University of Reykjavík

Final Project Fall 2015

Final Report

Ásgeir Atlason

Georg Styrmir Rúnarsson

1.Introduction

The Icelandic Strætó app (http://www.straeto.is/app) is one of the more famous Icelandic applications in the country, allowing you to effectively construct and plan routes with respect to the bus network between destinations, view current bus locations in real time on a map and most importantly: purchase a ticket and then use it by showing the ticket on the phone with the app to the driver. At the time of writing, the Strætó application is only available for mobile devices using the more recent Apple and Android operating systems.

Until recently, Android and Apple devices have dominated the smartphone market and have therefore been prioritized as platforms for the Strætó app. New developments, the release of the new Microsoft Windows 10 operating system and the subsequent push from Microsoft to make development tools easily available and supported for application development, have made Windows devices much more desirable for development. For these reasons Strætó bs. has been working with Stokkur Software (the company that made and maintains the bus app on behalf of Strætó) and Opin Kerfi (a distribution partner for Windows devices in Iceland) to experiment with porting the current app to the Windows 10 platform. The team was offered the chance lead this first attempt, the goal being to get a working application including the core features such as buying and using tickets and also to document the experience working with the Windows Phone environment.

The flagship of the Windows 10 application architecture is the Universal Windows Platform (UWP).
Expert from the official msdn webpage UWP is described:

> *The UWP provides a guaranteed core API layer across devices. This means you can create a single app package that can be installed onto a wide range of devices. And, with that single app package, the Windows Store provides a unified distribution channel to reach all the device types your app can run on.*

> *https://msdn.microsoft.com/en-us/library/windows/desktop/dn894631.aspx*

The windows 10 universal application platform was one of the most interesting things about this project and was what first drew the team to take it on. The universal platform was a logical for Microsoft after experimenting with it on the windows 8 and 8.1 operating systems allowing for

the first time users to develop "Universal apps" bringing all kinds of comfort for multi platform programmers.

In this project we introduce a working prototype version of the Strætó app on the Windows 10 platform. This prototype is made in collaboration with Strætó bs. and Stokkur using their pre-existing designs. This report is the documentation of this process.

The report will be structured as follows. In the Background section (2) we go into how the project came about and who is behind its creation. Product (3) discusses how the application was created and which tools and means were required. In Project planning (4) there is a description of how the team managed it's time and how well this management turned out. A brief chapter on Future Work(5) will as implied go over what is next on the agenda for this product and finally we end with the Conclusion (6) which will go over the project as a whole and discuss it in a retrospective.

2.Background

A version of the app for Android and Apple has already been published by Strætó and Stokkur hf. This version of the app will mainly focus on usability by Windows 10 phone but thanks to the UWP can with minor improvements be runnable on Windows 10 computers. This app has access to the current backend the Android and Apple versions are using at Stokkur and will be kept aesthetically as similar as possible to the already deployed versions for android and iOS.

Strætó bs. is a public transport company owned by six municipalities in Reykjavík which operates city buses in the Icelandic capital. This app is made for them and their customers. Daði Ingólfsson was our contact from Strætó bs. and he is the project owner so he takes decisions regarding the project's direction.

Stokkur hf. is the company that Strætó hired to do make the Android and iOS versions of the application. Our contact at Stokkur Software ehf. is Jón Andri Sigurðsson, the company's CEO. He has given us valuable information and help regarding how the previous versions of the app were made as well as giving us access to the backend and graphical content for the app. Halldór Sigurðsson, an employe at Stokkur specialising in the backend for the app, was also available to assist us with any problems encountered with backend communications.
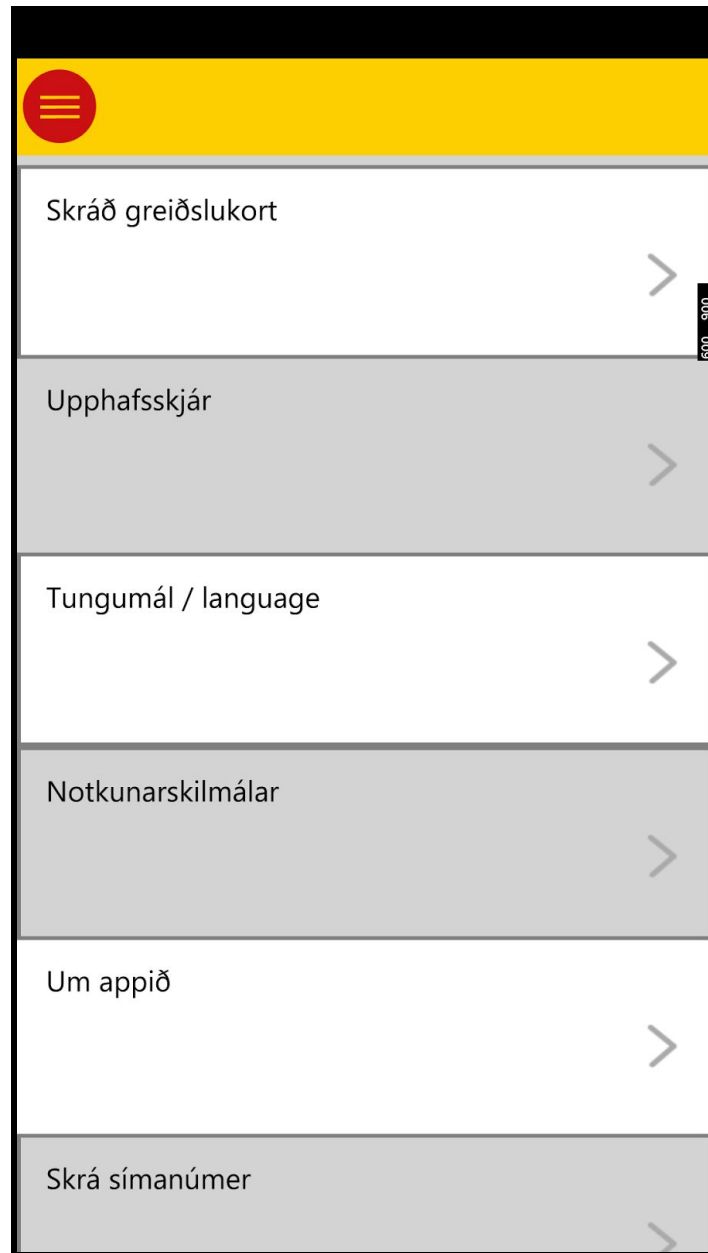
3.Product

Since the release of the Windows 10 operating system, Microsoft have released developer tools and Visual studio 2015 community edition for free. The group decided to use these options and for version control the group was given access to a Bitbucket repository created by Stokkur where the project would be stored.

The following images will show various states of the app:

This view would be a standard first view for a user. The splitview menu panel is open but the "buy tickets view" can still be seen in the background. This panel can be opened from anywhere in the application.

Skráð greiðslukort

Upphafsskjár

Tungumál / language

Notkunarskilmálar

Um appið

Skrá símanúmer

The "Settings" view is accessible from the splitview panel by clicking the "gear" button. Here the user has various options to change various functionalities.
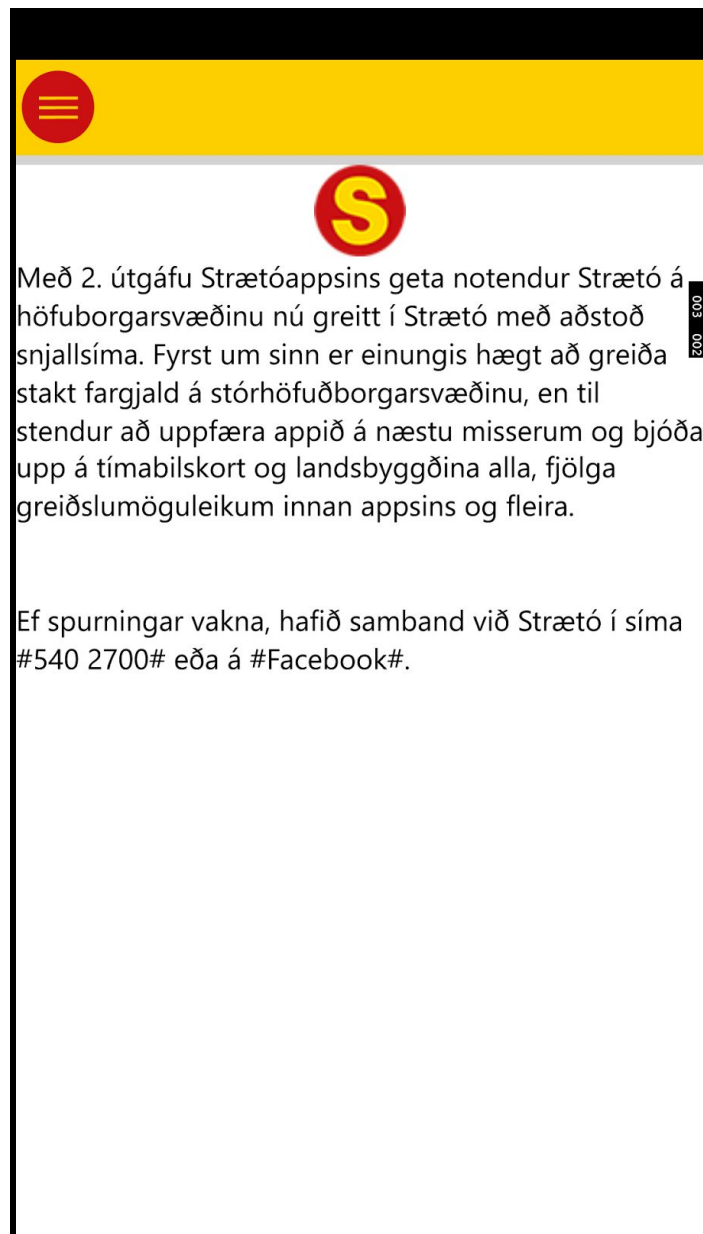
"Change the start page" allows you to choose which page is loaded up when you start the application. The information is stored on the phone using the application storage functionality.
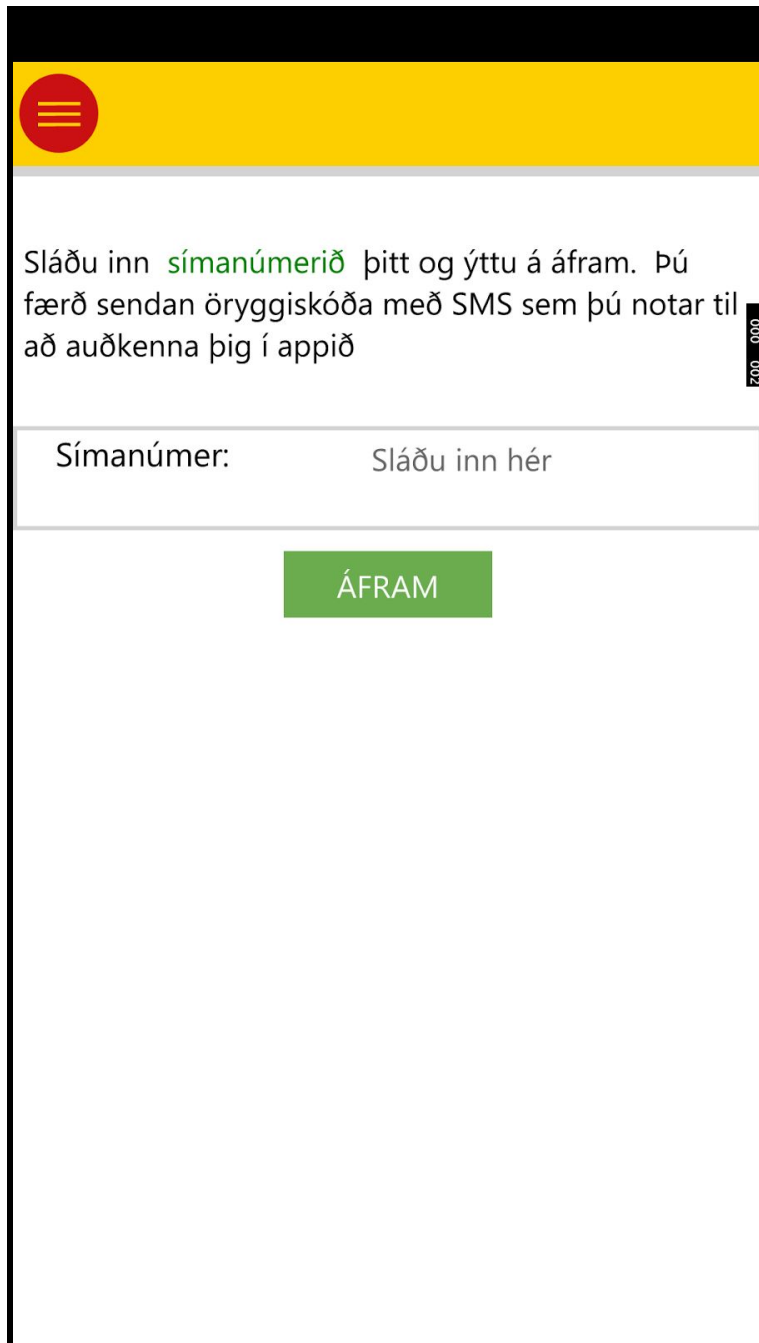
The "change language" view allows the user to choose between icelandic and english languages. All the localizable strings are stored in resource files and the value of the current language is stored locally. At the moment his application does not use the Windows Globalization functionality to automatically determine the user's region.
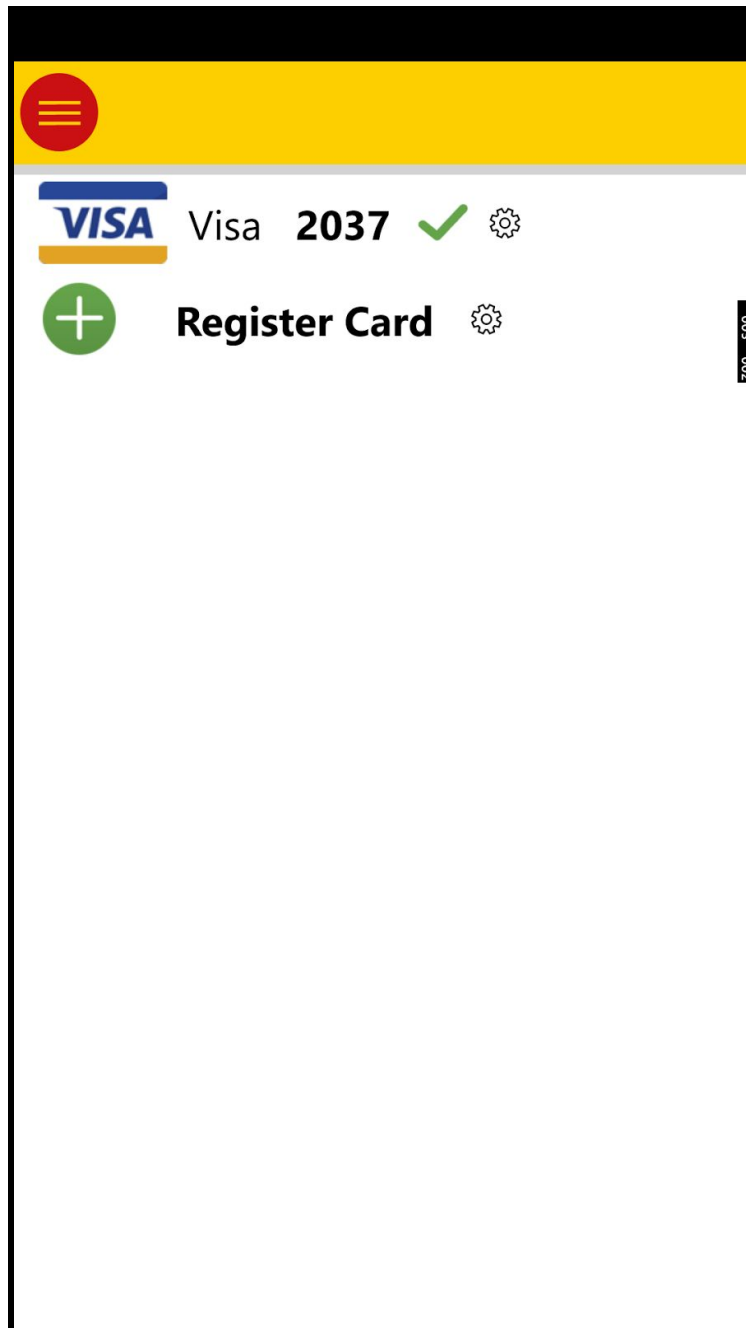
The "Register Payment" view allows the user to store Creditcards for use in ticket payments.

The user can add and remove cards at will or designate one card as the default payment card.

No Creditcard information is stored locally and tokens are used for all business transactions.

Með 2. útgáfu Strætóappsins geta notendur Strætó á höfuborgarsvæðinu nú greitt í Strætó með aðstoð snjallsíma. Fyrst um sinn er einungis hægt að greiða stakt fargjald á stórhöfuðborgarsvæðinu, en til stendur að uppfæra appið á næstu misserum og bjóða upp á tímabilskort og landsbyggðina alla, fjölga greiðslumöguleikum innan appsins og fleira.

Ef spurningar vakna, hafið samband við Strætó í síma #540 2700# eða á #Facebook#.

The "terms of use" view will always update Its terms to the latest version each time it is opened.

In the Strætó application, authentication is done with registering a phone number to the application with SMS confirmation. This view can either be prompted when the user enters a state where registration is necessary or when selected in the settings. After providing a phone number a very similar screen will appear, offering the user to enter the received sms code.

The "Buy ticket" screen allows the user to choose to buy up to 19 tickets of any kind. The ticket prices are fetched from the backend each time this screen is viewed.

FULLORÐNIR	**5 x**	400
BÖRN OG UNGMENNI	**2 x**	200
ALDRAÐIR OG ÖRYRKJAR	**3 x**	200
		3000

GREIÐSLUMÁTI

| Visa | 2037 |

Kaupa miða

This screen shows the user a list of his purchase allowing him to choose the payment before continuing.

Initially the team had decided upon user testing to be made by willing individuals during the project development but due to various factors this was not done, the leading factor being time constraints but also the fact is that Windows phone users are few and far between but also the Windows 10 OS has not officially been released for all Windows smartphones making it rare that these users could even run the app, therefore the programmers had to make due with making basic tests themselves on provided smartphones with a developer version of Windows 10 installed.

When comparing the Windows prototype with the Android and Apple versions, is favorable in that the Windows platform has proven to be very resourceful when emulating the various frontend patterns found in the other platforms. This has yet to be tested fully as many of the more complex functionalities have yet to be implemented but so far the comparison is promising.

4.Project planning

From the beginning the team set out to follow all recommendations in the course guidelines and also from interviews with the product owners. Deciding on the SCRUM planning method, there were several aspects that are desirable for a project like this. The sprint system is especially useful for managing and measuring progress as anyone familiar with SCRUM can attest. The first step was to make divide up the project into it's elements or "stories", using SCRUM poker these stories were assigned "story points" on a range from 1 to 20 and then given an importance rating of A, B or C, with A being "a must" and C being "nice to have". The next step is dividing the remaining days until the deadline into sprints, roughly two weeks each.

Sprint	1	2	3	4	5	6
Period	07/9 - 20/9	21/9 - 04/10	05/10 - 18/10	19/10 - 01/11	02/11 - 15/11	25/11 - 08/12

(How the setup ended up looking like)

A typical sprint started with a planning meeting, in this meeting the team takes a retrospective of the previous sprint and plans the next sprint. This planning includes the team deciding which stories, or features, to work on during this particular sprint then splitting them into tasks, tasks being the "atoms" of a story, each task estimated everyday how many hours it would take to complete. The question of how many tasks are to be allocated to the sprint is determined by the group's capacity, the capacity being determined at first with rough estimates and then with experience using story points burned per sprint. Of course the groups capacity can fluctuate over time but in theory the burndown measurement can help to demonstrate how much the team can reasonably hope to accomplish in the remaining time. before the deadline.

In the course of the project the biggest external factor was other schoolwork. All group members had other responsibilities during most of the project and it was necessary to factor this into the plan so the team made a commitment to the project and promised to follow these guidelines

1. The team will at the minimum work 2 days a week with at least 6 hours of work each day.
2. The team will emphasize daily standups to ensure communication.
3. The team will try to have a buildable product in the end of each sprint to ensure that bugs will be tackled in a timely manner.
4. The team will have a meeting with the project managers after each sprint to keep the product owners up to date.
5. The team will have a meeting with the project supervisor once every week to demonstrate that the team is working in according with the plan.

The progress of the project is documented in a progress report containing detailed records of how well the team follows the plan, making this report also helps with focus in large projects like this one.

Without going too much into detail, the implementations of the plans proved troublesome for a time as inexperience meant bad sprint planning but after a late shakeup the team could boast a solid capacity even after one member of the group having to abandon the project. In retrospect the argument exists that better risk management would have been beneficial.

5.Future work

The prototype at the moment fulfills the most basic function of ticket communications but in the future there is room for improvement. The project owners have shown interest in letting the team keep working on the product and hopefully bring it to a more complete form

A list of further improvements on top of the various missing features from the existing Android and Apple applications might include

- Telling the user when his bus will arrive
- Make the application live tile show relevant information
- Use the cortana voice recognition function

6.Conclusion

After reading this report the reader should be familiar with the fundamentals of the project as well as the work methodology upon which our work was based. This project was the most extensive we have undertaken during our time at Reykjavík University, as a final project should be, and we gained a lot of experience and problem-solving skills in the process.

The most important lesson we can draw from the project is that planning and work ethic are the foundation of any such undertaking. Properly planning the architecture and overall structure of the program from the start can save a lot of time, but can be extremely difficult to do for a team which is not experienced in the use of the tools and frameworks available. This is something the team learned first-hand once we started, since at the beginning we severely underestimated the time it would take to learn the fundamentals of app programming and setting up a project of this magnitude.

Working with the Universal Windows Platform (UWP) was quite intuitive after learning how to use C# and the .NET platform in the Web Programming course in our first year. Microsoft has clearly put in a lot of work on their Developer Network (MSDN), which contains quite a lot of guides, tutorials and samples. Problems arose, however, when we had some issues not covered on MSDN. The UWP is quite new, so getting third-party guides and solutions for various smaller issues could be quite a hassle. It didn't help that a lot of changes had been made from the Windows Presentation Foundation (WPF), the framework used for app programming in Windows 8 and 8.1, and many third-party guides turned out to only work for WPF. However, the group agrees that the UWP was a delight to work with and will only get better once more people start using it.

We would like to thank Stokkur Software for technical assistance and general advice, Opin Kerfi for a terrific facilities in which we could work and Strætó for their support and patience. We