



Installation and Administration Guide

QAD Demand Management Engine

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Chapter 1 Introduction

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Section 1: Overview

The Demand Management Engine (DME) is used for forecasting and planning.



1-1: Demand Management Engine Highlights

Some of the new features of the DME:

- Support localization for currency and numeric values
- Improved Batch Scheduler
- Retagging

1-2: Logging In

You can log in to the DME through the Base Unit. You can also change your password in the Base Unit when you log in.

Table 1-1: Default Username and Password

Login	Password
Username	fxadmin
Password	fxadmin

Note: ~~Username and passwords are case sensitive.~~

1-3: Logging Out

If you would like to log out of the application, click the  button at the bottom of the Base Unit.

Section 2: Documentation Conventions

2-1: Text

The following table lists text conventions in this user guide.

Table 1-2: Text Convention Descriptions

Convention	Description
Text represented as a screen display.	This typeface represents displays that appear on your terminal screen, for example: <code>lom></code>
Text represented as menu or sub-menu names.	This typeface represents all menu and sub-menu names within procedures, for example: On the File menu, click New .

2-2: Screen Captures

The example screens in this guide may not represent what you see on your monitor; use them only as guidelines.

Section 3: Acronyms and Abbreviations

Term	Definition
ANOVA	ANalysis of VAriance
ARIMA	Moving Average
BOM	Bill of Materials
DTL	Detail Scenario
DF	Degrees of Freedom
PO	Purchase Order
DME	Demand Management Engine
FG	Finished Goods
MAPE	Mean Absolute Percentage Error
MOU	Mass Observation Update
MSU	Mass Series Update
IM	Inventory Management

Chapter 2 Installation

This chapter includes:

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Section 3: Installing the DME 20

Section 4: Database Installation and Upgrade 35

Section 5: Retagging Installation 39

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Section 1: Overview

The DME consists of six applications. The table below details each application.

Application	Description
FX_JGD – DME Database	SQL Server Database, which serves as the DME database and repository.
Base Unit	Configures data loading, forecast method and user management.
Viewer	Center of DME; controls and launches all the major features within the DME.
Batch Scheduler	Enables you to configure and run repetitive tasks as part of a batch process, such as monthly maintenance routine. It consists of a service and a management.
FX Connection Utility	Defines FX_JGD Database location and log in information.

All the data for the DME is in FX_JGD Database. This database may exist on a Server or locally on the PC. If the database exists on a

server, it is an SQL Server 2000 or 2005. If the database exists locally it uses either of the following:

- SQL Server 2000 or 2005 (Local)
- MSDE 2000 (kernel of the SQL Server 2000 or 2005)

Section 2: Installation Requirements

The installation process for the DME is automated. However, there are certain hardware and software requirements necessary to ensure the application installs successfully.

2-1: Hardware

The list below details the required hardware to install the DME.

Table 2-1: Hardware Requirements

Hardware	Minimum	Recommended
CPU	Pentium 3 - 700 MHZ	Pentium 4 - 2.0 GHZ Pentium M - 1.2 GHZ
RAM	512 MB	1 GB
Hard Disk	50 MB	100 MB

2-2: Software Media

The list below details the required software to install the DME application.

- Demand Management Engine v5.0 CD
- Microsoft .NET Framework 2.0 (Included in installation media)

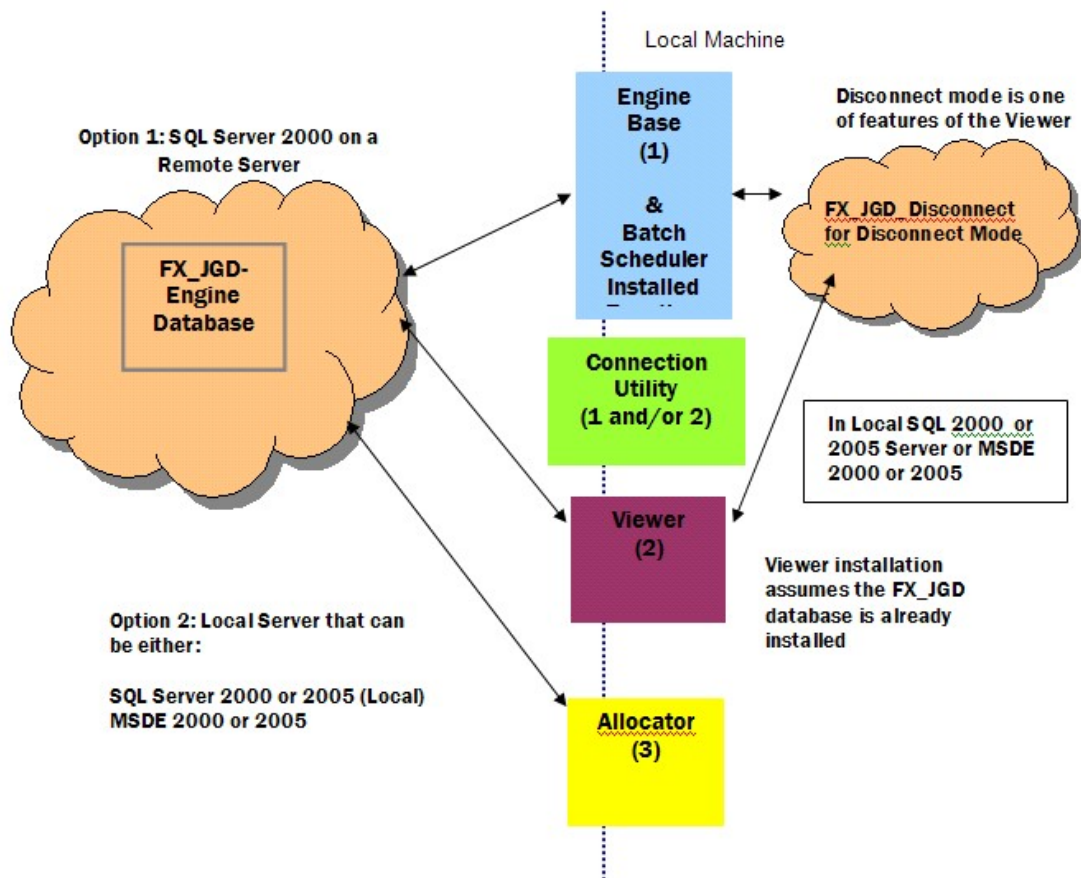
Section 3: Installing the DME

There are three components in the Demand Management Engine, they are:

- Base Unit
- Batch Scheduler
- Viewer

The Base Unit installation and the Viewer installation also install the Connection Utility. The Demand Management Engine installation process is driven by the following series of steps.

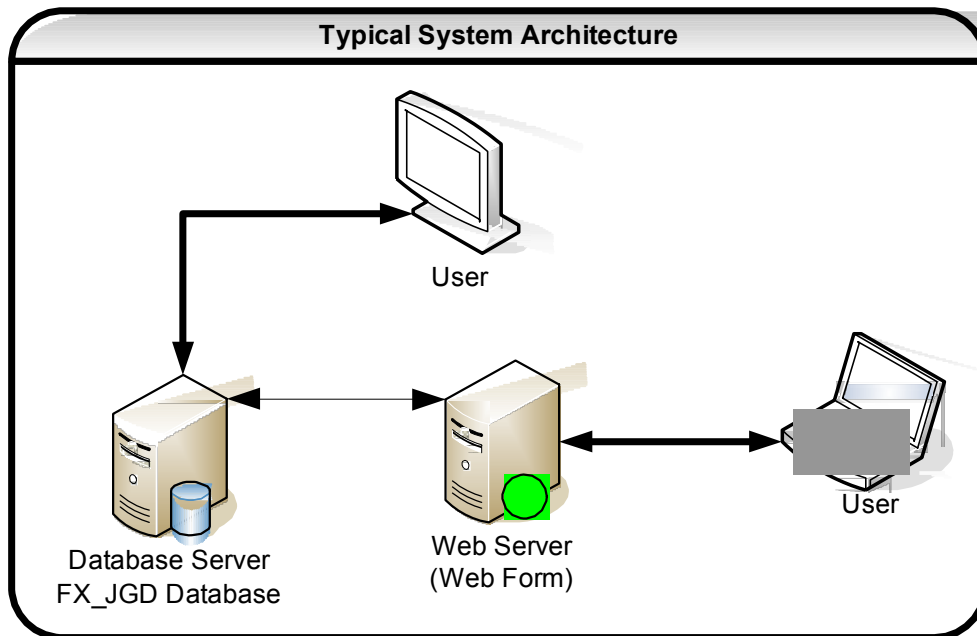
The depiction below displays the interrelationships between the applications of the Demand Management Engine. The left side of the figure illustrates the server or data side of the application. The right side of the figure illustrates the applications and the order in which they are installed during the process. Notice that the Base Unit and the Batch Scheduler are installed together after the FX_JGD Database is installed on either a server or locally on a PC.



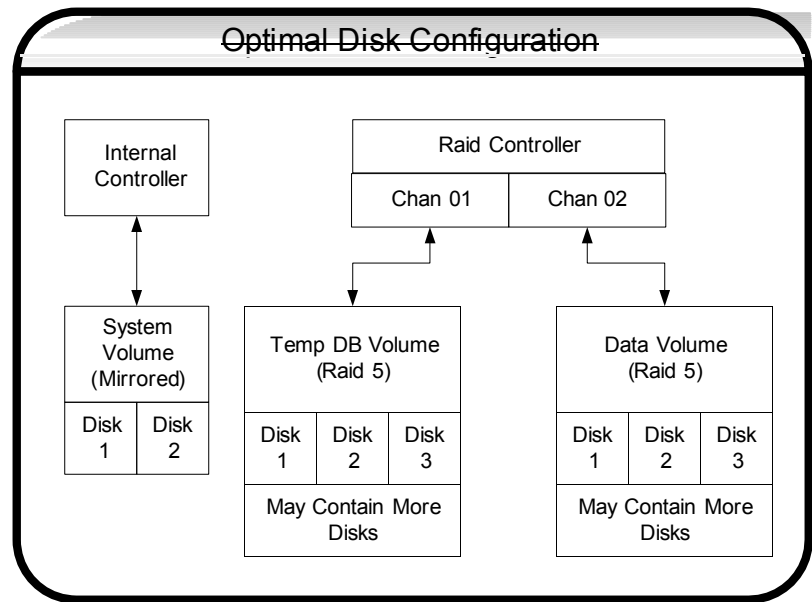
3-1: Installing DME/Viewer in a Network Environment

In a network environment, the DME database is accessible from different workstations with the database residing on a SQL 2000 or 2005 Server.

The following figure illustrates two workstations that access the same DME database. Both workstations request and save data in the same database.



The following illustration details the optimal disk configuration for the database server.



Depending on the data volume and performance requirements it is possible to change this configuration.

In a network environment, you must install the DME in the following order:

Location	Description
SQL 2000 or 2005 Server	On the SQL 2000 or 2005 Server, install the DME using the Local installation type.
Workstation	On each workstation, install DME using the Connect to existing database installation type. The workstations will access the DME database on the remote SQL server.

3-2: Base Unit & Viewer Installation

This section describes how to install the Base Unit and Viewer:

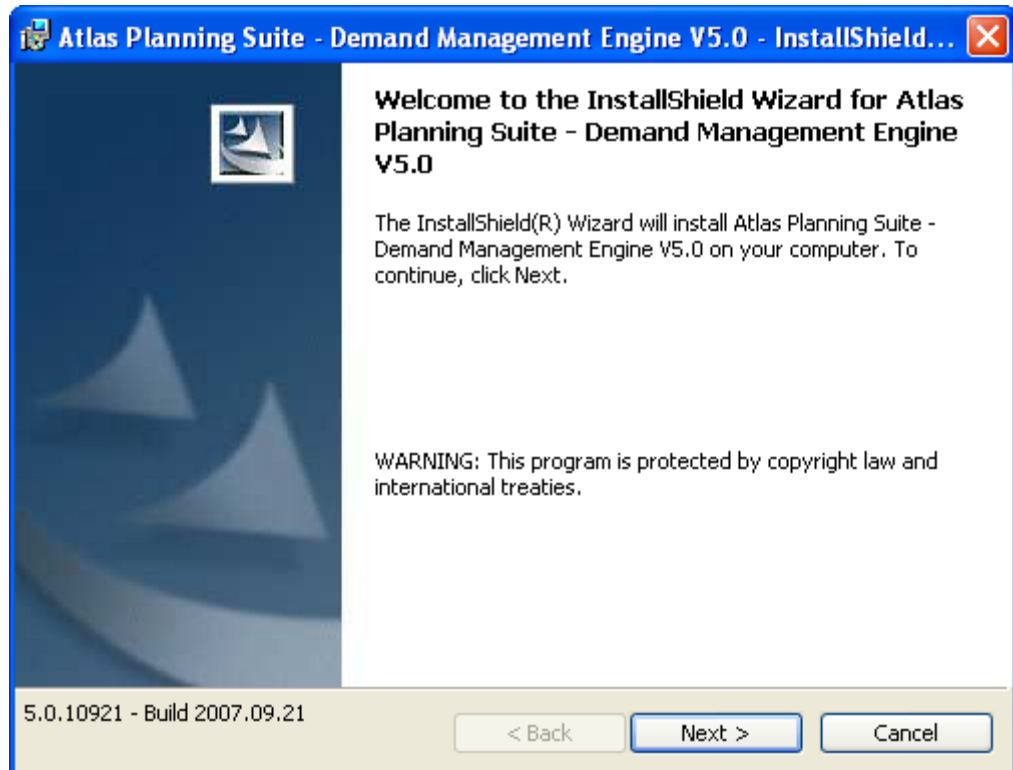
1. Insert the **Demand Management Engine CD** into your CD-ROM drive.
2. Click the **Start** button and select **Run** from the menu.

3. Type the **drive letter:\Setup.exe** in the **Run** dialog box.

Note: *The drive letter is the drive where your CD is located. If you do not know the letter assigned to your CD-ROM drive, select Browse in the prompt window to locate the appropriate drive.*

4. Click OK.

The Installation Wizard screen displays.



5. Click **Next**.

The License Agreement window displays.

6. Click **I Agree** if you agree the terms, otherwise click **Cancel** to quit.

The Registration Information window displays.

Atlas Planning Suite - Demand Management Engine V5.0 - InstallShield...

Customer Information

Please enter your information.

User Name:
Macelo Solis

Organization:
JGS

Install this application for:

☒ Anyone who uses this computer (all users)

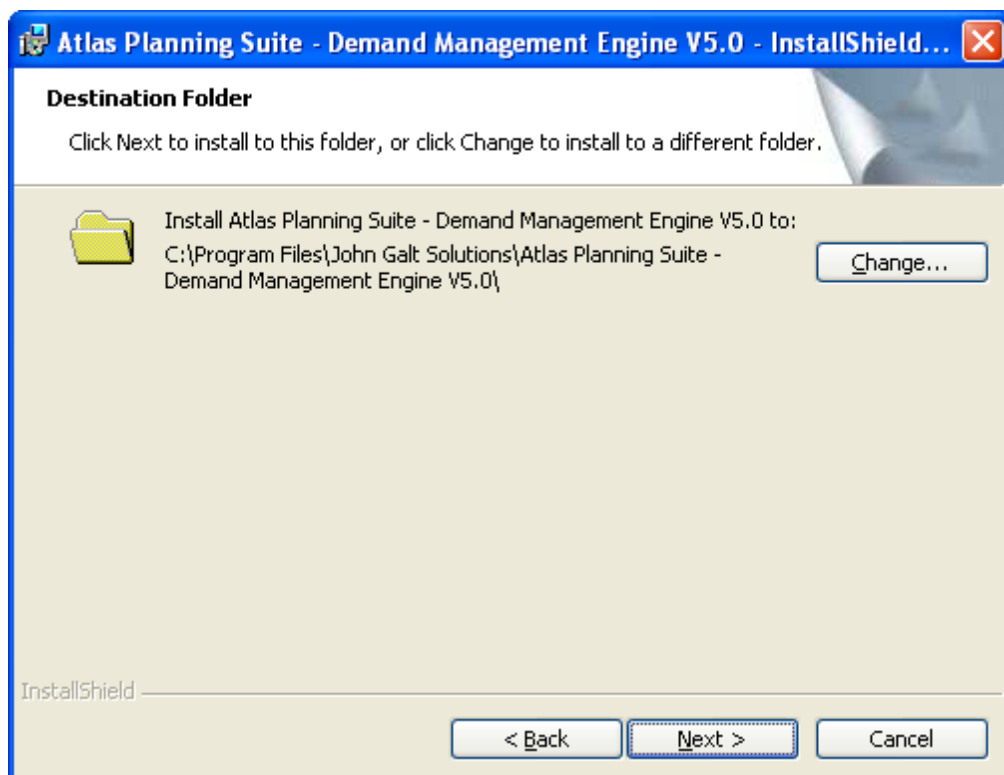
☐ Only for me (Macelo Solis)

InstallShield

< Back Next > Cancel

7. Type **your name** in the **Name** textbox.
8. Type **your company name** in the **Company** textbox and click **Next**.

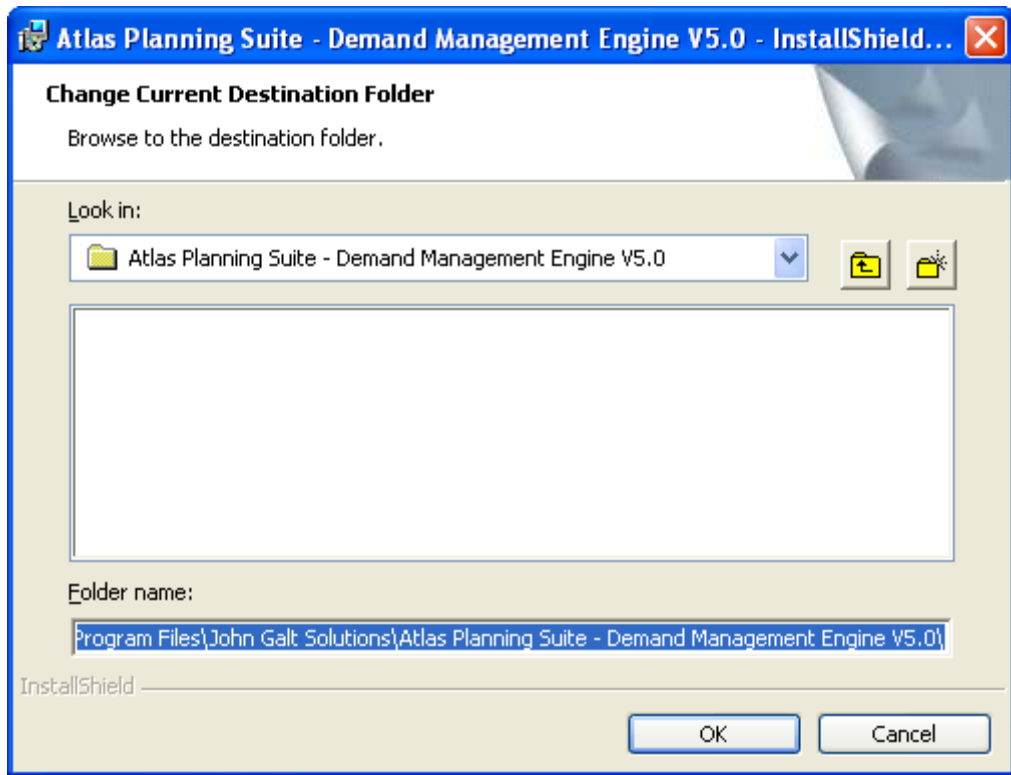
The Choose Destination Location window displays.



9. Check the **Destination Folder** location and click **Next** if this is the location where you want the software installed.

If you want the software installed in another location click **Browse**.

The Select Destination Directory Dialog Box displays.

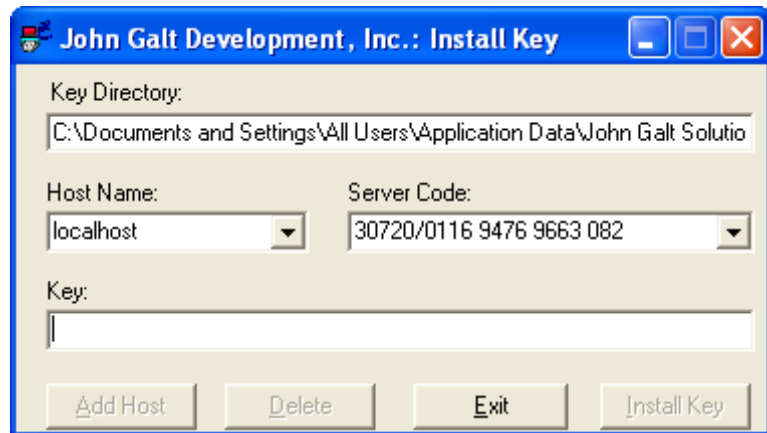


10. Go to the location where you would like the application to be installed and click **OK**. then click Next
11. The installation process will now try to locate a licence key for the application, if it finds one you will be asked if you wish to override the existing license with a new one, or keep the existing license.

If you select to install a new key, first you will be prompted with a Licensing window with the contact information, call QAD for your license key.

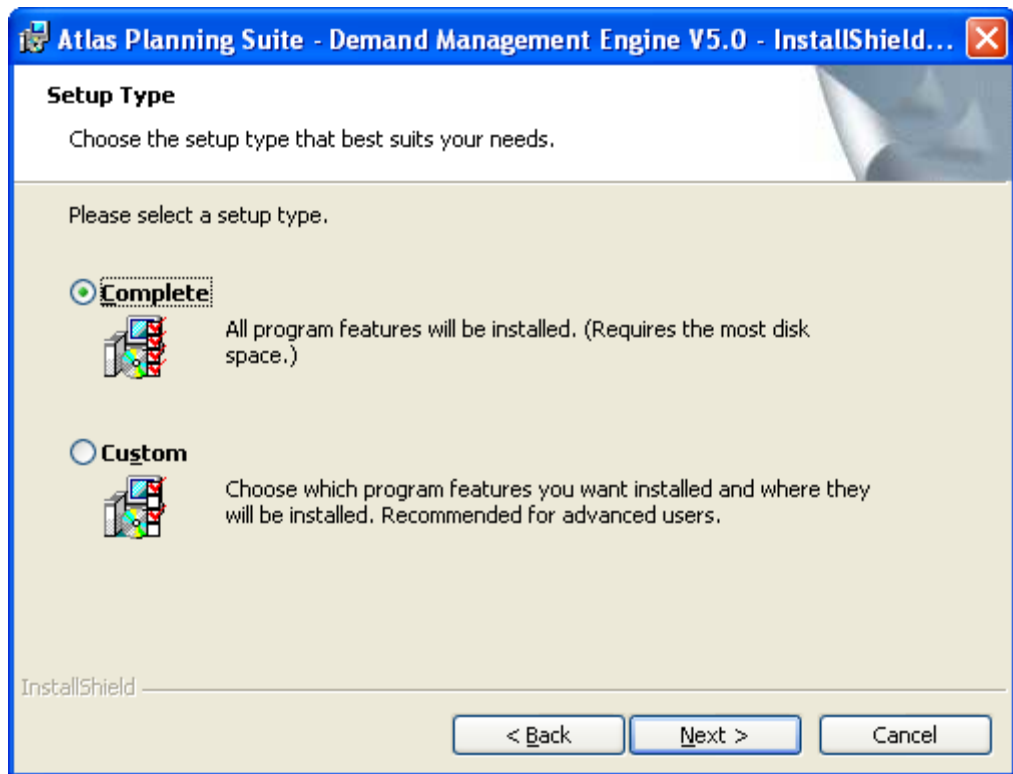
12. To begin the Key Installation press **OK**.

The Install Key Window is displayed



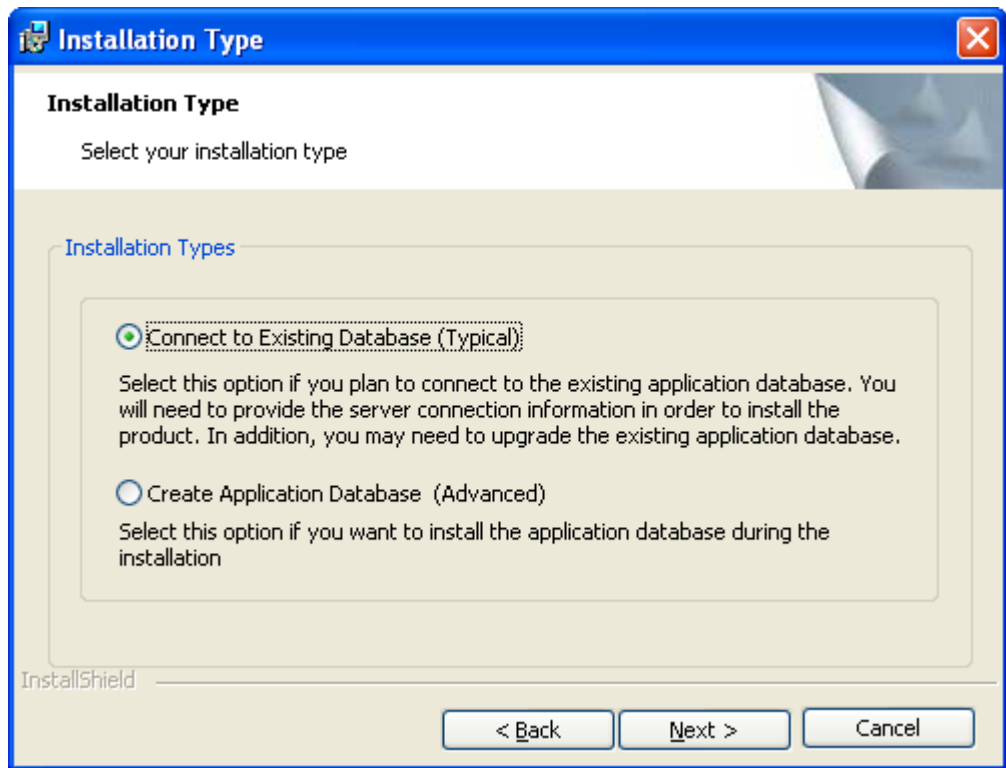
13. Type the **installation key** provided by QAD in the **Key** textbox and click **Install Key**.
14. Click **OK** in the information messages that the license has been correctly installed and then click **Exit** in the Install Key window to continue the installation process.

The Setup Type window is displayed.



15. In this setup step you can decide which components of the DME suite you wish to install. You could select a Custom installation to only install some of it's components. Click **Next** for a Complete installation.

The Installation Type window is displayed.



16. In this window you can select from two options: **Connect to existing Database** to use a DME database that you already have setup; or **Create application Database** which is used when you have no DME database. Select **Connect to Existing Database** and click **Next**.

Note: *If you selected to create the application database, you will still need to run the installer again on the created database to update it correctly.*

The Database Server window is displayed

Database Server

Select database server and authentication method

Select the database server to install to from the list below or click Browse to see a list of all database servers. You can also specify the way to authenticate your login using your current credentials or a SQL Login ID and Password.

Database Server:

SQL_SERVER_NAME

Browse...

Connect using:

Login ID: sa

Password: *****

Database: FX_JGD

Refresh

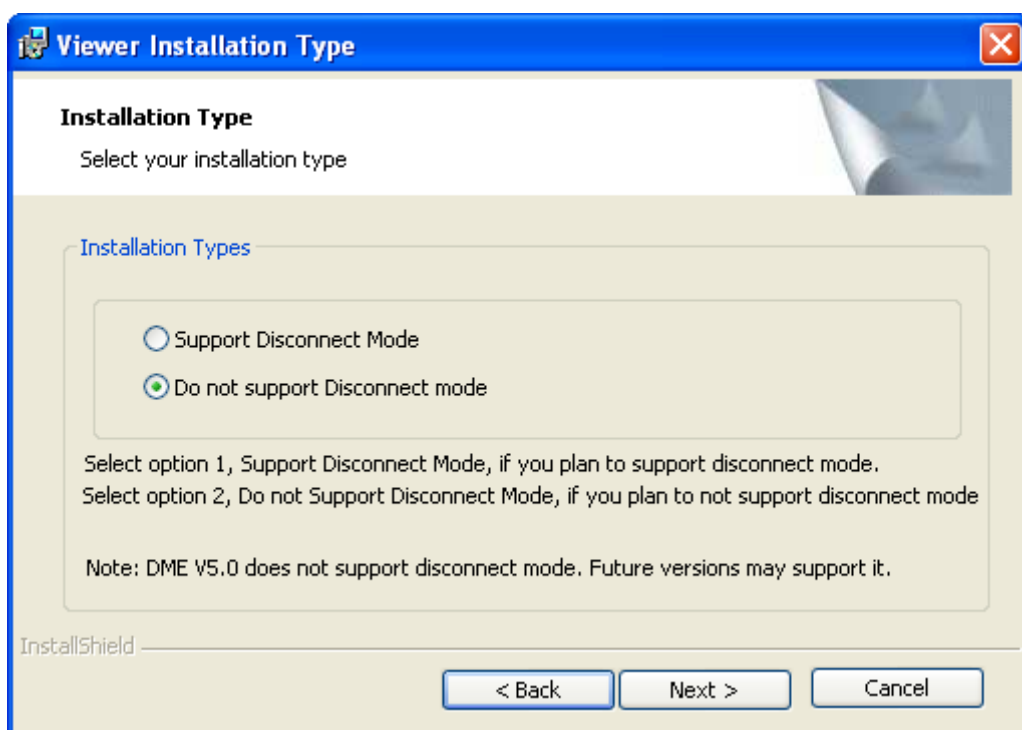
InstallShield

< Back Next > Cancel

17. In this step provide the necessary information to connect to your database server, including the Database Server Name, Login and Password. After Configuring those parameters click on the **Refresh** button, if you connection information is correct the database drop down list will be populated with the databases in your SQL Server, pick your DME database from the list.

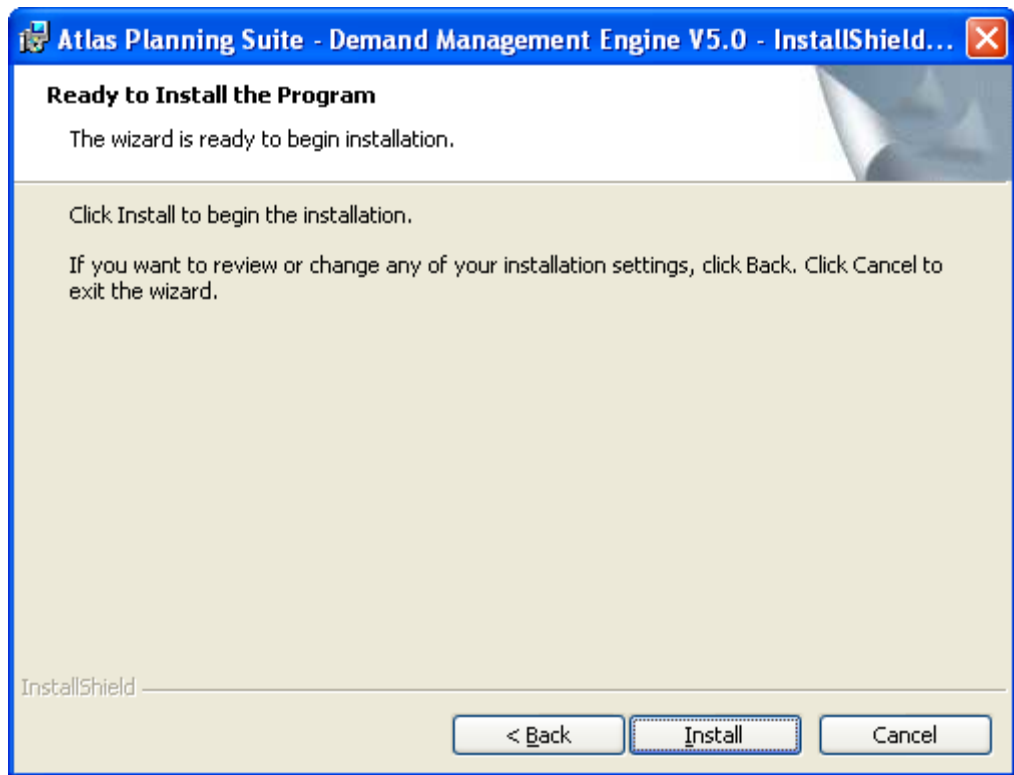
Note: *The installation requires the database system administrator user (sa) user login as password.*

18. Click **Next**. If you did not select to install the DME Viewer, please jump ahead to Step 21



19. This version of the DME does not support the Disconnect Mode feature so click **Next** to continue.

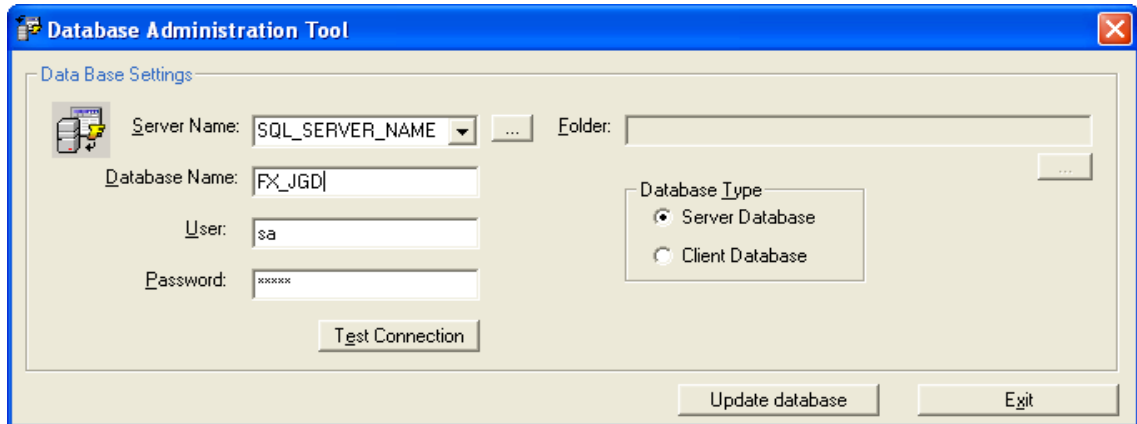
The Ready to install window is displayed.



20. You are now ready to install the application, if you need to make any changes click Back otherwise click **Install**.

21. After the installation process is done,

The Database Administration tool is displayed.



22. Verify the Database settings and click on the **Test connection** button, if the test was successful click **Upgrade Database**.

23. Then click Finish.

The installation is now successfully installed, a new shortcut on the desktop should be created for the DME Viewer.

Section 4: Database Installation and Upgrade

DME 5.0 only supports SQL Server 2000 or 2005. If you are running SQL Server 7.0, upgrade the server to SQL Server 2000 or 2005 before installing DME 5.0.

Warning: It is highly recommended that you backup the current database before upgrading to the DME 5.0 database.

Note: When installing the DME in a version of SQL Server prior to SQL 2005 certain features of the application will not be available. The features that will not be available are all the ones related to On-fly hierarchies.

Note: The installation or upgrade requires the database system administrator user (sa) user login as password.

4-1: Backup the Database

1. Go to **Start > All Programs** folder and locate the MS SQL Server folder, for SQL 2000 open “Enterprise Manager” and if you are using SQL 2005 open “SQL Server Management Studio”
2. After logging into the server containing your DME database right-click the DME database and select **Backup Database from the Tasks menu option**.
3. Once in the backup window, you must provide a Destination file for the backup; you do this by clicking on the Add button. The window might vary from SQL Server 2000 and SQL Server 2005, but you need to specify a file for the backup in both versions.

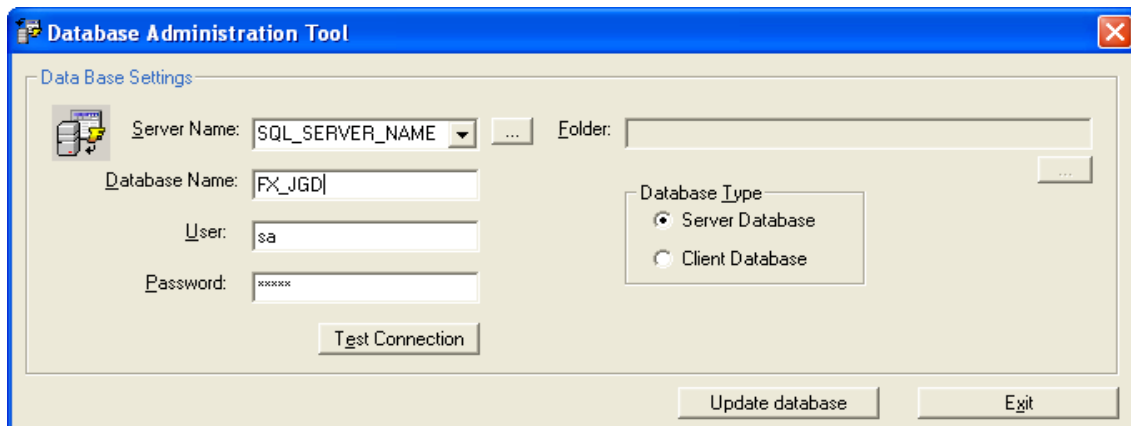
The SQL Server Backup – Server Name Dialog Box displays.

4. Ensure that the **Database-complete** option is checked and complete the other options based on your environment and click **OK**.

4-2: Upgrade the DME Database

There are two options to upgrading a DME database. The first one is to upgrade the database with the installation process, so look for step 22 from the following section [“Base Unit & Viewer Installation” on page 23](#).

The second option is to update the database without having to install the software. Within the installation files provided, you will see a folder named **program files\QAD\Atlas Planning Suite - Demand Management Engine V5.0\DB**; inside you will find a file named **DBUpgrade.bat**. Running this file will allow you to upgrade any database to the latest version.



After entering the right information for Server name, Database name and the login credentials you can test your connection to the server by clicking on the “Test Connection” button. When the connection test has been passed you can upgrade your database by clicking on the “Upgrade Database” button.

Note: *The upgrade requires the database system administrator user (sa) user login as password.*

4-3: Restoring or attaching DME Database

If you have a completely updated DME Database and for whatever reason you need to restore a backup or attach it to the same SQL Server instance or in a different SQL Server Instance you will need to follow these steps:

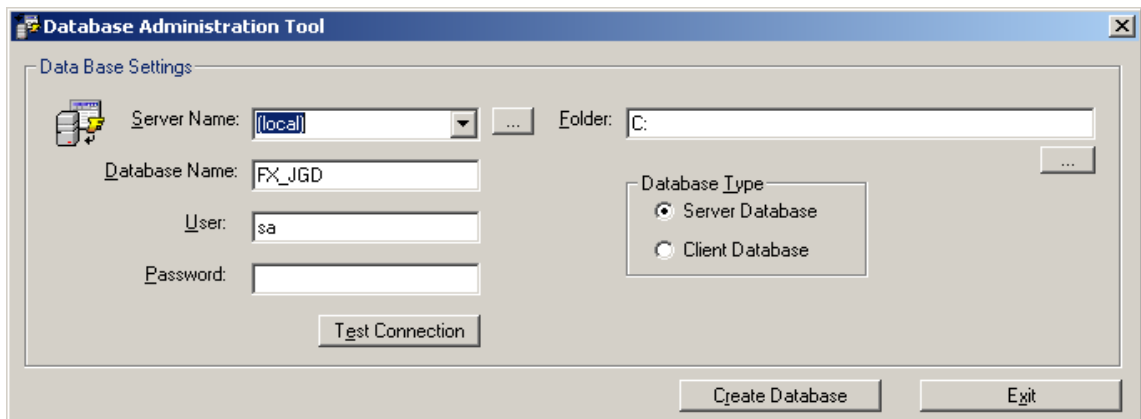
Warning: **These steps only need to be applied if you are restoring a DME database from and to SQL Server 2005 or SQL Server Express 2005.**

1. First restore your database's backup or attach it to the new server.

2. Go to the folder where the DME files were installed, the default location is C:\Program Files\QAD\Atlas Planning Suite - Demand Management Engine V5.0\ In a folder named DB you will find a file named **CLRConfigure.sql**; this file needs to be executed pointing to the restored database. Before running the script you must edit it, the file has two references to the FX_JGD database, if your DME database has a different name you must change the .sql file accordingly before executing it. Make sure to run the script as the System Administrator user (sa) of the SQL Server instance.

4-4: Creating new DME Database

The installation media for the DME v5.0 include a folder name DB, in it you will find several files, one of them is named **DBCcreate.bat** this file can be used to create a new empty DME Database.



After running this tool you will have to specify the **server name**, **Database Name** and credentials to log into the SQL server. You must run this tool locally on the computer running the SQL Server because you must also specify the local **folder** where the database files will be stored.

After completing the required data you can verify the settings by pressing the "Test Connection" button. If the test succeeded you can go ahead and start the database creation by pressing the "Create Database" button.

4-5: Updating and Using SQL 2005

When you select Integration Services for installation, Setup also installs support for DTS packages, including the DTS runtime and DTS package enumeration in SQL Server Management Studio. Support in the runtime is enhanced to enable DTS packages to access the SQL Server 2005 data sources. For additional information, go to <http://msdn2.microsoft.com/en-gb/library/ms143706.aspx>

The SQL Server 2005 Integration Services (SSIS) does not install the DTS designer. An updated version of the DTS package designer is available as a separate Web download. Download the Microsoft SQL Server 2000 or 2005 DTS Designer Components or go to <http://www.microsoft.com/downloads/details.aspx?familyid=df0ba5aa-b4bd-4705-aa0a-b477ba72a9cb&displaylang=en>

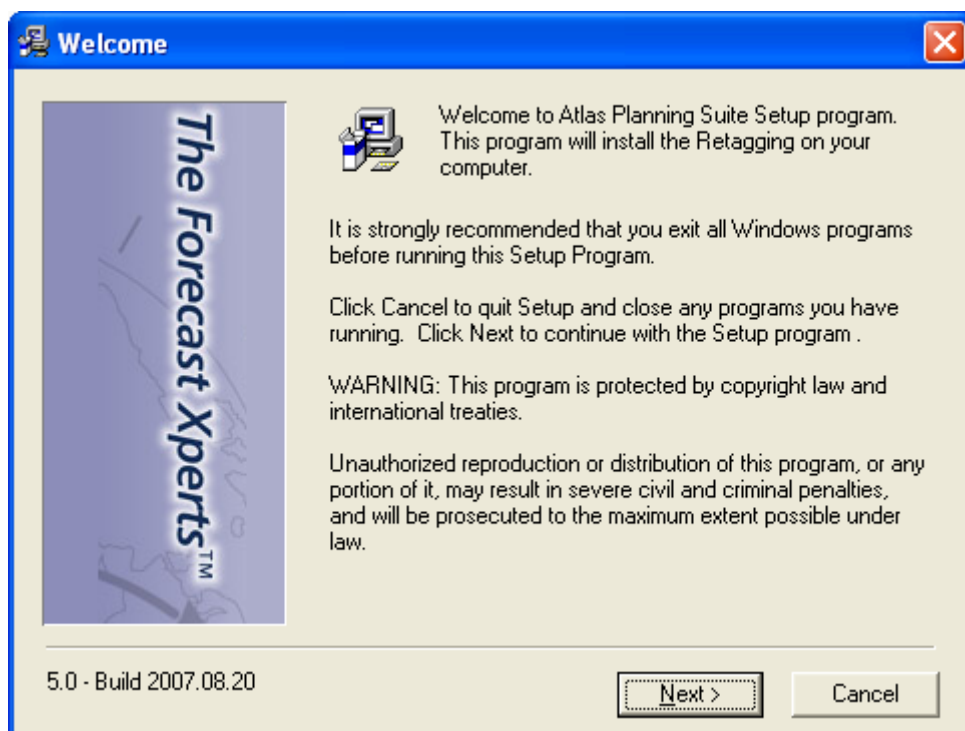
Section 5: Retagging Installation

The Retagging module is an add-on component to the DME Viewer and has its own separate installation, you must have the DME Viewer installed prior to installing Retagging. This section details the procedure to install Retagging successfully. For information in regard to configuring Retagging, see [“Retagging Configuration” on page 340](#).

In order to install Retagging as an add on to the DME Viewer v5.0 you need an installation CD or another media with the installation files for Retagging v5.0

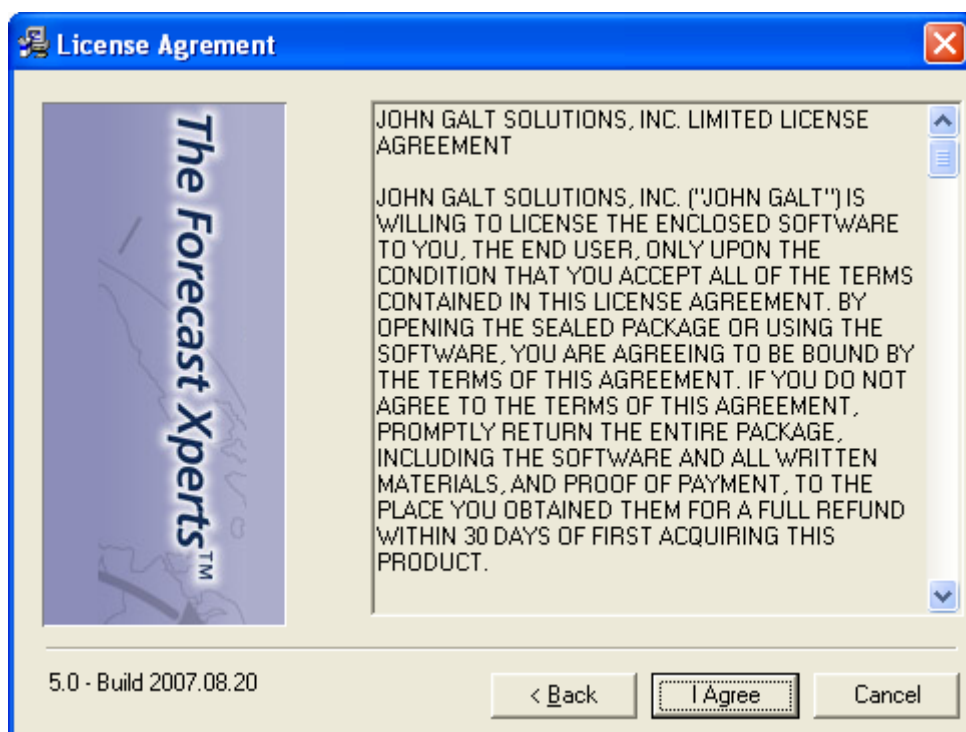
1. First, make sure the DME Viewer is closed.
1. Click on the **Setup Retagging.exe** file.

The Welcome screen displays.



2. Click Next.

The License Agreement window displays.



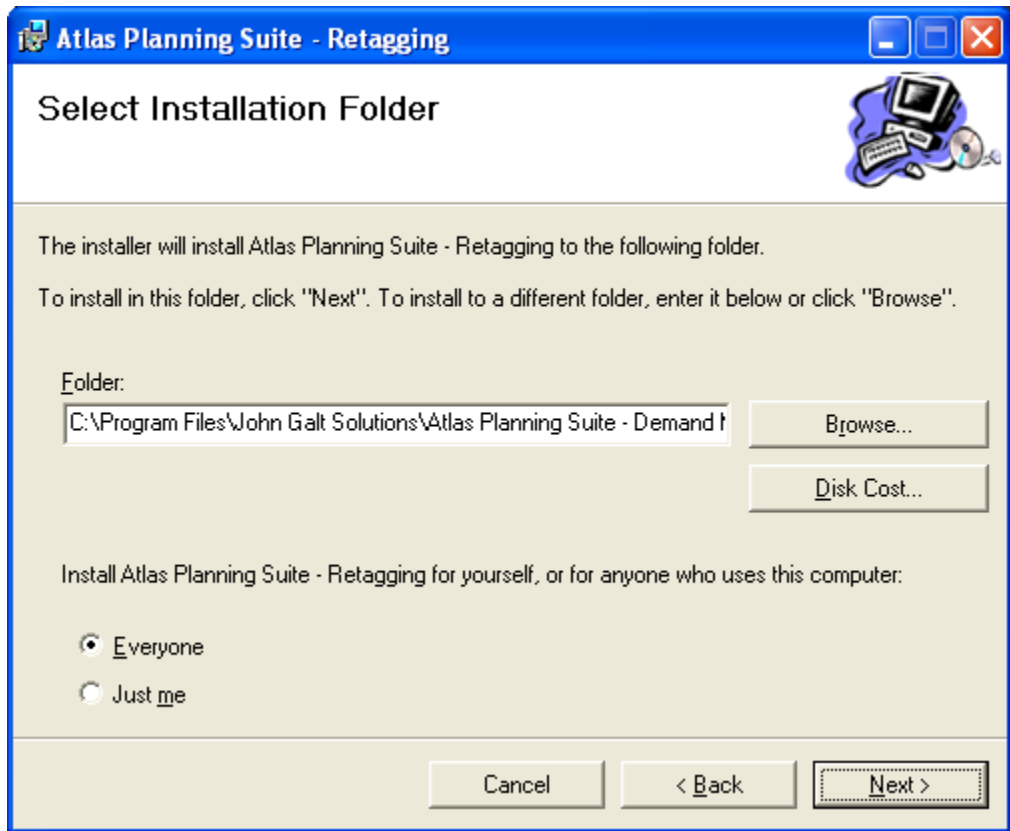
3. Click I Agree.

The Retagging Setup Wizard window displays.



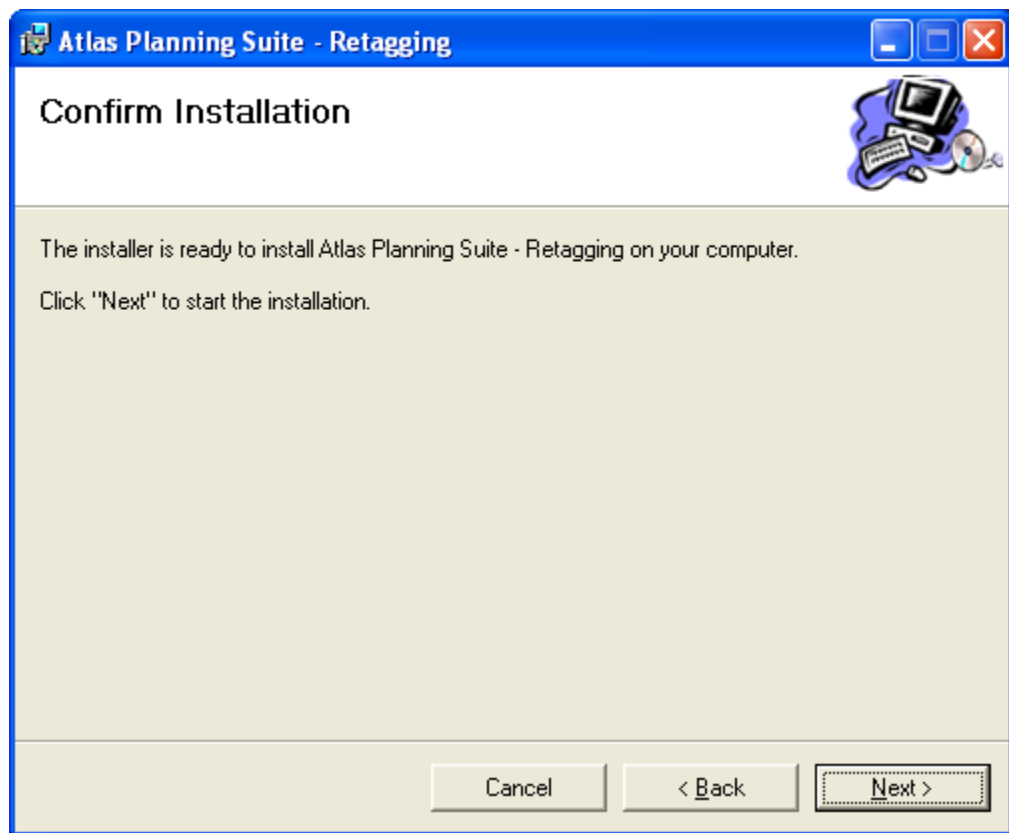
4. Click Next.

The Select Installation Folder window displays.



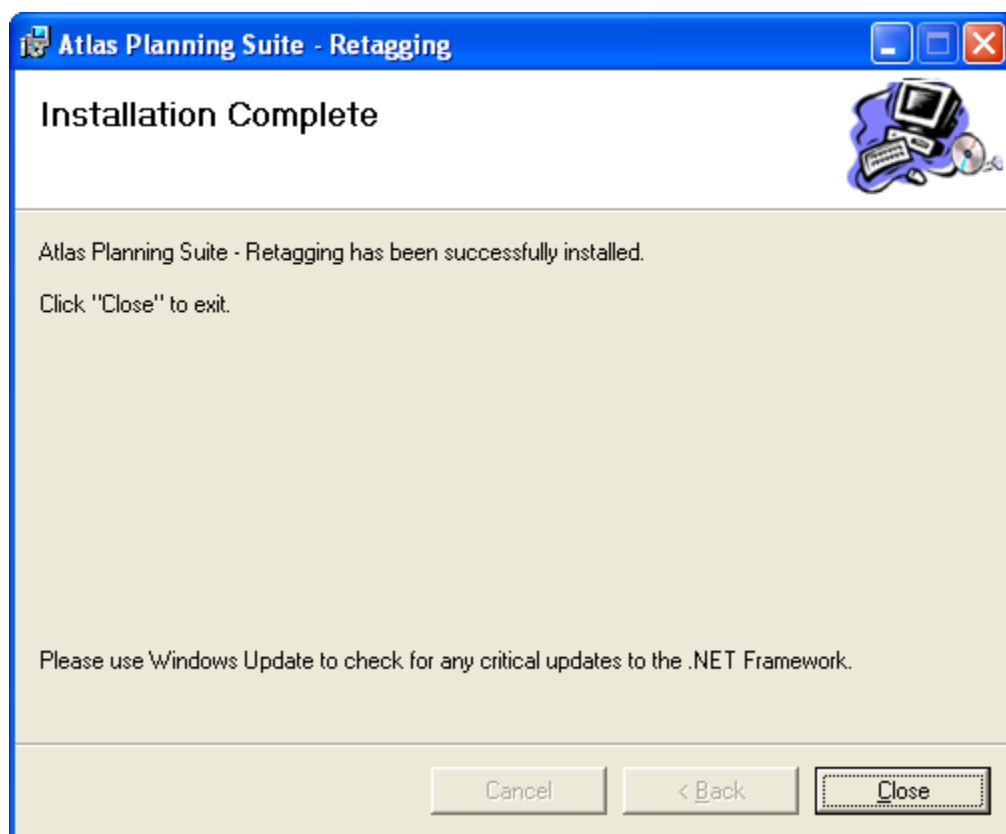
5. By default, the application installs itself in the directory shown above. To choose a different location, click Browse.
 - To view the disk space available on your computer, click on Disk Cost.
 - Select Everyone to allow anyone to access the DME from your computer or Just Me to allow only yourself access.
6. Click Next.

The Confirm Installation window displays.



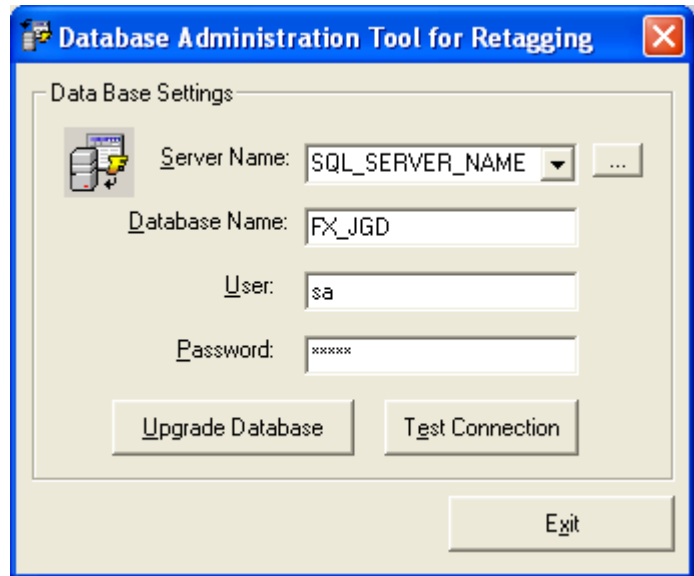
7. Click Next.

The Installation Complete window displays.



8. Click Close.

The Database Administration Tool for Retagging window displays.



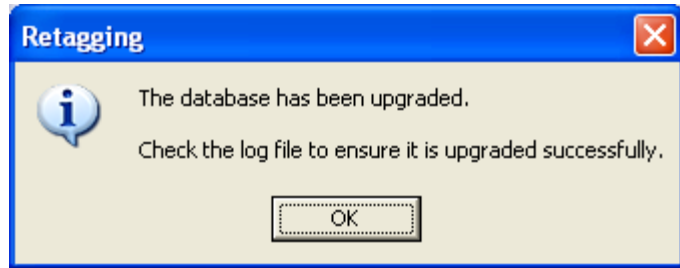
9. Verify the Database settings, and click on **Test Connection** if the test was successful

The Test Connection Confirmation window displays.



10. If the test was not successful verify your Database connection settings, if it was successful click on the **Upgrade Database** button to upgrade the database.

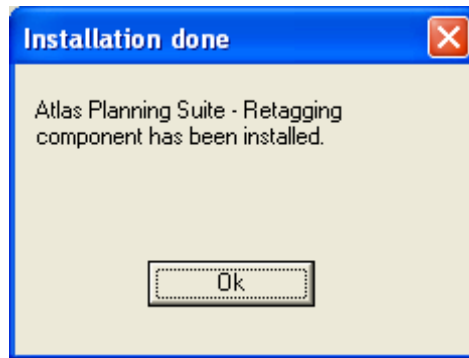
The Confirmation window displays.



11. Click OK.

12. Click Exit.

The Installation done window displays.



13. Click OK.

The Retagging feature is now installed successfully. You can access the feature from the DME Viewer by navigating to the Forecast > Retagging menu option.

Section 6: Batch Scheduler Installation

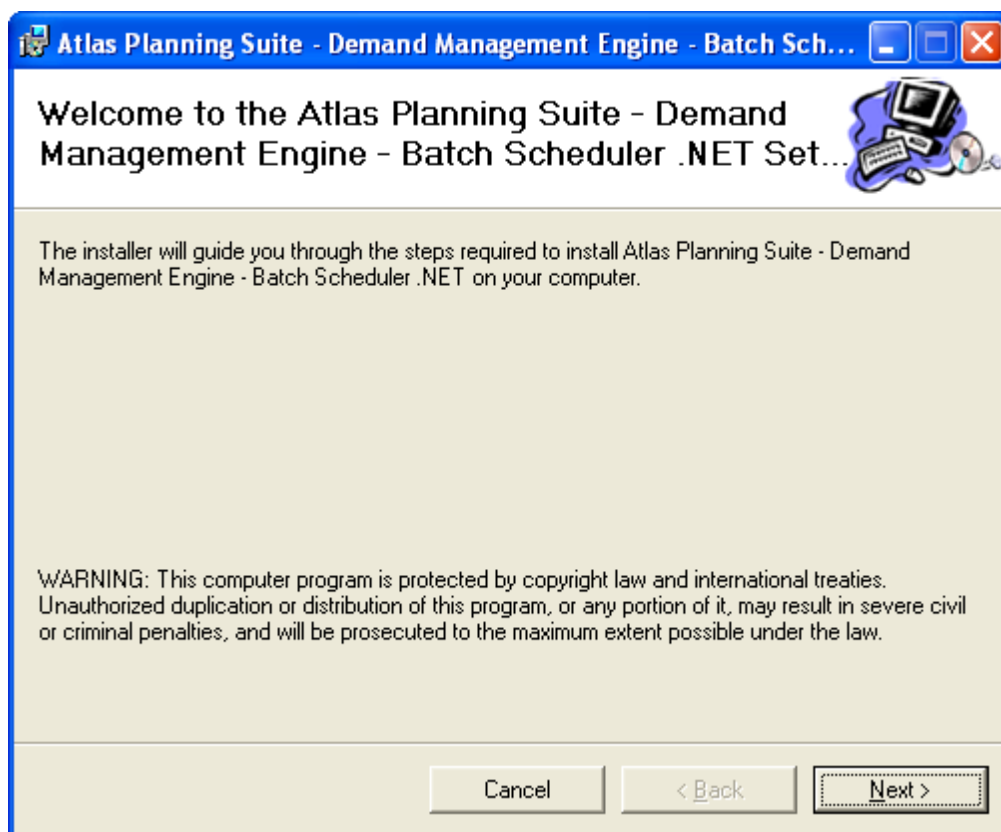
This section details how to install the Batch Scheduler. The Batch Scheduler installation is separate from the DME installation.

In order to install the Batch Scheduler you need an installation CD or another media with the installation files for the Batch Scheduler .NET v5.0

To install the Batch Scheduler:

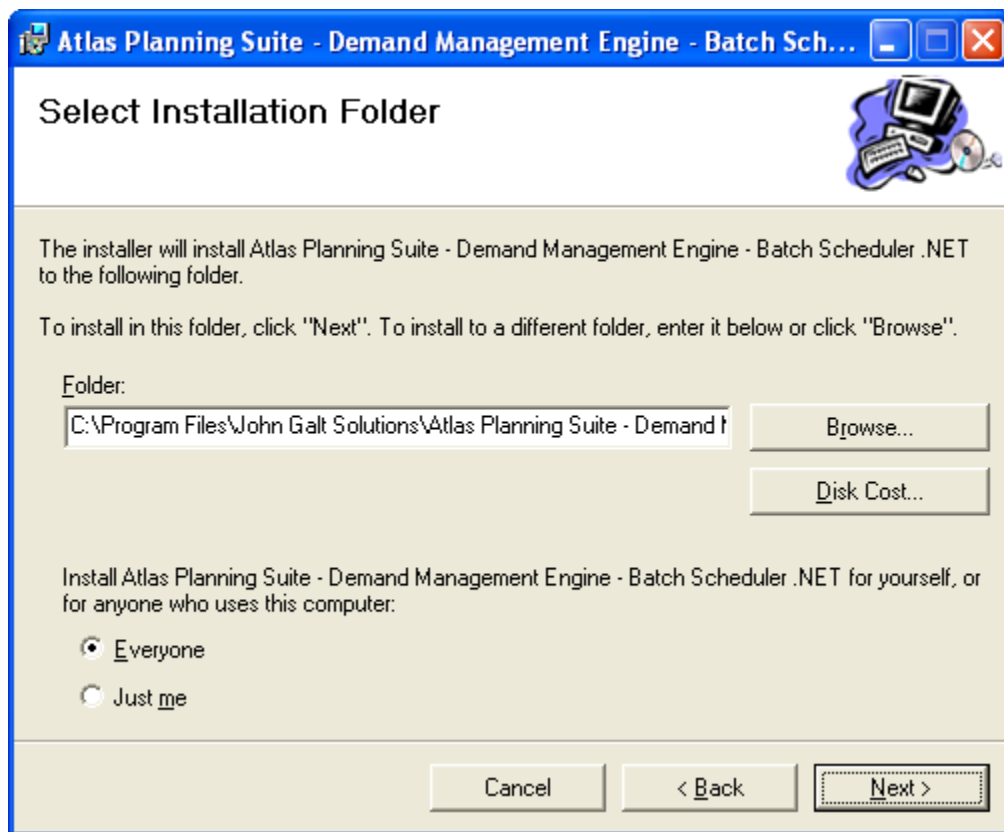
1. First, close all other DME applications.
1. Click on the **setup.exe** file.

The Demand Management Engine - Batch Scheduler .NET window displays.



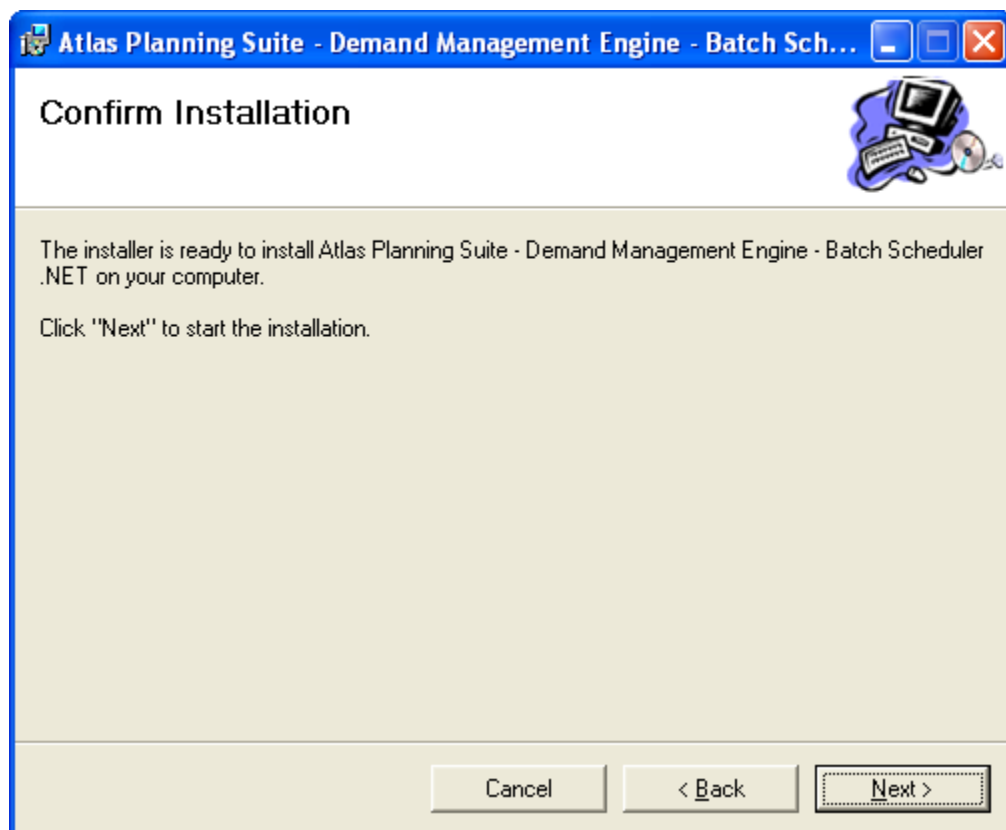
2. Click Next.

The Select Installation Folder window displays.



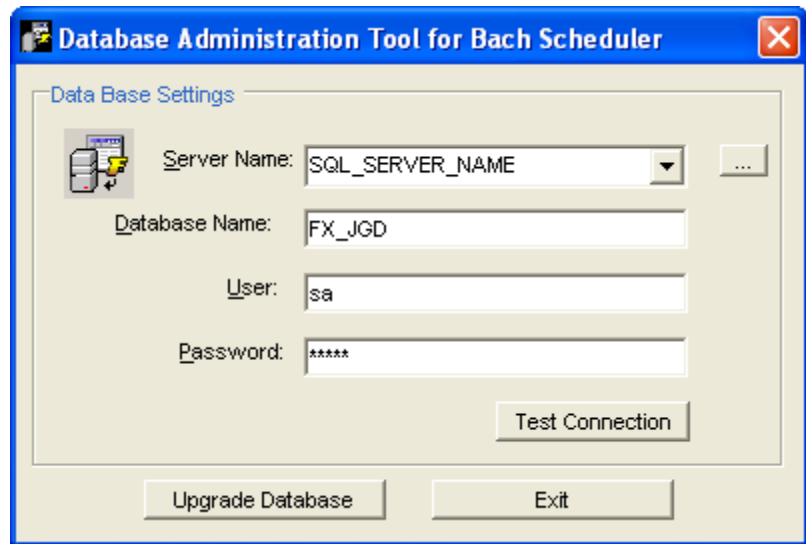
3. By default, the application installs itself in the directory shown above. To choose a different location, click Browse.
 - To view the disk space available on your computer, click on Disk Cost.
 - Select Everyone to allow anyone to access the Batch Scheduler from your computer or Just Me to allow only yourself access.
4. Click Next.

The Confirm Installation Window displays.



5. Click **Next** to begin the installation.

6. Before the Installation is completed, you will see the Database Administration Tool window



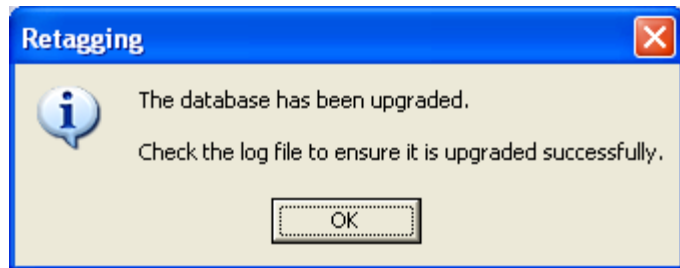
7. Verify your Database Settings and click the Test connection button to verify connectivity.

The Test Connection Confirmation window displays



8. If the test was not successful verify your Database connection settings, if it was successful click on the **Upgrade Database** button to upgrade the database.

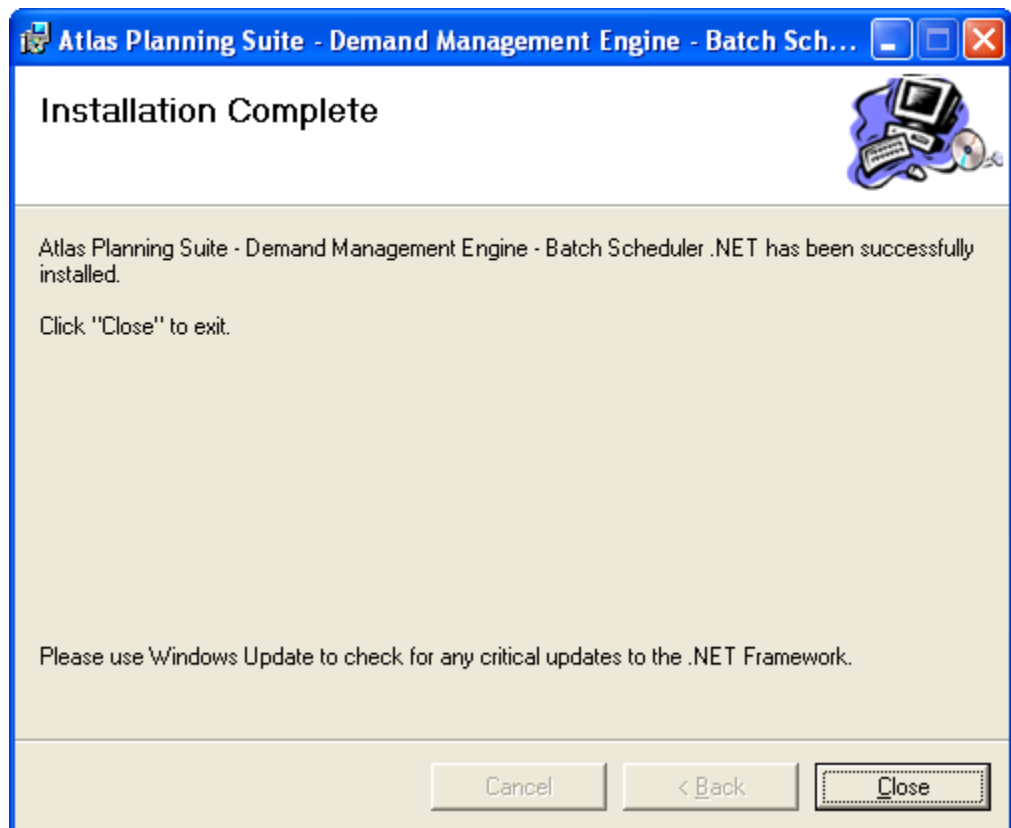
The Confirmation window displays.



9. Click OK.

10. Click Close

The Installation Complete window displays when the Batch Scheduler has been installed successfully.



11. Click Close.

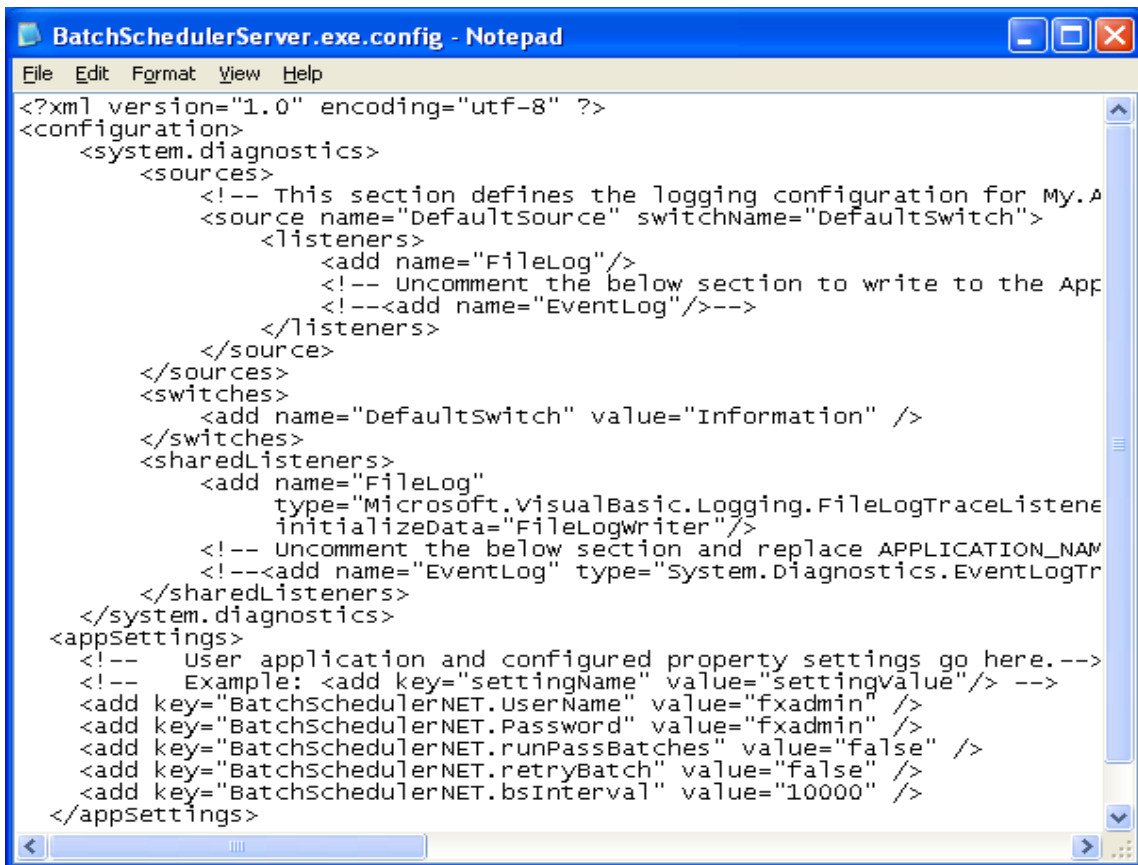
6-1: Batch Scheduler System Administrator Username and Password

To change the default System Administrator username and password you must change your username and password in the BatchSchedulerServer.exe configuration.

1. Go to the folder where you installed the Batch Scheduler, the default folder is:

C:\Program Files\QAD\Atlas Planning Suite - Demand Management Engine V5.0\BatchScheduler.NET\

Edit the BatchSchedulerServer.exe.config file in notepad.



```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <system.diagnostics>
    <sources>
      <!-- This section defines the logging configuration for My.A
      <source name="DefaultSource" switchName="DefaultSwitch">
        <listeners>
          <add name="FileLog"/>
          <!-- Uncomment the below section to write to the App
          <!--<add name="EventLog"/>-->
        </listeners>
      </source>
    </sources>
    <switches>
      <add name="DefaultSwitch" value="Information" />
    </switches>
    <sharedListeners>
      <add name="FileLog"
        type="Microsoft.VisualBasic.Logging.FileLogTraceListene
        initializedData="FileLogWriter"/>
      <!-- Uncomment the below section and replace APPLICATION_NAM
      <!--<add name="EventLog" type="System.Diagnostics.EventLogTr
    </sharedListeners>
  </system.diagnostics>
  <appSettings>
    <!-- User application and configured property settings go here.-->
    <!-- Example: <add key="settingName" value="settingvalue"/> -->
    <add key="BatchScheduler.NET.UserName" value="fxadmin" />
    <add key="BatchScheduler.NET.Password" value="fxadmin" />
    <add key="BatchScheduler.NET.runPassBatches" value="false" />
    <add key="BatchScheduler.NET.retryBatch" value="false" />
    <add key="BatchScheduler.NET.bsInterval" value="10000" />
  </appSettings>
```


2. Type in the new value in the UserName and Password rows.
3. Go to File > Save when finished.

6-2: Batch Scheduler Configuration

The Batch Scheduler consists of two components:

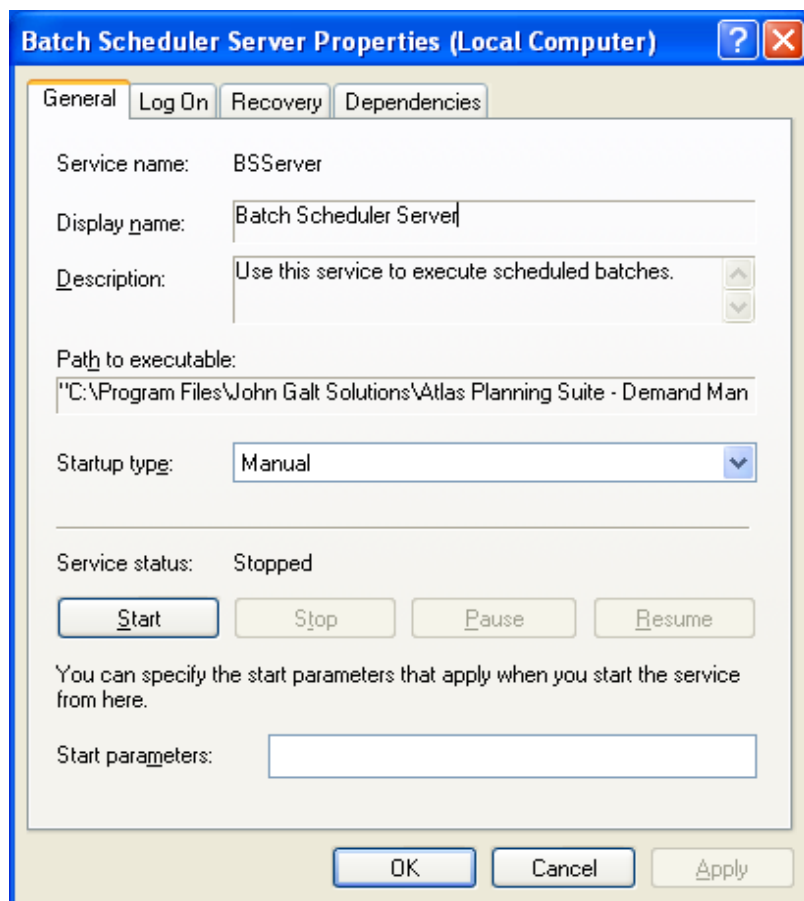
- Batch Scheduler Server (Windows Service)
- Batch Scheduler Manager

6-2-1: Batch Scheduler Server Startup

To automatically or manually start the Batch Scheduler Server with the DME:

1. Go to Start > Control Panel > Administrative Tools > Services > Batch Scheduler Server Properties.

The Batch Scheduler Server Properties window displays.



2. From the General tab, select either Automatic or Manual from the Startup Type textbox. You can also select Disabled to inactivate the Batch Scheduler.

Note: *If you setup the Batch Scheduler Service to start automatically you need to be sure the service is ran once the SQL Server service for the DME Database is ran first, otherwise your batches will fail.*

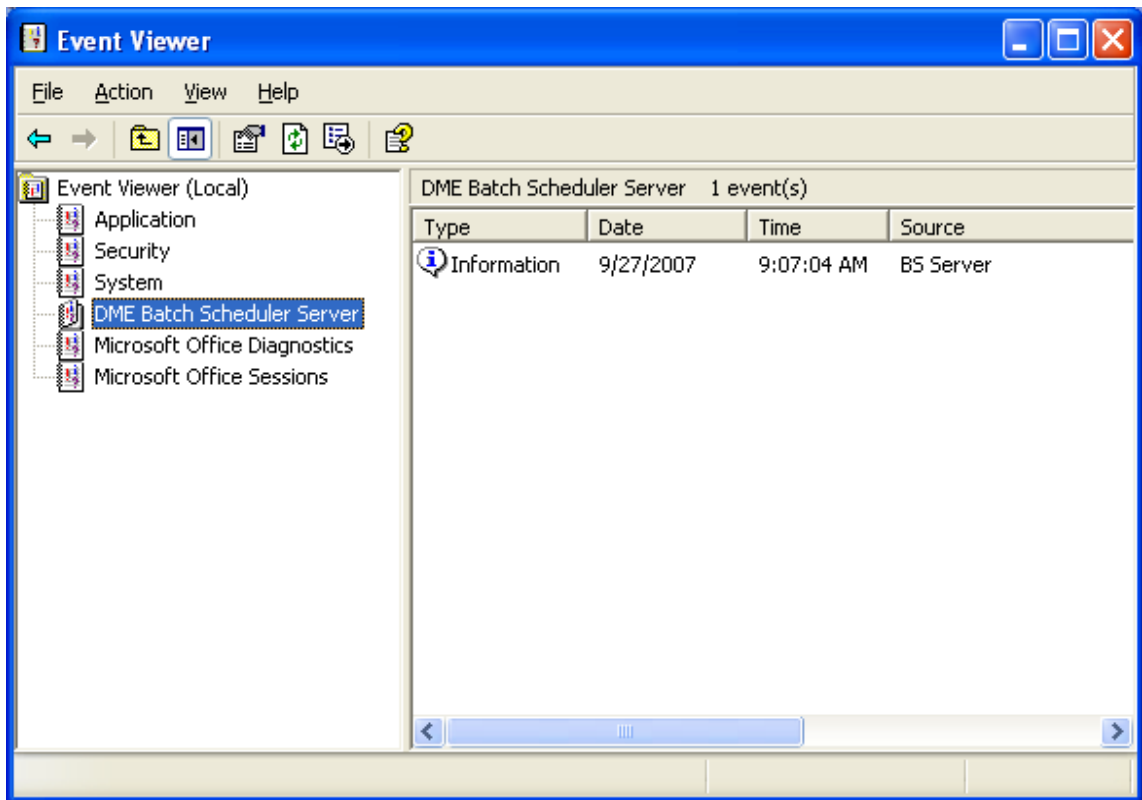
3. Click Apply.
4. Click OK.

6-2-2: Batch Scheduler Server Status Display

You can view the status of the Batch Scheduler Server by looking at the System's Event viewer, this will help with any troubleshooting issues that may arise while using the Batch Scheduler.

1. Go to Start > Control Panel > Administrative Tools > Event Viewer.

The Event Viewer window displays.



Note: The Event Viewer log for the DME Batch Scheduler Server is created the first time the server need to write information to it.

Section 7: Troubleshooting

The table below details common troubleshooting Scenarios and solutions.

Table 2-2: Installation Troubleshooting Tips

Problem	Solution
Previous version of Microsoft SQL Server 2000 or 2005 is installed	You must upgrade your existing SQL Server to Microsoft SQL Server 2000 or 2005 for an DME 5.0 installation.
MSDE could not be started	Try to install the service manually. Start > MSDE > Service Manager When the dialog box displays, click the Start/Continue button.
Installation could not start Microsoft SQL Server 2000 or 2005	Try to start the service manually from Control Manager. If there is still an error, check the login account for the appropriate permissions.
The DME database is already installed and you want to complete an update.	Backup FX_JGD before updating the database. To upgrade the database, See “Database Installation and Upgrade” on page 35 in this chapter.
Database preparation has failed.	Check the following: ■ SQL Server is running ■ User ID, Password and server name are correct ■ Permissions to attach and detach to the databases are correct.
Cannot login to the DME	If you are trying to login with a user ID other than sa , check to make sure the permissions are correct.

Chapter 3 Creating and Managing Users

This chapter includes:

Section 1: Overview 58

Section 2: Add a New User. 59

Section 3: Create an Email Subscription 61

Section 4: Edit a User. 62

Section 5: Delete a User. 64

Section 6: Set User Permissions 65

Section 1: Overview

There are two types of security established for the DME. First, there is User Management where the System Administrator adds, deletes and modifies user login accounts. Second, there is the DME Manager security that provides access to data, Scenarios, and functions such as ABC Analysis, Lifecycle Forecast, Display Sets and others.

To use the DME, a user must have a user ID and password or login account. The DME contains a User Management feature that enables the System Administrator the capability to add, edit, and delete users and manage other settings including the following:

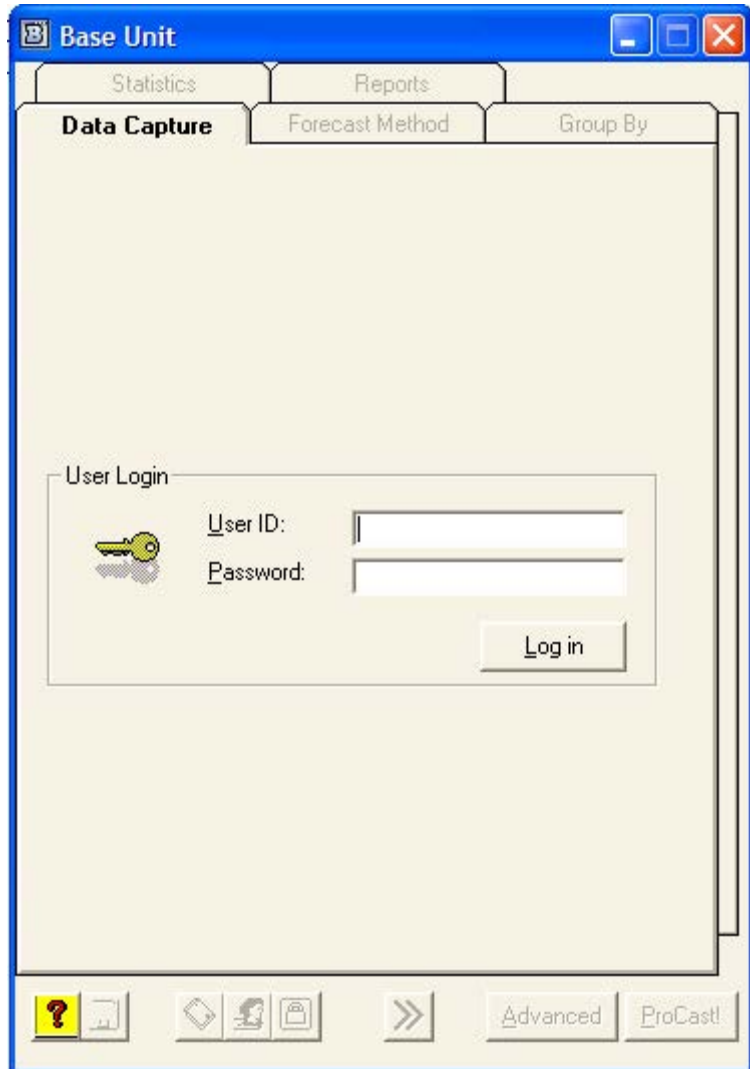
- User ID
- Name
- Password
- User Permissions

During the installation of the DME, the System Administrator User ID and password are created automatically. The default User ID and password for the System Administrator account is **fxadmin**.

Section 2: Add a New User

1. Select **Start > Programs > Atlas Planning Suite > Demand Management Engine > Base Unit** from the Windows menu.

The Base Unit window displays.

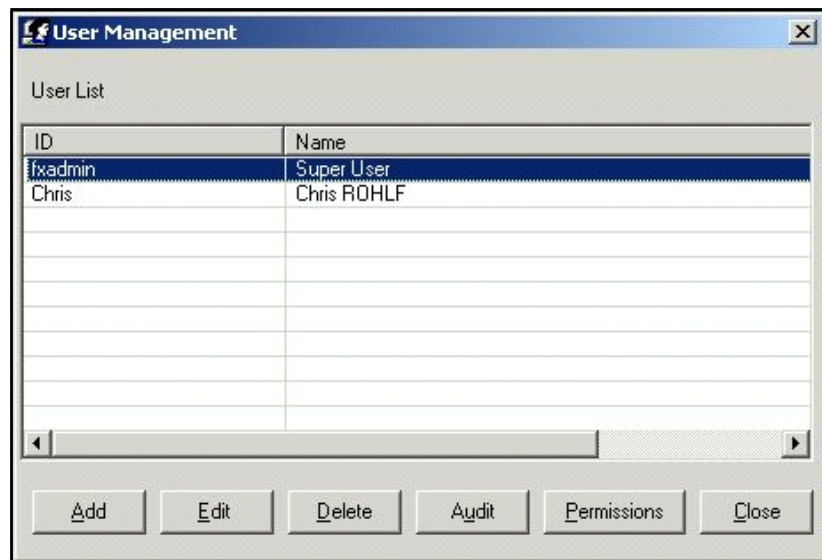


2. Type **fxadmin** in the **Username** textbox and **fxadmin** in the **Password** textbox and press **Log in**.

Note: Once the application is installed it is recommended that the password for the *fxadmin* account be changed to prevent unauthorized access to the system.

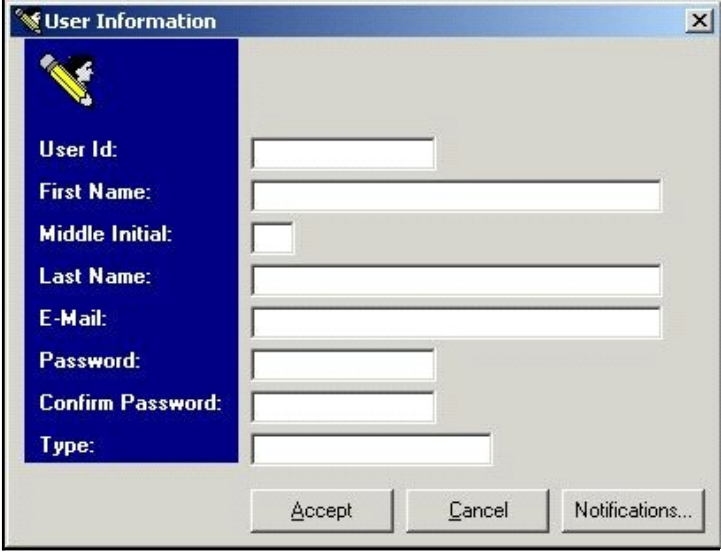
3. Click the  **User Management** icon on the bottom of the window

The User Management window displays..



4. Click the **Add** button.

The User Information window displays.

A screenshot of a 'User Information' dialog box. The window has a title bar with a pencil icon and the text 'User Information'. The main area is divided into a blue sidebar on the left and a light gray main panel on the right. The sidebar contains a pencil icon and labels for 'User Id:', 'First Name:', 'Middle Initial:', 'Last Name:', 'E-Mail:', 'Password:', 'Confirm Password:', and 'Type:'. The main panel contains corresponding text input fields. At the bottom right, there are three buttons: 'Accept', 'Cancel', and 'Notifications...'.

User Information

User Id:

First Name:

Middle Initial:

Last Name:

E-Mail:

Password:

Confirm Password:

Type:

Accept Cancel Notifications...

5. Enter the the user information in the text boxes and click Accept when finished.

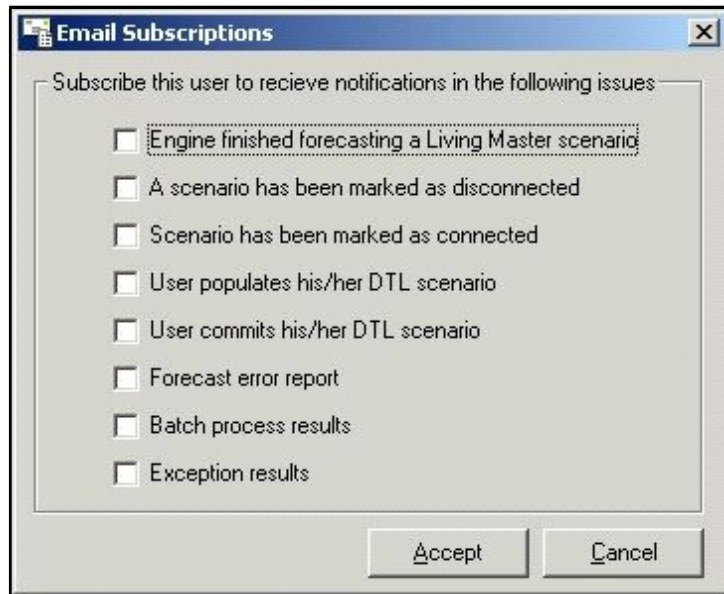
The User Management window displays.

Section 3: Create an Email Subscription

The DME defines eight issues or events when a user may be notified.

1. Select the user on the User Management window and click the Edit button.
2. Click the Notifications button to specify the email subscriptions for the current user.

The Email Subscriptions window displays.



3. Check the issues or events that the user requires.

Note: *The Email Service is explained in more detail in [Chapter 7 Email Service](#).*

1. Click the Accept button.

The User Information window displays.

2. Click the Accept button again.

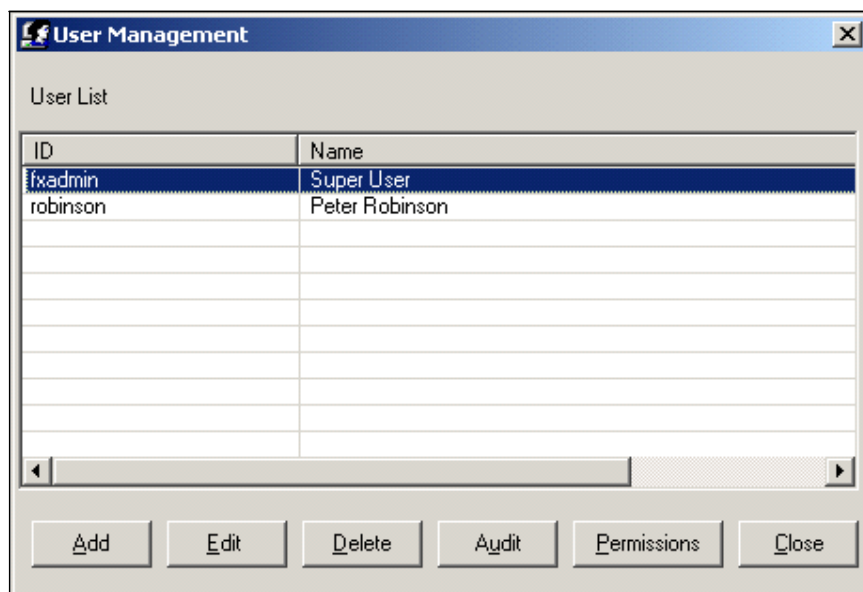
The Email Subscriptions are applied to the user account.

3. Click the Close button.

Section 4: Edit a User

1. Click the  **User Management** button on the Base Unit menu.

The User Management window displays.



2. Locate and highlight the user you want to edit and click Edit.

The User Information window displays. The fields are populated with the user's existing information. Notice that the user ID cannot be changed.

A screenshot of a 'User Information' dialog box. The window has a blue title bar with a pencil icon and the text 'User Information'. On the left is a dark blue sidebar with a pencil icon and labels for 'User Id:', 'First Name:', 'Middle Initial:', 'Last Name:', 'E-Mail:', 'Password:', 'Confirm Password:', and 'Type:'. To the right of the sidebar are text input fields. The 'User Id' field contains 'User1'. The 'First Name' field contains 'User First Name'. The 'Middle Initial' field is empty. The 'Last Name' field contains 'User Last Name'. The 'E-Mail' field contains 'User1@johngalt.com'. The 'Password' and 'Confirm Password' fields contain 'xxxxxx'. The 'Type' field contains 'Marketing'. At the bottom right are three buttons: 'Accept', 'Cancel', and 'Notifications...'.

User Id:	User1
First Name:	User First Name
Middle Initial:	
Last Name:	User Last Name
E-Mail:	User1@johngalt.com
Password:	xxxxxx
Confirm Password:	xxxxxx
Type:	Marketing

3. Modify the user data.
4. Click Accept.

The User Management window displays with the updated information.

5. Click Close when finished.

The ForecastX DME window displays.

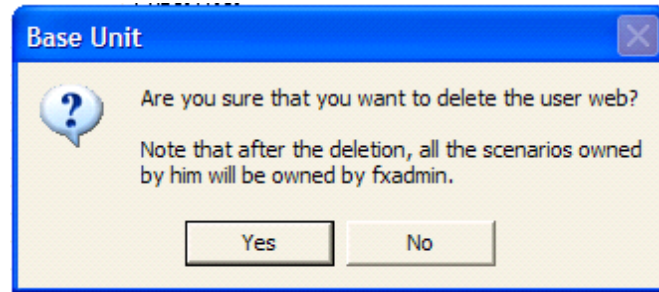
Section 5: Delete a User

1. Click the  **User Management** button on the Base Unit menu.

The User Managment window displays.

2. Select the user you want to delete and click Delete.

The following message displays.



3. Click Yes.

The User Management window displays with the user deleted from the list.

Note: *After deleting the user any Scenarios owned that user are now owned by the System Administrator (fxadmin).*

Section 6: Set User Permissions

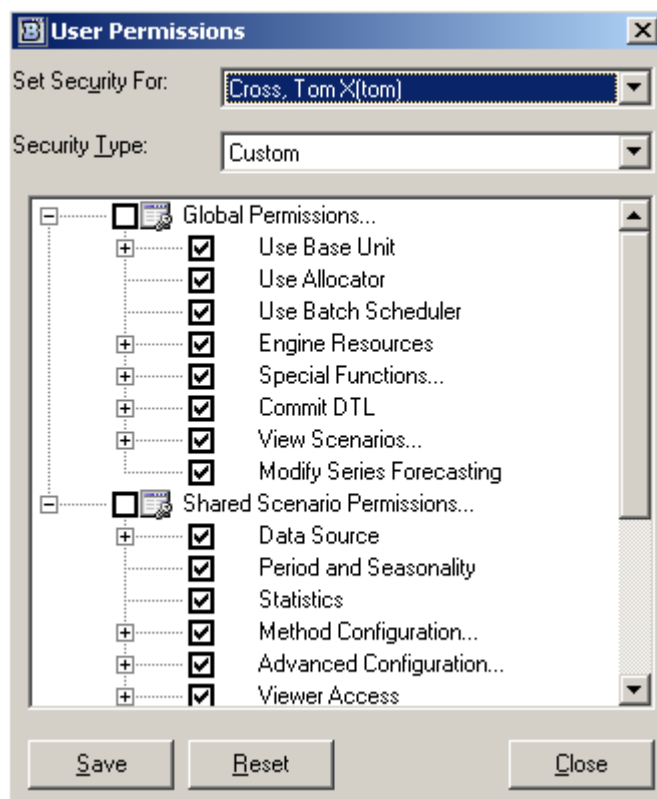
User Permissions are settings that control which DME features are available to the user. The System Administrator can grant or revoke permissions for users.

1. Click the  **User Management** button on the Base Unit menu.

The User Management window displays.

2. Click Permissions.

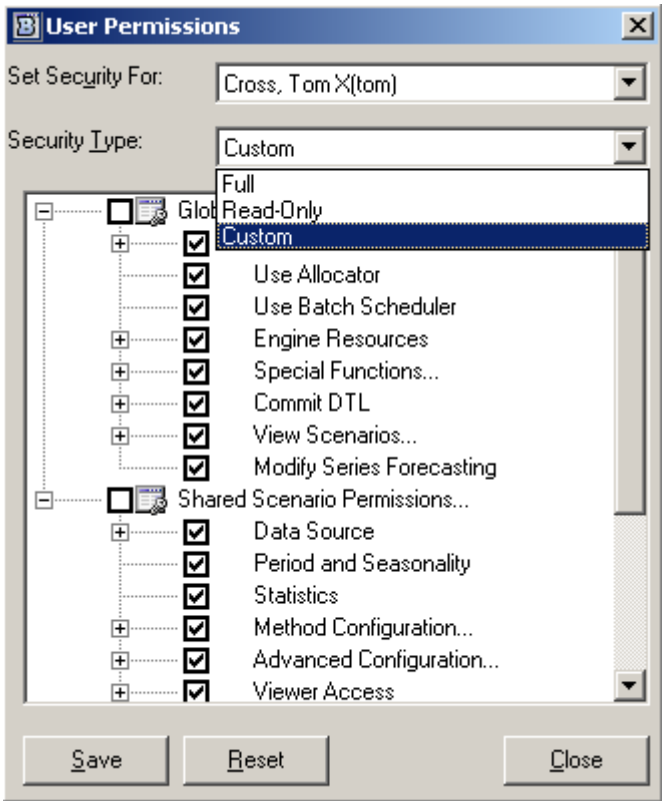
The User Permissions window displays.



All fields are checked by default.

3. Select the **name of the user** that requires the permissions from the **Set Security For** drop-down list.

4. Select the **type of security** required for the user from the **Security Type** drop-down list.

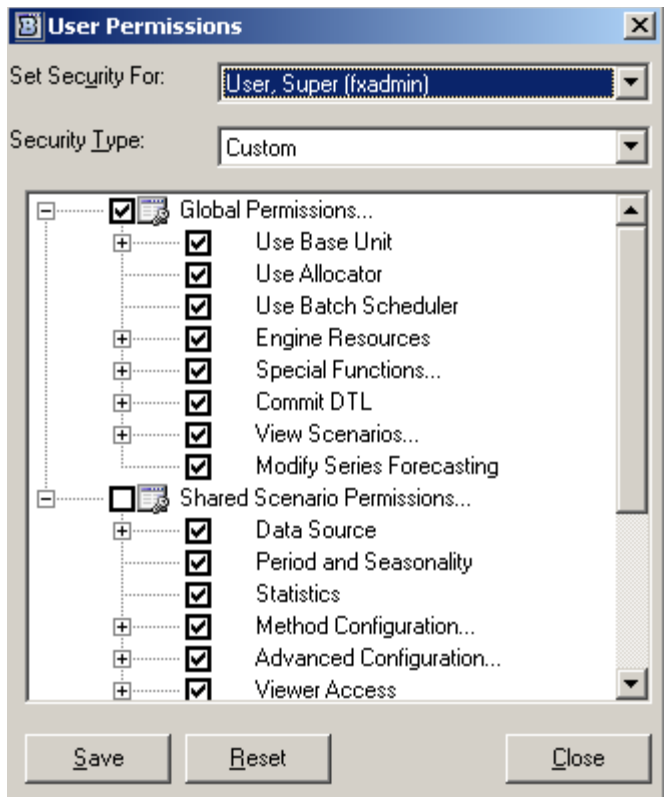


The following table details the security type options:

Table 3-1: User Security

Security	Description
Full	Gives the user permissions to use all product applications and features.
Read-Only	Gives the user read-only permissions to all features. The user will not be able to schedule, create, change or share any Scenarios or data.
Custom	You choose which applications and features are available to the user.

5. Uncheck the appropriate permission options from the **Security Application tree**.



Note: When permission is granted, a check displays in the box.

The following table identifies the feature and description of the Security types.

Table 3-2: User Permissions

Permission	Description
Global	For all Scenarios.

Table 3-2: User Permissions

Permission	Description
Use Base Unit	The Base Unit defines the data source, Scenario configuration, forecasting technique, and statistical reports. If you grant the user permission to the Base Unit, the user is automatically granted permission to the following options. However, you can grant permission to the following options individually. ■ Create Scenario: This option allows the user to create Scenarios. ■ Share Scenario: This option allows the user to share his Scenarios with other users. ■ Open Base Unit: This option allows the user to open the Base Unit from Viewer.
Use Batch Scheduler	The Batch Scheduler allows the user access to this component for scheduling repeatable jobs such as forecasting data, reports and incremental updates.
Engine Resources	The DME enables the user to manage custom functions. If you grant the user permission to manage DME Resources, the user is automatically granted permission to the following options. You can also grant permission to the following options individually. ■ Manage Filters: enables the user to define and manage Filters. ■ Manage Display Sets: enables the user to define and manage Display Sets. ■ Manage Exceptions: enables the user to define and manage Exceptions. ■ Manage Events: enables the user to define and manage Events. ■ Manage Custom Tasks: enables the user to define and manage custom tasks based on stored procedures. ■ Manage ABC Templates: enables the user to define and manage ABC Templates.

Table 3-2: User Permissions

Permission	Description
Special Functions	The DME enables the user to manage special functions. You can grant permission to the following options individually. ■ General Inventory: enables the user to access the Inventory Management Tool. ■ Run PO Launcher: enables the user to work with Purchase Orders. ■ Run Retagging: Enables the user to access the Retagging feature.
Commit DTL	Used to specify permission regarding what a user can do in their DTL Scenario. It contains the following permissions: ■ Allow Observation Values - If this option is checked, the user will be able to commit the changes to the Observation points back to the Living Master Scenario, if not, all the changes made to the series attributes will only remain on the DTL Scenario when committing changes. ■ Allow Series Attributes - If this option is checked, the user will be able to commit changes to the series attributes back to the Living Master, if not, all the changes made to the series attributes will only remain on the DTL Scenario when committing changes. ■ Allow New Series - If this option is checked, the user will be able to create new Series in his/her DTL Scenario. ■ Allow New Observations - If this option is checked, the user will be able to create new Observations points in his/her DTL Scenario.

Table 3-2: User Permissions

Permission	Description
View Scenarios	Used to allow access to the different types of scenarios available. The options are: ■ Owned/Shared Scenarios - If this option is selected the user will be able to view their own scenarios and scenarios that have been shared to them. ■ Living Master Permissions - This section is used to define the operations a user can perform in a Living Master scenario. These permissions apply only when a scenario is opened in Living Master mode. For more information on different types of modes lookup the Scenario Modes section on the User Guide. ■ Living Master Scenarios - This option is used to allow the user to view Living Master scenarios in the list of available Scenarios. When users open Living Master scenarios the data they will have access to will depend on the Data Permission they were assigned.
Modify Series Forecasting	Used to indicate whether the users will have access to edit the forecast settings at both the series and scenario level. If a user is given this permission they will be able to make changes to any forecast setting within their DTL scenario and commit it back to the Living Master. This permission applies to scenarios opened in Owned mode only, this includes DTL scenarios. For more information on different types of modes lookup the Scenario Modes section on the User Guide.

Table 3-2: User Permissions

Permission	Description
Shared Scenario Permissions	These options apply to the recipient of the shared Scenario user. For example: ■ If User A shares Scenario1 with User B, User B can only change the period and seasonality of Scenario 1 if User B has permission to do so. ■ If a user is not granted any Shared Scenario Permissions, all Scenarios shared with the user are Read-Only.
Data Source	Enables the user to alter the data source for a shared Scenario. If you grant the user permission to alter Data Source Information, the user automatically has permission for Table Selection and Data Organization. ■ Table Selection: enables the user to select what table in the data source is used for the forecast. ■ Data Organization: enables the user to select the organizational method of the data used in the selected table.
Period and Seasonality	Enables the user to adjust the number of periods and seasonality data regarding a shared Scenario.
Statistics	Enables the user to add or change any statistical information in a shared Scenario.

Table 3-2: User Permissions

Permission	Description
Method Configuration	Enables the user to add or change any of the Forecast Method options for a shared Scenario. If you grant the user permission to Method Configuration, the user is automatically granted permission to the following options. You can also grant permission to the following options individually. ■ Select Method: enables the user to select the method used for the forecast of a shared Scenario. ■ Modify Parameters: enables the user to change the parameters of a method used in a shared Scenario. ■ Series Configuration: enables the user to add or change series information on a method used for the forecasting of a shared Scenario.

Table 3-2: User Permissions

Permission	Description
Advanced Configuration	Enables the user to add or change the Advanced Configuration options of a shared Scenario. If you grant the user permission to Advanced Configuration, the user is automatically granted permission to the following options. You can also grant permission to the following options individually. ■ Dates: enables the user to add or change information regarding the dates used in the forecast of a shared Scenario. ■ Series Layout: enables the user to add or change information regarding the series fields used in the forecast of a shared Scenario. ■ Same As: enables the user to add or change information regarding the Same As fields used in the forecast of a shared Scenario. ■ Load Incrementally: enables the user to add or change information regarding the incrementally loaded observations used in the forecast of a shared Scenario. ■ Cleansing: enables the user to add or change information regarding the Cleansing information used in the forecast of a shared Scenario. ■ Accuracy: enables the user to add or change information regarding the Accuracy information used in the forecast of a shared Scenario.

Table 3-2: User Permissions

Permission	Description
Viewer Access	Grants access to change the series information or observations for any series in a Scenario. If you grant the user permission to Viewer Access, the user is automatically granted permission to the following options. You can also grant permission to the following options individually. ■ Modify series: enables the user to change the series while previewing a shared Scenario. ■ Modify Observations: enables the user to change the observation or observation values of a shared Scenario. ■ New/Add/Clone Series: enables the user to create new series. ■ Modify Series Forecasting: Enables the user to modify forecast settings at the series or scenario level. This permission applies to scenarios opened in Shared mode only. For more information on different types of modes lookup the Scenario Modes section on the User Guide.
Reports	Enables the user to run or change configurations for reports for the shared Scenarios. If you grant the user permission to Reports, the user is automatically granted permission to the following options. You can also grant permission to the following options individually. ■ Run Report: enables the user to run reports on a shared Scenario. ■ Report Options: enables the user to add or change report options for a shared Scenario.
Procast	Enables the user to Procast a shared Scenario.
Reload Series	Enables the user to reload the series information and values from the QAD database for a shared Scenario.

Table 3-2: User Permissions

Permission	Description
Groups	Enables the user to change the Group information of a shared Scenario. If you grant the user permission to Groups, the user is automatically granted permission to the following options. You can also grant permission to the following options individually. ■ Group Configuration: enables allows the user to configure groups for the shared Scenario. ■ Group Options: enables allows the user to add or change groups for the shared Scenario.
Freeze Scenario	Enables the user to freeze a Scenario that is shared.
Overwrite Forecast	Enables the user to overwrite the forecast data in a Scenario shared.

Table 3-2: User Permissions

Permission	Description
Tools	Enables the user to access DME Tools/Resources against a shared Scenario. If you grant the user permission to Tools, the user is automatically granted permission to the following options. However, you can grant permission to the following options individually. ■ Hierarchy/Rebalance: enables the user to rebalance in a Scenario shared to the user. ■ Hierarchy/Remove Hierarchy: enables the user to remove the hierarchy in a Scenario shared to the user. ■ Reforecast: enables the user to reforecast a Scenario shared to the user. ■ Calendar: If this option is active, all shared Scenarios can be possible target Scenarios for Calendar. Otherwise those Scenarios are not displayed as possible target Scenarios. ■ Conversion Factors: enables the user to apply conversion factors in a Scenario shared by the user. ■ Life Cycle Forecast: enables the user to apply Life Cycle Forecast factors in Scenario shared by the user. ■ ABC Analysis: enables the user to use ABC Analysis in Scenario shared by the user. ■ Bill of Materials: enables the user to use Bill of Materials in a Scenario shared by the user. ■ Run Exception: enables the user to apply an exception in a Scenario shared by the user.
Special Functions	■ General Inventory: Gives the user access to the IM Tool. ■ Run PO Launcher: Gives the user permission to work with Purchase Orders. ■ Run Retagging: Enables the user to use the Retagging module.

6. Click **Save** when you are finished granting the user permissions.

7. Click Close.

The Base Unit window displays.

Use the Reset button to remove all the previous permissions. If you made permission changes that you do not want to apply to the user, click Reset. The previous saved permissions for the user are then activated.

Chapter 4 Creating and Managing Scenarios

This chapter includes:

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Section 3: Create a New Scenario	81
Section 4: Edit a Scenario	82
Section 5: Share a Scenario	84
Section 6: Source Data Filtering Wizard	96
Section 7: Safety Stock	114

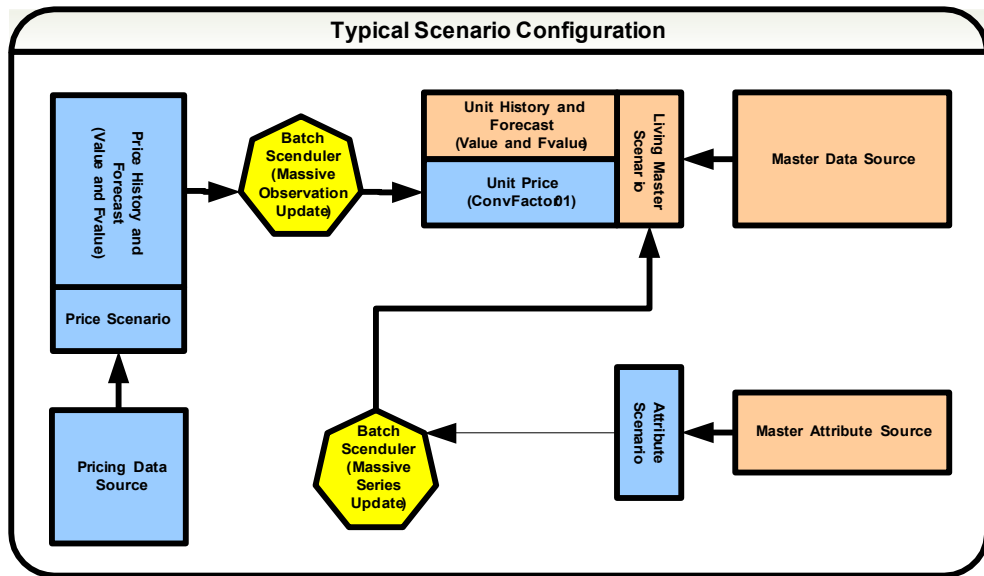
Section 1: Overview

The DME uses Scenarios to create forecasts. A Scenario is composed of data, statistical information and instructions. This chapter describes how to create and manage Scenarios, as well as how to setup the data for a Scenario.

Scenarios are used to bring data into the DME, as well as providing a mechanism for developing forecasts. Proper Scenario setup when combined with the Batch Scheduler provides a very powerful method for managing data within the DME.

In the majority of cases, the DME is configured with a single Living Master Scenario that contains the active version of the forecast. In addition, it is likely that there will be a series of helper Scenarios that bring additional data into the DME.

The following illustration details a simple Scenario setup within the DME that pulls in and forecasts unit data and then adds time phased pricing back to the Living Master as a conversion factor.

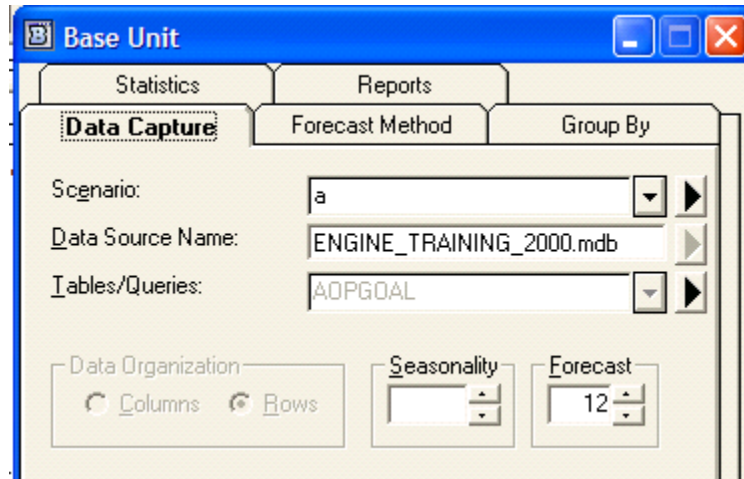


In this case, the Batch Scheduler loads the price update attributes. By segmenting the data into multiple Scenarios, it is easy to manage and update each Scenario and post the results into the Living Master Scenario.

Each Scenario is unique and contains different information. The DME uses each Scenario to examine and forecast a different aspect of your business. In order to ensure the integrity of your forecasts, users must closely manage their Scenarios. This section explains how to keep Scenarios unique, as well as share Scenarios with other users.

Section 2: First Time Login

The Data Capture tab displays when you log into the Base Unit for the first time. There are two fields available or enabled; the Scenario and Data Source Name textboxes.

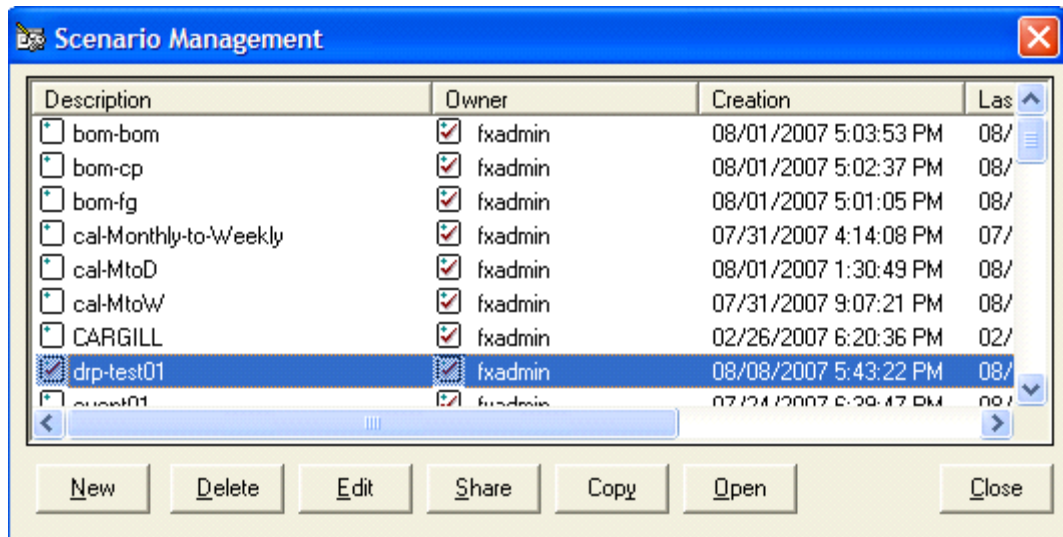


The First Scenario is created for you. Use this default Scenario or rename it or create a new Scenario.

Section 3: Create a New Scenario

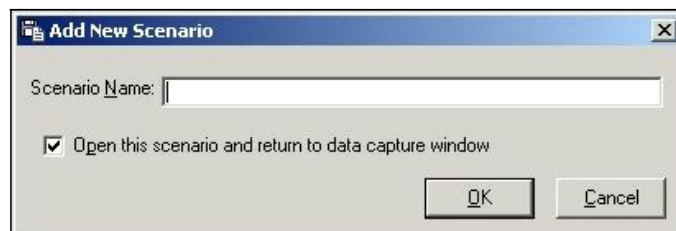
1. Click the Scenario Management  button located to the right of the Scenario drop-down list.

The Scenario Management window displays.



- Click the **New** button.

The Add New Scenario window displays.



- Enter a name in the **Scenario** textbox and press **OK**.

A confirmation message that the Scenario was created displays.

Section 4: Edit a Scenario

- To rename an Existing Scenario, click the **Scenario Management**



The Scenario Management window displays.

2. Select the **Scenario** and click **Edit**.

The Edit Scenario window displays.

3. Change the Scenario name or define and edit the Scenario attributes.

The attributes are used for further definition and to group Scenarios. For example, if Time Level 1 is set to **Monthly**, then a forecast can be grouped for all Scenarios that forecast monthly. The table details the default and predefined values for the following attributes:

Time Level	Description
Level 1	The default value is Monthly. The predefined values are Daily, Weekly, Monthly and Quarterly. The values are defined in TBL_ModuleClassValue.
Level 2	This attribute contains the same default and predefined values as Time Level 1.

The table below details the default and predefined value for the following attribute:

- **User Field 1** - The default value is Normal. The predefined values are Normal, Living Master, Profile and Calendar. The attribute determines the internal type of Scenario.

Scenario	Description
Living Master	A Scenario holding almost all detail data. It is controlled by the System Administrator and works as a data warehouse. Other users populate data from the Living Master Scenarios, make the change, and commit the change back to Living Master Scenarios.
Profile	A Scenario holding profiling data using in a Life Cycle Forecast routine.
Calendar	A Scenario holding the transformation information for transfer data from one time scale to another time scale.
Normal	A general Scenario used for the purpose of forecasting.

Note: *For additional information on how to set this attribute, refer to [Chapter 13 Using the Calendar](#) and [Chapter 19 Grouping and Allocation](#).*

Section 5: Share a Scenario

When you create a Scenario, you are the only user that can view and edit the Scenario information. If you want another user to be able view or make additions to your Scenario, you can share the Scenario.

If you designate a Scenario as Living Master, then other users are able to extract information from your Scenario, make changes and commit them back to the database.

You can share your Scenario if you would like to give other users direct access to your Scenario. Depending on the shared Scenario permissions granted, users can share a Scenario with another user, view the Scenario in read-only mode, or make changes to the Scenario.

Note: For additional information on sharing Scenario permissions, refer to [Chapter 3 Creating and Managing Users](#).

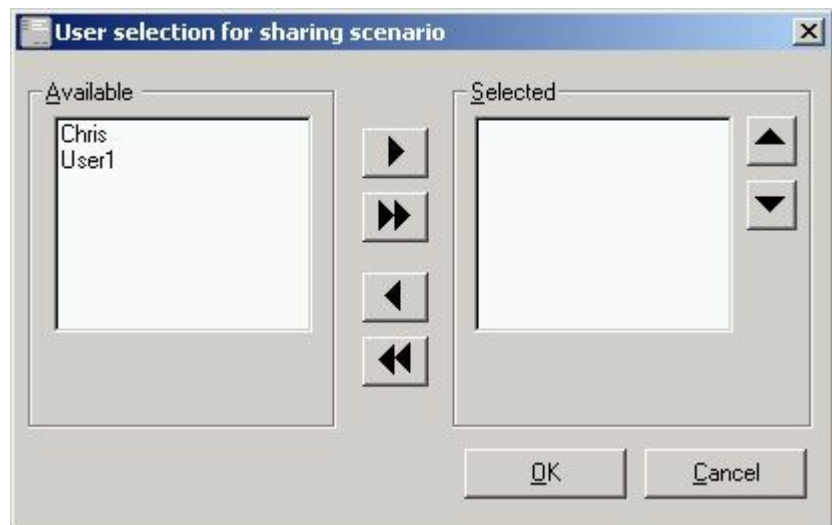
5-1: To Share a Scenario with a User

1. Click the **Scenario Management**  button located to the right of the Scenario drop-down list.

The Scenario Management window displays.

2. Select the **Scenario** and click **Share**.

The User Selection for Sharing Scenario window displays.



Note: All users who have sharing Scenario permissions are listed in the Available column.

3. Locate and select the **name of the user** with which you want to share the Scenario in the Available list.
4. Click the **single arrow** pointing to the **Selected** list.

The user name displays in the Selected list.

Note: The single arrows select or unselect one user name at a time. The double arrows select or unselect all the user names at once.

5. Click **OK**.

A message confirming sharing of the Scenario displays.

5-2: Delete/Remove Sharing from a Scenario

1. Click the **Scenario Management**  button located to the right of the **Scenario** drop-down list.

The Scenario Management window displays.

2. Select the **Scenario** you want to delete, and click **Delete**.

A delete confirmation window displays.

3. To continue deleting the selected Scenario, click **Yes**.

A message displays confirming the deletion of the Scenario.

5-3: Remove Sharing from a Scenario

1. Click the **Scenario Management**  button located to the right of the **Scenario** drop-down list.

The Scenario Management window displays.

2. Select the **shared Scenario** that you want to unshare, and click **Unshare**.

An Unshare Confirmation window displays.

3. To continue unsharing, select the Scenario and click **Yes**.

A message displays confirming removal of the share from the Scenario.

5-4: Copy a Scenario

When the information in a new Scenario varies slightly from an existing Scenario, you may want to copy the options of the existing Scenario and change a few pieces of information that will be different in the new Scenario.

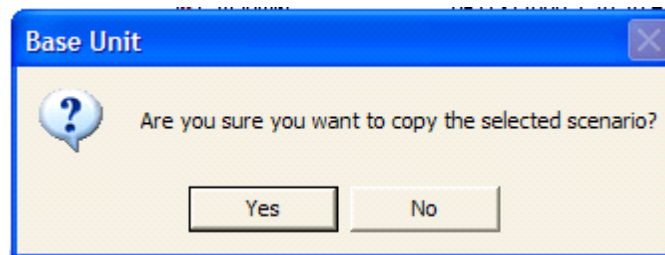
Making a copy of a Scenario enables you to avoid recreating the entire Scenario. In addition, copying a Scenario copies only the options, not the data.

1. Click the **Scenario Management**  button located to the right of the **Scenario** drop-down list.

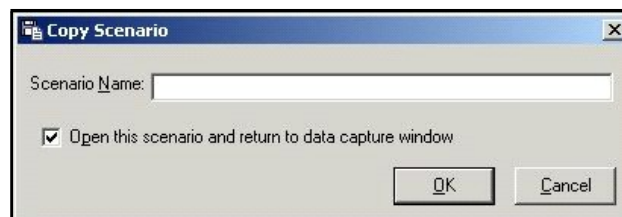
The Scenario Management window displays.

2. Select the **Scenario** you want to copy and click **Copy**.

The Copy Scenario window displays.



3. Click **Yes**.



4. Type a **new, unique name** for the Scenario and click **OK**.

A Confirmation window displays when the copy is completed.

5. Click **OK**.

5-5: Capture the Data for the Scenario

You must first supply a data source that contains forecast data in order to use the Viewer. The table below details the types of data sources.

Data Source	Description
Microsoft Access Database file (.mdb)	A file created in Microsoft Access, that contains a database layout including tables, indices and queries.
Excel Spreadsheet file (.xls)	A spreadsheet created in Excel that contains the data in a tabular format.
SQL Server	A server-based relational database management system.
Other (ODBC, Oracle)	Various other data formats.

button located to the right of the **Data Source Name** drop-down list.

Base Unit

Statistics

Reports

Forecast Method

Data Capture

Group By

Scenario:

a

[3] [tl

Q.ata Source Name:

ENGINE_TRAINING_2000m_db...

=

!abies/Queries:

JAOPGOAL

[3

Data Organization

Columns Rows

Seasonality

Forecast n

r-;...:J

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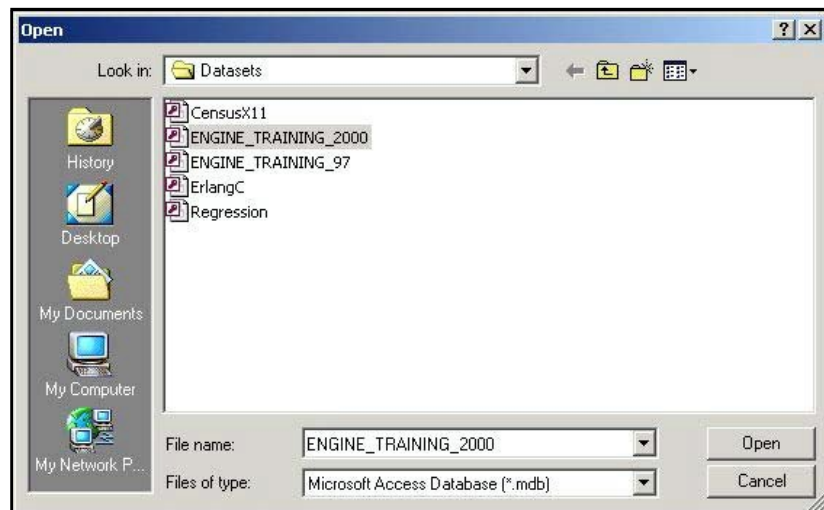
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The Data Capture window displays.



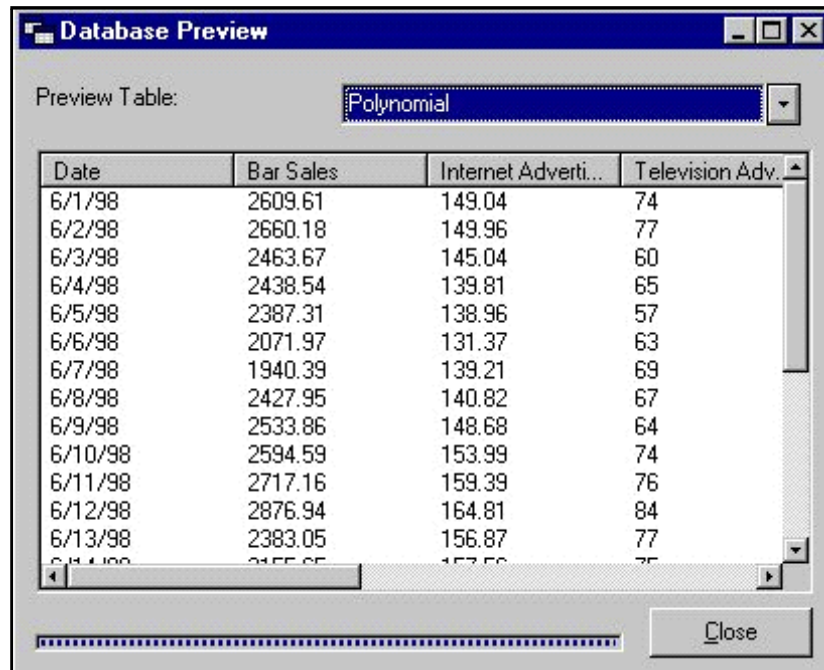
2. Select the **type of data source** you want to use.
3. Click **Browse**. Depending on the type of file you select, a different dialog box displays.

If you select a Microsoft Access Database file (.mdb), the Open window displays.



4. Select the .mdb file and click **Open**.
5. When the **Data Capture** screen redisplay, click **Preview Database**.

The Database Preview dialog box displays.

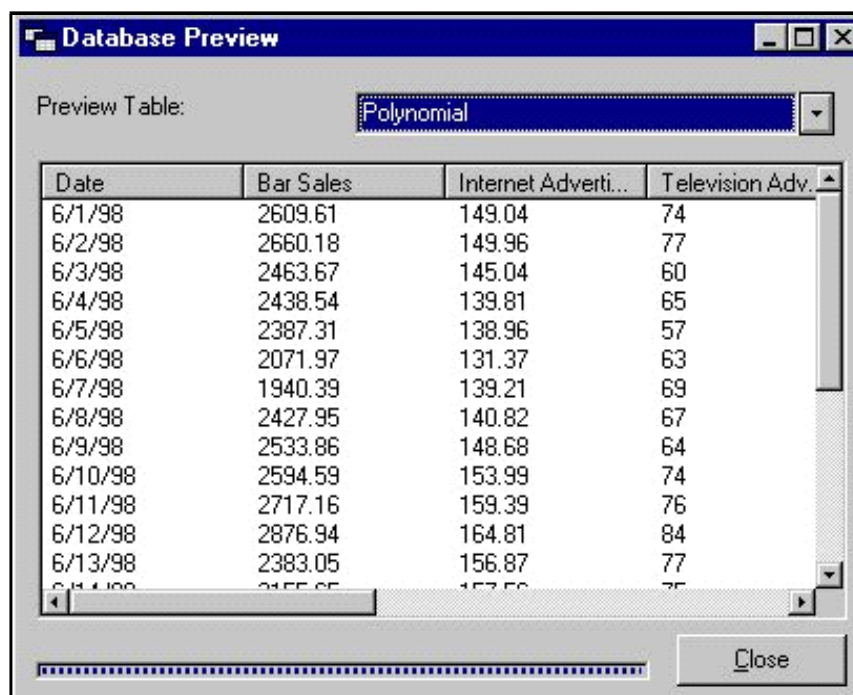


6. Select the table you want to use for the forecast from the **Preview Table** drop-down list and click **Close**.

If you choose Excel Spreadsheet (.xls), a Windows Open dialog displays. **Browse** to the location of your .xls file and click **Open**.

7. When the **Data Capture** screen redisplay, click **Preview Database**.

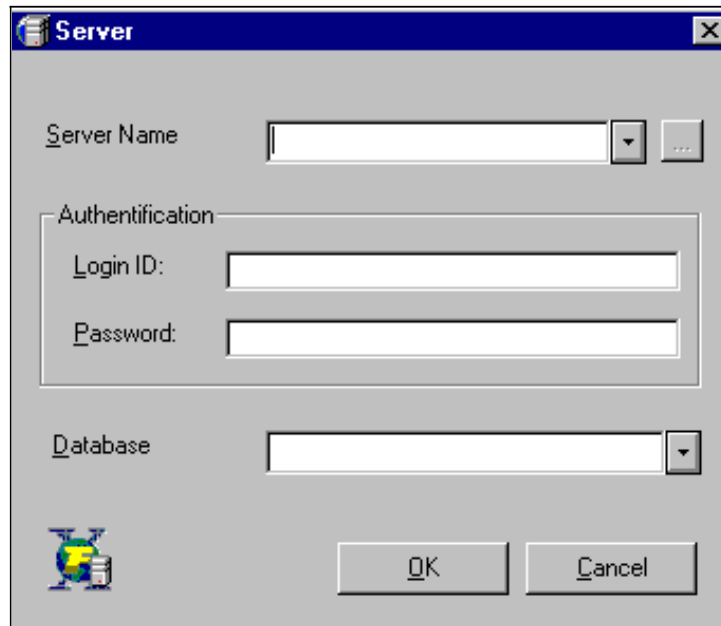
The Database Preview dialog box displays.



8. Select the table from the **Preview Table** drop-down list and click **Close**.

Note: For information about selecting a particular section of an Excel spreadsheet, see [“Excel Ranges” on page 95](#).

9. If you selected a **SQL Server source** and click **Configure**, then the Server window displays.

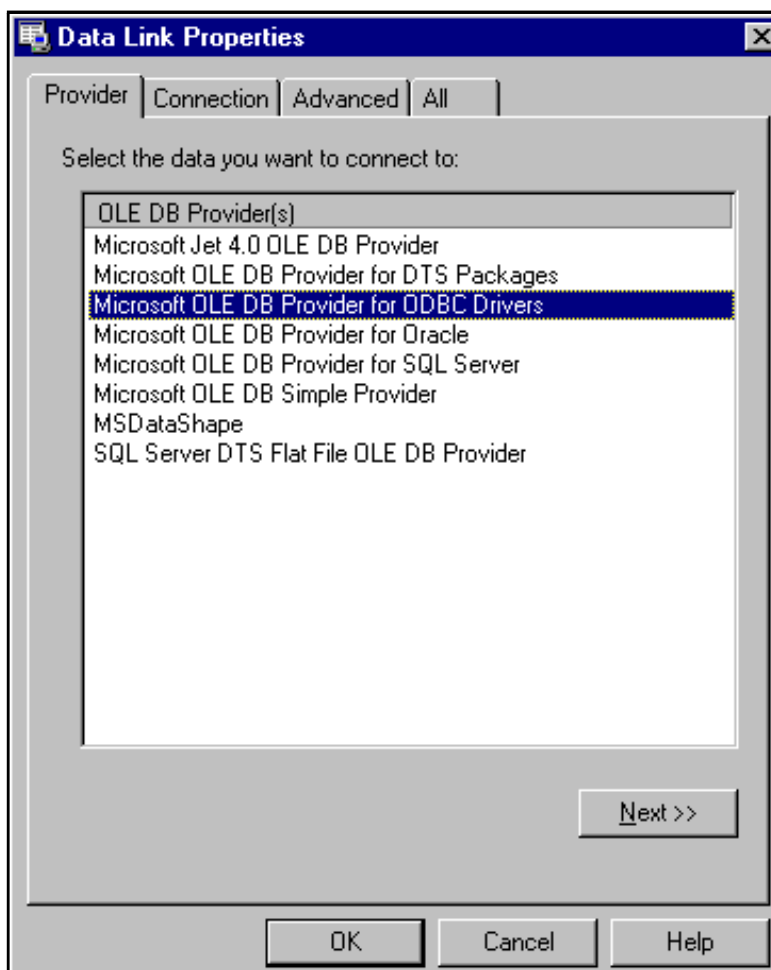


The screenshot shows a dialog box titled "Server". It contains the following elements:

- Server Name:** A text input field followed by a dropdown arrow and a small square button.
- Authentication:** A section containing two text input fields labeled "Login ID:" and "Password:".
- Database:** A text input field followed by a dropdown arrow.
- Buttons:** "OK" and "Cancel" buttons at the bottom right.
- Icon:** A small server icon at the bottom left.

10. Enter the appropriate **Server Name**, **Login**, **Password**, and **Database** information for the SQL server in the appropriate textboxes and click **OK**.
11. If you select Other (ODBC, Oracle) and click **Configure**.

The Data Link Properties window displays.



12. Select the **data option** for the source data connection and click **Next**.

Note: *Refer to Microsoft or SQL documentation for additional information on configuring these types of files.*

After you select the Data Source, the path and name of the data source appears in the Actual Selection field at the bottom of the screen.

13. Click **Done**.

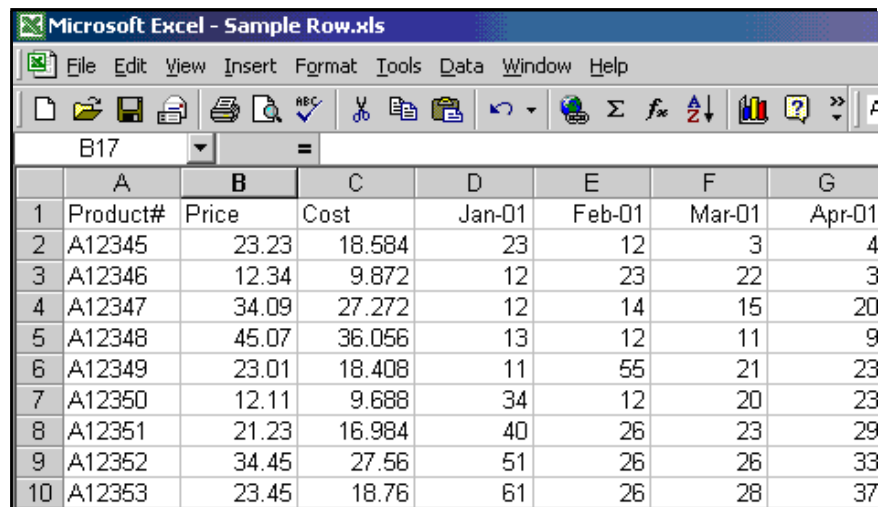
The ForecastX DME main window displays.

5-6: Excel Ranges

If your data source is an Excel Spreadsheet, you can select a part of the data to use for the forecast. This selection of data is called a **Range**.

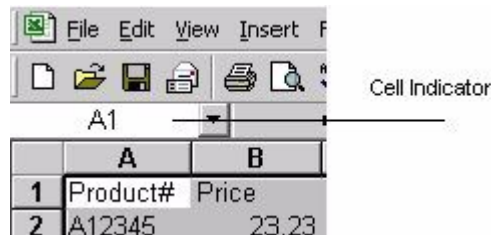
To select a Range:

1. To select a range, click the **data for the range** in the Excel spreadsheet.



	A	B	C	D	E	F	G
1	Product#	Price	Cost	Jan-01	Feb-01	Mar-01	Apr-01
2	A12345	23.23	18.584	23	12	3	4
3	A12346	12.34	9.872	12	23	22	3
4	A12347	34.09	27.272	12	14	15	20
5	A12348	45.07	36.056	13	12	11	9
6	A12349	23.01	18.408	11	55	21	23
7	A12350	12.11	9.688	34	12	20	23
8	A12351	21.23	16.984	40	26	23	29
9	A12352	34.45	27.56	51	26	26	33
10	A12353	23.45	18.76	61	26	28	37

2. Name the **range** in the **Cell Indicator**



5-7: Select Tables or Queries

Once you select the Data Source, you must indicate the specific table or query within the database that you want to use for the forecast.

To select a Table or Query:

1. Click the **Tables/Queries** drop-down list.

The tables, queries, and ranges in your data source are listed.

2. Select the table, query, or range and click **OK**.

The selection displays in the Tables/Queries field.

Section 6: Source Data Filtering Wizard

Since many tables and queries can be rather large, you can filter the source data. Using the Filtering Wizard you can indicate particular groups or sections of the table or query for use. To accomplish this, you create an Expression.

6-1: Expressions

An Expression is a combination of values that specify exactly what values to use in the forecast.

For instance, you have a table in your data source that lists your earnings for the month of June last year. However, for your forecast you want the DME to only use the values for the last two weeks in June. You can use the **Filtering Wizard** to build an expression for the DME to look only at the earning values between the dates of June 15 and June 30.

This expression would look like this:

`Date >= '%6/15/99%' AND Date <= '%6/30/99%'`

For example, you have a table listing all your employees, their departments, and start dates. You want to know how many people started in the Marketing and Sales departments in the year 1999. You can build an expression that specifies to look only at dates in 1999 and employees in the Sales or Marketing departments.

This expression would look like this:

Start Date >= '%1/1/99%' AND Start Date <= '%12/31/ 1999%' AND
(Dept = Sales OR Dept = Market)

6-2: Use the Filtering Wizard

the **Tables/Queries** drop-down list.



Scenario: _____ [3] [tl

Q.ata Source Name: IENGINE_rR'AININ'G_2'o'od,.mdb...=0-

!abies/Queries: jAOPGOAL [3

Data Organization---		☐ Seasonality	☐ Eforecast
<i>r</i> .[,columns	<i>r</i> . B.ows		



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The Data filter window displays.

The screenshot shows the 'Data Filter' window for a scenario named 'scn1'. The window is divided into several sections. At the top is the 'Expression Builder' section, which includes a 'Field List' dropdown menu currently showing 'ABCCODE', an equals sign operator, and a 'Values' dropdown menu. Below these are a 'Field Type' label set to 'String' and two buttons: 'Show Values' and 'Add Expression'. The next section is 'Logic Operators and parenthesis', containing buttons for 'AND', 'OR', '(', and ')'. Below this is a large text area labeled 'Filter expression' which is currently empty. At the bottom of the main area are four buttons: 'Show Results', 'Parse Expression', 'Clear Filter', and 'Count'. The very bottom of the window has two buttons: 'Save and Close' and 'Cancel'.

2. If the expression requires an () open parenthesis, go the Logic operators and parenthesis section and select the **open paren**.
3. Select the **name of the field** for the first part of the expression from the **Field List** drop-down list.

Note: *The values available depend on the fields in the table or query.*

4. In the next field, there is an (=) equal sign. Click the **drop-down list** and select the **operator**.



The measurement choices are:

- = Equal to
 - <> Not equal to
 - > Greater than
 - < Less than
 - >= Greater than or Equal to
 - <= Less than or Equal to
 - Like
 - Is not Null
 - Is Null
5. Click the **Show Values** button. All the values that coincide with the field you selected in step 1 populate the **Values** drop-down list.
 6. Locate and select the appropriate value from the **Values** drop-down list.
 7. Click **Add Expression**. The expression you created displays in the **Filter** field.

8. To add on to the expression, click the appropriate **AND OR** values in the **Logic** operators and **parenthesis** section, and continue building the expression.
9. Make sure the expression is valid, click **Parse Expression**. If the expression is not valid, an error message appears.
10. Click **Show Results** when you are finished building the expression.

All the values you specified will display on the window.

11. Edit your expression or click **Accept**.

6-3: Data Organization for Rows

You must specify how the data in the selected data source is organized. Data is organized in rows or columns.

Note: *Indication of the correct layout is imperative to ensure an accurate forecast.*

Data layout is organized by:

Data Layout	Description
Series	Represents an individual product or item in your database.
Observations	A set of values for the series.

To indicate the Layout of Data:

1. Click the radio button for the layout that describes your data source. The only choices are **Columns** and **Rows** on the **Data Capture** tab in the Data Organization box on the ForecastX DME window.

When data is organized in rows, the observations go across the X axis (horizontal).

	A	B	C	D	E	F	G	H
2	BASE MODEL	Mar-97	Apr-97	May-97	Jun-97	Jul-97	Aug-97	Sep-97
3	DT1000	8047	6732	6329	9192	6062	7500	7604
4	DT4300	3785	2819	3770	3464	2590	3163	3141
5	DT9700	1322	564	488	447	336	546	590

Note: *When data is in rows the observations are all numeric values that span the columns. To reduce or filter the amount of data, use the Filtering Wizard.*

6-4: Advanced Configuration Options for Rows

Once you select a data source, table/query, and filter, you can configure the data for the forecast. Depending on the organization of your data source, you will have different configuration options.

The following shows how to configure the options for data that is organized in rows.

a

[3[tl

ENGINE_1R'AININ'G_2'o'oo,mdb...=0-

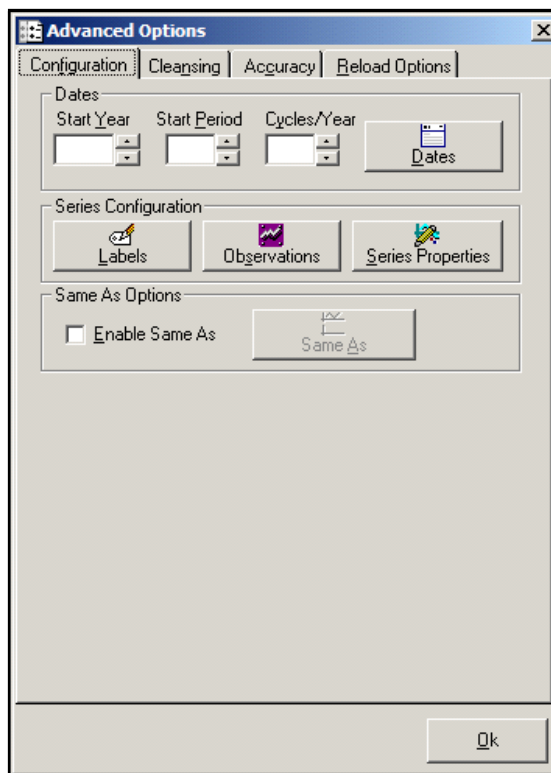
jAOPGOAL

[3

Seasonality Forecast

$$r \text{ .}[:,\text{columns}] \text{ } r \text{ .rows}$$


The Advanced Options screen displays.



The options available for configuring a data source organized by rows are:

Option	Description
Dates	Determines how dates display in generated reports.
Labels	Used to select which fields from the data source are used to represent each unique product or item in the DME. If the fields selected do not result in labeling unique items, the system automatically completes the label to be unique. This label is displayed in the DME Viewer as the description for each Series.

Option	Description
Observations	Used to set which fields from the data source are the ones that represent the actual information. These represent the Historical information on which the DME will be based to create the Forecast.
Series Properties	Used to configure additional information for each item or product, now called a Series in the DME (i.e., cost, price, or Product Type)
Enabled Same As	Determines Historical and/or Seasonality relationship among Series.

6-5: Data Organization for Columns

When data is organized in columns, the observations go vertically down the data set or spreadsheet and series go across the columns. The following illustration displays an example.

Description	Adj Hist	Act Fcst
2007-10		248,925
2007-11		275,155
2007-12		279,371
2008-01		195,881
2008-02		251,773
2008-03		283,165
2008-04		343,679
2008-05		269,913
2008-06		224,717
2008-07		249,994
2008-08		264,072
2008-09		293,875
2008-10		298,878
2008-11		329,464
2008-12		333,619

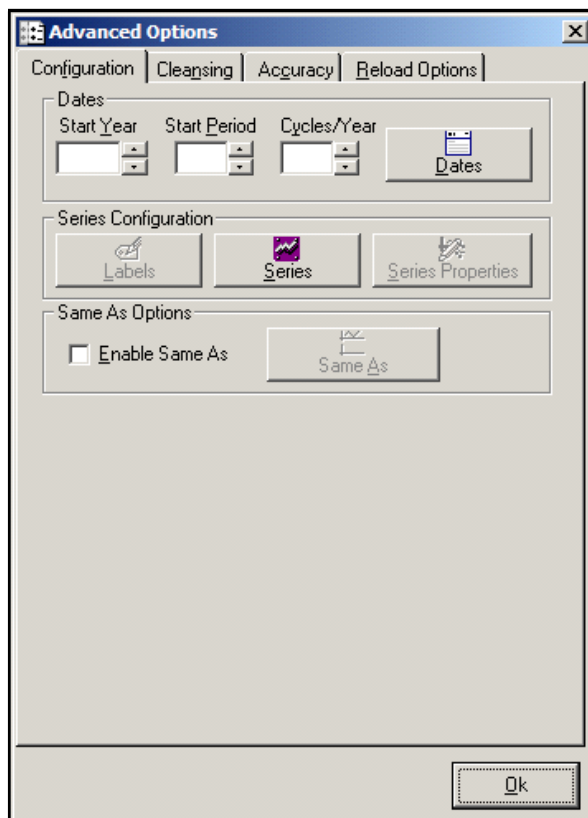
Observations span down rows when data is organized in columns; this means that using the Filtering Wizard reduces the length of each series. When pieces of data are eliminated from the forecast, there are fewer rows needed to store the data.

6-6: Advanced Configuration Options for Columns

Once you select a data source, table/query, and filter, you can configure the series in the table.

1. Click the **Advanced** button on the bottom of the ForecastX DME menu.

The Advanced Options screen displays.



The Advanced Configuration Options for data organized in columns are:

- Dates
- Series Configuration

6-7: Additional Advanced Configuration Options

The Advanced Configuration options for data organized in rows are:

- Dates
- Labels

The sections below detail how to use these options.

6-7-1: Dates

Regardless of the organization of the data, you can configure the series date fields in your data source. By configuring dates, you can specify how dates are displayed in the generated reports.

Configure Series Dates

In the Dates section of the Advanced Options, select the appropriate values for the following fields:

Series Date	Description
Start Year	Specify the starting year of the data in the series.
Start Period	Specify the date cycle. For example, when using weekly data, the value 2 indicates that the dates start in the second week of the year.
Cycles/Year	Specify when the period starts in the beginning of the year. For example, the value 52 means weekly, 365 means daily and 12 means monthly.

Following are examples of various types of data and how the configured date fields are displayed in the Viewer.

Daily Data

A daily data set up of:

Dates

Start Year	Start Period	Cycles/Year	
2007	11	365	Dates

Will return the following dates:

Data View			
[1080][BIG DEPOT][EAST]			
History	9999		
Description	Value	FValue	UserValue01
2002-359	36.90	35.62	0.00
2002-360	36.90	35.62	0.00
2002-361	36.90	35.62	0.00
2002-362	36.90	35.62	0.00
2002-363	36.90	35.62	0.00
2002-364	36.90	35.62	0.00
2002-365	36.90	35.62	0.00
2003-001		25.72	0.00
2003-002		25.72	0.00

Weekly Data

A weekly data set up of:

Dates

Start Year	Start Period	Cycles/Year	
2007	11	52	Dates

Will return the following dates:

Data View		
[1080][BIG DEPOT][EAST]		
History	4	
Description	Value	FValue
2002-49	252.94	244.17
2002-50	252.94	244.17
2002-51	252.94	244.17
2002-52	252.94	244.17
2003-01		200.50
2003-02		176.26
2003-03		176.26

Monthly Data

A monthly data set up of:

Dates		
Start Year	Start Period	Cycles/Year
2007	11	12
 Dates		

Will return the following dates:

Data View		
[1080][BIG DEPOT][EAST]		
History	3	
Description	FValue	Value
2002-10	981.11	1,012.00
2002-11	1,138.40	1,096.00
2002-12	1,104.34	1,144.00
2003-01	797.19	
2003-02	1,028.46	

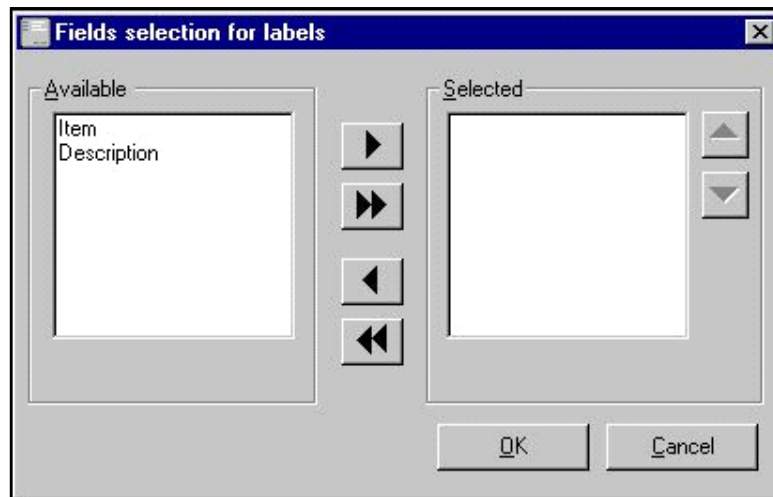
6-7-2: Labels

When the forecast is generated, the DME names the series in your data source as Series 1, Series 2, etc. You can control how the DME labels the series.

To assign Labels to a Series:

1. Click the  Labels button.

The Fields selection for labels screen appears, listing the text fields from your data source in the Available column.



2. Select the **fields** you want to set up as your Series' descriptions and move them to the **Selected** column and click **OK**.

Note: *The order in which you select the fields is important. Use the up arrow and down arrows next to the Selected column to change the order of the fields selected.*

When using Labels with repeated values, the DME appends a number to differentiate the same series. For example, if you select Description as the label and you have the value Shoe twice, the series name is [Shoe][1] and [Shoe][2].

6-8: Observations

The DME automatically selects all numeric fields as observations in the same order as they appear in the Table/Query. You can change that configuration by using the Observation button.

Configuring Observations is useful when you do not include an observation in your forecast that represents something else. For example, if a database had several fields with the price and cost of certain products, then you can remove them from the Observation selection.

To include Observations in the Data:



1. Click the **Observations** button.

The Fields selection for Series window displays.

2. Select or unselect the fields you want to include in the data.
3. Click **OK**.

6-9: Series Properties

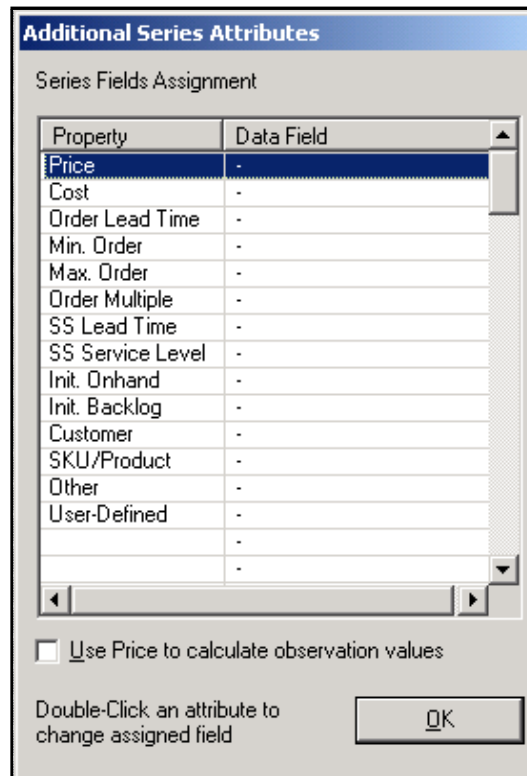
Use Series Properties to import additional information for each individual series, for example, cost, price or description.

To specify Series Properties:



1. Click the **Series Properties** button.

The Additional Series Attributes window displays.



2. In the **Property** column double-click on the Attribute you want to apply to a data field.

A window displays listing the available data fields.

3. Select the **data field** containing the attribute values you want to import.

The Additional Series Attribute window displays with the attribute and the data field listed next to it.

4. Click **OK**.

The process can be repeated for any of the data fields that can be mapped into the DME. Using Display sets it is possible to customize the labels and descriptions that are shown within the tool.

Note: *If the data organization is Column, the Series Properties cannot be loaded at the same time when loading the Observations. For more information, see [“Massive Series Update” on page 232](#). This section explains how to import the Series Properties without changing the data organization and reloading the data.*

Section 7: Safety Stock

The DME provides two ways to deal with Safety Stock.

- Activate the safety stock feature found in the Statistics tab. This enables you to set lead-time and customer service levels. The numbers you define will then be applied to all series.
- Pull safety stock components (i.e., lead-time, service levels, etc.) directly from your data source. This enables you to create series specific safety stock levels.

To Set Safety Stock Using Data Source:

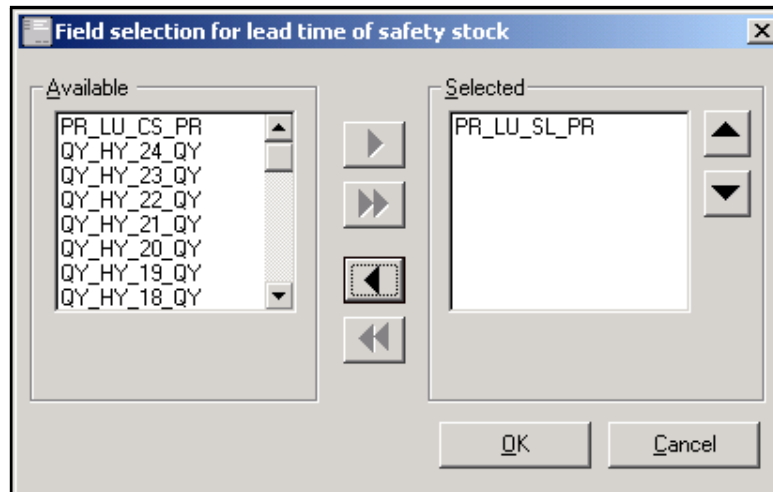
1. Click the **Advanced** button on the Base Unit main window.

The Advanced Options window displays.

2. Click on the **Series Properties** button On the Advanced Options window.

Listed in the Property fields, you will see SS Lead Time.

3. Double click on SS Lead Time and move the field specified for lead time in your data source from the available list to the selected list.



4. Repeat the step above for Service Level.
5. Click **OK**.

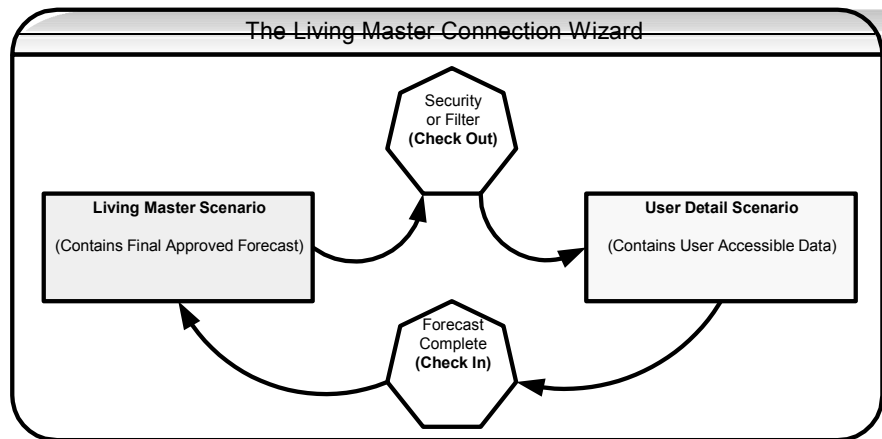
Chapter 5 Demand Management Engine Database

This chapter includes:

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Section 2: Living Master Scenario Access	117
Section 3: Living Master Scenario Management.....	117

Section 1: Overview

The Living Master is a tool that centralizes the data and provides a data repository for your forecasting and planning efforts. This tool helps expedite the performance of the DME and Viewer; users can take a portion of data to work on rather than managing a large Scenario. The illustration below provides an overview to the living master process.



The Living Master Scenario enables users to download a portion of a master Scenario into their own Scenario, make changes, and then commit the selected changes back to the master Scenario. This prevents users from attempting to edit a Scenario when someone else is using it or having to provide access to multiple users for a group of Scenarios.

Section 2: Living Master Scenario Access

The System Administrator can provide additional security to the Living Master Scenario using the security component, DME Manager and its permissions and domains. The System Administrator can limit what data a user may specify and what changes they can make to the Living Master Scenario.

Permissions and domains control the user access to the Living Master Scenario data. The System Administrator assigns one **permission** and one **domain** to each user.

Permissions are administrator-defined filters that limit access to the Living Master Scenarios and series. The System Administrator can create and administer permissions using the DME Manager. For additional information on creating and assigning permissions see [Chapter 6 Demand Management Engine](#).

Domains are System Administrator-defined access rights to the observation lines for the series that the user populates to the DTL Scenario. Access rights include which observation lines the user can see and whether or not those observation lines can be changed. For example, a domain may provide a user access to only the Value, FValue, Original, UserValue01, and ConvFactor01 observation lines, with Value and Original set as Read-Only. For additional information on creating and assigning Domains see [Chapter 6 Demand Management Engine](#).

Section 3: Living Master Scenario Management

With the appropriate security, a user can download or check out a portion of data with which they need to work. The user downloads the data into the default Scenario, DTL (Detail) that is created for them when their user ID is created by the System Administrator.

Note: *Users created prior to a Living Master being designated do not have DTL Scenario.*

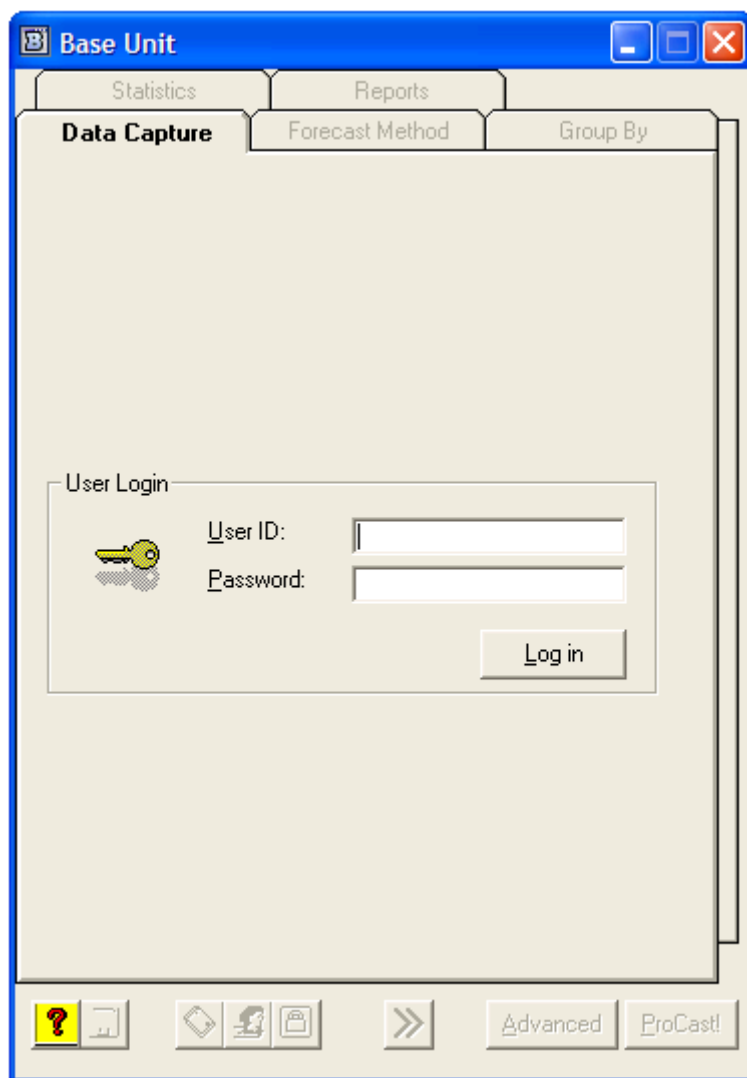
Downloading data into a DTL Scenario is referred to as populating the DTL Scenario. A DTL Scenario may be populated and repopulated at any time with data from one and only one Living Master Scenario. Users then

may make changes to their DTL Scenario and commit selected changes back to the Living Master Scenario.

3-1: Create a Living Master Scenario

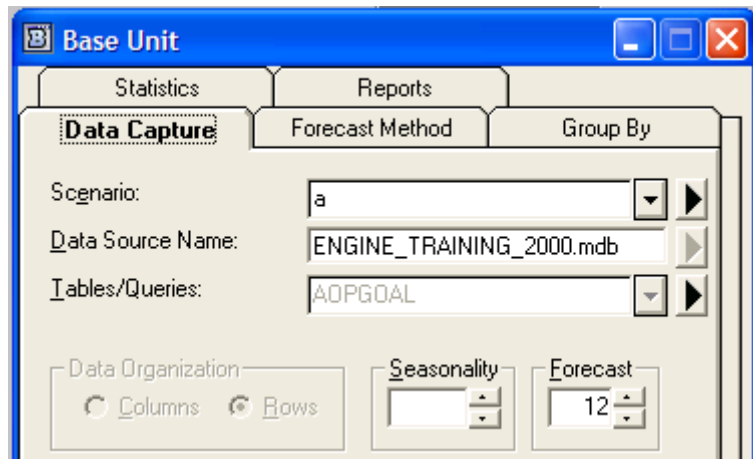
Living Master Scenarios are Normal Scenarios created and designated as Living Master Scenarios by the System Administrator. For additional information, see [Chapter 4 Creating and Managing Scenarios](#).

1. Select **Start > Programs > Demand Management Engine > Base Unit** from the Windows menu.



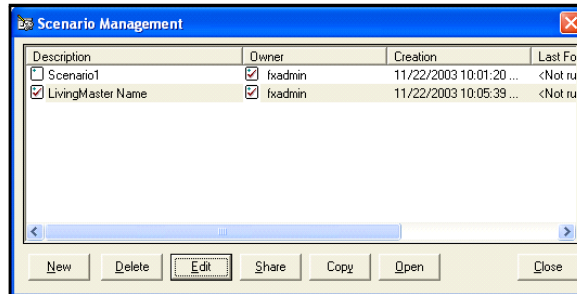
2. Enter the **Administrator User ID** and **password** in the textboxes and click the **Log in** button.

The Base Unit window displays.



3. Click the **Scenario Management** button located to the right of the Scenario drop-down list.

The following window displays.



4. Select the Scenario that you want to designate as a Living Master Scenario and click the **Edit** button.

The Edit Scenario window displays.

The screenshot shows the 'Edit Scenario' dialog box. The title bar is blue with a close button (X) in the top right corner. The dialog contains the following fields:

- Name: LivingMaster Name
- Type: (empty text field)
- Class: (empty text field)
- Use: (empty text field)
- Status: (empty text field)
- Time Level 1: Monthly (dropdown menu)
- Time Level 2: Monthly (dropdown menu)
- Time Level 3: (empty text field)
- Time Level 4: (empty text field)
- User Field 1: LivingMaster (dropdown menu)
- User Field 2: (empty text field)
- User Field 3: (empty text field)
- User Field 4: (empty text field)
- User Field 5: (empty text field)
- User Field 6: (empty text field)

At the bottom right, there are two buttons: 'OK' and 'Cancel'.

5. Select **LivingMaster** from the **User Field 1** drop-down list and click **OK**.

Chapter 6 Demand Management Engine

This chapter includes:

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Section 4: Data Domains	137

Section 1: Overview

You can use the Engine Manager to configure the DME's user interface and features. The Engine Manager is the component that is used primarily by the System Administrator to control key aspects of the solution. The aspects that the Engine Manager controls are:

- Data Filters and Exceptions
- Custom Tasks
- Display Sets
- ABC Templates
- User Data Attribute Access Security
- User Field Data Access Security

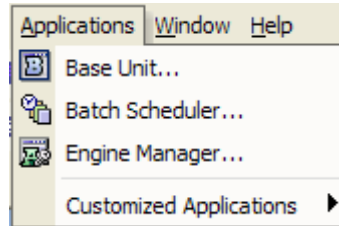
In addition to providing access to the various features, the Engine Manager can be used to create the permissions and domains necessary for the DME's database, which is the Living Master Scenario. For additional information in regard to these features, see [Chapter 5 Demand Management Engine Database](#).

The Engine Manager is also responsible for the features Form Data Views and Field Views. These features are accessible by the System Administrator only.

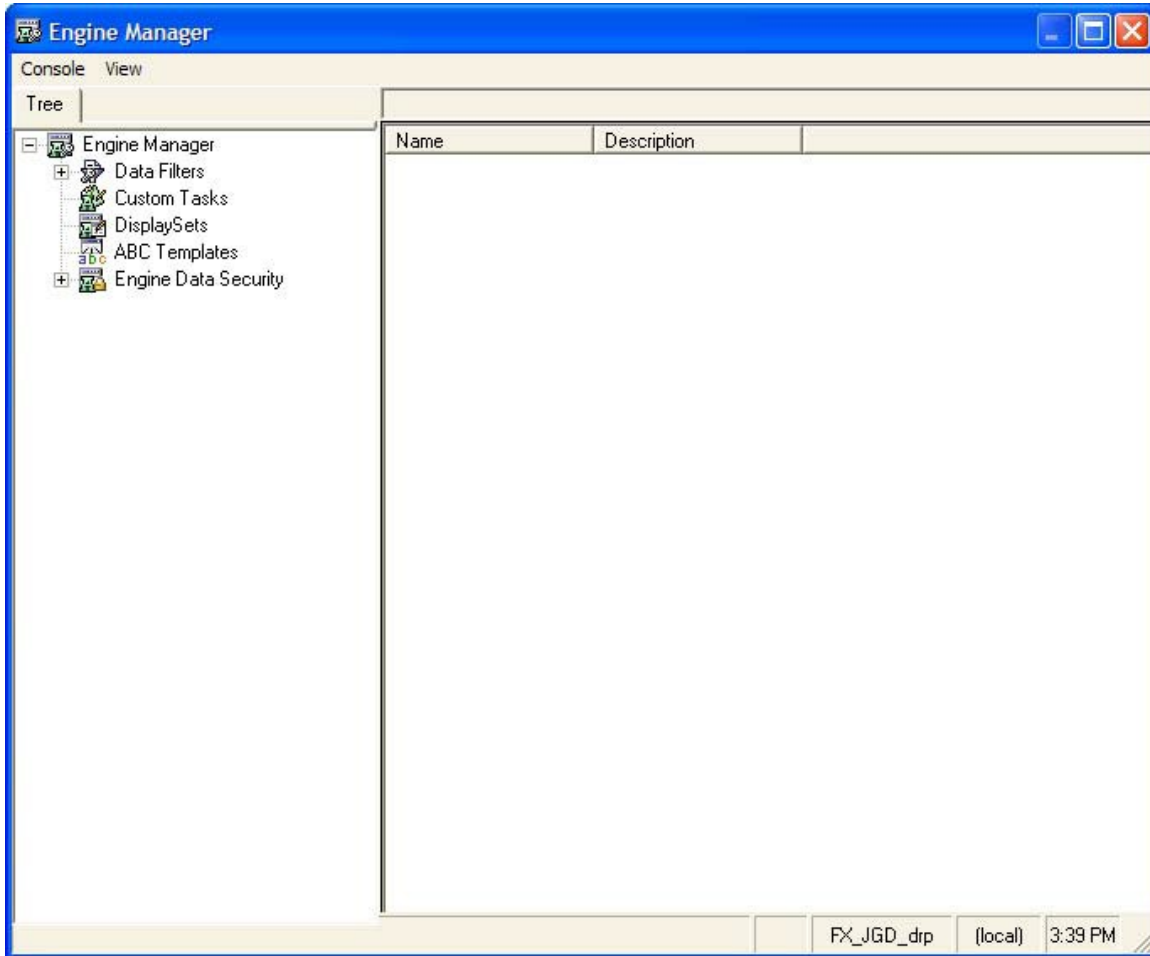
The user who creates a resource can share or assign the resource to other users. Resources shared to a user are visible in the Engine Manager, but cannot be edited or shared with additional users.

Section 2: Using the Engine Manager

1. Select **Applications > Engine Manager** from the Viewer menu.



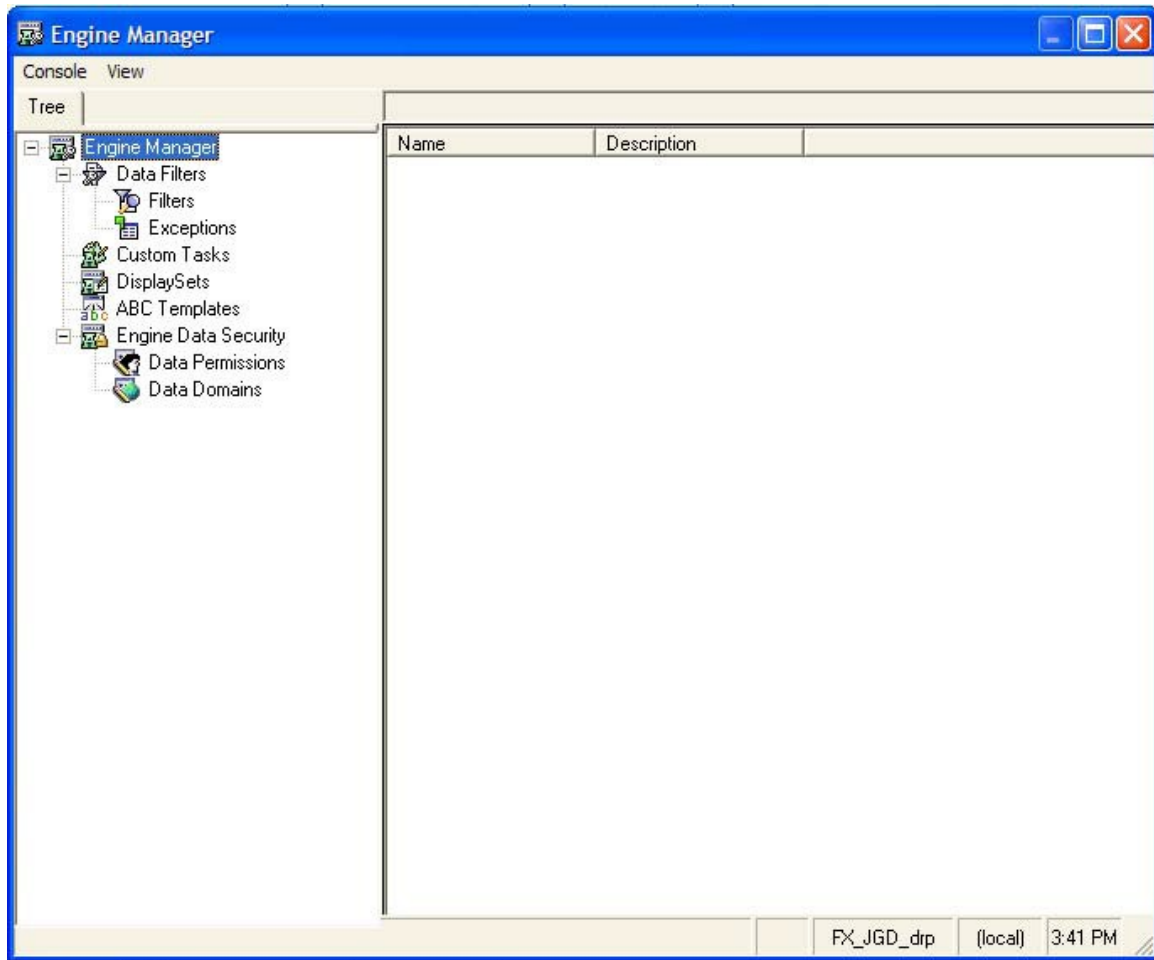
The Engine Manager window displays. Listed under the Engine are resources available to the current user.



Note: *The security resources are only available to the System Administrator or fxadmin user.*

2. Click the  to expand the Data Filters resource.
3. Click the  to expand Engine Data Security resource.

The window now displays the following:



The following table details each function managed by the Engine Manager.

Branch	Resource Type	Description
Data Filters	Filters	Available to all users that have permission to manage filters. Refer to Chapter 9: Filters and Exceptions for details.

Branch	Resource Type	Description
	Exceptions	Available to all users who have permission to manage filters. Refer to the DME User Guide for additional information.
Custom Tasks	Stored Procedures	Available to all users who have permission to install custom tasks. Refer to Chapter 3 - Section 3 of the User Guide for additional information. Note: this option is only available when a Scenario is open in the viewer.
Display Sets	Label Names	Available to all users who have permission to manage display sets.
ABC Templates	ABC Templates	Available to all users who have permission to manage ABC Templates.
Engine Data Security	Data Permissions	Available to the fxadmin user ID. Use this option to manage permissions. Refer to Section 3: Data Permissions in this chapter.
	Data Domains	Available to fxadmin user ID. Use this option to manage domains. Refer to Section 4: Data Domains in this chapter.

It is important to note that each item in this list has the same four options when selected with a right-click.

Option	Description
Create	Enables the user to create a new entry within the given option.
Edit	Enables the user to modify an existing entry within the given option.

Option	Description
Remove	Enables the user to eliminate an entry within a given option. Note: in order for this to work all users must be unassigned from the entry.
Review Assignments	Enables the user to grant or revoke access to a given entry within a given option.

Section 3: Data Permissions

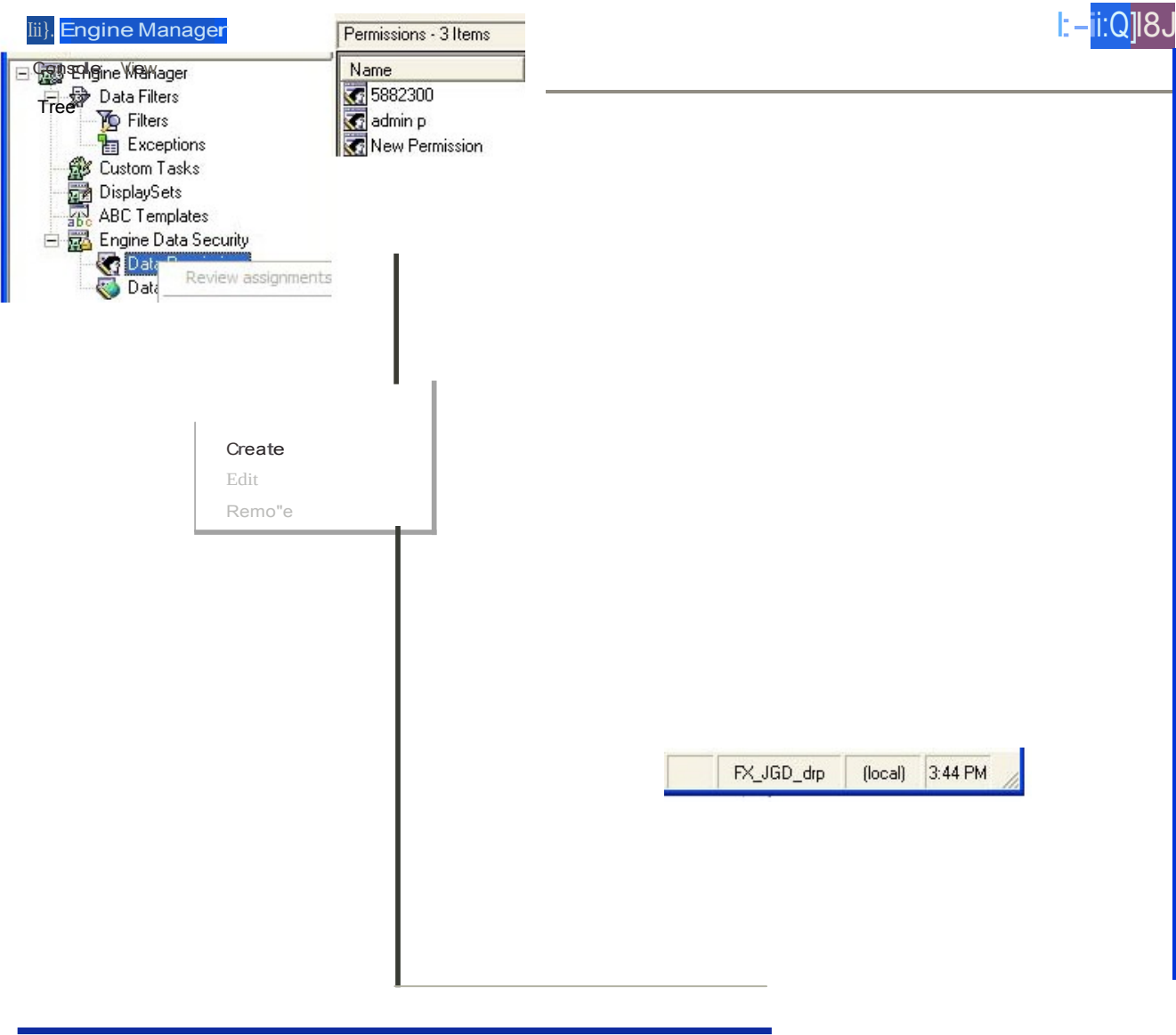
In order to retrieve data from the Living Master Scenarios, users must have permissions over the data and be assigned to use one and only one Data Permission entity. Only System Administrators have access to the security resources. The user must have access to the series of Living Master Scenarios in order to access them, If a user's permissions are set to allow it, users can access data from the Living Master directly; the data they will have access to from the Living Master will be defined by the Data Permission that is assigned to them.

Data Permissions are applied when users try to access Living Master or DTL Scenarios, they do not apply to owned or shared scenarios.

For additional information on Living Master Scenarios, see [Chapter 5 Demand Management Engine Database](#).

Note: *For information on User Permissions in the Planning Portal, see the Planning Portal Super User Guide.*

1. Right-click the Data Permissions resource and select Create.



The Filtering Wizard window displays.

Filtering Wizard

Expression Builder

Field List: Additional = Values

Additional Show Values Add Expression

Logic Operators and parenthesis

AND OR ()

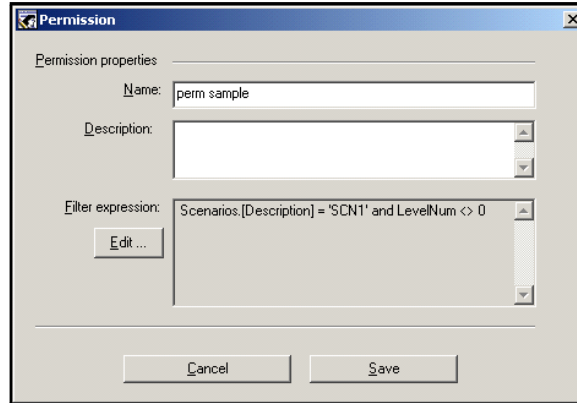
Filter expression

Show Results Parse Expression Clear Filter Count

Cancel Save

2. Click **Save**.

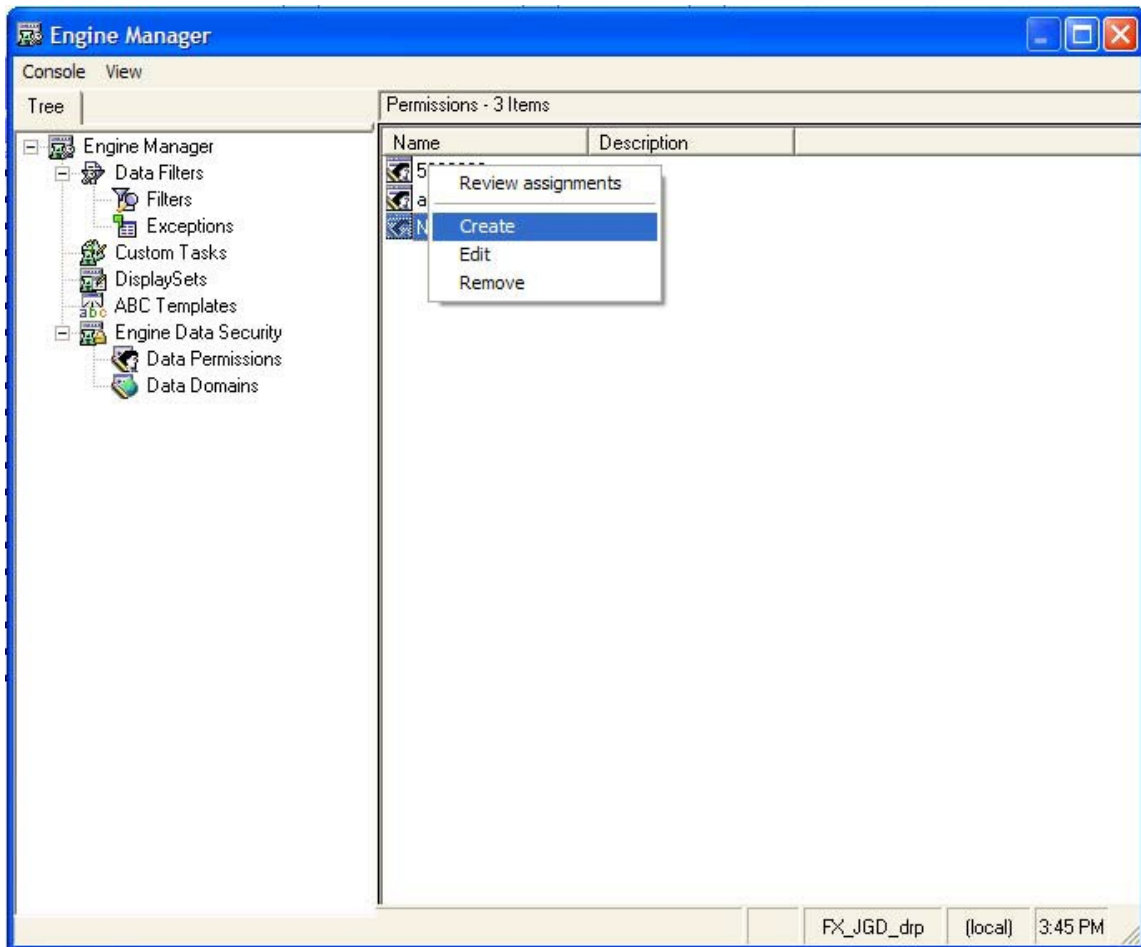
The Permission dialog box displays.



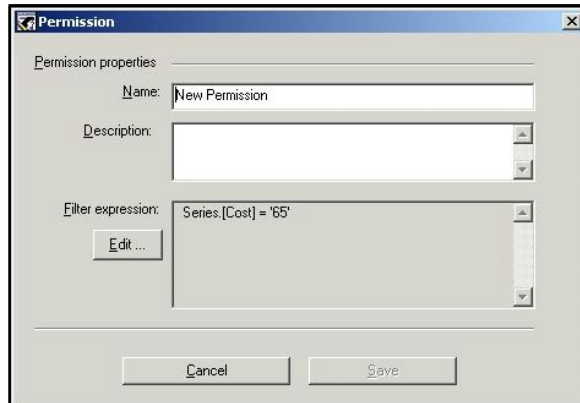
3. Enter a name for the permission in the **Name** textbox and click **Save**.

3-2: Edit an Engine Manager Permission

1. Right-click the **Permission** that requires the change from the list and select **Edit**.



The Permission window displays.



2. Click the **Edit** button.

The Filtering Wizard window displays.

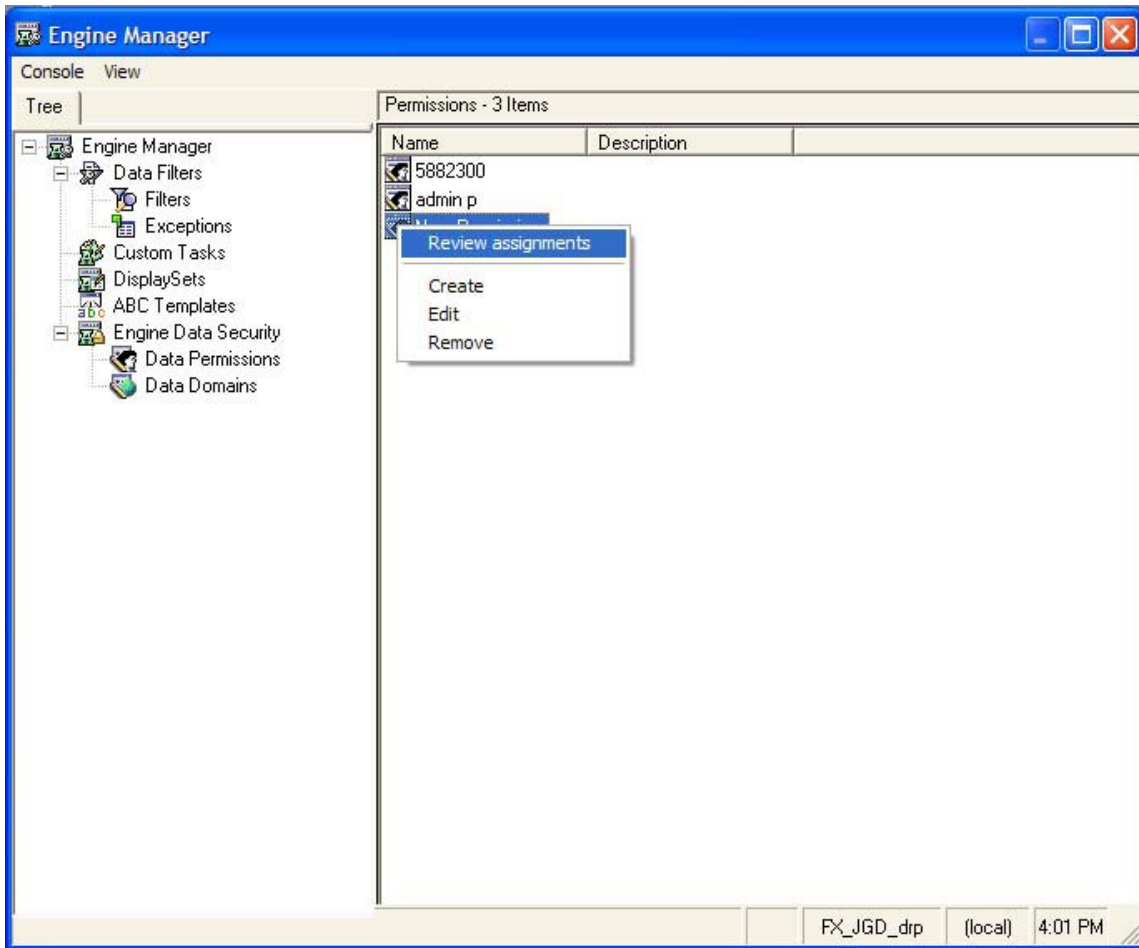
The screenshot shows the 'Filtering Wizard' window with a blue title bar and a close button. The window is divided into several sections:

- Expression Builder:** Contains a 'Field List' dropdown menu with 'Additional' selected, an equals sign operator, and a 'Values' dropdown menu. Below these are 'Show Values' and 'Add Expression' buttons.
- Logic Operators and parenthesis:** Contains buttons for 'AND', 'OR', '(', and ')'.
- Filter expression:** A large text area for entering the filter expression.
- Action Buttons:** A row of buttons labeled 'Show Results', 'Parse Expression', 'Clear Filter', and 'Count'.
- Footer:** 'Cancel' and 'Save' buttons.

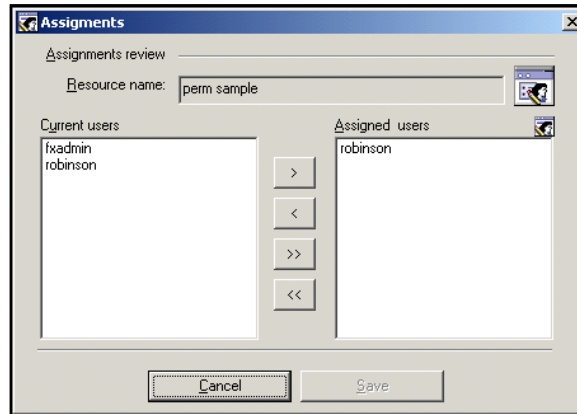
3. Modify the filter and click **Save**.

3-3: Assign the Engine Manager Permission to a User

1. Right-click the **Permission** that you want to assign from the list and click **Review Assignments**.



The Assignments window displays.



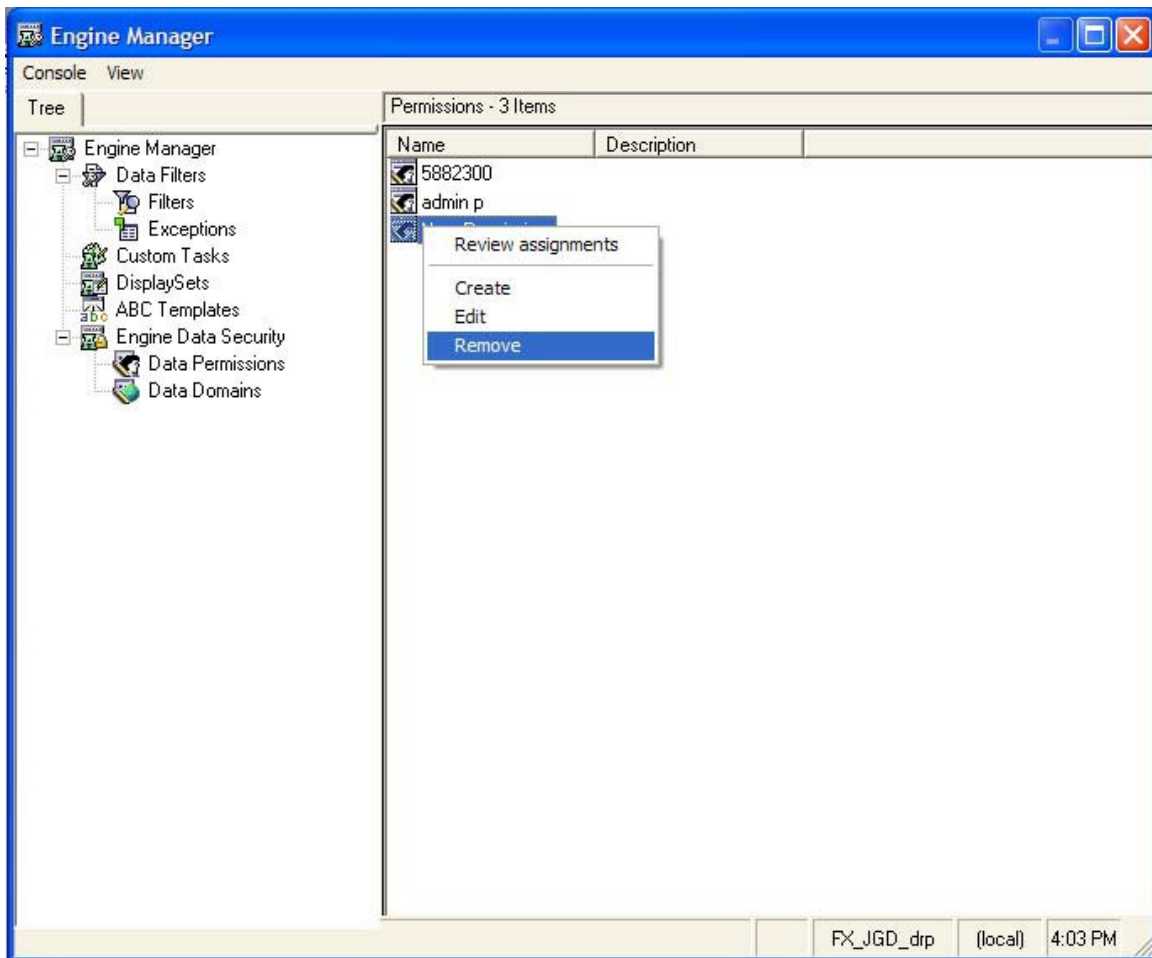
2. Select the users from the **Current users** textbox and move them to the **Assigned users** textbox.

Note: *A user can only be assigned to one User Permission. If you assign permission to a user with a previous permission assignment, the user loses the previous permission and acquires the new permission.*

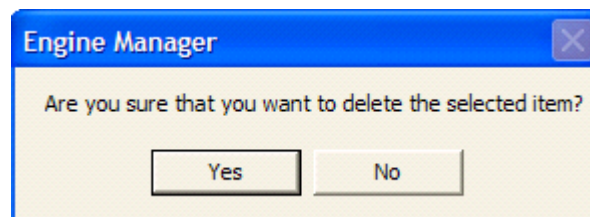
3. Click **Save**.

3-4: Delete an Engine Manager Permission

1. Right-click the New Permission and select **Remove**.



The following message displays.



2. Click Yes.

Note: *Once you remove the permission, you must reassign the permission or else the user does not have access to the Living Master Scenarios.*

Section 4: Data Domains

Data Domains are System Administrator-defined access rights to the Observation lines and the attributes for series; these permissions apply to what users have Read-only or Read-write access when accessing Living Master scenarios directly or when using their DTL Scenario. Access rights include which observation lines the user can see and whether or not those observation lines can be edited. For example, a domain may provide a user access to only the Value, FValue, Original, UserValue01, and ConvFactor01 observation lines, with Value and Original set as Read-Only.

Note: *A domain is used to protect the Living Master Scenario's data. Owned or shared Scenarios do not use domains. Data Domains are only required if a user has a DTL Scenario or if they are accessing a Living Master scenario directly. For additional information on Domains and Planning Portal, see the Planning Portal Super User Guide.*

4-1: Domain Properties Tab

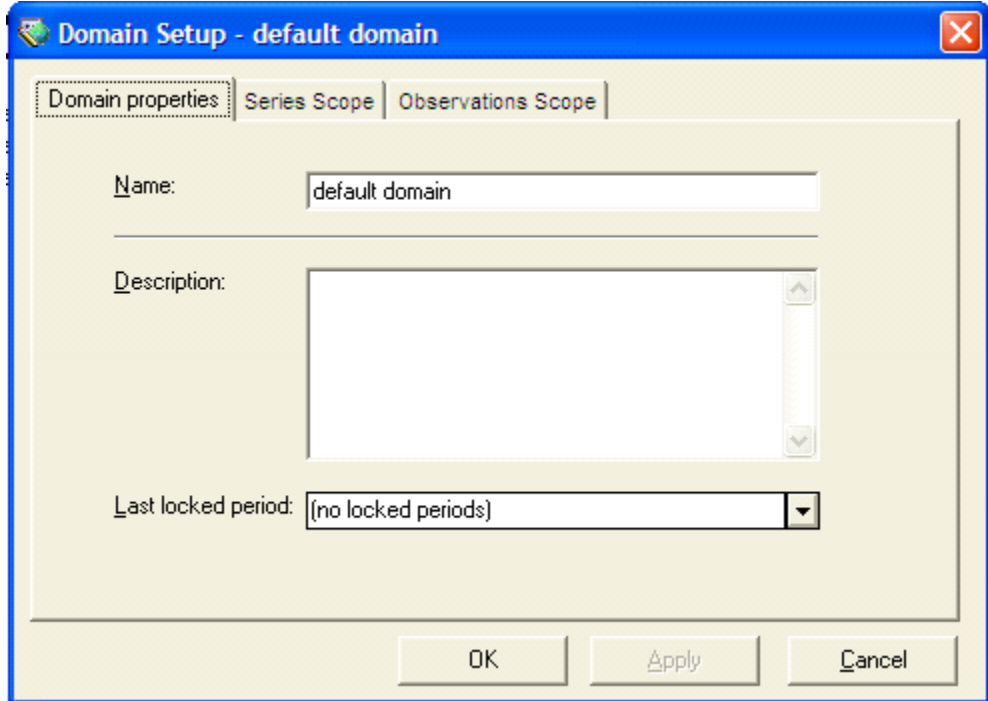
1. Click the **Data Domains** resource.

A Domain entity contains the following parts:

Domain Part	Description
Name	Name of the current domain.
Last Locked Period	A user cannot change the Opinion Lines in periods that come from a locked period or before the locked period. You can setup a user's domain that does not contain the last locked period.

When you create or modify a domain, there are three tabs used to specify the requirements.

Use the following tab to assign a name to the domain, for example Marketing Data and a description.



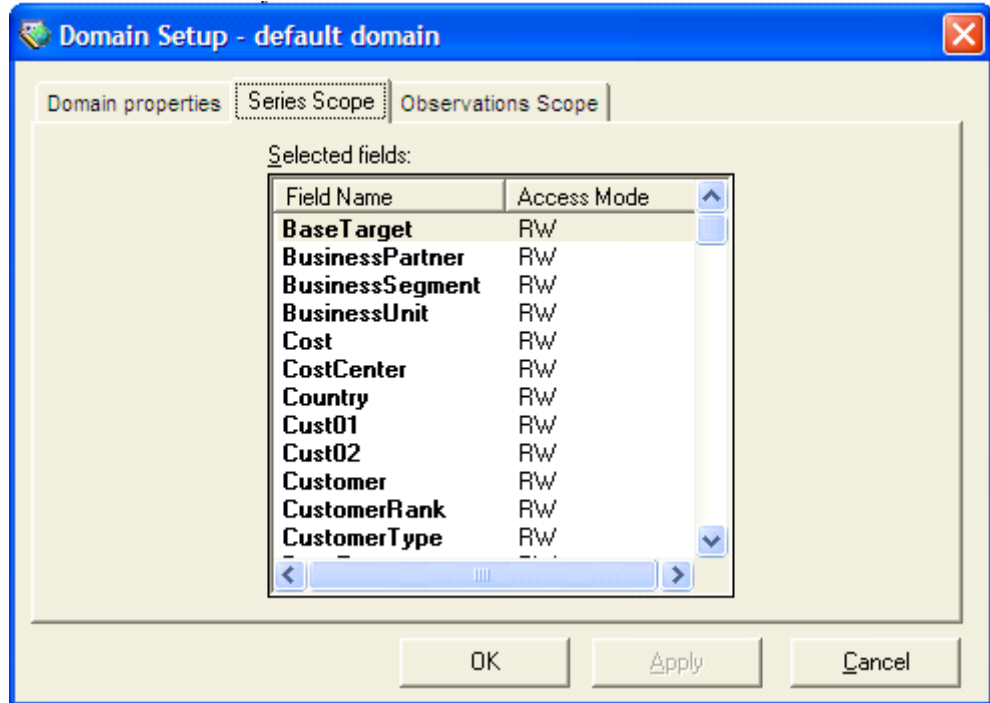
The screenshot shows a dialog box titled "Domain Setup - default domain". It has three tabs: "Domain properties", "Series Scope", and "Observations Scope". The "Domain properties" tab is active. It contains three main input areas: a "Name:" label followed by a text box containing "default domain"; a "Description:" label followed by a large empty text area; and a "Last locked period:" label followed by a dropdown menu showing "(no locked periods)". At the bottom of the dialog are three buttons: "OK", "Apply", and "Cancel".

The Last locked period textbox contains a predefined list of observations that you can specify as locked.

4-2: Series Scope Tab

The Series Scope tab identifies the Series attributes fields available for the user to view and edit. To change the access Mode for a field you must first select it then right-click on it and set the desired Access

Mode from the menu; you can also select multiple fields at the same time to change the Access Mode.



4-3: Observations Scope Tab

The Series Scope tab identifies the different Opinion Lines available for the user to view and edit. To change the access Mode for a field you must first select it then right-click on it and set the desired Access Mode from the menu; you can also select multiple fields at the same time to change the Access Mode

Domain properties

Series Scope

Observations Scope

available fields:

ActShipments

AvgEventValue

Backlog

ConllInterval

ConvFactor01

ConvFactor02

ConvFactor03

ConvFactor04

ConvFactor05

ConvFactor06

ConvFactor07

ConvFactor0B

ConvFactor09

ConvFactor10

CustomerOrders

ErlangB

>

<

>>

<<

Selected fields:

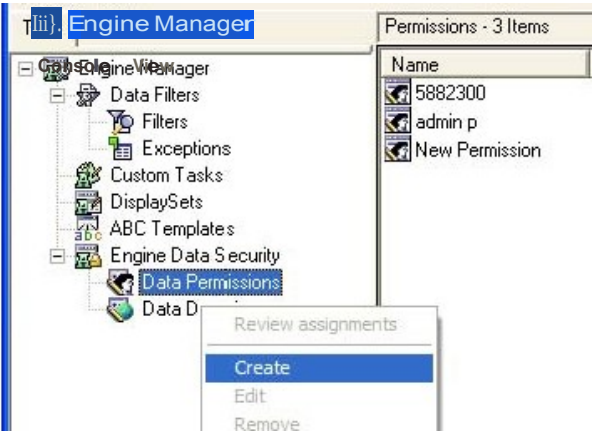
Field Name	Access Mode
ActShipments	RW
AvgEventValue	RW
Backlog	RW
ConllInterval	RW
ConvFactor01	RW
ConvFactor02	RW
ConvFactor03	RW
ConvFactor04	RW
ConvFactor0S	RW
ConvFactorOS	RW
ConvFactor07	RW
ConvFactorDB	RW
-	-

OK

Apply

ancel

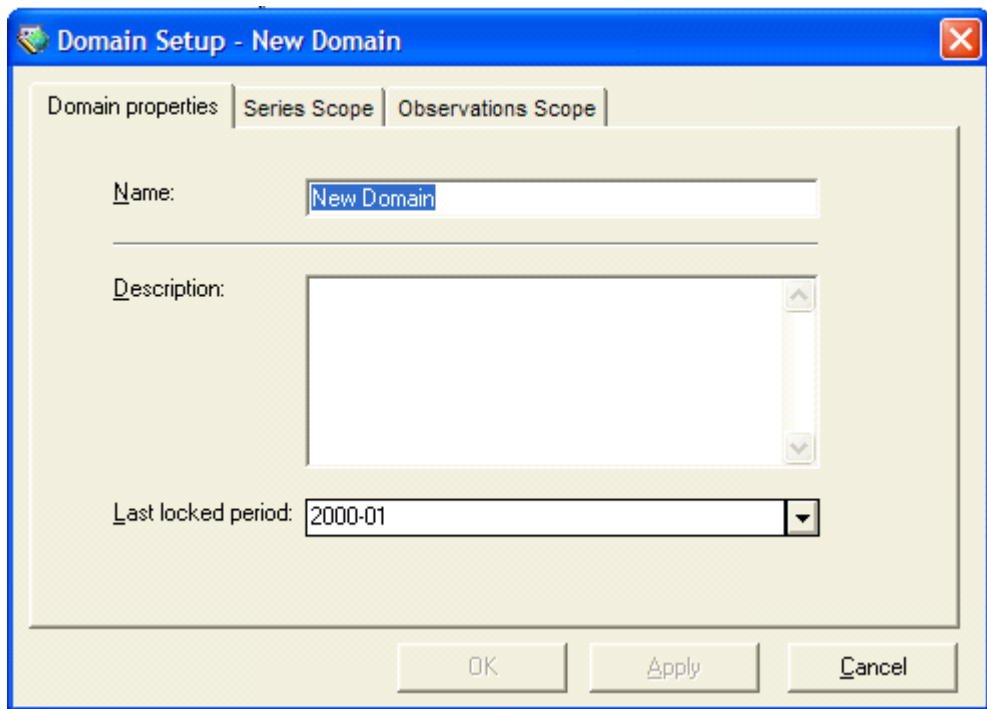
1. Right-click the **Data Domain** resource and select **Create**.



[-i:Q]18J

FX_JGD_drp (local) 4:05 PM

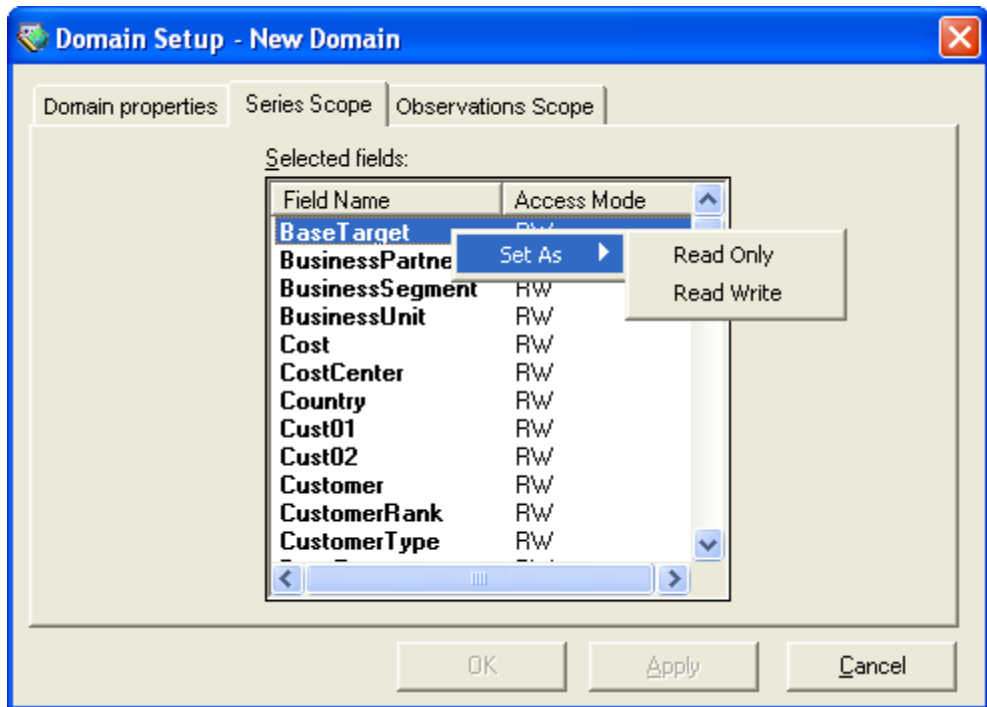
The Domain Setup window displays.



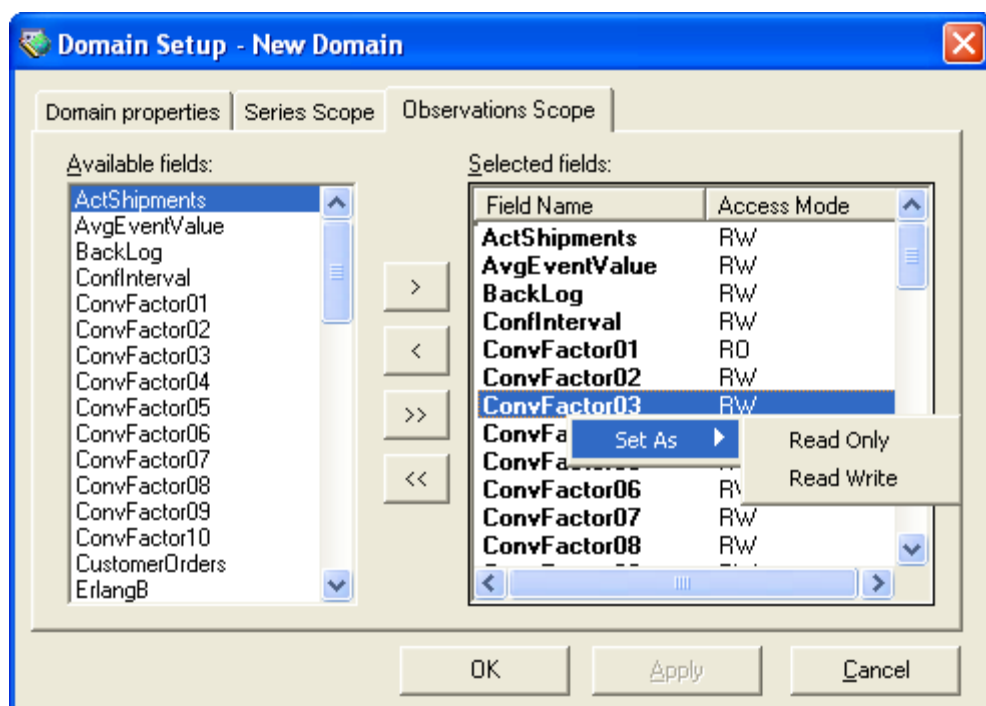
The screenshot shows a Windows-style dialog box titled "Domain Setup - New Domain". It has a blue title bar with a close button (X) in the top right corner. Below the title bar are three tabs: "Domain properties", "Series Scope", and "Observations Scope". The "Domain properties" tab is selected. Inside this tab, there are three input fields: a "Name:" text box containing "New Domain", a "Description:" text area which is empty, and a "Last locked period:" dropdown menu currently showing "2000-01". At the bottom of the dialog are three buttons: "OK", "Apply", and "Cancel".

2. Type in a **Name** and **Description** for the appropriate textboxes.
3. Click the **Last locked period** drop-down list and select the appropriate period and click **Save**.
4. Click the **Series Scope** tab. Here you can select which series attributes the user has access to read or write. You change an

attributes Access Mode by Right clicking on it and use the **Set As** menu to either **Read Only** or **Read Write**.



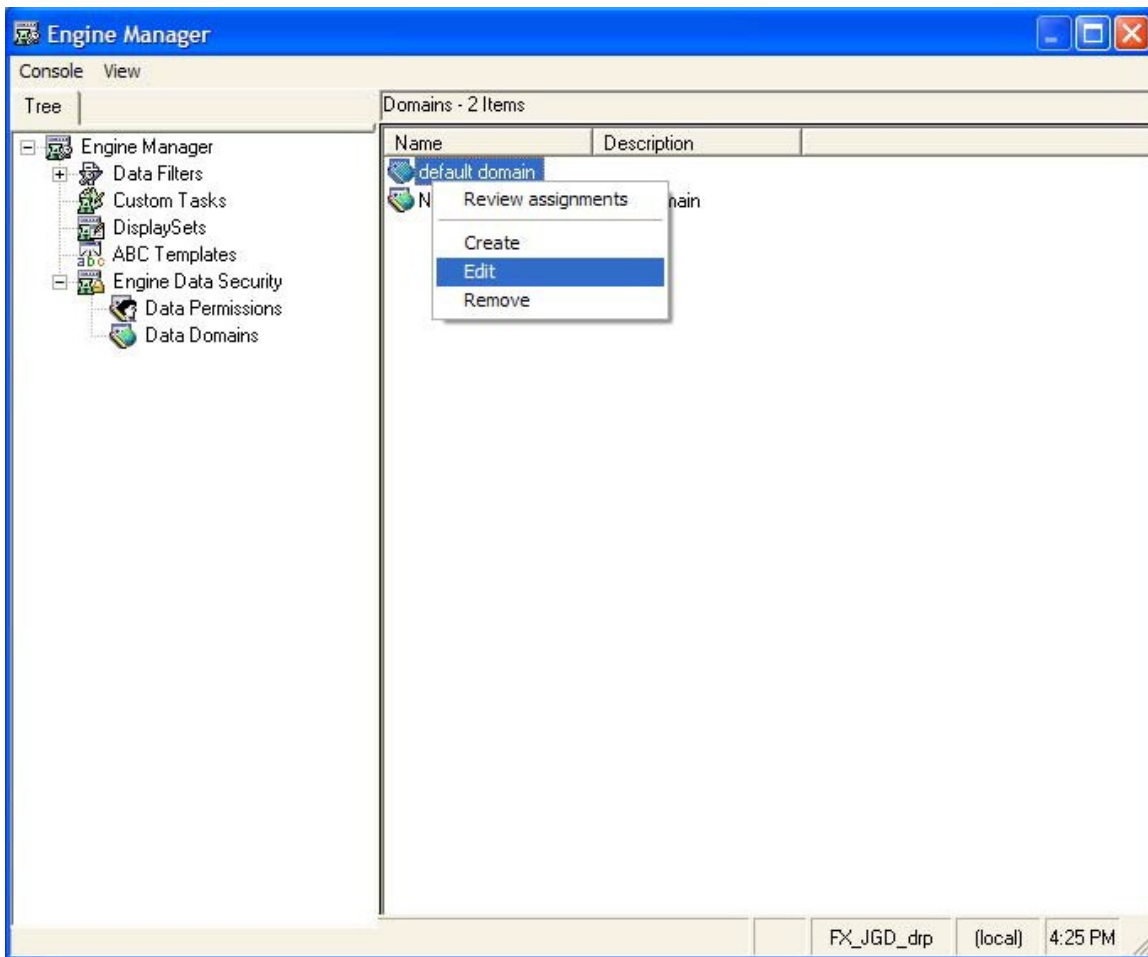
5. Click on the Observation Scope tab
6. Select the **Opinion Lines** required from the Available fields textbox and move the **Opinion Lines** to the **Selected fields** textbox using the buttons in the middle of the lists. The opinion lines in the Selected fields list will be the ones available to the users assigned to the Data Domain.
7. Select an **Opinion Line** from the Selected fields textbox. To change an opinion Lines Access Mode, right-click and select **Set As** and either **Read Only** or **Read Write** from the list.



8. Click OK to save the Data domain.

4-5: Edit a Domain

1. Right-click the **New Domain** you want to change and select **Edit**.



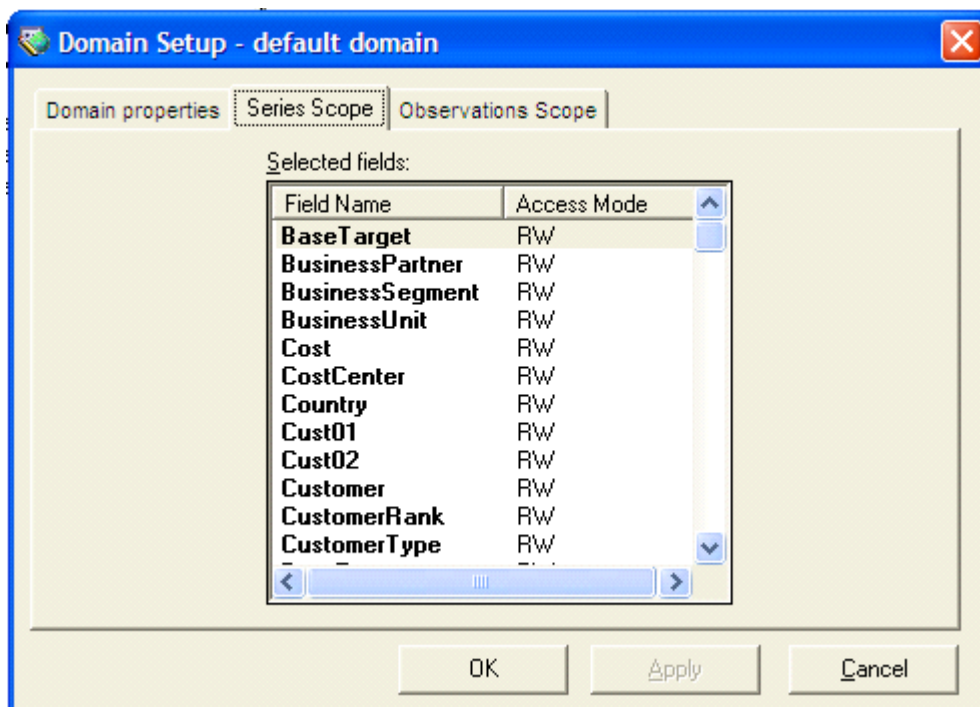
- 2.

The Domain Setup window displays.

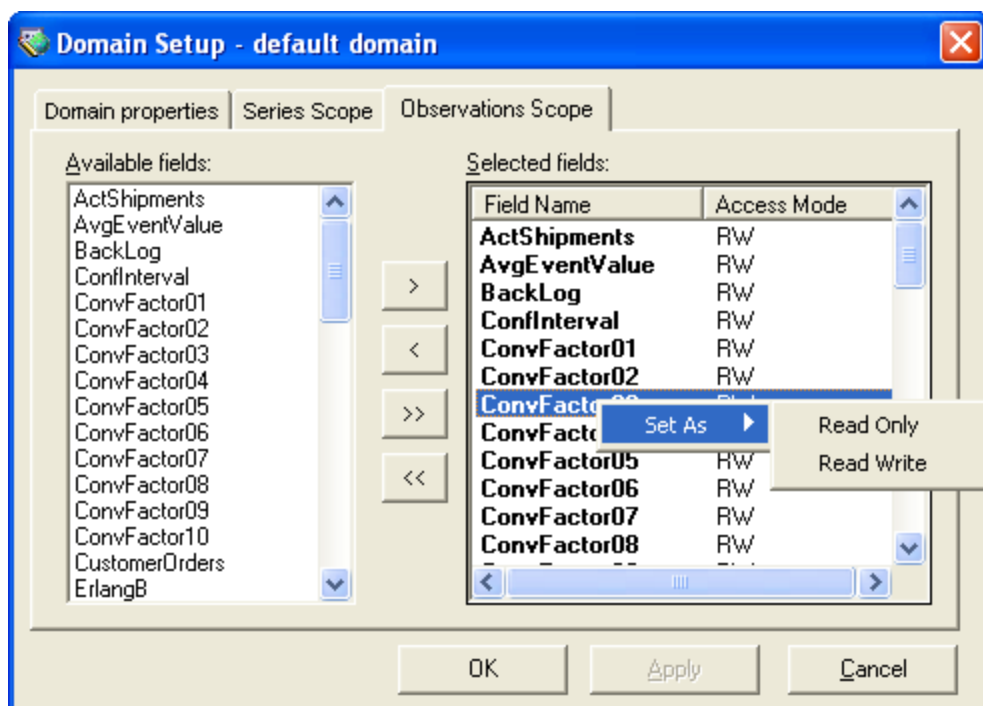
The screenshot shows a Windows-style dialog box titled "Domain Setup - default domain". It has three tabs: "Domain properties", "Series Scope", and "Observations Scope". The "Domain properties" tab is active. Inside the tab, there are three main sections: "Name:" with a text box containing "default domain"; "Description:" with a large empty text area; and "Last locked period:" with a dropdown menu showing "(no locked periods)". At the bottom of the dialog are three buttons: "OK", "Apply", and "Cancel".

3. Modify the required fields and click **OK**.

4. Click the **Series Scope** tab.



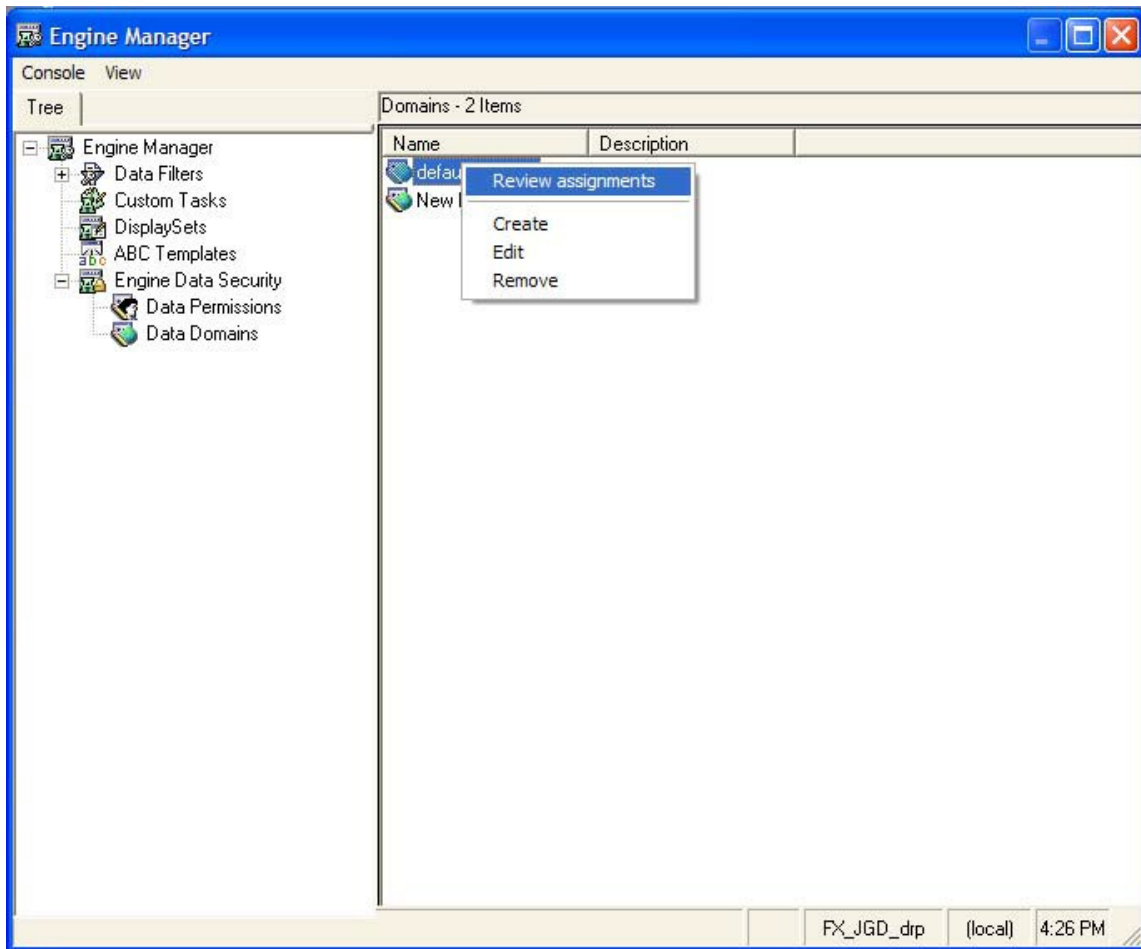
5. Modify the required fields and click **OK**. To change an opinion Lines Access Mode, right-click and select **Set As** and either **Read Only** or **Read Write** from the list.
6. Click on the Observation Scope tab
7. Select the **Opinion Lines** required from the Available fields textbox and move the **Opinion Lines** to the **Selected fields** textbox using the buttons in the middle of the lists. The opinion lines in the Selected fields list will be the ones available to the users assigned to the Data Domain.
8. Select an **Opinion Line** from the Selected fields textbox. To change an opinion Lines Access Mode, right-click and select **Set As** and either **Read Only** or **Read Write** from the list.



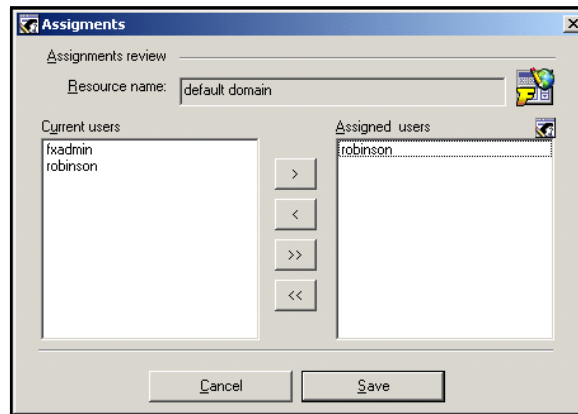
9. Click OK to save the Data domain.

4-6: Assign Domains to Users

1. Right-click over the **New Domain** and select **Review assignments**.



The Assignments window displays.

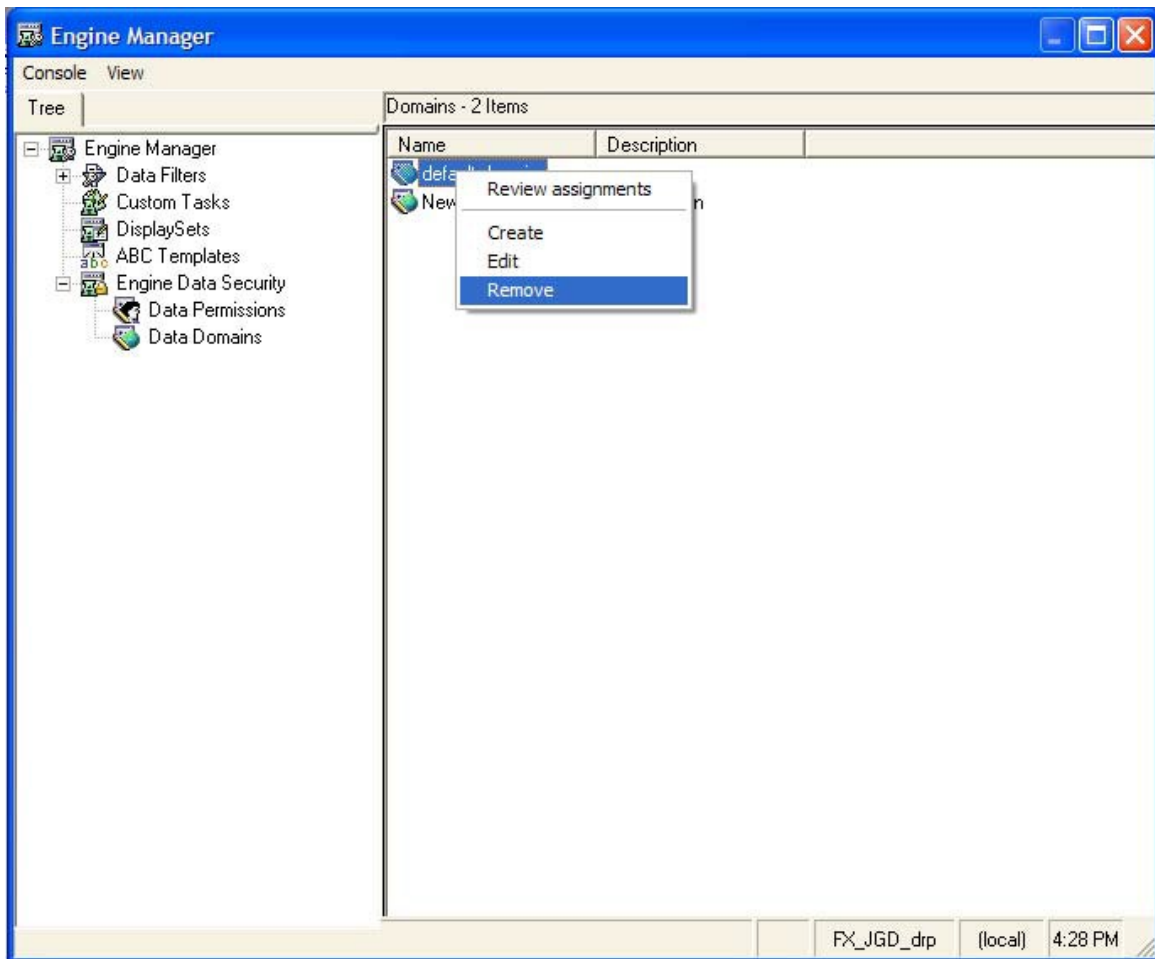


2. Select the **users** from the **Current users** textbox and move the **users** to the **Assigned users** textbox and click **Save**.

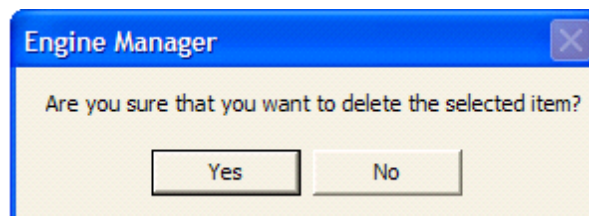
Note: *A user can be affected by only one domain.*

4-7: Remove Domains

1. Right-click the **New Domain** and select **Remove**.



The Engine Manager window displays.



2. Click Yes.

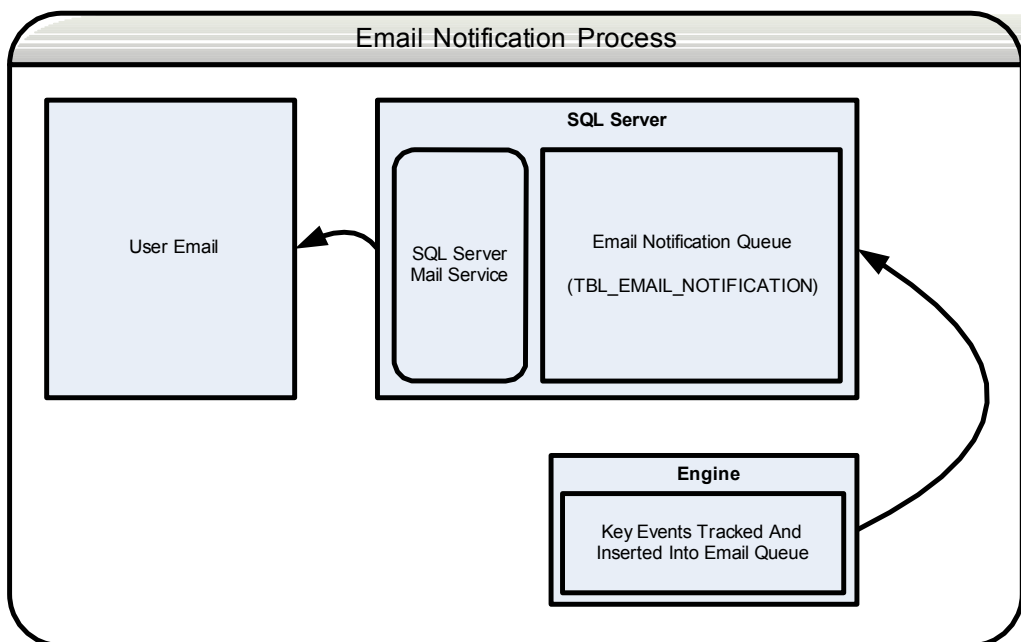
Chapter 7 Email Service

This chapter includes:

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Section 2: Email Service Management	153

Section 1: Overview

The Email Service provides email notification of any updates to users. The email notifications describe the event and action and enables users to update information, if necessary. The depiction below details displays the email workflow:



Email Service is used to notify a user when the following has occurred:

- DME has finished a Living Master Scenario.

- A Scenario is marked as disconnected.
- A Scenario is marked as connected.
- A user populates a DTL Scenario.
- A user commits a DTL Scenario.
- Forecast error report.
- Batch Process results.
- Exception results.

It is important to note that technical users can add their own messages into the email notification queue. By doing this, DME functionality can be extended to send a range of additional messages that provide additional information value to the Forecasting process.

Section 2: Email Service Management

2-1: Email Service Setup

The DME Mail can use the SQLMail (Available in SQL 2000 and SQL 2005) and Database Mail (only available in SQL 2005) to perform its operations. The list below details the prerequisites necessary to use the Email Service:

- An email profile exists on the SQL Email Service.
- A Mapi profile must be configured in the mail option of the control panel using the mail service.
- SQL Server Agent is running.
- SQL Server Mail is running properly with a valid email profile.

For additional references on how to launch the SQL Server Email Service refer to SQL Server documentation.

Note: *The SQL Server 2000 or 2005 sql mail supports an extended mapi.*

2-2: Configure DME Email Service

The DME Email Service is a JOB that is scheduled to run periodically. Usually, the job runs every few minutes. This job executes a stored procedure that sends a message, to check if it exists in the Email Service queue.

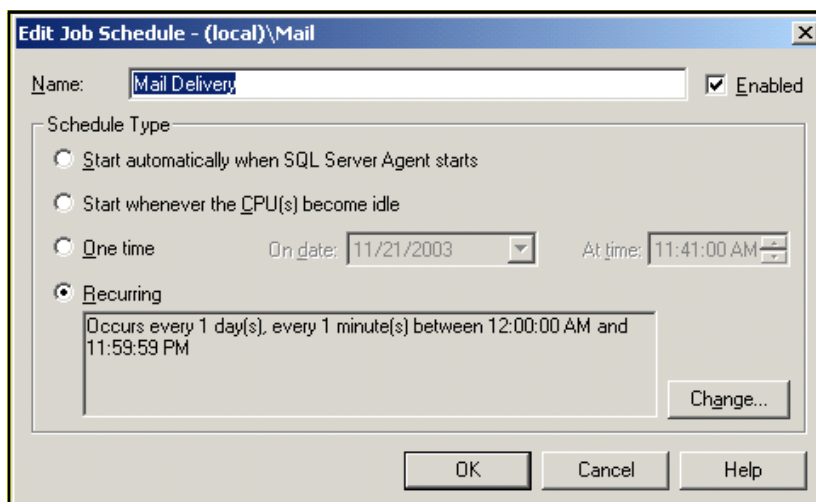
Messages are stored in the TBL_EMAIL_NOTIFICATION table. This table stores a flag along with the message. If the flag has a value of 1, the message was processed. If the flag has a value of 0, the Email Service has not processed the message.

For maintenance purposes you can check that table and remove the old messages. For details please check database maintenance section of this document.

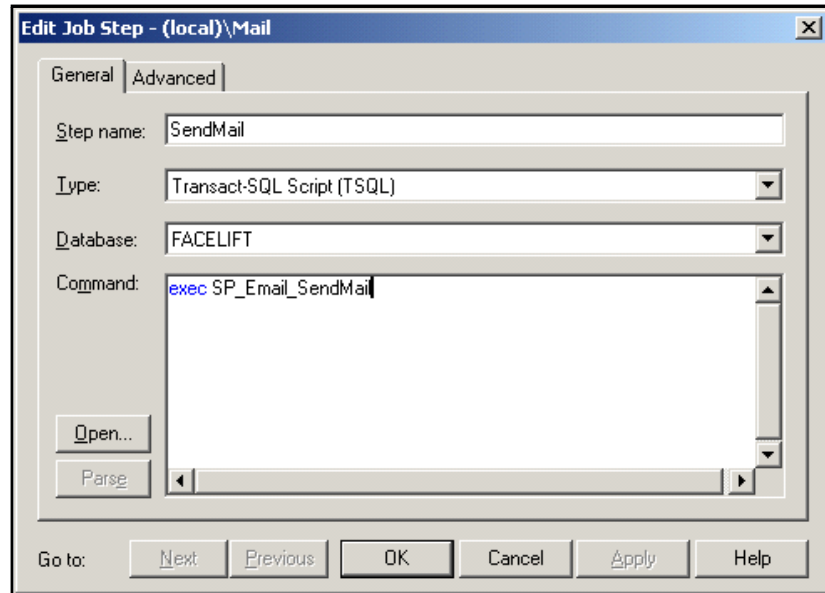
2-3: Start the DME Email Service

1. Create a **SQL Server JOB**.

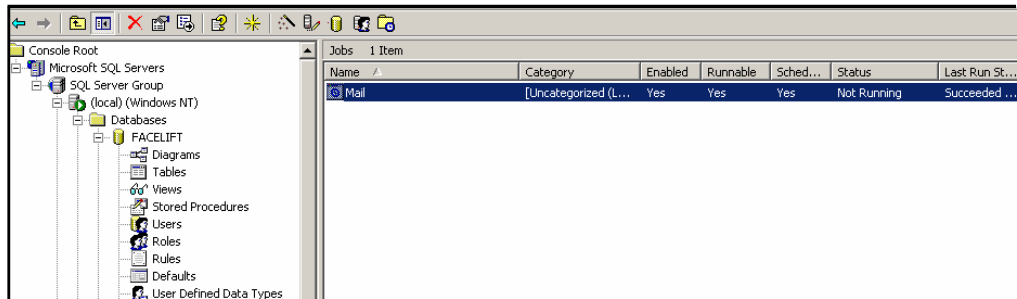
The JOB must be scheduled to run periodically, such as every one minute. The depiction below is an example.



2. Specify the JOB to run the Stored Procedure SP_Email_SendMail. Run the task against DME Database (default is FX_JGD). The depiction below is an example.



The following window displays.



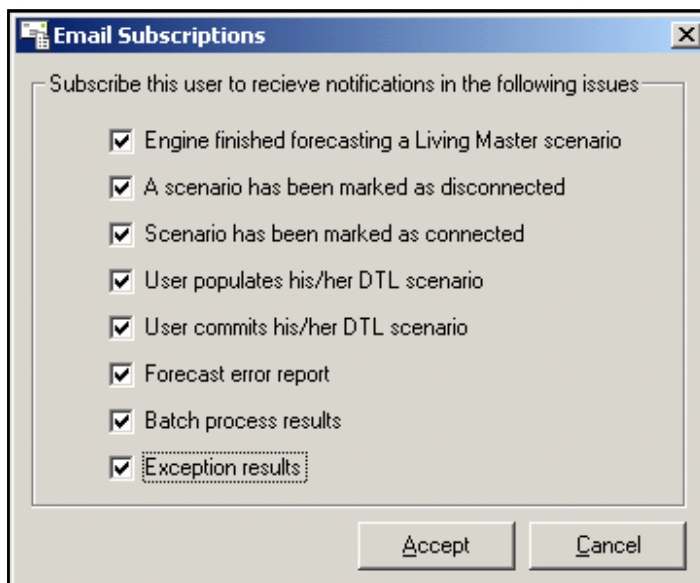
2-4: Setup an Email Account

Users must have a valid email addresses to receive email notifications. The ForecastX Administrator (fxadmin) can specify the email account when editing a User's Properties. For additional information, see [Chapter 3 Creating and Managing Users](#).

2-5: Email Subscriptions

A user can receive email notifications for specific events. A user can also receive customized data that may be of interest to them.

You can configure up to eight events that define the email subscriptions for users.



The following table summarizes what each subscription option means:

Issue	Description	Email Content
Engine finished forecasting a Living Master scenario	The forecasting process is complete and run against a Living Master Scenario.	The user receives the first 20 items and the total forecast. Only users that have access to the items and the total forecast may receive the notifications. Refer to Chapter 3 Creating and Managing Users for additional information.

Issue	Description	Email Content
A scenario has been marked as disconnected	A user chooses to disconnect from the server.	The Scenario name was marked as disconnected. Refer to Chapter 21: Disconnect Mode in the DME User Guide for additional information.
Scenario has been marked as connected	A user connects to server.	The Scenario was marked as connected. Refer to Chapter 21: Disconnect Mode in the DME User Guide for additional information.
A user populates the DTL scenario	A user has populated data in the DTL Scenario.	The user receives the first 20 items and the total forecast. Only users that have access to the items and the total forecast may receive the notifications. Refer to Chapter 3 Creating and Managing Users for additional information.
A User commits his/her DTL scenario	A user has committed data in the DTL Scenario.	The user receives the first 20 items and the total forecast. Only users that have access to the items and the total forecast may receive the notifications. Chapter 3 Creating and Managing Users for additional information.
Forecast error report	Errors have occurred during forecasting a Scenario.	Error report.
Batch process results	Batch scheduler sends the status of the processes.	Process status, errors and exceptions.

Issue	Description	Email Content
Exception results	System detects which series now fulfills the exception and which fields no longer fulfills the exception. Note that the first time that an exception runs, all series will sent as new series.	Subscriber receives the items in the following way: List of NEW items that fulfills an exception List of items that no longer fulfills the exception Note that items that already fulfill the exceptions are not sent. To determine the new items that fulfill the exception, the DME keeps a list of the items from the previous exception execution. That list is compared with the actual exception list.

2-6: User Email Initiation

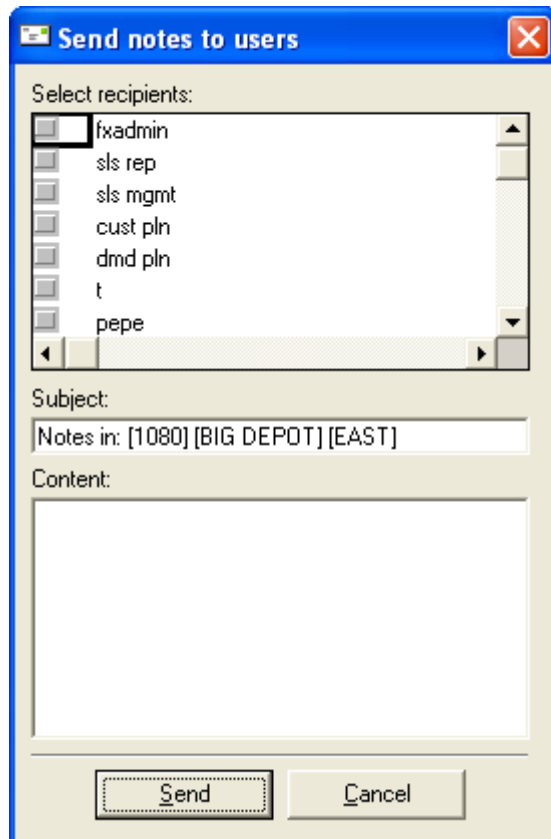
A user can send email to other users.

1. Right-click on Notes Control.

2. Click Send Item Notes

The Send notes to user window is displayed.

3.



4. You can select which user to send the notes to, and also fill out the contentst of the message.
5. Click Send to send the e-mail.

Chapter 8 Configuring Statistical Forecast

This chapter includes:

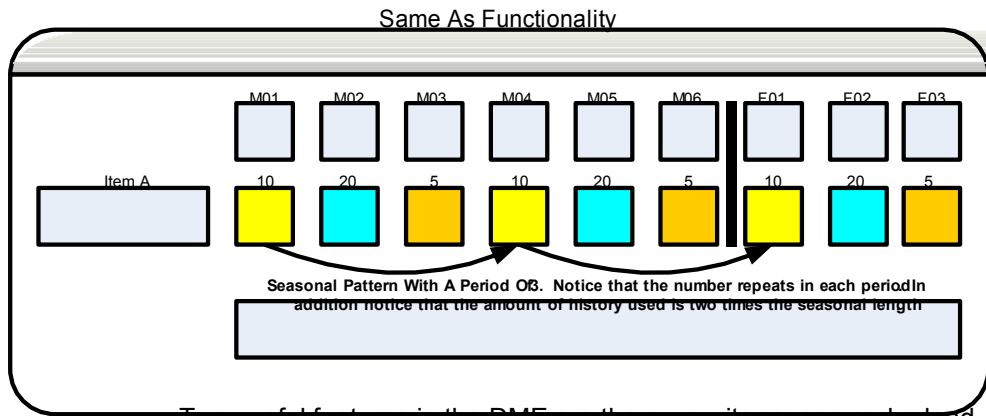
Section 1: Overview	160
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Section 4: Reload Options	165
Section 5: Freeze Scenario	166
Section 6: Forecast Overwrite Range.....	166
Section 7: Reload Series	168
Section 8: Incremental Update	168
Section 9: Including New Items in the Forecast	169
Section 10: Include New Items Using the Batch Scheduler ..	171

Section 1: Overview

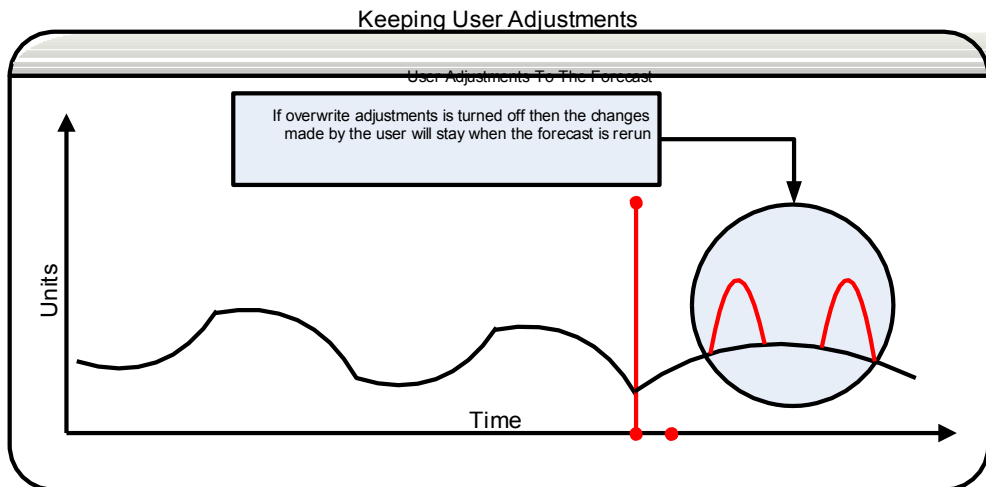
The DME provides the following configurations to assist you with defining the most accurate forecasts and simple forecasting processes.

Seasonality provides the ability to signal to the DME that there may be patterns within the data. In general, it requires two times the seasonal length of data to generate an accurate Forecast. When using monthly data, it will take at least 24 months of data to generate a good seasonal Forecast. Seasonality can also be generated with

smaller data sets. The following diagram illustrates seasonal patterns:

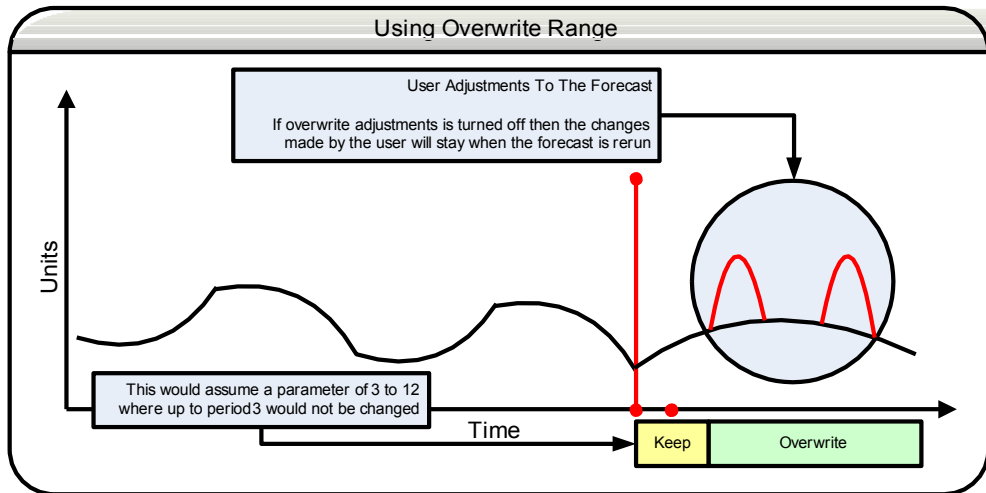


Two useful features in the DME are the overwrite ranges and reload option. These parameters enable you to control the information that is overwritten when a Forecast is run. The depiction below details how these options affect the Forecast:



Notice that all the non-adjusted values are overwritten when the Statistical Forecast is rerun. To save the values, use the overwrite range. This feature assumes that if users have reviewed a Forecast, they have tacitly agreed to the result. To change those numbers with a new forecast means that the numbers that the user had approved

would no longer be in place. Using the overwrite range prevents this from happening. The depiction below details this point:



Both the Overwrite Adjusted Forecast and Forecast Overwrite range are used in combination to provide a stable forecast that can be adjusted. This chapter details the configuration parameters that can be set for the Forecast.

Section 2: Seasonality

When using the DME, you can indicate if your data is subject to seasonality. Although the DME can automatically detect seasonality, utilizing the Seasonality feature provides the most accurate Forecast results.

2-1: Select Seasonality

1. Enter the seasonality in the **Seasonality** field on the **Data Capture** tab.

The screenshot shows the 'Base Unit' window with the 'Data Capture' tab selected. The 'Scenario' dropdown is set to 'DRP-Daily'. The 'Data Source Name' text box contains 'DemoData.xls'. The 'Tables/Queries' dropdown is set to 'tbl_repl_data'. Under 'Data Organization', the 'Rows' radio button is selected. The 'Seasonality' spinner box is set to '2', and the 'Forecast' spinner box is set to '0'. The bottom toolbar includes icons for help, data source, user, save, and navigation, along with 'Advanced' and 'ProCast!' buttons.

For example, if data contains quarterly seasonality, enter four (4) in the Seasonality textbox. Alternatively, you can use the up and down arrows next to the textbox.

Section 3: Forecast Periods

You can specify the number of periods you want the DME to include in the Forecast. The DME defaults to 12 periods and can forecast up to 999 periods.

3-1: Set the Forecast Periods

1. Enter the **number of periods** in the **Forecast** textbox.
Alternatively, use the up and down arrow buttons to increase or decrease the number of periods.

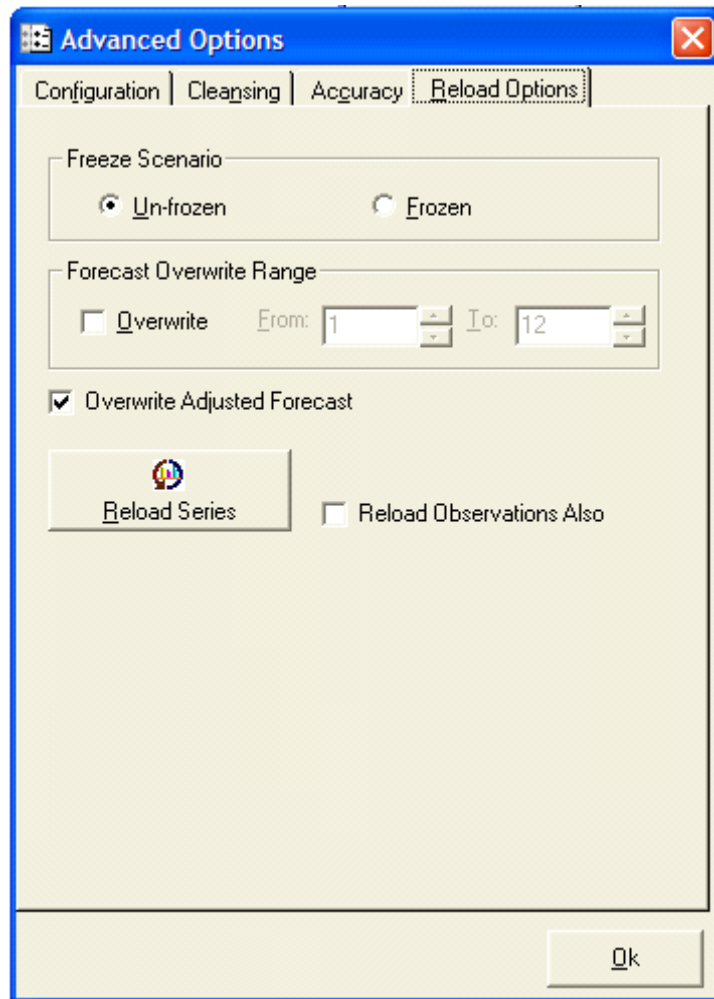
The screenshot shows the 'Base Unit' dialog box with the 'Data Capture' tab selected. The 'Statistics' and 'Reports' tabs are also visible. The 'Data Capture' tab contains the following fields and controls:

- Scenario:** A dropdown menu set to 'DRP-Daily' with a right-pointing arrow button.
- Data Source Name:** A text box containing 'DemoData.xls' with a right-pointing arrow button.
- Tables/Queries:** A dropdown menu set to 'tbl_repl_data' with a right-pointing arrow button.
- Data Organization:** Two radio buttons, 'Columns' (selected) and 'Rows'.
- Seasonality:** A numeric spinner box set to '2'.
- Forecast:** A numeric spinner box set to '0'.

At the bottom of the dialog box, there is a toolbar with icons for help, data source, and other functions, followed by 'Advanced' and 'ProCast!' buttons.

Section 4: Reload Options

Reload Options is the fourth tab on the Advanced Options window. These options affect the reloading of data for each Scenario.



1. In the Freeze Scenario area, select Un-frozen or Frozen.
2. In the Forecast Overwrite Range, check the Overwrite checkbox if you would like to overwrite the forecast.

If the Overwrite box is selected, the From: and To: textboxes will become active. Choose the range.

3. Check the “Overwrite Adjusted Forecast” checkbox if you would like to overwrite the Adjusted Forecast.
4. Click OK when finished.

Section 5: Freeze Scenario

When some properties of a Scenario change, the DME must reload the Scenario in order for the changes to take place. Reloading the Scenario removes all the existing forecasted values and modifications. The Freeze Scenario option enables users to freeze those properties of a Scenario, which prevents the DME from reloading the Scenario. When a Scenario is frozen, you are unable to reload a Series or adjust any of the configuration options associated with the reloading series.

When a Scenario is frozen, the following configurations are Read-Only:

- Dates
- Series Configuration (Labels, Observations, Series Properties)
- Remove Trailing and Leading Zeros
- Outliers and Missing Values
- Grouping

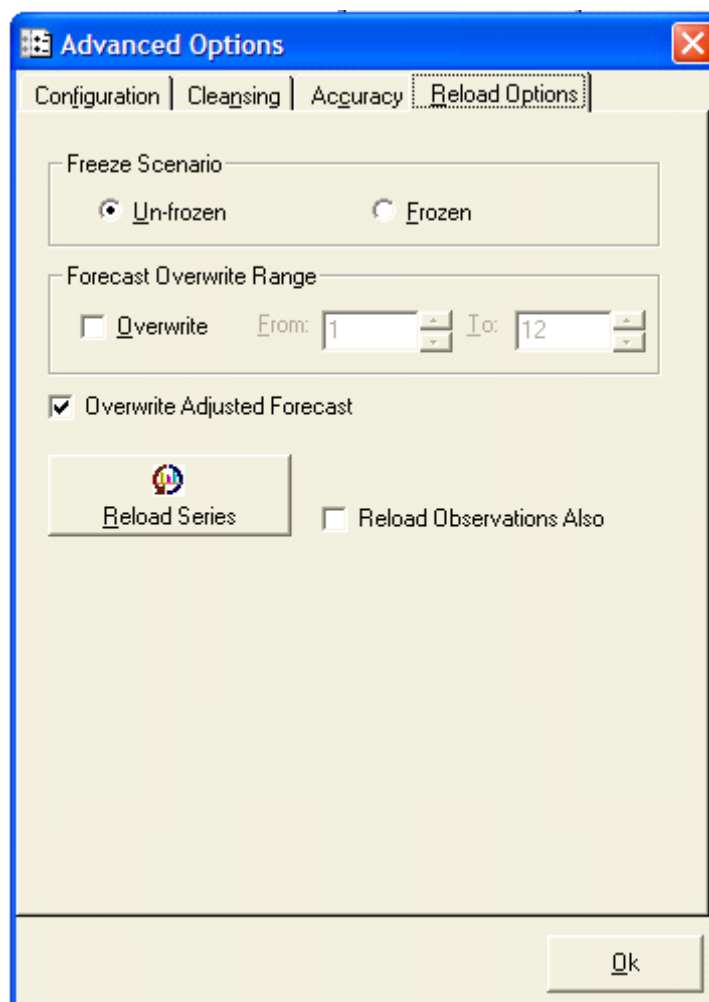
The option to Freeze Scenario is available on the Advanced Options window on the Reload tab.

Note: *With shared Scenarios, users only have the capability to freeze or unfreeze Scenarios where the System Administrator grants permission in User Preferences.*

Section 6: Forecast Overwrite Range

The Forecast Overwrite Range function enables users to select a specific forecast range that can be overwritten with a new system

generated Forecast. The Forecast is overwritten when the Historical Data is re-forecasted. You can select the Overwrite checkbox to turn this option on or off and set the overwrite range using the To and From fields. The advantage of this feature is that you overwrite only a specific range while keeping another part of the forecast.



The minimum value is 1 and the maximum value is the total number of forecasted periods.

Section 7: Reload Series

The Reload Series button removes all of your existing data, including all modifications, and then reloads the series. After reloading the series, the DME automatically reloads all the observations, and then the forecast when you click the Procast button.

In order to reload the observations without a forecast or any changes to the original data, select the “Reload Observations Also” check box.

1. Enter **0** in the **Forecast Period** textbox.
2. **Uncheck** the following options:
 - Replace Outliers
 - Replace Missing Values
 - Remove Zero Values
 - Convert negative value to 0
3. Click the **Procast** button to load the observations.

Section 8: Incremental Update

The latest Historical data is usually available at the beginning of each Forecasting cycle and will directly affect the accuracy of the forecast. Including this new information in the new forecasting cycle is called an incremental update.

One straight forward way to include the latest Historical data in a Scenario is to change the observation configuration and reload the data. However, this process also removes all the existing forecasted values, including any modifications. In most cases, this is not an acceptable solution. In order to allow users to apply the most recent Historical data to an existing, established Scenario without losing the existing forecast and modification, the DME introduced the Incremental Update feature in the Batch Scheduler component. For additional information see [Chapter 11 Batch Scheduler](#).

Section 9: Including New Items in the Forecast

Business changes and grows every day. This means there is always a demand to include new items in the forecasting data pools. These new items may be new customers, new stores, or new products.

Similar to the incremental update process, users can also include the new items by reloading the data for a Scenario. However, this process also removes any existing forecasted values including all the modifications. In most cases, this is not an acceptable solution. The DME provides several ways to include new items for an existing Scenario without losing the forecasted values and modifications.

9-1: Clone

In the Viewer, use the Clone feature to provide a new name for an existing series. Modify the new series with the properties of the new item and the new values. This method is straightforward, but it is not efficient for a large number of new items. For additional information on cloning a series and editing a series, see [Chapter 7 Viewer](#).

9-2: Copy/Move

In the Viewer, you can copy or move one or more series from one Scenario to another Scenario. Use Copy/Move to include new items in an existing Scenario. First, create a Scenario to load all the new items and then use the Viewer to Copy/Move all the items in this new Scenario to an existing Scenario. This method is more efficient than the Clone method, but it requires the user to identify the new items from their source data. For more information of copying/moving series, see [Chapter 7 Viewer](#).

9-3: New Series

The New Series feature is used to create new series into your data. The following configurations need to be set in order for this feature to work properly:

- The Scenario must have a Display set applied to it.

- The applied Display Set must have at least one Series Attribute configured in the Label Column. This new label column indicates which series attributes are used, and in which order, to form the Description fields for your series. Generally, you would want these fields configured as labels to be the same as the ones you configured in the labels section in the Base Unit.

1. From the main toolbar in the DME, go to Edit > New Series.

The Create New Series window displays.

Create New Series

Fields

Item [] [v] ...

Store Number [] [v] ...

Region [] [v] ...

New Series Options

☒ Copy Obs from Series [] [v] ...

☐ Initial Obs to 0

Historical Periods: 36 [v]

Check Unique Create Cancel

2. Provide information in the fields to define a new unique series. You can populate the drop-down list with the values from all other existing series by pressing on the "...". When finished, you can verify that the series is unique by pressing the "Check Unique" button.

3. In the New Series Options section, select one of the following to indicate which observations will be used for the new series.

Observation	Description
Copy Obs from Series	Allows you to select an existing series from the scenario and copy the observations from that existing series to the new one.
Initial Obs to 0	The new series observations are initialized to zero. You will then need to provide the amount of historical periods you want to create for the new series.

4. Click Create.

Section 10: Include New Items Using the Batch Scheduler

Using the Batch Scheduler, select the Mass Observation Update from the menu. Use the **Send New Item to Scenario** option to include items for an existing Scenario. This option works in a standalone or with an Incremental Update process. This method is similar to Copy/Move. The advantages of using this option are:

- No user interaction
- A user does not need to identify the new items from the source data.

For additional information, see [Chapter 11 Batch Scheduler](#).

Chapter 9 **Forecasting Data Cleansing and Forecast Accuracy**

This chapter includes:

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Section 3: Data Cleansing	178
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Section 5: Forecast Techniques and Methods	183
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Section 7: Group Forecasting	203

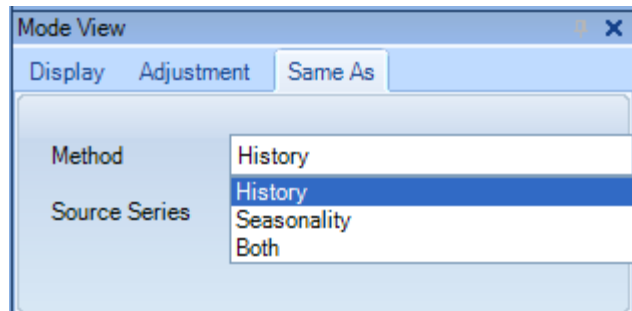
Section 1: Overview

This chapter details how to use the following features:

- Same As
- Data Cleansing
- Forecast Accuracy
- Forecast Techniques and Methods
- Regression Methods
- Group Forecasting

Section 2: Same As Method

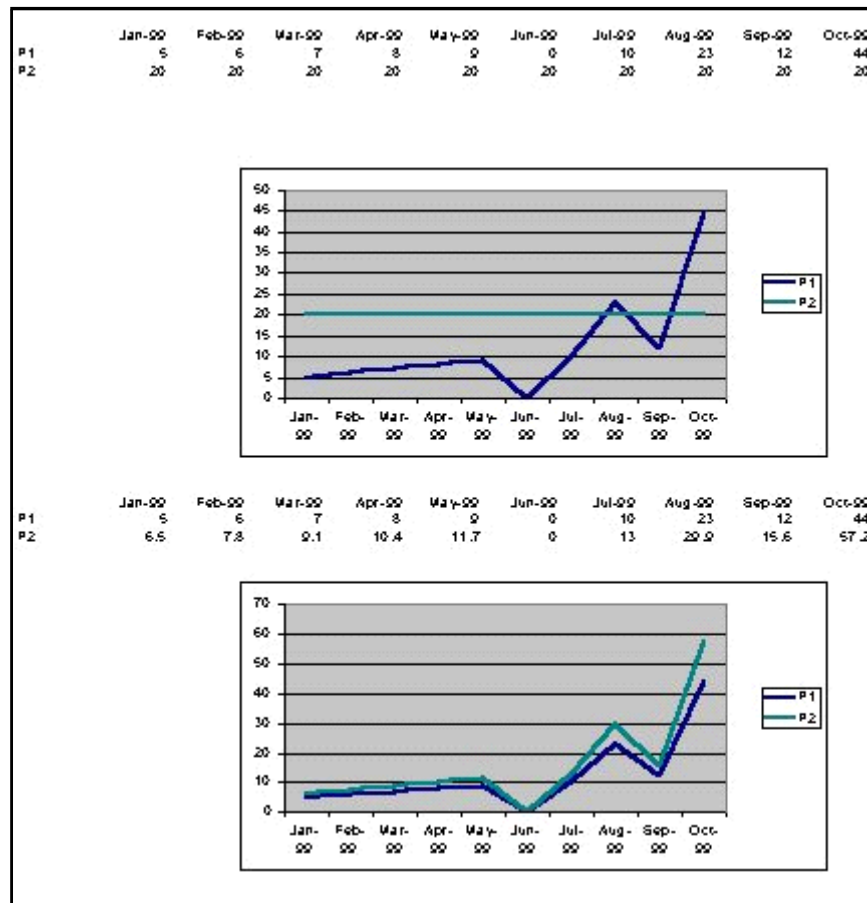
There are two types of Same As methods from the Method drop-down in the Mode View window. When you configure Same As values, they do not take effect until you run the Forecast.



2-1: Same As History

Same As History affects the product's history. The Same As History function enables you to replace one product's history with another product's history by a certain percentage.

For example, if you have three products P1, P2, P3, you can indicate that P2's history is 30% of P3's history, and P1's history is 15% of P3's history.



2-2: Same As Seasonality

The Same As Seasonality feature enables you to replace one product's Forecast with another product's Forecast to simulate data for products with similar properties. Same As Seasonality affects the product's Forecast.

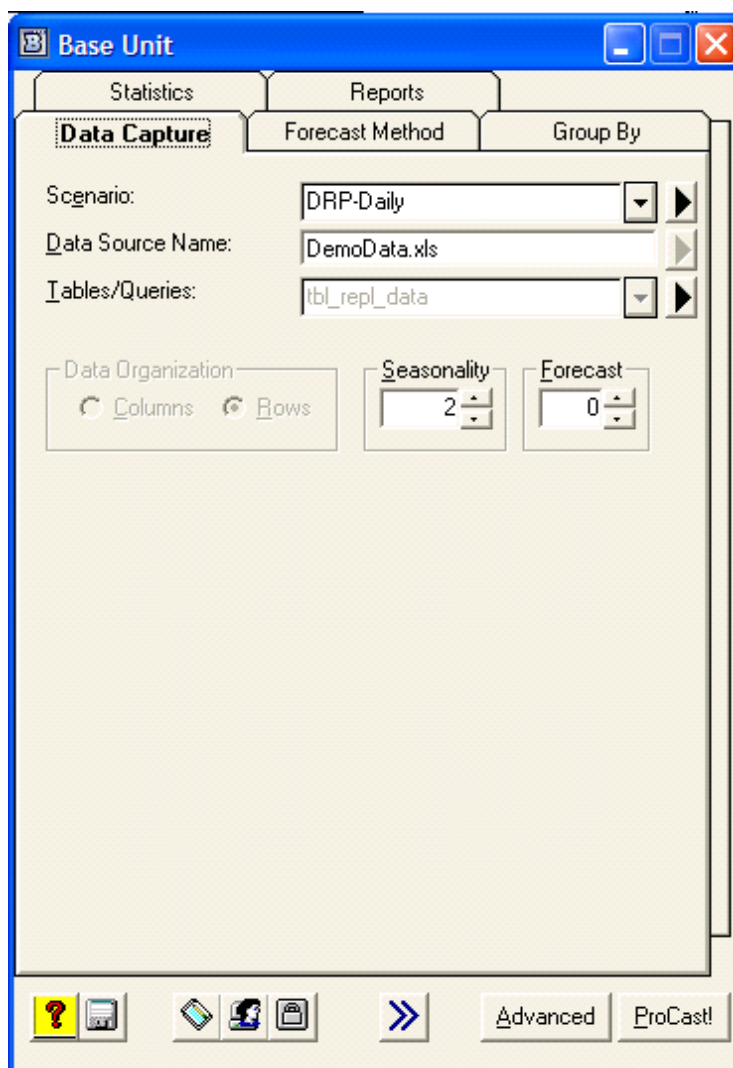
For example, if you have products P1, P2, P3, you can indicate the Forecast of P1 is going to be similar in pattern of that of P2 and P3's Forecast is going to be similar to P2's seasonality.

2-3: Same As History and Same As Seasonality Configuration

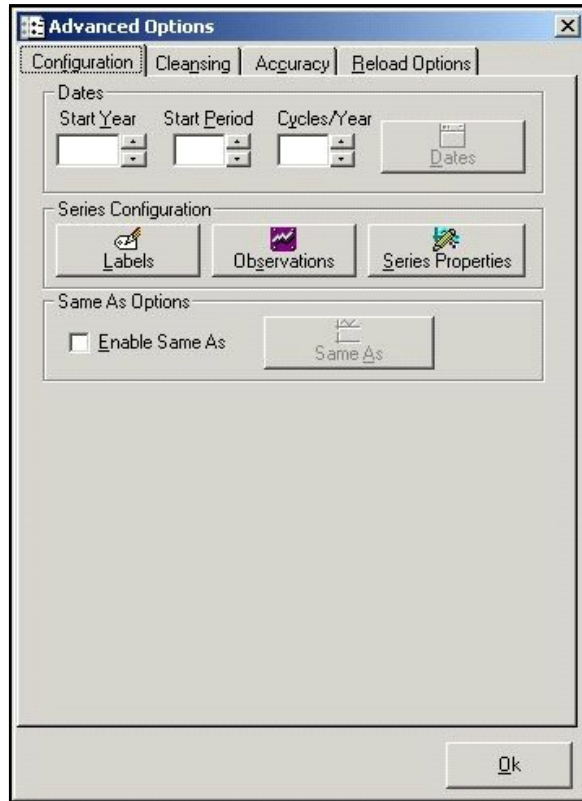
The Same As History and Same As Seasonality are configured by using the same dialog, this section details how to configure both methods.

Note: When you enable the Same As option, the Remove Trailing Zeros option is disabled. For additional information see [Section 7: Group Forecasting](#).

1. From the Data Capture tab, click the **Advanced** button.

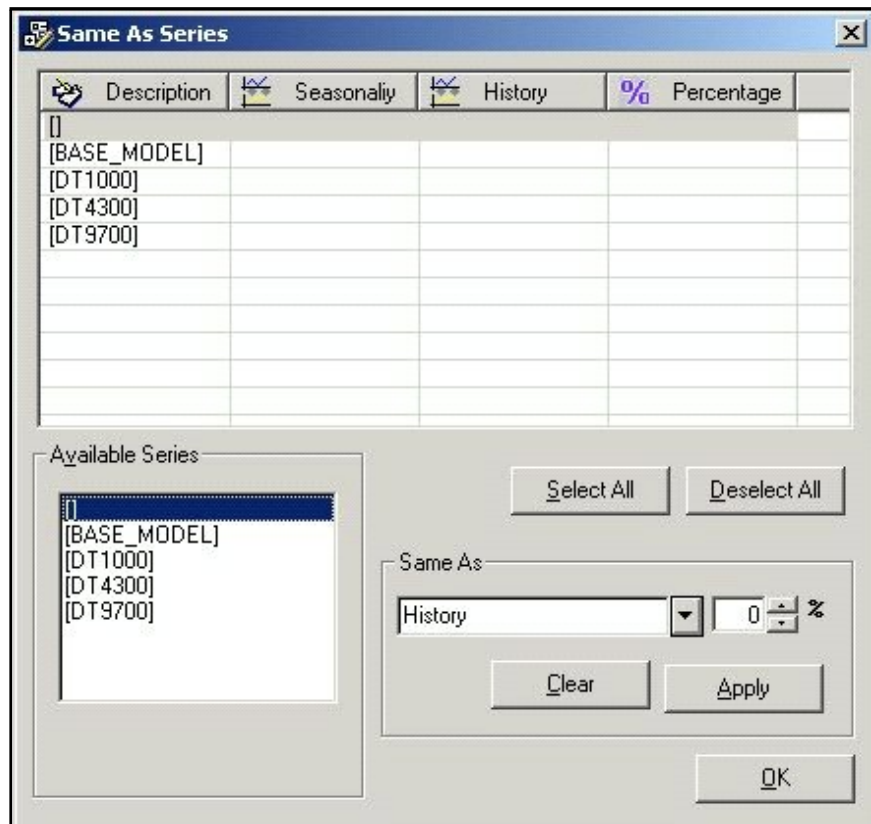


The Advanced Options window displays.



2. Check the **Enable Same As** check box and click the **Same As** button.

The DME loads the Series and the Same As Series dialog box displays.



3. Select the **Series** in the **Description** column in which you want to apply the Same As method.

Note: Hold down the Ctrl key to select more than one Series or use the Select All button to select all the series in the Description column.

4. Select the series in the Available Series column that contains the History or Seasonality you want to apply to the series, selected in Step 3.

Note: You can only select one Series.

5. Select the option from the **Same As** drop-down list. The option specifies whether the selected series has the same History, Seasonality or both.

6. If you selected History or Both, enter the percentage by which the Series has the same History. The percentage applies only to the Series History.

7. Click **Apply**.

The appropriate values populate the Seasonality, History and Percentage columns.

Note: *To make changes to any of the values in the columns, you must use the fields in the Same As dialog box.*

8. Click **OK** when you are finished applying Same As functionality.

Section 3: Data Cleansing

Users can cleanse their data in order to generate a more accurate Forecast. Data Cleansing is applied to history of the Forecast. Data cleansing options for Historical shaping include:

- Removal of outliers
- Removal of zeros
- Removal of missing values

3-1: Cleanse the Data

1. Click the **Advanced** button on the Base Unit.

The Advanced Options window displays.

2. Click the **Cleansing** tab.

Outliers

Replace outliers

Std. Dev2

Forecast Technique

Exponential Smoothing (default)

Replacement Type

Both (default)

Missing Values

Replace missing values

Forecast Technique

Average (default)

Lower Value

Upper Value

☐ Remove Zero Values

Preprocessing

Trimming

3. Select the **cleansing options you want to use in the Forecast.**

Option	Description
Replace Outliers	Select the Replace Outliers check box to replace outliers. An outlier is an anomaly within a data set with a low chance of occurrence. This outlier disturbs the accuracy of a forecast. For example, the effect on sales of snow shovels that resulted from a snow storm in Texas in the middle of July, would cause an outlier within a data set. ■ Std Dev - Specify the standard deviation. The default is two standard deviations from the mean. The outlier is replaced with a number that is calculated using a forecast technique. ■ Or, you can select how far a data point needs to be from the data series mean in order to be considered an Outlier by selecting the number of standard deviations. ■ Forecasting Technique - Select the forecasting technique you would like to use to perform outlier replacement. ■ Replacement Type - Select the type of value with which you want outliers replaced. The choices are Upper value, Lower value, or Both.
Missing Values	Select Replace Missing Values to replace any missing or erroneous values in the data set. For example, if a period or a range of periods is not reported, instead of leaving it blank, the DME can replace it with a value calculated by a forecast technique. ■ Forecast Technique - Select the forecasting technique you would like to use to perform Replace Missing Values. ■ Lower Val/Upper Val - To expand the scope of the missing values range beyond zero, change the lower and upper values.

Option	Description
Remove Zero Values	Select Remove Zero Values to have zero values ignored. This is useful in new product introductions, when there are long stretches of zeros representing times when the product did not exist. When you select this option the DME advises you to reload your data. ■ Leading - Click here to remove leading zeros. ■ Trailing - Click here to remove trailing zeros.

Section 4: Forecast Accuracy

The Accuracy tab contains additional advanced options to ensure checks and balances for Forecast Accuracy. Forecast Accuracy is applied to the Forecast. You can configure the DME's monitoring processes that provide added measures of confidence to the Forecasts.

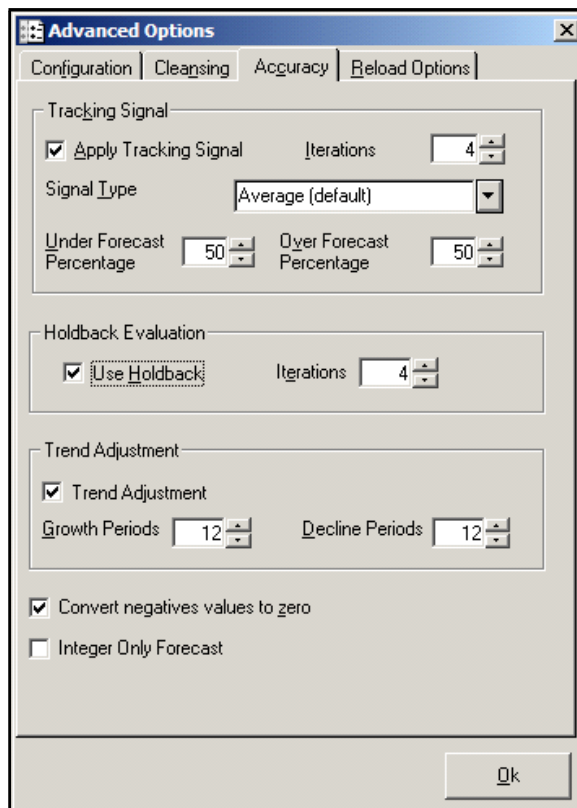
4-1: Set Forecast Accuracy Options

1. From the Data Capture tab, click the **Advanced** button.

The Advanced Options screen displays.

2. Click the **Accuracy** tab.

3. The following dialog box displays.



4. Select the **accuracy options** for the Forecast.

Option	Description
Signal Tracking	Check Apply Tracking Signal to use this option. ■ The Tracking Signal is used for fine-tuning the overall accuracy of a forecast. Fitted values serve as the baseline for your Forecast, while the Tracking Signal determines if the fitted values are under or overforecasting. ■ Comparing it with the overall MAPE improves the accuracy by less than a percentage point. ■ Under Forecast Percentage - Enter the Under Forecast Percentage to be tracked. ■ Over Forecast Percentage - Enter the Over Forecast Percentage to be tracked.

Option	Description
Holdback Evaluation	Click Use Holdback to use this option. Holdback Evaluation enables you to judge whether the current Forecasting process is sufficient by enabling users to specify a time period in data to be held out and compared with another mini-forecast. The DME produces an out-of-sample table in the Audit trail report for further analysis. ■ Iterations - Enter the number of Iterations you want to hold back.
Trend Adjustment	Check Trend Adjustment to use this option. The Trend Adjustment option enables you to adjust the growth and decline phases for new or old products.
Convert negative values to zero	Select this option if you want any negative values in your data to be changed to zeros.
Integer Only Forecast	Select this option if you want the Forecasted values are in integer instead of decimal.

Section 5: Forecast Techniques and Methods

There are several Forecast techniques available for the Forecast. Each technique has one or more methods that can be used to perform the technique while Forecasting. Some techniques use a primary and secondary method.

Select a Forecasting technique based on the specific demands of the Forecast you need to generate. The DME enables you to also select the Forecasting methods that enhance the technique you choose. You can adjust the parameters of each method.

Note: *The requirements for the event index need to be properly numbered; right now, they are all numbered as "2".*

The following table details the available Forecast Techniques and Forecast Methods and how they are grouped.

Forecast Techniques and Methods	Description
Distribution	ErlangB (accepts secondary method) ErlangC (accepts secondary method) Poisson (accepts secondary method)
Business Promotional Mode	Event Model (accepts secondary method)
Exponential Smoothing	Adaptive ES Croston Intermittent Double ES Brown Double Holt Simple ES Triple ES Brown
Slow Moving Item	Slow Method Croston Intermittent
Expert	Procast
Moving Average	Moving Average Weighted Moving Average
New Product Curve	Gompertz Curve Logistic Curve New Product Curve Probit Curve
Regression	Linear Regression Multiple Regression (accepts secondary method) Polynomial Regression (accepts secondary method) Stepwise (accepts secondary method)
Seasonal Mode	Box-Jenkins Holt-Winters Census X-11 (accepts secondary method)

The Forecast Methods are divided into three groups depending on the configuration:

- Methods with basic configurations
- Method that require additional series or indices
- Regression methods

5-1: Forecasting Methods with Basic Configurations

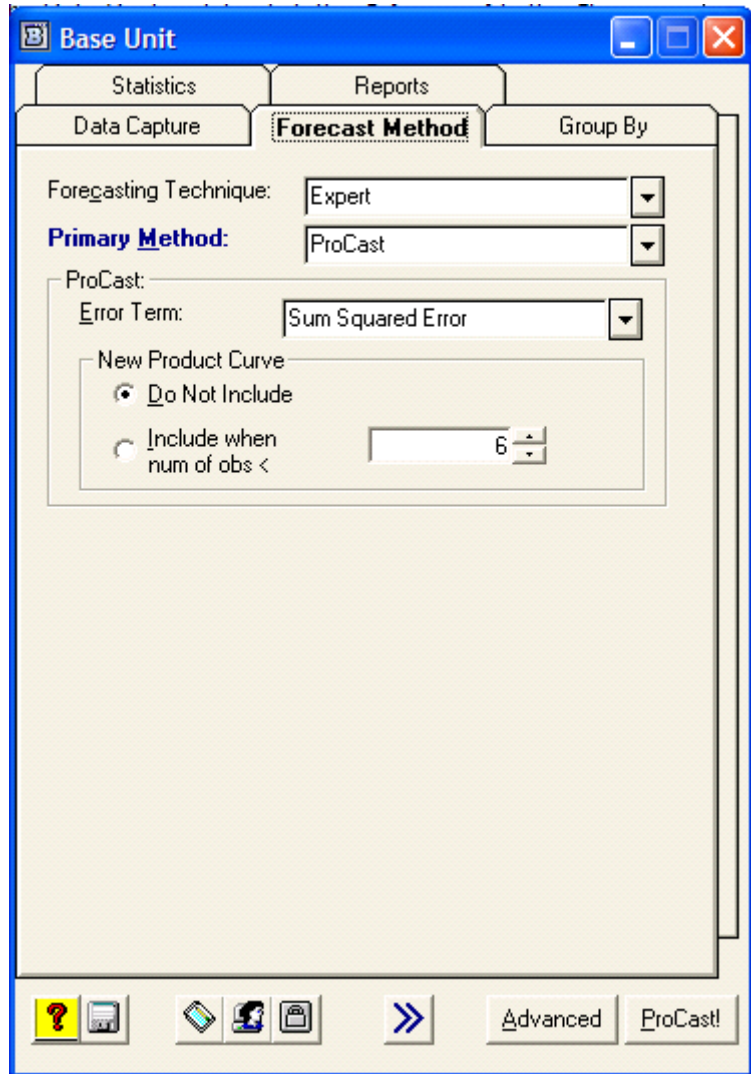
The following techniques have basic configurations and do not require the use of additional Series or Indices.

Forecast Technique	Available Forecast Method
Expert	New Product Curve
Moving Average	Distribution (only with ErlangB and Poisson methods)
Exponential Smoothing	Seasonal Model (only with Box-Jenkins and Holt-Winters)

5-2: Select Methods with Basic Configurations

1. From the Base Unit main window, click the **Forecast Method** tab.

The following window displays.



2. Select the **method** from the **Forecasting Technique** drop-down list.

Note: *If you select Procast as the Primary method, the DME selects the best method to analyze the data for the Forecast.*

3. Select the **Primary Method** from the drop-down list. If you do not select a method, the method that displays in the text box is applied to the data.

The following depiction details an example of a window using the Forecasting Technique, Business Promotional Mode.

Base Unit

Statistics Reports

Data Capture **Forecast Method** Group By

Forecasting Technique: Business Promotional Model

Primary Method: Event Model

Event Model:

Event Flags Alpha (for Event Index):

Simulation

☒ No Simulation ☐ Random Event Simulation

☐ Fixed Percentage Simulation

Additional table

Secondary Method: ProCast

ProCast:

Error Term: Sum Squared Error

New Product Curve

☒ Do Not Include

☐ Include when num of obs < 6

Help Data Save >> Advanced ProCast!

4. Select the parameters for the **Primary Method**.
5. Select the **Secondary Method** from the drop-down list if the Primary Method has a secondary method.
6. Select the parameters for the **Secondary Method**.

Note: *If you do not set the parameters, the DME selects the best parameters for the data.*

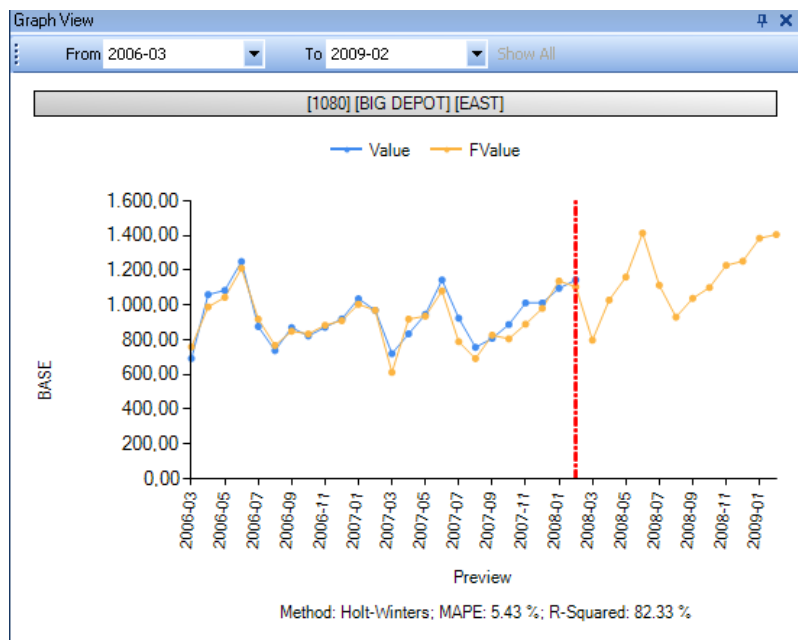
7. Click the **Procast!** button.

5-3: Primary Method Procast

When you select Procast as the Primary Method, the DME analyzes the data and chooses the method that best fits the data.

5-3-1: Procast Method

In order to know what method the DME selects for each Series, open the scenario you just Procast in the Viewer and select the graph view tab, at the bottom of the graph you will see the selected Method.



5-4: Forecasting Methods that Require Additional Series or Indices

The Indices tables must be arranged in order to be valid for the DME. The Indices must be compliant with either a columns or rows layout. The following Forecast Techniques require the use of additional indices in order to run a Forecast:

- Business Promotional Model (Event Model)
- Distribution (with ErlangC)
- Seasonal Model (with Census X-11)

Note: *Before running a Forecast using the ErlangC, Event Model, or Census X-11 method, make sure that all the forecasting series are mapped to an additional series. For the event model, the additional series is the event index series. For event index series, there more requirements: ² You have pre-defined indices. ² The indices are stored in a separate table. ² The indices are compliant with column and row layouts. ² The indices values are consecutive, such as, 1, 2, 3. (1, 2, 5, is not valid). There must be enough values to forecast. This means the amount of index values must be greater than or equal to the history + periods.*

5-4-1: Columns

If the data that you want to use for the Forecast is in Excel, you must have an additional spreadsheet with your indices.

In the spreadsheet, the type of index values in the columns, the entries below the index label are numeric. You must start in the cell A1, and you can have as many index series as you want.

The following is an example of a valid index configuration with a column layout.

	A	B
1	Optimistic	Pesimistic
2	1	1
3	1	2
4	1	3
5	1	1
6	2	2
7	2	3
8	2	1
9	4	2
10	0	3
11	4	1
12	4	2
13	4	3
14	4	1

Below is an invalid index configuration.

	A	B
1		
2	Optimistic	Pesimistic
3	1	1
4	1	2
5	Invalid	3
6	1	1
7	2	2
8	2	FXE
9	2	1
10	4	2
11	0	3
12	4.4	1
13	4	2
14	4	3.2
15	4	1

Does not start in first row.

Text is not a valid value.

Decimal index values are not allowed.

If your data is stored in a database such as Access, SQL Server, or Oracle, you must have a separate table containing only the index. The field type should be numeric. The following is an example of this index.

	Optimistic	Pesimistic
	1	1
	2	4
	3	1
	1	4
	2	4
	3	2
	1	2
	2	2
	3	3
	1	3
	2	4
	3	4

The depiction below details an example of an invalid configuration.

	Optimistic	Pesimistic
	1	1
	2	4
	3	1
	1	4
	2.01	4
	3	2
	1	2
	2	2
	3	3
	1	3
	2	4
	3	4
*	0	0

Decimal values are not valid.

5-4-2: Rows

When the data is in Excel, you must have a separate spreadsheet in the index or indices. You need to define the labels that appear horizontally. For each row, the first column should be text to represent the index name. After this column you need to enter the numeric index values.

Below is an example of a valid index configuration in Excel.

	A	B
1	Optimistic	Pesimistic
2	1	1
3	1	2
4	1	3
5	1	1
6	2	2
7	2	3
8	2	1
9	4	2
10	0	3
11	4	1
12	4	2
13	4	3
14	4	1

Below is an example of an invalid index configuration example in Excel.

	A	B	C	D	E	F	G
1							
2	First	1	2	1	2	2	2
3	1	2	3	1	2	3	1

No Index Name for Each Series

No Labels

If you have the data that you want to forecast in a database, then you need a table with one text field to store the index name, and as many numeric fields as you need to store the index values. Please see the example below.

	IndexName	Index1	Index2	Index3	Index4	Index5	Index6	Index7
	Optimistic	1	2	3	1	2	3	1
⌵	Pesimistic	1	1	4	4	1	1	4

If you try to provide an incorrect index table, the DME detects it and reports an error. The forecast fails if you do not provide the index values for the history and period in the data.

5-5: Methods that Require Additional Series or Indices

1. From the Base Unit, select the **Forecast Method** tab.
2. Select a **technique** from the **Forecasting Technique** drop-down list.

3. Select **ErlangC**, **Event Model** or **Census X-11 method** from the **Primary Method** drop-down list.

The screenshot shows the 'Base Unit' dialog box with the 'Forecast Method' tab selected. The 'Forecasting Technique' is set to 'Business Promotional Model'. The 'Primary Method' is set to 'Event Model'. Under 'Event Model', 'Event Flags' is selected, and 'Alpha (for Event Index)' is set to 1. The 'Simulation' section has 'No Simulation' selected. The 'Additional table' is empty. The 'Secondary Method' is set to 'ProCast'. Under 'ProCast', 'Error Term' is set to 'Sum Squared Error'. The 'New Product Curve' section has 'Do Not Include' selected. The 'Include when num of obs <' is set to 6. At the bottom, there are icons for help, data, and a 'ProCast!' button.

Base Unit

Statistics Reports

Data Capture **Forecast Method** Group By

Forecasting Technique: Business Promotional Model

Primary Method: Event Model

Event Model:

Event Flags Alpha (for Event Index): 1

Simulation

☒ No Simulation ☐ Random Event Simulation

☐ Fixed Percentage Simulation

Additional table

Secondary Method: ProCast

ProCast:

Error Term: Sum Squared Error

New Product Curve

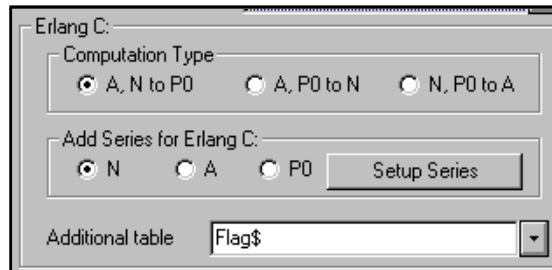
☒ Do Not Include

☐ Include when num of obs < 6

Advanced ProCast!

4. Select a **secondary method** from the **Secondary Method** drop-down list if the Primary Method permits another selection.
5. Set the **parameters** for both the **primary** and **secondary** methods.

For example if you selected ErlangC from the Primary Method list, the following dialog box displays.

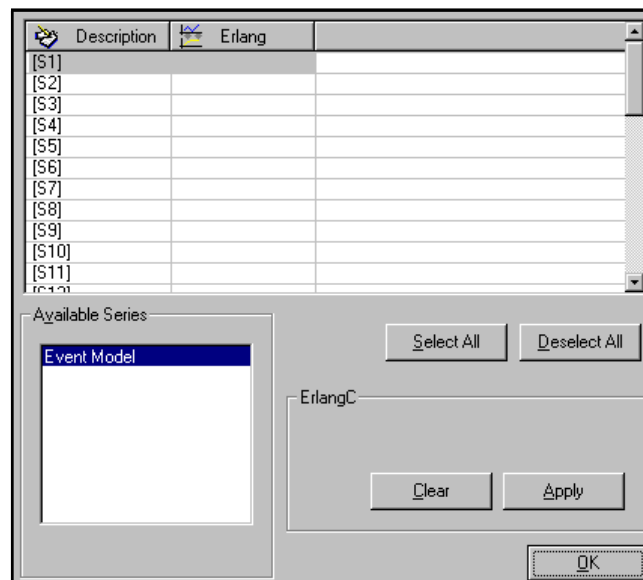


Note: Remember to set the parameters for the forecast. If you do not set them, the DME selects the best parameters for the data.

6. Select the **additional series or indices** required for the method.
7. Select the **table name** from the **Additional Table** drop-down list. This table contains the additional series or indices.
8. Click the **Setup Series** button.

Note: Depending on the model selected, the button may be Setup Series for ErlangC, an Event Flags button for Event Modeling or a Setup Trading Day button for Census X-11.

The following window displays.



9. Select the **series** from the **Available Series** box.

10. Select the **series** in the **Description** column to link to the indices.

Note: *You can use the Select All button to select all the series that appear on the screen. Use the Deselect All button to deselect all selected series.*

11. Click **OK**.

12. Click the **Procast** button after configuring the Forecast Method tab.

5-6: Forecasting By Series

Forecast Methods can also be set at a series level, this way each series or group of series will have it's own settings for a particular forecast method.

For more information on how to setup series level forecasting please refer to Chapter 2 of the DME User Guide and see the ForecastX Method tab.

Section 6: Regression Methods

There are four regression methods available for the Regression Forecasting Technique.

- Linear regression
- Multiple regression
- Stepwise
- Polynomial regression

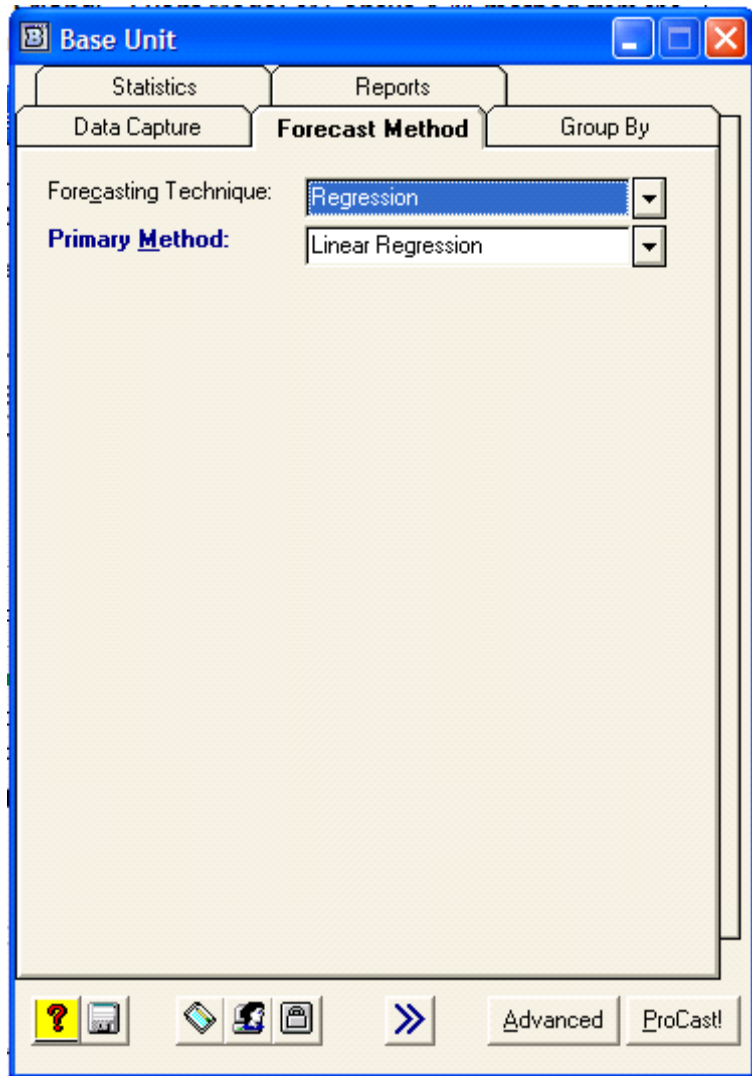
The Linear regression method applies to each series in a Scenario. The other methods require one dependent series and several independent series. The DME uses the first series in a Scenario as the dependent series and other series in the same Scenario are the independent series.

6-1: Select Regression Methods

Note: *When you select a Regression method, the Remove Zero Values option is not available. For addition information see [Section 7: Group Forecasting](#).*

1. Click the **Forecast Method** tab.
2. Select **Regression** from the **Forecasting Technique** drop-down list.

The following window displays.



3. Select the **regression method** from the **Primary Method** from the drop-down list. This example selected is Multiple Regression.

The following window displays.

The screenshot shows the 'Base Unit' window with the 'Forecast Method' tab selected. The 'Forecasting Technique' is set to 'Regression'. The 'Primary Method' is set to 'Multiple Regression', and the 'Dependent Series' is 'First Series'. The 'Secondary Method' is set to 'ProCast', and the 'Error Term' is 'Sum Squared Error'. Under the 'New Product Curve' section, the 'Do Not Include' radio button is selected. The 'Include when num of obs <' option is also visible with a value of 6. The bottom of the window features a toolbar with icons for help, data, and a 'ProCast!' button.

Note: *If you select Multiple Regression, Polynomial Regression or Stepwise, the DME displays a Secondary Method text box used to identify the independent series.*

4. Select the **statistical method** that you want applied to the independent series from the **Secondary Method** drop-down list.
5. Select the **parameters** for the **Primary Method**.

For example if you selected Multiple Regression from the Primary Method list, the following dialog box displays. This parameter cannot be changed.



Note: *Remember that if you do not set the appropriate parameters, the DME selects the best parameters for the data.*

6-1-1: Polynomial Parameters

drop-down list displays the following window...

Base Unit

Statistics

Reports

Forecast Method

Data Capture

Group By

Forecasting Technique: iRegression

Primary Method:

Polynomial Regression: == == == == == == == == == ==

Dependent Series:)First Series

Max. Q.egree J Partial F-Value 4

Min. F- alue In J 2 Max F-Value.Qut

econdary Method: JProCast

ProCast: == = -- --

;;=;;:::==;;=====;;::;-1

];_nor Term: JSum Squared Error

New Product Curve ----->

r. .Qo Not Include

r Include when num of obs < 6.....J

?

13
13

13
13

advanced | froCast!

1. Select the appropriate **Primary Parameters**.

Primary Parameter	Description
Dependent Series	To run Multiple Regression, Polynomial or Stepwise, one series must be the dependent series. The remaining series are considered independent series. Therefore, in order to run any of these methods, you will need at least two series. When your data organization is in rows, the first series in the table (or Excel spreadsheet) is always considered the dependent series. When your data is in columns, the order is defined when you configure your data using the Series button.
Max Degree	Indicate the maximum degree that the polynomial regression can have.
Partial F-Value	Enter the value used to determine which degree the polynomial regression should use.
Min F-Value In/ Max F-Value Out	Enter the F-value that is used to determine which series can be included in the polynomial regression model.

2. Select the **secondary method** from the **Secondary Method** drop-down list.
3. Enter the appropriate **Secondary Method** parameters and click the **ProCast!** button.

6-1-2: Stepwise Parameters

Selecting the Stepwise Method option from the Primary Method drop-down list displays the following window.

Base Unit

Statistics Reports

Data Capture **Forecast Method** Group By

Forecasting Technique: Regression

Primary Method: Stepwise

Stepwise:

Dependent Series: First Series

☒ Stepwise Min. Series: 4 Min. F In: 4 Min. Lag: 0

☐ Forward Max. Series: Max. F Out: Max. Lag:

☐ Backward

☐ Lag Dependent

Secondary Method: ProCast

ProCast:

Error Term: Sum Squared Error

New Product Curve

☒ Do Not Include

☐ Include when num of obs < 6

Advanced ProCast!

1. Select the appropriate **Primary Parameters**.

Primary Parameter	Description
Stepwise, Forward	Indicate the direction to search the stepwise model.

Primary Parameter	Description
Min/Max Series	Indicate the range of the number of series that the Stepwise model can have.
Min F In/Max F Out	Indicate the F-value used to determine which series can be included in the stepwise model.
Lag Dependent	Indicate whether the stepwise model includes a lag dependent series.

2. Select the **secondary method** from the **Secondary Method** drop-down list.
3. Enter the appropriate **Secondary Method** parameters and click the **ProCast!** button.

Section 7: Group Forecasting

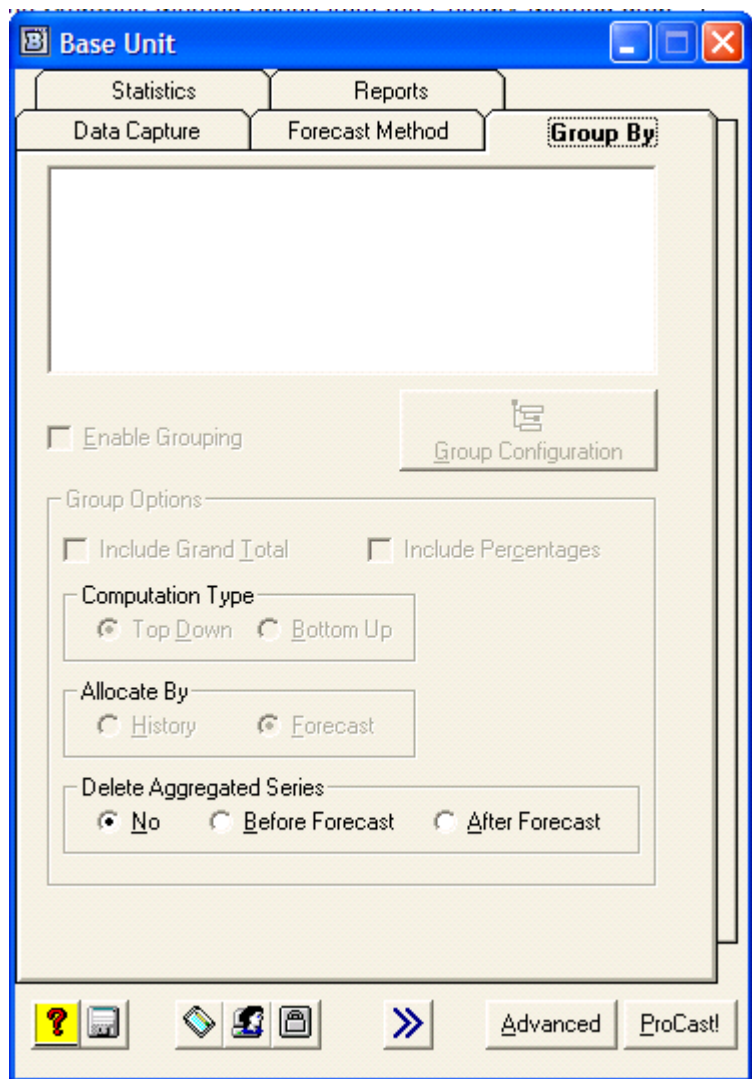
With the DME, you can configure the forecast to create groups of data. This is called **Aggregated Forecasting**.

Note: *DME 4.5 introduces a new feature, Hierarchy Management. Hierarchy Management replaces the Group Forecast. The new feature has all the functionality as Group Forecasting except Pivoting Data. Hierarchy Management is more powerful, flexible and manageable. For additional information, see [Section 2: Hierarchy Management](#).*

7-1: Configure a Group Forecast

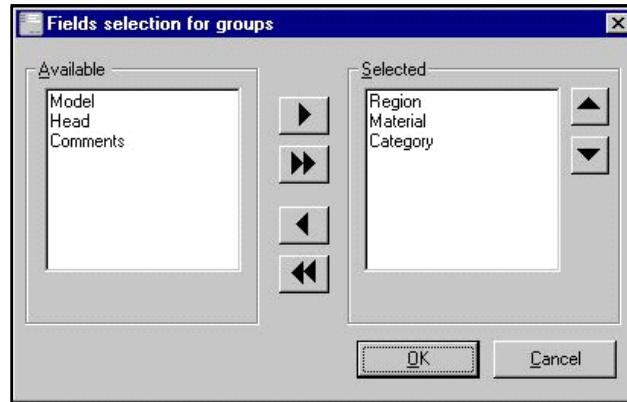
1. Create a new Scenario with a data source containing the series for the group. You can group by selecting one or more fields. QAD calls this **Group Levels**.

2. Click the **Group By** tab.



3. Click the **Enable Grouping** check box.
4. The fields on the window become active.
5. Click the **Group Configuration** button, to specify the fields for the groups.

The Fields Selection for Groups dialog box displays.



6. Move the fields from the **Available** column to the **Selected** column to designate group levels and click **OK**. Use the Up and Down arrows to move the appropriate field names to a higher or lower position.

The Group By tab displays.

7. Select the appropriate options.

Option	Description
Include Grand Total	Select this option if you need a series in your data that is the grand total, or sum, of all the series.
Include Percentages	This field is available only when the Top Down option is selected. Select Include Percentages if you need to retrieve the percentage in the forecasted value from higher-level series to lower-level series.
Computation Type	Select the type of calculation you want used in the forecast. ■ Top Down - The higher-level series are forecasted. ■ Bottom Up - lower level series are forecasted first, and then higher-level series use the sum of the lower-level forecasted values as their forecasted values.

Option	Description
Delete Aggregated Series	Indicate whether you want the Aggregated Series deleted, and if so, when to delete the Aggregated Series. ■ No - The aggregated series are not deleted. ■ After Forecast -The aggregated series are deleted after grouping forecasting. ■ If you select the No or After Forecast options, the following cannot be used or are disabled: ■ Distribution ■ Business Promotional Mode ■ Census X-11 ■ Regression (with After Forecast) ■ Holdback Evaluation option on the Accuracy tab ■ Same As functionality ■ Remove Leading Trailing zero values options in Data Cleansing ■ Before Forecast - The aggregated series are deleted after loading the series with the group hierarchy information. The detail level series are forecasted by the usual.

Chapter 10 Lifecycle Forecasting

This chapter includes:

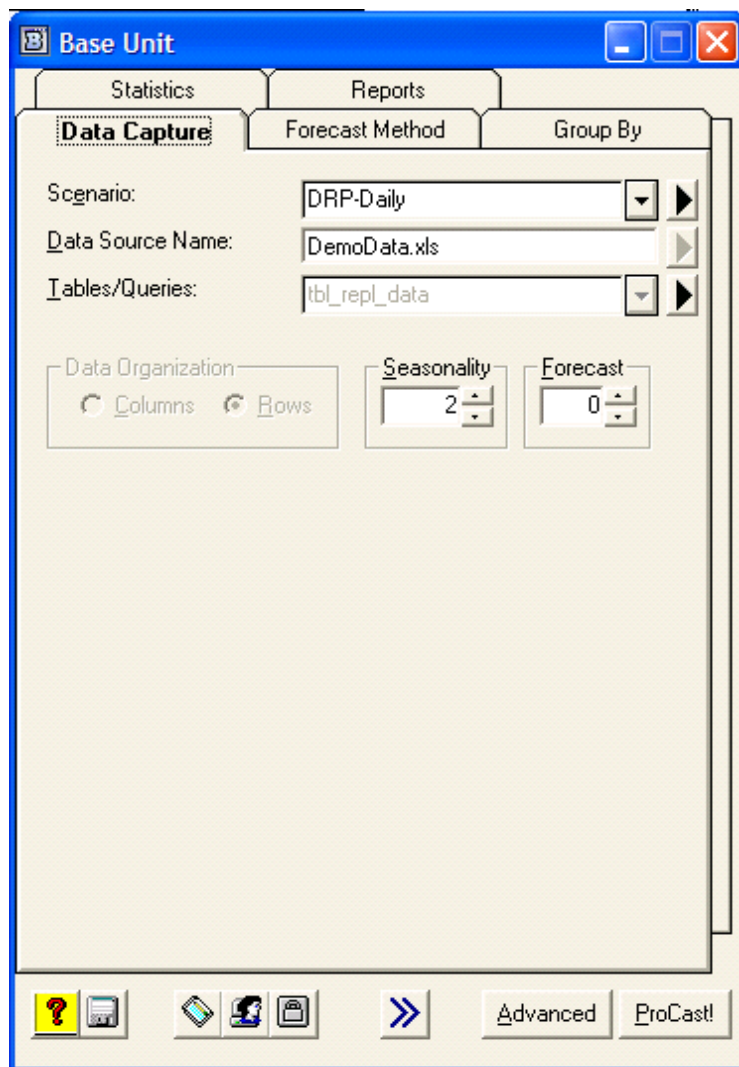
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Section 1: Overview

The DME lifecycle forecast feature enables users to predefine the lifecycle pattern. With this feature, a product's lifecycle information is loaded into a Scenario. The Scenario is defined as a "Profile" Scenario. Each Series in this Scenario is a Profile, which defines the lifecycle pattern. Different types of Profiles (i.e., introduction, seasonal patterns, and retirement) can be in the same "Profile" Scenario. When applying a lifecycle Forecast, a user can use different Profiles for different Forecasting periods. A user can define as many "Profile" Scenarios as needed.

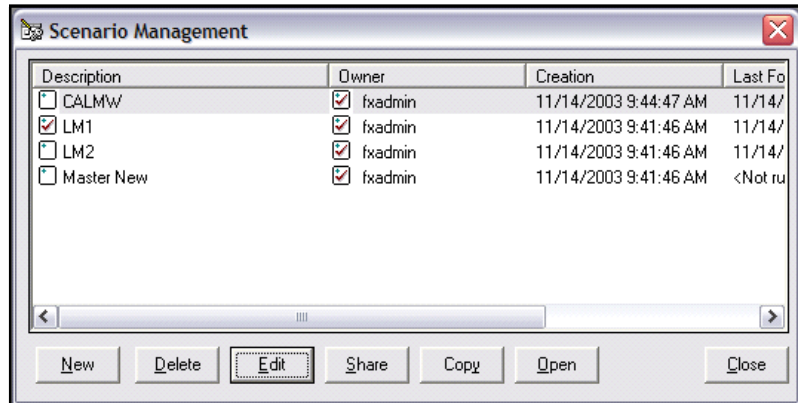
Section 2: Create a Profile Scenario

1. Click the Base Unit icon.

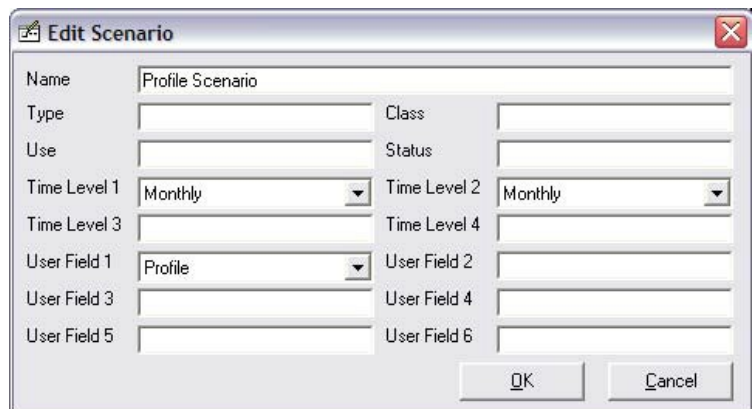


The image shows a software dialog box titled "Base Unit". It has a blue title bar with standard window controls. The dialog is divided into several tabs: "Statistics", "Reports", "Data Capture", "Forecast Method", and "Group By". The "Data Capture" tab is currently selected. Inside this tab, there are three input fields: "Scenario:" with a dropdown menu showing "DRP-Daily", "Data Source Name:" with a text field containing "DemoData.xls", and "Tables/Queries:" with a dropdown menu showing "tbl_repl_data". Below these fields, there are three sub-sections: "Data Organization" with radio buttons for "Columns" and "Rows" (where "Rows" is selected), "Seasonality" with a numeric spinner set to "2", and "Forecast" with a numeric spinner set to "0". At the bottom of the dialog, there is a toolbar with icons for help, save, and other functions, followed by "Advanced" and "ProCast!" buttons.

- Click the right arrow ► button to access Scenario Management.

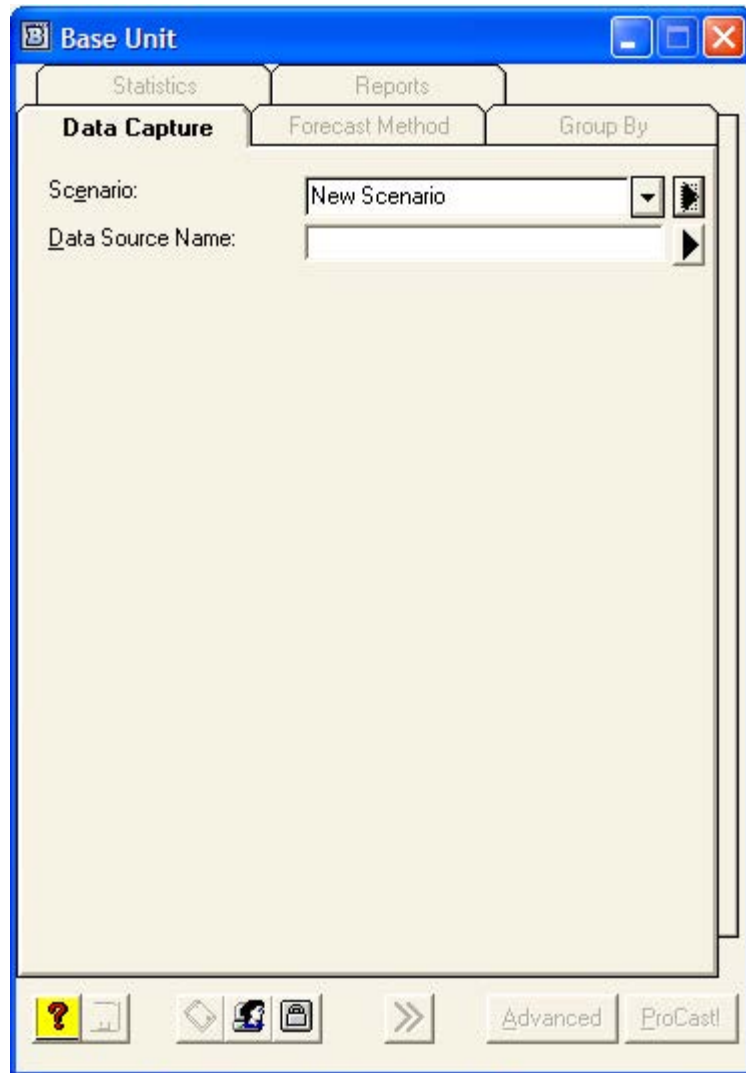


- Click the New button.
- Enter the Scenario name and click OK.
- Click the Edit button to open a Scenario for the Profile Scenario.



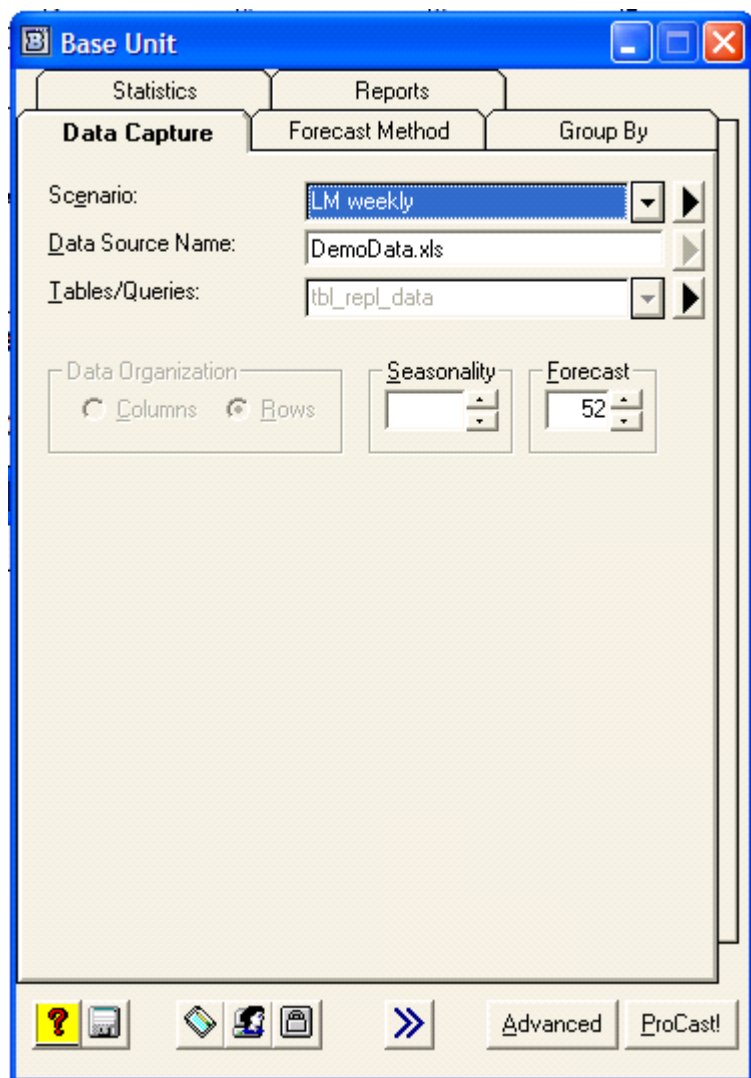
- In the User Field 1 drop-down list, select Profile for the appropriate Scenario Attribute.
- Click OK and close the dialog box.

8. Click the ► the Data Source Name Management button and load the data source and selected corresponding table/query information.



The Data Capture tab displays with additional features and options.

9. Enter 0 in Forecast text box



10. Click the Advanced button.

ID

Advanced Options

Configuration

Cleaning

Accuracy

Blocked Options

Outliers

Replace outliers

Std Dev

2

Forecast Technique

Exponential Smoothing (default)

13

Replacement type

Both (default)

13

Missing Values

Replace Missing Values

Forecast Technique

Average (default)

13

Lower Val

Upper Val

.....1

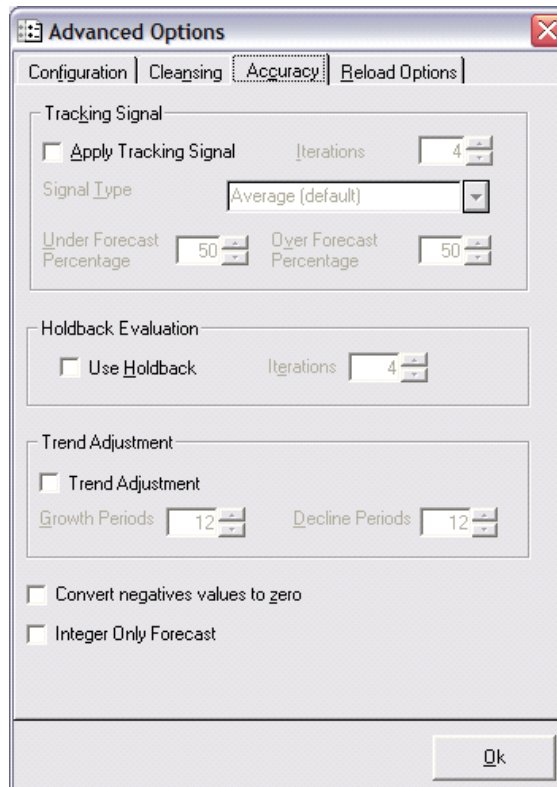
Remove Zero Values

Leave blank

Truncating

Qk

12. Click the Accuracy tab. Ensure the Convert negative values to zero selection is unchecked.



13. Click OK to close the Advanced Option dialog box.
14. Click ProCast! to load the data.

2-1: Setting up a Profile

1. Login to the Viewer. Open the Scenario that will use "Life Cycle Forecast".
2. From the Forecast menu, select "Life Cycle Forecast".

The “Profile Forecasting” window displays.

- From the Affected area, choose which Series is affected by the Life Cycle Curve. The table below details what each option means.

Option	Description
Selected Series	Profile affects the selected Series only.
Whole Tree	Forecast affects the whole tree (i.e., all the Series in the hierarchy tree). This option is enabled only when a tree is viewed (i.e., a hierarchy has been applied).
Scenario	Forecast affects the Series in one Scenario in the hierarchy tree only.

- Click the Change button to update which data fields are to be affected that are listed in the Affected Data Field area.
- From the Profile Scenario drop-down, select Profile Scenario.

If there is nothing in the drop-down list, the UserField1 Attribute of the Profile Scenario is not set to “Profile”.

6. Select all the types of Profiles you would like to apply from the “Profile” drop-down list.
7. Check the “Actv” check box for each selected Profile Series. If you do not check the “Actv” check box, the curve in that line will not be applied.

Note: *A maximum of six curves can be applied.*

8. Select the “Start” and “End” period of the Series that will be Forecasted. The start period and the end period determine the period range where the shape will be applied.

Note: *Users have the ability to apply multiple Profiles to a single Series by selecting start and stop dates that do not overlap one another.*

9. From the Profile Start column, select the start date of the Profile from which the profile data is be used. In most cases, the start period for Profile Series match the start period for the Series.
10. Check or uncheck the “Offset” option. The table below details what each option means.

Option	Description
Checked	All the values within the start and end period for the Series are used for lifecycle Forecasting.
Unchecked	The value in the start period for the Series is used for lifecycle Forecasting

Date	2004-01	2004-02	2004-03	2004-04
Observation Value (before applying Life Cycle)	100	200	150	250
Profile Value	1	0.9	0.8	0.7

Date	2004-01	2004-02	2004-03	2004-04
Observation Value when uncheck "Offset"	$100 = (100 * 1)$	$90 = (100 * 0.9)$	$80 = (100 * 0.8)$	$70 = (100 * 0.7)$
Observation Value when check "Offset"	$100 = (100 * 1)$	$180 = (200 * 0.9)$	$120 = (150 * 0.8)$	$175 = (250 * 0.7)$

- 11.** Check or uncheck the Profile Recycle option for each Profile. This option affects the behavior of the lifecycle Forecast when there is not enough data point in the Profile Series. For example, the data range is two years, but the Profile only has one year of data for the Seasonal pattern.

If the Profile Recycle check box is unchecked, the value for the last period for the remaining periods is reused.

If the check box is checked, the values starting from the beginning of the profile series (recycle) are used.

- 12.** Click the Forecast button to apply the Lifecycle Forecast.

Chapter 11 Batch Scheduler

This chapter includes:

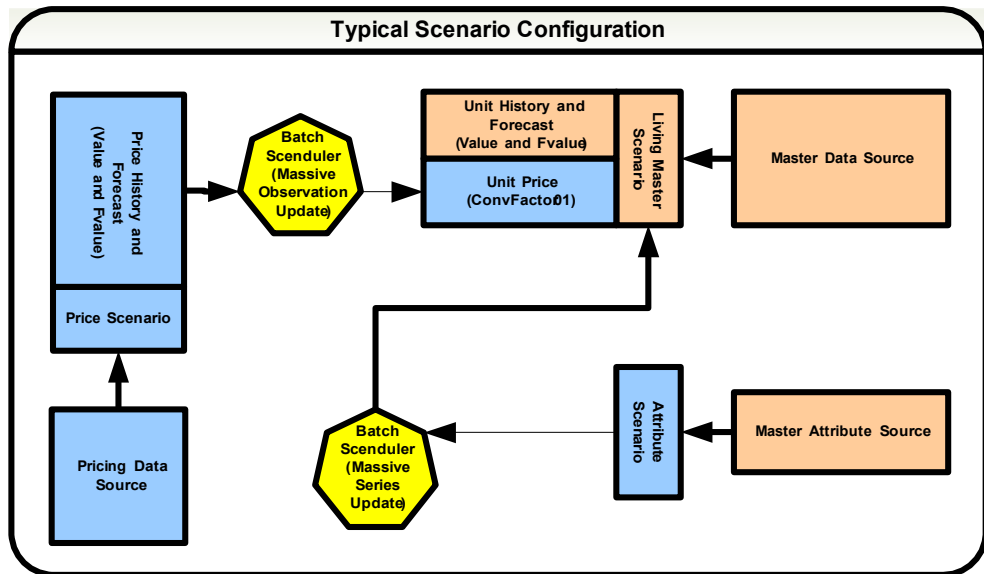
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Section 1: Overview

The Batch Scheduler enables you to run Forecasts, load data, run Exceptions and perform Custom Tasks in the DME. The Batch Scheduler enables System Administrators to configure and users to run repetitive tasks as part of a batch process at a specific time. All of these features can be run either on a Client or Server machine.

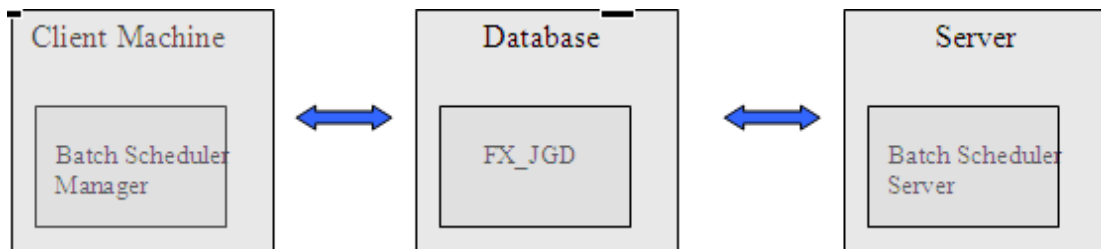
The Batch Scheduler performs the task of moving data between Scenarios and updating the Attributes. When using the Batch Scheduler, you can update time series data points and hierarchy Attributes. The depiction below details one of the key configurations for performing the incremental update process.

Note: *If multiple users need to run Batch Scheduler, then the Batch Scheduler needs to run on multiple managers. Each user must have their own Batch Scheduler Manager and Batch Scheduler Server.*



Section 2: Batch Scheduler Architecture Overview

The depiction below details the Batch Scheduler Architecture.

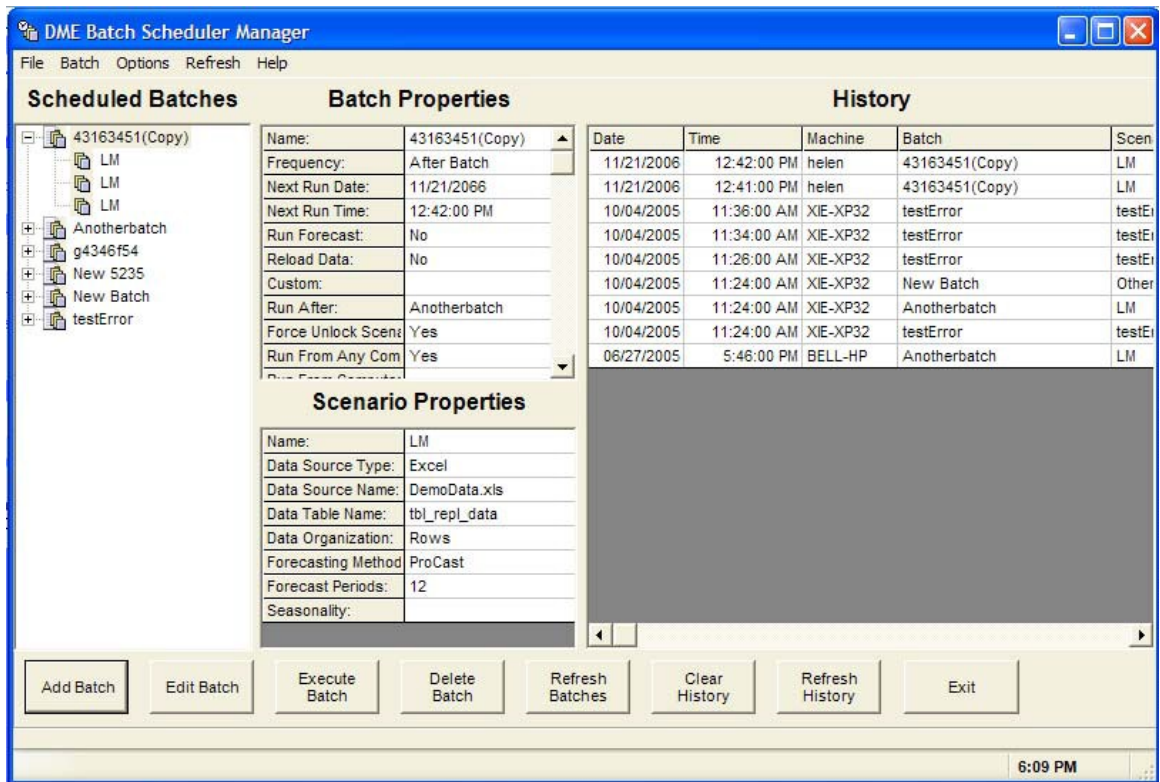


Section 3: Batch Scheduler Management

3-1: Open the Batch Scheduler Manager

1. Go to Start > All Programs > Atlas Planning Suite > Batch Schedule Manager.

The DME Batch Scheduler Manager displays.



Note: The Scheduled Batches listed in the left-hand pane are not listed in scheduled chronological order. To view the order for when batches are to be run, highlight the Scheduled Batch and look at the batch's "Run After:" information in the Batch Properties area of the window.

The following table details what each button means at the bottom of the window, as well as the features available from the toolbar.

Button	Description
Add Batch	Used to add a new scheduled batch.
Edit Batch	Used to edit an existing scheduled batch.
Execute Batch	Used to place a scheduled batch in the server queue to run at a later time. For additional information, see 3-2-1: Run Mode .
Delete Batch	Used to delete a scheduled batch.
Refresh Batches	Used to refresh list of batches when a new scheduled batch is created.
Clear History	Used to clear entire history table in the History area.
Refresh History	Used to update the history (i.e., displays the latest information from the server).
Exit	Used to close the Batch Scheduler window.
Reset Mode	Batch > Reset Mode. Used to reset the Run Mode to the Default (Normal) mode.
Copy Batch	Batch > Copy Batch. Used to copy/clone a scheduled batch.
Show Start Up Screen	Option > Show Start Up Screen. Used to display the Start Up window when the Batch Scheduler is started.
Auto Login	Option > Auto Login. When logging in to the Batch Scheduler, the user needs to enter a username and password. The user has also the option to logon automatically the next time. The next time when the Batch Scheduler opens, it uses the current username and password.
Clean Batches Repository	Option > Clean Batches Repository.

Button	Description
Batch List	Refresh > Batch List. Used to refresh the list of scheduled batches.
History	Refresh > History. Used to refresh the History area.
Refresh settings	Refresh > Refresh settings. Used to determine how often the Batch List settings are refreshed. From the Refresh Settings window, select the frequency interval and click Save.

3-2: Edit a Batch

When running a batch, ensure that the service is running.

1. From the Batch Scheduler window, click the **Add Batch** button.

Batch Name: JNew Batch

Available

Scenarios	
a	
Calendar	
DRP-Daily	
DRP-Monthly	
ed - DTL	
LM	
LM weekly	
OtherLM	

Selected

Show Scenario Properties

Express mode

Scheduling

Run) Massive Series Update 3 for selected scenarios

once 3 11:04:53AM starting 1/13/2007 ::0J

Always Reload Series

Use Last Loaded Series

Setup task..

Force Unlock Scenario

Use Current Filter

Run From Computer: J. Any Computer Enter Computer Name 1

OK

Cancel

2. Enter the necessary information. The table below details what each feature means.

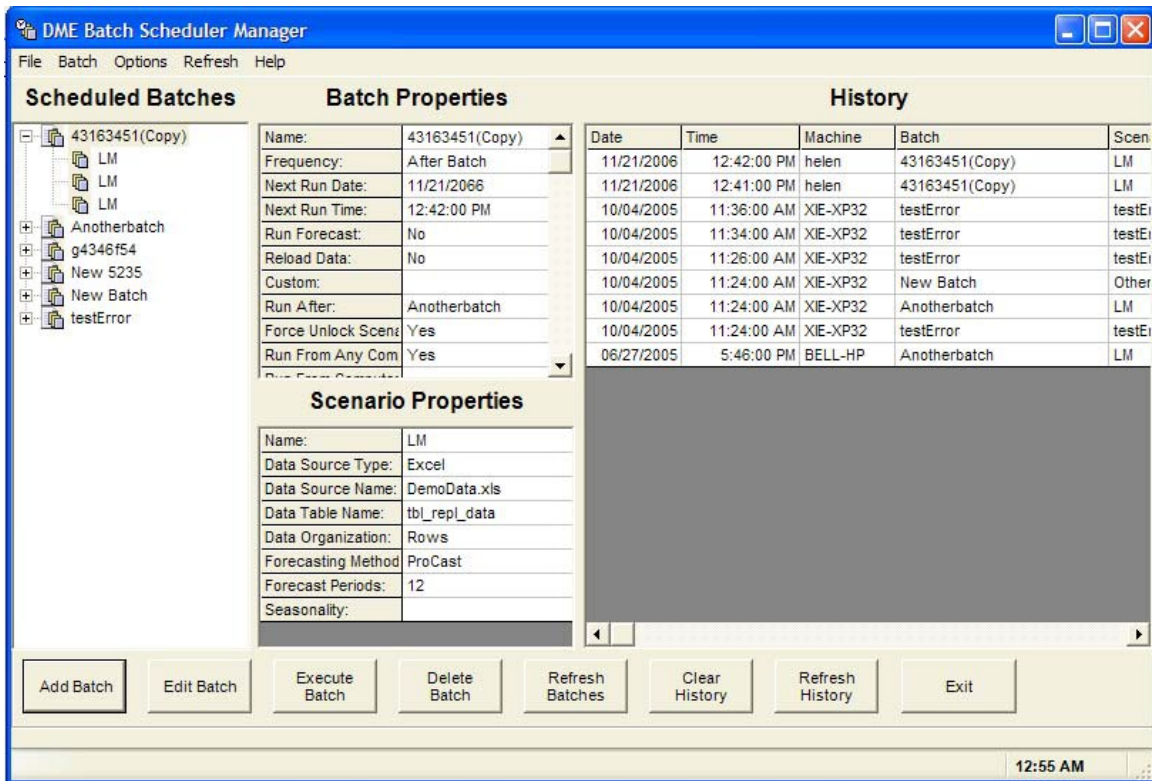
Textbox	Description
Batch Name	Enter a name or description of the Batch you would like to schedule.
Available	The Available column lists the names of the Scenarios available to include in the batch. Use the arrows to move the appropriate Scenarios into Selected column.
Selected	The Selected column lists the Scenarios selected to be run in the batch.
Show Scenario Properties	Indicate whether to display the Scenario properties in the Scenario Properties box on the Batch Scheduler screen. If the box is checkmarked, the Scenario properties display.
Express Mode	Only applied to Forecast, Mass Series Update, and Mass Observation Update. Improves performance when running certain types of batches. It is used to retrieve information directly from the data source. For additional information, see 3-4: Express Mode .
Force Unlock Scenario	Specifies if the Scenario should be unlocked before performing any operations.
Use Current Filter	Specifies if the batch operation should be executed and taking into account the current filter applied in the Scenarios to which the batch has been assigned.
Run from computer	Specifies if a specific batch can be executed from any computer or only a specific computer; only computer names can be entered.

Textbox	Description
Run	Select what will run when the scheduled job runs. ■ Forecast - Only the forecast is generated when the job runs. ■ Mass Series Update - Updates series properties for a group of Scenarios from a common source Scenario. For detail information of this task, see “4-1-1: Setup Mass Series Update task.” ■ Mass Observation Update - Update values of Opinion Lines for a group of Scenarios from a common source Scenario, including the incremental update function. For detail information of this task, see 4-3-2: Set Up the Massive Observation Update. ■ Exception execution - Runs specified exceptions for each selected Scenario in batch mode. Used for Forecast and Custom Task features. For additional information, see Chapter 9 Using Filters and Exceptions. ■ Custom Task - Runs specified custom tasks for each selected Scenario in batch mode. The custom task will use the saved parameters for each Scenario. If you select the Custom Task option, you can also check the “Run whole tree” checkbox to run the whole tree. For additional information, see Section 8: Custom Tasks Management.

Textbox	Description
Batch Schedule	In the Scheduling area, select the frequency, time and day when you want the batch to run. ■ Frequency - Select the frequency at which the batch will run. Your choices are once a day, once a week, once a month, once an hour, once every 15 minutes, once, or “After Batch”. “After Batch” allows you to execute a batch after a previous batch has finished, which establishes a dependent chain of tasks. Other options are “After Batch Success” and “After Batch Failure”. ■ Time - Select the time of day you want the batch to run. ■ Starting day - When you click on an arrow, a calendar of the current month displays. On the calendar, select the day you want the batch schedule to begin.
Always Reload Series	Select this radio button to have the data reloaded from the database before the Forecast is run. This option is disabled for the following tasks: ■ Exception Execution ■ Custom Task
Use last Loaded Series	Select this radio button to use the exact data values that were generated the last time it was loaded.
Setup Task	Used for “Mass Series Update” and “Mass Observation Update” tasks, this button is available to setup other settings. For additional information, see “4-1-1: Setup Mass Series Update task”.

3. Click **OK**.

The Batch Scheduler window displays the information for the new scheduled batch.



When the Batch Scheduler window displays again, the following information is available.

Name	Description
Scheduled Batches	Lists the existing scheduled batches with their selected Scenarios underneath the batch name.
Batch Properties	Lists options for the scheduled batch.
Scenario Properties	Lists options for the selected Scenarios within a batch.

Name	Description
History	Display the results of the jobs run. Notice that it is one item per Scenario run, not per Batch. If Forecast in the Run drop-down list box is selected, an item for the forecast is shown. If the Result status is Error, double-click on it to view the error message.

When you are finished scheduling the batch job to run, do not EXIT the Batch Scheduler; the scheduled jobs will not run. However, you can close the window. After closing the Batch Scheduler, it will continue to run as an icon in your Windows taskbar. Double-clicking on the icon re-opens the Batch Scheduler.

The table below details the buttons at the bottom of the screen and their usage. These features are also available from the File menu bar.

Name	Description
Add Batch	Used to add a new batch.
Edit Batch	Used to edit the configuration with which the batch was created.
Execute Batch	Used to select a batch. The batch runs as soon as the Batch Scheduler Server service is run. When executing a batch that has dependent batches, the user is prompted to run batches in two different ways: ■ Execute only the selected batch: With this option only the selected batch is executed. If any dependent batches exist, they are not executed. NOTE: If the Batch Scheduler Server is configured to retry failed batches, this option to execute only the selected batch only takes effect the first time. Once the Server tries to retry the failed batches, it also runs their dependent batches. ■ Also affect the dependent batches: the selected batch is executed and also all the dependent batches that maybe associated with it.
Delete Batch	Used to delete the selected batch.

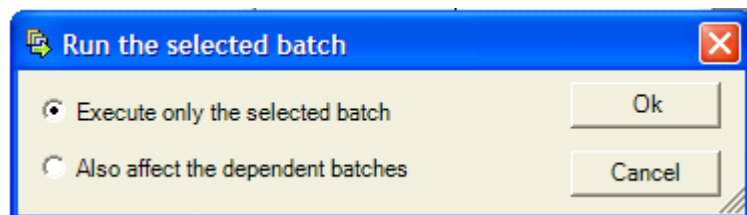
Name	Description
Refresh Batches	Used to update the list of scheduled batches in case another batch was created in another machine with the same username. Also, see the Refresh Settings option under the Refresh menu option.
Clear History	Used to erase the whole history list and clear the results for all the batches.
Refresh History	Used to refresh the history list. This list displays the results of the last executed batches.
Exit	Used to exit the application.

3-2-1: Run Mode

The Run Mode feature in the Batch Properties area of the DME Batch Scheduler Manager affects the scheduled batches only if there is another batch dependent upon the first batch scheduled to run.

1. From the DME Batch Scheduler Manager window, highlight the Scheduled Batch and click on the Execute Batch button.

The Run the selected batch window displays.



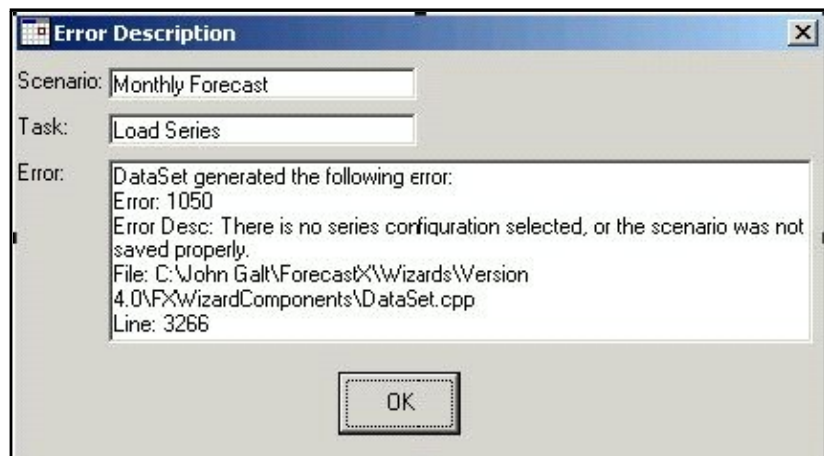
2. Select either "Execute only the selected batch" or "Also affect the dependent batches."
 - Execute only the selected batch - if selected, the Run Mode in the Batch Properties area is "This Batch Only."
 - Also affect the dependent batches - this is the Default mode. If selected, the Run Mode in the Batch Properties area is "Normal."

Note: *If you run a batch with “Execute only the selected batch” and the batch fails, use the “Reset Mode” menu to reset the Run Mode to the default (Normal) mode.*

3. Click OK.

3-3: Error Description

If a scheduled batch fails to finish running, an error message displays indicating that the batch running is incomplete. The error dialog box displays the Scenario name, the specific task where the batch failed, and a description of what caused the error. The depiction below is an example of the error message.



3-4: Express Mode

The Express Mode option on the Batch Add/Edit window is used for the following features:

- Forecast
- Massive Series Update
- Massive Observations Update

3-4-1: Forecast

To ensure that the Express Mode is running for the Forecast feature, the following criteria must be met:

- Data Source: Row (Base Unit > Data Capture tab > Data Organization - Row is selected)
- Grouping is disabled (Base Unit > Group By tab > Uncheck “Enable Grouping”)
- Always Reload Series (DME Batch Scheduler > Edit Mode > “Always Reload Series” is selected)
- At least one Attribute is loaded from the Data Source directly in the Base Unit. (Base Unit > Advanced > Configuration tab > Series Properties)

3-4-2: Massive Series Update

To ensure that the Express Mode is running for the MSU feature, the following criteria must be met:

- Data Source: Row (Base Unit > Data Capture tab > Data Organization - Row is selected)
- Grouping is disabled (Base Unit > Group By tab > Uncheck “Enable Grouping”)
- Always Reload Series (DME Batch Scheduler > Edit Mode > “Always Reload Series” is selected)
- Attributes or Labels used in the links and mappings source are loaded from the Data Source directly in the Base Unit (Base Unit > Advanced > Series Attributes or Label)
- At least one Attribute is loaded from the Data Source directly in the Base Unit. (Base Unit > Advanced > Configuration tab > Series Properties)

3-4-3: Massive Observations Update

To ensure that the Express Mode is running for the MOU feature, the following criteria must be met:

- Data Source: Row (Base Unit > Data Capture tab > Data Organization - Row is selected)
- Grouping is disabled (Base Unit > Group By tab > Uncheck “Enable Grouping”)
- Always Reload Series (DME Batch Scheduler > Edit Mode > “Always Reload Series” is selected)
- Attributes or Labels used in the links and mappings source are loaded from the Data Source directly in the Base Unit (DME Batch Scheduler > Edit Mode > “Use Last Loaded Series”).
- Mapping source can only use “Value”.
- Target Scenarios tab > “Send new items to Scenario” box is disabled.
- Incremental Update is unavailable.
- At least one Attribute is loaded from the Data Source directly in the Base Unit. (Base Unit > Advanced > Configuration tab > Series Properties)

Section 4: Massive Data Update (MDU) Management

The Massive Data Update feature includes the Mass Series Update and Mass Observation Update features. It updates Series Properties or Opinion Lines in Observations by connecting Scenarios based on labels or Series properties. It also eliminates hours of manual editing and retains other existing values. The following examples describe when the Massive Data Update feature is used:

- Import new streams of Opinion Lines, such as financial forecast or custom orders to compare against the forecast values.
- Introduce new periods of actual values via an incremental update.
- Introduce new items to an existing Scenario.

- Change the price and cost values as they are updated without effecting forecast numbers.
- Add or Change attributes such as sale representative, client information as necessary, and modify the series label correspondingly.

MDU performs a copy of the values from a source Scenario to one target Scenario or group of target Scenarios. The copy is required to specify how the series should be linked between the source and target Scenarios and which fields are required for the update.

The table below details how the MDU works.

Term	Definition
Source Scenario	MDU uses the source Scenario to perform the update. One and only one Scenario can be the source Scenario.
Target Scenarios	All the Scenarios that are affected by the update. At least one target Scenario must be specified.
Links	Represents the links at the series level between each target Scenario with the source Scenario. It can link by series label, or series properties. It is essential that all links combined will NOT generate a many to one relationship between source and target Scenario, which means one source series can be mapped to one or more target series, but not many sources series are mapped to one target series. Otherwise, the update result will be unexpected.
Mappings	Mapping specifies which target field/Opinion Line is updated using a value of a specific source field/Opinion Line. These links are mapped series properties or observation Opinion Line.

4-1: Massive Series Update

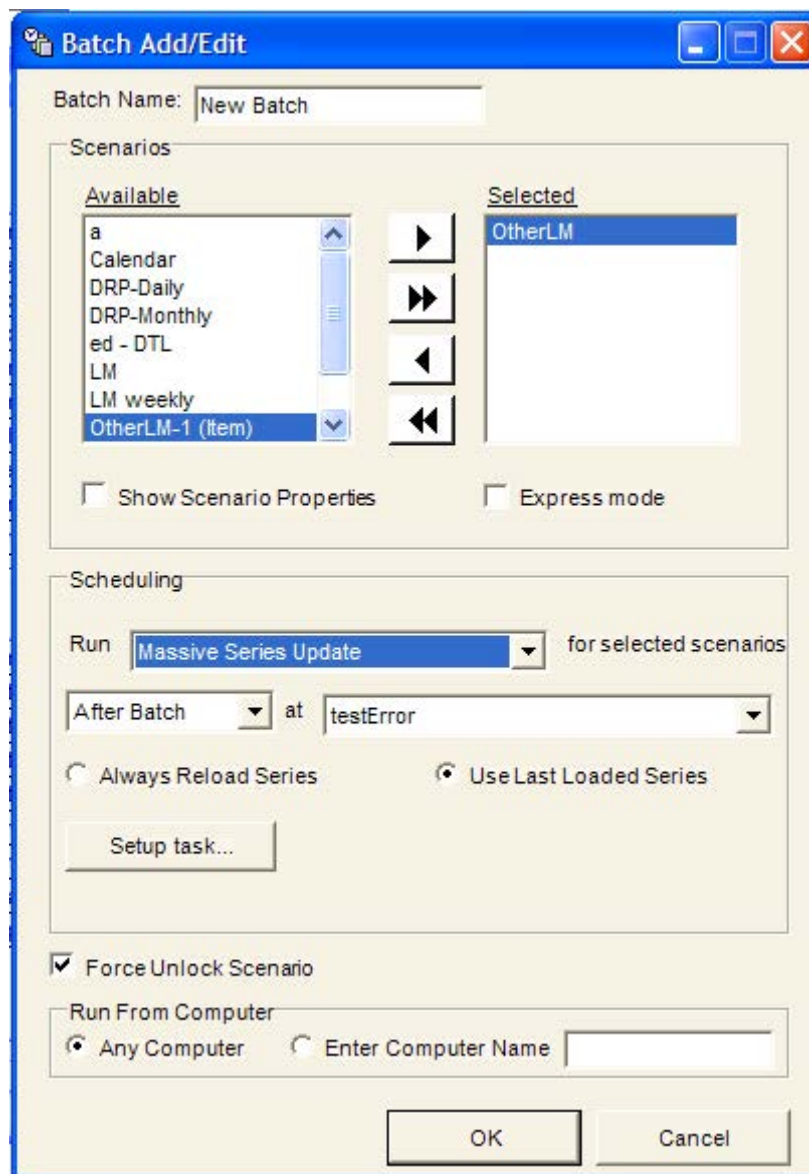
Massive Series Update enables users to update the properties' values of the Series for given target Scenarios in Batch Mode. When

using MSU, the user does not need to reload the Scenario in order to set the most updated properties' values for each Series.

4-1-1: Setup Mass Series Update task

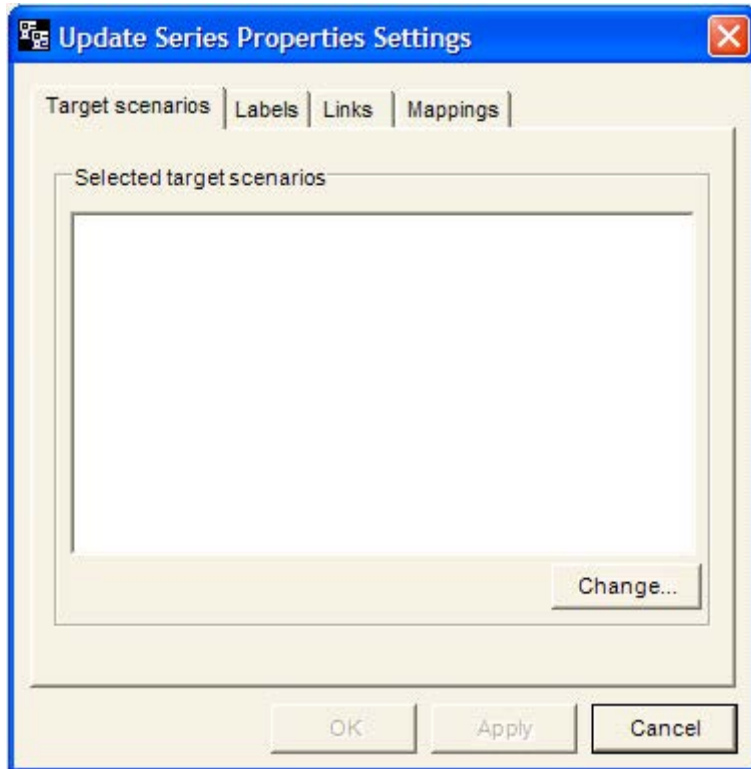
If you create or edit a batch and select Mass Series Update, there are other settings to consider. Note that only one Scenario can be selected as the source Scenario.

The following window displays.



4. Click the **Setup task** button.

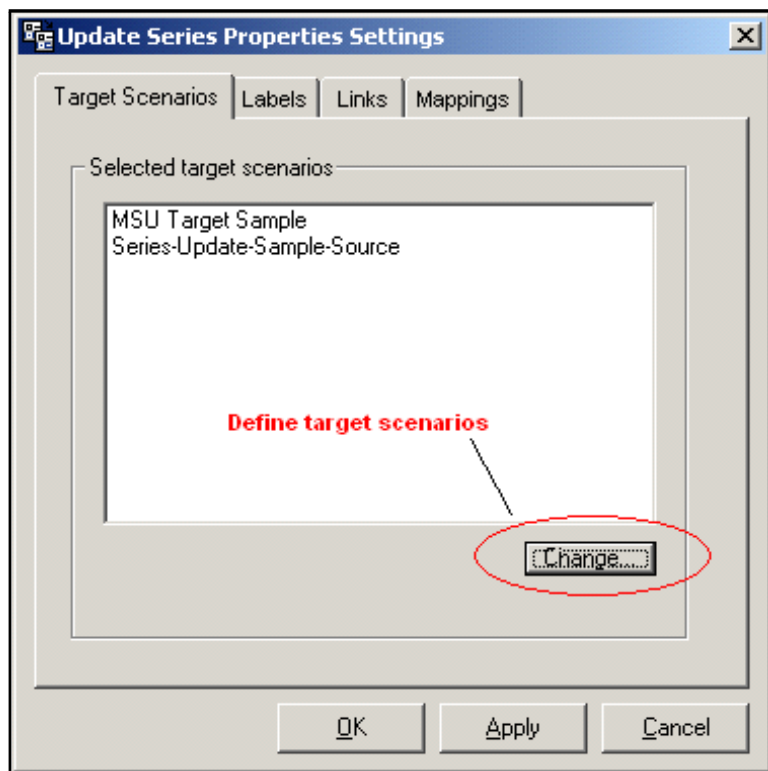
The Update Series Properties Settings window displays.



The following sections describe the tab functions on the Update Series Properties Settings dialog box.

Target Scenarios Tab

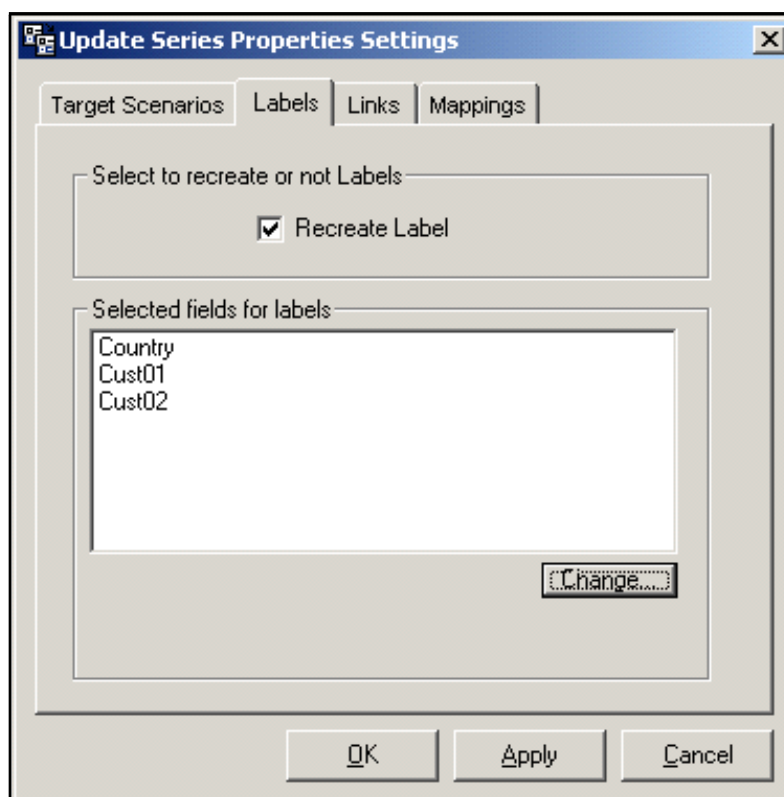
The Target Scenarios tab contains the current selected Scenarios defined as the target. Use the Change button to modify the list.



Labels Tab

The Labels tab recreates the labels. By default, the option is unchecked. If you want to recreate labels, you must specify at least

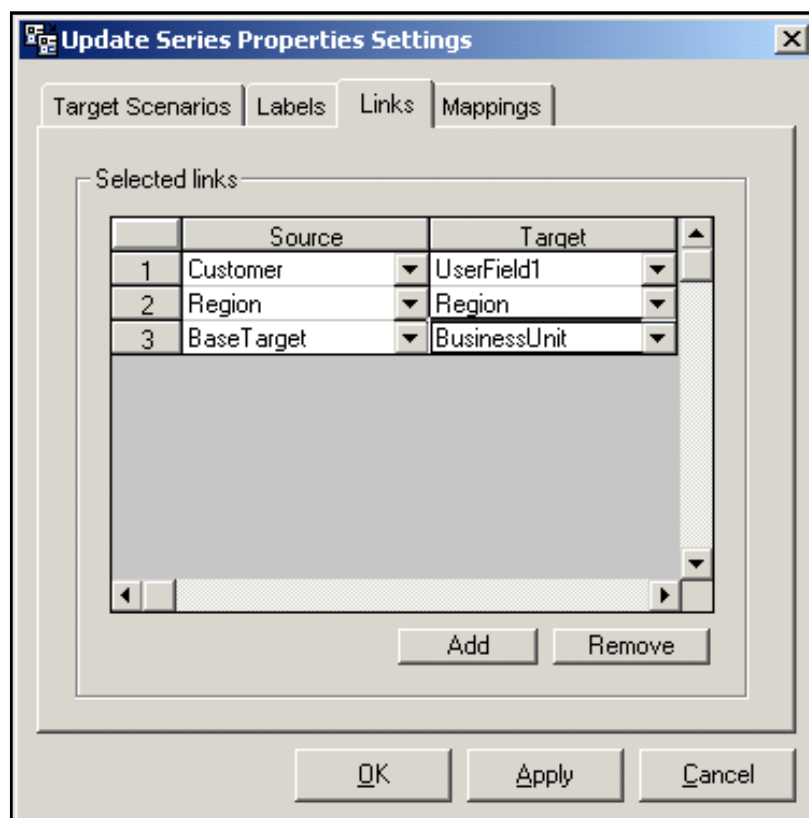
one field for the label. To modify the list of fields for labels use the Change button. Note that the field order is important.



Links Tab

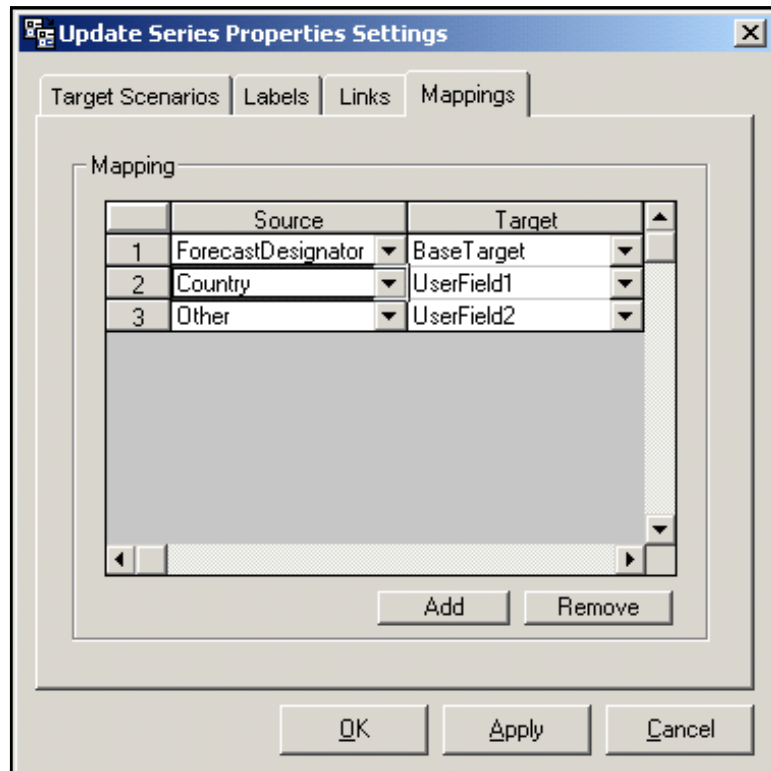
The Links tab specifies the links between the Target and the Source Scenario. The combination of source fields represents a unique

Series in the source Scenario while the combination of target fields represents a unique series in the target Scenario.



Mappings Tab

The Mappings tab specifies the fields that are affected by the update. In the user interface, each mapping is a couple of a target and source field. At least one mapping should be defined.



4-2: Massive Observation Update

Mass Observation Update is similar to Mass Series Update. MOU updates the Opinion Line values in observations and the MSU update the series level properties. One significant feature supported by MOU is the incremental update. This feature enables users to introduce new period data without reloading the Scenario. As a result, all other existing Forecasted values remain unchanged. Another difference is that the MOU links observations in the matched Series by the date information. The source and target Scenario should be in the same time level. For example, all are either monthly data or weekly data.

Massive Observation Update enables users to update the Opinion Line values of the observations for given target Scenarios in Batch Mode. It enables users to import new items to an existing Scenario. It also supports incremental update feature. When using MOU, users

do not need to reload the Scenario in order to set the most updated Opinion Line values for each observation.

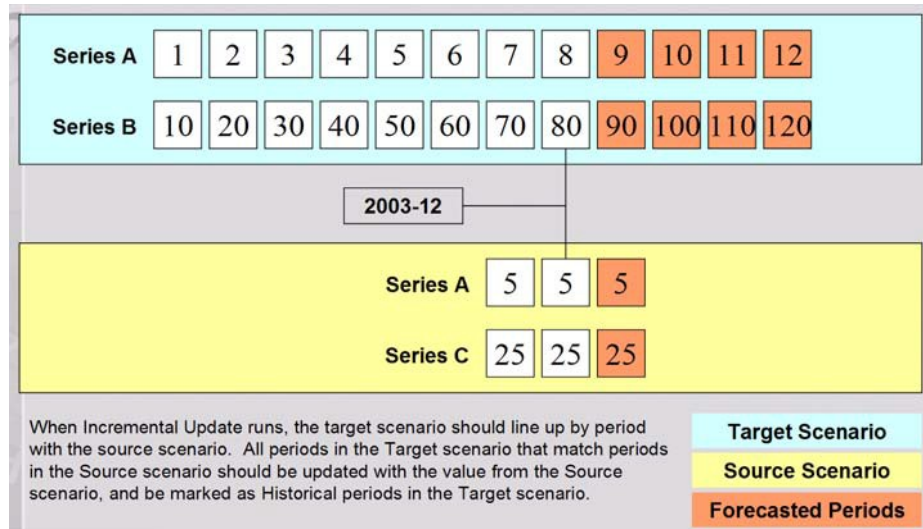
4-3: Incremental Update

Incremental Update enables users to apply the most recent Historical data to existing, established Scenarios. For each target Scenario, the Batch Scheduler compares the dates in the Scenario against the source Scenario. Where the dates are the same, the Batch Scheduler uses the data in the source Scenario to update the Historical data in each target Scenario. The Batch Scheduler uses the Series Label or Series Attributes to determine which Series to update in each Scenario. The Batch Scheduler also adds new periods to the end of the Forecast for each line item in the target Scenarios. The number of periods added is equal to the number of Forecasted periods updated by the new Historical data.

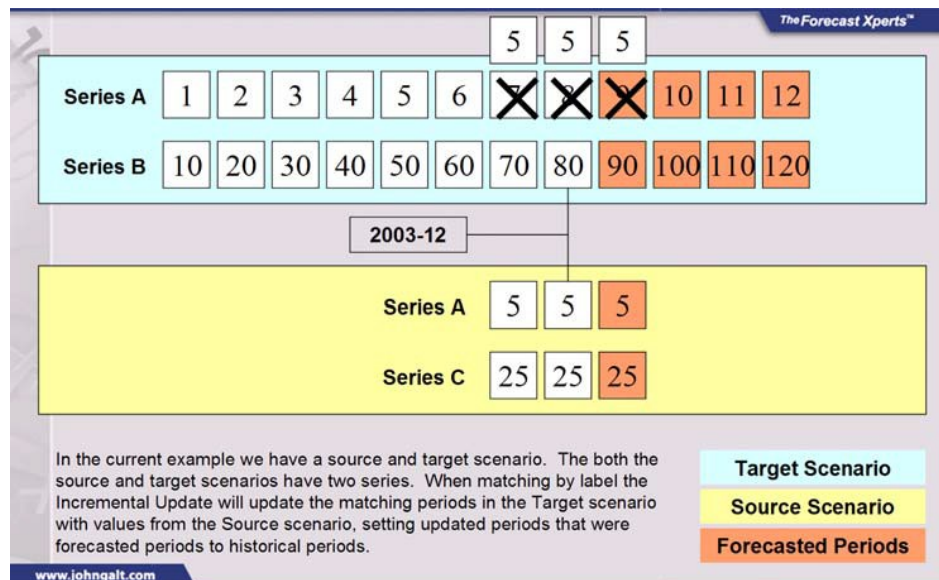
4-3-1: Incremental Update Example

The incremental update process enables the System Administrator to update the data in the system and extend the time fence based on the new data. In this way, the DME is able to pull in new data and provide the ability to measure any differences that exist between the Forecast

and the actual results. The depiction below details the effects that the incremental update has when it is run.

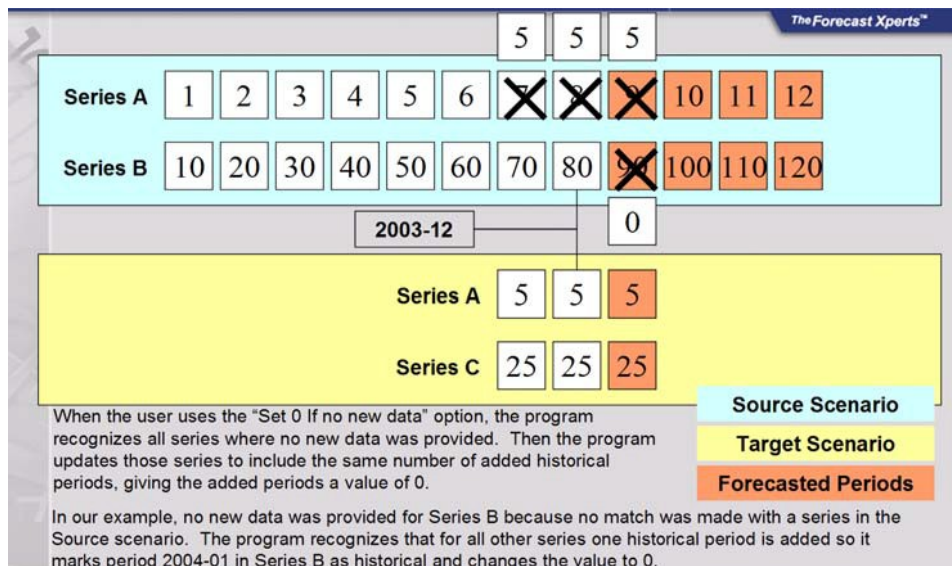


The new data periods in the source Scenario represent the current months actual data. The purpose of the incremental update is to move the new data to the DME and add any new items that have been added. The depiction below details the effect that the incremental update has on the Series:



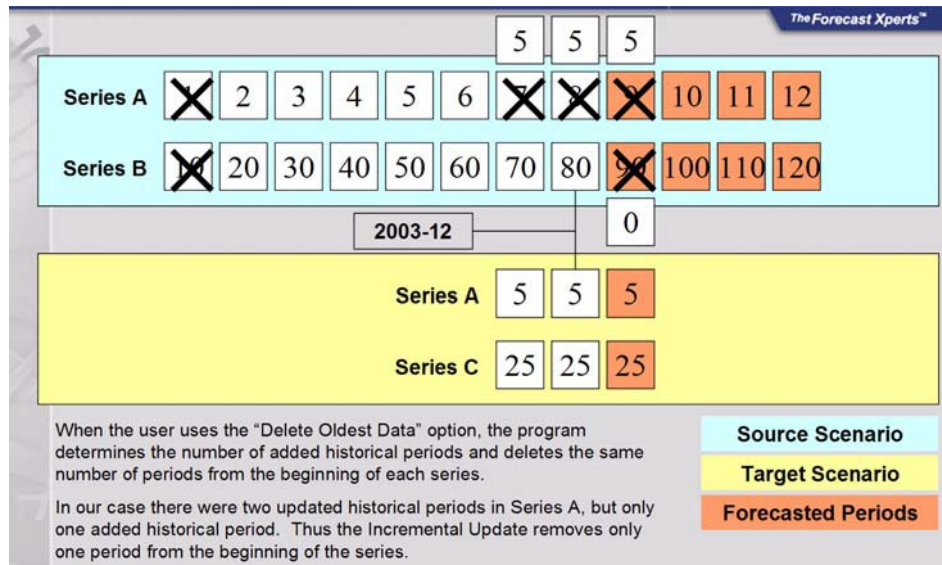
In the update process, the Observations are updated based on the dates that are entered. Using this approach it is possible to update and remap history, as well as adding data to the future periods. The Incremental update options are not enabled when the data is updated. However, as shown in the depiction, the time fence will not be advanced and the Forecast will not be extended. This is very useful for adding data to the DME that provides insight into current activity such as POS, customer orders.

If the incremental update option is turned on and the set to zero option is set then a different behavior occurs. The depiction below details an example.

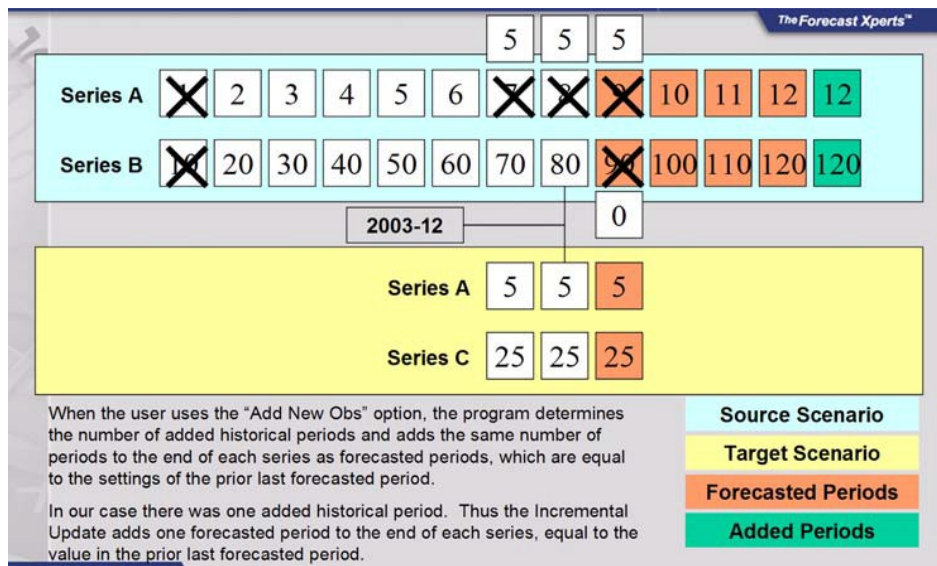


If this option is set, then any Series that does not appear in the source Scenario has the update period set to zero. After the initial update process is complete, the base data cleanup phase begins by (if the

option is selected) removing the oldest data from each Series. The depiction below details this process.



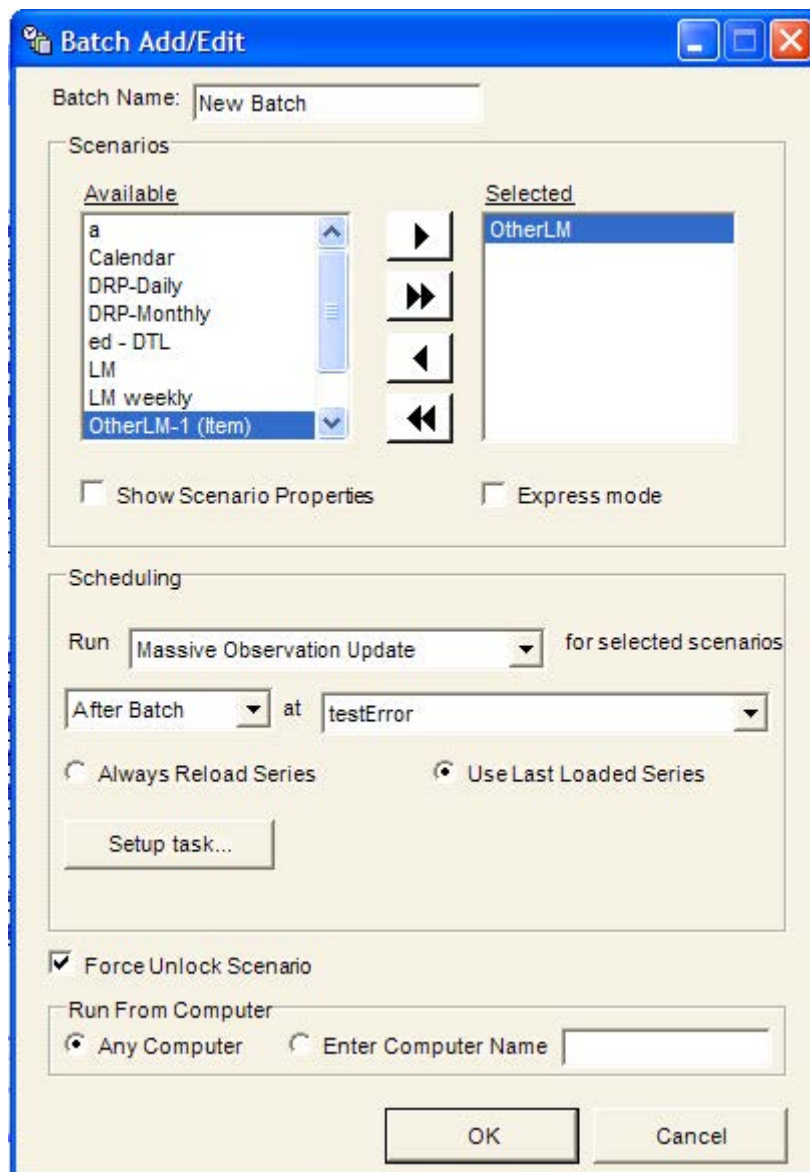
After the data is updated and the DME determines the number of periods that were added, the DME drops the same number of periods from each Series. Once the deletion process is complete, the DME then extends the Forecast. The depiction below details this process.



After this process is complete, the DME completes the process by adding the new items to the new item Scenario that was selected when the Incremental update was configured. In this way, it is possible to control and Forecasted new items separately from the established products. The sections below detail the parameters and settings that are used to perform the Incremental update process.

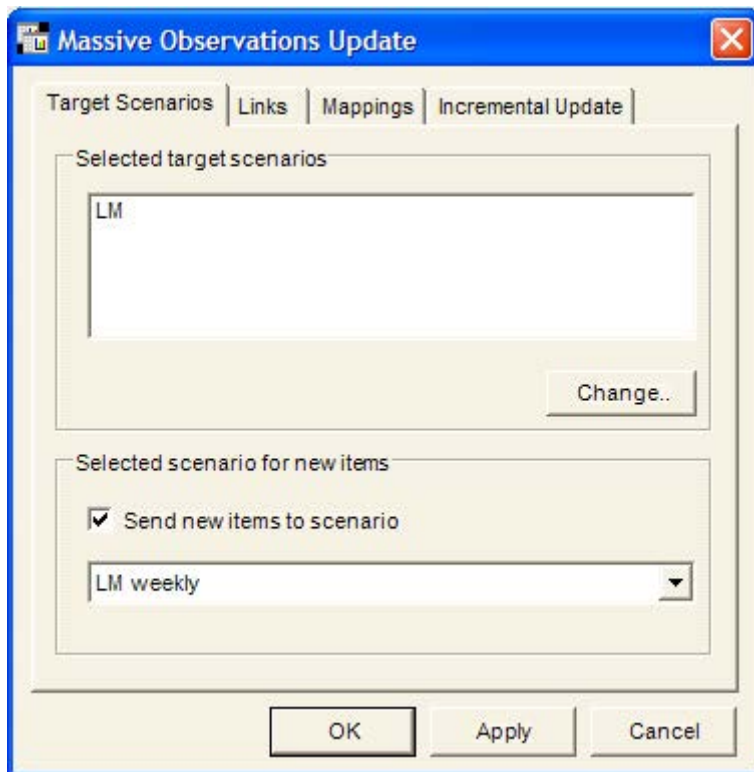
4-3-2: Set Up the Massive Observation Update

When creating or editing a batch, if choosing Mass Observations Update, you need to setup other settings using “Setup task...” button. Only one Scenario can be selected as the source Scenario.



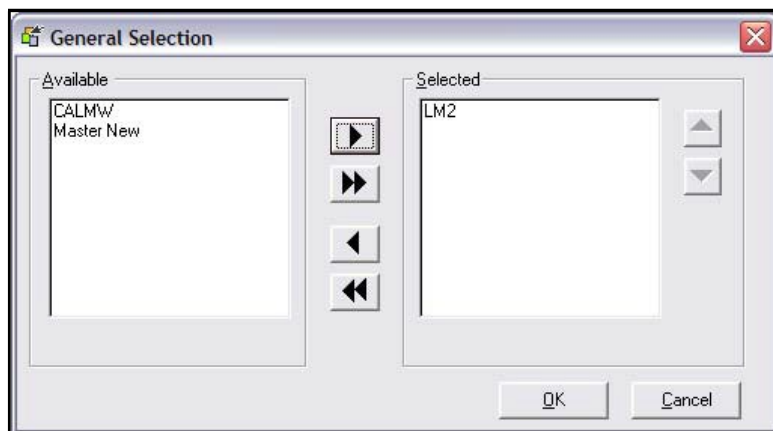
1. Click the **Setup task** button.

The following window displays.



2. Click on **Change** button.

The General Selection dialog box displays.



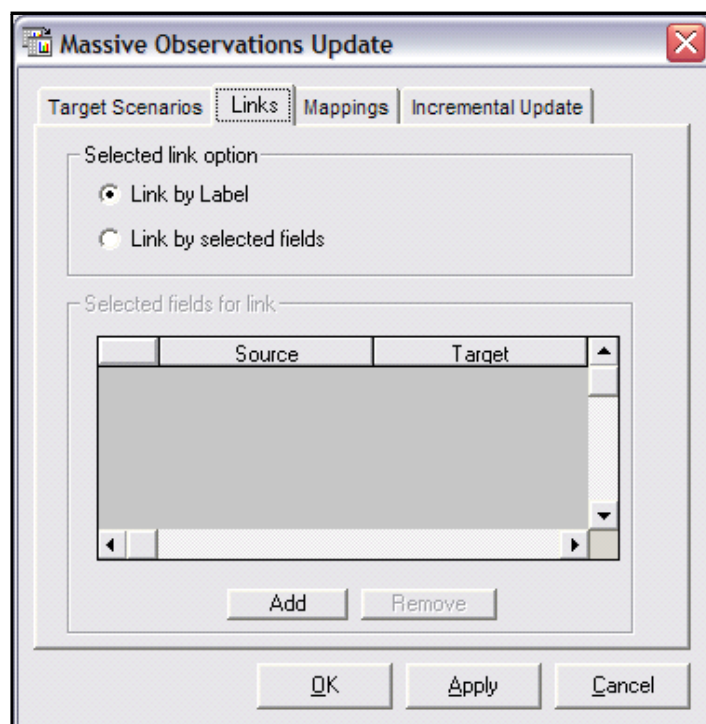
3. Select the target Scenarios and click OK.

The Send Scenario-to-Scenario checkbox enables users to send new items from source Scenario to a specified target Scenario.

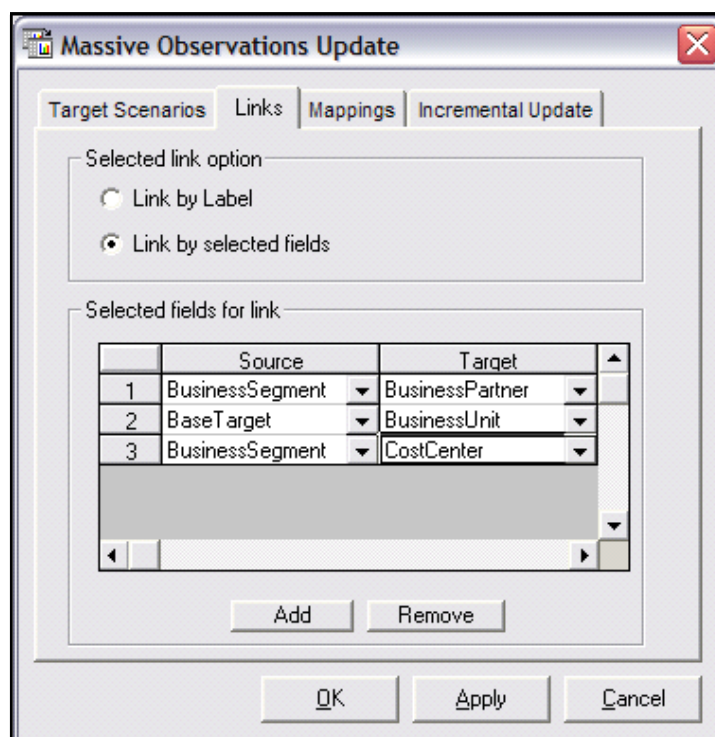
4. Click the **Links** tab.

There are two options:

- Link by Label
- Link by selected fields

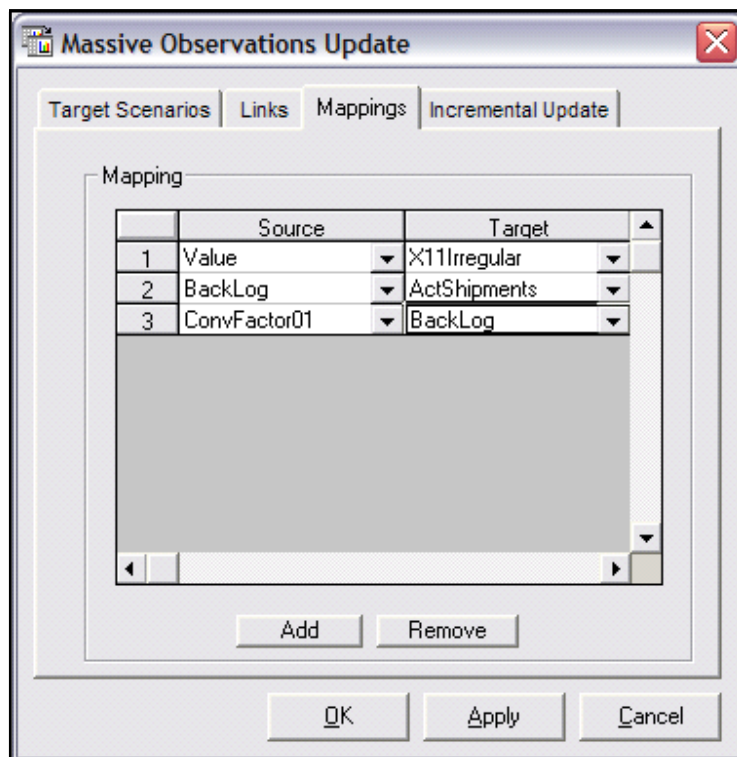


The “Link by Label” option matches the series in the source Scenario to the targeted Scenarios by Series label.



The “Link by selected fields” option matches the series in the source Scenario to the targeted Scenarios by selected Series fields.

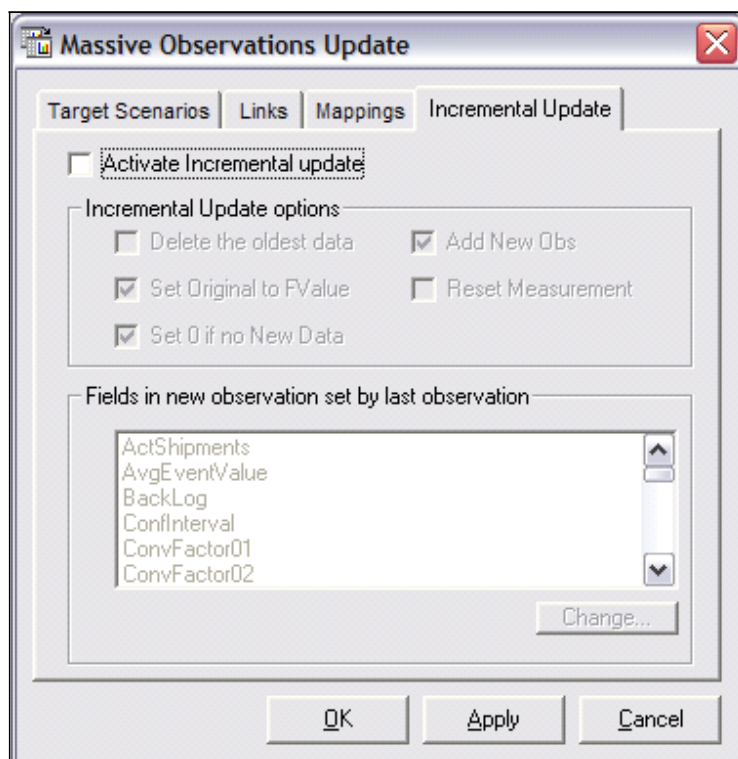
5. Click the **Mappings** tab.



You can specify the source Opinion Line and target Opinion Line. The number of fields in the source and target Scenarios should be the same.

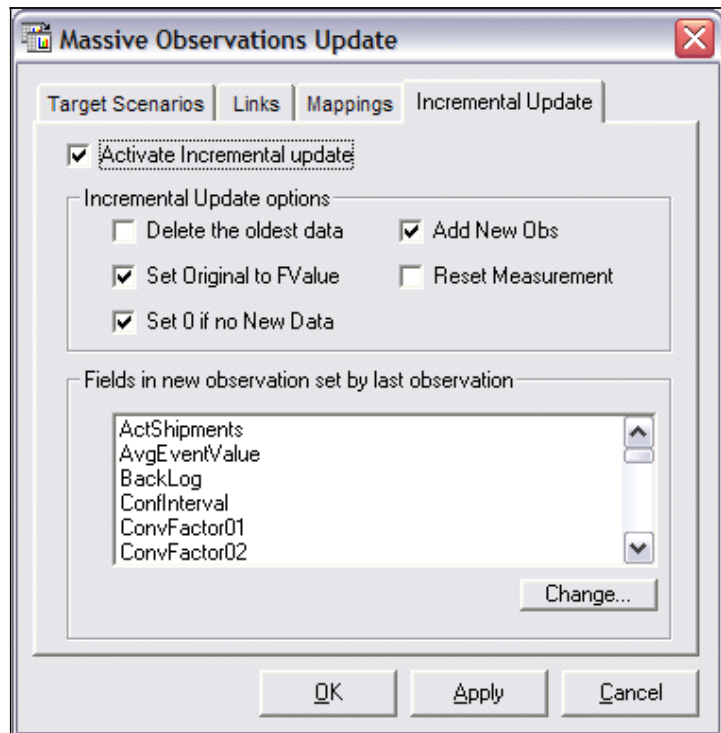
4-3-3: Incremental Update Tab

1. Click the **Incremental Update** tab.



If you unselect Activate Incremental Update checkbox, all options in this dialog are greyed out. The program takes all the source Opinion Lines and updates the corresponding target Opinion Lines, both Historical and Forecast.

If you select Activate Incremental Update checkbox, the following options are available.



4-3-4: Delete the Oldest Data

If you want to remove the oldest period of data after incremental update, check this option. The following diagram illustrates this idea

4-3-5: Add New Observations

Because the incremental update makes all the updated forecast period to Historical, you may want to add new periods so that you will not run out of forecast periods. Note that the number of periods being added equals to the number of forecasted periods being updated. The values in the new observations are copied from the last Forecasted Observation.

4-3-6: Set Original to FValue

This option sets Original Opinion Line equals to FValue Opinion Line.

4-3-7: Reset Measurement

This option sets Measurement Opinion Line to zero.

4-3-8: Set 0 if no New Data

If you check this option, the Observations for all Series which do not exist in source Scenario are set to zero.

4-3-9: Fields in New Observation Set By Last Observations

If “Add New Observations” option is checked, you can set the values in which fields (Opinion Lines) are copied from the last Observation to the newly added Observations.

4-4: Limitations

Incremental update does not update target Scenario if the dates in the source and target Scenarios do not correspond.

4-4-1: Target Scenario

2000-01	2000-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08
10	11	12	13	14	15	16	15

4-4-2: Source Scenario

2000-01	2000-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08
1	1	1	1	1	22	23	24

In this case, source Scenario start date is 2001-01 but the target starts at 2000-01. There is no overlap and incremental update will not update the target Scenario.

If target Scenario does not have any Forecast period, incremental update does not delete any oldest Observation and does not add any new Observations, because there is no Forecast period in target to update.

Chapter 12 Statistical Information

This chapter includes:

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Section 1: Overview

The DME's Statistics option enables you to apply statistics to the Forecasting process. The statistics that are generated measure the accuracy of the Forecast and help understand your data. The statistics you choose are viewed in reports. You can select the statistics that are to be applied in a Forecast. The DME supports more than 40 types of statistics.

This chapter serves as a reference guide for questions you may have on statistic methods used by the DME.

Section 2: Statistics Tab

The DME's Statistics tab has a variety of options based on various specific business models and data. Use the Statistics tab to define the statistics you want applied to your Forecast and choose the parameters for your Safety Stock Properties and Confidence Limits.

This section introduces the DME's Statistics tab, explains its options, and provides instructions on how to select and use the options effectively in your Forecast.

(: : : :]

Reports

General : : : : = : : : ; S al.le ty S to: c JsP ro p e rti; s = : : : ;

P" Mean Abs. Pet.];.nor

P" Active

☐ !!lt.:

☐ Add Forecasted Values

☐ A!C

Level: 50 -- 90 %

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onfidence Limits Properties

☐ Durbin Watson

P" Active

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Limits: EU

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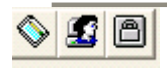
Options ----->

☐ ariance

P" Write Single Statistics

All.Qn

☐ Write Multiple Statistics



More >

advanced | froCast!

2. Set the appropriate options for your Forecast. When an option is selected, a checkmark displays in the check box next to the option.

Option	Description
General	Select the statistics that you want applied to your Forecast. You can select or deselect all the listed statistics by clicking the All On or All Off buttons.
Safety Stock Properties	Select the appropriate Safety Stock Properties for your Forecast. ■ Activate - Select this option to be able to view Safety Stock Properties in your Forecast. (Safety Stock is what a manufacturer needs to keep on hand in order to ensure that they are never over or under stock on an item.) ■ Lead time - Specify the Lead Time. Lead Time is the number of periods covered by a Safety Stock Properties. In other words, the duration between the reorder and receipt of order. ■ Level - Specify the level you want to maintain. For instance, enter 90 if you want to ensure adequate stock 90% of the time.
Confidence Limits Properties	Select the Confidence Limits Properties for your Forecast. ■ Activate - Select this option to view Confidence Limits, that represent the trustworthiness of the Forecasted data, within Executive Reports and the Series Preview screen. ■ Limits - Specify the measure of confidence you want your Forecast view to reflect.

Option	Description
Options	Indicate whether you want to Write Single or Multiple Statistics. A Forecast runs faster when these two options are not selected, but the results will not be as useful as they are with the statistics. ■ Write Single Statistics - Check this field to write all statistics, fitted values, Same As history, and all selected Data Cleansing options. If this option is not selected, the DME does not save any single statistics even if they are selected. ■ Write Multiple Statistics - Methods such as Event Model, Holt Winters, Box Jenkins, and Regression models generate multiple statistics tables that can be seen in the reports. If this option is not selected, the statistics are not calculated and saved in the database.

3. Click the **More** button for more Statistics options. The Additional Statistics screen displays. Select the additional statistics you

want generated for your Forecast, or use the **All On** button to select all the options in a group.

Additional Statistics

Accuracy

- ☐ Mean Absolute Error
- ☐ Mean Error
- ☐ Mean Square Error
- ☐ Normality Error
- ☐ Root Mean Square Error
- ☐ Standard Deviation Error
- ☐ Theils

Descriptive

- ☐ Range
- ☐ Max
- ☐ Min
- ☐ Kurtosis
- ☐ Skewness
- ☐ Mode
- ☐ Ljung-Box
- ☐ Auto-Covariance
- ☐ Auto-Correlation
- ☐ Coefficient of Variation
- ☐ Sum of Squared Deviation
- ☐ Root Mean Square
- ☐ Mean Square Deviation
- ☐ Mean Absolute Deviation

Regression Table

- ☒ ANOVA
- ☒ Coefficient
- ☐ Correlation Coefficient
- ☐ Covariance
- ☐ Coefficient Determination

All On **All Off** **Close**

The additional statistics are divided into three categories:

- Accuracy
- Descriptive
- Regression

Accuracy and Descriptive statistics can be selected with any Forecast technique, but the Regression category is available only with Regression Forecast techniques.

4. Click Close when finished.

Section 3: Statistics View

The Statistics View allows you to view more detailed information regarding a forecast and allows you to select which statistics are displayed. You can also change how you view the statistics by grouping them together based on any column in the Statistics View.

You can also customize the information that displays in this view by adding or removing fields using the Forecast Settings window. In earlier releases of the DME, this information could only be viewed by generating reports, but is now available as part of the Series View.

Please note that after upgrading versions of the DME, your statistics will need to be re-generated. Simply run your forecasts and your statistics will be displayed.

1. In the Series View, select the Statistics View tab at the bottom of the main window.
2. The Statistics View displays data relating to the statistics selected for this series.

Source	Target	Category	Statistic	Value
Adj Hist	Act Fcst	General	(NonBlanks)	
Adj Hist	Act Fcst	General	MAPE	0.4761
Adj Hist	Act Fcst	General	Mean	11,463.7083
Adj Hist	Act Fcst	General	R-Square	0.5944
Adj Hist	Act Fcst	General	Standard Deviation	7,485.8059

3. To view statistics for multiple forecasts within this series, clear your filter criteria from the top row of the table.

3-1: Grouping in the Statistics View

You can sort the Statistics View by any column by clicking on the title and then clicking again to reverse the sort order.

You will also notice that above the statistics is an area that says “Drag a column header here to group by that column.” This allows you to group your statistics by any column from the statistics view. You can drag additional columns to this area to further group and sort your statistics.

The screenshot shows the 'Statistics View' window. At the top, there's a 'Target' dropdown menu. Below it is a table with columns: Source, Categ, Statistic, and Value. The first row shows 'Adj Hist' under Source, 'A' under Categ, 'A' under Statistic, and '=' under Value. Below this table, there are three expandable sections, each representing a target:

- Target : Act Fcst (4 items)**

Adj Hist	General	MAPE	1.3801
Adj Hist	General	R-Square	0.5032
Adj Hist	General	Mean	17,009.5000
Adj Hist	General	Standard Deviation	18,501.2101
- Target : Com Ord Arr (4 items)**

Adj Hist	General	MAPE	1.3801
Adj Hist	General	R-Square	0.5032
Adj Hist	General	Mean	17,009.5000
Adj Hist	General	Standard Deviation	18,501.2101
- Target : Dep Dmd (4 items)**

Adj Hist	General	MAPE	5.3392
Adj Hist	General	R-Square	0.0000
Adj Hist	General	Mean	17,009.5000
Adj Hist	General	Standard Deviation	18,501.2101

At the bottom of the window, there are three tabs: 'Graph View', 'Data View', and 'Statistics View' (which is currently selected).

You can drag the statistics boxes back to the list view to remove this level of grouping and restore the column to the list view.

3-2: Changing the Statistics View

The Forecast Settings screen is used to select which statistics display on the Statistics View tab and select the parameters used in generating these statistics. The Forecast Method can also be changed from this screen by selecting a new method from the Forecast Settings section. Changes made to the fields on the Statistics View will only display when the forecast re-run.

1. Double-click on the Target field in the in the Misc Windows panel.
2. The Forecast Settings screen displays.

Forecast Settings : 02-TR-INV-OPT-LM - [1818402C2], Opinion Line : Act Fcst

Save RollBack

Forecast Settings		History Range	Forecast Range
Source Opinion Line	Adj Hist	Fixed Start Period	Forecast periods 17
Target Opinion Line	Act Fcst	Fixed End Period	
Forecast Method	ProCast	Floating Start Periods	
Overwrite History	☒	Floating End Periods	
Automatic Forecast	☒		

Forecast X Method Parameter	General Statistics	Accuracy Statistics	Descriptive Statistics
Error Term	MAPE ☒	Mean Absolute Error ☐	Range ☐
Sum Squared Error	BIC ☐	Mean Error ☐	Auto Covariance ☐
Include New Product Curve ☐	AIC ☐	Mean Square Error ☐	Max ☐
Include when numb. of obs 6	Sum Squared Error ☐	Normality Error ☐	Auto Correlation ☐
	R-Square ☒	Root Mean Square Error ☐	Min ☐
	Adjusted R-Square ☐	Standard Deviation Error ☐	Coefficient Of Variation ☐
	Durbin Watson ☐	Theil ☐	Kurtosis ☐
	Mean ☒	Standardized Mae ☐	Sum Squared Deviation ☐
	Median ☐		Skewness ☐
	Standard Deviation ☒		Root Mean Square ☐
	Variance ☐		Mode ☐
			Mean Squared Deviation ☐
			LjungBox ☐
			Mean Absolute Deviation ☐

Safety Stock Statistics	Regression Table	Statistics Attribute Mapping
Active ☒	Anova ☐	☒ Add Item ☐ Remove Item
Add Forecasted Values ☐	Coefficient ☐	Statistic Attribute
Lead Time 2.00	Correlation Coefficient ☐	
Level% 95	Coefficient of Determination ☐	
	Covariance ☐	

Confidence Limits Statistics	
Active ☒	
Limit% 90	

3. Use the check boxes to select the statistics to display.
4. Click Save. The Forecast Settings window will close.
5. Re-run the forecast to update the statistics with the new settings.

Section 4: Descriptive Statistics

Descriptive Statistics describes data. This section provides detailed information for different types of statistics.

4-1: Auto Correlation

Auto Correlation describes the dependence between two variables of the same time Series at different time periods. Auto Correlation helps determine if there is a causal connection between two variables, even though there is a time lag between their occurrences. For example, Auto Correlation can be useful in sales for determining if a special promotional event occurring at regular intervals is a causal factor in increased sales after the events happen.

4-2: Coefficient of Determination

Auto Correlation can tell you if Y is dependent on X, even though X happens before Y. Not only can Auto Correlation be used to determine Seasonality, it also helps describe if a Series is stationary. A Stationary Series is one that has properties independent of the time period in which they occurred.

Also known as R-Squared tells the proportion of variance in Y that can be explained by X. X is an Independent Variable that has some influence on Y's variance. It can also explain how dispersed the data points are from the mean data point. This can be useful in determining if an Independent Variable affects the Seasonality of your data.

4-3: Coefficient of Variation

The relative amount of dispersion in the data can be calculated by expressing the standard deviation as a percentage of the mean. This measurement is called the Coefficient of Variation. This enables comparison of the dispersions of two separate data sets that are entirely different.

4-4: Confidence or Interval Estimate

Confidence Estimate or Interval Estimate is defined by two numbers and within these two numbers lies the parameter point of interest. The parameter point of interest is retrieved by forming an interval around the point estimate (i.e., a value arrived at from the sample data that estimates the unknown population value) and is computed using either the Normal distribution or the T distribution. The goal of the

Confidence Estimate is to help determine whether the Forecast is trustworthy. Therefore, if the Forecast is trustworthy, the Confidence Estimate is small.

4-5: Correlation Coefficient

Correlation Coefficient determines how strongly two variables are related. The value of the Correlation Coefficient is always between -1 and 1. That means that if the value is 0, then the two variables, X and Y, are independent.

If the Correlation Coefficient is positive, it means when X is large, Y is likely to be large as well. If the Correlation Coefficient is closer to 1, then X and Y are almost directly related. However, if there is a negative correlation, it means that when X is large, Y is likely to be small. The closer the Correlation Coefficient is to -1, the stronger the negative correlation.

4-6: Covariance

The degree of dependence between two random variables is measured by Covariance. This is useful if you have two random, dependent variables, such as X and Y.

4-7: Difference

Difference is one of the easiest ways to make comparisons of a time-Series variable over time. It is accomplished by subtracting the current value of a variable by a past value.

This procedure is useful to see the absolute change in the direction the variable is taking. Differencing is often used to make a non-stationary time Series stationary, or detrended. A non-stationary time Series is one that does not have a fixed mean.

4-8: Kurtosis

Kurtosis measures the thickness of the tails of a distribution. Kurtosis is a measure of flatness and tail thickness of a distribution as compared with the normal distribution. Positive Kurtosis, or

Leptokurtic, indicates a relatively peaked distribution. Negative Kurtosis, or Platykurtic, indicates a relatively flat distribution.

For a normal distribution, Kurtosis is equal to three. When the tail of the distribution is thicker than the normal distribution, Kurtosis is greater than three. When the tail of the distribution is thinner than the normal distribution, the kurtosis is less than three.

See [4-16: Skewness](#) for additional information.

4-9: Ljung Box

Ljung Box tests the overall Auto Correlation of the fitted errors of a model. It determines how a variable relates to itself when it is lagged one or more periods. It also shows that if the correct ARIMA model is estimated, the Ljung Box statistic tends to be smaller. Conversely, an erroneous model would tend to inflate the Ljung Box statistic.

4-10: Max

Maximum is the largest value in the data set.

4-11: Mean

Mean is the average. The Mean is calculated by adding the values of the items and then dividing the total by the number of items added. Like Median, it is often used as a measure of location for a frequency or probability distribution.

4-12: Median

Median is the middle item after the entire sequence is arranged in either ascending or descending order. Median is used to measure the location for a frequency or probability distribution.

4-13: Min

Minimum is the smallest value in the data set.

4-14: Mode

The value or values that appear most frequently within your data set.

4-15: Range

The difference between the Max and the Min.

4-16: Skewness

Skewness is similar to Mean and Variance, which calculate the distribution of a random variable. Skewness measures whether or not the distribution is symmetrical. A symmetric distribution has a Skewness of 0. If the tail of the distribution is long and in the positive direction, then it has positive Skewness. If the distribution has a long tail in the negative direction, then the Skewness is negative.

4-17: Standard Deviation

Standard Deviation is a descriptive statistic that is derived from taking the square root of the variance. The variance you to see how far each data point is from the mean within the data set.

4-18: Sum of Squared Deviation

With the Sum of Squared Deviation, given a single data Series, each observation is subtracted from the estimated mean of the data Series, and then squared. All Observations are then added to produce the Sum Squared Deviations. The Sum Squared Deviations are used to calculate the sample variance, alternatively called the Mean Squared Deviation (MS), of a single data Series.

4-19: Variance

Variance measures the dispersion of the data. Variance is calculated by determining how far each data point is from the Mean.

Section 5: Statistical Methods

This section details the different types of Statistical Methods that are used within the DME.

5-1: Holt-Winters Method

The Holt-Winters method is an exponential smoothing technique that incorporates growth and Seasonality into the Forecast by producing seasonal lift factors for each seasonal period. The DME displays the seasonal indices in the Audit Trail report.

The Holt-Winters formula uses three parameters, or smoothing constants, to calculate a Forecasted value:

Parameter	Description
Alpha	The level of smoothing.
Gamma	Determines growth trend.
Beta	Determines seasonality.

The value of each parameter is always between 0 and 1.

If the Historical data changes rapidly, large smoothing constants should be used. For stable, naturally consistent data, the smoothing constants should be closer to zero. In either case, the DME automatically optimizes the parameters when they are not already specified.

5-1-1: Holt-Winters Method Example

The Holt-Winters Method example is based on the volume of ticket sales for bus rides. The **Go Anywhere** bus line is trying to determine when the company should deploy the largest number of buses to meet its rider demand. Using the Holt-Winters method, Go Anywhere will Forecast its ticket volume sales.

1. Create a new Scenario.

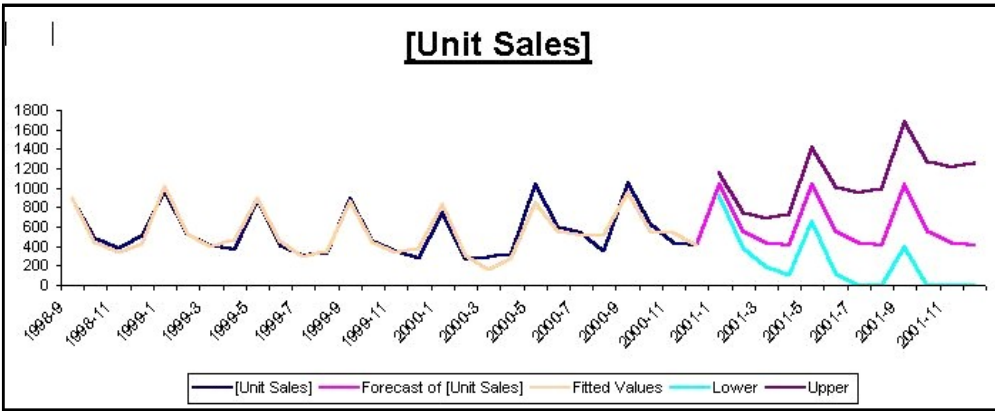
2. Click the **Data Capture and View** button. On the Data Source dialog, select Excel Spreadsheet.
3. Browse to the **ExcelExampleFXE.xls** file and click **Done**.
4. Select the **Holt-Winters Table/Query** from the **Table/Query** drop-down list. In this example there are 28 months of Historical ticket-sales on which to base the Forecast.
5. Select **Columns** in the **Data Organization** box.
6. Click the Forecast Method tab. Select the **Seasonal Model** from the **Forecasting Technique** drop-down list.
7. Select **Holt-Winters** from the **Primary Method** drop-down list.

Leave the smoothing constants blank to enable the DME to automatically select them.

8. Select the **Statistics** tab.
9. Check **Write Multiple Statistics**. This saves the seasonal indices in the database and shows them in the report.
10. Click **Procast**.
11. Click the **Reports** tab to select how to display the results. Select the Audit Trail report. The Audit Trail provides an analysis of your Forecast.
12. Select **Show Charts** on the **Executive** tab to display a graphical representation of your data, and the **Upper and Lower limits** check boxes to display the confidence limits of your Forecast.
13. Click **Run Report**.

After running the Forecast, the DME creates a graph and table with the Seasonal indices and smoothing constants. The graph enables

users to quickly assess the trend and Seasonality of data by visualizing the peaks and valleys of data.



5-1-2: Graph Results

The statistical tables enable users to determine the accuracy of a Forecast. The table below details the lines on the graph.

Line	Description
Brown	Represents the Fitted Values of the Forecast and illustrates how closely the Forecasted and actual values match.
Dark Blue	Represents the Actual Values.
Pink	Represents the Forecast Values.
Light Blue	Above and below the Forecasted values are the Confidence Limits. These values represent the likelihood, within 5%, of the Forecast to fall within that range.
Purple	Above and below the Forecasted values are the Confidence Limits. These values represent the likelihood, within 5%, of the Forecast to fall within that range.

Overall, the graph shows that there is an upward trend in the sale of bus tickets, with this seasonal trend continuing in the future.

5-1-3: Audit Trail Results

Audit Trail statistics reveal that the DME created an accurate and trustworthy Forecast shown by the very low Mean Absolute Percentage Error of 12.54%. In addition, the Audit Trail report displays the smoothing constants, Alpha, Beta, and Gamma, as well as the seasonal indices. You can use this detail to learn about the trends and Seasonality of your data.

Audit Trail - Statistics			
Accuracy Measures		Value	
Mean Absolute Percentage Error (MAPE)		12.54%	
R-Square		90.26%	
Forecast Measures		Value	
Mean		539.36	
Standard Deviation		249.18	
Method Statistics		Value	
Primary Method		Holt Winters	
Alpha		0.78	
Beta		1.00	
Gamma		0.00	
Seasonal Length		4.00	
Decomposition Type		Additive	

Using the Forecast, the **Go Anywhere** bus line can operate more efficiently and cost effectively. Bus drivers are staffed as needed, the correct number of buses are deployed at the appropriate times, and the company is able to service the buses during down times, which results in not losing any riders due to lack of buses. Ultimately, **Go Anywhere** adds to its bottom line by providing the highest level of customer service.

5-2: Simple Exponential Smoothing

Simple Exponential Smoothing is a method of Forecasting using both Historical data and Fitted data to generate the new Forecast. The underlying concept of Simple Exponential Smoothing is that recent values are given relatively more weight than older observations.

For example, in a three period Moving Average Forecast, the February, March, and April actual values evenly determine May's Forecast.

Depending on the level (Alpha value) given to the Data Series, a Simple Exponential Smoothing method creates a Forecast for May that more heavily relies on April's observations. Simple Exponential Smoothing is most effective as a Forecasting method when irregular influences comprise the main effects on the Historical time Series values.

The Alpha value, or the level of smoothing, always is a value between 0 and 1. If the Alpha value is closer to 1, then the level of smoothing is going to more closely reflect the actual data. If the value is closer to 0, the level of smoothing is going to more closely reflect the fitted line, or Forecasted values.

As with all other Smoothing techniques within the DME, you have the freedom to either set the Smoothing constants yourself or enable the DME to optimize the values.

5-2-1: Simple Exponential Smoothing Example

The following example uses data that does not have recognizable patterns such as Trend or Seasonality. This makes Simple Exponential Smoothing an optimal method to use.

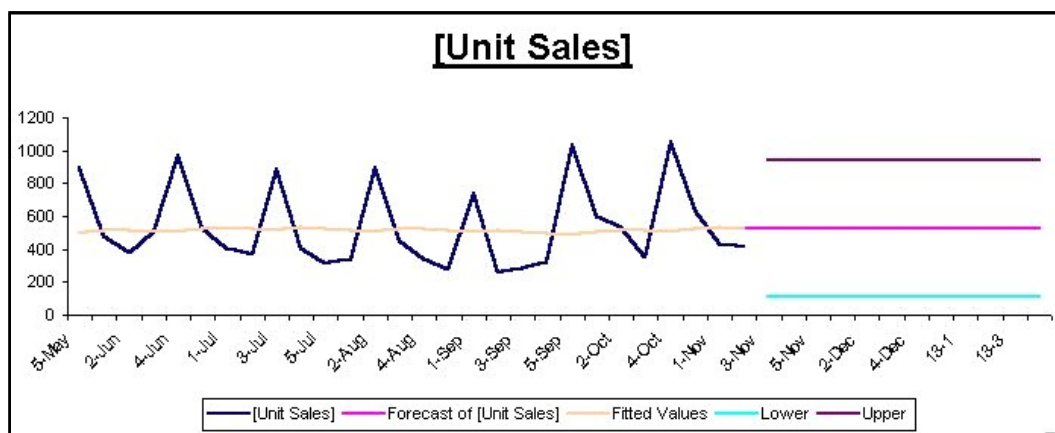
1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the Data Source dialog, select Excel Spreadsheet.
3. Browse to the **ExcelExampleFXE.xls** file and click **Done**.
4. Select the **Simple Exp. Smoothing** data source from the **Table/Query** drop-down list.
5. Select **Simple ES** from the **Primary Method** drop-down list on the **Forecast Method** tab.
6. Click **Procast**.
7. Click the **Reports** tab.
8. Select the **Audit** report on the **Reports** tab.
9. Select **Show Charts** on the **Executive** tab. This enables you to see a graph of your Forecast and analyze the statistics used to measure the Simple Exponential Smoothing Forecast.

10. Click **Run Report** and wait for the graph to display.

5-2-2: Summarizing the Results

The DME provides two tools to judge the accuracy of your Forecast and determine the direction of your business. The first thing you see is the Executive Report chart. One line shows the actual values, and the other line represents the fitted values and the Forecasted values.

The DME also creates a detailed table that displays the optimized parameters for your Exponential Smoothing Forecast. The table indicates that the Forecast has an average error of 6.53%. This means that the DME smoothed your data to a considerable degree. A low smoothing value indicates a high level of smoothing.



Audit Trail

Summary Comments			
The forecast has an average error of		6.53%	
The data has a standard deviation of		7.20	
The forecast exceeds the accuracy of a simple average by		0.07%	
Audit Trail - Summary Analysis			
Audit Trail Statistics			
Accuracy Measures		Value	Forecast Statistics
Mean Absolute Percentage Error (MAPE)		6.53%	Mean
R-Square		0.07%	Standard Deviation
Method Statistics		Value:	
Method Selected		Exponential Smoothing	
Alpha		0.12	

5-3: Adaptive Exponential Smoothing

The Adaptive Exponential Smoothing method is derivative from the Simple Exponential Smoothing method. The difference with Adaptive Exponential Smoothing is that the Alpha value systematically changes from period to period to enable pattern changes in the Historical data.

The Adaptive Exponential Smoothing method is completely automated and uses the advantages of Simple Exponential Smoothing. This method is most useful in the following situations:

- There is a large number of items in the data
- The data is not Seasonal
- There is no trend in the data

5-3-1: Adaptive Exponential Smoothing Example

An example of when to use Adaptive Exponential Smoothing is when there is a product that has been sold for a long period of time, and there is a significant market change recently. While Forecasting, you want to consider the most recent sales data more than the older sales data.

In the dataset file that was installed with the DME, you can use a file to generate a sample Forecast using the Adaptive Exponential Smoothing method.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the Data Source dialog, select Excel Spreadsheet.
3. Browse to the **ExcelExampleFXE.xls** file and click **Done**.
4. Select the **Adaptive Exp. Smoothing** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.
6. Select **Exponential Smoothing** from the **Forecasting Technique** drop-down list box. Leave the parameters blank so the DME can optimize the values.

7. Click **Procast** to run the Forecast.
8. Select the **Reports** tab.
9. Select **Standard** from the five reporting options available. Your output will appear in an Excel Spreadsheet.
10. Select **Show Charts** from the **Standard** tab.
11. Click **Run Report**.

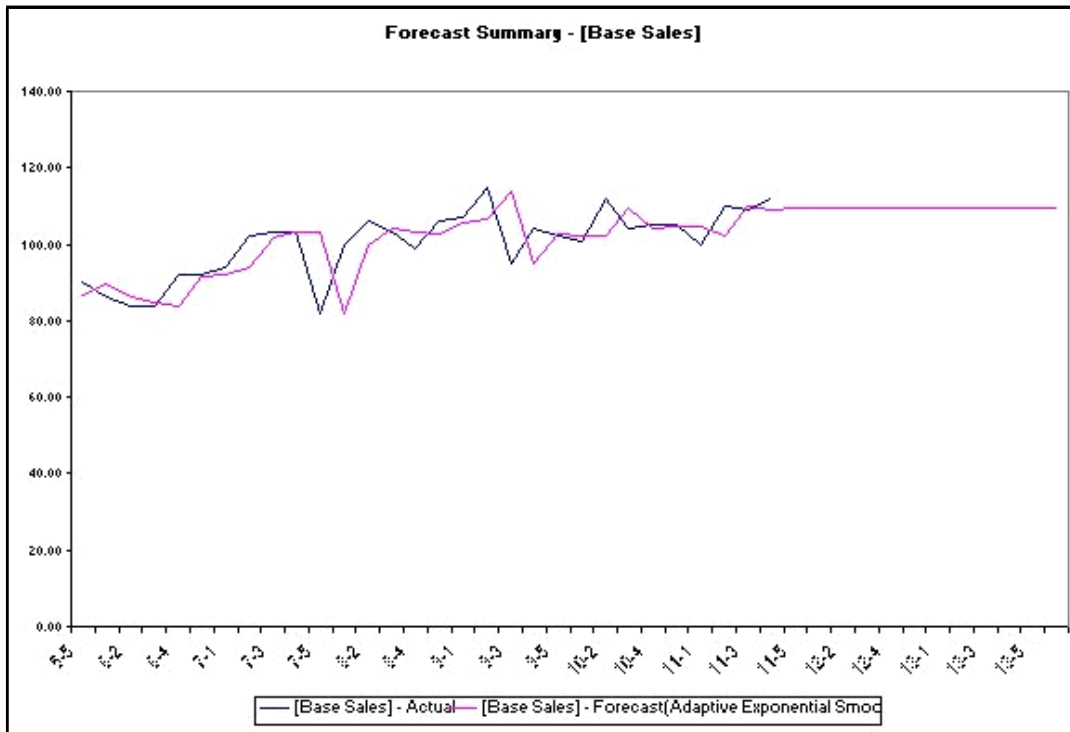
5-3-2: Summarizing the Results

There are two areas in the Standard report for you to see the results of your Forecast.

1. The Excel spreadsheet, which is called Chart1, produced by the DME displays three criteria:
 - The actual values of your original Historical data
 - The Forecast method chosen
 - The Forecasted values for both the original Historical data and the future values
2. Near the bottom of the spreadsheet is a table that contains basic error measurements:
 - Mean Absolute Percentage Error
 - R-Square Error
 - Mean
 - Standard Deviation

This table shows you that your Forecast accuracy is good, and the fit of the Forecast, represented by the R-Square value, is very good.

Click the tab in the lower-left corner of the spreadsheet to view a graph. The graph enables you to view the Forecast's future and also the behavior of the data's history.



As the graph indicates, the market changes from April '97 to June '99 affected the sales of your product. Because you chose the Adaptive Exponential Smoothing method, the DME weighed the most recent values more heavily than older values. This enables you to consider how the market is currently behaving, and how that behavior is going to affect your total sales.

5-4: Box-Jenkins ARIMA Modeling

The basis for the Box-Jenkins methodology consists of three phases:

- Identification
- Estimation
- Testing and applying the ARIMA model

This methodology is a multi-step model building strategy aimed at optimizing the ARIMA process. The DME automatically optimizes the best ARIMA using the Box-Jenkins methodology. For users who are more advanced, the DME enables to perform data transformation and analyze the ACF and PACF charts for model selection. Box Jenkins is best used on extensively long Historical data sets with lower volatility.

5-4-1: The Box-Jenkins Methodology

There are four phases of the Box-Jenkins method. The table below details what each means.

Phase	Description
Model Identification	Data is plotted (if needed) for performing transformation and differencing analysis. A data transformation stabilizes the variance within a set of data points. Differencing the data makes it stationary. A first guess at the ARIMA model is analyzed.
Estimation and Forecasting	The model parameters are chosen based on the model that provides the lowest error term. The data is then Forecasted.
Diagnostic Checking	The decision is made based on an analysis of the Statistical Accuracy of the model whether to re-run using a different model or continue using the ARIMA model diagnosed.
Forecasting	A Forecast of the time Series is generated using the ARIMA model.

The two basic classes of components in Box-Jenkins are trend and seasonality. The airline example is an excellent way to learn trend and Seasonality within Box-Jenkins, as well as demonstrate how Box-Jenkins projects future travel patterns and, in turn, gross sales.

Seasonality differs from trend in that sporadic changes in the number of passengers traveling happen repeatedly throughout the year and various seasons. The fact that these elements come into play at a specific time of the year demonstrates Seasonality.

When looking for trends in data, look for gradual increases in sales over time that does not repeat within the time range being Forecasted. For instance, the number of people who fly in general has increased over the last ten years resulting in a consistent upward slope in the data. This, in combination with higher sales during certain times of the year (seasonality), signifies an increase in sales from year to year that follows a seasonal pattern, which is why we've chosen to use the Box-Jenkins/ARIMA modeling to handle this data.

5-4-2: Box-Jenkins Example

During holiday seasons, airline flights are booked. Frequently, more people are trying to fly than the airlines can accommodate. This Forecasting problem has become a classic example for time Series Forecasting. Most textbooks and college courses use the famous airline data from 1949 to 1960's to walk through Box-Jenkins ARIMA methodology.

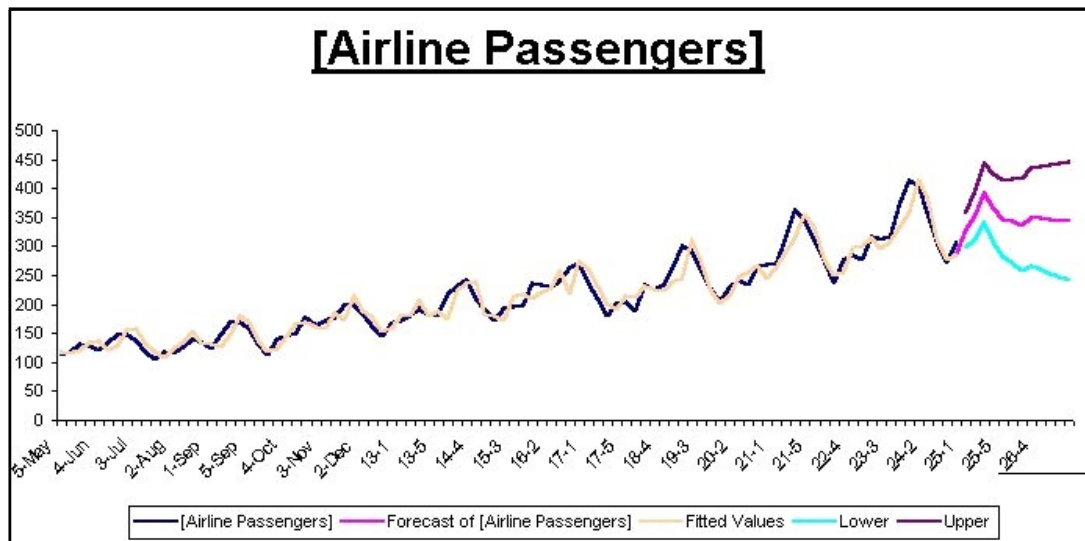
In the dataset file that was installed with the DME, you can use a file to generate a sample Forecast using the Box-Jenkins method.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the Data Source dialog, select Excel Spreadsheet.
3. Browse to the **Tutorial_AirlineData.xls** file and click **Done**.
4. Select **Data** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.
6. Set the **Forecast** to **36** to Forecast three years into the future, and set the Seasonality to 12.
7. Select the **Forecast Method** tab.
8. Select the **Seasonal Model** from the **Forecasting Techniques** drop-down list. Select **Box-Jenkins** as the **Primary Method**.

Note: *For this example, we did not set seasonal parameters. We allow the DME to select the best parameters.*

9. Click **Procast**.

10. Click on the **Reports** tab and check the **Audit** report. The Audit Trail report includes accuracy and descriptive statistics for the model.
11. Click **Run Report**. The graph displays.



5-5: Performing ARIMA Analysis

The DME includes several tools to analyze your data and assist on ARIMA selection. These tools include:

- **Customize ARIMA Model Input:** The ability to input a non-seasonal and seasonal ARIMA model.
- **On the Forecasting Method screen,** you can select Box-Jenkins and enter your own ARIMA model.
- **Data Transformation** charts the variance and provides the functionality to transform your data. By examining the Variance chart, you can perform a log, square, and square root transformation. Click the Series Preview and Transformations button at the bottom of the DME window and the Transformation screen is displayed. Review the Variance chart. The goal is to have data distributed evenly around the Mean.

- The Data Analysis chart includes the ACF and PACF charts (Auto Correlation Function and Partial Auto Correlation Function) and provides functionality to difference your data. By examining the ACF chart, you can determine if differencing is required and also what the order of the ARIMA should be.
- From the Series Preview and Transformation screen, select the Analyze tab. You can set the differencing parameters. Differencing enables you to remove the trend by subtracting adjacent data points. The correlogram displays the ACF and PACF, which show you the Auto Correlations and relationships that each variable has with the past. If correlation is high, it indicates that the variable is predictable.
- The ACF and PACF (Auto Correlation Function and Partial Auto Correlation Function) are used in determining whether or not your data is stationary. It also enables you to see Seasonality and Trend. As discussed previously, your data may contain both factors and, therefore, must be differenced before we can choose our ARIMA model. The DME enables you to put in the differencing parameters and view the changes in the correlogram as you create them. In addition, looking at the pattern of the data in both the ACF and the PACF helps determine the best model.

5-6: Holt's Double Exponential Smoothing

Holt's Linear Exponential Smoothing is similar in principle to Simple Exponential Smoothing. It calculates Alpha, the level component, to measure the trend in the Forecast. It also adds the parameter Gamma, the trend component, to create a linear trend in the Forecast. This equation is similar to a linear Regression line and is useful when a product is experiencing an exponential growth or decline, while not exhibiting recognizable Seasonality. In other words, if your data is very dynamic and doesn't change due of seasonal factors, then Double Holt is an appropriate method to employ.

5-6-1: Holt's Double Exponential Smoothing Example

The following example uses a short data set that is very intermittent. As Sales Manager of this new product, you need to determine what the trend is likely to be, despite given such sporadic data.

1. Create a new Scenario.

2. Click the **Data Capture and View** button. On the Data Source dialog, select Excel Spreadsheet.
3. Browse to the **ExcelExampleFXE.xls** file and click **Done**.
4. Select **Double Holt** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.
6. Click the **Forecast Method** tab. Select **Exponential Smoothing** from the **Forecasting Technique** drop-down list.
7. Select **Double Holt** from the **Primary Method** drop-down list.
8. Leave the smoothing constants blank to allow the DME to automatically select them.
9. Click the **Advanced** button.
10. When the Data Capture Advanced Options window displays, click the **Cleansing** tab and select **Replace Outliers**. The DME I automatically removes the outliers and produce a more accurate Forecast as a result.
11. Click **Procast**.
12. Click the **Reports** tab to select the Audit Trail report and click **Run Report**.

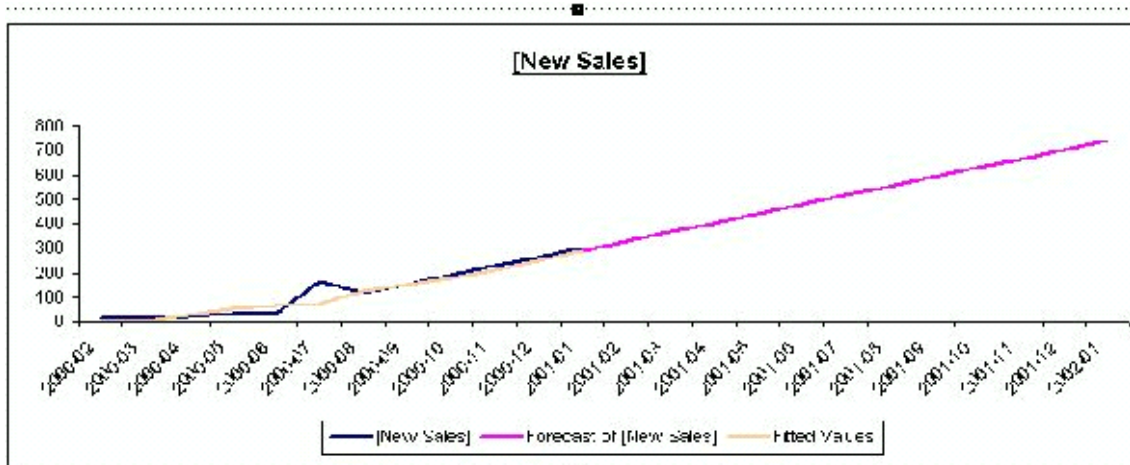
The report is displayed.

Audit Trail - Statistics			
Accuracy Measures		Value	
Mean Absolute Percentage Error (MAPE)		43.16%	
R-Square		91.42%	
Forecast Measures		Value	
Mean		126.13	
Standard Deviation		104.92	
Method Statistics		Value	
Primary Method		Double Holt	
Alpha		0.20	
Gamma		0.81	

5-6-2: Summarizing the Results

After the results are created in an Audit Trail report, you can see all the statistics necessary to measure the values of your Double Holt Forecast.

The graph that is made of the Actual, Fitted, and Forecast values enables you to see the trend in your new product. Although much data is non-existent, the DME detected the likely trend.



One point of interest on the graph is the area of June 1998. The DME removed a large data point, the outlier. The only thing needed is to click Replace Outliers on the Advance Option screen.

There are two important statistics to look at in the Audit Trail report for the Double Holt Forecast:

- Constant Smoothing values
- Alpha and Gamma measurements

These values determine how significantly the DME smoothed the data. The Gamma value is high (near 1.00), so the smoothing is insignificant. However, the Alpha value is low and, therefore, a significant smoothing constant. In result, the data has a significant trend. Again, you can verify this by reviewing the graph.

Section 6: Additional Smoothing Methods

This section introduces additional smoothing methods available. The example reports in this section use the **Tutorial_AirlineData.xls** data file with the respective method.

6-1: Moving Average

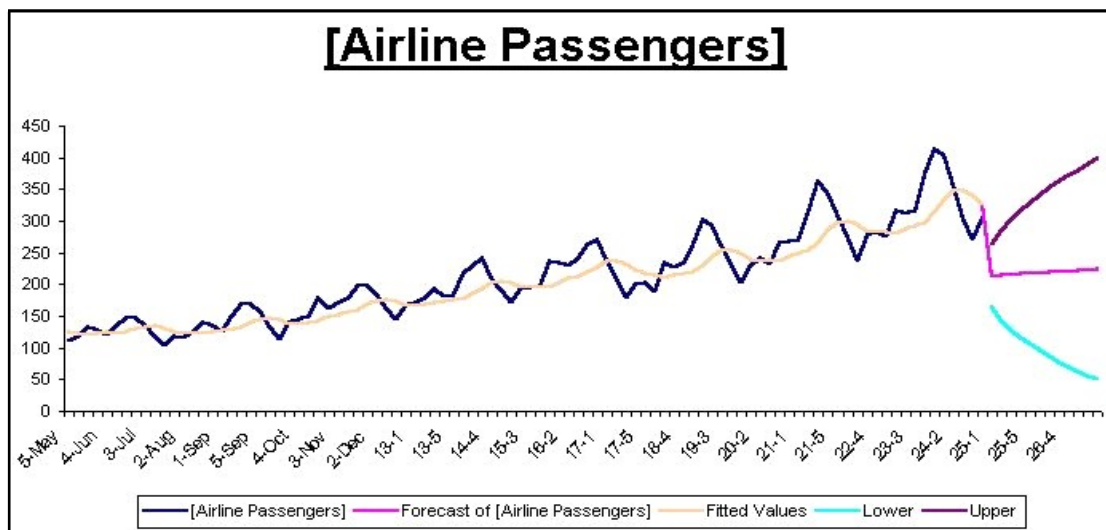
A Moving Average Forecast is the average of a time Series over a specific number of preceding periods. When a new value is added, the last is dropped from the calculation, so that the specific number of preceding periods remains a constant.

However, two drawbacks are that Moving Averages do not effectively handle significant trends in data and all Historical data must be stored to create the moving average. In the case of time Series data, Moving Average Forecasts are often used to eliminate unwanted fluctuations, thereby smoothing the time Series. The appropriate number of preceding periods should be determined by selecting the amount of periods that yields the least amount of error.

The start value of a moving average is where the calculation begins. The start value uses zero as its first value, so if you would want to start at the fourth observation, the start value would be three. The number of Observations to include in the average calculation is called the History.

For example, if you want to start at the fifth observation and perform a moving average with three Historical Observations, the start value would be 4 because the count starts at 0.

The moving average calculation would include the third, fourth, and fifth Observations.



6-2: Weighted Moving Averages

Rather than replace the oldest Observations within the data, the Weighted Moving Average replaces the oldest moving average with the most recent moving average. In this way, Weighted Moving Averages handles significant data trends.

Use Weighted Moving Average Forecasts to overcome the strong affects of extreme values within a time Series by assigning current data more weight than older data. The start and history parameters are the same as those in moving averages.

6-3: Brown's Double Exponential Smoothing

The Brown's Double Exponential Smoothing method attempts to create a linear equation. It performs two simple exponential smoothing Forecasts and then adjusts for the linear trend in the data.

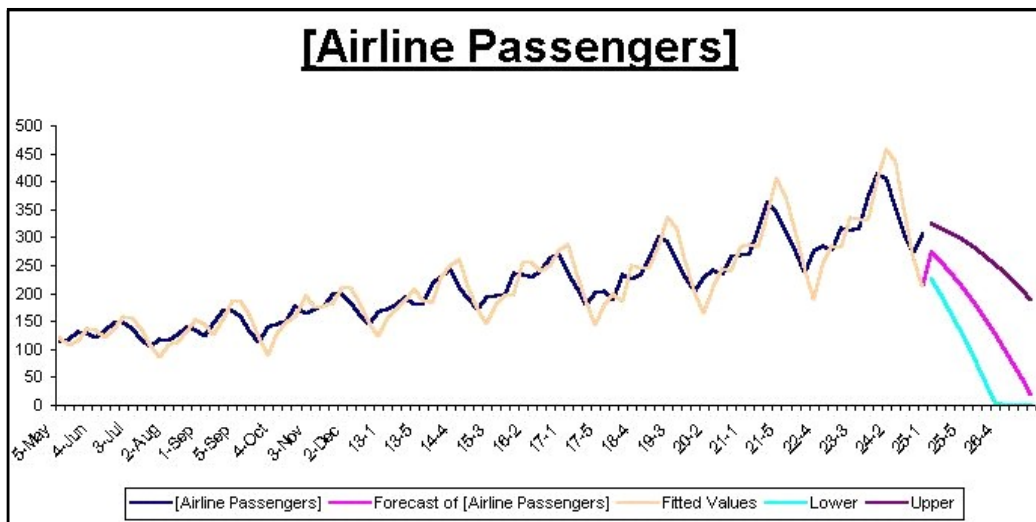
Brown's Double Exponential Smoothing method is similar to Holt's method in the fact that the goal is to create a linear trend, but Brown's does so without adding additional parameters to the equation.

Since Forecasts can be expressed as a function of the single and double smoothed constants, the procedure is known as Double Exponential Smoothing. Brown's Double Exponential Smoothing is most appropriate for data that shows a linear trend over time. As defined above, the smoothing component is Alpha.

6-4: Brown's Triple Exponential Smoothing

Brown's Triple Exponential Smoothing is implemented on data showing a quadratic trend over time. It works well for data that has a very steep growth or decline.

The Brown's Triple Exponential Smoothing method attempts to create a linear equation by performing three simple exponential smoothing Forecasts and then adjusting for the linear trend in the data.



6-5: Census X-11

Census X-11 is a refinement of the Seasonal-decomposition method. Census X-11 is best suited for a Series where the number of days in the time period directly affects the values in those time periods. It seasonally adjusts and decomposes your data through a Series of predefined steps:

- Seasonal
- Trend
- Cycle
- Random or Irregular

A Seasonal component of a time Series occurs regularly (i.e., Christmas), while a Cycle has a duration that varies from cycle to cycle. Economic variables are cyclical. A depression occurs at Random or Irregular intervals.

During the Forecasting process, Census X-11 factors in trading days to refine the Forecast and reduce the irregular component of the

Forecast by weighting each period by the number of trading days. The DME enables you to account for trading days with one easy step or Forecast without adjusting for trading days. The former produces more accurate Forecasts when trading days are important.

This is especially useful if the number of trading days dramatically affects the amount of business that is done in a time period. For example, you have a value of 100 in two consecutive months. On first glance, it appears that the two months are equal. However, assume that the first month has 25 trading days while the second has 15. In this case, Census X-11 will take the value 100 and spread it over 25 ($100/25$) for the first month and 15 ($100/15$) for the second. It's advantageous to use Census X-11 here because it is likely any extreme observations between the months can be explained by the number of trading days.

Trading days also can be specifically known for each time period. For example, you can determine how many trading days each of the last 12 months contained by reviewing how many official working days took place. You can easily determine how many trading days are going to occur over the next 36 months (or whatever your Forecast periods) by taking into account days off, holidays, or weekends. Census X-11 offers another way of determining factors affecting your Forecasts.

Census X-11 also identifies two types of Seasonality:

- Additive
- Multiplicative

Consider the following example to differentiate the two. Suppose you look at an annual sales report for product X with a peak that repeats every year in the months of November and December. Every year during December, the sales of X increase by \$200,000. Each year \$200,000 (over the annual average) is added to the sales of X in December. The Seasonality is Additive. However, suppose that sales of X increase by 20% during December. Then the Seasonality is Multiplicative. Additive Decomposition assumes the data is the sum of the time-Series components and is independent of the trend. Multiplicative Decomposition assumes the data is the product of the time-Series components and is a ratio of the trend.

6-5-1: Census X-11 Example

In this example, you are the owner of the Club Sport Gear import-export clothes store. Through the global-nature of the Internet, you have realized that your business is highly seasonal and influenced by holidays. In addition, your clothes distributor is located in China.

As your business grows, your Forecast accuracy decreases because the overall affect of the Chinese New Year is not factored into Forecasts. During the Chinese New Year, which never falls on the same day in consecutive years, your Forecasts haven't allowed you to make confident decisions. That is because the Chinese Distribution Company you have come to depend on always allows employees a traditional five days off work during their holiday and your sales in China decrease on their holiday, as well as the days surrounding it. The challenge you face is determining the extent to which the Chinese New Year affects your sales.

The Chinese New Year may fall in mid-January one year and late February the next. You have been able to Forecast using the amount of money you make per month in exports, but you know the Forecast would be more accurate if you could factor in the number of actual business (or trading) days per month. If all factors are not taken into account, the Forecast output is not as accurate as it could be.

Since the number of days you do business with the Chinese Distribution Company varies, this year you have selected the Forecasting technique Census X-11, which enables you to factor in the irregular work schedule. This added factor to your Forecast greatly improves the overall accuracy of the Forecast.

According to your data, you have increased sales on exports each of the past 11 years. The Chinese New Year dramatically increases your export sales in November and December. Whereas, the months of the Chinese New Year always decrease your export sales in either January or February, depending on when the holiday occurs. You know when the Chinese New Year occurs over the next several years.

With Census X-11, you can account for the factor that is affecting your Forecasts. The DME accomplishes this by dividing your original data by the number of trading days that you specify. This weighs the monthly Observations in accordance to their respective trading-days for each month. Now your Forecast is based on more accurate data. To illustrate the power of Census-X11, perform the first Forecast without accounting for trading days.

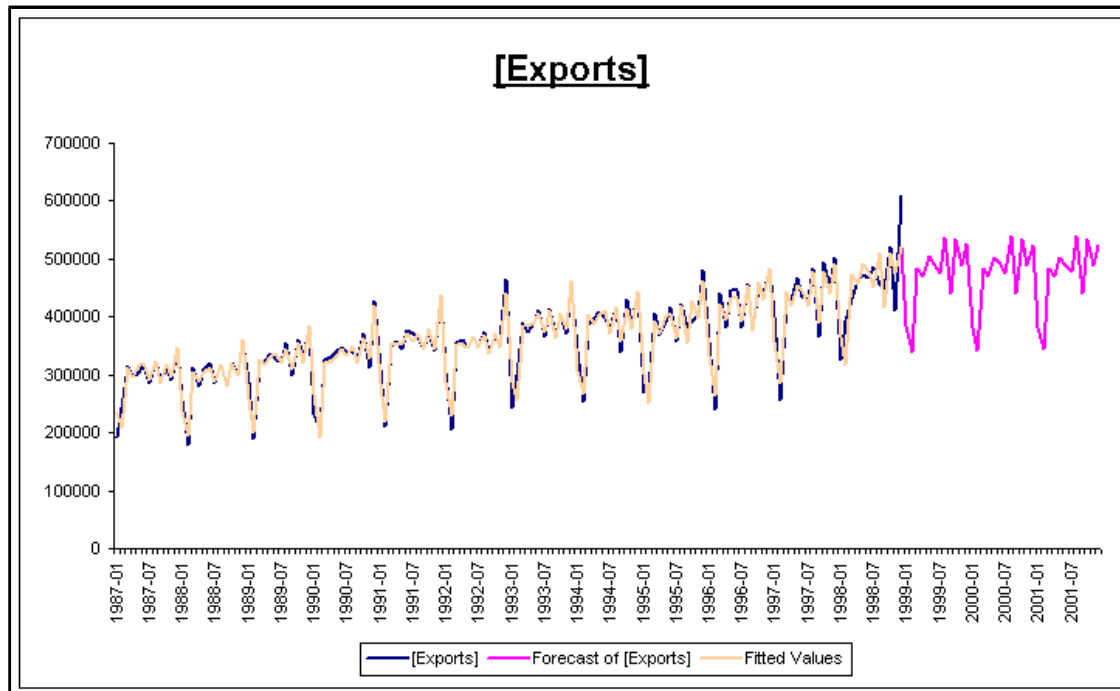
1. Create a new Scenario.

2. Click the **Data Capture and View** button. On the Data Source dialog, select **Microsoft Access Database**.
3. Browse to and select the **CensusX-11.mdb** file and click **Done**.
4. Select the **Census X-11Table** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.
6. In the **Seasonality** box, enter **12**. To produce a Forecast for 3 years, enter 36 in the Forecast box.
7. Click the **Advanced** button to specify your data as monthly.
8. Click the **Forecast Method** tab. Select **Seasonal Model** for the Forecasting technique and **Census X-11** from the **Primary Method** drop-down list. Leave **Trading Day Adjust** empty for this Forecast.
9. Click **Procast**.
10. Select the **Report** tab. Check **Executive Report** and unselect any other available options.
11. Click **Run Report**.

Summarizing the Results

Notice the DME has confirmed the Chinese New Year does affect your sales in the months preceding and following the holiday. Watch for the following information. According to the Forecast, sales through your distribution outlet continue to increase over the next three years. Although, since you didn't take the actual number of business or trading days into account, the average error of your Forecast is 3.81%. Now you decide to run a Forecast that does account for the

actual trading days in each month. The goal here is to produce an even more accurate Forecast.



Summary Comments

The forecast has an average error of	3.81%
The data has a standard deviation of	73,637.65
The forecast exceeds the accuracy of a simple average by	92.97%

6-6: Forecasting With Advanced Census X11

1. Select the **CensusX-11.mdb** sample spreadsheet as the data source.
2. Select **Data** from the **Table/Queries** drop-down list.
3. Select **Columns** in Data Organization.
4. Enter **12** because the data is monthly in the **Seasonality** box.

5. Enter **36** in the **Forecast** box to make a direct comparison to your previous Forecast of 3 years.
6. Click the **Forecast Method** tab, and from the **Forecasting Technique** drop-down list, select **Seasonal Model**.
7. Select **Census X-11** from the **Primary Method** drop-down list.
8. In the **Seasonal Type** box, choose the **Multiplicative Decomposition** method and in the **Add Series for Census X-11** field, enable **Trading Day Adjustment**.

Multiplicative decomposition spreads the total values from each month over the actual number of trading days of each month.

9. From the **Additional Table** drop-down list, select the table where the trading days are located. Then press the **Setup Trading Days** button.
10. Select **Procast** from the **Secondary Method** drop-down list.
11. Click **Procast**.
12. Click the **Reports** tab when the Procast is done generating.
13. On the Reports tab, check the **Audit Trail** and unselect all other report types. This way, only the Audit Trail Report is generated.
14. Click **Run Report**.

Summarizing the Results

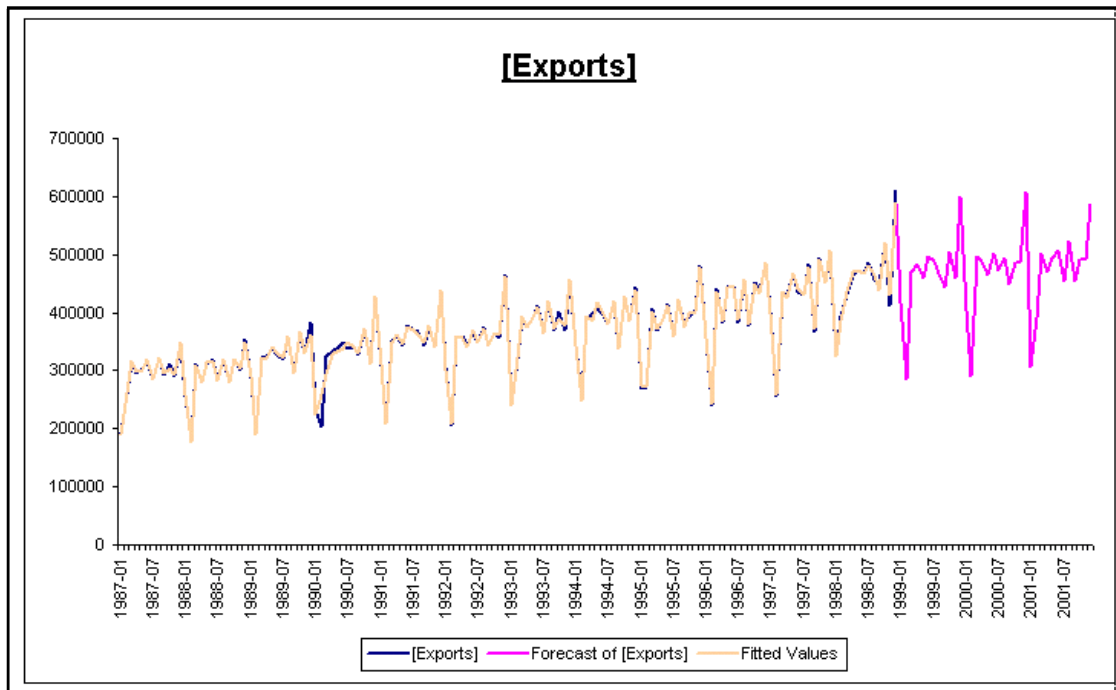
The Audit Trail report is much more detailed than the Executive report. For example, there is detailed information about the method you selected, Census X-11, along with the decomposition type you specified, multiplicative. Choose multiplicative when you want to spread the values from each month over the actual number of trading days for each month.

In this example, the DME enabled you to divide the value from January of 1989 by the actual number of trading days in January 1989.

Summary Comments

The forecast has an average error of	1.23%
The data has a standard deviation of	73,637.65
The forecast exceeds the accuracy of a simple average by	99.03%

The most important statistic is the Mean Absolute Percentage Error (MAPE) of 1.23%. In the previous Forecast, you did not specify the number of trading days and the Forecast returned a MAPE of 3.81%.



When using the DME, you are able to specify the exact number of trading days, thereby receiving a Forecast with an increased accuracy of 2.58%. The advanced functionality of the DME enabled you to achieve your goal of an accurate Forecast, which enhances your decision making abilities about future sales to the Chinese Distribution Company during important holidays.

6-7: Croston's Intermittent Model

Croston's Intermittent Model is the method used to handle sporadic data. For example, consider a manufacturer whose inventory is constantly in sporadic demand; there are no precursors to when orders will be placed, or the demand is often zero even though the average demand is for several units. In addition when an order is placed, it is usually for more than one particular item.

This situation causes an over calculation of the average or mean demand. At times the demand is zero, and other times the demand is for multiple orders, which limits how accurately the manufacturer is able to predict stock needed. Orders do not arrive at predictable times, so there are times when the manufacturer is over or under stocked.

Croston's Intermittent Model is specifically designed to deal with such a situation with a two-step process. The main goal is to provide a good Safety Stock, resulting in a situation where the manufacturer is neither over nor under stocked. This is accomplished by considering two aspects of the data: the demand size and the demand occurrence.

Croston's Intermittent Model is superior to Exponential Smoothing in a case like this because Exponential Smoothing does not take into account the sporadic nature of the data. For example, suppose that the average order for a manufacturer is 10 units, but they occurred only 10 times a year in the past, in irregular patterns, and the demand was often zero. In this case, Croston's Intermittent Model recognizes both the sporadic timing of the orders and that the average order (10) is actually a misrepresentation if it is spread evenly over the number of days.

6-7-1: Croston's Intermittent Example

This example shows how Croston's Intermittent Model can accurately Forecast intermittent demand and help you control stock. This Forecast example tracks the compact disc sales from a new group who has just released their first album.

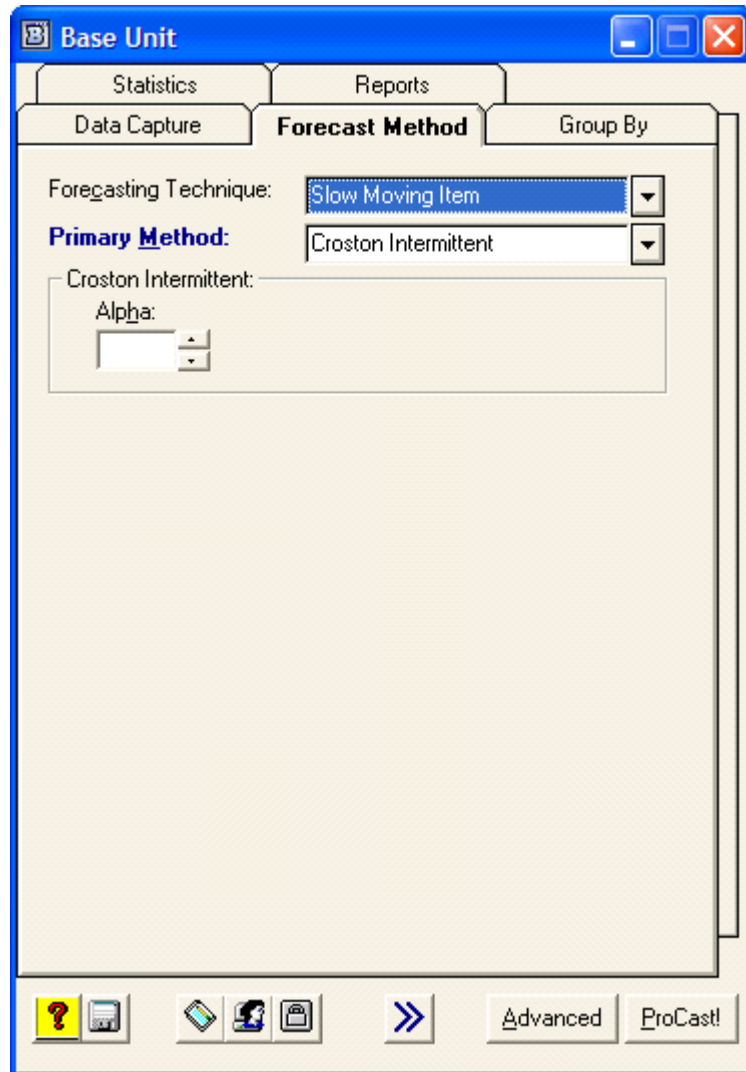
As the manager of a music store, you started Forecasting demand for the new CD. Although sales for this group has sky rocketed, their daily sales began to take a more irregular pattern of sales. You decide to Forecast the demand in order to save money and space for other, almost-as-popular CDs.

1. Create a new Scenario.
2. Click the **Data Capture and View** button on the Data Source dialog and select Excel Spreadsheet.
3. Browse to and select the **ExcelExamplesFXE.xls** file and click **Done**.

This spreadsheet contains daily records of the CDs you have sold. The demand is unpredictable; both when the Demand occurs and in what quantity it occurs.

4. Select the **Croston's Table** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.

6. Click the **Forecast Method** tab. Select **Slow Moving Item** from the **Forecasting Technique** drop-down list and **Croston Intermittent** from the **Primary Method** drop-down list.



The Alpha or Smoothing constant box displays. Leave it blank. The DME optimizes the value for you.

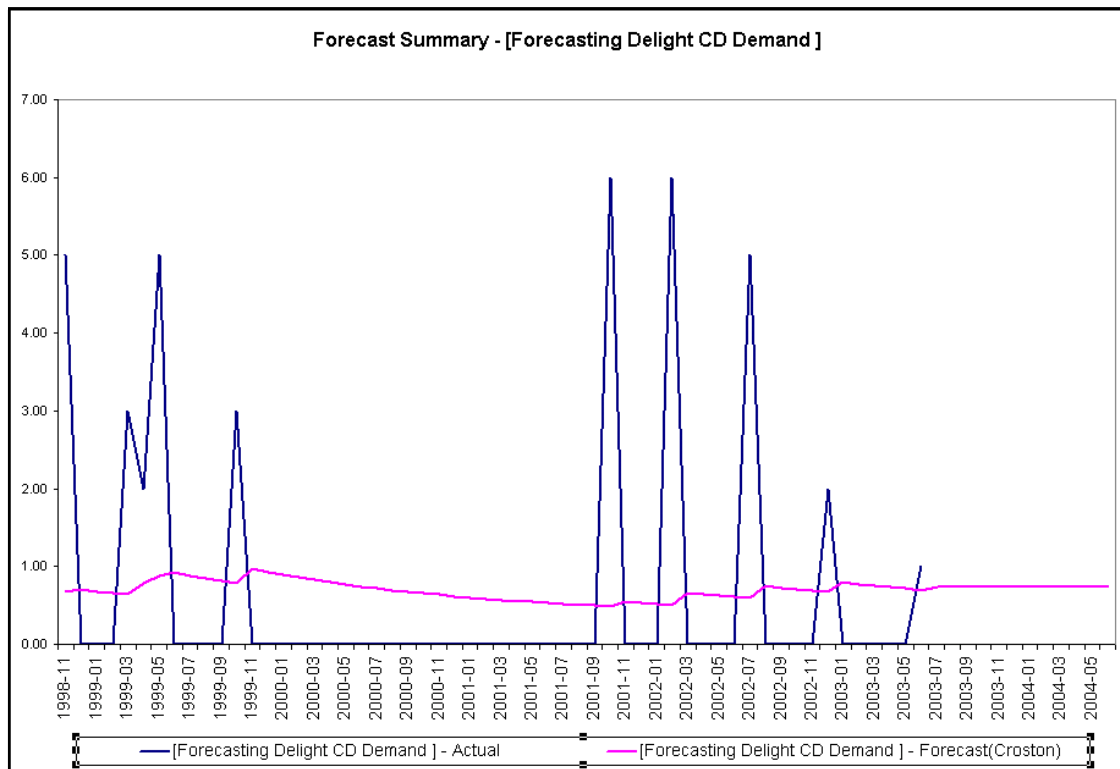
7. Click **Procast** to run the Forecast.
8. Select the **Reports** tab to choose the reports to print.

9. On the **Reports** tab, select the **Standard Report** in the **Show Charts** box after the Forecast is run.

10. Click **Run Report** to view the Forecast.

Summarizing the Results

Following is Chart1, produced by the Standard report. The data is Sporadic.



With Croston's Intermittent Forecasting method, you can control and smooth sporadic data. This method provides excellent results for product control and Forecasted demand. In the standard report, you can see the MAPE is 75.05% and the R-Square is 0.

At first glance, the Forecast result is poor. However, because there are many zeros in the data set, these two statistics are not useful in judging the accuracy of the Croston's Intermittent Forecast. The most

important measure is the Forecast observations themselves. In this example, 0.73 is the value of each and every Forecast observation.

With the Forecast values, the Mean, and the Standard Deviation of the data set, the Safety Stock can be calculated accurately. You can retrieve the Safety Stock from the Audit Trail report. It has been theoretically proven that for intermittent data sets, Croston's Intermittent Forecasting method can produce much more accurate Safety Stock than other Exponential Smoothing methods.

6-8: Slow Moving Method

For slow moving demand, most Forecasting packages use the Croston method. The issue with Croston is that it assumes the incoming demand is a normal distribution and it does not consider seasonal pattern. In reality, a lot of demands are not normal distribution and has some seasonal pattern.

The technique is designed to calculate the optimal stocking level for sporadic data. This technique works for items that have large numbers of zeros and items that have highly variable non-seasonal demand.

The following chart displays the types of data that are suitable for the slow moving stocking level technique. In each case, it is important to note that neither Series contains a pattern nor the demands are not normally

distributed around a Mean which would lend itself to a more traditional Forecasting technique.



The purpose of the slow moving technique is to set the appropriate stocking level to ensure that the proper amount of inventory is in place to meet demand taking into account service level and lead time.

When the slow method is run the result is the total stocking level required to support demand and an average sales rate. This allows

demand to be decomposed into its two components: an average sales rate, and Safety Stock.



In this case, the Slow Method was configured to support a 90% service level with a 2-month lead-time. The Slow Method then developed an event model to measure the demand impulses and compute a stocking level demand to meet the expected demand in the lead-time period.

What this means is that in each case the slow method was able to recommend a stocking level to achieve the desired service level for the sporadic item.

When this is contrasted to the Croston technique several major differences emerge because Croston assumes that the data being

Forecasted in normally distributed. When this is the case, as often occurs with sporadic data the results are dramatic.



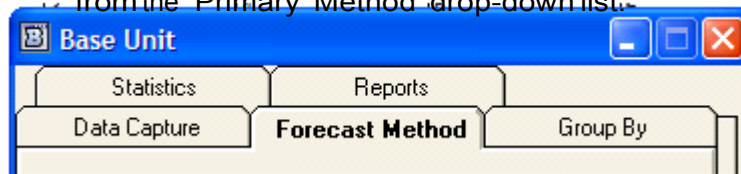
Because the data is not normally distributed, Croston yields results that may not guarantee that the desired service level is achieved. In the case of Item A the safety stock level is significantly higher, 1380 vs. 1121, than in the slow method resulting in a potential over investment in inventory for this item. In the case of Item B we see that the situation is precisely reversed, 7168 vs. 9729, resulting in under investment and the potential of lost sales. Therefore, as a general rule, it is better to use the Slow Moving method for Forecasting rather than Croston and the calculated Safety Stock as the stocking levels.

1. Create a new Scenario.
2. Click the **Data Capture and View** button on the Data Source dialog and select Excel Spreadsheet.
3. Browse to and select the **ExcelExamplesFXE.xls** file and click **Done**.

This spreadsheet contains daily records of the CDs you've sold. The demand is unpredictable; both when the demand occurs and in what quantity it occurs.

4. Select the **Croston's Table** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box,

the Forecasting Technique dropdown list and Slow Method from the Primary Method drop-down list.



Forecasting Technique: Jslow Moving Item

[3

Primary Method:

[3

Event Index Creation	Number of Simulation
☐ Seasonal	☐ Fixed j100
☐ Std Bucket J;i Exclude 0	☐ % thresh 51 ...----
Start Incr End	Event Replaceable ☐
☐ fD.50 j3	☐ Yes
	☐ No
Basic Stat Method	Base Fest. Method
☐ Mean J;i Exclude 0	☐ Same as Base
☐ Croston	☐ jProCast
Service Level	Lead lime: j 2jJ
☐ % of Total	Level: 50 .. j, — i ..., %
☐ Std of Sample	
Service Level in List As	
☐ % of Amount	☐ % of Periods

[3

advanced | froCast!

7. Select the **Event Index Creation**. There are two options.

Option	Description
Seasonal	This method is used to create the event indexes in the Historical period automatically. The number cannot be larger than the number of Observations. If it is empty, the cycle is the same as the number of observations. In this mode, the index starts from 1 until the cycle number, and then repeat.
Std Bucket	Use the mean and standard deviation to determine the event index. The options include: ■ Exclude 0 - Use Exclude 0 when using the mean and standard deviation. In this option, all 0 are assigned a same event index 0. ■ Start - For values in the range [mean, mean + Start * std], assign index 1 to Start. For values in the range [mean – Start * std, mean], assign index 2 to Start. ■ Incr - For values in the range around the mean by (Start + x) * std, assign x*2 and x*2 + 1 index to Incr (depend on the direction). ■ End - For values in the range around the mean by End * std, assign the last two index to End.

8. Enter the **Base Cal Method**. This method is used to calculate the base line of the event model. Select from the following options.

Option	Description
Mean	Use the mean as the base line. Select Exclude 0 when calculating the mean.
Croston	Use the Croston method to calculate the base line.

9. Enter the **Base Fcst. Method**. This method is used to calculate the Forecasted value of the baseline of the event model. Select from the following options:

Option	Description
Same as Base Calculation	Use the same method as the one used in the base line calculation.
Select a specific method	It can be one of: Simple ES, Croston, Adaptive ES, Linear Regression, Double-Holt, Double-Brown, New Product Curve or Procast.

10. Select **Event Replacable**. This option simulates the events in the future periods. Select from the following options:

Option	Description
Yes	Randomly selects an event from Min event to Max event. Note that for case that all 0s are assigned the same event (0), this special event needs more possibility to be selected then other events.
No	Each event and the number of its appearance are in a pool. An event is randomly selected and the number of the corresponding appearance is reduced by 1. If the lead time is longer than the Historical periods, this option is disabled. Note that the number of the events in future periods is the ceiling value of the safety stock lead time because the lead time can be a fractional number. As an example, if the lead time is 2.7, then 100% of Forecasted period 1, 100% of period 2, 70% of period 3 is used.

11. Enter the **Number of Simulations**. This option specifies how many simulations are needed before the safety stock is calculated. Select from the following options:

Option	Description
Fixed	Enter a fixed number, such as 100.

Option	Description
% Threshold	Enter a threshold % to stop the calculation. When a safety stock is not different to the previous one by the threshold (e.g., the difference is less than 1%), then stop the simulation. To improve the performance, the simulation will not calculate the % difference until it finishes at least 10 simulations.

12. Select the Service Level As option. This service level will determine the calculation of Safety Stock.

Option	Description
% of Total	The Safety Stock is cut at the specified % of the total simulated demand.
Std of Sample	The Safety Stock is calculated by the specified Standard Deviation of the sample assume the simulated demand is normal distribution.

13. Select the Service Level in Hist As option. This option determines the calculation of service level in the Historical periods if the same Safety Stock is used in the Historical periods. Select from the following:

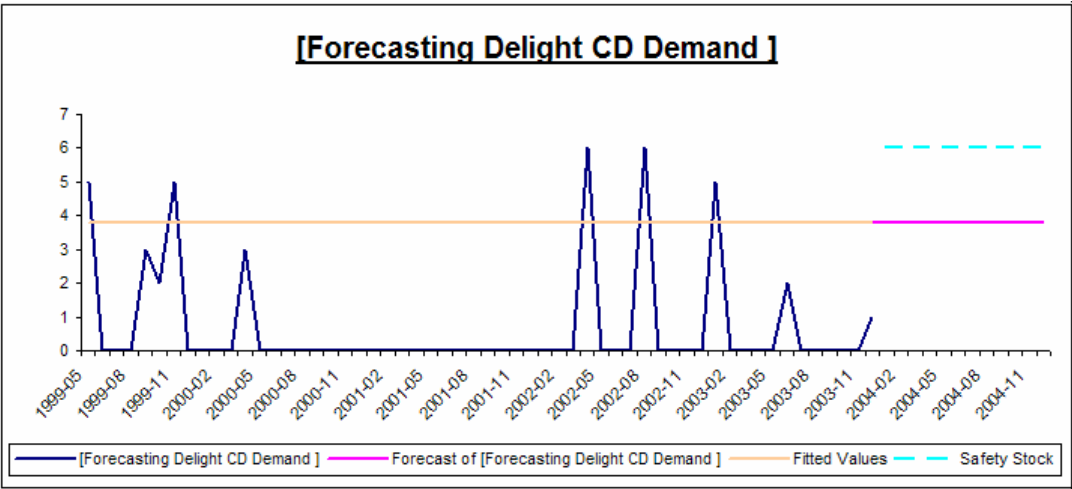
Option	Description
% of Amount	The Safety Stock is calculated as the % of the under stock amount over the total demand in the whole Historical periods.
% of Periods	The service level is calculated as the % of the periods when the under stock occur over the total Historical periods.

14. Click **Procast**.

15. Click the **Reports** tab to select how to display the results. Select the Audit Trail report. The Audit Trail provides an analysis of your Forecast.

16. Select **Show Charts** on the **Executive** tab to display a graphical representation of your data, and the **Safety Stock** check boxes to display the confidence limits of your Forecast.
17. Click **Run Report**.

After running the Forecast, the DME produces a graph and table with the Safety Stock and other information of the Slow Method.



Graph Results

The table below details the lines in the graph:

Line	Description
Brown	Represents the Fitted Values of the Forecast and illustrates how closely the Forecasted and actual values match.
Dark Blue	Represents the Actual Values.
Pink	Represents the Forecast Values.
Light Blue	Represents the Safety Stock.

Audit Trail Results

Audit Trail statistics reveal that the DME produced an accurate stocking level, represented by the very high Historical service level of 99%. The 99% means that if the recommended stocking level is used, then in the Historical period, 99% of the service level can be achieved.

Audit Trail - Statistics			
Accuracy Measures		Value	
Mean Absolute Percentage Error (MAPE)		65.87%	
R-Square		0.00%	
Forecast Measures		Value	
Mean		0.68	
Standard Deviation		1.64	
Method Statistics		Value	
Primary Method		Slow Moving Demand	
Hist Service Level		0.99	

Note that because the Slow Method uses simulation technique, the resultant stocking level can be different for each running for the same data. The higher number of simulation, the more stable of the result.

6-9: Linear Regression

Linear Regression analysis uses an equation to analyze the relationship between two or more quantitative variables in order to predict one from the other(s). Linear Regression is best used when one Independent Variable significantly influences a dependent variable. Linear Regression measures the relationship between two variables: X and Y. Where X is the Independent Variable and Y is the Dependent Variable. A particular observation of Y depends on X and an additional random error.

$$Y = mX + b$$

The relationship between X and Y can be expressed by the slope coefficient, or the parameter b. The parameter b represents the nature of the relationship between the dependent and the Independent Variable. If b is negative, an inverse relationship exists. If b is positive, there is a direct relationship between X and Y.

If the slope coefficient is zero, then there is no relationship between X and Y. Parameter b is also used to quantify the relationship between the variables. If b is a very large positive or negative number, then it will have a greater influence on the dependent variable, Y. The importance of the slope coefficient is that it represents how the

dependent variable changes when the Independent Variable changes by one unit.

The DME estimates the best-fit Regression Line for any input data. However, the user must first make an analysis about the estimated model and whether it provides meaningful information. A question that often arises is whether the Forecasted relationship between X and Y exists, and if it does, how good does the Regression line fit. There are several ways to evaluate and judge the goodness-of-fit of a Regression.

The variance of the Dependent Variable around the Independent Variable can be estimated using sample data. A common statistic used to judge the accuracy of the Regression is called the Standard Error of the Estimate. A large Standard Error indicates a lot of residual or error variation, which signifies a poor fit. If the Standard Error is small, there is a minimal amount of residual variation, thus the fit is good. The Standard Error of the Estimate helps determine how accurate the model is for prediction. The difficulty in using the Standard Error is making judgments about how large errors can be before they become unacceptable.

Another common statistic is the Coefficient of Determination. The Coefficient of Determination, or R-Squared helps make a better judgment about the model's goodness-of-fit.

The R-Squared produces a percentage error term rather than a numerical one. The percentage represents the variation in the Y variable as explained by the Regression. If the R-Squared is large (98%, 89%, etc.), the model is providing a good fit and you can have confidence in its ability to predict. However, if the R-Squared is small, the model is not providing a good fit and you should have less confidence in its ability to predict. Even with the R-Squared, there is still ambiguity about how large the percentage needs to be in order to be considered a good fit. Hypothesis tests such as the F-Test and T-Test enable us to make better judgments about the model as a whole.

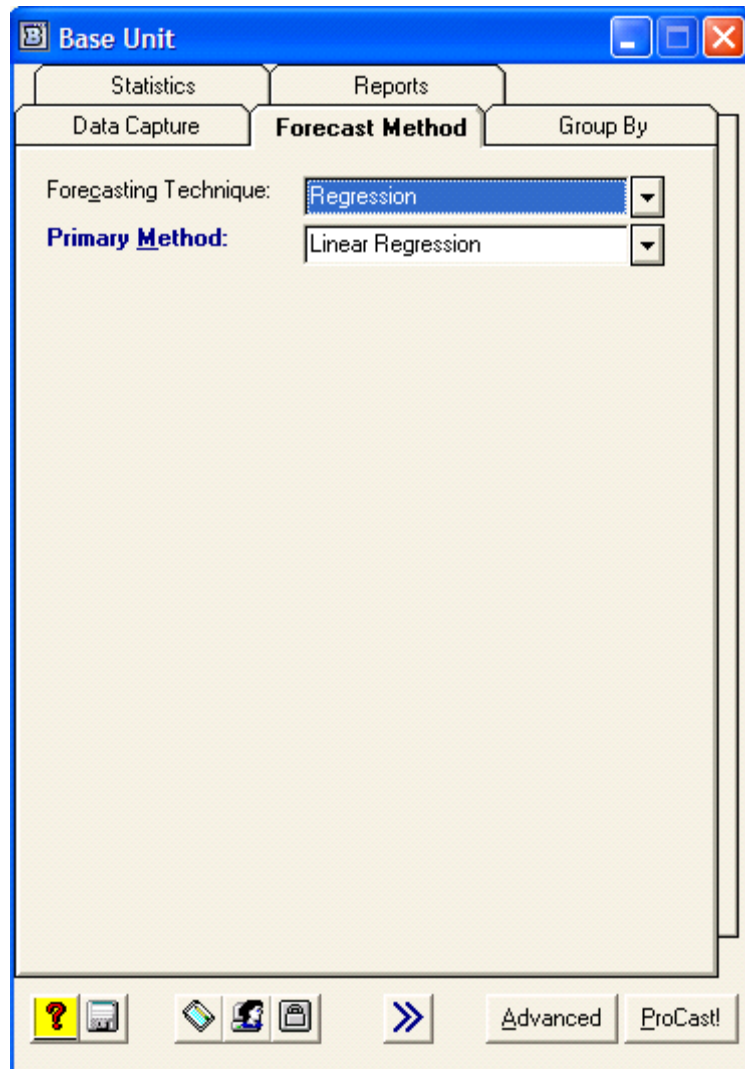
The T-Test is used to make a judgment about the variable b, or the slope coefficient. This test indicates whether b is significantly different than zero. Again if b is significantly different than zero, there is a relationship between the Dependent and Independent Variables. For Linear Regression the F-Test and the T-Test deduce the same conclusions.

6-9-1: Linear Regression Example

Suppose you have 12 months worth of sales data. You want to create a Linear Regression Forecast for the next 12 months and determine if the model is reliable. The procedure below details how to create a Linear Regression model.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the **Data Source** dialog, select **Excel Spreadsheet**.
3. Browse to and select the **ExcelExamplesFXE.xls** file and click **Done**.
4. Select **Linear Regression** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.

6. Click the **Forecast Method** tab. Select **Linear Regression** from the **Primary Method** drop-down list.



7. Select the **Statistics** tab. Select **Write Multiple Statistics to calculate Regression statistics**.
8. Click **More**.
9. On the **Additional Statistics** screen, select **Anova** and **Coefficient**.

10. Click **Procast**. After the Forecast is run, select the **Reports** tab to choose the reports to print.
11. On the **Reports** tab, select the **Audit Trail** report. Unselect all other reports.
12. Click **Run Report** to view the Forecast.

Summarizing the Results

The Audit Trail graph displays three aspects of your data:

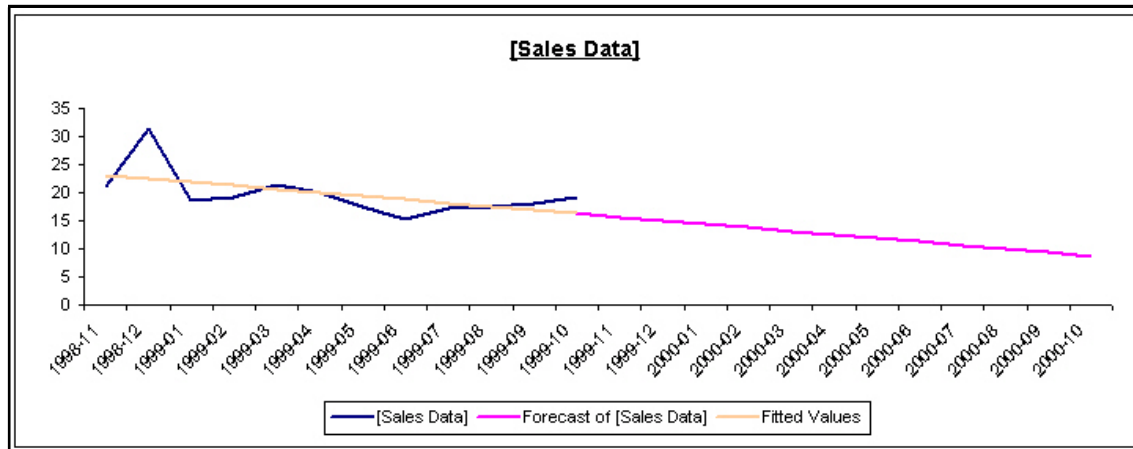
- Actual Observations
- Fitted or Smoothed values
- Forecasted values

The graph shows the trend of your sales data. To view a more detailed report of your Forecast, scroll down the Audit Trail report. The DME has automatically calculated the Accuracy and Descriptive statistics you need to determine the goodness-of-fit of your Regression model. The Mean Absolute Percentage Error (MAPE) is 10.86%, and represents the average of the errors in your Forecast. The Audit Trail Coefficient Table displays your T-Test and F-Test values, which indicate the goodness-of-fit of your Regression model.

Audit Trail - Statistics						
Accuracy Measures		Value	Forecast Measures	Value		
Mean Absolute Percentage Error (MAPE)		10.86%	Mean	19.73		
R-Square		31.64%	Standard Deviation	4.02		
Method Statistics		Value				
Primary Method		Linear Regression				
Audit Trail -- ANOVA Table (Linear Regression Selected)						
Source of Variation	SS	df	MS			
Regression	56.33	1	56.33			
Error	121.69	10	12.17			
Total	178.02	11				
Audit Trail -- Coefficient Table (Linear Regression Selected)						
Name	Value	Standard Error	T-test	F-test	Elasticity	Overall F-test
Intercept	23.18	1.89	12.24	149.70		4.63
Slope	-0.63	0.29	-2.15	4.63	-0.18	

Since the F-Test value is large, 149.70, you know that the Independent Variable **time** in your example has a significant influence

on the dependent variable **sales**. Based on the statistics the DME produced, you know that Linear Regression is a good choice for this particular data set.



6-10: Stepwise Regression

Stepwise Regression is a method used to sort out or determine the relevant explanatory variables from a set of Independent Variables. Explanatory Variables are the variables most useful to explain the dependent variable. Explanatory variables are typically included in the final Regression model.

When the number of Independent Variables is significantly large, it makes it impossible for common Regression models to compute and determine all of the explanatory variables. In such cases, Stepwise Regression is used to determine Explanatory Variables. There are three different types of Stepwise Regression.

6-10-1: Stepwise Forward Regression

From all the Explanatory or Independent Variables, this method selects the one with the highest correlation with Y, the Dependent Variable. It then determines the residuals, or errors, that result from this Regression and consider these residuals a new set of Y values or Dependent Variables. From the remaining Independent Variables, it selects the one that correlates most highly with these residuals.

Remember to consider these residuals as a new set of dependent values. Continue the process until no remaining explanatory or Independent Variable has a significant relationship with the last set of variables.

6-10-2: Stepwise Backward Regression

This method starts with a Regression that includes all the variables, assuming this is possible, and then proceeds to weed out the variable that is least significant in the equation, as measured by the t-test.

When this variable is removed, another Regression is performed to determine the next variable to be removed. This process is repeated until the most significant variable remains.

6-10-3: Stepwise-Forward-with-a-Backward-Look Regression

Combining the advantages of Stepwise Forward Regression and Stepwise Backward Regression, this method is the most powerful and the most popular of the three. This method works through an iterative process to determine the best Explanatory Variables. When it is no longer possible to find any new variable that contributes to the R-Squared value, or if no variable needs to be removed, the iterative process stops.

6-10-4: Stepwise Regression Example

As a sales manager for Super Chewy Bars, Ltd., you are responsible for determining where to spend your promotional and advertising dollars. You have spent the last several months collecting data that tells you how many Super Chewy Bars you have sold, as well as where you have been spending your advertising dollars. In order to decide where to spend your money in the future, you need to determine which advertising avenues are having the biggest impact on your sales.

With so much data, it could take you days or even weeks to determine which media channels would be best for you. Fortunately, you have just purchased the DME. With its advanced functionality, you know your decision-making process has just been made faster, easier, and more accurate.

Immediately, you notice that your spreadsheet provides the following information:

Information	Information Super
Chewy Bar Sales	Radio Advertising
Internet Advertising	Competition Index
Television Advertising	Coupon Discounts
Print Media Advertising	Distributor Discounts

Your goal is to find the promotional method with the greatest affect on Super Chewy Bar sales.

You have your data and Forecasting tool and now need to select your Forecasting technique. After a little research, you choose Stepwise Regression. This form of Regression begins by picking from all the Independent Variables, finding the one with the highest correlation with the dependent variable, and then determining the error between the two.

From the remaining Independent Variables, the one with the highest correlation to the errors of the initial Regression is calculated. This process is repeated until no remaining Independent Variable has a significant relationship with the last set of errors.

Although it sounds complicated, you know that the DME automates the entire process. This means that you are now be able to quickly and accurately determine the Independent Variable, the advertising media, that most directly affects your Super Chewy Bar sales.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the **Data Source** dialog, select **Excel Spreadsheet**.
3. Browse to and select the **ExcelExamplesFXE.xls** file and click **Done**.
4. Select **Stepwise Regression** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.

- Click the **Forecast Method** tab. Select **Stepwise Regression** from the **Primary Method** drop-down list.

Base Unit

Statistics Reports

Data Capture **Forecast Method** Group By

Forecasting Technique: Regression

Primary Method: Stepwise

Stepwise:

Dependent Series: First Series

☒ Stepwise Min. Series Max. Series Min. F In Max. F Out Min. Lag Max. Lag

☐ Forward

☐ Backward

☐ Lag Dependent

Secondary Method: ProCast

ProCast:

Error Term: Sum Squared Error

New Product Curve

☒ Do Not Include

☐ Include when num of obs < 6

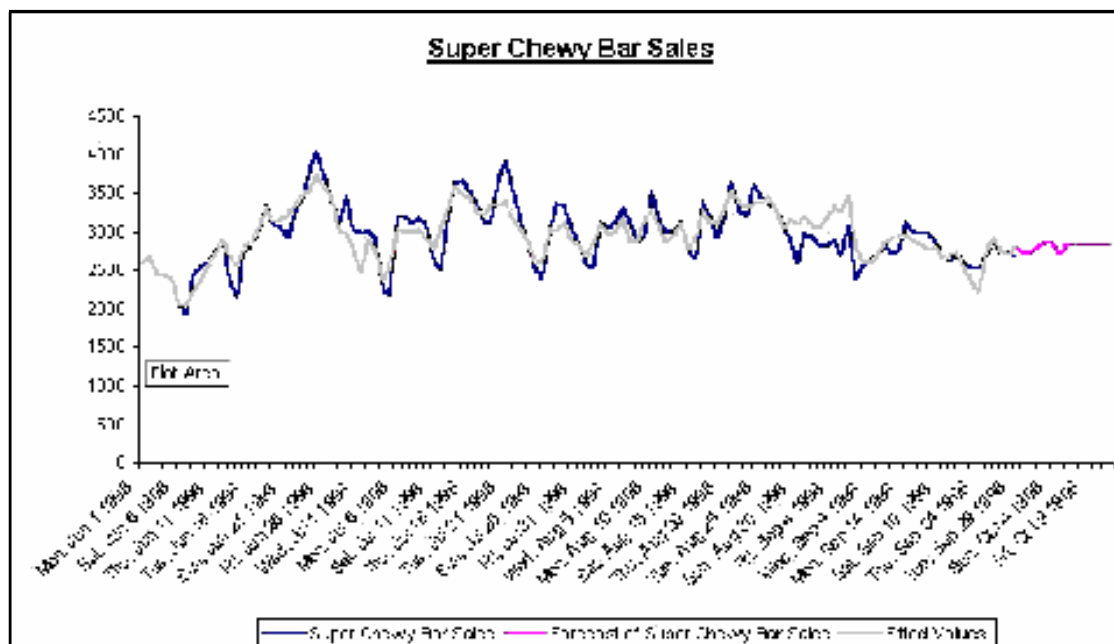
Advanced ProCast!

Since Super Chewy Bar Sales is the first Series in the Series list, the DME uses it as the dependent Series.

- Click **Procast** to run your Forecast. After the Forecast runs, select the **Reports** tab and select the **Audit Trail** report.
- Click **Run Report** button to get your Forecast results.

Summarizing the Results

The graph the DME produces shows a smoothed Forecast of Super Chewy Bar sales over the next few periods. However, since you need more detail, scroll through the Excel spreadsheet and find the following details.



The summary contents show you the Forecast has a Mean Absolute Percentage Error of 5.26%. As you look further down the report, you

notice the Coefficient Table. Each Series is listed in the left-hand column.

Summary Comments							
The forecast has an average error of	5.26%						
The model has a standard deviation of	32.85%						
The forecast exceeds the accuracy of a 2-hole average by	72.83%						
Audit Trail - Summary Analysis							
Audit Trail -- ANOVA Table (Stepwise Selected)							
Source of Variation	SS	df	MS				
Regression	17,107,272.00	3	5,702,424.00				
Error	9,907,000.00	110	89,972.73				
Total	27,014,272.00	113					
Audit Trail - Coefficient Table (Stepwise Selected)							
Series Description	Included In Model	Coefficient	Standard Error	T-Test	F-Test	Elasticity	Overall F-Test
Super Chewy Bar Sales	Constant	17,107,272.00	5,702,424.00	3.00	9.00	1.00	9.00
Internet Advertising	Yes	1.26	0.02	63.00	4,000.00	1.75	4,000.00
Television Advertising	No						
Print Media Advertising(Lag 1)	No						
Radio Advertising	Yes	1.45	0.02	72.50	5,250.00	1.98	5,250.00
Competition Index(Lag 0)	Yes	1.21	0.01	121.00	14,641.00	1.00	14,641.00
Coupon Discounts(Lag 1)	No						
Distributor Discounts(Lag 0)	No						

After most of the Series, there is a Lag amount in parenthesis. This signifies there is a Lag dependency in the Series. For this example, the Lag represents the days (independent Series) it takes for the advertising method to effect the sales production (dependent Series). For example, Print Media Advertising has Lag 1 following it. This means that the Print Media Advertising method does not have a direct effect on the sales production until after 1 day.

One column over, you can see the Independent Variables the DME included in your Regression model: Internet Advertising, Radio Advertising and the Competition Index. As you notice from the T-Test and F-Test, the most significant Independent Variable is Internet Advertising. This is easy to tell, since the largest T-Tests and the F-Tests represent the most significant Independent Variables. In fact, the DME automatically disregarded the least significant Independent Variables, which makes your job much easier.

You can now confidently assert that Internet Advertising is having the most affect on your Super Chewy Bar sales.

6-11: Multiple Regression

Multiple Regression is similar to Simple Regression except with more X's, or Independent Variables. Often, the Y or dependent variable may be predicted or explained by more than one X or Independent Variable. For example, you may have sales data that is dependent on many factors: time of year, advertising dollars spent, and/or special promotions implemented. Each of these factors potentially has an influence over the sales figures. Multiple Regression is one Forecasting technique that determines the Independent Variable with the greatest impact. As with Linear Regression. Multiple Regression must be interpreted and evaluated by the individual performing the Forecast. There are accuracy and descriptive statistics that help explain what is implied and predicted by the Multiple Regression Forecast.

Like Linear Regression, the slope coefficients, such as b , needs to be interpreted. The coefficients represent the change in Y, or the dependent variable, from a change in the X, or Independent Variable of interest. In other words, Multiple Regression will determine how more than one Independent Variable influences a single dependent variable.

The same concepts are used in both a Linear Regression and a Multiple Regression to evaluate the Regression model. The standard error of the Regression model is based on the residuals. The residuals are the difference between the actual and predicted value for each observation. To accomplish this, the DME uses fitted values. In other words, the DME produces a Forecast of your Historical data and compares those Forecasted values with the actual values. Of course, the DME also produces future Forecasted values based on the number of periods you want to predict.

The R-Squared in a Multiple Regression Forecast is called the coefficient of multiple determination. Although the name is different from the R-Squared used in Linear Regression, it is still the percentage of the variation in the Y, or dependent variable, that's explained by the estimated Regression relationship. The R-Squared tells you what percentage of the variation in the dependent variable is explained by a change in the Independent Variables. A very high R-Squared indicates a strong explanatory relationship between the dependent variable and the Independent Variable.

The F-Tests and T-Tests used in Multiple Regression indicate whether there is explanatory power in the model. As in Linear Regression the DME reports these statistics. The difference is that for Multiple

Regression a test is done for each Independent Variable to determine the particular relationship between each X, or Independent Variable, and Y, the dependent variable.

6-11-1: Multiple Regression Example

Data from a mutual savings bank is used as an example to depict Multiple Regression. The concern within the mutual savings bank is that monthly changes in deposits are getting smaller while withdrawals are getting bigger. It is of interest to develop a Forecasting model to Forecast changes in the end of month balances over the next few months.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the Data Source dialog, select Excel Spreadsheet.
3. Browse to and select the **ExcelExamplesFXE.xls** file and click **Done**.
4. Select **Multiple Regression** from the **Table/Query** drop-down list.

The spreadsheet contains 60 months of end of month Observations. Additionally, there are AAA bond rates and the rates on United States Government 3-4 year bonds. It is thought that these two rates influence the end of month figures in the bank.

5. Select **Columns** in the **Data Organization** box.

6. Select the **Forecast Method** tab. Select **Multiple Regression** from the **Primary Method** drop-down list.

The screenshot shows the 'Base Unit' dialog box with the 'Forecast Method' tab selected. The 'Forecasting Technique' is set to 'Regression'. The 'Primary Method' is set to 'Multiple Regression'. The 'Multiple Regression' section shows 'Dependent Series' as 'First Series'. The 'Secondary Method' is set to 'ProCast'. The 'ProCast' section shows 'Error Term' as 'Sum Squared Error'. The 'New Product Curve' section has two options: 'Do Not Include' (selected) and 'Include when num of obs <' (with a value of 6). The bottom of the dialog has a toolbar with icons for help, print, save, and a 'ProCast!' button.

Since Dif of End of Month is the first Series in the Series list, the DME uses it as the dependent Series.

7. Click **Procast**. After the Forecast runs, select the **Reports** tab to choose reporting options.
8. On the **Reports** tab, select **Audit Trail** to view the most detailed report of your Multiple Regression Deselect the other reports.

- 9. Select **Fitted Values Table**, so that you can compare actual values to the DME Forecasted values.
- 10. Click **Run Report** to view the report.

Summarizing the Results

The DME has provided a detailed report of the Multiple Regression Forecast that includes a graph, a fitted values table, an ANOVA chart, and a Coefficient Table.

This graph displays three lines. The table below details what each line means.

Line	Description
Blue	Represents your actual values.
Purple	Represents the Forecasted value.
Dotted Red Line	Represents the fitted values. The fitted values are what the Historical values would have been if the DME had Forecasted them.

The summary contents of the Forecast and the fitted values table are included in the DME Audit Trail report. The average error of the Forecast, 6.43%, indicates that you can have a high degree of confidence of in the Forecasted values. As you scroll down through the Audit Trail report, you can view each fitted value compared to the actual value of every data point.

The Audit Trail report in the DME is a powerful feature that enables you to view all the relevant statistics when deciding whether to trust your Forecast. In this case, for your Multiple Regression Forecast, you can see that the DME included each independent Series in the model. Additionally, the DME calculated the F-Test and T-Test for each independent Series. This enables you to decide objectively which Series has the greatest influence on your dependent Series, **End of Month**. From the F-Test, you can see that **AAA Bond Rates** is the independent Series with the greatest influence on the **End of Month** balance.

6-12: Polynomial Regression

Polynomial Regression is one of the most frequently used linear response models in practice. It is an enhancement of Multiple Regression. Polynomial Regression models can contain one, two, or even several Independent Variables just like a Multiple Regression model. However, Polynomial Regression goes further and treats the relationship between the Dependent and Independent Variable in more than a linear fashion. Polynomial Regression allows the Independent Variables to be present in various powers.

A Regression model in the second power is called a second-order model. The Independent Variables appear in the first and second powers. These functions often look like a curve. A Regression model in the third power is called a third-order model. The Independent Variables appear in the first, second, and third powers. This function has two curves in it. Theoretically, there are no limitations of orders in Polynomial Regression. Generally when there is only one Independent Variable, it is only necessary to have a maximum order of three.

When there is more than one Independent Variable, it is only necessary to have a maximum order of two. Any degrees higher than that are typically useless.

When the Independent Variables are adjusted according to orders or degrees, which creates new Independent Variables, the relationship shown is more than linear.

Polynomial models with Independent Variables present in higher powers than the third degree are often not employed. The interpretation of the coefficients becomes difficult in such models. It should be noted that a polynomial model of sufficiently high order can always be found to fit the data perfectly, though these models may not show the basic elements of the Regression relationship between X and Y, and may lead to erratic results.

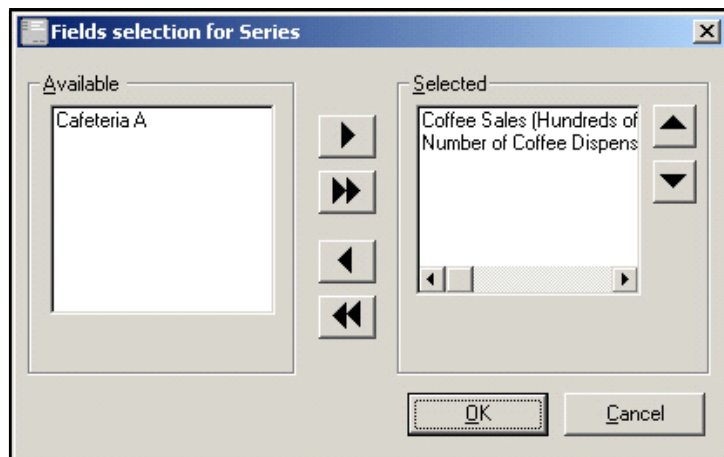
Although Polynomial Regression is more versatile than Multiple Regression, it is often unhelpful to create new sets of Independent Variables without knowing which Independent Variables are the most significant. The DME combines the power of Stepwise Regression with Polynomial Regression to overcome this challenge. Using Stepwise Regression along with Polynomial Regression enables users to determine the most significant Independent Variable from all the Independent Variables.

6-12-1: Example

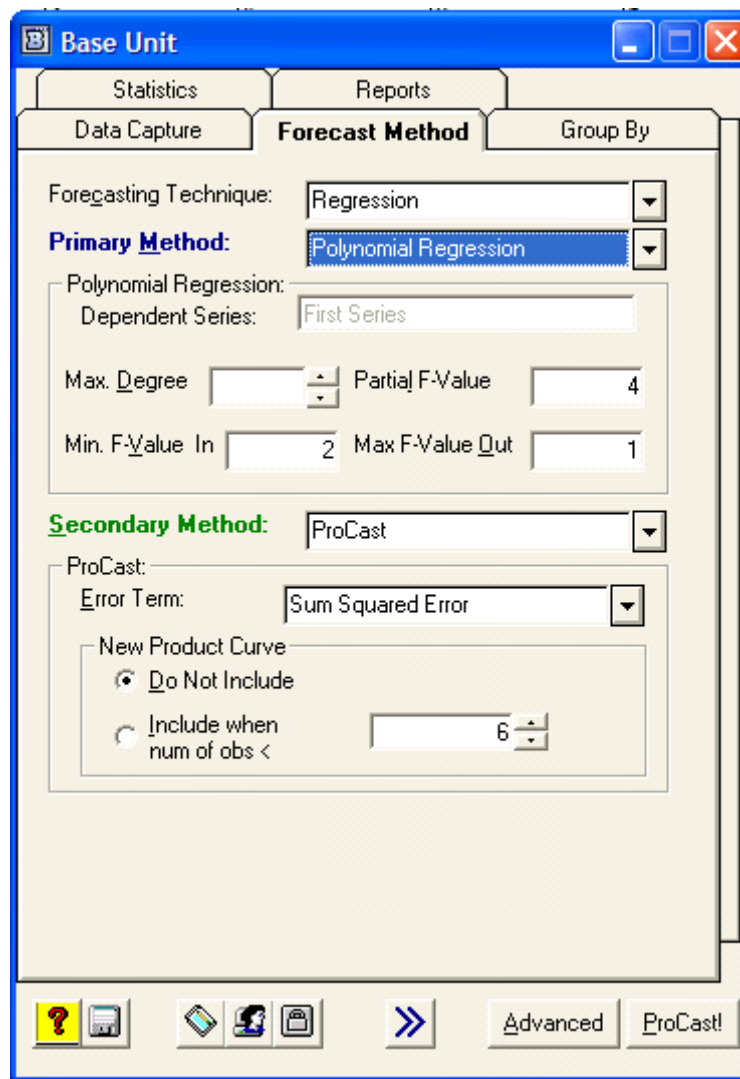
To show how Polynomial Regression is used, consider the relationship between the number of self-service coffee dispensers in a cafeteria line and sales of coffee. The coffee sales are measured in hundreds of gallons of coffee sold. You want to discover whether the relationship between sales and number of self-service dispensers is quadratic in the range of observations.

If so, sales should increase as the number of dispensers. But if the space is cluttered with dispensers, increasing the number of dispensers becomes a slower, more difficult process.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the **Data Source** dialog, select Excel Spreadsheet.
3. Browse to and select the **ExcelExamplesFXE.xls** file and click **Done**.
4. Select **Polynomial Regression** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box,
6. Click the **Advance** button. On the Advanced Options window, select the **Observations** button to change the Series order so that Coffee Sales is on top. This designates Coffee Sales as the Dependent Series.



7. Click **OK**.
8. Select the **Forecast Method** tab. Select **Polynomial Regression** from the **Primary Method** drop-down list.

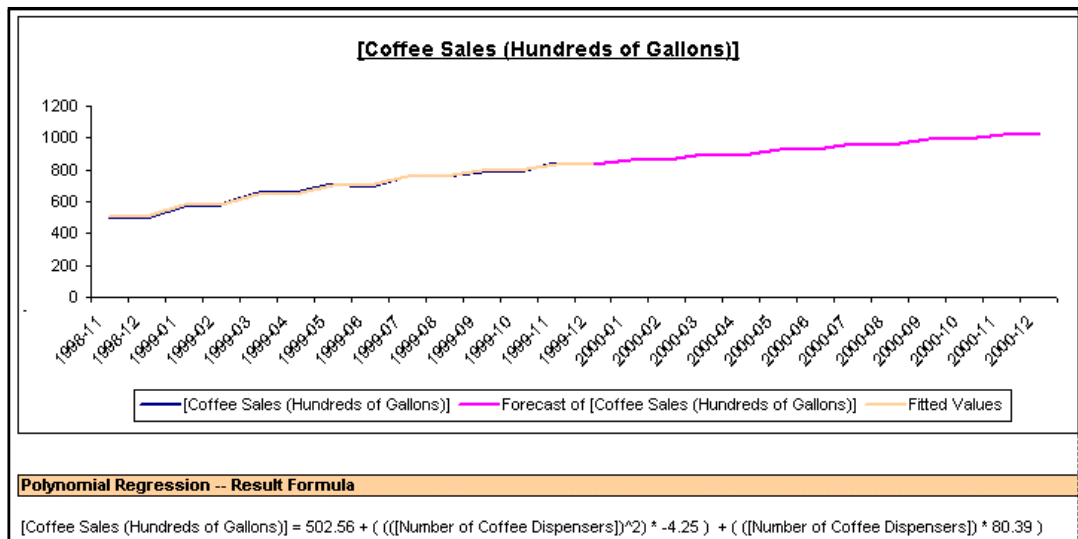


9. Select **Procast** from the **Secondary Method** drop-down list.
10. Click **Procast**. After the Forecast runs, select the **Reports** tab.
11. To see all the detailed statistics (i.e., F-Test, T-Test, etc.), select the **Audit Trail** report and deselect any other report type.

12. Click **Run Report** and wait for the DME to display the results of your Forecast.

Summarizing the Results

The formula used to make the Polynomial calculations is located directly below the graph.



The independent Series **Number of Coffee Dispensers** is used twice in this Forecast: the first time to the first order or degree and the second time to the second degree.

An **^2** signifies that an Independent Variable has been taken to the second order.

This means when making the Forecast, the DME factored in both the original **Number of Coffee Dispensers** and a new independent Series, **Number of Coffee Dispensers to the Second Order**.

Summary Comments							
The forecast has an average error of		0.89%					
The data has a standard deviation of		115.18					
The forecast exceeds the accuracy of a simple average by		99.61%					
Audit Trail - Summary Analysis							
Audit Trail - Statistics							
Accuracy Measures		Value	Forecast Measures	Value			
Mean Absolute Percentage Error (MAPE)		0.89%	Mean	688.48			
R-Square		99.61%	Standard Deviation	115.18			
Method Statistics		Value					
Primary Method		Polynomial Regression					
Secondary Method		Procast					
Audit Trail -- ANOVA Table (Polynomial Regression Selected)							
Source of Variation	SS	df	MS				
Regression	171,773.44	2	85,886.72				
Error	679.22	11	61.75				
Total	172,452.66	13					
Audit Trail -- Coefficient Table (Polynomial Regression Selected)							
Series Description	Included in Model	Coefficient	Standard Error	T-test	F-test	Elasticity	Overall F-test
[Coffee Sales (Hundreds of Dependent		502.56	4.85	103.62	10,736.93		1,390.94
[(Number of Coffee Dispen Yes		-4.25	0.61	-7.01	49.12	-0.08	
[Number of Coffee Dispe Yes		80.39	3.79	21.23	450.80	0.35	

However, you still need to determine the independent Series that has the most significant affect on your coffee sales. As you scroll down the output, you come to the Summary Contents, ANOVA Table, and the Coefficient Table.

The ANOVA (ANALYSIS OF VARIANCE) Table contains the source of variation, Degrees of Freedom (DF), sums of squares (SS) and the mean square (MS). The degrees of freedom represent the sums of squares and is the value of all the errors squared. In this ANOVA table, the SS error of 679.22 indicates that the model is a good fit. Finally, the MS error is a traditional way of determining the accuracy of a Forecast. In this case, the mean square error of 61.75 indicates that the error is still small, even after averaging all the errors and squaring the value.

The Forecast has a Mean Absolute Percentage Error (MAPE) under 1%, which indicates that the Forecasted values are trustworthy. The Coefficient Table contains the dependent variable, Independent Variable and Independent Variable to the second order, T-Test, and F-Test values. As with other Regression models, the F-Test signifies how significant is the model.

The original independent Series **Number of Coffee Dispensers** has an F-Test statistic of 450.80 and significantly influences the dependent variable **Coffee Sales**.

The F-Test value for the **Number of Coffee Dispensers to the Second Order** is 49.12, which is not as significant as the original independent Series. The overall F-Test of the dependent Series is very large. That means that the model is a good fit (i.e. the Independent Variables significantly affect the dependent variable).

For this example, Polynomial Regression has shown you that increasing the number of coffee dispensers most likely significantly increases your coffee sales.

6-13: New Product Forecasting

Since new products lack Historical data, most Forecasting techniques cannot produce satisfying results. For example, it is typically impossible for Double Exponential Smoothing to determine the trend since the data set is too small. Otherwise, it may only deduce a strong trend despite the fact that the new product has its own growth limitation. To overcome this difficulty, the DME introduces New Product Forecasting.

New Product Forecasting includes three new product models and one automatic model. The three new product models are:

- Gompertz Curve
- Logistic Curve
- Probit Curve

There are two main differences between these three models. The first difference is in the shapes of the product curve (i.e., amount of time that lapses before a product's growth curve stabilizes). The second difference lies in the fact that the three new product models may use different lower and upper limits for the same Forecast data. The automatic model is recommended most often because it can automatically choose the best model from the three basic new product models.

Each new product model has its own lower and upper limit. For most cases, the lower limitation is 0. Determining the upper limit is a complicated undertaking. Fortunately, the DME provides the most

flexible settings for a multitude of situations. If you do not know what the upper limit should be, the DME determines the best upper limit for your data. If you know the maximum feasible upper limit according to your business experience, the DME can also employ this useful bit of information to find the best upper limit accordingly. Of course, if you know the exact upper limit, the DME can just use it to determine the model.

You have just over seen the launch of a new product in your company's toy department. Although the sales have gone well over the past several months, your department head needs a report on future sales over the next year.

That means you need to create a Forecast based on very limited Historical data to show when the sales will stabilize. Given the limited amount of data you have, you're feeling fortunate that you've just loaded the DME on your computer. With its advanced functionality and New Product Forecasting methodology, you know you can deliver the quality Forecast your department head needs.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the **Data Source** dialog, select **Excel Spreadsheet**.
3. Browse to and select the **NewProductForecast.xls** file and click **Done**.
4. Select **Data** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.

6. Select the **Forecast Method** tab, and select **New Product Forecasting** from the **Forecasting Technique** drop-down list box.

The screenshot shows the 'Base Unit' dialog box with the 'Forecast Method' tab selected. The 'Forecasting Technique' dropdown is set to 'New Product Curve'. The 'Primary Method' dropdown is set to 'Gompertz Curve'. Under the 'Gompertz Curve' section, the 'Optimized' radio button is selected. The 'Min' value is set to 0, and the 'Max' value is empty. The dialog box has a blue title bar with standard window controls. At the bottom, there is a toolbar with icons for help, data, and a 'ProCast!' button.

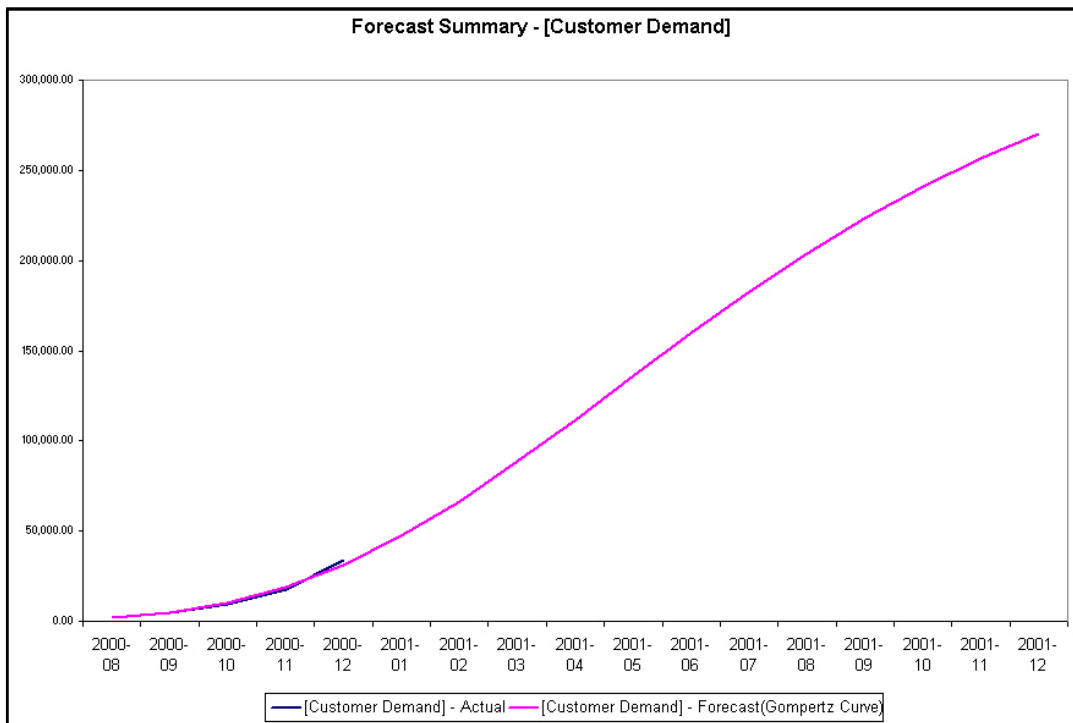
7. Select **Gumpertz Curve** as your **Primary Method**.
8. Check **Optimized**. The DME selects the best Min and Max values for you.

Note: *The Min value is the potential minimum value of the model, whereas the Max value is the potential maximum value of the model.*

9. Click **Procast** to run your Forecasts. After the Forecast runs, click the **Reports** tab and choose the **Standard Report** report and check the **Show Charts** option.
10. Click **Run Report** to view your Forecast results.

Summarizing the Results

The DME has produced a Gumpertz graph, which displays the new product's Actual and Forecasted data. As you can see, the graph displays the new product launch. The DME recognizes that after several periods, the growth tapers off. As the growth decreases, the line becomes flat.



As you view the standard report results, you can see that the DME has produced a trustworthy Forecast. Given that you only have 5 periods of Historical data, you created a Forecast for your new product.

6-14: Using and Creating an Event Model

Whether you are in packaged goods, manufacturing, sales, inventory, or the production planning area of your company, your product sales are often affected by promotional campaigns. The more you are able to account for these irregular occurrences, the better you can plan and thus prepare for their effects.

Event Modeling was designed to enhance your data analysis and allow you to take promotions and other events into account as you develop your Forecasts. Now you can go beyond analyzing the trend and seasonality contained in your Historical data by assessing the impact of promotions on your Historical and future demand.

Companies conduct promotions of various types. At any given moment your organization may use push and pull types of promotions at various times throughout the year. In general, push promotions are designed to push the merchandise off of the shelves through increased customer awareness, whereas pull promotions are designed to attract customer's attention by means of an incentive that causes them to purchase your product.

The whole trick to event modeling is to define and place the proper event indices during the period the promotion or event is taking place. In the case of pull promotions, it is quite simple to mark the section of the Forecast where the effects take place, because the effect on sales is almost immediate. For example, a newspaper will offer a free month subscription if customers are willing to subscribe for six months. When this promotion is offered, the effect on subscriptions is immediate; therefore, the promotional flag would be added to the month in which it occurred.

In the case of push promotions, assigning event flags is a little more challenging, but the process is essentially the same. The only difference is that the event flags must be applied to the future period where the effects of the promotion begin to take effect. For example, a packaged goods company sends out 50-cent coupons in a mass mailing. The effects of the promotion will not be recognized until the customers begin to redeem the coupons during their next visit to the store.

6-14-1: Event Model Example

In the following Scenario, you are the product manager for Junk Mailers International, a firm that specializes in soliciting sales using

mass mail offerings. During a meeting with the CFO of your company, you are asked to participate in the preparation of the earnings estimates that will be delivered to the board in your annual meeting.

Under careful guidance, Junk Mailers has developed equations allowing you to describe your operating costs as a function of the mailings. Because of the set up costs and other factors involved, your costs are higher at the beginning of the year. For this reason, it is critical for you to be able to accurately predict the response rates you will see throughout the year. As the demand planner, you know the importance of developing an accurate Forecast. To do this you know you will need the help from the marketing department.

Your first stop on the tour is with the marketing department, where you present your situation and explain the issues facing you. The first step in the process is to show the marketing department the spreadsheets you've prepared and some initial Forecast results to demonstrate the need to develop a promotional Forecast.

As you begin, you review the Event Model Scenario with the marketing director. While you explain the process, you emphasize how the marketing department's promotional plans will impact the earnings estimate. To further illustrate your point you pull up the DME on your computer and quickly create a Forecast.

1. Create a new Scenario.
2. Click the **Data Capture and View** button. On the **Data Source** dialog, select **Excel Spreadsheet**.
3. Browse to and select the **EventModel.xls** file and click **Done**.

The Event Model sample spreadsheet shows the two sheets you need for an event model. The first sheet is the Historical data and the second sheet is the Flags used for the events.

4. Select the **Data\$ table/query** from the **Table/Query** drop-down list.
5. Select **Columns** in the **Data Organization** box.
6. Select the **Forecast Method** tab and select **Expert** as the **Primary Technique**.
7. Click **Procast** to run the Forecast and then select the Series Preview to view the Forecast or go to the **Reports** tab to print out a report.

Impressed, the marketing director watches in amazement as you present a Forecast in thirty seconds flat. Without any further explanation, the marketing director realizes that the Forecast doesn't take into consideration the Marketing plans for the next year. As you begin to talk through the marketing initiatives that are used, you realize there are four types of marketing initiatives typically used. As you work through the process the two of you realize there is a delayed effect between the mail drop and the increase in sales activity. Together you begin to classify the types of marketing initiatives that are used. The following table details these Event Flags.

Event Flag	Description
Event Type 1	Represents full color catalogs used as a targeted mailing.
Event Type 2	Represents catalogs followed up by solicitation calls.
Event Type 3	Represents blow-ins added to utility bills.
Event Type 4	Represents response cards requiring postage for return.

As you further refine your thoughts, you realize you need to use your Historical data to develop the lift factors that are generated by each campaign. In order to do this, you need to label your events and enter them by month into a separate sheet in your spreadsheet. As you begin to reconstruct history, you realize that it is relatively easy to place the events in the proper month. After you complete your task, you realize that you have created an event model.

As you review the results, you realize that once you factored in your promotional plans, the picture for the future looks more realistic. The procedure below details how the projections were created.

1. Create another Scenario.
2. From the **Data Capture** dialog, select **EventModel.xls**.
3. Select **\$Data** from the **Table/Query** drop-down list.

4. Select the **Forecast Method** tab. Select **Business Promotional Model** for the **Forecasting Technique**.

The screenshot shows the 'Base Unit' dialog box with the 'Forecast Method' tab selected. The 'Forecasting Technique' is set to 'Business Promotional Model'. The 'Primary Method' is 'Event Model'. Under 'Event Model', the 'Event Flags' button is highlighted. The 'Alpha (for Event Index)' is set to 1. The 'Simulation' section has 'No Simulation' selected. The 'Additional table' dropdown is empty. The 'Secondary Method' is 'ProCast'. Under 'ProCast', the 'Error Term' is 'Sum Squared Error'. The 'New Product Curve' section has 'Do Not Include' selected. The 'Include when num of obs <' is set to 6. The bottom of the dialog has a toolbar with icons for help, save, print, and a 'ProCast!' button.

Base Unit

Statistics Reports

Data Capture **Forecast Method** Group By

Forecasting Technique: Business Promotional Model

Primary Method: Event Model

Event Model:

Event Flags Alpha (for Event Index): 1

Simulation

☒ No Simulation ☐ Random Event Simulation

☐ Fixed Percentage Simulation

Additional table

Secondary Method: ProCast

ProCast:

Error Term: Sum Squared Error

New Product Curve

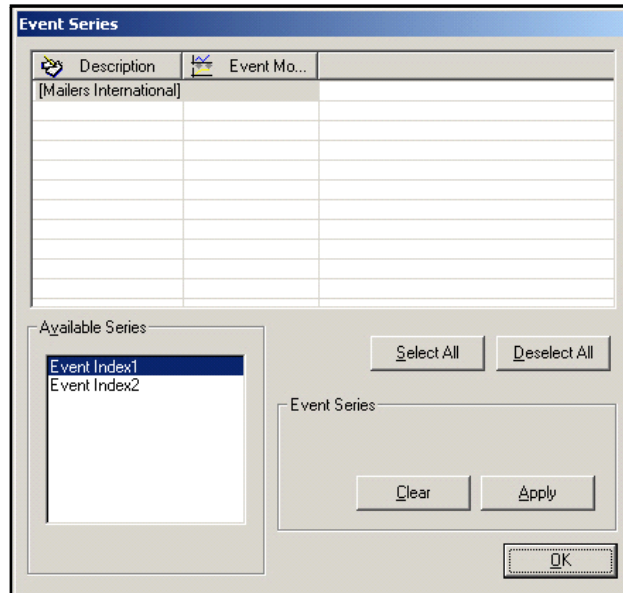
☒ Do Not Include

☐ Include when num of obs < 6

Advanced ProCast!

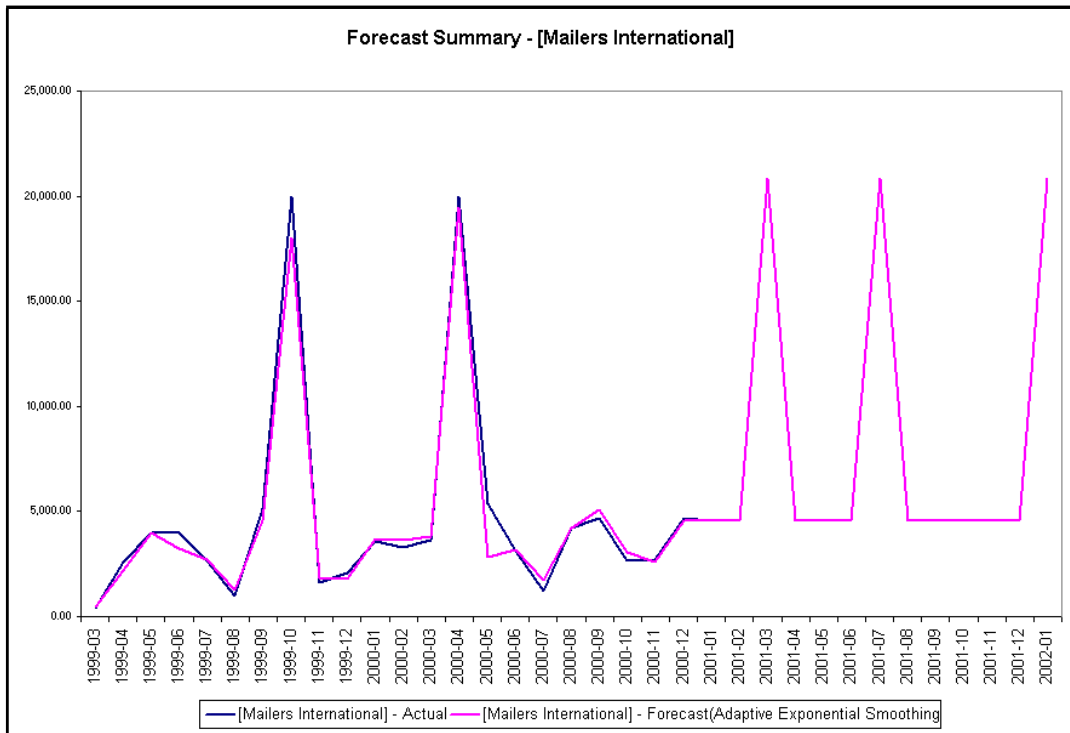
5. Click the **Additional Table** drop-down list and select the **Event** spreadsheet.
6. Click the **Event Flag** button to apply the **Event Flag** to the appropriate Series.

The Event Series dialog displays.



7. Click **Apply**.
8. Go to the **Reports** tab and select **Standard Report** making sure **Show Charts** is selected.
9. Select **Write Multiple Statistics** from the **Statistics** tab.
10. Click **Procast**. After the Forecast runs, click the **Reports** tab and choose the **Standard Report** report and check the **Show Charts** option.
11. Click **Run Report**.

When the report generates, notice the peaks in the graph. The peaks represent the events that were defined for the future.



6-15: Event Modeling from the Series View

Event Models can also be created from the Series View by adding a new method and selecting Event Model. You can still set your historical flags on your past performance data and use these to project your forecast data for future dates.

1. In the Misc Window, click the Add Item button. A new line is added to the list.
2. Use the Method drop-down to select “Event Model”.
3. Double-click on the Target field in the in the Misc Windows panel.
4. The Forecast Settings screen displays.

Forecast Settings : 02-TR-INV-OPT-LM - [1818402C2], Opinion Line : Act Fcst

Save RollBack

Forecast Settings		History Range		Forecast Range	
Source Opinion Line	Adj Hist	Fixed Start Period		Forecast periods	17
Target Opinion Line	Act Fcst	Fixed End Period			
Forecast Method	ProCast	Floating Start Periods			
Overwrite History	☒	Floating End Periods			
Automatic Forecast	☒				

Forecast X Method Parameter		General Statistics		Accuracy Statistics		Descriptive Statistics	
Error Term	Sum Squared Error	MAPE	☒	Mean Absolute Error	☒	Range	☐
Include New Product Curve	☐	BIC	☐	Mean Error	☐	Auto Covariance	☐
Include when numb. of obs	6	AIC	☐	Mean Square Error	☐	Max	☐
		Sum Squared Error	☐	Normality Error	☐	Auto Correlation	☐
		R-Square	☒	Root Mean Square Error	☐	Min	☐
		Adjusted R-Square	☐	Standard Deviation Error	☐	Coefficient Of Variation	☐
		Durbin Watson	☐	Theil	☐	Kurtosis	☐
		Mean	☒	Standardized Mae	☐	Sum Squared Deviation	☐
		Median	☐			Skewness	☐
		Standard Deviation	☒			Root Mean Square	☐
		Variance	☐			Mode	☐

Safety Stock Statistics		Regression Table		Statistics Attribute Mapping	
Active	☒	Anova	☐	☒ Add Item	☐ Remove Item
Add Forecasted Values	☐	Coefficient	☐	Statistic	Attribute
Lead Time	2.00	Correlation Coefficient	☐		
Level%	95	Coefficient of Determination	☐		
		Covariance	☐		

Confidence Limits Statistics	
Active	☒
Limit%	90

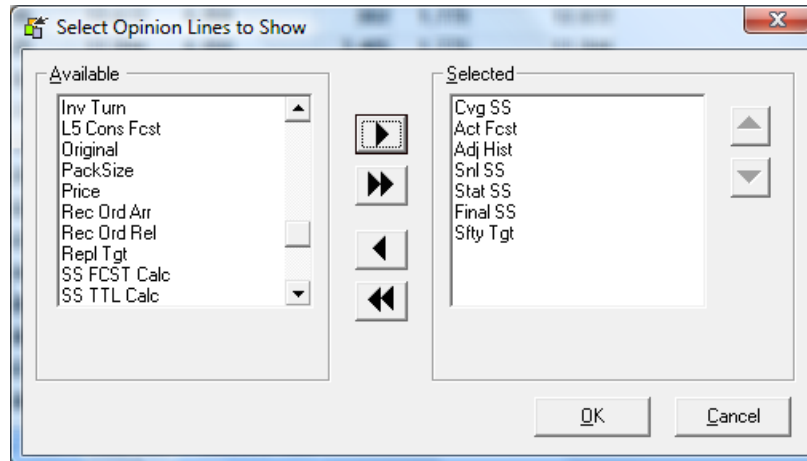
5. Click on the Opinion Lines field to open the Opinion Lines for Regression window.

Opinion lines for regression

Selected	Description
☒	Adj Hist
☐	Act Fcst
☐	Dep Dmd
☐	Ttl Dmd
☐	Com Ord Arr
☐	Rec Ord Arr
☐	End Inv
☐	Repl Tgt
☐	Sfty Tgt
☐	Unsp Dmd
☐	Final SS
☐	Stat SS
☐	Snl SS
☐	Cvg SS

OK Cancel

6. Select the Opinion Line and click OK.
7. On the Forecast Settings screen, click Save.
8. On the Data View tab, right-click and click “Select Opinion Lines to Show”.
9. On the Select Opinion Lines to Show screen, click the opinion line you chose above and add it to the “Selected” list.

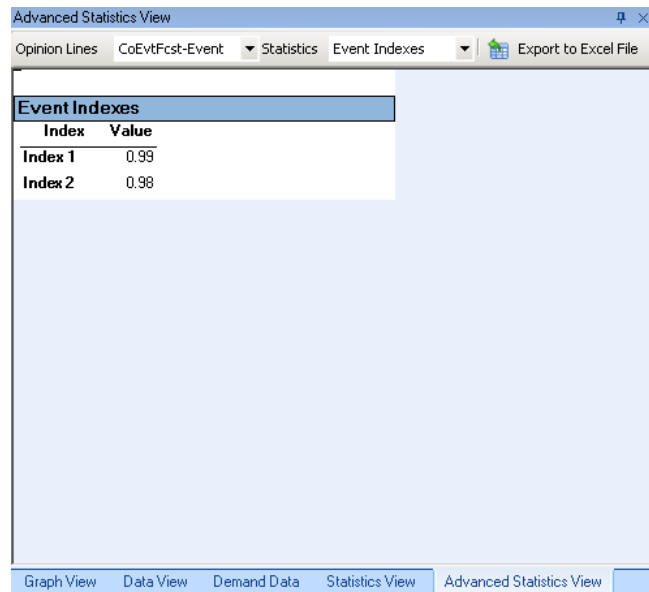


10. Click OK to return to the Data View.
11. In the new opinion line, use numbers to flag events in the historical data.

Note: *The numbers used to flag events must be sequential in order for the Event Model to run. For example, you can't have a "1" and a "3" without a "2". However, each flag can be used multiple times.*

12. Re-run the forecast and the flags will now display in the Graph View.

13. You can also view more detailed information regarding this model on the Advanced Statistics View.



The screenshot shows a software window titled "Advanced Statistics View". It has a menu bar with "Opinion Lines", "CoEvtFcst-Event", "Statistics", "Event Indexes", and "Export to Excel File". Below the menu bar is a table titled "Event Indexes" with two columns: "Index" and "Value". The table contains two rows: "Index 1" with a value of 0.99, and "Index 2" with a value of 0.98. At the bottom of the window is a tab bar with five tabs: "Graph View", "Data View", "Demand Data", "Statistics View", and "Advanced Statistics View", which is currently selected.

Index	Value
Index 1	0.99
Index 2	0.98

Note: *The Advanced Statistics View will only display when you run a method that requires complex calculations such as Event Modeling or Multiple Regression.*

14. On the Advanced Statistics View, the Opinion Lines drop-down allows you to choose which lines are used in this statistics.
15. Use the Statistics drop-down to change the type of statistics you are viewing.
16. You can also save these statistics into a spreadsheet by clicking the "Export to Excel File" button

Section 7: Accuracy Statistics

This section details statistics that measure the accuracy of a Forecast.

7-1: Akaike Information Criterion (AIC)

Akaike Information Criterion is a statistic that aids in the Box-Jenkins specification stage of model building. A model that minimizes the AIC is considered to be the most appropriate model. This implies that when several models may be appropriate, choose the one with the smallest number of free parameters, thus the smallest AIC.

7-2: Adjusted R-Squared

The coefficient of determination establishes that when an explanatory variable is added to a model, R-Squared decreases no matter how useless the additional variable is. Therefore, R-Squared is the fraction of variance explained by the model. Ideally, the measure of fit would decrease when useless variables are entered into the model as explanatory variables. In other words, if the measure of fit decreases every time a useless variable is entered into the model, then the analysts can measure and determine which variables to keep and which to expunge. A statistic widely used to achieve this is the coefficient of determination adjusted for the number of parameters in the model (Adjusted R-Squared). Adjusted R-Squared tells you when the negative affect of the variable outweighs the positive.

7-3: Bayesian Information Criterion (BIC)

Bayesian Information Criterion (BIC) is an order estimation criterion used in the Box -Jenkins specification stage of model building. A model that minimizes the BIC is considered to be the most appropriate model. When several models may be appropriate, choose the one with the smallest BIC. The AIC and BIC differ in their second terms, which are penalty functions for extra parameters. Often AIC and BIC lead to the same model choice.

When measuring accuracy, it is necessary to test for Auto Correlation within the errors. Auto Correlation occurs when there is dependence between the successive error values, which is also called a serial correlation. Durbin Watson is the most widely used statistic to determine random errors.

7-4: Durbin Watson

The Durbin Watson statistic always lies between 0 and 4. If it is closer to 0, it indicates a positive Auto Correlation. A value close to 4 indicates negative Auto Correlation. A value close to 2 tends to reinforce the conclusion that no correlation exists among the error. Therefore, values below 2 represent positive serial correlation amongst the errors and values above 2 represent negative serial correlation amongst the errors.

7-5: Mean Absolute Error (MAE)

Similar to Mean Error, except the MAE considers the absolute values of the errors. In other words, it takes negative values and replace them with their absolute (i.e. positive) values. This method de-emphasizes large outliers. Negative and positive results are unable to cancel each other. A 0 MAE represents a perfect fit.

7-6: Error / Residual

In Forecasting the terms **error** and **residual** are interchangeable. They both refer to the difference between the Forecasted and actual values.

7-7: Mean Absolute Percentage Error (MAPE)

Mean Absolute Percentage Error is commonly used in quantitative Forecasting methods because it produces a measure of relative overall fit. The absolute values of all the percentage errors are summed and the average is computed. For example, if you are Forecasting sales that vary greatly from month to month and the MAPE is +5%, it is a more useful result than a Mean Error. The MAPE also de-emphasizes outliers, but produces results calculated as the average absolute error in percentage terms, which are easily interpretable.

7-8: Mean Error (ME)

Mean Error Calculated as the average error value. It is less reliable in some cases than other accuracy statistics because there is the risk

that large outliers can cancel each other out, producing a ME near zero, which would indicate a perfect fit. For example, positive and negative error values could produce an average of zero, which may not be an accurate description of the overall fit of the Forecast.

7-9: Mean Square Error

One of the traditional measures of Forecast accuracy. Mean Square Error is used when all of the errors are similar in magnitude. If the data does contain one or two large errors, calculate the mean absolute error (MAE), since using sum squares magnifies these errors. Also use the MAE or MSE to select the right Forecasting model by choosing the model that results in the smallest MAE or MSE. Keep in mind that you cannot compare Forecast models that used different data transformations and you cannot compare MSE to MAE.

7-10: R-Squared

7-11: Root Mean Square Error

Referred to as the Coefficient of Determination. It tells the amount of variance in Y that can be explained by variable X. Variance is how dispersed the data is, and is calculated by how far away the data points are from the average data point. Where Y is the Dependent Variable and X is the Independent Variable, R-Squared determines the level of influence X has on Y's variance.

The square root of the Mean Square Error It is calculated by taking the square root of the arithmetic mean of squared deviations from the mean. It is also called standard deviation, when the deviations do not represent errors.

7-12: Standard Deviation Error

Used in Regression analysis to measure the average variation of the observed values around the Forecast values. It measures how far away the Forecasted values are from the actual values in the data set.

7-13: Sum Squared Error (SSE)

An accuracy measure where the errors are squared, then added. It is used to determine the accuracy of the Forecasting model when the data points are similar in magnitude. The lower the SSE, the more accurate the Forecast. Understanding this accuracy statistic helps you choose which Forecasting model best fits your data.

7-14: Theil's Statistic

Theil's Statistic is an accuracy measure that compares the accuracy of a Forecast model to the actual model. Theil's uses the actual value of the last time period as the Forecast. The closer Theil's statistic is to zero the more accurate the Forecasting model. For instance, if Theil's Statistic is equal to 1, the Forecast is completely inaccurate. If it is equal to 0, then the Forecasting model is a perfect fit.

7-15: Standardized MAE

Standardized MAE is the MAE divided by the average of the absolute values. It is a percentage base statistic. It is similar to MAPE except the Standardized MAE considers the total Absolute Error over the average of the absolute values, while MAPE considers each Absolute Error over each absolute value. MAPE is a large number if when some value is very small. Standardized MAE overcomes the issue.

Chapter 13 Retagging

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Section 1: Overview

The Retagging feature in the DME automates processes in which one Series is copied or moved to another Series. Retagging is beneficial when a product is at EOL and a company is introducing another product to replace it. Or, introducing a product similar to one that already exists. Retagging can also be used to merge products together, split them apart, or combine customers.

Retagging works by copying part or all of an Opinion Line from one Series to another; this enables the user to base the Forecast on History from another item. Retagging copies the data from the source to the target for dates within the specified range. It then multiplies the source data by the remain percentage.

Each Retag contains:

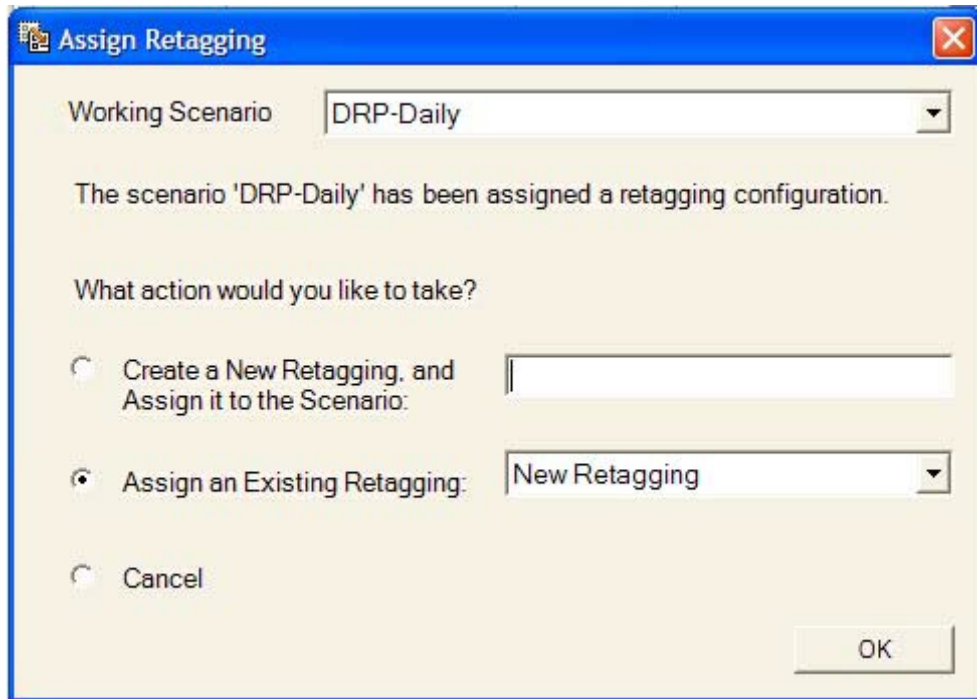
- Source Series
- Target Series
- Start date
- End date
- Remain percentage

Section 2: Retagging Configuration

You can configure the Retagging feature for users.

1. From the Viewer, go to Forecast > Retagging.

The Assign Retagging window displays.

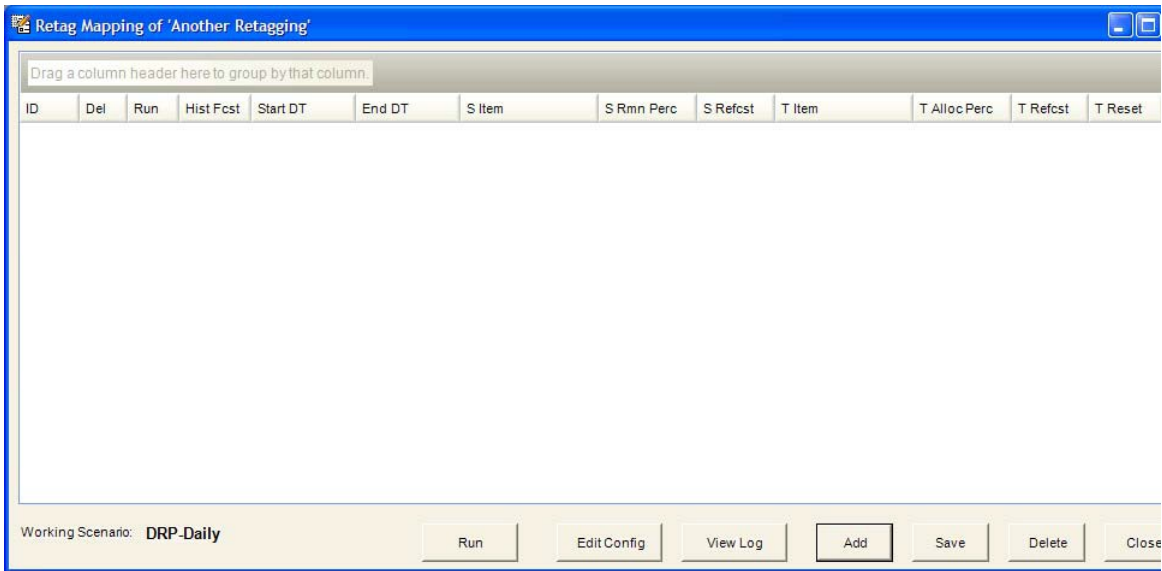


2. Select to create a new retagging or assign an existing retagging to the Scenario in the “What action would you like to take?” area. Select Cancel to close the window.

2-1: Create a New Retagging and Assign it to the Scenario

1. If you selected “Create a New Retagging, and Assign it to the Scenario” type in the name of the new retagging.
2. Click OK.

The Retag Mapping of “Another Retagging” window displays.

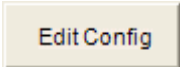


The table below details what each column means.

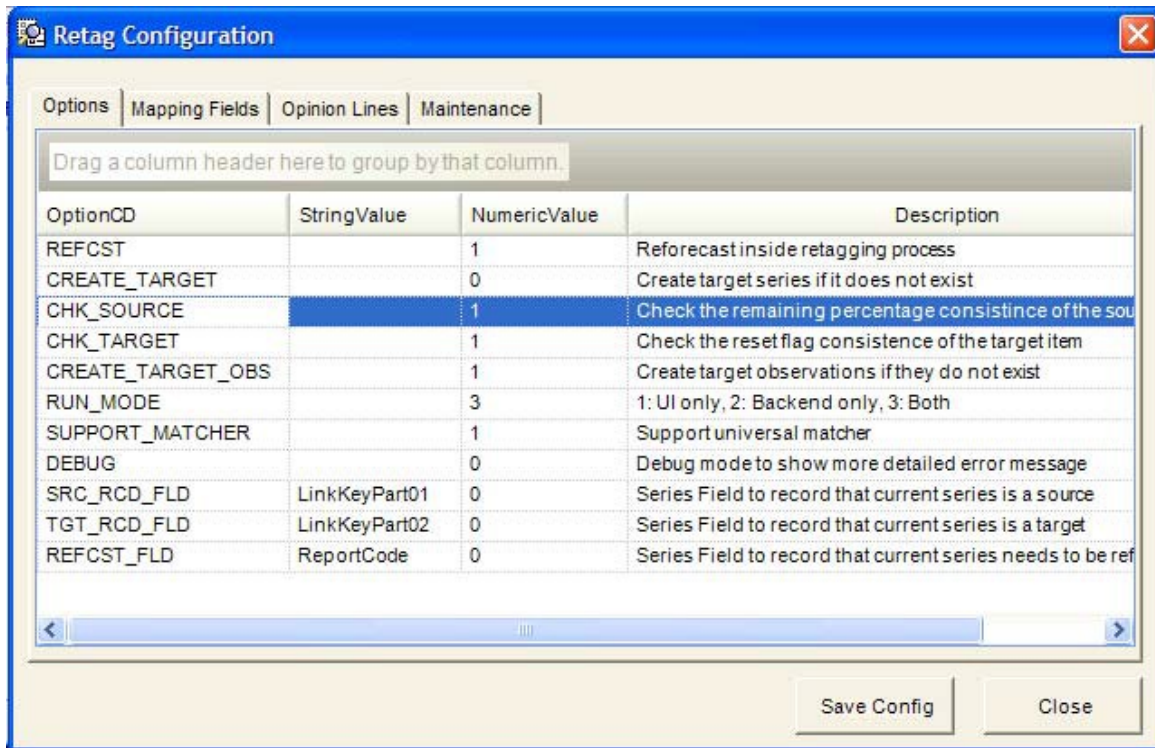
Column	Description
ID	Automatically generated ID to identify each mapping contained in a Retag configuration.
Del	Select in order to delete a mapping created for a Retag configuration. All the mappings with this check box enabled will delete after pressing the Delete button.
Run	Select in order to run a mapping. All the mappings with this check box enabled will be executed when the Run button is pressed.
Hist Fcst	Determines which types of periods in a Scenario will be affected by a mapping. There are three available options: ■ History - Mapping only affects Historical periods in the Scenario. ■ Future - Mapping only affects Forecast periods in the Scenario. ■ Both - Mapping affects both Historical and Forecast periods in the Scenario.

Column	Description
Start DT	Start date from which the mapping will have effect. Note: All periods before this date will not be affected by the mapping. Note: If a period after this date and was not affected by a mapping, double check the "His Fcst" option and see if the period is included in it.
End DT	Start date from until which the mapping will have effect. Note: All periods after this date will not be affected by a mapping. Note: If a period is before this date and was not affected by a mapping, double check the "Hist Fcst" option and see if the period is included in it.
S Sku	Retrieves the observations and puts them in the Target Series. This is the only source field configured by default. Note: The amount of source fields can be configured for each retag. (See step 5).
S Item	Source mapping fields. Multiple series can be retagged with one mapping. You can match any two series.
S Rmn Perc	Tells the system what percentage of the original value to leave in the source.
S Refcst	Specifies whether the Source Series should be reforecasted after the mapping has run.
T Sku	Identifies the Target Series that will take the information from the Source Series. This is the only target field configured by default. Note: The amount of source fields can be configured for each retag (See step 5).

Column	Description
T Item	Target mapping fields. Multiple series can be retagged with one mapping. You can match any two series.
T Alloc Perc	Specifies what percentage of the Source Series should be inserted into the Target Series.
T Refcst	Specifies whether the Target Series should be reforecasted after the mapping has run.
T Reset	Specifies whether the system should reset the observations in the Target Series before taking the information from the Source Series and saving it. If unchecked, then the existing values in the Target Series are added to the ones from the Source Series.

3. Click on the  button. End-users do not have access to the Edit Config button.

The Retag Configuration window displays.



4. From the Options tab, edit the options listed by highlighting the row and typing your changes.

The table below details the Options listed:

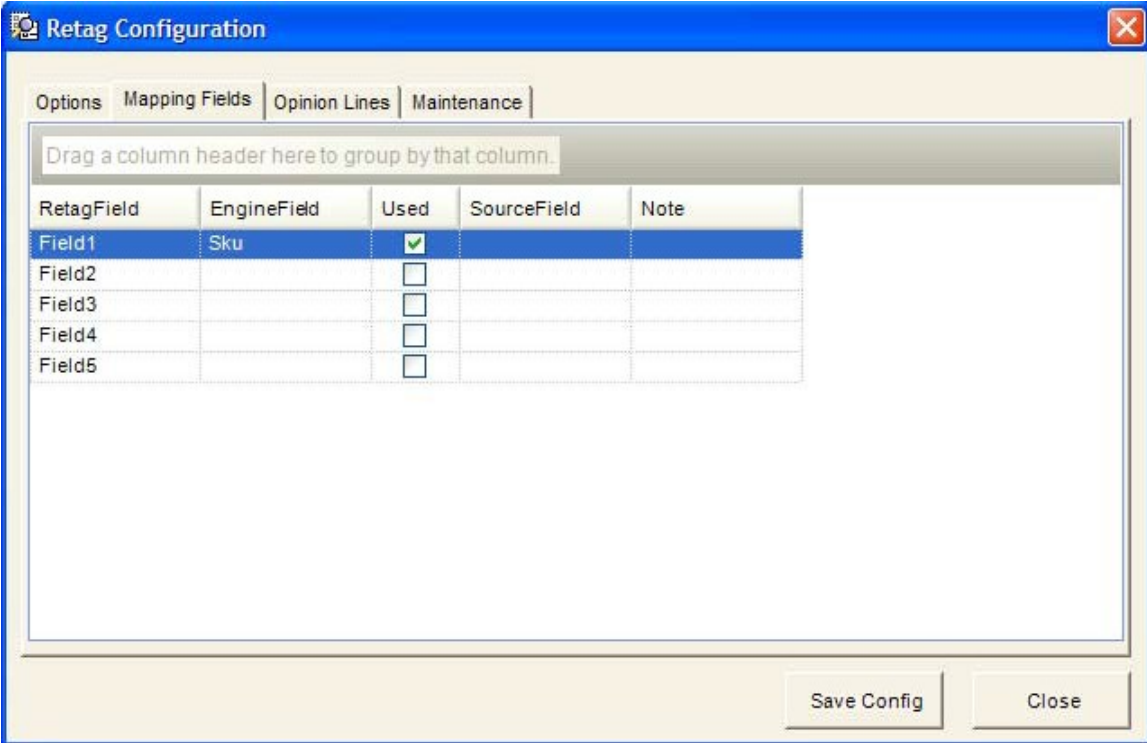
Option	Description
REFCST	Reforecast. Set NumericValue to 1 to enable, 0 to disable. If enabled, the task recalculates the Statistical Forecast for the series that have been affected.
CREATE_TARGET	Create Target. Set NumericValue to 1 to enable, 0 to disable. If enabled, the task creates the Target Series, if it is non-existent.

Option	Description
CHK_SOURCE	Check Source Series. Set NumericValue to 1 to enable, 0 to disable. If enabled, the task checks the Source Series for consistency. For example, if the same series is specified as a source twice, but with different remain percentages, it will generate a warning.
CHK_TARGET	Check Target Series. Set Numeric value to 1 to enable, 0 to disable. If enabled, the task checks the Target Series for consistency.
CREATE_TARGET_OBS	Create Target Observations. Set NumericValue to 1 to enable, 0 to disable. If enabled, the task will create observation periods in the Target Series that are present in the source, but not the target. For example, if the Source Series had history going back to 2004-02, but the target only went back to 2004-06, this would allow the task to create observations for 2004-02 through 2004-05.
RUN_MODE	Run Mode. Set NumericValue to 1 allow and to allow retagging to run from the User Interface only. Set Numeric Value to 2 if you only want to run from Custom Task or another backend process. To allow both, set the Numeric Value to 3.
SUPPORT_MATCHER	Support Universal Matcher. Set NumericValue to 1 to enable the use of universal matcher (*) operator. Note: Universal matchers are allowed in place of any of the source or target fields of a retag mapping. For more information, see Using Universal Matchers.
SRC_RCD_FLD	Source Record Field. Set StringValue to the name of a series attribute. This determines which field the process will use as a flag to indicate which series were used as a source. After retagging, the field specified will contain "Y" if used as a source, "N" otherwise.

Option	Description
TGT_RCD_FLD	Target Record Field. Set StringValue to the name of a series attribute. This determines which field the process will use as a flag to indicate which series were used as a target. After retagging, the field specified will contain "Y" if used as a source, "N" otherwise.
REFCST_FLD	Reforecast Field. Set StringValue to the name of a series attribute. This determines which field the process will use as a flag to indicate which series needs to be reforecast (if reforecasting enabled).
Note: Set this to a field that is not otherwise in use.	

5. The Mapping Fields tab contains the key fields used to link the Source Series with the Target Series. You can specify up to five fields. For each field you use, check "Used" and type the field name from the Series table into EngineField. The SourceField and Note columns are for reference purposes. The amount of

fields selected here determines the amount of Source and Target columns in the Retag main window.

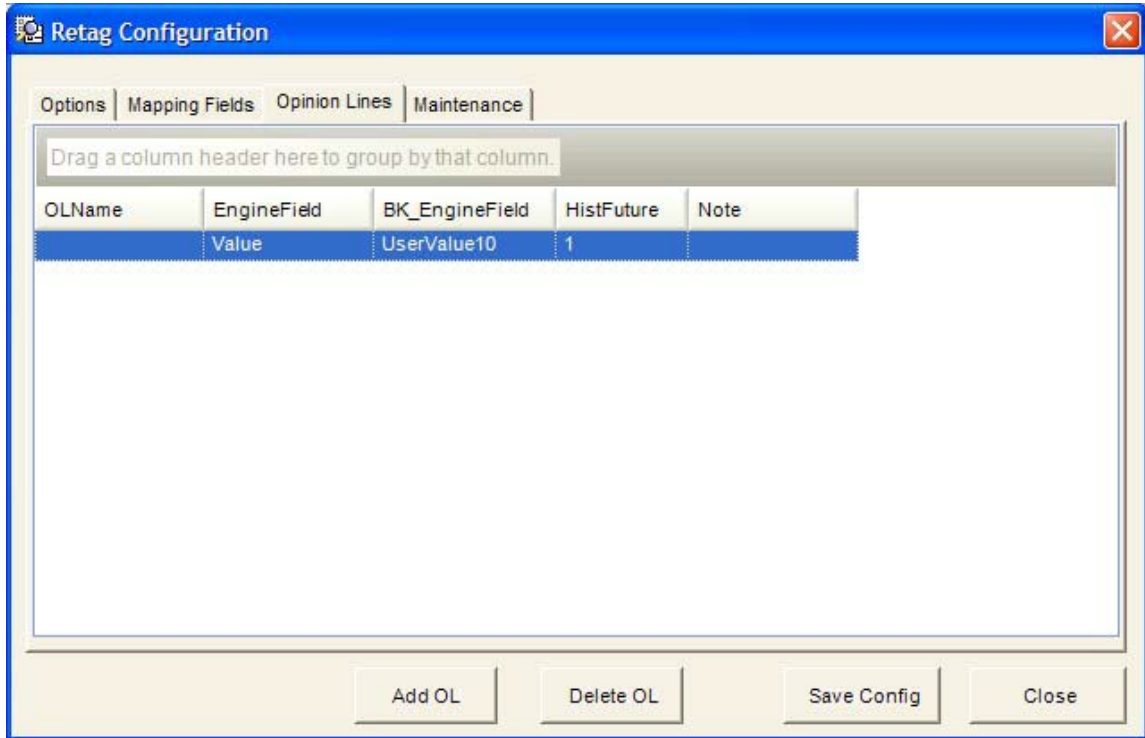


The image shows the 'Retag Configuration' dialog box with the 'Mapping Fields' tab selected. The dialog has a blue title bar and a close button in the top right. Below the title bar are four tabs: 'Options', 'Mapping Fields', 'Opinion Lines', and 'Maintenance'. The 'Mapping Fields' tab contains a text box with the instruction 'Drag a column header here to group by that column.' Below this is a table with five columns: 'RetagField', 'EngineField', 'Used', 'SourceField', and 'Note'. The table has five rows, labeled 'Field1' through 'Field5'. 'Field1' is selected, and its 'EngineField' is 'Sku' and 'Used' is checked. The other rows have empty cells for 'EngineField' and 'Used'. At the bottom right of the dialog are two buttons: 'Save Config' and 'Close'.

RetagField	EngineField	Used	SourceField	Note
Field1	Sku	☒		
Field2		☐		
Field3		☐		
Field4		☐		
Field5		☐		

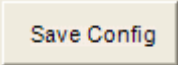
6. The Opinion Lines tab determines which Opinion Lines are affected by retagging. Click Add OL button to add new opinion lines. Enter the name of the field in the Observations table into EngineField. The OLName and Note columns are for reference purposes. Set HistFuture to 1 to affect historical periods only, 2 for forecast periods only, or 3 for history and forecast. BK_EngineField is used to set a backup field for an Opinion Line

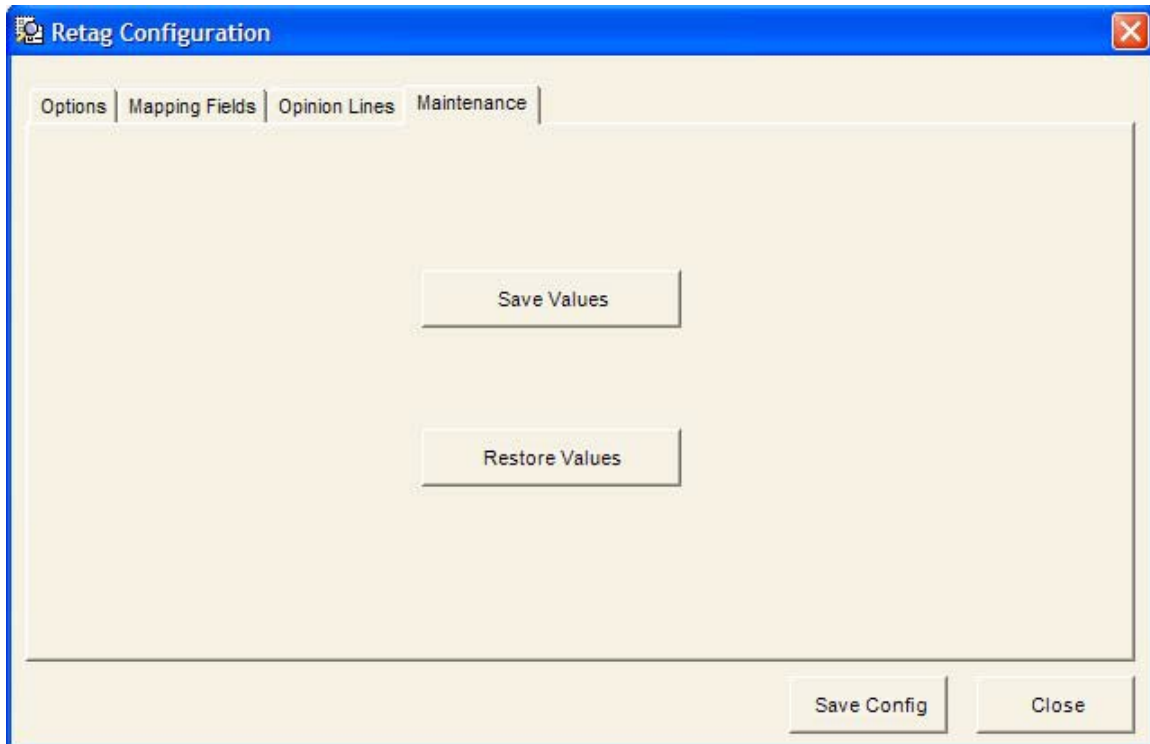
and used with the SaveValues task in the Maintenance tab. To delete an Opinion Line, click the Delete OL button.

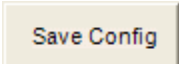


The Opinion Lines tab specifies which Opinion Lines are affected by Retagging. The table below details what each column means:

Column	Description
OLName	Used for reference only.
EngineField	Name of the field in the Observations table.
BK_EngineField	Used to set backup field for an Opinion Line. Is used with the Save Values task in the Maintenance tab.
HistFuture	Used to affecting Forecasting periods: ■ 1 - Historical periods ■ 2 - Forecast periods ■ 3 - Historical and Forecast periods
Note	Used for reference only.

7. Click the  button.
8. The Maintenance tab contains two features: Save Values and Restore Defaults. Click on Save Values to back up the information of the Opinion Lines, set in the Opinion Lines tab to their respective backup fields. This is set by the BK_EngineField column. Click on Restore Defaults to restore the default configuration or a Retag.



9. Click on the  button.

Note: *After saving a Retag configuration, close the Retag window and reopen it to see the changes made to the configuration.*

10. Click Close.

Note: Before running a mapping, the Run check box should be selected. This is used to indicate which of the mappings created in the Retag are run.

11. Check the Run check box for each mapping you want to enable

and click the

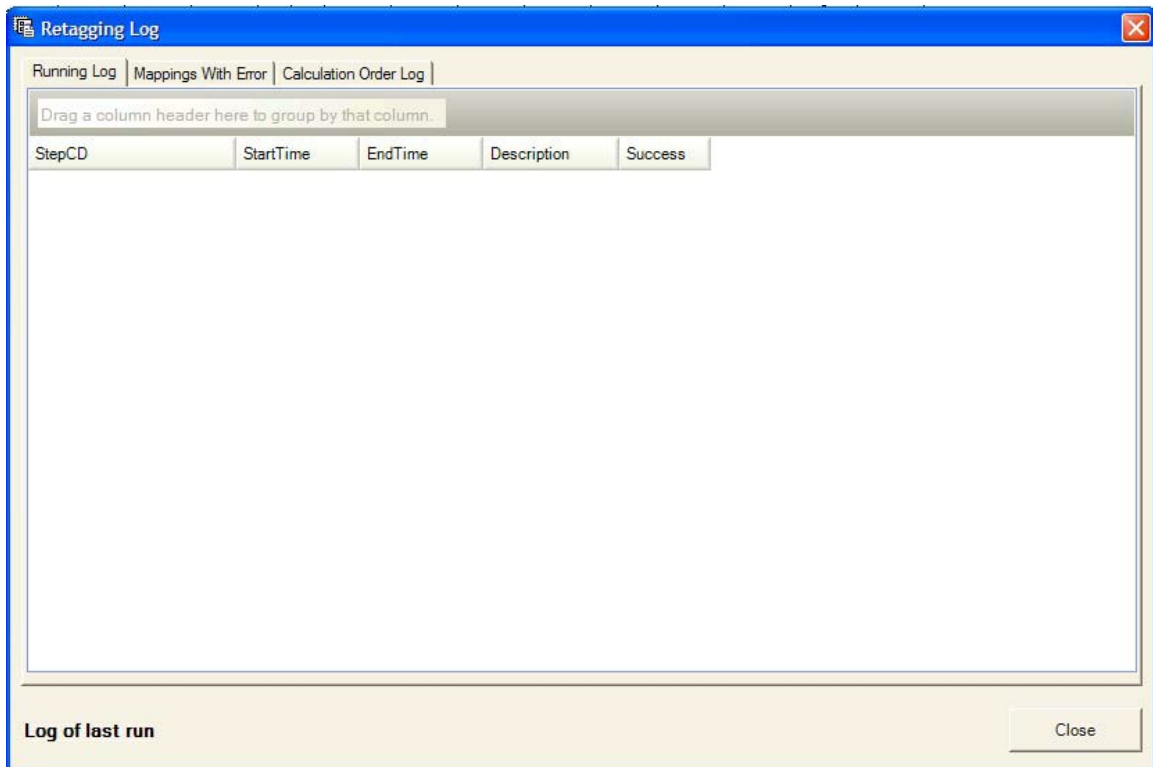
Run

button to run the retag mapping.

12. After retagging has run, click the

View Log

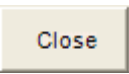
button to open the Retagging Log window.

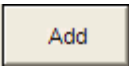


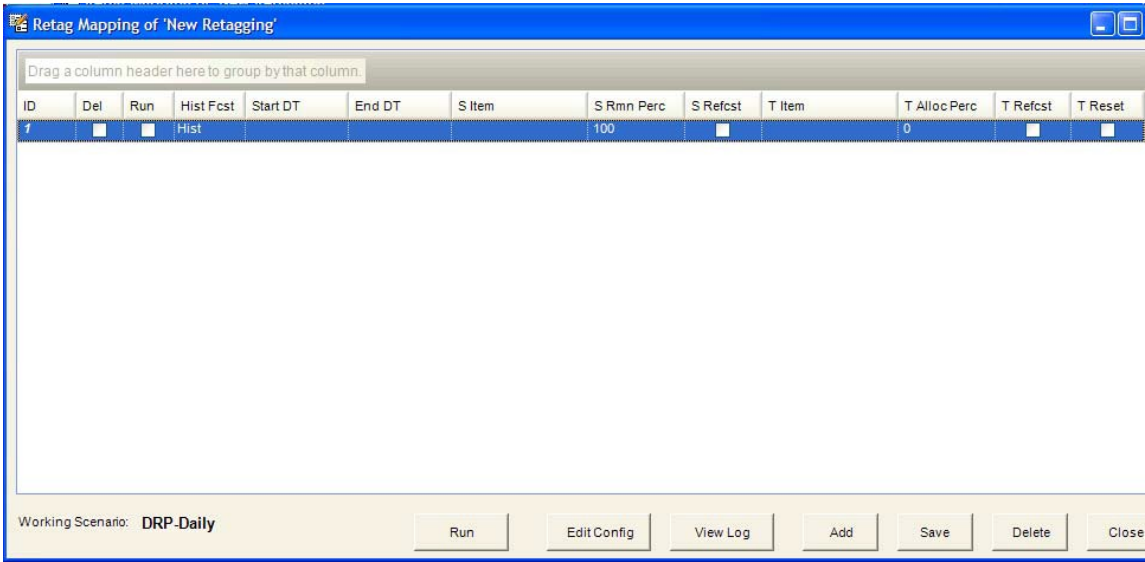
The following table details what each tab means.

Tab	Description
Running Log	Displays description of what is performed during the Retag.

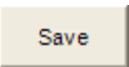
Tab	Description
Mappings With Error	Displays the mappings that failed in the execution.
Calculation Order Log	Displays which Series was retagged to which Series.

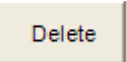
13. Click the  button when finished.

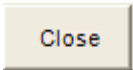
14. Click the  button to add another retag mapping row.

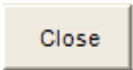


Note: For additional information, see the table in [2-1: Create a New Retagging and Assign it to the Scenario.](#)

15. Click the  button to save your changes.

16. To delete a retag mapping, highlight the retag mapping and click the  button.



17. Click the  button to close the window.

- Note:**
- You can click on the columns' headings to arrange the retags in decremental or incremental order.*
- Note:**
- You can drag a heading to the grey area to display only that column. You can also add more columns to group the columns in hierarchal order.*

2-2: Using Universal Matchers (*)

Universal matchers are allowed in place of any of the source or target fields of a retag mapping. This allows multiple series to be retagged with one mapping. The Universal Matcher match any two series. Here is the same example with Universal Matchers:

ID	Del	Run	Hist Fcst	Start DT	End DT	S Sku	S Customer	S Rmd Perc	S Refcst	T Sku	T Customer	T Alloc Perc	T Refcst/	T Reset
9	☒	☒	Hist	01/01/2005	05/05/2005	DM2000	*	50	☒	DM2100		50	☒	☒
											* JCPenney Kmart Meijer Sears Target Walmart			

Note the asterisk (*) in the Customer fields. This mapping will retag any series with Sku='DM2000' to another series with Sku='DM2100', provided Customer matches for those two series. If there is no matching Target Series, the Source Series will not be retagged, unless the CREATE_TARGET option is enabled.

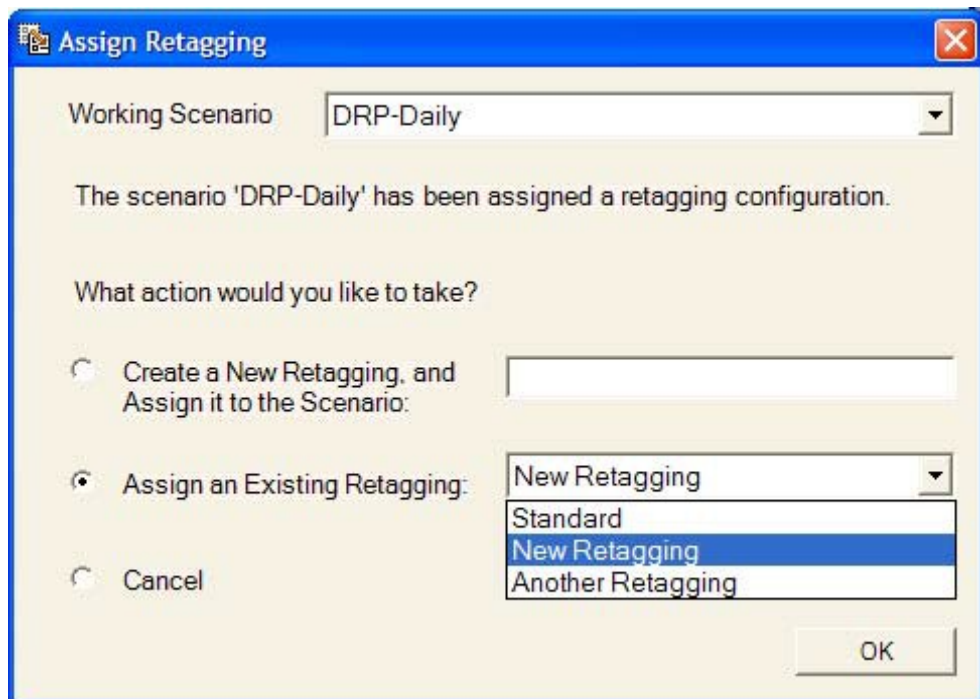
Series ID	SKU	Customer
1000	DM2000	Big Depot
1001	DM2000	Q Mart
1002	DM2000	Leftorium
1003	DM2100	Big Depot
1004	DM2100	Q Mart

If CREATE_TARGET is disabled, the above example retags SeriesID 1000 to 1003, 1001 to 1004, and does nothing to 1002. If CREATE_TARGET is enabled, a new series is created and the data from the Series 1002 is retagged to it.

Series ID	SKU	Customer
1005	DM2100	Leftorium

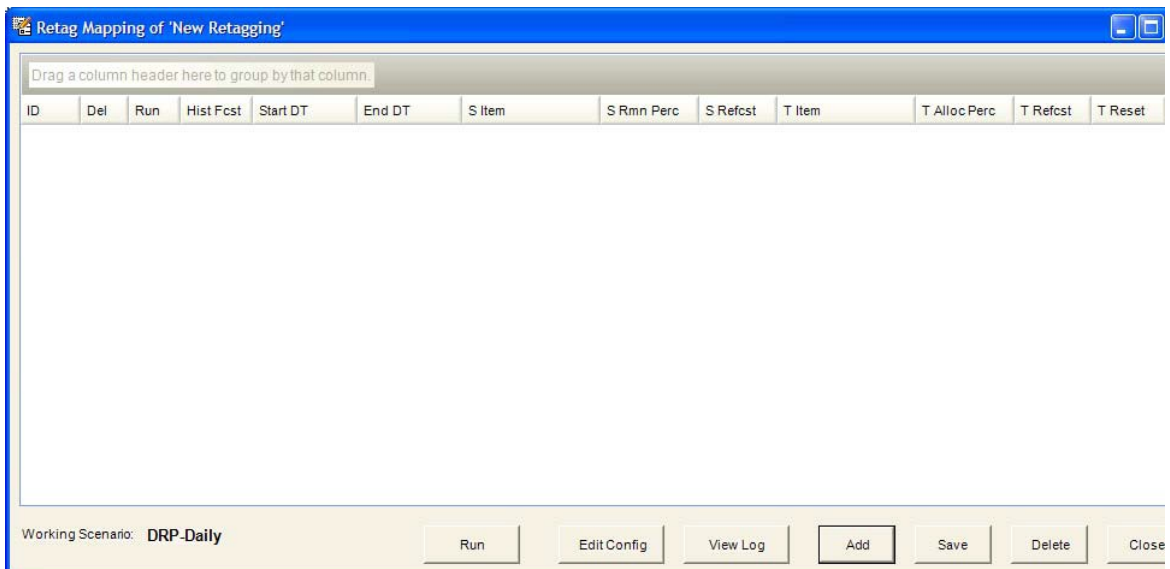
2-3: Assign an Existing Retagging

1. If you selected “Assign an Existing Retagging”, select one of the retaggings from the drop-down list.



2. Click OK.

The Retag Mapping of 'New Retagging' displays.



See [2-1: Create a New Retagging and Assign it to the Scenario](#) for additional information on each of the features available in the Retag Mapping window.

Section 3: Helpful Hints

This section provides useful hints when using the Retagging feature in the DME.

- Run Retagging in the Living Master

To optimally run the Retagging feature is in the Living Master because a new series with Retagging can only be saved in the Living Master. In addition, a New Observation added in History with Retagging can only be saved in the Living Master.

- Retagging History v. Forecast

When Retagging the Forecast, do not use Target Forecast. The Target Forecast feature is used for Retagging History.

- If linking with an object in the Source field, ensure that the object is the same in the Target field.

- Schedule Retagging in Batch Scheduler
 - Use Stored Procedure (Usp_Retag_CT)
 - Create Retagging as Custom Task 1 (i.e., Retag Name, Mapping IDs, PPPermission)
 - To have it run automatically, add in Batch Scheduler.

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