

MINISTRY OF DIGITAL DEVELOPMENT, COMMUNICATIONS AND MASS MEDIA OF THE RUSSIAN FEDERATION

FEDERAL STATE BUDGET-FINANCED EDUCATIONAL
INSTITUTION OF HIGHER EDUCATION THE BONCH-BRUEVICH SAINT PETERSBURG
STATE UNIVERSITY OF TELECOMMUNICATIONS

DEVELOPMENT OF AN EMERGENCY ALERT INFORMATION SYSTEM

Student:

Ivan Zaleskii

Thesis advisor:

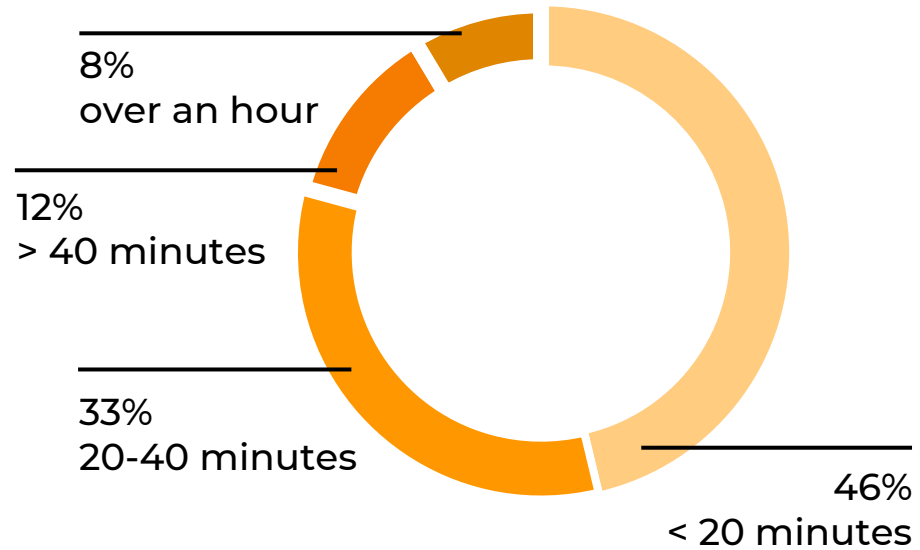
Yulia Denisova

ISS department assistant

St. Petersburg
2023

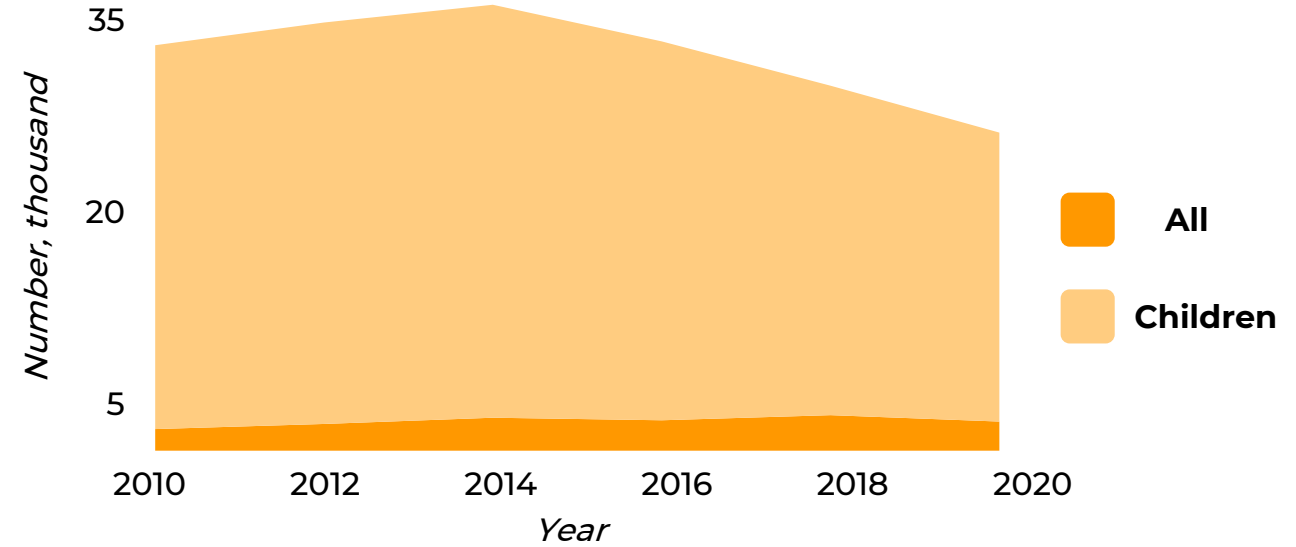
Relevance

Waiting for an ambulance *



**KOUZH, Rosstat*

Dead from crimes: all people vs children *



**Demoscope Weekly, 2022*

Gun crimes growth *

+30%

**RBC, MIA*

Moscow
+200%

St. Pet
+100%

Purpose, tasks



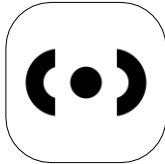

Purpose

- 🎯 Reducing the risk to people's lives and health by developing an Information System for calling help and alerting the surrounding individuals in emergency situations.





Tasks

- ☐ domain analysis in the filed of calling help and alerting the surrounding individuals in emergency situations
- ☐ search and research of existing solutions in the filed of calling help and alerting surrounding individuals in emergency situations
- ☐ setting requirements for system
- ☐ tech stack selection
- ☐ database design
- ☐ server part design
- ☐ client part design
- ☐ testing
- ☐ project development analysis





Analogues

	 Emergency call	 Family applications	 Citizen	 LiS
sending location with SOS signal	+	+	+	+
emergency services call	+	+	+	+
sending SOS to “The Circle” group	-	+	+	+
availability in Russia/CIS	+	+	-	+
can be used by all population groups	+	-	+	-
alerting surrounding individuals	-	-	+	-
sending SOS to strangers	-	-	+	+

Analogue

	 Emergency call	 Family applications	 Citizen	 LiS
sending location with SOS signal	+	+	+	+
emergency services call	+	±	+	+
sending SOS to “The Circle” group	-	+	+	±
availability in Russia/CIS	+	+	-	+
can be used by all population groups	+	-	+	-
alerting surrounding individuals	-	-	+	-
sending SOS to strangers	-	-	+	+

Analogue

	 Emergency call	 Family applications	 Citizen	 LiS
sending location with SOS signal	±	+	+	+
emergency services call	+	±	+	+
sending SOS to “The Circle” group	-	+	+	±
availability in Russia/CIS	+	+	-	+
can be used by all population groups	+	-	+	-
alerting surrounding individuals	-	-	+	-
sending SOS to strangers	-	-	+	+

Idea



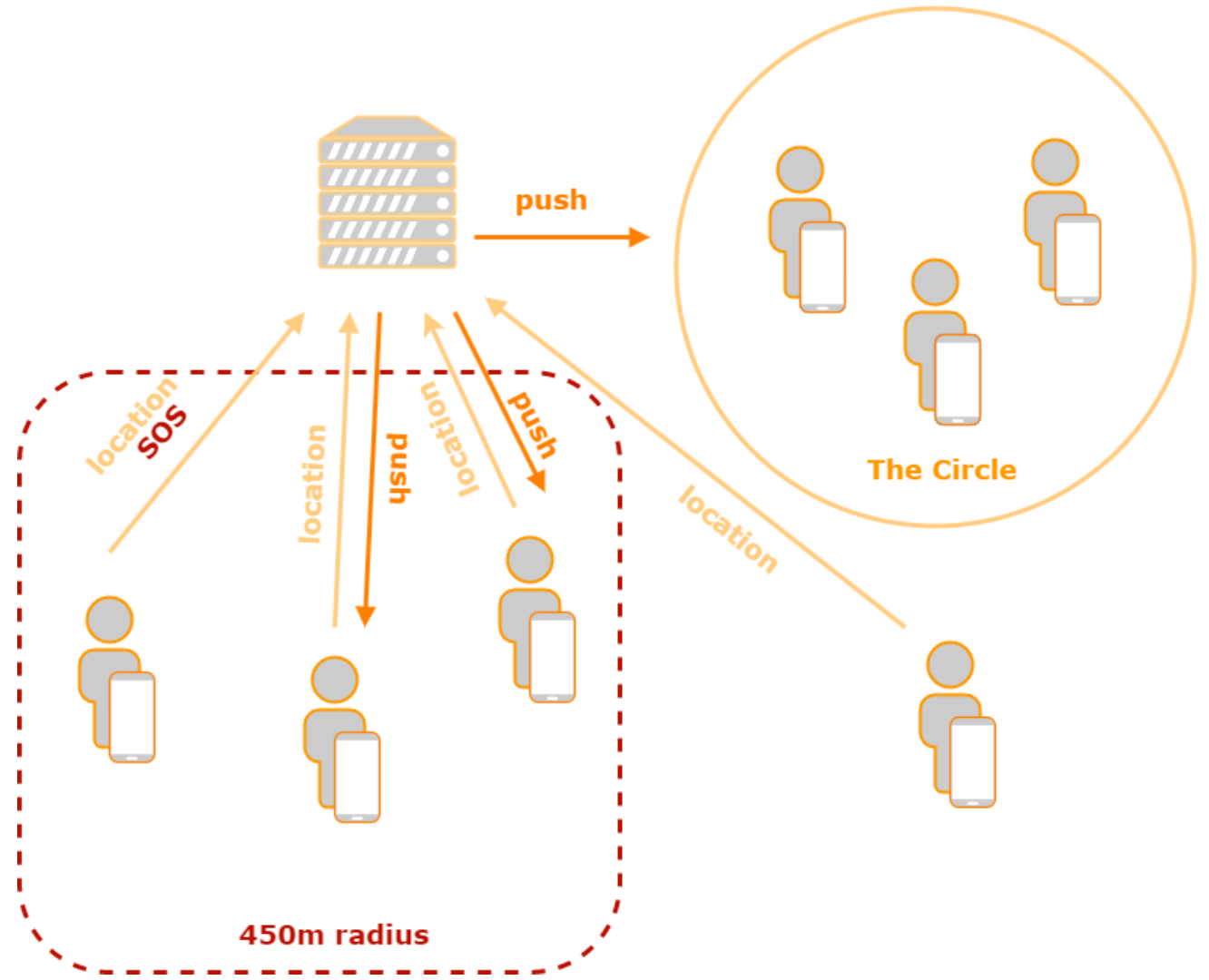
Location updates










Help within 450m radius



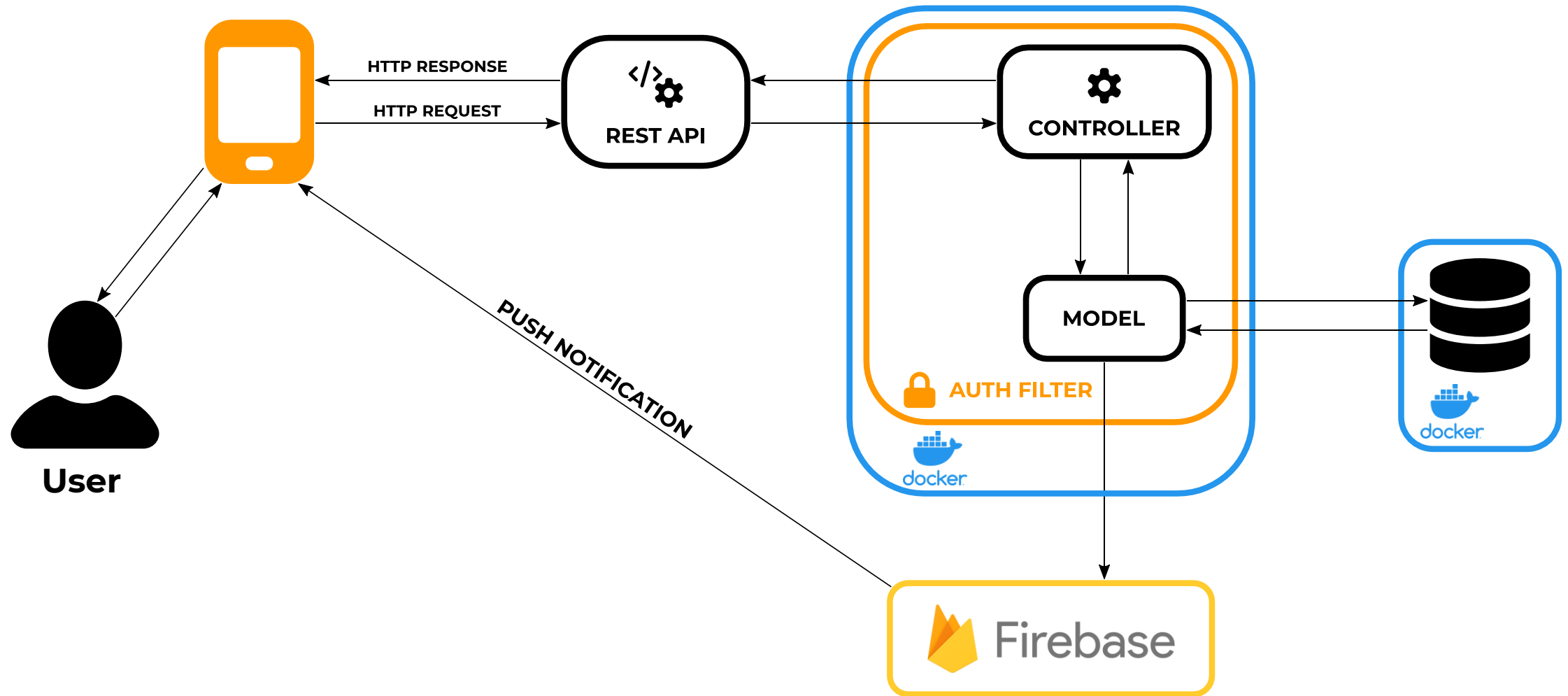
Push-notifications



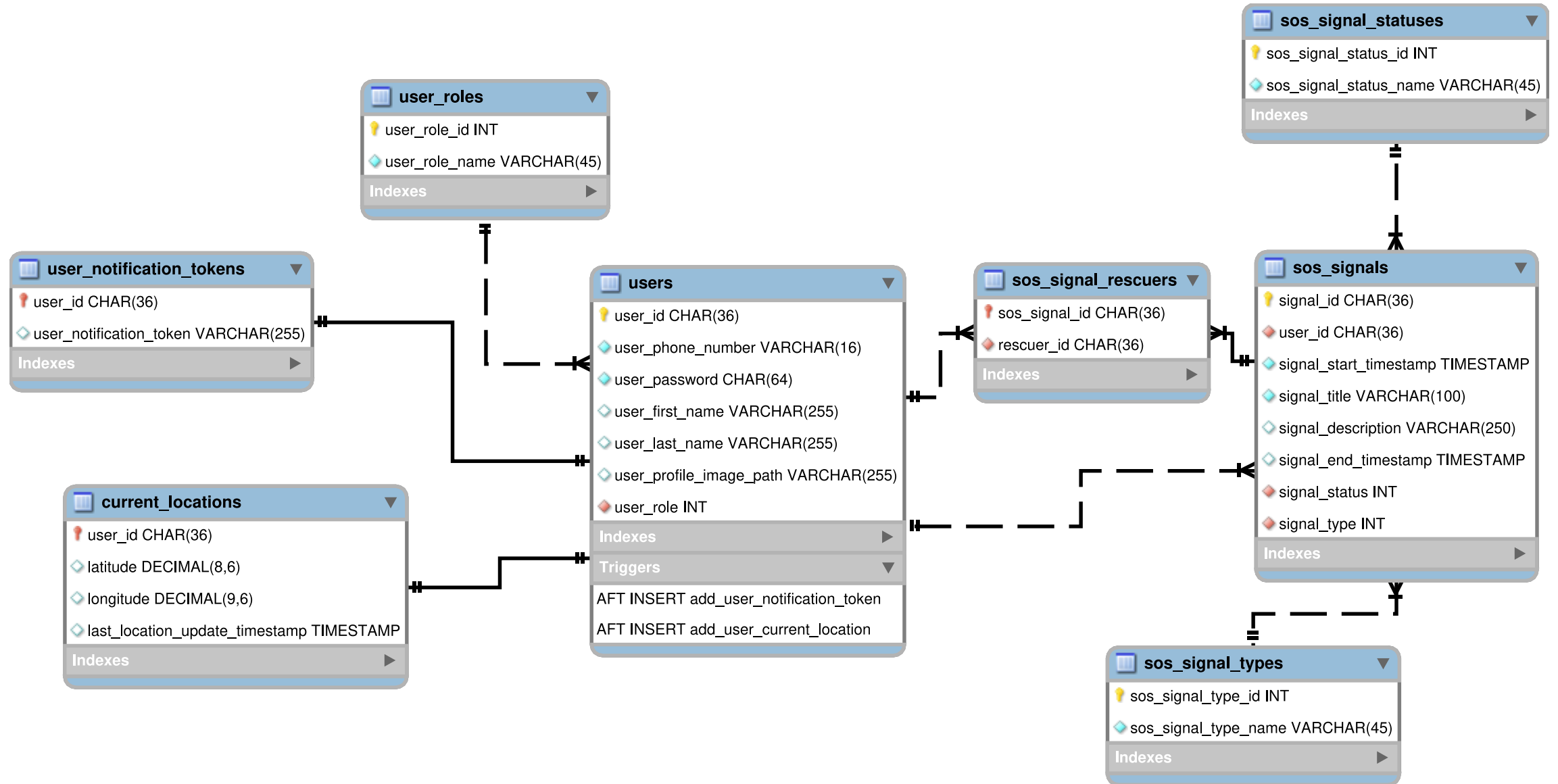
Tech stack

	Architecture	Tech	Main advantage
Backend	SOLID Clean Modularization	 Spring	IOC container
		 Java	Cross-platform
		 MySQL	Simple queries speed
		 Docker	Single containers launch simplicity
		 Firebase	5,000 Push-notifications per hour in FCM
Application	MVC		
	MVVM	 Android	70% mobile devices market
	MVI	 Kotlin	Recommended by Google as primary language for Android development

System scheme



Database



Server

Architecture



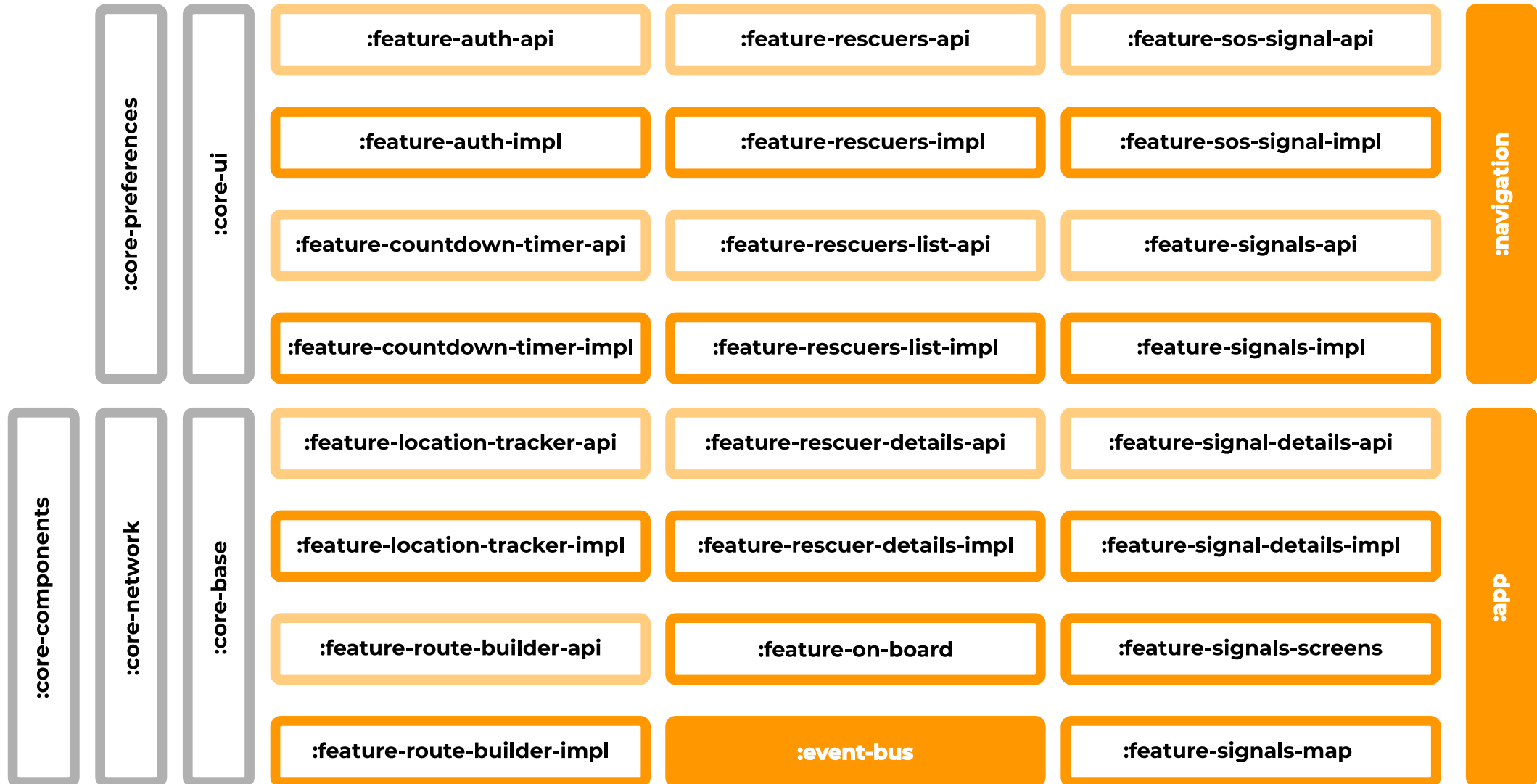
Server

API

<p>/signals/api/v1/login</p> <p>POST</p> <p>200 Ok 400 Bad Request</p> <p>500 Internal</p>	<p>/signals/api/v1/sos-signals/near</p> <p>GET</p> <p>200 Ok 403 Forbidden</p> <p>500 Internal</p>	<p>/signals/api/v1/sos-signals/{id}/rescuers</p> <p>POST</p> <p>201 Created 403 Forbidden</p> <p>500 Internal 404 Not Found</p>
<p>/signals/api/v1/locations</p> <p>PATCH</p> <p>201 Created 403 Forbidden</p> <p>500 Internal</p>	<p>/signals/api/v1/sos-signals/{id}</p> <p>GET</p> <p>200 Ok 403 Forbidden</p> <p>500 Internal 404 Not Found</p>	<p>/signals/api/v1/sos-signals/{id}/rescuers</p> <p>DELETE</p> <p>200 Ok 403 Forbidden</p> <p>500 Internal 404 Not Found</p>
<p>/signals/api/v1/sos-signals/new</p> <p>POST</p> <p>201 Created 403 Forbidden</p> <p>500 Internal</p>	<p>/signals/api/v1/rescuers</p> <p>GET</p> <p>200 Ok 403 Forbidden</p> <p>500 Internal</p>	<p>/signals/api/v1/notification-tokens</p> <p>PATCH</p> <p>201 Created 403 Forbidden</p> <p>500 Internal</p>
<p>/signals/api/v1/sos-signals</p> <p>DELETE</p> <p>200 Ok 403 Forbidden</p> <p>500 Internal 404 Not Found</p>	<p>/signals/api/v1/rescuers/{id}</p> <p>GET</p> <p>200 Ok 403 Forbidden</p> <p>500 Internal 404 Not Found</p>	

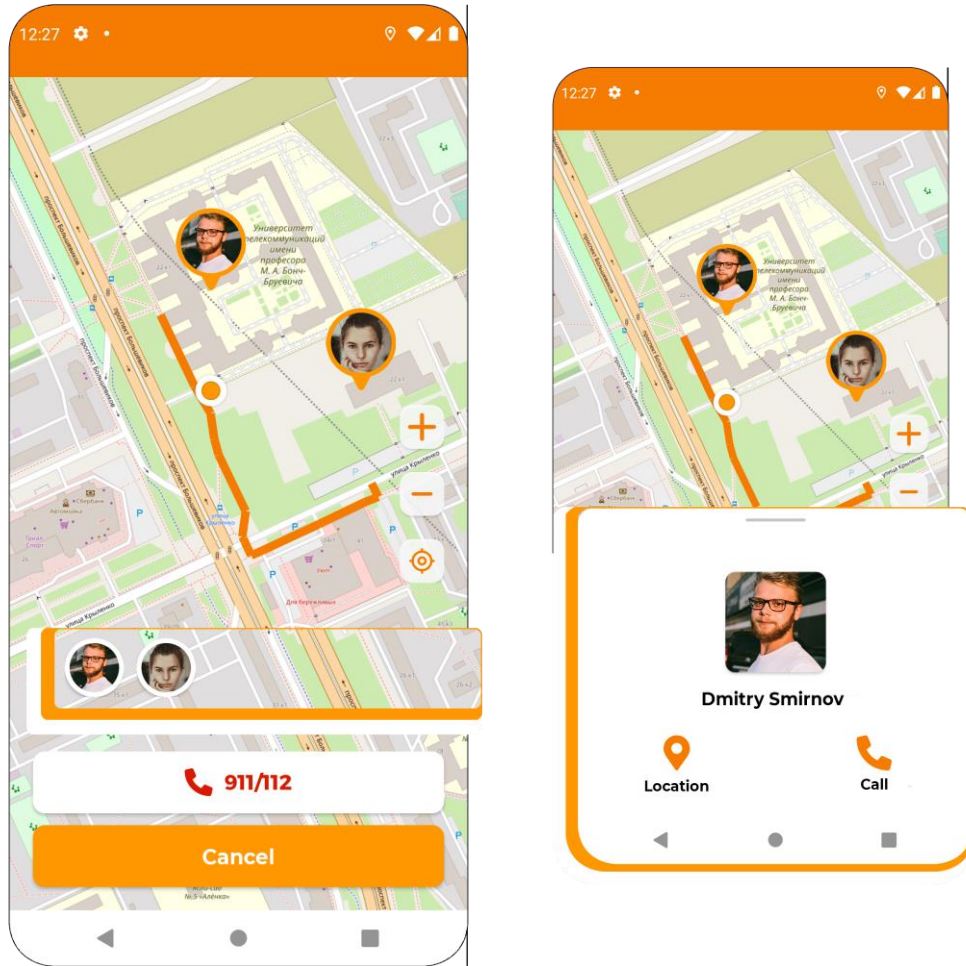
App

Architecture



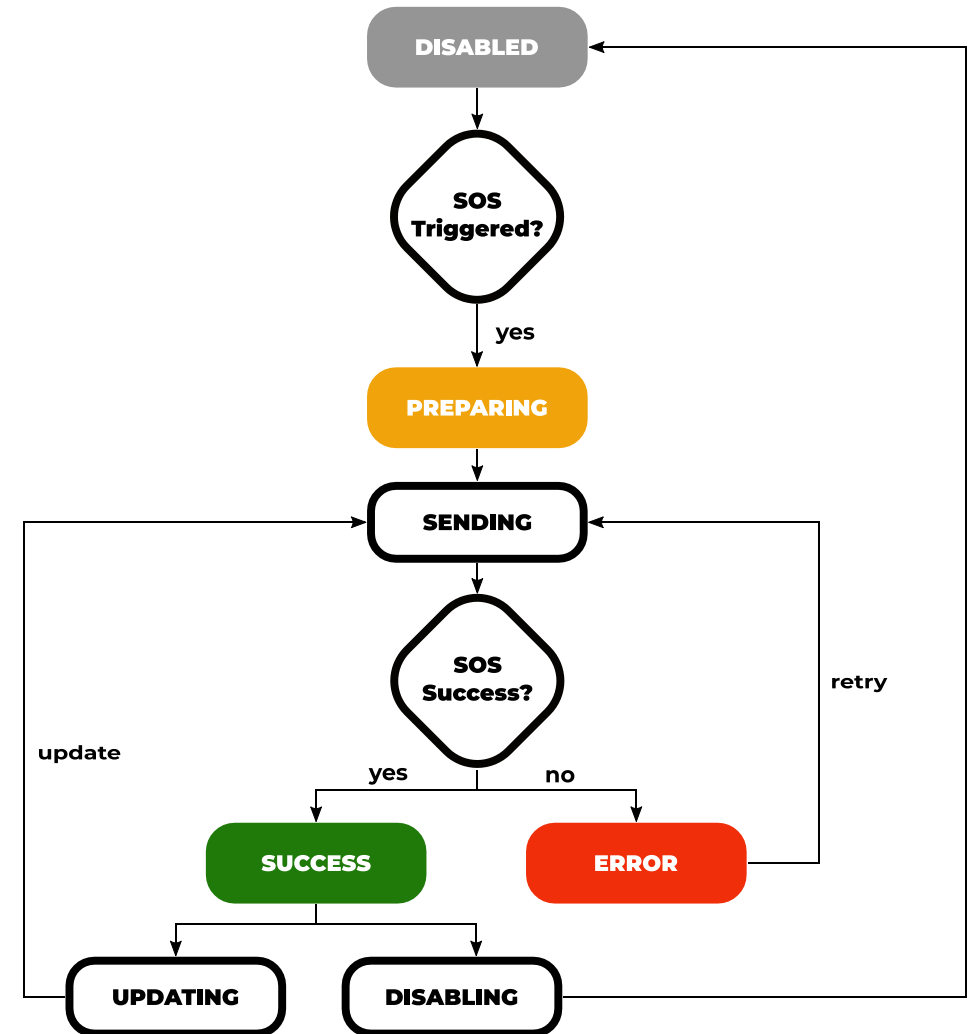
App

Modularization



Screens modularization

SOS SIGNAL LIFECYCLE



SOS-signal lifecycle

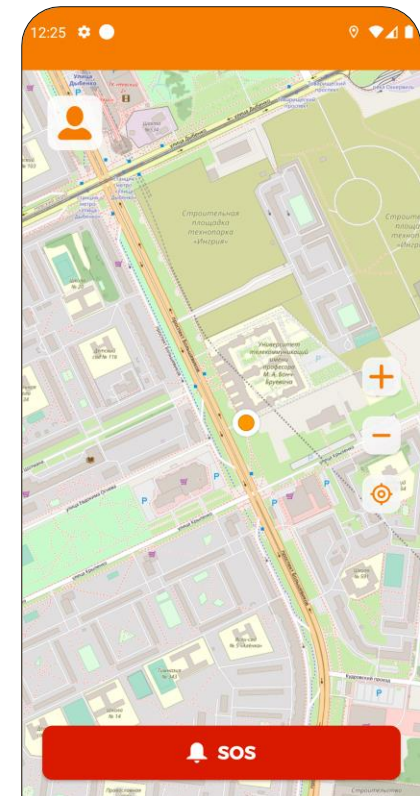
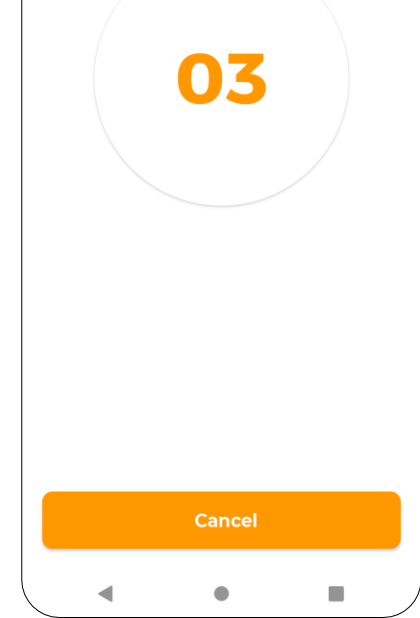
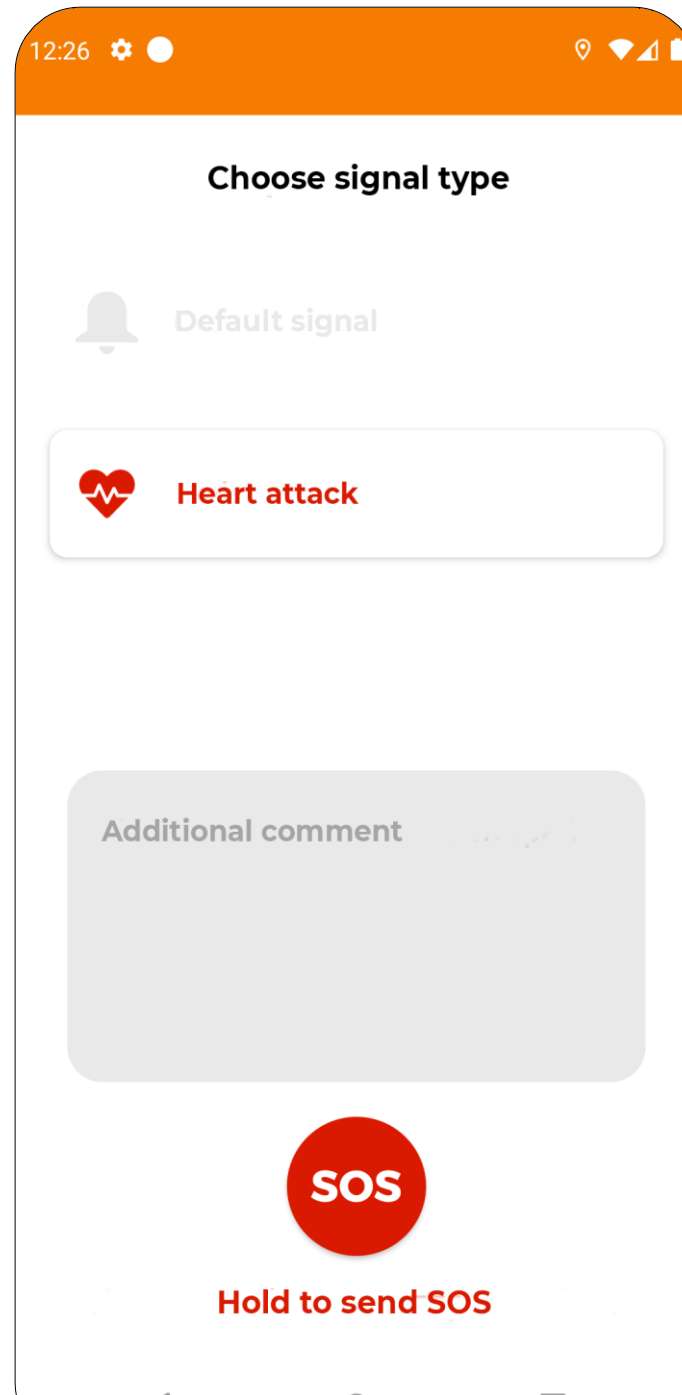
Sending SOS

 **Up-to-date location**

 **Non-stop work**

 **SOS type selection**

 **Accidental click control**

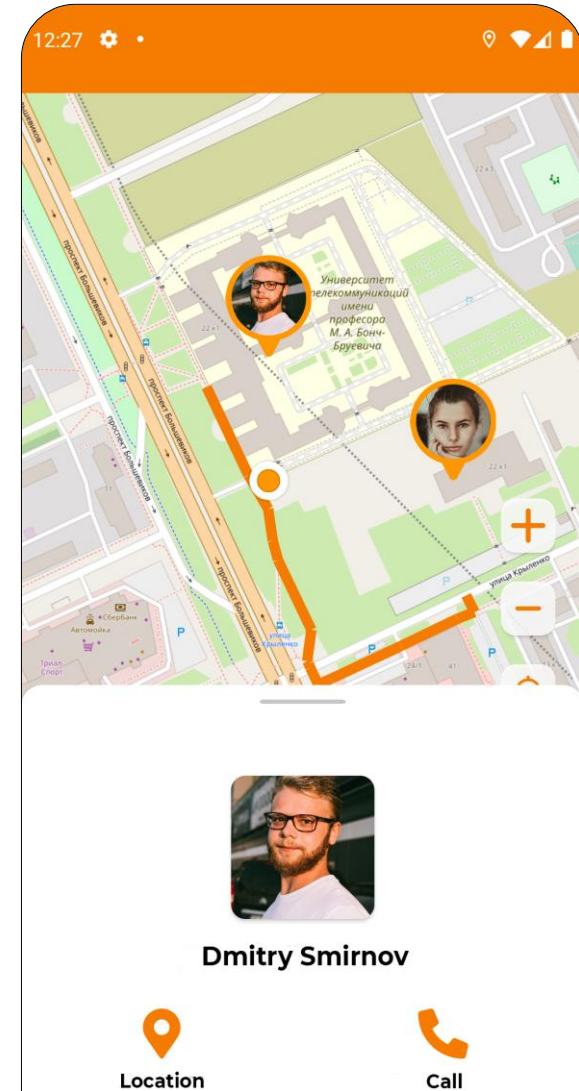
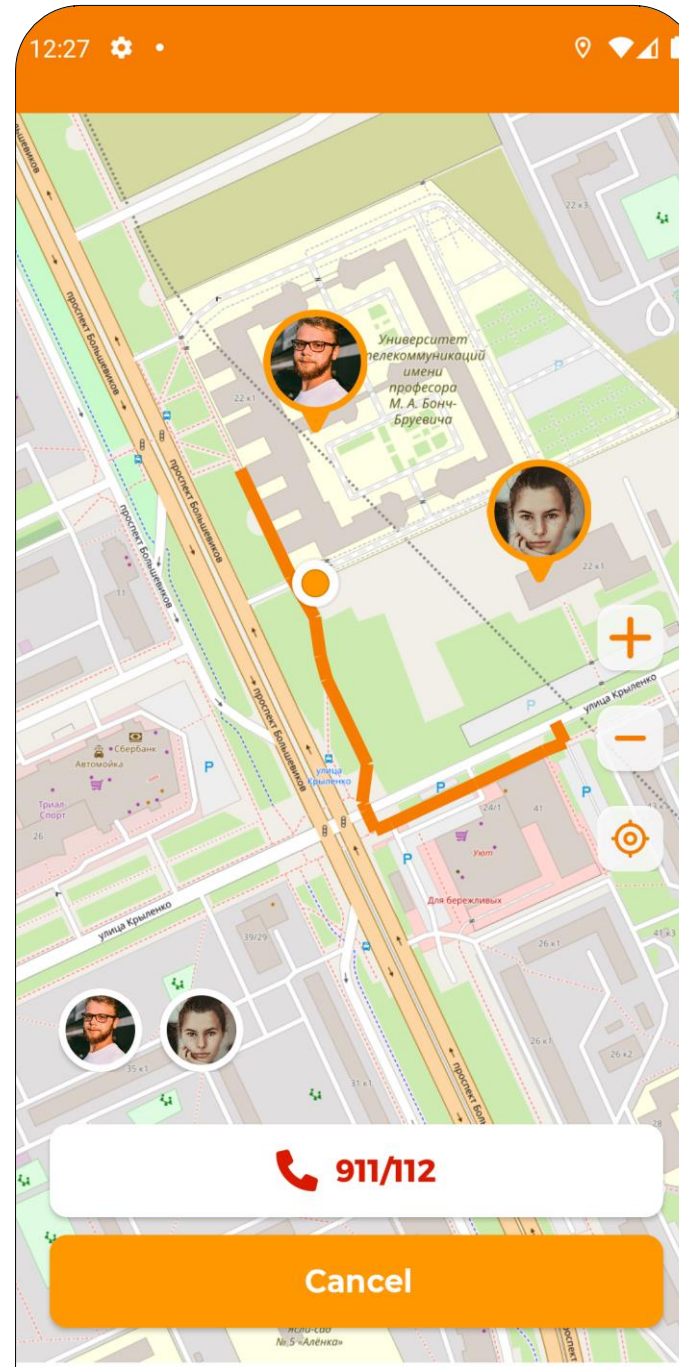


Sending SOS

 **Rescuers list**

 **Rescuer details**

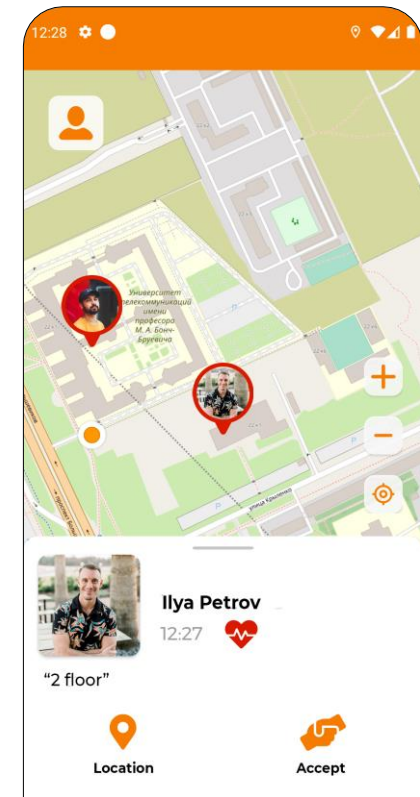
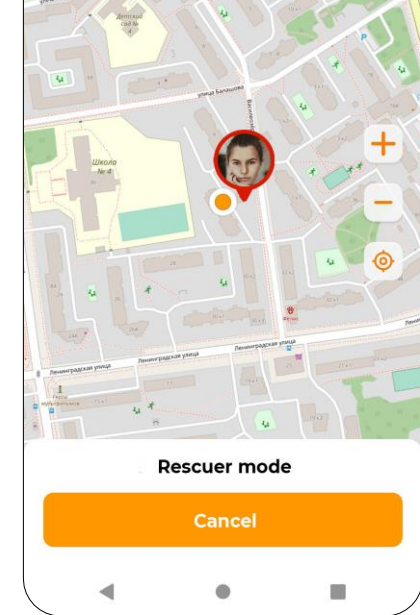
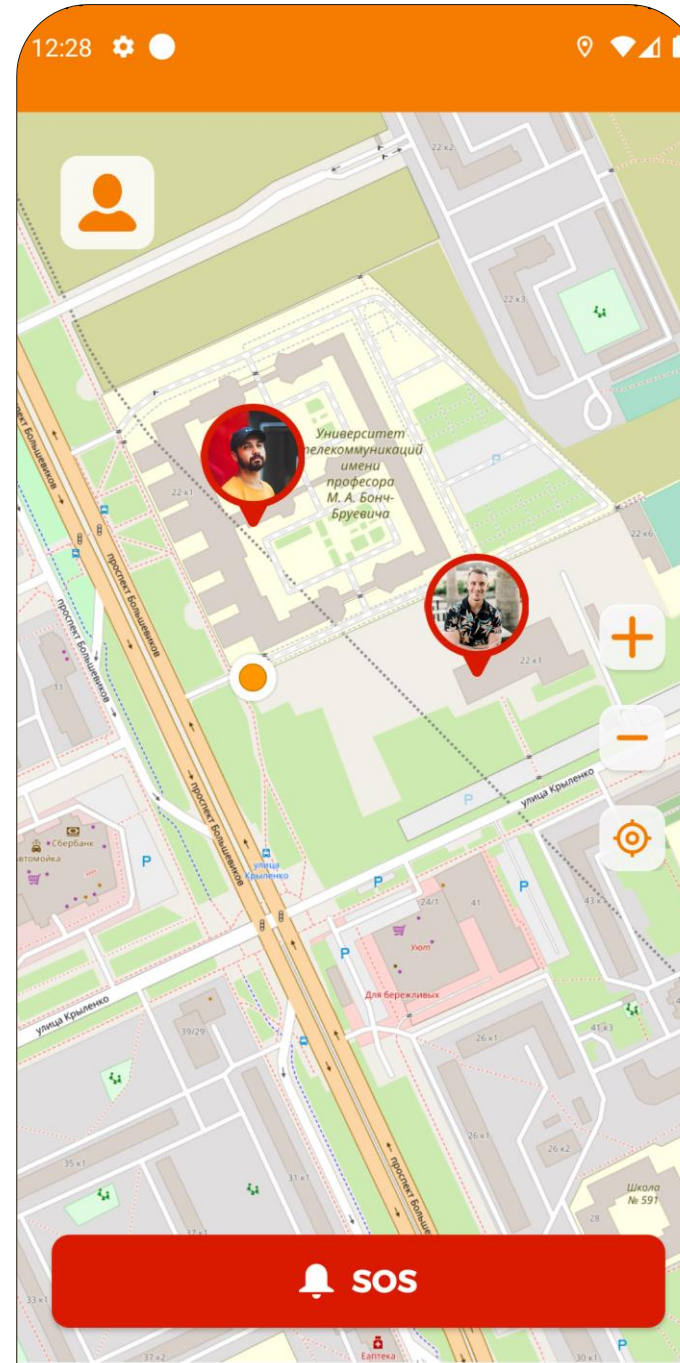
 **Communication with rescuer**



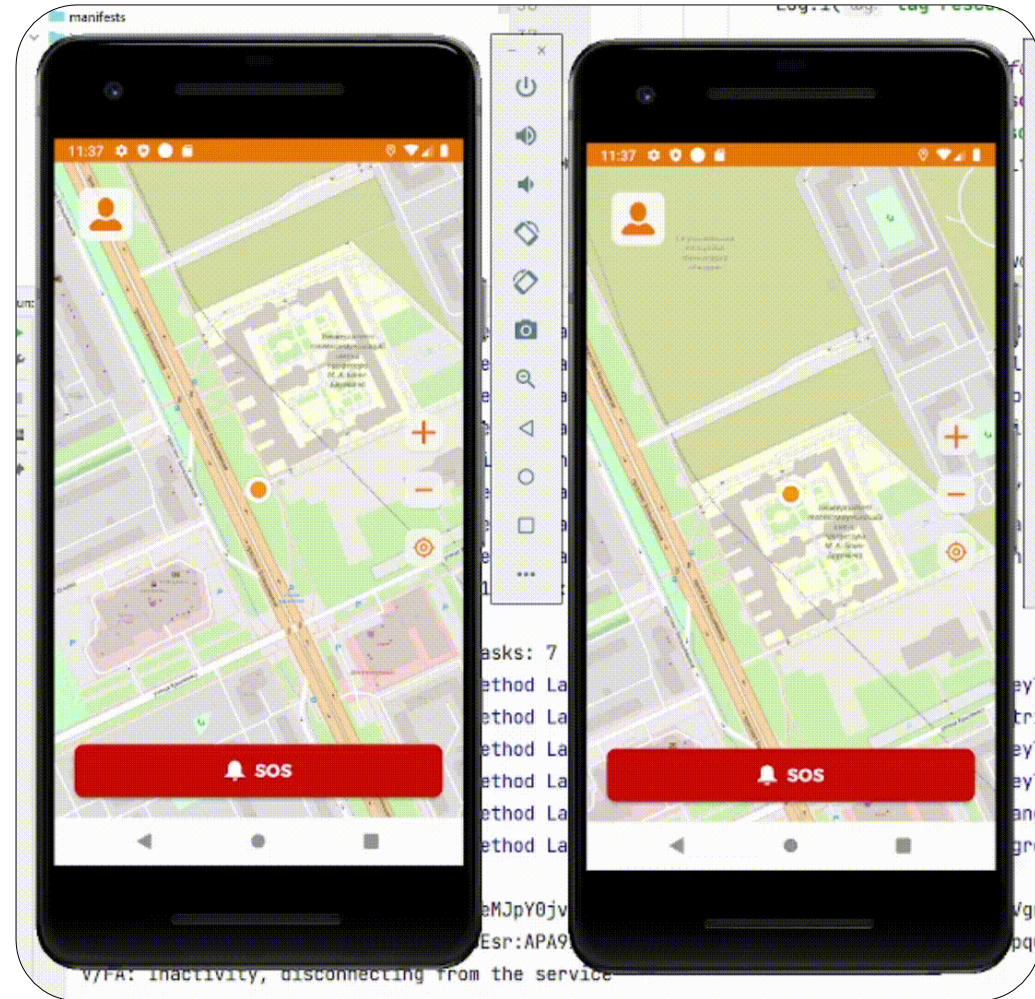
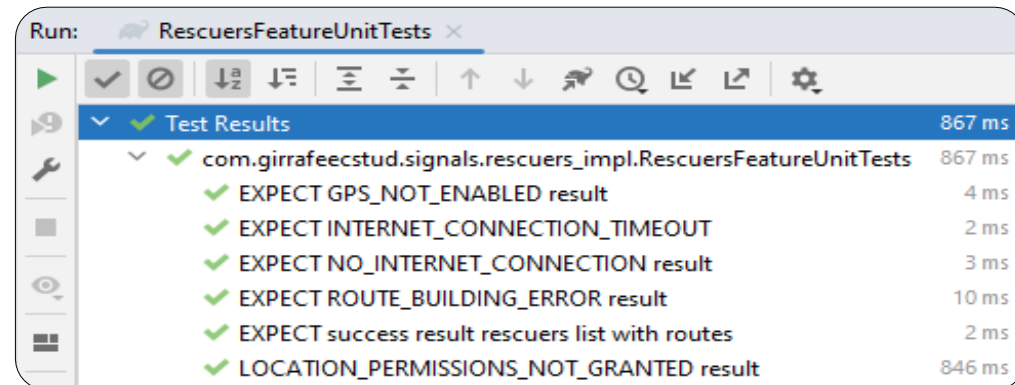
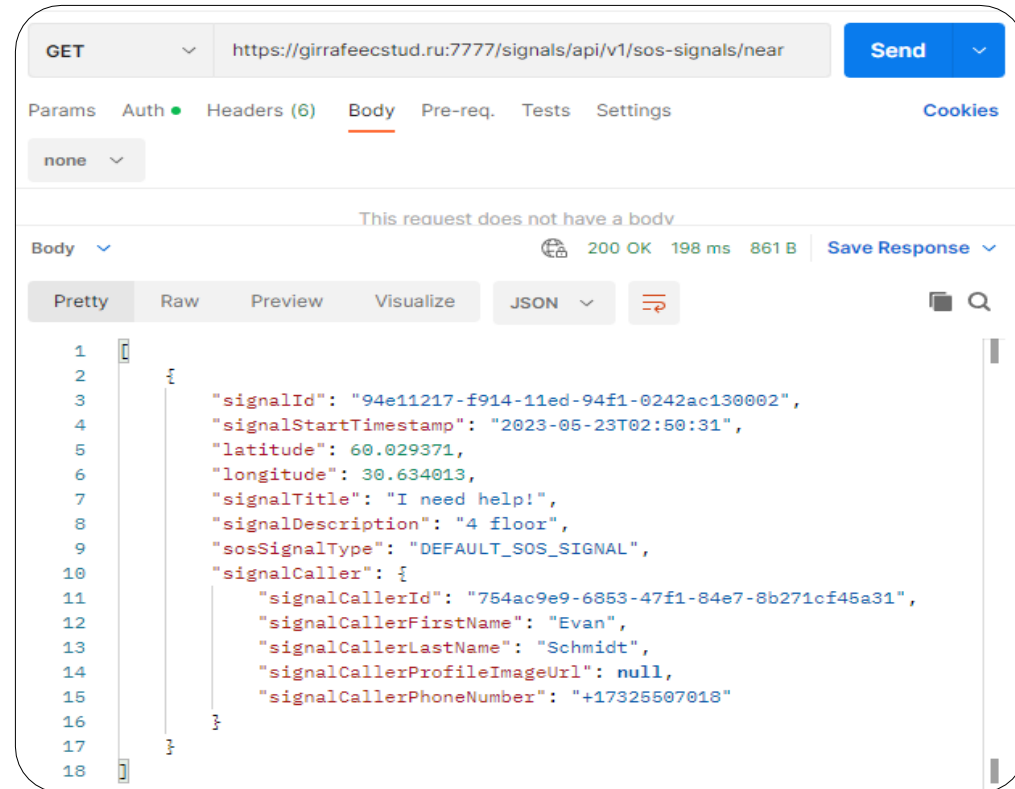
Receiving SOS

 **Signal details**

 **Communication with
signal caller**



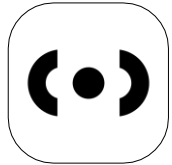
Testing



- ✓ API testing with Postman
- ✓ Complex business logic Unit testing
- ✓ Functional testing

Prospect

Market competition



Citizen

Available only in US



LiS

Focused on children

Possible development directions

- ✂ P2P SOS delivering
- 🗄 Control panel for emergency services
- 📶 ELS implementation in Russia
- 🌐 Routes recognition

Financial prospects

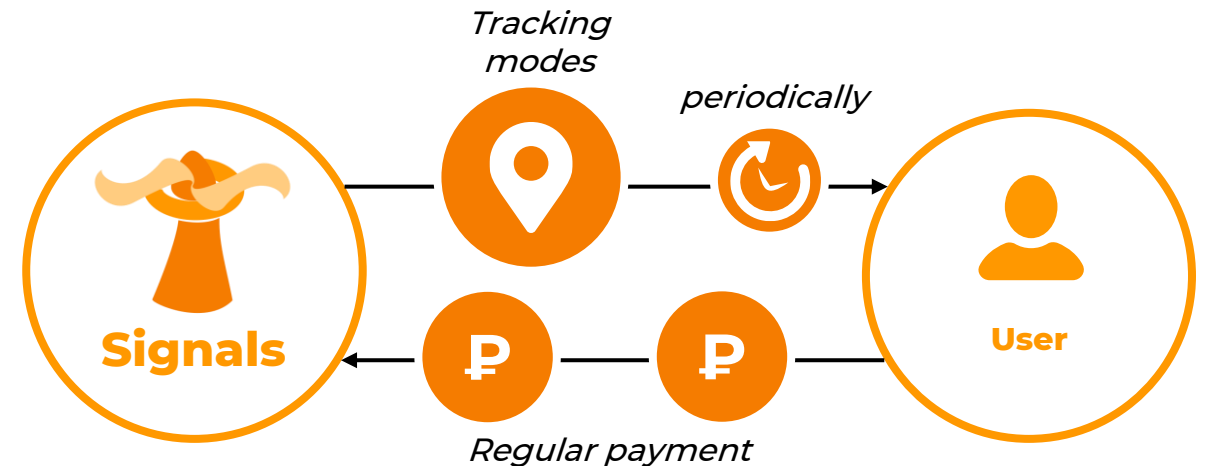


\$133,000,000 for 3 funding rounds

\$27,000,000 annual income

100,000 subscription users

Subscription business model



Results

- ✓ The existing possibilities for calling help in emergency situations were considered
- ✓ Common system scheme was presented
- ✓ Tech stack was selected
- ✓ Database, API and Android application were developed
- ✓ API tests, unit tests and functional tests were made
- ✓ System development prospects were considered

MINISTRY OF DIGITAL DEVELOPMENT, COMMUNICATIONS AND MASS MEDIA OF THE RUSSIAN FEDERATION

FEDERAL STATE BUDGET-FINANCED EDUCATIONAL
INSTITUTION OF HIGHER EDUCATION THE BONCH-BRUEVICH SAINT PETERSBURG
STATE UNIVERSITY OF TELECOMMUNICATIONS

DEVELOPMENT OF AN EMERGENCY ALERT INFORMATION SYSTEM

Student:

Ivan Zaleskii

Thesis advisor:

Yulia Denisova

ISS department assistant

St. Petersburg
2023

Extras #1

Team



Ivan Zaleskii

techlead

mobile

backend

devops

ui/ux



@girrafeec

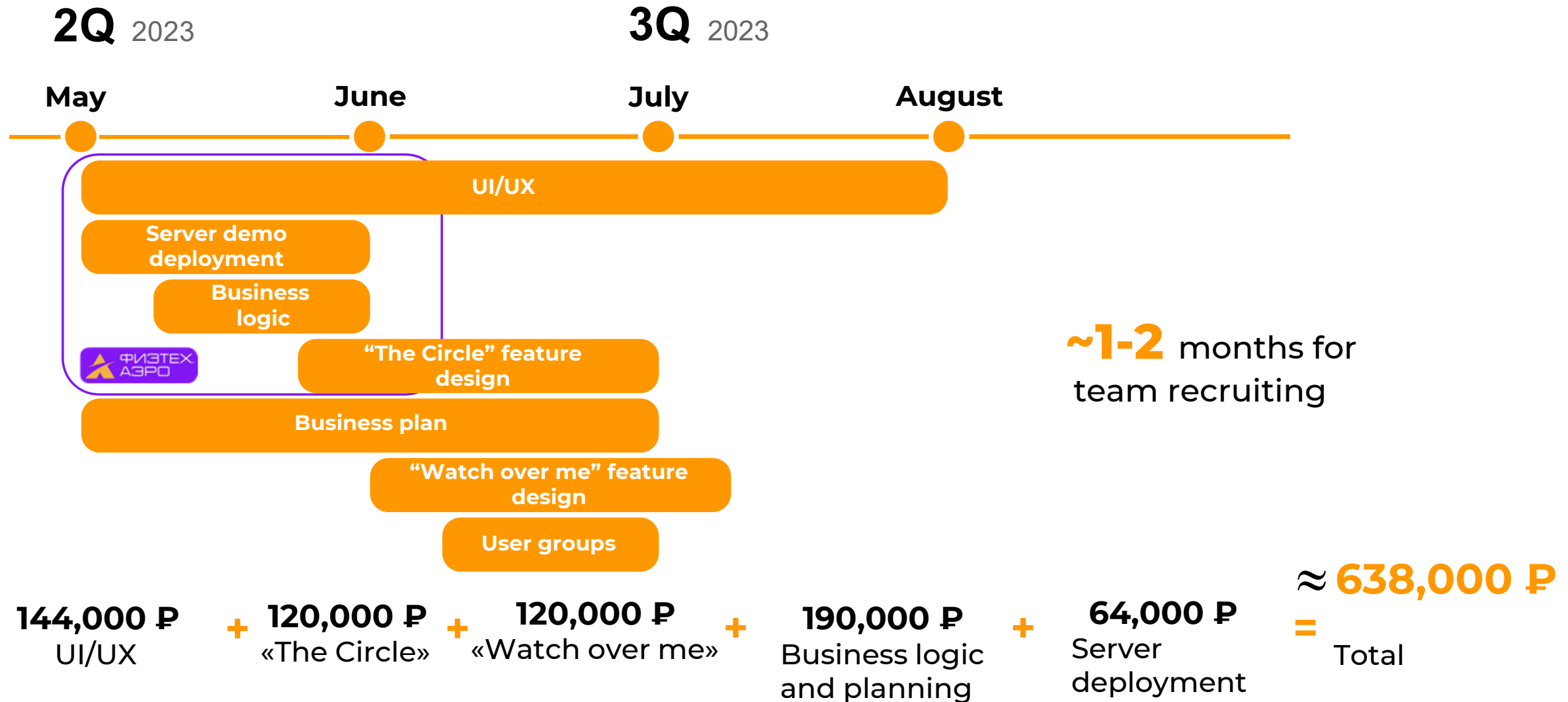


girrafeecstud@gmail.com

Team, I am waiting for you...

Extras #2

Implementation



Extras #3

Tech stack



*SOLID, MVC, MVI, MVVM, Clean,
Modularization and other...*

Extras #4

Code lines

```
girrafeec@girrafeec:~/Documents$ . ./signals_lines.sh  
Total number of *.java lines in signals-api files: 6491  
Total number of *.kt lines in signals-app files: 16187  
Total number of *.kts lines in signals-app files: 2478  
Total number of *.xml lines in signals-app files: 4293
```

