IBM VisualAge® for Java™, Version 3.5

Visual Composition

Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 251.

Edition notice

This edition applies to Version 3.5 of IBM VisualAge for Java and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Chapter 1. Visual programming fundamentals

VisualAge® for Java™ includes a state-of-the-art object-oriented visual composition editor for assembling program elements visually from JavaBeans components.

Object-oriented programming facilitates development of complex software systems by breaking them up into a number of much smaller, simpler program elements called *objects*. Objects work together by sending each other *messages*, that is, by requesting behavior that is implemented by the target object. Taken as a group, these behaviors comprise a *class interface*.

Using an object-oriented approach for complex systems provides the following benefits:

- Individual classes are much easier to create and understand.
- Systems are much easier to maintain and enhance. Object implementations can be modified individually without modifying the rest of the system, as long as the objects continue to respond appropriately to messages sent to them by other objects.

Despite these benefits, implementing large systems can still be expensive. One way to reduce the cost is to reuse object implementations. Many companies would prefer to buy reliable reusable classes, creating classes only for functions specific to their business. This vision of constructing custom software using standard building blocks has been called *construction from parts*. The building blocks themselves have popularly been called *parts* or *components*.

However, reuse is hard to achieve when the class interfaces are too specific to the application for which they were originally developed. To promote wider reuse, class interface conventions called *component models* have been defined, such as ActiveX, OpenDoc, and JavaBeans.

JavaBeans is the standard component model for the Java language and is the component model used by VisualAge. JavaBeans includes the following definitions:

An event model. Event models specify how a component sends messages to other objects without knowing the exact methods that the other object implements. This enables a component to be reused with a range of objects that have different interfaces

Events, properties, and methods. JavaBeans defines a component interface in terms of the events it can signal, the property values that can be read and set, and the methods it implements. This definition provides more structure to the interface of a component compared with a simple class interface, facilitating the use of tools such as the VisualAge Visual Composition Editor.

Introspection. Introspection refers to the ability to discover programmatically the component interface for instances of a particular component class. The reason to provide introspection is that it enables the use of programs such as the Visual Composition Editor that can work with component instances at run time without having the details of these components programmed into them.

The Visual Composition Editor enables you to create programs graphically from existing beans. Beans are simply Java classes that comply with the JavaBeans specification. JavaBeans is the component model supported and used throughout VisualAge, so this documentation will refer to VisualAge components as *beans*.

VisualAge provides user interface beans based on Java classes in the Abstract Windowing Toolkit (AWT) and Swing packages. The Visual Composition Editor is also extensible. It allows you to work with beans you create yourself, and it allows you to include beans imported into the environment from other sources. You can even create your own beans graphically using the Visual Composition Editor and then reuse these beans again within another program being created with the Visual Composition Editor.

To build a program with the Visual Composition Editor, you draw a picture using a canvas and palette of icons representing reusable beans. This picture specifies the set of beans that implements the function of the larger program (or bean) you are creating. For beans like user interface controls, the position of the controls relative to each other in the picture specifies how the controls will appear in the final program. For beans such as database components, the position of the bean in the picture generally has no significance.

The Visual Composition Editor provides a very sophisticated connection capability to specify how components of the picture will interact to implement functions of the program. Using connections, much of the behavior of an application can be specified graphically. Connections also allow you to integrate custom code written in the Java language.

See the JavaBeans home page for links to detailed information on JavaBeans and BeanInfo.

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Chapter 2. How classes and beans are related

VisualAge beans are Java classes that conform to the JavaBeans component architecture. *Composite* beans are made up of embedded beans. We use the term *bean* to refer to both a class and its instances, as follows:

- When we refer to beans on a palette or to beans that you create by writing code, we mean bean **classes**.
- When we refer to beans on the free-form surface or to beans that are connected, we mean bean **instances**. Sometimes, beans represent instances that have not yet been created.

During visual composition, you interact with bean interfaces. The most useful bean interfaces contain the following features:

Access to data, or ***properties*****.** A complete property interface includes methods to return the value of the property, to set the value of the property, and to notify other beans when the value of the property changes. The interface for a property does not have to be complete. For example, a property might be read-only, in which case the interface would not support the ability to set the value of a property. A property can be any of the following:

- An actual data object stored within the bean, such as the street in an address bean
- A computed data, such as the sum of all numbers in an array or the profit that is computed by subtracting dealer cost from the retail price

Access to the behavior of a bean, or ***methods*****.** These represent tasks you can ask a bean to perform, such as open a window or add an object to a collection of objects.

Event notification. By signaling events, a bean can notify other beans that its state has changed. For example, a push button can signal an event to notify other objects when it is clicked, or a window can signal an event when it is opened, or a bank account can signal an event when the balance becomes negative.

Events can also be signaled when the value of a bean property changes, such as when money is deposited into or withdrawn from a bank account. In this case, the balance property is said to be *bound* to an event.

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Chapter 3. Visual, nonvisual, and composite beans

You can use many kinds of beans to construct program elements. All beans exist as either primitives or composites. Primitive beans are the basic building blocks from which composites are constructed. You must construct new primitive beans using a programming language because there are no similar beans to use in building them. Primitive beans can be either visual or nonvisual.

Visual beans are elements of the program that the user can see at run time. The development-time representations of visual beans in the Visual Composition Editor closely match their runtime visual forms. Users can edit these beans in the Visual Composition Editor in their visual runtime forms. Examples include windows, entry fields, and push buttons. In general, visual beans are subclasses of java.awt.Component.

Nonvisual beans are elements of the program that are not necessarily seen by the user at run time. On the Visual Composition Editor's free-form surface, users can manipulate these beans only as icons. Examples include business logic, database queries, and communication access protocol beans.

Beans that have a visual representation at run time but do not support visual editing are treated as nonvisual. Examples of this kind of nonvisual bean include message boxes and file selection dialogs.

Composite beans can contain both visual and nonvisual components. In general, composite beans are based on one of these classes, but you are by no means limited to these:

- Applet or JApplet, for Web applets
- Frame or JFrame, for GUI applications
- Panel or JPanel, for reusable GUI surfaces embedded in either applets or applications

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Chapter 4. Visual Composition Editor overview

Visual composition is the creation of object-oriented program elements by manipulating graphical representations of components. VisualAge provides a powerful tool, the Visual Composition Editor, that enables you to visually construct applications, applets, and reusable beans.

In the Visual Composition Editor, you select and place beans to create graphical user interfaces (GUIs). These GUIs can include VisualAge beans, imported beans, and beans you create yourself. By following a few guidelines, you can design versatile beans that you can reuse in many compositions. VisualAge also enables you to use nonvisual beans to perform the business logic and data access.

Development using visual composition can include the following steps:

1. Design your program elements. Determine what you can compose visually and what you must write by hand.
2. Create nonvisual beans.
3. Using the Visual Composition Editor, enhance these classes by dropping beans and setting initial values for properties. Extend the behavior of VisualAge beans by writing code.
4. For business logic, add code to the appropriate class stubs.
5. Connect beans to define the program element's behavior and flow.
6. Save your work. VisualAge generates and compiles the code for visually composed beans. Click on  **Run** in the Visual Composition Editor to try out the finished product.

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Free-form surface

The *free-form surface* is the large open area in the Visual Composition Editor. It is like a blank sheet of paper or a work area where you can add, manipulate, and connect the beans that you use to create your composite bean.

Some of the functions you can perform on the free-form surface include:
- Add visual beans.
- Add nonvisual beans to build the application logic for a composite bean.
- Delete beans.
- Connect beans to define behavior.

You cannot edit on the free-form surface if the bean you are attempting to edit meets any of the following conditions:
- The class is in a system package.
- An exception occurred during the creation of the bean.
- The class is a Java AWT lightweight component.

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Beans palette

The *beans palette*, located on the left side of the Visual Composition Editor, provides building blocks you can use to construct a program element. It consists of categories in a drop-down list, each one containing groups of beans.

You can add a bean to your program element by first selecting the category, then a bean, and then dropping it on the free-form surface, a container bean, or the beans list.

To add multiple instances of the same bean, enable **Sticky** by holding Ctrl while selecting the bean. Select a new bean or the Selection tool to disable **Sticky**.

The status area displays the name of the selected category and bean.

The beans palette initially contains the following:
- Categories (including **AWT**, **Swing**, and **Other**) and the option to load Available installed features to the workspace.
- Beans provided with VisualAge
- "Selection tool" on page 9
- "Choose bean tool" on page 9
- A pop-up menu

You can modify the palette by resizing it, changing the icon size, adding categories, adding separators, adding beans you have constructed yourself or beans supplied by a vendor, or removing separators, categories, or beans. In addition, the Available feature on the category menu loads installed features to the workspace. This may include the addition of categories and beans to the palette. Modifying the beans palette can increase your productivity in the following ways:

- By reducing the time and effort required to place beans that you have created and that you use often in the Visual Composition Editor.
- By reducing the time and effort required to place vendor beans or beans from another project.
- By eliminating the need for manually placing beans through the Choose Bean tool, which requires that you use the exact class name of the bean.

When you add a new bean to the palette, the entire visual or nonvisual bean is represented with the default puzzle icon  unless you designate another icon in the BeanInfo Class. Once you add beans to the palette, you can place them in the free-form surface Visual Composition Editor in the same way you place beans that VisualAge provides.

Selection tool

Click on  to unload the mouse pointer and return it to the selection pointer. The loaded mouse pointer appears as a crosshair and carries a bean that can be added to the free-form surface, the beans list, or an existing container bean. When unloaded, the mouse pointer reverts to an arrow that you use to select and perform actions on beans. If the mouse pointer is not loaded, this tool is not enabled.

Choose bean tool

Click on  to retrieve a bean that is not on the palette and drop it on the beans list, free-form surface, or an existing container bean.

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Visual composition hints and tips

When you place beans in the Visual Composition Editor, remember the following:

Avoid overlaying beans. It is not good interface design for one bean to overlay another bean. Completely or partially overlaying a bean can result in focus problems, causing users to see but be unable to select the bean.

Embed composite beans into other composites. By embedding composite beans into other composites, you minimize the confusing spider effect of connection lines. For example, you can create a composite bean that consists of a panel on which you have placed buttons and check boxes, and make connections. When you

embed this bean in your main interface, you cannot see the connection lines. You place and work with the composite as one bean—not as a panel and separate buttons and check boxes.

If you need to edit the composite or its internal connections, you simply select **Open** from the pop-up menu and the Visual Composition Editor for the composite appears, as described in “Editing beans within a composite beans” on page 69.

Avoid changing the composite’s superclass manually. This action creates a discrepency between the visual metadata and the class definition that may result in faulty generated code. In extreme cases, you could lose the visual metadata altogether.

Common problems

Property-to-property connection does not work. At least one of the end-point properties might not be bound to an event. Open the properties window for the connection; check the **Source Event** and **Target Event** lists. If either reads **<none>**, the corresponding end point is unbound; choose an event from the list. For JTextField’s text property, a good choice is the KeyTyped event.

Recent changes to a bean interface are not reflected in an open Visual Composition Editor. The Visual Composition Editor reflects feature lists that were current at the time you opened it. To update the feature lists in an open Visual Composition Editor, select **Refresh Interface** from the pop-up menu of the free-form surface.

After export and import of a class to another repository, the visual composition information is missing. To fix this, you must have access to the repository from which the class was originally exported. You have two options:

- Re-export the class to a repository (.dat) file and import it into the new repository.
- In the original repository, generate a metadata method and then re-export the class to a source-code (.java) file.

  First, set the correct option: From the **Window** menu, select **Options**, **Visual composition**, and then **Code generation**. Then select **Generate meta data method**.

  Then open the composite in the Visual Composition Editor and select **Re-generate Code** from the **Bean** menu. Save the bean and export it. Then import it into the new repos

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Property sheets

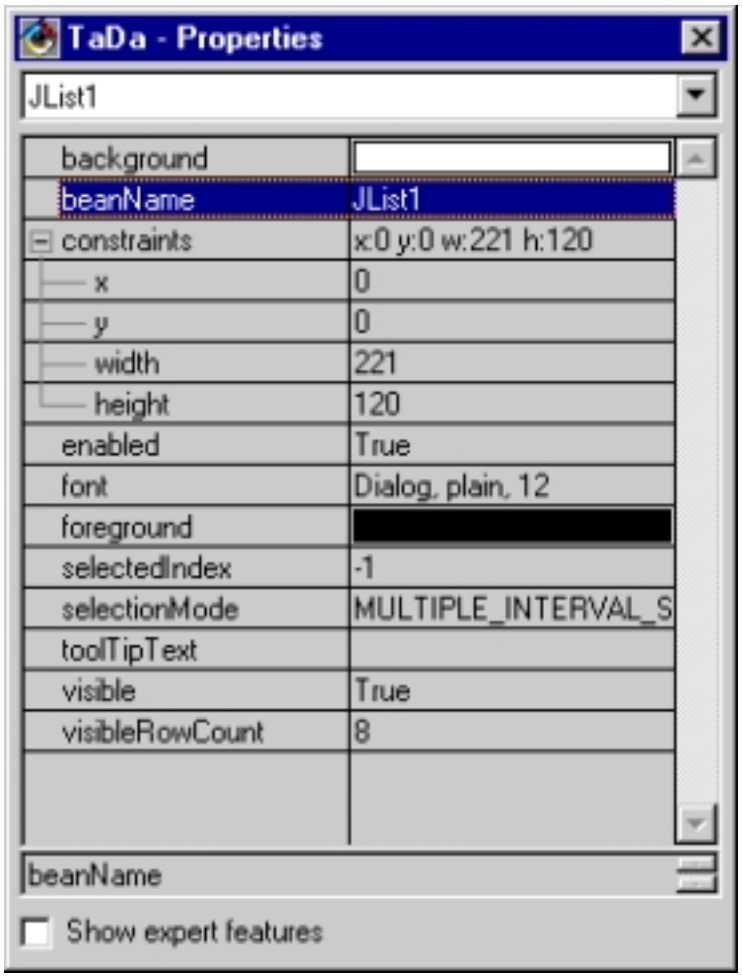
The bean property sheet provides options for changing the initial appearance and state of beans. You can open the property sheet from the pop-up menu of a selected bean either in the Visual Composition Editor or Beans List window. You can also select **Properties** from the **Tools** menu or click on  on the tool bar.

The left column of the bean property sheet contains a list of properties and the right column contains the editable values. An expansion icon  to the left of the property indicates that the property has more editable values. For example, when you expand the constraints, sizing properties, such as x, y, width, and height, appear for editing. When you select the value column of a property, you are provided with an editing option. For example, if you want to modify the property for a label, select the value field for *label* and enter the new label in the entry field. If you want to change the background color for the same bean, a small button  appears when you select the value column for *background*. When you click on this button, a dialog window appears with color options. You can use the **Reset** button to change any property sheet setting back to the default.

You can specify the type of property editor to associate with the property by setting the propertyEditor field in the BeanInfo. For more information, see ″Enabling Custom Edit Support for Your Bean.″

Once you open a property sheet, you can modify properties for most beans in the Visual Composition Editor. To edit another bean select it in the Visual Composition Editor or from within the property sheet by selecting the bean from the drop-down list at the top of the property sheet. If you open a property sheet after selecting multiple beans, the property sheet provides editing options for only the common values of the selected beans. For example, you can use this feature to set the left

and top inset of several beans in a GridBagLayout at once.



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Tabbing order

The tabbing order is the order in which the input focus moves from bean to bean as the user presses the Tab key. The initial tabbing order is determined by the order in which you drop the beans. The first bean in the tabbing order receives the initial input focus. For example, if the first bean in the tabbing order is a button, that button receives the initial input focus when the application starts.

The tabbing order can be set or displayed only for beans that are placed within a composite bean. For example, if you place a row of buttons in a frame window, you can set the tabbing order for the buttons.

If the tabbing order includes each entry field in which a user can type, the user can move the input focus from one entry field to another. Arrow keys only move the cursor within an entry field; only the Tab key, backtab key, and mouse can change the input focus from one entry field to another. Read-only fields do not need to be included in the tabbing order.

Because the order in which beans are placed on a composite bean determines the tabbing order, you will probably need to change the order as you add or rearrange beans.

For example, drop three buttons and then rearrange them so that Button3 is between Button1 and Button2. The tabbing order of these buttons is Button1, Button2, Button3, even though Button3 is now between Button1 and Button2. You must change the order to have the focus move from Button1 to Button3 to Button2.

The color of the tab tags reflects information about the beans that you use. Yellow tab tags represent simple beans, such as entry fields and buttons. Blue tab tags represent composite beans and container beans.

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Torn-off properties

You tear off a property to gain access to the encapsulated features of a bean. This can be necessary when a property is in itself a bean and you want to connect to one of its features. The torn-off property is not actually a separate bean but a variable that represents the property itself or points to it.

For example, in an address book application you might tear off properties as follows:

- You might have a Person bean that contains both homeAddress and workAddress properties, both of which, in turn, could contain street, city, and state properties.
- Tearing off a homeAddress or workAddress property makes the nested street, *city*, and state properties directly accessible. Now that the nested properties are directly accessible, you can make connections to and from them, as well as to their associated events and methods.

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Layout managers in visual composition

Many container components support the use of *layout managers*. A layout manager is a class that implements the java.awt.LayoutManager or java.awt.LayoutManager2 interface.

You assign a layout manager to the container. In most layouts, you can then define properties for the layout that govern the specifics of the sizing and resizing behavior for the components.

In addition to those provided, you can create custom layout managers for use with your beans. Custom layout managers must inhereit from *Object* class and implement a LayoutManager interface. If you choose to implement LayoutManager2, you must implement `public final static java.lang.Class getConstraintsClass()` in your layout manager class and supply a property editor for the type. Your custom layout managers appear at the bottom of the list of available layout managers in the property sheet. For examples of using layout managers, see the com.ibm.ivj.examples.vc.customLayoutManager classes shipped in the IBM Java Examples project.

Visual composition makes it easy to try different layouts. If you prefer to lay beans out individually, you can use the null layout setting (that is, no layout) and the Visual Composition Editor alignment tools. For layout manager details, see the Java API documentation. For examples of using layout managers, see the com.ibm.ivj.examples.vc.layoutmanagers classes shipped in the IBM Java Examples project.

Alignment tools are disabled for all but null layout.

Consider waiting to set layout properties until you have settled on a layout manager. Many values are lost when you switch layouts or move the component to another container on the free-form surface.

VisualAge supports the use of the following layout managers in container beans:
- "BorderLayout manager"
- "BoxLayout manager"
- "CardLayout manager"
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- "GridLayout manager" on page 16
- "GridBagLayout manager" on page 16
- "Null layout" on page 17

BorderLayout manager

BorderLayout arranges components along each edge of the container (North, South, East, and West), and one component in the center. Beans placed in BorderLayout assume the shape and size necessary to conform to the new layout.

VisualAge provides placement assistance by drawing an outline of the regions in the layout when you drag the bean. When you release the mouse button, VisualAge places the bean within the outline under the crosshair.

If you drop beans in the a layout and then switch the layout to Border, the order in which you dropped the beans determines their location. The first bean dropped fills the center, the second bean spans the top of the container bean, the third spans the bottom, the fourth fills the left side, and the fifth fills the right. If you use more than 5 components, changing the container layout to border could result in overlaid components. You can use the beans list to perform tasks on the covered components.

From the property sheet, you can specify the spacing between adjacent components.

BoxLayout manager

BoxLayout arranges components vertically or horizontally without wrapping. You can nest multiple panels with different combinations of horizontal and vertical BoxLayout to achieve an effect similar to GridBagLayout, without the complexity. If you are using the vertical alignment, BoxLayout attempts to make all components the same width. With horizontal alignment, BoxLayout attempts to match component height.

VisualAge provides placement assistance by drawing a bold horizontal or vertical bar in the layout when you drag the bean. When you release the mouse button, VisualAge places the bean near the line under the crosshair.

From the property sheet, you can specify whether the components are arranged vertically or horizontally.

CardLayout manager

CardLayout arranges components in a linear depth sequence similar to a deck of cards, notebook, or tabbed dialog box. Each component is called a *card*.

VisualAge provides placement assistance by drawing an outline of the container when you drag the bean. When you release the mouse button, VisualAge places

the bean within the outlined container under the crosshair. VisualAge adds beans to the top of the card deck, making the first bean you dropped the bottom card. You can use **Switch To** on the pop-up menu to move through the deck, or perform tasks on the covered cards from within the beans list.

From the property sheet, you can specify the size of the verticle and horizontal frame around each component.

FlowLayout manager

FlowLayout arranges components in horizontal wrapping lines.

VisualAge provides placement assistance by drawing a bold verticle bar in the layout when you drag the bean. When you release the mouse button, VisualAge places the bean to the right of the vertical bar under the crosshair.

From the property sheet, you can specify the spacing between adjacent components and the starting alignment from center, left, or right.

GridLayout manager

GridLayout arranges components in a table, all cells having the same size.

VisualAge provides placement assistance by drawing a bold verticle bar in the layout when you drag the bean. When you release the mouse button, VisualAge places the bean to the right of the vertical bar under the crosshair.

From the property sheet, you can specify the spacing between adjacent components, and the number of rows and columns.

GridBagLayout manager

GridBagLayout enables you to arrange components in a highly complex grid. As you add or move beans, the free space shuffles so that beans are centered on the interface, while retaining your arrangement. Grid cells are not necessarily identical in size and components can span multiple cells. You can customize grid sizing behavior down to each individual component.

Resize behavior in GridBagLayout is tied to the weightX, weightY, and fill constraints of components within the layout. By default, the component properties are set without resize behavior. If you place components in any layout and then change the layout to GridBag, the component constraints are set to maintain the look created in the original layout.

VisualAge provides placement assistance by drawing a bold grid that is based on the beans dropped so far. VisualAge attempts to place the bean as indicated by the pointer. If the pointed-to cell is empty, all borders of the cell are highlighted. If the pointer rests on a row or column boundary, a new row or column is inserted. New rows appear below the pointer; new columns appear to the right.

You do not specify additional layout properties for a container that uses GridBagLayout. However, you can specify constraints for the components within the container.

Null layout

Null layout means that no layout manager is assigned. Without a layout manager, resizing the container at run time does not affect the size and position of the components.

VisualAge provides placement assistance by drawing an outline of the container. When you release the mouse, VisualAge places the bean within the container under the crosshair.

You can customize components within the null layout by means of dragging the beans, using tool bar options, or through the **constraints** option in Properties.

Dropping beans into the layout

To access the layout interface directly, drop a Variable bean on the free-form surface to the right of the container. Change the type of the Variable bean to that of the class implementing the layout manager interface (for example, CardLayout). Connect the layout property of the container bean to the *this* property of the Variable bean. Then connect to features of the Variable bean.

If you use a layout that allows for a bean to completely cover another bean, the beans list enables you to easily perform tasks on the covered components. To modify bean placement on the Visual Composition Editor from within the beans list, open the Properties for the bean and modify the Constraints.

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Chapter 5. Bean design for visual composition

Designing a good bean is very similar to designing a good class: it must be usable. In fact, making a bean usable for visual composition improves its use in handcoding as well. Consider the following:

- Implement a null constructor.
- Keep your bean small. Minimize dependencies on other beans and classes.
- Implement the java.io.Serializable interface.
- For visual beans, subclass from java.awt.Component or one of its subclasses.
- Make important functions available through settable properties. If necessary, provide a custom editor to make setting properties easier. Avoid dependencies upon the order in which properties are set.
- Mark interface features in BeanInfo to optimize clarity:
  - Set preferred to `true` for those features that most people will use.
  - Set expert to `true` for those properties that most people will never use.
  - Set hidden to `true` for those properties that must not be used in connections.
  - Set Design time property to `false` for those properties that you do not want surfaced in the bean's property sheet.
- To take advantage of reflection, follow standard design patterns for methods, events, and properties. Do not use the same set method names for different properties. Provide a BeanInfo class with meaningful display names and descriptions.
- Set up bound properties where appropriate. However, be careful not to overdo it, because property events are multicast through PropertyChangeEvent, which can affect performance.
- Have your bean signal events for significant state changes. Use unique event classes instead of a single event class with a flag in eventData.
- Provide .gif files so that the bean can be represented in the Visual Composition Editor. Include both 16x16 and 32x32 versions, with transparent backgrounds.
- To minimize the number of connections during visual composition, specify several methods with a small number of parameters rather than a single method with many parameters.

RELATED CONCEPTS

"Chapter 2. How classes and beans are related" on page 3
"Chapter 6. Use of visual beans created in other tools" on page 21

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"Chapter 27. Enabling custom edit support for your bean" on page 119

Chapter 6. Use of visual beans created in other tools

VisualAge can generate visual composites from GUI beans created outside the VisualAge development environment. This can save you editing time if the bean contains a large number of visual components. VisualAge constructs the composite by querying an instance of your GUI bean about its contents. This is what you can expect from this reverse-engineering process:

- VisualAge constructs only those controls that ultimately inherit from java.awt.Component.
- Each component must have a null constructor; VisualAge writes over the null constructor of the class being edited to make it consistent with that for other visual components. Be sure that all visuals embedded within a component also have null constructors.
- VisualAge also generates its own names for visual components, so any handwritten code referring to the previous component names must be updated with the new names. If you want VisualAge to use the names you assigned in the original bean, explicitly set the name of each component using the setName( ) method before you proceed with reverse-engineering. An example follows:

```
if (myBean == null) {
   myBean = new JTextField();
   myBean.setName("myBean");
}
```

- VisualAge writes over methods and fields whose names collide with those it typically generates. This most commonly occurs with get and set accessor methods. For a complete list, read “Chapter 9. Generated code” on page 31.
- Layout and property settings for visual components are preserved whenever possible. Custom layout managers are not supported.
- No attempt is made to construct connections from method calls, but you can draw new connections as soon as VisualAge has constructed the composite. In most cases, you will have to draw event connections to get the bean to behave as it did before the reverse-engineering.
- Embedded composites are constructed as primitives. Reverse-engineer the embedded composites first.
- Serialized instances are constructed from the class, not from a serialization file. As with nonserialized components, VisualAge sets properties from BeanInfo queries.
- When VisualAge does not have enough information to set a property, the property is not set. (One example of this is the icon property of the JButton bean and other Swing components.)

Undo is not supported for reverse-engineering visual composites. If you are not satisfied with the results, close the class browser without saving the newly engineered composite. In any case, version the bean before you reverse-engineer it.

To proceed with reverse-engineering, open the bean in the Visual Composition Editor. From the **Bean** menu, select **Construct Visuals from Source**.

RELATED CONCEPTS

“Chapter 3. Visual, nonvisual, and composite beans” on page 5

Chapter 7. Bean interfaces and BeanInfo

The bean interface defines the property, event, and method features of your bean. These features can be used in visual composition when your bean is added to another bean. A BeanInfo class describes the bean and features that you add to the bean. Other features are inherited from the superclass of your bean unless you choose not to inherit features.

You can define a bean interface in the following ways:

- In the Workbench window, create a new bean class based on a class with features you need. By default, the new bean inherits the features of the class it extends. You can control feature inheritance by setting the **Inherit BeanInfo of bean superclass** option in the Visual Composition pane of the Options window. Open the Options window from the **Window** menu of the Workbench.
- In the **BeanInfo** page, add new features to a bean. You can add features to extend the inherited feature set, to override inherited features, or both. When you add a feature to a bean, VisualAge generates code that describes the feature in the BeanInfo class for the bean.
- In the Visual Composition Editor, promote features of embedded beans to the interface of a composite bean. When you promote a feature of an embedded bean, VisualAge generates code that describes the promoted feature in the BeanInfo class for the composite bean.

When you create a new bean, it does not initially have a BeanInfo class. VisualAge creates a BeanInfo class when you add or promote the first feature that is not inherited, or when you explicitly direct VisualAge to create a BeanInfo class. You can create a BeanInfo class in the **BeanInfo** page.

RELATED CONCEPTS

"Promotion of bean features"
"Default promoted feature names" on page 24
"Feature naming guidelines" on page 24
"Chapter 2. How classes and beans are related" on page 3
"Chapter 5. Bean design for visual composition" on page 19
"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133

Promotion of bean features

When you create a composite bean, you might want some features of beans that are embedded within it to appear in the interface of the composite bean. For example, suppose you create a composite bean named ButtonSet containing a set of buttons that you want to reuse. When you add the ButtonSet composite bean to another composite, you want to be able to connect to each of the buttons.

To add features of embedded beans to the interface of a composite bean, you must promote them to the composite's interface. To add an entire embedded bean as a property of the composite bean, promote the *this* property of the embedded bean.

When you promote a feature of an embedded bean, VisualAge generates code that describes the promoted feature in the BeanInfo class for the composite bean. After

the feature is promoted, you can manage the feature in the **BeanInfo** page the same as you manage features that you add there.

When you add a bean with promoted features to another bean, you can use the promoted features the same as you use other features of the bean. If you add a bean that has an embedded bean as a property, you can tear off the property as a Variable. Then, you can access the features of the embedded bean referenced by the Variable.

RELATED CONCEPTS

"Chapter 7. Bean interfaces and BeanInfo" on page 23
"Default promoted feature names"
"Torn-off properties" on page 13

RELATED TASKS

"Promoting features of embedded beans" on page 139

Default promoted feature names

When you promote a feature of an embedded bean in the Promote Features window, you can use a default feature name produced by VisualAge. If you do not want to use the default feature name, you can change the name.

The default feature name is a combination of the name of the embedded bean and the name of the feature you are promoting. This identifies the bean that implements the feature, which is helpful if the composite bean contains more than one bean with the same feature. Then, when you connect to the feature, you can tell which embedded bean it belongs to.

For example, if you promote the enabled property for a bean named YesButton, the default composite bean feature name is yesButtonEnabled).

RELATED CONCEPTS

"Chapter 7. Bean interfaces and BeanInfo" on page 23
"Promotion of bean features" on page 23

RELATED TASKS

"Promoting features of embedded beans" on page 139

Feature naming guidelines

When you add or promote a feature, use these naming guidelines:

- Begin the feature name with a lowercase character. Features represent methods, which typically have names that begin with a lowercase character. By contrast, class names typically begin with an uppercase character.
- Do not use blanks in the feature name.

RELATED CONCEPTS

"Chapter 7. Bean interfaces and BeanInfo" on page 23

RELATED TASKS

"Adding property features" on page 134
"Adding method features" on page 136
"Adding event features" on page 137
"Promoting features of embedded beans" on page 139

Chapter 8. Connections

When you make a connection in the Visual Composition Editor, you define the interaction between components. For example, if you want a data value to change when an event occurs, you would make an event-to-property connection. The following table summarizes the types of connections that the Visual Composition Editor provides. The return value is supplied by the connection's normalResult event.

Table 1. Connection Type Summary

If you want to...	Use this connection type	Color	Does connection have a return value?
Cause one data value to change another	property-to-property	Dark blue	No
Change a data value whenever an event occurs	event-to-method	Dark green	Yes
Call a public behavior whenever an event occurs	event-to-method	Dark green	Yes
Call a behavior whenever an event occurs	event-to-code	Dark green	Yes
Supply a value to a parameter	parameter-from-property, parameter-from-code, or parameter-from-method	Violet	No

The source and target of a connection

A connection is directional; it has a source and a target. The direction in which you draw the connection determines the source and target. The bean on which the connection begins is the *source*; the bean on which it ends is the *target*.

Often, it does not matter which bean you choose as the source or target, but there are connections where direction is important.

- In an event connection, the event is always the source.
- For property-to-property connections, if only one of the properties has a public set method, VisualAge makes that property the target. This is done so that the property that has the public set method can be initialized at run time.
- When you make property-to-property connections, the order in which you choose the source and target is important. The source and target property values may be different when the bean is first initialized. If they are, VisualAge resolves the difference by changing the value of the target to match that of the source if the properties are bound. Thereafter, if both properties have public set methods, the connection updates either property if the other changes.

The target of a connection can have a return value. If it does, you can treat the return value as a feature of the connection and use it as the source of another connection. This return value appears in the connection menu for the connection as *normalResult*.

Property-to-property connections

A *property-to-property connection* links two property values together. This causes the value of one property to change when the value of the other changes, except as noted in the table below. A connection of this type appears as a bidirectional dark blue line  with dots at either end. The solid dot indicates the target, and the hollow dot indicates the source.

When your bean is constructed at run time, the target property is set to the value of the source property. These connections never take parameters.

For indexed properties, VisualAge generates two get/set method pairs—one for the array and one for accessing elements within the array. When you connect indexed properties, VisualAge uses the accessors for the entire array. If you want to access an individual element, make a method connection to the specific accessor.

To achieve the behavior that you anticipate, you must know something about the properties you are connecting. The following table shows the results of connecting properties of different types.

Table 2. Behavioral Considerations for Connections

	TARGET HAS...		
SOURCE HAS...	**Set method and Event**	**Event only**	**Set method only**
Set method and event	Source and target values are fully synchronized.	This connection is not valid.	The source initializes the target. The target updates whenever the source's value changes.
Event only	The source initializes the target. The target updates whenever the source's value changes.	This connection is not valid.	The source initializes the target. The target updates whenever the source's value changes.
Set method only	The source initializes the target only. The source updates whenever the target's value changes.	This connection is not valid.	The source initializes the target. No further updates occur.

A *bound* property is a property that fires an event when its value changes. For example, when a deposit or withdrawal event occurs from a bank account, the balance property is said to be *bound* to the event.

Properties in a property-to-property connection do not synchronize if:

- The property is not bound and has no associated event.
- At least one property is constrained, or prevented from changing under certain conditions, and a change is vetoed.
- The event to which the properties are bound is asynchronous. See the bean information for details on selecting another event.

Because most of the properties in this version of AWT are not bound, the source initializes the target when constructed and performs no further updates. If you want the property values to synchronize when an event occurs, you must associate an event with the property. You can do this by opening the property sheet for that connection and selecting an event from the source or target event fields. For example, the text property in AWT components is unbound. You can force this property to fire by selecting the textChanged event from the event field.

Event-to-property connections

An *event-to-property* connection updates the target property whenever the source event occurs. An event-to-property connection appears as a unidirectional dark green arrow  with the arrowhead pointing to the target.

The property must have a public set method known to VisualAge; otherwise, you cannot make the connection. If you open properties on a connection of this type, the target of the connection appears as a method with the same name as that of the target property.

Event-to-method connections

An *event-to-method* connection calls the specified method of the target object whenever the source event occurs. An event-to-method connection appears as a unidirectional dark green arrow  with the arrowhead pointing to the target.

Often much of an application's behavior can be specified visually by causing a method of one bean to be invoked whenever an event is signalled by another bean. For example, you might invoke the dispose method on a Frame bean when the actionPerformed event is signalled by a button (this happens when the user clicks the button).

A connection with a dashed line requires parameters. You can provide parameters through a parameter connection, by passing event data (an option in the connection window), or through a return value. For more information, see the Task information on connections.

To access behavior that is not part of the bean interface, use code connections.

Code connections

A *code* connection calls code of the composite bean whenever the source event occurs. This type of connection appears as a unidirectional dark green arrow  with the arrowhead pointing to a moveable text box on the free-form surface.

If you want processing to occur when a bean in your composition signals an event, but no available bean has a public method to accomplish that process, you can write and connect to a custom private method of the class you are editing. These methods are called code to distinguish them from the public methods for the composite class that you create and publish as bean methods. Technically, your code does not need to be private, and it is not different from other Java methods.

Note: You might notice that in VisualAge for Java, the word *method* is used in two subtly different ways. In the Java language, method refers to a callable function of any class. In the JavaBeans component model, method refers to a subset of the Java class methods that are exported as bean features. The set of JavaBeans method features is often the same as the set of Java public methods. However, the bean provider may further restrict the set of Java methods that show up as JavaBeans features.

You can use a code connection for the bean you are developing to connect to:
- Private methods
- Public methods
- Protected methods
- Package-private methods
- Public methods of any of its embedded beans

You cannot, however, connect to private or protected methods of embedded beans.

You might want to create a code connection to:
- Reduced the number of connections in a bean.
- Encapsulate repeated tasks that are specific to the bean being developed.
- Keep an operation internal to the class, such as a composite bean performing a calculation the user does not need to be aware of whenever a value changes.

Parameter connections

In most cases, when a connection needs a parameter, the connection line appears dashed.  A parameter connection supplies an input value to the target of a connection by passing either the value from a property or the return value from a method. In a parameter-from-method or a parameter-from-code connection, the connection appears as a unidirectional violet arrow

with the arrowhead pointing from the parameter of the original connection to the method or code providing the value. In a parameter-from-property connection, the connection appears as a bidirectional violet line with dots at either end. The solid dot indicates the target, and the hollow dot indicates the source.

The original connection is always the source of a parameter connection; the source feature is the parameter itself. If you select the parameter as the target, VisualAge reverses the direction of the parameter connection automatically.

If the target of the original connection takes parameters and the same event provides parameters by default, the connection line might appear solid. This is true even if the target takes one input parameter and you have not otherwise provided one. VisualAge can use any of the following means to supply parameters with values:
- If the parameter is connected to a property, the connection calls the get method for the property to get the value for the property and return it to the parameter.

- If the parameter is connected to a method, the connection code calls the method and passes the return value for the method to the parameter.
- If the source of the original connection passes event data in the connection code, VisualAge applies it to the parameter. If several values are required, event data is applied to the first parameter only.
- If you specify a constant parameter value in the original connection, VisualAge passes it in the connection code.

RELATED CONCEPTS

"Generated feature code" on page 33

RELATED TASKS

"Chapter 22. Connecting beans" on page 81
"Changing the source and target of connections" on page 86
"Supplying parameter values for incomplete connections" on page 83

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147
"Chapter 56. Property-To-Property Connection window" on page 217
"Chapter 57. Event-To-Method Connection window" on page 219
"Chapter 59. Event-to-Code Connection window" on page 223
"Chapter 58. Constant Parameter Value properties window" on page 221
"Chapter 60. Parameter-from-Code Connection window" on page 225

Chapter 9. Generated code

With the Visual Composition Editor, you lay out beans graphically and specify their interaction using a high-level connection model. When you save your composition, VisualAge generates Java code that maps this graphical representation to the JavaBeans component model and to the APIs for the beans themselves. The resulting generated code is best understood if you are familiar with the JavaBeans component model; in fact, it is quite similar to code that an expert JavaBeans programmer would have written by hand. If you are interested in understanding more about the code generated by VisualAge, read the JavaBeans specification first; then read the rest of this section and look at the code generated by VisualAge for different visual compositions.

Some items are generated only once; others are regenerated every time the product detects a relevant change. Some items are generated only if you have indicated to VisualAge that you want certain capabilities present in your bean. Methods that are regenerated whenever the product detects a relevant change are indicated by

 to the right of the method signature.

Note: The code resides in the VisualAge repository, not as code files in your working directory. To get a copy of your code or compiled class in a file, you must export the class.

Code generated from visually composed beans

When you compose your bean visually, VisualAge generates much of the user interface code for you. The connections you make between beans are often sufficient to define behavior at run time. If not, you can extend it by adding your own code.

In addition to other items generated for all classes, VisualAge generates code for a composite bean when you save the bean, select **Re-generate Code** from the **Bean** menu of the Visual Composition Editor, or click on  **Run**.

Code generated for beans

- A field declaration for each embedded bean, which takes its name from the name given to the bean when it was dropped in the Visual Composition Editor. This field is declared as private. To minimize potential collisions between handwritten and generated code, all generated field names start with ivj.
- A private get method for each embedded bean, which takes its name from the name given to the bean when it was dropped in the Visual Composition Editor. Because Variable and Factory beans represent instances that do not exist at initialization, VisualAge generates public get and set methods for them so that they can be set at run time. Serialized instances are restored in the get method through a call to Beans.instantiate( ); other instances are created in the get method in a `new` expression if they do not already exist.

  Note: Take care when renaming embedded beans or torn-off properties. Otherwise, VisualAge might generate an accessor method that overrides an inherited method or overwrites a user-written method.

- For each promoted feature, a public get and set method. If the promoted feature's name is the same as that of the bean in which the feature resides, VisualAge generates the bean's get and set methods as public instead of private.
- If at least one hidden-state bean is used, a serialized-object file (.sos) that takes its name from that of the composite class (for example, ivjMyComposite.sos). VisualAge also generates a getSOSByteArrayCache( ) method, which reads a byte stream from the serialized-object file into an instance variable for deserializing.
- If you choose to externalize strings, a field for each resource bundle used, declared as static private.

Code generated for connections

- For each method or code connection, a private method.
- For each property-to-property connection where both end points are writable, two methods are generated. Parameter-from-property connections appear in code as secondary calls within the original connection.

  The name of the connection method depends on the type of connection you draw. By default, the naming convention is connFtoFx, where F represents the type of feature being connected and x is an index number to ensure uniqueness. This translates into the following possible combinations:
  - connEtoM1 (the first event-to-method connection drawn)
  - connEtoS1 (the first event-to-code connection drawn)
  - connPfromM1 (the first parameter-from-method connection drawn)
  - connPtoP1setTarget (the first property-to-property connection drawn, setting the target from the source)
  - connPtoP1setSource (the first property-to-property connection drawn, setting the source from the target)

  When you rename a connection, VisualAge deletes the obsolete connection method and generates a new method whose name is compatible with the connection's new name.
- An initConnections( ) method, which contains a call to every notifier required for event connections in the composite bean. This method is not generated if there are no connections in the composite.
- For each event set connected to within the composite, the code that is generated depends upon the code generation option set:
  - If **Do not use any inner classes** is selected, VisualAge generates the appropriate listener methods in the composite class.
  - If **Use one inner class for all events** is selected, VisualAge generates the appropriate listener methods in a single inner class, IvjEventHandler, regardless of the number of event sets used. This appears in the declaration for the outer class.
  - If **Use an inner class for each event** is selected, VisualAge generates the appropriate listener methods in an anonymous inner class for each event set used. These appear in the initConnections( ) method.

Code generated for the composite as a whole

- For applets, an init( ) method. This method calls initConnections( ), if it exists.
- For nonapplets, an initialize( ) method. This method calls the initConnections( ) method, if it exists.

  Several constructors may also be generated. The constructor with no arguments calls the superclass contructor and the initialize( ) method.

VisualAge also generates the following methods if they do not exist:

- main(java.lang.String [ ]. If you copy, rename, or move the bean, you must delete this generated method, regenerate code for the composite, and save the bean.

- getBuilderDat( ), which contains visual layout information for restoring the free-form surface if the bean is exported and then imported into another VisualAge Java development environment. This method is generated only if the **Generate meta data method** option has been set in the Workbench.
- handleException(java.lang.Throwable), a stub method for debugging that gets called in the init( ), initialize( ), and set ( ) methods.
- For applets, getAppletInfo( ).

Generated feature code

The term *feature* refers to an element of the bean interface. Features can be properties, methods, or events. To add features to the interface, use SmartGuides available from the **BeanInfo** page.

The following items are generated for each feature added from the **BeanInfo** page.

- For each property, VisualAge generates the following:
  - A field declared as private
  - If the property is readable, a get( ) method
  - If the property is writable, a set( ) method
  - If the property is indexed, two additional methods for you to access individual elements
- If at least one property is bound, the propertyChange event and associated program elements are generated:
  - propertyChange, a field of type java.beans.PropertyChangeSupport, declared as protected transient
  - addPropertyChangeListener(java.beans.PropertyChangeListener), a public method
  - firePropertyChange(java.lang.String, java.lang.Object, java.lang.Object), a public method
  - removePropertyChangeListener(java.beans.PropertyChangeListener), a public method
- If at least one property is constrained, the vetoableChange event and associated program elements are generated:
  - vetoablePropertyChange, a field of type java.beans.VetoableChangeSupport, declared as protected transient
  - addVetoableChangeListener(java.beans.VetoableChangeListener), a public method
  - fireVetoableChange(java.lang.String, java.lang.Object, java.lang.Object), a public method
  - removeVetoableChangeListener(java.beans.VetoableChangeListener), a public method
- For each event set, VisualAge generates the following items:
  - A listener field, declared as protected transient
  - Public addListener and removeListener methods
- For each new listener interface, VisualAge generates the following items. VisualAge gives you the opportunity to specify your own names for these items before they are created.
  - An event class in the same package as the class being edited
  - A listener interface in the same package
  - A multicaster class in the same package
  - An event feature in the class being edited
  - Public addListener and removeListener methods in the class being edited

In addition, VisualAge creates a BeanInfo class when you add the first feature. After that, VisualAge updates the BeanInfo class to reflect each feature changed from the **BeanInfo** page.

Generated BeanInfo descriptor code (an advanced topic)

BeanInfo code defines the public interface of your bean in a standard way. Specifying BeanInfo code enables your bean to be used with any development tool, including VisualAge, that supports the JavaBeans specification. With BeanInfo code available, enabled tools can query an instance of your bean for information about its interface, regardless of underlying implementation.

VisualAge generates BeanInfo class code as needed to capture the interface details you specify on the **BeanInfo** page for your bean. If a BeanInfo class does not exist for the bean, VisualAge uses the process of *reflection*, matching interface features against Java design templates, to create the class. If a BeanInfo class does exist, VisualAge generates BeanInfo code only for interface elements defined as bean features (properties, methods created from the **BeanInfo** page, and events). For more information about reflection, see the JavaBeans specification.

The following items are generated when you add features to the bean from the **BeanInfo** page:

- A classNameBeanInfo class in the same package. This type of class normally contains several list and descriptor methods, which enabled tools call to get information about the bean. A list of the most commonly generated methods follows:
  - getBeanClass( ), which returns a instance of java.lang.Class that corresponds to the bean.
  - getBeanClassName( ), which returns a String whose value is the full name of the bean.
  - getEventSetDescriptors( ), which returns an array of descriptors corresponding to the event sets implemented in the bean.
  - getMethodDescriptors( ), which returns an array of descriptors corresponding to the method features implemented in the bean.
  - getPropertyDescriptors( ), which returns an array of descriptors corresponding to the properties implemented in the bean.
  - findMethod(Class, String, int), used to locate a descriptor method that is requested by name but not found.
  - getAdditionalBeanInfo( ), generated only if you opted to inherit BeanInfo from the bean's superclass. (This is set from the Visual Composition page of the Options notebook.)
- getBeanDescriptor( ), which returns general information about the bean:
  - If you marked the bean as expert, this method calls setExpert(true).
  - If you marked the bean as hidden, this method calls setHidden(true).
  - If you require all instances of the bean to be serialized, this method calls setValue(″hidden-state″, new Boolean (true)).
- For each method feature in the bean being browsed, a public methodNameMethodDescriptor method in the associated BeanInfo class. This descriptor method determines how information about the method is revealed: its true name, its display name, and a description of the bean. If you created the bean in VisualAge, the descriptor method reflects selections you made through the New Method Feature SmartGuide.
- handleException(java.lang.Throwable), a stub method for use in debugging.
- For each property, a public propertyNamePropertyDescriptor method in the associated BeanInfo class:

  - If you opted to bind the property to an event, this method calls setBound(true).
  - If you marked the property as expert, this method calls setExpert(true).
  - If you marked the property as preferred, this method calls setValue(″preferred″, new Boolean (true)).
  - If you marked the property as design-time to keep it from appearing in the property sheet at run time, this method calls setValue(″ivjDesignTimeProperty″, new Boolean(false)).
- If at least one property is bound, the following methods:
  - addPropertyChangeListenerMethodDescriptor( ), a public method in the associated BeanInfo class
  - removePropertyChangeListenerMethodDescriptor( ), a public method in the associated BeanInfo class
- For each event set, public event descriptor methods in the associated BeanInfo class (for example, actionEventSetDescriptor( ) and actionactionPerformed_javaawteventActionEventMethodEventSetDescriptor( ))
- For each new listener, a public event descriptor method in the associated BeanInfo class (for example, stringModifiedEventSetDescriptor( ), stringModifiedSignalModification_CodeGenStringModifiedEventMethodEventDescriptor( ), and stringModifiedSignalModification_javalangObjectMethodEventDescriptor( )).

How generated code coexists with user-written code

Generated code falls into the following categories:

Items generated only if they do not exist. These include main(java.lang.String[]), handleException(java.lang.Throwable), and getAppletInfo( ). You can write your own versions or modify generated versions; VisualAge preserves your code.

Items regenerated around handwritten changes. Most code of interest falls into this category. These methods contain the reminder comment `WARNING: THIS METHOD WILL BE REGENERATED.` and are indicated by  to the right of each method signature. The rest of this section describes how VisualAge handles this type of generated code.

In general, VisualAge preserves handwritten changes to basic class declarations, as follows:

- package and import statements associated with the class.
- Access and keyword modifiers for the class.
- Interfaces implemented completely by hand.
- Uniquely named fields, as long as their names do not start with ivj. Because VisualAge uses ivj to mark generated fields, handwritten fields starting with ivj will be deleted the next time VisualAge generates code for the class. VisualAge does not preserve updates to access modifiers (private, public, protected) in generated fields.
- Uniquely named methods, including exceptions. VisualAge preserves updates to access modifiers (private, public, protected) in generated methods if the updates render access less restrictive.
- Handwritten comments in generated methods.

You can add lines of code in designated areas of generated methods. VisualAge indicates these areas in the generated code with comment lines similar to the following:

```
//user code begin {1}
//user code end
```

If a generated method does not include comment lines like these, any code you add will be overwritten the next time the bean is saved.

RELATED CONCEPTS

“Chapter 2. How classes and beans are related” on page 3
“Chapter 4. Visual Composition Editor overview” on page 7

RELATED TASKS

“Chapter 17. Visual bean basics” on page 53
“Chapter 22. Connecting beans” on page 81
“Chapter 31. Defining bean interfaces for visual composition” on page 133

RELATED REFERENCES

“Chapter 10. Example of generated feature code” on page 37
“Chapter 11. Example of code generated from visual composite” on page 39
“Chapter 34. Beans for visual composition” on page 147

Chapter 10. Example of generated feature code

Suppose you define simpleString, the most basic property useful for visual composition: readable, writable, and bound to an event. VisualAge generates the following items:

- fieldSimpleString, a private field of type java.lang.String
- propertyChange, a field of type java.beans.PropertyChangeSupport declared as protected transient
- getSimpleString( ) and setSimpleString(java.lang.String) methods
- add- and removePropertyChangeListener(java.beans.PropertyChangeListener) methods
- firePropertyChange(java.lang.String, java.lang.Object, java.lang.Object)

If simpleString is also indexed, fieldSimpleString is a private field of type java.lang.String[ ]. Accordingly, setSimpleString( ) takes java.lang.String[ ] as a parameter.

VisualAge also generates the following methods to access individual elements of the array. Unlike the previous accessors, these methods are exposed in BeanInfo:

- getSimpleString(int)
- setSimpleString(int, java.lang.String)

Suppose you define an existing event set, action, for use in your class using default values in the New Event Set SmartGuide. VisualAge generates the following items:

- aActionListener, a field of type java.awt.event.ActionListener declared as protected transient
- add- and removeActionListener(java.awt.event.ActionListener) methods
- fireActionPerformed(java.awt.event.ActionEvent)

Suppose you define stringModified, a new listener event specifically for your class. VisualAge generates the following items:

- StringModifiedListener, an interface.
- StringModifiedEvent and StringModifiedEventMulticaster classes.
- aStringModifiedListener, a field of type StringModifiedListener declared as protected transient in the class being edited.
- add- and removeStringModifiedListener(StringModifiedListener) methods in the class being edited.
- fireStringModification(StringModifiedEvent) in the class being edited.
- A listener method stub in the class being edited, for example, signalStringModification(StringModifiedEvent e). You must enter a name for this stub yourself.

RELATED CONCEPTS

“Chapter 9. Generated code” on page 31
“Generated BeanInfo descriptor code (an advanced topic)” on page 34
“Code generated from visually composed beans” on page 31
“How generated code coexists with user-written code” on page 35

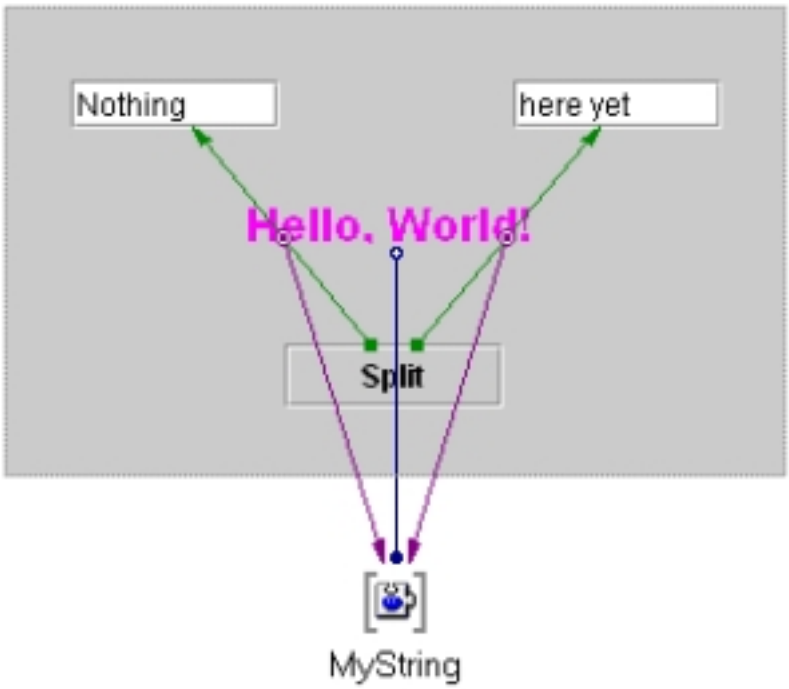
RELATED TASKS

“Chapter 31. Defining bean interfaces for visual composition” on page 133

RELATED REFERENCES

“Chapter 11. Example of code generated from visual composite” on page 39
“Chapter 34. Beans for visual composition” on page 147

Chapter 11. Example of code generated from visual composite



This simple Hello World! applet contains the following beans:
- A JApplet bean, HelloWorld, to which a JPanel bean has been added by default. This JPanel bean is called JAppletContentPane.
- Two JTextField beans, FirstWordArea and SecondWordArea.
- A JLabel bean, MyHello.
- A JButton bean, SplitButton.
- A Variable bean of type java.lang.String, called MyString.

All the finished applet does at run time is split the text value of the JLabel bean into two substrings and copy each substring to an entry field.

Suppose the composite is saved after the beans have been dropped and edited for initial content. VisualAge generates field declarations and accessor methods as follows:
- ivjFirstWordArea; getFirstWordArea( ). The initial contents of FirstWordArea (″Nothing″) are set through the bean's *text* property. This generates the appropriate setter code in getFirstWordArea( ).
- ivjSecondWordArea; getSecondWordArea( ). The initial contents of SecondWordArea (″here yet″) are set through the bean's *text* property. This generates the appropriate setter code in getSecondWordArea().
- ivjJAppletContentPane; getJAppletContentPane( ).
- ivjMyHello; getMyHello( ).
- ivjSplitButton; getSplitButton( ).
- ivjMyString; getMyString( ) and setMyString(java.lang.String).

VisualAge also generates the following applet methods:
- main(java.lang.String)

- init( )
- getAppletInfo( )
- getBuilderData( ), if you opted to generate meta data
- handleException(Throwable exception)

The first connection, connPtoP1, links the text property of MyHello to the *this* property of MyString. When you save the composite, VisualAge generates these additional methods:
- connPtoP1SetSource( )
- connPtoP1SetTarget( )
- ivjConnPtoP1Aligning, a validation flag used to filter method calls to synchronize the two property values
- initConnections( ), which calls connPtoP1SetTarget( ) to initialize the String variable.

Connections from the actionPerformed event of SplitButton to the text property of each TextField bean (connEtoM1 and connEtoM2) reset the text displayed in each entry field. By default, no event data is passed to the target of the connection, so each connection requires input for the new value of text. Parameter connections (connPfromM1 and connPfromM2) pass in these values: the value property of each push button connection is connected to the substring(int, int) method of MyString. The exact character indexes are provided as connection properties of connPfromM1 and connPfromM2.

Now when you save the composite, VisualAge generates these additional methods:
- connEtoM1(java.awt.event.ActionEvent), which calls getFirstWordArea().setText(getMyString().substring(0, 5)) (changing ″Nothing″ to ″Hello″)
- connEtoM2(java.awt.event.ActionEvent), which calls getSecondWordArea().setText(getMyString().substring(7,12)) (changing ″here yet″ to ″World″)

What is generated to handle the events that trigger the connections depends upon how you have the code generation option set. Suppose we had chosen **Use one inner class for all events**. In this case, the following is generated:
- IvjEventHandler, an inner listener class that listens for both action and propertyChange events
- ivjEventHandler, a field of type IvjEventHandler in the outer class

Suppose you then separate all text into a resource bundle:
- If you opt for a new list bundle, VisualAge generates a resource class for you in the package you specify.
- If you opt for a new property file, VisualAge generates a resource field declaration for you.

In addition, the get methods are regenerated to retrieve the appropriate resources instead of using hardcoded text. With the use of a property file, the call for setting MyHello to ″Hello, World!″ looks something like this:

```
ivjMyHello.setText(resmyhello.getString("rHelloString"));
```

resmyhello is the resource field generated by VisualAge.

RELATED CONCEPTS

“Chapter 9. Generated code” on page 31
“Generated BeanInfo descriptor code (an advanced topic)” on page 34
“Code generated from visually composed beans” on page 31

“How generated code coexists with user-written code” on page 35
“Chapter 15. Internationalization in VisualAge” on page 49

RELATED TASKS

“Chapter 17. Visual bean basics” on page 53
“Chapter 22. Connecting beans” on page 81
“Chapter 29. Separating strings for translation” on page 129

RELATED REFERENCES

“Chapter 10. Example of generated feature code” on page 37
“Chapter 34. Beans for visual composition” on page 147

Chapter 12. Bean morphing

In the Visual Composition Editor, *morphing* enables you to change the class or type of a component without significantly reworking property or connection settings. This capability can be very helpful in tasks like the following:

- Changing AWT components to Swing components
- Repairing breakage caused by renaming a class or moving it to a different package
- Changing class beans to Variables (or the reverse)

However, you cannot change the superclass of a composite through morphing.

If renaming or moving a class has introduced a referencing error into a composite, VisualAge alerts you when you attempt to open the composite. If you know that a class has been moved or renamed and you already have the composite open, you can select **Resolve Class References** from the **Bean** menu. In either situation, VisualAge searches the repository for a like-named class and presents the first candidate it finds. You can choose to proceed with the candidate VisualAge suggests, ignore the problem for now, or specify an alternative class.

In situations other than breakage, you change the class or type of a component by selecting **Morph Into** from the bean's pop-up menu. In this case, you must specify the name of the replacement class or bean type.

Common property settings and connection endpoints are preserved in the new component. To determine feature commonality, VisualAge compares both name and type; both must match. For example, suppose you change a component from a TextField to a JTextField bean. The background color for the original TextField bean happens to be gray. The gray setting is propagated into the new JTextField bean.

Conversely, VisualAge discards property settings that cannot be used in the new class. This includes torn-off properties but does *not* include promoted properties. You must delete obsoleted promotions manually from the **BeanInfo** page of the class browser.

Connection endpoints are handled similarly. Connections to features that are no longer valid in the new class remain until code is regenerated for the composite. To delete such connections instead, select **Delete invalid connections** before you click on **OK** to start the morphing process. Because components vary in their use of like-named features, make sure that the updated composite behaves as you expect it to.

RELATED TASKS

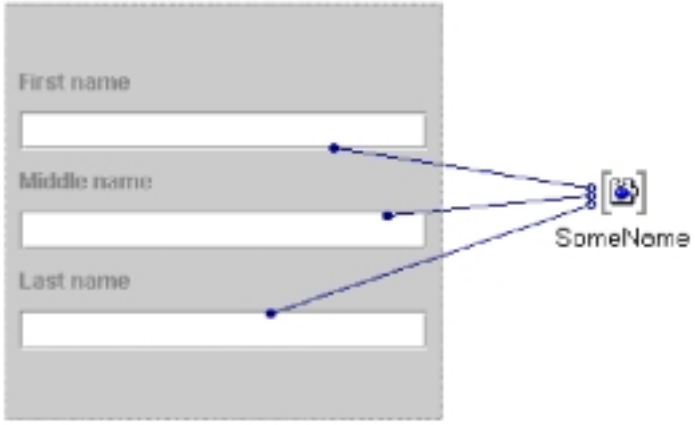
"Morphing beans" on page 65

RELATED REFERENCES

"Chapter 61. Morph Into" on page 227
"Chapter 62. Resolve Class References" on page 229

Chapter 13. Quick form

A *quick form* represents a way for you to very quickly lay out a GUI panel that corresponds to the properties of a model bean. You specify the visual bean to use for each property; VisualAge drops the beans and connects them to the model bean.



In this simple case, a NameEntry composite has been created that corresponds to the relevant properties of a Name bean. The NameEntry composite is based on a JPanel bean, so the composite initially consists of just the superclass bean. From there, the quick-form process works as follows:

- You drop a Name bean (SomeName). In this case, SomeName is a variable, for a reason that will be discussed later in this topic.
- You specify a quick form for SomeName, including where you want the beans dropped, the properties to be included, the components to be used, layout, and labeling. Default values exist for all of these parameters.
- When you click on **Finish**, VisualAge drops the beans and draws the appropriate connections.

By default, VisualAge uses text fields (TextField or JTextField) for String properties like a first or last name. If you prefer, you could use labels to create a read-only display composite, as follows:

By default, VisualAge sets up certain visual beans for use as quick-form components for the base data types. To use something other than the default components, you can create and then register your own quick form for a particular

data type. Make sure that the target property in the visual bean is writeable and that the target property is compatible with the data type for which you are registering the quick form.

For example, suppose you want to use your own JComboBox-based bean for an int property. As part of registering this as a quick form, you tell VisualAge which property and event of the JComboBox-based bean to use when making the connection (for example, the selectedIndex property and its corresponding event). Later, when you actually use the quick-form process, you can select your quick form from the list of quick-form components registered for a property of type int.

You can also register composites as quick forms for use with properties that have an object type. For example, you could register both of the previous composites for reuse with any property of type Name. This would enable you to select one of these composites when laying out a GUI for a Person bean with a name property. Now the reason for including SomeName as a variable makes sense: You promote the *this* property of the variable and specify it as the target property during registration with Name.

Quick forms can be shared between workstations. For more information, see the task topic listed at the end of this topic.

RELATED CONCEPTS

“Promotion of bean features” on page 23

RELATED TASKS

“Chapter 21. Creating GUI layouts with quick forms” on page 77
“Sharing quick forms” on page 78
“Registering quick forms” on page 79

RELATED REFERENCES

“Chapter 52. Quick Form SmartGuide” on page 209

Chapter 14. Object serialization in VisualAge

Object serialization is a means that the Java language provides to save state information about a class instance between runs of a program element.

- Serializable classes support the java.io.Serializable interface, which provides a protocol for writing self-contained instance state information to a binary file.
- Externalizable classes support the java.io.Externalizable interface, which provides a protocol for writing identity information about an instance to a binary file. This protocol is not complete; it depends on other state information being preserved within the class itself.

To experiment with serialization, start with examples:

- The com.ibm.ivj.examples.vc.propertyeditors package of the IBM Java Examples project contains one simple serializable class, called Name. To have VisualAge write a serialization file for you, run the main method of the NameWriter class.
- The Sun BDK Examples project shipped with VisualAge includes additional examples of both serializable and externalizable classes. The sunw.demo.buttons package contains a serializable class (ExplicitButton), an externalizable class (ExternalizableButton), and sample classes (OrangeButtonWriter and BlueButtonWriter, respectively) that can be used to save a sample instance.

Marking a class serializable does not require that it be serialized. It simply gives you the flexibility to do so. For more information about object serialization issues in general, see Sun's Object Serialization site and the JavaBeans specification.

VisualAge supports two different aspects of serialization:

- **Direct consumption of serialization (.ser) files within the IDE.** Wherever serialized beans are supported, you can enter the name of an .ser file instead of a class name. This includes adding the serialized bean to the beans palette and dropping it into a composite. You can add serialization files to the beans palette in the Visual Composition Editor just as you would bean classes present in your workspace. Once a serialized bean has been dropped, you interact with it as you would any other type of bean.

  Before using a serialized bean, make sure that all classes referenced by the serialized bean exist in your workspace. Otherwise, VisualAge cannot deserialize the bean.
- **Enforcement of required serialization.** You can require that all instances of a serializable bean be saved and restored through serialization by setting its Hidden-state attribute to `true` in its associated BeanInfo class. VisualAge writes all hidden-state beans found within a class to a single serialized-object file (.sos) associated with the class.

VisualAge also uses serialization internally to preserve property settings, so it is important that property values be serializable. By default, primitive types, arrays, strings, and any bean that inherits from java.awt.Component are serializable.

RELATED CONCEPTS

"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 24. Managing the beans palette" on page 89
"Creating and modifying a BeanInfo class" on page 133

RELATED REFERENCES

“Chapter 49. Choose Bean window” on page 203

Chapter 15. Internationalization in VisualAge

VisualAge supports two means of text separation by locale: list bundles and property files. A list bundle is a persistent form of java.util.ListResourceBundle. A property file is a persistent form of java.util.PropertyResourceBundle.

Both types of resource bundle contain key-value pairs. ListResourceBundle.getContents( ) returns an array of key-value pairs. The key-value pairs stored as static strings in a property file are used to initialize the corresponding bean when it is loaded. Each resource bundle contains values for one (or a default) locale. The name of the bundle can be keyed by locale so that the virtual machine loads the appropriate resources for the current locale setting.

VisualAge supports the creation, editing, and use of resource bundles for all text found in a class. You can separate String property values as you set them from the Visual Composition Editor, or you can separate all text at once from the Workbench.

You can use your own resource bundles, or you can create them using VisualAge. You can edit existing resource bundles by hand or from within VisualAge. Multiple resource sources can be referenced within a single bean. VisualAge generates the appropriate code the next time you save the bean.

VisualAge does not separate text located in user code fields. To take advantage of programmatic string separation, move the user code into a separate method and call the method from within the user code block.

RELATED TASKS

“Chapter 29. Separating strings for translation” on page 129

Chapter 16. Using visual composites from previous releases of VisualAge

Changes to code generation from Version 2.0

- Generation of the main( ) method has changed. Because VisualAge does not regenerate this method if it already exists, you must delete the previously generated method and regenerate code for your composite.
- Generation of code to handle events has changed, leaving many generated methods in your class that are no longer called. To give you the opportunity to retrieve any code you might have added to these methods by hand, VisualAge does not delete these methods automatically. After retrieving any handwritten code that you want to keep, delete these obsolete methods and regenerate code for your composite.
- By default, VisualAge now generates some code using inner classes. Be sure to read about these changes, starting with the topic ″Generated code.″

Change to icon property setting from Version 2.0

Different code is now generated for visual beans that have their icon property set. To ensure that the proper code is generated for your visual composite, open the property sheet for each bean that specifies an icon and reselect the icon. Click on **OK** and save the bean.

Migrating visual composites to the Java 2 SDK

VisualAge provides a migration utility to repair classes based on JDK 1.1.7 that have been imported into this version of the product. You can also use this utility to repair breakage caused by the renaming of packages or classes. You *must* use this utility for visual composites; use with other classes is optional.

RELATED CONCEPTS

“Chapter 9. Generated code” on page 31

RELATED TASKS

“Specifying icons” on page 56
“Chapter 32. Repairing class or package references” on page 143

Chapter 17. Visual bean basics

If you are just getting started, read the following concept topics:
- “Chapter 2. How classes and beans are related” on page 3
- “Chapter 3. Visual, nonvisual, and composite beans” on page 5

You can perform the following tasks to modify your beans:
- “Editing bean properties”
- “Displaying bean pop-up menus” on page 56
- “Working in the Beans List” on page 57
- “Renaming beans and connections” on page 58

Editing bean properties

The property sheet for a bean provides a way to display and set initial property values for the bean. Changes made to values in the property sheet are applied immediately.

You can edit the properties for a single bean or select several beans and open a property sheet for them. When you change a property on the property sheet, the change affects all the selected beans.

If you modify a setting and change your mind, click on the **Reset** button; a secondary window appears, listing the properties you have modified. Select the box next to each property you want to reset, click on **OK**, and VisualAge returns the value to the default setting.

Some of the tasks you can perform include:
- “Using code strings in bean properties” on page 54
- “Changing bean colors” on page 55
- “Changing bean fonts” on page 55
- “Changing bean size and position” on page 55
- “Specifying icons” on page 56
- “Setting a layout manager during visual composition” on page 60
- “Editing bean labels” on page 56
- “Chapter 26. Setting general properties for beans” on page 117

Opening the property sheet for a bean

To change the properties for a single bean, follow these steps:
1. From either the free-form surface or the Beans List window, place the pointer over the bean and double-click the left mouse button. The property sheet for the bean appears.
2. When you have chosen the property you want to modify, select the value field to the right of the property name.
3. Make the appropriate changes from the provided options. Options for modifying the properties depend upon the bean and may include selecting a button, entering information into the field, selecting from a drop-down list, or proceeding to other dialog boxes.

To change the properties for multiple beans (multiple selection), follow these steps:
1. Select the beans with properties you want to change.
2. Move the mouse pointer over one of the selected beans.

3. Click the right mouse button.
4. Select **Properties** from the pop-up menu. A property sheet for the selected beans appears and displays the common properties for the selected beans.

Once you open a property sheet, you can modify properties for most beans in the Visual Composition Editor. To open the properties on another bean select it in the Visual Composition Editor. To select if from within the property sheet:
1. Open the drop-down list at the top of the property sheet.
2. Select the bean you want to modify.
3. Modify the properties.

Note:

If a common property is not visible on the property sheet, select the **Show expert features** check box.

To enable national language support for your composite, be sure to read "Chapter 29. Separating strings for translation" on page 129.

Setting properties typed as interface implementers

Some bean properties, such as border and model, are typed as interface implementers rather than as classes, so you use the interface editor to set them.

When you select the value field for such a property, a small button,  , which indicates a secondary window, appears to the right. Click on the button; the interface editor for that property appears.

In the interface editor, set the property one of the following ways:

- **Enter a code string for VisualAge to use in code generated to initialize the property.** To enter your own code string, select **Code String** and type your code in the entry field.
- **Specify an implementer for the interface.** To see a list of available implementers, select **Bean Implementing Interface**. From the drop-down list, select the desired implementer for that property and modify any values listed.

Using code strings in bean properties

VisualAge enables you to set some bean properties using code strings. Curly braces, **{ }**, in the value column of a bean property sheet indicate that you can type Java code directly into the property field.

For example, you can use code strings to dynamically instantiate a dialog window when the user clicks on a button.
1. Create and save a dialog window named MyDialog.
2. Create the main user interface bean and drop a Factory bean with the type MyDialog.
3. Connect the actionPerformed event of a button to the MyDialog method of the factory.
4. Open the Event-to-Method Connection window and click on the **Set parameters** button.
5. Enter new java.awt.Frame in the value field of the parent property.

   This string directs VisualAge to create a new instance of MyDialog when the button is clicked.
6. Connect the actionPerformed event of the button to the Show( ) method of the Factory, to make the dialog visible.

Changing bean colors

Visual beans have color properties for the foreground and background. To change a color property of a bean in its property sheet, do the following:

1. Select either the foreground or background property. A small selection button  appears in the value column.
2. Click on  to open the Colors property window.
3. Select either the **Basic**, **System**, or **RGB** checkbox.
   - **Basic**—Select either a color box or the color name. The selected color appears in the preview window.
   - **System**—Select the standard system object color.
   - **RGB**—Manipulate the sliders to create the desired color.
   - Click on **OK** to accept the changes and return to the property sheet.

When you change bean colors, select colors that are available across various platforms.

For an example, open the background property in the property sheet for any of the com.ibm.ivj.examples shipped in the IBM Java Examples project.

Note: If you are setting the background property of a Swing bean, be sure the opaque property of the bean is set to true.

Changing bean fonts

To change the font of a bean in its property sheet, do the following:

1. Select the font property. A small selection button  appears in the value column.
2. Click on  to open the Fonts property window.
3. Modify any of the following font values:
   - Name
   - Style
   - Size
4. Preview the font changes in the preview window.
5. Click on **OK** to apply the changes and return to the property sheet.

When you change bean fonts, select fonts that are available across various platforms.

For an example, open the font property in the property sheet for any com.ibm.ivj.examples.vc. class shipped in the IBM Java Examples project.

Changing bean size and position

If a bean is embedded in a container that does not use a layout manager (null layout), you can change the x and y coordinates, the width, and the height using the bean property sheet. To modify the size and position features, do the following:

1. Click on the expansion icon  to the left of the constraints property.
2. Select the value field for the property you want to modify and enter the new property value.
3. Press Enter to apply the value.

Note: If you specify a non-null layout for the container, the bean position and sizing constraints are affected by that layout manager.

When you open the bean property sheet using multiple selection, some size and position constraints may appear stippled rather than solid because the values for the field are not common to all the selected beans. Once you modify the constraint, however, all the selected beans have the same value and the constraint appears solid.

For an example of the different layout managers, see the COM.ibm.ivj.examples.vc.layoutmanagers.LayoutManagers class shipped in the IBM Java Examples project.

Specifying icons

Some visual beans, such as JLabel and JButton, have icon properties. You can assign an icon to these beans through the property sheet.

To add an icon to a visual bean:

1. Place the icon in the project_resources path under your project subdirectory.
2. Open the bean property sheet.
3. Select the Icon value field.
4. Click on  to open the Icon Editor.
5. To add an icon from a graphics file, select **File** and enter the fully qualified path and file name in the name field, or select **Browse** and select the file through the file locator.
6. To add an icon from a URL, select URL and enter the fully qualified path and file name in the name field.
7. Press Enter to view the icon in the preview pane.
8. Click on **OK** to accept the icon.

Note: When you export your bean using the export SmartGuide, assure that the icon file is specified as a resource.

Editing bean labels

Some visual beans, such as buttons and menus, contain text strings. You can edit these labels through the property sheet.

To edit the text of a label:

1. Open the bean property sheet.
2. Select the label value field.
3. Enter the new label name.

Displaying bean pop-up menus

To see a menu of operations you can perform on a bean, right-click on the bean. The pop-up menu for the bean appears. Choices on the pop-up menu allow you to delete the bean, rename it, and perform other operations (which vary, depending on the bean).

To display a pop-up menu for multiple beans:

- Select the beans.
- Place the mouse pointer over any of the selected beans.
- Click the right mouse button.

Note: When you open a pop-up menu for multiple selected beans, one menu displays the choices common to all selected beans. Operations performed from that pop-up menu affect all selected beans.

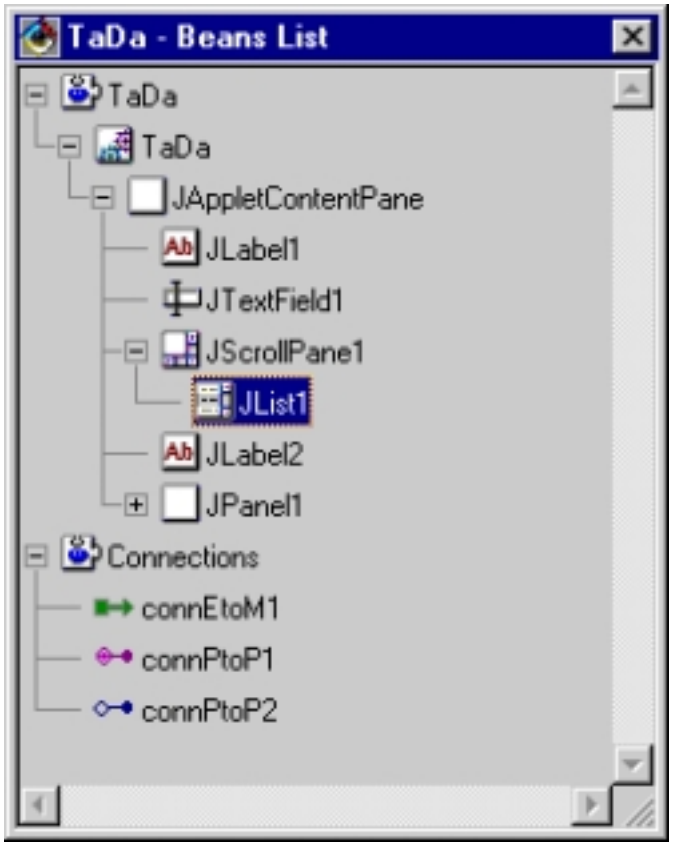
Working in the Beans List

The Beans List window displays an ordered list of the beans and connections on the free-form surface. The beans are initially listed in the order in which they were dropped, which also reflects the tabbing order. If you change the order of beans that have tabbing set, the Visual Composition Editor reflects the updated tabbing order.

To view the beans list, select **Beans List** from the tool bar or click on  from the **Tools** menu.

You can perform the following tasks within the beans list:

- Drop a bean from the palette directly onto the beans list.
- Select a bean or connection.
- Reorder a bean or connection by dragging.
- Change the tabbing order.
- Move a bean to a different composite by dragging.
- Make connections between beans on the beans list.
- Perform any tasks on the bean or connection pop-up menu for an item in the beans list.



Renaming beans and connections

The Visual Composition Editor assigns default names to distinguish beans and connections when you generate the code to build your program element. For example, for each bean, VisualAge generates a get method that you should use to access the bean within user methods or code. In addition to use in generated methods for beans and connections, the names for selected beans and connections appear in the information area at the bottom of the Visual Composition Editor.

The Visual Composition Editor assigns bean names based on the bean palette name or the name you specify when you use the **Choose Bean** tool. For example, VisualAge names the first button bean that you drop `Button1`, the second `Button2`, the third `Button3`, and so forth. When you select this bean, the information area at the bottom of the Visual Composition Editor displays the message `Button1 selected`.

The Visual Composition Editor assigns connection names based on the type of connection. For example, the first property-to-property connection is named *connPtoP1*, the second is *connPtoP2*, etc. All other connection types receive their names similarly. For example, an event-to-code connection is named *connEtoC1*, an event-to-method is named *connEtoM1*, etc.

To assign bean or connection names that are more descriptive or meaningful to your program element, follow these steps:

1. Move the mouse pointer over the bean or connection that you want to rename.
2. Right-click and the pop-up menu appears.
3. Select **Change Bean Name** or **Change Connection Name**. The Name Change Request or Connection Name Change Request window appears.
4. Type a new name in the entry field.
5. Click on **OK**. The Visual Composition Editor changes the name.

To view the changes outside the Visual Composition Editor, you must regenerate the code.

You can also rename beans in the property sheet and you can change bean or connection names from the pop-up menu in the Beans List.

Note: When you name a bean, take into account that VisualAge uses the name of the bean in generating get methods. For example, if you name a torn-off property *font*, the generated method getFont( ) overrides the inherited method.

RELATED CONCEPTS

"Chapter 4. Visual Composition Editor overview" on page 7
"Property sheets" on page 11

RELATED TASKS

"Chapter 20. Arranging beans visually" on page 71
"Chapter 18. Advanced visual bean tasks" on page 59
"Opening the property sheet for a bean" on page 53
"Chapter 26. Setting general properties for beans" on page 117

RELATED REFERENCES

"Chapter 44. Visual Composition Editor" on page 183
"Chapter 47. Pop-up menus for the Visual Composition Editor" on page 193
"Beans List" on page 188

Chapter 18. Advanced visual bean tasks

You can perform the following advanced tasks to modify your beans:
- "Setting the tabbing order"
- "Promoting bean features"
- "Tearing off properties"
- "Setting a layout manager during visual composition" on page 60

Setting the tabbing order

The tabbing order specifies how the input focus moves from bean to bean as the user presses the Tab key.
1. Open the pop-up menu for the composite bean.
2. Select **Set tabbing** and then **Show tab tags** and numbered tab tags appear.
3. Place the mouse pointer over the tab tag you want to change.
4. Press and hold down the left mouse button.
5. Drag the tab tag to its new position.
6. Release the left mouse button.
7. Repeat until the numbered tags reflect the desired tabbing order.

You can also change the tabbing order by moving the beans in the Beans List.

Promoting bean features

If you want to connect to the features of a bean that is embedded within a composite, you must promote bean features. To promote the bean features:
1. Open the pop-up menu for the composite bean.
2. Select **Promote bean feature**.
3. Select the type of feature: **Method**, **Property**, or **Event**.
4. From the list box, select the feature you want to promote and >> is enabled.
5. Click on >>. The feature appears in the **Promoted features** list.
6. Repeat for the other features you wish to promote.
7. If you wish to rename the feature, double-click and modify the name listed in the **Promote Name** list.
8. If you wish to remove the feature from the **Promoted features** list, click on <<.
9. Click on **OK**.

When you promote features, VisualAge performs the following tasks:
- Saves the composite bean
- Generates the code for the composite bean
- Creates a BeanInfo Class, if one doesn't already exist
- Adds a new connection between the embedded bean and the composite, where appropriate (for all but promoted methods)

When you embed this bean within another bean, the features that you promoted are listed under the type in the **Connectable Features** window. Connect the promoted feature of each bean to effect the change you desire.

Tearing off properties

If you want to gain access to an encapsulated feature of a bean, you must tear off the property. To tear off a property:

1. Select **Tear off property** from the pop-up menu of the bean with the property you want to access. Another menu appears listing all of the properties of the bean.
2. Select the property you want to tear off. The mouse pointer is now loaded with a variable bean representing or pointing to the property you selected.
3. Place the new bean on the free-form surface, as you would any other nonvisual bean. The torn-off property now appears as a variable bean connected to the original bean by a property-to-property connection.

Setting a layout manager during visual composition

You can assign a layout manager before or after dropping components on your container bean. However, if you change the layout manager after dropping components, it may affect bean placement.

To set a layout manager in a container bean, follow these steps:
1. Open the property sheet for the container bean.
2. From the value column, select the cell for the layout property.
3. From the **Layout Manager** drop-down list, select a layout.

Setting layout properties during visual composition

The complexity of this task depends on which layout manager you choose for your container bean and how much custom behavior your bean requires. Default behavior exists to some extent for all layouts. To set layout properties for the components of the container bean, follow these steps:
1. Open the property sheet for the component bean.
2. If one exists, click on the expansion icon  to the left of the constraints property.
3. Select the value field for the property you want to modify and enter the new property value.
4. Press Enter to apply the value.

Consider waiting to set layout properties until you have settled on a layout manager. Many values are lost when you switch layouts or move the component to another container.

GridBagLayout constraints

GridBagLayout is a powerful tool for layout, however, because of its many choices, it can become confusing. Once you have selected GridBagLayout for your user interface, adjust the constraints from the property sheet or the Layout Options from the pop-up to affect the placement and resize behavior of beans within the layout.

Constraint	Specifies...
Anchor	Where within the cell (North, South, etc.) to place a component that is smaller than the cell.
Fill	How to size the component (Vertical, Horizontal, Both, or None) when the cell is larger than the component's requested size.
gridX, gridY	The column (gridX) and row (gridY) where your component resides. If gridWidth or gridHeight is >1, gridX and gridY are the starting row and column. The default places a new component to the right or below the previously added component.

Constraint	Specifies...
gridWidth, gridHeight	The number of cells the component should use in a row (gridWidth) or column (gridHeight).
insets	The component's external padding, the minimum amount of space between the component and the edges of its cell.
ipadX, ipadY	The component's internal padding within the layout, or how much to add to the width and/or height of the component.
weightX, weightY	How to redistribute space for resizing behavior. You should specify a weight for at least one component in a row (weightX) and column (weightY) to prevent all the components from clumping together in the center of their container. The distribution of extra space is calculated as a proportional fraction of the total weightX in a row and weightY in a column.

Achieving the resize behavior you want

Unlike in other layout managers, in GridBag you set constraints on individual components within the layout and not on the layout itself. Also unlike other layout managers, GridBag enables you to set constraints so that the size of the components adjusts as you resize the runtime program.

Resize behavior in GridBagLayout is tied to the weightX, weightY, and fill contstraints of components within the layout. By default, the component properties are set without resize behavior. If you place components in any layout and then change the layout to GridBag, the component constraints are set to maintain the look created in the original layout.

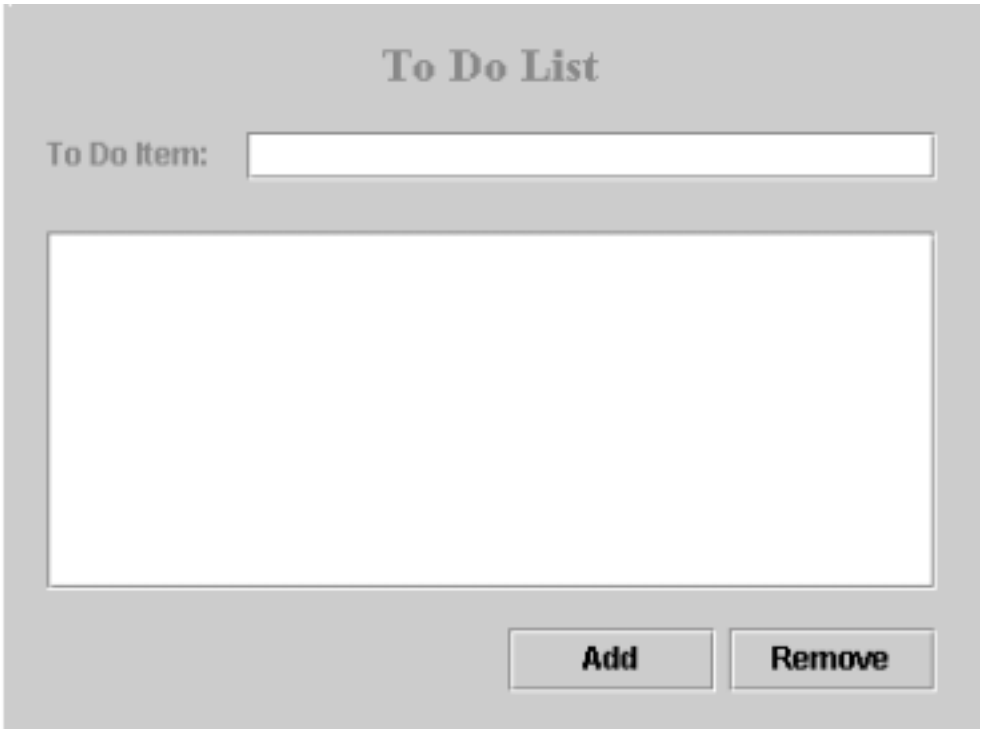
To set constraints so that components increase and decrease as you resize the runtime program, you must:

1. Apply a weightX, such as 1.0, to a component in a row.
2. Apply a weightY, such as 1.0, to a component in a column.
3. Apply the appropriate fill value for each component in the container you wish to resize. For example, if you want the component to resize only in the horizontal direction, select the horizontal fill for that component.
4. If the calculated inset padding is not appropriate, adjust the inset values.

You can perform these adjustments from the constraints on the property sheet or from Layout Options on the component pop-up menu.

Creating a GUI using GridBagLayout

Follow these steps to create a To Do List GUI using GridBagLayout:



1. To set up the applet:
   - From your package in the IDE add an applet with JApplet as the superclass.
   - Open the Visual Composition Editor to the JApplet bean. The applet contains a JAppletContentPane bean, on which you work.
   - Select  from the tool bar, and place the Beans List window in a visible but out of the way location.
   - Select  from the tool bar, and place the Properties window in a visible but out of the way location.

     Note: These windows are necessary for modifying properties and accessing covered components throughout this process.
   - Select the JApplet bean.
   - From the Properties window, open the layout drop-down, and select **GridBagLayout**.
2. To place beans in the GridBagLayout:
   - Select a JLabel bean from the palette and drop it on the JAppletContentPane. Because GridBagLayout distributes extra space around the beans in the layout, the JLabel bean falls to the center of the pane. You change this behavior, later in the procedure, by setting the weightX/weightY constraints property on one of the components in the layout.
   - Select a JTextField bean.
   - Hold down the left mouse button and move the pointer to the right of the JLabel bean. The dark line between the pointer and the JLabel bean indicates target emphasis. Release the mouse button while the emphasis line is on the right side of the JLabel bean and a JTextField bean appears to the right of the JLabel bean.

Note: Beans dropped in GridBagLayout appear in their *preferred size*. The preferred size, which is different for every component, is usually dependent on one of the component's property settings. For example, the preferred size of a JLabel bean is the size of the text within the label. If the component is a container, like a JPanel or a JScrollPane bean, the preferred size usually reflects the preferred size of the contents of the component.

- Select another JLabel bean and position it so that target emphasis is on top of JLabel1.
- Select a JScrollPane bean and position it so that target emphasis is under JLabel1.
- Select a JList bean and place it on the JScrollPane bean in the beans list. Because the preferred size of the JScrollPane is small, it is easier to add the JList bean directly onto the JScrollPane that is in the Beans List window. When you drop the bean, the preferred sizes of the JScrollPane and JList align.

3. To adjust property values within the Properties window, select the bean and then adjust the property value:

Bean...	**Property...**	**Change Value to...**	**What You See..**
JTextField1	columns	5	TextField width increase
JLabel1	text	To Do Item:	Change in text
JLabel2	text	To Do List	Change in text
JLabel2	font	Name=serif, Size=18	Change in font style and size
JLabel2	horizontalAlignment	center	Label placement is centered

4. To adjust the constraints properties within the Properties window, select the bean and then open the constraints tree-view and adjust the property value :

   Note: Because the JScrollPane bean, not the JList bean, is the component that is sitting in the GridBagLayout, you modify its constraints. Because the JList bean completely covers the JScrollPane bean, you must select the pane from either the Beans List window or the Properties window. If you select the JList bean instead, you cannot adjust the component width within the layout manager.

Bean...	Constraint...	Change Value To...	What You See..
JScrollPane1	gridWidth	2	Pane covers two cells width
JScrollPane1	fill	both	Pane fills the cell vertically and horizontally
JScrollPane1	weightX	1	Column containing the JScrollpane expands to fill the extra horizontal space in the JApplet

JScrollPane1	weightY	1	Row containing the JScrollpane expands to fill the extra vertical space in the JApplet
JScrollPane1	insets	left=15, bottom=5, right=15	Padding on the left, bottom, and right of the pane
JLabel2	gridWidth	2	Label covers two cells width
JLabel2	insets	top=15	Padding on the top of the label
JTextField1	fill	horizontal	Textfield fills cell horizontally
JTextField1	insets	top=15, bottom=5, right=15	Padding around top, bottom and right side of the TextField
JLabel1	ipadX	10	Internal padding between text and component border
JLabel1	insets	top=15, left=15, bottom=5, right=5	Padding around all sides of label

Note: Setting the weightX and weightY on the JScrollPane bean ensures that the GUI resizes proportionately. Setting the ipadX on JLabel1, ensures that the label resizes proportionately. This is especially helpful when translating your GUI into other languages.

5. To add the button panel:
   - Select a JPanel bean and position it so that target emphasis is under JScrollPane1.
   - Because JPanel defaults to null layout, it has no constraints and is not visible. From the Beans List window, select JPanel1 and change the layout to GridLayout in the Properties window.
   - Place two JButton beans on JPanel1 in the Beans List window.
6. To adjust the properties and constraints properties for JPanel1 and its contents:

Bean...	**Property...**	**Change Value To...**	**What You See...**
JPanel1	constraints—anchor	EAST	Panel placement moves to the lower right corner
JPanel1	constraints—insets	bottom=15, right=15	Padding around the right and bottom of the panel
JPanel1	layout—hgap	5	Space between the buttons
JButton1	text	Add	Button label changes
JButton2	text	Remove	Button label changes

Morphing beans

Morphing allows you to perform the following tasks:
- Change AWT components to Swing components (or the reverse)
- Repair breakage caused by renaming a class or moving it to a different package
- Change class beans to variables (or the reverse)

To morph a bean:
1. Select the bean you want to morph.
2. Open the bean pop-up and select **Morph Into**.
3. Select the bean type and use **Browse** to select the class.
4. Click on **OK**.

Changing look and feel in Swing-based composites

To preserve cross-platform portability, Swing components use the Metal look and feel. You can change the appearance of these components during visual composition through the use of a .properties file.

1. Create the file swing.properties in your favorite text editor. An example follows:

   ```
   swing.defaultlaf=com.sun.java.swing.plaf.windows.WindowsLookAndFeel
   ```

   You must enter the swing.defaultlaf constant exactly as shown, but you can specify any valid look-and-feel class after the equals sign.
2. Save the file in the program\lib directory of your VisualAge installation.

   VisualAge scans the program\lib directory for the existence of this file every time a new Visual Composition Editor is opened. Consequently, any that are already open at the time you save the file will not be affected.

If you get the following message after changing look and feel, a problem exists with the look-and-feel class:

```
ClassName cannot be composed during creation. Please resolve
any problems that may exist.
```

In this case, check for one of the following problems:
- A typographical error in the swing.properties file prevents the IDE from finding the proper class.
- The class cannot be found anywhere in the class path, either because the class path is not set properly or because the class is not currently loaded in the specified package.
- The class is not supported in the current operating environment.

To determine whether a given look-and-feel class is supported in the current environment, try it out in the Scrapbook window. Enter code like the the following and inspect it:

```
javax.swing.LookAndFeel lf =
    new com.sun.java.swing.plaf.windows.WindowsLookAndFeel();
lf.isSupportedLookAndFeel();
```

If the inspection returns `false`, the class is not supported.

RELATED CONCEPTS

"Chapter 12. Bean morphing" on page 43
"Promotion of bean features" on page 23
"Chapter 4. Visual Composition Editor overview" on page 7

“Layout managers in visual composition” on page 14
“Tabbing order” on page 13
“Torn-off properties” on page 13

RELATED TASKS

“Editing bean properties” on page 53

RELATED REFERENCES

“Promote bean feature” on page 197
“Chapter 50. Promote Features window” on page 205
“Chapter 44. Visual Composition Editor” on page 183
“Chapter 47. Pop-up menus for the Visual Composition Editor” on page 193
“Properties” on page 188

Chapter 19. Composing beans visually

Visually composing beans means using the Visual Composition Editor to place and connect individual and composite beans in a graphical user interface (GUI). More specifically, visually developing a user interface bean includes:

1. Designing the user interface.
2. Choosing a layout for the bean.
3. Dropping visual and nonvisual beans on the free-form surface or the beans list.
4. Changing properties and manipulating the beans.
5. Making connections to determine the behavior of the beans.
6. Manipulating connections.
7. Running, which includes saving, generating code, and compiling the class.
8. Making changes.

When you edit the bean that represents the overall structure of your application (usually its main user interface view), you graphically build your application. By making connections between beans, you build your program's business logic.

Embedding beans in a composite bean

A composite bean is a bean that contains other beans. The beans you add are referred to as embedded beans. You can embed primitive or composite beans into your composite bean.

You can add beans that appear on the beans palette, as well as beans that do not appear on the palette. Beans that do not appear on the palette may include composite beans you created, such as a panel with several buttons.

Note: If you use a layout that allows a bean to completely cover another bean, the "Beans List" on page 188 enables you to easily perform tasks on the covered components.

Adding beans from the palette

To add a bean from the palette to the Visual Composition Editor surface, follow these steps:

1. From the category menu button, select the category containing the bean you want.
2. Select the bean you want. The mouse pointer becomes a crosshair, indicating that the mouse pointer is loaded with the bean you selected.
3. Move the crosshair to the location where you want to place the bean.
4. Press and hold mouse button 1. An outline of the selected bean appears under the crosshair. Without releasing the mouse button, move the crosshair to position it precisely.
5. Release the mouse button. The bean you selected is placed at the location of the crosshair, and the mouse pointer returns to normal.

   Note: If you specify a non-null layout for the container, the bean placement is affected by that layout manager.

To add a bean from the palette to the beans list, follow these steps:

1. Select the category containing the bean you want.
2. Select the bean you want.

3. From the Beans List window, click on the composite bean that you want to place the bean within. The bean you selected is added to the beans list and the composite bean.

Note: The layout you specified for the container affects the placement for the bean. To modify bean placement on the Visual Composition Editor from within the Beans List window, open the Properties for the bean and modify the **Constraints**.

To add multiple instances of the same bean, enable **Sticky** by holding Ctrl while selecting the bean. Selecting a new bean or the Selection tool disables **Sticky**.

If the bean you want to add is not on the beans palette, you can add it with the Choose Bean tool from the beans palette.

Adding beans not on the palette

You can add a bean as a *class*, a *serialized bean*, or a *variable*. When you add a bean as a *class*, the default constructor for the class is used when the program runs. This means that a real object is created, not a variable that points to a real object defined elsewhere. For more about serialized beans, see "Chapter 14. Object serialization in VisualAge" on page 47.

Before you try to add a serialized bean, make sure its serialization file (.ser) is somewhere in the classpath for your workspace.

To place a bean on the Visual Composition Editor:

1. From the beans palette, select the **Choose Bean** tool; the Choose Bean window appears.
2. Enter the fully qualified class name in the **Class name** field. The **Browse** button is especially helpful in locating the **Class name** when several of the same name exist in multiple packages.
3. Type a name for the bean in the **Name** field. This name appears in the information area at the bottom of the Visual Composition Editor when you select the placed bean; it represents the bean in generated bean code.

   The **Name** field is optional. If you leave it blank, VisualAge generates a default name based on the class.
4. To close the Choose Bean window after loading the mouse pointer with the bean, click **OK**.

   To enable the **OK** push button, you must enter the fully qualified name, package, and class in the **Class name** field.
5. Move the crosshair to the desired location on either the Visual Composition Editor surface or the beans list, and click mouse button 1.

If you are dropping a bean that uses a graphic resource, place the graphic resource file in the directory where your program element is located. For example, if your program element is called *MyProject.MyPackage.MyApp*, place your graphic resource file in **x:\..\ide\project_resources\MyProject\MyPackage\MyApp** (where x is the drive where VisualAge is installed). If you have not exported your program element or created subdirectories in the project_resources directory, you may need to create the subdirectories manually.

Unloading the mouse pointer

To unload the mouse pointer at any time, from the beans palette, click the Selection tool. 

Editing beans within a composite beans

VisualAge enables you to edit a composite bean or nonvisual bean that is embedded within another composite bean.

To modify the bean, open the bean pop-up menu and select **Open**. The Visual Composition Editor appears for that bean. If you add features to the embedded bean from the BeanInfo page, select **Refresh Interface** when you return to the original Visual Composition Editor.

Saving a bean

Saving a bean that you have constructed includes generating the source code. To save the bean and generate the source code:

1. Select **Bean** from the menu bar.
2. Select **Save Bean**.

Note: Clicking on  from the tool bar also saves the bean and generates the source code.

Running and testing beans

When you select  **Run** from the tool bar, VisualAge performs the following actions on your visually composed bean:

- Saves the bean
- Generates code
- Compiles the class
- Runs the compiled bean in an applet window

RELATED CONCEPTS

"Visual composition hints and tips" on page 9
"Beans palette" on page 8
"Free-form surface" on page 8
"Layout managers in visual composition" on page 14
"Chapter 4. Visual Composition Editor overview" on page 7

RELATED TASKS

"Chapter 24. Managing the beans palette" on page 89
"Moving beans" on page 73
"Editing bean properties" on page 53
"Composing an applet" on page 93
"Changing bean size and position" on page 55
"Chapter 19. Composing beans visually" on page 67
"Chapter 20. Arranging beans visually" on page 71

RELATED REFERENCES

"Beans List" on page 188
"Chapter 49. Choose Bean window" on page 203
"Chapter 47. Pop-up menus for the Visual Composition Editor" on page 193

“Chapter 44. Visual Composition Editor” on page 183

Chapter 20. Arranging beans visually

Once you have placed beans on the free-form surface, you can make the following changes to achieve the look and function you want:

Selecting and deselecting beans

To select a single bean, click on the bean. If you previously selected other beans, they are deselected automatically.

To select multiple beans, do one of the following:

- In Windows®: Hold down Ctrl or Shift and click on each additional bean you want to select.
- In Windows: To select all the beans within a container, select the container bean and then, from the **File** menu, select **Select All**.
- In UNIX® platforms: Hold down the left mouse button and move the mouse pointer over each bean you want to select. After you select the beans, release the mouse button.

You can select beans or connections, but not both together. However, if you delete a bean with connections, the Visual Composition Editor deletes the connections and the bean.

When you select a bean in the Visual Composition Editor, selection handles ■ appear on the corners and between the corner handles. If you select more than one bean, the last bean selected has solid selection handles, indicating that it is the *anchor* bean and the other selected beans have hollow selection handles. The anchor bean is the guide by which the other beans are manipulated. For example, if you want to match the widths of two beans, the anchor bean is used as the guideline width.

To change the anchor bean, hold down Shift and click on a selected bean.

Note: You can also select and modify beans, one at a time, in the beans list.

To deselect a bean after you have selected it, click anywhere on the Visual Composition Editor.

To deselect multiple but not all selected beans, follow these steps:

1. Hold down the Ctrl key.
2. Click and release the left mouse button on all the beans you want to deselect.

You can deselect all selected beans by clicking anywhere but on a selected bean.

Positioning beans

Positioning a bean refers to aligning or spacing. For beans in a null layout, the tool bar and the **Tools** pull-down menu provide options for aligning beans.

The anchor bean, indicated by solid selection handles, is the bean that serves as the alignment reference. To align beans with one another, select the ones you want to modify and select the anchor bean last. You can also change the anchor bean by holding Shift and clicking on the new anchor bean.

To align beans:
1. Click on all the beans you want to align, and then select the bean you want the others to match.
2. Click on one of the following alignment tools from the tool bar:

 Align Left

 Align Top

 Align Center

 Align Middle

 Align Right

 Align Bottom

The pop-up menu provides options for spacing within the bounding box, an unseen box that contains the selected beans. You can also manage the placement of parts by using a layout manager.

To space beans within the bounding box:
1. Click on all the beans you want to evenly space. You must select a minimum of three beans.
2. From the pop-up menu of one of the selected beans, select **Layout** then **Distribute**, and then either **Horizontally in bounding box** or **Vertically in bounding box**.

Note: If you specify a non-null layout for the container, the bean alignment and spacing are controlled by that layout manager and not the alignment tools.

Resizing visual beans

You can change the size of a visual bean in the Visual Composition Editor using any of the following techniques:
- Dragging the selection handles
- Matching by multiple selection
- Changing Constraints properties
- In a non-null layout manager, resetting layout constraints

Beans that cannot be resized, such as variables, menus, and tear-off properties have reversed background color, but no selection handles. Beans using non-null layouts cannot be resized, but have selection handles.

Note: If you specify a non-null layout for the container, the bean sizing is affected by that layout manager.

Resizing beans by dragging

To change the size of a visual bean in a container using a null layout, follow these steps:

1. Select the bean by clicking on it. To size several beans at once, select all the beans you want to size.
2. Place the mouse pointer over one of the handles and hold the left mouse button.
3. While holding down the left mouse button, drag the handle to a new location. As you move the mouse, the outline of the bean dynamically changes size. When it is the size you want, release the mouse button. The bean remains at the chosen size.

Note: Pressing the Esc key before releasing the mouse button cancels resizing without making changes.

To size a bean in only one direction, press and hold the Shift key while resizing the bean. Holding down the Shift key prevents one dimension of the bean from changing when you resize the other dimension. For example, to change the width of a bean but prevent its height from changing, hold down the Shift key while changing the width.

Matching bean sizes using the tool bar

1. Select all the beans you want to size, making sure the last bean you select, the anchor, is the size you want the others to match. You can change the anchor by holding down Shift and clicking the new anchor.
2. Select one of the following from the tool bar or the **Tools** pull-down menu:

    **Match Width**

    **Match Height**

   The size of the selected beans changes to match the size of the anchor bean.

Moving beans

To move a bean in the Visual Composition Editor, follow these steps:

1. Place the mouse pointer over the bean you want to move.
2. Hold down the appropriate mouse button and move the mouse pointer to the new location.
   - In Windows: Hold down the left mouse button.
   - In UNIX platforms: Hold down the middle mouse button.
3. Release the mouse button. The bean appears in its new location with a solid border around it, indicating it is selected.

If the bean you are dragging is one of several that you selected, all selected beans move together. Pressing the Esc key before releasing the mouse button cancels the move without making changes.

You can reorder or reparent a bean in the beans list. To reorder, select a bean in the beans list and drag it to a new position within its composite bean. This action does not change the position of the bean in the Visual Composition Editor (except as noted below), but reorders the list, which affects the tabbing order. To reparent a bean, select and drag it to a different composite bean in the beans list. This action does change the position of the bean in the Visual Composition Editor. You cannot, however, select multiple beans on the beans list.

To modify bean placement on the Visual Composition Editor from within the Beans List window without reparenting, open the Properties for the bean and modify the Constraints.

Note: If you use BoxLayout, FlowLayout, or GridLayout managers, you can move beans on the Visual Composition Editor surface by reordering them in the beans list.

Moving a composite bean requires special handling. For information, see “Code generated from visually composed beans” on page 31.

Copying beans

To copy beans using the clipboard:

1. Select all the beans you want to copy.
2. From the **Edit** pull-down menu, select **Copy**. A copy of each selected bean is placed on the clipboard.
3. From the **Edit** pull-down menu, select **Paste**. The mouse pointer turns into a crosshair, indicating that it is loaded with the copied beans.

   If you decide against pasting the beans, unload the mouse pointer by clicking on the  Selection tool.
4. Position the mouse pointer where you want the beans to be copied.
5. Click the left mouse button. Copies of the beans appear at the position of the crosshair.

As long as you do not copy another item to the clipboard, you can continue pasting these beans.

Note: When you copy or cut and paste beans, the Visual Composition Editor preserves the bean names but not the connections.

When you copy or cut and paste two or more beans, they retain their positions relative to each other.

To copy beans by dragging:

1. Select all the beans you want to copy. If you only want to copy one bean, you do not have to select it.
2. Position the mouse pointer over one of the beans you want to copy.
3. Hold down both the Ctrl key and the appropriate mouse button.
   - In Windows: Hold down the left mouse button.
   - In UNIX platforms: Hold down the middle mouse button.

4. Move the mouse pointer to a new position. To help you with positioning, an outline of the bean appears. When you are copying multiple beans, the outlines of the selected beans move together as a group.
5. When the beans you are copying are in the desired position, release the mouse button and Ctrl key. The copied beans appear where you positioned the outline.

Note: Pressing the Esc key before releasing the mouse button cancels copying without making changes.

Copying a composite bean requires special handling. For information, see "Code generated from visually composed beans" on page 31.

Deleting beans

To delete beans, select them and press **Delete** or select **Delete** from the pop-up menu.

When you delete a connected bean, the connections between that bean and other beans are also deleted. However, when you select **Edit** and then **Undo**, you restore the deleted bean and any connections that were removed.

Undoing and redoing changes in the Visual Composition Editor

If you undo an operation that you decide you had right in the first place, select **Redo** from the **Edit** pull-down menu. **Redo** restores the bean to the state before the last **Undo**, including any connections that were deleted.

Undo and **Redo** affect operations you perform on the free-form surface and beans palette in the Visual Composition Editor. They do not affect any of the functions in the **File** pull-down menu.

Use **Undo** to reverse any or all of the changes you made to the Reorder Connections list.

RELATED CONCEPTS

"Tabbing order" on page 13
"Layout managers in visual composition" on page 14
"Torn-off properties" on page 13
"Property-to-property connections" on page 26
"Beans palette" on page 8

RELATED TASKS

"Setting layout properties during visual composition" on page 60
"Opening the property sheet for a bean" on page 53
"Changing bean size and position" on page 55

RELATED REFERENCES

"The tool bar in visual composition" on page 183
"Align left" on page 189
"Align Center" on page 189
"Align Right" on page 189
"Align Top" on page 189
"Align Middle" on page 189
"Align Bottom" on page 190
"Vertically in bounding box" on page 196
"Horizontally in bounding box" on page 195

“Set Tabbing” on page 198
“Chapter 61. Morph Into” on page 227
“Tear-off property” on page 198

Chapter 21. Creating GUI layouts with quick forms

To create a layout with quick form from a model bean, do the following:

1. Right-click on the bean and select **Quick form** from the pop-up menu that appears. The Quick Form SmartGuide opens.
2. From the **Select a parent for the quick form** list, select where you want VisualAge to drop the quick-form components.
3. Specify which quick form to use, as follows:
   - If a quick form is already registered for this type of bean, the **Use an existing registered quick form** radio button is preselected. Select one from the list.
   - If the component that you want to use already exists but is not registered for this type, register the quick form by clicking **Manage Quick Forms**. The Quick Form Manager window opens. (For additional instructions, refer to the task topic listed at the end of this topic.)
   - Otherwise, click on **Create a new quick form**.
4. Below the **Registered quick forms** list, click on the check boxes that control which registered quick forms appear in the list.
5. From the properties list, click on the name of any property that you do *not* want included in the quick form. The check boxes for some properties might initially be deselected; this means that no quick forms (default or otherwise) are registered for those property types.
6. For each property that you do want to include, make a selection from the **Registered quick forms** list.
7. At this point, you have a choice to make, as follows:
   - To accept the default layout without saving the quick form, click on **Finish**. VisualAge drops the beans and draws the connections in the composite that you are editing. You are done!
   - Otherwise, click on **Next** to continue with this procedure.

     The Quick Form Layout page opens. As you edit layout settings in this window, the Preview pane shows you how they will affect the finished quick form.
8. To configure how many properties are laid out in each row, select a value from the **Number of columns per row** list.
9. Select a layout style, as follows:
   - To use GridBagLayout, click on **GridBag into panel**. In this case, VisualAge drops a panel into the parent of the quick form, sets the panel to GridBag layout, and drops the individual quick-form components into the panel.
   - If the parent of the quick form is empty and set to <null> or GridBagLayout, you can choose **Free flow into parent**. In this case, VisualAge drops the individual quick-form components directly into the parent.
10. To reorder an item in the **Properties to quick form** list, select a property and click on the **Up** or **Down** buttons.
11. Make minor adjustments in the **Property quick form details** group box, as follows:

- To include a label for the quick-form component (for example, a label to accompany a text field), make sure that the **Include label** check box is selected.
- Set alignment for the label: Select the **Top** or **Left** radio button.
- Edit the text for the label as appropriate.
- If the quick-form component for a particular property must span multiple columns, select an appropriate value from the **Columns to span** list.

12. At this point, you have a choice to make, as follows:
    - To create the quick form without saving it as a separate class, click on **Finish**. VisualAge drops the beans and draws the connections in the composite that you are editing. You are done!
    - To save and register the quick form for reuse, click on **Next**. Continue with the rest of this procedure.

      If you save quick forms as separate classes, you can transfer quick form registrations to other workstations without repeating the registration process on the target machines. For more information, read the task topic listed at the end of this procedure.
13. Click on **Save quick form**.
14. Specify a project, package, and quick-form class.
15. Give the quick form a name.
16. Provide a one-line description of the quick form.
17. If you do not wish to register the quick form now, make sure that **Register quick form** is not selected. If you wish, you can register the quick form separately.
18. Click on **Finish**.

RELATED CONCEPTS

"Chapter 13. Quick form" on page 45

RELATED TASKS

"Registering quick forms" on page 79
"Sharing quick forms"

RELATED REFERENCES

"Chapter 52. Quick Form SmartGuide" on page 209

Sharing quick forms

If you have saved quick forms as separate classes, you can transfer quick form registrations to other workstations without repeating the registration process on each target machine. Follow these steps:

Transferring registrations when either workstation has a stand-alone VisualAge installation

1. Copy the ide\program\quickForm.properties file from the source to the target workstation. (Make sure you put the file in the correct place.)
2. Export the appropriate quick-form classes from the source installation as repositories.
3. Import the repository files into the target installation.

Transferring registrations when the workstations share a repository

1. Copy the ide\program\quickForm.properties file from the source to the target workstation. (Make sure you put the file in the correct place.)

2. Load the appropriate quick-form classes into the workspace of the target installation.

RELATED CONCEPTS

"Chapter 13. Quick form" on page 45

RELATED TASKS

"Chapter 21. Creating GUI layouts with quick forms" on page 77
"Registering quick forms"

RELATED REFERENCES

"Chapter 52. Quick Form SmartGuide" on page 209

Registering quick forms

You can register quick forms for reuse with any property of a specific type. To register a quick form at the same time that you create it, follow the instructions in "Chapter 21. Creating GUI layouts with quick forms" on page 77. This topic tells you how to register quick forms at any other time, from the Quick Form Manager window.

Opening the Quick Form Manager window from the workspace options

1. From the **Window** menu, select **Options**.
2. From the expandable list on the left, select **Visual Composition** and then **Quick Form Manager**. The Quick Form Manager window opens.

Opening the Quick Form Manager window from the Quick Form SmartGuide

1. From the Quick Form SmartGuide of the Visual Composition Editor, select **Manage Quick Forms**. The Quick Form Manager window opens.

Registering quick forms from the Quick Form Manager window

1. Click on **Register New**. The Register Quick Form window opens.
2. Give the quick form a name.
3. Select a type to register the quick form against. (Use the **Browse** button as necessary.)
4. Select a visual bean to represent the quick form. This visual bean can be a single component or a visual composite.
5. Select a target property for the visual bean. VisualAge connects to this property when it drops the quick-form bean.
6. Select a target event for the visual bean. If the property you selected in the previous step is bound, the property's bound event is automatically filled in for you.
7. As you prefer, provide a one-line description of the quick form.
8. To include a label with the quick-form bean, make sure the **Include label** check box is selected.
9. Click on **OK** to close the window.
10. In the Options window, click on **OK** to apply the change.

Deleting a registration

In the Quick Form Manager window, select the type, select the quick form, and click on **Unregister**.

RELATED CONCEPTS

"Chapter 13. Quick form" on page 45

RELATED TASKS

“Chapter 21. Creating GUI layouts with quick forms” on page 77
“Sharing quick forms” on page 78

RELATED REFERENCES

“Chapter 52. Quick Form SmartGuide” on page 209

Chapter 22. Connecting beans

In VisualAge, you draw connections between beans to define their interaction. This involves using the mouse to select a feature of the source bean and connect it to the feature of the target bean. The type of feature at the source—property or event—and the type of feature at the target—property, method, or code—determines the type of connection. For example, if the source is an event and the target is a method, the connection is an event-to-method.

If you decide to change the connection behavior of the bean, you can edit or reorder the existing connections without redrawing them.

Note: You can also perform connections within the Beans List window.

Connecting features to other features

To connect two features, follow these steps. The term *source* refers to the where the connection begins and the term *target* refers to where the connection ends.

1. Select the source bean, right-click, and select **Connect** from the pop-up menu.

   In most cases, a cascade menu appears that displays the names of the most commonly used (or *preferred*) features. If additional features exist that are appropriate for the connection type, **Connectable Features** also appears on the menu. Selecting **Connectable Features** opens a connection window with an expanded list of features, sorted alphabetically and by feature type.

   - If a connection window appears instead of the cascade menu, this means that preferred features have not been assigned for the bean.
   - If the **Connectable Features** selection does not appear on the menu, this means the menu contains all available features, not just the preferred ones, and there are no more from which to select.

2. Select a feature by doing one of the following:
   - If the feature appears in the preferred list, select it.
   - If the feature does not appear in the list but the **Connectable Features** selection is available, select **Connectable Features** and then select the feature from the expanded list in the connection window.
   - If the feature does not appear in either the preferred or expanded list, you may be able to edit the bean to add the feature you need.

3. If, at this point, you decide not to complete the connection, do one of the following:
   - If a pop-up menu appears, move the mouse pointer away from the connection menu and click.
   - If a window showing all the features appears, click on **Cancel**.

   The menu or window closes without completing the connection.

4. Place the mouse pointer over the target bean. As you move the mouse, a dashed line trails from the mouse pointer back to the source bean.
5. Click the left mouse button. As with the source bean, either a pop-up menu or connection window appears.
6. Select the target feature as before.

When you complete the connection, a colored connection line appears. The color indicates the connection type, based on the features you selected as end points.

You make connections within the beans list in the same manner as in the Visual Composition Editor. You cannot, however, start a connection on the Visual Composition Editor and complete it in the beans list or vice versa. You may want to draw connections on the beans list instead of the Visual Composition Editor if you use a layout that allows for a bean to completely cover another bean.

Note: If you are using an unbound property in a property-to-property connection, open properties on the connection and select an event to associate with the property. When the event is triggered, the properties values align.

Connecting features to code

The source for a code connection must be either an event or a bound property (a property that fires an event when its value changes). Connect to a code as follows:

1. Open the pop-up menu for the source bean.
2. Select **Event to Code** and the Event-to-Code Connection window appears.
3. Select an **Event** from the **Event** drop-down menu.
4. If you have already written the code, select it from the Method drop-down. Otherwise, leave `<new method>` visible in the Method field.
5. Modify the code in the code window as appropriate. This window operates the same as the code window for creating methods in the IDE.

   Note: You can use code assist in this source pane. For information on this tool, refer to *Getting Started*.
6. If you want the event to pass its parameters to the new method, select **Pass event data** at the bottom of the panel.
7. If the code takes input parameters and you want to specify them as constants, save the code by opening the code pane pop-up and selecting Save. When the code is saved, click **Set parameters** and enter the constants you want.
8. Click on **OK**.

   The connection window closes and VisualAge draws a green connection arrow from the source bean to a moveable text box on the free-form surface. If the connection arrow is dashed, you must supply values for the input parameters of the code.

   You can also create a code connection by selecting a source event and targeting an Event-to-Code Connection on the free-form surface.

Connecting from connection results

An *exception* is any user, logic, or system error detected by a function that does not deal with the error itself but passes the error on to a handling routine, called an *exception handler*. In VisualAge®, you can catch exceptions by connecting exception events to either methods or code.

An exception is a feature of a connection, not a bean. It appears as exceptionOccurred on the connection's connection menu.

You can also pass the return value from the target of a connection. This return value displays as the normalResult event of the connection. You can connect the normalResult event to a feature of the same bean or another bean. For example, you can connect the exceptionOccurred to a method that brings up a prompter with an error message.

Supplying parameter values for incomplete connections

Connections sometimes require parameters, or input arguments. If a connection requires parameters that have not been specified explicitly or by default, it appears as a dashed arrow, indicating that it is incomplete. When you have made all the necessary parameter connections, the connection line becomes solid, indicating that the connection is complete.

You can create parameter from method and parameter from code connections. When the primary connection calls for a value parameter, it calls the method or code, which passes the return value as the parameter.

Supplying a parameter value using a connection

You can complete a connection that requires a parameter, by drawing another connection to the broken connection line. Start a new connection using as the source, the dashed connection line that requires the parameter and as the target, select the feature that provides the value.

For example, if you have a button that copies the text from TextField2 to TextField1, make the following connections:

1. Connect the button's actionPerformed event to the text property of TextField1.
2. From the broken connection line, connect the value property to the text property of TextField2.

Supplying a parameter value using a parameter-from-code connection

You can complete a connection that requires a parameter, by using the parameter-from-code option on the pop-up for that connection.

For example, if you have a button that copies the text from JTextField2 to JTextField1, do the following:

1. Connect the button's actionPerformed event to the setText property of JTextField1.
2. From the broken connection line, open the pop-up and select the parameter-from-code option.
3. From the source pane of the parameter-from-code connection window, replace `return null;` with the following:

   ```
   return getJTextField2().getText();
   ```

   This return value for the method, provides the value for the parameter.

Supplying a parameter value using a constant

When connections need parameters with constant input values, provide these values through the properties window of the incomplete connection, as follows:

1. Open properties for the incomplete connection by selecting **Properties** from the pop-up menu or by double-clicking the connection line. The properties window of the incomplete connection appears.
2. Select **Set parameters**. The Constant Parameter Value Properties window appears showing the parameters for which you can set constant values.
3. Enter the constant parameter values you want to use.
4. Do one of the following:
   - To apply and save the values and close the window, click on **OK**.

- To close properties without saving any of the parameter values you just entered, click **Cancel**.

Specifying values for parameters by default

In most connections other than event-to-code, data is not passed by default from the source of a connection to the target. However, you can set VisualAge so that it always passes the available event data. In that case, the initial connection line may not appear dashed.

To set the connection to always pass event data, follow these steps:
1. Open the properties for the connection.
2. Select the **Pass event data** check box.

Note: The source of the connection determines the event data that is passed.

The event-to-code dialog defaults the **Pass event data** check box to false only if either of the following is not true:

- The event passes a parameter and the code accepts a method.
- The event parameter matches the type of the parameter accepted in the code.

Editing connection properties

Connection properties enable you to change a connection without redrawing it. Through the properties window, you can do the following:
- Change the source or target feature, depending on the connection type
- Reverse the direction of a property-to-property connection
- Specify an input parameter as a constant
- Delete the connection

To open properties for a connection from either the free-form surface or the Beans List window, move the mouse pointer over the connection and do one of the following:
- Double-click the left mouse button.
- Right-click and select **Properties** from the connection's pop-up menu.

RELATED CONCEPTS

"Parameter connections" on page 28
"Chapter 8. Connections" on page 25
"Code connections" on page 27

RELATED TASKS

"Reordering connections" on page 86
"Selecting and deselecting connections" on page 85
"Deleting connections" on page 85
"Showing and hiding connections" on page 85
"Changing the source and target of connections" on page 86

RELATED REFERENCES

"Beans List" on page 188
"Pass event data" on page 219
"Chapter 59. Event-to-Code Connection window" on page 223

Chapter 23. Manipulating connections

Once you have made connections to and from beans on the free-form surface, you can modify them as follows:

- Display or hide the connection lines
- Delete the connection
- Reorder the connections from a bean
- Change the connection name
- Change the source and target of the connection without starting over

Showing and hiding connections

You can show and hide connections by using the  **Show Connections** and  **Hide Connections** tools. They can be found on the tool bar or as selections on the **Tools** menu. These tools show or hide all connections that have the selected bean or beans as their end points. If no beans are selected, these tools show and hide all connections in the composite bean.

If you hide connections, the Visual Composition Editor is refreshed faster and is less cluttered, making it easier for you to work.

You can also show and hide connections from the pop-up menu by selecting the **Browse Connections** cascade menu. The choices in this menu affect only connections going to and from the bean whose pop-up menu you opened.

Deleting connections

To delete a connection, do one of the following:

- Select the connection and press the **Delete** key.
- From the connection's pop-up menu, select **Delete**.
- From the connection's properties window, click **Delete**.

Selecting and deselecting connections

You select connections in the same way that you select beans. When you select a connection, boxes called *selection handles* ■ appear on it to show that it is selected. When first drawn, a connection contains three selection handles: one at each end and one in the middle. You can use selection handles to change either of the following:

- The end points of the connection.
- The shape of the connection line, by dragging the middle box to another location. This helps you distinguish among several connection lines that are close together.

Selecting a single connection

1. Move the mouse pointer over the connection you want to select.
2. Click the left moue button and the connection is selected.

Selecting multiple connections

To select multiple connections, do one of the following:

- In Windows: Hold down Ctrl or Shift and click on each connection you want to select.
- In UNIX platforms: Hold down the left mouse button and move the mouse pointer over each connection you want to select. After you select the connections, release the mouse button.

Deselecting connections

To deselect a connection without selecting another bean or connection, follow these steps:

1. Move the mouse pointer over the connection line.
2. Hold down the Ctrl key.
3. Click the left mouse button.

Reordering connections

If you make several connections from the same bean, they run in the order in which you made the connections. To ensure the correct flow of control when you generate the source code, you might need to reorder the connections. If so, do the following:

1. Select the source bean.
2. From the source bean pop-up menu, select **Reorder Connections From**. The Reorder Connections window appears, showing a list of your connections.
3. With the mouse pointer over the connection you want to reorder, press and hold the appropriate mouse button:
   - In Windows: Left mouse button
   - In UNIX platforms: Rightmost mouse button
4. Drag the connection to the place in the list where you want the connection to occur.

   Note: Parameter connections must always follow the connections they supply.
5. Release the mouse button.
6. Repeat these steps until the connections are listed in the order in which you want them to occur.
7. Close the window.

Changing the connection name

You can change the name of a connection to make identification easier. To change the connection name:

1. Open the pop-up for the connection.
2. Select **Change Connection Name**.
3. Modify the connection name.

The connection name changes in the Visual Composition Editor and, after you save the bean, in the source code.

Changing the source and target of connections

You can change the end points of a connection without redrawing it, either by dragging the connection or by changing its properties.

You can change the source of any connection. In most cases, you can also change the target. However, you cannot change the target to a type that is not allowed. For example, you cannot change a target to an event because an event can only be the source of a connection.

Moving either end of a connection to a different bean

1. Select the connection.
2. Move the mouse pointer over the appropriate selection handle at the end of the connection.
3. Press and hold down the left mouse button.
4. Move the mouse pointer to the new bean or connection.
5. Release the mouse button.

If you change the target of a *feature*-to-method connection to a bean that does not support the target method, the connection menu appears, and you can select a new target feature.

Moving either end of a connection to a different feature

1. Open properties for the connection. The Properties window for that connection type appears.
2. Select new end points from the lists shown.
3. Click on **OK**.

Reversing the direction of a connection

The direction of property-to-property connections determines which end point is initialized first. The target property is initialized first based on the value of the source. Only property-to-property connections can be reversed. To do this, open properties for the connection and click on **Reverse**.

Changing the shape of a connection

To help you distinguish among several connection lines that are close together, you can change the shape of connections. To do this, follow these steps:

- Select the connection line you want to change.
- Place the mouse pointer over the middle selection handle of the connection line.
- Click and hold down the left mouse button and drag the connection line to the desired shape.
- Release the mouse button and the new line is set with two new midpoint handles.

You can change the connection back to its original shape by selecting **Restore Shape** from the pop-up window.

RELATED CONCEPTS

“Chapter 8. Connections” on page 25

RELATED TASKS

“Selecting and deselecting beans” on page 71
“Chapter 22. Connecting beans” on page 81
“Editing connection properties” on page 84
“Displaying bean pop-up menus” on page 56

RELATED REFERENCES

“Show Connections” on page 189
“Hide Connections” on page 189
“Reorder Connections From” on page 197

“Change Connection Name” on page 194

Chapter 24. Managing the beans palette

You can modify the beans palette at any time from the Visual Composition Editor and in any of the following ways:
- Add a bean
- Add a category
- Add a grouping separator line
- Change icon size
- Refresh the palette
- Remove a bean
- Remove a category
- Reorder beans
- Resize the palette

To resize the palette, drag the sizing handle on the right side of the palette. If you choose not to resize the palette and some of the beans are not visible, you can access the beans by using the scroll buttons that appear at the top and bottom of the palette.

To change the icon size on the palette and the Beans List, open the palette pop-up and select **Show Large Icons**. This is a toggle option with the default set to small icons (16x16). The large icons are 32x32.

To reorder the beans within a category, or move a bean to another category:
1. From the palette pop-up or the **Bean** pull-down, select **Modify Palette**.
2. From the **Palette** list, drag the bean to the position or category you desire.
3. Click on **OK**.

If you have a category with many beans, you can group common beans using separators. To add a grouping separator to a category:
1. Select the category.
2. Select **Add Separator** and VisualAge adds a separator to the end of the category.
3. Select the new separator line and drag it to the desired location.

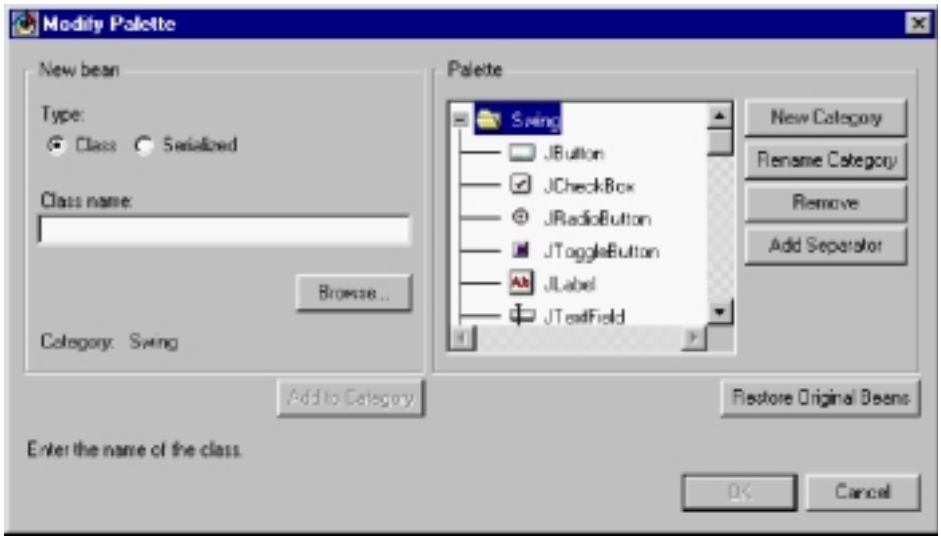
To remove a separator line, select the separator and then click **Remove**.

You may need to refresh the palette to view the following changes:
- Changing the icon that represents a bean
- Adding new beans
- Loading installed features manually at the package or class level

To refresh the palette, select **Refresh Palette** from the palette pop-up.

Adding a category to the palette

1. From the palette pop-up, select **Modify Palette**, and the Modify Palette window appears.
2. From the Palette group box, select **New Category** and a new category item appears highlighted in the list.
3. Enter the name for your new category in the highlighted region.
4. Click on **OK**.



RELATED CONCEPTS

"Beans palette" on page 8
"Chapter 14. Object serialization in VisualAge" on page 47

RELATED TASKS

"Chapter 19. Composing beans visually" on page 67

RELATED REFERENCES

"Chapter 48. Modify Palette window" on page 201
"Refresh Palette" on page 197

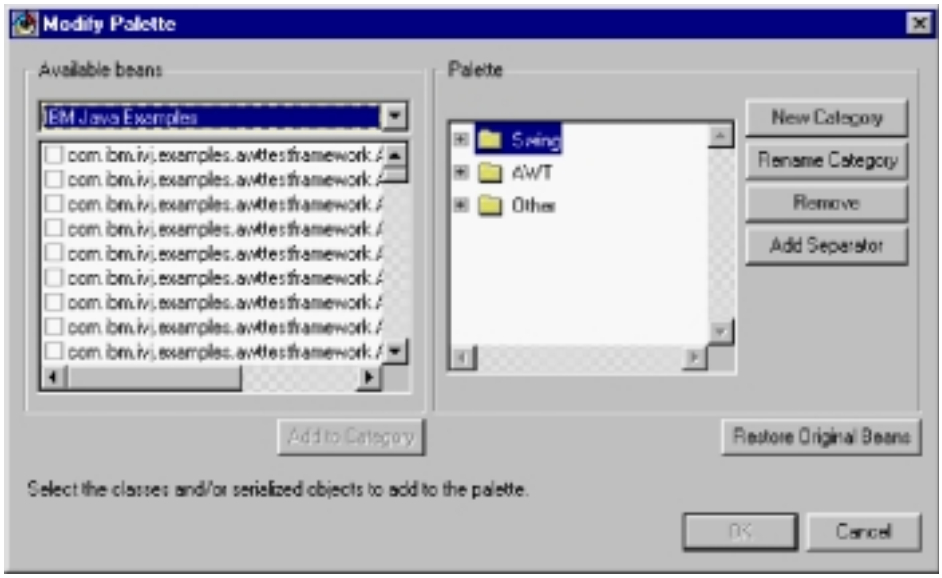
Adding a bean to the palette

To add beans to any category on the beans palette:

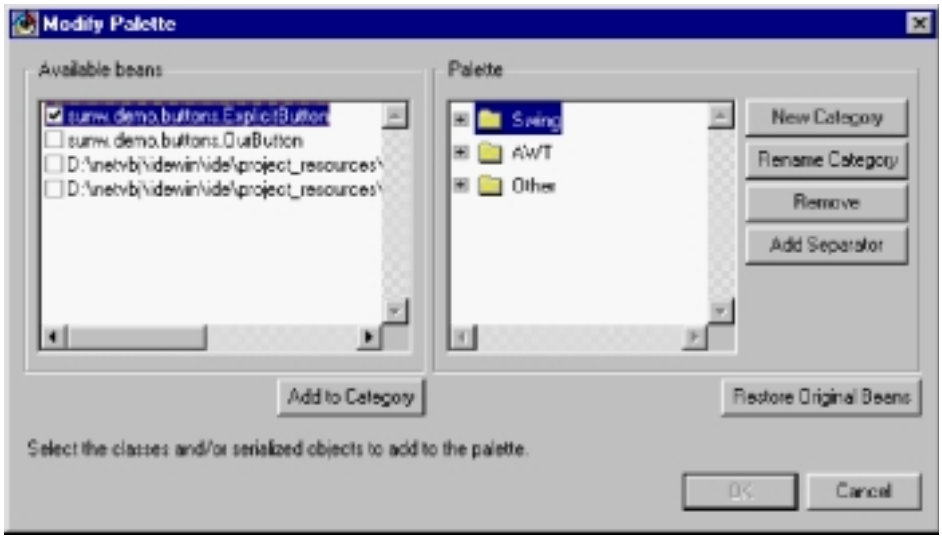
1. From the palette pop-up, select **Modify Palette**, and the Modify Palette window appears.
2. Select the bean type.
   - If you selected the Class bean type, enter the class name in the entry field or select **Browse** to locate the class.
   - If you selected the Serialized bean type, enter the file name in the entry field or select **Browse** to locate the serialized object file to add.
3. Under **Palette**, select a category for the new bean.
4. Select **Add to Category** and click on **OK**. The Visual Composition Editor adds the bean to the category on the beans palette.

To add beans from a project to any category on the beans palette:

1. From the palette pop-up, select **Add Bean from Project**, and the Modify Palette window appears.
2. From the Available beans pane, open the project in the drop-down list and select the project that contains the beans you want to add to the palette.
3. Select the beans, by selecting the check boxes.
4. Under **Palette**, select a category for the new beans.
5. Select **Add to Category** and click on **OK**. The Visual Composition Editor adds the beans to the category on the beans palette.



You can also add class or serialized files from .jar files to the palette by following the import SmartGuide from the **File** menu. The Modify Palette window that appears contains an **Available beans** list, where you select the beans you want to add to the category you select, or create, in the **Palette** list.



Note: If you designate an icon for the bean in the Information pane of the BeanInfo class, it is used for the palette entry. Otherwise, a default icon is used.

RELATED CONCEPTS

"Beans palette" on page 8

RELATED TASKS

"Deleting a bean or category from the palette" on page 92

RELATED REFERENCES

"Chapter 48. Modify Palette window" on page 201
"Chapter 65. BeanInfo page" on page 235
"Add Bean from Project" on page 193

Deleting a bean or category from the palette

To remove a bean from the beans palette:

1. From the **Bean** menu, select **Modify Palette** and the Modify Palette window appears.
2. In the Palette tree view, expand the category that contains the part you wish to remove.
3. Select **Remove** and a confirmation dialog appears.
4. Select **Yes** and then click on **OK**. The selected bean is removed from the beans palette.

To remove a category from the beans palette:

1. From the **Bean** menu, select **Modify Palette** and the Modify Palette window appears.
2. In the list box, select the category that you wish to remove.
3. Select **Remove** and then click on **OK**. The selected category is removed from the beans palette.

RELATED CONCEPTS

"Beans palette" on page 8

RELATED TASKS

"Adding a category to the palette" on page 89
"Adding a bean to the palette" on page 90

RELATED REFERENCES

"Chapter 48. Modify Palette window" on page 201

Chapter 25. Using VisualAge beans in visual composition

You can use VisualAge beans, property settings and connections to compose a wide variety of Java program elements. VisualAge provides a set of user interface beans that you can use to compose an applet or application. The product also provides Factory and Variable beans that you can use to create and access bean instances.

RELATED CONCEPTS

"Chapter 2. How classes and beans are related" on page 3

RELATED TASKS

"Composing an applet"
"Composing a window" on page 95
"Adding a pane or panel" on page 97
"Adding a table or tree view" on page 101
"Adding a text component" on page 102
"Adding a list or slider component" on page 105
"Adding a button component" on page 109
"Adding a menu or tool bar" on page 111
"Chapter 26. Setting general properties for beans" on page 117
"Dynamically creating and accessing a bean instance" on page 114
"Chapter 17. Visual bean basics" on page 53

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

Composing an applet

Applets are generally small, specialized programs that are downloaded and run within a Java-enabled web browser. Applets operate within constraints that provide security from remote system intrusion.

You can compose and test an applet in the Visual Composition Editor. To run an applet in a web page, export the applet class and edit the web page source file to include the applet.

VisualAge provides applet beans from the javax.swing package, as well as others.

Bean	Description
JApplet (Swing) or Applet (AWT)	A program that can run in a compatible web browser

Changing Applet or JApplet properties

Use the bean property sheet to change default property settings. To open the property sheet for a JApplet, select the JApplet bean from the Beans List.

Arranging beans in an applet

Use either of the following methods:
- Assign a layout manager to control size and position of beans within the applet or applet content pane.

- Use a null layout (no layout manager) and the visual composition alignment tools to control size and position of beans.

Accessing the applet context

The applet context represents the environment in which an applet is running. It provides methods that perform the following:
- Get an image from a URL
- Get an audio clip from a URL
- Find other applets within the document
- Show a document at another URL

To access these applet context methods, tear off the appletContext property of the Applet or JApplet bean.

Accessing the document or applet URL for an Applet or JApplet bean

To get the URL of the HTML file where the applet is running, connect to the documentBase property or the getDocumentBase( ) method. To get the URL of the applet, connect to the codeBase property or the getCodeBase( ) method.

Providing information about the applet for an Applet or JApplet bean

To define information about the applet, from the **Members** page, edit the getAppletInfo( ) method. To get the applet information for an About dialog, connect to the appletInfo property or the getAppletInfo( ) method.

Exporting an applet class

Do the following to export the applet:
1. From the Workbench window, select the applet class.
2. From the **File** menu, select **Export** and The SmartGuide – Export window appears.

Adding an applet in an HTML file

Specify the applet in your web page source file at the location where you want the applet to run. If VisualAge generated an HTML file when you exported the applet, you must edit the source to specify attributes for the `<applet>` tag.

Use the `<applet>` tag to identify the applet class and to specify the dimensions of the bounding rectangle in which the applet is to run. The following example specifies an applet named MyApplet that runs in a 100 by 80 pixel rectangle.

```
<applet code="MyApplet.class" width=100 height=80></applet>
```

Bean—specific tasks
- JApplet tasks

For attributes that you can specify in the Applet tag, refer to books that document HTML.

For examples, see the BookmarkList class in the com.ibm.ivj.examples.vc.swing.bookmarklist and com.ibm.ivj.examples.vc.bookmarklist packages. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

“Chapter 17. Visual bean basics” on page 53
“Chapter 25. Using VisualAge beans in visual composition” on page 93

RELATED REFERENCES

“Chapter 35. Applet beans” on page 149

JApplet tasks

Accessing a JApplet bean in the Visual Composition Editor

JApplet beans contain a default content pane that completely covers the base bean. With the exception of a JMenuBar bean, you add visual beans to the content pane. You can access the covered JApplet bean in the Beans List.

Resizing or moving a JApplet bean in the Visual Composition Editor

JApplet beans (like Swing window beans) contain a default content pane that completely covers the base bean. With the exception of a JMenuBar bean, you add visual beans to the content pane. To select the JApplet bean and not the content pane, which is necessary for moving or resizing, select the JApplet bean in the Beans List.

Replacing the content pane for a JApplet bean

To replace the default content pane, delete it and add another container component. When you delete the content pane, a warning appears indicating that the content pane is missing. If you save the bean without specifying a new content pane, the Visual Composition Editor adds a JPanel bean.

Composing a window

Window beans are the primary visual context for other user interface components. VisualAge provides window beans from both the javax.swingpackage.

You can compose and test a window in the Visual Composition Editor. You can use window beans to create new composite beans. You can also add window beans as secondary windows. A FileDialog, which represents a system file dialog, cannot be composed as a primary window bean.

Bean	Description
JDialog (Swing) or Dialog (AWT)	A custom dialog, typically a secondary window
JFrame (Swing) or Frame (Dialog)	A desktop window with title bar, sizing borders, and sizing buttons
JInternalFrame (Swing)	A frame that is a child of another Swing component
JWindow (Swing) or Window (AWT)	A window without a title bar, sizing borders, and sizing buttons

Accessing a Swing window bean

Swing window beans (JDialog, JFrame, and JWindow) contain a default content pane that completely covers the base bean. With the exception of a JMenuBar bean, you add visual beans to the content pane. You can access the covered Swing window bean in the Beans List.

Replacing the content pane for a Swing window bean

To replace the default content pane, delete it and add another container component. When you delete the content pane, a warning appears indicating that the content pane is missing. If you save the bean without specifying a new content pane, the Visual Composition Editor adds a JPanel bean.

Arranging beans in a window

Use either of the following methods:
- Assign a layout manager to control size and position of beans within the applet or applet content pane.
- Use a null layout (no layout manager) and the visual composition alignment tools to control size and position of beans.

Basic connections
- Opening a window—Connect an event, such as the actionPerformed event of a button or menu item, to the show method for the window.
- Closing a window—Connect an event, such as the actionPerformed event of a button or menu item, to the dispose method for the window.

Bean—specific tasks
- Dialog and JDialog tasks

For examples, see the CustomerInfo class in the com.ibm.ivj.examples.vc.customerinfo package. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Dialog and JDialog tasks"
"Chapter 17. Visual bean basics" on page 53
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 36. Window beans" on page 151

Dialog and JDialog tasks

Obtaining information from a closed dialog

Connect the normalResult of the show( ) connection to the target property for the information. Then, connect the dialog property that contains the information to the appropriate parameter of the normalResult-to-target connection.

For example, to open a dialog that prompts the user for a text field name and returns it to a label in the primary window, do the following:
1. Connect an event in the primary window to the show( ) method of the dialog.
2. Connect the normalResult of the show( ) connection to the text property of the label in the primary window.
3. Connect the text property of the dialog text field to the value parameter of the normalResult-to-text connection.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 36. Window beans" on page 151

Adding a pane or panel

A pane or panel is contained by another pane, panel, window, or applet and is itself a container for other components. VisualAge provides pane and panel beans from the javax.swing package.

You can add a pane or panel bean as an embedded container for other components. You can also create a bean as a subclass of one of these beans to define a reusable component. This is particularly useful for panels.

Bean	Description
JDesktopPane (Swing)	A pane for a desktop within another Swing container
JEditorPane (Swing)	A pane for editing defined text types, such as HTML
JOptionPane (Swing)	A simple dialog pane
JPanel (Swing) or Panel (AWT)	A composition surface for user interface components
JScrollPane (Swing) or ScrollPane (AWT)	A scrollable view for another component
JSplitPane (Swing)	A split view for other components
JTabbedPane (Swing)	A tabbed view for other components
JTextPane (Swing)	A pane for editing text with visible styles and embedded objects

Bean—specific tasks
- JScrollPane and ScrollPane tasks
- JSplitPane tasks
- JTabbedPane tasks
- JEditorPane tasks
- JOptionPane tasks

For examples, see the CustomerInfo, AddressView, and CustomerView classes in the com.ibm.ivj.examples.vc.customerinfo package, and the DirectoryExplorer class in the com.ibm.ivj.examples.vc.swing.directoryexplorer package. The AddressView and CustomerView classes subclass a Panel as a reusable bean. The showMessageBox( ) method of the CustomerInfo class uses a JOptionPane bean. The DirectoryExplorer class uses a JSplitPane bean. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

“Chapter 17. Visual bean basics” on page 53
“Chapter 25. Using VisualAge beans in visual composition” on page 93

RELATED REFERENCES

“Chapter 37. Pane and panel beans” on page 157

JScrollPane and ScrollPane tasks

Displaying scroll bars

Select a scroll bar policy in the pane’s property sheet. For a JScrollPane bean, set horizontal and vertical scroll bar policies with the horizontalScrollBarPolicy and verticalScrollBarPolicy properties. For a ScrollPane bean, set a policy for both scroll bars with the scrollBarDisplayPolicy property. Select one of the following choices to specify when to display the scroll bar or scroll bars:

Property Value	Description
ALWAYS or SCROLLBARS_ALWAYS	Display, regardless of the size of the scroll pane or the component it contains.
AS_NEEDED or SCROLLBARS_AS_NEEDED	Display, only when the scroll pane is smaller than the component it contains. For a JScrollPane bean, also specify a preferred size property.
NEVER or SCROLLBARS_NEVER	Never display, regardless of the size of the scroll pane or the component it contains.

Enabling scrolling for a null layout

If the panel that you embedded in a scroll pane uses a null layout, you must set its preferredSize property to support scrolling. Set this property so that the panel is larger than the scroll pane.

Scrolling a JScrollPane bean in the Visual Composition Editor

You can manipulate the scroll bars in a JScrollPane bean during composition by clicking the pointer on either size of the scroll box (thumb), but not by dragging.

JSplitPane tasks

Defining the component orientation in a JSplitPane bean

Set the orientation property in the pane's property sheet to arrange components within the split pane. The default setting, HORIZONTAL, arranges components on the left and right. To arrange components on the top and bottom, select VERTICAL.

Adding components to a JSplitPane bean

You can only add two components to a split pane: one component on each half. Select the component you want to add and drag it to the split pane. Before you release the mouse button, an outline appears around the target pane. When you release it, the first component appears to fill the split pane. However, the target outline appears when you move the loaded pointer over the empty side of the split pane.

Defining the divider for a JSplitPane bean

Set the dividerLocation property to specify the initial divider position. This is only affective if you have two components in to the split pane. Set the dividerWidth property to specify the initial width of the divider. Set the oneTouchExpandable property to `True` to enable the user to adjust the width of the divider.

JTabbedPane tasks

Composing the first tab page of a JTabbedPane bean

A JTabbedPane bean contains a default JPanel bean, named Page. You can customize this page by changing the tab and adding the components you want. You can change the default JPanel bean and add another container component. To avoid background paint problems when you delete a page, set the opaque property of the JTabbedPane bean to `True`.

Adding a tab page to a JTabbedPane bean

Drop the component you want onto the tab region of the pane tab page. If you drop the component on a tab, VisualAge inserts a tab containing the new component after the tab you dropped the component on. If you drop the component after the last tab in the tab region, VisualAge inserts the new component as the last tab page.

Switching the composition focus to a tab page component

You can use the following methods to work with a tab page component:
- Select the tab and then, select the tab page component to shift the focus from the tabbed pane to the tab page component.
- Select the tab page component in the Beans List window.

Defining the tab for a JTabbedPane page

Define the tab in the property sheet as follows:

Property	Description
tabTitle	Text for the tab
tabPlacement	Move tab from default position
tabIcon	Specify an icon for the tab
tabDisabledIcon	Specify an icon for the disabled state
tabTip	Provide tool tip text for the tab
tabBackground and tabForeground	Change tab colors
tabEnabled	Set the initial state of the tab

Composing minor tabs in a JTabbedPane bean

Add a JTabbedPane bean as a tab component in the primary tabbed pane. Then, define tab placement for the minor tabs on a different edge of the nested tabbed pane.

JEditorPane tasks

Defining initial properties of a JEditorPane bean

Define initial properties in the pane's property sheet, including the following:
- Specify the text content type for the contentType property. For example, you can specify one of the following:
  - `text/plain`—uses the DefaultEditorKit
  - `text/html`—uses the HTMLEditorKit
  - `text/rtf`—uses the RTFEditorKit
  - `application/rtf`—uses the RTFEditorKit
- Enter any initial text for the text property.
- For HTML, you can specify a document page instead of initial text. Specify the URL as a quoted string for the page property.

JOptionPane tasks

Customizing a JOptionPane dialog

For standard dialogs, you can call one of the JOptionPane static methods without adding a JOptionPane bean. These methods are described in the task on opening a standard JOptionPane dialog. If you want to customize a dialog, add a JOptionPane bean as follows:

1. Add a JDialog or JInternalFrame bean as the frame for the option pane.
2. Delete the content pane of the frame bean.
3. Add the JOptionPane bean as the content pane for the frame bean.

Customize properties in the pane's property sheet, including the following:

Property	Possible Values
messageType	ERROR_MESSAGE INFORMATION_MESSAGE PLAIN_MESSAGE QUESTION_MESSAGE WARNING_MESSAGE
optionType	DEFAULT_OPTION OK_CANCEL_OPTION YES_NO_OPTION YES_NO_CANCEL_OPTION

Opening a standard JOptionPane dialog

The JOptionPane class provides a set of static methods for standard dialogs. These methods have several signatures, enabling you to specify certain dialog characteristics. Call any of these methods by creating an event-to-code connection and specifying the method as the target.

For a ...	**Use ...**
Confirmation dialog	showConfirmDialog( )
Input dialog	showInputDialog( )
Message dialog	showMessageDialog( )

The code should process any selected options or requested input. Depending on the dialog type, the user can select the option and have the corresponding option returned from the dialog.

Opening and closing a customized JOptionPane dialog

If you add a JOptionPane bean for customization, process the dialog as follows:

1. To open the pane's frame to display the dialog—Connect an event to the frame's show( ) method.
2. To close the pane's frame when the user selects a close dialog—Connect the pane's propertyChange event to the frame's setVisible( ) method. Then, set the connection parameter to `False`.
3. To retrieve an option or input value—Connect the pane's propertyChange event to a property. Then connect the parameter for the event-to-property connection to one of the following option pane properties:
   - value—the selected option
   - inputValue—the requested input value

Adding a table or tree view

A table or tree provides a view of objects from a data model that organizes objects in a tabular or expandable tree format. VisualAge provides table and tree beans in the javax.swing and javax.swing.table packages.

Bean	Description
JTable (Swing)	A table view of objects from a table data model
JTree (Swing)	A tree view of objects from a tree data model

Bean-specific tasks
- JTable and table tasks
- JTree and tree tasks

For examples, see the DirectoryExplorer class in the com.ibm.ivj.examples.vc.swing.directoryexplorer package and the Amortization class in the com.ibm.ivj.examples.vc.swing.mortgageamortizer package. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 38. Table and tree beans" on page 161

JTable, table model, and TableColumn tasks

For best results with JTable, drop it into the composite through the beans list. VisualAge for Java automatically embeds the JTable instance in a JScrollPane instance.

Defining a table data model

Create a data model class as a subclass of the AbstractTableModel class. The AbstractTableModel provides most of the TableModel interface, but you need to implement the following methods:

getColumnCount( )	This method returns 0 by default. Return the number of columns in the data array.
getRowCount( )	This method returns 0 by default. Return the number of rows in the data array.
getValueAt(int, int)	This method returns null by default. Return the data array object at the row and column specified by the arguments.

You must provide column names and row data. In the **Members** page, create a field of column names as an array of Strings with an initial value of names. Populate the data model with data that is either fixed or dynamically derived. You can create a field for row data as a two-dimensional array of Objects, or as a Vector.

To use a data model class as the data model for a JTable bean in the Visual Composition Editor, do the following:
1. Add the class to the free-form surface.

2. Connect the data model's *this* property to the table's model property

Defining table columns

By default, a table uses all columns for each row in the data model. To display data in a subset of columns or reorder the columns,
1. For each column you want to use, add a TableColumn bean.
2. Map the table column to the data model column from the TableColumn's property sheet, by specifying the 0-based index of the model column for the modelIndex property.
3. Customize the column heading by setting the headerValue property.

Getting a selection from a table

To get the...	Make a connection from the table's...
Selected row	selectedRow property
Selected column	selectedColumn property
Contents of a selected cell	1. getValueAt( ) method to the target property or parameter. 2. Connect the selectedRow property to the first parameter of the getValueAt( ) connection. 3. Connect the selectedColumn property to the second parameter.

JTree and tree model tasks

Defining a tree data model

Create a data model class as a subclass of the DefaultTreeModel class. Define the tree nodes in the data model class.

To use a data model class as the data model for a JTree bean in the Visual Composition Editor, do the following:
1. Add the class to the free-form surface.
2. Connect the data model's *this* property to the tree's model property.

Adding a text component

Text components are available for simple text and for enhanced text and editing panes. You can add a text bean to enable text input or provide a label.

Bean	Description
JLabel (Swing) or Label (AWT)	A label, usually to identify another component
JPasswordField (Swing)	A text field for sensitive data
JTextArea (Swing) or TextArea (AWT)	A multiline text area
JTextField (Swing) or TextField (AWT)	A single-line text field

Adding a label graphic

You can add a graphic to a JLabel bean. Select a graphic file for the icon property in the label's property sheet. Use the horizontalTextPosition property to specify a LEFT, CENTER, or RIGHT position of text relative to the graphic. The default choice is RIGHT. Set the iconTextGap property to specify the space between the icon and label text.

Defining keyboard access to an input field

For Swing text input components, you can define keyboard shortcuts to place the focus in the input field or area.

- To define an accelerator for a text field, specify the accelerator character, enclosed in single quotes, for the focusAccelerator property in the text component's property sheet. If you define tool tip text for the text field, the accelerator is displayed with the tool tip text. For example, if you specify `a` as the focusAccelerator value, `alt+A` appears after tool tip text when the user moves the mouse pointer over the text field.
- To define a label mnemonic for a text field, in the displayedMnemonic property of the JLabel's property sheet, specify the mnemonic character enclosed in single quotation marks.

Aligning text

Select an alignment choice for the horizontalAlignment or alignment property in the text component's property sheet. The alignment options are LEFT, CENTER, and RIGHT.

Selecting initial text

To select the initial text, set the selectionStart and selectionEnd properties in the text component's property sheet. These values are offsets from the beginning of the text, which is at offset 0. To select all text without determining the initial text length, specify selection from offset 0 to an offset that you consider to be larger than the initial text length.

Defining a minimum size for layout managers

Some layout managers use a minimum size for placement of components. To specify a minimum width for a text area, enter the width, in characters, for the columns property in the text component's property sheet. To specify a minimum height for a text area, enter the number of rows for the rows property.

Hiding input text

To hide input text, either use a JPasswordField bean or, from the text component's property sheet, specify an echo character for the echoChar property.

Preventing text modification in a text area

To prevent any input in a text area, set the editable property to `False` in the text component's property sheet.

Making a text area scrollable

An AWT TextArea implements scrolling, duplicating the capability of a ScrollPane bean. A JTextArea bean does not implement scrolling itself, but can become scrollable by placing it in a JScrollPane bean and using its scrolling capability.

Defining tool tip text for a text component

For Swing components, you can specify tool tip text, also known as fly-over text or hover help. Enter text for the toolTipText property in the component's property sheet.

Defining initial availability

By default, the component is enabled for user interaction. To initially disable the component, set the enabled property to `False` in the component's property sheet.

Synchronizing text

If you need to synchronize user input between two text components, do the following:
1. Connect their text properties.
2. Open the connection properties.
3. Associate each end of the connection with the keyReleased(java.awt.event.KeyEvent) event.

If you need to synchronize text that you set by connection from another source, make connections to both text components.

Disabling a text component

To disable a text component when an event occurs, connect the event to the component's enabled property and set the connection parameter value to `False`.

Enabling a text component

To enable a text component when an event occurs, connect the event to the component's enabled property and set the connection parameter value to `True`.

For examples, see the LayoutManagers class in the com.ibm.ivj.examples.vc.swing.layoutmanagers and com.ibm.ivj.examples.vc.layoutmanagers packages and the Amortization class in the com.ibm.ivj.examples.vc.swing.mortgageamortizer and com.ibm.ivj.examples.vc.mortgageamortizer packages. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 39. Text beans" on page 163

Adding a list or slider component

List components provide a list of items for the user to select. Slider components show a range of selection values or show progress for the duration of an operation. VisualAge provides list and slider beans from the javax.swing package.

You can add a list or slider bean to enable the user to select an item or value.

Bean	Description
JComboBox (Swing) or Choice (AWT)	A selectable list with an entry field
JList (Swing) or List (AWT)	A selectable list of choices
JProgressBar (Swing)	A progress indicator
JScrollBar (Swing) or Scrollbar (AWT)	A scrolling component
JSlider (Swing)	A selection component for a range of values

Obtaining the selected choice or value

Connect a property representing the selection to a target property. Then, open properties for the connection and select a source event that indicates when the selection changes.

Bean	Source property	Source event
JComboBox	selectedItem	itemStateChanged
Choice	selectedItem	itemStateChanged
JList	selectedValue or selectedValues	valueChanged
List	selectedItem or selectedItems	itemStateChanged
JProgressBar	value	stateChanged
JSlider	value	stateChanged
JScrollBar	value	adjustmentValueChanged
ScrollBar	value	adjustmentValueChanged

To get the value of the selected choice, connect the Choice selectedItem property to the value target. To get the index of the selected choice, connect the Choice selectedIndex property to the value target.

Calling a method when the value changes

To call a method when the value changes, connect a source event that indicates when the selection changes to the method.

Bean—specific tasks
- JScroll and Scroll bean tasks
- JComboBox and Choice bean tasks
- JList and List bean tasks
- JProgressBar and JSlider bean tasks

For examples, see the BookmarkList class in the com.ibm.ivj.examples.vc.swing.bookmarklist and com.ibm.ivj.examples.vc.bookmarklist packages, the ToDoList class in the

com.ibm.ivj.examples.vc.todolist package, and the Amortization class in the com.ibm.ivj.examples.vc.mortgageamortizer package. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167

JList and List bean tasks

Making a JList bean scrollable

An AWT List implements scrolling, duplicating the capability of a ScrollPane bean. A JList bean does not implement scrolling itself, but uses the scrolling capability of a JScrollPane bean in which it is placed. If you want a JList bean to be scrollable, drop it in a JScrollPane bean.

Defining the selection mode for a JList or List bean

You can define a list to allow either a single selection or multiple selections. With single selection, the previous selection is deselected when the user selects another choice. Multiple selection differs between JList and List beans.

- The JList bean supports two modes of multiple selection. Select one of the following choices for the selectionMode property in the JList bean's property sheet:
  - SINGLE_SELECTION—allows only one choice to be selected at a time
  - SINGLE_INTERVAL_SELECTION—allows a range of choices to be selected
  - MULTIPLE_INTERVAL_SELECTION—allows multiple choices to be selected, individually or in ranges
- The List bean supports only one mode of multiple selection. Select one of the following choices for the multipleMode property in the List bean's property sheet:
  - `False`—allows only one choice to be selected at a time
  - `True`—allows multiple choices to be individually selected

Defining choices

You can specify choices using an initialization method. For a JList bean, you can alternatively define the list in a ListModel. Add the list model class to the free-form surface. Then, connect the list model's *this* property to the JList's model property.

To specify the choices using an initialization method, follow these steps:

1. After adding the bean, note its name. If you select the bean, its name appears in the Visual Composition Editor status area.
2. Save your composite bean.
3. On the **Members** page, add a method to initialize the choices. The method signature should look like this:

   ```
   void initializeChoices(choiceType myChoices);
   ```

   Specify the appropriate class for the choiceType:
   - javax.swing.JList
   - java.awt.List

4. Enter code in the initialization method to add choices. For a List bean, use the addItem method:

   ```
   myChoices.addItem("East");
   myChoices.addItem("West");
   myChoices.addItem("South");
   myChoices.addItem("North");
   ```

   For a JList bean, use the setListData() method:

   ```
   String[] data = {"East", "West", "South", "North"};
   myChoices.setListData(data);
   ```

5. Modify the get method for the bean you are initializing, for example, getJList1( ). In user code block 1, add code to call the initialization method you just created. The method call should look like this:

   ```
   initializeChoices(instanceName);
   ```

   Specify the instance name for the bean as the instanceName argument for the method call. The default instance name is something like ivjJList1, or ivjList1.

Obtaining the selected index or indexes for a JList or List bean

Connect the selectedIndex or selectedIndexes property to the value target. Then, open properties for the connection and select a source event that indicates when the selection changes.

JComboBox or Choice bean tasks

Getting the value that a user enters in a JComboBox bean

If you set the editable property of a JComboBox bean to True, the user can enter a value instead of selecting a choice from the list. To get an entered value, do the following:

1. Tear off the editor property of the JComboBox bean.
2. Tear off the editorComponent property of the torn-off editor property.
3. Connect the keyReleased event of the torn-off editorComponent property to the property that is to receive the entered value.
4. Connect the value parameter of the previous connection to the item property of the torn-off editor property.

Defining choices for a JComboBox or a Choice bean

You can specify choices using an initialization method.

To specify the choices using an initialization method, follow these steps:

1. After adding the bean, note its name. If you select the bean, its name appears in the Visual Composition Editor status area.
2. Save your composite bean.
3. On the **Members** page, add a method to initialize the choices. The method signature should look like this:

   ```
   void initializeChoices(choiceType myChoices);
   ```

   Specify the appropriate class for the choiceType:
   - com.sun.java.swing.JComboBox
   - java.awt.Choice
4. Enter code in the initialization method to add choices. Use the addItem() method:

```
myChoices.addItem("East");
myChoices.addItem("West");
myChoices.addItem("South");
myChoices.addItem("North");
```

5. Modify the get method for the bean you are initializing, for example, getJComboBox1( ). In user code block 1, add code to call the initialization method you just created. The method call should look like this:

   ```
   initializeChoices(instanceName);
   ```

   Specify the instance name for the bean as the instanceName argument for the method call. The default instance name is something like ivjJComboBox1 or ivjChoice1.

Allowing text entry in a JComboBox bean

Set the editable property to True in the property sheet.

Obtaining the selected index or indexes for a JComboBox or Choice bean.

Connect the selectedIndex or selectedIndexes property to the value target. Then, open properties for the connection and select a source event that indicates when the selection changes.

JScroll and Scroll bean tasks

Defining the orientation of a JScrollBar or ScrollBar bean

Select a choice for the orientation property in the property sheet. The orientation choices are VERTICAL and HORIZONTAL.

Defining the value range for a JScrollBar or ScrollBar bean

Set the minimum and maximum properties in the property sheet.

Defining the initial value of a JScrollBar or ScrollBar bean

Set value property in the property sheet. The initial value determines the initial progress, selection, or scrolling position in the value range.

Defining scrolling increments for a JScrollBar or ScrollBar bean

To define the value change when the user clicks on a scroll arrow, set the unitIncrement property in the ScrollBar property sheet. To define the value change when the user clicks in the scroll bar range away from the scroll box, set the blockIncrement property.

JProgressBar and JSlider bean tasks

Defining the orientation of a JProgressBar or JSlider bean

Select a choice for the orientation property in the property sheet. The orientation choices are VERTICAL and HORIZONTAL.

Defining the value range for a JProgressBar or JSlider bean

Set the minimum and maximum properties in the property sheet.

Defining the initial value of a JProgressBar or JSlider bean

Set value property in the property sheet. The initial value determines the initial progress, selection, or scrolling position in the value range.

Defining tick marks or values for a JSlider bean

To define the value increment between tick marks, set the majorTickSpacing and minorTickSpacing properties in the JSlider property sheet. To automatically adjust a user selection to the closest tick mark, set the snapToTicks property to True. To show the tick marks, set the paintTicks property to True. To show the tick values, set the paintLabels property to True. To reverse the minimum and maximum ends of the slider, set the inverted property to True.

Setting the value of a JProgressBar bean

Connect the value to the JProgressBar bean's value property. Then, open properties for the connection and select a source event that indicates when the selection changes.

Adding a button component

VisualAge provides button beans from the javax.swing and java.awt packages.

You can add a button bean to enable the user to perform an action or select a state.

Bean	Description
JButton (Swing) or Button (AWT)	A push button, generally used to perform a function
JCheckBox (Swing)or Checkbox (AWT)	A setting button that is checked when selected
JRadioButton (Swing) or CheckboxGroup (AWT)	A radio button or group for mutually exclusive settings
JToggleButton (Swing)	A two-state push button that appears to be pushed in when selected

Adding or customizing graphic images for Swing buttons

You can add or replace images for Swing buttons, such as JButton beans and JCheckBox beans. Specify the graphic file for one or more image properties in the component's property sheet.

Property	Represents...
icon	unselected button
pressedIcon	pressed button
selectedIcon	selected button
disabledIcon	unselected disabled button
disabledSelectedIcon	selected disabled button
rolloverIcon	unselected rollover button
rolloverSelectedIcon	selected rollover button

Defining the initial state of a toggle component

Set the selection or state property in the component's property sheet. For initial selection, set the property value to `True`. Otherwise, the value should be `False`. If the component is one of a group of mutually exclusive choices, only one member of the group should be initially selected.

If applicable, assign a toggle component to a group of mutually exclusive choices. Only one member of the group can be selected at a time.

Adding a group of JToggleButton or JRadioButton beans

Use a ButtonGroup bean to define a group of buttons:
1. Add the buttons for the group.
2. Add a ButtonGroup bean to the free-form surface.
3. Save the composite bean.
4. On the **Members** page, add user code in the get method of each button to add the button to the button group. For example, to add JRadioButton1 to ButtonGroup1, add this code to the getJRadioButton1( ) method:

   ```
   getButtonGroup1.add(ivjJRadioButton1);
   ```

Adding a group of Checkbox beans as radio buttons

Use a CheckboxGroup bean to define a group of radio buttons:

1. Add the Checkbox beans for the group.
2. Add a CheckboxGroup bean to the free-form surface.
3. In the property sheet of each Checkbox bean, specify the get method of the CheckboxGroup for the property. For example, to add Checkbox to CheckboxGroup1, specify getCheckboxGroup1( ) for the checkboxGroup property.

Calling a method when a button is selected

Connect the button's actionPerformed(java.awt.event.ActionEvent) event to the method on the target bean.

Obtaining the selected choice from a group

From the group's popup menu, tear off the property that represents the selected choice. For a ButtonGroup bean, tear off the selection property. For a CheckboxGroup bean, tear off the selectedCheckbox property. After tearing off the property, you can make connections to features of the Variable that represents the selected choice property.

Disabling a button

Connect a related event to the button's enabled property and set the connection parameter value to `False`.

Enabling a button

Connect a related event to the button's enabled property and set the connection parameter value to `True`.

For examples, see the ToDoList class in the com.ibm.ivj.examples.vc.todolist package, and the JRadioButtonPanel and RadioButtonPanel classes in the com.ibm.ivj.examples.vc.utilitybeans package. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Tearing off properties" on page 59
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 41. Button beans" on page 171

Adding a menu or tool bar

You can add a menu for a window, for a window component, or for another menu. Define a menu with menu choices that call a method or select a setting.

Define a tool bar with buttons and other components that call a method. Tool bars most commonly contain buttons with graphical images for functions such as clipboard and file operations. A JToolBar bean can contain other components, however, such as a JComboBox bean with font choices. The JToolBarButton bean is provided as a convenient means of adding a JButton bean that is tailored for a tool bar. The JToolBarSeparator bean represents a method call to add separation between other components in the JToolBar bean.

Bean	Description
JMenu (Swing) or Menu (AWT)	A cascade menu for another menu
JMenuBar (Swing) or MenuBar (AWT)	A menu bar for a window
JPopupMenu (Swing) or PopupMenu (AWT)	A pop-up menu for window components
JToolBar (Swing)	A graphical set of tool choices
JToolBarButton	A button for a tool bar
JToolBarSeparator	A visual separator between components in a tool bar

Adding a menu bar to a window

Drop a menu bar bean on the window. The menu bar appears in the window. Additionally, a cascade menu is added on the free-form surface and connected to a new menu label on the menu bar.

Adding a menu to a menu bar

Drop a menu bean on the menu bar. A menu is added on the free-form surface and connected to a new menu label on the menu bar. If you have already dropped the menu bean on the free-form surface, drag it to the menu bar and drop it to make the connection.

Adding a cascade menu to another menu

Drop a menu bean on the base menu you want to cascade from. A menu is added on the free-form surface and connected to a new menu item on the base menu. If

you have already dropped the new menu bean on the free-form surface, drag it to the base menu and drop it to make the connection.

Adding a pop-up menu

Drop a pop-up menu bean on the free-form surface. To show the menu when the user clicks the pop-up mouse button on a window component, connect the mouse event for the composite bean to a code that displays the menu.

The following example code determines whether the pop-up mouse button has been clicked, gets the window component, and shows the pop-up menu:

```
protected void genericPopupDisplay(java.awt.event.MouseEvent e, java.awt.PopupMenu p) {
   if ((e.isPopupTrigger()))  {
  e.getComponent().add(p);
  p.show(e.getComponent(), e.getX(), e.getY());
   };
}
```

Adding a tool bar

You can add a JToolBar bean to the content pane of a Swing applet or window. Before you add the tool bar, you should define the layout property of the content pane as a border layout. Add the tool bar to one of the border regions (North, South, East, or West). By default, a tool bar is detachable because the floatable property is set to `True`. If you want a floatable tool bar to be attachable to any side of the content pane, do not add any other components to the four border regions.

When you add a JToolBar bean, a JToolBarButton bean is added with it. The JToolBarButton bean is actually a JButton bean that is tailored for a tool bar. Change properties of the JToolBarButton bean, such as the icon, to serve your purpose.

Adding an action to a menu or tool bar

You can define a subclass of AbstractAction that can be used in one or more Swing menus and tool bars. For example, you can define an action for a clipboard operation and add it to menus and tool bars. You must implement the actionPerformed( ) method of the subclass. Add the AbstractAction subclass to the free-form surface. Save the bean. Then, edit the get( ) method for the menu or tool bar to add the AbstractAction subclass.

Enable or disable the menu. When a menu is disabled, the user cannot open it. By default, a menu is initially enabled.

Disabling a menu when an event occurs

Connect the event to the menu's enabled property. Then, set the connection parameter value to `False`.

Enabling a menu when an event occurs

Connect the event to the menu's enabled property. Then, set the connection parameter value to `True`.

Bean	Description
JCheckBoxMenuItem (Swing) or CheckboxMenuItem (AWT)	A menu choice that toggles a setting on and off
JMenuItem (Swing) or MenuItem (AWT)	A menu choice that calls a method
JRadioButtonMenuItem (Swing)	A menu choice that provides one of a set of mutually exclusive setting values
JSeparator (Swing) or MenuSeparator (AWT)	A horizontal line that separates groups of related choices

Adding a choice to a menu

Drop one of the menu choice beans within a menu at the location you want. Before you release the mouse button, a horizontal cursor line indicates where the choice will be placed.

Moving a menu choice

Drag the menu choice and drop it at a new location, either in the same menu or in another menu. Before you release the mouse button, a horizontal cursor line indicates where the choice will be placed.

Adding a separator to a menu

Drop a separator bean within a menu at the location you want. Before you release the mouse button, a horizontal cursor line indicates where the separator will be placed.

Adding a component to a tool bar

Drop a component bean on a JToolBar at the location you want. Before you release the mouse button, a cursor line indicates where the choice will be placed.

Moving a component on a tool bar

Drag the component and drop it at a new location. Before you release the mouse button, a cursor line indicates where the choice will be placed.

Adding a separator to a tool bar

Drop a JToolBarSeparator bean on a JToolBar bean at the location you want. Before you release the mouse button, a cursor line indicates where the separator will be placed.

Defining text for a menu choice

Enter the text in the value field of the label property in the property sheet.

Defining a keyboard shortcut for a menu choice

Set the shortcut property in the property sheet for the menu choice. Select the **Shift** check box if you want to use the Shift key. Select a unique key choice for the menu item.

Calling a method from a menu choice

Connect the actionPerformed(java.awt.event.ActionEvent) event of the menu choice to the method on the target bean. The method is called when the user selects the menu choice.

Defining the initial state of a check box menu choice

Set the state property of the menu choice in its property sheet. If the property value is `True`, the initial setting is on. Otherwise, the initial setting is off

Note: This property setting does not affect the appearance of a check box menu item in the Visual Composition Editor.

Updating a setting for a check box menu choice

Connect the state property of the menu choice to the property on the target bean. The property is set when the user toggles the menu choice.

Disabling a menu choice when an event occurs

Connect the event to the menu choice's enabled property. Then, set the connection parameter value to `False`.

Enabling a menu choice when an event occurs

Connect the event to the menu choice's enabled property. Then, set the connection parameter value to `True`.

For examples, see the PopupMenuExample class in the com.ibm.ivj.examples.vc.popupmenuexample package, the *Amortization* class in the com.ibm.ivj.examples.vc.mortgageamortizer package, and the DirectoryExplorer class in the com.ibm.ivj.examples.vc.swing.directoryexplorer package. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 42. Menu and tool bar beans" on page 175

Dynamically creating and accessing a bean instance

VisualAge provides beans that enable you to dynamically create and reference bean instances visually. A Factory bean creates new instances of a bean type, based on a connection from an event to a constructor for the Factory bean's type. A Variable bean refers to any instance of the Variable bean's type that you assign to it using a connection. With either a Factory or a Variable bean, you specify the bean type that it can create or reference.

A Factory bean's type specifies the type of bean instance, or object, that it creates. A Variable bean's type specifies the type of object that can be assigned to it. For example, if you change a Factory's type to Customer, it can create Customer objects. If you change a Variable's type to Customer, you can use it to reference any Customer object that you assign to it.

You can visually create and access beans in the Visual Composition Editor.

Bean	Description
Factory	A bean that dynamically creates instances of Java beans
Variable	A bean that provides access to instances of Java beans

Adding a Factory or Variable bean

Select a Factory or Variable bean from the **Other** category of the beans palette. Alternatively, you can select a class type as a Variable in the Choose Bean window.

Changing the Factory or Variable type

When you add a Factory or Variable bean from the palette, its initial type is Object. Change the type as follows:
1. Open the bean pop-up menu.
2. Select **Change type** to open the Choose a Type window.
3. In the **Pattern** field, enter the type name.
4. In the **Class Names** or **Type Names** field, select the type you want.
5. In the **Package Names** field select the desired package.
6. Click on **OK**.

After you change the type, you can make connections to features of the new type.

Creating objects with a Factory

Connect an event to a Factory constructor method. If the constructor you choose requires parameter values, you can provide these values with additional connections or with property settings. Because the Factory bean references an object that it creates, you can make connections from the Factory's *this* event to methods and properties of the referenced object.

Assigning a bean instance to a Variable

Connect a bean property of the same type as the Variable to the *this* property of the Variable. This connection assigns the source property to the Variable, and the Variable references the source as a bean instance. If the source bean is the source property, use its *this* property as the connection source.

You can use two customized variations of this procedure:
1. **Tearing off a property**. If a bean is a property of another bean, you can access its features by creating a bean instance of the property in the form of a Variable. You accomplish this by tearing off the property of the bean. You can then access the features of the property through the Variable. For example:
   - A Customer bean has properties for name, address, and phone.
   - The address property is an Address bean with street, city, state, and zipCode properties.
   - When you add a Customer bean, you can make connections to its address property, but not to individual elements of the address.
   - Tear off the address property of the Customer bean and an Address Variable appears on the free-form surface.
   - A connection assigns the address property of the Customer bean to the Address Variable.

You can now make connections to the properties of the Address Variable to access elements of the Customer's address property.

2. **Promoting a Variable**. You can enhance bean reusability by defining its data source as a property of the bean. When you use the bean in another bean, you can assign the data using a connection to the data property. To do this, add a Variable for the data source bean type in the reusable bean. Then, promote the Variable bean's *this* property to the interface of the reusable bean. For example:
   - A CustomerView bean provides a panel of fields to display or obtain information for a Customer bean. To make the CustomerView bean reusable with a Customer bean, you don't want to specify a particular Customer bean as the data model for the CustomerView bean.
   - Use a Customer Variable bean, instead of a Customer bean, in the CustomerView bean as the data model for the customer information fields.
   - Connect properties of the Customer Variable to corresponding customer information fields to tie the data model to the user interface.
   - Promote the Customer Variable to the CustomerView bean interface as a customer property.
   - Whenever you add a CustomerView bean to another bean, also add either a Customer bean or another bean that contains a Customer bean as a property. Connect the Customer bean to the customer property of the CustomerView bean. This assigns the Customer bean to the Customer Variable in the CustomerView bean.

For examples that use a Variable, see the Amortization class in the com.ibm.ivj.examples.vc.swing.mortgageamortizer package, and the AddressView and CustomerView classes in the com.ibm.ivj.examples.vc.customerinfo package. These examples are shipped in the IBM Java Examples project.

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 19. Composing beans visually" on page 67
"Promotion of bean features" on page 23
"Tearing off properties" on page 59
"Chapter 25. Using VisualAge beans in visual composition" on page 93

RELATED REFERENCES

"Chapter 43. Factory and variable beans" on page 181

Chapter 26. Setting general properties for beans

The property sheet for individual beans is different depending on the bean. However, there are property settings similar for many beans. The following table lists the property, possible values, and descriptions:

Property...	Description of Values
alignmentX and alignmentY	Swing components—Assigns component position within BoxLayout. If border layout is specified as being X_Axis, you can change the alignmentY to -1 for top or 1 for bottom. If the Y_Axis is specified, you can change the alignmentX to -1 for left or 1 for right.
background and foreground	Chose from Basic, System, or RGB colors to replace the default colors.
beanName	Enter the replacement name for the default beanName. This is the name used in code to identify the bean.
border	Specify the border type for your component. The border type can be your own code string or chosen from the bean implementing interface list.
constraints	Including x and y constraints (for position placement within the container) and width and height (for size of the component).
cursor	You can specify a cursor type for each component. For example, when the user points to the target button,
doubleBuffered	Boolean value—Sets whether the receiving component uses a buffer to paint. If set to true, the painting is performed to an offscreen buffer and then copied to the screen. If a component is buffered and one of its ancestor is also buffered, the ancestor buffer is used.
enabled	Boolean value—An enabled component responds to user input and generates events. Components are enabled initially by default.
font	Specify the name, style, and size of the text font within the component.
locale	Specify the language and country codes. The default is en_US and represents English language code with the United States country code. Language codes must be ISO-639 compliant and Country codes must be ISO-3166 compliant.
nextFocusableComponent	Specify the next focusable component.
opaque	Boolean value—If a Swing component is set to opaque, the Swing painting system does not paint anything behind the component.
preferredSize	The preferred size indicates the best size for the component. Enter new dimensions to change the default. However, certain layout managers ignore this property.
requestFocusEnabled	Request that the component get the keyboard focus.
text	Specify the text you want to appear within the component.
toolTipText	For Swing components— Enter text you want to appear as fly-over text or hover help. To provide tool tip text for table cells, enter the toolTipText for the cell renderer.

Property...	Description of Values
visible	Boolean value—When set to true, default, the component is visible.

Chapter 27. Enabling custom edit support for your bean

The JavaBeans specification defines two ways for you to implement custom edit behavior for your bean: property editors and customizers. Check the most recent version of the spec for details; a summary of custom editors follows:

- For setting a single property, use a property editor. This simple GUI implements the java.beans.PropertyEditor interface. You can associate a property editor with a property type or a specific property. Property editors are typically grouped into a single *property sheet* for the bean. The quickest way to create a property editor is to inherit from java.beans.PropertyEditorSupport, a concrete implementation class.
- For setting multiple properties through a single GUI, use a customizer. It is also a good choice if the bean interface itself is large or complex enough that you want to take responsibility for edit behavior for all properties in the bean. The quickest way to create a customizer in VisualAge is to inherit fromjava.awt.Panel, implementing the java.beans.Customizer interface.

All properties must be serializable. Java uses serialization to share instance information.

You must explicitly assign a customizer for it to be used; this is not true for property editors. The JavaBeans specification provides the following alternatives for associating a property editor and property:

- Name the property editor class appropriately and place it in the same package. If the property is of type MyObject, call the property editor class MyObjectEditor.
- Register the property editor with the PropertyEditorManager.
- Explicitly assign the property editor in the bean's BeanInfo class.

Assigning custom edit support to a bean property

In VisualAge, you can assign property editors and customizers from the **BeanInfo** page of the class browser, or you can hand-edit the BeanInfo class directly.

To assign a property editor when you define the property, enter the name of the class in the **Property editor** field on the second page of the New Property Feature SmartGuide. To assign a property editor at any other time, directly edit the **Property editor** field in the Property Feature Information pane of the **BeanInfo** page. In this case, the change does not take effect until you save the bean, either by closing the class browser and electing to save changes or by typing Ctrl+S.

To assign a customizer to a bean, directly edit the **Customizer class** field in the Bean Information pane of the **BeanInfo** page. (Make sure you have no features selected; if a feature is selected, the Feature Information pane appears instead.) The change does not take effect until you save the bean, either by closing the class browser and electing to save changes or by typing Ctrl+S.

Registering custom edit support for all instances of a property type

You can register custom edit support globally through the use of a .properties file. Follow these steps:

1. Create the file ivj-property-editor-registry.properties in your favorite text editor. Follow the standard format for entries in a .properties file, in this case, *property_type=custom_edit_class*. An example follows:

   ```
   javax.swing.Border=myorg.mypackage.MyBorderEditor
   ```

   Both class specifications must be fully qualified. You cannot override the editor for java.lang.String.

   To unregister the editor currently being used, simply specify the property type without a corresponding custom edit class, as follows:

   ```
   java.awt.Color=
   ```

2. Save the file in the program\lib directory of your VisualAge installation.

   VisualAge scans the program\lib directory for the existence of this file every time a new Visual Composition Editor is opened. Consequently, any that are already open at the time you save the file will not be affected.

Testing custom edit support

To test a bean's customization, drop the bean on the free-form surface and double-click on it.

- If you have implemented a property editor, the standard property sheet appears. Select the value field for the associated property. If the property editor has a custom editor, a small button  appears to the right. Select the button to open the custom editor.
- If you have implemented a customizer, a property sheet appears, bearing a **Custom Properties** button. Click on the button to open the customizer; it appears in a modal window.

For more information on implementing property editors themselves, see "Chapter 28. Property editor examples" on page 121, which discusses the com.ibm.ivj.examples.vc.propertyeditors sample package.

RELATED CONCEPTS

"Chapter 14. Object serialization in VisualAge" on page 47

RELATED TASKS

"Adding property features" on page 134

RELATED REFERENCES

"Chapter 65. BeanInfo page" on page 235

Chapter 28. Property editor examples

The JavaBeans specification and VisualAge support the following types of editors implementing the java.beans.PropertyEditor interface:

Tag-based. This editor presents a fixed list of property values (known individually as *tags*) from a drop-down list in the property sheet.

Text-based. This editor accepts a single string from within a property sheet, parsing it as necessary to set the property.

Custom. This editor opens a window separate from the property sheet to collect settings information.

Paintable. This editor paints a graphic representation of the property value back into the property sheet rather than returning a String value.

Each type of property editor supports a subset of the PropertyEditor interface, meaning that a different set of method implementations returns non-null values. A summary follows:

- All property editors must support setValue( ) and signal property change events. They must also support either setAsText( ) or getCustomEditor( ). If they support getCustomEditor( ), they must also return `true` from supportsCustomEditor( ).
- Tag-based editors support getTags( ) and getAsText( ).
- Text-based editors support getAsText( ).
- Paintable editors support paintValue( ) and return `true` from isPaintable( ).

For properties that require special code to be generated for initialization, the getJavaInitializationString( ) method should return a non-null value. VisualAge uses this value when it generates code for the bean whose property you are setting. (For an example, see “Custom editor for the Person bean” on page 124.)

For examples, look at the com.ibm.ivj.examples.vc.propertyeditors package shipped with VisualAge in the IBM Java Examples project. Consider the Person bean, which has the following properties: name, address, phoneNumber, sex, and incomeRange.

```
public class Person {
   String fieldSex = "";
   protected transient java.beans.PropertyChangeSupport propertyChange
      = new java.beans.PropertyChangeSupport(this);
   transient Address fieldAddress = null;
   static public final int belowTwenty = 1;
   static public final int twentyToFifty = 2;
   static public final int fiftyToOneHundred = 3;
   static public final int aboveOneHundred = 4;
   int fieldIncomeRange = 0;
   String fieldPhoneNumber = "";
   Name fieldName = null;
}
```

Because possible incomeRange values are predefinable, this property can be set using a tag-based editor. The phoneNumber property has a known format in each locale, so the example uses a text-based editor and validates the input argument in setAsText( ) to make sure it matches the North American notion of a telephone number. For the name property, the example uses a custom editor instead of setAsText( ); name is an instance of a serializable class, as required. We illustrate a paintable editor for the sex property. Because this example does not include an

editor for the address property and the Address class happens not to be serializable, the instance has been marked as transient.

The sample package illustrates two means of associating a property editor. The sex, incomeRange, and phoneNumber properties are of types (String and int) for which there is default editor support in VisualAge, so editors for these properties are explicitly assigned in the bean's BeanInfo class. The name property is of type Name; because a NameEditor class exists in the same package, Java uses it by default.

For a tour of each property editor, follow the Related Reference links below. To test these editors, we used a simple visual composite based on the JApplet bean, PersonTester. When you double-click on the APerson bean in the composite, a standard property sheet appears with certain property editor examples enabled.

RELATED TASKS

"Chapter 27. Enabling custom edit support for your bean" on page 119

RELATED REFERENCES

"Tag-based editor for the Person bean"
"Text-based editor for the Person bean" on page 123
"Custom editor for the Person bean" on page 124
"Paintable editor for the Person bean" on page 126

Tag-based editor for the Person bean

This topic discusses classes found in the com.ibm.ivj.examples.vc.propertyeditors package. You can try this editor from the PersonTester composite.

The incomeRange property has a tag-based editor class associated with it. This editor extends java.beans.PropertyEditorSupport, a concrete implementation class for thejava.beans.PropertyEditor interface. As a result, setValue( ) does not have to be implemented locally.

```
public class IncomeRangeEditor extends java.beans.PropertyEditorSupport {
   String[] stringValues = {
      "0 - 20,000",
      "20,000 - 50,000",
      "50,000 - 100,000",
      "100,000+" };
   int[] intValues = {1, 2, 3, 4};
   String[] codeGenStrings = {
      "propertyeditors.Person.belowTwenty",
      "propertyeditors.Person.twentyToFifty",
      "propertyeditors.Person.fiftyToOneHundred",
      "propertyeditors.Person.aboveOneHundred"};

   public String getAsText() {
      for (int i=0; i< intValues.length; i++) {
         if (intValues[i] == ((Integer) getValue()).intValue())
            return stringValues[i];
      }
      return "";
   }
   public String getJavaInitializationString() {
      for (int i=0; i< intValues.length; i++) {
         if (intValues[i] == ((Integer) getValue()).intValue())
            return codeGenStrings[i];
      }
      return "0";
   }
   public String[] getTags() {
```

```
      return stringValues;
   }
   public void setAsText(String text) throws java.lang.IllegalArgumentException {
      for (int i=0; i< stringValues.length; i++) {
         if (stringValues[i].equals(text)) {
            setValue(new Integer(intValues[i]));
            return;
         }
      }
      throw new java.lang.IllegalArgumentException(text);
   }
}
```

The getTags( ) method holds allowable property values in an array. IncomeRangeEditor uses a set of parallel arrays to manage the allowable income ranges. Note that the sole purpose of the codeGenStrings array is to address incomeRange constants in the Person bean through the getJavaInitializationString( ) method. The return value from this method appears in the getAPerson( ) method of the PersonTester class:

```
private Person getAPerson() {
if (ivjAPerson == null) {
try {
ivjAPerson = new com.ibm.ivj.examples.vc.propertyeditors.Person();
ivjAPerson.setSex("female");
ivjAPerson.setName(new Name("Mrs.", "Susan", "Gail", "Carpenter"));
ivjAPerson.setPhoneNumber("555-1212");
ivjAPerson.setIncomeRange(com.ibm.ivj.examples.vc.propertyeditors.Person.belowTwenty);
// user code begin {1}
// user code end
} catch (java.lang.Throwable ivjExc) {
// user code begin {2}
// user code end
handleException(ivjExc);
}
}
return ivjAPerson;
}
```

RELATED REFERENCES

"Chapter 28. Property editor examples" on page 121
"Text-based editor for the Person bean"
"Custom editor for the Person bean" on page 124
"Paintable editor for the Person bean" on page 126

Text-based editor for the Person bean

This topic discusses classes found in the com.ibm.ivj.examples.vc.propertyeditors package. You can try this editor from the PersonTester composite.

The phoneNumber property has a text-based editor associated with it. This editor extends java.beans.PropertyEditorSupport, a concrete implementation class for the java.beans.PropertyEditor interface. As a result, setValue( ) does not have to be implemented locally.

```
public class PhoneNumberPropertyEditor extends java.beans.PropertyEditorSupport {
   public void setAsText(String text) throws java.lang.IllegalArgumentException {
      if ((text.length() == 8) && (text.charAt(3) == '-' )) {
         setValue(text);
         return;
      }
      if (text.length() == 7) {
         setValue(text.substring(0,3) + "-" + text.substring(3,7));
         return;
```

```
        }
        throw new java.lang.IllegalArgumentException(text);
    }
}
```

The setAsText( ) method accepts only values that meet its format criteria; otherwise, it throws an IllegalArgumentException.

RELATED REFERENCES

"Chapter 28. Property editor examples" on page 121
"Tag-based editor for the Person bean" on page 122
"Custom editor for the Person bean"
"Paintable editor for the Person bean" on page 126

Custom editor for the Person bean

This topic discusses classes found in the com.ibm.ivj.examples.vc.propertyeditors package.You can try this editor the PersonTester composite.

Thename property has a custom editor (NameEditor) and custom editor panel (NameCustomEditor) associated with it. Support of the PropertyEditor interface and the edit function itself are decoupled in order to optimize performance in Person's property sheet. By decoupling them, we can delay construction of the custom editor panel until the user requests it; only the property editor itself is instantiated when the property sheet is first opened. This functional separation is significant when the type being supported can occur several times in a single property sheet (like a custom String editor), because each property requires its own instance of the custom editor.

When you browse the sample, note the public constructor for NameEditor. All of the other property editor classes in this sample have protected constructors, generated by default because the superclass constructor is protected. When you explicitly assign a property editor in BeanInfo, access to the protected constructor is not a problem. For the name property, however, we have not explicitly assigned an editor in BeanInfo. In this case, the PropertyEditorManager class becomes involved in coordinating edit support for the property, so we must provide a public constructor.

The NameEditor property editor looks like this:

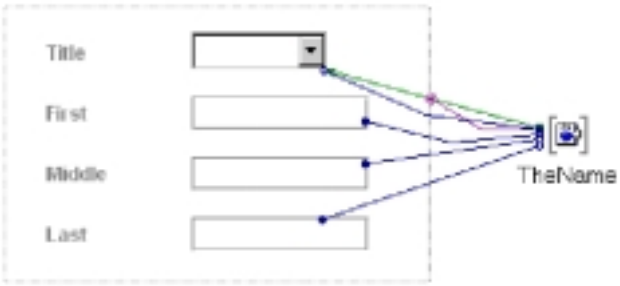
```
public class NameEditor extends java.beans.PropertyEditorSupport {
   java.beans.PropertyChangeSupport iPropertyChange
      = new java.beans.PropertyChangeSupport(this);
   NameCustomEditor iNameCustomEditor = null;
   Name iName = null;

   public String getAsText() {
      return ((Name) getValue()).toString();
   }
   public java.awt.Component getCustomEditor() {
      if (iNameCustomEditor == null) {
         iNameCustomEditor = new NameCustomEditor();
         iNameCustomEditor.setTheNameThis( getName() );
      }
      return iNameCustomEditor;
   }
   public String getJavaInitializationString() {
      Name tName = ( (Name) getValue() );
      return "new propertypditors.Name(\"" +
         tName.getTitle() +
         "\", \"" +
```

```
            tName.getFirstName() +
            "\", \"" +
            tName.getMiddleName() +
            "\", \"" +
            tName.getLastName() +
            "\")";
      }
      public Name getName() {
         if (iName == null) iName = new Name();
         return iName;
       }

      public Object getValue() {
         if (iNameCustomEditor == null)
            return getName();
         else
            return iNameCustomEditor.getTheNameThis();
      }
      public void setValue(Object value) {
         Object tValue = getName();
         if (iNameCustomEditor == null) {
            iName = ((Name) value);
            iPropertyChange.firePropertyChange("value", tValue, value);
         }
         else
         iNameCustomEditor.setTheNameThis( (Name) value );
}
      public boolean supportsCustomEditor() {
         return true;
      }
}
```

NameEditor manages the getting and setting of property values through the property sheet; NameCustomEditor collects the information from the user. The common currency between the property editor and the custom editor panel is a Name instance. The NameCustomEditor panel looks like this:



In this composite, property-to-property connections link Name properties in the variable bean to the text properties of the TextField beans. The Choice bean requires two connections: one from its selectedItem property to the title property of the variable, and one from the title property of the variable to the select( ) method of the Choice bean (passing in the current value of title as a parameter of the select( ) method). The variable's *this* property is promoted to the interface of the composite so that it can be set from NameEditor during initialization.

To understand how these two classes interact, follow this partial program flow:

1. When Person's property sheet is opened, a NameEditor instance is created. The getAsText( ) method is called to populate the value field for the name property.

2. The setValue( ) method is called, passing the value that currently appears in the property sheet as an input parameter. This value is then stored in NameEditor's iName field.
3. When the value field is selected, NameEditor's supportsCustomEditor( ) method is called. It returns true, so a small button appears in the value field.
4. When the button is clicked, NameEditor's getCustomEditor( ) method is called, creating an instance of NameCustomEditor and setting NameCustomEditor's TheName variable to match NameEditor's iName field.
5. If the **OK** button of NameCustomEditor is clicked, the getValue( ) and getJavaInitializationString() methods of NameEditor are called. If, however, the **Cancel** button is clicked, no methods are called in NameEditor.

RELATED REFERENCES

"Chapter 28. Property editor examples" on page 121
"Tag-based editor for the Person bean" on page 122
"Text-based editor for the Person bean" on page 123
"Paintable editor for the Person bean"

Paintable editor for the Person bean

This topic discusses classes found in the com.ibm.ivj.examples.vc.propertyeditors package. You can try this editor from the PersonTester composite.

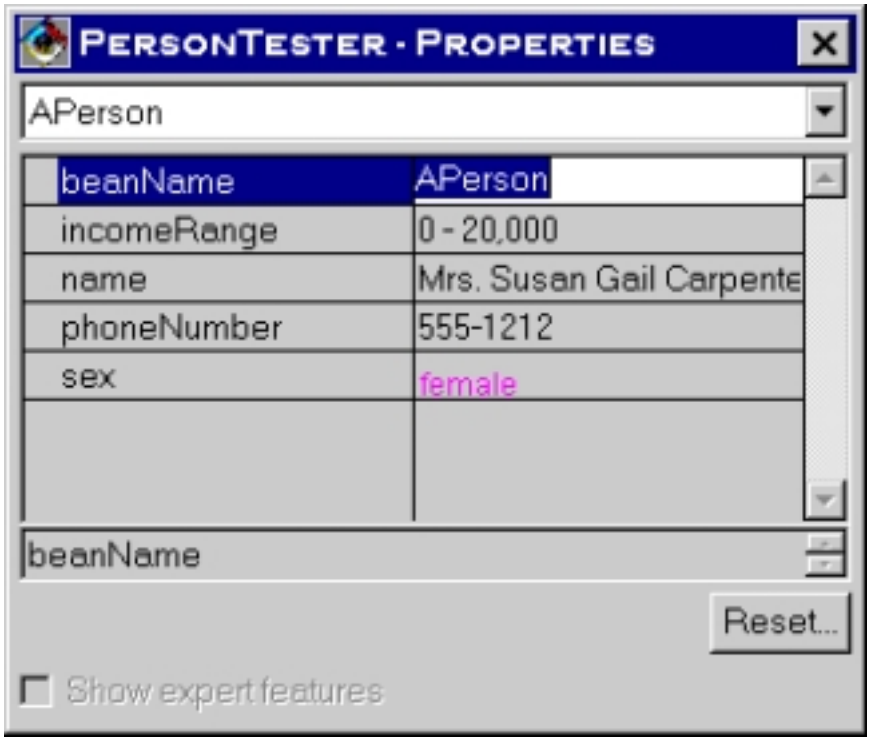
The sex property has a paintable editor associated with it. This editor extends java.beans.PropertyEditorSupport, a concrete implementation class for the java.beans.PropertyEditor interface. As a result, setValue( ) does not have to be implemented locally. In this type of property editor, we paint the tagged value back into the property sheet instead of returning it as a String.

```
public class PaintingEditor extends java.beans.PropertyEditorSupport {
   public String[] getTags() {
      String[] tags = {"male", "female"};
      return tags;
   }
   public boolean isPaintable() {
      return true;
   }
   public void paintValue(java.awt.Graphics gfx, java.awt.Rectangle box) {
      String tString = getAsText();

      if (tString.equals("male") )
         gfx.setColor(java.awt.Color.blue);
      else
         gfx.setColor(java.awt.Color.magenta);

      gfx.drawString(tString, (box.x) + 1, (box.y) + (box.height) - 2);
      return;
   }
}
```

The getTags( ) method holds allowable property values in an array. Instead of using getAsText( ) and setAsText( ) as we did for IncomeRangeEditor, we override isPaintable( ) and paintValue( ). The resulting property sheet looks like this:



RELATED REFERENCES

"Chapter 28. Property editor examples" on page 121
"Tag-based editor for the Person bean" on page 122
"Text-based editor for the Person bean" on page 123
"Custom editor for the Person bean" on page 124

Chapter 29. Separating strings for translation

Before doing this task, please read the conceptual information listed at the end of this topic.

From the Workbench, you can separate all String values from the class at once. From the Visual Composition Editor, you can separate String property values as you set them in the property sheet.

To separate String values from an entire class at once, follow these steps:

1. From the **Projects** page of the Workbench, select the class.
2. Select **Selected** and then **Externalize Strings**. Alternatively, click the right mouse button and select **Externalize Strings** from the pop-up menu that appears.

   The Externalizing: Package.Class window appears, bearing a list of hardcoded strings found in the class.
3. Specify the type of resource bundle by selecting one of the following radio buttons:
   - **List resource bundle**
   - **Property resource file**
4. Specify the name of the resource bundle.
   - To choose an existing resource bundle, click on the **Browse** button, pick a bundle from the standard dialog box, and then click on **OK**.
   - To create a new bundle, click on **New**. Enter values as prompted, depending on the type of resource bundle; click on **OK**.
5. If necessary, mark for exclusion those strings listed under **Strings to be separated** that should be left as is. To mark an item, click on the graphic listed to the left of the column, as follows:
   - To separate the item, do nothing. **Translate** is already displayed.
   - If the item must never be separated, click on once to display **Never translate**.
   - To leave the item hardcoded for now, click on twice to display **Skip**.

   If you are not sure of an item, review it in the **Context** field.
6. Click on **OK** to proceed with separation.

VisualAge marks each item marked with a special comment. To make a string previously marked appear in the externalization list once again, find the string in the code and delete the comment at the end of the line: `//$NON-NLS-1$`. Then perform this task a second time.

Separating strings through property sheets

To separate String property values as you set them, follow these steps:

1. Open the property sheet for each embedded bean that contains a text setting.

2. Click on the value field to the right of the property name. A small button  appears to the right.
3. Click on the small button. The String Externalization Editor window appears. At the top of the window is a set of radio buttons that enable you to specify how you want VisualAge to handle the text. The current property setting, if any, appears in the **Value** field.
4. Select the appropriate radio button:
   - **Do not externalize string**
   - **Externalize string**
5. If you selected **Do not externalize string**, you are finished. Just click on **OK** to close the window.
6. If you selected **Externalize string**, specify the type of resource bundle by selecting one of the following radio buttons:
   - **List resource bundle**
   - **Property resource file**
7. Specify the name of the resource bundle.
   - To choose an existing resource bundle, click on the **Browse** button, pick a bundle from the standard dialog box, and then click on **OK**.
   - To create a new bundle, click on **New**. Enter values as prompted, depending on the type of resource bundle; click on **OK**.

   The name of the bundle appears in the **Bundle** list. If you selected an existing class, a currently defined key-value pair appears in fields below the bundle name.
8. To define a resource, type its name in the **Key** field. If the resource already exists, the corresponding value for the key appears in the **Value** field underneath; otherwise, the field is empty. To edit the resource, type a new value.
9. Click on **OK** to close the window.

The next time you save the class, VisualAge modifies the generated get methods for the beans whose properties you just set as bundles.

RELATED CONCEPTS

"Chapter 15. Internationalization in VisualAge" on page 49

RELATED TASKS

"Editing bean properties" on page 53

RELATED REFERENCES

"Chapter 63. String Externalization Editor" on page 231
"Chapter 11. Example of code generated from visual composite" on page 39

Chapter 30. Incorporating user-written code into visual composites

Although VisualAge enables you to compose and generate user interface beans, you will probably want to write other beans yourself at some point. These are typically nonvisual beans that provide business logic. You can either create a new bean and write the code to support its features, or you can define bean interface features for code you have already written.

If you just need to extend the function of the bean, you can probably accomplish this by using code connections. As a last resort, you can modify generated code for the bean.

VisualAge provides a *code assist* tool within source panes and some other dialogs and browsers, such as Scrapbook windows and Configure Breakpoints. Code assist provides a list of appropriate classes, methods, and fields to insert in your code. For more information on this tool, refer to *Getting Started.*

Assembling a bean from generated and user-written code

Before you get started, read the related conceptual topic about generated code.

1. Design the bean interface.
2. Define the bean interface in the **BeanInfo** page. VisualAge generates source code for the interface features in the bean class. It also generates descriptor methods for the bean and its features in an associated BeanInfo class.
3. Modify the feature code to provide the behavior you want.

Modifying generated feature code

For properties, generated feature code is usually sufficient without modification. For method features, you must modify the feature code to add the behavior you want your bean to provide.

You can modify the feature code in the Source pane of either the **Members** page or the **BeanInfo** page. If you choose to modify feature code for visual composites, be sure to stick to the designated user-code areas marked. Otherwise, VisualAge will overwrite your code the next time the bean is saved.

If you need to modify the signature for a method that supports a feature, follow these steps:

1. Remove the feature in the **BeanInfo** page.
2. Modify or replace the method in the **Members** page.
3. Add the feature again in the **BeanInfo** page.

Adapting user-written classes for use as beans

Before you get started, read the related conceptual topic about generated code.

1. If you wrote a class outside of VisualAge, import the class. VisualAge interprets the bean interface using introspector design patterns.
2. From the **BeanInfo** page, extend the bean interface with new features as needed. VisualAge generates a BeanInfo class when you add the first new feature. The BeanInfo class contains bean information for the bean, for the features you imported and for each new feature you add.

If you add public methods on the **Members** page, you can add them as features on the **BeanInfo** page. To add methods as features, select **Add Available Features** from the **Features** menu. Then, select the methods you want to add as features.

If you add a new method feature with the same name as a method you have already written, VisualAge uses the existing method. Otherwise, it generates a new method stub.

RELATED CONCEPTS

"Chapter 3. Visual, nonvisual, and composite beans" on page 5
"Code connections" on page 27
"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"How generated code coexists with user-written code" on page 35
Importing classes from the file system

RELATED REFERENCES

"Generated BeanInfo descriptor code (an advanced topic)" on page 34

Chapter 31. Defining bean interfaces for visual composition

The bean interface defines the property, event, and method features of your bean. These features can be used in visual composition when your bean is added to another bean. A BeanInfo class describes the bean and features that you add to the bean. Other features are inherited from the superclass of your bean unless you choose not to inherit features. See the related conceptual topic about bean interfaces for more information.

Add features to the bean interface in the **BeanInfo** page. You can use either the tool bar or **Features** menu to add a new feature. When you add a feature, VisualAge generates the following:

- Public methods for the feature in the bean class
- Bean information code that describes the feature in the BeanInfo class for the bean

If you create public methods for the bean in the **Members** page, you can add them as features in the **BeanInfo** page. Select **Add Available Features** from the **Features** menu to open the Add Available Features window and add methods as features.

Promote features of embedded beans in the Visual Composition Editor. You can promote features from the pop-up menu of an embedded bean. When you promote a feature, VisualAge generates the following:

- Public methods in the bean class that call methods of the embedded bean
- Bean information code that describes the feature in the BeanInfo class for the bean

RELATED CONCEPTS

"Chapter 7. Bean interfaces and BeanInfo" on page 23
"Chapter 2. How classes and beans are related" on page 3
"Chapter 9. Generated code" on page 31

RELATED TASKS

"Creating and modifying a BeanInfo class"
"Adding property features" on page 134
"Adding method features" on page 136
"Adding event features" on page 137
"Promoting features of embedded beans" on page 139
"Specifying expert features" on page 139
"Specifying hidden features" on page 140
"Specifying preferred features" on page 140
"Setting enumeration constants for a property" on page 140

RELATED REFERENCES

"Chapter 65. BeanInfo page" on page 235
"Features—BeanInfo page" on page 239

Creating and modifying a BeanInfo class

When you create a new bean, it does not initially have a BeanInfo class. VisualAge automatically creates a BeanInfo class for a bean if one does not exist and you do any of the following:

- Modify a BeanInfo property in the Information pane of the **BeanInfo** page. VisualAge generates bean information code that describes the bean.

- Add a new feature in the **BeanInfo** page. VisualAge generates bean information code that describes the bean and the new feature.
- Promote a feature of an embedded bean in the Visual Composition Editor. VisualAge generates bean information code that describes the bean and the promoted feature.

You can explicitly create a BeanInfo class in the **BeanInfo** page as follows:

1. From the **Features** menu, select **New BeanInfo Class** to open the SmartGuide – BeanInfo Class window.
2. In the SmartGuide – BeanInfo Class window, you can specify a display name and short description to use for the bean. If you want to provide customized initialization of bean properties, specify a customizer class for the bean. Click on **Next** to open the SmartGuide – Bean Icon Information window.
3. In the SmartGuide – Bean Icon Information window, you can specify files containing icons for the bean. Click on **Finish** to create the BeanInfo class.

You can also create or replace a BeanInfo class in the **BeanInfo** page as follows. From the **Features** menu, select **Generate BeanInfo class**. VisualAge generates bean information code that describes the bean and all features that you have added or promoted to the bean interface.

To modify the information in a BeanInfo class, edit bean information properties in the Information pane of the **BeanInfo** page. If no feature is selected in the Features pane, you can edit bean information for the bean. If a feature is selected, you can edit bean information for the feature.

If you want a bean to be serialized, set the Hidden-state property of the bean to `true` in the Information pane.

RELATED CONCEPTS

"Chapter 7. Bean interfaces and BeanInfo" on page 23
"Generated BeanInfo descriptor code (an advanced topic)" on page 34
"Chapter 14. Object serialization in VisualAge" on page 47

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"Setting enumeration constants for a property" on page 140

RELATED REFERENCES

"BeanInfo Class SmartGuide" on page 244
"Bean Icon Information SmartGuide" on page 245
"Information pane—BeanInfo page" on page 237

Adding property features

Define property features to represent bean data or attributes that you want other beans to have access to.

Add a new property feature in the **BeanInfo** page as follows:

1. From the tool bar, select  **New Property Feature**. If you prefer, you can select **New Property Feature** from the **Features** menu. Either selection opens the SmartGuide – New Property Feature window.
2. In the SmartGuide – New Property Feature window, do the following:
   a. Specify the property name in the **Property name** field.

b. Specify the property type in the **Property type** field.

c. If you want the property value to be retrievable, make sure that the **Readable** check box is selected. If this option is selected, a get method is generated for the property.

d. If you want the property value to be modifiable, make sure that the **Writeable** check box is selected. If this option is selected, a set method is generated for the property.

e. If you want the property to send value changes on connections, make sure that the **bound** check box is selected.

f. If the property consists of an array of elements, select the **Indexed** check box. After you finish adding the property feature, select **Add Available Features** from the **Features** menu to add the get and set array element methods as features so you can make connections to them.

g. If you want other beans to be able to veto value changes for the property, select the **constrained** check box.

h. Click on**Next** to open the SmartGuide – Bean Information window.

3. In the SmartGuide – Bean Information window, do the following:

a. If you want a name other than the actual feature name to be displayed for the property in the Visual Composition Editor, specify the name in the **Display name** field. This name appears when the property is listed in connection menus, the bean property sheet, and other windows.

b. If you want a description other than the feature name to be displayed for the property in the Visual Composition Editor, specify the description in the **Short description** field. This description appears in certain windows, such as connection windows and the Promote Features window, when the property is selected.

c. If you do not want the property to appear in development windows unless the user chooses to display expert features, select the **expert** check box.

d. If you do not want the property to be exposed to the bean consumer, select the **hidden** check box.

e. If you want the property to be available in the bean connection menu, select the **preferred** check box.

f. If you want to provide customized initialization of the property, specify a property editor class.

g. Click on **Finish** to add the property. VisualAge generates the following:
   - Public methods for the feature in the bean class
   - Bean information code that describes the feature in the BeanInfo class for the bean

RELATED CONCEPTS

“Feature naming guidelines” on page 24
“Chapter 9. Generated code” on page 31

RELATED TASKS

“Specifying expert features” on page 139
“Specifying hidden features” on page 140
“Specifying preferred features” on page 140
“Setting enumeration constants for a property” on page 140
“Creating and modifying a BeanInfo class” on page 133
“Chapter 31. Defining bean interfaces for visual composition” on page 133

RELATED REFERENCES

“New Property Feature SmartGuide” on page 246
“Bean Information SmartGuide” on page 245

"Features pane—BeanInfo page" on page 236

Adding method features

Define method features to represent bean behaviors or functions that you want other beans to have access to.

Add a new method feature in the **BeanInfo** page as follows:

1. From the tool bar, select  **New Method Feature**. If you prefer, you can select **New Method Feature** from the **Features** menu. Either selection opens the SmartGuide – New Method Feature window.
2. In the SmartGuide – New Method Feature window, do the following:
   a. Specify the method name in the **Method name** field.
   b. Specify the method return type in the **Return type** field.
   c. If your method feature requires parameter input, specify the number of parameters in the **Parameter count** field.
   d. Click on **Next** to open the either the SmartGuide – Parameter window or the SmartGuide – Bean Information window.
3. In the SmartGuide – Parameter window for each parameter, do the following:
   a. Specify the parameter name in the **Parameter name** field.
   b. Specify the parameter type in the **Parameter type** field.
   c. If you want a name other than the actual parameter name to be displayed for the parameter in the Visual Composition Editor, specify the name in the **Display name** field. This name appears when the parameter is listed in visual composition windows.
   d. If you want a description other than the feature name to be displayed for the parameter in the Visual Composition Editor, specify the description in the **Short description** field. This description appears when the parameter is selected in visual composition windows.
   e. Click on **Next** to open the SmartGuide – Bean Information window.
4. In the SmartGuide – Bean Information window, do the following:
   a. If you want a name other than the actual feature name to be displayed for the method in the Visual Composition Editor, specify the name in the **Display name** field. This name appears when the method is listed in connection menus, the Promote Features window, and other windows.
   b. If you want a description other than the feature name to be displayed for the method in the Visual Composition Editor, specify the description in the **Short description** field. This description appears in certain windows, such as connection windows and the Promote Features window, when the method is selected.
   c. If you do not want the method to appear in development windows unless the user chooses to display expert features, select the **expert** check box.
   d. If you do not want the method to be exposed to the bean consumer, select the **hidden** check box.
   e. If you want the method to be available in the bean connection menu, select the **preferred** check box.
   f. Click on **Finish** to add the method. VisualAge generates the following:
      - A public method for the feature in the bean class
      - Bean information code that describes the feature in the BeanInfo class for the bean

RELATED CONCEPTS

"Feature naming guidelines" on page 24
"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"Creating and modifying a BeanInfo class" on page 133
"Specifying expert features" on page 139
"Specifying hidden features" on page 140
"Specifying preferred features" on page 140

RELATED REFERENCES

"New Method Feature SmartGuide" on page 248
"Parameter SmartGuide" on page 249
"Bean Information SmartGuide" on page 245
"Features pane—BeanInfo page" on page 236

Adding event features

Define event features to represent the occurrence of any events in your bean that you want other beans to be aware of.

You can add an event feature in the **BeanInfo** page based on either an existing event set or a new event set that you define. An *event set* consists of an event listener interface with associated event object and multicaster classes. The multicaster enables multiple listeners for an event.

Add an event feature based on an existing event set in the **BeanInfo** page as follows:

1. From the tool bar, select  **New Event Set Feature**. If you prefer, you can select **New Event Set Feature** from the **Features** menu. Either selection opens the SmartGuide – New Event Set Feature window.
2. In the SmartGuide – New Event Set Feature window, do the following:
   a. Specify the event name in the **Event name** field.
   b. Select an event listener in the **Event listener** list.
   c. Click on **Next** to open the SmartGuide – Bean Information window.
3. In the SmartGuide – Bean Information window, do the following:
   a. If you want a name other than the actual feature name to be displayed for the event in the Visual Composition Editor, specify the name in the **Display name** field. This name appears when the event is listed in connection menus, the Promote Features window, and other windows.
   b. If you want a description other than the feature name to be displayed for the event in the Visual Composition Editor, specify the description in the **Short description** field. This description appears in certain windows, such as connection windows and the Promote Features window, when the event is selected.
   c. If you do not want the event to appear in development windows unless the user chooses to display expert features, select the **expert** check box.
   d. If you do not want the event to be exposed to the bean consumer, select the **hidden** check box.
   e. If you do not want the event to be available in the bean connection menu, select the **preferred** check box.

f. Click on **Finish** to add the method. VisualAge generates the following:
   - A public method for the feature in the bean class
   - Bean information code that describes the feature in the BeanInfo class for the bean

Add an event feature based on a new event set in the **BeanInfo** page as follows:

1. Select **New Listener Interface** from the **Features** menu to open the SmartGuide – New Event Listener window.
2. In the SmartGuide – New Event Listener window, do the following:
   a. Specify the event name in the **Event name** field.
   b. Specify the event listener name in the **Event listener** field. A default name is produced based on the name you specify in the **Event name** field.
   c. Specify the event object name in the **Event object** field. A default name is produced based on the name you specify in the **Event name** field.
   d. Specify the event multicaster name in the **Event Multicaster** field. A default name is produced based on the name you specify in the **Event name** field.
   e. Click on **Next** to open the SmartGuide – Event Listener Methods window.
3. In the SmartGuide – Event Listener Methods window, do the following:
   a. For each method that you want to add to the listener, specify the method in the **Method name** field. Then, click on **Add**. These listener methods respond to the event. You must add code that responds to the event in each method.
   b. Click on **Next** to open the SmartGuide – Bean Information window.
4. In the SmartGuide – Bean Information window, do the following:
   a. If you want a name other than the actual feature name to be displayed for the event in the Visual Composition Editor, specify the name in the **Display name** field. This name appears when the event is listed in connection menus, the Promote Features window, and other windows.
   b. If you want a description other than the feature name to be displayed for the event in the Visual Composition Editor, specify the description in the **Short description** field. This description appears in certain windows, such as connection windows and the Promote Features window, when the event is selected.
   c. If you do not want the event to appear in development windows unless the user chooses to display expert features, select the **expert** check box.
   d. If you do not want the event to be exposed to the bean consumer, select the **hidden** check box.
   e. If you do not want the event to be available in the bean connection menu, select the **preferred** check box.
   f. Click on **Finish** to add the method. VisualAge generates the following:
      - A public method for the feature in the bean class
      - Bean information code that describes the feature in the BeanInfo class for the bean

You can modify BeanInfo for the event in the Information pane of the **BeanInfo** page. If you want the event to appear as a preferred feature in the connection menu of the bean, set the feature's Preferred property to true.

RELATED CONCEPTS

"Feature naming guidelines" on page 24
"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"Creating and modifying a BeanInfo class" on page 133
"Specifying expert features"
"Specifying hidden features" on page 140
"Specifying preferred features" on page 140

RELATED REFERENCES

"New Event Set Feature SmartGuide" on page 248
"New Event Listener SmartGuide" on page 247
"Event Listener Methods SmartGuide" on page 247
"Bean Information SmartGuide" on page 245
"Features pane—BeanInfo page" on page 236

Promoting features of embedded beans

Promote features in the Visual Composition Editor as follows:

1. From the pop-up menu of the embedded bean, select **Promote bean feature** to open the Promote Features window.
2. For each feature that you want to promote, do the following:
   a. Click on **Method**, **Property**, or **Event** to filter promotable features in the features list box.
   b. In the features list box, select the feature you are promoting.
   c. Click on the >> button. The feature is moved to the **Promoted features** list.
   d. If you do not want to use the default name, double-click the feature name in the **Promote feature name** field. Then, edit the name to change it.
3. Click on **OK** to close the Promote Features window.
4. Save the composite bean to incorporate the features you just promoted. If you run the test tool, the bean is automatically saved.

RELATED CONCEPTS

"Default promoted feature names" on page 24
"Feature naming guidelines" on page 24
"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"Creating and modifying a BeanInfo class" on page 133

RELATED REFERENCES

"Chapter 50. Promote Features window" on page 205

Specifying expert features

You can designate *expert* features that you do not normally want listed in development windows. These are features that are complex or easily misused.

To designate a feature as expert, do either of the following:

- When adding the feature, select the **expert** check box in the SmartGuide – Bean Information window.
- Edit the bean information in the Information pane of the **BeanInfo** page. Click on the Expert property; then select True in the value column.

RELATED CONCEPTS

"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133

“Creating and modifying a BeanInfo class” on page 133

RELATED REFERENCES

“Bean Information SmartGuide” on page 245
“Information pane—BeanInfo page” on page 237

Specifying hidden features

You can designate *hidden* features that you do not want to be available for connections and property settings. These are features that you use within the bean for implementation that you do not want exposed.

To designate a feature as hidden, do either of the following:

- When adding the feature, select the **hidden** check box in the SmartGuide – Bean Information window.
- Edit the bean information in the Information pane of the **BeanInfo** page. Click on the Hidden property; then select True in the value column.

RELATED CONCEPTS

“Chapter 9. Generated code” on page 31

RELATED TASKS

“Chapter 31. Defining bean interfaces for visual composition” on page 133
“Creating and modifying a BeanInfo class” on page 133

RELATED REFERENCES

“Bean Information SmartGuide” on page 245
“Information pane—BeanInfo page” on page 237

Specifying preferred features

You can designate *preferred* features that you want to appear in the connection menu of a bean. These are features that you want to be available use within the bean for implementation.

To designate a feature as preferred, do either of the following:

- When adding the feature, select the **preferred** check box in the SmartGuide – Bean Information window.
- Edit the bean information in the Information pane of the **BeanInfo** page. Click on the Preferred property; then select True in the value column.

RELATED CONCEPTS

“Chapter 9. Generated code” on page 31

RELATED TASKS

“Chapter 31. Defining bean interfaces for visual composition” on page 133
“Creating and modifying a BeanInfo class” on page 133

RELATED REFERENCES

“Bean Information SmartGuide” on page 245
“Information pane—BeanInfo page” on page 237

Setting enumeration constants for a property

Through an associated BeanInfo class, you can establish valid enumeration constants for a given property. This enables you to control the range of values presented in the bean’s property sheet without resorting to a custom property editor. Follow these steps:

1. Open the bean in the class/interface browser to the **BeanInfo** page.
2. In the **Features** pane, select the property for which you want to set up enumeration constants.
3. In the Information pane, select the Enumeration Values property; then select the value column. A small button,  appears to the right.
4. Select the small button. The Enumeration Values window opens.
5. To add an enumeration constant, click on **New Item**. Focus moves to the Identifier column of the table.
6. Enter an identifier for the enumeration constant. (This identifier is what appears in the property sheet later.)
7. In the Value column, type a value for the new constant.

   If you enter a primitive value (such as `5`), VisualAge converts your entry to the corresponding object value (such as `new Integer(5)`). You cannot enter a named system constant in this field.
8. VisualAge fills in the Java Initialization String column. This string corresponds to an initialization string that is valid for the property editor in effect for the property's type.
9. To reorder an element in the enumeration, select the element from the table and click on **Move Up** or **Move Down**.
10. When you are finished, click on **OK**.

When the BeanInfo class is saved, VisualAge generates code in the property descriptor method for the BeanInfo class.

RELATED CONCEPTS

"Chapter 9. Generated code" on page 31

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133
"Creating and modifying a BeanInfo class" on page 133

RELATED REFERENCES

"Bean Information SmartGuide" on page 245
"Information pane—BeanInfo page" on page 237

Chapter 32. Repairing class or package references

If your classes contain obsolete class or package references due to renaming, you can repair breakage with the Fix/Migrate SmartGuide. Because this sort of repair is as much an art as it is an algorithm, be sure to read the related topic listed at the end of this section *before* you attempt the repair. You will find this tool especially useful if you are moving classes to the Java® 2 SDK.

Note: You *must* use this tool for repairing visual composites, even if you make corrections by hand. This is because metadata must also be repaired. If you do not repair the metadata, VisualAge will probably generate incorrect code.

VisualAge can correct references to the following program elements:
- Classes, interfaces, and packages
- Superclass designation
- Import designations
- User-defined fields and methods
- Fields and methods that are generated for visual composites

To repair references, follow these steps:

1. In the Workbench, right-click on any class, package, or project name.
2. From the pop-up menu that appears, select **Reorganize** and then **Fix/Migrate**.
3. Follow these steps for each class or package that has been renamed:
   - In the **From** field, enter the original name of the renamed class or package.

     To specify a package, append `.*` to the package name. For example, to repair all classes in myPackage, enter `myPackage.*`
   - In the **To** field, enter the current name of the renamed class or package.
   - Click on **Add**.
4. To automatically migrate references to the Java 2 SDK, select the **Include JDK1.2 renamed packages** check box.
5. Click on **Finish**.

If VisualAge detects any transient problems during the repair, an error window will appear. Make a note of the error and click on **OK** to continue the process. In most cases, errors occur because of the order in which references are being repaired; these errors are usually corrected by the time that all references have been repaired. Following the repair guidelines will minimize this occurrence.

To fix errors in visual composites that remain after all classes have been repaired, open the composites in the Visual Composition Editor and regenerate code from the **Bean** menu.

RELATED REFERENCES

"Chapter 33. Fix/migrate guidelines for class or package references" on page 145

Chapter 33. Fix/migrate guidelines for class or package references

The Fix / Migrate SmartGuide can repair broken class or package references due to migration of classes to the Java 2 SDK or the renaming of user-defined program elements. Because this sort of repair is not an exact science, follow these tips for the best results:

- In the Workbench, look at the **All Problems** page to get a sense of what is broken.
- If possible, repair references at the class level. This gives you the most control over the order in which classes are repaired, minimizing transient compilation problems. If you do repair at the package or project level, VisualAge processes BeanInfo classes before their associated bean classes.
- Repair referenced classes first, as necessary. Proceeding in this direction ensures that API updates for a referenced program element are available when the classes that refer to it are repaired.
- If a given class has an associated BeanInfo class, repair the BeanInfo class first.
- After repair of visual composites, open them in the Visual Composition Editor and regenerate code.
- To migrate references to the IBM Data Access libraries from Version 1.0 to Version 2.0, specify the following changes:
  - `COM.ibm.ivj.eab.data.*` to `com.ibm.ivj.eab.dab.*`
  - `COM.ibm.ivj.javabeans.*` to `com.ibm.ivj.eab.dab.*`
- To migrate references to the javax.swing.preview.JFileChooser class, specify the following change: `javax.swing.preview.*` to `javax.swing.*`
- Successful migration of class references to the Java 2 SDK does not ensure that all beans run as you expect them to. Sun's implementation of some beans might have changed, so test migrated beans thoroughly.

RELATED TASKS

"Chapter 32. Repairing class or package references" on page 143

Chapter 34. Beans for visual composition

VisualAge provides a wide range of beans that you can use to visually compose your own program elements. These include the following:

- Basic user interface beans from the Abstract Windowing Toolkit (AWT)
- Enhanced user interface beans
- Factory and variable beans for dynamically creating and referencing bean instances

The following topics describe beans provided by IBM. When you create your own beans, you can add them to the palette. See the related task topic on modifying the palette.

User interface beans

VisualAge provides a set of user interface beans that you can use to compose an applet or application. Basic user interface beans from the Abstract Windowing Toolkit (AWT) are provided in the Java class libraries project. AWT beans are in the java.awt and java.applet packages. Enhanced user interface beans (Swing) are also provided in the Java class libraries project. Swing beans are in javax.swing and related packages.

Although Swing and AWT components can be mixed, it is inadvisable. For this reason, VisualAge does not allow you to drop AWT beans on Swing beans. Because you might want to add Swing beans to AWT beans that you created before Swing was available, VisualAge *does* allow you to drop Swing beans on AWT beans. You can morph the AWT beans to Swing beans when you are ready to convert completely to Swing.

The problem with mixing AWT and Swing beans arises from the fact that all AWT components have peer classes that are specific to the operating system, while most Swing components do not. Components with system peers are known as *heavyweight* components. Components without system peers are known as *lightweight* components. The only Swing heavyweight components are JApplet, JDialog, JFrame, and JWindow. Painting problems occur if heavyweight components are children of lightweight parents, because the heavyweight components always paint over lightweight components.

VisualAge provides its own BeanInfo classes for Swing and AWT beans. These BeanInfo classes are tailored for visual composition.

Swing beans have a LookAndFeel (L&F) architecture that specifies how Swing components appear and behave. On the Visual Composition Editor, Swing beans appear in the default, cross-platform Metal L&F implementation. To change the run-time appearance to the System L&F of the current platform, execute the following code in your main() method before you construct your components:

```
String myLookAndFeel = javax.swing.UIManager.getSystemLookAndFeelClassName();
javax.swing.UIManager.setLookAndFeel(myLookAndFeel);
```

myLookAndFeel can be the name of any class that implements javax.swing.LookAndFeel and is available on the current platform. This code changes only the run-time L&F implementation and not the images on the Visual

Composition Editor. To change L&F on the Visual Composition Editor, see “Changing look and feel in Swing-based composites” on page 65.

VisualAge information about Swing and AWT beans supplements class information from Sun Microsystems. VisualAge reference topics for these beans provide links to Sun API information. The following topics describe these beans:

- “Chapter 35. Applet beans” on page 149
- “Chapter 36. Window beans” on page 151
- “Chapter 37. Pane and panel beans” on page 157
- “Chapter 38. Table and tree beans” on page 161
- “Chapter 39. Text beans” on page 163
- “Chapter 40. List and slider beans” on page 167
- “Chapter 41. Button beans” on page 171
- “Chapter 42. Menu and tool bar beans” on page 175

Factory and variable beans

VisualAge provides Factory and Variable beans that you can use to dynamically create and reference bean instances. The following topic describes these beans, “Chapter 43. Factory and variable beans” on page 181.

RELATED CONCEPTS

“Chapter 2. How classes and beans are related” on page 3

RELATED TASKS

“Chapter 25. Using VisualAge beans in visual composition” on page 93
“Chapter 24. Managing the beans palette” on page 89

Chapter 35. Applet beans

Applets are generally small, specialized programs that are downloaded and run by a Java-enabled web browser. Applets operate within constraints that provide security from remote system intrusion.

The following beans provide applets:

Bean	Description
JApplet (Swing)	A container bean you use with Swing beans.
Applet (AWT)	A container bean you use with AWT beans.

RELATED TASKS

"Composing an applet" on page 93

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JApplet (Swing)

The JApplet bean  differs in one way from the AWT Applet bean in that it contains a content pane. In the Visual Composition Editor this content pane completely covers the JApplet bean. While the content pane provides logical separation of the applet from its child components, it also makes accessing the JApplet bean difficult. You can, however, access the JApplet bean within the Beans List. With the exception of JMenuBar, you add user interface components to the content pane. The default content pane, JAppletContentPane, is represented in the Beans List as the child of the JApplet bean. You can delete the default content pane and replace it with another container component.

If you want to create an applet using Swing components, specify JApplet as the superclass for a new applet bean.

If you want to use AWT components in the applet, use an Applet bean rather than a JApplet bean.

RELATED TASKS

"Composing an applet" on page 93

RELATED REFERENCES

"Chapter 35. Applet beans"
"Chapter 34. Beans for visual composition" on page 147

Applet (AWT)

The Applet bean  is the basic object required for building your applet. Specify Applet as the superclass for a new applet bean.

If you want to use Swing components in the applet, use a JApplet bean rather than an Applet bean.

RELATED TASKS

“Composing an applet” on page 93

RELATED REFERENCES

“Chapter 35. Applet beans” on page 149
“Chapter 34. Beans for visual composition” on page 147

Chapter 36. Window beans

Bean	Description
JDialog (Swing) or Dialog (AWT)	A custom dialog, typically a secondary window
FileDialog (AWT)	A dialog for accessing the file system
JFrame (Swing) or Frame (AWT)	A desktop window with a title bar, sizing borders, and sizing buttons
JInternalFrame (Swing)	A frame that is a child of another Swing component
JWindow (Swing) or Window (AWT)	A window without a title bar, sizing borders, and sizing buttons

Window beans are the primary visual context for other user interface components. VisualAge provides window beans from both Swing and the Abstract Windowing Toolkit (AWT) packages. Basic window beans from AWT reside in the java.awt package (Java class libraries project) and appear in the AWT palette category. Enhanced window beans reside in the javax.swing package and appear in the Swing palette category.

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JDialog (Swing)

Use a JDialog bean  for a custom dialog. A dialog is typically used to display or gather information for a single purpose.

The JDialog bean provides a content pane in which to place other components. The content pane provides logical separation of the dialog from its child components. With the exception of JMenuBar, user interface components are added to the content pane. The default content pane, JDialogContentPane, is represented in the Beans List as the child of the JDialog bean. You can delete the default content pane and replace it with another container component.

Use a Dialog bean, rather than a JDialog bean, if you want to use AWT components in the dialog. Alternatively, use a JOptionPane bean to create any of a variety of standard dialogs.

Changing Default Property Settings

Setting	Value	Description
mode	Load	Set the value to Load for an Open File dialog
mode	Save	Set value to Save for an Save file dialog
directory	specify the directory	Define the initial directory selection information for the file dialog

Setting	Value	Description
file	specify the file	Define the initial file selection information for the file dialog

RELATED TASKS

“Composing a window” on page 95

RELATED REFERENCES

“Chapter 36. Window beans” on page 151
“Chapter 34. Beans for visual composition” on page 147

Dialog (AWT)

Use a Dialog bean  for a custom dialog. A dialog is typically used to display or gather information for a single purpose.

The Dialog bean contains a ContentsPane bean, the default client component, where you place other visual components. You can replace the default client with another container component.

RELATED TASKS

“Composing a window” on page 95

RELATED REFERENCES

“Chapter 36. Window beans” on page 151
“Chapter 34. Beans for visual composition” on page 147

FileDialog (AWT)

Use a FileDialog bean  for a dialog through which the user can open or save files. File dialogs are useful in stand-alone applications and are not typically used in applets because of security constraints.

The FileDialog bean represents a system file dialog. The bean appears on the free-form surface as an icon because it cannot be composed.

Changing Default Property Settings

Setting	Value	Description
directory	specify the directory	Define the initial directory selection information for the file dialog
file	specify the file	Define the initial file selection information for the file dialog
filenameFilter	specify the filename filter	Define the file type selection information for the file dialog
mode	Load	Set the value to Load for an Open File dialog
	Save	Set value to Save for an Save file dialog

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"Chapter 36. Window beans" on page 151
"Chapter 34. Beans for visual composition" on page 147

JFrame (Swing)

Use a JFrame bean  for a desktop window with a title bar, sizing borders, and sizing buttons. You can add beans to the frame and its content pane to define menus and other user interface components.

The JFrame bean provides a content pane in which to place other components. The content pane provides logical separation of the frame from its child components. With the exception of JMenuBar, user interface components are added to the content pane. The default content pane, JFrameContentPane, is represented in the Beans List as the child of the JFrame bean. You can delete the default content pane and replace it with another container component.

Use a Frame bean, rather than a JFrame bean, if you want to use AWT components in the frame.

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"JInternalFrame (Swing)" on page 154
"Chapter 36. Window beans" on page 151
"Chapter 34. Beans for visual composition" on page 147

Frame (AWT)

Use a Frame bean  for a desktop window with a title bar, sizing borders, and sizing buttons. You can add beans to the frame to define menus and other user interface components.

The Frame bean contains a ContentsPane bean, the default client component, where you place other visual components. You can replace the default client with another container component.

If you want to use Swing components in the frame, use a JFrame bean rather than a Frame (AWT) bean.

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"Chapter 36. Window beans" on page 151
"Chapter 34. Beans for visual composition" on page 147

JInternalFrame (Swing)

Use a JInternalFrame bean  for a frame that is a child of a JDesktopPane bean. By contrast, a JFrame bean is a child of the desktop. The user can manipulate an internal frame within a desktop pane. For example, the user can maximize, minimize, resize, move, or close the internal frame.

The JInternalFrame bean provides a content pane in which to place other components. The content pane provides logical separation of the frame from its child components. With the exception of JMenuBar, user interface components are added to the content pane. The default content pane, JInternalFrameContentPane, is represented in the Beans List as the child of the JInternalFrame bean. You can delete the default content pane and replace it with another container component.

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"JFrame (Swing)" on page 153
"Chapter 36. Window beans" on page 151
"Chapter 34. Beans for visual composition" on page 147

JWindow (Swing)

Use a JWindow bean  to add a window without a title bar, sizing borders, and sizing buttons. This bean is suitable for a splash window that your application displays briefly at start-up.

The JWindow bean provides a content pane in which to place other components. The content pane provides logical separation of the window from its child components. With the exception of JMenuBar, user interface components are added to the content pane, which completely covers the JWindow bean in the Visual Composition Editor. The JWindow bean can be accessed from the Beans List. The default content pane, JWindowContentPane, is represented in the Beans List as the child of the JWindow bean. You can delete the default content pane and replace it with another container component.

Use a Window bean, rather than a JWindow bean, if you want to use AWT components in the window.

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"Chapter 36. Window beans" on page 151
"Chapter 34. Beans for visual composition" on page 147

Window (AWT)

Use a Window bean to add a window without a title bar, sizing borders, and sizing buttons. This bean is suitable for a splash window that your application displays briefly at start-up.

Use a JWindow bean, rather than a Window bean, if you want to use Swing components in the window.

RELATED TASKS

"Composing a window" on page 95

RELATED REFERENCES

"Chapter 36. Window beans" on page 151
"Chapter 34. Beans for visual composition" on page 147

Chapter 37. Pane and panel beans

A pane or panel is a container for other components. It is used within another pane or panel, within a window, or within an applet. VisualAge provides pane and panel beans from Swing and AWT packages. Basic pane and panel beans from the Abstract Windowing Toolkit (AWT) are provided in the java.awt package (Java class libraries project). Enhanced pane and panel beans are provided in the javax.swing package.

The following beans provide panes and panels:

Bean	Description
JDesktopPane (Swing)	A pane for a desktop within another Swing container
JEditorPane (Swing)	A pane for editing defined text types, such as HTML
JOptionPane (Swing)	A simple dialog pane
JPanel (Swing) or Panel (AWT)	A composition surface for user interface components
JScrollPane (Swing) or ScrollPane (AWT)	A scrollable view for another component
JSplitPane (Swing)	A split view for other components
JTabbedPane (Swing)	A tabbed view for other components
JTextPane (Swing)	A pane for editing text with visible styles and embedded objects

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147
"Chapter 35. Applet beans" on page 149
"Chapter 36. Window beans" on page 151

JDesktopPane (Swing)

Use a JDesktopPane bean  for a desktop within another Swing container. Add one or more JInternalFrame beans to the desktop pane.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans"
"Chapter 34. Beans for visual composition" on page 147

JEditorPane (Swing)

Use a JEditorPane bean  for editing defined text types, such as HTML.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JOptionPane (Swing)

Use a JOptionPane bean  for an input prompt, a message, or user confirmation. The dialog is modal, so the thread is held until the user dismisses the dialog.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JPanel (Swing)

Use a JPanel bean  as a composition surface for other user interface components, such as buttons, lists, and text. You can add a panel to a window, an applet, or another panel. In a Swing window or JApplet, JPanel can either serve as the contentPane, or be added to the contentPane.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

Panel (AWT)

Use a Panel bean  as a composition surface for other user interface components, such as buttons, lists, and text. You can add a panel to a window, an applet, or another panel. In an AWT window, Panel can either serve as the client component, or be added to the client component.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JScrollPane (Swing)

Use a JScrollPane bean  for a pane with scroll bars. This enables you to define a pane that is not always completely within view. You can place one component in the scroll pane. If you want multiple components within the scroll pane, add a JPanel bean to the scroll pane and place the components on the panel.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

ScrollPane (AWT)

Use a ScrollPane bean  for a pane with scroll bars. This enables you to define a pane that is not always completely within view. You can place one component in the scroll pane. If you want multiple components within the scroll pane, add a Panel bean to the scroll pane and place the components on the panel.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JSplitPane (Swing)

Use a JSplitPane bean  as a split view for other components. You can place one component on each pane. If you want multiple components within a pane, add a JPanel bean to the pane and place the components on the panel.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JTabbedPane (Swing)

Use a JTabbedPane bean  as a tabbed view for other components. Each component you drop on a JTabbedPane becomes a new page with a separate tab. If you want multiple components within a page, add a JPanel bean to the scroll pane and place the components on the panel. When you add a JTabbedPane bean, a JPanel bean is automatically added as the first page.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JTextPane (Swing)

Use a JTextPane bean  for editing text with visible styles and embedded objects.

RELATED TASKS

"Adding a pane or panel" on page 97

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

Chapter 38. Table and tree beans

A table or tree provides a view of objects from a data model that organizes objects in a tabular or expandable tree format. VisualAge provides table and tree beans in the javax.swing and javax.swing.table packages (Java class libraries project), as follows:

Bean	Description
JTable	A tabular view of objects in a data model
TableColumn	A view of objects in a table-model column
JTree	A hierarchical view of objects in a data model

RELATED TASKS

"Adding a table or tree view" on page 101

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JTable (Swing)

Use a JTable bean  as a view of objects from a table data-model. Use the table model to define or derive the objects for the table. You can do this either by coding the model or by using a tool such as the database builder to create the data model.

The user can select objects from the table, manipulate columns, and directly edit table cells.

RELATED TASKS

"Adding a table or tree view" on page 101

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JTree (Swing)

Use a JTree bean  as a view of objects from a tree data-model. Use the tree model to define or derive the objects for the tree.

RELATED TASKS

"Adding a table or tree view" on page 101

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

TableColumn (Swing)

Use a TableColumn bean  as a view of objects from a table-model column. This bean enables you to map a column in a JTable bean to a column in the table model. You can also use it to define visual properties of a table column. If you want a default table view of each column in the table model, do not add any TableColumn beans to a JTable bean.

RELATED TASKS

“Adding a table or tree view” on page 101

RELATED REFERENCES

“Chapter 34. Beans for visual composition” on page 147

Chapter 39. Text beans

Text components are available for simple text and for enhanced text and editing panes. VisualAge provides text beans from Swing and AWT packages. Basic text beans from the Abstract Windowing Toolkit (AWT) are provided in the java.awt package (Java class libraries project). Enhanced text beans are provided in the javax.swing and javax.swing.text packages.

The following beans provide simple text components:

Bean	Description
JLabel (Swing) or Label (AWT)	A label, usually to identify another component
JPasswordField (Swing)	A text field for sensitive data
JTextArea (Swing) or TextArea (AWT)	A multiline text area
JTextField (Swing) or TextField (AWT)	A single-line text field

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 37. Pane and panel beans" on page 157
"Chapter 34. Beans for visual composition" on page 147

JLabel (Swing)

Use a JLabel bean  as a text label for your user interface. You can add a graphic to the label as well as text. You can also define a mnemonic in the label as a means of quick access to a text input field.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans"
"Chapter 34. Beans for visual composition" on page 147

Label (AWT)

Use a Label bean  as a text label for your user interface.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans"
"Chapter 34. Beans for visual composition" on page 147

JPasswordField (Swing)

Use a JPasswordField bean  as a text field for sensitive data. A JPasswordField bean is a text field that always uses an echo character to mask characters that are entered. The echo character can be specified in the property sheet for JPasswordField. You can use a focus accelerator to provide quick accessability to the password field.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans" on page 163
"Chapter 34. Beans for visual composition" on page 147

JTextArea (Swing)

Use a JTextArea bean  as a large area for text entry or presentation. A text area can contain multiple lines of text. To make a JTextArea bean scrollable, drop it in a JScrollPane bean. You can use a focus accelerator to provide quick accessibility to the text area.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans" on page 163
"Chapter 34. Beans for visual composition" on page 147

TextArea (AWT)

Use a TextArea bean  as a large area for text entry or presentation. A text area can contain multiple lines and is vertically and horizontally scrollable.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans" on page 163
"Chapter 34. Beans for visual composition" on page 147

JTextField (Swing)

Use a JTextField bean  for text entry or presentation. A text field consists of a single line. You can use a focus accelerator to provide quick accessibility to the text field.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans" on page 163
"Chapter 34. Beans for visual composition" on page 147

TextField (AWT)

Use a TextField bean  for text entry or presentation. A text field consists of a single line.

RELATED TASKS

"Adding a text component" on page 102

RELATED REFERENCES

"Chapter 39. Text beans" on page 163
"Chapter 34. Beans for visual composition" on page 147

Chapter 40. List and slider beans

List components provide a list of items for the user to select. Slider components show a range of selection values or show progress for the duration of an operation. VisualAge provides list and slider beans from Swing and AWT packages. Basic list and slider beans from the Abstract Windowing Toolkit (AWT) are provided in the java.awt package (Java class libraries project). Enhanced list and slider beans are provided in the javax.swing package.

The following beans provide visual list and slider components:

Bean	Description
JComboBox (Swing) or Choice (AWT)	A selectable list with an entry field
JList (Swing) or List (AWT)	A selectable list of choices
JProgressBar (Swing)	A progress indicator
JScrollBar (Swing) or Scrollbar (AWT)	A scrolling component
JSlider (Swing)	A selection component for a range of values

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JComboBox (Swing)

Use a JComboBox bean  for a selectable drop-down list. You can choose to allow direct text entry as well as selection from the list.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans"

"Chapter 34. Beans for visual composition" on page 147

Choice (AWT)

Use a Choice bean  for a drop-down list that lets the user select a single choice. The current choice is always displayed. The user can open the list by selecting the drop-down button.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans"

"Chapter 34. Beans for visual composition" on page 147

JList (Swing)

Use a JList bean  for a list of choices from which the user can make one or more selections. Your program can add or remove choices from the list. If you want the list to be scrollable, place it in a JScrollPane bean.

By default, the user can select one choice from the list. When the user selects a choice, any previously selected choice is no longer selected. You can change the behavior of the list to allow multiple selection.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167
"Chapter 34. Beans for visual composition" on page 147

List (AWT)

Use a List bean  for a list of choices from which the user can make one or more selections. Your program can add or remove choices from the list.

By default, the user can select one choice from the list. When the user selects a choice, any previously selected choice is no longer selected. You can change the behavior of the list to allow multiple selection.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167
"Chapter 34. Beans for visual composition" on page 147

JProgressBar (Swing)

Use a JProgressBar bean  as a progress indicator for an operation.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167
"Chapter 34. Beans for visual composition" on page 147

JScrollBar (Swing)

Use a JScrollBar bean  as a scrolling component. Generally, JScrollPane is a suitable alternative for a scrollable view with scroll bars.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167
"Chapter 34. Beans for visual composition" on page 147

Scrollbar (AWT)

Use a Scrollbar bean  for a slider that the user can manipulate to select a value from a range of values. A *scroll bar* consists of a scroll shaft that represents the range of values, a scroll box within the range, and scroll arrows at the ends of the range. A scroll bar can be either horizontal or vertical.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167
"Chapter 34. Beans for visual composition" on page 147

JSlider (Swing)

Use a JSlider bean  as a selection component for a range of values.

RELATED TASKS

"Adding a list or slider component" on page 105

RELATED REFERENCES

"Chapter 40. List and slider beans" on page 167
"Chapter 34. Beans for visual composition" on page 147

Chapter 41. Button beans

VisualAge provides button beans from Swing and AWT packages. Basic button beans from the Abstract Windowing Toolkit (AWT) are provided in the java.awt package (Java class libraries project). Enhanced button beans are provided in the javax.swing package.

The following beans provide button components:

Bean	Description
JButton (Swing) or Button (AWT)	A push button, generally used to perform a function
JCheckBox (Swing) or Checkbox (AWT)	A setting button that is checked when selected
JRadioButton (Swing) or CheckboxGroup (AWT)	A radio button or group for mutually exclusive settings
JToggleButton (Swing)	A two-state push button that appears to be pushed in when selected

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JButton (Swing)

Use a JButton bean  for a push button that the user can select to perform an action. For example, you can define an **OK** button to let the user save changes and close a window.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans"

"Chapter 34. Beans for visual composition" on page 147

Button (AWT)

Use a Button bean  for a push button that the user can select to perform an action. For example, you can define an **OK** button to let the user save changes and close a window.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans"

"Chapter 34. Beans for visual composition" on page 147

JCheckBox (Swing)

Use a JCheckBox bean  to provide a settings choice that has two states, such as on and off. A mark in the check box indicates that the choice is selected. You can customize the images used for unselected and selected check boxes.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans" on page 171
"Chapter 34. Beans for visual composition" on page 147

Checkbox (AWT)

Use a Checkbox bean  to provide a settings choice that has two states, such as on and off. A mark in the check box indicates that the choice is selected.

Check boxes are independently selectable, unless they are defined in a group. Use check boxes in a group to provide a set of mutually exclusive choices that appear as radio buttons. To define a group, associate each Checkbox bean with a CheckboxGroup bean.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans" on page 171
"Chapter 34. Beans for visual composition" on page 147

JRadioButton (Swing)

Use a JRadioButton bean  to provide one of a group of mutually exclusive settings choices. A mark on the radio button indicates that the choice is selected.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans" on page 171
"Chapter 34. Beans for visual composition" on page 147

CheckboxGroup (AWT)

Use a CheckboxGroup bean  to provide a set of mutually exclusive choices that appear as radio buttons. Each choice in the group is a Checkbox bean that you associate with the CheckboxGroup bean.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans" on page 171
"Chapter 34. Beans for visual composition" on page 147

JToggleButton (Swing)

Use a JToggleButton bean  for a two-state push button. The button appears to be pushed in when selected, and popped out when not selected. Use JToggleButton beans in a button group for a set of mutually exclusive functions. When the user selects an unselected button in the group, the previously selected button is popped out.

RELATED TASKS

"Adding a button component" on page 109

RELATED REFERENCES

"Chapter 41. Button beans" on page 171
"Chapter 34. Beans for visual composition" on page 147

Chapter 42. Menu and tool bar beans

VisualAge provides support for menus and tool bars. Basic menu beans from the Abstract Windowing Toolkit (AWT) are provided in the java.awt package (Java class libraries project). Enhanced menu and tool bar beans are provided in the javax.swing package (Java class libraries project). Some IBM bean implementations for visual composition are provided in the com.ibm.uvm.abt.edit package (IBM Java Implementation project).

The following beans provide menu and tool bar components:

Bean	Description
JMenuBar (Swing) or MenuBar (AWT)	A menu bar for a window
JMenu (Swing) or Menu (AWT)	A cascade menu for another menu or menu bar
JPopupMenu (Swing) or PopupMenu (AWT)	A pop-up menu for window components
JMenuItem (Swing) or MenuItem (AWT)	A menu choice that calls a method
JCheckBoxMenuItem (Swing) or CheckboxMenuItem (AWT)	A menu choice that toggles a setting on and off
JRadioButtonMenu (Swing)	A menu choice that provides one of a set of mutually exclusive setting values
JSeparator (Swing) or MenuSeparator (AWT)	A horizontal line that separates groups of related choices
JToolBar (Swing)	A graphical set of tool choices
JToolBarButton (Swing)	A button for a tool bar
JToolBarSeparator (Swing)	A visual separator between components in a tool bar

RELATED TASKS

“Adding a menu or tool bar” on page 111

RELATED REFERENCES

“Chapter 34. Beans for visual composition” on page 147

JMenuBar (Swing)

Use a JMenuBar bean  as a set of pull-down menus for a window. When you add a JMenuBar bean, one menu is automatically added to the menu bar. You can modify this menu and add other menus that you need.

RELATED TASKS

“Adding a menu or tool bar” on page 111

RELATED REFERENCES

“Chapter 34. Beans for visual composition” on page 147

MenuBar (AWT)

Use a MenuBar bean  as a set of pull-down menus for a window. When you add a MenuBar bean, one menu is automatically added to the menu bar. You can modify this menu and add other menus that you need.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JMenu (Swing)

Use a JMenu bean  for a set of related choices for a window or component. You can add the menu either as a pull-down menu for a menu bar or as a cascade menu for another menu. You can also add subclasses of AbstractAction to the free-form surface and add them to the menu in the menu get method.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

Menu (AWT)

Use a Menu bean  for a set of related choices for a window or component. You can add the menu either as a pull-down menu for a menu bar or as a cascade menu for another menu.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JPopupMenu (Swing)

Use a JPopupMenu bean  for a pop-up list of choices for window components. The user can display the menu by clicking a pop-up mouse button on a component. You can also add subclasses of AbstractAction to the free-form surface and add them to the menu in the menu's get method.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

PopupMenu (AWT)

Use a PopupMenu bean  for a pop-up list of choices for window components. The user can display the menu by clicking a pop-up mouse button on a component.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JMenuItem (Swing)

Use a JMenuItem bean  as a functional choice for a menu.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

MenuItem (AWT)

Use a MenuItem bean  as a functional choice for a menu.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JCheckBoxMenuItem (Swing)

Use a JCheckBoxMenuItem bean  to provide a menu setting choice that the user can toggle on and off.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

CheckboxMenuItem (AWT)

Use a CheckboxMenuItem bean  to provide a menu setting choice that the user can toggle on and off.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JRadioButtonMenuItem (Swing)

Use a JRadioButtonMenuItem bean  to provide a menu setting choice for a group of mutually exclusive menu settings.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JSeparator (Swing)

Use a JSeparator bean  to visually separate other components. It is commonly used to draw a horizontal line between groups of related items in a menu, but can also be used to separate components on a panel.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

MenuSeparator (AWT)

Use a MenuSeparator bean  to provide a horizontal line between groups of related menu items.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JToolBar (Swing)

Use a JToolBar bean  to provide a graphical menu. When you add a JToolBar bean, a JToolBarButton bean is automatically added as the first component. Add JToolBarButton and other components to the tool bar. You can also add subclasses of AbstractAction to the free-form surface and add them to the tool bar in the tool bar's get method.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

JToolBarButton

Use a JToolBarButton bean  to add buttons to a tool bar. VisualAge customizes the JButton bean for a tool bar by presetting certain properties as follows:

Property	Setting
icon	question mark
text	null
margin	0,0,0,0
horizontalTextPosition	CENTER
verticalTextPosition	BOTTOM

The JToolBarButton bean is provided as a convenience. VisualAge generates code for a JButton bean.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 42. Menu and tool bar beans" on page 175
"Chapter 34. Beans for visual composition" on page 147

JToolBarSeparator

Use a JToolBarSeparator bean  to provide visual separation between other components on a tool bar. You can drop a JToolBarSeparator bean only on a JToolBar bean. The JToolBarSeparator bean is provided as a convenience. VisualAge generates code for the addSeparator() method of the JToolBar bean.

RELATED TASKS

"Adding a menu or tool bar" on page 111

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

Chapter 43. Factory and variable beans

VisualAge provides beans that enable you to dynamically create and refer to bean instances visually. These beans are not Java classes. A Factory bean creates new instances of a bean type. A Variable bean refers to any instance of a bean type that you assign to it. With either Factory or Variable, you specify the bean type that it can create or reference.

The following beans provide support for bean instances:

Bean	Description
Factory	Dynamically creates bean instances
Variable	Provides access to bean instances

RELATED TASKS

"Dynamically creating and accessing a bean instance" on page 114

RELATED REFERENCES

"Chapter 34. Beans for visual composition" on page 147

Factory

Use a Factory bean  to dynamically create instances of the Java type that you specify. A Factory bean is not a Java class or an instance of the bean it creates. The Factory bean creates a bean instance whenever an event occurs, based on a connection you make from the event.

Generally, when you add a bean to a visual composite, a fixed instance of that bean is created. When you add a Factory bean, however, a bean instance is not created. Instead, you can make a connection to dynamically create a bean instance of the type specified for the Factory bean. Connections to the Factory bean's features then operate on the created bean instance. If you create another bean instance, connections to the Factory bean's features operate on the newly created bean instance rather than on the previously created instance. The Factory bean serves as a bean instance generator.

RELATED TASKS

"Dynamically creating and accessing a bean instance" on page 114

RELATED REFERENCES

"Chapter 43. Factory and variable beans"
"Chapter 34. Beans for visual composition" on page 147

Variable

Use a Variable bean  to refer to any instance of a particular class. A Variable bean is not a Java class or an instance of the class it represents. Variable beans are commonly used to represent tear-off properties and objects from other composite beans.

Generally, when you add a bean to a visual composite, a single fixed instance of that bean is created. When you add a Variable bean, however, a bean instance is not created. Instead, you can make a connection to assign any bean instance of the type specified for the Variable bean. Connections to the Variable bean's features then operate on the assigned bean instance. If you assign another bean instance to the Variable bean, connections to the Variable bean's features operate on the newly assigned bean instance rather than on the previously assigned instance. The Variable bean serves as a reference for bean instances.

RELATED TASKS

"Dynamically creating and accessing a bean instance" on page 114

RELATED REFERENCES

"Chapter 43. Factory and variable beans" on page 181
"Chapter 34. Beans for visual composition" on page 147

Chapter 44. Visual Composition Editor

The Visual Composition Editor is a powerful composing tool that you can use to:
- Build the user interface for your program by dropping beans.
- Construct business logic by connecting the beans.
- Edit existing beans.

The Visual Composition Editor makes it easy to build applets, beans, and entire applications using the functions available on the menu bar, pop-up menus, tool bar, and the variety of reusable beans on the beans palette. A description of the functions on the tool bar or beans palette appears when the mouse pointer is positioned over the item.

Areas in this window
- "Free-form surface" on page 8
- "Beans palette" on page 8
- "Chapter 45. The menu bar in visual composition" on page 187
- "The tool bar in visual composition"
- "Chapter 47. Pop-up menus for the Visual Composition Editor" on page 193
- "Status area—Visual Composition Editor"

RELATED CONCEPTS

"Visual composition hints and tips" on page 9

RELATED TASKS

"Chapter 17. Visual bean basics" on page 53
"Chapter 22. Connecting beans" on page 81
"Chapter 19. Composing beans visually" on page 67
"Saving a bean" on page 69
"Chapter 26. Setting general properties for beans" on page 117

RELATED REFERENCES

"Properties" on page 188
"Chapter 45. The menu bar in visual composition" on page 187
"Chapter 47. Pop-up menus for the Visual Composition Editor" on page 193
"Chapter 46. Keys" on page 191
"Chapter 65. BeanInfo page" on page 235

Status area—Visual Composition Editor

The status area displays information about the last operation or your current selection.

The tool bar in visual composition

Use the tools on the tool bar to help you build the user interface for your program.

You can also access some or all of these tools from the **Tools** pull-down menu in the Visual Composition Editor, and from pop-up menus.

The alignment tools are only available when using the null layout manager.

The anchor bean, indicated by solid selection handles, is the bean that serves as the alignment reference. When you want to align beans with one another, select the

ones you want to move and select the anchor bean last. You can also change the anchor bean by holding the Ctrl key and double-clicking on the new anchor bean.

Tools in this area

 “Run” on page 188

 “Properties” on page 188

 “Beans List” on page 188

 “Show Connections” on page 189

 “Hide Connections” on page 189

 “Align left” on page 189

 “Align Center” on page 189

 “Align Right” on page 189

 “Align Top” on page 189

 “Align Middle” on page 189

 “Align Bottom” on page 190

 “Distribute Horizontally” on page 190

 “Distribute Vertically” on page 190

 “Match Width” on page 190

 “Match Height” on page 190

RELATED CONCEPTS

“Chapter 9. Generated code” on page 31
“Property sheets” on page 11
“Chapter 8. Connections” on page 25

RELATED TASKS

“Positioning beans” on page 72
“Running and testing beans” on page 69
“Saving a bean” on page 69
“Chapter 19. Composing beans visually” on page 67
“Moving beans” on page 73
“Chapter 22. Connecting beans” on page 81
“Working in the Beans List” on page 57

“Editing bean labels” on page 56
“Renaming beans and connections” on page 58
“Deleting beans” on page 75
“Showing and hiding connections” on page 85
“Chapter 26. Setting general properties for beans” on page 117

RELATED REFERENCES

“Layout” on page 195
“Connect” on page 194

Chapter 45. The menu bar in visual composition

The following menus provide options unique to the Visual Composition Editor:
- "Bean"
- "Tools" on page 188

Bean

The **Bean** menu provides options to perform the following tasks:

Save Bean	Saves the current bean and generates and compiles its code.
Re-generate Code	Generates and compiles the code for the current bean.
Run > In Applet Viewer	Saves the current bean, generates and compiles its code, and runs the bean in an applet viewer.
Run > Run main	Saves the current bean, generates and compiles its code, and runs the bean in a test frame.
Run > Check Class Path	Brings up the **Class Path** tab of the project properties window where you can modify the path for the current class. VisualAge adds the path for each dropped bean. However, if you are using other files, such as .gif files, be sure to add their location to the path.
Code Generation Options	Brings up the properties window for your current composite. Tab options can include: • Applet—Modify the runtime size and name attributes and applet parameters for an applet bean • Program—Include runtime command line arguments and properties for composite beans running in main() • Class Path—Modify the class path. See Setting the Class Path • Code Generation—Allow code generation and make event handling decisions. See "Code generated from visually composed beans" on page 31 • Info—List information about the composite
Modify Palette	Manipulates categories and beans in the beans palette.
Fix Unresolved References	Changes the class of an unknown component to one that is loaded into your workspace. Before you select this, read "Chapter 62. Resolve Class References" on page 229.

Construct Visuals from Source	Reverse-engineers a visual composite from Java source code. This option is available only if the source class has a null constructor. Before you select this, read “Chapter 12. Bean morphing” on page 43.

Tools

Select **Tools** to help build and manipulate your user interface. The Visual Composition Editor also provides such tools as **Show Connections** and **Hide Connections** that lets you change how the free-form surface looks as you build your user interface.

You can access all or some of these tools from the tool bar, which is just below the menu bar in the Visual Composition Editor, and from pop-up menus.

The alignment tools are only available when using the null layout manager.

The anchor bean, indicated by solid selection handles, is the bean that serves as the alignment reference. When you want to align beans with one another, select the ones you want to move and select the anchor bean last. You can also change the anchor bean by holding the Ctrl key and double-clicking on the new anchor bean.

Run

Select  **Run** to save the bean, generate code, compile the class, and run the compiled bean in an applet window.

Properties

Select  **Properties** to display the property sheet for the bean you selected. The property sheet contains editable values for the selected bean. You can open the property sheet for a selected bean either from the Visual Composition Editor or Beans List window.

If you selected multiple beans and then **Properties**, a property sheet appears and displays the common properties for the selected beans. When you change a property on the property sheet, the change affects all the selected beans.

If you modify a setting and change your mind, click the **Reset** button and a secondary window appears listing the modified properties. Select the box next to each property you want to reset, click **OK**, and VisualAge returns the value to the default setting.

Beans List

Select  **Beans List** to display a list of the beans and connections used in your user interface. You can perform many of the same tasks within the beans list as you would in the Visual Composition Editor. This ability is particularly important when you are working with components that are covered by other components. For example, if your base bean is a panel using a border layout, another panel

used as the center component expands to fill all empty space. Performing tasks on the covered border layout panel is difficult.

Show Connections

Select  to display the connections you create between beans. This tool works on all connections only if nothing is selected. Otherwise, only the connections to and from the selected beans are affected.

The Visual Composition Editor displays all connections by default.

Hide Connections

Select  **Hide Connections** to conceal the connecting links between beans. If you wish to hide all connections, do not select any beans. Otherwise, select only the beans with connections you wish to hide.

If your program has numerous connections, you can reduce the visual clutter by hiding those not currently being modified.beans

Align left

Select  **Align Left** to move the selected beans so that their left edges are aligned.

Align Center

Select  **Align Center** to move the selected beans so that their centers are aligned vertically.

Align Right

Select  **Align Right** to move the selected beans so that their right edges are aligned.

Align Top

Select  **Align Top** to move the selected beans so that their top edges are aligned.

Align Middle

Select  **Align Middle** to move the selected beans so that their centers are aligned horizontally.

Align Bottom

Select  **Align Bottom** to move the selected beans so that their bottom edges are aligned.

Distribute Horizontally

Select  **Distribute Horizontally** to move the selected beans so that they are spaced evenly between the left and right container borders.

Distribute Vertically

Select  **Distribute Vertically** to move the selected beans so that they are spaced evenly between the top and bottom of the container borders.

Match Width

Select  **Match Width** to size the selected beans to the width of the anchor bean.

Match Height

Select  **Match Height** to size the selected beans to the height of the anchor bean.

RELATED CONCEPTS

“Property sheets” on page 11
“Beans palette” on page 8
“Free-form surface” on page 8

RELATED TASKS

“Editing bean properties” on page 53
“Opening the property sheet for a bean” on page 53
“Chapter 24. Managing the beans palette” on page 89
“Undoing and redoing changes in the Visual Composition Editor” on page 75
“Chapter 26. Setting general properties for beans” on page 117

RELATED REFERENCES

“Modify Palette” on page 196
“Chapter 48. Modify Palette window” on page 201
“Chapter 49. Choose Bean window” on page 203
“Chapter 62. Resolve Class References” on page 229
“Chapter 61. Morph Into” on page 227
“The tool bar in visual composition” on page 183
“Chapter 46. Keys” on page 191

Chapter 46. Keys

You can use keys in the following ways while you are using this product:

Use the...	To...
Window keys	Navigate within and among windows.
Accelerator keys	Speed up certain actions in product windows.
Help keys	Display help information.

When a plus sign (+) joins two key names, use them together. Hold down the first key and press the second key.

Mnemonics (single underlined characters) are available for menu bar and pull-down choices. To select a menu bar choice using the mnemonics, hold down Alt and type the mnemonic for the choice that you want. (If the menu bar has the focus, enter only the mnemonic.)

To select a choice on a pull-down menu, enter the mnemonic for the pull-down choice.

Window keys

Use...	To...
Alt	Move the focus to and from the menu bar or close the system menu.
Alt+F4	Close the primary window.
Alt+Spacebar	Open the system menu for the primary window.
Arrow key	Move the cursor from choice to choice.
Ctrl+Esc	In Windows NT: Display the task list.
Ctrl+F5	In Windows platforms: Restore the primary window.
Enter	Complete the selection of a menu bar choice or pull-down choice. Also perform the action described on the push button that currently has focus.
Esc	Cancel a pull-down menu or cancel the action window if the window contains a **Cancel** push button.
F10	Move the focus to and from the menu bar or close the system menu.
Page Down or PgDn	Scroll forward a page at a time.
Page Up or PgUp	Scroll backward a page at a time.
Spacebar	Select or deselect check boxes and list box choices. Also perform the action described on the button that currently has focus.
Tab	Move the selection cursor from field to field.

Accelerator keys

You can use the following keys, when applicable, to speed up actions within the product windows:

Use...	To...
Alt+up arrow	In UNIX platforms: Move through all active windows.
Alt+Right Mouse Button	In UNIX platforms: Minimize the active window.
Ctrl+Z	Reverse (undo) the operation most recently performed on the bean.
Ctrl+Y	(Redo) Remove the effect of the last **Undo** operation.
Ctrl+Alt+Right Mouse Button	In UNIX platforms: Select several parts at a time using the right mouse button.
Ctrl+Click	Select several parts at the same time. In UNIX platforms, use the right mouse button.
Ctrl+Double-click	Assigns the anchor part in multiple selection.
Ctrl+X	Move selected beans or information to the clipboard. **Note:** Select the beans or text before using the Ctrl+Delete keys.
Ctrl+E	Exit (close) the current window.
Ctrl+S	Saves any changes you made to the part.
Ctrl+G	Generate bean code for the bean currently being edited. If the bean has no primary bean, VisualAge saves the bean.
Ctrl+C	Copy selected beans or information to the clipboard.
Ctrl+P	Add a new bean to the beans palette.
Ctrl+V	Load the mouse pointer with the contents of the clipboard.
Delete	Delete the selected beans or text.
Shift+Drag Handles	To size in one direction only.
Shift+Control+Drag	To copy and move the copy.

Help keys

Use...	To...
F1	Display general help for the active window. You can use this key on any window.
Esc	Display the previous help window.
Alt+F4	Close the help window.
Shift+F10	Display help for Help. You can use this on any help window.

Chapter 47. Pop-up menus for the Visual Composition Editor

VisualAge provides pop-up menus from the following:
- Free-form surface
- Beans palette
- Beans
- Connections

These menus provide options for adding or making changes to various elements of theVisual Composition Editor or bean design. Depending on the elements you work with, the following pop-up menu items are available:
- "Add Bean from Project"
- "Browse Connections"
- "Change Bean Name" on page 194
- "Change Connection Name" on page 194
- "Change type" on page 194
- "Connect" on page 194
- "Connectable Features" on page 195
- "Delete" on page 195
- "Event to Code" on page 195
- "Layout" on page 195
- "Layout Options" on page 196
- "Modify Palette" on page 196
- "Morph Into" on page 197
- "Open" on page 197
- "Parameter from Code" on page 197
- "Properties" on page 188
- "Promote bean feature" on page 197
- "Refresh Palette" on page 197
- "Quick Form" on page 197
- "Refresh Interface" on page 197
- "Reorder Connections From" on page 197
- "Restore shape" on page 197
- "Set Tabbing" on page 198
- "Show Large Icons" on page 198
- "Switch to" on page 198
- "Tear-off property" on page 198

Add Bean from Project

Select **Add Bean from Project** from the palette pop-up and the Modify Palette window appears. This version of the Modify Palette window provides an option for you to add beans from your project to the palette.

Browse Connections

Select **Browse Connections** to show or hide connections to or from the bean.

Menu choices

Show To	Displays the connections for which the bean is the target.
Show From	Displays the connections for which the bean is the source.

Show To/From	Displays the connections for which the bean is either the target or source.
Show All	Displays all the connections among beans in the Visual Composition Editor window.
Hide To	Conceals the connections for which the bean is the target.
Hide From	Conceals the connections for which the bean is the source.
Hide To/From	Conceals the connections for which the bean is either the target or source.
Hide All	Conceals all connections among beans in the Visual Composition Editor window.

Change Bean Name

Select **Change Bean Name** to change the name of a bean placed in the Visual Composition Editor.

You can give beans descriptive names to more easily identify them. For example, you can change the default name `Button1` to `Delete`. **Change Bean Name** does not change the label that appears on beans such as push buttons.

When you change the name of any bean, you change the beanName property. This name appears in the status area at the bottom of the Visual Composition Editor window as you make connections, and identifies the bean in the beans list.

Note: For subclasses of java.awt.Component, the bean name is the same as the name property of the bean.

For a nonvisual bean, the name also appears as text beneath the icon for the bean on the free-form surface.

Change Connection Name

From the connection pop-up menu, select **Change Connection Name** to change the name of a connection in the Visual Composition Editor.

You can give connections descriptive names to more easily identify them. For example, you can change the name of a connection that changes the background color from `button1actionPerformed` to `ChangeBackgroundColor`.

Change type

Select **Change type** to change the class of a variable bean on the free-form surface. The default class for a dropped variable bean is java.lang.Object. The default class for a torn-off property variable is the same as the declared type of the property. For example, if you set a panel to CardLayout and tear off its layout property, the variable type is LayoutManager, not CardLayout.

Connect

To make a connection between two beans, select **Connect** from the pop-up menu. When you select **Connect**, the list of preferred features associated with the bean appears.

Select a feature from the **Preferred features** list. If the feature you want is not in the **Preferred features** list, select **Connectable Features**. A connection window appears that lists the available features associated with the bean.

Connectable Features

The **Connectable Features** option is available from the bottom of the **Connect** option on the pop-up menu. Select **Connectable Features** to see a complete list of the available features (properties, events, and methods) for the bean that you are connecting. The features in the list depend upon the bean and features with which you are working. For example, since an event cannot be a target, the target connections list does not include events.

If the **Connectable Features** menu does not display the feature you are looking for, check the **Show expert features** check box. If the feature is designated as expert, it appears in the list.

Delete

Click on **Delete** to delete a bean and its connections, just the bean, or just the connections. You can use multiple selection to delete more than one bean at a time.

Event to Code

Select **Event to Code** from a bean's pop-up menu to create a connection that calls a code whenever a specified event occurs. The code can be an existing method or a newly written method. For more information see "Chapter 59. Event-to-Code Connection window" on page 223.

Layout

Select **Layout** to adjust the placement of beans in a container using null-layout or to adjust the placement of a container bean on the free-form surface. You can adjust the layout of one bean or adjust placement of several beans in a container. If you select one bean, you can adjust its placement horizontally or vertically, by selecting **Distribute**. If you select two beans, you can adjust:

- Alignment to each other—left, center, right, top, middle, bottom
- Relative size to each other—match width, match height, both
- Distribution—horizontally or vertically in the surface

If you select three or more beans, you can make all of these adjustments as well as distribution horizontally or vertically within a bounding box.

Distribute

Select **Distribute** to space visual beans evenly within a specified area.

Horizontally in bounding box

Select **Horizontally in bounding box** to space the selected beans evenly between the right and left edges of the bounding box they occupy. This item appears only if three or more beans are selected.

Horizontally in surface

Use **Horizontally in surface** to space the selected beans evenly between the right and left edges of the bean on which they were dropped. If the selected beans sit directly on the free-form surface, VisualAge distributes them across the entire scrollable width of the free-form surface.

Vertically in bounding box

Use **Vertically in bounding box** to space the selected beans evenly between the top and bottom edges of the bounding box they occupy. This item appears only if three or more beans are selected.

Vertically in surface

Use **Vertically in surface** to space the selected beans evenly between the top and bottom edges of the bean on which they were dropped. If the selected beans sit directly on the free-form surface, VisualAge distributes them across the entire scrollable height of the free-form surface.

Layout Options

Select **Layout Options** to modify the constraints of a component using GridBagLayout. You can also modify these constraints from the property sheet. The pop-up layout options include the following:

Option	Description
Fill Horizontal	Sizes the component to fill the cell horizontally when the cell is larger than the component.
Fill Vertical	Sizes the component to fill the cell vertically when the cell is larger than the component.
Fill Both	Sizes the component to fill the cell horizontally and vertically when the cell is larger than the component.
Remove Fills	Removes any specified fills to the component.
Weight Horizontal	Assigns a weight of 1.0 to the horizontal placement of the component to prevent them from clumping together in the center of their container. The distribution of extra space is calculated as a proportional fraction of the total weightX in a row and weightY in a column.
Weight Vertical	Assigns a weight of 1.0 to the vertical placement of the component to prevent them from clumping together in the center of their container. The distribution of extra space is calculated as a proportional fraction of the total weightX in a row and weightY in a column.
Remove Weights	Removes any weight assignments.
Remove Padding	Removes internal padding from the component.
Remove Insets	Removes the external padding (padding between the component and the edges of its cell) from the component.

Modify Palette

Select **Modify Palette** from the palette pop-up menu; the Modify Palette window appears.

Morph Into

Select **Morph Into** to change the class or type of a component. For example, you can use this capability in a visual composite to change AWT components to Swing components with few (if any) changes to property or connection settings. For more information before you proceed, see “Chapter 12. Bean morphing” on page 43.

Open

Select **Open** to open an editor for the bean you selected. If the selected bean has embedded visual beans, the Visual Composition Editor opens for the bean.

Parameter from Code

Select **Parameter-from-Code** from the bean pop-up to complete a connection that calls code whenever a specified event occurs.

Promote bean feature

Select **Promote bean feature** to make a feature of an embedded bean accessible outside the scope of the current composite.

Quick Form

Select **Quick Form** to generate a visual layout from the property interface of a bean.

Refresh Palette

Select **Refresh Palette** from the palette pop-up to view changes made to the palette, such as recently added beans and changes to icons. **Refresh Palette** also displays beans for features not loaded at the project level.

Refresh Interface

Select **Refresh Interface** to refresh the bean interface when you add methods or other bean information. The changes are reflected in the Visual Composition Editor.

Reorder Connections From

Select **Reorder Connections From** to change the order in which the connections are executed.

Since the connections from an object with the same notification id run in the order in which they are made, you must use **Reorder Connections From** to place the connections in the order that want them to occur.

Restore shape

Select **Restore shape** to redraw the selected connections in their original shape.

Set Tabbing

Select **Set Tabbing** to specify the tabbing order for beans that support tabbing. The tabbing order determines the sequence in which beans receive focus when the user presses the Tab, backtab, or cursor movement keys.

The initial tabbing order is determined by the order in which you add the beans. Tabbing options include:

Tabbing Option	Description
Default Ordering	Sets tabbing order from left to right, top to bottom.
Show Tab Tags	Shows tab tags next to all beans included in the tabbing order.
Hide Tab Tags	Hides the displayed tab tags.

You can change the tab order by dragging the tab tags to the desired order.

Show Large Icons

Select **Show Large Icons** from the palette pop-up to modify the size of icons on the palette and the Beans List. **Show Large Icons** is a toggle with the default set to display 16x16 icon images. The large icons are 32x32.

Switch to

Select **Switch to** when using the CardLayout manager. The CardLayout manager arranges the components in a linear depth sequence (like a deck of cards). **Switch to** is also available for the Swing bean, JTabbedPane.

Switching to...	Does this...
First	Arranges the cards so that the first card is on the top of the deck.
Next	Moves the next card to the top of the deck.
Previous	Returns the card previously on the top of the deck to the top.
Last	Moves the last card in the deck to the top.

Tear-off property

Select **Tear-off property** to work with a property as if it were a stand-alone bean. The torn-off property is a variable representing the property and not actually a separate bean.

When you select **Tear-off property**, VisualAge displays the list of properties for the bean you are tearing from. After you select a property from the list, you can drop the torn-off property on the free-form surface. VisualAge creates a connection (represented by a blue double-headed arrow) between the original bean and the torn-off property. You can then form other connections to or from the torn-off property.

RELATED CONCEPTS

“Beans palette” on page 8
“Chapter 8. Connections” on page 25
“Promotion of bean features” on page 23
“Property sheets” on page 11

“Tabbing order” on page 13
“Chapter 13. Quick form” on page 45
“Torn-off properties” on page 13
“Chapter 12. Bean morphing” on page 43

RELATED TASKS

“Chapter 22. Connecting beans” on page 81
“Chapter 24. Managing the beans palette” on page 89
“Setting the tabbing order” on page 59
“Promoting bean features” on page 59
“Supplying a parameter value using a parameter-from-code connection” on page 83
“Editing bean properties” on page 53
“Reordering connections” on page 86
“Tearing off properties” on page 59
“Chapter 21. Creating GUI layouts with quick forms” on page 77

RELATED REFERENCES

“Chapter 55. Connection windows” on page 215
“Chapter 59. Event-to-Code Connection window” on page 223
“Chapter 60. Parameter-from-Code Connection window” on page 225
“Chapter 50. Promote Features window” on page 205
“Chapter 48. Modify Palette window” on page 201
“Chapter 51. Reorder Connections window” on page 207
“Chapter 52. Quick Form SmartGuide” on page 209

Chapter 48. Modify Palette window

Use this window to perform the following actions:
- Add and remove a category
- Add and remove a bean
- Add and remove a grouping separator
- Reorder beans
- Rename a category

Once you have added beans to the palette, you can place them on the free-form surface, in the beans list, or on an existing container bean, in the same way you place beans that VisualAge provides.

Choose this button...	To perform this action...
Browse	Locate the class/file for the bean.
Add to Category	Add a bean to the selected category.
New Category	Create a new category for the palette.
Rename Category	Change the name of the selected palette category.
Remove	Remove the selected bean or category from the palette.
Add Separator	Place a separator line within the category and drag it to the desired position.
Restore Original Beans	Restore the order and composition of the base categories. User created categories or beans are not affected.
OK	Perform the action and exit the window.
Cancel	Cancel the action.

Bean type

The bean type field specifies the form of bean that you can add.

Select...	If you want...
Class	To add a bean to the palette.
Serialized	To add a serialized bean to the palette.

Class name or file name

This field name changes according to the specified bean type.

If you specified...	The field name is...
Class	Class Name
Serialized	File Name

If you created the bean, the name you specified appears in the **Name** field.

Open the Modify Palette window from the palette pop-up or by clicking on **Bean** and then **Modify Palette**. In the **Name** field, type the class name of the bean that you want to add. If you created the bean, this is the same name you specified when you originally created the bean. You can use the **Browse** button to locate the correct file or class name.

Palette list

The Palette list displays the current categories where you can add a bean. If you create a new category, it appears in this list. You can expand the category for a list of its beans and you can remove beans and categories by selecting the item and then clicking on **Remove**.

RELATED CONCEPTS

"Beans palette" on page 8

RELATED TASKS

"Chapter 24. Managing the beans palette" on page 89
"Adding a bean to the palette" on page 90

Chapter 49. Choose Bean window

Select the  on the palette to retrieve a bean and drop it on the beans list, free-form surface, or an existing container bean. You must supply the fully qualified class name to add the bean from this window. You can, however, use the **Browse** button to locate the name.

Use the Choose Bean window under the following circumstances:
- When the bean does not appear on the beans palette.
- For beans that you do not use frequently.

Note: You cannot add a bean inside itself and you cannot embed a composite bean inside itself.

Fields
- "Bean type"
- "Class name"
- "Name" on page 204

Bean type

You can add a bean as a *class*, a *serialized bean*, or as a *variable*. When you add a bean as a *class*, the default constructor for the class is used when the application runs. This means that a real object is created, not a variable that points to a real object defined elsewhere.

From **Bean Type**, select the type of bean you want to add.

Select...	If you want...
Class	To add an instance of a bean.
Variable	To add a reference to an instance of a bean.
Serialized	To add a serialized bean.
[ENTERPRISE] **Transacted Variable** (Persistence Builder)	To add a variable with a transaction context, which ensures that all operations performed on the instance referenced by the variable are scoped within a single unique transaction.

Class name

This field name changes according to the specified bean type.

If you specified...	The field name is...
Class	Class Name
Variable	Interface / Class Name
Serialized	File Name

In the **Class name** field, type the fully qualified name of the Java class. You can use the **Browse** button to locate the name or, if you added the bean previously, it appears in the drop-down list box.

Name

Type a name in the **Name** field for the bean you want to drop. Bean names may include letters and numbers, but must begin with a letter and include no spaces. This text appears under the bean icon on the free-form surface. If you leave this field blank, VisualAge assigns a name for you.

RELATED CONCEPTS

“Visual composition hints and tips” on page 9
“Choose bean tool” on page 9

RELATED TASKS

“Adding beans not on the palette” on page 68

Chapter 50. Promote Features window

Use this window to select the methods, properties, and events that you want to add to the public interface for the composite bean.

Fields
- "Method" on page 215
- "Property" on page 216
- "Event" on page 216
- "Promote name"
- "Details" on page 216
- "Show expert features" on page 220

Push buttons
- ">> Promote"
- "<< Remove"

Promote name

In the **Promoted features** list, double-click the name of the promoted feature and enter the name that you want the property, method, or event to have when added to the public interface for the bean. When you move a feature to the list of promoted features, a default name appears in this field.

>> Promote

Click on >> to add the property, method, or event to the **Promoted features** list. Click on **OK** to add the feature to the public interface of the bean. The feature that you promote appears in the **Connectable Features** window and in the property sheet.

<< Remove

Click on << to delete the property, method, or event from the **Promoted features** list. You must first select the feature from the **Promoted features** list.

RELATED CONCEPTS

"Promotion of bean features" on page 23

RELATED TASKS

"Promoting bean features" on page 59

RELATED REFERENCES

"Promote bean feature" on page 197

Chapter 51. Reorder Connections window

Use this window to change the sequence in which connections from the selected bean are run.

If you make several connections from the same event or property of a bean, the connections for the event or property run in the order in which you made the connections. You can change the sequence by selecting and dragging the listed connection.

RELATED CONCEPTS

“Chapter 8. Connections” on page 25

RELATED TASKS

“Reordering connections” on page 86
“Chapter 22. Connecting beans” on page 81

RELATED REFERENCES

“Reorder Connections From” on page 197

Chapter 52. Quick Form SmartGuide

Use the Quick Form SmartGuide to define and register quick forms for use in the Visual Composition Editor.

Parts of this SmartGuide

- In the Quick Form window, you specify the properties to be included, the components to be dropped, and the location of the finished quick form. You can also register a pre-existing visual bean as a quick form from this window.
- In the Quick Form Layout window, you specify how you want VisualAge to lay the components out.
- In the Save Quick Form window, you specify how you want VisualAge to save and register your quick form for reuse.

Quick Form window

In this window, you specify the properties to be included, the components to be dropped, and the location of the finished quick form. You can also register a pre-existing visual bean as a quick form from this window.

Fields

- **Select a parent for the quick form**, which determines where the quick-form components will be dropped. Any valid container bean in the composite will appear in this list.
- **Use an existing registered quick form**, a list of all quick forms already registered for objects of this type.
- **Create a new quick form**, a table in which you map individual properties to quick-form components. Filter the list of registered quick forms by clicking on the **Swing** and **AWT** check boxes.

To register an existing component or composite as a quick form from this window, click on **Manage Quick Forms**. The Quick Form Manager window opens.

Quick Form Layout window

In this window, you specify how you want VisualAge to lay the components out.

Fields

- **Number of columns per row**, which determines how many columns to set up in the layout, regardless of whether labels are used.
- **Layout style**
  - **GridBag into panel**. With this setting, VisualAge lays down a panel on top of the parent container bean, sets the newly dropped panel to GridBagLayout, and drops the quick-form components into the newly dropped panel. (For parent-container layouts other than <null> or GridBag, this option is used automatically; the radio buttons are not enabled.)
  - **Free flow into parent**. This option is available only if the parent container bean is empty and already set to either <null> or GridBagLayout. In this case, VisualAge drops the quick-form components directly into the parent container.

- **Properties to quick form**, a reorderable list of the properties you chose to include in the quick form. Use the **Up** and **Down** buttons to reorder items in the list.
- **Property quick form details**, which summarizes how each property will be represented in the quick form, as follows:
  - The visual bean that you chose to represent the property (read-only)
  - **Include label** check box
  - Radio buttons for label alignment: **Top** or **Left**
  - **Label text** field
  - **Columns to span**, the number of columns you want the property's representation to take up in the layout

The Preview pane reflects your layout choices as you make them. When you click on **Finish**, VisualAge implements the quick form without saving it for reuse. To save the quick form for reuse, click on **Next**.

Save Quick Form window

In this window, you specify how you want VisualAge to save and register your quick form for reuse.

Fields

- **Save quick form**, which determines whether the quick form will be saved in a separate class. By default, it is not checked.
- **Project**, the name of the project in which you want the class to be stored.
- **Package**, the name of the package in which you want the class to be stored.
- **Class name**, the name of the quick-form class.
- **Quick form name**, the name of the quick form as maintained by the quick-form manager.
- **Quick form short description**.
- **Register quick form**, which determines whether to register the quick form. By default, it is checked, but it is enabled only if **Save quick form** has been checked.

RELATED CONCEPTS

"Chapter 13. Quick form" on page 45

RELATED TASKS

"Chapter 21. Creating GUI layouts with quick forms" on page 77
"Registering quick forms" on page 79

Chapter 53. Quick Form Manager window

Use this window to check which quick forms are registered for a given type. You can also register or unregister quick forms.

Areas in this window

- **Types**, which lists the types that currently have quick forms registered for them. This list does not include product defaults.
- **Registered quick forms**, which lists the quick forms that are registered for the selected type.

Push buttons

To register a quick form, click on **Register New**. The Register Quick Form window opens.

To delete a registration, select the quick form and click on **Unregister**. This action does not delete the quick form class.

To apply your changes, click on **OK**.

RELATED CONCEPTS

"Chapter 13. Quick form" on page 45

RELATED TASKS

"Chapter 21. Creating GUI layouts with quick forms" on page 77
"Registering quick forms" on page 79

Chapter 54. Register Quick Form window

Use this window to register a visual bean as a quick form for a specific property type.

Fields

- **Quick form name**, a nickname for the quick-form class as applied to this property type.
- **Select a type to register the quick form against**, the designated property type. Click on **Browse** to open a class-selection dialog.
- **Select a visual bean to represent the quick form**, the designated visual class. This can be a component or a visual composite. Click on **Browse** to open a class-selection dialog.
- **Select the target property for the visual bean**, the property to which VisualAge will draw the connection.
- **Select the target event for the visual bean**, the event that will trigger property-value synchronization from the visual bean. If the property you specified earlier is bound, this field is automatically set to the event associated with the bound property.
- **Quick form short description**, text that, in the future, will help you decide when to use this particular quick form.
- **Include label**, which determines whether VisualAge inserts a label with the visual bean used to represent the quick form. The initial value of the label is set for you, but you can edit it at the time you actually use the quick form.

RELATED CONCEPTS

"Chapter 13. Quick form" on page 45

RELATED TASKS

"Chapter 21. Creating GUI layouts with quick forms" on page 77
"Registering quick forms" on page 79

Chapter 55. Connection windows

Use the connection windows to select the feature that you want to use in a connection.

- The Start Connection From window appears when you select **Connectable Features** from the connections pop-up window of the bean you are connecting *from*.
- The Connect *feature_type* Named window appears when you select **Connectable Features** from the preferred features list of the bean you are connecting *to*.

Fields
- "Method"
- "Property" on page 216
- "Event" on page 216
- "Show expert features" on page 220
- "Details" on page 216

The values in these fields vary depending on the following:
- The bean you selected
- If you selected the free-form surface
- How you added features to the bean interface

Push buttons

To use the selected method, property, or event and continue, click on **OK**.

The **Set parameters** button appears when the target of your connection is a method, writable property, or script. Click on this button to specify constant input parameters for the method.

RELATED CONCEPTS

"Chapter 8. Connections" on page 25

RELATED TASKS

"Chapter 22. Connecting beans" on page 81
"Chapter 23. Manipulating connections" on page 85

RELATED REFERENCES

"Chapter 56. Property-To-Property Connection window" on page 217
"Chapter 57. Event-To-Method Connection window" on page 219
"Chapter 58. Constant Parameter Value properties window" on page 221
"Chapter 59. Event-to-Code Connection window" on page 223
"Chapter 60. Parameter-from-Code Connection window" on page 225

Method

From the **Method** list, select the method you want to use. The list of methods available depends on the bean you selected. The act of changing or setting the value of a property can be considered a method, so property names might also appear in this list.

Property

From the **Property** list, select the property you want to use. The list of properties available depends on the bean you selected.

Event

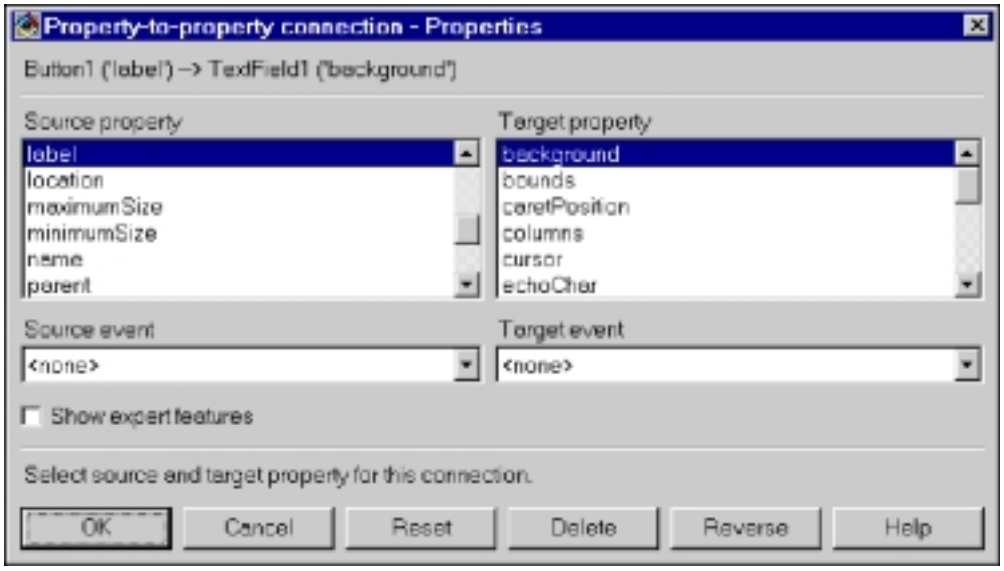
From the **Event** list, select the event you want to use. The list of events available depends on the bean you selected.

Details

The **Details** field provides information about the selected feature.

Chapter 56. Property-To-Property Connection window

Use the Property-to-Property Connection – Properties window to change the source or target of a connection.



Fields
- "Source property"
- "Target property" on page 218
- "Source event" on page 218
- "Target event" on page 218
- "Show expert features" on page 220

Push buttons

To update the source and target properties or event of the connection and close the window, click on **OK**.

To back out of the window without making changes, click on **Cancel**.

To reset the source and target connections to the original configuration, click on **Reset**.

To switch the source and target properties of the connection, click on **Reverse**.

To delete the connection, click on **Delete**.

Source property

The **Source Property** field shows the current source for the connection. To update the connection, select a new source property from the list and then click on **OK**.

If you cannot find the property you want, check the **Show expert features** check box. If the property is designated as expert, it appears in the list.

Target property

The **Target Property** field shows the current target for the connection. To update the connection, select a new target property from the list. Then click on **OK**.

If you cannot find the property you want, check the **Show expert features** check box. If the property is designated as expert, it appears in the list.

Source event

The **Source Event** field lists the event associated with the source of a connection. To update the connection, select a new source event from the list and then click on **OK**.

Setting this field enables you to control whether the data synchronization is unidirectional, bidirectional, or only performed at initialization. This field also enables you to use an unbound property as the source of a connection. When the event is triggered, the target is aligned with the source value. If you do not set this value and the property is not bound, VisualAge enables you to make the connection, but the target property value is not updated when the source property value changes.

Target event

The **Target Event** field lists the event associated with the target of a connection. To update the connection, select a new target event from the list. Then click on **OK**.

Setting this field enables you to control whether the data synchronization is unidirectional, bidirectional, or only performed at initialization. This field also enables you to use an unbound property as the target of property-to-property connections. When the event is triggered, the source is aligned with the target value. If you do not set this value and the property is not bound, VisualAge enables you to make the connection, but the source property value is not updated when the target property value changes.

RELATED CONCEPTS

“Property-to-property connections” on page 26
“Chapter 8. Connections” on page 25

RELATED TASKS

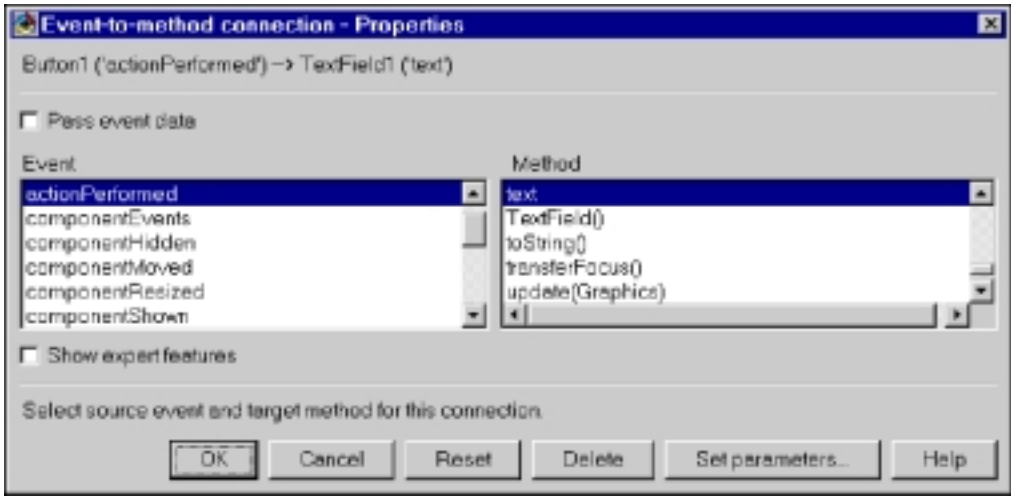
“Chapter 22. Connecting beans” on page 81
“Chapter 23. Manipulating connections” on page 85

RELATED REFERENCES

“Chapter 55. Connection windows” on page 215
“Chapter 57. Event-To-Method Connection window” on page 219
“Chapter 58. Constant Parameter Value properties window” on page 221
“Chapter 59. Event-to-Code Connection window” on page 223

Chapter 57. Event-To-Method Connection window

Use the Event-to-Method Connection – Properties window to change either end point of an event-to-method connection.



Fields
- "Pass event data"
- "Event" on page 220
- "Method" on page 220
- "Show expert features" on page 220

Push buttons

To update the source and target connection features and close the window, click on **OK**.

To delete the connection, click on **Delete**.

To specify constant parameter values for the target method, click on **Set parameters**.

Pass event data

The **Pass event data** check box indicates whether connection code will pass data, which is sent in the event notification, to the target as input. The specific nature of the data varies by type of event.

This setting affects the visual cues that VisualAge uses to indicate incomplete connections. Since event data is the first parameter value passed, if the target method or code requires only one parameter and **Pass event data** is selected, the connection appears complete. If the target method or code requires more than one parameter, the connection continues to appear incomplete.

If this box is cleared and inputs are required, VisualAge does not attempt to pass event data to the target, and the connection appears incomplete.

If an event has more than one data parameter and is not specified in another order, the data is passed to the target's parameter in order.

Event

The **Event** field shows the current source event for the connection. To update the connection, select a new source from the **Event** list. Then click on **OK**.

Method

The **Method** field shows the current target method for the connection. To update the connection, select a new target from the **Method** list. Then click on **OK**.

Show expert features

Features that are designated as expert do not appear by default in the feature list. When you select the **Show expert features** check box, VisualAge displays all features, including those designated as expert.

Set parameters

When you select the **Set parameters** button, the Constant Parameter Value Properties window opens. Use this window to specify parameter values for the connection.

If you specify parameter values and change your mind, click on **Reset**; a secondary window appears listing the modified properties. Select the box next to each property you want to reset and click on **OK**. VisualAge reverts the value to the default setting.

RELATED CONCEPTS

"Event-to-method connections" on page 27
"Chapter 8. Connections" on page 25
"Parameter connections" on page 28

RELATED TASKS

"Chapter 22. Connecting beans" on page 81
"Chapter 23. Manipulating connections" on page 85
"Specifying expert features" on page 139
"Specifying values for parameters by default" on page 84

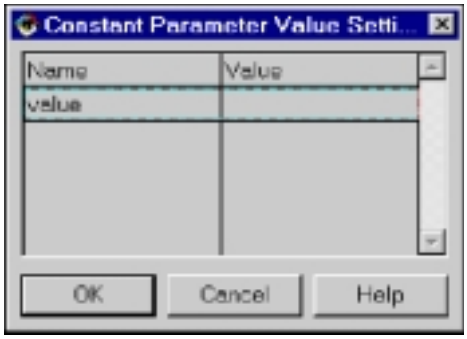
RELATED REFERENCES

"Chapter 55. Connection windows" on page 215
"Chapter 56. Property-To-Property Connection window" on page 217
"Chapter 58. Constant Parameter Value properties window" on page 221
"Chapter 59. Event-to-Code Connection window" on page 223

Chapter 58. Constant Parameter Value properties window

Use this window to supply a parameter as a constant value. In each parameter field, enter the constant value to be assigned to the specified parameter at run time.

The fields provided in this window depend on the type and number of parameters defined by the method.



RELATED CONCEPTS

“Chapter 8. Connections” on page 25
“Parameter connections” on page 28

RELATED TASKS

“Supplying a parameter value using a parameter-from-code connection” on page 83
“Editing connection properties” on page 84
“Supplying a parameter value using a constant” on page 83
“Chapter 22. Connecting beans” on page 81

RELATED REFERENCES

“Chapter 56. Property-To-Property Connection window” on page 217
“Chapter 57. Event-To-Method Connection window” on page 219
“Chapter 59. Event-to-Code Connection window” on page 223

Chapter 59. Event-to-Code Connection window

Use the Event-to-Code Connection window to create a connection that calls code whenever a specified event occurs.

Fields
- "Method class"
- "Event"
- "Methods"
- "Code pane"
- "Pass event data" on page 224

Push buttons

To complete the connection and close the window, click on **OK**.

To specify parameter values that are constant, click on **Set parameters**.

To close the window without completing the connection, click on **Cancel**.

Method class

The **Method class** field lists the class being edited and all its superclasses. By selecting one of the superclasses, you connect your code to code contained in the superclass. The **Method class** field updates according to the class selected.

Event

From the **Event** list, select the event you want to use. The list of events available depends on the bean you selected.

Methods

This field provides a drop-down list that contains a placeholder name for new methods and the names of methods you previously created. If you select `<new method>` and create a new method, VisualAge assigns a default method name by combining the bean name with the event type. For example, if you create an Event-to-Code Connection with `button1` as the source and actionPerformed as the event with no event data passed, VisualAge assigns the name *button1_ActionPerformed* to the new method. You can make the method more descriptive and easier to recognize by changing its name.

Note: The connection name in the beans list is *connEtoC1*.

Code pane

The method code pane is the large pane located below the event and method fields. Enter your method code in this editable pane. You can also change the name, return value, or parameters of the method by editing the method code. The code pane pop-up menu provides options to assist in editing your code.

Note: You can use code assist in this code pane. For information on this tool, refer to *Getting Started.*

Pass event data

If you want the event to pass its parameters to the new method, check **Pass event data** at the bottom of the panel.

The **Pass event data** check box indicates whether connection code will pass data, which is sent in the event notification, to the target as input. The specific nature of the data varies by type of event.

This setting affects the visual cues that VisualAge uses to indicate incomplete connections. Since event data is the first parameter value passed, if the target method or code requires only one parameter and **Pass event data** is selected, the connection appears complete. If the target method or code requires more than one parameter, the connection continues to appear incomplete.

If this box is cleared and inputs are required, VisualAge does not attempt to pass event data to the target, and the connection appears incomplete.

If an event has more than one data parameter and is not specified in another order, the data is passed to the target's parameter in order.

If the event and method parameters match in type, VisualAge defaults to **Pass event data**. If the event does not have or does not accept parameters, the default is to not pass event data.

RELATED CONCEPTS

"Code connections" on page 27
"Chapter 8. Connections" on page 25

RELATED TASKS

"Supplying a parameter value using a parameter-from-code connection" on page 83
"Connecting features to code" on page 82
"Supplying a parameter value using a constant" on page 83

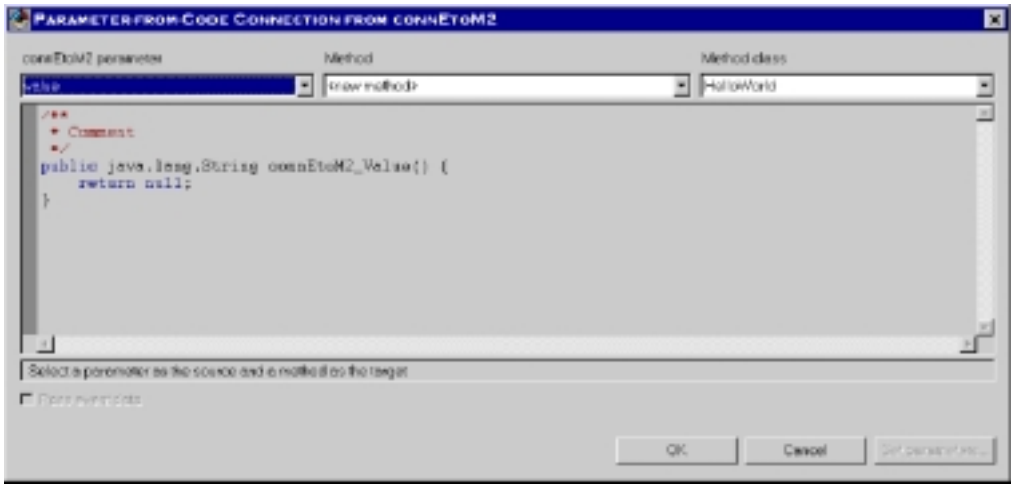
RELATED REFERENCES

"Chapter 55. Connection windows" on page 215
"Chapter 56. Property-To-Property Connection window" on page 217
"Chapter 57. Event-To-Method Connection window" on page 219
"Chapter 58. Constant Parameter Value properties window" on page 221
"Chapter 60. Parameter-from-Code Connection window" on page 225

Chapter 60. Parameter-from-Code Connection window

Use the Parameter-from-Code Connection window to complete a connection that calls code whenever a specified event occurs. The Parameter-from-Code Connection window is similar to the Event-to-Code Connection window, except it is used to complete a connection that requires further parameters.

Note: You can use code assist in this source pane. For information on this tool, refer to *Getting Started.*



RELATED CONCEPTS

"Code connections" on page 27
"Chapter 8. Connections" on page 25

RELATED TASKS

"Supplying a parameter value using a parameter-from-code connection" on page 83
"Connecting features to code" on page 82
"Supplying a parameter value using a constant" on page 83

RELATED REFERENCES

"Chapter 55. Connection windows" on page 215
"Chapter 56. Property-To-Property Connection window" on page 217
"Chapter 57. Event-To-Method Connection window" on page 219
"Chapter 58. Constant Parameter Value properties window" on page 221
"Chapter 59. Event-to-Code Connection window" on page 223

Chapter 61. Morph Into

Use the **Morph Into** window to change the class or type of a component.

To change the class, type the fully qualified name of the new class in the entry field provided. To pick a class from the list of classes loaded in your workspace, click on **Browse**.

To specify a new type, select one of the following. Not all choices may be available, depending on the current class and type of component.

- **Class**, a fully initialized instance.
- **Variable**, an uninitialized instance.
- **Serialized**, a fully initialized, serialized instance. If you select **Serialized** as the new type, you must replace the displayed class name with the name of an .ser file.

Connections to features that are no longer valid in the new class remain until code is regenerated for the composite. To delete such connections instead, select **Delete invalid connections** before you click on **OK** to start the process.

RELATED CONCEPTS

"Chapter 12. Bean morphing" on page 43
"Chapter 2. How classes and beans are related" on page 3
"Chapter 8. Connections" on page 25

RELATED REFERENCES

"Variable" on page 181
"Morphing beans" on page 65

Chapter 62. Resolve Class References

Use the Resolve Class References window to change the class of an unknown component to one that is loaded into your workspace.

When VisualAge encounters an unknown class reference, it attempts to find the correct class name anywhere in the repository. VisualAge then displays the name of the first class name it finds.

Push buttons

To leave the class unresolved for the moment, click on **Ignore**.

To pick an alternative class name from the standard class dialog, click on **Replace**.

To proceed with the change, click on **OK**.

RELATED CONCEPTS

“Chapter 12. Bean morphing” on page 43

Chapter 63. String Externalization Editor

Use the String Externalization Editor window to specify how you want a given String property value separated for translation. Select one of the following radio buttons:

- **Do not externalize string**, for leaving literal String values in the generated code
- **Externalize string**, for specifying String separation

Resource type radio buttons

- **List resource bundle**
- **Property resource file**

Fields

- **Bundle**, the name of the resource bundle in which to define the String resource
- **Key**, the locale-independent string used to retrieve the resource
- **Value**, the locale-dependent string value of the resource

Push buttons

To create a new resource bundle, click on **New**.

To pick from an existing resource bundle, click on **Browse**.

RELATED CONCEPTS

“Chapter 15. Internationalization in VisualAge” on page 49
“Chapter 9. Generated code” on page 31

RELATED TASKS

“Chapter 29. Separating strings for translation” on page 129

Chapter 64. Externalizing: Package.Class

Use this window to specify how you want strings in this class separated for translation.

Resource type radio buttons
- **List resource bundle**
- **Property resource file**

Fields
- An unlabeled entry field through which you specify the resource bundle name. The name of the last bundle accessed, if any, appears in the field. A maximum of eight bundle names is selectable from the drop-down list.
- **Strings to be separated**, which contains the following information. You can edit all values.
  - An unlabeled column that indicates how VisualAge will treat the item. One of the following graphics appear:  **Translate**,  **Never translate**, or  **Skip**.
  - **Key**, the locale-independent string used to retrieve each resource.
  - **Value**, the locale-dependent string value of a given resource.
- **Context**, which shows you where the selected string occurs.

Push buttons

To create a new resource bundle, click on **New**.

To pick from an existing resource bundle, click on **Browse**.

This window lists those strings that have not been previously externalized or marked  . To make a string previously marked  appear in this window, find the string in the code and delete the comment at the end of the line: `//$NON-NLS-1$`

RELATED CONCEPTS

“Chapter 15. Internationalization in VisualAge” on page 49
“Chapter 9. Generated code” on page 31

RELATED TASKS

“Chapter 29. Separating strings for translation” on page 129

Chapter 65. BeanInfo page

Use the **BeanInfo** page of the class/interface browser to view, define, or modify bean interface features. These features, consisting of properties, events, and methods, represent the characteristics and behavior of your class. When you add features in the **BeanInfo** page, you define the external view of your bean to consumers who use the bean. By contrast, when you compose a composite bean in the Visual Composition Editor, you define the internal content of the bean.

When you add a new feature in the **BeanInfo** page, VisualAge generates code for the feature in the bean class. For some features, particularly properties, you might not need to modify this generated code. Additionally, VisualAge generates code that describes the feature in the BeanInfo class for the bean. If a BeanInfo class does not exist for the bean, it is created when you add the first feature in the **BeanInfo** page. You can also create a BeanInfo class from the **Features** menu. See the JavaSoft home page for links to detailed information about the JavaBeans specification and BeanInfo.

If you do not want your bean to inherit features from its superclass, turn off BeanInfo inheritance before a BeanInfo class is created for your bean. If BeanInfo is not inherited from the superclass, only features defined in your bean are available to bean consumers. This means that no inherited features are available for connections or the property sheet when your bean is embedded in another bean. BeanInfo inheritence does not affect accessibility within your class to inherited methods and fields. To control Beaninfo inheritance, select **Options** from the **Window** menu. Then, select **Inherit BeanInfo of bean superclass** in the Visual Composition pane.

If you edit an embedded bean in the Visual Composition Editor and then change its features in the **BeanInfo** page, be sure to refresh the bean interface when you return to the Visual Composition Editor. Do this by selecting **Refresh Interface** from the bean's pop-up menu in the Visual Composition Editor.

From the **BeanInfo** page, use either the **Features** menu or the tool bar, or both, to manage bean features. Open the **Features** menu either by selecting it from the menu bar or by opening it as a pop-up menu from the Features pane.

Fields

Menu choices

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133

RELATED REFERENCES

“Chapter 66. BeanInfo page menus” on page 239
“Chapter 67. BeanInfo page tools” on page 243

Features pane—BeanInfo page

Use this pane to view locally defined features for a bean. To view inherited features, browse the bean that defines the features. Initially, all local features except hidden and expert features are listed.

To specify which features are listed, open the **Features** menu, select **Show**, then select a choice to filter the list. The title of the Features pane reflects its filtered contents. The features that are listed for each title are as follows:

Option	Description
Features	All features of the bean
Normal Features	All features except hidden and expert features
Property Features	Features that represent bean properties
Event Features	Features that report the occurrence of an event in your bean
Method Features	Features that provide bean behavior
Expert Features	Features that are marked in BeanInfo as expert
Hidden Features	Features that are marked in BeanInfo as hidden

Each listed feature is preceded by a symbol that indicates the feature type:


Property


Event


Method

The following superscripts provide information about features in the pane:


Bound


Constrained


Expert


Hidden


Indexed


Readable


Writeable

If you select a feature in the Features pane, the following information appears in other areas of the **BeanInfo** page:

- Underlying classes, interfaces, and methods of the feature are listed in the Definitions pane.
- Bean information for the feature appears in the Source pane.
- The fully-qualified name of the feature appears in the status area.

RELATED TASKS

"Specifying expert features" on page 139
"Specifying hidden features" on page 140

RELATED REFERENCES

"Features—BeanInfo page" on page 239
"Definitions pane—BeanInfo page"
"Information pane—BeanInfo page"
"Source pane—BeanInfo page" on page 238
"Status area—BeanInfo page" on page 238
"Chapter 65. BeanInfo page" on page 235

Definitions pane—BeanInfo page

Use this pane to list the underlying classes, interfaces, and methods that define features listed in the Features pane. If no features are selected, the Definitions pane is empty. If you select a feature, definitions for the selected feature are listed.

If you select a definition in the Definitions pane, the following information appears in other areas of the **BeanInfo** page:

- Source code for the class, interface, or method appears in the Source pane.
- The fully-qualified name of the class, interface, or method appears in the status area.

RELATED REFERENCES

"Definitions—BeanInfo page" on page 240
"Features pane—BeanInfo page" on page 236
"Information pane—BeanInfo page"
"Source pane—BeanInfo page" on page 238
"Status area—BeanInfo page" on page 238
"Chapter 65. BeanInfo page" on page 235

Information pane—BeanInfo page

Use this pane to view or edit bean information for a bean or feature. The information is obtained from the BeanInfo class for the bean, if it exists, or by bean reflection.

The content of the Information pane depends on whether you have selected a feature in the Features pane. If a feature is selected, information is displayed for the selected feature. Otherwise, information is displayed for the bean.

The title also depends on whether the information is obtained from BeanInfo or by reflection. For example, if information is displayed for a bean by reflection, the title of the Information pane is Bean Reflection Information. If the information is obtained from BeanInfo, the title is Bean Information.

You can modify information in this pane by selecting the item and editing its value field, as follows:

- **Direct entry.** In some cases, you simply enter a value in the field.

- **Selection from a drop-down list.** To set boolean information, select `True` or `False`. To set a type (such as designating a property editor class), select from the list of classes that are valid for that purpose.
- **Setup of enumeration constants.** You can establish valid enumeration constants for a property by editing **Enumeration Values**. You enter identifier/value pairs; when an instance of the bean is dropped and edited later, the identifiers appear as selectable values in the property sheet for the bean. (For examples of this, open JComponent to the BeanInfo page: Look at alignment and orientation properties.)

RELATED CONCEPTS

"Generated BeanInfo descriptor code (an advanced topic)" on page 34

RELATED TASKS

"Setting enumeration constants for a property" on page 140

RELATED REFERENCES

"Information—BeanInfo page" on page 242
"Features pane—BeanInfo page" on page 236
"Chapter 65. BeanInfo page" on page 235

Source pane—BeanInfo page

Use this pane to view or edit source code for a feature definition. The Source pane is displayed when you select a class, interface, or method in the Definitions pane.

RELATED CONCEPTS

"How generated code coexists with user-written code" on page 35

RELATED REFERENCES

"Definitions pane—BeanInfo page" on page 237
"Chapter 65. BeanInfo page" on page 235

Status area—BeanInfo page

Use the status area at the bottom of the **BeanInfo** page to view the fully-qualified name of a selected feature or feature definition.

- If you select a feature in the Features pane, the status area shows the feature name.
- If you select a class, interface, or method in the Definitions pane, the status area shows the name of the selected item.
- If nothing is selected, a message to that effect is displayed in the status area.

RELATED REFERENCES

"Features pane—BeanInfo page" on page 236
"Definitions pane—BeanInfo page" on page 237
"Chapter 65. BeanInfo page" on page 235

Chapter 66. BeanInfo page menus

Several menus are available in the **BeanInfo** page that you can use to work with beans and their features. You can use the following menu bar choices to work with features and related information:

- **Edit**: Use with the Source pane
- **Features**: Use with the Features pane
- **Definitions**: Use with the Definitions pane
- **Information**: Use with the Information pane

RELATED REFERENCES

"Features—BeanInfo page"
"Definitions—BeanInfo page" on page 240
"Information—BeanInfo page" on page 242
"Chapter 65. BeanInfo page" on page 235

Features—BeanInfo page

Use this menu to define or modify bean interface features. You can open the **Features** menu either from the menu bar or as a pop-up menu from the Features pane.

You can perform the following tasks from the **Features** menu:

- Create a bean information class for a bean
- List bean interface features for a bean
- Add or remove bean interface features
- Open a feature

Option	Description
Open	Opens the class/interface browser for the selected feature
Open to	Opens a menu of bean information choices
Show	Opens a menu of filtering choices for the Features pane
Sort	Opens a menu of ordering choices for the Features pane
New BeanInfo Class	Opens a SmartGuide to create a BeanInfo class for the bean
Generate BeanInfo class	Creates a BeanInfo class for the bean
Add Available Features	Opens a dialog to add methods and fields as features
New Property Feature	Opens a SmartGuide to create a new property
New Event Set Feature	Opens a SmartGuide to create a new event set feature
New Method Feature	Opens a SmartGuide to create a new method feature
New Listener Interface	Opens a SmartGuide to create a new event listener
Delete	Opens a dialog to remove selected features and underlying definitions

RELATED TASKS

"Chapter 31. Defining bean interfaces for visual composition" on page 133

RELATED REFERENCES

"Features pane—BeanInfo page" on page 236
"Show—BeanInfo page" on page 240
"Sort—BeanInfo page" on page 240

"BeanInfo Class SmartGuide" on page 244
"BeanInfo class generator" on page 244
"Add Available Features" on page 249
"New Property Feature SmartGuide" on page 246
"New Event Set Feature SmartGuide" on page 248
"New Method Feature SmartGuide" on page 248
"New Event Listener SmartGuide" on page 247
"Delete Features" on page 249

Show—BeanInfo page

Use this menu to determine what features are listed in the **BeanInfo** page Features pane. You can open this menu by selecting it from the **Features** menu. Then select a choice to list all features or a subset of features for a bean. The features that are listed for each menu choice are as follows:

Option	Description
Connectable Features	All features of the bean
Normal features	All features except hidden and expert features
Property features	Features that represent bean properties
Event features	Features that report the occurrence of an event in your bean
Method features	Features that provide bean behavior and access to bean properties
Expert features	Features that are marked in BeanInfo as expert
Hidden features	Features that are marked in BeanInfo as hidden

RELATED REFERENCES

"Features pane—BeanInfo page" on page 236
"Features—BeanInfo page" on page 239

Sort—BeanInfo page

Use this menu to order features in the **BeanInfo** page's Features pane. You can open this menu by selecting it from the **Features** menu. Then select a choice to sort features by name or by type.

RELATED REFERENCES

"Features pane—BeanInfo page" on page 236
"Features—BeanInfo page" on page 239

Definitions—BeanInfo page

Use this menu to work with feature definitions in the Definitions pane. You can open the **Definitions** menu either as a pull-down menu from the menu bar or as a pop-up menu from the Definitions pane.

Option	Description
Open	Opens a browser for the selected method, class, or interface

Option	Description
Open to	Opens a menu of choices for opening another browser: **Project** A project browser for one of the following: • The class or interface that contains the selected method • The selected class or interface **Package** A package browser for one of the following: • The class or interface that contains the selected method • The selected class or interface **Type** A browser for the selected class or interface
References To	Opens a menu of choices to search for the following: **This Method** Calls to the selected method from other methods **Sent Methods** Methods that are called from the selected method **Accessed Fields** Fields that are accessed by the selected method **ReferencedTypes** Classes and interfaces that are referenced by the selected method **This Type** References to the selected class or interface **Field** References to a field in the selected class or interface **Static Field** References to a static field in the selected class or interface **Constant** References to a constant in the selected class or interface
Declarations Of	Opens a menu of choices to search for declarations of the following: **This Method** The selected method **Sent Methods** Methods that are called from the selected method **Accessed Fields** fields that are accessed by the selected method **ReferencedTypes** Classes and interfaces that are referenced by the selected method
Replace With	Opens a menu of choices for replacement by one of the following: **Previous Edition** The previous edition of the selected method, class, or interface **Another Edition** Any other edition of the selected method, class, or interface

Option	Description
Manage	Opens a menu of management choices for a class or interface: **Version** Version the open edition of the selected class or interface **Release** Release the open edition of the selected class or interface **Create Open Edition** Create a new open edition of the selected class or interface **Change Owner** Change ownership of the selected class or interface
Compare With	Opens a menu of choices for comparison with one of the following: **Released Edition** The released edition of the selected class or interface **Previous Edition** The previous edition of the selected method, class, or interface **Another Edition** Any other edition of the selected method, class, or interface **Each Other** Selected methods, classes, or interfaces
Document	Opens a menu of choices for replacement by one of the following: **Print** Prints source code for the selected class or interface **Generate javadoc** Generates Java API documentation for the selected class or interface
Print	Prints source code for the selected method

RELATED REFERENCES

“Definitions pane—BeanInfo page” on page 237

Information—BeanInfo page

Use this menu to work with bean information for a bean or feature in the Information pane. You can open the **Information** menu by right-clicking anywhere within the Information pane.

Revert Returns the bean information to its previously saved state

Save Saves the current bean information

RELATED REFERENCES

“Information pane—BeanInfo page” on page 237

Chapter 67. BeanInfo page tools

Several tools are available from the **BeanInfo** page to help you work with beans and their features. You can access these tools through menus or the tool bar.

RELATED REFERENCES

“Chapter 65. BeanInfo page” on page 235
“Tool bar—BeanInfo page”

Tool bar—BeanInfo page

Use the tool bar to launch some common tools in the **BeanInfo** page. The following tools are available from the tool bar:

Tool	Description
Open Debugger	Opens a window for debugging
Search	Opens a window to search for a class, interface, constructor, method, or field
New Property Feature	Opens a window to define a new property feature
New Event Set Feature	Opens a window to define a new event set feature
New Method Feature	Opens a window to define a new method feature

RELATED REFERENCES

“New Property Feature SmartGuide” on page 246
“New Event Set Feature SmartGuide” on page 248

"New Method Feature SmartGuide" on page 248
"Chapter 65. BeanInfo page" on page 235

BeanInfo class generator

Use the BeanInfo class generator to create bean information class code for the bean you are working with. This produces bean information for all existing features.

Before you generate the bean information class, bean information for the **BeanInfo** page is obtained by reflection. After you generate the bean information class, the class is used to find bean information.

RELATED REFERENCES

"Features—BeanInfo page" on page 239

BeanInfo Class SmartGuide

Use the SmartGuide – BeanInfo Class window to create bean information class code for the bean you are working with. This produces bean information for the bean, but not for existing features. When you add new features, bean information is added to the BeanInfo class.

Before you add any new features, bean information for the **BeanInfo** page is obtained by reflection. After you generate the bean information class, the class is used to find bean information.

Fields

Display name
The display name represents the BeanInfo class in the VisualAge user interface. This field is optional. If you do not specify a display name, the BeanInfo class name is used.

Short description
The short description is used in the VisualAge user interface. This field is optional. If you do not provide a description, the BeanInfo class name is used.

Customizer
A customizer class provides customized definition of property values for a bean. This field is optional. To provide a custom dialog for modification of your bean properties, specify a class to support the dialog. To select an existing customizer class, click on **Browse**.

expert Expert beans do not appear in the Visual Composition Editor by default. However, you can request that expert beans be shown. Mark the bean as expert if you want it to be available in visual composition, but not by default. This option is not initially selected.

hidden
Hidden beans do not appear in some tools, but are available in the Visual Composition Editor. Mark the bean as hidden if you do not want it to be available in other tools. This option is not initially selected.

RELATED REFERENCES

"Class Qualification Dialog" on page 250
"Bean Icon Information SmartGuide" on page 245
"Features—BeanInfo page" on page 239

Bean Icon Information SmartGuide

Use the SmartGuide – Bean Icon Information window to specify the names of files that define icons for your bean. These icons represent the bean on the palette, in the Beans List, and on the free-form surface.

Fields

16X 16 Color
A file that contains a color icon that is 16 pixels wide and 16 pixels high. This field is optional. To specify an icon file, click on **Browse**.

32X 32 Color
A file that contains a color icon that is 32 pixels wide and 32 pixels high. This field is optional. To specify an icon file, click on **Browse**.

16X 16 Monochrome
A file that contains a monochrome icon that is 16 pixels wide and 16 pixels high. This field is optional. To specify an icon file, click on **Browse**.

32X 32 Monochrome
A file that contains a monochrome icon that is 32 pixels wide and 32 pixels high. This field is optional. To specify an icon file, click on **Browse**.

Bean Information SmartGuide

Use the SmartGuide – Bean Information window to define bean information for a new feature. This information determines how the feature is viewed and accessed in visual composition.

Fields

Display name
The display name represents the feature in the VisualAge user interface. This field is optional. If you do not specify a display name, the feature name is used.

Short description
The short description is used in the VisualAge user interface. This field is optional. If you do not provide a description, the feature name is used.

Property editor
This optional field is available only for property features. A property editor provides customized definition of a property value. To provide a custom dialog to modify a property, specify a property editor class to support the dialog. To select an existing property editor, click on **Browse**.

For example, you might want to provide a property editor for an alignment property that has an integer value. This property can be edited with the registered integer property editor. However, a user can more easily understand descriptive choices, such as Left, Center, and Right. You can create a property editor class that presents these descriptive choices to the user and maps them to integer values for the property.

expert Expert features do not appear in the Visual Composition Editor by default. However, you can request that expert features be shown. Select **expert** if you want the feature to be available in visual composition, but not by default. This option is not initially selected.

hidden
Hidden features do not appear in the Visual Composition Editor. Select **hidden** if you do not want the feature to be available in visual composition. This option is not initially selected.

preferred
Preferred features do not appear in the bean connection menu by default.

Select **preferred** if you want the feature to be available in the bean connection menu. This option is not initially selected.

New Property Feature SmartGuide

Use the SmartGuide – New Property Feature window to add a new property feature. Method features are also added to get and set the property. If the property is readable, a get method feature is added, and if the property is writable, a set method feature is added.

If the property is indexed, it contains individually accessible elements. Get and set method features are added to access an element. These are in addition to the get and set method features for the property as a whole. Note that an array property can either be indexed or not. If it is not indexed, array elements are not accessible in the Visual Composition Editor.

If the property is bound, the propertyChange event and related method features are also added if they have not yet been added. The propertyChange event provides notification of property value changes.

If the property is constrained, the vetoableChange event and related method features are also added if they have not yet been added. The vetoableChange event provides notification of requested property value changes. If a listener of the vetoableChange event throws the PropertyVetoException, the property value change is not committed.

Fields

Property name
The name of the property feature. Enter a name for the feature.

Property type
The data type of the property. The type value is initially java.lang.String. If you need a different type, either enter a data type or click on **Browse** to select a fully qualified type. You can focus the type search by entering a partial type specification in the **Property type** field before you click on **Browse**.

Readable
A readable property can report its value. This means that you can make a connection from the property to obtain its value. This option is initially selected.

Writeable
A writable property can have its value modified. This means that you can make a connection to the property to change its value. This option is initially selected.

Indexed
An indexed property contains individually accessible elements. This means that, if the property is readable and writable, you can make a connection to obtain or change the value of an element. This option is initially not selected.

bound A bound property can report value changes. This means that you can make a connection from the property to obtain the new value whenever it is changed. VisualAge generates code to report the change using the propertyChange event. This option is initially selected if a BeanInfo class has been created for the bean.

If a property is not bound, you must associate an event with the source and target properties in connection settings to obtain the value change.

VisualAge generates listener methods to get the source property value and set the target property when the event occurs. For example, if you want to obtain the text property value from a TextField bean when the Enter key is pressed, you can associate the actionPerformed event with the text source property and the target property.

constrained

A constrained property can have its value changes vetoed. This means that you can make a connection from the vetoableChange event to a method feature or code that could veto the proposed change. This option is not initially selected.

RELATED REFERENCES

"Chapter 9. Generated code" on page 31
"Class Qualification Dialog" on page 250
"Bean Information SmartGuide" on page 245
"Tool bar—BeanInfo page" on page 243
"Features—BeanInfo page" on page 239

New Event Listener SmartGuide

Use the SmartGuide – New Event Listener window to create a new event listener and add it as an event set feature. An *event set* consists of an event listener interface with associated event object and multicaster classes. The multicaster enables multiple listeners for an event.

Method features are also added that other beans can use to add and remove the listener. These methods enable other beans to start and stop listening for the event.

Fields

Event name

The name of the event set feature. Enter a name for the feature.

Event listener

The name of the event listener. This field is initialized when you define the **Event name** field. For example, if the event name is whatHappened, the event listener name is initially WhatHappenedListener.

Event object

The name of the event object. This field is initialized when you define the **Event name** field. For example, if the event name is whatHappened, the event object name is initially WhatHappenedEvent.

Event Multicaster

The name of the event multicaster. This field is initialized when you define the **Event name** field. For example, if the event name is whatHappened, the event multicaster name is initially WhatHappenedMulticaster.

RELATED REFERENCES

"Event Listener Methods SmartGuide"
"Bean Information SmartGuide" on page 245
"Features—BeanInfo page" on page 239

Event Listener Methods SmartGuide

Use the SmartGuide – New Event Listener window to define one or more methods for a new event listener. These listener methods respond to the event. You must add code for each method. The first listener method is added as an event feature. To add additional listener methods as event features, select **Add Available Features** from the **Features** menu. Then, in the Add Available Features window, select the methods you want to add as features.

Fields

Method name

The name of an event method to add to the listener.

Event Listener methods

A list of methods for the event listener. To add the method in the **Method name** field as a listener method, click on **Add**. To remove the selected method from the list, click on **Remove**.

New Event Set Feature SmartGuide

Use the SmartGuide – New Event Set Feature window to select an existing event listener and add it as an event set feature. An *event set* consists of an event listener interface with associated event object and multicaster classes. The multicaster enables multiple listeners for an event.

The event listener contains one or more methods that respond to the event. Each listener method is added as an event feature. Method features are also added that other beans can use to add or remove the listener. These methods enable other beans to start and stop listening for the event.

Fields

Event name

The name of the event set feature. The initial selection is `action`. You can select a different event set from the drop-down list.

Event listener

The name of the event listener. The initial selection depends on the selected event set. For the action event, the initial listener is java.awt.event.ActionListener. You can select a different event listener from the drop-down list. If you need to select a fully-qualified name for the particular listener you want, click on **Browse** for the listener.

RELATED REFERENCES

"Class Qualification Dialog" on page 250
"Bean Information SmartGuide" on page 245
"Tool bar—BeanInfo page" on page 243
"Features—BeanInfo page" on page 239

New Method Feature SmartGuide

Use the SmartGuide – New Method Feature window to add a new method feature. The SmartGuide creates a new public class method for the feature. You must add logic code for the method.

Fields

Method name

The name of the method feature. Enter a name for the feature.

Return type

The return data type of the method feature. The type value is initially void. If you need a different type, either enter a data type or click on **Browse** to select a fully qualified type. You can focus the type search by typing a partial type specification in the **Return type** field before you click on **Browse**.

Parameter count

The number of parameters for the method feature. The initial selection is 0. You can select a different number from the drop-down list. You define each parameter with the parameter SmartGuide.

RELATED CONCEPTS

"How generated code coexists with user-written code" on page 35

RELATED REFERENCES

"Class Qualification Dialog" on page 250
"Parameter SmartGuide"
"Bean Information SmartGuide" on page 245
"Tool bar—BeanInfo page" on page 243
"Features—BeanInfo page" on page 239

Parameter SmartGuide

Use the SmartGuide – Parameter window to define a parameter for a new method feature.

Fields

Parameter name

The name of the method parameter. Enter a name for the parameter.

Parameter type

The data type of the parameter. The type value is initially boolean. If you need a different type, either enter a data type or click on **Browse** to select a fully qualified type. You can focus the type search by typing a partial type specification in the **Return type** field before you click on **Browse**.

Display name

The display name is used in the VisualAge user interface. This field is optional. If you do not specify a display name, the parameter name is used.

Short description

The short description is used in the VisualAge user interface. This field is optional. If you do not provide a description, the parameter name is used.

RELATED REFERENCES

"Class Qualification Dialog" on page 250

Add Available Features

Use the Add Available Features window to add features based on public methods that are not defined as features. VisualAge finds all available public methods of the class that have not been added as features, and lists them for you to select. For example, methods that you add in the **Members** page can be added as features. Get and set methods for fields can be added as property features.

Delete Features

Use the Delete features window to remove features and underlying methods. Features that you selected for deletion are listed in the **All the following feature(s) will be deleted:** field. The methods that define the features are listed in the **The following selected method(s) will be deleted:** field. If you want to delete any of these methods, select them. Click on **OK** to delete features and methods.

Class Qualification Dialog

Use the Class Qualification Dialog to select a fully-qualified class or interface name for a field in another window. The initial scope of the class or interface search is determined by input to this dialog when it is opened.

Fields

Pattern

A selection pattern that determines class and interface names listed in the **Type Names** field. The initial pattern depends on information passed to this dialog.

Type Names

A list of unqualified class and interface names that match the selection pattern, accessed through **Browse**. If there is no selection pattern, all available classes and interfaces are listed.

Package Names

A list of packages that contain the selected class or interface. Select the package that contains the class or interface you want. The selected package name is used to qualify the selected class or interface name returned to the calling window.

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