Precise™ Business Storage Optimizer

User Guide

Version 9.7.0

Precise™ Business Storage Optimizer User Guide

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Contents

Introducing the Precise Business Storage Optimizer portlets

This section includes the following topics:

About the Precise Business Storage Optimizer users guide

This user's guide is divided into 3 sections:

- Introduction
- About the Oracle-based Precise Business Storage Optimizer portlets
- About the MS-SQL-based Precise Business Storage Optimizer portlets

The introduction section provides general information about the product, terms used, and features used in both Oracle and MS-SQL-based portlets.

Note: The fields in which you have to enter information are case sensitive.

About common terms used in this manual

The following table describes some often used terms:

Time In Oracle	The total consumption time that the statement/program spent in the Oracle database.
Time In MS-SQL	The total consumption time that the statement/program spent in the MS-SQL database.
I/O Time	The total time that the statement/program was waiting for I/O.
EFD	Enterprise Flash Drive.
FC	Fiber Channel (15K).
SATA	Serial ATA Drive.
Ranking	Ranking Indicator.

About Precise Business Storage Optimizer portlets in the Precise Custom Portal

The Precise Custom Portal will be used for the UI presentation of the data. The portlets for showing the simulated data placed on a new page (tab) are:

- Tiering Recommendations
- Transactions
- User
- Database
- Storage Device
- FAST Integration

Additionally a Settings page is also shown.

The Precise Business Storage Optimizer portlets show the impact percentage of improvement in terms of Total Response Time. This percentage may have a deviation of up to 10%.

About the users in the Precise Business Storage Optimizer

There are two users defined in the Precise Business Storage Optimizer with the following rights:

Table 1-1 Defined users

User	Password	Rights
simulator	simulator	View rights on all screens.
simulatoradm	simulatoradm	Also edit right in the Settings screen.

About the Settings page

The Settings page provides four groups of fields that are used to define what information is displayed.

Table 1-2 Connectivity Parameter fields

Field	Description
Monitored database technology	The type of technology that is used (Oracle or MS-SQL).
Precise application	The name of the Precise application.
Precise Tier	The type of Tier that is used.

Table 1-3 Display field

Field	Description
Maximum number of presented rows	The maximum number of rows presented in all tables throughout the product.

Table 1-4 Device Cost Parameter fields

Field	Description
Currency	The currency used for the cost of the devices.
Cost of 1GB of EFD	Cost of 1GB of storage on an EFD device.
Cost of 1GB of FC	Cost of 1GB of storage on an FC device.
Cost of 1GB of SATA	Cost of 1GB of storage on a SATA device.

Note: If one of the values is zero (0), then the recommended ranking will be based on performance only.

Table 1-5 Ranking Threshold Parameter fields

Field	Description
High performance improvement	Enter the recommender ranking threshold parameter in percentage for a high performance improvement. Note: When the default value is 60 and the calculated value is 60 or higher, the performance improvement is high.
Medium performance improvement	Enter the recommender ranking threshold parameter in percentage for a medium performance improvement. Note: When the default value is 45 and the calculated value is between 45 and 60, the performance improvement is medium.
Low performance improvement	Enter the recommender ranking threshold parameter in percentage for a low performance improvement. Note: When the default value is 30 and the calculated value is between 30 and 45, the performance improvement is low.
Low performance deterioration	Enter the recommender ranking threshold parameter in percentage for a low performance deterioration. Note: When the default value is 6 and the calculated value is between 6 and 12, the performance deterioration is low.
Medium performance deterioration	Enter the recommender ranking threshold parameter in percentage for a medium performance deterioration. Note: When the default value is 12 and the calculated value is between 12 and 20, the performance deterioration is medium.
High performance deterioration	Enter the recommender ranking threshold parameter in percentage for a high performance deterioration. Note: When the default value is 20 and the calculated value is between 20 and higher, the performance deterioration is high.
Help button	Provides context sensitive help.
Back button	Return to the previous screen.
Next button	Go to the next screen.
Close button	A warning message is displayed. If you confirm the cancellation, the Configuration wizard is closed and your previous changes are saved. Next time you start the Configuration wizard you will see the changes you have already made and can click on **Next** until you advance to where you left off.

The following tables show the default parameters for the Ranking Thresholds. The tables are followed by examples:

Table 1-6 Performance improvement

Level	Value
High performance improvements	60%
Medium performance improvements	45%
Low performance improvements	30%

Table 1-7 Performance deterioration

Level	Value
Low performance deterioration	6%
Medium performance deterioration	12%
High performance deterioration	20%

The following are examples based on the default thresholds in the above tables.

If the performance of a statement on an FC device is 1 hour and you simulate this statement on an EFD device, the performance improvement can be calculated. Based on the calculated value, the performance improvement can be for example 47%. This means that the performance improvement is medium. If you simulate this statement on a SATA device, there can be a deterioration of the performance of 7% and this is than low. This level of deterioration can be acceptable.

If the performance of a statement on an FC device is 1 hour and you simulate this statement on an EFD device, the performance improvement can be calculated. Based on the calculated value, the performance improvement can be for example 20%. This means that the performance improvement is lower than the set threshold, which means that the optimizer will not recommend to move the entity to an EFD device.

About Time Frame selection

To select the desired Time Frame, do one of the following

1. On the Time Frame pane, select one of the pre-defined time frames (i.e., 6h, 1d, 2d, 1w, or 2w)
   OR
2. On the Time Frame pane, click the currently selected time frame or the down arrow and on the displayed dialog box either:
   a. Click the 'Last:' option and enter the number of Min, Hrs, Days, Weeks, or Months to use as your time frame. Click **OK**.
      OR
   b. Click the 'From:' option and select the beginning and ending date and time to use as your time frame. Click **OK**.

By default, a 'last day' time frame is selected.

About the Simulate button

The Simulate button is used to refresh the data in the tables of the portlet or apply the changes that have been made in the settings for that portlet (for example a change Target Device Type in the Transaction page).

About the Recommend button

The Recommend button is used to refresh the data in the tables of the Recommendation page or apply the changes that have been made in the settings for that page (for example a change from Objects to Data files).

About the Oracle-based Precise Business Storage Optimizer portlets

This section includes the following topics:

About the Tiering Recommendations page

The Recommendation page shows a prioritized list of tiering action items based on the collected information in your application and on the provided parameters. The parameters are:

- The Oracle instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The recommendation method (optimize cost, optimize performance, or both)
- The tiering entities (Object, Datafiles, Devices)

The summary information will be shown after clicking **Recommend**.

When hovering over a row, more information is shown with links to check the improvement in the Storage Device Simulation and activity overtime in Precise for Oracle.

The following fields are displayed in the portlet when choosing Object as tiering entity:

Table 2-1 Object tiering fields

Field	Description
Object Name	Name of the object.
Size	Object size.
Recommendation	Recommended action to take.
Performance Improvement	Improvement of the action on the object.
Cost Change	Cost change of the action on the object (Cost change based on disk space and cost per GB).
Ranking	Presentation of the rank with which we define the priority of the actions to take.

The following fields are displayed in the portlet when choosing Datafiles as tiering entity:

Table 2-2 Datafiles tiering fields

Field	Description
Datafile Name	Name of the datafile.
Size	Actual size of the datafile.
Recommendation	Recommended action to take.
Performance Improvement	Improvement of the action on the datafile.
Cost Change	Cost improvement of the action on the datafile (Cost change based on disk space and cost per GB).
Ranking	Presentation of the rank with which we define the priority of the actions to take.

The following fields are displayed in the portlet when choosing Devices as tiering entity:

Table 2-3 Devices tiering fields

Field	Description
Device Name	Name of the device
Size	Actual size of the device
Recommendation	Recommended action to take.
Performance Improvement	Improvement of the action on the device.
Cost Change	Cost improvement of the action on the device (Cost change based on disk space and cost per GB).
Ranking	Presentation of the rank with which we define the priority of the actions to take.

About the Transaction page

The Transaction page shows the storage tiering impact on a selected transaction and its related users, objects, datafiles, and devices.

You need to select:

- The Oracle instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The transaction/program (field with search option)
- The target device type (selection from drop-down box)

After you click **Simulate**, a summary, a graph, an objects improvement table, a datafiles improvement table, a devices improvement table, and a users improvement table are shown.

The following fields are displayed in the portlet in the summary row:

Table 2-4 Summary row fields

Field	Description
Total Measured Time In Oracle	Total measured time in the Oracle database (HH:MM:SS)
Total Predicted Time In Oracle	Total predicted time in the Oracle database (HH:MM:SS)
Improvement	Time in the Oracle database improvement in percentage

The Time In Oracle Overview graph shows the measured and predicted time in Oracle values in a graph over time. The following fields are displayed in the portlet in the Objects Improvement table:

Table 2-5 Objects improvement fields

Field	Description
Object Name	Name of the object
Object Size (MB)	Object size in MB
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and predicted improvement in the Database view.

The following fields are displayed in the portlet in the Datafiles Improvement table:

Table 2-6 Datafiles improvement fields

Field	Description
Datafile Name	Name of the datafile
File Size (MB)	Datafile size in MB
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and predicted improvement in the Database view.

The following fields are displayed in the portlet in the Devices Improvement table:

Table 2-7 Devices improvement fields

Field	Description
Device Name	Name of the storage device
Device Size (MB)	Device size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and predicted improvement in the Storage Device view.

The following fields are displayed in the portlet in the Users Improvement table:

Table 2-8 Users improvement fields

Field	Description
User Name	Name of the user
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and predicted improvement in the User view.

About the User page

The User page shows the storage tiering impact on the selected user and its related transactions, objects, datafiles, and devices.

You need to select:

- The Oracle instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The user (field with search option)
- The target device type (selection from drop-down box)

After you click **Simulate**, a summary, a graph, a transactions improvement, a statements improvement table, a devices improvement table, an objects improvement table, and a datafiles improvement table are shown.

The following fields are displayed in the portlet in the summary row:

Table 2-9 Summary row fields

Field	Description
Total Measured Time In Oracle	Total measured time in the Oracle database (HH:MM:SS)
Total Predicted Time In Oracle	Total predicted time in the Oracle database (HH:MM:SS)
Improvement	Time in the Oracle database improvement in percentage

The Time In Oracle Overview graph shows the measured and predicted In Oracle time values in a graph over time.

The following fields are displayed in the portlet in the Transactions Improvement table:

Table 2-10 Transactions Improvement fields

Field	Description
Transaction Name	Name of the transaction
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and predicted improvement in the Transaction view.

The following fields are displayed in the portlet in the Statements Improvement table:

Table 2-11 Statements improvement fields

Field	Description
Statement	Statement text
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for Oracle. The following fields are displayed in the portlet in the Devices Improvement table:

Table 2-12 Devices improvement fields

Field	Description
Device Name	Name of the storage device
Device Size (MB)	Device size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Storage Device view. The following fields are displayed in the portlet in the Objects Improvement table:

Table 2-13 Objects improvement fields

Field	Description
Object name	Name of the object
Object Size (MB)	Object size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Database view. The following fields are displayed in the portlet in the Datafiles Improvement table:

Table 2-14 Datafiles improvement fields

Field	Description
Datafile Name	Name of the datafile
File Size (MB)	Datafile size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Database view.

About the Database page

The Database page shows the storage tiering impact on the selected object name or datafile and its related users, transactions, objects, datafiles, and devices.

You need to select:

- The Oracle instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The object name or datafile (field with search option)
- The target device type (selection from drop-down box)

After you click **Simulate**, a summary, a graph, a transactions improvement table, a users improvement table, and a statements improvement table are shown.

The following fields are displayed in the portlet in the summary row:

Table 2-15 Summary row fields

Field	Description
Size	Device size
Total Measured I/O Time	Sampled I/O time (HH:MM:SS)
Total Predicted I/O Time	Predicted I/O time (HH:MM:SS)
Improvement	In Oracle time improvement percentage

The I/O Time Overview graph shows the measured and predicted I/O time values in a graph over time.

The following fields are displayed in the portlet in the Transactions Improvement table:

Table 2-16 Transactions improvement fields

Field	Description
Transaction Name	Name of the transaction
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Transaction view.

The following fields are displayed in the portlet in the Users Improvement table:

Table 2-17 Users improvement fields

Field	Description
User Name	Name of the user
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Users view.

The following fields are displayed in the portlet in the Statements Improvement table:

Table 2-18 Statements improvement fields

Field	Description
Statement	Statement text
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for Oracle.

About the Storage Device page

The Storage Device page shows the storage tiering impact on the selected storage device and its related transactions, users, objects, and datafiles.

You need to select:

- The Oracle instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The storage device (select a specific device from drop-down box or select “All”)
- The target device type (selection from drop-down box)

After you click **Simulate**, a graph, a devices improvement table, a transactions improvement table, a users improvement table, and a statements improvement table are shown.

The I/O Time Overview graph shows the measured and predicted I/O time values in a graph over time. The following fields are displayed in the portlet in the Devices Improvement table:

Table 2-19 Devices improvement fields

Field	Description
Device name	Name of the storage device
Device Size (MB)	Device size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Storage Device view.

The following fields are displayed in the portlet in the Transactions Improvement table:

Table 2-20 Transactions improvement fields

Field	Description
Transaction Name	Name of the transaction
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for Oracle and improvement in the Transaction view.

The following fields are displayed in the portlet in the Users improvement table:

Table 2-21 Users improvement fields

Field	Description
User Name	Name of the user
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for Oracle and improvement in the Users view.

The following fields are displayed in the portlet in the Statements Improvement table:

Table 2-22 Statements improvement fields

Field	Description
Statement	Statement text
Measured Time In Oracle	Measured time in the Oracle database improvement
Predicted Time In Oracle	Predicted time in the Oracle database improvement
I/O Time Improvement	I/O time improvement
Time In Oracle Improvement (%)	Time in the Oracle database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for Oracle.

About the FAST Integration page

The FAST Integration page enables you to promote critical transactions and demote non-critical transactions and based on that present the associated devices. The next step is to differentiate between critical devices and non-critical devices, naming the storage groups, and generating them.

To present the associated devices

1 Select the instance name (selection from drop-down box, e.g. All Instances)

2 Select the Time Frame

3 (Optional) Insert the filter parameter, click the filter icon and the Transactions List is populated based on the selected filter criteria.

Note: The Transaction List based on the filtered criteria only contains the top-*n* transactions where the default value for *n* is 100.

4 Make a selection of the Critical and Non-Critical Transactions and move them to their relevant tables.

Note: Multiple selections with CTRL and Shift can be made in the Transactions List table

5 (Optional) Click the **Open/Close advanced settings** toggle to change the default settings for critical and non-critical target device types (default: critical - EFD, non-critical - SATA).

6 (Optional) Mark **Automatically select recommended storage devices**. See "About Automatically select recommended storage devices" on page 19.

7 Click Present Associated Devices.

About Automatically select recommended storage devices

If Automatically select recommended storage devices is marked and at least one of tables (Critical or Non-Critical Transactions) contains an entry, it is mandatory to define the available disk space related to the (non-) critical transactions table. This will result in marked rows in the (Non-)Critical Devices table(s). For example, if you know that you have 30GB space available for non-critical transactions, mark Automatically select recommended storage devices and enter this value in the Available disk space for non-critical transactions field. After clicking the Present Associated Devices button, the table with Non-Critical Devices will contain top ranked devices that are marked and use up to 30GB of storage space.

About the Load Associated Devices

The tables of the critical and non-critical devices are now populated after performing the load the associated devices procedure. By default, the devices are ordered by Rank. Above the tables there is a summary row which indicates the total size of selected devices, the total I/O time of selected transactions, and the total improvement percentage of the selected devices out of the total selected transactions Time in DB. The following fields are displayed in the critical and non-critical devices tables:

Table 2-23 Critical and Non-Critical devices table fields

Field	Description
Selection field	Use this selection field to mark the device as one of the devices that are part of the storage group. Some rows may already be marked based on the selection of Automatically select recommended storage devices and the size inserted in the available storage fields. The check box in the header can be used to mark all devices or clear all devices.
Rank	Prioritization based on tiering effectiveness on the selected transactions.
Device Name	Name of the device (Unit ID and LUN ID).
Device Size	Size of the device.
Business Impact	Drill into the storage page to measure business impact on the device.
Measured I/O Time	Actual measured time that the database spent performing I/O on the storage device.
I/O Time Improvement (%)	Predicted improvement of I/O for the device.
Selected Trans. I/O Time	Total time that the transactions spent in I/O.
Transactions Improvement (%)	Predicted improvement of total selected transaction time for the device.

Note: If you are using Meta LUNs, it is recommended to follow the instructions in Appendix A on page 33 before generating storage groups.

To generate storage groups

1 Insert a name for the critical storage group.

2 Mark a maximum of *n* associated storage devices. The maximum is related to the total available device size.

Note: If Automatically select recommended storage devices is marked and a value is inserted in the size fields, one or more associated storage device(s) will be marked.

3 Insert a name for the non-critical storage group.

4 Mark a maximum of *n* associated storage devices. The maximum is related to the total available device size.

Note: If Automatically select recommended storage devices is marked and a value is inserted in the size fields, one or more associated storage device(s) will be marked.

5 Click Generate Storage Groups.

6 Define the name and location to store the Storage Groups.

7 Click **OK**.

About Precise Business Storage Optimizer and the FAST policy

This section describes the process of integrating the Precise Business Storage Optimizer Business Aware Tiering Recommendation into the FAST policy.

Precise Business Storage Optimizer analyzes the transactions activity and provides business aware tiering recommendations. These recommendations, eventually, materialize into two scripts for FAST Storage Groups generation:

- one to be used for moving critical data to faster devices
- one to be used for moving non-critical data to slower devices

To fully utilize these scripts, the following detailed procedure needs to be performed

Note: Use the Symmetrix Management Console to perform the steps referring to FAST components. For additional help on how to use the SMC, see the EMC documentation.

1 Setup the FAST policy by performing the following steps:

a Create one or more new FAST Tiers that describe the target technology type that you want to associate with one or more Storage Groups.

For Example: If you used Precise Business Storage Optimizer to simulate the migration to Flash drives, the tier target technology type should be EFD.

b Verify that the previously created FAST Tiers are associated with Disk Groups from the correct technology and that the Disk Groups have sufficient disk space.

c Create a new FAST Policy. Each target technology must be represented by a different FAST policy and a policy may not contain different tier types.

For Example: If you used Precise Business Storage Optimizer to simulate the migration to flash drives, the policy should only contain EFD tiers.

d Add the previously created FAST Tiers (Step a) to the new FAST policy (Step c).

2 Generate the Business Aware Storage Group with Precise Business Storage Optimizer by performing the following steps:

a Run Precise Business Storage Optimizer to generate Business Aware Storage Groups. See “About the FAST Integration page” on page 19.

b From the location where we saved the Storage Group script, open the script.

c Run the SymCLI commands in the script.

The commands in the script create the Storage Group and associate it to the selected devices.

d Verify that the Storage Group has been created successfully.

3 Associate the Storage Group with the FAST policy.

For example: if the Storage Group represents “critical activity”, the FAST policy associated with it, becomes the Business Critical policy.

4 Execute the Tiering policy.

Once the FAST policy is associated with the Storage Group, the FAST analysis engine takes over the activities (according to its scheduling and configuration).

Note: If FAST is configured to work with “user approval”, you need to approve the FAST recommendation manually.

About the MS-SQL-based Precise Business Storage Optimizer portlets

This section includes the following topics:

- About the Tiering Recommendations page
- About the Transaction page
- About the User page
- About the Database page
- About the Storage Device page
- About the FAST Integration page

About the Tiering Recommendations page

The Recommendation page shows a prioritized list of tiering action items based on the collected information in your application and on the provided parameters. The parameters are:

- The MS-SQL instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The recommendation method (optimize cost, optimize performance, or both)
- The tiering entities (Database, Datafiles, Devices)

The summary information will be shown after clicking **Recommend**.

When hovering over a row, more information is shown with links to check the improvement in the Storage Device Simulation and activity overtime in Precise for SQL Server.

The following fields are displayed in the portlet when choosing Datafiles as tiering entity:

Table 3-1 Datafiles tiering fields

Field	Description
Datafile Name	Name of the datafile.
Size	Size of datafile.
Recommendation	Recommended action to take.
Performance Improvement	Improvement of the action on the datafile.
Cost Change	Cost improvement of the action on the datafile (Cost change based on disk space and cost per GB).
Ranking	Presentation of the rank with which we define the priority of the actions to take.

The following fields are displayed in the portlet when choosing Devices as tiering entity:

Table 3-2 Devices tiering fields

Field	Description
Device Name	Name of the device
Size	Actual size of the device
Recommendation	Recommended action to take.
Performance Improvement	Improvement of the action on the device.
Cost Change	Cost improvement of the action on the device (Cost change based on disk space and cost per GB).
Ranking	Presentation of the rank with which we define the priority of the actions to take.

About the Transaction page

The Transaction page shows the storage tiering impact on a selected transaction and its related databases, users, datafiles, and devices.

You need to select:

- The MS-SQL instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The transaction/program (field with search option)
- The target device type (selection from drop-down box)

After you click **Simulate**, a summary, a graph, an databases improvement table, a datafiles improvement table, a devices improvement table, and a users improvement table are shown.

The following fields are displayed in the portlet in the summary row:

Table 3-3 Summary row fields

Field	Description
Total Measured Time In MS-SQL	Total measured time in the MS-SQL database (HH:MM:SS)
Total Predicted Time In MS-SQL	Total predicted time in the MS-SQL database (HH:MM:SS)
Improvement	Time in the MS-SQL database improvement in percentage

The Time In MS-SQL Overview graph shows the measured and predicted time in MS-SQL values in a graph over time. The following fields are displayed in the portlet in the Databases Improvement table:

Table 3-4 Databases improvement fields

Field	Description
Database Name	Name of the database
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and predicted improvement in the Database view.

The following fields are displayed in the portlet in the Datafiles Improvement table:

Table 3-5 Datafiles improvement fields

Field	Description
Datafile Name	Name of the datafile
File Size (MB)	Datafile size in MB
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and predicted improvement in the Database view.

The following fields are displayed in the portlet in the Devices Improvement table:

Table 3-6 Devices improvement fields

Field	Description
Device Name	Name of the storage device
Device Size (MB)	Device size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and predicted improvement in the Storage Device view.

The following fields are displayed in the portlet in the Users Improvement table:

Table 3-7 Users improvement fields

Field	Description
User Name	Name of the user
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and predicted improvement in the User view.

About the User page

The User page shows the storage tiering impact on the selected user and its related transactions, statements, datafiles, and devices.

You need to select:

- The MS-SQL instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The user (field with search option)
- The target device type (selection from drop-down box)

After you click **Simulate**, a summary, a graph, a transactions improvement, a statements improvement table, a devices improvement table, and a datafiles improvement table are shown.

The following fields are displayed in the portlet in the summary row:

Table 3-8 Summary row fields

Field	Description
Total Measured TIme In MS-SQL	Total measured tIme in the MS-SQL database (HH:MM:SS)
Total Predicted Time In MS-SQL	Total predicted time in the MS-SQL database (HH:MM:SS)
Improvement	Time in the MS-SQL database improvement in percentage

The Time In MS-SQL Overview graph shows the measured and predicted In MS-SQL time values in a graph over time.

The following fields are displayed in the portlet in the Transactions Improvement table:

Table 3-9 Transactions improvement fields

Field	Description
Transaction Name	Name of the transaction
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and predicted improvement in the Transaction view.

The following fields are displayed in the portlet in the Statements Improvement table:

Table 3-10 Statements improvement fields

Field	Description
Statement	Statement text
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for SQL Server.

The following fields are displayed in the portlet in the Devices Improvement table:

Table 3-11 Devices improvement fields

Field	Description
Device Name	Name of the storage device
Device Size (MB)	Device size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and improvement in the Storage Device view.

The following fields are displayed in the portlet in the Datafiles Improvement table:

Table 3-12 Datafiles improvement fields

Field	Description
Datafile Name	Name of the datafile
File Size (MB)	Datafile size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and improvement in the Database view.

About the Database page

The Database page shows the storage tiering impact on the selected database name or datafile and its related users, transactions, and statements.

You need to select:

- The MS-SQL instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The database name or datafile (field with search option)
- The target device type (selection from drop-down box)

After you click **Simulate**, a summary, a graph, a transactions improvement table, a users improvement table, and a statements improvement table are shown.

The following fields are displayed in the portlet in the summary row:

Table 3-13 Summary row fields

Field	Description
Size	Device size
Total Measured I/O Time	Sampled I/O time (HH:MM:SS)
Total Predicted I/O Time	Predicted I/O time (HH:MM:SS)
Improvement	In MS-SQL time improvement percentage

The I/O Time Overview graph shows the measured and predicted I/O time values in a graph over time.

The following fields are displayed in the portlet in the Transactions Improvement table:

Table 3-14 Transactions improvement fields

Field	Description
Transaction Name	Name of the transaction
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and improvement in the Transaction view.

The following fields are displayed in the portlet in the Users Improvement table:

Table 3-15 Users improvement fields

Field	Description
User Name	Name of the user
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and improvement in the User view.

The following fields are displayed in the portlet in the Statements Improvement table:

Table 3-16 Statements improvement fields

Field	Description
Statement	Statement text
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for SQL Server.

About the Storage Device page

The Storage Device page shows the storage tiering impact on the selected storage device and its related transactions, users, devices, and statements.

You need to select:

- The MS-SQL instance (selection from drop-down box, e.g. All Instances)
- The Time Frame
- The storage device (select a specific device from drop-down box or select “All”)
- The target device type (selection from drop-down box)

After you click **Simulate**, a graph, a devices improvement table, a transactions improvement table, a users improvement table, and a statements improvement table are shown.

The I/O Time Overview graph shows the measured and predicted I/O time values in a graph over time.

The following fields are displayed in the portlet in the Devices Improvement table:

Table 3-17 Devices improvement fields

Field	Description
Device name	Name of the storage device
Device Size (MB)	Device size
Measured I/O Time	Measured I/O time improvement
Predicted I/O Time	Predicted I/O time improvement
I/O Time Improvement	I/O time improvement
I/O Time Improvement (%)	I/O time improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and improvement in the Storage Device view.

The following fields are displayed in the portlet in the Transactions Improvement table:

Table 3-18 Transactions improvement fields

Field	Description
Transaction Name	Name of the transaction
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with links to check the activity overtime in Precise for SQL Server and improvement in the Transaction view.

The following fields are displayed in the portlet in the Users improvement table:

Table 3-19 Users improvement fields

Field	Description
User Name	Name of the user
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for SQL Server and improvement in the User view.

The following fields are displayed in the portlet in the Statements Improvement table:

Table 3-20 Statements improvement fields

Field	Description
Statement	Statement text
Measured Time In MS-SQL	Measured time in the MS-SQL database improvement
Predicted Time In MS-SQL	Predicted time in the MS-SQL database improvement
I/O Time Improvement	I/O time improvement
Time In MS-SQL Improvement (%)	Time in the MS-SQL database improvement percentage

When hovering over a row, more information is shown with a link to check the activity overtime in Precise for SQL Server.

About the FAST Integration page

The FAST Integration page enables you to promote critical transactions and demote non-critical transactions and based on that present the associated devices. The next step is to differentiate between critical devices and non-critical devices, naming the storage groups, and generating them.

To present the associated devices

1 Select the instance name (selection from drop-down box, e.g. All Instances)

2 Select the Time Frame

3 (Optional) Insert the filter parameter, click the filter icon and the Transactions List is populated based on the selected filter criteria.

Note: The Transaction List based on the filtered criteria only contains the top-*n* transactions where the default value for *n* is 100.

4 Make a selection of the Critical and Non-Critical Transactions and move them to their relevant tables.

Note: Multiple selections with CTRL and Shift can be made in the Transactions List table

5 (Optional) Click the **Open/Close advanced settings** toggle to change the default settings for critical and non-critical target device types (default: critical - EFD, non-critical - SATA).

6 (Optional) Mark **Automatically select recommended storage devices**. See "About Automatically select recommended storage devices" on page 30.

7 Click Present Associated Devices.

About Automatically select recommended storage devices

If Automatically select recommended storage devices is marked and at least one of tables (Critical or Non-Critical Transactions) contains an entry, it is mandatory to define the available disk space related to the (non-) critical transactions table. This will result in marked rows in the (Non-)Critical Devices table(s). For example, if you know that you have 30GB space available for non-critical transactions, mark Automatically select recommended storage devices and enter this value in the Available disk space for non-critical transactions field. After clicking the Present Associated Devices button, the table with Non-Critical Devices will contain top ranked devices that are marked and use up to 30GB of storage space.

About the Load Associated Devices

The tables of the critical and non-critical devices are now populated after performing the load the associated devices procedure. By default, the devices are ordered by Rank. Above the tables there is a summary row which indicates the total size of selected devices, the total I/O time of selected transactions, and the total improvement percentage of the selected devices out of the total selected transactions Time in DB. The following fields are displayed in the critical and non-critical devices tables:

Table 3-21 Critical and Non-Critical devices table fields

Field	Description
Selection field	Use this selection field to mark the device as one of the devices that are part of the storage group. Some rows may already be marked based on the selection of Automatically select recommended storage devices and the size inserted in the available storage fields. The check box in the header can be used to mark all devices or clear all devices.
Rank	Prioritization based on tiering effectiveness on the selected transactions.
Device Name	Name of the device (Unit ID and LUN ID).
Device Size	Size of the device.
Business Impact	Drill into the storage page to measure business impact on the device.
Measured I/O Time	Actual measured time that the database spent performing I/O on the storage device.
I/O Time Improvement (%)	Predicted improvement of I/O for the device.
Selected Trans. I/O Time	Total time that the transactions spent in I/O.
Transactions Improvement (%)	Predicted improvement of total selected transaction time for the device.

Note: If you are using Meta LUNs, it is recommended to follow the instructions in Appendix A on page 33 before generating storage groups.

To generate storage groups

1 Insert a name for the critical storage group.

2 Mark a maximum of *n* associated storage devices. The maximum is related to the total available device size.

Note: If Automatically select recommended storage devices is marked and a value is inserted in the size fields, one or more associated storage device(s) will be marked.

3 Insert a name for the non-critical storage group.

4 Mark a maximum of *n* associated storage devices. The maximum is related to the total available device size.

Note: If Automatically select recommended storage devices is marked and a value is inserted in the size fields, one or more associated storage device(s) will be marked.

5 Click Generate Storage Groups.

6 Define the name and location to store the Storage Groups.

7 Click **OK**.

About Precise Business Storage Optimizer and the FAST policy

This section describes the process of integrating the Precise Business Storage Optimizer Business Aware Tiering Recommendation into the FAST policy.

Precise Business Storage Optimizer analyzes the transactions activity and provides business aware tiering recommendations. These recommendations, eventually, materialize into two scripts for FAST Storage Groups generation:

- one to be used for moving critical data to faster devices
- one to be used for moving non-critical data to slower devices

To fully utilize these scripts, the following detailed procedure needs to be performed

Note: Use the Symmetrix Management Console to perform the steps referring to FAST components. For additional help on how to use the SMC, see the EMC documentation.

1 Setup the FAST policy by performing the following steps:

a Create one or more new FAST Tiers that describe the target technology type that you want to associate with one or more Storage Groups.

For Example: If you used Precise Business Storage Optimizer to simulate the migration to Flash drives, the tier target technology type should be EFD.

b Verify that the previously created FAST Tiers are associated with Disk Groups from the correct technology and that the Disk Groups have sufficient disk space.

c Create a new FAST Policy. Each target technology must be represented by a different FAST policy and a policy may not contain different tier types.

For Example: If you used Precise Business Storage Optimizer to simulate the migration to flash drives, the policy should only contain EFD tiers.

d Add the previously created FAST Tiers (Step a) to the new FAST policy (Step c).

2 Generate the Business Aware Storage Group with Precise Business Storage Optimizer by performing the following steps:

a Run Precise Business Storage Optimizer to generate Business Aware Storage Groups. See “About the FAST Integration page” on page 29.

b From the location where we saved the Storage Group script, open the script.

c Run the SymCLI commands in the script.

The commands in the script create the Storage Group and associate it to the selected devices.

d Verify that the Storage Group has been created successfully.

3 Associate the Storage Group with the FAST policy.

For example: if the Storage Group represents “critical activity”, the FAST policy associated with it, becomes the Business Critical policy.

4 Execute the Tiering policy.

Once the FAST policy is associated with the Storage Group, the FAST analysis engine takes over the activities (according to its scheduling and configuration).

Note: If FAST is configured to work with “user approval”, you need to approve the FAST recommendation manually.

A

Working with Meta LUNs

This section includes the following topics:

- Introduction
- Prerequisites
- Preparing the Meta LUNs properties file

Introduction

Before generating the Storage Group script when using Meta LUNs, it is recommended to handle additional meta header information with an external tool called `Meta LUNs Mapping tool`. The reason for this is that FAST storage groups can only be created with Head members. However, the Precise FAST Integration module can simulate both Meta members and Head members. This tool collects the hierarchy information of all Meta members and creates a properties file. If you select Meta members without using this tool prior to the storage group creation, the storage group creation will fail.

Note: This procedure does not need to be performed for applications without Meta LUNs.

Prerequisites

The following prerequisites are needed on the server on which you are going to use the tool:

- SYMCLI 6.3 or higher
- JRE v1.4 or higher and needs to be declared in the `path` system variable.
- UNIX root/Windows Administrator permission

Preparing the Meta LUNs properties file

To prepare the Meta LUNs properties file

1. Copy the folder under *<BSO home>*`\META-LUNS-MAPPING-TOOL` to the server where the SYMCLI in installed.

   Note: The folder contains the following files: RunMetaLUNsMapping.bat, RunMetaLUNsMapping.sh, and MetaLUNsMapping.jar.

2. Run the following file: UNIX: RunMetaLUNsMapping.sh Windows: RunMetaLUNsMapping.bat
3. Take the output file (`devices.properties`) and place it on the server with the Precise Business Storage Optimizer under:

   <BSO home>`\webapps\Precise_Storage_Tiering_Simulator\WEB-INF\properties`

To control the launch parameters

1 Copy the folder under <*BSO home*>\META-LUNS-MAPPING-TOOL to the server where the SYMCLI in installed.

Note: The folder contains the following files: RunMetaLUNsMapping.bat, RunMetaLUNsMapping.sh, and MetaLUNsMapping.jar.

2 Run the .JAR file in the following way:

```
Java -classpath MetaLUNsMapping.jar
com.precise.oracle.whatifflash.engine.utils.FASTConvertor.FASTConver
tor Usage: FASTConvertor <-clihome <SYMAPI-home-folder>> <-offline>
```

where:

-clihome is the SYMCLI solution enabler home (The default SYMCLI home folder in Windows is \Program Files\EMC\SYMCLI\bin\)

-offline is executing the SYMCLI commands offline without refreshing the database before.

3 Take the output file (devices.properties) and place it on the server with the Precise Business Storage Optimizer under:

<*BSO home*>\webapps\Precise_Storage_Tiering_Simulator\WEB-INF\properties