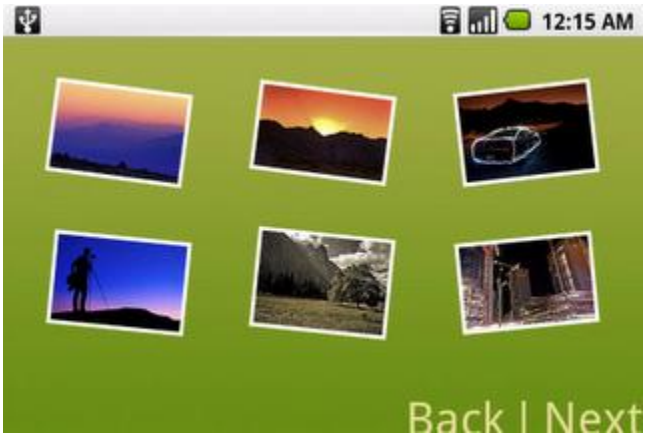
# Faster screen orientation change

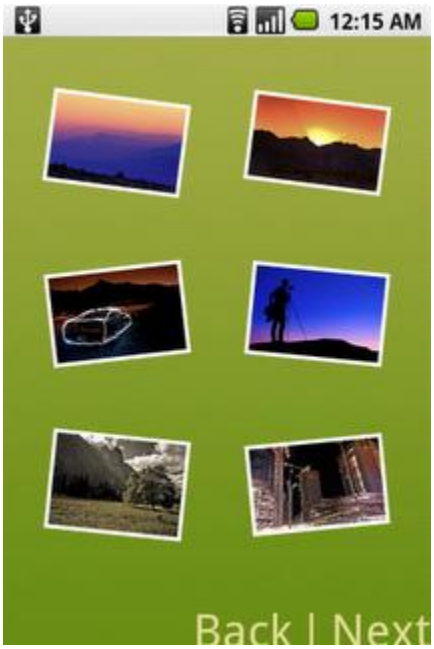
*Posted by Romain Guy on 19 February 2009 at 9:00 AM*

Android is a mobile operating system meant to be run on a wide array of devices, with very different hardware configurations. Some devices, like the T-Mobile G1, can change their hardware configuration at runtime. For instance, when you open the keyboard, the screen change from the portrait orientation to the landscape orientation. To make Android applications development easier, the OS automatically handles configuration changes and restart the current activity with the new configuration. This is the default behavior that lets you declare resources like layouts and drawables based on the orientation, screen size, locale, etc. If you are not familiar with the way Android handles resources, I highly suggest you to read the official documentation on resources.

While this behavior is really powerful, since your application adapts automatically to the device's configuration at runtime, it is sometimes confusing for new Android developers who wonder why their activity is destroyed and recreated. Facing this "issue," some developers choose to handle configuration changes themselves which is, in my opinion, a short-term solution that will complicate their life when other devices come out or when the application becomes more complex. The automatic resource handling is a very efficient and easy way to adapt your application's user interface to various devices and devices configurations. It sometimes comes at a price though.

When your application displays a lot of data, or data that is expensive to fetch, the automatic destruction/creation of the activities can be lead to a painful user experience. Take the example of Photostream, a simple Flickr browsing application I wrote for the release of Android 1.0. After you launch the application and choose a Flickr account, the application downloads a set of 6 photos (on a T-Mobile G1) from the Flickr servers and displays them on screen. To improve the user experience, I also use slightly different layouts and drawables in portrait and landscape, and this is what the result looks like:






Photostream lets Android take care of the configuration change when the screen is rotated. However, can you imagine how painful it would be for the user to see all the images being downloaded again? The obvious solution to this problem is to temporarily cache the images. They could be cached on the SD card (if there's one), in the Application object, in a static field, etc. None of these techniques is adapted to the current situation: why should we bother caching the images when the screen is not rotated? Fortunately for us, Android offers a great API exactly for that purpose.

The Activity class has a special method called onRetainNonConfigurationInstance(). This method can be used to pass an arbitrary object *your future self*and Android is smart enough to call this method only when needed. In the case of Photostream, I used this method to pass the downloaded images to the future activity on orientation change. The implementation can be summarized like so:

```
@Override
public Object onRetainNonConfigurationInstance() {
    final LoadedPhoto[] list = new LoadedPhoto[numberOfPhotos];
    keepPhotos(list);
    return list;
}
```

In the new activity, in `onCreate()`, all you have to do to get your object back is to call getLastNonConfigurationInstance(). In Photostream, this method is invoked and if the returned value is not null, the grid is loaded with the list of photos from the previous activity:

```
private void loadPhotos() {
    final Object data = getLastNonConfigurationInstance();

    // The activity is starting for the first time, load the photos from
Flickr
    if (data == null) {
```

```
            mTask = new GetPhotoListTask().execute(mCurrentPage);
        } else {
            // The activity was destroyed/created automatically, populate the
grid
            // of photos with the images loaded by the previous activity
            final LoadedPhoto[] photos = (LoadedPhoto[]) data;
            for (LoadedPhoto photo : photos) {
                addPhoto(photo);
            }
        }
    }
```

Be very careful with the object you pass through `onRetainNonConfigurationChange()` though. If the object you pass is for some reason tied to the Activity/Context, you will leak all the views and resources of the activity. This means you should never pass a View, a Drawable, an Adapter, etc. Photostream for instance extracts the bitmaps from the drawables and pass the bitmaps only, not the drawables. Finally, remember that`onRetainNonConfigurationChange()` should be used only to retain data that is expensive to load. Otherwise, keep it simple and let Android do everything.