App Widgets

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“Learn with Passion!”

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Topics

- What is an App Widget?
- App Widget framework
- Steps for creating an App Widget
- Creating App Widget configuration Activity

What is App Widget (Widget)?

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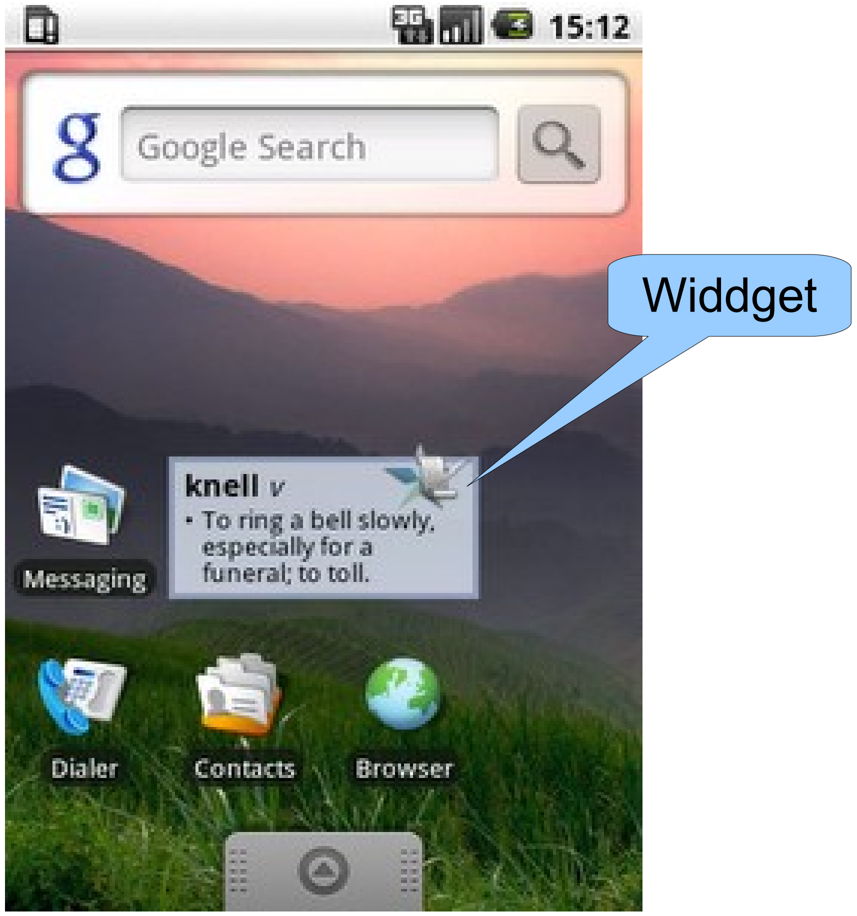
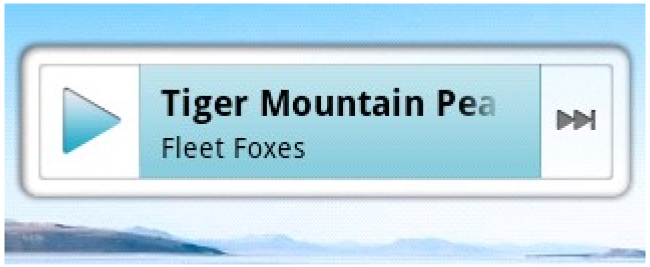
- App Widgets are miniature application views that can be embedded in other applications (such as the Home screen) and receive periodic updates.



Usage Examples of App Widgets

- People can drop widgets onto their home screen and interact with them
- Widgets can provide a quick glimpse into full-featured apps, such as showing upcoming calendar events, or viewing details about a song playing in the background.
- Users can also interact with your app through the widget, for example pausing or switching music tracks.



Music App Widget

App Widget Framework

Things that make up an App Widget

- App Widget Provider Metadata XML file
  - Describes the metadata for an App Widget, such as minimum width, minimum height, update frequency, the AppWidgetProvider class.
  - It also references App widget's layout resource file
- *AppWidgetProvider* class
  - Defines the basic methods that allow you to programmatically interface with the App Widget, based on broadcast events. (*AppWidgetProvider* class is a child class of *BroadcastReceiver* class.)
  - Through it, you will receive broadcasts when the App Widget is updated, enabled, disabled and deleted.

Things that make up an App Widget

- Layout resource file
  - Defines the initial layout for the App Widget, defined in XML - this is a regular layout file
  - This layout file is referenced in App Widget Provider Metadata XML file
- Optionally, you can implement an App Widget configuration Activity
  - This is an optional Activity that launches when the user adds your App Widget (to the home screen) and allows him or her to modify App Widget settings at create-time.

Steps for Building an App Widget

Steps for Building an App Widget

1. Declare an *AppWidgetProvider* in the Manifest file (AndroidManifest.xml)
2. Create the App Widget Provider Metadata XML file
3. Create the App Widget Layout resource XML file
4. Write the *AppWidgetProvider* Class

1. Declare AppWidgetProvider in Manifest file

- The <*receiver*> element requires the *android:name* attribute, which specifies the *AppWidgetProvider*
- The <*intent-filter*> element must include an <*action*> element with the *android:name* attribute. This attribute specifies that the AppWidgetProvider accepts the *ACTION_APPWIDGET_UPDATE* broadcast.
- The <*meta-data*> element specifies the location of the AppWidgetProviderInfo meta-data resource file

```
<receiver android:name="ExampleAppWidgetProvider" >
    <intent-filter>
        <action android:name="android.appwidget.action.APPWIDGET_UPDATE" />
    </intent-filter>
    <meta-data android:name="android.appwidget.provider"
               android:resource="@xml/example_appwidget_info" />
</receiver>
```

2. Create App Widget Provider Metadata XML file

- Define the App Widget Provider Info in an XML resource using a single *<appwidget-provider>* element and save it in the project's res/xml/ folder.
  - This file is referenced from the manifest file
- Define the essential qualities of an App Widget, such as its minimum layout dimensions, its initial layout resource, how often to update the App Widget, and (optionally) a configuration Activity to launch at create-time.

```
<appwidget-provider
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:minWidth="294dp"
    android:minHeight="72dp"
    android:updatePeriodMillis="86400000"
    android:initialLayout="@layout/example_appwidget"
    android:configure="com.example.android.ExampleAppWidgetConfigure" >
</appwidget-provider>
```

3. Create App Widget Layout XML file

- App Widget layouts are based on *RemoteViews*, which do not support every kind of layout or view widget.
- A *RemoteViews* object (and, consequently, an App Widget) can support the following layouts and Widget classes
  - FrameLayout, LinearLayout, RelativeLayoyt
  - AnalogClock, Button, Chronometer, ImageButton, ImageView, ProgressBar, TextView

App Widget Layout Resource File

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:orientation="vertical"
    android:background="@drawable/widget_bg_normal"
    android:layout_gravity="center"
    android:layout_height="wrap_content">

  <TextView
        android:id="@+id/widget_textview"
        android:text="@string/hello"
        android:layout_height="wrap_content"
        android:layout_width="wrap_content"
        android:layout_gravity="center_horizontal|center"
        android:layout_marginTop="5dip"
        android:padding="10dip"
        android:textColor="@android:color/black" />
</LinearLayout>
```

4. Write AppWidgetProvider Class

- The *AppWidgetProvider* class extends *BroadcastReceiver* as a convenience class to handle the App Widget broadcasts
- Methods to override
  - onUpdate(Context, AppWidgetManager, int[]) - called when each App Widget is added to a host (unless you use a configuration Activity), Typically the only method that needs to be present
  - onDeleted(Context, int[])
  - onEnabled(Context)
  - onDisabled(Context)
  - onReceive(Context, Intent)

Example AppWidgetProvider

```
public class ExampleAppWidgetProvider extends AppWidgetProvider {

    public void onUpdate(Context context, AppWidgetManager appWidgetManager,
                                    int[] appWidgetIds) {
        final int N = appWidgetIds.length;

        // Perform this loop procedure for each App Widget that belongs to this provider
        for (int i=0; i<N; i++) {
            int appWidgetId = appWidgetIds[i];

            // Create an Intent to launch ExampleActivity
            Intent intent = new Intent(context, ExampleActivity.class);
            PendingIntent pendingIntent = PendingIntent.getActivity(context, 0, intent, 0);

            // Get the layout for the App Widget and attach an on-click listener to the button
            RemoteViews views = new RemoteViews(context.getPackageName(),
                                            R.layout.appwidget_provider_layout);
            views.setOnClickPendingIntent(R.id.button, pendingIntent);

            // Tell the AppWidgetManager to perform an update on the current App Widget
            appWidgetManager.updateAppWidget(appWidgetId, views);
        }
    }
}
```

Create App Widget Configuration Activity

Why App Widget Configuration Activity?

- If you would like the user to configure settings when he or she adds a new App Widget, you can create an App Widget configuration Activity.
- This Activity will be automatically launched by the App Widget host and allows the user to configure available settings for the App Widget at create-time, such as the App Widget color, size, update period or other functionality settings.

Declare it in Manifest File

- The configuration Activity should be declared as a normal Activity in the Android manifest file.
- However, it will be launched by the App Widget host with the ACTION_APPWIDGET_CONFIGURE action, so the Activity needs to accept this Intent

```
<activity android:name=".ExampleAppWidgetConfigure">
    <intent-filter>
        <action
                android:name="android.appwidget.action.APPWIDGET_CONFIGURE" />
    </intent-filter>
</activity>
```

Declare it in Metadata Config file

- Also, the Activity must be declared in the AppWidgetProviderInfo XML file, with the android:configure attribute

```
<appwidget-provider
           xmlns:android="http://schemas.android.com/apk/res/android"
   ...
   android:configure="com.example.android.ExampleAppWidgetConfigure"
   ... >
</appwidget-provider>
```

Thank you!

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