Digitisation Agenda 2020

Success stories and future digital projects at the Federal Office for Migration and Refugees (BAMF)

Information technology
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>3</td>
</tr>
<tr>
<td>The Digitisation Agenda 2020 – at the halfway point on the path to a “digital, breathing” public authority</td>
<td>4</td>
</tr>
<tr>
<td>Digital initiatives – recent success stories</td>
<td>8</td>
</tr>
<tr>
<td>New digital ways of working</td>
<td>16</td>
</tr>
<tr>
<td>IT architecture and technological foundations – highlights from new technology</td>
<td>20</td>
</tr>
<tr>
<td>Organisational foundations – digital culture at the BAMF</td>
<td>23</td>
</tr>
<tr>
<td>Upcoming priorities</td>
<td>25</td>
</tr>
<tr>
<td>Digitisation initiatives – an overview</td>
<td>31</td>
</tr>
<tr>
<td>Glossary</td>
<td>42</td>
</tr>
<tr>
<td>Imprint</td>
<td>43</td>
</tr>
</tbody>
</table>
Dear Readers,

The ability to respond to change quickly and flexibly is essential in these fast-moving times. As a Federal authority, we must therefore become a “digital, breathing public authority” that can respond in all respects to changing requirements and conditions. Information technology can and must play an important role in making this possible and laying its technical foundation. At the same time, this technology is to define what an up-to-date organisation looks like and promote its achievement.

To pursue these aims, in the summer of 2016 the BAMF developed the Digitisation Agenda 2020, incorporating large numbers of IT initiatives. This brochure gives us an opportunity to inform you as to the current status of the initiatives and to update the agenda itself.

We have made huge progress in the last two years. The success stories described here and experience reports from members of our staff show that the plans we made and actions we took have put us on the right path. These initiatives have helped the Federal Office become a leader in digitisation.

As it implements the initiatives, the BAMF is following new paths. This brochure describes the innovative methods of software development that we are using – as one of the first Federal authorities in Germany to do so. In addition, we are testing modern ways of working together, such as design thinking, in our IT lab. The goal pursued by the Federal Office for the long term is the end-to-end digitisation of processes as a user-orientated approach, working closely with staff members who use our IT solutions. This has entailed completely redesigning office space at the BAMF to encourage collaboration, discussion and the development of ideas.

The Digitisation Agenda 2020 and our staff’s commitment to it are making a groundbreaking contribution to the design of more efficient, reliable processes for conducting asylum procedures, protecting refugees and promoting integration.

I hope that you will find it a stimulating read!

Dr Markus Richter
Vice President of the Federal Office for Migration and Refugees (BAMF)
The Digitisation Agenda 2020 – at the halfway point on the path to a “digital, breathing” public authority

Digitisation is central to the BAMF's success. The extent to which the volume of the applications that the Office receives and are processed by the BAMF’s staff varies – combined with the high expectations in terms of the quality of asylum decisions – creates special challenges for all those who are concerned or involved. Whilst the 220,000 applications filed in 2017 represent a drop from the total of 750,000 that were received in 2016, it is still a very high number. In addition, the volume of resumption, appeal and family reunification proceedings has been on the rise once more since 2017. This entails increased demands on the BAMF’s information technology (IT). Digitisation involves more than simply introducing new technologies: it is an essential element of the BAMF’s success on the ground.

With this in mind, the BAMF initially set out to upgrade and stabilise its IT systems in order to handle the large number of applications and significantly reduce system outages. These aims were achieved thanks to the modernisation of both the IT infrastructure and the asylum procedure. After meeting this challenge, the BAMF set itself the ambitious goal of becoming a “digital, breathing public authority” by 2020. Essentially, this means:

- Ensuring the ability to scale up or down in response to widely-fluctuating peaks in the technical and/or organisational workload, and
- Ensuring that the content of processes can flexibly adjust to changing circumstances and requirements.

Digitisation encompasses…

- … all of the BAMF’s current lines of business
- … contact points with both asylum-seekers and citizens
- … overarching elements of BAMF organisation and processes
- … current and new interfaces with other authorities at all national and international levels

Digitisation affects both all areas of the BAMF and interfaces with other public authorities
The Federal Office’s approach

The BAMF believes that digitisation is vital in order to optimally empower its staff to carry out their tasks. Necessary aspects include digitising processes on an end-to-end basis (in other words: eliminating media discontinuities) and providing systematic support for the decision-making process (for example with artificial intelligence). Classic monolithic application architectures must be broken up and turned into modern, modular IT structures. Furthermore, the IT infrastructure is to be able to accommodate and process fluctuations in utilisation. In addition to these technical capacities, there is a need to integrate new ways of working such as agile development throughout the Office’s organisation.

Milestones already achieved on the way to becoming a digital, breathing public authority

The stabilisation and modernisation of the IT infrastructure have reduced system downtime to nearly zero. Access to integration and language courses has been significantly improved as digital links to participating institutions were established, making the real-time courses that are on offer transparent at all times. In addition, technologies that were new to the Federal Office (such as blockchain and artificial intelligence) have been tested as ways to improve internal processes. Concrete areas of application include the interview assistance system (ASA) and cross-BAMF communication and collaboration. An IT lab was also established and anchored within the Federal Office, providing a place where the business and IT sides can

Digitising long-term processes end to end requires that IT at the BAMF continuously meet the demands of new requirements and parameters
work as partners to quickly address digital topics using agile methods. Modern, modular IT architecture (based on microservices) now makes it possible to flexibly meet business-side requirements. At the same time, the BAMF underwent an organisational transformation: project management processes were completely revamped and a culture of multi-project management established. Project administration now involves standard methods and tools that provide everyone involved with the security they need to implement the wide range of digital topics. These successes show that systematic IT support is essential for the Federal Office’s future. Without IT, the high requirements in terms of quality, scalability and flexibility required could not be met. Reaching our current state of progress was only possible because everyone involved – at both the operational and management levels – has worked closely together.

**What lies ahead?**

Through its Digitisation Agenda 2020, the BAMF intends to remain a pioneer for the long term. The goal is to concentrate on a return on digitisation, rather than simply digitising processes for the sake of doing so. Instead, digitisation efforts should focus on processes that have the highest value for our mission, such as those which determine the identity of people requesting asylum. Paperwork is to be digitised as well. We feel that user interfaces and a functional scope that meets the needs of both internal and external users (user-centric design) are important to us in this endeavour. Over and above this, rigorous digitisation provides ways to save both money and time that can, in turn, be invested into new digitisation initiatives. If a positive return on digitisation is achieved, digitisation can essentially pay for itself.

The BAMF’s Digitisation Agenda contains four levels that together form a “digitisation pyramid”
Specific priorities that the BAMF will be setting through 2020

The quest for end-to-end digitisation involves work at multiple levels: not only must purely business-side requirements be met as to digitisation, but technological and organisational prerequisites must be in place as well. In order to meet this challenge, the BAMF has broken down its Digitisation Agenda 2020 into four levels that go together to create a pyramid. Level 1 contains the digitisation initiatives. The focus is placed here on digitising diverse business-side processes that generate the highest possible return on digitisation. Level 2 represents new digital ways of working that are essential for consistently implementing digitisation at the BAMF. Level 3 covers the technological foundations of digitisation, whilst the base of the pyramid – Level 4 – comprises the underlying organisation that is required if digitisation is to work.
Digital initiatives – recent success stories

Since the Digitisation Agenda was first laid out in October 2016, the BAMF has expanded the portfolio of initiatives for achieving its vision of becoming a digital, breathing public authority. The 2016 portfolio emphasised mastering the high number of applications by stabilising and modernising the IT systems. Now the focus has shifted to the end-to-end digitisation of document services in order to support the Federal Office’s employees in managing, processing and sending documents.

The first step here involves digitising paperwork (see Initiative 14: centralised inbound mail). Actions taken to optimise document processing include reducing discrepancies between interfaces to a single clearing office.

The portfolio of initiatives

The portfolio includes 115 different projects and processes (status: October 2018). The BAMF’s IT is working on 19 digitisation initiatives in parallel in 2018. Larger initiatives, such as the integration business file (InGe) or MARiS, consist of diverse smaller projects that build on one another. A number of smaller IT projects beyond the scope of the Digitisation Agenda are underway as well.

The profiles starting on page 31 provide details on the content and objectives of the 19 initiatives.

The portfolio of initiatives for 2018 has been updated in line with current BAMF requirements.
Furthermore, digital documentation will eventually reduce today's paper-based document storage and enable the end-to-end digital processing of files. Mailing documents electronically (see Initiative 11: Electronic Court and Administration Mailbox (EGVP)) furthermore improves administrative processes by significantly reducing errors during processing (e.g. of applications).

The initiatives that make up the Federal Office’s digitisation portfolio are classified into three stages of maturity. Stage I initiatives provide the electronic data storage capabilities that constitute a prerequisite for digitisation. The aim of these initiatives is to facilitate the storage and transmission of documents such as asylum files in electronic form. Building on this foundation, Stage II initiatives digitise BAMF processes on an end-to-end basis. The result is digital workflows that reduce the need for staff to enter data by hand and, consequently, reduce processing time whilst boosting processing quality. Once such fully digitised processes are in place, Stage III initiatives (systematic support for decision making) can then be implemented. These will be supplemented by digital technologies such as data analysis or artificial intelligence, used to support staff in a targeted manner when it comes to processing and decision making.

We would like to tell you below about a few recent success stories that were achieved in initiatives in 2017/18.
Digitisation at the BAMF is a three-stage process

**Stage I**
**Electronic data storage**

All documents are available electronically, making relevant information available across locations

<table>
<thead>
<tr>
<th>Goal</th>
<th>Paperless administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Scanned identity document</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Already completed</td>
</tr>
</tbody>
</table>

**Initiative 14: Centralised inbound mail (Zentraler Posteingang, ZPE) – digitisation of documents and external communication**

The goal of the BAMF’s centralised inbound mail initiative is to scan – and thus digitise – incoming paperwork. Doing so requires standardising, harmonising and certifying the various different types of scanning processes used today to ensure paperless mail processing that increases efficiency whilst meeting legal requirements. The resulting standardised digitisation method, combined with the centralised availability of documents achieved by using the specialist MARiS process, makes it possible to transmit and process documents electronically. As a result, staff at BAMF locations can focus on their core tasks instead of having to spend time managing documents.

As a part of centralised inbound mail, Deutsche Post AG’s scanning centres are used to centrally digitise existing files, incoming mail and internally prepared documents. Staff at the mailrooms of BAMF locations assess whether incoming mail should be digitised. The identified paperwork is then transported with logistics solutions specifically designed for this purpose. The most advanced technology is then used to scan the documents, perform quality assurance, attach a qualified electronic signature, and automatically forward the scanned documents to the right recipients as defined in the MARiS business process – all whilst conforming to client-specific requirements. The Deutsche Post facilities and processes involved have demonstrated that flexibility and scalability enables virtually limitless linkages to further clients (such as other public authorities or internal BAMF processes).
II Digital work flows

Within a process, all data fields are available electronically and can be read out and used consistently throughout the entire process.

III Systematic decision support

Data are interpreted automatically, and support for employees – which can take forms up to fully automated sub-steps – is derived from these results.

Digital end-to-end processes

- Access to and use of individual data fields
- Continuous improvement (open-ended)

IT-assisted decisions

- Automated plausibility verification of the way name is written
- Continuous improvement (open-ended)

The solution developed as a part of centralised inbound mail goes a long way towards minimising the document management processes, reducing time pressure, and significantly improving quality despite the need to scan approximately 20,000 documents every day. Digitising inbound mail also simplifies logistical processes, thus reducing traffic and transport volumes.

Initiative 15: Vocational German language promotion (BerD) – on the way to a comprehensive language programme in the digital age

The BAMF is responsible for nationwide efforts to promote knowledge of vocational German. They constitute the comprehensive language programme for all recent and established immigrants and, together with integration courses, form a core element of the government’s official integration activities. A central digital platform with a broad range of applications is currently being set up to manage, co-ordinate and bill for vocational German language promotion. The system is linked with the employment agencies, job centres, accredited municipalities and course providers. The new digital solution for vocational language promotion is completely replacing the paper-based process used to date.

Digitisation also enables more efficient management of vocational German language promotion: staff can handle course administration, organisation and billing themselves, digitally. A digital solution can completely eliminate the need to enter data by hand and provide information orally.
This leads to faster, more reliable matching of supply and demand. In addition, the digital platform complies with the statutory requirement to monitor results and successes by enabling staff to calculate and evaluate relevant key indicators at the push of a button.

**Initiative 7: Integrated Identity Management – plausibility, data quality and security aspects (IDM-S) – intelligent systems to support decisions**

Ascertaining an asylum-seeker’s place of origin is an important factor in the decision on asylum. Innovative digital tools can provide additional support to BAMF staff involved in interviews and decision making when it comes to validating this information.

The nationwide roll-out of Integrated Identity Management (IDM) made the infrastructure for registering those seeking protection at an early stage and in a uniform manner, and issuing their proof of arrival documents, available throughout Germany. The registration data are now stored in the core data system, and are thus immediately available to authorities authorised to access them. As a result, individuals can be definitively identified based on both their proof of arrival documents and on their fingerprint data. By refining the Integrated Identity Management: plausibility, data quality and security aspects (IDM-S) programme, the Federal Office hopes to be able to verify information provided during the asylum process and check its plausibility in order to further increase cross-authority efficiency and transparency as well as the security of the asylum procedure.

BAMF staff need to check and verify claims made by applicants during the asylum procedure. The process involved is time-consuming, primarily manual and based largely on the claims made by the asylum-seekers themselves. In a number of pilot projects, the BAMF is now testing innovative approaches for support systems enabling experienced decision makers to validate and verify the plausibility of information obtained during the asylum procedure. These systems use methods such as automatic face or dialect recognition, name transliteration and analysis, or the analysis of mobile data devices.

**Automatic face recognition**

The registration process for asylum-seekers already involves storing a biometric photograph. A further step towards improving the registration process is therefore to compare an applicant’s biometric characteristics with the database. Special software supports this comparison by checking newly included photographs against those of previously registered asylum-seekers based on the biometric characteristics they contain. Biometric authentication thus provides an additional identification method supplementing fingerprint analysis. This improves data quality, and it becomes easier to determine whether an applicant is using multiple identities.

**Automatic dialect recognition**

Voice biometry software analysing the major Arabic dialects can be used to check the information provided by asylum-seekers on their country of origin. Using biometric characteristics, the spoken dialect can be roughly located in geographical terms in order to point towards the country of origin. However, the ability to draw concrete conclusions about an applicant’s country of origin is limited at this time. Recordings of sufficient clarity and length are also essential for informative results. IT-assisted analysis of voice biometrics is an independent, objective method that can be broadly applied. It provides an initial assessment, but it is no substitute for evaluation by staff of the Federal Office.

**Name transliteration and analysis**

To date, factors such as phonetics and the experience of BAMF staff member have largely determined how asylum-seekers’ names are recorded during the registration process. Name transliteration and analysis now make it possible for asylum-seekers who speak major Arabic dialects to enter their names themselves using a keyboard accommodating the characters used in their language. The transliteration assistant automatically converts this input into the characters of the Latin alphabet. This approach reduces the burden on BAMF staff involved in asylum interviews and decisions. Data quality increases as well, and it becomes easier to identify individuals
Extended IDM: four essential tools are used for identity management

across authorities. Given that specific spellings may permit conclusions to be drawn as to the country of origin, they may also be used in support of the plausibility checks regarding origin.

**Analysis of mobile data media**

The analysis of mobile data devices also helps in determining identity and country of origin. Legislative changes to provide better enforcement of obligations to leave the country allow the BAMF to analyse mobile data devices for this purpose. The objective of this approach – which is only applied in certain case constellations – is to use information such as smartphone metadata (including stored geodata) to check the accuracy of asylum-seekers’ statements regarding their identity. Only metadata are accessed; no content is analysed. For example, the language used for communication is obtained, but not the content of any messages. Similarly, geodata for photos are accessed, but the actual images are not. Mobile data media are only analysed as a last resort in exceptional cases and within a narrow set of legal conditions – for example when an individual does not have a valid identification document and his/her country of origin or identity cannot be determined with a sufficient level of plausibility.

**Initiative 11: Electronic Court and Administration Mailbox (EGVP) – AI-assisted sorting process for e-mail correspondence with the administrative courts**

The Electronic Court and Administration Mailbox (EGVP) provides a channel for the electronic, legally compliant,
encrypted sharing of information between the BAMF and other authorities, especially the administrative courts. Previously, these authorities largely communicated and sent files and correspondence via conventional postal services and fax. Media discontinuities led to inefficiencies and quality shortcomings within the process. As a result of the initiative, nearly all correspondence with the administrative courts was digitised in just a year – with no need for significant changes to the existing IT architecture or the core system. Ongoing optimisation and further automation of analogue processes are further increasing processing efficiency.

Since digital communication via the EGVP began, the Federal Office has sent an average of 1,800 files and documents to the courts electronically each day – and received more than 7,000 documents via the EGVP in return (status: August 2018). The courts benefit from the digital exchange because asylum files arrive faster, new automated options exist for handling incoming mail, and costs for delivering and processing documents have fallen significantly. Not having to send documents out in a physical form reduces the workload for the Federal Office and its external locations. Processing times and logistical efforts have shrunk, and manual process steps have been standardised or gradually automated.

The planned introduction of EGVP 2.0 aims to further automate process steps by fully integrating them into the core MARIS application. In the future, correspondence arriving via EGVP is to be automatically forwarded to the right employee and successively prepared at each step for further processing. The MARIS integration will make sending documents with EGVP even simpler, whilst the application gains additional functionalities and is migrated to a new, scalable technical platform. Further communication partners – currently the immigration authorities in a number of Federal Länder – are being added as well.

When EGVP 2.0 is in place, the transmission of standardised machine-readable data will simplify the work-flows at the Federal Office and administrative courts. As a result, information can be collected and integrated into the appropriate IT systems faster whilst reducing the number of errors. Minimising media discontinuities can also make processes faster: BAMF staff members can receive inbound messages within seconds and process them. Migrating the system to create a sustainable, scalable platform ensures that the BAMF will remain flexible in the future and continue to be able to respond to changing requirements and conditions – a further step towards becoming a digital, breathing public authority.

The electronic court and administrative mailbox (EGVP) simplifies collaboration between the BAMF and administrative courts.
Experiences: How is the shift from analogue to digital thinking progressing?

What objectives is the Federal Office pursuing by digitising its document services?

Digitising document services allows us to achieve a range of advantages. We anticipate cost and time savings when processing applications because documents can be shared and processed in virtually real time. We also expect significant improvements to quality because we can automate many process steps and thus avoid potential errors.

What will change about how staff members work?

As the share of digitisation increases, it is only natural that our staff will need to think in new ways. Whilst many documents were processed in writing before, new software is now being used at many points. We will be offering appropriate training to introduce our colleagues to the new ways of working and achieve this shift in thinking.

What successes can you point to so far? What challenges did you have to overcome?

Centralised inbound mail and the Electronic Court and Administration Mailbox have brought initial successes in document digitisation and digital document sharing with other public authorities. The major challenge that we face is the number of parties involved in the overarching programme, which places new demands on project management at the Federal Office.

What successes have been achieved to date in terms of promoting German language skills?

We launched an enormous language promotion programme nationwide in an extremely short time with a budget of more than EUR 400 million p.a. The success has been overwhelming: within two years about 330,000 eligibility notices were recorded and more than 10,000 courses have been launched. This would have been impossible without a database of attendees’ data. We reached a central milestone on 19th March 2018 – the direct transmission of personal eligibility data into the BerD system.

Were there any teething problems?

The volume of incoming documents would be practically unmanageable at present if we were unable to further expand the IT system quickly. As a result, we are required to continually adopt new procedures or completely new software elements, or else to run them in parallel. The rapid pace of change demands immense flexibility and results in a high need for information and training.

What additional digital innovations are you working on for the coming year?

We have extremely high expectations for 2019. Working in the live system, we need to integrate dozens of Excel lists and the two current productive BerD IT applications into one single application. Our goal for the end of 2019 is to have a dashboard that provides staff with all the relevant information as quickly and clearly as possible so that they can make good decisions about the implementation of vocational language courses wherever they are working.
New digital ways of working

The Digitisation Agenda represents a very ambitious programme for the BAMF. In order to quickly complete the large number of initiatives included in this programme, the Federal Office is also pioneering new approaches to implementation. For example, it is the first German public authority to use an IT lab to systematically apply agile software development methods. In addition, piloting minimum viable products (MVPs) has become a key tool for testing ideas quickly and taking them live.

**The IT lab – design thinking at the Federal Office**

The IT lab is designed to use agile methods of software development to promote collaboration. The iterative, incremental Scrum method plays a central role. The Scrum process involves developing new software in sprints: recurring development periods (usually two weeks) that are planned jointly by the team at the beginning of each iteration. Each sprint results in an MVP – a product increment which provides all the basic functionalities that are absolutely necessary.

The distinctive thing about Scrum is that the business side works very closely with the development team, making it easy to adjust the project in question to changes such as those caused by evolving business-side requirements.

The IT lab consists of three rooms that support close collaboration between developers
In order to be able to successfully apply Scrum in a software development project at the Federal Office, three new rooms were fashioned into an IT lab with a work area, a communication room, and a presentation/meeting space. The work area contains workstations with the latest technical equipment and enables the business and IT sides to work together closely. The communication room provides a place for discussions and the joint development of new ideas. Different types of seating encourage informal conversation. The presentation/meeting space can be used to present results and hold demonstrations or meetings.

Following a pilot phase in which individual pilot teams worked according to the Scrum model, a permanent, highly-effective Scrum team is now using the IT lab as a base for successively implementing other projects. This has enabled the BAMF to integrate its IT lab into its day-to-day operations. Other IT projects within the organisation are gradually adopting the Scrum approach as well.

This newly established way of working has met a very positive reception. To date four projects were completed at the IT lab, and several employees have been trained as Scrum masters. The Federal Office is also working with three German universities to share its experiences in agile collaboration through lectures in the classroom and for wider audiences. In the long term, the Federal Office plans to build on these successes and develop the majority of its digital solutions using agile methods.

Scrum’s particular usefulness was apparent from the very start of the pilot phase for two reasons: first, initial results are available as soon as the sprints are complete, and second, regular co-ordination between the business side and IT enable both sides to work together closely as partners. Because work products are demonstrated early on, developers can identify any changes that need to be made together with the business side and implement them easily, without making the work done up to that point obsolete. In the traditional approach, the need for such corrections would not become evident until after the development phase, and would entail far more additional work.

The six stages of design thinking are based on typical design processes.
Converting the IT lab into a process lab – design thinking

Motivated by the successes achieved by agile software development, the BAMF is working towards the next step – the establishment of a “process lab” for work based on design thinking. Design thinking involves bringing together people from different disciplines in an environment that fosters their creativity. Together they consider how to maximise benefits for end users (user-centric design) whilst remaining cost-effective and complying with relevant architecture principles. The design thinking approach to developing solutions is based on the typical stages of the design process: understanding, observing, defining the point of view, prototyping and testing.

In the first stage, the team works together to develop a common understanding of their task. The focus of the next phase is observation: gathering as many facts as possible to comprehensively grasp the problem. Once all the required information has been collected, the team can generate first hypotheses. These provide the basis for approaching the problem from as many angles as possible as the team develops ideas on how the task can be completed. Brainstorming sessions in which team members give free rein to their ideas are part of the design thinking method. Once all the ideas have been assessed and described in the greatest possible detail, prototypes are developed for promising ideas. These prototypes do not need to be fully fledged products at first – it is much more important to use the prototypes to test ideas for their implementability in order to receive feedback as quickly as possible.

The use of integrated teams means that both the business side and IT are involved from the start.
The stages of design thinking do not necessarily progress in chronological order. Instead, one hallmark of this creative design-thinking process is that teams switch between the stages as needed. Making mistakes, learning from them and finding new ways to solve the problem as a result are all natural parts of the process.

How does the Federal Office benefit from the design-thinking method? First and foremost, its development process becomes completely user-centric. Users of digital solutions (such as the staff who will work with them) are involved in the problem-solving process from the beginning and act as members of the core team. The Federal Office therefore plans to digitise processes end to end using this approach.

Proof of concept (PoC) – getting to functioning solutions quickly

Piloting before projects start

Pilots constitute a cornerstone of the ability to talk about ideas early in the development process. For this reason, the Federal Office has begun launching PoC tests for many new projects, especially those involving innovative concepts, before implementing them. These “pre-projects” involve advance testing of the most challenging part of the project in order to find out how it can be successfully realised later on in the project. If the PoC is positive, the project can begin. PoCs can be used to test aspects of projects such as underlying algorithms, the technology used, or a specific process. The approach has already been successfully applied in many scenarios, including projects related to blockchain (Initiative 10) and the intelligent IDM-S interview decision-making support tool (Initiative 7).

MVPs – a basis for obtaining fast feedback

The aim of such PoC efforts is not to produce final digital solutions, but rather an MVP containing just the vital basic functionalities. Limiting development to this minimal functional scope makes it possible to quickly conduct use tests in order to obtain feedback and drive iterations of the digital solution.

An MVP is launched with the minimum number of features required to quickly gain insights into user behaviour

MVPs are launched quickly in order to obtain user feedback and further develop solutions based on user behaviour.
The BAMF has defined a clear vision for the IT architecture that it will be putting into place on its way to becoming a digital, breathing public authority. It consists of four central building blocks: 1) the applications and services that make up digital solutions; 2) the platform that makes it possible to put together digital solutions flexibly; 3) the infrastructure that acts as the “engine” (computing capacity) of digital applications; and 4) access to the applications for users.

Applications and services – efficient development through reuse

Due to their history, software systems in many public institutions and companies are often inflexible – they were developed over a period of years and thus grew gradually into their current forms. The BAMF’s vision for the future involves breaking up these software monoliths with a flexible software architecture based on microservices – lightweight, highly granular IT components. These microservices can be assembled into larger applications that meet business-side needs. As a result, applications can be combined flexibly, without the need to expend extensive development efforts to expand functionalities.

Microservice architecture offers another advantage as well: reuse. Meeting business-side needs depends on fulfilling certain technical requirements – for example, a user may need to sign in before using an application (an instance of Identity and Access Management (IAM)). In a classic, monolithic software architecture, such functions are often realised redundantly – in this case, for example,
every application would contain its own IAM. The Federal Office’s modern architecture encapsulates functionalities into microservices, making them reusable: applications that require IAM can use this microservice. If new IAM requirements emerge, the resulting changes can be made on the platform once, rather than separately in each business-side application.

**Platform abstraction – flexibility through encapsulation**

Generally speaking, newly developed software is provided to users in the form of a new release. Such a release contains all the functionalities (such as new elements in the graphic interface) that were not included in the most recent one (or since the beginning of the development). The time typically lapsing between releases at the Federal Office is several months, since releases are not issued until all the planned functionalities have been programmed.

In the future, the Federal Office aims to provide software functionalities as soon as they are ready. Encapsulating functionalities makes it possible to provide users with new software quickly. In addition, developers receive feedback more quickly on whether improvements are required and can respond to it faster. Establishing such continuous delivery of functionalities in software development is key to the success of this approach.

**Infrastructure – using the cloud for scalability**

The Federal Office’s various business-side applications currently run on allocated servers. Such a server is generally a high-performance physical computer. As loads increase – for example due to a higher number of registration processes or resumption procedures – the burden on BAMF applications grows, and servers can reach the limit of their computing capacity. In a classic IT infrastructure, new capacity must be acquired to accommodate these load peaks. Doing so often involves a lengthy process, as it is virtually impossible to flexibly scale up or down available computing capacity with this type of infrastructure.

For this reason, the BAMF’s vision includes a private cloud structure that eliminates the limits of the allocated server approach. IT can respond quickly and appropriately to peaks with a highly scalable cloud that distributes the load efficiently. Thanks to self-management capabilities, the infrastructure scales required capacities up and down, adjusting dynamically to changing loads.

**Access – more secure, more continuous and simpler**

Many different people use the BAMF’s IT functionalities and business-side applications. In addition to BAMF staff (both at headquarters in Nuremburg and at external locations), employees at other public authorities can also access certain information. Simple, continuous, secure access to specific BAMF systems is therefore essential.

To provide it, the BAMF is working towards standardised access that functions over multiple devices (such as a smartphone, tablet or computer) and channels (such as a website, an app or voice recognition). As a result, internal and external users can obtain information – such as the status of a resumption procedure – securely and at any time.
Interview: What is the BAMF’s vision for its technical architecture?

Marcus Ziegelmieier
Software development officer

How does the BAMF benefit from its new middleware (Initiative 9)?

The central service platform, or middleware, provides overarching cross-cutting services, both for providing and sharing data and as the basis for further initiatives. The middleware is based on a microservice architecture that already meets future requirements such as scalability and cloud capability, also making it possible to reuse individual components. Instead of needing to implement services themselves, new projects can simply integrate them. Any changes to a service can be made centrally at a single point – in the ideal case, no action at all is required in the linked applications. When microservices were introduced, we were also careful to implement more flexible deployment mechanisms and make configuration management easier to handle.

What has working with the many interfaces been like?

Good planning and detailed descriptions of the functions and data to be exchanged become more important as the number of systems using an interface increases. For new interfaces in particular, defining specifications as early as possible determines the risk of delays due to development errors. It is especially important to document precisely what data each project delivers and expects, and in what format. Thinking about a valid approach when errors occur is equally critical – something that experience shows is often neglected. People must be made aware of the significance of integration tests as well. The use of many small, distributed functions means that testing how they interact in the larger system becomes even more important.

Looking back, how would you rate the success of the project? What would you do differently?

The high reuse rate of the individual services confirms that the project is a complete success. We did underestimate how much support and guidance would be needed by individual projects that wanted to and should use the middleware. Another issue was that instead of already being available as a basis, it was only possible to implement the middleware in parallel to the first projects (Initiative 11: Electronic Court and Administration Mailbox (EGVP), Initiative 14: central inbound mail (ZPE), and the e-archive, a subproject of Initiative 12). This situation added implementation pressure for us, and greatly increased the co-ordination effort required. In light of the high time pressure, a decision was furthermore made to take an agile approach in implementing the project. This way of working was new for the BAMF and many of the people involved, but it would presumably have been impossible to implement the project within the same timeframe using any other method.

What innovations can we look forward to in the future?

Both the architecture and the use of the middleware will be analysed for every planned project. This involves checking whether existing services can be used and whether new functions could be interesting for projects beyond the one under consideration. In the latter case, a decision then follows on implementing new middleware services centrally.

Planning is currently underway for a central generic task manager to, for example, carry out a specific task, trigger an event, call up an interface or send an e-mail after a specified amount of time.

In the future there is to be one single central interface for managing digitised documents – in other words, for sharing them among applications or storing them in the archive for the long term (sub-project of Initiative 12). Documents – whether in interim storage for sharing or filed in the long-term archive – will be available to applications continually and transparently, which can access them via an unambiguous ID.

Other innovations include the BAMF coding guidelines, which should also make systems more homogeneous and easier to maintain. We have exciting work ahead of us – and every new project brings new challenges.
Organisational foundations – digital culture at the BAMF

The digital transformation can only be achieved with extraordinary employee commitment. The dedication of the Federal Office’s staff has played a crucial role in its considerable digitisation success during the past several years. But commitment alone is not enough – the processes and organisational structures that are vital to achieving the digitisation initiatives’ ambitious targets had to be put in place as well.

Cultural change at the BAMF

One of the main steps towards achieving the goals took the form of a cultural change at every level of the BAMF. The past years’ successes were only possible because all the staff – at both managerial and operational levels – worked together effectively.

In addition, an established part of the BAMF’s culture of innovation involves regular idea-sharing with other institutions – both public authorities and research institutes. For example, the Federal Office supported the establishment of NExT (Network of Experts for the Digital Transformation of the Administration), an innovation network intended to actively promote digitisation in the public sector. The experts involved see themselves as catalysts and pioneers of digital innovations and methods. The network’s members represent about 20 different authorities involved in areas including the Federal Ministries of the Interior, Finance and Defence, as well as the Federal Foreign Office. NExT’s six working groups address specific issues ranging from new technologies to new ways of working and communication within the digitisation pyramid. They also develop new ideas and initiatives that go on to optimise public-authority processes and procedures.

A further key element of cultural change at the BAMF is close collaboration between different disciplines. End-to-end process digitisation is only made possible by working in interdisciplinary, integrated teams (for example, with experts from both the IT and business sides).

The NExT innovation network focuses on six topics

- Digital projects
- Co-operative efforts
- Communication and marketing
- Organisation and way of working
- Digital capabilities
- New technology

We are NExT

- We play an active role in panels and workshops
- We want to set up our initiatives in a way that enables analogous implementation by other public authorities
- We want to act as pioneers who actively drive Germany’s digital transformation forward

We don’t want to just develop ideas, strategies and concepts, but implement initiatives as well

The NExT innovation network focuses on six topics.
Increased significance of project and quality management

The Federal Office’s Digitisation Agenda involves a large number of individual measures, including several that have already been realised. Making progress towards the ambitious targets for these measures is only possible with the right underlying organisation and processes. For this reason, a project for further developing the project portfolio and multi-project management approach was launched in the BAMF’s IT in June 2017. The project, which concluded in August 2018, had the vision of using a standardised user-orientated set of transparent methods and tools to implement all IT projects. The roll-out of the standardised project management model included comprehensive internal training for project managers and important stakeholders.

Rather than focusing on rigid processes and tools, the new methods were launched with development and improvement in mind. Because the project was implemented without halting day-to-day operations, planners always had to simultaneously take the entire dynamic organisation into account. The overarching objective of the methodical approach is to enhance the capabilities of everyone involved in IT projects at the BAMF – equipping them with improved methods and tools and enabling them to work more effectively. In this way, establishing a project and project management culture also contributes to the successful implementation of the Digitisation Agenda.
Upcoming priorities

In addition to the projects and initiatives already described here, the BAMF’s upcoming digitisation efforts will focus on three areas. On the business side, work will continue to establish digital document systems and intelligent assistance systems in all core areas of the Federal Office. On the technical side, the Federal Office will continue to pursue the vision for its IT architecture, especially by applying new technologies such as blockchain and cloud computing. Finally, the BAMF is breaking new ground in terms of its organisation and processes: beyond establishing innovative collaboration models on a broad basis, innovation management will represent a key step towards becoming a digital, breathing public authority.

End-to-end digitisation of document services

The end-to-end digitisation of all document administration currently in progress at the BAMF is creating significant efficiencies, for example by automating tasks that are now performed manually. The BAMF has identified six areas where action is required. Today’s initiatives are already addressing some aspects of them, and they will remain at the focus of future work as well:

- **Digitisation of paperwork**: The centralised inbound mail initiative established a solution for digitising paperwork that will be successively expanded to cover all areas of the BAMF.
- **Paperless document management**: With paperless document management, the BAMF aims to reduce personnel and storage costs through simplified search, storage and archiving to further increase document-related efficiency.
- **Digital document processing**: The Federal Office’s long-term goal is to automate the processing of documents (available in electronic form) to the greatest possible extent. Such automated processing will enable a flexible response to future workload peaks, reducing the number of pending applications.
- **Real-time processing**: Looking ahead, fully electronic processing will make it possible to record and research applications in real time. As a result, the latest information on topics such as the status of the processing of applications can be called up whenever necessary.

The BAMF’s digital document services focus on six areas for action
- Electronic transmission. Digitising documents makes it possible to exchange them electronically. The faster document sharing and higher-quality overarching administration processes that this capability will bring can be expected to significantly improve collaboration within the BAMF and with external agencies (both external locations and other authorities).

- Reporting. Today some reports from external locations are prepared manually and sent to BAMF headquarters in Nuremberg. In the future, digital document management will enable digital reporting on topics such as the number of documents being processed and their current status, creating the basis for digital controlling and monitoring activities.

Once such digital document services are available throughout the Federal Office, they can provide a basis for developing intelligent assistance systems. Intelligent mechanisms integrated into these systems, such as similarity detection or plausibility checks of data to support employee decision making, not only make processes more efficient, but significantly improve their quality as well.

Continuing to realise the vision for the technical architecture

To achieve the aims laid out for the business side that were described above, the Federal Office is working towards a modern IT concept with four main objectives. The first is to make IT systems flexible and responsive in order to ensure that we can quickly address changes to business-side requirements and conditions as new processes requiring digitisation become necessary or new statutory regulations are issued. Second, a highly scalable infrastructure will enable the Federal Office to adjust as workloads and volumes fluctuate. Plans also exist to provide employees with intelligent support mechanisms based on data analytics. Finally, access should be made easy for users of the BAMF’s IT, as modern technologies lead to an increase in both access channels (such as voice recognition and apps) and access devices (such as smartphones and tablets).

To accomplish these objectives, the Federal Office will continue to employ the very latest technologies, including blockchain and modern private cloud-based infrastructures.
Blockchain: support for communication and collaboration across authorities

Blockchain technology is a promising method for sharing information across authorities quickly and securely. It can be used to document changes in status, such as in the asylum procedure, and enable all the authorities involved and that have access rights to see them. At the same time, however, no personal data are saved in the blockchain – instead, better links are created among the existing systems. Blockchain also ensures that information is always up to date. Any relevant institution can quickly obtain the current status of an asylum-seeker and immediately identify and rectify any process errors that may occur. In this way, blockchain can supplement existing communication channels and support asylum procedure co-operation.

The Federal Office has already conducted initial PoC testing to investigate the opportunities for using blockchain and their advantages. This involved modelling a simplified asylum procedure and simulating blockchain support for it. Based on the results, blockchain is now also being piloted at the AnkER centre in Dresden.

Cloud: highly scalable IT infrastructure

One common disadvantage of classic IT infrastructure (e.g. conventional “server rooms”) is its inability to accommodate load peaks. As a result, for example, a sharp increase in the number of application processes could strain computing capacity to the extent that requests can no longer be processed. The BAMF’s IT structure must therefore be scalable – in other words, additional computing capacity must be available when peaks occur. In response, the Federal
Office is pursuing a cloud strategy that eliminates such limitations. If a large number of applications are submitted, as happened in the summer of 2015, the IT can respond appropriately thanks to its essentially limitless infrastructure. The goal is to create a self-managing infrastructure that scales computing capacity up or down as needed.

**Goal-orientated innovation management**

The Federal Office has set itself an ambitious goal by creating a vision of a future-orientated public authority. Particularly in light of the exacting requirements that it faces, it needs to be able to identify new solutions at any time and to implement innovative ideas quickly. Not only is the Federal Office expected to constantly transform itself and adjust to change, but it must also be able to work with incomplete, unstructured or heterogeneous input – for example, when little or no information is available because an asylum-seeker’s papers are missing or as a result of language barriers. BAMF IT’s task is therefore now to find solutions fast that adequately support staff at external locations in the face of these challenges. As a result, the BAMF will also be devoting considerable attention to the topic of innovation management.
Interviews: What digital innovations is the BAMF pursuing?

Kausik Muni
Head of the Software Development Division

Michaele Golbostan
Head of the Data Quality Management Division

What will change for the BAMF as a result of cloud technology?

We use cloud-based infrastructure to make it possible to respond flexibly during peak loads – in other words, when we receive many requests at once. A particular advantage will be self-management: our computing capacities will adjust to demand in terms of the volume of incoming requests, scaling up or down automatically.

How do you make sure that sensitive data are protected?

We use a multi-layered security concept. First, clear guidelines govern which data are made available where. Sensitive data are of course stored in a private cloud, never a public one. At the same time, we are adjusting our development and operations concepts in line with the “security by design” principle in order to ensure the highest level of security.

What plans exist for the future?

We have taken the first steps with the cloud and laid out a roadmap for moving our applications there step by step. Now we are working on an operating model that will ensure stable operations. Once it’s ready, we can start with our first cloud-based applications!

Artificial intelligence and advanced analytics at the Federal Office – what concrete applications do you foresee in these areas?

A diverse range of applications is possible. We have already gathered initial experience – in analysing profiles to examine interview records, analysing course providers in order to optimise integration courses, and in optimising software through analysing technical protocols (or alternatively log files). The goal for all these applications is to support our staff and improve the quality of decisions and processes.

What are the biggest challenges?

Maintaining a clear overview is always important whenever a new technology or method is introduced. We need to make sure that all staff members can put the new tools to optimal use whilst conforming to any legal requirements. The Federal Office has a long change process ahead of itself, but I think we’re on the right path!

What does the Federal Office’s path look like?

We will build a centre of excellence that simplifies the use of artificial intelligence and advanced analytics. Doing so requires a strong foundation, both technically (in the shape of a suitable BAMF analytics platform) and organisationally (via experts). We will be carrying out additional pilot projects in the short term in order to gain further experience – enabling us to eventually establish a complete analytics platform to support our core processes.
Interviews: What digital innovations is the BAMF pursuing?

Tamás Szeidl
Data quality officer

Why is the BAMF using blockchain technology?
Blockchain is a promising technology that can support communication and collaboration among the public authorities involved in asylum procedures. It offers many advantages, especially for sharing status updates quickly and securely: The authorities involved can obtain an overview of the course of an applicant’s asylum process via the blockchain and call up the current status in virtual real time. Successful PoC testing has already demonstrated the technology’s key benefits.

Haris Trtovac
IT project manager

What challenges did the PoC testing involve?
The main challenge when using new technologies like blockchain is quickly building up and applying the required know-how. For this reason, we worked closely with experts to develop specific knowledge and to discuss and evaluate this technology’s possibilities. Whilst the blockchain approach works with distributed data, it is also essential to ensure that we comply with all data protection guidelines and do not store any personal data in the blockchain itself.

How much does data quality matter for the BAMF?
Data constitute a key element in the BAMF’s ability to take the correct course of action. It’s therefore essential that they meet defined requirements regarding quality. Data that are processed at the BAMF must be suitable and of the appropriate quality, both for the core and support processes that use them, and as a basis for decisions. Five dimensions are considered when assessing and optimising data quality: correctness, topicality, completeness, consistency and validity.

Will data quality continue to increase in importance?
The topic will grow in importance as public authorities become increasingly networked and determine data quality criteria together. When applications are up and running, preventative measures can be installed to keep new data errors from happening. In addition, special software can be integrated into applications to ensure data quality – for example by searching for similar datasets in order to check for duplicates.

What is the Federal Office doing to make sure that it will continue to meet high requirements for data quality in the future?
Our goal is to build a shared underlying understanding of data quality. To do so, we want to improve support for users, for example in the form of training and informational material. Other focus areas include designing and implementing technical measures in IT applications and interfaces or building up a group of knowledge holders on the business-side divisions.

Where else can digital technologies like blockchain be applied in the future?
Essentially, blockchain can provide support whenever information needs to be shared quickly and securely with other institutions, such as other public authorities. To explore the possibilities using steps from the actual asylum procedure, we are currently piloting a blockchain solution at the AnkER centre in Dresden.
1. Optimising the Migration-Asylum Reintegration System (MARiS)

**Business unit:** Asylum procedure  
**Digitisation stages:** I/II/III  
**Status:** productive and in development

**Brief description**

As a result of increased demand, the MARiS management system – which supports the processes that make up the asylum procedure – underwent fundamental modernisation, especially in terms of scalability and stability. Performance and stability have now improved significantly. As a result, release 3.5 (March 2018) integrates additional requirements such as links to the centralised inbound mail system and the Electronic Court and Administration Mailbox (EGVP), as well as further business-side requirements, such as the electronic file safe and additional record-keeping functions.

Future work will entail both realising more business-side requirements (such as a new control concept in line with the stipulations of the Federal Commissioner for Data Protection and Freedom of Information), and making changes to ensure harmonisation with the BAMF’s IT architecture (breakdown of monoliths into microservices) – all with the aim in mind of being able to respond faster to demands, especially in terms of BAMF-wide communication.

**Qualitative benefits**

Stabilising the system made it possible to greatly increase its availability – down time is approaching zero, bringing significantly better resource utilisation for processing asylum requests. Thanks to the links to the centralised digital inbound mail system and the Electronic Court and Administration Mailbox, some formerly manual work steps have been partly automated and the flow of information has been accelerated. Additional business-side requirements are now being implemented to accommodate current developments in the asylum procedure whilst conforming to more stringent data protection requirements.

**Quantitative benefits**

Approx. EUR 10.3 million p.a. (due to greatly increased system availability).

**Dependencies**

- Stipulations when communicating with other authorities, such as the Federal Criminal Police Office and the Federal Office of Administration
- Stipulations resulting from changes to formats for sharing information, especially XAusländer and GSAT, and technical parameters for the central service platform (middleware)
- Parameters from the Federal Commissioner for Data Protection and Freedom of Information
2. Similarity search in the Migration-Asylum Reintegration System (MARiS)

**Business unit:** Asylum procedure  
**Digitisation stage:** II  
**Status:** under development

**Brief description**
Implementation of an effective, error-tolerant phonetic search based on the Levenshtein algorithm in MARiS.

From the business-side perspective, lists of results from searches for entries on specific individuals in MARiS are inadequate at present. One reason is that transcriptions of names from Arabic into Latin script do not always follow a consistent method, thus resulting in different spellings of the same person’s name (Mohamed Ali versus Mohammad Ali, for example). If enough valid information on an individual is available, the search used today can find the desired datasets. However, if not enough information is provided or this information is imprecise or incorrect, it is up to the user to manually apply a broader search logic. This logic is derived from experience, and success depends on the user’s personal knowledge. Such cases primarily occur when information is provided orally or in handwritten form or the correct spelling of elements in the name is not known.

Examples of such cases are asylum-related searches regarding family members or other relatives, handwritten notifications of illness or withdrawal from courses, or duplicate entries created when no biometric data are available and the spelling of name elements is unclear, resulting in situations in which no matching dataset can be found.

A feasibility study and a pilot project have already been conducted to test the capabilities of the new, more effective search function.

**Qualitative benefits**
Using the similarity search has reduced search times by a factor of five, thus enabling interviewers to devote more time to the actual interview and to increasing interview quality. The similarity search improves data quality as well, since fewer duplicate entries are made.

**Quantitative benefits**
No quantifiable benefit for the Federal Office.

**Dependencies**
- MARIS  
- Middleware

3. Integration business file (Integrationsgeschäftsdatei, InGe) – course tracker

**Business unit:** Integration initiatives  
**Digitisation stage:** I  
**Status:** productive (Stage I)/under development (Stage II)

**Brief description**
The course tracker provides an overview of available integration courses and the demand for them. Course providers will transmit course planning data and utilisation levels for current and planned courses directly to the BAMF via InGe online. The information collected in this way is to be made public throughout Germany in the BAMF’s geobased WebGIS portal. Plans call for an app-based solution at later stages of development.

**Qualitative benefits**
Better transparency regarding available courses leads to optimal course utilisation and enables asylum-seekers to start taking integration courses sooner. Participating regional BAMF offices, Migration Counselling offices and offices authorised to mandate an asylum-seeker’s participation will be enabled to find the nearest free place on a course at any given time. The course tracker, which functions identically regardless of location, meets the BAMF’s current requirements much better.

**Quantitative benefits**
No quantifiable benefit for the Federal Office.

**Dependencies**
- Changes to WebGIS geoinformation system to accommodate the new data contained in InGe  
- Expansion of the InGe integration business file system and InGe online course tracker
4. Integration business file (Integrationsgeschäftsdatei, InGe) – online TGS

**Business unit:** Integration initiatives  
**Digitisation stage:** II  
**Status:** productive (Federal Employment Agency’s job centres)/approval in progress (job centres for accredited municipalities)  

**Brief description**

Until the late summer of 2016, public funding institutions of basic social services/insurance (Träger der Grundsicherung, TGS) still transmitted data on beneficiaries’ mandatory course attendance to the Federal Office on paper. Now, thanks to an online link to the job centres run by the Federal Employment Agency, electronic communication is possible between VerBIS (placement, advice and information system), the system used by the Federal Employment Agency, and the Federal Office’s integration business file, or InGe. The next step is to link the systems used by accredited municipalities – a task that will involve connecting seven different IT systems to InGe online. In total, around 300 of the Federal Employment Agency’s job centres and 100 accredited municipalities will participate in the digital exchange of data regarding the integration courses.  

**Qualitative benefits**

In addition to higher data quality, the online TGS link also promises more secure management of integration courses: Individuals can be identified more easily and unauthorised activities prevented. The system also provides notifications on citizenship and residence status.  

**Quantitative benefits**

EUR 3.0 million p.a.  

**Dependencies**

Willingness of accredited municipalities to request a link via XAusländer between their IT systems and InGe online

5. Integration business file (Integrationsgeschäftsdatei, InGe) – centralised inbound mail

**Business unit:** Overarching  
**Digitisation stage:** I  
**Status:** under development  

**Brief description**

The scanning line for digitising inbound mail, which was set up for the optimised MARiS asylum management system, can also be used to support the InGe system for integration. Doing so will allow the electronic transfer and processing of accreditation applications from new instructors, which in the past arrived primarily via the postal system.  

**Qualitative benefits**

A centralised digital inbound mail solution will help the Federal Office save valuable resources and improve quality. The solution will reduce the use of time-consuming and cost-intensive physical postal services, lower the strain on personnel and material resources, and decrease clerical errors due to the manual entry of data from forms into the system.  

**Quantitative benefits**

EUR 1.2 million p.a.  

**Dependencies**

- Technological basis: MARiS central inbound mail system  
- Provision of the service platform (middleware)  
- Integration of digital documents in InGe 2.0
6. Integration business file (Integrationsgeschäftsdatei, InGe) – digital file

**Business unit:** Integration initiatives  
**Digitisation stage:** II  
**Status:** in planning  

**Brief description**

The digital file InGe (system to support integration business or case file) is to completely replace paper files for integration course instructors and attendees. Amongst other things, the initiative is intended to digitise the accreditation and management process for the hiring of new instructors. The technological basis for the system will be the electronic MARiS file (see also profiles on MARIS (Initiative 1) and ZPE (Initiative 14)).

**Qualitative benefits**

The digital file will save large amounts of archive space previously required for storing paper files. Fast, targeted access to the data they need will also save time for the staff. In addition, employees will enjoy greater flexibility because they can retrieve the data they need from any location.

**Quantitative benefits**

EUR 4.9 million p.a.

**Dependencies**

Technological basis: digital file of the MARIS work flow and document management system

---

7. Integrated Identity Management – plausibility, data quality and security aspects (IDM-S)

**Business unit:** Asylum procedure  
**Digitisation stage:** II  
**Status:** handover to line and further development in progress  

**Brief description**

Integrated Identity Management (IDM) was introduced in 2016 to increase process efficiency in the asylum procedure. With the related IDM-S programme, the BAMF is further qualifying and trialling innovative tools that help decision makers assess the information collected during registration and verify the plausibility of statements made during asylum interviews. The tools provided by the programme include the following:

- **Name transliteration (currently for major Arabic dialects):** standardisation of how an applicant’s name is spelled when converted from non-Latin script (such as Arabic) into Latin script, with a resulting assessment of the probable country of origin based on the name.

- **Automatic dialect recognition (currently for major Arabic dialects):** comparison of a recording of the applicant’s speech with a language database to determine the language and dialect in order to help decision makers verify or disprove applicants’ statements about their countries of origin.

- **Automatic face recognition:** comparing biometric characteristics in a photograph of the applicant to those of other asylum-seekers in the BAMF database to avoid duplicate entries and multiple registrations. Photo biometrics also make faster processing of requests from security agencies with photographs possible.

- **Analysis of mobile data devices:** using a system of specialised kiosks to access data from mobile data media (especially cell phones and smartphones) to help determine an applicant’s identity and geographical origin.

These tools were successfully tested and broadly piloted in 2017; they went live in early 2018. Now they are being anchored within sustainable line structures. Further development of all tools is in progress or being planned with the goal of boosting their performance, improving their integration into the BAMF’s work processes and IT landscape, and maintaining the required high level of data protection and security.
The IDM-S programme will also entail ongoing testing of innovative technologies and assessment of their suitability for the BAMF’s needs, including their ability to support the BAMF on security matters. For example, an analysis tool is currently under development that will systematically check notes from applicant interviews for security-relevant information. The result will be a support system that helps decision makers and security experts fulfil the BAMF’s legal obligations to report security concerns – quickly, without gaps, and with high-quality information.

Systematic examination of whether partner authorities in Europe could use IDM-S IT tools is taking place as well. Discussions with representatives of migration authorities from other countries point to interesting opportunities for working together, especially in terms of dialect recognition.

**Qualitative benefits**

The assistance systems support BAMF employees in collecting data and other information at many points along the asylum procedure and verifying their plausibility, thus establishing a broader foundation for decision making, even faster processes and simpler work flows. These improvements also help prevent potential fraud and further ensure public security.

**Quantitative benefits**

No quantifiable benefit for the Federal Office.

**Dependencies**

- AZR
- MARIS

---

### 8. Integrated Identity Management (IDM) – BASIS

**Business unit:** Asylum procedure  
**Digitisation stage:** I  
**Status:** productive

**Brief description**

The nationwide launch of Integrated Identity Management (IDM) was successfully completed at the end of May 2016. The result is infrastructure throughout Germany to register asylum-seekers early and consistently and to issue their proof of arrival documents at the same time.

As a continuation of the programme, personalisation infrastructure components were expanded for additional case categories. A separate work flow for fast-ID (a system to quickly compare fingerprints) is now available as well.

This unique digital documentation of all personal data on individuals to be registered in asylum procedures, which was introduced in May 2016, makes it possible to provide these data to all relevant authorities (e.g. Federal Criminal Police Office, Federal Office of Administration) even before the BAMF processes the applications.

**Qualitative benefits**

The introduction of personalisation infrastructure components means that a consistent nationwide process developed jointly at Federal and Länder levels is now in place for registering asylum-seekers, unaccompanied minors and unauthorised foreigners in Germany. Better data quality is the result. Providing electronic data records in advance also speeds up processing times. All involved authorities and pending procedures can access the most up-to-date data at any time, for greater asylum procedure security.

**Quantitative benefits**

Quantitative benefits ensue from faster processes and higher data quality, which limit cost and effort in the future by, for example, avoiding issues requiring subsequent error correction.

**Dependencies**

- Central Register of Foreigners  
- Federal Criminal Police Office  
- MARIS
9. Middleware

**Business unit:** overarching

**Digitisation stage:** II/III

**Status:** productive

**Brief description**

The BAMF’s platform-as-a-service (PaaS) middleware provides a range of services, software components and libraries that make it considerably easier to develop cloud-capable architecture in line with the BAMF’s architecture guidelines.

- The logging service provides a high-availability “representational state transfer” (REST) endpoint, which makes it possible to centrally store, call up and analyse technical logging data. REST is a programming paradigm for distributed systems, especially Web services.
- Interim file storage enables high-availability and high-performance interim storage and management of files of any type. It can be activated via REST from any programming language. For Java systems, a client library is provided for easy use of all functions.
- With document services, various services for storing and managing documents in the electronic and long-term archives are available via REST.
- The ID service delivers unique identifiers (IDs) that follow predefined patterns and can be used to save files (in the interim file storage) or documents in the archive.
- The IP category service sends back information for categorising IP addresses to enable access control depending on the access channel (e.g. mobile workplaces).
- Microservices and client-server and Web applications can use an OAuth2 protocol to authenticate themselves at a REST endpoint in order to receive the role information recorded in the BAMF’s identity management (IDM) infrastructure, which can be used to authorise users. OAuth2 stands for “OpenAuthorisation Version 2″. A client library is also provided for Java development activities.
- Data grid (DGR) provides both master and MARiS data as specialised REST services.
- The “Grabenaffe” (part of the NAM) provides special REST services that enable simple connection to MARiS and the transfer of documents into MARiS files.
- The service registry and a configuration server enable cloud operation on an M-ware cluster (a farm of virtual computers).

**Qualitative benefits**

Developing applications in line with architecture requirements becomes easier and developing cloud-capable applications becomes considerably easier. Furthermore by enabling a better response to future increases or decreases in load, cloud-capable applications play an important role as the volumes of BAMF business change.

**Quantitative benefits**

Avoidance of the duplicate implementation of interfaces, data storage and notification functions, resulting in significant savings potential in projects. In addition, most middleware services can be maintained while they are running, thus obviating the need for a maintenance window (in other words, with no down time).

**Dependencies**

- Infrastructure of the Federal Centre for Information Technology
- Architecture and standards of the Federal Centre for Information Technology
10. Blockchain proof of concept

**Business unit:** overarching  
**Digitisation stage:** II  
**Status:** in development

**Brief description**

The BAMF is looking to blockchain technology to support communication and collaboration in asylum procedures across public authorities.

Blockchain uses a decentralised data structure that enables data to be stored permanently and transparently in cryptographically-linked blocks. Its central concept is the management of stored data by a network of participants rather than a central entity. New blockchain technologies also make it possible to automate aspects of cross-authority process management, assuming such automation is permissible and makes sense to all involved parties. Whilst multiple distributed-ledger technologies exist, blockchain is the best known.

Distributed-ledger technologies occupy a key role as focus technologies in both the Federal Government’s digitisation strategy and in the BAMF’s Digitisation Agenda.

**Qualitative benefits**

Blockchain technology has already been subjected to PoC testing. The results indicated that it can support and promote many aspects of communication and collaboration across authorities. Up-to-date information on individuals’ asylum procedure status can be quickly shared with all relevant authorities whilst ensuring conformity to legal requirements. Based on the positive results of the PoC tests, blockchain technology is being piloted at AnkER centres. The aim is absolutely not to replace existing systems such as the Central Register of Foreigners or MARiS, but rather to supplement them with additional functionalities. The first step is to support communication and collaboration between the BAMF and the central immigration authorities. Concrete objectives include designing more efficient processes and further ensuring that asylum procedures conform to the rule of law. The next step could then involve expanding the system to other public authorities (city-level immigration authorities, security agencies, administrative courts etc.) – resulting in even greater benefits ensuing from blockchain technology.

**Quantitative benefits**

No quantifiable benefit for the Federal Office.

**Dependencies**

Co-ordination with other public authorities

---

11. Electronic Court and Administration Mailbox (Elektronisches Gerichts- und Verwaltungs-postfach, EGVP)

**Business unit:** Asylum procedure  
**Digitisation stage:** II  
**Status:** in development

**Brief description**

The Electronic Court and Administration Mailbox (EGVP) provides a channel for the electronic, legally compliant, encrypted sharing of information between the BAMF and other authorities, especially the administrative courts. Nearly all correspondence and the transfer of files and paperwork via mail and fax has now been digitised. Since digital communication via the EGVP began, the Federal Office has sent an average of 1,800 files and documents to the courts electronically each day – and received more than 7,000 documents in return (status: August 2018).

With EGVP 2.0, the focus shifts to improving EGVP communication by migrating to a new, scalable technical platform, which will ensure full integration into the core MARiS application. In addition, the functional scope is to be expanded as innovative technologies (including technologies for intelligent automation) and the switch to the XJustiz 2.1 standard for sharing metadata will enable the further automation of process steps.

**Qualitative benefits**

EGVP 2.0 further advances the digitisation of communication between administrative courts and the BAMF. The additional streamlining of work flows due to the transmission of machine-readable standardised metadata benefits both the BAMF and the administrative courts. Information can be recorded and integrated into the relevant IT systems faster, even as the number of errors is reduced. In addition, more extensive automation will further speed document transmission/processing and the reduction of media discontinuities to a minimum. Messages arriving at the BAMF can be delivered to the appropriate staff members within seconds. At the same time, staff members will perform fewer repetitive tasks, thus freeing up time for the activities that require their expertise.

Finally, the migration to a sustainable, scalable platform will equip the BAMF to respond flexibly to changing requirements for EVGP communication in the future.

**Quantitative benefits**

Only limited quantifiable benefit for the BAMF.

**Dependencies**

- Interfaces to MARiS, document services and the service platform (middleware)
- Conformity with the XJustiz 2.1 standard for sharing data
12. Digital file management
(Digitale Aktenverwaltung, DigA)

**Business unit:** overarching  
**Digitisation stage:** II  
**Status:** in development

**Brief description**

The digitisation of file management is a central element in the transition from paper to electronic files at the BAMF. With the business-side and technical parameters in mind, work in this area through the end of 2018 will entail evaluating the technical options for electronic file management, making a decision and identifying the first pilot projects for linking up the chosen solution.

Starting in 2019, paperwork throughout the BAMF will be digitised as business processes are successively linked to the BAMF’s electronic file management solution. The goal for such projects is to implement electronic file management that can be both linked to existing business applications and used by business areas for which no business application exists.

**Qualitative benefits**

Digitising the BAMF’s paperwork and introducing consistent electronic file management that can be used throughout the organisation create an important basis for improving and standardising processes in every part of the BAMF. The introduction of paperless file storage and digital file processing enables BAMF staff to work together without media discontinuities and to share documents digitally.

**Quantitative benefits**

The quantitative benefits will be determined in the course of the projects beginning in 2019.

**Dependencies**

Expansion of the centralised inbound mail solution to cover all incoming mail.

13. Secure external communication
(Gesicherte Kommunikation, GeKo)

**Business unit:** overarching  
**Digitisation stage:** II  
**Status:** in development

**Brief description**

External communication between the BAMF and all individuals, organisations and authorities is to take place via secure channels so that no third party can access the shared information. “Secure external communication” provides the IT for this purpose. Another goal is to conduct all correspondence with the BAMF’s electronic file solution.

**Qualitative benefits**

Ensuring that messages can only be read by their intended recipients, remain unchanged until receipt and have a clearly identified sender, preserves their confidentiality, integrity and authenticity. Linking the communication solution to the BAMF’s digital file management system and electronic archive makes it possible to save communication in the files, making administrative steps easier to follow and understand.

**Quantitative benefits**

No quantifiable benefit for the Federal Office.

**Dependencies**

Availability of digital file management.
14. Centralised inbound mail (Zentraler Posteingang, ZPE)

**Business unit:** overarching  
**Digitisation stage:** II  
**Status:** in development  

**Brief description**

The goal of the centralised inbound mail project is to standardise, simplify and certify the heterogeneous scanning processes and work flows used at BAMF offices to ensure more efficient, paper-free mail processing that meets legal requirements. Implementing a consistent digitisation process and providing documents centrally in MARiS will make it possible to transmit and process documents electronically. As a result, staff at BAMF locations will be able to focus on their core work. Instead of spending working time managing, tracking and organising documents, they will be able to concentrate more fully in future on processing documents involved in the asylum procedure.

**Qualitative benefits**

A better scanning solution and improved scan quality will shorten processing times, bringing time and cost savings. Due to these and other advantages such as the elimination of mail backlogs – especially during high-stress periods – and easier management and communication, the process followed with asylum applications will become faster and more streamlined. The time pressure and high error rate that result when approximately 20,000 documents arrive each day at BAMF locations throughout Germany will both be reduced.

Eliminating redundant work activities will allow clearly-defined areas of responsibility to emerge. The effort is expected to reduce mail/parcel shipments and logistical processes across all organisational units. The digitisation solution will also lead to far lower traffic and transport volumes.

**Quantitative benefits**

Potential savings from centralised inbound mail starting in 2019 – approximately EUR 5.3 million in total.

**Dependencies**

- MARIS as the technological basis and preferred data management system
- Distribution and service platform, including middleware
- Deutsche Post as a trustworthy partner

15. Vocational German language promotion (Berufsbezogene Deutschsprachförderung, BerD)

**Business unit:** Integration initiatives  
**Digitisation stage:** I  
**Status:** in development  

**Brief description**

A central digital platform with a broad range of applications will be set up to manage, co-ordinate and bill for German language promotion (BerD). The system will be linked with employment agencies, job centres, accredited municipalities and course providers. This digital solution for vocational language promotion will completely replace the paper-based process used to date.

**Qualitative benefits**

Digitisation will result in more efficient and effective overall management of vocational German language promotion – from the organisation of the courses themselves to the accounting and billing process. Manual data entry and oral communication of the information will be made obsolete; supply and demand can be matched faster and more reliably. Not least, the digital BerD platform also complies with the statutory requirement to monitor results and successes by enabling staff to identify and evaluate relevant key indicators at the push of a button.

**Quantitative benefits**

EUR 1.7 million p.a.

**Dependencies**

- Co-ordination with the Federal Centre for Information Technology, the central provider of IT services for digital BerD applications
- Co-ordination with course providers regarding the establishment of an interface that simplifies the sharing of data between them and the BAMF
- Expansion of the XAusländer interface to include accredited municipalities
16. Quality assurance application for the asylum procedure (Fachanwendung Qualitäts sicherung Asylverfahren, FA QS)

**Business unit:** Asylum procedure  
**Digitisation stage:** II  
**Status:** in development  

**Brief description**  
The purpose of the quality assurance application initiative is to implement electronically assisted quality assurance at the BAMF, beginning with the asylum area. Quality assurance activities will draw on MARIS data. Users can select different types of errors from an electronic checklist and request that quality assurance specialists perform a check against the MARIS file to determine if they have occurred. The tool will take the form of a Web-based application located on the intranet that every BAMF computer can access.

**Qualitative benefits**  
Efficient documentation of quality checks for products and processes in a simpler approach than the current Excel-based solution; integrated, standardised sharing of information among quality assurance specialists and case officers. Media discontinuities are reduced (along with manual input), and processes are harmonised.

**Quantitative benefits**  
Replacing the set of manual processes supported only by Excel with a normed, Web-based system that includes supporting automation and integrated plausibility checking rules is expected to bring a more efficient workflow and a lower error rate.

**Dependencies**  
The quality assurance application depends on the general business-side optimisation of BAMF-wide quality assurance processes.

17. Interpreter management at the Federal Office (Bundesamt Bereitstellung Sprachmitlung, BABS)

**Business unit:** Asylum procedure  
**Digitisation stage:** II  
**Status:** in development  

**Brief description**  
Interpreting services are currently supported by the Interpreter Administration System (DVS), which has been in use since 1998. Since that time, the Federal Office’s interpreting activities have changed significantly both at its headquarters and at external locations. As a result, the DVS application is to be replaced by a new IT system known as BABS. The goal of BABS is to provide system-side support for recruiting interpreters and managing their contracts, as well as booking and paying them for their services, and for monitoring and managing their deployment.

**Qualitative benefits**  
Developing BABS can have a significant positive impact on the efficiency of interpreter-related operations. It will especially lower the effort involved in booking interpreters and paying their travel costs, since the system will recommend interpreters whose travel costs to the location where they are needed are low. Staff will also receive better support for interpreter scheduling, which, among other advantages, should decrease waiting time. BABS can also improve the quality of interpreter deployment by prioritising highly qualified interpreters. Finally, BABS will make the deployment of interpreters more manageable and transparent by, for example, providing centralised analysis of steering indicators.

**Quantitative benefits**  
EUR 1.9 million p.a.

**Dependencies**  
Interfaces to BAMF middleware (e.g. document management system, notification service, master data, task management, data grid)
18. Interfaces with international public authorities

**Business unit:** Asylum procedure  
**Digitisation stage:** II  
**Status:** in development

**Brief description**

The asylum procedure depends on the fast, direct exchange of electronic data – the only way to ensure that the data stored in the different systems involved are of the requisite quality at all times. Data-sharing with security agencies is especially important. Interfaces make it possible to link to various applications. Beyond this, the Central Register of Foreigners is connected directly with the BAMF. In this context, the new personalisation infrastructure component, which can be used by both the Länder and the Federation, utilises various of the Federal Office’s interfaces. The aim of this initiative is to develop and improve such digital interfaces, with a special emphasis on automating the sharing of personal data with relevant authorities. The ultimate goal is to successively update these interfaces to comply with the communication standard (X standard).

**Qualitative benefits**

The focus of this initiative is to speed up processes, reduce errors and improve security. Introducing electronic data-sharing systems will simplify cross-border communication processes among authorities, making it easier to compare data and avoid duplicate registrations. Connecting new business processes to various services will become simpler as well.

**Quantitative benefits**

No quantifiable benefit for the Federal Office.

**Dependencies**

- Modification to enable use of the XAusländer format for data exchange and the central distribution platform (middleware)
- Co-ordination with other authorities
- Compatibility with other countries’ IT systems
- Review of general legal conditions for such a system

19. Cloud

**Business unit:** overarching  
**Digitisation stage:** II  
**Status:** in development

**Brief description**

The BAMF is pursuing a course of service orientation and microservices combined with self-services on demand. Cloud environments such as those now established on the IT market provide precisely the infrastructure required for implementing the BAMF’s Digitisation Agenda.

In a cloud, resources such as storage and computing capacity or application software are provided as services via a secure intranet, avoiding the need to install additional applications on local computers. The entire IT industry is in the midst of dramatic change due to cloud technology, and the switch to cloud infrastructures will be complete in just two to four years’ time. Cloud offerings are already established in the private sector, and the changeover to cloud solutions is now underway in public administration.

**Qualitative benefits**

The BAMF private cloud will serve as a pilot and preliminary stage for the Federal cloud on the way to further developing the BAMF’s existing service-orientated architecture (SoA) and transitioning the middleware and DeKAV programmes that have been prepared for cloud-based operations to actually go live in that operating mode. The use of the BAMF private cloud is planned primarily for prioritised BAMF IT projects in progress, especially the MARiS renewal (Initiative 1), DeKAV (centralised inbound mail – Initiative 14), the Electronic Court and Administration Mailbox (EGVP – Initiative 11) and e-archive (subproject of Initiative 12), as well as interpreter management (BABS – Initiative 17).

**Quantitative benefits**

EUR 2.5 million p.a.

**Dependencies**

Co-ordination with the Federal Centre for Information Technology, the central provider of IT services for infra-structure
ASA  Interview assistance system (Assistenzsystem für Anhörungen)

BABS  IT system for interpreter management (Bundesamt Bereitstellung Sprachmittlung)

BAMF  Federal Office for Migration and Refugees (Bundesamt für Migration und Flüchtlinge)

BerD  Vocational German language promotion (Berufsbezogene Deutschsprachförderung)

DevOps  Term for an approach combining “development” and “operations”

DigA  Digital file management (Digitale Aktenverwaltung)

DVS  Interpreter administration system (Dolmetscherverwaltungssystem)

EGVP  Electronic Court and Administration Mailbox (Elektronisches Gerichts- und Verwaltungs­postfach)

EU  European Union

IAM  Identity and Access Management

ID  Non-ambiguous identifier

IDM  Integrated Identity Management

IDM-S  Integrated Identity Management – plausibility, data quality and security aspects

InGe  Integration business file (Integrationsgeschäftsdatei)

IT  Information technology

MARIS  Work-flow and documentation management in asylum and Dublin procedures (Migrations-Asyl-Reintegrationssystem)

MVP  Minimum viable product

PoC  Proof of concept

REST  Representational state transfer

SoA  Service-orientated architecture

TGS  Funding institutions of basic social services/insurance (Träger der Grund­sicherung)

VerBIS  Placement, advising and information system of the Federal Employment Agency (Vermittlungs-, Beratungs- und Informationssystem der Bundesagentur für Arbeit)

XAusländer  XML data exchange format of immigration authorities with communication partners

ZPE  Central inbound mail (Zentraler Posteingang)
Imprint

Published by:
Federal Office for Migration and Refugees
Frankenstrasse 210
90461 Nuremberg

Valid as of: October 2018; 3rd updated edition

Printed by: Federal Office for Migration and Refugees, Nuremberg

Design: Federal Office for Migration and Refugees, Nuremberg

Photo credits: Federal Office for Migration and Refugees, Nuremberg

Available from:
Publications office of the Federal Office for Migration and Refugees
www.bamf.de/publikationen

This brochure is part of the public relations work of the Federal Office for Migration and Refugees.
The publication is distributed free of charge and is not for sale.