Programming in Android

Session: 9

Google API

Objectives

- Explain API and its uses
- Explain Google API
- Explain location based service

Introduction

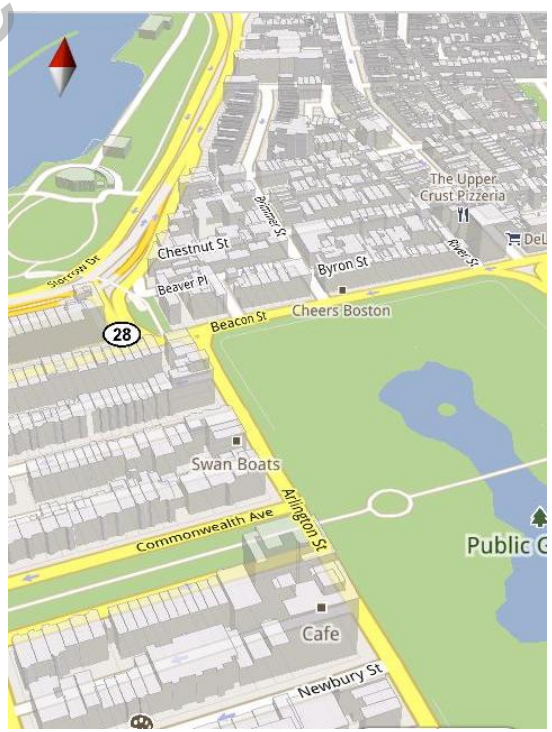
- An API can be explained as follows:
  - API stands for Application Programming Interface
  - It is a specification used by software components to communicate with each other
  - It is a library containing specifications for objects, classes, variables, and so on
  - It describes the ways in which a particular task is performed
- Google API's basically consist of specialized Web services, programs, and specialized scripts
- Google APIs are used as an added resource in their applications

Google API

- Google as an organization provides several services such as Google Drive, Google App Engine, Google Translate, Google Maps, and so on
- Developers can integrate these services provided by Google into their application free of cost
- The developer needs to keep in mind that by using Google API, the application will rely on a network connection in order to function properly

Working with Location Based Services

- Location Based Service (LBS) is an information service and has a number of uses in social networking
- With the incorporation of Global Positioning System (GPS) devices in Smartphones, LBS have become important in the past few years
- Most important classes and interface that are to be used are as follows:
  - LocationManager
  - LocationProvider
  - Location
  - LocationListener



Retrieving Current Location Example

- The user analytics on the map are feasible in one of the following ways:
  - Using the GPS device that comes with the mobile
  - Using the ID of the cell that the user is currently being served by
- The current user location can be retrieved as shown in the following Code Snippet:

```
LocationManager locationManager =
(LocationManager)getSystemService(Context.LOCATION_SERVICE);

locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER,
MINIMUM_TIME_BETWEEN_UPDATES, MINIMUM_DISTANCE_CHANGE_FOR_UPDATES, new
MyLocationListener());

Location location = locationManager. getLastKnownLocation(LocationManager.GPS_
PROVIDER);
```

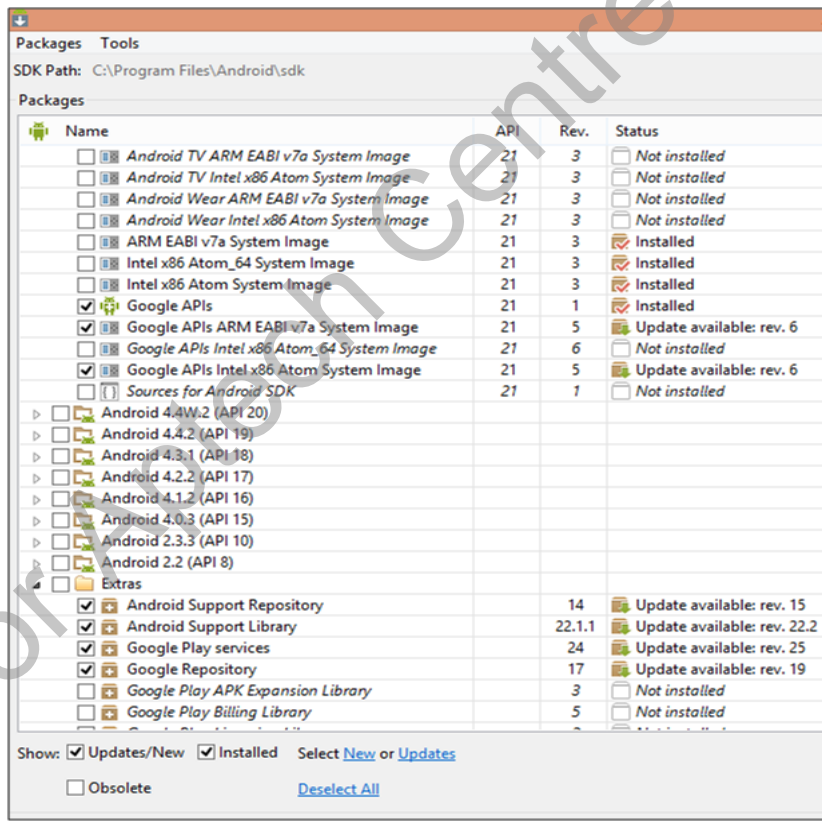
Location Based Services Example

- Using the code, an application for demonstrating LBS is created as shown in the following figure:

- Clicking Retrieve Location will return the current location

Setting up Android SDK for Google API

- Navigate to Tools → Android and select SDK Manager
- Select Google APIs under the Android API being used. In this case it is Android 5.0.1
- Select Google Play services under Extras
- Click Install. The selected packages will be installed as shown in the given figure

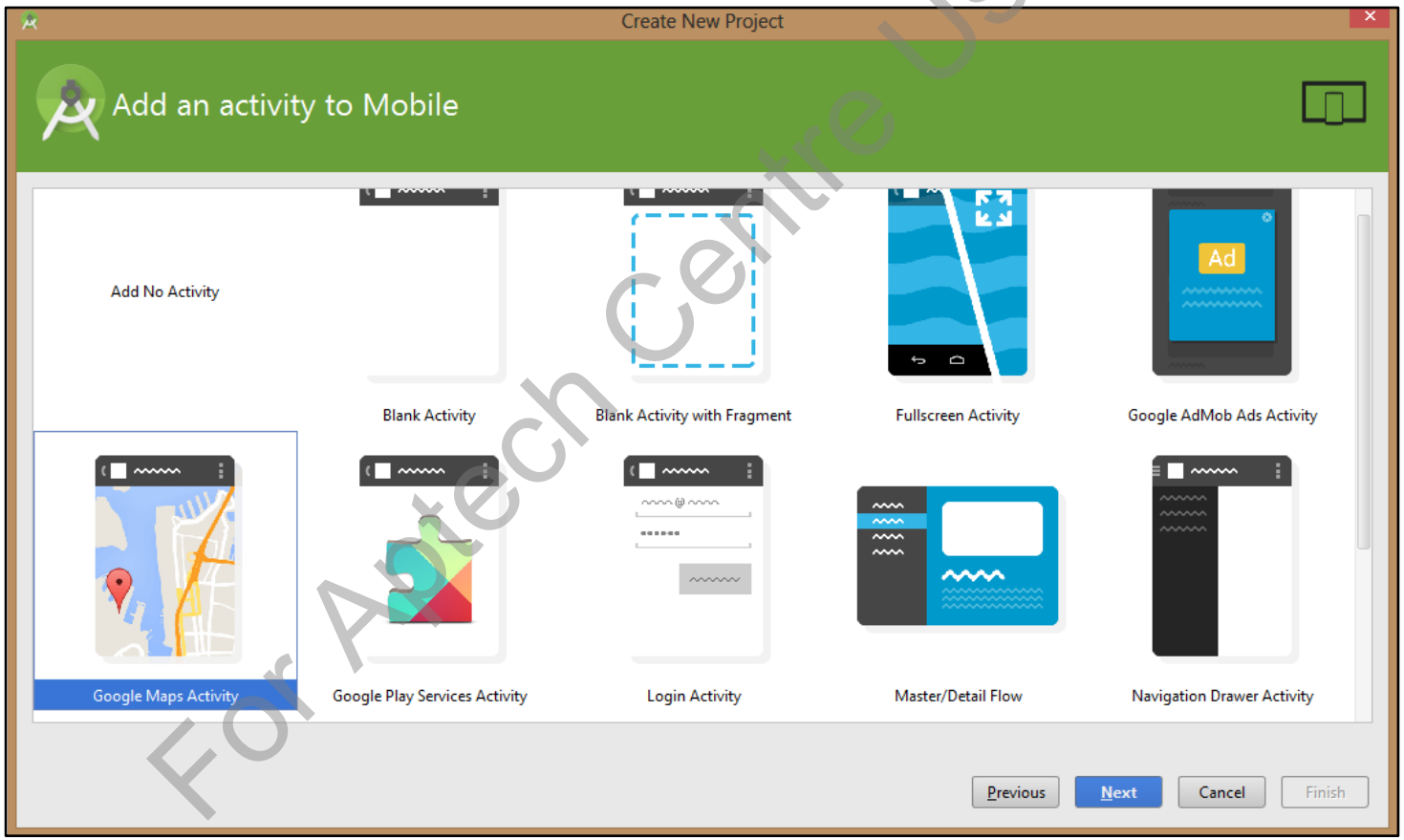


Working with Google Maps

- Google Maps allows the users to explore the world with rich maps provided by Google
- It helps to identify locations with custom markers, augment the map data with image overlays, embed one or more maps as fragments, and much more
- In order to use Google Maps the needs to host an Activity Fragment
- The Steps are as follows:
  - The Android SDK should have libraries for Google Maps installed
  - The Activity class that will be responsible for showing the map needs to extend from ActivityFragment class
  - The application manifest file needs to be setup with the 'android.permission.INTERNET' permission
  - The application manifest file is also required to be setup with the Maps key

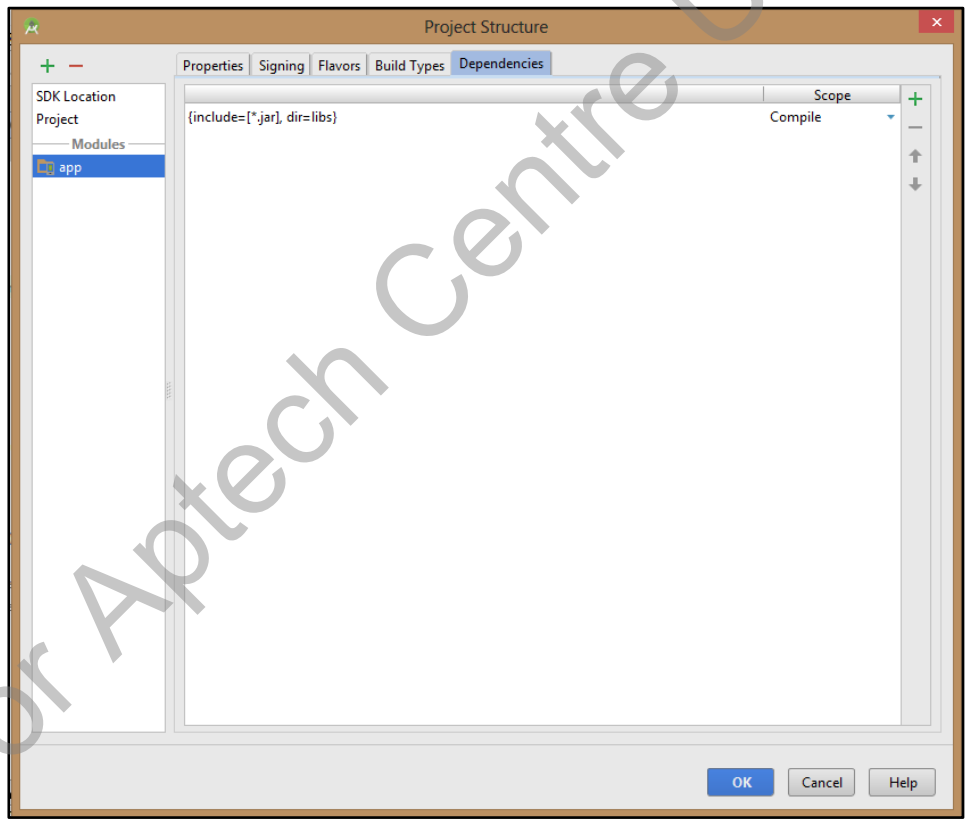
Adding Dependencies for the Application 1-3

- Create a project named GoogleProject in Android Studio
- During the activity selection screen, select Google Maps Activity as shown in the following figure:



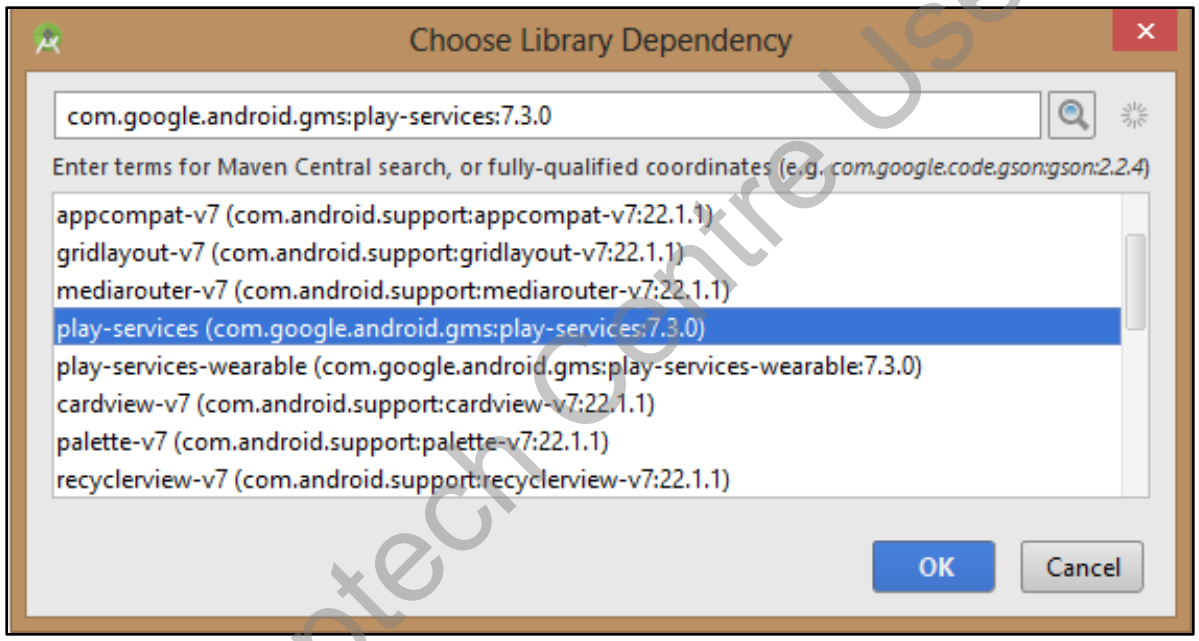
Adding Dependencies for the Application 2-3

- If the project is created using a Blank Activity, right-click app and select Open Module Settings
- From the Project Structure dialog box, select the Dependencies tab as shown in the following figure:



Adding Dependencies for the Application 3-3

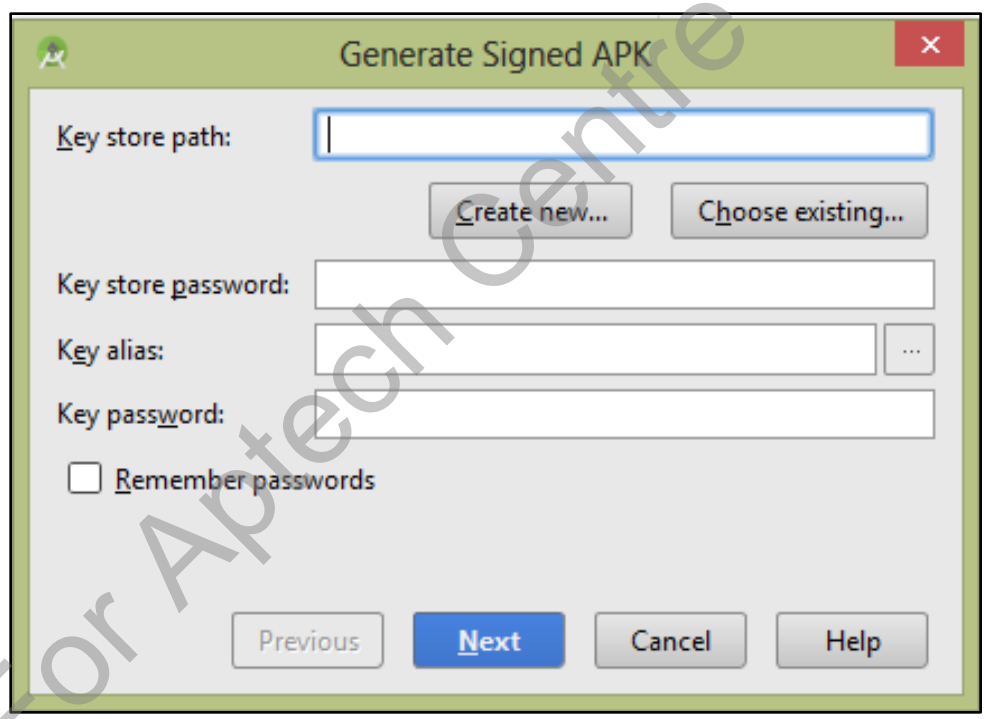
- Click the '+' sign and select Library Dependency to open Library Selection dialog box as shown in the following figure:



- Select the play-services library and click OK
- Click OK again to confirm the dependencies
- Navigate to app → java → com.example.googleproject and add the import for the package com.google.android.gms.maps.GoogleMap

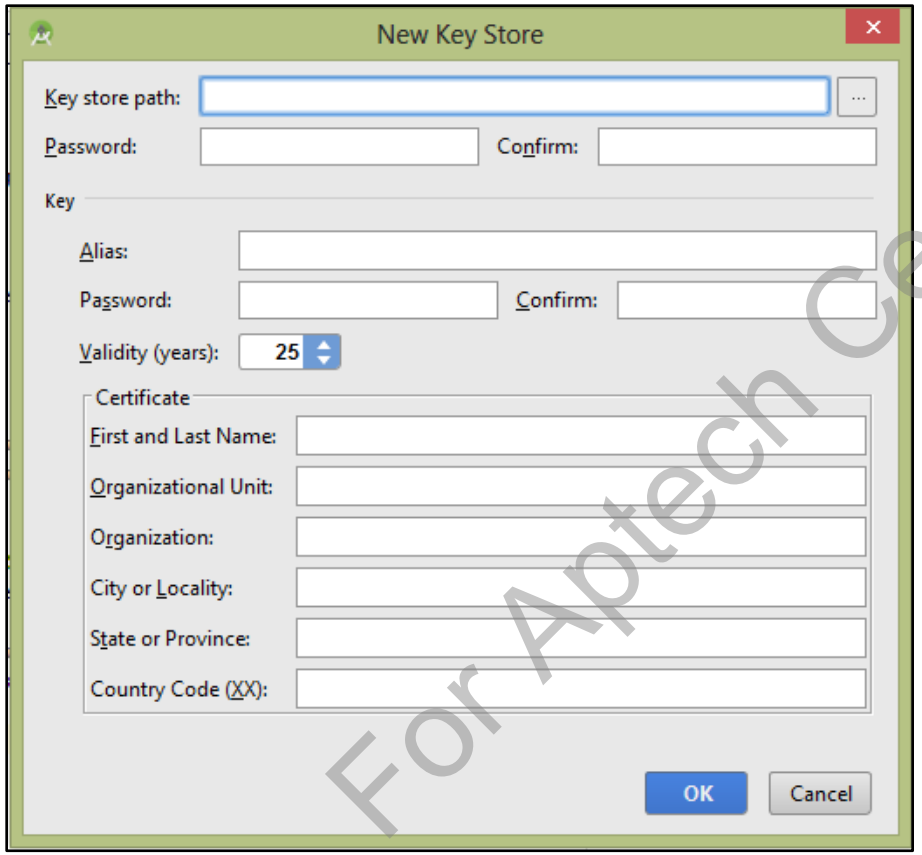
Generating a Key for the Application 1-3

- Start Android Studio and open the desired project
- Navigate to the Build Menu and select Generate Signed APK
- The Generate Signed APK dialog box is displayed as shown in the following figure:

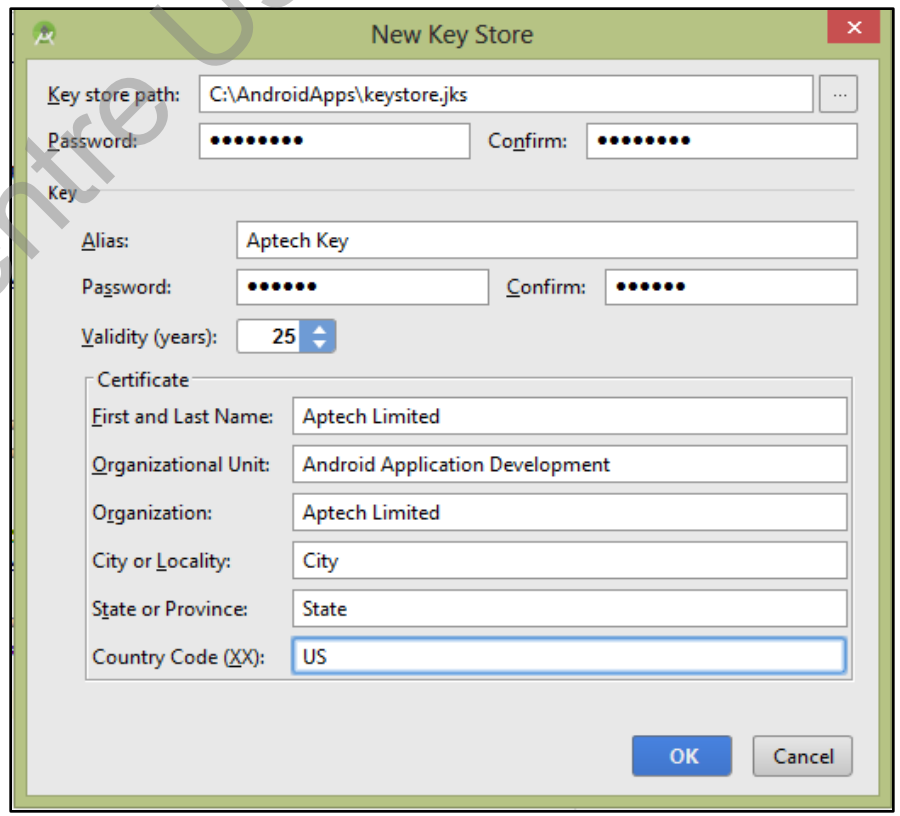


Generating a Key for the Application 2-3

- If it is the first time signing, click Create new to open the New Key Store dialog box as shown in the following figure:

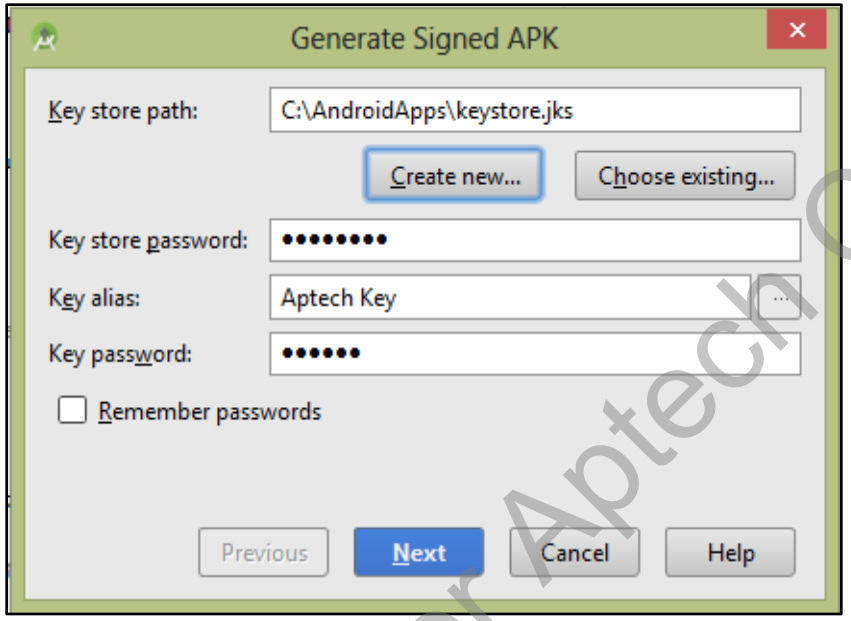


- Enter the details as shown in the following figure:

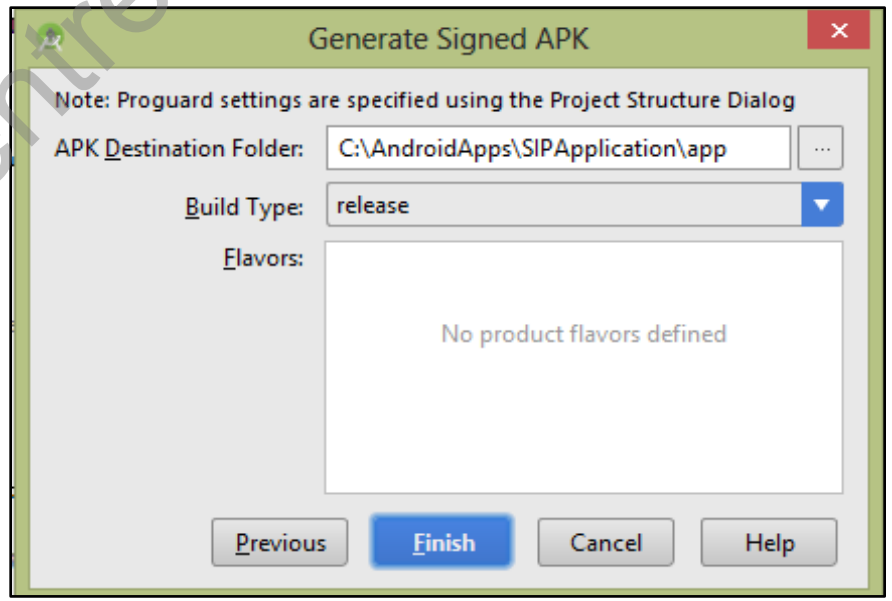


Generating a Key for the Application 3-3

- Click OK to return to the Generate Signed APK dialog box with the details already entered as shown in the following figure:



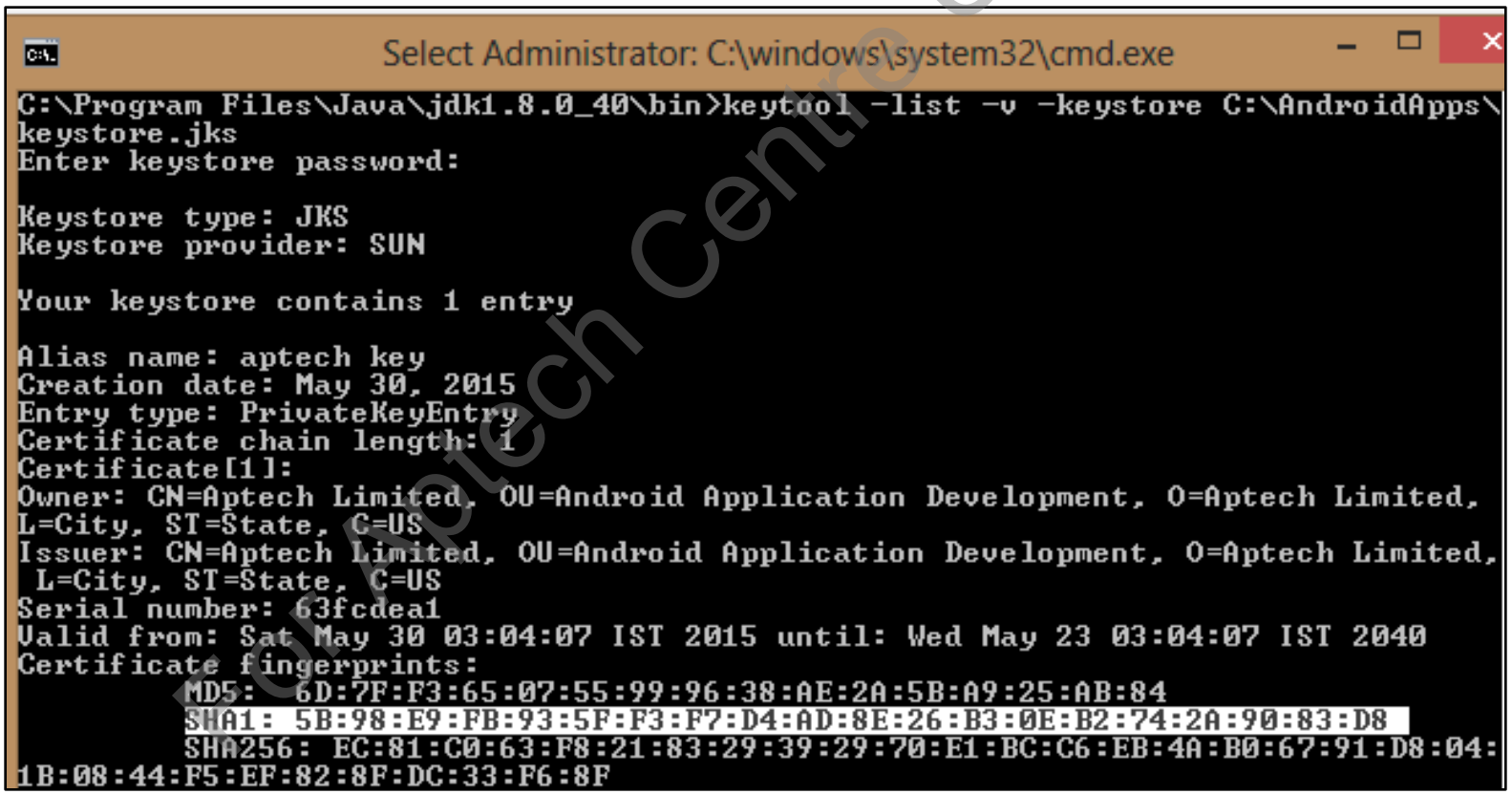
- Click Next to display the Destination dialog box as shown in the following figure:



- Click Finish

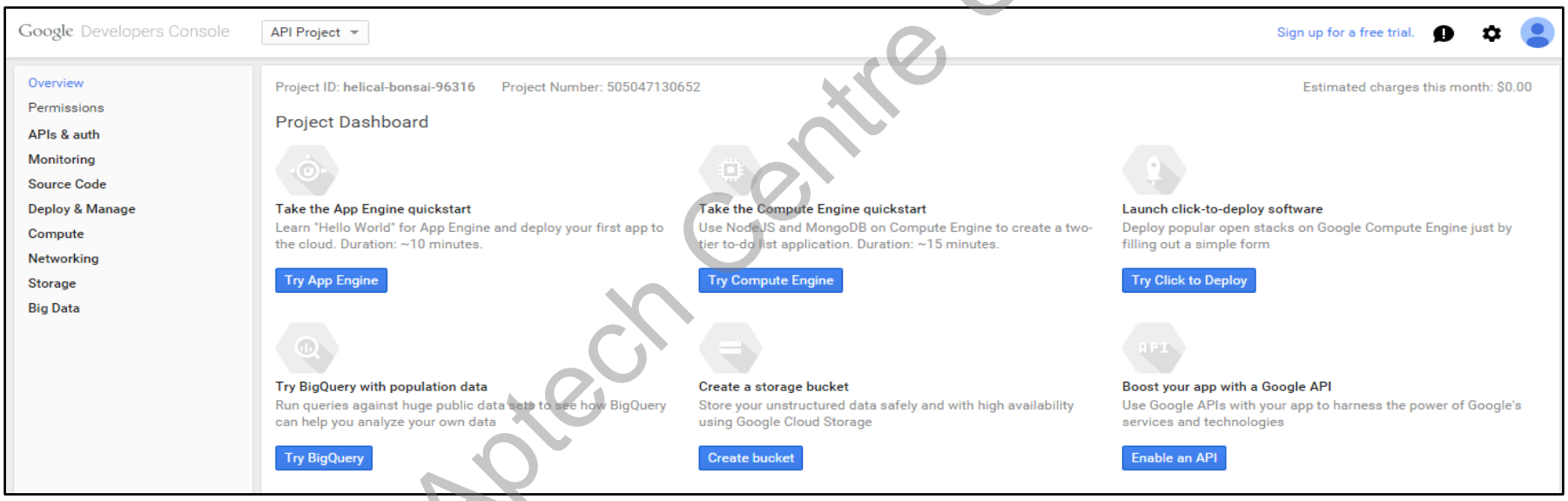
Retrieving a Google Maps API Key 1-9

- The keytool.exe is present in the C:\Program Files\Java\<JDK_version_number>\bin folder
- Type the following command to extract the SHA1 fingerprint: keytool -list -v -keystore C:\AndroidApps\keysotre.jks. When prompted, enter the password as shown in the following figure:



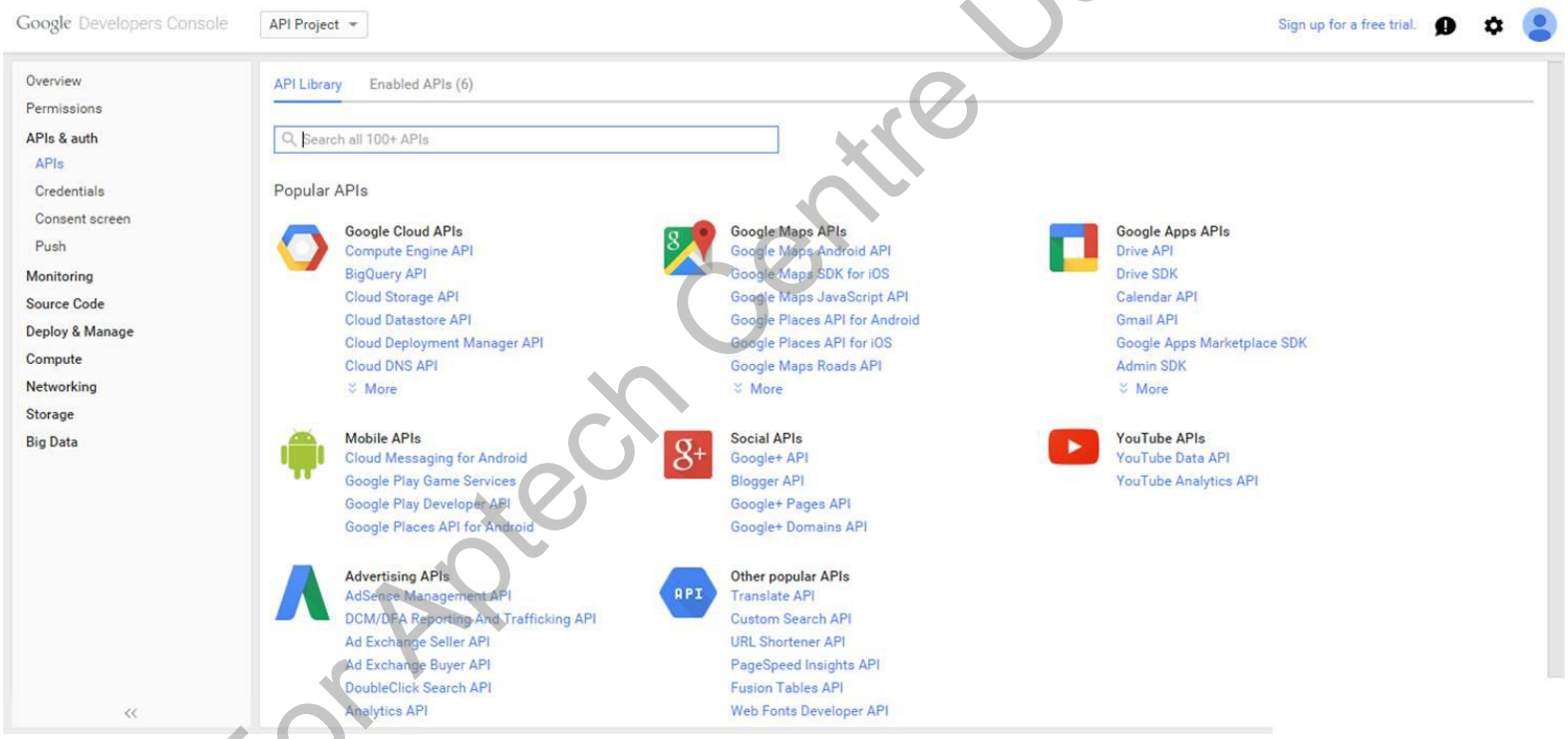
Retrieving a Google Maps API Key 2-9

- Enter https://console.developers.google.com/ in the address bar of a browser
- Sign-in with the Gmail ID of the developer. If you are using the Google APIs Console for the first time, then click Create Project to create a new project named API Project as shown in the following figure:



Retrieving a Google Maps API Key 3-9

- Click APIs & auth and select APIs from the left pane as shown in the following figure:

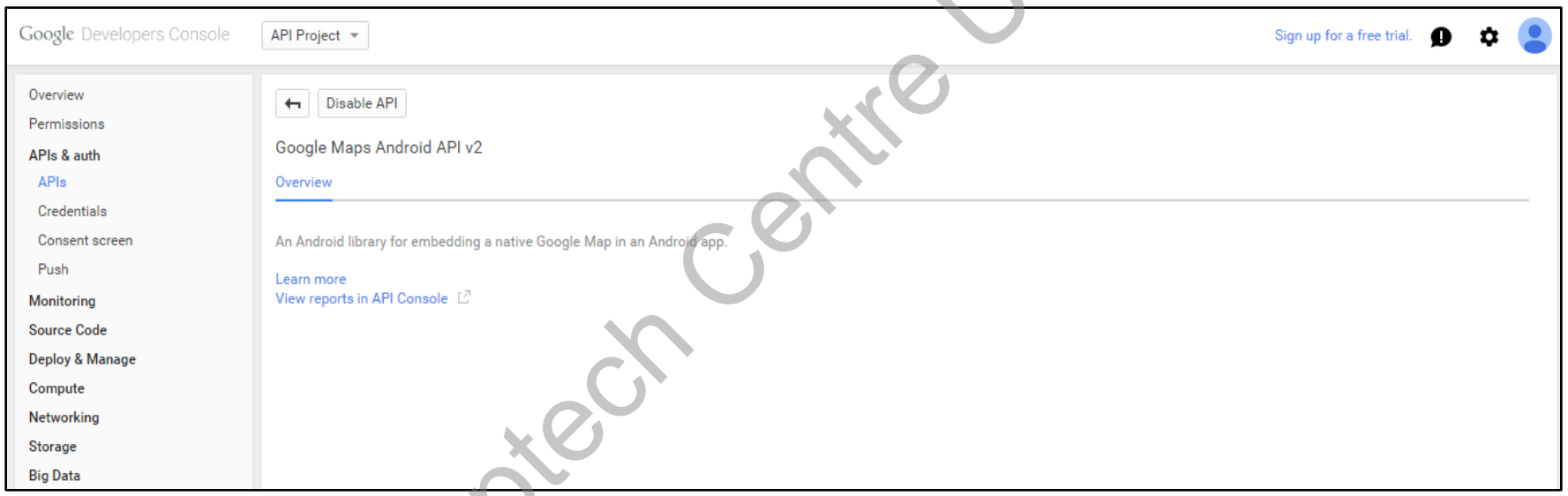


Retrieving a Google Maps API Key 4-9

- Select Google Maps Android API under Google Maps APIs and click Enable API. The output will be as shown in the following figure:

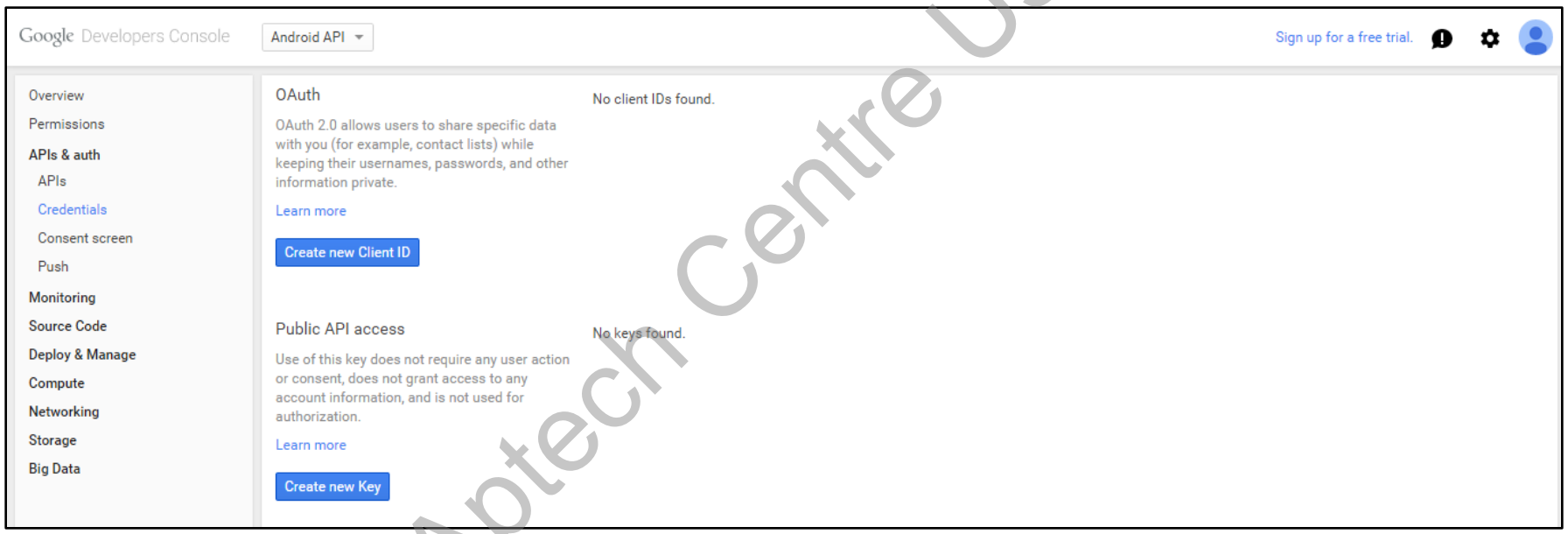
Retrieving a Google Maps API Key 5-9

- Select Google Maps Android API under Google Maps APIs and click Enable API. The output will be as shown in the following figure:



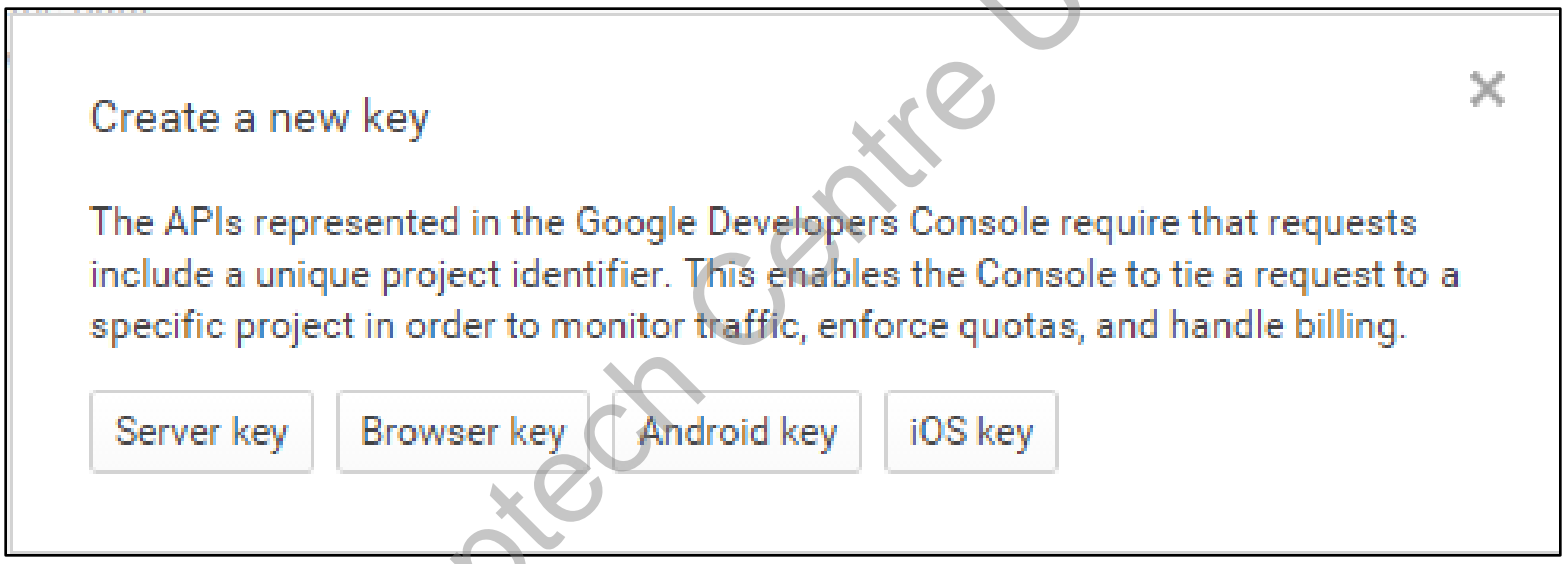
Retrieving a Google Maps API Key 6-9

- From the left pane, click Credentials as shown in the following figure:



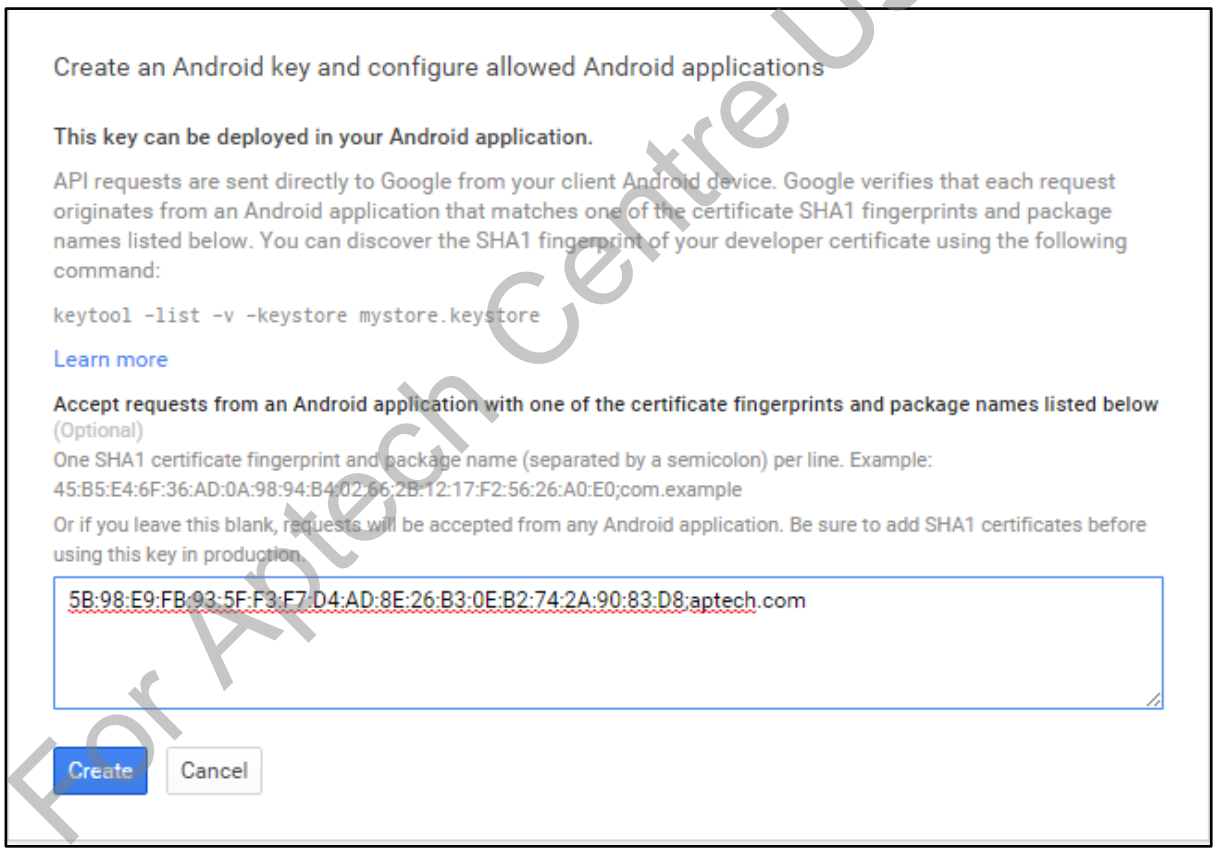
Retrieving a Google Maps API Key 7-9

- Click Create new Key
- Click Android key to obtain an API key from the popup as shown in the following figure:



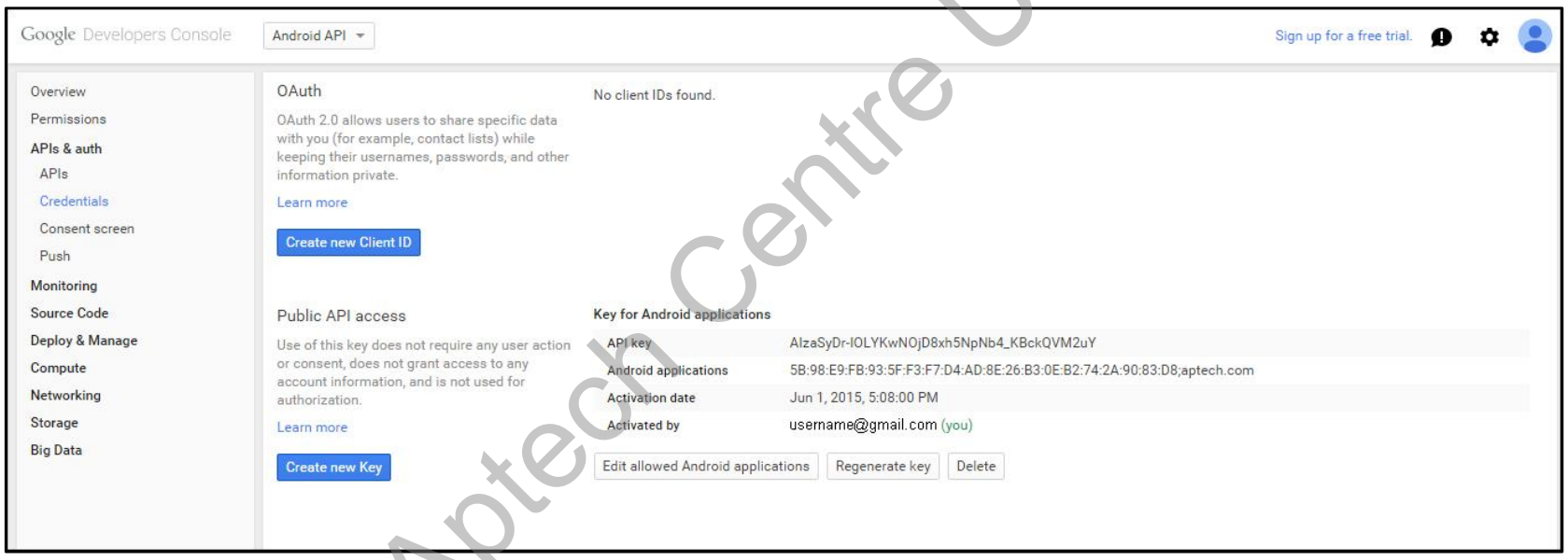
Retrieving a Google Maps API Key 8-9

- Enter the application key followed by a semicolon and the package name as shown in the following figure:



Retrieving a Google Maps API Key 9-9

- Click Create to generate an API key. The API key is created and displayed on the Credentials page as shown in the following figure:



Google API Manifest Changes 1-2

- The AndroidManifest.xml needs to be modified to add the key and set the permissions for your application to access Android features and Google Maps servers
- An example is shown in the following Code Snippet:

```
<permissionandroid:name="com.trafficapp.permission.MAPS_ RECEIVE"
android:protectionLevel="signature"></permission>
<uses-permission android:name="com.trafficapp.permission.MAPS_ RECEIVE"/>
 <uses-permission android:name="android.permission. INTERNET"/>
<uses-permission android:name="com.google.android. providers.gsf.permission.READ_GSERVICES"/>
<uses-permission android:name="android.permission. ACCESS_NETWORK_STATE"/>
<uses-permission android:name="android.permission. ACCESS_COARSE_LOCATION"/>
<uses-permission android:name="android.permission. ACCESS_FINE_LOCATION"/>
<uses-feature android:name="android.hardware.location" android:required="false" />
<uses-feature android:name="android.hardware.location.network" android:required="false" />
<uses-feature android:name="android.hardware.location. gps" />
<uses-feature android:name="android.hardware.wifi" android:required="false" />
<uses-feature android:glEsVersion="0x00020000" android:required="true"/>
<meta-data
          android:name="com.google.android.maps.v2.API_ KEY"
          android:value=" AIzaSyDr-IOLYKwNOjD8xh5NpNb4_KBckQVM2uY"/>
```

Google API Manifest Changes 2-2

- If the project is made using the Google Maps activity, a string resource is used instead
- In this case, navigate to res → values and open google_maps_api.xml for editing and modify the code as shown in the following Code Snippet:

```
<resources>
<string name="google_maps_key" translatable="false"
templateMergeStrategy="preserve">
        AIzaSyDr-IOLYKwNOjD8xh5NpNb4_KBckQVM2uY
    </string>
</resources>
```

Map Fragment Example

- The code to add a Map Fragment is shown in the following Code Snippet:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/ apk/res/android"
android:layout_width="fill_parent"
android:layout_height="fill_parent"
android:orientation="vertical" >
<LinearLayout
        android:layout_width="fill_parent"
        android:layout_height="fill_parent" >
<fragment
        android:id="@+id/map"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
 class="com.google.android.gms.maps.SupportMapFragment" />
</LinearLayout>
</RelativeLayout>
```

Google Maps Example Application

- Using the code, an application for demonstrating Google Maps is created as shown in the following figure:

Google Play Services

- Play Services is a client library available for use by other applications to access the Google API
- Play Services is installed as an APK on devices by default. It is automatically updated on a regular basis
- On older devices, where play services is not pre-installed, the Play Store will make an automatic install
- The developer can assume that almost all devices have Play Services installed and freely use the services provided by the library

Google Play Services Classes 1-2

- **GoogleApiClient.Builder**
  - The builder class is used to retrieve a reference to a GoogleApiClient object
  - The API that will be utilized by the application can be specified using the addAPI() method
  - The addConnectionCallbacks() method is used to set the callback listener
  - The addOnConnectionFailedListener() method is used to set a call back listener if the connection to the service fails
  - The build() method is used to retrieve an instance of GoogleApiClient

- **GoogleApiClient**
  - This class is the main entry point for Google Play Services integration
  - The blockingConnect() and connect() methods are used to make a blocking and a non-blocking connect respectively
  - The disconnect() and reconnect() methods are used to disconnect and reconnect respectively
  - The getSessionId() method is used to get the session id for the connection

Google Play Services Classes 2-2

- **GoogleApiClient**
  - The registerConnectionCallbacks() is used to register callback listeners for non-blocking connect and unregisterConnectionCallbacks() method is used to unregister the listener

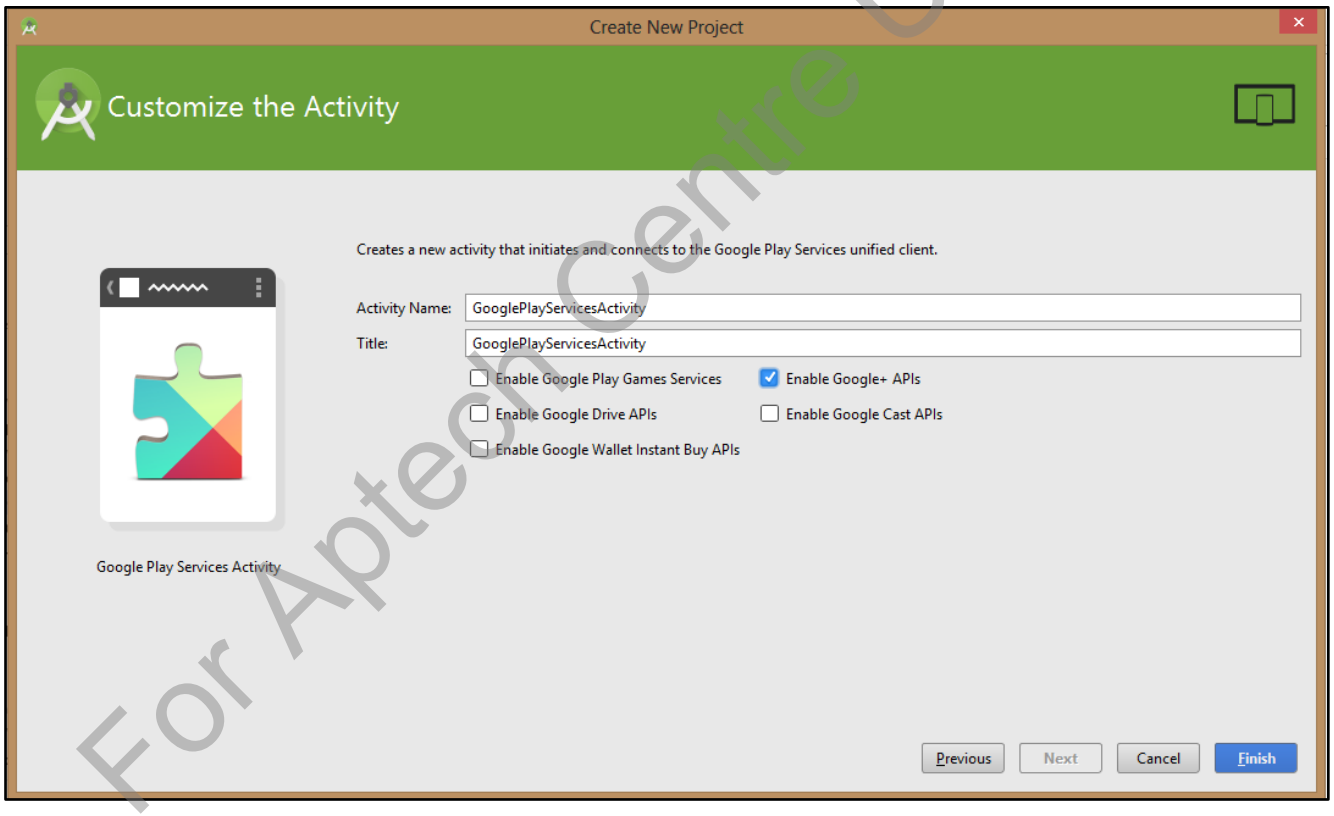
- **GooglePlayServicesUtil**
  - A utility class which can be used to verify that Google Play Services are available on the devices and to check the version to ensure that they are up to date
  - The static method isGooglePlayServicesAvailable() is used to check if Google Play Services is installed

Adding Dependencies for the Application 1-4

- Create a project named PlayServices in Android Studio
- During the activity selection screen, select Google Play Services Activity as shown in the following figure:

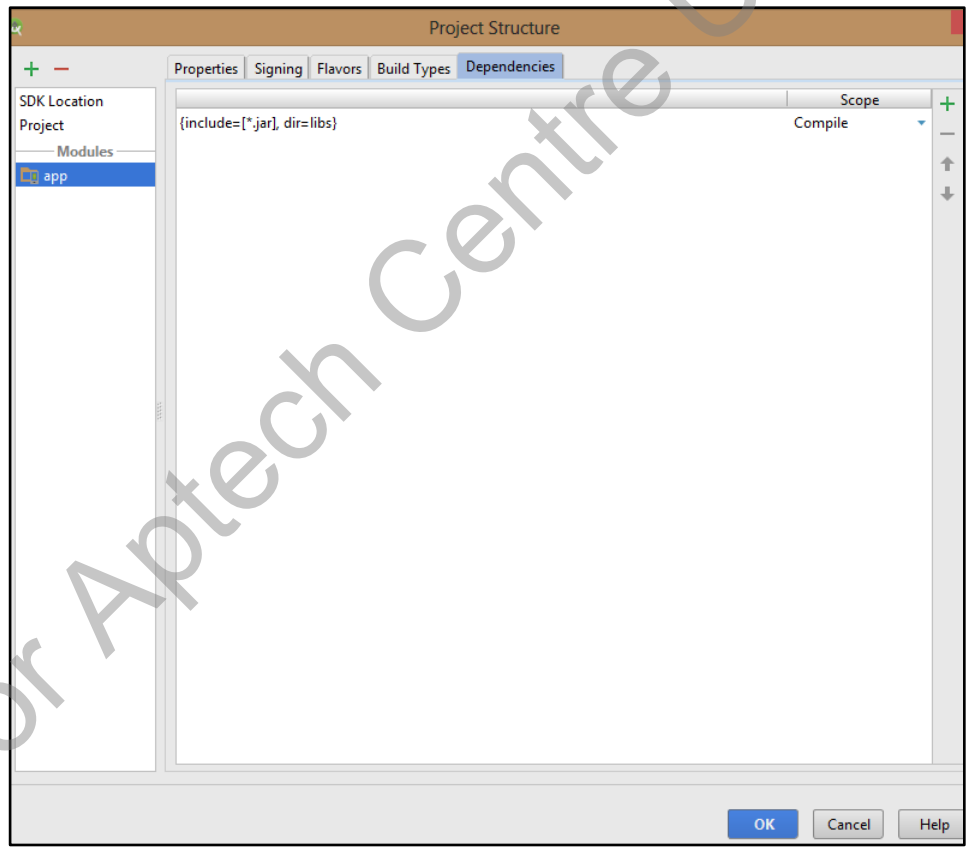
Adding Dependencies for the Application 2-4

- Click Next
- Select the Enable Google + APIs check box as shown in the following figure:



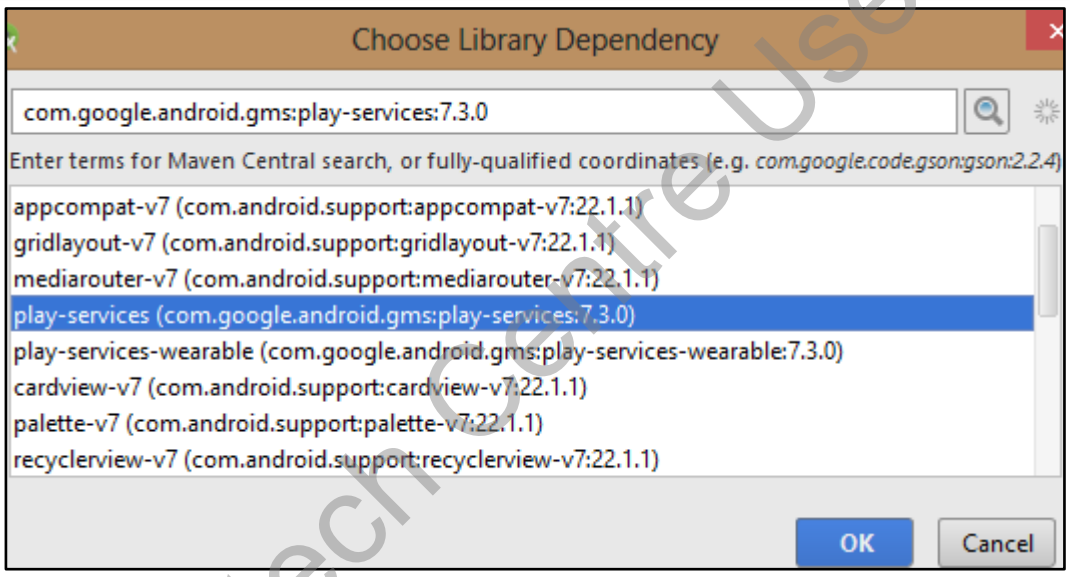
Adding Dependencies for the Application 3-4

- If the project is created using a Blank Activity, right-click app and select Open Module Settings
- From the Project Structure dialog box, select the Dependencies tab as shown in the following figure:



Adding Dependencies for the Application 4-4

- Click the '+' sign and select Library Dependency to open Choose Library Dependency dialog box as shown in the following figure:



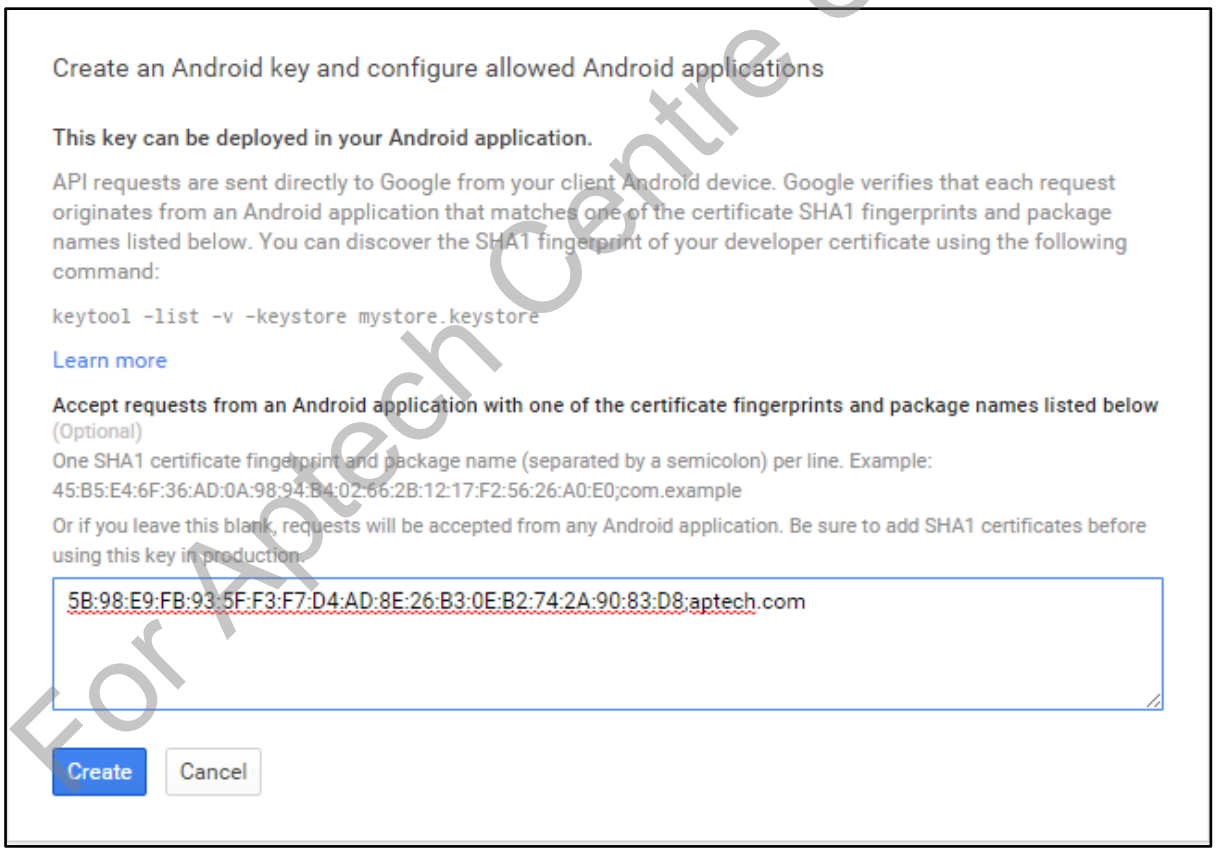
- Select the play-services library and click OK
- Click OK again to confirm the dependencies
- Navigate to app → java → aptech.com.playservices and add the imports
- Generate a Key for the Application

Retrieve a Google+ API Key 1-3

- The keytool.exe is present in the C:\Program Files\Java\<JDK_version_number>\ bin folder
- Type the following command to extract the SHA1 fingerprint: keytool -list -v -keystore C:\AndroidApps\keysotre.jks .When prompted, enter the Password
- Enter https://console.developers.google.com/ in the Address bar of a browser. This opens the Google console to register your application for the Maps API
- Sign-in with the Gmail id of the developer. If you are using the Google APIs Console for the first time, then click Create Project to create a new project named API Project
- Click API & auth and select APIs
- Select Google+ API and click Enable API
- From the Left pane, click Credentials

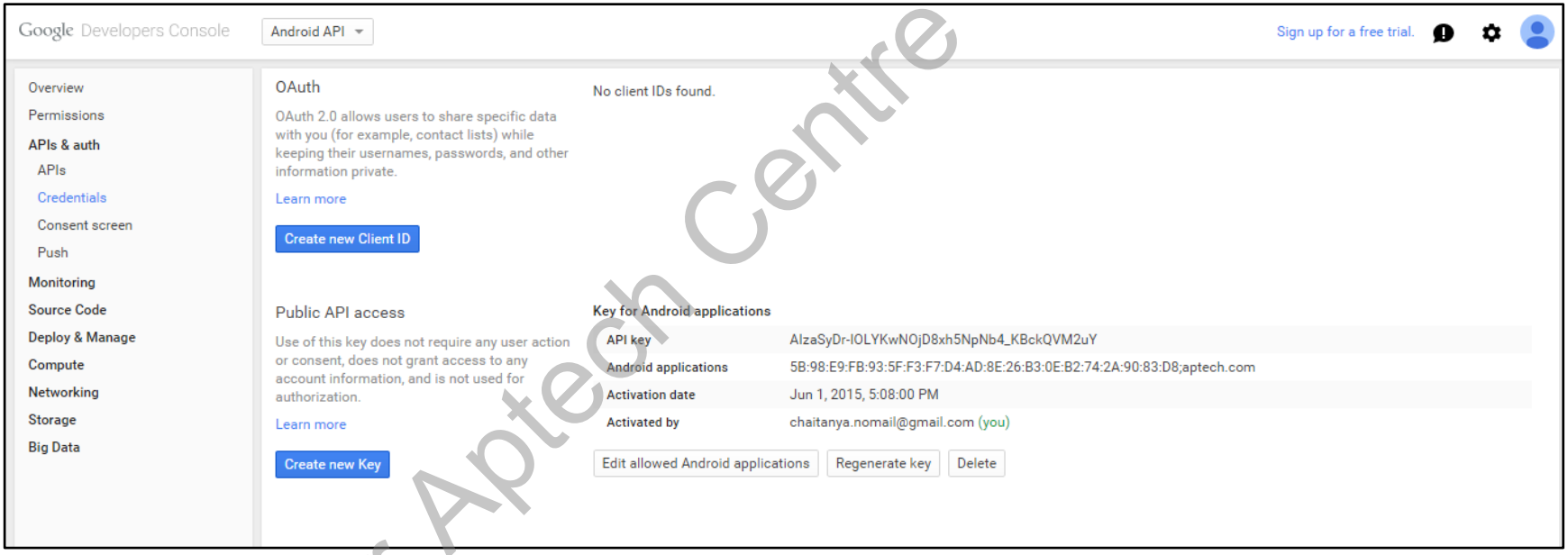
Retrieve a Google+ API Key 2-3

- Click Create new key
- Click Create new Android Key to obtain an API key from the popup
- Enter the application key followed by a semicolon and the package name as shown in the following figure:



Retrieve a Google+ API Key 3-3

- Click Create to generate an API key. The API key is created and displayed on the Credentials page as shown in the following figure:



Google+ Login Button Example

- The code to add a Google+ Sign in Button is shown in the following Code Snippet:

```
<LinearLayout>

<com.google.android.gms.common.SignInButton
        android:id="@+id/gpluslogin"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:onClick="onGPlusClicked"
        android:layout_marginBottom="20dp"/>

</LinearLayout>
```

Retrieving User Information Example

- The code to retrieve logged in user information is shown in the following Code Snippet:

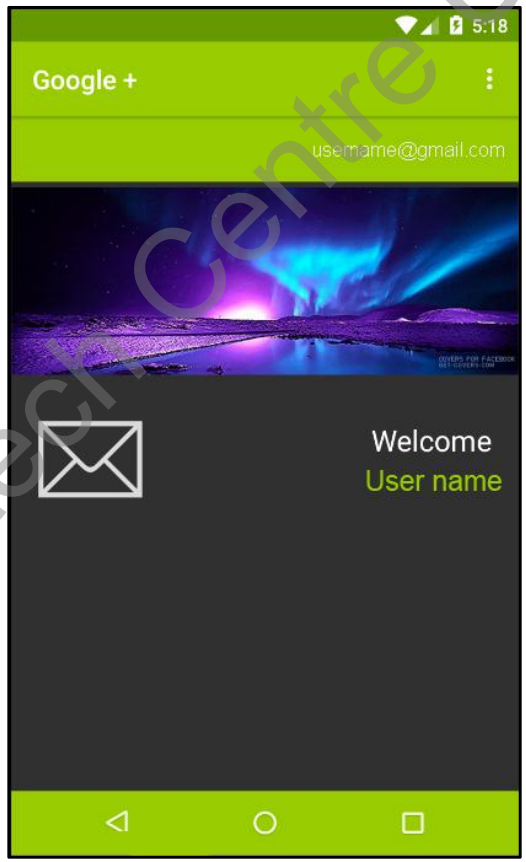
```
try {
            if (Plus.PeopleApi.getCurrentPerson(mGoogleApiClient) != null) {
                Person user = Plus.PeopleApi.getCurrentPerson(mGoogleApiClient);

                String userName =
Plus.AccountApi.getAccountName(mGoogleApiClient);
                String userRealName = user.getDisplayName();
                String userPhotoUrl = user.getImage().getUrl();
                String userCoverUrl = user.getCover().getCoverPhoto().getUrl();
}
```

Google API Example 1-3

- Using the code, an application for demonstrating Google API is created as shown in the following figure:

Google API Example 2-3

- Click the Red ‘g+’ sign in the SIGN IN button and sign in to your Google+ account
- Once the user signs in, the Google+ Home page is displayed as shown in the following figure:



Google API Example 3-3

- The users can logout from the action menu and return to the login page as shown in the following figure:

Google API Application Logic

- A Google+ Sign in Button is added for the Main Activity
- An onClick() listener is registered for the Login Button
- Once the login process is completed, the login listener is triggered
- The user details are then retrieved from the Login Listener
- The user details are added as extras and the login Home Page is loaded

Summary

- Google provides API for developers to access their product services such as search, drive, App Engine and so on
- Location-based Services (LBS) refer to a set of applications that exploit the knowledge of the geographical position of a mobile device in order to provide services based on that information
- Google Maps allow the developers to develop applications of world with rich maps provided by Google
- Google API Add on is an extension to Android SDK development environment that lets the developer develop applications for devices that include Google's set of custom applications, libraries, and services
- The GoogleAPIClient and GooglePlayServicesUtil classes are used to access Google API
- Google Play Services is a client side library for accessing Google services