

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

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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 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 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 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 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 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 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 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 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 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 10 Statements improvement fields

Field	Description
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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 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 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 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 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 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 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 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 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 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 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.



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.



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 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.
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 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.

 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.

 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

 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](#).
 - 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).

 If FAST is configured to work with "user approval", you need to approve the FAST recommendation manually.