

The concept and structure of e-hailing applications

[Science](#), [Computer Science](#)



E-hailing applications are technology platforms, which connect drivers to riders. They are built upon highly distributed software architecture that relies on a fault tolerant and highly available infrastructure. The only way that companies such as Uber and Taxify can deliver the required levels of performance and availability is through software and automation, and in order to fully achieve its benefits, it always strives to use open standards based technologies and avoid dependency on any single vendor across the infrastructure stack.

Running these applications require a smartphone and an Internet connection. Upon sign up, the applications store the rider's personal details (name, number, credit card*) on a relational database in data centers under which they can track and record riders/drivers trips, as well as manage any electronic payments. Uber systems run on a hybrid cloud model, essentially using multiple cloud providers and a number of active data centers to store and back up data. Supposedly a data center was to fail or malfunction, all data such as trips and records are automatically stored on a different data center to ensure that no data is lost. Each city or country is assigned a data center, which it is geographically closest to, and are all assigned backup centers located at different locations in case of foreseen events.

When requesting a ride, a rider's default pick-up location is set to their present GPS location and may be altered by typing in a new address. The rider must manually enter their final destination and choose their vehicle type before requesting pick up. Uber and Taxify both use machine learning; hence they often display a drop down list of recent places visited to improve user experience. When a rider requests a trip, the driver who is best

positioned (nearest available driver) to pick up the rider will receive the request. This is essentially retrieved through the drivers and riders GPS. When a trip request is made, the system automatically tracks the nearest available drivers GPS which is embedded in their smartphone and displays the request. At this point, the driver is given approximately 15 seconds to either accept or decline the trip before the system directs the request to second nearest driver.

For IOS devices, Uber uses a framework called Core Location, which is used in identifying a rider's location; in particular, it determines the devices geographical location, orientation, altitude and position in response to a nearby iBeacon. To gather this data, the Core Location framework makes use of all accessible hardware and software devices such as Bluetooth, barometer, cellular hardware, magnetometer, WI-FI and not to forget, the GPS. On the other hand, android devices use Google's location APIs that uses information directed from cell towers and WI-FI nodes to return a location and accuracy radius, which mobile devices can detect.

As the driver accepts the trip request, the system runs the drivers identification number, which is essentially the primary key in the relational database to retrieve their details, which are displayed on the rider's device. The driver's name, image, phone number, vehicle type and number plate will be shown on the screen. On the map displayed, the user can also track the drivers' location, whereabouts, and estimated time of arrival (ETA). Upon pick up, you are on trip. Alongside the basic identification of device locations, E-hailing applications have incorporated an on board routing system, which

provides drivers a point-to-point direction to and fro, a rider's destination. Both Uber and Taxify have partnered with Google and use Google Maps API that uses 2D satellite imagery along with a device's location and beacon points to provide directions and routes.

Upon arrival at rider's final destination, the driver ends the ride, and the total fare for the ride is calculated and indicated. E-hailing applications have varying prices based on their charges, however the fare is calculated using the following criteria; base fare, cost per minute, cost per mile, booking fee, surge pricing and tipping which is optional. These calculations are automatically processed in the application servers according to each rider's trip and are displayed on the rider's device. Riders are given two payment options: cash or electronic payment. When a payment is made, it is automatically registered in the driver's database of which the company takes a percentage of the total fare and the driver receives the remaining. The electronic processor in applications system creates an electronic receipt, which it automatically sends to the rider. Here after, both rider and driver are prompted to rate one another, which brings accountability and transparency to every ride. These ratings are accumulated for every trip and averaged, providing a round rating of the driver and rider to ensure safety of travel and maintain high user experience through respectable drivers.