WHITE PAPER

Application Performance Management

Managing the Performance of DB2 Environments

Management summary

Downtime and slow system performance can result in substantial monetary loss to any organization. Proactive application and database tuning significantly reduces system problems, however, maintaining a proactive performance process requires continuous data collection and analysis efforts from your Database Administrators (DBA). Improving the quality and quantity of performance data and providing superior organization of that information maximizes the time DBAs have available to proactively manage performance and capacity of your systems. More time means reduction of costly system downtime, optimization of application performance and elimination of unnecessary hardware upgrades.

Leveraging a management solution to help your DBAs to better utilize their time proactively managing systems (i.e. making decisions based upon accurate and timely information supplied rather than remaining in a "fire-fighting" reactive mode) can result in a significant cost savings to your organization while improving the quality of service that your customers receive.

Precise for DB2 UDB stands out from other performance monitoring and tuning solutions because it monitors system performance differently. It collects relevant information from your systems 24X7, allowing Administrators to be proactive in managing systems so they can help minimize the risk of downtime whilst maximizing your return on investment.

If tuning of these systems is undertaken, real gains in database and application performance can be made without hardware upgrades. Precise for DB2 UDB collects detailed statistics in the production environment allowing the DBA to tune the worst performing SQL statements and verify the impact of these proposed changes before they are implemented. It is possible to perform detailed trend analysis and capacity planning, which means that hardware upgrades can be planned well in advance and only undertaken when actually required.

Precise for DB2 UDB is complimentary to IBM's management and analysis tools and together they can be used to maximize the value of your DBAs, minimize system problems and achieve maximum system up-time and performance.

Precise for DB2 UDB: Application Performance Monitoring

Operational environments often consist of both in-house applications and packaged third party applications. In both cases there is a need for a tuning methodology that will allow you to tune an existing operational system whilst minimizing the chances of adversely affecting it.

Maximizing the efficiency of DBAs

To guarantee the stability of the system, a DBA can take either the reactive or proactive approach. The reactive approach means that the DBA will sit at his desk, get user complaints and handle them as they come in. Many DBAs believe they can maintain the stability of the system by handling all users' complaints in the shortest possible time. It is extremely easy for the DBA to slip into reactive mode, running from one escalated issue to another. The main problem in this approach is that reacting to a problem takes time. In many cases several problems will occur at once. Some while the DBA is away from their desk, and others during the night shift and over the weekend. The reactive DBA will then find himself working more and more hours, staying over the weekend and still not managing to do all his or her tasks.

The proactive approach is to prevent a fire from starting rather than to hire more firemen. The proactive DBA will build a foundation for a stable and efficient database and thus help to prevent problems before they occur.

Monitoring 24 hours by 7 days a week

Precise for DB2 UDB facilitates the proactive tuning approach. It provides low-overhead 24x7 detailed operating system and DB2 application statistics. These statistics may be correlated and viewed by DB2 program, by statement, by user, by time element and most importantly by resource consumption. Thus the proactive DBA has many ways to identify potential bottlenecks and take corrective action before end-users are adversely affected.

Maximizing investment in DB2, applications, and hardware

Without detailed performance statistics it is impossible to determine if performance problems are due to hardware or software inefficiencies. Often new hardware is purchased unnecessarily when application tuning would have resulted in better performance gains at a lower cost. Experience shows that in most production databases 20% of the statements are responsible for 80% of the resource usage. Therefore if tuning of these statements is undertaken, real gains in DB2 and application performance can be made without hardware upgrades. Precise for DB2 UDB collects detailed statistics in the production environment allowing the DBA to tune the worst offending statements and verify the impact of these proposed changes before they are implemented.

Using Precise for DB2 UDB to tune applications

There are many ways to tune applications which use DB2. The sections that follow show how Precise for DB2 UDB can be used to implement a variety of techniques.

Rewriting SQL statements

SQL is a rich language. Often statements can be written in many ways to provide the same result set. These different statements can result in the optimizer choosing different access paths into the database. Some access paths can be many times more efficient than others. Precise for DB2 UDB identifies the problem statements, provides easy to understand graphical explain plans, displays the optimized text generated by the DB2 optimizer and allows the user to test alternative statements where appropriate while providing a framework for easy alternative statement comparison.

Managing Indexes

Where alternative SQL statements cannot be generated (for example in third party applications) it is often necessary to add indexes to help tune your worst offending statements. Although you know that adding the index will have a positive effect on the statement you are tuning, you do not know what impact it will have on the rest of the system. It is possible that other statements may also start using the index, but with a negative impact. Traditionally this has meant either a 'try it and see' approach or major re-testing on a test machine. Precise for DB2 UDB collects statements over time and stores these statements in a data warehouse. Based on this set of statements Precise can answer questions such as "which statements access table X", "which statement access index Y" or even "which indexes are not being used". Using this information you can see groups of statements that access a certain table based on common predicates, see predicate information (such are whether the predicates are indexable or SARGable and even see the predicate filtering factor in each statement). Using this information you can easily understand the effectiveness of each index, plan new index and remove non-effective indexes and hence minimize the risk of changes in the operational environment.

Dropping redundant indexes

All indexes have to be maintained by DB2 whether they are being used or not. Therefore if an index is never being used it is putting an unnecessary overhead on the database. It can be very difficult to determine if an index is being used within a production environment. So indexes are often never removed 'just in case'. Precise for DB2 UDB ensures that a DBA can locate unused indexes so that they can be removed and system resources saved.

Long term analysis

Analyzing resource consumption over a long period of time is the only way to identify patterns and predict future resource consumption.

To identify daily, weekly, or monthly trends or patterns in resource consumption (such as what are the bottlenecks that typically occur at the beginning or end of each month, how does the night shift resource consumption looks like compared to the days shift resource consumption) you must be able to view summarized information on statement, user, program, transaction and the entire database levels over any length of time.

Precise for DB2 UDB's Performance Warehouse contains long-term historical information on database and application. This reservoir of historical information can help you manage the performance of your system and business by enabling trend analysis and capacity planning

Using Precise for DB2 UDB's Performance Warehouse, you can track:

- Long-term historical resource consumption at the database and application level
- Long-term performance information on tablespaces and buffer pools
- Long term performance information on tables and indexes showing you total resource consumption of a table or an index
- Break down of table and index resource consumption down to the specific statements accessing these tables or indexes
- History of access paths of SQL statements
- The Performance Warehouse enables you to achieve the following business goals:
- Track historical resource consumption trends to understand and predict long-term performance behavior
- Perform period-to-period comparisons to analyze performance improvements or degradation over time
- Track database access patterns to understand their affect on performance of data structure changes and object growth
- Proactively detect performance bottlenecks before they turn into problems and issue alerts when performance degrades from established baselines

Achieving these goals will allow you to better manage your DB2 database, make knowledgeable decisions on database changes, application changes and hardware upgrades and better plan for the future.

Centralized monitoring and remote access

Precise for DB2 UDB uses an intelligent, low-overhead agent to collect performance information. This information can be viewed from a centralized dashboard, where Administrators can monitor

multiple databases from a single point. This allows the DBA to switch from one database to another in a single pane of glass. In addition, this means that DBA's have the ability to share information with each other to help accelerate problem troubleshooting

About Precise Software Solutions

Commitment, Focus, Experience

For over 15 years Precise Software Solutions has helped our Global 2000 customers manage business performance in complex, heterogeneous environments, assuring availability and business continuity. Precise offers a complete solution – from discovery through ongoing management – that allows our customers to focus on their core business. We offer the broadest platform support, in terms of enterprise application, operating system, database, and development environment coverage. Precise is the solution of choice for IT as an organization-wide standard for application management.

Visit our Web site

www.precise.com

To speak with a Product Specialist in the U.S.

Call toll-free 1 (877) 845 1886. For specific country offices and contact numbers, please visit our Web site.