Android-Adding SystemService

From Texas Instruments Wiki

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This wiki page will demonstrate - "How to add system service to android framework". Example - "Adding a Bluetooth HID service" - taken as reference of understanding.This will also help to add support for more bluetooth profiles into android framework.

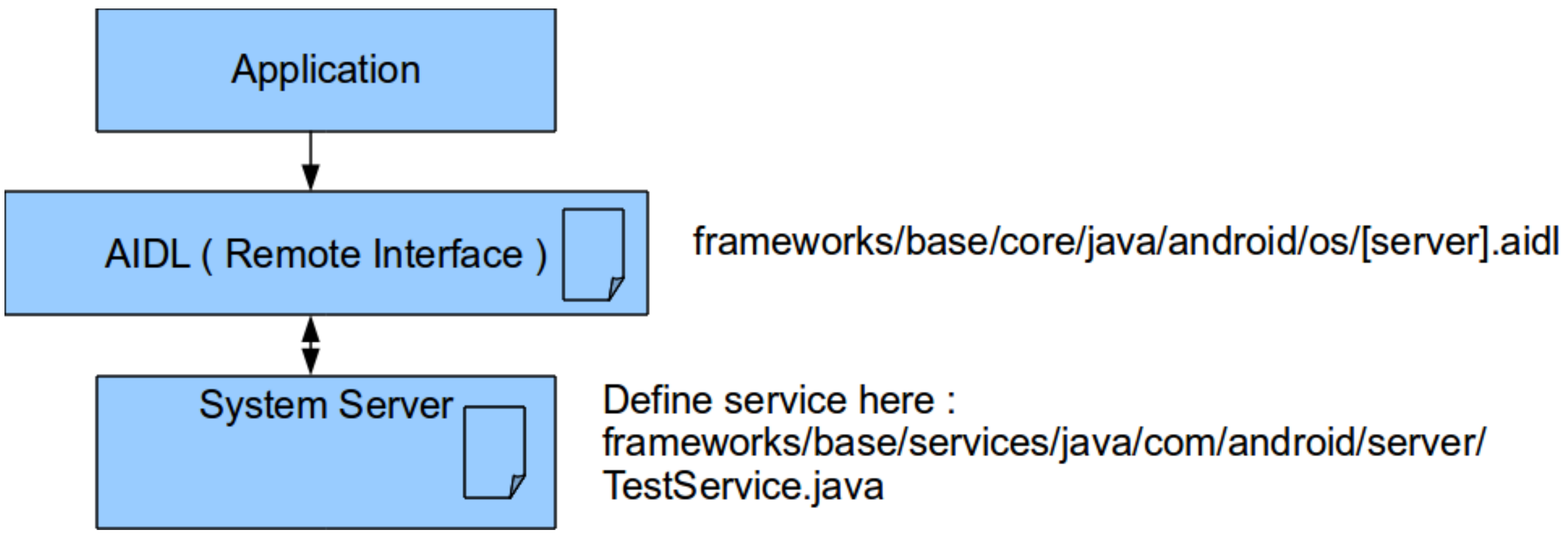
Contents

What is service?

As per the definition given at http://developer.android.com/guide/topics/fundamentals/services.html

A Service is an application component that can perform long-running operations in the background and does not provide a user interface. Another application component can start a service and it will continue to run in the background even if the user switches to another application. Additionally, a component can bind to a service to interact with it and even perform interprocess communication (IPC). For example, a service might handle network transactions, play music, perform file I/O, or interact with a content provider, all from the background.

Service layer


Application
AIDL (Remote Interface)
frameworks/base/core/java/android/os/[server].aidl
System Server
Define service here :
frameworks/base/services/java/com/android/server/
TestService.java

Create service

- Add your code to frameworks/base/services/java/com/android/server/

```
/*TestService.java */
package com.android.server;
import android.content.Context;
import android.os.Handler;
import android.os.ITestService;
import android.os.Looper;
import android.os.Message;
import android.os.Process;
import android.util.Log;
public class TestService extends ITestService.Stub {
   private static final String TAG = "TestService";
   private TestWorkerThread mWorker;
   private TestWorkerHandler mHandler;
   private Context mContext;
   public TestService(Context context) {
      super();
      mContext = context;
      mWorker = new TestWorkerThread("TestServiceWorker");
      mWorker.start();
      Log.i(TAG, "Spawned worker thread");
   }

   public void setValue(int val) {
      Log.i(TAG, "setValue " + val);
      Message msg = Message.obtain();
      msg.what = TestWorkerHandler.MESSAGE_SET;
      msg.arg1 = val;
      mHandler.sendMessage(msg);
   }

   private class TestWorkerThread extends Thread {
      public TestWorkerThread(String name) {
          super(name);
      }
      public void run() {
          Looper.prepare();
          mHandler = new TestWorkerHandler();
          Looper.loop();
      }
   }

   private class TestWorkerHandler extends Handler {
      private static final int MESSAGE_SET = 0;
      @Override
      public void handleMessage(Message msg) {
          try {
              if (msg.what == MESSAGE_SET) {
                  Log.i(TAG, "set message received: " + msg.arg1);
              }
          } catch (Exception e) {
              // Log, don't crash!
              Log.e(TAG, "Exception in TestWorkerHandler.handleMessage:", e);
          }
      }
   }
}
```

Register service

- Register service in SystemServer.java

```
/*
 * go to function "@Override public void run()"
 * ........
 * Add following block after line "if (factoryTest != SystemServer.FACTORY_TEST_LOW_LEVEL) {"
 */

try {
    Slog.i(TAG, "Test Service");
    ServiceManager.addService(“Test”, new TestService(context));
} catch (Throwable e) {
    Slog.e(TAG, "Failure starting TestService Service", e);
}
```

Expose service

- A service can expose set of functions that can be access by other process/application. Exposed functions are required to be declared in .aidl file at following location

frameworks/base/core/java/android/os/[server].aidl

```
/*
* aidl file : frameworks/base/core/java/android/os/ITestService.aidl
* This file contains definitions of functions which are exposed by service
*/
package android.os;
interface ITestService {
/**
* {@hide}
*/
      void setValue(int val);
}
```

Add [service].aidl for build

```
/*
 * open frameworks/base/Android.mk and add following line
 */
...
core/java/android/os/IPowerManager.aidl \
core/java/android/os/ITestService.aidl \
core/java/android/os/IRemoteCallback.aidl \
...
```

- Rebuild the framework/base or android system.Service is now ready to use by other application/process.

Using service

To use service

- first get service handle using "ServiceManager.getService()" api
- use service handle to call set of functions exposed by service

Below is the sample code to use service.

```
/*
 * HelloServer.java
 */
package com.Test.helloserver;
import android.app.Activity;
import android.os.Bundle;
import android.os.ServiceManager;
import android.os.ITestService;
import android.util.Log;
public class HelloServer extends Activity {
  private static final String DTAG = "HelloServer";
  /** Called when the activity is first created. */
  @Override
  public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.main);

    ITestService om = ITestService.Stub.asInterface(ServiceManager.getService("Test"));
    try {
      Log.d(DTAG, "Going to call service");
      om.setValue(20);
      Log.d(DTAG, "Service called succesfully");
    }
    catch (Exception e) {
      Log.d(DTAG, "FAILED to call service");
      e.printStackTrace();
    }
  }
}
```

References

- http://developer.android.com/reference/android/app/Service.html
- http://developer.android.com/guide/topics/fundamentals/services.html
- http://www.opersys.com/blog/esc-india-2011-wrapup

Support

For community support join http://groups.google.com/group/rowboat
For IRC #rowboat on irc.freenode.net