



IBM Software Group

CICS On-line Transmission Time Optimizer

Technical Overview



 business on demand

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Preface

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Agenda

- Overview - CICS Online Transmission Time Optimiser for z/OS
 - ▶ Optimization Techniques
 - 3270 Devices
 - SCS Printers
 - 3600/4700 Series Banking Terminals
 - ▶ Controlling Optimization
 - ▶ Operating OTTO
 - ▶ Trace
 - ▶ How can OTTO optimization results be observed
 - ▶ Summary



What is CICS OTTO ?

- CICS Online Transmission Time Optimizer for z/OS
 - ▶ Compresses datastreams
 - 3270 - Screens & Printers
 - SCS - Printers
 - 3600 / 4700
 - ▶ Runtime Tool
 - ▶ Eliminates repetitive characters
 - ▶ Only sends changed data
 - ▶ CICS specific solution (not VTAM)
- Not part of CICS Transaction Server for OS/390
 - ▶ Program Product - 5655-I05
 - ▶ Releases Supported ...
 - CICS Transaction Server for z/OS, Version 2
 - CICS Transaction Server for OS/390, Version 1.3

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CICS Online Transmission Time Optimizer for z/OS (CICS OTTO) improves end-user productivity and increases network utilization through 3270 data stream optimization by:

- Examining outgoing data streams and dynamically compressing them
- Eliminating repetitive characters
 - 20% to 25% of all characters are typically repetitive
- Ensuring that only changed data is sent to the terminals
- Optimizing messages to increase printer speed
- Enabling exclusion and inclusion of terminals dynamically
- Operating transparently to users and applications
- Providing an optional exit for you to change the data stream in the optimized message
- Monitoring its own operation

IBM CICS OTTO improves 3270 network resources utilization and response time and increases end-user productivity by identifying and removing repetitive data and compressing 3270 data streams. CICS OTTO operates efficiently and transparently to applications and users and supports both, local and remote users.

Why would I want CICS OTTO ?

- Better line utilisation
- Less costs for network equipment
- Less costs for data transmission
- Better response times & printer speeds



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Depending on your internal requirements, by using CICS OTTO you can :

- Reduce the frequency of communication bottlenecks. This may eliminate the need for new communication equipment (lines, modems, controllers).
- Add more terminal activity on existing communication lines.
- Realize improved response times for terminals on existing communication lines.

What LU-Types are supported?

- OTTO Supports the following LU-Types:
 - ▶ LU Type 0
 - 3600/4700 type financial systems
 - ▶ LU Type 1
 - SCS printers
 - ▶ LU Type 2
 - 3270 type terminals
 - ▶ LU Type 3
 - 3270 type printers

CICS Online Transmission Time Optimizer for z/OS operates on any hardware supporting CICS/ESA V4.1, CICS Transaction Server for

OS/390 V1, or CICS Transaction Server for z/OS V2. CICS Online Transmission Time Optimizer supports both local and remote devices using the VTAM/SDLC protocol.

Devices connected via ACF/TCAM do so through TCAM's Subsystem Interface (SSI), and appear to CICS as if they are using one of the valid VTAM protocols.

CICS Online Transmission Time Optimizer supports the following IBM Logical Unit (LU) types:

- LU type 0 — 3600/4700-type financial systems
- LU type 1 — SCS printers
- LU type 2 — 3270-type terminals
- LU type 3 — 3270-type printers

What devices are supported?

- 3270 display station
- 3179 display station
- 3180 display station
- 3275 models 1 and 2
- 3276 display station
- 3277 models 1 and 2
- 3278 models 1,2,3,4 and 5
- 3279 models 2A,2B,3A and 3B
- 3284 printer models 1 and 2
- 3286 printer models 1 and 2
- 3290 partitioned display station
- any device type running in 3270 data stream compatibility mode

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These are the IBM device types supported.

CICS Online Transmission Time Optimizer also supports other non IBM devices that are compatible with the terminals listed above. To be supported, these terminals must recognize standard 3270 hardware order streams and not object to String Control Byte (SCB) compression.



CICS OTTO uses basic optimization techniques (replacing repeating characters, sorting the data stream by buffer addresses) for terminals, and printers as well, and a more advanced technique (imaging) for terminals, only.

CICS OTTO Optimisation

- CICS OTTO optimizes
 - ▶ Data streams directed to 3270-type display stations and/or printers
 - ▶ Data streams directed to SCS-type printers
 - ▶ Data streams directed to banking terminals 3600/4700

- How does CICS OTTO optimize 3270 data streams?
 - ▶ Fully uses the 'INTELLIGENCE' of the 3274 control unit
 - ▶ Keeps an image of the actual screen layout
 - The whole screen with its field attributes and data is kept in virtual storage
 - Only changed data is transmitted.
 - ▶ Sends changed data only in case of output messages

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3270 Optimization Techniques

The 3270 component is divided into terminals and printers, referred to as logical units (LUs).

Generally, optimization is done according to the 3270 data stream conventions using the intelligence of connected cluster controllers and/or terminals. This is done by the following basic optimization techniques:

- Replacing repeating characters by an RA-order (Repeat to Address).
- Sorting the data stream by buffer addresses.

These techniques are used for terminals as well as for printers with a defined line length in the WCC (Write Control Character). For printers without defined line length, blanks followed by a NL (New Line) order are eliminated. Additionally, spaces at the end of the line (without NL) are optimized. You can also handle such data streams as if the line length were defined using the WCC-IGNORE option.

In addition to these basic optimization techniques, Imaging is provided for 3270 terminals.

Imaging is an optimization technique that keeps a copy of a screen in main storage and transmits only changed data. CICS OTTO uses an image pool to do this.

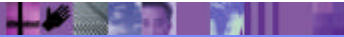
Sending 3270 Data

- With the command ERASE-WRITE (X 'F5 ')
 - ▶ This command first erases the buffer.
 - ▶ All data must be written to the screen
 - Includes data which has not changed

- With the command WRITE (X 'F1 ')
 - ▶ This command writes data to a specified screen buffer address.
 - ▶ New data is written to the already existing screen.

- OTTO uses the advantage of WRITE command
 - ▶ ERASE-WRITE changed to Write

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Imaging starts with the first outbound message that is written by the application with an ERASE/WRITE command. All of the subsequent messages destined for the terminal are compared with the existing data in the screen image and only changed data and attributes are transmitted after the optimization process. Simultaneously, the screen image is updated with the new data and attributes.

The Imaging technique leads to a high optimization ratio if terminal operators are using applications that always send the same screen, or at least the same headings and constants. If you use Imaging, the following additional optimization techniques may be used.

Other Optimisation: 3270 Devices

- CICS OTTO optimizes
 - ▶ Repeating characters
 - Replaced by an RA order (Repeat to Address)
 - ▶ Data stream is sorted by buffer address

- These techniques are used for terminals and printers with a defined line length in the WCC (Write Control Character)

- For printers without a defined line length
 - ▶ Trailing blanks followed by a NL (New Line) order are removed
 - ▶ Trailing blanks (without NL) are optimised

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A sequence of more than four identical characters can be replaced by an RA order (Repeat-to-Address) which requires only four bytes. The RA function is a standard feature of 3270 type devices. The data stream is sorted by buffer address, thus accelerating the screen display.

These techniques are used for terminals as well as for printers with a defined line length in the WCC (Write Control Character). For printers without defined line length, blanks followed by a NL (New Line) order are eliminated.

Additionally, spaces at the end of the line (without NL) are optimized.

With CICS OTTO, you can also handle such data streams as if the line length were defined using the WCC-IGNORE option.

Other Optimisation: SCS Printers

- SCS Printers: 3262, 3287 & 3289
- Optimising SCS printer data
 - ▶ The only way to optimize SCS printer data streams is to replace blanks by tabulator positions.
 - ▶ Instead of multiple blanks, only a PT-order (Program Tab) is transmitted after the optimization process.
 - ▶ Additionally, one or more SHF-orders (Set Horizontal Format) are generated to determine the tabulator positions.
- OTTO provides optimization for printers that are:
 - ▶ Defined as SCS printers to the CICS
 - ▶ Connected to a 3174-type cluster controller.

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SCS Optimization Techniques

The only way to optimize SCS printer data streams is to replace blanks by tabulator positions.

Instead of multiple blanks, only a PT-order (Program Tab) is transmitted after the optimization process. Additionally, one or more SHF-orders (Set Horizontal Format) are generated to determine the tabulator positions.

CICS OTTO provides the ability to use the 3270 printer optimization techniques for printers that are defined as SCS printers to the TP system and connected to a 3174-type cluster controller.

Other Optimisation: 3600/4700

- Optimisation for banking terminals
 - ▶ OTTO provides pure SCB data compression (String Control Blocks) for both outbound and inbound directions
 - Prime character
 - Usually blank or hexadecimal null
 - Single byte replaces series of prime characters
 - Repeating characters
 - Two bytes
 - Normal text
 - Plus one count byte
- Good optimization results will be achieved if the data streams contain a lot of prime characters and/or repeating characters
- The decompression/compression mechanism on the 3600/4700 side is not part of the package, it is a user responsibility

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3600/4700 Optimization Techniques

CICS OTTO provides pure SCB data compression (String Control Blocks) for both outbound and inbound directions. This technique distinguishes three categories of characters:

- Prime character.
- Repeating characters.
- Normal text.

The prime character is the most frequently used character in the data streams sent to the banking terminals (usually blank or hexadecimal null). After the optimization process, only one byte is transmitted instead of a series of prime characters. For repeating characters, two bytes are transmitted and for normal text the number of bytes of the text plus one count byte are transmitted. Good optimization results will be achieved if the data streams contain a lot of prime characters and/or repeating characters.

Module ABLNSNA performs SCB compression/decompression. ABLNSNA is responsible for the pure SCB data compression as described in the IBM manual, *SNA Sessions Between Logical Units* (GC20-1868), Part 2 Chapter 5. However, the FMH handling is dependent on the TP system.

This special handling (such as setting the compression bit in the appropriate FMH) is performed by an interface module, ABLNSNAI. A sample source member is distributed as ABLNSNAI. Within this source member, all actions to be performed are described in detail.

The decompression/compression mechanism on the 3600/4700 side is not part of the package, it is a user responsibility.

The 3600/4700 Optimization may be started only for TP-System outbound messages (SET OPT OUT 3600) or for both directions (SET OPT FULL 3600).

3270 Data Transmission

- 3270 Screen Sends:
 - ▶ The key pressed on the 3270 keyboard (AID)
 - ▶ The cursor address
 - ▶ The whole field content of fields with attribute 'MDT on'
 - If ENTER-KEY or PF-KEY was pressed

- How is the MDT BIT in attribute byte set ?
 - ▶ The MDT bit is set whenever the user enters data into an unprotected field
 - ▶ The MDT bit can also be set by the application program in an output data stream (pre-modified fields)

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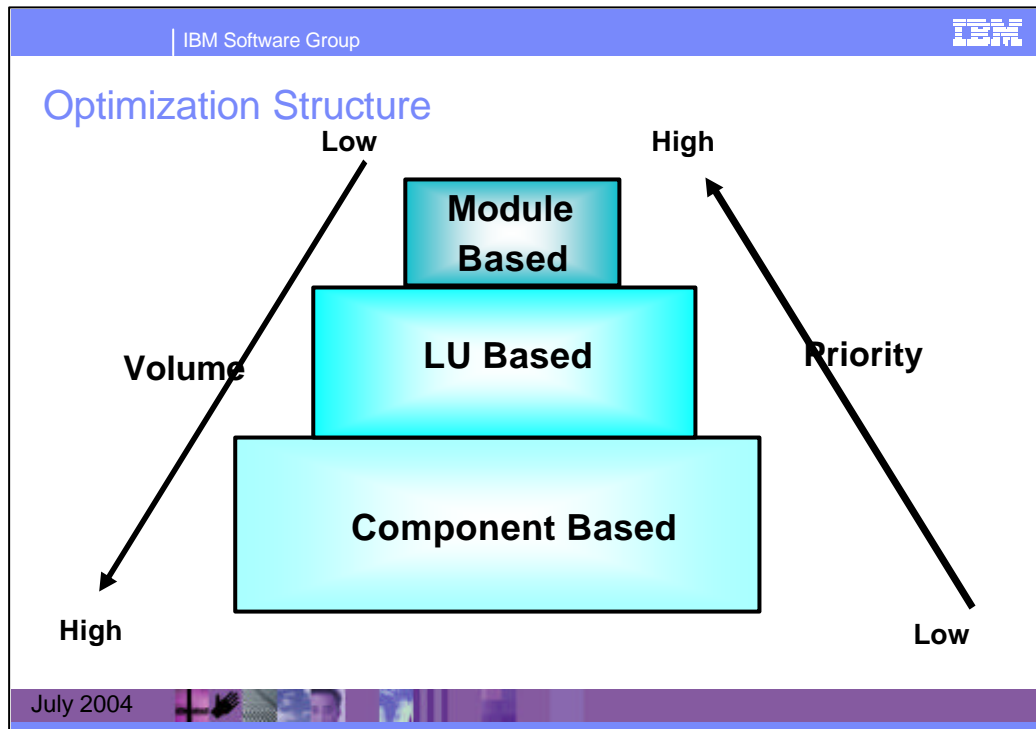
When a key is pressed on the 3270 keyboard, the following data are transmitted to the host :

- The Attention ID (AID) which identifies the key
- The cursor address
- If the ENTER, or a PF key was pressed the whole field content of all fields with attribute "MDT on" is transmitted



Controlling Optimisation





The optimization features of CICS OTTO are controlled based on two different types of start modes:

- Fully started indicates that **all** logical units (LUs) and modules will be included in

optimization **except** for those which are specifically excluded either because of active LU or

module exclusions.

- Selectively started indicates that only those messages which are destined for terminals

and/or printers specifically defined in the CICS OTTO selection list will be optimized.

The minimum definitions required are those that define which optimization features should apply

to the components. This is called Component Based Optimization. You can go further by

defining optimization features that are LU specific and module specific.

LU Based definitions take priority over the Component Based definitions. Module Based definitions

take priority over both LU and Component Based definitions. This structure provides

that most of your optimization needs can be handled at the component level.

Controlling CICS OTTO

- The optimization features are controlled with a set of powerful commands
 - ▶ Online dialog
 - ▶ Commands can be entered temporarily or permanently:
 - Temporary commands are executed immediately
 - Permanent commands are executed immediately and additionally stored on a VSAM file for automatic execution at the next system startup

- All optimization options can be set for
 - ▶ The whole component
 - ▶ A group of LU 's or Modules
 - ▶ One LU or Module



The optimization features described in the first chapter can be controlled using the CICS dialog panels. The majority of all functions can be performed using these interactive and self-explanatory panels without the need to know or understand CICS OTTO's native command language.

Controlling CICS OTTO (Cont.)

▪ The main optimization parameters are:

- Imaging
 - ▶ Keeps images in a compressed format in main storage to save memory but costs CPU
 - ▶ SET 'OFF'
- Compress images
 - ▶ SET 'ON' whenever applicable
- Zero MF order allowed
 - ▶ Default is 'OFF'
 - ▶ SET 'ON' whenever applicable
- Clear TIOA
 - ▶ Clear TIOA before moving optimized message to it.
 - ▶ Causes CPU overhead
 - ▶ TIOA (TIOADL) v scan the whole I/O area
 - ▶ Default is 'OFF'
- Printer linesize
- Lightpen
- 3179/3192 C
- WCC-Ignore
- Base Color Switch

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The main optimization considerations are :

- Imaging, or basic optimization only (default is "imaging", which includes basic optimization)
- Saved screen images can be compressed (which saves up to 50% of storage but requires some CPU overhead, default is "no compression")
- The MF-order (Modify Field) may be generated with a zero number of pairs. This kind of order is allowed for terminals which are 100% IBM compatible. As default, CICS OTTO does not generate such orders.
- The terminal input/output area (TIOA) can be cleared before CICS OTTO moves the optimized message to it. This option causes CPU overhead, and should only be activated if there are transactions that do not use the length field of the TIOA (default is "no clearing").
- The standard printer line size (default is 132)
- Are there terminals that may work with a light pen?
Default is "no lightpen support".
- Are there terminals of type 3179, or 3192?
Default is "no 3179/3192 support".
- Whether the line length in the WCC of a 3270 printer data stream should be honored (default is "yes").
- Whether there are terminals with the BASE COLOR SWITCH set on (default is "no such terminals").

On the whole, the default parameter settings are chosen to give a maximum optimization ratio with minimum CPU overhead.

Controlling CICS OTTO (cont.)

- The optimization features are controlled based on two different types of start modes:
 - ▶ Fully started - all LUs and modules are included
 - Unless they have been specifically excluded either because of active LU or module exclusions.
 - ▶ Selectively started - defined in CICS OTTO selection list
- The minimum required
 - ▶ Component Based Optimization
- Additionally:
 - ▶ LU specific optimization features
 - ▶ Module specific optimization features



Exclude LUs from Optimisation

- The exclude LUs from optimization panel is displayed when option 7 is entered on the primary option menu

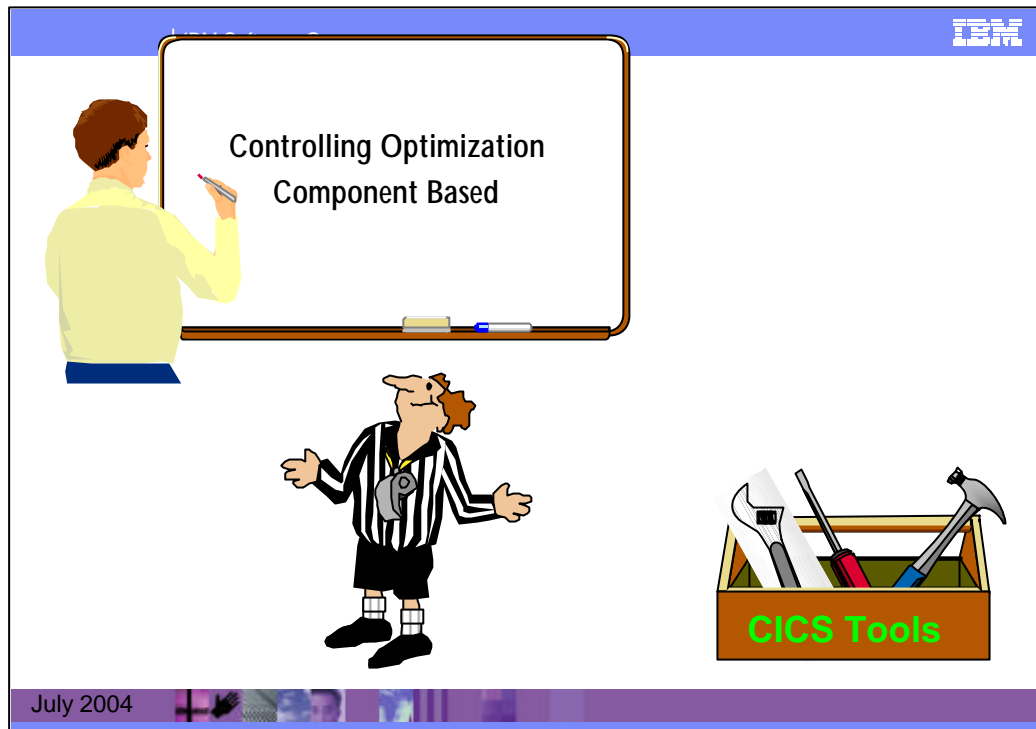
```

EXCL. LU'S FROM OPT.      Otto for CICS V1R1      OTTOM14
ABL50011 COMMAND SUCCESSFULLY PROCESSED
OPTION ==>                EXCLUDE LU . . . . . ENTRIES 1 TO 1 OF 1
PERMANENT . NO
-----
LU      EXCLUDE      INCLUDE      LU      EXCLUDE      INCLUDE
      temp.  perm.  temp.  perm.  temp.  perm.  temp.  perm.
-----
TC32   YES    NO      .      .      .      .
-----
F3=End  F7=Backward  F8=Forward  F4=Return
-----
NR      C                      R                      04/014
Connected to remote server host entries using profile

```

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- This panel is displayed if you want to exclude a terminal from optimization (TC32, e. g.) : You have to
- select option 7 on the PRIMARY OPTION MENU
 - enter "TC32" in the field "EXCLUDE LU . ."
 - press ENTER



The optimization level as well as other processing-relevant information for a given message are defaulted to the component values. The following options may be set for the 3270 component:

Imaging

Optimization

Image-Compression

Clear-TIOA

Lightpen

WCC-Ignore

Base-Color-Switch

Printer-Linesize

3192

Zero-MF-Allowed

Component based optimization control

- The optimization features for 3270

3270 COMPONENT SETTINGS	CURRENT	PERM.	CHANGE CURRENT	CHANGE PERM.
Imaging	ON	ON	---	---
Compress images	OFF	OFF	---	---
Lightpen	OFF	OFF	---	---
3179/3192 C	OFF	OFF	---	---
MCC-ignore	OFF	OFF	---	---
Base color switch	OFF	OFF	---	---
Zero MF order allowed	OFF	OFF	---	---
Clear TIOA	OFF	OFF	---	---
Printer linesize	132	132	---	---

F3=End

04/014

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This Component Based Optimization Control panel is displayed when Option 3 is entered in the Primary Option Menu. It is used to change CICS OTTO's optimization features for all connected 3270 terminals and printers, except for those which have special settings for LU or modules different from the 3270 component values.

Component based optimization control (cont.)

- The optimization features for 3600 / SCS

3600 COMPONENT SETTINGS		CURRENT	PERM.	CHANGE CURRENT	CHANGE PERM.
Prime compr. character	X'40'	X'40'	X'40'	X'40'	X'40'
Input optimization	OFF	OFF	OFF	OFF	OFF
Clear TIOA	OFF	OFF	OFF	OFF	OFF

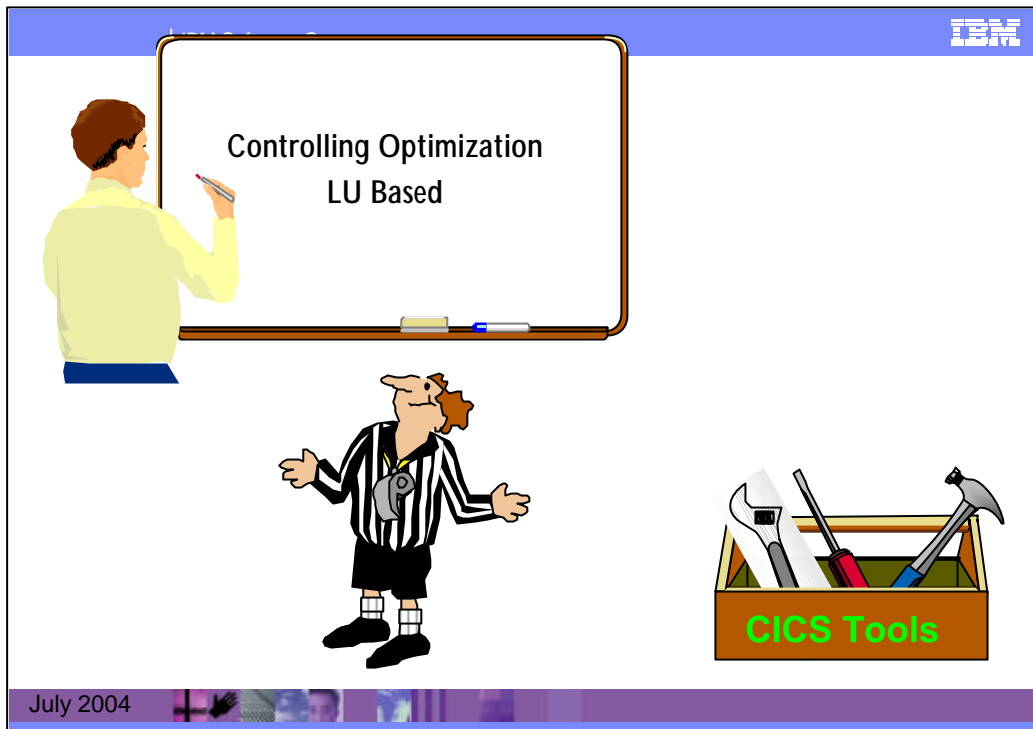
SCS COMPONENT SETTINGS		CURRENT	PERM.	CHANGE CURRENT	CHANGE PERM.
SCS linesize	132	132	132	132	132
Opt. as SCS / 3270	SCS	SCS	SCS	SCS	SCS

F3=End

04/014

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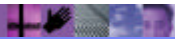
This panel (Primary Option Menu - option 4) is used to change CICS OTTO's optimization features for all of the connected 3600/4700 terminals or SCS printers, except for those which have special settings for LUs or modules different from the 3600/4700 or SCS component values.



One or more component defaults may be overwritten by specific terminal settings, called LU settings. All options as described for the component may be set for one or more LUs. LU settings have a higher priority than the component values.

LU based optimisation control

- One or more component defaults may be overwritten by specific terminal (LU) settings
- All component options may be set for one or more LUs.
- LU settings have a higher priority than the component settings
- The LU based optimization control menu is displayed when option 5 is used from the primary option menu



LU-based optimization control ...

```
LU BASED OPT. CONTROL      Otto for CICS V1R1      OTTON07

OPTION ==> _____

1. Specify Optimization Values for Specific LU
2. Display a List of all LU's with Specific Settings
3. Display Active 3270 Terminals
4. Display Active 3270 Printers
5. Display Active 3608 Terminals
6. Display Active SCS Printers

LU-NAME ... _____ For option 1 : input required
                          full or generic name
                          (= from position 2 possible)

                          For option 2-6: input optional, default = =
                          full or generic name
                          (= from position 1 possible)

-----
F3=End

C 04/014
```

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This Panel is displayed when Option 5 is entered in the Primary Option Menu. This LU BASED OPT. CONTROL menu is used to select several panels that allow you to view or change CICS OTTO's optimization features for a single LU or a group of specific terminals/printers (LUs) connected to the CICS system.

LU-based optimization control ...

- The LU LIST panel is displayed when options 2 through 6 are entered on the previous menu

```

LU List (lu type )          Otto for CICS V1R1          OTTOM08
OPTION ==> _____ DISPLAY CRITERIA * _____ Entries      1 to 44 of 48
                                                                MORE: +

      Selection for LU based optimization control

      LU              LU              LU              LU
-----
- LU00*             - LU01*             - LU02*             - LU03*
- LU11*             - LU12*             - LU13*             - LU14*
- LU15*             - LU16*             - LU17*             - LU18*
- LU19*             - LU21*             - LU22*             - LU23*
- LU24*             - LU25*             - LU26*             - LU27*
- LU28*             - LU29*             - LU31*             - LU32*
- LU33*             - LU34*             - LU35*             - LU36*
- LU37*             - LU38*             - LU39*             - LU41*
- LU42*             - LU43*             - LU44*             - LU45*
- LU46*             - LU47*             - LU48*             - LU49*
- AAAA             - BLA                - PR00              - PR01

                                                                MORE...

F3=End   F7=Backward   F8=Forward   F4=Return
  
```

This is another example of an LU based optimization control. This panel (the list of active 3270 terminals) is displayed if option 3 is selected in LU BASED OPT. CONTROL menu.

LU-based optimization control ...

- The optimization features for 3270

The screenshot shows a terminal window titled "3270 LU OPT. CONTROL" with the following content:

```

3270 LU OPT. CONTROL      Otto for CICS V1R1      OTTOM18


OPTION ---> _____      NEXT LU . . . . .

SETTINGS FOR LU          CURRENT          PERM.          CHANGE          CHANGE
0113                    (Component values in parenth.)          CURRENT          PERM.
-----
Imaging                 ON (ON)         ON (ON)         ---             ---
Compress images         OFF (OFF)       OFF (OFF)       ---             ---
Lightpen                OFF (OFF)       OFF (OFF)       ---             ---
3179/3192 C            OFF (OFF)       OFF (OFF)       ---             ---
WCC-ignore             OFF (OFF)       OFF (OFF)       ---             ---
Base color switch      OFF (OFF)       OFF (OFF)       ---             ---
Zero WF order allowed  OFF (OFF)       OFF (OFF)       ---             ---
Clear T10R             OFF (OFF)       OFF (OFF)       ---             ---
-----
F3=End      F4=Return

b                                     04/014
  
```

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One of the ways to display this panel is to enter option 3 in LU BASED OPT. CONTROL menu, and then select an active terminal. This panel is used to control LU optimization features for 3270.



Controlling Optimization
Module Based



Module-based optimization control

- The highest priority is:
 - Module
 - LU
 - Component
- For modules, the following can be set:
 - Imaging
 - Clear Tioa
 - WCC-Ignore
 - Prime Character
 - Lightpen
 - SCS Optimization
 - Linesize

	Component Value	LU Value	Module Value	Resulting Value
Imaging	ON	ON	ON	ON
Clear TIOA	OFF	OFF	OFF	OFF
Lightpen	OFF	OFF	OFF	OFF
WCC-Ignore	OFF	OFF	ON	ON

- Example:

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The following options may be set for specific modules:

Imaging Optimization

Clear-TIOA Lightpen

WCC-Ignore Opt. as SCS/3270

Prime-Compression-Char

If one of the above options is set for a specific module and differs from the component value, any

current LU-specific settings for these options are ignored for messages sent by the specific module destined for the specific LU. All other options that can be set for the component or LU but **not** for a module are taken from any current LU settings, or lastly from the component settings.

For example, assume the following controls are issued:

```
SET OPTIMIZATION OUT IMAGE ALL PERM
```

```
SET WCC-IGNORE ON MOD= pgm PERM
```

As a result, the settings highlighted in the table, are active for the component, the LU, and module.

If a message is sent by the module *pgm* to the LU *name* the module settings for the above options are assumed. All options that are not explicitly set for a module are defaulted from the LU value (if it exists) or from the component.

Module-based optimization control ...

- The Module-based optimization control menu is displayed when option 6 is used from the primary option menu

```

MOD. BASED OPT. CONTROL      Otto for CICS V1R1      OTTOK09

OPTION ==> _____

      1. Specify Optimization Values for Specific Module
      2. Display a List of all Modules with Specific Settings

MODULE . . _____ For option 1 : input required
                        Full or generic name
                        (* from position 2 possible)

                        For option 2 : input optional, default = *
                        Full or generic name
                        (* from position 1 possible)

-----
F3=End
  
```

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For modules, the following optimization features may be set:

- Imaging
- Clear Tioa
- WCC-Ignore
- Prime Character
- Lightpen
- SCS Optimization
- Linesize

The highest priority for settings is 1) the module, 2) the LU, and 3) the component.

This means if one or more of the above options is set for a specific module and the setting is different from the component settings or the LU specific settings, the module settings override the messages sent by the specific module destined to the specific LU. All other options which can be set for the component or LU, but not for a module are taken from the component settings or eventually present LU settings.

This Module Based Optimization Control Menu is displayed when Option 6 is entered in the Primary Option Menu.

Module-based optimization control ...

- The Module LIST panel is displayed when option 2 is entered on the previous menu

```
Mod. List (Spec. Sett.)          Otto for CICS V1r1          OTTOM08
OPTION ==> _____ DISPLAY CRITERIA *_____          Entries 1 to 3 of 3
                               Selection for module based optimization control
      MODULE          MODULE          MODULE          MODULE          -----
-----
_ MOD00000          _ MOD00001          _ OTTO*
-----
F3=End F7=Backward F8=Forward F4=Return
```


Module-based optimization control ...

- The optimization features for Module

```

MODULE OPT. CONTROL      Otto for CICS V1R1      OTTOM13

OPTION ==> _____  NEXT MODULE . . . _____

Module:  EQR*           CURRENT      PERM.      CHG. CURRENT  CHG. PERM.
-----
Imaging           ON (ON)      ON (ON)      _____
Lightpen         OFF (OFF)    OFF (OFF)    _____
ICC-ignore       OFF (OFF)    OFF (OFF)    _____
Base color switch -NA-         -NA-         _____
Printer linesize  132 -NA-     132 -NA-     _____
Prime compr. char. X'40' (X'40') X'40' (X'40') X'____' X'____'
Compress images  -NA-         -NA-         _____
3175/3192 C      -NA-         -NA-         _____
Zero MF order allowed -NA-         -NA-         _____
Opt. as SCS / 3270 SCS (SCS)    SCS (SCS)    _____
Clear T10A       OFF (OFF)    OFF (OFF)    _____

-----
F3=End   F4=Return   F9=Delete Entry

MBE  b  04/014
  
```

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This panel can be displayed if module name is entered and option 1 is selected in the Module Based Optimization Control Menu. Here you can change optimization features for the selected module.



CICS OTTO is invoked via CICS standard output and input message edit exits. Startup is automatic when the CICS region is started.

To monitor and control the operation of CICS OTTO, call the OTTO transaction that supports all needed commands.

Operating CICS OTTO

- CICS Startup
 - ▶ Automatically initiated using the PLT phase (ABLSTRT)
 - ▶ Enables the CICS input and output exits
 - ▶ Initializes CICS OTTO - interface module OTTOEXIT
- CICS Normal Operation
 - ▶ XZCOUT, XZCOUT1 and XZCIN
 - ▶ Normally, enable CICS OTTO first
- CICS Shutdown
 - ▶ Optimization statistics are automatically written from PLT
 - Program ABLSTOP
 - Console
 - //OTTOSTAT DD SYSOUT=*
 - ▶ Statistics are only written if a SHUT,NO is issued
- Run CICS Transaction OTTO

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CICS Startup

CICS OTTO is automatically initiated using the PLT -phase ABLSTRT at CICS startup time. ABLSTRT enables the CICS input and output exits and initializes CICS OTTO by calling the interface module OTTOEXIT. All other routines are loaded from the VSAM control file OTTOMOD into the private area of the CICS region above the 16 MB line. All other required storage such as work areas, control blocks and the image pool is also acquired from above the 16 MB line.

CICS Normal Operation

CICS OTTO gets control of all input and output messages using standard CICS exits:

XTCOUT and XTCIN in case of BTAM

XZCOUT, XZCOUT1 and XZCIN in case of VTAM

If your installation is already using one or more of these exits, the order in which they should be enabled depends on the logic they perform. Generally, CICS OTTO should be the first one to get control of all messages, i.e. it should be the first one to be enabled. However, contact IBM Support if you want to use more than one program for the above exits.

3270, SCS and 3600/4700 type messages are optimized depending on the various start and control options. Additionally the user exit may influence the optimization.

CICS Shutdown

Optimization statistics are automatically written to the console or, if DD statement OTTOSTAT is present, to the statistics file at CICS shutdown time. This is initiated using the PLT program ABLSTOP.

CICS OTTO - Operation

```

PRIMARY OPTION MENU           Otto for CICS V1R1           OTTON01

OPTION ==> _____

1. START / STOP Otto for CICS Optimization
2. Display and Control Otto Image Pool Size
3. 3270 Component Based Optimization Control
4. 3600/SCS Component Based Optimization Control
5. LU Based Optimization Control
6. Module Based Optimization Control
7. EXCLUDE LU's from Optimization
8. EXCLUDE Modules from Optimization
9. SELECT LU's for Optimization
10. Trace
11. System Options
12. Statistics Control
13. Display Statistics
14. Otto Commands (Compatibility Mode)
X. Exit

-----
F1=Help   F3=Exit

July 2    C    04/014
connected to remote server Pool name=004ibg port 13

```

This is the Primary Option Menu which is used to access other menus and panels that allow you to control all optimization features, run traces, and manage system statistics.

Available controls enable you to:

- Start or stop CICS OTTO for each component type
- Display and control the image pool size
- Select or exclude specific terminals or modules to optimize
- Dynamically add or remove terminals or modules from optimization in runtime
- Start and stop trace
- Display statistics

The exclude list is used to say that optimization should not be performed on certain logical units because, for example, they are using the session to do a file transfer.

The list of commands end with some statistics to show how well optimization is being performed.

Controls can be set on temporary or permanent basis.

Also, by utilizing the provided user exits it is possible to:

- Use return codes to process specific messages unchanged
- Keep and reinsert message parts after optimization
- Change characters for specific countries.

System Options

- The System options panel is displayed when option 11 is entered on the primary option menu

```

SYSTEM OPTIONS                               Otto for CICS V1R1                               OTTOW18

OPTION ==> _____

-----
SYSTEM OPTION      CURRENT      PERM.      CHANGE CURRENT      CHANGE PERM.
-----
Katakana support   NO          NO          _____          _____
User exit active   NO          NO          _____          _____
Name of user exit  -NR-       -NR-       _____ (SUFFIX)   _____ (SUFFIX)
Application-ID     IYCLZCOO
Otto mod's loaded  NO          NO          _____          _____
Date formatting    EUROPEAN   EUROPEAN   _____ A,E,J    _____ A,E,J

                                     A = American
                                     E = European
                                     J = Julian

STATUS OF OTTO CONTROL FILE:
-----
CLOSE                                     CLOSE CONTROL FILE . . . YES

-----
F3=End
  
```

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Here you can define general processing parameters, such as date format, exit support, etc.

This System Options panel is displayed when option 11 is entered on the Primary Option Menu.

Start / Stop Optimization

```
START / STOP          Otto for CICS V1R1          OTTOM02

OPTION ==> _____

Valid Input for Status:  1 - START FULL
                        2 - START SELECTED
                        3 - STOP

COMPONENT      CURRENT      PERMANENT      CHANGE CURRENT      CHANGE PERM.
-----      -Status-----      -Status-----      -Status-----      -Status-----

3270      FULLY STARTED      FULLY STARTED      -                  -
SCS       FULLY STARTED      FULLY STARTED      -                  -
3688      STOPPED           STOPPED           -                  -

-----
F3=End

c                                     04/014
```

July 2

This START/STOP Panel (Primary Option Menu - option 1) displays the current optimization status for each component and provides you with the option to change this status.

Display & Control Image Pool

- The image pool panel is displayed when option 2 is entered on the primary option menu.

```

IMAGE POOL                               Otto for CICS V1R1                               OTTON04
OPTION 0000
                                           Image Pool Statistics
Number of slots generated . . : 00020          Shortage deletions . . : 00000
Number of slots in use . . . : 00003          Delete requests . . . : 00000
Average image length . . . . : 02503 Bytes    Image not saved . . . : 00000
Length of longest image . . . : 02892 Bytes    Image not found . . . : 00003
Length of shortest image . . . : 01992 Bytes

POOL SIZE SETTINGS                       CURRENT          PERMANENT          CHANGE PERM.
-----
Total pool size in KB                    00020           00020
Slot size in Bytes                       1024            1024

-----
F3=End
  
```

July 2004

This panel is used to display and change the size of CICS OTTO's image pool. The image pool is allocated in the private area above 16MB. Imaging means a copy of each screen is kept in main storage. CICS OTTO's image tool is used for this. Imaging starts with the first outbound message written by the application with an ERASE/WRITE. All of the following messages that are destined to the same terminal will be compared with the existing data in the screen image and only changed data and attributes will be transmitted after the optimization process. Consequently, the screen image is updated with the new data and attributes.

The IMAGE POOL panel is displayed when option 2 is entered on the PRIMARY OPTION MENU.



CICS OTTO will trace all input and output messages before and after optimization for those components for which the trace facility was activated. The trace file is opened when a trace is started, and closed when the trace is stopped.

CICS OTTO Trace Control

- The trace control panel is displayed when option 10 is entered on the primary option menu

```

TRACE CONTROL                               Otto for CICS V1R1                               OTTOH15

OPTION ==> _____

1. Start Trace . . . . . for . . . . .
2. Start Internal Trace for . . . . .
3. Stop Trace

1. All 3270 LU's
2. All 3600 LU's
3. All SCS Printers
4. Specific or Generic LU-name
5. Specific or Generic Module-name
6. All LU's

MODULE(S) OR LU(S) . . . . . _____

ID . . . . . 01
PAGESIZE . . . . . 60
TITLE . . . . . _____

TRACE IS CURRENTLY STOPPED

Line count:                               Entry count:
-----
F3=End
  
```

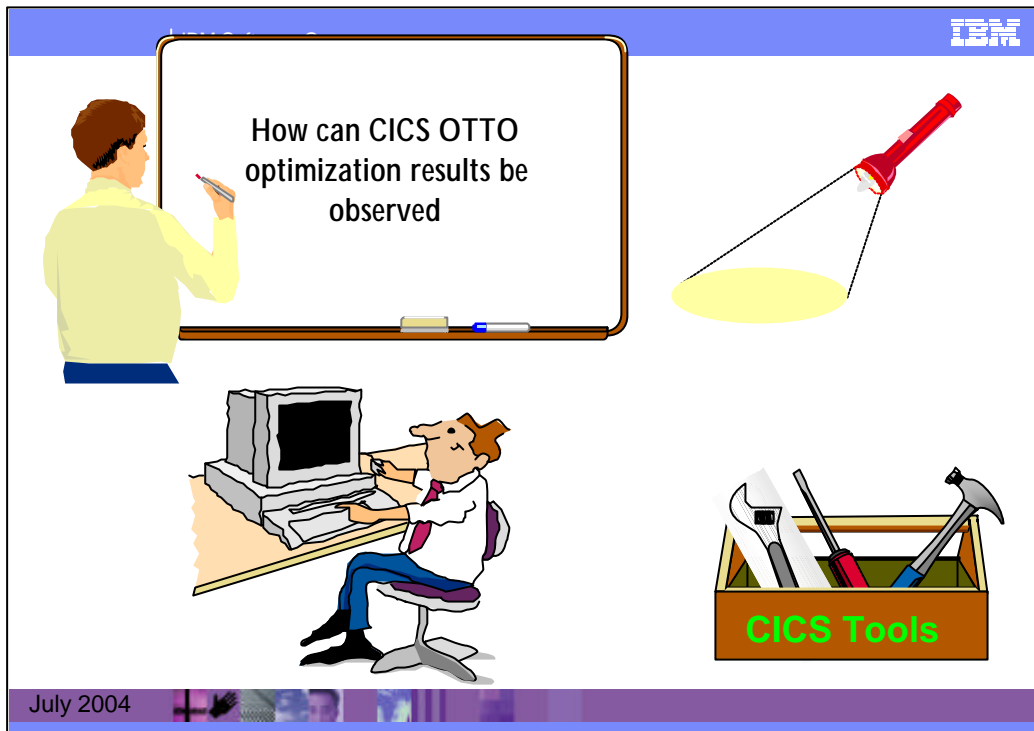
July 2004

Message traces can be produced before and after each optimization for LUs and modules. Traces may be useful for error determination.

The TRACE CONTROL panel is displayed when option 10 is entered on the PRIMARY OPTION MENU.

Use the TRACE CONTROL panel to define the characteristics of a trace.

- Start Trace allows you to start a message trace.
- Start Internal Trace starts an internal trace. This trace should only be performed if requested by your technical support representative.
- Stop Trace closes the trace file and makes it available for printing. The trace file should be printed before a new trace is started. Otherwise, the trace information previously written may be lost.



CICS OTTO optimization results can be fully viewed online via the OTTO transaction. Most of the statistics can also be written to the OTTOSTAT file (or the system log).

CICS OTTO Statistics

- The following different kinds of optimization statistics are provided:
 - ▶ Overall Statistics
 - ▶ Component Based Statistics
 - ▶ LU Based Statistics
 - ▶ Module Based Statistics
- The statistics can be found using the following sources:
 - ▶ Viewed using the CICS panels
 - ▶ Written to the OTTOSTAT file for printing on demand
 - ▶ At CICS shutdown, statistics are automatically written to the OTTOSTAT
- Note: If DDNAME OTTOSTAT is missing, the statistics are written to the system log.

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Optimization results can be viewed and analyzed using CICS OTTO's statistics. These statistics show how many messages have been optimized and how many bytes have been saved during the optimization process. If CICS OTTO is fully started, all messages are counted except those for which an LU or module exclusion was active. If CICS OTTO is selectively started, only the messages destined to those LUs which are in CICS OTTO's selection list are counted.

The following different kinds of optimization statistics are provided:

- Overall Statistics: provide a graphical summary of all optimization results for all LUs; 3270, SCS and 3600. This information is provided only online.
- Component Based Statistics: show counters for message optimization and saved bytes, as well as total reduction expressed as a percentage. For the 3270 component, these statistics are separated by terminal statistics (T3270) and printer statistics (P3270).
- LU Based Statistics: always active. However, these are available only online. Statistical information can be obtained for a single LU, for a group of LUs qualified by a generic name, or different LU types.
- Module Based Statistics: an option allows accumulation of module statistics the same as for LUs. The module name is obtained from CICS PCTIPIA, if available. Otherwise, the PCTTI is used if the transaction name was generated. Module based statistics are available only if they have been explicitly activated.

Module statistics should only be used to figure out modules/transactions that have a low optimization ratio. Module statistics cause CPU overhead. Therefore, you may wish to exclude modules with a low optimization ratio. Statistical data may be collected for a list of predefined modules by starting the module statistics selectively or for all modules by starting them fully.

On each of the statistics panels (except the LU STATISTICS SUMMARY) you can use PF9 to write the statistics to the OTTOSTAT file.

Statistics Control

```
STATISTICS CONTROL          Otto for CICS V1R1          OTTON17

OPTION ==> _____

1. Clear Otto for CICS Image Pool Statistics
2. Clear all LU and Module Statistic Values
3. Clear all LU Statistic Values
4. Clear all Module Statistic Values
5. Clear all 3270 Statistic Values
6. Clear 3270 Terminal Statistic Values
7. Clear 3270 Printer Statistic Values
8. Clear 3800 Statistic Values
9. Clear SCS Statistic Values
10. Clear Statistics of Specific LU          LU . . . . _____
11. Clear Statistics of Specific Module     MODULE . . . _____
12. Start Module Statistics for all Modules
13. Start Module Statistics for Selected Modules
14. Stop Module Statistics
15. Exclude Modules from Statistics
16. Select Modules for Statistics
17. Control Size of Control Blocks for Module Statistics

-----
F3=End
```

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The STATISTICS CONTROL menu is displayed when option 12 is entered on the PRIMARY OPTION MENU. STATISTICS CONTROL panel can be used to issue commands and define variables that control the statistical information that is gathered. Such controls include:

- Clearing statistics. This means set all counters to zero.
- Starting statistics for all or specific modules.
- Stopping module statistics.
- Selecting modules for the statistics.
- Excluding modules from the statistics.
- Changing the restricted size of the module statistics in main storage.

Display Statistics

```
DISPLAY STATISTICS MENU      Data for CICS VIR1      DTOM18

OPTION ==> _____

1. Display LU Statistics Summary
2. Display 3270 Statistics
3. Display 3270 Terminal Statistics
4. Display 3270 Printer Statistics
5. Display 3800 Statistics
6. Display SCS Statistics
7. Display Statistics of Specific 3270 Terminal(s) . . .
8. Display Statistics of Specific 3270 Printer(s) . . .
9. Display Statistics of Specific 3800 Terminal(s) . . .
10. Display Statistics of Specific SCS Printer(s) . . .
11. Display Statistics of Specific Module(s) . . .

-----
F3=End
```

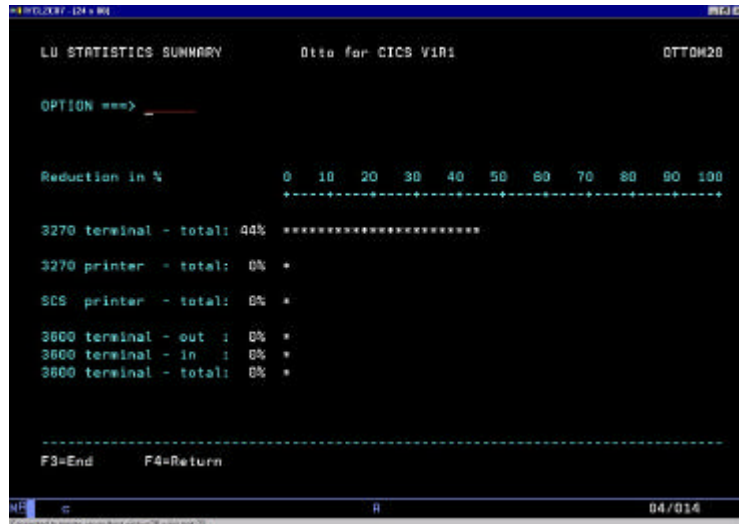
-Option 1 ==>

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Statistics can be accessed using the DISPLAY STATISTICS MENU. This menu is displayed when option 13 is entered on the PRIMARY OPTION MENU.

CICS OTTO - LU Statistics summary

- Optimization results can be viewed using OTTO's statistics



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In this screen you can see a simple graph showing the LU Statistics Summary. In this example the 3270 data streams are being reduced by 44%.

CICS OTTO - Component Statistics

- The component statistics panel is displayed when options 2 - 6 are used on the Display Stats Menu

```

COMPONENT STATISTICS      Date for CICS V1R1      OTTOM21
OPTION ==> _____
                Statistics for all 3270 LU's
From  28-12-2001 11-12-25  to *****
COUNT      OPTIMIZED      PERCENTAGE
-----
Number of output messages . :          99          98      98%
COUNT BEFORE  COUNT AFTER  REDUCTION
-----
Number of output bytes . . . :    129,245      72,195      45%
-----
F3=End      F9=Write Statistics to OTTOSTAT or Console      F4=Return
  
```

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These statistics for 3270's show that 98% of messages have had some optimization performed on them (98 messages out of the total of 99 messages sent from CICS). The second line shows that the number of characters transmitted is 72,195 with an input to the optimizer of 129,245. A reduction of 45% has been achieved. Option 2 has been selected in the Display Statistics Menu to display these statistics.

CICS OTTO Summary

- Reduces network load
 - ▶ shorter messages go faster
 - ▶ end-user response time improvement
- Use device characteristics to create output quicker
 - ▶ tab characters on printers, for example
- Easy to install, customize and use
 - ▶ Interface, familiar to any CICS systems programmer
- Statistics maintained

CICS OTTO focuses on providing low cost basic compression and optimization of CICS 3270 and LU type 2 outbound data streams. It is a CICS specific solution designed to help lower the cost of CICS network operations. It provides the basic services in a simple and easy to use package

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IBM Software Group

Appendix

Useful Information on CICS



 business on demand

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Useful information

CICS Web site

CICS Product Web Page: Contains product information including highlights and benefits, announcements, services, supportpacs, publications for CICS TS 2.3 and the CICS Tools
ibm.com/cics

Bibliography:

CICS Online Transmission Time Optimizer for z/OS User's Guide. SC34-6104

SNA Sessions Between Logical Units (GC20-1868)

