

Aim : To connect Flutter app with Firebase

Theory:

Firebase is a comprehensive platform for building mobile and web applications developed by Google. It provides a wide range of backend services and tools to help developers build high-quality apps more efficiently. Here's an overview of the key components and features of Firebase:

Firebase Features:

Realtime Database: Firebase Realtime Database is a cloud-hosted NoSQL database that allows you to store and sync data in real-time across multiple clients. It's ideal for applications that require real-time updates, such as chat apps or collaborative tools.

Cloud Firestore: Firestore is a flexible, scalable database for mobile, web, and server development. It offers more powerful querying capabilities, offline support, and automatic syncing across devices. Firestore is often preferred for larger and more complex applications.

Authentication: Firebase Authentication provides easy-to-use SDKs and ready-to-use UI libraries to authenticate users using email/password, phone number, Google, Facebook, Twitter, and more. It handles identity verification and securely manages user accounts.

Cloud Storage: Firebase Cloud Storage allows you to store and serve user-generated content such as photos, videos, and files. It offers secure uploads and downloads, powerful access control, and integration with Firebase Authentication.

Cloud Functions: Firebase Cloud Functions lets you run backend code in response to events triggered by Firebase features and HTTPS requests. You can write serverless functions to handle tasks like sending notifications, processing data, or integrating with third-party services.

Hosting: Firebase Hosting provides fast and secure web hosting for your static and dynamic content. You can deploy web apps and static websites with a single command, and Firebase takes care of SSL, CDN, and caching for improved performance.

Analytics: Firebase Analytics helps you understand user behavior and app performance with comprehensive analytics and reporting tools. You can track user engagement, retention, conversion rates, and more to optimize your app and marketing strategies.

Cloud Messaging: Firebase Cloud Messaging (FCM) enables you to send targeted notifications and messages to your app users across platforms (iOS, Android, and web). You can send notifications based on user segments, user actions, or specific topics.

Remote Config: Firebase Remote Config allows you to dynamically customize and personalize your app's behavior and appearance without requiring app updates. You can modify app configurations, feature flags, and UI elements remotely to improve user experience and test new features.

Performance Monitoring: Firebase Performance Monitoring helps you identify and fix performance issues in your app by measuring app startup time, network latency, and UI rendering performance. It provides insights and metrics to optimize app performance and user experience.

App Distribution: Firebase App Distribution simplifies the process of distributing pre-release versions of your app to testers and stakeholders. It supports both iOS and Android platforms and provides feedback and crash reporting for better testing and debugging.

Benefits of Firebase:

Integrated Platform: Firebase offers a unified platform with all the backend services and tools you need to build, scale, and monitor your app.

Scalability: Firebase services are built on Google's infrastructure and can scale automatically to handle large user bases and traffic spikes.

Real-Time Updates: Firebase provides real-time data synchronization across clients, enabling collaborative and interactive app experiences.

Simplified Development: Firebase SDKs and libraries offer simple APIs and easy-to-use tools to streamline app development and reduce development time.

No Server Management: With Firebase, you can focus on building your app without worrying about server maintenance, infrastructure setup, or backend management.

Built-in Security: Firebase offers built-in security features such as authentication, data encryption, and access control to protect your app and user data.

Analytics and Insights: Firebase provides powerful analytics and monitoring tools to track app usage, user engagement, and performance metrics, helping you make data-driven decisions and optimize your app.

Cost-Effective: Firebase offers a generous free tier and flexible pricing plans based on usage, making it accessible to startups and small businesses.

Overall, Firebase is a powerful and versatile platform that empowers developers to build high-quality apps with rich features, real-time functionality, and robust backend infrastructure. Whether you're building a simple mobile app or a complex web application, Firebase provides the tools and services you need to succeed.

Implementing connection to firebase:

```
C:\Users\LENOVO>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[!] Flutter (Channel stable, 3.19.0, on Microsoft Windows [Version 10.0.19045.4046], locale en-IN)
    ! Warning: `dart` on your path resolves to C:\Users\LENOVO\dart-sdk\bin\dart.exe, which is not inside your current
      Flutter SDK checkout at E:\Flutter\flutter. Consider adding E:\Flutter\flutter\bin to the front of your path.
[✓] Windows Version (Installed version of Windows is version 10 or higher)
[!] Android toolchain - develop for Android devices (Android SDK version 34.0.0)
    X cmdline-tools component is missing
      Run `path/to/sdkmanager --install "cmdline-tools;latest"`
      See https://developer.android.com/studio/command-line for more details.
    X Android license status unknown.
      Run `flutter doctor --android-licenses` to accept the SDK licenses.
      See https://flutter.dev/docs/get-started/install/windows#android-setup for more details.
[✓] Chrome - develop for the web
[!] Visual Studio - develop Windows apps (Visual Studio Community 2022 17.8.5)
    X Visual Studio is missing necessary components. Please re-run the Visual Studio installer for the "Desktop
      development with C++" workload, and include these components:
        MSVC v142 - VS 2019 C++ x64/x86 build tools
        - If there are multiple build tool versions available, install the latest
        C++ CMake tools for Windows
        Windows 10 SDK
[✓] Android Studio (version 2023.1)
[✓] VS Code (version 1.87.1)
[✓] Connected device (3 available)
[✓] Network resources

! Doctor found issues in 3 categories.
```

```
C:\Users\LENOVO>dart pub global activate flutterfire_cli
```

```
+ ansi_styles 0.3.2+1s... (2.1s)
+ args 2.4.2
+ async 2.11.0
+ boolean_selector 2.1.1
+ characters 1.3.0
+ ci 0.1.0
+ cli_util 0.3.5 (0.4.1 available)
+ clock 1.1.1
+ collection 1.18.0
+ dart_console 1.2.0
+ deep_pick 0.10.0 (1.0.0 available)
+ ffi 2.1.0 (2.1.2 available)
+ file 6.1.4 (7.0.0 available)
+ flutterfire_cli 0.2.7
+ http 0.13.6 (1.2.1 available)
+ http_parser 4.0.2
+ interact 2.2.0
+ intl 0.18.1 (0.19.0 available)
+ json_annotation 4.8.1
+ matcher 0.12.16+1
+ meta 1.12.0
+ path 1.9.0
+ petitparser 6.0.2
+ platform 3.1.4
+ process 4.2.4 (5.0.2 available)
+ pub_semver 2.1.4
+ pub_updater 0.2.4 (0.4.0 available)
+ pubspec 2.3.0
```

```
Building package executables... (4.5s)
Built flutterfire_cli:flutterfire.
Installed executable flutterfire.
Warning: Pub installs executables into C:\Users\Soham\AppData\Local\Pub\Cache\bin, which is not on your path.
You can fix that by adding that directory to your system's "Path" environment variable.
A web search for "configure windows path" will show you how.
Activated flutterfire_cli 0.2.7.
```

```
C:\Users\LENOVO\AndroidStudioProjects\ProjectViewer>flutter pub add firebase_core
"firebase_core" is already in "dependencies". Will try to update the constraint.
Resolving dependencies...
  _flutterfire_internals 1.3.23 (1.3.25 available)
  firebase_auth 4.17.6 (4.17.8 available)
  firebase_auth_platform_interface 7.1.6 (7.1.8 available)
  firebase_auth_web 5.9.6 (5.9.8 available)
  firebase_core 2.25.5 (2.27.0 available)
  js 0.6.7 (0.7.1 available)
  leak_tracker 10.0.0 (10.0.4 available)
  leak_tracker_flutter_testing 2.0.1 (3.0.3 available)
  leak_tracker_testing 2.0.1 (3.0.1 available)
  meta 1.11.0 (1.12.0 available)
  test_api 0.6.1 (0.7.0 available)
  url_launcher_web 2.2.3 (2.3.0 available)
  vm_service 13.0.0 (14.1.0 available)
  web 0.4.2 (0.5.1 available)
Got dependencies!
14 packages have newer versions incompatible with dependency constraints.
Try `flutter pub outdated` for more information.
```

```
Future <void> main() async {
  WidgetsFlutterBinding.ensureInitialized();

  await Firebase.initializeApp(options: DefaultFirebaseOptions.currentPlatform);
  runApp(MaterialApp(
    home: Home(),
    theme: ThemeData(
      fontFamily: 'Teko',
    ), // ThemeData
  )); // MaterialApp
}
```

Conclusion: From the above experiment we came to know about firebase. Then we came to know about how to implement/connect firebase to our application.