SWISSUbase

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SWISSUbase
Organisational Structure, Technical Infrastructure and Security

2024

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1 ORGANISATIONAL STRUCTURE

1.1 Institution

SWISSUbase is an online platform and services which are operated by a consortium consisting of FORS (Swiss Centre of Expertise for the Social Sciences) and the Universities of Lausanne, Neuchâtel and Zurich, legally established as a "Simple Society" (Einfache Gesellschaft; Société simple). Consortium members (that are either higher-education institutions or other academic organizations) are jointly responsible for the operation and development of the platform and its services according to the SWISSUbase "Simple Society" agreement. In 2023, the business model was extended to non-higher education institutions in the form of a Collaborating Partner agreement.

SWISSUbase Consortium members and Collaborating Partner institutions have the freedom to develop the policies, practices, and rules best suited to their local conditions and community. On the other hand, certain guiding principles are accepted and implemented by all SWISSUbase members to ensure consistency and compliance with national legal requirements and international standards for data curation, preservation, and dissemination.

1.2 Mission

The mission of SWISSUbase is to serve the Swiss scientific community to share and preserve research data for future reuse in a trusted and secure environment.
To achieve this, SWISSUbase has the following key features:

> A trustworthy[1] repository to collect, archive and share research data
> Swiss National Science Foundation (SNSF) approved repository[2]
> OAIS[3] (ISO 14721) compliant long-term preservation
> Datasets managed and shared according to the FAIR principles[4]
> Open and restricted licenses with access control, deposit contracts for data producers
> Deposited data is checked for quality assurance, coherence of metadata and to ensure long-term preservation.
> Search, discovery, and promotion of research projects, researchers linked to these projects and their institutional affiliations
> Search, discovery, and download of datasets and related documentation

Find out more in our **About us** section.

1.3 Governance

This section gives an overview of the various actors in the SWISSUbase Consortium, including the SWISSUbase central team members (employed by FORS as a part of the

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[1] https://www.coretrustseal.org/
[2] https://www.snf.ch/en/WtezJ6qxuTRnSYgF/topic/open-research-data-which-data-repositories-can-be-used
[3] https://public.ccsds.org/Pubs/650x0m2.pdf
[4] https://www.go-fair.org/fair-principles/

INDEV unit)[5] and the team members required from member institutions. The roles and responsibilities of all team members within the Consortium are described in the following sections.

1.3.1 SWISSUbase Central Teams

This section describes the roles and responsibilities of the SWISSUbase central teams, including the Central Management Team, the Central Operations Team (including the Development (IT) team and the Support & Services team) and Administration.

Table 1: SWISSUbase Central Teams Roles & Responsibilities

Team	Team members	Roles & Responsibilities
Central Management	**Unit Head,** **Head of IT,** **Head of Support & Services / Product Owner,** **Project Manager**	> Manage communications and coordination between all members. > Operationalise the overall strategy (defined by the SWISSUbase governance bodies) and policy development. > Plan the future technical developments of SWISSUbase, in collaboration with various governance bodies. > Conduct outreach and promotion. > Gather and prioritize new requirements and specifications, serving as intermediary between data service units and the IT team. > Integrate new disciplines into the system, including the creation of new metadata schemas, in concert with the relevant research communities.
Central Operations > Support & Services	**Head of Support & Services / Product Owner** **Project Manager,** **Data Specialist**	> Provide workshops and trainings to the DSUs, including data management, archiving data and how to help researchers with the system. > Support DSU members for the set-up and organisation of the DSU and other aspects of research data management. > Manage the DSU member network, facilitating knowledge exchange and support across DSUs. > Support on the SWISSUbase application.
Central Operations > IT Development	**Head of IT,**	> Conduct ongoing operations and maintenance, upgrading the technical infrastructure.

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[5] FORS was designated by the SWISSUbase Consortium to manage the SWISSUbase central tasks and platform development.

	Software Developers, Metadata Specialist	> Develop and implement new features and improvement. > Integrate new disciplines into the system, including the creation of new metadata schemas, in concert with relevant research communities. > Correct problems ("bug-fixing") in the system.
Administration	**Financial Officer**	> Handles financial matters, including billing to member institutions for all services. > Manages reporting and the provision of statistics to member institutions on data downloads and used storage space.

1.3.2 Governance Boards

This table summarizes the Governance members required from each member institution of the SWISSUbase Consortium.

Table 2: SWISSUbase Governance Roles & Responsibilities

Board	Member description	Roles & Responsibilities
Oversight Board	**High-ranking officials (e.g., Vice-rectors)**	> Oversees the overall strategy and decision-making including: the SWISSUbase vision and mission; the long-term direction and evolution of the infrastructure and services; the business model; the addition of new members; the financing model; and evaluation. > Meets 2-3 times a year.
Steering Committee	**High-level infrastructure and research data management specialists – with authority to make decisions that are aligned with their institutional policies and interests**	> Advises the Oversight Board on strategy and direction of the infrastructure and services. > Communicates regularly with the SWISSUbase Management Team regarding DSU status regarding the SWISSUbase platform and the DSU services. > Provides direction to the DSU Operational Lead on DSU strategy and implementation. > Point of escalation for issues that can't be solved at the operational level.

SWISSUbase Management Team	**Head of Unit,** **Head of IT** **Head of Support & Services / Product Owner,** **Project Manager**	> Organises the Oversight Board and Steering Committee meetings, providing agenda proposals and recording meeting minutes. > Ensures effective communication among the Governance members. > Plans, executes, monitors and controls platform and service development. > Oversees daily operations and ensures they align with the SWISSUbase strategic objectives. > Supervises and guides teams. > Makes sure that platform and service development aligns with user needs and strategic objectives.

1.3.3 Data Service Units

It is required that member institutions establish a local Data Service Unit (DSU). The purpose of DSUs is to validate projects entered in SWISSUbase; to archive and publish deposited data; and to train and support researchers in their use of SWISSUbase. The DSUs are the front lines of support for their research community (both data producers and data consumers). A DSU can be institutional or disciplinary. The disciplinary data service units will be national in scope, serving all researchers in particular disciplines. The institutional data service units are cross-disciplinary but serve only the researchers of one institution. This decision is up to the member institution and can also be adapted if the strategic objectives of the member institution change.

Table 3: Overview of Data Service Units and the communities they serve

Consortium Member	DSU Name	DSU Type	Discipline / Institution
FORS – SWISS Centre of Expertise in the Social Sciences	**FORS Data Service**	Disciplinary (national)	Social Sciences
University of Zurich (UZH) / Language Repository of Switzerland (LaRS)	**LaRS Data Service**	Disciplinary (national)	Linguistics
University of Lausanne (UNIL)	**UNIL Data Service**	Institutional (cross-disciplinary)	University of Lausanne
University of Neuchâtel (UNINE)	**UNINE Data Service**	Institutional (cross-disciplinary)	University of Neuchâtel

Members may select any number of individuals best suited to provide the services, including for example librarians, archivists, data stewards or faculty members.

Table 4: Consortium member institution (Data Service Unit) roles & responsibilities

Team member	Role	Responsibilities

Operational Lead	**Coordinator**	> Works with the Steering Committee member to define and execute the DSU strategy
		> Lead of the DSU team members
		> Manages the day-to-day aspects of SWISSUbase use including:
		  > New features and improvements
		  > Reporting technical issues regarding maintenance, storage, and updates
		  > Aligning with other DSUs on common requirements
		  > Creating and maintaining policies, practices and rules for their institution
		  > Participation and coordination during partner testing phases before each new version release

Data Steward / Data Curator (Data Archivist)	**The Data Steward / Data Curator role may be held by the same person or different people within the DSU.** **The roles and responsibilities of DSU resources should be determined by each DSU according to their institution and/or disciplinary structure.**	> Review, validation, and publication of project descriptions submitted by researchers > Conducting quality assurance controls of deposited data and metadata > Curation and archiving of the datasets deposited by researchers > Consultations and assistance to individual researchers with data deposit and access > Management of SWISSUbase users from their institution > Publication of studies and datasets to the institutional catalogue

1.3.4 Discipline-specific DSU

In the current SWISSUbase model, discipline specific DSUs provide services nationally for the discipline (e.g. FORS for social sciences; LaRS for linguistics). FORS currently receives sustainable national funding through SNSF, which is not the case for LaRS. In addition, an important consideration for extending the platform and services to other disciplines with a national scope is the funding of such national services.

For example, if we would like to extend the platform and services to cover Geosciences nationally, a lead institution would need to be identified for the central management and coordination of the DSU services and resources, while the team members could be located within the same institution or in different institutions across the country.

2 STANDARDS AND CERTIFICATIONS

2.1 OAIS Reference Model

The SWISSUbase platform is based on and complies with the OAIS Reference model.
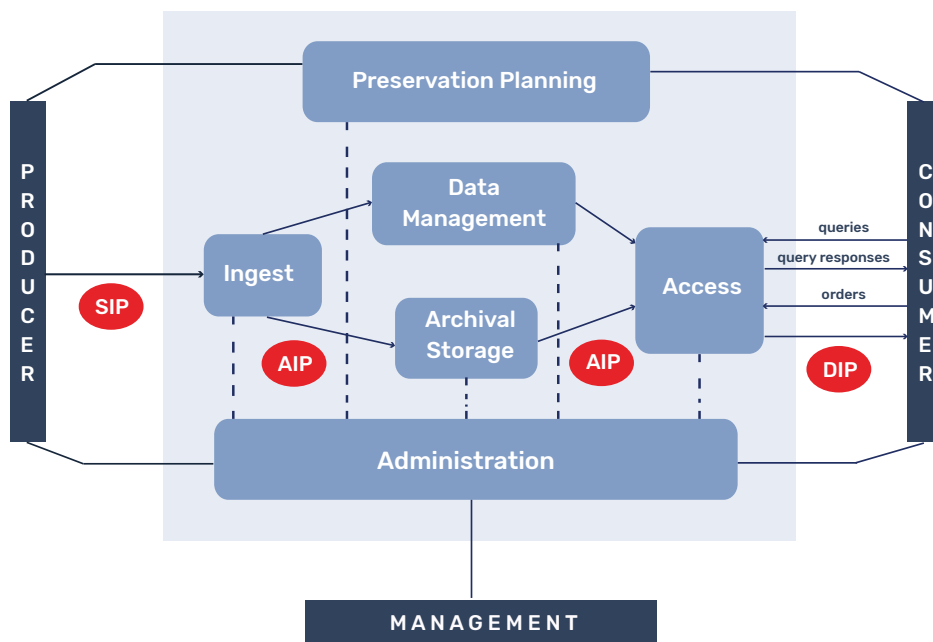
OAIS stands for « Open Archival Information System » and is based on the international standard ISO 14721:2012[6]. It serves as a reference model for organisations and institutions looking to preserve and make digital information available in the long term. In other words, it provides a common language and a conceptual framework for designing and managing digital archives.

In summary, an OAIS-type archive must meet a set of minimum responsibilities; operate in a certain environment; provide a high-level description of the information objects it manages; and describe the core set of mechanisms that collectively define the OAIS' preservation and access operations. Therefore, an OAIS-type archive must be able to perform a finite number of functions defined in the reference model, which includes Ingest, Data Management, Archival Storage, Access, Administration and Preservation Planning.

The goal of an OAIS-type archive is to fulfil its primary mission of preserving information over the long term and making it available to its designated community[7].

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[6] OAIS Reference Model (ISO 14721), http://www.oais.info/
[7] Lavoie, Brian: The Open Archival Information System (OAIS) Reference Model: Introductory Guide (2nd Edition), https://www.dpconline.org/docs/technology-watch-reports/1359-dpctw14-02/file

The five OAIS functional units control the flow of information from the information producers to the archive and from the archive to the end users. Together they represent the key processes that occur in most digital information preservation systems. Since the OAIS is a reference model, it is likely that a digital archive will contain functional components similar to the OAIS functionalities, but the specific implementation varies from archive to archive.

2.2 CoreTrustSeal Certification

FORS Data Service together with SWISSUbase as a repository was awarded the CoreTrustSeal in September 2023. This means that SWISSUbase is certified as a Trustworthy Data Repository (TDR) for the Social Sciences in Switzerland.

CoreTrustSeal is an international, community based, non-governmental, and non-profit organisation promoting sustainable and trustworthy data infrastructures. It defines requirements and offers core level certification for Trustworthy Data Repositories holding data for long-term preservation[8].

Since the collecting of scientific data is a very resource intensive endeavour, the resulted data should be carefully managed, curated, and archived to preserve its value for future use. Certification helps to ensure that data archives are reliable and durable so that they can continue to share data over a long period of time. This, in turn, helps the entire data community, to improve the quality and transparency of the repository's processes and raise awareness and compliance with established standards.

To be certified with the CoreTrustSeal, a data repository must demonstrate its sustainability by applying best practices and meeting certain standards. In practise, this means undergoing an internal self-assessment based on the Core Trustworthy Data Repositories Requirements9, a set of 16 requirements that cover organisational, technical, financial, legal, or other areas. The self-assessment is then reviewed by members of the CoreTrustSeal community (e.g. by Members of the Assembly of Reviewers10). For successful certification, the 16 criteria must be verifiably assessed as "fully implemented", or at least be in the "implementation phase".

Find more information about the FORS Data Service and a copy of the CTS assessment report **here**.

2.3 Metadata Standards

A metadata standard is a number of metadata elements grouped into sets designed for a specific purpose. For every element, the name and the semantics (the meaning of the element) are specified, and specific rules apply as to how the content must be formulated.

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[8] https://www.coretrustseal.org/about/
[9] https://www.coretrustseal.org/requirements/
[10] https://www.coretrustseal.org/about/assembly-of-reviewers/

Furthermore, it specifies the allowed values for each metadata element (e.g., from a controlled vocabulary). Metadata standards are crucial with regards to improved interoperability between systems, enhanced discovery of, and access to, data. Metadata standards can be generic (e.g., DataCite Metadata Schema, Dublin Core) or discipline-specific (e.g., DDI, META-SHARE, CMDI). Generic metadata standards generally consist of fewer core metadata properties chosen for an accurate and consistent identification of a resource for citation and retrieval purposes, whereas discipline-specific metadata standards allow for in-depth documentation of data relevant for a specific research domain.

SWISSUbase uses the following two discipline-specific metadata standards.

Data Documentation Initiative and CESSDA Metadata Model

The Data Documentation Initiative (DDI)[11] is an international standard for describing the data produced by surveys and other observational methods in the social, behavioural, economic, and health sciences. DDI is a free standard that can document and manage different stages in the research data lifecycle, such as conceptualisation, collection, processing, distribution, discovery, and archiving. Documenting data with DDI facilitates understanding, interpretation, and use - by people, software systems, and computer networks.

SWISSUbase uses DDI for its social science metadata schema, namely the CESSDA Metadata Model[12] which is built from the viewpoint of quantitative (social science) data and is based on the DDI Lifecycle 3.2 metadata standard.

The Component Metadata Infrastructure

The Component Metadata Infrastructure (CMDI) is developed by CLARIN[13]. It provides a flexible metadata model standard in which components and profiles of metadata standards (e.g., META-SHARE) can be combined and adapted to different needs. SWISSUbase metadata specific to Linguistics is based on META-SHARE[14]. It focuses on the description of language resources and covers both data resources and tools/services used for their processing. META-SHARE remains at the level of resource rather than individual item, in the sense that it aims to describe whole sets of text/audio/video etc. files (corpora), sets of lexical entries (lexical/conceptual resources), integrated tools/services and so on. However, the schema can also handle resource parts.

The metadata provided by OAI-PMH to the CLARIN Virtual Language observatory will be CMDI by default.

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[11] https://ddialliance.org/
[12] https://www.cessda.eu/Training-Resources/Resource-crd-2592
[13] https://www.clarin.eu/content/cmdi-component-metadata-infrastructure
[14] http://www.meta-net.eu/meta-share/metadata-schema

2.4 FAIR Principles

SWISSUbase adheres to the FAIR Principles to allow for optimal (re-)use of data and metadata which are discoverable in the online catalogue.
FAIR is a set of guiding principles to guide those who wish to enhance the reusability of their data holdings by making them Findable, Accessible, Interoperable, and Reusable. The FAIR Principles emphasise on improving not only the ability of machines to automatically find and use data, but also supporting its reuse by individuals.

The FAIR principles:
> **Findable** – easy to find by assigning unique and persistent Digital Object identifiers (DOI) to each dataset, with metadata that follow international standards (e.g., DDI 3.2 and CMM 1.0 for the social sciences and META-SHARE for linguistics)
> **Accessible** – openly accessible for a long period of time (long-term preservation)
> **Interoperable** – compliant with international standards and harvested by DataCite. Connectivity and interoperability on the European level and the national level
> **Reusable** – available to be used and reused; properly documented together with rich metadata

Examples of how SWISSUbase has implemented the FAIR Principles:
> Persistent Identifiers (DOIs) for entire datasets provided by DataCite
> Discipline-specific metadata schemas and standards that allow rich metadata description (see section 2.3 – Metadata Standards)
> Searchable, public online catalogue: www.swissubase.ch
> Metadata harvested by related EU research infrastructures (see section 3.3 - Interoperability)
> SWITCH edu-ID log-in for user and rights authentication (i.e. for restricted access)
> Quality assurance checks by data curators before archiving and publishing data and metadata
> Various options for usage licenses and access levels (Creative Commons, restricted access contracts)

3 TECHNICAL INFRASTRUCTURE

3.1 Software Platform

SWISSUbase is an application developed with the Python Flask and Angular frameworks and hosted by the Swiss infrastructure provider SWITCH[15]**.** It uses the following platform services:

> **A Kubernetes Container Platform,** specifically the SWITCH's Kubernetes as a Service (SWITCHKaaS[16]) platform on which the SWISSUbase application code is deployed and operates.
> **A PostgreSQL Database,** where the metadata and application data are stored.

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[15] https://www.switch.ch/en
[16] https://www.switch.ch/en/kubernetes-as-a-service/

> **An S3 Object Store** where the research data files are stored, specifically in SWITCH's Ceph S3[17]. There are three main buckets, for the SIPs, AIPs and DIPs[18] respectively.
> **An Elastic Search index,** to offer high-speed full-text search functionality in the catalogue.

Apart from the production system, SWISSUbase is also available in three other non-productive environments for development, testing and demonstration purposes.

3.2 Data centres

SWISSUbase operates on the infrastructure provided by SWITCH, which operates two data centres, one in Zurich, Switzerland and another in Lausanne, Switzerland.

The production version of the application runs exclusively in the Zurich data centre, while the Lausanne data centre is utilized for non-production versions and backups. The Lausanne data centre belongs and is managed by the University of Lausanne.

3.3 Interoperability

SWISSUbase is committed to the reuse of the data preserved in the platform and as such it offers two API protocols for the integration with third-party platforms and applications:

1) The OAI-PMH harvesters' API to share the metadata catalogue
2) The application API for applications to download, upload or modify the data or metadata on behalf of humans

3.3.1 OAI-PMH harvesters' API

This API exposes the Social Science metadata from the SWISSUbase catalogue to third-party platforms so that they can freely download the metadata and to display it on their platforms. For now, the SWISSUbase catalogue is harvested by and exposed in the CESSDA Data catalogue (CDC)[19]. In 2024, it is planned for the CLARIN Virtual Language Observatory (VLO)[20] to harvest the Linguistic metadata.

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[17] https://help.switch.ch/engines/documentation/object-storage/
[18] Submission Information packages (SIP) are original data files deposited by researchers on SWISSUbase; Archival Information Packages (AIP) are generated and stored to be preserved in the long term; Dissemination Information Packages (DIP) are data distributed to end-users via the SWISSUbase Online Catalogue: www.swissubase.ch
[19] CESSDA - The Consortium of European Social Science Data Archives is a European Research Infrastructure Consortium (ERIC) and provides large-scale, integrated, and sustainable data services to the social sciences, among them the CESSDA Data Catalogue (CDC), which contains metadata descriptions of more than 40,000 data collections from over 20 European countries. The CDC is available here: https://datacatalogue.cessda.eu/
[20] CLARIN – The Common Language Resources and Technology Infrastructure is a pan-European research infrastructure aiming to render accessible all digital language resources and tools from all over Europe through a single sign-on online environment. The Virtual Language Observatory (VLO) faceted browser was developed within CLARIN to explore linguistic resources, services and tools available within CLARIN and related communities. The VLO is available here: https://vlo.clarin.eu/

The API is available under the following URL:
https://www.swissubase.ch/oai-pmh/v1/oai

And it follows the protocol described here:
https://www.openarchives.org/OAI/openarchivesprotocol.html

3.3.2 Application API

The application API exposes the functionality of the platforms' web user interface to 3rd party applications to interact with the platform freely on behalf of humans. This API is a RESTful API currently under development and planned to be released in 2024, mainly for the Swiss Linguistics community represented by LaRS[21].

4 SECURITY

4.1 Data centre security

Both data centres (see section 3.2), the production centre in Zurich and the data centre in Lausanne for backups, restrict physical access to only authorized persons. The centres are protected from fire and heat with temperature monitoring, smoke detectors and fire suppression systems.

4.1.1 Physical access

> Access to SWITCH offices and the data centres is restricted to only authorised persons.
> Access to the data centres is additionally restricted to a named list unless accompanied by a SWITCH authorised person.
> Access to the data centres requires an access card issued by the hosting organisation, upon request from SWITCH.
> Access is controlled by on-site staff who control that persons are authorised.
> Identification is required to have access.
> Access rights are reviewed when roles change.

4.1.2 Natural disaster

A fire suppression system is in place in the Zurich data centre, which uses a potassium aerosol to extinguish fire. The Lausanne data centre has smoke detectors installed, with an Inergen gas extinguishing system is in place.
In the Zurich data centre there are **temperature** monitors in the server room, while in Lausanne, there are 4x 75kW cooling units installed as well with N+1 redundancy.

The Zurich data centre is subject to **flooding** risk in case the Limmat or Sihl rivers cause flooding, which statistically happens once every 100 years. However, the Zurich Lake level is regulated, acting as an enormous buffer to mitigate flooding risks.

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[21] LaRS - the Language Repository of Switzerland, is a national platform for the publication of linguistic research data, which uses SWISSUbase as its repository system.

No specific natural flood risks have been identified for the Lausanne data centre. No information is available regarding the buildings' resistance to earthquakes, but both data centres have been built in the last decade.

4.2 Data storage security

4.2.1 Checksums

For each dataset, checksums are calculated using the MD5 hash algorithm and are stored in the PostgreSQL database. The checksums are displayed on the SWISSUbase user interface for DIP files, so that users can verify that the download content is correct. The checksums are also stored in the metadata file, which is part of the DIP and can also be directly downloaded from the platform.

4.2.2 Encryption

We are aware that encrypted storage is a need for our user communities; however, our storage provider SWITCH does not yet offer stable, encrypted storage. Offering encrypted storage is on SWITCH's 2024 roadmap and once available, we will evaluate the use of encrypted storage for SWISSUbase.

4.2.3 Antivirus

Files uploaded to SWISSUbase are scanned for viruses using the tool ClamAV[22]. The files are kept in quarantine until the scanning is completed and no virus is found. In case a virus is found, the file is automatically deleted, and the user is informed.
If an error occurs during the scanning, the user is prompted, but the file is not deleted. The user cannot proceed to submit the dataset until the scan is completed successfully.
Files larger than 4GB cannot be scanned with ClamAV. These large files are permitted to be published with a warning that the file is too large for antivirus scanning.

4.3 Backups

Two types of data are backed up: the PostgreSQL database and the SIP, AIP and DIP research datasets. All are backed up on the S3 object store, on a daily and monthly basis with 30 day and 12-month retention policies respectively. The backups are located in Lausanne, Switzerland, at a distance of 100Km from the main data centre in Zurich, to be compliant with CoreTrustSeal (see section 2.2).
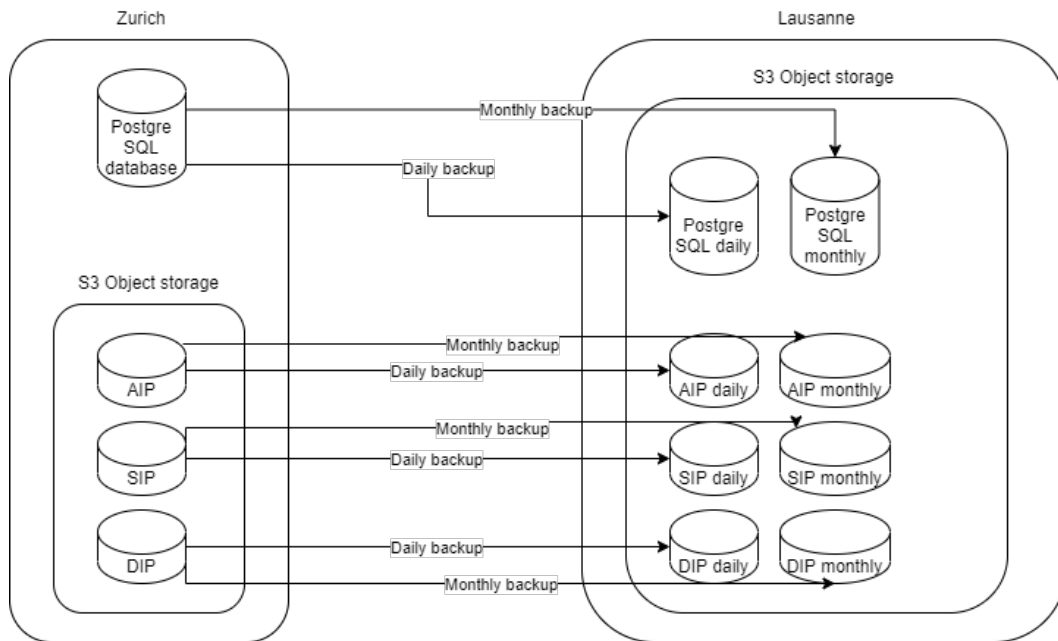Backups are performed on the following buckets:

> DIP daily
> DIP monthly
> SIP daily

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[22] https://www.clamav.net

> SIP monthly
> AIP daily
> AIP monthly
> PostgreSQL daily
> PostgreSQL monthly

4.4 Security updates

SWISSUbase follows a thorough process to keep the systems up to date to mitigate security threads. Kubernetes updates are regularly deployed by SWITCH following the standard Kubernetes schedule. Should a major security vulnerability be identified, a patch would be deployed as a matter of urgency.

Software libraries, such as Phyton or Angular are updated twice a year to the latest stable versions; however, should a security vulnerability be identified, an update is deployed following the hotfix release process.

For the certificates, SWISSUbase uses Let's Encrypt[23] that automatically renews the certificates every 3 months. For edu-ID (see section 4.6 below for more details), following the requirements of SWITCH, there is a self-signed certificate which is valid for 10 years.

All updates follow the standard release process whereby the whole application is thoroughly tested with the new configuration before it is deployed in the production system.

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[23] https://letsencrypt.org/

4.5 Data transfer security

The SWISSUbase application is accessible over HTTPS. The network infrastructure is managed and monitored by the SWITCH Cyber Security team[24].
Dataset downloads are restricted to valid token holders. The SWISSUbase application generates tokens for single use and with an expiration of 10 seconds for legitimate download requests made via the web user interface.

4.6 Data access to SWISSUbase

The authentication to SWISSUbase is based on SWITCH edu-ID[25]. This authentication mechanism requires a secure password and a double factor authentication using JWT tokens. As such, SWISSUbase does not store any passwords as these are managed by SWITCH edu-ID.

SWISSUbase has a role-based permissions system built-in to authorise access to different parts of the application or workflow steps. The following roles exist: Researcher basic, Researcher full, Data curator and Administrator.

The access to data is restricted by the usage license selected by the data owner for each dataset deposited on SWISSUbase. Open datasets are free to download to not authenticated users, but datasets with restricted contracts require users to be authenticated and to follow an approval workflow.

For authorised download requests, SWISSUbase generates a single-use token that expires after 10 seconds and redirects the user to the S3 storage for direct download using the token.

System administrators from the SWISSUbase IT team and SWITCH can access both the research data files stored in S3 and the metadata and application data stored in the database. However, administrators with such permissions have clearly defined responsibilities, are approved by their team leaders and controlled by the LDAP protocol[26].

4.7 Staff and workplace safety measures

Researchers and data curators can access SWISSUbase from any workstation and any network; however, system administrators from SWITCH and the SWISSUbase IT team are restricted by the following security measures.

4.7.1 SWITCH

Access to SWITCH offices is restricted to authorised persons only and the access rights are reviewed when roles change (see section 4.1.1).

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[24] https://www.switch.ch/en/competencies/cyber-security
[25] https://help.switch.ch/de/eduid/faqs/
[26] https://ldap.com/

4.7.2 SWISSUbase IT team

The offices of the SWISSUbase IT team are located inside the University of Lausanne (UNIL) campus with electronic access control (UNIL Campus Card). The issuing of this card is managed by UNIL upon reception of a request from FORS HR (as the SWISSUbase IT Team is employed by FORS – see section 1.3.1). This access card must be activated weekly. Only FORS employees and cleaning staff of the University have access to the offices.
The computers are secured with a personal password, which must be changed regularly according to the UNIL policies. Remote access is allowed as long as the UNIL managed VPN is utilised - this requires a double factor authentication with edu-ID. The remote work security policies are in the staff member's employment contract.

4.7.3 Data Service Units of SWISSUbase

The Data Service Units adhere to the security measures of their host institutions.

4.8 Disaster recovery measures

In the rare case where the primary data centre (SWITCH in Zurich) suffers from a major incident that causes the application not to be recoverable, the secondary data centre (SWITCH-UNIL in Lausanne) can be configured to act as the primary one.

The backups from the PostgreSQL database and the S3 Object store would be restored and the Kubernetes cluster would be configured with the latest code from Gitlab.

4.9 Other security measures

The application has built-in versioning functionality with minor and major versions created automatically. The application also has a built-in workflow to manage the contracts when access to download a dataset is granted.

5 FUTURE DEVELOPMENTS

SWISSUbase is continuously evolving, with new features and improvements. Further developments, in addition to those in the yearly roadmap, depend on the evolving needs of the various SWISSUbase Consortium members.

The underlying SWITCH KaaS infrastructure platform will be replaced between 2024 and 2025. The new platform will include monitoring tools and encryption for the S3 object store in ISO certified datacentres.

Regarding interoperability, the application API will be released in 2024 and an integration is foreseen in 2024 with CLARIN via the OAI-PMH harvesters' API. Additionally, in 2024 it's planned that the SWISSUbase catalogue will be integrated within the Federal Statistical Office interoperability portal (I14Y).

The Language Repository of Switzerland, the national data service for the Swiss linguistics community, has planned to apply for the CoreTrustSeal certification in the same manner that FORS Data Service obtained the certification in 2023.