MOBILE APPLICATION DEVELOPMENT

ANDROID (2017)

LECTURE 20: FIREBASE

'SERVERLESS' BACKENDS

- A new trend in backend design where applications depend on third-party services rather than managed, dedicated servers.
- Allows developers to use powerful suites of 'cloud' functionality without needing to manage their own infrastructure.
  - Can make scaling extremely simple, and often reduces cost.
  - Entails sacrifices on flexibility and customization.
- Amazon, Google, and Microsoft all have mature and dependable products in these areas, and many other companies are adding their own regularly.

FIREBASE

- A suite of interconnected products Google offers to simplify app development and abstract away common sets of functionality developers use in internet-connected applications.
- Consists of a number of standalone products, including:
  - Authentication: Manages user signup, login, and account management.
  - Realtime Database: Allows applications to store and manipulate data.
  - Storage: Provides storage for files (as opposed to database data).
  - Crashlytics: Web-based crash reporting and analysis.

FIREBASE AUTHENTICATION

- Manages signup, sign-in, and account maintenance for users.
- Abstracts away a number of common user maintenance features:
  - Password resets, including email of password reset links.
  - Signup throttling.
  - User display name configuration.
- Supports a variety of registration mechanisms, including email/password, Google/Facebook account authentication, phone number registration, etc.

FIREBASE REALTIME DATABASE

- Provides a way of storing structured, JSON-based data for an application in a way that extensively supports realtime updating and querying.
- Allows a rigid definition of data structure based on sets of rules, which are defined on the Firebase site but govern interactions from all clients (apps, etc.).
- Supports indexing data as well as restricting access to data based on user authentication or (manually-defined) permissions.
- Does not support some common database features like foreign keys or triggers without a lot of manual intervention from the programmer.

FIREBASE STORAGE

- Provides a mechanism by which large amounts of data can be stored online in an organized manner.
- In contrast to Realtime Database, this product is designed to store non-structured binary data files like images, videos, etc.
- Provides its own set of rules, similar to Realtime Database, that make it easier to manage access to and control over the stored data.
- Somewhat higher cost than Realtime Database, but designed to operate alongside Realtime Database for applications that need both kinds of storage.

FIREBASE CRASHLYTICS

- A new Firebase product (in beta currently) which provides a cloud-based console to manage error reports for an application.
- Allows developers to receive email alerts if their app crashes, along with online reports about the crash that include things like stack traces and device information for the device that the crash occurred on.
- Ranks crashes by severity as well as number of users affected.
- Allows new app releases to be evaluated relative to old app releases on the basis of stability.

FIREBASE PROS/CONS

- Pro: Easy setup, particularly on Android, and good integration with existing code.
- Pro: Supports iOS/Android/Web with extensive and well-made SDKs.
- Pro: (Subjective) Simplifies coding and managing backends substantially.
- Con: Is not free (though it is cheap).
- Con: Not HIPAA-compliant, lacks some levels of enterprise-grade reliability.
- Con: Little control over low-level data representation in most places.
- Con(?): Requires that Google ends up storing all/most of your data.