# SI Attendance Management

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### What is Supplemental Instruction (SI)?

- Internationally recognized academic support program
- Hold study sessions to help students currently in the class find success
- Sessions lead by student leaders.

In order to receive their funding the organization needs to present data to show that Supplemental Instruction improves students' grades. This is done by collecting SI session attendance data for each student and pairing that with their academic success in the given class.

### **Current Attendance Process**

- 1. ISU Attendance Tracking (A-Track)
- 2. Swipr app (also developed by ISU Web Dev)
- 3. Download .csv file from A-Track
  - a. Optional method: Pen and Paper
- 4. Download Excel file from CyBox
- 5. Manual data Transfer
- 6. Upload new copy to CyBox

	Α	В	С	D	E	F	G
1	First Name	Last Name	Email	Proctor	Check In Date	Check In Time	Method
2	George	Southwick	leos@iastate.edu	leos	09 Nov 2016	3:49 PM	Manual Entry
3	Matthew	Ackerman	mattack@iastate.edu	leos	09 Nov 2016	3:49 PM	Manual Entry
4	David	Lowry	dlowry@iastate.edu	leos	09 Nov 2016	3:49 PM	Manual Entry
5	Jonathan	Haut	jhaut@iastate.edu	leos	09 Nov 2016	3:49 PM	Manual Entry

### **Problem Statement**

SI's current attendance process consists of using an out-of-date application, primarily on mobile devices for which it is not tailored. Leaders also have to take part in a tedious and time-consuming data transfer task from one Excel file to another on a weekly basis.

### Goals

- Make the entire attendance process more efficient for SI
  - Easy-to-use web app
  - Mobile-friendly
  - Automated data transfer to CyBox
  - Significantly decrease time Student Leaders spend on this process

# Requirements

### **Functional Requirements**

- Authenticated user accounts
- Utilize A-Track API for creation of SI Sessions
- Display all events related to proctor only on their homepage
  - Sessions categorized by Upcoming, Completed, Processed
- Check-in students using both the Swipr App and manually
- Create event from home page
- Attendance data processed automatically in CyBox
- Completely Mobile Friendly

### **Non-Functional Requirements**

- Speed up the data transfer
  - When using our solution, the time to transfer the data from A-Track to CyBox needs to be significantly faster.
- No installs
  - SI leaders do not need to install any new programs onto their computers.
  - SI leaders do not need to download any excel files locally, all handled via the website
- Security
  - Due to the sensitivity of the data we will need to be accessing and storing all data in a secure fashion
- Scalability
  - The solution needs to work for all different SI courses, not just one
  - Needs to be able to handle the addition of new SI courses
- Usability
  - The user interface is easy to operate and very intuitive even for non-tech savvy SI leaders
  - Any SI leader can operate the site with minimal assistance

# Design Process

### Laravel

#### • Overview

- MVC
- Customizable (packages, framework)
- Excellent Documentation and Support.

#### • Services Supported

- Routing
- Middleware (CSRF, Auth)
- Illuminate DB
- Queues
- o Jobs
- Notifications (Toastr package)

### Queues, Jobs, and Broadcasting

- Database driven queue
- Worker implementation (Supervisor)
- Jobs
  - Process
  - Broadcast
- Notification
  - Private, Authenticated Channels (sockets)
  - Laravel-Echo listener (javascript)
    - Toastr



### Shibboleth

#### Issues

- 1. Site not secure
- 2. Browser fail on redirects
- 3. Encrypted Data
- 4. Infinite redirects but no crash
- 5. Handling the data

#### Mitigations

- 1. Obtained proper Certs
- 2. Modified Apache Configuration fails
- 3. Modified where we were looking for the data, lots of SAML tracing
- 4. Modified Shibboleth Configuration files
- 5. Laravel routes to handle data



### Navigation flow of the web application



### Python Excel/CyBox API

- OpenPyXL
  - Library for manipulating Excel files
  - Manipulates cells and style data
  - Maintained in part by professional programmers
- CyBox API
  - Download and upload files
  - Requires:
    - Client secret
    - Client ID
    - OAuth access token
  - OAuth tokens expire
  - Cron Job updates OAuth tokens hourly

### Flow of the python process



### Mobile Friendly Design

- Bootstrap
- Dynamic Tables
- Different colored notifications
- ISU Color Scheme
- Concise interface and buttons



### Failed Design - Exceljs

- Original solution for manipulating Excel files
- Exceljs smaller than OpenPyXL
- Node good for asynchronous I/O
- We don't need asynchronous I/O
- No advantages over Python
- No formulas or formatting without modifying the source code

### Failed Design - Plain PHP

- Unorganized code
- Code not commented enough
- Transferring ownership would be very difficult
- Excessive work to implement new functions

### Failed Design - Tablesorter Library

- Originally worked really well for HTML tables
- Eventually we switched our index page to Vue divs for mobile friendliness
- Decided to implement the search functionality instead of sorting



### **User Testing**

Test Environment

- Separate test database schema
- Tested by eight current SI Student Leaders
- Feedback at meetings with the leaders every two weeks
- Gather feedback/suggestions
- Make changes

### **Testing Results**

- Bugs Found
  - Excel formatting issue
  - Login issues
  - Various hard-coding errors
- Additional Ideas
  - Random Student Name Generator
  - Additional page to display attendance data analytics

## Demo