

ENGLISH

# CONNECTING IDEAS THROUGH OPEN SOURCE



FEDERATED IDENTITY MANAGEMENT.  
DIGITAL HUMANITIES.  
OPEN SOURCE.



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Peter Gietz  
**WORDS  
OF FOUNDER**



DAASI International represents professionalism, commitment, sustainability, fairness and digital sovereignty. These values are deeply rooted in our corporate philosophy and are the reason we are one of the leading open source providers for Identity & Access Management (IAM) and Digital Humanities (DH).

DAASI International originated in the field of research. By founding the company as a spin-off of a DFN (Deutsches Forschungsnetz, German National Research and Education Network) research project at the University of Tübingen, we set ourselves the goal of creating interesting and varied jobs for a dedicated team and promoting innovative technologies.

Today, our expertise in federated Identity & Access Management is in high demand all over Europe. We help organisations to improve the efficiency and security of their IT systems, and to create a reliable and intuitive infrastructure using modern open source technology. In doing so, we are simplifying the daily work of many users, despite the increasing complexity of IT landscapes, and we are improving IT security. Since IAM technologies and methods are also essential to many virtual research environments, we enjoy contributing our technical knowledge to the Digital Humanities and thereby joining both our business fields.

We are characterised by our many years of experience, the promotion of open source technologies, open standards, and data protection in the spirit of digital sovereignty, as well as our commitment to research. We hope to make a valuable contribution to the common good. Eventually, DAASI International is also a successful proof of concept for an open source business model in which values are more important than maximising profits.

A handwritten signature in black ink, appearing to read 'P. Gietz'.

Peter Gietz, Founder & CEO

## Why OPEN SOURCE?

Open source is happening! Even established tech companies, so-called global players like Amazon and Google, actively support open source projects and rely on open technologies for their solutions. Let us tell you why:

### OPEN, INDEPENDENT, SUSTAINABLE

Proprietary software is always subject to paid licences. The source code can only be viewed by the manufacturer and may only be modified by them. The development of new features is based on the general demand on the market; it is not possible to make your own further developments. With open source software, on the other hand, you have free access to the source code and can integrate new functionality yourself or with the help of the IT service provider of your choice and make further customisations as required. Open standards ensure compatibility with other systems, while the absence of license fees spares your budget. With open source solutions, you promote innovation, scale your technologies and conserve your financial resources. Furthermore, you are independent and can determine the timing and direction of any modifications yourself.

### OPEN SOURCE BY CONVICTION

We firmly support the idea of open source because we are convinced that this principle not only forms the basis for digital sovereignty, but also for innovation, progress, and efficiency. Open source makes an important contribution to reducing the digital divide both between different social classes and between the countries of the global North and South.

DAASI International has been working closely with developers of modern open source software in the IAM sector for many years, advocates standardisation in various committees and only develops products itself that are subject to an open source licence. It also plays an active role in ensuring that open source technologies are also used effectively in Africa.

- = INDEPENDENCE
- = HIGH FLEXIBILITY AND ADAPTABILITY
- = TRANSPARENCY
- = OPEN STANDARDS

DAASI International highly values structured yet flexible project management, so that a collaboration is pleasant and transparent for everyone involved. This is why the teams work according to the agile project method Scrum. Let us reach your goal together – step by step.

## Agile PROJECT MANAGEMENT

### FLEXIBLE

We divide projects into four-week project phases, so-called “sprints”. After every sprint, the team evaluates their work progress and plans the next phase of the project. This way, the project can continuously benefit from new knowledge incorporated into the work and hence, the course of the project is optimised. This creates an iterative working method which can easily adapt to changes in requirements.

### TRANSPARENT

The stakeholders always know the current stage of their project. They receive permanent feedback and can see results early on – and request adjustments accordingly if necessary.

### SUSTAINABLE

The periodic sprint meetings ensure the exchange between team members of a project on a regular basis. This way, clear structures during the work process can be established which does not only ensure high-quality of outcomes, it also increases productivity and satisfaction levels of all project partners.

### FIXED-PRICED PROJECTS

We offer this if you are working with exact budget specifications. As the scope of services and service period must be calculated precisely in advance, the planning phase usually takes a little longer. To calculate the fixed price, we use your requirement specifications or specifications such as a requirements analysis or an implementation concept.

### EFFORT BASED PROJECT

We will provide a cost forecast. The final price ultimately depends on the actual amount of work put into the project. As this method requires less planning time, one advantage is a sooner start of your project. Additionally, projects billed on work effort mean we can react more spontaneously to changes in concept or new requirements during the working phase.

## DAASI International is an Expert on **IDENTITY & ACCESS MANAGEMENT**



As digitalisation progresses, organisations are faced with the challenge of managing a large number of digital identities efficiently and securely. These identities include data and accounts of employees, customers, suppliers and, increasingly, services and devices (Internet of Things). Identity & Access Management (IAM) makes it possible to provide users with all the necessary accounts and access rights at a central location. In this way, sensitive resources are protected from unauthorised access without any major administrative effort.

**Identity & Access Management and federated IAM with open source software are the core competencies of DAASI International.**

### MORE EFFICIENCY AND SECURITY THROUGH IAM

If an organization operates multiple systems with more than a few dozen users, it is already beneficial to consider a systematic approach to identity management. Users obtain an account and a corresponding number of passwords for every single system. Conventional user management usually saves and manages this data in different, separate databases. This leads to confusing structures as well as to a duplication of the administration process and unnecessarily takes time away from the users as well as from the administrator. In addition, a safety risk is created when accounts, for example of former employees, can not be deactivated consequently and timely.

IAM allows you to manage different systems through a central user data administration. This significantly reduces the complexity and enables a quick provision of accounts and access rights. Organisations and users also benefit from increased data security and improved user experience, for instance through single sign-on and self-service.

### FEDERATIONS – MAKING RESOURCES ACCESSIBLE TO EVERYONE

By using the federated IAM, users can not only access the resources of their own organisation, but also the resources of other organisations within the federation. They use their existing access data for authentication and do not have to create additional accounts with the partner organisation. Such federations are formed by contracts ensuring the data is up to date and processed in compliance with data protection regulations and are based on a certificate list of the participating servers, which acts as a member directory.

### THE TECHNOLOGY

Identity & Access Management uses many different technologies to allow for the automated synchronisation of central master data from different source databases (like HR systems). This master data is stored centrally in a database or directory, here called metadirectory. At this core, you can not only manage user data itself, but also administer the corresponding access rights, block accounts, or reset passwords. This aggregated data is then instantly provisioned to target systems, using different standardised or proprietary protocols. The protocols that are being used vary depending on the type of provisioning:

**Just in case** (before users access a service): SPML, SCIM, periodic LDAP request, or any proprietary protocol, like filling relational databases using SQL statements

**Just in time** (while users access a service): SAML, OIDC/OAuth2, or LDAP requests after login

## Our Products

### IDM SOLUTIONS

## midPoint

midPoint is the comprehensive open source software for 'Identity Governance and Administration' and is used as a standard product in identity management. As a complete solution, midPoint has all the necessary tools and configuration options required for the introduction of your IAM system – and more. DAASI International is an official Gold Partner of the midPoint developer Evolveum.

**Credential Management** means automated generation of strong passwords compliant with conditions predefined by the administrator to ensure a high level of IT security.

**Workflow:** midPoint can be easily adjusted to per-existing processes and the individual workflow of an organisation, this is to ensure that the workflow is not disrupted while also protecting the system from unauthorised accesses.

**Organisational Structure:** midPoint comes with an integrated structure model for organisations so it can be adjusted to already existing hierarchies and structures within an organisation.

**Identity Governance** is the core of the software which manages roles and access authorisation for all users. Different policy options help to maintain high security levels within an organisation.

**Auditing** creates transparency and makes interactions within a system traceable. Additionally, all decisions are constantly revised by an integrated feedback mechanism that will notify the appropriate post if necessary.

**Entitlement** allows you to define and authorise individual access for users on all levels (users, roles, projects, hierarchies) to protect resources.



OpenLDAP is an open source solution for centralised user administration. The software integrates the IETF standard LDAPv3 and serves as a reference system for other implementations. OpenLDAP is one of the most powerful LDAP servers. It can adapt itself independently to the performance of the hardware and thus gives any IT infrastructure more stability. OpenLDAP is an open source community project. A worldwide community is constantly working on its optimisation, with the aim of creating a comprehensive open source LDAP suite. The development of OpenLDAP is organised by Symas, a US partner company of DAASI International. Symas relies on proven open source software such as OpenSSL, Cyrus SASL, Heimdal Kerberos or Berkeley DB and also offers modern technologies for better performance and higher security with the LMDB database or the PBKDF2 hashing method.



eduMFA is an innovative authentication system for multi-factor authentication that has been specially customised to the needs of universities. By integrating multiple authentication methods, eduMFA offers optimum protection for sensitive data. The fork of the open source software privacyIDEA created by German universities has a modular structure and can be customised and expanded. Thanks to its high scalability and support for multi-client and multi-instance environments, eduMFA is also suitable for organisations of any size. The authentication flow can be customised flexibly, as communication takes place via common REST interfaces. This enables seamless integration into existing IT infrastructures. eduMFA supports a wide range of authentication tokens. Particularly worth emphasising is the implementation of Passkey, which enables authentication without a password.

didmos is the IAM suite from DAASI International. Its strength lies in its modular form: it consists of seven customisable open source modules that can be expanded via plug-in interfaces and complement each other perfectly. Together they form a powerful, standard-compliant IAM system. All modules can be used independently of each other and can be integrated individually into existing infrastructures.

## The IAM-Framework DIDMOS



CORE

didmos Core enables the management of objects, users and groups. The Python-based module utilises the Django framework for partially automated app code writing, which simplifies the development process. Core provides SCIMv2 endpoints for managing and querying identity data, as well as additional REST endpoints for multi-level workflow implementations and role-based access control (RBAC). A metadirectory in the form of an LDAP server acts as a high-performance data backend that turns didmos Core into a web service interface for writing and reading LDAP data and implementing business logic.



LUI

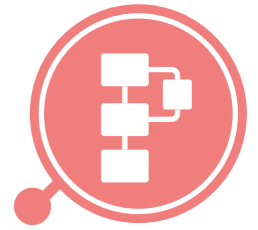
The LDAP User Interface, LUI for short, is the front-end component for user administration and self-service functionalities, including self-administration of own MFA tokens. By supporting the SCIMv2 standard for distributing identities in the cloud, LUI can also be used universally for other IdM backends. LUI can be customised on many levels and is easy to adapt to your corporate design.



ETL FLOW

ETL Flow (Extract, Transform, Load, Workflow) extracts data from various sources - such as ERP, SAP, XML or SQL databases - which is then synchronised into the central metadirectory. Key processes here are the identification of identities using weighted attributes (duplicate recognition), merging into a consistent data record with other automatically generated attributes, automatic grouping and attribute generation, for example for email addresses.

The didmos Provisioner enables the transfer of identity information to connected target systems in real time. Relevant changes are written to the RabbitMQ queueing system as a JSON document and then imported into the target system by a dedicated worker. The worker utilises the ICF connector framework, which serves various interfaces such as SOAP, REST, LDAP or SQL. Custom connectors can also be developed to connect proprietary systems.



PROVISIONER

The Authenticator is an identity provider (IdP) and authentication component and can be customised to individual requirements within any SSO environment. The integration of the SAML and OpenID Connect protocols enables users to log in using both local and external accounts, e.g. via social login. They can access all services within a federation without having to create and manage multiple accounts. The authenticator can be connected to eduMFA for maximum data security through multi-factor authentication.



AUTHENTICATOR

The didmos Federation Services are the latest module in this IAM suite. A toolkit that particularly addresses the challenges in federated IAM environments, such as the integration of numerous identity providers or dealing with authentication issues in the non-web area. The first tool, FedSSH, secures SSH access to servers via login to federated IdPs. Complex IT landscapes such as research infrastructures can particularly benefit from this in terms of security, user-friendliness and administration effort.



FEDERATION SERVICES

The Pwd Synchroniser synchronises event-based password changes to an Active Directory domain controller in other directories, such as OpenLDAP. The simple installation as a Windows service, the encrypted intermediate storage on the domain controller and the logging of synchronisation processes make the Pwd Synchroniser an effective module for integrating Active Directory.



PWD SYNCHRONISER



## Our Products

### SSO Technologies



Shibboleth enables federated authentication and authorisation for web applications. This solution is used in particular in networks of universities, authorities and large companies and is based on the SAML standard. Shibboleth offers two components for this purpose:

1. The Shibboleth Identity Provider (IdP) can be used to create a central login to which the services of your own organisation or those of an entire federation can be connected.
2. The Shibboleth Service Provider (SP) can be used to protect web applications so that they do not have to support the complex SAML protocol.

Upon request, DAASI International enhances the standard functions of Shibboleth, for example through plug-ins for multi-factor authentication with eduMFA or to support OpenID Connect.



Keycloak enables the maintenance of user accounts as well as the configuration of self-service functionality for registration and password management.

Keycloak is the community version of RedHat SSO. The software is based on the modern standards OpenID Connect (OIDC), OAuth2, and SAML, and hence is very versatile in its application. If a customer-specific requirement cannot be met by the standard product, Keycloak can easily be extended accordingly. Moreover, the software benefits from a very active community, who continuously works on adding more features.

Permission management in Keycloak works with role-based access control (RBAC). With this even complex structures can be represented.



The Janssen access management solution enables authentication and authorisation via OIDC and OAuth2. It supports a variety of protocols and standards such as SCIM, FIDO2 and LDAP, can integrate user management and may be configured via a REST API or a command line interface. Janssen is highly versatile, whether in Kubernetes clusters, on virtual machines or as a single instance. In addition, various technologies such as LDAP, SQL and NoSQL integrate easily as a persistence layer.

Originally developed by the US software company Gluu, Janssen forms the basis for their licence product Gluu Flex. By transferring the Janssen copyright to the Linux Foundation in 2022, the core of Gluu Flex will remain permanently open source.



At first glance, the Satosa authentication tool looks very similar to Shibboleth. However, Satosa is actually a proxy that is connected between a service and an identity provider (IdP). This proxy consists of two components, each of which communicates either with the service or the IdP and with each other. Satosa makes it possible to transparently forward or modify communication between the service and IdP. Attributes can be changed or queried from additional databases. It is even possible to change the authentication protocol, which in some cases makes communication possible in the first place.

Satosa supports single sign-on across the OpenID Connect and SAML protocols without users realising it. Incidentally, Satosa forms the basis of the didmos Authenticator.



## Experts on IAM

### OUR SERVICES

As a full-service provider, DAASI International accompanies you from the very first thought, over conceptualisation, development, training and migration into the product distribution, at every stage of your IAM project.



#### CONSULTING

DAASI International will advise you on your project. We evaluate the current status of your IT infrastructure, create a needs analysis as well as rough and detailed concepts, carry out feasibility studies and consult you on questions regarding IT security and project management.

#### INTEGRATION

Every new introduction of IT systems presents challenges. DAASI International will tackle these together with you. We integrate new applications into a wide variety of IT systems, restructure them as needed and optimally adapt them to your processes. We set up federations or integrate third-party systems into existing federations.

#### SOFTWARE DEVELOPMENT

The standard solution does not fit your IT landscape or cannot fully meet your requirements? DAASI International develops customised plug-ins, overlays and connectors for existing products, creates functional specification documents and evaluates software libraries. Let us customise the software according to your wishes. We are happy to develop individual solutions for you.

#### TRAINING

As an ambassador for IAM with open source products, DAASI International is happy to pass on the knowledge. Our IAM experts train your staff on technologies such as LDAP, SAML, OIDC and OAuth2, as well as our open source solutions. For a purposeful transfer of knowledge, we adapt the presentation material to your individual needs and provide training material.

#### SUPPORT

After commissioning a new system, many questions arise in the initial phase, and regular maintenance is essential for smooth operation. Therefore, DAASI International will be happy to assist you even after the project is completed. We provide dependable support for customised solutions and for all of our standard products. We take care of the software maintenance, answer your questions via help desk and provide with our managed services a comprehensive operating package including hosting, backup and monitoring for your life system in the form of software as a service.

## Our Customers

# SUCCESS STORIES

### THE PROJECT

The request was to provide an IDaaS platform for the commercial partners of the European Space Agency (ESA) in the ESA member states to give them access to the agency's applications and Earth observation data.

### REQUIREMENTS

Users were to receive a centralised ESA identity via a Gluu-based system. The platform had to enable account management and SSO, support standards such as SAML, OpenID Connect and OAuth and be highly available.

### CHALLENGES

Ensuring business continuity required a highly available platform. Workflows had to be automated and account transfers had to be ensured without loss.



### OUR CONTRIBUTION

Together with project partner Deimos, DAASI International developed a highly available platform with a message queue system for secure data transfer. Workflows between the didmos, Jira and Gluu applications were automated while security was significantly improved thanks to centralised user management. Following the project, DAASI International and Deimos continued to operate the platform for several years and supported the integration of new services.

### THE PROJECT

The identity management system at Nikolauspflege had become outdated. The foundation therefore decided to replace its system with a modern standard solution.

### REQUIREMENTS

Responsibilities had to be allocated sensibly. Ensuring security, data protection and compliance with Federal Office for Information Security (BSI) guidelines required a dual control principle. In addition, the administration had to be relieved, processes accelerated and the user experience improved through a barrier-free interface.

### CHALLENGES

The challenge was to replace many years of customised programming without detailed documentation by a standard software and to reprocess inconsistent personnel data records.



### OUR CONTRIBUTION

In order to fulfil the specifications, administration rights were implemented at various levels as well as key user roles. The dual control principle was established with the help of a workflow for authorisation requests. Accessibility is supported by midPoint as standard. Individual translation gaps were filled with special extensions. By merging the various databases into an IdM system, the administration of cross-domain authorisations was automated and thus significantly simplified.

## THE PROJECT

The contract was to set up a web portal solution for registering and managing customer users so that they can register centrally for selected applications and manage their data themselves.

## REQUIREMENTS

The design of the portal envisaged an on-premises solution that would be GDPR-compliant and provide typical self-service functionalities such as account registration, password changes and the option of requesting additional services. Interaction between the portal and the existing LDAP server, which provides the data for authorising external users, was another requirement.

## CHALLENGES

The system should be designed in such a way that administrators can integrate unlimited additional applications without needing external service providers for configuration work in the future.



## OUR CONTRIBUTION

DAASI International rebuilt this portal on the basis of LUI, a customisable module of the didmos IAM framework. It consists of two components: a self-service portal and an administration portal for managing external users. didmos LUI functions as an interface between the web applications and the OpenLDAP server.

## Our Customers

## FURTHER REFERENCES





## The Scholarly Future

# DIGITAL HUMANITIES

The term digital humanities refers to the usage of algorithms to gain knowledge in the research field of humanities. Methods from information technology are used, for example, to gain new insights in linguistics, archaeology or history and cultural studies and to answer innovative research questions. The IT components used include but are not limited to long-term archiving, collaborative work, visualisation, statistics, complex search algorithms, and text mining.

The systematic use and evaluation of digital resources as well as the global networking of researchers also enable new forms of collaboration and working methods.

DAASI International offers various tools for research and teaching which seek to support scholars and teachers in their everyday work.

Get more  
Insights with  
**DH-TOOLS**



ConedaKOR is an innovative database especially useful to semantically annotate data images, within a network structure. Using so-called graph database technology to manage information more easily, faster and with more details than before. ConedaKOR offers many innovative functions which lighten information management immensely. For many years already, academic institutions all around the globe trust ConedaKOR with their media management.

DAASI International offers ConedaKOR in form of software as a service, so that scholars can concentrate on their actual work with the tool instead of having to take care of operational questions.



## SERVICES around Digital Humanities

DAASI International decided to take on the task of supporting scholars who use DH-methods in order to encourage developers and users of DH-tools to continue their work. As one of the few private-sector IT providers for digital humanities in Europe, DAASI International offers a comprehensive range of services at technical and project level.

### TECHNICAL SERVICES

We develop and implement innovative Authentication and Authorisation Infrastructures (AAI) as well as databases and visualisation tools, and we design sustainable operating models.

### PROJECT SERVICES

Upon request we will support you with our know-how in project management and help to compile a research proposal, or to search for new commercial cooperation partners for your research project.

### DARIAH-DE

DARIAH-DE is the German partition of the European project DARIAH (Digital Research Infrastructure for the Arts and Humanities). The goal of the project is, among others, to provide a virtual research environment for scholars in order to develop new digital research methods. DARIAH-DE supports the setup through consultation, joining activities that have been separate before, and with generic services of the technical infrastructure. Existing digital resources as well as applications and findings are matched-up regardless of their respective discipline or research proposal, and used together. Unsere DH-Projekte Besides the AAI setup and operation of the AAI, the implementation of new technologies, and the development of sustainable operational models, we also contributed to the conceptualization and setup of the DARIAH-Storage-Infrastructure.

### TEXTGRID

TextGrid is a virtual research environment for all text-based disciplines of the humanities. It serves as a tool for scholarly editing, and offers modules for methodological, collaborative text data processing and comes with standardised interfaces for publishing software, research data and tools. The idea behind TextGrid is the vision of a digital ecosystem for the humanities in which a free exchange and specific adaption of individual components according to the specific needs of each expert community is possible. Among other services, DAASI International especially helped to set up the user management as well as the rights and license management of TextGrid. Additionally, we aided the development of the workflow user interface and the data repository including the AAI. Now, TextGrid is one of the offered tools by DARIAH-DE.

## PROJECTS in the Field of Digital Humanities

### DARIAHdocs

DARIAHdocs is a service offered by DAASI International for the European scholarly research infrastructure DARIAH-EU. Using this service, scholars can share documents with their peers to simultaneously work on them without having to expose the content to a cloud provider DARIAH-docs for scholarly collaboration is based on Collabora, which is a commercially supported version of the open source product LibreOffice Online. DAASI International hosts and operates DARIAH-docs in compliance with German data privacy laws to ensure the security of sensitive research data.



As a spin-off of research projects on X.500 and LDAP, funded by the German Federal Ministry of Education and Research, DAASI International has been involved in research right from the beginning and maintains this relationship until today. Even as a private company, it continues to participate in innovative research projects with its own research department. DAASI International does not earn any money with the participation in research. Nonetheless, the time we spend working on state-of-the-art technologies and to be in touch with the brightest minds in the field of Authentication and Authorisation Infrastructures (AAI) research is invaluable to us. The resulting experience, know-how and contacts drive the company forward and are therefore an evident asset.

## We are highly involved in **RESEARCH**

DAASI International was significantly involved in projects of the D-Grid initiative, as well as in projects in the fields of digital humanities and research infrastructure. Especially noteworthy are the BMBF-funded Text Grid and DARIAH projects, in which DAASI International was actively involved. The focus here was on the development of an internationally compatible AAI for humanities research environments and infrastructures.

Of particular importance is the participation in the EU project 'Authentication and Authorisation for Research Collaboration' (AARC). In the first two phases, blueprints for modern AAI were researched and specified, to which most research infrastructures, including those as exposed as CERN, adhere. The follow-up project AARC TREE builds on the findings of AARC I and II with the aim of further standardising and simplifying the implementation of federated authentication and authorisation solutions in research infrastructures. The main focus is on the further development of previous approaches and their implementation in practice in order to make access to research resources even more efficient and secure.

IAM4NFDI, the latest project in which DAASI International is participating, is concerned with the management of digital identities and federated access to resources within and between the NFDI consortia. In this respect, DAASI International is primarily involved in the area of architecture and operational issues.

After all, DAASI International does own fundamental research on AAI and federations and subsequently monitors and maintains them for universities – an excellent way for us to scout for young talents for our company.



Europaplatz 3 | D-72072 Tübingen  
0049 7071 407109-0  
[business@daasi.de](mailto:business@daasi.de)  
[www.daasi.de](http://www.daasi.de)