# Project 4-Part 1 Report

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Facebook REST API Server

The Facebook REST API server is built on the spray-can framework built on top of Akka. Each time a user performs a Put on the endpoint for the Profile objects (Page and User), it corresponds to the server creating a new Profile Actor responsible for handling all the requests sent with regard to that user. This means every time that user creates any object, that actor will be delegated to for handling the request. Similarly, if another user tries to get any objects from a user, that user's actor will be responsible for completing the request. All the supported objects include Post, Picture, Album and Friendlist.

A pool of Delegator Actors is responsible for accepting the initial connections from clients and forwarding requests to their appropriate Profile Actors. All objects are stored in memory and there is no database layer present. A Debug object is responsible for a single "/debug" endpoint and returns JSON of various runtime metrics of the server such as average number of requests completed per second and total number of objects created. Every time an endpoint is hit from the Delegator Actor, the debug object value is incremented. It provides a way to periodically probe the server and get a snapshot of its status.

Facebook API Server
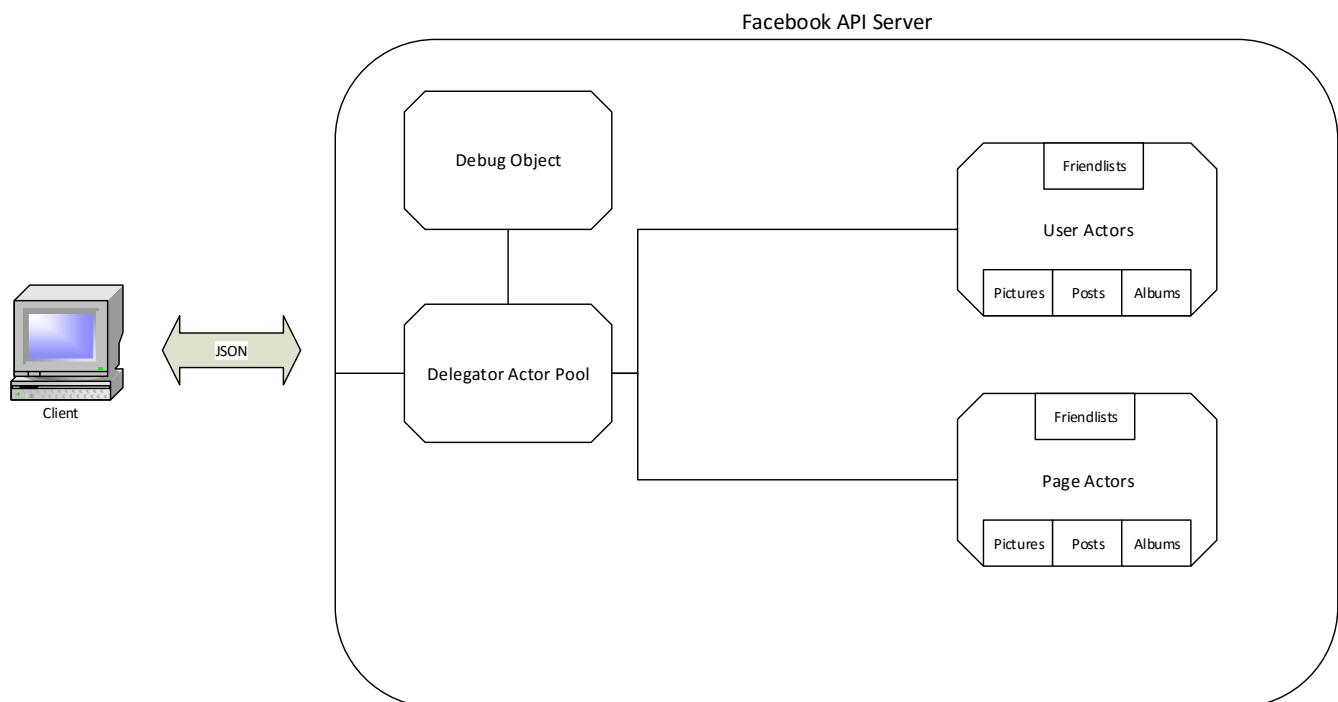
Client Simulator

The Client Simulator is implemented as a separate actor system within the same program that starts up after a short delay once the server system has been initialized. However, logically the client system could be implemented on a separate machine since the only communication that occurs between the server and client system are in the form of JSON sent over HTTP connections. Each Client actor registers itself with the server as a Profile in the form of either a User or a Page. After another short delay, each Client actor begins a process by which every second they perform one or many requests to the server depending on the behavior they have been assigned to.

There are a few different types of Clients created in the simulator created based on the metrics collected in the paper written by Ryan and Xenos and published to Computers in Human Behavior. The paper aimed at correlating the personalities of Facebook users categorized into one of five types, with their activity patterns on Facebook. The Big Five or Five Factor model of personalities include the following categories: Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness. Each participant was assigned to one of these personality types and their activity was measured in four different categories: active social contributions such as posting content, passive engagement such as reading posts, news and information related to reading content from media outlets, and real-time social interaction such as messaging friends. These different types of behaviors were condensed into three different categories of clients in the simulator: active clients that performed a high quantity of posting content and reading existing content, passive clients that spent a lot of time reading content and making friends, and content creators that were represented as Pages that could represent a celebrity or public figure that posted a lot of content but did not read much. The ratios of the types of clients were maintained to be within the same percentages recorded in the paper.

In order to simulate real-world interaction between people that translate into online friendships, there is a single Matchmaker Actor responsible for simulating Clients meeting each other in real life and subsequently creating a connection within the Facebook server. The Matchmaker actor is informed of every client that is created in the simulator and will randomly select pairs of client actors to "meet" in real life. The client actors may then proceed to request the server to create a friendship within the Facebook system.

Client Simulator

MatchMaker Actor ——Actor References—— **Client Actor Pool**

Client Actor Pool contains:
- Active Client
- Passive Client
- Content Creator

JSON

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