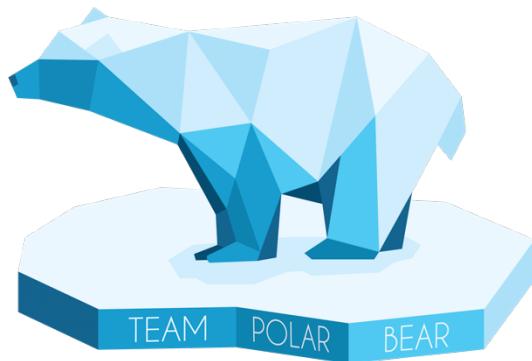


# Design & Deployment Document - OSO

25-Apr-2018

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DDD-OSO	1

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Change History				
Rev	Date	Prepared by	Sections affected	Description
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# Table of Contents

<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1 Purpose .....	1
1.2 Scope .....	1
1.3 Terms/Definitions.....	1
1.4 Requirements .....	3
<b>2. DESIGN .....</b>	<b>6</b>
2.1 General Function .....	6
2.2 Assumptions .....	6
2.3 Trade-off Analysis.....	6
2.4 Operation.....	7
2.5 System Architecture.....	8
2.6 Hardware and Software Requirements .....	10
2.7 Installation & Deployment .....	11
2.8 Team Acknowledgment .....	11
<b>ANNEX A SERVER &amp; DASHBOARD INSTALLATION .....</b>	<b>A-1</b>
<b>ANNEX B MOBILE INSTALLATION.....</b>	<b>B-1</b>

# List of Figures

Figure 1: Chatbox Section.....	8
Figure 2: Closet Section.....	8
Figure 3: Market Section .....	8
Figure 4: System Architecture .....	9
Figure 5: Folder Structure .....	A-2
Figure 6: Login Screen.....	A-3
Figure 7: Hosting Settings .....	A-3
Figure 8: Hosting Settings.....	A-4
Figure 9: Databases Section .....	A-4
Figure 10: Add a Database .....	A-5
Figure 11: Databases Section .....	A-6
Figure 12: phpMyAdmin Dashboard .....	A-6
Figure 13: Result of Database Import.....	A-7
Figure 14: File Manager .....	A-8
Figure 15: JDK Download .....	B-2
Figure 16: Android Home Screen .....	B-3
Figure 17: SDK Manager.....	B-3



## 1. INTRODUCTION

### 1.1 Purpose

1.1.1 The purpose of this document is to give a detailed description of the requirements for the “OSO” software platform. It will illustrate the purpose and scope of the system. Also, the deployment steps will be thoroughly described. This document is primarily intended to be delivered to our client Janam Tech Solutions as part of the final deliverable.

### 1.2 Scope

1.2.1 The “AI for Mental Health” is a mobile application which helps patient know how effective their treatments are going. It mainly used a message interface that acts like a chatbot. The chatbot has the purpose of asking a series of questions to the patients. The result is shown in a dashboard which is tracked by providers and doctors. The doctor creates a new patient in the dashboard, and a link is sent to the patient to download the application.

### 1.3 Terms/Definitions

#### 1.3.1 Mobile Application

Term	Definition
User	Someone who interacts with the mobile phone application.
Chatbot	An AI-powered computer program that uses natural language processing to mimic human conversation.
Oso	It is the name of the chatbot.
Splash screen	The first screen that appears when loading the application.
Login Page	Login is used to authenticate users.
Chatbox Page	An interface where users send or receive messages.
Preferences Page	Users can customize their name, notification settings and themes.
Notification	Users are notified if a message is sent to their chatbox.
Theme	Users can change the background and text colours by selecting a particular theme.
Closet Page	Users can look inside Oso’s closet and dress him with previously purchased articles of clothing.
Market Modal	Users can purchase articles of clothing from the market.
Paw Points	Users can get paw points by chatting with Oso. Points are allocated after a randomly generated number of user responses.
Food Modal	Users can feed Oso by selecting a particular food.
Application Store	An installed application on mobile phone which helps user to find new compatible applications with mobile phone platform and download them from the Internet.



## 1.3.2 Server Application

Term	Definition
GET	Requests data from a specified resource.
POST	Submits data to be processed to a specified resource.
DELETE	Deletes the specified resource.
PUT	Uploads a representation of the specified URI.
Intent	Intent represents a mapping between what a user says and what action should be taken by your software.
Entity	Entities are extracted parameter values from the natural language inputs.
Context	Context represents a mapping between what a user says and what action should be taken by your software.

## 1.3.3 Dashboard Application

Term	Definition
Admin	System administrator who is given specific permission for managing and controlling the system
Dashboard	A web application which is used by the administrators of the system
Login Page	Login is used to authenticate users.
Home Page	Displays patient information, medical history, prescriptions, trend analysis and word cloud tags.
Notes Page	Displays patient notes. Notes can be edited or deleted. Admins can enter a new note.
Journal Page	Displays journal entries. Notes associated to journal entries can be created, edited or deleted.
Chat History Page	Displays the chat history. Notes associated to chat histories can be created, edited or deleted.
Patients Page	Displays a list of patients. Admins can create, edit or deleted patients.
Settings Page	Admins can customize alert and account settings.
Logout	Logout is used to terminate an admin's session.



## 1.4 Requirements

### 1.4.1 Mobile Application

Req. #	Requirement Description	Priority
MA-1	The chat interface provides a mechanism for users to post messages and get responses back from the chat bot.	Required
MA-2	The login page should be the first page that users see when starting the application. It should provide two text fields – one for entering a login name and one for entering a password.	Required
MA-3	When setting up profile information for the first time, the process will be facilitated with the chat bot on the chat interface.	Required
MA-4	The reward system page will have a marketplace to buy accessories for the polar bear. Users gain points by chatting and answering questions from the chat bot. Points are allotted randomly so users can't predict rewards.	Required
MA-5	The chat bot uses natural language processing.	Required
MA-6	The chat bot also tracks user moods using a variation of the PHQ-9 and HCL-32 tests. (Manic to depressive scale)	Required
MA-7	The mobile application is built for Native Android.	Required
MA-8	Users can change theme color of the application.	Preferred
MA-9	The food rewards page will allow users to feed the polar bear. Users will be able to buy food with their rewards.	Preferred
MA-10	Users can change the name that polar bear calls them by.	Preferred
MA-11	Users have access to their chat history.	Preferred
MA-12	Application has an interactive widget displaying messages from the chat bot.	Preferred
MA-13	You can talk to the chatbot using Speech-to-Text	Desirable



## 1.4.2 Server Application Requirements

Req. #	Requirement Description	Priority
SA-1	The server application has to have CRUD operations on user accounts. It will be used for user management of patients and providers.	Required
SA-2	The server application will be hosted in a hosting service.	Required
SA-3	The server application will have a basic public domain and subdomain (ex: abc.com)	Required
SA-4	The server application will have ftp/sftp access.	Required
SA-5	The server application will have a minimum of 128MB ram with proper database support.	Required
SA-6	The server application will have SSL support on domain mandatory as transaction contains patient's information.	Required
SA-7	The server application will have a secure 3rd party Database service. It will store patient messages with encryption.	Required
SA-8	The server application will have a secure 3rd party Storage Service. It will store patient images and other documents.	Required

## 1.4.3 Dashboard Application Requirements

Req. #	Requirement Description	Priority
DA-1	The dashboard will have charts based analytics.	Required
DA-2	The dashboard will have word clouds based on patient input.	Required
DA-3	The dashboard will display alerts when the patient input specific flag words.	Required
DA-4	The dashboard will display progress notes.	Required



Req. #	Requirement Description	Priority
DA-5	The dashboard will display journal entries from patients.	Required
DA-6	The dashboard will have CRUD capabilities. It should be able to create, read, update and delete patients.	Required
DA-7	Email notifications for doctors.	Preferred
DA-8	The dashboard will display medical information and history.	Preferred

---

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## 2. DESIGN

### 2.1 General Function

2.1.1 “OSO” is a patient to provider platform that makes health diagnosis for bipolar patients more transparent and data-driven. Using chatbot technology, a mobile application is used to collect information from the patient. Then using machine learning and artificial intelligence, the results are carefully shown on a dashboard for the provider.

### 2.2 Assumptions

2.2.1 No assumptions were made during the design phase.

### 2.3 Trade-off Analysis

2.3.1 A trade-off analysis was made early in the project. The choice of development technology was based on:

- Complexity of Use;
- Technical Skills of Resources; and
- Documentation;

2.3.2 The “OSO” solution required three different systems which include the mobile, server and dashboard applications.

#### 2.3.2.1 *Mobile Application*

2.3.2.1.1 During the design phase research was made on choosing which technology for the mobile app.

2.3.2.1.2 The first option evaluated was cross-platform development with Framework7.io, VueJS and Cordova. This option is an out of the box template that mainly uses JavaScript as a programming language. Framework7.io and VueJS are relatively new and easy to use. It does require some level of technical skills to understand all its components and interconnections fully. Documentation is also limited.

2.3.2.1.3 The second option evaluated is native Android development. This option is a custom solution that requires Java as a programming language. Android development has been around for a while now and is also easy to use. The level of technical skills necessary to code in android is relatively low. Android has lots of documentation online.

2.3.2.1.4 The option selected is Native Android Development because our team was more familiar with it and the learning curve was much more low than with option one. There's also the fact that Android has way more documentation than Framework7.io and VueJS.

2.3.2.2 *Server Application*

- 2.3.2.2.1 While researching on mobile technologies, research on the server side technology was also made.
- 2.3.2.2.2 The first option evaluated was NodeJS. This option is server-side language that uses JavaScript as a programming language. NodeJS is widely used and has excellent resources online. It does require some level of technical skills to understand all its components and interconnections fully. Documentation is also limited.
- 2.3.2.2.3 The second option evaluated was PHP with CodeIgniter. This option is a custom solution that requires PHP as a programming language. CodeIgniter is a framework with a small footprint. It has exceptional performance and security. The level of technical skills necessary to code in Android is relatively medium-to-high for newcomers. CodeIgniter has lots of documentation online.
- 2.3.2.2.4 The option selected is CodeIgniter because our team was more familiar with PHP and the framework adds security to the server application. There's also the fact that CodeIgniter has lots of documentation online.

2.3.2.3 *Dashboard Application*

- 2.3.2.3.1 While researching on both mobile and server technologies, research on the dashboard technology was also made.
- 2.3.2.3.2 No trade-off analysis was made for the dashboard technologies.
- 2.3.2.3.3 The option selected was a dashboard bootstrap template found on GitHub. Using templates can save the web developer lots of time if correctly chosen. The template found proved to be exactly what our team was looking for regarding the dashboard.

**2.4 Operation**

- 2.4.1 The healthcare provider is given a username and password to access the dashboard. Upon successful login, providers can create new patients and fill out all their patient's medical information. Once the patient is generated the server sends an email to the patient with a username and password.
- 2.4.2 The patient goes into his emails and saves the username and password. After completion, the patient can click on the download app link which will download the apk file of the mobile application "OSO" on their cellphone. In the next phase of this solution, this step will be changed as the patient will be redirected to Google Play Store instead.
- 2.4.3 The patient can now sign in with their credentials and access the "OSO" mobile app.
- 2.4.4 Upon entering for the first time, an onboarding screen is displayed. Figures 1, 2 and 3 on the next page illustrate what the application can do and where to find all its features.

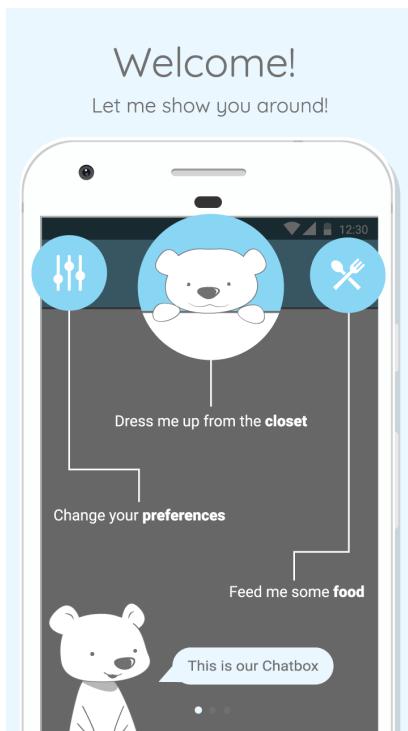


Figure 1: Chatbox Section

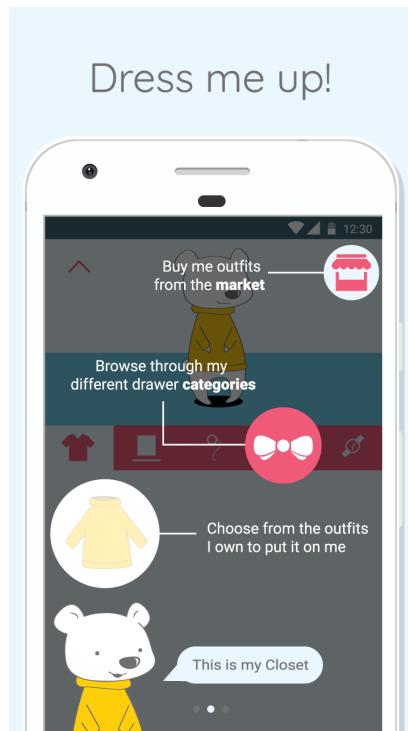


Figure 2: Closet Section

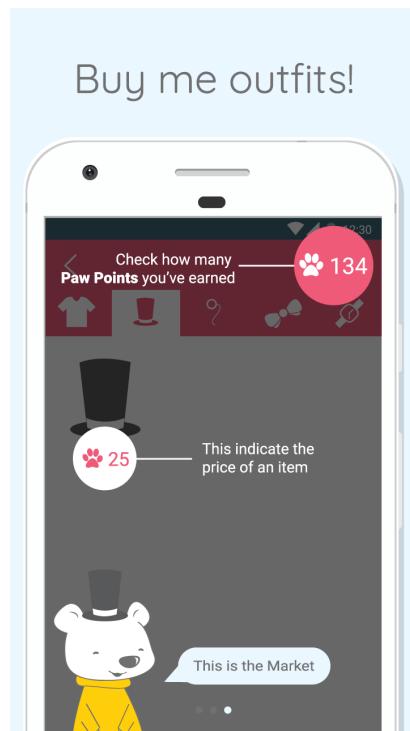


Figure 3: Market Section

2.4.5 After onboarding the patient can chat with OSO. All the chat history will be saved on their cellphone and sent to the server. The patient gets rewards points for talking with OSO. With those points, the patient can buy outfits for OSO and dress it up accordingly. The patient also has the option to feed OSO.

2.4.6 The provider will have a dashboard that will be able to see the chat history and word clouds.

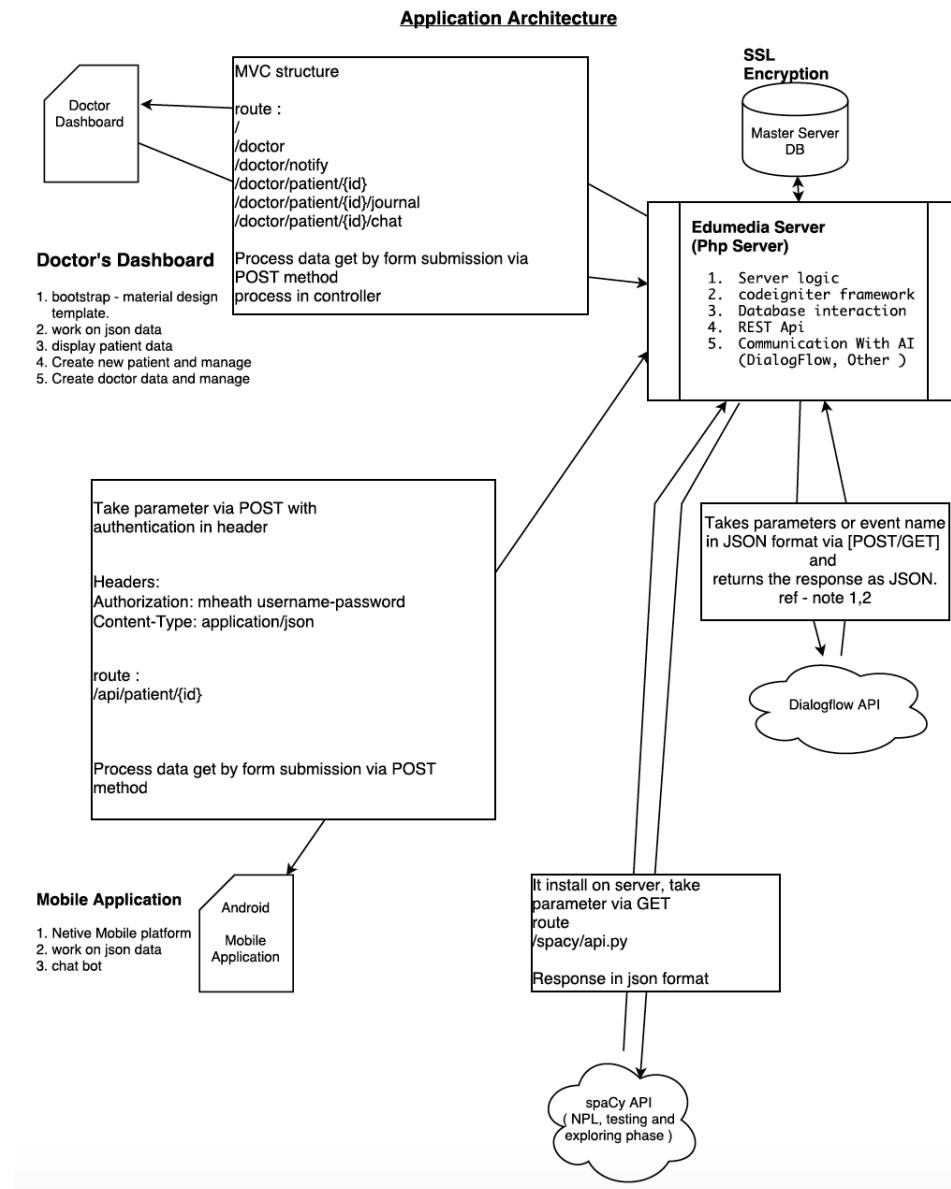
## 2.5 System Architecture

2.5.1 The system has three major systems:

- Doctor Dashboard
- Edumedia Server
- Mobile Application



2.5.2 Figure 1 below shows the architecture of the patient-provider solution.



**Figure 4: System Architecture**



## 2.6 Hardware and Software Requirements

### 2.6.1 *Hardware Requirements*

2.6.1.1 The hardware requirements for running the mobile, server and dashboard applications are the following:

- A Mac computer running macOS; Or
- A Windows computer running Windows.
- An Android phone that runs on Android 6.0 and up. (For optimal performance, a Google Pixel device with Android 8.0 is the best option)

### 2.6.2 *Software Requirements*

2.6.2.1 The software requirements for running the mobile, server and dashboard applications are the following:

- Android Studio
  - Here's the link to download Android Studio:  
<https://developer.android.com/studio/index.html>
- Java Development Kit 8
  - Installing this development kit is mandatory if you are using the android emulator. Here's the download link:  
<http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>
- Coding IDE
  - For the dashboard, it is recommended that you use an IDE. The most popular paid one is WebStorm by JetBrains. You can download it using this link:  
<https://www.jetbrains.com/webstorm/download/#section=mac>
  - If you are looking for a free IDE, then Brackets is your next choice. Here's the downloading link: <http://brackets.io/>
- Internet Browser (Safari, Chrome, Firefox and Opera)
  - Internet browsers are common on any operating system. You need an internet browser to operate the provider's dashboard. Here are the links to the most common ones:
    - Safari: <https://support.apple.com/downloads/safari>



- Chrome: <https://www.google.ca/chrome/>
- Firefox: <https://www.mozilla.org/>
- Opera: <https://www.opera.com/>

## **2.7 Installation & Deployment**

### 2.7.1 *Server & Dashboard*

2.7.1.1 See Annex A for all the installation steps of the Server and Dashboard Applications.

### 2.7.2 *Mobile Application*

2.7.2.1 See Annex B for all the installation steps of the Server and Dashboard Applications.

## **2.8 Team Acknowledgment**

### 2.8.1 *Team Polar Bear*

#### 2.8.1.1 PROJECT OSO

Algonquin College – Mobile Application Design & Development Program

Winter 2018

#### 2.8.1.2 TEAM MEMBERS

Alexandre Gravelle – Project Lead

Christine Tamkican – Design Lead

Jason Smyth – Mobile Lead

Harsh Doshi – Web Lead

Gorden Kerr – Solutions Architect

Ryan Radmore – Mobile Developer

Gregoire Rosier – Web Developer



## ANNEX A

# SERVER & DASHBOARD INSTALLATION

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Installation of the server and dashboard application will be shown using Rebel's hosting panel and will require an Edumedia account. There are many different hosting panels on the market, but this installation will only cover Rebel's hosting panel.

The server code will be handed over via a zip file. The folder structure is illustrated in Figure 5 below:

ServerDashboardApp			
Development Assets		ServerDashboardApp	
Favorites	Name	Date Modified	Size Kind
AirDrop	.gitignore	Apr 13, 2018, 5:29 AM	2 KB Unix e...utable
All My Files	.htaccess	Apr 13, 2018, 5:29 AM	1 KB Unix e...utable
iCloud Drive	.idea	Yesterday, 10:06 AM	-- Folder
Applications	api_dialogflow	Apr 13, 2018, 5:29 AM	-- Folder
Desktop	application	Apr 13, 2018, 5:29 AM	-- Folder
Documents	include	Apr 22, 2018, 5:42 PM	-- Folder
htdocs	index.php	Apr 13, 2018, 5:29 AM	10 KB PHP: H...ument
Downloads	license.txt	Apr 13, 2018, 5:29 AM	1 KB Plain Text
Music	phpinfo.php	Apr 13, 2018, 5:29 AM	64 bytes PHP: H...ument
Pictures	readme.md	Apr 13, 2018, 5:29 AM	224 bytes Markd...cument
GRAVELLE	system	Apr 13, 2018, 5:29 AM	-- Folder

Figure 5: Folder Structure

Before doing anything with the server code, make sure the selected server has the following requirements:

- The domain is registered with an SSL certificate
- Email service is enabled
- FTPS Access
- LAMP SERVER
- Server: Localhost via UNIX socket
- Server Storage of 20 GB or higher
- PHP extension: mysqli curl mbstring
- PHP version: 7.1.16 or higher
- Database Server type: MySQL
- Database Server version: 5.6.28
- Database Protocol version: 10
- Database Server charset: UTF-8 Unicode (utf8)

Here are the steps to install the server:



1. Go to Rebel's hosting panel by clicking on this link: [https://edumedia.ca:8443/login\\_up.php](https://edumedia.ca:8443/login_up.php).
2. Sign in using your username and password.

Figure 6: Login Screen

3. Once logged in, go to “Websites & Domains” and click on “Hosting Settings”.
4. Make sure your domain name has this form: [www.grav0211.edumedia.ca](http://www.grav0211.edumedia.ca).
5. Select the preferred domain to be grav0211.edumedia.ca.

Figure 7: Hosting Settings

6. Check the SSL/TLS support checkbox.
7. Verify that the PHP support is for PHP version 7.1.16.
8. Your input form should look similar to the one below.

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Search...

Logged in as Alexandre Gravelle  Subscription grav0211.edumedia.ca  Help  POWERED BY plesk

**Websites & Domains**

Mail Applications Files Databases Statistics Users Account WordPress Security Advisor

Select the URL (either with or without the www. prefix) to which site visitors will be redirected via a SEO-safe HTTP 301 redirect.

**Security**

To secure transactions with your site, use SSL/TLS protocol, which encrypts all data and transfers it over a secure connection. To employ SSL/TLS, install an SSL/TLS certificate on the site, and then select it below.

SSL/TLS support  Permanent SEO-safe 301 redirect from HTTP to HTTPS

Certificate

**Web scripting and statistics**

Specify which of the following programming and scripting languages should be interpreted, executed or otherwise processed by the web server.

SSI support  PHP support (PHP version 7.1.16, run PHP as FPM application)

Note that changing the PHP handler type may disrupt the operation of existing PHP scripts on this website.  
[Learn how to choose the most suitable PHP settings](#)

CGI support  Perl support  FastCGI support

[Webalizer](#) Web statistics (Protect access to your web statistics with your FTP username and password)  Custom error documents

\* Required fields

**Figure 8: Hosting Settings**

9. After everything is well inputted, go ahead and click “OK”.
10. Once completed with the hosting settings, go to “Databases” and click on the “Add Database” button.

Search...

Logged in as Alexandre Gravelle  Subscription grav0211.edumedia.ca  Help  POWERED BY plesk

**Websites & Domains**

Mail Applications Files Databases **Databases** Statistics Users Account WordPress Security Advisor

**Databases**

Information: The selected databases were removed.

Here you can create new or manage existing databases.

No items found.

User Management  Backup Manager

**Figure 9: Databases Section**

11. Create database name and leave “Related site” to “No related sites”.

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12. Make sure the “Create a database user” checkbox is checked.
13. Create database username with the same name of the database above. Make sure to use a strong password.
14. Uncheck “User has access to all databases within the selected subscription.”
15. Your input form should look similar to the one below.

The screenshot shows the QRebel Plesk interface. The left sidebar has icons for Websites & Domains, Mail, Applications, Files, Databases (which is highlighted in orange), Statistics, Users, Account, WordPress, and Security Advisor. The main area has a search bar and a navigation menu with 'Databases' and 'Add a Database'. The 'Add a Database' form has a 'General' section with 'Database name \*' set to 'grav0211', 'Database server' set to 'localhost:3306 (default for MySQL, v5.5.56)', and 'Related site' set to 'No related sites'. It has a 'Users' section where 'Create a database user' is checked, setting the 'Database user name \*' to 'grav0211', 'New password \*' to a masked password, and 'Confirm password \*' to the same masked password. A 'Strong' button indicates the password is secure. There is also a 'Generate' and 'Show' button. Below these fields is a checkbox for 'User has access to all databases within the selected subscription'. At the bottom, there is a note about required fields and two buttons: 'OK' and 'Cancel'.

**Figure 10: Add a Database**

16. After filling up all the required fields, go ahead and click “OK”.
17. Once your database is created, a card view of your database will be shown. See Figure on the next page.



Databases

Here you can create new or manage existing databases.

Add Database

MySQL **grav0211** Assign this database to a site

Host: localhost:3306 (MySQL) Users: **grav0211** Tables: 0 Size: 0 B

SHOW LESS

phpMyAdmin Connection Info Copy

Export Dump Import Dump Check and Repair

Remove Database

Figure 11: Databases Section

18. Click on either the “phpMyAdmin” link inside the card view or the button inside the card view header to access phpMyAdmin. It will bring you to the phpMyAdmin dashboard.

Server: localhost:3306 » Database: **grav0211**

No tables found in database.

Create table

Name:  Number of columns: 4

Go

Figure 12: phpMyAdmin Dashboard

19. Go to “Import” and import the db.sql file provided with the zip folder.
20. Keep all other input fields untouched. Click the “GO” button.
21. If everything worked, you should have the following information on the dashboard. See Figure on next page.

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```
Import has been successfully finished, 35 queries executed. (db.sql)

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0001 seconds.)
SET time_zone = '+00:00'

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0001 seconds.)
/*i40101 SET @OLD_CHARACTER_SET_CLIENT=@@CHARACTER_SET_CLIENT */

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0001 seconds.)
/*i40101 SET @OLD_CHARACTER_SET_RESULTS=@@CHARACTER_SET_RESULTS */

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0001 seconds.)
/*i40101 SET @OLD_COLLATION_CONNECTION=@@COLLATION_CONNECTION */

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0001 seconds.)
/*i40101 SET NAMES utf8mb4 */

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0034 seconds.)

CREATE TABLE `doctor` ( `iddoctor` int(11) NOT NULL, `name` varchar(200) NOT NULL, `email` varchar(100) NOT NULL, `password` varchar(200) NOT NULL, `access_token` text, `sex` enum('male','female') NOT NULL DEFAULT 'male', `age` int(11) NOT NULL DEFAULT '20', `address` varchar(200) NOT NULL, `cell` varchar(20) NOT NULL, `enabled` tinyint(1) NOT NULL DEFAULT '0', `oncreate` timestamp NOT NULL )
```

Figure 13: Result of Database Import

22. Now that the database is all set up, it's time to bring in the whole server application. Let's go back to Rebel's hosting panel.
23. Go to Files and upload the zip folder to the server root (httpdocs).
24. Unzip the zip file and make sure the hosting directory tree looks like Figure 14 on the next page.



The screenshot shows the Rebel Plesk File Manager interface. The left sidebar has a navigation menu with options like Websites & Domains, Mail, Applications, Files (which is selected), Databases, Statistics, Users, Account, WordPress, and Security Advisor. The main area is titled 'File Manager' and shows the contents of the 'httpdocs' folder. The folder structure is: Home directory > error\_docs > httpdocs > logs. The file list table has columns for Name, Modified, Size, Permissions, User, and Group. The files listed are: .. (modified Apr 24, 2018 11:14 AM, size 4.0 KB, permissions rwx-r-x---, user grav0211, group psaserv); .idea (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); api\_dialogflow (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); application (modified Apr 20, 2018 08:02 PM, size 4.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); include (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); system (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); .gitignore (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rw-r--r--, user grav0211, group psacln); .htaccess (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rw-r--r--, user grav0211, group psacln); index.php (modified Apr 13, 2018 08:29 AM, size 12.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); license.txt (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rwx r-x r-x, user grav0211, group psacln); phpinfo.php (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rw-r--r--, user grav0211, group psacln); and readme.md (modified Apr 13, 2018 08:29 AM, size 4.0 KB, permissions rw-r--r--, user grav0211, group psacln). The top right corner shows the user is logged in as Alexandre Gravelle, with a subscription to grav0211.edumedia.ca, and a 'POWERED BY plesk' logo.

Figure 14: File Manager

25. Next step is updating the configuration file from the folder **application/config/config.php**. In the config.php file at line 26, you can add your base URL. It should have this format: <http://grav0211.edumedia.ca/>. Click on the “OK” or “APPLY” buttons to save the files.
26. After go to the database.php file, and locate lines 77 to 81. The ‘username’ field is your edumedia username. The ‘database’ field is the database name, and the ‘password’ field is the database password. Click on the “OK” or “APPLY” buttons to save the files.
27. Another relevant file from the folder **application/config/constants.php**. In the constants.php file at line 93, you will find the client access token for DialogFlow. If you decide to make your own DialogFlow account, you will need to find this access token on the DialogFlow Console. Here’s the link: <https://console.dialogflow.com/api-client/#/login>. Username and password will be provided in the GitHub repository of the project.
28. To test if the server is working, enter this URL: <http://grav0211.edumedia.ca/> where grav0211 would be changed to your edumedia username.



## **ANNEX B**

### **MOBILE APP INSTALLATION**

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Use or disclosure of the data on this sheet is subject to the restrictions on page i.



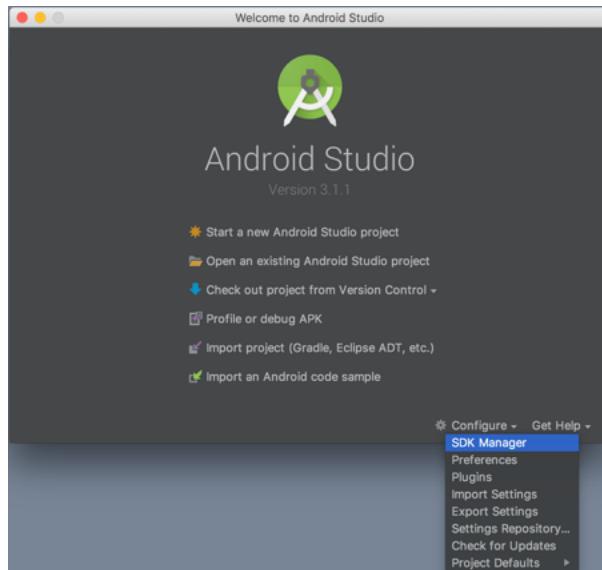
This guide is used for developers that want to continue development of the mobile application. It will also show you a way to install the apk file on your android device.

1. Install JDK (Java Development Kit) from the link listed in section 2.6.2.1 of this document.
2. Select and download the version for MAC OS X x64 or Windows x86.

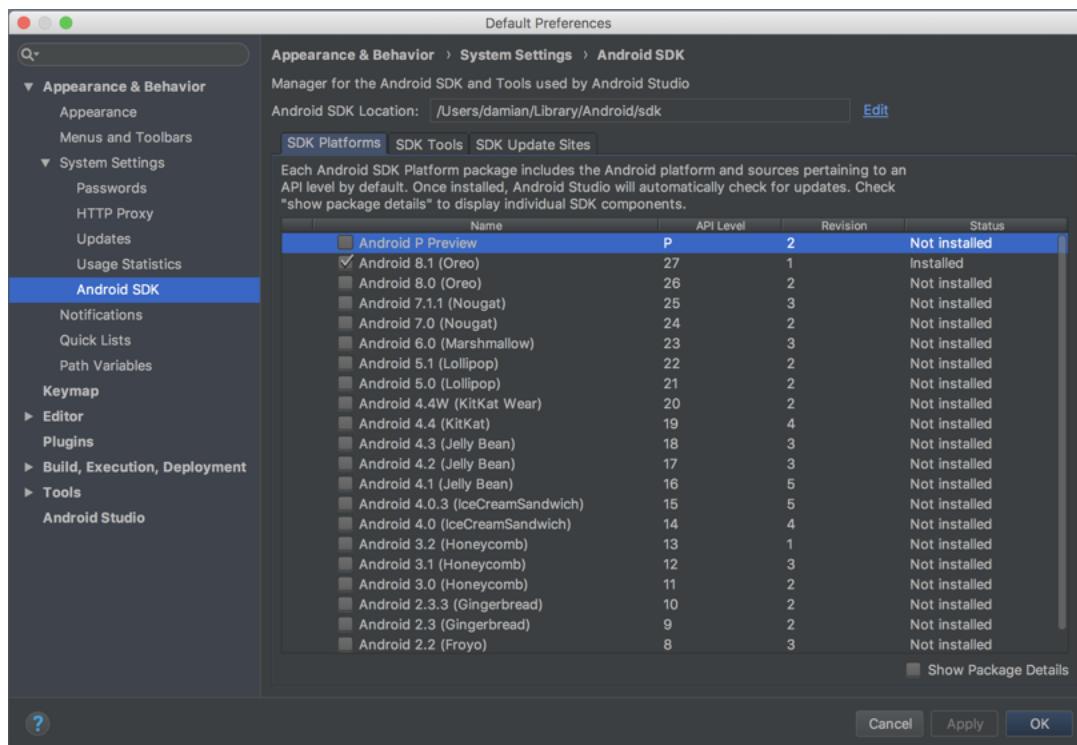
The screenshot shows the Oracle Java SE Development Kit 8 Downloads page. At the top, there's a navigation bar with the Oracle logo, a menu icon, a search bar, and links for Sign In, Country/Region, and Call. Below the navigation bar, the URL is Oracle Technology Network / Java / Java SE / Downloads. On the left, a sidebar lists categories like Java SE, Java EE, Java ME, etc. The main content area has tabs for Overview, Downloads (which is selected), Documentation, Community, Technologies, and Training. A sub-section titled "Java SE Development Kit 8 Downloads" provides an overview of the JDK, its tools, and developer resources. It includes links for Java SE, Java EE and Glassfish, Java ME, Java Card, NetBeans IDE, Java Mission Control, Java APIs, Technical Articles, Demos and Videos, Forums, Java Magazine, Developer Training, Tutorials, and Java.com. Below this, there's a section for "Java SE Development Kit 8u171" with a note about accepting the Oracle Binary Code License Agreement. Two radio buttons are shown: "Accept License Agreement" (selected) and "Decline License Agreement". A table lists download links for various platforms: Linux ARM 32 Hard Float ABI (77.97 MB), Linux ARM 64 Hard Float ABI (74.89 MB), Linux x86 (170.05 MB), Linux x86 (184.88 MB), Linux x64 (167.14 MB), Linux x64 (182.05 MB), Mac OS X x64 (247.84 MB), Solaris SPARC 64-bit (SVR4 package) (139.83 MB), Solaris SPARC 64-bit (99.19 MB), Solaris x64 (SVR4 package) (140.6 MB), Solaris x64 (97.05 MB), Windows x86 (199.1 MB), and Windows x64 (207.27 MB). Each row has a download link labeled "jdk-8u171-".

Figure 15: JDK Download

3. After the download is complete, install the package.
4. Download Android Studio from the link listed in section 2.6.2.1 of this document.
5. After the download is complete, install the package.
6. When you open Android Studio for the first time, it is essential to check for updates and download the SDKs. You can find the “Check for Updates” and “SDK Manager” by selecting the “Configuration” drop-down menu and clicking SDK Manager. On the next page, Figure 16 illustrates where to find the SDK Manager link.

**Figure 16: Android Home Screen**

7. The SDK Manager will look like Figure 17 below. You must make sure the version you install is versions 7.1.1 to 8.0. All depends on your Android device's version.

**Figure 17: SDK Manager**

8. After you have successfully installed the SDKs, you can now open the android studio project and then open the project.

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Use or disclosure of the data on this sheet is subject to the restrictions on page i.



- Once the project is opened, you can select the green play button, and you can see it in action in the Android emulator. (See Figure 18).



The screenshot shows the Android Studio interface with the project navigation bar at the top. The left sidebar displays the project structure, including the `src` folder containing `main`, `java`, and `com.algonquincollege.oso`. Below this is the `Gradle Scripts` section, which includes files like `build.gradle` (Project: Oso), `build.gradle` (Module: app), `build.gradle` (Module: onboarder), `gradle-wrapper.properties` (Gradle Version), `proguard-rules.pro` (ProGuard Rules for app), `proguard-rules.pro` (ProGuard Rules for onboarder), `gradle.properties` (Project Properties), `Settings.gradle` (Project Settings), and `local.properties` (SDK Location). The main editor window shows the `ChatActivity.java` file, which contains Java code for initializing a RecyclerView and setting up a LinearLayoutManager.

```
134     setContentView(R.layout.activity_message_list);
135
136     toolbar = (Toolbar) findViewById(R.id.oso_app_bar);
137     toolbar.setTitle("");
138     setSupportActionBar(toolbar);
139
140     ActivityCompat.requestPermissions(activity, new String[]{android.Manifest.permission.RECORD_AUDIO}, requestCode);
141
142     mRecyclerView = (RecyclerView) findViewById(R.id.recycler_view);
143     userMessage = (EditText) findViewById(R.id.messageInputField);
144     addBtn = (RelativeLayout) findViewById(R.id.inputBtn);
145
146     //setting up layout manager
147     mRecyclerView.setHasFixedSize(true);
148     final LinearLayoutManager linearLayoutManager = new LinearLayoutManager(context);
149     linearLayoutManager.setStackFromEnd(true);
150     mRecyclerView.setLayoutManager(linearLayoutManager);
151
152
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157
158     //creates a dummy message for testing purposes. when connected just initialize list
159
160     //grabs adapter
161     chatAdapter = new ChatAdapter(messageArrayList);
162
163     Date currentTime = Calendar.getInstance().getTime();
164
165     Log.d("onCreate", "onCreate: " + currentTime);
166
167     Log.d("onCreate", "onCreate: " + userMessage.getText());
168
169     Log.d("onCreate", "onCreate: " + addBtn);
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**Figure 18: Android Studio Workspace**

10. If you are looking to install the apk file on your phone, you first need to enable developers mode and then enable USB debugging. Every phone is slightly different, so our recommendation is to do a quick google search. Your search should look like: “Enable developer mode in Pixel 2” or “Enabling USB debugging in Pixel 2”.
  11. Once that is complete, you can plug your android phone to the computer using USB and rerun the green play button. Select the options that show your android device and the project will be installed on your phone.