Project applications of the twelfth call for proposals (August 2020)

Total number of applications: 7, list sorted by key area of focus, project ID.

Key area of focus	Main Implementation action	Project ID	Project short title	Project full title *Link to the abstract further below*	Leading institution	Partner institution(s)	Contact *linked to e-mail address*	Total cost / funding [kCHF]
eScience	G-6	201-001	openRDM.swiss Extended	A National Platform for FAIR Research Data Management and Analysis → Abstract	ETHZ	-	Henry Lütcke	163.0 (100%) / 81.5 (50%) **Approved**
eScience	G-1	201-002	SWISSUbase	SWISSUbase – a Modular Research Information and Data Archiving Solution → Abstract	UniL	FORS	Gérard Bagnoud	1'207.5 (100%) / 450.0 (37%) **Approved**
eScience	R-4	201-003	Materials Cloud	Materials Cloud as an open, international, and fully FAIR repository of computational data and workflows → Abstract	EPFL	CSCS, other	Giovanni Pizzi	850.6 (100%) / 305.0 (36 %) **Approved**
eScience	G-1	201-004	OLOS.swiss	OLOS.swiss → Abstract	UniGE	HES-SO GE	Pierre-Yves Burgi	769.7 (100%) / 392.0 (51%) **Approved**

Key area of focus	Main Implementation action	Project ID	Project short title	Project full title *Link to the abstract further below*	Leading institution	Partner institution(s)	Contact *linked to e-mail address*	Total cost / funding [kCHF]
eScience	G-6	201-005	INCIPIT-CRIS	Infrastructure Nationale d'un Complément d'Identifiants Pérennes, Interopérables et Traçables – Current Research Information System → Abstract	HES-SO GE	SIB	Arnaud Gaudinat	358.6 (100%) / 179.3 (50%) **Approved**
Services	G-6	201-006	ASPIRE+	Graasp for Open Evidence-based Research in Digital Education+ → Abstract	EPFL	other	Denis Gillet	403.2 (100%) / 201.6 (50%) **Rejected**
Basis	G-5	201-007	EOSC-ELCH	Swiss EOSC-EGI Link → Abstract	UniBE	CSCS, PSI, other	Sigve Haug	200.8 (100%) / 77.8 (39%) **Approved**

Abstracts

openRDM.swiss Extended (201-001)

In the openRDM.swiss project, ETH Zurich Scientific IT Services (ETH SIS), together with partners from the Zurich University of Applied Sciences and the University of Zurich, have established a national research data management (RDM) service based on the openBIS platform. The service allows users to store, annotate and backup their research data according to the FAIR data principles (Findable, Accessible, Interoperable, Reusable). Here we propose openRDM.swiss Extended, a project to extend the openRDM.swiss service with resources for reproducible processing and analysis of data. In particular, we aim to extend the openRDM.swiss service by a JupyterLab-based reproducible research platform (RRP) developed by ETH SIS. This extension will provide a user-friendly interface to promote the reproducible analysis of datasets stored in openBIS. In addition to integrating with the RRP-solution developed by ETH SIS, we also propose to investigate integrations of openRDM.swiss with other discipline-specific national data infrastructures. Finally, we aim to evaluate opportunities for offering the openRDM.swiss service outside of Switzerland as part of the emerging European Open Science Cloud service portfolio. The enhancements proposed as part of openRDM.swiss Extended will add substantial new value to the established openRDM.swiss service for existing and prospective customers. Furthermore, they will extend the service offering to a new user base outside of Switzerland. In general, openRDM.swiss Extended will prepare the ground work for further integrations with national and international resources as part of the upcoming PgB Open Science. This will contribute to a FAIRer national RDM landscape, thereby promoting the overall competitiveness of science in Switzerland.

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SWISSUbase (201-002)

SWISSUbase will be released by the end of 2020 and start on 01.01.2021 a one-year transition phase between the first version of SWISSUbase to the regular service, which will begin in January 2022. The basic idea is that SWISSUbase can be further improved and extended due to the needs of the partner institutions, while the researchers can already use a fully functional system. There are five major domains where extensions are necessary to strengthen SWISSUbase as a national and sustainable solution for research data:

1) Implementation of national and international system interoperability and connectivity
2) Integration of additional scientific disciplines
3) Infrastructure developments (system monitoring tool, backup strategies, incident management plans, CoreTrustSeal certification)
4) Extended functionalities: Automated notifications for researchers, database grooming tools and grouping features for the data curators, and enhanced knowledge discovery features in the catalogue.
5) Service developments: Materials and trainings

The idea of SWISSUbase as a flexible solution to archive, share and promote research data for different disciplines and institutions has already found significant support. In addition to the project partners (UZH, UNIL and FORS), five other universities have confirmed their interest in SWISSUbase (UNIBAS, UNIFR, UNINE, UNILU, USI), the University of Neuchâtel has already decided in principle that they want to become a partner of SWISSUbase, and DaSCH will also be using SWISSUbase as the main archiving platform for humanities data. However, the integration of potential new partners and the preparation of SWISSUbase for the regular service in 2022 requires this additional year and the implementation of the outlined extensions.

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Matierials Cloud (201-003)

Materials Cloud (https://www.materialscloud.org) is a **web platform for Computational Open Science (see Fig. 1)**, conceived to a) assist Computational Scientists in the full life-cycle of their projects, starting from data generation, and b) track, visualize, and publish the controlled conditions under which the data was generated, i.e., record and share of the data provenance (the logical chain or, more precisely, graph of all input data and calculations that were used to produce the final result).

The core of Materials Cloud is a data generation platform, strongly coupled with an archive and a sharing platform for open research data, assisting scientists in data dissemination, curation and publishing with DOIs. This sharing platform, thanks to a rich web interface, allows users to browse the data, navigate its provenance, visualize it, and download it for further reuse, making data fully accessible and interoperable. In particular, the web-based data generation platform is named "**AiiDA lab**" (https://www.materialscloud.org/aiidalab) and is powered by our software framework AiiDA (http://www.aiida.net), that provides automation of simulations, of workflows and a completely automated provenance tracking to ensure reusability and reproducibility. AiiDA has a collection of plugins supporting over 100 simulation tools, and implementing over 80 advanced scientific workflows (see AiiDA plugin registry: https://aiidateam.github.io/aiida-registry). Thanks to the unique combination of features of AiiDA and Materials Cloud, our platform can ensure FAIR data sharing. Online since late 2017 and hosted at CSCS, Materials Cloud already makes hundreds of thousands of fully reproducible simulations openly available (https://www.materialscloud.org/home#statistics). To our knowledge, currently no other infrastructure exists that is designed to guarantee the same level of reproducibility and FAIR sharing of the results in the field of Computational Materials Science, Physics and Chemistry, coupled with automation of simulations and workflows.

The aim of this project is to scale up our Materials Cloud infrastructure, focusing in this 2021 extension mostly on two components: The AiiDA lab simulation platform, and the Materials Cloud Archive for longterm storage of research data. Our aim is to match the needs of the whole scientific community, in Switzerland and beyond, and specifically targeting simulation laboratories that work in close collaboration with experimental researchers. At the same time, we want to ensure that the whole infrastructure is scalable, secure, and easy to redeploy on the (bare-metal or virtual) hardware of any university or research lab.

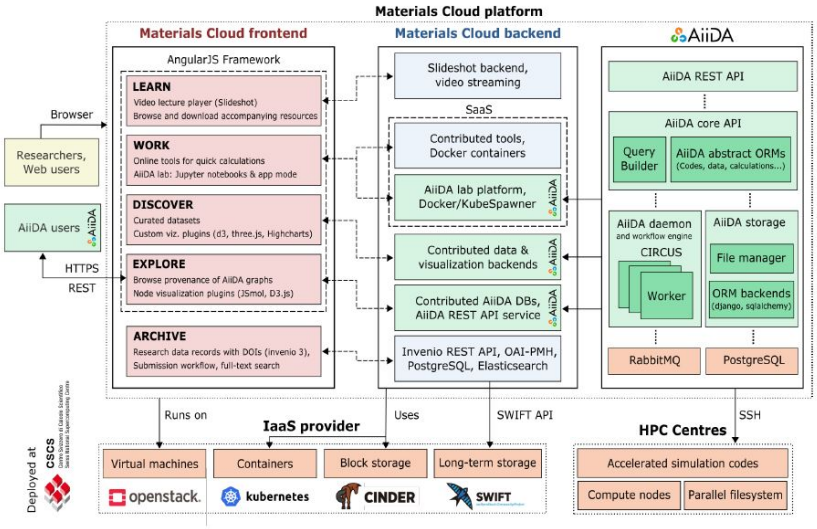

Fig. 1: *The current Infrastructure of the Materials Cloud. A number of the sections in the backend (including AiiDA lab) are powered by AiiDA, that manages the execution of computational research on remote computers and HPC centres, and stores data and their provenance in a combination of databases and files. Its REST API, combined with the Materials Cloud REST API, provides the data displayed interactively by the AngularJS frontend. The long-term storage Archive portal relies on the robust Invenio framework (the same powering Zenodo at CERN) and stored data on the Swift object store at CSCS. Figure adapted from L. Talirz et al., arXiv:2003.12510 (2020).*

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OLOS.swiss (201-004)

During the P-5 program (2019-2020), the DLCM services transitioned from pilot to operational status: a data management training program and ad-hoc support were delivered throughout Switzerland, and OLOS, the long-term solution for research data archiving and publication, became operational. Yareta, powered by the same DLCM technology than OLOS, was launched in June 2019 and successfully operated since then by the University of Geneva to all the Higher Education Institutions of the Geneva Canton. The next step is to offer an equivalent service at the National level, thanks to OLOS, accessible through SWITCHhub by the end of 2020. Several institutions expressed undeniable interest in our approach. They are willing to make a positive and concerted effort to set up use cases emphasizing some of the benefits of the solution, such as suitable conditions to preserve large volumes (several Terabytes) of data.

During its Phase 1, the DLCM project invested a lot of efforts in developing the backend of the solution so as to offer a robust system guaranteeing long-term preservation. In Phase 2, the efforts focused on the front-end and the usability of the solution to ensure an intuitive use of OLOS by the communities of researchers and other users (stewards, administrators, public, etc.). In this new phase, the project aims at (1) anchoring OLOS within an associative structure and strengthening the marketing strategy to ensure the sustainability of the service, (2) qualifying OLOS for the FAIR certification process to secure the highest level of quality control, (3) extending the number of use cases and performing feasibility studies to further integrate OLOS within research environments, (4) promoting and increasing further research data management training opportunities for all users. It is expected that the work achieved during this phase will enhance the quality, visibility and reliability of Open Research Data (ORD) initiatives in Switzerland, setting the ground for international partnerships and enabling funding and governing authorities to push further the ORD agenda in Switzerland.

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INCIPIT-CRIS (201-005)

Le but principal du projet INCIPIT-CRIS est de combiner un service de base d'attribution d'un identifiant pérenne avec un CRIS (=Current Research Information System) et un ensemble d'algorithmes pour la fouille, la désambiguïsation et l'interopérabilité. Le système à créer comprendra plusieurs fonctionnalités ainsi que des services intégrés, qui jusqu'à présent ont été traités de manière séparée : l'attribution d'un identifiant pérenne et son articulation avec d'autres identifiants pour permettre un traçage cohérent et une identifica tion de confiance. Pour la première fois, ces données seront hébergées et gérées dans un CRIS. Cette articulation entre attribution de PID, liaison avec d'autres PID et l'intégration dans un CRIS aura un effet levier pour la gestion (des données) de la rec herche et préparera de façon logique la transition des données et métadonnées dans un dépôt et/ou une archive.

L'implémentation du service envisagé se fera selon les axes suivants :

1. Continuer d'établir à large échelle le service d'attribution d'un identifiant pérenne complémentaire de fine granularité selon les demandes des chercheurs et leurs institutions pour les données de la recherche ainsi que l'attribution par défaut pour toutes les autres ressources jouant un rôle dans le processus de la gestion de ces données en utilisant les principes et la technologie des ARK/EZID.

2. Modéliser, concevoir et mettre en oeuvre un service transparent pour les institutions académiques suisses q ui trace l'interconnexion de leurs travaux en se basant (dans un premier temps) sur les identifiants pérennes attribués à leurs publications, données et organisations. Ce service permettra des requêtes variées et sera en parallèle intégré dans un système CRIS enrichi grâce à sa connexion avec le reste du Web et un support par le service de base d'INCIPIT.

3. Développer les services mentionnés en intégrant et combinant des technologies de fouille de données structurées et non structurées du web. En particulier des données liées pour assurer la confiance et la couverture dans les identités créées, faciliter la désambiguïsation et permettre leur synchronisation avec le CRIS à implémenter. Ce troisième but, malgré le fait d'être indissociablement lié aux buts an térieurs, comprend un travail moins orienté service et plus orienté recherche et sera cofinancé par un projet de recherche complémentaire : Swiss -Trust-Science-Miner.

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ASPIRE+ (201-006)

Graasp is an open-access, GDPR-compliant cloud platform for digital education developed and hosted at EPFL. Graasp was incubated in the framework of national initiatives (SWITCH-AAA-PLE), as well as European integrated projects (FP7) and innovation actions (H2020) as part of the Go-Lab initiative (Go-Lab, Next-Lab, and GO-GA). It is now exploited worldwide by universities and schools for blended active learning and digital knowledge sharing, and has currently has around 400’000 users. Most recently, it has been used in primary schools in Geneva during the first wave of the COVID-19 pandemic, acquiring over 230’000 new users during the confinement period.

To sustain the platform beyond its academic roots, a new spin-off nonprofit association Graasp.org was founded in October 2019 and is progressively taking over the development and outreach activities from EPFL. A driving feature of the platform is that—provided consent—it is possible to collect data regarding teacher and student interactions within online learning spaces and with digital learning resources. These data points, referred to as learning analytics, can be used not only for pedagogical awareness and reflection, but also for evidence-based research. The vision we started to implement in the 2020 phase of the P5 ASPIRE project is to empower researchers, beyond the current platform stakeholders, to access learning data collected from multiple sources, from within Graasp or exported from Moodle. To this end, we have built a set of additional findable, accessible, interoperable, and reusable (FAIR) open digital education research services, which notably include bootstrapping translational research, managing consent for research experiments, checking the anonymity of the collected data, openly sharing the associated datasets, and facilitating data processing pipelines and visualizations.

In this new 2021 phase, we envision engineering additional services that will support adoption, dissemination, and sustainability, including: (1) an on-premises instance of the Graasp platform that each research institution can install.

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EOSC-ELCH (201-007)

The European Open Science Cloud (EOSC) brings data and services to access and process the data to research and industry. Many are already provided via the EOSC portal – www.eosc-portal.eu. The implementation has been driven by several EC projects to which Switzerland is participating with its EGI membership – www.egi.eu. The EGI Federation is an international e-Infrastructure set up to provide advanced computing and data analytics services for research and innovation. The Swiss membership is provided by the EnhanceR association – www.enhancer.ch- a nationally and internationally recognized network for Swiss research IT expertise. The link to EGI and related services are sustained with support from swissuniversities.

In July 2020 the EOSC legal entity was founded as a Belgian AISBL (Association Internationale Sans But Lucratif). Swiss participation is expected from ETHZ and EnhanceR at least via its EGI membership. With this project extension we seek to sustain the EGI membership and the related services through 2021 in order to understand and settle Swiss funding and representation in EOSC and EGI with the various stakeholders. The requested support from swissuniversities amounts to 77’750 CHF.

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