

41.0 Trace and Performance Program

41.1 Overview

The IBM Token-Ring Trace and Performance Program is designed to assist users of IBM Token-Ring Networks in problem determination and performance analysis of the network.

The Trace and Performance Program measures the ring activity and stores data only on the ring to which it is attached. However, that ring may be connected to other rings by network bridges. The program will capture data from the ring and save it on disk or diskette. It can then present several different views of this data, either in detail or in summary, to aid in the discovery of problems on the ring. It also collects and stores data relating to the amount of traffic on the ring at any given time and can present this data as a percentage of the maximum amount of traffic that the ring can handle.

41.2 Planning Checklist

41.2.1 Minimum Requirements

- An IBM Personal Computer or Personal System/2 with at least 512 Kb of memory and one diskette drive. This could be either:
 - A PC/XT model 286
 - A PC/AT
 - A PS/2 Model 30, 50, 60, or 80.
- A Display (monochrome or color graphics)
- One of the following special adapters:
 - IBM Token-Ring Network Trace and Performance Adapter II (for the PCs or PS/2 model 30)
 - IBM Token-Ring Network Trace and Performance Adapter/A (for the PS/2 Models 50, 60, or 80).
- A copy of DOS Version 3.3 or higher.
- The Trace and Performance Program package. This includes:
 - *IBM Token-Ring Network Trace and Performance Program User's Guide*
 - One 3.5" and two 5.25" program diskettes.
- IBM LAN Support Program.

41.3 Installation

The hardware installation of the Token-Ring Network Trace and Performance Adapter II or Adapter/A card is the same as for the PC Token-Ring Adapters and is covered in the chapters on "PC Token-Ring Network Adapter Installation" on page 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21.

Installing the software simply means copying the programs and files from the diskettes to a directory on the fixed disk. The help text files must be placed in a subdirectory named DOC as the Trace and Performance program looks for this directory to locate these files. If they are not located in this directory, then the help text will not be available to the Trace and Performance program. All the other programs and files may be located in any directory as long as a DOS PATH command identifies the path to them. However we do recommend that for uniformity and ease of backup, they all be placed in a directory created exclusively for Trace and Performance (TAP).

Follow these steps to transfer the programs and files to your fixed disk:

1. Create directories for the help files and the program files.

Using your fixed disk as the default drive, type:

MD DOC This creates the "DOC" directory in which the help files must be placed.

MD TAP To create the directory to hold the Trace and Performance programs and files. You can use any name for this directory and it can be embedded in the root directory or any other subdirectory except the "DOC" directory.

2. Place the Trace and Performance program diskette in drive "A" and type:

COPY A: *.* C:\TAP This will copy all the Trace and Performance program files from the diskette to the directory on your hard disk.

COPY A:\DOC*.* C:\DOC This will transfer the help files to the "DOC" directory.

3. Add a path statement to your AUTOEXEC.BAT file pointing to these new directories.
4. Remove the diskettes and store them in a safe place.

The installation is now complete.

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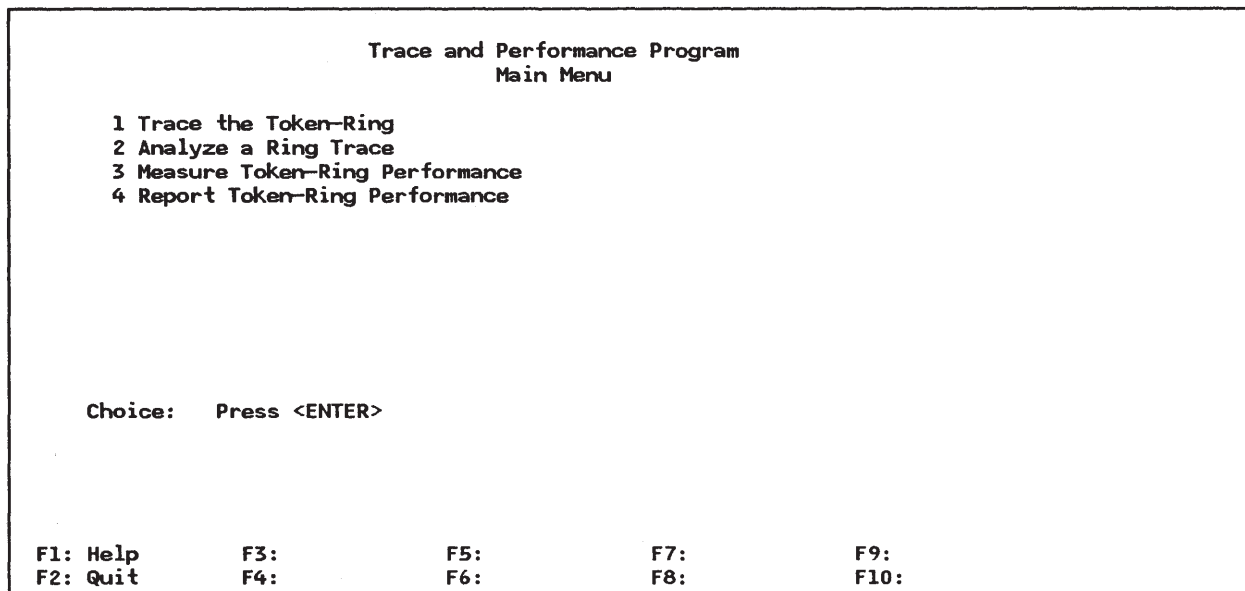
41.4.1 Starting the Trace and Performance Program

Prior to starting the Trace and Performance program, initialize the IBM LAN Support program

The Trace and Performance program is started by using a shell program (TAP.EXE) provided with the package. To start the program:

1. Ensure that there are no other application programs using the adapter.
2. Change to the directory in which the programs reside.
3. Type TAP and press Enter.

In a few seconds the program's title will be displayed. Press the Enter key and the main menu panel will be displayed.



4. Select the desired function from this menu by typing the number that corresponds to the function and press Enter.

Trace Facility

The Trace Facility captures data from the ring and stores it on the fixed disk. You can designate the data to be captured by type, source or destination addresses.

The data captured can be:

- Medium Access Control (MAC) frames only
- Non-MAC frames
- All frames
- Frames going to or coming from a specific address or group of addresses.

Trace Analysis Facility

The Trace Analysis Facility is used to view the data captured by the Trace Facility.

Performance Facility

The Performance Facility monitors the activity on the ring by displaying either of two panels while it is in operation. These panels indicate the relative loading of the ring in different ways. One shows the instantaneous loading and the other shows a performance graph over a prescribed period.

Performance Analysis Facility

The Performance Analysis Facility is used to display a performance summary, a graphic detail report and a tabular detail report.

41.4.2 The Trace Facility

Select Option 1 and press Enter. The first of a series of trace facility panels will be displayed.

```

                                Trace Facility

Trace File Name:
    dougl

Parameter File Name and Extension:

Synonym File Name and Extension:

                                To invoke the ring trace facility press <ENTER>

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:

```

1. Trace Facility panel 1.

- On this panel, you are required to name the file in which you want the Trace and Performance program to store the data collected.
- The parameter and synonym file names are optional. Use these if you have pre-defined parameters for the trace or you wish to use synonyms instead of addresses.

When you have entered the information on this panel, press Enter and the following panel will be displayed.

```

                                Trace Facility
A Traffic to trace: MAC, Non-MAC, All (M,N,A)

Y Copy one buffer only: (Y/N)
Time based triggers (HH:MM:SS)
Start 14:40:00 Stop 14:43:00

Data based triggers
Start Pattern          Stop Pattern
Start Offset          Stop Offset

                                Trace File Name
DOUG1

F1:      F3:      F5: Start   F7:      F9: Save Parm
F2: Quit  F4:      F6:        F8: Set Addr F10:

```

2. Trace Facility panel 2.

On this panel you have the option to select certain parameters to limit the trace to specific data. If you are using a parameter file, the values from the file will be displayed here. The options are:

- The type of frames to be traced. M = MAC frames. N = Non-MAC frames, or A = All frames.

- Copy only one buffer (Y), or the entire frame (N). If you copy only one buffer of the frame, you will have access to the physical header of a MAC frame, the SAP addresses of a LLC frame, and the transmission and record headers for SNA-type frames.
- Time-based triggers: Enter the start and stop times you want the program to monitor the network. The format is: hours (HH), minutes (MM) and seconds (SS), which are based on the PC clock time.
- Data based triggers: Enter the trigger's start pattern as a sequence of hexadecimal characters representing up to eight bytes of frame data. Enter the start offset as a decimal number representing the number of bytes from the start of the frame. Enter the trigger's stop pattern and stop offset the same as you did for the start pattern and offset. This data identifies the frames with which you want to start the trace.
- Enter the file name in which you want the data stored.

If you wish to trace the frames between MAC addresses, then press F8 and this panel will be displayed.

Trace Facility				
Destination Addresses				
10005A107E41	400051130005			
N All addresses EXCEPT those in destination list? (Y/N)				
Source Addresses				
400051130005	10005A107E41			
N All addresses EXCEPT those in source list? (Y/N)				
O Frame must match: One of Destination AND One of Source (A) One of Destination OR One of Source (O)				
F1:	F3:	F5: Start	F7: Perf Parms	F9: Save Parms
F2: Quit	F4:	F6:	F8:	F10:

3. Trace Facility panel 3.

This panel allows you to set the source and destination addresses to trace. You may specify up to ten source and destination addresses in the spaces provided on this display. Each address represents a specific station on the network and is 12 hexadecimal digits long. Any frame on the ring with one of the addresses selected may be traced. If no addresses are specified all frames on the ring will be traced.

- You can choose to trace frames to and from the addresses listed or to and from all addresses except those that you have listed. Answer (Y) YES or (N) NO to that question on both address fields. The default in both cases is NO.
- You can trace frames that match both a source and a destination address or frames that match either a source or a destination address. Answer (A) AND or (O) OR to this question. The default is OR.

Having made your selections, you can now start the trace. To do this, press F5. The Trace Facility will start saving the data from the ring to the file that you specified. If no frames are transmitted for a 15-second period, a message will be displayed indicating that there is no data on the ring.

To stop the trace, you can:

- Wait until either the time or data trigger's criteria are met (if you had set some).

- Press "Ctrl-Q" key combination.

To view the data collected by the trace, return to the Trace and Performance main menu and select option 2 to analyze a ring trace.

Press Enter and this screen will be displayed.

```

                                Trace Analysis Facility

Trace File Name and Extension:
    DOUG.TRO
Synonym File Name and Extension:

                                To invoke the trace analysis facility press <ENTER>

F1: Help      F3:          F5:          F7:          F9:
F2: Quit     F4:          F6:          F8:         F10:
  
```

1. Trace Analysis Facility panel 1.

On this panel, enter the name of the file that contains the trace data to be analyzed. If the trace was just done and you had not run any other programs, had quit the trace function or re-IPLed the machine, then the name of the file just used will be displayed. Press the Enter key.

The Trace Analysis Facility will display a message stating that an index for the trace data is being formed. When this is completed, the following panel is displayed.

```

DOUG.TRO
                                RTAP
                                Built the File Index

File Name:
    DOUG.TRO

                                988 records. 14 MAC Frames. 974 Non-MAC Frames.

                                First MAC Record Number 0. First Non-MAC Record Number 1.

F1: Help      F3:          F5:          F7:          F9:
F2: Quit     F4:          F6:          F8:         F10:
  
```

2. Trace Analysis Facility panel 2.

This panel indicates the quantity and type of data that was captured by the Trace Facility.

Press the Enter key and the RTAP menu will be displayed.

```
DOUG.TRO

                                RTAP Trace Analysis Facility
                                RTAP Menu

1 Display Ring Configuration
2 Display Summary
3 Display Frame Detail
4 Set Search Parameters
5 Save or Get Search Parameters
6 Specify Trace File

Choice: 2 Press <ENTER>

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:
```

3. Trace Analysis Facility panel 3.

From this menu you may select any of the Trace Analysis functions listed. These are dealt with in detail in the *IBM Token-Ring Trace and Performance User's Guide*.

Shown below is a typical example of what a summary display looks like.

```
DOUG.TRO

                                RTAP Summary Display

FRM Destination      Source      Interpretation
0 C000FFFFFFFF RS 400051130005 RS <Standby Monitor Present>
1 10005A107E41 OC 400051130005 OC <RR> 92
2 400051130005 OC 10005A107E41 OC <RR> 5
3 400051130005 OC 10005A107E41 OC <I> 92 5 Req. FMD User data.
4 10005A107E41 OC 400051130005 OC <RR> 93
5 10005A107E41 OC 400051130005 OC <I> 5 93 Req. FMD User data.
6 400051130005 OC 10005A107E41 OC <RR> 6
7 400051130005 OC 10005A107E41 OC <I> 93 6 Req. FMD User data.
8 10005A107E41 OC 400051130005 OC <RR> 94
9 10005A107E41 OC 400051130005 OC <I> 6 94 Req. FMD User data.
10 400051130005 OC 10005A107E41 OC <RR> 7
11 400051130005 OC 10005A107E41 OC <I> 94 7 Req. FMD User data.
12 10005A107E41 OC 400051130005 OC <RR> 95
13 C000FFFFFFFF RS 400051130005 RS <Standby Monitor Present>
14 10005A107E41 OC 400051130005 OC <I> 7 95 Req. FMD User data.
15 400051130005 OC 10005A107E41 OC <RR> 8
16 400051130005 OC 10005A107E41 OC <I> 95 8 Req. FMD User data.
17 10005A107E41 OC 400051130005 OC <RR> 96

F1: Help      F3: Search +   F5:          F7:          F9: Print
F2: Quit      F4:          F6: Search - F8:          F10: Srch Parm
```

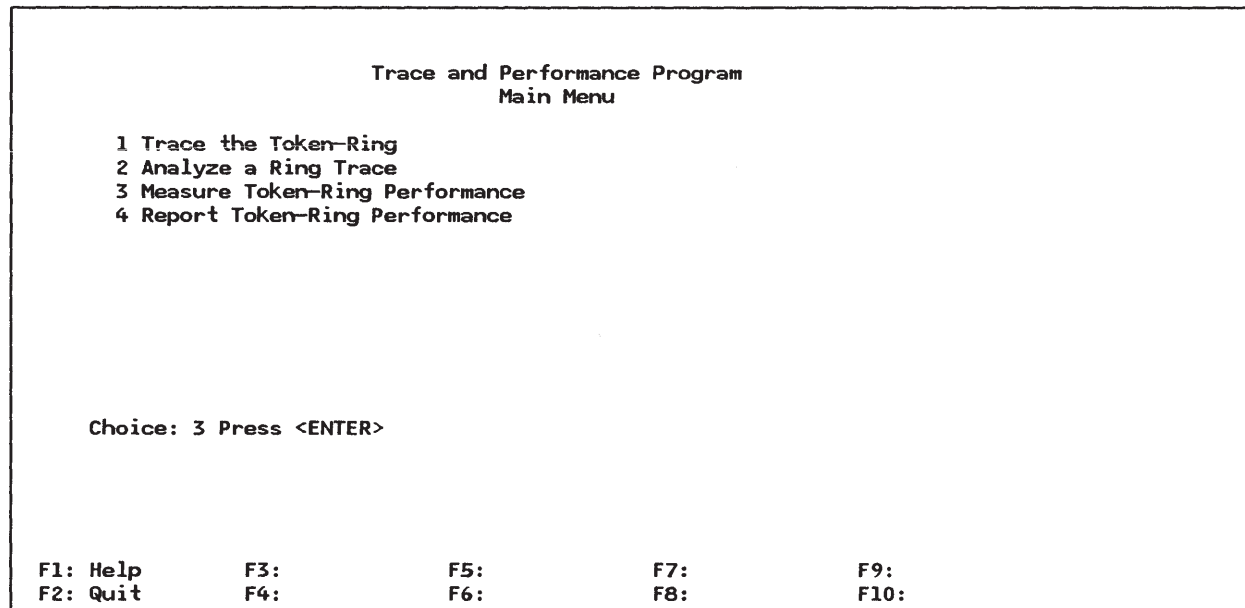
4. Trace Analysis Facility panel 4.

This is probably the most often used display of the Trace Analysis Facility. Each line of data shown represents one frame and the information displayed is the record number in the file, the destination address, the destination service access point (DSAP), the source address, the source service access point (SSAP), and the frame type for LLC frames or the major vector type for MAC frames.

41.4.3 The Performance Facility.

The Performance Facility monitors the activity on the ring by displaying either of two panels. One of these panels shows the instantaneous loading of the ring, much like a speedometer, while the other displays a performance graph over a period of two hours.

To start the Performance Facility, select Option 3 from the Trace and Performance main menu.



The next screen to be displayed requires that you enter the name of the file in which you want the performance data to be stored.


```

                                Performance Facility

Performance File Name:

    DELPERF

Parameter File Name and Extension:

Synonym File Name and Extension:

                                To invoke the performance facility press <ENTER>

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:

```

1. Performance Facility panel 1.

When you have entered the file name, press the Enter key and the following screen will be displayed.

```

                                Performance Facility

Time based triggers (HH:MM:SS)
Start      Stop

128      256      512      Frame Size Distribution Intervals
1024     2048

                                Performance File Name

    DELPERF

F1:          F3:          F5: Start    F7:          F9: Save Parm
F2: Quit     F4:          F6:          F8: Set Addr F10:

```

2. Performance Facility panel 2.

This panel allows you to select parameters that will limit the performance measurements to specific data.

- Time-based triggers: Enter the start and stop times you want the program to monitor the network. The format is: hours (HH), minutes (MM) and seconds (SS), which are based on the PC clock time.
- The frame size distribution intervals allow the selection of different frame lengths for monitoring. The defaults supplied can be changed to indicate the frame size distribution you want.

The intervals are (128) 0 - 128, which counts all frame sizes that are between 0 and 128 bytes long; (256) 129 - 256, which counts all frame sizes 129 to 256 bytes long, and so on.

The next Performance Facility panel allows you to select source and destination addresses to count.

To display this panel, press the F8 key.

Performance Facility				
Destination Addresses				
10005A107E41	400051130005			
N All addresses EXCEPT those in destination list? (Y/N)				
Source Addresses				
400051130005	10005A107E41			
N All addresses EXCEPT those in source list? (Y/N)				
O Frame must match: One of Destination AND One of Source (A) One of Destination OR One of Source (O)				
F1:	F3:	F5: Start	F7: Perf Parms	F9: Save Parms
F2: Quit	F4:	F6:	F8:	F10:

3. Performance Facility panel 3.

Up to 10 addresses can be specified in either group. Any frames on the ring with one of these addresses may be counted. Frames to or from addresses not listed will be ignored. If no addresses are selected, then all frames will be counted.

You have the choice of making the addresses listed on the panel the addresses to be counted, or they can be the addresses NOT to be counted. This choice is accomplished by answering (Y) YES, or (N) NO, to the question under each address field. The default is NO.

You also have the choice of selecting frames that have both a source AND a destination address listed (A), or those that have either a source OR a destination address listed (O).

Press F5 to start the performance logging process and one of two screens will be displayed.

5. Performance Facility panel 5.

This graph shows the ring utilization over the last two hours. The screen is refreshed at four-minute intervals.

Hold down the Ctrl-Q keys together to stop the count and return to the Trace and Performance main menu.

```

                                Trace and Performance Program
                                Main Menu

1 Trace the Token-Ring
2 Analyze a Ring Trace
3 Measure Token-Ring Performance
4 Report Token-Ring Performance

Choice: 4 Press <ENTER>

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:
```

Select Option 4: "Report Token-Ring Performance" to use the Performance Analysis Facility.

This screen will be displayed.

```

                                Performance Analysis Facility

Performance File Name and Extension:

DELPERF.CTO

To invoke the performance analysis facility press <ENTER> Ar. Ar.

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:
```

1. Performance Analysis Facility panel 1.

Type in the name of the count file that was used to collect the performance data and press Enter.

This screen will be displayed.

```
DELPERF.CT0                                PMON
Sample date 05/27/1988
Sample period is 1 minute.
File Name:
      DELPERF.CT0

Finished...F2 to return to PMON Menu

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:
```

2. Performance Analysis Facility panel 2.

This panel shows the date the measurement was made and the duration of the sampling period.

Press F2 and the Performance Analysis Facility menu will be displayed.

```
DELPERF.CT0                                PMON Performance Analysis Facility
                                           PMON Menu

1 Display Ring Performance Summary
2 Output Ring Performance Graphs
3 Output Ring Performance Tables
4 Specify Performance Count File

Choice:  Press <ENTER>

F1: Help      F3:          F5:          F7:          F9:
F2: Quit      F4:          F6:          F8:          F10:
```

3. Performance Analysis Facility panel 3.

This menu lists the various types of reports that can be obtained from the performance data collected. They are described briefly here. A more detailed explanation of their formats and use can be found in the *IBM Token-Ring Network Trace and Performance Program User's Guide*.

- The performance summary shows date, start and stop times, duration in minutes, number of frames and bits per second, percentage bandwidth utilization and distribution of frames by frame sizes chosen.

- The ring performance graphs is a group of six bar charts showing the number of frames and bytes per second. Separate charts are produced for each interval showing the total data, non-MAC data and user data.
- The ring performance tables is a listing of the frames and bits per second for each interval in tabular form.
- Specifying performance count file simply allows you to specify another performance data file from this menu.

Below is a sample of the Ring Performance Analysis Summary. To view this select Option 1 and press Enter.

The Performance Analysis Summary will be displayed.

```

DELPERF.CTO
                PMON Performance Analysis Summary

Date 05/27/1988 Start 12:13 End 12:13 Sample period is 1 minute.
Number of intervals with unreliable data 0.
                Frames/Sec   Bits/Sec   Utilization % % Non-MAC BW
Total                4         2,229         0.06
MAC Frames           0.          85          0.00
Non-MAC Frames       4         2,144         0.05         100.00

LLC Control          2           715         0.02         33.37
User Data            2         1,428         0.04         66.63

                Frame Size Distribution as a percent of Total Frames
0 - 128 - 256 - 512 - 1024 - 2048 - 32767
  88    9    1    0    2    0

F1: Help      F3:          F5:          F7:          F9: Print
F2: Quit      F4:          F6:          F8:          F10:

```

4. Performance Analysis Facility panel 4.

41.5 Basic Troubleshooting

Problems with the Trace and Performance Program are indicated by messages displayed at the bottom of your screen. These messages take the form "EAJxxnnnE" where:

- 'xx' signifies the facility that issued the message. These codes are:
 - ME - Signifies that the message was issued by the Shell Program (TAP.EXE).
 - TR - Signifies that the message was issued by the Trace Facility Program (TRACE.EXE).
 - RA - Signifies that the message was issued by the Trace Analysis Facility Program (RTAP.EXE).
 - PF - Signifies that the message was issued by the Performance Facility Program (PERF.EXE).
 - PM - Signifies that the message was issued by the Performance Analysis Facility Program (PMON.EXE).
- 'nnn' is a three-digit decimal number corresponding to the message number within each category.

An explanation of each of the possible messages that can be displayed and the action to be taken to recover from the condition that caused the message to be issued appears in Appendix A of *IBM Token-Ring Network Trace and Performance Program User's Guide*.

41.6 Where To Go For More Information

IBM Token-Ring Network Trace and Performance Program User's Guide.

41.7 Migration Issues

Information regarding new versions of this program will be included in the release update ship group.