

IBM WebSphere Developer for System z Version 7.0.0



# File Manager Integration for WebSphere Developer for System z Technology Preview

**Note** Before using this document, read the general information under “Notices” on page 20.

### **First edition (March 2007)**

This edition applies to File Manager for version 7.0.0 of IBM WebSphere Developer for System z (product number 5724-L44) and to all subsequent releases and modifications until otherwise indicated in new editions.

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# **1 About this book**

This document discusses the uses and functionality added by WebSphere Developer for System z File Manager.

## **2 Introduction to IBM WebSphere Developer for System z File Manager**

IBM WebSphere Developer for System z File Manager provides the Formatted Data Editor to IBM WebSphere Developer for System z. The Formatted Data Editor provides editing access to sequential datasets, PDS members, and VSAM datasets of type KSDS and ESDS based on a data structure stored within a COBOL copybook or an IBM File Manager Template. The Formatted Data Editor takes the data structure(s) available in the copybook, include, or template, and applies them to the record of the datasets, providing a field type-sensitive edit session.

The functionality added by WebSphere Developer File Manager has been made available through an integration effort with IBM File Manager. IBM File Manager provides the data to WebSphere Developer File Manager. The Formatted Data Editor is closely based on the dataset editor available in IBM File Manager. In order to use the WebSphere Developer File Manager technology preview, the IBM File Manager integration tech preview must be installed as well. Both are available from the same download page.

## **3 IBM File Manager Concepts**

Many concepts from IBM File Manager have been reused for WebSphere Developer File Manager and understanding them is crucial to properly use COBOL copybooks and particularly IBM File Manager templates (this group of items will simply be referred to as templates from here on) to properly format your data. It is highly recommended that you download the IBM File Manager user's guide and familiarize yourself with IBM File Manager's editor and template concepts. The following items are areas that are especially important to understand and/or areas where WebSphere Developer File Manager slightly deviates from IBM File Manager's implementation of the concepts. For more information on any of the items below, please refer to the IBM File Manager User's Guide.

### **3.1 Record Layout**

A record layout defines the set of fields contained within a particular record set. All records matching this layout will be formatted with its set of fields at the offsets it describes. Each field is treated as a column in a table in the primary view, which is the table view. The record layout is built directly from data structure definitions located in COBOL copybooks.

## **3.2 IBM File Manager Templates**

Record layouts are also obtained from IBM File Manager templates. In addition to describing record layouts, templates can also describe identification criteria and selection criteria, which can further alter the view of the data provided by the Formatted Data Editor. Templates obtain their data structures directly from COBOL copybooks. These types may be compiled into templates using IBM File Manager under ISPF. There is currently no support for requesting this compilation from within WebSphere Developer File Manager. For more information on templates, selection criteria, and identification criteria, please refer to the IBM File Manager User's Guide.

## **3.3 Unselected Records**

When a formatted data edit session is requested on a dataset with a given template, WebSphere Developer File Manager will contact IBM File Manager which will use the template to apply any selection criteria or identification criteria that exists in the template. Any records not meeting the selection criteria will be marked as unselected and will be represented as a grayed out line similar to the shadow line shown in IBM File Manager under ISPF. Selection criteria and identification criteria are not editable using WebSphere Developer File Manager, so these records will be unselected and therefore, not editable until the template is modified so that they meet the selection criteria and the Formatted Data Editor is reopened.

## **3.4 Suppressed Sets**

Templates can describe multiple record layouts. If they do, IBM File Manager will use record length and/or identification criteria to match the available record layouts to the dataset's records (see the IBM File Manager User's Guide for more information). Only one record layout may be displayed at once. Any records not matching the current record layout are grouped into "Suppressed sets." Unlike unselected record sets, suppressed record sets may be edited during a formatted data edit session without template modification. Editing suppressed record sets is described in the Formatted Data Editor functionality section.

## **3.5 Excluded records**

Excluded records are one or more records that have been temporarily removed from the editor's view. Excluded records, unlike suppressed sets, are removed manually at the user's discretion and not by record layout constraints. This particular method of "data hiding" can be helpful when performing searches on datasets where the user knows that specific records can be excluded. Record exclusion is similar to record selection, except exclusion is performed only during a specific editor session instead of for all editor sessions with the template as is the case with selection criteria. Excluded records may easily be included back into the visible, editable set of records during the edit session.

The process of excluding and including records will be covered in the Formatted Data Editor functionality section.

### 3.6 Shadow Line

A shadow line is a spacer displayed within the editor that represents a group of adjacent records that have been unselected, suppressed, or excluded from the view by the user.

## 4 The Formatted Data Editor

The Formatted Data Editor provides similar functionality to the IBM File Manager ISPF dataset editor, however WebSphere Developer File Manager's editor takes advantage of the GUI environment to provide a more user friendly experience. It provides the ability to display and edit PDS members, Sequential datasets, and VSAM datasets in a formatted view based on record layouts for the data derived from data structures stored within a COBOL copybook, or an IBM File Manager template. The editor offers the same three modes to view data in as IBM File Manager (single, character, and table), and given the same dataset and template, should format the data in the same way that IBM File Manager's ISPF editor formats it. However, there are some limitations on WebSphere Developer File Manager's functionality that keep it from doing so in all cases. For more on the limitations, see section 5.13, Limitations. For more information on IBM File Manager's ISPF dataset editor, please see the IBM File Manager User's Guide.

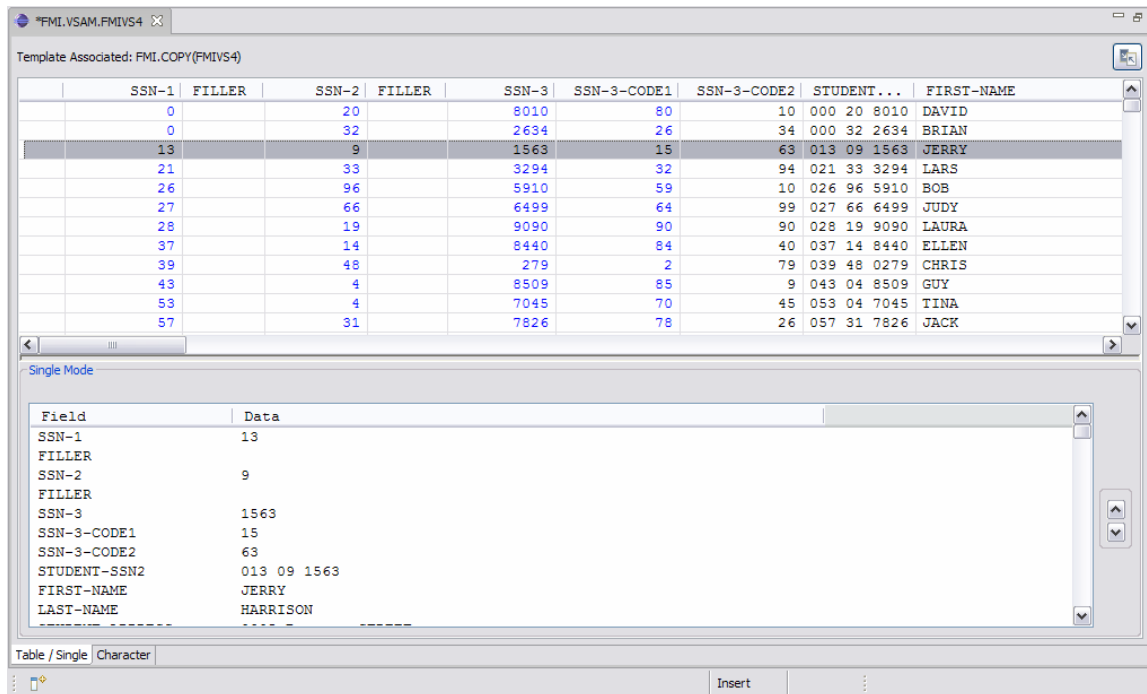


Figure 4.1: The Formatted Data Editor



## 4.1 Starting the Formatted Data Editor

### 4.1.1 New file mappings

WebSphere Developer File Manager adds two new dataset extension mappings to WebSphere Developer's z/OS Projects perspective, '.tpl' and '.tdat'. '.tpl' is used to define a dataset as an IBM File Manager template. '.tdat' is used to set a dataset as targeted for editing with the Formatted Data Editor. When the '.tdat' extension is added to a dataset, the Formatted Data Editor will be defined as its default editor. By default, all datasets matching the pattern **\*\*TEMPLATE** and all of their members will have the extension '.tpl' appended. Also by default, all datasets matching the pattern **\*\*DATA** will have the '.tdat' extension appended. As before, all dataset extensions can be set manually in the

Remote Systems view in the z/OS Projects perspective to force them to '.tpl' or '.tdat'. Once the dataset has the '.tdat' extension, it may be opened using the Formatted Data Editor with the dataset's "Open With" or "Open" options, or simply by double-clicking on it.

Note: VSAM clusters and sequential data sets must also have this extension to open them in the Formatted Data Editor even though the extension does not show up after being added using the Mappings panel in the Preferences dialog.

### 4.1.2 Template Association

In order to start the Formatted Data Editor with a template associated against a dataset, you must go into the dataset's properties and set the desired template to be associated. The template association properties panel is only available on sequential datasets, VSAM clusters, and PDS members with the '.tdat' extension. To open the template association properties panel, right click on the target dataset and select "Properties." Once in the properties dialog, select "Template Association" on the left sidebar. Once the template association panel is up, there are 2 options for setting the template to be associated with the dataset. You may enter the remote dataset location manually in the remote location text field if you know the exact location or you can use the combo box below to select it from the datasets known to RSE. The combo box contains the RSE MVS filters currently available in the Remote Systems view. To search for a template, select the appropriate filter from the combo box and a tree view of the dataset hierarchy will appear in the box below. Browse to the template and select it. Optionally, the "Only show known templates and copybooks" checkbox may be checked so that the results shown in the hierarchy are only datasets with the '.tpl', '.cpy', and '.incl' extensions.

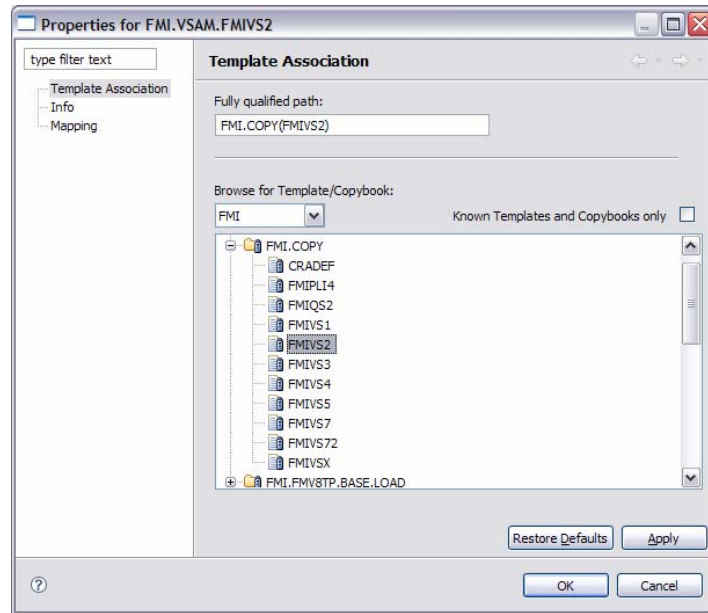


Figure 4.2: The Template Association Panel

## 4.2 Editor Modes

The Formatted Data Editor for WebSphere Developer offers users the same view modes (single, character, and table) as IBM File Manager's ISPF editor. In IBM File Manager's ISPF editor, each of these modes is available in a different panel. In the Formatted Data Editor, the Table and Single modes are available at the same time and are fully synchronized as well. Users have the ability to remove the single mode from the default editor panel if they prefer to only work in table mode. The single mode portion of WebSphere Developer File Manager can be resized to better suit personal working needs or can be collapsed when not needed. The Character mode is available in a separate tab.

### 4.2.1 Table mode

The Table Mode view provided with WebSphere Developer File Manager takes the layout information that is provided by a template during a formatted session and applies that information against the data records which are then displayed within a table. Only one record layout is displayed at a time. Each column in the table relates to one field in the currently displayed record layout. The name of the field is the header for the column. The field's data type, field number, default record offset, and default length (these may vary if the field follows an OCCURS DEPENDING ON variable length array) are available by hovering over the column headings.

SSN-1	FILLER	SSN-2	FILLER	SSN-3	SSN-3-CODE1	SSN-3-CODE2	STUDENT...	FIRST-NAME
0		20		8010	80	10	000 20 8010	DAVID
0		32		2634	26	34	000 32 2634	BRIAN
13		9		1563	15	63	013 09 1563	JERRY
21		33		3294	32	94	021 33 3294	LARS
26		96		5910	59	10	026 96 5910	BOB
27		66		6499	64	99	027 66 6499	JUDY
28		19		9090	90	90	028 19 9090	LAURA
37		14		8440	84	40	037 14 8440	ELLEN
39		48		279	2	79	039 48 0279	CHRIS
43		4		8509	85	9	043 04 8509	GUY
53		4		7045	70	45	053 04 7045	TINA
57		31		7826	78	26	057 31 7826	JACK

Figure 4.3: Table Mode

STUDENT-SSN2
000 20 8010
00 #12 634
013 09 1563

Figure 4.4: Field Properties

## 4.2.2 Single mode

The Single mode view, unlike the Table mode view, only focuses on a single record at a time. Instead of displaying all of the records' fields horizontally, like in the table mode, the single mode displays single records' fields vertically. Whenever a record is selected in the table mode, it will also be displayed in the single mode. There are two buttons available on the right side of the single mode, that may be used to move one record up or down at a time within the table and change the selected record in the table mode and single mode. Single mode is completely synchronized with table mode; if a record is modified in table mode, the change will appear in single mode instantaneously. Single mode may be removed from view or brought back into view by clicking on the button just above the top right point of the Table mode.

Field	Data
SSN-1	13
FILLER	
SSN-2	9
FILLER	
SSN-3	1563
SSN-3-CODE1	15
SSN-3-CODE2	63
STUDENT-SSN2	013 09 1563
FIRST-NAME	JERRY
LAST-NAME	HARRISON

Figure 4.5: Single Mode

### 4.2.3 Character mode

The Character mode view is the most basic of the three modes. It is available via a tab found on the editor page. Records displayed within character mode are displayed in a “raw” data format with template information only applied for the selection criteria. Each record is treated as if it has a single alphanumeric field. Data that cannot be converted to an alphanumeric character representation will be displayed as a box (see screenshot below). The functionality for this mode mimics that of the Table mode mentioned above. Editing binary data using character mode is not recommended.

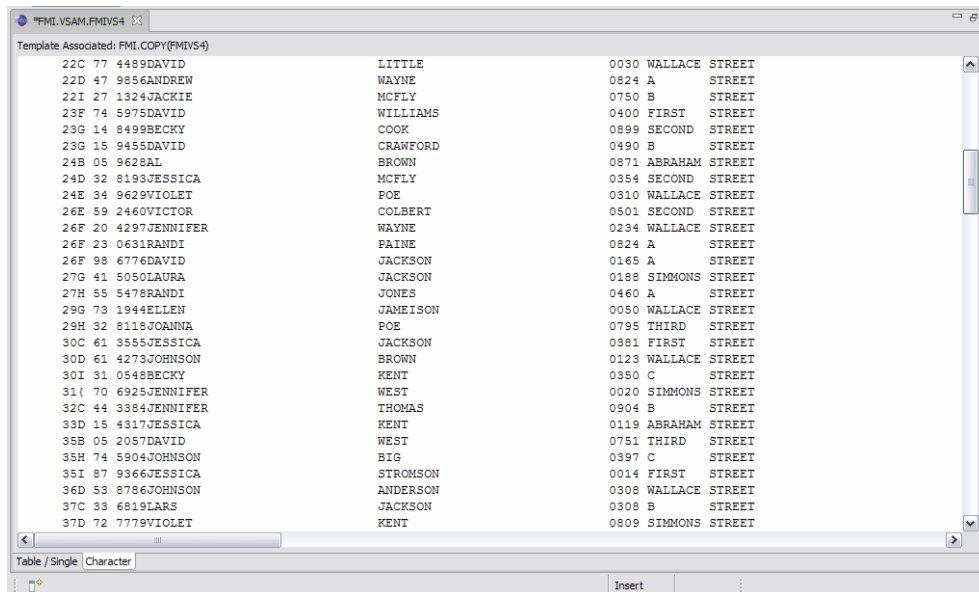


Figure 4.6: Character Mode

### 4.3 Standard Editing Capabilities

When Table and Character mode are being used, the following basic editing capabilities and functions are provided by the Formatted Data Editor:

- Find/Replace
- Cut/Copy/Paste (within the same dataset)
- Row selection within the table used to perform a Cut, Copy, Delete, or Exclude operation on the selected group.
- Add new records before or after any selected row.

## 5 Common Editor Mode Features

The following are common features that are implemented in all IBM WebSphere Developer for System z File Manager editor modes (character, single, table).

### 5.1 Data Validation

WebSphere Developer File Manager provides continuous data validation. When templates are applied for QSAM and VSAM datasets, each field in the layout has a specific data type that is defined by the template. When editing any field within a data record, the new or changed input is continuously validated to make sure that the data being entered matches the field characteristics (type, length, etc.) For example, a floating point field will not accept any alphabetic data. An error will be displayed above the editor if a field has been identified as being invalid.

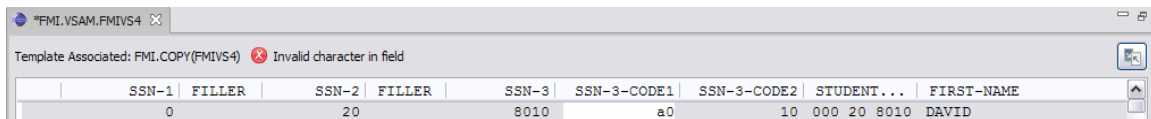


Figure 5.1: Invalid Data Entered into Field

Any changes to the field that is in error will not be applied until all errors have been corrected. If no action is taken to correct the invalid field and the field is exited, the data will be replaced with the information that was present in the field prior to editing.

Some data validation cannot be performed on the client, however. For example, when editing a KSDS VSAM cluster, the client may not know all of the keys on the host dataset (some records may be unselected). In this case, the client can not check to make sure that there is no duplication of keys and will not display an error until the data is sent back to the host.

### 5.2 Hexadecimal Editing

In addition to providing the three separate modes to edit records in, WebSphere Developer File Manager also provides vertical hexadecimal editing similar to what is available in IBM File Manager under ISPF. The hex that is displayed in the editor is the dataset's actual EBCDIC hex content located on the host, not the local ASCII representation displayed in the editor. This type of hex editing can be enabled within any of the three modes at any time by selecting the button labeled "Hex" in the menu bar.

When the HEX editing function is enabled, the data validation techniques described previously are not enforced with the exception of invalid hex digits that are entered into the hex field. Invalid data for the data type (e.g., alphanumeric data into a binary field) can be forced into the field's hex as long as the digits entered into the hex fields are the numbers 0-9 or letters A-F. Entering invalid data will cause a series of red asterisks to be

displayed in the field's standard display area, denoting it as containing invalid contents for its data type. The only other time fields may be found to be in error is when the editor initially loads the dataset.

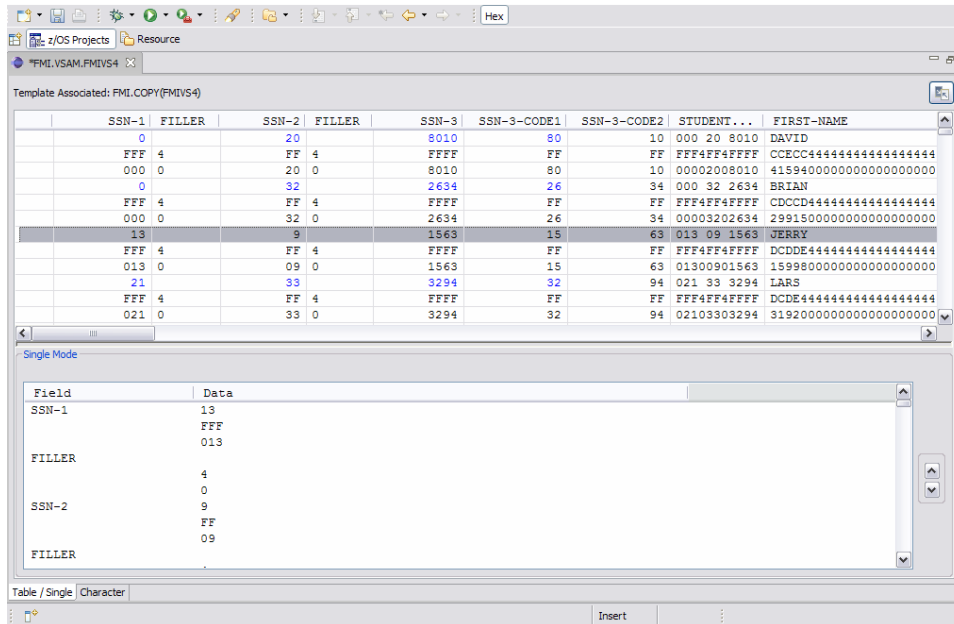


Figure 5.2: Hex Editing Mode

## 5.3 Find/Replace

The WebSphere Developer for System z File Manager Tech Preview provides facilities for searching through records and replacing content on a per-field basis. This functionality is provided through the Find/Replace window which is found under the Edit menu.

### 5.3.1 Searching

The Find/Replace window provides numerous options to allow users flexibility in performing searches. The user may specify the set of fields that he or she wishes to select for searching. Users may search through selected, visible, and excluded records in assorted combinations by choosing among the radio buttons within the Scope group. In addition, the user may specify whether to search forward or backward through records. Options to use case sensitive searching as well as searching by regular expression matching are also provided.

### 5.3.2 Replacing

If a match is found for the search criteria, the user has the option of replacing the match with new data. If an attempt to replace data will fill a field with too much data then the

replace operation will fail and a message will be displayed at the bottom of the Find/Replace window. Optionally, the user may use the “Replace/Find” button to replace the previous match and move to the next matching field. Users are also given the option to attempt replacing all existing matches in the data set through the use of the “Replace All” button.

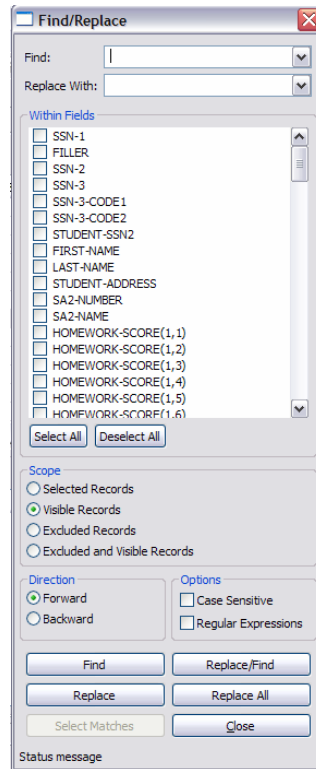


Figure 5.3: Find/Replace Dialog

## 5.4 Synchronization

Synchronization of information between modes is done automatically without any action from the user. This continuous updating of information allows for seamless editing of multiple records in-between the three various display modes. Changes that are made will immediately be reflected in the other two modes. Switching between different modes simply changes the format of how the information in the record(s) is displayed to the screen.

## 5.5 Formatted Editing

Formatted editing refers to using a template while editing data within WebSphere Developer File Manager’s Formatted Data Editor. Datasets can be opened in the editor

with a template applied against them or no template at all. If no template is specified, all records are treated as having single alphanumeric fields for the entire width of the record.

When performing formatted edits using one of the previously mentioned template formats, the editor will display the following information for datasets:

- Field ID
- Field Widths
- Field Types
- Field Names

Datasets can be opened in the Formatted Data Editor with different templates applied against them, however editing IBM File Manager templates' through WebSphere Developer File Manager is not supported in this release. COBOL copybooks may be edited as usual within WebSphere Developer and then compiled into IBM File Manager templates using IBM File Manager's template editing facilities.

To associate a template with a dataset and open a formatted edit session, see section 4.1.2.

## 5.6 Unformatted Editing

Unformatted editing refers to using the Formatted Data Editor to edit a dataset without an associated template. Choosing to perform an unformatted edit will cause WebSphere Developer File Manager to default to a basic template that only utilizes one alphanumeric field per record. In this case, both the table and character modes will present data in the same way.

**NOTE:** Editing binary data using unformatted editing is not recommended.



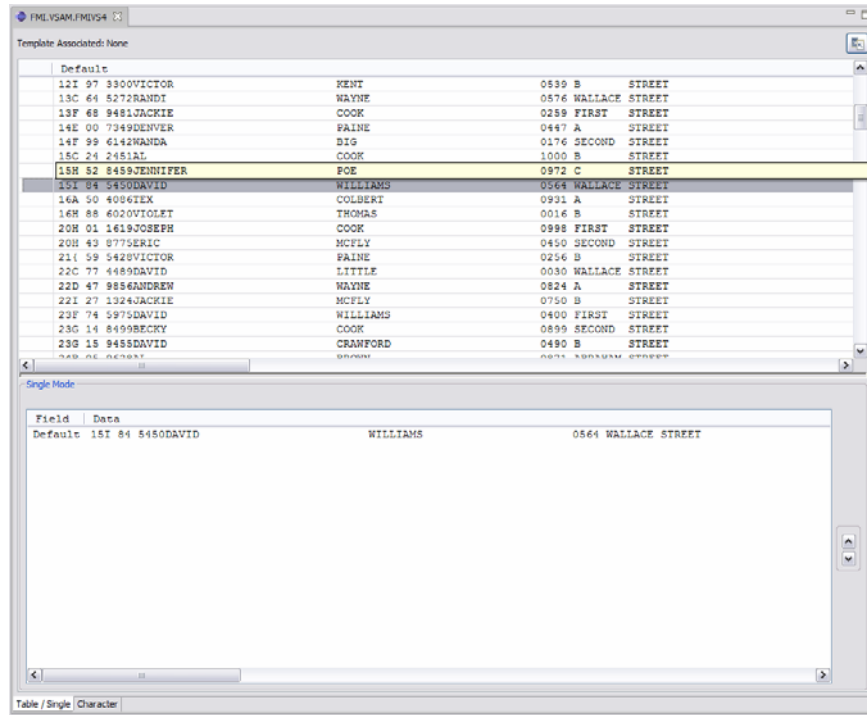


Figure 5.4: Unformatted Editing

## 5.7 Shadow Lines

There are 3 types of shadow lines in the Formatted Data Editor:

- Unselected record sets
- Suppressed record sets
- Excluded record sets

All are described in section 3. Shadow lines are displayed with an icon at the left and are otherwise completely gray lines. When hovering over them, they will display the number of records contained within them. In the case of suppressed record sets, they will also display the name of the layout associated with the records within.

### 5.7.1 Suppressed Sets

Both suppressed and excluded record sets' records can be modified within the Formatted Data Editor. To make suppressed record sets' records visible, right click on the set and select "Switch record layout." After doing so, the table will change to match the set's layout and its records will be displayed. All records that were previously visible under the previous layout are now suppressed.



Figure 5.5: Suppressed Record Set Icon

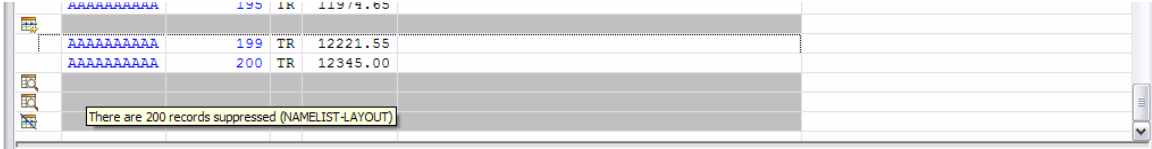


Figure 5.6: Suppressed Record Set Hover Text

### 5.7.2 Excluded Sets

Excluded record sets may be included back into the visible set of records by selecting “Include” after right clicking on the set in the table or character modes. After selecting “Include,” a preview dialog will pop up containing previews of the data included in each excluded record. Checkboxes on the left of the dialog can be used to select which records to include back into the visible, editable set. To exclude records, select one or multiple records (using <Ctrl> or <Shift>), right click, and select “Exclude records.” They will be grouped into an excluded record set or sets.



Figure 5.7: Excluded Record Set Icon

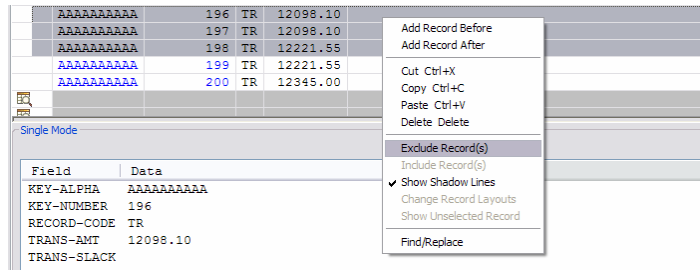


Figure 5.8: Excluding Records

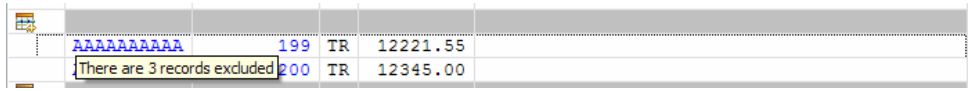


Figure 5.9: Hover text over newly excluded records

### 5.7.3 Unselected Sets

Unselected record sets are different from the other two shadow line types in that they are never editable in the Formatted Data Editor. They are simply placeholders marking where a group of unselected records exists and providing the count of those records. To make the unselected sets’ records editable, the template must be modified using IBM File Manager’s ISPF template utilities.



Figure 5.10: Unselected set icon



Figure 5.11: Hover text over unselected set

## 5.8 KSDS Editing

There are a couple of differences while editing KSDS VSAM clusters. These clusters are indexed based on a unique key. All records in the dataset are stored in sequential order by key value. In the Formatted Data Editor, the key field is highlighted in blue in the table mode during the edit session to make it easier to remember that the record's key is being modified. (Note that all screenshots thus far have shown a KSDS being edited). If a key is changed, the record will likely be moved in the dataset upon a save operation, but the user will not see the movement until after the save is performed.

There is also the possibility of duplicating keys, especially on a cut/copy and paste operation or the creation of multiple new records. If there are multiple records with the same key in the data that the client knows about (all selected records), the client will mark all records with a duplicate key as being in error with a red X in the far left column of the table mode. Until these duplications are resolved, the changes cannot be saved. If a key duplication occurs between a key in a selected record and one in an unselected record, the Formatted Data Editor has no way of knowing about the unselected record's key, so the error will not be displayed until a save operation is requested.

NOTE: Using a template with selection criteria on key fields is not recommended. A situation can arise where a record's key is changed so that it is both a duplicate with another unselected record and, after a save, the record becomes unselected itself. If this happens, there is no way to alter the newly unselected record's key and resolve the duplication so the session must be exited.

## 5.9 OCCURS DEPENDING ON

OCCURS DEPENDING ON arrays are only partially supported in the WebSphere Developer for System z File Manager technology preview. When initializing the editor, the array sizes are fixed and are not editable during the edit session. The array's defining objects and any unused array indices will be grayed out to show that they are not editable.

N.	T...	T...	T...	T...	T...
4	75	49	57		
4	62	61	84		
1	81				
1	1				
1	91				
2	16	75			
5	58	25	58		
3	52	65	39		
5	98	71	14		
1	35				
3	90	6	16		
4	32	50	33		
4	54	81	24		
3	63	79	96		
2	60	52			
3	41	65	38		
1	6				
2	86	65			
3	25	91	34		
1	1	4	58		

Figure 5.12: Occurs Depending On in Data set

## 5.10 In-Place Edit

Some datasets may not allow for record additions, deletions, or even modifications. When there is a limitation on the operations that can be performed, the edit session will be considered to be In-Place only. “In-Place” will appear at the bottom of the editor (see Figure 5.13) and options will be disabled when right-clicking on a record.

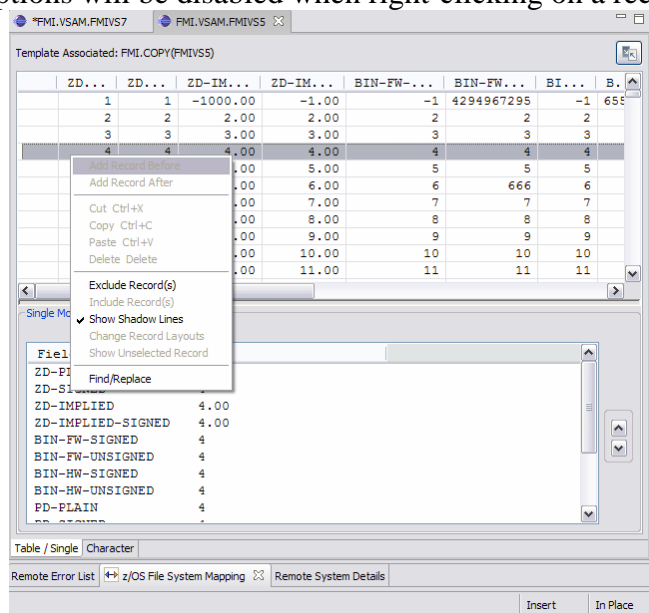


Figure 5.13: In-place edit

## 5.11 Inserting new records

New records may be inserted before or after the currently selected record in the Table and Character views. When inserting a new record matching a layout with OCCURS DEPENDING ON fields, the values for those fields’ defining objects will be requested before the record is created. These values are needed because the editor does not allow modification of OCCURS DEPENDING ON array sizes, as was described in section 5.9. Once the sizes of all OCCURS DEPENDING ON arrays, if any, are known, a default

record will be added before or after the currently selected record, depending on which insertion option was picked. This record will contain default values for all of its data types (e.g., spaces for alphanumeric, zeros for numeric types, etc.).

AAAAA	7	TR	370.35
	0		0.00
AAAAA	8	TR	493.80

Figure 5.14: A newly added record between two previously existing records

## 5.12 Saving

The process of saving data while using the Formatted Data Editor is accomplished in the same way as it is in other Eclipse editors. At any time, a save may be requested using the menu bar or by pressing <Ctrl>-S. When saving, 2 steps are taking place in the background.

While editing datasets within the Formatted Data Editor, all edits are validated and stored locally on the client. Although the data has previously been validated in real time, all of the records will not be completely validated until a save is performed. Only when a save has been initiated from the client will the changes be pushed to the host. During this process the updated records will be merged into the dataset located on the host machine. If the save fails because one or more of the records did not pass the final validation, the incorrect records will be identified so that the user may attempt to correct them and try again.

## 5.13 Limitations

### 5.13.1 Data Type Limitations

For the technology preview of WebSphere Developer for System z File Manager, only the following data types are respected by the Formatted Data Editor:

- Alphabetic
- Alphanumeric
- Binary
- Unsigned Binary
- Packed Decimal
  - Implied decimal points
- Zoned Decimal
  - Implied decimal points
  - SIGN LEADING, SEPARATE
- Internal Floating Point (COMP-1, COMP-2)

### **5.13.2 No PL/I**

This release of WebSphere Developer File Manager has not been validated to handle PL/I includes being used as templates. It will attempt to open them if the user specifies one as a template, but the results are unknown.

### **5.13.3 No Record Length Changes**

Record length changes are not allowed for the technology preview version. All OCCURS DEPENDING ON array sizes are fixed after initialization and no varying length field types are supported.

### **5.13.4 Very Large Datasets**

This release of WebSphere Developer File Manager does not currently support the ability to open and step through very large datasets. Editing an entire, very large dataset at once would cause the WebSphere Developer File Manager client and possibly even the job running on the host to run out of resources. In order to alleviate this limitation and prevent any such occurrences, a dataset size limit can be specified within the WebSphere Developer File Manager capabilities panel. Once a maximum dataset size has been identified, any dataset that is selected for editing, and also greater than the maximum size set will return an error to the user and will fail to open.

### **5.13.5 IBM File Manager Runs as Started Job**

To access data from IBM File Manager for an edit session, WebSphere Developer File Manager kicks it off as a started job. There is one started job per edit session. This can lead to the host running out of available initiators if too many users are attempting to edit data using WebSphere Developer File Manager at once. To help with this problem, the maximum number of WebSphere Developer File Manager edit sessions open per client can be set in the WebSphere Developer File Manager preferences panel. Directions for accessing the preferences panel are provided in section 4.1.2.

### **5.13.6 No Connection Recovery**

If the connection between WebSphere Developer and IBM File Manager is lost, there is no connection recovery available in the technology preview version of WebSphere Developer File Manager. All changes made since the last save request will be lost.

### **5.13.7 IBM File Manager Job Timeout**

One possible cause of a connection loss as described in section 5.13.5 is a timeout of the IBM File Manager job. If the job times out due to inactivity, all changes made since the last save request will be lost.

### **5.13.8 No Recovery from RSE Connection Loss**

If the WebSphere Developer for System z RSE connection is dropped during an edit session, the session will not realize that it has no connection to the host until an attempt to save is made. As described in section 5.13.5, there is no connection recovery in the WebSphere Developer for System z File Manager technology preview. All changes made since the last save will be lost.

### **5.13.9 Cannot Edit Empty Datasets**

For the technology preview version of WebSphere Developer for System z File Manager, there is no support for editing empty datasets. Requests to open an empty dataset will result in an error being returned.

### **5.13.10 No “Open” or “Open With” items in VSAM cluster context menus**

Even after applying the “.tdat” extension to a VSAM cluster, neither an “Open” nor “Open With” item will appear in the cluster’s context menu in the Remote Systems view. The cluster may be opened by double-clicking on it. However, if the “.tdat” extension has not been added to the VSAM cluster, it will not have the Formatted Data Editor assigned as its default editor and will not open on double-click.

## 6 Notices

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