SOVEREIGN TECH FUND

Evaluation Report
Pilot Phase

APRIL 2023

The Sovereign Tech Fund (STF) invests in the maintenance, improvement, and development of open digital base technologies that are in the public interest. The goal is to sustainably strengthen the open source ecosystem and empower the people behind the projects, focusing on security, resilience, and technological diversity.

The program is the first of its kind to recognize the importance of digital infrastructure for competitiveness, innovation, and democratic principles, and the first to specifically invest in this infrastructure. In the long term, the Sovereign Tech Fund aims to strategically pursue and ensure digital sovereignty (the self-determined use of digital technologies and systems by individuals, companies, and governments).

The Sovereign Tech Fund is financed by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) and started its work in September 2022 within SPRIND GmbH, the Federal Agency for Disruptive Innovation. The official launch took place in the Bundestag on October 18, 2022. It was hosted by Dr. Franziska Brantner, the Parliamentary State Secretary at the Federal Ministry for Economic Affairs and Climate Action with over 45 guests from politics, business, and civil society. For the fourth quarter of 2022, around €1,300,000 was budgeted to validate the STF model, and around €1,250,000 has been spent on setting up the program and the pilot round of nine projects.

The pilot round began in November 2022 and the contracts for the pilot projects are set to conclude in May 2023. For 2023, the STF has €11,500,000 to spend on scaling the program, piloting a new bug bounty program, and investing in approximately 35 projects. The implementation plans are therefore closely aligned with the parameters developed in the feasibility study. The STF is now entering the post-launch phase.

THE SOVEREIGN TECH FUND – BASICS	
Funding amount per project	€50,000–500,000
Project duration	6–24 months
Projects per year	Approximately 30
Financial volume (in total)	Approximately €10 million per year
Additional support	Coaching, audits, consulting, etc.
Funding recipients	Few or no restrictions

POST LAUNCH:

- Ongoing optimization of regular operations, mapping of the ecosystem, and expansion of the database for eligible software components

- Continuous collection, evaluation, and implementation of feedback from communities

- Regular communication with opinion leaders and an expanded public relations effort

Goals

This report presents the findings from the pilot phase. The STF feasibility study outlined the need to test processes and validate assumptions in this initial phase. These include the processes for establishing the STF, as well as the selection and commissioning of the pilot projects.

The report includes both the STF team's experiences and the results of the pilot round evaluation. The evaluation is based on **interviews** with six of the nine projects in the pilot round, for which participation was voluntary.[1] The aim of the semi-structured interviews was to gain insights into the projects' funding experiences to further optimize the STF's work. In particular, the STF wanted to better understand the projects' perspectives on the support process and contract drafting, the relationship with the STF team, and the importance of the support for the projects and their future plans.

Based on these findings, the STF is adapting working methods and processes and defining the next steps in the **post-launch phase**. Since the STF intends to work "open source" itself, it is making its internal findings and experiences public and reusable for others. In the next phase of the STF, the processes will be regularly evaluated, and knowledge gained will be published in suitable formats. By serving as a continually evolving **blueprint**, the STF aims to scale its positive influence on the open source ecosystem and similar initiatives worldwide.

This first assessment focuses on testing the core hypotheses from the STF feasibility study. This applies especially to the areas of organizational development and process design, with a particular emphasis on scouting and procurement, and the external perception of the fund. In the next phase, the aspects of the STF that have already been tested and evaluated will be professionalized and scaled up. The STF will also work on other areas, above all non-monetary support through services such as security audits and the creation of a database on open digital base technologies.

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[1] The interviews and synthesis of results were conducted independently of the STF program team.

Organization

To validate the processes outlined in the feasibility study and to establish the Sovereign Tech Fund, four people were employed by **SPRIND**, and external experts provided additional support.

This approach had several **advantages**: For the test run of the program, STF did not need to set up new structures first; it could rely on processes and systems that had already been tried and tested. This **saved resources and accelerated the process**. It allowed the STF to focus on the core questions for the validation of the feasibility study: How does scouting of open digital base technologies work? How does STF approach suitable developers or organizations to commission work? How is the procurement process organized?

SPRIND has shown itself to be a very suitable partner, as the organization is still young, and has set up and scaled many processes in the recent past. They can share from their **practical experience** when similar questions and challenges arise at the STF. In particular, the communication with procurement and management was decisive for the STF's successful launch. SPRIND and STF share many complementary goals and objectives. **The maintenance of existing digital infrastructure and the capacity for and speed of developing emerging technologies are directly interlinked**. This is because a resilient and functional open source ecosystem is essential for innovation of any kind. It provides the foundation for innovative and agile science, entrepreneurship, and technology development. The fact that the STF, as a structural innovation in its own right, is being incubated at SPRIND has been doubly beneficial for establishing the STF's structures and mission in the pilot phase.

Although the STF used and adapted SPRIND processes for selecting and commissioning projects, there are no established mechanisms for **safeguarding open digital base technologies as digital infrastructure**. This is because there is limited public understanding of the necessity of doing this. In this context, SPRIND's pioneering work in using existing mechanisms to commission and procure work was also beneficial for the STF.

Developing its own **identity** (for example, by being an independent organization) and the public perception of the STF are strongly influenced by the size of the program and the type of organizational structure. The STF's long-term relative autonomy and operational independence are also important for strengthening the **target group's trust** in the organization and the **credibility of its mission**. At present, trust and credibility are primarily established through the individual team members and their long-standing connections within the community. However, the goal is to transfer that personal trust to the organization. The mutual trust between the projects selected in the pilot round and the STF program team shaped the entire application process: from contacting potential projects, scoping activities and milestones, through concluding contracts.

The participants in the evaluation interviews even reported that they did not initially expect any benefits through their contact with the STF, even though in some cases the STF program team already knew the participants. The personal contact contributed significantly to closing the public information gap at the time and gave the STF additional legitimacy.

> *"The thinness of the website made me question if it's legitimate. But [the STF program manager] is legitimate."*

For the continued success of the STF, program managers need to be well-connected in the open source ecosystem to adequately address legitimacy concerns. Attending relevant conferences and face-to-face events remains an important aspect of building trust within open source communities. Additionally, the STF must develop and make more information publicly available about the program and make this information accessible in appropriate formats such as podcasts and blog articles..

Processes

In the pilot phase, STF selected and commissioned nine projects. The projects are OpenMLS, curl, WireGuard, OpenSSH, Bundler/RubyGems, OpenBGPd, Sequoia-PGP, Fortran Package Manager, and OpenPGP.js/GopenPGP.

The pilot round made it possible to test various STF processes: **Scouting and prioritizing** critical open digital base technologies that are in the public interest, and **matching** (identifying and approaching suitable people to commission work on these technologies –especially smaller organizations and individuals). Subsequently, as part of the **scoping** process, the program team developed appropriate work orders for each project.

At the same time, the STF set up an open application system and conducted research on quantitative metrics, complementing the qualitative process. The team is still in the planning stages of developing matching funding initiatives with larger companies for work on critical open software components and of a catalog of non-monetary support.
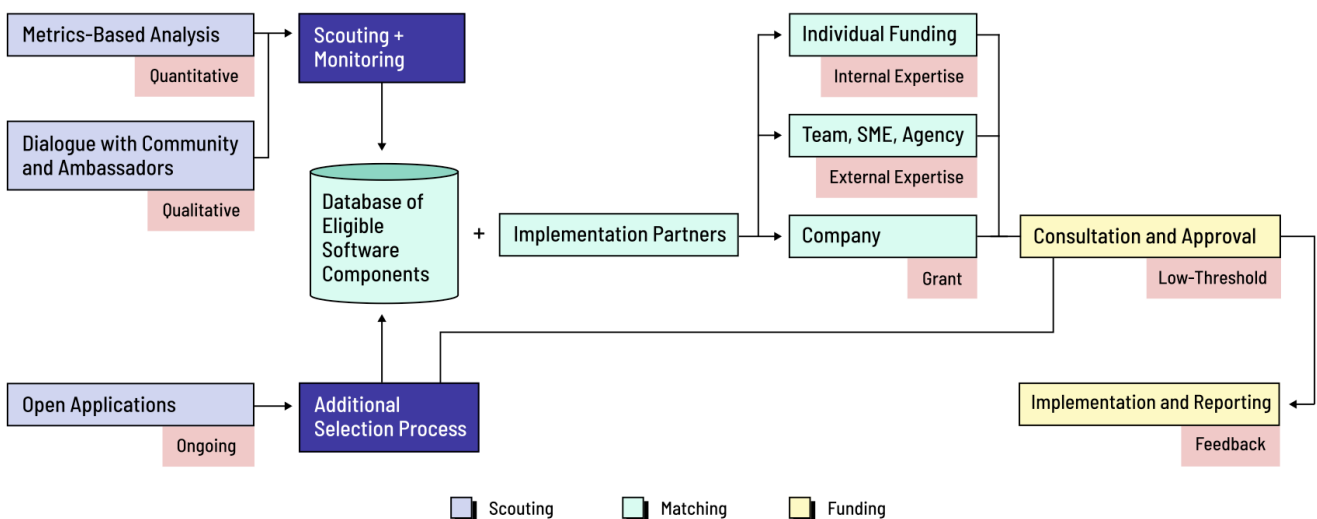
PLANNING	BUILDING	EXECUTING
Offering non-monetary support services (external expertise)	Metrics-based analysis	Dialogue with communities and ambassadors (qualitative)
Matching funding with companies and other organizations (subsidies)	Database of fundable software components	Open application (on-going)
		Individual funding (internal expertise)

The STF program team **scouted** the pilot round, which involved speaking with **representatives of open source communities** and evaluating existing **research reports** and **data sets**. For this, Frank Rieger (CCC), Karsten Nohl (srlabs), Corinne Cath-Speth (OTF), Fieke Jansen (Critical Infrastructure Lab), and Aaron Glenn (RIPE Community) served as external experts. From over 50 projects identified as open digital base technologies in the public interest falling within the STF's mission, the nine previously mentioned projects were selected. These were then reviewed and commissioned through SPRIND's processes. As the pilot round was a test run, the projects were commissioned on a standardized basis for a shorter term of 6 months with a contract value of around €200,000.

It is important to note that the funding allows for different spending strategies per project. The evaluation documented that most projects used the funds to **fast-track work** that needed to be done urgently. Without STF's investment, the projects would have had to find a way to complete the work alongside paid individual support contracts. The projects feel committed to maintaining their infrastructure and appreciate that the public sector values and supports this work, which is often unpaid. The STF funding allowed the projects to address the work in a more **structured, predictable, and rapid** manner.

"It takes us further; we build foundations. If we hadn't done the project now, we would have done it maybe less ambitious, slower. It is more controlled now."

The funding enabled them to work on issues that may not have been obvious to most users, but that made the software **safer, more reliable, and more stable**. Projects spent a lot of time adapting their technology to technical changes. This is in contrast to **service contracts for companies**, which are often tied to **specific functions** that benefit commercial reuse but do not address **overall security** or architectural work on digital infrastructure. The open nature of funding using general milestones made it possible for projects to spend the money according to their specific needs, such as keeping up the work of project members worldwide, initiating new programs, or fostering younger members in their community.

> *"We decided to invest in junior developers to start maintaining, and the senior people continued on a voluntary basis."*

In the future, STF's core role will continue to be balancing the need for flexibility – essential for a strong open-source ecosystem – with public funding's administrative requirements.

While scouting pilot projects, the STF also addressed two substantive objectives: **emphasizing** (1) **the relevance** and (2) **the scope of open digital base technologies** in the public interest. This resulted in the selection of projects from the areas of network technology, standardization, security, and development tools, all of which represent critical infrastructure for software development and digital technologies.

- Among other projects, curl received support in the pilot phase. curl is one of the most widely used open source tools. It is used for the transmission of data, be it in car software, modems, or numerous web applications and smartphones.

- Another project was to improve Bundler and RubyGems, which are technologies required for programming in Ruby. A RubyGem server failure or the loss of Bundler's functionality would be felt worldwide.

- There has also been significant investment in the PGP ecosystem by supporting OpenPGP.js, GopenPGP, and SequoiaPGP. These are three different implementations of OpenPGP, which is a standard that enables end-to-end encrypted communication via email as well as the signing and verification of software packages. This use makes OpenPGP a critical standard for many basic internet applications, such as secure communication and securing the software supply chain. Supporting and promoting multiple interoperable implementations can strengthen the resilience of the standard and the ecosystem by ensuring that it is widely used and that bugs are eliminated.

It is not possible to evaluate the success of different open digital infrastructures with (uniform) metrics. Open source software (OSS) developers usually cannot provide information on the number of end users, because in principle open digital base technologies do not and should not track usage. In the words of an interview participant,

"Realistically, we don't have any data on that. There's no tracker in [our project] that phones home."

Additionally, in cases where the number of downloads (not equivalent to end users) can be tracked or estimated, the numbers quickly become irrelevant. If a single download leads to implementation in a smartphone operating system, the margin of error for download-based metrics could be in the billions. In cases like this, these types of **KPIs** seem **unhelpful to use**.

curl is used in almost every device that is connected to the internet (i.e., an estimated 7–8 billion times in smartphones alone); one could say that curl exists "beyond metrics." RubyGems has logged more than one billion downloads and serves 8 GB/second on average.

Therefore, measuring the success of STF investments should be more **qualitative** and based on the projects' objectives. For participants, their project's success during the funding period meant that they reached their milestones and that they made **structural and strategic changes** to the way they work on technology or within their community. However, this funding can only start to lay the foundation for long-term (financial) sustainability.

The viability of long-term public support must be evaluated with respect to procurement law and process design. It also depends on the financial stability of the Sovereign Tech Fund itself. Furthermore, in the future, increased engagement and financing from the private sector, which benefits from open technologies, should be pursued.

Within this context, the projects were able to achieve excellent results:

- "Software is never finished." The successful completion of a development cycle or milestone, which establishes the foundation for future work and ensures software stability, is a huge success. The projects were able to adapt to the ongoing changes in the (digital) world, which increased the usefulness of the technology as well as its performance and usability. The STF funding enabled work on the internal architecture of the technology and not just on the edges, as is usually the case in contracts with companies. These results contribute to the goal of establishing **digital services in the public interest.**

- The funded development work not only contributes to the success of the technology, but also to the careers of the people involved. Success in this context means securing people's livelihood through the work they are committed to. Projects can be unstable if they rely solely on the skills and availability of a single developer or a small group.

- It is a major success for the projects to have a significant **increase in development capacity and staff**, which reduces the burden on the existing core developer(s). The core developer can then distribute responsibilities and tasks among several people. Projects that are part of a larger community were able to build up and maintain a healthy community of contributors. These contributors are then able and willing to give their time to become maintainers, and as mentors for newcomers

"If you are volunteering on a project, it will always be your last priority — if you even get paid a little, it won't be the very last."

- Working on OSS means being part of a larger community. For instance, the projects were able to successfully build **relationships** with other projects and improve communication and collaboration with one another.

- **Stability** was seen as another characteristic of success. One project was able to set up a global emergency team to avoid downtime and did not have to rely (solely) on volunteers.

"With STF money, we were able to establish an around the globe 24/7 on-call rotation for response. We have coverage of all the time zones now."

These success stories highlight the significance of funding that can be invested more freely according to expertise and needs of the community. The interview participants emphasized how important the negotiation process within their community was, for deciding how to spend the money most effectively. In many cases, this meant that **uncertain volunteer activities were transformed into more secure employment relationships**, allowing for greater accountability and predictability in the development and maintenance of the technology. The negotiation process and consultations with experts from within projects create more predictability, commitment, and security.

In the **matching process**, which ran in parallel to the community negotiation process, a variety of organizational forms were selected as the most suitable contractors: Two individuals in Canada and France, a GmbH in Germany, two AGs in Switzerland, a non-profit organization and two companies in the USA, and a foundation in the Netherlands. Five of these contracting organizations acted as fiscal hosts who (as in the case of the curl project) are themselves resident in other countries. A fiscal host is an organization that explicitly handles administration and finances, and can thus easily pay or employ the actual developers.

These intermediary organizations are especially important in the open source ecosystem because they enable open source technologies and help the developer teams behind them to organize their operations and to further develop. It has also become clear that the open source ecosystem **works internationally**, which means that the technologies deemed critical to Germany and Europe are not only developed there. Hence, geographically restricting the STF would constrain the impact of the program.

During the **scoping process**, the interview participants appreciated the technical expertise of the program managers. In particular, they valued their knowledge of OSS development logic, the modus operandi of OSS projects, and the culture in open source communities. The participants also felt respected as experts in their respective technologies.

"I also really trusted [the program manager] in particular but the STF in general to understand OS development and to trust us [on] how we do things. You don't always have the luxury that customers understand what we do – usually, you spend a lot of time explaining."

Interview participants emphasized that they were not told how to approach a certain issue, but that their deeply **specialized expertise** within the project was respected. They were also not asked to do predefined tasks that were outside their area of responsibility. The interview participants highlighted this as a positive contrast to many contracts with other financing bodies. Between the STF and the potential projects, it was mutually understood that the services to be provided must be flexible to accommodate the creative development process.

"My expectations were, and that was articulated from [the STF] in the beginning, that they don't want to interfere."

The intensive dialogue between the program team and projects during the **scoping phase** helped clarify the public interest in particular software components and in the development work necessary. At the same time, it helped build more **trust** between the projects and the STF. Balancing top-down procurement with bottom-up experience is especially important for the effectiveness of the investments. The projects were aware that financing bodies have their own strategies and objectives. They expected **transparency** regarding financing organizations' intentions and goals in the funding process.

The projects were intent on ensuring that the contracted activities were in line with what is useful for the success of the technology and the community around it. In the interviews, they stressed that they pushed for flexibility and would rather forgo funding than compromise on their values or bow to demands of clients or financing bodies that would harm the project.

In the future, the STF will need more resources to develop approaches for **values-based community work**. For example, one participant expressed disappointment that the current funding **focus** was on **development work**, which meant that community-building activities, particularly regarding equality, diversity, and inclusion, could not be addressed.

Other projects requested support in creating an independent legal form or help in recruiting new contributors. These are areas that should be explored further.

In terms of administration, projects also need **clear guidelines**. During the scoping and contract phases, the projects had to contact the different stakeholders in their community, coordinate with them, and ensure that they could meet the STF's accounting and reporting requirements. In these phases, projects require clear guidance on conditions – especially regarding the time frame of the funding and information about the amount of funding – so that they can adapt their technical work to the STF's framework and requirements.

None of the projects were able to use their usual commercial hourly rate; some even took a 30% cut on their usual hourly rate. Others used an average German hourly rate for software development as a benchmark for their international team, whose hourly rates were sometimes above and sometimes below the chosen hourly rate, depending on the region.

In the pilot round, the STF used its processes for the first time and adapted them agilely to the conditions encountered in practice. That is why it was not possible to provide a complete overview of the upcoming procedures from the beginning, which increased the administrative burden for all parties. This will improve as processes are optimized and **organizational structures evolve** at the STF.

"Time sheets are definitely a pain."
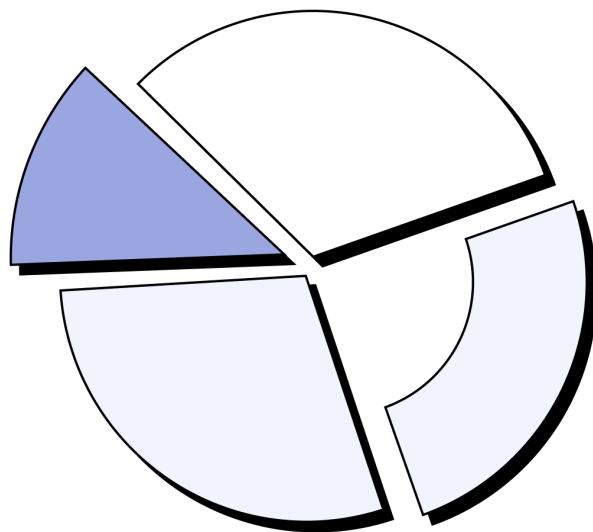
The main problem this resulted in during the pilot round was that projects had to submit time sheets. Contractors and program managers initially agreed on milestone-based invoicing, as this best reflects the creative process of software development. However, the contracts were designed in such a way that time sheets were required. The STF process must be adapted to avoid this in the future. In retrospect, however, the contractors considered the process to be a comparatively quick and easy procedure for obtaining public funding.

"This was probably the easiest funding that I ever had."

The interview participants were **positively surprised that contracts with public institutions can be relatively simple**, especially compared to EU funding contracts. The option of entering into contracts instead of grant agreements benefitted most projects, as contracting was easier to fit into an organizational or operational framework. The use of contracting is a promising first step towards the STF's goal of creating a **fast and streamlined funding mechanism for critical digital infrastructure**.

"Contracting was the easiest option for us. This is the closest to how the private sector works."

Visibility

Since the publication of the STF's feasibility study, **the program has been reported on more than 40 times**, including in trade press and national media (Heise, Zeit Online, Golem, the Tagesspiegel Background Digitalisierung, special reports at the Atlantic Council, among others, Netzpolitik.de, and Logbuch:Netzpolitik).

As a result, the program continues to gain visibility and attracts attention beyond its core target group in the open source ecosystem. **Internationally, the STF is perceived as a flagship project and is considered a "thought leader."** At the European level and in the US, various civil society and policy- and industry-oriented groups are already expressing interest in similar programs to contribute to the goals of digital sovereignty and establishing digital services in the public interest.

The pilot round projects welcome **investment from public funds and the German government**. Towards the end of their contracts, most of them referred to the STF exclusively as a funding institution and did not see it as a political body. However, this does not mean that public investment in OSS is seen as a one-sided affair.

Before accepting funding, one interview participant sought verification that the **STF is an independent (public) actor** and not part of any foreign policy interventions. These apprehensions were allayed through direct communication and the program team's ties to the OSS community. For the STF's mission, it is critical that the STF retains its independent status so that projects can accept the contracts without concerns about political reservations.

Another interview participant saw the STF as a consequence of the assertion **"Public Money, Public Code."** They stated that the development of infrastructure is in the public interest and that taxpayers' money should benefit the public and not a few proprietary products.

The interview participants recognize the intention behind the STF investments (to strengthen the open source ecosystem with the goals of digital sovereignty and establishing digital services in the public interest). These goals do not conflict with supporting the global open source ecosystem and are considered a legitimate purpose.

> *"German start-ups will use the same OSS as part of their tech stack, so these are necessary to support."*

The interview participants noted the considerable effort by the STF to explain the technical specifics and usage of software components in a less technical and more accessible format for the broader public.

Participants linked this communications strategy directly to the spending of public funds. While they noted that this translation may have simplified the possible applications of their technology, they acknowledged the necessity for the STF to do this to explain how this work relates to STF's mission.
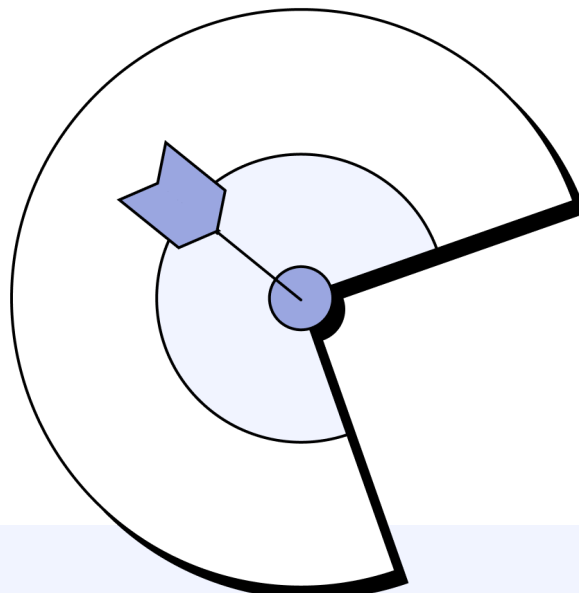
Looking ahead

In STF's "start-up phase," incubating the organization at SPRIND made agile work and quick results possible.

As the program grows, **new requirements** are emerging: the increased financial volume and the resulting larger number of investments and projects require more staffing. Also, STF must scale its field-tested processes, and continue to professionalize organizational development. This includes the application system, so that funding continues to be accessible not only through active scouting (pull) but also through submissions (push), and augmenting the qualitative technology selection with **quantitative metrics**.

The STF will move forward step by step. This includes **developing a database** of relevant open digital base technologies, which will facilitate proactive investment decisions and intertwining policy objectives with targeted investments in critical software components. It also includes establishing mechanisms for **matching funding** with private or other public actors. In addition to financial investments, the STF will develop a **catalog of additional services** to explicitly support the project sustainability. This includes, among other things, training for community building; fostering newcomers, junior developers, and diversity; security audits; and support for open source strategies in SMEs.

Furthermore, two groups will be formalized at the STF. The first group will be made up of **advisors from the community, the business world, and public administration** with exceptional domain knowledge and an extensive network in the open source ecosystem. This group will support and complement the scouting processes of the program team. The second group will be a smaller **panel of experts to accompany and review investment decisions**. The communication of the STF's goals and their social relevance will be expanded, which will require more resources for outreach, a more extensive website, and more publications.

As a **new program area**, the STF will pilot a **bug resilience program,** whose goal is to provide complementary services to support the open source ecosystem. The approach supplements existing bug bounty programs with a stronger focus on the developers in the ecosystem, whose work is crucial for preventing and fixing security vulnerabilities. For this purpose, the STF will design and test a three-stage program, consisting of research, training, and bug bounties. The bug resilience program is intended to be

available to projects the STF has supported, but it will also be open to other stakeholders working on critical software components.

At a substantive and organizational level, the STF and SPRIND are a good fit (due to their missions, adjacent topics, and compatible workflows and processes). Nevertheless, the **STF has unique process requirements beyond the pilot phase** and **its own focus**, which no other organizations address. Because the issue of digital public infrastructure is important, it requires its **own organization and the visibility that comes with that**. The current (international) attention on the issue is remarkable. Through the STF, Germany is seen – especially in many conversations at the EU level and in the US – as a pioneer in a new field. In this area, investment in the foundations of the modern economy and civil service is long overdue. The expected effects on the open source ecosystem are unanimously considered to be very positive.

For the STF's long-term success, combining the pragmatic approaches with the approaches that are most promising in the long term is recommended. A continued close affiliation with SPRIND **would not result in any loss of speed** in the operation and further development of the STF. The current pioneering role of the STF should be maintained, and the model can serve as a blueprint for other actors in the field. An independent legal and organizational form is necessary so that the STF is seen as an **independent actor** by OSS communities and other stakeholders. It is also necessary so that the **importance of the STF's mission** is given the appropriate weight, and the STF brand and its **visibility** can grow.

In the first six months of the Sovereign Tech Fund, the hypotheses from the feasibility study have been confirmed. The need for the program has exceeded expectations, as has the relevance and acceptance of the program. In the validation process, the approaches and steps developed at the Sovereign Tech Fund have proven to be viable and can now be scaled up.

Credits

SOVEREIGN TECH FUND

Sovereign Tech Fund

SPRIN−D

SPRIND GmbH
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Many thanks to our interview participants for sharing their feedback and being open with us.