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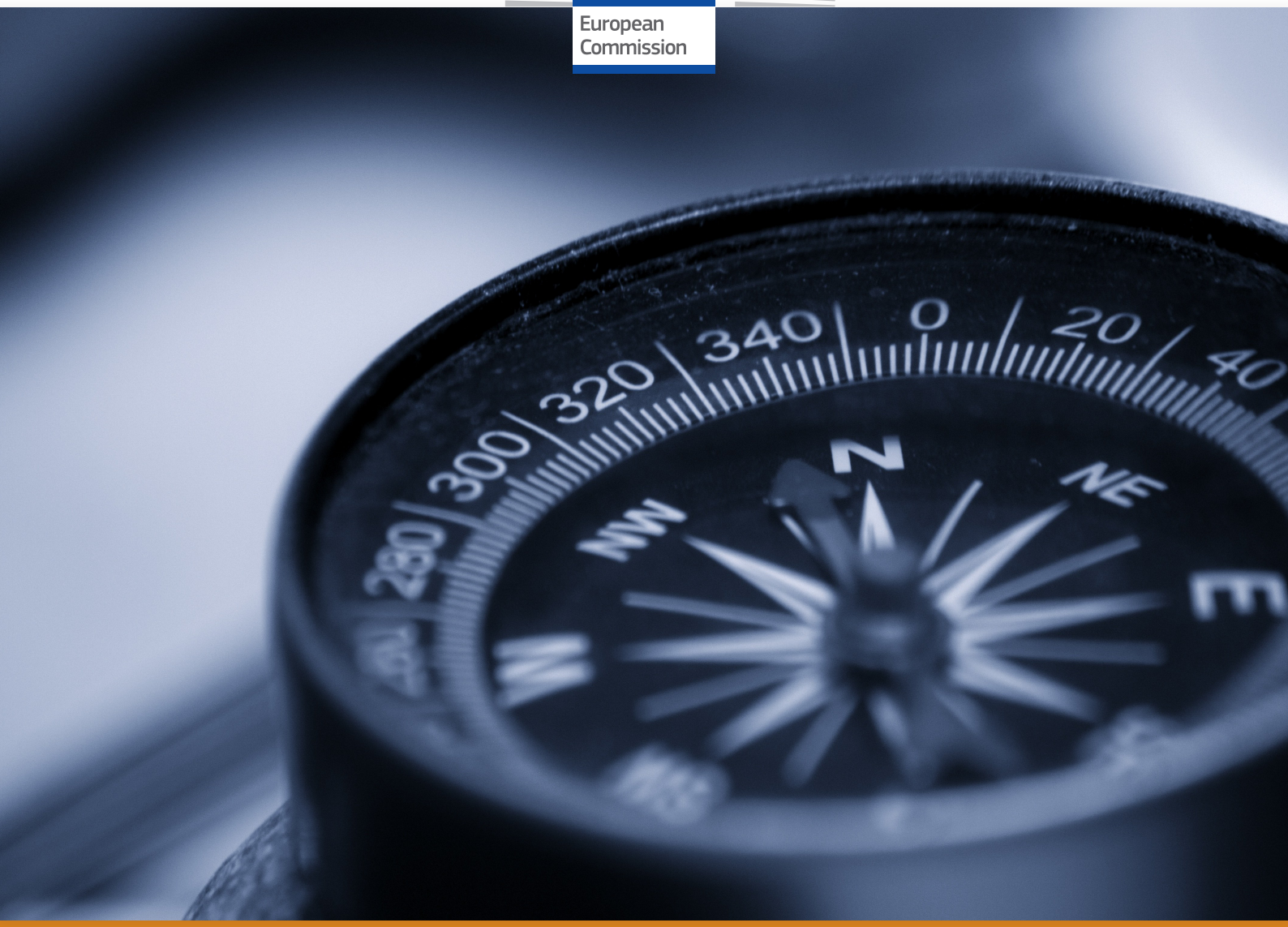

Guidelines
for Sustainable Open Source Communities in the Public Sector

2021 updated version

ISA²

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This work was carried out for the ISA² programme under Specific Contract No 272 and Specific Contract No 469. Framework Contract DI/07626 by: WAVESTONE

Acknowledgments

The OSOR team is grateful for the generous feedback received from the community throughout the development of these Guidelines. We would also like to thank the community members that have contributed to the update of these Guidelines and shared their views in the dedicated webinar. We would like to especially thank Nephtis Brandsma (Groningen Municipality), Miguel Arana Catania (formerly CONSUL), Leonardo Favario (Developers Italia), Philippe Bareille and Pierre Levy (City of Paris), Fritjof Knier (Integreat), Timo Aarnio (OSKARI), Bastien Guerry (DINUM), Janis Tupulis (LATA), the Foundation for Public Code team, Mike Linksvayer (GitHub), Tiago Mendonça (Portuguese Administrative Modernisation Agency), Jani Kylmäaho (NLS) for their time and contributions.

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Introduction

Open source software (OSS) can be highly beneficial to those who choose to harness it. One of the key strengths of OSS is its adaptability: anyone can reuse or modify it to best suit their needs, and therefore, its use is not restricted to any single domain or user group. Public administrations represent one such user group which stands to gain from the use of OSS when developing and implementing IT solutions for both internal processes and the delivery of digital public services.

Nevertheless, the adoption of OSS across public administrations has historically been a slow and often unsustainable journey. There are many examples of public administrations at the national or local level adopting OSS, only to switch back to a proprietary solution at a later stage. This happens for many reasons, be it due to compatibility issues or a change of heart at the managerial level. However, across public administrations of all sizes, there are many instances of flourishing OSS communities with diverse user bases and a wide array of contributors. The varying levels of success among public administrations in fostering OSS communities raises questions about the factors that determine their sustainability.

Recognising the different experiences of public administrations in adopting and maintaining OSS and building on the belief that the sustainability of open source projects relies heavily on the communities around them, the European Commission's Open Source Observatory (OSOR) has put together dedicated Guidelines for Sustainable Open Source Communities in the Public Sector. The purpose of the Guidelines is to debunk the myth that working with OSS is challenging, resource intense, and requires domain-specific knowledge. They aim to demonstrate that there are different ways to launch an OSS project and a community around it within a public administration and to guide readers through this process. Whilst many guidelines on OSS community-building exist, such as the Linux[1] or GitHub[2] Open Source Guides, there is a gap to fill when it comes to the sustainable OSS community-building in the public sector.

First published in 2020, the Guidelines for Sustainable Open Source Communities in the Public Sector are for civil servants at all administrative levels, project managers, IT developers, and OSS enthusiasts looking to start or participate in an OSS project or for individuals who are simply curious about what such an endeavour might entail.

The Guidelines are based on the assumption that public administrations should not merely reuse OSS (i.e. be consumers) but rather be active members and contributors to the communities that exist around this software.

The Guidelines were put together based on research consisting of a literature review, a dedicated survey, and five case studies on the following sustainable OSS communities in the public sector: the **Integreat** software developed outside the public sector and used by German municipalities; the use of the **CONSUL** platform by the Groningen municipality in the Netherlands; **Lutece**

[1] Available at: https://www.linuxfoundation.org/resources/open-source-guides/
[2] Available at: https://opensource.guide/

software developed by the City of Paris; the **Developers Italia** community launched by the Italian government; and the geospatial **OSKARI** software developed in Finland.

Figure 1 Case studies on the sustainability of open source communities

Developer Italia	Integreat	Lutece	Oskari	Voice of Groningen
Launched in 2017 by the Agency for Digital Italy, Developers Italia is a vibrant community made up of citizens, civil servants, public administrations, and enterprises. Community members meet on this online platform and discuss ongoing or future projects, share ideas, and upload source code.	Launched in 2015 by a group of students, Integreat is an open source digital integration platform aiming to reduce information poverty for new arrivals in and within Germany. The Integreat platform is now used by over 60 German municipalities	Lutece, launched in 2001, is an initiative of the City of Paris aiming to supply each Parisian district with a tailored Content Management System tool to manage their own website. It is a portal engine allowing users to create a dynamic website, which can be tailored to users' needs with additional modules and features.	Oskari is an open source software designed as a framework that can be used to easily build web mapping applications, showcase geospatial data, and analyse such data. Its distributed Spatial Data Infrastructures enable public administrations and other bodies to share their spatial data and work collaboratively.	In 2019, the City of Groningen started a new participatory democracy project following the successful launch of the Voice of Groningen platform, based on the open source software CONSUL. The new project aims to give citizens more decision-making power in relation to their locality.

The research methods used to produce the Guidelines are briefly described in the Methodological Note chapter and the reserach results are available in an analysis document, Key Success Factors of Sustainable Open Source Communities published on the OSOR Knowledge Centre.

There are two general approaches that public administrations can take to engage with OSS. They can either join an existing OSS community or create one from scratch. In both cases, it is crucial for public administrations to address some key questions internally before deciding on how to best engage in or launch a public sector OSS community. Therefore, the Guidelines consist of the following three key chapters:

1. **Setting the foundation for sustainable open source engagements** – detailing the type of questions that should be addressed within public administrations before committing to an OSS engagement and outlining the two main approaches one can take to achieve this goal.
2. **Joining an existing community** – describing the sustainable way to join an existing OSS community and reuse its software if the software meets a public administration's needs.
3. **Building your own public sector OSS community** – a detailed breakdown of the steps that should be taken and questions that need to be answered to build a sustainable OSS public sector community.

The Guidelines have been designed with a user-centric approach so that readers can easily understand the key aspects of engaging with OSS in public administrations, either by launching a new OSS community or by joining an existing one. For this reason, the Guidelines follow a Q&A structure, posing and answering the most pertinent questions associated with the sustainability of OSS in the public sector.

This is an updated version of the Guidelines with additional recommendations and resources following a consultation with the open source community. We have included further recommendations on creating a favourable environment in your public administration for working with OSS, creating an open and diverse community, advice on how to approach the departure

of members, and more.

The Guidelines are part of the European Commission's work to promote the sharing and reuse of IT solutions within public administrations under the Sharing and Reuse Action[3].

[3] The Sharing and Reuse Action is part of the European Commission's ISA2 programme. More information is available at: https://ec.europa.eu/isa2/actions/promoting-sharing-and-reuse-interoperability-solutions_en

Terms and Definitions

TERM	DEFINITION
Fork	Creating a "fork" is producing a personal copy of someone else's project. Forks act as a bridge between the original repository and a personal copy[4].
Open source community	A group of individuals who work together to develop, test, or modify open source software products[5].
Open source engagement	An organisation's commitment to engage with open source software either by launching an OSS community from scratch or joining an existing community and contributing to it instead.
Open source project	A specific project for which the source code is available to everyone to contribute to and reuse, as defined by the open licence used for the project.
Open source software (OSS)	Software for which the original source code is made freely available and may be redistributed and modified[6].
Proprietary software	Occasionally referred to as closed source software, proprietary software is software that legally remains the property of the organisation, group, or individual who created it. The organisation that owns the rights to the product usually does not release the source code and may insist that only those who have purchased a special licence key can use it[7].
Software as a Service (SaaS)	A software licensing model in which access to the software is provided on subscription basis, with the software being located on external servers rather than on in house servers. Software-as-a-Service is typically accessed through a web browser, with users logging into the system using a username and password. Instead of each user having to install the software on their computer, the user is able to access the programme via the internet[8].

[4] GitHub, "Forking Projects". More information: https://guides.github.com/activities/forking/#:~:text=After%20using%20GitHub%20by%20yourself,contribute%20to%20someone%20else's%20project.&text=Creating%20a%20%E2%80%9Cfork%E2%80%9D%20is%20producing,repository%20and%20your%20personal%20copy.

[5] IGI Global, "What is Open Source Community". More information: https://www.igi-global.com/dictionary/collaborative-development-environments/21213

[6] Opensource.com, "What is open source?". More information: https://opensource.com/resources/what-open-source and https://opensource.org/osd

[7] BBC, "Software concepts". More information: https://www.bbc.co.uk/bitesize/guides/z6r86sg/revision/4

[8] Investopedia, "Software-as-a-Service (Saas)". More information: https://www.investopedia.com/terms/s/software-as-a-service-saas.asp

TERM	DEFINITION
Total cost of ownership (TCO)	A financial estimate aimed at calculating the short- and long-term costs of any product or service by taking into account the complete costs. For IT, TCO includes hardware and software acquisition, management and support, communications, end-user expenses and the opportunity cost of downtime, training and other productivity losses[9].
Vendor lock-in	A situation whereby a customer becomes dependent on a product or service provided by a commercial supplier and cannot move to another vendor without substantial costs and/or inconvenience[10].

[9] Gartner Glossary, "Total Cost of Ownership". More information: https://www.gartner.com/en/information-technology/glossary/total-cost-of-ownership-tco

[10] The LINUX information project, "Vendor Lock-In Definition". More information: http://www.linfo.org/vendor_lockin.html

1

Setting the foundation for sustainable open source engagements

1. Setting the foundation for sustainable open source engagements

When considering starting an open source engagement, public administrations are faced with two key choices: join an existing community or create a new one. Before deciding, there are several elements to consider. In this chapter, we review the criteria to help guide you through making this choice. We also outline some crucial elements that can help to ensure your engagement's long-term sustainability such as well-defined funding and internal support.

How to set a foundation for sustainable open source engagements

1. Assess your needs and capabilities
2. Formalise your OSS project - make it 'official'
3. Secure project funding
4. Foster a favourable environment

1.1 Assess your needs & capabilities

Before you engage with a specific OSS community or embark upon building your own, there are several aspects to consider. Firstly, you should carefully evaluate your software needs and identify whether they are unique to the public administration alone or whether there are other potential software partners with similar needs. Secondly, you should assess the IT capabilities of your public administration and, in turn, scan the OSS market to see whether a solution that meets your needs already exists.

What kind of software are we looking for?

Organisations' software needs must be assessed prior to engaging with any OSS. Your public administration might need various types of software, such as an operating system, word processors, database management, an intranet portal, or a specific application, to cover different business processes. Having a clear understanding of your software needs will make it easier to look for existing solutions on the market.

Another key element to keep in mind is the interoperability of the software. Your new open source engagement cannot inhibit the upgrade path for related legacy IT systems, and it needs to be compatible with the infrastructure already in place within your public administration. That is why the licence of the open source software that you develop or decide to reuse has to be compatible with the existing IT infrastructure at your administration. This will increase the sustainability of your OSS venture.

You should assess the most important functional aspects that you are looking for in a solution. This will help you better understand the efforts that would be required to maintain and develop the software. By doing so, you will have a clear idea of the short-, mid-, and long-term goals you wish to achieve, and you will be prepared for the agile needs of the public sector.

Finally, there are some **non-functional aspects** of the software to consider. You should take into account the **security requirements** of the planned OSS engagement, as this might potentially restrict the range of software your administration can reuse. It is also beneficial to assess the software's targeted user base, consider its scalability in the future, and understand the resources that need to be allocated for software maintenance, among other things. Figure 2 below summarises these considerations.

Figure 2 How to assess your software needs?

The European Commission, under the ISA2 programme, has developed some tools that can support you in this process. For example, PM² is a project management methodology designed specifically for managing projects in public administrations. Additionally, Interoperability Maturity Assessment of a Public Service (IMAPS) is a self-assessment tool aimed at helping public administrations to assess the interoperability of a new solution under development. Finally, Common Assessment Method on Standards and Specifications (CAMMS) helps public administrations to select appropriate standards and specifications for their solutions.

What are the IT capabilities available at our public administration?

The type of OSS engagement that your public administration will choose is largely dependent on its IT capabilities. If there is a dedicated in-house developer team, then it is very likely that the public administration will be in a good position to host existing OSS or even develop the software from scratch. This is more likely to be the case in large, centralised administrations such as ministries or agencies. Yet, as detailed in the next section, it is not always necessary to develop a solution from scratch. You can reuse or build on the work of other communities.

When it comes to smaller public administrations, there might not be an in-house developer team or civil servants with a high level of IT knowledge. In this case, you might consider joining an existing OSS community with vendors offering tailored versions of the software (i.e. vendors who provide Software as a Service).

However, even if your public administration does not have in-house IT support, you could consider developing such capabilities, be it on a small scale over time. This will give the public administration more autonomy over the software development. Alternatively, you could procure civil society organisations or SMEs to develop the open source solution while making sure that you also build and participate in the community around it.

How to ensure software compatibility with our administrations' existing legacy systems?

No matter what you decide, you should consider having an in-house team of software experts that continue to build their knowledge and expertise over time. This is essential because lock-in is not always a strategic and purposeful act by a vendor. Indeed, vendors can create lock-in by building systems that are incompatible with competitor vendors, applying closed standards, or adopting less reciprocal[11] or closed licences. Additionally, an open source community with a relevant project could be building software that is incompatible with your public administration's legacy systems. Searching for a good alternative to this software may result in limited strong options and cause an accidental lock-out. An internal team of IT experts would not only be able to recognise this but perhaps customise and interface different systems. To be able to do so, your experts will need in-depth knowledge of your organisation's current IT systems as well as the open source project.

Is there an existing open source solution that meets our needs?

Having assessed the software needs of your public administration as well as your IT capabilities, you should then conduct some in-depth research to analyse if any software that matches your needs already exists. This can be done in several ways.

A good place to start is to check whether your central government has published a **dedicated catalogue or repository of available solutions for reuse**. Alternatively, you can take a look at catalogues or repositories produced by other governments. This way, you can save valuable public resources and reuse software supported by public administrations .

Joinup is a collaborative platform created by the European Commission for sharing knowledge, good practices and IT solutions in the public sector. It is home to the OSOR collection that has a page listing open source repositories targeting public administrations. You should also browse through the main OSS development platforms such as GitHub, GitLab, Bitbucket, or the open source Codeberg. GitHub, for example, consists of over 100 million member-driven software repositories. It can be navigated by browsing a list of its popular topics or by searching the platform. You can also browse through lists of government organisations on GitHub to learn more about projects launched by other public administrations.

Bear in mind that an open source solution existing on the market does not need to fully meet the requirements of your public administration in order to be considered. If, having assessed the available software, you believe that additional features that suit your needs could be developed as add-ons, then the software could indeed be reused by your public administration.

The OSOR community has indicated that preference is often given to readily available 'off-the-shelf' proprietary solutions. When looking for a solution that would suit your needs, use it as an opportunity to explore being innovative in developing add-ons and look at ready-to-use

[11] There are many OSI approved licenses but each one differs in the degree of openness, reciprocity obligations and restrictions. If there is a choice in licence, then the more reciprocal obligations will ensure community engagement and sustainability. If monetary returns are the more pressing concern, then a less reciprocal license will be effective.

open source solutions which may suffer from less visibility than their proprietary counterparts.

However, if the core software itself must be modified, it is preferable to work with the OSS community or a vendor that develops the solution in order to add your required features to the core. This is because making local changes to any open source community-driven project brings its own risks. The adapted fork[12] that you produce would have to be updated by your public administration alone as the community surrounding the software will continue to work on the original branch, rather than the fork that you developed. Updates and maintenance needs must then be met in-house as any forked project will need to be sustained over time. Working with the OSS community is generally a more sustainable option than forking.

However, if having assessed the software landscape, you fail to identify a suitable solution, it is worthwhile **considering launching your own OSS community and developing a new solution**. Where possible, this should be done in collaboration with other public administrations. This will help you to mitigate the risk of having a low number of contributions. As mentioned above, the development of such a solution does not necessarily have to be done in-house. Together with other public administrations, you could hire an IT company to develop the open source solution for you. Your responsibility would then be to grow the community around the software within the public administration.

Could other public administrations partner with us for this project?

The Groningen municipalities often work with the Hanze University of Applied Sciences and the University of Groningen (RUG) on the implementation of different projects, including that of CONSUL.

Public administrations within a country tend to share the same culture and have similar government institutions. Therefore, they are likely to have similar IT needs. Before you procure or develop software, you should check whether other public administrations at the national, regional, or local levels might want to collaborate. It may be helpful to reach out to public administrations of the same type – i.e. another municipality, public institution, or a ministry.

Identifying potential synergies with other public administrations will facilitate the **pooling of resources and exchanging lessons learnt and best practices** when it comes to working on the software together. You can also look outside your own country for software that could be adapted to your needs. Although pooling resources requires more coordination efforts, the benefits of such collaboration will outweigh the costs in the long run. Working with **universities** is another great way to pool resources, generate ideas, and gather OSS expertise.

1.2 Embed your community within the public administration – make it 'official'

Once your team has selected the most suitable way to engage in a public sector OSS project, the next key step is to formalise this engagement within your public administration.

[12] Please refer to Terms and Definitions section for a definition of this term.

Which key public administration actors do we need to onboard to kick-start the community?

Political support is a strong enabler of sustainable OSS communities in the public sector[13]. One of the reasons why political support is crucial is the hierarchical decision-making structure found in public administrations. Even if you have the IT personnel and mid-level management on board, the initiative might struggle to take off without the approval of the political layer. Open source efforts risk being abandoned if there is no true buy-in from an organisation's political leadership[14]. Furthermore, the initial period of building a new OSS project and community around it might bring its own challenges. Hence, having **political and managerial support** might be helpful to keep the momentum going.

Between 2018 and 2019, the Dutch Ministry of Interior ran a digital participatory democracy project, the basis of which was the use of OSS. Thanks to the leadership of the Ministry, several local municipalities then harnessed OSS to deliver participatory democracy platforms.

OSS community leaders and members play an important role as advocates of their project in the public administration. They should invest resources in demonstrating the benefits of using OSS, wich can help them ga in political support within their public administration.

How do we formalise our community within the public administration?

In order to ensure the longevity of a public sector OSS community, it is crucial to formalise the community within the public administration, rather than view it as an ad hoc engagement.

This means giving it status, a clear name, choosing a project manager and a dedicated team, and securing the budget (described in more details below).

Developers Italia, a community launched by the Agency for Digital Italy and the Digital Transformation Team, was promoted to be part of the Department of Digital Transformation within the Ministry for Innovation and Technology.

With the adoption of Guidelines for Code Acquisition and Reuse of Software, which mandate that any software developed or owned by the Italian government must be released under an OSI approved license and made available on Developers Italia, the community has gained legal certainty.

This will make it easier to lock in dedicated resources. The time that community contributors spend fostering the community and/or working on the OSS project should be officially **recognised as part of their work duties** rather than as a voluntary engagement. Official recognition of the community improves its long-term sustainability as the community becomes part of the administration's strategic planning. This protects the community against any short-term shifts in public administration's political focus or priorities.

[13] Our research shows that having political support for any type of OSS project is a pre-requisite for a sustainable public sector OSS project. More specifically, 62% of our survey respondents believe the support of the political level is a 'very important' factor in the sustainability of any community.

[14] According to our survey respondents.

1.3 Secure project and community funding

The final crucial aspect of getting your community off the ground is securing funding. There are several factors to consider when assessing your funding needs and securing resources for it.

What elements should we consider when defining the budget for an OSS project and the community around it?

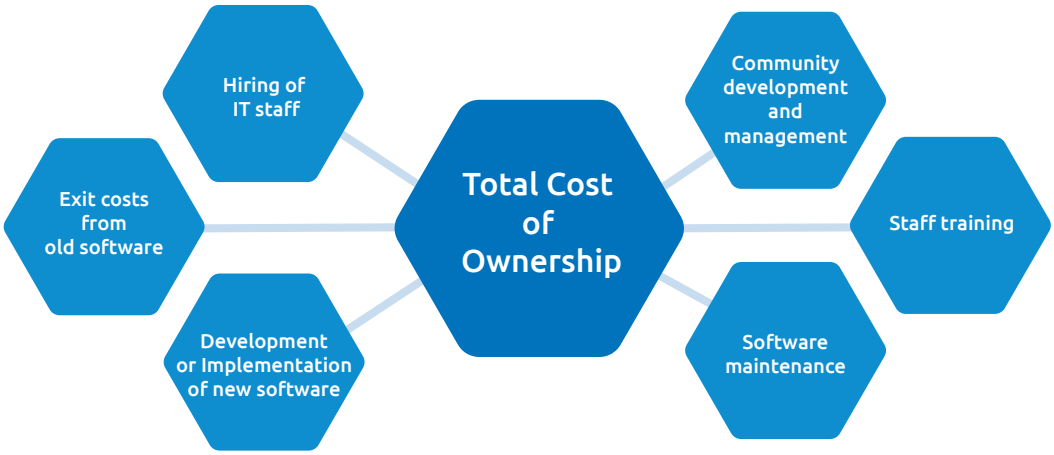
In order to secure a sufficient budget for the OSS project and the community around it, you should evaluate the ex-ante costs associated with it. This involves considering the **Total Cost of Ownership** (TCO) in order to help you better understand the project's long-term costs. Some of the costs to be considered include:

- initial hiring of IT staff;
- exit costs for existing software being used;
- development or implementation of the new software;
- staff training, if any, on working with the new software;
- maintaining the software;
- developing the community;
- managing the community.

In addition to assessing the TCO of your project, you could also develop a business case demonstrating the long-term benefits of your OSS community to help secure managerial and political support for it.

Young public sector OSS communities sometimes underappreciate the importance of dedicating resources to software maintenance and ensuring community vibrancy (community management). A budget should be allocated in order to nurture the community itself (developing the community) by investing in community events, such as hackathons, physical meetups, or online gatherings where members can exchange feedback, lessons learnt, and future ideas.

Figure 3 Key elements to consider when assessing Total Cost of Ownership



How do we secure project and community funding?

A clearly defined budget is crucial for any public sector initiative[15] . Our research clearly shows the importance of having sufficient funds to develop the core aspects of a community and its associated software. Therefore, public administrations should dedicate a portion of their annual budget to launch their OSS project and to help maintain the associated community. It can be complemented by additional funds from other organisations interested in participating.

The CONSUL digital participatory platform is funded through contributions from all participating municipalities across the world. Municipalities set a dedicated amount of their budgvet to invest in the platform - whether through contributing to code or community engagement.

The nine main public administrations involved in the use and development of the Finnish OSKARI geospatial software each contribute a yearly fee of € 5 000 for the development of the platform.

For administrations with constrained budgets, there is an option to consider: **co-funding**. It refers to the involvement of one or more organisations willing to contribute financial support for software development to supplement funding provided by the public administration. This arrangement may also result in public-private partnerships.

If you decide to engage with OSS by joining an existing community, one way to support it is through **crowdfunding**, which refers to the raising of funds from a wide range of donors, usually through a dedicated platform. Some communities choose this option to fund the development of specific software components or to receive financial support for the growth of the community. If the community of your choice is open to crowdfunding, there is a variety of platforms that it may select for this purpose. Bear in mind that any public sector organisation interested in crowdfunding should first check if it is compliant with existing policy and national legal frameworks.

Should we consider hiring additional resources?

Before diving into a new OSS project, you need to assess whether additional resources are required to guarantee its smooth implementation. Whilst contributions to OSS are largely driven by members' commitment to collaborative open source values, public sector OSS communities need certainty and structure to ensure their longevity.

If there is a need for additional community contributors, it is worthwhile to **invest resources in hiring developers** to implement, maintain and provide support for your software. This will help to maintain the project's quality and usefulness in the long run[16] . It is also a great opportunity to make skilled skilled IT professionals a part of your public administration, thus providing support and encouragement for new community members and users with less IT knowledge.

Public administration community managers and members might have parallel commitments and hence, might not be available to focus on the OSS full time. Hiring individual developers can

[15] 54% of our survey respondents consider a clearly defined budget as a 'very important' or an 'important' sustainability factor.

[16] Hiring developers was seen as a 'very important' factor by 47% and as an 'important' factor by 22% of our survey respondents.

help to ensure that the software is regularly maintained. Nevertheless, this is not to say that the project management should be outsourced to these contributors. Public administration community managers should be empowered to dedicate time to the community and its growth, even if they have parallel commitments.

This is something that was done by the Developers Italia community, which, upon its inception, launched several public tenders to develop core products associated with the community.

Similarly, rather than hiring full-time developers, it might be worth launching **a public tender calling for developers** to work on certain aspects of the OSS project. This will help to ensure continuous developer commitment to the project, and it is also an effective way to produce initial project output.

How should we approach private sector contributions?

OSS communities often benefit from private sector's financial contributions from the private sector. However, when it comes to private sector involvement, especially from large organisations, the support should not manifest itself in indirect control of the community and its outputs. This also holds true for OSS initiatives in the public sector.

The French OSS community of Lutece, founded by the City of Paris, received funding from the Bloomberg Philanthropies to re-design their website and launch an online training course for potential new community members.

The public sector should retain the steering role of the community while private sector contributions should take the form of providing additional support and advice, when necessary. Generally, it is advisable to allow private sector contributions when the community is more mature. Particular attention should be paid to the transparency of the community's governance model and to ensuring that engagement with the private sector does not compromise this model. In other words, community funding and participation in a community's growth and evolution should be separated.

1.4 Foster a favourable environment in your administration to work with OSS

Public administrations should view engagement with open source communities as a long-term commitment. In order to build a smooth and long-term commitment to open source, public administrations should work toward creating a nurturing environment for open source communities and projects.

How should we build the capacity of open source in my public administration?

Sustainability of open source communities is driven by members' commitment to them. There will be at least two different kinds of audience in public administrations: The first and much smaller group will be the software/IT teams, and the second will be the majority of any administration – computer-literate users without software development knowledge. For the first group, it is

important to build awareness of open source. However, if civil servants are not aware of the benefits of working with open source and do not have any know-how on doing so, public sector engagement with OSS will not go very far. Therefore, you should consider creating a 'basics guide' for your colleagues, detailing the benefits and ways your administration is planning to work with OSS.

Bringing the second type of civil servants on board with open source is usually harder as they usually do not immediately understand the value of an open licence and can also prove reluctant to switch to software they haven't used before. You could consider organising regular events and, more importantly, training sessions to build awareness of OSS and what should be considered when working with the software and being part of a community. Drawing attention to the value of increased functionality offered by an open source product would be helpful. The functionality of the software can be adapted and increased because of its open licence. This will encourage users to get engaged and request changes. Studies show that when requested changes are included in new product versions, the people that requested them become more devoted to the product. Such devotees often become strong advocates for the product amongst their immediate colleagues.

Another possibility is to invite open source community representatives and devoted users belonging to a public administration to your training sessions to share real-life testimonials and examples of working with open source.

How do we create a favourable environment for open source communities and OSS in our administration?

One way to encourage your public administration's commitment to nurturing open source communities is by adopting a communication or vision document that puts these goals in writing. As highlighted throughout the OSOR country intelligence reports, many countries use their political strategies and action plans to commit to OSS, e.g. Portugal's ICT Strategy (2019) and Slovakia's Digital Transformation Strategy and Action Plan (2019-2022). In the case of Malta, the Malta Information Technology Agency went beyond committing to open source by pledging its support to open source communities in the government's white paper Open Source Vision.

How can we support our colleagues who want to work with open source?

Nurturing a favourable environment for working with OSS requires that public officials feel comfortable and supported when embarking on a new open source engagement. To facilitate knowledge exchange and the provision of technical support, consider gathering like-minded individuals from other public administrations and/or organisations to build OSS expertise together. For example, the Dutch Government, putting its policy "open, unless" ("Open, tenzij")[17] into practice, has launched a website (hosted on the Pleio platform) that offers an open source toolbox and open source discussion groups about various topics. The toolbox is meant for government employees and offers practical information and tools to get started with OSS.

[17] The State Secretary of the Interior and Kingdom Relations outlined the policy "open, unless" ("Open, tenzij") in his letter sent to the House of Representatives on 17 April 2020

Similarly, any public official can join the open source discussion groups on Pleio. Together, members can chat on related topics (e.g. procurement processes), join events, learn about the latest software developments, exchange good practices, and find the latest news on open source in the Netherlands.


source: unsplash.com

2

Joining an existing community

2. Joining an existing community

After assessing your needs and IT capabilities and evaluating the open source solution market, there are a few elements that you will need to consider if you decide to join an existing open source community. The list below will help to guide you and ensure that, having selected the community you want to engage with, you establish sustainable long-term collaboration.

How to join an open source community

1. Understand the community behind the software
2. Facilitate sustainable collaboration
3. Contribute to the solution in the long run

2.1 Understand the community behind the software

Before joining an existing open source community and reusing its software, there are several questions that you should ask yourself in order to fully understand its nature and how you can best contribute.

What is the setup of the community we are joining?

To find a community that will match your organisation, you need to consider its setup and governance. Identifying the governance model, the community's communication channels, its manager, and consulting the code of conduct are good elements to start with, as outlined in Figure 4 below.

A clear understanding of the community's governance model of the community is key to your future contribution[18] . Put simply, the governance of the community should be compatible with the processes in your public administration or at least compatible enough that your public administration can adapt to the processes within the community and ensure its smooth cooperation.

Although each open source community is slightly different, the main types of governance models are as follows[19] :

- **Founder-led:** a type of OSS community where a single person, normally the founder of the community, is in charge of making all the key decisions with regard to the evolution of the project. Such a governance type can often be found in smaller organisations and young OSS communities with only a few contributors. As the project evolves, the single decision-maker can also be replaced by a steering committee.

[18] Our survey highlighted the importance of having a clear governance structure. Indeed, survey respondents underlined the importance of having a clear leadership structure (74% of respondents) and clearly defined roles and responsibilities (76% of respondents).

[19] Taken and adapted from: Open Source Leadership and Governance Guide and Red Hat's Guide to open source project governance models.

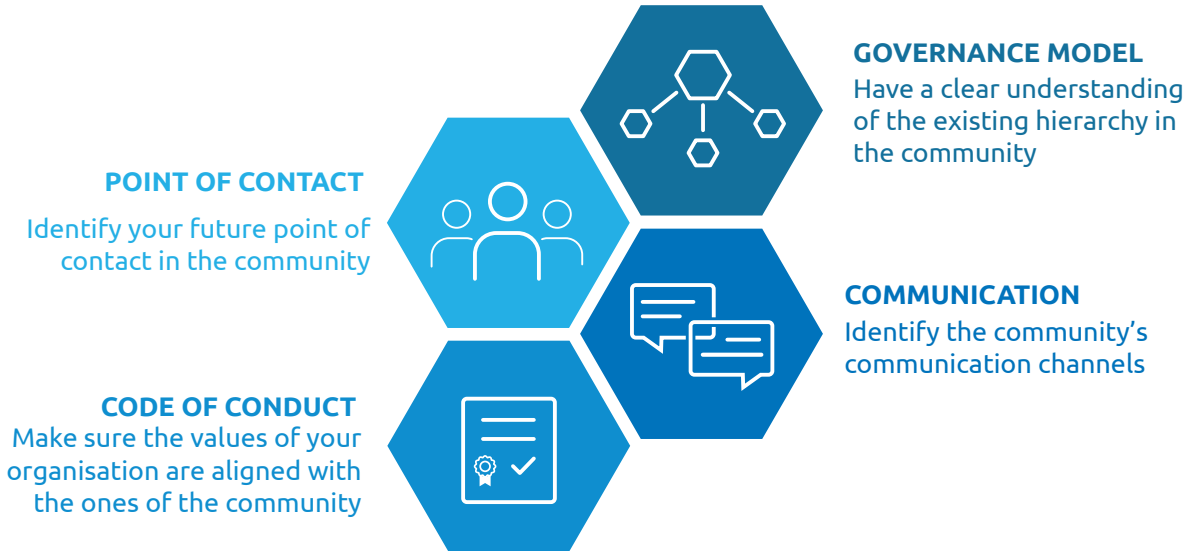
- **Merit-based:** a community where responsibilities are assigned based on merit, i.e. developers' commitment and contributions to the project. In such communities, decisions can also be driven by voting to ensure member-driven project evolution.
- **Member-driven:** a community without a strict or formal governance model, where contributions are made by individual members and the evolution of the project is driven by consensus-building among community members with varying degrees of influence. Usually, the governance of such projects is implicit, and it might be difficult for new joiners to grasp.

Each governance type comes with its own benefits and drawbacks, and it is not unusual for a community to adapt its governance structure as it evolves.

You will need to identify a future **point of contact** in the community, and assign a point of contact within your own organisation. This will ease your onboarding in the community and allow you to get more information on the project. Similarly, understanding the community's communication channels will help your team to stay on top of any community updates and easily collaborate with key members.

You should also check the community's **code of conduct** to see if it is aligned with your own needs and public administration's values.

Figure 4 Understanding existing communities



How mature is the community we are joining?

The maturity of the community will affect how you collaborate with it. The following criteria that may help you gauge the maturity of a particular community:

- size of its developer community
- size of its user base

- number of recent commits to the code
- sustainability and diversity of its funding model
- frequency of update releases
- date of last update.

If the community that you wish to join was only created recently, you will be in a better position to help shape the functioning of the community and to establish yourself as a key player regarding decisions about the core features of the solution. Smaller and newer communities also allow you more flexibility when collaborating with other community members as rules and practices are typically quite new. However, 'young' communities might require the mobilisation of more financial and human resources in order to kick-start their growth.

If the community you join is large and mature, you will benefit from extensive existing content. Most probably, the OSS will already be at a mature stage of code development and some contributors may have developed substantial forks and plug-ins. Some of these forks may well be established under distinct licences, some of which may be less reciprocal, but even this is a sign of community and project health because it attracts different user bases. It might also offer capabilities to host the software you need on their own platform. However, individuals involved in the community will have reduced influence over the direction of the community and the OSS product itself.

To conclude, the choice of open source community depends on your financial and technical resources, as well as the type of software you are looking for. In both cases, you should pay attention to the interoperability of this solution with the software already in use in your organisation.

Are the licensing aspects of the community aligned with our public administration's needs and infrastructure?

To reap the full benefits of joining an existing community and reusing its software, you should assess the compatibility of their licensing framework with your own public administration's needs and existing legacy infrastructure. You should liaise with your legal department to ensure that the internal procedures in your administration are permissive enough to work with the particular OSS licensing framework.

You can use open source licence compliance and compatibility assessments, such as the Joinup Licensing Assistant's Compatibility Checker or the open source Fossology project..

How can we make the most of the OSS community behind the software?

If you have decided to use an open source solution, it is best to fully exploit its potential. Unlike proprietary solutions, open source solutions benefit from a community of developers around them who fix bugs, develop new features and plugins, and contribute to the code. Below are some tips on how to make the most of the open source community behind your software.

The core team of Voice of Groningen chose CONSUL as it was a well-documented solution with a strong and supportive community of developers behind it. Whilst the software has been forked more than 550 times, a lot of communities contribute upstream and share their software updates with CONSUL.

- **Interact with the community** if you have questions about the installation or use of the software.
- **Contribute** to the community by developing code, contributing to or creating documentation, and resolving issues.
- **Have a look at other public organisations** using the same software. Their variation of the software can provide inspiration for your own version.
- Make sure that citizens are aware that the software your organisation is using is open source. Not only is it a guarantee of transparency, it also gives **visibility** to the community and to the OSS solution. This way, your organisation is contributing to the sustainability of the open source community.

In order to make the most of the open source solution, it is important to not only receive from the community, but also to contribute to **the sustainability of the solution**. Should your organisation develop plugins, write documentation or create additional features around the software, these elements should be published under an open source licence, preferably the same as the solution itself, and shared with the upstream community.

2.2 Facilitate sustainable collaboration

There are several steps that you can take to ensure that your public administration will reap the full benefits of collaborating with an OSS community.

How can we adapt our procurement rules and processes to work with OSS communities?

Appropriate procurement procedures and rules are a prerequisite to healthy collaboration with OSS communities. You should assess whether your procurement procedures are permissive enough to facilitate the purchasing of open source software and related software, including the possibility to run pilots and develop prototypes[20]. For example, public procurement templates should have clear and permissive clauses on purchasing open source solutions. The templates

The Italian government has dedicated Guidelines on the acquisition and reuse of software for public administrations, which are legally binding.

[20] Public Digital (2021), Open source in government: creating the conditions for success. Available at https://public.digital/

should also allow civil servants not to only purchase OSS solutions but also engage with the community surrounding the software. Public administrations are encouraged to maintain lists of compatible OSS licenses, and those should also be specified in public procurement templates when purchasing software. Check whether your country has guidelines on public procurement and open source solutions. For example, the previously mentioned open source discussion groups Pleio launched by the Dutch government has a dedicated Toolbox that provides key information on how to engage with open source in the public sector. One of its elements is a detailed explanation of key legislation outlining the use of open source and provides a detailed and informative decision tree of various legal aspects to take into account when considering working with open source. Your administration could implement similar guidelines. Pleio also includes a dedicated group established for 'Purchasers of Open Source Software' to discuss key aspects linked to OSS procurement as well as publicly available questions and answers about issues pertaining to procurement.

Many countries in Europe have published procurement guides that provide a fair playing field for OSS against proprietary software such as Estonia, Slovenia, and Malta.

For an overview of which countries have adopted policies about OSS in procurement, you can consult OSOR's report on the Status of open source software in Europe. You can also consult the individual Country Intelligence Reports to read the detailed descriptions of these policies that have been implemented by various public administrations in Europe. The Linux foundation has published a guide on open source software for procurement professionals, which addresses the key questions on this topic.

How to best implement open source software?

Once your organisation has chosen the open source solution, you need to decide whether you will be running the software in your own premises, relying on the upstream community to host it for you, or modifying the source code altogether and tailoring it to your own needs.

Relying on an existing software version is a good way to start your open source project while minimising financial and technical outputs for your public administration. Hence, you might want to choose this option if you have limited IT resources and the existing solution is strongly aligned to your needs.

Creating add-ons and plug-ins is useful when you want to add tailored features to the existing software. However, you should follow the open source industry best practices and share your changes with the upstream community. If the changes are important and relevant to the broader community, they can potentially be included in the upcoming software release. Contributing upstream is an crucial aspect of giving back to the community as code-sharing is one of the key values of OSS.

The Linux Guide on Participation to Open Source Communities lists several best practices when it comes to contributing to the upstream community.

What are the strengths that we can offer to the community?

When choosing to join a community, you should assess what kind of contribution you are willing to make. The potential resources you can mobilise include:

- financial resources;
- human resources, both in terms of technical human resources such as developers, and supporting human resources such as project managers, community managers and communication specialists;
- technical knowledge and resources, assuming that your organisation has the capacity to create content for the open source solution that could be shared with the community;
- leverage of your public administration's involvement with the community so as to attract other public administrations, thus helping the community to grow.

Contributing to the open source project helps your public administration to gain substantial respect within the open source community, which in turn can expedite your transition from a minor community player to a core decision-maker. Decision-making control is beneficial because it will allow your public administration to direct the trajectory of the open source project in line with your own needs. Even if you are working on a fork of an OSS product, make sure to contribute upstream and share your updates.

2.3 Contribute to the solution in the long run

Joining an OSS community is not a one-off engagement. For a more complete view of your potential contribution, assess your capabilities and resources in the short-, medium-, and long-term. An honest and representative assessment will prevent you from over-committing beyond your capabilities.

Your public administration will have to find ways to contribute, collaborate and give back to the community in the long run. Collaboration is one of the key principles behind the success of OSS

How can we promote the solution in other public administrations to help grow the community?

Growth is crucial to any community's sustainability[21] . Therefore, as a public sector community representative, you can help to expand the community's user base. If you happen to know a public administration like yours that could be interested in the open source solution, share your documentation. You can also plan to **pool your resources** with several other public bodies to promote a solution. This strategy is particularly useful for small public entities which, taken alone, often do not have the financial or technical resources for a long-term involvement in an

[21] 45% of our survey respondents deem a community's capacity to attract new members as a 'very important' or 'important' sustainability factor.

open source community. This will allow you to build expertise across public administrations that can then train, implement and offer policy suggestions to other public bodies.

How can we contribute to the visibility of the community?

Contributing to the visibility of the OSS community is essential to its sustainability[22]. Without visibility, the open source community is unlikely to attract new members, thus putting the long-term maintenance of the solution at risk. Public organisations using open source solutions should therefore market the community and the software behind it, allowing viewers to access the software's repository.

Your organisation can also **communicate actively** about the community. We encourage the development of a dedicated online space for the solution that your organisation plans to use. It is worth outlining the software's open source characteristics and providing a brief explanation text about the solution and the community behind it if the website is addressed to the wider public.

[22] 64% of our survey respondents highlighted the importance of communication in the sustainability of an open source project.

3

Building your own public sector OSS community

3. Building your own public sector OSS community

If you have decided to create a new open source community, this section will explore the key issues that you may encounter and how to overcome them. In the first few months, you will likely have to make several important decisions that will impact the sustainability of your community. Such decisions should be made with a long-term perspective, all the while accounting for the future maintenance of your software.

How to build an open source community

1. Public sector's way of working
2. Focus on the software
3. Organise the community
4. Keep the community active
5. Grow your community

3.1 Operating within your public administration

Given that the OSS community is to be launched within a public administration, the nature and operation of the community will inherently be affected by the public administration's ways of working. Therefore, to ensure that the community is well positioned and recognised within the public administration, it is recommended that you promote the community and inform your colleagues about the benefits of and ways of working with OSS.

How to establish collaboration between an OSS community and the public administration it is attached to?

Building relationships outside your community will help to boost its recognition. Contributions and resources dedicated to your OSS community have to be recognised and valued by the management and employees. This can only happen if other civil servants outside the community understand what working on an open source solution entails.

The Developers Italia community started by inviting civil servants from the Italian public administration to participate in the community's forums and events, thus helping them to get better acquainted with the working methods of OSS and to recognise the value of the community.

The benefits of the new OSS community should be demonstrated to your peers, management, and the decision-makers of your organisation as early as possible. This could be done by sharing weekly or monthly reports about the recent developments and code contributions to the software. Another good way to showcase your project's growth over time is to define some metrics against which you could assess your community.

For inspiration, you can consult the CHAOSS Community Health Metrics.

It is also important that the hierarchy of your public administration understands the collaborative nature of OSS communities. This will help safeguard the **horizontal and transparent ways of**

working in the community. Furthermore, public sector managers should appreciate the fact that software development is a continuous process that might require several iterations, tests and release cycles before the final product is put together. Even then, software updates and new add-ons are regularly released. OSS communities are not static and there is no end-goal per se. As long as the software is used, the open source community behind it will be needed to publish updates and respond to user requests.

Should we set up an Open Source Programme Office (OSPO)?

To better position your OSS projects within the public administration, you may consider setting up an Open Source Programme Office (OSPO). OSPO's responsibilities will vary depending on the size of your organisation and its OSS engagement scale. Its main mission is, however, to nurture and support the open source approach to software development, foster its organisation's capability to work with OSS, and engage with developer communities. The European Commission, in its renewed open source software strategy, has established an OSPO and tasked it with facilitating all activities outlined in the strategy.

Setting up an OSPO also allows you to get in touch more easily with other public administrations engaged in open source projects. OSPO networks offer useful resources to leverage OSS, create OSPOs and open source programmes, and provide information on good practices regarding the health of open source communities. For instance, the OSPO++ network organises bi-weekly working group meetings to exchange information on the benefits of OSPO programmes and share advice on potential challenges among practitioners and public administrations or non-profit organisations looking to set up an OSPO. The OSPO++ network also publishes a series of podcasts on good practices when setting up and maintaining an OSPO. Another example is the OSPO alliance which provides useful resources on the use of OSS to any public or private organisation wanting to engage with open source. One example is the Good Governance blueprint.

Description of functions and tasks that can be carried out by the OSPO have been proposed by TODO Group.

How can we ensure the community's growth within our public administration?

As your community will be set up within a public administration, you should work to ensure that its decision-making process does not slow down your community's growth. **Raising awareness of OSS benefits** and your community among civil servants and the political hierarchy will encourage openness in your public administration with regard to fostering the growth of an OSS community. You should highlight the fact that OSS helps prevent vendor lock-in and ensures your administration's digital sovereignty. You could invite your colleagues to contribute to community forums, participate in any online or physical events and encourage them to meet community

members to better understand the nature of OSS communities. Having an above-mentioned OSPO in place will also help your administration to build capacity to work with OSS.

Bearing in mind that public administrations are hierarchical, which stands in contrast to the the horizontal communal nature of OSS projects, launching and growing your community may take patience and determination. The decision-making process within public administrations depends on long-term planning and budget cycles, which in turn depend on the political priorities at the time. Nevertheless, the OSS communities that we have studied all demonstrated **flexibility and agility** to work with and within public administrations.

Who can become our community's members?

A public sector open source community should always arise from the needs of the public administration. However, just because the project is created and funded by a public administration, it does not imply that the community cannot evolve beyond the frame of a single public organisation or branch out to other users. In fact, our research shows that an increase in the number of actors involved in the community as **active contributors** strengthens its sustainability[23]. Indeed, the Growing Open Source Projects with a Stable Foundation report recommends that the technical and community governance be siloed from each other. This will allow the technical contributions to the project to remain open. It will also enable various contributors to take part in developing the code base without influencing the evolution of the community's governance.

The open source community behind the CONSUL software has an active strategy of diversification of its contributors and users. This strategy prevented the development of an unbalanced dependency of the open source community towards a single decision-making authority, in this case the City of Madrid which created the software.


source: pixabay.com

[23] According to our survey respondents, the community's capacity to attract new members and retain current members are key sustainability factors, deemed as 'very important' by 46% and 53% of our survey respondents respectively

3.2 Focus on the software

The maturity of the community's software is crucial for the community's sustainability as it is the foundation on which the community is built. There are several elements that you need to consider when releasing and maintaining the community's code.

How can we choose the right licence?

Choosing the appropriate licence allows the software to gain visibility. It is also a guarantee for all actors involved in the project that the source code will benefit the open source community. It is good practice to choose an open source licence recognised by the Open Source Initiative (OSI). Furthermore, it is recommended to choose a licence commonly used in the programming language or framework ecosystem that your project will build upon. This will ensure continued participation from outsiders and lead to a more sustainable community. If you decide to adopt a less-than-reciprocal licence, it is important to add a clause to the effect that you will update/change your software licence if certain conditions are not met. These would include failing to grow a strong user base or the community of public administrations losing interest in the project at some future date. We reiterate that an OSI-approved licence is usually best, but even within the list, there are less reciprocal options. A permissive licence is best when attempting to build a healthy community. A less reciprocal license – one that does not oblige the party adopting it to maintain an open license in the future – does not build trust within the community. Trust is a concern because the community needs to believe that parties using their software will contribute back. Communities that have a highly reciprocal license for their software project are more likely to attract a diverse range of contributors.

Some tools that can help you in the process of identifying the right license include Joinup Licensing Assistant and Choose A License. Once chosen, open source licence compliance-checking software, such as the open source Fossology project, allow you to run licence, copyright and export control scans from the command line.

Additionally, open source communities need to check whether the country where the project is taking place has **requirements** regarding the licensing of open source solutions by the public administrations. For example, in France, public administrations are obligated to publish their source code under an open licence listed by the Decree, and in Spain, public administrations should follow the Guidelines on the Publication and Licencing of Assets, that explain how to publish and distribute open source software.

Which programming language should we choose?

The choice of the programming language is another key element of an open source project. It depends on the nature of the software, but whenever possible, you should choose a well-known language to allow more developers to

City of Groningen's adoption of CONSUL was slightly slowed downed by the software's programming language. As the software is written in Ruby on Rails, the Groningen team found it difficult to find local developers proficient in this programming language, as it is not widely used in the Netherlands.

contribute to the project and foster its **reusability**.

How should we approach software releases?

Having an overview of your planned product releases, as is the case with proprietary software, helps to add structure to your project. A **project roadmap** will be a helpful way for your team to plan the key milestones associated with your software's development. When it comes to OSS, new software releases often happen in 3- or 6-month cycles.

A designated team within Integreat updates the software, conducts peer-reviews, and follows up on any bug reports. They ensure that Integreat is up to date, responsive to the community's needs, and digitally relevant. The mature and user-friendly packaging of their software is one of the key factors explaining their success and rapid growth.

Additionally, **planned software releases** should be announced in advance. This will create anticipation, boost your community's visibility and help the community to prepare for the new release. More specifically, having a clear idea of the next version release will allow community members to anticipate potential new bug fixes, plan training sessions, and to set expectations for their workflow.

How should we ensure code quality?

Prioritising **quality over quantity** with regard to the development of the source code is a key element of an open source project's sustainability. To ensure that the source code meets high quality standards, open source communities need to put **testability mechanisms** in place and foster **peer-review processes**. Giving more responsibilities to individual members of the community can also motivate them to keep the highest standard of code quality without relying too much on the community's code testing capacities.

Furthermore, to maintain the long-term software quality, you need to carefully evaluate (and not underestimate) the workload required to keep the software updated, fix bugs and respond to users' queries. In many cases, software maintenance is a full-time job.

What should we do regarding software documentation?

Well-documented software makes it easier to onboard new members and foster software reusability[24].

For more information on how to write software documentation, you can consult advice published by the Write the Docs community. Additionally, the Foundation for Public Code outlined suggested requirements for documenting software developed by public administrations.

Does our software have to meet GDPR requirements?

When building an open source solution for a public administration, keep in mind the specific requirements that it entails. Lack of compliance with the requirements of the General Data

[24] 61% of our survey respondents consider that documentation is an important element of the sustainability of the open source project. Some of our interviewees even believe that 50% of developers' time should be dedicated to documentation.

Protection Regulation (GDPR) is an obstacle to the use of some software. Open source communities need to make sure that their software is **GDPR-compliant** and that information about its compliance is easily accessible to external users. It is also worth checking whether the software that your public administration is developing must meet any national requirements or regulations.

How do we make the software accessible?

It is equally important to ensure that your software meets the EU and international standards for **accessibility**. The European Commission's Web Accessibility Directive, in force since 22 December 2016, lays down the standards and procedures associated with ensuring the accessibility of European websites and mobile apps of public services.

The Developers Italia community decided to invest their resources in physical gatherings. Not only did this stimulate communication and more efficient collaboration, these gatherings also helped to put a face to the community.

Additionally, the W3C has put together a detailed guide on Accessibility, including international accessibility principles.

When to make the source code available?

It is good practice to make the code publicly available from the project's inception, starting with the very first line of code. This way, more developers are encouraged to join the community. Waiting too long before publishing the source code not only results in fewer developers being involved but also contradicts one of the core principles of open source – making the source code available.

In addition to publishing software, you should maintain and keep it up to date. Ideally, the public software repository should be the main 'working' software repository used by the project team and the community.

The UK Government has put together a dedicated guidance explaining the value and process of making source code open from the start.

3.3 Organise the community

Organising OSS communities helps to guarantee their smooth operation. Given the hierarchical nature of the public sector, organising the community becomes especially important in demonstrating a project's success and sustainability. Clear governance and operational guidance should be agreed upon with the community so it can operate and grow freely.

How should the decision-making structure of the community be set up?

The sustainability of any open source community depends on strong leadership and open management. Community governance, set up transparently, should strike the right balance between openness and the organisational structure of the public administration[25].

- **Identifiable public sector manager:** The role of public sector manager(s) is to enable flexible and transparent modes of operation for the community. Any decisions taken by public sector management should be clearly reported back to the community along with justifications for such decisions. Considering the openness of open source communities, public sector manager(s) should consult with community members as frequently as possible to ensure that the community is truly member-driven. This will also help to strengthen members' motivation to contribute to thecommunity and its project(s)[26].
- **Project manager / steering committee:** The project manager or steering committee should demonstrate a strong understanding of OSS and the nature of the community as well as knowledge of public sector operations. This will allow them to act as facilitators between the community and the public administration within which it operates. Additionally, the project management team should include the project's key developers as they have the most specialised knowledge of the software.

For the sake of long-term sustainability, the community's management should also take into account potential changes to the roles in the community. You should facilitate the **organic growth of the community members' responsibilities** and envisage potential replacements of managers if they are no longer available to steer the community. Resources should also be dedicated to training future community leaders - a strong team behind the community is crucial for its sustainability.

A key part of your community is to have a core team. These are members who make daily contributions to your software, interact with the broader community, and are responsible for making decisions for certain subsets of your community. More often than not, some core team members are also part of the project management team as they tend to have the strongest knowledge of the long-term evolution of the open source software and the community.

One of the factors behind the sustainability of the Lutece software is the role played by core developers in the project. While Lutece's inception stems from a political initiative, the developers' team in charge of its technical development has been driving the evolution of the software since its inception.

Finally, users of your open source solution are another key community group as they share valuable feedback on the new releases. However, this group and the contributors can be viewed as being at the periphery of your community. Unlike the core group, they are more likely to

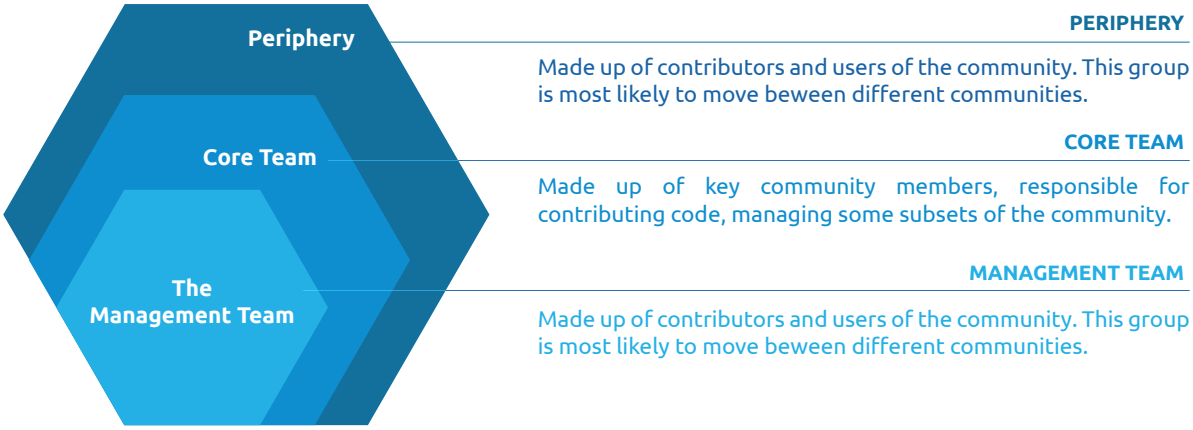
[25] Our research shows transparency of the decision-making hierarchy to be a factor strongly influencing OSS contributors' motivation.

[26] 43% of our survey respondents view the presence of coordination mechanisms among community members as a very important factor to its sustainability.

switch to other software and be less committed to your project in the long run.

These key community layers are summarised in Figure 5 below.

Figure 5 High Level Organisation of OSS communities



What are some key roles & responsibilities that should be fulfilled in the community?

For your community to function smoothly, your core community members should fulfil several different roles. Even though there are many types of open source communities, below are some of the key roles that can be found in most communities, as additionally summarised in Figure 6:

- **Management** – the key person(s) responsible for the community and taking decisions on features, releases, and other activities as well as acting as a bridge between the community and the public administrations' political hierarchy.
- **Core Technical Committee** – a technical management team that is highly committed and is responsible for verifying and approving proposed changes to the code and making the final decisions regarding the project's evolution together with the project leader(s).
- **Maintainers** – members of the community responsible for maintaining and managing certain aspects of the project (e.g. security). Community members who have a strong sense of responsibility and direction are best positioned to be community maintainers.
- **Committers** – community members who have demonstrated dedication to the community and are regular contributors can, with time, be recognised as project committers. They can also be responsible for reviewing new code contributions.
- **Contributors** – any members of the community who participate in forums, comment on issues, organise events and are active in any other way.

Additionally, some members of the core team should also be responsible for promoting the community and be in charge of communication, marketing and social media management.

The team behind the CONSUL software exhibits a strong commitment to community building and outreach. Dedicated team members are tasked with being responsible the search for new users of the solution.

Figure 6 Community roles & responsibilities

The Linux foundation and GitHub Open Source Guides both outline some of the most commonly found roles within OSS communities.

What organisational information should be made available to the community members?

A community operates best when there are clear roles and responsibilities as well as defined means of operation. However, these aspects need to be agreed upon with and driven by the community. Community members are also encouraged to take up roles and responsibilities voluntarily.

The governance structure of the community itself will largely depend on the type of community being set up. A young community may be self-driven, thus allowing contributions to happen spontaneously. However, setting up your community will require strong efforts in the beginning to structure the team, set goals and milestones and build coordination mechanisms.

Clear Community Vision & Mission

A community is more sustainable if it has **a common sense of purpose and a shared identity**. For this reason, new and mature communities alike should have clear, publicly available Vision[27]

[27] Community's vision states what the community wants to achieve in the future.

and Mission[28] statements, which will help foster a sense of a community working toward achieving a single goal. They will also help potential new commvunity members to understand the community's purpose, thus encouraging them to join.

Community Guidelines

The rules governing the community should be driven from the bottom-up and agreed with community members. Nevertheless, if you wish to have more formal internal control, the coordination mechanism should not undermine the community's ability to freely evolve, innovate, and develop. A mature community may, over time, become leaner and more informal.

The best way to set out the community's operational model is by putting forward Community Guidelines[29].

They should cover the key elements as follows:

- **Code of Conduct** – outlining the operating principles of the community and expectations for how community members should behave.
- **Roles & Responsibilities** – detailing any specific roles & responsibilities that exist within the community and how community members can get involved.
- **Community's ways of working and key procedures** – outlining the key processes within the community, such as becoming a community member, contributing code, reporting and fixing bugs, and animating the community.
- **Resources** – detailing any supporting resources available to community members, such as online tutorials, documentation, and online forums.

You can host a FAQ on your website or on the development platform that you use for your project. This FAQ may also be divided into two parts: one for contributors and the other for the users of your open source solution.

The FAQ can comprise **various sections** on general questions, definitions, rules, licencing, documentation, and the communication channel.

The City of Helsinki (Finland), for instance, uses GitHub to outline best practices for software development for the city. Developers Italia (Italy) hosts a document website of relevant manuals and documents. Tchap, an instant messaging service used by government officials in France, also hosts an onlineFAQ.

How can we foster a diverse and inclusive community?

Despite the shared values of openness and collaboration, open source communities can still do better in applying diversity, equity and inclusion (DEI) principles. For example, men constitute

[28] Community's mission states the purpose of the community.

[29] Overall, 41% of our survey respondents believed community guidelines to be very important and 41% an important factor for sustainability.

a vast majority of contributors.

If you want to nurture an inclusive community from the start, make sure you create a welcoming environment for new members. Research shows that the first experience of participating in an OSS community is crucial for later participation. Consider having mentors, onboarding kits, and events to ease new members into your community.

Additionally, in your community's Code of Conduct, highlight how your community approaches diversity and outline transparent procedures for resolving issues linked to harassment or discrimination[30].

How inclusive can we afford to be at the start of the project without losing control of the direction?

Your community should be agile and understand that priorities may need to be redefined at times. The outputs of your community will be based on the current needs of the public sector but may, in the future, require changes and new input that will put other projects on hold. Changes may include adding new features and reworking the code at hand to adapt to these new needs. Your community should thus be prepared for **agile methods** but you should define a short-, mid-, and long-term vision to **achieve the set goals**.

Additionally, choosing a few key developers to start developing the software will be useful. You can choose a well-respected figure from the open source world to join the project – even if only temporarily to help secure developers' initial commitment and contribution to the code.

3.4 Keep the community active

An OSS community is driven by the dedication of its members. Thus, ensuring the community's health and vibrancy is vital to its longevity.

How to best facilitate communication between community members?

Rapid and transparent communication is key for open source communities, and there are various ways to facilitate it. For example, the community may establish a place for both synchronised and unsynchronised conversations, in the form of live chats and a forum respectively. In addition to informal chatting, a central information hub should also be set up. This can be a wiki, a mailing list, Discord, Slack, GitHub, or GitLab. A single point containing all information will ensure that no important information is lost or scattered across the various channels. Furthermore, your community may also opt to hold meetings at a frequency determined by you, for example every

To ensure the smooth flow of information between the diverse OSKARI community, the project team has hired a community manager responsible for handling internal and external communication flows.

[30] Singh et al (2021), Codes of conduct in Open Source Software—for warm and fuzzy feelings or equality in community?, Software Quality Journal, available at: https://www.springerprofessional.de/en/codes-of-conduct-in-open-source-software-for-warm-and-fuzzy-feel/18912452

two weeks. These meetings may serve as an opportunity to communicate with your peers or to share any updates on your project. You can choose to use open source video conference tools such as Jitsi Meet, Apache Open Meetings, Jami, BigBlueButton, BlueJeans, or Nextcloud Talk. Some of these tools can be used for free. Public sector open source projects are encouraged to choose OSS for their means of communication in order to boost their credibility within the community.

Public progress reports highlighting weekly or monthly **contributions** are also very popular with community members as a means of ensuring transparency within the community. These updates might also be shared with the public administrations' hierarchy to demonstrate the project's evolution.

How to sustain the motivation of community members?

Motivation of the community members is a key aspect of the community's long-term growth and sustainability . If community members do not feel motivated, they are more likely to leave.

There are several ways to maintain the motivation of your community's members: recognising members' work, transparent decision-making, and organising meetups.

Recognition of members' work

Community members are more likely to be motivated and proactively participate in the community if they feel that their contributions are visible and recognised[31]. This, for example, can be facilitated by having weekly overviews of the community's activities that are shared with the entire community. Another good practice is to recognise OSS contributions and work within an OSS community as part of developers' employee evaluation.

Similarly, active community contributors can be rewarded by being assigned more formal and **official roles with the community**. Such roles and duties include management positions, providing translation services, managing documentation, acting as an organisational integrator, reviewing code, and tracking progress. Allocation of these roles will help to ensure that the community's management is as horizontal as possible within the framework of a public administration.

Another way to recognise members' contributions to the community is by introducing **gamification elements**, such as badges or leader boards, to your community. These might be a fun way to give recognition to and motivate community members. However, before introducing these concepts, assess whether they would be welcome. Some community members might view these changes as fostering competition, rather than collaboration, between members.

Transparent decision-making

Transparent and non-hierarchical decision-making is imperative in ensuring that members feel valued and motivated to participate in the community. Any decisions made regarding the community should be **clearly logged and transparent**. Community members should also, to the

[31] 72% of our survey respondents deem the ability to get credit for one's contribution to an open source community as a 'very important' or 'important' sustainability factor.

extent possible, be involved in planning the next steps and project releases. An organic community is defined by good coordination and the members working together towards the same goal.

Organising meetups

The Developers Italia community decided to invest their resources in physical gatherings. Not only did this stimulate communication and more efficient collaboration, these gatherings also helped to put a face to the community.

As much as open source communities' members mostly interact online, physical community meetups are highly beneficial to the community. While physical meetups should not replace online interactions and hangouts of the community, they might help to add some vibrancy to it. If your **budget** allows for it, your project will benefit from **regular meetups** as these are useful to maintain a sense of belonging and foster information exchange. Furthermore, as your community grows, it might also be worthwhile to organise location-specific meetups for, say, different municipalities using your software. If physical gatherings are not possible, organised online meetups may bring similar benefits.

The management team at the Integreat platform, recognising the importance of a vibrant community behind its solution, organises regular events where both the developers and users of the application can come together and share their experiences of using the software.

3.5 Grow your community

How do we ensure the visibility of our community?

As discussed in section 3.3, some community members need to be dedicated to increasing the visibility of your community. One factor that might help your community be more visible to potential contributors and users is having a dedicated website. It should be easy to access and navigate and provide the most important information about your software. You should use the social media to raise awareness about your software, find like-minded community members, and learn about other ongoing projects. Furthermore, you should list your software in an existing national catalogue and any other independent catalogues.

Are there other public administrations that could be interested in joining the community?

Community growth is an important aspect of any community's sustainability. It is likely that there might be other public administrations with similar needs that could also benefit from your software.

Therefore, your community should dedicate time and resources to **raising its visibility** across other public administrations. Your software might be particularly useful to small public entities which, taken alone, do not have the financial or technical resources for long-term involvement in an open source community.

How do we attract new contributors?

Developers Italia organised a 48-hour code sprint throughout Italy and even in San Francisco! They invited programmers, IT professionals, and students to develop functionality for public administration projects hosted by the community.

There are a multitude of ways to attract new contributors to your community. Most commuities **collaborate** with other public administrations, universities, private developers, private companies and citizens. Once communities reach a mature stage, you should publish clear mission statements and have easily accessible documentation and code. You should also participate in any online or physical gatherings of open source communities. There are many OSS focused events taking place across the globe every single year. Your community could attend EU-funded workshops and conferences, such as the Sharing & Reuse Awards, where you could showcase your project and boost its visibility.

If you have resources to spare, you could take a more pro-active role in attracting new community members. Hosting a hackathon is a great way to involve interested citizens and potential new community members.

How do we approach the departure of members?

You should be aware that it is natural for community members to leave. Indeed, high turnover of peripheral members is a sign of health in a community. Movement of members between different projects generates new idea circulation and innovation. However, core member loss is a more serious concern. Departing members should be quickly replaced with new ones so your community grows organically. For this to be a smooth process, you should document the evolution of your community (e.g., by tracking key decisions and maintaining meeting minutes) and have onboarding kits ready for new joiners. In the case of departing core team members, it is best to select a replacement from within the community – somebody who has good knowledge of its evolution and is familiar with the required responsibilities in the new role. In successful open source projects, such as Linux, the community often has conversations about 'grooming' and training replacement leaders for the possible departure of Linus Torvalds, the founder of the Linux community. This is good practice for all projects. The departing member should also take time to train their new replacement or (at least) prepare guiding documents for the role, as well as make sure the documentation corresponding to the area of expertise on the software is available to the community. Their software skills are important, but passion for the project and charisma will be highly effective in rallying the community so that the latter endures.

Generally speaking, an OSS community with a strong developer core and a large body of peripheral developers with a high turnover is a good indication of a community that is doing well and evolving naturally. Hence, as long as you have a pool of active contributors, you should be able to fill departing members' roles without major complications.

4

Long-term sustainability

4. Long-term sustainability

If there is one thing that you should take away from these Guidelines, it is that the sustainability of OSS communities is not a one-off investment. Once you either successfully join or launch an OSS community, it is important for your public administration and your steering committee to keep nurturing and growing the community behind your software.

In the long run, your community's sustainability will rely on the following key factors: a clear governance structure, the vibrancy and health of the community, continuous commitment of the public administration's political hierarchy to the project, sustainable funding, and the maturity of your software.

As mentioned throughout the Guidelines, transparency is at the heart of successful open source communities. For this reason, as your community evolves and grows over time, its governance should remain clear and transparent. This will help you to attract new members, make it easier to promote your software, and ensure the commitment of key community contributors.

Secondly, your community is only as strong as its members' commitment to it. Hence, it is imperative that, over time, core team members remain committed to the software and continue contributing code, fixing bugs, and ensuring new software releases. Similarly, it is important to invest resources in raising the community's visibility so that it can grow over time.

Given that the Guidelines focus on open source communities in public administrations, you need to invest time in guaranteeing the long-term commitment of the public administration to your community. As detailed in the Guidelines, this can be achieved by demonstrating successful project output and providing clear communication on how the community works.

Sustainable funding is essential the community's growth. It will attract new community developers, and the funds can be invested in new features, used to organise events, and help to raise the community's visibility.

Finally, at the core of OSS communities is the software itself. Your public administration should dedicate resources to maintaining the software over time rather than just investing in its implementation at the beginning.

It is our hope that, with the practical advice and scenarios laid out in the Guidelines, you will have more confidence and a deeper understanding of what it takes to launch a public sector open source project.

5

Methodology

5. Methodological Note

Several research methods were employed to produce the Guidelines for Sustainable Open Source Communities in the Public Sector. More specifically, a three-step approach was taken consisting of a literature review, a dedicated survey of public sector OSS community representatives, and the development of five case studies illustrating sustainable public sector OSS communities. Each step was built upon the main findings from the previous steps. This approach allowed us to put together Guidelines based on both theoretical literature and practical findings from the survey and case studies. The outcome of each step is described in more detail below.

Step 1 – Literature Review

The key objective of the literature review was to identify the most recurring success and failure factors of sustainable open source communities. More than 30 information sources were consulted, including academic papers and online resources. The literature review focused on the specificities of open source communities in the public sector as this is the goal of the Guidelines. The outcome of the literature review was a streamlined list of five key success factors that contribute to OSS communities' sustainability: software maturity, sustainable finance, community vibrancy, community governance, and public sector adoption incentives.

Step 2 – Survey addressed to the open source community

In order to validate and expand on the findings of the literature review, we launched an online survey targeting members of public sector OSS communities. Between 16 January 2020 and 15 March 2020, the survey gathered a total of 74 complete responses. In addition to gathering feedback on the success factors behind sustainable public sector OSS communities, the survey also helped us to put together a long list of existing communities in public administrations. A total of 46 examples of public sector OSS communities were identified.

Step 3 – Case Study Analysis

To further explore what makes public sector OSS communities sustainable, we developed five case studies. They were selected from the list of communities identified in our survey, taking into account their geographical distribution, level of administration, and type of community together with its sustainability. The resulting five case studies were: the Developers Italia community launched by the Italian government; the implementation of participatory democracy through the CONSUL platform in Groningen; the Integreat application, originally developed by German students and now used by over 60 municipalities across Germany to provide information to new arrivals; the OSKARI software in Finland and the Lutece software launched by the City of Paris and used across France. All five are available on the OSOR Knowledge Centre.

We had initially envisaged producing four case studies looking at sustainable public sector OSS projects and one looking at an unsustainable project. However, it proved difficult to follow up with representatives of case studies on unsustainable projects and to receive consent to publish

their input. For this reason, all five case studies focus on sustainable communities.

These case studies helped us to gather an in-depth understanding of the similarities and differences across OSS communities in the public sector. They also helped us to better understand how the success factors we identified through our research contribute to communities' sustainability in practice.

More information about the above methodology can be found in a supporting study Success Factors for Sustainable Open Source Communities published on the OSOR Knowledge Centre.

Community feedback

The three-step approach described above was only possible with the kind contribution of the vibrant OSS community that shared their thoughts and experiences throughout the entire process.

Our team held a workshop at the FOSDEM 2020 conference conference to validate the research on the five key sustainability factors and to gather further input from the open source community. We also organised a community webinar where we presented the draft on the Guidelines and gathered feedback from the webinar participants on how the Guidelines could be further developed.

Furthermore, several community members (see Acknowledgements) provided feedback on the draft version of the Guidelines.

Update of the Guidelines

The first edition of the Guidelines for Sustainable Open Source Communities in the Public Sector was published in November 2020. In 2021, the OSOR team decided to further evolve and expand the Guidelines based on community feedback and experience with implementing them.

To carry out the update, community members were welcome to share their feedback with the team, be it general recommendations or specific changes that they wished to see in the Guidelines. In addition to direct remarks, the OSOR team held a webinar where together with the community, the sustainability of open source communities in the public sector was discussed. Webinar participants shared their experiences on the topic and shared insights on which challenges have to be tackled to build sustainable OSS communities in the public sector.

The community feedback was taken into account for the updated version of the Guidelines, which includes further useful tools and good practices that make an OSS community sustainable.

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