Mobile Phone Security

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Content Provider

Reference

Learning Android Forensics
A hands-on guide to Android forensics, from setting up the forensic workstation to analyzing key forensic artifacts

Rohit Tamma   Donnie Tindall   [PACKT] open source

Learning Pentesting for Android Devices
A practical guide to learning penetration testing for Android devices and applications
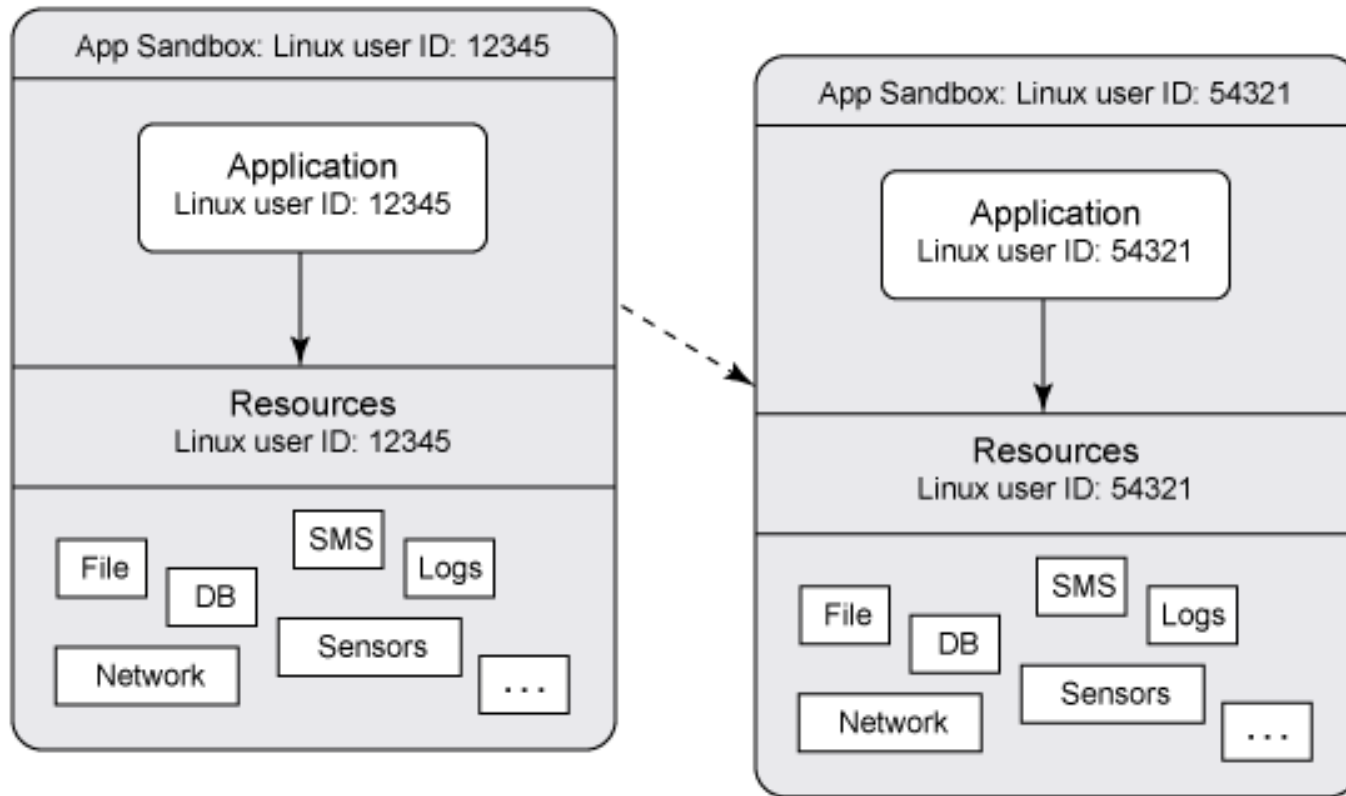Foreword by Elad Shapira, Mobile Security Researcher

Aditya Gupta   [PACKT] open source
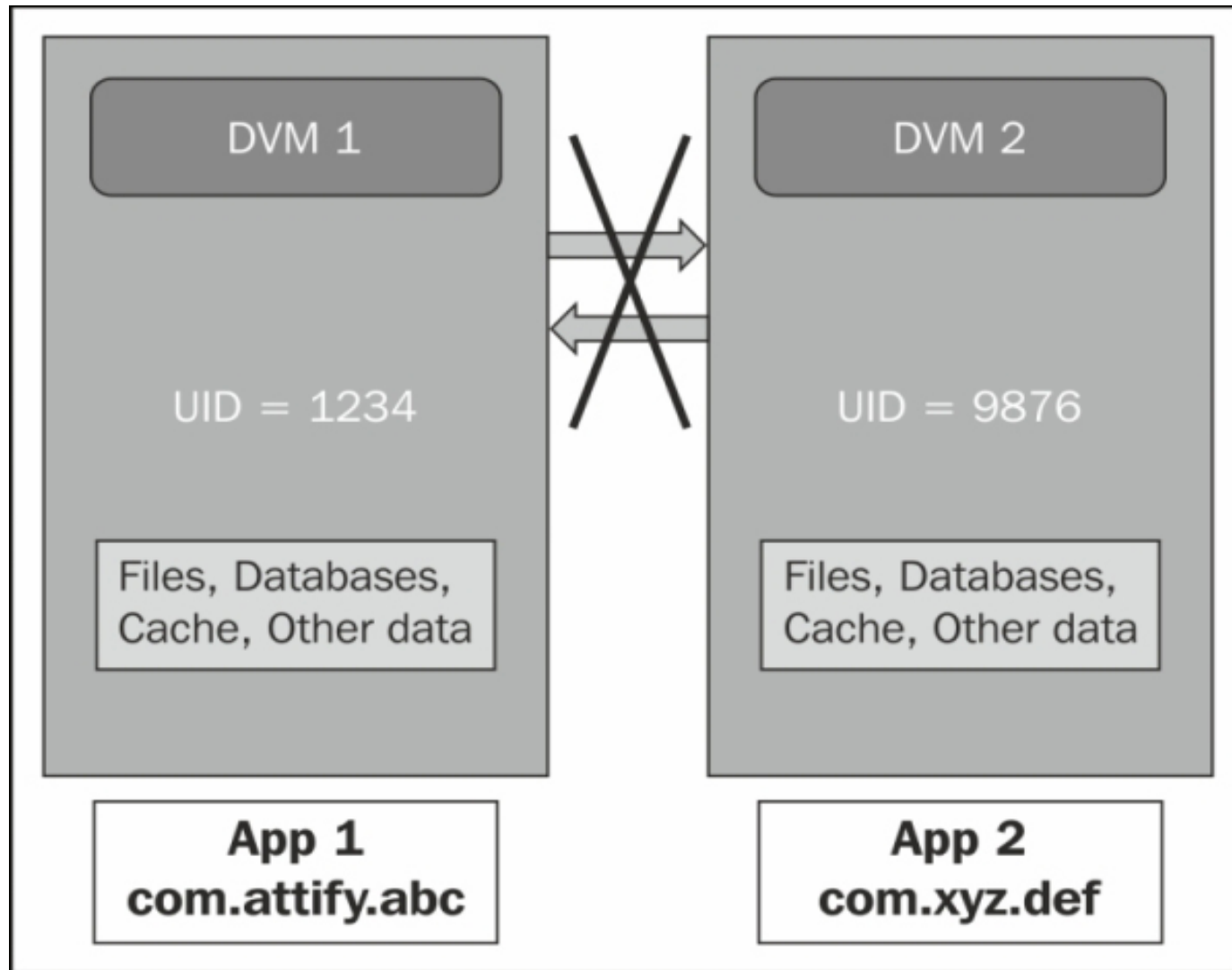
www.developer.google.com

Content Provider

Android application/process space

App Sandbox: Linux user ID: 12345

Application
Linux user ID: 12345

Resources
Linux user ID: 12345

File SMS Logs DB Network Sensors . . .

App Sandbox: Linux user ID: 54321

Application
Linux user ID: 54321

Resources
Linux user ID: 54321

File SMS Logs DB Network Sensors . . .

Two applications on different processes (with different user-ids)

http://CEnriqueOrtiz.com

Content Provider

- ✓ Content providers provide the content/data to Android applications from an Android system or other Android applications.

- ✓ Let's go through the details of the content provider in Android, but first, let's take a glance of topics that we will discuss:
  - ✓ What are Content Providers
  - ✓ CRUD operations
  - ✓ Examples
  - ✓ Accessing data with Content provider
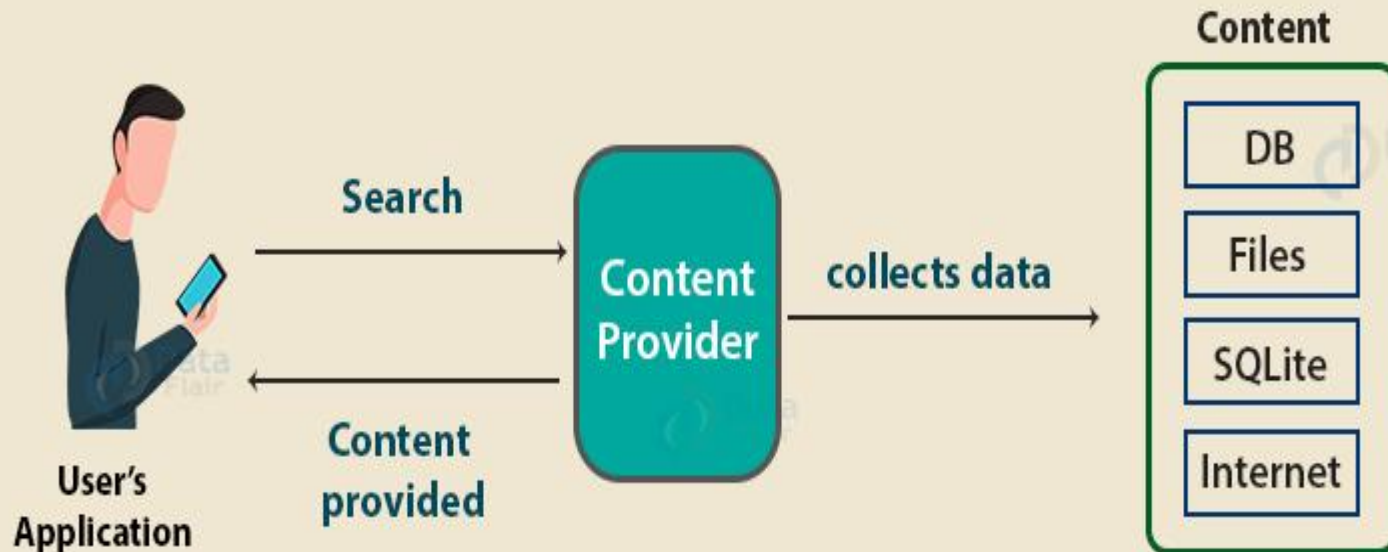 - ✓ Implementing Content Provider

✓ Content Providers are an important component of Android. They handle the access to the central repository and supply data from one application to another on request.

✓ This task of handling is done by methods of **ContentResolver** class. So, content providers can store data in various ways such as files, database or over the internet.

- ✓ Many a time we need to share our data with applications and that's where it becomes useful.

- ✓ The following diagram depicts how the content provider helps in sharing data with applications from data stores.
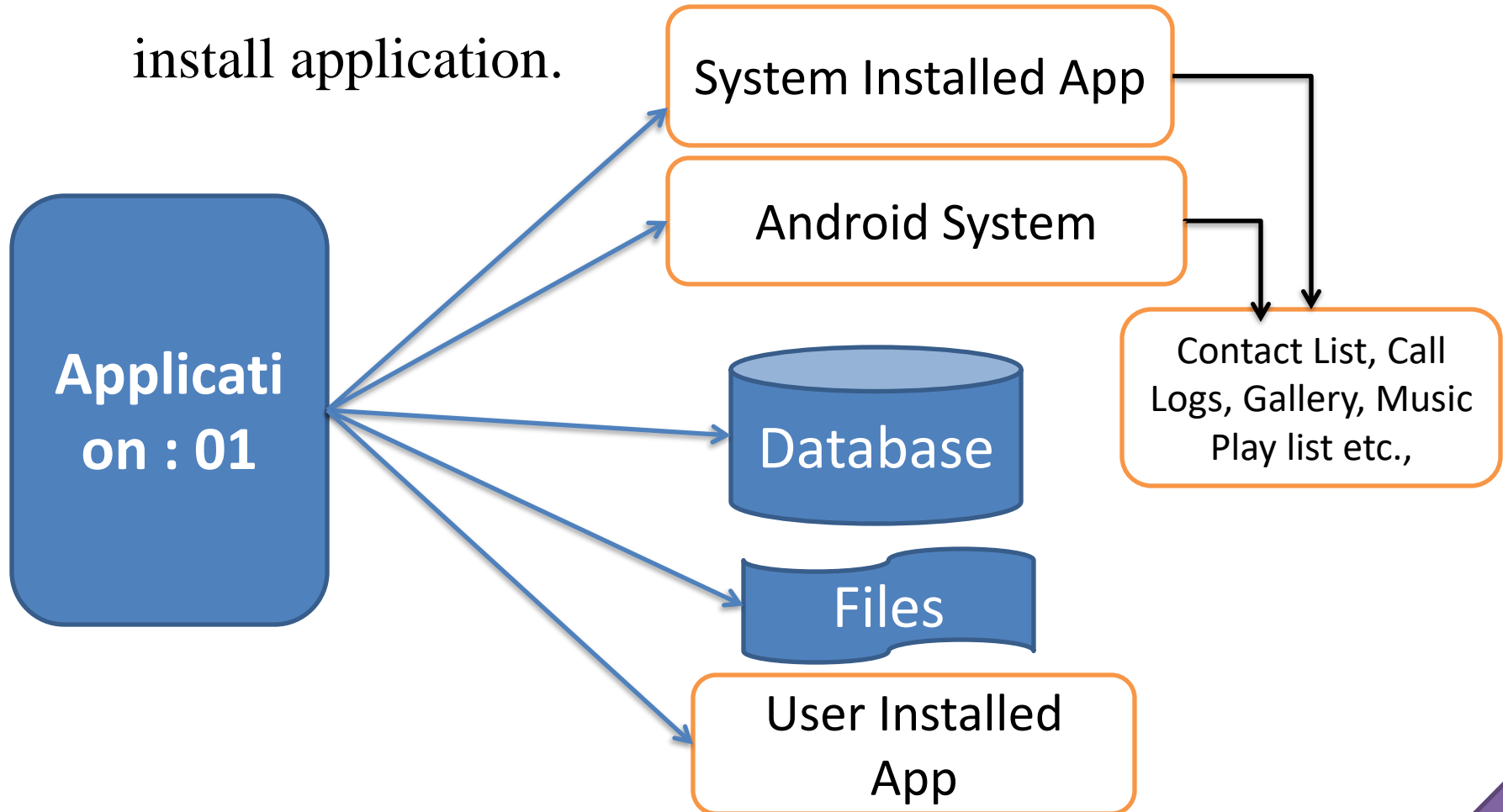
✓ As can be seen, the content provider lets us collect the data centrally and provide them to applications as shown in the above diagram.

✓ Content providers act the same as database and also we can query it to add, delete, insert or update the data.

- ✓ It can be understood that a content provider hides the database details and also, it lets an application share data among other applications.

- ✓ Content providers are not limited to texts, but also contains images and videos as well.
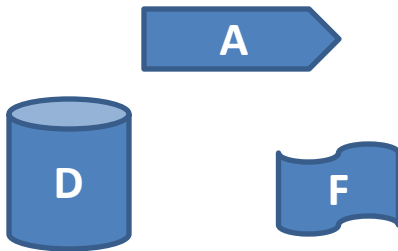
- ✓ But there is a business need when one applicaiton needs to share or access data with or from system or user install application.

Application : 01

System Installed App

Android System

Database

Files

User Installed App

Contact List, Call Logs, Gallery, Music Play list etc.,

Content Provider

ContentProvider hides the details related to database, files etc., What does it mean App:02 request for data and content provider hides details on the App:01 side and provide detail to App:01

Application : 01

ContentProvider

Data Request

Content Resolver ①

URI ②

A

D

F

Data Response

Application : 02

③ **Cursur**
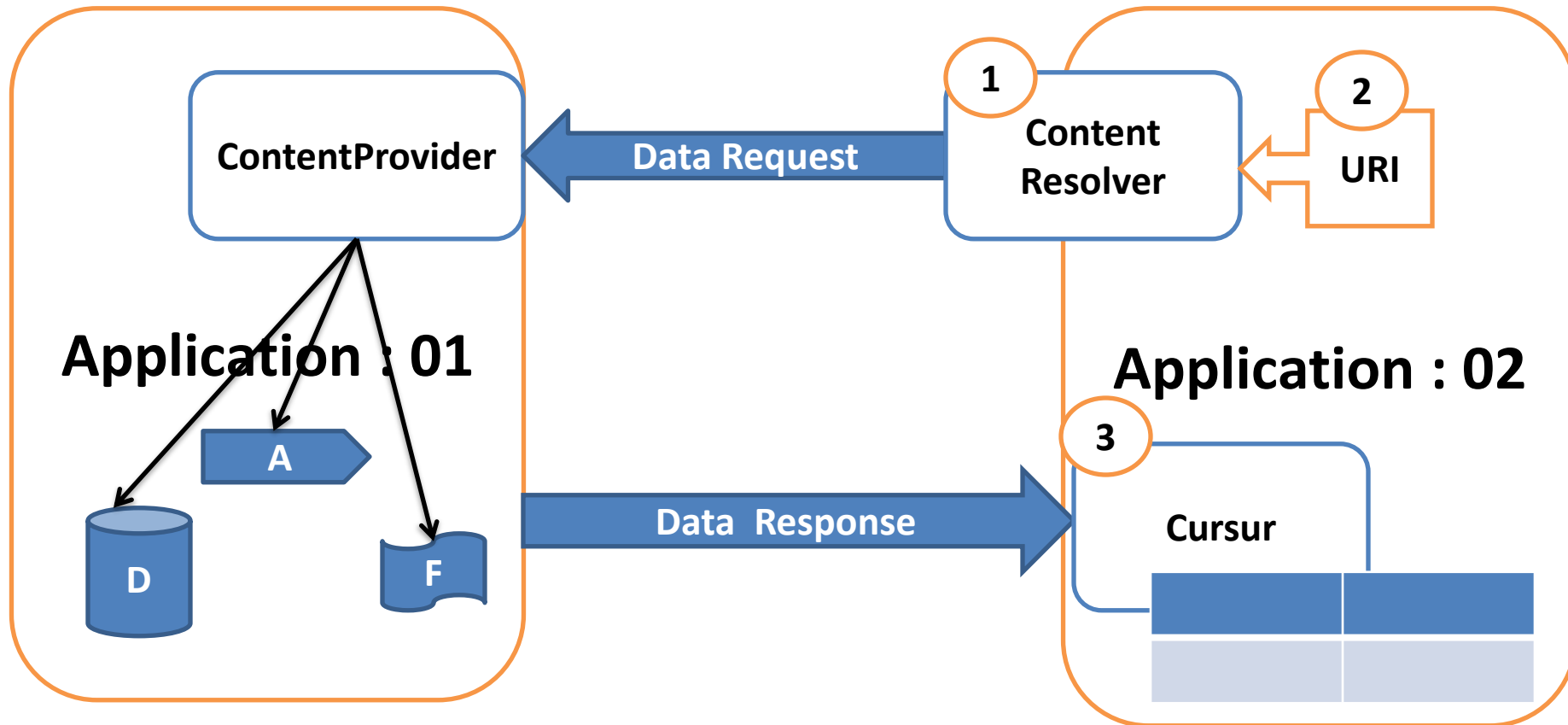
Android OS

- ✓ **Content Resolver:** We need to use the ContentResolver object in our application, in order to communicate with the content providers for data access.

- ✓ **ContentRsolver resolver = getContnetResolver();**

- ✓ **Cursor cursor = resolver.query(uri, projection, selection, selectionArgs, sortOrder);**

- ✓ The Content Resolver is the single, global instance in your application that provides access to your (and other applications') content providers.

- ✓ The Content Resolver behaves exactly as its name implies: it accepts requests from clients, and resolves these requests by directing them to the content provider with a distinct authority.

- ✓ To do this, the Content Resolver stores a mapping from authorities to Content Providers.

✓ The Content Resolver includes the CRUD (create, read, update, delete) methods corresponding to the abstract methods (insert, query, update, delete) in the Content Provider class.

✓ The Content Resolver does not know the implementation of the Content Providers it is interacting with (nor does it need to know); each method is passed an URI that specifies the Content Provider to interact with.

Cursor cursor = getContentResolver().query(

URI,   // The content URI of the words table

projection,   // The columns to return for each row

selectionClause, // Selection criteria WHERE col = value

 selectionArgs,   // Selection criteria

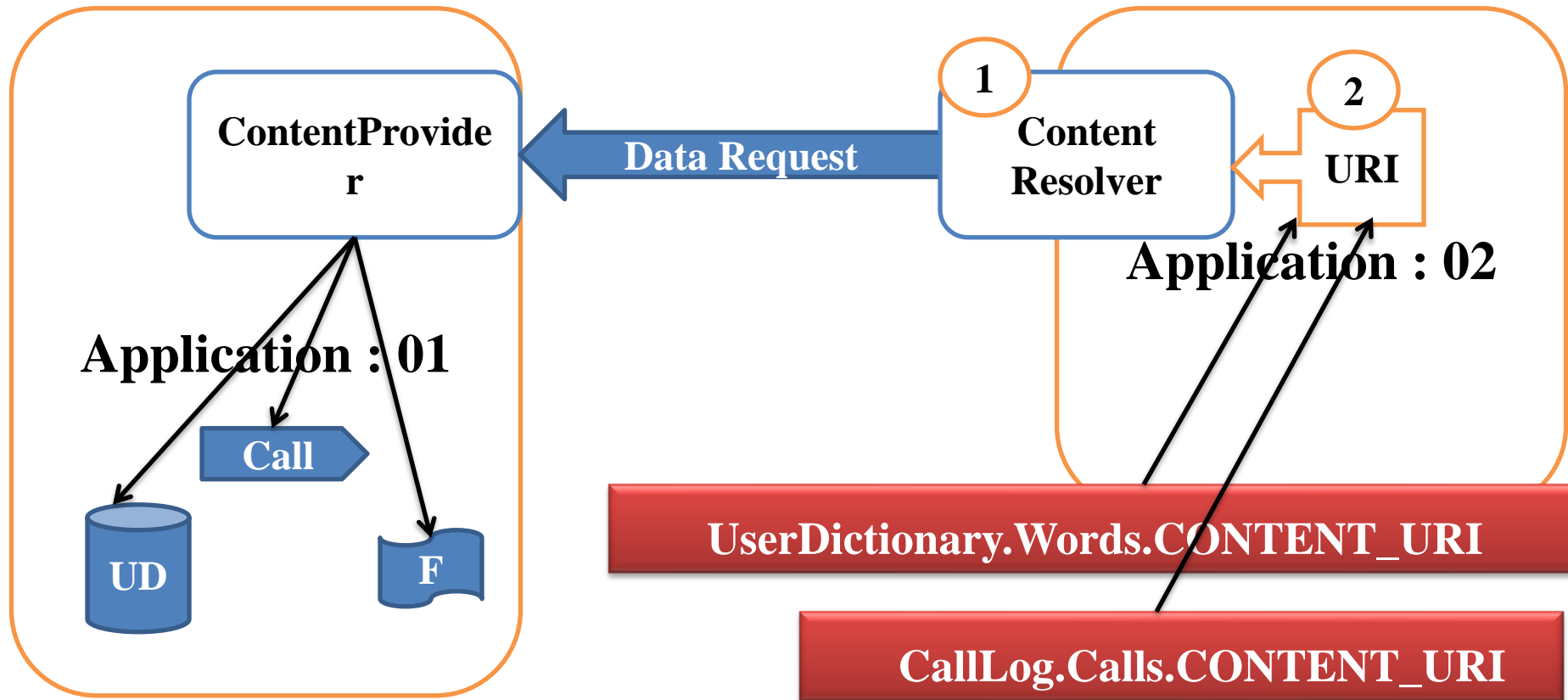 sortOrder);   // The sort order for the returned rows

Example Select id, name from tbl_student where id =
        student_id

✓ A content URI is a URI that identifies data in a provider. Content URIs include the symbolic name of the entire provider (its authority) and a name that points to a table (a path).

✓ http://domain-name/data-in-the-site - Uniquer domains in http urls.

✓ content://authority-name/data-in-the-provider

✓ content://user_dictionary/words

✓ where the user_dictionary string is the **provider's authority,** and the words string is the table's path.

ContentProvider Authorities and URI

Each ContenrProvider has unique Authority and Applicaiton : 02 can resolved the content provider using content://<AuthorityName>/table-name

ContentProvider ← **Data Request** ← **1** **Content Resolver** ← **2** **URI**

Application : 01

Call

UD

F

Application : 02

UserDictionary.Words.CONTENT_URI

CallLog.Calls.CONTENT_URI

Cursor

They must be created when you are executing a SELECT statement that returns more than one row. Even though the cursor stores multiple records, **only one record can be processed at a time**, which is called as current row. When you fetch a row the current row position moves to next row.

ContentProvider

Data Response

3

Cursor

Application : 01

A

D

F

ID	Name
01	Digvijay
02	Parag
....	....
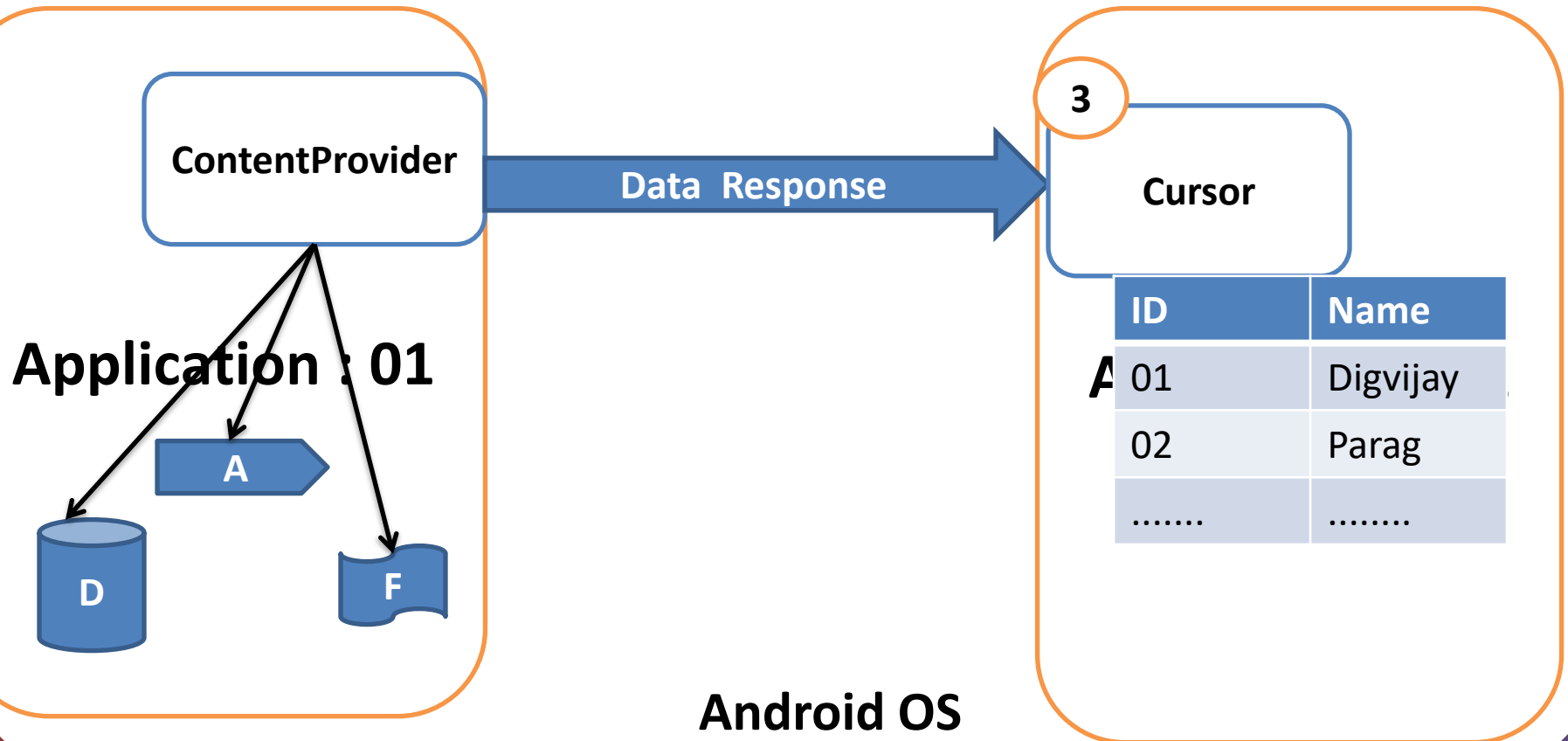
Android OS

- ✓ while (cursor.moveToNext()) {

}

- ✓ **Implementation of Android Services and discussion of source code.**

- ✓ contentprovider_contacts_example (Application will not run successfully)

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