

POLITECNICO DI MILANO

*Computer Science and Engineering*

**Project of Software Engineering 2: “*myTaxiService*”**

**Project Plan Document**

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**1. Introduction**

This document has the scope of evaluate and identify the time and resources necessary to the development of the myTaxiService application.

**2. Function Points**

* 1. **Internal Logic Files**

|  |  |  |  |
| --- | --- | --- | --- |
| **Record Elements** | **Data Elements** | | |
|  | 1-19 | 20-50 | 51+ |
| 1 | Low (7) | Low (7) | Average (10) |
| 2-5 | Low (7) | Average (10) | High (15) |
| 6+ | Average (10) | High (15) | High (15) |

The Internal Logic Files are homogeneous set of data used and managed by the application, and in the myTaxiService application are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ILF** | **Record Elements** | **Data Elements** | **Weight** | **Function Points** |
| Passenger | 2 | 11 | Low | 7 |
| Driver | 2 | 20 | Average | 10 |
| Operator | 2 | 10 | Low | 7 |
| Administrator | 2 | 11 | Low | 7 |
| Area | 1 | 5 | Low | 7 |
| Queue | 1 | 2 | Low | 7 |
| Request | 1 | 12 | Low | 7 |
|  |  |  |  |  |
| **Total:** | | | | 52 |

User: first name, last name, email, telephone, password, birthdate, address, city, zipcode, gender.

* User, not considered

Passenger: request\_id + user\_data(10).

* User, Passenger

Operator: user\_data(10)

* User, Operator

Administrator: specialCode + user\_data(10).

* User, Administrator

Driver: status, queue position, queue\_id, latitude, longitude, maxPassengers, workStartedAt, acceptedRequests, declinedRequests, currentRequestID + user\_data(10).

* Driver, User

Area: name, startingLatitude, startingLongitude, endingLatitude, endingLongitude.

* Area

Queue: areaID, containedTaxis.

* Queue

Request: passenger\_id, address, city, zipCode, taxi\_id, status, eta, numberOfPassengers, isFromACall, endLatitude, endLongitude, operator\_id.

* Request
  1. **External Interface Files**

|  |  |  |  |
| --- | --- | --- | --- |
| **Record Elements** | **Data Elements** | | |
|  | 1-19 | 20-50 | 51+ |
| 1 | Low (5) | Low (5) | Average (7) |
| 2-5 | Low (5) | Average (7) | High (10) |
| 6+ | Average (7) | High (10) | High (10) |

The External Interface Files are homogeneous set of data used by the application but generated and maintained by other applications, and in myTaxiService application are:

* Google Maps data (maps, coordinates: two record elements)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EIF** | **Record Elements** | **Data Elements** | **Weight** | **Function Points** |
| Map Data | 1 | 1 | Low | 5 |
| Coordinate | 1 | 3 | Low | 5 |
| ETA | 1 | 2 | Low | 5 |
| SMS | 1 | 1 | Low | 5 |
|  |  |  |  |  |
| **Total:** | | | | 20 |

Map Data: image.

Coordinate: latitude, longitude, address.

ETA: arrivalTime, eta.

SMS: sent status.

* 1. **External Inputs**

|  |  |  |  |
| --- | --- | --- | --- |
| **File Types** | **Data Elements** | | |
|  | 1-4 | 5-15 | 16+ |
| 0-1 | Low (3) | Low (3) | Average (5) |
| 2-3 | Low (3) | Average (5) | High (6) |
| 4+ | Average (5) | High (6) | High (6) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EI** | **File Types** | **Data Elements** | **Weight** | **Function Points** |
| Passenger Registration | 1 | 14 | Low | 3 |
| Call Center Forced User Registration | 2 | 11 | Average | 5 |
| Login | 4 | 5 | High | 6 |
| Logout | 4 | 2 | Average | 5 |
| Call Center Request | 6 | 8 | High | 6 |
| Passenger Request | 5 | 7 | High | 6 |
| Manage User Profile | 4 | 13 | High | 6 |
| Delete User Profile | 5 | 4 | Average | 5 |
| Create Area | 2 | 7 | Average | 5 |
| Manage Area | 2 | 8 | Average | 5 |
| Delete Area | 2 | 3 | Low | 3 |
| Update Driver Status | 2 | 5 | Average | 5 |
| End Request | 4 | 6 | High | 6 |
| Report exceptional event | 5 | 8 | High | 6 |
| Accept Request | 4 | 7 | High | 6 |
| Decline Request | 3 | 8 | Average | 5 |
| Report Passenger Status | 3 | 4 | Average | 5 |
| Update Driver Location | 3 | 4 | Average | 5 |
| Set Request End Point | 2 | 4 | Low | 3 |
|  |  |  |  |  |
| **Total:** | | | | 96 |

The External Inputs are elementary operation to elaborate data coming from the external environment, and in the myTaxiService application are:

User Registration: all user data (10) + 2filed password + activity button + message

* User

Call Center Forced User Registration: all user (except password) + activity button + message

* Passenger, Operator

Login: email, password, code + activity button + message

* Operator, Administrator, Passenger, Driver

Logout: activity button + message

* User, Operator, Administrator, Passenger, Driver

Call Center Request: address, city, zipCode, numberOfPassengers, driver\_id (derived and stored in the request), eta (calculated and stored) + activity button + message

* Request, Operator, Passenger, Area, Queue, Driver

Passenger Request: numberOfPassengers, driver\_id, eta, latitude, longitude, activity button, message

* Request, Passenger, Area, Queue, Driver

Manage User Profile: all user data(10) + level + activity button + message

* Administrator, Operator, Passenger, Driver

Delete User Profile: user\_id + request\_id, activity button + message

* Administrator, Operator, Passenger, Driver, Request

Create Area: name, startlatitude, startlongitude, endlatitude, endlongitude, activity button, message

* Administrator, Area

Manage Area: name, startlatitude, startlongitude, endlatitude, endlongitude, area\_id, activity button, message

* Administrator, Area

Delete Area: area\_id, activity button, message

* Administrator, Area

Update Driver Status: status, driver\_id, queue\_id, activity button, message

* Driver, Queue

End Request: request\_id, area\_id, queue\_id, driver\_id, activity button, message

* Driver, Request, Area, Queue

Report Exceptional event: driver\_id, request\_id, area\_id, queue\_id, newdriver\_id, passenger\_id, activity button, message

* Driver, Request, Area, Queue, Passenger

Accept Request: driver\_id, passenger\_id, eta, request\_id, queue\_id, activity button, message

* Driver, ETA, Request, Passenger

Decline Request: driver\_id, request\_id, queue\_id, queueposition, newdriver\_id, status, activity button, message

* Driver, Request, Queue

Report Passenger Status: status, passenger\_id, activity button, message

* Driver, Passenger, Request

Update Driver Location: latitude, longitude, newarea\_id, newqueue\_id

* Driver, Area, Queue

Set Request Endpoint: address, request\_id, activity button, message

* Driver, Request
  1. **External Outputs**

|  |  |  |  |
| --- | --- | --- | --- |
| **File Types** | **Data Elements** | | |
|  | 1-5 | 6-19 | 20+ |
| 0-1 | Low (4) | Low (4) | Average (5) |
| 2-3 | Low (4) | Average (5) | High (7) |
| 4+ | Average (5) | High (7) | High (7) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EO** | **File Types** | **Data Elements** | **Weight** | **Function Points** |
| Incoming Request Notification | 3 | 3 | Low | 4 |
| Request Update Notification | 4 | 3 | Average | 5 |
| SMS Notification with Admin Code | 2 | 1 | Low | 4 |
| SMS Notification for passenger not found | 3 | 2 | Low | 4 |
|  |  |  |  |  |
| **Total:** | | | | 17 |

The External Outputs are elementary operation that generates data for the external environment (usually includes the elaboration of data from logic files), and in the myTaxiService application are:

Request Notification: address, numberOfPassengers, activity button

* Request, Driver, Coordinate

Request Update Notification: status, eta, driver\_id

* Request, Driver, Passenger, ETA

SMS Notification with Admin Code: code

* Administrator, SMS

SMS Notification for passenger not found: message, request\_id

* Passenger, Request, SMS
  1. **External Inquiries**

|  |  |  |  |
| --- | --- | --- | --- |
| **File Types** | **Data Elements** | | |
|  | 1-5 | 6-19 | 20+ |
| 0-1 | Low (3) | Low (3) | Average (4) |
| 2-3 | Low (3) | Average (4) | High (6) |
| 4+ | Average (4) | High (6) | High (6) |

The External Inquiries are elementary operation that involves input and output (usually does not include significant elaboration of data from logic files), and in the myTaxiService application are:

View User Information: user\_data(10) + code(admin)

* Passenger, Administrator, Operator, Driver

View Area Information: area\_data(5)

* Area

View Active Request Information: request\_data(12)

* Request, Passenger, Driver

View Queue Information: position

* Queue, Driver

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EQ** | **File Types** | **Data Elements** | **Weight** | **Function Points** |
| View User Information | 4 | 11 | High | 6 |
| View Area Information | 1 | 5 | Low | 3 |
| View Active Request Information | 3 | 12 | Average | 4 |
| View Queue Information | 2 | 1 | Low | 3 |
|  |  |  |  |  |
| **Total:** | | | | 16 |

|  |  |
| --- | --- |
| **FP Type** | **FP Count** |
| ILF | 52 |
| EIF | 20 |
| EI | 96 |
| EO | 17 |
| EQ | 16 |
|  |  |
| **Total:** | 201 |

UFP to SLOC : the multiplier for java code is 53.

10653 SLOC

**3. COCOMO**

**3.1. Software Scale Drivers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Name** | **Factor** | **Value** |
| PREC | Precedentedness | Low | 4.96 |
| FLEX | Development Flexibility | High | 2.03 |
| RESL | Architecture / Risk Resolution | High | 2.83 |
| TEAM | Team Cohesion | Extra High | 0.00 |
| PMAT | Process Maturity | High | 3.12 |
|  |  |  |  |
|  | | | 1.0394 |

PREC: Reflects the previous experience of the organization with this type of project. Very low means no previous experience, extra high means that the organization is completely familiar with this application domain.

It is set to “Low” because there is no enough experience with the used technology and the design skills achieved until now are not enough. The most of the notions and technology used for this project are new.

FLEX: Reflects the degree of flexibility in the development process. Very low means a prescribed process is set; Extra high means that the client only sets general goals.

It is set to “High” because there are some goals and some general key-point defined, but there is also a good level of flexibility.

RESL: Reflects the extent of risk analysis carried out. Very low means little analysis, extra high means a complete a thorough risk analysis.

TEAM: Reflects how well the development team know each other and work together. Very low means very difficult interactions, extra high means an integrated and effective team with no communication problems.

Only one member composes the team, so the factor is set to Extra High.

PMAT: Reflects the process maturity of the organization. The computation of this value depends on the CMM Maturity Questionnaire but an estimate can be achieved by subtracting the CMM process maturity level from 5. By analyzing the description of each CMM level, it can be a CMM level 3.

CMM level 3: defined. It is characteristic of processes at this level that there are sets of defined and documented standard processes established and subject to some degree of improvement over time. These standard processes are in place (i.e., they are the AS-IS processes) and used to establish consistency of process performance across the organization.

So, High

**3.2. Software Cost Drivers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Name** | **Factor** | **Value** |
| **Product** | | | |
| RELY | Required Software Reliability | Nominal | 1.00 |
| DATA | Data Base Size | Nominal | 1.00 |
| CPLX | Product Complexity | Nominal | 1.00 |
| RUSE | Developed for Reusability | Nominal | 1.00 |
| DOCU | Documentation Match to Lifecycle Needs | Nominal | 1.00 |
| **Platform** | | | |
| TIME | Time Constraint | Nominal | 1.00 |
| STOR | Storage Constraint | Nominal | 1.00 |
| PVOL | Platform Volatility | Low | 0.87 |
| **Personnel** | | | |
| ACAP | Analyst Capability | High | 0.85 |
| PCAP | Programmer Capability | Nominal | 1.00 |
| PCON | Personnel Continuity | Very High | 0.81 |
| APEX | Application Experience | Very Low | 1.22 |
| PLEX | Platform Experience | Very Low | 1.19 |
| LTEX | Language and Toolset Experience | Low | 1.09 |
| **Project** | | | |
| TOOL | Use of Software Tools | Low | 1.09 |
| SITE | Multisite Development | Extra High | 0.80 |
| SCED | Required Development Schedule | Nominal | 1.00 |
|  |  |  |  |
| **:** | | | 0.8266 |

**3.3. Results**

The effective duration of the project has to be recalculated due the fact that the number of currently working people is 1 instead of 3 and is 28.4182 months.

The effective duration of the project is 29 months.

**4. Tasks and Schedule**

**5. Resources allocation**

**6. Risks**

**6.1. Project Risks**

Delays

One team member

Requirements Change

Lack of experience

**6.2. Technical Risks**

Downtime

Scalability issues? Only if cloud provider crashes

Data loss

Data leaks

Security problems

Junk code

Integration testing failures

**6.3. Business Risk**

Bankruptcy

Competitors