

W UW ECE Degree Progress

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INTRODUCTION

Build a web application to help ECE undergraduate students to check their degree process, plan their courses and career paths (Software Engineers, Hardware Engineers or Control Engineers etc.).

- The functionalities of this web application includes:
 - Undergraduate students could login with their UW NetID.
 - Students can monitor their academic information. Data shown in a visualized pie chart that is easy enough to read.
 - The system display the major and program requirements with status.
 - Students could make their own courses plan with the career path function. The career path function is the way to lead the students to their future career

USE CASES

- Students could login with their UW NetID and the profile page could show the courses via pie diagram.
- To be specific, the Degree Progress page would show the details courses with the taken credits.
- The career path page would show the topological relation between the current and the pre-courses under each career.
- The courses are shown with different color to note the already taken, taking or have not taken.
- Students could access to our website via multi-device, such as iPhone, iPad or iMac

SYSTEM DESIGN

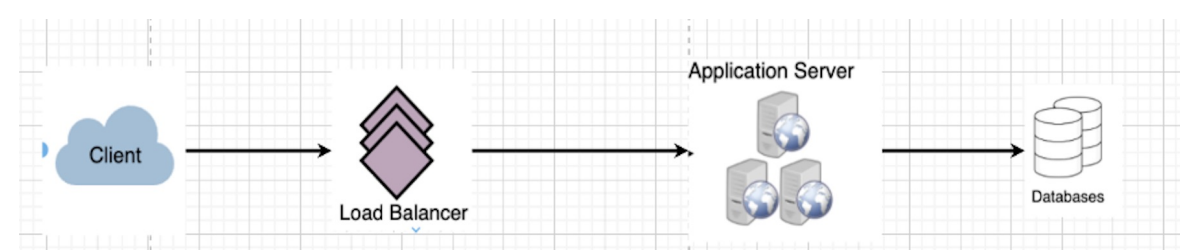


Figure 1: High level System Design

- Security
 - Clients communication with servers through HTTPS protocol.
 - Sensitive data should be well control, only access by owner.
 - Service and Sensitive data should under the protection of UW IT.
- Availability
 - 99% SLA
 - User friendly, access from Mobile, PC and Pad
- Reliability
 - Data show correctly and store in relation database.
 - Latency is accepted but no more than 5mins
- Scalability
 - All interface are stateless
 - All Load balancer and Application servers support Horizontal scaling

IMPLEMENTATION

FRONT-END

- Designed the front-end pages with profile page, degree progress page and career path so that the student could access via different device. Also, the front-end pages are implemented by bootstrap framework.

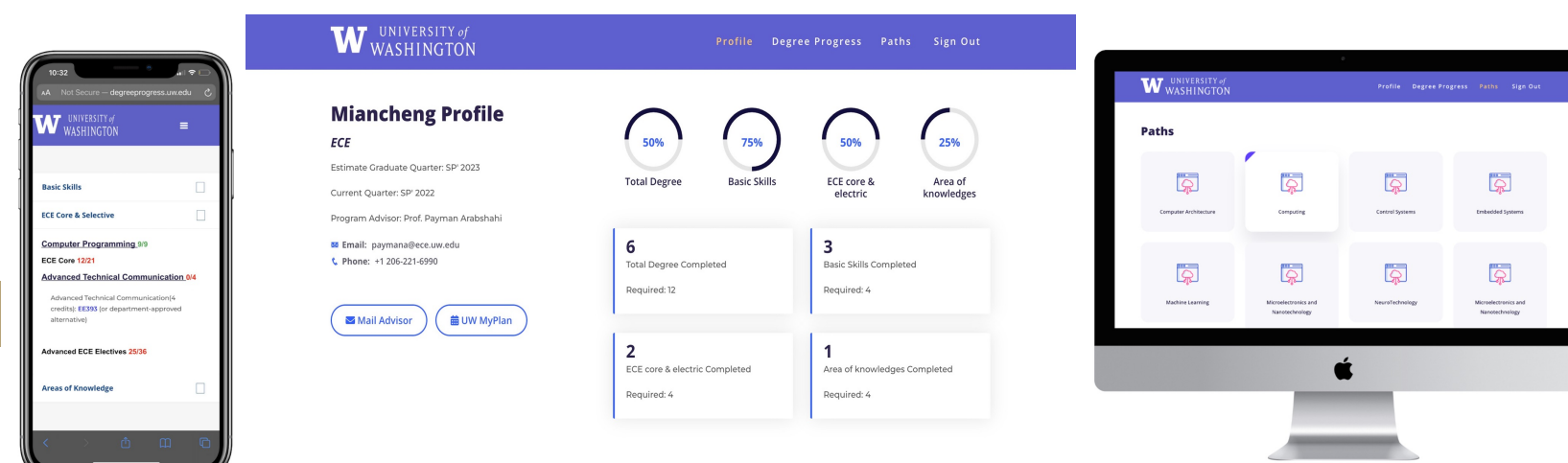


Figure 2: Front-End pages with profile, degree progress and career path via different device

BACK-END

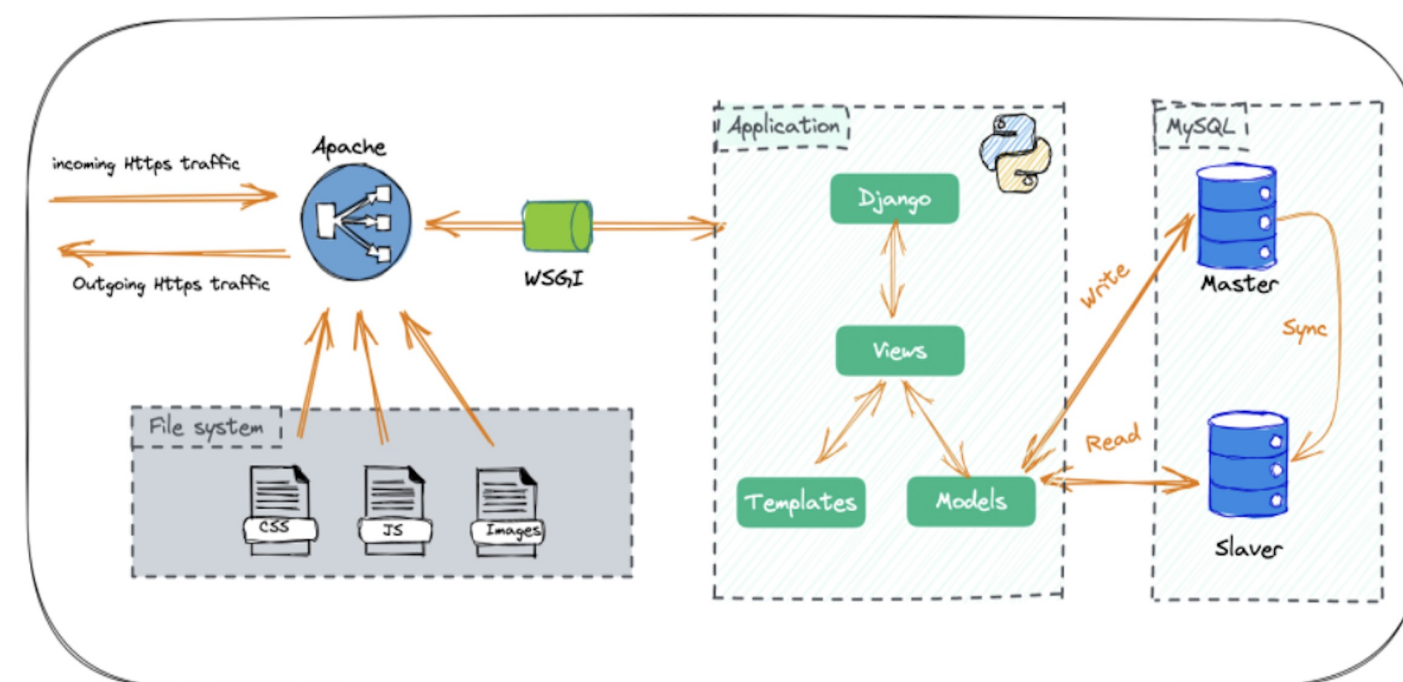


Figure 3: System Architecture

- API is written using Django MTV pattern.
- API are response in JSON and HTML.
- Data are transport in HTTPS protocol.
- Hosted on UW Standard Host Server.
- Apache as Load balancer and host Django Application servers using WSGI
- Sensitive data are protected by UW NetID and SAML2.0 protocol
- API documentation is automatically management by swagger
- Data are stored in MySQL cluster. Writing data to master and reading from slavers
- Static resource(HTML, JS, CSS) are upload to CDN for access acceleration.

OPENSOURCE TECH



Figure 4: Main Programming Languages, Tools and Libraries

FUTURE DEVELOPMENT

Some of the functions would be developed that the student could have a better use for their degree progress.

- Multi-stage expansion to show the pre-courses and future courses, which could have an overall view with the career paths.
- Multilevel cache solution can be used to improve the website performance.
- Advisors could login with UW NetID to manage students' degree progress and know their career plan.
- Sync student data from UW database.

CONCLUSION

Our Team's conclusion:

- This website are designed to be friendly access from all devices.
- The website is running under the uw.edu domain, hosting on UW servers and authenticate by UW NetID
- Students can have an overview of their degree progress visually and explore different career paths on our website.
- All components of the website are built by opensource technologies. Easy to maintain and develop.
- Our implement put the security first and meet the requirement of availability, reliability and scalability.

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