



# Circle - A Chat Room

A Cross Platform Application

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2021SP93066  
2021SP93040  
2021SP93029  
2021SP93045  
2021SP93003



# Introduction

- Circle is a cross platform application written in flutter which allows the users to create a group for a topic of interest and allows users to join the group and send text based messages.
- Once the users are in the group, the application allows them have conversation with rest of the participants in the room.
- Primary mode of interaction can happen through either by an iOS application or by web application.
- The users who wish to join the chat room must authenticate themselves with a valid credentials before publishing content or messages into the chat room.
- All the metadata about the users and the messages that they are sending in the corresponding groups will be stored in the data store.



# Components

Chat room mainly consists for following components

- iOS Application
- Web Application
- Google Firebase



# iOS Application

- This is an application which is written for the mobile operating system created and developed by Apple i.e, iOS.
- This application can be downloaded in any iPhone via the app store (in our case the app will not be published into the app store).
- Once downloaded, this application can be used to connect to the chat room and perform various operations.



# Web Application

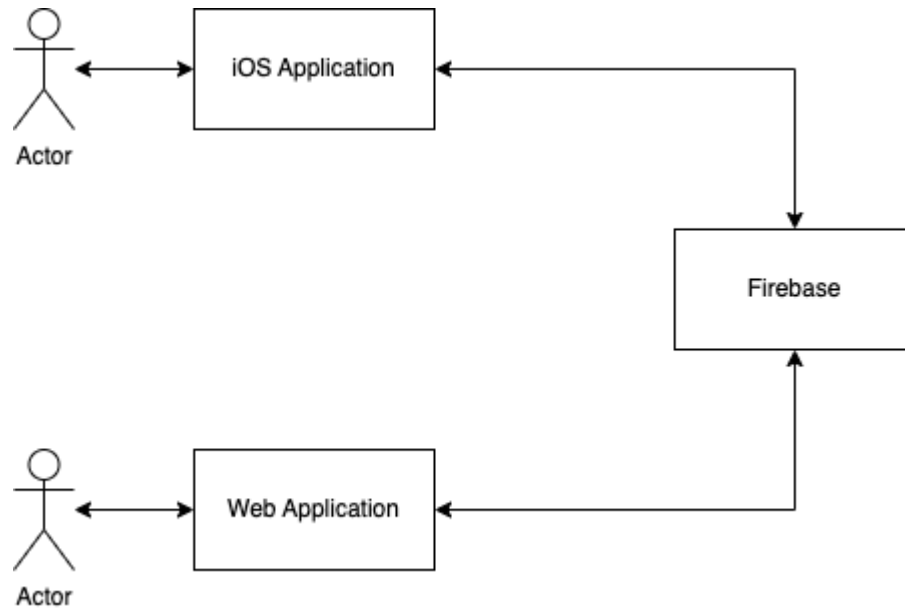
- A web application (or web app) is application software that runs in a web browser, unlike software programs that run locally and natively on the operating system (OS) of the device.
- Web applications are delivered on the World Wide Web to users with an active network connection.
- Circle will be hosted in a web server, people can access it over the internet, login and continue the operations specific to the application.




# Firestore

- Firestore is a set of hosting services for any type of application.
- It offers NoSQL and real-time hosting of databases, content, social authentication, and notifications, or services, such as a real-time communication server.
- Firestore is a paid service provided by Google as part of GCP services.

# Architecture



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- The actors in the above diagram represent the users of the application.
  - The primary mode of interaction of the actors with the system is through the iOS or web application.
  - Users can perform the following operations
    - Create a new group chat room
    - Exit the group chat room
    - Join a existing group chat room
    - Send messages in the group chat room
    - Authentication and authorization
  - Here, firebase acts as an interface that connects the iOS and web application.
  - Firebase can be thought as the NoSQL database for the chat room, it will hold the context of all the groups and the users.
  - Firebase also stores the messages sent across the groups by various users.





# Cross Platform

Since there are multiple computing platforms that are involved in the above system i.e, iOS, web and connection to firebase, we need a common codebase that can serve all the needs without having to touch the native platforms in which they are hosted.

This application is designed as a cross platform application for the following reasons -

- Provide a common interface across different platforms
- A single codebase to ensure that code can be maintained
- A single user experience for users logging via different platforms
- Write a single code and use it in different platforms



# Flutter Framework

Flutter is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase.

Flutter transforms the app development process. We can build, test, and deploy mobile, web, desktop, and embedded apps from a single codebase.

## Advantages

- Flutter code compiles to ARM or Intel machine code as well as JavaScript, for fast performance on any device.
- Allows us to build and iterate quickly with Hot Reload. We can update code and see changes almost instantly, without losing state.
- We can control every pixel to create customized, adaptive designs that look and feel great on any screen.



# Dart Language

- Dart is a programming language designed for client development, such as for the web and mobile apps. It is developed by Google and can also be used to build server and desktop applications.
- To run in mainstream web browsers, Dart relies on a source-to-source compiler to JavaScript. In a web browser, the code is precompiled into JavaScript using the dart2js compiler, making it compatible with all major browsers with no need for browsers to adopt it.
- Dart code can be AOT-compiled (Ahead of Time) into machine code (native instruction sets). Apps built with Flutter, a mobile app SDK built with Dart, are deployed to app stores as AOT-compiled Dart code.