MAINVIEW® Batch Optimizer General Information

Version 2.3

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Restricted Rights Legend

Contacting BMC Software

You can access the BMC Software Web site at **http://www.bmc.com**. From this Web site, you can obtain information about the company, its products, corporate offices, special events, and career opportunities.

United States and Canada

Address BMC Software, Inc.
2101 CityWest Blvd.
Houston TX 77042-2827

Telephone 713 918 8800 or
800 841 2031

Fax 713 918 8000

Outside United States and Canada

Telephone (01) 713 918 8800

Fax (01) 713 918 8000

Customer Support

You can obtain technical support by using the Support page on the BMC Software Web site or by contacting Customer Support by telephone or e-mail. To expedite your inquiry, please see “Before Contacting BMC Software.”

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You can obtain technical support from BMC Software 24 hours a day, 7 days a week at **http://www.bmc.com/support_home**. From this Web site, you can

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Before Contacting BMC Software

Before you contact BMC Software, have the following information available so that Customer Support can begin working on your problem immediately:

- product information
  - product name
  - product version (release number)
  - license number and password (trial or permanent)
- operating system and environment information
  - machine type
  - operating system type, version, and service pack or other maintenance level such as PUT or PTF
  - system hardware configuration
  - serial numbers
  - related software (database, application, and communication) including type, version, and service pack or maintenance level
- sequence of events leading to the problem
- commands and options that you used
- messages received (and the time and date that you received them)
  - product error messages
  - messages from the operating system, such as `file system full`
  - messages from related software

Contents

About This Book

This book contains general information about the Product Name product and is intended for OS/390 system administrators.

How This Book Is Organized

This book is organized as follows:

Section	Description
“Introduction”	provides an overview of Product Name
“MAINVIEW Batch Optimizer Editions”	describes the Standard, Advanced, and Enterprise editions of MAINVIEW Batch Optimizer
“Features of MAINVIEW Batch Optimizer”	explains the features of MAINVIEW Batch Optimizer
“Benefits of Batch Optimizer”	explains the benefits of MAINVIEW Batch Optimizer
“Summary and Justification”	explains how Product Name will save your organization time and money

In addition, an index appears at the end of the book.

Related Documentation

BMC Software products are supported by several types of documentation:

- online and printed books
- online Help
- release notes and other notices

Online and Printed Books

The books that accompany BMC Software products are available in online format and printed format. If you are a Windows or Unix user, you can view online books with Acrobat Reader from Adobe Systems. The reader is provided at no cost, as explained in “To Access Online Books” on page viii. You can also obtain additional printed books from BMC Software, as explained in “To Request Additional Printed Books” on page viii.

To Access Online Books

Online books are formatted as Portable Document Format (PDF) files. You can view them, print them, or copy them to your computer by using Acrobat Reader 3.0 or later.You can access online books from the documentation compact disc (CD) that accompanies your product or from the World Wide Web.

In some cases, installation of Acrobat Reader and downloading the online books is an optional part of the product-installation process. For information about downloading the free reader from the Web, go to the Adobe Systems site at **http://www.adobe.com**.

To view any online book that BMC Software offers, visit the support page of the BMC Software Web site at **http://www.bmc.com/support_home**. Log on and select a product to access the related documentation. (To log on, first time users can request a user name and password either by registering at the support page or by contacting a BMC Software sales representative.)

To Request Additional Printed Books

BMC Software provides printed books with your product order. To request additional books, go to **http://www.bmc.com/support_home.**

Online Help

MAINVIEW Batch Optimizer includes online Help. In the MAINVIEW Batch Optimizer ISPF interface, access Help by pressing **F1** from any ISPF panel.

Release Notes and Other Notices

Printed release notes accompany each BMC Software product. Release notes provide current information such as

- updates to the installation instructions
- last-minute product information

In addition, BMC Software sometimes provides updated product information between releases (in the form of a flash or a technical bulletin, for example). The latest versions of the release notes and other notices are available on the Web at **http://www.bmc.com/support_home**.

Conventions

This book uses the following conventions:

Item	Example
information that you are instructed to type	Type **SEARCH DB** in the designated field. Type **search db** in the designated field. (Unix)
specific (standard) keyboard key names	Press **Enter**.
field names, text on a panel	Type the appropriate entry in the **Command** field.
directories, file names, Web addresses	The BMC Software home page is at **www.bmc.com**.

code examples, syntax statements, system messages, screen text	`//STEPLIB DD`
	
	`The table` *`table_name`* `is not available.`

emphasized words, new terms, variables	The instructions that you give to the software are called *commands*. In this message, the variable *fileName* represents the file that caused the error.,
GUI menu sequence	Choose **File => Open**.

This book uses the following types of special text:

Note: Notes contain important information that you should consider.

Introduction

Batch processing is the most common cause of low online resource availability. Companies are processing more data from growing online processes, thereby increasing batch processing time. The lack of 24x7 availability of global online e-business applications, shortage of skilled technical resources, increasing costs of downtime, and inefficient hardware resource utilization are among the problems IT management face that are directly tied to batch processing. Typical solutions, such as code reengineering, JCL changes, and additional hardware acquisition, can make problems worse—high-cost and time-consuming implementation, increased downtime, and a scarcity of skilled technical resources to get the job done.

MAINVIEW® Batch Optimizer is a specialized set of components that maximize your online resource availability through I/O optimization and batch job management—without expensive and time-consuming code re-engineering, JCL changes, or hardware purchases. You can use MAINVIEW Batch Optimizer to better manage your batch workloads by optimizing the I/O activity and dynamically executing job steps across a sysplex, which dramatically reduces elapsed processing time.

MAINVIEW Batch Optimizer increases system performance and predictability in the following ways:

- reducing elapsed batch processing times
- maximizing uptime for online applications
- processing batch jobs and/or job steps in parallel
- balancing workload
- increasing throughput
- enhancing I/O performance
- reducing I/O contention
- reducing dependence on physical media

MAINVIEW Batch Optimizer adds value to the following types of IT environments:

- parallel sysplex environments
- shops with growing data volumes
- operations with high availability needs
- businesses where downtime cost is high
- departments with a shortage of skilled IT staff

MAINVIEW Batch Optimizer Editions

BMC Software offers three editions of MAINVIEW Batch Optimizer to meet the needs of your environment—Standard, Advanced, and Enterprise.

Each edition provides specific MAINVIEW Batch Optimizer components:

MAINVIEW Batch Optimizer Edition	Data Optimizer	Job Optimizer	Job Optimizer Pipes	Job Optimizer for DB2 and IMS	MAINVIEW Batch Optimizer User Interface	MAINVIEW Batch Optimizer Subsystem	BMC Primary Subsystem
Standard	X				X	X	X
Advanced	X	X	X		X	X	X
Enterprise	X	X	X	X	X	X	X

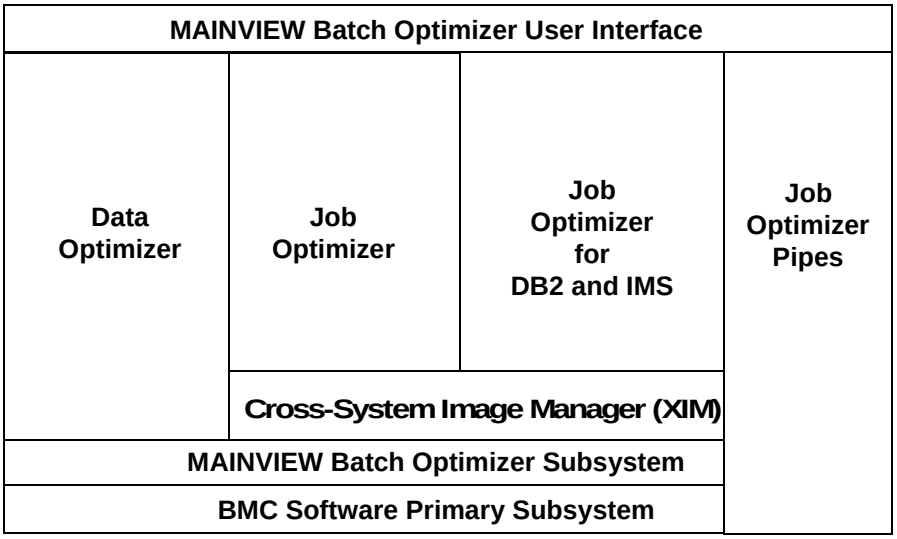
MAINVIEW Batch Optimizer Components

MAINVIEW Batch Optimizer has the following components:

- Data Optimizer
- Job Optimizer
- Job Optimizer Pipes
- Job Optimizer for DB2 and IMS
- MAINVIEW Batch Optimizer user interface
- MAINVIEW Batch Optimizer Subsystem (MBOS)
- BMC Software Primary Subsystem (BMCP)
- Cross-System Image Manager (XIM)

Some MAINVIEW Batch Optimizer components provide common, core functionality; others provide optimization for data and job performance processing. Figure 1 shows the components of MAINVIEW Batch Optimizer.

Figure 1 MAINVIEW Batch Optimizer Components



Data Optimizer

The Data Optimizer component provides I/O performance benefits for VSAM and non-VSAM data sets. Using a variety of I/O optimization techniques, Data Optimizer reduces the number of accesses to disk and reduces (or eliminates) unnecessary wait times, resulting in reduced elapsed run times. Data Optimizer automatically tunes your system to achieve optimum application performance.

Data Optimizer is provided with MAINVIEW Batch Optimizer – Standard Edition, MAINVIEW Batch Optimizer – Advanced Edition, and MAINVIEW Batch Optimizer – Enterprise Edition.

Job Optimizer

The Job Optimizer component addresses the major problems facing businesses with batch workloads: lengthy processing time, contention for resources, and unbalanced workloads. To reduce your organization's batch processing time and to balance the workload across your system or parallel sysplex, Job Optimizer uses parallelism, workload distribution, and data sharing. Job Optimizer can dramatically reduce the elapsed time of batch jobs and job streams by running job steps in parallel and by automatically routing job steps to available OS/390 images in the parallel sysplex.

Job Optimizer is provided with MAINVIEW Batch Optimizer – Advanced Edition and MAINVIEW Batch Optimizer – Enterprise Edition.

Job Optimizer Pipes

The Job Optimizer Pipes component provides in-memory piping of application data between batch jobs and job steps. This component allows two data-related applications to execute concurrently rather than sequentially. This process reduces the elapsed time required to process the jobs. Using XES services, the applications sharing the data can run on different images within a Parallel Sysplex environment.

Job Optimizer Pipes is provided with MAINVIEW Batch Optimizer – Advanced Edition and MAINVIEW Batch Optimizer – Enterprise Edition.

Job Optimizer for DB2 and IMS

The Job Optimizer for DB2 and IMS components provide performance benefits to batch jobs that access DB2 and IMS databases. Performance is optimized by running job steps concurrently.

Job Optimizer for DB2 and IMS offers the same performance benefits as Job Optimizer; however, Job Optimizer for DB2 and IMS executes job steps in parallel that access DB2 or IMS databases.

Job Optimizer for DB2 and IMS is provided with MAINVIEW Batch Optimizer – Enterprise Edition.

MAINVIEW Batch Optimizer User Interface

The Batch Optimizer user interface is an ISPF-based dialog that provides access to the Batch Optimizer control data set. The user interface is provided with each Batch Optimizer edition. The MAINVIEW Batch Optimizer control data set configures the Data Optimizer, Job Optimizer, Job Optimizer Pipes, and Job Optimizer for DB2 and IMS components. From the dialog, you can use the Edit function to view or modify the control data set members. When you are creating or modifying control data set members, the dialog verifies that any control data set members which you create or modify are syntactically correct and do not provide conflicting instructions to the optimization components.

MAINVIEW Batch Optimizer Subsystem

MAINVIEW Batch Optimizer Subsystem (MBOS) is provided with each Batch Optimizer edition. MBOS provides the following key services to the other Batch Optimizer components:

- console communications
- history data set access
- common service routines

BMC Software Primary Subsystem

BMC Software Primary Subsystem (BMCP) is provided with each Batch Optimizer edition. BMCP establishes supervisory services for Batch Optimizer to manage virtual storage.

Cross-System Image Manager

Job Optimizer incorporates the BMC Software Cross-System Image Manager (XIM™) technology. XIM allows Job Optimizer to distribute and manage job steps across one or more MVS systems. XIM functions transparently within Job Optimizer, but it requires the presence of the IBM® Cross-System Coupling Facility (XCF).

To permit the distribution of job steps across multiple operating system images, XCF must be operating in a multisystem environment.

Features of MAINVIEW Batch Optimizer

This section describes the features of the MAINVIEW® Batch Optimizer components.

Data Optimizer Features

Data Optimizer has the following features:

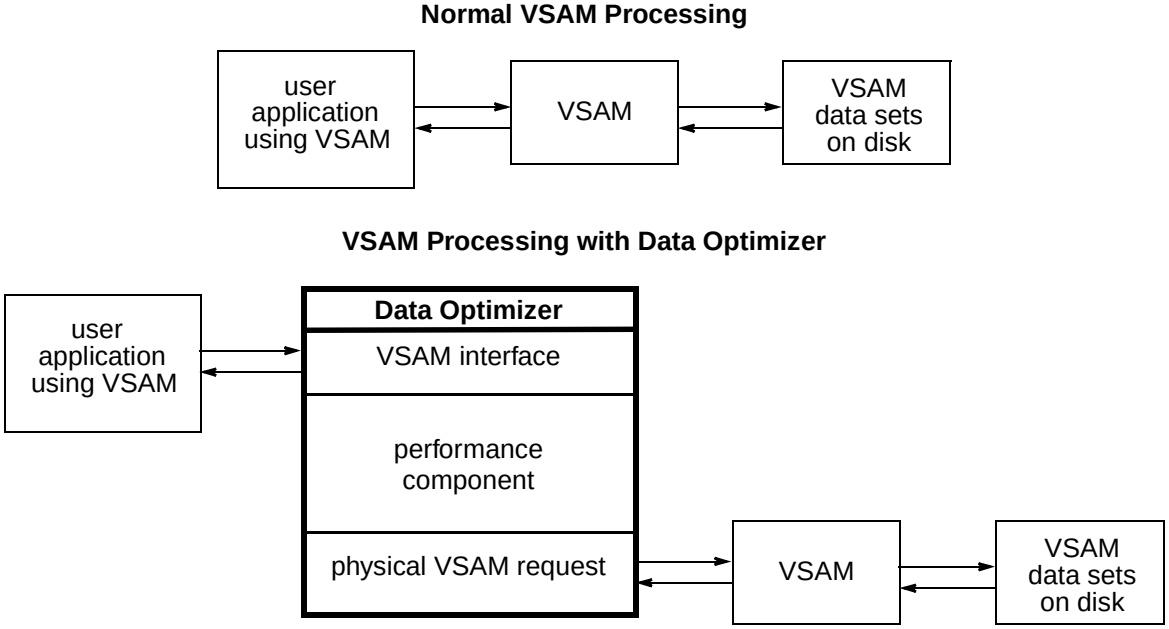
- VSAM optimization
- non-VSAM optimization
- robust tuning techniques
- dynamic tuning based on resource availability
- dynamic region adjustment
- data policy
- detailed messages and reports

VSAM Optimization

Data Optimizer optimizes buffer processing to speed VSAM data set access. For sequential access, Data Optimizer optimizes index and data buffer values. For random access, Data Optimizer dynamically builds and uses LSR buffer pools without changes to the application. For each type of access, Data Optimizer creates a historical record that it uses as a reference for subsequent processing.

Figure 2 shows the VSAM performance component of Data Optimizer.

Figure 2 VSAM Performance Component



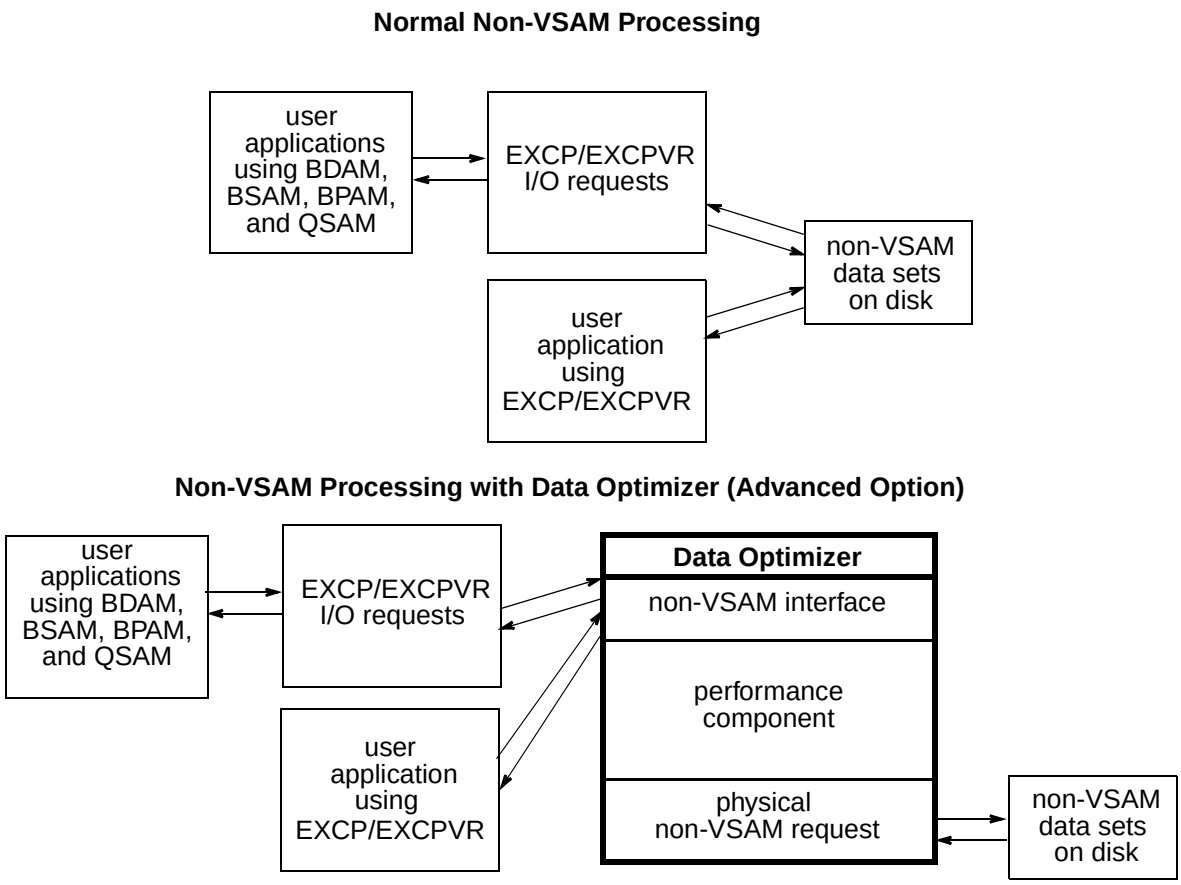
Non-VSAM Optimization

For non-VSAM data sets, Data Optimizer replaces all low-level I/O functions with its own functions, providing Data Optimizer with complete control of buffer management and of the physical I/O requests. All I/O requests by the application are satisfied logically and transparently by the Data Optimizer internal buffer manager. Data Optimizer handles non-VSAM optimization by using the following methods:

- For sequential access, Data Optimizer reads large amounts of data with each I/O and overlaps the I/Os to maximize performance, regardless of physical blocking characteristics.
- For random access, Data Optimizer can retain up to 255 tracks of data in memory to maximize cache-hit performance benefits. With Data Optimizer, you can remove virtual storage constraints by decreasing the number of buffers that are obtained in 24-bit storage.
- For tape data sets, PDS members, and striped data sets, Data Optimizer optimizes data management buffer values.

Figure 3 shows the non-VSAM performance component of Data Optimizer.

Figure 3 Non-VSAM Performance Component



Robust Tuning Techniques

Data Optimizer provides a variety of sophisticated tuning techniques that provide the best possible performance benefits for each type of processing and file structure. Techniques range from simple buffer value changes to more advanced techniques such as dynamically caching buffers, overlapping I/O, building and using LSR pools, and the complete rebuilding of channel programs.

Dynamic Tuning Based on Resource Availability

When a data set that is being opened has been selected for optimization, Data Optimizer checks the availability of a variety of system resources. This check ensures that system capacity is available and that optimal tuning values are selected.

Dynamic Region Adjustment

Data Optimizer can dynamically modify the region values in an address space to compensate for any additional I/O-related storage areas that have been obtained on behalf of an application. This feature eliminates the need to increase the region value on the JOB or EXEC JCL statements to prevent S878 and S80A abends. The feature also prevents the application from seeing a decrease in the amount of *getmain-able* storage when optimization is used.

Data Policy

You use data policies to define when and how optimization processing occurs from a single centralized repository. Data policy definitions associate one or more selection criteria with a set of performance options. When an open request matches the selection criteria, MAINVIEW® Batch Optimizer uses the performance options that have been specified in the data policy definition to determine how to improve performance.

Detailed Messages and Reports

Data Optimizer displays easy-to-understand messages that describe the source requesting optimization or exclusion and the specific reasons for bypassing optimization. Data Optimizer also provides detailed statistics reports that describe the type of processing which is performed on a data set; processing duration; and JOBNAME, STEPNAME, DDNAME, and DSNAME information.

Job Optimizer Features

Job Optimizer has the following features:

- step parallelism
- workload management (WLM)
- data capture and history recording
- job analysis
- data sharing
- job policy
- User Control Facility (UCF)
- data and step constraint analysis
- job performance reports

Step Parallelism

Job Optimizer uses step parallelism to reduce the elapsed time of multi-step batch jobs. For each job, Job Optimizer analyzes the execution characteristics of the job's steps during normal sequential processing. Based on the analysis and the absence of constraints, Job Optimizer may split the job steps into separate units of work. If the job steps are split, Job Optimizer runs the steps in parallel on the same image, or separate images, during subsequent runs of the job.

Job Optimizer automatically applies its step parallelism functions to batch jobs that meet user-specified criteria and whose history of job step behavior indicates that steps can be run in parallel.

Workload Management

WLM provides performance data that helps Job Optimizer decide where to target work. To maximize the resources in your sysplex, Job Optimizer may target work to another image whose processing capabilities are more suited to running a job step.

Job Optimizer provides a function for overriding a job step target. If you know that the step would perform best on a specific image, you can add Job Optimizer comment cards to the job stream. This addition will direct Job Optimizer to always process the step on an image.

Data Capture and History Recording

Job Optimizer identifies and captures job analysis data in a VSAM cluster referred to as the history file. When a job matches a job policy, Job Optimizer queries the history file to determine whether historical data has been gathered for the job. When the job terminates, Job Optimizer updates the history file.

Job Analysis

Job Optimizer analyzes data accesses, data dependencies, and job step dependencies to determine the best optimization method to use for executing batch workloads. Job Optimizer also analyzes the consistency of multiple jobs.

Job Optimizer provides the following optimization methods:

- redirecting jobs to other processors in the sysplex
- converting batch jobs to a pipeplex for parallelism
- facilitating batch workload balancing across multiple systems
- allowing two or more job steps to run in parallel without application or JCL changes

Data Sharing

Job Optimizer uses Shared Record Positioning (SRP) or Job Optimizer Pipes to provide step-to-step piping of application data for job steps that are split by the product.

SRP allows data records that have already been written to disk to be read by subsequent job steps before the current writing step is complete. SRP provides the location of data on DASD to job steps that are scheduled by Job Optimizer on the same or different systems in the sysplex.

Job Optimizer Pipes allows data-related steps to execute in parallel by providing a method of transferring data through memory. Job Optimizer Pipes establishes a pipe in memory. This pipe is used to transfer the data written by the writer step to the reader step. These writer and reader steps can execute on the same image or on separate images in a sysplex. Job Optimizer Pipes allows the data that is being transferred via memory to be copied to DASD or tape for retention purposes. For more features of Job Optimizer Pipes, see “Job Optimizer Pipes Features” on page 14.

Job Policy

A job policy is a collection of selection criteria and performance options for batch jobs. When a batch job is initiated, Job Optimizer checks the policy to determine whether the batch job matches the criteria that have been defined in a job policy. If a match occurs, Job Optimizer intercepts the job and performs the action that is specified in the job policy.

If the batch job does not match the criteria that have been defined in a job policy, Job Optimizer takes no action; the job is processed as normal.

User Control Facility

When a job matches the criteria defined in a job policy, Job Optimizer evaluates the UCF for each program and DD name to determine whether any action is required. UCF is a set of keywords that you specify in a member of the Batch Optimizer control data set.

UCF keywords can accomplish the following tasks:

- override Job Optimizer default processing
- perform event processing
- change virtual I/O (VIO) from one name to another

Data and Step Constraint Analysis

Job Optimizer analyzes step and data set interdependencies to determine which job steps can run in parallel and which data sets can be shared between steps.

Job Optimizer assumes that a data constraint exists when two steps concurrently access the same data set. When this event occurs, Job Optimizer attempts to resolve the constraints before executing job steps in parallel.

Job Performance Reports

Job Optimizer provides the following types of job performance reports:

- The Summary Information report presents a single line of information about each job. You can use this report to determine which jobs have longer run times and higher predicted savings. Actual performance results depend on your workload and environment.

- The Detail Information report presents a graphical view of the job statistics. The report produces a before and after picture of processing and elapsed times, clearly showing the potential benefits of Job Optimizer. You can use this report to view how the jobs might split if the jobs are intercepted by Job Optimizer.

Job Optimizer Pipes Features

Job Optimizer Pipes has the following features:

- pipes
- dynamic pipe setting
- pipe policy rules
- physical file creation
- internal checkpoint support

Pipes

A pipe is a processor storage buffer that allows data to be passed between applications that run in parallel. In addition, the data can be written and saved to external media. Pipes can be used between batch jobs that run in parallel and for step-to-step piping.

Pipe Policy Rules

A pipe policy rule is a collection of selection criteria and pipe parameters for establishing and managing pipes. The selection criteria are used for dynamic pipe setting. When a pipe is established (as a result of dynamic pipe setting or JCL specification), the pipe policy rule sets the pipe management parameters.

Dynamic Pipe Setting

JCL references to physical files can be dynamically replaced by references to pipes. The replacement is performed by Job Optimizer Pipes during job initiation. Job Optimizer Pipes checks whether a data set within the job matches the criteria that have been defined in a pipe policy rule. If a match is found, Job Optimizer Pipes dynamically replaces the reference to the sequential data set with a reference to a pipe.

Physical File Creation

Data transferred through a pipe can also be written to a physical file if a physical copy of the data is required for future use or for backup purposes. The physical file creation can be controlled by means of the pipe policy rule, without any JCL changes.

Internal Checkpointing (NOTE) Support

Internal Checkpointing is supported when you use pipes instead of sequential data sets. This functionality requires that a physical file be created to hold the pipe data.

Job Optimizer for DB2 Features

Job Optimizer for DB2 has the following features:

- DB2 job step parallelism
- DB2 workload management
- data capture and history recording
- job analysis
- constraint analysis
- DB2 job policy

DB2 Job Step Parallelism

Job Optimizer for DB2 analyzes DB2 job steps, identifies DB2 dependencies on those steps, and provides the information to Job Optimizer. Batch Optimizer determines which job steps can be run in parallel on a single OS/390 image or can be distributed among multiple OS/390 images for parallel processing. For example, if two steps of the job update the same DB2 table, Job Optimizer prevents the two steps from running concurrently (but not separately) from other steps. If the DB2 steps update/read two non-related DB2 tables or read the same tables and have no other constraints, Job Optimizer may schedule those steps to run in parallel.

DB2 Workload Management

DB2 workload management provides performance data that helps Job Optimizer for DB2 decide where to target work. Job steps that reference DB2 can run in parallel on a single OS/390 image for non-data sharing DB2 configurations or they can run in parallel on multiple OS/390 images with DB2 data-sharing configurations. To run job steps on multiple OS/390 images, all DB2 subsystems across multiple OS/390 images must belong to the same active DB2 data sharing group.

Data Capture and History Recording

Job Optimizer for DB2 identifies and captures the following information about a DB2 batch job from the DB2 plans that are opened by each job step:

- DB2 SSID
- name of package and version, if using DB2 packages
- name of the DB2 plans

Job Optimizer for DB2 records all statistics and information about database access and job execution in the same VSAM cluster (history file) that the Job Optimizer component in Batch Optimizer uses for data capture and history recording. The history file contains database access information such as ddnames and data set names that have been referenced at the Program Specification Block (PSB) level—and the accesses against them. The history file also contains job execution information such as the name of the DB2 database that is accessed, the type of access (read or update), and execution parameters.

Job Optimizer for DB2 builds batch job profiles that are based on statistics and historical data. Job Optimizer for DB2 uses the profiles to predict how job steps will behave and to determine which job steps are good candidates for parallel processing.

Job Analysis

Job Optimizer for DB2 analyzes data accesses, data dependencies, DB2 job step dependencies, and DB2 database accesses to determine the best optimization method for executing DB2 batch workloads. Job Optimizer for DB2 also analyzes the consistency of multiple jobs.

Job Optimizer for DB2 provides the following optimization methods:

- redirecting jobs to other processors in the sysplex
- converting batch jobs for parallel processing
- facilitating batch workload balancing across multiple systems
- allowing two or more job steps to run in parallel without application or JCL changes

Constraint Analysis

Job Optimizer for DB2 analyzes DB2 step constraints by using plan and package information that is saved in the history data set. Job Optimizer for DB2 recognizes additional DB2 interdependencies between steps and puts shared or exclusive usage constraints on the steps. The constraints allow or prevent steps from executing in parallel. Results of the analysis are passed to the Job Optimizer component of Batch Optimizer, which controls the serialization and parallel processing of DB2 job steps.

DB2 Job Policy

During installation and customization of Job Optimizer for DB2, DB2 policy definitions are saved as members in the Batch Optimizer control data set. A DB2 job policy contains global option statements and DB2 group option statements. The DB2 group option statements let you specify actions to be taken against a user-specified plan or table and let you override default or specified global values.

Job Optimizer for IMS Features

Job Optimizer for IMS has the following features:

- IMS job step parallelism
- IMS workload management
- data capture and history recording
- job analysis
- constraint analysis
- IMS job policy

IMS Job Step Parallelism

Job Optimizer for IMS analyzes IMS DLI, DBB, and BMP steps, identifies IMS dependencies of those job steps, and then provides the information to Job Optimizer. Job Optimizer determines which IMS job steps can be run in parallel on a single OS/390 image and which jobs can be distributed among multiple OS/390 images for parallel processing. Job Optimizer also determines which OS/390 images are eligible to run each job step. For example, parallel processing of job steps that use IMS could occur on images that are capable of sharing the same IMS databases. IMS steps are considered capable of parallel processing only if they do not update non-generalized sequential access method (GSAM) IMS databases.

IMS Workload Management

IMS workload management provides performance data that helps Job Optimizer for IMS decide where to target work. Job steps that reference IMS can run parallel on a single OS/390 image for non-data sharing IMS configurations and on multiple OS/390 images for data-sharing IMS configurations. To run job steps on multiple OS/390 images, all OS/390 images must share IMS databases.

Data Capture and History Recording

Job Optimizer for IMS records all statistics and information about database access and job execution in the same VSAM cluster (history file) that the Job Optimizer component in Batch Optimizer uses for data capture and history recording. The history file contains database access information such as ddnames and data set names referenced at the PSB level and the accesses against them. The history file also contains job execution information such as the name of the IMS database accessed, the type of access (read or update), and execution parameters.

Job Analysis

Job Optimizer for IMS analyzes data accesses, data dependencies, IMS job step dependencies, and IMS database accesses to determine the best optimization method to use for executing IMS batch workloads. Job Optimizer for IMS also analyzes the consistency of multiple jobs.

Job Optimizer for IMS provides the following optimization methods:

- redirecting jobs to other processors in the sysplex
- converting batch jobs for parallel processing
- facilitating batch workload balancing across multiple systems
- allowing two or more job steps to run in parallel without application or JCL changes

Constraint Analysis

Job Optimizer for IMS provides an interface to the Job Optimizer component of MAINVIEW® Batch Optimizer. MAINVIEW® Batch Optimizer analyzes and resolves constraints on the execution of IMS batch workloads. For example, if there is a potential constraint for an IMS job step, Job Optimizer compares current execution parameters to execution parameter data that is stored in the history file. The reason for this comparison is to predict how IMS job steps will behave and to determine which job steps are good candidates for parallel processing.

Job Optimizer does not allow parallel processing for IMS job steps if they have the following constraints:

- Job Optimizer takes no action if the processing involves *any* IMS utility job steps. Subject to the normal constraints of Job Optimizer, the job steps are treated as normal OS/390 job steps.

- An IMS job step must run serially if the processing involves DBMS updates, although the step may be routed to other OS/390 images. This condition is caused by logging and backout considerations. There is no JTL override capability for this condition.

IMS Job Policy

During installation and customization of Job Optimizer for IMS, IMS policy definitions are saved as members in the Batch Optimizer control data set. An IMS job policy contains global option statements and IMS job step option statements. The IMS global option statements let you specify actions to be taken against user-specified IMS steps and let you override default or specified global values.

Benefits of Batch Optimizer

Each edition of Batch Optimizer offers optimization solutions for the problems that your organization encounters with typical batch processing.

MAINVIEW® Batch Optimizer lets you execute batch jobs faster than by using typical batch processing methods. In addition to optimizing standard batch job processing, MAINVIEW Batch Optimizer also optimizes DB2 and IMS batch jobs. The decrease in batch processing time allows for greater on-line availability. This important shift in time allocation should help improve your return on your IT investment.

Standard Edition

Batch Optimizer–Standard Edition provides data optimization with the Data Optimizer component. Data Optimizer uses buffering, caching, and other I/O optimization techniques for fast and efficient data access.

Batch Optimizer–Standard Edition provides the following benefits:

- larger data transfers for each I/O operation
- improved I/O efficiency
- reduced elapsed times
- improved buffering and caching
- virtual storage constraint relief
- conversion from HIPER-CACHE

Larger Data Transferred for each I/O Operation

MAINVIEW Batch Optimizer – Standard Edition increases the amount of data that is transferred for each I/O operation. Increased data movement decreases the number of I/O operation and reduces elapsed time.

Improved I/O Efficiency

MAINVIEW Batch Optimizer – Standard Edition captures and records an application's data access patterns and restructures I/O requests in response to the patterns. MAINVIEW Batch Optimizer restructures the requests by using advanced I/O improvement techniques such as improving buffering, overlapping I/O requests, and decreasing I/O path lengths.

Reduced Elapsed Times

Reducing elapsed batch processing times maximizes application performance. MAINVIEW Batch Optimizer reduces the number of accesses to disk, therefore reducing the batch processing elapsed time. MAINVIEW Batch Optimizer dynamically tunes your system to maintain optimum application performance without overusing resources and decreasing system performance.

Improved Buffering and Caching

MAINVIEW Batch Optimizer automatically sets optimum buffer values for utilities and applications. MAINVIEW Batch Optimizer adjusts buffer values as I/O access patterns change for a utility or application.

Virtual Storage Constraint Relief

Maximizing virtual storage constraint relief improves I/O. When appropriate, MAINVIEW Batch Optimizer moves data areas above the 16 MB line to maximize virtual storage constraint relief for VSAM and non-VSAM processing.

Conversion from HIPER-CACHE

MAINVIEW Batch Optimizer – Standard Edition provides a HIPER-CACHE conversion utility to convert HIPER-CACHE user tables to a Data Optimizer data policy. A data policy is similar in features, functions, and behavior to HIPER-CACHE tables but is superior in performance. By learning how Data Optimizer compares to HIPER-CACHE, you can simplify the conversion process from HIPER-CACHE to Data Optimizer and can ensure a smooth transition.

MAINVIEW Batch Optimizer – Standard Edition provides the following HIPER-CACHE features and functions:

- definition of a storage reserve amount
- option to direct various reports to the JES SYSMSG data set or to a separate JES SYSOUT data set
- definition of the SMF record type to use
- option to intercept only for the purpose of producing statistics, not for performance enhancement
- concept of user-defined specification of resource constraint values
- commonly used JCL override statements

Table 1 lists preliminary benchmarks from testing VSAM KSDS alone, testing with MAINVIEW Batch Optimizer – Standard Edition, and testing with HIPER-CACHE.

Table 1 MAINVIEW Batch Optimizer – Standard Edition versus HIPER-CACHE

VSAM KSDS Test Results		
Optimization Product	**Random**	**Sequential**
Base (No HC or MBO)	3.757 cpu 88.982 elapsed	0.107 4.456
HIPER-CACHE	0.413 cpu 3.665 elapsed	0.132 3.948
MBO–Standard	0.408 cpu 3.595 elapsed	0.119 3.917
Note: All times are in seconds.		

Advanced Edition

MAINVIEW Batch Optimizer–Advanced Edition provides the same benefits as MAINVIEW Batch Optimizer–Standard Edition and also provides job optimization with the Job Optimizer and Job Optimizer Pipes components. Job Optimizer and Job Optimizer Pipes components enable parallel step execution and step-to-step and job-to-job data piping with no JCL changes.

MAINVIEW Batch Optimizer–Advanced Edition provides the following benefits:

- faster job processing
- improved workload balancing
- migration from SmartBatch

Faster Job Processing

By using MAINVIEW Batch Optimizer – Advanced Edition, you can reduce your batch processing time by 50 percent or more. MAINVIEW Batch Optimizer – Advanced Edition uses the following methods to optimize batch jobs for faster processing:

- splitting job steps for parallel execution, based on history and policy definitions
- executing job steps in parallel
- forming a pipe between data-dependent steps
- forming pipes between data-dependent jobs

Improved Workload Balancing

Improving workload balancing helps to maximize your system resources. MAINVIEW Batch Optimizer–Advanced Edition improves workload balancing by gathering and analyzing job performance data. MAINVIEW Batch Optimizer–Advanced Edition uses the performance data to determine where to target work.

Migration from SmartBatch

You can migrate SmartBatch or BatchPipes to data to MAINVIEW Batch Optimizer–Advanced Edition. MAINVIEW Batch Optimizer–Advanced Edition replaces the functionality of the IBM SmartBatch product and provides the following improvements:

- more robust options and controls
- significant usability improvements
- support for data sets larger than five volumes
- support for z/OS 1.3 systems
- support for dynamic setting of job-to-job pipes, without JCL changes
- support for BatchPipes subsystem parameters to allow smooth migration

Enterprise Edition

MAINVIEW Batch Optimizer uses optimization methods that are similar to those for DB2 and IMS job steps. However, it analyzes DB2 and IMS constraints to determine step splitting and workload management.

MAINVIEW Batch Optimizer - Enterprise Edition provides DBMS batch processing optimization and workload management – in addition to the benefits of the Standard and Advanced edition components.

MAINVIEW Batch Optimizer–Enterprise Edition offers two versions of Job Optimizer: Job Optimizer for DB2 and Job Optimizer for IMS.

MAINVIEW Batch Optimizer–Enterprise Edition provides the following benefits:

- DB2 and IMS batch parallel processing
- DB2 and IMS job optimization and workload management

DB2 and IMS Batch Parallel Processing

Parallel processing decreases I/O and reduces elapsed processing time. MAINVIEW Batch Optimizer–Enterprise Edition analyzes DB2 and IMS job steps, identifies the dependencies of the steps, and distributes the steps among multiple MVS images for parallel processing.

DB2 and IMS Job Optimization and Workload Management

Optimizing DB2 and IMS jobs save time, especially because the jobs must access their respective databases during processing. Managing DB2 and IMS workloads helps to maximize your system resources. Batch Optimizer–Enterprise Edition optimizes DB2 and IMS jobs and manages workloads by gathering and analyzing job performance data. Batch Optimizer–Enterprise Edition uses the performance data to determine how to optimize a job and where to target work.

Summary and Justification

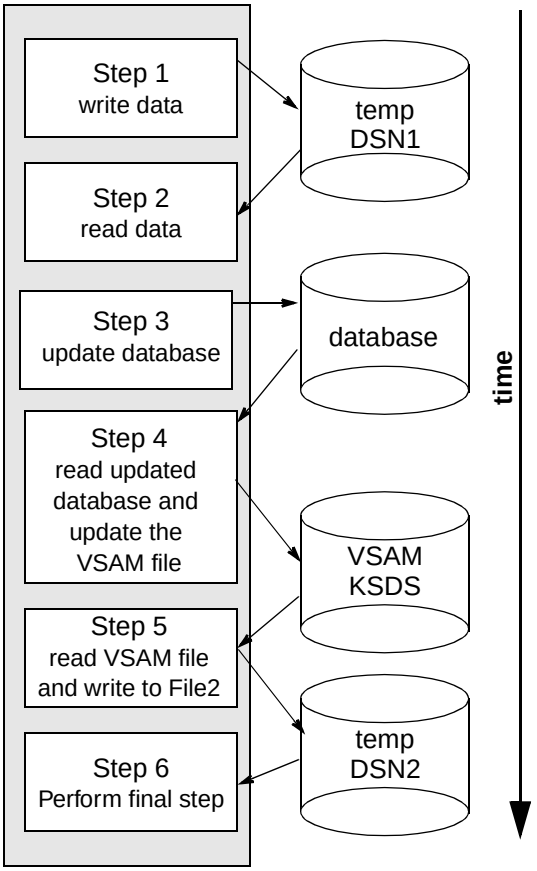
MAINVIEW® Batch Optimizer saves your organization time and money by providing the following advantages:

- improves I/O performance
- saves time with parallel processing
- maximizes DB2 and IMS usability

Improve I/O Performance

Typical batch processing ties up system resources and increases downtime, which directly affects your organization's profitability. Because processing is sequential, a large batch job can take hours to complete. Figure 4 is an example of typical batch job processing.

Figure 4 Typical Batch Job Processing



Benchmark testing with a typical set of batch jobs reveals an average processing time savings of 11 percent, using MAINVIEW Batch Optimizer–Standard Edition. BMC Software customers have reported actual production savings of as much as 50 percent with MAINVIEW Batch Optimizer–Standard Edition.

Table 2 compares preliminary benchmarks for running batch without optimization and with MAINVIEW Batch Optimizer–Standard Edition.

Table 2 Non-Optimized and MAINVIEW Batch Optimizer–Standard Edition Preliminary Benchmarks

JOBNAME	Non-Optimized Duration	Optimized Duration w/Standard	Total Time Savings w/Standard	Percentage of Time Savings
MFKBNCH1	0.000347222	0.000231481	0.000115741	33.33
MFKBNCH5	0.001284722	0.000335648	0.000949074	73.87
MFKBNCH6	0.009270833	0.009270833	0.00	0
MFKBNCH7	0.000231481	0.000219907	0.000011541	5
MFKBNCH8	0.000231481	0.000173611	0.00005787	25
MFKBNCH9	0.000219907	0.000115741	0.000104167	47.37
MFKBNCHA	0.000219907	0.000150463	0.000069444	31.58
Batch Cycle Time	0.011805556	0.010497685	—	—
Total Time Saved	—	—	0.00130787	—
Average % Saved	—	—	—	11.08

Save Time with Parallel Processing

MAINVIEW Batch Optimizer–Advanced Edition builds on the I/O optimization in MAINVIEW Batch Optimizer–Standard Edition by enabling parallel processing of batch jobs and job steps. Job Optimizer and Job Optimizer Pipes components enable step splitting, step-to-step piping, and piping of data between batch jobs.

Steps Parallel Processing

Figure 5 shows batch processing with and without steps parallel processing.

Figure 5 Batch Processing with and without MAINVIEW Batch Optimizer

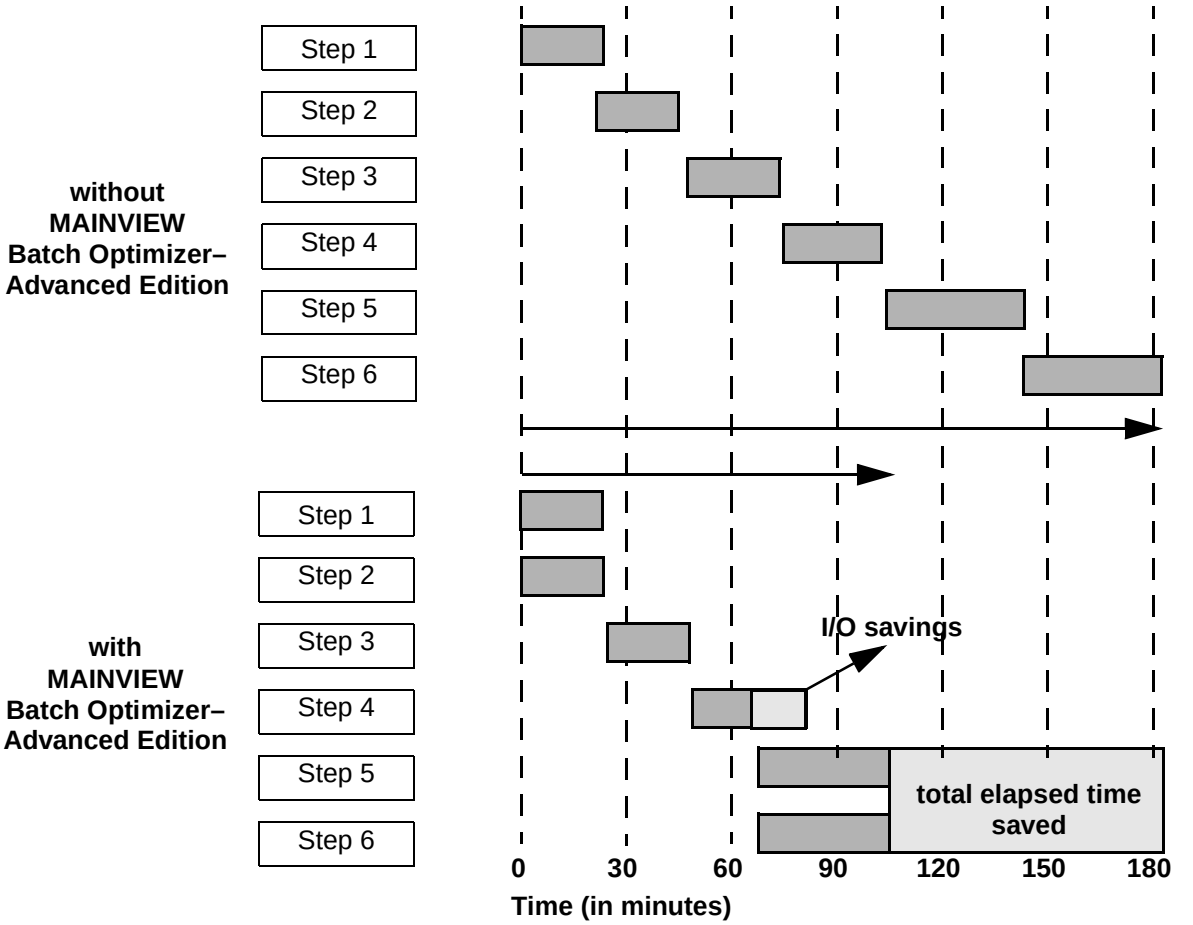


Table 3 compares preliminary benchmarks for running batch without optimization and with MAINVIEW Batch Optimizer–Advanced Edition.

Table 3 Non-Optimized and MAINVIEW Batch Optimizer–Advanced Edition Preliminary Benchmarks

JOBNAME	Non-Optimized Duration	Optimized Duration w/Advanced	Total Time Savings w/Advanced	Percentage of Time Savings
MFKBNCH1	0.000347222	0.000231481	0.000115741	33.33
MFKBNCH5	0.001284722	0.000844907	0.000439815	34.23
MFKBNCH6	0.009270833	0.004872685	0.004398148	47.44
MFKBNCH7	0.000231481	0.000185185	0.000046296	20
MFKBNCH8	0.000231481	0.000162037	0.000069444	30
MFKBNCH9	0.000219907	0.000104167	0.000115741	52.63
MFKBNCHA	0.000219907	0.000138889	0.000081017	36.84
Batch Cycle Time	0.011805556	—	—	—
Total Time Saved	—	—	0.005266204	—
Average % Saved	—	—	—	44.6078

Job Parallel Processing

Figure 6 shows JOB1 creating DSN1, which JOB2 will use as an input. Without MAINVIEW Batch Optimizer–Advanced Edition, JOB2 cannot execute unless JOB1 is completed.

Figure 6 Job Processing without MAINVIEW Batch Optimizer–Advanced Edition

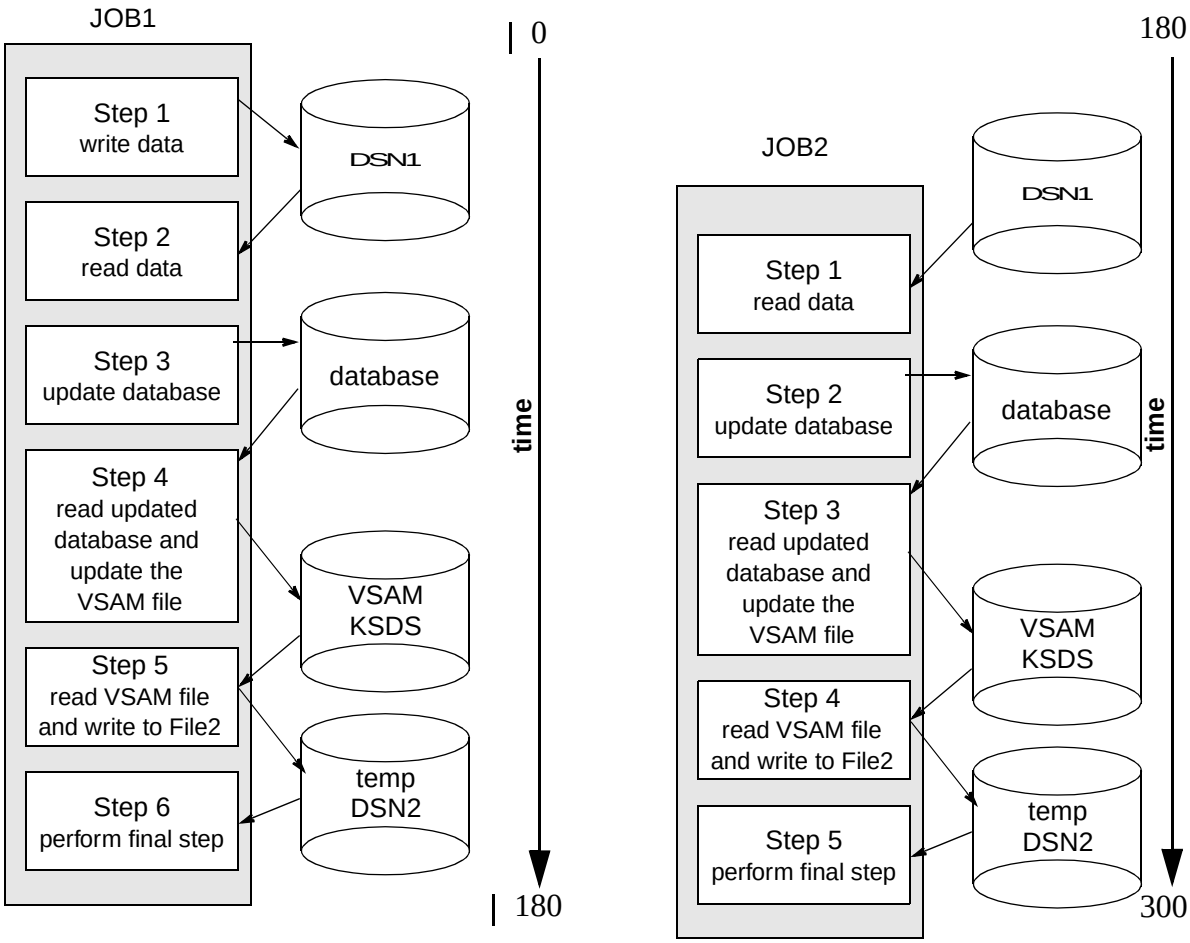


Figure 7 shows that, by establishing a data-in-memory pipe between the creating step and the successor job step, MAINVIEW Batch Optimizer–Advanced Edition allows parallel execution of the predecessor job and the successor job.

Figure 7 Job Parallel Processing with MAINVIEW Batch Optimizer–Advanced Edition

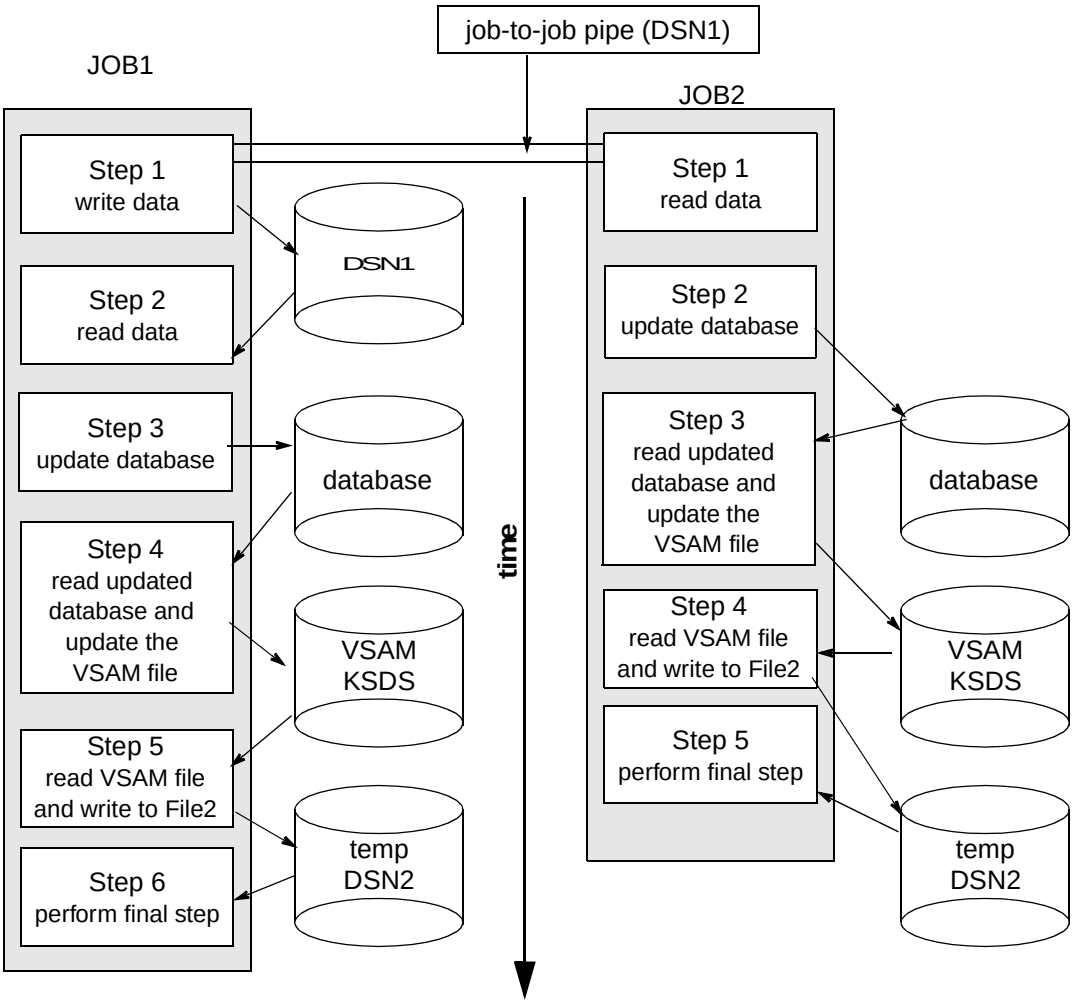
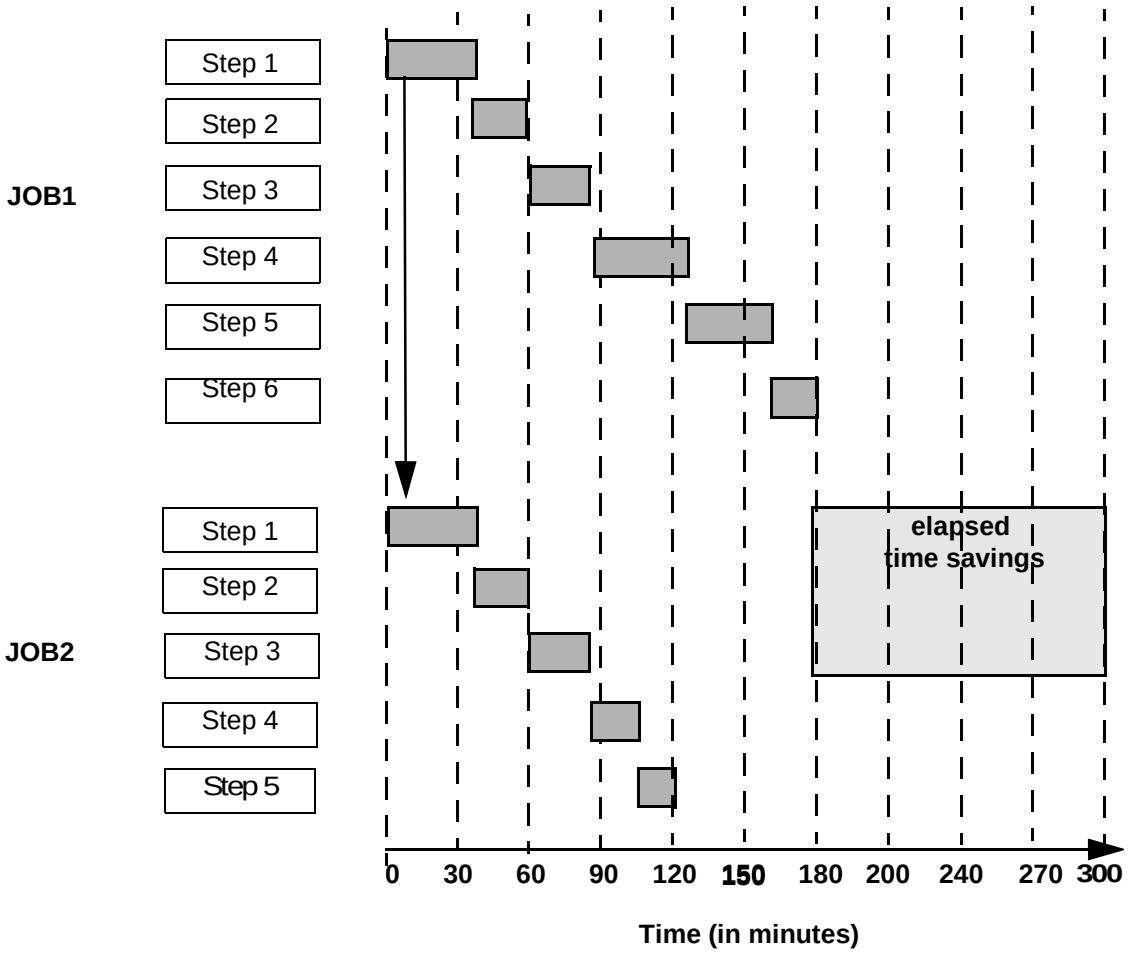


Figure 8 shows the time that is saved by using job-to-job piping with MAINVIEW Batch Optimizer–Advanced Edition. Without using job-to-job piping, JOB2 would have run after JOB1. The elapsed time for both jobs would have been 300 minutes (180 minutes for JOB1, and 120 minutes for JOB2). Using job-to-job piping, the total elapsed time is 180 minutes; JOB2 executes in parallel with JOB1, saving 120 minutes elapsed time.

Figure 8 Job-to-Job Piping with MAINVIEW Batch Optimizer – Advanced Edition



Other Cost Considerations

Many organizations consider time-consuming and costly solutions to resolve problems that are associated with batch processing. The following cost considerations can help you compare the value of using MAINVIEW Batch Optimizer:

- code reengineering
- JCL changes
- additional hardware acquisition

Maximize DB2 and IMS Usability

MAINVIEW Batch Optimizer–Enterprise Edition helps maximize the return on investment in your DB2 and IMS systems by optimizing DB2 and IMS batch jobs and running them in parallel.

Maximize DB2 Usability

MAINVIEW Batch Optimizer–Enterprise Edition improves I/O performance by using DB2 data access patterns as a guide for overlapping requests, resulting in a faster system response than before. Splitting DB2 job steps and running them in parallel also improves I/O performance.

Figure 9 is an example of typical DB2 batch job processing.

Figure 9 Typical DB2 Batch Job Processing

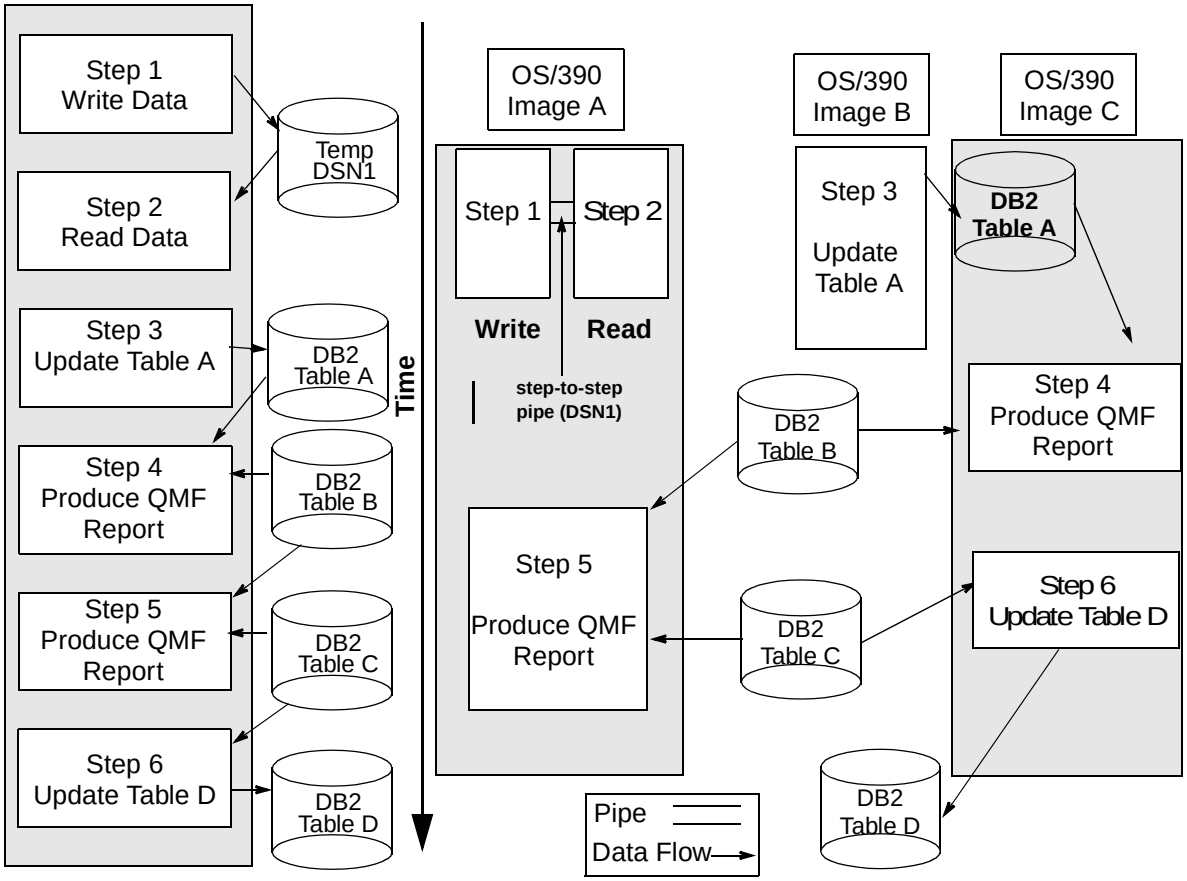
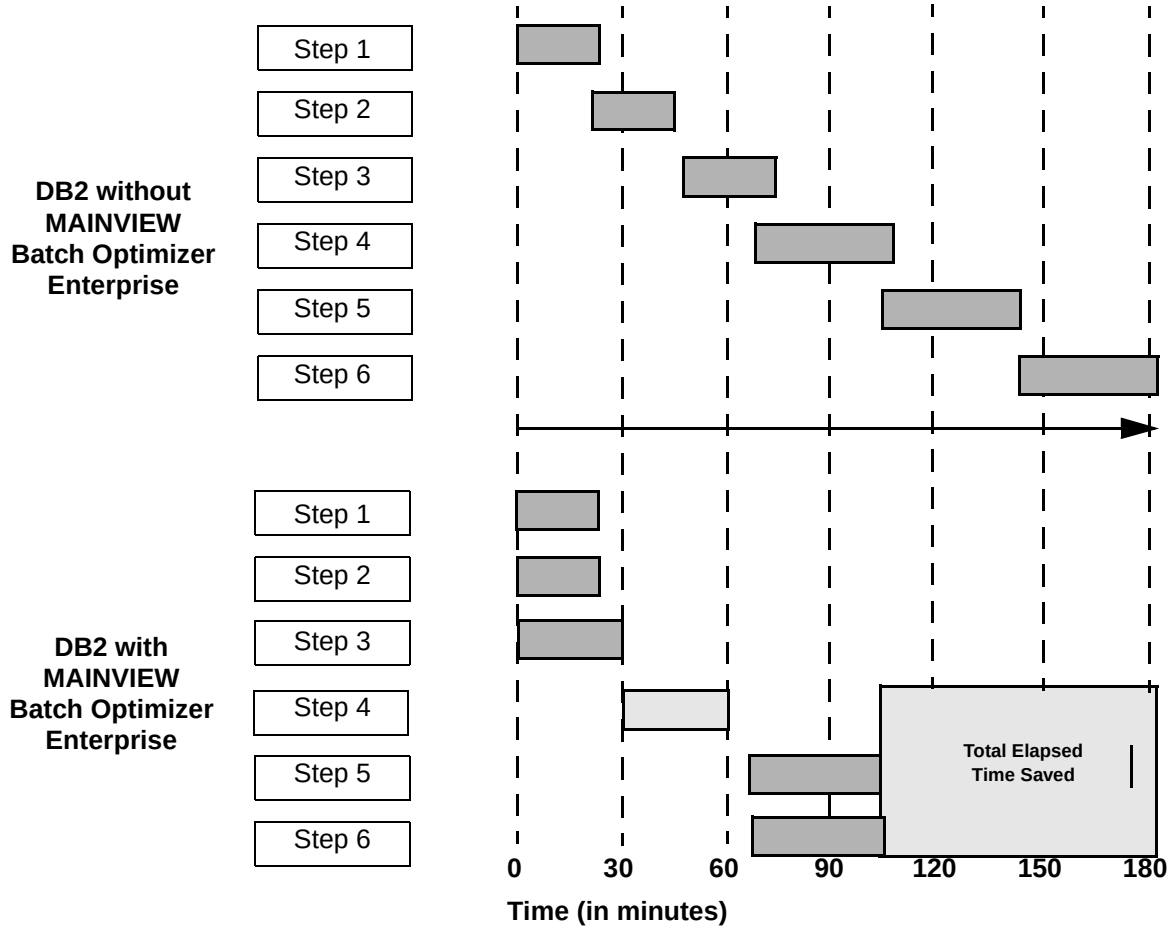


Figure 10 compares DB2 batch jobs that are run with and without MAINVIEW Batch Optimizer–Enterprise Edition.

Figure 10 DB2 Batch Processing with and without MAINVIEW Batch Optimizer



Maximize IMS Usability

Batch Optimizer–Enterprise Edition improves I/O performance by using IMS data access patterns as a guide for overlapping requests, resulting in a faster system response. Splitting IMS job steps and running them in parallel also improves I/O performance.

Figure 11 is an example of typical IMS batch job processing.

Figure 11 Typical IMS Batch Job Processing

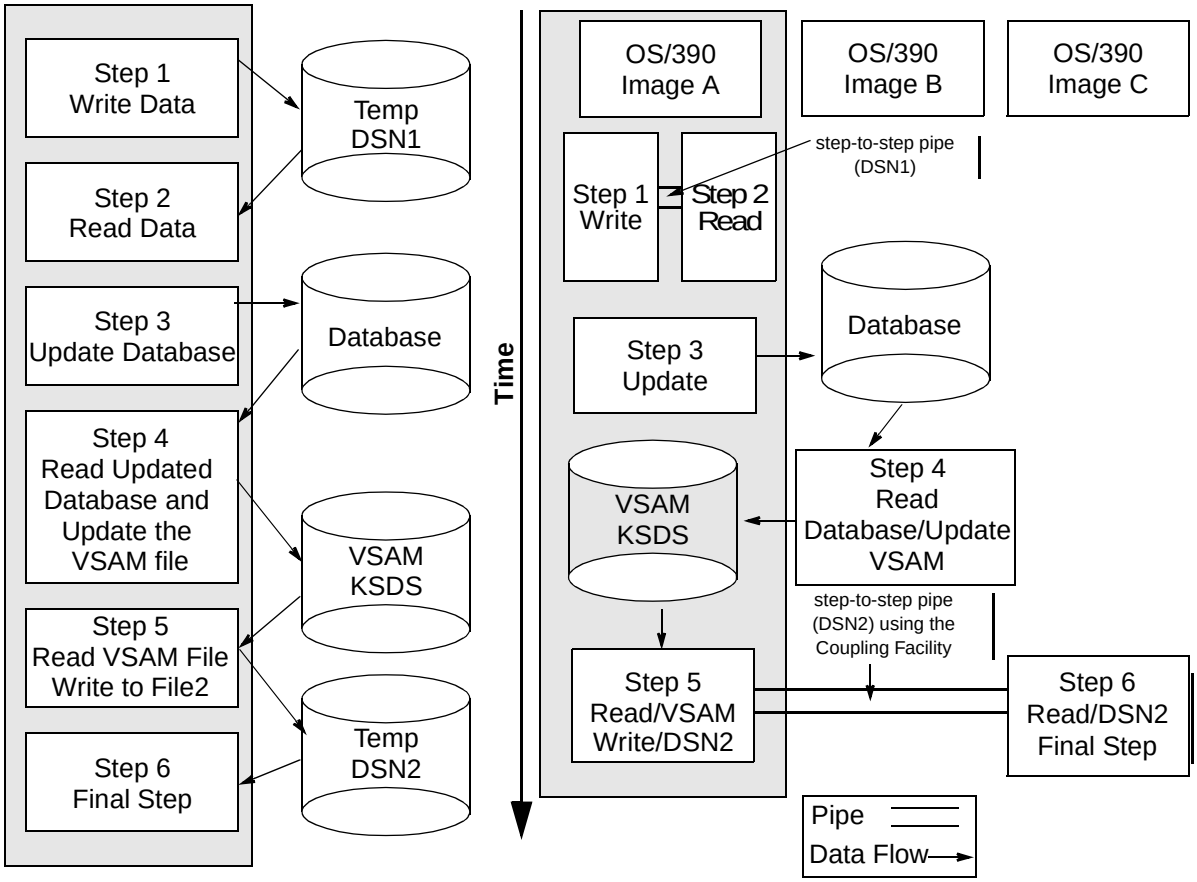
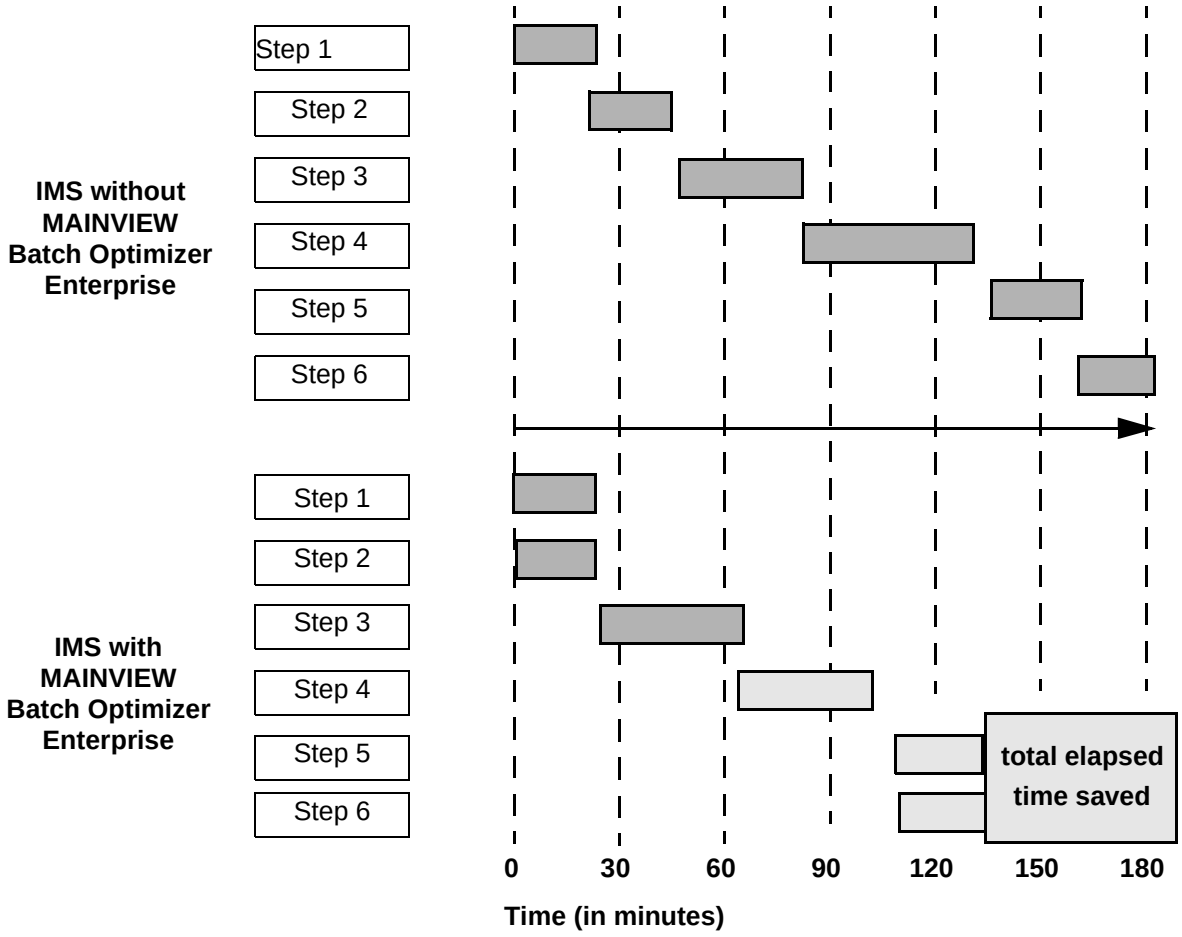


Figure 12 shows IMS batch jobs that are run with and without MAINVIEW Batch Optimizer–Enterprise Edition.

Figure 12 IMS Batch Processing with and without MAINVIEW Batch Optimizer–Enterprise Edition



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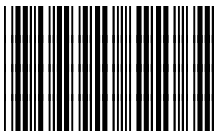
Notes



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