Programming Handheld Systems

The Service Class

Today's Topics

The Service Class

Implementing started Services

Implementing bound Services

The Service Class

No user interface

Two main uses

Performing background processing

Supporting remote method execution

Starting A Service

Components can start a service by calling

```
Context.startService(Intent intent)
```

Starting A Service

Once started, the Service can run in the background indefinitely

Started Services usually perform a single operation & then terminate themselves

By default, Services run in the main thread of their hosting application

Binding to a Service

Components can bind to a Service by calling

```
Context.bindService (
        Intent service,
        ServiceConnection conn,
        int flags)
```

Binding to a Service

Binding to a Service allows a component to send requests and receive responses from a local or a remote service

At binding time, the Service will be started, if necessary

Service remains active as long as at least one client is bound to it

ServiceLocalLoggingService

Client sends a log message to a local Service

The Service writes the message to the log console

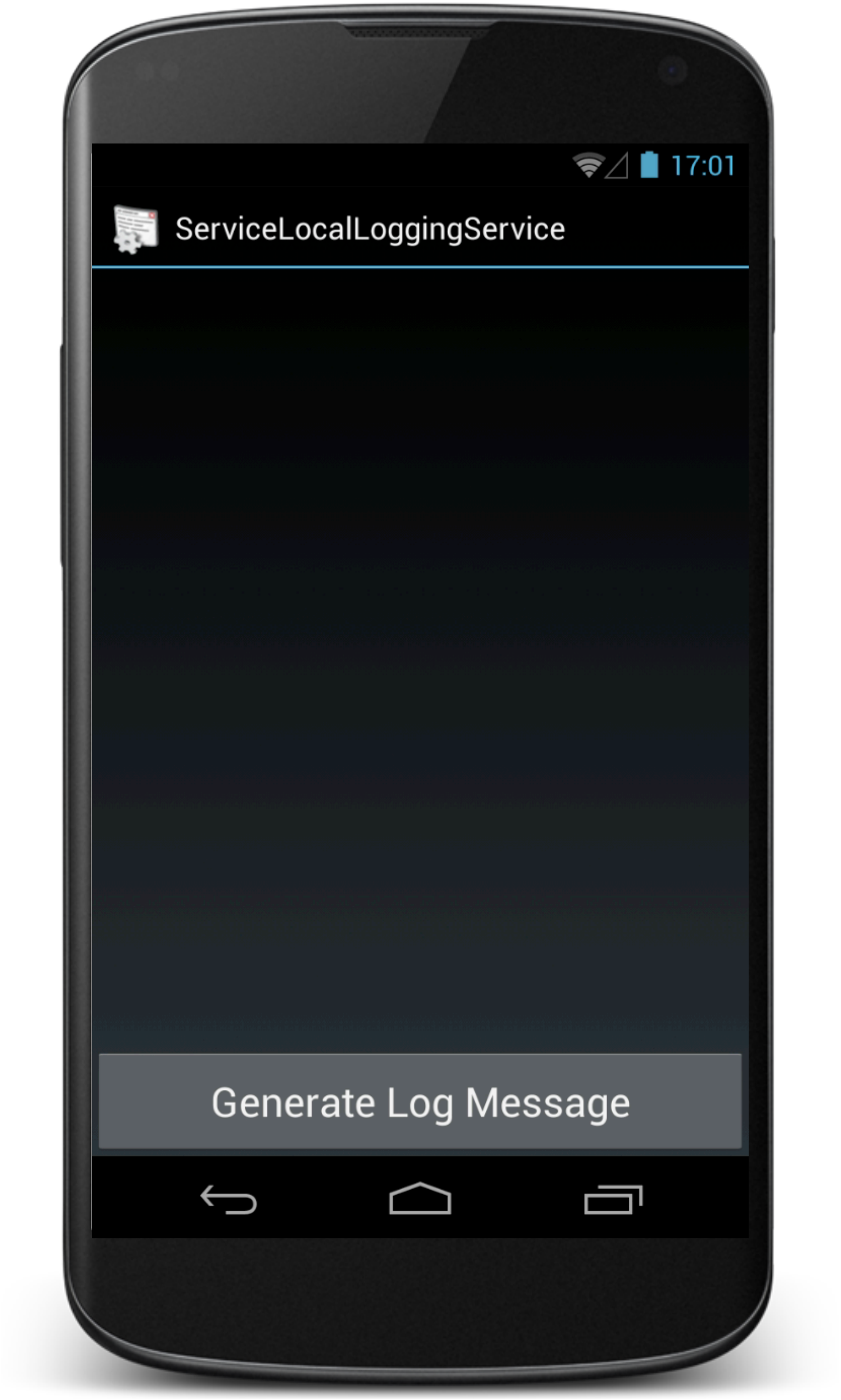
LoggingService implemented as an IntentService

IntentService

Subclass of Service

IntentService requests are handled sequentially in a single worker thread

IntentService is started and stopped as needed


17:01
ServiceLocalLoggingService
Generate Log Message

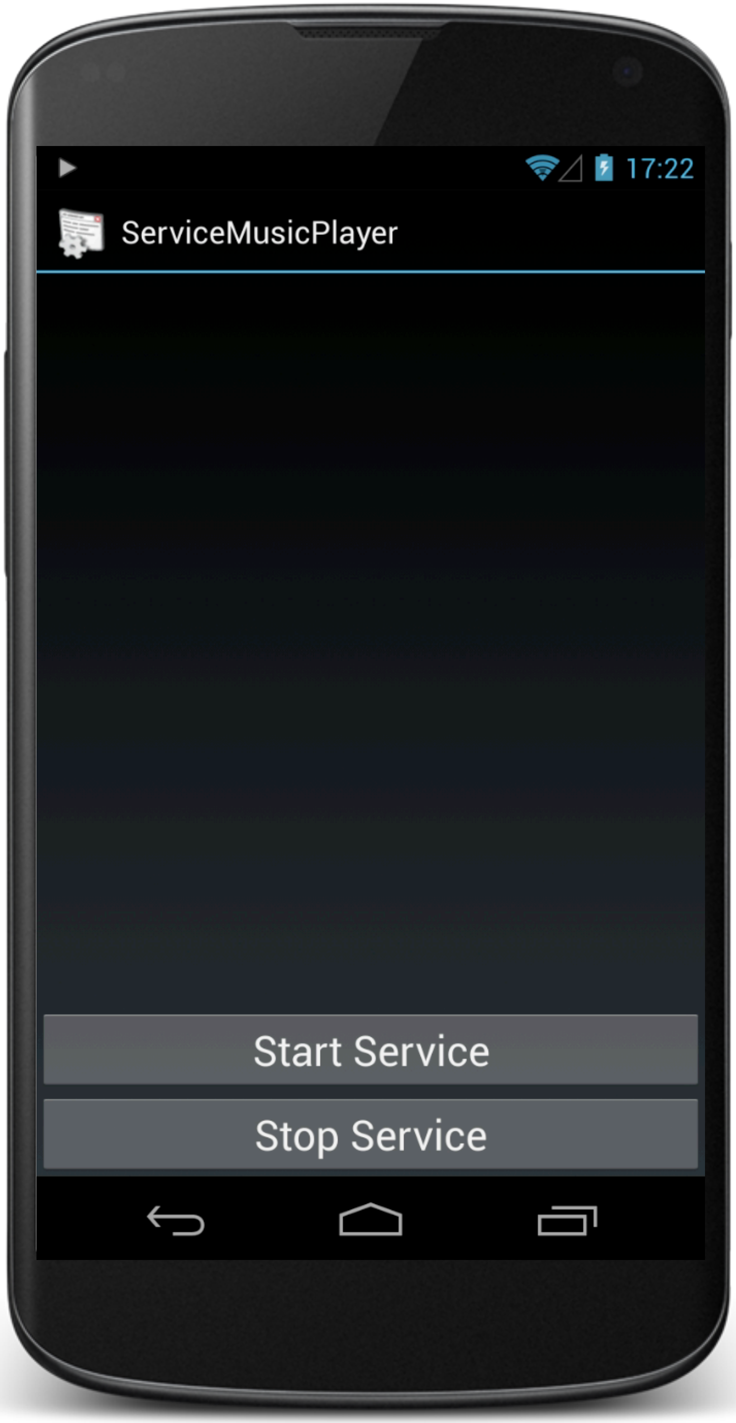
Demonstration of the ServiceLocalLoggingService project in the IDE

MusicPlayerForegroundService

Client Activity starts service to play a music file

Service plays music as a foreground service

Service continues playing even if Client Activity pauses or terminates


17:22
ServiceMusicPlayer
Start Service
Stop Service

Demonstration of the MusicPlayerForegroundService project in the IDE

Binding to Remote Services

Using the Messenger class

Defining an AIDL interface

Implementing Services with Messengers

Messenger managers a Handler

Allows Messages to be sent from one component to another across process boundaries

Messages are queued and processed sequentially by recipient

Implementing Services with Messengers

Service creates a Handler for processing specific messages

Service creates a Messenger that provides a Binder to a Client

Implementing Services with Messengers

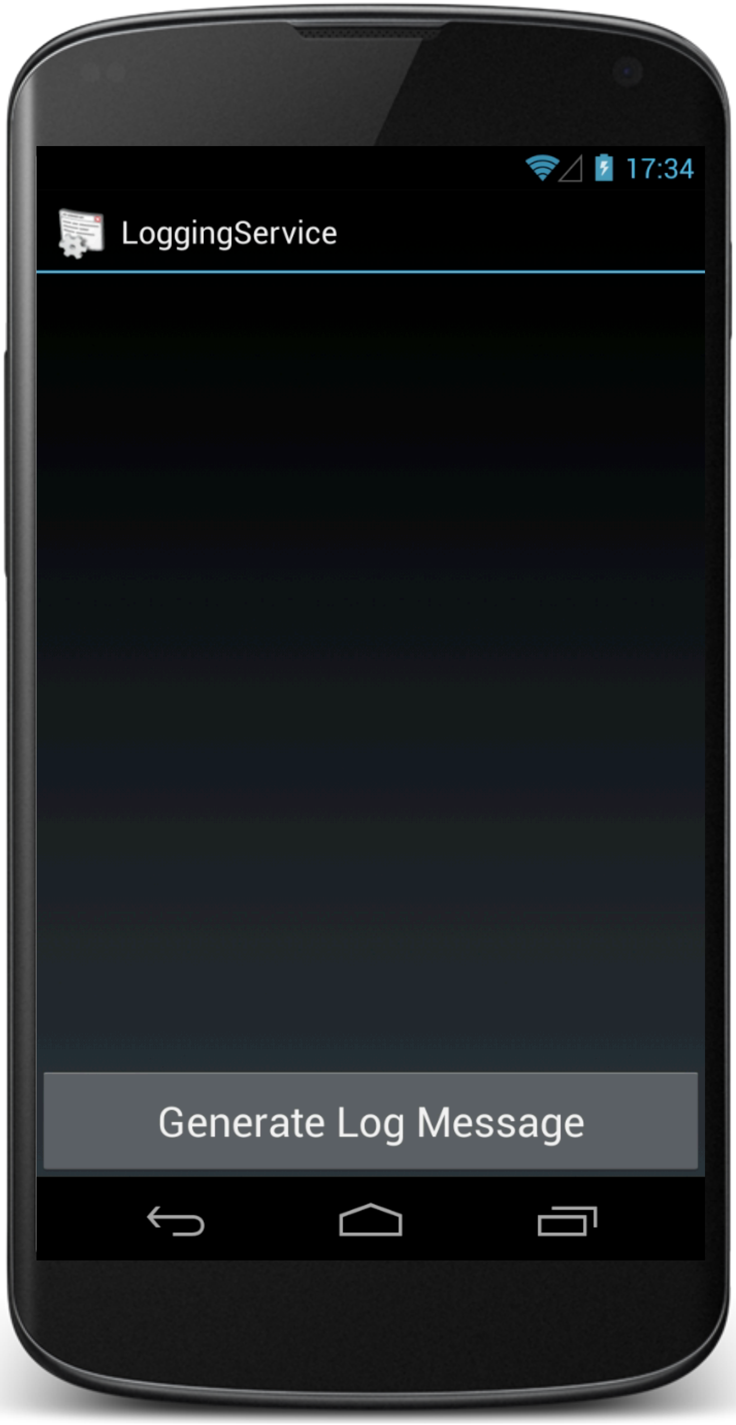
Client uses the Binder to create its own Messenger

Client uses the Messenger to send Messages to the Service

ServiceLoggingWithMessenger
ServiceLoggingWithMessengerClient

Client sends log messages to a remote Logging Service

Logging Service writes messages to a log console



17:34
LoggingService
Generate Log Message

Demonstration of the
ServiceLoggingWithMessenger
ServiceLoggingWithMessengerClient
projects in the IDE

Implementing Services with AIDL

If a Service must be accessed concurrently, then develop an AIDL interface

Implementing Services with AIDL

Define remote interface in the Android Interface Definition Language (AIDL)

Implement remote interface

Implement Service methods

Implement Client methods

Define Remote Interface

Declare interface in a .aidl file

This defines how components can interact with the Service

AIDL Syntax

Similar to Java interface syntax

Can declare methods

Cannot declare static fields

AIDL Syntax

Non-primitive remote method parameters require a directional tag

in: transferred to the remote method

out: returned to the caller

inout: both in and out

AIDL Data Types

Java primitive types

String

CharSequence

AIDL Data Types

Other AIDL-generated interfaces

Classes implementing the Parcelable protocol

AIDL Data Types

List

List elements must be valid AIDL data types

Generic lists supported

AIDL Data Types

Map

Map elements must be valid AIDL data types

Generic maps not supported

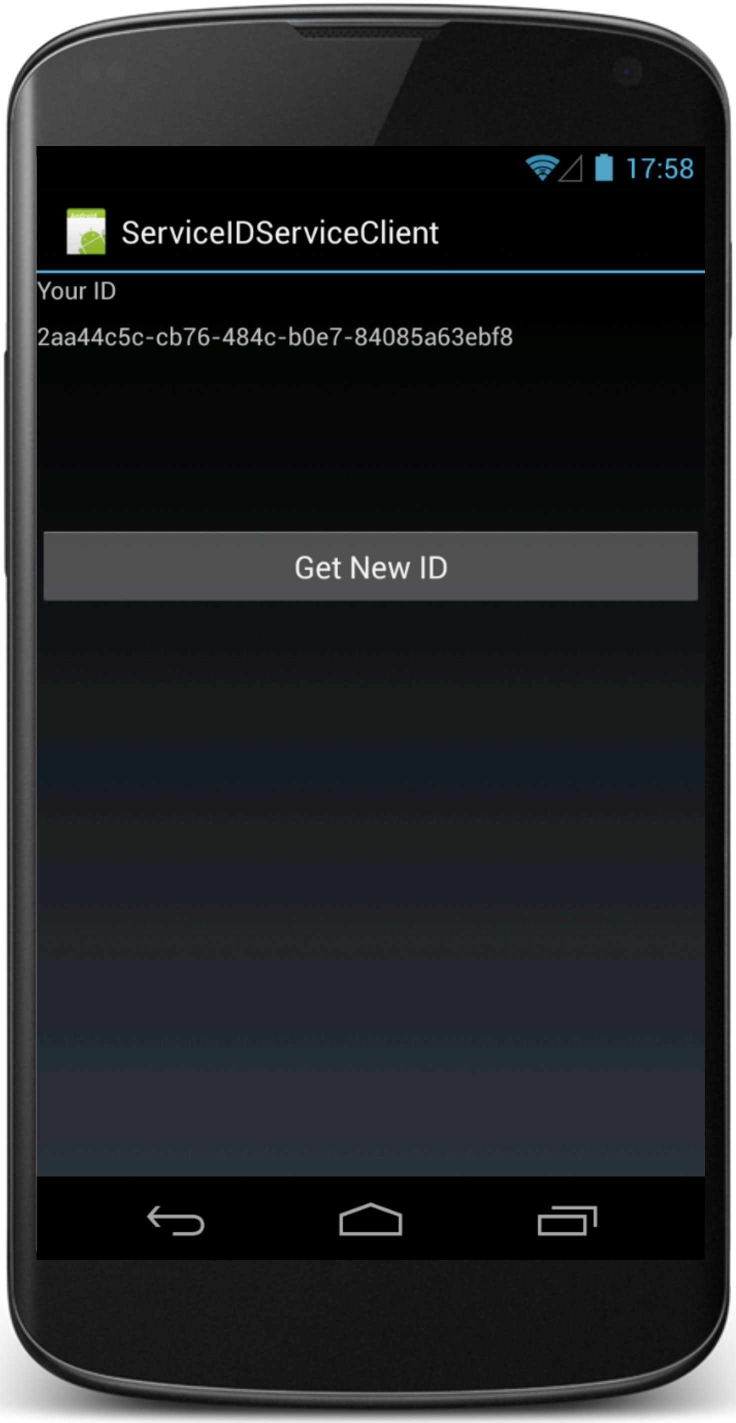
Example Remote Interface

```
interface KeyGenerator {
    String getKey();
}
```

ServiceIDService
ServiceIDServiceClient

Client binds to a Service hosted in another application

Client retrieves an ID from service



Your ID

2aa44c5c-cb76-484c-b0e7-84085a63ebf8

Demonstration of the
ServiceIDService
ServiceIDServiceClient
projects in the IDE