



Demo: Embedding Windows Forms elements inside a Java GUI application

Version 10.1



SPANNING JAVA & .NET

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August 13, 2019



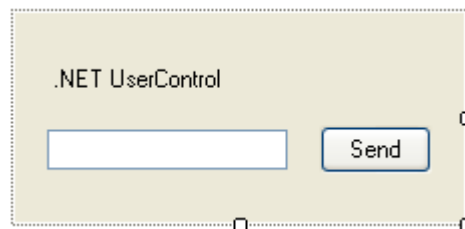
Introduction

This document shows how a .NET WinForms control can be embedded inside a Java GUI application (either an AWT, Swing, or SWT application). If you are unfamiliar with JNBridgePro, we recommend that you work through one of the other demos first. We recommend working through the “Java-to-.NET demo,” which will work through the entire process of generating proxies and setting up, configuring, and running an interop project. This current document assumes such knowledge, and is mainly a guided tour of the code and configuration information necessary to embed .NET GUI elements inside GUI-based Java applications.

The .NET GUI component

In this example, we have provided a simple .NET WinForms control, `JNBTest.JNBControl`.

Any .NET GUI component to be embedded inside a Java GUI application must be derived from `System.Windows.Forms.Control`. The `JNBControl` class above is derived from `System.Windows.Forms.UserControl`, which is a subclass of `System.Windows.Forms.Control`. `JNBControl` contains a `TextBox` and a `Button`; the `TextBox` is public, so outside code can get and set the box’s text, and a public method makes it possible to register an event handler for the button. `JNBControl` should look like the following:



Generating the proxies

We have provided a proxy jar file `dotNetControlProxies.jar`, which contains the proxies for `JNBTest.JNBControl`, plus all supporting classes. However, it is straightforward to generate the proxies oneself.

If you generate the proxy jar file, you should make sure that both the dll with the .NET control, and `System.Windows.Forms` (from the GAC) are in the proxy generator’s assembly list. Make sure you have the correct version of `System.Windows.Forms`. Also, you must explicitly add `System.Windows.Forms.UnsafeNativeMethods` to the proxy generation project and proxy it.

Embedding the Java component inside the Windows Form

We have prepared a Java AWT application to contain the embedded .NET component.

Inside the application’s main method, we have added the following lines

```
// create the .NET control
JNBControl c = new JNBControl();
// wrap it so it can be embedded
DotNetControl dnc = new DotNetControl(c);
```



```
// size it
dnc.setSize(224, 104);
// embed it
f.add(dnc, dncConstraints);
```

The code first instantiates the proxy for the .NET component (JNBControl), then embeds it inside a special wrapper, `com.jnbridge.embedding.DotNetControl`, which inherits from `java.awt.Canvas`, and which allows the .NET component to be used wherever a Java component is expected. The `DotNetControl` is then resized to be the same size as the embedded .NET control, and the control is added to the application's `Frame` object, along with previously defined layout constraints.

We have also created a callback class that implements `JNBTest.clickDelegate`, the interface representing the button's event handler, and which will be executed whenever the .NET component's button is clicked:

```
static TextField echo;

public static class ClickEventHandler implements clickDelegate
{
    public void Invoke(String message)
    {
        echo.setText(message);
    }
}
```

The callback code takes the text from the .NET `TextBox` (passed as a parameter), and writes it to the Java `TextField` `echo`. The callback is instantiated and registered with the .NET component as an `clickDelegate` by the following line in the main method:

```
c.registerClickDelegate(new ClickEventHandler());
```

Finally, `JNBridgePro` is started and configured through a call to `com.jnbridge.jnbcore.DotNetSide.init()`:

```
DotNetSide.init(args[0]);
```

where the path to the Java-side configuration file is supplied as a command-line argument.

Configuring and running the application

The project is constructed in the same way as other .NET-to-Java interop projects. The communications mechanism must be shared memory:

```
# .NET-side (Java-to-.NET) properties
dotNetSide.serverType=sharedmem
dotNetSide.assemblyList.1=./DotNet/JNBTest/bin/Debug/JNBTest.dll
dotNetSide.assemblyList.2=System.Windows.Forms, Version=4.0.0.0,
    Culture=neutral, PublicKeyToken=b77a5c561934e089
dotNetSide.javaEntry=C:/Program Files (x86)/JNBridge/JNBridgePro v10.1/4.0-
targeted/JNBJavaEntry_x64.dll
```

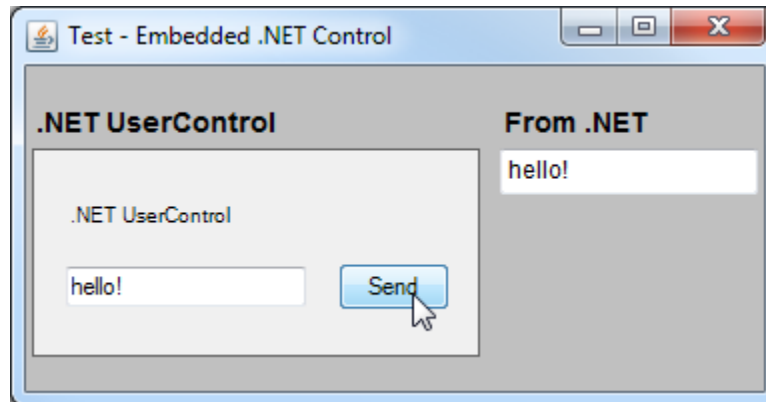
As with all other Java-to-.NET applications that use shared memory, you must make sure that `jnbshare.dll`, `jnbsharedmem_x86.dll` (or `jnbsharedmem_x64.dll`, or both), and `jnbjavaentry2_x86.dll` (or `jnbjavaentry2_x64.dll` or both) are all installed in the Global Assembly Cache (GAC). Depending



on whether you will be running the application as 32-bit or 64-bit, choose the “_x86” or “_x64” variants of `jnbsharedmem.dll`, `jnbjavaentry.dll`, and `jnbjavaentry2.dll`, as appropriate.

We supply a `.bat` file `runJava.bat` to encapsulate the commands needed to start the application

When the Java application is run, the .NET component appears embedded in the Java application, and when text is entered in the .NET component’s text field and the “Send” button is clicked, the text will appear in the Java application’s text box, illustrating how the .NET and Java GUI elements communicate.



Embedding .NET controls in SWT applications

It is also possible to embed a .NET control in an SWT application. The process is identical to that of embedding in AWT/Swing applications, as described above, except for the following differences:

- Instead of wrapping the embedded .NET control inside `com.jnbridge.embedding.DotNetControl`, you must embed it inside `com.jnbridge.embedding.DotNetSWTControl`, which inherits from `org.eclipse.swt.widgets.Composite`. The constructor for `DotNetSWTControl` takes as arguments both the embedded .NET control and the parent SWT composite object that will contain it:

```
DotNetSWTControl myControl = new DotNetSWTControl(dotNetControl, parent);  
myControl.setBounds(0, 50, 655, 303); // and set its size and location
```

Note that the `DotNetSWTControl` should be positioned and sized after being created.

- The Win32 version of `swt.jar` must be in the run-time classpath.
- The path of the folder containing the Win32 version of the SWT dlls (typically the `plugins\org.eclipse.swt.win32_3.1.0\os\win32\x86` folder in the Eclipse installation folder) must be in the Java library path. For example, for Eclipse 3.1, add `-Djava.library.path="C:\Program Files\Eclipse 3.1\eclipse\plugins\org.eclipse.swt.win32_3.1.0\os\win32\x86"` to the command-line immediately after the `java` command. This path will differ depending on your installation and the version of Eclipse you are using.



Summary

The above example shows how simple it is to embed a .NET Windows Forms component inside a Java GUI application. This embedding can be accomplished in three steps:

- Proxy the .NET component and the supporting classes
- Write code to wrap the Java component's proxy in the special DotNetControl wrapper class, size it, and add that DotNetControl object to the containing Java Frame.
- Create Java classes to implement any event handlers, and register them with the .NET control's proxy,

We also describe how to embed .NET controls inside SWT applications. The main difference between embedding in SWT applications and embedding in AWT/SWT applications is that you must use the DotNetSWTControl wrapper class when embedding in SWT applications.