

Apereo Foundation

# Annual Report

## 2021 Supplement



Serving the Academic Mission

The last Apereo Foundation Annual Report was delayed by the COVID-19 Pandemic. This supplement, covering December 2020 to June 2021 restores our regular schedule of publication.



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## Introduction

The Apereo Foundation is a value-driven membership organization, committed to open software and open innovation in the service of higher education. Apereo member institutions and commercial partners serve higher education on five continents. The Apereo community are realists: we expect higher education to continue to make use of a “mixed economy” of open and proprietary software, infrastructure and services for the foreseeable future, but that the default should always be to *consider open first*.

This is a matter both of utility and principle. Principle because openness aligns with the core values of higher education. Utility because challenging times demand collective and collaborative innovation that will be prevented by depending on locked-down and essentially hidden proprietary software.

Adapting, articulating and focusing Apereo core values in the face of the pandemic has been a key role of the Apereo Board throughout the year. In late 2020 we produced an extended Apereo white paper “Facing the ‘New Normal’ – The Value of the Apereo Foundation”. This white paper sets out the role of open source as an essential component of higher education’s response to the pandemic and how Apereo works to stimulate and sustain open source in higher education globally. The White Paper can be found online and as a download at <https://www.apereo.org/content/values> .

Apereo seeks to add value to higher education, and not to duplicate the work of others. A key element of this lies in developing dialog and effective partnerships. Whilst this aspect of our work -like many others - has been slowed by the pandemic, close liaison with the LAMP Consortium of small institutions, and the ESUP-Portail Consortium in France has continued to enrich our work at every level during 2020/2021. The free-to-access live stream of Open Apereo plenary sessions at Open Apereo (in English and French) are a strong symbol and reminder of that partnership and its tangible benefits.

The longstanding partnership of Apereo and ESUP-Portail provides an exemplar that Apereo seeks to expand. In early 2021 The Apereo Foundation agreed a memorandum of understanding with AXIES (Academic eXchange for Information Environment and Strategy), an approximate analogue of EDUCAUSE in Japan. The partnership’s initial focus is on sharing information more effectively between the two organizations, through the AXIES open-source software special interest group. Shoji Kajita, a long-time participant in Apereo communities, joined the Apereo Board of Directors as a representative of AXIES in February 2021.

In 2020-21 Apereo continued to focus on what we termed ‘low carbon collaboration’ as a further contribution to global sustainability. In practice, we believed that meant that events would grow increasingly stronger virtual components, alongside work to demonstrate the connection between open-source software and sustainable development goals. In the event, COVID-19 drove us further towards the virtual than we anticipated: Open Apereo 2020 was our first entirely online community conference. It was marked by increased international participation but remained very much a conventional event in an online setting. A particular focus of Open Apereo 2021 is to maximize community participation by taking advantage of

its virtual nature, opening the conference as far as possible whilst maintaining a break-even financial target.

The COVID-19 Pandemic has posed a series of challenges to higher education that have yet to play out. These challenges are too numerous to list exhaustively, but several questions have arisen repeatedly in community conversations:

*Has pandemic-driven speed of change led to rounded assessment of software choices? Have issues such as privacy and ethical considerations been downplayed as a result? What happens to the commercial-proprietary "sweetheart deal" when the "sweetheart" period ends?*

*Is higher education investing in capacity building to better equip itself for future shocks, or investing in software license fees which both reflect and further the financialization of the sector? How much further traction will far-reaching initiatives such as the Hewlett Foundation "Beyond Neoliberalism: Rethinking Political Economy"<sup>1</sup> gain in higher education as a result of the pandemic?*

*How do we expand advocacy around open-source alternatives in a period where securing volunteer effort is challenged by necessary pandemic-related effort close to home? How can we better network viable alternatives to the prevailing status quo?*

In 2014 as Apereo came into being we posited an organisation with a deliberately limited remit around services and functions that added value beyond that of an individual institution or software community. The pandemic should lead to a reassessment of that perspective and, if necessary, adjustment to the role we outlined. Reassessment and adjustment are a constant necessity in a healthy organization – but must be built around inclusive dialog and consensus-building if they are to be effective.

On a personal note, June marks the end of my tenure as Apereo Executive Director. I have been an advocate for open solutions for more than twenty years, and Executive Director of the Sakai and Apereo Foundations for eleven years. It's time to pass the baton and effect a transition.

We are a diverse and innovative global community. I am confident we will rise to the challenges faced by the sector and continue to fulfill our mission – which is today perhaps more relevant than ever - to assist higher education "collaborate to foster, develop, and sustain open technologies and innovation to support learning, teaching, and research."

Ian Dolphin,  
Executive Director  
Updated June 2021

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<sup>1</sup> <https://hewlett.org/library/beyond-neoliberalism-rethinking-political-economy/>

## Apereo Foundation Board Members June 2021

Anne-Marie Scott – Athabasca University (Chair) (CA)

Francois Campbell – OpenCollab (Secretary) (ZA)

Inge Donkervoort – DLearning (NL)

Mathilde Guerin - ESUP-Portail and Université de la Rochelle (FR)

Thierry Koscielniak - Conservatoire National des Arts et Métiers (FR)

Sam Lee Pan – University of Cape Town (ZA)

Salvador Pelicer – Entornos de Formación S.L. (ES)

Stuart Phillipson – University of Manchester (UK)

Boeta Pretorius - North West University (Vice-Chair) (ZA)

Ian Dolphin – Executive Director (Ex Officio) (GB)

Brief biographies of Board members can be found at  
<https://www.apereo.org/content/leadership>

Lucy Appert, Laura Gekeler and Jim Helwig retired from the Board in 2020. Laura McCord, Tim Carroll and Matthew Rascoff left the Board in 2021. The Board offer their thanks on behalf of the community for their service.

## Apereo Fellows 2021

The purpose of the Apereo Foundation Fellows Program is to acknowledge, celebrate and reward the contributions of these important Apereo volunteer contributors. The Apereo Fellows program seeks to foster community leadership and contribution through recognizing and supporting active contributors. Contributors bring varied expertise to the community, including architecture, design and development of technology, best practices in teaching, learning, research and collaboration, and coordination of community functions. The Apereo Fellows program recognizes such contributions and supports the efforts of the Fellows through a modest stipend. Thanks to Anthony Whyte, of the University of Michigan for stewarding the Fellows selection process.



### David Bauer, University of Dayton, Sakai, Tsugi, Koseu

David is the Assistant Director of eLearning at the University of Dayton. He has been working in educational technology as a software developer and technical lead since 2012 when he first began developing in Sakai. His work with the Tsugi project began at UD in 2016. In addition to various small features and bug fixes, David's past contributions to Apereo projects have included many enhancements to the Lessons tool in Sakai, development of the Attendance contrib tool, and several improvements to the Tsugi project including new tools and an enhanced UI. David participates in the weekly Sakai core call and attends as many Sakai conferences and camps as he can as both a participant and presenter. He believes that the biggest value offered by Sakai is the community and encourages everyone to participate as much as they are able.



### Maximiliano Lira Del Canto, University of Cologne, Opencast

Maximiliano is a software developer and consultant who works for the University of Cologne in Germany in the Regionales Rechenzentrum (RRZK). He graduated as a Telematics engineer from Santa Maria Technical University, Valparaíso, Chile. He has been a member of the Opencast community since 2015. In 2018 he began contributing code, documentation, translations, and answers to questions about OpenCast. Maximiliano also participated as release manager for the version 7 of Opencast. Some of the key areas that he has contributed to involve the use of GPU processing in media systems and the development of tools for Opencast.



### Olivier Gerbe, HEC Montreal, Karuta

Olivier Gerbé has been working for several years in the fields of knowledge management and skills management in the industry and at HEC Montreal. He is interested in the modeling of the different types of electronic portfolios and more particularly in those of skill assessments as well as their integration into competency-based approach.

Olivier is the architect and the main developer of Karuta, an open source software of the Apereo Foundation dedicated to the education community. Karuta is a flexible tool for the incremental prototyping and the diffusion on the web of digital portfolios or eportfolios for various purposes; showcase portfolio, learning portfolio, assessment portfolio.



### M Nikki Kaufman Massaro, Penn State, ELMS:LN

Nikki Massaro Kauffman develops open source web components to make Penn State University's online courses accessible, media rich, and interactive. She is also serving as President of the HighEdWeb Association. Nikki believes that accessibility, higher education, the web, and open source are about reaching more people. She has degrees in computer science and in education and has been working in these fields since 1998.

# Apereo Software Communities

## Apereo Open Academic Environment

### Background and Objectives

The Open Academic Environment is a multi-tenant platform aiming to support academic collaboration and networking. Specifically, OAE provides tools and services that can be used in the context of a class, of a formal or informal group outside a class or of such a group outside an institution.

OAE is widely used by staff in French higher education in the context of research and other inter- institutional collaboration.

### Technologies

OAE has a fairly complex technology stack that includes Express / NodeJS, Cassandra, Redis, Etherpad, Ethercalc and Elasticsearch. The project development environment requires docker and contributions are submitted via Github.

### Statistics

Date of First Release: 2009

Date of Last Release: May 2020

Number of Releases: 74 (4 in 2020, none in 2021)

Commits in 2021: 195

Total Commits: 4887

Contributors in 2021: 2

Estimated number of sites in use: 1 (Esup Portail, France)

### Context

The project activity slightly declined throughout 2021 and will likely see lower metrics to 2020 by the end of the year. The reasons for this are related to the nature of the work: on the backend, the team upgraded elasticsearch on six major versions, which, in retrospect, is an enormous task that does not reflect accordingly on the number of commits. Concerning the frontend and the new interface, momentum is still low due to prototyping, mockup design and development/tooling setup.

### 2021 Highlights

The v16.0.2 release in May 2020 paved the way for significant changes in 2021 and beyond, such as upgrading Elasticsearch (6 major versions) - completed in March 2021 - and moving the database to a relational model using Postgres - planned to start in September 2021). Completing both is part of the overall goal of making the project leaner and more flexible, which, in turn, will help attract third-party contributors to the project.

As the backend slowly transforms, the OAE team has also made good progress on refining and implementing a new frontend. The mockups first presented at Open Apereo 2018 have evolved significantly and gave birth to a new Github repository. That codebase is where most of OAE development currently takes place. A prototype is expected to emerge in 2022.

Additional investment and involvement from Learner Experiences has added impetus to OAE Development.

### Future Plans and Priorities

As stated above, the OAE is undergoing several major changes to its core: the redesign, the technical debt on the form of upgrades to components and dependencies, and the move to a relational database model. This work will likely continue throughout 2021 and 2022 and reflect on major releases.

### Links to repositories and downloads

Backend: <https://github.com/oaeproject/Hilary>

Frontend: <https://github.com/oaeproject/3akai-ux>

New Frontend: <https://github.com/oaeproject/Cake>

## Bedework

### Background and Objectives

Bedework is an open-source enterprise calendar system that supports public, personal, and group calendaring. It is designed to conform to current calendaring standards with a goal of attaining strong interoperability between other calendaring systems and clients. Bedework is built with an emphasis on higher education, though it is used by many commercial enterprises. Bedework may be deployed for public events calendaring, personal calendaring and scheduling, or both. Bedework is suitable for embedding in other applications or in portals and has been deployed across a wide range of environments. From the outset Bedework has been very strongly standards based.

### Technologies

Java, ElasticSearch, RedHat Wildfly, Undertow, XSL, JavaScript, JSP,

### Statistics

Date of First Release - March 2006 Bedework 3.0 (July 2002 UWCalendar 1.0)

Date of Last Release - March 28, 2020 - Bedework 13.13.2

Number of Releases > 25

Commits in 2020 - 699

Commits in 2021 - 360

Total Commits - more than weekly

Contributors in 2021 - 3

Estimated number of sites in use > 25

### Context

Most development over the past five years has been driven by contracts between Universities and Bedework commercial providers.

### Future Plans and Priorities

Close to another release - significant refactoring to split out read-only service from read/write. This should enable auto-scaling of the service allowing for smaller machines. Upgrading to latest wildfly - there are significant improvements in memory usage

### Links to repositories and downloads

<http://bedework.github.io/bedework/#installing-the-quickstart>

## CAS

### Background and Objectives

Central Authentication Service, more commonly referred to as CAS, is an enterprise multilingual single sign-on solution for the web and a comprehensive platform for authentication and authorization needs. CAS is an open and well-documented authentication protocol. The primary implementation of the protocol is an open-source Java server component by the same name, with support for a plethora of additional authentication protocols and features.

### Technologies

Java Development Toolkit

Spring Framework and family

Apache Tomcat and/or Jetty

MFA via Duo Security, Google Authenticator, etc

Data integration with storage technologies such as MongoDB, Redis, etc

Many more...

### Statistics

Date of Last Release: April 30<sup>th</sup> 2021

Number of Releases: 25

Commits in 2020: 2540

Commits in 2021: 3400

Total Commits: ~20,000

Contributors in 2020: 68

Contributors in 2021: 60

Estimated number of sites in use: >= 12,000

### Context

The estimated number of sites in use is calculated by the search engine shodan.io, and only accounts for search findings that could be publicly parsed and indexed by the engine. It does not speak to how active, alive or recent those deployments are. No other statistic exists.

### 2021 Highlights

Major highlights include improvements to the following sub-systems:

- MFA FIDO2, AWS Integration, Delegated authentication, JDK 16 compatibility, Database performance, etc.

## Future Plans and Priorities

The CAS project generally does not put together a roadmap or plan and grows entirely organically based on efforts of volunteers and contributors around the world. As such, ideas thrown around as interesting and worthy to pursue insofar are:

- Compatibility with future Java versions (17)
- Password management improvements
- Continued support for SAML2, OIDC and other protocols
- Improved management UI consoles for application integrations

## Links to repositories and downloads

- <https://github.com/apereo/cas>

## Commercial Support

CAS in the Cloud

Tirasa

Unicon, inc

Cirrus Identity

## ELMS LN

### Background and Objectives

ELMS Learning Network (ELMS:LN) is an open source educational technology platform for building and sustaining innovation in course technologies. It is a Next Generation Digital Learning Environment (NGDLE) that utilizes a Suite of Tools approach to system design and deployment. We believe it takes an ecosystem to effectively meet the needs of educators and believe in empowering faculty by treating courses as small networked ecosystems that encourage experimentation, fragmentation, growth, and then ultimately stabilization of new ideas.

### Technologies

Polymer, LitElement, W3C Web component standard, Drupal, WordPress, GravCMS, BackdropCMS, HAXcms (PHP).

### Statistics

Date of First Release Jan 5, 2019

Date of Last Release Dec 1, 2020

Number of Releases 20

Commits in 2020 - 1430

Commits in 2021 - 608

Total Commits 2729

Contributors in 2020 - 10

Contributors in 2021 - 15

Estimated number of sites in use - 1,000+

### Context

Our main element repo now contains the vast majority of code for our community. ELMS:LN produced web components power an unknown number of websites in the wild but power over 200 courses at Penn State and 60+ external courses based on core contributor footprint. NPM distribution of assets suggests that our 250 design assets have been downloaded 374,080 in the first 5 months of 2021.

### 2020 Highlights

The project now openly communicates demonstrations of our primary assets on <https://webcomponents.psu.edu/>. We picked up over a dozen core contributor commits from students learning how to build web systems in the classroom via contribution to ELMS:LN. We've created a new mash-up project called HAX11ty that takes the static publishing aspects of 11ty and github-pages publishing, and mashes in the theme and creative capabilities of HAX / HAXcms in order to make a easy publishing workflow for community sites. This has been adopted by the Penn State Libraries and we have begun using it on our own project sites like <https://wcfactory.js.org>. HAX has successfully shipped 2 major UX revisions in the past year based on production usage by faculty, students and staff at Penn State and Buttercups Training Limited.

We have established weekly Penn State ELMS community calls and bi-weekly community calls for ELMS that we've stuck to successfully for the past 5 months. This has improved the

quality of HAXcms and ELMS through regular communication with our stakeholders and ensuring a higher level of platform quality overall as a result.

### Future Plans and Priorities

HAX Next major UX revision based on student feedback will launch in June 2021. HAX is starting to show up in communities outside of our own and we recently have been engaging with members of the Moodle community around what a HAX Moodle plugin would look like and how it works. This has led to improvements in documentation and API standardization for HAX.

From there our next major priority is an offline grade book tool as well as a revision of our award winning Open Studio collaboration platform. The gradebook is currently being engineered in a LMS agnostic manner so that faculty can load and engage in flexible rubrics from their local file system. This will read and write XLSX / ODS formats and allow decentralization of grading while improving flexibility of HOW someone evaluates a student. The Open Studio has been in revision for over a year and will be entirely student and community centered. Both are anticipated to launch Fall 2021.

The default theme in ELMS:LN will be a HAXcms based theme for improved performance and design flexibility. HAXcms now has four high quality themes engineered specifically for course content presentation. By further integrating ELMS and HAXcms we've been able to improve both products through shared community knowledge and needs.

There will also be a Penn State course structured entirely around contribution to the visual assets and systems of ELMS starting this Fall. This course taught by community lead Bryan Ollendyke, will feature members of the HAX, ELMS and wider web components community in teaching students how to build web components and contribute to open source projects by engaging directly with them in the classroom. Semester projects will start with portfolio work and lead into direct contribution and critique of code to get it accepted to the LRNWebcomponents repo.

### Links to repositories and downloads

[HAXTheWeb.org](https://HAXTheWeb.org)

[elmsln.org](https://elmsln.org)

[wcfactory.js.org](https://wcfactory.js.org)

## Karuta

### Background and Objectives

Karuta is a flexible tool for the incremental prototyping and sharing of digital portfolios (ePortfolios) for various purposes: showcase portfolios, learning portfolios, assessment portfolios.

### Technology/ies

jQuery javascript (front-end), REST APIs, Java, and MySQL (or Oracle). Responsive design

### Statistics

Date of First Release: May 2014

Date of Last Release: Spring 2021

Number of Releases: 29

Commits in 2020: 445

Commits 2021 : 87

Total Commits: 1324

Contributors in 2019: 2

Contributors in 2020: 3

Contributors in 2021: 3

Estimated number of sites in use: 25

### Context:

The Karuta Project emerged from a research project at the University of Montreal. The code has been re-written many times. We have a small team of developers that is currently expanding in France. The new Karuta 3.0 version has been completely rewritten using well-known open source frameworks. Thanks to better documentation and code clarity, we should be able to attract more community developers.

### 2021 Highlights

In 2021 we completed the alpha and beta releases of version 3.0 with a much richer set of functionalities for fully customizing portfolio presentations. We also started an ambitious project with University Savoie Mont Blanc to build a prototype for implementing APC in France or Competency-Based Learning. Starting in September 2021, all French universities will be required to transform their undergraduate programs to help students reflect on their learning using ePortfolios based on competency-frameworks. To assist this important change and help universities transition to Karuta, we held 12 1-hour seminars with more than 120 participants (teaching specialists, developers, etc.). The videos and content are available here (in French). We held one meeting of the international Karuta Governing Board on March 10 2021. The notes are available in the Community section of the karutaproject.org web site.

### Future Plans and Priorities

The coming months will be important. We will continue the design and test our APC prototype with many French universities interested joining this effort. We were involved in a proposal to secure funding from the French Ministry of Education to support APC. We will

release the final Karuta 3.0 front-end version while working to release an alpha 3.0 version of the back-end that was completely re-written to support a large number of users (20 000+). We will also release a new version of our bilingual web site powered by Karuta 3.0. This website will contain community information, templates, tutorials, use cases, etc.

### Links to Repositories and Downloads

Go to <https://github.com/karutaproject> to access the following repositories

- karuta-templates
- karuta-backend
- karuta-scripts-utilitaires
- K'IUT
- karuta-frontend
- karuta-report
- karuta-frontend-documentation
- karuta-fileserver
- karuta-iut-templates
- Karuta-Project-Wiki

### Commercial Support

ePortfolium (<http://eportfolium.com>)

## OnTask

### Background and Objectives

OnTask is a platform to provide data-driven personalised messages in a learning environment. The target audience are instructors and course designers that want to provide learners with personalised messages to promote engagement, coaching, or simply as a conversation starter. Users manage a collection of "workflows". Each workflow contains a data table and a set of actions. The actions are message templates with conditions and filters to change their appearance based on the data stored in the table. OnTask provides a one-stop shop to manipulate the table and the corresponding actions to communicate with large student cohorts.

### Technologies

OnTask has been implemented using Django + PostgreSQL + Javascript. The data manipulation is done through Pandas and mapped to PostgreSQL using Psycopg2.

### Statistics

Date of First Release: 12/Nov/2017

Date of Last Release: 4/July/2020

Number of Releases: 66

Commits in 2021: 23

Total Commits: 2763

Contributors in 2021: 1

Estimated number of sites in use: 25

The code has been stable during 2021 with minor updates to keep versions up to date.

### 2021 Highlights

The tool has focused on dissemination aspects with no major functional upgrades.

### Future Plans and Priorities

We plan to keep on fostering adoption in several institutions.

### Links to repositories and downloads

[https://github.com/abelardopardo/ontask\\_b](https://github.com/abelardopardo/ontask_b)

## Opencast

### Background and Objectives

Opencast is an open source video management system for academic institutions. It covers all stages of the video lifecycle from live streaming, recording (lecture capture), and video upload/ingest to processing/encoding, publishing, playing, and archiving video assets. It's scalable from a one-server installation to mass production in the cloud and versatile to play with other academic systems (LMS, course catalogues etc.). Additional modules exist to meet requirements beyond the core features (Opencast Studio for web-based video production, Video Annotation Tool etc.).

### New Technology/ies since last report

- Integration with BigBlueButton and Zoom
- Stand-alone video editor
- Adaptive streaming

### Statistics

Date of First Release - August 2010, Matterhorn 1.0

Date of Last Release - May 17 2021 (Opencast 9.5)

Number of Releases - 16 in 2020, 5 in 2021

Commits in 2020 - 1,297

Commits in 2021 (June 1) - 847

Frequency of Commits = Daily

Number of Contributors in 2020 - 62

Number of sites in use (estimated) > 200

### Context

Release policy sees two major annual releases plus a handful of smaller (service) releases.

### 2021 Opencast Highlights

- Proven scalability during the pandemic "video rush".
- Included adaptive streaming

### Future Plans

- Due to the pandemic, the video portal is now scheduled for 2022.
- Automatic speech recognition

### Link to repositories and downloads

<https://pkg.opencast.org/>

<https://github.com/opencast/opencast/releases>

### Commercial Support

<https://opencast.org/support>

## OpenEQUELLA

### Background and Objectives

openEQUELLA is a digital repository that provides a single platform to house teaching/learning, research, media, and library content.

openEQUELLA has been deployed for copyright resource collections; research materials; managing and exposing materials through websites and portals; content authoring; workflow; institutional policy; and organizational resources. openEQUELLA is currently in use in a wide range of schools, universities, colleges, TAFEs, departments of education, government agencies, and corporations worldwide.

Open sourced in 2017, but with over 17 years of history, openEQUELLA is a mature solution written for the Java platform that can enable educational content to effectively reach teachers and learners.

### Technologies

Java, Scala, React, Typescript, Purescript, SBT, Gradle

### Statistics

Date of First Release: 2017-12-05 (6.5)

Date of Last Release: 2021-4-28 (2021.1.0)

Number of Releases 2 major releases per year. (2021.1 released April 28, 2021.1 due mid-November)

Commits in 2021: See below for stats since Nov 12 (from last report)

Total Commits: 1154

Contributors in 2021: 7

- Chris Beach
- Christian Murphy
- Ian Stevenson
- Nick Charles
- Penghai Zhang
- Samantha Fisher
- Bots (Renovate Bot and Dependabot)

Estimated number of sites in use: North America (8); EU (12); APAC (31)

### 2021 Highlights

- Continuation of React/Material UI Design application to create a new Search experience, including gallery views, favouriting and attachment counts.
- Ability to download search results to a CSV file from the new UI Search page
- New Search page Selection session UI improvements

### Future Plans and Priorities

- Continue to convert application to a responsive, React / Material UI Design application.
- Upgrade LTI to latest version across LMS integrations
- Continue to work with adopters on requested features as they emerge.

### Links to repositories and downloads

<https://github.com/apereo/openEQUELLA>

(<https://github.com/apereo/openEQUELLA/releases>)

<https://apereo.github.io/openEQUELLA-docs>

### Commercial Support

Unicon <https://www.unicon.net/>

Edalex <https://www.edalex.com/>

# Sakai

## Background and Objectives

Sakai is a freely available, feature-rich, learning management solution built by higher education for higher education, and used by a diverse and global adopter community. Sakai provides a wealth of powerful, flexible tools that enable great teaching, compelling learning, and dynamic collaboration. Thanks to Sakai's responsive design, instructors and students can achieve their academic goals no matter where they are or what device they use. Sakai's breadth of features means you can choose the tools that meet your needs. Out of the box, Sakai includes all of the standard online learning, teaching, and collaboration tools found in modern learning platforms. In addition, Sakai has a wide range of community contributed tools and external integrations available as add-on components. Sakai's open source flexibility allows you to configure or customize the system as much or as little as needed.

## Technologies

Java, XML, Javascript, JSP. A complete list is available on request.

## Statistics

Date of First Release: 2004

Date of Last Release: 18, March 2021

Number of Releases: 73

Commits in 2020: 1119

Commits in 2021: 336 and counting

Total Commits: 47637

Contributors in 2020: 51

Contributors in 2021 so far: 36

Estimated number of sites in use: 300

Each year, Sakai typically has between 1000 and 2000 commits from over 40 developers updating its 1.4-million-line code base.

Sakai has approximately 300 institutional adopters worldwide - the exact number of institutions using Sakai is unknown, since Sakai is free to download without registration and has no mechanism to "call home" to let us know it is being used.

## 2020 Highlights

Sakai Camp strategic planning retreat held in Orlando, FL on January 27-29, 2020.

At Sakai Camp 2020, the UI Steering Group was created and charged with leading efforts related to overall UI/UX improvement across all of Sakai.

Sakai PMC Quarterly Meetings were implemented as a regular touch point for budget review, planning, and community discussion. PMC meetings took place in January (at Sakai Camp), and virtually in April, July, and October 2020.

Sakai 19.4 - release date 03 April, 2020, more information at <http://source.sakaiproject.org/release/19.4/>

Sakai 20.0 - release date 29 April, 2020, more information at <http://source.sakaiproject.org/release/20.0/>

Sakai 20.1 - release date 10 July, 2020, more information at <http://source.sakaiproject.org/release/20.1/>

Sakai 19.5 - release date 31 July, 2020, more information at <http://source.sakaiproject.org/release/19.5/>

Sakai Project Management Committee (PMC) elections were held in June-July, 2020. PMC membership is reflective of significant contributions to the community and a dedication to the shared goals of the Sakai community. Two new PMC members were elected to join the committee: Michael Greene - Duke University, and Adrian Fish - Longsight Inc. Also, three prior PMC members have now moved to Emeritus status: Diego del Blanco - Unicon, Matthew Hall - University of Virginia, and Jeff Pasch - New York University.

Throughout 2020, the Sakai Marketing Working Group implemented a number of new initiatives, including a Social Media marketing effort to raise awareness of Sakai on Facebook, Twitter, and Instagram.

Sakai Virtual Conference was held online Nov. 12, 2020. There were nearly 200 attendees at this event, and approximately \$10,000 USD in funding was raised (from both registrations and sponsor contributions) to be used for future Sakai Development. Recordings of the presentations are available on the Sakai YouTube Channel.

## 2021 Highlights

Due to travel and meeting restrictions related to the COVID-19 pandemic, the on-site Sakai Camp strategic planning retreat, normally held in Orlando, FL, was canceled in 2021. Instead, the Sakai Community held a virtual planning retreat called "Sakai Days" on February 25th and 26th, 2021. Sakai Days included the first quarterly PMC and community meeting of the year, as well as additional community workshops on the Open Source Health Factors project, and User Story Mapping for a new threaded discussion tool currently in development.

The 2021 Sakai Online Faculty Showcase was held on Wednesday, May 26. At this virtual event, six instructors at Sakai institutions demonstrated how they've adopted best practices in their teaching using Sakai. Each instructor was featured in a pre-recorded video presentation and also participated in live discussion via the Zoom chat. Recordings of the showcase session and individual presentations are available on the [Sakai YouTube Channel](#). The showcase event was very well attended, with 278 registered attendees.

An updated version of the SakaiLMS.org website was launched at the end of May 2021. The updated site features a fresh new look, as well as additional community story content from individual Sakai users.

Sakai 21.0 - release date 18 March, 2021, more information at <http://source.sakaiproject.org/release/21.0/>

Sakai 20.3 - release date 12 April, 2021, more information at <http://source.sakaiproject.org/release/20.3/>

## Future Plans and Priorities

Upcoming PMC and Community meetings will be scheduled virtually in June, September, and December, 2021. Also, we have begun planning for hosting an on-site Sakai Camp meeting in Orlando, FL again in January of 2022.

The Sakai Community has published an updated three-year strategic roadmap to steer the ongoing, energetic, rapid innovation that is the hallmark of the Sakai LMS. This new plan builds upon Sakai's track record of market leadership in higher education, as evidenced by independent survey research and [market data](#). It prioritizes the development of teaching technologies that increase design flexibility for faculty and enable greater learning outcomes for students.

The roadmap guides rapid innovation in response to faculty needs, represents Sakai's dedication to meeting the needs of faculty and students with relevant advanced technology, highlights the impact that can be made by an energetic community leveraging an open platform, and encourages institutional support for Sakai's rapid development. The 2022-2024 road map was discussed and revised with community input throughout the fall 2020 and winter 2021. Version 3 of the Roadmap, the latest version, was adopted in February 2021 at the quarterly Sakai Community meeting.

## The Roadmap: Annual Areas of Focus

- 2022: New Discussions/Forums tool; New tables and tabs UI; Meetings tool improvements; Video Feedback; New Calendar UI
- 2023: Messaging mobile app; Achievements/badging; Improved content import; Analytics; Smart notification agents; Assignment annotation
- 2024: Sakai Page Editor

## Sakai Feature Roadmap

*Audiences: General public, Sakai Community*

<b>Year of Release</b>	<b>New Features</b> <i>(audience: public)</i>	<b>Improvements</b> <i>(audience: public)</i>	<b>Ongoing investment (priority order)</b> <i>(audience: Sakai community)</i>
2022	New discussions tool New tables & forms UI New Course registration tool	Lessons improvements Meetings tool improvements, likely including Zoom and MS Teams integrations New Calendar UI Assignment video feedback	Samigo QTI 2 support Workflow improvements: Assignments, Tests & Quizzes; Resources Search improvements Improved course replication Dashboard widget improvements Improve CK editor accessibility Rubrics performance improvements
2023	Sakai Messaging mobile app Achievements Date Wizard Better Import from Canvas New global navigation Program-level analytics Smart agents	Annotation of assignment submissions Instructional analytics Branding Wizard	Separate SiteInfo by role Resources integration for Google & OneDrive
2024	Sakai Page Editor	TBD	Box and Dropbox support

## Technical Roadmap (in priority order)

Audience: Sakai Community

Adjusted based upon Core Team prioritization exercise, completed 2/4/2021.

Year of Release	Application	Infrastructure
2022	Grading service Tab Safety: Samigo, Assignments, Grader + Rubrics Implement accessible media player Provide Sakai Editor (CK5) for core tools Unified Messaging service Create UX style guide in storybook Implement Storybook	Implement Java 11 + Elasticsearch 6.8 MySQL 8 support Caching improvements <ul style="list-style-type: none"> <li>Transition from EHCACHE to Ignite for cache provision</li> <li>Session clustering &amp; failover (use of distributed cache)</li> </ul> Upgrade JSF1 tools (6) to JSF2 JPA Migration (from native Hibernate app to JPA-based app) (pt 1) Move remaining 3rd Party specific CSS to Sakai CSS namespace
2023	Tab safety: Lessons, Forums, Syllabus, Resources, Drop Box Replace file picker (open source TBD) Replace date picker (open source TBD) Improve import from other platforms	JPA Migration (pt 2) Retire RSF tools (2) Retire additional obsolete libraries Upgrade Velocity (templates) to latest version Upgrade to Wicket 8 (interface framework) Handsontable replacement (Gradebook) ContentHosting (Single instance store) Investigate GraalVM
2024	Further removal of technical debt	Further removal of technical debt

### Links to repositories and downloads

<https://github.com/sakaiproject>

<http://source.sakaiproject.org/release/19.0/>

## UniTime

### Background and Objectives

UniTime is a comprehensive educational scheduling system that supports developing course and exam timetables, managing changes to these timetables, sharing rooms with other events, and scheduling students to individual classes. It is a distributed system that allows multiple university and departmental schedule managers to coordinate efforts to build and modify a schedule that meets their diverse organizational needs while allowing for minimization of student course conflicts. It can be used alone to create and maintain a school's schedule of classes and/or exams or interfaced with an existing student information system.

The system was originally developed as a collaborative effort by faculty, students, and staff at universities in North America and Europe. The software is distributed free under an open-source license in hopes that other colleges and universities can benefit their students through better scheduling or wish to contribute to ongoing research in this area.

### Technologies

UniTime is written in Java. It is using Hibernate to connect to MySQL, Oracle, or PostgreSQL database. It deploys on Apache Tomcat. We use Spring Security for authorization and authentication (allowing for CAS or LDAP out of the box). Older pages are written using JSP and Apache Struts, newer pages use Google Web Toolkit. JGroups is used for clustering (including messaging and RPCs) and Infinispan for data replication within a cluster. Most modern web browsers are supported.

### Statistics

Date of First Release September 2007 (UniTime 3.0 first release)

Date of Last Release December 5 2020 (major release) April 2021 (minor release)

Number of Releases: 12

Commits in 2020 - 324 (as of Oct 28, 2020)

Commits in 2021 - 172 Jan-May 2021

Total Commits - 7590

Frequency of Commits - Almost daily

Number of sites in use - c90

### Context

Most development is still being done at Purdue University or by the core UniTime team members. While we are getting more institutions involved, they often choose to sponsor the development of new features that they need rather than developing them in-house.

About 500 institutions have filled in our voluntary registration so far (about 50 have been added during the last 12 months).

### 2021 UniTime Highlights

UniTime 4.5 was released in December 2020 with three minor releases since then. It contains many improvements to student scheduling and in the ability to make massive

course timetabling and student re-scheduling changes related to the 2020 global pandemic. There have also been improvements for timetabling online-only classes and exams.

There is a new Advisor Course Recommendations page that can be used by academic advisors (e.g., when they are meeting with their students) to provide suggestions on what courses the student needs to take. Students can easily use these recommendations for course pre-registration and for registering for classes. The advisors can track the progress of their students through the Online Student Scheduling Dashboard, including indications of how well they are following their advice.

There have also been a few improvements in the student scheduling algorithm, for instance, providing the ability to prioritize certain students, or allowing some off-campus students to only get online courses.

Some initial effort has been spent on localization and support of right-to-left languages. There are many small changes and improvements, many of which have been driven by the changes in higher education caused by the 2020 global pandemic.

See <https://builds.unitime.org/UniTime4.5/Release-Notes.xml> for the latest release notes of UniTime 4.5.

### Future Plans and Priorities

Much of the planned development will continue to focus on student scheduling (e.g., automated wait-listing). There are also plans to improve localization, accessibility, and documentation. We will continue the technology upgrade of older (JSP-based) pages. More work is also planned on integration with external systems. We also plan to build a user interface for a team-building solver that has been piloted at Purdue University.

The next version, UniTime 4.6, is planned to be released by the end of 2021. It will contain the first production-ready version of automated wait-listing that is planned to be used at Purdue University starting the Spring 2022 semester. It will also support Apache Tomcat 10 (using Jakarta EE) and Java 16+ (avoiding illegal access exceptions).

### Repositories and downloads

Repositories:

<https://github.com/UniTime/unitime>

<https://github.com/UniTime/unitime-addons>

<https://sourceforge.net/projects/unitime> (includes secondary Git repo) Downloads:

<https://github.com/UniTime/unitime/releases>

<https://sourceforge.net/projects/unitime/files>

<https://builds.unitime.org> (nightly builds)

### Commercial Support

Most of the commercial support is being done by UniTime LLC (based in the USA) and UniTime, s.r.o. (based in the Czech Republic) at the moment.

We have started cooperating with Naseej in 2017, which is providing commercial support for higher education institutions in the Arabic countries.

## uPortal

### Background and Objectives

uPortal is the leading open source enterprise portal framework built by and for the higher education community. The platform itself is complemented by a wide variety of projects that make up the greater uPortal Ecosystem. We encourage community members to engage on the lists, enhance documentation, contribute a fix, add a feature, propose a new sub-project, become an Apereo member, and become a uPortal Supporting Subscriber.

### Technologies

uPortal is a Java-based, enterprise platform that embraces standards and collaboration to enhance the user experience of navigating the host institution. uPortal leverages existing services and data to build a set of user attributes and associations to provide a highly personalized view of content. It supports established integration standards (e.g., JSR-286 Portlets, LDAP, Active Directory, RSS/ATOM/iCAL, REST) and many front-end technologies (e.g., Angular, ReactJS, Vue, web components, native mobile apps). The platform includes an administrative user interface, a command line interface, supporting services, and many APIs. All this allows for a very wide and flexible approach to each institution's uPortal deployment.

### Statistics

Date of First Release - 2001

Date of Last Release - 2021-01-13

Number of Releases - 1

Commits in 2020 - 1324

Commits in 2021 - 388 (as of 2021-05-21)

Frequency of commits - Monthly

Active contributors - 15

Number of sites in use (estimated) - dozens

The statistics are generally aggregated across all of the projects in the uPortal Ecosystem. The number of sites in use is an estimate due to their not being a requirement to register uPortal installations. General activity throughout the ecosystem has remained steady.

### 2019 - 2020 uPortal Highlights

Work over the last year includes:

- Released uPortal 5.8.2 and 5.9.0
- New features include:
  - Prepared SQL statements for entity groups
  - Upgrading Google Visualization (Statistics Portlet) version
  - Add queue size vars to portletThreadPool and uPortalTaskExecutor
  - Smart LDAP leverages attribute mapper
- Consolidated uPortal ecosystem repositories under <https://github.com/uPortal-Project>
- Started tracking uPortal Steering Committee tasks in GitHub

The community remained active with 427 subscribers on the uPortal Community list,

uportal-user@apereo.org, and 250 subscribers on the uPortal Developer list, uportal-dev@apereo.org. The uPortal Supporting Subscription program for pooling financial resources to help move the project forward with a variety of subscription levels has three current subscribers bringing in approximately \$7,000 each year. Members of the community got together virtually at Open Apereo 2020 and ESUP-Days # 31 / Apereo Paris 2021

### Future Plans

Community members will be meeting virtually following Open Apereo 2021 to review and adjust the roadmap.

### List and link to repositories and downloads

<http://www.uportal.org>

<https://github.com/Jasig/uPortal/>

### Commercial Support

Unicon

## Xerte

### Background and Objectives

The Xerte Project aims to provide the very best open-source authoring system in its class for non-technical subject matter experts, developers and media specialists to collaborate in the production of interactive, highly accessible and engaging learning materials. It is used in hundreds of institutions around the world and accessed by millions of learners.

### Technologies

PHP, JavaScript, HTML5

### Statistics

Date of First Release April 2008

Date of Last Release August 2020 (or June 2021 if 3.10 is released...)

Number of Releases 50

Commits in 2020 431

Commits in 2021 224

Contributors in 2020 8

Contributors in 2021 11

Estimated number of sites in use 300+.

993 downloads of v3.9.

### 2020/2021 Highlights

The last year has been completely dominated by the covid pandemic and the associated rise in demand for tools that allow content to be authored quickly has seen a huge spike in Xerte related activity at institutions that use it: at the University of Nottingham, where Xerte has been running since 2008, something like one third of the content ever produced with Xerte has been produced during the pandemic, and Xerte has emerged as the tool of choice for many content creators. We hear similar stories from other institutions.

New accessibility legislation in the UK has led to a complete review of Xerte's accessibility, and we remain very proud of the best-in-breed native accessibility features. Accessibility has always been a priority for the project, and users can use the tools knowing that the accessibility support is as good as it can be. We have published a comprehensive accessibility statement, as well as guides for authors wanting to produce highly accessible materials.

We ran a hugely successful online event in March, with over 320 participants coming together for two days of all things Xerte has to offer. Our user communities in the UK and northern Europe are very strong, and we have new volunteers to contribute to the project. v3.10 will be released soon.

### Future Plans and Priorities

Release of 3.10.

Regular developer days.

Further online events.

Documentation.

Enhanced testing.

Links to repositories and downloads

www: <https://www.xerte.org.uk>

Git: <https://github.com/thexerteproject/xerteonlinetoolkits>

Commercial support: <https://learningapps.co.uk>

## The Apereo Incubation Process

The Apereo Incubation Working Group, Chaired by Benito Gonzales of Unicon, has continued to steward new software communities through our incubation process throughout the year. Incremental changes to the process were introduced in late 2020. This is designed to provide assistance for new projects, which may center around one organisation, assess levels of broader interest and facilitate partnership building within the community.

The Working Group has noted a slower pace of incubation as participants pivoted to meet organizational needs in the light of the pandemic. Addressing this, and adapting the process in the light of pandemic experience is a current focus of conversation and planning, and is the focus of a plenary session at Open Apereo 2021. If you are interested in participating in the Incubation Working Group please contact [ed@apereo.org](mailto:ed@apereo.org).

## Incubating Software

### EDexchange

EDexchange, a project of the Postsecondary Electronic Standards Council (PESC) Common Data Services (CDS) Task Force of over 30 institutions and vendors, aims to create a secure network for the exchange of transcripts between US educational institutions. The open source, web service based software EDexchange creates has the potential to be utilized to setup secure networks to exchange education data regionally and locally in many countries.

### Fiosan

Fiosan (pronounced Fi-san) aims to transform task-related communications within higher education institutions, through delivering a cross-system solution for personalized notifications and emergency communications, enabling notifications to be created-by and consumed across multiple services and communication channels.

### Tsugi

The goal of Tsugi is to build a scalable multi-tenant "tool" hosting environment based on the emerging IMS standards to help move the industry toward a Next Generation Digital Learning Environment (NGDLE) . The use of this framework does not automatically imply any type of IMS certification. Tools and products that use this framework must still go through the formal certification process through IMS ([www.imsglobal.org](http://www.imsglobal.org)).

Further information about incubating software can be found at <https://www.apereo.org/content/projects-communities>

## **Financial Report**

The Apereo Foundation 2020 audit remains delayed by the COVID-19 pandemic. An audited financial report will be published as soon as possible.