Programming Handheld Systems

ContentProvider

Today's Topics

ContentProvider & ContentResolver

ContentResolver methods

CursorLoader

Implementing ContentProviders

ContentProvider

Represents a repository of structured data

Encapsulates data sets

Enforces data access permissions

ContentProvider

Intended for inter-application data sharing

Clients access ContentProviders through a ContentResolver

ContentResolver

Presents a database-style interface for reading & writing data

   query, insert, update, delete, etc.

Provides additional services such as change notification

ContentResolver

Get reference to ContentResolver by calling Context.getContentResolver()

ContentProvider & ContentResolver

Together these classes let code running in one process access data managed by another process

Android ContentProviders

Browser — bookmarks, history

Call log— telephone usage

Contacts — contact data

Media — media database

UserDictionary — database for predictive spelling

Many more

ContentProvider Data Model

Data represented logically as database tables

_ID	artist
13	Lady Gaga
44	Frank Sinatra
45	Elvis Presley
53	Barbara Streisand

URI

Content providers referenced by URIs

The format of the URI identifies specific data sets managed by specific ContentProviders

Format

CONTENT://AUTHORITY/PATH/ID

CONTENT — SCHEME INDICATING DATA THAT IS MANAGED BY A CONTENT PROVIDER

AUTHORITY — ID FOR THE CONTENT PROVIDER

PATH — 0 OR MORE SEGMENTS INDICATING THE TYPE OF DATA TO BE ACCESSED

ID — A SPECIFIC RECORD BEING REQUESTED

Example: Contacts URI

ContactsContract.Contacts.CONTENT_URI =
"content://com.android.contacts/contacts/"

CONTENTRESOLVER.QUERY()

```
Cursor query (
    Uri uri,                    // ContentProvider Uri
    String[] projection         // Columns to retrieve
    String selection            // SQL selection pattern
    String[] selectionArgs      // SQL pattern args
    String sortOrder            // Sort order
    )
```
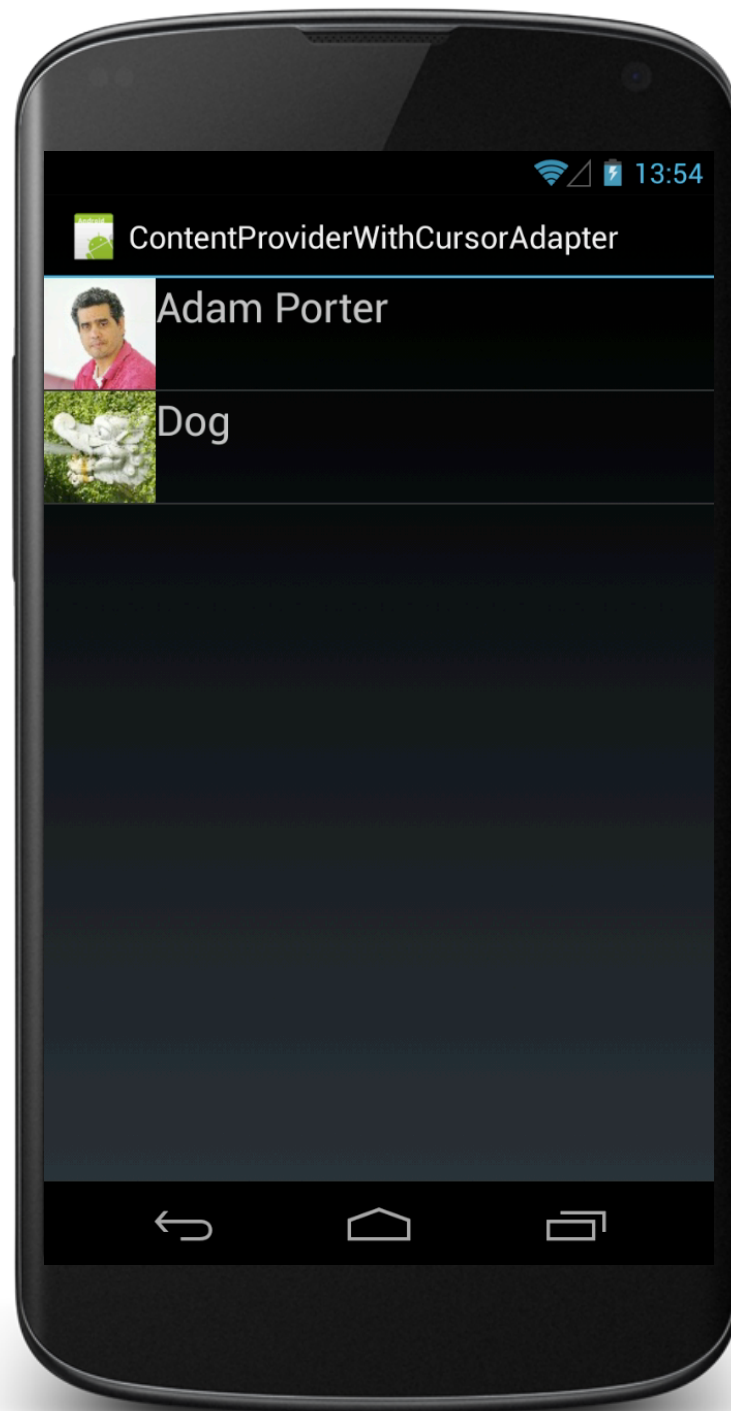
RETURNS A CURSOR FOR ITERATING OVER
THE SET OF RESULTS

ContentProviderWithCursorAdapter

Extracts Contact information from the android Contacts ContentProvider

Displays each contact's name and photo, if available

Demonstration of the ContentProviderWithCursorAdapter project in the IDE

CursorLoader

Conducting intensive operations on the main thread can affect application responsiveness

CursorLoader uses an AsyncTask to perform queries on a background thread

Using a CursorLoader

Implement LoaderManager's LoaderCallbacks interface

Create and initialize a cursor loader

initLoader()

Initialize and activate a Loader

```
Loader<D> initLoader(
        int id,
        Bundle args,
        LoaderCallbacks<D> callback)
```

LoaderCallbacks

Called to instantiate and return a new Loader for the specified ID

Loader<D> onCreateLoader (
                int id,
                Bundle args)

LoaderCallbacks

Called when a previously created loader has finished loading

```
void onLoadFinished(
        Loader<D> loader,
        D data)
```

LoaderCallbacks

Called when a previously created loader is reset
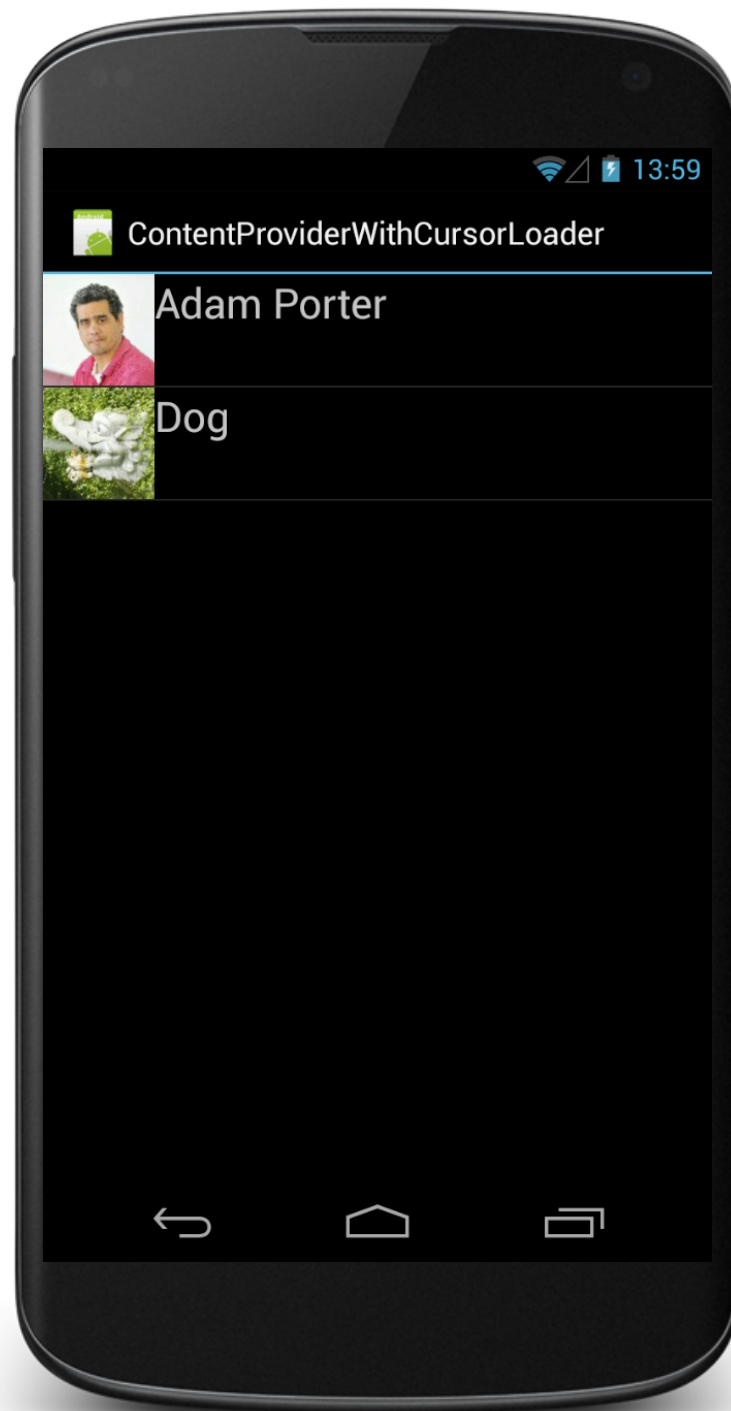
```
void onLoaderReset (
        Loader<D> loader)
```

ContentProviderWithCursorLoader

Extracts Contact information from the android Contacts ContentProvider

Displays each contact's name and photo, if available

But it uses a CursorLoader when querying the ContentProvider

Demonstration of the
ContentProviderWithCursorLoader
project in the IDE

ContentResolver.delete()

```
int delete (
  Uri url,                // content Uri
  String where,           // SQL sel. pattern
  String[] selectArgs     // SQL pattern args
)
```

RETURNS THE NUMBER OF ROWS
DELETED

ContentResolver.insert()

```
Uri insert (
   Uri url,                    // content Uri
   ContentValues values        // values
)
```

RETURNS THE URI OF THE INSERTED
ROW

ContentResolver.update()

```
int update(
    Uri url,                    // content Uri
    ContentValues values        // new field values
    String where,               // SQL sel. pattern
    String[] selectionArgs      // SQL pattern args
)
```

RETURNS THE NUMBER OF ROWS UPDATED

ContentProviderInsertContacts

Application reads contact information from the Android Contacts ContentProvider

Inserts several new contacts into Contacts ContentProvider

Displays old and new contacts

Deletes these new contacts on exit

Demonstration of the ContentProviderInsertContacts project in the IDE

Creating a ContentProvider

- Implement a storage system for the data

- Define a Contract Class to support users of your ContentProvider

- Implement a ContentProvider subclass

- Declare and configure content provider in AndroidManifest.xml
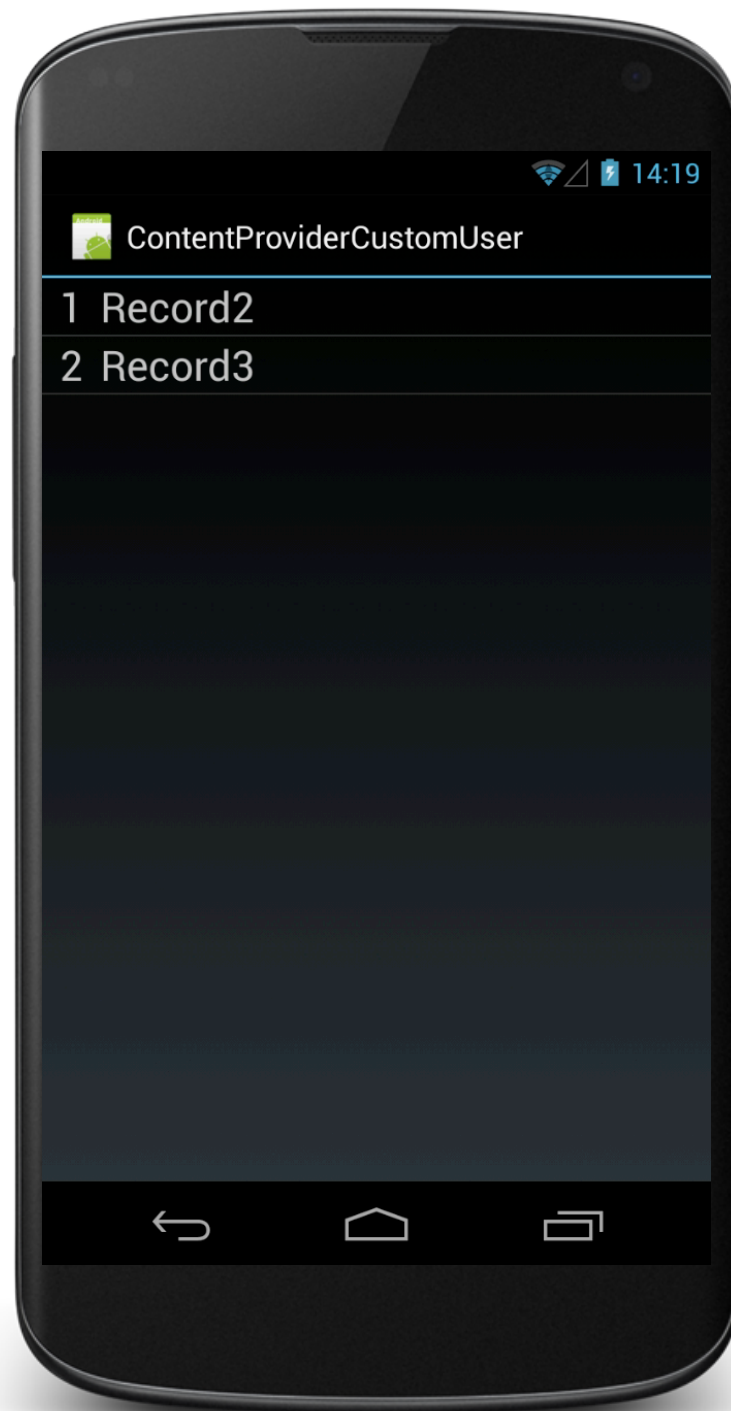
ContentProviderCustom

Application defines a ContentProvider for ID/string pairs

Demonstration of the
ContentProviderCustom
project in the IDE

ContentProviderCustomUser

Reads ID/String pairs from the ContentProvider we just examined

Displays the data in a ListView

Demonstration of the
ContentProviderCustomUser
project in the IDE

Next Time

Service