13th International Multidisciplinary
Scientific Geoconference SGEM 2013
16-22 June, 2013, Albena Co., Bulgaria

INFORMATICS, GEOINFORMATICS AND REMOTE SENSING

Conference Proceedings
volume I

INFORMATICS

GEOINFORMATICS

CARTOGRAPHY AND GIS

13-TH INTERNATIONAL MULTIDISCIPLINARY
SCIENTIFIC GEOCONFERENCE
SGEM2013

GeoConference on

INFORMATICS, GEOINFORMATICS AND REMOTE SENSING

CONFERENCE PROCEEDINGS
VOLUME I

International Multidisciplinary Scientific GeoConference SGEM

SGEM

INFORMATICS

GEOINFORMATICS

CARTOGRAPHY AND GIS

16-22, June, 2013
Albena, BULGARIA

TIPS FOR CREATING iOS MOBILE APPLICATIONS ON WINDOWS

Grad. Eng. Dalibor Serafimovski

Assoc. Prof. Dr. Vlado Gicev

University "Goce Delcev" Stip, Faculty of Informatics, **Macedonia**

ABSTRACT

This paper provides tips and guidelines for creating iOS mobile applications on Windows. The paper gives solution to the problems that comes together with this process, and in details describes the full process, together with all the necessary tools needed for the creation of the applications. Full attention is paid to the process of preparation and deployment of the mobile applications and also the process of certification and singing of the applications. The full process goes on Windows PC and the last chapter is dedicated to the delivering of the mobile applications to the online stores.

Keywords: mobile applications, software, flash, flex

INTRODUCTION

This paper aims to give clear guidance on the process of creating mobile apps for the iOS operating system. In the past few years a lot of attention was paid to the web development and building of web applications. Every modern company has a web site that is used for presentation of the products or services that the company provides. In the new era of mobile applications and mobile internet, things are changing, so, the mobile applications are replacing the web sites and turns to be a better solution. From here, the need of creation of mobile applications is imposed. The usage of smartphones is growing every day and it makes the companies aware of this process. The major challenge is to involve in the process of creation of mobile applications, following current trends and imposing market competition. According to the literature that we reviewed and the experience of creating mobile applications, we will try to present the major aspects of the process of creating iOS mobile applications on Windows PC. This paper will be good starting position for developers, undergraduate students and also young researchers who would like to involve them self into mobile development. Below are presented many tools and techniques for iOS development on Windows and also many tips to avoid obstacles. This study is dedicated to the people and companies who wants to start iOS mobile development on Windows [11]. The last few chapters provides many tips to avoid singing problems or application rejection from the App Store. Many people are trying to make useful application for iOS on Windows, many people have ideas, we will try to solve some of the problems that comes with this process. The creation of iOS applications is not an easy process at all, much attention is paid in this study to the characteristics of the devices and the native extensions. For the purposes of this study we will use the Flex technology in order to build an iOS mobile applications on Windows PC. Software engineering and human-computer interaction will also be part of the explanation below, because this two segments are very important for the process of mobile software development. Human – computer interaction on mobile devices helps to increase the quality of the software, created for mobile platforms. Also it is a proven fact that the knowledge of HTML, Java or CSS helps building iPhone applications. We will give Flash Builder examples for this purposes and we will try to implement the Adobe tools for different needs of this process [15]. The native iOS programming language is Objective C, and XCode is the native (IDE), Integrated Development Environment. On Windows we will describe the full process using the programming languages, Action Script and MXML.

OPERATING SYSTEM DESCRIPTION

The operating system iOS is targeting the mobile devices iPhone, iPad and iPod Touch. Our goal is to create a mobile application that will run on this three devices with all the supported native extensions and gestures. Apple provides a lot of programs like iAd and Game Center for developers. People use gestures to operate with the unique Multi – Touch interface of the iOS device. Supported gestures for iOS devices are: Tap to press or select a control or item, Drag to scroll or pan, Swipe with the finger to reveal the red delete button, Pinch to zoom and many others [7]. The content of the device is presented in one or more VIEWS. The device also supports full screen mode and running in background. Testing of the iOS applications on Windows is an easy process with the new Flash Builder that supports testing on device using development certificate. Full and detailed description of the certification process will be provided below. The iOS applications runs on portrait and landscape mode and the navigation between different views is very fast. Also you are able to force the application to run only in portrait or only in landscape mode by setting the property values for this in the configuration file. We will review all the configuration aspects below and the problems that might appear if the application is not set correctly. The final product is a file with (.ipa) extension ready to be uploaded to the official Apple App Store.

APPLICATION ICONS

The iOS icons must meet specific criteria, so that the operating system can display them property. As we mentioned before, all the application settings are made in the application descriptor file. This is an XML file that contains all the application settings and here you set thing like filename, application name, application permissions and many other things important for the installation process on the device. When creating an app icon for multiply devices like iPhone and iPad you need to define all the needed sizes of the icons inside the application descriptor file. Recommended file extension for icons is PNG, after all the icons are finished you need to put them in the application assets folder and to define the path in the application descriptor file. The recommended size of the icon for the app store is 1024x1024. This icon you need to upload when you add new application inside iTunes Connect developer portal.

APPLICATION DESCRIPTOR FILE

Descriptor file is an XML file that Flash creates to define the configuration settings. When creating iOS application you need to set the property setting inside the application descriptor file. Every new Flash Builder project creates XML configuration file for the project. The file is named *Appname-app.xml* [7]. As we mentioned before, here you need to define the most important configuration setting for the application to work correctly on targeted devices. The most important segment to define here is the application ID. The compiler uses this value as the Bundle ID for the iPhone application. Recommended format of the application ID is something like "*com.companyname.appname*". The application ID uniquely identifies your application. Other elements from the application descriptor file are name, version, filename, content, aspect ratio, auto orientation and many other things. Inside Flash Builder you can edit the descriptor file and set the property XML tags, some of them are important for the character of the application. If the application supports only iPhone and iPod Touch, then you need to define that inside the <key> tag [2]. The <string>2</string> setting defines support for the iPad. Apple has very strict criteria and only good configuration settings can pass the review process. If you want to remove the support for the iPad you need to remove the <string>2<sting> setting inside the <key> tag.

TOOLS AND TECHNIQUES

FLEX MOBILE

For the purposes of this paper we will use few tools and we will try to describe the process of creation of iOS mobile applications on Windows PC. First tool to review is Flash Builder. This is unique tool that helps building mobile applications using the Flex technology [1]. Flex is a highly productive, open source application framework for building and maintaining expressive web applications that deploy consistently on all major browsers, desktops, and devices. It provides a modern, standard-based language and programming model that supports common design patterns suitable for developers from many backgrounds [4]. The Flex SDK is free but I recommend using Flash Builder in order to exploit all the advantages offered by Flash Builder. This tool offers an integrated compiler for iOS application. Flash Builder uses Action Script and MXML. Action Script 3.0 is the programming language for Adobe Flash and Adobe AIR runtime environment. With Flash Builder you can run the mobile project on the desktop with the integrated simulator for iOS devices, you can choose to run on iPhone 3GS, iPhone 4 or iPad. Flash Builder works with VIEWS. You can create as many views as you need for the mobile application. For the theme of the iOS application you can use CSS to define the look of your application. Good thing to mention is that Flash Builder offers mobile components that are ready to use when working on Design View mode. Greatest benefit from the use of Flash Builder is the ability to switch into Design View mode which makes Flash Builder different from other IDEs. Flash Builder also offers lots of code snippets and prepared functions, this saves a lot of time and effort. Flash Builder offers collaboration with other Adobe products like Flash Catalyst and Adobe Flash, you can create a custom component with Adobe Flash with previously defined sizes of the component inside the Design View in Flash Builder. Inside your project you can import flash containers from Adobe Flash or projects from Flash Catalyst. Flash Builder also offers the ability to import Action Script classes and use them inside the project [6]. The figure below shows the project file and packages in Flash Builder. Another good feature of this tool is the opportunity to add library files. The library files are files with SWC extensions that are created with Adobe Flash and imported inside Flash Builder to be used as custom component tools. You can create a SWF movie with flash and add some action script code inside, this is a great feature because you can create menus, animated buttons and even flash music players and then export them as SWC file libraries and use them inside Flash Builder [9]. SWC`s allow easy distribution of assets between Flash and Flex (Flash Builder).

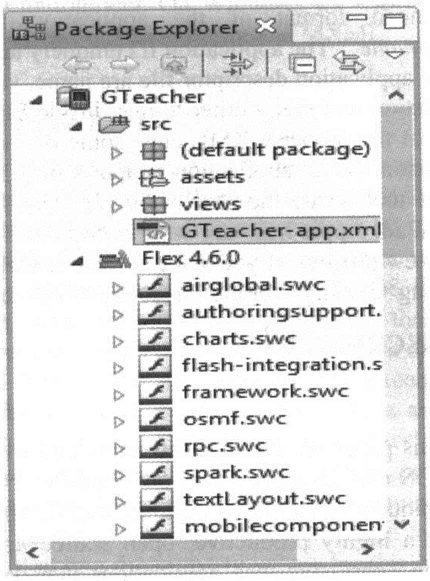
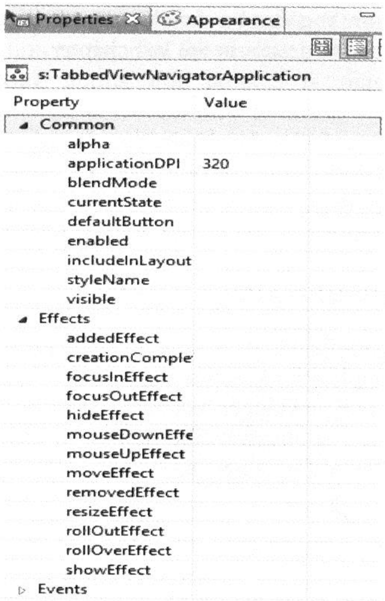


Figure 1. Flash Builder package explorer and project files. The project on the image is called Guitar Teacher mobile for iOS and it is completely made using Flash Builder and Adobe Flash CS 5.

Splash screen image is one of the most interesting elements we need to review in the process of creation of iOS mobile applications. Splash screen is called the image that we see while an iOS game or application is loading [10]. When creating a mobile application that will run on all devices we need to take care about the sizes of the images. The figure 2 shows the Splash screen configuration for multiply devices. The iPad requires high resolution graphics and you need to pay attention on the graphics quality. In order to make good splash screen you need to have splash screen images for different device densities. As we said before, design view mode gives you exclusive features for creating professional application layout, the next figure shows some of the properties that you can use while working on design view mode.



s:TabbedViewNavigatorApplication

Property	Value
Common	
alpha	
applicationDPI	320
blendMode	
currentState	
defaultButton	
enabled	
includeInLayout	
styleName	
visible	
Effects	
addedEffect	
creationComple	
focusInEffect	
focusOutEffect	
hideEffect	
mouseDownEffe	
mouseUpEffect	
moveEffect	
removedEffect	
resizeEffect	
rollOutEffect	
rollOverEffect	
showEffect	
Events	

Figure 2. Flash Builder Properties tab while running in design view mode. The image shows the ability that Flash Builder offers to add function and effects directly to the selected objects on the stage.

Until now, we looked at all the important aspects of this technology, I strongly recommend using Flash Builder for iOS development on Windows because of all the great features that this tool offers. Next we will try to review some more tools in order to make the process of iOS development on Windows PC much clear.

ADOBE FLASH FRAMEWORK

We will try to give some simple review of the opportunities that Adobe Flash is giving to us for iOS development. Flash manipulates vector and raster graphics to provide animation of text, drawings, and still images. It supports bidirectional streaming of audio and video, and it can capture user input via mouse, keyboard, microphone and camera. Flash applications and animations can be programmed using the object-oriented language called Action Script [18]. Adobe Flash Professional is the most popular and user-friendly authoring tool for creating the Flash content, which also supports automation via the JavaScript Flash language. Adobe Flash Player makes the Flash content accessible on various computer systems and devices and is available free of charge for common web browsers (as a plug-in), some smartphones and tablets, and a few other electronic devices using Flash Lite. Adobe integrated AIR for iOS into the new Flash Pro CS5. It is simple, now flash developers have the opportunity to create mobile applications with user friendly interface on Windows PC and to compile them for Apple App Store. Flash is commonly used for game development with Action Script. With the new AIR for iOS, flash developers will have the opportunity to compile flash games for iOS [5]. The next figure below shows the compiler properties. Before exporting an iOS application you need a development certificate [10]. The Process of certification will be described in details in the last chapter.

USING SQLITE

When creating an iOS application on Windows you can use SQLite to store application data. You can create an XML data file and read the data from there and store in database using SQLite. With SQLite databases, you can store your application data in a secure database and query your data just as you would, with any other database.

PREPARING FINISHED APPLICATION

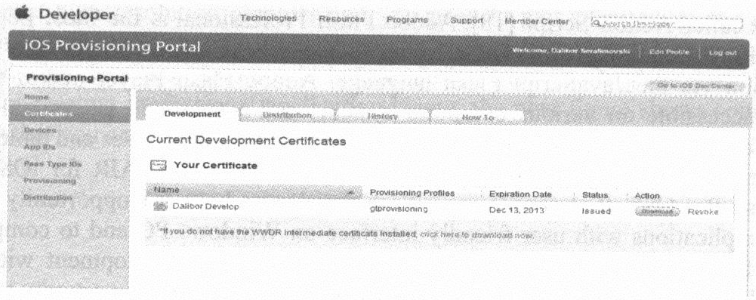
After the application is completed, it is time to publish it to an (.ipa) file, the file extension for iOS mobile applications. At the beginning of this process we need to setup a new application with our developer account. iTunes Connect provides all the necessary tools to setup a new application like Bundle ID , SKU number, application ID and many other things. After adding a new application we are ready to proceed with the deployment process.

CERTIFICATION AND SIGNING

The iOS application needs to be signed with distribution certificate. First thing is to create Certificate Signing Request file. Because our goal is to finish the full process on Windows PC, I recommend using OpenSSL for the creation of the Certificate Signing Request file. After that, you need to upload the file to the Apple`s Provisioning portal, then wait a few seconds and hit F5. The page will refresh and you will be able to download the certificate file. The next figure below shows this process. The next step is to create (.p12) file from the certificate file, for this step you can use OpenSSL again. First you need to convert the Certificate file you have downloaded from iOS Provisioning Portal into PEM file and after that you need to create the (.p12) file. Here is an example for creating (.p12) files using OpenSSL from command line on Windows PC.

To convert certificate: openssl x509 –in ios_distribution.cer –inform DER –out ios_distribution.pem –outform PEM

To export p12 file : openssl pkcs12 -export -in input.crt -inkey ios_distribution.pem -out ios_distribution.p12



Current Development Certificates

Your Certificate

Name	Provisioning Profiles	Expiration Date	Status	Action
Dalibor Develop	gtprovisioning	Dec 13, 2013	Issued	Download Revoke

*If you do not have the WWDR intermediate certificate installed, click here to download now.

Figure 4. iOS Provisioning Portal. The image shows the development tab. Here are created the development certificates for testing the application on device

The last step is to download the provisioning profile. This profile you can download from the Provisioning section in the iOS Provisioning Portal. The most common error that developers are making during this process is signing the application with development certificate. Remember that for distribution to the Apple official App Store, the application needs to be signed with distribution certificate. Last thing to mention is that the value of the application ID in the descriptor file must match with the application ID you created on the iOS Provisioning Portal.

DISTRIBUTION

The last thing is to publish the finished application binary file to iTunes Connect website. This is not an easy process. For this process you need to have MAC OS operating system in order to install the Application Loader. The Application Loader is a software that Apple uses to upload the (.ipa) binary files to iTunes Connect. The problem here is that Application Loader runs only on MAC OS devices. Because we want to finish the full process on Windows PC we need to find a solution. We recommend using Oracle VirtualBox to install virtual Mac OS machine and run Application Loader on it. Virtual machines are very helpful for this kind of problems and VirtualBox offers installation of Mac OS operating system on it. Other alternative is VMware Workstation that also will do the job.

CONCLUSIONS

Above, we reviewed all the important aspects of the process of creation of iOS mobile applications on Windows PC. General conclusion is that this is an open environment for research and promotion. Microsoft Windows operating system is used in the major European countries imposing the need of iOS development on Windows. Some great tools with great features are available for the process of iOS development on Windows. Flash developers can produce great iOS application using their knowledge of Flash, MXML and Action Script. This method sourly saves time, money and effort. The challenge to make functional application with less funding, which at the same time will be high quality and simple to use, is huge for any modern IT company. Every day we see the major online application stores rising their potential. Undoubtedly the need is imposed to make an effort to become part of these stores in order to make a successful business.

REFERENCES

[1]. Mike C., Daniel D., Kevin H. & Dragos G.: Adobe AIR for JavaScript Developers (2008)

[2]. Larry U.: Effortless Flex 4 Development, New Riders, Berkeley, CA, 64-72. (2010)

[3]. Alaric C., Elijah R.: Learning Flex 4, O'Reilly Media, Inc., Canada, 365-386. (2011)

[4]. Adobe Systems: Action Script 3.0 for Adobe Flash Professional, Classroom in a Book, Adobe Systems Incorporated and its licensors, The Official Training Workbook, 14-30. (2011)

[5]. Dev R., Adrian D.: The Essential Guide to Physics for Flash Games, Animation and

Simulations, Springer Science, Business Media LLC, New York, USA, 13-43. (2011)

[6]. Cristopher G.: Real – World Game Development With Flash, Second Edition, Elsevier Inc. 227-243. (2012)

[7]. Gene B.: Professional iPhone and iPad Application Development, Wiley Publishing Inc., Indianapolis, Indiana, 15-40. (2011)

[8]. Bernerd A., Jeremy A.: Flex on Java, Manning Publications Co., 6-10. (2009)

[9]. Peter A.: Hello! Flex 4, Manning Publications Co., USA, 25-89. (2010)

[10]. Rich T.: Developing iOS Applications With Flex 4.5 O'Reilly Media, Inc., USA, 47-75. (2011)

[11]. Yakov F. Viktor R. Anatole T.: Enterprise Development with FLEX, Adobe Developers Library, 63-97. (2010)

[12]. David F.: JavaScript, The Definitive Guide, Published by O`Reilly Media Inc. (2011)

[13]. Eric F. & Elisabeth R.: Head First HTML5 Programming: Building Web Apps with JavaScript (2011)

[14]. Cesare R.: Data Visualization with Flash Builder, Designing RIA and AIR Applications With Remote Data Sources, Elsevier, Inc., 249-282. (2011)

[15]. Jonathan C.: Flex Mobile in Action, Manning Publications Co., Shelter Island, NY, 78-128. (2012)

[16]. Steven P.: Flash Builder and Flash Catalyst, The New Workflow, Springer-Verlag New York, Inc., USA, 51-67. (2010)

[17]. Jennifer F.: Learning Adobe Muse, Create Beautiful Websites without Any Code, PACKT Publishing, Birmingham, UK, 205-216. (2012)

[18]. Richard W.: Professional Flash Mobile Development, Creating Android and iPhone Applications, Wiley Publishing, Inc., Indianapolis, IN, 285-289. (2011)