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NETWORK LOGICAL DATA MANAGER

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COMMUNICATION NETWORK MANAGEMENT
USING Network Logical Data Manager

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GG24-1585-0
DATE: May 18th, 1983

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ACKNOWLEDGMENTS :

The author of "Appendix C. VTAM Discard Codes" on page 77 is Ernie Gilman from 'Installation Support' IBM Kingston, NY.

First Edition (May 18th, 1983)

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CHAPTER 1. INTRODUCTION

This document is the result of a project at the Raleigh International System Center to install, test, and evaluate an early release of the Network Logical Data Manager (NLDM, program number 5668-971) program product. The access method used was ACF/VTAM V2R1 and this will be the only access method considered in this document. The job control and samples must be adjusted for each system.

The intent of this paper is to ease the initial installation and use of NLDM V1R1 and try to give answers to the questions "how helpful is NLDM in the problem determination area, and how should it be used to solve a specific problem?".

NLDM operates with Network Communications Control Facility (NCCF) release 2, with the appropriate PTFs. It uses system functions of NCCF to communicate with the SNA access method, to collect data related to SNA sessions, and to communicate with the VSAM data base to store and retrieve historical session data. It also uses the cross-domain capability of NCCF to permit the display of data collected in remote NCCF domains that are also running NLDM V1R1.

The collected data includes information about session activation and deactivation, session partners, the physical configuration associated with the session, access method PIU data and NCP data. Figure 2 on page 3 details the selected hardware resources for which tracing is provided and the type of data collected. For the active sessions the data is kept in virtual storage, while for terminated sessions the data is recorded in the NLDM data base as historical data.

Therefore, NLDM collects and correlates data related to SNA sessions, gives the user on-line access to this information, and thus helps him to identify network problems. NLDM can be compared to existing TRACE capabilities, in the same way that NPDA can be compared to LOGREC.

With the ability to view data from other domains, NLDM also provides a centralized problem determination facility.

NLDM can coexist with the other NCCF products like NETWORK PROBLEM DETERMINATION APPLICATION (NPDA), 3600 THRESHOLD ANALYSIS AND REMOTE ACCESS FEATURE (TARA), and TERMINAL ACCESS FACILITY (TAF).

How to use this document:

To learn how to operate NLDM read "CHAPTER 2. Using NLDM" on page 9 and "CHAPTER 3. Session Tracing" on page 29.

Read "CHAPTER 3. Session Tracing" on page 29 and "CHAPTER 4. Network Control Center use of NLDM - Scenarios" on page 31 for examples of the practical use of NLDM.

Information for installing NLDM is given in "CHAPTER 5. Installing NLDM" on page 61 and "CHAPTER 6. Performance Considerations" on page 71.

For the definitions of some terms used, consult "Appendix F. Definitions" on page 89.

OPERATING ENVIRONMENT

The environment in which NLDM operates is shown in Figure 1.

NLDM operates under the control of NETWORK COMMUNICATIONS CONTROL FACILITY (NCCF) Release 2 and is invoked by an NCCF operator at an NCCF terminal.

NLDM collects data relating to SNA sessions in single-domain and multi-domain networks in a wrappable area in virtual storage for the active sessions, and recorded in a data base for the terminated sessions. It can trace all sessions of a given NAU which have an end point in the host, when the NAU is acting as either a primary or secondary end of the session (see "CHAPTER 3. Session Tracing" on page 29). NLDM also collects data relating to the data flows for certain non-SNA (FIDO) terminals (see Figure 2 on page 3). For the NLDM cross-domain support, which allows a view of the session data of a partner residing in another domain, an NLDM must be active in both domains and an NCCF to NCCF session must be started.

NLDM gives an on-line hierarchical presentation of the collected data to the NLDM user.

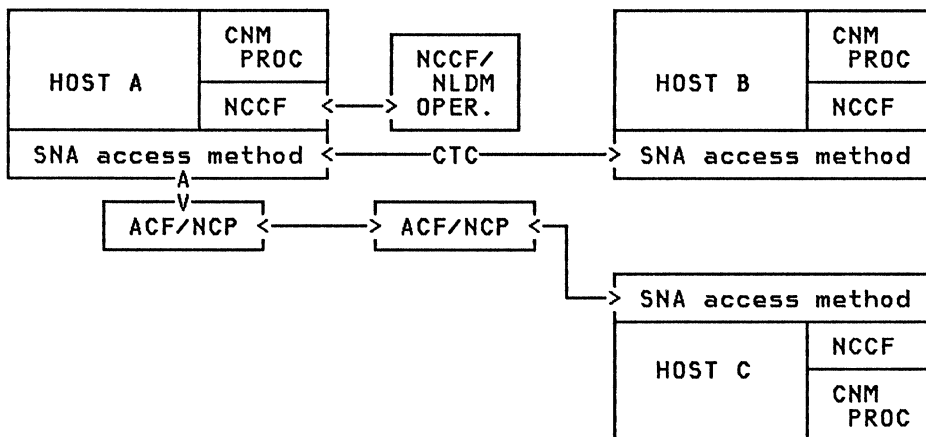


Figure 1. NLDM ENVIRONMENT

CNM processors controlled by NCCF may use NPDA and/or NLDM.

The CTC attachment is provided only by ACF/VTAM V2. The MSNF feature is necessary for controlling multiple-domain networks if ACF/VTAM V1 is used.

NLDM consists of a command processor that executes under the control of an NCCF Data Services Task (DST) and a set of command processors that operate under the control of an NCCF Operator Station Task (OST). There is one OST for each NCCF operator who logs on and, therefore, for each NLDM user (for further information see "Appendix A. NLDM structure" on page 73).

DATA COLLECTION

The access method and the NCP do not provide session trace data until they receive an explicit request from NLDM. For remote NAU's NCP trace data can only be obtained after NLDM receives a session awareness for the ACTPU of the corresponding NCP. For the resources added by dynamic reconfiguration or switched, since their addresses are dynamically assigned, tracing may be accomplished only if a global trace was started from NLDM initialization or by using the TRACE ALL command.

It is important that NLDM be initialized before activating any network nodes for which session awareness and/or session data is required. (see "Initialization" on page 9).

The user can allow NLDM to issue trace requests for all LU and SSCP sessions as a part of the initialization process (TRACELU, TRACESC parameters). Once NLDM initialization is accomplished the user is able to display and START/STOP data capture for specific NAU's (TRACE DISP and TRACE STOP/START commands). The maximum number of resource names that can have traces started or stopped is given by an initialization parameter (MAXTRACE). This parameter value does not affect the TRACE ALL command.

NLDM maintains a wrap area in virtual storage for each active session. The size of the wrap area is an initialization parameter (KEEPPIU) and may be displayed and changed dynamically for each session by the user (DISKEEP and KEEP commands).

RESOURCE	session awareness data	session trace data		
		session param.& PIUs	NCP data	
host LU APPL	x	x	x	
local SNA	x	x	x	
non-SNA	x	x	x	
remote SNA	x	x	x	x
non-SNA	x		x	x
(NCP attached)				
NTO	x	x	x	
DR added and SWITCHED	x	x	x	x

Figure 2. NLDM RESOURCES and DATA TRACED

NLDM collects and displays two types of session data (see Figure 2 for the type of data collected for each type of resource):

- **session awareness data** which is collected each time a session (SSCP-SSCP, SSCP-PU, SSCP-LU, LU-LU, non-SNA devices(FIDO))¹ activates successfully or terminates. Session awareness data is always traced if NLDM is active. The session awareness RU is time stamped by NLDM and consists of:
 - session partner names or CDRM names if the partner is a cross-domain resource
 - network addresses
 - session type
 - configuration information about the primary and secondary ends

These RU's will be discarded if NCCF is unavailable. NLDM can display data from the session awareness RU, even if the session data is not traced (Figure 6 on page 13):

 - session name list display
 - most recent sessions for a specific name display
 - configuration for a specific session display
- **session trace data** which consists of:
 - **session activation parameters.** This data is collected if at least one end point of the session is traced and only if the session is successfully activated. The data is taken from the SNA command used to activate the session (ACTCDRM,ACTPU,ACTLU, BIND).
 - **access method PIU data.** For a single domain session the PIU data is collected if at least one end point is traced, and only once if

¹ SSCP-HOSTPU and PU-PU sessions are not supported

both ends are traced. For a multi-domain session the PIU data may be collected by the domain of the primary end of the session (see "CHAPTER 3. Session Tracing" on page 29).

The PIU data includes the TH, RH and 11 bytes from the RU data.

- **NCP data.** This data is collected only for the remote resources and by the domain of the corresponding NCP (see "CHAPTER 3. Session Tracing" on page 29).

The NCP data consists of four PIU sequence numbers, the last two in and out (except for the SSCP-LU and SSCP-PU sessions), and selected contents of appropriate control blocks that relate to the NCP resource involved in session.

For FIDO devices see later in this chapter.

DATA RECORDING

Upon session termination or when requested by the user (**FORCE** command), the virtual storage wrap area is migrated to the NLDM VSAM data base as historical data. The amount of history is an NLDM initialization parameter (**KEEPPSES**) and may be displayed and changed dynamically for each session by the user (**DISKEEP** and **KEEP** commands).

The NLDM operator can change the amount of session history any time the corresponding session is active by means of the **KEEP n SESS FOR name** command. This change will be permanently recorded in the data base whereas the **KEEP n PIUS FOR name** is temporary in nature and will revert back to the default initialization value once the current session is terminated.

By issuing a **FORCE** command, session data is recorded using the data of the current session. The start time of the current session is modified to reflect the time the **FORCE** command was issued. Since VTAM buffers PIU trace data before sending the data to NLDM it is **essential** that the operator display the relevant PIU trace data **prior** to using the **FORCE** command. This will ensure that NLDM requests VTAM to send the trace buffers so that any relevant PIU information is available to NLDM. If this is not done only the trace data currently in NLDM buffers is recorded on disk, and this **may not** be the true position.

Similarly the NCP data will be recorded only if it is in storage as a result of a user solicitation.

It is extremely important, therefore, for the operator to SOLICIT both the PRIMARY and the SECONDARY trace data PRIOR to using the FORCE command.

NLDM provides a Buffer Pending Queue (BPQ) and a Time Pending Queue (TPQ) to keep the information when several active sessions terminate in a very small period of time (5 seconds). The sizes of these queues are established at initialization by a parameter (**MAXEND**).

NLDM can alternate the recording of session data between two VSAM data bases (**NCCF SWITCH** command). There is no automatic switching and no support of the VSAM shared option. The structure of the NLDM data base is described in "Appendix B. NLDM DATA BASE STRUCTURE" on page 75.

NLDM'S USE OF THE CNM INTERFACE

NLDM, like NPDA, uses the CNM interface to communicate with the SSCP.

NLDM uses the CNMI:

- **to forward requests:**
 - **to the access method like:**
 - START/STOP tracing for a specific resource or resources

START/STOP session awareness notification

GET/FREE tracing buffers

SEND partial trace buffer

- to the NCP to request capture of or to retrieve trace information for a session or sessions
- to receive solicited RUs for NLDM user display:
 - NCP trace RUs for SNA and non-SNA devices
- to receive unsolicited deliver RUs:
 - session awareness RUs generated by the access method whenever a session (SSCP-SSCP, SSCP-PU, SSCP-LU, LU-LU, non-SNA devices(FID0)) is started successfully or terminated. NLDM collects the session parameters from the SNA command used to activate the session:
 - ACRCDRM for the SSCP-SSCP session
 - ACTPU for the SSCP-PU session
 - ACTLU for the SSCP-LU session
 - BIND for the LU-LU session
 - NCP trace RUs generated by NCP each time the session ends for a traced SNA resource, and consisting of the sequence numbers of the last 4 PIUs and selected control block fields. Since a session does not exist for a non SNA device (FID0), the NCP will send non-SNA trace data when a device error occurs.

For receiving unsolicited deliver RUs an application must be authorized to use the CNM interface (in the APPL statement AUTH=CNM) and also be designated in the CNM routing table ISTMGC00 (see "Installation" on page 63). The CNM routing table contains the name of the application and the type of unsolicited RUs to be received (for NLDM RECFMS only).

NLDM'S USE OF THE NCCF LU - VTAM LU SESSION

NLDM uses a new NCCF LU task (DSIAMLUT APPL AUTH=(ACQ)) to establish a session with the secondary ACF/VTAM LU (ISTPDCLU) and to receive the PIU trace buffers.

The PIU's are blocked in an access method buffer. The size of the access method buffer is an NLDM initialization parameter (BUFSIZE) and is a function (see "CHAPTER 6. Performance Considerations" on page 71) of the maximum number of active sessions traced at the same time. The access method provides 2 buffers. To increase this number, this value must be changed in the replaceable constants module ISTRACON (see "Installation" on page 63), during the tuning process (see "CHAPTER 6. Performance Considerations" on page 71).

When the access method buffer is full, its contents are transferred through the LU-LU session to the NCCF LU task which sends it to the NLDM DST. The number of PIUs kept by NLDM for each session is an initialization parameter (KEEPPIU) and can be dynamically changed by command (see "NLDM Commands" on page 24). NLDM will request partial buffer data from the access method when an NLDM operator views PIU data. This ensures that any PIU data for the session will be available to the operator.

NLDM can request the access method to trace PIU's for a named resource or all resources. For performance and storage reasons, the access method keeps only the first 11 bytes of the RU data.

NLDM'S CROSS-DOMAIN SUPPORT

NLDM cross-domain support requires:

- an NCCF-NCCF session between the domains (NCCF START DOMAIN command in the requesting domain)
- an NLDM active in each domain

In order to achieve this, a list of all CDRM's defined in each domain and the corresponding NCCF_id is used by NLDM to collect cross-domain information. The list is coded in the new NLDM member DSIPRMLU of the NCCF parameter library.

NLDM cross-domain support allows the user to:

- view session data for a session partner residing in another domain - **implicit cross-domain support**. NLDM coordinates the routing of requests and data between the two domains ("CHAPTER 3. Session Tracing" on page 29). The NCCF_id of the domain from which the data is retrieved is displayed.
- view only session data which resides in another domain - **explicit cross-domain support**. The NLDM Set Domain (SDOMAIN) command must be issued and all the data displayed is now extracted from the new domain. To return to the first domain issue the NLDM Set Domain (SDOMAIN) command for this first domain.
- send NLDM commands from one domain to another - **TRACE START/STOP name domain_id** (see "NLDM Commands" on page 24).

NLDM FIDO DEVICE SUPPORT

For FIDO devices NLDM:

- will use the device name as the LUNAME
- will receive session awareness unsolicited RU's
- will receive PIU RU's
- will receive the NCP data, consisting of the last three P->S FIDO reference numbers captured by the NCP and maintained by the access method, and the last S->P NCP reference number, in unsolicited trace records when a device failure occurs or in a solicited RU when requested for display.
- the NCP data recorded will be the data existing in storage and corresponding either to the last device failure or to the last user solicitation.

DISCARDED PIUS

A special "pseudo-session" trace buffer area is maintained for keeping 'discarded' PIU's and the associated ACF/VTAM module which determined it to be discarded. The size of this area is given by an initialization parameter (**KEEPDISC**) and can be displayed and changed dynamically (**DISKEEP** and **KEEP** commands for *DISCARD name). The access method may discard a PIU because:

- the PIU is associated with an active session but it is violating the session protocol. These PIU's are also inserted in the session's PIU wrap area.
- the PIU can not be associated with a session.

For a more complete discussion on the DISCARD the reader should refer to "Appendix C. VTAM Discard Codes" on page 77

To display the discarded PIU's enter the command 'SESS *DISCARD' from any display in the hierarchy.

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU						PAGE	
NAME: *DISCARD								DOMAIN: NCF11	
-----		***** PRIMARY *****		***** SECONDARY *****					
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME	
(1)	*DISCARD	SSCP	NCF11	*DISCARD	SSCP	NCF11	08/17 14:25:28	*** ACTIVE **	
(2)	*DISCARD	SSCP	NCF11	*DISCARD	SSCP	NCF11	07/22 12:27:37	07/22 13:17:3	
END OF DATA									
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SSES PARMS), PC(P-CON) OR SC(S-CON)									
1 PT									

Select the number corresponding to a session and the primary trace data.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA						PAGE	
-----		PRIMARY			SECONDARY			-----	
NAME	*DISCARD	SA	FFFFFFFF	EL	FFFF	NAME	*DISCARD	SA	FFFFFFFF
-----		-----			-----			-----	
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN
(1)	19:21:59	0001	,	ISTTSMRO	81.337				
(2)	19:21:59	0000	S-P	(+)RSP	....OC.DR.				1
(3)	19:22:00	0001	,	ISTTSMRO	81.337				
(4)	19:22:00	0000	S-P	(+)RSP	....OC.DR.				1
(5)	19:22:02	0001	,	ISTTSMRO	81.337				
(6)	19:22:02	0000	S-P	(-)RSP	....OC.ER.				5 0809
(7)	19:22:03	0001	,	ISTTSMRO	81.337				
(8)	19:22:03	0000	S-P	(+)RSP	....OC.DR.				1
(9)	19:22:19	0001	,	ISTTSMRO	81.337				
(10)	19:22:19	0000	S-P	(+)RSP	....OC.DR.				1
(11)	19:22:20	0001	,	ISTTSMRO	81.337				
(12)	19:22:20	0000	S-P	(+)RSP	....OC.DR.				1
(13)	19:22:21	0001	,	ISTTSMRO	81.337				
(14)	19:22:21	0000	S-P	(+)RSP	....OC.DR.				1
ENTER TO VIEW MORE DATA									
ENTER SEL# OR COMMAND									

INITIALIZATION

The initialization of NLDM occurs when NCCF is started. NLDM initialization consists of building internal tables/control blocks, opening the VSAM files and initializing them if they are empty, establishing the LU-LU session with the access method, sending a request to activate session awareness notification, activating session traces. The last initialization date of the current NLDM data base (primary or secondary) appears on the NLDM menu display (Figure 3 on page 10).

The initialization process uses the customer specified initialization parameters (see "Data Collection" on page 2 and "Installation" on page 63) which are:

- an option to override the access method PIU's trace buffer size - **BUFSIZE**
- an option to override the automatic activation of tracing:
 - all sessions with LU resources (SSCP-LU,LU-LU) - **TRACELU**
 - all SSCP sessions (SSCP-SSCP,SSCP-PU,SSCP-LU) - **TRACESC**
- a limit of the resource names for which trace is started or stopped by command - **MAXTRACE**
- a limit of the number of sessions kept in VSAM file - **KEEPSES**
- limits of the virtual storage areas:
 - active session PIU's wrap area - **KEEPPIU**
 - discarded PIU's wrap area - **KEEPDISC**
 - outstanding requests on CNMI - **MAXSOL**
 - buffer and time pending queue size - **MAXEND**

For complete and accurate data it is important to initialize the network in the following order:

- start the access method without automatically activating resources to be used in sessions that are to be traced by NLDM. For remote resources don't activate the NCP (an NCP restart will be required if the NCP is activated before NLDM initialization, and you want to have NCP trace data available).
- start NCCF, which includes NLDM activation and automatic tracing of all LU, SSCP sessions, necessary for Dynamic Reconfiguration added and switched resources
- using the CLIST capability of NCCF:
 - activate the rest of the network.
 - deactivate the NLDM trace for those resources for which session data is not necessary. The session awareness is always captured for all sessions that become active after NLDM initialization.

OPERATION

To use NLDM, the operator must first **log on to NCCF**, and then enter the NCCF command **NLDM**, invoking the NLDM command processor. The NLDM command provides access to NLDM functions for on-line, interactive viewing of NLDM information related to a specific session or sessions. Entering **NLDM X** on a 3279 color display terminal invokes the extended color and highlight functions of the terminal for all the NLDM displays. The customer may

change the actual NLDM command name specified in the NCCF CMDMDL statement (see "Installation" on page 63).

The result of the NLDM or NLDM X command is the display of the message AAU930I.

```
NETWORK COMMUNICATIONS CONTROL FACILITY                08/30/82 16:54:55 A
* NCF11      NLDM
NCF11      AAU930I NLDM APPLICATION STARTED: PRESS ENTER TO CONTINUE
-----
??? ***
```

After pressing ENTER the NLDM menu is displayed.

```
NLDM.MENU                                NETWORK LOGICAL DATA MANAGER MENU                                PAGE 1
                                           DOMAIN NCF11
SEL#                                     DESCRIPTION
( 1)  LUNAME LIST                       LIST OF ALL LOGICAL UNIT NAMES
( 2)  SLUNAME LIST                      LIST OF SECONDARY LOGICAL UNIT NAMES
( 3)  PLUNAME LIST                      LIST OF PRIMARY LOGICAL UNIT NAMES
( 4)  PUNAME LIST                       LIST OF PHYSICAL UNIT NAMES
( 5)  SSCPNAME LIST                    LIST OF SSCP NAMES
( 6)  HELP                             EXPLANATION OF COMMANDS

                                           NLDM FILE LAST INITIALIZED 07/16/82

ENTER SEL# OR COMMAND
```

Figure 3. MENU DISPLAY

NLDM runs as a full screen command processor under NCCF, and as such is in full control of the terminal. PF-key assignment is as follows:

COMMAND	PARMS	PF/PA KEY	DESCRIPTION
H(ELP)		PF01/13	ENTER HELP MODE
E(ND)		PF02/14	END APPLICATION
R(ETURN)		PF03/15	RETURN TO PREVIOUS DISPLAY LEVEL
COPY		PF04/16	PUT CURRENT SCREEN TO NCCF HARD COPY LOG
T(ITLE)		PF05/17	GO TO FIRST PAGE IN CURRENT DISPLAY LEVEL
BOT(TOM)		PF06/18	GO TO LAST PAGE OF CURRENT DISPLAY LEVEL
B(ACK)	(N)	PF07/19	MOVE BACK N PAGES IN CURRENT DISPLAY LEVEL
F(ORWARD)	(N)	PF08/20	MOVE FORWARD N PAGES IN CURRENT DISPLAY LEVEL
SET HEX	ON|OFF	PF09/21	SET HEX DISPLAY MODE
SESS	name	PF10/22	DISPLAY SESSION LIST FOR A NAU or *DISCARD
LIST	LU|SLU PLU|PU|SSCP	PF11/23	DISPLAY LIST OF NAU NAMES WITH SESSION DATA
		PF12/24	RETRIEVE LAST COMMAND ENTERED
		PA02	ESCAPE TO NCCF MODE

Figure 4. PF KEY ASSIGNMENT

Any text entered in the NLDM command entry line before pressing a PF key is used as the operand of the command invoked.

The RETRIEVE function will display the last NLDM command that was executed. Repeated use of this function via PF12 results in the next previous command being displayed up to a maximum of twelve previous commands.

The PA2 key suspends NLDM operator functions and NCCF regains control. This allows the user to start another NCCF application (e.g. NPDA), to execute a CLIST, to establish a session through TAF with a remote subsystem etc.. Reentering the NLDM or NLDM X command resumes processing from the point of interruption:

```

NETWORK COMMUNICATIONS CONTROL FACILITY                08/30/82 17:35:38 A
* NCF11      NLDM
NCF11      AAU930I NLDM APPLICATION RESUMED: PRESS ENTER TO CONTINUE
-----
??? ***

```

In summary, NLDM operator functions are:

- started - if it is the first NLDM or NLDM X command or if NLDM operator functions were previously stopped by the END command
- resumed - if NLDM operator functions were previously stopped by the PA2 key

During the NLDM operation, any messages sent to the terminal from NCCF, the access method, or another NCCF operator are queued, and are displayed only after using ENTER, CLEAR, PA1, or a PF key. ALL messages are displayed and NLDM is resumed, after pressing the ENTER key, from the point of interruption.

HIERARCHY OF NLDM DISPLAYS

The general layout of the NLDM displays is represented in Figure 5 where:

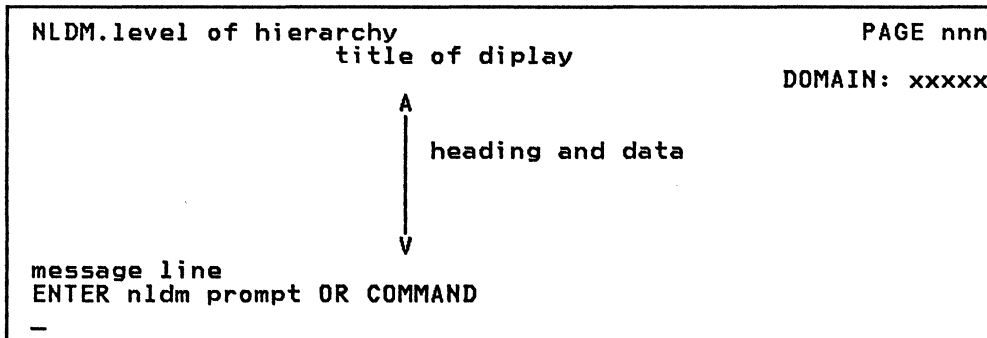


Figure 5. NLDM DISPLAY LAYOUT

- the level of hierarchy is an indication of the display position in the hierarchy
- the xxxxx is the current NCCF domain identification, the domain for which session data is displayed or session commands are issued
- the line reserved for messages may contain:
 - an error message
 - one of the prompt messages
 - ENTER TO VIEW MORE DATA
 - END OF DATAindicating that there are several numbered pages or there are no more pages of data to be viewed (see display control commands in "NLDM Commands" on page 24).
- the cursor is positioned just under the prompting line, ready to enter the NLDM prompt:
 - sel# - a number that allows the operator to proceed further in the display hierarchy
 - R - to return to the previous level displayor any NLDM command or only the operands of a command entered by pressing a PF key.

The NLDM functions are presented to the NLDM operator via a set of hierarchical displays (see Figure 6 on page 13).

To progress down in the hierarchy use the SEL# or an explicit NLDM command which directly invokes a lower level display.

To return up the hierarchy use the RETURN command (PF3) or an explicit NLDM command which directly invokes a higher level display.

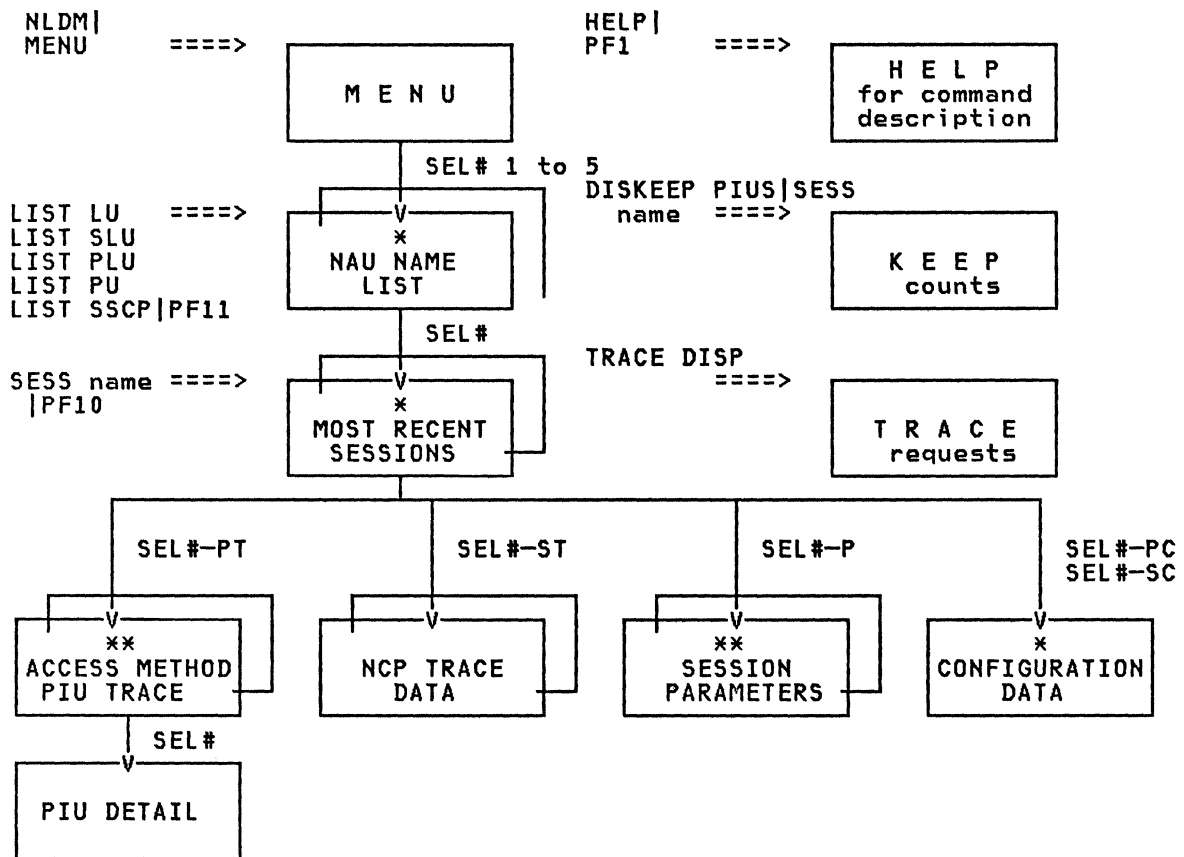


Figure 6. HIERARCHY OF NLDM DISPLAYS

* - display available even if the session is not traced

** - a hexadecimal view of the display is available using the command SET HEX ON or the PF9 key

The following pages contain samples of some NLDM displays:

NAU NAME list Display

This display is a list of the required type of NAU (LU,SLU,PLU,PU,SSCP) known by NLDM either because they are currently in session and their session has been activated after NLDM initialization, status ACTIVE, or because NLDM is able to provide history data from the data base, status INACTIVE.

If there is current session awareness as well as history data in the NLDM data base, the NAU will appear as both ACTIVE and INACTIVE.

This display is reached by selecting 2 from the MENU display or directly, from any display in the hierarchy, by the command LIST LU|SLU|PLU|PU|SSCP. A sample SLU list is shown below:

NLDM.LIST			NAU NAME LIST			PAGE 1		
LIST TYPE	SLU					DOMAIN	NCF11	
SEL#	NAME	STATUS	SEL#	NAME	STATUS	SEL#	NAME	STATUS
(1)	H11L372	ACTIVE	(16)	H11L370	INACT	(31)	H28L375	INACT
(2)	H11L373	ACTIVE	(17)	H11L371	INACT	(32)	L40A377	INACT
(3)	H11L374	ACTIVE	(18)	H11L372	INACT	(33)	NCF01000	INACT
(4)	H11L375	ACTIVE	(19)	H11L373	INACT	(34)	NCF01001	INACT
(5)	H11S25C1	ACTIVE	(20)	H11L374	INACT	(35)	NCF11000	INACT
(6)	ISTPDCLU	ACTIVE	(21)	H11L375	INACT	(36)	NCF11001	INACT
(7)	NCF11004	ACTIVE	(22)	H11L376	INACT	(37)	NCF11002	INACT
(8)	TAF11F00	ACTIVE	(23)	H11L377	INACT	(38)	NCF11003	INACT
(9)	T14NPA	ACTIVE	(24)	H11L378	INACT	(39)	NCF11004	INACT
(10)	T140A0F5	ACTIVE	(25)	H11L379	INACT	(40)	NCF21003	INACT
(11)	T24NPA	ACTIVE	(26)	H11S25C1	INACT	(41)	N001	INACT
(12)	T24020E1	ACTIVE	(27)	H11S25C5	INACT	(42)	RDPD1MVS	INACT
(13)	CICS11	INACT	(28)	H28L371	INACT	(43)	TAF11F00	INACT
(14)	D003	INACT	(29)	H28L372	INACT	(44)	TAF11F01	INACT
(15)	H01L371	INACT	(30)	H28L373	INACT	(45)	TAF11F02	INACT

ENTER TO VIEW MORE DATA
ENTER SEL# OR COMMAND

Figure 7. NAU NAME LIST DISPLAY

In this display you can see that H11L372 is marked as both "ACTIVE" and "INACTIVE". Item # 6 ISTPDCLU is the access method LU used for the session trace data.

MOST RECENT sessions Display

This is a list in reverse chronological order of the sessions kept in history data and of the currently active sessions, if there is one. This list is for a specific NAU. Each entry includes:

- name and type of each partner
- domain of each partner (if a CDRMDEF card was defined see "Installation" on page 63)
- session activation time (time stamped by NLDM)
- session deactivation time for sessions that have ended or ***FORCED*** for sessions for which data has been copied to disk by operator command

The user may select to display:

- specific session parameters (P)
- specific session trace data of the primary or secondary partner (PT,ST)
- specific configuration data of the primary or secondary partner (PC,SC)

If the partner is in the same domain but it is a remote resource, then the contents of the secondary trace ST is the NCP data. This information is available only if the NCP was activated after NLDM initialization or if the NCP is restarted. If the resource is not in the current domain (displayed in the heading lines of the display), NLDM will automatically attempt to invoke NCCF cross-domain procedures to retrieve by implicit routing the selected information. This will only succeed if:

- an NCCF-NCCF session has been established from the operator station between the NCCFs.
- the resource is traced in the alternate domain

By selecting in a NAU name list display the number corresponding to an NAU, for which the sessions are to be viewed, or by entering directly from any display in the hierarchy the command 'SESS name', the operator can view the session history display.

For example SESS N14BF3A produced:

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU						PAGE 1	
NAME: N14BF3A								DOMAIN: NCF11	
***** PRIMARY *****		**** SECONDARY ****				START TIME		END TIME	
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM			
(1)	VTAM	SSCP	NCF11	N14BF3A	PU	NCF11	07/30 08:46:40	*** ACTIVE ***	
(2)	VTAM	SSCP	NCF11	N14BF3A	PU	NCF11	07/29 16:34:34	07/30 08:58:00	
(3)	VTAM	SSCP	NCF11	N14BF3A	PU	NCF11	07/28 19:45:50	*** FORCED ***	
(4)	VTAM	SSCP	NCF11	N14BF3A	PU	NCF11	07/28 18:59:26	07/28 19:44:56	

END OF DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
1 PT

Figure 8. MOST RECENT SESSIONS DISPLAY

Access Method PIU trace data Display

This is a formatted list of PIUs kept in storage for an active session or found on the data base for an inactive session. Each entry is time stamped by the access method (in GMT) and includes:

- the sequence number (for non-SNA devices this is a one byte reference number)
- the direction (P->S,S->P)
- the type of the PIU:
 - +RSP,-RSP
 - DATA
 - interpretation of the command (for non-SNA devices an abbreviation of the BTU commands - see GLOSSARY)
- the interpretation of the bit settings in the RH (see GLOSSARY)
- the RU length
- the SNA sense code for any negative response
- an indication 'D' for DISCARDED PIU's

If the message

AAU925I NO DATA EXISTS FOR COMMAND SPECIFIED

is displayed in the message line it means that the PIU trace for this session has not been started. An entry exists for this session in the most recent sessions display, because the session was activated after NLDM initialization and session awareness is always kept for the sessions that are activated after NLDM initialization.

Select in the most recent sessions display, the number corresponding to a session for which the primary partner data is to be viewed.

As example, "1 PT" from Figure 8 on page 15 results in:

NLDM.PIUT		SPECIFIC SESSION TRACE DATA						PAGE 2				
PRIMARY		+			SECONDARY			+- DOM -				
NAME	VTAM	SA	0000000B	EL	0001	NAME	N14BF3A	SA	0000000E	EL	0000	NCF11
SEL#	GMT	SEQ#	DIR	TYPE	***** REQ/RESP HEADER *****			RULEN	SENS	T		
(1)	15:58:47	0042	S-P	RECMS	FMH.OC.NR.....			66				
(2)	16:00:29	0043	S-P	RECMS	FMH.OC.NR.....			62				
(3)	16:01:12	0044	S-P	RECMS	FMH.OC.NR.....			62				
(4)	16:02:52	0045	S-P	RECMS	FMH.OC.NR.....			62				
(5)	16:05:39	0046	S-P	RECMS	FMH.OC.NR.....			62				

END OF DATA
ENTER SEL# OR COMMAND

The corresponding hexadecimal display (PF9 key) contains an unformatted hexadecimal list of the same PIU's -TH,RH and a few bytes from the RU. To view the eleven bytes of the RU display the PIU detail display.

```

NLDM.PIUT.HEX          SPECIFIC SESSION TRACE DATA          PAGE 2
----- PRIMARY -----+----- SECONDARY -----+-- DOM --
NAME VTAM      SA 000000B EL 0001 | NAME N14BF3A  SA 000000E EL 0000 | NCF11
-----+-----
SEL# ***** TH ***** * RH * *** RU *** T
( 1) 400010122000025A00000000B0000000E1C000001000000420045 0B0000 0103811CAC
( 2) 400010122000825B00000000B0000000E1C000001000000430041 0B0000 0103811C29
( 3) 400010122000025C00000000B0000000E1C000001000000440041 0B0000 0103811C2B
( 4) 400010122000025D00000000B0000000E1C000001000000450041 0B0000 0103811C27
( 5) 400010122000825E00000000B0000000E1C000001000000460041 0B0000 0103811C29

END OF DATA
ENTER SEL# OR COMMAND

```

Figure 9. ACCESS METHOD PIU TRACE DATA DISPLAY

Session Parameters Display

There are different versions of this display depending on the type of session:

- LU - LU
- SSCP - PU
- SSCP - LU
- SSCP - SSCP

To view this data, select in the most recent sessions display the number corresponding to the session for which the session parameters are to be viewed, together with "P" for session Parameters.

As sample, an LU-LU session parameters display is shown below:

```

NLDM.SPRM                SPECIFIC SESSION PARAMETERS                PAGE 1
----- PRIMARY -----+----- SECONDARY -----+ DOM--
NAME NCF11004 SA 0000000B EL 0077 | NAME T140A0F5 SA 0000000E EL 00B1 | NCF11
-----+-----
RU BIND    TYPE REQ  ACT N/A  NEGOTIABLE NO  TS PROFILE 3  FM PROFILE 3
FID 4
-----+-----
FM USAGE/PLU -----+----- FM USAGE/SLU -----
MULTIPLE RU CHAINS ALLOWED          MULTIPLE RU CHAINS ALLOWED
REQUEST CONTROL MODE IS IMMEDIATE   REQUEST CONTROL MODE IS IMMEDIATE
PRI ASKS FOR DEF OR EXCEPT RESP   SEC ASKS FOR EXCEPTION RESPONSE
COMPRESSION WILL NOT BE USED        COMPRESSION WILL NOT BE USED
PRIMARY MAY SEND EB                 SECONDARY WILL NOT SEND EB
FM HEADERS ARE NOT ALLOWED          CONTENTION WINNER IS THE SECONDARY
BRACKETS ARE USED - RESET STATE=BETB HDX-FF RESET STATE: N/A
BRACKET TERMINATION RULE 1 USED     SEC-PRI PACING 1 STAGE, SEND COUNT 0
ALTERNATE CODE SET WILL NOT BE USED RECEIVE COUNT 0 MAXRU 1024
SEQ NUMBERS N/A                     PRI SEC PACING 1 STAGE, SEND COUNT 0
SEND/RECEIVE MODE IS HALF-DUPLEX FLIP RECEIVE COUNT 0 MAXRU 1536
RECOVERY RESP IS CONTENTION LOSER   LU TYPE: 2

ENTER TO VIEW MORE DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
    
```

The same data can be viewed in HEX using SET HEX ON command (PF9 key).

```

NLDM.SPRM.HEX            SPECIFIC SESSION PARAMETERS                PAGE 1
----- PRIMARY -----+----- SECONDARY -----+ DOM--
NAME NCF11004 SA 0000000B EL 0077 | NAME T140A0F5 SA 0000000E EL 00B1 | NCF11
-----+-----

01.....05.....10.....15.....20.....25.....30.....35
31010303B1903080000087C70000028000000000185020507F000008D5C3C6F1F1F0F0
F400

ENTER TO VIEW MORE DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
    
```

The session parameters displays (in text and HEX) for an NCP are shown below:

```

NLDM.SPRM                SPECIFIC SESSION PARAMETERS                PAGE 1
----- PRIMARY -----+----- SECONDARY -----+-- DOM--
NAME VTAM      SA 0000000B EL 0001 | NAME N14BF3A  SA 0000000E EL 0000 | NCF11
-----+-----
RU ACTPU  TYPE REQ  ACT ERP  NEGOTIABLE N/A  TS PROFILE 5  FM PROFILE 5
FID 4
SSCP PU TYPE IS 5          SSCP ID: 050000000000B

CONTROL VECTOR(S):

(09) ACTIVATION REQ/RSP SEQUENCE IDENTIFIER: 160142072F1F8D86
(0B) PU FUNCTION MANAGEMENT DATA RU USAGE,
    - NETWORK SERVICES LOST SUBAREA IS NOT REQUIRED
    - ADJACENT LINK STATION NETWORK ADDRESS IS SUPPORTED

ENTER TO VIEW MORE DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

```

NLDM.SPRM.HEX            SPECIFIC SESSION PARAMETERS                PAGE 1
----- PRIMARY -----+----- SECONDARY -----+-- DOM--
NAME VTAM      SA 0000000B EL 0001 | NAME N14BF3A  SA 0000000E EL 0000 | NCF11
-----+-----

01.....05.....10.....15.....20....
113255050000000000B0908160142072F1F8D860B01C0

ENTER TO VIEW MORE DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

Sample session parameters displays for an SSCP-SSCP session follows:

```

NLDM.SPRM          SPECIFIC SESSION PARAMETERS          PAGE 1
----- PRIMARY -----+----- SECONDARY -----+-- DOM--
NAME VTAM          SA 000000B EL 0001 | NAME M21          SA 0000015 EL 0001 | NCF11
-----+-----
RU ACTCDRM TYPE REQ ACT ERP NEGOTIABLE N/A TS PROFILE 17 FM PROFILE 17
FID 4
CONTENTS ID:          SSCP PU TYPE IS 5          SSCP ID: 00000000B

CONTROL VECTOR(S):
(06) CDRM CONTROL VECTOR,
- NAME PAIR SESSION KEY SUPPORTED          - CDINIT          SUPPORTED
- ADDR PAIR SESSION KEY SUPPORTED          - CDSESEND NOT SUPPORTED
- PARALLEL SESSIONS SUPPORTED
- URC IN CD SESSION INIT IS SUPPORTED
- PCID SESSION KEY IS SUPPORTED
(09) ACTIVATION REQ/RSP SEQUENCE IDENTIFIER: 1601420840AAD3B8

ENTER TO VIEW MORE DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

```

NLDM.SPRM.HEX      SPECIFIC SESSION PARAMETERS          PAGE 1
----- PRIMARY -----+----- SECONDARY -----+-- DOM--
NAME VTAM          SA 000000B EL 0001 | NAME M21          SA 0000015 EL 0001 | NCF11
-----+-----

01.....05.....10.....15.....20.....25.....30.....
14021111100000000000000000000000050000000000B000603007E8009081601420840AAD3B8

ENTER TO VIEW MORE DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

Figure 12. SESSION PARAMETERS DISPLAY

Configuration data Display

This shows the configuration for the primary or secondary partner of the selected session. It contains the address of the selected partner, the domain name, the name of the subarea PU (either a HOST or NCP) and the names of up to three network nodes:

- for host application - LU
- for local SNA - CUA,PU,LU
- for local non-SNA - CUA,LU
- for remote resources SNA or non-SNA - LINK,PU,LU

No information about Intermediate Network Nodes (INN) is provided.

To view this display select in the most recent sessions display the number corresponding to a session for which the primary or secondary configuration data is to be viewed, together with "PC" for Primary Configuration or "SC" for Secondary Configuration. A sample of a remote SNA secondary configuration is shown below:

```

NLDM.CONF          SPECIFIC SESSION CONFIGURATION DATA          PAGE 1
----- PRIMARY -----+----- SECONDARY -----+-- DOM --
NAME NCF11004 SA 0000000B EL 0077 | NAME T140A0F5 SA 0000000E EL 00B1 | NCF11
-----+-----
                                     NAME
                                     +-----+
                                     | SUBAREA PU | . . . . . N14BF3A
                                     +-----+
                                     |   LINK   | . . . . . L140A0
                                     +-----+
                                     |   PU    | . . . . . P140A0F
                                     +-----+
                                     |   LU    | . . . . . T140A0F5
                                     +-----+

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
    
```

Figure 13. CONFIGURATION DISPLAY

NLDM COMMANDS

The NLDM commands may be classified as:

Display control commands:

- to move between pages within an NLDM display level
 - T(ITLE) or PF5 - to display the first page
 - BOT(TOM) or PF6 - to display the last page
 - B(ACK) n|1 or PF7 - to display a previous page
 - F(ORWARD) n|1 or PF8 - to display a next page
- C(OPY) or PF4 - to copy a display on an available hard-copy printer or, if none is available, to the NCCF log.
- SET HEX OFF|ON or PF9 - to view the contents of the display in hexadecimal. Valid only for certain displays (Figure 6 on page 13)
- to move to different displays
 - H(ELP) or PF1 - to view the HELP display which provides a description of some commands (TRACE,LIST,SESS,KEEP,DISKEEP) and a list of display control commands with their attached PF keys
 - E(ND) or PF2 - to stop the NLDM operator functions and to return control to NCCF. Reissuing the NLDM or NLDM X command, operator functions start from the beginning, from the MENU display. This command also resets the outstanding operator requests
 - M(ENU) - to display the menu display, the first display in the hierarchy
 - R(ETURN) or PF3 - to display the previous hierarchical display if the user is in an hierarchical sequence or the MENU display if not

Utility commands:

- TRACE START|STOP name|ALL <domainid> - to start or stop session trace for any valid NAU or for all NAU's in the current domain, or in an alternate one if a domainid is specified
- TRACE DISP - to display a list of NAU's for which the trace has been started or stopped by command. This display also indicate which NCCF operator started or stopped the trace. An example follows:

NLDM.DIST	DISPLAY TRACE REQUESTS			PAGE 1
				DOMAIN: NCF11
	RESOURCE	TRACE	BY	AT
	GLOBAL	ON		
	NCF11002	OFF	OPER1	08/17 14:42:53
END OF DATA				
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND				

Figure 14. TRACE DISP COMMAND DISPLAY

- DISKEEP PIUS|SESS FOR name1 <name2|ALL> - to display the number of PIU's or sessions kept for a specific session or for all sessions of a given named resource (may be *DISCARD).

As a sample, "DISKEEP PIUS FOR NCF11004" produced:

NLDM.DISK			DISPLAY KEEP COUNTS			PAGE 1
KEEP TYPE = PIUS						DOMAIN: NCF11
PRI NAME	SEC NAME	COUNT	PRI NAME	SEC NAME	COUNT	
NCF11004	T140A0F5	020	NCF21002	NCF11004	020	
VTAM	NCF11004	020				

END OF DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

Figure 15. DISKEEP PIUS COMMAND DISPLAY

and "DISKEEP SESS T140A0F5" produced:

NLDM.DISK			DISPLAY KEEP COUNTS			PAGE 1
KEEP TYPE = SESS						DOMAIN: NCF11
PRI NAME	SEC NAME	COUNT	PRI NAME	SEC NAME	COUNT	
NCF11	T140A0F5	005	NCF11000	T140A0F5	005	
NCF11001	T140A0F5	003	NCF11002	T140A0F5	003	
NCF11004	T140A0F5	003	NCF20	T140A0F5	003	
NCF20002	T140A0F5	003	NCF20004	T140A0F5	003	
NCF20007	T140A0F5	003	NCF21	T140A0F5	005	
NCF21003	T140A0F5	005	TS011	T140A0F5	005	
TS01101	T140A0F5	003	TS01102	T140A0F5	005	
TS01103	T140A0F5	005	TS01104	T140A0F5	003	
TS01105	T140A0F5	005	TS01106	T140A0F5	003	
TS021	T140A0F5	003	TS02101	T140A0F5	003	
VTAM	T140A0F5	005				

END OF DATA
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

Figure 16. DISKEEP SESS COMMAND DISPLAY

- **KEEPnnn PIUS|SESS FOR name1 <name2/ALL>** - to change the number of PIU's or sessions kept for a specific session or for all sessions of a given named resource (may be *DISCARD).

The number of sessions kept in the NLDM data base is updated when a new entry for the corresponding session is created.

- **FORCE name1 <name2>** - to record the session or sessions data to the VSAM data base. Name1 may be *DISCARD.
- **SD(OMAIN) domainid** - set domain command to define the NCCF domain from which the session data is to be displayed (explicit cross-domain support).

Data display commands:

- **LIST LU|SLU|PLU|PU|SSCP or PF11** - to list all resources of the specified type for which NLDM data is available either because the resource is involved in an active session or because NLDM has historical data from previous sessions. SSCP lists only SSCP-SSCP sessions. LU lists of PLU and SLU that have an SSCP session in the host.

- **SESS name1 or PF10** - to list the most recent sessions for a specific NAU (may be *DISCARD) in reverse chronological order. If a session currently exists for this NAU it is displayed first.

RELATED NCCF COMMANDS

- **NLDM|NLDM X** - to start or resume NLDM operator functions
- **START DOMAIN=domainid** - to initiate a cross-domain session with another NCCF.
- **ROUTE domainid,command** - to send NCCF commands to another domain
- **SWITCH AAUTSKLP P|S|T** - to allow access to the primary(P), secondary(S) or to close(T) access to the current NLDM data base. Active NLDM users may experience unpredictable results. This command is intended to be used by an authorized NCCF operator for the purpose of error recovery, for data base reorganization etc..

The sessions which terminate during the switch operation will be lost and those which terminate after the switch operation is finished will be recorded in the new data base.

- **START HCL=hclname,OP=''** - to start a hard copy log on the named terminal for the current user. This is required if the NLDM operator wants to use PF4 to COPY an NLDM display
- **STOP HCL=hclname,OP=''** - to stop a hard copy log on the named terminal for the current user
- **some NLDM commands** can be entered directly from the NCCF screen using the verb NLDM followed by the command and its operands
 - **NLDM TRACE START name|ALL <domainid>**
 - **NLDM TRACE STOP name|ALL <domainid>**
 - **NLDM KEEP nnn PIUS|SESS FOR name1 <name2|ALL>**
 - **NLDM FORCE name1 <name2>**
 - **NLDM END**

All these commands may be included in CLISTS and the messages that they generate are displayed in standard NCCF mode.

The collection of session awareness data may be stopped, if no resource has the trace active, by the command **NLDM DISABLE**. Use of this command should be restricted to authorized operators because:

- tracing can not be restarted until NCCF is closed down
- to restart full session awareness tracing, both NCCF and the network must be restarted
- session data collected is invalid because the notifications of session activation and termination are not received. Only the history file can be considered valid

MESSAGES

NLDM uses NCCF services to issue messages to the network console.

The NLDM messages have the following format:

AAUnnnI message text

and are sent to the NCCF authorized terminal operator or the NLDM terminal user. If the NCCF authorized terminal operator (AUTH ...,MSGRECVR=YES) is

not connected the messages destined for him are sent to the system console operator.

Some messages contain the NLDM CSECT name, the location in it where an error condition was detected and the NLDM terminal operator identifier. All return codes displayed in NLDM messages are in decimal format.

All NLDM messages are assembled in a separate CSECT (AAUZMDMA) with 30% of free space in text areas to facilitate translation into other languages.

When an internal NLDM logic error occurs or a serious problem is detected, NLDM issues a completion code and the presentation services command processor (PSCP) terminates processing. This code is presented on the ABEND dump listing as a user code Uxxxx.

Error conditions detected by the access method while processing requests will result in SNA sense codes (e.g.:

- X'0806' - resource unknown
- X'0812' - no storage available to PGF)

LOSS OF INFORMATION

There are several possible cases of loss of information in NLDM:

- loss of the NCCF LU - ACF/VTAM LU session. NLDM issues the message
AAU085I LU SESSION WITH AM LOST: PIU TRACING HAS BEEN TERMINATED

- loss of PIU trace data when all of the PIU trace buffers are full and their contents have not been sent to NLDM. When the next PIU arrives ACF/VTAM reuses the buffer that contains the earliest PIU data. NLDM recognizes when data is lost and issues the message

AAU024ITRACE BUFFER SEQUENCE ERROR nnn DATA BUFFERS LOST

A solution to this problem is to define multiple buffers of a smaller size (see "CHAPTER 6. Performance Considerations" on page 71)

- loss of session termination notification caused by too small Buffer Pending and Time Pending Queues (initialization parameter MAXEND) and too many sessions deactivating (e.g. NCP deactivation which provokes the deactivation of all remote sessions). The message

AAU081I NO FREE SLOTS AVAILABLE IN

or

AAU088I MQS FAILURE DETECTED WHILE PROCESSING TPQ

will signal this condition. A solution to this problem is to increase the MAXEND value and the corresponding DSRBO value. This last parameter represents the number of preallocated NCCF blocks for processing solicited RUs and VSAM requests. If more requests are received than blocks preallocated, then the requests are queued. The recommended starting value for DSRBO is 10.

- loss of session data for sessions which terminated during the switch operation
- main storage unavailable
- auxiliary storage unavailable
- physical or logical I/O errors on the VSAM data base

The network configuration diagram (Figure 17) represents two domains, A and B with their resources.

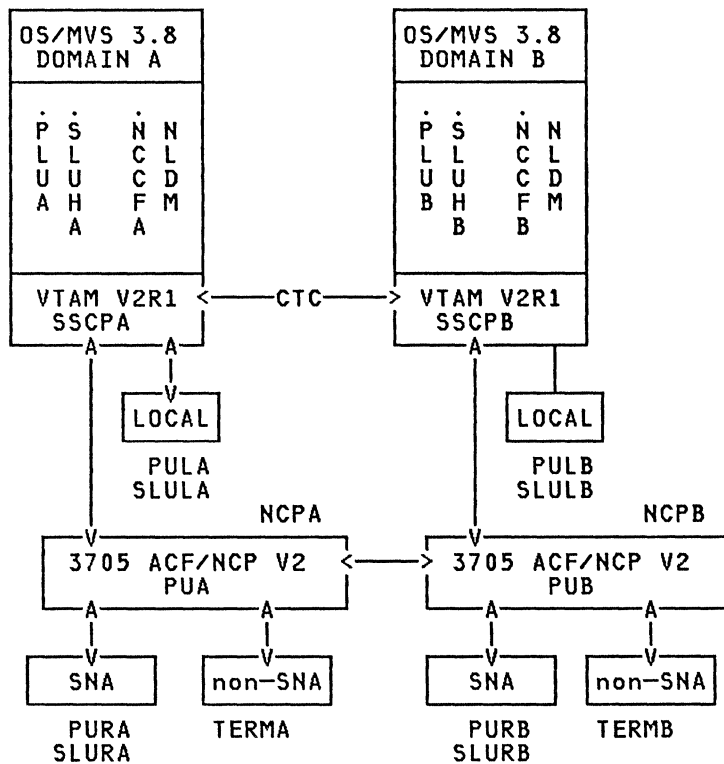


Figure 17. NETWORK CONFIGURATION DIAGRAM

The following table shows which session trace data is displayed in DOMAIN A depending:

- on the type of session established (single or multi-domain)
- on the type of resources for which session trace has been started

NLDM from DOMAIN A collects data for the resources of DOMAIN A. If only one end of the session is in DOMAIN A, the NLDM data collected in DOMAIN B for the other end can be obtained by the implicit cross-domain support of NLDM if:

- a session NCCFA-NCCFB has been started from DOMAIN A by the command
START DOMAIN=NCCFB
 - the end point, residing in DOMAIN B, is traced in DOMAIN B as a result of an NLDM command :
 - entered by the operator of DOMAIN B
TRACE START name
 - sent by the operator of DOMAIN A
TRACE START name NCCFB
- or if a global trace was started in DOMAIN B.

NLDM SESSION DATA AVAILABLE IN DOMAIN A WHEN THE TRACE IS STARTED FOR:		D O M A I N A								D O M A I N B									
		S	P	S	P	S	P	P	S	T	S	P	S	P	S	P	P	S	T
↓		S	L	L	U	L	U	U	L	E	S	L	L	U	L	U	U	L	E
		C	U	U		U			U	R	C	U	U		U			U	R
↓		P								M	P								M
		A	A	H	L	L	A	R	R	A	B	B	H	L	L	B	R	R	B
				A	A	A		A	A				B	B	B		B	B	
D O M A I N A	SSCPA	-	P	P	P	P	P	P	P	P	P	-	-	-	-	-	-	-	-
	PLU A	P	-	P	-	P	-	-	P	P	-	-	P	-	P	-	-	Ps	Ps
	SLU HA	P	P	-	-	-	-	-	-	-	-	p	-	-	-	-	-	-	-
	PU LA	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SLU LA	P	P	-	-	-	-	-	-	-	-	p	-	-	-	-	-	-	-
	PU A	PS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PU RA	PS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SLU RA	PS	PS	-	-	-	-	-	-	-	-	Sp	-	-	-	-	-	-	-
TERMA	PS	PS	-	-	-	-	-	-	-	-	Sp	-	-	-	-	-	-	-	

where:

P = session parameters and PIU data collected in DOMAIN A.

p = session parameters and PIU data collected in DOMAIN B

This data is available entering "# PT" in the most recent sessions display of the resource.

S = NCP data and control blocks collected in DOMAIN A (for SSCP-LU, sessions control blocks only).

s = NCP data and control blocks collected in DOMAIN B

This data is available entering "# ST" in the most recent sessions display of the resource.

CHAPTER 4. NETWORK CONTROL CENTER USE OF NLDM - SCENARIOS

Typically, many people in an organization are involved with some part of the network problem determination process. These people usually have varying skill levels and job responsibilities.

1. Level 1: This is the network 'Help Desk' level. The help desk has the critical function of answering the (normally telephone) calls from end users who have a real or imagined problem with 'The Computer'.
2. Level 2: This is the Network Operator level. The tasks include: startup, closedown, monitoring and control of the network and sometimes of CICS, IMS, or other on-line applications.
3. Level 3: This is the highest technical level of problem determination, and would include the "SNA" specialists. This organization is often called Technical Support. Problems that cannot be solved by Levels 1 and 2 come to this level.

The examples given in this document are for illustrative purposes and may not be applicable to all environments. They are examples of some types of errors where NLDM can be used to help isolate the failing components or indicate the incorrect use of system procedures. One of the prime design objectives of NLDM was to assist in the isolation of intermittent or transient network problems. As it is almost impossible to create a real "intermittent" problem we have not simulated the solving of such problems.

We have rather attempted to give some insight as to how some commonly encountered problems can be solved by the correct application of NLDM.

We have also made no attempt at this stage to break down the problem solving process into the relevant skill levels as described above. However it would be fair to say that they are probably not directly applicable to the Helpdesk operators, but would probably be referred to level 2 or level 3 support as defined earlier.

The functions provided by NLDM V1R1 are oriented:

- to the second line problem determination specialist, system programmer or to any user who has SNA expertise.
- to the IBM software FE
- and perhaps to HELP-DESK or NETWORK operators

Providing a continuous trace on an NAU basis, NLDM can help:

1. in centralized problem determination. NLDM helps to isolate undetected logical errors more quickly. The detection can be made:
 - at the first occurrence of a problem; NLDM must have been initialized before activating the network with the trace started for all sessions
 - at the subsequent occurrence of a problem; NLDM can be initialized:
 - before activating the network and the trace started only on demand for the required resources
 - after activating the network and the trace started only on demand for the required resources. NLDM can collect data only for sessions activated or reactivated after its initialization. To collect NCP data, the NCP must be restarted
2. in documenting:
 - the configuration
 - problem history
3. in monitoring network activity

CENTRALIZED PROBLEM DETERMINATION

Problem determination in a network should be an orderly process to locate network components that are failing continuously or intermittently. To diagnose a problem, in addition to system dumps and abend codes, the customer can use:

Standard software facilities

- ACF/VTAM:
 - buffer use trace
 - buffer contents trace
 - I/O trace
- NCP:
 - NCP line trace
 - NCP transmission group trace
 - storage display
- TEST:
 - link level 2 test
 - explicit route test
 - LU connection test

CNM-tools

- for hardware/software problem reporting
 - messages from subsystems and the operating system
 - NPDA - stores and analyzes the error reporting records received from the network (RECFMS,RECMS) or from the operating system for the locally attached devices
 - LPDA/386X - tests the line, inspects both ends of a link and sends the results to NPDA
 - TARA - analyzes 3600 loop counters
 - CNM/CS - sends the 3600 error loop counters when requested and alerts when hw/sw error occurs
 - DPPX,DPPX/PDA
- for managing the network
 - NCCF - the TP monitor of local and remote networks
 - OCCF - controls local or remote DOS/POWER and OS/JES systems
 - TAF - controls local and remote TSO,IMS,CICS,HCF,NPA and other VTAM applications
 - HCF - controls the DPPX systems
 - TARA - controls 4700/3600 systems
 - SOF - execute a list of operating system commands at specific events, message or clock time
- for informative and administrative work
 - INFO/SYSTEM

NLDM can replace the standard buffer contents and I/O trace.

Access to the other standard software facilities or CNM-tools can be achieved by using the PA2 key. This key suspends NLDM operator functions and returns control to NCCF. Reentering NLDM or NLDM X causes NLDM operator functions to be resumed from the point of interruption. This allows a flip/flop between NLDM operation and any one of the following processes :

- execute an NCP storage display using the addresses obtained from the NCP control blocks displayed by NLDM
- start a TEST facility
 - link level two test - F NET,LL2,ID=nodename,options
This will send a SDLC frame from the NCP to the PU or link station, which will return the frame if it has been received correctly (the node must be deactivated).
 - explicit route test - D NET,ROUTE,DESTSUB= ,TEST=YES,ER=
This consists of sending a PIU to the destination subarea, and every subarea on the way will return a PIU saying that the corresponding subarea was reached.
 - LU connection test - IBMTEST on a terminal
Consists of an echo test on the SSCP-LU session.
- execute NPDA, using the configuration data provided by NLDM:
 - to discover the problems through notifications 'alerting' of changes in the system and network status
 - to solicit error and statistical data from SNA controllers
 - to gain access to the NPDA most recent events screen which is an on-line summary of the latest events involving the end user's terminal
 - to obtain for each error:
 - NPDA's indication of the probable cause of the error; that is, what element(s) of the network are likely to be the failing components.
 - NPDA's 'Recommended Action' screen; a list of suggested actions for resolving the problem.
- execute a CLIST
- execute the COPY command, which copies the display on the available hardcopy printer or, if none is available, to the NCCF log

The type of errors which may be detected more quickly with NLDM are the following:

Session activation

An entry is created in the MOST RECENT SESSIONS display with the status *** ACTIVE *** and session parameters are collected only if the session was successfully activated. NLDM can not be used to track ACTCDRM, ACTPU and ACTLU session activation errors.

For a PLU-SLU session activation (LOGON process) you can obtain some information from sense codes of the corresponding VTAM-SLU session, and from SNA commands of the VTAM-PLU session.

The following scenarios are an illustration of:

- USS logon procedure errors
 - unknown USS command - USSMSG=02,sense=1003

- invalid LOGON format - USSMSG=03,sense=1005
- unknown application - USSMSG=04,sense=0806
- unknown LOGMODE name - USSMSG=04,sense=0821
- invalid BIND parameters

USS LOGON PROCEDURE ERRORS.

1. UNKNOWN USS COMMAND - USSMSG MSG=02; SENSE=1003

The end user at terminal T140A0F8 is unable to LOGON. The network control center operator displays the MOST RECENT SESSIONS of the terminal entering (from any NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU						DOMAIN: NCF11			
NAME: T140A0F8											
***** PRIMARY *****				***** SECONDARY *****							
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME		END TIME		
(1)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15	09:54:37	*** ACTIVE ***		
(2)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15	09:55:54	09/15	10:15:03	
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15	09:55:45	09/15	09:55:55	
(4)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14	10:47:13	09/14	10:47:47	
(5)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/14	10:47:11	09/14	10:47:48	
(6)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14	09:45:53	09/14	10:33:32	
(7)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/14	07:46:47	09/14	08:56:34	
(8)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/10	12:46:09	09/10	13:58:52	
(9)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/10	07:59:57	09/10	10:27:37	
(10)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09	17:34:09	09/09	18:22:14	
(11)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09	07:11:01	09/09	08:43:37	
(12)	TS01104	LU	NCF11	T140A0F8	LU	NCF11	09/08	19:46:46	09/08	20:30:49	
(13)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/08	19:46:36	09/08	19:46:54	
(14)	TS01103	LU	NCF11	T140A0F8	LU	NCF11	09/08	19:38:20	09/08	19:43:58	

ENTER TO VIEW MORE DATA
 ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
 1 PT

Then, he selects the primary trace data of the active VTAM session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA												
NAME VTAM		PRIMARY					SECONDARY					DOM		
		SA	0000000B	EL	0001	|	NAME	T140A0F8	SA	0000000E	EL	00B4	|	NCF11
SEL#	GMT	SEQ#	DIR	TYPE	***** REQ/RESP HEADER *****			RULEN	SENS	T				
(1)	15:37:40	0000	S-P	DATA	....OC.DR.....			3						
(2)	15:37:40	0000	P-S	(-)RSP	....OC.ER.....			4	1003					
(3)	15:37:40	0002	P-S	DATA	....OC.DR.....			386						
(4)	15:37:40	0002	S-P	(+)RSP	....OC.DR.....			0						
(5)	15:37:40	0002	S-P	(+)RSP	....OC.DR.....			0						

END OF DATA
 ENTER SEL# OR COMMAND
 2

The VTAM negative response means that the input request was rejected. The network control center operator selects the negative response (second PIU) to get the sense code description.

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----

RU DATA:          10030000                *.....*
SENSE DATA:
CATEGORY - (10) REQUEST ERROR
MODIFIER - (03) FUNCTION NOT SUPPORTED: THE FUNCTION MAY HAVE BEEN
SPECIFIED BY A FORMATTED REQUEST CODE, A FIELD IN AN
RU, OR A CONTROL CHARACTER. BYTES 2 AND 3 FOLLOWING THE
SENSE CODE ARE NOT USED FOR USER-DEFINED DATA; THEY
CONTAIN SENSE-CODE SPECIFIC INFORMATION. SETTINGS
ALLOWED ARE:
0000 FUNCTION REQUESTED IS NOT SUPPORTED.
6022 THE RESOURCE IDENTIFIED BY THE DESTINATION
PROGRAM NAME (DPN) IS NOT SUPPORTED.
6003 THE RESOURCE IDENTIFIED BY THE PRIMARY RESOURCE
NAME (PRN) IS NOT SUPPORTED.
(NOTE: CODE CAN BE USED INSTEAD OF SENSE CODE X'0826'.)

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
R

```

He notes the text definition of the sense CATEGORY/MODIFIER, in this case 'function requested is not supported', which is the unknown USS command. The network control center operator returns then to the primary trace data display and selects the rejected request (first PIU) to get more information about the LOGON format.

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----

RU DATA:          E7E8E9                *XYZ.....*

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

He can see the first 11 bytes ² of the LOGON procedure used. The user has entered XYZ which was an unknown USS command.

² For 3277 displays the RU also contains the screen control characters AID,SBA,SF etc..

2. INVALID LOGON FORMAT - USSMSG MSG=03; SENSE=1005

The network control center operator gets a call from an end user who can not LOGON from the terminal T140A0F8. He then displays the MOST RECENT SESSIONS of the user's terminal by entering (from any NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU								DOMAIN: NCF11	
NAME: T140A0F8											
***** PRIMARY *****				***** SECONDARY *****				START TIME		END TIME	
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM					
(1)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15	09:54:37	*** ACTIVE ***		
(2)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15	09:55:54	09/15	10:15:03	
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15	09:55:45	09/15	09:55:55	
(4)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14	10:47:13	09/14	10:47:47	
(5)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/14	10:47:11	09/14	10:47:48	
(6)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14	09:45:53	09/14	10:33:32	
(7)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/14	07:46:47	09/14	08:56:34	
(8)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/10	12:46:09	09/10	13:58:52	
(9)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/10	07:59:57	09/10	10:27:37	
(10)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09	17:34:09	09/09	18:22:14	
(11)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09	07:11:01	09/09	08:43:37	
(12)	TS01104	LU	NCF11	T140A0F8	LU	NCF11	09/08	19:46:46	09/08	20:30:49	
(13)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/08	19:46:36	09/08	19:46:54	
(14)	TS01103	LU	NCF11	T140A0F8	LU	NCF11	09/08	19:38:20	09/08	19:43:58	

ENTER TO VIEW MORE DATA
 ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
 1 PT

He selects the primary trace data of the active VTAM session.

NLDM.PIU		SPECIFIC SESSION TRACE DATA													
----- PRIMARY -----		----- SECONDARY -----								- DOM -					
NAME	VTAM	SA	000000B	EL	0001	|	NAME	T140A0F8	SA	000000E	EL	00B4	|	NCF11	
SEL#	GMT	SEQ#	DIR	TYPE	***** REQ/RESP HEADER *****								RULEN	SENS	T
(1)	15:35:55	0000	S-P	DATA	....OC.DR.....								11		
(2)	15:35:55	0000	P-S	(-)RSP	....OC.ER.....								4	1005	
(3)	15:35:55	0002	P-S	DATA	....OC.DR.....								387		
(4)	15:35:56	0002	S-P	(+)RSP	....OC.DR.....								0		
(5)	15:35:56	0002	S-P	(+)RSP	....OC.DR.....								0		

ENTER TO VIEW MORE DATA
 ENTER SEL# OR COMMAND
 2

The network control center operator notes that the user request was rejected by VTAM (negative response). To get the sense description he selects the negative response PIU.

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----

RU DATA:          10050000                *.*****
SENSE DATA:
CATEGORY - (10) REQUEST ERROR
MODIFIER - (05) PARAMETER ERROR:  A PARAMETER MODIFYING A CONTROL
FUNCTION IS INVALID, OR OUTSIDE THE RANGE ALLOWED BY
THE RECEIVER.

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
R

```

The text definition of the sense CATEGORY/MODIFIER, in this case 'parameter error' indicates an invalid LOGON format. To get more information about the LOGON format used, the network control center operator returns to the primary trace data display and selects the corresponding PIU type DATA (first entry).

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----

RU DATA:          E3E2D6406BC7D4D6C4F2F1      *TSO.,GMOD21*

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

From the first 11 bytes ³ of the LOGON procedure used, the network control center operator can see where the error was and explain the correct format to the user.

³ For 3277 displays the RU also contains the screen control characters AID,SBA,SF etc..

3. UNKNOWN APPLICATION - USSMSG MSG=04; SENSE=0806

The end user complains of not being able to LOGON from T140A0F8. The network control center operator then displays the MOST RECENT SESSIONS of the user's terminal by entering (from any NLDM display) the command:

SESS T0140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU							DOMAIN: NCF11		
NAME: T140A0F8											
***** PRIMARY *****				***** SECONDARY *****							
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME			
(1)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 09:54:37	*** ACTIVE ***			
(2)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15 09:55:54	09/15 10:15:03			
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 09:55:45	09/15 09:55:55			
(4)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 10:47:13	09/14 10:47:47			
(5)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/14 10:47:11	09/14 10:47:48			
(6)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 09:45:53	09/14 10:33:32			
(7)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/14 07:46:47	09/14 08:56:34			
(8)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/10 12:46:09	09/10 13:58:52			
(9)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/10 07:59:57	09/10 10:27:37			
(10)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09 17:34:09	09/09 18:22:14			
(11)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09 07:11:01	09/09 08:43:37			
(12)	TS01104	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:46:46	09/08 20:30:49			
(13)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:46:36	09/08 19:46:54			
(14)	TS01103	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:38:20	09/08 19:43:58			

ENTER TO VIEW MORE DATA
 ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
 1 PT

He selects the primary trace data of the active VTAM session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA										
		PRIMARY				SECONDARY				DOM		
NAME	VTAM	SA	0000000B	EL	0001	NAME	T140A0F8	SA	0000000E	EL	00B4	NCF11
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T	
(1)	15:37:29	0000	S-P	DATA	....	OC.DR.....			7			
(2)	15:37:29	0000	P-S	(-)RSP	....	OC.ER.....			4	0806		
(3)	15:37:30	0002	P-S	DATA	....	OC.DR.....			427			
(4)	15:37:31	0002	S-P	(+)RSP	....	OC.DR.....			0			
(5)	15:37:31	0002	S-P	(+)RSP	....	OC.DR.....			0			

ENTER TO VIEW MORE DATA
 ENTER SEL# OR COMMAND
 2

The user request was rejected by VTAM. To find the reason the network control center operator selects the PIU which correspond to the negative response.


```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----
RU DATA:          08060000                *.....*
SENSE DATA:
CATEGORY - (08) REQUEST REJECT
MODIFIER - (06) RESOURCE UNKNOWN: THE REQUEST CONTAINED A NAME OR
ADDRESS NOT IDENTIFYING A PU, LU, LINK, OR LINK STATION
KNOWN TO THE RECEIVER.

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
R

```

From the text definition of the sense CATEGORY/MODIFIER he concludes that the user tried to LOGON to an unknown application. To know which one, he returns to the primary trace data display and selects the user request PIU (first entry).

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----
RU DATA:          D3D6C740E7E7E7          *LOG.XXX....*

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

The first 11 bytes ⁴ of the user request displayed contains the name of the unknown application. In this case XXX.

⁴ For 3277 displays the RU also contains the screen control characters AID,SBA,SF etc..

4. UNKNOWN LOGMODE NAME - USSMSG MSG=04; SENSE=0821

From the terminal T140A0F8 the end user can not LOGON. The network control center operator then displays the MOST RECENT SESSIONS of the terminal by entering (from any NLDM NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU							DOMAIN: NCF11	
NAME: T140A0F8										
	***** PRIMARY *****			**** SECONDARY ****						
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME		
(1)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 09:54:37	*** ACTIVE ***		
(2)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15 09:55:54	09/15 10:15:03		
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 09:55:45	09/15 09:55:55		
(4)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 10:47:13	09/14 10:47:47		
(5)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/14 10:47:11	09/14 10:47:48		
(6)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 09:45:53	09/14 10:33:32		
(7)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/14 07:46:47	09/14 08:56:34		
(8)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/10 12:46:09	09/10 13:58:52		
(9)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/10 07:59:57	09/10 10:27:37		
(10)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09 17:34:09	09/09 18:22:14		
(11)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09 07:11:01	09/09 08:43:37		
(12)	TS01104	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:46:46	09/08 20:30:49		
(13)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:46:36	09/08 19:46:54		
(14)	TS01103	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:38:20	09/08 19:43:58		

ENTER TO VIEW MORE DATA
 ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
 1 PT

He selects the primary trace data of the active VTAM session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA								
NAME VTAM		PRIMARY			SECONDARY			DOM		
		SA 0000000B	EL 0001	|	NAME T140A0F8	SA 0000000E	EL 00B4	|	NCF11	
SEL#	GMT	SEQ#	DIR	TYPE	***** REQ/RESP HEADER *****	RULEN	SENS	T		
(1)	15:36:51	0000	S-P	DATA	....OC.DR.....	114			
(2)	15:36:51	0000	P-S	(-)RSP	....OC.ER.....	4	0821		
(3)	15:36:51	0002	P-S	DATA	....OC.DR.....	427			
(4)	15:36:52	0002	S-P	(+)RSP	....OC.DR.....	0			
(5)	15:36:52	0002	S-P	(+)RSP	....OC.DR.....	0			

ENTER TO VIEW MORE DATA
 ENTER SEL# OR COMMAND
 2

The LOGON request was rejected by VTAM. The network control center operator tries to get more information about the cause of error, by selecting the PIU with the sense code.

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----

RU DATA:          08210000                *.....*
SENSE DATA:
CATEGORY - (08) REQUEST REJECT
MODIFIER - (21) INVALID SESSION PARAMETERS: SESSION PARAMETERS WERE NOT
              VALID OR NOT SUPPORTED BY THE HALF-SESSION WHOSE
              ACTIVATION WAS REQUESTED.

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
R

```

The text definition of the sense CATEGORY/MODIFIER indicates an invalid LOGMODE, which means in this case an unknown LOGMODE. The case of invalid BIND session parameters does not give a sense code in the primary trace data display of the VTAM session of the terminal. This case is the subject of the next scenario.

To know which LOGMODE was used, the network control center operator returns to the primary trace data display and selects the rejected request PIU.

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----

RU DATA:          D3D6C740E3E2D66BC7D4D6      *LOG.TSO,GM0*

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

```

The first 11 bytes ⁵ of the RU displayed are not always sufficient to see all the name of the LOGMODE used.

⁵ For 3277 displays the RU also contains the screen control characters AID,SBA,SF etc..

INVALID BIND PARAMETERS (BIND FAILURE)

In case of LOGON failure from a terminal (in this case T140A0F8) without sense codes in the primary trace data display of the VTAM session of the terminal, the network control center operator displays the MOST RECENT SESSIONS of the requested application by entering (from any NLDM display) the command:

SESS TS011

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU							DOMAIN: NCF11	
NAME: TS011										
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME		
(1)	VTAM	SSCP	NCF11	TS011	LU	NCF11	09/16 10:34:39	*** ACTIVE ***		
(2)	TS011	LU	NCF11	H11L375	LU	NCF11	09/16 15:11:15	09/16 15:12:45		
(3)	TS011	LU	NCF11	H11L373	LU	NCF11	09/16 13:00:36	09/16 13:01:38		
(4)	TS011	LU	NCF11	H11L374	LU	NCF11	09/16 12:52:11	09/16 12:52:50		
(5)	TS011	LU	NCF11	T24020E1	LU	NCF11	09/16 12:50:06	09/16 12:50:31		
(6)	TS011	LU	NCF11	H11L371	LU	NCF11	09/16 12:13:30	09/16 12:13:55		
(7)	TS011	LU	NCF11	H11S25C1	LU	NCF11	09/16 11:46:44	09/16 11:47:22		
(8)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/16 11:20:47	09/16 11:21:46		
(9)	TS011	LU	NCF11	H11L377	LU	NCF11	09/16 10:48:54	09/16 10:49:10		
(10)	TS011	LU	NCF11	H11L379	LU	NCF11	09/16 10:38:12	09/16 10:38:28		
(11)	TS011	LU	NCF11	H11L372	LU	NCF11	09/16 08:34:22	09/16 08:34:32		
(12)	TS011	LU	NCF11	H11L372	LU	NCF11	09/15 22:44:25	09/15 22:44:41		
(13)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/15 21:01:10	09/15 21:01:31		
(14)	TS011	LU	NCF11	T140A0F5	LU	NCF11	09/15 20:52:20	09/15 20:53:20		

ENTER TO VIEW MORE DATA
 ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
 1 PT

He selects the primary trace data of the active VTAM session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA										
NAME VTAM		PRIMARY SA 000000B EL 0001					SECONDARY NAME TS011 SA 000000B EL 0006					DOM - NCF11
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T	
(1)	15:57:35	0009	P-S	CINIT	FMH.OC.DR	.....	.....	.....	116		
(2)	15:58:04	0009	S-P	(+)RSP	FMH.OC.DR	.....	.....	.....	3		
(3)	15:58:05	0014	S-P	SESSST	FMH.OC.NR	.....	.....	.....	9		
(4)	15:58:10	0015	S-P	INITOTHR	FMH.OC.DR	.....	.....	.....	46		
(5)	15:58:10	0015	P-S	(+)RSP	FMH.OC.DR	.....	.....	.....	3		
(6)	15:58:11	0016	S-P	SESEND	FMH.OC.NR	.....	.....	.....	11		
(7)	16:15:33	000B	P-S	CINIT	FMH.OC.DR	.....	.....	.....	112		
(8)	16:15:34	000B	S-P	(+)RSP	FMH.OC.DR	.....	.....	.....	3		
(9)	16:15:35	0018	S-P	BINDF	FMH.OC.NR	.....	.....	.....	13		
(10)	16:19:54	000C	P-S	CINIT	FMH.OC.DR	.....	.....	.....	108		
(11)	16:20:04	000C	S-P	(+)RSP	FMH.OC.DR	.....	.....	.....	3		

ENTER+TO VIEW MORE DATA
 ENTER+SEL# OR COMMAND
 9

He tries to find the corresponding BINDF PIU and notes the time. In the sample this occurred at 16.15.35. Selecting the BINDF PIU the network control center operator can see in the first 11 bytes displayed the sense code of invalid session parameters.

```

NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME TSO11      SA 0000000B EL 0006 | NCF11
-----

RU DATA:      8106850821000010071606      *.....*
                --|--
                V
                sense code of invalid session parameters

ENTER+'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
SESS T140A0F8

```

To know which LOGMODE was used, the network control center operator displays the MOST RECENT SESSIONS of the terminal by entering (from any NLDM display) the command:

SESS T140A0F8

```

NLDM.SESS
NAME: T140A0F8                SESSION HISTORY FOR SELECTED NAU                DOMAIN: NCF11
-----
***** PRIMARY *****      **** SECONDARY ****
SEL#  NAME      TYPE  DOM      NAME      TYPE  DOM      START TIME      END TIME
( 1) VTAM      SSCP  NCF11    T140A0F8  LU    NCF11    09/15 09:54:37  *** ACTIVE ***
( 2) NCF11003  LU    NCF11    T140A0F8  LU    NCF11    09/15 09:55:54  09/15 10:15:03
( 3) NCF11     LU    NCF11    T140A0F8  LU    NCF11    09/15 09:55:45  09/15 09:55:55
( 4) NCF11001  LU    NCF11    T140A0F8  LU    NCF11    09/14 10:47:13  09/14 10:47:47
( 5) VTAM      SSCP  NCF11    T140A0F8  LU    NCF11    09/14 10:47:11  09/14 10:47:48
( 6) NCF11001  LU    NCF11    T140A0F8  LU    NCF11    09/14 09:45:53  09/14 10:33:32
( 7) NCF11000  LU    NCF11    T140A0F8  LU    NCF11    09/14 07:46:47  09/14 08:56:34
( 8) NCF11001  LU    NCF11    T140A0F8  LU    NCF11    09/10 12:46:09  09/10 13:58:52
( 9) NCF11000  LU    NCF11    T140A0F8  LU    NCF11    09/10 07:59:57  09/10 10:27:37
(10) NCF11000  LU    NCF11    T140A0F8  LU    NCF11    09/09 17:34:09  09/09 18:22:14
(11) NCF11000  LU    NCF11    T140A0F8  LU    NCF11    09/09 07:11:01  09/09 08:43:37
(12) TSO1104   LU    NCF11    T140A0F8  LU    NCF11    09/08 19:46:46  09/08 20:30:49
(13) TSO11     LU    NCF11    T140A0F8  LU    NCF11    09/08 19:46:36  09/08 19:46:54
(14) TSO1103   LU    NCF11    T140A0F8  LU    NCF11    09/08 19:38:20  09/08 19:43:58

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
1 PT

```

He selects the primary trace data of the active VTAM session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA									
PRIMARY				SECONDARY				DOM			
NAME	VTAM	SA 0000000B EL 0001				NAME T140A0F8 SA 0000000E EL 00B4				NCF11	
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T
(1)	16:15:05	0737	P-S	ACTLU	....	OC.DR	.....	.....			3
(2)	16:15:05	0737	S-P	(+)RSP	....	OC.DR	.....	.....			16
(3)	16:15:05	0000	S-P	NOTIFY	FMH.	OC.DR	.....	.....			11
(4)	16:15:11	0001	P-S	DATA	....	OC.DR	.....	.....			705
(5)	16:15:15	0001	S-P	(+)RSP	....	OC.DR	.....	.....			0
(6)	16:15:15	0001	S-P	(+)RSP	....	OC.DR	.....	.....			0
(7)	16:15:15	0001	S-P	(+)RSP	....	OC.DR	.....	.....			0
(8)	16:15:18	0000	P-S	(+)RSP	FMH.	OC.DR	.....	.....			3
(9)	16:15:29	0000	S-P	DATA	....	OC.DR	.....	.....			11
(10)	16:15:32	0000	P-S	(+)RSP	....	OC.DR	.....	.....			0
(11)	16:15:32	0002	P-S	DATA	....	OC.DR	.....	.....			41
(12)	16:15:32	0002	S-P	(+)RSP	....	OC.DR	.....	.....			0

ENTER TO VIEW MORE DATA
ENTER SEL# OR COMMAND
9

He selects the PIU type DATA sent by the terminal, just before the noted time of 16.15.35. In this case the PIU type DATA from 16.15.29.

NLDM.PIUD		SPECIFIC RU DETAIL DATA								
PRIMARY				SECONDARY				DOM		
NAME	VTAM	SA 0000000B EL 0001				NAME T140A0F8 SA 0000000E EL 00B4				NCF11
RU DATA:		D3D6C740E3E2D66BE2C3E2				*LOG.TSO,SCS*				

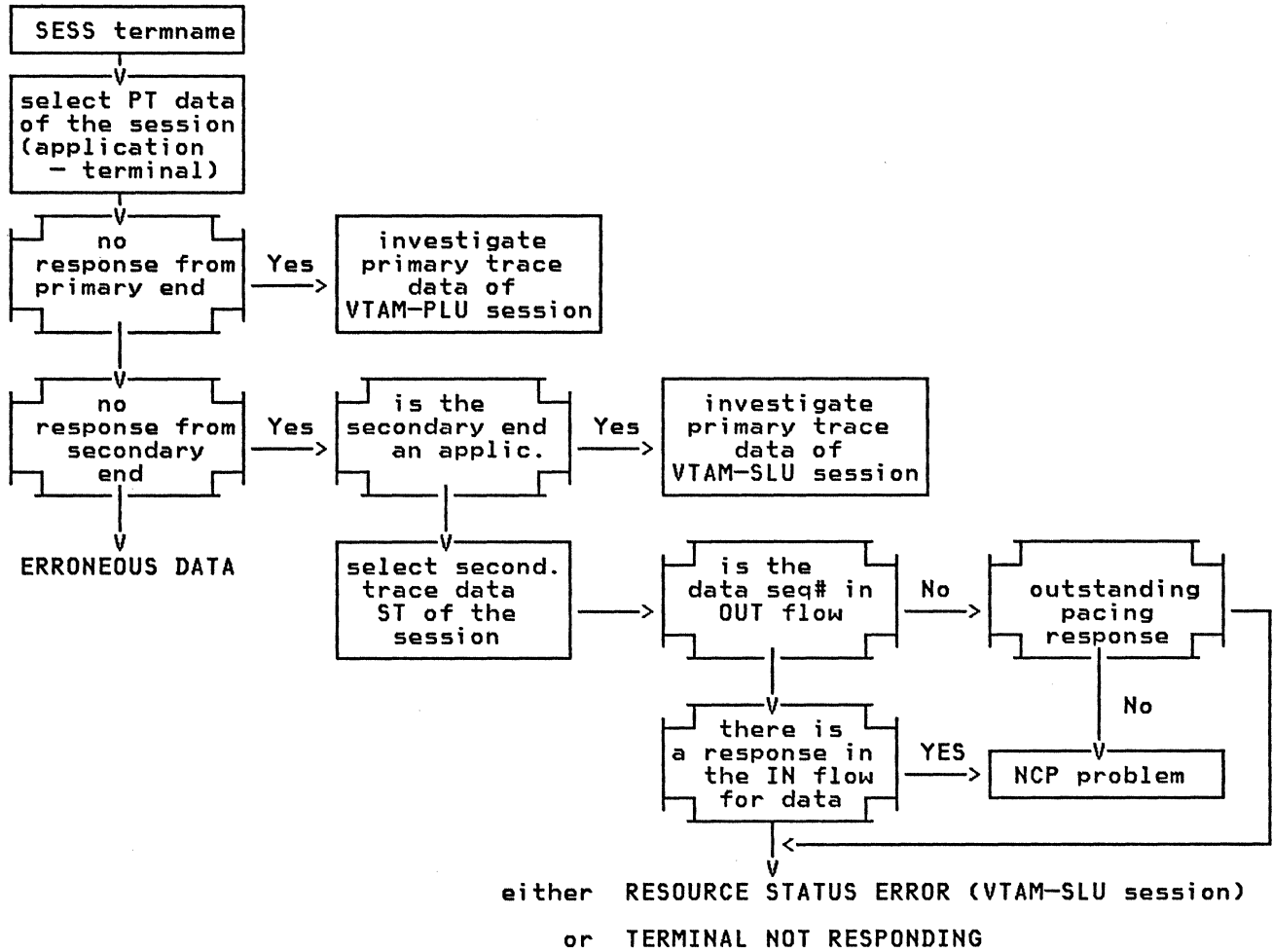
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

The first 11 bytes ⁶ of the LOGON procedure used may contain the first characters of the LOGMODE used.

⁶ For 3277 displays the RU also contains the screen control characters AID,SBA,SF etc..

Hung session

The end user complains that he is not able to enter anything at his terminal. The network control center operator problem determination process using NLDM is described in the following flow chart.



The following scenario is an illustration of a 'terminal not responding'.

Resource status error

A resource status error is always indicated by a corresponding sense code in the primary trace data of the current VTAM session of the terminal.

To detect this kind of error the network control center operator:

- displays the MOST RECENT SESSIONS of the supposed failing resource
- selects the primary trace data for the current VTAM session
- pages through the primary trace data displays until the latest PIU's
- selects the PIU with the sense code to get the sense code description

The following scenarios are an illustration of intervention required and LU disconnect error on the terminal T140A0F8

INTERVENTION REQUIRED ERROR.

The network control center operator displays the MOST RECENT SESSIONS of the terminal by entering (from any NLDM display) the command:

```
SESS T140A0F8
```

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU							DOMAIN: NCF11	
NAME: T140A0F8										
		***** PRIMARY *****			***** SECONDARY *****					
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME		
(1)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:44:26	*** ACTIVE ***		
(2)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 12:44:17	*** ACTIVE ***		
(3)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 12:39:51	09/15 12:43:07		
(4)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:38:10	09/15 12:39:34		
(5)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:38:04	09/15 12:38:17		
(6)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 12:37:31	09/15 12:39:34		
(7)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:25:58	09/15 12:30:02		
(8)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:25:57	09/15 12:26:10		
(9)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 12:25:56	09/15 12:35:07		
(10)	NCF11004	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:05:35	09/15 12:22:10		
(11)	NCF11004	LU	NCF11	T140A0F8	LU	NCF11	09/15 11:59:05	09/15 12:03:31		
(12)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:57:12	09/15 11:08:36		
(13)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:50:05	09/15 10:56:22		
(14)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:42:51	09/15 10:49:34		

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
2 PT

He selects the primary trace data of the active VTAM session,

NLDM.PIUT		SPECIFIC SESSION TRACE DATA							
----- PRIMARY -----		----- SECONDARY -----						- DOM -	
NAME VTAM	SA 0000000B EL 0001	| NAME T140A0F8 SA 0000000E EL 00B4				| NCF11			
-----	-----						-----		
SEL#	GMT	SEQ#	DIR	TYPE	***** REQ/RESP HEADER *****	RULEN	SENS	T	
(1)	17:44:09	04D5	P-S	ACTLU	....OC.DR.....		3		
(2)	17:44:10	04D5	S-P	(+)RSP	....OC.DR.....		16		
(3)	17:44:10	0000	S-P	NOTIFY	FMH.OC.DR.....		11		
(4)	17:44:11	0001	P-S	DATA	....OC.DR.....		705		
(5)	17:44:13	0000	P-S	(+)RSP	FMH.OC.DR.....		3		
(6)	17:44:13	0001	S-P	(-)RSP	....OC.ER.....		4	0802	
(7)	17:44:22	0000	S-P	SESEND	FMH.OC.NR.....		11		
END OF DATA									
ENTER SEL# OR COMMAND									
6									

and from it the PIU with sense code.

NLDM.PIUD		SPECIFIC RU DETAIL DATA							
----- PRIMARY -----		----- SECONDARY -----						- DOM -	
NAME VTAM	SA 0000000B EL 0001	| NAME T140A0F8 SA 0000000E EL 00B4				| NCF11			
-----	-----						-----		
RU DATA:	08020000					*.....*			
SENSE DATA:									
CATEGORY - (08)	REQUEST REJECT								
MODIFIER - (02)	INTERVENTION REQUIRED: FORMS OR CARDS ARE REQUIRED AT AN OUTPUT DEVICE, OR A DEVICE IS TEMPORARILY IN LOCAL MODE, OR OTHER CONDITIONS REQUIRE INTERVENTION.								
ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND									

The text definition of the sense CATEGORY/MODIFIER indicates the type of error, in this case intervention required provoked by the test key.

LU DISCONNECT ERROR.

The network control center operator displays the MOST RECENT SESSIONS of the terminal by entering (from any NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU						DOMAIN: NCF11	
NAME: T140A0F8									

	***** PRIMARY *****			**** SECONDARY ****					
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME	
(1)	NCF11004	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:05:35	09/15 12:05:35	*** ACTIVE ***
(2)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 12:05:30	09/15 12:05:30	*** ACTIVE ***
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 12:05:31	09/15 12:05:31	09/15 12:05:46
(4)	NCF11004	LU	NCF11	T140A0F8	LU	NCF11	09/15 11:59:05	09/15 12:03:31	
(5)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 11:59:01	09/15 12:03:32	
(6)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:57:12	09/15 11:08:36	
(7)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:50:05	09/15 10:56:22	
(8)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:42:51	09/15 10:49:34	
(9)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:35:29	09/15 10:35:51	
(10)	TSO1104	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:34:53	09/15 10:35:37	
(11)	TSO11	LU	NCF11	T140A0F8	LU	NCF11	09/15 10:34:22	09/15 10:35:04	
(12)	NCF11003	LU	NCF11	T140A0F8	LU	NCF11	09/15 09:55:54	09/15 10:15:03	
(13)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 10:47:13	09/14 10:47:47	
(14)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 09:45:53	09/14 10:33:32	
ENTER TO VIEW MORE DATA									
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)									
2 PT									

He selects the primary trace data of the active VTAM session,

NLDM.PIUT		SPECIFIC SESSION TRACE DATA										
NAME VTAM		PRIMARY					SECONDARY					DOM
		SA 0000000B EL 0001					NAME T140A0F8 SA 0000000E EL 00B4					NCF11

SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T	
(1)	17:29:50	0000	S-P	SESSEND	FMH.OC.NR	.....	.....	.....	11		
(2)	17:29:54	0002	P-S	DATA	....OC.DR	.....	.....	.....	705		
(3)	17:29:55	0002	S-P	(+)RSP	....OC.DR	.....	.....	.....	0		
(4)	17:29:55	0002	S-P	(+)RSP	....OC.DR	.....	.....	.....	0		
(5)	17:29:55	0002	S-P	(+)RSP	....OC.DR	.....	.....	.....	0		
(6)	17:33:12	0000	S-P	NOTIFY	FMH.OC.DR	.....	.....	.....	11		
(7)	17:33:13	0000	P-S	(+)RSP	FMH.OC.DR	.....	.....	.....	3		
(8)	17:34:40	0003	P-S	DATA	....OC.DR	.....	.....	.....	705		
(9)	17:34:41	0003	S-P	(-)RSP	....OC.ER	.....	.....	.....	4	0831	
(10)	17:34:41	04AB	P-S	DACTLU	....OC.DR	.....	.....	.....	1		
(11)	17:34:41	04AB	S-P	(+)RSP	....OC.DR	.....	.....	.....	1		
ENTER TO VIEW MORE DATA												
ENTER SEL# OR COMMAND												
9												

and then, the PIU with sense code to get the sense code description.

```
NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----
```

```
RU DATA:          08310000                *.....*
SENSE DATA:
CATEGORY - (08) REQUEST REJECT
MODIFIER - (31) LU COMPONENT DISCONNECTED: AN LU COMPONENT IS NOT
              AVAILABLE BECAUSE OF POWER OFF OR SOME OTHER
              DISCONNECTING CONDITION.
```

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

The text definition of the sense CATEGORY/MODIFIER indicates an LU component disconnect which has been provoked in this case by manipulating the security key.

Erroneous data

Erroneous data may be sent by each end point of a session.

The data may violate the session protocol, and then the corresponding entry in the ACCESS METHOD PIU TRACE DATA display is noted by an "D" in column T and is also kept in the discarded PIU's session.

The data may request a function which is not supported by the other end point.

The following scenarios are an illustration of erroneous data sent by the application and by the terminal.

ERRONEOUS DATA SENT BY THE APPLICATION.

The end user reports a programming error, message

PROGxxx

on the bottom line of the display T140A0F8. The network control center operator displays the MOST RECENT SESSIONS display of the terminal by entering (from any NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU							DOMAIN: NCF11	
NAME: T140A0F8										
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME		
(1)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:47:42	*** ACTIVE ***		
(2)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 19:40:52	*** ACTIVE ***		
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:47:36	09/15 19:47:53		
(4)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:40:54	09/15 19:41:09		
(5)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:40:53	09/15 19:41:03		
(6)	TS01101	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:39:16	09/15 19:41:03		
(7)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:39:01	09/15 19:39:25		
(8)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:28:46	09/15 19:29:16		
(9)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:28:43	09/15 19:28:56		
(10)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 19:28:42	09/15 19:41:03		
(11)	TS01102	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:27:49	09/15 19:28:54		
(12)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:27:35	09/15 19:28:00		
(13)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:26:31	09/15 19:26:59		
(14)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 19:26:22	09/15 19:28:54		

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
1 PT

He selects the primary trace data of the failing session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA									
PRIMARY					SECONDARY					DOM	
NAME NCF11001 SA 0000000B EL 0074					NAME T140A0F8 SA 0000000E EL 00B4					NCF11	
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T
(1)	00:48:21	0017	P-S	DATA	....	OC.DR	.....	BBEB	25		
(2)	00:48:22	0017	S-P	(+)RSP	....	OC.DR	.....		0		
(3)	00:48:26	0006	S-P	DATA	....	OC.ER	.....	BB...CD	6		
(4)	00:48:26	0018	P-S	DATA	....	OC.DR	.....	EB	50		
(5)	00:48:26	0018	S-P	(+)RSP	....	OC.DR	.....		0		
(6)	00:48:26	0019	P-S	DATA	....	OC.DR	.....	BBEB	14		
(7)	00:48:26	0019	S-P	(+)RSP	....	OC.DR	.....		0		
(8)	00:48:27	001A	P-S	DATA	....	FC.ER	.....	BBEB	1536		
(9)	00:48:27	001B	P-S	DATA	....	LC.DR	.....		681		
(10)	00:48:28	001A	S-P	(-)RSP	....	OC.ER	.....		4	1003	
(11)	00:48:28	05B8	P-S	CLEAR	....	OC.DR	.....		1		
(12)	00:48:29	05B8	S-P	(+)RSP	....	OC.DR	.....		1		
(13)	00:48:29	05B9	P-S	SDT	....	OC.DR	.....		1		
(14)	00:48:29	05B9	S-P	(+)RSP	....	OC.DR	.....		1		

ENTER TO VIEW MORE DATA
ENTER SEL# OR COMMAND
10

The data sent by the application as a result of a user request was rejected by the terminal. To find out the reason, the network control center operator selects the PIU with sense code.

NLDM.PIUD		SPECIFIC RU DETAIL DATA									
PRIMARY					SECONDARY					DOM	
NAME NCF11000 SA 0000000B EL 0073					NAME T140A0F8 SA 0000000E EL 00B4					NCF11	
RU DATA:		10030000			*.....*						
SENSE DATA:											
CATEGORY - (10)		REQUEST ERROR									
MODIFIER - (03)		FUNCTION NOT SUPPORTED: THE FUNCTION MAY HAVE BEEN SPECIFIED BY A FORMATTED REQUEST CODE, A FIELD IN AN RU, OR A CONTROL CHARACTER. BYTES 2 AND 3 FOLLOWING THE SENSE CODE ARE NOT USED FOR USER-DEFINED DATA; THEY CONTAIN SENSE-CODE SPECIFIC INFORMATION. SETTINGS ALLOWED ARE:									
		0000 FUNCTION REQUESTED IS NOT SUPPORTED.									
		6022 THE RESOURCE IDENTIFIED BY THE DESTINATION PROGRAM NAME (DPN) IS NOT SUPPORTED.									
		6003 THE RESOURCE IDENTIFIED BY THE PRIMARY RESOURCE NAME (PRN) IS NOT SUPPORTED.									
		(NOTE: CODE CAN BE USED INSTEAD OF SENSE CODE X'0826'.)									

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND

From the text definition of the sense CATEGORY/MODIFIER he concludes that the user transaction request (SEQ# 6) results in some erroneous data sent by the application (SEQ# 1A and 1B).

ERRONEOUS DATA SENT BY THE TERMINAL.

The end user complains that the keyboard of his terminal is locked.

The network control center operator then displays the MOST RECENT SESSIONS of the terminal, in this case T140A0F8, by entering (from any NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU						DOMAIN: NCF11	
NAME: T140A0F8									
***** PRIMARY *****				***** SECONDARY *****					
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME	
(1)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:47:42	*** ACTIVE ***	
(2)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 19:40:52	*** ACTIVE ***	
(3)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:47:36	09/15 19:47:53	
(4)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:40:54	09/15 19:41:09	
(5)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:40:53	09/15 19:41:03	
(6)	TSO1101	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:39:16	09/15 19:41:03	
(7)	TSO11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:39:01	09/15 19:39:25	
(8)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:28:46	09/15 19:29:16	
(9)	NCF11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:28:43	09/15 19:28:56	
(10)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 19:28:42	09/15 19:41:03	
(11)	TSO1102	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:27:49	09/15 19:28:54	
(12)	TSO11	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:27:35	09/15 19:28:00	
(13)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/15 19:26:31	09/15 19:26:59	
(14)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/15 19:26:22	09/15 19:28:54	

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
2 PT

He selects the primary trace data of the active VTAM session.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA											
----- PRIMARY -----				----- SECONDARY -----				----- DOM -----					
NAME	VTAM	SA	0000000B	EL	0001	NAME	T140A0F8	SA	0000000E	EL	00B4	DOM	NCF11
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T		
(1)	00:41:19	0000	S-P	DATA	....OC.DR.	.....	.....	.....	0				
(2)	00:41:19	0000	P-S	(-)RSP	....OC.ER.	.....	.....	.....	4	1002			
(3)	00:41:19	0002	P-S	DATA	....OC.DR.	.....	.....	.....	385				
(4)	00:41:20	0002	S-P	(+)RSP	....OC.DR.	.....	.....	.....	0				
(5)	00:41:20	0002	S-P	(+)RSP	....OC.DR.	.....	.....	.....	0				

ENTER TO VIEW MORE DATA
ENTER SEL# OR COMMAND
2

The data sent by the user was rejected by VTAM. To get the description of the sense code the network control center operator selects the negative response PIU.

```
NLDM.PIUD                SPECIFIC RU DETAIL DATA
----- PRIMARY ----- SECONDARY ----- - DOM -
NAME VTAM      SA 0000000B EL 0001 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
-----
RU DATA:          10020000                *.....*
SENSE DATA:
CATEGORY - (10) REQUEST ERROR
MODIFIER - (02) RU LENGTH ERROR:  THE REQUEST RU WAS TOO LONG OR TOO
                          SHORT.

ENTER 'R' TO RETURN TO PREVIOUS DISPLAY - OR COMMAND
R
```

From the text definition of the sense CATEGORY/MODIFIER determines the network control center operator decides to return to the primary trace data to verify the RU length. In this case the RU was too short, it has a length of zero which is probably due to operator error at the terminal.

Poor response times

To detect the cause of poor response times in a session the network control center operator:

- increments the number of PIU's kept for this session. He will thus be able to view more exchanged PIUs
- from the MOST RECENT SESSIONS display of the terminal he selects the primary trace data of this session
- pages through the primary trace data displays and notes the times T,t0,t1,t2,...ti,R

```

SEL#   GMT   SEQ# DIR   TYPE   ***** REQ/RESP HEADER *****
( )    T     n    S-P DATA   ....OC.ER.....BB...CD....
( )    t0    m    P-S DATA   ....FC.ER.....EB.....
( )    t1    m1   P-S DATA   ....MC.ER.....
( )    t2    m2   P-S DATA   ....MC.ER.....
.....
( )    ti    mi   P-S DATA   ....LC.DR.....
( )    R     mi   S-P ( )RSP  ....OC.DR.....

```

- compares:

```

t0 - T           - host system and primary application process time
ti - (ti-1)     - host system process time
R  - ti         - network plus terminal time

```

As an example, see the scenario that follows.

An end user complains of bad response times at terminal T140A0F8. The network control center operator displays the MOST RECENT SESSIONS by entering (from any NLDM display) the command:

SESS T140A0F8

NLDM.SESS		SESSION HISTORY FOR SELECTED NAU						DOMAIN: NCF11	
NAME: T140A0F8									
***** PRIMARY *****				***** SECONDARY *****					
SEL#	NAME	TYPE	DOM	NAME	TYPE	DOM	START TIME	END TIME	
(1)	TS01104	LU	NCF11	T140A0F8	LU	NCF11	09/14 10:47:13	*** ACTIVE ***	
(2)	VTAM	SSCP	NCF11	T140A0F8	LU	NCF11	09/14 10:47:11	*** ACTIVE ***	
(3)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/14 09:45:53	09/14 10:33:32	
(4)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/14 07:46:47	09/14 08:56:34	
(5)	NCF11001	LU	NCF11	T140A0F8	LU	NCF11	09/10 12:46:09	09/10 13:58:52	
(6)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/10 07:59:57	09/10 10:27:37	
(7)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09 17:34:09	09/09 18:22:14	
(8)	NCF11000	LU	NCF11	T140A0F8	LU	NCF11	09/09 07:11:01	09/09 08:43:37	
(9)	TS01104	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:46:46	09/08 20:30:49	
(10)	TS011	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:46:36	09/08 19:46:54	
(11)	TS01103	LU	NCF11	T140A0F8	LU	NCF11	09/08 19:38:20	09/08 19:43:58	

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(S-CON)
1 PT

He selects the primary trace data of the session with poor response time.

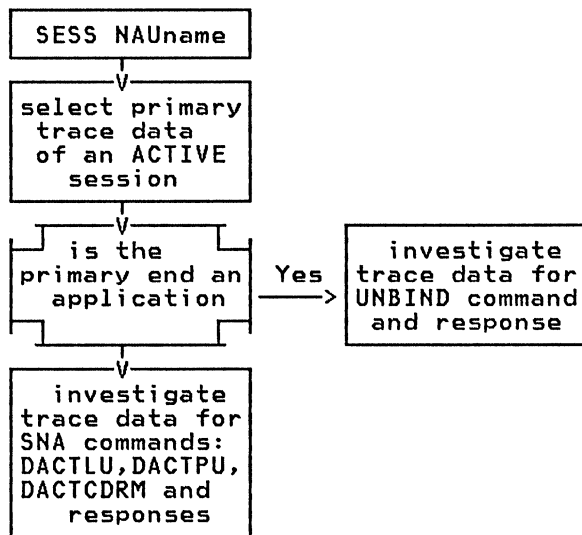
NLDM.PIUT		SPECIFIC SESSION TRACE DATA									
PRIMARY					SECONDARY					- DOM -	
NAME TSO1104 SA 0000000B EL 0074					NAME T140A0F8 SA 0000000E EL 00B4					NCF11	
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T
(1)	16:37:48	0049	S-P	DATA	....OC.ER.....	BB...CD.....			85		
(2)	16:39:32	00D6	P-S	DATA	....FC.ER.....	EB.....			1536		
(3)	16:39:32	00D7	P-S	DATA	....MC.ER.....				1536		
(4)	16:39:32	00D8	P-S	DATA	....LC.DR.....				562		
(5)	16:39:36	00D8	S-P	(+)RSP	....OC.DR.....				0		
(6)	16:42:24	004A	S-P	DATA	....OC.ER.....	BB...CD.....			85		
(7)	16:42:27	00D9	P-S	DATA	....FC.ER.....	EB.....			1536		
(3)	16:42:28	00DA	P-S	DATA	....MC.ER.....				1536		
(8)	16:42:28	00DB	P-S	DATA	....LC.DR.....				562		
(9)	16:42:31	00DB	S-P	(+)RSP	....OC.DR.....				0		

END OF DATA
ENTER SEL# OR COMMAND

The network control center operator notes that the first transaction (SEQ# 49) takes about 2 minutes of host system and application process time. The poor response time is probably caused by the application process time, since the multiple output chained message was sent with no apparent system delay. Comparing this transaction with the next one, which has a good response time he concludes that the first transaction is a heavy one. Displaying the detail of the corresponding user request (SEQ# 49) he may found out what this transaction was.

Session inactivation

Session inactivation errors are a special case of 'HUNG' sessions. The helpdesk operator problem determination process, using NLDM, is described in the following flow chart:



DOCUMENTATION

The documentation of the configuration or of a problem is implemented through INFO/MANAGEMENT. NLDM can provide, by means of the COPY function, the knowledge:

- of how a component is connected (the name of the subarea PU, and the names of up to three network nodes - LINK/CUA,PU,LU)
- of the environment just before the problem appeared or during a test

MONITOR NETWORK ACTIVITY

Keeping a time stamped track of the start and termination time of sessions, NLDM can provide useful statistics about:

- the availability of the system
- the availability of applications with:
 - the number of sessions
 - the terminals connected
 - the peak period of utilization
- the availability of a terminal with:
 - the number of sessions with a given application and the average session time
 - the peak period of utilization
- the number of discarded PIUs and the associated ACF/VTAM modules. This data can be checkpointed using the FORCE command for *DISCARD name in conjunction with an NCCF timer driven CLIST

The method which may be used to obtain these statistics is the VSAM REPRO function of the SIR or SID records (see "Appendix B. NLDM DATA BASE STRUCTURE" on page 75) followed by an SLR analysis.

NLDM runs on all IBM host processors supported by TCAM/VTAM on OS/VS2 systems.

PROGRAMMING REQUIREMENTS

NLDM operates with OS/VS2(MVS) Rel 3.8 using:

- one of the following TP access methods:
 - ACF/TCAM Version 2 Release 4
 - ACF/VTAM Version 1 Release 3 or ACF/VTAM Version 2 Release 1 each one with ACF/VTAM SPE
- NCCF Release 2 with NCCF SPE
- VSAM

ACF/NCP Version 2 is not a prerequisite for NLDM, but is required to obtain the NCP PIU sequence numbers and control blocks.

STORAGE REQUIREMENTS

No dedicated real storage is necessary. However, the buffers used by VTAM for PIU tracing are in fixed common storage area (CSA).

Virtual storage (Figure 18 on page 62) and disk storage (Figure 19 on page 62) requirements depend on the number and kinds of sessions traced and the amount of session data kept for each session traced.

Each installation should establish the following values (remember to check the NLDM Installation and reference manual):

- U - number of NLDM users
- S - number of unique session name pairs
- SA - number of sessions active
- T - percentage of sessions traced
- SK - average number of sessions kept
- PK - average number of PIU kept
- DSRBT - Sum(NLDM DSRBO, NPDA DSRBO, NPDA DSRBU) values
- MXE - Maximum number of session_ends in 5 seconds.
- MXT - Maximum number of explicit trace commands.

For applications like TSO or NCCF, at each logon the following three sessions are created:

```
<NCCF_idxxx|TS0idxxx> - terminal
<NCCF_idxxx|TS0idxxx> - VTAM
<NCCF_id|TS0id> - terminal (for the logon/logoff process)
```

The virtual storage requirements are summarized in the table below:

PROGRAM STORAGE	
display functions	113K
common display service functions	47K
data services functions	120K
CONTROL BLOCKS & TABLES	
presentation services	
30K x U	_____K
common control storage	_____10K
10K x DSRBT	_____K
24 x MXT/1000	_____K
100 x MXE/1000	_____K
1650 x BUFSIZE/1000	_____K
SA x (300 + T% (300 + PK x 50))/1000	_____K
(BUFNI*IndxCISZ+BUFND*DataCISZ)/1000	_____K
TOTAL	_____K

Figure 18. NLDM STORAGE ESTIMATES

Auxiliary storage requirements are shown below:

LIBRARIES (cyl-dir blocks for 3330)	
SYS1.NLDMLIB (3-10)	_____
SYS1.NLOADLIB (5-50)	_____
PRIMARY VSAM DATA BASE	
CYL = (2.09 x(S x(150 + SK x(420 + + T% x(450 + PK x102)))))/BC	_____
BC = number of bytes per cylinder for DASD type	
TOTAL NUMBER OF CYLINDER	_____

Figure 19. NLDM AUXILIARY STORAGE

Example:

For a network composed of (and viewed from one host):

resource	session name pairs		sessions active	sessions traced
3 host	SSCP-SSCP	2	2	2
5 PU	SSCP-PU	5	5	5
3 PLU in same dom.	SSCP-PLU	3	3	3
4 PLU in other dom.	SSCP-PLU (none)	none		
20 SLU in same dom.	SSCP-SLU	20	20	20
	PLU-SLU	(3+4)x20	20	140
10 SLU in other dom.	SSCP-SLU	none		
	PLU-SLU	3x10	10	30
TOTALS		S = 200	SA = 60	T1 = 200

and for:

U = 3 NLDM users
T = 100% sessions traced (T=1.0)
SK = 10 average sessions kept

PK = 10 average PIU kept
 MXE = 500 maximum session terminations
 MXT = 100 maximum explicit trace commands
 DSRBO = 10 (NLDM)
 DSRBO = 4 (NPDA)
 DSRBU = 1 (NPDA)
 DSRTU = 15
 BUFSIZE = 32K

we need 701K of virtual storage.

PROGRAM STORAGE	
display functions	113.0K
common display service functions	47.0K
data services functions	120.0K
CONTROL BLOCKS & TABLES	
presentation services	
30K x U	90.0K
common control storage	10.0K
10K x DSRBT	150.0K
24 x MXT/1000	2.4K
100 x MXE/1000	50.0K
1650 x BUFSIZE/1000	52.8K
SA x (300 + T% (300 + PK x 50))/1000	66.0K
TOTAL	701.2K

This figure does not include the virtual storage requirements for VSAM. This will depend on the definitions used for the VSAM datasets.

The NLDM data base requires 33 cylinders.

$$\begin{aligned}
 \text{cylinders} &= (2.09 \times 200 \times (150 \times 10 \times (420 + 1.00 \times (450 + 10 \times 102)))) / 13030 \times 19 \\
 &= 418.0 \times 19050 / 13030 \times 19 \\
 &= 33
 \end{aligned}$$

INSTALLATION

The following steps are necessary to install NLDM:

APPLY APPROPRIATE PTFs ON ACF/VTAM V2R1 (5665-280,FMID=HVT2101) or on ACF/VTAM V1R3

Always make reference to the DIRECTORY to obtain a complete list of required PTF's.

APPLY APPROPRIATE PTFs ON NCCF RELEASE 2 (5752-XX6,FMID=HCS1502)

APPLY THE NLDM PROGRAM PRODUCT (5668-971,FMID=HLD1100)

which results in the creation of two libraries:

- SYS1.NLOADLIB the distribution library
- SYS1.NLMLIB the processing library

DEFINE THE NLDM APPLICATION TO NCCF

MODIFY THE NCCF DEFINITIONS

Add the following statements to DSICMD member

```
*****
*      DSICMD member                                     *
*      (change the name of the NLDM command if necessary) *
*****
NLDM      CMDMDL      MOD=AAUPNLDM,TYPE=R
          PARMSYN KEEP,K
          PARMSYN TRACE,T
          PARMSYN FORCE,F
DISABLE  KEYCLASS 1
AAUPCPEX CMDMDL MOD=AAUPCPEX,TYPE=R
AAUDCPEX CMDMDL MOD=AAUDCPEX,TYPE=RD
AAUIBMPD CMDMDL MOD=AAUPCPEX,TYPE=R
DSILUITF CMDMDL MOD=DSILUITF,TYPE=D,CTL=N
AAUD090A CMDMDL MOD=AAUD090A,TYPE=D
AAUD050A CMDMDL MOD=AAUD050A,TYPE=D
AAUD095A CMDMDL MOD=AAUD095A,TYPE=D
AAUD001A CMDMDL MOD=AAUD001A,TYPE=D
AAUD020A CMDMDL MOD=AAUD020A,TYPE=D
AAUD002A CMDMDL MOD=AAUD002A,TYPE=D
AAUSTPQA CMDMDL MOD=AAUSTPQA,TYPE=D
*****
```

Add the following statements to DSIDMN member

```
*****
*      DSIDMN member                                     *
*****
* if NPDA is installed
  TASK      MOD=DSIZDST,TSKID=BNJDSERV,INIT=Y,PRI=6,MEM=NLDMBDST
  TASK      MOD=DSIZDST,TSKID=AAUTSKLP,INIT=Y,PRI=7,MEM=AAUPRMLP
  TASK      MOD=DSIZDST,TSKID=DSIAMLUT,INIT=Y,PRI=7,MEM=DSIPRMLU
  TASK      MOD=AAUNTIMR,TSKID=AAUNTIMR,INIT=Y,PRI=9
*
* if NPDA is not installed
  TASK      MOD=DSIZDST,TSKID=AAUTSKLP,INIT=Y,PRI=6,MEM=AAUPRMLP
  TASK      MOD=DSIZDST,TSKID=DSIAMLUT,INIT=Y,PRI=7,MEM=DSIPRMLU
  TASK      MOD=AAUNTIMR,TSKID=AAUNTIMR,INIT=Y,PRI=9
*****
```

Add the following member to DSIPARM library if NPDA is installed

```
*****
*      NLDMBDST member (NPDA initialization parameters) *
*****
  DSTINIT PDDNM=BNJLGPRI
  DSTINIT PPASS=NPDA
  DSTINIT SDDNM=BNJLGSEC
  DSTINIT SPASS=NPDA
  DSTINIT DSRBU=1
  DSTINIT DSRBO=1
  DSTINIT UNSOL=BNJUNSOL
  DSTINIT FUNCT=BOTH
```

```
DSTINIT XITVN=BNJAINA
DSTINIT XITCI=AAUSRTEA
DSTINIT XITDI=AAUINIT
INITMOD AAUCPEX DSTXIT=BNJAPAMA
..... NPDA initialization cards.....
*****
```

Add two new members AAUPRMLP and DSIPRMLU to DSIPARM library

```

*****
*      AAUPRMLP member (NLDM initialization parameters)      *
*****
DSTINIT PDDNM=AAUVSPLP
DSTINIT PPASS=userpass
DSTINIT SDDNM=AAUVSSLP
DSTINIT PPASS=userpass
DSTINIT FUNCT<=VSAM if NPDA |=BOTH if not NPDA)
DSTINIT DSRB0=10
<DSTINIT UNSOL=AAUDCPEX if no NPDA>
<DSTINIT XITCI=AAUSRTEA if no NPDA>
DSTINIT XITVN=AAUAINTA
DSTINIT XITDI=AAUINIT
INITMOD AAUICPEX MAXSOL=<nnn|50>
INITMOD AAUICPEX CNMITASK<=BNJDserv if NPDA |=AAUTSKLP if not NPDA>
INITMOD AAUINLDM AMLUNAME=ISTPDCLU
INITMOD AAUINLDM MAXTRACE=<nnn|100>
INITMOD AAUINLDM MAXEND=<nnn|100>
INITMOD AAUINLDM BUFSIZE=<nnK|4K>
INITMOD AAUINLDM TRACELU=<NO|YES>
INITMOD AAUINLDM TRACESC=<NO|YES>
INITMOD AAUINLDM KEEPSES=<nnn|10>
INITMOD AAUINLDM KEEPPIU=<nnn|10>
INITMOD AAUINLDM KEEPDISC=<nnn|250>
nn < 32K

*****
*      DSIPRMLU member (NCCF LU initialization parameters)    *
*****
DSTINIT FUNCT=OTHER
DSTINIT XITDI=DSILINIT
CDRMDEF cdrmname1=nccfid1
CDRMDEF cdrmname2=nccfid2
.....
*****

```

DEFINE THE NLDM DATA BASES

```

*****
*      NLDM data bases definition JOB                          *
*****
//DEFPLP EXEC PGM=IDCAMS,REGION=500K
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
DELETE (primary-cluster) PURGE CLUSTER
DEF CLUSTER (NAME(primary-cluster) -
INDEXED -
UNIQUE -
RECSZ(102 4086) -
KEYS (54 0) -
UPDPW(userpass)) -
DATA -
(FSPC(nn nn) -
CISZ(6144) -
CYLINDERS(nn n) -
VOL(xxxxxx)) -
INDEX -
(CISZ(1024) -
IMBED -
REPLICATE -
CYLINDERS(nn n) -
VOL(xxxxxx)) -
DELETE (secondary-cluster) PURGE CLUSTER
DEF CLUSTER (NAME(secondary-cluster) -
INDEXED -
UNIQUE -
RECSZ(102 4086) -
KEYS (54 0) -
UPDPW(userpass)) -
DATA -
(FSPC(nn nn) -

```

```

CISZ(6144) -
CYLINDERS(nn n) -
VOL(xxxxxx) -
INDEX -
(CISZ(1024) -
IMBED -
REPLICATE -
CYLINDERS(nn n) -
VOL(xxxxxx) -

```

```

/*
*****

```

UPDATE THE NCCF START PROCEDURE

```

*****
add to the existing STEPLIB DD cards
// DD DSN=SYS1.NLDMLIB,DISP=SHR,UNIT=SYSDA
add the DD cards corresponding to the NLDM data bases
//AAUVSPL DD DSN=primary-cluster,DISP=SHR,
// AMP='AMORG,BUFNI=nn,BUFND=mm'
//AAUVSSLP DD DSN=secondary-cluster,DISP=SHR,
// AMP='AMORG,BUFNI=nn,BUFND=mm'

```

The values for BUFNI and BUFND should be chosen as follows:

```

BUFNI = NLDM DSRB0+25
BUFND = NLDM DSRB0+1

```

DEFINE THE NLDM APPLICATION TO ACF/VTAM

UPDATE THE NCCF APPLICATION PROGRAM MAJOR NODE to reflect the NLDM application

```

*****
* ACF/VTAM application program major node *
*****
AAUTSKLP APPL AUTH=CNM
DSIAMLUT APPL AUTH=(ACQ),VPACING=1
*****

```

UPDATE THE CNMI ROUTING TABLE MODULE ISTMGC00

```

*****
* ISTMGC00 MODULE *
*****
//ASM EXEC PGM=IFOX00,PARM=OBJ
//SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
//SYSUT1 DD DSN=SYSUT1,DISP=VIO,SPACE=(1700,(600,100))
//SYSUT2 DD DSN=SYSUT2,DISP=VIO,SPACE=(1700,(300,50))
//SYSUT3 DD DSN=SYSUT3,DISP=VIO,SPACE=(1700,(300,50))
//SYSPRINT DD SYSOUT=A
//SYSPUNCH DD DUMMY
//SYSGO DD DSN=SYSOBJSET,UNIT=SYSDA,SPACE=(80,(200,50)),
// DISP=(MOD,PASS)
//SYSIN DD *
ISTMGC00 CSECT
DS 0F
DC X'0003' NUMBER OF ENTRIES IN THE TABLE
DC X'000C' LENGTH OF EACH ENTRY
DC XL4'00000000' RESERVED
DC XL4'00000000' RESERVED
DC XL1'00' FLAGS FOR NPDA ACF/VTAM R2
* CNMI
DC XL3'010381' RECMS
* DC C'BNJDSERV' MUST APPEAR IN APPL STATEMENT FOR
VTAM WITH AUTH=CNM

```


- the domains which can be started by a GLOBAL operator, with their resources
nccfid RRD nodename,.....
- the maximum number of SPAN names to be handled by this NCCF
MAXSPAN n/0

NLDM OPERATION

- the type of logon authorization checking
OPTIONS VERIFY MINIMAL/NORMAL/RACF
- the maximum number of times an invalid logon is processed
MAXLOGON n/3
- the network resource names of devices that may be hard-copy devices
HARDCOPY name used by the NLDM copy command

OPERATOR'S ASSOCIATED PROFILE (see Figure 20 on page 70)

NLDM CROSS-DOMAIN SUPPORT

the operator's authority:

- GLOBAL if he can control any resources in this domain and start any domain defined in RRD statements
- SPECIFIC if he can control only those resources designated by ISPAN and SPAN statements and start domains designated in DOMAINS statement (ISPAN establishes the initial environment, SPAN defines the environment which can be started by command)

NLDM OPERATION

- the eligibility to receive the messages associated with logon, lost terminal or undeliverable messages (MSGRECV=YES)
- the name of the hard-copy log device (HCL=....)
- the name of the command list executed immediately after logon (IC=....)
- the access to a subset of commands and a subset of their keywords (OPCLASS)

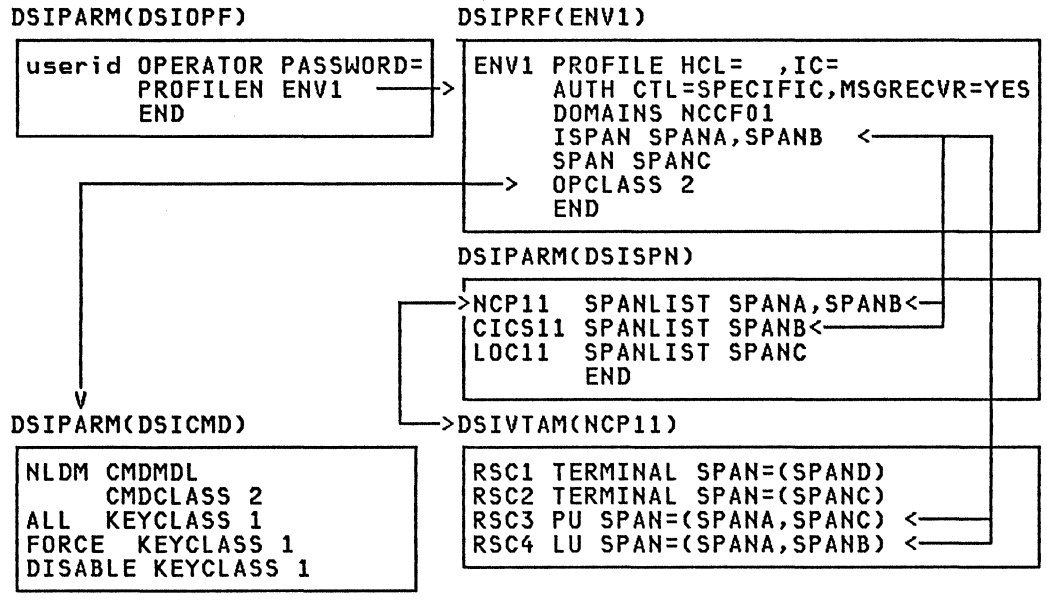


Figure 20. LOGON DEFINITION STATEMENTS

CHAPTER 6. PERFORMANCE CONSIDERATIONS

The two main areas that require performance evaluation for NLDM are:

SESSION TRACE

Session awareness involves one RU from the access method to NLDM per session activation and one per session termination, and therefore is relatively inexpensive during normal processing.

Session data involves the capture in virtual storage of each PIU flowing in the network for each session being traced. The number and size of access method buffers allocated is a tuning consideration of each installation. The recommended values of BUFSIZE, for a given maximum number N of active sessions traced at a time, are:

N	BUFSIZE
< 20	2K min
30	4K
40	5K
50	6K
100	12K
150	18K
200	24K
250	30K
> 250	32K max

The number of buffers built by ACF/VTAM is contained in module ISTRACON. By specifying multiple buffers of a smaller size, the PIU trace can be maintained in a smaller area and with less risk of lost PIU data.

Depending on the network configuration and operating procedures, high NLDM activity may be experienced during network startup or restart and network shutdown. If the system performance is degraded during these periods due to the above factors it may be necessary to turn off, totally or selectively, NLDM trace activity before activating or deactivating the network.

Data recording

NLDM I/O's take place at session end or on demand (FORCE command). It is then necessary to improve VSAM performance when many sessions terminate at the same time. Such a situation can appear at NCP deactivation. The standard VSAM performance recommendations also apply to NLDM data bases:

- keep them separated from heavily used disk files
- define the data and index components separately
- for the data component specify:
 - the space in cylinders with a primary extent large enough to typically not use secondary extents, and with sufficient free space. Monitor them using LISTCAT.
 - the largest CI accepted by the disk type (12288 for 3330, 18432 for 3350)
- for the index component specify:
 - the space in cylinders
 - the CI just large enough to reference one CA of the data component (1024 for 3330 and 4096 for 3350)
 - IMBED and REPLICATE

- use BUFND (number of data buffers) and BUFNI (number of index buffers) in the DD card in the NCCF start procedure (BUFND=DSRBO+1 and BUFNI=DSRBU+25).
- monitor the data base usage by making regular listings of the catalog and interpreting the number of CI or CA splits and the number of deleted records. Use the VSAM REPRO function to compress the data base when these numbers become excessive. As an alternative do it on a scheduled basis, for example whenever you stop NCCF. To improve the repro process use

AMP='BUFND=n,BUFNI=2' (VSAM file)

or

DCB=BUFNO=n (sequential file)

for the source and backup data bases, where n is twice the number of CI on a track

If the NLDM data base is defined reusable (in the DEF CLUSTER statement use REUSE in place of UNIQUE) then the REPRO function can be done during NCCF processing. It is only necessary to stop NLDM operator processing (NLDM END command) on all NLDM terminals and to switch to the alternate NLDM data base.

```

*****
*      NLDM data base reorganization JOB                                *
*      before:                                                         *
*          NLDM END on all NLDM terminals                               *
*          SWITCH AAUTSKLP,S                                           *
*****
//PRTCAT EXEC PGM=IDCAMS
//AAUVSPLP DD DSN=cluster-name,DISP=SHR,AMP=AMORG
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
  VERIFY FILE(AAUVSPLP/userpass)
  LISTC ENTRIES(cluster-name) ALL
/*
//REPRO EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=A
//INPUT DD DSN=cluster-name,DISP=SHR,
// AMP='BUFND=n,BUFNI=2'
//OUTPUT DD DSN=NLDMmdd,UNIT=TAPE,DISP=(NEW,PASS),
// VOL=SER=NLDMmm,DCB=(DEN=3,BUFNO=n),LABEL=(,NL)
//SYSIN DD *
  VERIFY FILE(INPUT)
  REPRO -
    INFILE(INPUT/userpass) -
    OUTFILE(OUTPUT)

/*
//REPRO2 EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=A
//INPUT DD DSN=NLDMmdd,UNIT=TAPE,DISP=OLD,
// VOL=SER=NLDMmm,DCB=(DEN=3,BUFNO=n),LABEL=(,NL)
//OUTPUT DD DSN=cluter-name,DISP=SHR,
// AMP='BUFND=n,BUFNI=2'
//SYSIN DD *
  VERIFY FILE(INPUT)
  REPRO -
    REUSE -
    INFILE(INPUT) -
    OUTFILE(OUTPUT/userpass)

/*
//PRTCAT EXEC PGM=IDCAMS
//AAUVSPLP DD DSN=cluster-name,DISP=SHR,AMP=AMORG
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
  VERIFY FILE(AAUVSPLP/userpass)
  LISTC ENTRIES(cluster-name) ALL
/*

```

APPENDIX A. NLDM STRUCTURE

NLDM consists of a command processor that executes under the control of an NCCF Data Services Task (DST) and a command processor that operates under the control of an NCCF Operator Station Task (OST). There is one OST for each NCCF operator who logs on and, therefore, for each NLDM user. Figure 21 illustrates the general NLDM control flow:

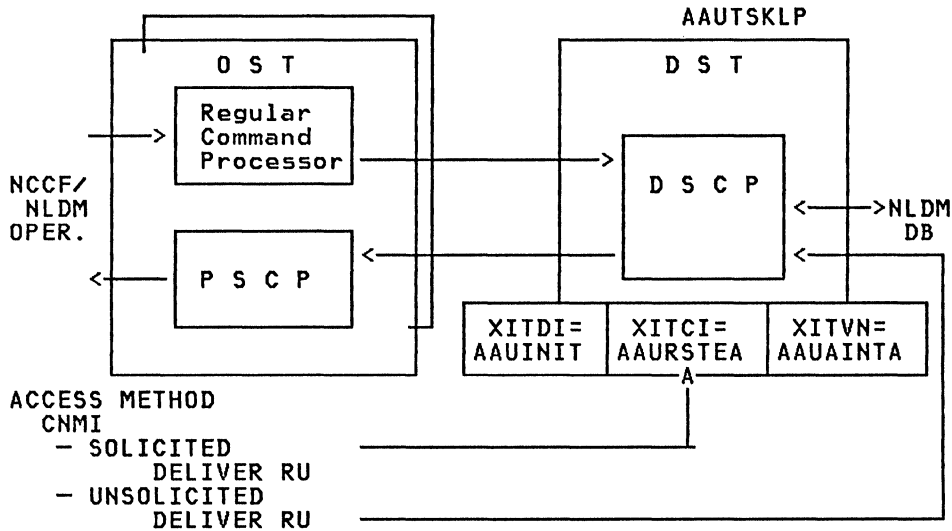


Figure 21. NLDM CONTROL FLOW

AAUTSKLP is an AUTH=CNM application and is designated in the CNM routing table.

- a regular command processor checks command syntax and operands and formats the command for the DSCP.
- the data services command processor (DSCP) executes the command and interacts with the VSAM data base through DSM (for recording, retrieving and updating see "Data Collection" on page 2), with the CNM interface (for sending Forward request RU's and for receiving Deliver request RU's see later in this chapter), or with both. The maximum number of outstanding NLDM requests on CNMI is given by an initialization parameter (MAXSQL). The data to be displayed, read from the NLDM data base, existing in virtual storage or received from NCP, is sent to PSCP.
- the presentation services command processor (PSCP). The PSCP accumulates data in a buffer. When there is no more data or when it has enough data for a full screen, the buffer is sent to PSM to perform the actual display at the user's terminal.
- The XITDI exit is invoked by the DST during initialization, for each card read from the member named as the operand of MEM keyword of the TASK statement.
- The XITCI exit is invoked when an RU is received from the SSCP over the CNMI. Its function is to determine whether the RU is for NLDM or NPDA.
- The XITVN exit is invoked if the DST encounters a VSAM open failure due to an empty data base. Its function is to supply the first record.

NLDM provides the information on a session basis. It collects the session information from two sources (Figure 22 on page 74):

- the access method (VTAM or TCAM)
- the boundary function of NCP

and using two data paths established between NLDM and the access method during the initialization phase:

- the CNM interface
- the LU - LU session between NCCF and ACF/VTAM (introduced by an SPE for NCCF and an SPE for ACF/VTAM see "Programming Requirements" on page 61)

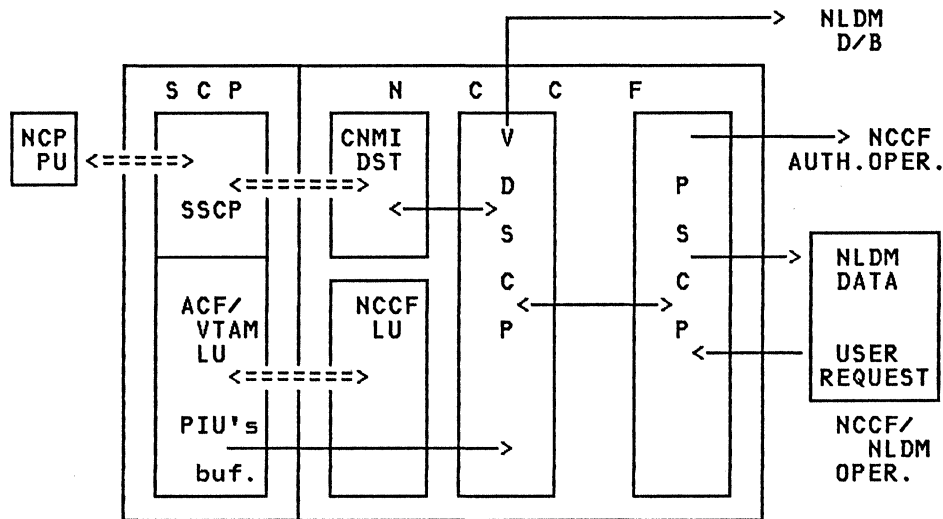


Figure 22. NLDM DESIGN

The CNMI DST is either AAUTSKLP or BNJDSERV (if NPDA is installed)

An application program can use the CNM interface to request and receive data from same-domain PUs. The request or command data is imbedded in a FORWARD RU (REQMS ⁷ with, if a reply is solicited, a procedure-related identifier PRID for request/reply correlation). The data or replies are imbedded in the solicited DELIVER RU (RECFMS with the corresponding PRID) or in an unsolicited DELIVER RU (RECFMS ⁸, RECMS ⁹).

NCCF uses the CNMI, which is a single-thread resource and can be used by only one NCCF DST. If NPDA is installed, it uses the CNM interface and it runs under its own DST (BNJDSERV). To allow the NPDA DST to pass FORWARD/DELIVER RUs between NLDM and CNMI, NLDM provides an exit XITCI for the NPDA DST (XITCI=AAURSTEA).

⁷ REQuest Maintenance Statistics
⁸ RECOrd Formatted Maintenance Statistics
⁹ RECOrd Maintenance Statistics

APPENDIX B. NLDM DATA BASE STRUCTURE

The NLDM data is organized on an NAU name pair basis. All records have the same key structure (54 bytes):

```

    DOMAINID.NLDMID.KEYID.QUAL
    DOMAINID = 8 bytes domain designation
    NLDMID   = X'F5F0'
    KEYID    = 8 bytes
    QUAL     = 36 bytes
  
```

where:

- for KEYID = 'DATA 0 ' MASTER record
the QUAL is

SECname (8)	PRIname (8)	(4)	SECadr (6)	PRIadr (6)	(4)
----------------	----------------	-----	---------------	---------------	-----

There is one master record for each specific NAU name SEC/PRI pair. It is a control record for the wrap area and contains:

- current wrap count (2 bytes)
- current entry in wrap area (4 bytes + 7 bytes reserved)
- date/time when this wrap area was last updated (7 bytes)
- wrap mode indicator (1 byte - bit 0)

Each master record has associated with it a set of SIR records.

- for KEYID = 'DATA 1 ' SIR record
the QUAL is

SECname (8)	PRIname (8)	nn (4)	SECadr (6)	PRIadr (6)	(4)
----------------	----------------	-----------	---------------	---------------	-----

The Session Incidence Record (SIR) is created each time a session terminates. For a specific NAU name pair SEC/PRI, NLDM maintains the number of SIRs and a pointer to the current wrap file entry in the corresponding master record. Using this pointer the data is sequentially inserted in the wrap area until the maximum session keep count is reached. At that time NLDM will set the wrap mode indicator to 'on'. Following this moment, the addition of a new SIR at the end of the wrap area is accompanied with the deletion of the oldest SIR. In this way the number of most recent SIRs is limited to the wrap count in the master record, value which is updated by the command:

```
KEEP nnn SESS name1 name2/ALL
```

The nn value in the SIR record represents the wrap sequence number.

An SIR record contains:

- a session data bit map (8 bytes) to indicate the presence of:
 - bit 0 - PRI configuration
 - bit 1 - SEC configuration
 - bit 2 - session parameters
 - bit 3 - PRI trace data
 - bit 4 - SEC trace data

- session start time (7 bytes)
- session end time (7 bytes) data

Each SIR has associated with it a set of SIDs records.

- for KEYID = 'DATA 2n' SID record
with n equal to the SID record type and QUAL being

SECname (8)	PRIname (8)	nn (4)	SECadr (6)	PRIadr (6)	mm (4)
----------------	----------------	-----------	---------------	---------------	-----------

A Session Incidence Data Record (SID) is created each time a session terminates and represents the data associated with the session. Whenever a SID record is created for a specific SIR the appropriate SID data bit in the SIR is turned on. The number of SIDs depends on which functions the user has activated for the specific session. The value mm represents the data record sequence number.

There are 4 types of SID records:

- session connectivity data record (CON)
At least one of these records will always exist.
- session parameter data record (SPR)
This record only exists if the customer was tracing the session at activation time
- access method PIU trace data (TRA)
This record only exists if the customer was tracing the session
- NCP sequence number trace data (NCP)
This record only exists if the NCP was activated after NLDM initialization and the customer was tracing the session

- for KEYID = 'TIME'
the QUAL is

RES1 name	time	RES2 name	RES1 address	RES2 address
--------------	------	--------------	-----------------	-----------------

There is an entry for each different ordered pair of NAUs. These records provide a correlation between the time and the data for a given NAU (e.g. a time ordered list of all sessions of a given SLU etc.)

- for KEYID = 'XREF '
the QUAL is

PRIname (8)	SECname (8)	20 bytes X'40'
----------------	----------------	----------------

These records provide secondary-indices (inverted NAU name - PRI/SEC - data cross reference key) which are used to form logical relationships (e.g. all SLUs for a given PLU etc.)

DISCARD OVERVIEW

The VTAM PIU DISCARD reason codes can be found in the NLDM trace panels. Any time the VTAM TSC component cannot forward a PIU towards the final destination, a DISCARD trace entry is generated to NLDM. NLDM must be active to VTAM to accept the DISCARD PIU and reason code. TCAM also identifies discard PIUs to NLDM but without any reason code string.

Most of the PIU DISCARDS are really not error conditions and should not be investigated. The SNA protocols allow for PIU scenarios in which PIUs can be discarded without causing any problems in the network. A PIU DISCARD should only be investigated if there is an error symptom such as a hung condition.

A description of the NLDM trace panels can be found in the following manual (NETWORK LOGICAL DATA MANAGER - INSTALLATION AND OPERATION, SC30-3165)

FORMAT OF THE DISCARD ENTRY

< NLDM PIU TITLE HEADER LINE > T
RRRR,ISTTSxmm YY.DDD
(DISCARDED PIU) D

RRRR This is the reason code associated with the VTAM module. The reason code helps identify different discard points and reasons within the same VTAM module.

ISTTSxmm This is the CSECT name of the VTAM module that determined the PIU should be discarded.

IST is the module prefix unique to all VTAM modules

TS this indicates that the module belongs to the TSC component. TSC is the only component in VTAM that sends PIU discards to NLDM.

x is an operating system identifier and may be C or M. Both identifiers are interchangeable for the same module.

mm this identifies the individual module

YY.DDD This is the YEAR and DAY of the year in which the VTAM module was assembled.

D The DISCARDED PIU will always follow the discard reason entry with a "D" under the T column.

All DISCARDS sent to NLDM can be referenced via the following NLDM command:

SESS *DISCARD

This is a special file NLDM has for all discarded PIUs. NLDM will also put the discarded PIU into the associated session trace file whenever possible.

EXAMPLE OF AN NLDM PANEL WITH A VTAM DISCARD ENTRY

This is an actual scenario of an NCP force inactivate from VTAM. NLDM PIU keep count was set at 10 so only the last 10 PIUs are recorded. Hex mode was set off so that we could see the PIUs formatted.

NLDM.PIUT		SPECIFIC SESSION TRACE DATA						PAGE	1				
NAME VTAM		PRIMARY			SECONDARY			DOM	-				
		SA	0000000A	EL	0001	NAME	NI03732	SA	00000003	EL	0000	NC01	
SEL#	GMT	SEQ#	DIR	TYPE	*****	REQ/RESP	HEADER	*****	RULEN	SENS	T		
(1)	16:04:37	0027	S-P	(-)RSP	FMH.OC.ER.....				7	0822			
(2)	16:04:37	000B	S-P	REQMS	FMH.OC.NR.....				62				
(3)	16:04:37	0026	S-P	(-)RSP	FMH.OC.ER.....				7	0822			
(4)	16:04:37	000C	S-P	REQMS	FMH.OC.NR.....				40				
(5)	16:04:38	0023	S-P	(-)RSP	FMH.OC.ER.....				7	8002			
(6)	16:04:38	000D	S-P	REQMS	FMH.OC.NR.....				62				
(7)	16:04:38	0029	S-P	(-)RSP	FMH.OC.ER.....				7	0822			
(8)	16:04:41	0000	S-P	DACTPU	....OC.DR.....				3			
(9)	16:05:32	0001	ISTTSMRO 81.337										
(10)	16:05:32	0000	P-S	(+)RSP	....OC.DR.....				1			D
END OF DATA													
ENTER SEL# OR COMMAND													

In the previous example the discard entry is select #9 and the discard PIU is SEL# 10. Discard code 0001 out of ISTTSMRO says that the virtual route was not active here and the probable cause is post failure traffic purge.

"VARY NET,INACT,ID=NI03732,F" will cause VTAM to DACTPU the NCP and then to INACTIVATE the virtual route without waiting for the DACTPU RESP. The DACTPU we see at SEL# 8 is an internally generated PIU created by VTAM for SON (session outage notification) and simulated to come from the NCP. VTAM will generate SON for all sessions that have not come down yet when the VR becomes inactive. VTAM's response to the DACTPU, SEQ# 10, is then discarded because the virtual route is already inactive. The PIU discard causes no problem here because no one is waiting for the discarded PIU.

VTAM DISCARD CODES MEANINGS

VTAM MODULE	REASON CODE	DISCARD EXPLANATION (PROBABLE CAUSE)
NOTE: x = M OR C in module name		
***** ISTTSxCR is connection point manager receive		
ISTTSxCR	1	The request TSCB is a PRI.DT send/SECONDARY DT.RCV pending reset state. (TIMING ON LU-LU SESSION TRAFFIC)
***** ISTTSxIP is the host INN processor		
ISTTSxIP	1	The route was not available to the destination (POST FAILURE TRAFFIC PURGE)
ISTTSxIP	2	Cannot generate a response (POST FAILURE TRAFFIC PURGE)
***** ISTTSxIS is the inbound session control function interpreter		
ISTTSxIS	1	Discard the Resp when PRI.SESS.SEND is not in a pending active state (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSxIS	2	Discard the Resp when PRI.DT.SEND is not in a pending active state (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSxIS	3	Discard the Resp when PRI.DT.SEND react state (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSxIS	4	Discard the Response when RQR.SEND is not in a pending state (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSxIS	5	Discard the Resp when PRI.SESS.SEND or SEC.SESS.RCV is not in an active state (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSxIS	6	INVALID session control response (SHOULD NOT OCCUR - LU ERROR)
***** ISTTSxIU is the host INN utility processor		
ISTTSxIU	1	Link is not contacted and active (POST FAILURE TRAFFIC PURGE)
ISTTSxIU	2	No INN extension exists on the NCB (POST FAILURE TRAFFIC PURGE)
***** ISTTSxLS is the local 3270 write scheduler		
ISTTSxLS	1	Link not active yet (POST FAILURE TRAFFIC PURGE)
ISTTSxLS	2	Request purged due to following session control request (TIMING ON LU-LU SESSION TRAFFIC)

VTAM MODULE	REASON CODE	DISCARD EXPLANATION (PROBABLE CAUSE)
----------------	----------------	---

NOTE: x = M OR C in module name

***** ISTTSxMB is the migration bind processor		
ISTTSxMB	1	This is not a migration route (SHOULD NOT OCCUR - OR ROUTE HAS BEEN REDEFINED)
ISTTSxMB	2	The ICNCB was not found (POST FAILURE TRAFFIC PURGE)
ISTTSxMB	3	The VR number and the TPN in the TH are both not zero and should be for migration (SHOULD NOT OCCUR VR AND TPN MUST BE 0 FOR MIGR.)
***** ISTTSxNC is the network control function interpreter		
ISTTSxNC	1	Only the initialization complete request is allowed as an inbound request from network control (SHOULD NOT OCCUR - ERROR IN NETWORK)
***** ISTTSxNS is the no session pab processor		
ISTTSxNS	1	No processing was required for this FIDO PIU (TIMING CONSIDERATION WITH BSC 3270)
***** ISTTSxPI is the path control inbound processor		
ISTTSxPI	1	The RU size is exceeded and the PIU is not for session control (LU PROBLEM-THE LU SENT IN A PIU LARGER THAN THE BIND SPECIFIED MAXIMUM)
***** ISTTSxPR is the path control router		
ISTTSxPR	1	Can not generate a Resp for an INN PIU (POST FAILURE TRAFFIC PURGE)
***** ISTTSxQD is the session deactivation request processor		
ISTTSxQD	1	Contention ACTCDRM was discarded due to the arrival of a DACTCDRM RU from the same subarea. (OPERATIONAL - OPERATOR DEACTIVATION OF CDRM FROM ONE HOST AFTER ACTIVATION)
***** ISTTSxQP is the session deactivation processor		
ISTTSxQP	1	ACTCDRM contention purge unnecessary ACTCDRM (OPERATIONAL - CDRM ACTIVATED FROM BOTH HOSTS AT THE SAME TIME)
***** ISTTSxRA is the abend recovery routine		
ISTTSxRA	1	This is not a first in segment PIU (POST FAILURE TRAFFIC PURGE AFTER APPLICATION ABEND)

VTAM MODULE	REASON CODE	DISCARD EXPLANATION (PROBABLE CAUSE)
NOTE: x = M OR C in module name		
***** ISTTSxRI is the virtual route path control inbound routine		
ISTTSxRI	1	The Origin subarea is invalid (SHOULD NOT OCCUR - ADJACENT NCP HAS ERROR)
ISTTSxRI	2	The route is not usable (POST FAILURE TRAFFIC PURGE - ER NOT OPERATIVE)
ISTTSxRI	3	Invalid sequence number (SHOULD NOT OCCUR - LOST DATA OR LU ERROR)
***** ISTTSxRO is the virtual route path control outbound routine		
ISTTSxRO	1	Route not active (POST FAILURE TRAFFIC PURGE)
ISTTSxRO	2	The activation number does not match the VR Activation number (POST FAILURE TRAFFIC PURGE)
***** ISTTSxSA is the segment assembler routine		
ISTTSxSA	1	The beginning of the PIU segment lost (SHOULD NOT OCCUR - NETWORK ERROR)
ISTTSxSA	2	Retransmission of PIU, discard the partial PIU segment, 2 first in segments received (SHOULD NOT OCCUR - CHECK OUT LU)
ISTTSxSA	3	Hot I/O, discard all PIU segments on session. (SHOULD NOT OCCUR - CHECK OUT LU)
***** ISTTSxTS is the boundary function transmission control inbound channel attached SNA 3790,3274		
ISTTSxTS	1	(SSCP,PU).BF.SESS.RCV is not pending active for ACTPU RSP. VTAM was not waiting for ACTPU RSP. (SHOULD NOT OCCUR - OUT OF SYNC ON SSCP-PU SESSION)
ISTTSxTS	2	(SSCP,PU).BF.SESS.RCV is not pending reset for DACTPU RSP. VTAM was not waiting for DACTPU RSP. (SHOULD NOT OCCUR - OUT OF SYNC ON SSCP-PU SESSION)
ISTTSxTS	3	(SSCP,SLU).BF.SESS.RCV is not pending active for ACTLU RSP. VTAM was not waiting for ACTLU RSP. (SHOULD NOT OCCUR - OUT OF SYNC ON SSCP-LU SESSION)
ISTTSxTS	4	(SSCP,SLU).BF.SESS.RCV is not pending reset for DACTLU RSP. VTAM was not waiting for DACTLU RSP. (SHOULD NOT OCCUR - OUT OF SYNC ON SSCP-LU SESSION)
ISTTSxTS	5	(PLU,SLU).BF.SESS.RCV is not pending active for BIND RSP. VTAM was not waiting for BIND RSP. (TIMING BETWEEN SSCP SESSIONS AND LU-LU SESSION, SSCP SESSION RESET DURING LU SESSION BRINGUP)
ISTTSxTS	6	(PLU,SLU).BF.SESS.RCV is not pending reset for UNBIND RSP. VTAM was not waiting for UNBIND RSP. (TIMING BETWEEN SSCP SESSIONS AND LU-LU SESSION, SSCP SESSION RESET DURING LU SESSION TAKEDOWN)

VTAM MODULE	REASON CODE	DISCARD EXPLANATION (PROBABLE CAUSE)
NOTE: x = M OR C in module name		
*****	ISTTSxWS	is the communications controller/cluster controller write scheduler
ISTTSxWS	1	The channel-link has not been contacted. (POST FAILURE TRAFFIC PURGE)
*****	ISTTSxXS	is the CTCA write scheduler
ISTTSxXS	1	The channel-link is not in contacted/active state (POST FAILURE TRAFFIC PURGE)
*****	ISTTSx3R	the 3270 virtual pu/lu transmission control outbound channel attached non-sna 3270
ISTTSx3R	1	DT.RCV is not active (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSx3R	2	Session is being reset (TIMING ON LU-LU SESSION TRAFFIC)
*****	ISTTSx3S	the 3270 virtual pu/lu transmission control inbound channel attached non-sna 3270
ISTTSx3S	1	No session active or react and session not active (TIMING ON LU-LU SESSION TRAFFIC)
ISTTSx3S	2	(SSCP,PU).SEC.SESSION.RCV is not pending active for ACTPU RESP. VTAM was not waiting for ACTPU RSP. (SHOULD NOT OCCUR - OUT OF SYNC ON SSCP-PU SESSION)
ISTTSx3S	3	(SSCP,PU).SEC.SESSION.RCV is not pending reset for DACTPU RESP. VTAM was not waitin for DACTPU rsp. (SHOULD NOT OCCUR - OUT OF SYNC ON SSCP-PU SESSION)
ISTTSx3S	4	(SSCP,SLU).SEC.SESSION.RCV is not pending active for ACTLU RESP. VTAM was not waiting for ACTLU RSP. (TIMING BETWEEN SSCP-PU AND SSCP-LU SESSIONS)
ISTTSx3S	5	(SSCP,SLU).SEC.SESSION.RCV is not pending reset for DACTLU RESP (TIMING BETWEEN SSCP-PU AND SSCP-LU SESSIONS)
ISTTSx3S	6	(PLU,SLU).SEC.SESSION.RCV is not pending active for BIND RESP. VTAM was not waiting for BIND rsp. (TIMING BETWEEN SSCP SESSIONS AND LU-LU SESSION, SSCP SESSION RESET DURING LU-LU SESSION BRINGUP)
ISTTSx3S	7	(PLU,SLU).SEC.SESSION.RCV is not pending reset for UNBIND RESP. VTAM was not waiting for UNBIND rsp. (TIMING BETWEEN SSCP SESSIONS AND LU-LU SESSION, SSCP SESSION RESET DURING LU-LU SESSION TAKEDOWN)
ISTTSx3S	8	DATATRAFFIC_RCV is not active form FM DATA PIU (TIMING ON LU-LU SESSION TRAFFIC)

COMMON PROBABLE CAUSE

COMMON PROBABLE CAUSES	EXPLANATION OF PROBABLE CAUSES
TIMING ON LU-LU SESSION TRAFFIC	This can occur on the session between the application and the SLU. It is usually due to some type of reset function from the application. For example a CLEAR or a BIND can cause this condition. There are usually no problems caused with this type of discard.
TIMING BETWEEN SSCP SESSIONS AND LU-LU SESSION	This discard usually occurs when a reset of the SSCP-PU or SSCP-LU effects a pending session initiation or termination of the LU-LU session. For example : If the application issues a CLSDST to the LU, VTAM will send out an UNBIND to the LU. If the SSCP-LU fails before the UNBIND response comes back, then the UNBIND response will be discarded. There are usually no problems caused with this type of discard.
TIMING BETWEEN SSCP-PU AND SSCP-LU SESSION	This discard usually occurs when a reset of the SSCP-PU session effects a pending session initiation or termination of the SSCP-LU session. For example: If the operator inactivates the LU, VTAM will then send out a DACTLU to the LU. If the SSCP-PU session fails before the DACTLU response comes back, then the DACTLU response will be discarded. There are usually no problems caused by this type of discard

COMMON PROBABLE CAUSES

EXPLANATION OF PROBABLE CAUSES

POST FAILURE TRAFFIC PURGE

This discard is caused after a network failure is initiated. any PIU traffic trickling in after the network failure but before the session is brought down can be purged in this way.
For example: after a channel I/O error and before the channel goes inactive, PIUs that continue to queue up outbound over the channel can be discarded for this reason. There are usually no problems caused with this type of discard.

SHOULD NOT OCCUR

This type of discard reason implies that there may be a hardware or a software error in the network. This discard is usually set after a major SNA protocol violation. For example : If VTAM is waiting for a sequence number of 0008 but gets a PIU with sequence number of 0010, PIUs 0008 and 0009 are missing. The two missing PIUs could have been lost anywhere in the session path or maybe they were never sent. The LU,PU,LINE,NCP,CHANNEL and VTAM are all suspects in this example.

Further investigation is usually required to determine where the problem is in the network. The type of documentation needed to resolve a problem identified by this discard code will vary depending on the session type and the reason code.

* * *

APPENDIX D. SAMPLE INITIALIZATION CLIST

The name of the CLIST to be executed at NCCF initialization is indicated in the DSIDMN member of the DSIPARM library

NCCFIC IC=NLDMCLST

The CLIST itself is a member of the DSICLD library.

```
*****
*      NLDM initialization CLISTS      *
*  allow NLDM initialization before commands are issued  *
*****
```

```
./ ADD LIST=ALL,NAME=NLDMCLST
CLIST
&CONTROL ERR
EVERY 2,PPT,ID=TIMER1,NLDMTIME
&EXIT
```

```
./ ADD LIST=ALL,NAME=NLDMTIME
CLIST
&CONTROL ERR
NLDMCMDS
PURGE TIMER=TIMER1,OP=PPT
&EXIT
```

```
./ ADD LIST=ALL,NAME=NLDMCMDS
CLIST
&CONTROL ERR
&BEGWRITE -VTAM
  VTAM commands to activate the network after NLDM initialization
-VTAM
V NET,ACT,ID=name
&BEGWRITE -NLDM
  NLDM commands to deactivate the NLDM trace and change the KEEPPSES
  or KEEPPIU values for some sessions
-NLDM
TRACE STOP name|ALL
KEEP n SESS name1 <name2|ALL>
KEEP n PIUS name1 <name2|ALL>
KEEP m SESS *DISCARD
KEEP m PIUS *DISCARD
&EXIT
```


APPENDIX E. RELATED PUBLICATIONS

NLDM PUBLICATIONS

NLDM GENERAL INFORMATION, GC30-3081
NLDM INSTALLATION AND OPERATION, SC30-3165
NLDM DIAGNOSIS, SC30-3166
NLDM LICENSED PROGRAM SPECIFICATIONS, GC30-9555

RALEIGH INTERNATIONAL SYSTEMS CENTER TECHNICAL PAPERS

CNM/CUSTOMIZING NCCF, GG24-1554
CNM/NCCF TERMINAL ACCESS FACILITY, GG24-1540
CNM/USING INFO-MANAGEMENT, GG24-1546
CNM/USING THE CNM-TOOLS, GG24-1561
CNM/MANAGING INTERCONNECTED SYSTEMS, GG24-1539
ADVANCED COMMUNICATIONS FUNCTION PRIMER, GA24-1547
ACF/SNA SYSTEM PROBLEM DETERMINATION GUIDE VOL1, GG24-1514
ACF/SNA SYSTEM PROBLEM DETERMINATION GUIDE VOL2, GG24-1523

APPENDIX F. DEFINITIONS

AUTHORIZATION MESSAGE. An NCCF message that is directed to an authorized operator such as successful logon, logon rejected because of an invalid password, a DSM error message, logoff etc.

AUTHORIZED OPERATOR. In NCCF, an operator who has been authorized to receive undeliverable messages, authorization messages and lost terminal messages. Authorization is specified on the AUTH statement (MSGRECVR operand) during NCCF definition.

COMMAND. A request from a terminal to execute an operation or a particular program. A command may be entered from a terminal by operator, or generated from a command list, or implied in a receive message, or issued by a command processor.

COMMAND PROCESSOR. A program executed to perform an operation specified by a command.

CNM. Communication network management. The process of designing, installing, operating and managing the distribution of information and control among end users of communication systems.

COMMUNICATION NETWORK MANAGEMENT APPLICATION. An ACF/VTAM application program that is authorized to issue formatted management services request units containing physical-unit-related request and to receive formatted management services request units containing information from physical units. An example is NCCF with associated processors.

CNMI. Communication network management interface. The interface provided to application programs by the access method to acquire information from or to send information to physical units in session with the SSCP. The application may send Forward request units (RUs) to the SSCP which send them to the PU and receive Deliver request units (RUs) from the SSCP which have been send by the PU.

COMMUNICATION NETWORK MANAGEMENT PROCESSOR. A command processor that manages one of the functions of a communication network management application. It is executed under the control of NCCF and requires NCCF as a prerequisite program.

CTC. Channel to channel attachment.

DSCP. Data services command processor. An NCCF component that structures the request for recording and retrieving data to the data base, performs requested data base maintenance services and also structures the request to solicit data from a network device.

DST. Data services task. The NCCF subtask that provides support to gather, record and manage data in a VSAM file that contains communication network management information.

DSM. Data services manager. A function in NCCF that provides the interface between DSCP's and the CNM interface and/or VSAM services for data storage and retrieval.

FID. Format identification field. A field in the transmission header, TH, that indicates its format, that is, the presence or absence of certain fields. TH format differ in accordance with the types of nodes between which they pass. There are six FID types:

- FID0 for traffic involving non-SNA devices
- FID1 for traffic between adjacent subarea nodes when either or both do not support explicit route and virtual route protocols
- FID2 for traffic between a subarea node and an adjacent PU type 2 node
- FID3 for traffic between a subarea node and an adjacent PU type 1 node
- FID4 for traffic between adjacent subarea nodes when both support explicit route and virtual route protocols

- FIDF for certain commands sent between adjacent subarea nodes when both support explicit route and virtual route protocols (e.g. for transmission group control)

INFO/MANAGEMENT. A component of INFO/SYSTEM consisting of transactions which help an operator to enter data into the INFO/MANAGEMENT data base concerning problem, change and configuration management.

NCCF. Network communication control facility. A program consisting of a base for communication network management processors that can monitor, control and improve the operation of a data communication network.

NAU. Network addressability unit. In SNA, a logical unit, a physical unit or a system services control point. It is the origin or the destination of information transmitted by a path control network and. Each NAU has a network address.

NPDA. Network problem determination application. A CNM processor that assists the user in identifying communication network problems from a central control point using interactive display techniques. NCCF is a prerequisite.

NTO. Network terminal option. A product that extends the capabilities of the ACF/NCP to support certain non-SNA devices.

OCCF. Operator communication control facility. A program designed to run with MVS or VSE, and NCCF. It intercepts messages from MVS or VSE and application programs and responds automatically with pre-coded actions. Is implemented as a set of transactions in NCCF.

OST. Operator station task. An NCCF subtask that establishes and maintains the on-line session with the network operator. There is one OST for each network operator who logs on to NCCF.

PSCP. Presentation services command processor. An NCCF component that receives and process user requests and initiates DSCP action or receives user requested data from DSCP, formats it to display and send it through PSM to the user terminal.

PSM. Presentation services manager. A function in NCCF that provides the interface between PSCP's and the user terminal.

SPE. Small program enhancement.

SSCP. System services control point. A NAU that provides configuration, maintenance, management, and session services via sessions with physical units, logical units, and other SSCPs. It also provides services for the network operators who control the configuration.

TAF. Terminal access facility. A feature of NCCF Release 2 that lets NCCF operators interact with screen oriented applications on CICS/VS, IMS/VS, TSO, remote NCCF systems and through HCF with 8100/DPPX.

TARA. Threshold analysis and remote access feature. A NPDA feature that records, analyzes and displays systems management data collected through the CNM/Controller Support of the 3600 System Monitor.

INTERPRETATION OF BIT SETTINGS IN THE RU

BB begin bracket
CD change direction
DR definite response
EB end bracket
ED enciphered data
ER exception response
FC first in chain
FMD function management data
FMH function management header
LC last in chain
MC middle in chain
NR no response
NSH network services header
OC only in chain
PAC pacing
PD padded data
Q queued response

ABBREVIATION OF THE BTU COMMAND

CH SPEED change modem speed
CONT ID contact with return resource identification
CONT NRM contact normal
COPY DEV copy device session information
COPY DST copy destination node
COPY SES copy session initiation information
DISC EOC disconnect with end of call
DISC E&I disconnect with end of call and invite
DISC INV disconnect with invite
DISC NRM disconnect normal
DSP STAT display line status
INV ASRT invite with auto restart
INV BLK invite block

INV DISC invite transmission with disconnect
INV MSG invite message
INV NORM invite normal
INV PERP invite perpetual
INV TRAN invite transmission
LPDA TST LPDA test interrupt
MOD BLK modify block handler set associate
OVER ADD override session address
PHY DISC physical disconnect
RD BLK read block
RD DISC read transmission disconnect
RD INV read with invite
RD MSG read message
RD NORM read normal
RD TRANS read transmission
REP SESS replace session initiation information for a line
RST COND reset conditional
RST CONT request control mode reset
RST DEV reset device queues
RST EOC reset at end of command
RST ERR reset error lock
RST IMMD reset immediate
RST OLTT reset online terminal test
RPL DEV replace device session information
SET ADDR set session address
SET DEST set destination mode
SW BKUP switch to backup
SW PRI switch from backup to primary
TST DEV test device
TST LINE test line
WRT CONT write with contact
WRT DISC write with disconnect

WRT EOM write with end of message
WRT EOT write with end of transmission
WRT INV write with invite
WRT NORM write normal
WRT READ write with read (implied EOT)
WR/C DIS write with contact and disconnect
WR/C EOT write with contact (implied EOT)
WR/C ETX write with contact (implied ETX)
WR/C RD write with contact and read
NCP CONTROL BLOCKS

AXB adapter control block extension
CCB character control block
CUB common physical unit block (SDLC)
DVB device base control block
IOB input output block
LCB line control block
LKB line control block (SDLC)
LUB logical unit control block
LXB link XIO control block (SDLC)
PSB SSCP-NCP physical services block
SNP SSCP-NCP session control block, one for each concurrent session

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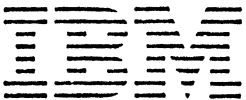
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