Communication Products
and
CDCNET Installation
by
Hans Pederson
Supplements
H₂O
Open System Interconnection (OSI) communication

International Standard Organization Reference Model (ISORM) in both hosts
ISORM
International Standards Organization Reference Model

OSI Layers

7 6 5 4 3 2 1

FOREIGN HOST

NETWORK

OSI Layers

7 6 5 4 3 2 1

CYBER
APPLICATION LAYER (7)

Provides system - independent application services such as the following

- FTAM  (File Transfer Access and Management)
- MOTIS (Message Oriented Text Interchange System)
- JTM   (Job Transfer and Manipulation)
- VT    (Virtual Terminal)
FTAM – File Transfer Access and Management

PDU – Protocol Data Unit acts as a message exchange between peer (file) layer. It is made up of control information.
APPLICATION LAYER (7)

USER

END - SYSTEM

APPL. AGENT
APPL. LAYER
TERMINAL INTERFACE AGENT
VT

APPL. AGENT
APPL. LAYER
PACKAGE INTERFACE AGENT
VT

SERVICE PROVIDER
(lower layers)

PDU (message)

VIRTUAL TERMINAL (VT)

Presents to an END - SYSTEM a single terminal type and maps the characteristics of this Virtual Terminal to the real terminal involved.
Job Transfer and Manipulation (JTM) is associated with job submission to remote computer systems.
Job Transfer and Manipulation (JTM) is associated with job status, control, and output routing.
The PRESENTATION layer deals with information representation such as code translation.
SESSION Layer provides data transfer, control and management services to enhance the reliable end-to-end transfer service provided by the layer below (transport).
The Transport layer ensures a reliable end-to-end data transmission capability.
TRANSPORT LAYER (4)

The intermediate system has two ‘staks’ of entities of the lower 3 layers each reflecting the nature of the subnet it represents.

TRANSPORT PDU
end to end data transmission

Cooperating end systems on different sub-networks
A REPEATER is a network device that extends the ETHERNET beyond one 500 Meter length of segment cable. It acts as a signal amplifier. Repeaters function only at the PHYSICAL layer.
BRIDGES interconnect two networks using the same protocol, the same kind of transmission methods, and the same addressing structure. BRIDGES function at the DATA LINK layer.
In the BRIDGE DI the XNS and the OSI protocol stack can run concurrently. The CDCNET SESSION can use either the Generic Transport or the OSI Transport via the Common Transport Interface (CTI). Such a bridge supports to either XNS or OSI system. However, the bridge system does not allow a
CONFIGURATION
CDCNET Configuration

This file defines the network and is executed whenever the network is activated. This file can be manipulated via the following commands:

- `GET_CDCNETPROCEDURE (GETCP)`
- `ATTACH_CONFIGURATION_FILE (ATTCF)`
- `REPLACE_CDCNETPROCEDURE (REPCP)`
- `DEFINE_CONFIGURATION_FILE (DEFCF)`
- `REPLACE_CONFIGURATION_FILE (REFCF)`

To use the above commands you must add them to your command list by entering `CRECLE $SYSTEM.CDCNET.VERSION_INDEPENDENT.COMMAND_LIBRARY`
GET_CDCNET_PROCEDURE
ATTACH_CONFIGURATION_FILE
(GETTCP, ATTTCF)

GET_CDCNET_PROCEDURE  F=DI_CONF  PT=SC  PN=2000E8(16)
(Specific for DI)

Gets a configuration file or procedure library in the
$SYSTEM.CDCNET.SITE_CONTROLLED catalog.
GETTCP has an alias named ATTTCF.
REPLACE_CDCNET_PROCEDURE (REPCP)

REPCP replaces the procedure in the appropriate procedure library in $SYSTEM.CDCNET.SITE_CONTROLLED catalog. The aliases to REPCP are DEFINE_CONFIGURATION_FILE (DEFCF) and REPLACE_CONFIGURATION_FILE (REPCF).
GET_CDCNET_PROCEDURE
ATTACH_CONFIGURATION_FILE
(GETTCP, ATTTCF)

GET_CDCNET_PROCEDURE F=DI_CONF PT=SC PN=ALL

Gets a configuration file or procedure library in the $SYSTEM.CDCNET.SITE_CONTROLLED catalog.
GETTCP has an alias named ATTTCF.
DEFINING CHANNELS

The DEFINE_VE_INTERFACE command is used to define the channel connection of the DI.

DEFVI INTERFACE_SLOT=7 INTERFACE_NAME=$MCI_7 NETWORK_ID=1

This command defines the MCI board to be in slot location 7.
The logical name of this board is $MCI_7 and the NETWORK_ID is 1.
DEFINING the ETHERNET

DEFET command prepares an ethernet cable to serve as a CDCNET trunk. It gives a logical name to the Ethernet logic card and defines its slot.

DEFEN configures a CDCNET network solution using a previously defined Ethernet trunk.

```
DEFINE ETHER_TRUNK SLOT=5 TRUNK_NAME=$ESCI_5
DEFINE ETHER_NET TN=$ESCI_5 NETWORK_ID=2 COST=0A(16)
```

The two commands above define the ethernet connection in the DI.
The ethernet logic card is in slot 5 and the logical name of that card is $ESCI_5. This ethernet card has a unique network id of 2 and the cost of its traffic has been set to 0A(16).
The cost is calculated by the following formula:
\[
\text{cost} = \frac{100000000}{\text{transfer rate in bits per second}}
\]
\[
\text{cost} = \frac{100000000}{10000000} \text{ (for the ethernet)}
\]
\[
\text{cost} = 10(10) - 02(18)
\]
The load source switch on the MPB board defines over which slot (board) the DI software will be loaded into the memory (PMM, SMM).
The load source switch on the MPB board defines over which slot (board) the DI software will be loaded into the memory (PMM, SMM).
DI BOOT

BOOT file in
$SYSTEM.CDCNET.VERSION_xxxx DI_OBJECT

CIM SWITCH
0 1
enable boot from CIM

LIM number for secondary boot source
port number
LIM number for primary boot source

LOAD SOURCE SWITCH=7
(load over slot 7)
MCI board

2000E8
01234567
MPSS PMMM BMMM
EC SCMI
DI loaded and running

HDLC CONNECTION

PORT 0

The load source switch on the MPB board defines over which slot (board) the DI software will be loaded into the memory (PMM,SMM)
The `DEFINE_LINE` command defines the logical name, physical hardware address, the name of the TIP that serves the line, the physical line attributes, and connection timeout values of a single communication line or URI parallel interface line.
The DEFINE_LINE command defines the logical name, physical hardware address, the name of the TIP that serves the line, the physical line attributes, and connection timeout values of a single communication line or URI parallel interface line.
The `DEFINE_LINE` command defines the logical name, physical hardware address, the name of the TIP that serves the line, the physical line attributes, and connection timeout values of a single communication line or URI parallel interface line.
The LOAD_MODULE command causes the TIP to be loaded into the DI memory during the Load Process.
The DEFINE_TIP command defines the software that resides in a TDI that enables Terminals/Workstations that employ specific terminal protocols (such as ASYNC,HASP,IBM3270) to communicate in CDCNET networks.

```
DEFINE_TIP TIP_NAME=ASYNCTIP TUP=XXX
```

If a TIP is not loaded as part of the DI load process, the first terminal user is likely to encounter a long delay (up to a minute) before the terminal is recognized. To avoid the delay include a load_module command for each TIP configured in a DI.
Physical layer bits

Try to decode the HDLC Frame and the Packet in the bottom example.
**X.25 LAYERS**

HDLC - LAPB (DATA LINK LAYER)

X.25 PACKET (NETWORK LAYER)

CYBER

NETWORK
DATA LINK
PHYSICAL
An X.25 Gateway links CDCNET to networks that do not use CDCNET’s protocols. A GATEWAY acts as a protocol translator between CDCNET’s CDNA protocols and X.25 protocols for support of Application to Application connections.
X.25 INTERFACE
ASYNCHRONOUS TIP

The X.25 asynchronous TIP allows asynchronous terminals connected to an X.25 PAD Concentrator to access CDCNET.

A Terminal Interface Program (TIP) is software that resides in a DI and enables terminals that employ specific terminal protocols (async, HASP, 3270) to communicate in CDCNET networks.
Notice that both hosts are talking to the network with different protocols, one in OSI the other in TCP/IP. Both CYBER and CYBER 910 can't understand the other.
DOD comparison to OSI

DOD MODEL
- PROCESS
- HOST to HOST
- TCP
- INTERNET (IP)
- NETWORK ACCESS

OSI MODEL
- APPLICATION
- PRESENTATION
- SESSION
- TRANSPORT
- NETWORK
- DATA LINK
- PHYSICAL
TCP/IP to CYBER

By having defined a TCP/IP GATEWAY the CYBER understands both the TCP/IP and OSI protocol. A GATEWAY is a software interface between systems with different protocols. The TCP/IP interface software is contained in a TCP/IP GATEWAY.
The TCP/IP GATEWAY DI acts as a protocol translator. It translates TCP/IP protocol to OSI protocol. The connections may be over ETHERNET or X.25.
The DOD standard is utilized by both hosts. This standard is often called TCP/IP which stands for Transmission Control Protocol and Internet Protocol.
Department of Defense (DOD) Military Standard Protocol

Diagram:

- Layer 4: Application
- Layer 3: TCP
- Layer 2: IP
- Layer 1: Network

Network connection between two devices labeled CY 910.
The DOD (TCP/IP) model uses 4 layers instead of 7 layers which are used in the OSI model.
The PROCESS or APPLICATION layer contains the following:

- FTP  a simple application to transfer ASCII, EBCDIC, and binary files
- SMTP a simple electronic mail facility
- TELNET a simple scroll – mode terminal capability
DOD LAYERS

PROCESS LAYER
FTP SMTP TELNET

HOST to HOST LAYER
TCP

INTERNET LAYER
IP

NETWORK ACCESS LAYER

The HOST to HOST LAYER (TCP) provides a reliable end-to-end data transfer service. It ensures that data is delivered error free, in sequence, with no loss or duplication.
**DOD LAYERS**

**PROCESS LAYER**
FTP SMTP TELNET

**HOST to HOST LAYER**
TCP

**INTERNET LAYER**
IP

**NETWORK ACCESS LAYER**

Provides a connectionless service for end systems to communicate across one or more networks. Does not assume the network to be reliable.
The NETWORK ACCESS LAYER is concerned with routing data between two devices attached to the same network. The sending host must provide the network with the address of the destination host, so that the network may route the data appropriately. INTERNET LAYER is used to provide the routing function across multiple networks.
APPLICATION PORTS

Each application (process) within the host must have an address that is unique within the host; this allows the HOST to HOST protocol (TCP) to deliver data to the proper process (application).
GLOBAL NETWORK ADDRESS

Each host on the network has a unique global network address; this allows the data to be delivered to the proper host. Actually, two levels of addressing are needed. A unique GLOBAL ADDRESS and a PORT ADDRESS.
User data and protocol control information

PDU (Protocol Data Unit) acts as a message exchange between peer (like) layer. It contains the header and the data.
User data and protocol control information

TELNET, FTP, SMTP

USER DATA

TCP

TCP SEGMENTS

IP

IP DATAGRAMS

PH

PACKETS

TCP DESTINATION PORT, SEQUENCE NUMBER, CHECKSUM

IP SOURCE and DESTINATION adr., DATA LENGTH ect.

PH DESTINATION SUBNETWORK adr. ect.
DOD protocol interfaces

other applications

FTP
SMTP
TELNET

TCP
IP

NETWORK ACCESS
TCP is connection oriented to support reliable data transfer. FTP, SMTP, TELNET make all use of TCP, thus they are connection-oriented.
FTP is used to support immediate (real time) file movement. The initiator of the transfer can either be human or a computer program. The initiator must wait until the file transfer is complete before proceeding with other activities.
FTP is used to support immediate (real time) file movement. The initiator of the transfer can either be human or a computer program. The initiator must wait until the file transfer is complete before proceeding with other activities.
A CDCNET user TELNET connection connects a CDCNET terminal to a Server TELNET host (910). The CREATE_CONNECTION command initiates a User TELNET connection. You specify the title of a Server TELNET host or a User TELNET gateway and an internet address with the service_data parameter on this command.
File Transfer Protocol (FTP)
CYBER to 910

FTP provides file transfer capabilities to and from connected TCP/IP hosts. To access the FTP Client, use the CREATE_CLIENT_FTP_CONNECTION utility, which provides about 35 subcommands.
File Transfer Protocol (FTP)

910 to CYBER

FTP SERVER

CY 910

FTP CLIENT

GET FILE C D

CRE FC or FTP

ETHERNET

CYBER
Network File System (NFS)

NFS is an interface software that allows a variety of machines and operating systems to share files. It enables workstations and PC’s, called CLIENT systems, to access portions of the NOS/VE file system through CDCNET. It allows working with files without copying them like PTF.
Network File System (NFS)

EXPORT - makes a file available to the CLIENT (910) via a MOUNT command issued on the CLIENT.

MOUNT - The MOUNT command attaches the file into the local file system at a specific mount point. A Mount Point is a directory that has been created to receive an exported file system. These files can then be used like any other...
Define INETD and the SERVICES that INETD controls. It contains two commands.

**DEFINE_INETD** - defines the INETD applications
**DEFINE_SERVICES** - creates an entry for each service that INETD controls
Network File System (NFS)

CYBER

NFS

SERVER

TCP/IP GATEWAY

CLIENT

MASS STORAGE

EXPORT

ETHERNET

MOUNT CYBER1: /TRAINING/PEDERSON/TEXT /USR/MOUNTPT

name of
SERVER
NOS/VE host

NOS/VE family

NOS/VE user catalog

NOS/VE sub cat.

mount point
the directory
which receives
the exported files

user name
MANTA monitors and controls INETD and the SERVERS via the manta files which have been defined in the configuration.

INETD monitors for TCP connections and UDP packets which will be taken care of in the server tasks.
**TCP/IP HOST FILE**

$SYSTEM.TCP_IP.HOSTS

<table>
<thead>
<tr>
<th>INTERNET ADDRESS</th>
<th>SYSTEM NAME</th>
<th>LOCAL HOSTS</th>
<th>ALIASES</th>
<th># COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>185.9.1.20</td>
<td>ARH930</td>
<td>HOST</td>
<td>A01</td>
<td>NOS/VE 930</td>
</tr>
<tr>
<td>185.8.3.2</td>
<td>ARHSUN</td>
<td>SUN160</td>
<td>SUN</td>
<td>SUN_3</td>
</tr>
<tr>
<td>185.0.5.10</td>
<td>CYB910</td>
<td>910</td>
<td>C910</td>
<td>910 WRKST.</td>
</tr>
</tbody>
</table>

Contains the mapping between the Internet Address and the names and aliases of the hosts on the network. This file exists on all hosts on the network. When a user references a host by name, the underlying application uses this file to translate the host name into an Internet Address.
**TCP/IP SERVICES FILE**

$SYSTEM.TCP_IP.SERVICES

<table>
<thead>
<tr>
<th>OFFICIAL SERVICE NAME</th>
<th>PORT NR. / PROTOCOL NAME</th>
<th>ALIASES</th>
<th># COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP</td>
<td>21/TCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TELNET</td>
<td>23/TCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TFTTP</td>
<td>69/UDP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contains information regarding the known SERVICES in the INTERNET.
DATEX - P Net

DATEX - P Net of the German POST Office
the Dark Cloud

DTE - Data Terminal Equipment
DATEX-P History

DATEX-P Phase I
April 1979 start of DATEX-P
August 1979 decision to use SL 10 processors from (Northern Telecom)
June 1980 Installation accepted by German Post Office
August 8, 1980 open to the users (trial)

DATEX-P Net Status August 1985
17 Data Switching Computer Centers
88 National Lines (64000 bit) connecting Data Switching Computer Centers
Connections to 45 Countries
14700 DTE Addresses
User growth 4% per month
60000 DTE Addresses predicted by 1990
SL 10 processors can support up to 30000 DTE Addresses

DATEX-P Phase II
New more powerful processors from SIEMENS
10000 DTE connection instead of 600
30000 Packets/sec instead of 1000
600 calls/sec instead of 40
2.048 Mega bit/sec connections between Data Switching Computer Center
instead of 64000 bit/sec

TIME TABLE FOR PHASE II
January 1985 Phase II bidding opened
December 1985 decision for 2 test systems from SIEMENS
January 1989 Installation of SIEMENS processors
Datex-P Connections

Frankfurt
Offenbach

4800 bit/sec

4800 bit/sec

4800 bit/sec

4800 bit/sec

34000 bit/sec

34000 bit/sec

34000 bit/sec

34000 bit/sec

Reprent a Data Switching Computer Center of the German Post Office using 64 10 Processor.
This represents Datex-P Phase I.

Luebeck
Hamburg
Munich
Schliersee

2400 bit/sec

4800 bit/sec
Datex-P Connections

- Hamburg
  - Luebeck: 2400 bit/sec
  - Frankfurt: 4800 bit/sec
  - Offenbach: 4800 bit/sec

- Frankfurt
  - Muenchen: 2048 Kbit/sec
  - 2 Kbit/sec

- Schliersee

- LENGGRIES

Note: Represents a Data Switching Computer Center. SIEMENS processors are used for increased performance.
Phase I to Phase II communication

Phase I

SIEMENS NET

PHASE II

GATEWAY

DATEX - P

X.75

GATEWAY

NORTHERN TELECOM NET
An X.25 NETWORK SOLUTION links one CDCNET network to another CDCNET network. To operate as a network solution, both ends of the network must use CDNA protocols.
An X.25 gateway links CDCNET to networks that do not use CDCNET's protocols. A GATEWAY acts as a protocol translator between CDCNET's CIN Poocols and X.25 protocols for support of Application connections.
X.25 config. commands

PROC_SYSTEM_080025200190
DEFINE_SYSTEM SYSTEM_NAME=TDIX25
DEFINE_TIP TIP_NAME=ASYNCTIP
LOAD_MODULE M=ASYNCTIP_MODULE
LOAD_MODULE M=X25ASYNCTIP_MODULE

DEFINE_X25_TRUNK LIM=2 PORT=2 TRUNK_NAME=X25_A MODE=DCE
CLOCKING=EXTERNAL PF_RECOVERY_TIMER=4000 RETRANSMISSION_LISTING=10
MAX_UNACK_FRAMES=7 TRUNK_SPEED=9600

DEFINE_X25_INTERFACE TN=X25_A PUBLIC_DATA_NETWORK=TELENET
TWOWAY RANGE=1..16

DEFINE_X25ASYNCTIP TRUNK_NAME=X25_A TDP=HFD_WDS

DEFINE_X25_GW GATEWAY_NAME=HFD_WDS_GW TRUNK_NAME=X25_A
VE_OUTCALL_TITLE=WDSPAD START=TRUE
**X.25 config. commands**

```plaintext
PROC SYSTEM_080025200190
DEFINE_SYSTEM SYSTEM_NAME=TDIX25
DEFINE_TIP TIP_NAME=ASYNCTIP
LOAD_MODULE M=ASYNCTIP_MODULE
LOAD_MODULE M=X25ASYNCTIP_MODULE

DEFINE_X25_TRUNK LIM=2 PORT=3 TRUNK_NAME=DATEX_P MODE=DTE..
CLOCKING=EXTERNAL PF_RECOVERY_TIMER=4000 RETRANSMISSION_LIMIT=10..
TRUNK_SPEED=9600 MAX_UNPACK_FRAMES=7

DEFINE_X25_INTERFACE TN=DATEX_P PUBLIC_DATA_NETWORK=TELENET..
TWO_WAY_RANGE=1..10

DEFINE_X25ASYNCTIP TN=DATEX_P TDP=DTXP_NO_USER_DATA..
PROCEDURE_FILE_OPTION=CALL_DATA_PROCEDURE..
CONNECTION_DISCONNECT_TIMEOUT=4

START=TRUE
```
The X.25 Asynchronous TIP allows asynchronous terminals connected to an PAD over a Public Data Network to access CDCNET

A Terminal Interface Program (TIP) is software that resides in a DI and enables terminals that employ specific terminal protocols (async, HASP, 3270) to communicate in CDCNET networks.
X.25 LAYERS

X.25 PACKET (NETWORK LAYER)

HDLC - LAPB (DATA LINK LAYER)

MODEM

DATA LINK

NETWORK

MODEM

DATA LINK

NETWORK

CYBER

PHYSICAL

PHYSICAL
Layer 1 (Physical) protocol

DATEX-P connection with 48000 bit/sec

The Physical Layer
- is the lowest layer
- is the physical transmission medium
- contains mechanical and electrical definitions
This Layer contains the following:
- recognizes data transfer errors of the lower layer and corrects them
- this error recognition is done via the FCS (Frame Check Sequence)
- adds a destination address (01 = DCE, 03 = DTE)
- control field is used to control the data transfer

FOR EXAMPLE
FCS
0D38FD7BF2C1005024441532657415220535048545A4520210847E012F1B07EC3...
Network Layer contains the following:

- transparent data transfer over the whole connection
- addressing of the receiver
- multiplexing of several logical channels
- flow control for each logical channel

Virtual connection through a logical channel.
X.25 Layer 3 Protocol

VIRTUAL CONNECTION through a LOGICAL CHANNEL

NETWORK
DATA LINK
PHYSICAL

X.25 PACKET (NETWORK LAYER)

X.25 PACKET (NETWORK LAYER)

DATA PACKET
FLAG
FCS

CONTROL
LOGICAL CHANNEL NR

FOR EXAMPLE

0136F7E0C1D005C0443932052415226851C463443201DD47D51B10D3C3...
THINGS TO LOOK FOR:
1. SYSTEM (LOGICAL) NAME AND SYSTEM ADDRESS (SYSTEM ID) CORRELATION
2. PER CENT CPU UTILIZATION SHOULD BE RELATIVELY LOW
3. MEMORY AND BUFFER STATES SHOULD BE GOOD (OTHER STATES ARE: FAIR, POOR, CONGESTED)
4. DATE/TIME OF LAST RELOAD CAN CORRELATE WITH Di DUMPS TO FIND OUT WHY THE Di RELOADED

SAMPLE REPORT:

REPORT DAY: 88/02/09

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>SYSTEM ID</th>
<th>LOG ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>88/02/09</td>
<td>05:55</td>
<td>08002510006D</td>
<td>593</td>
</tr>
</tbody>
</table>

**DI SYSTEM STATUS**
- SYSTEM NAME = AHO_NDI_10060
- SYSTEM ADDRESS = 08002510006D
- BOOT VERSION NUMBER = 4308(16)
- SOFTWARE RELEASE LEVEL = 4308(16)
- NUMBER OF TASKS = 23
- FREE SWM MEMORY = 248988
- PERCENT CPU UTILIZATION = 13
- BUFFER STATE = GOOD
- MEMORY STATE = GOOD
- DATE AND TIME OF LAST RELOAD = 88/02/05 21:22:59

**BUFFER STATUS**
- TYPE TOTAL BUFFERS AVAILABLE BUFFERS BUFFER SIZE
  - DATA 1720 1074 144
  - DESCRIPTOR 566 545 32

**SWM MEMORY STATUS**
- TOTAL MEMORY AVAILABLE MEMORY EXTENTS DELOADABLE MEMORY
  - 1046576 248988 132 56148

**PMB MEMORY STATUS**
- TOTAL MEMORY AVAILABLE MEMORY EXTENTS DELOADABLE MEMORY
  - 191072 24292 5 0

**MPB RAM STATUS**
- TOTAL MEMORY AVAILABLE MEMORY EXTENTS DELOADABLE MEMORY
  - 10384 2060 2 0
- LARGEST SWM MEMORY EXTENT AVAILABLE = 200590
### NPA REPORTS - ETHRRP1

**THINGS TO LOOK FOR:**
1. CHECK THE COLLISIONS COLUMN

**SAMPLE REPORT:**

<table>
<thead>
<tr>
<th>TIME</th>
<th>CS RECEV</th>
<th>255 RECEV</th>
<th>511 RECEV</th>
<th>767 RECEV</th>
<th>9233 XMIT</th>
<th>1033 XMIT</th>
<th>1279 XMIT</th>
<th>1539 XMIT</th>
<th>COLLISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0912</td>
<td>6</td>
<td>2252</td>
<td>52</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1012</td>
<td>6</td>
<td>2196</td>
<td>41</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1212</td>
<td>6</td>
<td>2370</td>
<td>458</td>
<td>63</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1312</td>
<td>6</td>
<td>4509</td>
<td>61</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1412</td>
<td>6</td>
<td>1971</td>
<td>48</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1512</td>
<td>6</td>
<td>4179</td>
<td>34</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### NPA REPORTS - ETHRRP2

**THINGS TO LOOK FOR:**
1. CRC ERRORS - PROBLEMS WITH ESCI, TRANSMITTER, ETHERNET COAX
2. ALIGN. ERRORS - FRAME NOT VALID NUMBER OF OCTETS
3. OVERRUN ERRORS - TOO MANY BUFFER FRAGMENTS IN THE DI's MEMORY
4. RESOURCE ERRORS - NOT ENOUGH MEMORY IN THE DI
5. ABNORMAL LOGIC - SUM OF COLLISIONS + LOST CARRIER SENSE + TRANSMISSION UNDERRUNS (A CODING ERROR) + HARDWARE ERRORS

**SAMPLE REPORT:**

<table>
<thead>
<tr>
<th>ENDING TIME</th>
<th>CS RECEIVED</th>
<th>FRAMES SENT</th>
<th>CRC ERRORS</th>
<th>ALIGN ERRORS</th>
<th>OVERRUN ERRORS</th>
<th>RESOURCE ERRORS</th>
<th>ABNORMAL LOGIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0924</td>
<td>6</td>
<td>13144</td>
<td>14351</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>1024</td>
<td>6</td>
<td>13291</td>
<td>13764</td>
<td>0</td>
<td>27</td>
<td>0</td>
<td>103&gt;</td>
</tr>
<tr>
<td>1224</td>
<td>6</td>
<td>11549</td>
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### NPA REPORTS - EVNTRP3

**THINGS TO LOOK FOR:**

1. FREQUENCY OF ERRORS OF EACH SEVERITY LEVEL. PAY SPECIAL ATTENTION TO "ERROR", "FATAL", AND "CATASTROPHE" COLUMNS.

**SAMPLE REPORT:**

**REPORT DAY: 06/01/01**

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**USE:** EXPLAIN - CHECK LOG MESSAGE

**EXPCLM**

MN = 6.3

**EDIT**

**MESSAGE**
**NPA REPORTS - HDLCRP3**

**THINGS TO LOOK FOR:**
1. CRC ERRORS COLUMN INDICATES EITHER LINES NOISY OR TOO MANY HDLCs ASSIGNED TO ONE CIM BOARD

**SAMPLE REPORT:**

**REPORT DAY: 88/09/05**

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**NPA REPORTS - HRDWRP1**

**THINGS TO LOOK FOR:**
1. HARDWARE RELATED ALARMS LISTED BY DATE AND TIME

**SAMPLE REPORT:**

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<th>SYSTEM ID</th>
<th>LOG ID</th>
<th>SEVERITY</th>
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<td>--ERROR--  WPB FAILED ON-BOARD TESTING BEFORE INITIALIZATION WAS SUCCESSFUL.</td>
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**PC0027**

**HO-68**
THINGS TO LOOK FOR:
1. HARDWARE RELATED ALARMS LISTED BY SEVERITY AND ID

SAMPLE REPORT:
REPORT DAY: 36/01/01

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BEFORE INITIALIZATION WAS SUCCESSFUL.
SLOT NUMBER= 0
FATAL ERRORS= 7

<table>
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<th>DATE</th>
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<th>LOG ID</th>
<th>SEVERITY</th>
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DURING ON-BOARD TESTING.
SLOT NUMBER= 1
ERRORS= 39156
FIRST FAILING ADDRESS= 00010000

NPA REPORTS - HRDWRP3

THINGS TO LOOK FOR:
1. FREQUENCY OF ERRORS OF EACH SEVERITY LEVEL. PAY SPECIAL ATTENTION TO "ERROR", "FATAL", AND "CATASTROPHE" COLUMNS

SAMPLE REPORT:
REPORT DAY: 36/01/01

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TOTALS 19 10 4 5 0 0
# NPA REPORTS - MCISRP3

**THINGS TO LOOK FOR:**
1. CHECK "% BAD" COLUMNS FOR QUICK INDICATION OF PP CHANNEL'S OPERATION

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