Pool Advisor for DB2
User Guide

Supporting

Version 11.2.00 of Pool Advisor for DB2

May 2015
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  — Operating system type, version, and service pack or other maintenance level such as PUT or PTF
  — System hardware configuration
  — Serial numbers
  — Related software (database, application, and communication) including type, version, and service pack or maintenance level
■ Sequence of events leading to the problem
■ Commands and options that you used
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About this book

This book describes the functions of the Pool Advisor for DB2 product from BMC Software and provides guidelines for using the product. This book is intended for use by DB2 systems programmers, database administrators.

Pool Advisor offers the users of DB2 Universal Database a way to obtain accurate, real-time performance information about virtual storage constraint and the following DB2 storage resources:

- Buffer pools
- Group buffer pools
- EDM pool
- RID pool
- Sort pools

Pool Advisor collects and analyzes data from DB2 storage resources and makes recommendations for storage resource allocations, object configurations, and various DB2 parameter settings. In some cases Pool Advisor can automatically manage resources in real time to optimize performance across workload fluctuations.

Note

Pool Advisor for DB2 is also a component of the BMC System Performance for DB2 solution, which integrates the features and functions of Pool Advisor, OPERTUNE for DB2, MainView for DB2, and CATALOG MANAGER for DB2 (Browse only) into a single product interface.

Like most BMC documentation, this book is available in printed and online formats. To request printed books or to view online books and notices (such as release notes and technical bulletins), see the support website at http://www.bmc.com/support.

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- View Quick Course videos (short overviews of selected product concepts, tasks, or features), which are available from the following locations:
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Conventions

This document uses the following special conventions:

- All syntax, operating system terms, and literal examples are presented in this typeface.
- Variable text in path names, system messages, or syntax is displayed in italic text: `testsys/instance/fileName`

- Menu sequences use a symbol to convey the sequence. For example, `Actions => Create Test` instructs you to choose the `Create Test` command from the `Actions` menu.

## Syntax statements

This topic explains conventions for showing syntax statements.

A sample statement follows:

```plaintext
COMMAND KEYWORD1 [KEYWORD2 | KEYWORD3] KEYWORD4={YES | NO} fileName...
```

The following table explains conventions for syntax statements and provides examples:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items in italic type represent variables that you</td>
<td>alias</td>
</tr>
<tr>
<td>must replace with a name or value. If a variable</td>
<td>databaseDirectory</td>
</tr>
<tr>
<td>is represented by two or more words, initial</td>
<td>serverHostName</td>
</tr>
<tr>
<td>capitals distinguish the second and subsequent</td>
<td></td>
</tr>
<tr>
<td>words.</td>
<td></td>
</tr>
<tr>
<td>Brackets indicate optional items. Do not type the</td>
<td><code>[tableName, columnName, field]</code></td>
</tr>
<tr>
<td>brackets when you enter the option. A comma means</td>
<td><code>[-full, -incremental, -level]</code></td>
</tr>
<tr>
<td>that you can choose one or more of the listed options.</td>
<td></td>
</tr>
<tr>
<td>You must use a comma to separate the options if you</td>
<td></td>
</tr>
<tr>
<td>choose more than one option.</td>
<td></td>
</tr>
<tr>
<td>Braces indicate that at least one of the enclosed</td>
<td>`{DBDName</td>
</tr>
<tr>
<td>items is required. Do not type the braces when you</td>
<td>UNLOAD device={disk</td>
</tr>
<tr>
<td>enter the item.</td>
<td>deviceName}</td>
</tr>
<tr>
<td></td>
<td>`{-a</td>
</tr>
<tr>
<td>A vertical bar means that you can choose only one of</td>
<td>`{commit</td>
</tr>
<tr>
<td>the listed items. In the example, you would choose</td>
<td></td>
</tr>
<tr>
<td>either commit or cancel.</td>
<td></td>
</tr>
<tr>
<td>An ellipsis indicates that you can repeat the</td>
<td><code>columnName...</code></td>
</tr>
<tr>
<td>previous item or items as many times as necessary.</td>
<td></td>
</tr>
</tbody>
</table>
Summary of changes

This topic summarizes product changes and enhancements by version number and release date.

**Version 11.2.00 May 5, 2015**

This release fixes known problems and includes the following changes or enhancements:

- **End of support for IBM DB2 Version 9 systems**
  
  Starting with this release, Pool Advisor for DB2 does not support IBM DB2 Version 9. Earlier releases continue to support Version 9.

- **Collection of detailed page set statistics data**
  
  Pool Advisor now collects basic page set I/O statistics data by default, using a new method that has reduced overhead. Pool Advisor can operate the runtime dynamic advisors without collecting the more detailed getpage data. This feature significantly reduces the overhead that collecting detailed getpage collection statistics requires.

  This feature lets you schedule the collection start time and duration using standard automation tools. After you collect the data, you can run a configuration analysis to determine which set of data to use. You can also run comparisons between the configurations that you need on average, as opposed to configurations needed for peak periods.

  The default setting is *not* to collect page set access profile data. You can turn detail page set profile data collection on or off by entering a console command.

  **Note**

  If you turn collection on and off repeatedly, you might need to enlarge the PMDHIST data set in order to accommodate all of the resulting data sets.

**Version 11.1.00 June 25, 2013**

These topics describe the changes or new features in this release of Pool Advisor for DB2.

- **End of support for DB2 Version 8.1**
  
  This version of Pool Advisor for DB2 no longer supports IBM DB2 Version 8.1.00
Overview of Pool Advisor for DB2

This section introduces you to the Pool Advisor for DB2 product.

Introduction

Pool Advisor for DB2 provides a fast, accurate means of monitoring DB2 storage resources to help you identify and resolve problems as they occur.

Pool Advisor enables you to monitor the performance of DB2 activities in real time and to display data about the performance of the system in a readable, usable format.

Pool Advisor uses an advisor-driven system for retrieving pool-related data from DB2, reporting that data, detecting potential performance-related problems, and recommending actions to prevent those problems. Pool Advisor can operate under native TSO and ISPF.

Pool Advisor for DB2 is also a component of the BMC System Performance for DB2 solution, which integrates the features and functions of Pool Advisor for DB2, OPERTUNE for DB2, and MainView for DB2 into a single product interface.

If you have the BMC System Performance for DB2 solution installed at your site, you do not need this book. All Pool Advisor information is included in the BMC System Performance for DB2 User Guide.

Need for storage management

Tuning the performance of storage resources in DB2 is critical.

DB2 storage pools reside in the DBM1 address space, which, in earlier releases of DB2 (version 7 and earlier) was limited to 2 GB in size. On most z/OS systems, system and common storage areas reduce the available private area to less than 1.6 GB. This is the area that is available for virtual buffer pools, EDM, RID, and sort pools.
In DB2 version 8 and later, 64-bit memory architecture has eliminated the 2-GB virtual storage address space limit, but it has increased the need for monitoring real storage use. The maximum buffer pool sizes that are now allowed in DB2 can cause a greater demand on real storage requirements, and could introduce system paging, which can affect overall performance.

The pool management problem

One of the critical administration tasks of the DB2 systems programming and database is to distribute storage resources among the various pools.

Many factors must be considered for each type of pool, but each pool must be examined and tuned without causing a negative impact on any other. This can be a very time-consuming and error-prone job.

Buffer pools problem

DB2 includes a built-in caching mechanism for data pages that are read from DASD to satisfy SQL statements from applications.

This cache is referred to as buffer pools. Database administrators typically control the size of the pools and decide which data page objects will reside in which pool. Early releases of DB2 supported three buffer pools for 4-KB data pages and one buffer pool for 32-KB data pages.

As their customers moved more heavily into relational processing, IBM addressed mounting performance demands with a variety of I/O avoidance techniques, such as the various types of prefetch. It became obvious that radically different types of data that were accessed in different manners did not coexist well in the same buffer pool, so IBM increased the number of 4-KB pools to 50 and the number of 32-KB pools to 10 and added 10 8-KB and 10 16-KB pools. Beginning with DB2 v8.1, 64 bit memory architecture has allowed the buffer pool sizes to increase dramatically. Although this vast increase in caching resources has been available for years, most customers still use relatively few buffer pools.

DB2 system programmers and DBAs have found the task of buffer pool tuning complicated and difficult to understand and, with the advent of MVS sysplex configurations and DB2 data-sharing, the task has become even more complex. Shared data has to be accessed via "group" pools so that changes can be coordinated across MVS images. How data is assigned to these buffer pools can make a big difference in the performance of the data-sharing complex.

Another important factor is the trend among large companies towards large third-party vendor application suites such as PeopleSoft and SAP. A defining characteristic of these packages is that they use large numbers of data tables (from thousands to tens of thousands). The job of configuring buffer pools for optimum

Need for storage management
performance and use of storage resources when confronted with such massive numbers of data objects is daunting.

Faced with these circumstances, every DB2 DBA asks the same questions:

- How many buffer pools should I have?
- How big should they be, and how should I set their thresholds and parameters?
- How big should they be, and how should I set their thresholds and parameters?
- How big should they be, and how should I set their thresholds and parameters?
- Which objects should be grouped together, and into which pools?
- How should the buffer pool thresholds be changed through the day?
- How should the page set buffer pool assignments change over time?

How these questions are answered can have a dramatic impact on the performance of corporate database applications.

The problem with placing all DB2 data objects into one big buffer pool (which is not uncommon) is that these different data objects have varied and distinct access characteristics. These different characteristics tend to interfere with each other, often resulting in poor performance and inefficient resource use. Different data objects (with widely varying access characteristics) in the same pool can suffer complex interactions, resulting in some types being forced out of the pool excessively and driving down overall buffer pool effectiveness. The generally accepted way to deal with this problem is to classify the data objects and combine those with the same characteristics into their own pools.

Figure 1 on page 15 image illustrates a typical buffer pool configuration:

- Few buffer pools
- Approximate object separation
- Unlike objects sharing the same pool

Figure 1: Typical buffer pool configuration
Figure 2 on page 16 image illustrates a better configuration, with more buffer pools and more segregation of data into similar performance classes.

**Figure 2: Efficient buffer pool configuration**

By grouping objects with similar access and priority characteristics into multiple buffer pools, data pages are shared more equitably in each pool and overall hit ratios are improved. In addition, the size of each pool can now be varied individually to achieve caching targets by object group according to priority and workload demand.

While this process is straightforward in principle, two primary factors have limited its use:

- The data that is required to classify and group similar objects is not readily available. Expensive, high-volume buffer traces are required to collect the data.
- Data objects at a typical DB2 site now number in the thousands or tens of thousands.

The effort required to implement this straightforward strategy is too great in most IS shops today. Consequently, little real buffer pool tuning is being performed.

**EDM pool problem**

The EDM pool is used to hold the following objects that are used by executing SQL statements:

- Skeleton cursor tables (SKCTs)
- Cursor tables (CTs)
- Skeleton package tables (SKPTs)
- Package tables (PTs)
Plan authorization cache blocks (optional)

Efficiency of the EDM pool is measured by how successfully requests for these objects are satisfied without the need for loads from Direct access storage device (DASD). As the percentage of EDM pool storage use increases, there is an increased risk that DASD loads will fail because of a lack of storage. On the other hand, over-allocating the EDM pool leads to wasteful and inefficient use of system resources. The challenge facing DBAs is to monitor the size of the EDM pool to ensure it is meeting these diverse requirements without wasting system resources that might better be used elsewhere.

Dynamic statement cache problem

More and more business applications are based on dynamic SQL.

PREPARE processing for complicated SQL statements can be very expensive and time consuming. The same work is repeated. Caching can help because statements that are recalled from cache use far fewer resources than statements that need to be prepared again.

If caching is enabled DB2 caches all dynamic PREPAREs, not just those that are used repeatedly. There may not be enough storage to ensure consistently good cache performance.

RID pool problem

The RID pool is an area of storage used for sorting record IDs (RIDs) during execution of SQL that uses list prefetch (including hybrid joins and multiple index access).

The size of the RID pool is specified in an installation parameter and can be between 128 KB and 10,000 MB (if set to 0, RID list processing is disabled). RID pool processing can fail under any of the following circumstances:

- The number of RID entries is greater than the RDS limit (25% of the table being accessed).
- The number of RID entries is greater than the Data Manager limit of 16 million rows (an absolute limit that cannot be changed).
- There is insufficient virtual storage.
- A process attempts to use more than half of the RID pool.

RID pool failures are usually a sign of poor resource allocation, high concurrent activity, or application SQL with access path problems.
Sort pool problem

The sort pool is not part of the buffer pool. Sort pool storage is allocated separately for each concurrently active thread that requests sort processing.

The size of the sort pool is limited to a range between 240 KB and 128 MB per thread (the default is 2 MB) and is specified in an installation parameter. So the amount of storage needed depends on the number of active threads at any time. Failures can result from the lack of available virtual storage.

Group buffer pools problem

Data sharing in a DB2 parallel sysplex environment allows application programs running on multiple DB2 subsystems to read and write common data concurrently, while maintaining data integrity and currency.

The numerous benefits of data sharing include improved availability, better load balancing, virtually unlimited capacity, and better performance—if implemented correctly. However, the resources required to assure the integrity and currency of shared data (group buffer pools and locking mechanisms) is finite and can easily be depleted during peak workload periods.

When an application running on a DB2 member of a data sharing group updates data that is shared by all of the DB2 members of that group, the data is written to the group buffer pool and is said to have inter-DB2 read/write interest. All local buffer pool copies of that data page are invalidated and future access to the data is satisfied from the group buffer pool. As the shared workload levels increase, more and more data pages with inter-DB2 read/write interest are cached in the group buffer pools, placing an increasing demand on the available hardware resources of the cross-system coupling facility (XCF).

It is a challenge to configure the group buffer pools correctly to ensure the availability of both free data and directory entries when needed to cache data pages shared by multiple concurrently executing application programs. Because workload levels can vary wildly, it becomes even more challenging for the database administrator to monitor and control the group buffer pool configuration and identify potential problem areas before they become catastrophic failures.

The pool management solution

Pool Advisor for DB2 provides you with expert assistance in performance tuning and problem resolution, as well as some automated resource management capabilities.

Pool Advisor performs the following tasks:
Collects and analyzes DB2 data about buffer pool, EDM pool, dynamic statement caching, sort pool, RID pool, and group buffer pool use

Makes recommendations concerning storage resource allocation, object configuration, and various DB2 parameter settings

Automatically manages some of these resources on a real-time basis for best performance across workload fluctuations

Pool Advisor looks at storage requirements across the system and makes recommendations based on total storage resource requirements, so that an increase in one resource does not cause a shortage in another. When storage is constrained, Pool Advisor attempts to balance resource use and, under severe conditions, prevents increases to any storage resources.

**Buffer pools**

Pool Advisor can perform object classification far better than any comparable product available today.

Pool Advisor can process large lists of buffer pools and data objects. It more accurately groups data types by considering more performance characteristics than most DBAs can afford to consider:

- Type of object (table or index)
- Degree of sequential access versus random access
- Activity level
- Object size
- Update rate
- Optimum working set size for best hit rates
- Priority

The Configuration Advisor calculates a "score" that represents the overall fitness of the current configuration for the measured attributes of the page sets. You can then submit an analysis request that will evaluate the mix of pools and objects and recommend changes to the assignment of objects to pools and the attributes of the pools. You have the option to accept and implement those changes or modify and resubmit the analysis request.

Using this iterative and interactive approach, you can reach a configuration that meets the needs of your objects, while fitting within acceptable limits of complexity and resource use.
EDM pool

Pool Advisor attempts to make the EDM pool big enough to contain all frequently used objects in addition to the largest infrequently-referenced objects without the need for I/O.

If the EDM pool is sized correctly, there should be:

- Fewer SQL statement failures
- More concurrently active threads
- Better overall system performance
- Fewer wasted resources due to over allocation
- Fewer unnecessary delays resulting from physical I/Os to load objects from disk

Pool Advisor accomplishes this by constantly monitoring use of the EDM pool and making recommendations for size changes when increases in activity necessitate, keeping the pool operating at optimum levels. If the OPERTUNE for DB2 product is also installed, the EDM pool size can be increased dynamically.

Dynamic statement cache

Pool Advisor determines which SQL statement PREPAREs are using the most CPU, which SQL statements are duplicates that must be prepared at least twice, and what portion of the statement cache is in use. Pool Advisor monitors the dynamic statement cache and tracks CPU consumption and PREPAREs to determine the optimum size of the cache and makes recommendations for changes.

RID and sort pools

Although little can be done to tune the RID and sort pools, Pool Advisor monitors them constantly and can spot problems before they become critical.

Pool Advisor can warn you of these situations or (if OPERTUNE for DB2 is installed) dynamically alter the pool allocations to prevent failures.

Group buffer pools

Pool Advisor constantly monitors and evaluates critical DB2 group buffer pool performance metrics and configuration values, alerting you to potential problems and providing advice on prevention and resolution.
Efficiency values provide an overall status for each buffer pool and can also be used to compare the relative performance between the different group buffer pools in the data sharing group, making it possible to identify over and under allocated resources.

Read/write ratios help you to determine the predominant access method for each pool, helping you to group similarly accessed page sets to specific group buffer pools and increase their operational efficiency.

Pool Advisor recognizes potential storage resource shortages before they result in critical event failures. The number of available directory and data entries are monitored to help prevent castouts and cross-system invalidation.

Pool Advisor components

Pool Advisor has the following main components:

- Data Collector
- Report Manager
- Advisors
Pool Advisor provides a number of functions and components to help you monitor DB2 storage resources to help you identify and resolve problems as they occur. Figure 3 on page 22 illustrates the major components of Pool Advisor.

**Figure 3: Pool Advisor architecture**

### Data Collector

The Data Collector provides common access to DB2 performance data for all Pool Advisor users.

Each Data Collector can monitor all DB2 subsystems on the same z/OS image and can support up to 999 concurrent users. In a sysplex environment, Data Collectors can communicate across the sysplex and users can access data from any DB2 being monitored by those Data Collectors. In addition, the Data Collector retrieves data from DB2 control blocks.
Background advisors are the Data Collector component that watch over resource use in DB2 and warn you when potential problems are detected. The advisors can be accessed from Pool Advisor reports.

When the Data Collector is initialized, parameter messages are issued to the SYSTSPRT DD of the DOMPROC. Parameters are used to modify resources when the advisors recommend changes.

**Report Manager**

The Report Manager is your interface to BMC System Performance for DB2.

The Report Manager’s main function is to take the records collected by the Data Collector and generate reports. All Pool Advisor reports use the Report Manager for display.

Foreground advisors are a Report Manager mechanism for displaying a text-based explanation of the values found on these reports.

**Sysplex support**

Pool Advisor is designed to run in a sysplex environment.

One Data Collector from each z/OS image in the sysplex can be defined in a DOMPLEX group. Each Data Collector can monitor all DB2s on its same z/OS image and all Data Collectors in the DOMPLEX can communicate with each other. As a result, all data from all DB2s across the DOMPLEX is available to all DOMPLEX users. All users can view online reports that contain data from any or all DB2s in the DOMPLEX and commands can be issued to any DB2 in the DOMPLEX.
Figure 4 on page 24 illustrates Sysplex communication in a Pool Advisor DOMPLEX.

**Figure 4: Sysplex communication**

See the System and SQL Performance for DB2 Administrator Guide for a complete explanation of DOMPLEX option sets.

**Advisors**

Pool Advisor monitors the resources on your system, and spots potential problems and recommends changes before those potential problems become actual problems.

Advisors are the components that serve this purpose.

**Note**

The advisor technology is associated with the common BMC System Performance reports and Pool Advisor reports, but is not used by MainView for DB2 views.
Background advisors

Background advisors are the sentinels that watch over resources and let you know when there is a problem.

Individual component advisors monitor each type of resource at all times. If a problem is detected that can be corrected by a change in some parameter, a recommendation is sent to the system advisor.

System advisor

The system advisor coordinates all recommendations that are received and approves or rejects them, based on its analysis of all requirements and available resources.

If the system advisor decides that a recommendation should be honored, it is added to an Action List, from where you can implement it.

Note
Whenever an action is executed, a message is written to the SYSTSPRT DD of the DOMPROC.

Report expert advice

In the foreground, each report has expert advice that you can access easily by using hyperlinks or action codes:

The expert advice helps you to interpret the data on the report. Any recommendations that are issued by the system advisor are listed prominently, along with the key values that are used to determine alerts. Links in the expert advice provide more detailed information about conditions in the current interval and general information about the topic of the report.

View related information about how to use Pool Advisor advisors.

Related Information

■ “Using advisors” on page 43
Variable Repository

The variable repository stores the values for parameter variables. These values are used to modify storage resources when the advisors recommend changes. Initially, Pool Advisor uses default values when changes are recommended, but if you find that the recommended changes based on these default values are no longer appropriate, you can use the variable repository to modify the values. The variable repository consists of a series of easy-to-use panels that list the variables and provide fields for you to type new values from a range of acceptable values. You can access the variable repository by linking on the CONFIG button on Pool Advisor reports.

Features of Pool Advisor

Pool Advisor has a number of features to assist you in monitoring DB2 pool system performance.

Pool Advisor report set

The Pool Advisor report set combines the reporting abilities of the MainView for DB2 and Pool Advisor components with a supplemental set of comprehensive reports on all aspects of DB2.

The primary report displays key values in real time about each active DB2 in the Sysplex, plus an overall status. From the primary report, you can branch out to other reports, gathering data from all System Performance components.

The Pool Advisor report set consists of one main report and one or more history reports for each of the following storage resources:

- Overall status monitor
- Buffer pools
- EDM pool
- Dynamic statement cache
- RID pool
- Sort pool
- Group buffer pools
- Total DBM1 virtual storage

The primary reports display key values about storage use in real time for the corresponding topic. History reports display data from previous intervals.

There are also reports to examine all page sets in a selected buffer pool and all objects in a selected page set.

**Command log**

The Pool Advisor Command Log report lists all commands that have been issued as a result of recommendations approved by the system advisor.

Commands are listed in chronological order, with the most recent command listed first.

You can expand the report to display the command response and to see details of the recommendation and the rule that triggered the recommendation.

**Interval**

For most Pool Advisor reports, the data that is reported is collected every minute and accumulates over a 15-minute interval. At the end of 15 minutes, the data for the first five minutes is dropped and the new interval contains data from the previous 10 minutes. Data is added each minute for the next five minutes until the interval again represents data for a 15-minute period. Then the data for the oldest five minutes is dropped again.

The first interval begins when the Data Collector is started or when a DB2 subsystem is subsequently started. The cycle continues to repeat until the DB2 subsystem is cycled or the Data Collector is stopped.

**Sorting**

Using the SORT command, you can rearrange the sequence of data in common reports and in lists displayed on common panels.

You can specify any columns on selected scrollable panels as primary and secondary sort keys.

To view Online Help about the SORT command, type **HELP SORT** on the Command line.
Command interfaces

The Command Interface panels enable you to issue commands to the Data Collector, DB2, z/OS system, and OPERTUNE from within Pool Advisor, and to receive feedback from those commands.

Session Status

Session Status reports data about your session’s storage use and information about the Pool Advisor reports that are active under your user ID.

For more information, see Pool Advisor report set on page 26.

User Options

User Options are used to tailor your Pool Advisor session to your specific needs:

- You can set options that affect various session characteristics:
  - Display of panel ID
  - Command line placement
  - Cursor placement
  - Display of confirmation panels
  - Display of function keys
  - Screen format (80/132 columns)
  - Default scroll amount

- You can set your own defaults for function keys.

For more information about user options, see online Help (type HELP TOPTIONS on the Command line of any common report or panel, and press Enter).
Configuration analysis

Pool Advisor’s primary purpose is to measure the access of your objects and evaluate the performance of the buffer pools in real time.

While Pool Advisor attempts to alert you to problems and recommends pool attribute changes in order to adapt to mismatches, it is usually better to configure the buffer pools more accurately from the start. The configuration advisor is intended to help you do exactly that.

The configuration advisor calculates a compatibility score that represents the overall fitness of the current configuration for the measured attributes of the page sets. You can then submit an analysis request that will evaluate the mix of pools and objects and recommend changes to the assignment of objects to pools and the attributes of the pools, such as size, type, and operating steal and write thresholds. You have the option to accept and implement those changes or modify and resubmit the analysis request.

Using this iterative and interactive approach, you can reach a configuration that meets the needs of your objects, while fitting within acceptable limits of complexity and resource use.

Pool Advisor administration

Profiles are the Pool Advisor tool used to control access to Pool Advisor and (through Pool Advisor) to DB2. They are also used to set default values for subsystem-wide activities. Administrative functions are available only to users with administration authority (granted in the User Profile).

User Profiles

Each System Performance user is identified by a User Profile.

The user profile restricts access to Pool Advisor functions and access for monitoring DB2. In addition, the User Profile is used to set defaults for display characteristics and function keys.

Individual profiles can be created and tailored to individual needs, or profile characteristics can be shared by many users by creating a Master Profile. The System Performance administrator can grant users the ability to change their own profiles or restrict their access to portions of the profile.
DOMPLEX option sets

In SQL Performance, the collection of data, the summarization of data, and the filtering of data are specific to DB2.

Each DB2 subsystem that can be monitored is defined in a **DOMPLEX** option set. It also defines the DB2 subsystems to be monitored and the LOGFILEs used by the DOMPLEX. The collection, summarization, and filtering options set in the DOMPLEX option set apply to all programs and plans that are run on the DB2 subsystem.

DOMPLEX parameters also include a set of values that determine how Pool Advisor is configured. You can modify these values to suit the needs of your site. These options allow you to specify the following operating characteristics:

- Whether users are allowed to issue commands to DB2 and MVS from Pool Advisor
- Whether Pool Advisor uses the DB2 user authorization table (SYSUSERAUTH) to enforce security for DB2 commands and traces
- Whether hiperspace is used to stage records during the report-viewing process
- Whether Pool Advisor panels will be displayed using both upper- and lowercase characters or using uppercase characters only
- The style of date displayed on panels where the date occurs
- The symbol used to the left of the fractional portion of a number with decimal places

For a complete explanation of all common administrative functions, see the *System and SQL Performance for DB2 Administrator Guide*.

Pool Advisor security

Because many Pool Advisor functions can affect DB2 performance, a number of security mechanisms are provided to the Pool Advisor administrator to control access to these functions.

Access to Pool Advisor is controlled via RACF (or another z/OS security system that uses the RACF interface).

Authority to issue DB2 commands is controlled by:
Options in the User Profile

- The DB2 catalog tables, if the value for the Enforce security via DB2 authorization table global option is Y (Yes)
- A Pool Advisor exit that allows you to specify a DB2 primary authorization ID that differs from the Pool Advisor user ID
- The DB2 DSN3@ATH secondary authorization exit

Other authorizations are controlled by options in the User Profile:

- Access to DB2 for monitoring
- Access to Data Collectors
- Data Collector, z/OS, DB2, and OPERTUNE, command authority

For more information about security, see the *Installation System Reference Manual*.

**Reporting problems**

At times you might encounter problems using Pool Advisor that require you to contact BMC Customer Support for assistance.

Before calling your BMC Customer Support representatives, you can gather information that will help them to diagnose and resolve your problem as quickly as possible.

**Completing Customer Support Checklist**

The following checklist of information is useful in problem determination. Not all items will apply in every situation, but if you check this list before calling and provide as much information as you can when you call, your representative will be able to help you more effectively.

1. What was the sequence of events that resulted in this error?

2. Have you had the same problem before? How often?

3. Which messages were issued to the terminal?

4. Make a copy of the system log containing messages, registers, module names, and so on, at the time of the problem.

5. What version and maintenance levels are you using of the following:
6 Save the batch job output from any job that fails.

7 Save the dump if there is one.

8 Make a copy of the Maintenance panel (DOMEZAPT), which lists any PTFs that have been applied (option 3 on the Administration menu).

---

**Related Information**

- "Contacting BMC Software"
Getting started with Pool Advisor

This section provides general information about panel layouts, navigation, and logging on.

Logging on

As part of the Pool Advisor installation, one of the following logon mechanisms is created:

- A menu option
- A CLIST

To log on

When you log on, the Pool Advisor logo panel Figure 5 on page 34 is displayed briefly while the product initializes, followed by the Pool Advisor main menu. See Pool Advisor main menu on page 39.

1. Contact your product administrator for the proper procedure to use at your site and perform one of the following actions:

- Select the ISPF menu option
Execute the CLIST to log on to Pool Advisor.

**Figure 5: Pool Advisor logo panel**

![Pool Advisor logo panel]

**Note**
If you are using multiple System and SQL Performance for DB2 products, a common main menu is displayed. See related information for more details.

**Related Information**

- “Using multiple System and SQL Performance products” on page 109

**Navigation**

The Pool Advisor interface has been designed for quick and easy navigation through the solution’s panels and reports.

After you familiarize yourself with Pool Advisor, you should be able to navigate through the product with little or no supporting documentation.

Navigation through Pool Advisor reports and advisors resembles navigation in a web browser. Text and values that are hyperlinks are underscored. If your mouse button can be programmed to the function of the **Enter** key, you can navigate by clicking on hyperlinks. Otherwise, you need to move the cursor to a hyperlink and press **Enter**.

Action codes are also used to navigate between reports and advice. Action codes are listed in each common report header. To use an action code, type the one-letter code
on the plus sign (+) at the left of a line of data, and press Enter. Another report or expert advice containing related data is displayed.

You can use the SHOWCMDS command at any time from any panel or report to display all commands (including navigational commands) that can be issued from that panel or report. See the online Help for more information about SHOWCMDS (type HELP SHOWCMDS on the Command line and press Enter).

**Panel layout**

The following figure shows the attributes shared by Pool Advisor panels.

*Figure 6: Pool Advisor panels*

The following elements comprise the panel layout:

**panel ID**

The panel ID is displayed in the upper left corner of each panel. Display of the panel ID is optional. The default value (ON or OFF) is set in the User Profile or in User Options. You can use the PANELID command to suspend the default temporarily.
environment identifier

The environment identifier is displayed to the right of the panel ID, separated from it by a slash (/). Possible values are:

- I (when operating under ISPF)
- P (when operating under native TSO)

panel description

A description is displayed in the center of the top line of each common panel.

time or line count indicator

On non-scrollable panels, the time is displayed in the upper right corner in the format \texttt{hh:mm:ss}, where

- \texttt{hh} is hours in the range 00-23
- \texttt{mm} is minutes in the range 00-59
- \texttt{ss} is seconds in the range 00-59

On scrollable panels, the current line number and the total number of lines is displayed in the format \texttt{LINE nnn OF nnn}.

If the panel is scrollable, the scroll amount (in the format \texttt{Scroll ===>___}) is also displayed at the end of the Command line. Each time you begin a Pool Advisor session, the default scroll amount is retrieved from your User Profile and displayed here. You can change the scroll amount at any time, and the new value will remain in effect until you either change it again or end your session. Valid values are as follows.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAGE</td>
<td>Data is scrolled one full page at a time. A full page varies in size, depending on the number of scrollable lines on the panel or report. For example, if there are 10 scrollable lines on the panel, data is scrolled 10 lines at a time.</td>
</tr>
<tr>
<td>HALF</td>
<td>Data is scrolled a half page at a time. A half page varies in size, depending on the number of scrollable lines on the panel or report. For example, if there are 12 scrollable lines on the panel, data is scrolled 6 lines at a time.</td>
</tr>
<tr>
<td>CSR</td>
<td>The position of the cursor determines the number of lines that are scrolled. When scrolling down, position the cursor on the line to be displayed at the top of the scrollable area and press F8. When scrolling up, place the cursor on the line to be displayed at the bottom of the scrollable area and press F7. If CSR is specified and the scrolling keys are used when the cursor is not positioned on a scrollable portion of the panel, scrolling defaults to PAGE.</td>
</tr>
<tr>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>GRP</td>
<td>Data is scrolled one repeating group at a time. The first line of the next repeating group is displayed on the first line of the scrollable area. This value is valid only when viewing reports with repeating groups. If this value is specified, and there are no repeating groups on the panel, scrolling defaults to PAGE.</td>
</tr>
<tr>
<td>nnnn</td>
<td>Data is scrolled $nnnn$ lines at a time, where $nnnn$ is any number in the range 1 to 9999.</td>
</tr>
</tbody>
</table>

**Command line**

The Command line can be displayed directly beneath the panel ID and description or at the bottom of the panel directly above the function keys. The default value for the position of the Command line is set in the User Profile.

**function keys**

The function keys are displayed on the bottom two lines of the panel. Display of function keys is controlled by a parameter in the User Profile. The default values for each key can also be modified in the User Profile. The following defaults are shipped with System Performance:

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Help</td>
<td>F13</td>
<td>Home</td>
</tr>
<tr>
<td>F2</td>
<td>Split</td>
<td>F14</td>
<td>Keys</td>
</tr>
<tr>
<td>F3</td>
<td>End</td>
<td>F15</td>
<td>End</td>
</tr>
<tr>
<td>F4</td>
<td>Sort A (ascending)</td>
<td>F16</td>
<td>Terse</td>
</tr>
<tr>
<td>F5</td>
<td>Sort D (descending)</td>
<td>F17</td>
<td>Rfind</td>
</tr>
<tr>
<td>F6</td>
<td>Showcmds</td>
<td>F18</td>
<td>Filter</td>
</tr>
<tr>
<td>F7</td>
<td>Up</td>
<td>F19</td>
<td>Up</td>
</tr>
<tr>
<td>F8</td>
<td>Down</td>
<td>F20</td>
<td>Down</td>
</tr>
<tr>
<td>F9</td>
<td>Swap</td>
<td>F21</td>
<td>Expand All</td>
</tr>
<tr>
<td>F10</td>
<td>Left</td>
<td>F22</td>
<td>Left</td>
</tr>
<tr>
<td>F11</td>
<td>Right</td>
<td>F23</td>
<td>Right</td>
</tr>
<tr>
<td>F12</td>
<td>Cancel</td>
<td>F24</td>
<td>Retrieve</td>
</tr>
</tbody>
</table>

**Pool Advisor commands**

You can find descriptions of all Pool Advisor commands in online Help:

- Type `HELP commandName` on the Command line of any panel or report, and press Enter for help for a specific command.
- Type HELP COMMANDS on the Command line of any panel or report, and press Enter for a selection list of commands.

messages

Pool Advisor messages are displayed directly below the Command line when the Command line is displayed at the top of the panel and directly above the Command line when the Command line is displayed at the bottom of the panel.

Report layout

The figure below shows the common elements that are shared by Pool Advisor reports.

Figure 7: Common report elements

The following elements comprise the report layout:

report name

The name (report ID) of the report.

report description

A description of the report.
date

The current date in either the USA/ISO format (mm/dd) or European format (dd/mm), where mm is month in the range 01 to 12 and dd is day in the range 01 to 31.

time

The current time in the format hh:mm:ss, where

- **hh** is hours in the range 00-23
- **mm** is minutes in the range 00-59
- **ss** is seconds in the range 00-59

buttons

Navigational aids for quick access to the following features:

- **HELP**--displays online Help for the current report
- **ADVISOR/NOTES/WARNING/ALERT**--takes you to the background advisors
- **CONFIG**--displays the configuration dialog where you can set thresholds for problem determination or refresh object names from the DB2 catalog

Move the cursor to the button, and press **Enter**.

actions

Action codes that are used to expand the data on the report to display additional details or to navigate to other reports. Type the corresponding action code over the plus sign (+) beside the relevant object, and press **Enter**.

---

**Pool Advisor main menu**

The Pool Advisor for DB2 main menu provides access to the major functions of Pool Advisor.
Figure 8: Pool Advisor for DB2 main menu (PMDESEL1)

PMDESEL1/P Pool Advisor for DB2 16:19:10
Command ===> ________________________________________________________________

Current Data Collector : DOMO  Status : ACTIVE

Select one of the following options. Then press Enter.

_  P. Pool Advisor       - DB2 storage pools analysis and control
1. DOMPLEXes          - Select/change DOMPLEX/Data Collector connection
2. User Options       - View/modify user options
3. Administration     - Manage user and data collector profiles

H. Help
X. Exit                 Z. About Pool Advisor

The main menu contains the following options:

P

Use Pool Advisor to access the DB2 Pools Status Monitor report--the starting point for all Pool Advisor reporting.

1

Use DOMPLEXes to select a DOMPLEX for monitoring DB2 or to change from one active DOMPLEX to another.

2

Use User Options to view and modify the options used to tailor your session to your needs.

3

Use Administration to view and modify profiles and global parameters.

Note: This option is displayed on your menu only if you have administration authority.

H

Use Help to learn about the online Help facility, to see an overview of Pool Advisor, and to explore online Help topics

Z

Use About Pool Advisor to view copyright and trademark information about Pool Advisor and to obtain Internet and e-mail addresses for BMC Sales and Customer Support.

X

Use Exit to terminate your session.
The main menu that is displayed depends on the DB2 System and SQL Performance products and solutions that are installed and active at your site. Figure 8 on page 40 is displayed when Pool Advisor for DB2 is the only product or solution installed. If multiple products or solutions are installed, the main menu displayed will reflect the active product mix. Figure 66 on page 111 is an example of the main menu displayed when both System and SQL Performance solutions for DB2 are installed.

Online assistance

Wherever you go in Pool Advisor, online assistance is only a hyperlink or keystroke away. Every Pool Advisor panel, report, and field has traditional, context-sensitive online Help that is available by pressing F1 (Help). But Pool Advisor goes a step further by providing online tuning assistance that is based on the current status of your system (by hyperlinking to advice).

Online Help

Online Help for reports and panels provides a basic explanation of the report or panel, the hyperlinks and action codes that can be used, and static descriptions of the values in the report or panel fields.

You can access online Help from the Pool Advisor main menu to get either an explanation of how to use online Help or an overview of the product.

The overview also includes lists of the following major help topics:

- Commands
- Messages
- Reports
- Panels
- Tutorial topics

Each major topic branches to additional items that provide more detail.

Pool Advisor online Help is context-sensitive. Move the cursor to a text, input, or output area of any panel or report and press F1 for help that is specific to that field, panel or report.

You can also use the HELP command from any panel or report to get help on any topic you specify.
**Expert advice**

Expert advice is available from solution-specific and Pool Advisor reports.

Expert advice explains the values on the report in the context of current storage constraints and, based on current conditions, recommendations for changes in your configuration are listed, when necessary.

Hyperlinks and action codes are available on all Pool Advisor reports for access to advice.
Using advisors

This section describes the types and background operation of advisors that provide tuning advice from Pool Advisor.

Introduction

Advisors are at the center of Pool Advisor. In the background, they constantly monitor your system resources, calculating the optimum configuration for each resource, and recommending changes when necessary to ensure the best possible performance of your applications.

In the foreground, advisors are never more than a click or a keystroke away. From any Pool Advisor report, you can display an explanation of the current statistics on the report—an explanation that is tailored to the conditions at the current time. If a problem exists on any DB2 subsystem being monitored, you are notified instantly and, within a few keystrokes, you can see the action that is recommended to correct the problem.

Report advice

Report advice helps you to understand the data that is on reports and alerts you to problems that are related to that data.

Each Pool Advisor report has expert advice that can be reached from the report by means of hyperlinks or action codes.

The advice displayed depends on the conditions that exist at the time it is displayed. Any outstanding recommendations are displayed prominently along with the key values that determine the need for action. Links are provided to additional information about conditions in the current interval and to general information about the topic of the report.
Figure 9 on page 44 shows a number of possible paragraphs. The paragraph (if any) that is displayed depends on the severity of the condition that triggers the paragraph.

Figure 9: Variable advisor text

<table>
<thead>
<tr>
<th>No performance degradation due to excessive paging was detected and no change to the system is recommended at this time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The paging rate has increased to a level higher than normal but is still within reasonable limits. However, you should keep a close watch to determine if the increase is persistent, which would warrant further investigation.</td>
</tr>
<tr>
<td>The paging rate for this interval was nn pages per second, which is negatively affecting DB2 performance due to page fault delays. Over-allocated storage pools above and (to a lesser extent) below 2GB, are the main contributing factors. Reduce the size of one or more of the major storage-consuming pools to prevent severe performance degradation.</td>
</tr>
</tbody>
</table>

Figure 10 on page 45 is an example of the expert advice for the Buffer Pools status Monitor report. Values that are underscored are hyperlinks to more related information. Values that are bold indicate variables that will change as conditions change.
**Figure 10: Example of expert advice**

Command: Advisor Response

**Alert Advice for Buffer Pool BP49**

DB2 subsystem ID : DHY2 V9.1
Interval start : 2008-06-19-14.05.00
Current duration : 10.15 minutes

**Recommendations:**
- Increase buffer pool size by 49 pages
- Decrease the VPSEQT threshold to 10%
- No change to the deferred write threshold (DWQT)

**Key Buffer Pool Values:**
The virtual pool size is 1600 pages (6.2 MB).
The efficiency rating for this buffer pool is 75%. For most busy DB2 systems, this number should be quite high. The efficiency for this interval was poor.
The getpage rate is 2399.2 pages per second.
The synchronous read I/O rate is 28.1 I/Os per second.
The hit ratio for the virtual pool is 0.2%.
The minimum page residency time in the virtual pool is 1 seconds.

No adverse performance events were detected.

The Buffer Pool Advisor controls for this pool are as follows:
- minimum pool size allowed : 149 pages
- maximum pool size allowed : 50049 pages
- adjustment size for pool increases : 49 pages
- adjustment size for pool decreases : 199 pages

**Additional Information:**
For details about this buffer pool in the current interval, click here.
For general information about buffer pools, click here.
The advice in Figure 11 on page 46 recommends an increase in the size of the buffer pool. If you link on the recommendation, a complete explanation of the recommendation is displayed.

**Figure 11: Example of recommendation text**

<table>
<thead>
<tr>
<th>Command</th>
<th>Advisor Response</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADVISOR:PMDZBPM1</td>
<td>Increase Buffer Pool Size</td>
<td>06/19/08 14:17:19</td>
</tr>
</tbody>
</table>

The buffer pool advisor has determined that you should increase the size of this buffer pool because access is predominantly random, there has been significant read I/O, and both the residency time and the system hit ratio are less than optimal.

A recommendation to increase the size of the buffer pool has been sent to the System Advisor. The System Advisor might have rejected the recommendation based on its analysis of storage requirements for all pools.

If the request was accepted, an action item was created and added to the action list, from where you can view it or execute it.

To see the list of action items, click here.

---

**Note:**

System Performance for DB2 uses parameters to set upper and lower limits on the size of the buffer pools (SIZE_BP49_MAX and SIZE_BP49_MIN), and to make recommendations for increasing or decreasing their sizes (SIZE_BP49_INC and SIZE_BP49_DEC). The initial values for these parameters are calculated defaults, but you can use the variable repository to modify the values to suit conditions at your site. Click on the CONFIG button on any product report to display the Configuration Menu; then select option 1 (View and edit product variables).

See the Pool Advisor User Guide or the System Performance User Guide for a description of buffer pool parameters.

---

For more information about overall storage use in the DBM1 address space click here.

---

**Background advisors**

Background advisors are the sentinels that watch over resources in DB2 and let you know when there is a problem.

The following Pool Advisor individual component advisors monitor storage resources:

- Buffer Pool Advisor (one for each buffer pool)
- Group Buffer Pool Advisor (one for each group buffer pool)
- EDM Pool Advisor
The background component advisors monitor the storage resources constantly and compare the statistics that they gather against a set of rules that define conditions that warrant attention. When a condition that is identified by a rule is detected, the individual advisor that detected the condition checks the parameter values for the resource and sends a recommendation to the system advisor.

When Pool Advisor determines that changes should be made to the size of storage pools or what the maximum and minimum thresholds should be, the following values are used by default:

- Increase resource by 10% of ZPARM value
- Decrease resource by 10% of ZPARM value
- Maximum total increase of 25% of ZPARM value
- Maximum total decrease of 25% of ZPARM value

If the default values are not suitable to your environment, you can use parameters to modify the values. Parameters allow you to define the incremental amounts that storage resources can be increased or decreased and the minimum and maximum limitations.

For example, an EDM pool rule identifies a condition when the efficiency rating for the pool drops below 90%. The EDM Pool Advisor recognizes the condition and sends a recommendation to increase the size of the EDM pool by 10% to the system advisor.

The system advisor evaluates all information that is received from the component advisors and determines (with the data from the virtual storage advisor) whether the recommendations received can be carried out without an adverse effect on other resources.

In the case of the EDM pool recommendation, the system advisor looks at overall storage constraint and evaluate the effect of an increase in the size of the EDM pool on other storage resources. The system advisor also checks the EDM pool parameters to see if the maximum size parameter would be exceeded by the recommended action.

If the system advisor decides to honor a recommendation, it is added to the Action List.
Figure 12 on page 48 shows the relationship between the advisors, DB2, and reports.

**Figure 12: Advisor relationships**

If you find that the recommended changes based on these default values are no longer appropriate (for example, because of changes to ZPARM values), you can modify the default values.

The variable repository provides a method for editing parameter variables through a series of panels. The panels outline all of the variables, giving you the opportunity to edit any or all of the values.

See related information about parameter variables and rules for instructions about changing parameter values.
The ADVISOR button

The ADVISOR button on Pool Advisor reports is your window on the background advisors.

Throughout these reports, the ADVISOR button is always displayed and warns you if any problem exists across the sysplex.

The ADVISOR button can have the following values:

- **ADVISOR** (turquoise) indicates that no problems have been detected and no recommendations have been made.
- **NOTES** (green) indicates that at least one recommendation has been made, but not necessarily added to the Action List.
- **WARNING** (yellow) indicates that a problem exists that requires attention.
- **ALERT** (red) indicates a serious problem that requires immediate attention.

You can use the ADVISOR button to drill down to the specific resource that is experiencing problems.

Example of an alert

The following image shows an example of the RID Pool Status Monitor report.

There are two obvious indications that a problem exists:

- The value for RID pool efficiency is red
When the **ALERT** button is displayed, the problematic condition is not necessarily associated with the data on the current report. If an alert condition exists *anywhere* on the sysplex, the **ALERT** button is displayed on *all* reports.

When you click on the **ALERT** button, **Figure 14 on page 50** is displayed.

The Background Advisor DB2 Selection List panel lists all active DB2 subsystems on the sysplex.

**Figure 14: Background Advisor DB2 Selection List panel**

The **Current status** field indicates the highest severity condition that exists on the DB2 subsystem. The values for **Current status** correspond to the possible values for the **ADVISOR** button and are coded with the same colors:

- **NORMAL** corresponds to **ADVISOR** (turquoise)
- **NOTES** (green)
- **WARNING** (yellow)
- **ALERT** (red)
Click on the **Current status** value to display the individual advisors associated with a DB2 subsystem.

The Advisor Selection List lists the individual component advisors for the selected DB2 and the **Current Status** for each. The values represent the highest severity condition associated with the corresponding resource. Click on the value for **Current status** to display the analysis advisor for the resource.
If recommendations are pending, the Action List hyperlink is displayed. Click on the hyperlink to display the Pending Action List.

<table>
<thead>
<tr>
<th>Advisor</th>
<th>Current status</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUFFER POOL</td>
<td>ALERT</td>
</tr>
<tr>
<td>DYNA STMT CACHE</td>
<td>NORMAL</td>
</tr>
<tr>
<td>EDM POOL</td>
<td>NORMAL</td>
</tr>
<tr>
<td>RID POOL</td>
<td>WARNING</td>
</tr>
<tr>
<td>SORT POOL</td>
<td>NORMAL</td>
</tr>
<tr>
<td>VIRTUAL STORAGE</td>
<td>NORMAL</td>
</tr>
<tr>
<td>GROUP BUFFER POOL</td>
<td>ALERT</td>
</tr>
</tbody>
</table>
The current storage management mode is also displayed. Click on the mode value for an explanation of the storage management modes. Storage management mode relates only to the Virtual Storage component of Pool Advisor.

Storage management mode

The Advisor Selection List indicates the storage management mode under which Pool Advisor is operating. The virtual storage advisor determines this mode based on the available storage in the DBM1 address space and the MVS paging rate.

Ideally, when a component pool advisor sends a recommendation to the system advisor, the recommendation is added to the Action List, from where it can be executed. However, the ability to carry out recommendations depends on the availability of storage resources. The virtual storage advisor monitors available resources and sets the storage management mode that suits the storage constraint conditions in effect. If those conditions change, the operating mode is changed to match the new conditions.

Storage management mode values

The storage management mode can take the following values:

- **NORMAL** mode takes effect when the following conditions are all true:
  - The DBM1 region size is more than 5 MB below the VSCMAX value
  - The remaining free storage in the portion of the DBM1 region that is below the 2-GB bar exceeds the VSCAVAIL_NOTE threshold
  - The system page steal rate for DBM1 is less than the default value of the page steal rate NOTICE threshold in the VSCPSR_NOTE initialization parameter

  **Note**

  The default NOTICE value for Pool Advisor is 10. You can modify this value.

- **BALANCE** mode indicates that an equal trade-off must be made between increase and decrease recommendations. To increase one value, an equal decrease in another value is necessary. If an increase or decrease recommendation is made, the virtual storage advisor will determine if and where a balancing recommendation can be made. **BALANCE** mode takes effect when any of the following conditions is true:
  - The DBM1 region size is within plus or minus 5 MB of the VSCMAX value
— The available virtual storage in the DBM1 region below the 2-GB bar is less than the default value of the available storage NOTICE threshold in the VSCAVAIL_NOTE initialization parameter, but more than the WARNING threshold in the VSCAVAIL_WARN initialization parameter

— The system page steal rate for DBM1 is more than the default value of the page steal rate NOTICE threshold in the VSCPSR_NOTE initialization parameter, but less than the WARNING threshold in the VSCPSR_WARN initialization parameter

**Note**
The default WARNING value for Pool Advisor is 20. You can modify this value.

---

- **DECREASE** mode indicates that virtual storage constraint exists to the extent that only decrease recommendations will be honored. **DECREASE** mode takes effect when *any* of the following conditions is true:

  — The DBM1 region size is from 5 MB to 99 MB above the VSCMAX value

  — The available virtual storage in the DBM1 region below the 2-GB bar is less than the WARNING threshold in the VSCAVAIL_WARN initialization parameter, but more than the ALERT threshold in the VSCAVAIL_ALERT initialization parameter

  — The system page steal rate for DBM1 is more than the default value of the page steal rate WARNING threshold in the VSCPSR_WARN initialization parameter, but less than the ALERT threshold in the VSCPSR_ALERT initialization parameter

**Note**
The default ALERT value for Pool Advisor is 50. You can modify this value.

---

- **FORCE** mode indicates that virtual storage constraint is serious and an attempt will be made to reduce storage use for non-critical components. **FORCE** mode takes effect when any of the following conditions is true:

  — The DBM1 region size is more than 99 MB above the VSCMAX value

  — Available storage in the DBM1 region below the 2-GB bar is less than the ALERT threshold in the VSCAVAIL_ALERT initialization parameter

  — The system page steal rate for DBM1 is equal to or greater than the default value of the page steal rate ALERT threshold in the VSCPSR_ALERT initialization parameter
Note
The default ALERT value shipped with Pool Advisor is 50. You can modify this value.

The default values for initialization parameters can be found in the variable repository. See additional information relating to parameter variables and rules.

Note
A virtual storage shortage below the 2-GB bar is unlikely since all major consumers of virtual storage have been moved above the bar. For this reason, reducing any pool sizes would have limited effect. Reducing the DB2 workload would be the only effective action.

Related Information
■ “Parameter variables and rules” on page 113

Pending Action List

The Pending Action List displays all recommendations that have been accepted by the system advisor.

Figure 16 on page 56 shows an example of a Pending Action List with recommendations:

■ To decrease the buffer pool BP3 by 46 pages

■ To decrease the buffer pool BP4 by 38 pages
The BP3 and BP4 changes enables both buffer pools to continue to operate at peak capacity and makes storage available for use in other pools.

**Figure 16: Pending Action List panel**

Following is a list of all the pending action items for the following DB2 and interval, with the highest priority items listed first:

- **DB2 subsystem ID:** DEA1
- **Storage Mode:** BALANCE
- **Interval start:** 2008-10-10-18.30.01
- **Current duration:** 15 minutes
- **VS available ...:** 13538 KB

<table>
<thead>
<tr>
<th>Status</th>
<th>Priority</th>
<th>Advisr</th>
<th>Recmd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pending</td>
<td>H</td>
<td>BPM</td>
<td>DECREASE BP3 by 46 PGS</td>
</tr>
<tr>
<td>Action</td>
<td>RULE</td>
<td>EXEC</td>
<td>Mode: Manual</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>Priority</th>
<th>Advisr</th>
<th>Recmd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pending</td>
<td>H</td>
<td>BPM</td>
<td>DECREASE BP4 by 38 PGS</td>
</tr>
<tr>
<td>Action</td>
<td>RULE</td>
<td>EXEC</td>
<td>Mode: Manual</td>
</tr>
</tbody>
</table>

**To perform actions from the Pending Action List**

1. From the Action List, you can perform one of the following actions:
   - Click **RULE** to display the rule that triggered the recommendation
   - Click **EXEC** to execute the recommended command
   - Click **ACKN** to acknowledge a rule for which no action can be taken

**Displaying a rule**

A rule describes a condition in DB2, and when that condition is met Pool Advisor triggers a recommendation.
When you click on **RULE** on the Pending Action List panel, the Rule Details panel displays the rule associated with the selected recommendation.

**Figure 17: Rule Details panel**

<table>
<thead>
<tr>
<th>Command</th>
<th>Scroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisor Response</td>
<td>CSR_</td>
</tr>
</tbody>
</table>

**Rule Details**

**Rule Identifier:** BR3  
**Rule Version:** 5.3  
**DB2:** DHY2

**To control by individual buffer pool:** Click here

**Rule Description:**

A significant I/O rate, sequential access is medium, virtual pool residency time is less than 30 seconds, and the system hit ratio is less than 70%.

The action taken by this rule increases the size of the buffer pool by 10% (default), to a maximum of 125% (default) of the original buffer pool size. These default increment and maximum values can be overridden by modifying the SIZE_bpid_INC and SIZE_bpid_MAX values in the variable repository.

**Execution Mode:** Manual  
**Click here to set automatic mode.**

**Rule Ignored:** No  
**Click here to ignore this rule.**

**Times Triggered:** 1  
**Click here to reset this counter.**

From the Rule Details panel, perform one of the following actions:

- **If you want to apply the rule to individual buffer pools,** you can click next to the **To control by individual buffer pool** field. **Figure 18 on page 58** shows an example of the Apply rules by buffer pool panel.

- **If you feel comfortable letting Pool Advisor automatically issue the command that is associated with this rule whenever the rule is triggered,** you can change the execution mode to **Automatic** on this panel.

- **If you do not want a recommendation to be triggered when the condition that is associated with this rule exists,** you can choose to ignore the rule whenever the condition that is associated with the rule is detected.

- **To be notified whenever the condition exists,** leave the execution mode set to **Manual** and do not choose to ignore the rule.
Note
You can also use this panel to see how many times the rule has been triggered and how many times the command associated with the rule has been issued.

Figure 18: Apply rules by buffer pool panel

If Pool Advisor can issue a command to implement the recommendation you can click EXEC on the Pending action list to execute the command immediately.

For an example, see Figure 16 on page 56.

The OPERTUNE for DB2 component is used to issue commands to modify ZPARM values.

Note
If a command cannot be executed by Pool Advisor, the word EXEC is not underscored.
**Figure 19 on page 59** is an example of the Command Interface panel that is displayed when a command is executed.

**Figure 19: Command Interface panel**

```
DOMEADVO/I Advisor Response LINE 1 OF 33
Command ===> _______________________________________________ Scroll ===> CSR_
ADVISOR:PMDZCMD1 -- ------------------------------ -- 06/19/08 14:26:32
Command Interface
Command Text . . : OPT DHY2 IN(DHY2) SET BP49(+49) NORESET
Time Submitted . : 14:26:31
Time Completed . : 14:26:32
Command Response :

IN(DHY2) SET BP49(+49) NORESET
BMC31164I DDTL IN(DHY2@DDTL) SET BP49(+49) NORESET
BMC31164I DDTL DHY2 -ALTER BPOOL(BP49) VPSIZE(1649)
DSNB522I  *DHY2 VPSIZE FOR BP49 HAS BEEN SET TO 1649
```

The Command Interface panel displays the text of the command that was executed and any messages that were issued in response to the command. In addition, a message is issued to the SYSTSPRT DD of the DOMPROC whenever Pool Advisor issues a command.

**Acknowledgement of a recommendation**

At times, Pool Advisor detects a condition that triggers a rule, but the recommendation cannot be carried out because to do so would cause a limit to be breached.

For example, when the EDM pool efficiency drops below 70%, a rule is usually triggered to increase the size of the EDM pool. But if the EDM pool is already at the maximum size specified in the EDMSIZE_MAX parameter, that recommendation cannot be implemented.

In such cases, a WARNING will be issued to let you know that this condition exists, even though Pool Advisor cannot take an action to correct the condition. And an entry will be added to the Pending Action List. The entry will remain on the Pending Action List until you acknowledge it by clicking on ACKN (see Figure 20 on page [X]).
When you acknowledge the item, the status changes to *Done*. The item remains on the list until the next collection cycle.

**Figure 20: Pending Action List panel with acknowledgement pending**

<table>
<thead>
<tr>
<th>DB2 subsystem ID: DHY2</th>
<th>Storage Mode: BALANCE</th>
<th>Interval start: 2008-06-19-14.15.00</th>
<th>Current duration: 15 minutes</th>
<th>VS available: 22191 KB</th>
</tr>
</thead>
</table>

Status: Pending  Priority: M  Advsr: BPM  Recmd: INCREASE BP49 by 49 PGS
Action: RULE     ACKN         Mode: Manual

When a recommendation has been acknowledged, but the condition that caused the recommendation remains, the status of the corresponding advisor is changed to **NOTICE** until the condition is resolved, at which time the status returns to **NORMAL**.

**Changing the status of rules**

Pool Advisor keeps track of all rules for which the execution mode has been set to Automatic and all rules that are being ignored.

You can change these settings at any time from the Advisor Rules and Attributes panel and you can view the definition of a rule from the Rule Details panel.

**To change the status of rules**

1. Click on the ADVISOR button from any report.

**Figure 21: Background Advisor DB2 Selection List panel**

<table>
<thead>
<tr>
<th>PMDEROUT/I</th>
<th>Background Advisor DB2 Selection List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ====&gt;</td>
<td>_______________________________________________ Scroll ====&gt; CSR_</td>
</tr>
<tr>
<td>BMCSftwr.PMDROUT</td>
<td>-------------------------------------      06/19 14:34:38</td>
</tr>
</tbody>
</table>

The overall status of the background advisors for each monitored DB2 subsystem is shown below. Click on the value for "Current status" to display the individual advisors for that DB2 subsystem.

DB2 subsystem: DHB2 (8.1)  Current status: *ALERT*
DB2 subsystem: DHY1 (9.1)  Current status: NORMAL
DB2 subsystem: DHY2 (9.1)  Current status: *ALERT*
2 Click on the value for Current status.

**Figure 22: Advisor Selection List panel**

The current storage management mode is BALANCE.

Action items are recommended to the System Advisor by the individual component advisors. Click on the "Action List" hyperlink to view a list of recommended actions. The hyperlink flags are color coded to reflect the highest priority among the pending actions currently on the list: green = low, yellow = medium, red = high, blue = all actions executed.

**Action List**

Click here to change rule settings.

The current status of individual component advisors for the selected DB2 subsystem is shown below. Click on the value for "Current status" to display the expert advice for a specific component.

<table>
<thead>
<tr>
<th>Advisor:</th>
<th>Current status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUFFER POOL</td>
<td>WARNING</td>
</tr>
<tr>
<td>DYNA STMT CACHE</td>
<td>NORMAL</td>
</tr>
<tr>
<td>EDM POOL</td>
<td>NORMAL</td>
</tr>
<tr>
<td>RID POOL</td>
<td>WARNING</td>
</tr>
<tr>
<td>SORT POOL</td>
<td>NORMAL</td>
</tr>
<tr>
<td>VIRTUAL STORAGE</td>
<td>NORMAL</td>
</tr>
<tr>
<td>GROUP BUFFER POOL</td>
<td>ALERT</td>
</tr>
<tr>
<td>THREAD ENVIRONMENT</td>
<td>NORMAL</td>
</tr>
<tr>
<td>DDF ENVIRONMENT</td>
<td>NORMAL</td>
</tr>
<tr>
<td>LOG ENVIRONMENT</td>
<td>NORMAL</td>
</tr>
<tr>
<td>MAXIMUM DATA SETS</td>
<td>NORMAL</td>
</tr>
</tbody>
</table>
The Advisor Rules and Attributes panel lists all rules with their current settings. The first time this panel is displayed, the execution mode for all rules will be manual and none will be ignored (the default settings).

The following information is displayed at the top of the panel:

- Subsystem ID of the DB2 subsystem to which the rules apply
- Number of rules that apply to that DB2
- Last product version in which changes or additions to the rule set were made

The following information is listed for each rule:

- Rule ID
- Advisor to which the rule applies
- Last product version in which changes or additions to the rule were made
- Execution mode (Y = auto, N = manual)
- Ignore status (Y = rule is ignored, N = rule is not ignored)
- Acknowledgement status (Y = rule has been acknowledged, N = rule has not been acknowledged, P = acknowledgement pending)
- Description of the condition that triggers the rule

You can change the execution mode or ignore the status of an individual rule by clicking on the Aut or Ign value for that rule. These values toggle between Y and N each time you click on them.

You can change the status of all rules simultaneously in the following ways:

- Click AUTOMATIC to change the execution mode of all rules to Automatic. In Automatic mode, the commands associated with the rules are executed whenever a recommendation is triggered. No intervention is necessary.

- Click MANUAL to change the execution mode of all rules to Manual. In Manual mode, no commands are executed automatically. You must execute the command from the Pending Action List (see Pending Action List on page 55) when a warning or alert is issued.

- Click IGNORE if you want to ignore all rules. No warnings or alerts are displayed and no actions is taken.

- Click REINSTATE to reinstate all ignored rules. Warnings and alerts are displayed in the normal manner.
Example of an alert
Pool Advisor reports

This section describes the Pool Advisor reports.

Pool Advisor report set

Pool Advisor comes with a compact, but comprehensive, set of reports that lets you monitor all storage resources from one central report. You can quickly hyperlink from that report to reports about specific storage pools if an anomalous value is highlighted.

The Pool Advisor report set consists of one primary report and one or more history reports for each of the following storage resources:

- Overall status monitor
- Total DBM1 virtual storage
- Buffer pools
- Dynamic statement cache
- EDM pool
- RID pool
- Sort pool
- Group buffer pool

The primary reports display key values about storage use in real time for the corresponding topic. Some history reports display similar data from previous intervals and others display a daily history.

There are also reports to examine all page sets in a selected buffer pool and all objects in a selected page set.
An additional report lists all of the commands issued on behalf of advisor recommendations, including details about the recommendation, the rule that triggered it, and the command response.

The color of the values on reports alerts you to any potential problems. A yellow value indicates a potential problem that needs investigation. A red value indicates a serious problem that requires immediate attention.

Figure 24 on page 66 shows the Pool Advisor report set, including all history reports.

**Figure 24: Pool Advisor report set**

### Hyperlinks

Navigation through Pool Advisor reports and advisors resembles navigation in a Web browser.
Text and values that are hyperlinks are underscored (see underscored fields in DB2 Pools Status Monitor report in DB2 Pools Status Monitor on page 68). If your mouse button can be programmed to the function of the Enter key, you can navigate by clicking on hyperlinks. Otherwise, you need only move the cursor to a hyperlink and press Enter.

**Action codes**

Action codes are also used to navigate from reports to other reports and advisors.

Action codes are listed in the report header (see highlighted portion of DB2 Pools Status Monitor report in DB2 Pools Status Monitor on page 68). To use an action code, type the code over the plus sign (+) on the left margin of the report, and press Enter. The following action codes are common to all primary reports:

- **A**—takes you to the expert advice for problem analysis
- **H**—takes you to a historical report displaying recent intervals

Figure 25 on page 67 illustrates navigation through the Pool Advisor report set by using hyperlinks (field names) and action codes (in circles).

**Figure 25: Navigating the Pool Advisor reports**

---

**Interval**

Pool Advisor data is collected every minute and accumulates over a 15-minute interval. At the end of 15 minutes, the data for the first five minutes is dropped and
the new interval contains data from the previous 10 minutes. Data is added each minute for the next five minutes until the interval again represents data for a 15-minute period. Then the data for the oldest five minutes is dropped again.

The first interval begins when the Data Collector is started or when a DB2 subsystem is subsequently started. The cycle continues to repeat until the DB2 subsystem is cycled or the Data Collector is stopped.

Figure 26: Pool Advisor intervals

Viewing Pool Advisor reports

You can access and view Pool Advisor reports.

To view Pool Advisor reports

1. From the Pool Advisor Main Menu, select option P.

   For an example of the main menu, see Figure 8 on page 40.

DB2 Pools Status Monitor

The DB2 Pools Status Monitor report is the starting point for Pool Advisor reporting.
A row of data is displayed for each active DB2 in the sysplex. By displaying this report, you can tell immediately if problems exist in any storage resource across all DB2s.

An overall **Health** rating is displayed for each DB2 and an efficiency rating is displayed for each type of storage pool in each DB2. The color of the value alerts you to any potential problems. A yellow value, or the word **Fair**, indicates a problem that needs attention. A red value, or the word **Poor**, indicates a serious problem that requires immediate attention.

Use the **C** action code if you want the Configuration Advisor to analyze the current configuration of your buffer pools, identify incompatibilities, and recommend changes that will make your buffer pools operate more efficiently.

Use the **L** action code if you want to displays a list of commands that have been issued to DB2 as a result of recommendations from the system advisor. For more information, see **Command Log on page 85**.

The DB2 Pools Status Monitor report is the gateway (via hyperlinks) to all other Pool Advisor reports.

<table>
<thead>
<tr>
<th>Field</th>
<th>Hyperlinks to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2</td>
<td>Expert Advice for the DB2 Pools Status Monitor report</td>
</tr>
<tr>
<td>Region</td>
<td>Virtual Storage Status Monitor report</td>
</tr>
<tr>
<td>BP Efficiency</td>
<td>Buffer Pools Status Monitor report</td>
</tr>
<tr>
<td>DSC Efficiency</td>
<td>Dynamic Statement Cache report</td>
</tr>
<tr>
<td>EDM Efficiency</td>
<td>EDM Pool Status Monitor report</td>
</tr>
<tr>
<td>RID Efficiency</td>
<td>RID Pool Status Monitor report</td>
</tr>
</tbody>
</table>
Virtual Storage Status Monitor

The Virtual Storage Status Monitor reports provide information about virtual storage constraint in DB2.

With the introduction of 64-bit address spaces in current DB2 versions, virtual storage constraint has become less likely. Since all virtual buffer pools are allocated in storage above the 2-GB bar in current DB2 versions, the system advisor needs to pay special attention to the overall system and DBM1 address space paging rates and evaluate the effect of an increase in the size of the buffer pools on the operating system’s paging subsystem and, to a lesser extent, storage resources.
Figure 28 on page 71 is an example of the Virtual Storage Status Monitor report.

**Figure 28: Virtual Storage Status Monitor report (PMDSTRG1)**

<table>
<thead>
<tr>
<th>Command</th>
<th>Pool Advisor Report Viewer</th>
<th>Scroll =&gt; CSR_</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCSftwr.PMDSTRG1</td>
<td>-- VIRTUAL STORAGE STATUS MONITOR -- 06/19 14:42:24</td>
<td></td>
</tr>
<tr>
<td>Actions: (+) A - ADVICE H - History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2: DHY2 9.1</td>
<td>Start time: 2008-06-17-12.20.06 Status: ACTIVE</td>
<td></td>
</tr>
<tr>
<td>Current data interval start: 2008-06-19-14.25.01 Duration: 00:14:48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BM1 virt storage allocation summary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pages/sec to MVS page data sets</td>
<td>35</td>
<td>Pages/sec steal rate</td>
</tr>
<tr>
<td>Maximum virtual storage below 2GB</td>
<td>1651.98 MB (system limit)</td>
<td></td>
</tr>
<tr>
<td>Total allocated below 2GB</td>
<td>135.53 MB</td>
<td></td>
</tr>
<tr>
<td>Reserved for MVS functions</td>
<td>0.04 MB</td>
<td></td>
</tr>
<tr>
<td>Reserved for critical work</td>
<td>25.06 MB</td>
<td></td>
</tr>
<tr>
<td>Additional reserved</td>
<td>25.06 MB</td>
<td></td>
</tr>
<tr>
<td>Virt storage available below 2GB</td>
<td>1466.29 MB</td>
<td></td>
</tr>
<tr>
<td>Warning cushion for strg contract</td>
<td>82.30 MB</td>
<td></td>
</tr>
<tr>
<td>Total virt storage alloc above 2GB</td>
<td>5441.00 MB</td>
<td></td>
</tr>
<tr>
<td>Virtual storage allocation details: (ABOVE 2GB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total virtual storage allocated</td>
<td>5441.00 MB</td>
<td></td>
</tr>
<tr>
<td>Combined buffer pools</td>
<td>279.37 MB</td>
<td></td>
</tr>
<tr>
<td>Dynamic statement cache</td>
<td>9.77 MB</td>
<td></td>
</tr>
<tr>
<td>DBD pool</td>
<td>4.88 MB</td>
<td></td>
</tr>
<tr>
<td>RID pool (RID lists)</td>
<td>0.14 MB</td>
<td></td>
</tr>
<tr>
<td>Compression dictionaries</td>
<td>0.00 MB</td>
<td></td>
</tr>
<tr>
<td>Internal trace table</td>
<td>0.00 MB</td>
<td></td>
</tr>
<tr>
<td>Castout buffers</td>
<td>0.88 MB</td>
<td></td>
</tr>
<tr>
<td>Virtual pool control blocks</td>
<td>8.13 MB</td>
<td></td>
</tr>
<tr>
<td>Total attributed storage</td>
<td>292.74 MB</td>
<td></td>
</tr>
<tr>
<td>Unattributed storage above 2GB</td>
<td>5148.26 MB</td>
<td></td>
</tr>
<tr>
<td>Virtual storage allocation details: (BELOW 2GB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total virtual storage allocated</td>
<td>135.53 MB</td>
<td></td>
</tr>
<tr>
<td>EDM pool</td>
<td>4.88 MB</td>
<td></td>
</tr>
<tr>
<td>RID pool (RID maps)</td>
<td>0.05 MB</td>
<td></td>
</tr>
<tr>
<td>RDS operations storage</td>
<td>0.00 MB</td>
<td></td>
</tr>
<tr>
<td>Total agent local</td>
<td>39.27 MB</td>
<td></td>
</tr>
<tr>
<td>Total agent system</td>
<td>15.54 MB</td>
<td></td>
</tr>
<tr>
<td>Local statement cache cntl blks</td>
<td>0.99 MB</td>
<td></td>
</tr>
<tr>
<td>Local thread statement cache</td>
<td>1.32 MB</td>
<td></td>
</tr>
<tr>
<td>Pipe manager</td>
<td>0.00 MB</td>
<td></td>
</tr>
<tr>
<td>Total stack</td>
<td>11.89 MB</td>
<td></td>
</tr>
<tr>
<td>Storage allocated by MVS</td>
<td>11.66 MB</td>
<td></td>
</tr>
<tr>
<td>Total attributed storage</td>
<td>85.60 MB</td>
<td></td>
</tr>
<tr>
<td>Unattributed storage</td>
<td>49.93 MB</td>
<td></td>
</tr>
</tbody>
</table>
**Buffer Pool reports**

Pool Advisor provides the following reports to display buffer pool data:

- Buffer Pools Status Monitor on page 72
- Buffer Pool Page Sets reports on page 73
- Buffer Pool Page Set Objects report on page 75

**Buffer Pools Status Monitor**

The Buffer Pools Status Monitor report, shown below, presents a concise assessment of buffer pool performance for the selected DB2 subsystem.

In one row of statistics per pool, you can quickly see most of the relevant data that indicates if performance is good, bad, or somewhere in between.

**Figure 29: Buffer Pools Status Monitor report (PMDBPM2)**

Use the S action code to expand the Buffer Pools Status Monitor report to include additional statistics for each buffer pool.

**Figure 30 on page 72** is an example of an expanded report.

**Figure 30: Expanded Buffer Pools Status Monitor report**
The expanded area presents data in an easier-to-read format. Some of the statistics are the same as those in the main part of the report. The data in the expanded area is grouped by related functions.

From the Buffer Pools Status Monitor report, you can select a buffer pool and hyperlink to one of the Buffer Pools Page Sets reports. See Buffer Pool Page Sets reports on page 73.

**Buffer Pool Page Sets reports**

The Buffer Pool Active Page Sets report, shown below, provides detailed statistics about the active page sets in the selected buffer pool.

**Figure 31: Buffer Pool Active Page Sets report (PMDBPPS)**

| DBname | PSname | PT | Obj parts | sec | pool | seq | RIO/s | GPHt | GPHt | GPHt | dlyd | dlyd | dlyd | IO/s | RWI | Typ | Pri | Seq | Act | Upd | Siz |
|--------|--------|----|-----------|-----|------|-----|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| PMDDB4K | TSPG1 | T   1  | 1     | 26  | 57   | 0   | 0   | 100% | N/P | 0%   | 0%   | 0%   | 0%   | 0%   | 0%  | N   | TBL MED LOW LOW LOW MED |
| PMDDB4K | IXPG1 | I   1  | 1     | 8   | 18   | 0   | 2   | 80%  | N/P | 80%  | 20%  | 0%   | 20%  | 0%   | 0%  | N   | IDX MED LOW LOW LOW SML |
| PMDDB4K | IXPG2 | I   1  | 1     | 4   | 9    | 0   | 95% | N/P  | 95% | 5%   | 5%   | 5%   | 5%   | 5%   | 5%  | N   | IDX MED LOW LOW LOW SML |
| PMDDB4K | TSPG1 | T   1  | 1     | 4   | 9    | 0   | 73% | N/P  | 7%  | 93%  | 0%   | 93%  | 0%   | 93%  | 0%  | N   | TBL MED LOW LOW LOW SML |
| PMDDB4K | IXPG2 | I   1  | 1     | 4   | 9    | 0   | 73% | N/P  | 7%  | 93%  | 0%   | 93%  | 0%   | 93%  | 0%  | N   | TBL MED LOW LOW LOW SML |
| PMDDB4K | TSPG1 | T   1  | 1     | 4   | 9    | 0   | 73% | N/P  | 7%  | 93%  | 0%   | 93%  | 0%   | 93%  | 0%  | N   | TBL MED LOW LOW LOW SML |
| PMDDB4K | IXPG2 | I   1  | 1     | 4   | 9    | 0   | 73% | N/P  | 7%  | 93%  | 0%   | 93%  | 0%   | 93%  | 0%  | N   | TBL MED LOW LOW LOW SML |
| PMDDB4K | IXPG2 | I   1  | 1     | 4   | 9    | 0   | 73% | N/P  | 7%  | 93%  | 0%   | 93%  | 0%   | 93%  | 0%  | N   | TBL MED LOW LOW LOW SML |
| PMDDB4K | IXPG2 | I   1  | 1     | 4   | 9    | 0   | 73% | N/P  | 7%  | 93%  | 0%   | 93%  | 0%   | 93%  | 0%  | N   | TBL MED LOW LOW LOW SML |

The Figure 32 on page 73 provides detailed statistics about all page sets in the selected buffer pool.

**Figure 32: Buffer Pool All Page Sets report (PMDBPPSA)**

The expanded area presents data in an easier-to-read format. Some of the statistics are the same as those in the main part of the report. The data in the expanded area is grouped by related functions.

From the Buffer Pools Status Monitor report, you can select a buffer pool and hyperlink to one of the Buffer Pools Page Sets reports. See Buffer Pool Page Sets reports on page 73.
The buffer pool performance profile values are displayed above the characteristics for each page set so you can compare the values and easily identify the page sets that should be moved to a buffer pool with more compatible characteristics.

From the Buffer Pool Page Sets reports, you can select a page set and hyperlink to the Buffer Pool Page Set Objects report. See Buffer Pool Page Set Objects report on page 75.

### Enabling and disabling detail page set profile data collection

Pool Advisor now collects basic page set I/O statistics by default. Pool Advisor can operate the runtime dynamic advisors without collecting more detailed getpage data, removing the overhead that collection of detailed collection statistics requires.

The command for enabling or disabling detail page set profile data collection is as follows:

```
PMDSPRF SSID,{ON | OFF}
```

*SSID* is the ID of the DB2 subsystem whose data collection you want to enable or disable.

---

**Note**

The default setting for PMDSPRF is OFF.

The PMDSPRF command incurs some overhead. Use caution if large numbers of tables and indexes are associated with a DB2 subsystem. The overhead increases as the number of objects in the catalog increases. If you turn collection on and off repeatedly, you might need to enlarge the PMDHIST data set in order to accommodate all of the resulting data sets.

---

### To enable or disable basic page set I/O statistics data

1. Click the **CONFIG** button on any Pool Advisor report to display the Configuration Menu.

   **Figure 33: Configuration Menu (PMDECNFG/I)**

   Select one of the following options. Then press Enter.
   - 1. View and edit product variables
   - 2. Refresh object names from DB2 catalog
   - 3. Reset initialization parameters to default values

---
2. Select option 2 to display the Data Collector Command Interface panel (Figure 34 on page 75).

**Figure 34: Data Collector Command Interface panel (DOMECMP1/P)**

DOMECMP1/P | Data Collector Command Interface | Command ===> | Scroll ===> CSR_
---|---|---|---

Substitute the appropriate values for any variables (enclosed by <> symbols) in the command text below. Press Enter with no updates to issue the command.

**NOTE:** Commands submitted through this interface are only executed on the local MVS system. Commands intended for remote DB2 subsystems must be submitted on the remote MVS system.

A Command text (Line editing action codes: I Insert D Delete R Repeat)

```
PMDSRPFRF DIT1,ON
```

3. In the Command text field, enter the PMDSPRF command and press Enter twice.

The Command Interface panel displays a message indicating the command’s outcome.

**Figure 35: Command Interface output panel (DOMECMDIO/I) with sample messages**

DOMECMDIO/I | Command Interface | Line 1 of 10
---|---|---

BMC24237 Press Enter to reissue the last command

BMC23544 PMD - Pageset profiling ENABLED for DB2 DIT1

BMC24237 Press Enter to reissue the last command

BMC23544 PMD - Pageset profiling DISABLED for DB2 DIT1

4. Press F3 to return to the Configuration Menu.

**Buffer Pool Page Set Objects report**

The Buffer Pool Page Set Objects report, shown below, provides detailed statistics about all of the objects in the selected page set.

**Figure 36: Buffer Pool Page Set Objects report (PMDBPOBJ)**

<table>
<thead>
<tr>
<th>Object name</th>
<th>Type</th>
<th>Seq</th>
<th>Act</th>
<th>Upd</th>
<th>GPhgs/s</th>
<th>$Seq</th>
<th>Rand Sync</th>
<th>VPhr RIO/s</th>
<th>Rate WID/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ TBCASE3</td>
<td>T</td>
<td>LOW</td>
<td>LOW</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>+ TBCASE3_REF</td>
<td>T</td>
<td>LOW</td>
<td>LOW</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>+ TBCASE4</td>
<td>T</td>
<td>LOW</td>
<td>LOW</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>+ TBCASE4_REF_LONG_NAME_TEST_L&gt;&gt;</td>
<td>T</td>
<td>LOW</td>
<td>LOW</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Displaying long names

If an object name is longer than the space provided on the report, the last two character spaces will contain the greater-than symbol (>).

See the example in Buffer Pool Page Set Objects report on page 75.

Figure 37: Long name display

<table>
<thead>
<tr>
<th>OBJECT NAME</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q0850BNM:</td>
<td>TBCASE4_REF_LONG_NAME_TEST_LONG_NAME_TEST</td>
</tr>
</tbody>
</table>

To display long names

1. Move the cursor to the truncated value and press F6.
   The long name is displayed, as in Figure 37 on page 76.

2. Press F3 (End) to return to the report.

Refreshing object names

When the Data Collector is initialized, the names of all tables and indexes are retrieved from the DB2 catalog.

If the Data Collector has been active for a long time and new objects have been created since Data Collector initialization, Pool Advisor will report the new objects, but will not be able to determine their names. When an object name cannot be resolved, a question mark (?) is displayed in the Object name field on object reports.

You can use an option on the Pool Advisor Configuration Menu to issue a command that will refresh the names of all objects that have been created since Data Collector startup.
To refresh object names

1 Click the CONFIG button on any Pool Advisor report to display the Configuration Menu.

**Figure 38: Configuration Menu**

<table>
<thead>
<tr>
<th>PMDECNFG/I</th>
<th>Configuration Menu</th>
<th>14:02:52</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ====&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following options. Then press Enter.

- 1. View and edit product variables
- 2. Refresh object names from DB2 catalog
- 3. Reset initialization parameters to default values

2 Select option 2.

**Figure 39: Data Collector Command Interface panel**

<table>
<thead>
<tr>
<th>DOMECMPI/P</th>
<th>Data Collector Command Interface</th>
<th>LINE 1 OF 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ====&gt;</td>
<td></td>
<td>Scroll ===&gt; CSR_</td>
</tr>
</tbody>
</table>

Substitute the appropriate values for any variables (enclosed by <> symbols) in the command text below. Press Enter with no updates to issue the command.

**NOTE:** Commands submitted through this interface are only executed on the local MVS system. Commands intended for remote DB2 subsystems must be submitted on the remote MVS system.

The OBSCAN command is displayed in the Command text field. Substitute the subsystem ID of the DB2 subsystem for which objects are to be refreshed for `<DB2ID>` in the command text (OBSCAN DB2A, for example).

3 Press Enter twice. The command is issued and the Command Interface output panel is displayed with a message indicating the outcome of the command.

**Figure 40: Command Interface output panel**

<table>
<thead>
<tr>
<th>DOMECMD0/I</th>
<th>Command Interface</th>
<th>LINE 1 OF 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ====&gt;</td>
<td></td>
<td>Scroll ===&gt; CSR_</td>
</tr>
</tbody>
</table>

BMC24237 Press Enter to reissue the last command

BMC23511 PMDQ Object ID scan for DB2 DHY2 completed, RC=00

4 Exit back to the Figure 33 on page 74.
**Note**

Issuing the OBSCAN command incurs some overhead. Use caution if there are large numbers of tables and indexes associated with a DB2 subsystem. The overhead increases as the number of objects in the catalog increases.

---

### Dynamic Statement Cache

The Dynamic Statement Cache report, shown below, provides statistics about using the dynamic SQL statement PREPARE cache on the selected DB2 subsystem.

**Figure 41: Dynamic Statement Cache report (PMDDSC1)**

```
PMDEQRPN/I       Pool Advisor Report Viewer       LINE 1 OF 30
Command ===> ___________________________________________ Scroll ===> CSR_
            More:                                 +
BMCSftwr.PMDDSC1 -- DYNAMIC STATEMENT CACHE -- 06/19 15:08:01
--<  HELP >----------------< *ALERT* >---------------------< CONFIG >---
Actions: ( + ) A - ADVICE
+  DB2: DHY2 9.1
Current interval statistics  Start: 2008-06-19-14.55.01  Duration: 00:13:01
Dynamic stmt caching   :  ENABLED      Prepare cache efficiency   :     11 %
Dynamic stmt cache size: 10000.00 KB
Storage used by DSC    :  9416.00 KB

Prepare cache requests :    14752      Standard DSC hit ratio     :   8 %
Prepare cache inserts  :    13615      Repeat statements hit ratio:  11 %

Prepare times (in seconds)               Count      CPU Time  Elapsed Time
------------------------------------  --------  ------------  ------------
Cache hit/short PREPARE- repeat stmt      1135  00:00:00.068  00:00:00.151
Cache miss/long PREPARE- repeat stmt      9365  00:00:32.415  00:00:32.415
Cache miss/long PREPARE- new stmt         4252  00:00:15.853  00:00:15.853
Cache miss/long PREPARE- unknown             0  00:00:00.000  00:00:00.000

Costs (in seconds)                       Count      CPU Time  Elapsed Time
--------------------------------      --------  ------------  ------------
Actual cost of all PREPAREs              14752  00:00:48.336  00:00:48.420
Approximate savings from caching         1135  00:00:03.955  00:00:03.872
Potential additional savings             9365  00:00:31.854  00:00:31.166

Unique repeat statements that miss...
  at least once    :      183         at least 100 times :        0
  at least 10 times:        8         at least 1000 times:        0
```

Pool Advisor measures CPU usage and elapsed time used for each SQL statement PREPARE and shows you how many statements were misses but could have been hits if the pool had been larger. This allows you to determine if you can improve performance by increasing the size of the buffer.

The Dynamic Statement Cache report also shows you the cost, savings, and potential savings involved with dynamic statement caching.
EDM Pool Status Monitor

The EDM Pool Status Monitor report provides a summary of EDM pool activity for the selected DB2 subsystem.

The goal of Pool Advisor is to make the EDM pool big enough to contain all frequently used objects in addition to the largest infrequently referenced objects without the need for I/O.

If the EDM pool is sized correctly, there should be

- Fewer SQL statement failures
- More concurrently active threads
- Better overall system performance
- Fewer wasted resources due to over allocation
- Fewer unnecessary delays resulting from physical I/Os to load objects from disk

Pool Advisor accomplishes this by constantly monitoring use of the EDM pool and making recommendations for size changes when increases in activity necessitate, thereby keeping the pool operating at optimum levels. If the OPERTUNE for DB2 is also installed, you can increase the size of the EDM pool dynamically.

**Figure 42: EDM Pool Status Monitor report (PMDEDMP1)**

<table>
<thead>
<tr>
<th>Pool Name</th>
<th>Efficiency</th>
<th>Size (pages)</th>
<th>Full Failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDM</td>
<td>100%</td>
<td>1250</td>
<td>0</td>
</tr>
<tr>
<td>DBD</td>
<td>99%</td>
<td>1250</td>
<td>0</td>
</tr>
<tr>
<td>SKELETON</td>
<td>100%</td>
<td>1280</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Pages Allocated</th>
<th>Number Requests</th>
<th>Number Loads</th>
<th>Hit Ratio</th>
<th>Request Per Min</th>
<th>Loads Per Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBD</td>
<td>374</td>
<td>88821</td>
<td>1005</td>
<td>99%</td>
<td>5940</td>
<td>67</td>
</tr>
<tr>
<td>CT</td>
<td>14</td>
<td>93</td>
<td>0</td>
<td>100%</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>PT</td>
<td>15</td>
<td>14187</td>
<td>0</td>
<td>100%</td>
<td>949</td>
<td>0</td>
</tr>
<tr>
<td>SKCT</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKPT</td>
<td>134</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
RID Pool Status Monitor

The RID Pool Status Monitor report, shown below, provides detailed statistics of RID pool activity for the selected DB2 subsystem.

**Figure 43: RID Pool Status Monitor report (PMDRIDP1)**

<table>
<thead>
<tr>
<th>PMDROIDP1</th>
<th>Pool Advisor Report Viewer</th>
<th>LINE 1 OF 11 Command ====&gt; _______________________________________________ Scroll ===&gt; CSR_</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCSftwr.PMDRIDP1</td>
<td>--</td>
<td>RID POOL STATUS MONITOR -- 06/19 15:14:24</td>
</tr>
<tr>
<td>---&lt; HELP &gt;----------------&lt; <em>ALERT</em> &gt;----------------------&lt; CONFIG &gt;---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actions: ( + ) A - ADVICE H - History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2: DHY2 9.1 Interval start: 2008-06-19-15.00.01 Duration: 00:14:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RID Pool Size (Blks) Eff HWM (Blks) Use Fail Aborts - Aborts -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-- ----------- ---------- --------- -------- ---------- ----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ 89% 4 42 95 12 12 35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sort Pool Status Monitor

The Sort Pool Status Monitor report, displayed below, provides statistics of sort pool activity for the selected DB2 subsystem.

**Figure 44: Sort Pool Status Monitor report (PMDSRTP1)**

<table>
<thead>
<tr>
<th>PMDSRTP1</th>
<th>Pool Advisor Report Viewer</th>
<th>LINE 1 OF 21 Command ====&gt; _______________________________________________ Scroll ===&gt; CSR_</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMCSftwr.PMDSRTP1</td>
<td>--</td>
<td>SORT POOL STATUS MONITOR -- 06/19 15:18:54</td>
</tr>
<tr>
<td>---&lt; HELP &gt;----------------&lt; <em>ALERT</em> &gt;----------------------&lt; CONFIG &gt;---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actions: ( + ) A - ADVICE H - History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2: DHY2 9.1 Interval start: 2008-06-19-15.05.01 Duration: 00:13:54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ Sort pool merge/pass efficiency 94%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sort work file database name DHY2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum sort pool size (per thread) 260 K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sort merge passes 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of workfiles requested for merge passes 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of workfiles requested per merge pass 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of inefficient sort merge passes 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of workfiles denied for merge passes 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of workfiles denied per merge pass N/P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number of workfiles concurrently allocated 115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of times the work buffer pool did not have enough buffers to support the allocated workfiles at runtime 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Because there is no way to determine the number of successful sorts performed by DB2 from DB2 statistics, sort performance is primarily restricted to analysis of sorts that spill over to work-file processing. The sort pool size is a limit of the amount of private DBM1 storage that each thread can allocate to perform an internal quick sort. These are the most efficient sorts, and it is preferable that the majority of minor query sorting be performed in this manner. Unfortunately, it is difficult to determine
the ideal size. A very large limit can threaten DBM1 stability, because a sudden spike in concurrent large sort requests could cause a virtual storage shortage and a subsequent crash. The only way to approximate sort pool performance without running performance traces is to monitor the number of sorts that are overflowing to work file merge-pass processing. If an increase in the size of the sort pool significantly decreases the number of merge-pass runs, the increase is worthwhile. But you need to consider the impact of the potential maximum concurrent requests, and keep the size of the sort pool small enough to contain it.

Although sorts that execute within the sort pool are the most efficient, large sorts that spill over to work files can be very efficient if the work buffer pool is large enough to support the number of work files requested without significant I/O. Because work file processing is highly sequential, DB2 calculates the number of work files allowed by dividing the number of prefetch pages (pool size multiplied by the sequential steal threshold) by 16. As work files are used by concurrent processes, DB2 reduces the number that are available by subtracting double the number that are used (in an effort to prevent sort failures due to insufficient buffers).

The primary tuning opportunity for large spillover sorts is to define the work buffer pool with a high (100%) sequential steal limit and enough pages to handle the maximum concurrent work file demand without significant I/O. Similarly, you can set the write thresholds very high in an attempt to avoid ever writing data to DASD. However, if you have sorts that are so large that they cannot be contained in the work buffer pool, it is better to set the write thresholds low enough to optimize write engine efficiency with a steady flow of write I/O operations. Clearly, the data on this report must be interpreted in conjunction with the associated work buffer pool.

**Group Buffer Pool Status Monitor**

The Group Buffer Pool Status Monitor report, shown below, provides a high-level overview of the status of the group buffer pools associated with the selected DB2 subsystem.

**Figure 45: Group Buffer Pool Status report (PMDGBPS)**

Data sharing can greatly enhance the performance, flexibility, and availability of any high volume data management and processing system. However, whenever data is...
shared, data integrity is extremely important and must be assured at all times. DB2 uses group buffer pools and special locking mechanisms to ensure data integrity when data is shared by different DB2 subsystems.

The Group Buffer Pool Status Monitor report provides information about the operational status and configuration of the DB2 group buffer pools being used and shared by different members of a data sharing group in a parallel sysplex environment.

Use the S action code to display the Group Buffer Pool Details report (see Figure 46 on page 82), which shows statistics associated with the group buffer pool.

**Figure 46: Group Buffer Pool Details report (PMDGBPT)**

```
PMDEORPN/I               Pool Advisor Report Viewer               LINE 1 OF 26
Command =====> _______________________________________________ Scroll ===> CSR_#
BMCSfwr.PMDGBPT -- GROUP BUFFER POOL DETAILS -- 06/19 15:42:52
---< HELP >-------------------< *ALERT* >----------------------< CONFIG >---
Actions: ( + ) S - Efficiency Calculation Details  D - GBP Details

DS GROUP: DSNDHY                 INTERVAL BEGIN:  15:31:01
GBPOOL  : GBP25                  DURATION      :  00:11:52
GBPOOL SIZE:      512 PAGES   GBPCACHE: Y
DIR ENTRIES:      816         IN USE  :       55
DATA PAGES :      163         IN USE  :       17    CHANGED:       17
PAGE READ REQS    :    21.01 /SEC    FAILURES:     0.00 % (IN DIR CREATE)
PG RD HIRATIO : 0.25 % READ/WRT: 0.00
PAGE WRITES : 19.11 /SEC FAILURES: 0.00 %
PAGE WRT RE-UPDTS : 0.52 /SEC RATIO : 0.03 %
DIR RECLAIMS W/XI : 0.89 /SEC
DIR RECLAIMS-TOTAL: 0.97 /SEC MIN DIR RESIDENCY : 844 SECONDS
DATA PG RECLAIMS : 18.13 /SEC MIN PAGE RESIDENCY: 9 SECONDS
CASTOUT PAGE RATE : 0.01 /SEC
CLASS CASTOUTS : 0 CLASS CASTOUT THR : 10 %
GROUP CASTOUTS : 1 GROUP CASTOUT THR : 10 %
CHECKPOINTS : 10 CHKPPOINT INTERVAL : 1 MINUTES

DB2   EFF  XIREADS  NFREADS  PGWRTS WRFAILS TRDHR XRDHR RD/WRT  C/OS CKPTS
---- ----- -------  -------  ------ ------- ----- ----- ------  ---- -----+
+ DHY1 26 % 30 24 106 0 17 30 0.08 1 9
+ DHY2 32 % 5 27 25 0 13 60 0.15 0 1
```

The statistics reported relate to the entire group buffer pool. The values will be identical, regardless of the DB2 subsystem selected from the Figure 29 on page 72.

Statistics for each DB2 subsystem in the data sharing group are listed at the bottom of the report. Use the S action code to expand the report (see Figure 47 on page 83) to show EFFICIENCY CALCULATIONS more detailed statistics for each DB2 subsystem.
History reports

There are two types of Pool Advisor history reports--Recent Trends and Daily History.

Recent Trends reports

The Pool Advisor Recent Trends history reports contain data from recent intervals (up to 48 hours) so you can compare values over recent time.

There is one line of statistics for each interval.

Figure 48 on page 83 is an example of the Buffer Pools Recent Trends history report.

Figure 48: Buffer Pools Recent Trends (PMDBPM2H)

The following intervals are reported:

| Interval | Eff | VPsize sets | Res | Gps | PgRds | Advr | Appl | Sys | Sys | Gps | SgPs | RgPs | XISync | WIO | Pgs | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec | /Sec |

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- CURRENT—the same interval that was selected from the primary report
- 15 MIN AGO—the previous 15-minute period that began and ended on a 15-minute boundary (00, 15, 30, 45)
- 30 MIN AGO—the 15-minute period prior to the one displayed above
- 45 MIN AGO—the 15-minute period prior to the one displayed above
- 1 HR AGO—the most recent one-hour period that began on an hour boundary (00:00, 01:00, 02:00, and so on)
- 2 HRS AGO—the one-hour period prior to the one displayed above
- TODAY—an accumulation of the current 24-hour period that started at midnight (or when the Data Collector was started subsequent to midnight)
- YESTERDAY—an accumulation of the 24-hour period prior to TODAY

Use the I action code to expand any interval on the report to include the interval start time and duration.

---

**Note**

From the Buffer Pools Recent Trends report, you can hyperlink to the BP Active Page Sets/History report to see statistics about all page sets that were active during the selected interval, and then hyperlink to the BP Page Set Objects/History report to see details of all objects in the selected page set.

The Recent Trends reports provide access to the Daily History reports. Type H over the asterisk (*) to the left of the DB2 subsystem ID, and press **Enter**. The corresponding Daily History report is displayed.

**Daily History reports**

The Pool Advisor Daily History reports provide a summary of all data in the trace data set, divided into 24-hour intervals.

There is one line of data for each interval.

**Figure 49 on page 84** is an example of the Buffer Pools Daily History report.
The reports are sorted by interval with the interval for the current day listed first.

**Note**

From the Buffer Pools Daily History report, you can hyperlink to the BP Active Page Sets--Long History report to see statistics about all page sets that were active during the selected interval, and then hyperlink to the BP Page Set Objects--Long History report to see details of all objects in the selected page set.

There are no Daily History reports for the Dynamic Statement Cache reports.

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### Command Log

The Command Log displays a list of commands that have been issued to DB2 as a result of recommendations from the system advisor.

To display the Command Log use the L action code against a DB2 subsystem.

**Figure 50: Command Log report (PMDCMLOG)**

Use the S (Details) action code to expand the report to show details of the rule that triggered the recommendation. Use the R action code to see the command response.
Figure 51 on page 86 is an example of the Command Log report expanded to show details and command responses for all commands.

Figure 51: Expanded Command Log report (PMDCMLOG)

PMDEQRPW/I Pool Advisor Report Viewer
Command ------- Scroll ---> HALF
More: +>

PMDFtwr:PMDCMLOG -- COMMAND LOG -- 06/19 15:56:49
<-- HELP >-----------------------< ALERT* >----------------------< CONFIG >---
Actions: (+) S - Details  R - Response
DB2: DMY2  Rel: 9.1  DSGroup: DSNDMY  DSMember: DMY2
Date-hour  Command issued
--------------------------  ------------------------------------------------
+ 2008-06-19-15.55.09.895289   DB2 DMY2 -ALTER BUFFERPOOL(BP16K0) VPSIZE(497)
  Trigger rule:  BR8  Change amount:  1152  Recommendation:  DECREASE
  Rule Description:  Buffer pool size greater than MAX
  ----------------------------------------------------------------------------
+ 2008-06-19-15.55.09.561965   DB2 DMY2 -ALTER BUFFERPOOL(BP16K0) VPSEQT(10)
  Trigger rule:  TS2  Change amount:  10  Recommendation:  SET
  Rule Description:  VPSEQ threshold set too high
  -----------------------------------------------------------------------------------
+ 2008-06-19-15.55.09.374410   DB2 DMY2 -ALTER BUFFERPOOL(BP16K0) VPSIZE(573)
  Return code:  0000
  Response:  DSNB522I  *DMY2 VPSIZE FOR BP16K0 HAS BEEN SET TO 573
  DSN9022  *DMY2 DSNB1CMD '-ALTER BUFFERPOOL'
  -----------------------------------------------------------------------------------
+ 2008-06-19-15.55.09.189666   DB2 DMY2 -ALTER BUFFERPOOL(BP16K0) VPSEQT(10)
  Return code:  0000
  Response:  DSNB524I  *DMY2 VPSEQT FOR BP16K0 HAS BEEN SET TO 10
  DSN9022I*DMY2 DSNB1CMD '-ALTER BUFFERPOOL'

Related Information

■ “DB2 Pools Status Monitor” on page 68
Configuring buffer pools

This section describes the configuration analysis feature of Pool Advisor for DB2.

Navigation

You can navigate between configuration analysis panels.

This figure illustrates the flow of configuration analysis panels.

Figure 52: Configuration analysis navigation
Need for analysis

Pool Advisor’s primary purpose is to measure the access of your objects and evaluate the performance of the buffer pools in supporting that access.

Although Pool Advisor attempts to alert you to problems and recommends pool attribute changes to adapt to mismatches, a more effective strategy is to configure the buffer pools more accurately from the start.

Some DB2 systems are configured to place all of their data objects into one big buffer pool. However, these different data objects have varied and distinct access characteristics. These different characteristics tend to conflict with each other, often resulting in poor performance and inefficient resource use. Different data objects (with widely varying access characteristics) in the same pool can suffer complex interactions, resulting in some types being forced out of the pool excessively and driving down overall buffer pool efficiency.

The generally accepted approach to deal with this problem is to classify the data objects and combine those with the same characteristics into their own pools. Since buffer pool configurations can be changed while operations are in progress but page sets cannot be moved from one pool to another while they are in use, it is common to adjust the configuration of the pool to match the measured attributes of its objects while operations are in progress.

Figure 53 on page 88 illustrates a typical buffer pool configuration:

- Few buffer pools
- Approximate object separation
- Unlike objects sharing the same pool

Figure 53: Typical buffer pool configuration
When making configuration assignment decisions, it is more appropriate to decide on the attributes for which the pool will be optimized and then assign page sets that have the desired characteristics to the pools.

Figure 54 on page 89 illustrates a better configuration with more buffer pools and more segregation of data into similar performance classes.

Figure 54: Efficient buffer pool configuration

By grouping objects with similar access and priority characteristics into multiple buffer pools, data pages are shared more equitably in each pool and overall hit ratios are improved. In addition, the size and thresholds for each pool can then be varied individually to achieve caching targets by object group according to priority and workload demand.

**Configuration advisor**

The configuration advisor is primarily an organizational tool that helps you to group your DB2 page sets into buffer pools so that all page sets in a given pool are as alike in terms of their performance attributes as possible.

The configuration advisor reviews your configuration and calculates a compatibility score that represents the overall fitness of the current configuration to the measured attributes of the page sets. You can submit a request to Pool Advisor to analyze your current environment. The configuration advisor evaluates the mix of pools and objects and recommends changes to improve overall performance. These changes include the assignment of objects to pools and the attributes of the pools, such as size, type, operating steal thresholds, and write thresholds. You can then either accept and implement those changes or make manual changes and re-launch the analysis.
In this way, using an iterative and interactive approach, you can reach a buffer pool configuration that does a better job of meeting the needs of your objects while also fitting within acceptable limits of complexity and resource use.

For more information, view the Quick Course Configuration Advisor
You must have a BMC Support ID to view the Quick Course.

**Buffer pool compatibility profile**

Pool Advisor simplifies the task of data separation by using a compatibility profile to classify large lists of buffer pools and data objects.

You can use the profile to easily see which objects in your buffer pools should be moved to more compatible buffer pools.

The lifetime performance statistics for each page set (which are retained for the life of the page set or since monitoring with Pool Advisor began) are used to generate average performance attributes, which are then used for grouping page sets into pools.

The following attributes are used by the configuration advisor to evaluate compatibility:

- Page set type
- Priority
- Access method
- Activity level
- Update rate
- Page set size
- Data sharing

By default, all of these attributes are used in the grouping process. However, you can specify values that you want the configuration advisor to begin with during analysis. For more information, see Configuration analysis on page 94.
Page set type

The following page set types are reported:

- System page set (DSNDB01, DSNDB06, for example)
- Work page set (DSNDB07, for example)
- Application table space
- Application index space
- Large object (LOB)

System and workfile objects should be segregated into their own dedicated buffer pools. User tables and user indexes should not usually be mixed in the same buffer pool because they have substantially different performance characteristics.

Priority

Priority is a user-defined attribute.

You can rank page sets by importance and this ranking will be taken into consideration when page sets are assigned to pools. Additional storage resources can be assigned to buffer pools containing high-priority page sets.

You can assign one of the following priorities to each page set:

- High
- Medium (the default)
- Low

The configuration advisor does not recommend changes to priority. If you do not assign a priority to a page set, a priority of medium is assumed.

Access method

The access method (sequential or random) is used to segregate objects into different buffer pools that can then be optimized to support one access strategy or the other.

Sequential access is rated on the following default scale:
- High (70% or more of the getpage activity for the page set uses sequential access)
- Medium (between 30-69% of the getpage activity for the page set uses sequential access)
- Low (less than 30% of the getpage activity for the page set uses sequential access)

**Note**
You can change the default scale values in the variable repository. For more details, see related information about parameter variables and rules.

**Related Information**
- “Parameter variables and rules” on page 113

---

**Activity level**

Activity level is used to segregate objects into different pools based on how busy they are. When objects with low and high access rates share a pool, the objects with a low access rate (although equally important) will always have to perform I/O to access their pages because the objects with a high access rate will monopolize the available storage.

Activity level is rated on the following default scale:

- High (1000 or more getpages per second)
- Medium (in the range 100-999 getpages per second)
- Low (fewer than 100 getpages per second)

**Note**
You can change the default scale values in the variable repository. For more details, see information relating to parameter variables and rules.

**Related Information**
- “Parameter variables and rules” on page 113
**Update rate**

Update rate is used to segregate objects into different pools based on how heavily they are updated. Buffer pools can then be optimized to support either heavy update access or primarily read access. The buffer pool requirements are very different for each.

Update activity is rated on the following default scale:

- High (100 or more updates per second)
- Medium (between 10-99 updates per second)
- Low (fewer than 10 updates per second)

*Note*

You can change the default scale values in the variable repository. For more details, see information relating to parameter variables and rules.

**Related Information**

- "Parameter variables and rules" on page 113

---

**Page set size**

Page set size is used to segregate objects into different pools based roughly on their size in terms of physical page counts. You can place small, heavily-accessed objects in pools where most (if not all) of the objects can be cached most of the time. The benefit to these objects can be large while the resultant loss of storage might be minimal.

Page set size is rated on the following default scale:

- Small (fewer than 1,000 pages)
- Medium (in the range 1,000-99,999 pages)
- Large (100,000 pages or more)

*Note*

You can change the default scale values in the variable repository. For more details, see information relating to parameter variables and rules.
Data sharing

For buffer pools, the data sharing attribute indicates whether Pool Advisor has observed that the buffer pool has a group buffer pool assigned.

Usually it is better to assign page sets that are never shared to buffer pools without group buffer pools.

The following values are reported for buffer pool data sharing:

- Y (member of a data-sharing group)
- N (not a member of a data-sharing group)

Configuration analysis

If you select a DB2 subsystem for configuration analysis that is part of a data-sharing group, you must decide whether to analyze the configuration profile of the selected DB2 subsystem by itself or to merge the profile data from all the data-sharing members in order to produce a single configuration to be used by all members.

The merged analysis option should only be used if there is a reasonable expectation of similar resources and performance requirements on all members, see Figure 55 on
Asymmetric data sharing configurations generally should not use this option.

**Figure 55: Configuration Menu (PMDEBPCH)**

PMDEBPCH/I  
Command ====>  

DB2: DHB1  
Data sharing group: DSNDHB  

The selected DB2 is a member of a data sharing group. You can choose to analyze the configuration profile of this DB2 by itself, or you can choose to merge the profile data from all the data sharing members for analysis in order to generate a single configuration to be used by all members.

The merged analysis option should only be used if there is a reasonable expectation of similar resources and performance requirements on all members. Asymmetric data sharing configurations generally should not use this option.

Select one of the following options. Then press Enter.

1. Analyze the selected DB2 configuration only  
2. Analyze merged configuration profiles from all data sharing members

The DB2 subsystem that you select for analysis must reside on the current MVS system. For merged analysis of data-sharing members, any of the DB2 subsystems can reside on other MVS systems. However, the DB2 subsystem that you select for the configuration option must reside on the current MVS system.

The configuration advisor begins its analysis by examining the current buffer pool configuration. **Figure 56 on page 95** displays a summary of the buffer pools for a selected DB2 subsystem.

**Figure 56: Buffer Pool Configuration Summary panel (PMDEBPCA)**

PMDEBPCA/I  
Command ====>  

DB2: DHB1  
Rel: 8.1  
Data sharing: Yes, Merged=Yes  
Configuration: 0  
Compatibility: 76  

Actions:  < ANALYZE >  

Type one or more of the following action codes. Then press Enter.  
S - Details/set attributes  
P - List page sets  
L - Lock pool  
U - Unlock pool  
M - Lock page sets  
V - Unlock page sets

<table>
<thead>
<tr>
<th>PoolID</th>
<th>T P S A U Z D</th>
<th>PgSets</th>
<th>Cmp</th>
<th>Size (pages)</th>
<th>Fix</th>
<th>Page Seq</th>
<th>DWT</th>
<th>VDW</th>
<th>Chg</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP0</td>
<td>S H M H L Y 336 54 2000 N LRU 50 60 12 Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP1</td>
<td>I H M H H L N 51 72 480 N LRU 50 75 25 Y</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP2</td>
<td>T M M H L N 5 77 30 N LRU 10 50 23 Y</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP7</td>
<td>W H M M H L N 11 76 50 N LRU 50 75 24 Y</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP25</td>
<td>I H H H H L Y 62 86 370 N LRU 0 75 24 Y</td>
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<td></td>
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</tr>
<tr>
<td>BP31</td>
<td>I H M H H L N 1494 74 5770 N LRU 50 20 4 Y</td>
<td></td>
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</tr>
<tr>
<td>BP32</td>
<td>I H M H H L N 1495 81 5840 N LRU 50 20 4 Y</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BP33</td>
<td>I H H H H H L N 1546 80 6000 N LRU 50 20 4 Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BP34</td>
<td>I H H H H L N 1529 72 5960 N LRU 50 20 4 Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP35</td>
<td>T M M H L N 585 83 2260 N LRU 50 55 11 Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP49</td>
<td>I H H H H H L Y 54 79 1060 N LRU 0 75 24 Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The compatibility rating is used to determine if analysis is advisable. This rating is a scoring system that measures how much alike the page set attributes are within a given pool. If the compatibility rating is low, you can begin the analysis process by clicking on the ANALYZE button.
Figure 57 on page 96 allows you to see the values that the configuration advisor will use for the analysis and to specify your own values to be used, instead of the default values, as a starting point for analysis.

**Figure 57: Buffer Pool Configuration Options panel (PMDEBPCO)**

```plaintext
PMDEBPCO/I Buffer Pool Configuration Options 16:01:58
Command =>______________________________________________________________
MVS: SYSM Type: z/OS Rel: 01.08.00
DB2: DHB1 Rel: 8.1 Data sharing: Yes, Merged=Yes Configuration: 0

Specify the following options to set analysis controls.
To continue the configuration analysis click here: < CONTINUE >
```

<table>
<thead>
<tr>
<th>Total BP storage to use</th>
<th>Sum of Pagesets</th>
<th>Weights for attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>3205 MB</td>
<td>avg WSS: 4219 MB</td>
</tr>
<tr>
<td>Minimum</td>
<td>3000 MB</td>
<td>avg WSD: 2763 MB</td>
</tr>
<tr>
<td>Maximum</td>
<td>3500 MB</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of pools</th>
<th>Min</th>
<th>Max</th>
<th>Access type</th>
<th>Activity lvl</th>
<th>Update rate</th>
<th>Object size</th>
<th>Data sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 KB buffer pools</td>
<td>11</td>
<td>11</td>
<td>1-50</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>8 KB buffer pools</td>
<td>1</td>
<td>1</td>
<td>0-10</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>16 KB buffer pools</td>
<td>2</td>
<td>2</td>
<td>0-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 KB buffer pools</td>
<td>3</td>
<td>3</td>
<td>0-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Limit for the number of pageset moves considered 0 (0=no limit)

The Buffer Pool Configuration Options panel initially displays default values for the following configuration controls:

- Amount of storage to be used by buffer pools
- Number of pools
- Weighting factors for buffer pool attributes
- Limit on page set moves

**Related Information**

- "Buffer pool compatibility profile" on page 90

**Storage limits**

After analyzing the grouping of page sets, the configuration advisor determines starting pool sizes for each of the buffer pools.

Factors that are considered include the average working set size and average working set demand page counts, which are now displayed for your reference. These page counts (based on lifetime history) are used to generate the initial size estimates. Working set size page counts for highly sequential objects tend to remain...
close to the prefetch requirements in busy pools, while the working set size page
counts for highly random objects depend on the data, the applications, and
competition for available pool space. In all cases, the numbers can vary with
workloads, but long-term averages are useful for initial estimates.

The actual sizes that are generated for the pools depend on the target storage values
you provide on the Buffer Pool Configuration Options panel. The aggregate working
set sizes of the page sets in each pool (weighted by the user-defined priority)
determine the proportion of storage allocated to the pool.

Number of pools

When analysis is invoked, the configuration advisor considers the number of pools
first.

The advisor determines an optimal grouping of page sets within the number of pools
allowed. Separate consideration is given to 4-KB, 8-KB, 16-KB, and 32-KB pools.

By default, the minimum and maximum number of pools to be used are both set
equal to the number of pools in the current buffer pool configuration. The
configuration advisor does not attempt to delete any pools or create new ones. It
attempts to reassign page sets within existing pools to achieve a better overall
compatibility rating.

If you change the values for either or both the minimum and maximum number of
pools, the configuration advisor determines the number and kind of pools within the
stated range that gives the best overall compatibility rating with the fewest possible
number of pools.

Note

Be careful when changing these values. The resulting analysis can generate a large
number of page set reassignments. You can limit these reassignments by specifying a
value other than 0 in the Limit for the number of page set moves considered field.
For more information, see Limit on page set moves on page 98.

Weighting factors for buffer pool attributes

The attributes that make up the compatibility profile are listed with a default
weighting factor for each attribute.

The weighting factor is a number from 0 to 9. A value of 0 indicates that the attribute
will not be used at all in compatibility calculations. A value of 9 indicates that the
attribute will have a very heavy influence on the compatibility score.
You can choose which attributes you want the configuration advisor to consider during analysis and how much influence each attribute will have on the compatibility score.

**Limit on page set moves**

You can specify an upper limit to the number of page sets that can be reassigned to different buffer pools.

A value of 0 (default) indicates that there is no limit to the number of page set reassignments that can be generated. By allowing as many reassignments as needed, the configuration advisor can produce a recommendation that provides the best compatibility between page sets and buffer pools.

However, in some cases this could result in many thousands of page set reassignments, which could take a long time for the resulting ALTER commands to be executed by DB2 when implementing the changes.

By specifying a limit to the number of page set reassignments, the analysis process may produce a lesser total compatibility score but will generate a more easily implemented set of alterations. If $N$ is the designated limit, then only the top $N$ reassignments are generated, meaning the page sets are reassigned that result in the best overall compatibility improvement. When more than one page set reassignments have the same level of improvement, and there is not enough room within the limit to reassign them all, the first ones encountered are reassigned. This means that on different analysis runs under slightly different conditions, the list of $N$ reassignments can be slightly different.

When a limit is specified, that limit applies to each buffer pool class (4-KB, 8-KB, 16-KB, and 32-KB). So if you limit page set moves to 10, the total number of moves is limited to 10 for each buffer pool class, or 40 moves.

In addition, because the number of reassignments is limited, there is no practical value in doing subsequent interactive re-analysis. So when the limit feature is used, the Reanalyze hyperlink is unavailable on the Buffer Pool Configuration Analysis panel. For more information, see Recommended changes on page 99.

**Additional controls**

The configuration advisor also makes initial recommendations for sequential steal thresholds (Page stl), deferred write thresholds (DWT), and vertical deferred write thresholds (VDW).
The value for **Page stl** is based on the pool's predominant access type (sequential vs. random), with higher thresholds for mostly sequential pools and lower thresholds for mostly random pools. The values for **DWT** and **VDW** are based on the pool's predominant update rate and activity level, with emphasis on write engine optimization and trickle-write performance objectives.

**Note**

Trickle-write refers to the performance concept for scheduling write operations as soon as there are enough updated pages to allow efficient use of the write engine (as opposed to allowing so many updated pages to accumulate that there are major delays when checkpoints occur).

**Recommended changes**

When analysis is complete, a list of the changes recommended by the configuration advisor is displayed.
When only a few changes are recommended, the recommendations are fairly easy to understand. However, if the change list is extensive, you might find it difficult to see the big picture represented by the new configuration.

If you see undesirable changes in the results, you can discard the results and try again with different options. But if you are not sure, you can accept the results and continue to Figure 59 on page 101 to see how the changes are represented in the configuration. This panel makes it easier to see and explore the new configuration.
Figure 59: Buffer Pool Configuration Analysis panel (PMDEBPCC)

```
PMDEBPCC/I       Buffer Pool Configuration Summary                   LINE 1 OF 17
Command ===> _______________________________________________ Scroll ===> CSR_
DB2: DHB1  Rel: 8.1   Data sharing: Yes, Merged=Yes       Configuration:    1
   Compatibility:   90
Actions:  < REANALYZE >    < UNDO >      < GENERATE JCL >
Type one or more of the following action codes.  Then press Enter.
S - Details/set attributes     L - Lock pool           U - Unlock pool
P - List page sets             M - Lock page sets      V - Unlock page sets
-Attributes-                 Size     Pag  Page  -Thresholds-
PoolID  T P S A U Z D  PgSets  Cmp   (pages)  fix   stl  Seq  DWT VDW   Chg
------  -------------  ------  ---  --------- ---  ----  ---  --- ---   ---
_ BP0     S H M H H L Y     168   69       8070  N    LRU   50   15   3    Y
_ BP1     I H M H H L N     828   94      49590  N    LRU   50    0   0    Y
_ BP2     T M H M H L N    1591   87      63000  N    LRU   50    0   0    Y
_ BP7     W H M H L N      14   85       12310  N    LRU  100    0   0    Y
_ BP25    I H H H H L Y     72   96       18680  N    LRU   50    0   0    Y
_ BP31    I H L H H L N     488   92       16530  N    LRU   50    0   0    Y
_ BP32    I M M M L N      297   94       17730  N    LRU   50    0   0    Y
_ BP33    I L M H M M N     747   90       29470  N    LRU   50    0   0    Y
_ BP34    I H M M M L N     525   93       16530  N    LRU   50    0   0    Y
_ BP35    T H M H L N    1330   91       65890  N    LRU   50    0   0    Y
_ BP49    I M M H L N     1108   91       37490  N    LRU   50    0   0    Y
```

The Buffer Pool Configuration Analysis panel is identical to Figure 60 on page 102 with the following exceptions:

- The **Configuration** field is incremented each time analysis is performed.
- The button options have changed.

If you decide to discard the recommended changes and start over, click the **UNDO** button.

If you want to adjust the new configuration by changing the control options, click **REANALYZE** and modify values until you reach a satisfactory arrangement. The difference between various starting points in the analysis process is that there is a built-in bias towards the current setting. Changes are not recommended unless they appear to produce a better compatibility rating, even though there might be many arrangements that produce similar compatibility ratings.

You can exert more influence over the configuration process by setting and locking values for the buffer pools and the page sets.

You can manually set values for buffer pools on Figure 60 on page 102 and Figure 61 on page 102.

From the Buffer Pool Configuration Summary panel, you can choose to lock one or more buffer pools. When you lock a buffer pool, the configuration advisor will not change its size or parameters, but page sets might be moved to or from the buffer pool. In the example below, by placing an **L** next to BP0, you indicate that the configuration advisor should retain these settings for this buffer pool, and after pressing **Enter**, the value in the **Chg** field changes to **N**.
Select a buffer pool with the S action code to display the Figure 61 on page 102.

From the Buffer Pool Attributes panel, you can manually specify the performance attributes that you want the pool to support, as well as the various sizes and thresholds. By so doing, you define a different starting point for the analysis, which the configuration advisor will not change unless it calculates a better arrangement.

You can also lock your settings into place by specifying N in the Can these attributes be changed during analysis? field. And you can prevent page sets from being moved into the buffer pool by specifying N in the Can additional page sets be moved into this pool? field. The configuration advisor will search for the best configuration within the defined constraints.
You can manually set values for page sets, see Figure 60 on page 102 and the Figure 62 on page 103.

From the Buffer Pool Configuration Summary panel, you can lock all of the page sets in a buffer pool. The configuration advisor will not recommend moving any of the page sets in the buffer pool but is free to recommend changes to the size or parameters of the pool.

Figure 62: Page Set Attributes panel (PMDEBPP2)

From the Page Set Attributes panel, you can set the priority for page sets. Priority is always user defined. The configuration advisor will never make recommendations for priority. You can also specify a different buffer pool assignment. If the setting is not locked, the configuration advisor might not recommend the same buffer pool that you specify, but only if it finds a better fit than the one you chose. If the setting is locked, the configuration advisor will not attempt to reassign the page set or delete the indicated buffer pool.

Note

If a buffer pool is defined with zero pages, the buffer pool and all its page sets are treated as "dead" objects, and the configuration advisor ignores them even if they are not locked. If you want page sets to be eligible for configuration changes, they must reside in a buffer pool defined with a size greater than zero.

Related Information

- “Number of pools” on page 97
Implementing the changes

After you achieve a configuration that you want to implement, click the GENERATE JCL button to begin the process that tailors a batch job to implement the changes.

This batch job should be run during a maintenance period when it is acceptable to stop databases. It will include DB2 utility steps to stop, alter, and start the affected page sets, change the pool sizes and thresholds, change the Pool Advisor run-time control parameters, and, if necessary, change the Pool Advisor configuration history file where priorities and lifetime profile attributes are retained.

**Note**
Implementing the changes is a serious undertaking. All of the intended changes should be reviewed carefully before submitting the job.

To implement the changes

1. Click GENERATE JCL, Figure 63 on page 104) is displayed.

   **Figure 63: Buffer Pool Configuration JCL Generation panel (PMDEJCL0)**

   - **PMDEJCL0/I** Buffer Pool Configuration JCL Generation
   - **Command**
   - **DB2: DHB1 Rel: 8.1 Data sharing: Yes, Merged=Yes Configuration: 1**
   - **Specify the following JCL generation options. Then press Enter.**
   - **Default values are displayed. Type over values to change them. Delete values to restore defaults.**

   **Skeleton INPUT JCL:**
   - **DATA SET NAME:** PMDDQA.V6R2M00.BBPPARM
   - **MEMBER NAME:** PMDCFJCL
   - **Generated OUTPUT JCL (PDS must be preallocated):**
   - **DATA SET NAME:** PMDDQA.V6R2M00.BBPPARM.JCL
   - **MEMBER NAME:** DHB1DO
   - **UNDO MEMBER NAME:** DHB1UNDO (Blank if no UNDO needed)
   - **Create Single Job:** Y (Y/N)
   - **Stop By Database:** Y (Y/N)
   - **Max TS per Step:** 10000 (1-99999, valid if stop DB=N)
   - **Program name and parameters to execute DML:**
   - **RUN_PROGRAM(DSN1AD)***

   Default values are displayed for the input and output JCL data set and member names. You can type over these default values with the data set and member names of your choice. Be sure that the PDS for the output JCL is preallocated.

   You can also specify a valid UNDO JCL member name if you want the option to revert to the configuration that existed before the configuration JCL was submitted.

2. In the **Create Single Job** field, specify **Y** to create one batch job (one JCL deck) with multiple steps, or specify **N** to create a separate batch job for each step (one JCL deck per step).
3 In the **Stop By Database** field, specify **Y** to issue DB2 STOP and START statements for affected page sets at the database level rather than at the page set level. Specifying STOP and START statements at the database level significantly speeds up processing.

4 In the **Max TS per Step** field, specify the maximum number of page sets to be altered (moved to another buffer pool) per step in the output JCL. This value is only used when the **Stop By Database** field is set to **N**.

5 When you have specified the values on this panel, press **Enter**. An ISPF EDIT session is displayed, see Figure 65 on page 106 which shows the generated JCL to implement the configuration changes. You can verify the JCL, make any necessary changes, and submit the job. Or you can save it for execution at another time.

6 Pay close attention to your JCL review, especially if you are creating a merged configuration. Some changes may affect DB2 subsystems located on different MVS systems than the one you are running the configuration advisor from. Ensure that the JCL is appropriate for the target system. You can edit the JCL and
place JCL which targets other DB2 subsystems or other MVS systems into different JCL members.

**Figure 64: ISPF EDIT session**

<table>
<thead>
<tr>
<th>File</th>
<th>Edit</th>
<th>Edit_Settings</th>
<th>Menu</th>
<th>Utilities</th>
<th>Compilers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>Help</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss</td>
<td>Columns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>000001</td>
<td>000072</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command ——&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CSR

****** ***************************** Top of Data *****************************

000001 //PMDCFJOB JOB (4110), 'DBADM', MSGCLASS=X, CLASS=Q, REGION=OM
000002 /* *************************************************************/
000003 /* */
000004 /* */ CONFIGURATION ADVISOR SKELETON JCL
000005 /* */
000006 /* */ NOTE: INSERT A VALID JOBCARD AND STEPLIB CONCATENATION.
000007 /* */ PERMANENT CHANGES CAN BE MADE TO THE "PMDCFJCL"
000008 /* */ MEMBER RESIDING IN THE PARMLIB.
000009 /* */
000010 /* */
000011 /* */
000012 /* */ SUBMIT THIS JOB TO RUN ON THE SAME MVS SYSTEM AS THE
000013 /* */ PMQ DATA COLLECTOR AND THE DHB1 DB2 SUBSYSTEM.
000014 /* */
000015 /* */
000016 /* */ IMPLEMENT CHANGES GENERATED ON 2008.269 AT 14:44:09
000017 /* */
000018 /* */
000019 /* */ IMPLEMENT CHANGES GENERATED ON 2008.269 AT 14:44:09
000020 /* */
000021 /* */ JOBLIB DD DISP=SHR, DSN=PMDQA.V6R2MOO.BBLINK
000022 /* */
000023 /* */ STEPLIB DD DISP=SHR, DSN=SYS3.DHB.DSNEXIT
000024 /* */
000025 /* */ SYSUDUMP DD SYSOUT=* 
000026 /* */ SYSTSPRINT DD SYSOUT=* 
000027 /* */ SYSPRINT DD SYSOUT=* 
000028 /* */ SYSTSIN DD *
000029 DSN SYSTEM(DHB1)
000030 -ALTER BUFFERPOOL(BP0) VPSIZE(8070) PGFIX(NO) -
000031 VPSEQT(50) DWQT(15) VDWQT(3,0) -
000032 PGSTEAL(LRU) -
000033 -ALTER BUFFERPOOL(BP1) VPSIZE(49590) PGFIX(NO) -
000034 VPSEQT(50) DWQT(0) VDWQT(0,256) -
000035 PGSTEAL(LRU) -
000036 -ALTER BUFFERPOOL(BP2) VPSIZE(63000) PGFIX(NO) -
000037 VPSEQT(50) DWQT(0) VDWQT(0,256) -
000038 PGSTEAL(LRU) -
000039 -ALTER BUFFERPOOL(BP7) VPSIZE(540) PGFIX(NO) -
000040 VPSEQT(50) DWQT(75) VDWQT(25,0) -
000041 PGSTEAL(LRU) -

**Figure 65 on page 106** is an example of the skeleton input JCL that can be found in the PMDCFJCL member of the PARMLIB.

**Figure 65: Skeleton input JCL**

//PMDCFJOB JOB (), 'DBADM', MSGCLASS=X, CLASS=Q, REGION=OM
//***************************************************************************
/* */ CONFIGURATION ADVISOR SKELETON JCL
/* */
/* */ NOTE: INSERT A VALID JOBCARD AND STEPLIB CONCATENATION.
/* */ PERMANENT CHANGES CAN BE MADE TO THE "PMDCFJCL"
/* */ MEMBER RESIDING IN THE PARMLIB.
/* */
/****** Top of Data *******/

//JOBLIB DD DISP=SHR, DSN=$JOBLIB$
Data quality

For the configuration process to work effectively, you must have an accurate profile of the performance attributes of your objects.

It is not necessary to run expensive performance traces because this data is collected automatically while Pool Advisor is active, and the lifetime object statistics are updated every night with the daily statistics cycle. The more days of data collection you have, the more reliable the decision making.

Page sets that are rarely used can be problematic. If there is no significant access to a page set while Pool Advisor is collecting data, the configuration advisor cannot adequately understand the page set. The page set type can be ascertained, but the other attributes are either ignored or scored as medium, which is a crude compromise.

Note
The recommendations is only as good as the data upon which they are based. Pay close attention to the data collection metrics and to the recommended changes. If they don't seem to make sense, examine the page sets in more detail. This is especially true for objects that are accessed infrequently, such as at month-end or year-end.

Where to begin
Initially when you try the configuration process, use the default control options.
Using the default control options will result in recommendations within your existing buffer pools and your existing total storage allocation, typically the reassignment of some page sets, the reallocation of storage, and the resetting of some thresholds.

Then experiment with different controls, or manually specify changes until a desirable configuration is achieved. No changes are actually implemented until you run a generated reconfigure job, so you can safely experiment with the configuration advisor dialog.

Data sharing considerations

When analyzing the configurations of individual members of a DB2 data-sharing sysplex, there are a number of special issues that the current version of Pool Advisor may not automatically consider.

- All shared page sets are assigned to the same pool in each member of the sysplex via the shared catalogs. However, Pool Advisor analyzes only one DB2 subsystem at a time when you do not select the merged analysis option. You will, therefore, need to run the analysis on each member separately and resolve any significant differences prior to implementing the changes. Although the object statistics collected by each member should be similar, any asymmetrical workloads could generate differences that should be manually reviewed, even though the background advisors will compensate for minor differences at run-time.

- Pool Advisor does not currently manage group buffer pool definitions in the coupling facility, so the configuration advisor may recommend the movement of objects from one buffer pool to another without regard to the coupling facility definitions, especially when the weighting factor for the data-sharing attribute is set to a low value. If there are some pools that are shared and some that are not, you will need to use the lock controls to prevent page set reassignment to inappropriate pools or monitor any mixing that takes place to ensure that it remains acceptable.

- You might need to reconfigure the group buffer pool resource allocations in the coupling facility to match the page set movements and resized buffer pools when you implement a new configuration.
Using multiple System and SQL Performance products

This section describes the possibilities of integrating several System and SQL Performance for DB2 products.

Product description

The System and SQL Performance for DB2 products from BMC are a family of tightly integrated performance monitoring and management tools for DB2.

Most of the products share the same dialog architecture, enabling data sharing and exceptional ease of use across products. The following products can share the same started task and can be accessed through a common dialog box:

- **APPTUNE for DB2** -- A tool for tuning SQL statements and troubleshooting DB2 application performance.

- **Pool Advisor for DB2** -- A tool for monitoring DB2 pools, identifying inefficient use, and suggesting and implementing modifications to gain maximum benefit from storage resources.

- **SQL Explorer for DB2** -- A tool for analyzing SQL statements and database structures to optimize application performance.

- **MainView for DB2 - Data Collector** -- A selectable component of the MainView for DB2 product that allows MainView users to share some functions of the Performance Activity products Data Collector.

  This component provides access to DB2 performance data that supplements the data already available via MainView for DB2.

- **BMC System Performance for DB2** -- A solution that combines the features and functions of MainView for DB2, OPERTUNE, and Pool Advisor with a supplemental set of comprehensive reports on all aspects of DB2.
- **SQL Performance for DB2** -- A solution that combines the features and functions of the APPTUNE for DB2 and SQL Explorer for DB2 components with a comprehensive index reporting function that is available only with the solution.

- **Performance Advisor Database** -- The SQL Performance Solution for DB2 includes a set of features that are collectively called the Performance Advisor Database. These advisors improve the efficiency of the SQL statements, they include:
  
  — Workload Access Path Compare -- compares static and dynamic statement access paths over time, across subsystems, application versions, and DB2 releases and identifies the impact.
  
  — Workload Index Advisor -- improves SQL performance of a workload by recommending which indexes need to be created, kept, or dropped.

  — Reorg Advisor -- provides reorg recommendations based on physical characteristics plus performance characteristics of objects. Ideally you only want to REORG objects that are disorganized and show degraded performance since last REORG. you do not want to reorg objects that cannot benefit from it.

  — Exception Advisor -- examines the data accompanying the triggered exception and compares that data to past execution statistics for the same statement in baseline or aggregated tables.

### Integration

When a single product is enabled, the main menu for that product is displayed.

When multiple products or solutions are enabled, the main menu that is displayed reflects the active product mix. **Figure 66 on page 111** is an example of the main
menu that is displayed when all System and SQL Performance for DB2 products are enabled.

**Figure 66: System and SQL Performance for DB2 main menu (DOMESELT)**

<table>
<thead>
<tr>
<th>Command</th>
<th>System and SQL Performance for DB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Data Collector: FM01</td>
<td>Status: ACTIVE</td>
</tr>
</tbody>
</table>

Select one of the following options. Then press enter.

D. System Performance Solution - DB2 subsystem and storage pool analysis
--- SQL Performance Solution ---
Q. Apptune and Index Component - DB2 application and index analysis
S. SQL Explorer Component - DB2 SQL analysis
A. Performance Advisors - Advice and Recommendations

1. Domplexes - Select/Change Domplex connection
2. Session Status - View current session resource usage
3. User Options - View/modify user options
4. Log Operations - View/print logged screens and reports
5. Administration - Manage product and user profiles

H. Help
X. Exit
Z. About the System and SQL Performance Products

When multiple products share a product session, functions that are shared by all products are shown on the initial main menu. Select a product from the main menu to display the main menu for that product. Functions that are specific to each product are accessed through the product’s main menu.

All products share the same Data Collector and the same LOGFILES. If you select a different Data Collector in any product, the Data Collector is changed for all products.

**Note**

Filters set in APPTUNE have no effect on Pool Advisor or System Performance reports, because those products do not support filtering.
Parameter variables and rules

This section lists and details the Pool Advisor parameters that you use to modify storage resources when the advisors recommend changes. The section also details the rules that trigger recommendations.

Overview

When the Pool Advisor Data Collector contacts a DB2 subsystem for the first time, it reads the DB2 ZPARM values and uses them to create the default values for product parameters.

The parameters based on the ZPARM values are stored in a repository. These computed values are stored in the repository only once. If the DB2 value changes (either temporarily or permanently), Pool Advisor will not be aware of the change and will continue to apply thresholds to the values in the repository.

When Pool Advisor determines that changes should be made to the size of resources or what the maximum and minimum thresholds should be, it uses the following values by default:

- Increase resource by 10% of ZPARM value
- Decrease resource by 10% of ZPARM value
- Increase resource by a maximum of 25% of ZPARM value
- Decrease resource by a maximum of 25% of ZPARM value

If you find that the recommended changes based on these default values are no longer appropriate (for example, because of changes to ZPARM values), you can modify the default values.
Modifications are made in the variable repository. You can access the variable repository by hyperlinking on the CONFIG button on Pool Advisor reports. Figure 67 on page 114 is displayed.

**Figure 67: Configuration Menu (PMDECNFG)**

<table>
<thead>
<tr>
<th>PMDECNFG/I</th>
<th>Configuration Menu</th>
<th>10:15:05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ====&gt; ________________________________________________________________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following options. Then press Enter.

1. View and edit product variables
2. Refresh object names from DB2 catalog
3. Reset initialization parameters to default values

Use the Configuration menu to perform the following tasks:

- **View and edit product variables** Select this option to display and edit the values for the thresholds upon which Pool Advisor acts to recommend corrective actions.

- **Refresh object names from DB2 catalog** Select this option to issue a command that refreshes the names of all objects that have been created since Data Collector startup.

- **Reset initialization parameters to default values** Use this option to cancel any changes that you made to the parameter values for a DB2 subsystem. The parameters revert to the default values shipped with the product. Selecting this option displays the Advisor Interface. The PMDZDROP command is inserted in the Advisor text field. Use the following syntax to revert to default values: `PMDZDROP DB2 ssid`

---

**Variable repository**

The variable repository provides a method for editing parameter variables through a series of panels.

The panels outline all of the variables, giving you the opportunity to edit any or all of the values.

One variable repository is created for each Data Collector. Use the variable repository for a Data Collector to set values for parameter variables for all DB2 subsystems that have been monitored by that Data Collector (whether or not they are currently being monitored).
Select option 1 (View and edit product variables) from the Configuration Menu to access variable repository functions. Figure 68 on page 115 is displayed.

**Figure 68: Variable Repository SSID Selection panel (PMDEVDSR)**

<table>
<thead>
<tr>
<th>PMDEVDSR/I</th>
<th>Command</th>
<th>Variable Repository SSID Selection</th>
<th>Scroll</th>
<th>CSR_</th>
</tr>
</thead>
</table>

Select an item with one of the following action codes. Then press Enter.

- **S** - Select/Modify SSID
- **D** - Delete SSID
- **L** - List Repository Variables

- DB2
- #ALL
- DEDK
- DGE3
- DHI1

This panel lists all of the DB2 subsystems that are associated with the Data Collector. The panel also includes an option (#ALL) for assigning the same variable values to all DB2 subsystems in the list.

**Note**

If you specify a global value for a parameter (using #ALL) and you specify a different value for the same parameter for a specific DB2 subsystem, the DB2 subsystem value overrides the global value.

If you change a global value for a parameter using #ALL, you must recycle the Data Collector for changes to take effect for all DB2 subsystems that do not have a DB2-specific parameter specified. If you have previously specified a DB2-specific parameter and would like the #ALL variable to take effect after a Data Collector recycle, you must delete the parameter coded for the DB2 SSID.

If you are no longer using the current Data Collector to monitor a DB2 subsystem that is included in the list, you can use the **D** action code to delete the subsystem from the list. All of the specifications for that DB2 subsystem are removed from the repository for the Data Collector.

If you delete the variables from the repository, you should also delete the DB2 subsystem from the list of DB2 subsystems being monitored by this Data Collector in the DOMPLEX option set. If you do not remove it from the monitor list, you must recycle the Data Collector to reestablish the default values.

If you decide to monitor the DB2 again with the same Data Collector, default values will be computed for all variables until you set new values in the repository. You can delete the entries that are associated with #ALL, but you cannot delete the #ALL record.
Listing parameter values

You can view all the parameter values in the repository for the selected DB2 subsystem or for all DB2 subsystems.

To view all parameter values

1. Perform one of the following actions:
   - Use the L (List) action code
   - Use #ALL.

The Figure 69 on page 116 is displayed.

Figure 69: Variable Repository Variable List panel (PMDEVOVL)

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDMSIZE_DEC</td>
<td>5000</td>
</tr>
<tr>
<td>EDMSIZE_INC</td>
<td>5000</td>
</tr>
<tr>
<td>EDMSIZE_MAX</td>
<td>10240</td>
</tr>
<tr>
<td>EDMSIZE_MIN</td>
<td>6144</td>
</tr>
<tr>
<td>RIDSIZE_DEC</td>
<td>16</td>
</tr>
<tr>
<td>RIDSIZE_INC</td>
<td>16</td>
</tr>
<tr>
<td>RIDSIZE_MAX</td>
<td>80</td>
</tr>
<tr>
<td>RIDSIZE_MIN</td>
<td>48</td>
</tr>
<tr>
<td>SIZE_BP0_DEC</td>
<td>1200</td>
</tr>
<tr>
<td>SIZE_BP0_INC</td>
<td>1200</td>
</tr>
<tr>
<td>SIZE_BP0_MAX</td>
<td>15000</td>
</tr>
<tr>
<td>SIZE_BP0_MIN</td>
<td>9000</td>
</tr>
<tr>
<td>SIZE_BP1_DEC</td>
<td>20</td>
</tr>
<tr>
<td>SIZE_BP1_INC</td>
<td>20</td>
</tr>
<tr>
<td>SIZE_BP1_MAX</td>
<td>250</td>
</tr>
<tr>
<td>SIZE_BP16K_DEC</td>
<td>7</td>
</tr>
<tr>
<td>SIZE_BP16K_INC</td>
<td>7</td>
</tr>
<tr>
<td>SIZE_BP16K_MAX</td>
<td>87</td>
</tr>
<tr>
<td>SIZE_BP16K_MIN</td>
<td>52</td>
</tr>
<tr>
<td>SIZE_BP16K9_DEC</td>
<td>62</td>
</tr>
<tr>
<td>SIZE_BP16K9_INC</td>
<td>62</td>
</tr>
<tr>
<td>SIZE_BP16K9_MAX</td>
<td>781</td>
</tr>
<tr>
<td>SIZE_BP16K9_MIN</td>
<td>468</td>
</tr>
<tr>
<td>SIZE_BP2_DEC</td>
<td>10</td>
</tr>
<tr>
<td>SIZE_BP2_INC</td>
<td>10</td>
</tr>
<tr>
<td>SIZE_BP2_MAX</td>
<td>127</td>
</tr>
<tr>
<td>SIZE_BP2_MIN</td>
<td>76</td>
</tr>
<tr>
<td>SIZE_BP25_DEC</td>
<td>1000</td>
</tr>
<tr>
<td>SIZE_BP25_INC</td>
<td>1000</td>
</tr>
</tbody>
</table>

The Variable Repository Variable List displays the values of all parameter variables that are currently in the repository for:

- The selected DB2 subsystem
- All DB2 subsystems (if #ALL is selected)
Setting parameter values

This section details how to set, update and delete parameter values.

To set the parameter values.

1. Use the S (Select/Modify) action code from the Variable Repository SSID Selection panel to set or change repository values.

   **Figure 70: Variable Repository Category Selection panel (PMDEVDCR)**

   This panel lists the categories into which the variables are grouped.

2. Use the S (Select/Modify Category) action code to display a list of variables that are associated with the selected category.

   - If you select a category that represents a single entity (RID pool, for example), Figure 72 on page 118 is displayed.
If you select a category that represents multiple entities (buffer pools, for example), Figure 71 on page 118 is displayed.

**Figure 71: Repository Subcategory Selection panel (PMDEVDSC)**

Use the S (Select/Modify Category) action code to select one or more entries to be updated.

When you select a category or a subcategory, Figure 72 on page 118 is displayed.

**Figure 72: Variable Repository Variables panel (PMDEVDVE)**

Use this panel to set new values for the variables listed on the panel or to change existing values.
If no value has been previously set in the repository for a variable, no **Current** value is listed. If a value has been previously set in the repository, that value is displayed as the **Current** value.

**To change the value or to set a new value**

1. Type the new value in the **New Value** field.
   
   Be sure that the new value falls within the range specified on the panel.

2. Press **Enter**.
   
   The new value is validated.

3. Press **F3** to update the value.
   
   Message BMC24253 confirms that the update is successful.

**To delete a value**

1. Use the **D** action code to mark an entry to be deleted from the repository. The Current value is removed from the panel when you press **Enter**, but the value is not deleted until you exit from the panel.

2. Press **F12** to cancel any changes or deletions that you made.

---

**Initialization parameters**

The following table lists and describes the parameter values that you can modify.

You can set each of these variables for a specific DB2 subsystem or for all DB2 subsystems (when you select #ALL). If you specify different values for the same variable for a specific DB2 subsystem and for #ALL, the value you set for a specific DB2 subsystem takes precedence.

**Note**

If you change a global value for a parameter using #ALL, you must recycle the Data Collector for changes to take effect for all DB2 subsystems that do not have a DB2-specific parameter specified. If you have previously specified a DB2-specific parameter and would like the #ALL variable to take effect after a Data Collect recycle, you must delete the parameter coded for the DB2 SSID.
### Table 1: Pool Advisor parameter variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General parameter variables</strong></td>
<td></td>
</tr>
</tbody>
</table>
| GETPAGE_SAMPLING  | Determines whether all getpage operations are counted or a statistical sampling function is used to reduce CPU usage. Valid values are **ON** and **OFF**:  
  - **ON**—The sampling function is used to reduce CPU usage.  
  - **OFF**—All getpage operations are counted.  
  The default is **OFF**. |
| STATS_CYCLE       | Determines the following settings for statistics object collection:  
  - Period—how frequently statistics are collected and updated (in minutes)  
  - Interval—over what period of time statistics are aggregated (in minutes)  
  - Analysis—how frequently the background analysis advisors check for problems (in minutes)  
  Valid values are **HI**, **MED** and **LOW**.  
  **Note:** The following table outlines the frequency for each setting: |
<p>| <strong>SETTING</strong>       | <strong>PERIOD</strong> | <strong>INTERVAL</strong> | <strong>PERIOD</strong> |
| HI                | 5          | 15           | 5          |
| MED               | 5          | 15           | 15         |
| LOW               | 20         | 60           | 60         |
| <strong>Note:</strong> The same statistics cycle is set for all monitored DB2 subsystems. Individual DB2 subsystems cannot have different statistics cycles. |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| NEAR_HISTORY          | Specifies whether all near-history data is collected and reported (Recent Trends reports). Valid values are Y (Yes) and N (No):  
  - Y--Near-history data is collected and reported.  
  - N--Only the data for the CURRENT and TODAY intervals is collected and reported.  
  The default is Y.  
  Long-term history is not affected (Daily History reports).  
  **Note:** The Data Collector must be recycled after changing this parameter. |
| OBJECT_TRACKING       | Specifies whether page set object data is collected. Valid values are Y (Yes) and N (No):  
  - Y--All object data is collected.  
  - N--No object data is collected. Object reports will contain no data.  
  The default is Y.  
  **Note:** If the value for DAILY_PAGESET_HISTORY or DAILY_OBJECT_HISTORY is set to N, long-term object data will not be collected and reported, even if this parameter is set to Y.  
  **Note:** The Data Collector must be recycled after changing this parameter. |
| DAILY_OBJECT_HISTORY  | Specifies whether long-term object history data is collected and reported (Daily History reports). Valid values are Y (Yes) and N (No):  
  - Y--Long-term object history data is collected and reported.  
  - N--Long-term object history data is not collected or reported.  
  The default is Y.  
  Near-history is not affected (Recent Trends reports).  
  **Note:** If the value for OBJECT_TRACKING or DAILY_PAGESET_HISTORY is set to N, long-term object data will not be collected and reported, even if this parameter is set to Y.  
  **Note:** The Data Collector must be recycled after changing this parameter. |
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAILY_PAGESET_HISTORY</td>
<td>Specifies whether long-term page set history data is collected and reported</td>
</tr>
<tr>
<td></td>
<td>(Daily History reports). Valid values are Y (Yes) and N (No):</td>
</tr>
<tr>
<td></td>
<td>■ Y--Long-term page set history is collected and reported.</td>
</tr>
<tr>
<td></td>
<td>■ N--Long-term page set history is not collected and reported.</td>
</tr>
<tr>
<td></td>
<td>The default is Y.</td>
</tr>
<tr>
<td></td>
<td>Near-history is not affected (Recent Trends reports).</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: If this value is set to N, long-term object data will not be</td>
</tr>
<tr>
<td></td>
<td>collected and reported, even if the DAILY_OBJECT_HISTORY parameter is set</td>
</tr>
<tr>
<td></td>
<td>to Y.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: The Data Collector must be recycled after changing this parameter</td>
</tr>
<tr>
<td>DAILY_SYSTEM_HISTORY</td>
<td>Specifies whether long-term system history data is collected and reported</td>
</tr>
<tr>
<td></td>
<td>(Daily History reports). Valid values are Y (Yes) and N (No):</td>
</tr>
<tr>
<td></td>
<td>■ Y --Long-term system history data is collected and reported.</td>
</tr>
<tr>
<td></td>
<td>■ N --Long-term system history data is not collected and reported.</td>
</tr>
<tr>
<td></td>
<td>The default is Y.</td>
</tr>
<tr>
<td></td>
<td>The following reports are affected:</td>
</tr>
<tr>
<td></td>
<td>■ DB2 Pools Daily History (PMDMAINL)</td>
</tr>
<tr>
<td></td>
<td>■ Virtual Storage Daily History (PMDSTRGL)</td>
</tr>
<tr>
<td></td>
<td>■ Buffer Pools Daily History (PMDBPML)</td>
</tr>
<tr>
<td></td>
<td>■ EDM Pool Daily History (PMDEDMPL)</td>
</tr>
<tr>
<td></td>
<td>■ RID Pool Daily History (PMDRIDPL)</td>
</tr>
<tr>
<td></td>
<td>■ Sort Pool Daily History (PMDSRTPL)</td>
</tr>
<tr>
<td></td>
<td>■ Group BPool Daily History (PMDGBPL)</td>
</tr>
<tr>
<td></td>
<td>Near-history is not affected (Recent Trends reports).</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: The Data Collector must be recycled after changing this parameter</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>HOURLY_PAGESET_HISTORY</td>
<td>Specifies whether long-term page set history data is collected and reported at an hourly level (Long Term History reports) in addition to a daily level. Valid values are Y (Yes) and N (No):</td>
</tr>
<tr>
<td></td>
<td>■ Y -- Long-term page set history is collected and reported at an hourly level.</td>
</tr>
<tr>
<td></td>
<td>■ N -- Long-term page set history is not collected and reported at an hourly level.</td>
</tr>
<tr>
<td></td>
<td>The default is N.</td>
</tr>
<tr>
<td></td>
<td>You must recycle the Data Collector after you change this parameter.</td>
</tr>
<tr>
<td></td>
<td>Note: If this value is set to Y, the NEAR_HISTORY parameter must be set to Y.</td>
</tr>
<tr>
<td></td>
<td>Note: The Data Collector must be recycled after changing this parameter.</td>
</tr>
<tr>
<td>HOURLY_SYSTEM_HISTORY</td>
<td>Specifies whether long-term system history data is collected and reported at an hourly level (Long Term History reports) in addition to a daily level. Valid values are Y (Yes) and N (No):</td>
</tr>
<tr>
<td></td>
<td>■ Y -- Long-term system history data is collected and reported at an hourly level.</td>
</tr>
<tr>
<td></td>
<td>■ N -- Long-term system history data is not collected and reported at an hourly level.</td>
</tr>
<tr>
<td></td>
<td>The default is N.</td>
</tr>
<tr>
<td></td>
<td>You must recycle the Data Collector after you change this parameter.</td>
</tr>
<tr>
<td></td>
<td>Note: If this value is set to Y, the NEAR_HISTORY parameter must be set to Y.</td>
</tr>
<tr>
<td></td>
<td>Note: The Data Collector must be recycled after changing this parameter.</td>
</tr>
<tr>
<td>SHOW_ACTION</td>
<td>Specifies whether actions taken on behalf of recommendations will be written to the SYSTSPRT SYSOUT log at every cycle of the background advisors. Valid values are Y (Yes) and N (No).</td>
</tr>
<tr>
<td></td>
<td>The default is N (No).</td>
</tr>
<tr>
<td>SHOW_RECOMMEND</td>
<td>Specifies whether currently issued recommendations will be written to the SYSTSPRT SYSOUT log at every cycle of the background advisors. Valid values are Y (Yes) and N (No).</td>
</tr>
<tr>
<td></td>
<td>The default is N (No).</td>
</tr>
<tr>
<td>SHOW_WTO</td>
<td>Specifies whether WTO messages will be written to the SYSTSPRT SYSOUT log when actions are executed. Valid values are Y (Yes) and N (No).</td>
</tr>
<tr>
<td></td>
<td>The default is Y.</td>
</tr>
</tbody>
</table>

**Virtual storage parameter variables**
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSCMAX</td>
<td>Maximum amount of the DBM1 region (in megabytes) that the specified DB2 is allowed to use. The default is <strong>1000</strong>.</td>
</tr>
<tr>
<td>VSCAVAIL_ALERT</td>
<td>Level of available storage (in megabytes) at which an ALERT will be triggered. The default is <strong>100</strong>. Note: If this value is set for a specific DB2 subsystem, the values for VSCAVAIL_WARN, and VSCAVAIL_NOTE must also be set for that DB2 subsystem.</td>
</tr>
<tr>
<td>VSCAVAIL_WARN</td>
<td>Level of available storage (in megabytes) at which a WARNING will be triggered. The default is <strong>200</strong>. Note: If this value is set for a specific DB2 subsystem, the values for VSCAVAIL_NOTE, and VSCAVAIL_ALERT must also be set for that DB2 subsystem.</td>
</tr>
<tr>
<td>VSCAVAIL_NOTE</td>
<td>Level of available storage (in megabytes) at which a NOTE will be triggered. The default is <strong>500</strong>. Note: If this value is set for a specific DB2 subsystem, the values for VSCAVAIL_WARN, and VSCAVAIL_ALERT must also be set for that DB2 subsystem.</td>
</tr>
<tr>
<td>VSCPSR_ALERT</td>
<td>Page steal rate at which an ALERT will be triggered. The default is <strong>50</strong> (pages per second). Note: If this value is set for a specific DB2 subsystem, the values for VSCPSR_NOTE and VSCPSR_WARN must also be set for that DB2 subsystem.</td>
</tr>
<tr>
<td>VSCPSR_WARN</td>
<td>Page steal rate at which a WARNING will be triggered. The default is <strong>20</strong> (pages per second). Note: If this value is set for a specific DB2 subsystem, the values for VSCPSR_NOTE and VSCPSR_ALERT must also be set for that DB2 subsystem.</td>
</tr>
<tr>
<td>VSCPSR_NOTE</td>
<td>Page steal rate at which a NOTE will be triggered. The default is <strong>10</strong> (pages per second). Note: If this value is set for a specific DB2 subsystem, the values for VSCPSR_WARN and VSCPSR_ALERT must also be set for that DB2 subsystem.</td>
</tr>
</tbody>
</table>

**EDM pool parameter variables**

<p>| EDMSIZE_DEC       | Number of kilobytes by which to decrease the size of the EDM pool when a recommendation is made to decrease the size. <strong>Note:</strong> All specifications should be in 5000 KB increments and cannot be lower than the original setting. |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| EDMSIZE_INC      | Number of kilobytes by which to increase the size of the EDM pool when a recommendation is made to increase the size.  
**Note:** All specifications should be in 5000 KB increments. |
| EDMSIZE_MIN      | Size (in kilobytes) below which the EDM pool should not be decreased on behalf of a recommendation.  
**Note:** All specifications should be in 5000 KB increments. |
| EDMSIZE_MAX      | Size (in kilobytes) above which the EDM pool should not be increased on behalf of a recommendation.  
**Note:** All specifications should be in 5000 KB increments. |

**Performance profile variable parameter variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| GPGSACT_LOW      | Lower boundary for the activity level of a buffer pool in getpages per second.  
The default is < 100 getpages per second. |
| GPGSACT_HI       | Upper boundary for the activity level of a buffer pool in getpages per second.  
The default is > 999 getpages per second. |
| UPDATE_LOW       | Lower boundary for the update rate of a buffer pool in updates per second.  
The default is < 10 updates per second. |
| UPDATE_HI        | Upper boundary for the update rate of a buffer pool in updates per second.  
The default is > 99 updates per second. |
| SEQUENTIAL_LOW   | Lower boundary for the sequential access rate of a buffer pool.  
The default is < 30% getpage activity uses sequential access. |
| SEQUENTIAL_HI    | Upper boundary for the sequential access rate of a buffer pool.  
The default is > 69% getpage activity uses sequential access. |
| SIZE_LOW         | Lower boundary for the page set size in pages.  
The default is < 1000 pages. |
| SIZE_HI          | Upper boundary for the page set size in pages.  
The default is > 99,999 pages. |

**DBD cache parameter variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| DBDSIZE_DEC      | Number of kilobytes by which to decrease the size of the DBD cache when a recommendation is made to decrease the size.  
**Note:** All specifications must be in 5000 KB increments and cannot be lower than the original setting. |
| DBDSIZE_INC      | Number of kilobytes by which to increase the size of the DBD cache when a recommendation is made to increase the size.  
**Note:** All specifications must be in 5000 KB increments. |
### Variable Description

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| **DBDSIZE_MIN**  | Size (in kilobytes) below which the DBD cache should not be decreased on behalf of a recommendation.  
**Note:** All specifications must be in 5000 KB increments. |
| **DBDSIZE_MAX**  | Size (in kilobytes) above which the DBD cache should not be increased on behalf of a recommendation.  
**Note:** All specifications must be in 5000 KB increments. |
| **RID pool parameter variables** |                                                                 |
| **RIDSIZE_DEC**  | Number of kilobytes by which to decrease the size of the RID pool when a recommendation is made to decrease the size. |
| **RIDSIZE_INC**  | Number of kilobytes by which to increase the size of the RID pool when a recommendation is made to increase the size. |
| **RIDSIZE_MIN**  | Size (in kilobytes) below which the RID pool should not be decreased on behalf of a recommendation. |
| **RIDSIZE_MAX**  | Size (in kilobytes) above which the RID pool should not be increased on behalf of a recommendation. |
| **Sort pool parameter variables** |                                                                 |
| **SORTSIZE_DEC** | Number of kilobytes by which to decrease the size of the sort pool when a recommendation is made to decrease the size. |
| **SORTSIZE_INC** | Number of kilobytes by which to increase the size of the sort pool when a recommendation is made to increase the size. |
| **SORTSIZE_MIN** | Size (in kilobytes) below which the sort pool should not be decreased on behalf of a recommendation. |
| **SORTSIZE_MAX** | Size (in kilobytes) above which the sort pool should not be increased on behalf of a recommendation. |
| **Global buffer pool parameter variables** |                                                                 |
| **BPREDUCE**     | Determines whether the size of buffer pools can be decreased when the storage management mode is NORMAL and getpage activity is low. Valid values are Y (Yes) and N (No).  
- **Y** – Buffer pool decreases are allowed during NORMAL mode when getpage activity is low. The size of the buffer pool will decrease by the amount specified in SIZE_** _bpid_DEC_.  
- **N** – Buffer pool decreases are not allowed in NORMAL mode.  
The default is N (No).  
When specified for a DB2 subsystem, this variable applies to all buffer pools on the DB2 subsystem. When specified for #ALL, it applies to all buffer pools on all DB2 subsystems that are listed on the Variable Repository SSID Selection panel. |

**Initialization parameters**

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<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP#ALL_DP MAX</td>
<td>Maximum number of dirty pages allowed for all buffer pools combined. The default is 10000.</td>
</tr>
<tr>
<td></td>
<td>Note: If DPMAX = 0, the deferred write and vertical deferred write thresholds are recalculated.</td>
</tr>
<tr>
<td></td>
<td>When specified for a DB2 subsystem, this variable applies to all buffer pools on the DB2 subsystem. When specified for #ALL, it applies to all buffer pools on all DB2 subsystems that are listed on the Variable Repository SSID Selection panel.</td>
</tr>
<tr>
<td>VPSEQT_STICK</td>
<td>Number of times increments to the sequential steal threshold (VPSEQT) are allowed in a 24-hour period. Valid values are</td>
</tr>
<tr>
<td></td>
<td>■ 0 -- an unlimited number of increments are allowed</td>
</tr>
<tr>
<td></td>
<td>■ 1 - 255 -- the specified number of increments are allowed</td>
</tr>
<tr>
<td></td>
<td>The default is 3.</td>
</tr>
<tr>
<td></td>
<td>Note: Each 24-hour period begins at midnight. When the specified number of increments is reached, the VPSEQT is changed to 50% to accommodate varying workloads, and no additional changes are allowed until a new cycle begins at midnight.</td>
</tr>
<tr>
<td></td>
<td>When specified for a DB2 subsystem, this variable applies to all buffer pools on the DB2 subsystem. When specified for #ALL, it applies to all buffer pools on all DB2 subsystems that are listed on the Variable Repository SSID Selection panel.</td>
</tr>
<tr>
<td>Buffer pool parameter variables</td>
<td></td>
</tr>
<tr>
<td>SIZE_ bpid_DEC</td>
<td>Number of pages by which to decrease the size of the specified buffer pool when a recommendation is made to decrease the size.</td>
</tr>
<tr>
<td>SIZE_ bpid_INC</td>
<td>Number of pages by which to increase the size of the specified buffer pool when a recommendation is made to increase the size.</td>
</tr>
<tr>
<td>SIZE_ bpid_MIN</td>
<td>Size (in pages) below which the specified buffer pool should not be decreased on behalf of a recommendation.</td>
</tr>
<tr>
<td>SIZE_ bpid_MAX</td>
<td>Size (in pages) above which the specified buffer pool should not be increased on behalf of a recommendation.</td>
</tr>
<tr>
<td>Group buffer pool parameter variables</td>
<td></td>
</tr>
<tr>
<td>CASTO_ALERT</td>
<td>Number of castouts allowed before an ALERT is triggered. This value must be greater than the WARNING value.</td>
</tr>
<tr>
<td></td>
<td>The default is 15.</td>
</tr>
<tr>
<td></td>
<td>Note: If a value smaller than the WARNING value is specified, this value will be changed to three times the WARNING value.</td>
</tr>
<tr>
<td>CASTO_WARN</td>
<td>Number of castouts allowed before a WARNING is triggered.</td>
</tr>
<tr>
<td></td>
<td>The default is 5.</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CHECKP_ALERT</td>
<td>Number of checkpoint operations allowed before an ALERT is triggered. This value must be greater than the WARNING value. The default is 4. Note: If a value smaller than the WARNING value is specified, this value will be changed to twice the WARNING value.</td>
</tr>
<tr>
<td>CHECKP_WARN</td>
<td>Number of checkpoint operations allowed before a WARNING is triggered. The default is 2.</td>
</tr>
</tbody>
</table>

**Pool Advisor rules**

The following table details the rules that Pool Advisor uses to trigger recommendations for changes to parameters.

Each rule describes a condition in DB2, the existence of which triggers the recommendation.

**Table 2: Pool Advisor rules**

<table>
<thead>
<tr>
<th>Advisor</th>
<th>Rule is triggered when</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDM pool</td>
<td>The EDM pool efficiency drops below 70%</td>
</tr>
<tr>
<td></td>
<td>The EDM pool efficiency drops below 90%</td>
</tr>
<tr>
<td></td>
<td>The EDM pool has a positive load failure count</td>
</tr>
<tr>
<td></td>
<td>The EDM pool activity is high, but utilization is low</td>
</tr>
<tr>
<td></td>
<td>The EDM pool size is smaller than the minimum</td>
</tr>
<tr>
<td></td>
<td>The EDM pool size is larger than the maximum</td>
</tr>
<tr>
<td>RID pool</td>
<td>The RID pool efficiency drops below 70%</td>
</tr>
<tr>
<td></td>
<td>The RID pool efficiency drops below 90%</td>
</tr>
<tr>
<td></td>
<td>The RID pool experiences storage related failures</td>
</tr>
<tr>
<td></td>
<td>The RID pool activity is high, but utilization is low</td>
</tr>
<tr>
<td></td>
<td>The RID pool size is smaller than the minimum</td>
</tr>
<tr>
<td></td>
<td>The RID pool size is larger than the maximum</td>
</tr>
<tr>
<td>Advisor</td>
<td>Rule is triggered when</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sort pool</td>
<td>The sort pool efficiency drops below 70%</td>
</tr>
<tr>
<td></td>
<td>The sort pool efficiency drops below 90%</td>
</tr>
<tr>
<td></td>
<td>The sort pool size is smaller than the minimum</td>
</tr>
<tr>
<td></td>
<td>The sort pool size is larger than the maximum.</td>
</tr>
<tr>
<td>Buffer pool</td>
<td>There is positive DM event for this buffer pool</td>
</tr>
<tr>
<td></td>
<td>The I/O rate is significant, sequential access is low, the page residency time is less than 30 seconds, and the system hit ratio is less than 90%</td>
</tr>
<tr>
<td></td>
<td>The I/O rate is significant, sequential access is medium, the page residency time is less than 30 seconds, and the system hit ratio is less than 70%</td>
</tr>
<tr>
<td></td>
<td>The I/O rate is significant, sequential access is high, and the application hit ratio is less than 90%</td>
</tr>
<tr>
<td></td>
<td>The getpage rate is less than 10 pages per second and the virtual pool residency time is greater than 300 seconds</td>
</tr>
<tr>
<td></td>
<td>The virtual pool residency time is very high</td>
</tr>
<tr>
<td></td>
<td>The buffer pool size is smaller than the minimum</td>
</tr>
<tr>
<td></td>
<td>The Buffer pool size is larger than the maximum</td>
</tr>
<tr>
<td>Sequential steal threshold</td>
<td>Buffer pool access is predominantly sequential, but the sequential steal threshold (VPSEQT) is currently set too low</td>
</tr>
<tr>
<td></td>
<td>Buffer pool access is predominantly random, but the sequential steal threshold (VPSEQT) is currently set too high</td>
</tr>
<tr>
<td>Deferred write and vertical deferred write thresholds</td>
<td>Buffer pool access is predominantly random, the updated-page write I/O rate is above the minimum threshold of 5 pages per second, and the deferred write threshold (DWQT) is at least 20% lower than the recommended value</td>
</tr>
<tr>
<td></td>
<td>Buffer pool access is predominantly sequential or has low update activity, and the deferred write threshold (DWQT) is at least 20% higher than the recommended value</td>
</tr>
<tr>
<td></td>
<td>The maximum number of dirty pages allowed for all buffer pools (DPMAX) = 0 and update activity has increased or the size of the buffer pool has decreased</td>
</tr>
<tr>
<td></td>
<td>The maximum number of dirty pages allowed for all buffer pools (DPMAX) = 0 and update activity has decreased or the size of the buffer pool has increased</td>
</tr>
<tr>
<td>Group buffer pool</td>
<td>Prevent group buffer pool from changing system status</td>
</tr>
</tbody>
</table>
### Pool Advisor rules

<table>
<thead>
<tr>
<th>Advisor</th>
<th>Rule is triggered when</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBD cache</td>
<td>The DBD cache efficiency drops below 70%</td>
</tr>
<tr>
<td></td>
<td>The DBD cache efficiency drops below 90%</td>
</tr>
<tr>
<td></td>
<td>The DBD cache has a positive load failure count</td>
</tr>
<tr>
<td></td>
<td>The DBD cache activity is high, but utilization is low</td>
</tr>
<tr>
<td></td>
<td>The DBD cache size is smaller than the minimum</td>
</tr>
<tr>
<td></td>
<td>The DBD cache size is larger than the maximum</td>
</tr>
</tbody>
</table>
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