

MTAT.03.295 – Agile Software Development in the Cloud

Project Scenario ***Strelsau's Taxi Ordering System***

Traditionally, the taxi market in Strelsau (Ruritania) has been highly fragmented. As of 2016, there were around 20 taxi companies, each one operating an average of 100 taxis. Each company handled its taxi ordering service inefficiently based on rudimentary systems used by operators at the call centres of the companies.

The situation is about to change with the launch of United Taxis of Strelsau (UTS), which will absorb about half of Strelsau's taxi companies. United taxis will manage a fleet of around 1000 taxis, with the ambition to grow up to 1500 taxis by 2020.

United Taxis will put in place a single taxi ordering system: The Strelsau Taxi Ordering System (STRS). STRS will be multi-channelled. Customers will still be able to order a taxi via phone (the traditional way), but additionally, they will be able to do so via a Web-based front-end and via mobile applications available for all major smartphones (Android, iOS and Windows 10). The Web front-end will allow customers to enter the address where they require a taxi (i.e. pickup address), the drop off address, their name and their mobile number. STRS will inform the customer of the time when the taxi will pick them up and an estimation of the ride cost. Updates will also be sent to the customer in case the taxi is delayed (the corresponding message can be sent via email, message notification or SMS, depending on the option selected by the customer).

When reserving via a smartphone application, the application will automatically fetch the GPS location of the customer (if available), so that the customer does not need to enter the location explicitly – assuming they wish to be picked from their current location. If the pickup address does not correspond to the current customer location, the interface should allow the customer to enter an alternative address (e.g. using a text field or using a marker on a map). Customers will instantly get an estimate of how much time the taxi will take to pick them up.

All taxis will be equipped with Android tablet PCs with GPS. An application called TaxiHome will be installed in each of these devices. Taxi drivers will use TaxiHome to notify STRS of their availability. At a given point in time, a taxi can be off-duty, available, busy and invisible (this status is taken when no status update has been received by STRS for more than 5 minutes). When taxis are in available or busy states, TaxiHome will periodically report the location of the taxi to STRS.

When STRS receives a new taxi order, it assigns it to the closest available taxi. If there are several taxis at equal or almost equal distance from the location, the taxi that has been available the longest is assigned (i.e. first-in-first-out). STRS will communicate the assignment to the corresponding taxi. STRS will be built using Google Maps API or any other geolocation service, which is able to calculate the distance and approximate travel time between any two locations in Strelsau, given as

input the GPS coordinates or the address identifiers of the locations in question. Once an order has been assigned to a taxi, the taxi's terminal is notified that an order has been assigned to them via Google Cloud Messaging (GCM). Other alternative messaging services can be considered (e.g. Pusher) if the selected service offers better prices. The taxi driver can retrieve the details of the order via TaxiHome, and accept the order or reject it. If rejected, an alternative taxi is assigned by STRS.

Taxi operators pay a fee to UTS equivalent to 3% of the revenue generated by orders made via STRS. The corresponding invoice will be issued by the end of each month and will be made available to each taxi driver via the TaxiHome app.

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