

EXTENDED BUFFER MANAGER



Key Benefits

- > Dynamically optimizes online and batch performance by reducing the I/O that is required for providing access to frequently used data
- > Enables real-time buffer management
- > Improves response time for end users and batch processing by providing high-speed caching
- > Improves application availability when used with copy, load, reorganization, and integrity-checking features of BMC Software snapshot-enabled utilities
- > Provides real-time monitoring, enabling users to control and monitor resources
- > Provides a cost-effective solution without software or hardware upgrades
- > Minimizes host resource consumption by integration with intelligent storage devices

BUSINESS CHALLENGE

Fast access to mission-critical data is a high priority. One of the best ways to improve system performance is to eliminate I/O. However, improving performance has typically required additional hardware, and the high cost of hardware upgrades has prevented many users from enjoying the benefits of reduced response time and faster data access.

In addition, in today's business environment, data availability is crucial as information-processing capabilities evolve to better accommodate round-the-clock, global business operations. Organizations relying on mainframe applications need the ability to create backup copies of databases with minimal interruption of business-critical application processing. Shrinking batch windows and growing batch workloads are becoming increasingly problematic for many users.

BMC SOFTWARE SOLUTION

The EXTENDED BUFFER MANAGER (XBM) product family gives you faster access to your data without the need for expensive hardware upgrades. In addition, the XBM products work with selected BMC Software high-performance utilities to provide increased data availability. XBM also integrates with other BMC Software products to let you proactively manage system-wide performance and data availability.

IMPROVED SYSTEM PERFORMANCE BY USING I/O CACHING

XBM improves performance by reducing the number of physical read I/Os that are required for access to DB2 or IMS data. XBM achieves this reduction in physical I/O by caching data in an area of central or expanded storage called the *extended buffer*. When data stored in the extended buffer is requested, the request is satisfied without performing a physical I/O to read the data from DASD. Fewer I/O operations improve performance system-wide, including the performance of

- > specific applications
- > queries for specific DB2 tables
- > response time for IMS VSAM, OSAM, and Fast Path databases
- > DB2 ad hoc query systems
- > IMS online transactions and IMS batch operations
- > access time of all applications
- > your MVS system

To achieve these performance improvements, XBM monitors all DB2 or IMS I/O activity on the MVS system. For example, when DB2 makes a read request for data from a DB2 table space or index that XBM manages, XBM checks the extended buffer for the data. If the data is in the extended buffer, XBM satisfies the read request. If the data is not in the extended buffer, DB2 performs the read I/O. XBM then places that data in the extended buffer so that it will be available the next time that DB2 issues a read request for the data.

INCREASED DATA AVAILABILITY BY USING SNAPSHOT TECHNOLOGY

XBM increases data availability when used with supported BMC Software utilities to create snapshots. XBM increases data availability by using software snapshots, hardware snapshots, and Instant Snapshots.

Traditional Snapshots

Software and hardware snapshots are also called *traditional snapshots*. A traditional snapshot allows the supported utility to process data while a database remains available for updates. When the snapshot process starts, the database takes a very brief outage to establish a point of consistency. XBM ensures that the data read by the supported utility is consistent to that point in time:

- > For hardware snapshots, XBM uses intelligent storage to provide the utility with preimage records from a "frozen" copy of the database.
- > For software snapshots, XBM monitors write requests to the database for the data objects being processed. When a record is changed, XBM stores a preimage of the record in its software cache.

As the utility reads database records during its job, XBM satisfies the utility's read request with the preimage from the hardware device or the software cache. The data that is read by the utility for that database is as it existed when the point of consistency was established, while the source database continues to be updated.

Instant Snapshots

Instant Snapshots are significantly different from traditional snapshots. When one of the supported utilities requests an Instant Snapshot, XBM uses the appropriate intelligent storage interface to create (or snap) a copy of physical data on a storage device to a different location on the same device (or on another device within the same control unit or frame). Thus the data is duplicated without the overhead required for the utility to perform reads and writes. A copy of the data might remain on the storage device after the utility has finished processing. A utility can then request that XBM snap, or reapply, this copied data back to the original location for recovery. XBM works with supported BMC Software utilities to create these physical copies.

Instant Snapshots derive their name from the speed at which the copy and recovery occur—Instant Snapshots require no host I/O to copy the data set.

SNAPSHOT UPGRADE FEATURE

The SNAPSHOT UPGRADE FEATURE (SUF) of XBM allows the supported BMC Software utilities to use XBM snapshot technology when processing snapshots. SUF is included in the following BMC Software solutions:

- > Backup and Recovery Solution for IMS
- > Database Administration for DB2
- > Database Performance for DB2
- > MAXM® Reorg/EP for IMS
- > MAXM Reorg/Online for IMS
- > Recovery Management for DB2
- > RECOVERY UTILITY for VSAM
- > Smart Recover for SAP

You can also license SUF separately from the solutions and XBM and use it with the supported BMC Software utilities to perform snapshot processing.

Table 1 Supported BMC Software Utilities and Intelligent Storage Devices

Software Snapshots	
Snapshot-enabled utilities:	
<ul style="list-style-type: none"> > COPY PLUS for DB2 > CHECK PLUS for DB2 > IMAGE COPY PLUS for IMS > MAXM Reorg/EP > MAXM Reorg/Online > REORG PLUS for DB2 > UNLOAD PLUS® for DB2 	
Hardware Snapshots	
Snapshot-enabled utilities:	Intelligent storage devices:
<ul style="list-style-type: none"> > COPY PLUS for DB2 > CHECK PLUS for DB2 > IMAGE COPY PLUS for IMS > MAXM Reorg/EP > MAXM Reorg/Online > REORG PLUS for DB2 > Smart Recover for SAP > UNLOAD PLUS for DB2 	<ul style="list-style-type: none"> > EMC Symmetrix > Hitachi 7700E/9900 > IBM Enterprise Storage Subsystem devices with FlashCopy version 2 > IBM RAMAC Virtual Array > StorageTek Shared Virtual Array > IBM Shark [for peer-to-peer remote copy (PPRC)] > any other storage device capable of generic PPRC
Instant Snapshots	
Snapshot-enabled utilities:	Intelligent storage devices:
<ul style="list-style-type: none"> > COPY PLUS for DB2 > IMAGE COPY PLUS for IMS > MAXM Reorg/EP > MAXM Reorg/Online > RECOVER PLUS for DB2 > RECOVERY PLUS for IMS > RECOVERY UTILITY for VSAM > REORG PLUS for DB2 > UNLOAD PLUS for DB2 	<ul style="list-style-type: none"> > EMC Symmetrix > IBM Enterprise Storage Subsystem devices with FlashCopy version 2 > IBM RAMAC Virtual Array > StorageTek Shared Virtual Array

COMPONENTS OF XBM

XBM was designed with a component structure:

- > data-specific components for DB2, IMS, and VSAM
- > XBM for SSI component
- > XBM for Parallel Sysplex Support (PSS) component

Data-Specific Components

The IMS and DB2 components provide I/O caching and snapshot processing support that is specific to the type of data being processed. These components perform the following functions:

- > define the objects that are managed by XBM
- > provide statistics for data sets
- > improve performance by caching data
- > compress data sets in cache
- > prefetch data during sequential reads
- > process snapshots (if used with snapshot-enabled BMC Software utilities)

The VSAM component supports snapshot processing of VSAM data sets. XBM does not support I/O caching for VSAM objects.

SSI Component

The SSI component provides the following capabilities:

- > supports snapshot processing by using intelligent storage devices
- > provides an interface to allow manipulation of storage devices
- > monitors storage device status

PSS Component

The PSS component enables XBM to operate in a sysplex environment. The PSS component uses IBM coupling facility technology. For I/O caching, the coupling facility ensures that cached pages are available to all processors in a sysplex. For snapshot processing, the coupling facility ensures that preimages are available from all XBM subsystems in the sysplex.

Point-in-time copies of databases can be made available to BMC Software snapshot-enabled utilities across the sysplex. This capability delivers several benefits:

- > ensures data integrity, even when the data is updated on a different MVS image from the one where the snapshot utility is executing
- > improves DB2 performance in a parallel sysplex environment with I/O caching

- > enables snapshot processing for DB2 or IMS in a sysplex environment
- > maintains statistics for all XBM subsystems in a sysplex environment

FEATURES OF XBM

XBM provides the following features:

XBM ISPF Interface

XBM features a CUA-compliant ISPF interface. From this menu-driven interface, you customize XBM and set up data on your system for I/O caching or snapshot processing.

XBM Repository

The XBM repository stores all information for the data resources that it manages and stores options that control the way that XBM operates. You manage the XBM repository through the XBM ISPF interface.

Dynamic Caching

XBM lets you dynamically control database performance by specifying data sets to cache through the XBM ISPF interface.

Monitoring

XBM provides the following types of monitoring:

Performance statistics. These monitors display performance and activity information for the extended buffer and data sets, and for DB2 and IMS objects. XBM can monitor all DB2 and IMS objects on the subsystem, not just those data sets that are managed by XBM.

Status and progress. These monitors display the current status and progress of snapshot utilities and suspend/resume groups.

XBM gives you the option of recording historical information about a subsystem's operation to System Management Facilities (SMF) records. You can analyze these records to detect trends and to determine the effectiveness of XBM over time.

Simulate Mode

XBM incorporates a simulate mode that provides extensive statistical data to help you determine which objects can benefit most from caching and when they should be cached. XBM provides data on all data sets, not just those cached by XBM.

BENEFITS OF XBM

XBM provides the following benefits:

Data Integrity

XBM offers you speed without risk by not interfering with updates, even if XBM is stopped while the database is operating.

XBM satisfies only read requests—all data writes are handled by the database. As the database writes updates to DASD, XBM updates the data it manages in its buffer. This data always remains synchronized with the data in the database. The database’s logging, backup, and recovery services are fully functional and supported by XBM.

Flexible Cache Equals Fast Access

XBM uses caching techniques that reduce the number of physical I/Os, allowing faster access to databases. XBM architecture allows a single cache to share data, even across multiple subsystems. XBM delivers performance improvements by caching data that is accessed repeatedly. When the database performs a physical I/O to retrieve data, XBM stores that data in cache. Subsequent requests for that data by the same or different databases are satisfied from cache with no need for a time-consuming physical I/O.

XBM also provides the flexibility to dynamically allocate and manipulate the data and page sets being cached.

Other features include

- > use of all available memory resources
- > object-level data management
- > optional page-level compression on specified objects
- > user-assigned priority for cached objects

CONTROLLING HARDWARE DEVICES

Through the XBM ISPF interface, you can monitor and issue commands to hardware devices. This feature provides consolidated control of hardware devices from multiple storage vendors through a single XBM ISPF interface. Instead of learning to use a different interface for each storage device, you can use the XBM interface as the single point of control to issue commands to all supported hardware devices.

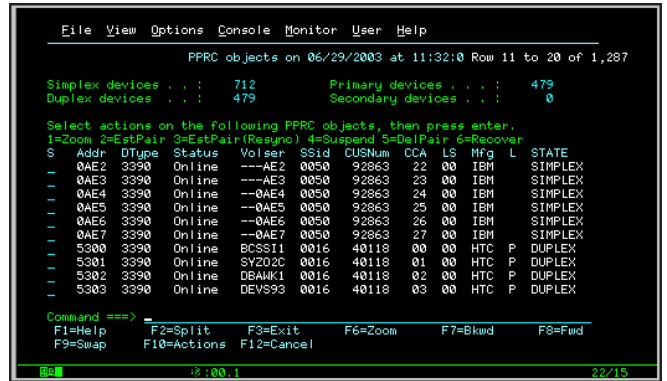
The types of devices to which you can issue commands include:

- > EMC TimeFinder devices
- > Hitachi ShadowImage and RemoteCopy devices
- > PPRC devices

About BMC Software

BMC Software, Inc. [NYSE:BMC], is a leading provider of enterprise management solutions that empower companies to manage their IT infrastructure from a business perspective. Delivering Business Service Management, BMC Software solutions span enterprise systems, applications, databases, and service management. Founded in 1980, BMC Software has offices worldwide and fiscal 2003 revenues of more than \$1.3 billion. For more information about BMC Software, visit www.bmc.com.

SUF and XBM lets you control your supported intelligent storage devices from a single interface.



Helping You Maintain Advantage

BMC Software Professional Services helps your company maintain its competitive advantage through a comprehensive suite of services that includes service level management consulting, installation, implementation, configuration, and customization. Our professional services and education offerings are designed to ensure the ongoing availability of critical business applications, maximize product potential, reduce project risk, deliver IT value to your business, and improve your operations. For more information about BMC Software Professional Services, visit <http://www.bmc.com/profserv>.



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