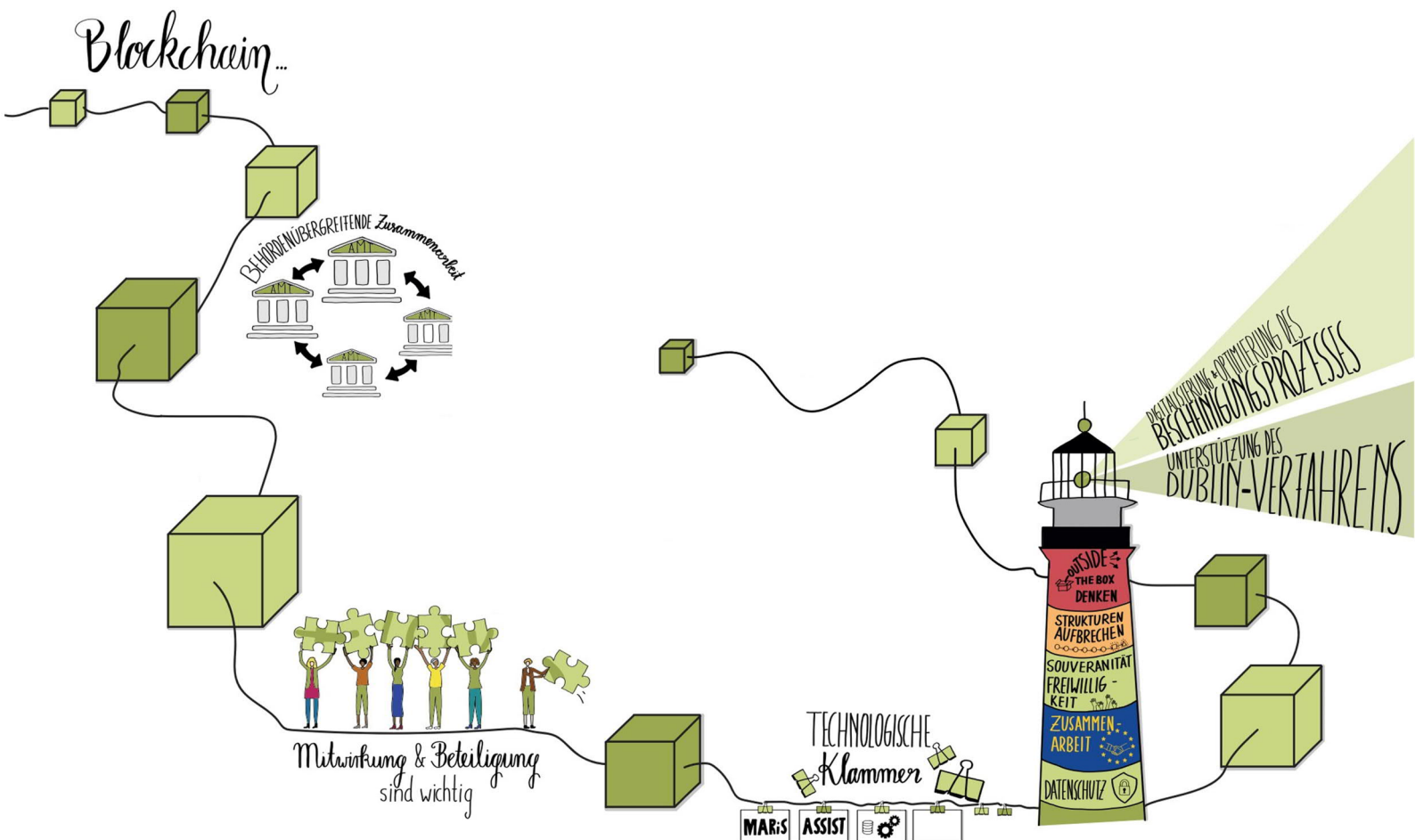


# Opportunities and challenges of using blockchain technology in public administration

Insights from the FLORA project of Germany's Federal Office for Migration and Refugees





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Whitepaper, authored by the Branch Business & Information Systems Engineering of the Fraunhofer FIT and the Interdisciplinary Centre for Security, Reliability, and Trust of the University of Luxembourg

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# Summary

Blockchain projects differ from conventional IT projects in many respects and present several challenges for the organizations involved. Some of these challenges are inherent to the technology and its relative immaturity. Others, however, result from the respective application context. Especially in public administration, the use of blockchain technology is often limited by various tensions, for instance, those between technology and data protection requirements. For the successful implementation of blockchain projects, these tensions must be identified and resolved.

During the development of a federal blockchain infrastructure for asylum (FLORA), Germany's Federal Office for Migration and Refugees (BAMF) has encountered and resolved various of these tensions. At the same time, it has learned about the particular opportunities offered by the use of blockchain technology. The FLORA flagship project started in 2018 with the vision of a blockchain-based IT application that would support cross-authority cooperation and communication during the asylum procedure. This application is envisioned to provide all involved authorities with a better overview of the status of specific asylum procedures or of asylum procedures that are currently at a particular status. The BAMF has since reached an important milestone towards such an application

by developing and successfully piloting a FLORA support system in Dresden, Saxony.

This white paper summarizes the insights gained by the BAMF in the course of developing and evaluating the support system. It is aimed, in particular, at other authorities that wish to either participate in the FLORA project or to advance their own blockchain projects as well as those who desire more information before initiating such projects. For a better understanding of FLORA's context, Section 2 of this whitepaper briefly explains the workings of the German asylum procedure, the potential for exploring new forms of cooperation in federalism, and Germany's current efforts to establish a more digital administration. Section 3 shows how blockchain may contribute to such an administration by providing an introduction to the technology and discussing the technical, organizational, and legal challenges that need to be considered when implementing blockchain technology. Section 4 examines the various tensions that arise when adding to these challenges the particularities of the German asylum procedure. Moreover, it shows how the BAMF was able to resolve these tensions in the FLORA project. In a final analysis, the whitepaper presents best practices for a successful implementation of other blockchain projects in public administration.

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## 1. Motivation

In Germany, public administration is organized according to federal principles, which is why many cross-authority processes, such as the asylum procedure, are characterized by decentralized structures. It is also why decentralized technologies are particularly suitable for the support of these procedures.

One of these technologies is blockchain. Thanks to its considerable flexibility, blockchain is especially suitable for accommodating and aiding the asylum procedure's various decentralized structures, which vary greatly from one regional site to another. The Federal Office for Migration and Refugees (BAMF) has taken advantage of this 'structural fit' in the development of a federal blockchain infrastructure for asylum (FLORA). In the course of this FLORA project, the BAMF has piloted a blockchain-based support system in Dresden and successfully completed its evaluation at the end of October 2021. The FLORA support system is currently being prepared for productive operation and a broad roll-out. The main focus of these efforts is on the stabilisation, expansion, and further development of the system.

The FLORA project uses blockchain technology as a tool to support cross-authority cooperation in the asylum procedure. It enables participating authorities to record and retrieve status reports on any particular asylum procedure – in line with their procedural access rights which vary depending on 'business' and local responsibilities. Meanwhile, the authorities involved can continue to use their own IT systems, which is why the FLORA blockchain can be described as a "technical bracket" (Amend et al. 2021b).

Since the FLORA project is a pioneer project, its key findings are regularly shared with other authorities and organizations throughout Germany. Many of these findings were produced by members of the project team, be it by way of observations or interviews, while others were the product of experience, as reported by employees of the participating authorities.

## 2. Particularities of the German asylum procedure

The German asylum procedure places a strong emphasis on federal structures. These structures determine the cooperation and distribution of tasks among all of the involved authorities. Accordingly, the German asylum procedure and its sub-processes must meet numerous legal requirements that vary from one state to another. This necessitates a considerable number of process variants and a correspondingly heterogeneous IT infrastructure. It further necessitates ample flexibility to accommodate all of these particularities in digitalisation projects.

### 2.1. Context of the asylum procedure

The context of the German asylum procedure differs fundamentally from the context of private-sector companies that operate beyond public-law structures (Fredriksson and Pallas 2016; BAMF 2021; Schammann 2015; Roth et al. 2022). Not only does this particular context determine the boundaries and objectives of the asylum procedures. It also determines the cooperation of the participating authorities and the distribution of their respective tasks.

#### 2.1.1. Societal mandate

Asylum is a societal responsibility. Its necessary legal provisions, however, fall within the remit of political decision-makers who must ensure that those provisions are appropriate and sufficiently clear to guide the authorities involved in the asylum procedure. For those authorities, the focus is on fulfilling this legal mandate as effectively and efficiently as possible.

To be more specific, their focus is on safeguarding the fair observance of due process of law, while also ensuring the provision of adequate accommodation, care, and support for asylum seekers. This includes the individual, competent, coordinated, and timely examination of all asy-

lum applications. To this end, technical innovations are being used that simplify and improve each step of the asylum procedure.

### 2.1.2. Legal provisions

The authorities involved in the German asylum procedure are part of the executive branch and serve the societal mandate of “asylum” on the basis of certain statutory provisions. Therefore, their scope of action, as well as their goals, are implicitly and explicitly determined by the current legal framework of the asylum procedure. This framework includes statutory provisions at the state, federal, and European levels. It determines the organizational framework, the process steps, and the competencies of the involved authorities.

The scope of action of each authority involved in the asylum procedure is regulated at the European level by – among others – the Dublin III and EURODAC regulations and the Asylum Procedure, Reception, and Qualification Directives. Of particular relevance at the federal level are the Basic Law, the Asylum Act, the Residence Act, and the Asylum Seekers Benefits Act. At the state level, the scope of action is primarily determined by competence regulations, such as the Residence and Asylum Procedure Competence Regulation of Saxony (Sächsische Aufenthalts- und Asylverfahrenszuständigkeitsverordnung). Due to the significant sum of these provisions, a large number of requirements must be observed when organizing the asylum procedure.

### 2.1.3. Task-related, cross-authority cooperation

To serve the societal mandate of “asylum”, the legal framework of the asylum procedure stipulates close cooperation between all involved authorities. This necessitates task-related cooperation and the exchange of information between those authorities. At the same time, however, it necessitates a highly complex communication network as it must connect the many authorities involved.

Aside from the BAMF, the asylum procedure involves the federal police as well as reception facilities, immigration authorities, youth welfare offices, health offices, and several other authorities that support asylum seekers or applicants at the state and local levels. The common goal is the successful completion of all the procedural steps. Due to the high complexity of multi-authority communication and data exchange, however, it can be difficult to achieve this goal.

### 2.1.4. Decision-making powers within defined areas of competence

The authorities involved in the German asylum procedure are guaranteed by law to have independent decision-making powers and scope for action within their respective areas of competence. Likewise, the separation of competencies between those authorities is legally defined. In line with the principle of subsidiarity, decision-making powers are deliberately delegated either to lower administrative levels or the authorities best suited to this purpose, be it because of their function or because of the associated powers and responsibilities.

In accordance with the Asylum Procedure Act, the BAMF is responsible for conducting the asylum procedure. More specifically, its responsibility is to examine and rule on asylum applications. These are then processed at the federal level. Also at the federal level, the Asylum Seekers Benefits Act sets the conditions on which asylum seekers are granted access to large parts of public life. At the level of the individual state, there is room for special provisions, particularly with regard to questions of social participation. The responsibility for reception, accommodation, and subsistence benefits lies with each federal state or with the local municipality, if delegated. The enforcement of the Residence Act is likewise the responsibility of the states and municipalities.

### 2.1.5. Transparent and due process

In Germany, all actions of public authorities are subject to the due process of law. To support the cooperation and exchange of information

between those authorities, there is a legal obligation to openness and transparency, particularly when it comes to sensitive procedures like the asylum procedure. These obligations do not only extend to the sharing of information on which such cooperation depends but also the assurance of predictability and accountability. Since the required degree of transparency can vary, not every decision or procedural information has to be made publicly available or indeed accessible to external parties, such as those affected, their legal counsel, or other authorities.

Rather, it is crucial for the completion of the asylum procedure that the information with relevance to the respective process steps is available and that the persons authorized to make decisions can rely on the correctness and completeness of said information. It is further necessary that, depending on the statutory degree of transparency, other authorities involved in the asylum procedure have access to the procedural information relevant to them.

## 2.2. Exploring new forms of cooperation

In certain areas, the federal system has such complex structures and decision-making paths that these can, on occasion, be somewhat restrictive. At the same time, however, it is this very system that makes it possible to test new forms of cooperation at the level of an individual state. Such test projects can then serve as blueprints for other states or the federal government at large (Klaeren 2013). This potential is particularly relevant for projects that work on establishing modern and digital cooperation among the authorities involved in the asylum procedure.

The BAMF's FLORA project (see chapter 4) is one such example of testing a new form of cooperation in the asylum context. The FLORA support system was initially piloted and successfully evaluated in the AnKER facility in Dresden where the BAMF cooperates closely with Saxony's State Directorate (Landesdirektion Sachsen, LDS). In the next phase, the FLORA

project will focus on the stabilization, expansion, and further development of said support system, and this will involve additional federal states. FLORA is therefore a flagship project for the use of blockchain in public administration with the added potential of acting as a digital enabler of federalism.

## 2.3. Efforts to establish a digital administration in Germany

The digitalization of public administration plays a central role in the current coalition agreement of Germany's federal government. Chapter 2 ("Modern state, digital awakening, and innovations"), identifies efforts to establish a digital state and administration as key objectives (Federal Government 2021). The purpose of digitalizing public administration is two-fold: it shall enable the state to act quickly and effectively without breaks between physical and digital formats, and it shall do so in a user-friendly manner.

With this purpose in mind, the federal government plans to establish the legal foundations and transparency required to promote and use digital innovation, especially in public administration. In doing so, it focuses on strategic digital technologies, such as artificial intelligence (AI), cybersecurity, and distributed ledger technology (DLT), commonly referred to as blockchain. It is this blockchain technology that is used in the BAMF's FLORA project to improve communication and cooperation in the German asylum procedure.

## 3. Blockchain

Introduced in 2009 as the technical basis for the cryptocurrency Bitcoin, blockchain is still a rather new technology (Nakamoto 2009). Today, it is applied in a broad range of use cases that go far beyond financial services, such as cross-organizational process coordination (Saberi et al. 2019) and digital identity (Fridgen et al. 2018b)ies (Strüker et al. 2021; Rieger et al. 2021; Sedlmeir et al. 2021). These two applications are of key



concern to the BAMF, whereas the FLORA project focuses primarily on improving cross-authority collaboration (Amend et al. 2021b; Fridgen et al. 2019) and less on the implementation of digital identities (Amend et al. 2021a). It is worth noting, then, that the best practices presented in this whitepaper chiefly concern the use of blockchain to improve cross-authority collaboration.

### 3.1. Technical foundations

A blockchain can be described in simple terms as a distributed database that can store information in a decentralized manner (Glaser 2017). This type of storage is highly resistant to tampering as information is first grouped into blocks that are then referenced to the preceding block by using cryptographic hash functions. This creates a chain of chronologically ordered, tamper-resistant blocks (Völter et al. 2021; Utz et al. 2022).

Moreover, copies of the chain are stored on different nodes of a participating network, the consistency of which is ensured by the use of consensus mechanisms (Schellinger et al. 2022). The choice of such a consensus mechanism depends largely on the purpose of the blockchain network and the corresponding design preferences.

The key decision to be made is whether each party may participate in the network or whether participation is restricted. This determines a distinction between public and private blockchain networks. Also to be determined are the read and write permissions of the participating parties. If no permission is required for read and write access, the blockchain network is "permissionless". In contrast, "permissioned" blockchain networks require special roles and rights concepts for read and write access (Sedlmeir et al. 2022).

Such roles and rights concepts must be coordinated with the participants when designing a blockchain network, especially if data protection regulations require clear data separation. Such roles and rights concepts are particularly

important in view of the General Data Protection Regulation and its principles of data minimization and purpose limitation.

### 3.2. Technical application

The use of blockchain is commonly associated with so-called cryptocurrencies, such as Bitcoin. Its actual area of application, however, is by no means limited to cryptocurrencies. Indeed, it is far broader, so much so that it is playing an increasingly important role in many companies (Casino et al. 2019) and digitalisation projects in public administration (Amend et al. 2021c; ØInes et al. 2017). The latter in particular stands to benefit from the use of blockchain as an infrastructure technology that can not only harmonise existing processes and systems across authority boundaries but also help to exchange cross-organizational data in a rather heterogeneous process and system landscape (Amend et al. 2021b; Fridgen et al. 2018b).

This is why blockchain technology is more likely to be found in the back-end of IT applications (much in the same way as common databases). It is also why users have no direct contact with the technology. It is also worth noting that, due to its limited scalability, blockchain is not suitable for storing large amounts of data. After all, the replication of data storage requires each network participant to provide the necessary storage space (Buterin 2021; Sedlmeir et al. 2022). Furthermore, distributed and immutable data storage prevents sensitive and personal data from being stored in plain text. It is important, therefore, to store data in a pseudonymous and minimised form, and to ensure that the rights of the data subjects and the requirements of purpose limitation are observed in every processing operation.

Not least due to these data privacy requirements, blockchain projects are frequently perceived as challenging, and this is often compounded, at least in the beginning, by a lack of practical experience (Fridgen et al. 2018a). Furthermore, the application of established innovation methods is often less effective with a technology like blockchain because the outcome is

usually far beyond the expectations and immediate needs of users (Chan et al. 2019).

It is worth noting, therefore, that blockchain projects, i.e., projects involving the implementation of blockchain-based software, can encounter certain technical, organisational, and legal challenges that can limit the use of the technology or indeed render it inappropriate (Choi et al. 2020).

### 3.2.1. Technical challenges

Blockchain is a rather new technology that is more complex than conventional databases. Blockchain projects are, therefore, often associated with a high level of technical effort. Further effort is required due to the lack of established reference architectures and standards, which means that blockchain systems have to be designed and implemented from scratch. Meanwhile, the rapidly advancing development of technology introduces an element of risk. Those who implement a blockchain-based system too soon risk becoming dependent on it only for it later to become unusable on a broad scale (Jensen et al. 2019).

### 3.2.2. Organisational challenges

Obstacles to the use of blockchain can also be encountered in the intra- and cross-organisational context. Within organisations, for example, the required technical competence is often not sufficient for the successful implementation of blockchain projects. Frequently, those endowed with decision-making powers are still rather unfamiliar with blockchain technology and its functionality, which explains why some remain sceptical about its use. Resolving these issues is critical because blockchain networks usually require all project partners to be willing and able to work with one another (Choi et al. 2020).

### 3.2.3. Legal challenges

Blockchain projects are significantly affected by the particular project environment. For example, if the legal situation is unclear, organisations will often refrain from implementing a blockchain project (Lindman et

al. 2020; Schellinger et al. 2022). Due to the inherent transparency and immutability of blockchains, there are particular challenges surrounding the implementation of blockchain-based projects in compliance with data protection laws (Rieger et al. 2019). When not enough guidance is offered to comply with the applicable legal framework and best practices are not fully known or understood, blockchain-based projects cannot reach the stage of a production system (Schellinger et al. 2022).

## 4. Insights from the BAMF's FLORA project

### 4.1. Federal Blockchain Infrastructure Asylum – FLORA

With the project "Federal Blockchain Infrastructure Asylum" (FLORA), the BAMF is advancing efforts to establish a decentralised blockchain-based infrastructure for the coordination of the German asylum procedure. The purpose of FLORA is to improve cross-authority communication in the asylum context.

Blockchain technology was chosen for its ability to map the federal organisational structures and principles into the digital infrastructure (Roth et al. 2022). Specifically, the use of blockchain is intended to ensure the timely and unalterable distribution of process data while maintaining a uniform and persistent level of information that can be shared among the authorities involved in the procedure. As a result, process efficiency can be improved across authorities, as can the quality of information.

An essential milestone of the FLORA project is the support system that the BAMF developed, tested, and evaluated in cooperation with Saxony's State Directorate at the AnKER facility in Dresden. The infrastructure built in this pilot phase and the lessons learned from its application have provided an important foundation for the use of blockchain technology in other authorities, both in the asylum procedure and beyond. Those lessons are

presented below, alongside the best practices for the use of blockchain-based IT support in public administration. Technical details on the FLORA support system can be found in the FLORA Whitepaper I "Supporting communication and collaboration in the asylum procedure with blockchain" (Fridgen et al. 2018a) and the FLORA Whitepaper II "Development of GDPR-compliant blockchain solution for the German asylum procedure" (Fridgen et al. 2019). The architecture used in the pilot project will soon be available in the FLORA Whitepaper III "Federal Blockchain Infrastructure Asylum: Piloting and Evaluating the FLORA Support System in Dresden".

## 4.2. Tensions and resolution strategies

One purpose of the FLORA project was to identify the tensions that typically arise in the German asylum procedure along with the essential challenges of using blockchain technology in said context. Its other purpose was to develop resolution strategies. These are explained in the following section and illustrated in Figure 1.

### Tension 1: Lack of standardisation

Using advanced technologies for the first time always bears a number of risks, but it also presents manifold opportunities. The use of blockchain, in particular, offers the chance to solve several of today's major problems - as long as

its use is accompanied by the awareness that the technology requires further standardisation in both technical and regulatory terms. Equally important to note is that reference projects to date have produced hardly any best practices. As a result, the use of blockchain is associated with substantial uncertainties and often requires considerable pioneering work, be it at the technical, regulatory, or organisational level. Indeed, challenges arising in the course of development often require new and bespoke solutions.

Internal and external coordination across authority boundaries may be required to resolve certain conflicts of interest when the authorities involved in a blockchain project have different priorities and perspectives. For example, blockchain technology might be adopted promptly by some parties, whereas others might not feel emboldened to follow suit until initial risks have been eliminated.

The BAMF has chosen to strike a balance, opting for timely testing while minimising risks by involving experienced blockchain service providers and academic experts. By drawing on such external competence, the BAMF was able to develop a reference architecture that is as promising as it is pioneering.

### Tension 2: Legal framework

Due to the novelty of blockchain technology, the current legal framework is not always able

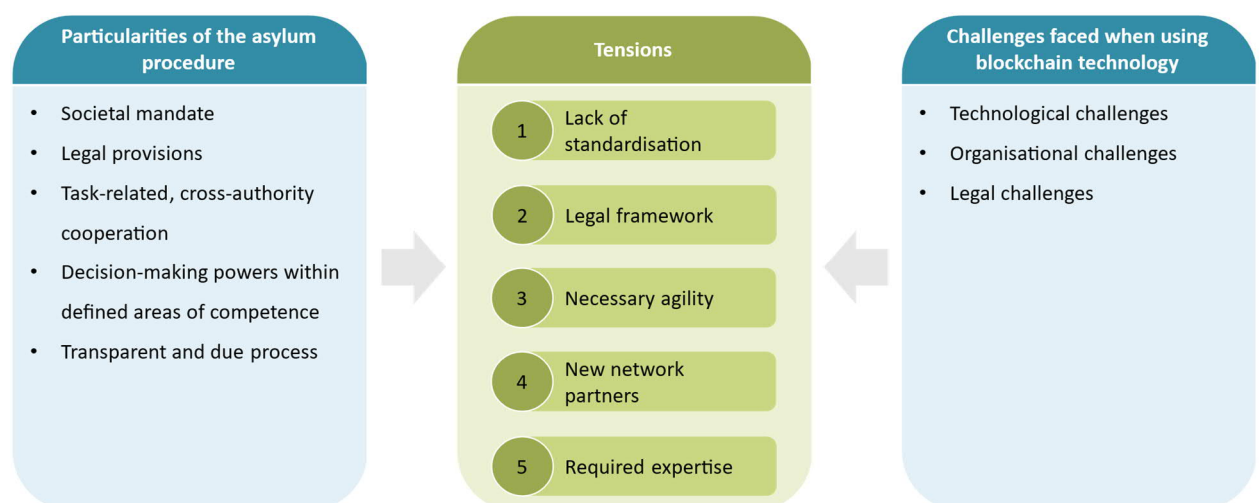


Figure 1: Tensions that arise when using blockchain technology for public administration

to provide definitive answers or recommendations. The resulting uncertainty is especially problematic in the area of data protection, for instance with regard to the permanence of data on the blockchain.

At the same time, it is the legal framework of the asylum procedure that sets the scope of action for the public authorities involved, and it is only within this scope that they are able to establish their goals and tasks. It is of some concern, therefore, that there are still no blockchain-specific provisions in said legal framework. However, current provisions can offer important guidance. Examples include the General Data Protection Regulation and procedure-specific provisions, such as the Asylum Act and the Residence Act at the federal level, as well as the Dublin III and EURODAC regulations at the European level. Any technical solution must therefore comply with the existing regulatory framework.

Conducting the asylum procedure requires the processing of personal data. The FLORA support system is, therefore, subject not only to asylum-specific regulations but also to the provisions of the General Data Protection Regulation. The BAMF set out to address possible data privacy issues with a GDPR-compliant architecture, and it was successful in so doing. FLORA's sophisticated pseudonymisation concept and its clearly defined roles and rights management system made it possible to meet all privacy requirements. Details can be found in the FLORA Whitepaper II (Fridgen et al. 2019).

### Tension 3: Necessary agility

Until best practices have been established for blockchain projects, the difficulty of planning them requires an iterative approach and an agile mindset to react to the many new challenges as and when they arise. Public administration, however, tends to involve a lot of internal coordination and co-determination processes, which can make the required agility more difficult to achieve.

In the FLORA project, the BAMF accounted for this by choosing an approach agile enough to

remain open and flexible despite the particularities of public administration. This approach included experimental phases in which continuous learning and iteration made it possible to reach important milestones, such as FLORA's architecture and later the support system. Agility was crucial not only in the development of the project but also in its management. One example is stakeholder management. Based on the best practices the BAMF established for its agile committee work, all relevant committees were involved in the FLORA from the early stages.

### Tension 4: New network partners

Blockchain networks are jointly operated by the involved participants. Permissioned blockchain networks, in particular, require cooperation among those participants in order for general rules to be established and questions of responsibility to be answered, such as which authorities are allowed to participate in the network and which of them should shape it.

Here, it is worth pointing out that budget limitations of potential network partners can create financial restrictions. Similarly challenging can be different perspectives between the authorities involved. What is more, there can even be different perspectives within a single authority, for instance, between the business and IT sides. This can complicate not only their cooperation but also the establishing and running of a blockchain network. Further complications arise from the fact that, even though cooperation between authorities is required by law and expressly desired, every participating authority is subject to a legal obligation to preserve its own sovereignty with regard to its process steps as well as its management of data.

To resolve these complications, the BAMF actively engaged other authorities involved in the asylum procedure as potential network partners from the very beginning. The project, its vision and goals, and the current technical elements were frequently presented and discussed to enable a close exchange. The BAMF defined its role as an active multiplier, providing space

for joint exchanges and actively participating in various exchange formats.

#### Tension 5: Required expertise

Due to the novelty and considerable complexity of blockchain technology, employees and stakeholders often lack blockchain-specific expertise. The required combination of economic and technical expertise is a further challenge as it can be difficult to predict how new technology will affect existing business processes and structures.

In Germany, public administration works on the basis of separate competencies, the division of which is intended to empower the respective authority to deal with current problems in the best way possible. Tasks are delegated to the authorities that are best suited due to their functions and the associated powers and responsibilities. However, the separation of competencies often also implies a separation between the business and IT sides. This, in turn, can lead to problematic situations in which those working on a project do not have access to both the business and IT expertise they need. This can complicate or delay the implementation of blockchain projects since those projects require not just detailed technical expertise but also knowledge of how the technology affects business processes and structures. In other words, for blockchain projects to be successful, there has to be close cooperation between those with expertise in business and IT.

With this in mind, the BAMF has set up an interdisciplinary project team that brings together experts from the fields of business and IT in order to aggregate their competencies. Moreover, the FLORA project draws on external expertise, especially in the area of blockchain, while developing internal competence.

### 4.3. Best Practices

The FLORA project allowed the BAMF to gather invaluable insights about the implementation of blockchain projects in public administration. In the following, these insights are aggregated into five best practices (BPs). Each of these best

practices addresses one or more of the aforementioned tensions.

#### BP1: Proactiveness and creativity

When the design of technical solutions within the current legal framework is held up because there are gaps in competency where there should be guidance, standards, and references (tensions 1 and 2), then it is necessary to take action to close these gaps. This involves bringing to the table the right people with the required expertise in business, technology, and the legal framework, so they can work together to develop forward-looking solutions.

One example of such a proactive and creative approach is the completion of FLORA's data protection impact assessment. This involved close collaboration with the Federal Commissioner for Data Protection and Freedom of Information (BfDI). It also involved the cooperation of the BAMF's own experts in business, IT, and the legal framework.

#### BP2: Willingness to learn and persevere

As blockchain technology is a very new technology, technical standards and references are not yet available in full (tension 1). It is important, therefore, to realise that blockchain projects are still the work of some considerable pioneering. Although the BAMF has been able to solve notable challenges in the context of the FLORA project, and although multiple authorities already stand to benefit from this wealth of experience, there will nevertheless be new hurdles to overcome in the future. Doing so will require accumulated experience and multiple further iterations. Success ultimately depends, as the FLOA project has shown, on a willingness to keep learning and persevering towards a joint solution, undeterred by minor setbacks.

In the FLORA project, this continued learning process was aided enormously by the interdisciplinary nature of the team; a team that brought together a broad variety of business, technical, and legal competencies and created many synergies.

**BP3: Agile and open mindset**

The requirement of agility goes beyond the need for agile practices, such as software development not following a waterfall model (tension 3). Rather, it is about internalising an agile mindset and bringing this to bear on daily project activities. Eventual users must, therefore, be involved extensively and early on. However, these users must also be ready to change and willing to reflect. This is to say that agility and openness are cultural rather than purely methodological issues. As such, they need to be addressed daily.

In the FLORA project, agility and openness were ensured by means of regular reviews in which the end-users contributed to the conceptualisation and design of the blockchain-based support system. This regular exchange also enabled an iterative development of concepts that incorporated both the business and IT sides, and it led to a shared understanding. Regularly involving other authorities further supported this iteration and learning process.

**BP4: Educational and supporting activities**

New technologies and their implementation can cause a lot of uncertainty among stakeholders, particularly until sufficient information is readily

available. Without such information, the acquisition of new network partners can be difficult (tension 4). Their uncertainty, however, can be alleviated by closely involving relevant stakeholders and informing them of new developments. In the best case, this creates curiosity and enthusiasm for the project.

In the course of the FLORA project, multiple exchange formats were organised, such as meetings, workshops, and working groups, all of which introduced participants to blockchain technology and its potential applications in public administration, for example during the CIC 'theme' days in Berlin where the focus was on blockchain and self-sovereign identities (SSI). To further extend its reach, the FLORA project used externally organised exchange formats at national and international levels. Members of the project team participated not only in business formats, such as events organised by the Conference of Ministers of the Interior (IMK) and the European Asylum Support Office (EASO) but also in technical formats, such as events organised by the Blockchain Coordination Project of the IT Planning Council and the European Blockchain Service Infrastructure (EBSI). These exchange formats were particularly successful when conducted both physically on site and digitally. Such hybrid formats kept



Figure 2: Best practices for blockchain projects in public administration

the threshold of participation low and simultaneously enabled an intensive exchange.

#### BP5: Collaboration at arm's length

The success of innovative projects like FLORA depends on close collaboration and aggregated competencies (tension 5). Given that blockchain requires multiple parties to participate in a network, it is important to find the right partners for such close cooperation (tension 4). These should be met on an equal footing to facilitate parity in the partnership.

In the FLORA project, joint exchange formats proved highly effective, for example in the form of project-specific workshops with interested authorities that had not been involved to date. The central focus of these workshops was to achieve a better understanding of the technical requirements of the interested authorities and clarify the details of their technical integration. In the context of such exchange formats, it was also possible to address how deeply the interested authorities would like to be involved in the future.

Figure 2 provides a summary overview of the five best practices derived from the BAMF's FLORA project.

## 5. Summary & Outlook

This white paper has shown the specific tensions that can arise when blockchain technology is used in the context of public administration, particularly in the context of Germany's asylum procedure. Crucially, however, the piloting of the FLORA support system has also demonstrated that these tensions can be successfully resolved.

The lessons learned in the FLORA project can now be transferred to other blockchain projects in public administration, specifically in the form of the five best practices that have been presented in these pages. All five best practices provide concrete measures that have proven effective in the FLORA project.

Building on the successful evaluation of the FLORA support system, the BAMF plans various expansion and further development activities. These include the extension of certain application areas such as "registration", "creation of an application file", and "personal interview", that have already been implemented in the AnKER facility in Dresden to other sites within Germany. To this end, business and technical issues concerning the integration of other interested authorities need to be clarified. Meanwhile, further development is underway in other application areas to better support processes between the BAMF and its partner authorities at various other sites. New concepts have been already developed for the application areas "referral", "ruling and enforcement", and "return counselling".

The piloting of the FLORA support system in the AnKER facility in Dresden is thus only the first step towards a comprehensive Federal Blockchain Infrastructure Asylum (FLORA). For this purpose, the FLORA support system has been embedded in a larger FLORA project landscape that involves further projects on the national level, and more on the European level. As such, the extended FLORA project landscape promises to be a lighthouse reference with the potential to offer other authorities valuable orientation and inspiration.

Going forward, the BAMF will also continue to advance its activities in the area of self-sovereign identities (SSI). These digital identities present asylum seekers and applicants with the opportunity to manage their identity in a simple, convenient, and reliable way. Such a secure digital identity is a prerequisite for asylum applicants to obtain access to digital public services. It is also indispensable for a modern, digital asylum procedure. After all, the BAMF is frequently tasked with identity management in the asylum procedure, for instance, in its collaboration with course providers and in its cooperation with other authorities. The use of SSI for these contexts is currently being investigated in a set of pilot projects.

Moreover, the BAMF also intends to make an important contribution to the digitalisation of the asylum procedure on the European level.

Collaborating closely with European partners, work is underway on the “European Blockchain Service Infrastructure” (EBSI) to enable better, Europe-wide connectivity and communication in the Dublin procedure. The expected benefit is an easier and faster coordination of cross-border and cross-authority processes in the Dublin procedure. Specifically, the idea is to use EBSI for the exchange of process status updates and other information relevant to asylum procedures between the Dublin units of the European member states. The insights gained in the FLORA project, and presented in this white paper, will serve as an essential foundation for

EBSI to successfully support cross-border asylum procedures.

To that end, the BAMF will continue to explore the potential of federalism to accommodate new forms of cooperation in the future. Yet even in the short term, FLORA will be of significant value to those trying to meet the challenging demands of modern digital administration in the asylum procedure.



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