Android: a full-stack to consume a REST API

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Introduction

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- Well-known concerns:
  - Communicate with remote API
  - Parse content and deal with it
  - Do it asynchronously
  - Notify components of job termination

REST client: Retrofit

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- Well-known, documented, “must-have” Android library
- Write a Java interface to declare API method
- Annotations to describe the HTTP request
  - HTTP method (`@GET`, `@POST`, etc.)
  - URL parameter (`@Path`)
  - query parameter (`@Query`, `@QueryMap`)
  - request body (`@Body`)
  - multipart request body (`@Multipart`, `@Part`)
  - form management (`@FormUrlEncoded`, `@Field`)
  - headers management (`@Headers`)

```
public interface GitHubService {

  @GET("/users/{user}/repos")
  Call<List<DTORepo>> listRepos(
    @Path("user") String user);

}
```

- Build at runtime an implementation

```
Retrofit retrofit = new
   Retrofit.Builder()
     .baseUrl("https://api.github.com")
     .build();

GitHubService service =
   retrofit.create(GitHubService.class);
```

- Simple calls

```
Call<List<DTORepo>> repos =
   service.listRepos("RoRoche");
```

- Converters to (de)serialize HTTP bodies

```
Retrofit retrofit = new
   Retrofit.Builder()
     //...
     .addConverterFactory(
         GsonConverterFactory.create())
     .build();
```

Conclusion

- To add a new HTTP request:
  - declare DTO class(es) with your parsing strategy
  - declare body class (optional)
  - declare the method in Java interface with suitable annotations
- Minimum amount of code to deal with remote API

JSON parser: LoganSquare

JSON parser: LoganSquare

- Faster, according to BlueLine Labs benchmark
- Clear annotations

```
@JsonObject
public class DTORepo {
    @JsonField(name = "id")
    public Integer id;

    @JsonField(name = "name")
    public String name;
}
```

- Available retrofit converter

```
Retrofit retrofit = new
    Retrofit.Builder()
      //...
      .addConverterFactory(
          LoganSquareConverterFactory.create())
      .build();
```

- Simple parsing methods

```
// Parse from an InputStream
InputStream is = //...
Image image = LoganSquare.parse(is,
   Image.class);

// Parse from a String
String json = //...
Image image = LoganSquare.parse(json,
   Image.class);
```

- Simple serializing methods

```
// Serialize it to an OutputStream
OutputStream os = //...
LoganSquare.serialize(image, os);

// Serialize it to a String
String json =
   LoganSquare.serialize(image);
```

- Small library
- Supports custom types
- **Compile-time**

Async management: Android Priority Job Queue (Job Manager)

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- Job queue to easily schedule background tasks
- Inspired by a Google I/O 2010 talk on REST client applications
- Easy to declare a new tasks (extends `Job`) and configure it

```
public class PostTweetJob extends Job {
    public static int PRIORITY = 1;

    private String mText;

    public PostTweetJob(String text) {
        super(new Params(PRIORITY)
            .requireNetwork()
            .persist());
        mText = text:
    }
    //...
}
```

```
public class PostTweetJob extends Job {
    //...
    @Override
    public void onAdded() {
    }

    @Override
    public void onRun() throws Throwable
       {
        webservice.postTweet(mText);
    }
    //...
}
```

- Job manager configuration

```
Configuration configuration =
    new Configuration.Builder(poContext)
        .minConsumerCount(1)
        .maxConsumerCount(3)
        .loadFactor(3) // 3 jobs per
           consumer
        .consumerKeepAlive(120)
        .build();

JobManager jobManager =
    new JobManager(context,
       configuration);
```

- Simple way to create and enqueue a task

```
PostTweetJob postTweetJob =
    new PostTweetJob("test");

jobManager
    .addJobInBackground(postTweetJob);
```

Result propagation: EventBus

Result propagation: EventBus

- Based on the publisher/subscriber pattern (loose coupling)
- Communication between application components
- Small library
- Thread delivery
- Convenient Annotation based API

Set-up

- Create an event class

```
public class EventQueryDidFinish
```

- Register your subscriber...

```
eventBus.register(this);
```

- ...and unregister if needed:

```
eventBus.unregister(this);
```

- Declare subscribing method

```
@Subscribe(threadMode = ThreadMode.MAIN)
public void onEventQueryDidFinish(
    EventQueryDidFinish event) {
    //...
}
```

- Post event

```
EventQueryDidFinish event = //...
eventBus.post(event);
```

Conclusion

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- Highly based on Java annotations
- Write less code
- Multiple ways to configure it
- Focused on performance and UX consistency