Campus of Applied Sciences and Technology (WSU Tech) requires an all in one platform: Academic Operations Platform that provides a single platform, integration and user experience for administration to cover Academic and Event Scheduling, Curriculum and Catalog Management, and Predictive Analytics & Reporting

Cloud Hosted Saas Platform to include applications and infrastructures to support an intuitive simple user interface that will improve efficiency and increase faculty adoption. The plate form must follow practice that is scalable, reliable and secure. The platform must be supported by dedicated research and development team that incorporates user feedback and regular updates the platform: Details for applications and infrastructure requirements are below

Applications

Overview

Admin Application that is running an Express.js server on the backend and a Vue.js-based JavaScript client application in the browser.

Universal JavaScript applications using Nuxt.js (Node.js backend with client-side Vue.js Application) for our public Catalogs and Events services. Those connect with our main Admin Application through our REST API.

functions-as-a-service services to handle very specific processes like schedule optimizations and PDF generation.

Separation of Concepts & API's

application architecture separates concepts (e.g., user, course, building) from each other, and communication between them relies on a well-defined API to follow the separation of concerns design principle. It is deployed as one service.

heavy-duty tasks, like PDF generation, optimizations, mailers, etc., have their own environments (e.g., in AWS Lambda) or are computed in a background worker.

Data Transfer Protocol

RESTful web services as the data transfer protocol between the system and the SIS.

randomly generated session tokens to identify users, which are sent over HTTPS in every request, so we can ensure that data is only accessible by users with the correct privileges.

session timeouts consistent with industry best practices.

Build Methodologies & Properties

self-contained environment that contains many underlying micro services.

All customer interaction with the product is executed through either a UI interface or HTTPS REST APIs

backend environment is distributed across multiple servers running simultaneously in an auto-scaling environment.

system is failure-tolerant and self-healing with distributed recovery protocols that isolates failures to single servers, and hot-replaces affected servers without causing downtime for end users.
Embedded analytics provide continuous monitoring and real-time error alerting
All code deploys are from versioned objects and are executed after the completion of an agile development cycle

Infrastructure
Overview

Hosted by Amazon Web Services or a similar service in the cloud with secure Virtual Private Cloud with its load balancer on a public subnet and servers hosting its applications on private subnets
Security group rules used on to provide overall network security o

Development, Staging and Production environments are separated via a standalone VPC
Availability of applications
Hosted in multiple zones with dynamic scaling in place which scales in and out depending on the traffic being hit
AWS Services or similar
AWS Route 53- for domain registration and DNS routing

AWS WAF -to protect web applications from a variety of application layer attacks such as cross-site scripting (XSS), SQL injection, and cookie poisoning, among others
AWS CodePipeline -as a continuous delivery service
AWS Elastic beanstalk -to deploy applications
AWS Cloudwatch- to store logs for the applications
AWS S3 is used -backups and artifacts
AWS Elastic-cache Redis -for caching mechanism
AWS secret manager- to store sensitive data like credentials or license key
ACM - to provision, manage, and deploy public and private Secure Sockets Layer/Transport Layer Security (SSL/TLS) certificates for use with AWS services
AWS batch and ECS with Fargate- used for nightly merges
The same or similar third-party tools to provide services
MongoDB Atlas – Used as main database
New Relic – to monitor the performance of our applications and infrastructure, as well as to get insight about the API's transactions

Bugsnag – Used to capture, triage, and solve errors on backend and frontend apps

Uptime Robot – Used to monitor critical applications URL and send alerts in case any go down
PagerDuty – Mapped with different tools like Uptime Robot and New Relic; in the event of any critical issues, concerned team/members are informed.
Circle CI – Used to run the test suites

GitHub – Used to store their code centrally in their private repos

Sync – Performs regular scans of the codebase and can create Pull Requests (PRs) directly in Github.
Terraform – used terraform to build and maintain infrastructure via code

Controlled Access: Role Based Control (RBAC) that can limit functionality by object, field and workflow step by role and on a conditional basis to enforce standard operation procedures. Platform it uses a single login to access all the projects and automatically map roles based on campus SSO (SAML, CAS, MS Active Directory)

Predictive Analytics & reporting: Platform to provide academic reporting and course demand projections and course & section recommendations that consider past enrollment trends new enrollment and current student needs based on their degree requirements and completion pathways. Platform to provide strategic insight into the college curriculum development insights including
*identify where students are stopping in their program progression to leave the institution or change programs and key contributing factors
*surface trend in program level marines to identity opportunities for resource allocation
*review program specific recommendations and easily act on these in the curriculum to impact student outcomes
*Configurable reporting that allows end users to create downloadable reports from any field in the system
*users can build their own reports and PDF's

Forms: Platform to provide drag 7 Drop form builders, with customizable template and custom fields of varying types (dropdowns or text). Able to edit any form questions including dynamic questions, after initial step up without call vendor support or writing code. Smart form fields that can be populated or made visible as a follow - ups to real time to ensure form accuracy to reduce submission errors. Form validation must be configurable

Work Flow: Intuitive no code self -service workflows integrated into all applications to simplify notifications and approval process. Workflow can be routed dynamically according to all fields on the form

Integration: solutions provides a single point real time integration with the SIS. Robust API's to share information with other platforms. Administration Dashboard to configure and manage integration settings

Public Facing Catalog and events - public facing sites should be hosted, institutionally branded mobile optimized SEO compliant and meet ADA and WCAG compliance requirements

Implementation and support: provide dedicated resources for implementation and ongoing support. To include Project Manager, Data Engineer to assist with integrations and data migrations. Must provide training materials and support.

Administrative Requirements

Single vendor that provide integrated services that were created to work together. Curricular changes feed to catalog updates and scheduling for courses with then allows for events to be planned in open times in a single system tightly integrated with the SIS

Must include the following

1. Single implementation to be able to accomplish the setup for the platforms
2. Ensure data integrity is 100% by leveraging self-service emerge dashboard
3. Workflows are 100% integrating to every feature and fully usable without the need for any developers of 3rd party consultants. Workflow work as the off the shelf automation tool for any non-technical end user
4. Configurable report that allows end user to create a downloadable report of each course, program or curriculum field
5. users can build their own reports and PDF's
6. Intuitive and simple user interface - ease of use by faculty
7. Drag and Drop form builder with customizable template and customer fields of varying types. Easily editable forms including dynamic questions after initial set up without need for call to support or to write code
8. Workflows that can be routed according to all fields on the form and maintained by the end user
9. Fully configurable email notifications at each step in the workflow process
10. Mail Merge functionality
11. Role based Access control with phased and future actions that can limit field /object access by role and on a conditional basis

Curriculum Management

The application must encompass the entire life cycle of academic operation. The system must link manage the curriculum through its natural life cycle while connecting to academic and event scheduling, course/program demand analytics and online catalog operations. The system much provide customizable academic reporting modules and processes through a single bi-directional integration with the SIS

Below are the detail requirements for the curriculum aspects of the project

1. Real time SIS bi-directional integration
2. Drag and Drop form builder with customizable template and customer fields of varying types. Easily editable forms including dynamic questions after initial set up without need for call to support or to write code
3. Workflows that can be routed according to all fields on the form and maintained by the end user
4. Include built in decision deadlines, committee functionality and workflow health checks to ensure workflow are not unknowingly broken or bottlenecked
5. SMART form fields that can be dynamically populated or made visible as follow ups in real time to ensure form accuracy and reduce submission errors

6. Role based access control that can limit functionality by object, field and work flow step by role add on a conditional basis to enforce standard operating procedures
7. Ability to easily generate curriculum meeting agendas with relevant proposals
8. Ability for curriculum committees to vote to be recorded electronically
9. Fully configurable email notifications at each step in the workflow process
10. Mail Merge functionality
11. Flexible degree map builder with auto calculation of credits and mobile friendly display for student, ability to integrate with degree audit processes and systems.
12. Built in pre-requisite program requirement course requisites builder
13. Ability to import from Degree works Scribe system
14. Full integration between scheduling, curriculum and catalog that is predicated on effective dates and includes the ability to edit curriculum at any given point in time (past, present and future) without compromising business processes or necessarily publishing information to students
15. Configurable reporting that allows end users to create a downloadable report for each course, program or curriculum field.
16. Ability for the user to build their own reports and PDF's - not restricted to preprogrammed reports
17. Intuitive, simple interface to ensure ease of adoption
18. Robust Approval process that is easy to set up and maintain
19. Visual Dashboard with customized role-based access control. The dashboard must provide easily readable and observable indication of where each item is in the approval process and which steps are left to be completed
20. Workflow must be easy to use/create/replicate (drop and drag)
21. Page specific audit trains with the ability to report on any individual change across the platform
22. Ability to create custom data objects such as learning experiences, policies and track them in the application without specialized customizations
23. Support an unlimited number of general use case forms and workflow for other use cases including policy management, articulation and major change requests
24. Flexible data model and automatically validated form files the tallow for catalog data fields and supplemental materials to be captured on any curriculum proposal
25. API that are robust enough (industry standard) to send and receive information from other platforms
26. Ability to visually highlight dependencies and requirements between courses and programs
27. Immediate ability to see impact of curricular change will have on courses and programs

Catalog Management

Over the catalog Management section must: create, organize and publish institution branded, student centric course catalogs and handbooks and campus policies online and in real time. The system must have the ability to make a change in one pace and have it updated throughout the system. The catalog feature much have curriculum data at its core, so the course catalog becomes the college communities' single source of truth for academic planning including accreditation documentation

Below are the detail requirements for the catalog aspects of the project

1. Real time SIS bi-directional integration
2. Full integration between scheduling, curriculum and catalog that is predicated on effective dates and includes the ability to edit curriculum at any given point in time (past, present and future) without compromising business processes or necessarily publishing information to students
3. Curriculum module provides the source of truth for the curricular content published in the online catalog
4. Catalog should allow prospective and current students to easily search for courses and programs by course/program name, general interest, and/or desired career path based on tags applied to the curriculum
5. Catalog should be a cloud-based online, mobile optimized and meet ADA and WCAG compliance requirements
6. Easily customizable to match the institutions website design
7. Ability to update the design of the catalog without hard coding
8. Catalog can be downloaded and printed in PDF form
9. Catalog page templates that can dynamically hide and or populate information based on criteria specific to the course or program being displayed
10. Catalog page can be assigned on term by term basis (information in summer can be different from what is displayed for Fall and summer)
11. Support multiple catalogs and allow for custom filter to decide what courses, programs policies or any other data objects are automatically updated in the online catalog
12. Ability to manage an unlimited number of handbooks for students, faculty, policies, other custom content to be created and published alongside the course catalog
13. Full class scheduling & Room optimization abilities native to the application to enable one application that integrates with course catalog and class schedule in the SIS without the need to have multiple integrations or vendors
14. Page specific audit trails and ability to report on any individual change across the platform
15. Flexible data model that allows for new schools/colleges. Departments and attachments to be easily added without contacting vendor support
16. API that are robust enough (industry standard) to send and receive information from other platforms

Academic and Event Scheduling

The system must have the ability to overlay academic and event scheduling for a holistic integrated view of campus space utilization and availability. Within academic scheduling the system should have the ability to enforce section scheduling policies, streamline departmental scheduling workflows project demand and optimize rooms in one platform. For events the system must streamline the event request process with configurable forms manage risk and communication with automatic notification approval and promote events in one platform.

Below are the detail requirements for the academic and event scheduling aspects of the project

1. Real time SIS bi-directional integration
2. Role based access control with phases and future actions that can limit field/object access by role and on a conditional basis to enforce standard operation procedures
3. Flexible rule enforcement to accommodate unlimited course/section relationships with ability for users to add new relationships such as cross-listed, non-overlapping, same day/time, different day/time, same room and others
4. Ability to dynamically collect faculty/program leadership preference on a wide range of factors (meeting time, unavailable, preferred course duration, back to back spaces, room preferences room feature needs preferred building, preferred room size course preferences and incorporate all other into section scheduling model
5. Option to run section scheduling optimization where sections are automatically assigned best fit time slots
6. Entirety of the course scheduling process can be managed without manually updating the SIS
7. Ability to tie final exam meeting patterns to academic/meeting pattern blocks
8. Robust reporting on enrollments, registration, time and space utilization, faculty satisfaction that is both native to the scheduling platform and interactive
9. Ability for users to tailor reports, filter, add/remove as needed.
10. Reports should be exportable as CSV format
11. Flexible data model for rooms sections and instructors that can sync bi directionally with the SIIS
12. Data model must not require custom code to define customer field on object and to integrate with the SIS
13. Out of the box prime time restriction rules (meeting pattern rules)
14. Page specific auditable trails and ability to report on any individual change across the platform
15. Change request workflows that can be routed dynamically according to all fields on the form and maintained entirely by the end users with reliance on vendor for support/customization
16. Ability to overlay academic schedule and even schedule for a holistic integrated view of campus space utilization
17. drop and drag form builder with easily customizable event room and resource templates and customer fields of multiple types. Easily able to edit any form questions, including dynamic questions after initial setup without requiring customer support or writing code
18. Workflows that can be routed dynamically for events according to all fields on the form and maintained entire by the end users
19. Robust API to send and receive information to their platforms

Reports and Demand Projections

Provide actionable course demand projections & pathway completion analyst ices to support on-time completions and operational efficiency.

Curriculum projections & Recommendations Requirements

1. Provide Audit projections to provide insight on student demand for programs and courses
2. Provide insight on pathways to graduation
3. Identify course combinations that will create barriers to student completion
4. Ability to utilize software to identify program completion barriers
5. Provide historical demand (number of seats and enrollment0 overall
6. provide historical demand (number of seats and enrollment) by course
7. Course demand projections for upcoming term
8. Provide data on number of sections needed for ensure all students meet graduation requirements on time
9. Provide insights on overfilled sections
10. Provide insights on underfilled sections
11. Identify opportunities to consolidate sections
12. Provide recommendations to add or remove sections at locations/times to fill student demand
13. Direct links from recommendations to scheduling to ensure immediate actions
14. Provide data on tuition revenue, instructor cost, margin by section and program
15. Effective Space utilization - projections by capacity
16. Effective faculty utilization across programs and courses
17. Matching Faculty to course facilitation requirements

Assessment

Unified Assessment Planning which provides centralized repository for all course and program outcomes and all assessment data. This software must integrate with the curriculum software to provide guidance on meeting institutional goals at course and programs level

Assessment Requirements

1. Software must have the ability to be the Learning outcomes Repository at course and program levels
2. Automated connection between learning outcomes and assessment data
3. Storage solution for Assessment data in centralized software
4. LMS integration with Canvas to provide easy import of assessment data
5. Automated Data Collection to include learning outcomes and curriculum maps to courses and programs
6. Configurable reporting that allows end users to create a downloadable report for each course, program or curriculum field.
7. Intuitive, simple interface to ensure ease of adoption
8. Visual Dashboard with customized role-based access control. The dashboard must provide easily readable and observable indication of progress of each assessment plan
9. Dashboard that monitors assessment plan progress in real time
10. Fully configurable email notifications at each step in the workflow process