SmartMeetings: Product Requirements Document

Team Name: Meeting is Believing
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Introduction

Motivation

Meetings are crucial for any line of work. They are necessary for communication between colleagues about ideas, problems, roadblocks, and more. However, repetition of discussions and materials from previous meetings is a downfall that causes present-day meetings to be inefficient and unnecessary. Other common problems in meetings are undistributed speaking time, groupthink, members absence, and run-on meetings. People may also forget what was discussed, either because they are unable to take notes, or they are unable to pay full attention to what is being said because they are too focused on taking notes.

Background

The problem is currently being solved using audio transcription by various companies. However, the processing and analysis of the transcription is lacking. Most applications focus on having a simple transcription of the meeting afterwards, which catches absent members up when necessary, but does not include real-time information that can benefit current, as well as the future, meetings. The simple transcription also does not help absent, as well as available members, to find out the important tasks at hand, as well as questions that each member may have during the meeting.

Goals

The minimum viable product will allow users to create an account in order to upload audio recordings of meetings to obtain a transcription and a summary of the transcription. The goal is to have a web application where a user can log in to their account, answer questions such as the topics that should be discussed and estimated time of the meeting, and then start a meeting. After the meeting, the users will be able to see the total time and whether all the topics listed in the pre-meeting questionnaire were discussed. The users will also be able to navigate to a page where they can see the whole transcription, a summary of the transcription, questions asked, tasks that were mentioned, and other analysis. Moreover, a reach goal is to detect emotional sentiments using video analysis. The data will allow users to evaluate the environment of the meeting for example, improving a tense meeting, or take note of how to maintain a positive meeting.

In order to achieve the goal, the team will follow the Agile software development methods, including two week sprints, daily scrums, and continuous re-analysis of the requirements. Weekly meetings and insight from our mentors at Invoca will also guide our priorities. All tasks will be kept track of on Trello, and Burndown Charts will be created to keep track of timely progress.

Innovation

This project will produce a tool that makes meetings more productive and collaborative by providing a more meaningful analysis of the meeting. The application will prompt pre-meeting questions about the type of meetings (stand-up, long board meetings, etc.) and the estimated or desired meeting time of the meeting. The application will then use the responses to predict the pacing and runtime of the meeting. Additionally, audio transcriptions will be used to detect off-topic conversations, and video analysis will detect restless behaviours, such as fidgeting. Such observations will be reported both in real time during the meeting and in a summary after the meeting in order to increase

productivity in future meetings and give personal feedback to the members of the meeting. The transcriptions and video analysis will allow the tracking of meeting progress and emotional sentiments as well.

Textual analysis functions include annotated transcription, question-tagging, note-taking, and automatic action item list creation based on spoken keywords are employed to provide a well-rounded summary of the meeting. This analysis can then be exported to externally into Trello boards, email, and PDF.

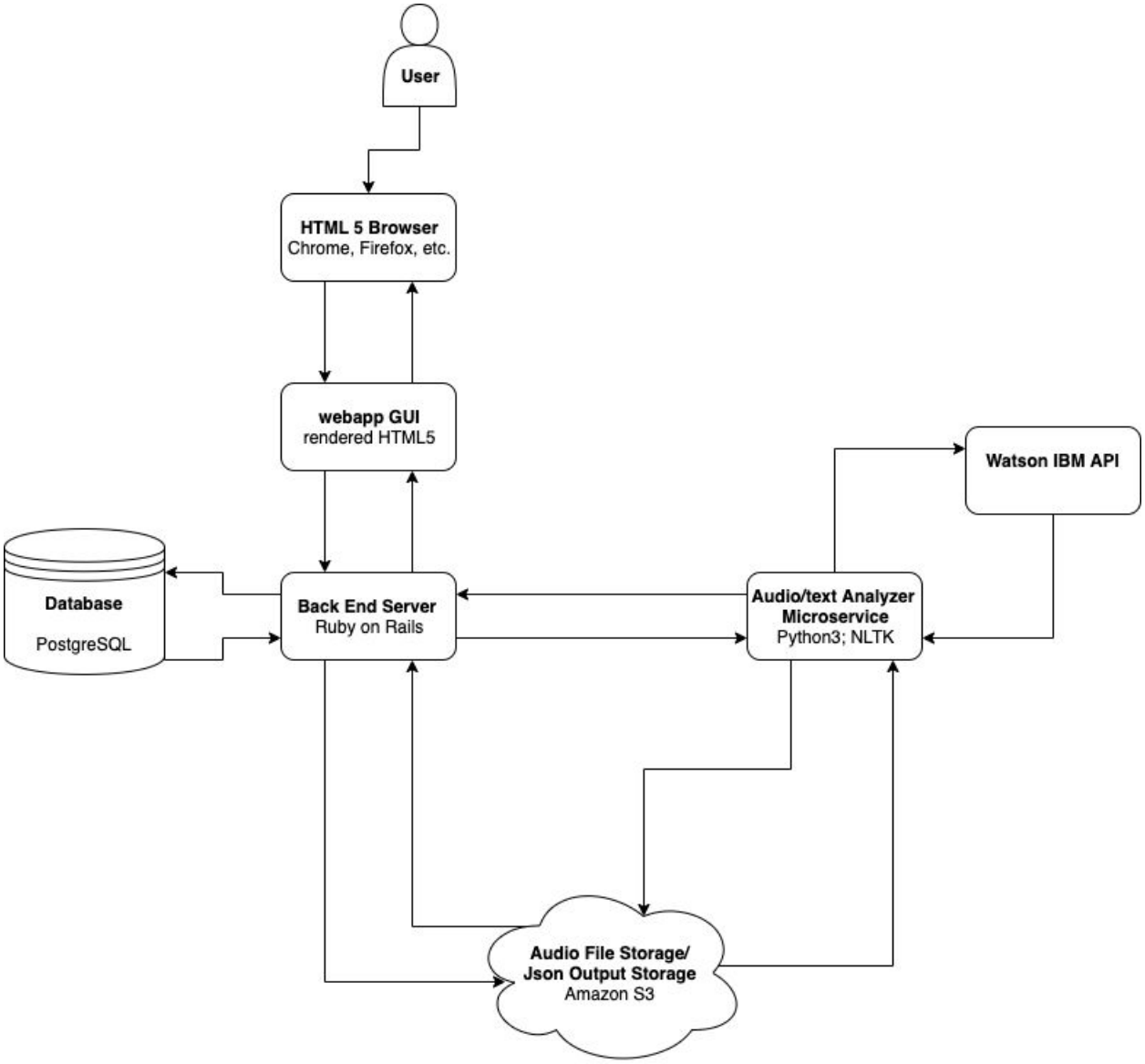
Misc.

One target audience is software developers. This audience would benefit greatly from the identification of action items in meetings and the Trello integration of these action items into Trello cards on Trello boards. This feature will speed up a developer's transition from a meeting back to working on tasks by automating the creation of these tasks as well as the assignment of these tasks to the appropriate users. Other analysis, such as the hesitation analyzer, can be used to identify and solve problems with a speaker's dictation for more effective future meetings.

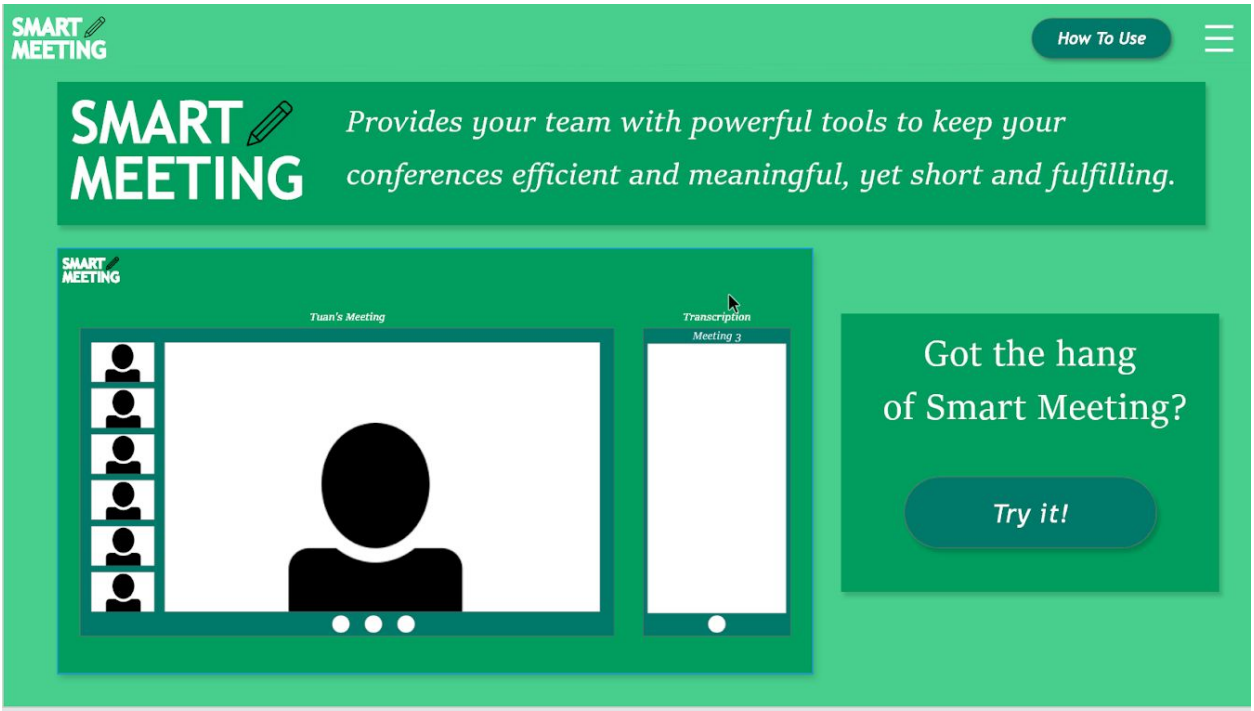
The technologies that will be utilized to solve the problem and accomplish such innovation are audio recognition through Watson IBM Speech-to-Text API and natural language processing through Python's Natural Language TookKit (NLTK). Furthermore, bootstrap will be utilized in order to provide an intuitive interface for users, whose data will be stored in a PostgreSQL database. WebRTC will provide users with real-time communication, and the audio and video files will be stored on Amazon S3. Everything will be integrated together using the backend framework Ruby on Rails. Finally, Docker will be used for the container platform to ensure portability and enable developers to work on their own machines without having to worry about dependencies, libraries, and configuration files. Docker containers will be hosted on AWS EC2 for public access to the application.

System Architecture Overview

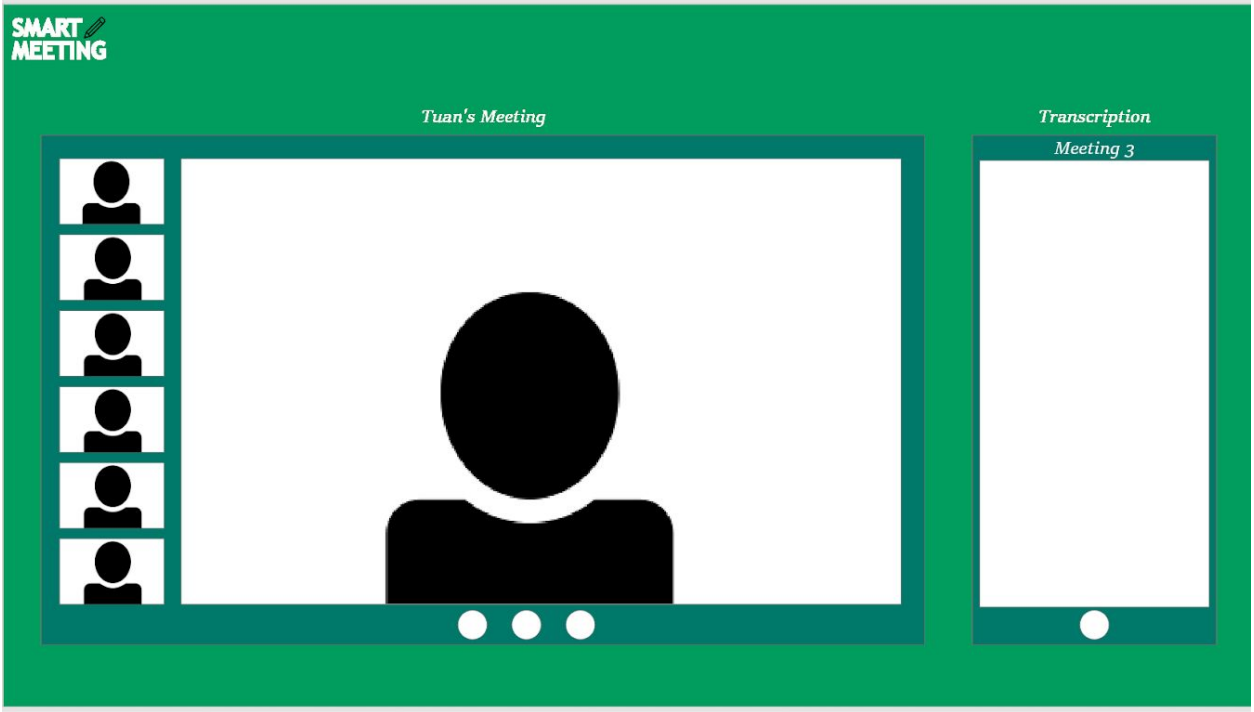
High Level Diagram



User Interaction and Design



Web 1920 – 2



Requirements

User Stories

1. As a user, I can input an audio file to the application to obtain a transcript of the meeting.
    a. Acceptance: Text file output upon Audio file input. Makes sense when it's translated.
    b. Duration: 1 week.
    c. https://github.com/maxtong9/smart_meetings/pull/23
    d. https://github.com/maxtong9/smart_meetings/pull/13
2. As a developer, I can pull a Docker image to my own machine without having to set up my own local environment.
    a. Acceptance: Developer can pull the Docker image from Docker Hub and run the container without having to download other dependencies or libraries.
    b. Duration: 3 weeks.
    c. https://github.com/maxtong9/smart_meetings/pull/22
3. As a user, I can see a summary of the meeting transcription to view the summary of the meeting without having to review everything that was said.
    a. Acceptance: Input is a transcription, output is a summary of the transcription that is shorter than the raw transcription
    b. Duration: 1 week.
    c. https://github.com/maxtong9/smart_meetings/pull/16
    d. https://github.com/maxtong9/smart_meetings/pull/20
    e. https://github.com/maxtong9/smart_meetings/commit/93f235c7f9e3184c3b6f62502279f96d47627900
4. As a developer, I can download and upload files to Amazon S3 in order to access files and push files to storage.
    a. Acceptance: File pushed to S3 by one member and downloaded by another member.
    b. Duration: 4 days.
    c. https://trello.com/c/QTazkX0b/32-setup-s3-storage-for-team-members
5. As a user, I can view questions that were asked during the meeting so I do not have to write them down.

    a. Acceptance: User can view questions during the meeting at a later time on the website.
    b. Duration: 2 days.
    c. https://github.com/maxtong9/smart_meetings/pull/21
6. As a User, I can see the Action Items from a meeting so that I can know exactly what things need to be done as discussed in the meeting.
    a. Acceptance: User say “Action Item” during the meeting which will translate to a list of action items displayed on the website
    b. Duration: 2 days.
    c. https://github.com/maxtong9/smart_meetings/pull/25
7. As a Developer, I can type “docker-compose up” in the root directory and have all components of the application built and running so I don’t have to build each image and run each container individually
    a. Acceptance: Each image and container is successfully built and ran, and the React interface is displayed at localhost:3000
    b. Duration: 1 week.
    c. https://github.com/maxtong9/smart_meetings/pull/36
8. As a User, I can see the number of hesitations for each user in order to improve time of meeting.
    a. Acceptance: The website displays hesitation percentages for each user.
    b. Duration: 2 days.
    c. https://github.com/maxtong9/smart_meetings/pull/37
9. As a User, I am able to upload multiple files from a meeting to obtain the transcription and analysis of the meeting.
    a. Acceptance: The user is able to upload multiple files and see the transcription, summary, action items, and hesitation results.
    b. Duration: 4 days.
    c. https://github.com/maxtong9/smart_meetings/pull/38
10. As a User, I am able to obtain information about Smart Meeting through the homepage.
    a. Acceptance: The User is able to access the Smart Meeting home page.
    b. Duration: 5 days.
    c. https://github.com/maxtong9/smart_meetings/pull/35
11. As a User, I can add action items that were not discussed during the meeting for others to see.

    a. Acceptance: The User is able to add action items on the webapp and other users will be notified of the new addition. The new content will be uploaded to storage.
    b. Duration: 3 days.
12. As a User, I can receive the transcription from my meeting in my email or google docs
    a. Acceptance: Transcription is sent to email.
    b. Duration: 5 days.
13. As a User, I can view in-depth text analysis, such as long pauses or divergence from the main topic, in order to improve the efficiency of future meetings.
    a. Acceptance: User can view text analysis on the website at a later time.
    b. Duration: 4 days.
14. As a User, I can edit the transcription when a transcribed word is not what was said.
    a. Acceptance: User can edit the transcription and the new version will be saved into the database.
    b. Duration: 2 days.
15. As a User, I can obtain a list of completed tasks that were discussed during the meeting
    a. Acceptance: Whenever a user mentions a task that they have completed, it shows up in the list below the transcription
    b. Duration: 3 days.
16. As a User, I can see action items and assignee through Trello, or other planning websites.
    a. Acceptance: Trello board shows action items along with assignee.
    b. Duration: 3 days.
17. As a User, I can input keywords important to the meeting to have a more focused summary.
    a. Acceptance: User is able to see a summary mostly related to the keywords.
    b. Duration: 2 days.
18. As a User, I can input one audio file of a meeting with multiple people and receive a transcription and analysis for the meeting.
    a. Acceptance: The transcription is able to label the members in the meeting and what they said. The result would be shown on the website.
    b. Duration: 3 days.

19. As a User, I can invite other meeting members to upload their audio file for transcription.
    a. Acceptance: The audio files from the same meeting will be transcribed together and shown to all the invited participants.
    b. Duration: 4 days.
20. As a User, I can make an account in order to access meeting transcription features.
    a. Acceptance: The user can select a “create an account” option to fill in basic information such as name, email, and password.
    b. The user can see their profile page after account creation.
    c. Duration: 2 days.
21. As a User, I can view my account details including transcriptions, audio, etc. so that I can see my saved data.
    a. Acceptance: From the profile page, the user can see lists of meetings that they can navigate to access transcriptions.
    b. Duration: 2 days.
22. As a user, I can create a video call so that I am able to start a meeting.
    a. Acceptance: A logged in user can create a call room through the user interface and join it.
    b. Duration: 1 week.
23. As a user, I can record my meeting (audio, video, or both) so I can review the meeting at a later time.
    a. Acceptance: The User can see recordings in their data and view them through the website.
    b. Duration: 4 days.
24. As a User, I can invite others to join my call.
    a. Acceptance: With an invitation, a guest can join the User’s call.
    b. Duration: 1 week.
25. As a User, there is an option to use one microphone when conducting a meeting in the same room as other Users.
    a. Acceptance: Audio to text is able to transcribe audio with multiple users and label them correctly.
    b. Duration: 5 days.
26. As a User, I can see real time transcription of the meeting
    a. Acceptance: When a User speaks, texts will appear for viewing.
    b. Duration: 2 weeks.

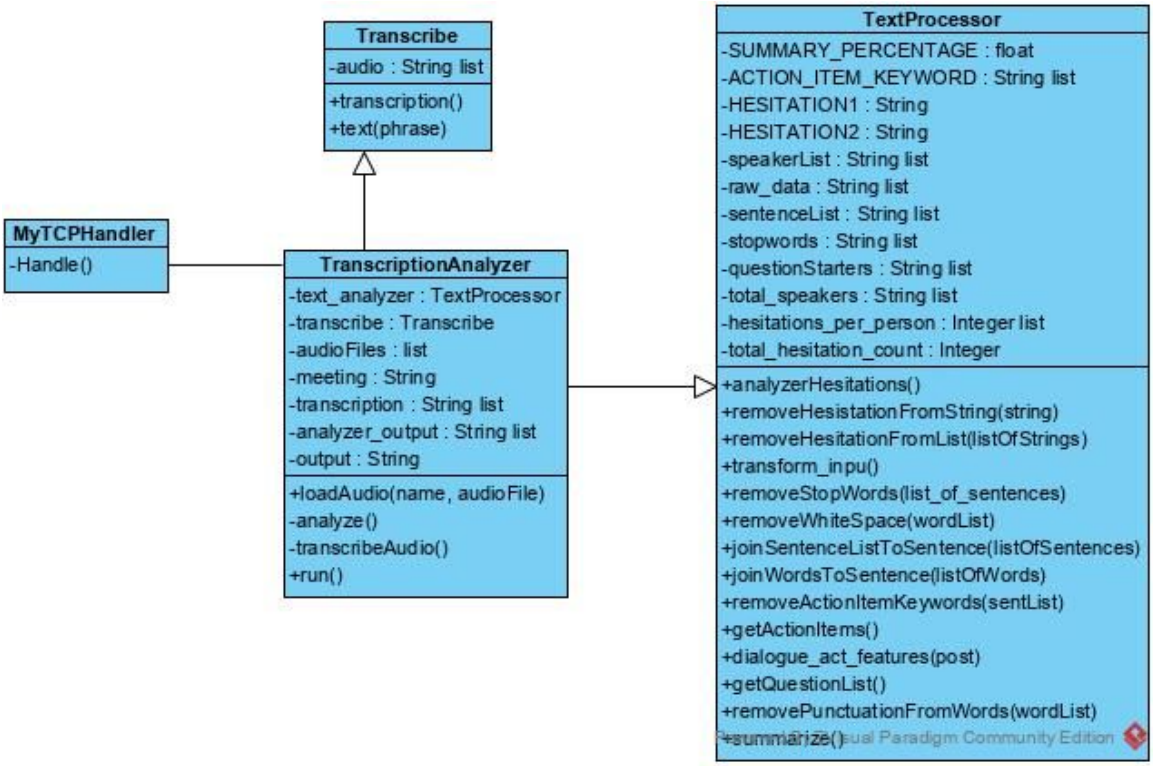
27. As a User, I can see the keywords and action items highlighted in real time.
    a. Acceptance: The transcription that appears will be highlighted if it is a keyword or action item.
    b. Duration: 1 week.
28. As a User, I can get real time audio feedback during the meeting so I know when I am getting off topic
    a. Acceptance: A popup is displayed whenever the user deviates from the subject matter of the meeting
    b. Duration: 2 weeks.
29. As a User, I can get real time video analysis/feedback during the meeting so that I know when the meeting may be going overtime
    a. Acceptance: A popup is displayed whenever other meeting attendees are getting restless
    b. Duration: 2 weeks.

Current Functions, Issues and Tasks

https://github.com/maxtong9/smart_meetings
https://trello.com/b/JEuyqKwx/smartmeetings

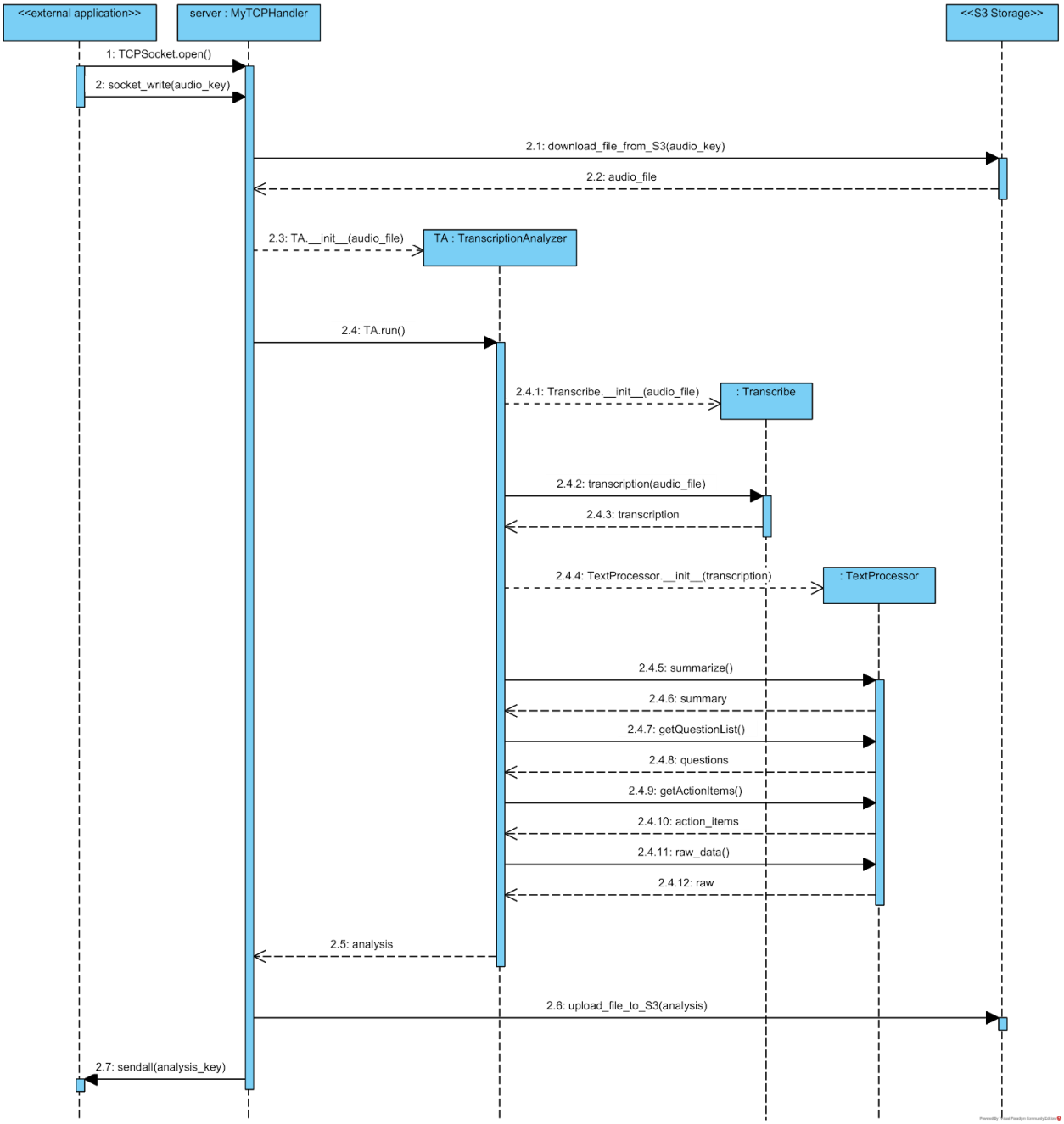
System Models

UML Diagram of Class

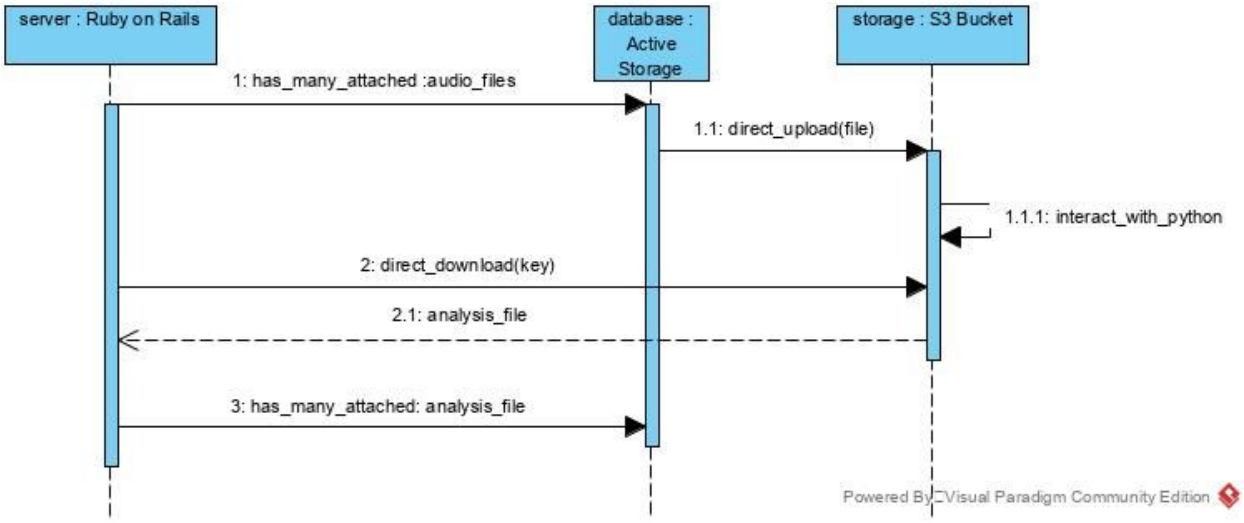


Module Interactions

Transcription and Text Analysis Sequence Diagram

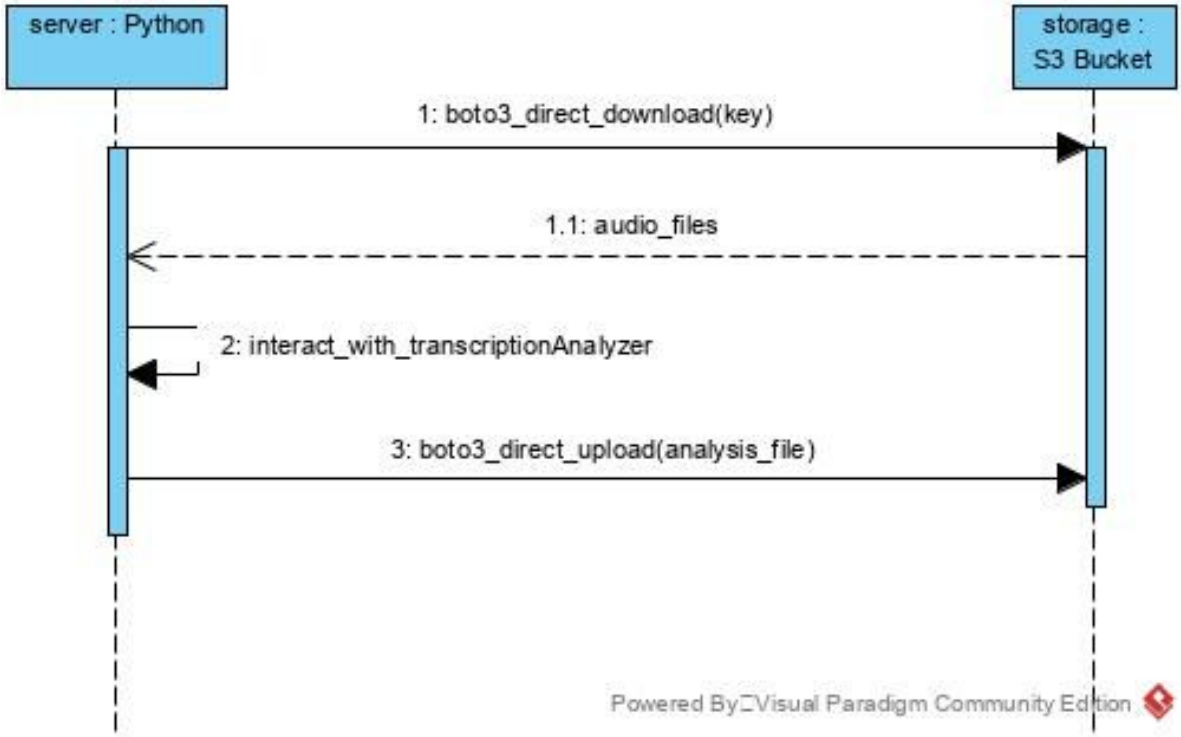


Ruby on Rails and S3 Bucket Sequence Diagram



Note: "1.1.1: interact_with_python" is described by the first and third sequence diagrams.

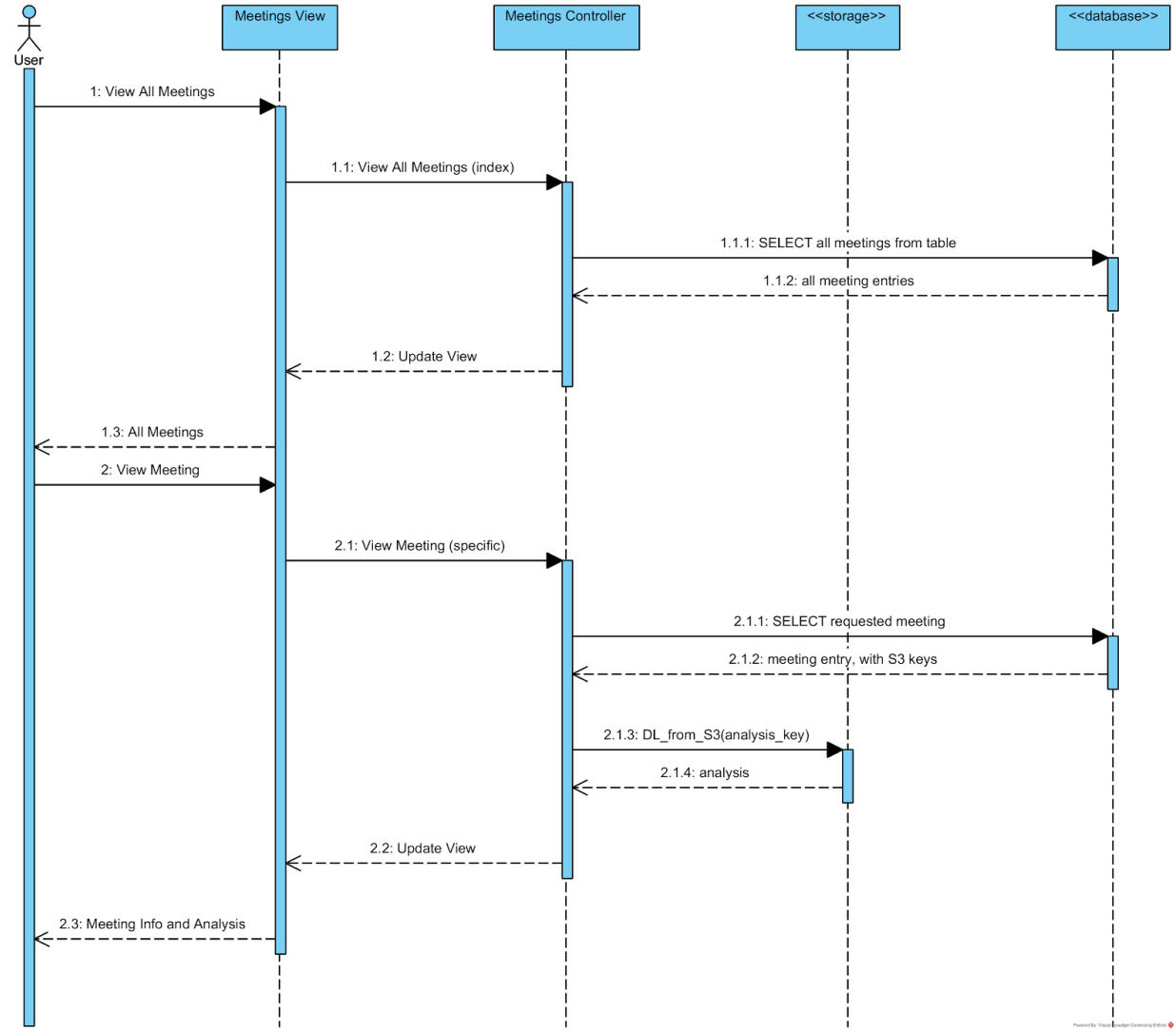
Python Server and S3 Bucket Sequence Diagram



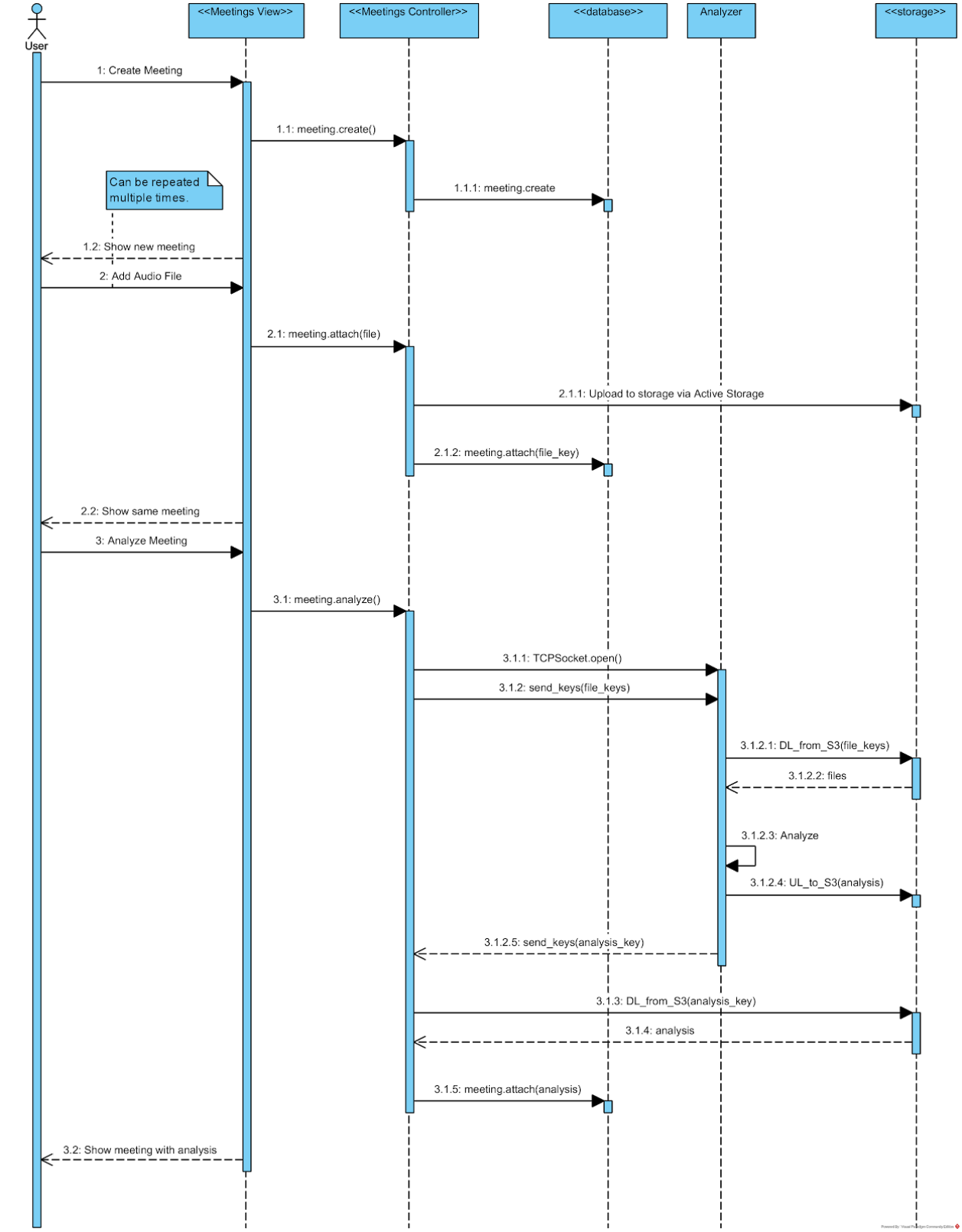
Note: "2: interact_with_transcriptionAnalyzer" is described by the first sequence diagrams.

User Interactions

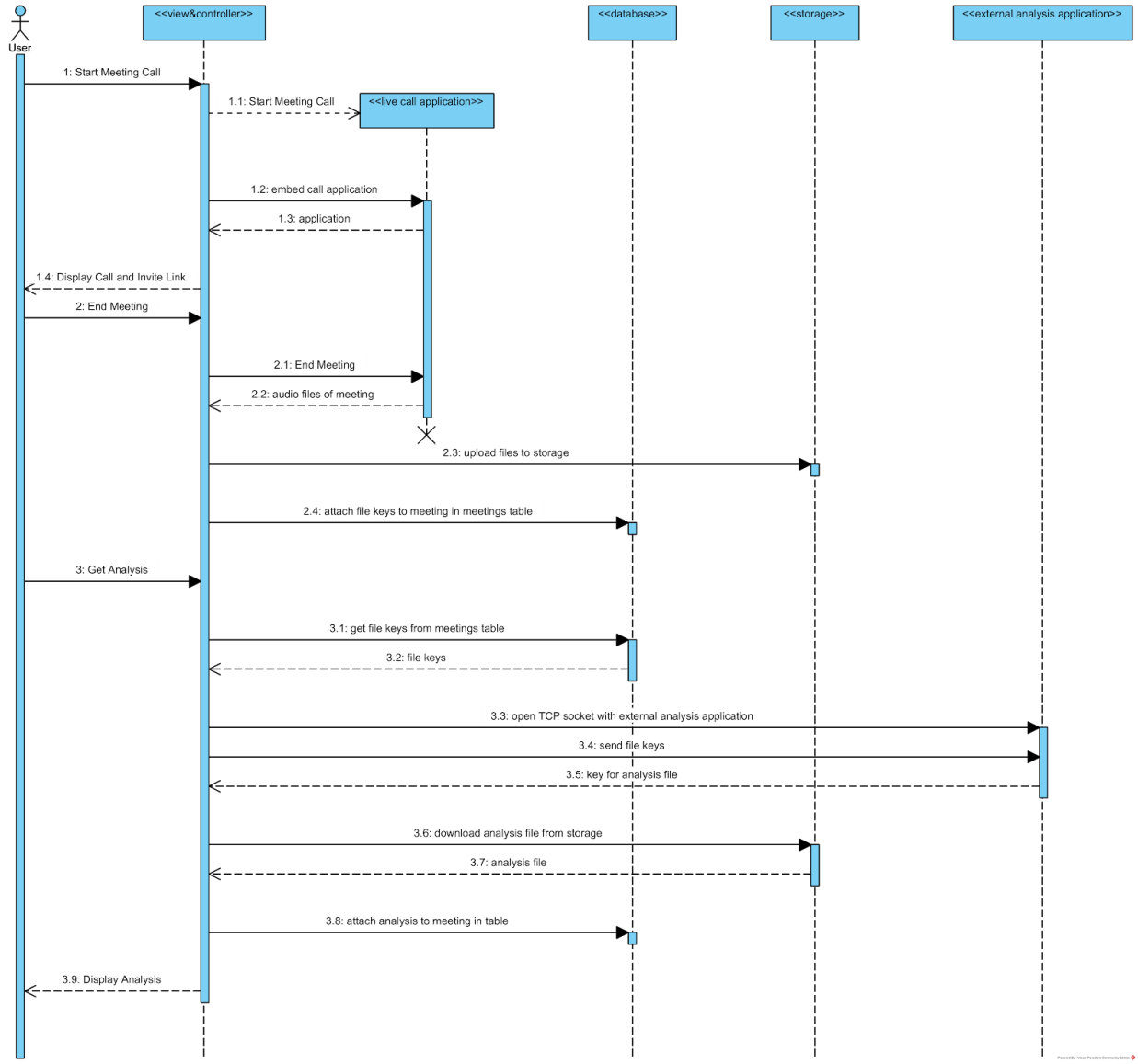
Viewing All Meetings and Specific Meeting Sequence Diagram



High-Level Project Sequence Diagram



Possible Live Call Creation and Analysis Sequence



Appendices

Technologies Employed

- GUI: bootstrap
- RTC: WebRTC
- User Database: PostgreSQL
- Storage: Amazon S3
- Backend Framework: Ruby on Rails
- Web Hosting: EC2
- Audio Transcription: IBM Watson (Python API)
- Text Processing: nltk (Python)
- Container Platform: Docker