

Managing DB2 for OS/390 Performance - Really

Most organizations monitor and tune the performance of DB2-based applications. But the performance management steps taken are almost always reactive. A user calls with a response-time problem. A tablespace maxes out on extents. The batch window extends into the day. Someone submitted that "query from hell" that just won't stop running. You've been there.

Even many of the supposedly proactive steps taken against completed applications in production are truly mostly reactive. Let's face it, DBAs are often too busy taking care of the day-to-day tactical database administration tasks to proactively monitor and tune their systems to the degree they wish they could. Event-driven tools exist on the market that can make performance management easier by automatically taking pre-defined actions when pre-specified alerts are triggered. And other tools exist that can ease the burden of performance management and analysis. But first let's define what we mean by "DB2 performance."

Defining DB2 performance

You need a firm definition of DB2 performance before you can learn ways to plan for efficiency. Think, for a moment, of DB2 performance using the familiar concepts of supply and demand. Users demand information from DB2. DB2 supplies information to those requesting it. The rate at which DB2 supplies the demand for information can be termed DB2 performance.

Five factors influence DB2's performance: workload, throughput, resources, optimization, and contention:

The **workload** that is requested of DB2 defines the demand. It is a combination of online transactions, batch jobs, ad hoc queries, data warehousing analysis, and system commands directed through the system at any given time. Workload can fluctuate drastically from day to day, hour to hour, and even minute to minute. Sometimes workload can be predicted (such as heavy month-end processing of payroll, or very light access after 5:30 p.m., when most users have left for the day), but at other times it is unpredictable. The overall workload has a major impact on DB2 performance.

Throughput defines the overall capability of the computer to process data. It is a composite of I/O speed, CPU speed, parallel

capabilities of the machine, and the efficiency of the operating system and system software.

The hardware and software tools at the disposal of the system are known as the **resources** of the system. Examples include memory (such as that allocated to bufferpools or address spaces), DASD, cache controllers, and microcode.

The fourth defining element of DB2 performance is **optimization**. All types of systems can be optimized, but relational databases such as DB2 are unique in that query optimization is primarily accomplished internal to DB2. However, there are many other factors that need to be optimized (SQL formulation, database parameters, ZPARMs, etc.) to enable the DB2 optimizer to create the most efficient access paths.

When the demand (workload) for a particular resource is high, **contention** can result. Contention is the condition in which two or more components of the workload are attempting to use a single resource in a conflicting way (for example, dual updates to the same piece of data). As contention increases, throughput decreases.

DB2 performance can be defined as the optimization of resource use to increase throughput and minimize contention, enabling the largest possible workload to be processed.

In addition, DB2 applications regularly communicate with other MVS sub-systems, which must also be factored into performance planning. Many factors influence not only the performance of DB2, but also the performance of these other MVS subsystems.

The PLATINUM Solution

PLATINUM's Performance Management and Analysis Solution provides a complete suite of tools that companies can rely on for start-to-finish performance analysis of their DB2 applications and systems. The first step should be to identify the most troublesome areas, but this is not as easy as it might seem!

Finding which SQL statements are the most expensive in a large DB2 shop is an extremely difficult thing to do. Resource hogging SQL statements might be hiding in one of hundreds or even thousands of DB2 programs. Interactive DB2 users who produce dynamic SQL statements might physically reside anywhere and any single

one person who is generating ad hoc queries can severely effect DB2 production performance.

PLATINUM Detector can find all expensive SQL that runs anywhere on DB2 in seconds at a very low cost. This includes all SQL statements that ever run on DB2 - including the dynamic SQL. Using Detector you can quickly identify the top resource consuming statements and concentrate your tuning efforts on the most costly statements.

After the poorly running SQL statements are found, it is not always obvious how to tune them to make them better. **PLATINUM Plan Analyzer** provides a comprehensive set of expert tuning recommendations on how to fix inefficient SQL statements. It analyzes SQL statements, explains the access paths in plain English, and advises you on how best to tune the SQL. So once Detector finds the poor performers, Plan Analyzer tells you how to fix them.

And if you want to analyze DB2 objects and system resources, **PLATINUM** has the solution. **Subsystem Analyzer** can display the most frequently accessed DB2 tables and indexes, bufferpools and DASD volumes anywhere on DB2 in seconds. This is historical data for example, you could look at the 10 most accessed indexes from last week. So, you could use Subsystem Analyzer to indicate the most used DASD volume, switch to Detector to find the most inefficient SQL statements accessing data on those DASD volumes and then switch to Plan Analyzer to see how to optimize the SQL statements. Now that's a proactive solution!

Summary

So, Detector and Subsystem Analyzer monitor resources and examine throughput, workload, and contention while Plan Analyzer optimizes your resource usage. Working together, the integrated components of PLATINUM's performance solution optimize resource use to increase throughput and minimize contention, enabling the largest possible workload to be processed—and that's the very definition of DB2 performance.

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