UC Cross Campus Enrollment System

Submitter:
Adam Hochman, Assistant Director of Technology Development, Innovative Learning Technology Initiative, UC Office of the President, adam.hochman@ucop.edu

Project Leaders:
Mary-Ellen Kreher, Director of Online Course Design and Technical Development, Innovative Learning Technology Initiative, UC Office of the President

Adam Hochman, Assistant Director of Technology Development, Innovative Learning Technology Initiative, UC Office of the President, adam.hochman@ucop.edu

Team Members:

UC Office of the President

- Dinesh Purohit, Lead Developer
- Adam Flanders, Technical Project Manager
- Andrew Touslee, Lead Middleware Developer
- Candace Jones, Senior Applications Manager

UC Berkeley

- Walter Wong, Registrar
- Tamer Sakr, Enterprise Integration Architect
- Ross Nolan, Data and Report Analyst
- Ross Stivison, PeopleSoft Technical Lead

UC Davis

- Barbara Noble, Registrar
- Justin Stagg, App Development Programmer
- Nan Jiang, Programmer III
- Libby Bullock, Programmer
- Kylie Podsakoff, Bus Process Analyst
- Brad Harding, Director of Enterprise Apps

UC Merced

- Laurie Herbrand, Registrar
- Will Wilcox, SIS Manager
- Matthew Cato, Director Enterprise Apps
- Nick Dugan, Deputy CIO and CISO

UC Santa Cruz

- Tchad Sanger, Registrar
- John Bartlett, Manager Academic Apps
- Paul Bauman, Lead Developer
- Scott Simmons, Programmer Analyst
- Kishcka Bluspiro, Systems Analyst
- Janaki Madhavan, Programmer Analyst

UC Los Angeles

- Frank Wada, Registrar
- Kate Jakway Kelly, Assoc Registrar
- Donny Morada, Programmer Analyst
- Santhana Srinivasa, Computing Resource Mgr
- Praveen Dugar, Computing Resource Mgr
- Priya Mishra, Programmer Analyst
Context

University of California is popular! More than 171,400 students, including 111,611 Californians, applied to at least one UC campus in 2017. To meet this demand, last year UC agreed to add a total of 10,000 new seats, including 5,000 in the current school year, for California students by the fall of 2018. Although steps have been taken to meet this ever growing challenge, students still struggle to access courses, satisfy degree requirements, and graduate on time. For example, Berkeley’s Intro to Computer Programming course, in the first two weeks of the semester, had approximately 2,000 additional computer science students seated at Zellerbach Hall, where the Philharmonia Orchestra of London and Sweden’s Cullberg Ballet performed just weeks later. Ultimately there aren’t enough physical spaces to meet student demand.
Challenges

University of California’s online course catalog has quadrupled in the past 4 years and continues to grow thanks to the work of UCOP’s Innovative Learning Technology Initiative (ILTI). These courses are developed to increase UC students’ opportunity to progress in a timely fashion and to broaden students’ access to UC’s breadth of knowledge. Prior to the proliferation of online courses, it was rare for a student to take a course at another campus. Online courses remove the physical barrier of space and distance and allow UC students to easily take a course at another campus. Cross campus enrollment is the linchpin to fulfill this promise.

“Simultaneous enrollment”, the process/policy that allows UC students to take courses at other campuses, was conceived many years ago and at that time it only considered a low volume of students who had to physically take courses at another campus. Beyond location, students needed to fulfill a high administrative barrier to participate in a course at another campus. Each campus had a different form and students had to complete a form from their campus, a complete a form at the host campus and acquire multiple signatures from campus administrators and faculty. Upon fulfilling these requirements, the administrative processes were highly manual and demanded multiple phone calls, emails, and at the end of the term the exchange of transcripts via mail. ILTI recognized this process would be a barrier for realizing the potential of online courses. The academic year prior to the introduction of the Cross Campus Enrollment System (CCES), UC campuses reported a total of 9 simultaneously enrolled students.

From a technical perspective, University of California campuses hosts 5 different student information systems and there was very little precedence for real time exchange of data between campuses for enrollment, grades, eligibility, personal identity information, courses and academic calendar events and terms. Intercampus integration consisted largely of large flat files that were processed at best daily but more commonly monthly/yearly. Modern RESTFUL web services were not leveraged for cross campus systems integration and few UC data standards existed to support cross campus enrollment. Technologies, like an Enterprise Service Bus (ESB), that enable data exchange had not been widely adopted so defining, designing, and building web service integrations was non-trivial.

Project

CCES practiced an agile design and development methodology, at the time an unusual approach for UC enterprise initiatives. ILTI separated the campuses into two phases and relied on the Phase 1 campuses (UCLA, UCSC, UCD, and UCSB) patience and high level of collaboration to
successfully design and develop the core requirements and implementation. Their work contributed to the Phase 2 campus’ success and ensured that the CCES system would meet campus needs. The design sessions kicked off in early 2015 and culminated in a May 2015 design summit at UCLA. As of today, all campuses with the exception of UCM and UCI are fully integrated with CCES. UCM will complete integration by Winter Quarter 2019 and the project will come to a close in Nov. 2019 with UCI as the final campus integration. The resources required to realize this project spanned from the hard work of enterprise architects, system administrators, middleware developers, software developers, network engineers, dbas, project managers, academic advisors, registrars, and business analysts, to the input and leadership of campus registrars and CIOs.

Achievements

Upon CCES’ introduction, the number of cross campus participants during the academic year increased from 9 to approximately 100x the number of participants. The CCES initiative standardized API contracts between campuses and UCOP, established RESTFUL interfaces to exchange information, and introduced ESB solutions to some of the campuses. CCES success with its ESB solution, CloudHub, ultimately led to the adoption of this technology by UC Path and will now be offered as a system wide service for the University of California IT. The course catalog web services and the cross campus schedule of classes unified University of California’s online course catalog. The grade web services have replaced paper transcripts that could take weeks to months to process with a digital records exchange that can instantly transfer grades. Collaboration with UC Trust established a new Shibboleth attribute to exchange campus student ids as a persistent, immutable identifier for federated authentication.

The discoverability of online courses varies from campus to campus, and students now have a dramatically improved experience to identify online learning opportunities.
Standard UC wide APIs and real time data exchange

- Academic Calendar
- Cross Campus Enrollments
- Host Enrollments
- Personal Identifiable Info
- Course Catalog
- Grades

Business applications support registrar and advisor’s review of student eligibility and approval of cross campus enrollments.
A modern enrollment experience with federated authentication has replaced antiquated paper forms.

CCES Ecosystem

CCES has been built on best of breed eco-system with industry leading tools: Salesforce for business applications and Course Ops, CloudHub for integration, AWS for transaction logs, and Canvas for online courses.
Transaction log manager tracks and ensures the integrity of all data sent through CCES. This tool is used by the campuses and CCES technical teams.

Case Management system to track issues between the campuses and ILTI. When transaction errors occur, cases are automatically generated and linked to the transaction manager.