SeeBeyond ICAN Suite™

eBAM Studio User's Guide

Release 5.0.1

SEEBEYOND®

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Chapter 1

Introduction

BAM (Business Activity Monitoring) involves the collection, aggregation, and presentation of business activity data according to specified Key Performance Indicators (KPIs). eBAM Studio (eBAM) provides the tools for generating custom cross-application digital dashboards for defining and monitoring KPIs that summarize the aggregated business data collected through the eInsight or eGate application layers. The eBAM Web interface allows business analysts to transform data that has been collected over time into meaningful, rich visual presentations.

KPIs provide a context for business processes by turning raw data into useful information, allowing the business analyst to focus on monitoring and analyzing measurable operations and processes across the enterprise. eBAM Studio provides the business analyst with different views of performance data, enabling the timely identification of business trends.

eBAM Studio renders real-time and historical data in familiar visual formats, such as pie and bar charts, for display in digital dashboards. These recognizable, easy-to-read contexts enable the business analyst to quickly translate information into action.

1.0.1 Document Purpose and Scope

The *eBAM Studio User's Guide* explains how to use eBAM to transform collected data into a visual context for accessibility over the Web. By leveraging the Web, key business information can be made accessible in a visual context across the enterprise to provide visibility, reporting, and analysis.

1.0.2 Organization of This Chapter

This introductory chapter includes the following information:

- **Organization of This Book** on page 10
- **Intended Audience** on page 10
- **Writing Conventions** on page 10
- **Online Documentation** on page 11
- **The SeeBeyond Web Site** on page 11
- **Additions and Changes in This Release** on page 11

1.1 Organization of This Book

The *eBAM Studio User's Guide* includes the following information:

- An overview of eBAM's application architecture.
- Prerequisites and installation instructions.
- An overview of eBAM's major user interfaces.
- A detailed description of eBAM's features, with step-by-step instructions to guide you through their setup and configuration.
- How to use eBAM, step-by-step, in a sample implementation that collects run-time data, analyzes it, and displays Key Performance Indicators as specified in the setup.
- A listing of special reserved words that should not be used as field names.

1.2 Intended Audience

This guide is intended for experienced computer users who have the responsibility of helping to set up and maintain a fully functioning ICAN Suite system. This person must also understand any operating systems on which eGate will be installed (Windows or UNIX) and must be thoroughly familiar with Web browsers and Windows-style GUI operations.

1.3 Writing Conventions

The following writing conventions are observed throughout this document.

Table 1 Writing Conventions

Text	Convention	Example
Button, file, icon, parameter, variable, method, menu, and object names.	**Bold** text	▪ Click **OK** to save and close. ▪ From the **File** menu, select **Exit**. ▪ Select the **logicalhost.exe** file. ▪ Enter the **timeout** value. ▪ Use the **getClassName()** method. ▪ Configure the **Inbound** File eWay.
Command line arguments and code samples	`Fixed font`. Variables are shown in ***`bold italic`***.	`bootstrap -p` ***`password`***
Hypertext links	**Blue** text	For more information, see **"Writing Conventions" on page 10**.

Additional Conventions

Windows Systems

For the purposes of this guide, references to “Windows” will apply to Microsoft Windows Server 2003, Windows XP, and Windows 2000.

Path Name Separator

This guide uses the backslash (“\“) as the separator within path names. If you are working on a UNIX system, please make the appropriate substitutions.

1.4 Online Documentation

The documentation for the SeeBeyond ICAN Suite is distributed as a collection of online documents. These documents are viewable with the Acrobat Reader application from Adobe Systems. Acrobat Reader can be downloaded from:

http://www.adobe.com

When downloading Acrobat Reader, make sure to download the version that includes the option for searching **.pdf** files—Acrobat Reader with Search. This version is required to view the searchable master index.

1.5 The SeeBeyond Web Site

The SeeBeyond Web site is your best source for up-to-the-minute product news and technical support information. The site’s URL is:

http://www.seebeyond.com

1.6 Additions and Changes in This Release

Since eBAM 5.0 (released in December 2004 with ICAN 5.0.3), the following features have been added or modified:

- eBAM Applications now allow you to specify data retention.
- Alert conditions now allow you to send an e-mail notification.
- You are now prevented from using SQL keywords as fieldnames.
- The sample implementation has been updated to reflect these above changes.
- The User’s Guide now provides an appendix of reserved words.
- The User’s Guide now provides an index.

Chapter 2

About eBAM Studio

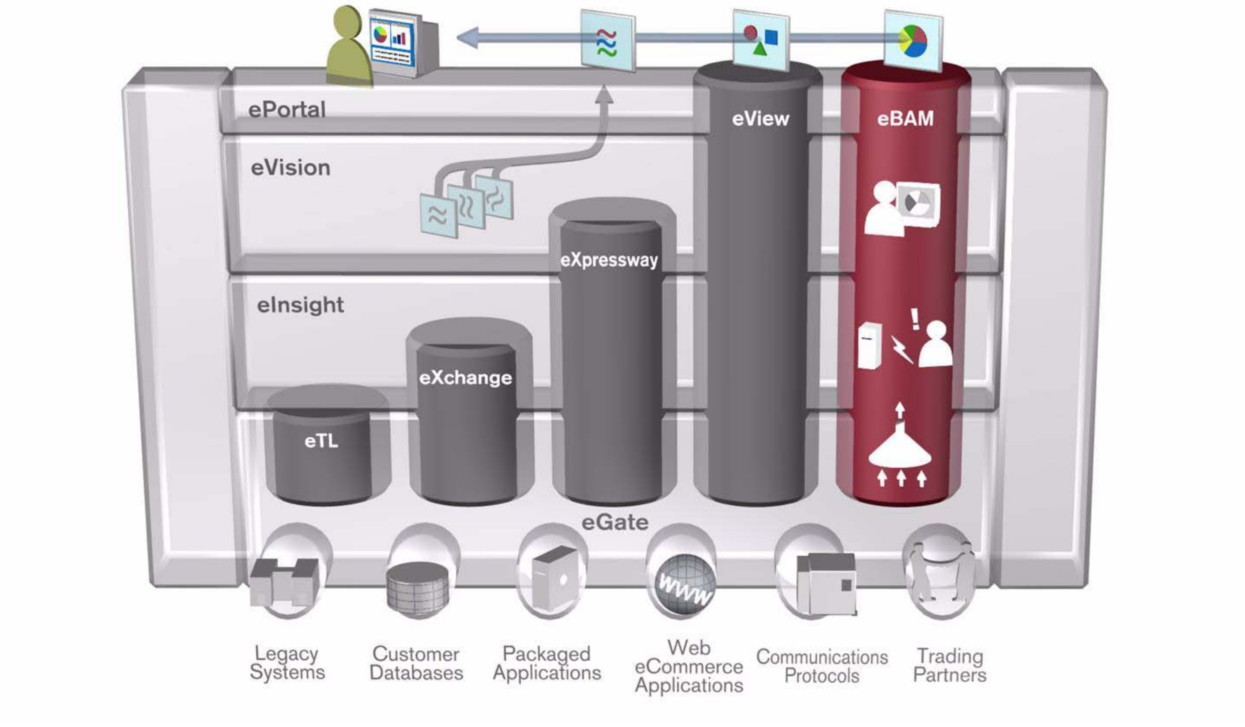
eBAM Studio enables the creation of business activity monitoring applications that intercept the flow of data through ICAN Suite components to produce visual presentations of data analysis based on Key Performance Indicators (KPIs) and alerts.

This chapter provides overviews of eBAM's architecture and overall approach to Business Activity Monitoring.

2.1 Architectural Overview

eBAM takes advantage of the overall J2EE architecture of the ICAN Suite to work hand-in-glove with other ICAN products. As Figure 1 suggests, eBAM can takes advantage of eGate and eInsight to leverage your investment in your other ICAN products, such as eVision and ePortal.

Figure 1 eBAM's Relationship to the ICAN Suite



2.1.1 eBAM Architecture in Conjunction With ICAN

Here are some ways that eBAM leverages other ICAN Suite products and features:

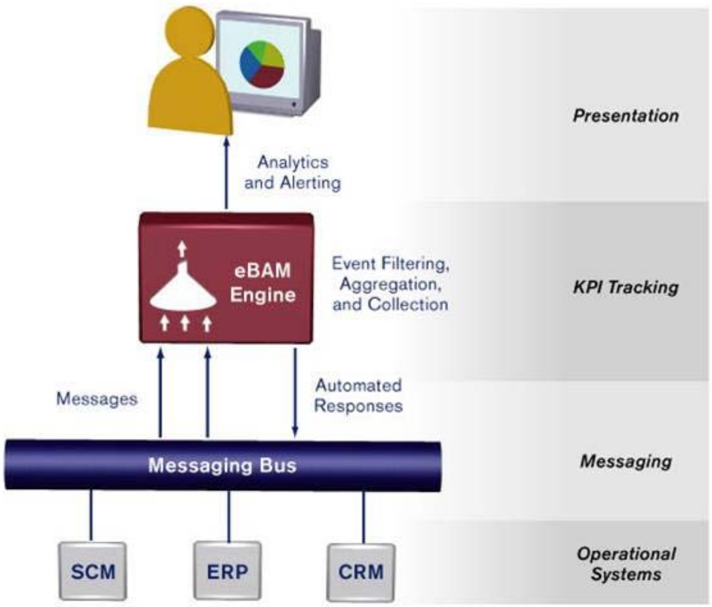
- The Repository stores and controls check-out/check-in and ACL access to eBAM-specific objects such as data definitions, chart configurations, and alert settings.
- Integration Server security provides single-sign-on functionality at design time, and also provides runtime resource management.
- The Enterprise Designer GUI is leveraged for the design of the data collection, graphical display, and notification processes, and the Enterprise Manager GUI allows eBAM to plug in its additional reporting and monitoring functionality.
- The Business Process Modeler is used for alert handling and graphic generation.
- Common deployment experience enabled via ePortal as a natural place for viewing all eBAM applications.

2.1.2 eBAM Data Flow

To allow for task differentiation, scalability, tunability, and maintainability/robustness, the eBAM data flow consists of a stack of separable layers. See Figure 2.

- The *presentation layer* provides a front-end GUI that allows business analysts to see only as much or as little as they decide to see, using the indicators they find meaningful, presented in the fashion they find most congenial.
- The *tracking layer* collects, aggregates, and filters data, passing periodic updates of the information-of-interest upwards to the presentation layer.
- The *messaging layer* communicates with external systems, mediated by eGate's JMS and Collaborations and eInsight's Business Processes.

Figure 2 eBAM's Stacked Layers for Task Differentiation



2.2 eBAM Means Business Activity Monitoring

eBAM takes a simple approach to business activity monitoring: Applications and KPIs.

- Each eBAM *Application* samples the ICAN data traffic and stores results in a way that allows standing queries to update and communicate their findings.
- Each eBAM *KPI* queries and filters the results and communicates them to the GUI. The GUI provides the data view that best suits the user, such as an overall sense of business performance, or specific data trends or anomalies.

2.2.1 What Is Inside an eBAM Application?

An eBAM application requires access to ICAN run-time resources, from which it gathers raw data and processes it (via user-configured aggregation and presentation) to render it into a meaningful format. An eBAM application requires the following:

- Access to run-time data from ICAN suite processes.
- User definitions for Key Performance Indicators.
- User definitions for thresholds and conditions—in other words, user-specified conditions that trigger an eBAM response.
- User-defined actions to take for Alerts and Notifications that are triggered when threshold boundaries are crossed.
- Graphical dashboard presentations—visual presentation of data using bar charts, pie charts, and meters (dial indicators).
- User-defined timeframes, such as frequency and starting/ending dates and times.

eBAM ties into raw data via JMS, eGate, and Web Services to perform real-time analysis on ICAN Suite composite applications.

2.2.2 What Is In a KPI?

An eBAM KPI requires that you specify the following attributes:

- Data points (the facts that form the basis for the calculation of a KPI value)
- The mathematical formula for calculating the KPI value.
- The dashboard (visual) representation of the KPI.
- The events that are triggered when the value of the KPI crosses a preset threshold.

eBAM provides an intuitive palette of graphical tools for constructing queries of the stored data.

Chapter 3

Installing eBAM

This chapter provides the prerequisites and steps for installing eBAM Studio.

3.1 System Requirements

This section lists requirements for operating systems and prerequisite products. The Readme.txt file on the product media contains the most up-to-date information on system requirements for each supported platform.

3.1.1. Platform Support

eBAM supports the following operating systems:

- Microsoft Windows Server 2003, Windows XP SP1a, and Windows 2000 SP3 or SP4
- Sun Solaris 8 and 9 with required patches
- IBM AIX 5.1 and 5.2 with required maintenance level patches
- HP-UX 11.0 and 11i with required patches
- HP Tru64 V5.1A with required patches
- Red Hat Linux 8 (Intel) and Linux Advanced Server 2.1 (Intel version)

3.1.2. Prerequisite Products

The prerequisite products for installing eBAM 5.0.1 are: A **Repository** at release **5.0.1** or later, and *one or the other* of the following:

- **eGate Integrator** and **eInsight Business Process Manager**, at release **5.0.1** or later.
- **eInsight Enterprise System Bus** (ESB) at release **5.0.1** or later.

Because of the APIs and GUIs that eBAM requires, eGate.sar (or eInsightESB.sar) must be uploaded *before* uploading eBAM.sar; for details, see the following section.

If you want to run the sample project (provided in **eBAMDocs.sar**) or follow all of the implementation steps provided in **Chapter 6**, then the **File eWay** at release **5.0.1** or later is also required.

Complete instructions on uploading and downloading **.sar** files and sample files are provided in the following section.

3.2 Installation Steps

The steps for installing eBAM are the same as for other products in the ICAN Suite. You can find general product installation instructions in the *ICAN Suite Installation Guide*, available on the product media and also accessible via Enterprise Manager (Documentation tab).

3.2.1. Uploading eBAM to the Repository

Before you begin

- A Repository server must be running on the machine where you will be uploading the eBAM product files, and a license file (license.sar) and prerequisite product files must have already been uploaded to this Repository.

To upload eBAM product files to the Repository

1. On a Windows machine, start a Web browser and point it at the machine and port where the Repository server is running:

   ```
   http://<hostname>:<port>
   ```

   where

   - *<hostname>* is the name of the machine running the Repository server.
   - *<port>* is the starting port number assigned when the Repository was installed.

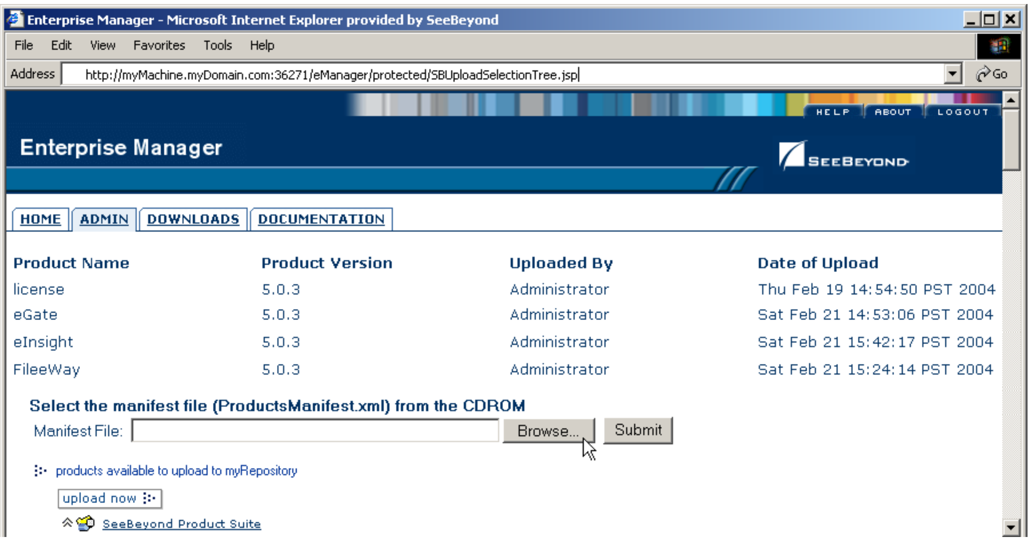
   For example, the URL you enter might look like either of the following:

   ```
   http://localhost:12001
   http://serv1234.company.com:19876
   ```

2. On the Enterprise Manager **SeeBeyond Customer Login** page, enter your username and password.

3. When Enterprise Manager responds, click the **ADMIN** tab. See Figure 3.

Figure 3 Enterprise Manager ADMIN Page



http://myMachine.myDomain.com:36271/eManager/protected/SBUploadSelectionTree.jsp

Product Name	Product Version	Uploaded By	Date of Upload
license	5.0.3	Administrator	Thu Feb 19 14:54:50 PST 2004
eGate	5.0.3	Administrator	Sat Feb 21 14:53:06 PST 2004
eInsight	5.0.3	Administrator	Sat Feb 21 15:42:17 PST 2004
FileeWay	5.0.3	Administrator	Sat Feb 21 15:24:14 PST 2004

Select the manifest file (ProductsManifest.xml) from the CDROM

Manifest File:

products available to upload to myRepository

4 In the ADMIN page, click **Browse**.

5 In the **Choose file** dialog, click **ProductsManifest.xml**, and then click **Open**.

6 In the ADMIN page, click **Submit**.

After the manifest uploads, the lower half of the ADMIN page lists the product files you are licensed to upload to this Repository.

7 In the Products column, find **eBAM**, and then click the **Browse** button for it.

8 In the **Choose file** dialog, click **eBAM.sar**, and then click **Open**.

9 Repeat the previous two steps for **eBAMDocs.sar** and (if you haven't already uploaded it, and if you will be doing the sample implementation described in Chapter 6) **FileeWay.sar**.

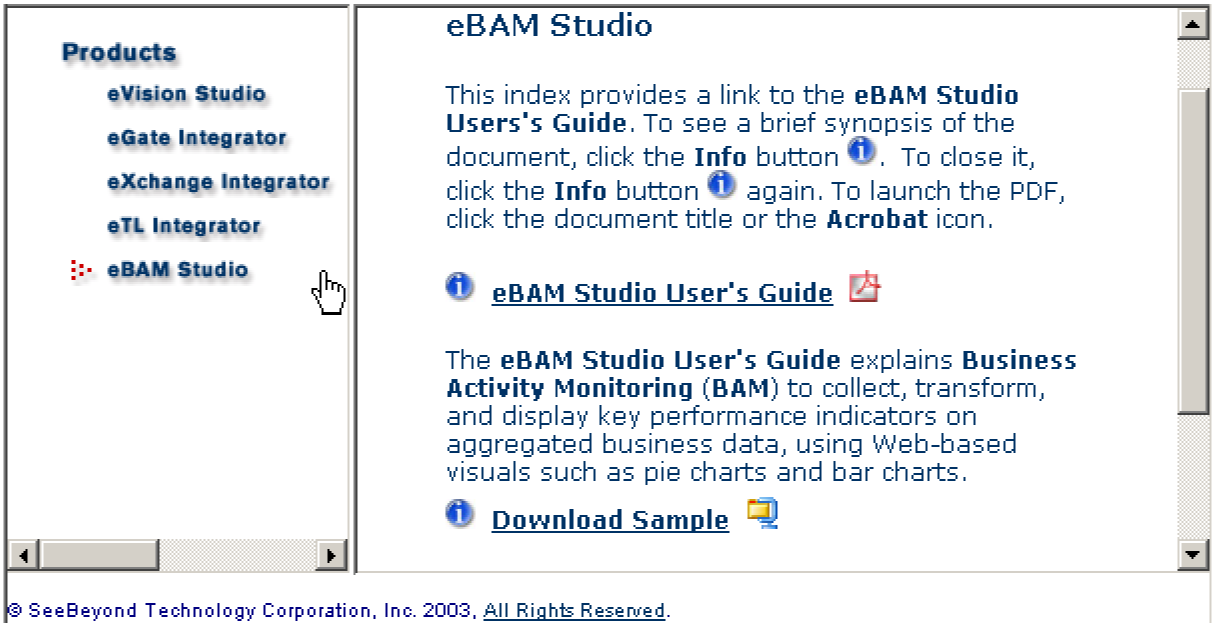
Note: *eBAMDocs.sar contains documentation and sample files. The File eWay is used in the sample implementation to read data from the files and write output.*

10 In the ADMIN page, click the | upload now ⁝· | button.

11 After the files upload, in Enterprise Manager, click the DOCUMENTATION tab.

12 In the DOCUMENTATION page, under **Products** (on the lower left), click **eBAM Studio**; then, under eBAM Studio (on the lower right), click **Download Sample**. See Figure 4.

Figure 4 DOCUMENTATION Page: Downloading eBAM Sample Files



eBAM Studio

This index provides a link to the **eBAM Studio Users's Guide**. To see a brief synopsis of the document, click the **Info** button. To close it, click the **Info** button again. To launch the PDF, click the document title or the **Acrobat** icon.

eBAM Studio User's Guide

The **eBAM Studio User's Guide** explains **Business Activity Monitoring (BAM)** to collect, transform, and display key performance indicators on aggregated business data, using Web-based visuals such as pie charts and bar charts.

Download Sample

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Result: Your repository can now serve the files in eBAM.sar to any Enterprise Designer that connects to it and uses the Update Center.

3.2.2. Updating Enterprise Designer with eBAM

Before you begin

- You must have already downloaded and installed Enterprise Designer.
- A Repository server must be running on the machine where you uploaded the eBAM product files.

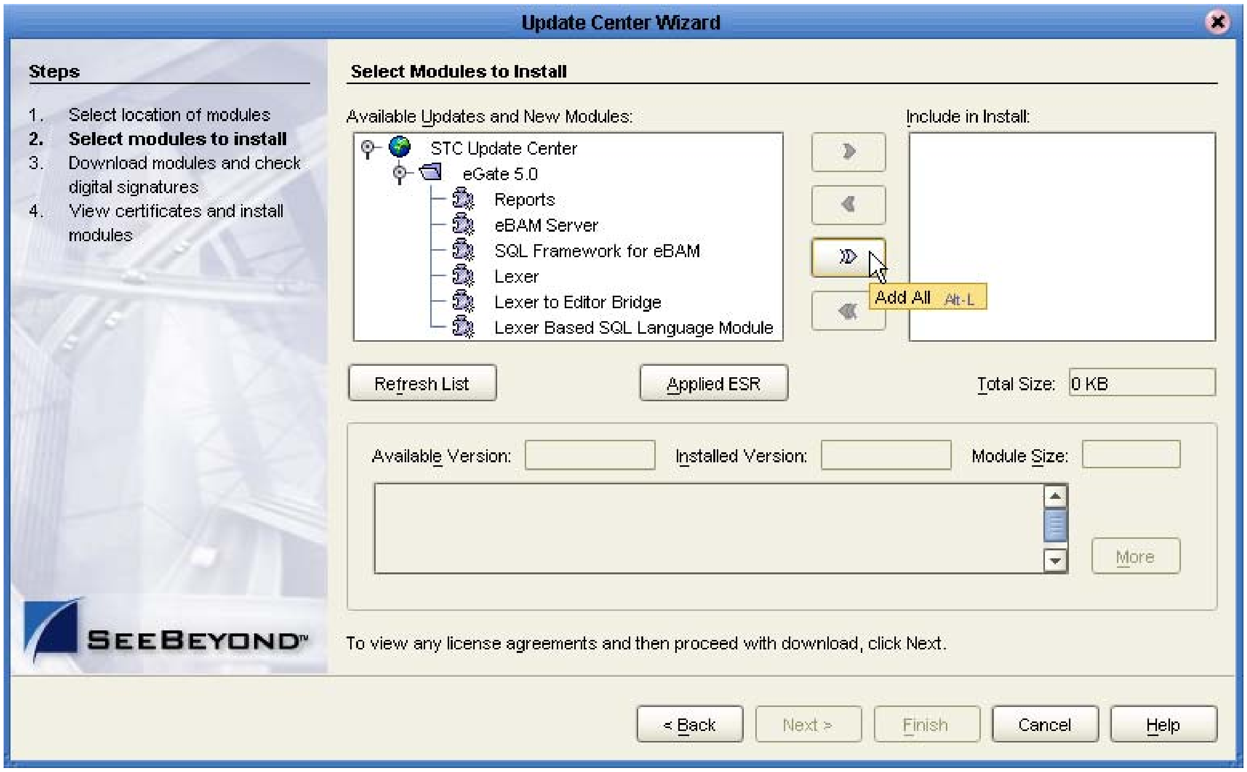
To refresh an existing installation of Enterprise Designer

1 Start Enterprise Designer.

2 On the **Tools** menu, click **Update Center**.

The Update Center shows a list of components ready for updating. See Figure 5.

Figure 5 Update Center Wizard: Select Modules to Install



Update Center Wizard

Steps

1. Select location of modules
2. **Select modules to install**
3. Download modules and check digital signatures
4. View certificates and install modules

Select Modules to Install

Available Updates and New Modules:

- STC Update Center
  - eGate 5.0
    - Reports
    - eBAM Server
    - SQL Framework for eBAM
    - Lexer
    - Lexer to Editor Bridge
    - Lexer Based SQL Language Module

Include in Install:

Total Size: 0 KB

Available Version:

Installed Version:

Module Size:

To view any license agreements and then proceed with download, click Next.

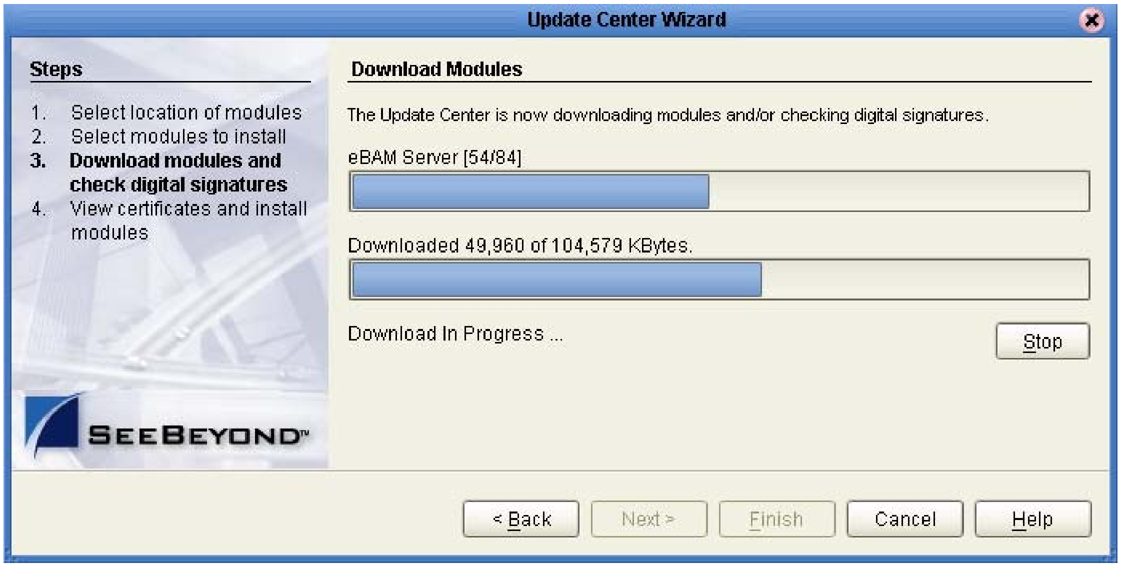
3 Click **Add All** (the button with a doubled chevron pointing to the right).

All modules move from the Available/New pane to the **Include in Install** pane.

4 Click **Next** and, in the next window, click **Accept** to accept the license agreement.

The wizard shows you the progress of the download. See Figure 6.

Figure 6 Update Center Wizard: Progress Bars



Update Center Wizard

Steps

1. Select location of modules
2. Select modules to install
3. **Download modules and check digital signatures**
4. View certificates and install modules

Download Modules

The Update Center is now downloading modules and/or checking digital signatures.

eBAM Server [54/84]

Downloaded 49,960 of 104,579 KBytes.

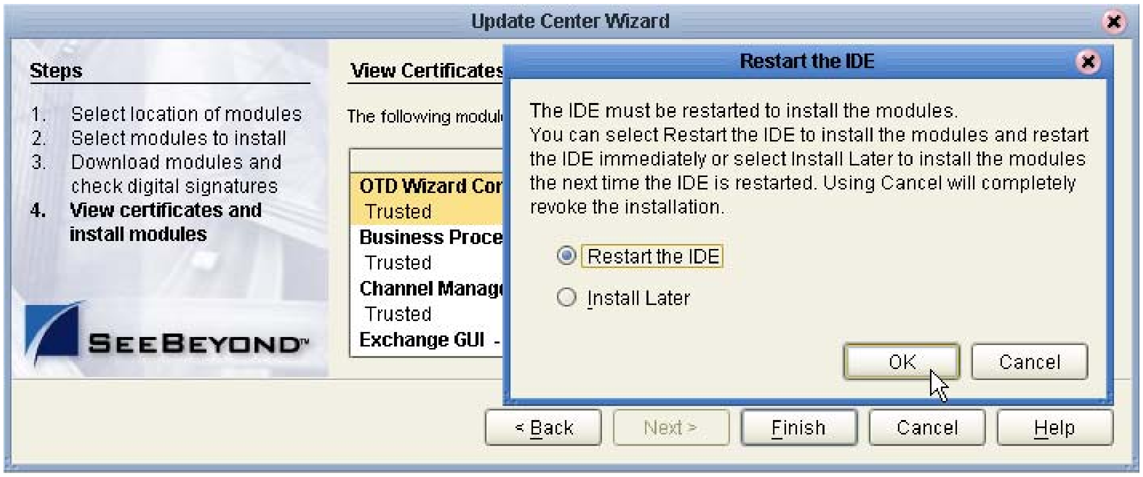
Download In Progress ...

5 When the progress bars indicate the download has ended, click **Next**.

6 Review the certificates and installed modules, and then click **Finish**.

7 When prompted to restart Enterprise Designer, click **OK**. See Figure 7.

Figure 7 Update Center Wizard: Restart Enterprise Designer



Update Center Wizard

Steps

1. Select location of modules
2. Select modules to install
3. Download modules and check digital signatures
4. **View certificates and install modules**

View Certificates

The following modul

OTD Wizard Cor
Trusted
Business Proce
Trusted
Channel Manag
Trusted
Exchange GUI -

Restart the IDE

The IDE must be restarted to install the modules. You can select Restart the IDE to install the modules and restart the IDE immediately or select Install Later to install the modules the next time the IDE is restarted. Using Cancel will completely revoke the installation.

● Restart the IDE
○ Install Later

Result: When Enterprise Designer restarts, the installation of eBAM Studio is complete, and you can use all eBAM tools provided on the Enterprise Designer and Enterprise Manager frameworks.

Chapter 4

Using eBAM Studio

This chapter provides information on the eBAM features and step-by-step instructions for using them.

The instructions in this chapter assume you are already familiar with the eGate repository and logical host, and therefore focuses on the concepts and design-time GUI operations specific to eBAM.

4.1 eBAM Applications

When you create an eBAM application, here are the important things to keep in mind:

- *External data flow*—You must identify a source of data, decide how to bring it into the eBAM application (reading records from a file, accessing a topic, and so forth), and parse the data using the **unmarshal** operation of the eBAM OTD you create. This is standard eGate methodology, and therefore not described in detail here.
- *Data definition*—For the parsed data, you must determine which [subset of the] data to pass to the eBAM application, and create names for the data elements of interest. Data passes into eBAM via the **add** activity (generated from the data definition).
- *Filtering by condition*—For alerts, and optionally for charts, you set up one or more conditions that must be met for data to be eligible for further processing by eBAM. This is done using the Condition Editor.
- *What to communicate*—For alerts, typically the only item to communicate is simply that the triggering condition was met. For charts, you calculate a metric such as a key performance indicator (KPI), using the Chart Editor to identify one or more fields and how to manipulate them to create the metric you want to communicate.
- *How to communicate*—Alert data can be communicated in two ways: via an e-mail message you design, and/or via the **notify** activity (generated from the alert condition) placed into an eInsight business process, making the data available for further processing. For a chart displaying a KPI, you select a type (pie, bar, or meter) and specify its properties (update frequency, size, color, font, spacing, and so forth). Charts are displayed in a special Web application called the Charts Viewer.

Components of an eBAM Application

Each eBAM Application consists of exactly one data definition, zero or more charts, and zero or more alert conditions. Charts and alerts are based on data definitions.

- The *data definition* is the infrastructure of the application. In it, you specify which data you are interested in, and how to label and organize the data. For step-by-step procedures, see **"Setting Up an eBAM Application's Data Definition" on page 21**.
- A*lert conditions* are triggered whenever a condition is met by one of the data items, such as exceeding a threshold. For step-by-step procedures, see **"Setting Up the Application's Alert Conditions" on page 28**.
- *Charts* provide real-time feedback on the current data set according to conditions you set up. For further information and step-by-step procedures, see **"About Charts" on page 34**. and **"Setting Up the Application's Charts" on page 37**.

4.2 Setting Up an eBAM Application's Data Definition

Before you begin: You must have a clear idea of the data you want to gather before you create the application. You should know the answers to the following questions:

- Altogether, how many data elements should be defined, and of what data type? (Each data element must be of type **char**, **float**, **integer**, **timestamp**, or **varchar**.)
- For each data element, what is the best name? (Each data element in an application must have a unique name; this is the name used when constructing conditions and charts, but is not necessarily the label that appears on the chart itself.)
- For each data element, what should be the default value? (If not specified, the default default is a null value of the appropriate type.)
- How many hours, days, months, or years should a dataset be retained?

In other words, be prepared with information whose form is similar to that of Table 2:

Table 2 Metadata for Creating a Data Definition

	Name	Default Value	Data Type
1	OrderNum	999999999	integer
2	DateOfOrder	2099-12-31 23:59:59	timestamp
3	CustName1	!! Customer Name Must Be Supplied !!	varchar
(...)	(...)	(...)	(...)
n	TotalDollarsThisOrder		float

Tip: Data definitions, once created, cannot be modified. Therefore, when you reach the end of the wizard, be sure to review your definition carefully before clicking Finish.

To create a new eBAM Application and specify its data definition

1. In Enterprise Designer, in the project tree (left side), right-click the project and, on the popup context menu, point at New and click **eBAM Application**.

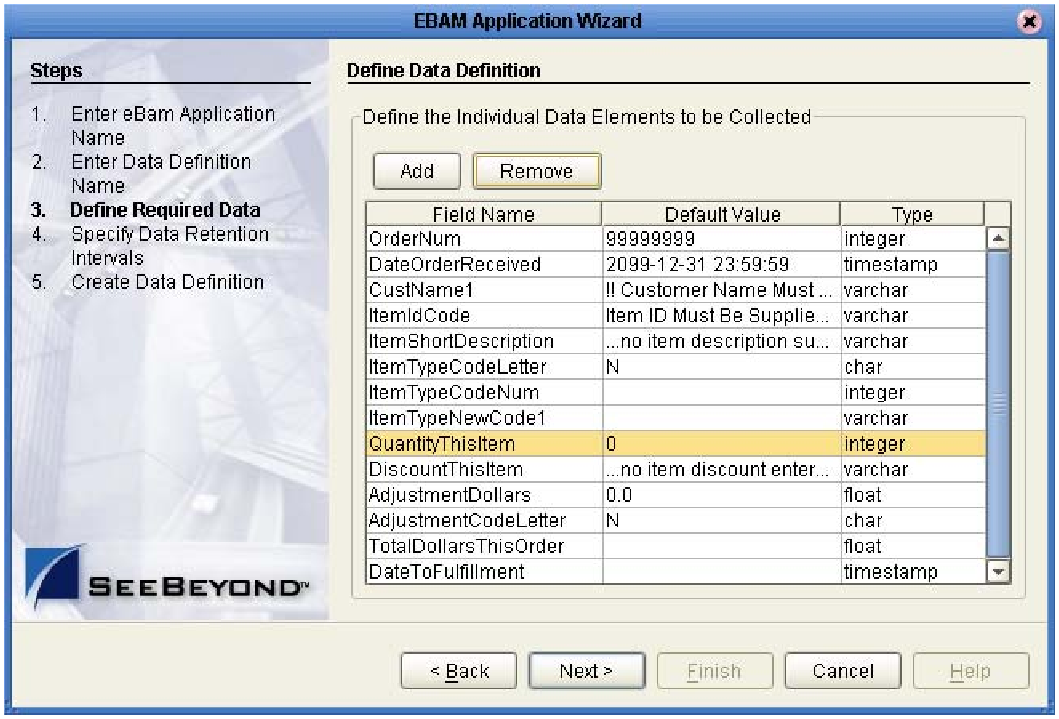
   The eBAM Application wizard opens, prompting you to name the application.

2. In step 1 of the wizard, type in a name for application, and then click **Next**.
3. In step 2 of the wizard, type in a name for the data definition, and then click **Next**.
4. In step 3 of the wizard, click **Add** several times, and then supply names, default values, and data types for the data elements.

   Tip: If the order of the elements is important to you, double-check frequently to ensure you have not omitted a row—clicking **Add** appends each new row to the end. (However, order is unimportant to the queries, and some of the GUIs alphabetize by field name.)

5. As needed, click **Add** to append additional rows or click **Remove** to remove unneeded rows. When done, click **Next**. See Figure 8.

Figure 8 Setting Up a Data Definition



Steps

1. Enter eBam Application Name
2. Enter Data Definition Name
3. **Define Required Data**
4. Specify Data Retention Intervals
5. Create Data Definition

Define Data Definition

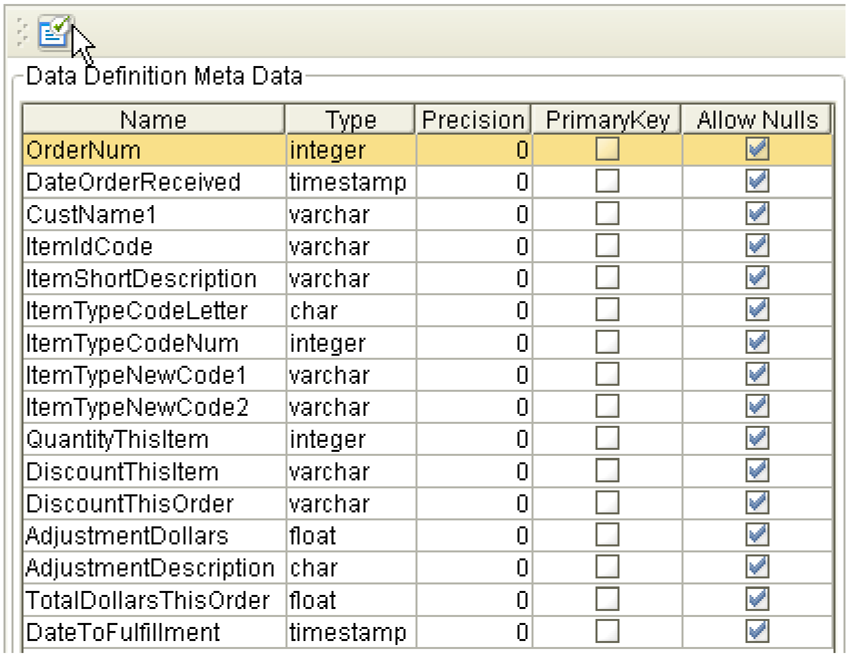
Define the Individual Data Elements to be Collected

Field Name	Default Value	Type
OrderNum	99999999	integer
DateOrderReceived	2099-12-31 23:59:59	timestamp
CustName1	!! Customer Name Must ...	varchar
ItemIdCode	Item ID Must Be Supplie...	varchar
ItemShortDescription	...no item description su...	varchar
ItemTypeCodeLetter	N	char
ItemTypeCodeNum		integer
ItemTypeNewCode1		varchar
QuantityThisItem	0	integer
DiscountThisItem	...no item discount enter...	varchar
AdjustmentDollars	0.0	float
AdjustmentCodeLetter	N	char
TotalDollarsThisOrder		float
DateToFulfillment		timestamp

6. In the Data Retention step, specify how long data is allowed to age before it expires, and how often to purge expired data from the database. For example, to keep data for a week, enter **7** and **Days**; to purge every five minutes, enter **5** and **Minutes**.
7. In the completed data definition, review all values carefully before continuing. As needed, click Back and Next to return to a step and make changes.
8. Click **Finish** only after you are completely satisfied with the data definition. *After you click Finish, you will be unable to make further changes to the metadata definition* (although you can use Properties to adjust data retention parameters).

Result: On the left side, the project tree displays the new eBAM application. On the right side (the canvas), the eBAM Editor opens to display the data definition; see Figure 9.

Figure 9 eBAM Editor Showing Completed Data Definition



Data Definition Meta Data

Name	Type	Precision	PrimaryKey	Allow Nulls
OrderNum	integer	0	□	☑
DateOrderReceived	timestamp	0	□	☑
CustName1	varchar	0	□	☑
ItemIdCode	varchar	0	□	☑
ItemShortDescription	varchar	0	□	☑
ItemTypeCodeLetter	char	0	□	☑
ItemTypeCodeNum	integer	0	□	☑
ItemTypeNewCode1	varchar	0	□	☑
ItemTypeNewCode2	varchar	0	□	☑
QuantityThisItem	integer	0	□	☑
DiscountThisItem	varchar	0	□	☑
DiscountThisOrder	varchar	0	□	☑
AdjustmentDollars	float	0	□	☑
AdjustmentDescription	char	0	□	☑
TotalDollarsThisOrder	float	0	□	☑
DateToFulfillment	timestamp	0	□	☑

Tip: Any time you complete a new data definition, it is good practice to use the Show Sample Data tool to double-check the data definition against sample data.

To validate the metadata definition

1. In the eBAM Editor, on the tool palette, click: **Show Sample Data**

   The Sample Data pane appears below the main eBAM Editor.

2. On the Sample Data tool palette, click: **Import**

3. In the File Import wizard's **Select File** step, browse to the location of the sample data file and select it.

4. In the formatting step, make appropriate choices (see Table 3), and then click Next.

Table 3 Specifying Formatting Type and Encoding for Imported Sample Data

Item	Choices	Notes
Table name		Must start with letter, and contain only letters, numbers, and underscores
Encoding scheme	**ASCII (ISO646-US)** UTF-8 EBCDIC: USA-Canada (cp037)	**ASCII** — 7-bit encoding, roman characters. UTF-8 — 8-bit encoding of Unicode. EBCDIC — for certain mainframe systems
File format	Delimited Fixed-width	Delimited files specify escape characters to distinguish fields in a record and one record from the next; fixed-width files specify a preset length for each record.

5 In the parsing step, make appropriate choices for delimited data (see Table 4) or fixed-width data (see Table 5), and then click Next.

Table 4 Parsing Information for Imported Sample Delimited Data

Item	Value	Notes
Default SQL Type	Any of the following: bigint, bit, char, date, decimal, double, longvarchar, numeric, real, smallint, time, timestamp, tinyint, **varchar**	

Record Delimiter	**{newline (lf)}**
	{cr}
	{cr-lf}
		newline — each new line starts a new record.
		cr — each carriage-return starts a new record.
		cr-lf — each carriage-return+linefeed starts a new record.

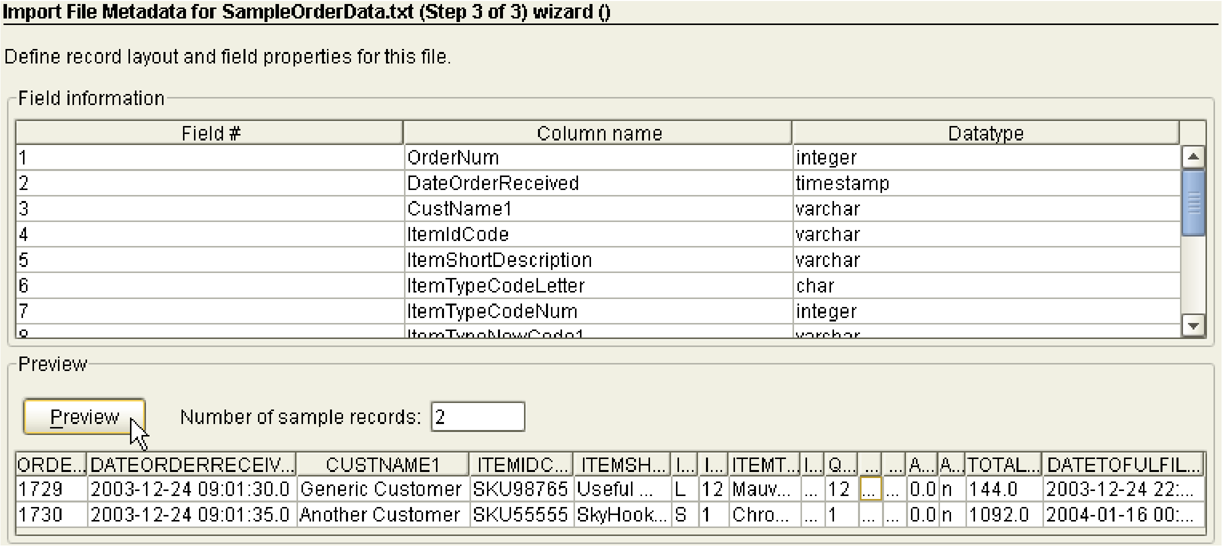
	You can type also type in a character or control character; for example, to specify TAB, type in: **\t**	
Field	**{comma}** {tab} {pipe}	**{comma}** — each instance of , starts a new field. {tab} — each tab character starts a new record. {pipe} — each instance of | starts a new field.
Text Qualifier	**none** " '	You can indicate whether text is distinguished by quotemarks; only doublequotes or singlequotes are supported.
First line contains field names?	**False** True	You can indicate whether the first record of the data consists only of labels for the fields, rather than actual data.

Table 5 Parsing Information for Imported Sample Fixed-Width Data

Item	Value	Notes
Default SQL Type	Any of the following: bigint, bit, char, date, decimal, double, longvarchar, numeric, real, smallint, time, timestamp, tinyint, **varchar**	
Record Length	**0**	To override the default, type in a nonzero number.
HeaderBytesOffset	**0**	To override the default, type in a nonzero number.
Field Count	**0**	To override the default, type in a nonzero number.

6 In the next step, verify the record layout and field properties in the Field information pane, enter the number of sample records to read and display in the preview pane, and then click **Preview**. See Figure 10, or **Figure 30 on page 55**.

Figure 10 Show Sample: Preview of Field Layout



Import File Metadata for SampleOrderData.txt (Step 3 of 3) wizard ()

Define record layout and field properties for this file.

Field information

Field #	Column name	Datatype
1	OrderNum	integer
2	DateOrderReceived	timestamp
3	CustName1	varchar
4	ItemIdCode	varchar
5	ItemShortDescription	varchar
6	ItemTypeCodeLetter	char
7	ItemTypeCodeNum	integer
8	ItemTypeNewCode1	varchar

Preview

Number of sample records: 2

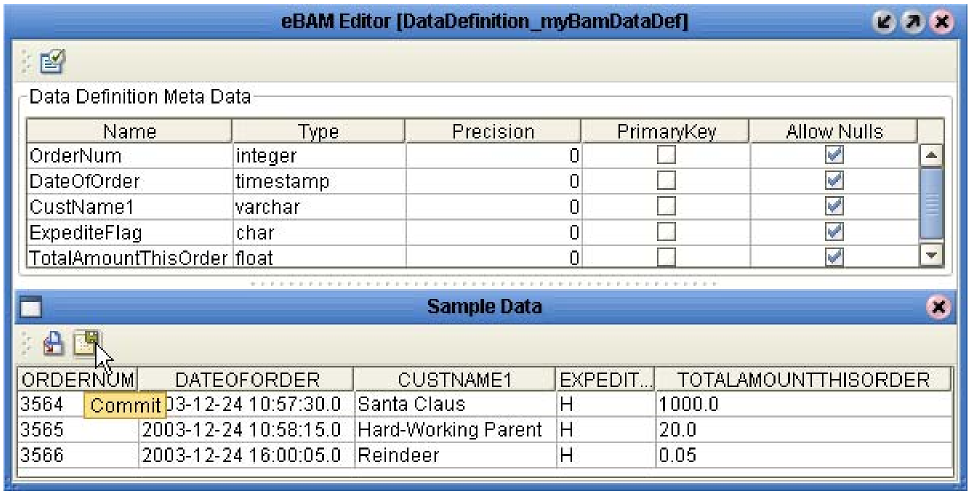
ORDE...	DATEORDERRECEIV...	CUSTNAME1	ITEMIDC...	ITEMSH...	I...	I...	ITEMT...	I...	Q...	...	...	A...	A...	TOTAL...	DATETOFULFIL...
1729	2003-12-24 09:01:30.0	Generic Customer	SKU98765	Useful ...	L	12	Mauv...	...	12	...	...	0.0	n	144.0	2003-12-24 22:...
1730	2003-12-24 09:01:35.0	Another Customer	SKU55555	SkyHook...	S	1	Chro...	...	1	...	...	0.0	n	1092.0	2004-01-16 00:...

If the sample data is valid (that is, in accord with the layout, encoding, formatting, and properties you specified), the Preview pane displays a table whose rows are the first few records, with each column headed by the data element name.

7 As needed, you can click **Back** and **Next** to return to a step and make changes to layout or formatting, or specify a different input file. When satisfied, click **Finish**.

8 The entire data set is parsed and displayed in the Sample Data pane. For examples, see Figure 31 on page 56 and Figure 11 below.

Figure 11 Sample Data Displayed in eBAM Editor



eBAM Editor [DataDefinition_myBamDataDef]

Data Definition Meta Data

Name	Type	Precision	PrimaryKey	Allow Nulls
OrderNum	integer	0	☐	☑
DateOfOrder	timestamp	0	☐	☑
CustName1	varchar	0	☐	☑
ExpediteFlag	char	0	☐	☑
TotalAmountThisOrder	float	0	☐	☑

Sample Data

ORDERNUM	DATEOFORDER	CUSTNAME1	EXPEDIT...	TOTALAMOUNTTHISORDER
3564	03-12-24 10:57:30.0	Santa Claus	H	1000.0
3565	2003-12-24 10:58:15.0	Hard-Working Parent	H	20.0
3566	2003-12-24 16:00:05.0	Reindeer	H	0.05

9 Optionally, if you want to commit this data set to being stored, click **Commit**.

Tip: When you finish a new data definition, it is good practice to commit sample data. This not only validates that you have set up the metadata correctly, it also makes the data available for other purposes, such as previewing the appearance of a chart.

After the data definition has been created, populated, and validated, it is available for use in one or more alert conditions and charts.

4.3 Alert Conditions and Charts

Each alert condition or chart requires:

- A name and an associated data definition. This is set when you run the wizard that creates the alert condition or chart.
- Zero or more conditions set on fields in the data definition instance.
  - For step-by-step instructions on setting up conditions, see **“Setting Data Definition Conditions for an Alert or Chart” on page 26** below, and **“Using the Condition Editor” on page 27**.
- One or more fields in the dataset view, with appropriate mappings to them from operators and data definition fields.
  - For instructions on setting up dataset views and mappings for alert conditions, see the **procedure on page 30**.
  - For charts, see the **procedure on page 38**.
- Property settings for the alert or chart as a whole, such as e-mail address, resend frequency, or chart display parameters
  - For instructions on configuring properties for an alert condition, see the **procedure on page 32**.
  - For chart properties, see **Table 10 on page 34** through **Table 14 on page 36**, as well as the **procedure on page 39**.

4.3.1 Setting Data Definition Conditions for an Alert or Chart

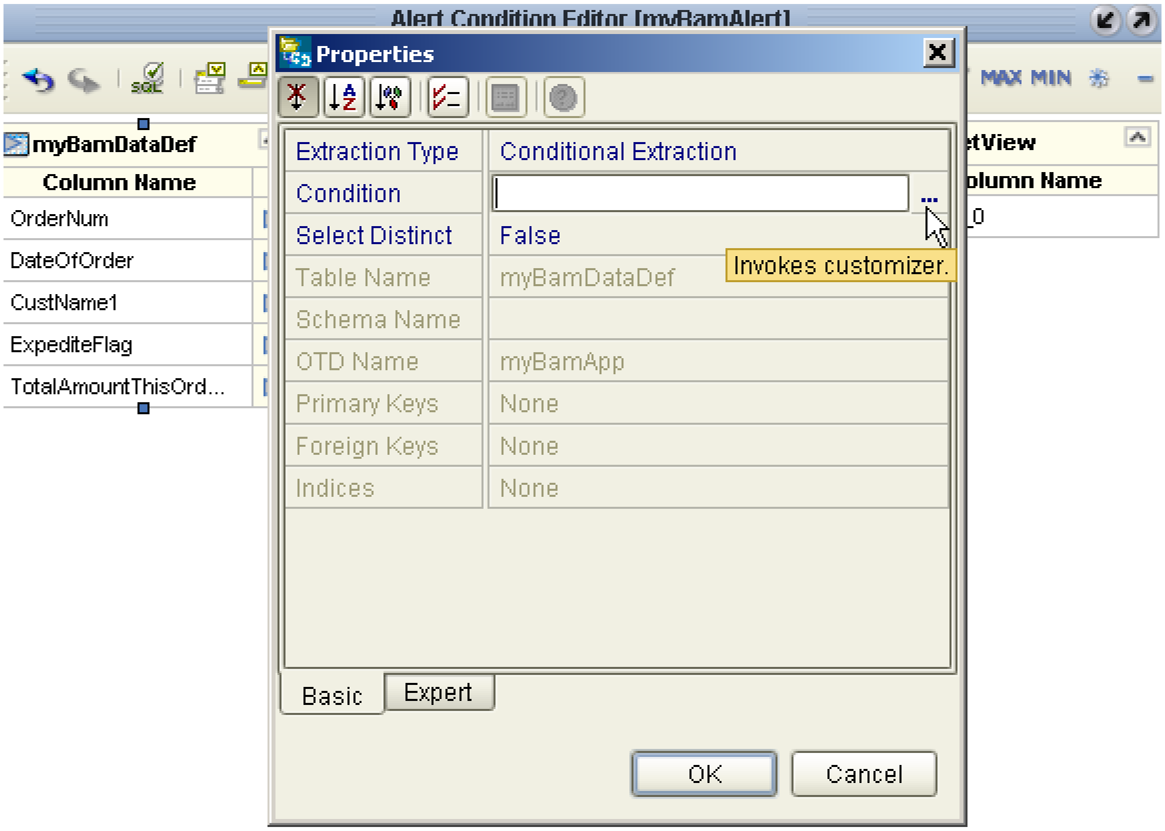
An alert usually depends (and chart can depend) on a condition that has been set on its data definition instance. The condition is a property of the data definition instance that appears in the alert (or chart); the **Condition** property is set using the **Condition Editor**.

To view or modify a condition on a data definition instance

1. In the Alert Editor or Chart Editor (discussed in detail later), right-click the data definition instance on the left and, on the popup context menu, click **Properties**.

   The **Properties** dialog opens, with the **Basic** tab displayed. See Figure 12.

Figure 12 Basic Properties of a Data Definition



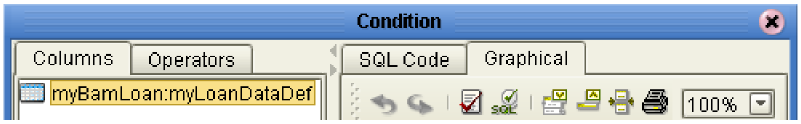
Extraction Type	Conditional Extraction
Condition	
Select Distinct	False
Table Name	myBamDataDef
Schema Name	
OTD Name	myBamApp
Primary Keys	None
Foreign Keys	None
Indices	None

2 In the Properties dialog, click **Condition**, and then click the ellipsis [...] to open the **Condition** editor.

Using the Condition Editor

The **Condition** editor constructs filters that constitute conditions on the data definition. Although you can type in (or use CTRL+V to paste) native SQL in text form, the editor offers features that help SQL-adept users avoid making mistakes, while allowing other users with less SQL knowledge to construct statements by purely graphical means.

In the Condition editor, you can switch at will both between the two tree listings (Columns and Operators) and between the two user modes (SQL Code and Graphical).



- The **Columns** tree, which opens via double-click, lists all data elements in the data definition. In both SQL Code and Graphical mode, you drag elements from this tree onto the canvas, after which you will specify operations to be performed on them.
- The **Operators** tree lists all SQL operations, providing a quick language reference for SQL Code mode (although you can also drag-and-drop) and providing tools to be dragged onto the Graphical canvas. For any operator placed on the canvas, you can hover your cursor over the title or any field for help on the operator or field.

- The **SQL Code** canvas allows you to enter native SQL commands and/or to drag elements or operators from the trees on the left. Its tool palette provides two tools:

Table 6 Tools Provided in the SQL Code Canvas of the Condition Editor

☑	**Validate** checks the syntactical validity of the SQL code listing and reports success or any errors found.

- The **Graphical** canvas allows you to create conditions simply by dragging elements and operators from the trees on the left. Its tool palette provides several tools:

Table 7 Tools Provided in the Graphical Canvas of the Condition Editor

↶	**Undo** and **Redo** allow you travel backward and forward through the sequence of modifications you have made to the graphical canvas.
↷	
☑	**Validate** checks the syntactical validity of the graph and, in the Output pane, reports success or any errors found, highlighting all operators that are unsatisfied.
SQL	**Show SQL for Condition** tries to validate the graph and, if successful, displays the corresponding SQL statement for the entire condition. In the Output pane, you can specify which "flavor" of SQL to display, of: Oracle8, Oracle9, SQL Server, internal, or ANSI92.
⊞	**Expand All Graph Icons** provides more detail, by showing all input to (and output from) all fields in all operators on the canvas.
⊟	**Collapse All Graph Icons** provides more screen space by minimizing all operators, showing only the connections to and from them.
⇄	**Autolayout All Graph Icons** disentangles crossed connections and overlaps, and creates left-to-right flow of input to output.
🖨	**Print Graph** allows you to print the graph, using various scaling options.

When the chart editor or alert editor displays a data definition that has a condition, a small "filter" icon—▼—appears to the right of the data element(s) being watched.

4.3.2 Setting Up the Application's Alert Conditions

eBAM allows you to set up tests whereby an alert (notification) is triggered whenever a condition is met. This can be as simple as a particular data item exceeding a threshold, or it might be a complex comparison between ratios of many aggregates of data items. You use the Condition editor, discussed earlier, to create queries to detect the condition. In addition to conditions on the data definition, you also set up a dataset view.

An eBAM application can contain many alert conditions, or only one, or none at all. Each alert condition requires the following:

- *Data definition* and name: See **To create a new alert condition** on page 29.
- *Filtering by condition:* See **"To configure a condition on a data definition" on page 29**.

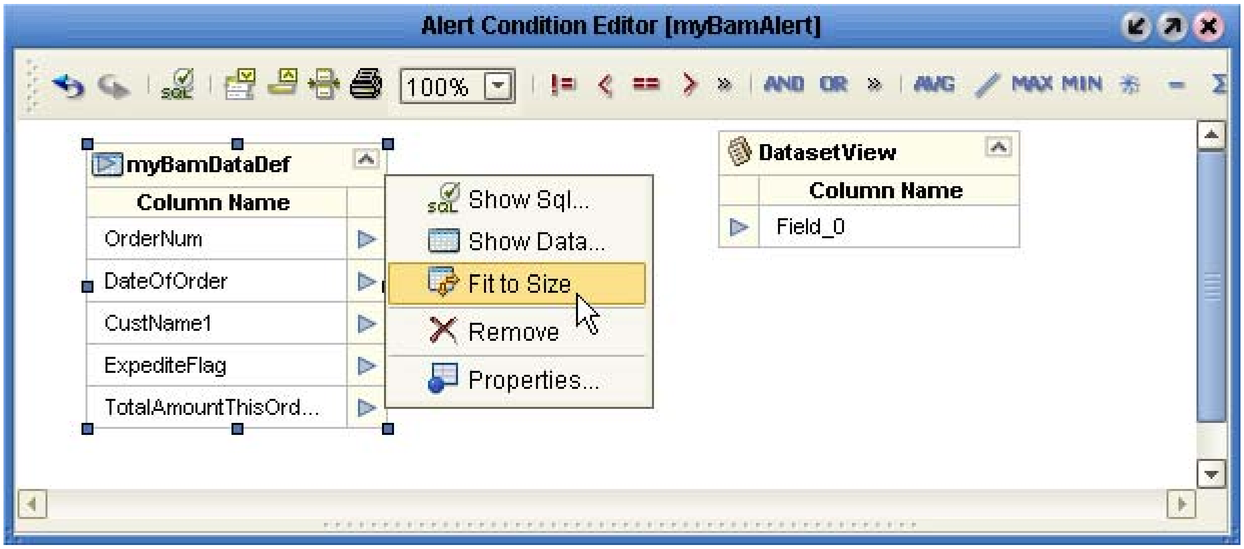
- *What to communicate:* One or more fields in the dataset view, with appropriate mappings to them from operators and data definition fields; see **"To configure the dataset view, mapping operators and data definition fields to its fields" on page 30**.
- *How to communicate:* Settings for the alert as a whole, such as resend frequency; see **"To configure properties of the entire alert condition" on page 32**.

To create a new alert condition

1. In the project tree, under the eBAM application, right-click **Alert Conditions** and, on the popup context menu, click: **New Alert Condition**
2. In step 1 of the wizard, type in a name for the alert condition, and then click **Next**.
3. In step 2, select the check box for the data definition, and then click **Finish**.

   The project tree displays the new object under Alert Conditions, and the Alert Editor opens to display an instance of the data definition on the left side of the canvas and an empty dataset view on the right side.
4. To see the entire data definition instead of a scrollable view, right-click it and, on the menu, click **Fit To Size**. See Figure 13.

Figure 13 Newly Created Alert Condition



To configure a condition on a data definition

1. In the Alert Editor, right-click the data definition; on the popup menu, click **Properties**. In the Properties dialog, click **Condition**, and then click the ellipsis **[...]** to open the Condition editor.
2. In the **Columns** tab, double-click the data definition open it and display its fields.
3. See **"Setting Data Definition Conditions for an Alert or Chart" on page 26**.

To configure the dataset view, mapping operators and data definition fields to its fields

1. In the Alert Editor, right-click **DatasetView** and, on the menu, click: **Configure**
2. In the **Configure Dataset View** dialog, click **Add** as many times as needed to accommodate all the report fields you will need.
3. Double-click each field, edit the name, and press ENTER. When finished, click OK.

Note: *Do not use field names that match SQL reserved words, irrespective of uppercase, lowercase, or mixed case. See* **"SQL Reserved Words" on page 73**.

4. In the Alert Editor, drag operators as needed from the Operator Palette (see **Figure 14 on page 31**) into the canvas between the data definition and the dataset view, and then map zero or more fields from the data definition through zero or more operators, with all output ultimately going into the dataset view. For examples of this, see the background of **Figure 15 on page 32**, or see **Figure 36 on page 61**.

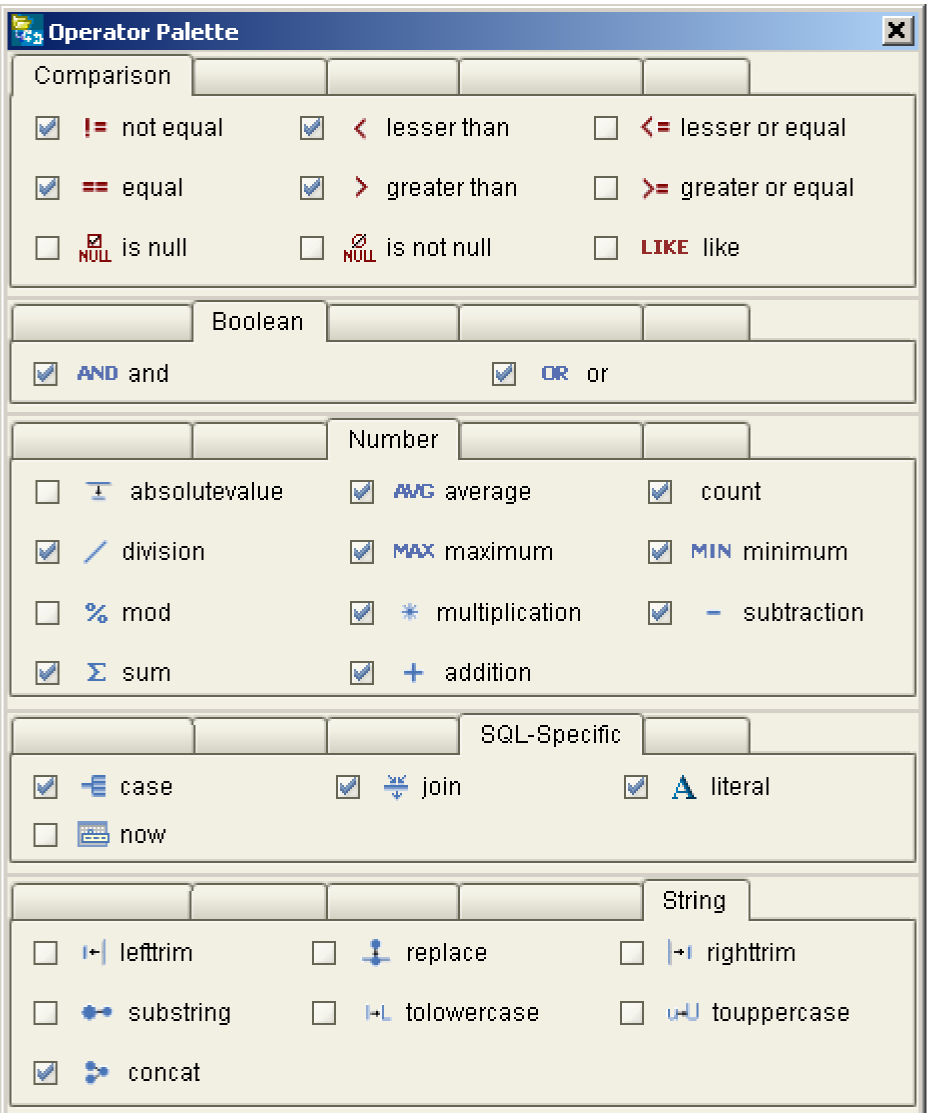
Note: *Data type conversions are done automatically where needed; for timestamps converted to varchar, permit truncation to occur.*

5. Optionally, you may want to click **Show SQL** occasionally to see SQL statements you are creating graphically, or use other graphical design tools listed in Table 8.

Table 8 Tools Provided in the Tool Palette of the Alert Editor

↶	**Undo** and **Redo** allow you travel backward and forward through the sequence of modifications you have made to the graphical canvas.
↷	
SQL	**Show SQL** tries to validate the graph and, if successful, displays the corresponding SQL statements for the mapping. In the Output pane, you can specify which "flavor" of SQL to display, of: Oracle8, Oracle9, SQL Server, internal, or ANSI92.
▤	**Expand All Graph Icons** provides more detail, by showing all input to (and output from) all fields in all operators on the canvas.
▭	**Collapse All Graph Icons** provides more screen space by minimizing all operators, showing only the connections to and from them.
⇄	**Autolayout All Graph Icons** disentangles crossed connections and overlaps, and creates left-to-right flow of input to output.
🖨	**Print Graph** allows you to print the graph, using various scaling options.

Figure 14 Operator Palette for SQL Operations



Comparison

☑ != not equal ☑ < lesser than □ <= lesser or equal
☑ == equal ☑ > greater than □ >= greater or equal
□ is null □ is not null □ LIKE like

Boolean

☑ AND and ☑ OR or

Number

□ absolutevalue ☑ AVG average ☑ count
☑ / division ☑ MAX maximum ☑ MIN minimum
□ % mod ☑ * multiplication ☑ - subtraction
☑ Σ sum ☑ + addition

SQL-Specific

☑ case ☑ join ☑ A literal
□ now

String

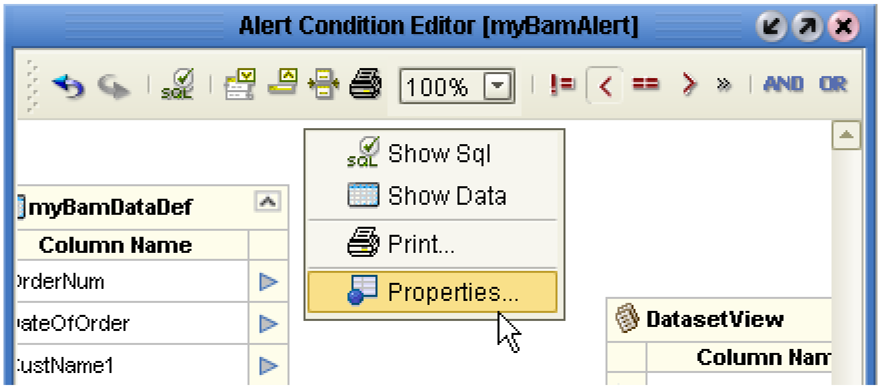
□ lefttrim □ replace □ righttrim
□ substring □ tolowercase □ touppercase
☑ concat

6 When you have set up all dataset view fields, save your work.

You are now ready to configure the properties of the alert condition as a whole.

To configure properties of the entire alert condition

1 In the Alert Editor, right-click a blank portion of the canvas itself and, on the popup menu, click: **Properties** (see below)

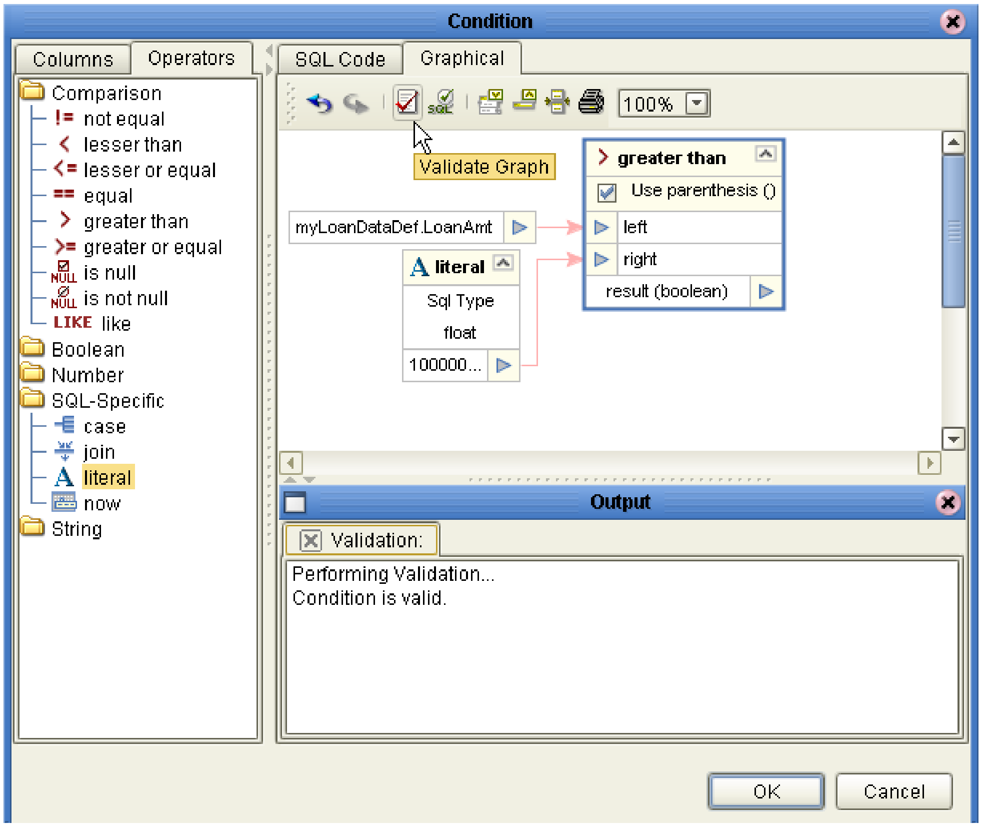


2 In the Condition Properties dialog:

A Change the Notification Interval and Resend Frequency to appropriate values and time units: Notification Interval specifies how often to run the process; Resend Frequency specifies how often to send an alert that was previously sent.

B Then, for Keys, open the Keys editor by clicking the ellipsis [...] to the far right. From the dataset view fields listed under Keys, select one or more check boxes, and then click OK. See Figure 15.

Figure 15 Setting Properties for the Entire Alert Condition



Performing Validation...
Condition is valid.

Note: *The key, or a set of keys, is used to prevent duplication. When a record is found that matches the condition, an alert is sent only if its key (or set of keys) mismatches all the records already staged for alert, or if the Resend Frequency has been exceeded.*

3 If you want an e-mail message sent when an alert condition occurs, click Email, and then supply values appropriate for your site, yourself, and this alert. See Table 9.

Table 9 Alert Properties for e-Mail

Name	Default Value	Comment
Send Email	False	To arrange for e-mails to be sent, change this to **True**. The value **False** causes all other properties to be ignored.
SMTP Server Host	(blank)	The hostname or IP addressof the SMTP server at your site. (SMTP = simple mail transfer protocol). Hostname is case-insensitive; domain is optional. Thus, all the following are valid: ▪ mySmtpServer ▪ mysmtpserver ▪ mysmtpserver.mydomain.com ▪ 10.18.133.200
SMTP Server Port	25	The port number that this machine uses for e-mail.
Username	(blank)	The login ID of a user who is authorized to send e-mail on this SMTP server. Required only if the SMTP server requires authentication. If provided, eBAM will try to authenticate.
Password	********	The password for this user on this SMTP server. All text entered in this field is masked as a row of asterisks (**********).
Send From	(blank)	The e-mail address of the message originator; can be blank. Case-insensitive, but preserves the case as entered. For internal e-mail, either of the following forms is valid: ▪ myname ▪ myname@mydomain.com For external e-mail, a domain must be specified; in other words: ▪ myname@mydomain.com
Send To	(blank)	The e-mail address of the message recipient(s). If sending to more than one recipient, separate e-mail addresses by commas. Case-insensitive, but preserves the case as entered.
Message	(blank)	The text of the message to be sent. For easier viewing and editing, click the ellipsis [...] to the far right of this field.

4 When you have finished configuring the alert properties, click Close.

4.3.3 About Charts

eBAM allows you to create three types of charts:

- *Pie charts* display elements in the dataset view as wedge-shaped segments (slices) comprising an entire disk (pie). Each segment's relation to the pie and to other segments is cued visually by its apparent area, based on its subtended angle. Specific view fields can be "exploded" to highlight them.
- *Bar charts* display elements in the dataset view as rectangles (bars) in a rectilinear setup where each bar's relation to the total and to other bars is cued visually by its apparent area, based on its length. Bar charts can have labels on either or both axes to facilitate quantitative readings.
- *Meters*, also called *meter charts*, display conditions as a needle on a dial, similar to a tachometer or clock face. At designated thresholds on the range, differing colors at the outside of the dial are used to signify when the measured condition is in normal range, warning range, or critical range. For an example, see **Figure 20 on page 41**.

All charts have common properties, and each has properties specific to its own type:

- **Table 10 on page 34** lists properties common to all three chart types.
- **Table 11 on page 35** lists properties common to pie and bar charts only.
- **Table 12 on page 35** lists properties specific to pie charts.
- **Table 13 on page 36** lists properties specific to bar charts.
- **Table 14 on page 36** lists properties specific to meters.

Table 10 Properties Common to All Three Chart Types

Property Name	Value	Notes
Display Title	True	Whether or not the chart title is displayed.
Title		Any string; initially set to match the name provided when the chart was created
Title Font		You can use any of 52 fonts, ranging in size from 9-point to 72-point, with or without bold and/or italic attributes.
Title Alignment	CENTER	You can change the default (CENTER) to either LEFT or RIGHT.
Title Color		You can specify any color using any of these methods: ▪ Pick a swatch from the display. ▪ Specify percentages for HSB: Hue, Saturation, Brightness ▪ Specify values (0-255) for RGB: Red, Green, Blue.
Title Background		
Draw Border	False	Whether or not to draw a border around the chart.
Border Color		You can specify any color either by picking a swatch or by specifying HSB or RGB.
Background Color		
Image Width	680	
Image Height	420	
Chart Width	680	
Chart Height	420	

Table 10 Properties Common to All Three Chart Types (Continued)

Property Name	Value	Notes
Data Number Limit	2147483647	The largest number your chart could conceivably expect to use as data. (2147483647 = 2^31 - 1)
Frequency in seconds	60	How often to update the chart with a new data view.

Table 11 Properties Common to Pie and Bar Charts (Continued)

Property Name	Value	Notes
3D	True	Whether or not a three-dimensional effect is displayed.
Depth Factor	0.3	Amount by which the chart seems three-dimensional.
Include Legend	False	Whether or not to display a legend with the chart.
Legend Anchor	SOUTH	Where to position the starting point for the chart legend.
Circular	False	For an elliptical (tilted-circle) chart, keep this set to **False**. For a circular chart, set this to **True**.
Null Real	0.0	Value to use for real numbers (float) without data.
Null Integer	0	Value to use for integers without data.
Null String		Value to use for strings (varchar) without data.
Integer Number Format	0	How many digits to display, and whether to display digits in comma-separated groups of three.
Real Number Format	0.000	Whether to display digits in comma-separated groups of three, and whether to display three digits after the decimal point (default) or two, with a dollar sign preceding the value.

Table 12 Properties Specific to Pie Charts

Property Name	Value	Notes
Radius	0.7	
Section Label	Name,Value	Choices consist of: None; Name; Value; Percent; Name,Value; Name,Percent, and Value,Percent.
Section Label Font		Any of 52 fonts, 9-pt to 72-pt, bold and/or italic or not.
Section Label Color		You can specify any color either by picking a swatch or by specifying HSB or RGB.
Section Label Gap	0.3	
Show Series Labels	False	Whether to display a label for the series.
Series Label Font		Any of 52 fonts, 9-pt to 72-pt, bold and/or italic or not.
Series Label Color		You can specify any color by swatch, HSB, or RGB.
Direction	Clockwise	Each successively larger value is displayed either right (clockwise) or left (anticlockwise) of the next smaller.
Interior Gap		

Table 13 Properties Specific to Bar Charts

Property Name	Value	Notes
Orientation	VERTICAL	Which direction (vertical or horizontal) the bars run.
Show X-Axis	True	Whether or not to display the X axis.
Show X-Axis Label	True	Whether or not to display the label for the X axis.
X-Axis Label	domain	The text to display as a label for the X axis.
Show Y-Axis	True	Whether or not to display the Y axis.
Show Y-Axis Label	True	Whether or not to display the label for the Y axis.
Y-Axis Label	range	The text to display as a label for the Y axis.

Table 14 Properties Specific to Meters

Property Name	Value	Notes
Minimum Value	0.0	
Maximum Value	0.0	
Value Font		Any of 52 fonts, 9-pt to 72-pt, bold and/or italic or not.
valuePaint		
Minimum Normal Value	0.0	Values below this threshold are too low to be normal.
Maximum Normal Value	0.0	Values above this threshold are too high to be normal.
Normal Range Color		You can specify any color either by picking a swatch or by specifying HSB or RGB.
Minimum Warning Value	0.0	Values below this threshold are too low for warnings.
Maximum Warning Value	0.0	Values above this threshold are too high for warnings.
Warning Range Color		You can specify any color by swatch, HSB, or RGB.
Minimum Critical Value	0.0	Values below this threshold are too low to be critical.
Maximum Critical Value	0.0	Values above this threshold are beyond being critical.
Critical Range Color		You can specify any color by swatch, HSB, or RGB.
Units	units	
Draw Chart Border	False	Whether or not to display a border around the chart.
Border Type	Normal Range	You can change this to Warning, Critical, or Full Range.
Dial Type	Circle	You can change this to either Pie or Chord.
Dial Border Color		You can specify any color by swatch, HSB, or RGB.
Dial Background Color		You can specify any color by swatch, HSB, or RGB.
Tick Label Type	Value Label	Whether to show marks with values, or just marks.
Tick Label Font		Any of 52 fonts, 9-pt to 72-pt, bold and/or italic or not.
Needle Color		You can specify any color, by swatch, HSB, or RGB.
Meter Angle	270	Angle subtended by the entire range of the meter.

4.3.4 Setting Up the Application's Charts

In eBAM, charts provide real-time feedback on the current data set according to conditions you set on one or more of the elements in the data definition. As discussed earlier (see **"Using the Condition Editor" on page 27**), you use the Condition editor to create queries that detect the condition. In addition to conditions on the data definition, you also set up a dataset view.

An eBAM application can contain many charts, or only one, or none at all. Each chart requires the following:

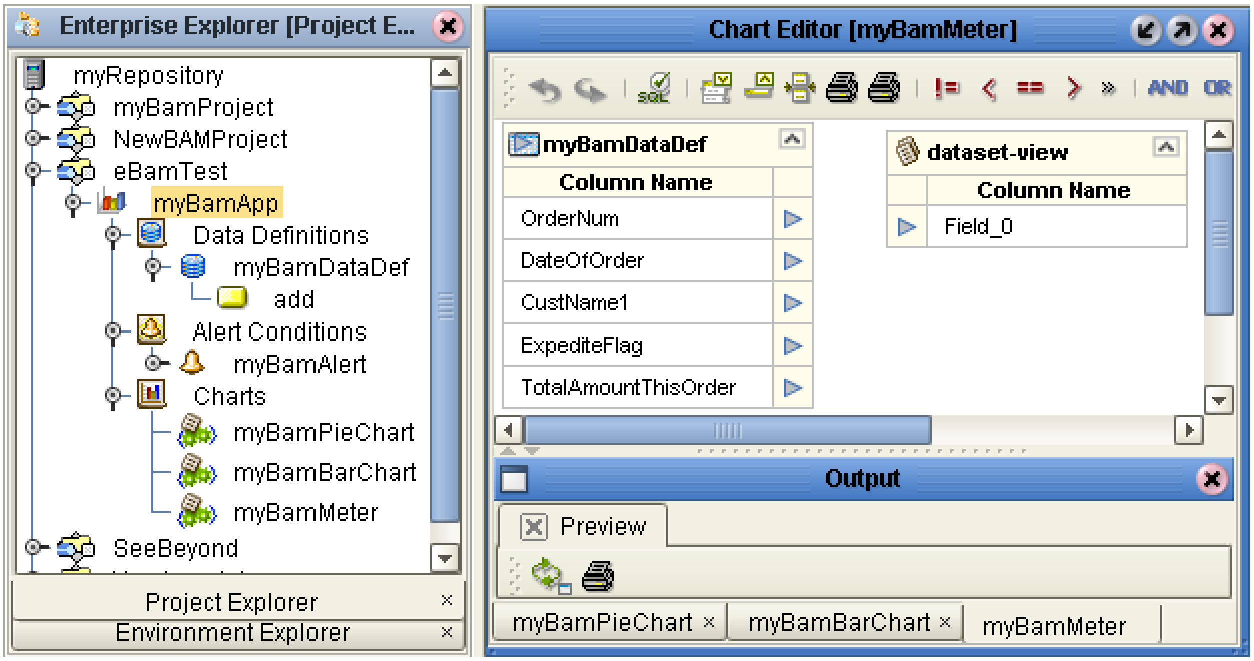
- A name and an associated data definition; see **"To create a new chart"**.
- Zero or more conditions set on fields in the data definition; see **"To configure a condition on a data definition field" on page 38**.
- One or more fields in the dataset view, with appropriate mappings to them from operators and data definition fields; see **"To configure the dataset view, mapping operators and data definition fields to its fields" on page 38**.
- Settings for the chart's properties as a whole. In addition to generic chart properties discussed earlier (see **"About Charts" on page 34**), you can also set chart properties that depend on the dataset view fields of your particular application, such as group-by (aggregation) fields and order-by settings; see **"To configure properties of the entire chart" on page 39**.

To create a new chart

1. In the project tree, right-click myBamLoan and, on the popup context menu, click: **New Chart**
2. In step 1 of the Chart wizard, specify a chart type (Pie Chart, Bar Chart, or Meter) and a name.
3. In step 2 of the wizard, select the check box for the data definition.
4. In step 3 of the wizard, adjust the common and chart-specific parameters in all three tabs to suit your taste. (Alternatively, you can defer your chart parameter decisions to a later time, and simply accept all defaults for now).
5. Click **Finish**.

Result: The project tree displays the new object under Charts, and the Chart Editor opens to display the data definition on the left side of the canvas and an empty dataset view on the right side. See Figure 16.

Figure 16 Chart Editor



Tip: The tool palettes for the Chart Editor and its output window are the same as for the Alert Conditions Editor. Table 8 on page 30 explains the graphical controls, and Figure 14 on page 31 lists the SQL operators.

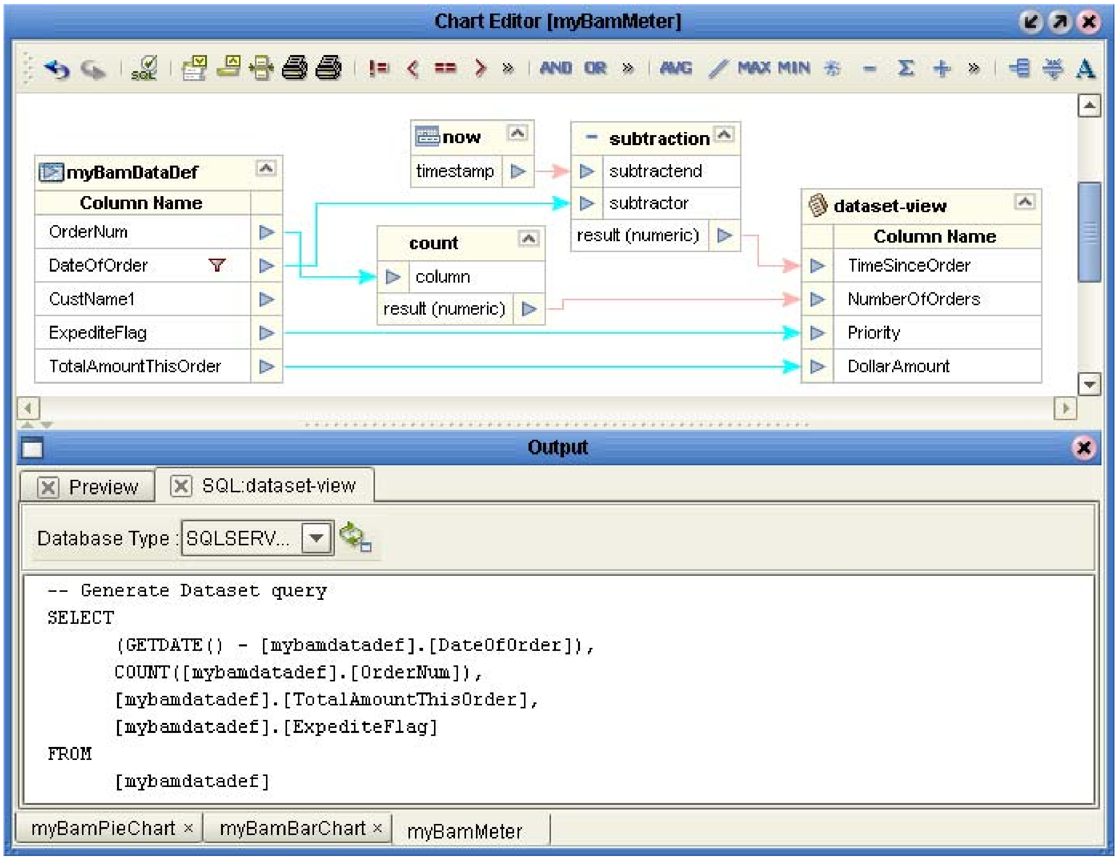
To configure a condition on a data definition field

1. In the Chart Editor, right-click the data definition; on the popup menu, click **Properties**. In the Properties dialog, click **Condition**, and then click the ellipsis **[...]** to open the Condition editor.
2. In the **Columns** tab, double-click the data definition open it and display its fields.
3. See **"Setting Data Definition Conditions for an Alert or Chart" on page 26**.

To configure the dataset view, mapping operators and data definition fields to its fields

1. In the Chart Editor, right-click **dataset-view** and, on the menu, click: **Configure**
2. In the **Configure Dataset View** dialog, click **Add** as many times as needed to accommodate all the report fields you will need.
3. Double-click each field, edit the name, and press ENTER. When finished, click OK.
4. In the Alert Editor, drag operators as needed from the operator palette (see **Figure 14 on page 31**) into the canvas between the data definition and the dataset view, and then map zero or more fields from the data definition through zero or more operators, with all output ultimately going into the dataset view. For examples of this, see **Figure 36 on page 61** and Figure 17 below.

Figure 17 Configuring a Dataset View Using Operators and Data Definition Fields



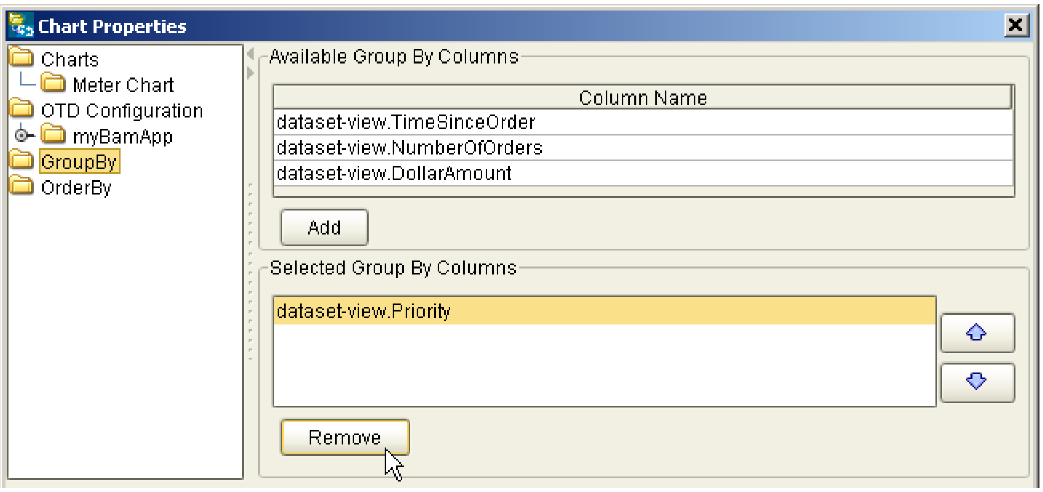
Database Type : SQLSERV...

```
-- Generate Dataset query
SELECT
      (GETDATE() - [mybamdatadef].[DateOfOrder]),
      COUNT([mybamdatadef].[OrderNum]),
      [mybamdatadef].[TotalAmountThisOrder],
      [mybamdatadef].[ExpediteFlag]
FROM
      [mybamdatadef]
```

To configure properties of the entire chart

1. In the Chart Editor, right-click the blank canvas and, on the menu, click: **Properties**
2. In the tree on the left side, select the **GroupBy** folder. Under Available Group-By Columns, select the dataset view element you want to group by, and then click **Add** to move the element to the Selected Group-By Columns pane. See Figure 18.

Figure 18 Chart Properties: “Available Group-By” and “Selected Group-By” Columns

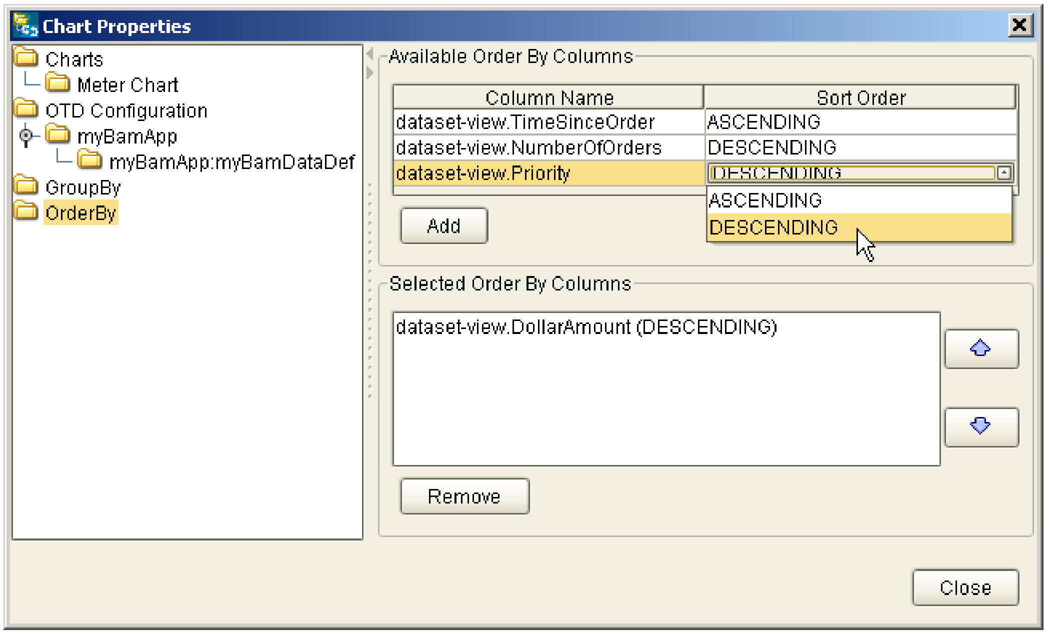


Column Name
dataset-view.TimeSinceOrder
dataset-view.NumberOfOrders
dataset-view.DollarAmount

dataset-view.Priority

3 Optionally, select the **OrderBy** folder, use the Sort Order controls to set the order (ascending or descending) for each view element, select the view element you want to order by, and then click **Add** to move the element to the Selected Order-By Columns pane. See Figure Figure 19.

Figure 19 Chart Properties: “Available Order-By” and “Selected Order-By” Columns



Column Name	Sort Order
dataset-view.TimeSinceOrder	ASCENDING
dataset-view.NumberOfOrders	DESCENDING
dataset-view.Priority	DESCENDING

dataset-view.DollarAmount (DESCENDING)

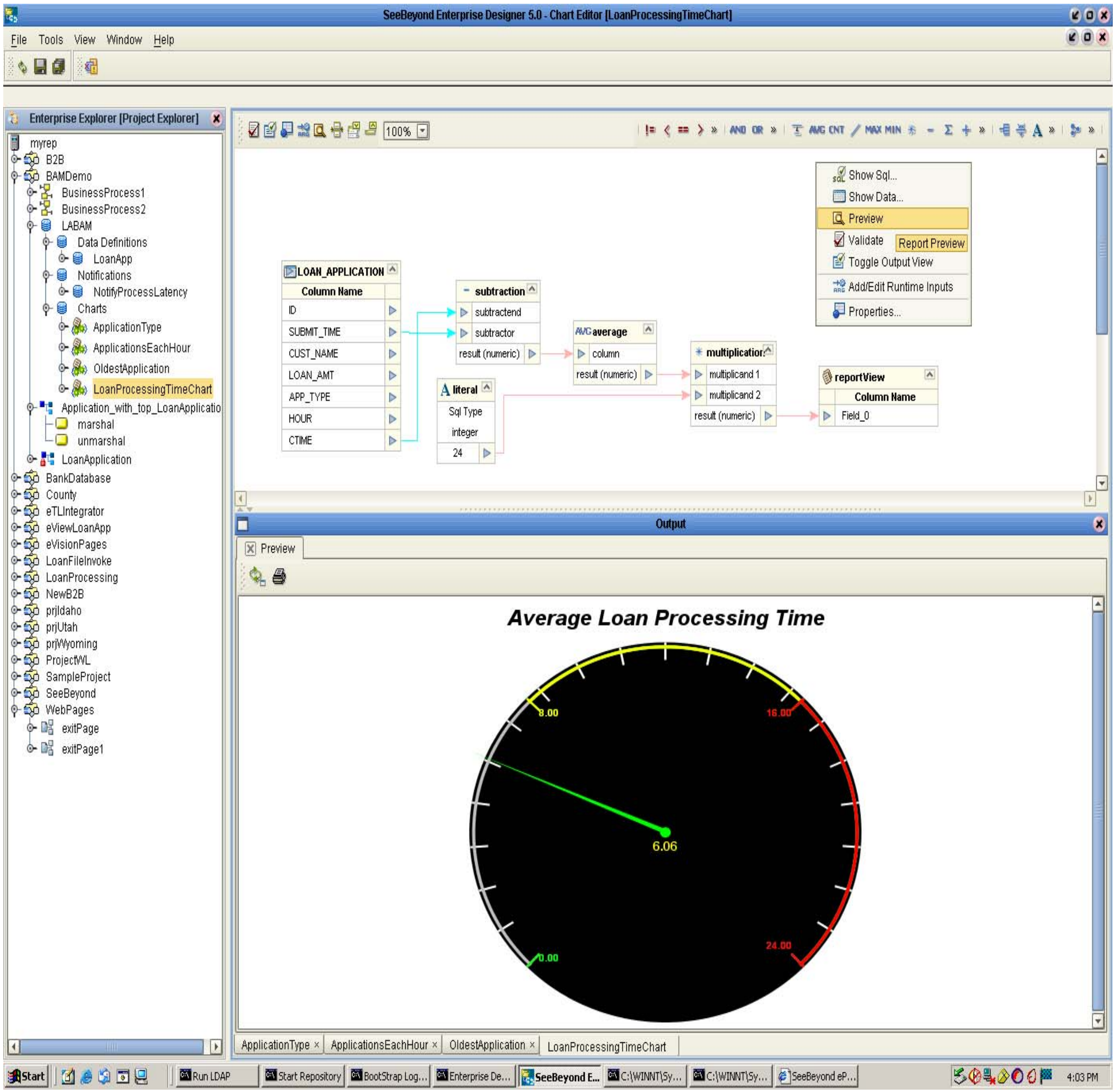
4 Optionally select the **Charts** folder and modify any of the common properties or chart-specific properties. (This is the alternative mentioned in step 4 of the **procedure on page 37**.)

5 When you have configured all chart properties, click **Close**.

6 To preview the chart, right-click the blank canvas and, on the menu, click: **Preview**

If sample data has been committed previously (see step 9 in the **procedure on page 25**), the Output window shows a preview of how the chart for that sample data will appear. For an example, see Figure 20.

Figure 20 Previewing a Chart



7 In the **Output** window, with the Preview tab selected, you can:

- Use the **Refresh** button to update the preview any time you make a change to the chart properties.
- Use the **Print** button to print a hardcopy of the previewed chart.

Chapter 5

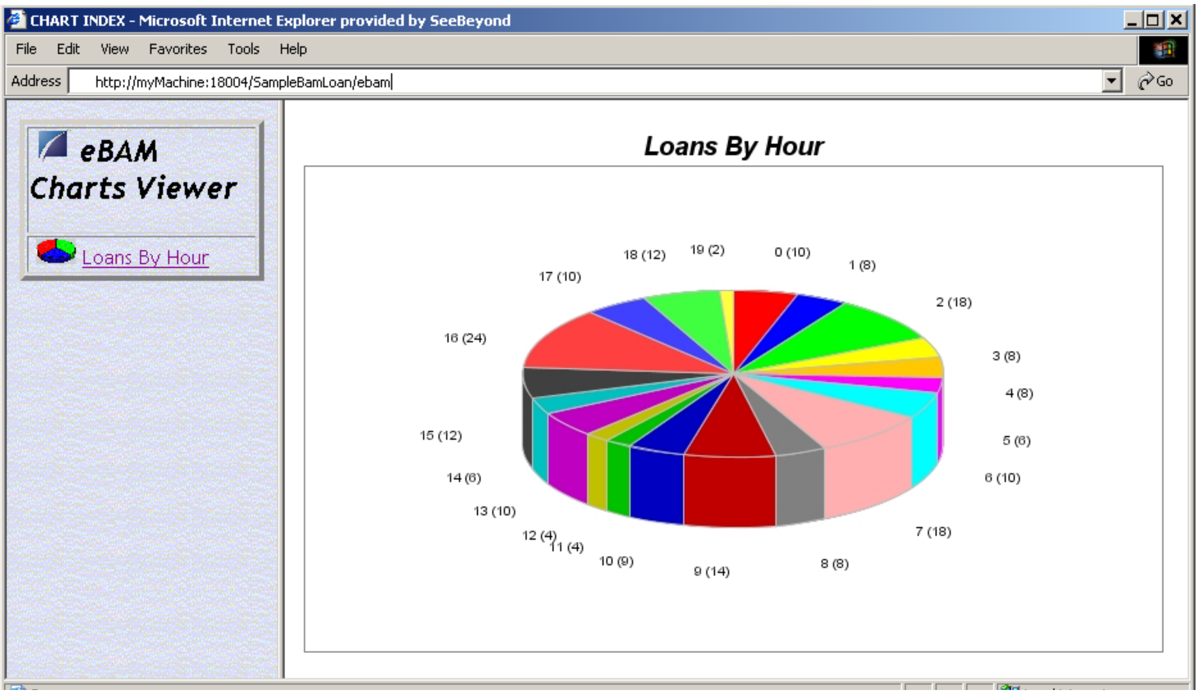
Installing and Running the eBAM Sample

This chapter provides step-by-step instructions for using the sample project and files supplied with the eBAM product file. The instructions in this chapter assume you have installed the prerequisite products (either eInsightESB, or else both eGate and eInsight), and that you have also installed the File eWay, which the sample implementation uses for input/output of sample data.

Last Things First

When you finish this chapter, you will have installed, deployed, run, and monitored the sample eBAM application supplied in eBAMDocs.sar. When you feed this application the "typical" data file, the result will be a pie chart that looks like Figure 21, with the display updating every 30 seconds.

Figure 21 Pie Chart for Sample



- To replicate the sample on your own system, continue with **"Overview of Steps for Setting Up the Sample Implementation" on page 43**.
- If, instead, you want to start from scratch and create an implementation that matches the sample, see **"Creating Your Own eBAM Implementation" on page 49**.

5.0.1 Overview of Steps for Setting Up the Sample Implementation

The eBAM Studio product includes a complete sample implementation, included in the **eBAMDocs.sar** file, that allows you to see the end results without having to go through all the design steps. The necessary procedures are gathered into two sections:

Procedures for initial setup

- **Installing the Sample Files** on page 43
- **Importing the Sample Project** on page 44
- **Creating the Sample Environment** on page 44
- **Starting the Logical Host for the Sample** on page 45

Procedures for configuration, deployment, and runtime

- **Configuring the eWays** on page 45
- **Activating and Running the Project** on page 46
- **Monitoring the Key Performance Indicators with Live Data** on page 47

5.1 Initial Setup Steps

5.1.1 Installing the Sample Files

These steps assume the existence of a temporary eBAM directory for sample files, such as **C:\temp\eBAM\**. You will install the sample files to this directory.

To install the sample files

Before you begin: Your repository must already be running, and you must be logged in to Enterprise Manager. If you have already uploaded the documentation for eBAM, you can skip steps 1 and 2 and start with step 3.

1. In the ADMIN tab, if you have not already done so, browse to the [...]\Documentation**ProductsManifest.xml** file and submit it.
2. In the ADMIN tab, if you have not previously done so, browse to the **eBAMDocs.sar** file, select it, and click the **upload now** button.
3. In the DOCUMENTATION tab, in the Products window, click: **eBAM Studio**
4. In the window that appears on the right side, click: **Download Sample**
5. Preserving file paths, extract the files to your temporary eBAM samples directory.

Result: The following directories and files are created:

```
C:\temp\eBAM\Sample\Projects\SampleBamProject.zip
C:\temp\eBAM\Sample\Data\In\LoanDataAllSmall.txt
C:\temp\eBAM\Sample\Data\In\LoanDataOneBig.txt
C:\temp\eBAM\Sample\Data\Out\SampleAlertOutput.dat
C:\temp\eBAM\Sample\Data\Out\SampleNormalOutput.dat
```

5.1.2 Importing the Sample Project

To install the sample Project

Before you begin: Your repository must already be running, and you must be logged in to Enterprise Designer.

1. In Enterprise Designer, save all work and close all canvases. In Project Explorer, right-click the repository and, on the popup context menu, click: **Import**
2. In the **Import Manager** dialog, open the folder where you installed the sample files (such as `C:\temp\eBAM\Sample\Projects`), select `SampleBamProject.zip`, and click **Open**.
3. In the **File Destination** dialog, select **Import to a new project**, enter the name **SampleBamProject**, and click OK.
4. On the main toolbar, click: **Refresh All from Repository**

Result: The sample project has been imported. It is now visible the Project Explorer tree.

5.1.3 Creating the Sample Environment

These steps assume you will use a default application server running on default ports. If you use anything other than a SeeBeyond Integration Server on ports 18000–18009, make adjustments in step 6 below or in the URL in step 2 in the **procedure on page 47**.

To create the sample environment

1. In Enterprise Designer, near the lower left of the window, click the **Environment Explorer** tab.
2. In the environment tree, right-click the repository and, on the popup context menu, click **New Environment**
   - Rename the newly created environment to **SampleBamEnv**
3. Right-click SampleBamEnv and, on the menu, click: **New File External System**
   - Name the new external **SampleExternalFileIn**, designate it an Inbound File eWay, and click OK.
4. Right-click SampleBamEnv > **New File External System**
   - Name it **SampleExternalFileOut**, designate it Outbound, and click OK.
5. Right-click SampleBamEnv > **New Logical Host**
   - Retain the default name: LogicalHost1
6. Right-click LogicalHost1 and click: **New SeeBeyond Integration Server**
   - Retain the default name: IntegrationSvr1

Result: The sample environment now contains the three servers it needs.

5.1.4 Starting the Logical Host for the Sample

These steps assume you have already installed a logical host named LogicalHost1, and that the environment is named SampleBamEnv.

To bootstrap the logical host

1 Open a command prompt and change directories to the location of your logical host's bootstrap executables. For example:

```
cd \ican5\logicalhost\bootstrap\bin
```

2 Start the bootstrap script using appropriate parameters. For example:

```
bootstrap -r http://myBox:12345/myRep -i myId -p myPassword
-e SampleBamEnv -l LogicalHost1
```

- For the **-r** (repository) parameter), supply the correct URL with repository name.
- For the **-i** and **-p** (ID and password) parameters, supply the appropriate values.
- For **-e** (environment) parameter, use: **SampleBamEnv**
- For **-l** (logical host name) parameters, use: **LogicalHost1**

Result: The logical host is now running, and ready to have a project deployed to it.

5.2 Design, Deployment, and Runtime Steps

This section provides steps for:

- **"Configuring the eWays" on page 45**, where you will use the Enterprise Designer's Configuration Map Editor to set parameters for inbound and outbound File eWays.
- **"Activating and Running the Project" on page 46**, where you will use Enterprise Designer to create a deployment profile and activate it.
- **"Monitoring the Key Performance Indicators with Live Data" on page 47**, where you will feed data to the logical host and use the Charts Viewer to monitor results.

5.2.1 Configuring the eWays

To configure the eWays

1 In the Connectivity Map Editor, double-click the eWay connecting SampleFileInLoan with SampleLoanProcess1, choose the **Inbound** File eWay template, and then make the following changes to the default parameter settings:
   - **Directory** must point to your input data: **C:\temp\eBAM\Sample\Data\In**
   - For **Multiple records per file**, change to: **True**
   - For **Remove EOL**, change to: **True**

2 Verify that all parameters are correctly set, and then click OK.

3 Double-click the eWay connecting SampleLoanProcess1 with SampleFileOutLoan, choose the **Outbound** File eWay template, and then check the parameter settings:
   - **Directory** should point to the input data: **C:\temp\eBAM\Sample\Data\Out**
   - **Output file name** should use this pattern: **output%d.dat**

4 Verify that all parameters are correctly set, and then click OK.

5 Double-click the eWay connecting SampleAlertProcess1 with SampleFileOutAlert, choose the **Outbound** template, and then make the following changes:

- **Directory** should point to : **C:\temp\eBAM\Sample\Data\Out**
- **Output file name** should use this pattern: **alert%d.dat**

6 Verify that all parameters are correctly set, and then click OK.

7 Save your work and close all canvases.

Result: All components are connected and configured. The next step is to create and activate a deployment profile for the project.

5.2.2 Activating and Running the Project

You will create a deployment profile named **SampleBamLoanDP**, which you will activate and deploy to the logical host that is currently running. (If it is not already running, see **"Starting the Logical Host for the Sample" on page 45**.)

To create the deployment profile

1 In the project tree, right-click SampleBamProject and, on the popup context menu, point at New and click: **Deployment Profile**

2 In the dialog box, name it **SampleBamLoanDP**, and be sure it references the SampleBamEnv environment before clicking OK.

Result: The project tree displays the new object, and the Deployment Editor shows the six components and the three servers to which you will assign them.

To assign components to servers

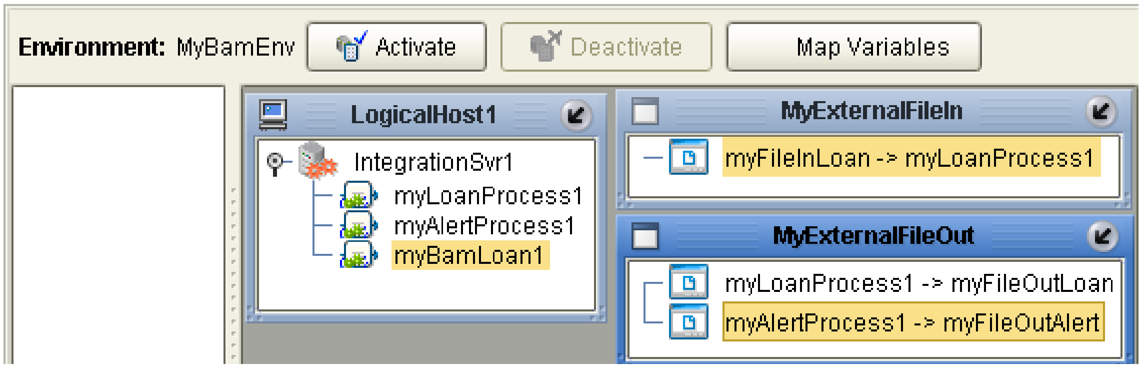
1 One by one, drag the three services (SampleLoanProcess1, SampleAlertProcess1, and SampleBamLoan1) into LogicalHost1 and onto **IntegrationSvr1**.

2 Drag the inbound File eWay (SampleFileInLoan->SampleLoanProcess1) into the **SampleExternalFileIn** server.

3 One by one, drag the outbound File eWays (SampleLoan...->SampleFileOutLoan and SampleAlert...->SampleFileOutAlert) into the **SampleExternalFileOut** server.

4 Save your work. See Figure 22.

Figure 22 Components from SampleBamProject Assigned to Servers in SampleBamEnv


Environment: MyBamEnv

To activate and run the project

1. In the Deployment Editor, after all six components in SampleBamProject are assigned to the three servers in SampleBamEnv, click **Activate**
   - Or, if you have previously activated this deployment profile, click **Reactivate**
2. After activation is successfully completed, when the Activate dialog box asks whether you want to apply the changes to the logical host immediately, click **Yes**

5.2.3 Monitoring the Key Performance Indicators with Live Data

Now that you have set up the data definitions and set up a pie chart and an alert condition, you are ready to display the results and see how they update in real time as you feed sample data to the project.

To start monitoring the project

1. Open a *new* browser session. (In other words, do ***not*** clone a new window from an existing session.)
2. Point your browser at the URL for monitoring the eBAM charts for this project. This takes the following form:

   http://*logicalhostname***:18004/***BamApplicationName***/ebam**

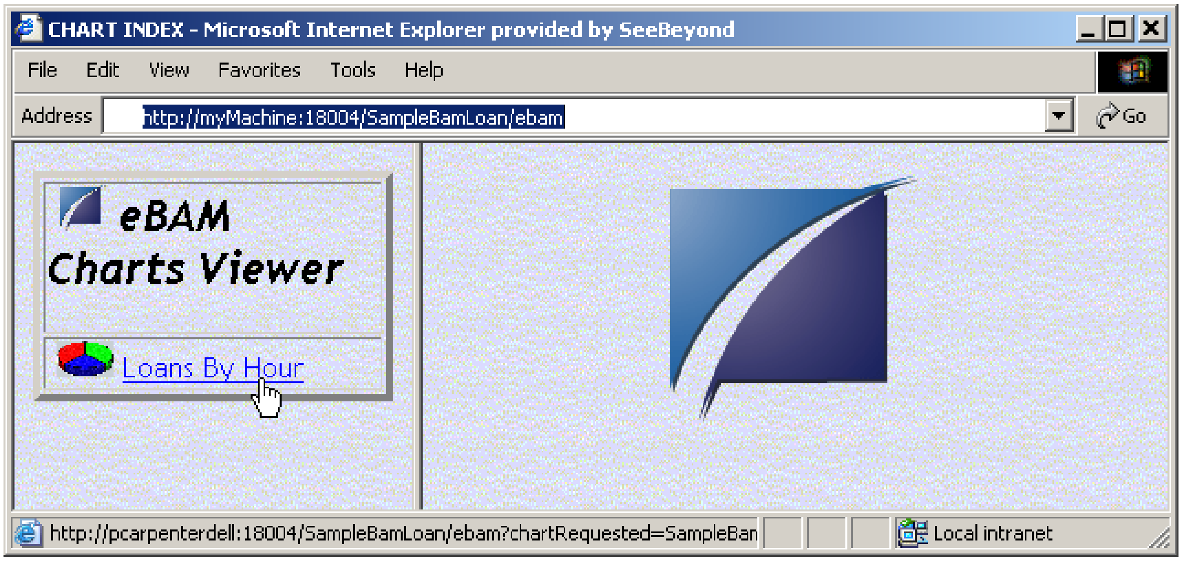
   (This is case-sensitive; the final four letters must be **ebam**, not eBAM.) For example:

   ```
   http://myMachine:18004/SampleBamLoan/ebam
   ```

   If your Integration Server does not use port 18004, then substitute the correct port number in the URL.

Result: See Figure 23.

Figure 23 Initial eBAM Charts Viewer (No Data)



Address: http://myMachine:18004/SampleBamLoan/ebam

http://pcarpenterdell:18004/SampleBamLoan/ebam?chartRequested=SampleBan

To feed sample data to the project

1. Browse (or open a command prompt and change directories) to the location where you installed the sample input data, and verify the presence of both sample data files (LoanDataAllSmall.txt and LoanDataOneBig.txt). For example:

   ```
   C:
   cd \temp\eBAM\Sample\Data\In
   dir
   ```

2. Rename a copy of LoanDataOneBig.txt to: **input_OneBig.txt**
3. Watch as the file is picked up by the File eWay, renaming it to **input_OneBig.~in**
4. Expect the following results:
   - C:\temp\eBAM\Sample\Data\Out\**output*.dat** should have a single record.
   - C:\temp\eBAM\Sample\Data\Out\**alert*.dat** should contain one line of alert data giving details on a loan flagged as being **::GreaterThanOneMillion::**
   - If your mail server is running, then it should send an e-mail message every five minutes to the addressee you specified.
5. In the Charts Viewer, if you have not already done so, click the **Loans by Hour** link and see the pie chart display a 360-degree “slice” representing a single data item.
6. Rename a copy of LoanDataAllSmall.txt to: **input_AllSmall.txt**
7. Watch as the file is picked up by the File eWay, renaming it to **input_AllSmall.~in**

Result: The Charts Viewer displays a pie chart whose slices show how many loans were submitted during each work hour monitored by the sample data file. See Figure 24.

Figure 24 eBAM Charts Viewer Showing Pie Chart of Loans By Hour

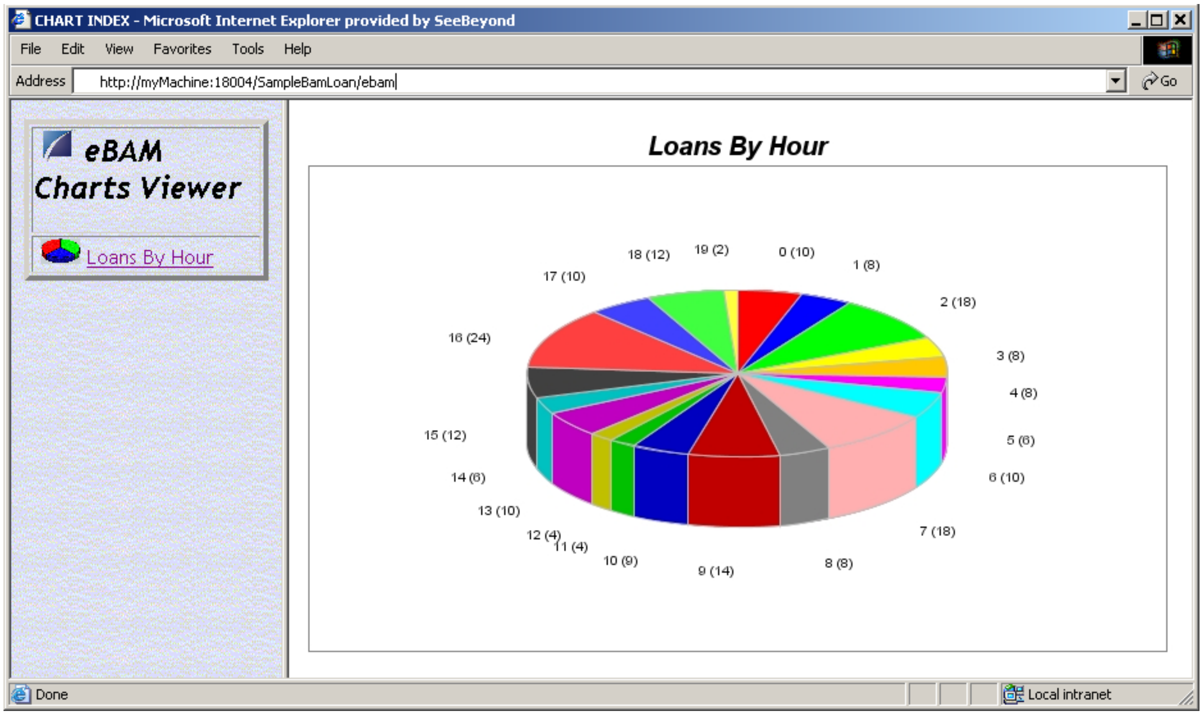


CHART INDEX - Microsoft Internet Explorer provided by SeeBeyond

Address http://myMachine:18004/SampleBamLoan/ebam

Chapter 6

Creating Your Own eBAM Implementation

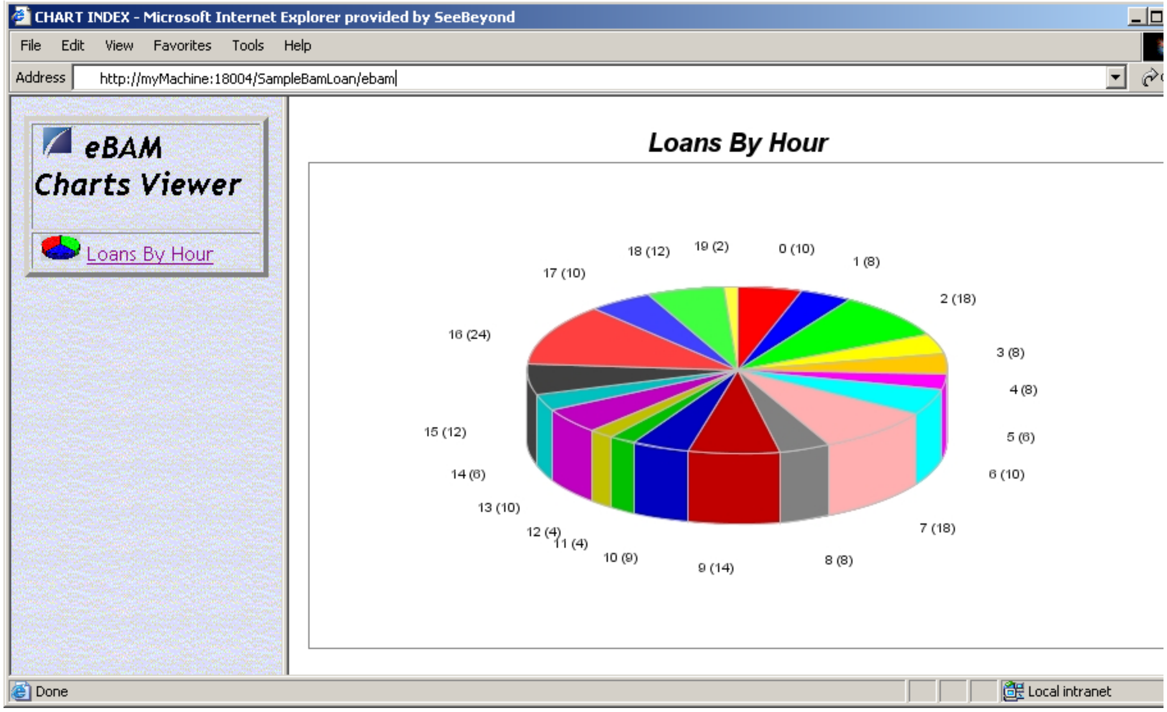
This chapter provides step-by-step instructions for re-creating the sample project supplied with the eBAM product file.

The instructions in this chapter assume you have installed the prerequisite products (either eInsightESB, or else both eGate and eInsight), and that you have also installed the File eWay, which the sample implementation uses for input/output of sample data.

The Implementation That You Will Create

When you finish this chapter, you will have designed, deployed, and run an eBAM application that matches the sample supplied in eBAMDocs.sar. When this application is fed the "typical" data file, the result will be a normal output file and a pie chart that looks like Figure 25, with the display updating every 30 seconds. When it is fed a data file with "exceptional" data (meeting an unusual condition you set up), the result will be a record written to an "alert" file, as well as an e-mail message sent to a recipient you specify, at resend frequency that you designate.

Figure 25 Pie Chart for Sample



Overview of Procedures for Creating Your Implementation

The procedures in this chapter are gathered into two sections:

Procedures for designing the project

- **Setting Up the Project and Environment** on page 50
- **Creating and Validating the OTD** on page 51
- **Creating and Validating the Data Definition** on page 53
- **Creating and Configuring the Alert Condition and Actions** on page 56
- **Creating and Configuring Charts** on page 59
- **Creating and Configuring Business Processes** on page 62
- **Creating and Configuring the Connectivity Map** on page 66

Procedures for deployment and runtime

- **Starting the Logical Host** on page 69
- **Activating and Running the Project** on page 69
- **Monitoring the Alerts and KPIs with Live Data** on page 70

These steps assume the existence of a temporary eBAM directory, **C:\temp\eBAM\**, that you will use for input and output data. To validate the instructions, for example, you can use the following sample data files provided with **eBAMDocs.sar**:

```
C:\temp\eBAM\Sample\Data\In\LoanDataAllSmall.txt
C:\temp\eBAM\Sample\Data\In\LoanDataOneBig.txt
C:\temp\eBAM\Sample\Data\Out\
```

6.1 Design Steps

6.1.1 Setting Up the Project and Environment

To create the project

1. In Enterprise Designer, in Project Explorer, right-click the repository and, on the popup context menu, click: **New Project**
2. Change the name of the new created project to: **myBamProject**

To create the environment

These steps assume you will use a default application server running on default ports. If you use anything other than a SeeBeyond Integration Server, you will need to make the appropriate adjustment to step 6.

1. In Enterprise Designer, near the lower left of the window, click the **Environment Explorer** tab.
2. In the environment tree, right-click the repository and, on the popup context menu, click **New Environment**. Rename the newly created environment to: **myBamEnv**

3 Right-click SampleBamEnv and, on the menu, click: **New File External System**. Name the new external **myExternalFileIn**, designate it an Inbound File eWay, and click OK.

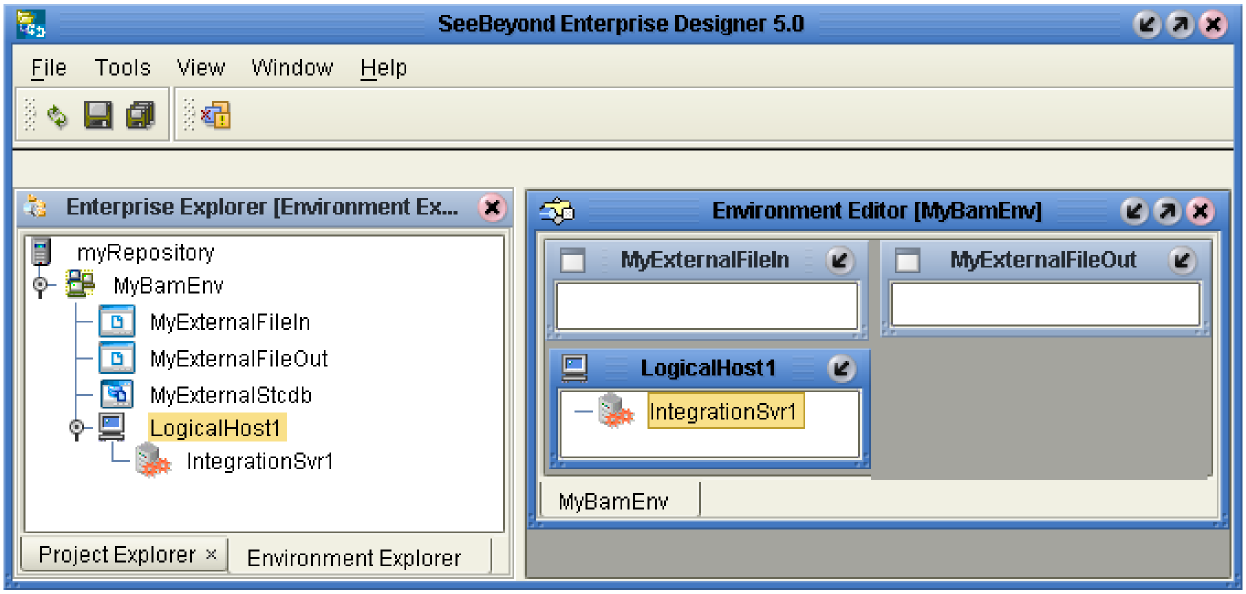
4 Right-click SampleBamEnv > **New File External System**; name the new external **myExternalFileOut**, designate it an Outbound File eWay, and click OK.

5 Right-click SampleBamEnv > **New Logical Host** and retain the default name: LogicalHost1

6 Right-click LogicalHost1 > **New SeeBeyond Integration Server** and retain the default name: IntegrationSvr1

Result: The environment has all servers needed for this implementation. See Figure 26.

Figure 26 Environment for Sample Implementation: myBamEnv



6.1.2 Creating and Validating the OTD

This particular implementation requires an User-Defined OTD to unmarshal data from a file that uses commas to delimit its records' six fields. Nothing in the following steps is specific to eBAM; however, the OTD is tightly coupled to the sample data provided, so take care that in the resulting OTD, the six fields appear in the exact order specified (CustName, Hour, ID, LoanAmt, SubmitTime, TypeOfApp).

To create myBamOtd

1 In Project Explorer, right-click myBamProject and, on the popup context menu, point at **New** and click: **Object Type Definition**

2 In the wizard, select **User-Defined OTD** and then click Next.

3 Name the OTD **myBamOtd** and then click Finish.

Result: The OTD is created, and is displayed in the OTD Editor.

To configure myBamOTD as comma-delimited

1. In the OTD Editor, in the Properties pane, double-click the properties column for **delim**, and then click the ellipsis **[...]** to open the Delimiter List Editor.
2. Right-click within the empty delimiter list and, on the popup context menu, click: **Add Level To End**
3. Select and right-click the newly created **Level 1** and then click: **Add Delimiter**
4. In the newly created **Delimiter** row, double-click the **Delimiter Bytes** column.
5. Type , (in other words, press the COMMA key), press ENTER, and then click OK.

To add the six fields to myBamOTD

- In the OTD Editor, in the Object Type Definition pane, repeat the following two steps until you have created six fields, thus:

  A. Right-click myBamOTD; in the popup context menu, point at Add Field, and then click: **Add Field As Child Node To End**

  B. In the Input dialog, name the new fields, in order, from first to last: **CustName**; **Hour24**; **ID**; **LoanAmt**; **SubmitTime**; **TypeOfApp**

To validate myBamOTD with sample data

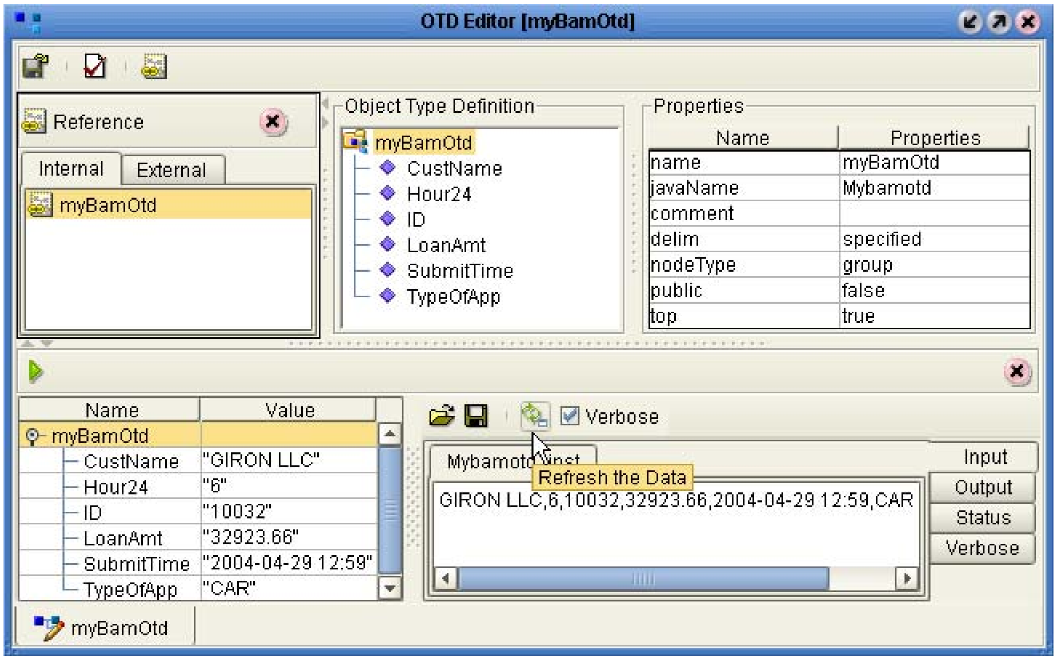
1. In the OTD Editor, on the toolbar palette, click: ☑ **Run Test**

   The OTD Tester pane appears below the main OTD Editor.
2. In the OTD Tester, with the **Input** tab selected, type or paste the following string:

   ```
   GIRON LLC,6,10032,32923.66,2004-04-29 12:59,CAR
   ```

   As the field order is {CustNum, Hour24, ID, LoanAmt, SubmitTime, TypeOfApp}, you can see that this comma-delimited record indicates that loan application #10032, submitted April 29th at 12:59, during the sixth hour of the workday, requested a car loan of $32,923.66 for a customer named GIRON LLC.
3. On the OTD Tester toolbar palette, click: **Refresh the Data**
4. In the left pane of the tester, expand myBamOtd and check results. See Figure 27.

Figure 27 myBamOtd, Fully Configured and Tested



Name	Properties
name	myBamOtd
javaName	Mybamotd
comment	
delim	specified
nodeType	group
public	false
top	true

Name	Value
myBamOtd	
CustName	"GIRON LLC"
Hour24	"6"
ID	"10032"
LoanAmt	"32923.66"
SubmitTime	"2004-04-29 12:59"
TypeOfApp	"CAR"

```
GIRON LLC,6,10032,32923.66,2004-04-29 12:59,CAR
```

5 Before continuing, save your work and close all canvases.

Result: The OTD for unmarshaling and parsing the sample data is now ready for use.

6.1.3 Creating and Validating the Data Definition

To create an eBAM Application

1 Right-click myBamProject; on the popup menu, click New > **eBAM Application**

2 In the wizard, for eBAM Application Name, type **myBamLoan** and then click Next.

3 For Data Definition Name, type **myLoanDataDef** and then click Next.

4 In the Define Data step, click **Add** five times. Then, for each of the six new records, double-click the field name to edit it to resemble the names below. Also change the Type values to those specified below.

Field Name	Default Value	Type
CustName		varchar
Hour24		integer
ID		integer
LoanAmt		float
SubmitTime		timestamp
TypeOfApp		varchar

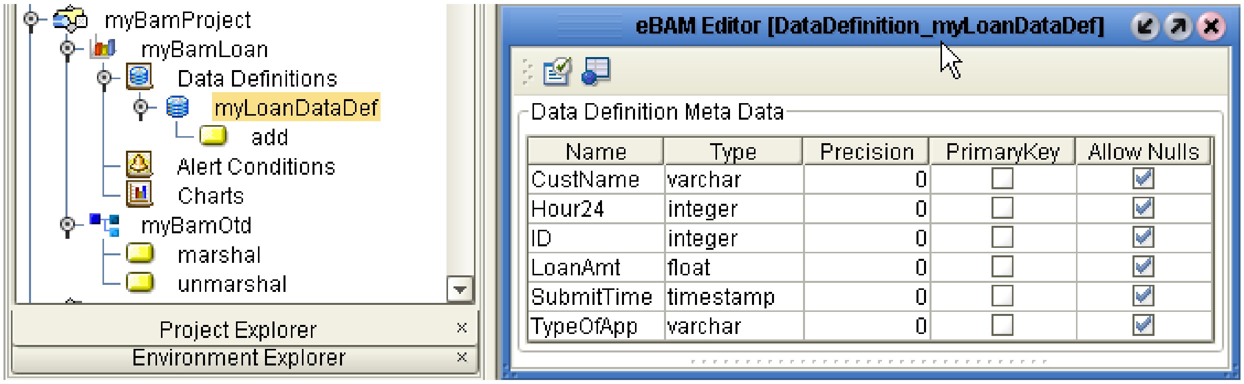
5 After creating and configuring the six rows as shown above, click Next.

6 In the Data Retention Intervals step, have the last **1 Hours** worth of data retained and the database cleaned of deleted entries every **15 Minutes**, and then click Next.

7 Click Finish.

Result: The project tree displays myBamLoan with daughter folders (Data Definitions, Alert Conditions, and Charts); on the canvas, the eBAM Editor displays your metadata. See Figure 28.

Figure 28 eBAM Application With Completed Data Definition



Name	Type	Precision	PrimaryKey	Allow Nulls
CustName	varchar	0	□	☑
Hour24	integer	0	□	☑
ID	integer	0	□	☑
LoanAmt	float	0	□	☑
SubmitTime	timestamp	0	□	☑
TypeOfApp	varchar	0	□	☑

To validate the metadata definition

1 In the eBAM Editor, on the tool palette, click: **Show Sample Data**

The Sample Data pane appears below the main eBAM Editor. Its column names match the field names you just finished creating for the data definition.

2 On the Sample Data tool palette, click: **Import**

3 In the File Import wizard's **Select File** step, locate and select sample data file (such as C:\temp\eBAM\Sample\Data\In\LoanDataAllSmall.txt) and then click Next.

4 In the formatting step, for File format, select **Delimited** and then click **Next**.

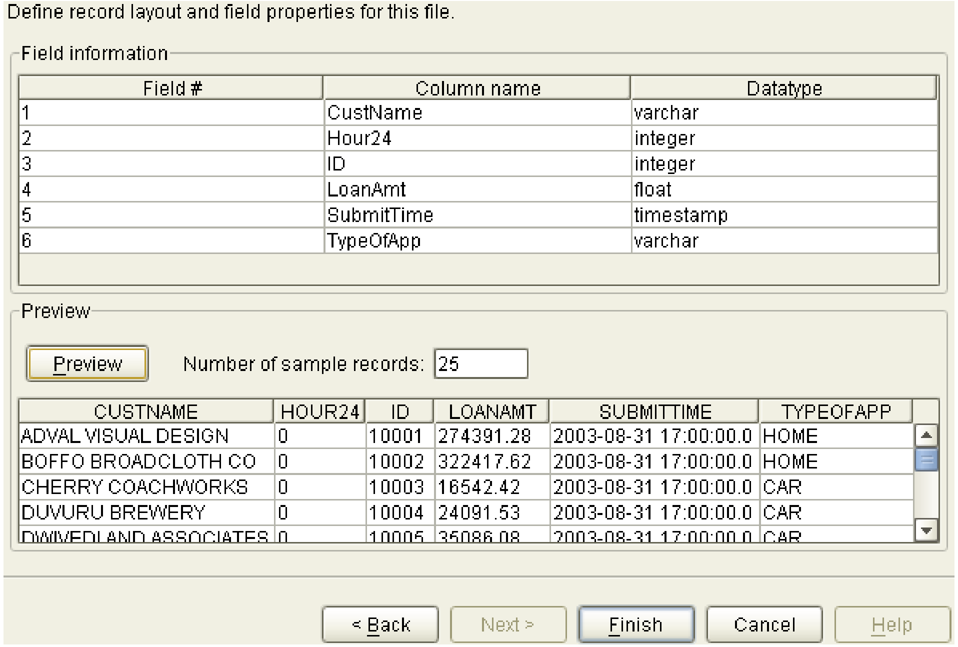
Table name:	LOANDATAALLSMALL_TXT
Encoding scheme:	ASCII (ISO646-US)
File format:	Delimited

5 In the parsing step, keep all defaults and then click **Next**.

Default SQL Type	varchar
Record Delimiter	{newline (lf)}
Field Delimiter	{comma}
Text Qualifier	none
First line contains field names?	False

6 In the record layout and field properties step, click **Preview**. See Figure 29.

Figure 29 Show Sample: Preview of Field Layout



Define record layout and field properties for this file.

Field information

Field #	Column name	Datatype
1	CustName	varchar
2	Hour24	integer
3	ID	integer
4	LoanAmt	float
5	SubmitTime	timestamp
6	TypeOfApp	varchar

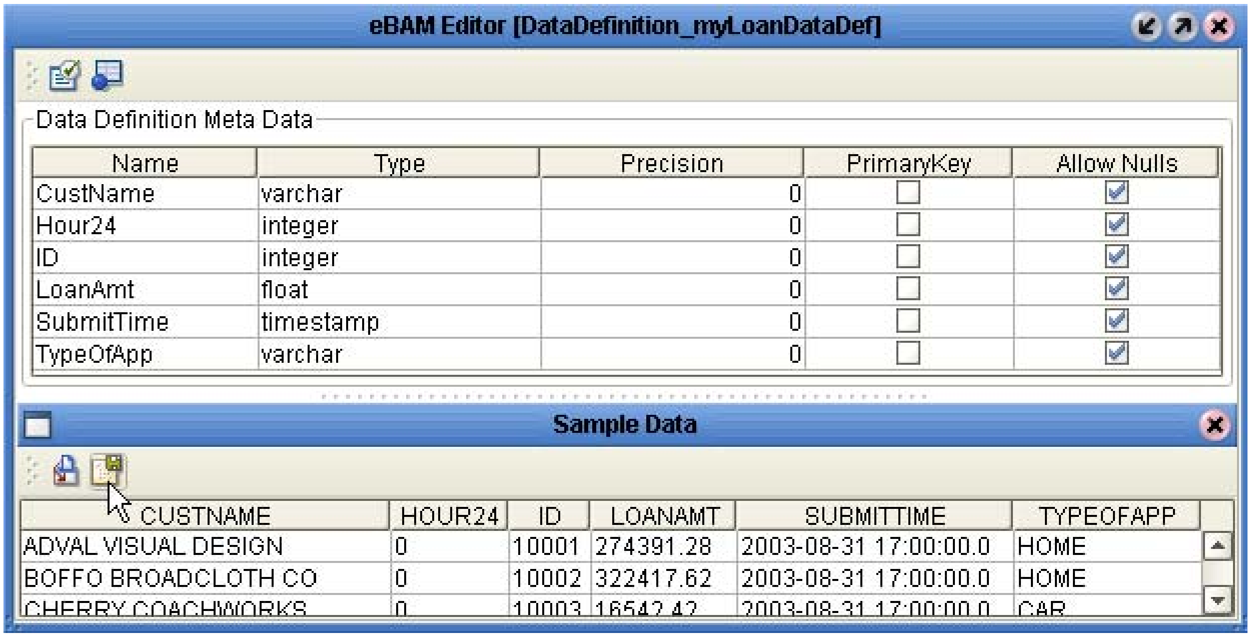
Preview

Number of sample records: 25

CUSTNAME	HOUR24	ID	LOANAMT	SUBMITTIME	TYPEOFAPP
ADVAL VISUAL DESIGN	0	10001	274391.28	2003-08-31 17:00:00.0	HOME
BOFFO BROADCLOTH CO	0	10002	322417.62	2003-08-31 17:00:00.0	HOME
CHERRY COACHWORKS	0	10003	16542.42	2003-08-31 17:00:00.0	CAR
DUVURU BREWERY	0	10004	24091.53	2003-08-31 17:00:00.0	CAR
DWIVEDI AND ASSOCIATES	0	10005	35086.08	2003-08-31 17:00:00.0	CAR

7 Click Finish. The entire data set is parsed and displayed in the Sample Data pane. See Figure 30.

Figure 30 Sample Data Displayed in eBAM Editor



eBAM Editor [DataDefinition_myLoanDataDef]

Data Definition Meta Data

Name	Type	Precision	PrimaryKey	Allow Nulls
CustName	varchar	0	☐	☑
Hour24	integer	0	☐	☑
ID	integer	0	☐	☑
LoanAmt	float	0	☐	☑
SubmitTime	timestamp	0	☐	☑
TypeOfApp	varchar	0	☐	☑

Sample Data

CUSTNAME	HOUR24	ID	LOANAMT	SUBMITTIME	TYPEOFAPP
ADVAL VISUAL DESIGN	0	10001	274391.28	2003-08-31 17:00:00.0	HOME
BOFFO BROADCLOTH CO	0	10002	322417.62	2003-08-31 17:00:00.0	HOME
CHERRY COACHWORKS	0	10003	16542.42	2003-08-31 17:00:00.0	CAR

8 On the tool palette, click **Commit**. Then save your work and close all canvases.

Result: You have validated the Data Definition with sample data and committed it. (When you have committed data, it can later be displayed in a chart preview.)

6.1.4 Creating and Configuring the Alert Condition and Actions

When the loan application exceeds a certain amount, it should trigger actions to occur. In the following steps, you will use the graphical editor to query data for the condition (LoanAmt>$1,000,000.00), identify fields of interest to be communicated and how often, and specify parameters for sending an e-mail message.

To create a new alert condition

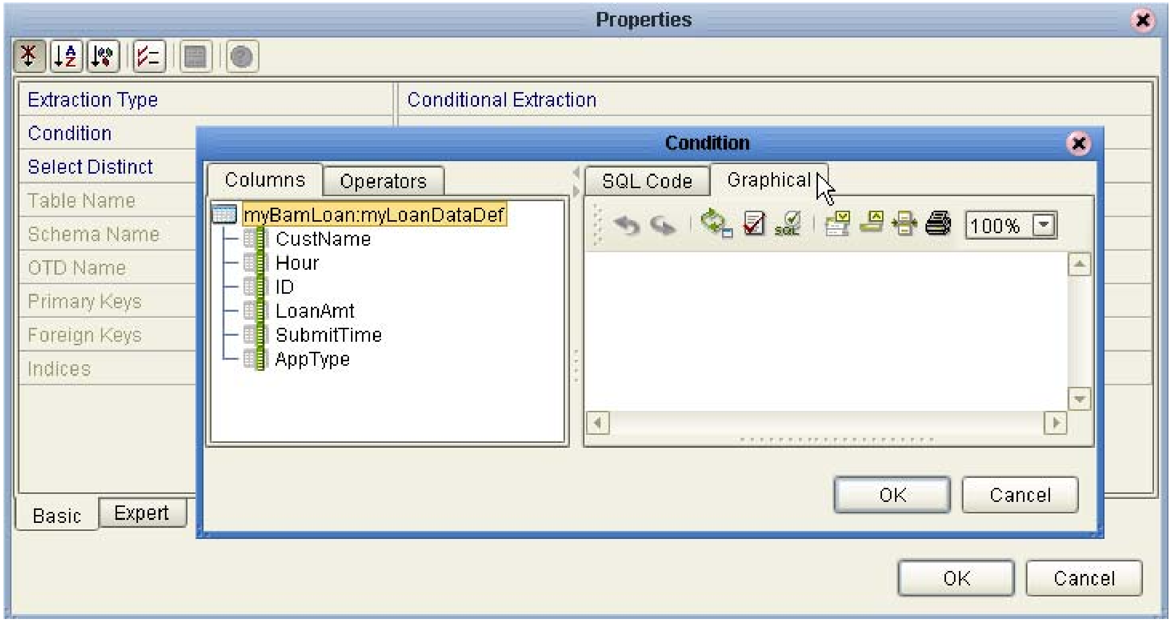
1. In the Project Explorer tree, under myBamLoan, right-click **Alert Conditions** and, on the popup context menu, click: **New Alert Condition**
2. In step 1 of the wizard, specify a name: **VeryBigLoan**
3. In step 2 of the wizard, select the check box for **myBamLoan:myLoanDataDef**

Result: The project tree displays VeryBigLoan under Alert Conditions; on the canvas, the Alert Editor displays myLoanDataDef and an empty dataset view. The six fields under myLoanDataDef correspond to the six columns of data to be parsed.

To configure a condition on a data definition field

1. In the Alert Editor canvas, right-click **myLoanDataDef** and, on the popup context menu, click: **Properties**
2. In the Properties dialog, click **Condition**, and then click the ellipsis [**...**] to open the Condition editor.
3. On the right side of the Condition editor, click the **Graphical** tab. See Figure 31.

Figure 31 Preparing to Set a Condition on the Data Definition



Extraction Type: Conditional Extraction

4. From the Columns tree, drag **LoanAmt** onto the upper left of the Graphical canvas.
5. Click the Operators tab and expand the folders for **Comparison** and **SQL-Specific**.
6. From Comparison, drag **greater than** onto the upper right of the Graphical canvas.

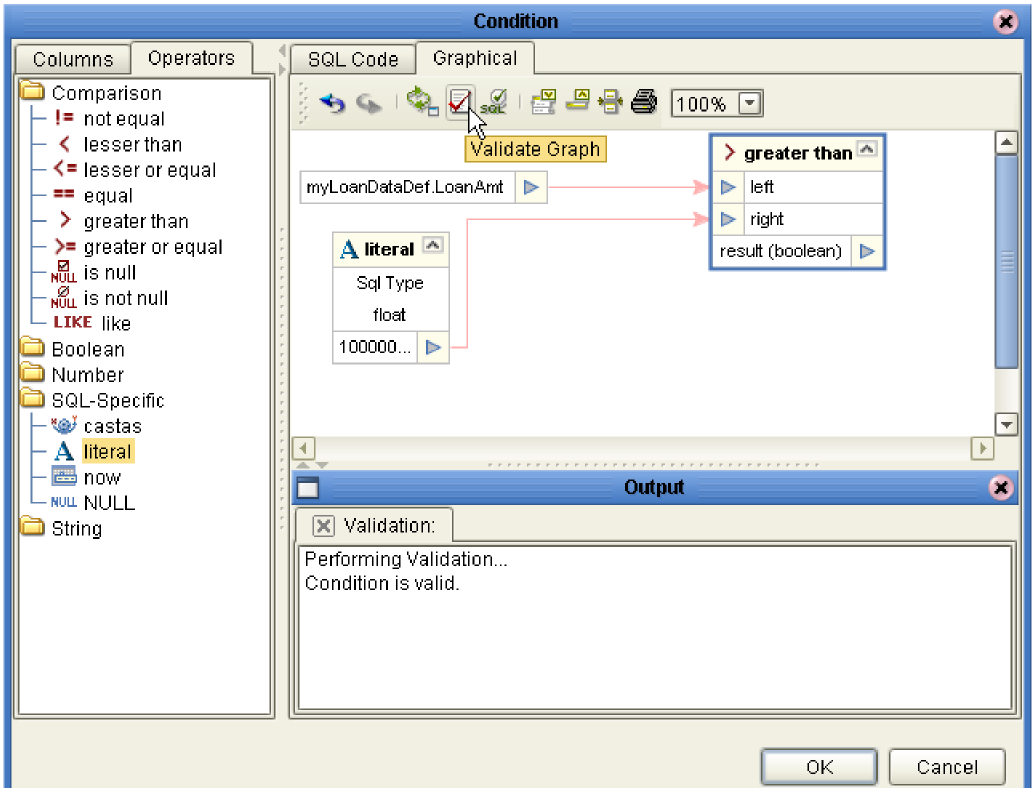
7 From SQL-Specific, drag **literal** onto the lower left of the Graphical canvas.

8 In the New Literal Object dialog, specify Type as **float** and Value as: **1000000.00** (Be sure that the number you enter includes a decimal point, to make it a **float**).

9 In the Graphical canvas, drag ....**LoanAmt** onto **left** and drag **1000000** onto **right**.

10 On the Graphical toolbar palette, click ☑ **Validate Graph**. See Figure 32.

Figure 32 Validating the Condition on the Data Definition

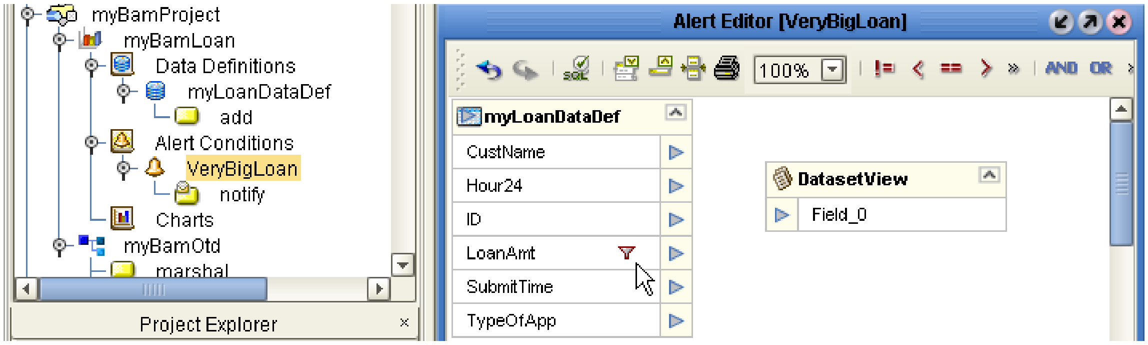


Performing Validation...
Condition is valid.

11 Click OK to redisplay the Properties dialog, with the value for **Condition** showing the SQL text of the query you created graphically. Click OK.

Result: The Alert Editor now displays the data definition with a small "filter" icon (▽) on the **LoanAmt** field, showing that a condition has been set on this field. See Figure 33.

Figure 33 Alert Editor Showing Filter on LoanAmt Field



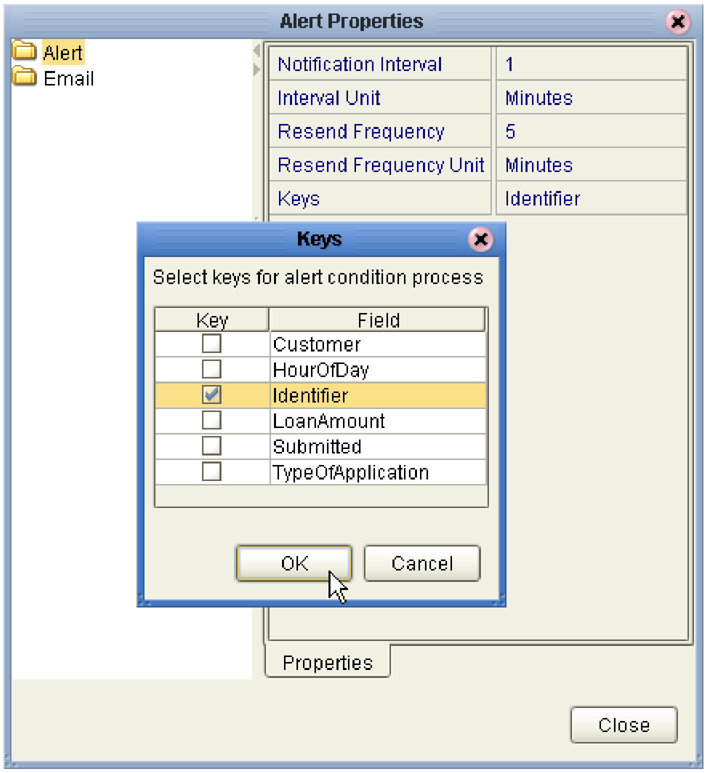
To create report fields and map data definition fields to them

1. In the Alert Editor, right-click **DatasetView** and, on the menu, click: **Configure**
2. In the **Configure Dataset View** dialog, click **Add** five times, yielding six fields.
3. Double-click each of the six fields, edit the field name appropriately (to: Customer, HourOfDay, Identifier, LoanAmount, SubmitTime, and TypeOfApplication), and click OK.
4. In the Alert Editor, drag each field from myLoanDataDef to the corresponding field in DatasetView. Data type conversions are done automatically where needed.

To configure properties of the alert condition

1. In the Alert Editor, right-click the blank canvas and, on the menu, click: **Properties**
2. In the Alert Properties dialog, change Notification Interval from 10 Minutes to **1** Minute; change Resend Frequency from 1 Day to **5 Minutes**; and for Keys, open the Keys editor, select the **Identifier** check box, and then click OK. See Figure 34.

Figure 34 Setting Properties for the Alert



Notification Interval	1
Interval Unit	Minutes
Resend Frequency	5
Resend Frequency Unit	Minutes
Keys	Identifier

Select keys for alert condition process

Key	Field
□	Customer
□	HourOfDay
☑	Identifier
□	LoanAmount
□	Submitted
□	TypeOfApplication

3. In the tree (left-hand side), click **Email**
4. Supply values appropriate for your site and yourself. For complete information on the parameters you can set, see **Table 9 on page 33**.
5. When done, click **Close**.

Result: You have created an alert condition such that any time the loan amount exceeds one million, a notification will be sent, based on the ID field of the data definition, with notification interval of one minute and resend frequency of five minutes. When the alert condition is triggered, an e-mail will be sent according to the parameters you specified for sender, receiver, and message text.

For further information on any of the material in the preceding section, refer to **"Setting Up an eBAM Application's Data Definition" on page 21** and **"Setting Up the Application's Alert Conditions" on page 28**.

6.1.5 Creating and Configuring Charts

In this section, you will set up the data definition conditions and chart properties for a pie chart that organizes the raw data on loan applications into hourly slices. For further information on any of the material in this section, refer to **"Setting Up an eBAM Application's Data Definition" on page 21** and **"About Charts" on page 34**.

To create a new pie chart

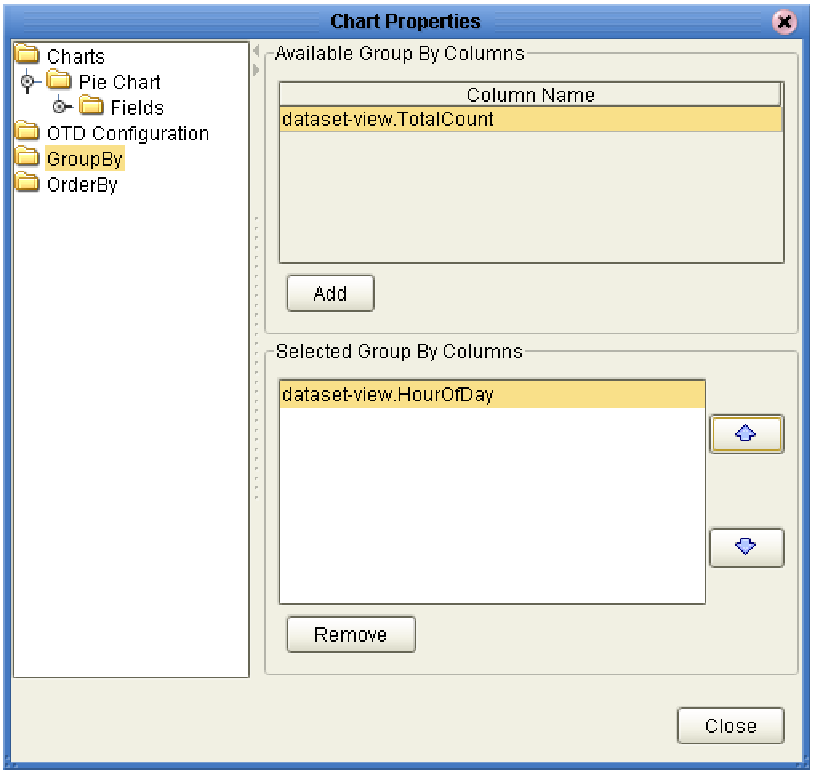
1. In the Project Explorer tree, under myBamLoan, right-click Charts and, on the popup context menu, click: **New Chart**
2. In step 1 of the Chart wizard, specify Type as **Pie Chart** and a name: **Loans by Hour**
3. In step 2 of the wizard, select the check box for **myBamLoan:myLoanDataDef**
4. In step 3 of the wizard, adjust the parameters for Common, Chart, and Pie-Specific to suit your taste (see tables in **"About Charts" on page 34**), and then click **Finish**.

Result: The project tree displays **Loans by Hour** under Charts; on the canvas, the Chart Editor displays myLoanDataDef and an empty dataset view.

To configure a view that groups by a field (HourOfDay) to count a key field (ID)

1. In the Chart Editor, right-click **dataset-view** and, on the menu, click: **Configure**
2. In the Configure Dataset View dialog, click **Add** once, yielding two fields.
3. Double-click each of the two fields, edit the field name appropriately (to **HourOfDay** and **TotalCount**), and then click OK.
4. In the Chart Editor, right-click the blank canvas and, on the menu, click: **Properties**
5. In the Chart Properties dialog, in the tree on the left side, click: **GroupBy**
6. Under Available Group-By Columns, click dataset-view.**HourOfDay** and then click **Add**. See Figure 35.

Figure 35 Setting Chart Properties: Available and Selected “GroupBy” Columns



dataset-view.TotalCount

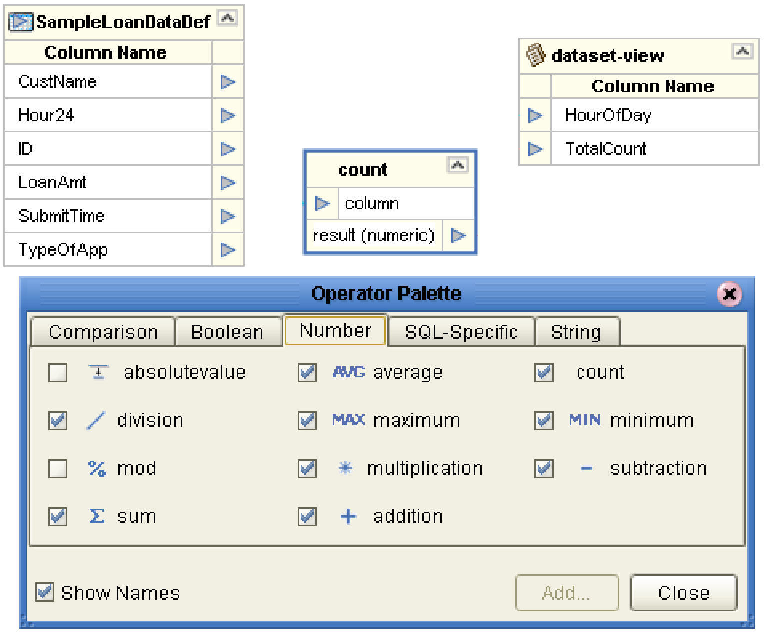
dataset-view.HourOfDay

The selected column name moves into the **Selected Group-By Columns** pane.

7 Click **Close**.

8 In the Chart Editor, on the tool palette across the top, click the chevron (») to open the Operator Palette. Then, in the Operator Palette, from the Number tab, drag **count** to the canvas. See Figure 36.

Figure 36 Dragging the “count” Operator from the Operator Palette



□ absolutevalue ☑ AVG average ☑ count
☑ division ☑ MAX maximum ☑ MIN minimum
□ % mod ☑ multiplication ☑ subtraction
☑ Σ sum ☑ + addition

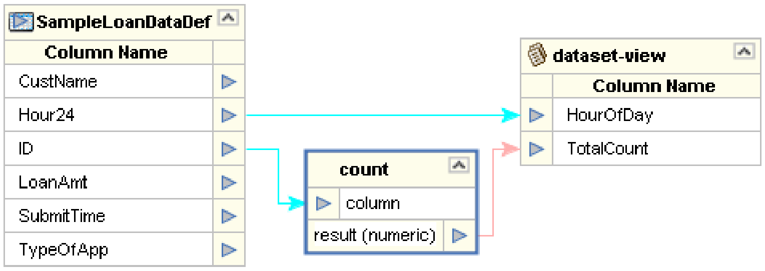
☑ Show Names

9 Click **Close**.

10 From the data definition, drag **Hour24** to [dataset-vew]**HourOfDay** and drag **ID** to [count]**column**.

11 From the **count** operator, drag **result** to [view]**TotalCount**. See Figure 37.

Figure 37 Completed Mapping for Chart Editor



12 Optionally, in the Chart Editor, right-click the blank canvas and, on the popup context menu, you can click either: **Show** Data (to show the data you previously committed in step 8 of the **procedure on page 55**); **Preview** (to display a preview of how the chart would display the data you committed); or **Properties** (to adjust the display properties of the chart; after making a change in properties, click Refresh to redisplay the chart using the new properties).

13 Save your work and close all canvases.

Result: You have created a KPI—a pie chart named **Loans by Hour** that tracks and counts how many loan applications were submitted for each hour of the day and displays the data using this view.

Now that you have finished the eBAM-specific work, the only remaining design work is to create and configure the business processes and connectivity map.

6.1.6 Creating and Configuring Business Processes

The implementation scenario requires two business processes:

- The **myLoanProcess** process, triggered by an input file record, unmarshals the data to the OTD created earlier, aggregates it (in accordance with the data definition) with other data received, and stages a "success" message to be written to a file.
- The **myAlertProcess** process, triggered by the Alert notify, marshals the data using the same OTD, flags it by prepending the current time and a user-specified string, and then stages the entire record to be written to a different output file.

To create the business processes: myAlertProcess and myLoanProcess

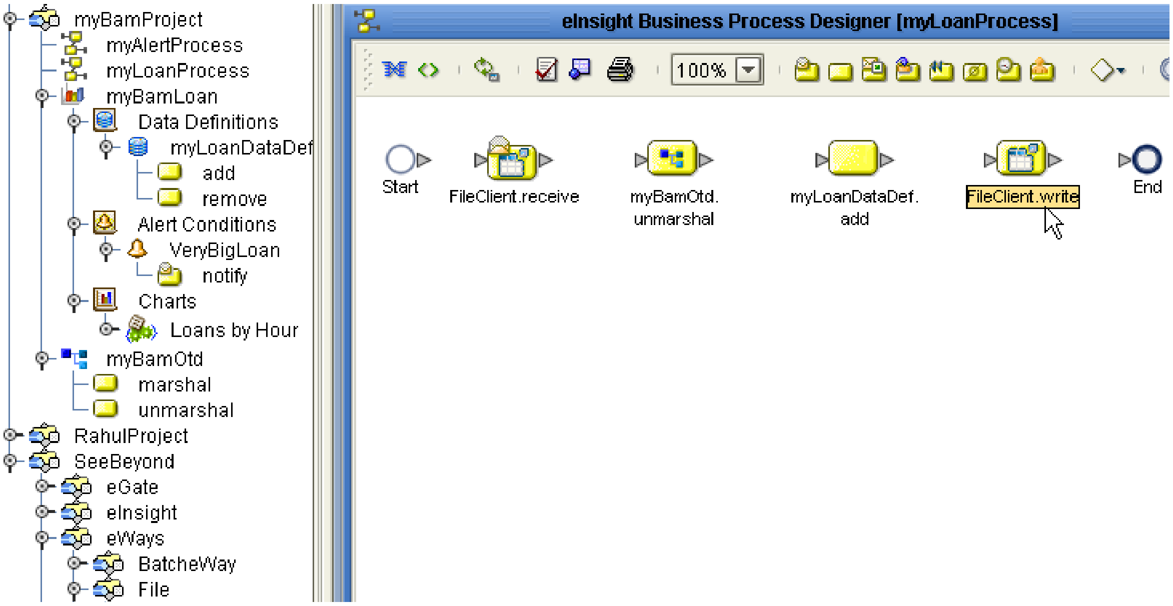
1. In the Project Explorer tree, right-click myBamProject and, on the popup context menu, point at New and click: **Business Process**. Rename the new business process to: **myAlertProcess**
2. Again, right-click myBamProject > New > **Business Process**. Rename the second new business process to: **myLoanProcess**

Result: The eInsight Business Process Designer canvas is blank but for Start and End.

To populate myLoanProcess with operations: receive, unmarshal, add, write

1. In the tree, under the SeeBeyond project, open eWays > File > **FileClient**, and drag the FileClient.**receive** operation onto the canvas, just to the right of Start.
2. Under the myBamProject project, open **myBamOtd** and drag its **unmarshal** operation onto the canvas, just to the right of receive.
3. Still under the myBamProject project, open myBamLoan > Data Definitions > **myLoanDataDef** and drag its **add** operation just to the right of unmarshal.
4. Under SeeBeyond > eWays > File > **FileClient**, drag the **write** operation onto the canvas, just to the right of add and just to the left of End. See Figure 38.

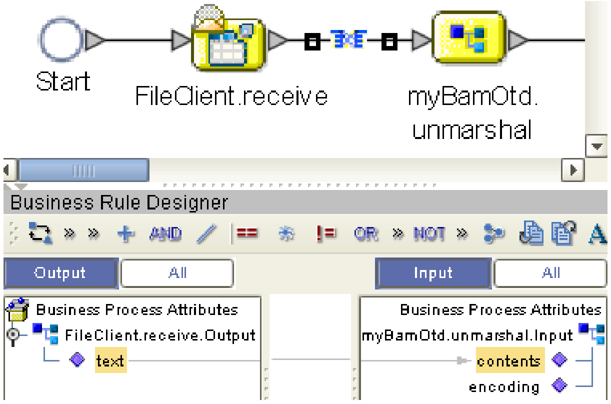
Figure 38 Operations for Activities in myLoanProcess



To connect the myLoanProcess activities

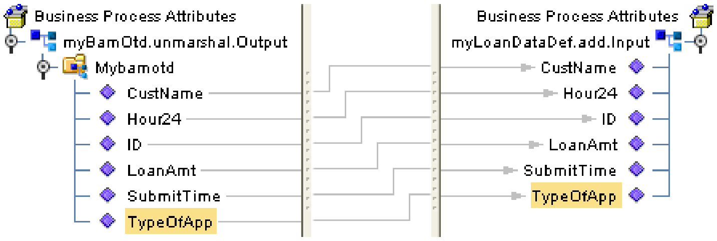
1. Connect each activity to its neighbor. In other words, connect Start to receive; receive to unmarshal; unmarshal to add; add to write, and write to End.
2. For the second connection (between **receive** and **unmarshal**): Right-click the line connecting receive to unmarshal and, on the menu, click: **Add Business Rule**
3. In the Business Rule Designer: Open both the Output and Input OTDs, and then drag the **text** node onto the **contents** node. See Figure 39.

Figure 39 myLoanProcess (Connection 2: receive to unmarshal)



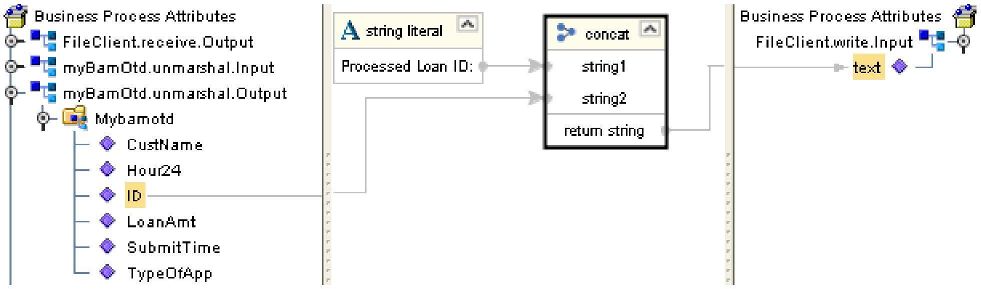
4. For the third connection: Add a business rule on the line from **unmarshal** to **add**. In the Business Rule Designer, fully open both the Output and Input nodes, and then drag each of the six nodes onto its corresponding node. See Figure 40.

Figure 40 myLoanProcess (Connection 3: unmarshal to add)



5 For the fourth connection: Add a business rule on the line from **add** to **write**. Then, in the Business Rule Designer (left side): click All; find unmarshal.Output, open myBamOtd, and highlight its **ID** node. On the right side: Open the Input node and highlight its **text** node. From the method palette, drag a A **string literal** method into the upper left and give it the value "**Processed Loan ID:**" (with the colon, but without the quotes). From the method palette, drag a **concat** method into the middle right; drag the literal onto its **string1**, and then drag the highlighted **ID** onto its **string2**. Finally, from the concat, drag its **return string** onto the **text** node on the right. See Figure 41.

Figure 41 myLoanProcess (Connection 4: add to write)



6 Validate the model (if you receive warning messages, you can delete unused attributes such as Fault if you want), save your work, click the myAlertProcess tab, and close the tab for myLoanProcess.

The Business Process Designer now displays the **myAlertProcess** tab and its canvas, which is blank except for the Start and End activities.

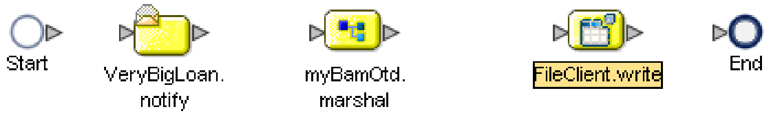
To populate myAlertProcess with operations: notify, marshal, write

1 Under the myBamProject project, open myBamLoan > Alert Conditions > **VeryBigLoan** and drag its **notify** operation just to the right of Start.

2 Under the myBamProject project, open **myBamOtd** and drag its **marshal** operation onto the canvas, to the right of notify.

3 In the project tree, under the SeeBeyond project, open eWays > File > **FileClient**, and drag it **write** operation onto the canvas, to the right of marshal. See Figure 42.

Figure 42 Operations for Activities in myAlertProcess

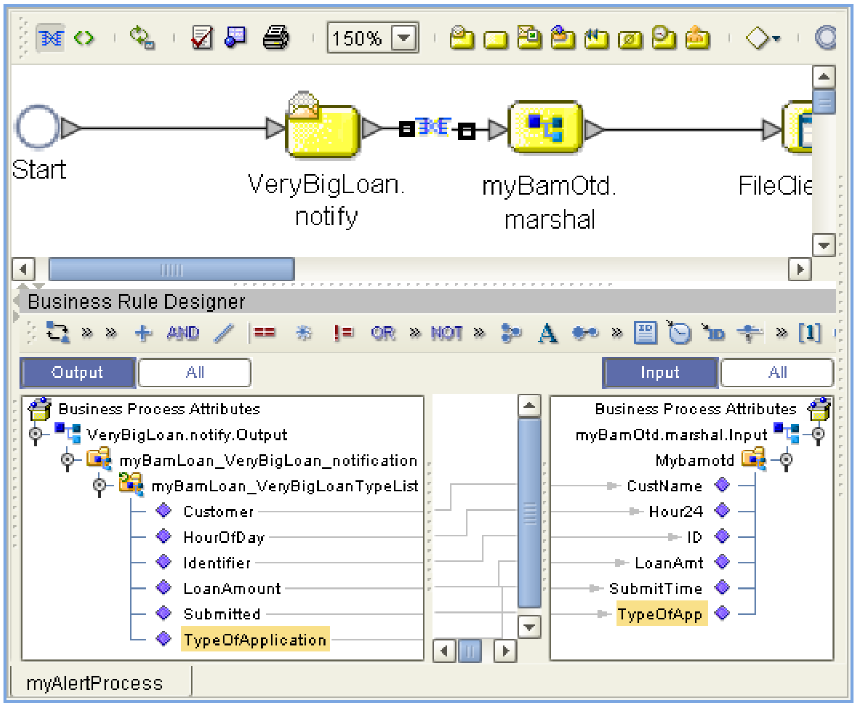


To connect the myAlertProcess activities

1 Connect each activity to its neighbor. In other words, connect **Start** to **notify**; **notify** to **marshal**; **marshal** to **write**, and **write** to **End**.

2 For the second connection: Add a business rule on the line from **notify** to **marshal**. In the Business Rule Designer, fully open both the Output and Input nodes, and then drag each of the six nodes onto its corresponding node. See Figure 43.

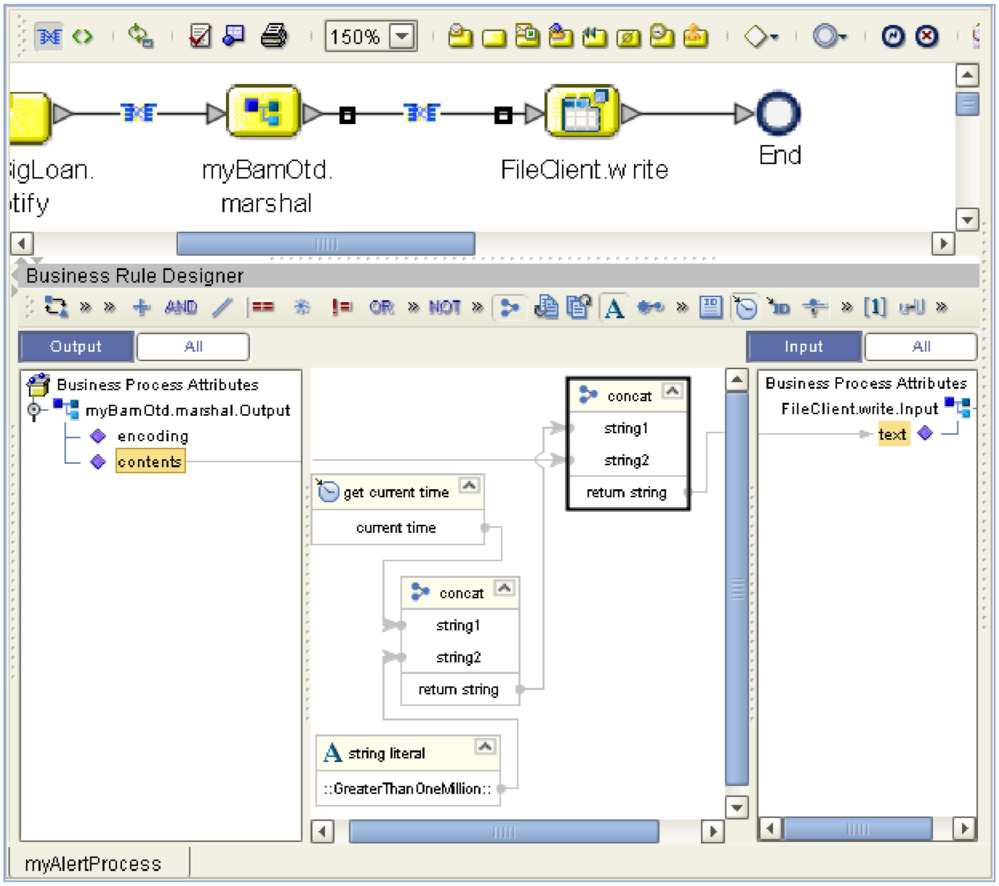
Figure 43 myAlertProcess (Connection 2: notify to marshal)



3 For the third connection: Add a business rule on the line from **marshal** to **write**. Next, in the Business Rule Designer, open the OTD (myBamOtd.marshal.Output) on the left and highlight its **contents** mode, and then open the FileClient.write.Input OTD on the right and highlight its **text** node. Then, from the method palette, drag a **get current time** method into the middle left, and then drag a **string literal** method into the lower left and give it the value "**::GreaterThanOneMillion::**" (with the colons but without the quotes). Drag a **concat** method into the middle center; drag **current time** onto its **string1**, and then drag the literal onto its **string2**. Drag another **concat** method, this time into the upper right; drag **return string** onto its

string1, and then drag [marshal.Output.]**contents** onto its **string2**. Finally, from the second concat, drag its **return string** onto the [write.Intput.]**text** node on the right. See Figure 44.

Figure 44 myAlertProcess (Connection 3: marshal to write)



4 Validate the model (if you receive warning messages, you can delete unused attributes such as Fault if you want), save your work, and close all canvases.

6.1.7 Creating and Configuring the Connectivity Map

The implementation scenario requires one connectivity map, named **myLoanCMap**, containing one input file, two output files, and the following three services:

- **myLoanProcess1** receives from the input file, talks to myBamLoan1, and sends its output to a simple output file.
- **myBamLoan1** listens to myLoanProcess1 and talks to myAlertProcess1.
- **myAlertProcess1** listens to myBamLoan1, and its output goes to an alert file.

To create the connectivity map

1 In the project tree, right-click myBamProject and, on the popup context menu, point at New and click: **Connectivity Map**

2 Rename the new connectivity map to: **myLoanCMap**

Result: In the canvas, the Connectivity Map Editor is blank.

To populate myLoanCMap with components

1 In the Connectivity Map Editor, open the tool for ▭ External Applications and enable **File External Application**.

2 From the tool palette, drag a File to the upper left of the canvas and rename it to: **myFileInLoan**

3 From the tool palette, drag a File to the upper right of the canvas and rename it to: **myFileOutLoan**

4 From the tool palette, drag a File to the lower right of the canvas and rename it to: **myFileOutAlert**

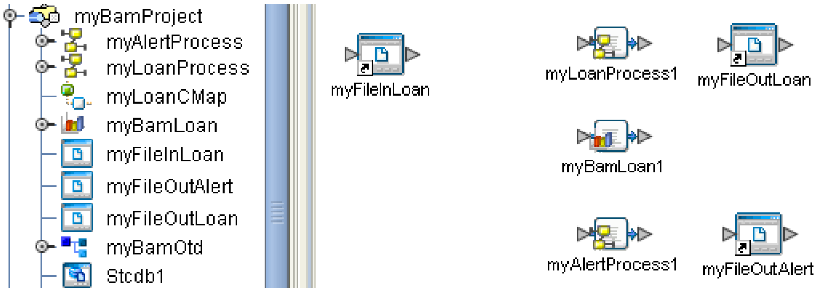
5 From the project tree, drag **myLoanProcess** to the upper center of the canvas and keep the default name: myLoanProcess1

6 From the project tree, drag **myAlertProcess** to the lower center of the canvas and keep the default name: myAlertProcess1

7 From the project tree, drag **myBamLoan** to the middle center of the canvas and keep the default name: myBamLoan1

Result: See Figure 45.

Figure 45 Components in Connectivity Map myLoanCMap



To connect the components in myLoanCMap

1 In the Connectivity Map Editor, double-click **myLoanProcess1** to open it, and then:

A From Implemented Services, drag **FileSender** leftward onto **myFileInLoan**.

B From Invoked Services, drag **FileReceiver** rightward onto **myFileOutLoan**.

Keep myLoanProcess1 open; you will minimize it after using it in the next step.

2 Double-click **myBamLoan1** to open it, and then:

A From Implemented Services, drag **add** upward onto **myLoanDataDef**. You can now minimize myLoanProcess1.

Keep myBamLoan1 open for now; you will close it after using in the next step.

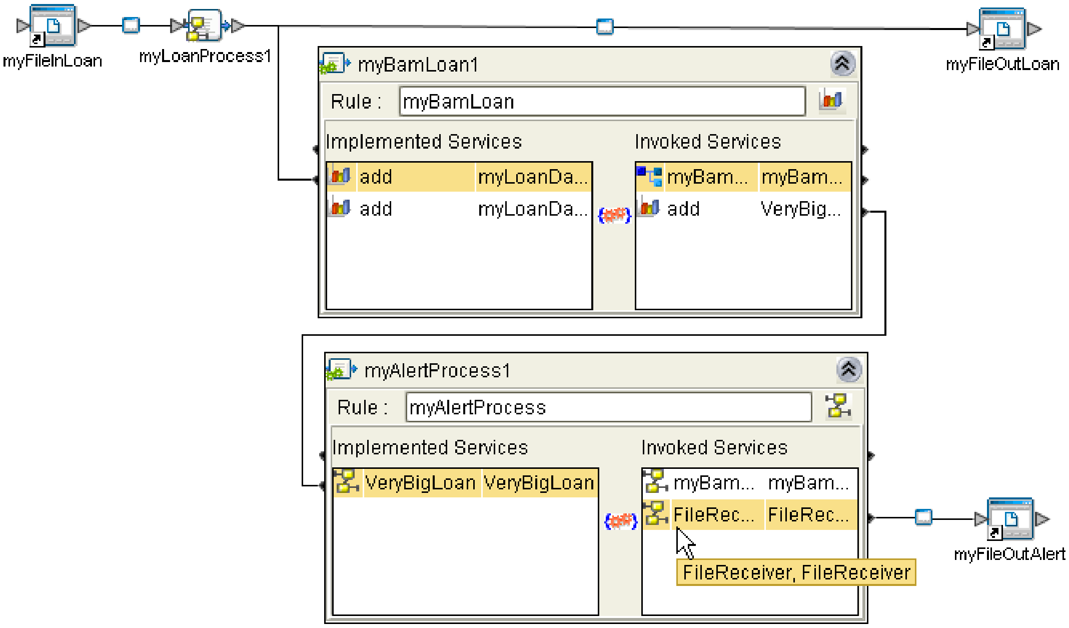
3 Double-click **myAlertProcess** to open it, and then:

A From Implemented Services, drag **VeryBigLoan** upward onto **VeryBigLoan_notify**. You can now minimize myBamLoan1.

B From Invoked Services, drag **FileReceiver** rightward onto **myFileOutAlert**.

Result: All components are connected, but the connections are not yet configured; see Figure 46.

Figure 46 Connected Components in myLoanCMap



To configure the eWays

1 In the Connectivity Map Editor, double-click the eWay connecting myFileInLoan with myLoanProcess1, choose the **Inbound** File eWay template, and then make the following changes to the default parameter settings:

- For **Directory**, change to: **C:\temp\eBAM\Sample\Data\In**
- For **Multiple records per file**, change to: **True**
- For **Remove EOL**, change to: **True**

2 Verify that all parameters are correctly set, and then click OK.

3 Double-click the eWay connecting myLoanProcess1 with myFileOutLoan, choose the **Outbound** File eWay template, and then make the following change to the default parameter settings:

- For **Directory**, change to: **C:\temp\eBAM\Sample\Data\Out**

4 Verify that all parameters are correctly set, and then click OK.

5 Double-click the eWay connecting myAlertProcess1 with myFileOutAlert, choose the **Outbound** template, and then make the following changes:

- For **Directory**, change to: **C:\temp\eBAM\Sample\Data\Out**

- For **Output file name**, change to: **alert%d.dat**

6 Verify that all parameters are correctly set, and then click OK.

7 Save your work and close all canvases.

Result: All components are connected and configured. The next step is to create and activate a deployment profile for the project.

6.2 Deployment and Runtime Steps

6.2.1 Starting the Logical Host

These steps assume you have already installed a logical host.

To bootstrap the logical host

1 Open a command prompt and change directories to the location of your logical host's bootstrap executables. For example:

```
cd \ican5\logicalhost\bootstrap\bin
```

2 Start the bootstrap script using appropriate parameters. For example:

```
bootstrap -r http://myBox:12345/myRepository -i myId -p myPassword
-e myBamEnv -l LogicalHost1
```

- For the **-r** (repository) parameter), supply the correct URL with repository name.
- For the **-i** and **-p** (ID and password) parameters, supply the appropriate values.
- For **-e** (environment) parameter, use: **myBamEnv**
- For **-l** (logical host name) parameters, use: **LogicalHost1**

Result: The logical host is now running, and ready to have a project deployed to it.

6.2.2 Activating and Running the Project

You will create a deployment profile named **myBamLoanDP**, which you will activate and deploy to the logical host that is currently running. (If it is not already running, see **"Starting the Logical Host" on page 69**.)

To create the deployment profile

1 In the project tree, right-click myBamProject and, on the popup context menu, point at New and click: **Deployment Profile**

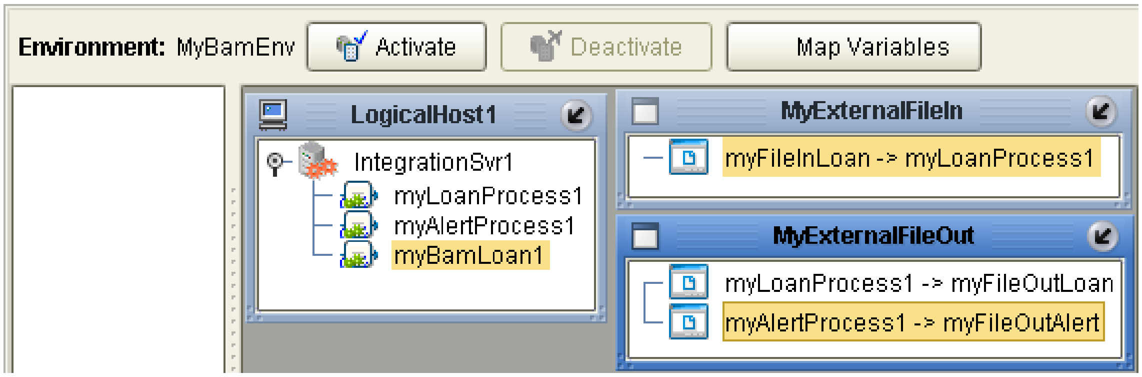
2 In the dialog box, name it **myBamLoanDP**, and be sure it references the myBamEnv environment before clicking OK.

Result: The project tree displays the new object, and the Deployment Editor shows the six components and the three servers to which you will assign them.

To assign components to servers

1. One by one, drag the three services (myLoanProcess1, myAlertProcess1, and myBamLoan1) into LogicalHost1 and onto **IntegrationSvr1**.
2. Drag the inbound File eWay (myFileInLoan->myLoanProcess1) into the **myExternalFileIn** server.
3. One by one, drag the two outbound File eWays (myLoan...->myFileOutLoan and myAlert...->myFileOutAlert) into the **myExternalFileOut** server.
4. Save your work. See Figure 47.

Figure 47 Components from myBamProject Assigned to Servers in myBamEnv



To activate and run the project

1. In the Deployment Editor, after each of the six components in myBamProject has been assigned to one of the three servers in myBamEnv, click **Activate**
   - Or, if you have previously activated this deployment profile, click **Reactivate**
2. After activation is successfully completed, when the Activate dialog box asks whether you want to apply the changes to the logical host immediately, click: **Yes**

6.2.3 Monitoring the Alerts and KPIs with Live Data

Now that you have set up the data definitions, set up a filter for an alert condition with actions, and set up a pie chart, you are ready to monitor the results and see how they update in real time as you feed sample data to the project.

To start monitoring the project

1. If you have not already done so, log in to Enterprise Manager.
2. In Enterprise Manager, enter the URL for monitoring the eBAM charts for this project. This takes the following form:

   `http://`*`hostname`*`:18004/`*`BamApplicationName`*`/ebam`

   (This is case-sensitive; the final four letters must be **ebam**, not eBAM.) For example:

   ```
   http://myMachine:18004/myBamLoan/ebam
   ```

   If your Integration Server does not use port 18004, then substitute the correct port number in the URL.

Result: See Figure 48.

Figure 48 Initial eBAM Charts Viewer (No Data)

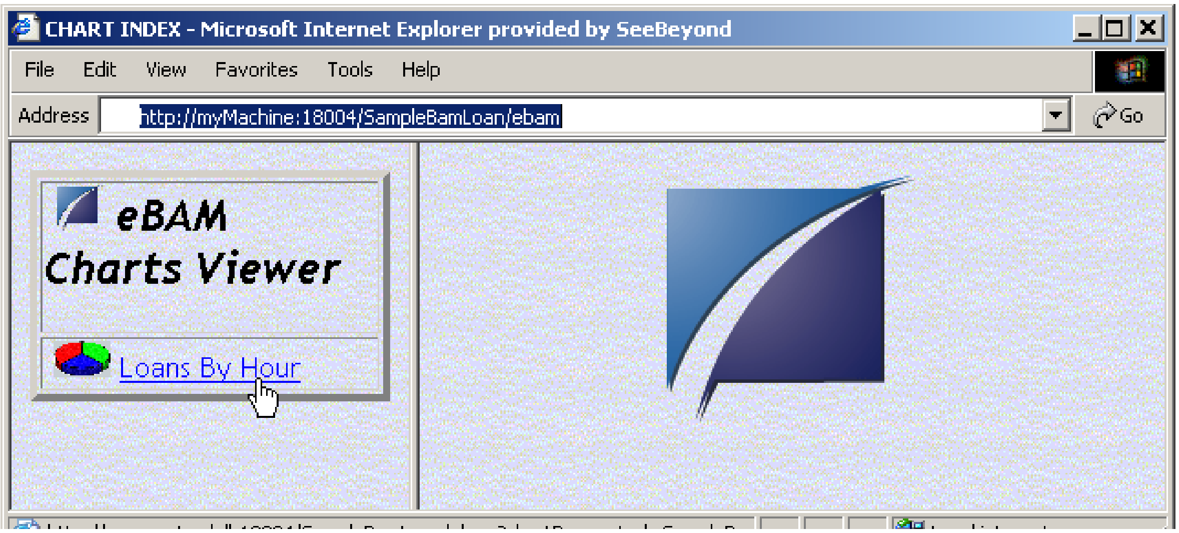


CHART INDEX - Microsoft Internet Explorer provided by SeeBeyond
File
Edit
View
Favorites
Tools
Help
Address
http://myMachine:18004/SampleBamLoan/ebam
Go
eBAM
Charts Viewer
Loans By Hour

To feed sample data to the project

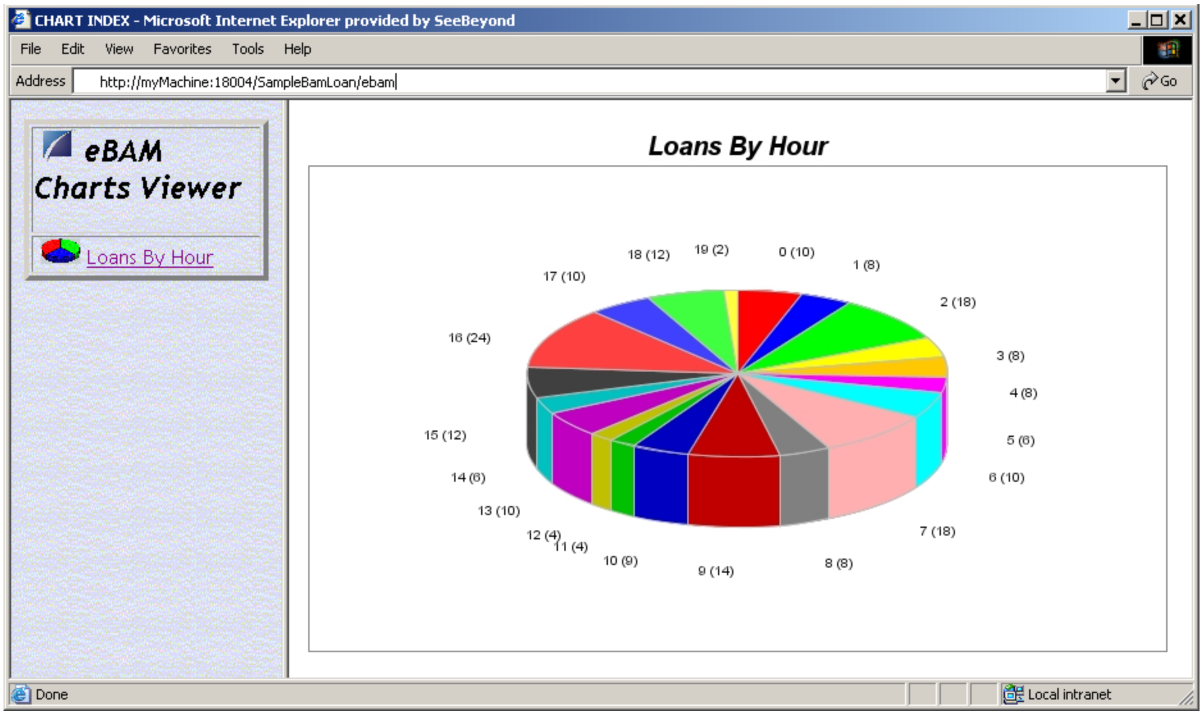
1. Browse (or open a command prompt and change directories) to the location where you installed the sample input data, and verify the presence of both sample data files (LoanDataAllSmall.txt and LoanDataOneBig.txt). For example:

```
C:
cd \temp\eBAM\Sample\Data\In
dir
```

2. Rename a copy of LoanDataOneBig.txt to: **input_OneBig.txt**
3. Watch as the file is picked up by the File eWay, renaming it to **input_OneBig.~in**
4. Every five minutes, an e-mail message will be sent to the recipient you specified (with the subject line “EBAM ALERT:<myBamLoan>:<VeryBigLoan>“). Its “From” address will be whatever you provided when you configured the Alert properties, and its body will contain your message text, followed by complete information on the loan record that triggered the alert.
5. Also notice that the output directory C:\temp\eBAM\Sample\Data\Out has two new files:
   - **output1.dat** provides the ID of the loan that was just processed.
   - **alert1.dat** contains a record containing a timestamp, the string **::GreaterThanOneMillion::**, and details on the exceptional loan.
6. In the Charts Viewer, if you have not already done so, click the **Loans by Hour** link and see the pie chart display a 360-degree “slice” representing a single data item.
7. Browse the output contents, in C:\temp\eBAM\Sample\Data\Out\output*.dat
8. Rename a copy of LoanDataAllSmall.txt to: **input_AllSmall.txt**
9. Watch as the file is picked up by the File eWay, renaming it to **input_AllSmall.~in**

Result: The Charts Viewer displays a pie chart whose slices show how many loans were submitted during each work hour monitored by the sample data file. See Figure 49.

Figure 49 eBAM Charts Viewer Showing Pie Chart of Loans By Hour



SQL Reserved Words

Because eBAM supports several dialects of SQL, it warns you against from using certain reserved words as eBAM field names. Table 14 lists the words that are disallowed; it is a superset of several lists of words reserved by SQL and/or SQLPlus.

Using any of these words as field name, whether in uppercase, lowercase, or mixed case, will result in a warning message.

Table 15 SQL Reserved Words

ABORT	ABS	ABSOLUTE
ACCESS	ACTION	ADA
ADD	ADMIN	AFTER
AGGREGATE	ALIAS	ALIGNMENT
ALL	ALLOCATE	ALPHANUMERIC
ALTER	ANALYSE	ANALYZE
AND	ANY	ARE
ARRAY	AS	ASC
ASENSITIVE	ASSERTION	ASSIGNMENT
ASYMMETRIC	AT	ATOMIC
AUTHORIZATION	AUTOINCREMENT	AVG
BACKUP	BACKWARD	BASETYPE
BEFORE	BEGIN	BETWEEN
BIGINT	BINARY	BIT
BITVAR	BIT_LENGTH	BLOB
BOOLEAN	BOTH	BREADTH
BREAK	BROWSE	BULK
BY	C	CACHE
CALL	CALLED	CARDINALITY
CASCADE	CASCADED	CASE
CAST	CATALOG	CATALOG_NAME
CHAIN	CHAR	CHARACTER
CHARACTERISTICS	CHARACTER_LENGTH	CHARACTER_SET_CATALOG
CHARACTER_SET_NAME	CHARACTER_SET_SCHEMA	CHAR_LENGTH
CHECK	CHECKED	CHECKPOINT

Table 15 SQL Reserved Words (Continued)

CLASS	CLASS_ORIGIN	CLOB
CLOSE	CLUSTER	CLUSTERED
COALESCE	COLLATE	COLLATION
COLLATION_CATALOG	COLLATION_SCHEMA	COLUMN
COLUMNS	COLUMN_NAME	COMMAND_FUNCTION
COMMAND_FUNCTION_CODE	COMMENT	COMMIT
COMMITED	COMMUTATOR	COMPACTDATABASE
COMPLETION	COMPUTE	CONDITION_NUMBER
CONNECT	CONNECTION	CONNECTION_NAME
CONSTRAINT	CONSTRAINTS	CONSTRAINT_CATALOG
CONSTRAINT_NAME	CONSTRAINT_SCHEMA	CONSTRUCTOR
CONTAINER	CONTAINS	CONTAINSTABLE
CONTINUE	CONVERSION	CONVERT
COPY	CORRESPONDING	COUNT
CREATE	CREATEDB	CREATEFIELD
CREATEGROUP	CREATEINDEX	CREATEOBJECT
CREATEPROPERTY	CREATERELATION	CREATETABLEDEF
CREATEUSER	CREATEWORKSPACE	CROSS
CUBE	CURRENCY	CURRENT
CURRENT_DATE	CURRENT_PATH	CURRENT_ROLE
CURRENT_TIME	CURRENT_TIMESTAMP	CURRENT_USER
CURSOR	CURSOR_NAME	CYCLE
DATA	DATABASE	DATE
DATETIME_INTERVAL_CODE	DATETIME_INTERVAL_PRECISION	DAY
DDBC	DEALLOCATE	DEC
DECIMAL	DECLARE	DEFAULT
DEFERRABLE	DEFERRED	DEFINED
DEFINER	DELETE	DELIMITER
DELIMITERS	DENY	DEPTH
DEREF	DESC	DESCRIBE
DESCRIPTOR	DESTROY	DESTRUCTOR
DETERMINISTIC	DIAGNOSTICS	DICTIONARY
DISALLOW	DISCONNECT	DISK
DISPATCH	DISTINCT	DISTINCTROW
DISTRIBUTED	DO	DOMAIN
DOUBLE	DROP	DUMMY
DUMP	DYNAMIC	DYNAMIC_FUNCTION
DYNAMIC_FUNCTION_CODE	DYNASET	EACH
ELSE	ELEMENT	ENCODING

Table 15 SQL Reserved Words (Continued)

ENCRYPTED	END	END-EXEC
EQV	EQUALS	ERROR
ERRLVL	ESCAPE	EVERY
EXCEPT	EXCEPTION	EXCLUSIVE
EXEC	EXECUTE	EXISTING
EXISTS	EXIT	EXPLAIN
EXTENDED	EXTERNAL	EXTRACT
FALSE	FETCH	FIELD
FILE	FILLCACHE	FILLFACTOR
FINAL	FINALFUNC	FIRST
FLOAT	FLOAT4	FLOAT8
FOR	FORM	FORMS
FORCE	FOREIGN	FORTRAN
FORWARD	FOUND	FREE
FREETEXT	FREETEXTTABLE	FREEZE
FROM	FULL	FUNCTION
G	GENERAL	GENERATED
GET	GETOBJECT	GETOPTION
GOTOPAGE	GLOBAL	GO
GOTO	GRANT	GRANTED
GROUP	GROUPING	GTCMP
GUID	HANDLER	HASHES
HAVING	HIERARCHY	HOLD
HOLDLOCK	HOST	HOUR
IDENTITY	IDENTITYCOL	IDENTITY_INSERT
IDLE	IEEEDOUBLE	IEEESINGLE
IF	IGNORE	ILIKE
IMMEDIATE	IMMUTABLE	IMP
IMPLEMENTATION	IMPLICIT	IN
INCREMENT	INDEX	INDICATOR
INFIX	INHERITS	INITCOND
INITIALIZE	INITIALLY	INNER
INOUT	INPUT	INSENSITIVE
INSERT	INSTANCE	INSTANTIABLE
INSTEAD	INT	INTEGER
INTEGER2	INTEGER4	INTERNALLENGTH
INTERSECT	INTERVAL	INTO
INVOKER	IS	ISNULL
ISOLATION	ITERATE	JOIN

Table 15 SQL Reserved Words (Continued)

K	KEY	KEY_MEMBER
KEY_TYPE	KILL	LANCOMPILER
LANGUAGE	LARGE	LAST
LATERAL	LEADING	LEFT
LEFTARG	LENGTH	LESS
LEVEL	LIKE	LIMIT
LINENO	LISTEN	LOAD
LOCAL	LOCALTIME	LOCALTIMESTAMP
LOCATION	LOCATOR	LOCK
LOGICAL	LOGICAL1	LONGBINARY
LONGTEXT	LONGVARCHAR	LOWER
LTCMP	M	MAIN
MAP	MATCH	MAX
MAXROWS	MAXVALUE	MEMO
MEMORYSET	MERGES	MESSAGE_LENGTH
MESSAGE_OCTET_LENGTH	MESSAGE_TEXT	MIRROREXIT
MIN	MINUTE	MINVALUE
MOD	MODE	MODIFIES
MODIFY	MODULE	MONEY
MONTH	MORE	MOVE
MUMPS	NAME	NAMES
NATIONAL	NATURAL	NCHAR
NCLOB	NEGATOR	NEW
NEWPASSWORD	NEXT	NO
NOCHECK	NOCREATEDB	NOCREATEUSER
NONCLUSTERED	NONE	NOT
NOTHING	NOTIFY	NOTNULL
NULL	NULLABLE	NULLIF
NUMBER	NUMERIC	OBJECT
OCTET_LENGTH	OF	OFF
OFFSETS	OIDS	OLD
OLEOBJECT	ON	ONCE
ONLY	OPEN	OPENDATASOURCE
OPENQUERY	OPENRECORDSET	OPENROWSET
OPENXML	OPERATION	OPERATOR
OPTION	OPTIONS	OR
ORDER	ORDINALITY	OUT
OUTER	OUTPUT	OVER
OVERLAPS	OVERLAY	OVERRIDING

Table 15 SQL Reserved Words (Continued)

OWNER	OWNERACCESS	PAD
PARAMETER	PARAMETERS	PARAMETER_MODE
PARAMETER_NAME	PARAMETER_ORDINAL_POSITION	PARAMETER_SPECIFIC_CATALOG
PARAMETER_SPECIFIC_NAME	PARAMETER_SPECIFIC_SCHEMA	PARTIAL
PASCAL	PASSEDBYVALUE	PASSWORD
PATH	PENDANT	PERCENT
PERM	PERMANENT	PIPE
PIVOT	PLACING	PLAIN
PLAN	PLI	POSITION
POSTFIX	PRECISION	PREFIX
PREPARE	PRESERVE	PRIMARY
PRIOR	PRINT	PRIVILEGES
PROC	PROCEDURAL	PROCEDURE
PUBLIC	QUIT	RAISERROR
READ	READS	READTEXT
REAL	RECALC	RECHECK
RECONFIGURE	RECORDSET	RECURSIVE
REF	REFERENCES	REFERENCING
REFRESH	REFRESHLINK	REGISTERDATABASE
REINDEX	RELATION	RELATIVE
RENAME	REPAINT	REPAIRDATABASE
REPEATABLE	REPLACE	REPLICATION
REPORTS	REQUERY	RESET
RESIGNAL	RESTORE	RESTRICT
RESULT	RETURN	RETURNED_LENGTH
RETURNED_OCTET_LENGTH	RETURNED_SQLSTATE	RETURNS
REVOKE	RIGHT	RIGHTARG
ROLE	ROLLBACK	ROLLUP
ROUTINE	ROUTINE_CATALOG	ROUTINE_NAME
ROUTINE_SCHEMA	ROW	ROWS
ROWCOUNT	ROWGUIDCOL	ROW_COUNT
RULE	SAVEPOINT	SCALE
SCHEMA	SCHEMA_NAME	SCOPE
SCREEN	SCROLL	SEARCH
SECOND	SECTION	SECURITY
SELECT	SELF	SENSITIVE
SEQUENCE	SERIALIZABLE	SERVER_NAME
SESSION	SESSION_USER	SET

Table 15 SQL Reserved Words (Continued)

SETFOCUS	SETOF	SETOPTION
SETS	SETUSER	SHARE
SHORT	SHOW	SHUTDOWN
SIMILAR	SIMPLE	SINGLE
SIZE	SMALLINT	SOME
SORT1	SORT2	SOURCE
SPACE	SPECIFIC	SPECIFICTYPE
SPECIFIC_NAME	SQL	SQLCA
SQLCODE	SQLERROR	SQLEXCEPTION
SQLSTATE	SQLWARNING	STABLE
START	STATE	STATEMENT
STATIC	STATISTICS	STDEV
STDEVP	STDIN	STDOUT
STORAGE	STRICT	STRUCTURE
STYLE	SUBCLASS_ORIGIN	SUBLIST
SUBSTRING	SUM	SYMMETRIC
SYSID	SYSTEM	SYSTEM_USER
TABLE	TABLEDEF	TABLEDEFS
TABLEID	TABLE_NAME	TABLES
TABLESET	TEMP	TEMPLATE
TEMPORARY	TERMINATE	TEXTSIZE
THAN	THEN	TIME
TIMESTAMP	TIMEZONE_HOUR	TIMEZONE_MINUTE
TO	TOAST	TOP
TRAILING	TRAN	TRANSACTION
TRANSACTION_COMMITTED	TRANSACTIONS_ROLLED_BACK	TRANSACTION_ACTIVE
TRANSFORM	TRANSFORMS	TRANSLATE
TRANSLATION	TREAT	TRIGGER
TRIGGER_CATALOG	TRIGGER_NAME	TRIGGER_SCHEMA
TRIM	TRUE	TRUNCATE
TRUSTED	TSEQUAL	TYPE
UNCOMMITTED	UNDER	UNENCRYPTED
UNION	UNIQUE	UNKNOWN
UNLISTEN	UNNAMED	UNNEST
UNTIL	UPDATE	UPDATETEXT
UPPER	USAGE	USE
USER	USING	VACUUM
VALID	VALIDATOR	VALUE
VALUES	VARBINARY	VARCHAR

Table 15 SQL Reserved Words (Continued)

VARIABLE	VARP	VARYING
VERBOSE	VERSION	VIEW
VOLATILE	WAITFOR	WHEN
WHENEVER	WHERE	WHILE
WITH	WITHOUT	WORK
WRITE	WRITETEXT	XOR
YEAR	YES	YESNO
ZONE		

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