CS z/OS Enterprise Extender and SNA

EE and SNA agenda

➢**VTAM and Enterprise Extender display enhancements**

➢**New DISPLAY EEDIAG command**
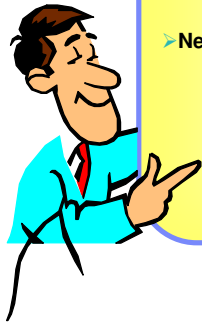
Removal of AnyNet - z/OS V1R7 last release to support AnyNet

➤ **Enterprise Extender, TN3270, and distributed Communications Server Remote API functions are the strategic protocols for SNA/IP integration**

  ∫ AnyNet has not been enhanced in years

➤ **EE is functionally superior, but also significantly outperforms AnyNet by all measures:**

  ∫ AnyNet exhibits lower throughput and higher CPU utilization relative to EE:
  − Interactive workloads
    • Throughput down 39%
    • CPU utilization up 63%
  − Stream workloads
    • Throughput down 89%
    • CPU utilization up 682-1817%

➤ **z/OS V1R7 is the last release of z/OS to include AnyNet as a component of Communications Server**

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VTAM and Enterprise Extender
display enhancements

Display negotiated RU sizes on the D NET,SESSIONS command

➤ **D NET,SESSIONS,SID= sidvalue command enhanced**

⸝ Includes negotiated RUSIZEs for this session

– IST2064I PLU TO SLU RU SIZE = plu_to_slu_rusize   SLU TO PLU RU SIZE = slu_to_plu_rusize

```
D NET,SESSIONS,SID=EAABEEC3E5A79CCB

IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = SESSIONS
IST879I PLU/OLU REAL = NETA.APPL2        ALIAS = ***NA***
IST879I SLU/DLU REAL = NETA.APPL1        ALIAS = ***NA***
IST880I SETUP STATUS = ACTIV
IST933I LOGMODE=INTERACT, COS=*BLANK*
IST1635I PLU HSCB TYPE: FMCB LOCATED AT ADDRESS X'0155F5B8'
IST1635I SLU HSCB TYPE: FMCB LOCATED AT ADDRESS X'0155F720'
IST2064I PLU TO SLU RU SIZE = 65535    SLU TO PLU RU SIZE = 65535
IST1636I PACING STAGE(S) AND VALUES:
IST1637I PLU--STAGE 1--SLU
IST1638I STAGE1: PRIMARY TO SECONDARY DIRECTION - ADAPTIVE
IST1639I        PRIMARY SEND: CURRENT  =    7    NEXT =    8
IST1640I        SECONDARY RECEIVE     = 32767
IST1641I STAGE1: SECONDARY TO PRIMARY DIRECTION - ADAPTIVE
IST1642I        SECONDARY SEND: CURRENT =    7    NEXT =    8
IST1643I        PRIMARY RECEIVE       = 32767
```

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Information on queued work elements returned by the D NET,,HPRDIAG=YES command

➢ **D NET,ID=rtppuname,HPRDIAG=YES command enhanced**

╷ Includes the current and highwater mark for the number of work elements queued for outbound transmission

╷ Includes a time stamp to note when the highwater mark was most recently reached.

–IST2085I NUMBER OF NLPS ON OUTBOUND WORK QUEUE = num_nlps
–IST2086I MAXIMUM NUMBER OF NLPS ON OUTBOUND WORK QUEUE = max_num_nlps
–IST2087I OUTBOUND WORK QUEUE MAX REACHED ON date AT time

Example of HPRDIAG command output

```
D NET,ID=CNR00001,HPRDIAG=YES

IST097I  DISPLAY ACCEPTED
IST075I  NAME = CNR00001, TYPE = PU_T2.1
IST1392I DISCNTIM = 00010 DEFINED AT PU FOR DISCONNECT
 .
IST924I  -----------------------------------------------------------
IST1973I OUTBOUND TRANSMISSION INFORMATION:
IST1974I NUMBER OF NLPS SENT = 12 (0K)
IST1975I TOTAL BYTES SENT = 1823 (1K)
IST1849I LARGEST NLP SENT = 161 BYTES
IST1980I SEQUENCE NUMBER = 372 (X'00000174')
IST1842I NUMBER OF NLPS RETRANSMITTED = 0
IST1976I BYTES RETRANSMITTED = 0 (0K)
IST1478I NUMBER OF UNACKNOWLEDGED BUFFERS = 0
IST1958I NUMBER OF ORPHANED BUFFERS = 0
IST1843I NUMBER OF NLPS ON WAITING-TO-SEND QUEUE = 0
IST1847I NUMBER OF NLPS ON WAITING-FOR-ACKNOWLEDGEMENT QUEUE = 0
IST1977I MAXIMUM NUMBER OF NLPS ON WAITING-FOR-ACK QUEUE = 6
IST1978I WAITING-FOR-ACK QUEUE MAX REACHED ON 01/08/04 AT 13:44:03
IST2085I NUMBER OF NLPS ON OUTBOUND WORK QUEUE = 0                    <----
IST2086I MAXIMUM NUMBER OF NLPS ON OUTBOUND WORK QUEUE = 5
IST2087I OUTBOUND WORK QUEUE MAX REACHED ON 01/08/04 AT 14:03:24
IST1511I MAXIMUM NETWORK LAYER PACKET SIZE = 16410 BYTES
IST924I  -----------------------------------------------------------
 .
```

7

D NET,RTPS enhancements

➢ **D NET RTPS command enhanced to add**

  ⌐ LIST=DETAIL option
  - Default
  - Displays essentially the same information as current display
  - New message IST2084I replaces message IST1454I in the output.
    - Shows number of displayed RTP pipes as well as the number of matching RTP pipes.
    - Shows the total number of RTP pipes that matched the display criteria when the output was truncated due to MAX limitations.
    - IST1454I count RTP(S) DISPLAYED
    - IST2084I count OF total MATCHING RTP PIPES DISPLAYED
  ⌐ LIST=SUMMARY option
  - Provides a summary of the matching RTP pipes.

```
D NET,RTPS,FIRSTCP=NETA.SSCP2A,LIST=SUMMARY
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = RTPS
IST2075I DISPLAY RTPS SUMMARY INFORMATION
IST2076I TOTAL MATCHING PIPES  =       5
IST2077I CPSVCMG PIPES         =       2
IST2078I RSETUP PIPES          =       1
IST2079I LU-LU PIPES           =       2
IST2080I PATH SWITCHING PIPES  =       0
IST2081I CONGESTED PIPES       =       0
IST2082I STALLED PIPES         =       0
IST2083I SESSIONS              =       4
IST314I END
```

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New DISPLAY EEDIAG
command

Display EEDIAG command

➢**V1R7 provides a new operator command to provide additional Enterprise Extender problem determination and management capability**

➢**Two basic forms:**

ƒ Display EE connections that have a packet retransmission rate that exceeds a specified threshold

ƒ Display EE connections that have exceeded a specified number of LDLC "TEST" frame retries (SRQRETRY)

EE

EE Tool Box

10
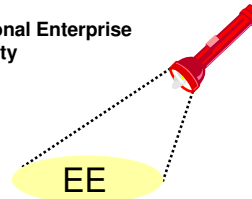
Display EE and display EEDIAG commands

➤ **DISPLAY EE command available in Communications Server V1R6**

⌐ The DISPLAY EE command available in Communications Server V1R6 was provided to better manage Enterprise Extender networks. This was the first VTAM command to provide some elementary information about Enterprise Extender. The outputs from the DISPLAY EE commands are very useful, but it is cumbersome to manually perform calculations necessary to see Enterprise Extender retransmission and LDLC retry information.

⌐ Useful, but....

⌐ Need diagnostic data
  – Retransmission rates
  – LDLC retry information

➤ **A new VTAM display command, DISPLAY EEDIAG, has been developed to extend the Enterprise Extender network management support.**

⌐ Various formats of the new display give the operator the ability to obtain:

  – Display Enterprise Extender connections that meet or exceed a specified retransmission threshold.
  – Display Enterprise Extender connections that meet or exceed a specified SRQRETRY threshold.

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DISPLAY EEDIAG command syntax - REXMIT

➢**Display Enterprise Extender connections that meet or exceed a specified retransmission threshold:**

```
>>__DISPLAY NET,EEDIAG,REXMIT=retransmission_rate_percentage_____>


                                     __,LIST=SUMMARY_
>_____ __|_____ __|_____>
           |__,CLEAR=ALL_____|    |_,LIST=SUMMARY___|
           |__,CLEAR=REXMIT____|     |_,LIST=DETAIL____ _|
           |__,CLEAR=SRQRETRY__|


           ___,MAX=lesser_of_20_or_DSPLYDEF_value_____
>_____|_____ _____|_____>
       |_,MAX=*_____ _____|
       |_,MAX= number_of_EE_connections_____|



>_____><|
   | EEDIAG Command Filters |
```

retransmission_rate_percentage specifies that only EE connections that have a
retransmission rate equal to or exceeding the specified percentage should be displayed.

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DISPLAY EEDIAG command syntax - SRQRETRY

➢**Display Enterprise Extender connections that meet or exceed a specified SRQRETRY threshold:**

```
>>__DISPLAY NET,EEDIAG,__SRQRETRY=retries_____>
                          |_SRQRETRY=*_____|


                                   __,LIST=SUMMARY_
>_____ __|_____ __|_____>
       |__,CLEAR=ALL_____|     |_,LIST=SUMMARY___|
       |__,CLEAR=REXMIT____|      |_,LIST=DETAIL____ _|
       |__,CLEAR=SRQRETRY__|


            ___,MAX=lesser_of_20_or_DSPLYDEF_value_____
>_____|_____ _____|_____>
       |_,MAX=*_____|
       |_,MAX= number_of_EE_connections_____|



>_____><|
    | EEDIAG Command Filters |
```

retries specifies that only EE connections that have had an LDLC signal retransmitted *retries* times or more prior to receiving a response should be displayed.

13

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DISPLAY EEDIAG command syntax - filters

➢**EEDIAG command filters:**

Limit the D EEDIAG command scope to one EE connection identified by LINE or PU name.
|____,ID=name_____|

    name   represents either an Enterprise Extender LINE or switched PU that has an active EE connection.

**Limit the D EEDIAG command scope to EE connections identified by IPADDR.**
|___,IPADDR=_local_ipaddr_____|
| |_ ,HOSTNAME=(,remote_hostname)_| |
|_(local_ipaddr)_____|
| |_ ,HOSTNAME=(,remote_hostname)_| |
|_(local_ipaddr, remote_ipaddr)_____|
|_(,remote_ipaddr)_____|

Limit the D EEDIAG command scope to EE connections identified by HOSTNAME.

|___,HOSTNAME=_local_hostname_____|
| |_,IPADDR=(,remote_ipaddr)_|____|
|_(local_hostname)_____|
| |_,IPADDR=(,remote_ipaddr)_|____|
|_(local_hostname,remote_hostname)_____ _|
|_(,remote_hostname)_____|

14

Enterprise Extender inactivity flows

15
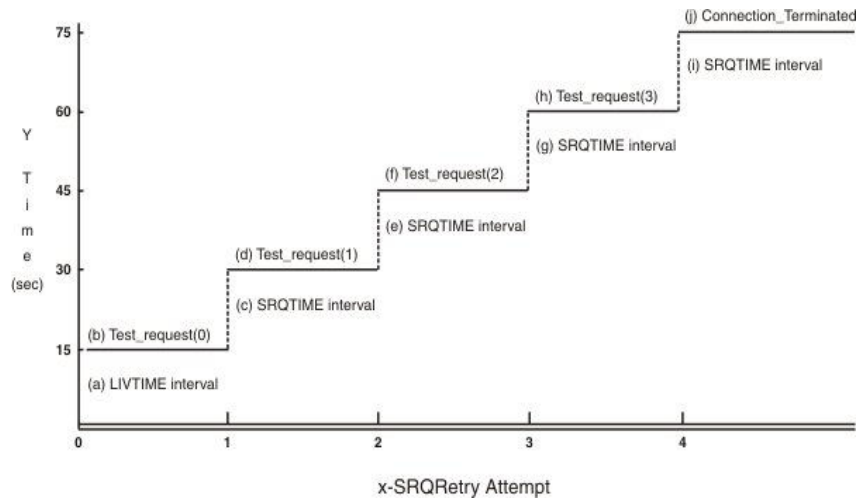
Enterprise Extender inactivity flows - notes

NOTES

Enterprise Extender inactivity example:

Assume the following values:
LIVTIME = 15
SRQTIME = 15
SRQRETRY = 3

If an EE connection is not receiving data from the partner for 15 seconds (LIVTIME), VTAM will send a test frame to test the connection. If the test does not receive a response within 15 seconds (SRQTIME), VTAM will repeat this up to 3 more times (SRQRETRY). If after the third retry attempt no response has been received, the EE connection is disconnected. VTAM uses the following formula: LIVTIME + (SRQTIME * (SRQRETRY+1)). In this example it would take roughly 75 seconds to disconnect the EE connection. See figure on previous page for the Enterprise Extender inactivity flows.

a) Initial LIVTIME interval expires and no inbound HPR traffic is detected by this EE endpoint during this 15 second interval.
b) The Logical Data Link Control (LDLC) layer sends a TEST request to the EE partner to see if the partner is still there. This is the initial TEST, which is not considered a retry. The LIST=DETAIL output for the D EEDIAG,SRQRETRY command will display the initial test as attempt number zero in message IST2074I.
c) After each TEST request is sent, VTAM will wait a period of time equal to the SRQTIME value (15 seconds in this example).
d) No response is received from the partner within the SRQTIME interval. The LDLC layer sends another TEST request. This is considered the first retry attempt up to a maximum of SRQRETRY value (3 retries for this example).
e) After each TEST request is sent, VTAM will wait a period of time equal to the SRQTIME value (15 seconds in this example).
f) No response is received from the partner within the SRQTIME interval. The LDLC layer sends another TEST request. This is considered the second retry attempt up to a maximum of SRQRETRY value (3 retries for this example).
g) After each TEST request is sent, VTAM will wait a period of time equal to the SRQTIME value (15 seconds in this example).
h) No response is received from the partner within the SRQTIME interval. The LDLC layer sends another TEST request. This is considered the third retry attempt, which is the final retry in this example.
i) After the final TEST request is sent, VTAM will wait a period of time equal to the SRQTIME value (15 seconds in this example). Since this was the final retry attempt, and no response was received from the partner EE node, the EE connection is terminated at this point with message IST1430I.

D NET,EEDIAG,REXMIT example

> **Find all Enterprise Extender connections associated with a particular VIPA with retransmission rates that meet or exceed 5% and display the output in detail format**

```
D NET,EEDIAG,REXMIT=5,IP=9::67:1:1,LIST=DETAIL
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = EEDIAG
IST2065I ENTERPRISE EXTENDER CONNECTION REXMIT INFORMATION
IST2067I EEDIAG DISPLAY ISSUED ON 08/27/04 AT 13:31:05
IST924I -------------------------------------------------------------
IST1680I LOCAL IP ADDRESS 9::67:1:1
IST1910I LOCAL HOSTNAME IP.SSCP1AV6
IST1680I REMOTE IP ADDRESS 9::67:1:6
IST1909I REMOTE HOSTNAME IP.SSCP2AV8
   .
   .
IST924I -------------------------------------------------------------
IST2032I PORT PRIORITY = HIGH
IST2036I   NLPS SENT          =                134  ( 000K )
IST2038I   NLPS RETRANSMITTED =                 67  ( 000K )
IST2068I   NLP RETRANSMIT RATE =               50%
IST924I -------------------------------------------------------------
   .
   .
IST924I -------------------------------------------------------------
IST2035I TOTALS FOR ALL PORT PRIORITIES
IST2036I   NLPS SENT          =               1948  ( 001K )
IST2038I   NLPS RETRANSMITTED =                 67  ( 000K )
IST2068I   NLP RETRANSMIT RATE =                3%
IST2069I REXMIT COUNTERS LAST CLEARED ON 08/27/04 AT 13:20:42
IST2042I 1 OF 1 EE CONNECTIONS DISPLAYED
IST314I END
```

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D NET,EEDIAG,CLEAR and SRQRETRY examples

➢ **Clear all diagnostic counters for all Enterprise Extender connections.**

```
D NET,EEDIAG,CLEAR

IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = EEDIAG
IST2067I EEDIAG DISPLAY ISSUED ON 08/23/04 AT 22:05:22
IST2071I ALL DIAGNOSTIC COUNTERS CLEARED FOR 3 EE CONNECTIONS
IST314I END
```

➢ **Find all Enterprise Extender connections that experienced LDLC retries of three or more attempts.**
  Present the output in detailed format and clear the SRQRETRY counters for all connections.

```
D NET,EEDIAG,SRQRETRY=3,LIST=DETAIL,CLEAR=SRQRETRY

IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = EEDIAG
IST2066I ENTERPRISE EXTENDER CONNECTION SRQRETRY INFORMATION
IST2067I EEDIAG DISPLAY ISSUED ON 08/23/04 AT 20:00:01
IST924I -------------------------------------------------------------
IST1680I LOCAL IP ADDRESS 9.67.1.1
IST1910I LOCAL HOSTNAME IP.SSCP1AV6
IST1680I REMOTE IP ADDRESS 9.67.1.4
IST1909I REMOTE HOSTNAME IP.SSCP2AV7
IST2024I CONNECTED TO SWITCHED PU CNV00006
IST2074I SUCCESSFUL SRQRETRY ATTEMPT =  0     OCCURRENCES =        98
IST2074I SUCCESSFUL SRQRETRY ATTEMPT =  1     OCCURRENCES =         5
IST2074I SUCCESSFUL SRQRETRY ATTEMPT =  2     OCCURRENCES =         1
IST2074I SUCCESSFUL SRQRETRY ATTEMPT =  3     OCCURRENCES =         1
IST2070I SRQRETRY COUNTERS LAST CLEARED ON 08/23/04 AT 18:55:15
IST2073I SRQRETRY COUNTERS CLEARED FOR 3 EE CONNECTIONS
IST2042I 1 OF 1 EE CONNECTIONS DISPLAYED
IST314I END
```

18

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19