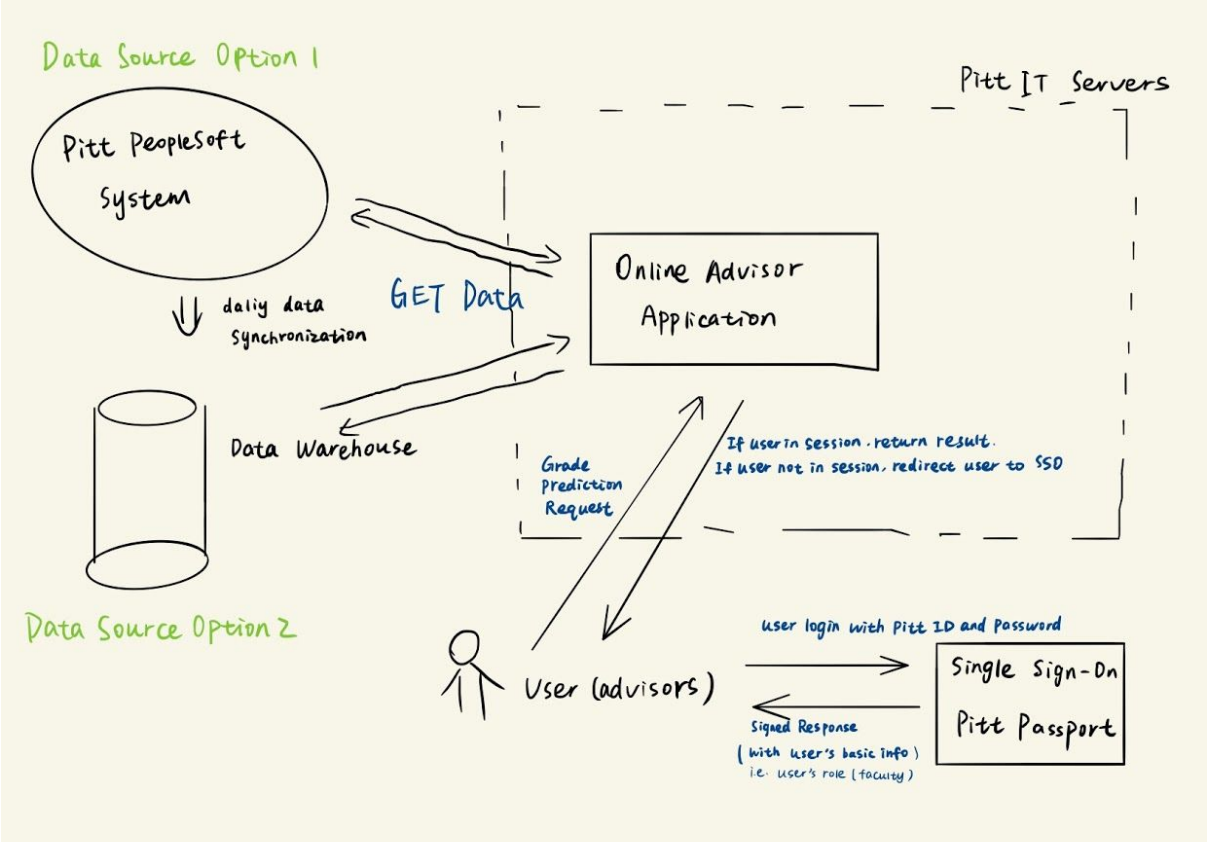
Pitt CS Online Advisor Proposal

Pitt CS online advisor is a web application that will provide similar student history exploration based on a student's current transcript. The application will provide features to CS advisors and students. It is able to help advisors to recommend courses and give performance estimation for students. In the future, we also want to be able to automatically examine a professor's courses so that they can make improvements. Eventually, students could also use it to find out the most suitable course sections and how likely they will do well, during the course registration period.

The current tool we are developing will help CS advisors in suggesting courses for students. It will match a student's transcript with all previous students' and generate estimated grades on all upcoming courses for the student. It will show the results in a designed UI so that gives the advisors an insight of which courses can be suggested to the students.

On the current stage, the application is deployed to each advisor's local machine. In the next stage, we want to deploy it to Pitt IT servers and provide web access to the users. This will promise that all users are using up-to-date data and be more convenient to use. We want to integrate with University's Single Sign-on System (Pitt Passport) for user authentication and University's Data Warehouse for student's grade history data. A basic workflow for the application to process a request is shown in the following diagram.

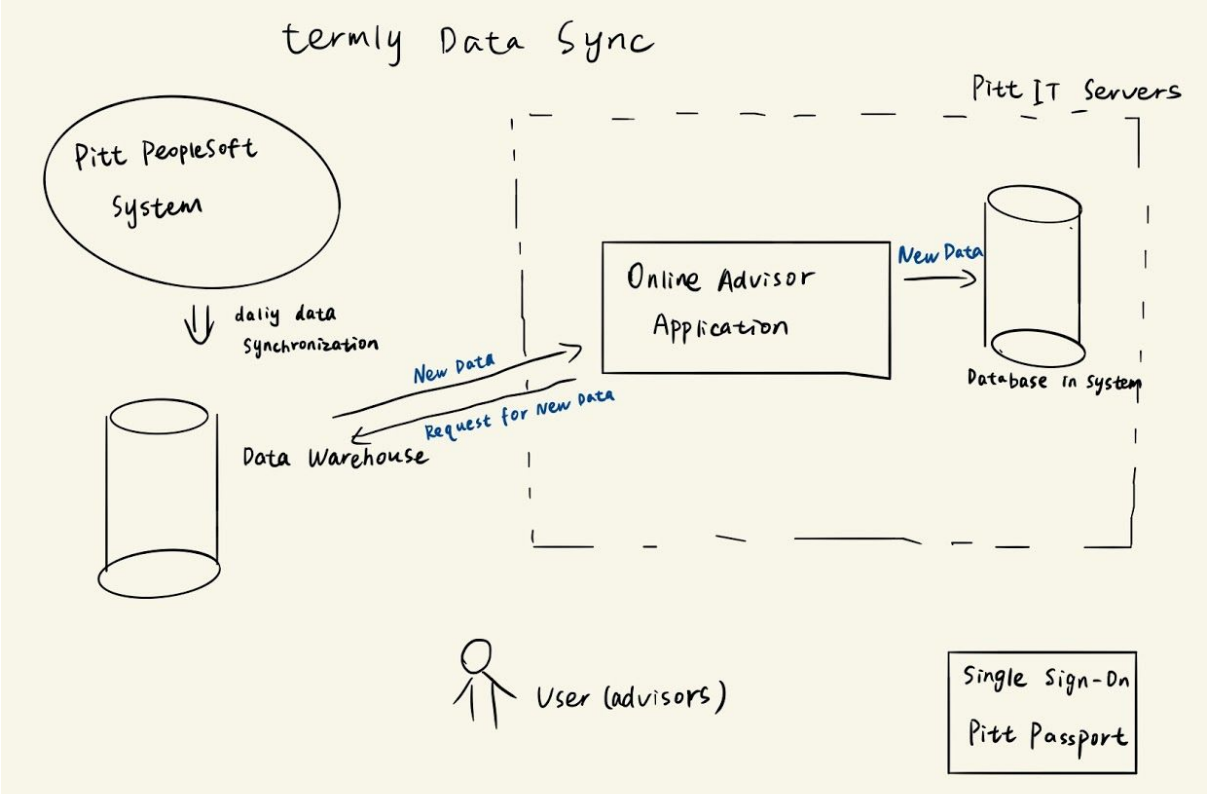


University's PeopleSoft system and Data Warehouse could both be the data source of the application. The University Data Warehouse is the central authoritative data source for the

University, and it synchronizes with the PeopleSoft system on a daily basis. Integration with either of them is possible, and we could talk to the IT department to make the decision.

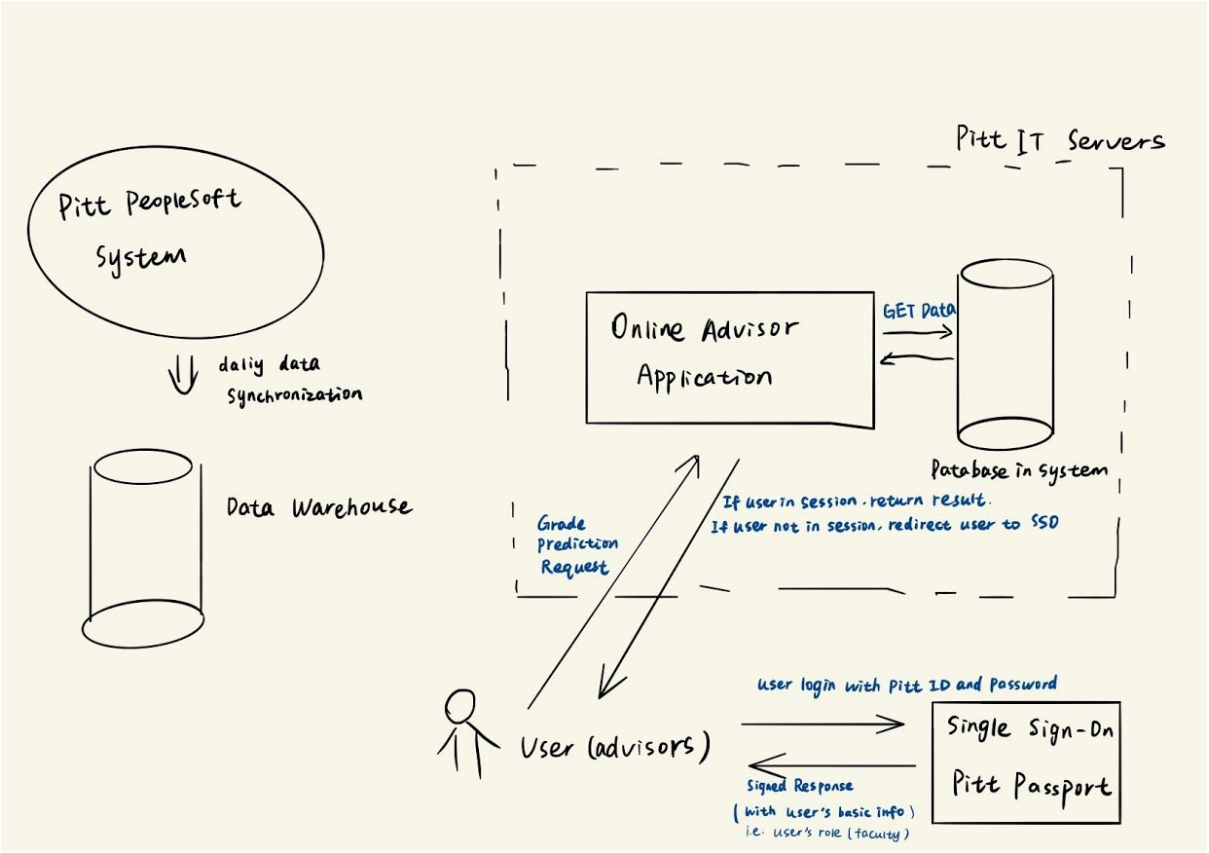
We expect that the user (advisor) will need to login to Pitt Passport to use all services. The application will get necessary data from University's Data Warehouse, and use the data to generate grade prediction for the requested student. All data used by the application will be anonymous, which means no personal information will be retrieved from the Data Warehouse. Finally, the grade prediction results will be returned and shown to the user.

We want to deploy the application to Pitt IT servers for better data security. We would like this to happen because we want to introduce a database into the system. We will store past student grade history to the database (all data is anonymous and insensitive[1]), along with additional machine learning information derived from the grade histories. This will significantly reduce the workload that we will be requesting from the University's Data Warehouse. New grade records are generated after each semester is finished, so the database will synchronize with the University's Data Warehouse once a semester. The workflow for data synchronization is demonstrated in the following diagram.



The application will ask for updated data from the Data Warehouse to update our database in the system. The operation is already supported by University's Data Warehouse so we don't need to use PeopleSoft.

After we introduce the database in the system, the workflow for processing a grade prediction request will be:



Instead of getting data from Data Warehouse, now the application will only talk to the database in the system. No load is assigned to Data Warehouse, and the whole system will be protected and controlled by Pitt IT.

If everything goes well after this application is deployed, we could introduce it to Pitt's community. We could refine the features and add it to the Student Center as a Student Self-Service. Besides only focusing on CS courses, machine learning approaches could also be introduced to generate suggestions on general courses.

Notes:

[1] We will only make use of students' grade history. We will not store student's identifiable information. However, we will be attaching anonymous IDs to student histories so we can trace a student's undergraduate career. (There will be a hash mechanism that will convert student ids into hash keys that cannot be traced back to the original student). We will conform with all University and federal policies regarding the handling of student data (such as FERPA (https://www.registrar.pitt.edu/students/ferpa)).

References:

[1] https://www.technology.pitt.edu/services/university-data-warehouse

[2] https://www.technology.pitt.edu/security/leverage-pitt-passport-for-your-application