3270 SUPEROPTIMIZER®/CICS General Information

3270 SUPEROPTIMIZER/CICS
3270 SUPEROPTIMIZER/CICS for VSE

Version 3.0

October 18, 2002

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.

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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.”

Support Web Site

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

- read overviews about support services and programs that BMC Software offers
- find the most current information about BMC Software products
- search a database for problems similar to yours and possible solutions
- order or download product documentation
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- subscribe to receive e-mail notices when new product versions are released
- find worldwide BMC Software support center locations and contact information, including e-mail addresses, fax numbers, and telephone numbers

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In the United States and Canada, if you need technical support and do not have access to the Web, call 800 537 1813. Outside the United States and Canada, please contact your local support center for assistance. To find telephone and e-mail contact information for the BMC Software support center that services your location, refer to the Contact Customer Support section of the Support page on the BMC Software Web site at **www.bmc.com/support.html**.

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

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About This Book

This book contains detailed information about the BMC Software 3270 SUPEROPTIMIZER®/CICS product (SUPEROPT®) and is intended for system programmers and administrators.

To use this book, you should be familiar with the following items:

- your database management system (DBMS)
- Multiple Virtual Storage (MVS) systems, job control language (JCL), and the Interactive System Productivity Facility (ISPF)
- your client and host operating systems

For example, you should know how to respond to ISPF panels and how to perform common actions in a window environment (such as choosing menu items and resizing windows).

How This Book Is Organized

This book is organized as follows:

Section	Description
“What Is 3270 SUPEROPTIMIZER/CICS?”	describes what SUPEROPT is and why BMC Software developed it
“Benefits of Using 3270 SUPEROPTIMIZER/CICS”	describes the benefits of using SUPEROPT in your data center
“Justification Method—Improved Response Time”	describes how to justify your use of SUPEROPT
“Technical Overview”	explains the SUPEROPT Optimizer and Monitor components
“Maximizing SUPEROPT Effectiveness”	explains how to maximize your use of SUPEROPT
“How System Resources Are Affected”	describes the effect of SUPEROPT on your system resources
“Required Environment for 3270 SUPEROPTIMIZER/CICS”	lists the operating system requirements and the SUPEROPT program specifications

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

In addition to this book and the online Help, you can find useful information in the publications listed in the following table. As “Online and Printed Books” explains, these publications are available on request from BMC Software.

Category	Document	Description
installation documents	*OS/390 and z/OS Installer Guide*	provides information about the OS/390 and z/OS Installer
	3270 SUPEROPTIMIZER/CICS for VSE Installation Guide	provides instructions for using product authorization and instructions for installing SUPEROPT in VSE/ESA environments
	3270 SUPEROPTIMIZER/CICS Customization Guide	provides instructions for customizing SUPEROPT
core documents	*3270 SUPEROPTIMIZER/CICS User Guide*	provides information for using SUPEROPT
	3270 SUPEROPTIMIZER/CICS Messages Manual	contains explanations, system actions, and user responses for messages that are issued by SUPEROPT
supplemental documents	release notes, technical bulletins, flashes	provide current information about SUPEROPT

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.” You can also obtain additional printed books from BMC Software, as explained in “To Request Additional Printed Books.”

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.html**. 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.html.**

Online Help

SUPEROPT includes online Help. In the SUPEROPT ISPF interface, you can 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.html**.

Conventions

This book uses the following general conventions:

Item	Example
information that you are instructed to type	Type **SEARCH DB** in the designated field.
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**.
nonspecific key names, option names	Use the HELP function key. KEEPDICTIONARY option
MVS calls, commands, control statements, keywords, parameters, reserved words	Use the SEARCH command to find a particular object. The product generates the SQL TABLE statement next.

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 *file_name* represents the file that caused the error.

This book uses the following types of special text:

Note: Notes contain important information that you should consider.

Warning! Warnings alert you to situations that could cause problems, such as loss of data, if you do not follow instructions carefully.

What Is 3270 SUPEROPTIMIZER/CICS?

The 3270 SUPEROPTIMIZER®/CICS product (SUPEROPT) is designed to reduce the length of data streams. This product reduces the length of the following data streams:

- *outbound* Customer Information Control System (CICS) data streams for IBM 3270 terminals and SNA character string (SCS) printers by as much as 90 percent, with an average reduction of 50 to 90 percent

- *inbound* CICS data streams by as much as 90 percent, with the average range of 40 to 90 percent

In addition, SUPEROPT compresses outbound data streams for 3600/4700 controllers and 3790 devices with decompression capability. SUPEROPT also expands inbound data streams that have been compressed by application logical units (LUs). The amount of compression can be as high as 45 percent (usually 20 to 40 percent).

Why Reduce the Lengths of Your Data Streams?

The path that your information follows from a remote terminal to a host application (such as CICS) and back again is complex. The most important factor that determines speed and efficiency is the amount of information that must be transmitted.

The path that your information follows from a local terminal to a host application and back again is not as complex. However, for certain applications—such as applications with graphic displays—the amount of information that is transmitted can still increase your response time.

SUPEROPT can reduce your response times and increase the efficiency of the system that transmits your information. Because of the methods that are used to produce these results, SUPEROPT can also increase the level of employee and customer satisfaction that is associated with the use of your site's terminal network.

This section provides a general description of how information is transmitted and how SUPEROPT can affect employee productivity and reduce network cost.

What Is a Data Stream?

Information is transferred in a unit that is referred to as a *data stream*. A data stream contains your information plus *other data* that is used by the software and by hardware that processes the data stream.

A data stream contains the following other data:

- orders

  These one-byte fields are instructions that define the data following the orders. Orders are instructions for how the data stream is processed.

- addresses

  These two-byte addresses indicate locations where your information is placed on a display screen or printed page.

- attribute bytes

  These fields are variable-length bytes that precede your information. Attribute bytes define the characteristics of the information, such as intensity, protection, visibility, color, and blinking.

Types of Data Streams

An *outbound* data stream is a collection of characters containing the following data:

- information that is displayed on a terminal or printed on a printer

  This information consists of headers (such as “Account Number”) that are the same from screen to screen and of variable data that the application program has extracted from a file or database.

- other data

  Other data is often created by a screen management facility (such as basic mapping support [BMS] and message format service [MFS]) so that programmers do not need to be involved with data streams at the byte level.

An *inbound* data stream is a collection of characters containing the following data:

- data that is typed by a terminal operator and possibly data that had been previously marked as inbound data by the application program

  Marked data is information that the program wants returned in the data stream (usually called pre-modified data).

- other data

  Other data is often created by a screen management facility (such as BMS and MFS) so that programmers do not need to be involved with data streams at the byte level.

How a Host Application Creates Data Streams

Application programs often create a data stream by sequentially building each piece of the data stream. They build one instruction set (for example, order, buffer address, attribute byte, and user information) then another set until all required information has been processed. The applications usually must create the data stream with no prior knowledge of what was transmitted.

SUPEROPT rebuilds the application data streams into shorter data streams that function the same way.

Example 1

If an application program must blank out a line on a 3270 display screen, it probably inserts 80 blanks in the data stream.

SUPEROPT rewrites this data stream by using a Repeat-to-Address (RA) order. When an RA order is processed, the hardware repeats the blank until the end. The end is indicated by a target address. The RA order, the target address, and the character to be repeated use 4 bytes in the data stream rather than the original 80 bytes.

This example demonstrates a simplified data stream optimization. SUPEROPT uses many other standard IBM 3270 instructions to reduce the number of bytes that must be transmitted to produce the desired display or printout.

Example 2

The application must erase the screen first because most application programs do not know what a terminal operator might have previously displayed on the screen. The erasure causes the screen to blink before the new data stream is displayed on the screen.

If the application-created data stream is displayed in ascending order, the data is displayed from top to bottom. If the data is not displayed in ascending order, the data is displayed in a random order. In either case, most employees and customers perceive the erasure and display as distracting and annoying. Their concentration is broken because the information that they were viewing disappears from the screen.

SUPEROPT remembers what is displayed on a screen. It is not necessary to erase the screen and start over. SUPEROPT builds a data stream that contains only the *information that is required* to transform the existing screen into the new screen.

Note: When SUPEROPT creates the necessary information, it examines your user data and *other data* that is included in the data stream. SUPEROPT transmits only user data that has changed; more importantly, it transmits only the required other data.

With SUPEROPT data stream management, the screen does not blink, and the terminal operator’s concentration is not broken. Employees and customers rate SUPEROPT high for increasing productivity and satisfaction with terminal interactions.

Factors Affecting Remote Transmission Speed

The following key factors determine how quickly an *inbound* data stream is transmitted from a remote device:

- number of terminals attached to the control unit

  This number determines how soon the control unit is able to process the data stream after the terminal operator presses **Enter**. A control unit at the remote end is the hardware device that performs the following actions:

  — receives inbound data streams from the terminals and passes them to the modem

  — receives outbound data streams from a modem, processes the data streams according to instructions that are embedded in the other data, and routes the data streams to the correct terminal or printer

- number of outbound data streams that are being transmitted

  Outbound data streams affect the processing of inbound data streams because outbound data streams have priority over inbound data streams.

- how quickly the modem can convert the data into a form that the telecommunications link accepts

  A modem is a hardware device that receives inbound data streams from a control unit, converts the data streams, and passes them to the telecommunications link. Modem efficiency—where milliseconds are important—varies greatly, depending on the brand and speed. For example, a transmission speed of 14.4 kilobits per second (Kbps) is much slower than 56.6 Kbps.

- speed, type, length, and complexity of your communications link

  Your communications link can be a telephone line or a satellite. It could operate at 14.4 Kbps, 28.8 Kbps, 56.6 Kbps, or another speed. The link might be one mile long or hundreds of miles long with many telecommunications carriers (for example, telephone companies) involved with the link.

- size and speed of your 37*xx* communication controller

  There are many types and several vendors of 37*xx* communication controllers. These hardware devices are driven by your network control program (NCP).

- how your NCP parameters are set, and the amount of memory in your 37*xx* communication controller

  Many NCP parameters can be controlled by your data center. Many of them affect the speed at which data streams are transmitted (for example, BUFSIZE, PASSLIM, MAXOUT, PAUSE, and DELAY).

- size and speed of your central processing unit (CPU)

- how your Virtual Telecommunications Access Method (VTAM) parameters are set

  As with the NCP, several VTAM parameters (for example, RUSIZE) can be controlled by your data center.

- number of line turnarounds

  Line turnaround is the procedure that a modem follows when it switches from transmitting data to receiving data and vice versa.

  The speed of a line turnaround depends on the type of modem that you are using. An average line turnaround speed is 50 milliseconds. Your modem vendor knows the speed of your modem.

- type of transmission path (for example, half-duplex or full-duplex)

  If your communication link is half-duplex, data is either transmitted or received at any one time.

  If your communication link is full-duplex, data is transmitted and received at the same time. Full-duplex links are valid only for synchronous data link control (SDLC) protocol.

- type of telecommunications protocol (for example, BSC or SDLC)

  BSC is binary synchronous communication. BSC is a type of line protocol that is used by your NCP for transmitting and receiving data. Line protocol is a set of rules for transferring data and synchronizing system components.

  SDLC is a type of line protocol with a number of architectural advantages over BSC. SDLC is usually faster than BSC because of the following advantages:

  — enhanced error checking and recovery
  — greater flexibility
  — full-duplex operation
  — more network software products

When the Data Stream Reaches the Host Application

When a data stream is received by the host application, it is scheduled (placed in a queue) for processing; then it must be processed. After processing, the new data stream is scheduled for transmission back to the terminal.

Most host applications are already well tuned, and the internal application processing time is usually between 0.5 and 1.0 second.

Response time for the terminal operator can be between 2.0 and 7.0 seconds. If you could eliminate the host processing time completely, response time would remain in the range from 1.0 to 6.0 seconds.

Most Important Factor in Remote Transmissions

The most important factor that affects all remote transmission components is *the amount of data to be transferred—inbound and outbound*.

With just one terminal, if you reduce the amount of data that is transferred, the amount of time that the system takes to transmit the data stream is reduced.

This reduction is why BMC Software developed optimizer products and why your data center will benefit from using SUPEROPT on remote terminals.

How Data Streams Are Transmitted to Local Terminals

The path that a data stream must travel from a local terminal or printer to a host application is much shorter and much faster than from a remote terminal. Only the control unit and the telecommunications access method, such as VTAM, are involved.

SUPEROPT can improve the performance of your local terminals in the following ways:

- SUPEROPT speeds the transmission of graphics data streams.

  For example, the response time for graphic displays with the IBM graphical data display manager (GDDM) greatly improves when using SUPEROPT.

- Optimization improves response time by reducing the amount of data and orders to be processed by the control unit.

  IBM 3274 control units are microcoded to allow for greater flexibility and lower cost. However, this means that they are also slower than older, hard-wired control units. The 3274 control units can benefit from optimization.

- Optimization of your local data streams can decrease your remote response times by removing the VTAM bottleneck.

  If your data center has a large local data stream load and your telecommunications access method, such as VTAM, is limiting your transmission throughput, your local data streams can benefit from optimization.

Even if response time reduction is negligible, your employees and customers might perceive the elimination of screen blinking and screen erasure as a great benefit.

Benefits of Using 3270 SUPEROPTIMIZER/CICS

You can gain the following benefits from SUPEROPT:

- improved response times
- reduced line use
- reduced NCP workload
- reduced load for telecommunication access method
- reduced telecommunication equipment costs
- improved employee productivity
- reduced terminal operator fatigue
- increased data transmission security

SUPEROPT is a very powerful addition to your data center because it *substantially* decreases terminal response time.

SUPEROPT can also be used as an important tool in the following ways:

- help your existing telecommunications hardware last longer
- lighten the load on your telecommunications software
- reduce the cost of future additions to your network

Your data center might discover other benefits—such as giving your company the competitive edge—that your management has been looking for. Faster response time pleases banking customers, insurance agents, inventory clerks, and other users. If you have remote offices, improved response time can boost morale by giving your customers and employees the feeling that they are more closely attached to your corporate headquarters and, more importantly, that they are an important part of your business.

Improved Response Time

SUPEROPT improves response time because of the following reasons:

- Fewer characters are transmitted.

  When data stream size is reduced, data stream transmission time is reduced. The host application (such as CICS), the telecommunication access method (such as VTAM), the NCP, and the modems all have less work to do when fewer characters are transmitted. In addition, the access method and the NCP require less storage when processing the data stream.

  Because smaller data streams take less time to transmit, the next data stream can be transmitted sooner on the same communication line. A cumulative effect occurs. You might also notice this effect when transmitting input data, because the line becomes available for input transmission much sooner.

  Example

  An average data stream that is optimized by 30 percent, operating on a line that is used at 40 percent, shows a 50 percent reduction in line response time.

  An average data stream that is optimized by 80 percent, operating on a line that is used at 40 percent, shows a 90 percent reduction in line response time.

  These results, when using SUPEROPT, are noticeable.

- The number of line turnarounds decreases.

  SUPEROPT reduces the length of outbound and inbound data streams. It is more important to reduce inbound data streams than outbound streams because of the way that inbound data is transmitted.

  Depending on the hardware, inbound data streams are transmitted in 256-byte or 512-byte blocks of data. The control unit that is sending the data cannot send additional data until it has determined that the previous block of data was received.

  The access method in the host CPU must acknowledge to the control unit that each block in the data stream was received. For half-duplex lines or for full-duplex lines that are multi-drop, one or more line turnarounds must occur. A line turnaround increases response time.

The number of line turnarounds can be reduced by reducing the amount of input data, which reduces the number of blocks and decreases response time.

In the past, most data centers did not optimize data streams belonging to local terminals. Your data center should evaluate the use of SUPEROPT with local terminals. In most cases, the terminal operators at your local terminals will notice faster response time.

If your data center uses the IBM GDDM or any other online applications that use programmed symbols or vector graphics, your terminal operators will notice the response-time difference.

Reduced Telecommunication Line Use

By reducing the length of data streams, SUPEROPT also reduces the load on your telecommunication lines. Your existing communication lines gain more capacity and, because the lines are carrying less data, the response times improve.

Reduced Load on NCP

With smaller data streams to process, your NCP has less work to process. In heavily loaded networks, this load reduction should also decrease response times.

Reduced Load on Telecommunications Access Method

Your telecommunications access method, such as VTAM, also has less work to process when data streams are shorter. The access method uses less buffer space. The amount of CPU time and storage that are used is also reduced.

Reduced Telecommunication Equipment Costs

Reducing the amount of transmitted data has a cumulative effect on your telecommunications hardware. The following other components are favorably affected:

- communication lines

  Load reduction can result in better use of your existing communication lines. Costs are reduced for any of the following reasons:

  — eliminated the requirement for faster lines

  — reduced line speeds

  — installed new lines at lower line speeds

  — eliminated the requirement for additional lines because more terminals can be added to existing lines

  — extended existing lines to additional sites (other office buildings, other cities, or other regions)

- satellite transmission facilities

  The speed and cost of satellite transmission—including X.25 and packet-switching—are particularly sensitive to the amount of data that is transmitted. The ability of SUPEROPT to significantly reduce data streams lengths is readily apparent in this environment. If cost is determined by the number of characters that are transmitted, SUPEROPT reduces your data center costs.

- modems

  The cost of modems is usually a function of the speed at which they operate. The faster the transmission speed, the higher the cost. With less data to transmit, you can use lower-speed modems, reducing the cost.

- control units

  More terminals can be added to existing lines, eliminating the requirement for additional control units.

- 37*xx* communications controller

  With the continuing growth of most telecommunication networks, many data centers must continually upgrade their communication controllers. Because less data is transmitted when you use SUPEROPT, the amount of data that the 37*xx* must handle decreases. Consequently, it takes longer before an upgrade is necessary.

Improved Employee Productivity

SUPEROPT can improve terminal operator productivity and effectiveness by speeding up terminal response times. Because the terminal response time improves, the effectiveness of terminal operators increases. This improvement lets more operators use a terminal, decreasing the requirement for more terminals.

Reduced Terminal Operator Fatigue

With most applications, the screen blinks and the screen is erased and refreshed. This blinking is distracting and increases eye fatigue.

Erasing the existing data before displaying the new data is not necessary because SUPEROPT can use the information that is already on the screen. This use of existing information helps reduce the fatigue that is so often associated with terminal operation and yields more productive employees.

Increased Transmission Security

The SUPEROPT product transmits only changed data. The resulting data streams are very abbreviated, making it difficult for anyone to determine what a terminal screen is actually displaying.

Justification Method—Improved Response Time

This book discusses how to evaluate SUPEROPT, including information about the following topics:

- measuring optimization
- justifying the cost of using SUPEROPT
- supplying samples of user evaluations

This section describes one of the most frequently used cost-justification methods—improving response time to save money.

Faster response time can provide the following results:

- increased customer satisfaction levels because customer requests can be processed faster
- improved terminal operator productivity
- increased amount of work that is processed

The calculations in the example in Table 1 on page 16 show one way that the time that is saved by SUPEROPT can be translated into savings. The example shows the time that is saved by SUPEROPT per transaction per day. The calculations are based on a terminal operator cost of US $10 per hour.

To calculate the savings for decreased terminal operator time in your data center, use the example in Table 1 as a guide.

Table 1 Calculating Savings from Decreased Terminal Time

Step	Formula	Description
1	25,000 × 2 _____ 50,000	transactions per day seconds saved per transaction seconds saved per day
2	50,000 ÷ 3600 _____ 13.9	seconds saved per day seconds saved per hour hours saved per day
3	13.9 × $10 _____ $139	hours saved per day hourly cost of a terminal operator amount saved per day
4	$139 × 21 _____ $2,919	amount saved per day work days per month amount saved per month
5	$2,919 × 12 _____ $35,028	amount saved per month months per year amount saved per year

Other Ways to Reduce Your Network Cost

Whether or not you use SUPEROPT, you can speed up your network transmission by taking some of the following actions:

- purchase more control units to give you fewer terminals per line
- install faster modems (check the line turnaround speed)
- install more lines that are as fast as your modem
- install more or larger 37*xx* control units
- tune your NCP and VTAM parameters
- get a faster CPU to increase VTAM and application processing speeds
- tune your host application (for example, CICS)
- rewrite your application programs to be more efficient

Most of these solutions are expensive and time-consuming. Your staff is probably already doing its best to tune your NCP, VTAM, and the host applications.

Technical Overview

SUPEROPT comprises two components: the Optimizer and the Monitor.

The Optimizer component performs the following functions:

- reduces data stream lengths
- analyzes data streams for both application and hardware errors
- traces data streams according to user-specified criteria
- saves statistics about the percentage of optimization that is obtained

For more information about optimization techniques that are used by the Optimizer, see “Optimizer Component” on page 18.

The Monitor component is the online portion of SUPEROPT. This component provides your data center with the following capabilities:

- start, stop, and/or shutdown optimization
- dynamic control of the optimization techniques and options
- control, through the use of passwords, of who can change the options that are displayed by the Monitor
- summary statistics displays
- statistic displays by transaction ID (Transid) and TASKREQ or by terminal ID (Termid) and VTAM Netname for CICS
- ability to print Monitor panels and statistics immediately, at hourly intervals specified by your installation, or at Optimizer shutdown
- online Help facility

- online Trace facility for capturing any inbound or outbound data stream that is intercepted by SUPEROPT (captured data streams can be displayed online or printed)
- ability to perform error analysis of application and hardware data streams

For more details about the Monitor component, see “Monitor Component” on page 23.

Optimizer Component

The Optimizer is a set of reentrant assembly-language programs that intercept CICS data streams. The Optimizer uses standard CICS-provided exits to intercept all data streams for the following telecommunications access methods:

- basic telecommunications access method (BTAM)
- Telecommunications Access Method (TCAM)
- Virtual Telecommunications Access Method (VTAM)

All new and existing application programs operate without any change.

Optimizer Design Objectives

The BMC Software Optimizer component functions as follows:

- dynamically adjusts to the CICS release that your data center is using
- dynamically adjusts to any customization changes that are selected from the Monitor component
- dynamically detects an MVS/ESA, OS/390, or z/OS environment and executes its code and acquires storage above the 16 megabyte (MB) line
- captures data streams for customer analysis

Because CPU time is a critical resource, the Optimizer uses as little CPU time as possible while still reducing data streams by a high percentage.

Other significant design features of the Optimizer are as follows:

- The Optimizer processes and optimizes data streams containing any combination of the following items:

  — extended attributes
  — program symbols
  — color
  — vector graphics
  — APL text keyboards
  — write-structured fields including outbound data streams containing embedded 3270 data streams
  — hardware partitions
  — 12-bit, 14-bit, and 16-bit addressing
  — double-byte character set (DBCS)

- PC file transfers are processed with no user interaction required.

- Inbound and outbound data streams are checked for any hardware- or application-generated errors.

- Several user exits are provided so that your data center can preprocess data streams, post-process data streams, or exclude/include a data stream for optimization/compression, based on special user criteria.

Optimization and Compression Techniques

When the Optimizer receives control of data streams, it uses several techniques to produce much smaller data streams that accomplish the same function as the larger ones. These techniques can be controlled from the online Monitor.

Techniques

The Optimizer uses the following optimization techniques:

- conventional optimization

  This technique focuses on the following items:

  — eliminating repeated strings of characters
  — eliminating unnecessary or redundant user data
  — eliminating unnecessary 3270 control characters
  — sorting data streams

- SNA character string (SCS) printer optimization

  The SCS printer optimization technique optimizes outbound data streams for SCS printers. Your SCS printers print faster because they have less to print.

- SCS Horizontal Tabs optimization

  This technique is used to reduce the length of SCS printer data streams. SCS Horizontal Tabs optimization uses the horizontal formatting codes, Set Horizontal Format and Horizontal Tab.

  If your data center has SCS printers that do not support these codes, this technique cannot be used.

- Imaging® optimization—Stage One

  This technology “remembers” what is displayed on each terminal screen. Imaging optimization transmits only the data that is necessary to make appropriate changes to the screen.

  Imaging optimization also supports partitioned terminals such as 3179, 3180, 3193, 3290, and 3775.

- Imaging optimization—Stage Two

  Imaging Stage Two is a technique that uses Imaging optimization—Stage One as a base and proceeds to ultimate optimization.

- Input Suppression optimization

  Warning! Input Suppression optimization should not be used with the **Erase Input** key.

  By exploiting the Imaging optimization technique, Optimizer can reduce the length of *inbound* data streams. This technique is referred to as Input Suppression optimization.

  Input Suppression uses the Imaging optimization technique to remove all unnecessary data and control characters that would otherwise be transmitted from the *terminal* to your host application. This optimization can be accomplished with the Optimizer software in your host CPU. No hardware changes are needed.

  Input Suppression also allows users to make additional adjustments to *outbound* data streams to further reduce their lengths.

Input Suppression optimization can also reduce the number of line turnarounds.

Depending on the types of hardware that are used, inbound data streams are usually transmitted in pieces, or segments, of 256 or 512 bytes. After each piece is transmitted from the terminal to the host, the host must acknowledge that it has received the data before the next piece can be transmitted. The protocol that the hardware and software follow to accomplish this verification process is called *line turnaround*.

If Input Suppression can reduce your inbound data streams from two pieces to one piece, the number of line turnarounds is also reduced.

Note: Because of the optimization algorithms in Imaging optimization—Stage Two, the Input Suppression optimization percentage can also rise.

- Erase Input Key Allowed optimization

  Erase Input Key Allowed optimization is a partial implementation of Input Suppression optimization. This feature is provided for data centers with terminal operators who use the **Erase Input** key.

  Warning! Input Suppression optimization should not be used with **Erase Input**.

  The difference between Input Suppression optimization and Erase Input Key Allowed optimization is that the percentage of reduction is higher with Input Suppression.

  Note: **Erase Input** and **Erase EOF** have different functions. **Erase EOF** can be used with Input Suppression.

- Systems Network Architecture (SNA) Data Compression

  SNA Data Compression *compresses* outbound data streams for 3600/4700 controllers and 3790 user programs that run application programs supporting SNA data decompression. This optimization technique also *expands* compressed inbound data streams that have been compressed by the application LUs.

Optimization Features

The Optimizer uses the following Imaging and Conventional optimization features:

- attribute elimination

  This feature eliminates all attributes that are embedded in outbound data streams that are being sent to printers.

- blank elimination

  This feature removes blanks from protected fields in outbound data streams that are being sent to CRTs and printers.

- field merge

  This feature allows your data center to eliminate start field orders from consecutive protected fields when the field attributes are the same.

- non-display fields

  This feature eliminates protected non-display fields from outbound data streams that are being sent to CRTs and printers.

Monitor Component

By using the Monitor component of SUPEROPT, your data center can perform the following tasks:

- start, stop, or shut down the Optimizer
- display and print statistics
- tune the Optimizer for maximum data stream optimization
- diagnose problems in the CICS data stream
- trace any user terminal data stream, both inbound and outbound, in CICS

The Monitor provides a Primary Menu from which you can access panels for the following options:

- Optimization Control
- Data Stream Statistics
- Data Stream Analysis
- Status
- Print or Reset Statistics
- Help Facility

Primary Menu

After initialization, the Monitor displays the Primary Menu. This menu provides the following items:

- password security check so that your data center can control the number of people who are authorized to modify the Monitor panels
- selection list for accessing Monitor menus for the following options:
  - Optimization Control
  - Data Stream Statistics
  - Data Stream Analysis
  - Status
  - Print or Reset Statistics
- ability of the terminal operator to change the active or inactive status of the Optimizer and to shut down or cancel shutdown of the Optimizer
- display of the following statuses:
  - active or inactive status of the optimizer
  - on or off status of Imaging, Input Suppression, and SCS Printer optimization
  - yes or no status of Erase Input Key Allowed optimization
- version number and date of the product distribution tape

Optimization Control Menu

The Optimization Control menu lists the optimization control panels that are provided by the Monitor. These panels let you fine-tune the way that your data streams are optimized so that you can achieve the highest possible optimization and can control the amount of storage that is used by the Optimizer.

Table 2 lists Optimization Control menu options.

Table 2 Optimization Control Menu Options

Option	Name	Description
1.1.*x*	Global Optimization Control	lets you control whether a data stream is optimized
1.2.*x*	Imaging	accesses the optimization control panels for the following items: • Imaging • Input Suppression • Erase Input Key Allowed
1.3.*x*	Selective Optimization	accesses the optimization control options and techniques for the following items: • SCS Printer Optimization • SCS Horizontal Tabs • PT Order Generation • SNA Data Compression • BTAM/VTAM Local Terminals and BTAM/TCAM Saved TIOAs
1.4.*x*	Conventional and Imaging	accesses the optimization control panels for the following items: • field merge • blank elimination • non-display fields • attribute elimination
1.5.*x*	User Exits	lets you activate and stop a user exit program that has been written by your system programmers
1.6.*x*	Storage Allocation	lets you control the amount of storage that can be used by the Optimizer for the following items: • Imaging and SCS Storage • Work Area Storage • Dynamic Terminal and Transid areas

Data Stream Statistics Menu

The Data Stream Statistics menu displays a selection list for the statistics options that are provided by the Monitor. This menu also provides choices for printing or resetting statistics.

Table 3 lists Data Stream Statistics menu options.

Table 3 Data Stream Statistics Menu Options

Option	Name	Description
2.1.0	Summary of Data Streams Optimized	displays summary statistics about the amount of optimization obtained
2.2.0	Data Streams Optimized by Termid and Transid	displays individual optimization statistics by terminal ID (Termid) and transaction ID (Transid)
2.3.0	Data Streams Excluded by Installation	displays information about the data streams that were not optimized because they were excluded (or not included) by your system programmers
2.4.0	Data Streams Excluded by Optimizer	displays information about the data streams that were not optimized because they were excluded by the Optimizer

Data Stream Analysis Menu

The Data Stream Analysis menu displays a selection list for the data stream analysis panels that are provided by the Monitor. These panels provide information about data stream errors. The panels also provide options for capturing inbound and outbound data streams for analysis.

SUPEROPT analyzes every outbound and inbound 3270 data stream for errors. The online Monitor has two panels that display the number of data streams that have been detected with an error.

Table 4 lists Data Stream Analysis menu options.

Table 4 Data Stream Analysis Menu Options

Option	Name	Description
3.1.0	Application Outbound Data Stream Errors	displays information about the application outbound data stream errors found by the Optimizer
3.2.0	Hardware Inbound Data Stream Errors	displays information about the hardware inbound data stream errors found by the Optimizer
3.4.0	Wraparound Data Stream Trace	provides you with the trace ability to continually capture data streams by wrapping around the allocated storage This trace can be stopped when you have determined that the target data stream has been captured.

Status Menu

The Status menu displays a selection list for the status panels that are provided by the Monitor.

Table 5 lists Status Menu options.

Table 5 Status Menu Options

Option	Name	Description
4.1.0	User Installation Tables	displays information about any user installation tables that have been used by the Optimizer or created by your system programmers and not used
4.2.0	Optimizer and Monitor Usage	displays the following information: • number of times that the Optimizer and Monitor have been used • time and date that the Optimizer was last started and stopped • time that the Optimization Control options or the Print or Reset Statistics options have been changed
4.3.0	CPU Wall-Clock Time	displays information about the CPU Wall-Clock Time that are used by the Optimizer to optimize your data streams

Print or Reset Statistics Panel

The Print or Reset Statistics panel is displayed when you select Option 9 from any Monitor menu. This panel lets you print and/or reset statistics. You can print or reset immediately, by interval, or when the Optimizer is shut down.

Help Facility

The Monitor Help facility provides online Help for the Monitor panels. Each Monitor panel has a corresponding Help panel. The Help panels provide a brief description of the Monitor panel information or a brief tutorial about how to enter data in the fields that can be modified.

Maximizing SUPEROPT Effectiveness

You can use SUPEROPT to achieve the following advantages:

- move your data center to a larger and more cost-effective location
- provide larger or more convenient office space for terminal operators
- standardize application screens
- improve the productivity of application programmers

The following examples describe ways that you can maximize the effectiveness of SUPEROPT at your site:

Example 1

The location of terminals has been a prime consideration for many sites. Many terminal operators want their terminals attached as local terminals to receive shorter response times. With SUPEROPT, response time is no longer a consideration.

In addition, your data center no longer needs to be restricted to your corporate headquarters. Your company can select less expensive, larger, and more usable office locations. For example, you can select a location where raised floors are easier to construct and telecommunications networks are easier to set up and change.

Example 2

SUPEROPT lets you consider changing your application programming standards. For example, many application programmers like to use terminal screens as a place to store data that they require.

Screen storage is easy to use and convenient, but many sites discourage this practice because it usually increases response times.

With SUPEROPT, using the screen for storage can be an advantage. Storing data elsewhere can generate useless overhead.

Example 3

Some data centers have avoided adding certain headers, such as the company name, to screens because of the amount of data that would have to be transferred.

With SUPEROPT, the amount of data is no longer a consideration.

Example 4

If all data center headers, dates, and so on are in the same position on every screen, these items would be transmitted only once rather than many times because the SUPEROPT Imaging optimization technique sends only changed data to terminals.

Standardization of screens could greatly reduce the amount of data that is transferred.

You might discover many other ways to maximize the effectiveness of SUPEROPT.

How System Resources Are Affected

This section provides you with information about the effect of SUPEROPT on your system resources.

Application Programs

Adding SUPEROPT to your system does not affect your application programs.

CPU Time

On an IBM 3081 Model K, optimizing a data stream can take approximately two to three milliseconds of elapsed time. This additional processor time varies according to the original data stream length, the complexity, and the amount of optimization that is achieved. With SUPEROPT, the larger the data stream reduction, the shorter the CPU time.

Hardware

SUPEROPT uses standard IBM 3270 hardware instructions to reduce the length of data streams. No hardware modifications are necessary.

System Programmers

SUPEROPT minimizes the amount of effort that is required to install, use, and maintain the product. SUPEROPT affects your system programmers in the following ways:

- Installation is easy.
- SUPEROPT statistics can be printed easily for permanent record-keeping and reports to management.
- Operation of SUPEROPT is transparent to CICS application programmers and terminal operators. No product training or education is necessary.
- No new method of logging on is necessary.
- The online Monitor is easy to use.
- With the SUPEROPT Wraparound Data Stream Trace option, capturing data streams for analysis is easy.
- If your site is running more than one CICS release, only one installation of SUPEROPT is required.
- If you convert from one CICS release to another release, no additional effort is required.
- SUPEROPT code easily adjusts from one CICS release to another release, with no required intervention.
- SUPEROPT supports the following CICS releases:
  - all versions of CICS Transaction Server (TS)
  - all versions of CICS TS for VSE
  - CICS/ESA 4.1
  - CICS/VSE 2.3
  - OS/390 and z/OS

System Modifications to CICS

No modification to CICS is required. SUPEROPT uses the standard CICS Dynamic User Exit facilities.

System Modification Program Extended (SMP/E) installation is not required, but SMP/E installation is available. SUPEROPT has no effect on any CICS maintenance procedures.

The operation of SUPEROPT has *no* effect on CICS. SUPEROPT is designed for continuous, 24-hour operation. You do not need to shut down CICS for any kind of file backup.

DASD Space for CICS

SUPEROPT product distribution tapes for CICS contain two data sets. Only one data set is required.

The only other direct access storage device (DASD) space that may be required is the space that is used by the two optional Virtual Storage Access Method (VSAM) data sets.

SUPEROPT Distribution Data Sets

SUPEROPT distribution data sets might be affected as follows:

- LOADLIB data set contains the load modules for SUPEROPT
- sample (BBSAMP) data set contains the following samples:
  - JCL that is listed in the installation instructions
  - CICS table entries that might not be needed for your data center
  - JCL to define and allocate the optional VSAM files
  - user exit program

Note: If you do not intend to use any of the samples in the BBSAMP data set, you do not need to unload or retain them on DASD.

DASD Space Required

The DASD space that is required for the BBSAMP data set and the LOADLIB data set is approximately one cylinder on a 3380.

The first optional VSAM file requires only one track on a 3380. This file is required only if your data center wants to save the Monitor options that you have selected.

The second optional VSAM file requires only one cylinder on a 3380. This file is required only if your data center wants to select this file as output from the Monitor screen print or Monitor Trace print options.

Storage Requirements

SUPEROPT has the following storage requirements:

- common service area (CSA) storage used

  No CSA storage is used by SUPEROPT.

- real storage used

  The code for all products is reentrant.

  Several of the SUPEROPT product modules can be placed in your link pack area (LPA) if you have MVS. Placing these modules in your LPA reduces the amount of real storage that is required for these products. LPA-eligible modules are described in the 3270 SUPEROPTIMIZER/CICS *Customization Guide*.

  If your operating system is MVS/ESA, OS/390, or z/OS, and you are using the XA option of CICS, all but 266 bytes of the code are above the 16 MB line. The SUPEROPT detects an XA or ESA environment and automatically makes the required adjustments.

- virtual storage used

  The optimization techniques and the compression technique require the use of virtual storage. The Optimizer requires 18 KB for work areas and approximately 2 KB of storage per terminal to save some data for each terminal that it processes.

  SUPEROPT has several special features for processing storage. It uses storage in the following manner:

  — The amount of virtual storage that the Optimizer uses can be increased or decreased by your data center online from the Monitor.

  — With the *Storage Compression* feature, the Optimizer compresses the stored data by 20 to 50 percent or by 40 to 80 percent. The amount is controlled by your data center. The Optimizer can optimize the data streams for four terminals by using the same amount of storage that would usually be needed for just one terminal in uncompressed form.

  — An internal storage routine has been developed for storing and retrieving the pieces that are associated with each physical device. This routine is coded for maximum efficiency. It also “touches” the fewest possible pages in memory, which reduces the amount of paging that is involved.

  — If your operating system is MVS/ESA, OS/390, or z/OS, and you are using the XA option of CICS, all virtual storage is obtained above the 16 MB line.

  — If your operating system is MVS/370 or VSE/ESA, all virtual storage is obtained from the CICS shared subpool.

  — In a CICS environment, *no* operating system (OS) GETMAINs are performed. The standard CICS GETMAIN process is used. When OS GETMAINs are performed within CICS, the CICS TCB waits for the GETMAIN to be completed. BMC Software wants to reduce your response time, not induce CICS region waits. In addition, OSCOR is not affected.

Required Environment for 3270 SUPEROPTIMIZER/CICS

This section describes the environment specifications for SUPEROPT and the program specifications for the Optimizer and Monitor components.

System Operating Environment

The following operating system environments are *required* for SUPEROPT:

- VSE/ESA
- MVS
- OS/390 or z/OS

VSAM is an *optional* operating system. If you want certain optional features, VSAM might be required.

Supported Devices

SUPEROPT supports the following devices:

- All 3270 models, including
  - color
  - SCS printers
  - extended attributes
  - program symbols
  - SNA data streams
  - non-SNA data streams
  - screen sizes:
    - 12 rows by 40 columns
    - 12 rows by 80 columns
    - 24 rows by 80 columns
    - 32 rows by 80 columns
    - 43 rows by 80 columns
    - 27 rows by 132 columns
    - any other valid screen or partition size
- 3600/4700 controllers and 3790 devices with decompression capability
- BTAM, TCAM, and VTAM (SNA and non-SNA)

CICS Environments

The following items of a CICS environment are *required* for SUPEROPT:

- command-level support
- for CICS/VS and later releases only—INQUIRE/SET support
- CICS user exit interface
- 83 KB of virtual storage for the Optimizer
- 18 KB to 2 gigabytes (GB)—depending on options that are used—for work areas

Note: If your operating system is MVS/ESA, OS/390, or z/OS, and you are using the XA option of CICS, only 266 bytes of virtual storage is required below the 16 MB line.

Optional

The following items of a CICS environment are *optional* for SUPEROPT:

- VSAM support in File Control Program
- Transient Data Program

Not Required

The following items of a CICS environment are *not required* for SUPEROPT:

- Temporary Storage Program
- BMS
- any area in Terminal Control Table user area (TCTUA)

Supports

The following versions of CICS are supported for SUPEROPT:

- all versions of CICS Transaction Server (TS)
- all versions of CICS TS for VSE
- CICS/ESA 4.1
- CICS/VSE 2.3
- OS/390 and z/OS

Program Specifications

This section describes program specifications for the Optimizer and Monitor components.

Optimizer Specifications

The Optimizer component has the following specifications:

- written in assembler language
- in CICS—a user exit interface program
- reentrant
- 83 KB
- RMODE=ANY AMODE=31

Monitor Specifications

The Monitor component has the following specifications:

- written in assembler language
- in CICS—command-level
- 66 KB of Help
- 35 KB of startup processing
- 181 KB of Monitor executable code
- 12 KB of messages
- RMODE=ANY AMODE=31

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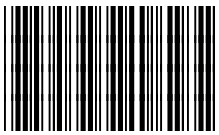
U.S. GOVERNMENT RESTRICTED RIGHTS. The Software under this Agreement is "commercial computer software" as that term is described in 48 C.F.R. 252.227-7014(a)(1). If acquired by or on behalf of a civilian agency, the U.S. Government acquires this commercial computer software and/or commercial computer software documentation subject to the terms of this Agreement as specified in 48 C.F.R. 12.212 (Computer Software) and 12.211 (Technical Data) of the Federal Acquisition Regulations ("**FAR**") and its successors. If acquired by or on behalf of any agency within the Department of Defense ("**DOD**"), the U.S. Government acquires this commercial computer software and/or commercial computer software documentation subject to the terms of this Agreement as specified in 48 C.F.R. 227.7202 of the DOD FAR Supplement and its successors.

MISCELLANEOUS TERMS. You agree to pay BMC all amounts owed no later than 30 days from the date of the applicable invoice, unless otherwise provided on the order for the License to the Products. You will pay, or reimburse BMC, for taxes of any kind, including sales, use, duty, tariffs, customs, withholding, property, value-added (VAT), and other similar federal, state or local taxes (other than taxes based on BMC's net income) imposed in connection with the Product and/or the Support. This Agreement constitutes the entire agreement between You and BMC and supersedes any prior or contemporaneous negotiations or agreements, whether oral, written or displayed electronically, concerning the Product and related subject matter. No modification or waiver of any provision hereof will be effective unless made in a writing signed by both BMC and You. You may not assign or transfer this Agreement or a License to a third party without BMC's prior written consent. Should any provision of this Agreement be invalid or unenforceable, the remainder of the provisions will remain in effect. The parties have agreed that this Agreement and the documents related thereto be drawn up in the English language. Les parties exigent que la présente convention ainsi que les documents qui s'y rattachent soient rédigés en anglais.

Notes



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