



MOBILE APPLICATION DEVELOPMENT

ANDROID (2017)

**LECTURE 18: RESTFUL WEB
SERVICES AND JSON**

REPRESENTATIONAL STATE TRANSFER (REST)

- ▶ A model for providing networked representation and manipulation of data in a stateless, predictable manner.
- ▶ Structures web content into resources and operations - users interface with resources through sets of defined operations.
- ▶ Stateless nature of the model means that systems can be scaled and upgraded on-the-fly with relative ease compared to other models.
- ▶ Treats a complete session of user interactions with a web server as progressions through a state machine - not necessarily a linear progression.

COMMON REST OPERATIONS

Resource	GET	PUT	POST	DELETE
Collection URI, such as <code>http://example.com/resources/</code>	List the members of the collection, complete with their member URIs for further navigation. For example, list all the cars for sale.	Meaning defined as "replace the entire collection with another collection".	Create a new entry in the collection where the ID is assigned automatically by the collection. The ID created is usually included as part of the data returned by this operation.	Meaning defined as "delete the entire collection".
Element URI, such as <code>http://example.com/resources/7H0U57Y</code>	Retrieve a representation of the addressed member of the collection expressed in an appropriate MIME type	Update the addressed member of the collection or create it with the specified ID.	Treats the addressed member as a collection in its own right and creates a new subordinate of it.	Delete the addressed member of the collection.

ARCHITECTURAL GOALS OF REST-BASED DESIGNS

- ▶ RESTful systems typically attempt to provide the following architectural benefits:
 - ▶ Simplicity - uniform interfaces and stateless communication.
 - ▶ Modifiability - modular components which can be swapped at runtime.
 - ▶ Portability - can often migrate code along with data.
 - ▶ Performance - individual interactions should be efficient and fast.
 - ▶ Scalability - can serve endpoints from multiple places at once and cache results.

INTERACTING WITH HTTPS

- ▶ Android uses the `HttpsURLConnection` class (among others) as the interface for programmers to obtain web content over HTTPS.
- ▶ May call `openConnection()` on a `URL` to obtain an `HttpsURLConnection`.
 - ▶ Can use the `responseCode` property of the `HttpsURLConnection` to determine whether the connection succeeded.
 - ▶ Can use the `InputStream` property of the `HttpsURLConnection` to read output from the connection like a file.
- ▶ Must ensure errors are handled, and that the `HttpsURLConnection` is closed (with the `disconnect()` method) when it is no longer needed.

JAVASCRIPT OBJECT NOTATION (JSON)

- ▶ Many REST APIs use JSON as their data representation.
- ▶ JSON is a near-ubiquitous data representation format designed for ease-of-use:
 - ▶ Rigidly-defined standard for data representation using simple types.
 - ▶ Requires the same representation on all platforms (UTF-8/16/32 text).
 - ▶ Nearly all major programming languages/platforms have extensive JSON support.
- ▶ May set the content type to `application/json` on a `HttpsURLConnection` to indicate that it should serve JSON to the application.

JSON TYPES

