



Connecting Android with Delphi DataSnap Server

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Agenda

- What's Android?
 - Who is behind Android
 - How it Works
- Android Overview
 - How to connect to a web server
- DataSnap REST Interface
 - REST and JSON
- DEMO
 - Customer Manager



What's Android?

- A free operating system and development platform, based on Linux and open source
- Built upon a component-based architecture
- Have tons of built-in services out of the box
- Supports high-quality graphics and sound
- Is portable across a wide range of hardware



How is behind Android?



open handset alliance

- Mobile Operators
- Handset Manufacturers
- Semiconductor Companies
- Software Companies
- Commercialization Companies

Devoted to advancing open standards for mobile devices. Develop technologies that will lower the cost of developing and distributing mobile devices and services



The Open Handset Alliance



Android is cool because...

- Combines
 - the ubiquity of mobile phones
 - the excitement of open source software
 - the corporate backing of Google and other Open Handset Alliance
- There are tons of samples and docs
- Makes it easy what is difficult to implement in the other O.S. and development system
 - Developing with Android is really “easy” compared to the others mobile platforms



Android is cool because...

- There is not only one hardware vendor
- Is not only a mobile phone OS
 - Google TV
 - Tablet
 - Cars on-board computer system
 - Videoconferences systems
- Is completely customizable
- Is growing VERY faster
 - Already surpassed iPhone sales in the US (May 2010)



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What Does It Have That Others Don't?

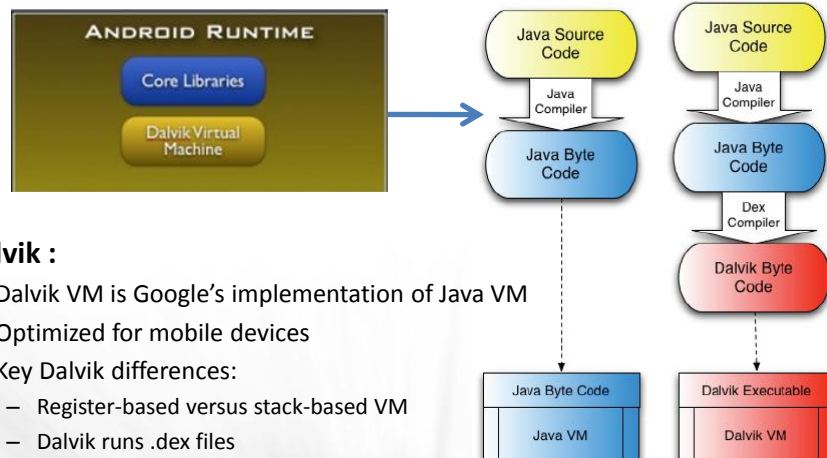
- **Background Services and Applications**
- **Shared Data and Interprocess Communication**
- **All Applications Are Created Equal**
- **P2P Interdevice Application Messaging**
- **Google Map Applications**



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Android Runtime



Dalvik :

- Dalvik VM is Google's implementation of Java VM
- Optimized for mobile devices
- Key Dalvik differences:
 - Register-based versus stack-based VM
 - Dalvik runs .dex files
 - More efficient and compact implementation
 - Different set of Java libraries than SDK

What is needed to develop in Android?

- Java 5.0+
 - You need to write in Java language
- Eclipse
 - Go to the downloads page, and pick “Eclipse IDE for Java Developers
- Android SDK
- Eclipse plug-in



Key Concepts, Overview

- Activities
- Intents
- Services
- Content Providers
- Broadcast Receivers
- Notifications



Activities

- An activity is a user interface screen.
- Applications can define one or more activities to handle different phases of the program.
 - Each activity is responsible for saving its own state so that it can be restored later as part of the application life cycle.
- Are your application's presentation layer.
- In terms of desktop development, an Activity is equivalent to a Form.

```
public class AboutActivity extends Activity
```



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Activity Stacks

- The state of each Activity is determined by its position on the Activity stack, a last-in–first-out collection of all the currently running Activities.
 - When a new Activity starts, the current foreground screen is moved to the top of the stack.
 - If the user navigates back using the Back button, or the foreground Activity is closed, the next Activity on the stack moves up and becomes active.
- When an activity is not in the foreground, could be destroyed

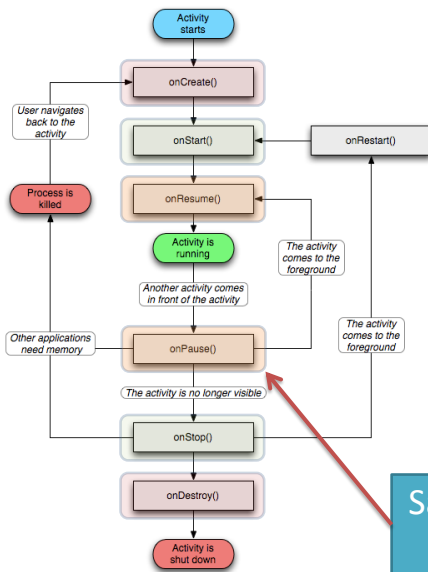


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The Activity Lifetime

There are the following key loops:

- **entire lifetime**
 - onCreate(Bundle)
 - onDestroy()
- **visible lifetime**
 - onStart()
 - onStop()
- **foreground lifetime**
 - onResume()
 - onPause()



Save all your stuff here

Sample Activity

```
package it.danieleteti.dante;
```

```
import android.app.Activity;
```

```
import android.os.Bundle;
```

```
public class AboutActivity extends Activity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.about);
    }
}
```

Last Saved Data from the last execution

Resource layout stored in XML file

Intents

- An intent is a mechanism for describing a specific action, such as “pick a photo”, “phone home,” or “play this video”
- In Android, just about everything goes through intents, so you can use and replace built-in components
- Using Intents, you can broadcast messages system-wide or to a target Activity or Service, stating your intention to have an action performed.



Intents Example

- There is an intent for “send an email.” If your application needs to send mail, you can invoke that intent.
- If you’re writing a new email application, you can register an activity to handle that intent and replace the standard mail program.
 - The next time somebody tries to send an email, they’ll get the option to use your program instead of the standard one.



Intents, starting new activity

```
Intent i = new Intent(context,  
                        OtherActivity.class);  
  
i.putExtra("key1", "My first Info");  
i.putExtra("key2", "My second Info");  
  
startActivity(i);
```



Intents, GoogleMaps Example

```
Intent i = new Intent(Intent.ACTION_VIEW);  
i.setData(Uri.parse(  
    "geo:41.806915,12.679939?z=23"));  
startActivity(i);
```

Others Samples URI for Google Maps

```
geo:latitude,longitude  
geo:latitude,longitude?z=zoom  
geo:0,0?q=my+street+address
```



Speech recognition for free

```
Intent intent = new Intent(  
    RecognizerIntent.ACTION_RECOGNIZE_SPEECH);  
intent.putExtra(  
    RecognizerIntent.EXTRA_LANGUAGE_MODEL,  
    RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);  
startActivityForResult(  
    intent,  
    VOICE_RECOGNITION_REQUEST_CODE);
```



Web Services

- No Support for SOAP!
- Complete support for REST



Connecting to the webserver

```
//Whatever connection is available
HttpClient client = new DefaultHttpClient();
//We want a GET HTTP Method
HttpGet method = new
    HttpGet("http://www.bittime.it/customers/3");
//Execute the command, wait for response
HttpResponse res = client.execute(method);
//We have the response InputStream
InputStream is = res.getEntity().getContent();
```



How to read the response (JSON)

```
//Buffered interface for the InputStream
BufferedReader reader =
    new BufferedReader(
        new InputStreamReader(
            res.getEntity().getContent(), "UTF-8"));
//Read all HTTP body
String body = reader.readLine();
//We have the JSON structure in memory
JSONObject jsonObject = new JSONObject(body);
```



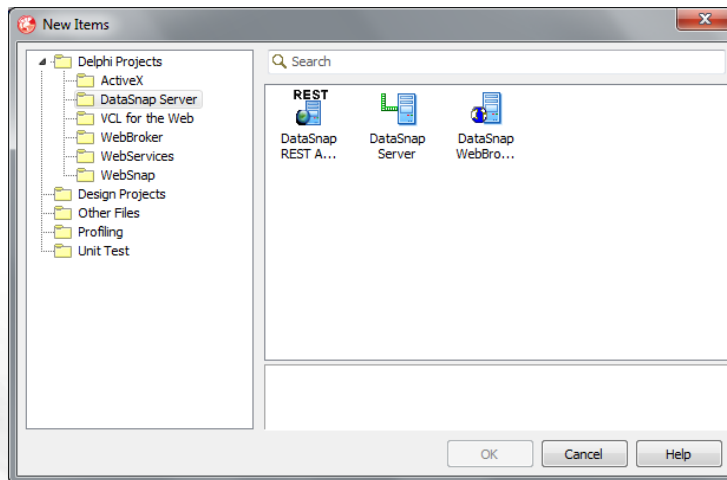
Where
Delphi fits?



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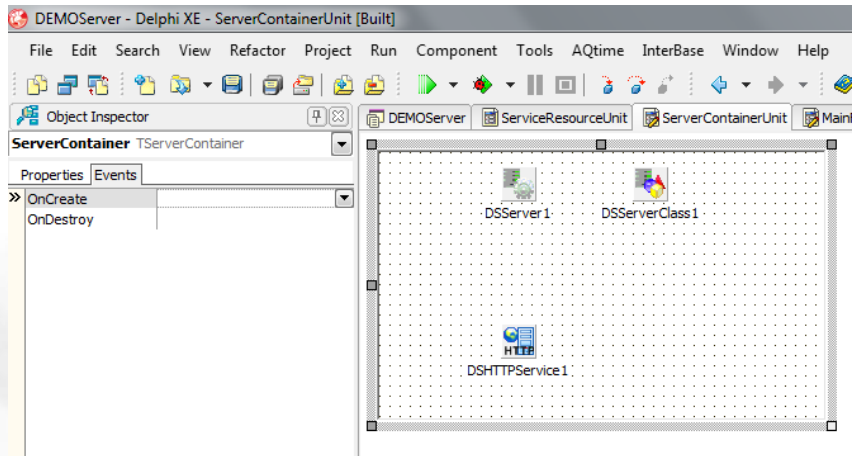
DataSnap does REST



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The DSHTTPService



REST DataSnap Mapping

<http://myserver/datasnap/rest/storage/daniele>

Operation	Command	Default Prefix	Example Server Method
Create	PUT	accept	<pre>procedure AcceptStorage(const Key: UnicodeString; const Obj: TJSONValue);</pre>
Request	GET	n/a	<pre>function Storage(const Key: UnicodeString): TJSONValue;</pre>
Update	POST	update	<pre>procedure UpdateStorage(const Key: UnicodeString; const Obj: TJSONValue);</pre>
Delete	DELETE	cancel	<pre>procedure CancelStorage(const Key: UnicodeString);</pre>



DataSnap REST Mapping

GET http://www.mysite.com/customers/4

```
function Customers(key: Int32): TJSONObject;
begin
    Result := TJSONObject.Create;
    Result.AddPair('first_name', 'Daniele');
    Result.AddPair('last_name', Teti);
end;

{'result': [{ 'first_name': 'Daniele',
               'last_name': 'Teti' }]}
```



How return an arbitraty Object?

```
function TService.Person: TPerson;
begin
    Result := TPerson.Create;
    Result.FullName := 'Daniele Teti';
    Result.Age := 31;
    //There is no «FREE» call
end;
```



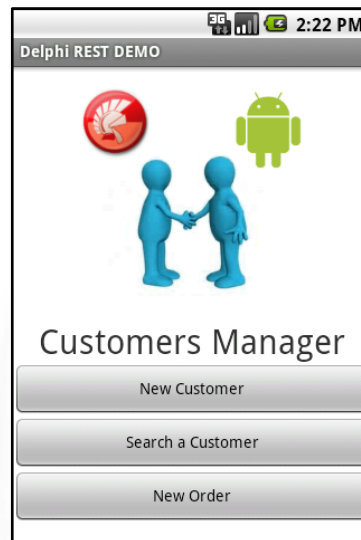
How return a DataSet/DBXTable?

```
function TService.Products: TJSONObject;  
var cmd: TDBXCommand;  
begin  
    cmd := Connection.DBXConnection.CreateCommand;  
    try  
        cmd.Text := 'SELECT * FROM PRODUCTS';  
        Result :=  
            TDBXJSONTools.TableToJSON(cmd.ExecuteQuery,  
                1000, true));  
    finally  
        cmd.Free;  
    end;  
end;
```



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Let's build a Real World Application!



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Sample REST Interface (CustomerManager)

HTTP VERB	URI	ACTION
GET	/customers	Get all customers
GET	/customers/5	Get customer with id = 5
PUT	/customers/4	Create a customer with id=4
POST	/customers/5	Update the customer with id = 5
DELETE	/customers/5	Delete the customer with id = 5
GET	/orders/1	Get order with i = 1
PUT	/orders	



And now, please...

Show Me The Code!



Q&A

- **EDN – Embarcadero Developer Network**

- <http://edn.embarcadero.com/br>

- **My Blog**

- www.danieleteti.it

- *Sample about JSON, Datasnap, Android etc*

- **bit Time Software**

- www.bittime.it

- *Webinar, Courses*

- **DataSnap 2010 White Paper (Bob Swart)**

- <http://edn.embarcadero.com/article/40356>



Mobile Boost



O dia dedicado a Mobile será dividido em dois cursos paralelos, cada curso com 7 horas de duração, serão abordados assuntos particulares em cada curso.



Thank You



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