Federal Office for Migration and Refugees

eu-LISA

Looking Ahead. Ensuring Cyber-resilience of EU IT Systems against Emerging Threats

Session III. Technology solutions for the IDENTIFY and PROTECT functions of the cybersecurity framework

From React to Act

Division 2: Digital Technologies, CIO, Innovation Management

The Federal Office for Migration and Refugees (BAMF) in Germany






Some facts:

- 8,300 employees in over 60 departments
  - 900 internal and external IT employees support approx. 150 IT products
- 244,132 asylum applications were received by the federal office in 2022
- > 3.4 million applications for asylum in the last 10 years, of which > 1.4 million in 2015 - 17

The Federal Office for Migration and Refugees (BAMF) is the centre of competence for asylum, migration and integration in Germany.

Today, it has a wide range of responsibilities:

- Implementation of the asylum procedure and decisions on asylum applications
- Promotion and coordination of integration
- Cooperation with security authorities
- International cooperation
- Research Centre for Migration, Integration and Asylum
- Digitalisation

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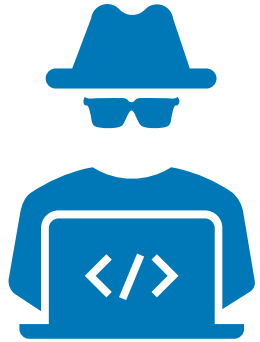
Journey - from react to act



Stay ahead of cybercriminals and be prepared to mitigate and counter emerging threats!

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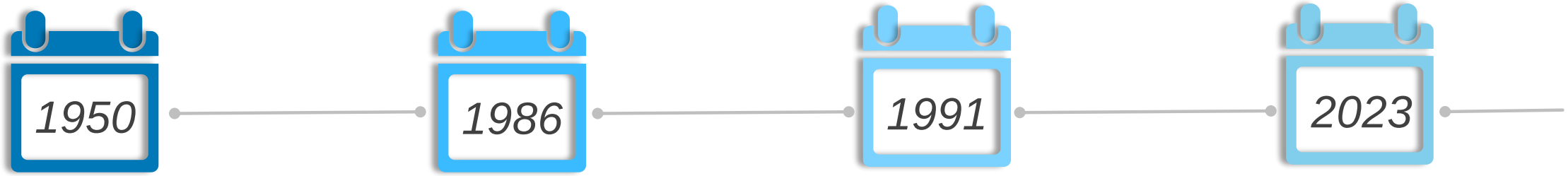
Cybersecurity in Germany – a brief overview



- *Zentralstelle für das Chiffrierwesen (ZfCh)* was founded
- Central department for encryption/ciphering
- Office branch of *Bundesnachrichtendienst (BND)* - German Intelligence Service

- Working group within *ZfCh* began to work on questions regarding security due to rapid development within the IT-domain

- *Bundesamt für Sicherheit in der Informationstechnik (BSI)* was founded
- Federal Office for Information Security
- Independent from BND with focus on information security

- Federal offices which cover certain security aspects (BSI, ZITis, Cyberagentur, …)
- Individual federal offices from different federal department areas (environment, traffic, energy, ...) have their own cybersecurity departments

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Cybersecurity Architecture of Germany

Source: https://www.stiftung-nv.de/en/publication/germanys-cybersecurity-architecture – 9th Edition, Stiftung Neue Verantwortung, CC-BY-SA 4.0

Link to Webpage from Stiftung Neue Verantwortung with interactive map of adjacent visualization. Also there is a descriptive publication available.

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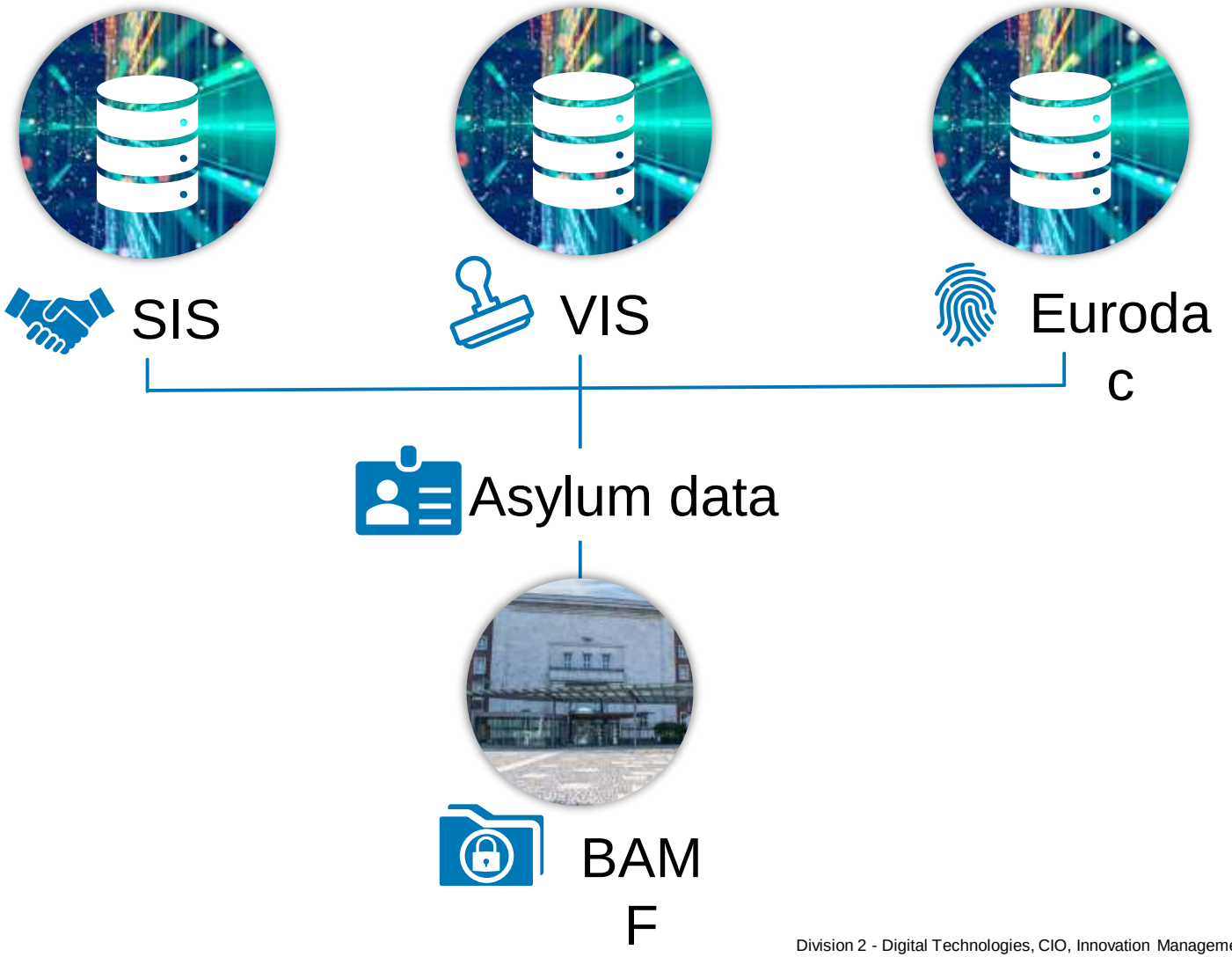
Asylum data exchange between EU and Germany



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Cybersecurity @BAMF – A Journey

2005

- BAMF started to offer web services for seamless integration of processes and data transfer
- At that time, it was hard to protect webservices made available to external consumers
- BAMF had to craft own concepts to solve this by building solutions, which were developed later within the international web community

2006

We had to establish:

- Secure Gateway (name nor product did not even exist)
- Strong Authentication with SAML and later oAuth2
- Federated Identity Management with delegated administration of identities

2014

- BAMF had to face its biggest challenge
- Between 2014-2016 about one million Refugees came to Germany
- Huge impact on organization and IT-systems
- Workload growth up to 270%
- Scale vertically (servers, storage, network)
- Service-platform
  - Data-Service-Platform
- Mobile Registration
  - Distributed mobile stations for registration purposes
  - Developed within 4 months to manage the huge workload

2018

- BAMF developed a Vision which yielded in strategic projects
- Digital transformation was started to build a modern, flexible and agile agency
- Cloud-based / Cloud Native architecture
- Microservice oriented continuous deployment
- Develop and establish security framework for digital trust
  - Secure sensitive assets

Today

- Prospects
  - Recent enactment of European NIS-2 policy (January 2023) produces significant effort for BAMF
    - We are considered critical infrastructure now
    - Many other agencies face this issue
    - e.g. communal municipality management of Munich
  - BAMF needs to act accordingly to stay on top of the wave
  - Continuous process to build secure, reliable, and future-oriented organizational and technical systems
  - Focus on recent development and research

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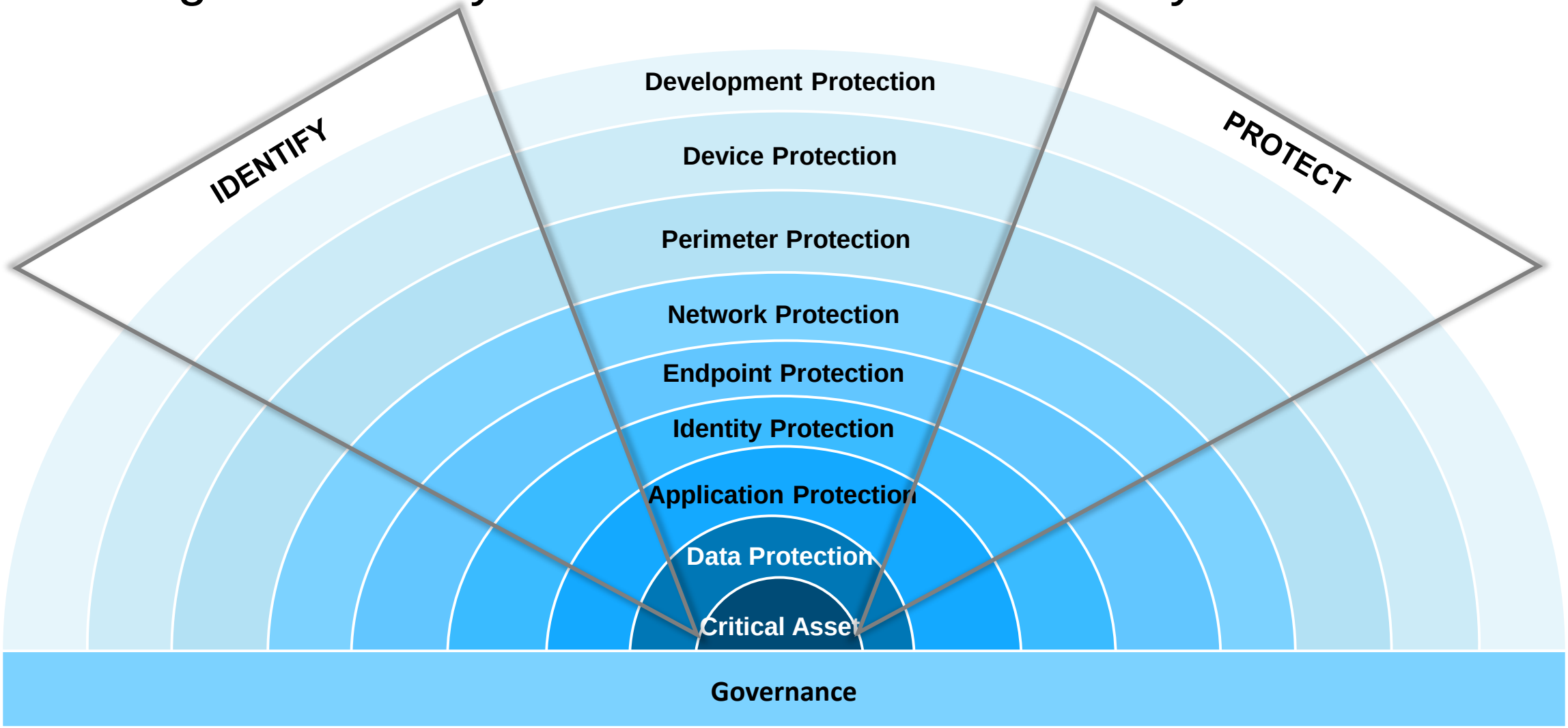
BAMF-Igloo-Security-Framework - with Onion Layers



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Technics and patterns to secure applications

Secure Coding

- Secure coding - practice of developing software in a way that guards against the accidental introduction of security vulnerabilities
- **Code Scanner** SAST Static Code Analysis, DAST Dynamic Code Analysis; especially Fuzzing
- **Memory Safe Programming languages** like Go, Rust -> non-safe ones cause between 60% and 70% of vulnerabilities

Token Exchange

- **Digital Transformation** led into service **mesh** and **cascaded calls**
- Ensure **E2E identity recognition**
- **On-Behalf-Of (OBO)** with Token exchange is a key for End2End context
- **OIDC is not designed** to support **service mesh** natively – requires RFC-8693
- Consider **SideCar** Pattern to protect endpoints in cross cutting concerns manner

Attribute based Access & SSI

- **Role based Access Control** (RBAC) is limited for MicroService architectures -> consider **Attribute-based access control** (ABAC)
- **Fine grain decision making** in the context of attributes are required
- **Self Sovereign Identity** (SSI) is a key to secure resources in usage of attribute
- Introduce a policy based engine with dynamic trusted attribute evaluation (OIDC4VP)

Secrets-Management

- Secrets are commonly used in configuration files and not protected from system administrators
- Separate secret management from property management
- Never expose Secrets to Repos -> Consider SLSA
- **Rolling secret renewal**
- Reveal digital profile exposure, & proactively uncover risks associated to data leaks, breaches

Separate Read and Write

- Understand that 90% of app access are read operations. Separate them to gain high available and fine grain access control
- **Read and Write separation**
- **Command-Query-Responsibility-Segregation (CQRS)**
- Endpoint Security with 1:1 Provider – Consumer
- BAMF introduced the DataGrid-Concept for OLTP to secure data access from various consumer services

Developer Environment Protection

Developer IDE

- Understand and **respect the the developers' individuality** and establish secure and modern development tools
- **IDE extension threats** – often not in focus and they are an easy way to infiltrate and spy
- Tight integration of scanning capabilities to ensure **Secure Coding with Code Scanners** SAST Static Code Analysis, DAST Dynamic Code Analysis; especially Fuzzing

Developer-Env

- **CloudNative development** 60% coding and 40% configuration.
- Attack vectors are increasing, which is why the configuration also needs to be tested from the first day onwards
- Help developers take **proactive actions** by prioritizing remediations and strengthening controls

OSS Code & Artefact management

- Recognize the external dependencies are manifold due to Open Source movement.
- **Containers** (e.g. Docker), **code form public repos** and other assets are often weakly secured. That can be ex-ploited by intruders -> 50 % are out-of-the box insecure
- Provide **Inhouse Artefact Proxy Repository**
- Scan CVE in depth – Container Images, Layers and
- Use highly secure build packs

SWLC – Deployment Strategy

- Change is the normal behavior and not the exception.
- **Continuous deployment-automation** reduces time to react
- **Rolling Upgrades** to aim for zero downtime
- Introduce **architecture-design principles** like **12Factors, Stateless, etc.**
- **GitOps** – Establish a single source of truth with versioning

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Conclusion

- You can't buy Security
- You can't reach an absolute secure state in an organization
- You can't build fully secure systems
- Security has to be seen as a *continuous process*

- The *information* is there, the *methods* are there, the *tools* are there; and most importantly: The *people* are there
- 5 Dimensions need to be combined in the right context:
  Information, Awareness, Organization, Process, and Technology

If we stop or slow down in keeping up with continuous developments, we will give up advance

act instead of react

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Thank you and see you later

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Thank you and
see you later