



Demo: Embedding Java GUI elements inside a .NET Windows Form

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SPANNING JAVA & .NET

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Introduction

This document shows how a Java GUI element (an AWT or Swing component – SWT is not currently supported in this scenario) can be embedded inside a .NET Windows Form. If you are unfamiliar with JNBridgePro, we recommend that you work through one of the other demos first. We recommend working through the “Log 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 Java GUI elements inside GUI-based .NET applications.

The Java GUI component

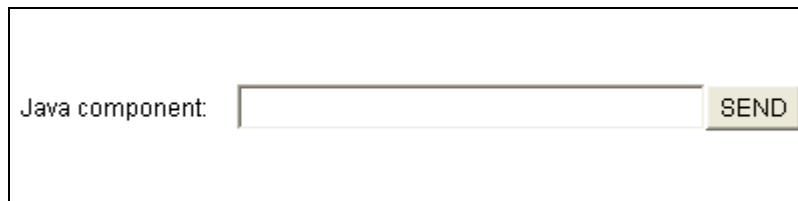
In this example, we have provided a simple AWT-based Java component, `jInN.JavaComponent`. (Swing components will work as well, but embedding SWT components inside .NET Windows Forms is not currently supported.)

```
public class JavaComponent extends Panel {
    public TextField javaTextBox;
    Button btn;

    public JavaComponent() {
        setSize(400, 100);
        setLayout(new GridBagLayout());
        add(new Label("Java component: "));
        javaTextBox = new TextField(30);
        btn = new Button("SEND");
        add(javaTextBox);
        add(btn);
    }

    public void addActionListener(ActionListener l)
    {
        btn.addActionListener(l);
    }
}
```

Any Java GUI component to be embedded inside a WinForm must be derived from `java.awt.Component`. The `JavaComponent` class above is derived from `java.awt.Panel`, which is a subclass of `java.awt.Component`. `JavaComponent` contains a `TextField` and a button; the `TextField` is public, so outside code can get and set the field’s text, and a public method makes it possible to add an `ActionListener` for the button. `JavaComponent` should look like the following:

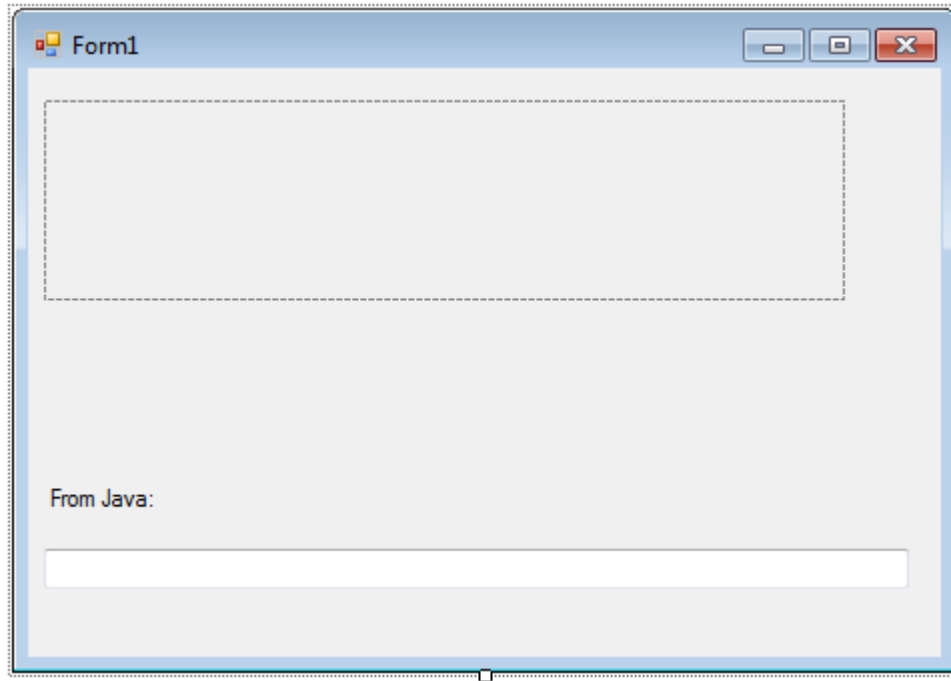


Generating the proxies

We have provided a proxy assembly `javaComponentProxies.dll`, which contains the proxies for `jInN.JavaComponent`, plus all supporting classes. However, it is straightforward to generate the proxies oneself.

Embedding the Java component inside the Windows Form

We have prepared a .NET Windows Form to contain the embedded Java component:



Note that the form contains a WinForms Panel component (highlighted), named `javaHolder`, which is the same size as the Java component, which will be embedded inside the panel.

Inside the form's constructor, we have added the following lines:

```
JavaComponent jcp = new JavaComponent();  
jc = new JavaControl(jcp, 400, 100);  
javaHolder.Controls.Add(jc);
```

The code first instantiates the proxy for the Java component (`JavaComponent`), then embeds it inside a special wrapper, `com.jnbridge.embedding.JavaControl`, which inherits from `System.Windows.Forms.Control`, and which allows the Java component to be used wherever a .NET Control is expected. Note that the Java component's size (400 pixels wide and 100 pixels high) must be supplied to the `JavaControl` constructor. Finally, the wrapped Java component is added to the `javaHolder` panel.

We have also created a callback class that implements `java.awt.event.ActionListener`, and which will be executed whenever the Java component's button is clicked:

```
[AsyncCallback("java.awt.event.ActionListener")]  
public class DotNetActionListener : ActionListener
```



```
{
    private java.awt.TextField javaTextBox;
    private TextBox dotNetTextBox;

    public DotNetActionListener(java.awt.TextField jTB, TextBox dNTB)
    {
        javaTextBox = jTB;
        dotNetTextBox = dNTB;
    }

    public void actionPerformed(ActionEvent p1)
    {
        string s = javaTextBox.getText();
        dotNetTextBox.Text = s;
    }
}
```

The callback code extracts the text from the Java TextField, and writes it to the .NET TextBox. The callback is instantiated and registered with the Java component as an ActionListener by the following line in the form's constructor:

```
jcp.addActionListener(
    new DotNetActionListener(jcp.javaTextBox, dotNetTextBox));
```

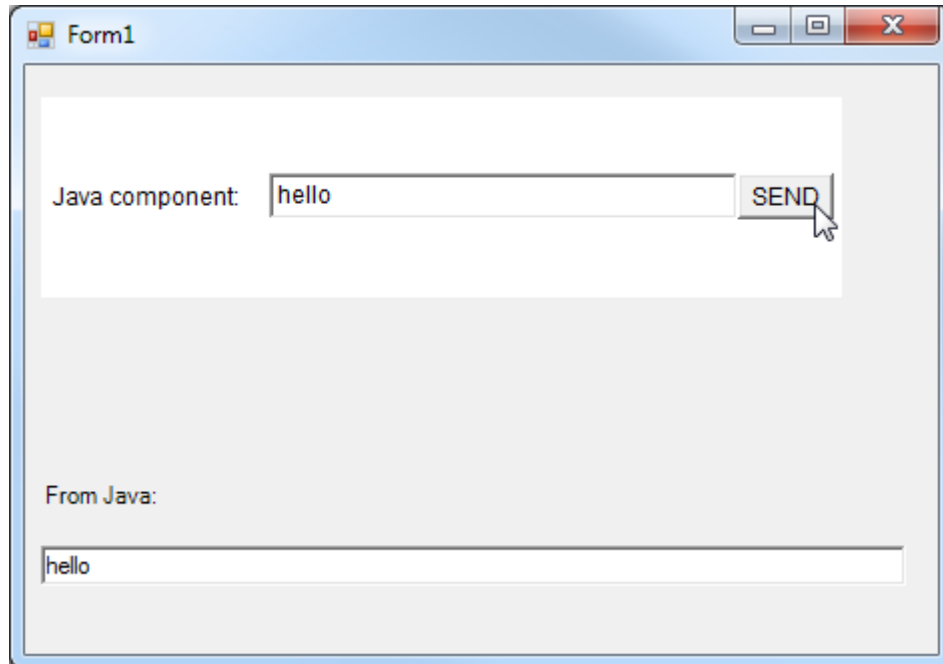
Configuring and running the application

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

```
<jnbridge>
  <dotNetToJavaConfig scheme="sharedmem"
    jvm="C:/Program Files (x86)/Java/jre6/bin/client/jvm.dll"
    jnbcore="C:/Program Files (x86)/JNBridge/JNBridgePro v10.0/jnbcore/jnbcore.jar"
    bcel="C:/Program Files (x86)/JNBridge/JNBridgePro v10.0/jnbcore/bcel-5.1-
jnbridge.jar"
    classpath="../../../../Java"
  />
</jnbridge>
```

The one other special consideration is that copies of the files `jawt.dll` and `jnbjavaentry.dll` must be placed in the same folder as the .NET .exe file. If either is not there, an exception will be thrown. A copy of `jawt.dll` can be found in the `jre\bin` folder (if you are using a JDK) or in the `bin` folder (if you are using a JRE).

When the .NET application is run, the Java component appears embedded in the WinForms application, and when text is entered in the Java component's text field and the SEND button is clicked, the text will appear in the .NET form's text box, illustrating how the .NET and Java GUI elements communicate.



Summary

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

- Proxy the Java component and the supporting classes
- Create a panel of the proper size in the .NET Windows Form.
- Write code to wrap the Java component's proxy in the special `JavaControl` wrapper class, and add that `JavaControl` object to the .NET panel.
- Create .NET classes to implement any `ActionListeners`, and register them with the Java component's proxy,

Note: *In addition to the standard Java-in-.NET embedding feature, we have provided a new "experimental" reimplementation to work with Java 7 and later. Changes to the native focus implementation in Java 7 broke the handling of focus-related events, particularly keyboard events, in the embedded Java controls. This new implementation, called `com.jnbridge.embedding.NewJavaControl`, restores these focus-related capabilities. There are a few caveats:*

- *Only embedding of Java controls inside Windows Forms is currently supported. Embedding Java inside Windows Presentation Foundation (WPF) will be supported in a future release.*



- *There may be some unresolved issues related to z-order (that is, in certain situations, the Java control might appear in front of an element that it should not appear in front of, or behind an element that it should not be behind). Please report such issues if you encounter them.*

The original implementation properly handles focus-related events in Java 5 and 6, and properly handles embedding (except for focus-related events) in Java 7 and later.