



POLITECNICO
MILANO 1863

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Acceptance Test Deliverable (ATD)

SAFESTREETS

- v1.0 -

Authors:

Morreale Federico

Maddes Evandro

Innocente Federico

Student Number:

945258

945642

870726

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INTRODUCTION

1.1 Purpose

This document is the Acceptance Test Deliverable (ATD) for the SafeStreets project. Its purpose is to analyze and test the project developed by another group, to point out any eventual bug of the system and inconsistencies with the requirements described in the RASD or DD documents.

1.2 Group References

The project analyzed has been developed by Giulio A. Abbo, Gianmarco Accordi and Massimiliano Bonetti, with the references of the professor Elisabetta Di Nitto. The source code, as well as the RASD, DD and ITD documents, and every other document concerning the project, can be found on github at the following *repository*.

INSTALLATION SETUP

2.1 References

The installation setup has been done by following the two documents provided by the developers of the system:

- SoftwareToInstall
- ITD1

Both the documents can be found on github, in the folder *DeliveryFolder*.

2.2 Installation choice

The following software has been used:

- **Glassfish5:** Glassfish has been used in its 5.0 version instead of the 4.0 (required in the ITD) because of an error that did not allowed to run the server (on iOS). The developer group ensured us that this choice was fine, since their team worked with that version too. Moreover, using Linux on another machine and Glassfish4, we could not deploy the web server(tried to deploy on console and on glassfish GUI, same error):

```
remote failure: Error occurred during deployment: Exception while loading the app : CDI deployment failure:WELD-001524 Unable to load proxy class for
bean Session bean [class com.SafeStreets.mapsserviceadapter.MapsserviceAdapter with qualifiers [@Any @Default]; local interfaces are [MapsserviceInter
face] with class class com.SafeStreets.mapsserviceadapter.MapsserviceAdapter using classloader WebappClassLoader (delegate=true; repositories=WEB-INF/
classes/). Please see server.log for more details.
Command deploy failed.
```

- **IntelliJ:** we used mainly IntelliJ to run the application, but some tests have been done even with AndroidStudio, to actually prove that IDE is not the problem.

2.3 Installation issues

2.3.1 iOS issues

On our Apple machine, during the server deploy process, an issue that did not allow the application to communicate with the server came up. We have been able to solve it by communicating with the developers. The problem that we found was that the SafeStreetsSOAP and SafeStreetsWebServer were assigned to an unrecognized link, different from the once that were expected by the client. The expected links were *\$com.sun.aas.instanceRootURI/* and *\$com.sun.aas.instanceRootURI/applications/SafeStreetsWebServer/*, while we found *\$com.sun.aas.instanceRootURI/applications/SafeStreetsSOAP54378953479583/* and *\$com.sun.aas.instanceRootURI/applications/SafeStreetsWebServer54378953479583/*. To solve the problem, we needed to go in the glassfish5/glassfish/domains/domain1/config folder and modify the domain.xml file by removing the unexpected characters wherever they show up and redeploy everything.

2.3.2 Linux issues

On our Ubuntu machine, during the import of the file database.sql file, these issues came up:

```
16:59:15 Restoring /home/morre/IdeaProjects/AbboAccordiBonetti/JARsAndOtherFiles/database.sql
Running: mysql --defaults-file="/tmp/tmpBvHxJ/extraparams.cnf" --protocol=tcp --host=127.0.0.1 --user=root --port=3306 --default-character-set=utf8 --comments --database=safe_streets_db < "/home/morre/IdeaProjects/AbboAccordiBonetti/JARsAndOtherFiles/database.sql"
ERROR 1273 (HY000) at line 25: Unknown collation: 'utf8mb4_0900_ai_ci'

Operation failed with exitcode 1
16:59:16 Import of /home/morre/IdeaProjects/AbboAccordiBonetti/JARsAndOtherFiles/database.sql has finished with 1 errors

16:59:55 Restoring /home/morre/IdeaProjects/AbboAccordiBonetti/JARsAndOtherFiles/database.sql
Running: mysql --defaults-file="/tmp/tmpW8Elv/extraparams.cnf" --protocol=tcp --host=127.0.0.1 --user=root --port=3306 --default-character-set=utf8 --comments --database=safe_streets_db < "/home/morre/IdeaProjects/AbboAccordiBonetti/JARsAndOtherFiles/database.sql"
16:59:56 Import of /home/morre/IdeaProjects/AbboAccordiBonetti/JARsAndOtherFiles/database.sql has finished
```

the error is: Unknown collation: 'utf8mb4_0900_ai_ci', so we opened that sql file and changed all the occurrences of utf8mb4_0900_ai_ci with utf8mb4_general_ci.

The only issue encountered during the deployment of the server is specified above (section 2.2), and was solved by using Glassfish5.

TESTING

The application has some important issues and bugs. Only few functionalities work properly, making it impossible to test all the features of the application. The requirements that we were not able to test are described in a dedicated section, with the reason of their failures. Note that we tested the application running the server both on a iOS machine and a Linux machine, with the same results.

3.1 Testing Requirements Table

As already described, it is not possible to test all the requirements since some of them do not show up at all. Moreover, it is difficult to follow the requirement's order presented in the RASD and in the ITD, so the following table's purpose is to show which requirements will be tested. At the end of the chapter a section for the untested requirements will be provided anyway.

- [R1] The reports about the violations are correctly stored.
- [R2] The user can view the statistics calculated by the system with some exceptions.
- [R3] The municipality can access only the data of the violations of its competence area.
- [R4] Violations registered by the municipality can be retrieved by the system.
- [R5] The system must avoid the manipulation of the violations.
- [R6] The system must be able to retrieve the position from the user or from the GPS.
- [R7] Only the municipality can access the submitted parking violation of its competence area.
- [R8] The system must allow the user to take a picture or to select one from the device.
- [R9] The system accepts reports from the user.
- [R10] The system must calculate some statistics.
- [R11] The municipality can view all the statistics calculated by the system.

- [R12] The system must suggest interventions to the municipality.
- [R13] The system accepts only reports with a valid plate number and position.
- [R14] The system must allow the user to perform the registration and the login.
- [R15] The system must allow the municipality to perform the registration and the login.
- [R16] The system must ask the user the non-mandatory attributes of the report.
- [R17] The system must communicate with the Identity Verifier.
- [R18] The system must communicate with the Plate Recognizer Service.
- [R19] The system must communicate with the Maps Service.

R	Implemented	Tested
1	<i>Yes</i>	No
2	<i>Yes</i>	Yes
3	<i>Yes</i>	Yes
4	<i>No</i>	-
5	<i>Yes</i>	No
6	<i>Yes</i>	No
7	<i>Yes</i>	No
8	<i>Yes</i>	Yes
9	<i>Yes</i>	Yes
10	<i>Yes</i>	No
11	<i>Yes</i>	Yes
12	<i>No</i>	-
13	<i>Partially</i>	No
14	<i>Yes</i>	Yes
15	<i>Yes</i>	Yes
16	<i>Yes</i>	No
17	<i>No</i>	-
18	<i>No</i>	-
19	<i>Yes</i>	No

Table 3.1: *Traceability matrix*

3.2 Test Cases

The test cases will be presented as follow: they will be grouped by tested requirements, and for every test will be described the following information:

1. **Test purpose**
2. **Device:** device on which the test run (android phone, iOS phone, simulator, web page, etc..)
3. **Input:** input of the test
4. **Outcome:** output of the test
5. **Result:** passed or fail
6. (Eventually) **Possible bugs:** list of possible bugs
7. (Eventually) **Comment:** relevant comments about the test

As previously explained, it will not be possible to test the requirements in the same order as they are presented in the RASD and ITD, but they will be marked with the same enumeration to make them easier to read. The requirements will be marked **[Rn]**, to refer to the n-th requirement.

3.2.1 User registration and login R[14]

R14: The system must allow the user to perform the registration and the login.

User login 1

- **Test purpose:** A user that is already signed up must be able to login correctly.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10), Web page (MacOS)
- **Input:** username: "jak4", password: "jak".
- **Outcome:** SafeStreet user's main menu.
- **Result:** Passed
- **Comment:** The user "jak4" was already registered and given to us by the developers with the password "jak".

User login 3

- **Test purpose:** A user that is already signed up must be able to login correctly only if the server is up.
- **Device:** iOS simulator, Android Emulator (Android 9), Android phone (Android 10),
- **Input:** Server turned off, username: "jak4", password: "jak".
- **Outcome:** Nothing happens.
- **Result:** Passed
- **Comment:** Since the server is down, it is fine that nothing happens if we try to login.

User login 4

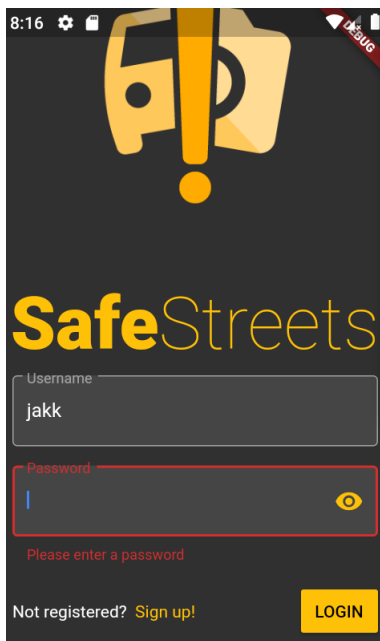
- **Test purpose:** A user can not login with an unregistered account.
- **Device:** iOS simulator, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** username: "fakeTestAccount", password: "psw".
- **Outcome:** Invalid data message.
- **Result:** Passed



Invalid username or password! Retry.

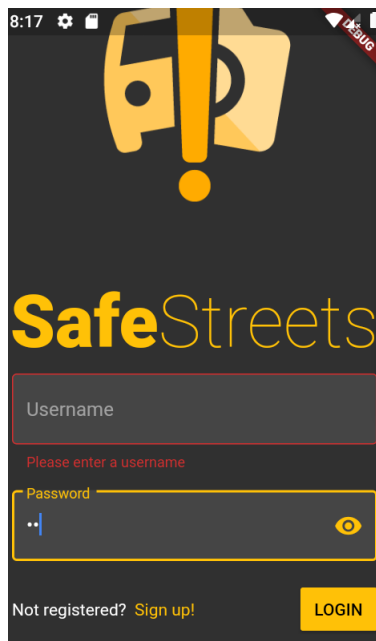
User login 5

- **Test purpose:** A user must be alerted if he does not insert any password.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10), Web page (MacOS)
- **Input:** username: "jakk", password: "".
- **Outcome:** password textfield highlighted in red.
- **Result:** Passed
- **Comment:**



User login 6

- **Test purpose:** A user must be alerted if he does not insert any username.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10), Web page (MacOS)
- **Input:** username: "", password: "jak".
- **Outcome:** username textfield highlighted in red.
- **Result:** Passed
- **Comment:**



User registration 1

- **Test purpose:** A user must be allowed to register. The user try to register by providing all the information required.
- **Device:** iOS simulator, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** username: "test1", email: "test@test.it", name: "TestName", surname: "TestSurname", place of birth: "TestPlace", date of birth: "01-01-1001", place of residence: "TestPlace", fiscal code: "aaaaaaaaaaaaaaaa", password "testpsw", id photo: a picture from device, your photo: a picture from device
- **Outcome:** Nothing happens
- **Result:** Failed
- **Possible bugs:** The application does not perform any action, but on the intelliJ console it is possible to see a *unhandled* error "Unhandled Exception: FormatException: Invalid date format".
- **Comment:** Talking with the developer group, we know that the correct format for the date is yyyy-mm-dd. The application should inform the user about that restriction. Moreover, the application should show an error to inform the user that something went wrong, because it is not intuitive to understand that the sign up request has been sent.

User registration 2

- **Test purpose:** A user must be allowed to register. The user try to register by not giving any information.
- **Device:** iOS simulator, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** none
- **Outcome:** All the textual textfields are signed as mandatory.
- **Result:** Passed
- **Comment:** The "ID PHOTO" and "YOUR PHOTO" button are not marked as mandatory even if they are.

User registration 3

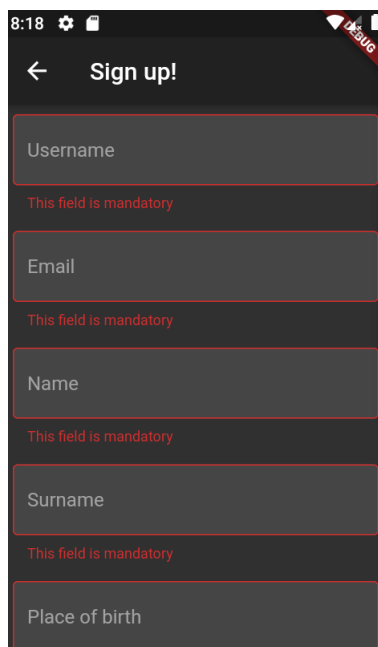
- **Test purpose:** A user must be allowed to register. The user try to register by giving all the information, except for the two pictures.
- **Device:** iOS simulator, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** username: "test1", email: "test@test.it", name: "TestName", surname: "TestSurname", place of birth: "TestPlace", date of birth: "1001-01-01", place of residence: "TestPlace", fiscal code: "aaaaaaaaaaaaaaaa", password "testpsw"
- **Outcome:** Nothing happens
- **Result:** Failed
- **Comment:** Nothing happens, but from the intelliJ console it is possible to see that the pictures are mandatory for the registration(*unhandled* error). They should be marked as mandatory as well as all the other fields, since it is not intuitive to understand what went wrong.

```
[ERROR:flutter/lib/ui/ui_dart_state.cc(157)] Unhandled Exception: Invalid argument(s) (path): Must not be null
#0      ArgumentError.checkNotNull (dart:core/errors.dart:183:27)
```

User registration 4

- **Test purpose:** A user must be allowed to register. The user try to register by giving all the correct information.

- **Device:** iOS simulator, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** username: "test1", email: "test@test.it", name: "TestName", surname: "TestSurname", place of birth: "TestPlace", date of birth: "1001-01-01", place of residence: "TestPlace", fiscal code: "aaaaaaaaaaaaaaaa", password "testpsw", id photo: a picture from device, your photo: a picture from device
- **Outcome:** All the textual textfield are signed as mandatory.
- **Result:** Passed
- **Comment:** The "ID PHOTO" and "YOUR PHOTO" button are not marked as mandatory.



User registration 5

- **Test purpose:** A user must be allowed to register. The user try to register by giving all the correct information.
- **Device:** Web page (MacOS)
- **Input:** username: "test1", email: "test@test.it", name: "TestName", surname: "TestSurname", place of birth: "TestPlace", date of birth: "1001-01-01", place of residence: "TestPlace", fiscal code: "aaaaaaaaaaaaaaaa", password "testpsw"
- **Outcome:** The web page do not open neither the camera nor the gallery.
- **Result:** Failed

- **Comment:** Since neither the camera nor the gallery can be used to upload a picture, the registration can not be performed by the web page (the pictures are mandatory information for the registration).

User registration 6

- **Test purpose:** A user must be allowed to register. The user try to register by giving all the correct information.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** username: "federico111", email: "federico.innocente.spam@gmail.com", name: "Federico", surname: "Innocente", place of birth: "Pordenone", date of birth: "1997-06-19", place of residence: "Pordenone", fiscal code: "NNCFRC97H19G888Q", password "passwordP1", id picture: picture from camera, your picture: picture from camera.
- **Outcome:** Nothing happens
- **Result:** Failed
- **Comment:** We can assume that the registration failed, since we provided all real information and if we try to go back in sign in page and try to log in, a message said that we are using invalid email and password.

```
[ERROR:flutter/lib/ui/ui_dart_state.cc(157)] Unhandled Exception: Connection closed before full header was received
#0      IOClient.send (package:http/src/io_client.dart:65:7)
```

3.2.2 Municipality registration and login [R15]

R15: The system must allow the Municipality to perform the registration and the login.

Municipality login 1

- **Test purpose:** A municipality that is already signed in must be able to login correctly.
- **Device:** iOS simulator
- **Input:** username: "Milano", password: "Milan".
- **Outcome:** SafeStreet municipality's main menu.
- **Result:** Passed

- **Comment:** The municipality "Milano" was already registered with the password "Milan".

Municipality login 2

- **Test purpose:** A user that is already signed in must be able to login correctly.
- **Device:** Web page (MacOS)
- **Input:** username: "Milano", password: "Milan".
- **Outcome:** SafeStreet municipality's main menu.
- **Result:** Passed
- **Comment:** The user "Milano" was already registered with the password "Milan".

Municipality registration

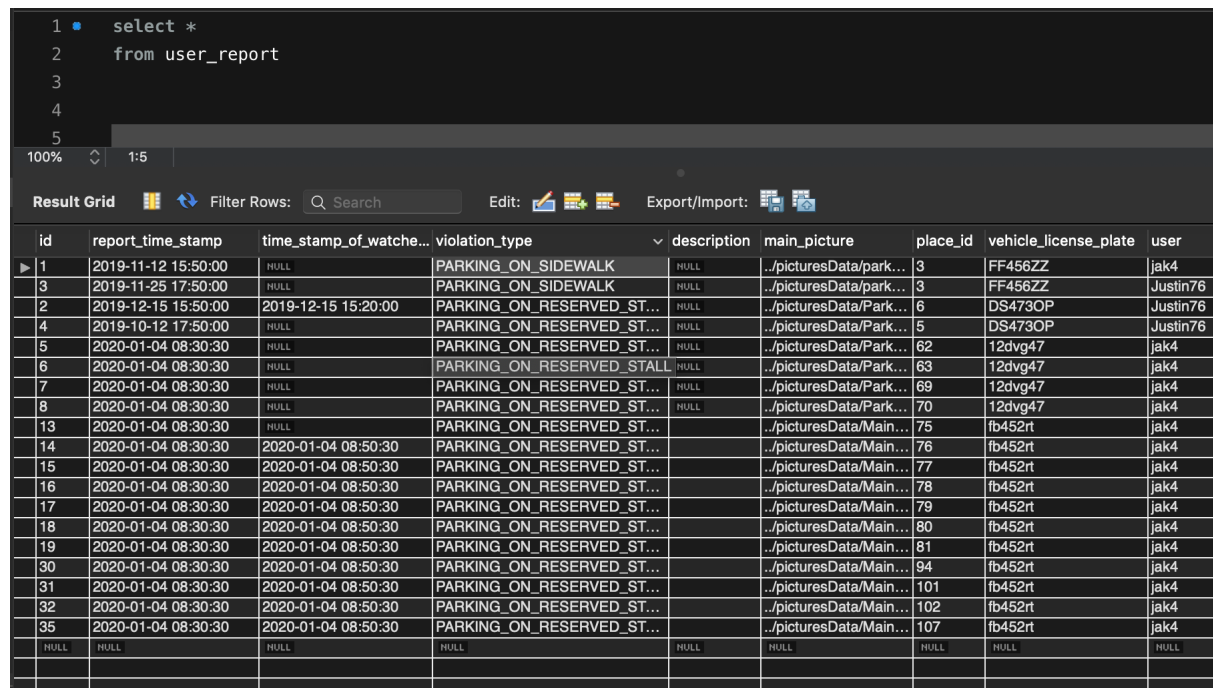
- **Test purpose:** A municipality must be able to register itself on SafeStreets.
- **Device:** Web page (MacOS)
- **Input:** activation code: "123123123", username: "Test", password: "TestPsw".
- **Outcome:** Nothing happens
- **Result:** Failed

3.2.3 User statistics [R2]

R2: The user can view the statistics calculated by the System with some exceptions.

R2.A: The vehicles that have committed the highest number of violations.

For the purpose of these tests, it is important to say that some violation was already stored in the database provided by the developer group. They are 19 violations, 17 reported for "PARKING_ON_RESERVED_STALL" and 2 for "PARKING_ON_SIDEWALK", all uploaded between 12-10-2019 and 04-01-2020, according with the stored information. A picture of a query on the database is provided for more information:



```

1 select *
2 from user_report
3
4
5

```

100% 1:5

Result Grid Filter Rows: Search Edit: Export/Import:

id	report_time_stamp	time_stamp_of_watche...	violation_type	description	main_picture	place_id	vehicle_license_plate	user
1	2019-11-12 15:50:00	NULL	PARKING_ON_SIDEWALK	NULL	../picturesData/park...	3	FF456ZZ	jak4
3	2019-11-25 17:50:00	NULL	PARKING_ON_SIDEWALK	NULL	../picturesData/park...	3	FF456ZZ	Justin76
2	2019-12-15 15:50:00	2019-12-15 15:20:00	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Park...	6	DS473OP	Justin76
4	2019-10-12 17:50:00	NULL	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Park...	5	DS473OP	Justin76
5	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Park...	62	12dvg47	jak4
6	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED_STALL	NULL	../picturesData/Park...	63	12dvg47	jak4
7	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Park...	69	12dvg47	jak4
8	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Park...	70	12dvg47	jak4
13	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	75	fb452rt	jak4
14	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	76	fb452rt	jak4
15	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	77	fb452rt	jak4
16	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	78	fb452rt	jak4
17	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	79	fb452rt	jak4
18	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	80	fb452rt	jak4
19	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	81	fb452rt	jak4
30	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	94	fb452rt	jak4
31	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	101	fb452rt	jak4
32	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	102	fb452rt	jak4
35	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED_ST...	NULL	../picturesData/Main...	107	fb452rt	jak4
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 3.1: Query on all the report stored.

Statistics interrogation 1

- **Test purpose:** A user must be able to view the statistics.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** "Effectiveness" choice in the drop down menu of the "Statistics" page.
- **Outcome:** Nothing happens
- **Result:** Failed
- **Comment:** The same results can be obtained by choosing the "Streets with most violation" or "Most common violation" option.

```

[ERROR:flutter/lib/ui/ui_dart_state.cc(157)] Unhandled Exception: Connection closed before full header was received
#0 IOClient.send (package:http/src/io_client.dart:65:7)

```

Statistics interrogation 2

- **Test purpose:** A user must be able to view the statistics.
- **Device:** Web page (MacOS)
- **Input:** "Effectiveness" choice in the drop down menu of the "Statistics" page.

- **Outcome:** A button with a text description "Send default" appears, but than clicking on any point of the page (both the button or not), it disappears and nothing happens.
- **Result:** Failed
- **Comment:** The same results can be obtained by choosing the "Streets with most violation" or "Most common violation" option.

3.2.4 Municipality violations access [R3]

R3: The Municipality can access only the data of the violations of its competence area. For the purpose of these tests, it is important to say that some violations were already stored in the database provided by the developers.

Municipality violation request 1

- **Test purpose:** The municipality can see all the violations reported on its territory.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** Milan municipality (username: "Milano", password: "Milan"), looks for the violations from "01-11-2019" until "21-01-2020".
- **Outcome:** 17 violations are reported, all of them with the city marked as "Milano".
- **Result:** Passed
- **Bugs:** The first 7 violations are always marked as uploaded in the moment in which the query has been done (same day and hour).
- **Comment:** The date and time error is for sure a bug of the application, but it does not prevent the requirement from being satisfied.

Municipality violation request 2

- **Test purpose:** The municipality can see all the violations reported on its territory.
- **Device:** Web page (MacOS)
- **Input:** Milan municipality (username: "Milano", password: "Milan"), looks for the violations from "01-11-2019" until "21-01-2020".
- **Outcome:** 17 violations are reported, all of them with the city marked as "Milano".

- **Result:** Passed
- **Bugs:** The first 7 violations are always marked as uploaded from the moment in which the query has been done (same day and hour).
- **Comment:** The date and time error is for sure a bug of the application, but it does not prevent the requirement from being satisfied.

Municipality violation request 3

- **Test purpose:** The municipality can see all the violations reported on its territory.
- **Device:** Web page (MacOS)
- **Input:** Venice municipality (username: "Venezia", password: "Venice"), look for the violations from "01-11-2019" until "21-01-2020".
- **Outcome:** 1 violation is reported, located in Venice and uploaded the 15-12-2019.
- **Result:** Passed

3.2.5 Violation access [R7]

R7: Only the Municipality can access the submitted parking violations of its competence area

User violation access

- **Test purpose:** The user page do not have the "Access reports" menu.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** Log in as a user
- **Outcome:** The "Access report" menu is not available.
- **Result:** Passed
- **Comment:** This requirement will be better discussed in the next section.

3.2.6 Picture selection [R8]

R8: The system must allow the User to take a picture or select one from the device. This requirement must be ensured in two cases: when a user uploads pictures for the registration and when the user uploads pictures for a violation.

Picture selection for registration 1

- **Test purpose:** A user must be allowed to take a picture or to select one from the device when he wants to register himself.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** "Chose ID photo" button from the sign in page.
- **Outcome:** A choice is given to the user between using his camera or selecting from gallery. Both the options work properly.
- **Result:** Passed
- **Comment:** The same operation can be done for the "Chose your photo" button, with the same result. After selecting a picture, nothing changes on the application page, but this can be thought as a choice and do not go against the requirement.

Picture selection for registration 2

- **Test purpose:** A user must be allowed to take a picture or to select one from the device when he wants to register himself.
- **Device:** Web App (MacOS)
- **Input:** "Chose ID photo" button from the sign in page.
- **Outcome:** A choice is given to the user between using his camera or selecting from gallery, but than nothing happens for both the choices.
- **Result:** Failed
- **Comment:** The same operation can be done for the "Chose your photo" button, with the same result.

Picture selection for violation 1

- **Test purpose:** A user must be allowed to take a picture or to select one from the device when he wants to upload pictures in the context of a violation.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** Tapping on "New Report" option from the main menu.

- **Outcome:** The camera is opened by default, but then it is possible to switch to the gallery to chose a picture. Both option allow you to select a picture and move to the next step in the violation reporting.
- **Result:** Passed

3.2.7 User new reports [R9]

R9: The system accepts reports from the User.

User's report upload 1

- **Test purpose:** A user must be able to upload a new report.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** "New report" from main menu, take a picture with the camera, confirm, chose category "Parking on traffic island", confirm.
- **Outcome:** Nothing happens. After some time, a message appears: "An error occurred, please retry" with a button "Abort". Sometimes, if the confirmation button is clicked several times before the error message comes out, the application moves to the next page and instantly shows the same error.
- **Result:** Failed
- **Possible bugs:** It is possible that the error is caused by the failure of the system to retrieve the position from the user GPS, and that does not allow the server to complete the task.
- **Comment:** The same result is obtained by uploading a picture from the gallery and by choosing another type of violation.

3.2.8 Municipality query statistics [R11]

R11: The municipality can view all the statistics calculated by the system.

Statistics interrogation

- **Test purpose:** A municipality must be able to view the statistics.
- **Device:** iPhone, Android Emulator (Android 9), Android phone (Android 10)
- **Input:** "Effectiveness" choice in the drop down menu of the "Statistics" page.

- **Outcome:** nothing happens.
- **Result:** Failed
- **Comment:** The same results can be obtained by choosing the "Streets with most violation", "Most common violation" or "Worst drivers" option.

3.3 Untestable requirements

Some requirements were impossible to be tested, and they are presented in this section with an analysis of the issues we have found.

3.3.1 Reports are correctly stored [R1]

R1: The reports about the violations are correctly stored.

It was impossible to test this requirement, since the system does not allow to go after choosing the violation type, making it impossible to upload the reports. All the tests that concern some violations are done on the reports that were already stored in the database, provided by the developers.

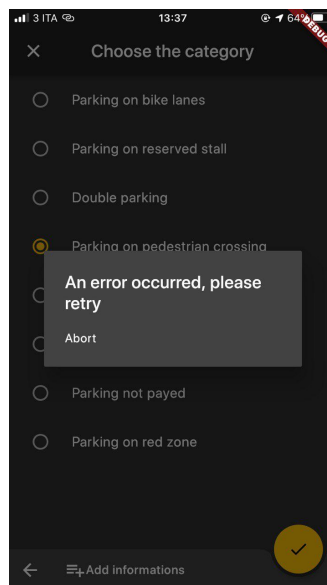


Figure 3.2: Report upload error.

3.3.2 Violation manipulation [R5]

R5: The system must avoid the manipulation of the violations.

Since it is impossible to upload a new violation, it is not possible to know if the system has manipulated the information. Anyway, a manipulation of data has been discovered

indirectly in the application testing: when a municipality queries the violation on its territory, sometimes some reports are showed with the current date and time as upload date. We do not know what can cause this issue, since the violations seems to be stored correctly on the database. The test case that pointed out this issue is *Municipality violation request 1*, from the previous section. In the follow is provided a screen of the error, as well as the database actual situation.

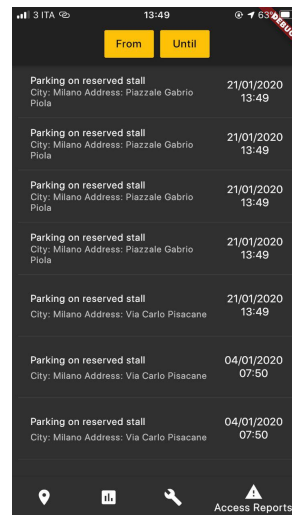


Figure 3.3: The first 5 violations show the date and time of the device (can be compared with the actual time on the top).

```

1 select *
2 from user_report
3
4
5

```

id	report_time_stamp	time_stamp_of_watche...	violation_type	description	main_picture	place_id	vehicle_license_plate	user
1	2019-11-12 15:50:00	NULL	PARKING_ON_SIDEWALK	NULL	../picturesData/park...	3	FF456ZZ	jak4
3	2019-11-25 17:50:00	NULL	PARKING_ON_SIDEWALK	NULL	../picturesData/park...	3	FF456ZZ	Justin76
2	2019-12-15 15:50:00	2019-12-15 15:20:00	PARKING_ON_RESERVED ST...	NULL	../picturesData/Park...	6	DS4730P	Justin76
4	2019-10-12 17:50:00	NULL	PARKING_ON_RESERVED ST...	NULL	../picturesData/Park...	5	DS4730P	Justin76
5	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED ST...	NULL	../picturesData/Park...	62	12dvg47	jak4
6	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED STALL	NULL	../picturesData/Park...	63	12dvg47	jak4
7	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED ST...	NULL	../picturesData/Park...	69	12dvg47	jak4
8	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED ST...	NULL	../picturesData/Park...	70	12dvg47	jak4
13	2020-01-04 08:30:30	NULL	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	75	fb452rt	jak4
14	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	76	fb452rt	jak4
15	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	77	fb452rt	jak4
16	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	78	fb452rt	jak4
17	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	79	fb452rt	jak4
18	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	80	fb452rt	jak4
19	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	81	fb452rt	jak4
30	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	94	fb452rt	jak4
31	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	101	fb452rt	jak4
32	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	102	fb452rt	jak4
35	2020-01-04 08:30:30	2020-01-04 08:50:30	PARKING_ON_RESERVED ST...	NULL	../picturesData/Main...	107	fb452rt	jak4
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 3.4: Actual situation of the violation database while the test was running.

3.3.3 Map and GPS [R6][R19]

R6: The system must be able to retrieve the position from the user or from the GPS.

R19: The System must communicate with the Maps Service.

This two requirements need to be presented together, since it is impossible to distinguish them for several issues of the application.

When the application runs, after the user login, an error message is shown in the "Around me" main menu. The error shows up on every device we used to run the application: web page (Chrome, as indicated), android phone, android emulator, iOS phone, iOS simulator. We think that this issue is related to the harvest of information about the user geolocation, and that it shares the same cause with some other bugs of the application (like the violation upload one), but this is just an approximate analysis that can not be considered accurate without looking at the source code (out of the scope of this document). In the following are showed some pictures of the error.

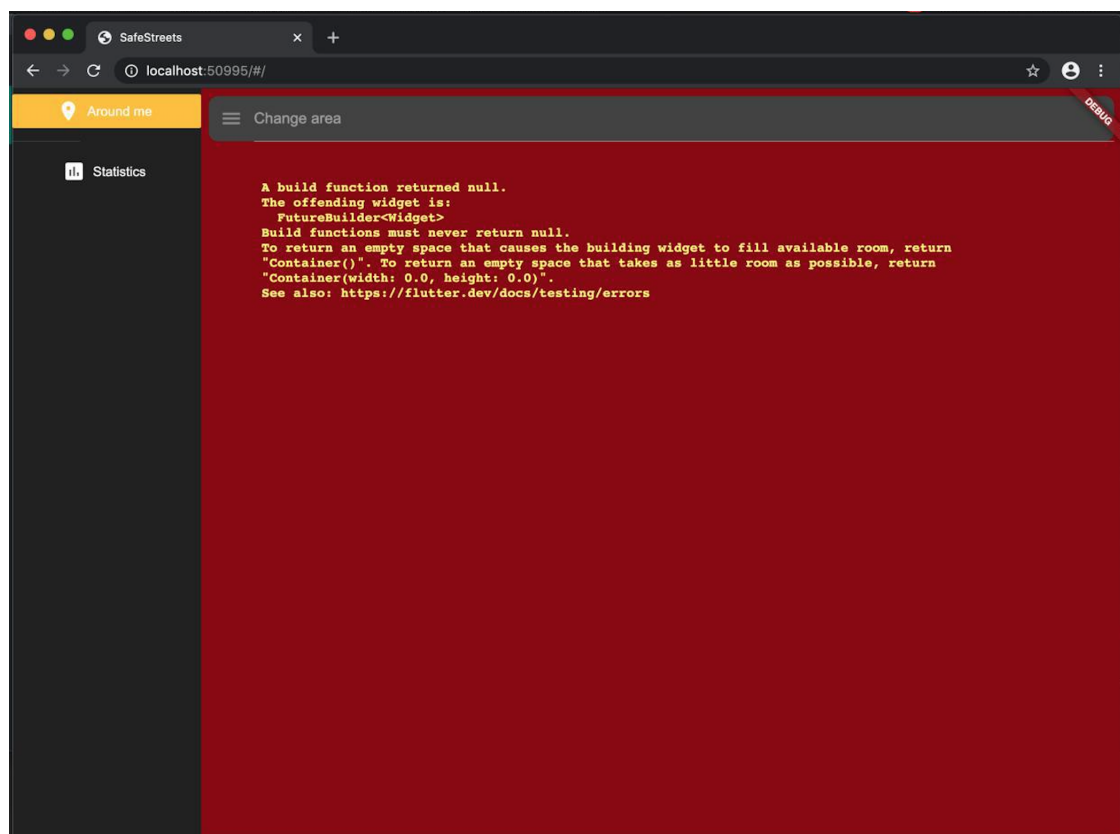


Figure 3.5: Web page error.

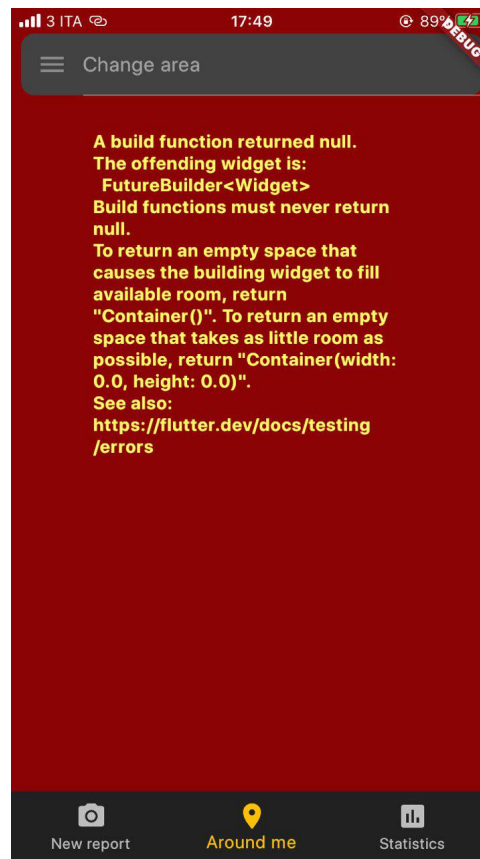


Figure 3.6: Smartphone error.

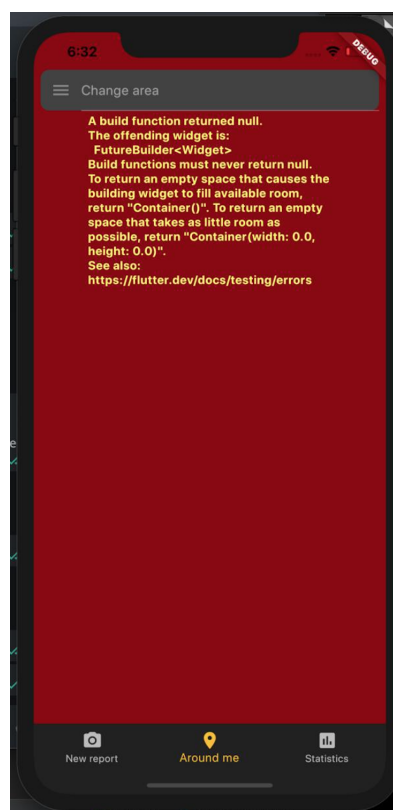


Figure 3.7: iOS simulator error.

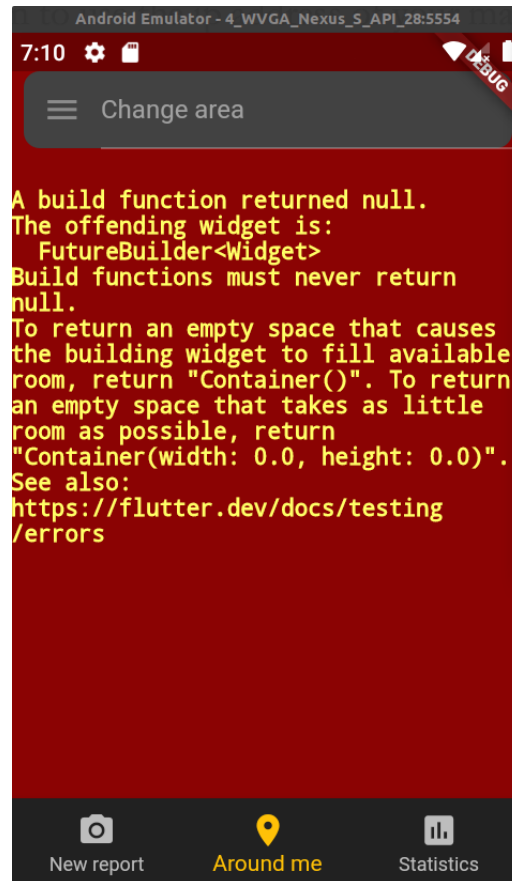


Figure 3.8: Android Emulator error.

```
The following assertion was thrown building FutureBuilder<Widget>(dirty, state: _FutureBuilderState<Widget>#bb5f3):
A build function returned null.

The offending widget is: FutureBuilder<Widget>
Build functions must never return null.
```

Figure 3.9: Console error.

The "Around me" menu should interface the user with the map, and it is not possible to say if this error comes from the GPS connection or the communication with the map service. By inserting a location in the text-bar on the top nothing happens, but it is reasonable to think that this is related to the bug already described.

The requirement R6 should concern even the violation uploaded by a user, that should be able to provide his location to associate it to the report. This is untestable, since it is not possible to reach that page in the upload phase.

3.3.4 Violation access [R7]

R7: Only the Municipality can access the submitted parking violation of its competence area

It is not possible to say if this requirement is satisfied. The only analysis that we can do is that the user can not see the "Access report" menu, but the main point of this requirement was probably on the possibility to see important information (like pictures or plate numbers) by the user, information that are neither provided on these menu nor for the municipality. The issue of testing this requirement came from the error previously discussed of the "Around me" map, that we can not say what would show to the user, as well (less probably) as the statistics page. The requirement is satisfied, but we can say nothing about what it would be without these two bugs.

3.3.5 Statistics calculation [R10]

R10: The System must calculate some statistics:

R10.A: The system must calculate the streets with the highest and the lowest number of violations.

R10.B: The system must calculate the effectiveness of the service.

R10.C: The system must calculate the vehicles (identified by the traffic plate) that have committed the highest number of violations.

As showed in the previous section (*Statistics [R2]*) the user can not see the statistics. This is enough to say that the requirement R2 (The user can view the statistics calculated by the System with some exceptions) is not satisfied, but not to say that the system is not able to build statistics, since it could just not show them. This consideration make the requirement impossible to be tested.

We did these considerations about this requirement because of its similarity with R2. In fact, considering a scenario in which the statistics are showed but they are incorrect, it would be satisfied only the requirement R2 and not the R10.

3.3.6 Violation acceptance

R13: The system accepts only reports with a valid plate number and position.

This requirement should be only partially implemented (only accepts a valid position). However, since it is not possible to upload a violation report, it is not possible to test it.

3.3.7 Non-mandatory attributes request

R16: The system must ask the User the non-mandatory attributes of the report.

The violation upload procedure can not be done, and it does not reach the page that should require the non-mandatory attributes. Because of that, it is not possible to test this requirement.

APPLICATION AND DOCUMENT ANALYSIS

4.1 Application analysis

4.1.1 Features analysis

In these section we want to provide a recap of the feature of the system that work correctly, partially work or do not work at all.

Working features

- User log-in
- Municipality log-in

Partially working feature

- Municipality violation query

Not working feature

- Registration
- Violation reporting
- Statistics querying
- Map visualization

4.1.2 Requirement analysis

Here is presented a table to recap which requirements pass the tests and which do not.

[R1] The reports about the violations are correctly stored.

[R2] The user can view the statistics calculated by the system with some exceptions.

[R3] The municipality can access only the data of the violations of its competence area.

[R4] Violations registered by the municipality can be retrieved by the system.

[R5] The system must avoid the manipulation of the violations.

- [R6] The system must be able to retrieve the position from the user or from the GPS.
- [R7] Only the municipality can access the submitted parking violation of its competence area.
- [R8] The system must allow the user to take a picture or to select one from the device.
- [R9] The system accepts reports from the user.
- [R10] The system must calculate some statistics.
- [R11] The municipality can view all the statistics calculated by the system.
- [R12] The system must suggest interventions to the municipality.
- [R13] The system accepts only reports with a valid plate number and position.
- [R14] The system must allow the user to perform the registration and the login.
- [R15] The system must allow the municipality to perform the registration and the login.
- [R16] The system must ask the user the non-mandatory attributes of the report.
- [R17] The system must communicate with the Identity Verifier.
- [R18] The system must communicate with the Plate Recognizer Service.
- [R19] The system must communicate with the Maps Service.

R	Satisfied
1	<i>Untestable</i>
2	<i>No</i>
3	<i>Yes</i>
5	<i>Yes*</i>
6	<i>Untestable</i>
7	<i>No</i>
8	<i>Yes</i>
9	<i>No</i>
10	<i>Untestable</i>
11	<i>No</i>
13	<i>Untestable</i>
14	<i>Partially**</i>
15	<i>Partially**</i>

16	<i>Untestable</i>
19	<i>Untestable</i>

Table 4.1: *Traceability matrix*

* : Some data are showed wrong in the municipality violation query.

** : Only login requirement is satisfied.

4.2 Test analysis

We successfully run all the tests involving the flutter client, here are the results:

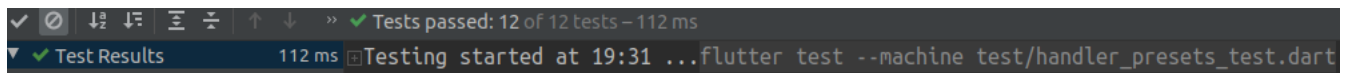


Figure 4.1: handler_presets_test.dart

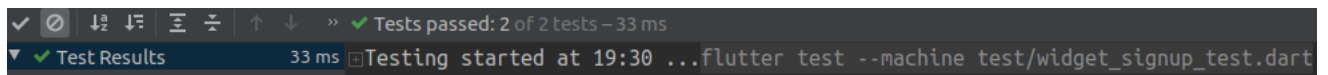


Figure 4.2: widget_signup_test.dart

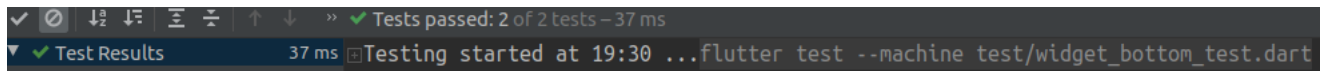


Figure 4.3: widget_bottom_test.dart

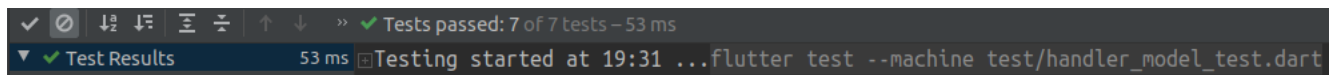


Figure 4.4: handler_model_test.dart

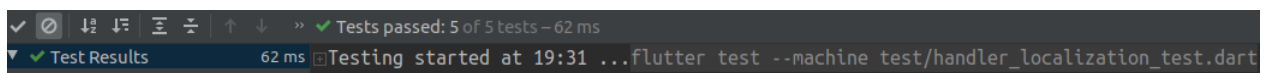


Figure 4.5: handler_localization_test.dart

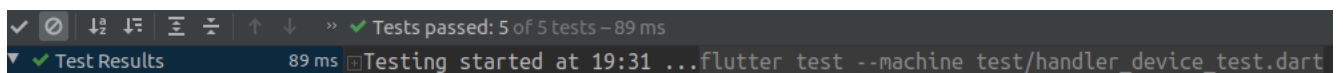


Figure 4.6: handler_device_test.dart

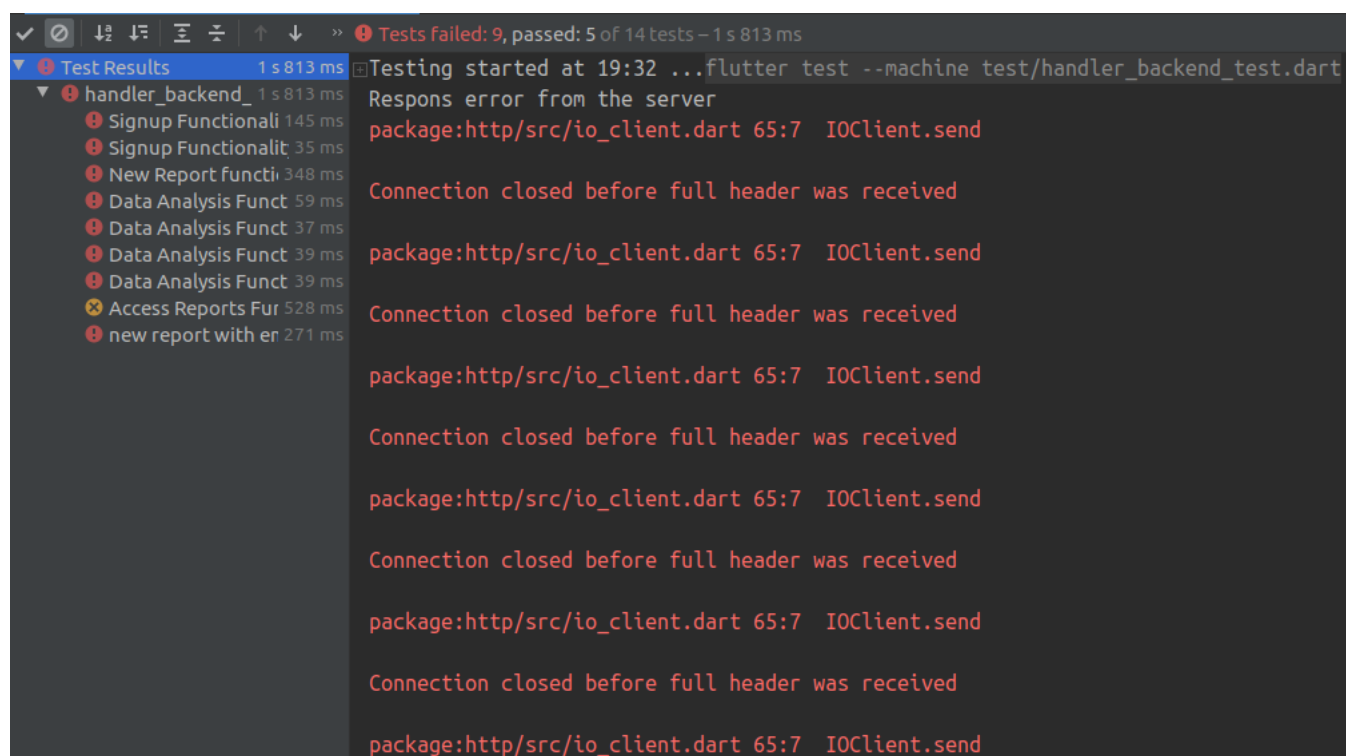


Figure 4.7: handler backend test.dart

We tried to run a second time this, but here is the result:

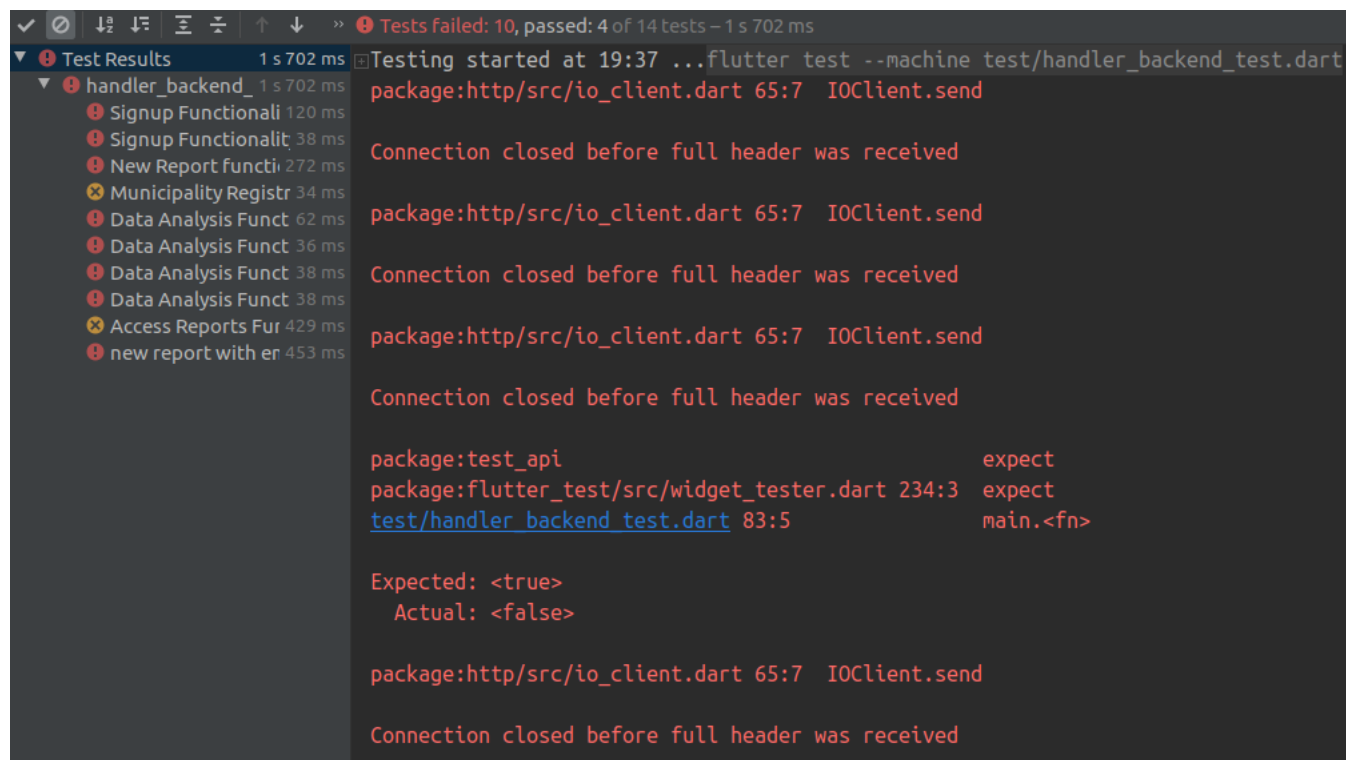


Figure 4.8: handler_device_test.dart 2

4.3 Document analysis

During the analysis of the documents (RASD, DD, ITD), we have found that there is no distinction between the functionalities offered by the app on the smartphone and the application on the web page. During the testing, we find out that on the smartphone is not allowed to register a user as a municipality. Moreover we noticed that on the web page is not possible to add a new report.

EFFORT SPENT

The major part of the document has been produced working together and that's the reason why there is not a precise division of hours per sections and per group component. The following is an approximate estimation of the number of hours of work for each group member:

- Federico Innocente: 3 days;
- Federico Morreale: 2 days;
- Evandro Maddes: 2 days.