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COMMUNICATION TO THE COMMISSION

OPEN SOURCE SOFTWARE STRATEGY 2020 – 2023
Think Open

Contents

1. Introduction

The European Commission aims to invigorate the EU's unique social market economy, promote competition and encourage SMEs — our innovators and entrepreneurs. We want to bring Europe's people together in an inclusive, open approach, to find new opportunities and transition to an inclusive, better digital environment that is ready for the realities of today's global economy.

In all of this, open source software has a role to play.

Open source is present everywhere. All around the world, companies and public services are using the open source collaborative methods to innovate and build new solutions. It powers the cloud and provides professional tools for big data and for information and knowledge management. It is in supercomputers, blockchain, the internet of things and artificial intelligence. It is in the internet. It is in our phones and our TVs. It provides us with streaming media. It is in our cars. It runs Europe's air traffic control. The chances are that, in any new project involving software, from kitchen appliances, through web-based public services to highly specialised industrial tools, most of the code will be based on open source.

Open source is close to the essence of public service, because:

- ✓ it is public code, which makes it a good use of public money, one that promotes freedom of choice and avoids getting 'locked in';

- ✓ it makes it easy to use and reuse software solutions, so we can pool efforts to create valuable cross-border services that are interoperable, and increase efficiency; and

- ✓ it is easy and efficient to add features to open source software, which can be freely shared with anyone, for any purpose. This means that everyone can benefit.

> **Free and open source software**
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> Open source software (or free software) combines copyright and a licence to grant users the freedom to run the software, to study and modify it, and share the code and modifications with others. It facilitates collaboration, innovation, and agility.

Working across the organisation, and joined by Member States, companies and the public at large, we can build new, innovative digital solutions that support our common policies and activities, and work towards technological sovereignty.

Open source allows for incremental innovation, based on the sharing of knowledge and skills. Openness increases trust in public services. It helps to solve complex technological problems by getting others to contribute unexpected solutions.

Being free to inspect and improve, open source offers more options for increasing security. It allows for independent audits and code inspections, so the time and effort spent can be balanced according to need. This improves security, not just for us, but for everyone.

The 2020-2023 open source strategy reinforces the Commission's internal working culture that is already largely based on the principles of open source. However, it will also help the Commission change some of its technological and information management processes.

To build Europe together, we have to get ready to contribute, and be ready to accept contributions from citizens.

The strategy is a practical instrument for achieving digital transformation in the Commission. At the same time, in a world of increasing uncertainty, complexity and change, the co-creation of technology increases our capacity to act independently to safeguard our interests, uphold European values and way of life, and help shape our future.

This strategy sets out how we encourage and leverage open source principles and software development practices to co-create, share and reuse across the organisation. By removing legal barriers, we can make it easier to contribute to open source projects and to share our own solutions. The strategy brings the Commission closer to the open source community, and makes us an agile contributor and an active participant. It encourages us to explore opportunities for dedicated support services for open source solutions that we consider critical. We will make more and more use of open source – in areas where it is practical, in the domain of IT, to areas where it makes sense and domains where it is strategic.

2. Vision

The Commission leverages the transformative, innovative, and collaborative power of open source, encouraging the sharing and reuse of software solutions, knowledge and expertise, to deliver better European services that enrich society and focus on lowering costs to that society.

The title of this strategy, 'Think Open', points to a change in mindset whereby the development of software solutions takes account of openness, sharing and reuse, security, privacy, legal considerations and accessibility[1]. It also indicates a commitment actively to support open source developer communities.

3. Commitment

This chapter links the open source strategy to key EU legislation, policies and plans.

3.1 The President's *Political guidelines for the next European Commission*

The open source strategy supports President von der Leyen's *Political guidelines for the next Commission (2019-2024)*[2]:

  '*... it is not too late to achieve technological sovereignty in some critical technology areas.*'

Open code makes algorithms transparent and allows for independent audits and reproducible builds. By extension, the strategy helps the Commission stay in control of its processes, data, information and technology.

3.2 European interoperability framework

This strategy takes a key principle from the European interoperability framework (EIF) Communication[3] (23 March 2017): removing barriers to a digital single market in Europe.

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[1] Accessible software solutions enable persons with disabilities to use them on equal basis with other people. This is in line with obligations under the UN Convention on the Rights of Persons with Disabilities to which the EU and all its Member States are party.

[2] https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission_en.pdf

[3] *European Interoperability Framework —— Implementation Strategy* (COM(2017) 134).

'Public administrations should not only use open source software, but whenever possible contribute to the pertinent developer communities.'

The strategy sets out how the Commission can 'walk the talk' and lead by example. Its implementation will help bring about the mutual beneficial goals of the EIF: seamless public services that are digital, cross-border and open by default.

3.3 Digital strategy

A well-orchestrated internal approach to open source will also help the Commission achieve the goals of its digital strategy[4]:

'By 2022, the Commission will be a digitally transformed, user-focused and data-driven administration — a truly digital Commission.'

This open source strategy matches the political priorities and activities of the digital strategy. The principal working methods are open, inclusive and co-creative; the results are interoperable, user-friendly and end-to-end secure digital services.

3.4 Digital Europe programme

This strategy links the digital strategy with the proposed Digital Europe programme[5].

'The programme, part of the multiannual financial framework for 2021-2027, shapes and supports the digital transformation of Europe's society and economy.'

The Commission's contributions to the open source solutions that it uses internally are effectively for the public good. Our use of open source multiplies Europe's efforts on its digital capacities and strategic infrastructures. This includes the deployment of interoperable solutions in areas of public interest, and sharing technology and know-how for all businesses, including SMEs and local innovators.

3.5 Data strategy

The strategy complements the European strategy for data:6

'The EU can become a leading role model for a society empowered by data to make better decisions – in business and the public sector.'

Open source code is available to all, which helps to creating interoperable, non-discriminatory and transparent procedures for access to data, AI and machine learning training methods and models.

3.6 Tallinn Declaration

The open source strategy follows the lead of the unanimous call to action by the European Union Member States in the Tallinn Declaration on e-Government[7] (6 October 2017):

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[4]   Communication on *European Commission digital strategy: a digitally transformed, user-focused and data-driven Commission* (C(2018) 7118).
[5]   Commission proposal for a Regulation of the European Parliament and of the Council establishing the Digital Europe programme for the period 2021-2027 (COM(2018) 434).
[6]   Communication on *A European strategy for data* (COM(2020) 66)
[7]   https://ec.europa.eu/digital-single-market/en/news/ministerial-declaration-egovernment-tallinn-declaration

'[The Member States call upon] *the Commission to consider strengthening the requirements for the use of open source solutions and standards when (re)building of ICT systems and solutions takes place with EU funding, including by an appropriate open licence policy — by 2020.'*

The strategy creates the momentum to adapt the Commission's internal rules on software distribution and make this process akin to the rules on the reuse of Commission documents[8].

4. Goals and outcomes

These days, open source software is everywhere. It has reshaped the landscape in the IT industry, is ubiquitous in manufacturing, and is an increasingly common instrument of public services. Governments across Europe and in the worlds' leading nations have adopted policies on open source.

Properly implemented, the strategy, its governing principles and its action plan will help us build and deliver better ICT solutions and services, to leverage the innovative and collaborative power of open source. They will make the Commission part of the open source community, an agile contributor and active participant. By co-developing with other European public-sector organisations and encouraging the sharing and reuse of our solutions, knowledge and expertise, we will deliver better services that enrich society and reduce its costs.

The strategy focuses on transformative and innovative aspects, and recognises open source as a catalyst for change. In addition, it leverages initiatives in the Member States and helps shape the conditions for open source development and government innovation. This chapter sets out the key reasons and principles underlying the new strategy.

4.1 Progress towards digital autonomy

One high-level argument for an emphasis on open source is made in the President von der Leyen's *Political guidelines for the next Commission (2019–2024)*:

'It may be too late to replicate hyper-scalers, but it is not too late to achieve technological sovereignty in some critical technology areas.'

Open source impacts the digital autonomy of Europe. Against the hyper-scalers in the cloud, it is likely that open source can give Europe a chance to create and maintain its own, independent digital approach and stay in control of its processes, its information and its technology, because:

- open source is independent of companies and countries. It minimises the risk of vendor lock-in and getting caught up in political shenanigans or trade disputes;

- open source is the leading model and inherently provides the most flexible platform for software development at the digital frontier, from blockchain, high-performance computing and artificial intelligence to the internet of things;

- by leveraging open source, Europe can devise an approach to cloud computing and software-as-a-service that balances their advantages and risks;

- being open promotes trust in the Union and its institutions.

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[8] Decision 2011/833/EU on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39), Commission Decision of 22.2.2019 adopting Creative Commons as an open licence under the European Commission's reuse policy (C(2019) 1655).

- with open source, Europe invests in its own, independent and competitive position in these technology areas. It can focus on an open, decentralised information society that will also support European actors and fiscal fairness; and

- open source makes decentralised, federated services possible that can be independently audited. It allows Europe to build solutions that are in harmony with its values: united in diversity, open and inclusive, non-discriminatory, and respectful of privacy.

4.2 Implementing the digital strategy

Crucially, the open source strategy helps the Commission achieve the high-level objectives of the digital strategy:

➢ support the Commission's political priorities and activities with secure, state-of-the-art digital solutions;

➢ provide the Commission with high-quality, trusted, borderless digital public services;

➢ enable the transformation of the Commission and maximise its role in policy-shaping;

➢ make the Commission a world-class 'open administration' – a collaborative, innovative and agile institution;

➢ ensure that the Commission's IT assets are secure; and

➢ guarantee the Commission's resilience.

The benefits of using open source software (the code is public, free to reuse and collaboratively adapt and improve; it can be inspected for security issues, is independent from vendors, and gravitates towards interoperable systems) clearly underpin these objectives.

The digital strategy makes it clear that 'collaborative working methods will be the norm within the Commission's IT community to foster the sharing of code, data and solutions'. The principal working methods encouraged by this open source strategy are open, inclusive and co-creative.

To drive efficiencies across the Commission, the digital strategy hinges on the existence of the reusable solutions platform:

'The platform will be built around a catalogue containing reusable building blocks and services, open-source solutions, a corporate architecture, standards, best practices, support and consultancy services'.

We have here a direct link between the digital strategy and the open source strategy: the reusable solutions platform proves the benefits of a working culture based on the principles of open source.
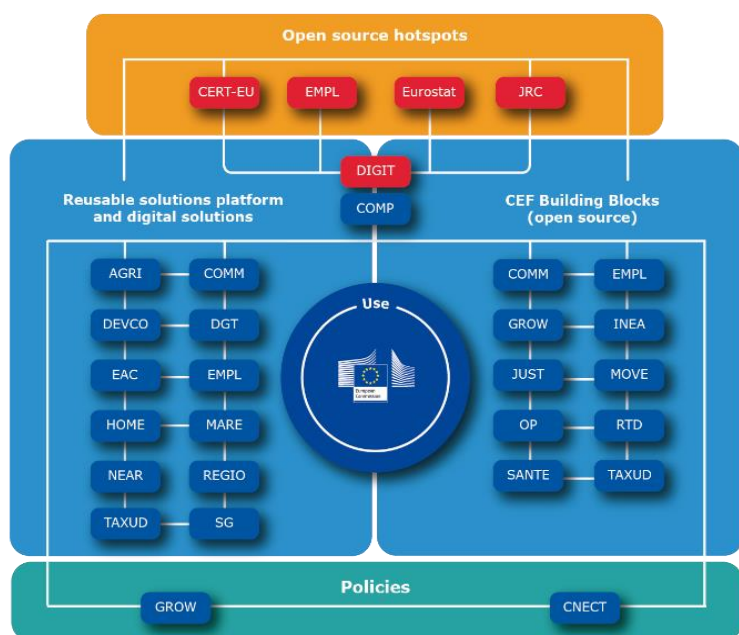
Figure 1:   Getting involved in a working culture based on the principles of open source

Another key instrument in the digital strategy is the Connecting Europe Facility (CEF); here too, the open source strategy provides an actionable link, able to take on board the lessons learned from CEF building blocks to build and foster communities around open source solutions.

The digital strategy refers to the vulnerability scanning of digital solutions and services, securing building blocks and patching procedures. Open source code can be inspected in detail and is easily included in systematic vulnerability scanning. This is another practical link between the digital strategy and the open source strategy.

4.3 Sharing and reuse benefits all

Open source makes it easy to share and reuse software and applications, as well as data, information and knowledge.

This is also in line with the digital strategy:

> *'Directorates-general … will share data and information between themselves and with other EU institutions and EU agencies. Where appropriate, they will also share data with Member States' administrations and third parties.'*

4.4 Contribute to the knowledge society

Sharing the Commission's source code as information that others can learn from or reuse is our civic responsibility. It lowers costs for society. It increases knowledge.

Directive (EU) 2019/1024 on open data and the reuse of public sector information[9], and the rules on the reuse of Commission documents[10] reflect the value of documents created by public organisations and encourage their reuse. Like data and information, source code constitutes a vast, diverse and valuable pool of resources that can benefit the knowledge society. Sharing will help maximise the growth potential of the digital economy, as communicated in the Commission's digital single market strategy[11]:

> *'Information and communications technology (ICT) is no longer a specific sector, but the foundation of all modern innovative economic systems.'*

This is why the strategy aims to make it possible for the Commission to share software using a process comparable to that for its documents.

4.5 Build a world-class public service

Open source is about co-creation and building public services that connect seamlessly across organisational silos and borders. That is why it is a component in most of the actions in the ISA[2] programme[12]. Building a responsible open Europe is something we can only do ourselves and the best way is to do it together.

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[9] OJ L 172, 26.6.2019, p. 56.
[10] Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39).
[11] Communication on *A digital single market strategy for Europe* (COM(2015) 192).
[12] Decision (EU) 2015/2240 of the European Parliament and of the Council of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector (OJ L 318, 4.12.2015, p. 1).

A study[13] for the Commission's Directorate-General for Informatics (DG DIGIT) shows that the open source strategy is in line with the best practices from public services and private companies. It confirms that our strengthened policy on the use of open source software is the norm nearly everywhere. The study's high-level recommendations are:

➢ emphasise the use and benefits of open source;

➢ create a dedicated open source entity that fosters and measures strategy adoption;

➢ improve procurement and product-management processes;

➢ establish an open culture;

➢ collaborate with communities and the open source software ecosystem;

➢ manage legal/licence/intellectual property rights issues; and

➢ enhance and develop the technical infrastructure and services.

5. Governing principles

The open source strategy supports the Commission's aims of radical transformation by simplifying and streamlining processes. It will help to make collaborative working methods the *de facto* standard for the Commission's work internally and with others.

It is important to stress that the principles and the action plan relate to existing work processes. The use of open source is commonplace across the Commission and in many parts of the organisation there is an established open source-like culture. We simply need to do more and keep getting better at it.

Below are the six principles that govern the 2020–2023 strategy:

5.1 Think open

Open-source solutions will be preferred when equivalent in functionalities, total cost and cybersecurity[14].

The Commission is an enthusiastic user of and contributor to open source. This is reflected in its digital strategy, which encourages the IT community to tap into the growing potential of open source, join forces with major commercial players and communities, and mobilise co-creation capacity to support directorates-general in pioneering new solutions.

5.2 Transform

We harness the working principles of open source; we innovate and co-create, share and reuse, and together build user-centric, data-driven public services.

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[13] *Study on open source software governance at the European Commission* (ISBN 978-92-76-10536-7).
[14] Communication on *European Commission digital strategy: a digitally transformed, user-focused and data-driven Commission* (C(2018) 7118).

We adopt a working culture based on the principles of open source, sharing and reuse. We nudge the organisation and its working methods forward by highlighting the crucial role of open source software and related best practices for co-creation and collaboration. Ideally, this transformation will go beyond IT, so that we apply open-source methods when working together and sharing information.

Open source offers practical tools and methods for teams to work together and co-create solutions, to share their expertise freely in order to obtain better results and have their solutions in actual use sooner. In these teams, which sometimes involve several directorates-general, developers look at software code written by their colleagues and try to insert new components. They combine parts, borrow tools and recipes, and together build and extend a collection of solutions they can use to run digital government solutions.

'Inner source' (the creation of working cultures based on open source) will be promoted, in order to bring teams closer to open-source working methods and encourage sharing and reuse within the organisation. This is a step towards opening up more projects as open source and sharing them with the outside world.

5.3 Share

We share our code and enable incidental contributions to related open-source projects.

Wherever it makes sense to do so, the Commission will share the source code of its future IT projects. For publication of these projects, the European Union public licence (EUPL)[15] will be preferred. The Commission will focus these efforts on an EU-centric digital government code repository. In addition, our developers will be free to make occasional contributions to closely related open-source projects.

The principles and actions of the new open source strategy will make it easier to obtain permission to share code with the outside world.

Currently, the paperwork involved in this process takes time to complete and this holds back many of our in-house projects. This situation needs to change.

5.4 Contribute

We strive to be an active member of the diverse open-source ecosystem.

To be an active member of the diverse open-source ecosystem, we will continue to gain open-source expertise to address product management and governance. The Commission will seek to become an active contributing member of key communities where it can add value, and while balancing costs.

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[15] Commission Implementing Decision (EU) 2017/863 of 18 May 2017 updating the open source software licence EUPL to further facilitate the sharing and reuse of software developed by public administrations (OJ L 128, 19.5.2017, p. 59).

On the basis of the principles set out here, we will build and maintain lasting, meaningful relationships with open-source communities, building on experience from CEF, the EU-free and open source software auditing (EU-FOSSA/EU-FOSSA 2) project and the ISA[2] programme. This will contribute to the viability of the ecosystem and facilitate product management and governance.

In addition to sharing source code, the Commission should consider joining open-source programme boards and committees, devise systematic methods for targeted funding, work to improve security and find ways to help critical open-source projects become self-sustainable.

5.5 Secure

We make sure the code we use and the code we share is free from vulnerabilities by applying continuous security testing.

Following IT security best practices and monitoring security advisories, automated continuous security testing will be in place to make sure that open source components that we use in our applications are free from vulnerabilities. Likewise, we will thoroughly test the code that we intend to share.

The Commission already has experience in this area in our security teams and the Computer Emergency Response Team for the institutions (CERT-EU), and from EU-FOSSA/EU-FOSSA 2.

5.6 Stay in control

We promote open standards and specifications that are implemented and distributed in open source.

Interoperability is of utmost importance to the Commission and the Member States. The key to interoperability is the use of well-established standards and specifications. To ensure our digital sovereignty and guarantee a level playing-field, for all future IT developments the Commission will promote standards and specifications that are implemented and distributed through open source software, and include this in its corporate governance approach.

The principles of this strategy will help us choose strategically between closely competing software solutions. They keep our options open. They will allow the Commission to choose non-open technologies where there are good reasons to do so, while encouraging us to plan for future open-source alternatives. They give our developers the flexibility to gain expertise on the diversity of open-source platforms. In return, this is how the Commission will learn about innovative new solutions.

The principles here are consistent with 'state of the art' policies in the Member States (see section 4.5. They are aligned with the EIF, in particular underlying principle 4 (reusability) and recommendation 6 ('Reuse and share solutions, and cooperate in the development of joint solutions when implementing European public services'). They also uphold the principles of the 2014-2017 open source strategy, concentrating on making them actionable.

6. Implementing the strategy

The Commission is an enthusiastic user of and contributor to free and open source software. The 2020-2023 open source strategy will ensure that it becomes even more involved.

6.1 Current situation and lessons learned

The Commission adopted its first strategy for the internal use of open source software in 2000. Since then, the strategy has been adapted and updated multiple many times. The Commission has learned that, to realise the benefits of open source, it has to develop its own capabilities.

The Commission's strategies and actions have helped it level the playing-field for the use of open source in the organisation. In the datacentre, open source has grown to become the dominant force, including Linux, Apache, MySQL and PHP, and open source is used for the vast majority of Commission websites and many online services. The ISA[2] software solutions and the CEF building blocks are available as open source. Our default software development environment is based on open-source tools.
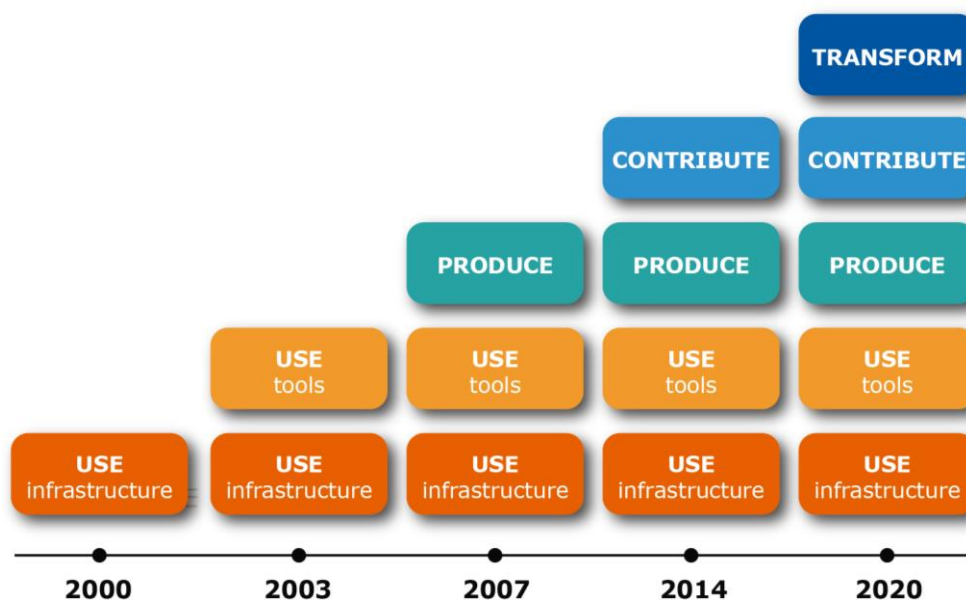

Figure 2: Open source strategy in action

We have learned valuable lessons over the years. The Commission has built partnerships with vendors, and encouraged pilots and sporadic initiatives. It is sharing some of its software solutions as open source and contributes incidentally to open-source projects. It now has a single point of contact on open source software, providing *ad hoc* assistance on product management, procurement, licence issues and actions involving communities.

Examples of open-source solutions shared by the Commission include EUSurvey (an online survey management tool), LEOS (an editor for legislative texts), the many statistics utilities shared by Eurostat, and JRC's scientific tools, such as the ship tracking software SUMO (the search for unidentified marine objects). The EU-FOSSA/EU-FOSSA 2 project helped fix several hundreds of bugs in common open-source tools, including the VLC mediaplayer and PuTTY (software for secure access to remote servers).

The Commission contributes by employing core contributors to:

- Drupal, the website content management system used for the vast majority of Commission websites;

- the HiveProject, software which makes it easier to respond to computer security incidents; and

- (20 years ago) Apache, the world's most-used web server.

Indirectly, the Commission encourages open-source use and development through the INSPIRE Directive, and in research and development initiatives such as FIWARE and the Next Generation Internet.

6.2 The right balance

This Strategy comes with an action plan that details how the Commission will encourage and leverage open source software development practices to co-create, share and reuse across the organisation. In addition to this internal focus on an open-source working culture, the strategy and action plan provide for increasing outreach to open-source communities and (building on experience from CEF, EU-FOSSA/EU-FOSSA 2 and ISA[2]) will help the Commission become a strong force in the community of European public services actively involved in open source.

With these internal and external activities, the strategy and action plan constitute practical instruments to help achieve the digital transformation of the Commission.

6.3 Open Source Programme Office

This strategy is firmly rooted in the Commission's and the wider EU policy context. For it to succeed, a proper enabling environment must be put in place to guide, encourage and nudge change across the organisation.

The strategy and the action plan are inextricably linked. The pivotal point will be an Open Source Programme Office that enjoys genuine political and organisational support, involving all directorates-general. The Office will act as facilitator for all activities outlined in the strategy and the action plan. It will assist subject-matter experts, encourage the directorates-general and help balance internal focus and external activities.

As domain leader for IT, DIGIT will be responsible for setting up and running the Programme Office. This will allow it to set priorities, measure outcomes and report on progress.

DIGIT will make an annual budget request for the Programme Office and the action plan, to be reviewed and approved through the normal budgetary procedures. Using the existing corporate IT governance structures, DIGIT will report on, monitor and review the action plan, and deliver a mid-term review of progress and implementation of the strategy.

6.4 Actions and impact

The best way to lead is by example. This strategy will rapidly produce tangible evidence of the benefits of a working culture based on open-source principles. In addition, by simplifying the rules on sharing Commission software and contributing to open-source projects, it will prove the value of open source to the organisation and to society at large.

These are the main actions:

Open source strategy main actions	Impact
Set up Open Source Programme Office	Expedite all activities in the action plan
Set and promote the inner source default	Enable co-creation and collaboration
Enhance the software repository	Enable co-creation and collaboration
Revise software distribution practices	Process simplification; lower cost to society
Enable and create innovation with open-source labs	Drive innovation; encourage co-creation
Develop skills and recruit expertise	Contribute to staff recruitment and retention
Increase outreach to communities	Encourage innovation; improve services
Integrate open source in internal IT governance	Increase organisational efficiency; foster innovation
Ensure security	Increase value of open source to the organisation and society
Encourage and promote inner source	Instrumental to success of strategy and actions

Table 1:   Impact of action plan

These actions will provide the tools to reinforce and extend the open-source working culture. Our source code will gradually become available to all developer teams in the Commission. Once the legal barriers are removed, we will make an increasing number of our solutions publicly available. We will then also be able to contribute to the tools on which we depend. This will help prepare us to accept contributions to our own work from outside the organisation.

We will make sure that the open source software reused by the Commission is free from security vulnerabilities. Similarly, we will include in our security testing all of the code that we make available as open source.

The open-source working methods and tools will be available to interested colleagues and we will help them try out innovative open-source solutions. We can focus on recruiting staff with proven open-source expertise and strengthen ties with open-source communities, by organising joint activities and finding practical ways to help projects achieve sustainability.

When selecting new IT solutions, we will put more emphasis on the role of open source. By balancing immediate technological needs and future flexibility, we can take account of sovereignty, openness and long-term interests.

To make sure these actions are executed in an organised, coordinated and scheduled manner, the strategy establishes a small Programme Office. It will liaise between projects, teams and subject-matter experts, and encourage the organisation on its path towards an open-source working culture.