

# STROBE MVS CICS Feature

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Release 3.0



**COMPUWARE®**

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## Summary of Changes

This section discusses the changes to the STROBE CICS Feature from STROBE MVS for Sysplex Release 2.5.0 to Release 3.0.

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### Changes to the STROBE CICS Feature

The STROBE CICS Feature has one change for STROBE MVS for Sysplex Release 3.0.

- The Performance Profile now provides Region Level Information reporting by default instead of the CICS Performance Supplement.

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### Changes to this Manual

The CICS API and non-API Service Reports will now display Java data if Java activity is detected during the measurement session. Examples and explanations of these reports are contained in Chapter 4. You must have the Java Feature installed to see Java report information.



# Introduction

This manual describes measurement concepts applicable to and specific data made available by the STROBE CICS Feature of the STROBE MVS Application Performance Measurement System. The STROBE CICS Feature augments the basic functions provided by STROBE.

The STROBE MVS Application Performance Measurement System and the STROBE CICS Feature are products designed for use with IBM MVS/ESA, IBM OS/390, and IBM z/OS systems. The STROBE CICS Feature is designed for use with IBM Customer Information Control System (CICS) and the following product releases:

- IBM CICS Transaction Server for OS/390 Release 2, V2R0 program number 5697-E93
- IBM CICS Transaction Server for OS/390 Release 1.3, V5R3 program number 5655-147
- IBM CICS Transaction Server for OS/390 Release 1.2, V5R2 program number 5655-147
- IBM CICS Transaction Server for OS/390 Release 1, V5R1 program number 5655-147
- V4R1 program number 5655-018 (CICS/ESA)
- V3R1, V3R2, V3R3 program number 5685-083 (CICS/ESA)
- V2R1 program number 5665-403 (CICS/MVS)
- V2R1 program number 5740-XX1 (CICS/OS/VS)

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## How This Manual Is Organized

Chapter 1, “Overview” presents an overview of the STROBE CICS Feature.

Chapter 2, “Using the STROBE CICS Feature” explains how to measure a CICS region and how to produce the Performance Profile.

Chapter 3, “The STROBE Performance Profile for a CICS System” describes how to interpret a STROBE Performance Profile generated from a measurement of the CICS region handling the application and how to interpret a STROBE Performance Profile when an application makes frequent use of system services in a CICS region.

Chapter 4, “The STROBE CICS Transaction Profile” explains how to interpret a STROBE CICS Transaction Profile.

Chapter 5, “Identifying Transaction Suspend by Class in a CICS System” explains how to identify resource classes cause suspend time in a CICS region.

Appendix A, “The STROBE CICS Performance Supplement” describes the STROBE CICS Transaction Profile including the report fields and examples of the reports.

Appendix B, “The CICS Transaction Profile” describes the STROBE CICS Performance Supplement including the report fields and examples of the reports.

Appendix C, “Terminal Types” lists the types of terminals that, if associated with a transaction, will cause STROBE to interpret a transaction as an interactive transaction or an output-only transaction.

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## How to Use This Manual

You should read Chapter 1, “Overview” and Chapter 2, “Using the STROBE CICS Feature” before submitting a measurement request. Read Chapter 3, “The STROBE Performance Profile for a CICS System” if you are using a CICS Performance Supplement to analyze the performance of a CICS region. Read Chapter 4, “The STROBE CICS Transaction Profile” if you are using a CICS Transaction Profile to analyze the performance of transactions in a CICS region. Read Chapter 5, “Identifying Transaction Suspend by Class in a CICS System” to identify transaction suspend by CICS resource. For a detailed description of the fields contained in the STROBE CICS Transaction Profile and Performance Supplement reports, read Appendix A, “The STROBE CICS Performance Supplement” and Appendix B, “The CICS Transaction Profile”.

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## The STROBE Library

The *STROBE* base product manuals include:

- *STROBE MVS Concepts and Facilities*, document number CWSTGX3A  
*STROBE MVS Concepts and Facilities* explains how to decide which programs and online regions to measure, when to measure them, and how to interpret the reports in the *STROBE* Performance Profile.
- *STROBE MVS Messages*, document number CWSTXM3A  
*STROBE MVS Messages* lists all messages and abnormal termination (ABEND) codes, describes how to interpret them, and in many cases suggests a corrective action.
- *STROBE MVS System Programmer's Guide*, document number CWSTXI3A  
The *STROBE MVS System Programmer's Guide* explains how to install and maintain *STROBE*.
- *STROBE MVS User's Guide*, document number CWSTUX3A and the *STROBE MVS User's Guide with Advanced Session Management*, document number CWSTUA3A  
The *STROBE MVS User's Guide* explains how to use *STROBE* to measure application performance. The *STROBE MVS User's Guide with Advanced Session Management* explains how to use *STROBE* with the *STROBE* Advanced Session Management Feature to measure application performance. Users who have the *STROBE* Advanced Session Management Feature will use this manual rather than the *STROBE MVS User's Guide*.
- *STROBE MVS Application Performance Measurement System Quick Reference*  
The *STROBE MVS Application Performance Measurement System Quick Reference* is a convenient reference for how to use *STROBE* and for interpreting the *STROBE* Performance Profile.

### STROBE Feature Manuals

These manuals describe the optional features of the *STROBE* MVS Application Performance Measurement System. Each manual describes measurement concepts applicable to and specific data made available by the feature.

- *STROBE MVS User's Guide with Advanced Session Management*, document number CWSTUA3A
- *STROBE ADABAS/NATURAL Feature*, document number CWSTUN3A
- *STROBE CA-IDMS Feature*, document number CWSTUR3A
- *STROBE CICS Feature*, document number CWSTUC3A
- *STROBE COOL:Gen Feature*, document number CWSTUG3A

- *STROBE CSP Feature*, document number CWSTUP3A
- *STROBE DB2 Feature*, document number CWSTUD3A
- *STROBE IMS Feature*, document number CWSTUI3A
- *STROBE Interface Feature*, document number CWSTUF3A
- *STROBE Java Feature*, document number CWSTUJ3A
- *STROBE MQSeries Feature*, document number CWSTUM3A
- *STROBE UNIX System Services Feature*, document number CWSTUU3A

## Online Documentation

*STROBE* manuals are available in HTML, Adobe Acrobat PDF format, and IBM BookManager format, on CD-ROM and at Compuware's technical support Web site at <http://frontline.compuware.com>.

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## Online Help

*STROBE* products provide the following online information:

- *STROBE/ISPF Online Tutorials*, Option T from the *STROBE/ISPF STROBE OPTIONS* menu
- *STROBE/ISPF Online Message Facility*, Option M from the *STROBE/ISPF STROBE OPTIONS* menu

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## Other Compuware Application Performance Management Products

The following products and features work in conjunction with the *STROBE MVS* Application Performance Measurement System. These tools extend the benefits of application performance management (APM).

### iSTROBE

iSTROBE enables you to view and analyze *STROBE* Performance Profile data on a workstation using a standard Web browser. Easy to install and easy to use, iSTROBE guides you through the performance analysis process and offers recommendations for improving performance. iSTROBE simplifies the performance analysis of applications that you measure with *STROBE*. For more information on iSTROBE, see the *iSTROBE Getting Started Guide*.

### SQL Analysis Feature

The SQL Analysis Feature works in conjunction with *STROBE* and iSTROBE or APMpower to supply access path analyses and database and SQL coding recommendations for DB2 applications measured by *STROBE*. The SQL Analysis Feature pinpoints the most resource-consuming static or dynamic SQL statements, explains why these statements might be inefficient, and provides recommendations to improve the performance of the DB2 application. For more information on the SQL Analysis Feature, see the *STROBE STROBE MVS User's Guide* or the *STROBE STROBE MVS User's Guide with Advanced Session Management*.

### APMpower

The APMpower Application Performance Analysis System extends the benefits of *STROBE* to application developers who use workstations to develop, test, and maintain MVS

applications. Developers employ the APMpower graphical user interface and advanced analytical aids to navigate the Performance Profile, analyze and improve application performance, and share performance knowledge across the IS organization. For more information about APMpower, see the APMpower documentation.

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## Compuware APM Technical Support

For North American customers, for technical support, please contact the Technical Support department by telephone at (800) 585-2802 or (617) 661-3020, by fax at (617) 498-4010, or by e-mail at [strobe-sup@compuware.com](mailto:strobe-sup@compuware.com).

To access online technical support, visit Compuware's FrontLine page on the World Wide Web at <http://frontline.compuware.com> and select the product "STROBE and APMpower."

For other international customers, please contact your local Compuware office or STROBE supplier.

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## Compuware APM Training

Compuware's Education Resources Group offers a range of training options for organizations that use STROBE, iSTROBE, and APMpower. To arrange Application Performance Management training, please contact Compuware at 1-800-835-3190 or visit Compuware's Education Resources Group at <http://www.compuware.com/training>

For other international customers, please contact your local Compuware office or STROBE supplier for a complete list of APM Training offerings.

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## Compuware APM Service Offerings

For North American customers, for information about current service offerings, please contact your local Compuware sales office or call Compuware Corporate Headquarters at 1-800-COMPUWARE (266-7892) or visit Compuware's APM Product page on the World Wide Web at <http://www.compuware.com/products/strobe>.

For other international customers, please contact your local Compuware office or STROBE supplier for a complete list of Services offerings.

## APM Installation Assurance

The APM Installation Assurance service assists you in planning for, installing, customizing and using APM products. The service will help you maximize the value and benefits derived from the APM product family.

Consulting engineers work closely with your IT personnel to understand your operating environment and your organization's APM goals. The engineer will assist you in developing a customization and installation plan for STROBE, iSTROBE, and APMpower. The engineer will oversee the installation process and verify product readiness. The engineer will also help set up measurement request schedules, request groups, history records, AutoSTROBE measurement requests, and will verify the installation of the SQL Analysis Feature.

With APM Installation Assurance services, your organization can immediately maximize the value received from your investment in the APM product family. You will also benefit from a fully customized installation that will enhance the product functionality and increase the automation aspects of your APM initiatives.

## Application Performance Management Consulting

The Application Performance Management (APM) Consulting services assist you in identifying and resolving specific performance problems in your OS/390 business-critical applications.

Using STROBE, iSTROBE, and APMpower, consulting engineers work closely with your IT personnel to measure an application's performance, identify performance improvement opportunities and make recommendations for implementing solutions.

With APM Consulting services, your organization cannot only resolve problems quickly and effectively, but also gain the skills necessary to prevent application performance degradation in the future.

## Application Performance Assessment

The Application Performance Assessment (APA) service assists you in achieving a higher level of performance for your OS/390 business-critical applications.

Using STROBE, iSTROBE, and APMpower, consulting engineers work closely with your IT personnel to evaluate the efficiency of business-critical applications, identify opportunities for improving performance and document the potential savings that can result from implementing recommended solutions.

With APA services, you cannot only improve application performance quickly and effectively, but also gain the knowledge and skills necessary to implement and sustain a process-oriented application performance management (APM) program.



# Chapter 1.

## Overview

STROBE is a product that determines where and how time is spent in an online subsystem or batch processing program. The STROBE CICS Feature extends the functions of the basic STROBE product by providing several report options to help you identify performance improvement opportunities in a CICS region. These reports will help you to:

- target, identify, and understand performance problems for a specific transaction or a set of transactions
- identify bottlenecks within a specific CICS region caused by transactions waiting for a resource
- evaluate the impact of new and existing applications on your CICS region
- develop standards for using CICS services
- make your CICS applications more efficient in using available CPU and I/O resources

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## Benefits of the STROBE CICS Feature

The STROBE CICS Feature provides three separate options for identifying performance improvement opportunities in a CICS region depending on the type of reports you have requested.

- The **STROBE CICS Performance Supplement** focuses on CPU use associated with a transaction.
- The **STROBE CICS Transaction Profile** provides the most robust, detailed view of transaction performance, including delay and suspend time.
- The **CICS Region-Level reports** help you identify the CICS resources that are the cause of transaction suspend or dispatch delay.

When you analyze a Performance Profile for the CICS environment, select the CICS Performance Supplement, the CICS Transaction Profile, or the CICS Region-Level reports, depending on the focus of your analysis. These reports provide the data that you need to focus on specific CICS application performance problems. Refer to the following table to determine which approach best suits your needs.

Focus	Suggested Approach
<b>CPU use</b>	Measure the region and request that STROBE collect CICS Performance Supplement data. Review the Transaction Summary and identify the transactions responsible for the most CPU use. Measure the region again requesting a Transaction Profile for the transactions in which you are interested.
<b>Response time or wait time</b>	Measure the region and request that STROBE collect Region Level data. Review the Transaction Summary, and determine which transactions are being delayed or suspended. If appropriate, measure again specifying a Transaction Profile for suspect transactions. Review the Region-Level reports and determine which resources are responsible for the high suspend or delay.

**Undecided** Measure the region and request that STROBE collect only Region Level data. Review the Transaction Summary to determine if transactions have high CPU use or have high suspend and delay times. If high CPU use is a problem, measure the region again, requesting a Transaction Profile for the transactions in which you are interested. Review the Region Level reports to see if a particular resource is causing high suspend or delay times.

The following sections describe the different sets of reports that are available to you with the STROBE CICS Feature.

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## The STROBE CICS Performance Supplement

By attributing CPU activity to transactions by transaction identifier, the CICS Performance Supplement details the causes of transaction CPU use and makes it possible for you to determine the total processing burden imposed by each transaction defined to CICS. Analyzing resource usage by the program components that process each type of transaction can help focus your performance improvement efforts. Request the CICS Performance Supplement when you want to identify the CPU use associated with the transactions in a CICS region or if you want to examine CICS-generated statistics.

The CICS Performance Supplement includes the following reports:

- **Time Distribution of Transaction Activity Level** shows, for the duration of the measurement session, the interactive transaction load placed on the CICS region and the level of performance of CICS under the transaction load. This report has four subreports: Time Distribution of Transaction Arrivals, Time Distribution of Transaction Service Time, Time Distribution of Data Base Operations, and Time Distribution of Transaction Inputs, Processing, and Outputs shows.
- **Transaction Activity** shows the processing details for individual transactions and transaction processing programs. It contains the following subreports: Transaction Summary, Transaction Exceptions, Processing Program Statistics, and CPU Usage by Control Section for Transaction *name*.
- **Network Activity** shows the data communication operations that CICS performed during the measurement session to collect transactions and input messages from terminals and to deliver output messages to terminals. It has two subreports: Terminal Statistics and Terminal Exceptions.
- **Input-Output Activity** shows the input and output activity for all CICS files that were active during the measurement session. It has four subreports: Summary of Input-Output Operations, DataBase Operations, Number of Output Operations to Transient Data Queues, and Journal Statistics.
- **Configuration Parameters and System-Wide Statistics** shows several counts that apply to the entire CICS region and the values of several CICS parameters that affect the performance of the region. It has seven subreports: Task Statistics, Classed Tasks Statistics, Storage Statistics, VTAM Statistics, Temporary Storage Statistics, Transient Data Statistics—Buffer and String Statistics, and Miscellaneous Statistics.

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## The STROBE CICS Transaction Profile

With the STROBE CICS Feature, you can obtain unified, detailed information on all aspects of performance for specific transactions or groups of transactions. This information is grouped in a series of reports called the STROBE CICS Transaction Profile. You must be measuring CICS Version 4 Release 1 and later for STROBE to produce a CICS Transaction Profile.

**Note:** This option only appears on the panel if the STROBE CICS Feature with the CICS Transaction Profile option is installed at your site.

Although the CICS Performance Supplement details the causes of transaction CPU use, it provides limited information on what causes a transaction to be suspended. The STROBE CICS Transaction Profile reports the average time transactions are delayed due to system dispatching or being suspended. When a transaction is suspended, STROBE identifies the command and resource for which the transaction is waiting. For example, if a transaction is waiting on a read to a VSAM file, STROBE reports the program and offset issuing the read, the DD being read, and the resource type causing the wait.

The Transaction Summary report provides high-level information for all user, mirror, system, or STROBE-generated pseudo-transactions. For user and mirror transactions, it attributes mean service time to the following categories: dispatch delay (the transaction is ready to execute but waiting to be dispatched), suspend (the transaction is waiting for a resource), and execution (the transaction is running). For user and mirror transactions, it also indicates whether detailed transaction information has been provided. It provides execution counts for user transactions, mirror transactions, and most system transactions. It shows CPU consumption for all transactions.

The Transaction subreports detail the performance of a single transaction. These reports provide a breakdown of transaction service time and wait time (both SUSPEND and DISPATCH DELAY), and attribute observed activity back to the CICS API or subsystem API. For each transaction detailed in the Transaction Summary, there are three subreports:

- **CICS API Service Time** shows, for a transaction, the subsystem API commands that STROBE identified within a module and control section. The report shows the command, the resource that the command is targeting, the DBRM statement number (where applicable), the offset from which the command was issued, and the mean service time, which is attributed to suspended and executing states. If you have the STROBE DB2, STROBE IMS, or STROBE MQSeries Features installed, STROBE will attribute the activity back to the command in the program that issued the subsystem call.
- **CICS API Service Time Detail** provides further detail for the information provided in the CICS API Service Time report, breaking down suspend and execution time into more discrete components. This subreport also provides function descriptor (brief explanations of the resource targeted by the command).
- **CICS Non API Service Time** accounts for service time that is not directly related to API commands. For resource type and resource name, this report shows the dispatch delay and suspend time. For modules and control sections, it shows execution time.

---

## CICS Region-Level Reports

With the STROBE CICS Feature, you can obtain an aggregate view of wait time in a CICS address space that helps you to identify system-level bottlenecks within a CICS region. This information is grouped into two reports called the CICS Region-Level reports.

The CICS Region-Level reports identify transaction wait time as time spent in either the SUSPEND or DISPATCH DELAY states. A transaction that is in the SUSPEND state is usually waiting for the availability of a resource (such as storage) before it is able to execute. A transaction in the DISPATCH DELAY state is ready to execute, but has not yet been allocated time on a processor. For DISPATCH DELAY, the source of the delay may be either MVS dispatcher or the CICS dispatcher. The CICS Region-Level reports provide an overall picture of suspend and dispatch delay time across an entire CICS address space. There are two Region-Level reports:

- **Region Suspend by Class** provides the percentage of region suspend time and the average transaction suspend time for the various categories of suspend reasons.

- **Region Suspend by Resource Within Class** provides for each of the categories of suspend reasons, the resource type, the resource name, a description of the resource type that was suspended, the percentage of the region suspend time, and the average suspend time for a transaction.

## Chapter 2.

# Using the STROBE CICS Feature

This chapter describes how to invoke the STROBE CICS Feature, collect STROBE CICS Transaction Profile information, and produce the STROBE CICS Transaction Profile and the CICS Performance Supplement.

With the STROBE CICS Feature, you can also request that STROBE collect Transaction Profile data or Performance Supplement data. Transaction Profile data includes all states of transaction activity for one transaction or a group of transactions, as well as region-level activity. Also available is the aggregate of the wait time for the address space during the measurement session. Performance Supplement data includes time distribution of transaction activity, transaction activity, network activity, I/O activity, and configuration parameters and system-wide statistics.

---

## Measuring a CICS Region

If your installation uses the standard IBM-supplied name (beginning with the prefix “DFHSIP”) for the load module invoked from the EXEC statement that initializes the CICS job step, STROBE will automatically invoke the STROBE CICS Feature whenever you measure a CICS region. However, you can also request that the STROBE CICS Feature collect transaction-level and region-level performance data instead of the standard CICS performance data.

**Note:** The transaction-level and region-level performance data is only available if the STROBE CICS Transaction Profile option is installed at your site.

You can find detailed instructions for submitting measurement requests in the STROBE/ISPF Online Tutorials and in the *STROBE MVS User's Guide* or the *STROBE MVS User's Guide with Advanced Session Management*.

To measure a CICS region, follow these steps:

1. Select Option 1 from the STROBE OPTIONS menu. STROBE/ISPF displays the STROBE - ADD ACTIVE REQUEST panel (Figure 2-1 on page 2-2)

Figure 2-1. STROBE - ADD ACTIVE REQUEST Panel

```

----- STROBE - ADD ACTIVE REQUEST -----
COMMAND ==>

JOBNAME ==> CICSTEST      (Jobname or clear to list active jobs)

SYSTEM  ==> TLP02        (System or clear to list available systems)

AUTO PROFILE CREATION  ==> Y (Y or N; Use Y only when overriding defaults)

MEASUREMENT SESSION INFORMATION:
  SESSION DURATION      ==> 1      (Estimated time in minutes)
  TARGET SAMPLE SIZE    ==> 10000  (Target number of samples)

TSO USERID TO NOTIFY   ==> WPAFXC  (Notify when session completes)

SAMPLE DATA SET INFORMATION:
  DATA SET NAME PREFIX ==> ZZ
  UNIT NAME             ==> WPAANY  VOLUME ==>          DISP ==> CATLG (CATLG OR KEEP)

SELECT ADDITIONAL PARAMETERS: (Y or N; Use Y only when overriding defaults)
  DATA COLLECTORS      ==> N      MODULE MAPPING DATA      ==> N
  SESSION MANAGEMENT   ==> N      REQUEST RETENTION          ==> N
  OTHER PARAMETERS     ==> N

```

2. Enter the name of the CICS region in the JOBNAME field.
3. Specify the target system in the SYSTEM field or clear this field to select from a list of systems.
4. Configure the measurement session by specifying
  - how long you want to measure the process in the SESSION DURATION field
  - how many performance samples you want STROBE to take in the TARGET SAMPLE SIZE field
  - the TSO user ID in the TSO USER ID TO NOTIFY field. STROBE notifies this user ID when the measurement request is complete.
5. Specify the sample data set information in the SAMPLE DATA SET INFORMATION fields.
6. Specify a “Y” in the DATA COLLECTORS field and press **Enter**. The STROBE - DATA COLLECTORS panel appears (Figure 2-2 on page 2-3).

Figure 2-2. STROBE - DATA COLLECTORS Panel

```

----- STROBE - DATA COLLECTORS -----
COMMAND ==>

OVERRIDE DATA COLLECTOR DEFAULTS FOR JOBNAME: WPAJEA
DATA COLLECTORS: (Y or N; Y adds to and N removes from your system defaults)
ADABAS      ==> ADA3GL      ==> C      ==>
CICS        ==> Y COBOL      ==> CSP      ==>
DB2         ==> IDMS        ==> IDMS BATCH DML ==>
IEF         ==> IMS         ==> JAVA      ==>
MQSERIES    ==> NATURAL     ==> PL/I      ==>
SVC         ==>

CICS Options:
Collect Region Data ==> Y OR Produce Performance Supplement ==>
Detail Transaction (TRAN or TR*): Collect Terminal Activity ==>
=> TX1 =>TN* => =>

CAPTURE Options: (Y or N; default is Y)
DB2 ==> IMS ==>

MQ Common User Module ==> Always use as default (Y/N) ==>

OTHER DATA COLLECTORS:
PROGRAM NAME ==> ==> ==>

```

7. Specify a “Y” in the CICS field of the DATA COLLECTORS section of the panel.

8. Perform one or both of the following steps:

- To request detailed measurement data for a specific transaction or a set of transactions, enter up to five CICS transaction names in the DETAIL TRANSACTION field. Note that this field is case-sensitive.

**Note:** You can use a wildcard character (“\*”) after a string of one or more characters in the DETAIL TRANSACTION field to measure transactions that meet the specified search criteria. The wildcard character cannot be inserted between two alphanumeric sequences.

- To request detailed measurement data for a CICS region, enter a “Y” in the COLLECT REGION DATA field.

**Note:** By default, the STROBE CICS Feature collects region-level data if any transaction names have been specified in the DETAIL TRANSACTION field. To suppress region-level data collection, enter an “N” in the COLLECT REGION DATA field. Also, if you want to exclude any system transactions from being measured by STROBE, you can specify which ones through a system task table. See Chapter 4 of the *STROBE MVS System Programmer’s Guide* for information about making these specifications.

- To request the CICS Performance Supplement, enter a “Y” in the PRODUCE PERFORMANCE SUPPLEMENT field. Additionally, enter a “Y” in the COLLECT TERMINAL ACTIVITY field to request that STROBE collect data on terminal activity.

**Note:** The CICS Performance Supplement option cannot be used in conjunction with the Transaction Profile option or the Region-Level option.

## Controlling the Size of STROBE CICS Feature Data Storage Areas

If you request performance data for a transaction, or if you request region-level data, the STROBE CICS Feature uses a buffer and a data space to collect and compress CICS statistics. For very active CICS regions, you may need to increase the size of the buffer STROBE uses to store transaction count and service time data during the measurement

session, or the size of the data space STROBE uses to compress the data. The default for the buffer is 34 KB, and the default for the data space is 2048 KB.

**Note:** You cannot specify CICS measurement information on the STROBE - DATA COLLECTORS panel and on the STROBE - OTHER PARAMETERS panel for the same measurement request. Therefore, if you want to change the size of the data storage areas, you must enter CICS data collection information on the STROBE - OTHER PARAMETERS panel only. Refer to Chapter 5 in the *STROBE MVS User's Guide* or to Chapter 8 in the *STROBE MVS User's Guide with Advanced Session Management* for complete details on submitting measurement requests with the STROBE Command Language.

To change the size of the data storage areas, follow these steps:

1. Enter "Y" in the OTHER PARAMETERS field and press **Enter**. STROBE/ISPF displays the STROBE - OTHER PARAMETERS panel (Figure 2-3).

**Figure 2-3.** STROBE - OTHER PARAMETERS Panel

```

----- STROBE - OTHER PARAMETERS -----
COMMAND ==>

OTHER PARAMETERS FOR JOBNAME :   SAJVSTST

OTHER PARAMETERS ==> IMS=(CAPTBUFF=100)

```

2. In the OTHER PARAMETERS field, specify the sizes for the buffer and data space, respectively, using the following parameters:

CICS=CAPTBUFF=*nnnn* (where *nnnn* is a value from 34 to 1000)

CICS=DSSIZE=*nnnn* (where *nnnn* is a value from 100 to 3072)

For example:

```
CICS=(RLI,DSSIZE=3072,CAPTBUFF=1000,TRAN=(TX1,TN*))
```

**Note:** Do not set DSSIZE to a value less than the value specified for CAPTBUFF. Also, you must include the RLI or TRAN parameter with the specifications for DSSIZE and CAPTBUFF.

3. Press **Enter** to submit the measurement request.

---

## Producing a Performance Profile

You can find detailed information about creating a STROBE Performance Profile in the STROBE/ISPF Online Tutorials, the *STROBE MVS User's Guide*, or the *STROBE MVS User's Guide with Advanced Session Management*.

**Note:** A Performance Profile contains a CICS Performance Supplement or a Transaction Profile (focusing on region-level data or transaction-level data), depending on what you specified when you submitted the measurement request.

1. Select Option 4 from the STROBE OPTIONS menu. STROBE/ISPF displays the STROBE - PRODUCE A PERFORMANCE PROFILE panel.

2. Specify a processing option, “B” for background (a batch job step) or “F” for foreground, by entering the appropriate option code in the OPTION field.
3. Enter the name of the sample data set in the SAMPLE DATA SET NAME field. If you do not know the name of the sample data set, clear the SAMPLE DATA SET NAME field and press **Enter**. STROBE/ISPF displays a list of all available sample data sets.
4. Enter “Y” in the TAILOR REPORTS field. STROBE/ISPF displays the STROBE - TAILOR REPORTS panel (Figure 2-4).

**Figure 2-4.** STROBE - TAILOR REPORTS Panel

```

----- STROBE - TAILOR REPORTS -----
COMMAND ==>

WAIT TIME BY MODULE -- Show location of wait ==> (Specify Y)
----- Report ----- Compress below OR Suppress (Specify Y)
PROGRAM USAGE BY PROCEDURE ==> % ==>
DASD USAGE BY CYLINDER ==> 02.0 % ==>
TRANSACTION USAGE BY CONTROL SECTION ==> % ==>
CICS TRANSACTION PROFILE ==> 00.50 sec ==>
CICS REGION LEVEL ==> 00.10 sec ==>
MQSERIES CALLS ==> % ==>
ATTRIBUTION Reports ==> % ==>
  Suppress reports for:
    C ==> CICS ==> COBOL ==>
    CSP ==> DB2 ==> DL/I ==>
    IDMS ==> IEF ==> JAVA ==>
    MQSERIES ==> PL/I ==> SVC ==>
PROGRAM SECTION USAGE SUMMARY Display inactive ==>
TIME and RESOURCE DEMAND DISTRIBUTION
  Combine tasks ==> Display all tasks ==> Display all DDs ==>

CICS TRANSACTION PROFILE FILTERS => TXN* => => => =>
  Suppress non-CICS TRANSACTION REPORTS ==> Y (Specify Y)
USE DATE AND TIME FORMAT FROM PARMLIB ==>

```

5. Customize the level of detail contained in the Performance Profile by selecting the appropriate options, as described in “Controlling the Level of Detail in the CICS Transaction Profile”.
6. Press **Enter** to produce the Performance Profile.

## Controlling the Level of Detail in the CICS Transaction Profile

You can compress or expand the level of report detail in the CICS Transaction Profile and the CICS Region-Level reports, as well as control which reports are produced, by specifying certain options when you create the Performance Profile. These options are described in the following sections.

### Compressing Transaction Detail Lines That do not Exceed a Specified Threshold

You can specify a minimum amount of time that must be observed for information associated with a transaction to appear as an individual line on the report. If the threshold is not reached, the information (a related command, class, or resource) is condensed into a single line under the pseudo-section called .COMPRES. The line is presented as the last line in the report.

To compress information associated with transactions that do not exceed a specified threshold, specify the minimum time, in seconds, in the appropriate field of the Compress below column on the STROBE - TAILOR REPORTS panel (Figure 2-4), as described below.

- To compress the CICS Region-Level reports, specify a baseline threshold between 00.01 and 99.99 seconds (the default is 00.01) in the Compress below column of the CICS REGION LEVEL field.

- For the Region Suspend by Class report, this option compresses all suspend category classes with average suspend times that do not meet the threshold.
- For the Region Suspend by Resource within Class report, this option suppresses all resources with average suspend times that do not meet the threshold. If none of the resources within a class meets the specified threshold, the entire class is suppressed. If none of the resources meets the specified threshold, the entire report is suppressed.
- To compress the CICS Transaction Profile reports, specify a baseline threshold between 00.00 and 99.99 seconds (the default is 00.01) in the Compress below column of the CICS TRANSACTION PROFILE field.
  - For the API Service Time subreport, this option compresses all instances of commands with SUSPEND and EXEC mean service times that do not meet the threshold.
  - For the NON-API Service Time subreport, this option compresses all resources, modules, and CSECTs with mean service times that do not meet the threshold.
  - For the API Service Time Detail subreport, this option suppresses all resources, modules, and CSECTs with mean service times that do not meet the threshold. If all instances of a resource do not meet the threshold, the resource is suppressed. If none of the resources meets the specified threshold, the entire report is suppressed.

Press **Enter** to produce the Performance Profile.

## Producing Only STROBE CICS Transaction Profile Reports

To focus your analysis on CICS transactions, you can suppress those reports in the Performance Profile that are not transaction-related, with the exception of the Measurement Session Data report. To suppress these reports, specify a “Y” in the Suppress non-CICS TRANSACTION REPORTS field on the STROBE - TAILOR REPORTS panel (Figure 2-4).

## Producing STROBE CICS Transaction Profile Reports for Specific Transactions

To focus your analysis on a single transaction or set of transactions, specify the transaction names on the lines to the right of the CICS TRANSACTION PROFILING FILTERS field on the STROBE - TAILOR REPORTS panel (Figure 2-4). The transactions that you specify must be from the same set of transactions that you requested when you submitted the measurement request. Otherwise STROBE ignores the filter request. You can specify up to five transaction names. The transaction names are case sensitive, can be up to four characters in length, and can contain the wildcard character (\*).

**Note:** You can use a wildcard character (\*) after a string of one or more characters. The wildcard character cannot be inserted between two alphanumeric sequences.

The resulting STROBE CICS Transaction Profile contains only information for the transactions you specified.

## Suppressing the STROBE CICS Transaction Profile Reports

To produce a Performance Profile that does not contain the CICS Transaction Profile or the CICS Region-Level reports, specify a “Y” in the Suppress column to the right of the CICS TRANSACTION PROFILE field or the CICS REGION LEVEL field on the STROBE - TAILOR REPORTS panel (Figure 2-4 on page 2-5).

## Chapter 3.

# The STROBE Performance Profile for a CICS System

This chapter describes a typical CICS application and the base STROBE Performance Profile. The Performance Profile in this chapter includes selected reports from the CICS Performance Supplement. These reports provide a broader range of information about CICS system-level activity than the Transaction Profiling reports. These are examples of situations when the CICS Performance Supplement reports are most helpful:

- The performance of an entire CICS region does not meet your standards and you want to see an overall view of activity within the region.
- One or more CICS transactions is performing inadequately, but you are not sure of their identities.
- You question whether one or more application programs is consuming more CPU time than it should be using.

The STROBE Performance Profile is enhanced through the CICS Performance Supplement by adding a set of reports that shows how specific CICS resources are utilized during the measurement session and a summary that accounts for all transaction activity within a CICS address space.

If you measure a CICS region and STROBE reports low CPU usage, you can obtain information about what is causing wait time by examining the CICS region level wait reports described in Appendix B. If you suspect that one or more specific transactions are displaying poorer than average performance, you should specify their names on the STROBE - DATA COLLECTORS panel as explained in Chapter 1, "Overview", and then use the Transaction Profiling subreports shown in Chapter 2, "Using the STROBE CICS Feature" to see detailed information about what is affecting the transaction's performance.

---

## Analyzing a CICS Performance Profile

The procedure for analyzing a base Performance Profile is outlined in Chapter 3 of *STROBE STROBE MVS Concepts and Facilities*. The procedure involves

- validating measurement session parameters
- identifying critical activities
- analyzing task execution activities
- analyzing file access activities

When you apply the analysis procedure to the CICS environment, you must refer to both the standard Performance Profile reports and the CICS Performance Supplement reports, which provide more data to help you focus on specific CICS application performance problems.

When interpreting your CICS Performance Profile, you can follow the general guidelines provided in this chapter. However, keep in mind that your CICS region probably has its own type of CPU and I/O facility usage inefficiencies.

The Performance Profile described here resulted from an examination of a cost accounting system, which revealed a CICS application with the following characteristics:

- acceptable transaction response time
- excessive CPU usage for its two principal transactions, CDUN and CSRV

- erratic and long response times for transaction BACK

To determine why these conditions exist, a STROBE measurement request was sent to the CICS region where the application was running, and a Performance Profile was generated from the sample data set.

## Validating Measurement Session Parameters

Before you analyze the results of the measurement session, you should verify that STROBE has conducted the session in the environment and under the conditions you intended. You can look at the session parameters in the Measurement Session Data report (Figure 3-1) and the distribution of the workload in the Time Distribution of Transaction Arrivals report (Figure 3-2) to see if the measurement session met your expectations.

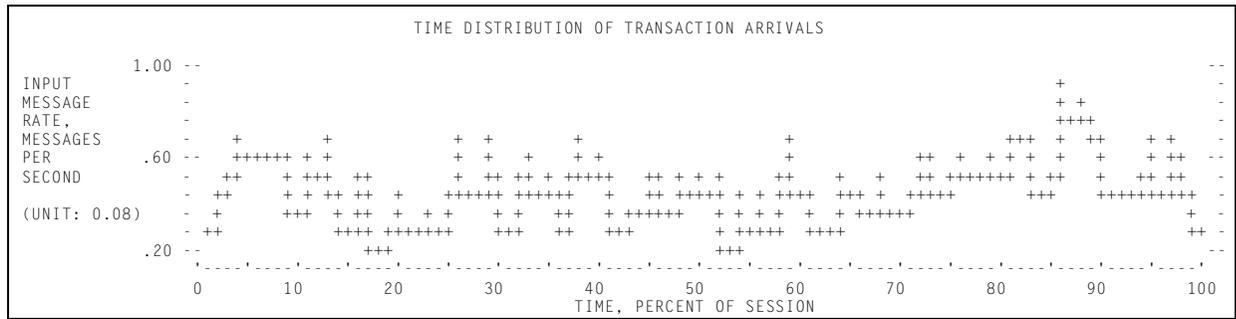
The Measurement Session Data report in this Performance Profile shows that the session was about 50 minutes long, beginning at 10:45 a.m., a period of peak demand for this CICS region. STROBE collected a total of 10,000 samples, adequate to produce statistically valid results. The stretch time is negligible, indicating that there was little CPU contention from higher-priority regions.

Figure 3-1. Measurement Session Data Report

** MEASUREMENT SESSION DATA **		
----- JOB ENVIRONMENT -----	----- MEASUREMENT PARAMETERS -----	----- MEASUREMENT STATISTICS -----
PROGRAM MEASURED - DFHSIP	ESTIMATED SESSION TIME - 45 MIN	CPS TIME PERCENT - 13.90
JOB NAME - CICSPROD	TARGET SAMPLE SIZE - 10,000	WAIT TIME PERCENT - 86.10
JOB NUMBER - STC 1427	REQUEST NUMBER - 26	RUN MARGIN OF ERROR PERCENT - .98
STEP NAME - CICSPRO2	FINAL SESSION ACTION (A)- QUIT	CPU MARGIN OF ERROR PERCENT - .13
DATE OF SESSION - 09/23/99	----- REPORT PARAMETERS -----	TOTAL SAMPLES TAKEN - 10,000
TIME OF SESSION - 10:45:16	REPORT RESOLUTION - 64 BYTES	TOTAL SAMPLES PROCESSED - 10,000
CONDITION CODE - C-0000	SORTSIZE - 999,999	INITIAL SAMPLING RATE - 3.70/SEC
SYSTEM - ESA SP4.2.2	LINES/PAGE - 60	FINAL SAMPLING RATE - 3.70/SEC
DFSMS - 1.1.0	DASD= 1.0% DASDGAP=5	SESSION TIME - 49 MIN 0.78 SEC
SUBSYSTEM - CICS 2.1	DATE FORMAT MM/DD/YY	CPU TIME - 6 MIN 53.95 SEC
CPU MODEL - 3090-400E	TIME FORMAT (24 HOURS) HH:MM:SS	WAIT TIME - 42 MIN 42.35 SEC
SMF/SYSTEM ID - ASYS		STRETCH TIME - 0 MIN 0.00 SEC
REGION SIZE BELOW 16M - 7,104K		SRB TIME - 0 MIN 0.24 SEC
REGION SIZE ABOVE - 32,768K		SERVICE UNITS - 344
PTF LEVEL - 2.3.0.000/000		PAGES IN - 0 OUT- 16
STROBE TAPE NUMBER - 000/S00001		PAGING RATE - 0.01/SEC
SAMPLE DATA SET - SA.CICSPROD.S001D001		EXCPS - 113,803 38.70/SEC

The Time Distribution of Transaction Arrivals Performance Supplement report (Figure 3-2) confirms that the workload was relatively uniform throughout the session and averaged about 30 transactions per minute, which is typical for this CICS region.

Figure 3-2. Time Distribution of Transaction Arrivals Report



Together, the Measurement Session Data report (Figure 3-1 on page 3-2) and the Time Distribution of Transaction Arrivals report (Figure 3-2 on page 3-3) indicate that the contents of this Performance Profile can help you successfully identify the critical activities associated with the problem transactions, and closely analyze the task execution and file access activities that offer the best opportunities for improvement.

## Identifying Critical Activities

After you have determined that the measurement data collected by STROBE contains the information you want to examine, you need to identify which activities occur most often when the CICS application runs. You know that the performance of the transactions CDUN, CSRV, and BACK is not meeting your expectations. Check on their performance first in the Transaction Summary report (Figure 3-3) to determine how much extra CPU time the transactions are consuming.

## Transaction Summary Report

Depending on the type of reporting parameters you set as described in the section “Measuring a CICS Region” on page 2-1, your Performance Profile will contain different types of data in the Transaction Summary report (Figure 3-3). This report example, produced without Transaction Profile data collection, shows the transactions that STROBE found executing during the measurement session. Transactions CDUN and CSRV accounted for far more activity than the other reported transactions. Together, their execution constituted a high percentage of the CPU time used within the CICS region. The CICS Transaction Profile reports described in Chapter 2, “Using the STROBE CICS Feature” allow you to see more detail about what is causing the CPU consumption by CDUN and CSRV.

This report also confirms that response times for transaction BACK are erratic and, at times, too long. The median service time for BACK is under two seconds, but 15% of the time service time averages more than 13 seconds.

**Note:** If STROBE detects that a transaction is operating as a CICS Bridge transaction, -B appears after the transaction name. For more information about transaction types, see “Transaction Activity Reports” on page 3-8.



and system program modules are the heaviest CPU users. The Supplement reports show the processing details for individual transactions and transaction processing programs. The types of reports are:

### Performance Profile reports:

- Program Section Usage Summary report
- Program Usage by Procedure report
- Attribution by CPU Execution Time report

### Performance Supplement reports:

- CPU Usage by Control Section report
- Program Processing Statistics report

Two more reports described in this chapter, the Wait Time by Module report (Figure 3-13 on page 3-14) and the Attribution of CPU Wait Time report (Figure 3-14 on page 3-14), provide some information about wait time incurred by a transaction. Chapter 1, “Overview” explains the STROBE Performance Profile reports that contain detailed information about transaction wait time.

---

## Program Module Reports

The Program Section Usage Summary report (Figure 3-5 on page 3-6) shows CPU usage in all programs including application programs, CICS service modules, and other system service routines. You can use this report to determine which CICS service modules or other modules were responsible for the majority of the CPU usage. The Program Usage by Procedure reports (Figure 3-6 on page 3-7 and Figure 3-7 on page 3-8) detail the CPU usage by user programs and system service modules.

**Note:** The Most Intensively Executed Procedures report highlights the information in the module reports. It lists the ten heaviest users of CPU time and allows you to determine quickly which modules are responsible for the majority of CPU usage. You can see an example of this report in *STROBE MVS Concepts and Facilities*.

### Program Section Usage Summary Report

The Program Section Usage Summary report shows the distribution of CPU time used by each active control section of each active module in the CICS address space. CICS and other system modules are compressed and shown as pseudo-sections under the pseudo-module .SYSTEM. This report helps focus your investigation by showing you whether CICS system modules or user programs are responsible for the greatest CPU activity.

In this example, the CICS system service-modules are responsible for 64.73% of the address space’s total CPU usage. You should examine the Program Usage by Procedure report for the CICS system services modules to determine the specific modules that are being invoked to cause the high CPU activity.

In a typical CICS region, only a few procedures account for most of the execution time. Once you have identified the problem procedures, you can often significantly reduce task execution time with little effort. Sometimes a single procedure within a transaction processing program accounts for significant CPU usage. But more often, you will find that substantial CPU time is spent in CICS service routines. You can often reduce how frequently applications use certain CICS services without affecting the function of the applications.

This Program Section Usage Summary report reveals that CICS routines used 64.7% of all region CPU time. The Transaction Summary report (Figure 3-3 on page 3-4), however, attributes only 0.79% directly to CICS overhead, a proportion that indicates CICS transactions are invoking service functions that use almost 65% of the region CPU time.

These figures indicate CPU usage in the application programs has to be curtailed and the transaction processing programs should use CICS service routines less frequently. The CPU Usage by Control Section reports (Figure 3-8 on page 3-9 and Figure 3-9 on page 3-10) identify the CICS service routines that the transactions use.

Figure 3-5. Program Section Usage Summary Report

\*\* PROGRAM SECTION USAGE SUMMARY \*\*

MODULE NAME	SECTION NAME	16M <, >	SECT SIZE	FUNCTION	CPU TIME SOLO	PERCENT TOTAL	CPU TIME HISTOGRAM	MARGIN OF ERROR - 2.63%
							.00 18.00 36.00 54.00 72.00	
.SYSTEM	.CICS			CICS SYSTEM SERVICES	29.35	64.73	.*****+	
.SYSTEM	.DSA			DYNAMIC STORAGE AREA	.00	.07	.	
.SYSTEM	.SVC			SUPERVISOR CONTROL	.07	.58	.	
.SYSTEM	.VSAM			VIRTUAL STORAGE ACC METH	15.90	23.53	.*****	
.SYSTEM	.VTAM			VIRTUAL TELECOM ACC METH	.07	.07	.	
.SYSTEM	TOTALS			SYSTEM SERVICES	45.39	89.98		
AKNCORRS		<	6976		.00	.07	.	
AKN04001		<	7784		.00	.07	.	
AKN04002		<	10872		.50	.56	.	
AKN16002		<	2288		.00	.18	.	
AKN37001		<	10424		.07	.22	.	
AKN60103		<	10832		.00	.07	.	
AKN61702		<	13024		.07	.07	.	
AKN76001		<	1800		.07	.07	.	
AKN96002		<	10992		.00	.07	.	
AKN99902		<	14000		.07	.07	.	
AKPKMANT		<	47280		.22	.26	.	
AKR63102		<	6584		.14	.43	.	
AKSCNCPK		<	600		.14	.43	.	
COMOPTIM		<	272		.22	.58	.	
COMOPT01		<	4048		.50	.84	.	
COMOPT02	COMOPTII		10178		.00	.07	.	
COMOPT02	COMOPTMI		604		.14	.22	.	
COMOPT02	COMOPTOG		8075		.00	.14	.	
COMOPT02	COMOPTOI		12052		.29	.58	.	
COMOPT02	COMOPTO2		4136		2.16	5.76	.***	
COMOPT02	TOTALS	<	35045		2.59	6.85		
DBVIORTN	.CICS		68	CICS SYSTEM SERVICES	.29	.45	.	
DBVIORTN	DBVIORTN		1924		.43	.52	.	
DBVIORTN	COMPACTF		2626		.00	.07	.	
DBVIORTN	DLDTCT		280		.22	.38	.	
DBVIORTN	GETF		1430		.72	1.19	.	
DBVIORTN	GETNEXTF		589		.43	.42	.	
DBVIORTN	LOCATE		162		.07	.07	.	
DBVIORTN	PUTR		240		.00	.07	.	
DBVIORTN	TOTALS	<	7319		2.16	3.17		
PROGRAM DFHSIP	TOTALS				42.16	100.00		

### Program Usage by Procedure Reports

The Program Usage by Procedure reports (Figure 3-6 on page 3-7 and Figure 3-7 on page 3-8) present a detailed accounting of CPU time spent by each control section within each program that was active during a measurement session. The report for application programs and the report for system modules look slightly different.

- For application programs, STROBE includes the module name, control section name, and starting location. If the control section was indexed, STROBE shows the line number and procedure name as well.
- For system modules, STROBE displays the module, and control section name, and a function descriptor.
- Both types of reports show the solo and total CPU time used by each control section within the module. (For a complete description of these reports, see Chapter 3 of *STROBE MVS Concepts and Facilities*.)

## Activity in Application Modules

Frequently in CICS applications, little opportunity exists to decrease CPU usage caused by the user-coded routines in the application. An exception that exists in the example application might be the main control section of COMOPT02. This Program Usage by Procedure report shows that COMOPT02 accounts for nearly 6% of all CPU time (75% of it in the two problem transactions) in two very concentrated areas of code.

Figure 3-6. Program Usage by Procedure Report for Application Modules

```

** PROGRAM USAGE BY PROCEDURE **
MODULE - COMOPT02
SECTION - COMOPT02
LINE  PROCEDURE  STARTING  INTERVAL  CPU TIME  PERCENT  CPU TIME HISTOGRAM  MARGIN OF ERROR - 2.63%
NUMBER  NAME        LOCATION  LENGTH    SOLO     TOTAL    .00    .50    1.00    1.50    2.00
      000000      128      .00      .00      - .
      000080      64      .65      1.51      .*****
      0000C0      64      .14      .58      .++++
      000100      64      .50      .94      .*****
      000140      64      .00      .00      .
      000180      64      .07      .14      .*+
      0001C0      64      .00      .14      .++
      000200     3392      .00      .00      - .
      000F40      64      .29      .94      .*****
      000F80      64      .22      .72      .*****
      000FC0      64      .29      .79      .*****
      001000      40      .00      .00      .
SECTION  COMOPT02  TOTALS          2.16      5.76
    
```

## Activity in System Modules

This Program Usage by Procedure report (Figure 3-7 on page 3-8) details activity in system modules. It shows the CICS modules that support the programs in this environment. Of particular interest in this example are:

- module DFHSCP (servicing requests for CICS dynamic storage), which accounts for 20.36% of CPU activity
- module DFHEIP (used for the command interface), which accounts for 8.15% of CPU activity
- module DFHUEH (the user exit handler), which accounts for 6.93% of CPU activity

To determine which transactions and programs caused the activity, examine Figure 3-10 on page 3-11 to see an example of the attribution reports for these modules.

Figure 3-7. Program Usage by Procedure Report for CICS Modules

** PROGRAM USAGE BY PROCEDURE **										
.SYSTEM		SYSTEM SERVICES		.CICS			CICS SYSTEM SERVICES			
MODULE NAME	SECTION NAME	FUNCTION	INTERVAL LENGTH	CPU TIME SOLO	PERCENT TOTAL	CPU TIME	HISTOGRAM	MARGIN OF ERROR;	1.45%	20.00
DFHCMP		CICS MONITORING FACILITY	64	.07	.70	.+				
DFHCSA		COMMON SYSTEM AREA	64	.07	.70	.+				
DFHEEI	DFHEEI	EXEC INTERF. HANDLE, ETC	3452	.24	3.01	.+++++				
DFHEFC		EXEC INTERF.--FILE CNTRL	3048	.02	.88	.+				
DFHEIC		EXEC--INTERVAL CONTROL	1072	.02	.09	.				
DFHEIP	DFHEIP	EXEC INTERFACE (COMMAND)	8937	.83	8.15	.*****				
DFHEKC		EXEC--TASK CONTROL	352	.02	.13	.				
DFHELRL		EXEC--LOCAL/REMOTE	1752	.11	.48	.				
DFHEMS		EXEC INTERFACE FOR BMS	3096	.02	.02	.				
DFHEPC		EXEC--PROGRAM CONTROL	1608	.09	.68	.+				
DFHERM		NON-CICS PRODUCT INTERF.	2128	.02	.07	.				
DFHESC		EXEC--STORAGE CONTROL	400	.00	.13	.				
DFHETC		EXEC--TERMINAL CONTROL	5784	.00	.02	.				
DFHETS		EXEC--TEMPORARY STORAGE	840	.07	.26	.				
DFHFCCP	DFHFCC	FILE CONTROL	274	.00	.07	.				
DFHFPCP	DFHFPC	FILE CONTROL	14144	.33	2.31	.++++				
DFHFVCP	DFHFVC	FILE CONTROL	1267	.02	.20	.				
DFHICP		INTERVAL CONTROL	4088	.00	.07	.				
DFHKCP	DFHKCD	TASK CONTROL	5514	.20	2.35	.++++				
DFHKCP	DFHKCP	TASK CONTROL	7814	.07	.86	.+				
DFHLFO		LIFO STACK OVERFLOW	1168	.00	.04	.				
DFHMCX		BMS FAST PATH	5232	.20	1.32	.++				
DFHPCHLL	DFHPCHLL	PROGRAM CONTROL	2472	.02	.42	.				
DFHPCP	DFHPCP	PROGRAM CONTROL	4056	.20	2.90	.++++				
DFHSCP	DFHSCP	STORAGE CONTROL	7742	2.09	20.36	.*****				
DFHSPP		SYNCHRONIZATION POINT	4080	.02	.13	.				
DFHSPZ		SYNC POINT RESOURCE MNGR	9880	.00	.02	.				
DFHTMP	DFHTMP	CICS TABLE MANAGEMENT	9674	.66	6.39	.*****				
DFHTRP	DFHTRP	CICS TRACE FACILITY	9674	.66	6.39	.*****				
DFHTSP	DFHTSP	TEMPORARY STORAGE CNTRL.	19424	.46	5.10	.*****				
DFHUEH	DFHUEH	USER EXIT HANDLER	1070	.62	6.93	.*****				
DFHXSP		SECURITY INTERF., VERIF.	4392	.00	.22	.				
DFHZCA		SNA WORKING SET 1	4208	.00	.02	.				
DFHZCBS\$		SNA WORKING SET 2	26640	.04	.09	.				
DFHZCPS\$		TERMINAL MANAGEMENT PRGM	64	.00	.22	.				
DFHZCO		TERMINAL CNTL INSTALL	64	.00	.07	.				
DFHZCX\$		SNA COMM. NONWORKING-SET	26744	.00	.02	.				
				----	----					
.CICS		TOTALS		6.44	64.73					

## Transaction Activity Reports

The system version of the Program Usage by Procedure report indicated that several modules providing system services accounted for high CPU consumption. By examining the following Performance Profile reports, you can determine which transactions access these modules most. Also, you can use the CICS Transaction Profile API reports described in Chapter 2, “Using the STROBE CICS Feature” to obtain even more detail about transaction CPU consumption that results from CICS system resource access.

### CPU Usage by Control Section Report

The CPU Usage by Control Section Performance Supplement report shows, for each transaction and each CICS pseudo-transaction, the CPU time percentage spent in the control sections of the modules executed for the transaction. The reports for CDUN (Figure 3-8 on page 3-9) and CSRV (Figure 3-9 on page 3-10) show relatively little CPU time in user-written programs. Instead, CICS service routines such as trace control, file control, and the execute interface program consume most of the CPU time.

### DFHTRP and DFHCMP: The CICS Trace and Monitoring Programs

The CICS trace facility DFHTRP consumes a substantial amount of CPU time. If your CICS region has a stable production environment, you might want to eliminate the use of this utility.

The CPU time spent in the DFHCMP module for CDUN and CSRV indicates that CICS may be collecting performance-class data. Unless you have a production use for the detailed data in this class, you can significantly reduce the CPU consumption of the module by not using it for monitoring purposes.

By not invoking the trace and performance-class monitoring functions, you can further reduce the CPU time used by the CICS region. (STROBE would still detect and show some activity in the DFHCMP module, however.) You would also reduce the CPU time spent in other CICS routines, because these routines would also bypass the DFHTRP and DFHCMP invocation sequences.

## DFHFCP: The CICS File Control Program

The transactions CDUN and CSRV access the data set CUSTOMER. This access is controlled by DFHFCP, the CICS file control program, and VSAM. These service routines do not offer much opportunity for reducing CPU time. Typically, a transaction spends more time in suspend rather than execution state when accessing DFHFCP. The CICS region-level reports contained in this chapter show why wait occurs for these kinds of service routines.

**Figure 3-8.** CPU Usage by Control Section Report—CDUN

CPU USAGE BY CONTROL SECTION FOR TRANSACTION CDUN										
MODULE NAME	SECTION			CPU TIME USED, PERCENT						
	NAME	COMPRESSED	FUNCTION	SOLO	TOTAL	.00	2.00	4.00	6.00	8.00
.CICS	DFHCMP	DFHCMP	MONITORING PROGRAM	1.07	2.24	.*****				
.CICS	DFHCSA	DFHLFA	COMMON SYSTEM AREA	.07	.43	.++				
.CICS	DFHEEI	DFHEEI	EXEC INTERF, HANDLE, ETC	.07	.07	.				
.CICS	DFHEFC	DFHEFC	EXEC INTERF.--FILE CNTRL	.36	1.65	.+++++				
.CICS	DFHEIP	DFHEIP	EXEC INTERFACE (COMMAND)	1.73	6.26	.*****				
.CICS	DFHEKC	DFHEKC	EXEC--TASK CONTROL	.22	.58	.**				
.CICS	DFHEPC	DFHEPC	EXEC--PROGRAM CONTROL	.14	.58	.++				
.CICS	DFHFCP	DFHFCP	FILE CONTROL	.36	2.09	.*****				
.CICS	DFHKCP	DFHKCP	TASK CONTROL	.94	3.09	.*****				
.CICS	DFHLFO	DFHLFO	LIFO STACK OVERFLOW	.07	.22	.+				
.CICS	DFHPCP	DFHPCP	PROGRAM CONTROL	.72	2.16	.*****				
.CICS	DFHSCP	DFHSCP	STORAGE CONTROL	1.58	3.88	.*****				
.CICS	DFHTRP	DFHTRP	AUXILIARY TRACE PROGRAM	1.08	3.17	.*****				
.CICS	DFHUEH	DFHUEH	USER EXIT HANDLER	.58	2.01	.*****				
.CICS	DFHXSP	DFHXSP	SECURITY INTERF., VERIF.	.07	.22	.+				
.VSAM	IDA019L1	IDA019RA	DIRECT RECORD LOCATE	.86	3.31	.*****				
.VSAM	IDA019L1	IDA019RM	VSAM DATA INSERT	.00	.07	.				
AKN04002				.43	.58	.**				
AKSCNCPK				.00	.07	.				
DBVIORTN	.CICS		CICS SYSTEM SERVICES	.14	.29	.+				
DBVIORTN	DBVIORTN			.00	.22	.+				
DBVIORTN	DLDTCT			.14	.43	.++				
DBVIORTN	GETF			.22	.58	.**				
DBVIORTN	GETNEXTF			.29	.58	.**				
COMOPTIM				.22	.43	.**				
COMOPT01				.07	.36	.+				
COMOPT02	COMOPTMI			.07	.07	.				
COMOPT02	COMOPT0G			.00	.07	.				
COMOPT02	COMOPT02			.86	2.45	.*****				
TOTAL				12.36	38.14					

Figure 3-9. CPU Usage by Control Section Report—CSR

CPU USAGE BY CONTROL SECTION FOR TRANSACTION CSR										
MODULE NAME	SECTION			CPUTIME USED, PERCENT						
	NAME	COMPRESSED	FUNCTION	SOLO	TOTAL	.00	2.00	4.00	6.00	8.00
.CICS	DFHCMP	DFHCMP	MONITORING PROGRAM	.56	2.59	.*****				
.CICS	DFHCSA	DFHLFA	COMMON SYSTEM AREA	.29	.36	.*				
.CICS	DFHEEI	DFHEEI	EXEC INTERF., HANDLE, ETC	.00	.07	.				
.CICS	DFHEFC	DFHEFC	EXEC INTERF.--FILE CNTRL	.94	2.23	.*****				
.CICS	DFHEIP	DFHEIP	EXEC INTERFACE (COMMAND)	3.24	7.19	.*****				
.CICS	DFHEKC	DFHEKC	EXEC--TASK CONTROL	.29	.50	.*+				
.CICS	DFHEPC	DFHEPC	EXEC--PROGRAM CONTROL	.22	.58	.*+				
.CICS	DFHFPC	DFHFPC	FILE CONTROL	1.29	2.30	.*****				
.CICS	DFHKCP	DFHKCP	TASK CONTROL	1.58	4.68	.*****				
.CICS	DFHPCP	DFHPCP	PROGRAM CONTROL	1.29	3.09	.*****				
.CICS	DFHSCP	DFHSCP	STORAGE CONTROL	1.94	4.03	.*****				
.CICS	DFHTRP	DFHTRP	AUXILIARY TRACE PROGRAM	1.29	2.88	.*****				
.CICS	DFHTSP	DFHTSP	TEMPORARY STORAGE CNTRL.	.07	.22	.+				
.CICS	DFHUEH	DFHUEH	USER EXIT HANDLER	.43	1.58	.*****				
.CICS	DFHXSP	DFHXSP	SECURITY INTERF., VERIF.	.00	.14	.				
.CICS	DFHZCPS\$		TERMINAL MANAGEMENT PRGM	.00	.07	.				
.DSA	.DSA		DYNAMIC STORAGE AREA	.00	.07	.				
.VSAM	IDA019L1		VSAM RECORD MANAGEMENT	1.80	4.60	.*****				
.VSAM	IDA019R0		VSAM	.07	.22	.+				
AKN04002				.07	.29	.+				
AKR63102				.07	.29	.+				
AKSCNCPK				.14	.36	.+				
DBVIORTN	.CICS		CICS SYSTEM SERVICES	.14	.36	.+				
DBVIORTN	DBVIORTN			.36	.36	.*				
DBVIORTN	DLDTCT			.07	.14	.				
DBVIORTN	GETF			.43	.65	.***+				
DBVIORTN	GETNEXTF			.14	.14	.				
COMOPTIM				.00	.07	.				
COMOPT01				.36	.50	.*+				
COMOPT02	COMOPTMI			.07	.07	.				
COMOPT02	COMOPTOG			.00	.07	.				
COMOPT02	COMOPTOI			.29	.58	.*+				
COMOPT02	COMOPTO2			1.08	2.45	.*****				
TOTAL				18.35	43.73					

### Storage Pool Pseudo-Module Names

The CPU Usage by Control Section reports show whether STROBE has recorded CPU time to one of the pseudo-modules representing one of the CICS storage pools. These pseudo-modules represent CPU time spent within the CICS region but not within an identifiable module. See Appendix B, “The CICS Transaction Profile” for a list of these pseudo-module names.

### Attribution of CPU Execution Time Report

The Attribution of CPU Execution Time report (Figure 3-10 on page 3-11) identifies the user tasks that call CICS and system service routines. Callers are identified by transaction name, program name, control section name (if available), and by the offset to the CICS macro- or command-level service request. When a specific CICS service routine has a high CPU time, its Attribution of CPU Execution Time report identifies the statements that invoked it.

CICS system service routines control CPU- and wait-intensive functions such as storage access, file control, and terminal I/O. It is not unusual for the Performance Profile to show high activity in these routines. You can use this information to focus on the CPU-intensive service calls and determine whether those calls can be reworked or avoided. The Attribution report for DFHSCP, which is the CICS service module in charge of storage control, accounted for 20.36% of CPU activity.

If you are able to focus on a specific statement number within a transaction when analyzing application performance, see the CICS Transaction Profile reports described in Chapter 2, “Using the STROBE CICS Feature”. These reports match the amount of time spent accessing the service module with the invoking EXEC CICS command contained in each transaction you choose to profile.

Figure 3-10. Attribution of CPU Execution Time Report

```

** ATTRIBUTION OF CPU EXECUTION TIME **

.CICS  DFHSCP  DFHSCP  STORAGE CONTROL
-----  -----  -----  -----
XACTION  MODULE  SECTION  WAS INVOKED BY-----  -----  VIA-----  CPU TIME %
          MODULE  SECTION  RETURN  LINE  PROCEDURE NAME  MODULE  SECTION  FUNCTION  SOLO  TOTAL
AX21     ABSCSERV  ABSCSERV  001CF4
AB21     MODDSERV  000098      .02  .02
AB21     JCCCOMOT  0003D8      .00  .02
AB21     MODDSERV  00043E      .00  .02
ACX1     JCCCOMOT  0018B0      .00  .02
ACX1     JCCVALDT  DSGFCSBL  00005A      .00  .02
ACX1     MODDSERV  000098      .02  .02
ACX1     MODDSERV  00043E      .00  .02
ACX1     ABSCSERV  ABSCSERV  000B62      .02  .02
ACX1     ABSCSERV  ABSCSERV  000B62      .00  .02
ACX1     ABSCSERV  ABSCSERV  000D6A      .00  .02
ACX1     ABSCSERV  ABSCSERV  0025EC      .00  .02
CDUN     ABSCSERV  ABSCSERV  000A29      1.58  3.88
CSRV     ABSCSERV  ABSCSERV  000B34      1.94  4.03
TER2     DMWDIVSN  00007A      .02  .07
TER2     DMWDIVSN  0000A2      .02  .31
TER2     DMW61101  0027F8      .00  .07
TER2     DMW76001  0000B6      .00  .02
TER2     DMW92501  003A92      .24  2.43
TER2     DMW92501  003B50      .02  .07
TER2     DMW92501  005AEC      .00  .02
TER2     DMW92501  006D50      .00  .02
TER2     DMW92501  007DF4      .00  .04
TER2     DMW93001  001C84      .00  .04
TER2     DMW93001  002F80      .00  .02
TER2     DMW93001  003456      .00  .02
TER2     DMW99501  000396      .00  .02
TER2     DMW99501  0003DC      .00  .02
TER2     ABSCSERV  ABSCSERV  0025EC      .00  .02
AC10     AC00100  000AAE      .00  .02
AXRK     AXBRK    005F8A      .00  .02
-----
                                1.38  20.36
    
```

### Header Lines

The report header identifies the invoked routine, showing:

- its pseudo-module and control section name (when available)
- a function descriptor for the control section or the module.

### Detail Lines

Each report detail line for a CICS service routine identifies the invoker of the module and includes:

- the transaction name
- the name and, if available, the control section name, of the calling module (If the transaction is initializing during the measurement session and STROBE is unable to identify the program, a pseudo-module name of .TXINIT is reported. If the transaction is terminating after making calls to an MQSeries application programming interface and STROBE is unable to identify the program, a pseudo-module name of .MQTERM is reported.)
- the offset in the application program of the CICS service call
- the path that the service request took to call the service routine, if available

### Total Line

The total line shows the total time attributed to the invokers of the module. It may be less than the time shown in the Program Usage by Procedure or Most Intensively Executed Procedures report because STROBE cannot always identify an invoker of a service routine.

## Locating Points of Invocation in Source Code

This Attribution report shows that the CICS command at offset X'3A92' in program DMW92501 is responsible for 2.43% of the CPU activity used by this CICS region. The VIA section of the report shows that DFHSCP (storage control) was called by DFHETS, the EXEC interface module for temporary storage. This indicates that a command-level temporary storage request was issued at offset X'3A92'. After a review of the program DMW92501, you can see that an EXEC CICS TS DELETEQ is being issued, as shown in the code sample in Figure 3-11.

When this program was originally written using macro-level CICS service requests, it was constrained by the limitations of temporary storage records. Thus, a new record was needed each time a variable was saved to temporary storage and that record had to be deleted whenever the variable was deleted.

When the program was converted to command-level CICS, the multiple-item queues available at this level were not implemented because the one-to-one correspondence supported the program's original logic. This program can be restructured employing the command level's rewrite and multiple-item queue options. The programmer can then rerun the measurement session and compare the Performance Profiles to determine how much CPU time is saved.

**Figure 3-11.** Sample CICS Code Using the DELETEQ

```

00287 005069*
00288 005070 4000-DELETE-Q.
00289 005071*****
00290 005072* DELETE TEMP STROAGE QUEUE *
00291 005073*****
00292 *EXEC CICS
00293 * DELETEQ TS
00294 * QUEUE(WS-QUE-NAME)
00295 *END-EXEC.
00296 005074 MOVE ' 00153 ' TO DFHEIVO
00297 CALL 'DFHEI1' USING DFHEIVO WS-QUE-NAME.
00298

288 *4000-DELETE-Q
296 MOVE 003A5A PN=010 EQU *
003A5A D2 10 6 208 C 189 MVC 208(17,6),189(12) DNM=3-328 LIT+257
003A60 92 40 6 219 MVI 219(6),X'40' DNM=3-328+17
003A64 D2 0A 6 21A 6 219 MVC 21A(11,6),219(6) DNM=3-328+18 DNM=3-328+17
297 CALL 003A6A 41 10 6 208 LA 1,208(0,6) DNM=3-328
003A6E 50 10 D 264 ST 1,264(0,13) PRM=1
003A72 41 10 6 020 LA 1,020(0,6) DNM=1-432
003A76 50 10 D 268 ST 1,268(0,13) PRM=2
003A7A 96 80 D 268 OI 268(13),X'80' PRM=2
003A7E 41 10 D 264 LA 1,264(0,13) PRM=1
003A82 58 F0 C 010 L 15,010(0,12) V(ILB0DBG4)
003A86 05 EF BALR 14,15
003A88 96 40 D 049 OI 049(13),X'40'
003A8C 58 F0 C 014 L 15,014(0,12) V(DFHEI1 )
003A90 05 EF BALR 14,15
003A92 94 BF D 049 NI 049(13),X'BF'
003A96 40 F0 D 05C STH 15,05C(0,13)
003A9A 58 F0 D 1B8 L 15,1B8(0,13)
003A9E 50 D0 F 080 ST 13,080(0,15)

```

## Processing Program Statistics Report

The structure of CDUN and CSRV also affects the heavy usage of other CICS service routines. The Processing Program Statistics report (Figure 3-12 on page 3-13) shows the CICS activity of programs named in the CICS Program Processing Table. During this STROBE measurement session, transactions call user programs through CICS more than 275,000 times. But the Transaction Summary report (Figure 3-3 on page 3-4) shows a total of fewer than 1,500 transactions.

The Processing Program Statistics Performance Supplement report shows that a user-coded module named DBVIORTN was called through CICS more than 250,000 times. The Program Section Usage Summary report (Figure 3-5 on page 3-6), shows that the programming of this file I/O routine is quite efficient. However, the CICS routines used by your transactions, such as the Program Control Program (DFHPCP), use much more CPU time than the file access routines themselves. In contrast, the user-coded communication optimization routine, COMOPT02 (shown in Figure 3-6 on page 3-7), uses more CPU time than the access method routines, but accrues no CPU time elsewhere because transactions do not invoke it through CICS routines. You can reduce CPU usage by as much as 50% by avoiding invocation through CICS.

Figure 3-12. Processing Program Statistics Report

PROCESSING PROGRAM STATISTICS							
PROGRAM NAME	TIMES LOADED	TIMES CALLED	TOTAL CPU TIME PERCENT	PROGRAM NAME	TIMES LOADED	TIMES CALLED	TOTAL CPU TIME PERCENT
.CICS	0	0	70.65	AKN61102	0	9	.00
.DSA	0	0	.07	AKN61104	0	52	.00
.SVC	0	0	.58	AKN61702	0	953	.07
.VSAM	0	0	13.53	AKN61703	0	1	.00
.VTAM	0	0	.07	AKN61706	0	98	.00
AKNCORRS	0	414	.07	AKN76001	0	610	.07
AKNTL2T1	0	4	.00	AKN93001	0	831	.00
AKN04001	0	1,289	.07	AKN96001	0	22	.00
AKN04002	0	1,295	.86	AKN96002	0	803	.07
AKN16002	0	1,220	.14	AKN97002	0	16	.00
AKN37001	0	1,215	.22	AKN99902	0	781	.07
AKN60103	0	1,128	.07	AKOIX02	0	3	.00
AKN61101	0	162	.22	CARQUE	0	737	.00
AKOIX02P	0	5	.00	COMOPTIM	0	0	.58
AKOJFRD	0	339	.00	COMOPT01	0	0	.94
AKPKMANT	0	89	.22	COMOPT02	0	0	6.76
AKPALCC	0	1	.00	RRICLAP	0	17	.00
AKPCLIN	0	4	.00	RRIFAT	0	9	.00
AKPCMA	0	318	.00	XTP	0	28	.00
AKPCSRV	0	2,727	.00	XTPLTABD	0	28	.00
AKR63001	0	1,183	.00	XTPVPD	0	28	.00
AKR63102	0	1,285	.43	XTPWTABD	0	28	.00
AKSCNCPK	0	497	.43	XVROUTC	0	28	.00
DBVIORTN	0	258,345	4.17				
ALL PROGRAMS					4	276,105	100.00

## Wait Time Reports

The Performance Profile contains several reports that show wait time in CICS address spaces. Two of these reports are the Wait Time by Module report (Figure 3-13 on page 3-14) and the Attribution of CPU Wait Time report (Figure 3-14 on page 3-14).

### Wait Time by Module Report

The Wait Time by Module report shows the sites of wait. In a typical CICS address space, STROBE will show wait time for SVC 001. You can examine the Attribution of CPU Wait Time report for the SVC to further determine what is causing wait time.

Figure 3-13. Wait Time by Module Report

```

** WAIT TIME BY MODULE **
MODULE SECTION COMPRESSED FUNCTION RUN TIME PERCENT RUN TIME HISTOGRAM MARGIN OF ERROR: .98%
NAME NAME SECTION PAGE TOTAL .00 24.00 48.00 72.00 96.00
.CICS DFHKCP TRANS MNGR BOOTSTRP ROUT .00 22.80 .+++++++
.SVC SVC 001 WAIT .00 72.80 .+++++++
.VSAN IDA019L1 VSAM RECORD MANAGEMENT .00 .03 .
PROGRAM DFHSIP TOTALS .00 95.63
    
```

## Attribution of CPU Wait Time Report

In the Attribution of CPU Wait Time report for SVC 001, the STROBE CICS Feature attributes all CICS service routine wait to the pseudo-transaction .WAIT. Within that pseudo-transaction, the STROBE CICS Feature distinguishes between event- and task-related wait by the pseudo-modules .USERTSK and .NOWORK.

The VIA column in the report will display CICS module name DFHKCP for CICS releases prior to 3.1 and DFHSIP for release 3.1 and subsequent releases. These modules are called by the application to perform task control and other system management functions.

(The pseudo-module .USERTSK identifies the amount of wait attributed to CICS-managed tasks waiting for events (for example, data set I/O, program loads, and timer expiration) to complete. The pseudo-module .NOWORK identifies the amount of wait attributed to the CICS dispatcher that is waiting for new work (transactions) to process. This can also be viewed as CICS idle time.

Figure 3-14. Attribution of CPU Wait Time Report

```

** ATTRIBUTION OF CPU WAIT TIME **
.SVC SVC001 TASK CONTROL/DISPATCHER
-----
XACTION MODULE SECTION WAS INVOKED BY----- VIA----- WAIT TIME %
RETURN LINE PROCEDURE NAME MODULE SECTION FUNCTION PAGE TOTAL
.WAIT .USERTSK USER TASK WAIT DFHKCP .00 10.40
.WAIT .NOWORK NO WORK TO DO DFHKCP .00 62.40
-----
.00 72.80
    
```

## Analyzing File Access Activities

File access activities can often be streamlined to maximize performance. Two of the example application activities called ORDERFL and PRODUCT, probably can be improved. A third activity, called CUSTOMER, seems to be optimally operating. The CICS region-level reports described in this chapter can disclose why transactions spend time in a suspend state as they attempt to access CICS files.

### ORDERFL

The ORDERFL access activity processes a VSAM data set by key and accounts for the largest EXCP count among the file access activities listed. The Data Set Characteristics report (Figure 3-15 on page 3-15) shows the EXCP count for file access activities.

Figure 3-15. Data Set Characteristics Report

** DATA SET CHARACTERISTICS **										
DDNAME	ACCESS METHOD	POOL NO	REC SIZE	BLK/CI SIZE	HBUF NO	BUF NO	RPL STRNO	-SPLITS- CI CA	EXCP COUNTS	DATA SET NAME
BIMAST	VSAM KSDS		6229	8192		6	5		34	XPROD.CUSMMVS.BIMAST
BIMAST	VSAM INDEX		2041	2048		7	5		6	XPROD.CUSMMVS.BIMAST
BOAAXRF	VSAM KSDS		38	4096		22	20		76	XPROD.CUSMMVS.BOAAXRF
BOAAXRF	VSAM INDEX		2041	2048		40	20		54	XPROD.CUSMMVS.BOAAXRF
BVPFILE	VSAM KSDS		30	1024		32	30		35	XPRODV.VARPR.FILE
BVPFILE	VSAM INDEX		1017	1024		32	30		18	XPRODV.VARPR.FILE
CUSTOMER	VSAM KSDS		6229	8192		9	8		34,378	XPROD.CUSMMVS.CUSTOMER
CUSTOMER	VSAM INDEX		1017	1024		32	8		3,635	XPROD.CUSMMVS.CUSTOMER
DBEXCPL	VSAM RSDS		1438	1536		40	8		1,485	XPROD.CUSMMVS.DBEXCPL
DBSPROD	VSAM KSDS		82	4096		3	2		173	XPROD.CUSMMVS.DBSPROD
DBSPROD	VSAM INDEX		2041	2048		2	2			XPROD.CUSMMVS.DBSPROD
DFHDMPA	QSAM		32756	32760					59	XPROD.CICSPRO.DFHDMPA
DFHRPL	BPAM			23200					14	XPROD.CICSPRO.TEMP.TABLLOAD
DFHRPL	BPAM			23200					14	PROD.CICSV1R7.LOADLIB2
DFHRPL	BPAM			23200					7	TECH.CICSR170.DATACOMM.LOADLIB
DFHRPL	BPAM			23200					35	XPROD.CUS.LOAD
DFHRPL	BPAM			23200					26	TEST.BI.LOADA
DFHTEMP	VSAM ESDS		4089	4096		7			1,017	TECH.CICSPRO.DFHTEMP
INSERTL	VSAM KSDS	LSR01	254	8192		10	24		1,057	XPROD.CUSMMVS.INSERTL
INSERTL	VSAM INDEX	LSR01	1017	1024		20	24		9	XPROD.CUSMMVS.INSERTL
KIXFILE	VSAM KSDS	LSR01	175	4096		25	24		34	XPRODV.KIXFILE
KIXFILE	VSAM INDEX	LSR01	4089	4096		25	24		1	XPRODV.KIXFILE
KIXHIST	VSAM KSDS	LSR01	74	8192		10	24	3	385	XPRODV.KIXHIST
KIXHIST	VSAM INDEX	LSR01	2041	2048		40	24		76	XPRODV.KIXHIST
KIXXRF	VSAM KSDS	LSR01	42	4096		25	24		34	XPROD.CUSMMVS.KIXXRF
KIXXRF	VSAM INDEX	LSR01	2041	2048		40	24		15	XPROD.CUSMMVS.KIXXRF
LEVEL2T1	QSAM			80					246	SYS89082.T080402.RA000.CICSPROD.R0000003
L2AUDIT	VSAM KSDS	LSR01	1475	4096		25	24		454	XPROD.CUSMMVS.L2AUDIT
L2AUDIT	VSAM INDEX	LSR01	2041	2048		40	24			XPROD.CUSMMVS.L2AUDIT
ORDERFL	VSAM KSDS	LSR01	727	8192		10	24	84	56,701	XPROD.CUSMMVS.ORDERFL
ORDERFL	VSAM INDEX	LSR01	2041	2048		40	24	4	3,130	XPROD.CUSMMVS.ORDERFL
PRODUCT	VSAM KSDS	LSR01	434	4096		25	24		1,586	XPROD.CUSMMVS.PRODUCT
PRODUCT	VSAM INDEX	LSR01	2041	2048		40	24		3,605	XPROD.CUSMMVS.PRODUCT
PTOOHDF	VSAM KSDS	LSR01	74	1024		20	24		12	XPRODV.UNIGEO.PTOOHD
PTOOHDF	VSAM INDEX	LSR01	4089	4096		25	24		6	XPRODV.UNIGEO.PTOOHD
SYS00001	QSAM		13026	13030					2,693	XPROD.BI.BACKUP.G2878V00
SYS00002	QSAM		13026	13030					2,693	XPROD.BI.GLOMA.G2878V00

The BACK transaction accesses ORDERFL, which appears to contribute to its erratic response time. Both the data component and index component of this data set occupy the same disk storage unit, where usage averages over 30% and approaches 100% for significant periods (as shown in the Time Distribution of Activity Level report Figure 3-4 on page 3-4). Also, see the I/O Facility Utilization Summary report, Figure 3-16 on page 3-16. Distributing ORDERFL over several disk storage units may significantly reduce average access times but only if the CMXT limitation imposed on BACK is lifted. The CMXT parameter controls the maximum number of transactions of a particular task class that can run simultaneously.

The Transaction Summary report (Figure 3-3 on page 3-4) shows BACK is a class 3 task. The Classed Tasks report (Figure 3-17 on page 3-16) shows that CICS must service class 3 tasks serially, but there were as many as four class 3 tasks awaiting service. Because the maximum allowed is one, BACK must wait each time previous BACK transactions have not been serviced. Enabling concurrent access to several portions of ORDERFL would not affect BACK response time unless you increased the maximum task value.

Figure 3-16. I/O Facility Utilization Summary Report

** I/O FACILITY UTILIZATION SUMMARY **													
UNIT NO	DEVICE TYPE	CACHE ELIG	VOLUME ID	DDNAME	I/O	RUN TIME		PERCENT TOTAL	RUN TIME HISTOGRAM				MARGIN OF ERROR - .98%
						SOLO			.00	7.50	15.00	22.50	
436	DA 3380		H2CK07	CUSTOMER	I	3.65		7.66	.*****				
74D	DA 3380		HEX002	BVPFILE	I	.20		.28	.				
74D	DA 3380		HEX002	KIXFILE	I	.04		.06	.				
74D	DA 3380		HEX002	PT00HDF	I	.00		.03	.				
74D	DA 3380		HEX002	PT00HDF	INDEX	0		.02	.				
UNIT 74D TOTALS								.25				.39	
74F	DA 3380		H2CI01	DFHRPL	I	.03		.04	.				
75F	DA 3380		H2CK06	CUSTOMER	I	2.38		7.73	.*****				
753	DA 3380		H2CK01	DFHRPL	I	.02		.03	.				
754	DA 3380		H2CK02	BIMAST	0	.02		.04	.				
754	DA 3380		H2CK02	DBEXCPL	0	.32		.60	.				
754	DA 3380		H2CK02	DBSPROD	I	.14		.18	.				
754	DA 3380		H2CK02	PRODUCT	I	.37		1.16	.+				
754	DA 3380		H2CK02	PRODUCT	INDEX	0		.67	.+++				
UNIT 754 TOTALS								1.52				4.30	
756	DA 3380		H2CK04	ORDERFL	I	20.17		29.20	.*****				
756	DA 3380		H2CK04	ORDERFL	INDEX	0		2.46	.***				
UNIT 756 TOTALS								21.43				31.66	
757	DA 3380		H2CK05	CUSTOMER	INDEX	0		.27	.+				
758	DA 3380		HEX001	DFHDMPA	I	.00		.06	.				
87E	DA 3380		CICSAS	DFHRPL	I	.01		.01	.				
87E	DA 3380		CICSAS	DFHTEMP	I	.13		.37	.				
UNIT 87E TOTALS								.14				.38	

### PRODUCT

The BACK transaction also accesses PRODUCT, which is another VSAM key sequenced data set. Although it is being accessed less than 4% of the session time, PRODUCT still could be contributing to the erratic performance of BACK. The Data Set Characteristics report (Figure 3-15 on page 3-15) shows excessive EXCPs for the index component of this data set.

Figure 3-17. Classed Tasks Report

CLASSED TASKS							
CLASS	MAXIMUM ALLOWED	MAXIMUM OBSERVED	TIMES AT MAXIMUM	CLASS	MAXIMUM ALLOWED	MAXIMUM OBSERVED	TIMES AT MAXIMUM
1	1	0	0	2	10	5	0
3	1	4	79	4	1	0	2
5	2	3	61	6	2	0	0
7	2	0	0	8	2	0	0
9	2	0	0	10	2	0	0

The DASD Usage by Cylinder report (Figure 3-18 on page 3-17) reveals that accesses to PRODUCT concentrate on a single cylinder, which contains the highest-level index control interval. The VSAM default buffer allocation of only one buffer for the index causes VSAM to retrieve all levels of the index from the disk each time PRODUCT accesses a data record. Therefore, you should increase the number of index buffers to allow more index levels to remain in virtual storage and consequently reduce I/O operations for the indexed component.

Figure 3-18. DASD Usage by Cylinder Report

```

** DASD USAGE BY CYLINDER **

DEVICE ADDRESS - 754   TYPE - 3380

VOLUME      DDNAME      CYLINDER      RUN TIME PERCENT      RUN TIME HISTOGRAM      MARGIN OF ERROR - .98%
ID          ID          NUMBER        SOLO      TOTAL      .00      .50      1.00      1.50      2.00

H2CK02     DBSPROD      1612          .14      .18      .***+

           BIMAST      1002-1003     .02      .03      .
           BIMAST      1007          .01      .02      .

           DBEXCPL     1377-1385     .07      .12      .*+
           DBEXCPL     1387-1388     .02      .05      .+
           DBEXCPL     1390-1394     .10      .13      .**
           DBEXCPL     1399          .02      .05      .+
           DBEXCPL     1413          .01      .01      .

           PRODUCT    1099-1101     .08      .38      .
           PRODUCT    1103          .00      .01      .
           PRODUCT    1109          .00      .01      .
           PRODUCT    1136-1137     .12      .32      .
           PRODUCT    1139-1140     .02      .17      .
           PRODUCT    1145-1146     .03      .08      .
           PRODUCT    1150-1151     .12      .15      .
           PRODUCT    1153-1154     .11      .29      .
           PRODUCT    1178-1189     .10      .14      .
           PRODUCT    INDEX 981        .45      1.73      .*****+
           PRODUCT    INDEX 982        .22      .59      .*****+

DEVICE ADDRESS - 754 TOTALS          1.39      4.30
    
```

## CUSTOMER

The Data Set Characteristics report (Figure 3-15 on page 3-15) indicates that the CUSTOMER activity also involves access to a VSAM key-sequenced data set and accounts for one-third of all EXCPs issued from within the CICS region.

The Time Distribution of Activity Level report (Figure 3-4 on page 3-4) reveals that this data set is sometimes heavily used. However, it appears from the reports that access attempts to CUSTOMER function very efficiently. The I/O Facility Utilization Summary report (Figure 3-16 on page 3-16) shows that the data component of CUSTOMER occupies space on two disk storage units and are about equally accessed; each is never used more than 8% at a time.

Also, both the index component and data component are adequately buffered. VSAM accesses the index component, which is located on a third disk storage unit, infrequently relative to the data component. The data component is well blocked and buffered so that, as you see in the Data Base Operations VSAM Files report (Figure 3-19 on page 3-18), there are nearly 20 times as many operations on this data set as there are physical accesses to the disk storage units.

Figure 3-19. Data Base Operations Report—VSAM Files

DATA BASE OPERATIONS--VSAM FILES													
FILE NAME	INPUT OPERATIONS				OUTPUT OPERATIONS				TOTAL INPUT AND OUTPUT	STRING WAITS		BUFFER WAITS	
	GET	UPDATE	BROWSE	TOTAL	ADD	UPDATE	DELETE	TOTAL		TOTAL	MAX	TOTAL	MAX
BCNTRYM	3,988	0	353	4,341	0	0	0	0	4,341	0	0	0	0
BCNTRYX	55	0	0	55	0	0	0	0	55	0	0	0	0
BIFSGAT	17	0	0	17	0	0	0	0	17	0	0	0	0
BIMAST	50	23	0	73	0	23	0	23	96	0	0	0	0
BKSPSTGD	24	0	0	24	0	0	0	0	24	0	0	0	0
BOAAXRF	5	21	89	115	5	16	0	21	136	0	0	0	0
BVPFILE	44	0	238	282	0	0	0	0	282	0	0	0	0
CUSTOMER	7,951	2,467	648,264	658,682	33	2,467	0	2,500	661,182	0	0	0	0
DBEXCPL	1,323	400	0	1,723	0	400	0	400	2,123	0	0	0	0
DBSPROD	180	0	0	180	0	0	0	0	180	0	0	0	0
INSERTL	19,609	927	3,523	24,059	0	927	0	927	24,986	0	0	0	0
KIXFILE	864	0	0	864	0	0	0	0	864	0	0	0	0
KIXHIST	0	0	399	399	149	0	147	296	695	0	0	0	0
KIXXRF	0	22	91	113	0	22	0	22	135	0	0	0	0
L2AUDIT	1	242	0	243	3	241	0	244	487	0	0	0	0
ORDERFL	55,225	120	544	55,889	504	120	0	624	56,513	0	0	0	0
PRODUCT	3,857	0	0	3,857	0	0	0	0	3,857	0	0	0	0
PTTCEDF	0	0	18	18	0	0	0	0	18	0	0	0	0
PTO0HDF	26	0	0	26	0	0	0	0	26	0	0	0	0
PTO0SD	10	0	0	10	0	0	0	0	10	0	0	0	0
PTO0S1F	18	0	684	702	0	0	0	0	702	0	0	0	0
PTTSHDF	8	0	0	8	0	0	0	0	8	0	0	0	0
PTTSSD	4	0	0	4	0	0	0	0	4	0	0	0	0
PTTSS1F	8	0	0	8	0	0	0	0	8	0	0	0	0
PTTSS2F	0	0	2	2	0	0	0	0	2	0	0	0	0
TOTAL	93,267	4,222	654,205	751,694	694	4,216	147	5,057	756,751	0	0	0	0

## VSAM LSR Pool Statistics Report

The VSAM Local Shared Resources (LSR) Pool Statistics Performance Supplement report (Figure 3-20 on page 3-19) shows information about buffer pools and is organized by LSR pool. Each entry line of the report represents a subpool. The components of a VSAM cluster will use the buffer subpool with buffers that are at least as large as the component's CI size. For example, if the data cluster of a file in the Data Set Characteristics report appears as part of pool number 1, and it has a CI size of 4096, its activity would be reported in the fourth line of Figure 3-20 on page 3-19 because that subpool has a buffer size of 4096.

The report columns under the RETRIEVES heading indicate how well buffers perform a "lookaside" function. When VSAM uses LSR, it scans the buffers to check if the required control interval is in storage before it issues a read to disk. If the control interval is there, VSAM may not have to issue the read. If STROBE reports a high value in the Retrieves Without I/O column, transaction response time should be significantly improved.

Figure 3-20. VSAM LSR Pool Statistics Report

** VSAM LSR POOL STATISTICS **														
POOL NO	TYPE	STR NO	KEY LEN	BUF LEN	BUFNO	HBUFNO	--- RETRIEVES ---		---- WRITES ----		----- HIPERSPACE -----		-----	
							WITH I/O	WITHOUT I/O	USER	NONUSER	- READS -	- WRITES -	SUCCESSFUL	FAILING
1	DATA	37	255	512	30	0	0	0	0	0	0	0	0	0
1	DATA	37	255	1024	4	0	0	0	0	0	0	0	0	0
1	DATA	37	255	2048	3	0	0	0	0	0	0	0	0	0
1	DATA	37	255	4096	70	0	908	30751	16	0	0	0	0	0
1	DATA	37	255	8192	15	0	11	38	0	0	0	0	0	0
1	DATA	37	255	12288	10	0	0	0	0	0	0	0	0	0
1	DATA	37	255	24576	4	0	0	0	0	0	0	0	0	0
1	INDEX	255	512	15	5	0	0	0	0	0	0	0	0	0
1	INDEX	255	1024	5	5	0	0	0	0	0	0	0	0	0
1	INDEX	255	2048	50	50	0	4	63189	0	0	0	0	0	0
1	INDEX	255	4096	25	25	0	7	134	0	0	0	0	0	0
1	INDEX	255	8192	5	5	0	0	0	0	0	0	0	0	0
1	INDEX	255	12288	5	5	0	0	0	0	0	0	0	0	0
POOL	1	STRING	WAITS		MAXIMUM	CONCURRENT	345	TOTAL	2345					

## Comparing Session Results

After making changes to your CICS region and its transaction-processing programs, you should conduct a measurement session to confirm that the changes have produced the necessary results.

If you conduct your measurement sessions in a production environment, the circumstances of the two sessions will not be exactly the same. The factors that you can control to make the sessions more comparable include: duration of the session, the time of day, the day of the session, and the number of samples collected. Other factors that you cannot control but affect performance include: stretch time, paging rates, the volume of transactions, and the transaction mix. By making the circumstances as similar as possible, you can more accurately assess whether your changes improved application performance.

The relative CPU usages shown in the reports that deal with CPU usage percentages alone will change, but not necessarily in the direction you might expect. Because CPU usage percentages must total 100%, a large reduction in the percentage of CPU usage in one module must be accompanied by increases in percentages of CPU usage in other modules, though the latter's absolute CPU usages remain unchanged.

If your two sessions are comparable, then you should see a reduction in the absolute measures of resource usage that you have tried to affect—CPU usage and EXCP counts or both—in the Measurement Session Data report. If you have reduced CPU usage, the percentage of wait time will have increased correspondingly and response times should improve and become more consistent.



## Chapter 4.

# The STROBE CICS Transaction Profile

This chapter describes the CICS STROBE Transaction Profile produced by the STROBE CICS Feature for application transaction measurement. These reports provide detailed information for the transactions you specified when you submitted the measurement request. Appendix A, “The STROBE CICS Performance Supplement” provides field-by-field descriptions of all reports and possible field values.

---

## Analyzing CICS Transactions

The STROBE CICS Transaction Profile contains extensive data about the performance of the CICS transactions in the CICS region you measured. During a STROBE measurement session, the CICS Feature records information about the state of the transaction at the time of each sample. The Transaction Profile reports provide a comprehensive view of the total response time incurred every time a CICS transaction runs. Response time, as defined by STROBE, consists of three different states:

- Execution State is the time spent executing instructions.
- Suspend State is the time spent waiting for an external event or resource.
- Dispatch Delay State is the amount of Suspend State specifically spent waiting for queue or dispatch time.

Each of these response time measurement data are presented in four types of Transaction Profile reports. The following sections describe these reports.

---

## Transaction Profile Reports

The Transaction Profile contains four types of reports. The reports provide different levels of information about transaction states and indicate, at the time of sampling, whether a transaction was directly engaged in CICS-related activity or was performing work not directly related to CICS. The following list describes the Transaction Profile reports:

- CICS Transaction Summary report provides lists of all transactions STROBE observed running during the measurement session. For each transaction, the following is reported:
  - number of times it executed (user, pseudo, and system transactions)
  - amount of CPU time consumed reported as a percentage of CPU used by the CICS address space (user, pseudo, and system transactions)
  - the average number of seconds a user transaction spent in suspend, dispatch delay, or execution state (user transactions only).
- CICS API Service Time Report displays EXEC CICS commands (and also DB2, IMS, MQSeries, and Java commands if the STROBE Feature is installed) as observed during transaction sampling. It also displays the resource consumption for each CICS API by offset and module CSECT.
- CICS API Service Time Detail report identifies the resource associated with the CICS API call that is causing execution or suspend time. A brief function descriptor is

provided for each resource. You can use the resource type for the transaction to make a cross-reference in the *CICS Problem Determination Guide*.

- CICS Non API Service Time report identifies transaction activity that was not directly related to CICS API services. It provides an account of time spent in Dispatch Delay state by resource type and, if appropriate, resource name. It also shows Non-API execution time for the transaction by module and CSECT.

---

## Reviewing Measurement Data

Before analyzing a transaction with the Transaction Profile reports, you should first examine the Measurement Session Data report. This report reveals whether the CICS transaction activity that you want to study was correctly measured by STROBE. Check to verify that all reporting parameters values you specified were in effect and whether the run and CPU margin of error percent are less than 2%. If this report shows you measured the desired CICS region and the Performance Profile contains the information you require, you can proceed with your application analysis.

## CICS Transaction Summary Report

The first report to examine is the Transaction Summary Report (Figure 4-1 on page 4-3) It lists transactions that STROBE found running during the measurement session. For the CICS Transaction Profile, the Transaction Summary report lists the average number of seconds STROBE found the user transactions in one of the following states:

- executing
- suspended waiting for a resource.
- in queue ready for dispatch

During the measurement session shown in this example, STROBE found transaction LCOM frequently waiting to be dispatched. It ran nine times and was in a state of execution during 4.77% of the session. For LCOM, the following on-average values were found:

- 4.33 seconds were spent in dispatch delay state
- 17.39 seconds were spent in suspend state
- 0.41 seconds were spent in execution state
- A total of 22.13 seconds were spent each time LCOM ran

When a transaction shows a high suspend or execution time, examine the CICS API Service Time reports for the transaction. If the transaction shows a high value for dispatch delay state, you should look at its CICS Non-API Service Time report.

This Transaction Summary report shows that transaction LCOM spent the highest average time in suspend state. Therefore, the next report you should examine is the CICS API Service Time report.

Figure 4-1. Transaction Summary Report

STROBE PERFORMANCE PROFILE				08/14/1999			
TRANSACTION BASELINE 0.00		** TRANSACTION SUMMARY **					
NAME	PROFIED	COUNT	CPU TIME PERCENT	DISPATCH DELAY	MEAN SUSPEND	SERVICE TIME EXEC	TOTAL
.CICS			6.14				
.DFHSKTS			.77				
.IGGOCLA			.17				
CEMT		1	3.41				
CKAM		1	.00				
CKTI		11	12.35				
CSNE		1	.00				
CSSY		3	.00				
CSTP		1	1.28				
EXEC	Y	20	.26	.39	.98	.07	1.44
LCOM	Y	9	4.77	4.33	17.39	.41	22.13
LINK	Y	14	2.04	3.49	1.43	.26	5.18
LLAT	Y	33	16.35	.45	5.61	.94	7.00
MQAA	Y	74	5.88	.15	3.32	.03	3.50
MQAO	Y	74	6.56	.13	2.00	.04	2.17
NOAX	Y	7	5.20	.12	.20	.05	.37
MQBB	Y	76	6.39	.16	3.43	.04	3.63
MQBO	Y	76	5.79	.17	2.07	.04	2.27
MQBX	Y	76	4.51	.16	.23	.04	.43
MQCC	Y	77	5.37	.14	3.38	.03	3.55
MQCO	Y	77	8.01	.16	2.03	.05	2.24
MQCX	Y	77	4.60	.14	.20	.04	.36
PRFC	Y	2	.17			.06	.06
TOTAL		777	100.00	AVERAGES 1.19	3.82	.26	1.60

## CICS API Service Time Report

The Transaction Summary Report shows that each time transaction LCOM ran, on average, it spent 17.39 seconds in the suspend state. The CICS API Service Time report (Figure 4-2 on page 4-4) provides you with an account of the amount of time each command issued by a transaction program was in suspend or execution state.

A transaction that is in the suspended state is usually waiting for the availability of a resource, such as access to a file, before it is able to run. When a transaction is in dispatch delay state, it is fully ready to run, but hasn't received a signal to proceed.

Several types of EXEC CICS API commands executed during the measurement session. These commands might be file or program control commands or transient data commands. For each command, the file or program name or transient queue name is listed under the COMMAND RESOURCE column. Under this heading, STROBE will generate this information for the following product types provided the appropriate Feature is installed:

- MQSeries—the queue name token
- DB2—the DBRM name
- IMS—the Program Specification Block (PSB) name
- Java—the package, class, and method name

Any EXEC CICS commands with mean service time for execution and suspend states that total less than the CICS TRANSACTION PROFILE seconds value specified in the STROBE - TAILOR REPORTS panel "Compress below" parameter field, are compressed into the pseudo command name ".COMPRES", which is the last line of the report.

The OFFSET column heading contains the offset of the command within the section where activity took place. The commands are ordered by offset, command within offset, resource within command, and, for DB2, the DBRM name within the resource. The DB2 executing statement number also will be listed under the "STMT#" column.

**Note:** If a common user module was specified on the STROBE - DATA COLLECTORS panel, this report will display the following data:

- Commands issued by the common user module are displayed in the COMMAND column for the caller of the common user module.
- The OFFSET column will display the offset of the call to the common service module

This report example shows that STROBE found the READ and REWRITE commands directed at the command resource file STDCLCFL to be in the suspend state for 5.59 and 7.73 seconds respectively. To examine these commands more closely, proceed to the detail report for the transaction.

**Note:** The CICS API Detail report may not show any data if you set a high "Compress below" value on the STROBE - TAILOR REPORTS panel.

**Figure 4-2.** CICS API Service Time Report

STROBE PERFORMANCE PROFILE		DFHSIP			
TRANSACTION BASELINE 0.0		** PROFILE FOR TRANSACTION LCOM **		MARGIN OF ERROR 1.79%	
CICS API SERVICE TIME					
MODULE - STDCLCOM					
SECTION - STDCLCOM					
COMMAND	COMMAND RESOURCE	STMT#	OFFSET	MEAN SERVICE TIME SUSPEND	EXEC
STARTBR	STDCLCFL		000544	3.63	.00
READNEXT	STDCLCFL		0005F6	.00	.09
WRITEQ TS			000648	.07	.19
READQ TS			00079A	.14	.03
READ	STDCLCFL		000800	5.59	.00
REWRITE	STDCLCFL		000896	7.73	.01
RETURN			000936	.00	.02
				----	----
MODULE - STDCLCOM	API	SERVICE TIME	FOR TRANSACTION LCOM	17.16	.34

**CICS API Service Time Report Showing Java Data**

If you have installed the Java Feature at your site, The CICS API Service reports will contain data about a Java program if STROBE detects Java activity during the measurement session and the associated transaction was reported. The report will only contain data for Java programs that are either JVM bytecode or JIT compiled executable code. Figure 4-3 shows an example of a CICS API Service Time report that contains Java data. The sections after the report examples provide brief descriptions of the report fields.

Figure 4-3. CICS API Service Time Report with Java data

```

TRANSACTION BASELINE 0.0      **  PROFILE FOR TRANSACTION  **
                               STRB2                               MARGIN OF ERROR  1.79%

                               CICS API SERVICE TIME

PACKAGE/CLASS - com.ibm.org.apache.xml.utils.synthetic.BuildMe
METHOD        - toSource(PrintStream)

COMMAND      COMMAND      STMT#  OFFSET  MEAN SERVICE TIME
              RESOURCE                               SUSPEND  EXEC
START        STDCLFCL                               .00      .01
RETURN                                             .00      .20
-----
CLASS BuildMe API SERVICE TIME FOR TRANSACTION STB2 .00      .21
    
```

**PACKAGE/CLASS**

Name of the Java PACKAGE/CLASS structure located by STROBE. If Java targeting data was specified when you submitted the request, it may affect the PACKAGE/CLASS and METHOD to which the Java activity is attributed. See the Java Feature for more information about Java activity and how STROBE reports it.

**METHOD**

Name of the Java METHOD showing execution activity.

## CICS API Service Time Detail Report

The CICS API Service Time Detail report (Figure 4-4 on page 4-6) contains an in-depth breakdown of the performance for each API command shown in the CICS API Service Time report. Execution time is shown against each load module that STROBE found executing as a result of the command. Suspend time is broken down by the suspend reason type and name. A command does not appear if the sum of its mean suspend and execution service time does not equal or exceed the threshold set for the transaction to be profiled. If no commands meet the threshold, the report will not be generated.

In this example, the STARTBR command spent an average of 2.54 seconds in suspend state due to command resource STDCLFCL. Also, the READ command spent 5.59 seconds on average in suspend state due to STDCLFCL. The report shows that a large amount of suspend time relates to the resource type FCPSWAIT, which indicates a wait for a private string. You can increase the value of the CICS STRINGS parameter or change the program logic so that strings are released more quickly.

A typical situation where strings could be held for excessive time is when a conversational transaction issues a STARTBR or READNEXT command and then begins a “wait for terminal input” without issuing an ENDBR. The browse remains active until the ENDBR, which causes a VSAM string and a control interval (CI) lock to be held over the terminal wait. The CI lock held by the browse is a probable explanation of the poor performance seen for the REWRITE command. See the *IBM CICS Problem Determination Guide* for more information about resource types and how to correct CICS transaction application code.

Figure 4-4. CICS API Service Time Detail Report

```

                                DFHSIP
                                ** PROFILE FOR TRANSACTION **
                                LCOM

TRANSACTION BASELINE 0.00                                MARGIN OF ERROR 1.79%
                                CICS API SERVICE TIME DETAIL
MODULE - STDCLCOM
SECTION - STDCLCOM

COMMAND  COMMAND  OFFSET  STMT#  FUNCTION  RESOURCE  RESOURCE  MODULE  SECTION  MEAN SERV  TIME
RESOURCE  RESOURCE  FUNCTION  TYPE  NAME  MODULE  SECTION  SUSPEND  EXEC

STARTBR  STDACFL  000544  FC-WAIT FOR VSAM I/O  FCIOWAIT  .01
FC-WAIT FOR VSAM STRING  FCPSWAIT  2.54
KC-SINGLE RESRCE ENQUEUE  KC_ENQ  .63
KC-EVENT OR TERMINAL  KC_COMPAT  .43

READNEXT  STDCLCFL  0005F6  APPL INTERFACE PGM  DFHAIP  .01
COMMON SYSTEM AREA  DFHCSA  .01
FILE CNTL EXEC INTERFACE  DFHFCEI  .03
FILE ACCESS REQ PROCESSR  DFHFCVS  .02
VSAM RECORD MANAGEMENT  IDA019L1  .01
TIMER SUPERVISION  IEA0TI00  .01

WRITEQ TS  000648  TS-AUX I/O IN PROGRESS  TSIO  .07
COMMON SYSTEM AREA  DFHCSA  .01
EXEC INTERFACE-TEMP STOR  DFHETS  .01
SM DOM-MACRO-COMPAT FREE  DFHSIP  DFHSMMF  .02
SM DOM-MACR-COMPAT GETM  DFHSIP  DFHSMMG  .02
TR DOM-TRC PUT-FAST PATH  DFHSIP  DFHTRPX  .04
CICS COMPOSITE ROUTINES  DFHSIP  KESRT  .01
TEMPORARY STOR CNTL PGM  DFHTSP  .04
TEMP STOR UN TBL ABS TYP  DFHTSUT  .03

READQ TS  00079A  TS-AUX I/O IN PROGRESS  TSIO  .14
EXEC INTERFACE-TEMP STOR  DFHETS  .01
SM DOM-MACR-COMPAT GETM  DFHSIP  DFHSMMG  .01
VTAM WORKING SET MODULE  DFHZCB  .01
VTAM  ISTAIVL1  .01

READ  STDCLCFL  000800  FC-WAIT FOR VSAM STRING  FCPSWAIT  5.59

REWRITE  STDCKCFL  000896  FC-WAIT FOR VSAM I/O  FCIOWAIT  7.73
FILE CNTL EXEC INTERFACE  DFHFCEI  .01
VSAM RECORD MANAGEMENT  IDA019L1  .01

RETURN  000936  VTAM WORKING SET MODULE  DFHZCB  .01
VTAM  ISTAPVL2  .01

```

**Note:** The two-letter prefixes that start each function descriptor are internal IDs that STROBE uses to place the descriptors in the correct columns.

**CICS API Service Time Detail Report with Java Data**

Figure 4-5 shows a CICS API Service Time Detail report that contains information about a Java method. Refer to the field descriptions for the CICS API Service Time report.

Figure 4-5. CICS API Service Time Detail Report with Java Data

```

TRANSACTION BASELINE 0.0      ** PROFILE FOR TRANSACTION STRB2 **
                                MARGIN OF ERROR 1.79%

                                CICS API SERVICE TIME DETAIL

PACKAGE/CLASS - com.ibm.org.apache.xml.utils.synthetic.BuildMe
METHOD        - toSource(PrintStream)

COMMAND      COMMAND  OFFSET  STMT#  RESOURCE  RESOURCE  MODULE SECTION  MEAN SERV  TIME
              RESOURCE                FUNCTION  TYPE      NAME                               SUSPEND   EXEC
RETURN
                                VTAM WORKING SET MODULE          writ-or)          .19
    
```

## CICS Non-API Service Time Report

Some of the transaction activity in the application you are measuring, for example, the execution of COBOL instructions, may not take place within any CICS service. To provide information about this activity, the STROBE CICS Feature produces data in the CICS Non-API Service Time report (Figure 4-6 on page 4-8.) The example shows the types of data that STROBE collects. The sum of the DISPATCH DELAY, SUSPEND and EXECUTION mean service time for a transaction must exceed the CICS TRANSACTION PROFILE value set on the STROBE - TAILOR REPORT "Compress below" parameter field to appear in this report.

Several pseudo-resource names and types are used in this report to identify resource types. Four ones you will commonly see in reports are:

- .DELAY is the pseudo-resource type that indicates the transaction was ready to execute, but the TCB on which it was to run was busy servicing another task.
  - .xx-TCB is a pseudo-resource name that uses ".xx" to indicate the CICS dispatcher mode TCB requested (or the External Resource Manager TCB for DB2, IMS, or MQSeries). The TCBs are listed in Appendix B, "The CICS Transaction Profile".
  - .MVS is a pseudo-resource type that indicates the transaction was waiting for the CICS region to be dispatched by MVS.
- .NONCICS is a pseudo-resource name that indicates that the transaction has been suspended by an External Resource Manager, but STROBE cannot identify the interface type. Installing the appropriate STROBE Feature may enable STROBE to determine the type of interface.

Other pseudo-resource names reported by STROBE are described in Appendix B, "The CICS Transaction Profile".

This report example shows that transaction LCOM was in dispatch delay state due to non-CICS activity for an average of 4.02 seconds and in execution state for 0.07 seconds. The time spent in suspend state only totaled 0.23 seconds, which indicates that the CICS transaction dispatcher is not working efficiently. Also, the .DELAY value on .QR\_TCB is very high, which indicates the CICS region is overloaded.

Figure 4-6. CICS Non-API Service Time Report

STROBE PERFORMANCE PROFILE				PROFILE FOR TRANSACTION LCOM		08/14/2002	
TRANSACTION BASELINE 00.01				** NON-API SERVICE TIME **		MARGIN OF ERROR 1.79%	
RESOURCE TYPE	RESOURCE NAME	MODULE	SECTION	DISPATCH DELAY	MEAN SERVICE SUSPEND	TIME	EXEC
.DELAY	.MVS			.11			
.DELAY	.QR_TCB			4.02			
.DELAY	.RO_TCB			.19			
PROGRAM	STDCLCOM				.23		
		STDCLCOM					.06
		SVC 026					.01
TRANSACTION LCOM NON-API SERVICE TIME TOTALS				4.32	.23		.07

**CICS Non API Service Time Report Showing Java Activity**

Figure 4-7 shows an example report where STROBE detected Java activity. A pseudo resource type of .JVMWAIT can appear in this report when STROBE attributes wait time to a Java application.

Figure 4-7. CICS Non-API Service Time Report

TRANSACTION BASELINE 0.0				** PROFILE FOR TRANSACTION STRB2 **		MARGIN OF ERROR 2.24%	
				NON-API SERVICE TIME			
RESOURCE TYPE	RESOURCE NAME	MODULE	SECTION	DISPATCH DELAY	MEAN SERVICE SUSPEND	TIME	EXEC
.DELAY	.MVS			.12			
.DELAY	.QR_TCB			2.24			
.MXT	XM_HELD				4.93		
.JVMWAIT					1.23		
TRANSACTION STRB2 NON-API SERVICE TIME TOTALS				2.36	6.16		

## Chapter 5.

# Identifying Transaction Suspend by Class in a CICS System

This chapter describes how to use the STROBE Performance Profile reports produced by the STROBE CICS Feature, to analyze a CICS Region to obtain information about CICS resources causing transaction delay. System programmers can use these reports to spot resource consumption that can be improved to reduce CICS transaction response time. For a full description of these CICS Region-Level reports, see Appendix A, “The STROBE CICS Performance Supplement”.

---

## Region-Level Reports

The STROBE CICS Feature provides two levels of activity for an entire CICS region.

- Region Suspend By Class report shows what classes caused suspend and dispatch delay time for a CICS region. The percentage of suspend time caused by each class and the average suspend time per user transaction are reported.
- Region Suspend By Resource within Class report shows, for each suspend class, the resource name and type that accounted for the suspend time reported for the class. The resource name, type, and a function descriptor for the resource are reported. Also provided are the percentage of region suspend time caused by the resource and the average suspend time spent by a transaction in the region due to that resource.

---

## Analyzing Transaction Suspend Time by Class

Within a CICS region, transactions may spend time in a suspended state because of the unavailability of a particular resource. The STROBE CICS Feature records every time a transaction waits for a resource to become available and then aggregates all suspend time caused by the resource to show which ones are most hindering transaction performance. This information can be used by the system programmer to find classes of resources for which access needs to be improved.

### Suspend by Class Report

The Suspend by Class report (Figure 5-1 on page 5-2) shows how a transaction region is affected by suspend and dispatch delay time during a STROBE measurement session. There are two columns of measurement data:

#### PERCENT OF REGION SUSPEND

This column shows a percentage of aggregate wait for each suspend class in proportion to the total wait time for the CICS region

#### AVERAGE TX SUSPEND TIME

This column reports in seconds the average time that a user transaction running in the region was suspended due to a particular class of resources.

**Note:** Whenever the suspend time for an average transaction does not meet the region threshold value, the value for that class is reflected within the total value

reported for .COMPRES. There are two other pseudo-classes described in Appendix A, "The STROBE CICS Performance Supplement".

The FILE CONTROL class in Figure 5-1 shows a suspend percentage of 97.02%, which indicates that transactions' attempts to access files could be causing excessive contention. The next report to examine shows specifically what is causing file control contention.

**Figure 5-1.** Region Suspend by Class Report

STROBE* PERFORMANCE PROFILE		08/14/1999	
REGION BASELINE 0.01		REGION SUSPENDED BY CLASS	
SUSPEND CLASS	PERCENT OF REGION SUSPEND	AVG. TX SUSPEND TIME IN SECS	
DISPATCH DELAY	2.40	4.02	
FILE CONTROL	97.02	162.21	
MAXIMUM TASKS	.29	.50	
PROGRAM MANAGEMENT	.27	.45	
TOTALS	100.00	167.18	

### Region Suspended by Resource within Class Report

The Region Suspended by Resource within Class report (Figure 5-2 on page 5-3) shows, by class, what resource type and name caused suspend time within the region. Each suspend class contained in the Region Suspend by Class report is broken down by the resources causing the suspend time. If none of the resources within a class meets the specified threshold, the entire class is suppressed. If none of the resources meets the specified threshold, the entire report is suppressed.

For each resource type within a class, the resource type, name, and function descriptor is provided. Each class is listed in the same order as the Region Suspend by Class report. The resource type name and function descriptor are the same as those described in "CICS API Service Time Report Showing Java Data" on page 4-4.

Figure 5-2. Region Suspended by Resource within Class Report

STROBE* PERFORMANCE PROFILE			08/14/1999	PAGE 5P
REGION BASELINE 00.01%		REGION SUSPENDED BY RESOURCE WITHIN CLASS		
CLASS:	DISPATCH DELAY			
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX
.DELAY	.MVS	DY-DISPATCH DELAY	.04	.07
.DELAY	.MVS	DY-DISPATCH DELAY	2.21	3.70
.DELAY	.MVS	DY-DISPATCH DELAY	.14	.25
CLASS:	FILE CONTROL			
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX
FCIOWAIT	STDCLCFL	FC-WAIT FOR VSAM I/O	4.92	8.24
FCIOWAIT	WPATRAN	FC-WAIT FOR VSAM I/O	.11	.19
FCPSWAIT	STDCLCFL	FC-WAIT FOR VSAM STRING	91.97	153.77
CLASS:	MAXIMUM TASKS			
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX
TCLASS	DFHTCL01	MX-TCLASS LIMIT REACHED	.29	.50
CLASS:	PROGRAM MANAGEMENT			
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX
PROGRAM	LINK0	PG-PROGM LOAD CONTENTION	.25	.43
PROGRAM	LINK2	PG-PROGM LOAD CONTENTION	.00	.01

In this report example, the FILE CONTROL class caused 97% of the region suspend time and an average transaction suspend time of 153.77 seconds due to resource STDCLCFL. The resource type for STDCLCFL is FCPSWAIT. The function descriptor for FCPSWAIT is "WAIT FOR VSAM STRING". If you find that tasks frequently wait on this resource type, you can try to lower buffer wait by increasing the number of VSAM strings in the FILE resource definition. See the *CICS Problem Determination Guide* for more information about resource types and suggestions for improving CICS code.



## Appendix A.

# The STROBE CICS Performance Supplement

This appendix provides descriptions and examples of the reports contained in the STROBE CICS Performance Supplement. Some of the reports are formatted to show a series of reports. For a description of the reports in the STROBE Performance Profile, see Chapter 3 of the *STROBE MVS Concepts and Facilities*.

---

## Time Distribution of Transaction Activity Level Report

The Time Distribution of Transaction Activity report (Figure A-1 on page A-2 and Figure A-2 on page A-3) show, for the duration of the measurement session, the interactive transaction load placed on the CICS region and the level of CICS performance under that transaction load.

## Time Distribution of Transaction Arrivals

The Time Distribution of Transaction Arrivals report shows how the arrival rate of interactive transactions varied during the session. Each interactive transaction request and each input message solicited during processing of a conversational transaction is counted as a transaction arrival. The graph of these transaction arrival counts shows the demand on the CICS region for transaction processing services during each 1% interval of the measurement session.

Unsolicited transaction initiation messages for all transactions associated with interactive terminals are counted as transaction arrivals. Input messages solicited by conversational transactions associated with interactive terminals are also counted as transaction arrivals. For a list of terminal types that the STROBE CICS Feature classifies as interactive, see Appendix C, "Terminal Types".

## Time Distribution of Transaction Service Time

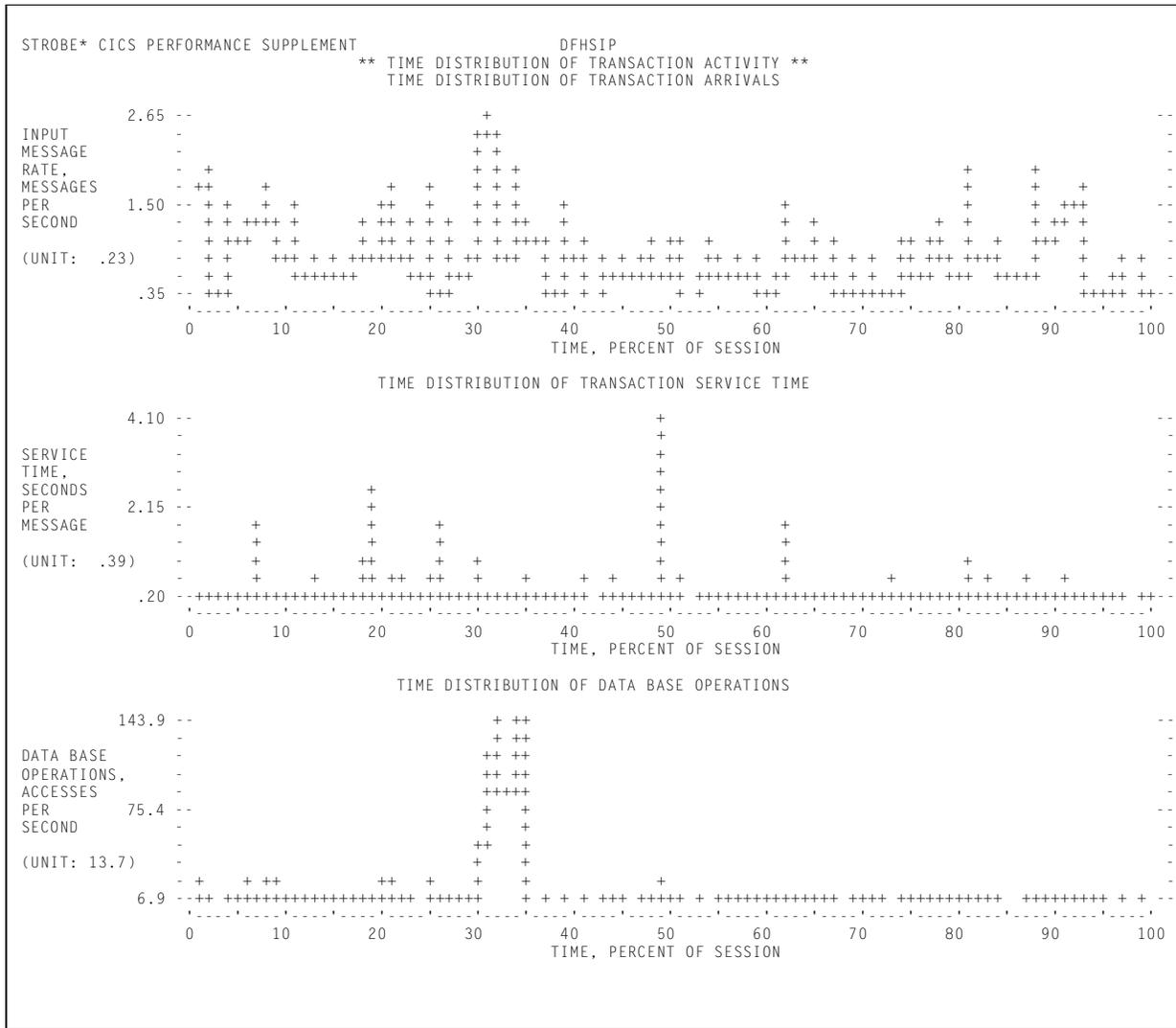
The Time Distribution of Transaction Service Time report shows how long, in seconds per input message, it took CICS to process the transactions whose arrival distribution is shown in the Time Distribution of Transaction Arrivals report.

The service time for a transaction is related to but shorter than the response time that an operator would observe at the terminal. It includes only the time that the transaction is being processed or awaiting processing within the CICS region. The total response time is the sum of service time and transmission delays, such as transmission time on the communication network and VTAM processing time.

# Time Distribution of Database Operations

The Time Distribution of Database Operations report shows the time variation of I/O operations performed by CICS on the database while processing the transactions.

Figure A-1. Time Distribution Reports



## Time Distribution of Transaction Inputs, Processing, and Outputs

The Time Distribution of Transaction Inputs, Processing, and Outputs report (Figure A-2) shows, for each 1% or period of the measurement session, the major statistics on input operations, processing, and output operations.

**Figure A-2.** Time Distribution of Transaction Inputs, Processing, and Outputs Report

```

STROBE* CICS PERFORMANCE SUPPLEMENT                DFHSIP
** TIME DISTRIBUTION OF TRANSACTION ACTIVITY **
TIME DISTRIBUTION OF TRANSACTION INPUTS, PROCESSING, AND OUTPUTS
-----
                INPUTS                PROCESSING                DATA BASE ACCESSES                OUTPUTS
                -----                -----                -----                -----
PERIOD  MESSAGES  TRANS-  TASKS  TOTAL  TIMES AT  INPUT  OUTPUT  TOTAL  MESSAGES
          ACTIONS  CREATED CPU TIME  -----
                7          7          PERCENT  MXT  CMXT
1           9           7           7           1.25    0    0           65     0           65     8
2          11          10           8           .60     0    0           50     0           50    12
3           2           2           1           .37     0    0            0     0            0     3
4           8           7           7           .23     0    0           34     0           34     9
5           9           7           7           .32     0    0           18     6           24     7
6           6           5           5           .42     0    0           75     0           75     4
7           6           5           5           .97     0    0           28     0           28     4
8           9           8           7           3.42    0    0          102     0          102     9
9           6           6           6           .65     0    0           55     0           55    11
10          4           3           3           .09     0    0            4     0            4     3
11          6           6           6           .32     0    0           21     0           21     6
12          3           3           3           1.53    0    0           52     0           52     4
13          5           3           3           3.15    0    0           17     0           17     4
14          3           2           2           2.55    0    0            9     0            9     5
15          3           3           3           2.22    0    0           35     0           35     2
16          3           3           3           3.01    0    0           15     2           17     3
17          5           5           5           1.20    0    0           25     0           25     4
18          5           5           5           .42     0    0           18     0           18     6
19          4           3           3           .56     0    0           29     0           29     4
20          8           7           7           3.29    0    0           67     0           67     8
21         10          10          10           1.16    0    0           72     26           98    12
22          4           4           4           .88     0    0           32     0           32     6
23          5           5           5           .23     0    0           29     0           29     5
24          2           2           2           .14     0    0            0     0            0     2
25          8           7           7           .60     0    0           74     0           74     8
26          1           1           1           .37     0    0           11     0           11     1
27          6           6           6           .56     0    0           50     0           50     5
28          2           2           2           .19     0    0            9     0            9     2
29          4           3           3           1.43    0    0           32     0           32     5
30         10          11          11           4.16    0    0          126     44          170     9
31         10          12          12           4.53    0    0          249     206          455     9
32         10          10          10           4.77    0    0          296     257          553    13
33          4           5           5           3.75    0    0          188     181          369     2
34         11          11          11           3.93    0    0          375     219          594    11
35          6           6           6           1.99    0    0          370     207          577     5
    
```

**PERIOD**

The number of the period that is being measured.

**INPUTS: MESSAGES**

The number of input messages that were unsolicited and solicited by transactions.

**INPUTS: TRANSACTIONS**

The number of transactions initiated during the period.

**PROCESSING: TASKS CREATED**

The number of tasks that CICS created during the period to process the transactions.

**PROCESSING: TOTAL CPU TIME PERCENT**

The percentage of all CPU time used in the CICS region during the period.

**PROCESSING: TIMES AT MXT**

The number of times that CICS had to create a task and either:

- set the task counter equal to the maximum number of tasks allowed (MXT) or
- found that the maximum number of tasks had already been reached.

**PROCESSING: TIMES AT CMXT**

The number of times that CICS was called upon to create a classed task and either:

- set the task counter equal to the maximum number of tasks allowed for that class (CMXT), or
- found that the maximum number of tasks had already been reached

**DATA BASE ACCESSES**

The number of input, output, and total accesses to the CICS or local DL/I databases during the period.

**OUTPUTS: MESSAGES**

The number of output messages produced during the period.

# Transaction Activity Report

The Transaction Activity report (Figure A-5 on page A-8) shows the details of processing for individual transactions and transaction processing programs.

## Transaction Summary

The Transaction Summary report shows, for every transaction that was invoked during the measurement session, its type and class, invocation count, CPU time, service time statistics, and initial processing program. STROBE will identify bridge and target transactions by appending a “-B” or “-L” to their name.

Figure A-3. Transaction Summary Report

STROBE* CICS PERFORMANCE SUPPLEMENT			DFHSIP ** TRANSACTION ACTIVITY ** TRANSACTION SUMMARY							
NAME	CLASS	FUNCTION	TRANS- ACTION COUNT	MESSAGES PER SECOND	TOTAL CPU TIME PERCENT	SERVICE TIME (SEC)				INITIAL PROGRAM
						MEAN	85 PC	MEDIAN	15 PC	
.CICS		CICS SYSTEM SERVICES			10.78					
.DFHSKTS					.42					
CDTS-X			5	0.00	.09	.00	--	--	--	DFHZATS
CITS-X			3	0.00	.09	.00	--	--	--	DFHZATS
CRSR		INTERSYSTEM COMM.	29	0.07	.14	.00	--	--	--	DFHGRS
CSMI		ISC/MRO FILE CNTRL MODEL	4	0.01	.05	.07	--	--	--	DFHMIRS
CSNC		INTERREGION CONNECTION			.28					
CSSC-X			1	0.00	.05	.00	--	--	--	DFHCSSC
CSSY		JOURNAL KICK-OFF PRGM			.09					
CSTP		TERMINAL CONTROL TASK			.05					
DSNC-X			13	0.00	.00	.00	--	--	--	DSNCCOM1
NAF0			8	0.02	.14	.11	--	--	--	QRSR0000
NAF1			17	0.04	.14	.06	--	--	--	QRSR0001
NAG0			1	0.00	.09	.72	--	--	--	QRSR0100
NAG5			1	0.00	.09	.36	--	--	--	QRSR0105
NAH5			18	0.05	22.40	3.14	8.35	1.00	.20	QRSR0115
NAJ5			9	0.02	.09	.38	--	--	--	QRSR0125
NBF5-X	DFHTCLO2		4	0.00	4.30	.00	--	--	--	QRSR0205
NBG5-X			4	0.00	.00	.00	--	--	--	QRSR0210
NBH0-X			4	0.00	49.38	.00	--	--	--	QRSR0230
NCF0			19	0.04	.74	.97	1.62	1.18	.26	QRSR0300
L305			1	0.00	.09	.48	--	--	--	QRSR0305
L315			4	0.01	.14	.20	--	--	--	QRSR0315
NCH5			65	0.16	4.30	.30	.62	.14	.04	QRSR0325
NDF0			2	0.00	.14	.76	--	--	--	QRSR0400
NDF5			1	0.00	.00	.40	--	--	--	QRSR0405
NEF1			2	0.01	.09	.12	--	--	--	QRSR0411
NEG1			3	0.01	.14	.11	--	--	--	QRSR0421
NEG2			23	0.06	1.48	.17	.64	.19	.04	QRSR0422
NFF0			3	0.01	.23	.13	--	--	--	QRSR0440
NFG0			5	0.01	.09	.05	--	--	--	QRSR0450
NJF0			39	0.10	1.53	.14	.23	.16	.08	QRSR0710
NJF5			110	0.27	2.22	.03	.04	.04	.02	QRSR0715
PRFC-B			5	0.04	1.83	.04	--	--	--	exit name
PRFM-L			1	0.01	.00	.00	--	--	--	WPAPRFM
TSYM-X			8	0.00	.00	.00	--	--	--	DFHCRP
TSYP-X			4	0.00	.00	.00	--	--	--	TSYPRNT
X03S			9	0.02	.14	.12	--	--	--	ADRV00
TOTAL--		INTERACTIVE TRANSACTIONS	373	0.97	47.92	.31	.52	.13	.04	
TOTAL--		OTHER TRANSACTIONS	46	0.12	53.91					

### NAME

The transaction identifier is shown in hexadecimal notation if the name is not alphanumeric.

The transaction type is identified by appending a letter to the transaction name.

<b>Identifier</b>	<b>Transaction Type</b>
X	No input or output, but some transaction execution occurred
M	Input and Output
O	Output only
Blank	Interactive

For bridge transactions, a -B is used as an identifier, regardless of the types of activity recorded. For linked transactions, the following identifiers are used:

<b>Identifier</b>	<b>Transaction Type</b>
N	Interactive
J	Output
K	Input and Output
L	Non-Interactive

#### **CLASS**

The class of the transaction if it belongs to a class that is the TCLASS parameter for the transaction assigns a class to the transaction. For CICS V4.1 and greater, the transaction class name is listed.

#### **FUNCTION**

A short description of the function of a transaction. The STROBE system provides function descriptors for CICS system transactions. Descriptions of user-defined transactions appear if your STROBE system programmer has included them in the STROBE module description program.

#### **TRANSACTION COUNT**

The number of times the transaction was invoked.

#### **MESSAGES PER SECOND**

For transactions invoked from terminals, the input message rate; for output-driving transactions, the output message rate; for mixed transactions, the combined rate of input messages for interactive instances of the transaction plus output messages for output-only instances of the transaction.

#### **TOTAL CPU TIME PERCENT**

The percentage of all CPU time used in the CICS region that the transaction used.

#### **SERVICE TIME (SEC): MEAN**

The average time in seconds required to service input messages received from interactive terminals.

#### **SERVICE TIME (SEC): 85 PC**

The 85th percentile of service time for the transaction, in seconds. That is, during 85% of the 100 periods, the average service time was less than or equal to the given value. If the transaction was observed to be active for less than 10% of the measurement session, this field is omitted.

**SERVICE TIME (SEC): MEDIAN**

The median service time for the transaction, in seconds. That is, during 50% of the 100 periods, the average service time was less than or equal to the given value. If the transaction was observed to be active for less than 10% of the measurement session, this field is omitted.

**SERVICE TIME (SEC): 15 PC**

The 15th percentile of service time for the transaction, in seconds. That is, during 15% of the 100 periods, the average service time was less than or equal to the given value. If the transaction was observed to be active for less than 10% of the measurement session, this field is omitted.

**INITIAL PROGRAM**

The name of the first program to which CICS passed control when the transaction was invoked.

## Transaction Exceptions

The Transaction Exceptions report (Figure A-4) appears only when an exceptional condition has occurred for a transaction during the measurement session. It shows the values of every exception counter for every transaction for which an exceptional condition occurred.

**Figure A-4.** Transaction Exception Report

TRANSACTION EXCEPTIONS						
TRANS- ACTION NAME	SIZE OF ANTICI- PATORY PAGE POOL	REQUESTS FOR MORE STORAGE	TIMES STALL- PURGED	TIMES RE- STARTED	STORAGE VIO- LATIONS	OVERFLOW BEYOND PRIMED STORAGE
NJF5	0	0	0	0	2	0
		----	----	----	----	----
		0	0	0	2	0

**TRANSACTION NAME**

The transaction identifier.

**SIZE OF ANTICIPATORY PAGE POOL**

The number of pages of storage initially allocated.

**REQUESTS FOR MORE STORAGE**

The number of times that additional storage beyond that of the initial allocation was requested for the transaction.

**TIMES STALL-PURGED**

The number of times CICS purged the transaction because of a stall condition.

**TIMES RESTARTED**

The number of times CICS restarted the transaction.

**STORAGE VIOLATIONS**

The number of storage violations that occurred while the transaction was being processed.

**OVERFLOW BEYOND PRIMED STORAGE**

The number of bytes of overflow storage. The total bytes for all invocations of the transaction appear.

## Processing Program Statistics

The Processing Program Statistics (Figure A-5) report shows the CICS activity of programs named in the CICS Program Processing Table.

Figure A-5. Processing Program Statistics Report

STROBE* CICS PERFORMANCE SUPPLEMENT				DFHSIP ** TRANSACTION ACTIVITY ** PROCESSING PROGRAM STATISTICS			
PROGRAM NAME	TIMES LOADED	TIMES CALLED	TOTAL CPU TIME PERCENT	PROGRAM NAME	TIMES LOADED	TIMES CALLED	TOTAL CPU TIME PERCENT
.CICS	0	0	67.93	QRSR0100	0	2	.00
.COBLIB	0	0	.32	QRSR0105	1	2	.00
.COMMON	0	0	.69	QRSR0115	0	22	1.25
.DB2	0	0	3.05	QRSR0120	1	15	.09
.IOCS	0	0	.09	QRSR0125	0	17	.00
.IRLM	0	0	1.06	QRSR0205	0	4	.69
.MEDIAMG	0	0	.09	QRSR0210	0	4	.00
.NUCLEUS	0	0	2.85	QRSR0215	1	14	.00
.SVC	0	0	7.56	QRSR0230	0	4	9.49
.VSAM	0	0	.97	QRSR0300	0	36	.09
ADRV00	0	9	.00	QRSR0305	1	2	.00
ADRV05	0	0	1.25	QRSR0315	1	8	.00
CICSSRV1	0	1	.00	QRSR0325	0	67	.28
DFHCRC	1	29	.00	QRSR0330	0	29	.19
DFHCSSC	1	1	.00	QRSR0400	2	4	.05
DFHMIRS	2	4	.00	QRSR0405	2	3	.00
DFHSTDT	1	1	.00	QRSR0411	1	3	.00
DFHSTFC	1	1	.00	QRSR0421	1	4	.00
DFHSTIB	1	1	.00	QRSR0422	2	24	.00
DFHSTJC	1	1	.00	QRSR0440	1	5	.00
DFHSTKC	1	1	.00	QRSR0450	2	6	.00
DFHSTLK	1	1	.00	QRSR0710	0	77	.05
DFHSTLS	1	1	.00	QRSR0715	0	144	.42
DFHSTTD	1	1	.00	QRSS000	0	3	.00
DFHSTTM	1	1	.00	QRSS001	0	28	.00
DFHSTTN	1	1	.00	QRSS100	0	2	.00
DFHSTTR	1	1	.00	QRSS105	0	2	.00
DFHSTTS	1	1	.00	QRSS115	0	17	.00
DFHTBS	1	8	.00	QRSS125	0	16	.00
DFHZATS	1	8	.00	QRSS300	0	33	.00
DFHZCQ	0	8	.00	QRSS305	0	2	.00
DIRO0520	1	7	.00	QRSS315	0	6	.00
DIRO5171	0	132	.05	QRSS325	0	66	.00
DSNCCOM1	0	13	.00	QRSS400	0	4	.00
ICHRFR00	0	0	.05	QRSS405	0	3	.00
IGC00130	0	0	.51	QRSS411	0	3	.00
IGC253	0	0	.74	QRSS421	0	3	.00
QPZ0AA50	0	73	.05	QRSS422	0	24	.00
QPZ0AA60	0	132	.14	QRSS440	0	4	.00
QRSR0000	1	9	.00	QRSS450	0	5	.00
QRSR0001	0	33	.00	QRSS710	0	74	.00
QRSR0010	1	7	.00	QRSS715	0	140	.00
TSYACNT	1	14	.00	TSYPRNT	2	4	.00
TSYDDENT	1	1	.00	TTYAACF	1	12	.00
TSYDSTVR	1	18	.00	TTYSECC	0	53	.00
ALL PROGRAMS					43	1,519	100.00

**PROGRAM NAME**

The name of the program from the CICS Program Processing Table.

**TIMES LOADED**

The number of times CICS loaded the program.

**TIMES CALLED**

The number of times CICS passed control to the program.

**TOTAL CPU TIME PERCENT**

The percentage of all CPU time used by the CICS region that was consumed by the program.

**ALL PROGRAMS**

The totals of each value in the report field for all of the programs listed in the report.

**CPU Usage by Control Section**

The CPU Usage by Control Section for Transaction "TXXXX" reports (Figure A-6) show, for each transaction and each CICS pseudo-transaction, the CPU time spent in each control section of each module executed while processing the transaction.

The transaction name appears in the heading line of each report. If the transaction is a CICS system transaction, a short description of its function follows. If the transaction name is not alphanumeric, STROBE presents the name in hexadecimal notation.

Descriptions of user-defined transactions appear if your STROBE system programmer has included them in the STROBE module description program.

**Figure A-6. CPU Usage by Control Section Report**

```

STROBE* CICS PERFORMANCE SUPPLEMENT                DFHSIP
** TRANSACTION ACTIVITY **
CPU USAGE BY CONTROL SECTION FOR TRANSACTION NBHO
-----
MODULE NAME      SECTION              CPU TIME USED, PERCENT
NAME            NAME            COMPRESSED  FUNCTION      SOLO  TOTAL  .00  2.50  5.00  7.50  10.00
-----
.NUCLEUS IEATTUSD      SUPERVISOR SERVICES      .42  .42  .*
.NUCLEUS IEAVRT05     TIMER SERVICE             .05  .05  .
.NUCLEUS IEAVTSFR     SETFRR SERVICE           .05  .05  .
.NUCLEUS IEAVXSTK     S/B PCLINK STACK/UNSTACK .28  .28  .*
.SVC      SVC 216        USER SVC                  3.52  3.79  *****+
ADRIV05
IGC253
QRSR0230 .CICS  DFHELII  EX INT LKED STUB-C370 AP  .09  .09  .
QRSR0230 DRVCLI
QRSR0230 IDMSCINT  IDMS/CICS INTERFACE      .14  .14  .
QRSR0230 QRSR0230
-----
TOTAL                                44.84  47.85
-----
CPU USAGE BY CONTROL SECTION FOR TRANSACTION NCF0
-----
MODULE NAME      SECTION              CPU TIME USED, PERCENT
NAME            NAME            COMPRESSED  FUNCTION      SOLO  TOTAL  .00  2.50  5.00  7.50  10.00
-----
.CICS  DFHAIP  DFHEIP  EXEC(CMD-LEVEL)INT PGM  .09  .09  .
.CICS  DFHERM  DFHERM  RESOURCE MGR INT(RMI)MOD .14  .14  .
.CICS  DFHMCX  DFHMCX  BMS FAST PATH MODULE   .05  .05  .
.CICS  DFHSIP  DFHSAT  DS DOM-ATTACH CHNG MODE .05  .05  .
.CICS  DFHSIP  DFHSMF  SM DOM-MACRO-COMPAT FREE .00  .05  .
.CICS  DFHSIP  DFHTRPX TR DOM-TRC PUT-FAST PATH .05  .05  .
.CICS  DFHZCX  DFHZCX  LOCATE, ISC/IRC REQUEST .05  .05  .
IGC253
QRSR0300
SUPERVISOR SERVICES      .05  .05  .
-----
TOTAL                                .64  .69
-----

```

**MODULE NAME**

The name of a module or pseudo-module. A pseudo module is used to attribute CPU time to a module within a CICS region that is unidentifiable.

**Storage Pool Pseudo-Module Names**

The CPU Usage by Control Section reports show whether STROBE has attributed CPU time to one of the pseudo-modules representing one of the CICS storage pools. These pseudo-modules represent CPU time spent within the CICS region but not within an identifiable module. Usually, little CPU time is attributed to these pseudo-modules.

If, however, you had moved a program module to be executed in CICS dynamically acquired storage, STROBE would assign its CPU time, which can be high, to one of these pseudo-modules. Some monitor programs also execute in CICS dynamically acquired storage. The following pseudo-modules represent the CICS storage pools:

**Table A-1.** CICS Pseudo Module Descriptions

Name	Description	CICS Versions
.DSA	Identifies activity within the CICS dynamic storage area storage pool that is not within an identifiable module	CICS V2.1, V3.1, and V3.2
.ECDSA	Identifies activity within the extended CICS dynamic storage area storage pool that is not within an identifiable module	CICS V3.3, V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.EDSA	Identifies activity within the CICS extended dynamic storage area that is not within an identifiable module	CICS V3.1 and V3.2
.ERDSA	Identifies activity within the CICS extended read-only dynamic storage area that is not within an identifiable module	CICS V3.3, V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.EUDSA	Identifies activity within the CICS extended user dynamic storage area that is not within an identifiable module ( )	CICS V3.3, V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.UDSA	Identifies activity within the CICS user dynamic storage area that is not within an identifiable module	CICS V3.3, V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.CDSA	Identifies activity within the CICS dynamic storage area that is not within an identifiable module (for CICS V3.3, V4.1, V5.1 and V5.2).	CICS V3.3, V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.SDSA	Identifies activity within the shared dynamic storage area that is not within an identifiable module (CICS V4.1, V5.1 and V5.2)	CICS V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.ESDSA	Identifies activity within the extended shared dynamic storage area that is not within an identifiable module (CICS V4.1, V5.1 and V5.2)	CICS V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3
.RDSA	Identifies activity within the read-only dynamic storage area	CICS V4.1, and Transaction Server Releases 1.1, 1.2, and 1.3

- CICS Version 2.1 uses .DSA
- CICS Versions 3.1 and 3.2 use .DSA and .EDSA.
- CICS Version 3.3 uses .UDSA, .CDSA, .EUDSA, .ECDSA, and .ERDSA.
- CICS Version 4.1 uses .UDSA, .CDSA, .EUDSA, .ECDSA, .ERDSA, .RDSA, .SDSA, and .ESDSA.
- CICS Transaction Server Releases 1.1, 1.2, and 1.3 use .UDSA, .CDSA, .EUDSA, .ECDSA, .ERDSA, .RDSA, .SDSA, and .ESDSA.

See Chapter 3, “The STROBE Performance Profile for a CICS System” of *STROBE MVS Concepts and Facilities* for a more detailed description of pseudo-modules.

#### SECTION: NAME

The control section name or the true name of the module if STROBE classifies the module as a pseudo-module.

#### SECTION: COMPRESSED

Names the control section of a module that has been compressed within a pseudo-module name, such as .CICS.

#### SECTION: FUNCTION

A short description of the system modules function.

**CPU TIME USED, PERCENT**

The percentages of solo and total CPU time that the control section or pseudo-section consumed.

---

## Network Activity Report

The Network Activity report (Figure A-7 on page A-12) shows the data communication operations that CICS performed during the measurement session to collect transactions and input messages from terminals and to deliver output messages to terminals.

### Terminal Statistics

The Terminal Statistics report shows the terminal status and data communication activity for each terminal that was active during the measurement session.

**NAME**

The identifier of the terminal.

**TYPE**

The terminal type: both the hexadecimal and the interpreted form of the byte TCTTETI of the Terminal Control Table.

**STATUS**

The terminal status: both the hexadecimal and the interpreted form of the byte TCTTETS of the Terminal Control Table.

**MESSAGES: INPUT**

The number of input messages, including transaction requests, received from the terminal during the measurement session.

**MESSAGES: OUTPUT**

The number of output messages sent to the terminal during the measurement session.

**MESSAGES: TOTAL**

The sum of the input and output message counts.

### Terminal Exceptions

The Terminal Exceptions report shows the status and error counts for each terminal associated with an exceptional condition during the measurement session.

Figure A-7. Network Activity Report

STROBE* CICS PERFORMANCE SUPPLEMENT				DFHSIP ** NETWORK ACTIVITY ** TERMINAL STATISTICS				
NAME	TYPE		STATUS	MESSAGES				
				INPUT	OUTPUT	TOTAL		
XXDS	91	3277	REMOTE	06	ATTENDED, ATI	6	6	12
XXF9	91	3277	REMOTE	06	ATTENDED, ATI	6	6	12
XXNY	91	3277	REMOTE	06	ATTENDED, ATI	4	4	8
XXR6	91	3277	REMOTE	06	ATTENDED, ATI	5	6	11
XXU3	91	3277	REMOTE	06	ATTENDED, ATI	47	47	94
XXU4	91	3277	REMOTE	06	ATTENDED, ATI	11	10	94
XXU5	91	3277	REMOTE	06	ATTENDED, ATI	5	5	94
XXU6	91	3277	REMOTE	06	ATTENDED, ATI	1	1	94
XXU7	91	3277	REMOTE	06	ATTENDED, ATI	7	7	94
XX00	91	3277	REMOTE	06	ATTENDED, ATI	3	3	6
XX2W	91	3277	REMOTE	04	AUTO XACTN INIT	13	12	25
XX22	91	3277	REMOTE	06	ATTENDED, ATI	1	1	2
XX82	91	3277	REMOTE	06	ATTENDED, ATI	1	1	2
XYM5	91	3277	REMOTE	06	ATTENDED, ATI	5	5	10
XYN3	91	3277	REMOTE	06	ATTENDED, ATI	23	27	50
XY0J	91	3277	REMOTE	04	AUTO XACTN INIT	2	4	6
XY6X	91	3277	REMOTE	06	ATTENDED, ATI	22	25	47
XY78	91	3277	REMOTE	06	ATTENDED, ATI	5	9	14
XZ00	91	3277	REMOTE	06	ATTENDED, ATI	7	6	13
XZ17	91	3277	REMOTE	06	ATTENDED, ATI	1	1	2
ZZ63	91	3277	REMOTE	06	ATTENDED, ATI	18	18	36
						434	447	881
-----								
				TERMINAL EXCEPTIONS				
NAME	TYPE		STATUS					
				TRANS- ACTION ERRORS	TRANS- MISSION ERRORS	STORAGE VIOLA- TIONS		
CDR1	91	3277	REMOTE	06	ATTENDED, ATI	2	0	0
GWR1	91	3277	REMOTE	06	ATTENDED, ATI	0	3	0
XY6X	91	3277	REMOTE	06	ATTENDED, ATI	0	4	0
TOTAL						2	7	0

**NAME**

The identifier of the terminal.

**TYPE**

The terminal type: both the hexadecimal and the interpreted form of the byte TCTTETI of the Terminal Control Table.

**STATUS**

The terminal status: both the hexadecimal and the interpreted form of the byte TCTTETS of the Terminal Control Table.

**TRANSACTION ERRORS**

The number of transaction errors for the terminal.

**TRANSMISSION ERRORS**

The number of transmission errors for the terminal.

**STORAGE VIOLATIONS**

The number of transactions entered from the terminal that resulted in a storage violation during processing.

---

## Input-Output Activity Report

The Input-Output Activity report (Figure A-8 on page A-14) contains four types of reports that show the input and output activity for all CICS files that were active during the measurement session.

### Summary of Input-Output Operation

The Summary of Input-Output Operations report summarizes all input and output operations, except for communication activity, during the session.

#### **FILE**

The file type.

#### **COUNT**

The number of I/O operations for the file type, and the total of I/O operations.

#### **RATE PER SECOND**

The rate of I/O operations for the file type, and the total of I/O operations.

Figure A-8. Input-Output Activity Report

```

STROBE* CICS PERFORMANCE SUPPLEMENT
                                DFHSIP
                                ** INPUT-OUTPUT ACTIVITY **
                                SUMMARY OF INPUT-OUTPUT OPERATIONS
-----
                                COUNT                                RATE PER SECOND
FILE                                INPUT  OUTPUT  TOTAL  INPUT  OUTPUT  TOTAL
VSAM                                3,999  1,167  5,166  10.01  2.92  12.94
PROGRAM LOADING                     43          43    .11          .11
TRANSIENT DATA                       46          46    .12          .12
JOURNAL                               821          821  2.06          2.06
TRANSACTION BACKOUT                   591          591  1.48          1.48
-----
ALL TYPES                             4,042  2,625  6,667  10.12  6.57  16.70
-----
                                DATA BASE OPERATIONS--VSAM FILES
-----
INPUT OPERATIONS                                OUTPUT OPERATIONS                                TOTAL INPUT AND OUTPUT  STRING WAITS  BUFFER WAITS
FILE NAME  GET  UPDATE  BROWSE  TOTAL  ADD  UPDATE  DELETE  TOTAL  OUTPUT  TOTAL  MAX  TOTAL  MAX
ARXA10Z    0    0    24    24    0    0    0    0    24    0    0    0    0
ARXA20Y    0    0    219  219    0    0    0    0    219  0    0    0    0
ARXA30W    0    0    24    24    0    0    0    0    24    0    0    0    0
ARXA40V -R  0    0    24    24    0    0    0    0    24    0    0    0    0
ARXA50T    0    0    24    24    0    0    0    0    24    0    0    0    0
BRGTRAN    0    0    12    12    0    0    0    0    12    0    0    0    0
LLTT40Z -R  0    551   0    551  368  183  0    551  1,102  0    0    0    0
LLVV40Z    0    575  2,377  2,952  376  183  8    567  3,519  0    0    0    0
MASTERA    0    16   0    16    0    16  0    16    32    0    0    0    0
MASTERC    0    18   0    18    0    18  0    18    36    0    0    0    0
MSTRO001   3    7    0    10    1    5  0    6    16    0    0    0    0
MSTRO002   2    0   109  111   13  0    1    14   125  0    0    0    0
MSTRO003   0    0    3    3    2    0  0    2    5    0    0    0    0
MSTRO004   1    0   10   11    2    0  0    2   13    0    0    0    0
-----
TOTAL      6  1,167  2,826  3,999  762  405  9  1,176  5,175  0    0    0    0
-----
                                NUMBER OF OUTPUT OPERATIONS TO TRANSIENT DATA QUEUES
-----
DESTI-  INTRA-  EXTRA-  INDIRECT  AUTO  REMOTE  TOTAL
NATION  PARTITION  PARTITION
ACNT    0    0    14    0    0    14
CADL    0    0    8    0    0    8
CSCS    0    0    1    0    0    1
CSSL    0    9    0    0    0    9
-----
TOTAL    0    9    23  0    0    32
-----
                                JOURNAL STATISTICS
-----
JOURNAL  WRITE OPERATIONS  AVERAGE  TIMES  BUFFER
IDENTIFIER  RECORDS  BLOCKS  BLOCK SIZE  FULL  SHIFTS
1          821    627    432    0    0
-----
TOTAL     821    627    432    0    0

```

## Database Operations

The Database Operations report shows for each type of database (VSAM, BDAM, and local DL/I) the number and type of I/O operations for each file accessed during the session.

### FILE NAME

The name of the file. For VSAM and BDAM files for CICS V3.3 and greater, files that are remote are designated on the report with "-R" next to the file name. Remote files are not shown on the Data Set Characteristics report because they reside in a different address space than the one STROBE is measuring.

### INPUT OPERATIONS

The number of get, update, browse, and total input operations for the file. For local DL/I files, this report shows the number of get unique, get next, get hold unique, get hold next, get hold next within parent (HOLD N.P.), and total input operations for the file. (For CICS Transaction Server Release 1.1, 1.2, and 1.3, the browse column will show the sum of browse and browse-with-update operations.)

**OUTPUT OPERATIONS**

The number of add, update, delete, and total output operations for the file. For local DL/I files, the number of insert, replace, delete, and total output operations for the file.

**TOTAL INPUT AND OUTPUT**

The total of both I/O operations for the file.

**STRING WAITS**

For VSAM files only: the total number of I/O operations that waited for a string and the maximum number of operations that were waiting simultaneously.

**Note:** The maximum string waits may have been reached before the beginning of the measurement session.

**BUFFER WAITS**

For VSAM files only: the total number of I/O operations that waited for a buffer and the maximum number of operations that were waiting simultaneously.

**Note:** The maximum buffer waits may have been reached before the beginning of the measurement session.

## Number of Output Operations to Transient Data Queues

The Number of Output Operations to Transient Data Queues report shows the number and type of output operations for every transient data queue to which a record was written during the measurement session.

**DESTINATION**

The identifier of the transient data queue.

**INTRAPARTITION**

The number of output operations to an intrapartition data set.

**EXTRAPARTITION**

The number of I/O operations to an extrapartition data set.

**INDIRECT**

The number of I/O operations to an indirect destination.

**AUTO XACTN**

The number of output operations initiated through automatic transaction initiation.

**REMOTE**

The number of I/O operations to a remote destination via the intersystem communication facility.

**TOTAL**

The total number of I/O operations for the queue.

## Journal Statistics

The Journal Statistics report shows the output operations for each journal file that was active during the measurement session. (This report is not produced for CICS V5.1 and up.)

**JOURNAL IDENTIFIER**

The two-digit CICS identifier of the journal file.

**WRITE OPERATIONS: RECORDS**

The number of logical records written to the journal file.

**WRITE OPERATIONS: BLOCKS**

The number of physical blocks written to the journal file.

**AVERAGE BLOCK SIZE**

The average size of the blocks written to the journal file.

**TIMES BUFFER FULL**

The number of times that the journal file buffer filled up and forced an output operation.

**BUFFER SHIFTS**

The number of times records that were shifted in the journal file buffer because the buffer shift-up value (BUFSUV) was reached.

## Configuration Parameters and System-Wide Statistics Report

The Configuration Parameters and System-Wide Statistics report (Figure A-9 and Figure A-10 on page A-20) comprises seven reports that show certain counts that apply to the entire CICS region and the values of several important CICS parameters that affect performance of the region.

In the case of the observed maximum values shown in the following reports, the values are those observed since the last time the values were reset (at expiration of a statistics-gathering interval, at CICS initialization, or when a user has invoked a CICS-supplied transaction such as CSTT or CEMT PERFORM STATISTICS to reset the statistics counters). When a maximum value was reached before the measurement session, the associated value of the number of times at maximum is zero.

Figure A-9. Configuration Parameters and System-Wide Statistics Reports

```

STROBE* CICS PERFORMANCE SUPPLEMENT          DFHSIP
** CONFIGURATION PARAMETERS AND SYSTEM-WIDE STATISTICS **
TASK STATISTICS
-----
ALL TASKS
MAXIMUM NUMBER ALLOWED (MXT)      50
MAXIMUM NUMBER OBSERVED           22
TIMES AT MAXIMUM                   0
ACTIVE TASKS
MAXIMUM NUMBER ALLOWED (AMXT)    10
MAXIMUM NUMBER OBSERVED           7
CLASSED TASKS
-----
CLASS   TOTAL   MAXIMUM   MAXIMUM   TIMES AT   TOTAL   MAXIMUM   PURGE   TIMES AT   TOTAL   PURGED
TRANS  ALLOWED  OBSERVED  MAXIMUM  QUEUED    QUEUED  THRESHLD  THRESHLD  IMMED  -  QUEUED
DFHTCL01 15,811    1         0         3        2001    25       25       8         8         0
DFHTCL02  10         0         0        10         25       2         0         0         0         0
DFHTCL03  670         0         0         1         6         0         0         0         0         0
DFHTCL04  1         0         0         0         8         0         0         0         0         0
DFHTCL05  981         0         0         0         10        5         5         1         5         0
STORAGE STATISTICS
-----
MAIN STORAGE
ACQUISITIONS          105,010
RELEASES              104,975
STORAGE CUSHION RELEASES          0
STORAGE REQUESTS ENQUEUED         0
TIMES STORAGE QUEUE ESTABLISHED   0
CONDITIONAL GETMAIN FAILURES      0
MAXIMUM NUMBER OF STORAGE REQUESTS ENQUEUED 0
VTAM STATISTICS
-----
RECEIVE-ANY REQUESTS
MAXIMUM NUMBER          1
NUMBER OF DYNAMIC OPENS
NUMBER OF TIMES SHORT-ON-STORAGE
NUMBER OF TIMES AT MAX.  0
CONDITION OCCURRED      0
    
```

## Task Statistics

The Task Statistics report shows the number and types of tasks that CICS created to service the region.

### ALL TASKS: MAXIMUM NUMBER ALLOWED (MXT)

The maximum number of tasks that may exist concurrently. This number is the value of the parameter MXT in the System Initialization Table. If this value is dynamically changed by a CICS transaction or other means during a STROBE measurement session, the field will show that value rather than the value set in the System Initialization Table.

### ALL TASKS: MAXIMUM NUMBER OBSERVED

The maximum number of tasks that STROBE observed.

**Note:** The value reported is the maximum number of tasks observed since the last time CICS statistics were reset.

### ALL TASKS: TIMES AT MAXIMUM

The number of times that CICS was called upon to create a task and either:

- set the task counter equal to the maximum number of tasks allowed (MXT), or
- found that the maximum number of tasks had already been reached.

### ACTIVE TASKS: MAXIMUM NUMBER ALLOWED (AMXT)

The maximum number of tasks allowed to be active concurrently. This number is the value of the parameter AMXT of the System Initialization Table.

### ACTIVE TASKS: MAXIMUM NUMBER OBSERVED

The maximum number of tasks that were observed to be active at any one time.

**Note:** The value reported is the maximum number of tasks observed since the last time CICS statistics were re-set.

## Classed Tasks Statistics

The Classed Tasks Statistics report shows the number, names, and types of classed tasks (tasks created for transactions with Transaction Control Table definitions that specified a value for the parameter TCLASS) that CICS created. This report appears only if CICS created one or more classed tasks during the measurement session.

### CLASS

The class number, or the class name for CICS V4.1 and greater.

### TOTAL TRANS

The total number of transactions observed for the class. This statistic is only reported for CICS V4.1 and greater.

### MAXIMUM ALLOWED

The maximum number of tasks of this class that may be processed concurrently. This value is specified in the CMXT parameter in the System Initialization Table for CICS V3.3 and earlier. For CICS V4.1 and greater, this value is specified in the MAXACTIVE field of the TRANCLASS definition.

### MAXIMUM OBSERVED

The maximum number of tasks of this class that were in existence at any one time. This value includes active and inactive tasks.

**Note:** The value reported is the maximum number of tasks observed since the last time CICS statistics were reset.

**TIMES AT MAXIMUM**

The number of times that CICS was called upon to create a classed task and either

- set the task counter equal to the maximum number of tasks allowed for that class, or
- found that the maximum number of tasks had already been reached.

**TOTAL QUEUED**

The total number of transactions queued for the class. This statistic is only reported for CICS V4.1 and greater.

**MAXIMUM QUEUED**

The maximum number of transactions observed at any one time that were queued for the class. This statistic is only reported for CICS V4.1 and greater.

**PURGE THRESHLD**

The limit at which transactions are purged rather than added to the queue of transactions waiting to execute in this transaction class. This statistic is only reported for CICS V4.1 and greater.

**TIMES AT THRESHLD**

The number of times that the transactions for the class were at the purge threshold. This statistic is only reported for CICS V4.1 and greater.

**TOTAL PURGED IMMEDIATE**

The number of transactions that were purged immediately due to the queue of transactions for the class reaching the purge threshold. This statistic is only reported for CICS V4.1 and greater.

**TOTAL PURGED QUEUED**

The total number of transactions purged that were waiting in the queue to execute. This number includes those transactions purged explicitly through the Master Terminal, or implicitly through the purge threshold of the transaction class being lowered. This statistic is only reported for CICS V4.1 and greater.

## Storage Statistics

The Storage Statistics report shows storage control statistics.

**MAIN STORAGE: ACQUISITIONS**

The number of storage acquisitions (GETMAINS) that CICS made.

**MAIN STORAGE: RELEASES**

The number of storage releases (FREEMAINS) that CICS made.

**CONDITIONAL GETMAIN FAILURES**

The number of conditional storage requests that failed.

**STORAGE VIOLATIONS**

The number of storage violations that occurred.

**STORAGE CUSHION RELEASES**

The number of times that CICS signaled a short-on-storage condition, either because available main storage had fallen below a threshold value or because a storage area could not be allocated because the available storage was fragmented.

**STORAGE REQUESTS ENQUEUED**

The number of times that CICS was unable to satisfy a request for main storage.

**TIMES STORAGE QUEUE ESTABLISHED**

The number of times that CICS started a new storage queue.

**MAXIMUM NUMBER OF STORAGE REQUESTS ENQUEUED**

The maximum number of enqueued requests for storage.

## **VTAM Statistics**

The VTAM Statistics report shows performance statistics for VTAM operations performed for the CICS region.

**RECEIVE-ANY REQUESTS: MAXIMUM NUMBER**

The maximum number of receive-any request parameter lists (RPLs) that were posted by CICS at any single dispatching of terminal control.

**RECEIVE-ANY REQUESTS: NUMBER OF TIMES AT MAX**

The number of times that the maximum number of RPLs that STROBE detected was reached.

**NUMBER OF DYNAMIC OPENS**

The number of times that a VTAM Access Method Control Block was opened through the master terminal.

**NUMBER OF TIMES SHORT-ON-STORAGE CONDITION OCCURRED**

The number of times a VTAM indicated a VTAM temporary storage problem.

Figure A-10. Configuration Parameters and System-Wide Statistics Reports (Continued)

```

STROBE* CICS PERFORMANCE SUPPLEMENT          DFHSIP
** CONFIGURATION PARAMETERS AND SYSTEM-WIDE STATISTICS **
TEMPORARY STORAGE STATISTICS
-----
MAIN STORAGE
PUT AND PUTQ REQUESTS          687
GET AND GETQ REQUESTS         728
MAXIMUM VIRTUAL STORAGE USED    257,970

AUXILIARY STORAGE
PUT AND PUTQ REQUESTS          62
GET AND GETQ REQUESTS         61
NUMBER OF TIMES EXHAUSTED      0

QUEUES
MAXIMUM NUMBER OF IDS         281
MAXIMUM ITEMS IN A QUEUE      7
TIMES QUEUE CREATED          702

BUFFERS
NUMBER                          20
NUMBER OF BUFFER WAITS         0
MAXIMUM USERS WAITING          0
NUMBER OF READS                0
NUMBER OF WRITES               0
WRITES FORCED BY RECOVERY      0

CONTROL INTERVALS
SIZE                            4,096
NUMBER                          4,140
MAXIMUM NUMBER ALLOCATED       58
NUMBER OF COMPRESSIONS        38
PUTS EXCEEDING CI SIZE        0
NUMBER OF I/O ERRORS          0

MESSAGE SETS
EXTENSION THRESHOLD           0
NUMBER OF TSGID EXTENSIONS    0

SHARED QUEUES
POOLS CONNECTED               20
POOLS DEFINED                 55
NUMBER OF READS               542
NUMBER OF WRITES              237

STRINGS
NUMBER                          5
NUMBER OF STRING WAITS        0
MAXIMUM USERS WAITING         0
MAXIMUM NUMBER IN USE         0

-----
TRANSIENT DATA STATISTICS--BUFFER AND STRING STATISTICS
-----
BUFFERS
NUMBER ALLOCATED               3
MAXIMUM NUMBER IN USE         3
ALLOCATION REQUESTS
TOTAL                          0
MAXIMUM CONCURRENT            1
ENQUEUED REQUESTS
TOTAL                          0
MAXIMUM CONCURRENT            0

STRINGS
NUMBER                          3
ALLOCATION REQUESTS
TOTAL                          0
MAXIMUM CONCURRENT            1
ENQUEUED REQUESTS
TOTAL                          0
MAXIMUM CONCURRENT            0

CONTROL INTERVALS
NUMBER                          3,420
LENGTH                         8,192
MAXIMUM NUMBER ALLOCATED       40

I/O OPERATIONS
PUT REQUESTS                   0
GET REQUESTS                   0
NO-SPACE RETURNS              0
I/O ERRORS                     0

-----
MISCELLANEOUS STATISTICS
-----
DYNAMIC TRANSACTION BACKOUT
NUMBER OF RECORDS LOGGED       0
NUMBER OF RECORDS SPILLED      0

STORAGE DUMPS
NUMBER OF TRANSACTION DUMPS    0
NUMBER OF WRITE ERRORS         0

```

## Temporary Storage Statistics

The Temporary Storage Statistics report shows performance statistics for operations on CICS temporary storage.

### MAIN STORAGE: PUT AND PUTQ REQUESTS

The number of records written to main temporary storage.

### MAIN STORAGE: GET AND GETQ REQUESTS

The number of records retrieved from main temporary storage.

### MAIN STORAGE: MAXIMUM VIRTUAL STORAGE USED

The maximum amount of virtual storage in use at any one time for temporary storage data.

### AUXILIARY STORAGE: PUT AND PUTQ REQUESTS

The number of records written to auxiliary temporary storage.

**AUXILIARY STORAGE: GET AND GETQ REQUESTS**

The number of records retrieved from auxiliary temporary storage.

**AUXILIARY STORAGE: NUMBER OF TIMES EXHAUSTED**

The number of times one or more transactions may have been suspended because of insufficient space in a temporary storage data set.

**QUEUES: MAXIMUM NUMBER OF IDS**

The maximum number of temporary storage queue names in existence at one time.

**QUEUES: MAXIMUM ITEMS IN A QUEUE**

The maximum number of entries held at one time on any temporary storage queue.

**QUEUES: TIMES QUEUE CREATED**

The number of temporary storage queues that CICS created.

**BUFFERS: NUMBER**

The number of buffers allocated for temporary storage by CICS.

**Note:** The number of buffers reported in the Data Set Characteristics report allocated for temporary storage (data set DFHTEMP) can be incorrect because CICS is handling temporary storage buffer allocation.

**BUFFERS: NUMBER OF BUFFER WAITS**

The number of times a request for a temporary storage buffer was enqueued because all buffers were in use.

**BUFFERS: MAXIMUM USERS WAITING**

The maximum number of temporary storage requests that were enqueued because no buffers were available.

**BUFFERS: NUMBER OF READS**

The number of times that a control interval had to be read.

**BUFFERS: NUMBER OF WRITES**

The number of WRITE operations issued for the temporary storage data set. This number includes WRITE operations forced by recovery, as well as those forced because the buffer was needed to accommodate another control interval.

**BUFFERS: WRITES FORCED BY RECOVERY**

The number of WRITE operations issued because recovery was specified for queues.

**CONTROL INTERVALS: SIZE**

The size of the control interval used to transmit data between direct-access storage and main storage.

**CONTROL INTERVALS: NUMBER**

The number of control intervals available for temporary storage data.

**CONTROL INTERVALS: MAXIMUM NUMBER ALLOCATED**

The maximum number of control intervals containing active data at one time.

**CONTROL INTERVALS: NUMBER OF COMPRESSIONS**

The number of times that CICS compressed the unused space in a control interval following a user-issued deletion of a record.

**CONTROL INTERVALS: PUTS EXCEEDING CI SIZE**

The number of records written to temporary storage that exceeded the size of the control interval.

**CONTROL INTERVALS: NUMBER OF I/O ERRORS**

The number of I/O errors that occurred during operations on the auxiliary storage data set used for temporary storage.

**MESSAGE SETS: EXTENSION THRESHOLD**

The number of records to be held in a single temporary storage group identifier. This statistic is not reported for CICS Transaction Server Release 1.1, 1.2, and 1.3.

**MESSAGE SETS: NUMBER OF TSGID EXTENSIONS**

The number of times CICS created a temporary storage group (TSGID) extension. This statistic is not reported for CICS Transaction Server Release 1.1, 1.2, and 1.3.

**SHARED QUEUES: POOLS CONNECTED**

The number of storage pools connected for shared temporary storage queues. This statistic is only reported for CICS Transaction Server Release 1.1, 1.2, and 1.3.

**SHARED QUEUES: POOLS DEFINED**

The number of storage pools defined for shared temporary storage queues. This statistic is only reported for CICS Transaction Server Release 1.1, 1.2, and 1.3.

**SHARED QUEUES: NUMBER OF READS**

The number of reads observed for shared temporary storage queues. This statistic is only reported for CICS Transaction Server Release 1.1, 1.2, and 1.3.

**SHARED QUEUES: NUMBER OF WRITES**

The number of writes observed for shared temporary storage queues. This statistic is only reported for CICS Transaction Server Release 1.1, 1.2, and 1.3.

**STRINGS: NUMBER**

The number of VSAM strings specified in the TSMGSET parameter of the System Initialization Table.

**STRINGS: NUMBER OF STRING WAITS**

The number of I/O requests for auxiliary temporary storage that were unqueued because no string was available.

**STRINGS: MAXIMUM USERS WAITING**

The maximum number of I/o requests waiting at any one time because no string was available.

**STRINGS: MAXIMUM NUMBER IN USE**

The maximum number of concurrent I/O operations observed for auxiliary temporary storage.

## Transient Data Statistics

The Transient Data Statistics—Buffer and String Statistics report shows statistics related to buffers, strings, control intervals, and I/O operations on transient data queues.

**BUFFERS: NUMBER ALLOCATED**

The number of buffers allocated for transient storage. This value is specified in the TD parameter of the System Initialization Table.

**BUFFERS: MAXIMUM NUMBER IN USE**

The maximum number of buffers for transient data that were in use at a single time.

**BUFFERS: ALLOCATION REQUESTS, TOTAL**

The number of requests for transient data buffers.

**BUFFERS: ALLOCATION REQUESTS, MAXIMUM CONCURRENT**

The maximum number of concurrent allocation requests for transient data buffers.

**BUFFERS: ENQUEUED REQUESTS, TOTAL**

The number of requests for transient data buffers that were enqueued because no buffer was available.

**BUFFERS: ENQUEUED REQUESTS, MAXIMUM CONCURRENT**

The maximum number of requests for transient data buffers that were enqueued concurrently because no buffer was available.

**CONTROL INTERVALS: NUMBER**

The number of available control intervals allocated for transient data.

**CONTROL INTERVALS: LENGTH**

The size, in bytes, of control intervals for transient data.

**CONTROL INTERVALS: MAXIMUM NUMBER ALLOCATED**

The maximum number of control intervals in use.

**STRINGS: NUMBER**

The number of strings allocated for transient storage. This value is specified in the TD parameter of the System Initialization Table.

**STRINGS: ALLOCATION REQUESTS, TOTAL**

The number of requests for transient data strings.

**STRINGS: ALLOCATION REQUESTS, MAXIMUM CONCURRENT**

The maximum number of concurrent allocation requests for transient data strings.

**STRINGS: ENQUEUED REQUESTS, TOTAL**

The number of requests for transient data strings that were enqueued because no string was available.

**STRINGS: ENQUEUED REQUESTS, MAXIMUM CONCURRENT**

The maximum number of requests for transient data strings that were enqueued concurrently because no string was available.

**I/O OPERATIONS: PUT REQUESTS**

The number of PUT requests for transient data storage.

**I/O OPERATIONS: GET REQUESTS**

The number of GET requests for transient data storage.

**I/O OPERATIONS: NO-SPACE RETURNS**

The number of no-space returns in response to requests for operations on transient data storage.

**I/O OPERATIONS: I/O ERRORS**

The number of errors that occurred during I/O operations on transient data storage.

## Miscellaneous Statistics

The Miscellaneous Statistics report shows statistics related to storage dumps and dynamic transaction backout operations.

**DYNAMIC TRANSACTION BACKOUT: NUMBER OF RECORDS LOGGED**

The number of records written to the dynamic log for dynamic transaction backout. (For CICS Transaction Server Release 1.1, 1.2, and 1.3, this statistic is not reported.)

**DYNAMIC TRANSACTION BACKOUT: NUMBER OF RECORDS SPILLED**

The number of records for dynamic transaction backout that were written to temporary storage because the dynamic log was full. (For CICS Transaction Server Release 1.1, 1.2, and 1.3, this statistic is not reported.)

**STORAGE DUMPS: NUMBER OF TRANSACTION DUMPS**

The number of storage dump records written.

**STORAGE DUMPS: NUMBER OF WRITE ERRORS**

The number of WRITE errors that occurred during storage dump operations.

## Appendix B. The CICS Transaction Profile

This appendix provides examples and full descriptions of the report fields and values contained in the STROBE CICS Transaction Profile.

### Transaction Summary Report

The Transaction Summary report (Figure B-1) provides general information about all transactions that were seen during the measurement period. All values reported are based on total time and count activity collected by STROBE.

Figure B-1. Transaction Summary Report

STROBE PERFORMANCE PROFILE				08/14/2002				
TRANSACTION BASELINE 0.00			** TRANSACTION SUMMARY **					
NAME	PROFILED	COUNT	CPU TIME	DISPATCH	MEAN SERVICE	TIME	TOTAL	
			PERCENT	DELAY	SUSPEND	EXEC		
.CICS			6.14					
.DFHSKTS			.77					
.IGGOCLA			.17					
CEMT		1	3.41					
CKAM		1	.00					
CKTI		11	12.35					
CSNE		1	.00					
CSSY		3	.00					
GSTP		1	1.28					
EXEC	Y	20	.26	.39	.98	.07	1.44	
LCOM	Y	9	4.77	4.33	17.39	.41	22.13	
LINK	Y	14	2.04	3.49	1.43	.26	5.18	
LLAT	Y	33	16.35	.45	5.61	.94	7.00	
MQAA	Y	74	5.88	.15	3.32	.03	3.50	
MQAO	Y	74	6.56	.13	2.00	.04	2.17	
NQAX	Y	7	5.20	.12	.20	.05	.37	
MQBB	Y	76	6.39	.16	3.43	.04	3.63	
MQBO	Y	76	5.79	.17	2.07	.04	2.27	
MQBX	Y	76	4.51	.16	.23	.04	.43	
MQCC	Y	77	5.37	.14	3.38	.03	3.55	
MQCO	Y	77	8.01	.16	2.03	.05	2.24	
MQCX	Y	77	4.60	.14	.20	.04	.36	
PRFC	Y	2	.17			.06	.06	
TOTAL		777	100.00	AVERAGES	1.19	3.82	.26	1.60

#### NAME

The transaction identifier - if the name is not alphanumeric it shows in hexadecimal notation. Three types of transactions are reported:

- User transaction - A user-defined transaction that executes user written programs
- System transaction - A CICS supplied transaction that provides internal services or access to CICS resources. (System transaction always begin with "C" and sometimes do not have counts associated with them. Mean service time does not appear for system transactions.)
- Mirror transaction - A CICS-supplied transaction that acts on behalf of the initial user transaction that was executed on a remote system.

- The STROBE CICS Feature associates execution activity with user and CICS system transactions. When the STROBE CICS Feature detects activity in the main CICS task and neither a user nor a CICS system transaction is in control, the Feature assumes that CICS is performing activities on its own behalf and it attributes that time to a pseudo-transaction named .CICS.

When a task other than the main CICS transaction-processing task is executing, the STROBE CICS Feature attributes the CPU time to a pseudo-transaction that is assigned a name consisting of an initial period, and the first seven characters of the module name in which execution of the task was initiated. The STROBE CICS journalling task and asynchronous VSAM task are attributed using this convention.

When a task is initializing or terminating and the STROBE CICS Feature cannot identify the name of such a module, activity is attributed to the pseudo-transaction .NOPRB.

**PROFILED**

A "Y" in this column indicates that a transaction detail report was created for the transaction. You can request a detail report for a specific transaction by specifying the transaction name in the "CICS TRANSACTION PROFILING FILTER" field of the STROBE - TAILOR REPORT panel. If you do not specify any transaction filters on the STROBE - TAILOR REPORT panel, detail reports are created for the transactions you specified on the STROBE - DATA COLLECTORS panel when you submitted the measurement request.

**COUNT**

The total number of times transactions were invoked during the measurement session.

**CPU TIME PERCENT**

The total percent of all CPU time consumed in the CICS region for all transactions, which was used by the transaction.

**Note:** If a transaction was attached prior to the start of the STROBE measurement session and still active at the end of the session, the reported service time may be less than the actual service time for the transaction. For conversational transactions, the average total time the transaction is active during the measurement was reported.

**MEAN SERVICE TIME:DISPATCH DELAY**

The average number of seconds when a transaction is ready to run but is waiting to be dispatched.

**MEAN SERVICE TIME:SUSPEND**

The average number of seconds that a transaction is waiting on a resource before being able to be dispatched.

**MEAN SERVICE TIME:EXECUTE**

The average number of seconds that a transaction is running.

**MEAN SERVICE TIME:TOTAL**

The total number of seconds that transactions are in a dispatch delay state, suspend state and an execution state.

**TOTAL: COUNT**

Total number of times transactions were invoked during the measurement.

**TOTAL: CPU TIME PERCENT**

Total percent of CPU time consumed in the CICS region for all transactions.

**TOTAL AVERAGES: DISPATCH DELAY**

Average mean service time for all user and mirror transactions in the Dispatch Delay state.

**TOTAL AVERAGES: SUSPEND**

Average mean service time for all user and mirror transactions in the Suspend state.

**TOTAL AVERAGES: EXEC**

Average mean service time for all user and mirror transactions in the EXEC state..

**TOTAL: OVERALL AVERAGES**

Combined (overall) averages for the Dispatch Delay, Suspend, and Execution states.

**Note:** If any of the transactions measured by STROBE (those that have mean service time associated with them) are conversational transactions that experienced significant delays in response time during the measurement session, then the (overall) averages: suspend value and the overall averages: total value will be large due to the nature of conversational transactions:

## Transaction Profile Reports

The Transaction Profile contains three transaction-specific reports for each transaction that you chose to profile. These reports are designed for use by the application programmer. The set of reports is presented in the following sequence: CICS API Service Time, CICS Non-API Service Time, and CICS API Service Time Detail. Each transaction that is profiled appears in alphabetical order.

### CICS API Service Time Report

The CICS API Service Time report (Figure B-2) contains the average number of seconds that a CICS API command issued by the measured application is in a suspend or an execution state. The information is in alphabetical ordered by each Module section that is part of the program. To appear in the report, the API Command Mean Service Time for Suspend and Execution states must be equal to or greater than the CICS Transaction Profile threshold value. The default threshold value is 0.01 seconds.

For commands with Suspend and Execution Mean Service Times that are lower than the CICS Transaction Profile threshold value, the measurement information is compressed into a pseudo transaction named “.COMPRES” and appears as the last line in the COMMAND column.

**Figure B-2.** CICS API Service Time Report

STROBE PERFORMANCE PROFILE		DFHSIP				
TRANSACTION BASELINE 0.0		** PROFILE FOR TRANSACTION LCOM **		MARGIN OF ERROR 1.79%		
CICS API SERVICE TIME						
MODULE	SECTION	COMMAND	RESOURCE	STMT#	OFFSET	MEAN SERVICE TIME SUSPEND EXEC
-	STDCLCOM					
		STARTBR	STDCLCFL		000544	3.63 .00
		READNEXT	STDCLCFL		0005F6	.00 .09
		WRITEQ TS			000648	.07 .19
		READQ TS			00079A	.14 .03
		READ	STDCLCFL		000800	5.59 .00
		REWRITE	STDCLCFL		000896	7.73 .01
		RETURN			000936	.00 .02
						----
MODULE -	STDCLCOM	API	SERVICE TIME	FOR TRANSACTION	LCOM	17.16 .34

**COMMAND**

The CICS EXEC API command. (If the Feature is installed, the DB2, IMS, MQSeries or Java command).

**COMMAND RESOURCES**

The argument used in EXEC CICS file control, program control, and transient data commands. For DB2, the DBRM name is reported. For IMS requests, the Program Specification Block (PSB) is reported. For MQSeries, the queue name token (generated by STROBE) is reported. For Java, the package, class and method name are printed.

**STATEMENT NUMBER**

The DBRM statement number, if appropriate.

**OFFSET**

The offset of the source causing program activity.

**MEAN SERVICE TIME: SUSPEND**

The average service time, in seconds, that the command is in a suspend state.

**MEAN SERVICE TIME: EXECUTION**

The average service time, in seconds, that the command is in an execution state.

## CICS Non-API Service Time Report

The CICS Non-API Service Time report (Figure B-3) contains the service time reported for transactions that was not directly related to CICS services. The report data represents the remainder of activity not contained in the CICS API Service Time report. The information is presented in alphabetical order: Dispatch Delay Time, Suspend Time, and Execution Time. Each state will be sorted by Resource Type and Resource Name, or Module and CSECT. For resources, the report presents the Resource Type and the Name (if available) of the resource where the sum of the Dispatch Delay and Suspend Mean Service Times are equal to or greater than the TLIBASE value. Not every resource type will have an associated resource name. For instance a Resource name is not provided for the API service MAXT nor the “.NONCICS” pseudo module.

Any module or section is reported that has an average execution Service Time equal to or greater than the specified CICS Transaction Profile threshold value that is reported. Resources or CSECTs whose Mean Service Time is less than the threshold value will be compressed into a pseudo “.COMPRES” module which appears as the last detail line of the report.

**Figure B-3.** CICS Non-API Service Time Report

STROBE PERFORMANCE PROFILE				08/14/2002		
TRANSACTION BASELINE 00.01			PROFILE FOR TRANSACTION LCOM		MARGIN OF ERROR 1.79%	
			** NON-API SERVICE TIME **			
RESOURCE TYPE	RESOURCE NAME	MODULE	SECTION	-----MEAN SERVICE DISPATCH DELAY	TIME ----- SUSPEND	EXEC
.DELAY	.MVS			.11		
.DELAY	.QR_TCB			4.02		
.DELAY	.RO_TCB			.19		
PROGRAM	STDCLCOM				.23	
		STDCLCOM				.06
		SVC 026				.01
TRANSACTION LCOM NON-API SERVICE TIME TOTALS				4.32	.23	.07

**RESOURCE TYPE**

The type of resource task that the command is using. Several pseudo-values are sometimes reported for this field because the transaction is ready to execute but another task is using the TCB that it requires.

**Table B-1.** Pseudo-Resource Types

Resource Type	Resource Name	Meaning
.DELAY	.MVS	The transaction is waiting on some other MVS resource.
.DELAY	.xx_TCB	The transaction is waiting to be dispatched on of the CICS mode TCBs. See the next table for list of these modes.
CDB2TBC	.DB2_TCB	The transaction is waiting to be dispatched on to a DB2 TCB
CDB2RDYQ	.DB2_THD	The transaction is waiting to be dispatched on to a DB2 thread
.INTCALL	.MQ_TCB	An IBM MQSeries internal call is being issued on behalf of the transaction.
.CICSDB2	.DB2_TCB	An IBM internal DB2 call is being issued on behalf of the transaction, (i.e. SYNCPOINT)
.LOKWAIT	LMQUEUE	The suspended transaction cannot acquire a lock on a requested resource.
.JVMWAIT		The transaction is waiting to be dispatched by a Java application.
.NONCICS		An External Resource Manager suspended the transaction and the user does not have the appropriate STROBE Feature.

**RESOURCE NAME**

The name of the resource for which the task is waiting.

**Table B-2.** Pseudo-Resource Names

Resource Name	Explanation
.xx-TCB	.xx indicates the CICS dispatch mode TCB that was requested. The dispatch modes reported are:  FO-file owning TCB used to offload various file operations RO-resource owning TCB under which program loads are performed QR-main CICS TCB under which applications are subdispatched CO-concurrent TCB used to offload I/O by various domains SZ-used for Front End Programming Interface (FEPI) SL-sockets domain listener TCB SO-is used by the Sockets domain S8-TCBs used by Sockets domain for SSL support J8-Java virtual machine L8-LA370 DB2 TCB
.MVS	The transaction is waiting some MVS resource.

**MODULE**

Name of the executing module. (If a .xxxxx pseudo-module appears in this column, see Appendix A of *STROBE STROBE MVS Concepts and Facilities* to identify its meaning.)

**SECTION**

Name of the executing module section. (If a .xxxxxx pseudo-section appears in this column, see Appendix A of STROBE *STROBE MVS Concepts and Facilities* to identify its meaning.)

**MEAN SERVICE TIME: DISPATCH DELAY**

The average number of seconds that a transaction was in the dispatch delay state due to the identified resource.

**MEAN SERVICE TIME: SUSPENDED**

The average number of seconds that a transaction was in the suspend state due to the identified resource.

**MEAN SERVICE TIME: EXECUTION**

The average number of seconds that the module or section was running.

**MEAN SERVICE TIME TOTAL: DISPATCH DELAY**

The total average number of seconds that the transaction was in the dispatch delay state due to the identified resources.

**MEAN SERVICE TIME TOTAL: SUSPENDED**

The total average number of seconds that the transaction was in the suspend state due to the identified resources.

**MEAN SERVICE TIME TOTAL: EXECUTION**

The total average number of seconds that the reported modules or sections were running.

## CICS API Service Time Detail Report

The CICS API Service Time Detail report (Figure B-4 on page B-7) identifies all resources that the CICS API commands use. To appear in the report, the average suspend time for the resource must equal or exceed the specified CICS Transaction Profile threshold value. The report also describes resources used by module/sections if the average execution service time equals or exceeds the threshold value. If the value is set too high, STROBE does not generate the report and you should lower the threshold. If all details of a command do not meet or exceed the threshold, the command is suppressed. If all commands are suppressed, the entire report is not produced. This report includes a function descriptor for each resource.

Figure B-4. CICS API Service Time Detail Report

** PROFILE DFHSIP FOR TRANSACTION LCOM ** CICS API SERVICE TIME DETAIL										
TRANSACTION BASELINE 0.00									MARGIN OF ERROR 1.79%	
MODULE - STDCLCOM										
SECTION - STDCLCOM										
COMMAND	COMMAND RESOURCE	OFFSET	STMT#	FUNCTION	RESOURCE TYPE	RESOURCE NAME	MODULE	SECTION	MEAN SERV SUSPEND	TIME EXEC
STARTBR	STDCACFL	000544		FC-WAIT FOR VSAM I/O	FCIOWAIT				.01	
				FC-WAIT FOR VSAM STRING	FCPSWAIT				2.54	
				KC-SINGLE RESRCE ENQUEUE	KC_ENQ				.63	
				KC-EVENT OR TERMINAL	KC_COMPAT				.43	
READNEXT	STDCLCFL	0005F6		APPL INTERFACE PGM			DFHAIP			.01
				COMMON SYSTEM AREA			DFHCSA			.01
				FILE CNTL EXEC INTERFACE			DFHFCEI			.03
				FILE ACCESS REQ PROCESSR			DFHFCVS			.02
				VSAM RECORD MANAGEMENT			IDA019L1			.01
				TIMER SUPERVISION			IEA0TI00			.01
WRITEQ TS		000648		TS-AUX I/O IN PROGRESS	TSIO				.07	
				COMMON SYSTEM AREA			DFHCSA			.01
				EXEC INTERFACE-TEMP STOR			DFHETS			.01
				SM DOM-MACRO-COMPAT FREE			DFHSIP	DFHSMMF		.02
				SM DOM-MACR-COMPAT GETM			DFHSIP	DFHSMMG		.02
				TR DOM-TRC PUT-FAST PATH			DFHSIP	DFHTRPX		.04
				CICS COMPOSITE ROUTINES			DFHSIP	KESRT		.01
				TEMPORARY STOR CNTL PGM			DFHTSP			.04
				TEMP STOR UN TBL ABS TYP			DFHTSUT			.03
READQ TS		00079A		TS-AUX I/O IN PROGRESS	TSIO				.14	
				EXEC INTERFACE-TEMP STOR			DFHETS			.01
				SM DOM-MACR-COMPAT GETM			DFHSIP	DFHSMMG		.01
				VTAM WORKING SET MODULE			DFHZCB			.01
				VTAM			ISTAIVL1			.01
READ	STDCLCFL	000800		FC-WAIT FOR VSAM STRING	FCPSWAIT				5.59	
REWRITE	STDCKCFL	000896		FC-WAIT FOR VSAM I/O	FCIOWAIT				7.73	
				FILE CNTL EXEC INTERFACE			DFHFCEI			.01
				VSAM RECORD MANAGEMENT			IDA019L1			.01
RETURN		000936		VTAM WORKING SET MODULE			DFHZCB			.01
				VTAM			ISTAPVL2			.01

**MODULE**

The module that was measured and is associated with the transaction being profiled.

**SECTION**

The control section name that was measured.

**COMMAND**

The name of the EXEC CICS commands found executing during the measurement session.

**OFFSET**

The offset of the source causing program activity.

**STATEMENT #**

The DBRM statement number of the command acting on DBRM.

**RESOURCE TYPE**

The name of the resource used. If the transaction suspends for a lock manager wait the following pseudo-type information is reported.

**Table B-3.** Pseudo Resource Types

Resource type	Resource name	Explanation
.DELAY	.MQ_TCB	A transaction is suspended, waiting to be dispatched on an MQSeries TCB.
.LOKWAIT	LMQUEUE	The suspended task cannot require a lock on a request resource.

Also, a suspended transaction can wait on a resource with a name value that contains little useful information. The following table explains this type of reporting. STROBE reports a blank column for values that can vary widely, such as terminal ID.

**Table B-4.** Resource Names

Resource type	Resource name reported by CICS	Resource name reported by STROBE	Explanation
ALLOCATE	TCTTETI	blank	A user attempted to obtain a session with another CICS region, but all sessions were in use.
ICGTWAIT	terminal ID	blank	A user task issued an EXEC CICS RETRIEVE WAIT command and the data to be retrieved is not available.
ICWAIT	terminal ID	blank	A user task issued an EXEC CICS DELAY command that was not yet completed.
Temporary storage resource types, prefixed with 'TS'	temporary storage queue name	blank	A user task has made a request for temporary storage that has not yet completed.
IRLINK	SYSIDNT+ session name	SYSIDNT only	(SYSIDNT is the identifier of the remote CICS region.) The task is using inter-region communications (IRC).
JCIOBLOCK	Jnnbbbb, where 'nn' is journal number and 'bbbb' is block number	Jnn	A user task made a JOURNAL request with the WAIT option and is waiting for the I/O to complete.
JCLASTBK	Jnnbbbb, where 'nn' is journal number and 'bbbb' is block number	Jnn	A user task has requested a journal switch when I/O is already active.

**FUNCTION**

A description of the resource type.

**MODULE**

Name of the module that STROBE saw active.

**SECTION**

The name of the resource that STROBE saw active.

**MEAN SERVICE TIME: SUSPEND**

The mean service time, in seconds, that the command was in a suspend state.

**MEAN SERVICE TIME: EXECUTION**

The mean service time, in seconds, that the command was in an execution state.

## Region Level Reports

The region-level reports are a set of two reports that show transaction data on a region-level basis. These reports are designed for use by the systems programmer. The first is the Region Suspend by Class report and the second is the Region Suspend by Class by Resource report.

### Region Suspend by Class Report

The Region Suspend By Class report (Figure B-5) presents classes of reasons why a transaction is suspended. It summarizes the percentage of all suspend and dispatch delay times for the region during the measurement, and provides the suspend time for the average transaction in that category.

For all Suspend Classes that cause an average suspend time for a transaction that is less than the RLIBASE, STROBE compressed their report data into a pseudo-class called .COMPRES, which is presented as the last detail line of the report.

**Figure B-5.** Region Suspend by Class Report

STROBE* PERFORMANCE PROFILE		08/14/2002	
REGION BASELINE 0.01		REGION SUSPENDED BY CLASS	
SUSPEND CLASS	PERCENT OF REGION SUSPEND	AVG. TX SUSPEND TIME IN SECS	
DISPATCH DELAY	2.40	4.02	
FILE CONTROL	97.02	162.21	
MAXIMUM TASKS	.29	.50	
PROGRAM MANAGEMENT	.27	.45	
TOTALS	100.00	167.18	

#### SUSPEND CLASS

The name of the class that was in a suspended state. Two pseudo-classes are used for values in this column.

**Table B-5.** Pseudo-Class Names

Pseudo Class	Explanation
.NONCICS	The transaction was suspended by a external resource manager, such as a subsystem interface. (DB2, IMS, or MQSeries)
.DELAY	The CICS task is ready to run but is waiting for access to a TCB.

#### PERCENT OF REGION SUSPEND

The percentage of time that the transactions running in a region were in a suspended state due to the listed class.

#### SUSPEND TIME AVERAGE TX

The average number of seconds that transactions running in the region were in suspend state because of the listed suspend class.

#### TOTAL: PERCENT OF REGION SUSPEND

The total percentage of transactions running in the region that suspended due to one of the listed classes.

#### TOTAL: SUSPEND TIME AVERAGE TX

The average number of seconds that any transaction running in the region was in a suspended state.

## Region Suspend by Resource within Class Report

The Region Suspend By Resource within Class report (Figure B-6) shows, for each class reported in the Region Suspend by Class report, the resource types and names that STROBE found that caused a transaction suspension. A function descriptor is provided for each resource. STROBE will not report any resource that causes an average suspension for a transaction that is less than the region level threshold value. A report is generated for each class reported by STROBE except for the “.NONCICS” and the “.COMPRES” pseudo-classes.

**Figure B-6.** Region Suspended by Resource within Class Report

STROBE* PERFORMANCE PROFILE		08/14/2002		PAGE 5P	
REGION BASELINE 00.01%		REGION SUSPENDED BY RESOURCE WITHIN CLASS			
CLASS: DISPATCH DELAY					
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX	
.DELAY	.MVS	DY-DISPATCH DELAY	.04	.07	
.DELAY	.MVS	DY-DISPATCH DELAY	2.21	3.70	
.DELAY	.MVS	DY-DISPATCH DELAY	.14	.25	
CLASS: FILE CONTROL					
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX	
FCIOWAIT	STDCLCFL	FC-WAIT FOR VSAM I/O	4.92	8.24	
FCIOWAIT	WPATRAN	FC-WAIT FOR VSAM I/O	.11	.19	
FCPSWAIT	STDCLCFL	FC-WAIT FOR VSAM STRING	91.97	153.77	
CLASS: MAXIMUM TASKS					
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX	
TCLASS	DFHTCLO1	MX-TCLASS LIMIT REACHED	.29	.50	
CLASS: PROGRAM MANAGEMENT					
RESOURCE TYPE	RESOURCE NAME	FUNCTION	PERCENT OF REGION SUSPEND	SUSPEND TIME AVERAGE TX	
PROGRAM	LINK0	PG-PROGM LOAD CONTENTION	.25	.43	
PROGRAM	LINK2	PG-PROGM LOAD CONTENTION	.00	.01	

**RESOURCE TYPE**

The type of resource that is the source of the class type causing suspension.

**RESOURCE NAME**

The name of the resource that is the source of the class type causing suspension.

**FUNCTION**

The function descriptor for the resource.

**PERCENT OF REGION SUSPEND**

The percent of time the region was in a suspended state due to the resource.

**SUSPEND TIME AVERAGE TX**

The average time the transaction was in a suspend state due to the resource.

## Appendix C. Terminal Types

When STROBE detects a transaction in a CICS region, it interprets the transaction type based on the terminal associated with the transaction. The following tables list the types of terminals that cause STROBE to interpret a transaction as either interactive or output only.

---

### Interactive Terminals

3770	3725 REMOTE
CONSOLE	3277 REMOTE
2260 REMOTE	3601
2260 LOCAL	3614
2265	ISC MM CONVERSATION
3277 REMOTE	

---

### Output-only Terminals

MODEL 33/35 TWX	3284 REMOTE
TELETYPEWRITER (WORLD TRADE)	3286 REMOTE
2740	3284 LOCAL
2741 CORRESPONDENCE	3286 LOCAL
2741 EBCDIC	



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