

IBM OMEGAMON for IMS on z/OS  
5.5.0

*Historical Component (EPILOG) User's  
Guide*



**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 29.](#)

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This edition applies to version 5, release 5, modification 0, of IBM OMEGAMON for IMS on z/OS (product number 5698-T02) and to all subsequent releases and modifications until otherwise indicated in new editions.

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# Chapter 1. Introduction to the EPILOG historical component

IBM OMEGAMON® for IMS on z/OS® is a Performance Management tool for the information management system (IMS) database management system. The EPILOG historical component collects performance data, and saves it in a database. You can make online and batch queries against it.

Topics in this material describe how you can complete the following tasks:

- Display wait states during an interval for a particular workload for an interval
- Pinpoint the key wait states for an interval
- Restrict reporting to particular dates and times
- Summarize the measurements of one interval in a single line
- Combine intervals
- Restrict reporting to intervals during which certain criteria were met
- Report on the many resources used by the host system
- Use the EPILOG special features

**Tip:** For more comprehensive reporting on the performance of your IMS systems, IMS Performance Analyzer offers a suite of reports to help you manage the performance and resource utilization of your IMS systems. IMS Performance Analyzer processes IMS log, IMS monitor, IMS Connect event data written to IMS Connect Extensions journals, and IBM OMEGAMON for IMS Application Trace Facility (ATF) data to provide comprehensive reports for use by IMS specialists to tune their IMS systems, and managers to verify service levels and predict trends. For more information, refer to the *IMS Performance Analyzer User's Guide*.

## Intended audience

---

EPILOG provides a flexible Performance Management system for data center personnel. You can set up the component so that personnel in each data center can investigate performance issues in their own departments.

*Performance Analysts* can identify and correct significant bottlenecks or spot trends toward poor performance among workloads that they feel are critical. For example, the PAYROLL job, which normally takes 2 hours, ran for 4 hours yesterday. With an EPILOG performance degradation display, it is easy to tell why the job ran as long as it did.

*Systems Programmers* can understand why jobs are running slower than usual, why processors are being under-utilized, and which disk packs are poorly configured. EPILOG can compare a system's efficiency before and after a tuning or configuration change.

*Application Programmers* can get feedback about how efficient their programs are and how they can achieve better performance.

*Production Control Personnel* can recognize jobs that must be rescheduled so they do not interfere with other work.

*Computer Operations Managers* can understand why jobs are running slower than usual and why IMS users are experiencing poor response time. Exception reports can spotlight incidents of specific interest to data center management.

*Capacity Planners* can examine the results of stress tests and more accurately estimate the benefits of a particular hardware upgrade.

## EPILOG overview

---

EPILOG has three major subcomponents: the EPILOG collector, the EPILOG reporter, and the maintenance utilities.

### The EPILOG collector

The EPILOG collector collects several different types of performance-related information from system management facility (SMF) records, IMS log records, and selected IMS control blocks. Information that is collected includes transaction response time, resource usage, and degradation data.

The IBM OMEGAMON for IMS on z/OS product's standard installation procedure sets the EPILOG collector to start automatically when the OMEGAMON for IMS Classic address space starts. There can be only one EPILOG collector active for each IMS system.

The collector writes data to the EPILOG data store (EDS) at the end of each collection interval (typically, the standard RMF interval of 15 minutes to an hour). Data in the EDS is available to the reporter immediately after it is written to the EDS.

In addition to writing data to the EDS, you can also have the collector write the data that it collects to an SMF record type.

### The EPILOG reporter

You can use the EPILOG reporter component either as a batch report generator or for interactive inquiry under time sharing option (TSO). You can use the powerful set of commands to request information for a spectrum of times and workloads. These commands can answer a wide variety of questions. Among other things, you can complete these tasks:

- Request data by specific time periods
- Combine and average collection intervals
- Select intervals by exceptional conditions
- Supply report titles

The procedure that is used to start the EPILOG reporter varies from site to site. To find out how to start the EPILOG reporter, contact the system programmer responsible for installing OMEGAMON for IMS on z/OS at your site.

### The EPILOG maintenance utilities

Three utilities are available to maintain an EPILOG reporter:

#### **KEBUTIL**

Re-creates an EDS from a backup data set created with IDCAMS REPRO. You can instruct KEBUTIL to delete specific data during the reload, thus removing old or unwanted data.

#### **KEBINIT**

Initializes a newly defined EDS.

#### **KEBMAINT**

Restores an EDS from an SMF file.

## Chapter 2. Getting started with the EPILOG reporter

When you get the EPILOG up and running, you can use the screen logging facility and view reports. The following topics provide basic information about the EPILOG reporter to help you get started.

- Start the EPILOG reporter
- Stop the EPILOG reporter
- Use the screen logging facility
- Get help
- Scroll the display to view long reports
- View and change function key assignments
- Run the EPILOG reporter in ISPF split-screen mode

### Starting the EPILOG reporter

You can start the EPILOG reporter in ISPF mode, TSO mode, or batch mode.

Use PARMGEN to configure OMEGAMON for IMS on z/OS to automatically start the EPILOG collector when you start OMEGAMON for IMS. You can also edit the **START** command by following the procedures in the *IBM OMEGAMON for IMS on z/OS: Planning and Configuration Guide*.

To start the EPILOG reporter, complete the following steps:

1. Enter the command to start the EPILOG reporter.

The command that you enter depends on whether you are running EPILOG in ISPF mode, TSO mode, or batch mode.

After you issue the command that starts the reporter, the first screen you see looks similar to the output that is shown in [Figure 1 on page 3](#).

```
Copyright 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1991, 1992, 2001
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Use permissible by license only.

EPILOG/IMS          Version 530
+-----+-----+
|                                     |
|          Summary Data Store Statistics          |
| Date and Time Range          Util   Xt          |
|-----|-----|-----|-----|
| 1 TDIMS.I5530SMP.RTENAM.IC1C.RKEIEDS          |
|   05/29/15 09:00 - 08/31/15 16:00          98%   18          |
|                                     |
|          Press ENTER to Continue          |
|                                     |
+-----+-----+
```

Figure 1. Copyright screen

This screen contains copyright information that safeguards IBM's proprietary rights to OMEGAMON product components. Information that follows the copyright identifies the EPILOG data store that is defined for the current reporter session, and statistics for the data store such as the creation date and time, the date and time the EDS was last updated, the percentage of usage, and the number of extents.

2. Press Enter.

[Figure 2 on page 4](#) shows the EPILOG default function key settings:

```

EPILOG/IMS V530 08/31/15 16:12 Mode: PAGE          1 of 2   PFK DISPLAY
CMD==>
*****
PROGRAM  FUNCTION  KEYS
PFK  1  'HELP'
PFK  2  'HELP'
PFK  3  'BACK'
PFK  4  'CONTROL RECALL'
PFK  5  'CONTROL TITLE'
PFK  6  'DIS RALL TODAY COMBINE STIME(9) ETIME(17) '
PFK  7  'CONTROL SCROLL UP'
PFK  8  'CONTROL SCROLL DOWN'
PFK  9  'CONTROL LOG'
PFK 10  'DIS SYSTEM TODAY SUMMARY COMBINE(1H) '
PFK 11  'DIS GRP(1) TODAY RIF(R0T(>1S)) AUTO'
PFK 12  'PFK'
PFK 13  'HELP'
PFK 14  'CONTROL MODE'
PFK 15  'BACK'
PFK 16  'CONTROL RECALL'
PFK 17  'CONTROL TITLE'
PFK 18  'DIS RALL TODAY COMBINE STIME(9) ETIME(17) '
PFK 19  'CONTROL SCROLL UP'
PFK 20  'CONTROL SCROLL DOWN'
PFK 21  'CONTROL LOG'
PFK 22  'DIS SYSTEM TODAY SUMMARY COMBINE(1H) '
PFK 23  'DIS GRP(1) TODAY RIF(R0T(>1S)) AUTO'
PFK 24  'PFK'

```

*Figure 2. Default function key settings*

The first line of the screen contains information about your EPILOG session.

The second line of the screen is the command line, where you enter EPILOG commands.

The body of the screen shows the default settings for function keys 1-24. The default for keys 1-12 are as follows:

- PFK 1 HELP
- PFK 2 CONTROL MODE
- PFK 3 BACK
- PFK 4 CONTROL RECALL
- PFK 5 CONTROL TITLE
- PFK 6 DIS RALL TODAY COMBINE STIME(9) ETIME(17)
- PFK 7 CONTROL SCROLL UP
- PFK 8 CONTROL SCROLL DOWN
- PFK 9 CONTROL LOG
- PFK 10 DIS SYSTEM TODAY SUMMARY COMBINE(1H)
- PFK 11 DIS GRP(1) TODAY RIF(R0T(>1S)) AUTO
- PFK 12 PFK

The settings for function keys 1 - 12 are the same as 13 - 24 to address terminals that are not equipped with 24 function keys. As you proceed through the following topics, some of the most helpful function keys are explained.

## Stopping the EPILOG reporter

You can stop the EPILOG reporter by issuing commands from the command line.

To stop processing, enter the END, STOP, or QUIT command on the command line. Then, the EPILOG reporter ends.



## Screen image logging facility

---

You can use the screen image logging facility to log the contents of the current screen to a SYSOUT data set.

To log the contents of the current screen to a SYSOUT data set (ddname RKEILOG), press F9 or F21. On the printout, EPILOG inserts a title block that describes the request that generated the display. By default, all output folds into uppercase. You can turn folding off or on by entering **CONTROL FOLDOFF** or **CONTROL FOLDON** in the **CMD==>** space.

## Help facility

---

You can use the online help facility to display screens of information to assist you in using EPILOG.

To access the help facility, press F1 or F13.

## Scrolling

---

In many cases, the total output for a display might not fit on one screen of your terminal. When the display extends beyond the screen of your terminal, EPILOG automatically goes into a scrolling mode. With scrolling mode, you can view the entire display.

When scrollable data is on the screen, the EPILOG header line shows 1 of *n*, where *n* is the total number of screens in the display. Here is an example:

```
EPILOG/IMS V530 08/29/15 12:34 Mode: PAGE          1 of 3
CMD==>
*****
...
Data Displays
...

```

*Figure 3. Scrolling mode*

The header line informs you that the display you see is the first of three screens of data. To scroll forward, press F8 or F20, as in ISPF. To scroll back to the beginning of the display, press F7 or F19.

EPILOG does not scroll in units of lines, but in units of display screens. You can enter a numeric value on the command line before you press the scroll function key. Then, you can scroll forward or backward through *n* displays.

Entering M rather than a number scrolls the maximum number of screens, either forward or backward.

## Function keys

---

To display the current function key assignments, you enter PFK without arguments.

The following list shows the default function keys and associated settings.

### **F1/F13**

HELP (no arguments).

### **F2/F14**

MODE. Rolls through display modes (PAGE, ROLL, HOLD, ONE). Every time that you press the function key, the mode changes. For information about the display modes, see [“Changing display modes” on page 17](#).

### **F3/F15**

BACK. Returns to the previous display.

### **F4/F16**

RECALL. Displays the previous input area command.

**F5/F17**

TITLE. Displays the report title block. For information about title blocks, see [“Displaying title blocks” on page 17](#).

**F6/F18**

DISPLAY. Runs the command DISPLAY RALL TODAY COMBINE STIME(9) ETIME(17), which displays all resource panels for today COMBINED from 09:00 to 17:00.

**F7/F19**

SCROLL UP. Scrolls backward, one report or screen at a time.

**F8/F20**

SCROLL DOWN. Scrolls forward, one report or screen at a time.

**F9/F21**

LOG. Logs the current screen to the RKEILOG data set.

**F10/F22**

DISPLAY. Runs the command DISPLAY SYSTEM TODAY SUMMARY COMBINE(1H), which displays an hourly summary of today’s system-wide bottlenecks.

**F11/F23**

DISPLAY. Runs the command DISPLAY GRP(1) TODAY RIF(ROT(>1S)) AUTO, which displays all intervals for today in which Transaction Group 1 response time 0 is greater than 1 second.

**F12/F24**

PFK. Displays the current function key definitions.

## Changing and saving function key definitions

Although all the function keys have a default setting, you can change settings and also save the changes under a name that you select.

You might want to have at least half of the function key settings closely resemble ISPF where possible (that is, HELP, BACK, SCROLL UP, SCROLL DOWN). To modify any function key, use the PF $nn$  command, where  $nn$  is the number of the function key you want to modify, followed by the new function key definition that is enclosed in quotation marks.

For example, to change the setting for F22 to display a summary of yesterday’s activity for Transaction Group 2, combined in two-hour reporting periods, enter the following command:

```
PFK 22 'DISPLAY YDAY GRP(2) COMBINE(2H) SUMMARY'
```

After you change a function key setting, the entire function key definition table is displayed. You can also change function key settings on this display by overwriting the appropriate line. However, you can change only one definition at a time. If you modify more than one line, and then press **Enter**, the MULTIPLE FIELD error message is displayed in the upper right corner of the screen, and no changes occur.

### Saving function key definitions

After you modify the function keys, you can save the new definitions in the RKANPARU data set under a one- to seven-character member name that you specify, for example:

```
PFK SAVE(MYPFKS)
```

If the member exists, the new settings replace it. To reload these definitions the next time you start an EPILOG session, enter the following command:

```
PFK READ(MYPFKS)
```

The default function key definitions are also saved in a PFK member called DEFAULT. You can reload the function key definition defaults at any time by entering the command KEIDEFAULT.

## Running EPILOG in ISPF split-screen mode

You can run EPILOG under ISPF (Version 2 and later) in split-screen mode. A CLIST, KEISPF, is provided for this function.

For more information about KEISPF, see the *IBM OMEGAMON for IMS on z/OS: Planning and Configuration Guide*.

To use the reporter under ISPF, follow these steps:

1. Start the KEISPF CLIST.

The first display is the **Primary Option menu** for starting your EPILOG session.

```
----- CANDLE PRIMARY OPTION MENU -----
OPTION  ===>

0  PARMS      - Change user session parms
1  COMMAND    - Begin COMMAND driven session
X  EXIT       - Return to ISPF
```

Figure 4. Primary Option menu

**Important:** The first time that each user starts the CLIST from a TSO user ID after product installation, it is necessary to enter option **0** to initialize the function key assignments. On subsequent invocations, you can go directly to step 2.

2. Select option 0.

The **User Parms menu** screen is displayed:

```
----- CANDLE USER PARMS MENU -----
COMMAND===>

1. ASSIGN PF KEYS FOR SPLIT AND SWAP FUNCTIONS
   (NOTE: THESE PF KEYS WILL NOT BE AVAILABLE TO THE REPORTER)

   SPLIT PFK # ===> 02
   SWAP PFK # =====> 09

PRESS ENTER WHEN CORRECT
```

Figure 5. User Parms menu

You can either press **Enter** to accept F2 and F9 for split and swap, or overwrite them with different function key settings.

3. After either accepting or changing function keys, press **Enter** to return to the **Primary Option menu**.
4. To initiate a reporter session, select option 1.

When you are in the reporter, the split function behaves exactly as it does in other ISPF functions. The reporter displays require a minimum of eight display lines. If you attempt to use fewer lines, the reporter displays the message

```
INSUF SCRN SIZE
```

in the upper right corner of the screen. If you see this message, split the screen again to allow EPILOG at least eight display lines. Then, reenter the command.

Avoid splitting the screen to a smaller size while you view EPILOG logical displays that exceed the size of your screen. Doing so might hide part of the display. However, if you do split the screen, you can recover the lost part of the display in one of the following ways:

- Return the screen to full-screen mode to reveal the hidden part of the display.

- Reenter the command, and view the display from the beginning.

To view the entire display, use the scrolling feature, as described in [“Scrolling” on page 5](#).

To stop the reporter, enter END, STOP, or QUIT on the command line. You are returned to the split-screen menu. Enter X on the OPTION line to complete reporter termination.

**Note:** Do not run the EPILOG reporter in both split-screen sessions of ISPF at the same time.

## Chapter 3. Creating EPILOG reports

EPILOG reporter commands are used to display data that is collected by the EPILOG collector.

Before you enter any reporter commands, note the following guidelines:

- EPILOG reporter commands consist of keywords and arguments (variables that are provided by you) that are similar to their English meanings.
- Keywords and arguments are separated from one another by one or more blanks, equal signs, commas, or pairs of parentheses.
- Most keywords have both long and short (abbreviated) forms.
- If a command is too long to fit on the command line, end the line with a hyphen with a blank on either side, like this command shows:

```
b-b
```

The rest of the line to the right of the second blank is ignored and can be used for comments. Press Enter, and the reporter displays a new blank command line. You can use as many lines as necessary to enter a command.

- Arguments containing blanks or other separators must be enclosed in paired single quotation marks.
- An argument that is enclosed in quotation marks cannot be continued from one line to the next.

### Issuing the DISPLAY command

The DISPLAY command displays performance information. You can enter the DISPLAY command with keywords that tell EPILOG what you want to display.

For example, you might want to find out how Transaction group 1 performed over a period of time. To display detailed performance information for Transaction group 1, type DISPLAY GROUP(1) on the command line, and press Enter. The output that you see looks similar to [Figure 6 on page 9](#).

```
EPILOG/IMS V530 08/29/15 9:30 Mode: PAGE
CMD==>
*****
+-----+
| Transaction Group = 1          Symbolic Name = CLASS1
| Period: 09:00 to 09:15 on 05/29/15          Elap = 15:00 M IMSA
+-----+
|                               RESPONSE TIME DATA
+-----+
| Response_Component   Avg. Rsp. Time   Trans. Count   Rate (per min.)
| Input Queue          .005166 s          639            42.60
| Pgm Input Queue     .000000 s           0              .00
| Processing           .027113 s          638            42.53
| Response time 0     .032285 s          638            42.53
| Output Queue        .088607 s          636            42.40
| Response time 1     .120833 s          636            42.40
| Input CQS time      .000000 s           0              .00
| Output CQS time     .000000 s           0              .00
| Local output time   .000000 s           0              .00
+-----+
|                               DEGRADATION DATA
+-----+
| Competing_State     Time      % | 0  1  2  3  4  5  6  7  8  9  0
| MVS Waits           0.01 S   33.3 | -----> . . . . .
| BLDL I/O            (0.01) S (33.3) | -----> . . . . .
| IMS Waits           0.02 S   66.7 | ----->>> . . . . .
| IWAIT in Term      (0.02) S (66.7) | ----->>> . . . . .
+-----+
| Average (Resp Time 0) .032285 s
+-----+
```

Figure 6. DISPLAY output

The first section of the display describes the workload (Transaction Group 1), the interval (09:00 to 09:15 on 05/29/15), and the elapsed time (15 minutes).

The Response Time Data section shows the average response time, transaction count, and transaction rate of the nine response time components that constitute a transaction.

The Degradation Data section of the display lists competing states, along with the number of seconds and the percentage of time that is spent in each state. A thread is in a competing state when it is being processed or is eligible to be processed but waiting.

The major categories of competing states are broken down into specific reasons. These reasons are indented, and their associated time and percentage figures are shown in parentheses.

A graph displays on the right side of the Degradation Data display and shows how often during the sampling period that the system is in the various competing states that occur during response time 0. Response time 0 is the internal systems application response time for the transaction. For information about calculating IMS response times, see the *IBM OMEGAMON for IMS on z/OS: Historical Component (EPILOG) Reference*.

The example in [Figure 6 on page 9](#) shows that the system is in

- MVS Waits 33.3% of the time
- IMS Waits 66.7% of the time

By default, the display lists only those competing states with associated percentage figures of 5 percent or more; you can change this threshold figure by using the **SET PLOTMIN** command.

The graph arrows represent the percentage figures. The arrows in the graph are broken into 30% ranges. The first range is indicated by a hyphen (-), the second by an equal sign (=), and the third by a greater-than sign (>).

The time figures that display are calculated by using their wait percentage and the logically associated response time component. For example, Wait for MPP is logically associated with the Input Queue Time response time component, since Wait for MPP occurs during Input Queue Time. Therefore, the wait time that is calculated for Wait for MPP is determined by multiplying its wait percentage by the time for Input Queue Time.

These calculations run differently depending on how many types of wait reasons there are under each execution state. For example, suppose that the system was waiting for GU in addition to MPP. Since Wait for GU is also logically associated with Input Queue Time, part of Input Queue Time must be associated with Wait for GU. Therefore, before the calculation runs, the percentage that is associated with Wait for GU and Wait for MPP is adjusted so both wait reasons account for 100% of the Input Queue Time. This adjustment is done only for the calculation of the wait time and does not affect the actual display of the wait percentage.

Also, if there is a Program Input Queue Time, this time will be added to Input Queue Time before the calculations are performed. The times are weighted based on the number of transactions that are associated with Input Queue Time and Program Input Queue Time.

Typically, the performance analyst is more concerned with the time figures that display than with the percentage-derived times.

## Issuing the SUMMARY keyword

---

The SUMMARY keyword displays a single line of data for each time interval. You can quickly scroll through a concise summary of activity for an entire day.

The figure in [“Issuing the DISPLAY command” on page 9](#) shows output for the time period 09:00 to 09:15 on 05/29/15. Because no date or time parameters were entered with the DISPLAY command, the reporter began displaying data from the first collection interval recorded on the EDS. If you continue to press Enter, EPILOG shows you data in successive 15-minute time intervals up to the present time.

For a summary report of the information that is presented by the DISPLAY command, type DISPLAY GROUP(1) SUMMARY on the command line. Figure 7 on page 11 shows the result of using the SUMMARY keyword.

```

EPILOG/IMS V530 08/29/15 9:36 Mode: PAGE
CMD==>
*****
| Transaction Group = 1
| Period: 09:00 to 11:45 on 05/29/15
+-----+
|                               COMPETING TRANSACTIONS
+-----+
| DATE  START  END  MAIN_REASON(*) TIME(-) |OS   1     2     3     4     5
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 05/29 09:00 09:15 IWAIT in Term .03228 |> .     .     .     .     .
|         09:15 09:30 IWAIT in Term .02917 |> .     .     .     .     .
|         09:30 09:45 IWAIT in Term .03181 |> .     .     .     .     .
|         09:45 10:00 IWAIT in Term .02968 |> .     .     .     .     .
|         10:00 10:15 IWAIT in Term .02946 |> .     .     .     .     .
|         10:15 10:30 IWAIT in Term .03041 |> .     .     .     .     .
|         10:30 10:45+IRLM Wait .53209 |---> .     .     .     .     .
|         10:45 11:00+CPU Wait(DEP) 3.86 S |-----> .     .     .     .     .
|         11:00 11:15 .01482 |> .     .     .     .     .
|         11:15 11:30 N/A |.     .     .     .     .
|         11:30 11:45 N/A |.     .     .     .     .
+-----+-----+-----+-----+-----+-----+-----+-----+
| Average (Resp Time 0) .142587 S
+-----+

```

Figure 7. SUMMARY keyword output

Each line of the display shows the largest wait reason for that time interval. For example, in Figure 6 on page 9 you saw that in the time interval 09:00 to 09:15, IWAIT in Term was the largest wait reason (66.7%). Because IWAIT in Term was the largest wait reason, it also displays in the SUMMARY display (Figure 7 on page 11).

## Issuing the GSUM keyword

Use the GSUM keyword with the DISPLAY command to show the transaction groups whose response times are higher than service level commitments. You can use the GSUM keyword to see the effect of a particular transaction group on the rest of IMS.

The GSUM keyword uses the following syntax:

```

DISPLAY GSUM

```

Figure 8 on page 11 shows the report layout for the GSUM display keyword.

```

EPILOG/IMS V530 08/29/15 11:35 Mode: PAGE
CMD==>
*****
| Group Summary
| Period: 09:00 to 09:15 on 05/29/15 Elap = 15:00 M IMSA
+-----+
|                               Response Time 0 Values
+-----+-----+-----+-----+-----+-----+-----+-----+
| Grp  Name      Rate   Count   Time   |OS   0.2   0.4   0.6   0.8   1
+-----+-----+-----+-----+-----+-----+-----+-----+
| System         4.67     70     0.99 S |---> .     .     .     .     .
| Other          .00      0     0.00 S |.     .     .     .     .
| 01 Billing      0.07      1     1.49 S |-----> .     .     .     .     .
| 02 Shipping    0.60      9     1.06 S |---> .     .     .     .     .
| 04 Account     11.28     53     1.00 S |--> .     .     .     .     .
| 05 Payroll     2.13     30     0.41 S |> .     .     .     .     .
| 06 Inventory   3.04     34     1.15 S |---> .     .     .     .     .
| 07 Orderproc   2.80     42     6.91 S |-----> .     .     .     .     .
+-----+-----+-----+-----+-----+-----+-----+-----+

```

Figure 8. GSUM keyword output

## Issuing date and time keywords

You can further define the DISPLAY information by adding time and date keywords.

The following are the supported keywords:

- STARTDATE**  
Starting Date
- ENDDATE**  
Ending Date
- STARTTIME**  
Starting Time
- ENDTIME**  
Ending Time

In the following example, these keywords are used to create a time-specified display. Because a command that uses all these keywords requires more than one line, you must use the continuation character (b-b) at the end of the first line to enter the entire command:

```
EPILOG/IMS V530 08/29/15 12:02 Mode: PAGE ENTER COMMAND
CMD==> DISPLAY GROUP(2) SUMMARY STARTDATE(05/29/15) ENDDATE(05/29/15) -
*****
```

Figure 9. DISPLAY with time limits—line 1

Now press **Enter**.

The first line of the command moves to the second line of the display. Continue entering the rest of the command on the command line as shown in the next figure.

```
EPILOG/IMS V530 08/29/15 12:02 Mode: PAGE CONTINUE INPUT
CMD==> STARTTIME(0900) ENDTIME(1700)
*****
DISPLAY GROUP(2) SUMMARY STARTDATE(05/29/15) ENDDATE(05/29/15) -
```

Figure 10. DISPLAY with time limits—line 2

The output of this command is similar to the display in [Figure 7 on page 11](#), but the data is displayed for a more restricted time period.

To produce the same output by using keyword abbreviation, see the next example.

```
EPILOG/IMS V530 08/29/15 12:02 Mode: PAGE ENTER COMMAND
CMD==> DIS GRP(2) SUM SDATE(05/29/15) EDATE(05/29/15) STIME(0900) ETIME(1700)
*****
```

Figure 11. Keyword abbreviations

EPILOG also provides you with keywords for time periods without specifying the exact date. For example, you can specify: TODAY (TDAY), YESTERDAY (YDAY), THISWEEK (TWK), THISMONTH (TMN), and so forth. For a complete list of the date and time keywords and their abbreviations, see the *IBM OMEGAMON for IMS on z/OS: Historical Component (EPILOG) Reference*.



## Issuing the COMBINE keyword

By default, the EPILOG collector records data in units of RMF intervals. RMF intervals usually range from 15 minutes to an hour, depending on your site. You might not always want to display data in such small intervals. You can use EPILOG to combine intervals into larger intervals.

If you add the keyword COMBINE to the DISPLAY command, EPILOG treats your data as if it came from one large time interval.

For example, if you enter the DIS command as follows with the COMBINE keyword, the output in [Figure 13](#) on [page 13](#) displays.

```
EPILOG/IMS V530 08/29/15 12:02 Mode: PAGE          ENTER COMMAND
CMD==> DIS GRP(1) SUM SDATE(05/29/15) EDATE(05/29/15) COMBINE
*****
```

Figure 12. COMBINE keyword

```
EPILOG/IMS V530 08/29/15 12:03 Mode: PAGE          LAST FRAME
CMD==>
*****
+-----+
| Transaction Group = 1 |
| Period: 24:00 on 05/28/15 to 24:00 on 05/29/15 |
+-----+
|                               COMPETING TRANSACTIONS                               |
+-----+
| DATE__START__END__MAIN_REASON(*)_TIME(-) | OS__0.2__0.4__0.6__0.8__1 |
| 05/28 24:00 24:00+IWAIT in Term .14258 | ----> . . . . . |
+-----+
| Average (Resp Time 0) .142587 S |
+-----+
```

Figure 13. COMBINE keyword output

As you can see, the display shows the largest single wait reason for the entire interval, IWAIT in Term. To combine this amount of data takes awhile, so be prepared to wait. Rather than combining all the intervals into one large interval, you might consider combining the intervals into medium-sized units, such as hours. Enter a time argument, such as 1H for 1 hour, after the COMBINE keyword:

```
DIS GRP(1) SUM SDATE(5/29/15) EDATE(5/29/15) COMBINE(1H)
```

The following output results:

```

EPILOG/IMS V530 08/29/15 12:03 Mode: PAGE
CMD==>
*****
| Transaction Group = 1
| Period: 11:00 to 22:00 on 05/29/15
|-----|
| COMPETING TRANSACTIONS
|-----|
| DATE_ START_ END_ MAIN_REASON(*)_ TIME(-) | 0S_ 0.2_ 0.4_ 0.6_ 0.8_ 1 |
| 05/29 11:00 12:00 N/A | . . . . . |
| 12:00 13:00 N/A | . . . . . |
| 13:00 14:00 N/A | . . . . . |
| 14:00 15:00 N/A | . . . . . |
| 15:00 16:00 N/A | . . . . . |
| 16:00 17:00 N/A | . . . . . |
| 17:00 18:00 IWAIT in Term .03228 | > . . . . . |
| 18:00 19:00 IWAIT in Term .03009 | > . . . . . |
| 19:00 20:00+IWAIT in Term .46536 | -----> . . . . . |
| 20:00 21:00 N/A | . . . . . |
| 21:00 22:00 N/A | . . . . . |
|-----|
| Average (Resp Time 0) .142587 S
|-----|
*****

```

Figure 14. COMBINE with argument output

For a list of available COMBINE units, see the *IBM OMEGAMON for IMS on z/OS: Historical Component (EPILOG) Reference Manual*.

## Issuing exception keywords

Instead of searching through hundreds of collection intervals to identify problems, you can use exception filters with the DISPLAY command to display only intervals that satisfy certain selection criteria.

For example, you might want to see only intervals where USING CPU IN IMS accounted for more than 10 percent of the total thread's lifetime. Enter the keywords that are shown in [Figure 15 on page 14](#).

```

EPILOG/IMS V530 08/29/15 17:35 Mode: PAGE
CMD==> DIS GRP(4) REPORTIF (CPUIMS(>10%))
*****

```

Figure 15. Exception keywords

When you press **Enter**, you see the following display:

```

EPILOG/IMS V530 08/29/15 17:44 Mode: PAGE
CMD==>
*****
+-----+
| Transaction Group = 4          Symbolic Name = CLASS4
| Period: 19:15 to 19:30 on 05/29/15          Elap = 15:00 M IMSA |
+-----+
|                               RESPONSE TIME DATA                               |
+-----+
| Response_Component   Avg. Rsp. Time   Trans. Count   Rate (per min.) |
| Input Queue         .569030 s         1052           70.13
| Pgm Input Queue     .000000 s           0              .00
| Processing          .023831 s         1052           70.13
| Response time 0     .592860 s         1052           70.13
| Output Queue        .160235 s         1052           70.13
| Response time 1     .753096 s         1052           70.13
| Input CQS time      .000000 s           0              .00
| Output CQS time     .000000 s           0              .00
| Local output time   .000000 s           0              .00
+-----+
|                               DEGRADATION DATA                               |
+-----+
| Competing_State     Time      % | 0  1  2  3  4  5  6  7  8  9  0 |
| Using CPU           0.08 S   14.3 | ----> . . . . . . . . . . |
| Using CPU in IMS   (0.08) S (14.3) | ----> . . . . . . . . . . |
| MVS Waits          0.17 S   28.6 | ----> . . . . . . . . . . |
| CPU Wait (DEP)     (0.08) S (14.3) | ----> . . . . . . . . . . |
| BLDL I/O           (0.08) S (14.3) | ----> . . . . . . . . . . |
| IMS Waits          0.34 S   57.1 | ----> . . . . . . . . . . |
| IWAIT in Term     (0.34) S (57.1) | ----> . . . . . . . . . . |
+-----+
| Average (Resp Time 0) .592860 s
+-----+

```

Figure 16. Exception output

Each time that you press **Enter**, the next time interval during which the exception criteria is met is displayed.

EPILOG offers you many exception criteria filters to focus your tuning efforts by tailoring your displays to display exactly what you want to know. For more information about these filters, see the *IBM OMEGAMON for IMS on z/OS: Historical Component (EPILOG) Reference*.

## Issuing resource keywords

To examine resource usage, use the DISPLAY keyword, followed by the four-character mnemonic for the resource.

For example, to display processor activity, enter the following command:

```
DIS RCPU
```

The following output results:

```
*****
===== CPU Activity =====
| Period: 09:00 to 09:15 on 06/29/15 Elap =15:00 M IMSA |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Region  Type  TCB   SRB   Total | Region  Type  TCB   SRB   Total |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DLIDBC  CTL   1.8 % .4 %  2.2 % | PNPSCICS          .0 % .0 %  .0 % |
| DLIDBRC DBRC  .0 % .0 %  .0 % | PWHFCICS          2.1 % .1 %  2.2 % |
| DLISAS  DLS   .3 % 1.3 %  1.6 % | PSRVCICS          2.8 % .0 %  2.8 % |
| PMSACICS          11.2 % .6 % 11.8 % | PAMPCICS          1.3 % .0 %  1.3 % |
| PMSACICS          11.2 % .6 % 11.8 % | PSRVCICS           .5 % .0 %  .5 % |
| PAMPCICS          5.3 % .1 %  5.4 % | PAUTCICS          .0 % .0 %  .0 % |
| PNPSCICS          .0 % .0 %  .0 % | PNPSCICS          2.1 % .0 %  2.1 % |
| PAUTCICS          10.1 % .1 % 10.2 % | PHE02J01 BMP     .0 % .0 %  .0 % |
| PAMPCICS          2.7 % .0 %  2.7 % | PNPSCICS          .0 % .0 %  .0 % |
| .       .       .       .       . | .       .       .       .       . |
| .       .       .       .       . | .       .       .       .       . |
| .       .       .       .       . | .       .       .       .       . |
| PAUTCICS          2.5 % .0 %  2.5 % | PWHFCICS          .2 % .0 %  .2 % |
| PAUTCICS          .0 % .0 %  .0 % | PAUTCICS          .0 % .0 %  .0 % |
| PNPSCICS          2.1 % .0 %  2.1 % | PNPSCICS          .0 % .0 %  .0 % |
| PAUTCICS          .0 % .0 %  .0 % | PNPSCICS          .0 % .0 %  .0 % |
*****
```

Figure 17. RCPU resource output

The RCPU display shows the percentage of time that each IMS region uses the processor. Because no term interval was specified on the command, the results start from when the EPILOG collector began recording data. Each time that you press Enter, EPILOG shows the processor activity for successive 15-minute periods until the last collection interval.

You can limit the scope of the resource keywords with DISPLAY parameters such as STARTTIME, ENDTIME, STARTDATE, ENDDATE, and COMBINE. You cannot issue the SUMMARY keyword along with a resource keyword, because by definition, SUMMARY and resource are two different types of displays.

For a list of resource keywords, see the *IBM OMEGAMON for IMS on z/OS: Historical Component (EPILOG) Reference*.

**Note:** NORESC disables these keywords. If you disable a keyword, its respective report is not available.

---

## Chapter 4. EPILOG special features

EPILOG provides special features that you use to change the screen appearance, reformat and redisplay the current screen, interrupt the reporter, and get help.

### Issuing the **CONTROL** command

---

You can use the **CONTROL** command to change the appearance of your EPILOG screen and to control certain attributes of your EPILOG reporter session

#### Controlling color and highlighting

By entering the **COLOR** keyword after the **CONTROL** command, you turn on the extended color support that sets the 8-byte color mask.

If extended color is already on, **CONTROL COLOR OFF** turns it off.

The **HILITE** keyword turns on extended color support and sets the 8-byte **HILITE** mask.

#### Changing display modes

You can view screen displays in four different modes.

##### **CONTROL ONE**

Shows only one display.

##### **CONTROL PAGE**

Shows as many displays as can fit on the screen.

##### **CONTROL ROLL**

Discards the first (and oldest) display each time that you press Enter, then rolls the next display that follows to the top of your screen. Each time that you press Enter, this process repeats.

##### **CONTROL HOLD**

Holds the first display on the screen and starts **ROLL** mode for all the following displays. In this way, you can compare one display with other more recent displays. In **HOLD** mode, you might be only able to view part of a rolled display because the held display can take up much of the screen.

#### Recalling the previous command

To recall the first line of the previously run command, use the **CONTROL RECALL** command.

You can also use **F4** or **F16**. After you recall a command, you can modify and reissue it. Overwrite the command on the command line and press Enter.

#### Displaying title blocks

The title block describes the options that you request for the **DISPLAY** command.

When you use EPILOG in full-screen mode, the title block does not display to save screen space. In batch mode, the title block always displays.

To force the title block for the topmost display to display, enter **CONTROL TITLE**. By default, **F5** and **F17** run **CONTROL TITLE**. Enter this command a second time to make the title block disappear. If you enter **CONTROL TITLE SHORT**, EPILOG produces a shortened title block.

## Redisplaying the current screen

---

The PA2 key reformats and redisplays the current screen.

If you accidentally press the clear key or otherwise erase the screen, press PA2 before you enter any new commands.

## Interrupting the EPILOG reporter

---

EPILOG accepts the attention key (PA1) in full-screen mode. For example, if you accidentally turn on color and the screen display is disrupted, press PA1 to reset color mode.

If your terminal is defined to have extended color and there is no color display, you must use the PA1 key to clear the terminal and turn off EPILOG color support.

If color mode is not in effect and you press PA1 instead of the Enter key, EPILOG considers this request as a request to end (END command).

To interrupt a long process, use PA1. For example, if you enter a command that requires an excessive amount of I/O and do not want to wait for it to complete, press PA1 to interrupt the current execution of the command. EPILOG presents any data that is already accumulated; you can then enter other commands.

## Getting help for EPILOG commands

---

Help is available for all EPILOG commands and other selected topics.

Enter HELP (or just H) without any arguments to see a list of commands and topics. Enter HELP commandname or HELP topicname to display the associated help.

When you request help for a function, EPILOG reads the HELP member from the data set allocated to RKANHENU (*thilev.TKOIHELP*) into memory. If the entire text does not fit on your screen, scroll the data forward and backward with the scrolling function keys. For more information about the scrolling function keys, see [“Scrolling” on page 5](#).

You can enter the HELP command at any time, even while you have the output of a DISPLAY command on the screen. When you finish viewing the HELP member, press **Enter** to return to the display.

You can also request help by typing the command or topic name on the input line, and pressing F1/13 instead of Enter. Whatever is on the input line is appended to the HELP command.

## Chapter 5. EPILOG system navigator

You can use the EPILOG system navigator to scan long intervals. You can also select a single interval, a detailed display, or a resource display.

To learn how to use the system navigator, follow these examples:

- “[Selecting a single interval in the EPILOG system navigator](#)” on page 19
- “[Viewing a detailed report in the EPILOG system navigator](#)” on page 20
- “[Viewing resource panels in the EPILOG system navigator](#)” on page 20

### Selecting a single interval in the EPILOG system navigator

You can see a report of one of the intervals.

First, generate the Transaction Group 1 summary display with the COMBINE option for intervals of 1 hour.

```
DIS GRP(1) SUM COMBINE(1H)
```

The resulting output is shown in [Figure 18 on page 19](#).

```
EPILOG/IMS V530 08/29/15 17:07 Mode: PAGE
CMD==>
*****
+=====+
| Transaction Group = 1 |
| Period: 16:00 on 06/29/15 to 03:00 on 06/30/15 |
+-----+
| COMPETING TRANSACTIONS |
+-----+
| DATE START END MAIN_REASON(*) TIME(-) |0_1_2_3_4_5_6_7_8_9_0|
| 06/29 16:00 17:00 Oth DL/I Iwt 23.8 |-----> . . . . . |
| 17:00 18:00 DBP030 11.1 |---> . . . . . |
| 18:00 19:00 CPU in Appl 13.2 |---> . . . . . |
| 19:00 20:00 Oth DL/I Iwt 13.5 |----> . . . . . |
| 20:00 21:00 CPU in IMS 15.2 |----> . . . . . |
| 21:00 22:00 CPU in IMS 19.2 |----> . . . . . |
| 22:00 23:00 CPU in IMS 17.2 |----> . . . . . |
| S 23:00 24:00 Oth DL/I Iwt 33.3 |-----> . . . . . |
| 06/30 00:00 01:00 Oth DL/I Iwt 29.9 |-----> . . . . . |
| 01:00 02:00 DBP067 18.2 |-----> . . . . . |
| 02:00 03:00 CPU in IMS 13.9 |----> . . . . . |
+-----+
| Average (Resp Time 0) .142587 S |
+=====+
```

Figure 18. System navigator—selecting single interval

Enter an S next to the interval with the largest wait, as shown in [Figure 18 on page 19](#) to see all the single intervals that comprise this combined interval (as shown in [Figure 19 on page 20](#)),.

```

EPILOG/IMS V530 08/29/15 17:07 Mode: PAGE D1 LAST FRAME
CMD==>
*****
-----
| Transaction Group = 1
| Period: 23:00 to 24:00 on 06/29/15
|-----
| COMPETING TRANSACTIONS
|-----
| DATE START END MAIN REASON(*) TIME(-) |0S 0.2 0.4 0.6 0.8 10|
|06/29 23:00 23:15 DBP052 50.0|-----=====> . . . . .|
| 23:15 23:30 CPU in IMS 100.0|-----=====>>>>>>>>>>>>>>>>>>|
| 23:30 23:45 INDEXPB 50.0|-----=====> . . . . .|
| 23:45 24:00 Oth DL/I Iwt 100.0|-----=====>>>>>>>>>>>>>>>>>>|
|-----
| Average (Resp Time 0) .465367 S
|-----

```

Figure 19. System navigator—single interval display

## Viewing a detailed report in the EPILOG system navigator

You can see a detailed report of one of the intervals.

To see a detailed report of one of the intervals, place a D next to the interval in the single interval display, and press Enter. The output is shown in Figure 20 on page 20.

```

EPILOG/IMS V530 08/29/15 17:08 Mode: PAGE D2 LAST FRAME
CMD==>
*****
-----
| Transaction Group = 2 Symbolic Name = CLASS2
| Period: 23:15 to 23:30 on 06/29/15 Elap = 15:00 M IMSA |
|-----
| RESPONSE TIME DATA
|-----
| Response_Component Avg. Resp. Time Trans. Count Rate (per min.)
| Input Queue .000000 s 0 .00
| Pgm Input Queue .000000 s 0 .00
| Processing .000000 s 0 .00
| Response time 0 .000000 s 0 .00
| Output Queue .000000 s 0 .00
| Response time 1 .000000 s 0 .00
| Input CQS time .000000 s 0 .00
| Output CQS time .000000 s 0 .00
| Local output time .000000 s 0 .00
|-----
| DEGRADATION DATA
|-----
| Competing_State Time % |0 1 2 3 4 5 6 7 8 9 0|
|-----
| Using CPU 100.0|-----=====>>>>>>>>>>>>>>>>>>|
| Using CPU in IMS (100.0)|-----=====>>>>>>>>>>>>>>>>>>|
|-----
| Average (Resp Time 0) 0.00 S
|-----

```

Figure 20. System navigator—detailed display

## Viewing resource panels in the EPILOG system navigator

You can see which resources are using processor resources during an interval.

To see the resources that might be contributing to a state such as **USING CPU IN IMS** during a selected interval, enter an R next to the wait reason in the detailed report. The resulting display consists of a number of resource panels that are automatically associated with this wait reason. Figure 21 on page 21 shows examples.



The resource panels that are automatically displayed for each wait reason can be changed. See AMATRIX in the *IBM OMEGAMON for IMS on z/OS: Historical Component (EPILOG) Reference Manual* for more information.

```

EPILOG/IMS V530 08/29/15 17:10 Mode: PAGE D3 1 of 5 LAST FRAME
CMD==>
*****
+===== General System Information =====+
| Period: 23:15 to 23:30 on 06/29/15 Elap =15:00 M IMSA |
+-----+
| IMS 12.1.0 IMS Restart Date=15.117 IMS Restart Time=16:33:19 |
| MVS SP7.1.3 Model=2817 Mode=Native |
| IMS TYPE = DBCTL RSR Status = None |
+-----+

```

Figure 21. System navigator—General System Information display

```

+===== SRM Statistics =====+
| Period: 23:15 to 23:30 on 06/29/15 Elap =15:00 M IMSA |
+-----+
| REGION | Rgn | CPU | I/O | MSO | Total | HUIC | I/O |
| | Type | Srv unts | Srv Unts | Srv Unts | Srv Unts | | per sec |
+-----+
| DLIDBC | CTL | 61K | 129K | 33K | 223K | 255 | 14.0 |
| DLIDBRC | DBRC | 0 | 0 | 0 | 0 | 254 | .0 |
| DLISAS | DLS | 23K | 65K | 263K | 352K | 254 | 7.1 |
+-----+
| PMSACICS | | 904K | 302K | 10M | 12M | 254 | 32.7 |
| PMSACICS | | 904K | 302K | 10M | 12M | 254 | 32.7 |
| . | . | . | . | . | . | . | .2 |
| . | . | . | . | . | . | . | .2 |
| . | . | . | . | . | . | . | .2 |
| PNPSCICS | | 469K | 7360 | 6M | 6M | 254 | 1.6 |
| | | | | | | | |
+-----+
| TOTAL | | 7M | 768K | 69M | 77M | | 81.5 |
| DEPENDENT | | | | | | | |
+-----+
| TOTAL | | 7M | 963K | 69M | 77M | | 102.6 |
+-----+
+===== CPU Activity =====+
| Period: 23:15 to 23:30 on 06/29/15 Elap =15:00 M IMSA |
+-----+
| Region | Type | TCB | SRB | Total | Region | Type | TCB | SRB | Total |
+-----+
| DLIDBC | CTL | .7 % | .2 % | .9 % | PSRVCICS | | 1.0 % | .0 % | 1.0 % |
| DLIDBRC | DBRC | .0 % | .0 % | .0 % | PSRVCICS | | 1.0 % | .0 % | 1.0 % |
| . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . |
+-----+
| PHE02J01 | BMP | .0 % | .0 % | .0 % | PUP21J02 | BMP | .2 % | .0 % | .2 % |
| PPC13J20 | BMP | .4 % | .0 % | .4 % |
+-----+

```

Figure 22. System navigator—SRM Statistics display



---

## Chapter 6. Troubleshooting EPILOG error messages

You might occasionally see error messages while you use EPILOG.

The following is a list of common error messages, along with some suggestions for helping you find the cause of the message.

- UNBALANCED QUOTES OR PARENTHESES
  - Is the entire string on one input line?
  - Is it missing a beginning or ending quotation?
  - Is it missing a left or right parenthesis?
- END OF INPUT, CONTINUATION EXPECTED
  - Did you enter a hyphen (b-b) at the end of the last input line?
- RESOURCE AND WORKLOAD TYPES ARE MUTUALLY EXCLUSIVE
  - Did you specify SUMMARY in the same command as a resource?
  - Did you specify a workload, such as transaction group, in the same command as a resource?
- INVALID KEYWORD
  - Did you spell the keyword correctly?
  - Did you enter the keyword in the **CMD** field?



# Accessibility

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Accessibility features help users with physical disabilities, such as restricted mobility or limited vision, to use software products successfully. OMEGAMON monitoring products support several user interfaces. Product functionality and accessibility features vary according to the interface.

The major accessibility features in this product enable users in the following ways:

- Use assistive technologies, such as screen-reader software and digital speech synthesizer, to hear what is displayed on the screen. Consult the product documentation of the assistive technology for details on using those technologies with this product.
- Operate specific or equivalent features using only the keyboard.
- Magnify what is displayed on the screen.

In addition, the product documentation was modified to include the following features to aid accessibility:

- All documentation is available in both HTML and convertible PDF formats to give the maximum opportunity for users to apply screen-reader software.
- All images in the documentation are provided with alternative text so that users with vision impairments can understand the contents of the images.

Some content presented in IBM Documentation might not yet be in a format that a screen reader can process. If you need help, contact [ibmkc@us.ibm.com](mailto:ibmkc@us.ibm.com).

## Interface information

The Tivoli® Enterprise Portal interface offers the greatest range of functionality, but is not entirely accessible. The OMEGAMON enhanced 3270 user interface offers more limited functionality, but is entirely accessible. (The enhanced 3270 user interface supports all the accessibility features supported by your emulator. If you are using IBM Personal Communications, you can find information about its accessibility features in the [Using Emulator Sessions](#) topic. If you are using a third-party emulator, see the documentation for that product for accessibility information.)

The OMEGAMON ("classic") interface uses an ISPF style interface. Standard and custom PF Key settings, menu options, and command-line interface options allow for short cuts to commonly viewed screens. While basic customization options allow for highlights and other eye-catcher techniques to be added to the interface, the customization options are limited.

## Related accessibility information

Some content presented in IBM Documentation might not yet be in a format that a screen reader can process. If you need help, contact [ibmkc@us.ibm.com](mailto:ibmkc@us.ibm.com).

## IBM and accessibility

See the [IBM Human Ability and Accessibility Center](#) for more information about the commitment that IBM has to accessibility.



## Support information

---

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

### **Online**

Go to the IBM Software Support site at <http://www.ibm.com/software/support/probsub.html> and follow the instructions.

### **Troubleshooting Guide**

For more information about resolving problems, see the product's Troubleshooting Guide.





## Notices

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