



BEA AquaLogic™ Service Bus

Format Builder

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What is Format Builder?

The BEA Format Builder tool assists you in creating descriptions of non-XML data records. Format Builder allows you to describe the layout and hierarchy of the non-XML data so that it can be transformed to or from XML. With Format Builder, you can describe sequences of bytes as fields. Each field description includes the type of data (floating point, string, etc.), the size of the data, and the name of the field. Format Builder allows you to further define groupings of fields (Groups), repetition of fields and groups, and aggregation.

The descriptions you create in Format Builder are saved in an XML grammar called Message Format Language (MFL). MFL documents are used by BEA AquaLogic Service Bus at run-time to transform an instance of a non-XML data record to an instance of an XML document (or vice-versa).

Overview

This help system describes how to use Format Builder to define schemas for non-XML documents. These schemas can then be used by xquery mapping tools to automatically transform data between XML and non-XML formats.

The following topics are included:

- **Format Builder Main Window** describes how to navigate the main window of Format Builder.
- **Message Format Detail Window** describes the fields on the Message Format detail window.
- **Group Detail Window** describes the fields on the Group Details detail window.

What is Format Builder?

- **Field Detail Window** describes the fields on the Field Details detail window.
- **Reference Detail Window** describes the fields on the Reference Details detail window.
- **Comment Detail Window** describes the fields on the Comment Details detail window.
- **Format Builder Options** describes the fields on the Format Builder Options detail window.
- **Format Tester** describes how to use Format Tester.
- **Importing Meta Data** describes how to use Format Builder to import a COBOL Copybook, or C Structure to generate XML files.
- **Format Builder Menus** describes the commands you can execute from the Format Builder menus.
- **Using the Palette** describes the Format Builder palette feature and how to use it.
- **How Do I?** gives you step-by-step instructions for performing the basic tasks in Format Builder.
- **Supported Data Types** lists the MFL and COBOL Copybook Importer data types supported by AquaLogic Service Bus.
- **Glossary** provides definitions of some of the unfamiliar terms you may encounter when using Format Builder.

Format Builder Main Window

The main window of BEA Format Builder is split into two panes. The left pane shows the structural information for the data format. The right pane shows the detail for the item selected in the left pane.

You can navigate in and execute commands from the main window by using one of the following methods:

- [Using the Menu Bar](#)
- [Using the Toolbar](#)
- [Using the Tree Pane](#)
- [Using the Shortcut Menus](#)

Using the Menu Bar

The Menu bar displays the menu headings. The menus that are available depend on what is selected in the left pane. You can open menus from the menu bar or by holding down the ALT key while pressing the underscored letter in the menu heading. For example, pressing ALT + F opens the File Menu.









Note: Menu items that appear in gray are unavailable for the current selection.












For a complete description of the menu commands, see *Format Builder Menus*.

Using the Toolbar

The Format Builder toolbar provides buttons that access some of the frequently used commands in the menus. If a command is unavailable, its button appears “grayed-out.”

The toolbar buttons provided with Format Builder are described below:

Toolbar Button	Name	Description
	New	Creates a new Message Format
	Open/Retrieve	Opens an existing Message Format.
	Save/Store	Saves the current Message Format
	Cut	<p>Removes the item currently selected in the left-hand pane, and its child objects, from the tree. The item can be pasted elsewhere in the tree.</p> <p>Note: This action is not available if the Message Format (root) item is selected.</p>
	Copy	<p>Makes a copy of the item currently selected in the left-hand pane for insertion elsewhere in the tree.</p> <p>Note: This action is not available if the Message Format (root) item is selected.</p>
	Paste as Sibling	Inserts the cut or copied item as a sibling object of the selected item.
	Paste as Reference	Inserts a reference to the cut or copied item as a sibling object of the selected item.
	Undo	<p>Reverses the previous action. The tool tip changes to indicate the action that can be undone. For example, changing the name of a field to Field1 and clicking Apply causes the tool tip to read “Undo Apply Field Field1”.</p> <p>Note: Format Builder supports multi-level undoing and redoing.</p>

Toolbar Button	Name	Description
	Redo	Reverses the effects of an Undo command. The tool tip changes to indicate the action that can be redone. For example, changing the name of a field to Field1 and then undoing that action causes the tool tip to read “Redo Apply Field Field1”. Note: Format Builder support multi-level undoing and redoing.
	Insert Field	Inserts a field as a sibling of the item selected in the tree pane.
	Insert Group	Inserts a group as a sibling of the item selected in the tree pane.
	Insert Comment	Inserts a comment as a sibling of the item selected in the tree pane.
	Move Up	Moves the selected item up one position under its parent.
	Move Down	Moves the selected item down one position under its parent.
	Promote item	Promotes the selected item to the next highest level in the tree. For example, Field1 is the child object of Group1. Selecting Field1 and clicking the Promote tool makes it a sibling of Group1.
	Demote item	Demotes the selected item to the next lower level in the tree. For example, Group1 is the sibling of Field1. Field1 immediately follows Group1 in the tree. Selecting Field1 and clicking the Demote tool makes it a child of Group1.
	Expand All	Expands all items in the tree pane to show child items.
	Collapse All	Collapses the tree pane to show first level items only.
	Format Tester	Opens the Format Tester window.

Using the Tree Pane

The Tree Pane represents hierarchical/structural information about the format of the non-XML data in a tree. The root node of the tree will correspond to the MFL document being created or edited. The root node is referred to as the Message node. Child nodes are labeled with group or field names. Fields are represented by leaf nodes in the tree. Groups contain fields or other groups and are represented by non-leaf nodes in the tree.

The icon for each node encapsulates information about the node. The icon indicates whether the node represents a message, a group, a field, a comment, or a reference. The icon also indicates whether a group or field is repeating, whether a group is a [Group Choice](#), and whether a group or field is optional or mandatory. You also have the ability to add, delete, move, copy, or rename nodes in the tree. This is done through the menus or the toolbar (see [Using the Menu Bar](#), [Using the Toolbar](#), and [Using the Shortcut Menus](#)).

The icons that appear in the Tree Pane are described in the following table.

Table 2-1 Tree Icon Descriptions






Tree Icon	Icon Name	Description
	Message Format	The top level element.
	Group	Collections of fields, comments, and other groups or references that are related in some way (for example, the fields PAYDATE, HOURS, and RATE could be part of the PAYINFO group). Defines the formatting for all items contained in the group.
	Optional Group	A group that may or may not be included in the message format.
	Repeating Group	A group that has one or more occurrences.
	Optional Repeating Group	A group that may or may not be included, but if included, occurs more than once.

Table 2-1 Tree Icon Descriptions











Tree Icon	Icon Name	Description
	Group Reference	Indicates that another instance of the group exists in the data. Reference groups have the same format as the original group, but you can change the optional setting and the occurrence setting for the reference group.
	Group Choice	Indicates that only one of the items in the group will be included in the message format.
	Field	Sequence of bytes that have some meaning to an application. (For example, the field <code>EMPNAME</code> contains an employee name.) Defines the formatting for the field.
	Optional Field	A field that may or may not be included in the message format.
	Repeating Field	A field that has one or more occurrences.
	Field Reference	Indicates that another instance of the field exists in the data. Reference fields have the same format as the original field, but you can change the optional setting and the occurrence setting for the reference field.
	Optional Repeating Field	A field that may or may not be included, but, if included, occurs more than once in the message format.
	Comment	Contains notes about the message format or the data transformed by the message format.
	Collapse	A minus sign next to an object indicates that it can be collapsed.

Table 2-1 Tree Icon Descriptions

Tree Icon	Icon Name	Description
	Expand	A plus sign next an object indicates that it can be expanded to show more objects.

Using the Shortcut Menus

Instead of using the standard menus to find the command you need, use the right mouse button to click an item in the left pane. The menu that appears shows the most frequently used commands for that item.

For a complete description of the shortcut menu commands, see [Shortcut Menu](#).

Using Drag and Drop

You can use the drag and drop feature of Format Builder to copy and/or move the items in the tree view.

To use drag and drop to move an item:

1. Select the item you want to move.
2. Press and hold the left mouse button while you drag the item to the desired location.
3. When the item is in the desired location, release the left mouse button. The item is moved to the new location.

To use drag and drop to copy an item:

1. Select the item you want to copy.
2. Press and hold the CTRL key.
3. Keeping the CTRL key depressed, press and hold the left mouse button while you drag the item to the desired location.
4. When the item is in the desired location, release the left mouse button and the CTRL key. A copy of the item is place at the new location.

Valid Names

Message Formats, Fields, and Groups are identified by a Name. The name that is specified is used as the XML tag when non-XML data is transformed to XML by AquaLogic Service Bus. Thus the name must conform to the XML rules for a name.

The format guidelines for a name are as follows:

- Must start with a letter or underscore.
- Can contain letters, digits, the period character, the hyphen character, or the underscore character.

The following are valid name examples:

```
MyField  
MyField1  
MyField_again  
MyField-again
```

The following are invalid name examples:

```
1MyField - may not start with a digit  
My>Field - the greater-than sign (>) is an illegal character  
My Field - a space is not permitted  
My/Field - the back slash (/), which is an illegal character  
My\Field - the forward slash (\), which is an illegal character  
My:Field - colon (:), which is an illegal character  
My;Field - a semi-colon (;), which is an illegal character
```

Format Builder Main Window

Message Format Detail Window

Defines the data for which you are creating a message format (the root node of a message format file).

Field	Description
Message Format Properties	
Name/XML Root	The name of the message format. This value will be used as the root element in the transformed XML document. This name must comply with XML element naming conventions.
Message Format Update Buttons	
Apply	Saves your changes to the message format document.
Reset	Discards your changes to the detail window and resets all fields to the last saved values.
Help	Displays online help information for this detail window.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel’s components.

Message Format Detail Window

Group Detail Window

Defines the groups contained in the message format. Groups are collections of fields, comments, and other groups or references that are related in some way (for example, the fields `PAYDATE`, `HOURS`, and `RATE` could be part of the `PAYINFO` group). You can create a group as a child of the message format item, as a child of another group, or as a sibling of a group or field.

Field	Description
Group Description	
Name	The name of the group. This name must comply with XML element naming conventions (see Valid Names for more information).
Optional	Choose Optional if this is an optional group.
Choice of Children	Choose Choice of Children if only one of the items in the group will be included in the message format.
Group Occurrence	

Field	Description
Occurrence	<p>Choose one of the following to indicate how often this group appears in the message format:</p> <ul style="list-style-type: none">• Once — Indicates the group appears only once.• Repeat Delimiter — Indicates the group will repeat until the specified delimiter is encountered.• Repeat Field — Indicates the group will repeat the number of times specified in the field denoted as the repeat field.• Repeat Number — Indicates the group will repeat the specified number of times.• Unlimited — Indicates the group will repeat an unlimited number of times. <p>Note: Unless a group is defined as Optional, all groups occur at least once.</p>
Group Attributes	
Group is Tagged	<p>Select this option if this is a tagged group. If tagged, a literal precedes the data, indicating that the data is present.</p> <p>If you selected the Group is Tagged option, enter the tag in the text box to the right of the checkbox.</p>
Group Delimiter	
None	<p>Select this option if the group has no delimiter.</p>
Delimited	<p>Groups can have their termination point specified by a delimiter. A delimiter is a string of characters that marks the end of the group of fields. The group continues until the delimiter characters are encountered.</p> <p>Select this option if the end of the group is marked with a delimiter.</p> <p>Value — Enter the delimiter that marks the end of the group of fields.</p> <p>Note: Normally, groups are not delimited. They are usually parsed by content (the group ends when all child objects have been parsed).</p>

Field	Description
Delimiter Field	<p>Groups can have their termination point specified by a field that contains a delimiter character string. A delimiter is a string of characters that mark the end of the group. The group continues until the delimiter character string contained in the specified field is encountered.</p> <ul style="list-style-type: none"> • Field — Select the field that contains the delimiter character string. A list of valid fields will be presented in a drop-down list. • Default — Enter the default delimiter character that will be used if the above field is not present in the data. This value is required. <p>For more information on delimiters, see Specify Delimiters.</p>
Delimiter is Shared	Indicates that the delimiter marks both the end of the group of data, and the end of the last field of the group. The delimiter is shared among the group, and the last field of the group, to delimit the end of the data.
Group Update Buttons	
Apply	Saves your changes to the message format document.
Duplicate	<p>Makes a copy of the group currently displayed. The duplicate group contains the same values as the original group. The name of the duplicate group is the same as the original group name, with the word “New” inserted before the original name. For example, duplicating a group called “Group1” results in a group with the name “NewGroup1”.</p> <p>When you duplicate an item with a numeric value in its name, the new item name contains the next sequential number. For example, duplicating “NewGroup1” results in a group named “NewGroup2”.</p>
Reset	Discards your changes to the detail window and resets all fields to the last saved values.
Help	Displays online help information for this detail window.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel’s components.

Group Detail Window

Field Detail Window

Defines the fields contained in the message format. Fields are a sequence of bytes that have some meaning to an application. (For example, the field `EMPNAME` contains an employee name.) You can create a field as a child of the message format item, as a child of a group, or as a sibling of a group or another field.

Field	Description
Field Description	
Name	The name of the field. This name must comply with XML element naming conventions (see Valid Names for more information).
Optional	<p>Select this option if this is an optional field. Optional means that the data for the field may or may not be present.</p> <p>If the Optional option is selected for a file, then you must also set the Field is Tagged option from the Field Attributes pane. In addition, in the Field Is Tagged text box enter a unique value for each optional field in a group. Multiple groups can use the same tag value but the tag value for each optional field in a group must be unique.</p>

Field	Description
Type	<p>Select the data type of the field from the drop-down list. The default is String.</p> <p>Note: The Field Type you select dictates the Field Data Options that appear on the dialog.</p> <p>Refer to Supported Data Types for a list of data types supported by Format Builder.</p>
Field Occurrence	
Occurrence	<p>Choose one of the following to indicate how often this field appears in the message format:</p> <ul style="list-style-type: none"> • Once - Indicates the field appears only once. • Repeat Delimiter - Indicates the field will repeat until the specified delimiter is encountered. • Repeat Field - Indicates the field will repeat the number of times specified in the field denoted as the repeat field. • Repeat Number - Indicates the field will repeat the specified number of times. • Unlimited - Indicates the field will repeat an unlimited number of times. <p>Note: Unless a field is defined as optional, the field will occur at least one time.</p>
Note: The fields that display in the following sections of the detail window depend on the Field Type selected.	
Field Data Options	
Data Base Type	If the field is a date or time field, the base type indicates what type of characters (ASCII, EBCDIC, or Numeric) make up the data.
Year Cutoff	If the field is a date field that has a 2-digit year, the year cutoff allows the 2-digit year to be converted to a 4-digit year. If the 2-digit year is greater than or equal to the year cutoff value, a '19' prefix will be added to the year value. Otherwise a '20' prefix will be used.
Code Page	The character encoding of the field data.
Value	The value that appears in a literal field.
Field Attributes	

Field	Description
Field is Tagged	<p>Select this option if this is a tagged field. Being tagged means that a literal precedes the data, indicating that the data is present. For example: <code>SUP:ACME INC</code>, <code>SUP:</code> is a tag. <code>ACME INC</code> is the field data.</p> <p>If you selected the Field is Tagged option, enter the tag in the text box to the right of the checkbox.</p>
Field Default Value	Select this option if the field has a default value. Then, enter the default value in the text box to the right of the checkbox.
Termination	
Length	<p>Variable-sized data types can be assigned a fixed length, eliminating the need to use a delimiter to specify the termination point of the field.</p> <ul style="list-style-type: none"> • Length - Enter the number of bytes in the length field if the length field is a variable length. • Trim Leading/Trailing - Removes the specified data from the leading or trailing edge of the data. • Pad - If the data is shorter than the specified length, enter the necessary value to the data until it is of correct length. Select the Trailing option to append padding at the end of a field. Select the Leading option to append padding at the beginning of a field. • Truncate - Removes a specified number of characters from a field. Select the Truncate First option to remove the specified number of characters from the beginning of the field. Select the Truncate After option to remove the specified number of characters from the end of the field. <p>If you select both truncation options, the Truncate First option is implemented initially, and the Truncate After option is invoked on the remaining characters.</p>

Field	Description
Imbedded Length	<p>Variable-sized data types can have their termination point specified by an imbedded length. An imbedded length precedes the data field and indicates how many bytes the data contains.</p> <ul style="list-style-type: none"> • Description - Select the Type from the drop down list. Then, depending on the Type selected, choose Length and enter the number of bytes, or choose Delimiter and enter the delimiter character. • Tag/Length Order - Specifies the order of tag and length fields when both are present. Default is tag before length. • Trim Leading/Trailing - Removes the specified data from the leading or trailing edge of the data. • Truncate - Removes a specified number of characters from a field. For more information on truncation, see the Length field.
Delimiter	<p>Variable-sized data types can have their termination point specified by a delimiter. A delimiter is a character that marks the end of the field. The field data continues until the delimiter character is encountered.</p> <ul style="list-style-type: none"> • Value - Enter the delimiter that marks the end of the field data. • Trim Leading/Trailing - Removes the specified data from the leading or trailing edge of the data. • Truncate - Removes a specified number of characters from a field. For more information on truncation, see the Length field.
Delimiter Field	<p>Variable-sized data types can have their termination point specified by a field that contains a delimiter character. A delimiter is a character that marks the end of the field. The field data continues until the field containing the delimiter character is encountered.</p> <ul style="list-style-type: none"> • Field - Select the field that contains the delimiter character. • Default - Enter the delimiter character. You must supply a default value. The default is used when the delimiter field is not present. • Trim Leading/Trailing - Removes the specified data from the leading or trailing edge of the data. • Truncate - Removes a specified number of characters from a field. For more information on truncation, see the Length field. <p>For more information on delimiters, see Specify Delimiters.</p>
Decimal Position	Specifies the number of digits (0-16) to the left of the decimal point.

Field	Description
Field Update Buttons	
Apply	Saves your changes to the message format file.
Duplicate	<p>Makes a copy of the field currently displayed. The duplicate field contains the same values as the original field. The name of the duplicate field is the same as the original field name, with the word “New” inserted before the original name. For example, duplicating a field called “Field1” results in a field with the name “NewField1”.</p> <p>When you duplicate an item with a numeric value in its name, the new item name contains the next sequential number. For example, duplicating “NewField1” results in a group named “NewField2”.</p>
Reset	Discards your changes to the detail window and resets all fields to the last saved values.
Help	Displays online help information for this detail window.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel’s components.

Field Detail Window

Reference Detail Window

A reference is used to indicate that another instance of the field or group format exists in the data. Reference fields or groups have the same format as the original field or group, but you can change the optional setting and the occurrence setting for the reference field or group. For example, if you have a “bill to” address and a “ship to” address in your data, you only need to define the address format once. You can create the “bill to” address definition and create a reference for the “ship to” address.

Note: References are given the same name as the original item. For example, the “bill to” address definition and the “ship to” address definition would be named the same.

Field	Description
Reference Description	
Name	Displays the name of the original field or group for which you created this reference. This value cannot be changed.
Type	Indicates the type of data being used, for example, a string or integer
Optional	Select this option if the reference field or group is optional.
Field Occurrence	

Field	Description
Occurrence	<p>Choose one of the following to indicate how often this reference field or group appears in the message format:</p> <ul style="list-style-type: none">• Once — Indicates the reference appears only once.• Repeat Delimiter — Indicates the reference will repeat until the specified delimiter is encountered. For more information on delimiters, see Specify Delimiters.• Repeat Field — Indicates the reference will repeat the number of times specified in the field denoted as the repeat field.• Repeat Number — Indicates the reference will repeat the specified number of times.• Unlimited — Indicates the reference will repeat an unlimited number of times.
Field Attributes	
Field Update Buttons	
Apply	Saves your changes to the message format document.
Edit Reference	Displays the detail window for the original item so you can edit the details of the referenced field or group.
Reset	Discards your changes to the detail window and resets all fields to the last saved values.
Help	Displays online help information for this detail window.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel’s components.

Comment Detail Window

Comments contain notes about the message format or the data transformed by the message format. Comments are included in the message format definition for informational purposes only. You can create a comment as a child or sibling of any message format, group, or field.

Field	Description
Comment Details	Enter the comment text.
Apply	Saves your changes to the message format document.
Reset	Discards your changes to the detail window and resets all fields to the last saved values.
Help	Displays online help information for this detail window.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel's components.

Comment Detail Window

Format Builder Options

Defines the options for BEA Format Builder. These options control the overall operation of Format Builder.

Field	Definition
Default Message Format Version	Select the MFL version used when creating new documents. Note: Message formats contain their own format version specified on the Message Format pane.
Character Encoding Options	
Default Message Format (MFL) Encoding	Select the character encoding default for the Message Format Layout (MFL) from the list of encoding names and descriptions. This defines the format that your MFL document and XML output will take.
Default Field Code Page	Select the default field code page from the list of non-XML formats. This selection will be the default code page for each field that is created in your MFL document. It specifies the character encoding of the non-XML data for each field.
XML Formatting Options	
Initial Indent	Enter the number of spaces to indent the first line of the XML document created by WebLogic Integration.

Field	Definition
New Line Indent	Enter the number of spaces to indent a new child line of the XML document created by WebLogic Integration.
XML Content Model Options	
Auto-generate DTD	Generates a DTD document when you save or store the MFL document. This document will be placed in the same directory as the message format when saving to a file.

Format Tester

Once you have build a format definition, you can test it using Format Tester. Format Tester parses and reformats data as a validation test and generates sample non-XML or XML data. This sample data can be edited, searched, and debugged to product the expected results.

[Format Tester Window](#)

[Format Tester Menus](#)

Format Tester Window

The following topics discuss the elements of the Format Tester main window and provide instructions for navigating and executing commands from the Format Tester main window.

[Using the Non-XML Window](#)

[Using the XML Window](#)

[Using the Debug Window](#)

[Using the Resize Bars](#)

Format Tester Menus

The following menus are available in Format Tester. All Format Tester menus are expandable from your keyboard by pressing Alt + *underlined letter*. Some menu commands are also executable using Ctrl + *letter* keystrokes.

[File Menu](#)

[Edit Menu](#)

[Display Menu](#)

[Generate Menu](#)

[Translate Menu](#)

[Shortcut Menu](#)

File Menu

The following commands are available from the File menu.

Menu Command	Description
Open Non-XML	Allows you to select a non-XML file to be displayed in the Non-XML window. Note: The default file extension for non-XML files is .DATA.
Open XML	Allows you to select a file to be displayed in the XML section of the Format Tester window. Note: The default file extension for XML files is .XML.
Save Non-XML	Allows you to save the contents of the Non-XML window.
Save XML	Allows you to save the contents of the XML window.
Debug Log	Allows the debug information to be saved in a text file.
Close	Closes the Format Tester window.

Edit Menu

The following commands are available from the Edit menu.

Menu Command	Description
Cut	Removes the currently selected text and places it on the clipboard for pasting into another location.

Menu Command	Description
Copy	Copies the currently selected text and places it on the clipboard for pasting into another location.
Paste	Inserts the cut or copied text at the cursor location.
Find	Allows you to search for a hex or text value in the non-XML data.
Find Next	Continues your search to the next instance of the specified value.
Go To	Allows you to move the cursor in the Non-XML editor to a specified byte offset.

Display Menu

The following commands are available from the Display menu.

Menu Command	Description
XML	Allows the XML data panel to be hidden or shown. If hidden, the non-XML data window expands to fill the width of the tester. The <i>To XML</i> button remains, but the splitter disappears.
Debug	Allows the Debug output window to be hidden or shown.
Clear→Non-XML	Resets the contents of the Non-XML data window to be empty.
Clear→XML	Resets the contents of the XML window to be empty.
Clear→Debug	Resets the contents of the debug window to be empty.
Hex→Offsets as Hexadecimal	Displays the offset values as hexadecimal. Selecting this option turns off the <i>Offsets as Decimal</i> display.
Hex→Offsets as Decimal	Displays the offset values as decimal. Selecting this option turns off the <i>Offset as Hexadecimal</i> display.

Generate Menu

The following commands are available from the Generate menu.

Menu Command	Description
Non-XML	Generates non-XML data to match the current format specification.
XML	Generates XML data to match the current format specification.
Prompt while generating data	If selected, you are prompted during the generation process to determine if optional fields or groups should be generated, determine which choice of children should be generated, and determine how many times a repeating group should repeat.

Translate Menu

The following commands are available from the Translate menu.

Menu Command	Description
Non-XML to XML	Converts the contents of the Non-XML window to XML.
XML to Non-XML	Converts the contents of the XML window to non-XML data.

Shortcut Menu

Instead of using the standard menus to find the command you need, use the right mouse button to click an item in the pop-up shortcut menu.

The following commands are available from the Shortcut menu.

Note: Some commands may be unavailable, depending on which display panel currently contains the mouse pointer.

Menu Command	Description
Cut	Removes the currently selected text and places it on the clipboard for pasting into another location.
Copy	Copies the currently selected text and places it on the clipboard for pasting into another location.
Paste	Inserts the cut or copied text at the cursor location.

Menu Command	Description
Clear	Resets the contents of the Non-XML or XML window to be empty.
Generate	Generates Non-XML or XML data to match the current format specification.
To XML	Converts the contents of the Non-XML window to XML.
To Non-XML	Converts the contents of the XML window to non-XML data.

Using the Non-XML Window

The Non-XML data display panel acts as a hexadecimal editor or a text editor, depending on which tab is selected.

The hexadecimal editor panel displays data offsets, the hex value of individual bytes, and the corresponding text. The corresponding text can be optionally displayed as ASCII or EBCDIC characters. The editor allows for editing of the hex byte or the text value. If a hex data value is modified, the corresponding text value is updated, and vice versa.

See Also

[Using the Data Offset Feature](#)

[Using the Text Feature](#)

Using the Data Offset Feature

The data offset feature of the hexadecimal editor allows you to display your data offsets as Hexadecimal or Decimal.

To change your data offsets:

1. Choose Display→Hex. The following two data offset options display.
 - Offsets as Hexadecimal
 - Offsets as Decimal
2. Click the display option that best suits your needs. The data offset panel of the Non-XML window dynamically changes to reflect your choice.

Using the Text Feature

To use the Text feature, select the Text tab from within the Non-XML window to view all printable characters, such as carriage returns. The Text window shows these as text with line breaks.

Using the XML Window

The XML data panel displays XML data that has been converted or transformed from the contents of the Non-XML panel. The contents of the XML panel can be cleared or edited to suit your needs.

You can also use this window to enter or generate the XML data to be transformed into non-XML format.

Using the Debug Window

The Debug window displays the actions that take place during the transformation operation, any errors that are encountered, and field and group values and delimiters. To determine the location of the error, determine the last field that parsed successfully and examine the specification of the next field on the [Using the Tree Pane](#) of Format Builder.

When you open the Format Tester, only the Non-XML and XML windows are visible. To open the Debug window, choose Display→Debug to toggle the Debug window on and off. The Debug window opens below the Non-XML and XML windows.

Note: Debug output is restricted to the most recent 64 KB of messages. Full debug information can be captured to a file. See [Using the Debug Log](#) for more information.

Using the Resize Bars

Resize bars are located between the Non-XML, XML, and Debug windows. These resize bars enable each window to be resized to suit your needs. Each resize bar can be selected and dragged up and down, or left and right, as appropriate, to enlarge one of the windows and reduce the other.

Each resize bar also contains two directional buttons that can be clicked to enlarge or diminish any of the three windows.

Debugging Format Definitions

The following topics discuss the various Format Tester utilities you can use to debug and correct your data.

[Searching for Values](#)

[Searching for Offsets](#)

[Using the Debug Log](#)

Searching for Values

The Find feature allows you to search for hex or text values in the Non-XML data. The following fields are available from the Find dialog.

Field	Description
Find What	
Value	Enter the value you want to find.
Text	Select this option if you want to find a text value.
Hex	Select this option if you want to find a hex value.
Direction	
Forwards	Select this option if you want to search from the selected location to the end of the document.
Backwards	Select this option if you want to search from the selected location to the beginning of the document.
From	
Beginning of File	Select this option if you want to start the search at the beginning of the file.
Current Position	Select this option if you want to start the search at the current cursor location.
End of File	Select the option if you want to start the search at the end of the file.
Action Buttons	
OK	Begins the search operation.
Cancel	Closes the Find dialog without performing a search.

Searching for Offsets

The Goto feature allows you to move the cursor in the Non-XML editor to a byte offset you specify. The following fields are available from the Goto dialog.

Field	Description
Bytes to Move	
Offset	Enter the offset value you want to find.
Dec	Select this option if you want to go to a decimal value.
Hex	Select this option if you want to go to a hex value.
Direction	
Forwards	Select this option if you want to search from the selected location to the end of the document.
Backwards	Select this option if you want to search from the selected location to the beginning of the document.
From	
Beginning of File	Select this option if you want to start the search at the beginning of the file.
Current Position	Select this option if you want to start the search at the current cursor location.
End of File	Select the option if you want to start the search at the end of the file.
Action Buttons	
OK	Begins the search operation.
Cancel	Closes the Goto dialog without performing a search.

Using the Debug Log

The debug log allows you to save your debug information to a text file.

To use the debug log, choose File→Debug Log. A dialog displays allowing you to enter a new path and file name or choose an existing file in which to save the debug information.

Note: If you select an existing file, the new debug information is appended to the end of the file.

Importing Meta Data

BEA Format Builder includes the following four utilities that allow you to import COBOL copybooks, and convert a C structure definition into MFL Message Definition.

- [Importing an XML Schema](#)
- [Importing a COBOL Copybook](#)
- [Importing C Structures](#)

Importing an XML Schema

Format Builder includes a feature that allows you to import an XML Schema representing the desired XML representation of your non-XML document. This can provide you with a jump-start on specifying the format of your non-XML document.

To import an XML schema:

1. Choose **Tools→Import→XML Schema Importer**. The **XML Schema Importer** dialog displays.
2. Enter data in the fields as described in the following table:

Field	Description
File Name	Type the path and name of the file you want to import.
Browse	Click to navigate to the location of the file you want to import.

Field	Description
Root Element	This value will be used as the root element in the transformed XML document. This name must comply with XML element naming conventions
MFL Field Delimiter Default	A delimiter is a character that marks the end of the field. The field data continues until the field containing the delimiter character is encountered.
Action Buttons	
OK	Imports the XML Schema using the settings you defined.
Cancel	Closes the dialog and returns to Format Builder without importing.

Importing a COBOL Copybook

Format Builder includes a feature that allows you to import a COBOL copybook into Format Builder and create a message definition to transform the COBOL data. When importing a copybook, comments are used to document the imported copybook and the Groups and Fields it contains.

To import a COBOL copybook:

1. Choose Tools→Import→COBOL Copybook Importer. The COBOL Copybook Importer dialog displays.
2. Enter data in the fields as described in the following table:

Field	Description
File Name	Type the path and name of the file you want to import.
Browse	Click to navigate to the location of the file you want to import.
Byte Order	

Field	Description
Big Endian	Select this option to set the byte order to Big Endian. Note: This option is used for IBM 370, Motorola, and most RISC designs (IBM mainframes and most Unix platforms).
Little Endian	Select this option to set the byte order to Little Endian. Note: This option is used for Intel, VAX, and Unisys processors (Windows, VMS, Digital, Unix, and Unisys).
Character Set	
EBCDIC	Select this option to set the character set to EBCDIC. Note: These values are attributes of the originating host machine.
US-ASCII	Select this option to set the character set to US-ASCII. Note: These values are attributes of the originating host machine.
Other	The character encoding of the field data.
Action Buttons	
OK	Imports the COBOL Copybook using the settings you defined.
Cancel	Closes the dialog and returns to Format Builder without importing.
About	Displays information about the COBOL Copybook importer including version and supported copybook features.

Once you have imported a copybook, you may work with it as you would any message format definition. If an error or unsupported data type is encountered in the copybook, a message is displayed informing you of the error. You can choose to display the error or save the error to a log file for future reference.

Importing C Structures

Format Builder includes a C structure importer utility that converts a C structure definition into an MFL Message Definition by generating MFL or C Code output.

- [Starting the C Structure Importer](#)
- [Generating MFL Data](#)
- [Generating C Code](#)

Starting the C Structure Importer

To start the C Structure Importer:

1. From the Format Builder main window, choose **Tools→Import→C Struct Importer**. The C Structure Importer dialog displays.
2. The C Structure Importer dialog opens with MFL specified as the default output and contains the following fields.

Field	Description
Input	
Input File	Enter the path and name of the file you want to import. You can also click the Browse button to navigate to the file you want to import.
Structure	This list box is populated with the list of structures found in the input file after it has been successfully parsed.
Parse	Click Parse to parse the input file. If successful, the Structure list box is populated with the list of structures found in the input file.
Output	
Name	Specify an existing profile either by entering the file name or using the Browse button.
MFL	Specifies the data must be compiled on the target machine to generate MFL.
C Code	Specifies the data must be compiled on the target machine to generate C code.

Generating MFL Data

Perform the following steps to generate MFL data.

1. Enter a file name in the Input File field, or click Browse to select a file.
2. Click Parse to parse the file.

Upon completion, the Structure list box is populated with the list of structures found in the input file.

3. Select the desired structure from the Structure drop-down list box.

At this point, you must provide some profile configuration data to generate the MFL directly. You can do this by creating a new hardware profile, or specifying an existing profile.

4. Specify an existing profile or create a new one by performing one of the following procedures.
 - Specify an existing profile either by entering the file name in the Hardware Profile Name field, or click Browse to select a file. Click Edit to open the hardware profile editor if you need to view or edit the profile parameters.
 - Click New to create a new hardware profile. This opens the Hardware Profile editor loaded with the default parameters. Specify a Profile Name, a description, and modify the primitive data types and byte order to suit your needs.
5. Click OK to save your hardware profile changes and return to the C Structure Importer dialog.
6. Click OK to generate your MFL. If the generation is successful, you are returned to Format Builder with an MFL object listed in the navigation tree. The MFL object reflects the same name as the input file used in the parse operation.

If errors are detected during the generation process, the MFL Generation Errors dialog displays providing you the opportunity to view or file the error log.

7. Click Display Error Log to view any errors encountered, click Save Error Log to save the error log to the location of your choice, or click Cancel to dismiss the MFL Generation Errors dialog box.

Once you have determined what errors were generated, you can return to the C Structure Importer and repeat the prior steps.

Generating C Code

Perform the following steps to generate C code.

Importing Meta Data

1. Enter a file name in the Input File field, or click Browse to select a file.

2. Click Parse to parse the file.

Upon completion, the Structure list box is populated with the list of structures found in the input file.

3. Select the desired structure from the Structure drop-down list box.

4. Select the C Code option button.

5. Enter a file name in either the MFL Gen or Data Gen fields, or click Browse to select a file.

6. Click OK. You will be warned about overwriting existing files and notified about the success or failure of the code generation.

7. Copy the generated source code to the platform in question and compile and execute it.

Note: You must copy the input file containing the structure declarations as well. Both programs, when compiled, take an argument of the output file name.

8. Copy the generated MFL or data back to the platform running Format Builder.

Format Builder Menus

[File Menu](#)

[Edit Menu](#)

[Insert Menu](#)

[View Menu](#)

[Tools Menu](#)

[Shortcut Menu](#)

File Menu

The following commands are available from the File Menu.

Menu Command	Description
New	Creates a new Message Format document.
Open	Opens an existing Message Format document.
Close	Closes the current Message Format document.
Save	Saves the current Message Format document.
Save As	Saves the current Message Format under a different name document.

Menu Command	Description
Properties	Opens the Properties window for the selected file or message format. You can change the MFL encoding or MFL version for the selected item.
Exits	Closes the application.

Edit Menu

The following commands are available from the Edit Menu.

Note: Some commands may be unavailable, depending on the actions you have taken.

Menu Command	Description
Undo	Reverses the previous action. The Undo command in the Edit Menu changes to indicate the action that can be undone. For example, changing the name of a field to Field1 and clicking Apply causes the Edit Menu to read “Undo Apply Field Field1”.
Redo	Reverses the effects of an Undo command. The Redo command in the Edit Menu changes to indicate the action that can be redone. For example, changing the name of a field to Field1 and then undoing that action causes the Edit Menu to read “Redo Apply Field Field1”.
Cut	Removes the item currently selected in the left-hand pane, and it’s child objects, from the tree. This item is placed on the clipboard for pasting into another location. Note: This action is not available if the Message Format (root) item is selected.
Copy	Makes a copy of the item currently selected in the left-hand pane for insertion elsewhere in the tree. Note: This action is not available if the Message Format (root) item is selected.
Paste	Inserts the cut or copied item. An additional menu displays when you select Paste. You can choose to paste the item as a child or sibling of the selected item. In addition, you can choose to paste a reference as a sibling of the selected item.

Menu Command	Description
Duplicate	<p>Makes a copy of the item selected in the tree. The duplicate item contains the same values as the original item. The name of the duplicate item is the same as the original item name, but the word “New” is inserted before the original name. For example, duplicating an item called “Field1” results in an item with the name “NewField1”.</p> <p>When you duplicate an item with a numeric value in its name, the new item name contains the next sequential number. For example, duplicating “NewGroup1” results in a group named “NewGroup2”.</p>
Delete	Deletes the item selected in the tree, as well as all child objects of that item.
Move Up	Moves the selected item up one position under its parent.
Move Down	Moves the selected item down one position under its parent.
Promote	Promotes the selected item to the next highest level in the tree. For example, Field1 is the child object of Group1. Selecting Field1 and clicking the Promote tool makes it a sibling of Group1.
Demote	Demotes the selected item to the next lower level in the tree. For example, Group1 is the sibling of Field1. Field1 immediately follows Group1 in the tree. Selecting Field1 and clicking the Demote tool makes it a child of Group1.

Insert Menu

The following commands are available from the Insert Menu.

Menu Command	Description
Field	Inserts a new field. You can choose whether to insert the field as a child or sibling of the item selected in the tree.
Group	Inserts a new group. You can choose whether to insert the group as a child or sibling of the item selected in the tree.

Menu Command	Description
Comment	Inserts a comment. You can choose whether to insert the comment as a child or sibling of the item selected in the tree.

View Menu

The following commands are available from the View Menu.

Menu Command	Description
Show Palette	Displays the palette window. For more information on the palette, see Using the Palette .
Expand All	Expands the entire tree pane to show the child objects of all items in the tree.
Collapse All	Collapses the entire tree pane to show only the root message format.

Tools Menu

The following commands are available from the Tools Menu.

Menu Command	Description
Import	Displays a list of the installed importers. Choose the importer from which you want to import a message.
Test	Opens the Format Tester. Refer to Format Tester for more information.
Options	Displays the Format Builder Options dialog. Refer to Format Builder Options for more information.

Help Menu

The following commands are available from the Help Menu.

Menu Command	Description
Help Topics	Displays the main Help screen.
How Do I . . .	Provides step-by-step instructions for performing the basic tasks in Format Builder.
About	Displays version and copyright information about Format Builder.

Shortcut Menu

The following commands are available from the Shortcut Menus. You can access the Shortcut Menus by right-clicking an item in the tree.

Note: Some commands may be unavailable, depending on the item you have selected in the tree.

Menu Command	Description
Cut	Removes the item currently selected in the left-hand pane, and it's child objects, from the tree.
Copy	Makes a copy of the item currently selected in the left-hand pane for insertion elsewhere in the tree.
Paste	Inserts the cut or copied item. An additional menu displays when you select Paste. You can choose to paste the item as a child or sibling of the selected item. In addition, you can choose to paste a reference to the cut or copied item as a sibling of the selected item.
Insert Group	Inserts a new group. You select whether to insert the group as a child or sibling of the selected item.
Insert Field	Inserts a new field. You select whether to insert the field as a child or sibling of the selected item.
Insert Comment	Inserts a comment. You select whether to insert the comment as a child or sibling of the selected item.

Menu Command	Description
Duplicate	<p>Makes a copy of the currently selected item. The duplicate item contains the same values as the original item. The name of the duplicate item is the same as the original item name, with the word “New” inserted before the original name. For example, duplicating a group called “Group1” results in a group with the name “NewGroup1”.</p> <p>When you duplicate an item with a numeric value in its name, the new item name contains the next sequential number. For example, duplicating “NewGroup1” results in a group named “NewGroup2”.</p>
Delete	Deletes the selected item.

Using the Palette

The Format Builder palette allows you to store commonly used message format items and insert them into your message format definitions. These items are stored in an XML document, and you can use the standard Windows drag and drop feature to copy items from the palette into your message format definition.

The palette contains some common date formats, literals, and strings. You can use these items in the message formats you create, as well as adding your own items to the palette.

[Displaying the Palette Window](#)

[Adding Items to the Palette](#)

[Adding Palette Items to a Message Format](#)

[Using the File Menu](#)

[Using the Shortcut Menu](#)

Displaying the Palette Window

To turn the palette display on or off, choose View→Show palette. If the palette is not currently displayed, it opens in a separate window next to the Format Builder window. If the palette is currently displayed, its window closes.

Adding Items to the Palette

To add items to the palette:

1. From the navigation tree, choose the item you want to add to the palette.
2. Click and hold the left mouse button and drag the item into the palette window.
3. When the item is placed in the position you want it (as a sibling of the selected item), release the mouse button. The item is copied from the navigation tree to the palette window.

Note: You cannot add any node that depends on the existence of another node to the palette. For example, you cannot add Field or Group References, and you cannot add items that have a Repeat Field specified.

Adding comments is possible, but not recommended since comments do not have unique names and therefore are indistinguishable on the palette.

Adding Palette Items to a Message Format

To copy items from the palette to a message format:

1. From the palette window, choose the item you want to add to your message format.
2. Click and hold the left mouse button and drag the item into the left pane of the Format Builder window.
3. When the item is placed in the position you want it (as the child or sibling of the desired item), release the mouse button. The item is copied from the palette to the message format.

Using the File Menu

The following commands are available from the palette's File menu.

Menu Command	Description
Open	Opens an existing message format.
Save	Saves any message format items you have added to the palette, or any existing items you have modified.
Hide palette	Closes the palette window.

Using the Shortcut Menu

The following commands are available from the palette's shortcut menu. You can access the shortcut menu by right-clicking within the palette window.

Note: Some commands may be unavailable, depending on the item you have selected in the tree.

Menu Command	Description
Insert	Inserts a new group in the palette. When you select this command, a window displays asking you to supply the name of the new group.
Rename	Displays a window asking you to supply the new name of the group.
Delete	Deletes the selected item.
Move Up	Moves the selected item up one position under its parent.
Move Down	Moves the selected item down one position under its parent.
Promote	Promotes the selected item to the next highest level in the tree. For example, Field1 is the child object of Group1. Selecting Field1 and clicking the Promote tool makes it a sibling of Group1.
Demote	Demotes the selected item to the next lower level in the tree. For example, Group1 is the sibling of Field1. Field1 immediately follows Group1 in the tree. Selecting Field1 and clicking the Demote tool makes it a child of Group1.

Using the Palette

How Do I?

[Create a Message Format](#)

[Create a Group](#)

[Create a Field](#)

[Create a Comment](#)

[Create a Reference](#)

[Save a Document](#)

[Use Format Tester](#)

[Debug Format Definitions](#)

[Search for Values](#)

[Search for Offsets](#)

[Use the Debug Log](#)

[Specify Delimiters](#)

Create a Message Format

The first step in creating a Message Format Definition file is to create a message format (the root node of a message format file).

To create a message format:

1. Choose File→New. The [Message Format Detail Window](#) displays in the right pane.

2. Enter data in the fields as appropriate. See [Message Format Detail Window](#) for field definitions.

Create a Group

Groups define fields that are related in some way (for example, the fields `PAYDATE`, `HOURS`, and `RATE` could be part of the `PAYINFO` group). You can create a group as a child of the message format item, as a child of another group, or as a sibling of a group or field.

To create a group:

1. Select an item in the tree view in the left pane.
2. Choose Insert→Group→As Child if you want to create the group as the child of the message format or another group. Choose Insert→Group→As Sibling if you want to create the group as the sibling of another group or a field. The Group Details window displays in the right pane.
3. Enter data in the fields as appropriate. See [Group Detail Window](#) for field definitions.
4. Click Apply to save your changes to the message format file, or click Reset to discard your changes to the detail window and reset all fields to the last saved value.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel's components.

Create a Field

Fields are a sequence of bytes that have some meaning to an application. (For example, the field `EMPNAME` contains an employee name.) You can create a field as a child of the message format item, as a child of a group, or as a sibling of a group or another field.

To create a field:

1. Select an item in the tree view in the left pane.
2. Choose Insert→Field→As Child if you want to create the field as the child of the message format or group. Choose Insert→Field→As Sibling if you want to create the group as the sibling of another group or a field. The Field Details window displays in the right pane.
3. Enter data in the fields as appropriate. See [Field Detail Window](#) for field definitions.
4. Click Apply to save your changes to the message format file, or click Reset to discard your changes to the detail window and reset all fields to the last saved value.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel's components.

Create a Comment

Comments contain notes about the message format or the data transformed by the message format. Comments are included in the message format definition for informational purposes only. You can create a comment as a child or sibling of any message format, group, or field.

To create a comment:

1. Select an item in the tree view in the left pane.
2. Choose Insert→Comment→As Child if you want to create the comment as the child of the selected item. Choose Insert→Comment→As Sibling if you want to create the comment as the sibling of the selected item. The Comment Details window displays in the right pane.
3. Enter the desired comment text. For more information, see [Comment Detail Window](#).
4. Click Apply to save your changes to the message format file, or click Reset to discard your changes to the detail window and reset all fields to the last saved value.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel's components.

Create a Reference

References indicate that the description of the field or group format has been previously defined and you want to reuse this description without re-entering the data. Reference fields or groups have the same format as the original field or group, but you can change only the optional setting and the occurrence setting for the reference field or group. For example, if you have a “bill to” address and a “ship to” address in your data and the format for the address is the same, you only need to define the address format once. You can create the “bill to” address definition and create a reference for the “ship to” address.

Note: References are named exactly the same as the original item. For example, the “bill to” address definition and the “ship to” address definition would be named the same. If you want to reuse a group definition, create a generic group and embed it within a specific group. For example, in the previous example, you can create an *address* group within a *bill_to* group and reference *address* within a *ship_to* group.

To create a reference:

1. Select a field or group in the tree pane.

2. Choose Edit→Copy.
3. Choose the proper sibling in the tree.
4. Choose Edit→Paste→As Reference.
5. Enter data in the fields as appropriate. See [Reference Detail Window](#) for field definitions.
6. Click Apply to save your changes to the message format file, or click Reset to discard your changes to the detail window and reset all fields to the last saved value.

Note: The Apply and Reset buttons are only enabled once changes are made to the detail panel's components.

Save a Document

To save a message format file for the first time:

1. Choose **File**→**Save As**. The Save As dialog displays.
2. Navigate to the directory where you want to save the file.
3. In the **File Name** text box, type the name you want to assign to the file.
4. If no extension has been given, Format Builder automatically assigns the extension `.MFL` to message format files.
5. Click Save As to save the file in the specified location with the specified name and extension.

To save a message format file using the same name, choose **File**→**Save**. The file is saved in the same location with the same name and extension.

To save a message format file using a different name, choose **File**→**Save As** and follow steps 1 through 5 above.

Use Format Tester

Format Tester parses and reformats data as a validation test. Using Format Tester, you can make sure the message formats you build using Format Builder produce the expected results.

Format Tester is available from Format Builder.

To Start Format Tester

1. In Format Builder, open a message format document (MFL file).

Note: To run Format Tester, you must have a message format document open in Format Builder.

2. From the **Format Builder** menu bar, choose **Tools→Test**.
3. The **Format Tester** dialog box is displayed.

Note: Format Tester uses the currently loaded message definition document.

Refer to [Format Tester](#) for more information.

Debug Format Definitions

[Search for Values](#)

[Search for Offsets](#)

[Use the Debug Log](#)

Search for Values

The find feature allows you to search for hex or text values in the non-XML data.

To search for values:

1. From within the Format Tester, choose **File→Open Non-XML** to open the non-XML data file you want to search.
2. Choose **Edit→Find**. The Find dialog opens.
3. Enter data in the fields as appropriate (see [Search for Values](#) for more information).
4. Click **OK** to begin the Search operation.

Search for Offsets

The Goto feature allows you to move the cursor in the Non-XML editor to a byte offset you specify.

To move to a specified offset:

1. Choose **Edit→Find**. The Goto dialog opens.
2. Enter data in the fields as appropriate (see [Search for Offsets](#) for more information).
3. Click **OK** to begin the Search operation.

Use the Debug Log

The debug log allows you to save your debug information to a text file.

To use the debug log, choose File→Debug Log. A dialog displays allowing you to enter a new path and file name or choose an existing file in which to save the debug information.

Note: If you select an existing file, the new debug information is appended to the end of the file.

Specify Delimiters

You can specify delimiters in Format Builder by entering the correct syntax. For example, to specify a tab character as the delimiter ('`\u0009`'), enter the construct `\t` to match it.

Table 13-1 Character Delimiters

Construct	Matches
<code>x</code>	The character <code>x</code>
<code>\\</code>	The backlash
<code>\0n</code>	The character with octal value <code>0n</code> ($0 \leq n \leq 7$)
<code>\0nn</code>	The character with octal value <code>0nn</code> ($0 \leq n \leq 7$)
<code>\0mnn</code>	The character with octal value <code>0mnn</code> ($0 \leq m \leq 3, 0 \leq n \leq 7$)
<code>\xhh</code>	The character with hexadecimal value <code>0xhh</code>
<code>\uhhhh</code>	The character with hexadecimal value <code>0xhhhh</code>
<code>\t</code>	The tab character (' <code>\u0009</code> ')
<code>\n</code>	The newline (line feed) character (' <code>\u000A</code> ')
<code>\r</code>	The carriage-return character (' <code>\u000D</code> ')
<code>\f</code>	The form-feed character (' <code>\u000C</code> ')
<code>\a</code>	The alert (bell) character (' <code>\u0007</code> ')
<code>\e</code>	The escape character (' <code>\u001B</code> ')
<code>\cx</code>	The control character corresponding to <code>x</code>

For more information, visit the following URL:

<http://java.sun.com/j2se/1.4/docs/api/java/util/regex/Pattern.html>

Supported Data Types

This section provides information about the following topics:

- **MFL Data Types**—This section lists the supported metadata data types used in non-XML to XML or XML to non-XML conversions.
- **COBOL Copybook Importer Data Types**—The Format Builder tool provides a utility for the conversion of COBOL copybooks into MFL files. This section lists the supported COBOL data types that can be converted to metadata data types. (This conversion occurs at design time.)
- **Unsupported C Language Features**—The Format Builder tool provides a utility for the conversion of C Structures into MFL files. This section lists the C Language constructs that *cannot* be converted to metadata data types. (This conversion occurs at design time.)

MFL Data Types

Table A-1 lists the MFL data types that data transformer supports. These types are specified in the “type” attribute of a FieldFormat element.

Table A-1 Supported MFL Data Types

Data Type	Description
Binary (Base64 encoding)	Any character value accepted. Requires a length, length field, delimiter, or a delimiter field. Resulting XML data for this field is encoded using base-64.

Table A-1 Supported MFL Data Types

Data Type	Description
Binary (Hex encoding)	Any character value accepted. Requires a length, length field, delimiter, or a delimiter field. Resulting XML data for this field is encoded using base-16.
Date: DD-MMM-YY	A string defining a date, i.e. 22-JAN-00.
Date: DD-MMM-YYYY	A string defining a date, i.e. 22-JAN-2000.
Date: DD/MM/YY	A string defining a date, i.e. 22/01/00.
Date: DD/MM/YYYY	A string defining a date, i.e. 22/01/2000.
Date: DDMMYY	A string defining a date, i.e. 22JAN00.
Date: DDMMYYYY	A string defining a date, i.e. 22JAN2000.
Date: MM/DD/YY	A string defining a date, i.e. 01/22/00.
Date: MM/DD/YYYY	A string defining a date, i.e. 01/22/2000.
Date: MMDDYY	A six digit numeric string defining a date, i.e. 012200.
Date: MMDDYYYY	An eight digit numeric string defining a date, i.e. 01222000.
Date: MMM-YY	A string defining a date, i.e. JAN-00.
Date: MMM-YYYY	A string defining a date, i.e. JAN-2000.
Date: MMMDDYYYY	A string defining a date, i.e. JAN222000.
Date: MMMYY	A string defining a date, i.e. JAN00.
Date: MMMYYYY	A string defining a date, i.e. JAN2000.
Date: Wed Nov 15 10:55:37 CST 2000	The default date format of the Java platform, i.e. 'WED NOV 15 10:55:37 CST 2000'
Date: YY-MM-DD	A string defining a date, i.e. 00-01-22. (The string: 00-01-22 defines the date January 22, 2000.)
Date: YY/MM/DD	A string defining a date, i.e. 00/01/22. (The string: 00/01/22 defines the date January 22, 2000.)

Table A-1 Supported MFL Data Types

Data Type	Description
Date: YYMMDD	A string defining a date, i.e. 000122. (The string: 000122 defines the date January 22, 2000.)
Date: YYYY-MM-DD	A string defining a date, i.e. 2000-01-22. (The string: 2000-01-22 defines the date January 22, 2000.)
Date: YYYY/MM/DD	A string defining a date, i.e. 2000/01/22. (The string: 2000/01/22 defines the date January 22, 2000.)
Date: YYYYMMDD	An eight byte numeric string of the format YYYYMMDD. A base data of String or EBCDIC may be specified to indicate the character encoding.
DateTime: DD/MM/YY hh:mm	A string defining a date and time, i.e. 22/01/00 12:24.
DateTime: DD/MM/YY hh:mm AM	A string defining a date and time, i.e. 22/01/00 12:24 AM.
DateTime: DD/MM/YY hh:mm:ss	A string defining a date and time, i.e. 22/01/00 12:24:00.
DateTime: DD/MM/YY hh:mm:ss AM	A string defining a date and time, i.e. 22/01/00 12:24:00 AM.
DateTime: MM/DD/YY hh:mm	A string defining a date and time, i.e. 01/22/00 12:24.
DateTime: MM/DD/YY hh:mi AM	A string defining a date and time, i.e. 01/22/00 12:24 AM.
DateTime: MM/DD/YY hh:mm:ss	A string defining a date and time, i.e. 01/22/00 12:24:00.
DateTime: MM/DD/YY hh:mm:ss AM	A string defining a date and time, i.e. 01/22/00 12:24:00 AM.
DateTime: MMDDYYhhmm	A string of numeric digits defining a date and time, i.e. 0122001224.
DateTime: YYYYMMDDhhmmss	A fourteen byte numeric string of the format YYYYMMDDHHMISS. A Base data type may be specified.

Table A-1 Supported MFL Data Types

Data Type	Description
DateTime: MMDDYYhhmmss	A string of numeric digits defining a date and time, i.e. 012200122400.
EBCDIC	A string of characters in IBM Extended Binary Coded Decimal Interchange Code. Requires a length, length field, delimiter, or a delimiter field.
Filler	A sequence of bytes that is not transformed to XML. This field of data is skipped over when transforming non-XML data to XML. When transforming XML to non-XML data, this field is written to the binary output stream as a sequence of spaces.
FloatingPoint: 4 bytes, Big-Endian	A four byte big endian floating point number that conforms to the IEEE Standard 754.
FloatingPoint, 4 bytes, Little-Endian	A four byte little endian floating point number that conforms to the IEEE Standard 754.
FloatingPoint: 8 bytes, Big-Endian	A eight byte big endian floating point number that conforms to the IEEE Standard 754.
FloatingPoint: 8 bytes, Little-Endian	A eight byte little endian floating point number that conforms to the IEEE Standard 754.
Integer: Signed, 1 byte	A one byte signed integer, i.e. '56' is 0x38.
Integer: Unsigned, 1 byte	A one byte unsigned integer, i.e. '128' is 0x80.
Integer: Signed, 2 byte, Big-Endian	A signed two-byte integer in big endian format, i.e. '4660' is 0x1234.
Integer: Signed, 4 byte, Big-Endian	A signed four-byte integer in big endian format, i.e. '4660' is 0x00001234.
Integer: Signed, 8 bytes, Big-Endian	A signed eight-byte integer in big endian format, i.e. '4660' is 0x0000000000001234.
Integer: Unsigned, 2 byte, Big-Endian	An unsigned two-byte integer in big endian format, i.e. '65000' is 0xFDE8.
Integer: Unsigned, 4 byte, Big-Endian	An unsigned four-byte integer in big endian format, i.e. '65000' is 0x0000FDE8.

Table A-1 Supported MFL Data Types

Data Type	Description
Integer: Unsigned, 8 bytes, Big-Endian	A unsigned eight-byte integer in big endian format, i.e. '65000' is 0x0000000000000FDE8.
Integer: Signed, 2 bytes, Little-Endian	A signed two-byte integer in little endian format, i.e. '4660' is 0x3412.
Integer: Signed, 4 bytes, Little-Endian	A signed four-byte integer in little endian format, i.e. '4660' is 0x34120000.
Integer: Signed, 8 bytes, Little-Endian	A signed eight-byte integer in little endian format, i.e. '4660' is 0x3412000000000000.
Integer: Unsigned, 2 bytes, Little-Endian	An unsigned two-byte integer in little endian format, i.e. '65000' is 0xE8FD.
Integer: Unsigned, 4 bytes, Little-Endian	An unsigned four-byte integer in little endian format, i.e. '65000' is 0xE8FD0000.
Integer: Unsigned, 8 bytes, Little-Endian	A unsigned eight-byte integer in little endian format, i.e. '65000' is 0xE8FD000000000000.
Literal	A literal value determined by the contents of the value attribute. When non-XML data is transformed to XML, the presence of the specified literal in the non-XML data is verified by WLXT. The literal is read, but is not transformed to the XML data. When XML data is transformed to a non-XML format, and a literal is defined as part of the non-XML format, WLXT writes the literal in the resulting Non-XML byte stream.
Numeric	A string of characters containing only digits, i.e. '0' through '9'. Requires a length, length field, delimiter, or a delimiter field.
Packed Decimal: Signed	IBM signed packed format. Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.
Packed Decimal: Unsigned	IBM unsigned packed format. Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.

Table A-1 Supported MFL Data Types

Data Type	Description
String	A string of characters. Requires a length, a length field, a delimiter, or a delimiter field. If no length, length field, or delimiter is defined for a data type String, a delimiter of "\x00" (a NUL character) will be assumed.
String: NUL terminated	A string of characters, optionally NUL (\x00) terminated, residing within a fixed length field. This field type requires a length attribute or length field which determines the amount of data read for the field. This data is then examined for a NUL delimiter. If a delimiter is found, data following the delimiter is discarded. If a NUL delimiter does not exist, the fixed length data is used as the value of the field.
Time: hhmmss	A string defining a time, i.e. 122400.
Time: hh:mm AM	A string defining a time, i.e. 12:24 AM.
Time: hh:mm	A string defining a time, i.e. 12:24.
Time: hh:mm:ss AM	A string defining a time, i.e. 12:24:00 AM.
Time: hh:mm:ss	A string defining a time, i.e. 12:24:00.
Zoned Decimal: Leading sign	<p>Signed zoned decimal format (US-ASCII or EBCDIC) where the sign indicator is in the first nibble. Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.</p> <p>Note: This data type is supported with US-ASCII data only with Message Format Language Version 2.02</p>
Zoned Decimal: Leading separate sign	<p>Signed zoned decimal format (US-ASCII or EBCDIC) where the sign indicator is in the first byte. The first byte only contains the sign indicator and is separated from the numeric value. Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.</p> <p>Note: This data type is supported with US-ASCII data only with Message Format Language Version 2.02.</p>

Table A-1 Supported MFL Data Types

Data Type	Description
Zoned Decimal: Signed	<p>Signed zoned decimal format (US-ASCII or EBCDIC). Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.</p> <p>Note: This data type is supported with US-ASCII data only with Message Format Language Version 2.02.</p>
Zoned Decimal: Trailing separate sign	<p>Signed zoned decimal format (US-ASCII or EBCDIC) where the sign indicator is in the last byte. The last byte only contains the sign indicator and is separated from the numeric value. Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.</p> <p>Note: This data type is supported with US-ASCII data only with Message Format Language Version 2.02.</p>
Zoned Decimal: Unsigned	<p>Unsigned zoned decimal format (US-ASCII or EBCDIC). Requires a length, length field, delimiter, or a delimiter field to be specified. The length or length field should specify the size of this field in bytes.</p> <p>Note: This data type is supported with US-ASCII data only with Message Format Language Version 2.02.</p>

COBOL Copybook Importer Data Types

[Table A-2](#) lists the COBOL data types and the support provided by the Importer. Support for these data types is limited. The following formats:

```
05 pic 9(5) comp-5
```

```
05 pic 9(5) comp-x
```

will be converted to an unsigned 4 byte integer type, while the following will generate errors:

```
05 pic X(5) comp-5
```

```
05 pic X(5) comp-x
```

In these samples, `pic9(5)` could be substituted for `pic x(5)`.

Table A-2 COBOL Data Types

COBOL Type	Support
BLANK WHEN ZERO (zoned)	supported
COMP-1, COMP-2 (float)	supported
COMP-3, PACKED-DECIMAL	supported
COMP, COMP-4, BINARY (integer)	supported
COMP, COMP-4, BINARY (fixed)	supported
COMP-5, COMP-X	supported
DISPLAY (alphanumeric)	supported
DISPLAY numeric (zoned)	supported
edited alphanumeric	supported
edited float numeric	supported
edited numeric	supported
group record	supported
INDEX	supported
JUSTIFIED RIGHT	ignored
OCCURS (fixed array)	supported
OCCURS DEPENDING (variable-length)	supported
OCCURS INDEXED BY	ignored
OCCURS KEY IS	ignored
POINTER	supported
PROCEDURE-POINTER	supported
REDEFINES	supported
SIGN IS LEADING SEPARATE (zoned)	supported

Table A-2 COBOL Data Types

COBOL Type	Support
SIGN IS TRAILING (zoned)	supported
SIGN IS TRAILING SEPARATE (zoned)	supported
SIGN IS LEADING (zoned)	supported
SYNCHRONIZED	ignored
66 RENAMES	not supported
66 RENAMES THRU	not supported
77 level	supported
88 level (condition)	ignored

The following values are defined as follows:

- **Supported** - the data type will be correctly parsed by the importer and converted to a message format field or group.
- **Unsupported** - this data type is not supported and the importer reports an error when the copybook is imported.
- **Ignored** - the data type is parsed and a comment is added to the message format. No corresponding field or group is created.

Some vendor-specific extensions are not recognized by the importer, however, any copybook statement that conforms to ANSI standard COBOL will be parsed correctly by the Importer. The Importer's default data model, which is based on the IBM mainframe model, can be changed in Format Builder to compensate for character set and data “endianness”.

When importing copybooks, the importer may identify fields generically that, upon visual inspection, could easily be identified by a more specific data type. For this reason, the copybook importer creates comments for each field found in the copybook. This information is useful in assisting you in editing the MFL data to better represent the original Copybook. For example:

original copybook entry:

```
05 birth-date    picxx/xx/xx
```

results in:

A field of type `EBCDIC` with a length of 8

Closer inspection indicates that this is intended to be a date format and could be defined as

A field of type Date: `MM/DD/YY`

or

A field of type Data: `DD/MM/YY`

Unsupported C Language Features

The C struct Importer utility does not parse files containing anonymous unions, bit fields, or in-line assembler code. The following samples of unsupported features are taken from the preprocessor output of a `hello.c` file that contained a `#include <windows.h>` statement:

- Anonymous unions

```
#line 353 "e:\\program files\\microsoft visual
studio\\vc98\\include\\winnt.h"
typedef union_LARGE_INTEGER{
    struct {
        DWORD LowPart;
        LONG HighPart;
    };
    struct {
        DWORD LowPart;
        LONG HighPart;
    } u;
#line 363 "e:\\program files\\microsoft visual
studio\\vc98\\include\\winnt.h"
    LONGLONG QuadPart;
} LARGE_INTEGER
```

- Bit fields

```
typedef struct_LDT_ENTRY {
    WORD LimitLow;
    WORD BaseLow;
    union {
        struct {
            BYTE BaseMid;
            BYTE Flags1;
            BYTE Flags2;
            BYTE BaseHi;
        } Bytes;
        struct
            DWORD BaseMid : 8;
            DWORD Type : 5;
```

```

        DWORD Dpl : 2;
        DWORD Pres : 1;
        DWORD LimitHi : 4;
        DWORD Sys : 1;
        DWORD Reserved_0 : 1;
        DWORD Default_Big : 1;
        DWORD Granularity : 1;
        DWORD BaseHi : 8;
    } Bits;
} HighWord;
} LDT_ENTRY, *PLDT_ENTRY;

```

- **Inline assembler code**

```

_inline ULONGLONG
_stdcall
Int64Shr1Mod32(
    ULONGLONG Value,
    DWORD ShiftCount
)
{
    _asm {
        mov ecx, ShiftCount
        mov eax, dword ptr [Value]
        mov edx, dword ptr [Value+4]
        shrd eax, edx, cl
        shr edx, cl
    }
}

```

Supported Data Types

Glossary

Big Endian

Non-XML, format where most significant byte has the lowest address. This format is used on IBM 370 and most RISC designs.

COBOL Copybook Importer

Reads a COBOL Copybook and generates a message format reflecting the data structure of the COBOL Copybook.

Code Page

In the context of this documentation, the character encoding of the field data.

Copybook

A common piece of source code designed to be copied into many source programs, used mainly in IBM DOS mainframe programming. In mainframe DOS (DOS/VS, DOS/VSE, etc.), the copybook was stored as a "book" in a source library. A library was comprised of "books", prefixed with a letter designating the language, (e.g., A.name for Assembler, C.name for Cobol, etc.), because DOS did not support multiple or private libraries. This term is commonly used by COBOL programmers, but is supported by most mainframe languages. The IBM OS series did not use the term "copybook"; instead it referred to such files as "libraries" implemented as "partitioned data sets" or PDS.

Copybooks are functionally equivalent to C and C++ include files.

Data Transformation

In the context of this documentation, data transformation is the term used to describe the mapping of data in one format to another format. An example would be mapping an instance of a RosettaNet document to an instance of a ebXML document.

Delimiter

A sequence of bytes that denote the end of a field or group of data.

Document Type Definition (DTD)

Defines what content can exist in an XML document. DTDs are part of the W3C XML Specification 1.0.

Field

A sequence of bytes that are interpreted by an application as a unit of data.

Group

A set of fields and/or groups that are to be treated as having a unifying relationship.

Group Choice

A group comprised of fields or other groups that are mutually exclusive in the actual non-XML data.

Little Endian

Non-XML format in which bytes at lower address have lower significance. This format is used on Intel and VAX processors.

Message Format

The description of a non-XML format produced by Format Builder.

Message Format Language (MFL)

An XML language created by BEA that describes the native representation and hierarchy of non-XML data. MFL is an XML description of non-XML data.

Metadata

Data that is used to describe other data. Message Formats created using Format Builder are the metadata used to parse non-XML data.

MFL Character Encoding

Specifying the character encoding of the non-XML data for each field and defining the format that your MFL document and XML output will take.

Non-XML Data

Any structured data that does not use an XML syntax to represent its format. Format Builder allows you to specify a schema for non-XML documents, much like the XML schema standard allows you to specify a schema for XML documents.

Reference

A group or field that relies on a prior definition to determine its name, type, and termination attributes.

XML - Extensible Markup Language

Data format that is easily read and manipulated by both humans and computers; data and metadata are both included in the data, to provide a standard self-describing syntax for representing information. XML is a World Wide Web Consortium (W3C) standard.

XML schema

An XML document that defines what can be in an XML document. A XML schema definition is more specific than a DTD and provides much finer-grained control over the content that can exist in an XML document.

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