Five Ways to Reduce Costs for Batch Processing
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EXECUTIVE SUMMARY

THE PROBLEM: BATCH DRIVES UP IT COSTS
Even with the advent of 24x7 business activity supported by wide-ranging, cross-platform applications, batch processing remains a critical business activity for generating revenue and ensuring online systems are ready to conduct business. As organic growth, business change, and new applications encroach on the time available for completing batch processing, many IT organizations find themselves funding hardware and software upgrades to ensure that the batch processing can be completed within its designated window of time. These upgrades, in turn, drive up the IT total cost of ownership and the cost of doing business.

SOLVING THE PROBLEM: ALTERNATIVES TO UPGRADES
Fortunately, there are alternatives to using upgrades to meet batch window requirements; alternatives that enable IT to maximize existing computing resources to complete the workloads more efficiently, and in less time. These alternatives include five ways to deliver batch processing optimization, and involve varying levels of IT effort. The five ways, along with examples of how organizations have realized savings, are discussed in the sections that follow.
BATCH PROCESSING ISSUES
In spite of advances in business models and their use of real-time online systems, batch processing continues to be a critical activity for most organizations. It is believed that at least 50 percent of workloads are, in fact, batch. From generating the invoices that collect revenue, to reconciling customer accounts for online access, to inventory updates that support retail operations or manufacturing, delays in the batch cycle can directly and negatively impact your organization’s revenue. In this climate, IT has to meet key batch processing window commitments to keep the business running.

BATCH PERFORMANCE CONSIDERATIONS
The strongest batch mandate for IT is to complete the critical work in an allotted timeframe — usually referred to as the “batch window” — though it is not unusual for companies to have multiple batch windows. Completion within the window ensures that a critical business process, such as billing, meets its business deadline on time. Additionally, for many businesses, batch processing has to be completed to ensure that customer and business data is up to date before online systems, which support a majority of business processes, can be started. In some industries, failure to meet agreed-upon service levels can result in hefty fines.

There is also growing business pressure to offer more competitive services via online systems that have to be available earlier and for longer periods of time, which effectively compresses the window available for batch processing.

Finally, even if all these competing priorities are being managed by IT today, the constant change caused by maintenance and application changes can significantly alter the batch processing flow and resource requirements at any time — usually without any advance warning. As all IT executives have learned, even “minor” changes can have major — or sometimes catastrophic — consequences.

TYPICAL BATCH RESOLUTIONS INCREASE IT COSTS
To address both the importance of batch and its performance considerations, IT traditionally has had two choices:

» Upgrade the hardware
» Re-engineer the batch application or process

The first option is the least invasive, but is a direct driver of increased total cost of ownership for IT. Upgrades include not only the cost of additional hardware, but also the cost of accompanying software. Analysts have estimated the cost of an upgrade to be in excess of $6,700 per MIPS for hardware and software. Beyond these direct costs are the cost of administration for those MIPS, driven by larger environments and increased complexity. When these indirect costs are included, the analyst estimate of the total cost is over $9,500 per MIPS.

Using these cost estimates, an upgrade of even a single z9EC engine (~580 MIPS) will result in first-year direct HW/SW costs of $3.9 million, and total first-year costs that could be more than $5.5 million. It is easy to see how the pressure on IT to deliver batch performance, which results in hardware upgrades, can lead to unplanned costs and substantial impact on the IT budget.

Unfortunately, the second option can be even more expensive — and much more resource and time intensive. Rewriting application code diverts developers from building new applications that can capture market share, innovate, or create business efficiency. In the case of long-lived legacy applications, IT may no longer even possess the program logic and coding knowledge needed for such re-engineering, as many of the application support teams have been downsized and may not even have the knowledge to re-work an application. Even if the knowledge and resources are available, it is a daunting task to identify which of the many thousands of batch jobs would be the best targets for delivering increased efficiency via re-engineering. With major resource, time, and skills challenges, re-engineering is not frequently chosen by IT, and upgrades have become the default for addressing batch deadline issues.
NEW IT OPTIONS: FIVE WAYS TO REDUCE BATCH COSTS

For IT management struggling to find a solution to batch processing issues, infrastructure management software advances offer new options for the batch processing/IT cost conundrum. They range from non-invasive optimization, to non-capital tuning alternatives, to rapid techniques for identifying application code inefficiencies. In addition, a batch scheduling solution can match resources to processing schedules to ensure service commitments are met with consistency and minimum resources. The five ways to reduce batch processing costs and meet batch window targets are:

1. Automatically reduce the time required to process the work
2. Automatically eliminate costly reruns caused by space-related job failures
3. Stabilize the batch processing environment
4. Identify configuration bottlenecks constraining batch and tuning alternatives that can relieve the bottlenecks
5. Automatically schedule and manage batch processing cycles to ensure work is completed on time and efficiently

These five technologies are described briefly in the following sections.

1. AUTOMATICALLY REDUCE THE TIME REQUIRED TO PROCESS THE WORK

Even with a gifted team of performance analysts, optimally managing the complex batch environment is a daunting task. In the 24x7 world, the static settings that govern batch jobs usually fail to deliver optimal performance. Yet it is impractical to monitor and adjust settings around the clock.

Many batch jobs, although operating correctly, have been in service for years and have not benefited from advanced technology, modern coding practices, or improved processing methods. Many of these programs still reside and execute below the 16MB line, with buffering techniques and sizes optimized for older CPU hardware, DASD, and software. Because of the high cost of any effort to rewrite old code and modify JCL, many of these jobs continue to function — inefficiently — night after night, year after year.

BMC MainView Batch Optimizer can overcome batch inefficiencies and automatically reduce batch run times by improving I/O performance, dynamically executing multiple batch job steps in parallel, and piping file I/O between batch processes for concurrent execution of data dependent steps or jobs — all without any JCL or application code changes.

The solution also will optimize performance to reduce job-elapsed time and thereby reduce the elapsed time used in the batch window. It also includes piping technology that further exploits the sysplex environment by dynamically moving and executing job steps on those processors or images with available capacity. This can enable IT to meet service level agreements for batch and online processing; and accommodate growth and application change — all without frequent unplanned upgrades.

Integration with BMC Control-M ensures that all of the job-to-job piping participants are submitted concurrently and recognizes and treats the set of inter-related pipes and participants as a single, comprehensive unit of work, called a “collection.” Because BMC Control-M uses a collection as the basic unit of work to be scheduled, all pipe participants are submitted concurrently, after verification that all required resources are available. This method ensures that some participants will not wait for other participants to start executing.

Let’s add an additional technology to the mix. Software compression services provided by BMC DATA ACCELERATOR Compression provide an additional benefit to the optimization provided by BMC MainView Batch Optimizer. BMC MainView Batch Optimizer utilizes enhanced buffering and I/O techniques to significantly speed up data transfer rates. These techniques can become even more efficient if they are used to transfer compressed data. For example, if a compression percentage of 70 percent is obtained, each I/O
operation will become 70 percent more efficient because it will transfer 70 percent more data for the same amount of overhead. BMC DATA ACCELERATOR Compression provides compression services to VSAM and QSAM (flat file) data.

Run Time Impact of Batch Optimizer
At one organization, it was pointedly demonstrated how much BMC MainView Batch Optimizer automatically reduces batch run times when the operations group inadvertently disabled the software. They saw a batch cycle that had been taking five hours soar to 19 hours. Without BMC MainView Batch Optimizer, the operations group would have needed a significant upgrade to meet the batch deadlines. They were clearly reminded of the business value BMC MainView Batch Optimizer was delivering.

2. AUTOMATICALLY ELIMINATE COSTLY RERUNS CAUSED BY SPACE-RELATED JOB FAILURES
When batch processing delays or job reruns extend batch completion times, ABENDs often are the cause. Recovering from space-related ABENDs continues to be a challenge, even with additional functions in the IBM® DFSMS (SMS) product. As storage capacity continues to expand — while storage management staff remains static — automating the recovery of space shortages to ensure availability can reduce delays and reruns, and thereby help batch meet business deadlines without costly upgrades.

By proactively preventing or recovering ABENDs, the BMC MainView SRM StopX37/II product enables jobs to complete successfully the first time. BMC MainView SRM StopX37/II works dynamically at the dataset level. It operates only when needed, efficiently maintaining continual availability. Functionality at the operating system level intercepts ABEND conditions, providing services without JCL or application changes.

Manufacturing Requires Space
If unable to manage storage space accurately, one consumer manufacturing company can corrupt — or even lose — corporate data that is critical to the business, causing it to miss important global SLAs. The company relies on the abilities of BMC MainView SRM StopX37/II to prevent failures, save time, and reduce costs by reducing the number of space-related ABENDs.

3. STABILIZE THE BATCH PROCESSING ENVIRONMENT
While known as a checkpoint restart product, BMC APPLICATION RESTART CONTROL is a family of products that addresses a number of issues that can cause havoc within the batch cycle. Three of them are listed below:

» Checkpoint Pacing - Many environments utilize DB2® and/or IMS™ as a datastore and rely heavily on checkpoint restart as a way of life. IMS Checkpoints and DB2 Commits are absolutely essential elements of many batch processes, but they are incredibly expensive in terms of CPU resources consumed and elapsed time required to process them. Many legacy applications have hard-coded commit intervals embedded within the program logic that was developed to run on much older hardware. As successive hardware upgrades have been applied to the environment, these older programs were never recalibrated to the upgraded hardware configuration. Modern hardware and operating systems can process much faster, and a program that once issued commits every five seconds, now may issue 40-50 commits per second.
BMC APPLICATION RESTART CONTROL contains a filter mechanism that eliminates excessive Checkpoint/Commit activity without requiring application changes. Removing this unnecessary overhead can produce staggering results in terms of reduced CPU consumption as well as elapsed time reductions.

**Application Reattach** - BMC APPLICATION RESTART CONTROL provides automation to manage deadlock contention in batch programs. When a deadlock condition is encountered (-911 SQL code in DB2 or U0777 ABEND in IMS), the product will intercept the condition and automatically re-drive the program to get past the conflict. If successful, the job step will eventually end normally — with no manual intervention required.

**S0C7 Conditions** - These conditions are typically the result of bad data coming into a program via an input file. When a program ABENDS with a S0C7 type ABEND, the on-call analyst must either clean up the bad input record or pull it off the input file so the batch job can then be rerun. BMC APPLICATION RESTART CONTROL provides automation that will place the bad input record on a REJECT file so the batch program can continue to execute. The “Rejected” records can then be cleaned up and inputted to the next cycle.

By managing the batch execution environment, many problems are detected and “handled” before they can escalate up and cause a much more serious problem to the nightly cycle.

A large financial services company has been able to exploit BMC APPLICATION RESTART CONTROL to add multiple streams of batch update processes to its environment instead of serializing them. This enables the company to comply with very stringent batch window requirements and, at the same time, allows it to contend with very wide swings in business volume due to the extremely volatile nature of the financial markets.

A large insurer has been able to realize significant reductions in both run time and CPU consumption by implementing checkpoint pacing to remove excessive checkpoint/commit activity without having to rewrite any of the application code.

### 4. EASILY AND ACCURATELY PINPOINT CONFIGURATION BOTTLENECKS

Configuration bottlenecks that artificially constrain batch performance are another source of batch performance issues. Growth in existing applications, the addition of new applications, and hardware and software changes continually impact the batch processing environment. Over time, or sometimes even with a single change, resource bottlenecks are introduced that decrease the efficiency of batch applications leading to resource constraints, batch delays, and the perceived need for upgrades.

Frequently, the resource constraints are caused by a conflict for a resource that, if identified and resolved, can enable increased processing efficiency and the deferral of upgrades.

The solution is to have performance management tools that can easily and accurately identify the source of the bottleneck. It should also be able to be used to test-drive tuning alternatives before committing to any actual changes in order to pick the best option and verify that it will in fact improve batch performance.

**BMC Capacity Management for Mainframes** is just such a solution. It delivers the capability for spotting the bottlenecks and for predicting the impact of alternative tuning options. It can pinpoint problems in processors or in I/O, including interference from other applications, LPARs, or systems. It also offers extensive out-of-the-box graphic reports on batch performance that enable both ad-hoc problem analysis and regular status reporting.
A Tale of Two Tunings

A health care company used BMC Capacity Management for Mainframes to identify inefficiencies in the batch billing cycle and implement tuning that resulted in bills being sent out one day earlier — which saved the company $600,000 per year.

A large manufacturer thought it needed a CPU upgrade when the service time of a critical batch application exceeded its targets. Instead, BMC Capacity Management for Mainframes enabled it to pinpoint the real cause: an I/O problem on a specific device caused by other applications using the device. Using the BMC Capacity Management for Mainframes predictive technology, the company was able to determine that shifting the I/O for the other work off the device would cut the service time of the critical batch application in half. It was able to avoid the cost of a CPU upgrade, as well as the ensuing problems it would have faced when the upgrade did not fix the performance problem.

BMC SQL Performance for DB2 alleviates problems caused by inefficient or runaway SQL statements. It provides the most accurate information on SQL statement performance and DB2 object performance metrics while minimizing the resources required for information gathering. This data can then be used to maximize SQL statement and DB2 object efficiency, thus improving batch application run times, overall DB2 system performance, and lowering DB2 cost of ownership.

Finding and Fixing SQL Problems Quickly

A financial services company noted that it was nearly impossible for the DB2 DBA staff to gather necessary application performance information in a timely manner for application-level problem resolution and performance enhancement. Also, it was difficult to provide the application staff with the information they require on the actual lock conflicts that occur in DB2 during the production batch runs. They have worked on lock issues with various application teams for long periods of time before pinpointing the exact SQL statement that was causing the problem and the exact program that was running at the lock conflict time. BMC SQL Performance for DB2 changed all that, making it possible to rapidly find problems by allowing them to tackle the most expensive DB2 applications first. The turnaround time on performance issues was cut dramatically.

5. AUTOMATICALLY SCHEDULE AND MANAGE BATCH PROCESSING CYCLES

IT capabilities directly affect competitive advantage, time to market, and profitability. With more than 50 percent of all critical data processing performed in batch processes, batch scheduling plays a key role in any business success. A reliable and scalable solution capable of effectively monitoring, managing, and automating the complex batch processing environment will address this need and meet business objectives. Issues that must be considered in today’s batch processing environment include: disparate systems that require a heterogeneous, cross-platform job scheduling solution; batch integration between packages; and the skyrocketing volume and
complexity of workload automation requirements, thanks to an influx of applications, architectures, Web-based transactions, and cross-platform, cross-application, and cross-company transactions.

While batch processing often is a foundation technology for applications, companies typically rely on individual knowledge and historical metrics when planning and implementing changes in their batch environment. With the growing complexities of job dependencies, highly critical SLAs that depend on batch flows, and tight integration with customer-facing online systems, the lack of sophisticated tools and solid methodologies capable of accurately predicting the impact of change often result in costly outages and staff-years of troubleshooting that cast a shadow on a company's reputation and a heavy burden on their budgets.

For companies that rely on critical business batch workflows, BMC Control-M provides a comprehensive and integrated batch scheduling and monitoring platform for the enterprise. BMC Control-M presents a single automation methodology for all platforms while helping companies reduce IT operational costs.

From a single point of management, BMC Control-M provides workload automation and scheduling control over mainframe environments and multiple other platforms/applications across the enterprise. Automation is enhanced via cross-application/platform scheduling capabilities, such as job dependencies, workload balancing, management by exception, and status-based job execution. BMC Control-M prevents scheduling problems from developing into business problems.

BMC Control-M is fully integrated with business priorities, providing early warnings of possible failures to meet SLAs and providing the modeling and simulation tools to allow operations to effect a resolution without creating further problems. Companies are now able companies to manage what matters and assure that critical batch associated SLAs are met. It offers unmatched security, auditing, and reporting tools allowing companies to adhere to the strictest security regulations and comply with Sarbanes-Oxley guidelines and other regulatory requirements.

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**Scheduling for Reduced Costs**

A travel industry company migrated to BMC Control-M for a single, multiplatform scheduling environment and achieved substantial payback, starting with the elimination of duplicate licenses and support fees for the batch scheduling tools on the mainframe. Additionally, skills requirements and staff training costs have dropped. Moreover, they now optimize batch scheduling, which ensures batch service level agreements (SLAs) are met more frequently. They also can perform enhanced and effective batch testing and maximize the use of the tool to better manage the physical resources on the mainframe.

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**SUMMARY: REDUCING BATCH COST IS EASILY ACHIEVABLE TODAY**

IT has largely been forced to use hardware upgrades to ensure they meet batch commitments. While this sometimes delivers timely results, it can also significantly increase costs and further erode the IT cost of ownership position. Fortunately, infrastructure management technology provides alternatives to hardware upgrades; alternatives that deliver more consistent and better batch performance, without the cost impact of repeated upgrades or the business impact of service failures. IT organizations should explore how one or more of these options can help drive down the cost of batch processing.
Business runs on IT. IT runs on BMC Software.

Business thrives when IT runs smarter, faster and stronger. That’s why the most demanding IT organizations in the world rely on BMC Software across both distributed and mainframe environments. Recognized as the leader in Business Service Management, BMC offers a comprehensive approach and unified platform that helps IT organizations cut cost, reduce risk and drive business profit. For the four fiscal quarters ended June 30, 2010, BMC revenue was approximately $1.92 billion.