

## **Project Calendar Documentation**

CP476 Final Project

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Project Calendar is a tool meant for groups to land on a meeting time, as we feel that the task can get difficult with large groups using only instant messaging services. It allows for users to create and join groups, and within these groups they get to display times that they are available for meetings. The member who created the group can then finalize a group meeting time and place and send calendar events to everyone in the group. This concept requires the use of various web technologies to fully realize, as the website needs to be reactive, responsive, and allow on-the-fly changes that are reflected in each group member's view. Our main tools were JQuery, AJAX, Bootstrap, Google Maps Javascript API, and Google Calendar API. While a similar website exists, Doodle, Project Calendar still contains a unique approach to the concept that both we and they share. However, due to time restrictions and some issues with Google's APIs, some features fell short. Despite this, Project Calendar still offers the experience one would need to accomplish their task.

Project Calendar is accessible at: [Hopper.wlu.ca/~boul9440/CP476project](http://Hopper.wlu.ca/~boul9440/CP476project)

## Technologies used

### JQuery

Most of the JavaScript was written with JQuery as it allowed for easy and simple processing of forms, as well as allowed us to better work with AJAX. Every form in the application is validated with JQuery, and the entire group schedule time picker page is formatted and handled with JQuery functions. Everyone in the group had experience with JQuery both in personal use and in the course, which simplified our choosing process. We chose JQuery

because of this experience, as well as the fact that we needed to use AJAX to make the site reactive, and AJAX is easiest to use through JQuery. The synergy of the two tools was impossible to pass up.

## AJAX

AJAX was the most important tool we used for Project Calendar. It facilitated the basic functions of the website and allowed us to make the group schedule time picker reactive, which we felt was the core of the site. Every time a cell is clicked on, a new request is sent to the website and immediately added to the database, which is subsequently available for viewing on other group members' machines. AJAX also allowed users to pick multiple cells without having to reload the page. Additionally, the message center and live chat for groups relied on AJAX calls to update for every user without them having to reload the page. Otherwise, these features would be useless as the chat would not be live. It also allowed for asynchronous validation and sanitization when used alongside JQuery. This, along with JQuery allowed the site to be as reactive as it was, which helped realize the vision of the application.

Everyone in the group had experience with AJAX, both inside and outside of the course so it was not a difficult task to complete. Both this fact and the multitude of uses mentioned previously, it was an obvious choice for us to pick this tool. It would require too much time, effort, and extra learning to try to implement all the features of the site without the use of AJAX, and we felt there is no sense in reinventing the wheel, especially because we would not be able to achieve the same level of efficiency and ease of use AJAX offers.

## Bootstrap

We feel an important part of the application is its ease of use, and a large part of that is having good formatting and UI. Bootstrap is a framework used to help keep websites reactive to user input, and it allows for an easier time making parts of the page look pleasant. We used bootstrap in every page as it allowed us to speed up the process of creating nice and friendly-looking pages. It also assisted us in the creation of a navigation bar on the top of every page on the website, making the entire application feel more cohesive and allowing the user to navigate to any page they wanted easily. Of course, everyone in the group had experience with bootstrap before and during the course, which greatly influenced our decision to use it. Since we already had learned how to use it, we didn't have to spend too much time to learn how it worked, which allowed us to better spend our time on completing the core functionalities of the application.

## Google Maps Javascript API

For Project Calendar, we used Google Maps as one of our APIs in order for groups to pick a meeting place alongside their meeting time. Our main purpose was to visualize latitude and longitude values within the map view and to add the location as an address in the Google Calendar event associated with the meeting. However, this latter feature could not have been completed for reasons explained in the "challenging hurdles" section. We went with Google Maps because of its ease of use, wealth of features, and ubiquity. Google simply has the most map data, has the cleanest visualization, and is willing to let anyone use it. One of the members of our group had some experience with it, which is another reason we decided to use it, but we all had to take some time to learn how to implement it as most of us had never used it before.

Additionally, it would be a good choice if Project Calendar was a real product, as it is a tool everyone is familiar with.

## Google Calendar API

Our second API was Google Calendar. We felt creating reminders in the form of calendar events was necessary, as it cemented the finalized meeting times and gives the user a tangible result from their use of the application. Implementation included finalized times being fetched from the database and used as “start” and “end” times for the meetings, as well as the day it took place. The emails of those in the group were also grabbed and added as attendances, so everyone in the group had the event added to their calendars. We decided to use Google Calendar as we had decided to use Google Maps, and thought that using an API from the same company would allow for easier use and time saved. Additionally, we thought our Google Maps implementation could provide useful data to add to our Google Calendar implementation, and that there would be value in this synergy. However, we were wrong again as outlined in the “challenging hurdles” section. None of us had any experience with the Google Calendar, or using two separate external APIs in the same project, so we had to spend a lot of time learning how it worked, and how to solve all the problems we ran into. Despite that, we still think Google Calendar is the best choice as it is also ubiquitous like Google Maps, we feel it is even more widely used than Outlook, which would have been our second choice.

## PHP Data Objects (PDO)

PDO is a database connection library built into PHP since version 5.1. It provides a consistent interface for accessing databases in PHP. Its functionality is similar to the very

popular MySQL or MySQLi extensions that are already widely used, however, PDO being a more modern extension is easier to configure and use.

## A Similar Tool: Doodle

<https://doodle.com/>

There exists a product named Doodle which serves a similar purpose to Project Calendar. A user can create a group, add members to the group, and schedule meetings when the members are available. The main difference is in the approach; the creator/leader of the group suggests a set of times and the other group members vote on these times, the time that the meeting is scheduled on is the one that gets the most votes. Another large difference is that there are more options than scheduling events, such as creating polls and 1:1 personal get-togethers. While Doodle embeds its own calendar into the site, both Doodle and Project Calendar use Google Calendar integration. However, Doodle is a paid service that requires a yearly subscription of \$49 or \$69 depending on what version of the product you want.

## Missing Features

There are some features that would more fully realize the potential of Project Calendar that we could not implement due to non-time related restrictions, like the ability to add the meeting location to the Google Calendar events generated by the site. This would require a reverse geocoder API to translate the latitude and longitude values from the Google Maps API into an address, and Google charges for that as part of their suite of premium APIs. We felt that raw latitude and longitude values as the location in the event was useless information, as an end user probably would not know what to do with such information.

However, a feature that would have been implemented if given enough time would be to allow the creation of supergroups and subgroups. This would allow hierarchical organization of groups within groups and would not have needed a substantial amount of work as it seemingly would have needed one extra table in the database (to see which groups belong to which group) and another PHP/HTML/JS page. This would allow groups to split up into smaller teams if needed and would allow for groups to merge with other groups if two teams were coming together. With Project Calendar in its current state, the user can still create groups like this, but this new feature would have added a much easier way to organize these types of groups and teams. With even more time, this idea could eventually evolve into having organizations, with super users able to be admin of multiple groups and other such features. Other smaller features such as polling for meeting locations by group members, and multiple meeting times per group would also be welcome additions.

## Challenging Hurdles

The most time-consuming tasks in projects are usually tasks that require the learning and experiencing of a new tool or technology that you have not used previously. While we had seen Bootstrap, JQuery, AJAX, etc. in other projects and in class, it was not difficult to realize our idea using them. The idea was also conceptually simple enough that once we came to an agreement for what it would be, the development was just following through. However, we ran into multiple hiccups with implementing the Google Maps and Google Calendar APIs.

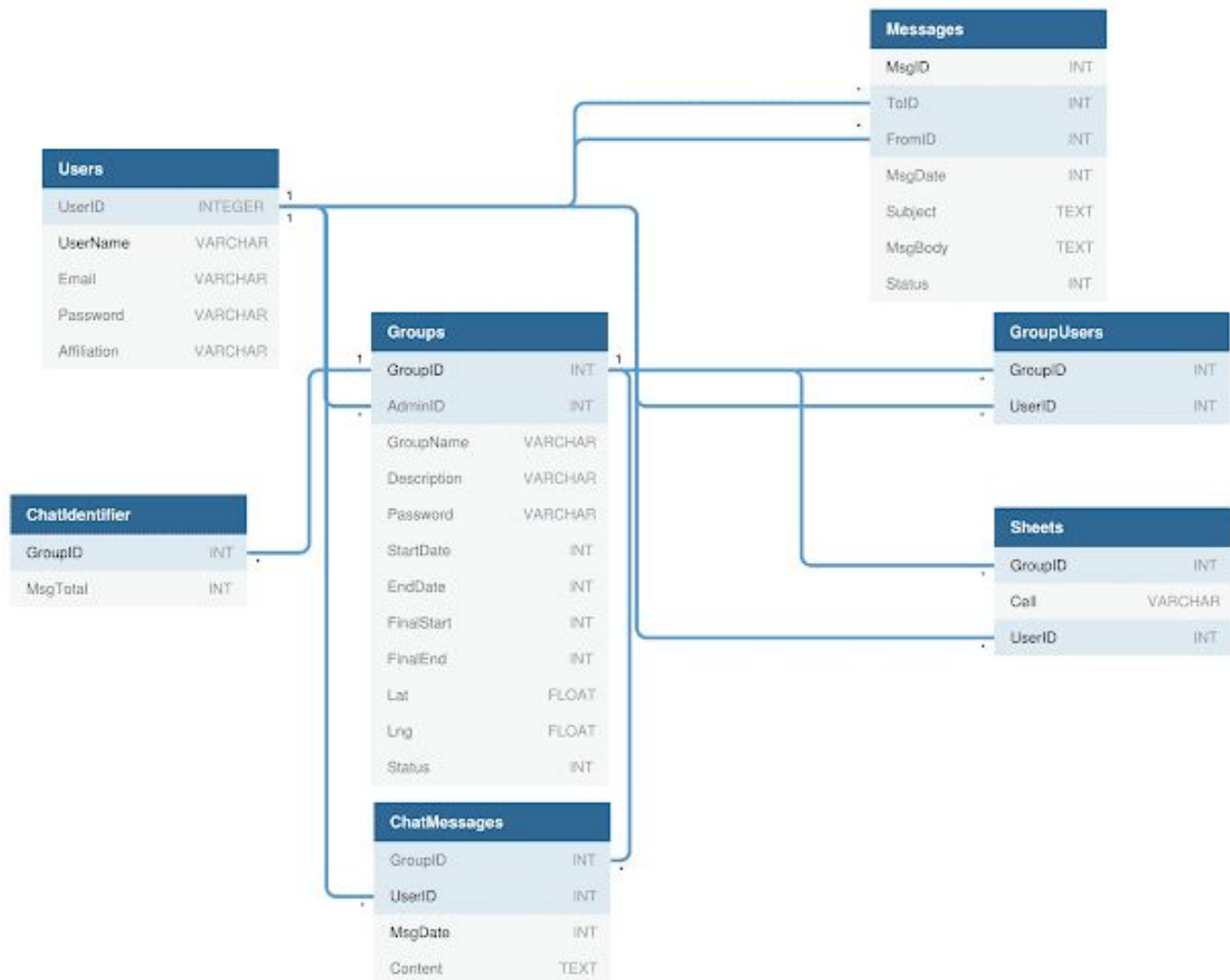
Google likes to structure their APIs in a developer console online, and requires security in the form of API keys and authentication tokens (OAuth). In order to learn how to use the APIs, we first had to learn about that. Putting more than one API key in the same project, especially if they're from different Google accounts, can be finicky as they have to be sent by

the same async defer JavaScript command, which took a long time to find out how to do.

Another issue was the OAuth certification for the site. Firstly, the SSL certification was signed for a virtual host (“project.calendar”) on our machines. It was mapped to localhost, but while Google can manage localhost, it has a problem with virtual hosts, and we had to scour the web to find out a solution in order to get it to work. The solution was non-trivial, and required us to put a “JUMP” in the URL on the Google Console. Additionally, “hopper.wlu.ca” is not a valid URL to authenticate, so the API will not work on the site hosted on hopper. Unfortunately, we did not find a solution to this problem.

## Database Design

The following diagram is an ER diagram illustrating the structure of the database.





# How to use Project Calendar

## Login / Signup

When using the site for the first time, users are required to sign up. Simply enter in the required information to create your account. Users that have already created an account can login using the login page.

## Account Page

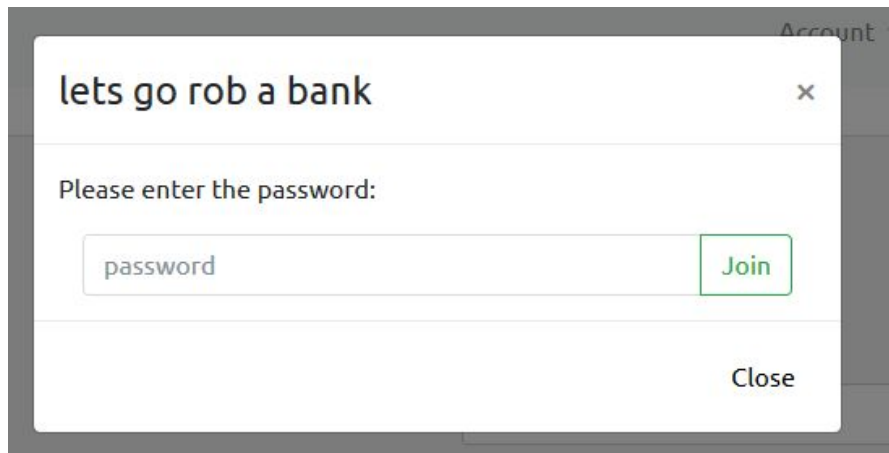
After logging in, users are redirected to their account page. From here, the user can view their account information, as well as change their email or affiliation should they feel the need. Central to this page however is the Group List. Users can see each group they are a member of. Users can delete groups they have created or exit those that they have joined. Additionally, users can view the group by clicking on the View Contents button.

| Account Details |             |                                     |                                       |  |
|-----------------|-------------|-------------------------------------|---------------------------------------|--|
| Username:       | Lucas       |                                     |                                       |  |
| Email:          | lsdf@dfg.ca | <input type="text" value="update"/> | <input type="button" value="Update"/> |  |
| Affiliation:    | WLU         | <input type="text" value="update"/> | <input type="button" value="Update"/> |  |

| Your Current Groups |                   |             |            |  |
|---------------------|-------------------|-------------|------------|--|
| Group Name:         | Description:      | Start Date: | End Date:  | <input type="button" value="View Contents"/> |
| lets go rob a bank  | when shall we go? | 2019/12/31  | 2020/01/07 | <input type="button" value="Delete Group"/>  |

## Group Search

Users can search for groups they would like to join from either the search bar in the header or from the Join Groups page, also accessible through the header. Results will be matched on both the name of the group as well as the group admin username, so that the user can search by either. Users must enter the correct group password when joining a group.



Additionally, users can create a group by clicking the Create New Group button on the Join Groups page. After filling out the required information, users are redirected to their new group page. **Note:** most test groups in the database can be accessed using the password “password”.

## Group View Page

On the Group View, users are presented with their schedule time sheet. By clicking on individual cells, users can indicate when they are available or not for the group. Each cell additionally indicates how many users in the group are also available for that specific time slot. To the right is an additional section, displaying all users that are available for the last selected time slot. Also visible is the group’s live chat, where users are able to message each other regarding specifics of the group.

## lets go rob a bank

Select when you are available:

|         | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Monday |
|---------|---------|-----------|----------|--------|----------|--------|--------|
| 8:00AM  | 2 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 8:30AM  | 1 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 9:00AM  | 1 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 9:30AM  | 1 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 10:00AM | 1 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 10:30AM | 1 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 11:00AM | 0 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 11:30AM | 0 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 12:00PM | 0 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |
| 12:30PM | 0 of 2  | 0 of 2    | 0 of 2   | 0 of 2 | 0 of 2   | 0 of 2 | 0 of 2 |

Finalize Times

Create Google Calendar Event

Last Selected Time:  
Tuesday, 10:30AM

The following users  
(1 of 2) have  
selected this time:

Lucas

Friday March 29th 11:57 AM  
sdfkj

Lucas

Friday March 29th 11:57 AM  
skdfjhsfkThskdjfhs

Lucas

Friday March 29th 11:57 AM  
ksdjkdjfh

sdfsdf

Friday 29th of March 2019 11:58  
asdasd

Lucas

Friday March 29th 11:58 AM  
asd

Type your message here...

Send

Below this section is the Google Map displaying the location selected for the group. The admin of the group has the ability to change the group's location, while other members can only view it. Group admins also have the ability to finalize the group time by clicking the Finalize Time button. The finalization page is similar to the group page, but only accessible to the group admin. The admin will select a final group time for the group. Time slots that are light grey are times that have been selected by at least one group member while dark grey times are times selected by all group members. The final tie selected by the admin will be green.

Finalize your group times:

|         | Apr 30 | May 1  | May 2  |
|---------|--------|--------|--------|
| 8:00AM  | 1 of 2 | 0 of 2 | 0 of 2 |
| 8:30AM  | 1 of 2 | 0 of 2 | 0 of 2 |
| 9:00AM  | 1 of 2 | 0 of 2 | 0 of 2 |
| 9:30AM  | 2 of 2 | 0 of 2 | 0 of 2 |
| 10:00AM | 2 of 2 | 0 of 2 | 0 of 2 |
| 10:30AM | 2 of 2 | 0 of 2 | 0 of 2 |
| 11:00AM | 2 of 2 | 0 of 2 | 0 of 2 |
| 11:30AM | 2 of 2 | 0 of 2 | 0 of 2 |
| 12:00PM | 1 of 2 | 0 of 2 | 0 of 2 |
| 12:30PM | 1 of 2 | 0 of 2 | 0 of 2 |

Normally, the admin will be able to push the calendar as event to all group member's Google Calendar, but that functionality, as mentioned above, does not work on hopper.wlu.ca. When using hopper.wlu.ca, the admin must click the Submit Time button to submit, then the Return button to return to the group page. Once the group times have been finalized, the group page will display those times. The group admin has the ability to finalize these times as many times as they want, allowing for changes to be made in the event.

### test group #2

Group Meeting has been finalized:

From Tuesday April 30th 2019 10:00AM to Tuesday April 30th 2019 12:30PM

If you have not received a google calendar event, it is likely the Group Admin has yet to push it to google. Message the Group Admin (Lucas) as soon as possible to fix.

Finalize Group Time

NotLuc

Monday 8th of April 2019 03:47

Chatting

Type your message here... Send

## Direct Messages

Users have the ability to directly message any user that they know the username of. Simply enter the Message Centre and create a new message. Messages are also sent from the system to each user for important system messages, such as deleting, exiting, or finalizing a group you are a member of.

Message Centre

Create new message

Calendar - Group Finalized!

The group "test group #2" has been finalized. Check your google calendar and the group page for details. If you do not see anything in your google calendar, contact your group admin ASAP.

Monday 8th of April 2019 03:53:28 PM

Delete