Performance Management Solutions for IBM DB2 Content Manager

This presentation provides an overview of IBM’s performance and monitoring solutions for IBM DB2 Content Manager.

IBM's DB2 Content Manager Enterprise Edition provides a world class solution for managing content. Whether your enterprise content management system runs on z/OS, on a distributed platform, or on a mixed environment, ensuring the best possible performance of your system and anticipating workload demands is critical. Let’s look at the main performance challenges that need to be addressed.

When Content Manager is first installed and set up, it is typically tuned using Out of the Box settings, which result in an operational system, but may not be optimized for a particular customer’s production environment. Because every customer’s environment – their platform, available resources and workload demands --are unique, customized tuning is always required to achieve optimal performance.

Once a Content Manager system is in production, requirements and user demands on the system will change over time. Like the engine in your car, the databases in the Content Manager environment need to be tuned periodically.

In addition, to ensure efficient ongoing performance and for capacity planning purposes, it’s crucial to be able to anticipate these demands. For example, if you can identify and track the number of users who are using the system over time, you can see trends and take proactive measures before problems arise, instead of being caught in reactive mode.

IBM DB2 Performance Expert for Content Manager is a performance monitoring and assessment tool to monitor and tune your Content Manager server databases, such as the library server, and resource manager databases. Performance Expert for Content Manager supports the initial tuning of your databases and allows you to create a reference baseline. It supports monitoring and maintenance over time by helping you troubleshoot performance problems, proactively analyze trends and perform capacity planning.

Performance Expert for Content Manager is tailored to show the most important DB2 metrics, information and recommendations for the Content Manager administrator. Double clicking on the Content Manager entry in the overview window displays the Library Server and Resource Manager database details with specific recommendations. The user can also choose to see a hierarchical view of the Content Manager Library Server or Resource Manager buffer pools and table spaces along with descriptions and recommendations.

Initial tuning consists of a relatively short cycle of monitoring the initial user set and troubleshooting any problems that are identified. We’ll illustrate a couple of the ways that DB2 Performance Expert for Content Manager supports initial tuning of your Content Manager databases. For example, it helps you monitor the health of the databases and spot problems such as ineffective buffer pools. Also, Performance Expert for Content Manager helps you troubleshoot any problems that arise.

Let’s consider a scenario in which a Content Manager administrator at a company notices a slow response time during the initial tuning phase. The administrator uses Performance Expert for Content Manager to get an at-a-glance indication of the overall health of the Content Manager library server and resource manager databases. The System Health graphs in the System Overview dashboard show how critical performance counters change over time.

One of the data views, the Buffer Pool Hit Ratio data view, monitors the buffer pools that hold most of the active user data in the library server and other resource manager buffer pools. Hit ratios consistently lower than 80% indicate that not all the required data is available in the buffer pool when needed. In this graph which shows the ratio for 5 buffer pools for a particular timeframe, we can see that one of the buffer pools is below the recommended level.

The Content Manager administrator may want to increase this buffer pool. Additionally, buffer pool analysis reports are also available to do further analysis before making any changes.

Now let’s consider a troubleshooting scenario. As part of tuning to their initial user set, the Content Manager administrator wants to be proactive about the situations that may result in slow running SQL statements. To do this, he’ll use Performance Expert for Content Manager’s exception processing feature, which alerts him when critical performance counter thresholds are exceeded. The alert function allows the administrator to catch a problem before it reaches users.

In this scenario, the Content Manager administrator receives an email that states a threshold was exceeded and indicating which CM database was affected.

The administrator opens Performance Expert for Content Manager’s Statistics Details window and views the Content Manager database requests. Sorting by average execution time will show which took the longest amount of time to complete.

Double-clicking on the statement displays more details about it. Clicking on the Explain button allows the administrator to see the access path. The table scans instead of index scans tell the administrator that an index is needed on this table. If this particular table will be used a lot, it’s important to add an index. At this point the administrator can then go to the Content Manager system administration client to add the index.

Now, let’s focus on ongoing maintenance and monitoring over time. Adding a new class of users may lead to changing workload and new queries being run or queries being run more often. Proactive monitoring of changing user demands is important for maintaining efficient performance day to day and for planning purposes.

DB2 Performance Expert for Content Manager supports proactive monitoring by accumulating performance data over time, and displaying that data in the form of graphical data views or via the performance warehouse which stores long-term historical data.

The following 3 examples illustrate how DB2 Performance Expert for Content Manager supports trend analysis and capacity planning.

Let’s say Content Manager has been in production for a few months at a particular company and a lot of new users have been added and workload has increased. The Content Manager administrator wants to anticipate the future hardware resource needs, rather than wait until a problem arises. Since trends in usage correlate with required hardware resources, the administrator wants to look at these trends to project future memory, space and CPU needs.

DB2 Performance Expert can help the Content Manager administrator be proactive about memory consumption. One way to do this is to look at the number of connected users over time. In February, approximately 400 users were connected, but by April, the number increased to approximately 600. Based on the increase in connected users over time, the administrator decides to enable DB2’s connection concentrator function for the library server database. This reduces the number of processes and therefore also reduces memory consumption.

By using DB2 Performance Expert for Content Manager’s space management function, the Content Manager administrator can monitor table space and disk space usage over time. This helps the administrator understand how the system is growing and to determine what performance and tuning resources the system will need in the future.

The administrator can also set a threshold on disk space and get alerted before a file system gets full.

Next, the administrator may want to review the trend in rate at which users are using the system. The administrator looks at Content Manager stored procedure call throughput because this is directly related to usage. He’ll correlate these throughputs with the trends in hardware resources, for example CPU usage on the server. The administrator finds that in February average (or peak) CPU usage increased to 40% and by April, it increased to 60%. This data allows him to project that performance problems might start to show up in June unless more hardware is ordered and installed.

In summary, Performance Expert for Content Manager’s ability to accumulate and display long-term historical data enables the administrator to identify and analyze trends, identify potential performance problems, determine the workload mix and usage patterns, and perform capacity planning. It also helps the administrator answer typical performance-related questions.

For customers who have DB2 Content Manager on the z/OS platform, IBM Tivoli OMEGAMON XE for DB2 Performance Expert on z/OS provides functionality to monitor the whole DB2 environment that handles Content Manager workload. This also includes remote workload accessing DB2 objects via DB2 Connect.

IBM's performance solution for Content Manager on z/OS provides several benefits. These include: having a single view of the Library Server and Resource Manager databases. It simplifies performance tuning and monitoring of the Enterprise Content Manager production environment. It helps reduce setup and tuning time, sets your performance baseline and lets you calibrate performance based on workload demands. It also provides trend analysis and forecasting features, and monitors performance changes over time.

Poor response times for queries that are issued against Content Manager could be due to how the buffer pools are configured. A poor hit ratio indicates that a high rate of I/O is required to return data to applications. Just as we have described how buffer pool monitoring can benefit the performance of Content Manager servers on the distributed platforms, OMEGAMON XE for DB2 Performance Expert on z/OS, provides the same tuning capability customized for Content Manager on z/OS. In particular, the Buffer Pool Analyzer function helps manage buffer pools more efficiently and includes a simulation feature to find the best buffer pool settings and object-to-buffer pool relationships. Using the best possible settings and relationships can dramatically improve your I/O performance.

If your Content Manager applications run on distributed platforms and connect to a Library Server or Resource Manager on z/OS, the ability to monitor the connections can be very useful. OMEGAMON XE for DB2 PE on z/OS can monitor DB2 Connect instances and analyze the performance of the DB2 connection. This information can be used to evaluate the overall health of a DB2 Connect server or make changes to improve the throughput.

Information resources are available to the Content Manager administrator that expand upon the points made in this presentation.

The first three guides (listed below) fully describe the tuning, monitoring, and troubleshooting phases and contain best practices and detailed recommendations. The white paper on monitoring IBM DB2 Content Manager with DB2 Performance Expert provides details on how to implement the recommendations that are described in the guides.

Customers with Content Manager on z/OS will be interested in the whitepaper on Monitoring Content Manager on z/OS with OMEGAMON XE for DB2 Performance Expert on z/OS.

- IBM Content Manager v8.3 Enterprise Edition Performance Tuning Guide
  http://www.ibm.com/support/docview.wss?uid=swg27006452

- IBM Content Manager v8.3 Enterprise Edition Performance Monitoring and Maintenance Guide
  http://www.ibm.com/support/docview.wss?uid=swg27006451

- IBM Content Manager v8.3 Enterprise Edition Performance Troubleshooting Guide
  http://www.ibm.com/support/docview.wss?uid=swg27006450

- Monitoring IBM DB2 Content Manager V8.3 Enterprise Edition with DB2 Performance Expert V2.2 for MP
  http://www.ibm.com/software/data/db2imstools/db2tools/db2pe/db2pe-mp.html

- Monitoring IBM DB2 Content Manager V8.3 for z/OS with OMEGAMON XE for DB2 Performance Expert on z/OS
  http://www1.ibm.com/support/docview.wss?rs=434&context=SSZJXP&dc=DA480&uid=swg27007738&loc=en_US&cs=utf-8&lang=en

Together, these resources provide the Content Manager administrator with a comprehensive understanding of DB2 Content Manager performance management.

For further information on this tool and other tools from IBM, visit the DB2 and IMS Tools website: http://www.ibm.com/software/data/db2imstools
Thank you.