

# Keeping the Last Mile of Availability Open for Traffic

Eliminating the Downtime Usually Associated  
with IMS Conversions and Restructures

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## EXECUTIVE SUMMARY

The maintenance window for many enterprise applications has slammed shut because they have to be available 24/7. Any downtime can have serious business consequences ranging from financial loss and customer defection to a negative hit to brand image. A single hour of downtime in a financial application, for example, could cost millions of dollars.

IMS databases contain critical data that many of these applications need. That means IMS data must also be available 24/7.

The problem is that changing business requirements often dictate a restructuring or conversion of the IMS database. And, of course, restructuring or conversion implies database downtime that could stretch into several hours. So you face a difficult choice:

- » Making the changes to IMS will result in downtime that can be costly to the business.
- » Not making the changes may mean you can't meet business demands for increased usage or new functionality.

There are other issues around avoiding changes to IMS. For example, when IMS runs out of space, it just stops. So if you don't make changes to accommodate growth, you put IMS availability at risk.

The bottom line is that you have to meet three seemingly conflicting demands:

- » Achieve 24/7 availability of IMS
- » Accommodate the increasing needs of the business by restructuring or converting IMS databases
- » Drive down costs

Fortunately, you can meet all three demands with BMC IMS solutions. These advanced software solutions allow you to meet the growing demands of the business without IMS downtime. At the same time, they help you drive down the cost of running IMS.

## **IMS, THE LAST MILE OF AVAILABILITY**

IMS is no newcomer to the data center. It's been around for decades. Consequently, most data centers have fairly stable IMS systems that maintain huge volumes of critical business data on customers, inventory, financial position and so forth. The list is nearly endless.

Because of the criticality of this data, the number of applications that need to access IMS has increased dramatically over the years. It's impractical to replicate IMS data, so the systems that support these applications must necessarily have an IMS component. As a result, IMS is not going away, at least not in the foreseeable future. Organizations intend to continue using it going forward for two primary reasons:

- » It isn't practical to rewrite the large number of legacy applications that use IMS.
- » IMS continues to offer attractive price/performance.

## **KEEPING IMS AVAILABLE**

Many of the applications supported by IMS require 24/7 availability. This is especially true of online applications. For example, people want round-the-clock access to their banking and stock trading accounts. In addition, global enterprises need follow-the-sun availability. Even local enterprises may require follow-the-sun availability. That's because they may have users who need to access applications from outside the country in which the enterprise resides. Examples include employees and customers who travel to foreign countries as well as military personnel stationed outside their country of origin.

24/7 IMS availability is paramount to businesses. If IMS is down, all the applications that need to access it are effectively down. That's why IMS is sometimes referred to as "the last mile of availability."

IT has responded by putting in place mechanisms, such as backups and failover, to minimize IMS downtime caused by failures. Vendors of IMS management technology have also responded with tools to help ensure IMS availability. IMS monitor offerings alert the IT staff to issues so they can move proactively to head off problems before they result in downtime. IMS advisors encapsulate IMS expertise, gather data about the IMS environment, analyze that data, and make recommendations based on the analysis. Some advisor tools automatically implement their recommendations to remediate problems before they affect IMS performance or availability. Tools are also available that permit online IMS database reorganization.

## **THE CHALLENGE OF CHANGE**

The problem is that the business environment is not static, but rather is continually changing. For example, a large insurance company wants to add banking to its services to exploit a market opportunity. To support banking, the IT staff would have to develop new banking applications that require access to customer data residing in an IMS database. It isn't practical to replicate the customer data in another database, so these applications must be given access to IMS. The resulting increase in the workload on the IMS database would be substantial. Moreover, these applications would require increased IMS database functionality.

Another factor driving change is the consumerization of IT. Users expect access to applications from anywhere at any time using the devices they choose. This universal access drives up usage significantly.

To respond to these changes in the business environment, IT must implement changes to IMS. Increase in usage, for example, may slow IMS performance below acceptable levels as well as push IMS beyond its size limit, generating the need for a database conversion to a larger, partitioned database. An increase in functionality of a business application may require a corresponding increase in the functionality of IMS, such as additional fields. That means restructuring the IMS database.

Consequently, you face the challenge of making changes to IMS to address shifting business demands while at the same time maintaining near 24/7 availability of IMS systems.

## THE COST OF CHANGE

Database conversions and restructures are beyond the scope of traditional IMS availability mechanisms and reorganization tools. These changes usually involve taking down the IMS database for long periods. So it's common perception that, if you implement these types of changes, you have to pay the price in hours of IMS downtime.

Based on this perception, the IT department in one company put in place a policy that prohibits changes to IMS that involve increase in database functionality. (IT evaluated the cost of eliminating IMS and found it to be prohibitive.) To get around making changes to IMS to accommodate new applications, IT wrote a mirror database in DB2 and linked it to IMS. This allowed new applications to take advantage of increased database functionality without having to change the functionality of IMS. The result is that usage grew, causing an increase in transaction volumes and data points in IMS. As this situation demonstrates, IMS is going to continue to grow despite mandates to hold it back.

Application owners have a tough decision to make: If adding an application feature requires conversion or restructuring of IMS, is that feature worth the price of the downtime? Because of the perceived difficulty in the mind of application owners of making such changes, they may schedule changes far out into the future, resulting in long delays of needed functionality. The business suffers as a result.

## MEETING THE CHALLENGE WITH BMC TECHNOLOGY

What if you could increase the size or functionality of IMS by restructuring or converting the IMS database while shrinking downtime from hours to minutes? You can, with BMC IMS restructuring and conversion solutions.

With this innovative technology, you can perform a variety of changes to IMS without incurring lengthy downtimes. Allowable changes include any combination of full-function conversions: nonpartitioned to partitioned, VSAM-to-OSAM, and add/change/delete compression routines. Table 1 shows a list of the many conversions you can accomplish.

Table 1. Database conversions

FROM TO	HDAM	HIDAM	HALDB	PDF	SHISAM	HISAM	DEDB
HDAM	N/A	√	√	√	√	√	
HIDAM	√	N/A	√	√	√	√	
HALDB	√	√	N/A	√	√	√	
PDF	√	√	√	N/A	√	√	
SHISAM	√	√	√	√	N/A	√	
HISAM	√	√	√	√	√	N/A	
DEDB			Future Release	Future Release			N/A

You can also perform database maintenance operations, including:

- » Add/delete indexes
- » Add/delete dataset groups
- » Add/change/delete partitions
- » Move DBD search/key fields

In addition, you can perform application-driven changes, including:

- » Expand/shrink segment size
- » Convert fixed-to-variable and variable-to-fixed lengths
- » Add/change/delete/initialize non-DBD search/key fields

## HOW IT WORKS

Figure 1.

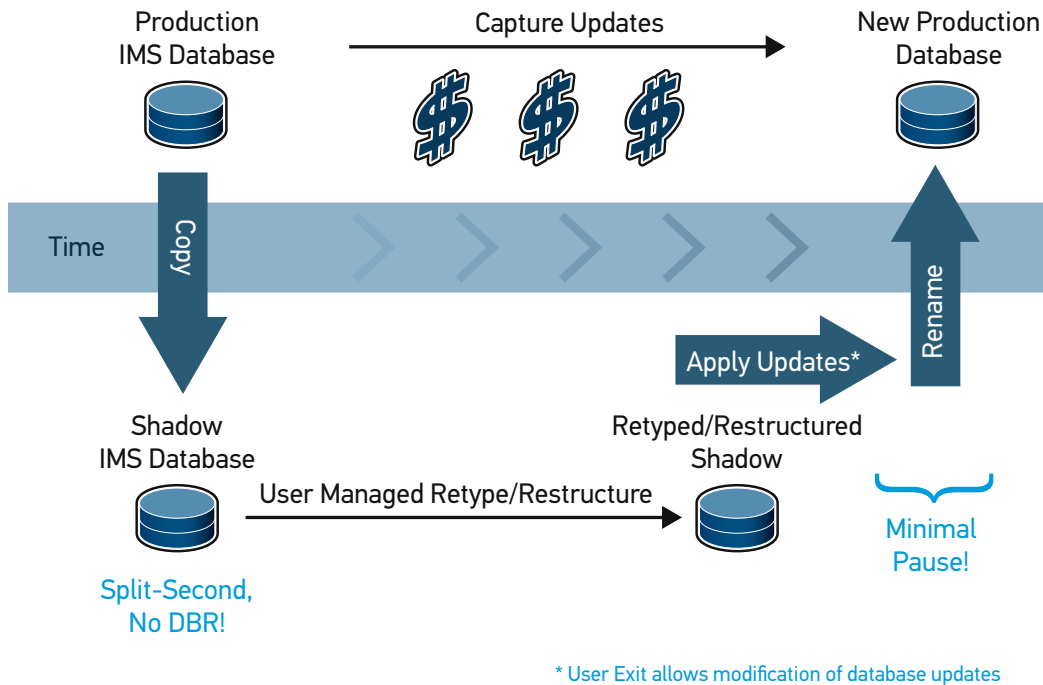


Figure 1 illustrates how the BMC Solution operates. It creates a shadow version of the production IMS database without interrupting transactions and continues to capture all further transactions with the database. Application users see no interruption to service.

Meanwhile, the solution restructures the shadow IMS database through a user-managed process to implement the required changes. You then rename the restructured shadow database to replace the original database, a process that takes only minutes. Finally, using user exit, you apply the transactions that were captured during the period when the shadow database was being restructured and renamed.

The solution also provides a prepare function that enables you to model proposed changes before implementing them. This minimizes risk by permitting you to identify errors before releasing changes to the production environment.

### AN ALTERNATIVE TO HALDB

One of the major problems IMS shops face is running out of database space. When IMS runs out of space, it stops working. You are then forced to convert to a larger capacity database to maintain IMS availability.

Some shops are converting to HALDB, a partitioned database. It enables you to add more containers to the database to gain more space. You can add any number of containers allowing virtually unlimited expansion.

HALDB, however, has drawbacks. It's costly from both a people and a process perspective. And it is a different type of database than IMS. Consequently, you may have to change your application programs.

What's more, HALDB is difficult to replicate and operate, so you will have to change your operational procedures. That requires considerable staff education and special handling. It also introduces risk in terms of supportability and recovery. Furthermore, it requires all-or-nothing migration of databases, and returning to a nonpartitioned state is difficult and requires ISV tools.

HALDB is also harder to manage than IMS. It has more data sets and requires changes to the recovery process. It requires database recovery control (DBRC) in all environments, which adds process overhead, and it requires change to the testing process resulting in a more complex testing environment. It may also introduce a performance drag due to self-healing pointers. Finally, HALDB offers no HISAM, SHISAM, or extended OSAM support.

BMC offers an attractive alternative to HALDB called BMC Partitioned Database Facility (PDF). Like HALDB, PDF is a partitioned database, so you gain the space and performance advantages that partitioning offers.

PDF, however, has none of the drawbacks of HALDB. It's a simple, straightforward solution that minimizes complexity, risks, and costs. So it offers an easy and natural next step to provide more space. With BMC PDF, you convert only those databases that have capacity or performance issues, and you can easily return them to a nonpartitioned state if necessary.

BMC PDF permits you to continue business as usual. It's transparent to applications. It does not require changes to your program testing environment and processes. In addition, BMC PDF is operationally consistent with IMS, so there is little or no change to production procedures. The result is a minimal learning curve on the part of the IT staff.

## **SUBSTANTIAL BENEFITS**

With BMC IMS solutions, you can make changes to IMS databases without incurring the downtime normally associated with IMS database conversions or restructures. As a result, you can reap the substantial rewards that changes to IMS can deliver.

For example, you can leverage these solutions to reduce MIPS consumption by increasing the efficiency of IMS database operation. In addition, BMC solutions help you offload some IMS database processing to System z Integrated Information Processors (zIIPs). What's more, the BMC tools themselves can run on zIIPs.

By reducing MIPS consumption, you can take on more business services without upgrading your mainframes. That means lower costs because MIPS are a major contributor to IT costs.

You'll also have increased agility. You won't be held back by the specter of long IMS downtimes, so you can quickly and easily cycle in IMS changes to meet new business requirements. In addition, the conversion and restructure procedures are highly automated, so they do not require the high level of IMS expertise normally needed for these procedures. That frees up IMS experts for more strategic endeavors.

## **CONCLUSION**

IMS has been a data center workhorse for decades. By all indications, it will continue in that role for the foreseeable future. As a result, IMS will continue to be a component of an increasing number of critical enterprise applications. Many of these applications will drive up IMS workload and some will require enhancements to IMS functionality. That means you will have to make changes to IMS.

With BMC IMS solutions, you can make those changes while still keeping IMS — the last mile of availability — open for traffic. So you can remain fast on your feet to meet the increasing demands of the business without jeopardizing application availability.

**BUSINESS RUNS ON IT. IT RUNS ON BMC SOFTWARE.**

Business runs better when IT runs at its best. That's why more than 20,000 IT organizations – from the Global 100 to the smallest businesses – in over 120 countries rely on BMC Software (NASDAQ: BMC) to manage their business services and applications across distributed, mainframe, virtual and cloud environments. With the leading Business Service Management platform, Cloud Management, and the industry's broadest choice of IT management solutions, BMC helps customers cut costs, reduce risk and achieve business objectives. For the four fiscal quarters ended June 30, 2012, BMC revenue was approximately \$2.2 billion.

