Pool Advisor for DB2®
User Guide

Supporting

Version 10.1 of Pool Advisor for DB2

April 2011
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  - 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 issue

- commands and options that you used

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  - messages from related software
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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. 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 System Performance for DB2 solution, which integrates the features and functions of Pool Advisor, OPERTUNE for DB2, and MainView for DB2 into a single product interface.

This book is intended for use by DB2 systems programmers, database administrators, DB2 performance analysts, and operators.

Like most BMC documentation, this book is available in printed and online formats. To request additional printed books or to view online books and notices (such as release notes and technical bulletins), see the Customer Support website at http://www.bmc.com/support. Some product shipments also include the online books on a documentation CD.

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The software also offers online Help. To access Help, press F1 from any panel, report, or field.

**Related publications**

The following related publications supplement this book and the online Help:

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<td>System and SQL Performance for DB2 Installation Guide</td>
<td>provides information you need to prepare for installation, to use the Installation Assistant to customize Pool Advisor, and to perform post-installation tasks that prepare Pool Advisor for use.</td>
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<td>System and SQL Performance for DB2 Administrator Guide</td>
<td>contains detailed information about the administrative functions for all of the System and SQL Performance products (APPTUNE for DB2, Pool Advisor for DB2, SQL Explorer for DB2, SQL Performance for DB2, System Performance for DB2, and MainView for DB2 – Data Collector)</td>
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**Messages**

The Pool Advisor documentation set does not include a messages manual. All Pool Advisor messages are documented in online Help. In addition, you can view the documentation for all messages by browsing the MSGLIST member of the BBSAMP data set. Both the online Help and the MSGLIST member provide an explanation for each message and suggest corrective actions. The MSGLIST member can also be printed if you prefer hardcopy documentation.

**Conventions**

This book uses the following special conventions that are worth noting:

- All syntax, operating system terms, and literal examples are presented in this typeface.
- Variable text is displayed in *italic* text:
  
  Type HELP *commandName* on the **Command** line.
- The symbol => connects items in a menu sequence. For example, **Actions => Create Test** instructs you to choose the **Create Test** command from the **Actions** menu.
Syntax diagrams

Read syntax diagrams from left to right and top to bottom.

The following conventions are used to diagram the syntax of commands and control statements:

- Required items are shown on the main line.
- Optional items are shown below the main line.
- Defaults are shown above the main line.
- If you must choose one item from two or more required items, the items are vertically stacked and the first item in the stack is shown on the main line.
- If you can choose from two or more optional items, the items are vertically stacked and the entire stack (except for the default) is shown below the main line.
Summary of changes

If you can choose more than one item, a recursive arrow is shown above the keyword, value, or stack.

If multiple values must be separated by a delimiter, the required delimiter is shown on the recursive arrow.

Actual values and keywords are shown in uppercase letters; variables are shown in lowercase letters.

Values in uppercase must be typed as shown except where the text indicates that other abbreviations can be used.

If a value in uppercase letters can be shortened, the minimum portion that is required is displayed in larger uppercase letters than the remainder of the word (for example, CANCEL).

Parentheses must be used as shown.

Summary of changes

The summary of changes for the current release is available in the release notes (see “What’s New”), and the summaries of changes for all previous releases of the product are available in online Help.

The latest version of the release notes is available on the web at http://www.bmc.com/support.

To view a summary of changes online, follow these instructions:

1. Select Summary of Changes from the main menu displayed when you begin your product session.

2. Select to view a list of previous change summaries.

3. Select any topic from the displayed selection list for an explanation of the new feature for each previous product release.

You can also reach the current summary of changes by typing CHANGES on the Command line of any product panel and pressing Enter.

Where additions and modifications to the technical content of this book occur, revision bars have been inserted in the margin.
Overview of Pool Advisor for DB2

This chapter introduces you to the Pool Advisor product for DB2 and contains the following topics:

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Introduction

Pool Advisor 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 System Performance for DB2 solution, which integrates the features and functions of Pool Advisor, OPERTUNE for DB2, and MainView for DB2 into a single product interface. If you have the System Performance solution installed at your site, you do not need this book. All Pool Advisor information is included in the *System Performance User Guide*.

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**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 MVS 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.

**What is the problem?**

Distributing storage resources among the various pools in a configuration that assists DB2 performance is one of the DB2 systems programming and database administration tasks. 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**

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 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?
- 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 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 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**

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 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, overallocating the EDM pool will lead 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.

**DBD cache**

DB2 version 8 and later stores database descriptors (DBDs) in a separate DBD cache that is allocated in above-the-bar storage. Moving the DBDs from the EDM pool, where they were stored in DB2 version 7 and earlier, relieves contention from other traditional EDM pool objects.

**Dynamic statement caching**

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 often done over and over. Caching can help because statements that are recalled from cache use far fewer resources than statements that need to be prepared again. But, if caching is enabled, DB2 caches all dynamic PREPAREs, not just those that are used repeatedly. There may not be enough storage to ensure good cache performance consistently.
RID pool

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

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 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

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.

**Solving the problem**

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

- 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 product available today. It 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 BMC Software OPERTUNE for DB2 product is also installed, the EDM pool size can be increased dynamically.
Dynamic statement caching

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 illustrates the major components of Pool Advisor.

**Figure 3  Pool Advisor architecture**

![Pool Advisor architecture diagram]

**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
- issues DB2, z/OS, and OPERTUNE commands that are received from Pool Advisor users

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.

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Report Manager

The Report Manager is your interface to Pool Advisor. 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 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 not only monitors the resources on your system, it can spot potential problems and recommend changes before those potential problems become actual problems. Advisors are the components that serve this purpose.

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.

**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 performance.

**Pool Advisor report set**

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.

For information 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, MVS, 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.

See Chapter 4, “Reporting,” for more information about reporting.
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, which 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
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 System and SQL Performance for DB2 Installation Guide.

Reporting problems

At times you might encounter problems using Pool Advisor that require you to contact BMC Software Customer Support for assistance. Before calling your BMC Software customer support representatives, you can gather information that will help them to diagnose and resolve your problem as quickly as possible.
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 products:
   - System Performance for DB2
   - SQL Performance for DB2
   - APPTUNE for DB2
   - Pool Advisor for DB2
   - SQL Explorer for DB2
   - MainView for DB2
   - MainView for DB2 – Data Collector
   - DB2
   - z/OS
   - DFP/DFSMS
   - CICS
   - security package

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 SUPERZAPs that have been applied (option 6 on the Administration menu).

You can contact BMC by calling BMC Software Customer Support in North America or by contacting a BMC Software international support center outside of North America.

From anywhere in the world, you can contact BMC Software on the World Wide Web or by e-mail:

- Internet address: www.bmc.com
- E-mail address: customer_support@bmc.com*
* In the subject line, enter **SupID:***yourSupportContractID*, such as SupID:12345.
Reporting problems
Getting started with Pool Advisor

This chapter provides general information about panel layouts, navigation, and logging on. The following topics are covered:

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Navigation ............................................................... 38
Panel layout .............................................................. 39
Report layout ........................................................... 42
Pool Advisor main menu ............................................. 43
Online assistance ....................................................... 45

Logging on

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

- a menu option
- a CLIST

Select the ISPF menu option or execute the CLIST to log on to Pool Advisor. Contact your product administrator for the proper procedure to use at your site.

When you log on, the Pool Advisor logo panel (Figure 5 on page 38) is displayed briefly while the product initializes, followed by the Pool Advisor main menu (Figure 8 on page 43).

If you are using multiple System and SQL Performance for DB2 products, a common main menu is displayed (for more information, see Appendix B, “Using multiple System and SQL Performance products”).
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 only 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

Figure 6 shows the attributes shared by 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 *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

On scrollable panels, the current line number and the total number of lines is displayed in the format **LINE mnn OF mnn**.
If the panel is scrollable, the scroll amount (in the format 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>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>
</tbody>
</table>
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.

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.

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<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>
Report layout

Figure 7 shows the common elements that are shared by Pool Advisor reports.

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

**Figure 8   Pool Advisor for DB2 main menu (PMDESEL1)**

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.

Y. Use Summary of Changes to see a list of new features and functions in the previous product releases.

Z. Use About Pool Advisor to view copyright and trademark information about Pool Advisor and to obtain Internet and e-mail addresses for BMC Software 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. The main menu that is shown in Figure 8 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 64 on page 122 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* 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 chapter describes the types of advisors that provide tuning advice from Pool Advisor. It also describes the background operation of advisors. The following topics are covered:

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Report advice .............................................................. 48
Background advisors ..................................................... 51
The ADVISOR button ..................................................... 53
Example of an alert ......................................................... 54
  Storage management mode ........................................... 57
  Pending Action List ..................................................... 59
  Displaying a rule ....................................................... 60
  Executing a rule ......................................................... 61
  Acknowledging a recommendation ............................... 62
  Changing the status of rules ........................................ 63

Introduction

Advisors are at the center of Pool Advisor. In the background, advisors are continually monitoring 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 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

No performance degradation due to excessive paging was detected and no change to the system is recommended at this time.

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.

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.
Figure 10 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

The advice in Figure 10 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).
Increase Buffer Pool Size

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
- RID Pool Advisor
- Sort Pool Advisor
- Dynamic Statement Cache Advisor
- Virtual Storage Constraint 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 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 Appendix C, “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. No matter where you travel through these reports, this 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

**Figure 13** is 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
- the red ALERT button is displayed

**Figure 13  RID Pool Status Monitor report**

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, the Background Advisor DB2 Selection List (Figure 14) 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**

```
PMDEROUT/I  Background Advisor DB2 Selection List  LINE 1 OF 3
Command =====> _______________________________________________ Scroll ===> CSR_
BMCSftwr.PMDROUT .............................................. 06/19 14:20:12

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*
```

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 (Figure 15) 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.
Figure 15  Advisor Selection List panel

If recommendations are pending, the Action List hyperlink is displayed. Click on the hyperlink to display the Pending Action List.

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

NORMAL mode indicates that all increase recommendations will be honored. 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
Example of an alert

- 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, or

- available storage in the DBM1 region below the 2-GB bar is less than the ALERT threshold in the VSCAVAIL_ALERT initialization parameter, or

- 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 Appendix C, “Parameter variables and rules” for more information.

**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.

### Pending Action List

The Pending Action List displays all recommendations that have been accepted by the system advisor. Figure 16 is an example of a Pending Action List with recommendations:

- to increase the size of the RID pool
- to increase the size of the sort pool

**Figure 16** Pending Action List panel

From the Action List, you can display the rule that triggered the recommendation (click on **RULE**), you can execute the recommended command (click on **EXEC**), or you can acknowledge a rule for which no action can be taken (click on **ACKN**).
Displaying a rule

When you click on RULE on the Pending Action List panel, the Rule Details panel (Figure 17) displays the rule associated with the selected recommendation. A rule describes a condition in DB2, and when that condition is met, Pool Advisor triggers a recommendation.

Figure 17  Rule Details panel

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 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.
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**

```
DOMEADV0/I                     Advisor Response LINE 1 OF 52
Command ===> ____________________________ Scroll ===> CSR_

ADVISOR:PMDZBRUL -- ------------------------------ -- 10/28/08 16:50:42
                                              Apply rules by buffer pool

Rule Identifier: BR3    Rule Version: 5.3    DB2: DEDO

Rule Description: System hit ratio less than 70%

Click on the Buffer ID value to create an individual rule or delete an existing individual rule. See product manual for details.

<table>
<thead>
<tr>
<th>Buffer ID</th>
<th>Aut</th>
<th>Ign</th>
<th>Ack</th>
<th>Times</th>
<th>Trig</th>
<th>Exec</th>
<th>Buffer ID</th>
<th>Aut</th>
<th>Ign</th>
<th>Ack</th>
<th>Times</th>
<th>Trig</th>
<th>Exec</th>
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<tr>
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<td>N</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td>BP1</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td></td>
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<td></td>
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<td></td>
</tr>
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<td>N</td>
<td></td>
<td></td>
<td></td>
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<td>N</td>
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<td></td>
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<td>N</td>
<td></td>
<td></td>
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<td>BP9</td>
<td>N</td>
<td>N</td>
<td>N</td>
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</tr>
<tr>
<td>BP10</td>
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<td></td>
<td>BP11</td>
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<td></td>
<td></td>
<td></td>
<td>BP13</td>
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<td></td>
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<td>BP14</td>
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<td>N</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**Executing a rule**

If Pool Advisor can issue a command to implement the recommendation, you can click on EXEC on the Pending Action List panel (Figure 16 on page 59) to execute the command immediately. 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 is an example of the Command Interface panel that is displayed when a command is executed.

**Figure 19  Command Interface panel**

![Command Interface panel](image)

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.

**Acknowledging a recommendation**

At times, Pool Advisor will detect 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). When you acknowledge the item, the status changes to **Done**. The item remains on the list until the next collection cycle.
When a recommendation has been acknowledged, but the condition that caused the recommendation remains, the status of the corresponding advisor is changed to NOTIFICATION until the condition is relieved, 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.

Follow these instructions:

1. Click on the ADVISOR button from any report.
The Background Advisor DB2 Selection List (Figure 21) is displayed.

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

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**.
The Advisor Selection List (Figure 22) is displayed.

Figure 22   Advisor Selection List panel

3 Link from Click here to change rule settings.
The default values are Auto: N and Ignore: N
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:

- **AUTOMATIC**
  Click on this value 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.

- **MANUAL**
  Click on this value 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 (Figure 16 on page 59) when a warning or alert is issued.

- **IGNORE**
  Click on this value if you want System Performance to ignore all rules. No warnings or alerts will be displayed and no actions will be taken.

- **REINSTATE**
  Click on this value to reinstate all ignored rules. Warnings and alerts are displayed in the normal manner.
Example of an alert
Reporting

This chapter describes the Pool Advisor reports. The following topics are covered:

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  Action codes ............................................................. 72
  Interval ................................................................. 72
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  Virtual Storage Status Monitor ...................................... 74
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  Dynamic Statement Cache ........................................... 83
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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 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 Figure 27 on page 73). 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 Figure 27 on page 73). 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 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](image)

**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.
Viewing Pool Advisor reports

The Pool Advisor session begins at the Pool Advisor Main Menu (see Figure 8 on page 43). Select option P (Pool Advisor) to display the DB2 Pools Status Monitor report.

DB2 Pools Status Monitor

The DB2 Pools Status Monitor report (Figure 27) 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 92.

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>
<tr>
<td>SORT Efficiency</td>
<td>Sort Pool Status Monitor report</td>
</tr>
<tr>
<td>GBP Efficiency</td>
<td>Group Buffer Pool Status report</td>
</tr>
</tbody>
</table>

**Virtual Storage Status Monitor**

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

Virtual storage constraint can be a serious problem resulting in severe consequences. In DB2 versions prior to version 8, the storage pools are allocated below the bar. The virtual storage advisor monitors available resources and considers recommendations for increases to individual pools against the overall availability of storage in an effort to balance resource use and prevent virtual storage constraint.
With the introduction of 64-bit address spaces in DB2 version 8, virtual storage constraint has become less likely. Since all virtual buffer pools are allocated in storage above the 2-GB bar in DB2 version 8, 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 76 is an example of the Virtual Storage Status Monitor report.
### Figure 28  Virtual Storage Status Monitor report (PMDSTRG1)

| PMDEQRPN/I | Pool Advisor Report Viewer | Command ====> | Pool Advisor Report Viewer | Scroll ===> | CSR_ | More:  | +
|-------------|----------------------------|---------------|---------------------------|-------------|------|--------|---

#### DBM1 virtual storage allocation summary

<table>
<thead>
<tr>
<th>Pages/sec to MVS page data sets</th>
<th>35</th>
<th>Pages/sec steal rate</th>
<th>34</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum virtual storage below 2GB</td>
<td>1651.98 MB (system limit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total allocated below 2GB</td>
<td>135.53 MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserved for MVS functions</td>
<td>0.04 MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserved for critical work</td>
<td>25.06 MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional reserved</td>
<td>25.06 MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Virt storage available below 2GB

| 1466.29 MB |

| Warning cushion for strg contract | 82.30 MB |
| Total virt storage alloc above 2GB | 5441.00 MB |

### Virtual storage allocation details: (ABOVE 2GB)

<table>
<thead>
<tr>
<th>Total virtual storage allocated</th>
<th>5441.00 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined buffer pools</td>
<td>279.37 MB</td>
</tr>
<tr>
<td>Dynamic statement cache</td>
<td>9.77 MB</td>
</tr>
<tr>
<td>DBD pool</td>
<td>4.88 MB</td>
</tr>
<tr>
<td>RID pool (RID lists)</td>
<td>0.14 MB</td>
</tr>
<tr>
<td>Compression dictionaries</td>
<td>0.00 MB</td>
</tr>
<tr>
<td>Internal trace table</td>
<td>0.00 MB</td>
</tr>
<tr>
<td>Castout buffers</td>
<td>0.88 MB</td>
</tr>
<tr>
<td>Virtual pool control blocks</td>
<td>8.13 MB</td>
</tr>
</tbody>
</table>

Total attributed storage | 292.74 MB |

Unattributed storage above 2GB | 5148.26 MB |

### Virtual storage allocation details: (BELOW 2GB)

<table>
<thead>
<tr>
<th>Total virtual storage allocated</th>
<th>135.53 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDM pool</td>
<td>4.88 MB</td>
</tr>
<tr>
<td>RID pool (RID maps)</td>
<td>0.05 MB</td>
</tr>
<tr>
<td>RDS operations storage</td>
<td>0.00 MB</td>
</tr>
<tr>
<td>Total agent local</td>
<td>39.27 MB</td>
</tr>
<tr>
<td>Total agent system</td>
<td>15.54 MB</td>
</tr>
<tr>
<td>Local statement cache cntl blks</td>
<td>0.99 MB</td>
</tr>
<tr>
<td>Local thread statement cache</td>
<td>1.32 MB</td>
</tr>
<tr>
<td>Pipe manager</td>
<td>0.00 MB</td>
</tr>
</tbody>
</table>
Buffer Pool reports

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

- Buffer Pools Status Monitor
- Buffer Pool Active Page Sets
- Buffer Pool All Page Sets
- Buffer Pool Page Set Objects

Buffer Pools Status Monitor

The Buffer Pools Status Monitor report (Figure 29) 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 is an example of an expanded report.

Table 30. Expanded Buffer Pools Status Monitor report

| PoolID | Eff | Pgs | PfX | PST | sets | Res | /Sec | /Sec | Evtt | HttR | HttR | dlyd | dlyd | dlyd | IO/s | /Sec | /Wrt | /Wrt | Cmpat | PoolID |
|--------|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| BP0    | 100%| 1000| N   | L   | 245  | 999 | 2019 | 1    | 0    | 100  | 100  | 0%   | 0%   | 0%   | 0%   | 1    | 3    | 242   | 89    |

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.
Buffer Pool Page Sets reports

The Buffer Pool Active Page Sets report (Figure 31) provides detailed statistics about the active page sets in the selected buffer pool.

Figure 31 Buffer Pool Active Page Sets report (PMDBPPS)

The Buffer Pool All Page Sets report (Figure 32) provides detailed statistics about all page sets in the selected buffer pool.

Figure 32 Buffer Pool All Page Sets report (PMDBPPSA)

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.
Buffer Pool Page Set Objects report

The Buffer Pool Page Set Objects report (Figure 33) provides detailed statistics about all of the objects in the selected page set.

Figure 33 Buffer Pool Page Set Objects report (PMDBPOBJ)

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 highlighted field in Figure 33 for an example. Move the cursor to the truncated value and press F6. The long name will be displayed, as in Figure 34. Press F3 (End) to return to the report.

Figure 34 Long name display

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 (?) will be 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. Hyperlink from the CONFIG button on any Pool Advisor report to display the Configuration Menu (Figure 35).

**Figure 35** Configuration Menu

![Configuration Menu](image)

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

Select option 2. The Data Collector Command Interface panel (Figure 36) is displayed.

**Figure 36** Data Collector Command Interface panel

![Data Collector Command Interface](image)

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)

_ OBSCAN <DB2ID>

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).
Press Enter twice. The command is issued and the Command Interface output panel (Figure 37) is displayed with a message indicating the outcome of the command.

**Figure 37  Command Interface output panel**

---

Exit back to the Pool Advisor Configuration Menu.

**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 (Figure 38) provides statistics about use of the dynamic SQL statement PREPARE cache on the selected DB2 subsystem.

**Figure 38  Dynamic Statement Cache report (PMDDSC1)**

<table>
<thead>
<tr>
<th>PMDEORPN/I</th>
<th>Pool Advisor Report Viewer</th>
<th>LINE 1 OF 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ===&gt;</td>
<td>Pool Advisor Report Viewer</td>
<td>Scroll ===&gt; CSR_</td>
</tr>
<tr>
<td>More: +</td>
<td>BMCSftwr.PMDDSC1 -- DYNAMIC STATEMENT CACHE --</td>
<td>LINE 1 OF 30</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</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ DB2: DHY2 9.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 : 103  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 (Figure 39) provides a summary of EDM pool activity for the selected DB2 subsystem.

Because database descriptors (DBDs) have been moved to above-the-bar storage in DB2 version 8, statistics regarding the DBD cache have been added to the EDM Pool Status Monitor report for these DB2 subsystems.

Figure 39 ➤ EDM Pool Status Monitor report (PMDEDMP1)
Figure 40 is an example of the report that is displayed for DB2 version 9.

**Figure 40   EDM Pool Status Monitor report for version 9 (PMDEDMMP1)**

<table>
<thead>
<tr>
<th>Pool Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDM</td>
</tr>
<tr>
<td>DBD</td>
</tr>
<tr>
<td>SKELETON</td>
</tr>
</tbody>
</table>

<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>

Pool Advisor’s goal 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 BMC Software OPERTUNE for DB2 product is also installed, you can increase the size of the EDM pool dynamically.
The RID Pool Status Monitor report (Figure 41) provides detailed statistics of RID pool activity for the selected DB2 subsystem.

Figure 41 RID Pool Status Monitor report (PMDRIDP1)
Sort Pool Status Monitor

The Sort Pool Status Monitor report (Figure 42) provides statistics of sort pool activity for the selected DB2 subsystem.

Figure 42 Sort Pool Status Monitor report (PMDSRTP1)

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 (Figure 43) provides a high-level overview of the status of the group buffer pools associated with the selected DB2 subsystem.

![Group Buffer Pool Status report (PMDGBPS)](image)

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, which shows statistics associated with the group buffer pool (Figure 44).

**Figure 44  Group Buffer Pool Details report (PMDGBPT)**

The statistics reported relate to the entire group buffer pool. The values will be identical, regardless of the DB2 subsystem selected from the DB2 Pools Status Monitor report (Figure 27 on page 73).

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 to show EFFICIENCY CALCULATIONS more detailed statistics for each DB2 subsystem (Figure 45 on page 90).
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 46 on page 91 is an example of the Buffer Pools Recent Trends history report.
The following intervals are reported:

- **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 47 is an example of the Buffer Pools Daily History report.

**Figure 47  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.

**Command Log**

The Command Log (Figure 48 on page 93) 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.
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 49 is an example of the Command Log report expanded to show details and command responses for all commands.
This chapter describes the configuration analysis feature of Pool Advisor. The following topics are covered:

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Data sharing considerations ...................................... 116
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 51 illustrates a typical buffer pool configuration:

- few buffer pools
- approximate object separation
- unlike objects sharing the same pool

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 52 illustrates a better configuration with more buffer pools and more segregation of data into similar performance classes.
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.

### 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 102.

**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 information, see Appendix C, “Parameter variables and rules.”

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 information, see Appendix C, “Parameter variables and rules.”
**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 information, see Appendix C, “Parameter variables and rules.”

**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 information, see Appendix C, “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 (Figure 53). 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.

**Figure 53  Configuration Menu (PMDEBPCH)**

PMDEBPCH/I  Configuration Menu  10:52:46
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. The Buffer Pool Configuration Summary panel (Figure 54 on page 103) displays a summary of the buffer pools for a selected DB2 subsystem.
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.

The Buffer Pool Configuration Options panel (Figure 55 on page 104) 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.
Configuration analysis

Figure 55  Buffer Pool Configuration Options panel (PMDEBPCO)

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

### 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 105.

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 option is inhibited on the Buffer Pool Configuration Analysis screen.

**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 is displayed that details the changes recommended by the configuration advisor (see Figure 56).

Figure 56  Configuration Analysis Results Summary panel (PMDEBPA1)

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 the Buffer Pool Configuration Analysis panel (Figure 57) to see how the changes are represented in the configuration. This panel makes it easier to see and explore the new configuration.

Figure 57 Buffer Pool Configuration Analysis panel (PMDEBPCC)

The Buffer Pool Configuration Analysis panel is identical to the Buffer Pool Configuration Summary panel (Figure 58 on page 109) 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 the Buffer Pool Configuration Summary panel (Figure 58) and the Buffer Pool Attributes panel (Figure 59 on page 110).

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.

**Figure 58  Buffer Pool Configuration Summary panel (PMDEBPCA)**

Select a buffer pool with the S action code to display the Buffer Pool Attributes panel (Figure 59 on page 110).
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 on the Buffer Pool Configuration Summary panel (Figure 58 on page 109) and the Page Set Attributes panel (Figure 60).

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 60  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.
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.

When you click GENERATE JCL, the Buffer Pool Configuration JCL Generation panel (Figure 61) is displayed.

**Figure 61  Buffer Pool Configuration JCL Generation panel (PMDEJCL0)**

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.
Implementing the changes

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).

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.

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*.

When you have specified the values on this panel, press **Enter**.

An ISPF EDIT session is displayed (Figure 62 on page 114), showing 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.

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.
Implementing the changes

Figure 62  ISPF EDIT session

```
Implementing the changes

000001//PMDCFJOB JOB (4110), 'DBADM', MSGCLASS=X, CLASS=Q, REGION=OM

000002/* CONFIGURATION ADVISOR SKELETON JCL
          *  
000003/* NOTE: INSERT A VALID JOBCARD AND STEPLIB CONCATENATION. *
000004/* MEMBER RESIDING IN THE PARMLIB.  *
000005/*  
000006//JOBLIB  DD DISP=SHR, DSN=PMDQA.V6R2M00.BBLINK
000007//                     DD DISP=SHR, DSN=PMDQA.AUTH.LOAD
000008//STEP01 EXEC PGM=IKJEFT01, DYNAMNBR=20, TIME=1800
000009//SYSDUMP DD SYSOUT=*
000010//SYSTSIN DD *
000011// IMPLEMENT CHANGES GENERATED ON 2008.269 AT 14:44:09
000012//  
000013//J0BLIB DD DISP=SHR, DSN=PMDQA.V6R2M00.BBLINK
000014//                     DD DISP=SHR, DSN=PMDQA.AUTH.LOAD
000015//STEP01 EXEC PGM=IKJEFT01, DYNAMNBR=20, TIME=1800
000016//SYSDUMP DD SYSOUT=*
000017//SYSTSIN DD *
000018//  
000019//ALTER BUFFERPOOL(BP0) VPSIZE(8070) PGFIX(NO) 
000020//   VPSEQT(50) DWQT(15) VDWQT(3,0) 
000021//   PGSTEAL(LRU)
000022//ALTER BUFFERPOOL(BP1) VPSIZE(49590) PGFIX(NO) 
000023//   VPSEQT(50) DWQT(0) VDWQT(0,256) 
000024//   PGSTEAL(LRU)
000025//ALTER BUFFERPOOL(BP2) VPSIZE(63000) PGFIX(NO) 
000026//   VPSEQT(50) DWQT(0) VDWQT(0,256) 
000027//   PGSTEAL(LRU)
```
Data quality

Figure 63 is an example of the skeleton input JCL that can be found in the PMDCFJCL member of the PARMLIB.

Figure 63  Skeleton input JCL

```plaintext
//PMDCFJOB JOB ('DBADM', MSGCLASS=X, CLASS=Q, REGION=0M
//*****************************************************************************
//    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.
//*****************************************************************************
//JOBLIB DD DISP=SHR, DSN=$JOBLIB$
//$ENDJOB
//STEP01 EXEC PGM=IKJEFT01, DYNAMNBR=20, TIME=1800
//STEPLIB DD DISP=SHR, DSN=$STEPLIB$
//SYSUDUMP DD SYSOUT=* 
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSTSIN DD *
```

You need to tailor the skeleton input JCL by providing a valid job card. You can also concatenate an optional user JOBLIB and/or STEPLIB to existing DD statements. Do not delete the DD statements containing the $JOBLIB$ and $STEPLIB$ symbolics.

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 will only be 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

The first time you try the configuration process, use the default control options, which 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 it does not hurt to 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.
Pool Advisor exits

Pool Advisor provides the following user exits. The #DOMEXIT member of the BBSAMP library can be used to assemble and link edit these exits if they need to be changed.

Set user ID for security checks (DOMEXIT1) ........................................ 117
Override Pool Advisor security attributes (DOMEXIT2) ......................... 118
Validate DB2 user authority (DOMEXIT4) .............................................. 119
Set Pool Advisor session ID (DOMEXIT6) ............................................. 119

Set user ID for security checks (DOMEXIT1)

DOMEXIT1 is invoked by the Data Collector whenever the subsystem user ID must be set or changed for security processing. For example, it is invoked to set the IDs for issuing a -START TRACE command to each DB2.

This module processes the following requests:

- establishes initial subsystem user ID to MVS
- changes Pool Advisor user ID to another user ID to be used for DB2 authorization
- restores user ID to initial z/OS user ID

This default exit assumes that a security system exists that supports RACF RACROUTE macro services.

The source for DOMEXIT1 is supplied in the DOMEXIT1 member of the BBSAMP data set.
Override Pool Advisor security attributes (DOMEXIT2)

**NOTE**
DOMEXIT1 has been modified to support IBM APAR OW13376, which extends the ASXUSER field from 7 to 8 bytes. The 8 byte field is accessed by using the name ASXUSR8. The DOMEXIT1 routine can be modified to use the new 8 byte ASXUSR8 field if an 8 byte authorization ID is required. See the DOMEXIT1 member of the BBSAMP data set for instructions.

**WARNING**
This exit is invoked as an extension of the Data Collector in supervisor state. Use extreme caution if privileged instructions or system keys (0–7) are used, because errors could violate the integrity of MVS.

Override Pool Advisor security attributes (DOMEXIT2)

DOMEXIT2 is invoked to override selected user security attributes that are specified in the SECURITY data set. This exit can be driven at the start of each user session with a Data Collector. If no user security record exists in the SECURITY data set, the user is not allowed access to the Data Collector and this exit is not driven.

If a user security record does exist, selected fields can be overridden by this exit. These fields show:

- which Data Collectors can be used
- which DB2 subsystems can be used
- user DB2 command authority
- user DB2 trace authority
- user MVS command authority

This default exit assumes that the user is allowed to access the same DB2s and lists with the same privileges as those specified in the user security record.

The source for DOMEXIT2 is supplied in the DOMEXIT2 member of the BBSAMP data set.

**WARNING**
This exit is invoked as an extension of the Data Collector in supervisor state. Use extreme caution if privileged instructions or system keys (0–7) are used, because errors could violate the integrity of MVS.
Validate DB2 user authority (DOMEXIT4)

DOMEXIT4 is invoked to validate a user’s authority to invoke a DB2 function (start a trace, for example). The result is to either deny or allow the function.

The source for DOMEXIT4 is supplied in the DOMEXIT4 member of the BBSAMP data set.

WARNING
This exit is invoked as an extension of the Data Collector in supervisor state. Use extreme caution if privileged instructions or system keys (0–7) are used, because errors could violate the integrity of MVS.

Set Pool Advisor session ID (DOMEXIT6)

DOMEXIT6 is invoked each time a user contacts the Data Collector for a new user session. This exit assigns a session ID for each user. The user ID is assigned as the session ID by default. The default exit routine is supplied as object code and is part of the normal installation procedure.

The exit is also supplied as assembler source that can be modified to change the user’s session ID (the RACF group ID, for example). The source for DOMEXIT6 can be found in the DOMEXIT6 member of the BBSAMP data set.

It is easy to modify the DOMEXIT6 routine to allow the use of the user’s default RACF group by commenting out the B NOSENV statement. This is documented in the source code and can be located quickly. Only one group in the RACF list is assigned as the default group. This is not a secondary authorization list (like DB2 secondary authorization IDs).

When you access the Report Manager from TSO, you can change your default group by inserting a group name into the Group Ident field of the TSO/E logon panel.

Pool Advisor validates user authority for restricted commands and DB2 interaction by checking the PROFILE and SECURITY data sets for the accessing ID. If the accessing user ID or 9DEFAULT PROFILE does not exist, the user is denied access to the product.

For more information about User Profiles and the 9DEFAULT record, see the System and SQL Performance for DB2 Administrator Guide.
**NOTE**

DOMEXIT6 has been modified to support IBM APAR OW13376, which extends the ASXBUSER field from 7 to 8 bytes. The 8 byte field is accessed by using the name ASXBUSR8. The DOMEXIT6 routine can be modified to use the new 8 byte ASXBUSR8 field if an 8 byte authorization ID is required. See the DOMEXIT6 member of the BBSAMP data set for instructions.

**WARNING**

This exit is invoked as an extension of the Data Collector in supervisor state. Use extreme caution if privileged instructions or system keys (0–7) are used, because errors could violate the integrity of MVS.
Using multiple System and SQL Performance products

The System and SQL Performance for DB2® products from BMC Software 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:

- **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.

- **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.
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 64 is an example of the main menu that is displayed when all System and SQL Performance for DB2 products are enabled.

**Figure 64  System and SQL Performance for DB2 main menu (DOMESELT)**

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 trace data sets. If you select a different Data Collector in any product, the Data Collector is switched in all products.

**NOTE**

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

This appendix lists and describes the Pool Advisor parameters that you use to modify storage resources when the advisors recommend changes. The appendix also describes the rules that trigger recommendations. The following topics are included:

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Variable repository ................................................. 125
   Listing parameter values ..................................... 126
   Setting parameter values ..................................... 127
Pool Advisor initialization parameters ......................... 130
Pool Advisor rules .................................................. 139

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. The Configuration Menu (Figure 65) is displayed.

**Figure 65  Configuration Menu (PMDECNFG)**

Use this 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. For a complete explanation, see the Pool Advisor User Guide for DB2.

- **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 DB2ssid
```
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. The Variable Repository SSID Selection panel (Figure 66) is displayed.

Figure 66  Variable Repository SSID Selection panel (PMDEVDSR)

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 Collect 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**

Use the L (List) action code to see a list of all parameter values in the repository for the selected DB2 subsystem or #ALL. The Variable Repository Variable List (Figure 67) is displayed.

**Figure 67  Variable Repository Variable List panel (PMDEVOVL)**

PMDEVVL/I Variable Repository Variable List LINE 1 OF 13

Command ===> ___________________________________________ Scroll ===> CSR_

SSID DB2 : #ALL

This repository contains the following values.

<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_BP16K0_DEC</td>
<td>7</td>
</tr>
<tr>
<td>SIZE_BP16K0_INC</td>
<td>7</td>
</tr>
<tr>
<td>SIZE_BP16K0_MAX</td>
<td>87</td>
</tr>
<tr>
<td>SIZE_BP16K0_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>
</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)

You cannot modify values from this panel.

**Setting parameter values**

Use the S (Select/Modify) action code from the Variable Repository SSID Selection panel to set or change repository values. The Variable Repository Category Selection panel (Figure 68) is displayed.

**Figure 68   Variable Repository Category Selection panel (PMDEVDCR)**

This panel lists the categories into which the variables are grouped. Use the S (Select/Modify Category) action code to display a list of variables that are associated with the selected category. You can select multiple categories.

If you select a category that represents a single entity (RID pool, for example), the Variable Repository Variables panel (Figure 70 on page 129) is displayed.
If you select a category that represents multiple entities (buffer pools, for example), the Repository Subcategory Selection panel (Figure 69) is displayed.

**Figure 69  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, the Variable Repository Variables panel (Figure 70) is displayed.

**Figure 70  Variable Repository Variables panel (PMDEVDVE)**

<table>
<thead>
<tr>
<th>PMDEVDVE/I</th>
<th>Variable Repository Variables</th>
<th>Command</th>
<th>Scroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSID DB2</td>
<td>: DBI2</td>
<td>Current</td>
<td>CSR_</td>
</tr>
<tr>
<td>Current Category</td>
<td>: RID POOL</td>
<td>Subcategory : N/A</td>
<td></td>
</tr>
</tbody>
</table>

Type a new value in the < New Value > field. Then press Enter to validate. Type F3 to exit and update or F12 to cancel.

Use the D action code to remove a value from the repository. Press Enter.

D - Delete

<table>
<thead>
<tr>
<th>A Variable name</th>
<th>Current/ New Value</th>
<th>Units</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIDSIZE_DEC</td>
<td>16</td>
<td>KB</td>
<td>0-25000000</td>
</tr>
<tr>
<td>RIDSIZE_INC</td>
<td>16</td>
<td>KB</td>
<td>0-25000000</td>
</tr>
<tr>
<td>RIDSIZE_MIN</td>
<td>48</td>
<td>KB</td>
<td>0-10000000</td>
</tr>
<tr>
<td>RIDSIZE_MAX</td>
<td>80</td>
<td>KB</td>
<td>0-10000000</td>
</tr>
</tbody>
</table>

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, follow these instructions:

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.

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.

Press F12 to cancel any changes or deletions that you made.
Pool Advisor 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>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GETPAGE_SAMPLING</td>
<td>Determines whether all getpage operations are counted or a statistical sampling function is used to reduce CPU usage. Valid values are ON and OFF:</td>
</tr>
<tr>
<td></td>
<td>- <strong>ON</strong>—The sampling function is used to reduce CPU usage.</td>
</tr>
<tr>
<td></td>
<td>- <strong>OFF</strong>—All getpage operations are counted.</td>
</tr>
<tr>
<td></td>
<td>The default is <strong>OFF</strong>.</td>
</tr>
</tbody>
</table>
### Table 1  Pool Advisor parameter variables (part 2 of 9)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General parameter variables continued</strong></td>
<td></td>
</tr>
<tr>
<td><strong>STATS_CYCLE</strong></td>
<td>Determines the following settings for statistics object collection:</td>
</tr>
<tr>
<td></td>
<td>- Period—how frequently statistics are collected and updated (in minutes)</td>
</tr>
<tr>
<td></td>
<td>- Interval—over what period of time statistics are aggregated (in minutes)</td>
</tr>
<tr>
<td></td>
<td>- Analysis—how frequently the background analysis advisors check for problems (in minutes)</td>
</tr>
<tr>
<td></td>
<td>Valid values are <strong>HI</strong>, <strong>MED</strong> and <strong>LOW</strong>.</td>
</tr>
<tr>
<td></td>
<td>The following table outlines the frequency for each setting:</td>
</tr>
<tr>
<td><strong>SETTING</strong></td>
<td><strong>PERIOD</strong></td>
</tr>
<tr>
<td><strong>HI</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>MED</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>LOW</strong></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>The default is <strong>HI</strong>. Object statistics are collected and updated every five minutes, they are accumulated into a rolling 15-minute average, and the background advisors check for problems every five minutes.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>The same statistics cycle is set for all monitored DB2 subsystems. Individual DB2 subsystems cannot have different statistics cycles.</td>
</tr>
</tbody>
</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).                                                                                   |
| **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**. |
### Table 1  Pool Advisor parameter variables (part 3 of 9)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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. |
| DAILY_PAGESET_HISTORY           | Specifies whether long-term page set history data is collected and reported (Daily History reports). Valid values are Y (Yes) and N (No)
  - Y—Long-term page set history is collected and reported.
  - N—Long-term page set history is not collected and reported.
  
The default is Y.
  
  Near-history is not affected (Recent Trends reports).
  
  **Note:** If this value is set to N, long-term object data will not be collected and reported, even if the DAILY_OBJECT_HISTORY parameter is set to Y. |
| DAILY_SYSTEM_HISTORY            | Specifies whether long-term system history data is collected and reported (Daily History reports). Valid values are Y (Yes) and N (No)
  - Y—Long-term system history data is collected and reported.
  - N—Long-term system history data is not collected and reported.
  
The default is Y.
  
  The following reports are affected:
  
  - DB2 Pools Daily History (PMDMAINL)
  - Virtual Storage Daily History (PMDSTRGL)
  - Buffer Pools Daily History (PMDBPML)
  - EDM Pool Daily History (PMDEDMPL)
  - RID Pool Daily History (PMDRIDPL)
  - Sort Pool Daily History (PMDSRTPL)
  - Group BPool Daily History (PMDGBPL)
  
  Near-history is not affected (Recent Trends reports). |
### Table 1  Pool Advisor parameter variables (part 4 of 9)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General parameter variables continued</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **HOURLY_PAGESET_HISTORY**        | 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):  
  - Y — Long-term page set history is collected and reported at an hourly level.  
  - N — Long-term page set history is not collected and reported at an hourly level.  
  The default is N.  
  You must recycle the Data Collector after you change this parameter.  
  **Note:** If this value is set to Y, the NEAR_HISTORY parameter must be set to Y. |
| **HOURLY_SYSTEM_HISTORY**         | 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):  
  - Y — Long-term system history data is collected and reported at an hourly level.  
  - N — Long-term system history data is not collected and reported at an hourly level.  
  The default is N.  
  You must recycle the Data Collector after you change this parameter.  
  **Note:** If this value is set to Y, the NEAR_HISTORY parameter must be set to Y. |
| **SHOW_ACTION**                   | 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).  
  The default is N (No). |
| **SHOW_RECOMMEND**                | 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).  
  The default is N (No). |
| **SHOW_WTO**                      | Specifies whether WTO messages will be written to the SYSTSPRT SYSOUT log when actions are executed. Valid values are Y (Yes) and N (No).  
  The default is Y. |
| **Virtual storage parameter variables** |                                                                                                                                                                                                 |
| **VSCMAX**                        | Maximum amount of the DBM1 region (in megabytes) that the specified DB2 is allowed to use.  
  The default is 1000. |
## Pool Advisor Initialization Parameters

### Virtual Storage Parameter Variables Continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSCAVAIL_ALERT</td>
<td>Level of available storage (in megabytes) at which an ALERT will be triggered. The default is 100. <strong>Note:</strong> 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 200. <strong>Note:</strong> 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 500. <strong>Note:</strong> 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 50 (pages per second). <strong>Note:</strong> 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 20 (pages per second). <strong>Note:</strong> 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 10 (pages per second). <strong>Note:</strong> 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>
### Table 1  Pool Advisor parameter variables (part 6 of 9)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDM pool parameter variables</strong></td>
<td></td>
</tr>
<tr>
<td>EDMSIZE_DEC</td>
<td>Number of kilobytes by which to decrease the size of the EDM pool when a recommendation is made to decrease the size.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments and cannot be lower than the original setting.</td>
<td></td>
</tr>
<tr>
<td>EDMSIZE_INC</td>
<td>Number of kilobytes by which to increase the size of the EDM pool when a recommendation is made to increase the size.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments.</td>
<td></td>
</tr>
<tr>
<td>EDMSIZE_MIN</td>
<td>Size (in kilobytes) below which the EDM pool should not be decreased on behalf of a recommendation.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments.</td>
<td></td>
</tr>
<tr>
<td>EDMSIZE_MAX</td>
<td>Size (in kilobytes) above which the EDM pool should not be increased on behalf of a recommendation.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments.</td>
<td></td>
</tr>
<tr>
<td><strong>Performance profile variable parameter variables</strong></td>
<td></td>
</tr>
<tr>
<td>GPGSACT_LOW</td>
<td>Lower boundary for the activity level of a buffer pool in getpages per second. The default is &lt; 100 getpages per second.</td>
</tr>
<tr>
<td>GPGSACT_HI</td>
<td>Upper boundary for the activity level of a buffer pool in getpages per second. The default is &gt; 999 getpages per second.</td>
</tr>
<tr>
<td>UPDATE_LOW</td>
<td>Lower boundary for the update rate of a buffer pool in updates per second. The default is &lt; 10 updates per second.</td>
</tr>
<tr>
<td>UPDATE_HI</td>
<td>Upper boundary for the update rate of a buffer pool in updates per second. The default is &gt; 99 updates per second.</td>
</tr>
<tr>
<td>SEQUENTIAL_LOW</td>
<td>Lower boundary for the sequential access rate of a buffer pool. The default is &lt; 30% getpage activity uses sequential access.</td>
</tr>
<tr>
<td>SEQUENTIAL_HI</td>
<td>Upper boundary for the sequential access rate of a buffer pool. The default is &gt; 69% getpage activity uses sequential access.</td>
</tr>
<tr>
<td>SIZE_LOW</td>
<td>Lower boundary for the page set size in pages. The default is &lt; 1000 pages.</td>
</tr>
<tr>
<td>SIZE_HI</td>
<td>Upper boundary for the page set size in pages. The default is &gt; 99,999 pages.</td>
</tr>
</tbody>
</table>
### Pool Advisor parameter variables (part 7 of 9)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DBD cache parameter variables</strong></td>
<td></td>
</tr>
<tr>
<td>DBDSIZE_DEC</td>
<td>Number of kilobytes by which to decrease the size of the DBD cache when a recommendation is made to decrease the size.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments and cannot be lower than the original setting.</td>
<td></td>
</tr>
<tr>
<td>DBDSIZE_INC</td>
<td>Number of kilobytes by which to increase the size of the DBD cache when a recommendation is made to increase the size.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments.</td>
<td></td>
</tr>
<tr>
<td>DBDSIZE_MIN</td>
<td>Size (in kilobytes) below which the DBD cache should not be decreased on behalf of a recommendation.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments.</td>
<td></td>
</tr>
<tr>
<td>DBDSIZE_MAX</td>
<td>Size (in kilobytes) above which the DBD cache should not be increased on behalf of a recommendation.</td>
</tr>
<tr>
<td><strong>Note</strong>: All specifications should be in 5000 KB increments.</td>
<td></td>
</tr>
<tr>
<td><strong>RID pool parameter variables</strong></td>
<td></td>
</tr>
<tr>
<td>RIDSIZE_DEC</td>
<td>Number of kilobytes by which to decrease the size of the RID pool when a recommendation is made to decrease the size.</td>
</tr>
<tr>
<td>RIDSIZE_INC</td>
<td>Number of kilobytes by which to increase the size of the RID pool when a recommendation is made to increase the size.</td>
</tr>
<tr>
<td>RIDSIZE_MIN</td>
<td>Size (in kilobytes) below which the RID pool should not be decreased on behalf of a recommendation.</td>
</tr>
<tr>
<td>RIDSIZE_MAX</td>
<td>Size (in kilobytes) above which the RID pool should not be increased on behalf of a recommendation.</td>
</tr>
<tr>
<td><strong>Sort pool parameter variables</strong></td>
<td></td>
</tr>
<tr>
<td>SORTSIZE_DEC</td>
<td>Number of kilobytes by which to decrease the size of the sort pool when a recommendation is made to decrease the size.</td>
</tr>
<tr>
<td>SORTSIZE_INC</td>
<td>Number of kilobytes by which to increase the size of the sort pool when a recommendation is made to increase the size.</td>
</tr>
<tr>
<td>SORTSIZE_MIN</td>
<td>Size (in kilobytes) below which the sort pool should not be decreased on behalf of a recommendation.</td>
</tr>
<tr>
<td>SORTSIZE_MAX</td>
<td>Size (in kilobytes) above which the sort pool should not be increased on behalf of a recommendation.</td>
</tr>
</tbody>
</table>
### Appendix C Parameter variables and rules

#### Global buffer pool parameter variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPREDUCE</td>
<td>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).</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td>- N—Buffer pool decreases are not allowed in NORMAL mode.</td>
</tr>
<tr>
<td></td>
<td>The default is N (No).</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>BP#ALL_DPMAX</td>
<td>Maximum number of dirty pages allowed for all buffer pools combined.</td>
</tr>
<tr>
<td></td>
<td>The default is 10000.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> 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><strong>Note:</strong> 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>
</tbody>
</table>

#### Buffer pool parameter variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>
### Buffer pool parameter variables continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

### Group buffer pool parameter variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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><strong>Note:</strong> 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>CHECKP_ALERT</td>
<td>Number of checkpoint operations allowed before an ALERT is triggered. This value must be greater than the WARNING value.</td>
</tr>
<tr>
<td></td>
<td>The default is 4.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> 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.</td>
</tr>
<tr>
<td></td>
<td>The default is 2.</td>
</tr>
</tbody>
</table>

---

a The Data Collector must be recycled after changing this parameter.
# Pool Advisor rules

Table 2 describes 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 (part 1 of 2)

<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>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</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>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>
</tbody>
</table>
### Table 2  Pool Advisor rules (part 2 of 2)

<table>
<thead>
<tr>
<th>Advisor</th>
<th>Rule is triggered when</th>
</tr>
</thead>
</table>
| Deferred write and vertical deferred write thresholds | - 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  
- 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  
- 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  
- 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 |
| Group buffer pool                                   | Prevent group buffer pool from changing system status                                                                                                                                                                  |
| DBD cache                                          | - The DBD cache efficiency drops below 70%  
- The DBD cache efficiency drops below 90%  
- The DBD cache has a positive load failure count  
- The DBD cache activity is high, but utilization is low  
- The DBD cache size is smaller than the minimum  
- The DBD cache size is larger than the maximum |
Glossary

A

ABOUT command
A basic panel command that displays copyright and trademark information about the product.

ADDB2 command
A Data Collector command that temporarily adds a DB2 subsystem to the list of DB2s that can be monitored by a Data Collector.

ADDPROD command
A Data Collector command that dynamically activates a System and SQL Performance product that was previously deactivated using the DELPROD command.

advisor
A collection of information (mainly accessed from reports) that displays key values, pinpoints problems detected by Pool Advisor or System Performance, and recommends actions you can take to correct those problems. See also background advisors and system advisor.

ADMIN command
A basic panel command that displays the Administration menu.

AP command
A basic panel command that navigates from any System and SQL Performance panels or reports to APPTUNE Workload Analysis or the DB2 Status report in APPTUNE.

APPTUNE
A BMC Software product used to analyze DB2 application performance.

auto-refresh
A feature that causes the values displayed for DB2 instrumentation data to be updated automatically at an interval specified by the user.

B

background advisors
Advisors that work in the background monitoring DB2, detecting problems, and making recommendations for corrective actions.
BACKWARD command
A basic panel command that moves the display of scrollable lists back in the direction of the top of the list. Synonymous with the UP command.

BEEP command
A basic panel command that alternately disables and enables the terminal bell that rings whenever a message is displayed and when an exception condition is displayed.

CANCEL command
There are two versions of the CANCEL command:

- **User Session**: Causes the last panel displayed before the current panel to be redisplayed, discarding any data entry in the process.
- **Data Collector**: Cancels a product user session.

CAPS command
A basic panel command that alternately changes the text displayed on all panels to uppercase or mixed case.

CHANGES command
A basic panel command used to display the current Summary of Changes.

CLEAR command
A panel-specific command that erases the contents of the command text buffer on the Command Interface input panels.

CMD command
A basic panel command that displays the Command Interface Menu, from which you can choose one of the Command Interface input panels to issue commands to the Data Collector, MVS, DB2 and other BMC products. Synonymous with the CMDMENU command.

CMDBOT command
A basic panel command that causes the Command line to be displayed at the bottom of all product panels.

CMDDB2 command
A basic panel command that displays the DB2 Command Interface input panel, from which you can issue commands to DB2.

CMDDC command
A basic panel command that displays the Data Collector Command Interface input panel, from which you can issue commands to the Data Collector.
CMDMENU command
A basic panel command that displays the Command Interface Menu, from which you can choose one of the Command Interface input panels to issue commands to the Data Collector, MVS, DB2 and other BMC products. Synonymous with the CMD command.

CMDOPT command
A basic panel command that displays the OPERTUNE Command Interface input panel, from which you can issue commands to OPERTUNE.

CMDTOP command
A basic panel command that causes the Command line to be displayed at the top of all product panels.

COLOR command
A basic panel command that alternately enables and disables the color feature used to build product panels in color on terminals using native TSO without ISPF.

Command Interfaces
A set of panels used to issue and view the results of Data Collector, DB2, MVS, and OPERTUNE commands and to receive DB2 messages.

compatibility profile
A method of classifying data objects by performance characteristics to assist in the segregation of objects into buffer pools with other objects with similar characteristics.

Configuration Advisor
The product component that analyzes the buffer pool configuration and recommends the grouping of page sets into buffer pools based on performance attributes.

D

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

data class
A collection of DB2 or BMC trace records (IFCID) that can be specified in an output group. Only the data classes specified will be collected and stored in the trace data sets for that output group.

Data Collector
The component that coordinates requests for data from all product and solution users and retrieves data from DB2.

DATASOURCE statement
A control statement used to select the source of data for batch reporting (data set or Data Collector).
DB2 Component Services (DBC)
DBC provides a persistent z/OS subsystem address space into which BMC products can dynamically initialize their own product services.

DB2 Product Configuration
The DB2 Product Configuration technology separates product (or solution) installation from configuration. Through its online interface, DB2 Product Configuration simplifies configuration and deployment by setting default option values for you.

DB2LOAD statement/parameter
A control statement (or parameter of the REPORT statement) used to produce a data set (from the data gathered to generate a batch report) in a format that can be loaded into DB2 tables using the DB2 Load utility.

DBCS command
A basic panel command that alternately enables and disables DBCS support when you are using native TSO without ISPF.

DEBUG command
A Data Collector command that enables or disables various diagnostic functions useful in problem determination.

DELDB2 command
A Data Collector command that dynamically deletes a DB2 subsystem from the list of DB2s that can be monitored by a Data Collector.

DELPROD command
A Data Collector command that dynamically deactivates an active System and SQL Performance product.

delta value
A value derived by subtracting the value in one record from the same value in another record.

DOMPLEX option set
A collection of attributes that define one or more Data Collectors and their components (for example, the DB2s that can be monitored and the trace data sets that are used).

DOWN command
A basic panel command that moves the display of scrollable lists forward in the direction of the bottom of the list. Synonymous with the FORWARD command.

DUMP command
A Data Collector command that enables or disables the diagnostic dump that occurs at abend retry, or takes a diagnostic dump of a specific job.
E

END command
A basic panel command that causes the last panel displayed before the current panel to be redisplayed, saving or committing any data entry in the process. Synonymous with the EXIT command.

ENQS command
A Data Collector command that displays enqueue conflicts or all enqueues held or waited for by a specific job or a specific DB2 subsystem.

execution mode
Indicates whether a recommendation will be issued when a rule is triggered (manual) or the command associated with the rule will be issued (automatic).

EXIT command
A basic panel command that causes the last panel displayed before the current panel to be redisplayed, saving or committing any data entry in the process. Synonymous with the END command.

EXPAND command
A command used to move from summary data to more detailed data within a report.

F

FIND command
A basic panel command that finds a specified string of text and moves the cursor to that text.

FKA command
A basic panel command that changes the display of function keys, alternating between the primary keys, alternate keys, and no display. Synonymous with the KEYS and PFSHOW commands.

FKEYS command
A basic panel command that displays the User Function Key Values panel (used to change the default values for function keys). Synonymous with the PFKEYS and PFKS commands.

FORWARD command
A basic panel command that moves the display of scrollable lists forward in the direction of the bottom of the list. Synonymous with the DOWN command.

G

global options
A set of values that determines how the System and SQL Performance products are configured.
HELP command
A basic panel command that causes informational text to be displayed, the topic of which is determined by the parameter specified, the point at which the command is issued, or by the position of the cursor.

HILITE command
A basic panel command that enables highlighting support when you are using native TSO without ISPF.

historical reports
Reports used to view data gathered from recent and/or archived trace data. See also Recent Trends reports and Daily History reports.

HOME command
A basic panel command that moves the cursor to the first input field on the current panel.

hyperlink
A navigational feature whereby you can move from reports to other reports or advisors with just one keystroke.

IEDIT command
A command that exports command text to an ISPF edit session (when you are operating under ISPF).

ignore status
Indicates whether a recommendation or a command will be issued when a rule is triggered (no) or the rule will be ignored and no action will be taken (yes).

instantaneous reports
Reports used to view data obtained instantaneously from DB2.

KEYS command
A basic panel command that changes the display of function keys, alternating between the primary keys, alternate keys, and no display. Synonymous with the FKA and PFSHOW commands.

LEFT command
A basic panel command that shifts the display of data to the left when a wide-mode panel or report (132 columns) is displayed on a screen with a width of 80 columns.
LOCATE command
A basic panel command that finds a specified list item and move the row containing that item to the top of the display area.

LOGSET
A LOGSET is a group of z/OS linear data sets (or log files) in which the Next Generation Logger (NGL) stores data records. Each instance of NGL can support multiple LOGSETs.

MainView for DB2
A BMC Software product used to monitor DB2 activity in real time and historically.

Master Profile
A User Profile from which profile values can be extracted and assigned to other User Profiles.

MENU command
A basic panel command that displays the Available Commands panel. Synonymous with the SHOWCMDS command.

Next Generation Logger (NGL)
NGL is a logging facility that logs and retrieves data based on application-defined keys and a time span. NGL runs as a service within the DB2 Component Services (DBC) subsystem and relies on the Runtime Component System (RTCS) for registry services.

NEXT command
A command that retrieves and displays report data in segments when the data collected for a report is too large to fit in the report output buffer.

online reporting
The process used to view DB2 data on the screen. Current DB2 activity can be monitored while the system is operating, or historical data can be viewed that has been stored in the trace data sets.

OPERTUNE for DB2
A BMC Software product used to dynamically modify DB2 installation parameters. Pool Advisor and System Performance have an interface to OPERTUNE that allows users to issue commands to OPERTUNE either via the OPERTUNE Command Interface panel or as a result of an advisor request.

OPTIONS command
A basic panel command that displays the User Options Menu (offering a selection of panels used to modify the User Profile).
output group
The product component used to buffer trace records and to define and allocate the trace data sets to which records will be written from the output groups.

P
PANELID command
A basic panel command that alternately displays or suppresses display of the panel ID in the upper left corner of all product panels.

parameters
Specifications that set limits on DB2 resources and ZPARM settings and that specify increments by which to alter the settings, based on current performance conditions.

PFKEYS command
A basic panel command that displays the User Function Key Values panel (used to change the default values for function keys). Synonymous with the FKEYS and PFKS commands.

PFKS command
A basic panel command that displays the User Function Key Values panel (used to change the default values for function keys). Synonymous with the FKEYS and PFKEYS commands.

PFSHOW command
A basic panel command that changes the display of function keys, alternating between the primary keys, alternate keys, and no display. Synonymous with the KEYS and FKA commands.

Pool Advisor for DB2
A BMC Software product used to monitor and manage DB2 storage resources.

PRODUCTS command
A Data Collector command that displays a list of all the currently active BMC Software Performance products for DB2, which comprises the following products:

- Pool Advisor
- APPTUNE
- OPERTUNE
- System Performance for DB2
- SQL Performance for DB2
- MainView for DB2 – Data Collector

profile
See User Profile, DOMPLEX option set.
QUIT command
A basic panel command that causes a quick, complete exit from the product in a manner equivalent to repeated executions of the CANCEL command.

Recent Trends reports
Reports that contain data from recent intervals (up to 48 hours).

report
A panel or printed output used to display DB2 data.

Report Manager
The System and SQL Performance products component that provides the user interface—the visible portion of the product. Through the Report Manager, users request that data be collected and measurements be taken. After the Data Collector gathers the data, the Report Manager sorts and formats the data into reports.

report output buffer
The buffer (allocated in extended private storage) that holds formatted report data.

report set
A comprehensive set of predefined reports that comes with all System and SQL Performance products.

RESET command
A panel-specific command that resets the default values for function keys to the values shipped with this product or resets the contents of the command text on the Command Interface panels to its initial value.

RESTART command
A command issued from only the product’s main menu that reprocesses the startup options in the User Profile as if an initial entry to the product was in progress.

RETRIEVE command
A basic panel command that redisplays the last command issued on the Command line (excluding navigational commands like EXIT).

RETURN command
A basic panel command that causes a series of EXIT commands to be issued until the product’s main menu is displayed.

RFIND command
A basic panel command that reissues the previous FIND command (including the direction).
**RIGHT command**  
A basic panel command that shifts the display of data to the right when a wide-mode panel or report (132 columns) is displayed on a screen with a width of 80 columns.

**Runtime Component System (RTCS)**  
RTCS runs as a started task and provides programming services to various BMC mainframe products. RTCS is designed for continuous operation and seldom, if ever, needs to be stopped.

**S**  
**segmented viewing**  
A method used to retrieve and display report data in segments when the data collected for a report is too large to fit in the report output buffer.

**SHOWCMD command**  
A basic panel command used to display the Available Commands panel, which lists all commands that can be issued from the panel.

**SHUTDOWN command**  
A Data Collector command used to stop the Data Collector subsystem in a normal manner.

**SORT command**  
A basic panel command that rearranges the order of data on scrollable panels or the order of repeating groups of data in reports.

**SPFOFF command**  
A basic panel command that disables the use of ISPF as the dialog display mechanism when it has been temporarily enabled using the SPFON command.

**SPFON command**  
A basic panel command that enables the use of ISPF as the dialog display mechanism (SPFOFF is the default when you begin your session).

**SQL Explorer for DB2**  
The SQL Explorer for DB2 product is an SQL analysis tool that enables you to solve performance problems that result from inefficient SQL statements.

**SQL Performance for DB2**  
A BMC Software solution that combines the features and functions of APPTUNE and SQL Explorer with additional index capabilities.

**STATUS command**  
There are two versions of the STATUS command:

- **Report Manager**: When issued from a report, STATUS displays the Report Status panel. When issued from any other product panel, STATUS displays the Session Status panel.
Data Collector: Displays status information about the Data Collector subsystem and its associated DB2 subsystems.

STATUSR command
A report-specific command that displays the Report Status panel containing a summary of information about the current report.

STATUSS command
A basic panel command that displays the Session Status panel containing a summary of information about the current user session.

STOP command
There are two versions of the STOP command:

Report Manager: Cancels auto mode (under which values on the current panel are automatically updated and redisplayed at a specified interval).

Data Collector: Stops the Data Collector subsystem in a normal manner.

STORAGE command
A Data Collector command that displays details of storage usage for a specific job or task on the system.

storage management mode
A state of storage constraint that determines whether increases and decreases in storage will be allowed based on the available storage in the DBM1 address space and the MVS paging rate.

SWITCH command
A Data Collector command that generates an archive from the currently active log file for the specified output group.

SYSPLEX command
A Data Collector command that establishes or terminates sysplex communication between the local Data Collector and other members of its DOMPLEX or displays information about the status of the DOMPLEX and the DB2s it monitors.

system advisor
The advisor that evaluates recommendations from individual component advisors and accepts or rejects them, based on its analysis of all system requirements and available resources.
System and SQL Performance products for DB2
An integrated family of products that share common DB2 data collection facilities and a common interface. The System and SQL Performance products comprise the following products and solutions:

- Pool Advisor
- APPTUNE
- System Performance for DB2
- SQL Explorer
- SQL Performance for DB2
- MainView for DB2 – Data Collector

System Performance for DB2
A BMC Software solution that combines the features and functions of MainView for DB2, Pool Advisor, and OPERTUNE for DB2 with additional reporting capabilities.

TERSE command
A command used to suppress blank lines and nonessential data on the display screen in order to increase the area used to display report output data.

thread
A DB2 mechanism that provides a path for an application to connect to (and perform work in) DB2 and that determines access to DB2 resources and services.

TOP command
A command used after one or more NEXT commands to redisplay the first segment of a report.

trace data sets
The data sets allocated in the DOMPLEX option set for the storage of DB2 trace records. Two data sets are allocated for each specification—one to store the trace records and one to store the index entries used to keep track of trace data.

UP command
A basic panel command that moves the display of scrollable lists back in the direction of the top of the list. Synonymous with the BACKWARD command.

User Profile
A collection of attributes that define a user’s access to product functions and reports.

USERS command
A Data Collector command that displays a list of users in session with a specified Data Collector.
V

variable repository
A storage mechanism of System Performance for DB2 and Pool Advisor for DB2 where the user can view the parameter variables and modify them.

Z

ZOOM command
The process of moving from summary data on one report to detailed information about the same data on another report.
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<tr>
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</tr>
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</tr>
</thead>
<tbody>
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<tr>
<td>Report set</td>
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</tr>
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<td>OBSCAN command</td>
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