started in 2020. As of October 2022, the project will move directly to publication, such that publication may be expected early 2023.	
		ISO/IEC 20009-3	Information security — Anonymous entity authentication — Part 3: Mechanisms based on blind signatures
		This standard specified cryptographic mechanisms for anonymous entity authentication using blind signatures. That is, the standard specifies one instance of an attribute-based credential system.	

Standardization Activity			
Body	**Committee**	**Standard identifier**	**Name**
		The standardization project, edited by AIT and co-edited by colleagues from the French national body, was re-initiated in 2020, and resulted in an international standard in February 2022.	
		ISO/IEC 23264-1	Information security — Redaction of authentic data — Part 1: General
		This standard specifies the foundations, e.g., terminology, entities, and security models, of redactable signature schemes. While not directly used within the KRAKEN architecture, such technologies might play a role when combining selective disclosure and end-to-end authenticity. The standard was edited by AIT and co-edited by German national body experts. The project was started within H2020 PRISMACLOUD and H2020 CREDENTIAL, and finally succeeded in a published standard in March 2021.	
		ISO/IEC 23264-2	Information security — Redaction of authentic data — Part 2: Redactable signature schemes based on asymmetric mechanisms
		This project specifies specific instances of redactable signature schemes. It is edited by German experts and co-edited by AIT. As Part 1, the project was initiated within previous projects. As of October 2022, the project was in CD (Committee Draft) stage. Publication as a final standard is expected late 2023 or early 2024.	
ZKProof	WG Sigma protocols	n/a	Spec for Sigma-Protocols
		Sigma protocols are a basic building block for many zero-knowledge proofs, including zk-SNARKs as deployed and researched within the KRAKEN project. The ambition of this community standardization, co-edited by AIT, is to provide a comprehensive specification for such protocols. The project was started within the ZKProof community standards initiative in 2021, and is currently undergoing reviews and revisions jointly with the relevant community.	

Table 28: Standardization activities overview

4.2.2 Further Contributions

Besides the aforementioned standardization efforts (co-)led by partners from the KRAKEN consortium, the partners additionally contributed to a variety of standardization efforts, including the following:

- KRAKEN partners contributed to ETSI's efforts on attribute-based encryption techniques for verifiable credentials by providing technical support of development of a new Work Item (WI) proposal within ETSI TC CYBER.
- Consortium members additionally worked on the standardization of predicate techniques for a verifiable credential proposal within ETSI TC ESI.
- Within W3C, beneficiaries engaged in the discussions on how credentials will evolve and on the specification of technical formats for credentials.
- Within ISO TC 307, KRAKEN members contributed to the discussions within Joint ISO/TC 307 - ISO/IEC JTC 1/SC 27 WG: "Security, privacy and identity for Blockchain and DLT".

5 Conclusion

This deliverable gives a summary of communication, dissemination and standardization activities carried out by the KRAKEN consortium up until November 2022 (M36), with a focus on the last year of the project. It thereby presents an update of **D6.6 Initial Communication Report** and **D6.7 Initial Communication, dissemination and standardization report**.

Despite the still ongoing global Covid-19 crisis, with its significant impact on travel, face-to-face events, and direct dissemination and communication activities, the consortium has not only achieved but also clearly exceeded most of the defined dissemination and communication KPIs for the period. Nevertheless, the still ongoing uncertainty of the current situation was a significant challenge for the implementation of project activities, which was mainly overcome leveraging digital channels.

While Y1 of the project was dedicated to visibility, Y2 focused on raising project awareness to make it recognizable for stakeholders and potential customers. The last year of the project finally focused on engagement, by generating interactions with stakeholders and potential customers, in order to support the successful and sustainable exploitation of KRAKEN's findings also after the end of project.

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