



Leveraging **Open Source Technologies** for Better Services in the European Software Ecosystem

JANUARY 2023

RECOMMENDATION REPORT



Introduction

The contribution of the software and the software-based services (SSBS) industry to the EU economy has been increasing in recent years in every dimension (employment, value-added, and productivity).

Leveraging existing technologies and services, SWForum.eu - the European forum of the software research community - aims to raise awareness and strengthen the competitiveness of the European Software Industry by facilitating a sustainable European forum that encourages both researchers and practitioners, as well as projects in software, digital infrastructure, and cybersecurity to create intersections of expertise and a multidisciplinary approach to research and innovation.

On 10 October 2022, SWForum.eu, together with [FASTEN](#), [FogProtect](#), [PolicyCLOUD](#) and [HSbooster.eu](#), invited the open source software community and policymakers from industrial, commercial, and public entities to an expert briefing on the perceived scope of leveraging open source technologies for better services in the European software ecosystem.

In the webinar, **Luis Carlos Busquets Pérez**, the European Commission's Programme Officer in DG Connect 2 (Cloud and Software), opened the webinar by highlighting how open source could be an asset upon which to build new innovations. He also stated why the European Commission is interested in open source: as a public administration its stakeholders are the EU citizens themselves, and open source has the potential to open up opportunities to EU citizens in the form of jobs and a stronger economy.

Six presentations were offered by speakers from the host projects and are available for download at SWForum.eu [Zenodo community](#). Alternatively, a video recording of the full session is available at the [SWForum.eu page](#).

- European Software Forum Community overview and objectives - Juncal Alonso (TECNALIA, SWForum.eu Project Coordinator)
- EU perspective and expectations - Luis Carlos Busquets Pérez (European Commission)
- Protecting sensitive data in the computing continuum - Ricardo Vitorino (Ubiwhere, FogProtect project)
- Enabling Intelligent Package Management - George Drosos (Athens University of Economics and Business, FASTEN project)
- Cloud for Data-driven Policy management - Konstantinos Oikonomou (UBITECH, PolicyCLOUD project)
- European Standardisation Booster - Nicholas Ferguson (Trust-IT/COMMpla, HSbooster.eu Project Coordinator)

In this webinar, we aimed to explore the overall objectives of the SWForum.eu project, together with EU-funded projects showcasing their technical achievements, and host a panel with experts from different areas of the Open Source software and policy landscape, to discuss the potential impact and the key challenges ahead.



Results of the interactive live poll session

Outputs from the interactive poll session are presented below. Key recommendations emerging from the session are also provided.

Speakers

- 4 R&I Projects
- 6 Lightning talks
- 7 Represented Industry

Attendees

- 30 Registered attendees
- 25 Live participants
- 12 Countries represented

Represented Industry

Industry	Count
Tech SME and Start-ups	17
Universities and research technology offices	10
Large software industry	3
Policy makers within relevant EC units	2
Sector-related authorities and associations	2
Research and innovation projects	1
Vertical industries	1

Attendees by Country

Country	Count
EU (Total)	9
Non-EU (Total)	3
Italy	8
Greece	7
Portugal	5
Belgium	4
France	3

Interactive Poll Results

Poll 1. Open Source in 1 word

Community

Poll 2. What are the Open Source Software challenges you currently facing?

Trustworthiness, Security

Poll 3. Would you be more inclined to adopt an Open Source Software (OSS) if it implemented certain security and/or legal and ethical policies and standards?

Response	Percentage
Yes	100%
Inrelevant	0%
No	0%

SWForum.eu projects webinar, in collaboration with the European Commission together with H2020 projects FogProtect, FASTEN, PolicyCloud and HSBosster.eu experts, briefing on leveraging open source technologies for better services in the European software ecosystem.

Webinar - Leveraging open source technologies for Better Services in the European Software Ecosystem

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Chairs and Speakers

SWForum.eu
Barcelona forum of the software research community

WEBINAR

Leveraging OS technologies for better services in the European software ecosystem
10 October 2022 | 14:30 - 16:00 CEST

Juncal Alonso Ibarra
R&D Engineer at TECNALIA, Project Coordinator

Luis Carlos Busquets Pérez
Administrator at European Commission

Ricardo Vitorino
Smart Cities R&I Manager at Ubiwhere, FOGPROTECT

Giorgos Drosos
Researcher at Athens University of Economics and Business, FASTEN

Konstantinos Oikonomou
Full Stack & Research Software Engineer at UBITECH, POLICYCLOUD

Nicholas Ferguson
Senior Project Manager at Trust-IT Services, HSbooster.eu Project Coordinator

Funded by the European Union

Juncal Alonso, PhD - R&D Engineer at Tecnalía, SWForum.eu Project Coordinator

Juncal is a senior researcher working in the Cloud Technologies projects area of TECNALIA (since 2007). She received her diploma of Master Telecommunication Engineering (BSc) from the University of the Basque Country (Escuela Técnica Superior de Ingeniería - UPV) in 2006. She also obtained a Master's diploma in Local ICT administration (UNED) and the ITIL certification in IT services management and also holds a PhD in Telecommunications, in the Cloud Computing domain. Currently, Juncal belongs to the High-Performance Architecture group in TECNALIA as a specialised researcher on Cloud-based architecture, DevOps and multi-cloud. Her research interests include software engineering for the cloud continuum, secure cloud federation and multi-cloud-enabled software applications. She is currently the coordinator of the PIACERE H2020 RIA action and SWForum H2020 CSA.

Luis Carlos Busquets Pérez - Programme Officer, DG CONNECT, European Commission

Luis C. Busquets Pérez holds a degree in telecommunications engineering (UPC, Barcelona) and a Master's in Business Administration (ESADE, Barcelona). For more than 20 years, his professional career has been developed in the ICT sector covering all OSI layers (from fibre optics and semiconductors to IT applications). Previous to his career in European institutions, he held several positions in marketing and sales for ICT Fortune 500 companies. In 2006, he joined the European Commission services and is currently Programme Officer in DG CONNECT E2, which is the Cloud and Software unit.

Ricardo Vitorino - Smart Cities R&I Manager at Ubiwhere

Ricardo is a Software Engineer passionate about Smart Cities, having taken his Master's degree at the University of Coimbra, the oldest Portuguese university and UNESCO's World Heritage Site. Ricardo has been Ubiwhere's Head of Innovation for Smart Cities since 2015, where he aligns the company's strategy with research and innovation projects and initiatives, leading the technical teams on the roadmap from idea to product. Ricardo has also acted as the vice-chairman of two groups from ETSI and AIOTI, promoting best practices in data interoperability and IoT solutions for the urban society, having also represented Ubiwhere as one of the success stories of CEF Digital Building Blocks.

George Drosos - Researcher at Athens University of Economics and Business

George works as a researcher at the Business Analytics Laboratory, established by the Athens University of Economics and Business (AUEB). He is also an undergraduate student at the Department of Management Science and Technology at AUEB, majoring in Software and Data Analysis Technologies. In the past year Giorgos has been working as a Research Software Engineer at the FASTEN Research Project. His main research interests lie in the area of Software Engineering, Program Analysis and Programming Languages.

Konstantinos Oikonomou - Full Stack & Research Software Engineer at UBITECH

Konstantinos works as a Full Stack & Research Software Engineer at Ubitech since 2020 as part of the Computing Systems, Software and Services Research Group. He received his diploma in Electrical and Computer Engineering from the University of Patras in March 2018 and in 2019, he received his Master of Science in Advanced Software Engineering with Management from King's College of London. He has worked since 2016 in various projects as a Software Engineer and Full Stack Developer and coordinates the Cloud Infrastructures Utilisation & Data Governance WP in PolicyCLOUD.

Nicholas Ferguson - Senior Project Manager at Trust-IT/COMMpla, HSbooster.eu Project Coordinator

Nicholas is a Senior Project Manager at Trust-IT and the coordinator of HSbooster.eu, European Commission's Standardisation Booster service. He has coordinated projects in cybersecurity and cloud computing including cyberwatching.eu which mapped the cybersecurity Research & Innovation landscape and provided online tools for the SME community. Nicholas also leads the dissemination modules for the EC's Horizon Results Booster and previously coordinated the EC's Common Dissemination Booster.





Questions and Answers

? **Question:** “You’re dealing with sensitive data. Some people might feel that the very openness of OSS makes it untrustworthy for this kind of application and other kinds of critical applications. How do you reassure them?”

It depends on who is asking. The main added value of putting up open-source projects available to the public is to allow any type of end-users to analyse the code base and see what is being done by, whom and when. Does the person asking the question have the technical or digital skills to do those kinds of assessments, can they analyse the different scripting languages, codes and policies?



I think we can do it in a “marketing” kind of way. I mean, you may not need to know exactly the details about the software, the different repositories and projects, but actually, look into infographics or charts about it and understand that these are well maintained, thanks to the people behind them. You can see that there is a team of members from different organisations and not something that is being brought up by a single organisation and relying on them. There is this community and we can see that they are active or diverse in different types of skills and so on.

So, if we can make this **more friendlier to any type of stakeholder** regardless of their technical skills, they can see that the project is under active development, that it has good policies in place, and a good track record and that the community building is not being ignored but actually involved and engaged with a lot of stakeholders participating, which I think creates trustworthiness in the project.

I would assume that if I want to understand how something works if it is a “Black Box” or an open-source project is doing that, I just need to make sure that things are done properly so I either trust the “Black Box” manufacturer or I can look into the team and look at how it is being developed. That would be the added value, especially if you have the technical and digital skills to look into the code itself there is no problem, it is just a matter of the repositories being accessible somewhere. Other than that, I think there is some work to do in terms of showcasing that these graphs, charts and repositories and these open-source libraries are provided by active teams, who are keeping them up-to-date, following best practices and certifying compliance to good policies.

? **Question:** “FASTEN has dealt with the problem of ensuring that an OSS community can convince its potential users that it has provided a solid, trustworthy basis (codebase, etc.) for their work. Can you explain the issues you have identified and a e working to resolve?”

Unfortunately, many people do not trust open-source software, and one of the main problems is that many projects are inactive; and this negatively affects all the projects that depend on them, because often there is a lack of support and it takes a long time to fix bugs. Therefore, many developers tend to turn to proprietary software or try to implement their own code in order to have full control over the project. Also, a very important pain point is related to the security risks introduced by open-source software: we receive the functionality but, in contrast, we increase risk due to the third-party code. Especially in the last couple of months, there has been an exponential rise in the number of attacks in the supply chain of software ecosystems. In such ecosystems, malicious users try to become contributors in open-source projects to gain the trust of the developers, and too often malicious code ends up being injected into dependent projects that use these packages; these kinds of attacks have been very prominent in the last months. We need to first understand such problems and the risks that they are introducing before we can try to find the solution .



Question: “How can strategically formulated policies help increase the perception of OSS being trustworthy to the community?”



Combining private and open licences in a multi-licencing approach can certainly be a viable strategy to approach the issue of licensing and can dictate the business model that is followed by the company. We are seeing this approach, i.e releasing a software product with an open licence and the same one with advanced features with a private licence, become more popular in recent years, mainly due to the option this provides to simultaneously improve the code by the open source community while also still being able to receive funding from its commercial licensing.

In PolicyCLOUD we didn't face this issue, as all the components are developed with an open licence.

Question: “How can standards promote a perception of OSS Trustworthiness?”



The reluctance issue is mostly resolved when they demonstrate that standards are being adopted. It's all about **trust**, and standards can provide that.

Another keyword is cybersecurity. Cybersecurity and standards are quite similar: they're often an afterthought or something that is addressed by developers quite late. Actually, if you look at it from the beginning and plan things right from the start then your potential to make an impact on the market or avoid the reluctance that we've just heard about in the webinar is increased a lot.

One of the partners in our project, SGS, was telling us about a client who developed a nice open-source solution and then had to wait another year before actually getting to market – because nobody trusted it! They needed to adopt the right standards and start to improve the way the potential product was presented.

Trust is key, and standards can support innovation and the adoption of new technologies. And so they are important in the emerging technologies field, which of course many of the projects that we've worked with are looking at. Standards are also very important for introducing innovative products. Open source solutions, they provide interoperability for new sectors. Likewise, standards are very important for competitiveness on both European and global levels. In summary, standards are an essential business tool today.

Question: How would you say the Commission is trying to support the promotion of the perception of trustworthiness so that your vision will be achieved?



That is a very interesting question because I would say it has two different target audiences. I remember twenty years ago, at least in my beginnings in open source in the early 2000s, where the problem was the fear, uncertainty, and doubt that was associated with the use of the open source. It was felt that you could not trust something if nobody was responsible. That is: “With commercial software, if something goes wrong, I know I could go to this company and do something; but if something goes wrong with open source software, then who do I go to?”

To a certain extent, this trustworthiness has been addressed by the business models in open source. The fact is that open source has been successful: we all have some sort of open source in our telephones and computers now -- not because we necessarily trust the open source, but because those companies who are supplying us with products are using open source to develop their solutions, their value-added propositions. To a certain extent, this is working at least for the end-users.

If the question is how to achieve a level of trustworthiness such that end-users will directly use open source coming from the projects – then that is far more difficult. I do not imagine my mother-in-law going to an open-source repository and downloading software, coding, compiling, and using it. But I do imagine my mother-in-law going to Carrefour and purchasing a new mobile phone which has millions of lines of open-source code inside. To a certain extent, when we speak about end-users rather than the consumer of the final product, the market economy has to work to solve these issues.

The other thing is the trustworthiness of the actual companies who are integrating open source. It is definitely an issue

to make sure that these companies assuage the fear, uncertainty, and doubts about utilising the open-source assets that are available. Why is it important? Because if they don't, then potential end-users will not use their software. Their competitors (maybe outside Europe) may go ahead and adopt another strategy, integrating open source in their own development, with the result that EU companies will become less competitive because of their reluctance to integrate open source assets that are available to them.

That is something that the recent study on economic impact pointed out. To a certain extent, we have to act as a lighthouse showing the way: reminding all that, as with everything in life, there's always a certain level of risk. If you are running a company you should try all different alternatives and understand the risks, how to mitigate these risks, and how to exploit assets that may be available. Otherwise, you're coming to a position of having to finance things that your competitor doesn't, and you're coming to a price structure that will make you less competitive, with the result that you are forced out of the market – certainly something that we do not want for our EU enterprises. We want them to stay competitive.

Of course, this is a free-market perspective. We realise that it's up to the companies to choose, and not all industries have to adopt the same solution. But certainly what is good for the European economy is that, in this way, at least we do not have all our eggs in the same basket.

Additional questions during the live webinar (Sli.do)

Question: How do you ensure E2E encryption of data collected by CCTV?

It depends on the provider and deployment, but within FogProtect, E2E encryption of data collected by CCTV is ensured with IBM's open-source tool `fybrik` and cyphers on top of the TCP/IP communication channels (e.g. TLS)

Question: What happens if the device collecting data is tampered with?

In the case a device gets tampered with, an alarm is triggered by the Smart Lamppost (thanks to its accelerometer and telemetry sensors) and the FogProtect technology performs Risk Analysis of the incident, as well as orchestration of the resources and data policies, which then secure data usage and enforce governance by intermediating all input and output flows between the device and the computing resources.





Recommendations for policymakers and industry (including SMEs)

Open source has immense potential to be a foundational element of the European strategy for a values-based, competitive economy with a leadership position in global innovation in high technology. But in order to achieve that objective, both industry and policymakers must continue to work together effectively. To that end, here are some recommendations that we have received as the output of the SWForum.eu webinar.



1 The main recommendations for policymakers and industry players from Ubiwhere, coordinator of Fogprotect, are to clearly identify the value proposition of open-source for your project/solution. Then, establish open-source mechanisms and culture in your project/organisation while understanding the impact of exploitation, both for you and for third parties. The main actions should be to understand open-source licensing (read and choose a proper licence), check for legal compliance, security and maturity regarding reusing third-party components, define the centralised repository and infrastructure needed, its governance mechanisms and establish contribution rules to, then, build community dynamics around the project. Please ensure you see open source as a technology (and development model), and not a product.



2 From the industry perspective, open-source software should be utilised in order to mitigate development and maintenance costs but they should minimise the risks introduced by third-party code. To do so, they can either implement or integrate systems that will proactively analyse their dependencies and prevent them from including a potential vulnerability in their code.

In the FASTEN project, we developed an intelligent package management system which assesses the risks of leveraging open-source software and informs the developers proactively.



3 Further effort needs to be made to standardise processes regarding state-of-the-art problems like data interoperability in Data Driven Policymaking. It is important to try and strike the balance between maximising legal and ethical compliance, which can create over-restrictive processes and limit the pool of available tools, and maximising the registrability of data analytics tools which can lead to failure to meet legal and ethical standards. A good compromise that was adopted as part of PolicyCLOUD is the requirement of users to document ethical and legal measures on platform registration, which can lead to a satisfactory degree of assurance regarding the legal and ethical soundness of analytics.



4 Open source and open standards share a common objective of achieving digital sovereignty. Open standards seek to ensure interoperability, which is an enabler of two key characteristics of digital sovereignty: choice - that is, avoidance of vendor lock-in; and federation - the ability of software systems under different jurisdictions to collaborate (essential in Europe). Open source also ensures choice by lowering the barriers to market entry of small, resource-poor but innovative players such as SMEs. Finally, open data together with open standards facilitates not only the free flow and sharing of data but also sovereignty over the use and storage of data.



About the projects



SWForum.eu
European forum of the software research community

[SWForum.eu](#) is the European forum of the software research community, promoting best practices and technology transfer opportunities to cross-synergise European excellence.



FogProtect

[FogProtect](#) aims to deliver new and advanced architectures, technologies and methodologies to ensure the protection of sensitive data in the computing continuum, from cloud data centres through fog nodes to end devices.



[FASTEN](#) will place powerful analysis capabilities into the hands of developers by integrating its analysis services into popular package managers, for the Java, C, and Python programming languages.



Policy Cloud
Cloud for Data-Driven Policy Management

[PolicyCLOUD](#) harnesses the potential of digitisation, big data and cloud technologies to improve the modelling, creation and implementation of public and business policy.



HSbooster.eu
Horizon Standardisation Booster

[HSbooster.eu](#) is increasing European standardisation impact coming from H2020 & Horizon Europe Research & Innovation projects by designing, launching, and managing a dedicated booster-type initiative.

[Leveraging open source technologies for better services in the European software ecosystem](#)



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