# VIRTEL Audit and Performance

## User's Guide

Version : 4.53

Release Date : 24 Sep 2014

Publication Date : 17/10/2014

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# 1. Monitoring lines and virtual circuits

The Line Status sub-application allows the administrator to display the current status of lines and virtual circuits (CVC) managed by VIRTEL control, and optionally to modify the status of lines.

# 2. Displaying line status

## 2.1. Access To The Application

The Line Status sub-application is invoked by pressing [PF9] in the Configuration Menu, by pressing [PF10] in the Sub-Application Menu, or via the Multi-Session Menu using a transaction which calls module VIR0027.

## 2.2. Security

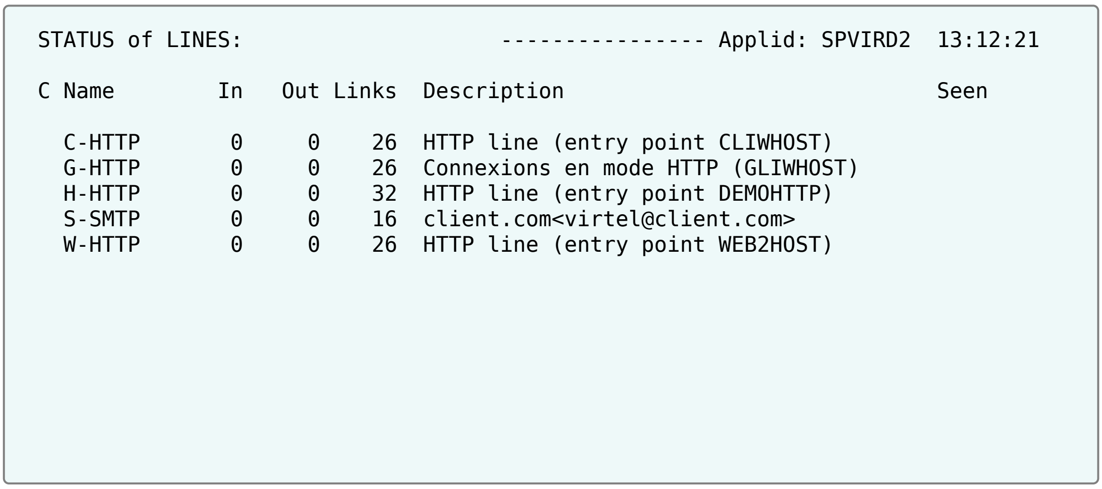
When the security subsystem is active, access to Line Status sub-application from the Configuration Menu or the Sub-Application Menu is controlled by the resource $$UTIL$$.

When accessed by a transaction, normal transaction security rules will apply.

Security management is described in chapter 4 of the VIRTEL Technical Documentation.

## 2.3. Objectives

This sub-application begins by displaying the Line Status Display screen. Started lines are displayed in high-intensity or white text, stopped lines are displayed in low intensity or blue text.



```
STATUS of LINES:                    ---------------- Applid: SPVIRD2  13:12:21

C Name        In   Out Links  Description                             Seen

  C-HTTP       0     0    26  HTTP line (entry point CLIWHOST)
  G-HTTP       0     0    26  Connexions en mode HTTP (GLIWHOST)
  H-HTTP       0     0    32  HTTP line (entry point DEMOHTTP)
  S-SMTP       0     0    16  client.com<virtel@client.com>
  W-HTTP       0     0    26  HTTP line (entry point WEB2HOST)
```

*Line Status Display screen*

## 2.4. Contents Of Each Field

**STATUS OF-LINES**

> Allows the administrator to display a subset of lines, by typing the first character of the name of each desired line into this field and pressing [Enter]. If the field is blank, all lines are displayed.

**C**

> Command input field.

**Name**

> The internal name of the line.

**In**

> The number of virtual circuits currently in use by incoming calls.

**Out**

> The number of virtual circuits currently in use by outgoing calls.

**Links**

> The number of terminals linked to the line.

**Description**

> Comments.

**Seen**

> User name.

## 2.5. Associated Functions

### 2.5.1. Positioning the list

If the line status display occupies more than one screen, you can scroll through the list of lines by using [PF5], [PF7] and [PF8].

**[PF5]**

> return to the first page of the list.

**[PF7]**

> scroll back to previous page.

**[PF8]**

> scroll forward to next page.

### 2.5.2. Displaying details of a line

To display information about the virtual circuits linked to a VIRTEL line, place the cursor on the line required and press [PF12].

### 2.5.3. Commands

To send a command to a line, place the cursor in the “C” field in front of the line name, type the command, then press [Enter]. The commands available are:

**s**

> starts a line. If the line is already started, VIRTEL attempts to start or restart any terminals associated with the line but not currently linked. This allows VIRTEL to recover LU’s which have been deactivated and reactivated by VTAM, without stopping the line.

**p**

> stops a line.

The LINE START and STOP commands can also be issued from the MVS or VSE console. See “Starting and stopping a line”, page 16.

### 2.5.4. Return to the configuration menu

To return to the configuration menu, press [PF3] or [Clear].

# 3. Displaying virtual circuits

## 3.1. Access To The Application

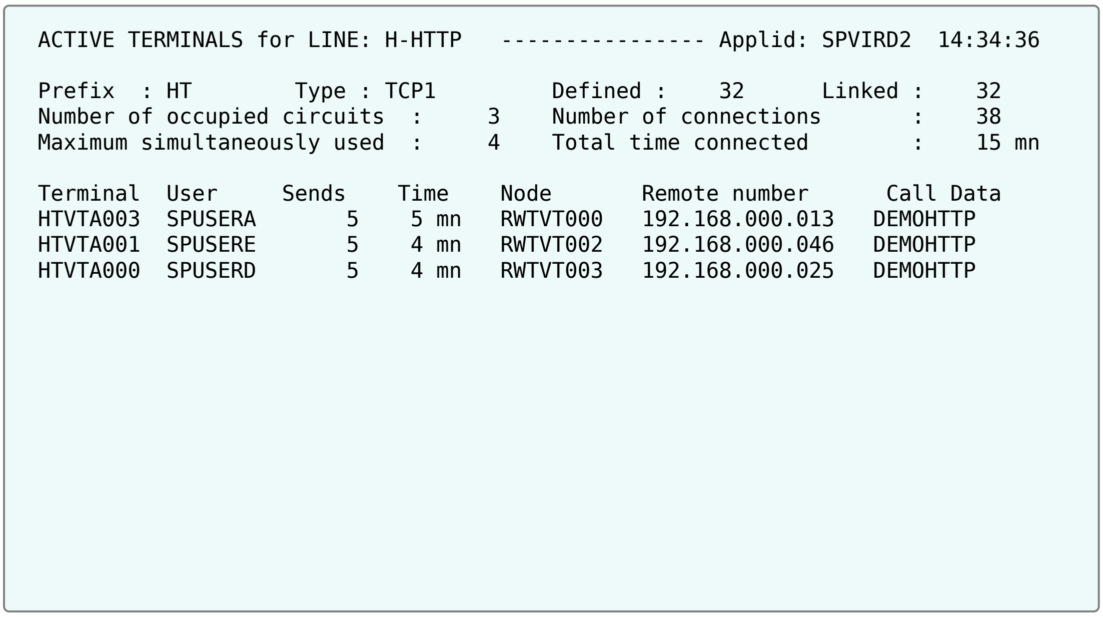
To display the status of the virtual circuits associated with a line, place the cursor on the desired line in the Line Status Display screen and press [PF12].

## 3.2. Security

Security rules are the same as those which apply to the previous screen.

## 3.3. Objectives

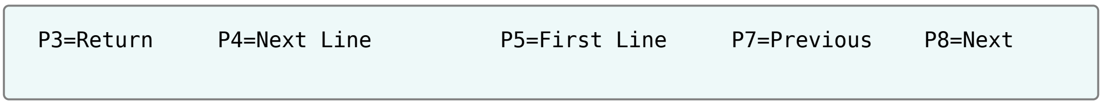
This sub-application begins by displaying the Virtual Circuit Display screen for the selected line, as shown in the example below:



```
ACTIVE TERMINALS for LINE: H-HTTP   ---------------- Applid: SPVIRD2  14:34:36

Prefix  : HT        Type : TCP1          Defined :    32      Linked :    32
Number of occupied circuits  :     3     Number of connections        :    38
Maximum simultaneously used  :     4     Total time connected         :    15 mn

Terminal  User     Sends    Time     Node        Remote number      Call Data
HTVTA003  SPUSERA       5     5 mn   RWTVT000    192.168.000.013   DEMOHTTP
HTVTA001  SPUSERE       5     4 mn   RWTVT002    192.168.000.046   DEMOHTTP
HTVTA000  SPUSERD       5     4 mn   RWTVT003    192.168.000.025   DEMOHTTP
```



```
 P3=Return     P4=Next Line          P5=First Line      P7=Previous     P8=Next
```

*Virtual Circuit Display screen*

## 3.4. Contents Of Each Field

**ACTIVE TERMINALS for LINE**

Indicates the internal name of the line whose virtual circuits are being displayed.

**Prefix**

The terminal name prefix associated with this line.

**Type**

The line type, as defined in the line definition.

**Defined**

The number of terminals defined for this line.

**Linked**

The number of terminals currently linked to this line.

**Number of occupied circuits**

The number of virtual circuits currently in use.

**Number of connections**

The total number of calls received.

**Maximum simultaneously used**

The maximum number of virtual circuits in use at any one time.

**Total time connected**

The total connection time.

**Terminal**

The terminal name (name of the virtual circuit).

**User**

User name if signed on to VIRTEL.

**Sends**

The number of messages sent to the terminal.

**Time**

The connection time in minutes.

**Node (for Minitel)**

The name of the node to which the terminal is currently connected.

**Node (for HTTP lines)**

The relay name (3270 LU name) used to connect to the host application.

**Remote number (for X25 lines)**

The X25 called number for an outgoing call, or the X25 calling number for an incoming call.

**Remote number (for HTTP lines)**

> The IP address of the client.

**Call Data (for X25 lines)**

> The call user data field of the call packet (for both incoming and outgoing calls).

**Call Data (for HTTP lines)**

> The external name of the transaction which represents the directory (pathname) in the URL.

## 3.5. Associated Functions

### 3.5.1. Positioning the list

If the Virtual Circuit Status Display occupies more than one screen, you can scroll through the list of terminals by using [PF7] and [PF8].

**[PF7]**

> scroll back to previous page.

**[PF8]**

> scroll forward to next page.

### 3.5.2. Displaying other lines

You can use the [PF4] and [PF5] keys to display information about the other lines under VIRTEL control. To view the Virtual Circuit Status Display screen for the following line, press [PF4]. To return to the Virtual Circuit Status Display screen for the first line defined in VIRTEL, press [PF5].

### 3.5.3. Return to previous screen

To return to the Lines Status Display, press [PF3]. To return to the Configuration Menu, press [Clear].

# 4. VIRTEL commands

VIRTEL allows certain functions to be controlled dynamically by console commands.

# 5. How to issue a VIRTEL command

VIRTEL allows certain functions to be controlled dynamically by console commands.

Use one of the following methods to send a command to VIRTEL, according to the operating system:

## 5.1. MVS Environment

The following command may be issued at the z/OS operator console, or from an SDSF session under TSO, in which case the command must be prefixed by the character “/”:

```
F stcvirte,virtel-cmd
```

**stcvirte**

> the name of the VIRTEL started task STC

**virtel-cmd**

> a VIRTEL command, as described in the following section

## 5.2. VSE Environment

To send a command to VIRTEL, issue the following command at the VSE operator console:

```
MSG virtel,DATA=virtel-cmd
```

**virtel**

> the VIRTEL jobname (usually VIRTEL), or the partition in which VIRTEL is executing (for example, F4)

**virtel-cmd**

> a VIRTEL command, as described in the following section

Alternatively, issue the following command at the VSE operator console:

```
MSG Fx
```

**Fx**

> Partition in which VIRTEL is executing

The system responds with:

```
AR 0015 1I40I  READY
Fx-nnnn
```

Note the reply number (nnnn) and issue the following command:

```
nnnn virtel-cmd
```

**nnnn**

> reply number

**virtel-cmd**

> a VIRTEL command, as described in the following section

# 6. List of commands

## 6.1. Displaying VIRTEL Lines And Terminals

### 6.1.1. List of lines

```
LINES
LINES,ACT
LINES,INACT
```

The LINES command displays the VIRTEL ACB name and a list of the lines defined in the VIRTEL configuration file. The optional keywords ACT or INACT may be used to restrict the display to lines in “started” or “stopped” state respectively.

### 6.1.2. List of terminals associated with a line

```
LINE=linename,DISPLAY (or L=linename,D)
```

**linename**

> internal or external name of the line

The LINE DISPLAY command displays the status of a line and its associated terminals.

### 6.1.3. List of relays

```
RELAYS
```

The RELAYS command displays the VIRTEL ACB name and a list of the relay LUs opened by VIRTEL.

## 6.2. Starting And Stopping A Line

```
LINE=linename,START (or L=linename,S)
LINE=linename,STOP (or L=linename,P)
```

**linename**

> internal or external name of the line

The LINE START and LINE STOP commands perform the same function as the “S” and “P” commands on the “Status of lines”. These commands may only be issued for line types AntiGATE, AntiPCNE, AntiFASTC, and TCP/IP.

## 6.3. Stopping VIRTEL

```
STOP
```

The STOP command allows to STOP the VIRTEL task. This command is intended to be mainly used in VSE environment even if it is also available in MVS environnment. On MVS environment you can also use the following command :

```
P stcvirte
```

**stcvirte**

> the name of the VIRTEL started task STC

## 6.4. Stopping A Scenario

```
KILL,T=termid
```

**termid**

> terminal name

The KILL command requests VIRTEL to abnormally terminate the scenario currently active on the specified terminal.

## 6.5. Activating And Deactivating A Terminal Or Line Trace

### 6.5.1. Terminal trace

A trace can be activated on the device or on his relay.

```
TERM=termid,TRACE (or T=termid,T)
TERM=termid,NOTRACE (or T=termid,N)
RELAY=relayname,TRACE (or R=relayname,T)
RELAY=relayname,NOTRACE (or R=relayname,N)
```

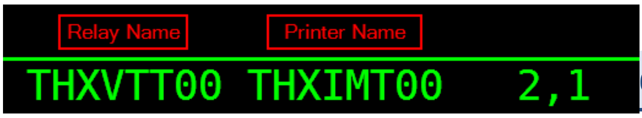
**termid**

> terminal name

**relayname**

> relay associated to the terminal

It is often easier to identify the relay used whose name appears at the bottom of the 3270 session screen as shown below.



```
THXVTT00 THXIMT00    2,1
```

### 6.5.2. Line trace

```
LINE=linename,TRACE (or L=linename,T)
LINE=linename,NOTRACE (or L=linename,N)
```

**linename**

internal or external name of the line

### 6.5.3. Alternate forms of trace commands

The following alternate forms of the TRACE/NOTRACE commands are also valid

```
TRACE,T=termid
TRACE,L=linename
TRACE,R=relayname
NOTRACE,T=termid
NOTRACE,L=linename
NOTRACE,R=relayname
```

**termid**

terminal name

**linename**

internal or external name of the line

**relayname**

name of VTAM relay LU currently associated with the terminal

### 6.5.4. Display list of active traces

```
TRACE,DISPLAY (or TRACE,D)
```

### 6.5.5. Deactivate all traces

```
NOTRACE,ALL
```

This command does not affect any memory trace. To stop a memory trace, refer to “Memory trace management”, page 43.

See “VIRTEL traces”, page 24.

## 6.6. Obtaining A SNAP

The SNAP command prints the contents of the VIRTEL internal trace table. See “VIRTEL SNAP”, page 26.

### 6.6.1. System level SNAP

```
SNAP
```

### 6.6.2. Terminal or Relay level SNAP

```
SNAP,T=termid
SNAP,R=relayname
```

**termid**

terminal name

**relayname**

name of VTAM relay LU currently associated with the terminal

### 6.6.3. Message-triggered SNAP

```
SNAPMSG,ALL
```

The SNAPMSG command requests VIRTEL to generate an automatic SNAP after certain messages (VIRI902W VIR0026W VIR0052I VIR1552I VIR0526W VIR1952I).

### 6.6.4. 80-column SNAP

```
SNAP80
```

The SNAP80 command prints the contents of the VIRTEL internal trace table in 80 column format, whatever the current value of the SNAPW parameter.

## 6.7. Adjusting The SNAP Format

```
SNAPW=80   ou   SNAPW=132
```

The SNAPW command sets the width for future SNAP commands (80 or 132 columns). The SNAPW parameter in the VIRTCT  determines the default width at VIRTEL startup. Refer to the section “Parameters of the VIRTCT” in the VIRTEL Installation Guide for details of the SNAPW parameter.

## 6.8. Refreshing A VIRTEL Program

```
NEW=progname
```

**progname**

program name

The NEW command requests VIRTEL to load a fresh copy of a program (presentation module, exit, etc) into the VIRTEL address space. This is required after an update has been made to a program. The message VIR0060W PROGRAM progname IS A NEW COPY indicates a successful reload. The message VIR0061W PROGRAM progname NOT IN MEMORY indicates that the program has not yet been loaded into the VIRTEL address space. In this case, VIRTEL will load the program automatically when it is next needed.

## 6.9. Refreshing A VIRSV Service Program

```
VIRSV,NEW=servname
```

**servname**

> service name

The VIRSV,NEW command requests VIRTEL to stop the requested VIRSV service. This has the effect of loading a fresh copy of the associated service program the next time the service is invoked by a scenario. The message VIR0260W SERVICE servname IS A NEW COPY indicates that the service was stopped successfully. The message VIR0261W SERVICE servname NOT IN MEMORY indicates that the service is not yet started. In this case, VIRTEL will start the service and load the program automatically when it is next needed.

## 6.10. Sending A Message To VIRTEL Multi-session Users

```
MSG=message text
```

The specified message will be displayed on the VIRTEL multi-session screen.

## 6.11. Suppressing Connection And Disconnection Messages

```
SILENCE
```

The SILENCE command reverses the state of the SILENCE parameter in the VIRTCT. Its purpose is to activate or deactivate the suppression of terminal connection and disconnection messages written to the operator console.

(Refer to the section SILENCE parameter in the "Parameters of the VIRTCT" in the VIRTEL Installation Guide for a list messages affected by this command.)

## 6.12. Patching A VIRTEL Program

```
ZAP=progname+offset,verify,replace
```

**progname**

> program name

**offset**

> offset into program

**verify**

> verify value (2 to 8 hexadecimal digits)

**replace**

> replacement value (2 to 8 hexadecimal digits)

The ZAP command allows the dynamic application of a corrective patch to a program while VIRTEL is running. This command is intended to be used only under the advice of Syspertec technical support personnel.

# 7. VIRLOG, TRACE, SNAP

## 7.1. Introduction

The VIRTEL started task offers the administrator 4 sources of information to verify the correct functioning of VIRTEL, to monitor its activity, or to diagnose possible problems:

- the CONSOLE file
- the VIRLOG file
- the TRACE in the VIRTRACE file
- the SNAP in the SYSPRINT file

## 7.2. The CONSOLE File

In **MVS environment**, the CONSOLE file is written to the VIRTEL started task's JESMSGLG file.

In **VSE environment**, the CONSOLE file is written to the VIRTEL partition's POWER LST file (LISTLOG)

The CONSOLE file allows the administrator to monitor the startup and subsequent activity of VIRTEL. Using the console file, the administrator can check that the VSAM files are correctly opened, verify that the customer key has been correctly recognized, check the initialization of the TCP/IP sockets interface using the correct IP address and port, and monitor connections and disconnections of terminals and applications.

The SILENCE=YES parameter in the VIRTCT allows the suppression of certain console messages relating to the connection and disconnection of terminals.

### 7.2.1. Example of CONSOLE file

```
                         J E S 2  J O B  L O G  --  S Y S T E M  M 2 3 5  --  N O D E  N 1

10.10.17 STC07142 ---- MONDAY,    27 FEB 2006 ----
10.10.17 STC07142  VARY NET,ACT,ID=APPLVIRT
10.10.17 STC07142  IEF695I START SPVIRBW  WITH JOBNAME SPVIRBW  IS ASSIGNED TO USER VIRTEL, GROUP TPPROD
10.10.17 STC07142  $HASP373 SPVIRBW  STARTED
10.10.17 STC07142  IEF403I SPVIRBW - STARTED - TIME=10.10.17
10.10.19 STC07142  +VIR0000I STARTING LICENCE P500 - PERMANENT (2999 - 12 - 31)
10.10.19 STC07142  +VIR0019I VIRTEL 4.32 HAS NO PTFS APPLIED
10.10.20 STC07142  +VIR0024I OPENING FILE VIRARBO
10.10.20 STC07142  +VIR0024I OPENING FILE VIRSWAP
10.10.21 STC07142  +VIR0024I OPENING FILE VIRCMP3
10.10.21 STC07142  +VIR0024I OPENING FILE VIRCAPT
10.10.21 STC07142  +VIR0024I OPENING FILE VIRHTML
10.10.22 STC07142  +VIR0024I OPENING FILE PCHOST1
```

```
10.10.22 STC07142  +VIR0024I OPENING FILE HTMLTRSF
10.10.22 STC07142  +VIR0024I ATTACHING SUBTASKS
10.10.22 STC07142  +VIR0604I VIRSTAT NOW RECORDING ON VIRSTATA DSN=SP000.SPVIRBW.STATA
10.10.23 STC07142  +VIR0024I READING VIRARBO
10.10.23 STC07142  +VIR0035E UNDEFINED LINE ADMRSET1 FOR RULE UPLOAD1A
10.10.23 STC07142  +VIR0035E UNDEFINED LINE ADMRSET1 FOR RULE UPLOAD1B
10.10.23 STC07142  +VIR0005W UNABLE TO ACTIVATE RHTIM000 (HTIMP000) ERROR: 58000000
10.10.23 STC07142  +VIR0024I READING TYPES
10.10.23 STC07142  +VIR0027I      0 SCREEN TYPES LOADED USING      0K
10.10.23 STC07142  +VIR0000I THIS COPY OF VIRTEL IS FOR THE EXCLUSIVE USE OF:
10.10.23 STC07142  +VIR0000I SYSPERTEC COMMUNICATION
10.10.23 STC07142  +VIR0000I 196 BUREAUX DE LA COLLINE
10.10.23 STC07142  +VIR0000I 92213 SAINT CLOUD CEDEX
10.10.23 STC07142  +VIR0000I HTTP Date: Mon, 27 Feb 2006 07:10:23 GMT
10.10.23 STC07142  +VIR0000I SMTP Date: Mon, 27 Feb 2006 08:10:23 +0100
10.10.23 STC07142  +VIR0000I SPVIRBW  STARTED AT 27/02/06 10:10:23 , VERSION 4.32
10.10.24 STC07142  +VIRT903W LINE HTTP-LIG HAS A SESSION STARTED WITH TCP/IP TCPIP
10.10.24 STC07142  +VIRHT01I HTTP INITIALISATION FOR HTTP-LIG (H-HTTP  ), VERSION 4.32
10.10.24 STC07142  +VIRT912W HTTP-LIG SOCKET 00000000 STARTED FOR 192.168.235.030:41000
10.10.24 STC07142  +VIRT903W LINE SMTP-LIG HAS A SESSION STARTED WITH TCP/IP TCPIP
10.10.24 STC07142  +VIRSM01I SMTP INITIALISATION FOR SMTP-LIG (S-SMTP  ), VERSION 4.32
10.10.24 STC07142  +VIRT912W SMTP-LIG SOCKET 00000000 STARTED FOR 192.168.235.030:42000
10.10.24 STC07142  +VIRT903W LINE HTTP-W2H HAS A SESSION STARTED WITH TCP/IP TCPIP
10.10.24 STC07142  +VIRHT01I HTTP INITIALISATION FOR HTTP-W2H (W-HTTP  ), VERSION 4.32
10.10.24 STC07142  +VIRT912W HTTP-W2H SOCKET 00000000 STARTED FOR 192.168.235.030:41001
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC000 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC001 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC002 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC003 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC004 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC005 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC006 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC007 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC008 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC009 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC010 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC011 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC012 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC013 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC014 TO H-HTTP
10.10.25 STC07142  +VIR0505I LINKING TERMINAL HTLOC015 TO H-HTTP
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA000 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA001 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA002 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA003 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA004 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA005 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA006 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA007 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA008 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA009 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA010 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA011 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA012 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA013 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA014 TO H-HTTP   RELAY *HTTPOOL
10.10.25 STC07142  +VIR0507I LINKING TERMINAL HTVTA015 TO H-HTTP   RELAY *HTTPOOL
```

*Example of CONSOLE file*

## 7.3. The VIRLOG File

This is a printable file with record length 131 and record format FA which provides a record of IP connections to VIRTEL.

### 7.3.1. Example of VIRLOG (HTTP)

The figure below shows an example of VIRLOG entries for incoming HTTP calls:

```
£Software: VIRTEL 4.32
£Date: 02/01/06
£Line    Local    Pseudo     Started  Ended    Price    Received Sent     Remote Address  User
W-HTTP   WHT00200 DELOC003 I 15.34.53 15.34.53 00000007 00000381 00023135 192.168.000.043           200 PUBLIC  DATA.JS  W2H-DIR
W-HTTP   WHT00200 DELOC002 I 15.34.53 15.34.53 00000004 00000381 00010833 192.168.000.043           200 PUBLIC  JS01.JS  W2H-DIR
W-HTTP   WHT00200 DELOC003 I 15.34.53 15.34.53 00000007 00000386 00006976 192.168.000.043           200 PUBLIC  VIRTBLUE W2H-DIR
W-HTTP   WHT00200 DEVTA003 I 15.34.53 15.34.59 00000649 00001169 00010397 192.168.000.043               PUBLIC  WEB2VIRT W2H-10
W-HTTP   WHT00200 DELOC002 I 15.35.02 15.35.02 00000005 00000402 00000049 192.168.000.043           304 WEB2HOSTXHTML.JP W2H-DIR
W-HTTP   WHT00200 DEVTA003 I 15.35.20 15.35.52 00003275 00008936 00095705 192.168.000.043 SPTBOWL       PUBLIC  WEB2VIRT W2H-13
```

```
W-HTTP   WHT00200 DELOC003 I 15.35.53 15.35.53 00000002 00000875 00000248 192.168.000.043           200 PUBLIC  WEB2VIRT W2H-DIR
W-HTTP   WHT00200 DELOC003 I 15.35.54 15.35.54 00000002 00000458 00000049 192.168.000.043           304 WEB2HOSTWEB2HOST W2H-DIR
```

*Example of VIRLOG file (HTTP)*

The LINE column shows the internal name of the HTTP line.

The LOCAL column shows the name of the rule selected for each call.

The PSEUDO column shows the VIRTEL terminal name used.

The next column contains “I” to indicate this is an incoming call.

The STARTED and ENDED columns show the start and end time of each IP session.

The PRICE column represents the duration of the transaction in hundredths of a second  This value may be modified by exit 7.

The RECEIVED and SENT columns contain the number of bytes received from and sent to the browser.

The REMOTE ADDRESS column contains the IP address of the browser.

The USER column contains the userid if the transaction is secured.

The next column contains the HTTP status code (for static pages)

The last three 8-byte columns represent:

- The external name of the VIRTEL transaction which represents the HTTP path name
- The name of the HTML page
- For static pages: The name of the VIRTEL directory containing the HTML page
- For dynamic pages: The internal name of the HTTP transaction which was used to populate the page

## 7.3.2. Example of VIRLOG (X25)

The figure below shows an example of VIRLOG entries for X25 calls:

```
£Software: VIRTEL 4.32
£Date: 11/21/07
£Line    Local    Pseudo     Started  Ended    Price    Received Sent     Remote Address  User
X001LINE 001880   X001T007 I 13.47.37 13.48.00 00002288 00000392 00000119 191334833                     MINITEL
X001LINE G001T004 X001T000 O 13.48.30 13.48.50 00001966 00000001 00000001 191334833001870
X001LINE P0010001 X001T001 O 13.48.49 13.49.20 00003069 00000001 00000001 001870                        PCNE1
X001LINE G001T003 X001T002 O 13.49.01 13.49.22 00002147 00000001 00000001 001870
```

*Example of VIRLOG file (X25)*

The LINE column shows the internal name of the X25 line.

The LOCAL column shows the called subaddress for incoming calls, or the name of the associated AntiGATE or AntiPCNE terminal for outgoing calls.

The PSEUDO column shows the VIRTEL terminal name used.

In the next column “I” indicates an incoming call, “O” indicates an outgoing call.

The STARTED and ENDED columns show the start and end time of each call.

The PRICE column represents the duration of the transaction in hundredths of a second, except for calls on Fast Connect lines, where the PRICE column contains the “X25 units sent” value supplied by NPSI. This value may also be modified by exit 7.

The RECEIVED and SENT columns contain the number of bytes received from and sent to the X25 line.

The REMOTE ADDRESS column contains the caller X25 number for incoming calls, or the called X25 number for outgoing calls.

The last column contains the PCNE call user data (if present), otherwise it contains the default entry point name for X25 calls specified by the DEFENTR parameter in the VIRTCT. For GATE calls this column is blank.

## 7.4. VIRTEL Traces

All messages which pass between a terminal and a host application, or all messages received and sent on a line, can be traced to a print file.

Activation and deactivation of a trace on a terminal or a line is performed by means of the TRACE and NOTRACE commands (see “VIRTEL commands”, page 13 and “Activating and deactivating a terminal or line trace”, page 17).

A terminal or line trace remains active until a corresponding NOTRACE command is issued or until the VIRTEL started task terminates.

It is also possible to trace specific incoming calls (“tracing by rule”). In this case, activation of the trace is specified in the definition of the rule which VIRTEL uses to route the incoming call. For example, a rule can be created to activate the trace for calls which originate from a specific terminal address (X25 or IP). The trace can be activated for commands and/or data packets.

Activation or deactivation of a “trace by rule” is performed via the VIRTEL on-line configuration menus, and consists of updating the “Trace” field in the rule definition, followed by pressing the F1 key. See  “Rules” in the VIRTEL Connectivity Reference manual for more details.

A “trace by rule” remains active as long as the “Trace” field in the rule definition is not empty. Message VIR0036W confirms the activation of the trace.

In **MVS environment**, the trace data is written to the VIRTRACE file in the VIRTEL started task.

In **VSE environment**, the trace data is written to the POWER LST file of the VIRTEL partition.

Activation and deactivation of a memory trace is performed by means of the MEMTRACE and NOMEMTRACE commands (see “Memory Trace Management”, page 43). The allocation memory is written in the SNAP file when a SNAP command is issued.

### 7.4.1. Contents of the trace

| Line type | Contents of line trace | Contents of terminal trace or trace by rule |
|---|---|---|
| HTTP | All messages flowing between the VIRTEL HTTP server and client browsers | Terminal without relay: None<br>Terminal with relay: Contents of the 3270 datastream between VIRTEL and the host application |
| SMTP | All messages flowing to and from the VIRTEL SMTP server | None |
| XOT | All messages flowing between VIRTEL and the router, including the XOT headers | All X25 messages (excluding the XOT header) belonging to the specified virtual circuit |
| /GATE<br>/FASTC | Messages on the control session between the MCH LU and the CTCP (call packet and call acknowledgement) | Messages on the data session between the CVC LU and the CTCP (data packets, X25 RESET and CLEAR commands) |
| /PCNE | None | Data flowing between the terminal LU and the application |
| APPC | N/A | Messages on the LU6.2 session |
| GATE<br>FASTC | N/A | Messages on the data session between the NCP and VIRTEL |
| 3270 | N/A | The 3270 datastream between the terminal and VIRTEL, and the 3270 datastream between VIRTEL and the host application |
| PCNE (Minitel) | N/A | The Vidéotex datastream between the terminal and VIRTEL, and the 3270 datastream between VIRTEL and the host applicationl |

## 7.4.2. Examples of traces

```
LCL712            11A: from application SPCICST                     13:05:47.48
00000  F1C2                                                                      *1B                              *  099A95B4
LCL712            11A: from application SPCICST                     13:05:47.49
00000  F5C2114B E9131140 5B290242 F1C0F8E2  89879596 9540A396 40C3C9C3 E24011C1  *5B..Z.. $...1é8Signon to CICS .A*  099A95B4
00020  40290242 F4C0F0C1 D7D7D3C9 C4290242  F5C0F0E2 D7C3C9C3 E2E34011 C8F02902  * ...4é0APPLID...5é0SPCICST .H0..*  099A95D4
00040  42F4C0F0 E3A89785 40A896A4 9940A4A2  85998984 40819584 409781A2 A2A69699  *.4é0Type your userid and passwor*  099A95F4
00060  846B40A3 88859540 979985A2 A240C5D5  E3C5D97A 114BD929 0242F4C0 F0E4A285  *d, then press ENTER:..R...4é0Use*  099A9614
00080  99898440 4B404B40 4B404B29 0241F442  F5114BF1 1DF0114B F4290242 F4C0F0C7  *rid . . . ....4.5..1.0..4...4é0G*  099A9634
000A0  9996A497 8984404B 404B404B 290241F4  42F5114C 4B1DF011 4CE92902 42F4C0F0  *roupid . . ....4.5.<..0.<Z...4é0*  099A9654
000C0  D781A2A2 A6969984 404B404B 404B2903  41F442F5 C04C114D C11DF011 4DF92902  *Password . . ....4.5é<.(A.0.(9..*  099A9674
000E0  42F4C0F0 D3819587 A4818785 404B404B  404B2902 41F442F5 114E4C1D F01150D5  *.4é0Language . . ....4.5.+<.0.&N*  099A9694
00100  290242F4 C0F0D585 A640D781 A2A2A696  9984404B 404B404B 290341F4 42F5C04C  *...4é0New Password . . ....4.5é<*  099A96B4
00120  1150F11D F0115A50 1D7C115B 5B1DF011  5B602902 42F2C0F8 C4C6C8C3 C5F3F5F2  *.&1.0.&.to.$$.0.$-...2é8DFHCE352*  099A96D4
00140  F040D793 8581A285 40A3A897 8540A896  A49940A4 A2859989 844B4040 40404040  *0 Please type your userid.      *  099A96F4
00160  40404040 40404040 40404040 40404040  40404040 40404040 40404040 40404040  *                                *  099A9714
       ... SAME AS ABOVE ...
00280  40404040 40404040 40404040 4040401D  F8404040 40404040 40404040 40404040  *               .8               *  099A9834
002A0  40404040 40404040 40404040 40404040  40404040 40404040 40404040 40404040  *                                *  099A9854
002C0  40404040 40404040 40404040 40404040  40404040 40404040 40404040 40404040  *                                *  099A9874
LCL712            11A: to application SPCICST                       13:05:51.03
00000  7D4B6C11 4BE9A7A8 A9                                                      *'.%..Zxyz                       *  099A95B4
```

*Example of terminal trace (inbound 3270 terminal)*

```
X001T007          XOT: RECEIVED FROM ROUTER                         13:48:15.26
00000  00000019 10010B96 00188019 13348330  0A420707 43030302 CC0300C4 80        *   ....o .....c........... D.   *  0989117C
X001T007          XOT: SENT TO ROUTER                               13:48:15.37
00000  00000003 10010F                                                           *   ....                         *  09896178
X001T007          XOT: RECEIVED FROM ROUTER                         13:48:15.53
00000  0000001B 100100D7 C5E2C9E3 404040E2  E8E2E7C3 C6E3C1E2 E8E2D7C1 E24040    *   ... PESIT   SYSXCFTASYSPAS   *  0989117C
X001T007          XOT: SENT TO ROUTER                               13:48:15.54
00000  00000003 100121                                                           *   ....                         *  0989117C
X001T007          XOT: SENT TO ROUTER                               13:48:15.55
00000  00000007 100120C1 C3D2F0                                                  *   ....ACK0                     *  098A4176
X001T007          XOT: RECEIVED FROM ROUTER                         13:48:15.57
00000  00000003 100121                                                           *   ....                         *  0989117C
X001T007          XOT: RECEIVED FROM ROUTER                         13:48:15.72
00000  00000083 10013200 A0402000 D9030853  59535843 46544104 08535953 58434654  *........to ....SYSXCFTA..SYSXCFT*  0989117C
00020  42050653 59535041 53060102 07030024  02160102 17010163 6E434654 20593D4D  *B..SYSPAS......$.......cnCFT Y=M*  0989119C
00040  2C443D32 30303530 31303531 33343831  3536302C 563D3233 302C5A3D 702D312D  *,D=2005010513481560,V=230,Z=p-1-*  098911BC
00060  31352D2D 4D565332 3230432D 41323330  3033352D 32303031 2F31302F 32322C4B  *15--MVS220C-A230035-2001/10/22,K*  098911DC
00080  3D514334 443248                                                           *=QC4D2H                         *  098911FC
X001T007          XOT: SENT TO ROUTER                               13:48:15.72
00000  00000003 100141                                                           *   ....                         *  0989117C
X001T007          XOT: RECEIVED FROM ROUTER                         13:48:15.72
00000  00000023 1001245A 56444850 37444C4E  39374A49 36513153 49594C2C 433D3830  *...£..$ZVDHP7DLN97JI6Q1SIYL,C=80*  0989117C
00020  33333430 333832                                                           *3340382                         *  0989119C
X001T007          XOT: SENT TO ROUTER                               13:48:15.73
00000  00000003 100161                                                           *   .../                         *  0989117C
```

*Example of line trace (XOT line)*

```
X001T007          005: INBOUND CALL PACKET                          15:10:11.97
00000  0BF00806 0018800A 42070743 030302CC  0300C018 80105043 4E4531             *........B..C..........PCNE1     *  09896176
X001T007          XOT: OUTBOUND X25 COMMAND                         15:10:11.99
00000  0F                                                                        *.                               *  0989617E
X001T007          XOT: INBOUND DATA                                 15:10:12.08
00000  00C3C6E3 D7E2C9E3 E7C3D7C1 E7F14040  40D7D8D9 E2404040 400D25             * CFTPSITXCPAX1   PQRS    ..     *  09891182
P001I001 AP80LU51 I09: DATA TO CFTBACB1                             15:10:12.21
00000  C3C6E3D7 E2C9E3E7 C3D7C1E7 F1404040  D7D8D9E2 40404040 0D25               *CFTPSITXCPAX1   PQRS    ..      *  0989617D
P001I001 AP80LU51 I09: DATA FROM CFTBACB1                           15:10:12.23
00000  C1C3D2F0 0D25                                                             *ACK0..                          *  0989617C
X001T007          XOT: OUTBOUND DATA                                15:10:12.23
00000  00C1C3D2 F00D25                                                           * ACK0..                         *  098A417C
X001T007          XOT: INBOUND DATA                                 15:10:12.46
00000  22003240 2000D903 0D4F5020 20202020  20435041 5831040D 4F502020 20202020  *".to ....OP      CPAX1..OP      *  09891182
00020  43504258 31060101 07030024 02160100  170101                               *CPBX1......$.......             *  098911A2
P001I001 AP80LU51 I09: DATA TO CFTBACB1                             15:10:12.47
00000  00324020 00D9030D 4F502020 20202020  43504158 31040D4F 50202020 20202043  *.to ....OP      CPAX1..OP      C*  098A417D
00020  50425831 06010107 03002402 16010017  0101                                 *PBX1......$.......              *  098A419D
P001I001 AP80LU51 I09: DATA FROM CFTBACB1                           15:10:12.55
00000  00114021 D9E20601 01070300 24021701  01                                   * . .RS..... .....               *  0989617C
X001T007          XOT: OUTBOUND DATA                                15:10:12.55
00000  00001140 21D9E206 01010703 00240217  0101                                 *  . .RS..... .....              *  098A417C
X001T007          XOT: INBOUND DATA                                 15:10:12.89
00000  440028C0 1FE20009 0C0B02FF FF0C0650  434E4531 410D0307 DC1D5C0D 414E5449  *D.(............PCNE1A.....ç.ANTI*  09891182
00020  50434E45 20544553 54                                                      *PCNE TEST                       *  098911A2
P001I001 AP80LU51 I09: DATA TO CFTBACB1                             15:10:12.90
00000  0028C01F E200090C 0B02FFFF 0C065043  4E453141 0D0307DC 1D5C0D41 4E544950  *.(............PCNE1A.....ç.ANTIP*  098A417D
00020  434E4520 54455354                                                         *CNE TEST                        *  098A419D
P001I001 AP80LU51 I09: DATA FROM CFTBACB1                           15:10:12.97
00000  000BC03F D9000203 000000                                                  * .é.R ..                        *  0989617C
X001T007          XOT: OUTBOUND DATA                                15:10:12.97
00000  00000BC0 3FD90002 03000000                                                *  .é.R ..                       *  098A417C
X001T007          XOT: INBOUND DATA                                 15:10:33.11
```

```
00000  66000B40 23E2D902 03000000                                                *. . .SR..                        *  09891182
P001I001 AP80LU51 I09: DATA TO CFTBACB1                             15:10:33.12
00000  000B4023 E2D90203 000000                                                  * . .SR..                         *  098A417D
P001I001 AP80LU51 I09: DATA FROM CFTBACB1                           15:10:33.14
00000  00064024 D9E2                                                             * . .RS                           *  0989617C
X001T007          XOT: OUTBOUND DATA                                15:10:33.14
00000  00000640 24D9E2                                                           *  . .RS                          *  098A417C
X001T007          XOT: INBOUND X25 COMMAND                          15:10:33.27
00000  130000                                                                    *.                                *  09891182
X001T007          XOT: OUTBOUND X25 COMMAND                         15:10:33.27
00000  17                                                                        *.                                *  09891182
```

*Example of “trace by rule” (XOT terminal to application on /PCNE line)*

## 7.5. VIRTEL SNAP

VIRTEL maintains an internal trace table in which it records significant events which occur during VIRTEL processing. The SNAP command allows the administrator to obtain a snapshot listing of the contents of the trace table at a given point in time.

The SNAP listing is primarily intended for use by VIRTEL development personnel and will normally need to be forwarded to Syspertec for analysis. For customer diagnostics, the TRACE command (described above) may often be more useful.

The format, the contents, and the size of the SNAP depend on the SNAPW, TRACBIG, TRACEB, TRACEON parameters in the VIRTCT.

The internal trace table is recorded in a circular fashion, so that each new event added to the table overlays and replaces the oldest event in the table. The table contains a fixed number of event slots (determined by the TRACBIG parameter in the VIRTCT), and additionally certain events may have a variable amount (up to 256 bytes) of data recorded. The variable data is stored in a separate area whose size is determined by the TRACEB parameter in the VIRTCT, and this area is also filled in a circular manner, with the oldest information being dropped from the table when new information is added. Thus, depending on the values of the TRACBIG and TRACB parameters, older entries in the trace table may no longer have data associated with them.

Clearly, the greater the level of activity in the VIRTEL system, the quicker the trace table will wrap and information will be pushed out to make way for new entries. Thus, in order for the SNAP listing to provide useful information, the size of the trace table and its associated buffer area must be adequate for the level of system activity, and the SNAP command must be issued as quickly as possible after the event under investigation occurs. In some cases it may be necessary to use an automation tool to issue the SNAP command immediately following the appearance of a certain console message.

As well as dumping the contents of the internal trace table, the SNAP command also dumps certain VIRTEL internal control blocks. A dump of the control blocks associated with a particular terminal may optionally be requested.

The SNAP command is described under the heading “VIRTEL commands”, page 13 and “Obtaining a SNAP”, page 18. VIRTEL may also produce a SNAP listing automatically if a program check or other abend occurs during VIRTEL processing.

In **MVS environment**, the SNAP output is written to the SYSPRINT file in the VIRTEL started task.

In **VSE environment**, the SNAP output is written to the POWER LST file of the VIRTEL partition.

Several SNAP commands may be issued during a single run of VIRTEL. The output file may thus contain successive SNAP listings concatenated one after the other.

### 7.5.1. Example of SNAP

```
P S W                                                                  0003E978
00000  00000000 8002E290                                                         *    ..S.                         *
PSW = VIR0009 +2BB8
R E G I S T E R S                                                      0003E980
00000  00000000 07F48830 07F48838 0001132C  07F488C0 00000100 0804A2CB 00000410  *    .4h0.4h8 ..,.4hé  . ..s.  ..*
```

```
00020  07F474A8 080495C0 000281D8 000CEA10  0002E138 07F48758 8002E290 0002DAEA  *.4ty..né .aQ ... ..8.4gX..S. ...*
R10 = VIR0099 +0000
R12 = VIR0009 +2A60
R14 = VIR0009 +2BB8
R15 = VIR0009 +2412
DATE=18 Oct 2005  TIME= 17:22:26   TASK=      ABEND=SNAP  TERM=NTIN0000  APPLICATION=SP3VIRMB  VERSION=4.32
          SYSPERTEC COMMUNICATION
          196 BUREAUX DE LA COLLINE
          92213 SAINT CLOUD CEDEX
          P500 - PERMANENT
TERMINAL  TASK   R15       R14       MODULE   OFFS  FUNCTION         1/10000 S.
NTOUT009  0253   00000000  8002DFD6  VIR0009 +28FE  3032  CONTINUE   1640023458
NTOUT009  0253   08043B80  8002E082  VIR0009 +29AA  8042  $FREEMAIN  1640023458
NTOUT009  0253   00000000  8002E082  VIR0009 +29AA  8021  $RECANY    1640023458
NTOUT009  0253   07F472D8  8002EDDC  VIR0009 +3704  8042  $FREEMAIN  1640023458
NTTCP-LI  EE54   421E0006  800565AC  VIR0T19 +02AC  804E  $CREATE    1640023459
NTTCP-LI  0254   07F580B0  8002FF58  VIR0009 +4880  8040  $GETMAIN   1640023459
NTTCP-LI  0254   00000005  8003008E  VIR0009 +49B6  804D  TO LINE    1640023459
NTTCP-LI  0254   00000000  80032146  VIR0M13 +00A6  8043  TO TCP     1640023459
.............

A C T I V E  R E Q U E S T                                             07F57560
00000  00000000 02000160 D9C5C1C4 40404040  00030000 00000000 00000000 00000000  *    . .-READ     .              *
00020  00000000 00000000 B4CFD8A6 95840500  07F18F6C 800761AC 07F18D60 07F46780  *        ..Qwnd. .1.l..a..1.-.4g.*
00040  07F579A0 080495C8 00000000 00000000  00000000 00000000 07F18FA4 07F575AC  *.5y...nH                .1.u.5u.*
00060  07F575A8 00072EEC 07F46790 08049868  0804A2D0 00000000 87F57658 00000000  *.5uy ....4g...qh..sè    g5vX    *
00080  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *                                *
       ... SAME AS ABOVE ...
000E0  00000000 00000000 00000000 00000000  00000000 00000000 07F57560 07F575AC  *                        .5u-.5u.*
00100  07F575A8 00000000 07F5D688 00071A80  07F18D60 07F57560 00000000 7F69E1D0  *.5uy    .5Oh ....1.-.5u-    .i.è*
00120  00038D00 00000000 00000000 00000000  00000000 00000000 00000000 00000000  * ..                             *
00140  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *                                *
S E S S I O N                                                          07F49108
00000  07F49108 0400011C F0F0F0F0 F0F0F0F0  00000000 00076108 00076108 07F18D60  *.4j.. ..00000000     .a. .a..1.-*
00020  FC040000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *..                              *
00040  00000000 00000000 00000000 00000000  00000000 00000100 00000000 00000000  *                      .         *

00060  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00001200  *                                *
```

*Example of SNAP listing*

## 7.5.2. Message-triggered SNAPMSG

The SNAPMSG command requests VIRTEL to generate an automatic SNAP after certain messages (VIRI902W, VIR0026W, VIR0052I, VIR1552I, VIR0526W or VIR1952I).

Only one SNAP can also be obtained with user specific code provided by SYSPERTEC for messages VIRHT31E and VIRHT63E. See “VIRTEL commands”, page 13

# 8. Statistics

## 8.1. The VIRSTAT File

The VIRSTAT file is a sequential file into which VIRTEL writes connection statistics.

When the STATS=YES parameter is coded in the VIRTCT, the VIRSTAT file is reinitialised at each VIRTEL startup. With STATS=YES, VIRTEL must be stopped periodically in order to avoid filling the VIRSTAT file, and the file should be defined as a GDG in order not to lose the information from a previous run. The STATS=MULTI parameter may be coded in the MVS environment to permit continuous operation.

Trying to browse the contents of the file from ISPF while it is in use by VIRTEL, can result to the obtain a system message indicating that the file is empty. In reality this is not true, because in fact the records are buffered in memory before being written in block.

The format of the statistics records depends on the value specified in the “Write Stats to” field of the VIRTEL terminal definition (refer to the VIRTEL Connectivity Reference manual for details of terminal definitions). Each terminal may request statistics in one or more of the possible formats:

**Classic**

> VIRSTAT classic format recording is intended for use with Minitel calls on terminals associated with NPSI lines (Gate or Fast Connect).

**Alternate X25**

> VIRSTAT alternate format recording may be requested for terminals associated with any X25 line (GATE, FASTC, XOT).

**Web**

> VIRSTAT format suitable for terminals associated with an HTTP line.

For terminals associated with all other line types (including /GATE, /PCNE, and /FASTC) the statistics record may not contain meaningful information and the statistics field in the terminal definition should be left blank.

The statistics file may contain a mixture of classic, alternate X25, and web format records. The record type indicator at position 61 of each record identifies the format of the particular record.

### 8.1.1. VIRSTAT classic format

For terminals which specify classic format recording (STATS=1), the VIRSTAT record format is shown in the following table:

| Position | Format | Type of information |
|---|---|---|
| 1 to 8 | Alphanumeric | Terminal name |
| 9 to 12 | Packed Decimal | Date (CCYYDDDF) |
| 13 to 16 | Packed Decimal | Time (HHMMSSTF) |
| 17 to 28 | Alphanumeric | User id |
| 29 to 36 | Alphanumeric | Originating terminal name (outbound calls) |
| 37 to 40 | Hexadecimal | No of bytes inbound (uncompressed) |
| 41 to 44 | Hexadecimal | No of bytes inbound (compressed) |
| 45 to 48 | Hexadecimal | No of bytes outbound (uncompressed) |
| 49 to 52 | Hexadecimal | No of bytes outbound (compressed) |
| 53 to 56 | Hexadecimal | No of sends |
| 57 to 60 | Hexadecimal | No of receives |
| 61 to 61 | Alphanumeric | Record type (C=cumulative,P=partial,E=end) [1] |
| 62 to 62 | Alphanumeric | Compression level (0,1,2) |
| 63 to 70 | Alphanumeric | Minitel: Server access node |
| 71 to 74 | Alphanumeric | Minitel: Call duration in minutes (ZZZ9) |
| 75 to 82 | Alphanumeric | Session start date (MM/DD/YY) |
| 83 to 86 | Alphanumeric | Session start date (.DDD) |
| 87 to 94 | Alphanumeric | Session start time (HH.MM.SS) |
| 95 to 102 | Alphanumeric | Session end date (MM/DD/YY) |
| 103 to 106 | Alphanumeric | Session end date (.DDD) |
| 107 to 114 | Alphanumeric | Session end time (HH.MM.SS) |
| 115 to 115 | Alphanumeric | Tarification level (External Servers) |
| 116 to 116 | Alphanumeric | Disconnection Type (T=by TIME-OUT) |
| 117 to 120 | Hexadecimal | X25 units received (Fast-Connect) |
| 121 to 124 | Hexadecimal | X25 units sent (Fast-Connect) |

*Format of VIRSTAT record (classic format)*

For NPSI Fast Connect lines, the X25 accounting statistics are recorded in billing units provided by NPSI at virtual circuit disconnection time. Their interpretation depends on the TAXUNIT parameter in the NPSI X25.MCH macro. Similarly, the session start and end times (Fast Connect only) are provided by NPSI and depend on the clock settings in the NCP. For other types of lines, accounting statistics and times are generated by VIRTEL.

**Note 1**

> Type C (cumulative) records are implemented at terminal disconnection.
>
> Type P (partial) records are implemented at regular intervals.
>
> Type E (end of job) records are implemented at VIRTEL shutdown.

### 8.1.2. VIRSTAT alternate X25 format

For terminals which specify alternate X25 format recording (STATS=4), the VIRSTAT record format is shown in the following table:

| Position | Format | Type of information |
|---|---|---|
| 1 to 8 | Alphanumeric | Terminal name |

| Position | Format | Type of information |
|---|---|---|
| 9 to 12 | Packed Decimal | Date (CCYYDDDF) |
| 13 to 16 | Packed Decimal | Time (HHMMSSTF) |
| 17 to 36 | Alphanumeric | Remote X25 number |
| 37 to 40 | Hexadecimal | Unused |
| 41 to 44 | Hexadecimal | Unused |
| 45 to 48 | Hexadecimal | Unused |
| 49 to 52 | Hexadecimal | Unused |
| 53 to 56 | Hexadecimal | Unused |
| 57 to 60 | Hexadecimal | Unused |
| 61 to 61 | Alphanumeric | Record type (I=inbound,O=outbound) [1] |
| 62 to 62 | Alphanumeric | Unused |
| 63 to 70 | Alphanumeric | Originating GATE/PCNE terminal name (outbound)<br>Entry point name (inbound) |
| 71 to 74 | Alphanumeric | Unused |
| 75 to 82 | Alphanumeric | Session start date (MM/DD/YY) |
| 83 to 86 | Alphanumeric | Session start date (.DDD) |
| 87 to 94 | Alphanumeric | Session start time (HH.MM.SS) |
| 95 to 102 | Alphanumeric | Session end date (MM/DD/YY) |
| 103 to 106 | Alphanumeric | Session end date (.DDD) |
| 107 to 114 | Alphanumeric | Session end time (HH.MM.SS) |
| 115 to 115 | Alphanumeric | Unused |
| 116 to 116 | Alphanumeric | Disconnection Type (T=by TIME-OUT) |
| 117 to 120 | Hexadecimal | Unused |
| 121 to 124 | Hexadecimal | Call duration in 1/100 second |

*Format of VIRSTAT record (alternate X25 format)*

For NPSI Fast Connect lines, the X25 session start and end times are provided by NPSI at virtual circuit disconnection time and depend on the clock settings in the NCP. For other types of lines, times are generated by VIRTEL.

**Note 1**

> Type I (inbound) records relate to X25 incoming calls.
>
> Type O (outbound) records relate to X25 outgoing calls.

### 8.1.3. VIRSTAT formats for VIRTEL Web Access

For terminals which specify web format recording (STATS=5 or STATS=6), the VIRSTAT record format is shown in the following tables:

| Position | Format | Type of information |
|---|---|---|
| 1 to 8 | Alphanumeric | Terminal name |
| 9 to 12 | Packed Decimal | Date (CCYYDDDF) |
| 13 to 16 | Packed Decimal | Time (HHMMSSTF) |
| 17 to 31 | Alphanumeric | Caller’s IP address |

| Position | Format | Type of information |
|---|---|---|
| 32 to 36 | Alphanumeric | Alphanumeric |
| 37 to 44 | Alphanumeric | Entry point name |
| 45 to 52 | Alphanumeric | Transaction external name |
| 53 to 60 | Alphanumeric | Rule name |
| 61 to 61 | Alphanumeric | Record type (H=HTTP inbound) |
| 62 to 64 | Alphanumeric | Unused |
| 65 to 68 | Alphanumeric | Error code |
| 69 to 76 | Alphanumeric | Relay LU name |
| 77 to 84 | Alphanumeric | Call duration in 1/100 second |
| 85 to 92 | Alphanumeric | No of bytes received |
| 93 to 100 | Alphanumeric | No of bytes sent |
| 101 to 108 | Alphanumeric | Session start date (MM/DD/YY) |
| 109 to 116 | Alphanumeric | Session start time (HH.MM.SS) |
| 117 to 124 | Alphanumeric | Session end time (HH.MM.SS) |

*Format of VIRSTAT record (type 5 for Web Access)*

This record type is written when 5 is specified in the STATS field of the terminal definition used for the HTTP line. If the terminal is disconnected by TIMEOUT, the “Error Code” field contains the word “TIME”.

| Position | Format | Type of information |
|---|---|---|
| 1 to 8 | Alphanumeric | Terminal name |
| 9 to 12 | Packed Decimal | Date (CCYYDDDF) |
| 13 to 16 | Packed Decimal | Time (HHMMSSTF) |
| 17 to 31 | Alphanumeric | Caller’s IP address |
| 32 to 36 | Alphanumeric | Caller’s port number |
| 37 to 44 | Alphanumeric | Entry point name |
| 45 to 52 | Alphanumeric | Transaction external name |
| 53 to 60 | Alphanumeric | Rule name |
| 61 to 61 | Alphanumeric | Record type (B=binary HTTP inbound) |
| 62 to 64 | Alphanumeric | Unused |
| 65 to 68 | Alphanumeric | Error code |
| 69 to 76 | Alphanumeric | Relay LU name |
| 77 to 80 | Hexadecimal | Call duration in 1/100 second |
| 81 to 84 | Hexadecimal | No of bytes received |
| 85 to 88 | Hexadecimal | No of bytes sent |
| 89 to 108 | Alphanumeric | User name |
| 109 to 124 | Alphanumeric | URL parameter |

*Format of VIRSTAT record (type 6 for Web Access)*

For this record type, the counters are in binary, and the Session Date and Time fields are replaced by User name (20 bytes) and URL parameter (first 16 bytes).

This record type is written when 6 is specified in the STATS field of the terminal definition used for the HTTP line.

## 8.1.4. Statistics file management

The STAT command is used to manage the VIRTEL statistics recording files (VIRSTATx). This command can be used only if STATS=MULTI is specified in the VIRTCT.

### 8.1.4.1. Display VIRSTAT

```
STAT,D
```

This command displays the status of the VIRSTATx files (message VIR0601I).

### 8.1.4.2. Switch VIRSTAT

```
STAT,I
```

This command forces VIRTEL to free the current VIRSTATx file and to start recording onto the next file.

## 8.1.5. Printing the contents of the VIRSTAT file (X25)

The VIR0070 program allows the contents of the VIRSTAT file to be printed. The source for this program is supplied in the SSL (VSE) or in the SAMPLIB (MVS) and you can use this as the basis of a user-written program to print statistics. Examples of the JCL required to execute this program are shown below:

```
* $$ JOB JNM=VIRSTAT,CLASS=0,DISP=D
* $$ LST DISP=D,CLASS=V,DEST=(,SPTUSER)
// JOB VIRPRNT
// LIBDEF *,SEARCH=VIRT442.SUBLIB
// DLBL STAT,'VIRTEL.VIRSTAT.ESDS',,VSAM,CAT=VSESPUC
// EXEC VIR0070,SIZE=AUTO
/*
/&
* $$ EOJ
```

*VIR0070 JCL to print VIRSTAT file (VSE)*

```
//VIRSTAT  JOB 1,USER,CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID
//TRI     EXEC PGM=SORT
//SYSPRINT DD  SYSOUT=*
//SYSOUT   DD  SYSOUT=*
//SORTWK01 DD  UNIT=3380,SPACE=(TRK,(100,20),RLSE)
//SORTWK02 DD  UNIT=3380,SPACE=(TRK,(100,20),RLSE)
//SORTIN   DD  DISP=SHR,DSN=VIRTEL.STAT
//SORTOUT  DD  DSN=&&STAT,UNIT=SYSDA,DISP=(,PASS),
//             DCB=(LRECL=124,BLKSIZE=620,RECFM=FB),
//             SPACE=(TRK,(100,20),RLSE)
//SYSIN    DD  *
 SORT FIELDS=(1,16,A),FORMAT=CH
 END
//STAT     EXEC PGM=VIR0070
//STEPLIB  DD  DISP=SHR,DSN=VIRT442.LOADLIB
//SYSUDUMP DD  SYSOUT=*
//SYSPRINT DD  SYSOUT=*
//VIRSTAT  DD  DISP=(OLD,DELETE),DSN=&&STAT
//
```

*VIR0070 JCL to print VIRSTAT file (MVS)*

## 8.1.6. Printing the contents of the VIRSTAT file (Web)

The PRTSTATW program supplied with the system allows printing of type 6 records from the VIRSTAT file. This program is delivered as a load module in the VIRTEL LOADLIB (from version 4.45 onwards) and the execution JCL is provided as member JCLPRTST in the VIRTEL SAMPLIB. Examples of the execution JCL for this program are shown below.

### 8.1.6.1. PRTSTATW JCL

In the VSE environment the VIRPRTST job, loaded into the POWER reader queue during VIRTEL installation, contains an example of JCL for printing the VIRSTAT file. This job is an example only and must be modified before execution:

```
* $$ JOB JNM=VIRPRTST,CLASS=0,DISP=D
* $$ LST DA
// JOB VIRPRTST
* *****************************************************************
* * VIRTEL:  EXAMPLE JCL TO EXECUTE STAT VIRTEL PRINT             *
* *****************************************************************
// LIBDEF *,SEARCH=(VIRT452.SUBLIB,PRD2.CONFIG,PRD1.BASE)
// DLBL SORTIN1,'VIRTEL.STAT',,VSAM,CAT=VSESPUC
// DLBL SORTOUT,'%VIRTEL.SORTFILE',0,VSAM,CAT=VSESPUC,DISP=(NEW,KEEP), C
               RECORDS=(10,100),RECSIZE=124
* // DLBL SORTOUT,'VIRTEL.SORTFILE',0,SD
* // EXTENT SYS001,SYSWK2,1,0,NNNN,15
* // ASSGN SYS001,DISK,VOL=SYSWK2,SHR
// EXEC SORT,SIZE=100K
 SORT FIELDS=(01,08,A),FORMAT=CH
 RECORD TYPE=F,LENGTH=124
 END
/*
*  OPTIONS FOR PRINT OR COUNT
* // DLBL SYSPRINT DD SYSOUT=*
* // DLBL SYSABEND DD SYSOUT=*
* // DLBL IJSYSLS  DD SYSOUT=*
*
// DLBL VIRSTAT,'%VIRTEL.SORTFILE',0,VSAM,CAT=VSESPUC,DISP=(,DELETE)
// ASSGN SYS007,SYSLST
// ASSGN SYS006,SYSRDR
// EXEC PGM=PRTSTATW,SIZE=AUTO
PRTSTATW  PRINT                                   NNN  0250
SELDATE   01012011  31122012
SELTERM   DEVTA*    CLVTA*
/*
*  * MAIN CARD    (REQUIRED)
*  * ---------
*  *         1         2         3         4         5         6
*  *1...!....0....!....0....!....0....!....0....!....0....!....0...
*  *PRTSTATW  PRINT                 BREAK USER          NNN  PPPP
*  *          SPECIFIC REQUEST TO PRINT THE STATISTICS
*  *PRTSTATW  COUNT                 $ALL$               NNN  PPPP
*  *          SPECIFIC REQUEST TO COUNT THE NUMBERS OF DIFFERENT
*  *          USERS
*  *SELECT CARD  (OPTIONAL)
*  * -----------
*  *         1         2         3         4         5         6
*  *1...5....0....5....0....5....0....5....0....5....0....5....0
*  *SELDATE   DDMMYYYY  DDMMYYYY
*  *          DATE SELECTION BEGIN,
*  *                    END  DATE
*  *SELTERM   TTTTTTTT  XXXXXXXX  YYYYYYYY  ZZZZZZZZ (UP TO 8 BYTES)
*  *SELUSER   USER4561890123456789  (UP TO 20 BYTES)
*  *SELPARM   PARM456189012345      (UP TO 16 BYTES)
*  *1...!....0....!....0....!....0....!....0....!....0....!....0...
*  *         THE '*' CHARACTER ALLOWS A GENERIC EVALUATION.
/&
* $$ EOJ
```

*PRTSTATW JCL to print VIRSTAT file in VSE (type=6)*

In the MVS environment the JCL for executing the PRTSTATW program is supplied as member JCLPRTST in the VIRTEL SAMPLIB:

```
//VIRPRTST JOB 1,USER,CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID
/*JOBPARM LINES=9999
//*------------------------------------------------------------*
//*    VIRSTAT FILE PRINTING JOB                               *
//*    VIRSTAT RECORD TYPE 6 (VSTA-RECORD-TYPE='B')            *
//*------------------------------------------------------------*
//        SET  LOAD=yourqual.VIRTnnn.LOADLIB
//        SET  STAT=yourqual.VIRTnnn.STAT
//*------------------------------------------------------------*
```

```
//JOBLIB   DD  DISP=SHR,DSN=&LOAD
//*------------------------------------------------------------*
//*
//STEP0    EXEC PGM=SORT
//SYSOUT   DD SYSOUT=*
//SORTIN   DD DISP=SHR,DSN=&STAT
//SORTOUT  DD DSN=&&SORTSTAT,DISP=(NEW,PASS),UNIT=SYSDA,
//            DCB=(BLKSIZE=1240,LRECL=124,RECFM=FB),
//            SPACE=(TRK,(1,1))
//SYSIN    DD *
 SORT FIELDS=(1,8,A),FORMAT=CH
//*
//STEP1    EXEC  PGM=PRTSTATW
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//IJSYSLS  DD SYSOUT=*
//*
//VIRSTAT  DD   DSN=&&SORTSTAT,DISP=OLD
//SYSIN    DD *
PRTSTATW  PRINT                                    NNN  0250
SELDATE   01012011  31122012
SELTERM   DEVTA*    CLVTA*
* ..!....0....!....0....!....0....!....0....!....0....!....0...
//* MAIN CARD    (required)
//* ---------
//*          1         2         3         4         5         6
//* 1...!....0....!....0....!....0....!....0....!....0....!....0...
//* PRTSTATW  PRINT               BREAK USER          NNN  PPPP
//*           specific request to print the statistics
//* PRTSTATW  COUNT               $ALL$               NNN  PPPP
//*           specific request to count the numbers of different
//*           users
//* SELECT CARD  (optional)
//* -----------
//*          1         2         3         4         5         6
//* 1...5....0....5....0....5....0....5....0....5....0....5....0
//* SELDATE   DDMMYYYY  DDMMYYYY
//*           DATE selection begin,
//*                     end  date
//* SELTERM   TTTTTTTT  XXXXXXXX  YYYYYYYY  ZZZZZZZZ (up to 8 bytes)
//* SELUSER   USER4561890123456789  (up to 20 bytes)
//* SELPARM   PARM456189012345      (up to 16 bytes)
//* 1...!....0....!....0....!....0....!....0....!....0....!....0...
//*            The '*' character allows a generic evaluation.
//
```

*PRTSTATW JCL to print VIRSTAT file in MVS (type=6)*

This JCL consists of two main steps:

- a first step to sort the file
- a second step to PRINT or COUNT the records

### 8.1.6.2. Sorting the file

The sort requirements are determined by the type of report desired. Since the PRTSTATW program offers the option of selecting records and also offers up to two levels of report break to allow printing of subtotals, it is important to specify the appropriate sort criteria to obtain the correct result.

The sort operates on one or more criteria, in ascending (A) or descending (D) mode. You should adapt the SORT SYSIN according to the syntax of the specific SORT program being used.

Several examples of sort criteria are shown below for various fields: terminal (TERM), date (DATE), user name (USER), URL parameter (PARM)

```
 SORT FIELDS=(1,8,A)     --> TERM        A: ascending D: descending
 SORT FIELDS=(9,4,A)     --> DATE
 SORT FIELDS=(89,20,A)   --> USER
 SORT FIELDS=(109,16,A)  --> PARM
 SORT FIELDS=(1,8,A,),FORMAT=CH sort by TERM
 SORT FIELDS=(1,8,A,89,20,A),FORMAT=CH sort by TERM first then USER
 SORT FIELDS=(17,15,A)   --> IP Adress (for $ALL$ request)
 SORT FIELDS=(89,20,A,17,15,A),FORMAT=CH sort for $ALL$ request
```

*PRTSTATW JCL sort criteria*

For example, to obtain a report in ascending order of session start date, specify the following statements in the SORT SYSIN:

```
//SYSIN    DD *
 SORT FIELDS=(9,4,A),FORMAT=CH
//*
```

### 8.1.6.3. The PRTSTATW program

The PRTSTATW program executed in the second step reads the sorted output file from the first step. It contains required and optional SYSIN cards.

#### 8.1.6.3.1. First card (required)

```
         1         2         3         4         5         6
1...!....0....!....0....!....0....!....0....!....0....!....0...
PRTSTATW  PRINT               BREAK USER          NNN  PPPP
```

*PRTSTATW first SYSIN card*

**Columns 1 to 8**

Program name: must be PRTSTATW

**Columns 11 to 16**

Report type: specify PRINT (print report) or COUNT (calculate number of distinct users)

**Columns 31 to 35**

Optionally specify BREAK if report break is desired (up to 2 levels) for printing (PRINT) or $ALL$ if counting (COUNT)

**Columns 37 to 40**

Optionally indicates the type of report break: TERM (break on change of terminal name), USER (break on change of user name), DATE (break on change of date) or PARM (break on change of URL parameter)

**Columns 43 to 46**

Optionally indicates the second level report break (TERM, USER, DATE, or PARM)

**Columns 51 to 53**

Optionally specify N (no) or O (yes) to print additional trace information (program trace, input/output trace, and miscellaneous trace respectively). The default is N for each trace.

**Columns 56 to 59**

Maximum number of pages to be printed (default 50 pages)

#### 8.1.6.3.2. Second card (optional)

```
         1         2         3         4         5         6
1...5....0....5....0....5....0....5....0....5....0....5....0
SELDATE   DDMMYYYY  DDMMYYYY
          DATE selection begin,
                    end  date
SELTERM   TTTTTTTT  XXXXXXXX  YYYYYYYY  ZZZZZZZZ (up to 8 bytes)
SELUSER   USER4561890123456789  (up to 20 bytes)
SELPARM   PARM456189012345      (up to 16 bytes)
```

*PRTSTATW second SYSIN card*

This card allows records to be selected according to 4 fields: DATE (selection by date range), TERM (selection of up to 4 different terminal names, otherwise 4 different HTTP lines), USER (selection by user name), PARM (selection by URL parameter).

It is possible to make a **generic** selection by coding a ‘*’ character at the end of a field. For example, specifying a terminal selection value of DEVT* allows the program to select all records whose terminal name begins with DEVT.

**Columns 1 to 7**

> Optional, indicates the selection type: SELDATE (for DATE), SELTERM (for terminal), SELUSER (for user), or SELPARM (for URL parameter).

**Columns 11 to 19**

> Indicates up to 8 characters for the chosen value (SELDATE and SELTERM). The value may end in ‘*’ for a generic search.

**Columns 21 to 29**

> For SELDATE: second date in the range, for SELTERM: second terminal name (optional)

**Columns 31 to 39**

> For SELTERM: third terminal name (optional)

**Columns 41 to 49**

> For SELTERM: fourth terminal name (optional)

**Columns 21 to 40**

> For SELUSER:up to 20 characters for the user name. The value may end in ‘*’ for a generic search.

**Columns 21 to 36**

> For SELPARM: up to 16 characters for the URL parameter. The value may end in ‘*’ for a generic search.

### 8.1.6.4. Counter report

Clients who wish to obtain the total number of unique users can execute the PRTSTATW program with the SYSIN shown below.

For the SORT: the first sort field is the user name, and the second sort field is the IP address:

```
//SYSIN    DD *
 SORT FIELDS=(89,20,A,17,15,A),FORMAT=CH
//*
```

For the PRTSTATW program:

```
//SYSIN    DD *
PRTSTATW  COUNT               $ALL$               NNN  0465
```

```
SELDATE   01012011  30122011
SELTERM   DEVTA*    CLVTA*
```

COUNT and $ALL$ are required. The selection cards are optional. They allow for example to report for a given period the number of different users connected to the system in HTTP mode and/or to filter on an HTTP line defined with transaction security active, which requires the user to sign on.

For MVS, sample JCL for the user counter report is supplied in the JCLCOUST member of the VIRTEL SAMPLIB. For VSE, a sample job named VIRCOUST is loaded into the POWER Reader Queue at installation time.

#### 8.1.6.4.1. Example of counter report (COUNT)

```
********************************* TOP OF DATA
************************************************************************
1== VIRTEL == Statistics file COUNT job ==
Submit on:     18-01-2011  at:  14:23:12     PAGE : 000

 Parameters CARDS list read by PRTSTATW


 PRTSTATW  COUNT               $ALL$  PARM         NNN  0469
 SELDATE   01012010  30122011
 * ..!....0....!....0....!....0....!....0....!....0....!....0...


               18-01-2011 14:23:12   * S U M M A R Y *
               18-01-2011 14:23:12   With criterias put for selection
at top of listing:
               18-01-2011 14:23:12   Total Records read
:  00207
               18-01-2011 14:23:12   Total Calls selected
:  00017
               18-01-2011 14:23:12   Total Calls duration
:  001hr04mn35s
               18-01-2011 14:23:12   Total Calls ended by "Timeout"
:  00007
               18-01-2011 14:23:12   Total Defined different Users
:  00004
               18-01-2011 14:23:12   Total Calls without signature
:  00001

 PRTSTATW      18-01-2011 14:23:12   End of execution
******************************** BOTTOM OF DATA *********
*************************************************************
```

*PRTSTATW user counter report*

### 8.1.7. SMF Support

Using VIRTEL 4.53+ and onwards allows VIRTEL SMF support writing VIRSTATS records into SMF. The VIRTCT must be reassembled and link-edited with a new value SMF or (SMF,nnn) for the STATS parameter to have this feature active.

The SMF record format is the same as the current STATS record but prefixed by the standard SMF header.

The default SMF record number is 223, but it can be modified using the (SMF,nnn) syntax.

### 8.1.8. Printing the contents of the VIRSTAT SMF records

The SMFPRINT job in VIRTEL.SAMPLIB can be used to print the SMF records from the SYS1.MANx dataset using SMFREXXP REXX procedure.

### 8.1.9. Messages

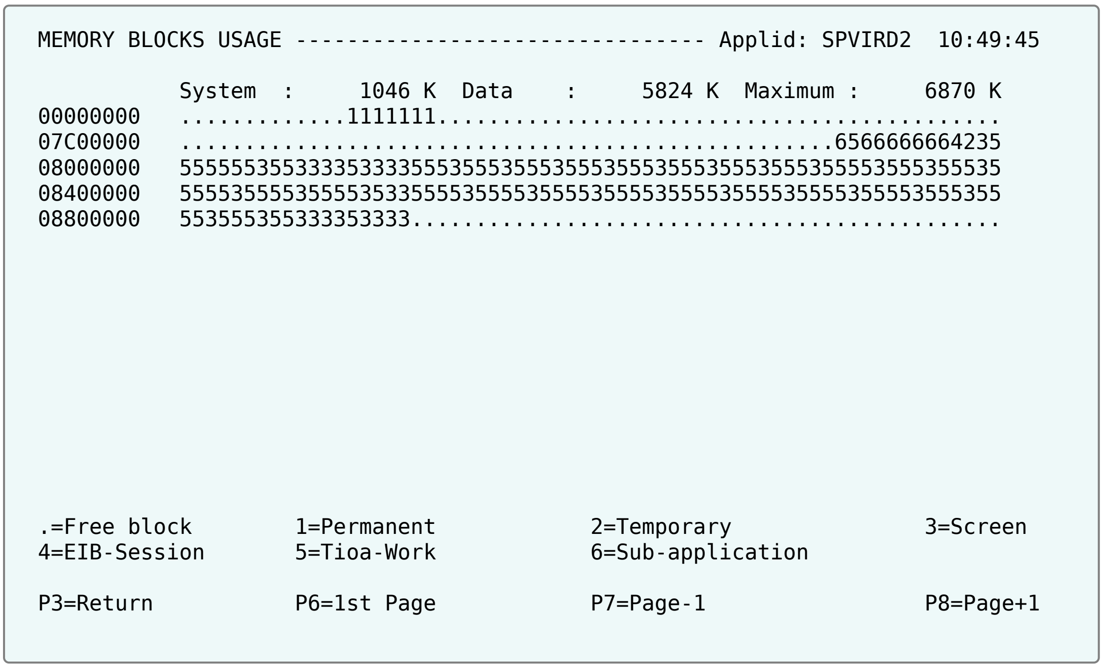
Messages "VIR0612E  VIRSTAT SMFWTM FAILED. RC=rc" and "VIR0611I   VIRSTAT NOW RECORDING TO SMF" are in relation with SMF support. See "Virtel Messages and Operations" manual for more details.

# 9. Memory management

The VIRTEL memory management sub-application allows the system administrator to display VIRTEL memory utilisation in real time. The memory management sub-application is a pseudo-graphical display which shows the allocation of VIRTEL memory by function. VIRTEL manages its own memory, in order to avoid memory shortages as a result of fragmentation. The memory management display can be used by the administrator to help understand VIRTEL's memory requirements during normal operation.

## 9.1. Access To The Application

To invoke the memory management sub-application, press [PA2] in the Configuration Menu to display the Sub-Application Menu, then press [PF4] in the Sub-Application Menu. The sub-application displays a screen similar to the example shown below. This screen represents the contents of the VIRTEL address space after deducting the space occupied by the VIRTEL kernel modules.



```
MEMORY BLOCKS USAGE ------------------------------ Applid: SPVIRD2  10:49:45

           System  :     1046 K  Data    :     5824 K  Maximum :     6870 K
00000000   .............1111111............................................
07C00000   ...................................................6566666664235
08000000   5555535553333533335553555355535553555355535553555355535553555535
08400000   5555355555355535335555535555535555535555535555535555535553555355
08800000   553555355333353333..............................................








.=Free block        1=Permanent            2=Temporary               3=Screen
4=EIB-Session       5=Tioa-Work            6=Sub-application

P3=Return           P6=1st Page            P7=Page-1                 P8=Page+1
```

*Memory display of VIRTEL address space*

Each screen position represents a 2K memory block (if MEMORY=BELOW is specified in the VIRTCT), or a 64K memory block (if MEMORY=ABOVE). The address displayed at the start of each line is the virtual address represented by the first position in the line.

Each free memory block is represented by a dot. Lines which consist entirely of dots are not displayed.

Permanently allocated memory blocks are represented by the character 1. To avoid memory shortages as a result of fragmentation, these blocks are always allocated at the end of the VIRTEL address space.

Temporarily allocated memory blocks are represented by the character 2. Blocks of this type are allocated and freed by VIRTEL as required.

Memory blocks used by the VIRTEL Multi-Session feature to save screen images are represented by the character 3. Blocks of this type are allocated and freed by VIRTEL as required.

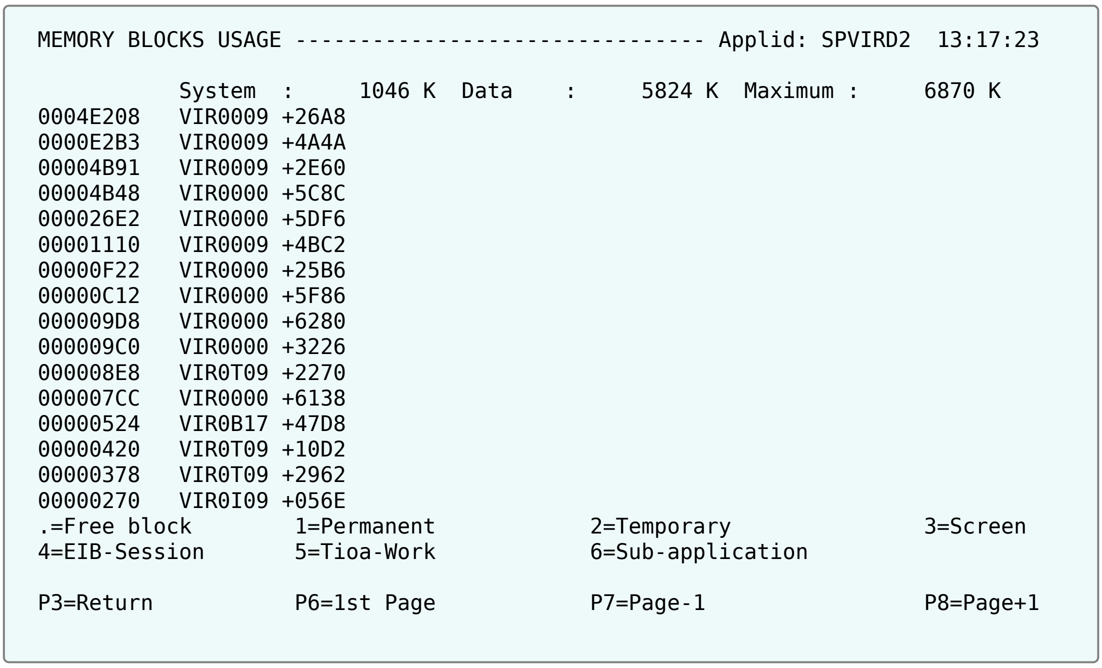
Memory blocks used for saving EIB and other session-related information are represented by the character 4. Blocks of this type are allocated and freed by VIRTEL as required.

Memory blocks used as communication areas by VIRTEL sub-applications are represented by the character 5. Blocks of this type are allocated and freed by VIRTEL as required.

In the VSE environment, sub-application modules are loaded in the SUBPOOL. Memory blocks used for this purpose are represented by the character 6. Blocks of this type are allocated and freed by VIRTEL as required. These blocks never appear in the MVS environment.

## 9.1.1. Memory display in MEMORY=TEST mode

If MEMORY=TEST is specified in the VIRTCT, the memory management sub-application displays its results in a different format. MEMORY=TEST mode allows support technicians to analyse memory occupation by module, as a debugging aid for possible memory shortage problems.



```
MEMORY BLOCKS USAGE -------------------------------- Applid: SPVIRD2  13:17:23

           System  :     1046 K  Data    :     5824 K  Maximum :     6870 K
0004E208   VIR0009 +26A8
0000E2B3   VIR0009 +4A4A
00004B91   VIR0009 +2E60
00004B48   VIR0000 +5C8C
000026E2   VIR0000 +5DF6
00001110   VIR0009 +4BC2
00000F22   VIR0000 +25B6
00000C12   VIR0000 +5F86
000009D8   VIR0000 +6280
000009C0   VIR0000 +3226
000008E8   VIR0T09 +2270
000007CC   VIR0000 +6138
00000524   VIR0B17 +47D8
00000420   VIR0T09 +10D2
00000378   VIR0T09 +2962
00000270   VIR0I09 +056E
.=Free block        1=Permanent           2=Temporary               3=Screen
4=EIB-Session       5=Tioa-Work           6=Sub-application

P3=Return           P6=1st Page           P7=Page-1                 P8=Page+1
```

*Memory display in MEMORY=TEST mode*

Each line of the screen represents one VIRTEL module which has obtained one or more memory blocks. The first column represents the number of bytes of memory (en hexadecimal) currently allocated by the module. The first 16 modules are displayed, in descending order of memory utilisation.

## 9.2. Associated Functions

### 9.2.1. Positioning the display

Where the memory display occupies more than one screen, you can press [PF8] to view the following page, [PF7] to view the previous page, and [PF6] to go back to the first page.

### 9.2.2. Real time monitoring

To refresh the display with up-to-date information, press [Enter].

### 9.2.3. Return to the sub-application menu

To return to the sub-application menu, press [PF3] or [Clear]

# 10. Memory trace management

A memory trace can be activated using a command or from the VIRTCT. In both case, VIRTEL records an history of memory allocations that appears in a SNAP listing.

## 10.1. Memory Trace Commands

### 10.1.1. Activating memory trace

A memory trace can be activated by using

```
MEMTRACE
```

The first answer is in the form:

```
VIR0200I MEMTRACE
VIR0214I MEMORY TRACE STARTED
VIR0218I MEMORY TRACE FOUND 00000000 BLOCKS USING 0000000000000000 BYTES (00000000 MEGS)
```

The following answers are in the form:

```
VIR0200I MEMTRACE
VIR0218I MEMORY TRACE FOUND 00000011 BLOCKS USING 0000000000053344 BYTES (00000000 MEGS)
```

### 10.1.2. Reseting memory trace

A memory trace can be reseted by using

```
MEMTRACE,CLEAR
```

The trace is stopped, memory blocks used by the memory trace are released, the trace is restarted.

```
VIR0200I MEMTRACE,CLEAR
VIR0218I MEMORY TRACE FOUND 00000011 BLOCKS USING 0000000000053344 BYTES (00000000 MEGS)
VIR0216I CLEARING MEMORY TRACE
VIR0217I MEMORY TRACE CLEARED
VIR0214I MEMORY TRACE STARTED
VIR0218I MEMORY TRACE FOUND 00000000 BLOCKS USING 0000000000000000 BYTES (00000000 MEGS)
```

### 10.1.3. Stopping memory trace

A memory trace can be stopped by using

```
NOMEMTRACE
```

The trace is stopped, memory blocks used by the memory trace are released.

```
VIR0215I MEMORY TRACE STOPPED
VIR0218I MEMORY TRACE FOUND 00000011 BLOCKS USING 0000000000053344 BYTES (00000000 MEGS)
```

## 10.2. Memory Trace From The VIRTCT

A memory trace can be activated from the VIRTCT by using MEMORY=TEST or MEMORY=(ABOVE,TRACE) parameter. In such case, the is no message VIR0218I display in the log, but only the benefit of recording the history of memory allocations is kept in the SNAP.

Since it is not possible to stop a trace initialized in this way, it is best to only use this method to perform an analysis of the memory allocation during the startup phase.

## 10.3. Memory Trace Analysis

Once a memory trace activated, issuing a SNAP command produce a report of the memory allocations history in the SNAP listing.

```
HTTP-SPV  0295   1EC67F80  9EB0E12A  VIR0T09 +206A  8040  STILL HERE 1205180941  02000208  1F4C9220
HTTP-SPV  0295   1EC564E8  9EB10BDA  VIR0T09 +4B1A  8040  STILL HERE 1205180852  04000173  1F4C9520
HTTP-SPV  0295   1EC56668  8003D63E  VIR0009 +54D6  8040  STILL HERE 1205180792  04000270  1F088FA0
HTTP-SPV  0294   208A5300  8003D458  VIR0009 +52F0  8040  STILL HERE 1205180792  05008CF5  1F4C9320
SPVTA015  0279   209AE880  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180750  03000F70  1F90A6E0
SPVTA014  0279   209AF7F8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180705  03000F70  1F90A660
SPVTA013  0279   209B0770  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180668  03000F70  1F90A5E0
SPVTA012  0279   209B16E8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180630  03000F70  1F90A560
SPVTA011  0279   209B2660  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180377  03000F70  1F90A4E0
SPVTA010  0279   209B35D8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180318  03000F70  1F90A460
SPVTA009  0279   209B4550  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180241  03000F70  1F90A3E0
SPVTA008  0279   209B54C8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180149  03000F70  1F90A360
SPVTA007  0279   209B6440  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180101  03000F70  1F90A2E0
SPVTA006  0279   209B73B8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205180066  03000F70  1F90A260
SPVTA005  0279   209B8330  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179956  03000F70  1F90A1E0
SPVTA004  0279   209B92A8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179923  03000F70  1F90A160
SPVTA003  0279   209BA220  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179881  03000F70  1F90A0E0
SPVTA002  0279   209BB198  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179849  03000F70  1F90A060
SPVTA001  0279   209BC110  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179782  03000F70  1F4C9FE0
SPVTA000  0279   209BD088  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179741  03000F70  1F4C9F20
SPLOC009  0279   2099E880  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179715  03000F70  1F4C9E20
SPLOC008  0279   2099F7F8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179689  03000F70  1F4C9D20
SPLOC007  0279   209A0770  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179654  03000F70  1F4C9C20
SPLOC006  0279   209A16E8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179607  03000F70  1F4C9B20
SPLOC005  0279   209A2660  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179568  03000F70  1F4C9A20
SPLOC004  0279   209A35D8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179526  03000F70  1F4C9920
SPLOC003  0279   209A4550  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179488  03000F70  1F4C9820
SPLOC002  0279   209A54C8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179458  03000F70  1F4C9620
SPLOC001  0279   209A6440  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179377  03000F70  1F4C9420
SPLOC000  0279   209A73B8  8003A9C0  VIR0009 +2858  8040  STILL HERE 1205179338  03000F70  1F4C9120
          0000   1EC584A8  8001BFE4  VIR0000 +4224  8040  STILL HERE 1205122226  04000270  1EC48F00
          0000   1EC58720  8001BFE4  VIR0000 +4224  8040  STILL HERE 1205122225  04000270  1EC48F20
          0000   1EC58998  8001BFE4  VIR0000 +4224  8040  STILL HERE 1205122225  04000270  1EC48F40
          0000   1EC58C10  8001BFE4  VIR0000 +4224  8040  STILL HERE 1205122225  04000270  1EC48F60
          0000   1EC58E88  8001BF68  VIR0000 +41A8  8040  STILL HERE 1205122225  04000170  1EC48F80
          0000   0010E500  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122223  01000250  1EC48FA0
          0000   0010E758  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122223  01000250  1EC48FC0
          0000   0010E9B0  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122222  01000250  1EC48FE0
          0000   0010EC08  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122222  01000250  1EC47000
          0000   0010EE60  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122221  01000250  1EC47020
          0000   0010F0B8  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122220  01000250  1EC47040
          0000   0010F310  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122220  01000250  1EC47060
          0000   0010F568  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122220  01000250  1EC47080
```

```
           0000   0010F7C0  8001EE2A  VIR0000 +706A  8040  STILL HERE 1205122219  01000250  1EC470A0
    1        2        3         4            5         6        7          8          9        10
```

*Example of a memory allocataion history*

1. Line or terminal name for which memory allocation is performed. This information is omitted when the allocation relates VIRTEL itself.
2. Task number behind the allocation request.
3. Register 15 value.
4. Register 14 value.
5. Program name + offset of the origin request.
6. Memory allocation type. (8040 = GETMAIN).
7. Memory block state.
8. Time of the allocation.
9. Type and size of the allocation. The two first bytes represents the type of memory allocated (See “Memory display of VIRTEL address space”, page 40 for a complete description of the memory block type.). The six last bytes represents the size of the memory block allocated.
10. Reserved for internal use.

## 10.4. Memory Trace Overhead

Tracing memory activity can produce an important overhead estimated to 20-30% of the activity. When using MEMTRACE command, the memory previously allocated to records history is released.

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