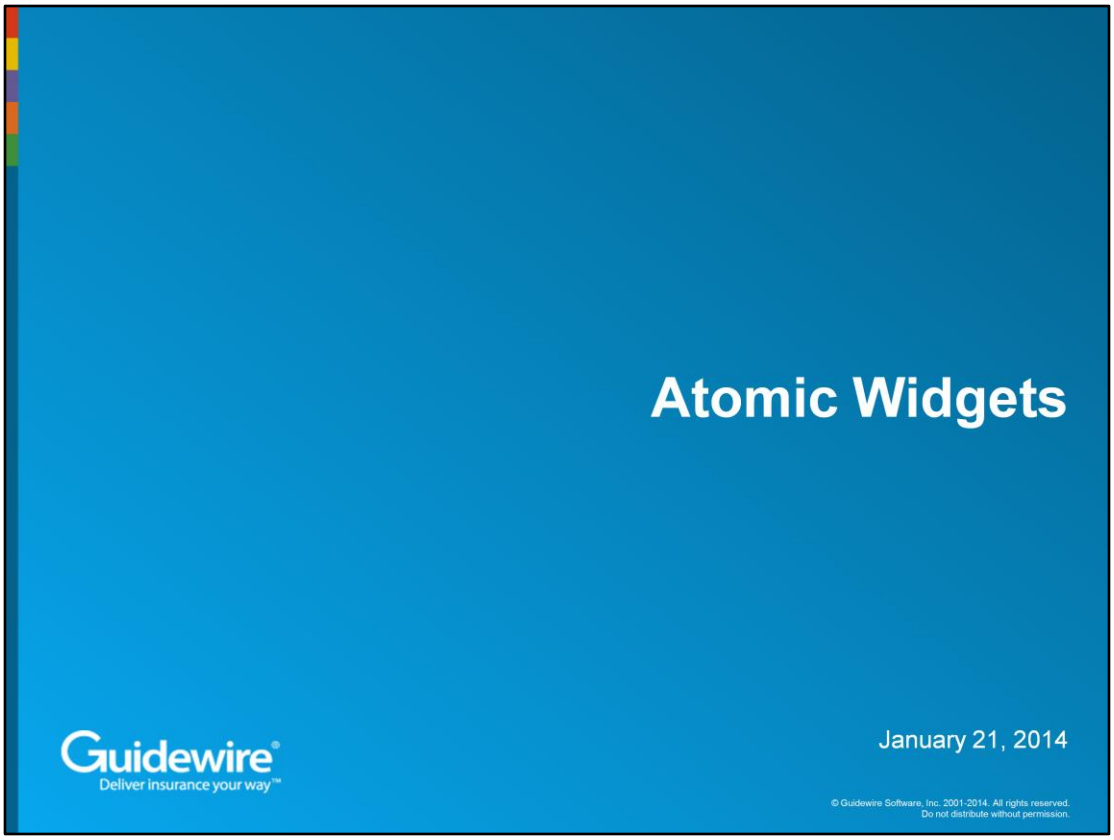

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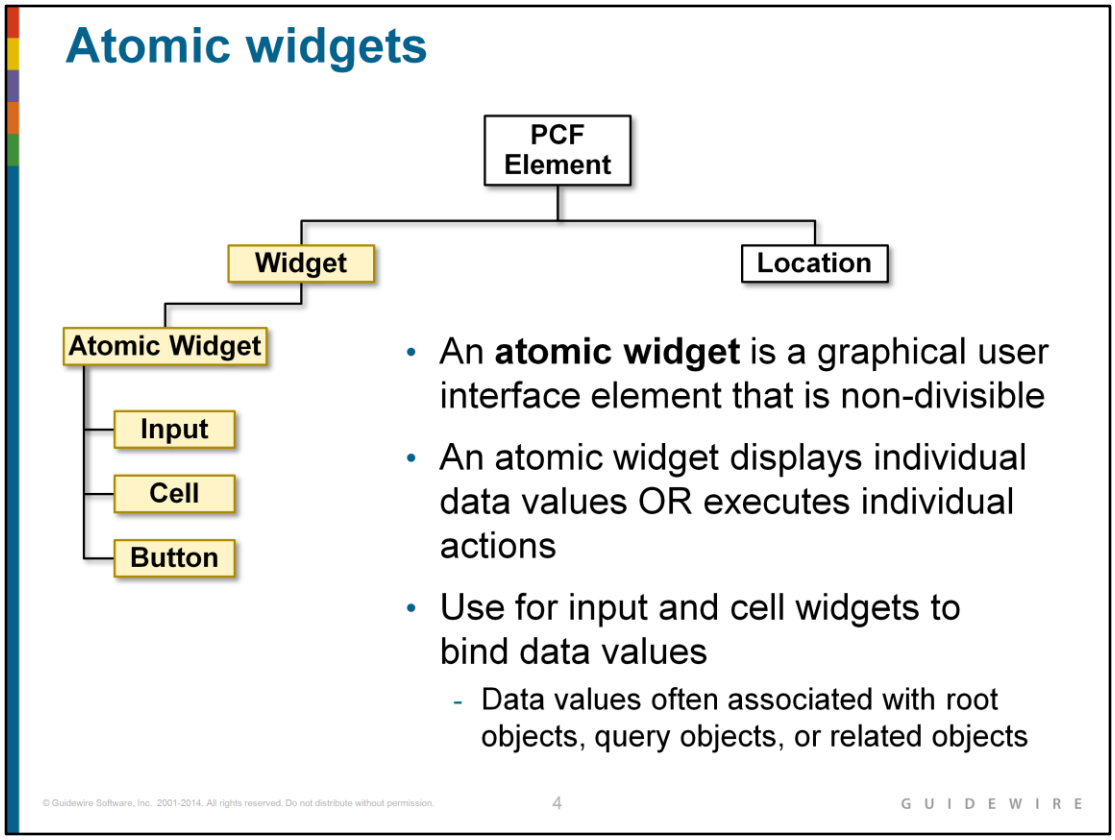
Lesson objectives

- By the end of this lesson, you should be able to:
  - Create atomic widgets
  - Bind an atomic widget to the data model
  - Create and modify widget labels
  - Use optional widget properties

This lesson uses the notes section for additional explanation and information.
To view the notes in PowerPoint, select View → Normal or View → Notes Page.
When printing notes, select Note Pages and Print hidden slides.

Lesson outline

- Atomic widget fundamentals
- Creating atomic widgets
- Binding widgets to the data model
- Widget labels and display keys
- Optional widget properties
- Deploy the PCF and display keys

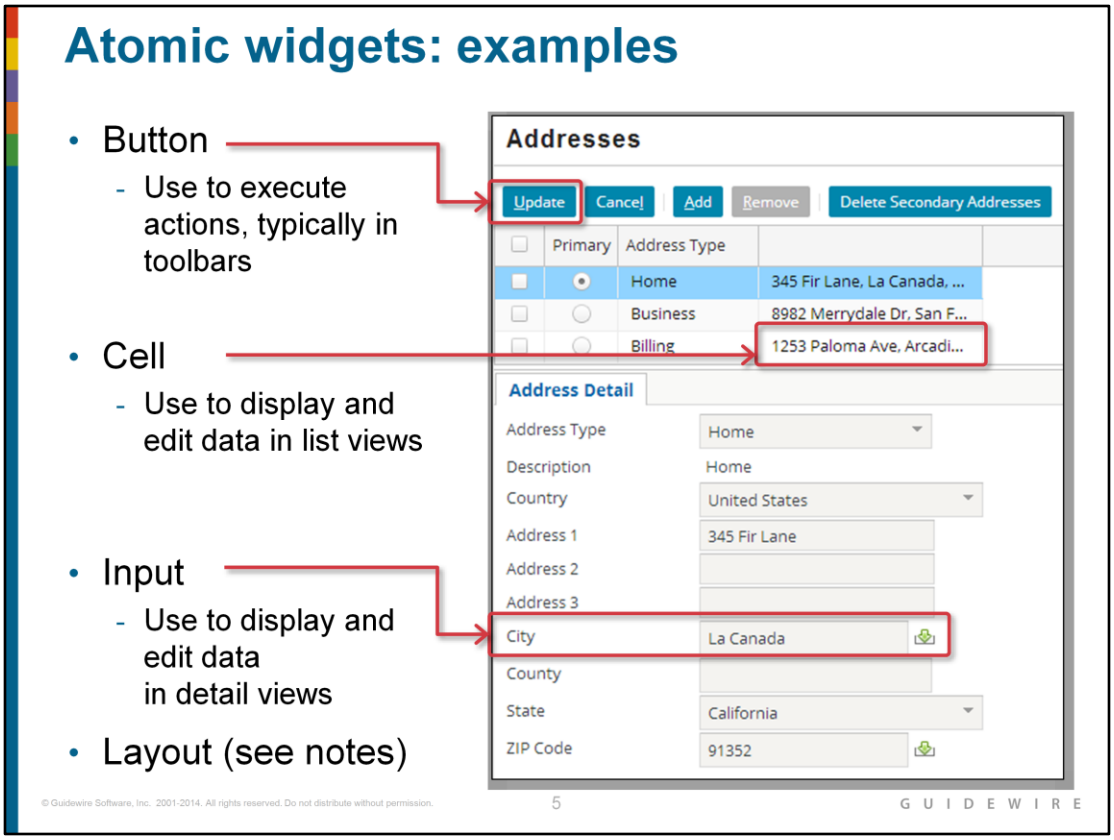


A widget is a graphical user interface element responsible for interacting with the user. "Widget" is a Java specific, industry term. Widgets maintain and draw their state using some combination of graphical drawing operations. Using the mouse or the keyboard, the user can change the state of a widget. When a state change occurs, whether initiated by the user or the application code, widgets redraw to show the new state.

Both Widget and Location are conceptual representations in this diagram. There are no <Widget /> or <Location /> elements. Atomic Widget is also a conceptual representation. There is no <AtomicWidget /> element.

A location is a place to which you can navigate in the interface. Locations are used primarily to provide a hierarchical organization of the interface elements, and to assist with navigation. PCF elements that are consider locations include pages, wizards, worksheets, forwards, and location groups.

A widget is a PCF element that a Guidewire application renders into an HTML object. Buttons, menus, text boxes, and dropdown lists are all examples of PCF elements that are considered widgets. Some widgets that are not visually presented in the web browser, but are rendered as an HTML object, such as a hidden input.



Layout widgets help organize the user interface to improve usability and legibility. Common layout widgets include the label widget and the input divider widget. For label widgets, you specify a value for the label property. For input divider widgets, there are no properties to specify.

Lesson outline

- Atomic widget fundamentals
- Creating atomic widgets
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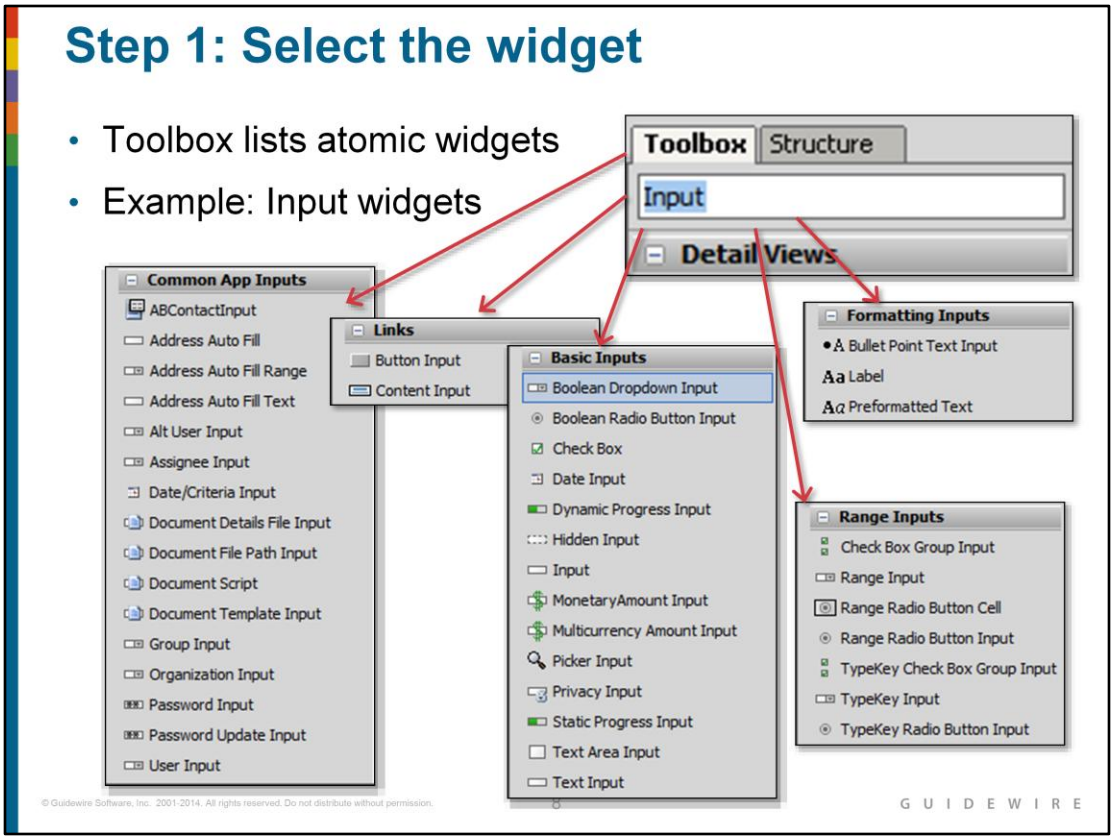
Steps to create an atomic widget

1. Select the widget from the toolbox
2. Add the widget to the PCF
3. Specify the required properties
   a) id property is unique name for widget0
   b) value property is for widget that display data
4. Specify a display key for the label property
5. Define additional properties specific to the widget type
6. Deploy the PCFs and display keys

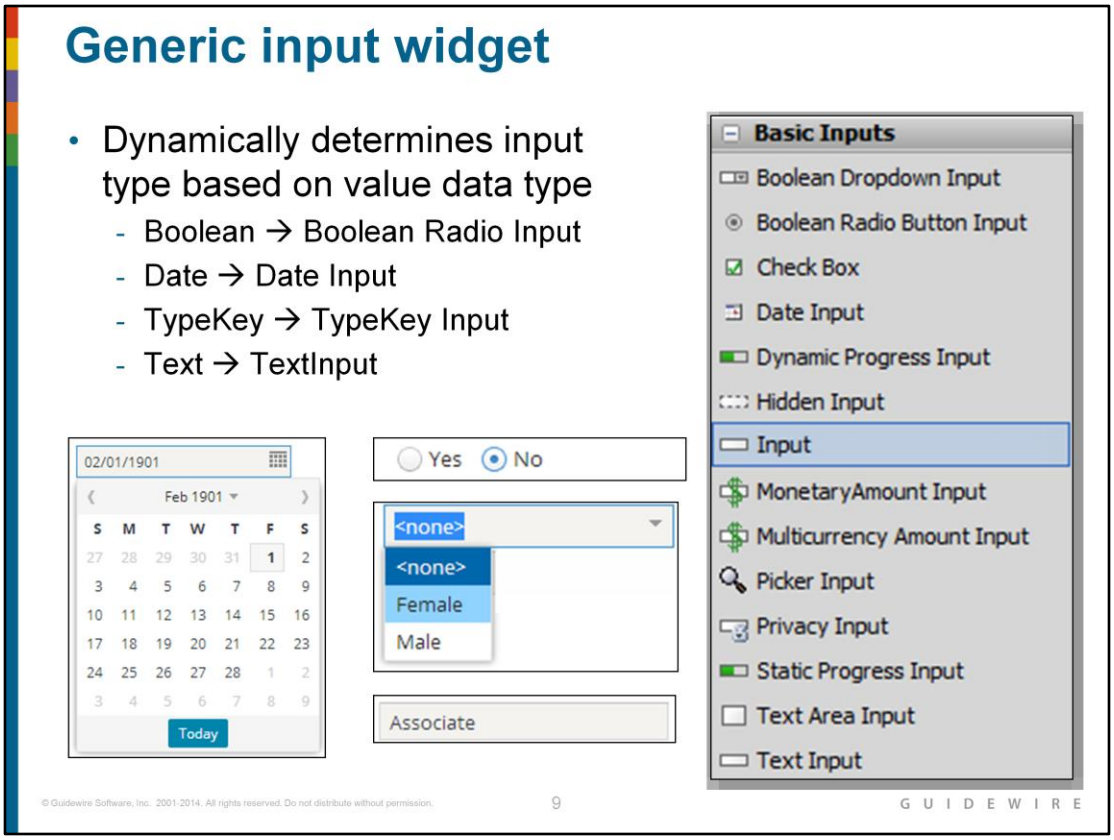
Guidewire recommends using "Ext" prefix for display keys. In a given widget property, specify the display key name. If necessary, localize display key values.



Atomic widgets are created by adding a widget into a container widget, such as a detail view panel, list view panel, or toolbar.

Widgets are listed in the Toolbox tab, which appears on the right side of the PCF Editor. Initially, all widgets are listed. You can, however, enter a string into the filter field, which causes the Toolbox to list only widgets whose descriptions contain that string. To view a widget tool description, mouse over the name of the widget tool in the Toolbox. The description appears in a tooltip.

Since PCF files are XML documents, each widget in the toolbox represents a specific XML element.



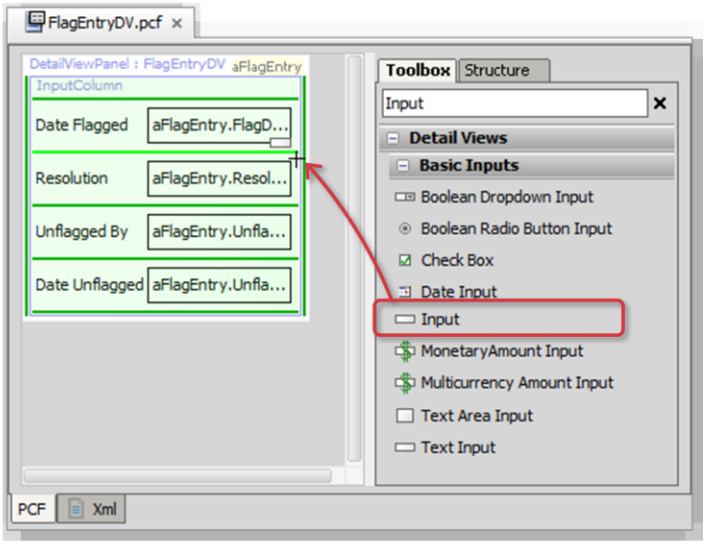
The generic input widget can be bound to any value. The type of the value widget (e.g., textbox, dropdown or checkbox) will be determined dynamically based on the value type, for example:

- Boolean - BooleanRadioInput
- Date - DateInput
- TypeKey - TypeKeyInput

If no such mapping is found, the default is to use a TextInput.

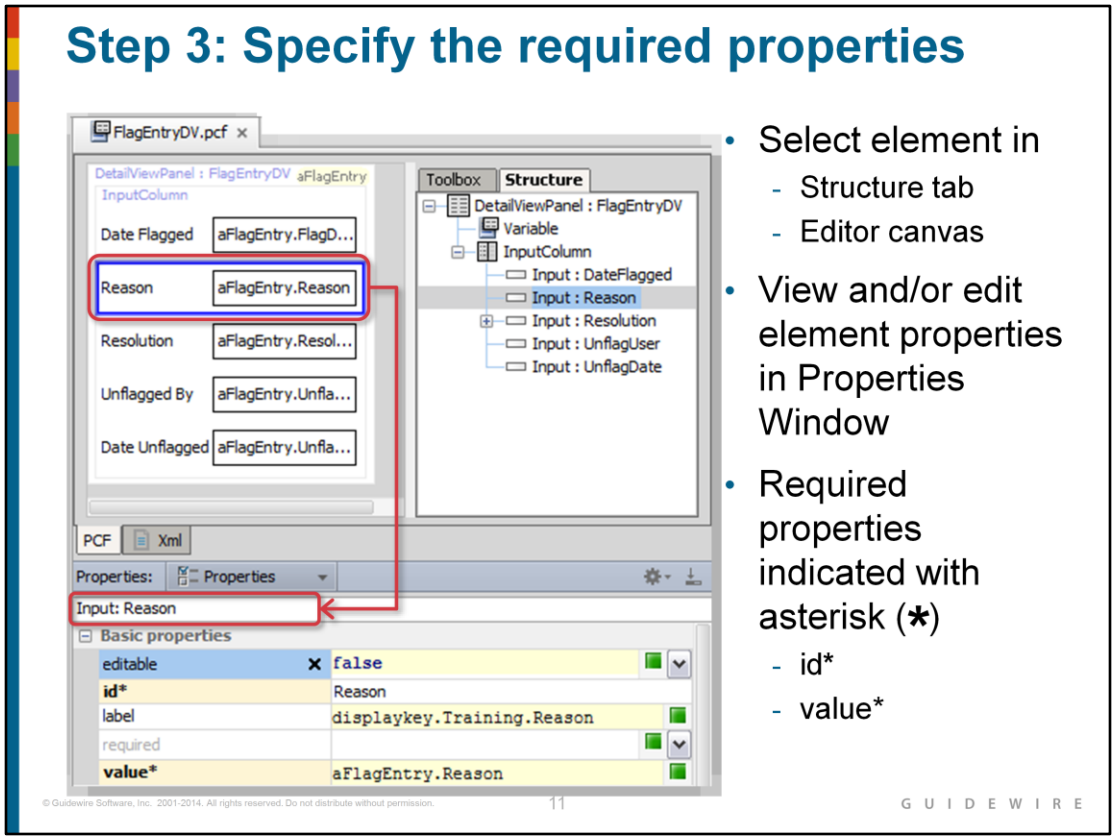
It may seem negligible, but to resolve the underlying data type for the widget value takes extra application processing. In aggregate, widget resolution can be a performance issue. Wherever possible, use the input widget that best matches the needs of the user, widget special properties, and the underlying data type value.

Step 2: Add the widget to the PCF



- Light green line - current place where new widget will go
- Dark green line - places where new widget can go

To add a widget, click its name in the Toolbox and hold the mouse cursor down. As you begin to drag the widget, Studio changes the mouse cursor so that it includes the icon for that widget. Studio places a green line on the canvas at every location on the canvas that it is possible to place the widget. Studio highlights the green line that is nearest on the canvas to the cursor. Studio also overlays in green the element containing the highlighted green line



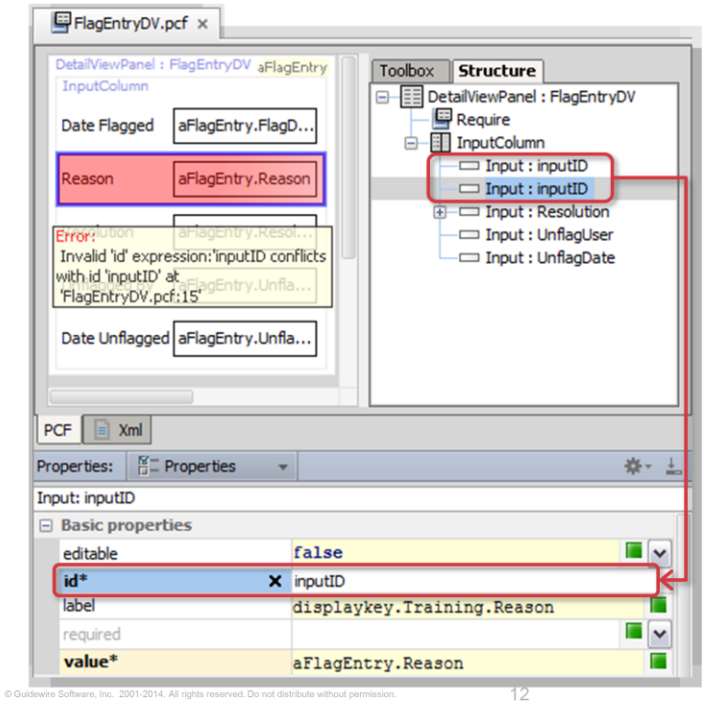
All PCF elements have definable properties in the Properties window. To view properties of a PCF file, click its title link in the upper-left corner. To view properties of any element, click that element.

The Properties window contains multiple property tabs. Click a tab to edit the associated properties. Some properties are not editable. Other properties are required. Required properties have an asterisk and the property name appears against a yellow background.

If you select a property, variable, or entry point, an "X" icon appears on the right-hand side of the cell for that property, variable, or entry point. You can click the "X" to restore the selected property, variable, or entry point to its default value.

The Properties window validates each property expression and/or and value.

Step 3a: Specify the ID property



- PCF validation will display error in canvas when two widgets have the same value for an id property
- id* property must be unique within a given PCF
  - id property not required for all types of widgets

GUIDEWIRE

Most atomic widgets require IDs. However, some widgets, such as labels and dividers, do not require IDs.

Lesson outline

- Atomic widget fundamentals
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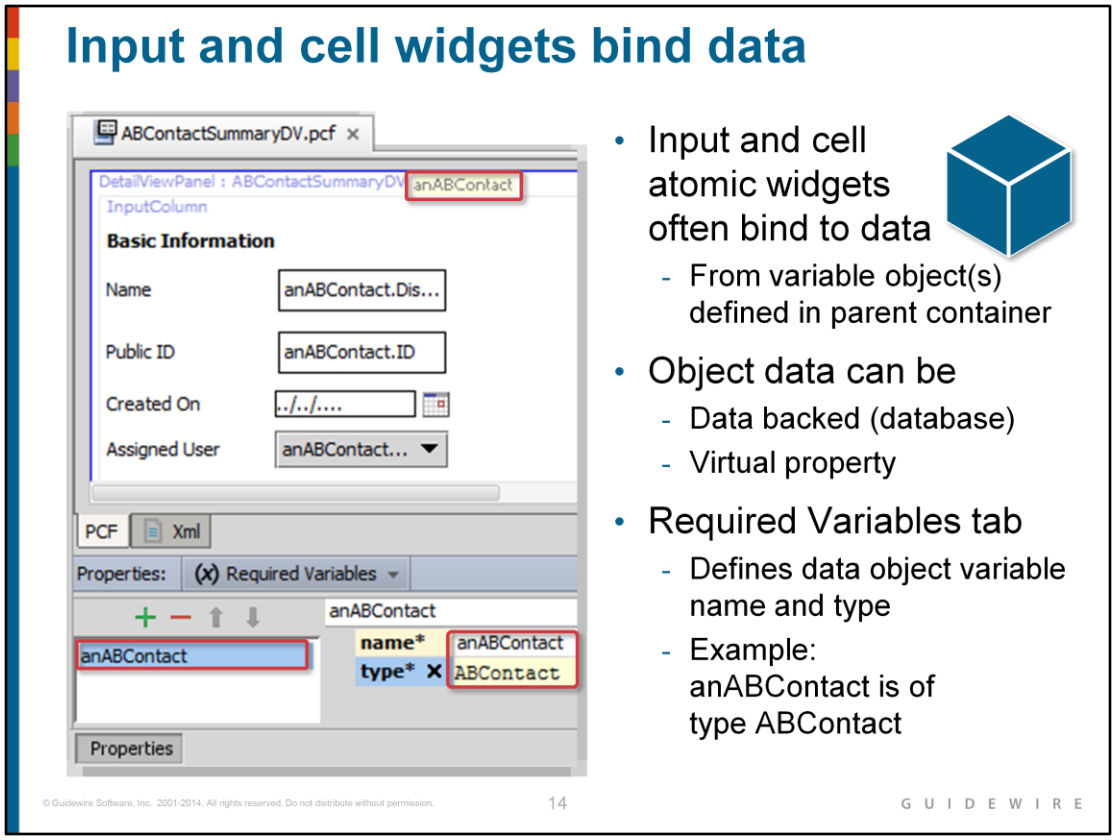


Most container widgets have at least one required object that contains data fields. One way to think of this is that there is at least one root object for a given container.

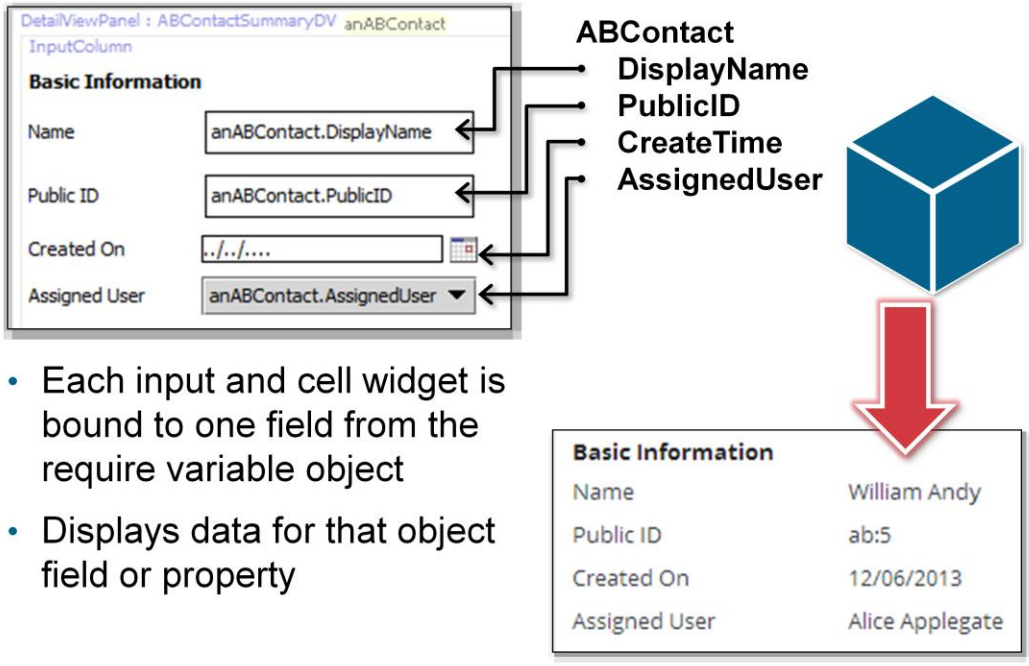
It is possible to have more than one defined object as it is also possible to not have a required object at all.

In later lessons, you will learn more about defining the required variable object and type.

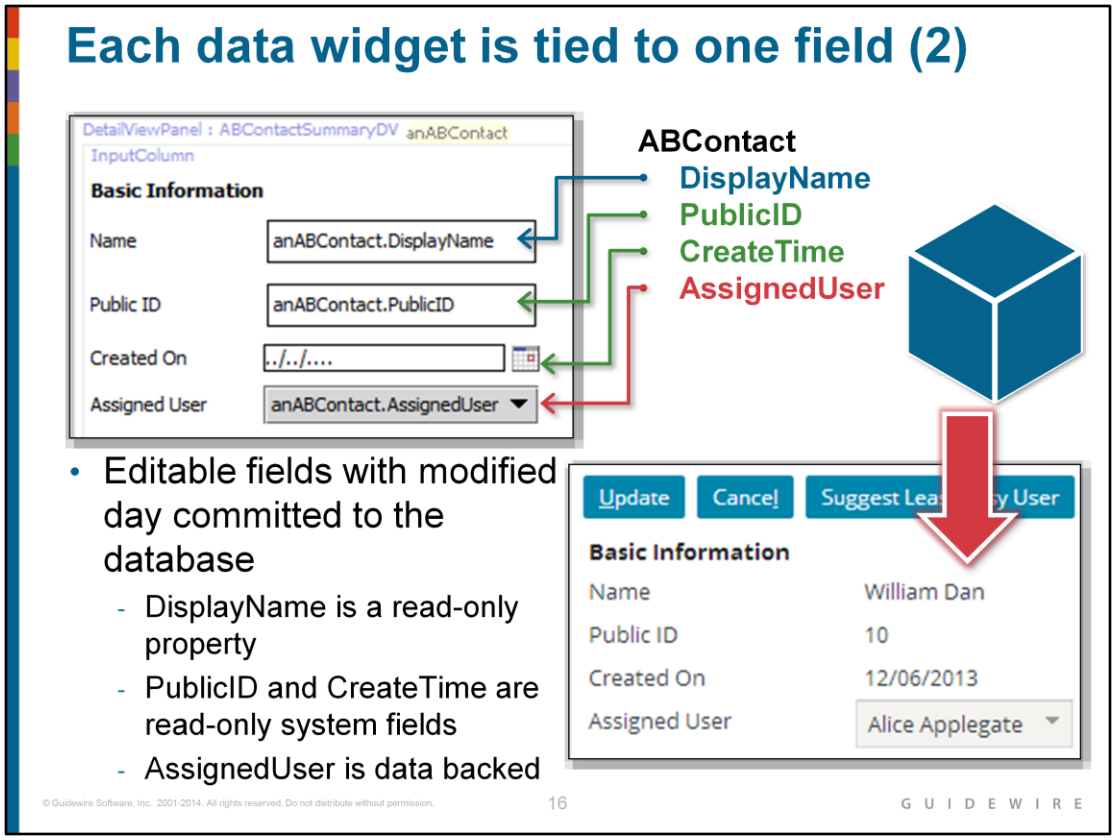
There are container widgets that do not have any required objects such as containers that display only static information. For example, the detail view on the NoContact page has no associated object. If a user clicks the Contact tab without ever having searched for a contact, they will navigate to the NoContact page. The detail view contains a single static label that states "You have not yet viewed any contacts. To view a contact, you must first search for it on the Search tab."

Search screens typically have no required object and display no data initially. If you execute a search, then the data in the search results is displayed. This data comes from the search itself, though, and not from any required variable object.

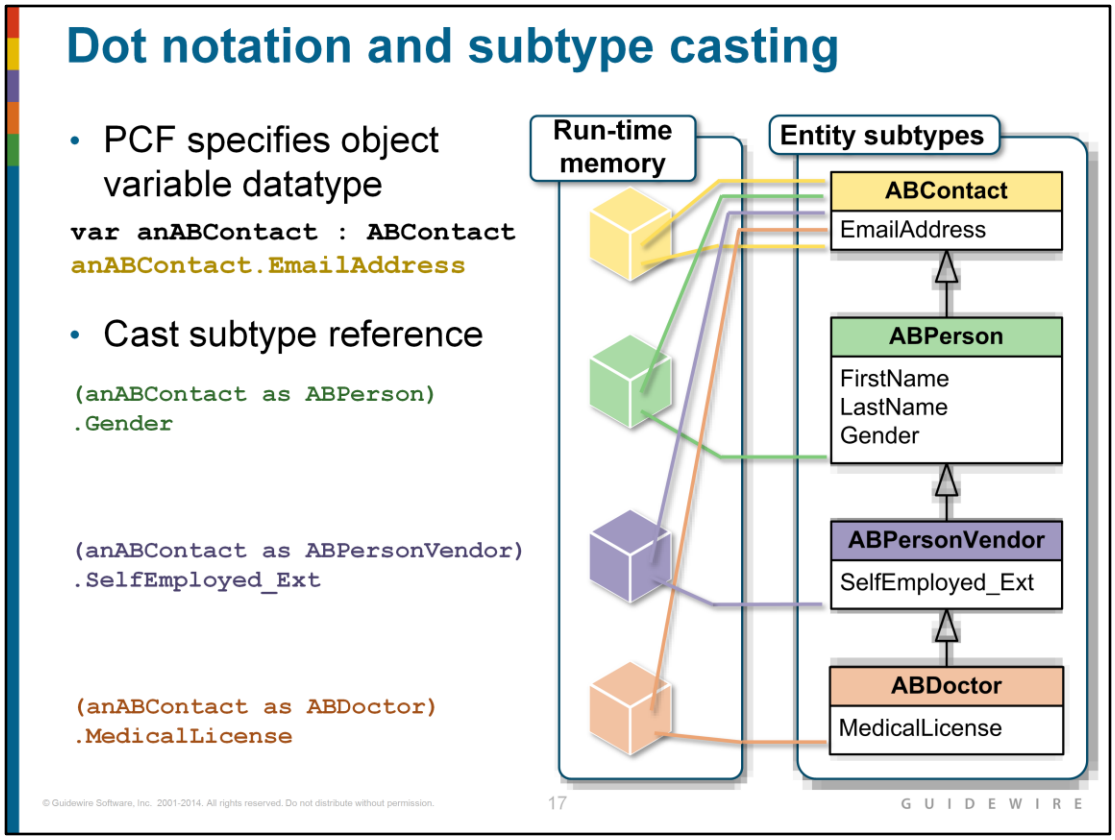
Each data widget is tied to one field (1)



- Each input and cell widget is bound to one field from the require variable object
- Displays data for that object field or property



If the root object field is editable and the widget is enabled to be editable, then changed data is committed to the database. In the slide example, only AssignedUser is an editable, data backed field for the anABContact required variable. DisplayName is an internal property for entity names. PublicID and CreateTime are read-only fields.



When a Guidewire application retrieves data from the database, it stores that data as an object in runtime memory. It works with the in-memory information until the data needs to be committed or re-retrieved from the database.

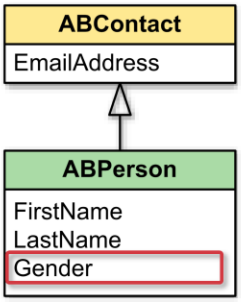
When an object is created, all of the information about the object is copied into memory. If the object is subtyped, then data for all the fields at every relevant subtype level is retrieved. For example, if an object is an ABDoctor, then information is copied over for fields at the ABContact, ABPerson, ABPersonVendor, and ABDoctor levels. Fields associated with ABPlace, ABCompany, or ABAttorney are irrelevant and ignored.

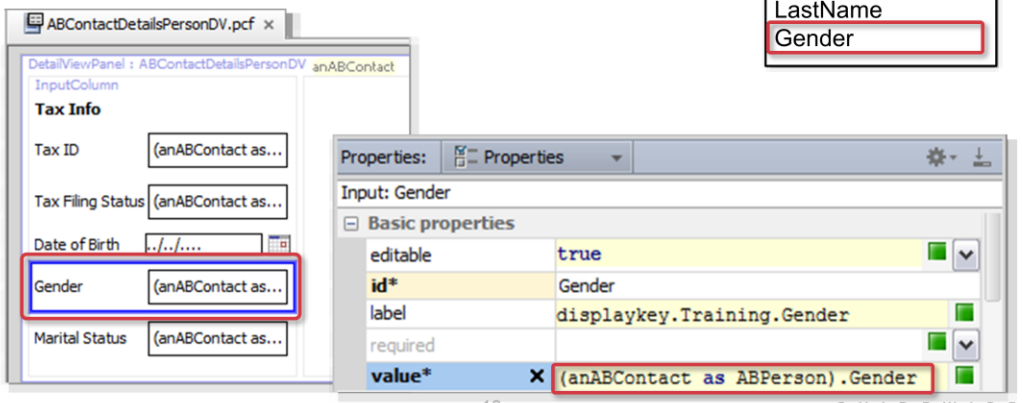
When an object is referenced, the server uses the datatype of the reference to understand the structure of the information in memory. For example, assume that there is an object named "anABContact" that stores information about an ABDoctor. If there is a reference to this object with a datatype of "ABDoctor", then the server knows that the object will have ABContact fields, ABPerson fields, ABPersonVendor fields, and ABDoctor fields. If there is a reference to this object with a datatype of "ABPerson", then the server knows that the object will have ABContact fields and ABPerson fields, but it will assume that the object has no fields beyond the ABPerson fields. There may be additional fields with information at the ABPersonVendor and ABDoctor levels, but the server will be unaware of them.

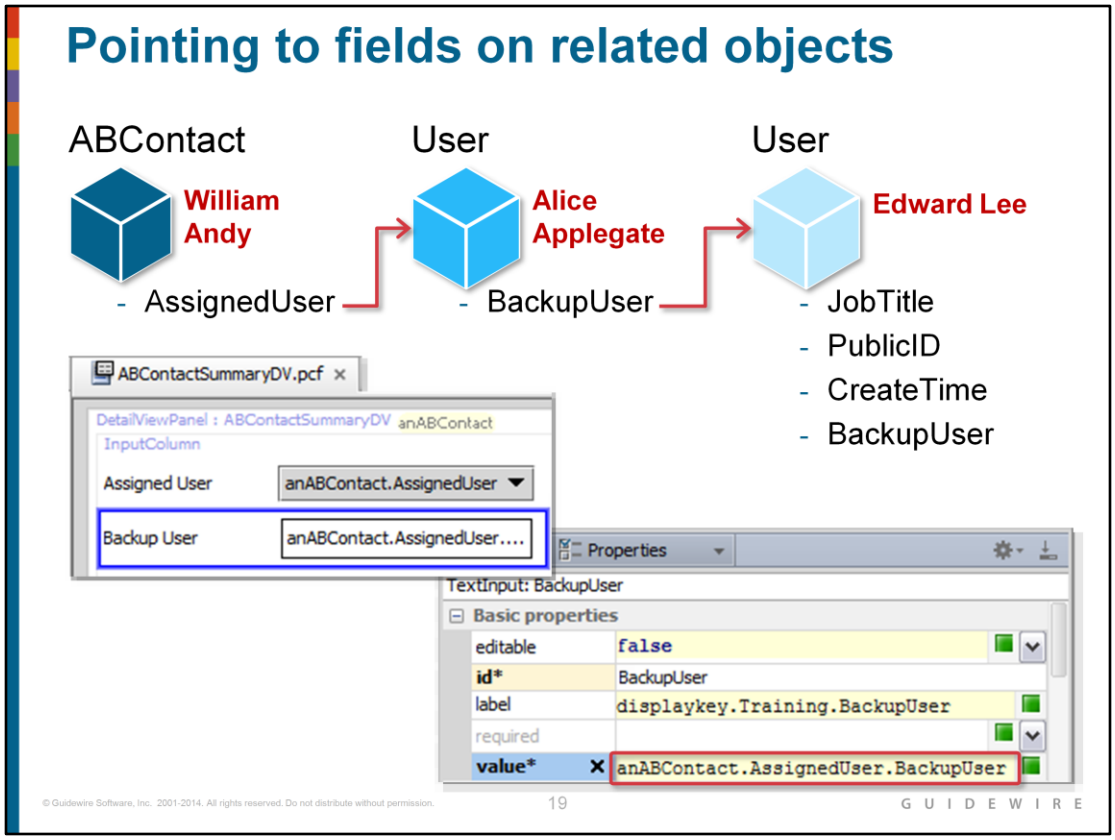
In some cases, a method or user interface container receives a reference to an object, and the reference uses a "high-level" datatype (such as ABContact). This reference cannot be used as-is to access fields below the specified level because the server assumes those fields don't exist. There is a programming technique known as casting in which you explicitly state the datatype for a subtyped object. This is done using the syntax "as <datatype>", where <datatype> is the datatype that you want to explicitly identify. When you cast a reference, you are providing the server with more information about the structure of the object. A casted reference can access fields that an uncasted reference cannot.

Pointing to fields at subtype level

- Cast the object to subtype
  - root object has a supertype datatype and the desired field is at subtype level
- Syntax
  - `(object as Subtype).subtypeField`
  - `(anABContact as ABPerson).Gender`

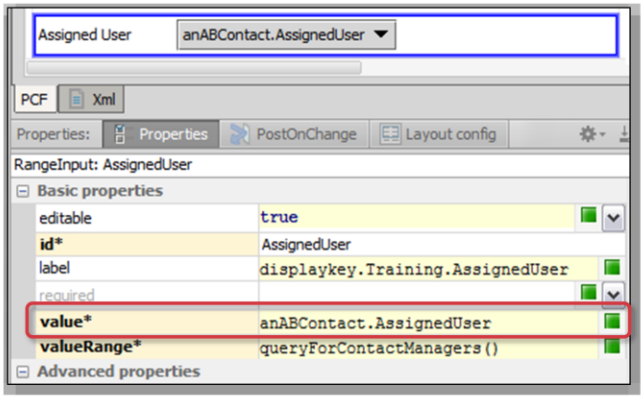






In some cases, the desired field is on a related object. The syntax to reference fields on related objects is: object.foreignKeyToRelatedObject.Field.

Step 3b: Specify the value property



- Value property defines the data field
- If the field is a "data" field, can set the editable property of the widget to "true"

- Specify field using dot notation
- Reference direct object field or related object field
- Only data fields are editable

For a given widget, the value property identifies the data field.

Lesson outline

- Atomic widget fundamentals
- Creating atomic widgets
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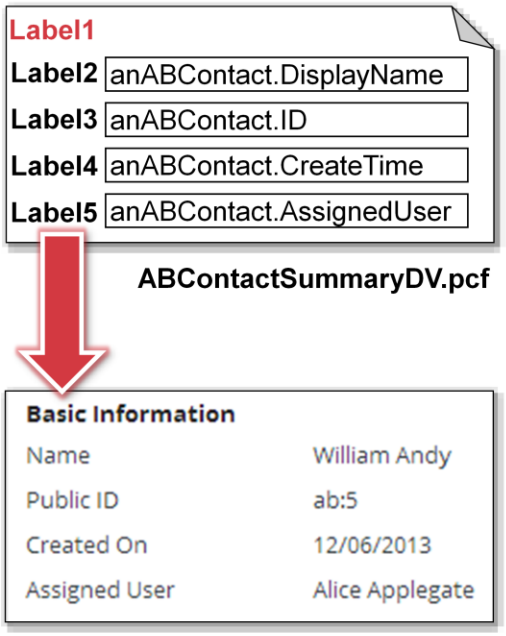
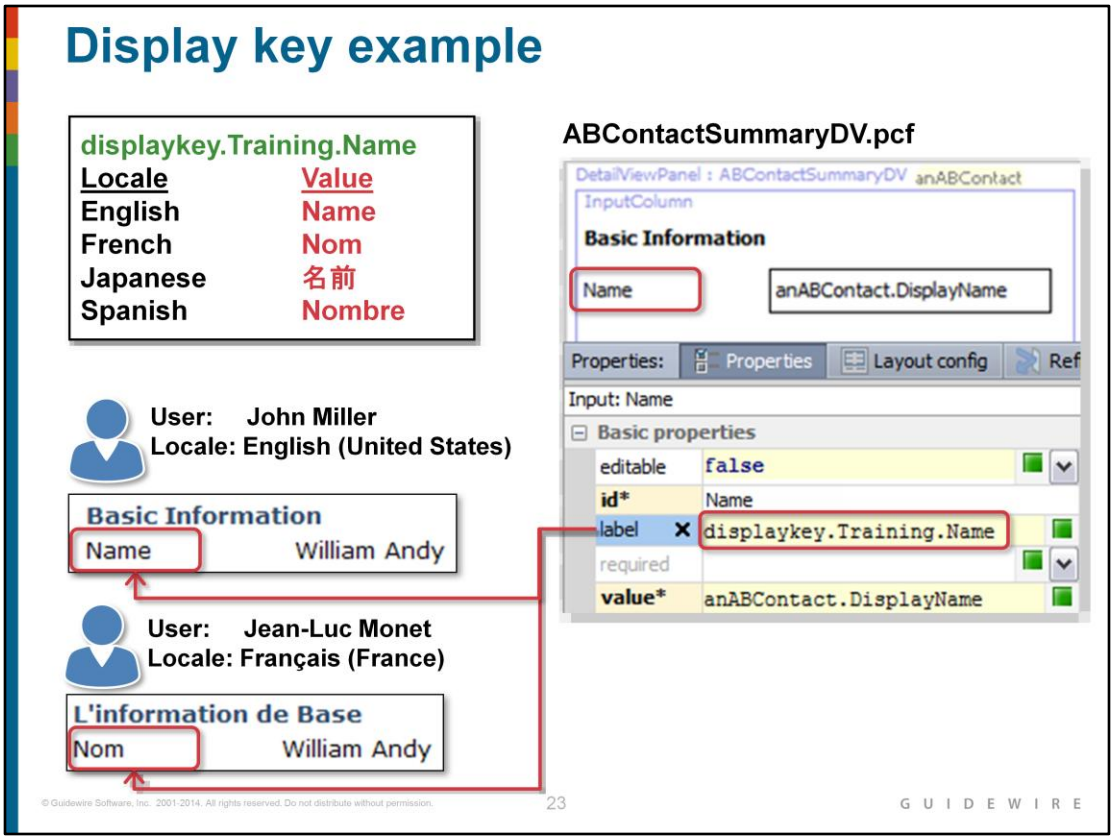
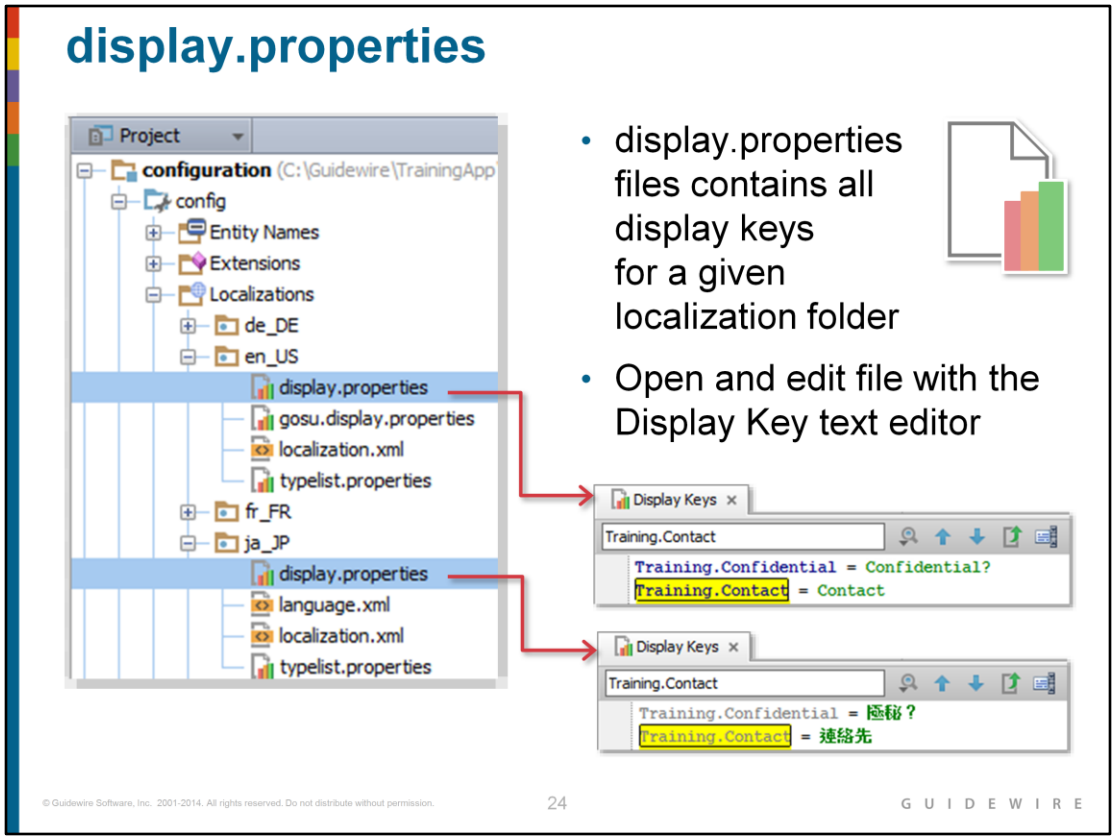
Structure, function, and text

- Use display keys for label values
  - Easily localize text and accommodate users from various locales
  - Allows for labels with dynamic content
- Guidewire recommends PCF file should not contain "hard coded" display text such as label text
  - PCF file defines structure and function of containers



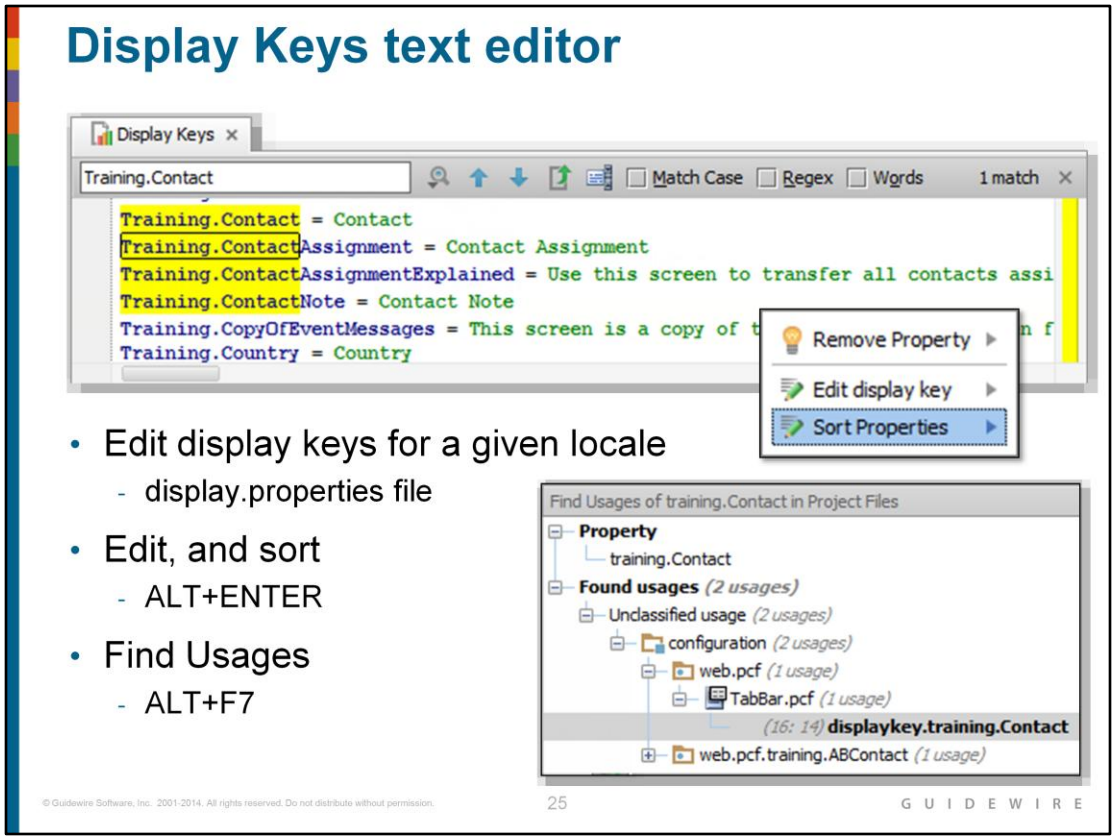


A display key is a text string displayed on the user interface. Every display key has one or more localized values. When a PCF file references a display key, the application converts the display key to one of the localized values depending on the user's internationalization language settings. In the example above, the display key "Name" is converted to "Name" for users with their language set to English, "Nombre" for users with their language set to Spanish, and "Nom" for with their language set to French.



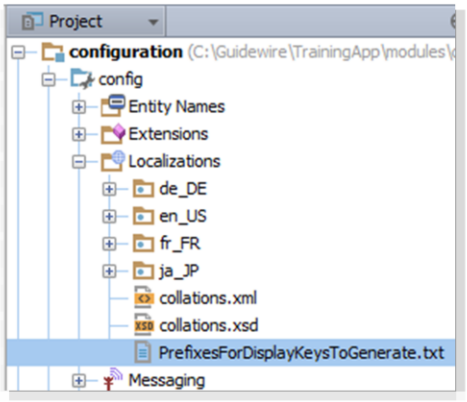
Because the display.properties file is associated with a physical folder that reads "locale", there is often confusion between the difference between language and locale. Locale settings relate to national and cultural settings for how to display information such as numbers, currency, and dates. Language settings relate to the user selected language which localizes the application in that selected language.

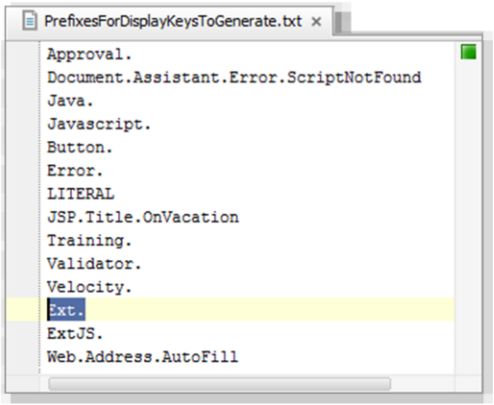
Guidewire applications that are configured to support additional languages use the related display.properties file and its defined display key values. If no display key is defined for the selected language, the application uses the default language display.properties file. A setting in the config.xml file defines the default language for a Guidewire application.



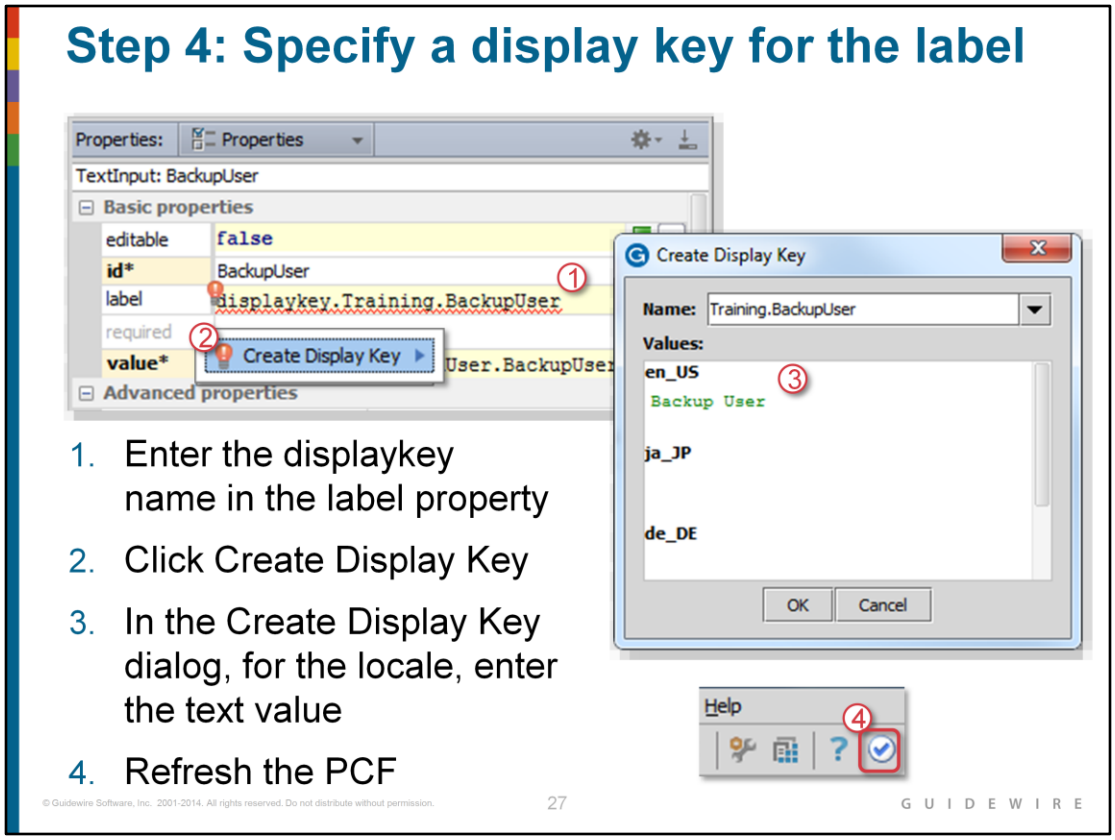
Often when working with PCF files and widget properties, you want to use a display key for a localized value as in the case of defining a value for widget's label property. You can create, edit, and remove display keys with the Display Keys text editor.

Display keys prefixes





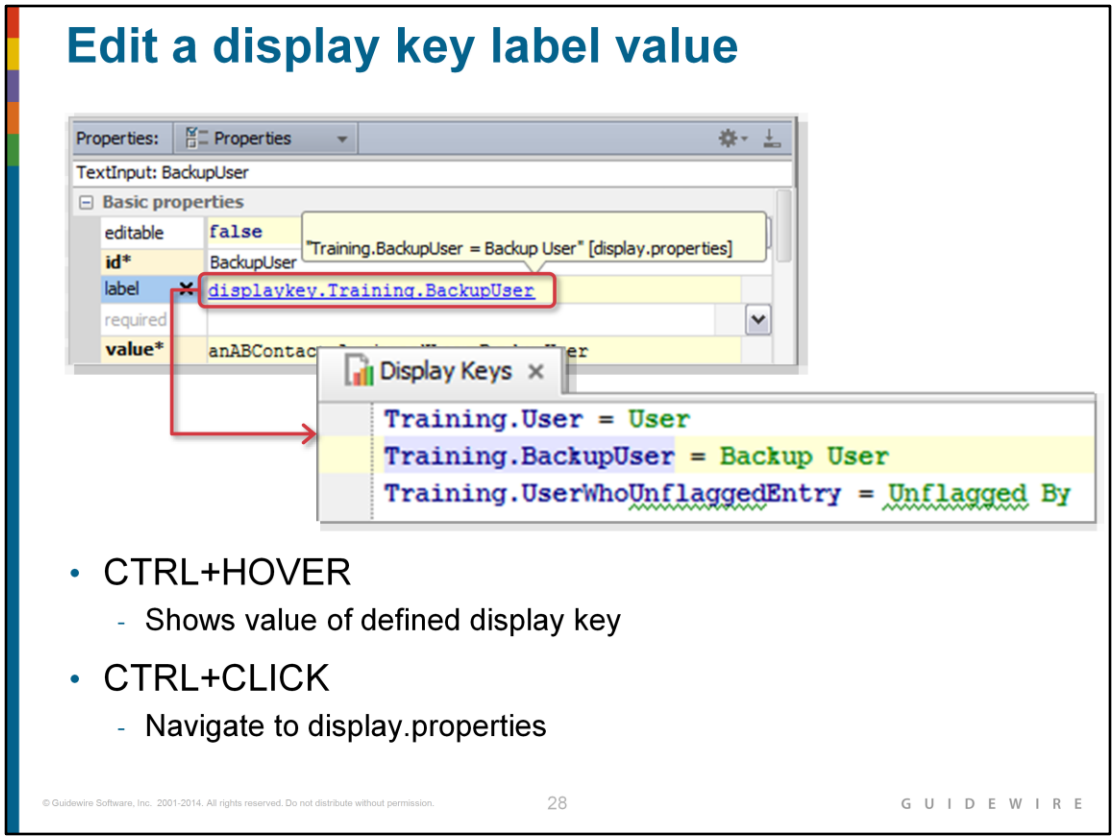
- PrefixesForDisplayKeysToGenerate.txt
  - Contains prefixes for display keys
  - Not required, but helpful for organizing prefixes
- For customers, naming convention recommendation is "Ext"



When you defined a value for a label property, you have the option to create a new a display key for the value or specify an existing display key for the property value.

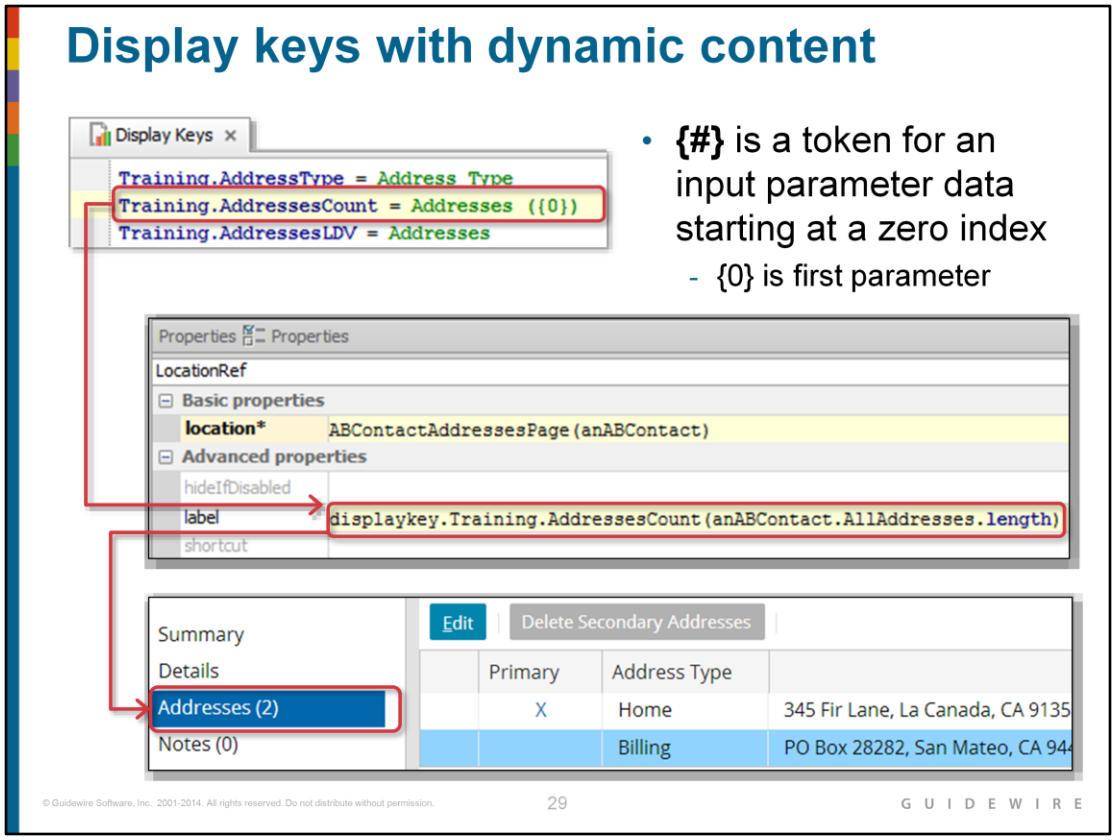
1. Enter a display key name in the label property. A display key name cannot have a space in it. After you enter a new display key name, you will be prompted to create a display key.
2. Next you should enter whatever you want to appear as the label for the new widget. You can enter in English, Japanese, German, and French.
3. Save the additions you made in the display key editor (you can verify that the new key is in the display.properties file in the Localizations).
4. To see the changes in Studio, go back to Studio and click on the Refresh PCF button.

The slide example shows a display key prefix named "Training". All TrainingApp display keys have the Training prefix. The recommended naming convention for customer display keys, however, is to a standard prefix such as "Ext". To reference a display key, always start with displaykey followed by a prefix and then the name of the display key.



Both keystroke techniques work for a variety of items.

For example, a detail view panel can be embedded in a screen using a PanelRef widget. The PanelRef has a property that names which detail view panel to embed. From the PanelRef widget, you can CTRL+CLICK the name of the referenced detail view panel to open it in the PCF Editor.



A display key can have one or more arguments. Each argument is noted by "{X}", where X is an integer. If there is only one argument, then the integer should be 0. If there are multiple arguments, then the arguments should be numbered starting with 0. When there are multiple arguments, the first argument listed in the label property is assigned to the {0} position, the second to the {1} position, and so on. In the slide example, the label property specifies a display key with an argument. It is also passed a value, specifically the length of the AllAddresses array. The label is rendered using the named display key with the argument is the designated location.

As an example of a display key with multiple arguments, consider a display key "Training.DataChanged", which has the value: 'The object you are trying to update was changed by {1} at {0}. Please cancel and retry your change.'. At runtime, the values "Jan 13, 2009 11:32 AM" and "Alice Applegate" are passed to the display key. The message displayed would be: "The object you are trying to update was changed by Alice Applegate at Jan 13, 2009 11:32 AM. Please cancel and retry your change."

It also possible for a display key to reference another display key. The syntax for this is: {displayKeyToEmbed }. An example is Web.Admin.NewReportGroup{Web.Admin.AddReportGroup}.

Embedding display keys can make UI changes both easier and more difficult. It can ease the process of changing a given term. For example, changing "POs" to "Purchase Orders" could be easier if the term exists in only one display key that is embedded in other display keys. It can complicate the translation process, however, if you want to implement a multi-lingual instance of the Guidewire application. Word order varies from language to language, and when you embed display keys in display keys, you start to "hard code" the word order. A given phrase may consist of contiguous words in one language but not in the other.

Lesson outline

- Atomic widget basics
- Creating widgets
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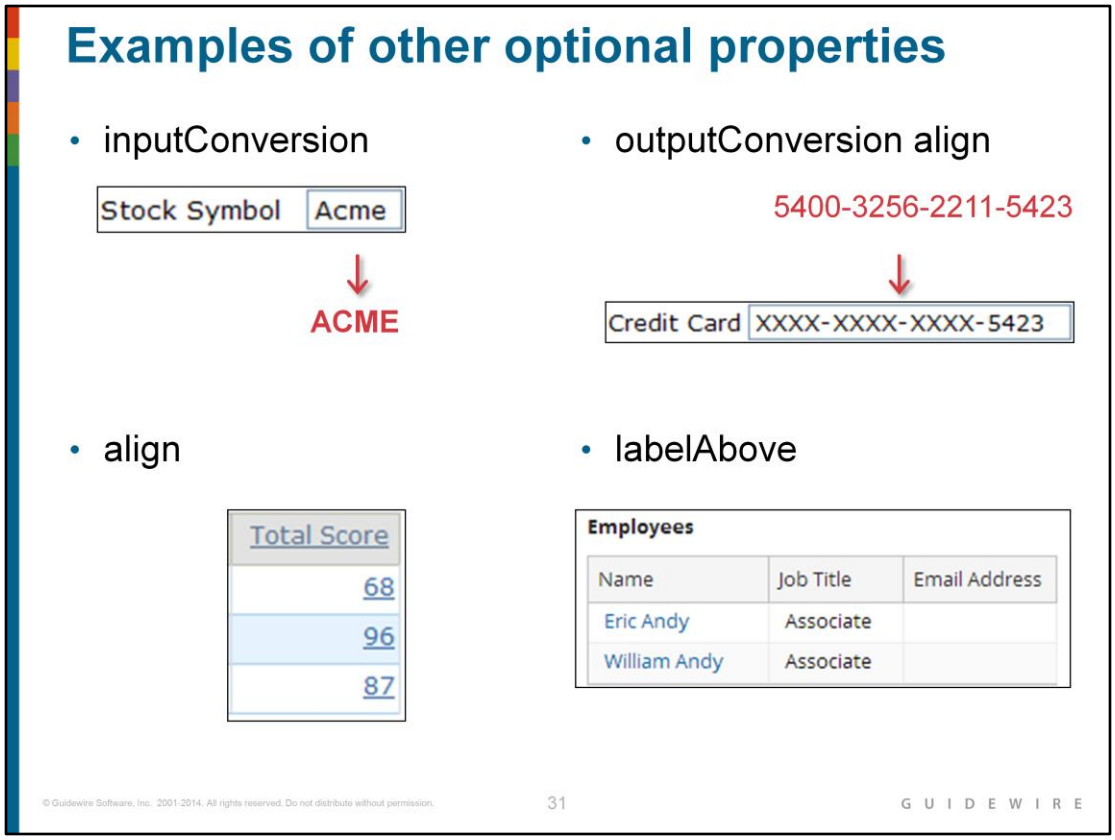


outputConversion is a Gosu expression property that modifies the value stored in the database before it is displayed in the user interface. For example, it can be used to mask all but the last 4 digits of a credit card number.

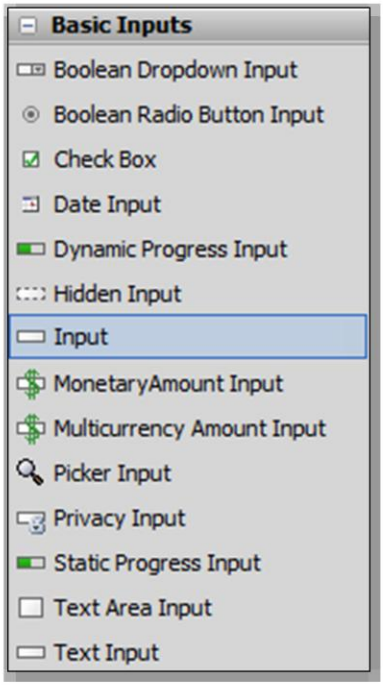
inputConversion is a Gosu expression property that modifies the value displayed in the user interface before it is stored in the database. For example, it can be used to convert any entered stock symbol into all upper-case characters.

align is a property that can be set to either "left", "center", or "right". It impacts the alignment of data in the corresponding widget.

labelAbove is a boolean property for widgets with labels and fields. When set to true, the widget's label is displayed above the field, rather than to the left of the field. In the screenshot above, the Occupation and Employer widgets have labelAbove set to true. The "Employment Info" widget is a label widget with no field.

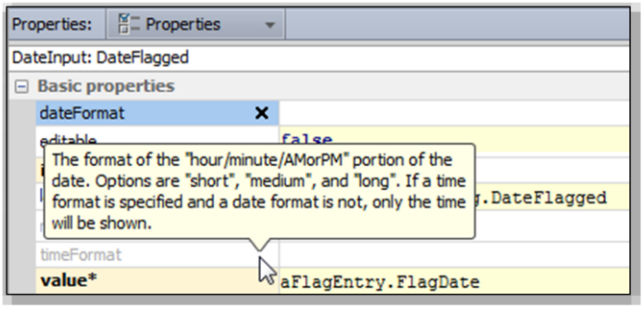
Input widget

- Input widget has only standard input properties
- Renders various data types:
  - Text field when underlying field is numeric or varchar
  - Date formatted field when underlying field is datetime
  - Dropdown when underlying field is typekey
  - Yes and no radio buttons when underlying field is boolean

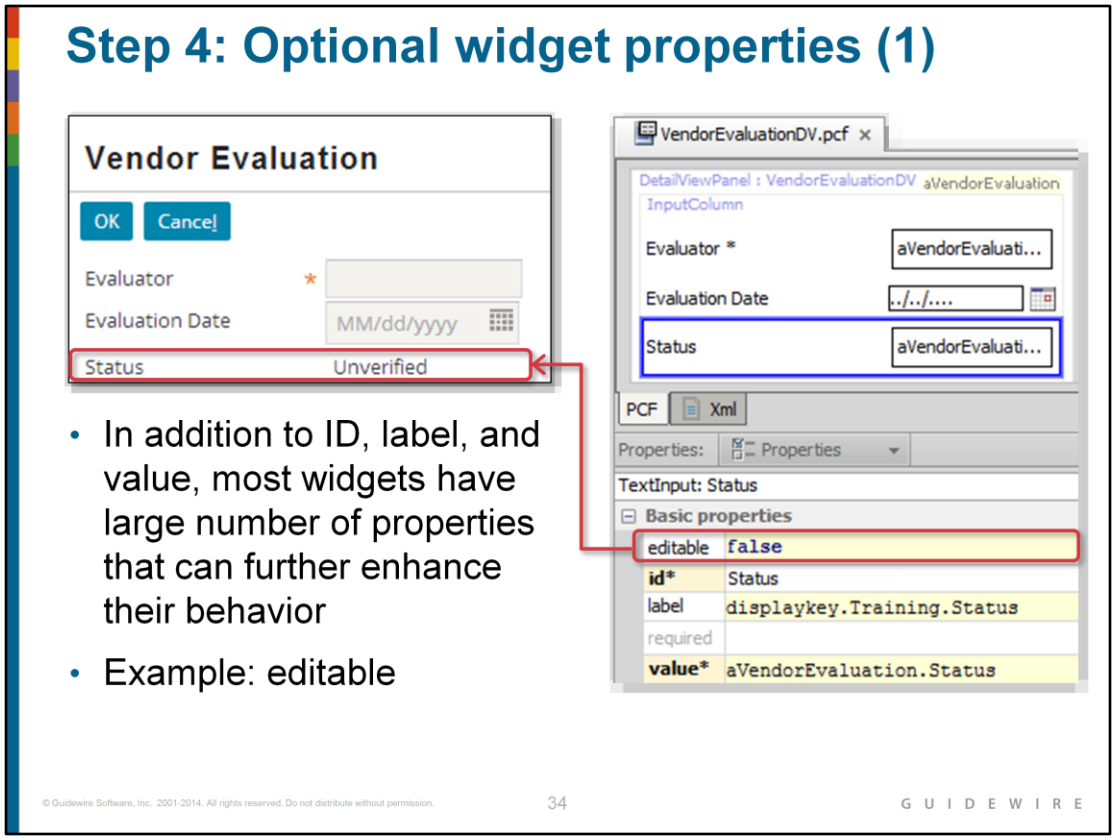


It may seem negligible, but to resolve the underlying data type for the widget value takes extra application processing. In aggregate, widget resolution can be a performance issue. Wherever possible, use the input widget that best matches the needs of the user, widget special properties, and the underlying data type value.

Property tooltips

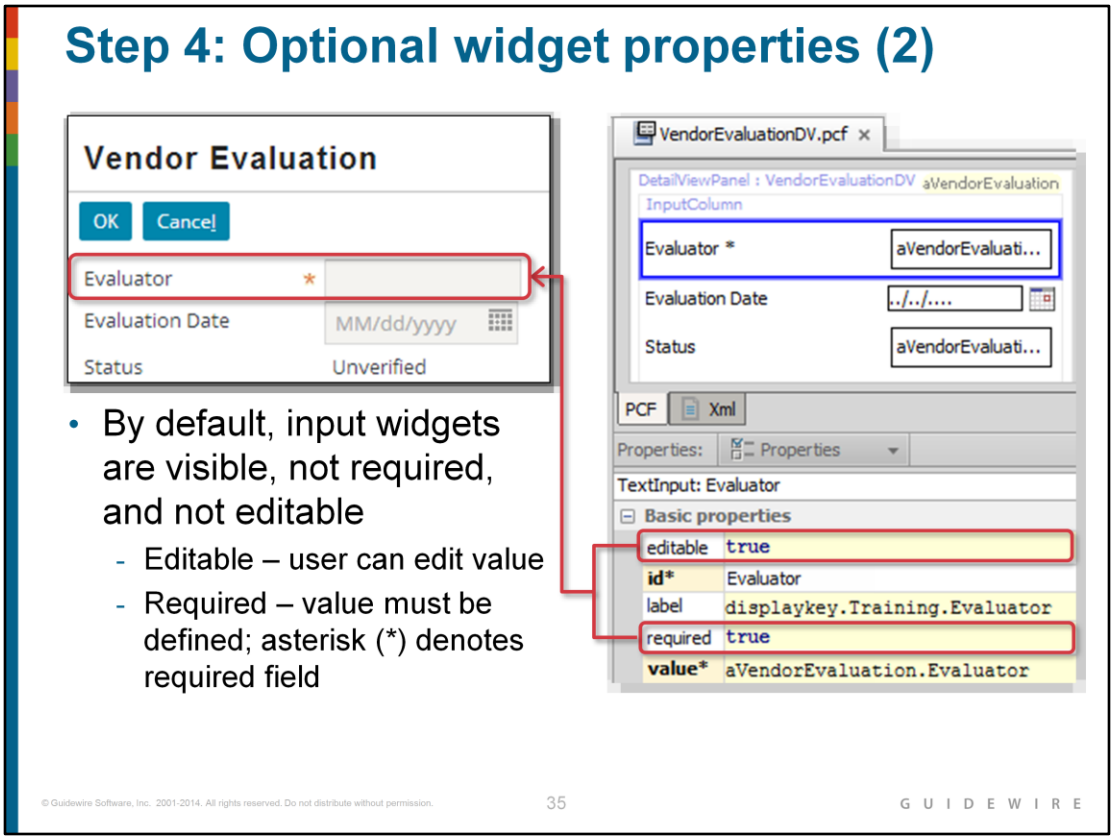


- If you mouse over a property name, a tooltip displays Description text of that property from the PCF reference
- Does not display property value type or defaults



The required variable for the VendorEvaluationDV.pcf file is aVendorEvaluation of the type VendorEvaluation. The VendorEvaluation entity describes the Status field. The Status field is a typekey defined by a value from the VendorEvaluationStatus typelist. For this entity typekey, the default value is unverified. The Status field can also contain a null value.

However, in the VendorEvaluationDV, the Status widget does not allow the Status property to be editable. This results in the value to always use the default value as described by the VendorEvaluation entity.



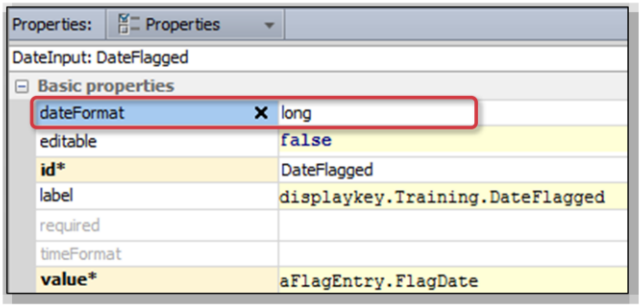
The required variable for the VendorEvaluationDV.pcf file is aVendorEvaluation of the type VendorEvaluation. The VendorEvaluation entity describes the Evaluator field. The Evaluator field is a varchar data field that can be null. No default value is defined for the field.

However, in the VendorEvaluationDV, the Evaluator widget does not allow the Evaluator field to have a null value. The Evaluator widget defines properties for making the widget both editable and required. Required and editable fields show an asterisk in the user interface when the PCF is in edit mode.

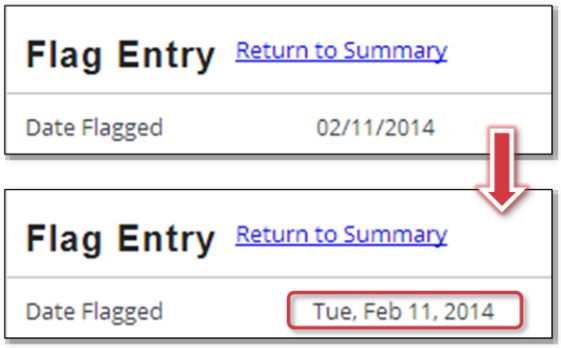
If the VendorEvaluation entity defines the Evaluator field as non-null (null=false), then the Evaluator widget shows the field to be required in the case when the required property is undefined. If the required property is set to false, then the widget will override this behavior. The result could be a DBNullConstraintException when a user attempts to commit the data.

Visible is typically not set to false. It is either set to true or it is set to an expression that renders the widget visible or not visible based on conditional logic. Setting widget properties to conditional expressions is covered in the "Partial Page Update" lesson.

Specialized widgets have extra properties



- Specialized widgets include additional properties for finer level of control



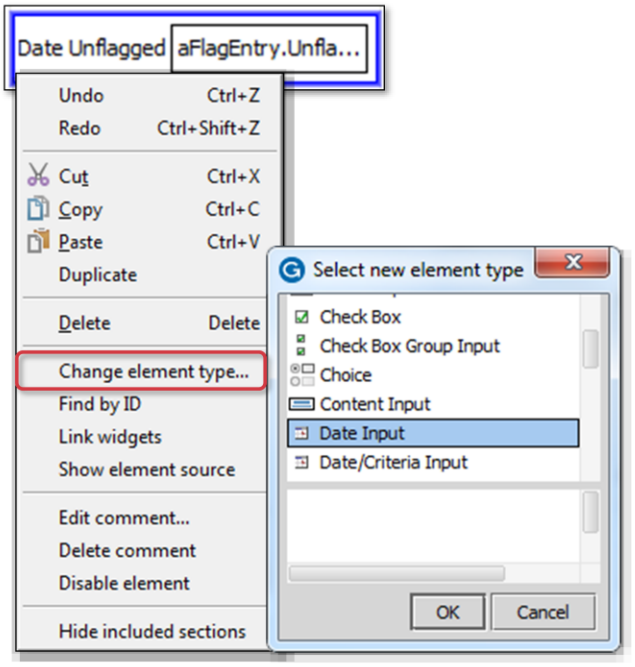
Other common atomic input widgets

- Basic
  - Boolean Dropdown Input
  - Boolean Radio Button Input
  - Check Box Input
  - Date Input
  - Monetary Amount Input
  - Multicurrency Amount Input
  - Text Area Input
  - Text Input
- Range
  - Range Input
  - Range Radio Button Input
  - TypeKey Input
  - TypeKey Radio Button Input

Data values and input widget examples

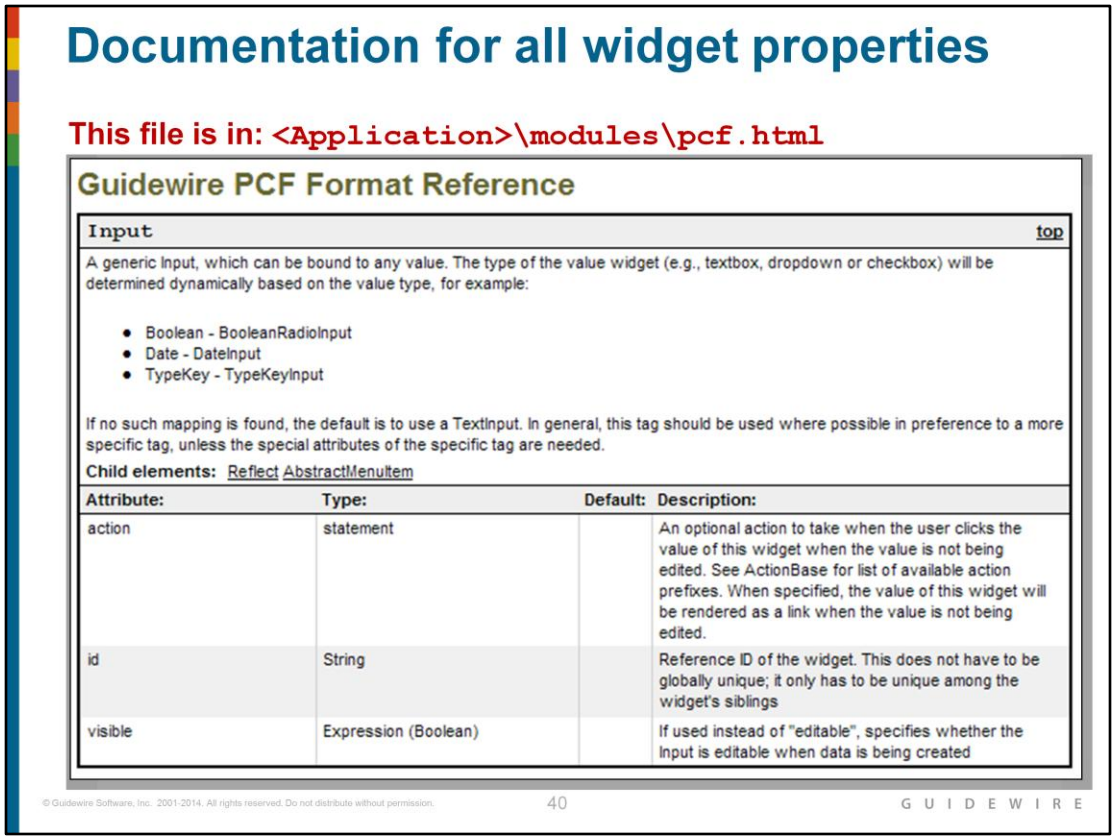
Data	Input Widget
varchar integer decimal	Text Input
varchar shorttext mediumtext longtext text	Text Area Input
date datetime	Date Input
money	Monetary Amount Input
bit	Boolean Dropdown Input Boolean Radio Button Input Check Box Input
typekey	TypeKey Input TypeKey Radio Button Input

Change element type for atomic widgets



- Select widget element in PCF Editor canvas
- Right click to open context menu
- Change element type…
  - Opens dialog of possible substitutes
- Make change selection in dialog

"Change element type…" context menu command substitutes a different element for the selected element. The dialog contains a list of element types that you can substitute for the selected element within the constraints of the PCF schema.

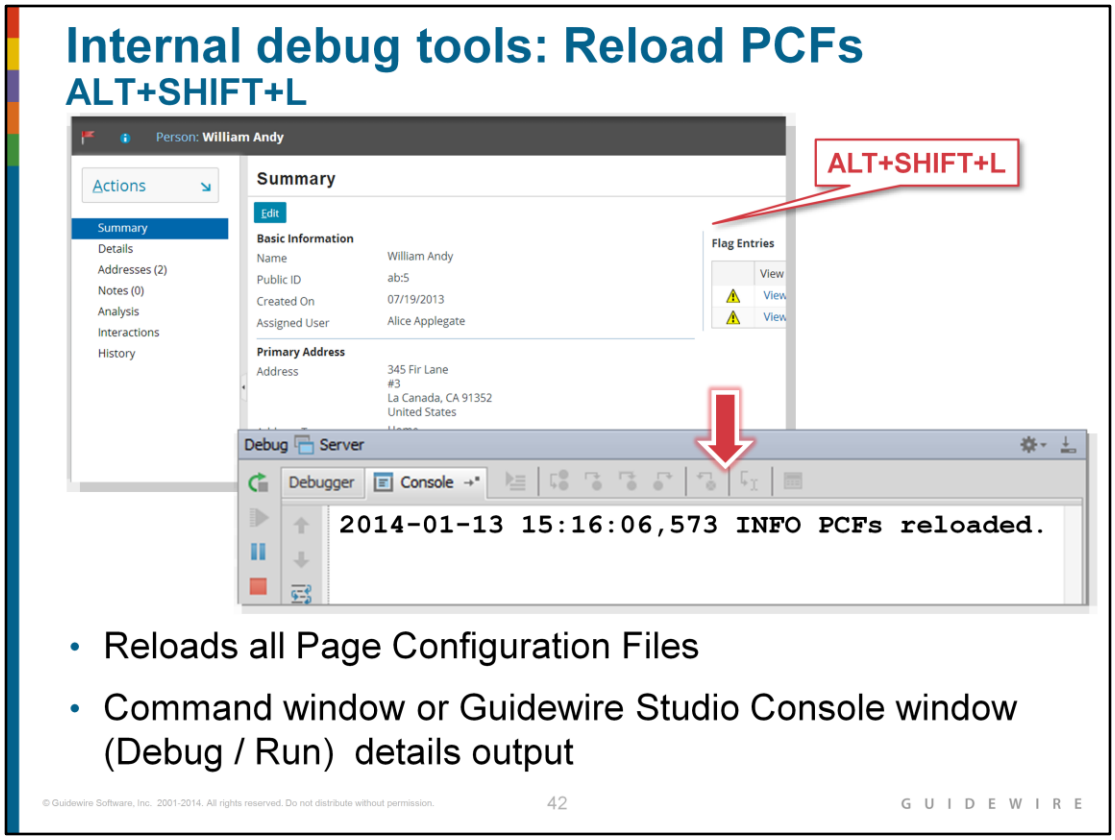


The PCF Format Reference defines the properties for every widget, including the type of value the property takes and a description of the widget. Note that the PCF Format Reference refers to widget properties as "Attributes".

The PCF Format Reference is located in <ApplicationRootDirectory>\modules\pcf.html.

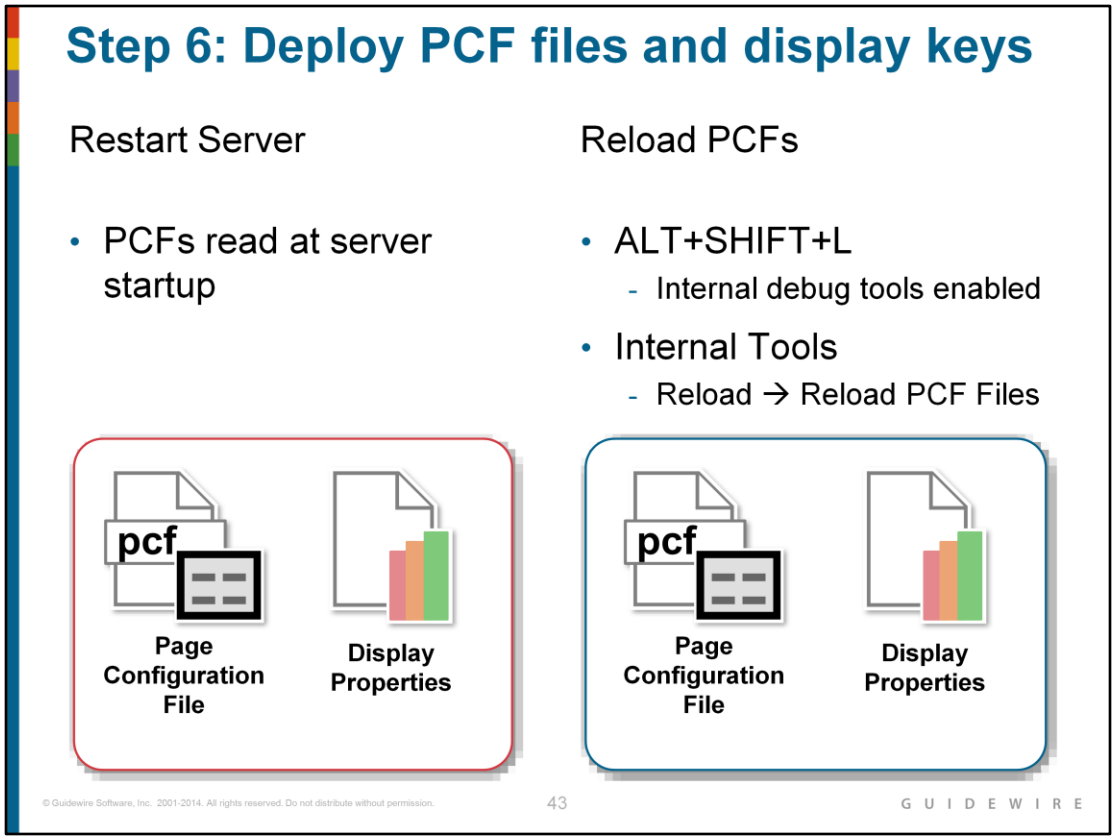
Lesson outline

- Atomic widget basics
- Creating widgets
- Binding widgets to the data model
- Widget labels and display keys
- Optional widget properties
- Deploy PCFs and display keys



If you are running an open application project in Guidewire Studio and if internal tools are enabled, you can reload all the page configuration files and displaykeys for the server.

If you reload PCF files while in edit mode, you may experience unpredictable results. For the current location, where there is a data modification in progress, the new PCFs may not be reloaded. Therefore, Guidewire recommends reloading PCF files while in read-only mode as it provides for more predictable results.



It is also possible to reload PCF files using the Guidewire API and/or internal server tools. The Reload PCF command can be found on the Reload page in Internal Tools. To access Internal Tools, you must log in as an administrator user, e.g., su/gw. Then, use ALT+SHIFT+T. In the tab bar, select Internal Tools --> Reload. On the Reload page, click the Reload PCF Files button. The Reload PCF Files button calls the static method gw.api.tools.InternalToolsUtil.reloadPCFs().

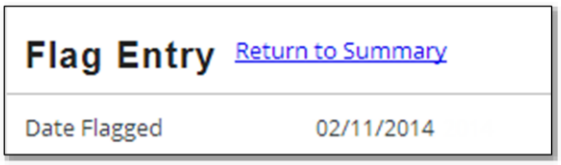
Lesson objectives review

- You should now be able to:
  - Create atomic widgets
  - Bind an atomic widget to the data model
  - Create and modify widget labels
  - Use optional widget properties

Review questions

1. What must you specify in a widget's "value" property?
2. When would you see the keyword "as" in the value property?

3. What is a display key?
4. If you create a widget and specify only the ID, name, and label, is the widget visible? Editable? Required?
5. The screenshot shows a standard input widget. The customer requires a "long" date format. How could you implement this requirement?



Answers
1) You must specify the field in the data model that the widget is bound to.
2) You would see the "as" when the container's base object is subtyped, and the field to which the widget must be bound is at one of the subtype levels.
3) A display key is an abstract display value referenced by a widget's label property. It can have one or more locale-specific values, and when the UI is rendered, the value matching the user's locale is used.
4) The widget will be visible, not editable, and not required.
5) You would need to recreate the widget using a date input. The date input widget contains properties to more finely control the widget behavior, such as the date format.

Notices