# Tapi3 Service Provider

## 1. Overview

Tapi3 is a GJTAPI service provider for Microsoft Tapi 3.0.
A Swing application called Tapi3Gui accompanies Tapi3 and shows how to use this service provider.
This document describes both the Tapi3 service provider and the Tapi3Gui test program.

## 2. Limitations

Tapi3 provider supports only a limited subset of the methods of CCTpi and MediaTpi:

| **Package** | **Method** | **Supported** | |
|---|---|---|---|
| CallControl | call() | YES | |
| | answer() | YES | |
| | hold() | YES | configurable through the *swapOnHold* parameter |
| | unhold() | YES | |
| | release() | YES | |
| | join() | no | |
| Media | allocateMedia() | no | |
| | freeMedia() | no | |
| | isMediaTerminal() | no | |
| | play() | no | |
| | record() | no | |
| | retrieveSignals() | no | |
| | sendSignals() | YES | |
| | stop() | no | |
| | triggerRTC() | no | |

Tapi3 provider associates only one terminal with each address. The terminal name is identical with the address name.

## 3. Installation and tuning

There is nothing to install in order to use the Tapi3 provider. Just make sure that all jars and needed props files (GenericResources.props, GenericCapabilities.props, Tapi3.props etc.) are in your classpath and that the Tapi3Provider.dll is in your java.library.path.

The name of the Tapi3 provider, as declared in GenericResources.props, is "Tapi3":
```
PROVIDER_Tapi3 = Tapi3.props
```

So you can create a Tapi3 provider using:
```
provider = peer.getProvider("Tapi3");
```

System properties can be used in Tapi3.props using the syntax: `${`*`propertyName`*`}` (e.g. `${user.home}`).
The following paragraphs show how to control the Tapi3 provider behaviour by changing some of the parameters of Tapi3.props.

## 3.1. Logging

### 3.1.1. Java logging

Tapi3 defines a very simple logging API through the Logger interface in package net.sourceforge.gjtapi.raw.tapi3.logging. It also offers a few implementations of this API:

- PrintStreamLogger - logs events to a PrintStream
- ConsoleLogger - logs events to System.err
- NullLogger - simply discards all log messages
- Tapi3Logger - delegates its job to a log4j Logger (used by Tapi3Gui)

You can easily write your own Logger implementation if none of these predefined loggers fit your needs.

You can configure a PrintStreamLogger that logs events to a file through the *tapi3.log.out* parameter. Example:

```
tapi3.log.out = C:\\tapi3.log
```

or

```
tapi3.log.out = ${user.dir}\\tapi3-${user.name}.log
```

The special value *"console"* can be used to configure a ConsoleLogger:

```
tapi3.log.out = console
```

The general method to configure a logger is to set the value of the *tapi3.log.class* parameter with the fully qualified name of the logger class. Example:

```
tapi3.log.class = net.sourceforge.gjtapi.raw.tapi3.logging.NullLogger
```

or

```
tapi3.log.class = net.sourceforge.gjtapi.test.tapi3.Tapi3Logger
```

The logger class must provide a constructor that takes no arguments.

### 3.1.2. DLL logging

Tapi3Provider.dll logs to the file specified by the parameter *tapi3.native.log.out*. Example:

```
tapi3.native.log.out = C:\\tapi3dll.log
```

or

```
tapi3.native.log.out = ${user.dir}\\tapi3dll.log
```

## 3.2. Hold and Unhold behaviour

Some telephony systems do not support the hold and unhold operations, but they may support the swap operation. You can ask Tapi3 provider to execute a swap instead of hold or unhold, by setting the *tapi3.native.swapOnHold* parameter to true:

```
tapi3.native.swapOnHold = true
```

In this case, a hold operation is possible only if the target terminal connection is in state TALKING and there is another terminal connection in state HELD.
Conversely, an unhold operation is possible only if the target terminal connection is in state HELD and there is another terminal connection in state TALKING.

### 3.3. Native implementation

You will probably never want to change this parameter, but it will be described shortly for the sake of completeness.

Tapi3 provider defines an interface called Tapi3Native which provides an abstraction level that binds the Java implementation with the native implementation (e.g. Tapi3Provider.dll). The Tapi3Native implementation to be used can be specified through the *tapi3.impl.class* parameter:

```
tapi3.impl.class = net.sourceforge.gjtapi.raw.tapi3.Tapi3NativeImpl
```

(Why would someone need this parameter? During the developing of Tapi3 provider I have had only limited access to my telephony system, so I have implemented an emulator for it. Through the *tapi3.impl.class* parameter I have had the possibility to switch between the real telephony system and the emulator).

## 4. Non-standard features

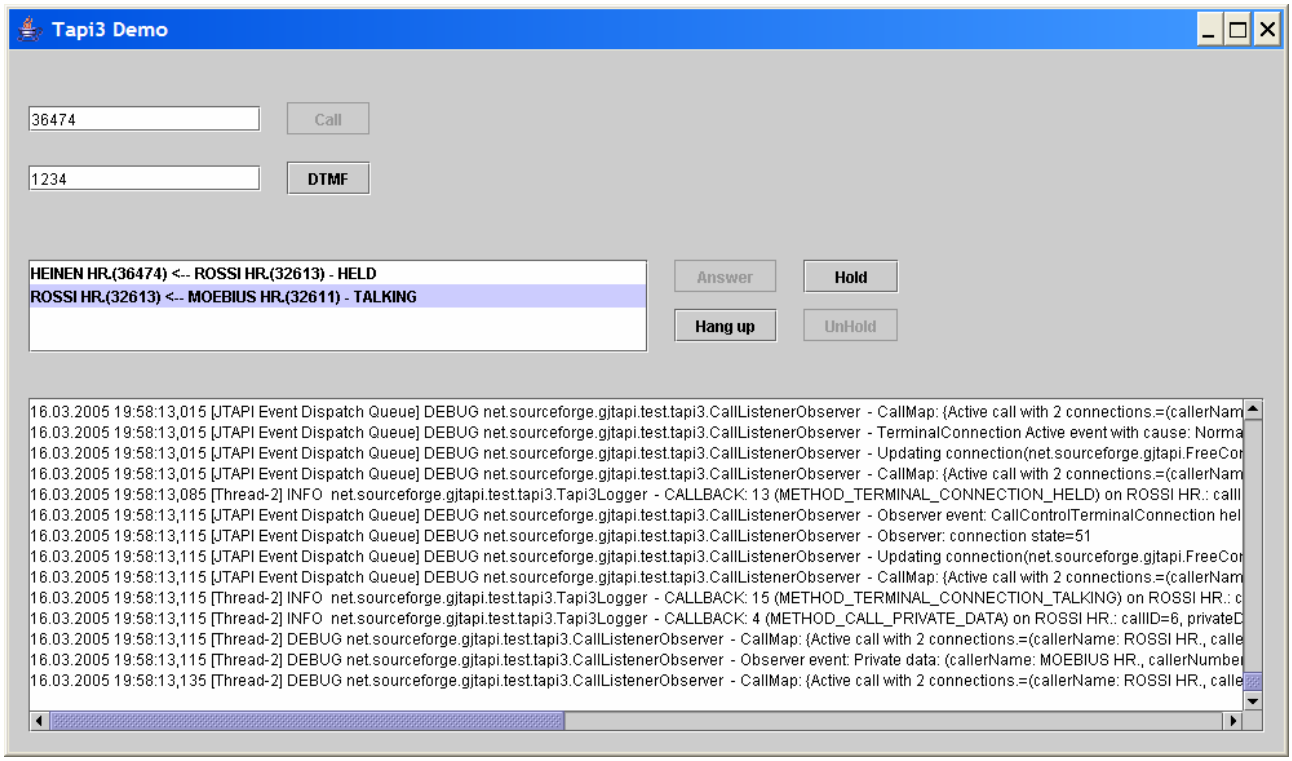
Tapi3 provider can send PrivateCallEv events containing the caller name, caller number, called name and called number as a private data object of type Tapi3PrivateData. The following idiom retrieves this information from a PrivateCallEv event:

```
PrivateCallEv privCallEv = ...;
Object privateData = privCallEv.getPrivateData();
if(privateData instanceof Tapi3PrivateData) {
   Tapi3PrivateData tapi3PrivateData = (Tapi3PrivateData)privateData;
   String callerName = tapi3PrivateData.getCallerName();
   String callerNumber = tapi3PrivateData.getCallerNumber();
   String calledName = tapi3PrivateData.getCalledName();
   String calledNumber = tapi3PrivateData.getCalledNumber();
   ...
   ...
   ...
}
```

Since this is a Tapi3 specific feature, you should try to avoid it if you don't really need the information provided by Tapi3PrivateData. In most cases, the data retrieved using the standard CallControlCall's methods: getCallingAddress(), getCalledAddress() and getCallingTerminal() (which are supported since gjtapi-1.8!) will be enough for you.

## 5. The Tapi3Gui application

Tapi3Gui is a Swing application that shows the use of the Tapi3 service provider. It allows you to make calls, receive calls and hold or unhold calls. You can also send DTMF digits to the selected terminal.
The main class of this application is net.sourceforge.gjtapi.test.tapi3.Tapi3Gui.
A button in Tapi3Gui is enabled only if its corresponding action is permitted. For example, you cannot make a call while other terminal connections are active (TALKING). The "Answer", "Hang up", "Hold" and "UnHold" buttons are enabled or disabled according to the state of the selected call in the call list.




## 5.1. Logging

Tapi3Gui uses the log4j based Tapi3Logger, so make sure that a recent version of the log4j jar (http://logging.apache.org/site/binindex.cgi) is in your classpath.
By default, Tapi3Gui has only one log4j appender that logs all messages to the trace area (placed at the bottom part of the GUI).

You can configure additional appenders if you use a log4j configuration file. For example, you can create a file named log4j.properties with the following content:

```
log4j.rootLogger=INFO, CON
log4j.appender.CON=org.apache.log4j.ConsoleAppender
log4j.appender.CON.layout=org.apache.log4j.PatternLayout
log4j.appender.CON.layout.ConversionPattern=%-5p - %m%n
```

Start the program setting the value of the *log4j.configuration* system property to the URL of your log4j.properties file:

```
java -Dlog4j.configuration=file:///C://gjtapi/log4j.properties ...
```

Now, Tapi3Gui will log messages both to the trace area and the console. This can be very useful to trace problems that arise before the main window (and hence the trace area) is displayed. Only messages with level INFO or higher will be logged using the configuration file above. (Note that this also affects the messages logged to the trace area).

## 5.2. Known issues

The program enables or disables the "Hold" and "UnHold" buttons assuming that the parameter *tapi3.native.swapOnHold* is set to true (i.e, hold and unhold are treated as swap). This means that these buttons are always disabled if there is only one call in the call list. You will have to adjust the Tapi3Gui code yourself if you want to change the *tapi3.native.swapOnHold* value to false. (Note that this is a Tapi3Gui issue, not a Tapi3Provider bug).