LeanCode

Firebase suite

Build

Accelerate app development with fully managed backend infrastructure

View all build products

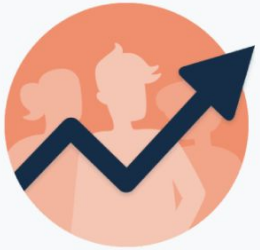
- Cloud Firestore
- Authentication

Release & Monitor

Release with confidence and monitor performance and stability

View all release & monitor products

- Crashlytics
- Google Analytics



Engage

Boost user engagement with rich analytics, A/B testing, and messaging campaigns

View all engage products

- Remote Config
- Cloud Messaging

We build digital products.

Build

Authentication

Authentication

- Email & password / Email & link
- Google / Apple / Facebook / Twitter / Github
- Phone number & SMS
- Anonymous user
- Custom auth provider

```
try {
  UserCredential userCredential = await FirebaseAuth.instance.signInWithEmailAndPassword(
    email: "barry.allen@example.com",
    password: "SuperSecretPassword!"
  );
} on FirebaseAuthException catch (e) {
  if (e.code == 'user-not-found') {
    print('No user found for that email.');
  } else if (e.code == 'wrong-password') {
    print('Wrong password provided for that user.');
  }
}
```

Cloud Firestore

Cloud Firestore

- NoSQL document database
- Flexible & scalable - you just use it (but also pay)
- Ordering & limiting
- Compound queries & indexing
- Security connected with Firebase Auth

```
@override
Widget build(BuildContext context) {
  // Create a CollectionReference called users that references the firestore collection
  CollectionReference users = FirebaseFirestore.instance.collection('users');

  Future<void> addUser() {
    // Call the user's CollectionReference to add a new user
    return users
        .add({
          'full_name': fullName, // John Doe
          'company': company, // Stokes and Sons
          'age': age // 42
        })
        .then((value) => print("User Added"))
        .catchError((error) => print("Failed to add user: $error"));
  }

  return TextButton(
    onPressed: addUser,
    child: Text(
      "Add User",
    ),
  );
```

Realtime Database

Realtime Database

- Original Firebase DB
- Cloud Firestore emerged from this
- Focused on low-latency synchronization
- Simple queries only

Storage

Storage

- File storage for user-generated content
- Robust operations (connectivity awareness)
- Integrated with Firebase Auth
- Scalability

```dart
import 'package:path_provider/path_provider.dart';

Future<void> downloadFileExample() async {
  Directory appDocDir = await getApplicationDocumentsDirectory();
  File downloadToFile = File('${appDocDir.path}/download-logo.png');

  try {
    await firebase_storage.FirebaseStorage.instance
        .ref('uploads/logo.png')
        .writeToFile(downloadToFile);
  } on firebase_core.FirebaseException catch (e) {
    // e.g, e.code == 'canceled'
  }
}
```

Machine Learning

Machine Learning

- Production-ready models for popular use cases (recognize text, label images, recognize landmarks)
- Hosting custom TensorFlow Lite models
- Training custom models in the cloud (using your uploaded data)

Hosting

Hosting

- SSL for free
- Static HTML (Flutter Web) or redirect to Cloud Function
- Easy upload (through Firebase CLI)
- Cache / CDN included

```
$ firebase deploy --only hosting
```

Cloud Functions

Cloud Functions

- Integrated with Firebase (Auth / Storage / Firestore triggers)
- Serverless = zero maintenance
- Look for Google Cloud Functions vs Cloud Functions for Firebase because they are **NOT** the same

```
exports.addMessage = functions.https.onRequest(async (req, res) => {
  // Grab the text parameter.
  const original = req.query.text;
  // Push the new message into Firestore using the Firebase Admin SDK.
  const writeResult = await admin.firestore().collection('messages').add({original: original});
  // Send back a message that we've successfully written the message
  res.json({result: `Message with ID: ${writeResult.id} added.`});
});
```

```
// Always change the value of "/hello" to "world!"
exports.hello = functions.database.ref('/hello').onWrite(event => {
  // set() returns a promise. We keep the function alive by returning it.
  return event.data.ref.set('world!').then(() => {
    console.log('Write succeeded!');
  });
});
```

Release & Monitor

Crashlytics

Crashlytics

- Crash reporting from Flutter
- Crash reporting from native code (iOS/Android) and Android NDK
- Deobfuscation handling
- Metrics synced with Analytics

```dart
void main() async {
  WidgetsFlutterBinding.ensureInitialized();

  await Firebase.initializeApp();

  // Pass all uncaught errors from the framework to Crashlytics.
  FlutterError.onError = FirebaseCrashlytics.instance.recordFlutterError;

  runApp(MyApp());
}
```

Performance Monitoring (ß)

Performance Monitoring

- Startup times
- Rendering per screen
- HTTP requests
- Foreground / background activity
- Performance metrics

Test Lab

Test Lab

- Test on real devices and emulators
- Both Android and iOS
- Integrations with CLI / IDEs / CI systems
- *integration_test* package works with Test Lab

App Distribution (ß)

App Distribution

- Distribute artifacts
- Tester groups but only per-project
- No auto-provisioning
- No auto-update alerts
- Worse than AppCenter :P

Engage

Analytics

Analytics

- Quantity analytics
- Free up to 500 events
- Events and user props
- Audience segmentation

```dart
await widget.analytics.logEvent(
  name: 'test_event',
  parameters: <String, dynamic>{
    'string': 'string',
    'int': 42,
    'long': 12345678910,
    'double': 42.0,
    'bool': true,
  },
);
```

Remote Config

Remote Config

- Config server-side parameters for users
- Auto-synchronization every 24 hours
- Connected to Analytics audiences

```dart
Future<RemoteConfig> setupRemoteConfig() async {
  await Firebase.initializeApp();
  final RemoteConfig remoteConfig = RemoteConfig.instance;
  await remoteConfig.setConfigSettings(RemoteConfigSettings(
    fetchTimeout: const Duration(seconds: 10),
    minimumFetchInterval: const Duration(hours: 1),
  ));
  await remoteConfig.setDefaults(<String, dynamic>{
    'welcome': 'default welcome',
    'hello': 'default hello',
  });
  RemoteConfigValue(null, ValueSource.valueStatic);
  return remoteConfig;
}
```

Predictions

Predictions

- ML connected to Analytics data predicts specific events
- Defaults to churn and spend predictions

A/B Testing

A/B Testing

- Experiments with Remote Config
- Connected to Predictions therefore also Analytics
- Combines with Notifications to notify about changes
- Allows “safe rollout” mechanisms

Cloud Messaging (FCM)

Cloud Messaging

- Send push notifications to Android / iOS / Web
- Use specific devices or pub/sub model
- Send acknowledgements from clients

```dart
FirebaseMessaging.onMessage.listen((RemoteMessage message) {
  print('Got a message whilst in the foreground!');
  print('Message data: ${message.data}');

  if (message.notification != null) {
    print('Message also contained a notification: ${message.notification}');
  }
});
```

In-App Messaging (ß)

In-App Messaging

- Send engagement messages without instant arrival
- Use segmentation from Analytics / Predictions
- Implement custom alerts in your code

Dynamic Links

Dynamic Links

- Deep links with after-install behavior
- Can be created through Firebase console or the app
- Connected to Analytics

```dart
void initDynamicLinks() async {
  FirebaseDynamicLinks.instance.onLink(
    onSuccess: (PendingDynamicLinkData? dynamicLink) async {
      final Uri? deepLink = dynamicLink?.link;

      if (deepLink != null) {
        Navigator.pushNamed(context, deepLink.path);
      }
    },
    onError: (OnLinkErrorException e) async {
      print('onLinkError');
      print(e.message);
    }
  );

  final PendingDynamicLinkData? data = await FirebaseDynamicLinks.instance.getInitialLink();
  final Uri? deepLink = data?.link;

  if (deepLink != null) {
    Navigator.pushNamed(context, deepLink.path);
  }
}
```

AdMob -> Google Mobile Ads

AdMob -> Google Mobile Ads

- Just ads :)
- Can be connected to Firebase Analytics
- Flutter support

```
InterstitialAd.load(
  adUnitId: '<ad unit id>',
  request: AdRequest(),
  adLoadCallback: InterstitialAdLoadCallback(
    onAdLoaded: (InterstitialAd ad) {
      // Keep a reference to the ad so you can show it later.
      this._interstitialAd = ad;
    },
    onAdFailedToLoad: (LoadAdError error) {
      print('InterstitialAd failed to load: $error');
    },
  ));
```

AppCheck (ß)

1. Your app interacts with the provider of your choice to obtain an attestation of the app or device's authenticity (or both, depending on the provider).
2. The attestation is sent to the App Check server, which verifies the validity of the attestation using parameters registered with the app, and returns to your app an App Check token with an expiration time. This token might retain some information about the attestation material it verified.
3. The App Check client SDK caches the token in your app, ready to be sent along with any requests your app makes to protected services.

AppCheck

DeviceCheck and AppAttest on iOS

SafetyNet on Android

reCAPTCHA on Web

Emulator (ß)


Firebase Emulator Suite
Android Emulator
iOS
IOS Simulator
HTTP
Web App
Storage Emulator
Auth Emulator
Firestore Emulator
Realtime Database Emulator
Functions Emulator
Hosting Emulator
Pub/Sub Emulator