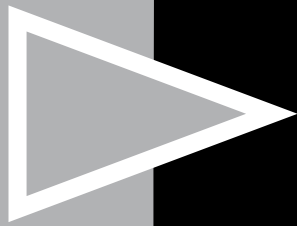




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DB2 Backout Point-in-Time Recovery

Table of Contents

- Backout Point-in-Time Recovery for DB2 for z/OS**.....1
 - > Recovery without a copy or pack backup1
 - > Automation of the recovery process2
 - > Recovery avoidance2
 - > Solution integration.....2
 - > Keeping development and QA productive2
 - Example3

- Backout Benchmark**3
 - > Performance comparisons3

- Conclusion**.....4

Backout Point-in-Time Recovery for DB2 for z/OS

Many options enable you to recover tablespaces and indexes to a previous point in time. However, when tablespaces and indexes are undamaged, alternative solutions are available. The BMC Software DB2 backup and recovery products provide unique recovery solutions to backout to a previous point in time. This paper discusses a solution that addresses physical backout using pages from the log.

Recovery without a copy or pack backup

The native DB2 recover utility always processes logs forward when performing a point-in-time recovery. In almost every case, image copies or a pack backup must provide the basis for the log processing. Indexes are generally rebuilt from the tablespace data rather than being recovered, as many customers don't copy indexes. Any point-in-time recovery from image copies reads and writes every page of every space involved, even if the updates to be eliminated during the recovery only affected a few pages.

To avoid reading and writing every page, BMC® RECOVER PLUS for DB2 supports a backout feature, giving it the ability to do a point-in-time recovery using undamaged spaces and backing out the changes from the log. This technique accomplishes point-in-time recoveries without using image copies or pack restores. No log is required before the point in time of the recovery. The spaces are merged with the sorted log records to avoid reading or writing pages more than once and pages without changes are simply left untouched. This powerful technique can accomplish point-in-time recovery many times faster than the traditional technique.

BMC RECOVER PLUS for DB2 provides several keywords that ensure an object is recovered to a point on the log where there is no uncommitted work (see the following table).

If none of these recovery points are considered viable, BMC RECOVER PLUS for DB2 provides a TO TIMESTAMP keyword to allow for recovery to ANY point-in-time — the utility will automatically detect and avoid recovery for uncommitted work, resulting in a consistent recovery to the specified timestamp.

Keyword	Description
TOLOGPOINT LASTQUIESCE	Locates the most recent quiesce point for the object in SYSIBM.SYSCOPY.
TOLOGPOINT LASTCOMMONQ	Locates the most recent quiesce point in SYSIBM.SYSCOPY that is common to a set of objects.
TOLOGPOINT LASTARCHQ	Locates the most recent ARCHIVE LOG MODE (QUIESCE) command.
TOLOGPOINT LASTSHUTDOWN	Locates the most recent STOP DB2 command.

Automation of the recovery process

With the automation in BMC RECOVER PLUS for DB2, you can dynamically define a group of tablespaces and indexes based on usage in a DB2 plan, a referential integrity data set, or names identified with wildcards. You then can generate the backout recovery JCL for the group.

Even if you did not plan a point for recovery, you still may be able to locate one. If you know that an online transaction occurred in the last few minutes, you can discover a quiesce or a copy useful for the recovery. However, it is more likely that you must choose a point on the log prior to the event. BMC RECOVER PLUS for DB2 can determine and present points known to be consistent based on SYSLGRNX entries for the spaces. If no quiesce points can be determined, BMC® Log Master™ for DB2 can determine and present quiet ranges from the log and register a QUIESCE point that did not previously exist.

Recovery avoidance

BMC® RECOVERY MANAGER for DB2 further enhances the recovery process by introducing the XUNCHANGED option, which analyzes objects in the group and determines whether an object has been modified since the recovery point. If an object has not changed, no action is taken to recover the object. The combination of Backout Recovery and Recovery Avoidance of unchanged objects will drastically reduce elapsed recovery time for large groups of related tablespaces.

Solution integration

The BMC® Recovery Management for DB2 solution includes all the functionality of the following BMC products:

- > BMC® COPY PLUS for DB2
- > BMC® SNAPSHOT UPGRADE FEATURE
- > BMC® RECOVER PLUS for DB2
- > BMC® R+/CHANGE ACCUM
- > BMC RECOVERY MANAGER for DB2
- > BMC Log Master for DB2

With the BMC Recovery Management for DB2 solution, you get all the functionality of the components (such as point-in-time backout support) along with some solution exclusives such as online consistent copy and backout to forward recovery automation. Sometimes, backout is not a viable alternative; for instance, if there is a LOG NO utility between the current time and the desired recovery point. The solution can detect that and automatically provide for a forward recovery for that object.

Keeping development and QA productive

With backout recovery, BMC RECOVER PLUS for DB2 helps get production databases back online with greatly reduced outages. In addition to production benefits, the backout feature provides a fast and reliable mechanism to reset test data.

Shops involved in software development spend considerable time and resources creating development and QA testing environments. Being able to return these environments to a point-in-time when the data is known to be accurate is a necessity. Furthermore, reducing recovery times shortens those nonproductive periods when test environments are unavailable.

Example

The following example illustrates a typical situation for development environments.

The QA staff spent several days creating test scenarios in preparation for certification of a new application, which was scheduled for implementation at the end of the month. When the QA staff completed these scenarios, the DBAs copied all the tablespaces in the RI set. A DBA scheduled the appropriate jobs to take an image copy of all of the tablespaces that night after the production schedule. Unfortunately, production problems that night caused all non-production jobs to be rescheduled at a later time.

The next morning, QA arrived early to begin the certification test of the new application, which is scheduled to be implemented in two weeks. After several hours of testing and many job executions, a summary report showed erroneous data. An investigation determined that an update program executing much earlier in the cycle had a bug that caused several fields to be miscalculated. The program was corrected, unit tested, and turned back over to QA. Because the tablespaces contained corrupted data, QA needed the DBA staff to recover the tablespaces using the copies from the previous night's run. After many phone calls and searching for job output, QA was notified

of the previous night's problem and the reality that the only existing copies were made three weeks earlier. The RI group of fifty tablespaces could be recovered to the previous night using the three-week-old image copies and reapplying log. However, it would take several days to complete the recovery, due to higher priorities and the time-consuming task of creating all the necessary recovery jobs. This excessive recovery time now had the potential to delay implementation, because user requirements specified the first day of a month. Another issue was the impact on QA productivity waiting on the recovery.

Backout will not prevent application programs from corrupting test environments, but it will increase availability of those environments significantly. In the true-to-life scenario described above, the BMC RECOVER PLUS for DB2 backout option would have recovered the certification tablespaces in minutes as opposed to days.

Backout Benchmark

The following chart compares backout recovery with a traditional point-in-time forward recovery using both IBM's® DB2 V8 RECOVER Utility and BMC RECOVER PLUS for DB2.

The benchmark is on a 60-million-row table in a tablespace with six (6) partitions and two (2) indexes.

Performance comparisons

Recover Plus Backout vs. IBM PIT Recovery

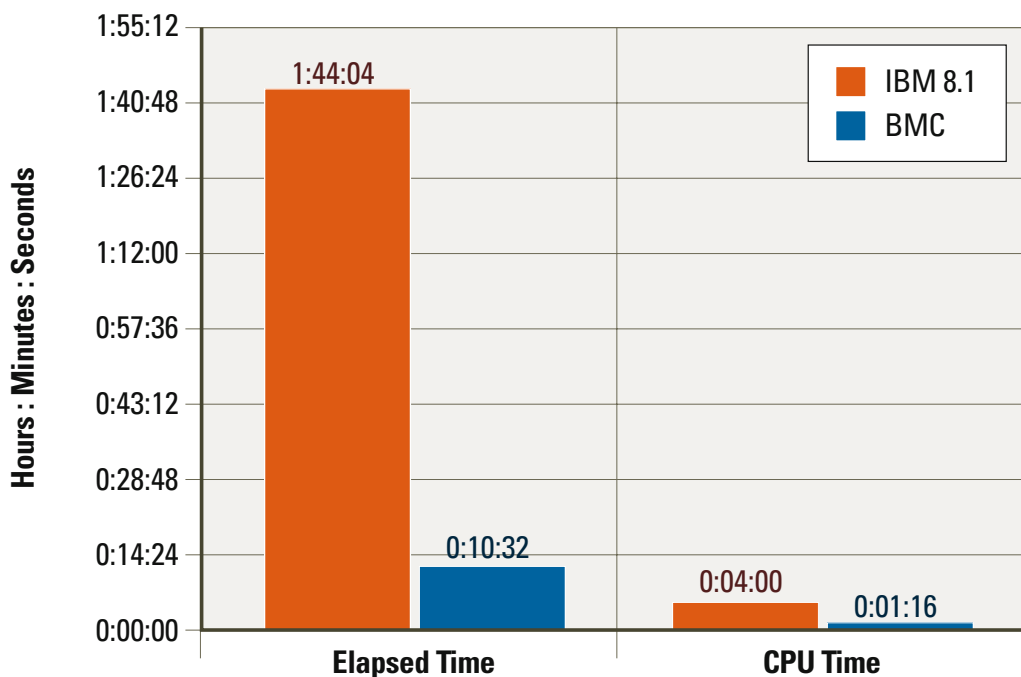


Figure 1. BMC RECOVER PLUS for DB2 Backout is 10 times faster than IBM DSNUTILB RECOVER

Conclusion

Minimizing CPU usage and outage time is critical to database availability. The flexibility in BMC RECOVER PLUS for DB2 allows the DBA to choose the best recovery option. Backout recovery is the fastest recovery option in the common recovery scenario where the tablespaces and indexes are undamaged. Backout recovery is available only with BMC RECOVER PLUS for DB2 and is among many innovations that enable the BMC Software backup and recovery products to ensure optimal DB2 availability.



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BMC Software delivers the solutions IT needs to increase business value through better management of technology and IT processes. Our industry-leading Business Service Management solutions help you reduce cost, lower risk of business disruption, and benefit from an IT infrastructure built to support business growth and flexibility. Only BMC provides best practice IT processes, automated technology management, and award-winning BMC® Atrium® technologies that offer a shared view into how IT services support business priorities. Known for enterprise solutions that span mainframe, distributed systems, and end-user devices, BMC also delivers solutions that address the unique challenges of the midsized business. Founded in 1980, BMC has offices worldwide and fiscal 2006 revenues of more than \$1.49 billion. Activate your business with the power of IT. For more information, visit www.bmc.com.

