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Chapter 1

Server Enhancements

The server provides a wide range of capabilities and tools for adapter configuration, metadata creation, application and path management, security control, communications configuration, and for monitoring, tuning, and troubleshooting server performance. Authorized users can perform most server administration tasks from a graphical Web Console. The server supports WebFOCUS reporting functions, extraction, load and transformation functions, and analysis and data access control functions.

In this chapter:

- Track Time for XML Adapters
- JSON Syntax for Adapter Connection Parameters
- Prompting for DBMS Credentials at Run Time for Procedure and Upload
- Selecting Adapter Connections for Upload and Data Load
- Enhance Session Log With WFDESCRIBE Output
- Support for Favorites
- Support for History/Recent Files
- New Privilege METUP for Create Synonym During Data Load
- Support for User-Specified Port Number
- Auto-Populate Combo-Box on Typing
- Text Editor: Alternate Color Theme
- Branching Now Available for Git
- Data Preparation Enhancements

Track Time for XML Adapters

On the Server Workspace page, a table of data service agent statistics is displayed for use in monitoring server performance, as shown in the following image.
The column DBMS Time is used to track the amount of DBMS processing time in seconds that is used to retrieve the data when a request is run.

This feature enables the DBMS Time statistic for the XML, JSON, and OData adapters.

**JSON Syntax for Adapter Connection Parameters**

New JSON-based syntax has been implemented for setting connection attributes. This syntax supports additional connection parameters.

Two new parameters have initially been implemented:

- `auto_prompt` to enable prompting for Adapter connection credentials at run time.
- `allow_data_load` to configure SQL Adapter Connections allowed for Upload, Quick Copy, and Custom copy.

**Prompting for DBMS Credentials at Run Time for Procedure and Upload**

You can configure the server to prompt for user credentials on running a procedure and upload.

First, you must enable this feature on the server by adding `connections_autoprompt=y` in the `edaserve.cfg` file.

This setting can be enabled from the Workspace page. Click **Settings**, **Workspace SET**, then **Profile Settings**. The Profile Settings page opens, as shown in the following image.

![Profile Settings](image)

Set `connections_autoprompt` to `y`.
After this parameter is configured, the server will:

- Add an additional parameter to the new Connection string for SQL Adapters. You can configure this on the Web Console Adapter Connection Properties page by setting "Auto Prompt Connection Credentials" to "y". The CONNECTION_ATTRIBUTES_EXT statement in the server profile will be updated with "auto_prompt": "y".

- Add the "Run As" option for procedures on the Web Console.

- When a procedure runs using the "Run As" option, it will be executed with WFDESCRIBE=XMLETLAS. WFDESCRIBE will return all connections from all Master Files used in procedures that are configured with "auto_prompt": "y".

Selecting Adapter Connections for Upload and Data Load

The new JSON-based SET CONNECTION_ATTRIBUTES_EXT command supports the following parameter to allow the adapter connection to be available for Upload, Quick Copy and Custom Copy.

"allow_data_load"

If this parameter is set to "y", the connection is available for upload and data load and would be shown in the Load Options dialog box for any data load. This is the default value.

If this parameter is set to "n", the server will hide this connection in the Load Options dialog box.

This parameter can be set or changed from the Web Console Adapter page. Right-click a connection for an SQL adapter, click Properties, and expand Advanced parameters. Update "Allow Data Load".

Enhance Session Log With WFDESCRIBE Output

The Session Log now shows output from WFDESCRIBE, which shows procedures executed with WFDESCRIBE=XMLETLAS that is generated by the Run As option used for prompting for credentials prior to running a procedure.

Support for Favorites

You can add a file to your list of favorites by right-clicking a file on the Web Console and clicking Add to Favorites.

To see your list of Favorites, on the Application Page ribbon, click Filter and select Favorites. Once the list of Favorites is displayed, you can delete a file from the list by right-clicking the file on the Favorites list and clicking Delete from Favorites.
Support for History/Recent Files

The myhome application directory for each user will contain a file named history.txt that contains a list of recent files opened by the user. By default, the history file contains the ten most recent files opened by the user.

To change the number of recent files or to disable saving recent files, on the Workspace page under Settings, click FOCUS Sets and Info, then Core Engine Settings. Under APP Service, the setting HISTORY_DEPTH configures the number of files to be kept on the recent files list. The value zero (0) means no history will be kept.

You can open the list of recent files by clicking Filter on the Application page ribbon and selecting Recent.

You can also issue the SET HISTORY_DEPTH command in any supported profile.

New Privilege METUP for Create Synonym During Data Load

The new General Privilege METUP enables CREATE SYNONYM only for upload, quick copy, and custom copy.

Support for User-Specified Port Number

The user can specify a custom FTP/SFTP port number to be used in bulk load operations. Append the port number to the host name after a colon. For example:

myhost:21

Auto-Populate Combo-Box on Typing

When entering text in a combo-box, the selections will be filtered by the characters entered.

Text Editor: Alternate Color Theme

The text editor options offer a color theme with a dark background in addition to the default color theme that has a light background.

Branching Now Available for Git

Branching on Git repositories is now supported and the following options are available:

**New Branch**

Creates a new branch and optionally, allows you to switch to the newly created branch.

**Current Branch**

Selects the current branch and allows you to switch to it.
**Delete Branch**
Deletes a specified branch.

**Merge into Current Branch**
Merges the selected branch into the current branch.

**Checkout Remote Branch**
Allows you to checkout a remote branch to access a branch that is stored remotely.

Once a Git adapter is configured, you can access these options from both the Reporting Server Web Console and the DataMigrator Data Management Console by right-clicking an application directory, pointing to *Git*, and then pointing to *Branch*, as shown in the following image.
Data Preparation Enhancements

The following Data Preparation enhancements have been added.

- A new data preparation capability from a web browser enables you to build flows to convert and load raw data for visualization in WebFOCUS designer.

- You can apply functions, write advanced transformations, select which columns to include, filter rows, and perform aggregation.

- You can prepare large data sets using an automatically generated representative sample, for rapid response time.

- A new data profiling Distribution report helps you understand how data in each field is distributed.

- You can automatically calculate the range of values for dates and numbers, and generate a count of unique values for character valued fields.

- You can automatically generate a bar chart that shows how frequently each value or group of values appears. Selecting one or more bars changes the display to show the effect that selection has on all of the other fields.

- Selections can be used on a filter when loading data.

- Data can be loaded to relational databases or column stores from the Web Console.
Chapter 2

Adapter Enhancements

This section describes new adapter features. All adapters can be used for WebFOCUS Reporting and SQL requests, and as sources for DataMigrator flows.

The server supports adapters designed to access a wide variety of data sources. Using the graphical Web Console, you can configure these adapters and create the metadata you need to seamlessly access the corresponding types of data.

On the Web Console, adapters are grouped as SQL, XML-based, ERP, OLAP, Procedures, Sequential and Indexed, DBMS, and Social Media.

In this chapter:

- SQL Adapters
- OLAP Adapters
- Procedures Adapters
- Sequential and Indexed Files Adapters
- Social Media Adapters
- XML Adapters

SQL Adapters

This section provides descriptions of new features for SQL adapters.

Adapter for Apache Hive: Support for STRING (CLOB) Columns

In prior releases, a CLOB column was described in the synonym with format TX. CLOB columns are now described with USAGE=STRING, ACTUAL=STRING.

Adapter for Db2: JDBC Support

The Adapter for Db2 can now be configured to use JDBC in addition to CLI and CAF.

Adapter for MariaDB: Support for Fractions of a Second

The Adapter for MariaDB supports fractions of seconds for TIMESTAMP, DATETIME, and TIME data types with Oracle Connector/J v.8.0.13 or higher.
Adapter for MySQL: Support for Fractions of a Second

The Adapter for MySQL supports fractions of a second for TIMESTAMP and DATETIME data types with MySQL Connector/J v.8.0.16 or higher.

Adapter for Oracle: CDC Archive Log Support

The Adapter for Oracle allows Time Traveling, that is, starting Change Data Capture (CDC) from a redo log that is already archived and continuing into the future until the current redo log is reached. This is a performance improvement from prior releases, where CDC could only be started from the current redo log. The starting point can be specified as a TIMESTAMP.

Adapter for Oracle: Timestamp with Local Time Zone as HYYMDm

The Adapter for Oracle now supports reporting on a timestamp field that includes a Local Time Zone (LTZ) by mapping it as format HYYMDm, the same format as an ordinary timestamp.

Adapter for Presto

The Adapter for Presto is a distributed SQL query engine designed to query large data sets. The adapter converts application requests into JDBC calls and returns optimized answer sets to the requesting application.

Adapter for SAP HANA DB: Pass SQL Hints

The Adapter for SAP HANA DB can now pass native SQL hint syntax to the DBMS using the following command.

```
SQL SQLHANA SET HINT hint_syntax
```

where:

`hint_syntax`

Is the SAP HANA DB proprietary syntax for SQL Hint. For example:

```
WITH HINT (RESULT_CACHE)
```

is converted to

```
SQL SQLHANA SET HINT WITH HINT (RESULT_CACHE)
```

According to HANA SQL syntax, a TABLE command will place the Hint at the end of the generated SQL. For example:

```
TABLE FILE T1 PRINT *
END
```
will be passed to SAP HANA as:

```sql
SELECT * FROM T1
WITH HINT (RESULT_CACHE)
```

The hint or hint combinations will only be passed when the adapter constructs a single SQL SELECT statement. It will not be passed in the case of a FOCUS-managed join. The user is responsible for the hint or hint combination syntax.

**Adapter for SQL Server: Version 2019 Support**


**Adapter for Teradata: Support for New Simba Driver**

The Adapter for Teradata ODBC now supports Simba driver version 16.20.

**Adapter for Vertica: Use Error-Less DROP TABLE IF EXISTS**

The DROP clause of CREATE FILE will now be converted into the following SQL syntax for the Adapter for Vertica:

```sql
DROP TABLE IF EXISTS tablename
```

This syntax will not cause an error if the table does not exist.

**OLAP Adapters**

This section provides descriptions of new features for OLAP adapters.

**Adapter for SQL Server Analysis Services (SSAS): Automatic Recognition of Date Patterns**

The following SET command for the Adapter for SSAS (multidimensional model) controls whether the adapter scans dimension members and automatically recognizes date and time patterns in the data. Recognized date/time patterns are described with USAGE formats and DATEPATTERN values for the corresponding fields in the generated synonym. The syntax is:

```sql
ENGINE SSAS SET DATEPATTERN_SCAN {ALL | DT | OFF}
```

where:

- **ALL**
  Specifies scanning data for all of the cube hierarchy levels.

- **DT**
  Specifies scanning for attributes with date- or time-related types (assigned using SQL Server Data Tools).
Specifies no scanning. This is the default behavior compatible with prior releases of the adapter.

### Procedures Adapters

This section provides descriptions of new features for Procedures adapters.

#### Adapter for REST: Support for Custom Headers

When you configure a connection for the Adapter for REST, you can now add custom headers consisting of name=value pairs that are passed in the HTTP headers.

To add custom headers for a REST connection, on the Connect to Data page of the Web Console, either add REST to the configuration or, if the adapter is already configured, edit an existing connection or add a new connection. In the Advanced HTTP connection options section, click **Add Custom Headers**.

A text box opens in which you can add the custom header, as shown in the following image.

![Add Custom Headers](image_url)

Custom Header values should be enclosed in double quotation marks, and the individual custom headers should be delimited by semicolons (;). For example:

```
Content-Type="CDF";PARAM1="ABC"
```

Custom headers can also be created in the metadata as part of the process of creating a synonym. Defining custom headers in the connection string makes the custom headers apply to the entire REST service. Defining the custom headers at the metadata level makes the custom headers apply to the specific REST call, and the custom header values can be changed at report time using WHERE or IF statements.

### Sequential and Indexed Files Adapters

This section provides descriptions of new features for Sequential and Indexed Files adapters.
Adapter for Kafka

The Adapter for Kafka provides access to and reporting against messages resident in the Apache Kafka environment.

Social Media Adapters

This section provides descriptions of new features for Social Media adapters.

Adapter for Slack

The Adapter for Slack enables WebFOCUS to integrate with the Slack business messaging application. WebFOCUS can retrieve and post Slack messages and, using the SLACK function, can send Slack messages from a WebFOCUS procedure.

XML Adapters

This section describes new features for the XML adapters.

Adapter for OData: Support for Selection on Aggregation

If you configured your OData connection with the Aggregation Extension, as shown in the following image, certain OData requests that involve summation or summation prefixes will send OData requests based on the OData Aggregation Extension specification.

This feature adds filters to the syntax of an OData Aggregation Extension request when WHERE_GROUPED or WHERE TOTAL is used in a WebFOCUS report.
DataMigrator Enhancements

This section describes the new features for DataMigrator.

DataMigrator represents a broad category of tools designed to facilitate and automate the extraction and integration of data. From source extraction through target load, data is transformed through the application of business rules. Once the transformation is complete, the data is loaded into table structures that have been optimized for a particular application.

For more information on any of these new features, see the DataMigrator User’s Guide.

In this chapter:

- Adapters
- Data and Process Flows

Adapters

The following section provides descriptions of new features for adapters.

Adapter for Kafka

The Adapter for Kafka provides access to and reporting against messages resident in the Apache Kafka environment.

Adapter for Presto

The Adapter for Presto is a distributed SQL query engine designed to query large data sets. The adapter converts application requests into JDBC calls and returns optimized answer sets to the requesting application.

Adapter for Slack

The Adapter for Slack enables WebFOCUS to integrate with the Slack business messaging application. WebFOCUS can retrieve and post Slack messages and, using the SLACK function, can send Slack messages from a WebFOCUS procedure.

Branching Now Available for Git
Branching on Git repositories is now supported and the following options are available:

**New Branch**
- Creates a new branch and optionally, allows you to switch to the newly created branch.

**Current Branch**
- Selects the current branch and allows you to switch to it.

**Delete Branch**
- Deletes a specified branch.

**Merge into Current Branch**
- Merges the selected branch into the current branch.

**Checkout Remote Branch**
- Allows you to checkout a remote branch to access a branch that is stored remotely.
Once a Git adapter is configured, you can access these options from both the Reporting Server Web Console and the DataMigrator Data Management Console by right-clicking an application directory, pointing to Git, and then pointing to Branch, as shown in the following image.

**Data and Process Flows**

The following section provides descriptions of new features for data and process flows.

**Ability to Disable the Automatically Connect Object Feature**

Currently, when you add an object to a Data Flow, the object automatically gets connected to the SQL object in the workspace. A new option for Data Flows allows you to disable this automatic connection. You can find this option in the Data Flow Designer section of the Options dialog box.
This section describes the new features for Resource Analyzer.

Resource Analyzer provides Information Systems (IS) organizations with the ability to manage the growing volume and unpredictable nature of ad hoc data access.

Resource Governor controls monitoring, system configuration parameters, and governing rules. It provides preemptive governing for requests issued to both relational and non-relational data sources.

Together, Resource Analyzer and its partner product, Resource Governor, are designed specifically to help IS organizations analyze and control end user data access.

**In this chapter:**

- Enhancement to Access Control Report
- Adapter Connection Node Now Displays

---

**Enhancement to Access Control Report**

The option to run a report that returns any errors being produced has been added to the ACI report. You can access this option by selecting *Error* from the Category drop-down menu that is available on the Report filter page for the report. To run the filter, expand the *Reports* folder in the Resource Management tree, right-click *ACI Monitoring*, and click *Run*.

**Adapter Connection Node Now Displays**

Configured adapters in Resource Management now display each connection node in the navigation pane tree, allowing for a more streamlined approach to monitoring data sources using the updated Manage Monitoring page.
Adapter Connection Node Now Displays
WebFOCUS is a complete information control system with comprehensive features for retrieving and analyzing data. It enables you to create reports quickly and easily. It also provides facilities for creating highly complex reports, but its strength lies in the simplicity of the request language. You can begin with simple queries and progress to complex reports as you learn about additional facilities.

In this chapter:

- **Full Outer Join Support**
- **Using a WHERE Phrase in a Filter on a Calculated Value**
- **IMPUTE: Replacing Missing Values With Aggregated Values**
- **OUTLIER: Identifying Outliers in Numeric Data**
- **Enhancement to the PARTITION_AGGR Function**
- **SLACK: Posting a Message to a Slack Channel**
- **Scaling PDF Report Output to Fit the Page Width**
- **Enhancement for Aligning a PDF Report Within a Page**
- **Synchronizing WebFOCUS Page Breaks With Excel Page Breaks**
- **Inserting Text Into XLSX Workbook Headers and Footers**

### Full Outer Join Support

Full outer joins and right outer joins are now supported whether or not the underlying data source supports them. When the underlying data source has support for these joins, the join processing is passed to the database engine. When it does not support them, all necessary data is returned and the join processing is handled by WebFOCUS.
Using a WHERE Phrase in a Filter on a Calculated Value

In prior releases, specifying a WHERE phrase on a calculated value (COMPUTE field) generated an error, and processing was terminated. In the current release, a WHERE condition on a calculated field will be automatically replaced with WHERE_GROUPED if the filter is eligible for WHERE_GROUPED processing, or with WHERE TOTAL if it is not.

IMPUTE: Replacing Missing Values With Aggregated Values

IMPUTE calculates a value to replace missing numeric data on report output, within a partition. In place of eliminating data records with missing values from analysis, IMPUTE enables you to substitute a variety of estimates for the missing values, including the mean, the median, the mode, or a numeric constant, all calculated within the data partition specified by the reset key. This function is designed to be used with detail level reports (PRINT or LIST commands), and with calculated values (fields created with the COMPUTE command).

The syntax is:

```
IMPUTE(field, reset_key, replacement)
```

where:

- **field**
  Is the name of the numeric input field that is defined with MISSING ON.

- **reset_key**
  Defines the partition for the calculation. Valid values are:
  - A sort field name.
  - PRESET, which uses the break defined by the SET PARTITION_ON command.
  - TABLE, which performs the calculation on the entire table.

- **replacement**
  Is a numeric constant or one of the following:
  - MEAN
  - MEDIAN
  - MODE
Example: Replacing Missing Values With Aggregated Values

To run this example, the FOCUS data source SALEMISS must be created. SALEMISS is the SALES data source with some missing values added in the RETURNS and DAMAGED fields. The following is the SALEMISS Master File, which should be added to the IBISAMP application.

FILENAME=KSALES, SUFFIX=FOC, REMARKS='Legacy Metadata Sample: sales',$

SEGNAME=STOR_SEG, SEGTYPE=S1,
  FIELDNAME=STORE_CODE, ALIAS=SNO, FORMAT=A3,$
  FIELDNAME=CITY, ALIAS=CTY, FORMAT=A15,$
  FIELDNAME=AREA, ALIAS=LOC, FORMAT=A1,$

SEGNAME=DATE_SEG, PARENT=STOR_SEG, SEGTYPE=SH1,
  FIELDNAME=DATE, ALIAS=DTE, FORMAT=A4MD,$

SEGNAME=PRODUCT, PARENT=DATE_SEG, SEGTYPE=S1,
  FIELDNAME=PROD_CODE, ALIAS=PCODE, FORMAT=A3,$
  FIELDNAME=UNIT_SOLD, ALIAS=SOLD, FORMAT=I5,$
  FIELDNAME=RETAIL_PRICE, ALIAS=RP, FORMAT=D5.2M,$
  FIELDNAME=DELIVER_AMT, ALIAS=SHIP, FORMAT=I5,$
  FIELDNAME=OPENING_AMT, ALIAS=INV, FORMAT=I5,$
  FIELDNAME=RETURNS, ALIAS=RTN, FORMAT=I3, MISSING=ON,$
  FIELDNAME=DAMAGED, ALIAS=BAD, FORMAT=I3, MISSING=ON,$
The following procedure creates the SALEMISS data source and then adds the missing values to the RETURNS and DAMAGED fields:

CREATE FILE ibisamp/SALEMISS
MODIFY FILE ibisamp/SALEMISS
FIXFORM STORE_CODE/3 CITY/15 AREA/1 DATE/4 PROD_CODE/3
FIXFORM UNIT_SOLD/5 RETAIL_PRICE/5 DELIVER_AMT/5
FIXFORM OPENING_AMT/5 RETURNS/3 DAMAGED/3
MATCH STORE_CODE
ON NOMATCH INCLUDE
ON MATCH CONTINUE
MATCH DATE
ON NOMATCH INCLUDE
ON MATCH CONTINUE
MATCH PROD_CODE
ON NOMATCH INCLUDE
ON MATCH REJECT
DATA
14BSTAMFORD S1212B10 60 .95 80 65 10 6
14BSTAMFORD S1212B12 40 1.29 20 50 3 3
14BSTAMFORD S1212B17 29 1.89 30 30 2 1
14BSTAMFORD S1212C13 25 1.99 30 40 3 0
14BSTAMFORD S1212C7 45 2.39 50 49 5 4
14BSTAMFORD S1212D12 27 2.19 40 35 0 0
14BSTAMFORD S1212E2 80 .99 100 100 9 4
14BSTAMFORD S1212E3 70 1.09 80 90 8 9
14NEW YORK U1017B10 30 .85 30 10 2 3
14NEW YORK U1017B17 20 1.89 40 25 2 1
14NEW YORK U1017B20 15 1.99 30 5 0 1
14NEW YORK U1017C17 12 2.09 10 15 0 0
14NEW YORK U1017D12 20 2.09 30 10 3 2
14NEW YORK U1017E1 30 .89 25 45 4 7
14NEW YORK U1017E3 35 1.09 25 45 4 2
77FUNIONDALE R1018B20 25 2.09 40 25 1 1
77FUNIONDALE R1018C7 40 2.49 40 40 0 0
K1 NEWARK U1019B12 29 1.49 30 30 1 0
K1 NEWARK U1018B10 13 .99 30 15 1 1
END
-RUN
The following request against the SALEMISS data source generates replacement values for the missing values in the RETURNS field, using only the values within the same store.

```
SET PARTITION_ON=FIRST
TABLE FILE SALEMISS
PRINT RETURNS
COMPUTE MEDIAN1 = IMPUTE(RETURNS, PRESET, MEDIAN);
COMPUTE MEAN1 = IMPUTE(RETURNS, PRESET, MEAN);
COMPUTE MODE1 = IMPUTE(RETURNS, PRESET, MODE);
BY STORE_CODE
ON TABLE SET PAGE NOPAGE
ON TABLE SET STYLE *
TYPE=REPORT, GRID=OFF,$
ENDSTYLE
END
```
The output is shown in the following image. The missing values occur in store 14Z, and the replacement values are calculated using only the RETURNS values from that store because PARTITION_ON is set to FIRST.

<table>
<thead>
<tr>
<th>STORE_CODE</th>
<th>RETURNS</th>
<th>MEDIAN1</th>
<th>MEAN1</th>
<th>MODE1</th>
</tr>
</thead>
<tbody>
<tr>
<td>14B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.00</td>
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<td>2.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.00</td>
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</tr>
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<td>5</td>
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<td>0</td>
<td>0.00</td>
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<td></td>
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<td>9</td>
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<td>8</td>
<td>8.00</td>
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<tr>
<td>14Z</td>
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<td>2.00</td>
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</tr>
<tr>
<td>.</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>77F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>K1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>
Changing the PARTITION_ON setting to TABLE produces the following output, in which the replacement values are calculated using all of the rows in the table.

<table>
<thead>
<tr>
<th>STORE_CODE</th>
<th>RETURNS</th>
<th>MEDIAN1</th>
<th>MEAN1</th>
<th>MODE1</th>
</tr>
</thead>
<tbody>
<tr>
<td>14B</td>
<td>10</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>9.00</td>
<td>9.00</td>
<td>9.00</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>8.00</td>
<td>8.00</td>
<td>8.00</td>
</tr>
<tr>
<td>14Z</td>
<td>2</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td>2.00</td>
<td>3.00</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td>2.00</td>
<td>3.00</td>
<td>.00</td>
</tr>
<tr>
<td>77F</td>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>K1</td>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
The 1.5 * IQR rule (where IQR means Inner Quartile Range) is a common way to identify outliers in data. This rule defines an outlier as a value that is above or below 1.5 times the inner quartile range in the data. The inner quartile range is based on sorting the data values, dividing it into equal quarters, and calculating the range of values between the first quartile (the value one quarter of the way through the sorted data) and third quartile (the value three quarters of the way through the sorted data). The value that is 1.5 times below the inner quartile range is called the lower fence, and the value that is 1.5 times above the inner quartile range is called the upper fence.

Given a numeric field as input, OUTLIER returns one of the following values for each value of the field, using the 1.5 * IQR rule:

- **0 (zero)**. The value is not an outlier.
- **-1**. The value is below the lower fence.
- **1**. The value is above the upper fence.

### Syntax: How to Identify Outliers in Numeric Data

```
OUTLIER(input_field)
```

where:

- **input_field**
  Numeric
  
  Is the numeric field to be analyzed.
**Example:** Identifying Outliers

The following request defines the SALES field to have different values depending on the store code, and uses OUTLIER to determine whether each field value is an outlier.

```
DEFINE FILE GGSALES
SALES/D12 = IF ((CATEGORY EQ 'Coffee') AND (STCD EQ 'R1019')) THEN 19000
ELSE IF ((CATEGORY EQ 'Coffee') AND (STCD EQ 'R1020')) THEN 20000
ELSE IF ((CATEGORY EQ 'Coffee') AND (STCD EQ 'R1040')) THEN 7000
ELSE DOLLARS;
END
TABLE FILE GGSALES
SUM SALES
COMPUTE OUT1/I3 = OUTLIER(SALES);
BY CATEGORY
BY STCD
WHERE CATEGORY EQ 'Coffee'
ON TABLE SET PAGE NOLEAD
ON TABLE SET STYLE *
GRID=OFF,$
ENDSTYLE
END
```

The output is shown in the following image. Values above 2 million are above the upper fence, values below 1 million are below the lower fence, and other values are not outliers:

<table>
<thead>
<tr>
<th>Category</th>
<th>Store ID</th>
<th>SALES</th>
<th>OUT1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>R1019</td>
<td>2,280,000</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>R1020</td>
<td>2,400,000</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>R1040</td>
<td>840,000</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>R1041</td>
<td>1,576,915</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1044</td>
<td>1,340,437</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1088</td>
<td>1,375,040</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1100</td>
<td>1,364,420</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1109</td>
<td>1,459,160</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1200</td>
<td>1,463,453</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1244</td>
<td>1,553,962</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1248</td>
<td>1,535,631</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>R1250</td>
<td>1,386,124</td>
<td>0</td>
</tr>
</tbody>
</table>
Enhancement to the PARTITION_AGGR Function

The post-aggregation calculations MEDIAN and MODE have been added to the PARTITION_AGGR function.

SLACK: Posting a Message to a Slack Channel

SLACK posts a message to a Slack channel from a WebFOCUS procedure:

- If the message is sent successfully, the function returns the value true.
- If the message is not sent successfully, the function returns a blank.

The syntax is:

\[
\text{SLACK}(\text{workspace}, \text{channel}, \text{message})
\]

where:

\text{workspace}
- Is a Workspace name.

\text{channel}
- Is a Channel name.

\text{message}
- Is an alphanumeric field containing the message.
Example: Sending a Slack Message From a WebFOCUS Request

The Adapter for Slack has been configured to have a connection to the devibi workspace, as shown in the following image.

The following request sends a Slack message to the general channel of the devibi Workspace, when the department is MIS.

TABLE FILE ibisamp/EMPLOYEE
SUM
   CURR_SAL
AND COMPUTE SLACK_MESSAGE/A200 = 'Salary for Department ' || DEPARTMENT || ' is ' || LJUST(20, FPRINT(CURR_SAL,'D12.2M'), 'A20');
AND COMPUTE CURR_SAL_SLACK/A20=IF DEPARTMENT EQ 'MIS'
    THEN SLACK('devibi', 'general', SLACK_MESSAGE) ELSE 'false';
AS 'Message Sent, to Slack highlighting, Salary'
BY DEPARTMENT
HEADING
"Slack"
"Slack Function Example"
ON TABLE SET PAGE-NUM NOLEAD
ON TABLE NOTOTAL
ON TABLE SET STYLE *
ON TABLE SET STYLE * INCLUDE=IBFS:/FILE/IBI_HTML_DIR/javaassist/intl/EN/ENIADefault_combine.sty,$
ENDSTYLE
END
Scaling PDF Report Output to Fit the Page Width

By default, if PDF report output is too wide to fit on a single page, the report generates multiple panels of the same page for the columns that do not fit. The page numbers specify the page and panel numbers. For example, page numbers 1.1 and 1.2 represent page 1/panel 1 and page 1/panel 2.

You can scale the output to fit across the width of the page using the PAGE-SCALE StyleSheet attribute or the PAGE-SCALE SET parameter.

Syntax: How to Scale PDF Report Output to Fit the Page Width

In a StyleSheet, use the following syntax.

```
TYPE=REPORT, PAGE-SCALE={OFF|AUTO}, $ 
```

In a procedure or profile, use the following syntax.

```
SET PAGE-SCALE = {OFF|AUTO} 
```

In a request, use the following syntax.

```
ON TABLE SET PAGE-SCALE {OFF|AUTO} 
```

where:

**OFF**

Disables page scaling in PDF report output. This is the default value.
AUTO

Implements page scaling in PDF report output.

**Reference:** Usage Notes for PAGE-SCALE

- PAGE-SCALE is supported for PDF report output only.
- When a page is scaled to fit more content on the page horizontally, fewer vertical pages may be generated, as well.

**Example:** Scaling PDF Report Output to Fit the Page Width

The following request generates PDF report output without using page scaling.

```plaintext
SET SQUEEZE=ON
DEFINE FILE WF_RETAIL_LITE
SHOWPIC/A100='C:\ibi\WFOCUS82\samples\web_resource\signin\images \favicon.jpg';
END

TABLE FILE WF_RETAIL_LITE
PRINT  PRODUCT_CATEGORY
BY SHOWPIC NOPRINT
BY CONTINENT_NAME
BY COUNTRY_NAME
WHERE COUNTRY_NAME EQ 'FRANCE' OR 'ITALY'
WHERE RECORDLIMIT=3000;
ON TABLE SUBHEAD
  " 
  " Report Without PDF Scaling "
  " 
  " 
ON COUNTRY_NAME SUBHEAD
  " 
  " 
ON TABLE PCHOLD FORMAT PDF
ON TABLE SET STYLE *
  TYPE=DATA, COLUMN=CONTINENT_NAME, FONT=COMIC SANS MS, COLOR=BLUE, STYLE=BOLD+ITALIC,
  TYPE=DATA, COLUMN=PRODUCTCATEGORY, COLOR=FUSCHIA, *
  TYPE=HEADING, STYLE=BOLD, COLOR=RGB(0 35 95), SIZE=12, JUSTIFY=CENTE", *
  TYPE=SUBHEAD, SIZE=18, STYLE=BOLD, COLOR=RED, *
  TYPE=SUBHEAD, IMAGE=(SHOWPIC), SIZE=(.5 .5), *
ENDSTYLE
END
```
Note: The image displayed in the subheading is distributed with WebFOCUS. The path to the image is dependent on your platform and installation options. The path in the request uses the default installation directory on Windows.
The output is too wide for the page and is paneled. Page 1.1 has the columns that fit across the width of the page, as shown in the following image.

<table>
<thead>
<tr>
<th>Customer Continent</th>
<th>Customer Country</th>
<th>Product Category</th>
<th>Cost of Goods</th>
<th>Revenue</th>
<th>MSRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>France</td>
<td>Camcorder</td>
<td>$82.00</td>
<td>$179.00</td>
<td>179.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$60.00</td>
<td>$169.99</td>
<td>169.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Production</td>
<td>$380.00</td>
<td>$598.00</td>
<td>598.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$260.00</td>
<td>$379.98</td>
<td>379.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessories</td>
<td>$80.00</td>
<td>$169.00</td>
<td>169.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computers</td>
<td>$167.00</td>
<td>$280.00</td>
<td>280.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessories</td>
<td>$500.00</td>
<td>$699.99</td>
<td>699.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Production</td>
<td>$234.00</td>
<td>$399.00</td>
<td>399.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$122.00</td>
<td>$199.99</td>
<td>199.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Televisions</td>
<td>$730.00</td>
<td>$998.00</td>
<td>998.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$96.00</td>
<td>$199.98</td>
<td>199.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$87.00</td>
<td>$179.99</td>
<td>179.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessories</td>
<td>$160.00</td>
<td>$253.50</td>
<td>338.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computers</td>
<td>$167.00</td>
<td>$280.00</td>
<td>280.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$145.00</td>
<td>$119.99</td>
<td>199.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$398.00</td>
<td>$449.99</td>
<td>599.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$87.00</td>
<td>$179.00</td>
<td>179.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessories</td>
<td>$380.00</td>
<td>$499.95</td>
<td>499.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$400.00</td>
<td>$559.98</td>
<td>559.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$420.00</td>
<td>$529.99</td>
<td>529.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$205.00</td>
<td>$299.00</td>
<td>299.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$92.00</td>
<td>$159.98</td>
<td>159.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessories</td>
<td>$398.00</td>
<td>$599.98</td>
<td>599.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$500.00</td>
<td>$524.25</td>
<td>699.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camcorder</td>
<td>$2,870.00</td>
<td>$3,499.00</td>
<td>3,499.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Production</td>
<td>$190.00</td>
<td>$299.00</td>
<td>299.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media Player</td>
<td>$220.00</td>
<td>$279.99</td>
<td>279.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$310.00</td>
<td>$499.00</td>
<td>499.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$312.00</td>
<td>$478.00</td>
<td>478.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$61.00</td>
<td>$80.99</td>
<td>89.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Production</td>
<td>$190.00</td>
<td>$179.40</td>
<td>299.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$122.00</td>
<td>$199.99</td>
<td>199.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stereo Systems</td>
<td>$121.00</td>
<td>$219.99</td>
<td>219.99</td>
</tr>
</tbody>
</table>
Page 1.2 has the remaining columns, as shown in the following image.

<table>
<thead>
<tr>
<th>Discount</th>
<th>Gross Profit</th>
<th>Quantity Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.00</td>
<td>$97.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$109.99</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$218.00</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$119.98</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$89.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$113.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$199.99</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$165.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$77.99</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$268.00</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$103.98</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$92.99</td>
<td>1</td>
</tr>
<tr>
<td>$84.50</td>
<td>$93.50</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$113.00</td>
<td>1</td>
</tr>
<tr>
<td>$80.00</td>
<td>-$25.01</td>
<td>1</td>
</tr>
<tr>
<td>$150.00</td>
<td>$51.99</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$92.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$119.95</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$159.98</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$109.99</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$94.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$67.98</td>
<td>2</td>
</tr>
<tr>
<td>$0.00</td>
<td>$201.98</td>
<td>2</td>
</tr>
<tr>
<td>$174.75</td>
<td>$24.25</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$629.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$109.00</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
<td>$59.99</td>
<td>1</td>
</tr>
<tr>
<td>$0.00</td>
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<tr>
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<td>1</td>
</tr>
</tbody>
</table>
The following version of the request uses page scaling.

```plaintext
SET SQUEEZE=ON
DEFINE FILE WF_RETAIL_LITE
SHOWPIC/A100='C:\ibi\WebFOCUS82\samples\web_resource\signin\images \favicon.jpg';
END

TABLE FILE WF_RETAIL_LITE
PRINT PRODUCT_CATEGORY
BY SHOWPIC NOPRINT
BY CONTINENT_NAME
BY COUNTRY_NAME
WHERE COUNTRY_NAME EQ 'FRANCE' OR 'ITALY'
WHERE RECORDLIMIT=3000;
ON_TABLE SUBHEAD
" "
" " " Report With PDF Scaling "
" " "
ON COUNTRY_NAME SUBHEAD
" "
" "
ON_TABLE PCHOLD FORMAT PDF

ON_TABLE SET STYLE *
TYPE=REPORT, PAGE-SCALE=AUTO, $
TYPE=DATA, COLUMN=CONTINENT_NAME, FONT=COMIC SANS MS,
   COLOR=BLUE, STYLE=BOLD+ITALIC, $
TYPE=DATA, COLUMN=PRODUCT_CATEGORY, COLOR=FUSCHIA, $
TYPE=HEADING, STYLE=BOLD, COLOR=RGB(0 35 95), SIZE=12, JUSTIFY=CENTER, $
TYPE=SUBHEAD, SIZE=18, STYLE=BOLD, COLOR=RED, $
TYPE=SUBHEAD, IMAGE=(SHOWPIC), SIZE=(.5 .5), $
TYPE=TABHEADING, SIZE=12, STYLE=BOLD, JUSTIFY=CENTER, $
ENDSTYLE
END
```

5. Reporting Language Enhancements
The output is shown in the following image. All of the columns fit across the width of the page, with no paneling.

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<tr>
<th>Customer</th>
<th>Country</th>
<th>Product Category</th>
<th>Cost of Goods</th>
<th>Revenue</th>
<th>MRP</th>
<th>Discount</th>
<th>Gross Profit</th>
<th>Quantity Sold</th>
</tr>
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<td>0.00</td>
<td>$129.99</td>
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</tr>
</tbody>
</table>
Enhancement for Aligning a PDF Report Within a Page

Instead of specifying margin spacing, you can now left-align, center, or right-align an entire PDF report within a page, using the JUSTIFYREPORT StyleSheet attribute.

To left-align, center, or right-align a PDF report, include the following syntax in your procedure, accordingly.

```
TYPE=REPORT, JUSTIFYREPORT={LEFT|CENTER|RIGHT},$
```

**Example:** Centering a PDF Report Within a Page

The following example, shows a PDF report that is centered within a page.

![Budget Dollars By Region and Category](image)

For more information, see the *Creating Reports With WebFOCUS Language* manual.

Synchronizing WebFOCUS Page Breaks With Excel Page Breaks

As of WebFOCUS Release 8206.03, WebFOCUS page breaks in format XLSX report output are synchronized with Excel page breaks.

Inserting Text Into XLSX Workbook Headers and Footers

In addition to supporting the insertion of images in XLSX Workbook headers and footers, you can now insert text in XLSX Workbook headers and footers. You can include text in headers and footers on every printed page, on the first page of the report only, or only on all subsequent pages. You can also specify the justification of placement within the defined area. This functionality is designed to enhance overall usability of the worksheets.
The following request against the GGSALES data source places the ibi_logo.gif image in the left header area and text in the center header area of the worksheet. It also places the webfocus_logo.gif image in the left footer area and text in the center footer area.

For more information, see the Creating Reports With WebFOCUS Language manual.
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WebFOCUS

Server New Features

WebFOCUS Reporting Server Release 8206
DataMigrator Server Release 7710