



Diagnosing Enterprise Extender Problems

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Agenda

- Enterprise Extender in the cloud(s)
- What is EE to TCPIP?
- What does an EE session look like in the cloud?
- What to do when you have a problem



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- ▶ There has been much talk about Enterprise Extender as far as SNA sessions traversing IP cloud and what that means to VTAM. There has been very little talk about what that IP cloud actually is.
- ▶ EE is UDP traffic to IP. As such, there is little traffic control in the "IP cloud"
- ▶ We will look at a TCPIP CTRACE with components, SYSTCPIP and SYSTCPDA (also referred to as PKTTRACE). We will spend the majority of time in the SYSTCPDA CTRACE as the formatted output is easier to read
- ▶ If you do encounter a problem, what resources are available and what should you do to identify the problem as well as collecting documentation if needed.

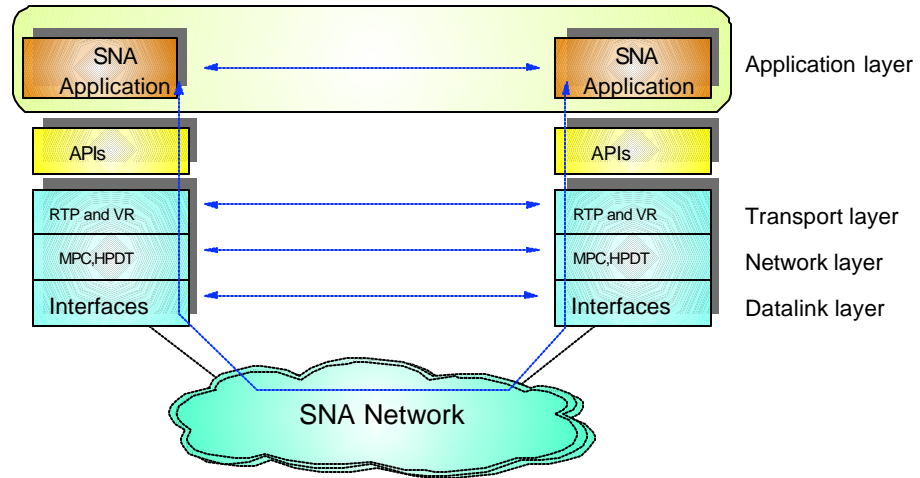
EE in the clouds

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OVERVIEW

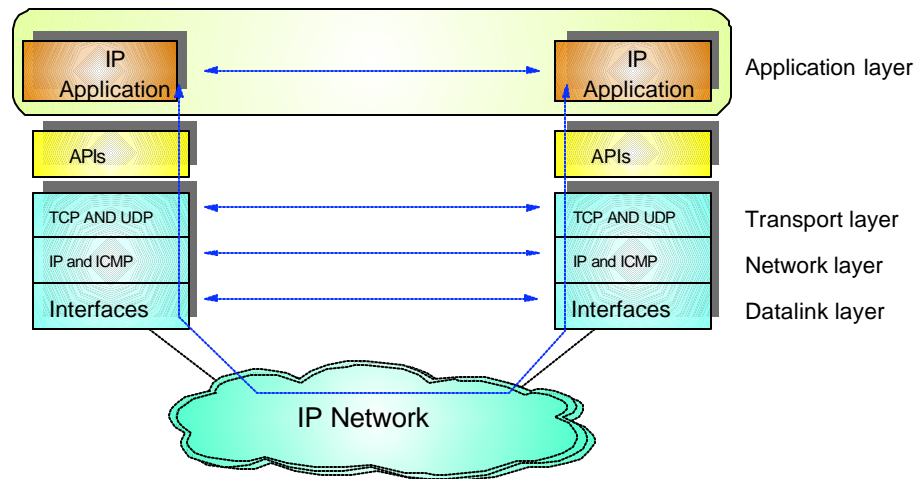
SNA Protocol



- ▶ This is what a typical SNA layering looks like. Take note of the transport layer here.

OVERVIEW

Internet Protocol

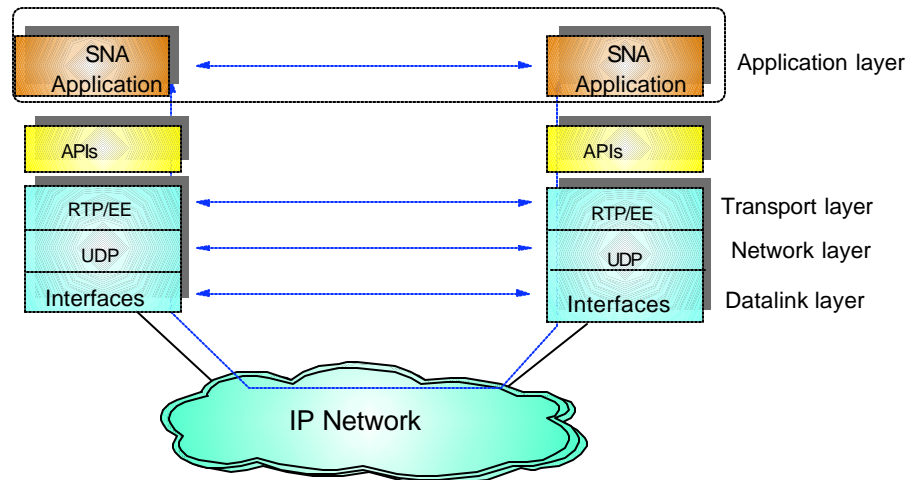


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- ▶ This is the layering as seen by TCPIP. Notice that the transport layer can be either TCP or UDP.
 - ▶ RAW is included in the transport layer as well.

OVERVIEW

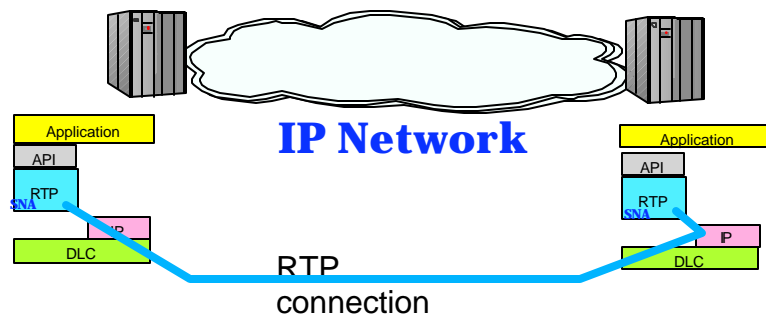
Enterprise Extender



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- ▶ This is the layering as seen with the combined VTAM and IP layers used with EE. This shows the different layers and how they correspond to each other on the two hosts involved in the SNA and UDP traffic.
- ▶ What is not shown here is the IP layer. The IP layer resides between the UDP and Interface layers.

Overview



- **SNA views EE connection as APPN TG(DLC) and provides**

- ▲ Error detection and retransmission
- ▲ Prioritization
- ▲ Non-disruptive reroute
- ▲ Congestion control

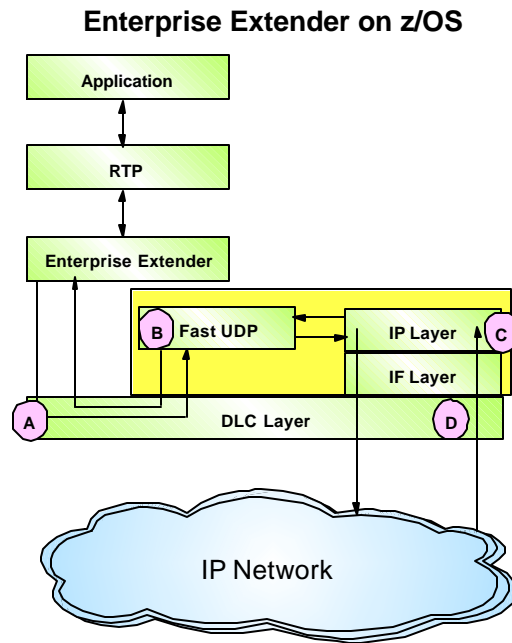
- **IP views EE as UDP application and provides**

- ▲ SNA priority mapped to TOS
- ▲ Use of standard UDP ports

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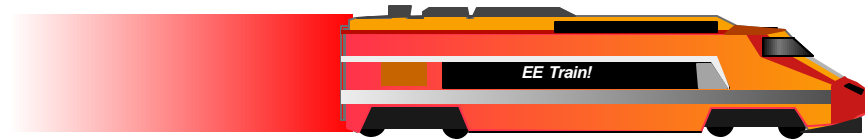
- ▶ Error detection and retransmission is performed by the RTP component in VTAM.
 - ▶ Note: For TCP applications this is done in the TCP layer.
- ▶ Prioritization is done in the host if using QDIO/IQDIO to transport the data from the z/OS. If not using QDIO then the prioritization needs to be done by the router.
- ▶ Reroute around failed links and nodes is done by the RTP component in VTAM.
- ▶ RTP utilizes ARB(Adjustable Rate Based) algorithm to constantly monitor the network capacity and speed. ARB will automatically adjust rates to current network capacity.
- ▶ If IP TOS is not used all IP traffic is grouped as the same level of service.

Overview



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- ▶ This is actually a more accurate picture of the EE layering.
- ▶ Notice that outbound EE traffic flows all the way to the DLC layer before it is "given" to IP.
- ▶ At that point the DLC layer determines that this is EE traffic and "gives" the data to the UDP layer which adds the corresponding UDP header (ports determined by the type of EE traffic).
- ▶ The data is then sent to the IP layer for proper IP header.
- ▶ Inbound traffic flows is identical in reverse.

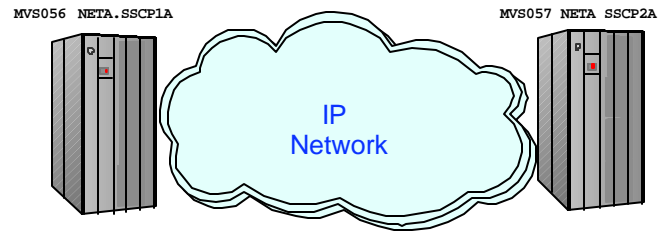


Trace example from an IP perspective

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- ▶ We will review how to get IP traces.
 - ▶ Both SYSTCPIP and SYSTCPDA (PKTTRACE)
- ▶ We will then view the formatted CTRACE and PKTTRACE out from CP-CP session start.

Enterprise Extender Example for traces



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- ▶ The scenario we will review is a CP-CP session start between two z/OS LPARs. One V1R6 and the other V1R7
- ▶ This trace is viewed from MVS056

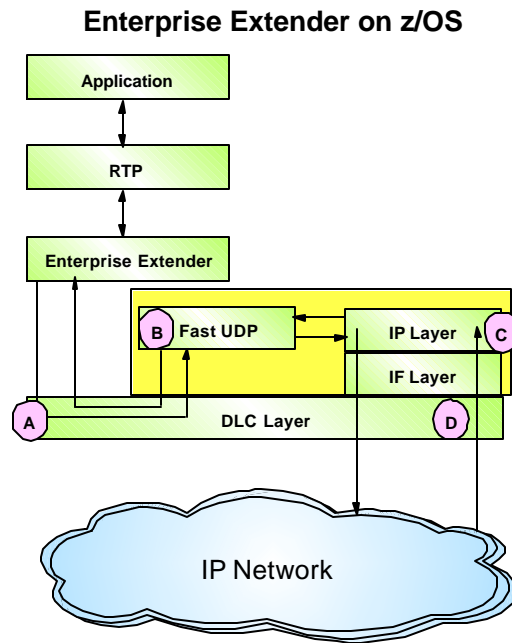
Gathering concurrent SYSTCPIP and SYSTCPDA traces

- SYSTCPDA (PKTTRACE) parameters
 - ▶ V TCPIP,tcp_proc,PKTTRACE,CLEAR
 - ▶ V TCPIP,tcp_proc,P,IP=10.81.2.2
 - ▶ TRACE CT,ON,COMP=SYSTCPDA,SUB=(tcp_proc)
R xx,END
 - SYSTCPIP (CTRACE) parameters
 - ▶ TRACE CT,ON,COMP=SYSTCPIP,SUB=(tcp_proc)
R xx,OPTIONS=(UDP,VTAMDATA),END
 - DUMP COMM=('text')
Rxx,JOBNAME=(tcpipprocname),DSPNAME=('tcpipprocname'.*),
SDATA=(ALLNUC,CSA,LPA,LSQA,RGN,SWA,SQA,TRT),END
- ➔ *Refer to the IP Diagnosis Guide or APAR II12014 for complete instructions*

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- ▶ These are the CTRACE parameters used for this particular case.
- ▶ These parameter and more are explained in the IP Diagnosis Guide
- ▶ Notice that I used the IP=parameter when starting PKTTRACE. The IP parameter limits the data traced to any local IP address and this non-local IP address.
 - ▶ This is normally recommended unless there is a need to trace more than one address or you are not sure what address is having a problem
- ▶ For SYSTCPIP I used OPTIONS=(UDP,VTAMDATA)
 - ▶ UDP - will capture anything happening in the UDP layer. For EE this is not much, but for the sake of completeness I included it
 - ▶ VTAMDATA will capture all the flows between VTAM's DLC and TCPIP
- ▶ Notice that the dump command parameters include the dataspace for TCPIP. In this case the CTRACES are not being captured to an external writer, but to the TCPIP dataspace. Of course, that option is available

Overview



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- ▶ I included this again, but with tags in the DLC, UDP and IP layers.
 - ▶ I have labeled the DLC layer with A and D tags
 - ▶ 'A' tag represents inbound and outbound data flow between VTAM and TCPIP in the PKTTRACE records at the EZASAMEMVS link without IP and UDP headers
 - ▶ 'D' tag represents CTRACE records in the DLC VTAMDATA layer
 - ▶ 'B' tag represents CTRACE data in the UDP layer and
 - ▶ 'C' tag represents PKTTRACE records at the IP layer both inbound and outbound.
- ▶ The rest of the slides are also labeled with these tags so that you know which layer produced the trace record.

PKTTRACE

```

406 MVS056  EE      00000006 12:10:19.294977 EE Trace Data
To Interface   : EZASAMEMVS      Device: Mpc Ptp      Full=139
Tod Clock      : 2006/02/20 12:10:19.294974      Intfx: 34
Sequence #     : 0              Flags: Dat Ver2 Adj Out
Source         : 10.81.1.1
Destination    : 10.81.2.2
Source Port    : 12000          Dest Port: 12000  Asid: 002D  TCB: 00000000
Data           : 139           Data Length: 139
000000 0804AF34 88FFF3BD 44000010 CB410000 0000A000 010B7100 7FFF0000 00000000 |...h.3.....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F1 C10E09F7 E2E6C5C5 |..1ISTPUS ..4NETA.SSCPLA..7SWEE|
000040 F4F2C1C9 46090980 00000000 00000110 3A002311 040E02F5 F6F9F5F1 F1F7F0F1 |42AI.....569511701|
000060 F1F7F008 04F0F6F0 F1F0F70A 06C1C3C6 61E5E3C1 D4161101 130011F2 F0F6F400 |170..060107..ACF/VTAM.....2064.|
000080 00000000 F0F0F7F7 F9F1F0                |....0077910|

```



**No IP
header
here**

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- ▶ We will be following the trace in chronological order. So we will go back and forth between PKTTRACE and CTRACE records as they occur in order.
- ▶ This is our first trace record. It is captured by PKTTRACE. It is captured by the DLC layer before UDP bypass.
- ▶ We will attempt to describe the most important records and fields
- ▶ Timestamp - important when multiple traces need to be analyzed aqnd coordinated together.
- ▶ To Interface- identifies that as data that is going outbound. The Interface name is defined here. This is EZASAMEMVS that is used for EE traffic from VTAM to TCPIP.
- ▶ Source and destination IP addresses are displayed.
- ▶ Source and destination ports are defined
- ▶ Total data length is defined
- ▶ The unformatted data as well as the ebcdic representation of that data is included.
- ▶ Notice that even though there is source and destination IP addresses and source and destination ports, there is no IP or UDP headers. This data has not yet gone to UDP or IP to have the headers added.

D

CTRACE

```
MVS056      VTAMDATA  1002003E  12:10:19.294997  Send Datagram Request
HASID..002D      PASID..002B      SASID..002D      USER...NET
TCB...00000000  MODID..EZBUDBYP  REG14..156DDF30  DUCB...0000000E
CID...00000000  PORT...0      CPUA...00
IPADDR. 0.0.0.0
ADDR...00000000  14EBCC20  LEN...00000088  Iutil Parameter List
+0000  01004363  01070000  00000000  00000000  | ..... |
+0010  14EBCA94  0001012E  90010002  00000000  | ...m..... |
+0020  00000000  2EE02EE0  0A510202  C0000000  | .....\. \.....{... |
+0030  7F210C1C  00000000  00000000  00000000  | "..... |
+0040  00000000  00000000  00000000  00000000  | ..... |
+0050  00000000  00000000  00000000  00000000  | ..... |
+0060  00000000  00000000  00000000  00000000  | ..... |
+0070  00000000  00000000  00000000  00000002  | ..... |
+0080  00000000  00000000  | ..... |
ADDR...00000000  14EBCA94  LEN...0000004C  Xbuffer Control Area
+0000  00000000  14EBCAE0  14EBCB08  14EBCB30  | ..... |
+0010  14EBCC20  14EBCBF8  95156748  00000000  | .....8n..... |
+0020  00000422  00000000  00000000  00000000  | ..... |
+0030  00000000  00000000  00000000  00000000  | ..... |
+0040  14EBCA30  94EADE40  00000000  | ...m.. |
ADDR...00000000  14EBCAE0  LEN...00000050  Xbuffer List Entries
+0000  00108000  00000000  00000000  00000000  | ..... |
+0010  00000000  14EBC538  000001B0  14EBC520  | .....E.....E. |
+0020  94EADE40  80000000  00100000  00000000  | m.. |
+0030  00000000  00000000  00000000  14EBCB60  | ..... |
+0040  0000008E  00000000  00000000  40000000  | ..... |
```

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- ▶ We next see this data in the SYSTCPIP (CTRACE) trace record.
- ▶ MVS056 is the system name
- ▶ VTAMDATA is the CTRACE option that is responsible for this trace record.
- ▶ Timestamp - important when multiple traces need to be analyzed
- ▶ "Send datagram Request" is the internal function responsible for this trace record. This means that TCPIP has received a request to send UDP data.
- ▶ USER identifies the requester.
- ▶ TCB identifies the MVS TCB that this is running under. In this case it is zero which means this is running in SRB mode
- ▶ MODID is the module name responsible for this trace record
- ▶ CID is the connection ID if one is assigned. In this case the CID is not known yet.
- ▶ At offset 24 in the Iutil Parameter List is the port pair and remote IP address of this data.

B

CTRACE

```
MVS056      UDP      40020002  12:10:19.295001  Send Datagram - Ucb found
HASID..002D      PASID..002B      SASID..002D      USER...NET
TCB...00000000  MODID..EZBUDBYP  REG14..156DDF94  DUCB...0000000E
CID...00000046  PORT...0          CPUA...00
IPADDR. 0.0.0.0
ADDR...00000000  7F216C58  LEN...000003A0  UDP Control Block
+0000  5CE4C3C2  00000000  BE64D38D  77C80247  | *UCB.....L..H.. |
+0010  00000000  00000000  00000000  00000000  | ..... |
+0020  00000000  00000000  00000000  00000000  | ..... |
+0030  00000000  00000000  00000000  D2260401  | .....K... |
+0040  00000000  00000000  10022EE0  0A510101  | .....\. |
+0050  00000000  00000000  00000000  00000000  | ..... |
+0060  00000000  00000003  00000000  00000000  | ..... |
+0070  00000000  00000000  0000FFFF  0000FFFF  | ..... |
+0080  00000000  45000000  00000000  40110000  | ..... |
+0090  0A510101  00000000  00000000  00000000  | ..... |
+00A0  00000000  00000000  00000000  00000000  | ..... |
+00B0  00000000  00000000  00000000  00000000  | ..... |
+00C0  0000FFFF  FFFF0000  00000000  00000000  | ..... |
+00D0  00000000  00000000  00000000  00000000  | ..... |
+00E0  00000000  00000000  00000000  00000000  | ..... |
+00F0  00000000  00000000  00000000  00000000  | ..... |
```

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- ▶ This CTRACE record is cut in UDP
- ▶ "Send Datagram - UCB found" means that TCPIP has an associated UCB (UDP Control Block).
- ▶ CID - Since TCPIP has a UCB it associates this connection ID.
- ▶ The complete UCB is formatted here. It is a very large control block. We will only concern ourselves with a few of the fields
 - ▶ Offset '49' is the address family
 - ▶ Offset '4A' is the local port
 - ▶ Offset '4C' is the local IP address
 - ▶ Offset '84' is the last IP header.
 - ▶ Note that it is mostly blank here because no data has flowed inbound or outbound

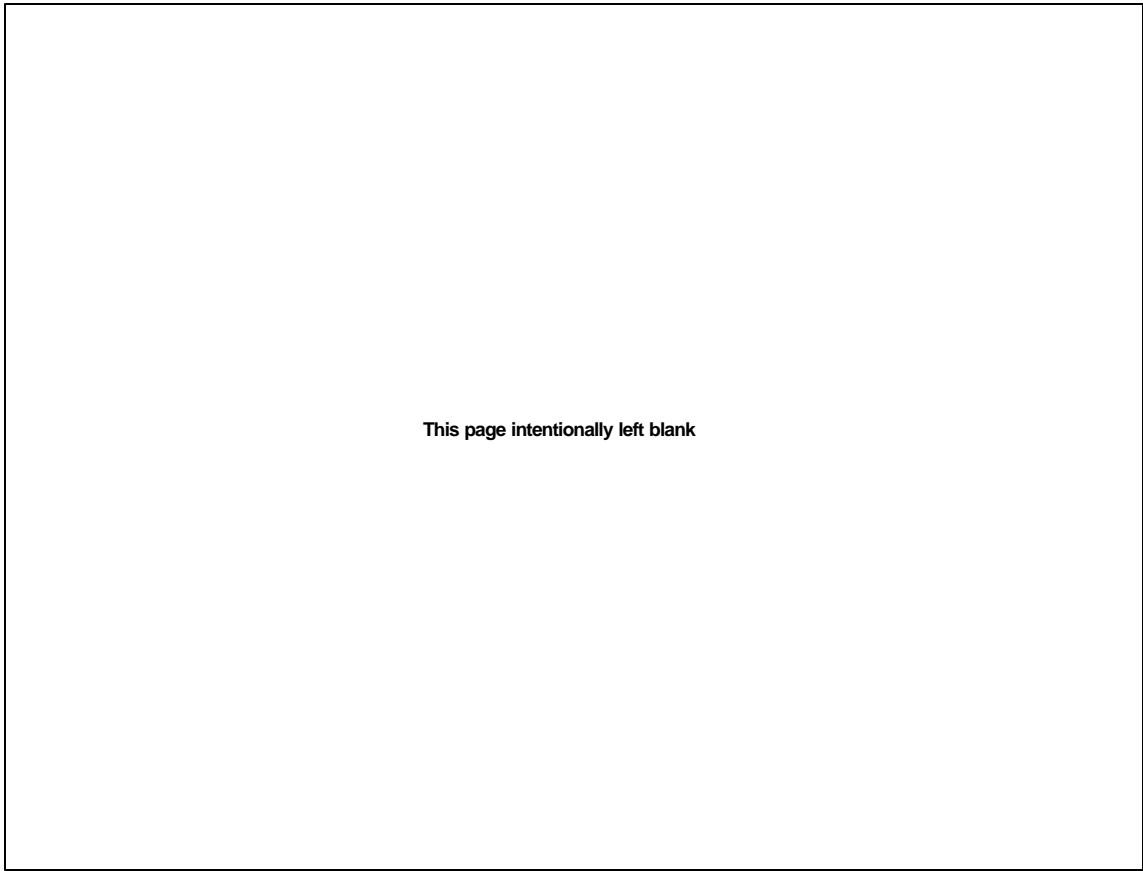
B

CTRACE

```
MVS056      UDP          4002003  12:10:19.295015  Send Datagram to IP
HASID..002D  PASID..002B      SASID..002D      USER...NET
TCB....00000000 MODID..EZBUDBYP  REG14..156DE024  DUCB...0000000E
CID....00000000 PORT...0          CPUA...00
IPADDR. 0.0.0.0
```

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- ▶ This trace record is cut in UDP and indicates that UDP header is built and the datagram is ready to go to IP.



- ▶ This page is left blank for printing layout. There are several others like this later in the presentation.

(C)

PKTTRACE (IPID=035d)

```
407 MVS056 PACKET 00000004 12:10:19.295028 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=167
Tod Clock        : 2006/02/20 12:10:19.295026 Intfx: 6
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12000      Dest Port: 12000 Asid: 002D TCB: 00000000
IpHeader: Version : 4          Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 167        ID Number: 035D
Fragment         :             Offset: 0
TTL              : 64          Protocol: UDP          CheckSum: 5E85 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length  : 147        CheckSum: C233 FFFF
EE: 139
```

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- ▶ This data is again traced in PKTTRACE. This time with IP and UDP headers.
- ▶ Interface MPC4121L, this is the real interface that the data is going out over.
- ▶ The IP header is formatted and easy to read
- ▶ The UDP header is formatted as well.

- ▶ The actual EE data follows on the next slide

C

PKTTRACE (IPID=035d) cont.

```
LDLC:
Remote Sap      : 08          Source Sap: 04 Request Control: AF (XID3 without poll)
STID... 34      LENTH.. 88      BLKNM.. FFF.3BD44
NCHR... 10CB    BIND... 41      NGFL... 00      TGSU... A0
TGNO... 00      DLCT... 01      LEN.... 0B
SDLC:
LSCP... 7100    ABCN... 00      MBTU... 7FFF    PROF... 00
MODE... 00      MAXF... 00
Control Vectors:
Cv..... 0E     Len.... 09      Type... F1      PU..... ISTEPUS
Cv..... 0E     Len.... 0c      Type... F4      CP.NAME NETA.SSCP1A
Cv..... 0E     Len.... 09      Type... F7      LINK... SWEE42AI
Cv..... 4E     Len.... 09      Transmission group
SV.... 80      Len.... 09      Transmission Group
00 09800000 00000000 01 *..... *
Cv..... 10     Len.... 3a      Product Set ID
SV.... 11      Len.... 23      IBM Software
SF... 02      Len.... 0E      Product component 569511701170
SF... 04      Len.... 08      Product level 060107
SF... 06      Len.... 0A      Product name ACF/VTAM
SV.... 11      Len.... 16      IBM Hardware
SF... 00      Len.... 13      Hardware product
00 130011F2 F0F6F400 00000000 F0F0F7F7 *...2064....0077*
10 F9F1F0 *910 *
5 control vectors found
IP Header      : 20
000000 45C000A7 035D0000 40115E85 0A510101 0A510202
Protocol Header : 8
000000 2EE02EE0 0093C233
Data          : 139      Data Length: 139
000000 0804AF34 88FFF3BD 44000010 CB410000 0000A000 010B7100 7FFF0000 00000000 |...h.3.....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F1 C10E09F7 E2E6C5C5 |..1ISTPUS ..4NETA.SSCP1A..7SWEE|
000040 F4F2C1C9 46090980 00000000 00000110 3A002311 040E02F5 F6F9F5F1 F1F7F0F1 |42AI.....569511701|
000060 F1F7F008 04F0F6F0 F1F0F70A 06C1C3C6 61E5E3C1 D4161101 130011F2 F0F6F400 |170..060107..ACF/VTAM.....2064.|
000080 00000000 F0F0F7F7 F9F1F0 |...0077910|
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```

- ▶ This is the EE data.
- ▶ We can see that this is identified as XID3 data, specifically
- ▶ The formatter uses the Systems Network Architecture (SNA) Formats (GA27-3136-19) to format the data.
- ▶ I have highlighted some of the fields such as control vectors
 - ▶ Control vector '0E' describe the PU, CPNAME and Link for this EE host
 - ▶ Control vector '10' describe the product set operating on this host.
- ▶ The data is also presented without formatting

D

CTRACE

```

MVS056 VTAMDATA 10025033 12:10:19.295040 Process Outbound Message
HASID..002D PASID..002B SASID..002D USER...NET
TCB....00000000 MODID..EZBIFOUT REG14..152BE3B0 DUCB...0000000E
CID....00000000 PORT...0 CPUA....00
IPADDR. 0.0.0.0
  ADDR...00000000 14F3B790 LEN...0000002C skmsgb-Outbound message block
  .
  .
  ADDR...00000000 14EBC538 LEN...0000015C iudreq@:*--Outbound message primi
  .
  .
    +0140 45C000A7 035D0000 40115E85 0A510101 | .{.x.).. .;e.... |
    +0150 0A510202 2EE02EE0 0093C233 | .....\.\.1B. |
SrcPort..12000 SrcIPAddr. 10.81.1.1
DstPort..12000 DstIPAddr. 10.81.2.2
  .
  .
  ADDR...00000000 14EBCB60 LEN...0000008E Data Portion of MDATA triple
+0000 0804AF34 88FFF3BD 44000010 CB410000 | ....h.3..... |
+0010 0000A000 010B7100 7FFF0000 00000000 | ....."...... |
+0020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 | ..1ISTPUS ..4NE |
+0030 E3C14BE2 E2C3D7F1 C10E09F7 E2E6C5C5 | TA.SSCPIA..7SWEE |
+0040 F4F2C1C9 46090980 00000000 00000110 | 42AI..... |
+0050 3A002311 040E02F5 F6F9F5F1 F1F7F0F1 | .....569511701 |
+0060 F1F7F008 04F0F6F0 F1F0F70A 06C1C3C6 | 170..060107..ACF |
+0070 61E5E3C1 D4161101 130011F2 F0F6F400 | /VTAM.....2064. |
+0080 00000000 F0F0F7F7 F9F1F0 | ....0077910 |

```



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- ▶ After this outbound data clears the IP layer it is traced again in the DLC layer before it is given to VTAM on its outbound journey
- ▶ The IP and UDP headers are traced here without formatting. This may not always be the case if there are many packets "grouped" into one message block you will not see all data.
- ▶ In this case nothing else is going on
- ▶ You can see the complete data length of this packet here.

D

CTRACE

```
MVS056 VTAMDATA 10020025 12:10:19.295049 Send Data to VTAM
HASID..002D PASID..002B SASID..002D USER...NET
TCB....00000000 MODID..EZBIFIUT REG14..152AC98C DUCB...0000000E
CID....00000000 PORT...0 CPUA...00
IPADDR. 0.0.0.0
ADDR...00000000 7F396450 LEN....00000010 Device Name
+0000 D4D7C3F4 F1F2F140 40404040 40404040 | MPC4121 |
ADDR...00000000 14EBCC20 LEN....0000001C Iutil Plist
+0000 01000363 01030000 00000200 00000000 | ..... |
+0010 14EBCA94 00010121 90020001 | ...m..... |
```

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► Last trace record as this data is given to VTAM.

D

CTRACE

```
MVS056 VTAMDATA 10025046 12:10:19.317096 Process Inbound Message
HASID..002B PASID..002B SASID..002B USER...TCPCS1
TCB...00000000 MODID..EZBIFINB REG14..1528D888 DUCB...0000000E
CID...00000000 PORT...0 CPUA...00
IPADDR. 0.0.0.0
ADDR...00000000 14F3B590 LEN...0000002C skmsgb-inbound message data bloc
+0000 E2D2D4C2 00000000 00000000 14F3BD90 | SKMB.....3.. |
+0010 40000002 00000000 14F3B5C0 00000000 | .....3.{.... |
+0020 14F1F800 14F1F914 00000000 | .18..19.... |
ADDR...00000000 14F3B5C0 LEN...0000002D skdatab-inbound message data buf
+0000 E2D2C4C2 14F3B590 00808000 15164480 | SKDB.3..... |
+0010 94E9A484 00010000 00000000 14F1F800 | mZud.....18. |
+0020 00000400 00000001 00000001 00 | ..... |
ADDR...00000000 14F1F800 LEN...00000114 data buffer
+0000 C9E4C4C9 00008020 00010000 00000000 | IUDI..... |
```

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- ▶ The CTRACE record indicates that there is inbound data
- ▶ Notice that the TCB is still zero
- ▶ The MODID is EZBIFINB.
- ▶ USER in this case is TCPCS1 which is the TCPIP stack name
 - ▶ TCPIP does not know what application this data is for so it runs under the TCPIP jobname

D

CTRACE

```
MVS056 VTAMDATA 10025047 12:10:19.317105 Process Inbound Frame
HASID..002B PASID..002B SASID..002B USER...TCPCS1
TCB....00000000 MODID..EZBIFINB REG14..1528D910 DUCB...0000000E
CID....00000000 PORT...0 CPUA...00
IPADDR. 0.0.0.0
ADDR...00000000 15A24840 LEN...0000009C Received frame
+0000 45C0009C 034F0000 40115E9E 0A510202 | .{...|.. .;..... |
+0010 0A510101 2EE02EE0 00882904 0409AF34 | .....\.\.h..... |
+0020 7DFFF3BC 06000010 CB410000 0000A000 | '.3..... |
+0030 010B7100 7FFF0000 00000000 0E09F1C9 | ....".....1I |
+0040 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 | STPUS ..4NETA.S |
+0050 E2C3D7F2 C1460909 80000000 00000002 | SCP2A..... |
+0060 103A0023 11040E02 F5F6F9F5 F1F1F7F0 | .....56951170 |
+0070 F1F1F6F0 0804F0F6 F0F1F0F6 0A06C1C3 | 1160..060106..AC |
+0080 C661E5E3 C1D41611 01130011 F2F0F6F4 | F/VTAM.....2064 |
+0090 00000000 00F0F0F7 F7F9F1F0 | .....0077910 |
```

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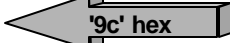
- ▶ There could be many individual packets with a single frame from VTAM. This record is TCP/IP processing this frame to make that determination.
- ▶ This particular frame has a length of x'9c'.
- ▶ This trace record traces the first part of every frame from VTAM
 - ▶ Starting at offset 0 is an IP header.
 - ▶ offset 4 within the IP header is the IP Identification. This can be used as correlation between CTRACE and PKTTRACE.
- ▶ Again, depending on the amount of traffic you are tracing you may or may not see the IP header information in this trace record.

PKTTRACE (IPID=034f)

408 MVS056 PACKET 00000004 12:10:19.317114 Packet Trace

<u>From Interface</u> : MPC4121L	Device: Mpc Ptp	Full=156
Tod Clock : 2006/02/20 12:10:19.317113	Intfx: 7	
Sequence # : 0	Flags: Pkt Ver2	
Source : 10.81.2.2		
Destination : 10.81.1.1		
Source Port : 12000	Dest Port: 12000 Asid: 002B TCB: 00000000	
IpHeader: Version : 4	Header Length: 20	
Tos : C0	QOS: Internetwork Normal Service	
Packet Length : 156	ID Number: 034F	
Fragment :	Offset: 0	
TTL : 64	Protocol: UDP	Checksum: 5E9E FFFF
Source : 10.81.2.2		
Destination : 10.81.1.1		
UDP		
Source Port : 12000 (EE-XID)	Destination Port: 12000 (EE-XID)	
Datagram Length : 136	Checksum: 2904 FFFF	

EE: 128



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- ▶ Now we see this inbound packet in the PKTTRACE.
- ▶ "From Interface" indicates that this is inbound data.
- ▶ The IP source and destination addresses have reversed. Meaning that this is a packet from the hst we just sent a packet to.
- ▶ The UDP header has the same port pair.
 - ▶ We can assume that this data is in relation to the previous data as it is from the same IP address and UDP port pair.
 - ▶ If you are not sure of the application data flow it is very hard to tell whether the data is good or bad.
- ▶ We will identify the next few slides by their IP Identifiers

C

PKTTRACE (IPID=034f) cont.

```
LDLC:
Remote Sap      : 04          Source Sap: 09 Response Control: AF (XID3 without poll)
STID... 34      LENTH... 7D      BLKNM... FFF.3BC06
NCHR... 10CB    BIND... 41      NGFL... 00      TGSU... A0
TGNO... 00      DLCT... 01      LEN.... 0B
SDLC:
LSCP... 7100    ABCN... 00      MBTU... 7FFF    PROF... 00
MODE... 00      MAXF... 00
Control Vectors:
Cv..... 0E     Len.... 09      Type... F1      FU..... ISTEPUS
Cv..... 0E     Len.... 0c      Type... F4      CP.NAME NETA.SSCP2A
Cv..... 46     Len.... 09      Transmission group
SV.... 80      Len.... 09      Transmission Group
00 09800000 00000000 02      *..... *
Cv..... 10     Len.... 3a      Product Set ID
SV.... 11      Len.... 23      IEM Software
SF... 02      Len.... 0E      Product component 569511701160
SF... 04      Len.... 08      Product level 060106
SF... 06      Len.... 0A      Product name ACF/VTAM
SV.... 11      Len.... 16      IEM Hardware
SF... 00      Len.... 13      Hardware product
00 130011F2 F0F6F400 00000000 F0F0F7F7 *...2064.....0077*
10 F9F1F0      *910 *
4 control vectors found
IP Header      : 20
000000 45C0009C 034F0000 40115E9E 0A510202 0A510101
Protocol Header : 8
000000 2EE02EE0 00882904
Data          : 128 Data Length: 128
000000 0409AF34 7DFFF3BC 06000010 CB410000 0000A000 010B7100 7FFF0000 00000000 |.....'3.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F2 C1460909 80000000 |..1ISTPUS ..4NETA.SSCP2A.....|
000040 00000002 103A0023 11040E02 F5F6F9F5 F1F1F7F0 F1F1F6F0 0804F0F6 F0F1F0F6 |.....569511701160..060106|
000060 0A06C1C3 C661E5E3 C1D41611 01130011 F2F0F6F4 00000000 00F0F0F7 F7F9F1F0 |..ACF/VTAM.....2064.....0077910|
```

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- ▶ We see here the XID3 from the other VTAM host
- ▶ The same type of control vectors as seen in this data.
 - ▶ The Source SAP and CPName are different for this host.

B

CTRACE

```
MVS056      UDP      40020006  12:10:19.317163  Receive Datagram Request
HASID..002B      PASID..002B      SASID..002B      USER...TCPCS1
TCB....00000000  MODID..EZBUDBYP  REG14..156DE1F0  DUCB...0000000E
CID....00000000  PORT...12000    CPUA....00
IPADDR. 10.81.2.2
  ADDR...00000000  14F3B590  LEN...0000002C  Message Block
    +0000  E2D2D4C2  00000000  14F3B590  14F3BD90  | SKMB.....3...3.. |
    +0010  40000002  00000000  14F3B5C0  00000000  | .....3.{.... |
    +0020  14F1F800  14F1F914  00000000  | .18..19..... |
  ADDR...00000000  14F3B5C0  LEN...0000002D  Data Block
    +0000  E2D2C4C2  14F3B590  00808000  15164480  | SKDB.3..... |
    +0010  94E9A484  00010000  00000000  14F1F800  | mZud.....18. |
    +0020  00000400  00000001  00000001  00        | ..... |
  ADDR...00000000  14F1F800  LEN...00000100  Data Buffer
    +0000  C9E4C4C9  00008020  00010000  00000000  | IUDI..... |
    +0010  00000000  00000000  00000000  14F3B590  | .....3.. |
    .
  ADDR...00000000  15A24840  LEN...00000014  IP Header
    +0000  45C0009C  034F0000  40115E9E  0A510202  | .{...|.. .?..... |
    +0010  0A510101  | .... |
  ADDR...00000000  15A24854  LEN...00000008  UDP Header
    +0000  2EE02EE0  00882904  | .\.\.h.. |
```

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- ▶ Chronologically, we are in the CTRACE records again.
- ▶ This is a UDP record for receiving the datagram
- ▶ The USER is TCPIPCS1 as the UCB has not been identified yet

B

CTRACE

```
MVS056   UDP           40020009  12:10:19.317171  Receive Datagram - Ucb found
HASID..002B   PASID..002B   SASID..002B   USER...TCPCS1
TCB...00000000  MODID..EZBUDBYP  REG14..156DE350  DUCB...0000000E
CID...00000046  PORT...12000    CPUTA...00
IPADDR. 10.81.2.2
ADDR...00000000  7F216C58  LEN....000003A0  UDP Control Block
+0000  5CE4C3C2  00000000  BE64D40E  2D524427  | *UCB.....M..... |
+0010  00000000  00000000  00000000  00000093  | .....1 |
+0020  00000000  00000000  00000000  00000001  | ..... |
+0030  00000000  00000000  00000000  D2260401  | .....K... |
+0040  00000000  00000000  10022EE0  0A510101  | .....\. |
+0050  00000000  00000000  00000000  00000000  | ..... |
+0060  00000000  00000003  00000000  00000000  | ..... |
+0070  00000000  00000000  0000FFFF  0000FFFF  | ..... |
+0080  00000000  45C00000  035D0000  40110000  | .....{...}. |
+0090  0A510101  0A510202  00000000  00000000  | ..... |
```



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- ▶ This is the next UDP trace record after the UDP headers have been interpreted for the destination UDP port and UCB identified.
- ▶ Again the complete UCB is formatted here
- ▶ The IP header at offset '84' is the last IP header for this UDP port pair.
 - ▶ In this case it is the one that was sent outbound

A

PKTTRACE

```
409 MVS056 EE 00000006 12:10:19.317190 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=128
Tod Clock : 2006/02/20 12:10:19.317190 Intfx: 34
Sequence # : 0 Flags: Dat Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
Data : 128 Data Length: 128
000000 0409AF34 7DFFF3BC 06000010 CB410000 0000A000 010B7100 7FFF0000 00000000 |....'.3.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F2 C1460909 80000000 |..1ISTPUS ..4NETA.SSCP2A.....|
000040 00000002 103A0023 11040E02 F5F6F9F5 F1F1F7F0 F1F1F6F0 0804F0F6 F0F1F0F6 |.....569511701160.060106|
000060 0A06C1C3 C661E5E3 C1D41611 01130011 F2F0F6F4 00000000 00F0F0F7 F7F9F1F0 |..ACF/VTAM.....2064.....0077910|
```

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- ▶ At this point TCPIP knows that this is EE data for port 12000 so it is sent to the EZASAMEMVS interface

▶

D

CTRACE

```
MVS056 VTAMDATA 1002003F 12:10:19.317193 Receive Datagram to Vtam
HASID..002B PASID..002B SASID..002B USER...TCPCS1
TCB....00000000 MODID..EZBUDBYP REG14..156DE536 DUCB...0000000E
CID....00000000 PORT...12000 CPUA....00
IPADDR. 10.81.2.2
ADDR...00000000 14F1F400 LEN....00000088 Iutil Parameter List
+0000 01000363 01000000 00000200 00000000 | ..... |
+0010 14F1F488 0001012E 90010002 00000000 | .14h..... |
+0020 00000000 2EE02EE0 0A510202 00000000 | .....\.\..... |
+0030 00000000 00000000 00000000 00000000 | ..... |
+0040 00000000 00000000 00000000 00000000 | ..... |
+0050 00000000 00000000 00000000 00000000 | ..... |
+0060 00000000 00000000 00000000 00000000 | ..... |
+0070 00000000 00000000 00000000 00000002 | ..... |
+0080 00000000 00000000 | ..... |
ADDR...00000000 14F1F488 LEN....0000004C Xbuffer Control Area
+0000 00000000 14F1F4D4 14F1F4D4 14F1F7CC | .....14M.14M.17. |
+0010 14F1F400 00000000 00000000 00000000 | .14..... |
```

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- ▶ Since this is EE data destined for VTAM it goes to the DLC layer and see this via VTAMDATA CTRACE record.
- ▶ This record indicates that the data has been delivered to VTAM

D

CTRACE

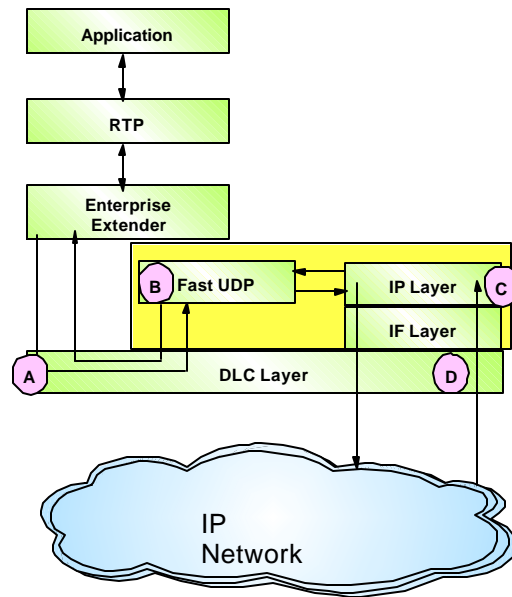
```
MVS056 VTAMDATA 1002504F 12:10:19.317250 Trace end of IF Inbound
HASID..002B PASID..002B SASID..002B USER...TCPCS1
TCB....00000000 MODID..EZBIFINB REG14..1528CBF4 DUCB...0000000E
CID....00000000 PORT...12000 CPUA....00
IPADDR. 10.81.2.2
ADDR...00000000 15005AE0 LEN....00000008 msglisth-Qed PutNext List
+0000 14F3B590 14F3B590 | .3...3.. |
```

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- ▶ The record is the last of the inbound data flow and completes the delivery of this EE data.

Overview

Enterprise Extender on z/OS



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- ▶ Again, I include this overview slide to review what we have just seen
 - ▶ Outbound data flows to the DLC --> UDP--> IP--> IF--> DLC
 - ▶ Inbound data flow is the reverse.

A

PKTTRACE

```
410 MVS056 EE 00000006 12:10:19.317614 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=139
Tod Clock : 2006/02/20 12:10:19.317614 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Adj Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12000 Dest Port: 12000 Asid: 002D TCB: 00000000
Data : 139 Data Length: 139
000000 0804AF34 88FFF3BD 44000010 CB410000 0000A000 010B7100 7FFF0000 00000000 |....h.3.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F1 C10E09F7 E2B6C5C5 |..1ISTPUS ..4NETA.SSCP1A..7SWEE|
000040 F4F2C1C9 46090980 00000000 00000110 3A002311 040E02F5 F6F9F5F1 F1F7F0F1 |42AI.....569511701|
000060 F1F7F008 04F0F6F0 F1F0F70A 06C1C3C6 61E5E3C1 D4161101 130011F2 F0F6F400 |170..060107..ACF/VTAM.....2064.|
000080 00000000 F0F0F7F7 F9F1F0 |....0077910|
```

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► This is another outbound request from VTAM EE

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C

PKTTRACE (IPID=035e)

```
411 MVS056 PACKET 00000004 12:10:19.317656 Packet Trace
To Interface      : MPC4221L      Device: Mpc Ptp      Full=167
Tod Clock        : 2006/02/20 12:10:19.317656      Intfx: 8
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12000      Dest Port: 12000 Asid: 002D TCB: 00000000
IpHeader: Version : 4          Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 167        ID Number: 035E
Fragment         :             Offset: 0
TTL              : 64          Protocol: UDP          CheckSum: 5E84 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length  : 147        CheckSum: C233 FFFF
EE: 139
```

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- ▶ Again, we are splitting the packet into two slides because of space.
- ▶ This is the IP and UDP headers along with the length of the EE data

C

PKTTRACE (IPID=035e) cont

```
LDLC:
Remote Sap      : 08          Source Sap: 04 Request Control: AF (XID3 without poll)
STID... 34      LENTH.. 88      BLKNM... FFF.3BD44
NCHR... 10CB    BIND... 41      NGFL... 00      TGSU... A0
TGNO... 00      DLCT... 01      LEN.... 0B

SDLC:
LSCP... 7100    ABCN... 00      MBTU... 7FFF    PROF... 00
MODE... 00      MAXF... 00

Control Vectors:
Cv..... 0E      Len.... 09      Type... F1      PU..... ISTEPUS
Cv..... 0E      Len.... 0c      Type... F4      CP.NAME NETA.SSCP1A
Cv..... 0E      Len.... 09      Type... F7      LINK... SWEE42AI
Cv..... 46      Len.... 09      Transmission group
SV..... 80      Len.... 09      Transmission Group
          00 09800000 00000000 01 *..... *
Cv..... 10      Len.... 3a      Product Set ID
SV..... 11      Len.... 23      IBM Software
SF... 02      Len.... 0E      Product component 569511701170
SF... 04      Len.... 08      Product level 060107
SF... 06      Len.... 0A      Product name ACF/VTAM
SV..... 11      Len.... 16      IBM Hardware
SF... 00      Len.... 13      Hardware product
          00 130011F2 F0F6F400 00000000 F0F0F7F7 *...2064.....0077*
          10 F9F1F0 *910 *
5 control vectors found
IP Header      : 20
000000 45C000A7 035E0000 40115E84 0A510101 0A510202
Protocol Header : 8
000000 2EE02EE0 0093C233
Data          : 139      Data Length: 139
000000 0804AF34 88FFF3BD 44000010 CB410000 0000A000 010B7100 7FFF0000 00000000 |...h.3.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F1 C10E09F7 E2E6C5C5 |..1ISTPUS ..4NETA.SSCP1A..7SWEE|
000040 F4F2C1C9 46090980 00000000 00000110 3A002311 040E02F5 F6F9F5F1 F1F7F0F1 |42AI.....569511701|
000060 F1F7F008 04F0F6F0 F1F0F70A 06C1C3C6 61E5E3C1 D4161101 130011F2 F0F6F400 |170..060107..ACF/VTAM.....2064.|
000080 00000000 F0F0F7F7 F9F1F0 |....0077910|
```

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- ▶ This is another XID3 from SSCP1A
- ▶ It wasn't mentioned before, but in the XID is a request.
- ▶ The LINK is now included because it was activated

C

PKTTRACE (IPID=0350)

```
412 MVS056 PACKET 00000004 12:10:19.393684 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=218
Tod Clock : 2006/02/20 12:10:19.393683 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 218 ID Number: 0350
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5E5F FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length : 198 CheckSum: 6B03 FFFF
EE: 190
```

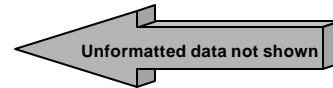
© Copyright International Business Machines Corporation 2006. All rights reserved.

- ▶ Another inbound UDP packet from 10.81.2.2

C

PKTTRACE (IPID=0350) cont.

```
LDLC:
Remote Sap      : 04          Source Sap: 09 Response Control: AF (XID3 without poll)
STID... 34      LENTH.. BB      BLKNM.. FFF.3BC06
NCHR... 10F7    BIND... 41      NGFL... 80      TGSU... A0
TGNO... 15      DLCT... 01      LEN.... 0B
SDLC:
LSCP... 7100    ABCN... 00      MBTU... 7FFF    PROF... 00
MODE... 00      MAXF... 00
Control Vectors:
Cv.... 0E      Len.... 09      Type... F1      PU..... ISTEPUS
Cv.... 0E      Len.... 0c      Type... F4      CP.NAME NETA.SSCP2A
Cv.... 0E      Len.... 09      Type... F7      LINK... SWEE41AH
Cv.... 46      Len.... 09      Transmission group
SV.... 80      Len.... 09      Transmission Group
00 09801500 00000000 02      *.....      *
Cv.... 61      Len.... 31      HPR Capabilities
Flags.. FE AnrLen.. 08
05 8001000A 01000000      *.....      *
SV.... 81      Len.... 23      HPR Transport Tower
00 03030000 EA6010BE 64C808BE 64C80808      *.....H...H.*
10 D4000000 00000000 08D20000 00000000      *M.....K.....*
20 00      *.....      *
SV.... 80      Len.... 03      Token Ring 802.2 LLC : 08
Cv.... 10      Len.... 3a      Product Set ID
SV.... 11      Len.... 23      IBM Software
SF... 02      Len.... 0E      Product component 569511701160
SF... 04      Len.... 08      Product level 060106
SF... 06      Len.... 0A      Product name ACF/VTAM
SV.... 11      Len.... 16      IBM Hardware
SF... 00      Len.... 13      Hardware product
00 130011F2 F0F6F400 00000000 F0F0F7F7      *...2064.....0077*
10 F9F1F0      *910      *
6 control vectors found
```



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- ▶ The formatted section of the UDP data shows this as a XID3 response
- ▶ This packets shows the link name from the other host as SWEE41AH because it has now been activated.
- ▶ The unformatted data has not been included due to lack of space

A

PKTTRACE

```
413 MVS056 EE 00000006 12:10:19.393823 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=190
Tod Clock : 2006/02/20 12:10:19.393822 Intfx: 34
Sequence # : 0 Flags: Dat Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
Data : 190 Data Length: 190
000000 0409AF34 BBFFF3BC 06000010 F7410080 0000A015 010B7100 7FFF0000 00000000 |.....3.....7.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F2 C10E09F7 E2E6C5C5 |..1ISTPUS ..4NETA.SSCP2A..7SWEE|
000040 F4F1C1C8 46090980 15000000 00000261 31FE0008 8001000A 01000000 23810303 |41AH...../.....a..|
000060 0000EA60 10BE64C8 08BE64C8 0808D400 00000000 000008D2 00000000 00000003 |...H...H..M.....K.....|
000080 8008103A 00231104 0E02F5F6 F9F5F1F1 F7F0F1F1 F6F00804 F0F6F0F1 F0F60A06 |.....569511701160..060106..|
0000A0 C1C3C661 E5E3CLD4 16110113 0011F2F0 F6F40000 000000F0 F0F7F7F9 F1F0 |ACF/VTAM.....2064.....0077910 |
```

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- ▶ This record indicates that the last inbound packet is being delivered to VTAM

(A)

PKTTRACE

```
414 MVS056 EE 00000006 12:10:19.393988 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=190
Tod Clock : 2006/02/20 12:10:19.393988 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12000 Dest Port: 12000 Asid: 002D TCB: 00000000
Data : 190 Data Length: 190
000000 0804AF34 BEFFF3BD 44000010 F7410080 0000A000 010B5100 7FFF0000 00000000 |.....3.....7.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F1 C10E09F7 E2E6C5C5 |..1ISTPUS ..4NETA.SSCP1A..7SWEE|
000040 F4F2C1C9 46090980 00000000 00000161 31FE0008 8001000A 01000000 23810303 |42AI...../.....a..|
000060 0000EA60 10BE64C7 42BE64C7 4208D400 00000000 000008D2 00000000 00000003 |...G...G..M.....K.....|
000080 8004103A 00231104 0E02F5F6 F9F5F1F1 F7F0F1F1 F7F00804 F0F6F0F1 F0F70A06 |.....569511701170..060107..|
0000A0 C1C3C661 E5E3C1D4 16110113 0011F2F0 F6F40000 000000F0 F0F7F7F9 F1F0 |ACF/VTAM.....2064.....0077910 |
```

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► This records shows the start of another outbound data flow

C

PKTTRACE (IPID=035f)

```
415 MVS056 PACKET 00000004 12:10:19.394015 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=218
Tod Clock        : 2006/02/20 12:10:19.394014  Intfx: 6
Sequence #       : 0          Flags: Pkt Ver2 Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12000      Dest Port: 12000 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : 0          QOS: Internetwork Normal Service
Packet Length    : 218      ID Number: 035F
Fragment         :          Offset: 0
TTL              : 64        Protocol: UDP          CheckSum: 5E50 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12000 (EE-XID)  Destination Port: 12000 (EE-XID)
Datagram Length  : 198          CheckSum: E1F FFFF
EE: 190
```

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- ▶ This is the IP and UDP headers of another outbound packet. Since this part is not necessarily the good part we will not always include speaker notes for these packets. Though, the packets will be included for a complete picture.

C

PKTTRACE (IPID=035f) cont.

```
LDLC:
Remote Sap      : 08          Source Sap: 04 Request Control: AF (XID3 without poll)
STID... 34      LENTH.. BB      BLKNM.. FFF.3BD44
NCHR... 10F7    BIND... 41      NGFL... 80      TGSU... A0
TGNO... 00      DLCT... 01      LEN.... 0B

SDLC:
LSCP... 5100    ABCN... 00      MTU... 7FFF     PROF... 00
MODE... 00      MAXF... 00

Control Vectors:
Cv..... 0E      Len.... 09      Type... F1      PU..... ISTPUS
Cv..... 0E      Len.... 0c      Type... F4      CP.NAME NETA.SSCP1A
Cv..... 0E      Len.... 09      Type... F7      LINK... SWEE42AI
Cv..... 46      Len.... 09      Transmission group
SV..... 80      Len.... 09      Transmission Group
SV..... 80      Len.... 09      Transmission Group
00 09800000 00000000 01 *..... *
Cv..... 61      Len.... 31      HPR Capabilities *..... *
Flags.. FE AnrLen.. 08
05 8001000A 01000000 *..... *
SV..... 81      Len.... 23      HPR Transport Tower
00 03030000 EA6010BE 64C742BE 64C74208 *.....G...G..*
10 D4000000 00000000 0BD20000 00000000 *M.....K.....*
20 00 *..... *
SV..... 80      Len.... 03      Token Ring 802.2 LLC + 04
Cv..... 10      Len.... 3a      Product Set ID
SV..... 11      Len.... 23      IBM Software
SF... 02      Len.... 0E      Product component 569511701170
SF... 04      Len.... 08      Product level 060107
SF... 06      Len.... 0A      Product name ACF/VTAM
SV..... 11      Len.... 16      IBM Hardware
SF... 00      Len.... 13      Hardware product
00 130011F2 F0F6F400 00000000 F0F0F7F7 *...2064.....0077*
10 F9F1F0 *910 *
6 control vectors found
```

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- ▶ Another XID3 request from 10.81.1.
- ▶ In this packet we see the HPR capabilities and the HPR Transport Tower information

C

PKTTRACE (IPID=0351)

```
416 MVS056 PACKET 00000004 12:10:19.394889 Packet Trace
From Interface : MPC4121L Device: Mpc Ptp Full=218
Tod Clock : 2006/02/20 12:10:19.394888 Intfx: 7
Sequence # : 0 Flags: Pkt Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 218 ID Number: 0351
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5E5E FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length : 198 CheckSum: 9AC3 FFFF
EE: 190
```

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- ▶ This is an inbound UDP packet from host 10.81.2.2.

(C)

PKTTRACE (IPID=0351) cont.

```
LDLC:
Remote Sap      : 04          Source Sap: 09 Response Control: AF (XID3 without poll)
STID... 34      LENTH.. BB      BLKNM... FFF.3BC06
NCHR... 10F7    BIND... 41      NGFL... C0      TGSU... A0
TGNO... 15      DLCT... 01      LEN.... 0B

SDLC:
LSCP... 4100    ABCN... 00      MTU... 7FFF     PROF... 00
MODE... 00      MAXF... 00

Control Vectors:
Cv.... 0E      Len.... 09      Type... F1      PU..... ISTEPUS
Cv.... 0E      Len.... 0c      Type... F4      CP.NAME NETA.SSCP2A
Cv.... 0E      Len.... 09      Type... F7      LINK... SWEE41AH
Cv.... 46      Len.... 09      Transmission group
SV.... 80      Len.... 09      Transmission Group
          00 09801500 00000000 02      *..... *
Cv.... 61      Len.... 31      HPR Capabilities
          05 8001000A 01000000      *..... *
          00 03030000 EA6010BE 64C808BE 64C80808      *.....H...H.*
          10 D4000000 00000000 0BD20000 00000000      *M.....K.....*
          20 00      *..... *
          20 00      *..... *
SV.... 80      Len.... 03      Token Ring 802.2 LLC : 86
Cv.... 10      Len.... 3a      Product Set ID
SV.... 11      Len.... 23      IBM Software
SF... 02      Len.... 0E      Product component 569511701160
SF... 04      Len.... 08      Product level      060106
SF... 06      Len.... 0A      Product name      ACF/VTAM
SV.... 11      Len.... 16      IBM Hardware
SF... 00      Len.... 13      Hardware product
          00 130011F2 F0F6F400 00000000 F0F0F7F7      *...2064.....0077*
          10 F9F1F0      *910 *
          6 control vectors found
```



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- ▶ We notice that it is a response
- ▶ This response also includes the LINK name from the other SSCP because it has now been activated.
- ▶ Again we see the HPR Capabilities and HPR Transport Tower
- ▶ The unformatted data has been deleted because of space

A

PKTTRACE

```
417 MVS056 EE 00000006 12:10:19.394908 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=190
Tod Clock : 2006/02/20 12:10:19.394908 Intfx: 34
Sequence # : 0 Flags: Dat Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
Data : 190 Data Length: 190
000000 0409AF34 BBFF3BC 06000010 F74100C0 0000A015 010B4100 7FFF0000 00000000 |.....3.....7.....".....|
000020 0E09F1C9 E2E3D7E4 E240400E 0CF4D5C5 E3C14BE2 E2C3D7F2 C10E09F7 E2E6C5C5 |..1LISTPUS ..4NETA.SSCP2A..7SWEE|
000040 F4F1C1C8 46090980 15000000 00000261 31FE0008 8001000A 01000000 23810303 |41AH...../.....a..|
000060 0000EA60 10BE64C8 08BE64C8 0808D400 00000000 000008D2 00000000 00000003 |...-...H...H...M.....K.....|
000080 8008103A 00231104 0E02F5F6 F9F5F1F1 F7F0F1F1 F6F00804 F0F6F0F1 F0F60A06 |.....569511701160..060106..|
0000A0 C1C3C661 E5E3C1D4 16110113 0011F2F0 F6F40000 000000F0 F0F7F7F9 F1F0 |ACF/VTAM.....2064.....0077910 |
```

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- ▶ This record and the following are EZASAMEMVS records for an inbound and outbound packet exchange. They occur independent of one another and therefore show up as two different records.

A

PKTTRACE

```
418 MVS056 EE 00000006 12:10:19.394991 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=10
Tod Clock : 2006/02/20 12:10:19.394991 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12000 Dest Port: 12000 Asid: 002D TCB: 00000000
Data : 10 Data Length: 10
000000 080403A0 100001FF 0003 |..... |
```

C

PKTTRACE (IPID=0360)

```
419 MVS056 PACKET 00000004 12:10:19.395013 Packet Trace
To Interface      : MPC4221L      Device: Mpc Ptp      Full=38
Tod Clock        : 2006/02/20 12:10:19.395013 Intfx: 8
Sequence #       : 0          Flags: Pkt Ver2 Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12000      Dest Port: 12000 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 38          ID Number: 0360
Fragment         :             Offset: 0
TTL              : 64          Protocol: UDP          CheckSum: 5F03 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length  : 18          CheckSum: 6CBF FFFF
EE: 10
LDLC:
Remote Sap       : 08          Source Sap: 04 Request Control: 03 (UI Control)
NLH Function
Tpf              : Low          Flags:
Type             : 0001        FRA: 0001 FRH: 03 (XID_DONE_RQ)
IP Header        : 20
000000 45C00026 03600000 40115F03 0A510101 0A510202
Protocol Header  : 8
000000 2EE02EE0 00126CBF
Data             : 10          Data Length: 10
000000 080403A0 100001FF 0003 |..... |
```

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► This is a resquest from 10.81.1.1 of XID3 done

C

PKTTRACE (IPID=0360)

```
420 MVS056 PACKET 00000004 12:10:19.395505 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=38
Tod Clock : 2006/02/20 12:10:19.395505 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 38 ID Number: 0352
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5F11 FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length : 18 CheckSum: 70BA FFFF
EE: 10
LDLC:
Remote Sap : 04 Source Sap: 08 Request Control: 03 (UI Control)
NLH Function
Tpf : Low Flags:
Type : 0001 FRA: 0001 FRH: 04 (XID_DONE_RSP)
IP Header : 20
000000 45C00026 03520000 40115F11 0A510202 0A510101
Protocol Header : 8
000000 2EE02EE0 001270BA
Data : 10 Data Length: 10
000000 040803A0 100001FF 0004 |..... |
```

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- ▶ The XID3 response from 10.81.2.2 of the XID3 exchanged being completed

A

PKTTRACE

```
421 MVS056 EE      00000006 12:10:19.395521 EE Trace Data
From Interface   : EZASAMEMVS      Device: Mpc Ptp      Full=10
Tod Clock       : 2006/02/20 12:10:19.395521      Intfx: 34
Sequence #     : 0                Flags: Dat Ver2
Source         : 10.81.2.2
Destination    : 10.81.1.1
Source Port    : 12000             Dest Port: 12000 Asid: 002B TCB: 00000000
Data          : 10                Data Length: 10
000000 040803A0 100001FF 0004      |.....|
```

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- ▶ Start of another outbound data flow.

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C

PKTTRACE (IPID=0363)

```
425 MVS056 PACKET 00000004 12:10:20.269071 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=235
Tod Clock        : 2006/02/20 12:10:20.269070 Intfx: 6
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001      Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0         QOS: Internetwork Normal Service
Packet Length    : 235       ID Number: 0363
Fragment         :           Offset: 0
TTL              : 64        Protocol: UDP          CheckSum: 5E3B FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 215       CheckSum: DEEB FFFF
EE: 207
```

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- ▶ We notice here that the UDP port pair has changed. It is now 12001.
- ▶ Notice that the Tos (Type of Service) has value x'c0' which is 'QOS Internet Normal Service'

C

PKTTRACE (IPID=0363) cont.

```
LDLC:
Remote Sap      : 08          Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
Tpfc           : Network      Flags: No_Delay
Type           : ANR Label    TP          ER Number  Address
NCE            : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID           : A4C742AF 0001014B
Reuse_Ct       : 24C742AF      Index: 0001          Element: 014B
Flag1          : 4C           Flag2: 0C
Offset         : 0030        Length: 00000000    Sequence: 00000000
Segment        : 05          Size: 26            Transport Address
00 26058000 0603D5C5 E3C10000 0800E2E2 *.....NETA....SS*
10 C3D7F1C1 0A26D400 00000000 00000000 *CP1A..M.....*
20 0639BE64 C7420000 0B0D0101 98000000 *...G.....q...*
30 0A2800C3 D7E2E5C3 D4C70000 0603D5C5 *...CPSVCMG...NE*
40 E3C10000 0800E2E2 C3D7F2C1 0639BE64 *TA....SSCP2A....*
50 C8080000 11140000 28838200 00000300 *H.....cb.....*
60 0000EA60 000000B4 0C670A00 8001000A *...-.....*
70 01000000 0C670A00 8001000A 01000000 *.....*
80 16850001 12461080 150BD5C5 E3C14BE2 *e.....NETA.S*
90 E2C3D7F1 C1210000 *SCP1A... *
Segment        : 22          Size: 05            Adaptive RB Pacing
00 05220100 000088B8 00013498 00000FA0 *.....h....q....*
```

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- ▶ Here 10.81.1.1 is sending a request with Transport Address and RB pacing information
 - ▶ The ANR Route is specified
 - ▶ TCID is also formatted here

C

PKTTRACE (IPID=0353)

```
426 MVS056 PACKET 00000004 12:10:20.440530 Packet Trace
From Interface : MPC4121L Device: Mpc Ptp Full=235
Tod Clock : 2006/02/20 12:10:20.440528 Intfx: 7
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version : 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 235 ID Number: 0353
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5E4B FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 215 CheckSum: C822 FFFF
```

C

PKTTRACE (IPID=0353) cont.

```
LDLC:
Remote Sap      : 04          Source Sap: 08 Request Control: 03 (UI Cont)
NLH Anr Route
TpF             : Network    Flags: No_Delay
Type           : ANR Label   TP          ER Number  Address
NCE            : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID           : A4C80892 00010081
Reuse_Ct      : 24C80892      Index: 0001      Element: 0081
Flag1         : 4C           Flag2: 0C
Offset        : 0030        Length: 00000000 Sequence: 00000000
Segment       : 05          Size: 26         Transport Address
00 26058000 0603D5C5 E3C10000 0800E2E2 *.....NETA....SS*
10 C3D7F2C1 0A26D400 00000000 00000000 *CP2A..M.....*
20 0639BE64 C8080000 0B0D0101 98000000 *...H.....q...*
30 0A2800C3 D7E2E5C3 D4C70000 0603D5C5 *...CPSVCMG....NE*
40 E3C10000 0800E2E2 C3D7F1C1 0639BE64 *TA....SSCP1A....*
50 C7420000 11140000 28838200 00000300 *G.....cb.....*
60 0000EA60 000000B4 0C670A00 8001000A *.....*
70 01000000 0C670A00 8001000A 01000000 *.....*
80 16850001 12461080 150BD5C5 E3C14BE2 *e.....NETA.S*
90 E2C3D7F2 C1210000 *SCP2A... *
Segment       : 22          Size: 05         Adaptive RB Pacing
00 05220100 000088B8 00013498 00000FA0 *.....h....q....*
10 0000012C *.....*
```

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- ▶ Here is a request from the other host (10.81.2.2) with the same type of information.

A

PKTTRACE

```
427 MVS056 EE 00000006 12:10:20.440587 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=207
Tod Clock : 2006/02/20 12:10:20.440587 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
Data : 207 Data Length: 207
000000 040803C6 08D40000 00000000 00FF00A4 C8089200 0100814C 0C003000 00000000 |...F.M.....uH.k...a<.....|
000020 00000026 05800006 03D5C5E3 C1000008 00E2E2C3 D7F2C10A 26D40000 00000000 |.....NETA....SSCP2A..M.....|
000040 00000006 39BE64C8 0800000B 0D010198 0000000A 2800C3D7 E2E5C3D4 C7000006 |.....H.....q.....CPSVCMG...|
000060 03D5C5E3 C1000008 00E2E2C3 D7F1C106 39BE64C7 42000011 14000028 83820000 |.NETA....SSCP1A....G.....cb..|
000080 00030000 00EA6000 0000B40C 670A0080 01000A01 0000000C 670A0080 01000A01 |.....-.....|
0000A0 00000016 85000112 46108015 0BD5C5E3 C14BE2E2 C3D7F2C1 21000005 22010000 |....e.....NETA.SSCP2A.....|
```

C

PKTTRACE

```
428 MVS056 PACKET 00000004 12:10:20.446690 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=95
Tod Clock : 2006/02/20 12:10:20.446689 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 95 ID Number: 0354
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5ED6 FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 75 CheckSum: A731 FFFF
EE: 67
E
Remote Sap : 04 Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
Tpf : Network Flags: No_Delay
Type ANR Label TP ER Number Address
NCE D4000000 00000000 *NA* *NA* *NA*
Thdr
TCID : 24C742AF 0001014B
Reuse_Ct : 24C742AF Index: 0001 Element: 014B
Flag1 : 00 Flag2: 04
Offset : 000D Length: 00000000 Sequence: 00000000
Segment : 10 Size: 03 Conn ID Exchange
00 03100000 A4C80893 00010082 *....uH.l...b *
Segment : 0E Size: 05 Status
00 050E0000 00010000 00000000 00000000 *.....*
10 00000000 *....*
```

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- ▶ This packet is small enough to show IP and UDP headers as well as the EE formatted data
 - ▶ This is an inbound CONN ID Exchange and status packet

C

PKTTRACE

```
429 MVS056 PACKET 00000004 12:10:20.446740 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=95
Tod Clock : 2006/02/20 12:10:20.446740 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 95 ID Number: 0355
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5ED5 FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 75 CheckSum: A5E5 FFFF
EE: 67
LDLC:
Remote Sap : 04 Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
Tpf : Network Flags: No_Delay
Type ANR Label TP ER Number Address
NCE D4000000 00000000 *NA* *NA* *NA*
Thdr
TCID : 24C742AF 0001014B
Reuse_Ct : 24C742AF Index: 0001 Element: 014B
Flag1 : 0C Flag2: 04
Offset : 000D Length: 00000000 Sequence: 00000000
Segment : 10 Size: 03 Conn ID Exchange
Segment 00 03100000 A4C80893 00010082 *....uH.l...b *
Segment : 0E Size: 05 Status
Segment 00 050E4000 00020000 00000000 00000000 *.. .....
```

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- Pages 57-64 does not show much but some status information going back and forth.. It is only included for continuity's sake. There are no more notes until page 64

A

PKTTRACE

```
431 MVS056 EE 00000006 12:10:20.446844 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=67
Tod Clock : 2006/02/20 12:10:20.446844 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Pdup Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
Data : 67 Data Length: 67
000000 040803C6 08D40000 00000000 00FF0024 C742AF00 01014B0C 04000D00 00000000 |...F.M.....G.....|
000020 00000003 100000A4 C8089300 01008205 0E400000 02000000 00000000 00000000 |.....uH.l..b..|
000040 000000 |...
```

C

PKTTRACE

```
433 MVS056 PACKET 00000004 12:10:20.555533 Packet Trace
To Interface      : MPC4221L      Device: Mpc Ptp      Full=83
Tod Clock        : 2006/02/20 12:10:20.555532      Intfx: 8
Sequence #       : 0           Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001        Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4           Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 83         ID Number: 0364
Fragment         :           Offset: 0
TTL              : 64         Protocol: UDP          CheckSum: 5ED2 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 63         CheckSum: 7739 FFFF
EE: 55
LDLC:
Remote Sap       : 08         Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
TpF              : Network    Flags: No_Delay
Type            ANR Label    TP      ER Number  Address
NCE             D4000000 00000000 *NA*    *NA*    *NA*
Thdr
TCID             : 24C80893 00010082
Reuse_Ct        : 24C80893      Index: 0001          Element: 0082
Flag1           : 00           Flag2: 04
Offset          : 000A        Length: 00000000     Sequence: 00000000
Segment         : 0E          Size: 05             Status
00 050E0000 00010002 00000000 00000000 *.....*
10 00000000 *....*
```

A

PKTTRACE

```

434 MVS056 EE 00000006 12:10:20.555771 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=67
Tod Clock : 2006/02/20 12:10:20.555770 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Pdus Adj Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12001 Dest Port: 12001 Asid: 002D TCB: 00000000
Data : 67 Data Length: 67
000000 080403C6 08D40000 00000000 00FF0024 C8089200 01008100 04000D00 00000000 |...F.M.....H.k...a.....|
000020 00000003 100000A4 C742B000 01014D05 0E000000 01000000 00000000 00000000 |.....uG.....(.. ..)|
000040 000000 |...

```

A

```

435 MVS056 EE 00000006 12:10:20.555772 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=67
Tod Clock : 2006/02/20 12:10:20.555772 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Pdus Adj Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12001 Dest Port: 12001 Asid: 002D TCB: 00000000
Data : 67 Data Length: 67
000000 080403C6 08D40000 00000000 00FF0024 C8089200 0100810C 04000D00 00000000 |...F.M.....H.k...a.....|
000020 00000003 100000A4 C742B000 01014D05 0E400000 02000000 00000000 00000000 |.....uG.....(.. ..)|
000040 000000 |...

```

C

PKTTRACE

```
436 MVS056 PACKET 00000004 12:10:20.555814 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=95
Tod Clock        : 2006/02/20 12:10:20.555814      Intfx: 6
Sequence #       : 0              Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001          Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4              Header Length: 20
Tos              : C0              QOS: Internetwork Normal Service
Packet Length    : 95              ID Number: 0365
Fragment         :                  Offset: 0
TTL              : 64              Protocol: UDP          CheckSum: 5EC5 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 75              CheckSum: A235 FFFF
EE: 67
LDLC:
Remote Sap       : 08              Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
Tpf              : Network        Flags: No_Delay
Type            : ANR Label       TP      ER Number  Address
NCE              D4000000 00000000 *NA*    *NA*    *NA*
Thdr
TCID             : 24C80892 00010081
Reuse_Ct        : 24C80892      Index: 0001          Element: 0081
Flag1           : 00              Flag2: 04
Offset          : 000D           Length: 00000000     Sequence: 00000000
Segment         : 10              Size: 03             Conn ID Exchange
00 03100000 A4C742B0 0001014D      *...uG....( *
Segment        : 0E              Size: 05             Status
```

C

PKTTRACE

```
437 MVS056 PACKET 00000004 12:10:20.555822 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=95
Tod Clock        : 2006/02/20 12:10:20.555822  Intfx: 6
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001      Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0        QOS: Internetwork Normal Service
Packet Length    : 95        ID Number: 0366
Fragment         :           Offset: 0
TTL              : 64        Protocol: UDP          CheckSum: 5EC4 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 75        CheckSum: A0E9 FFFF
EE: 67
LLLC:
Remote Sap       : 08        Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
TpF              : Network   Flags: No_Delay
Type            : ANR Label  TP      ER Number  Address
NCE             : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID            : 24C80892 00010081
Reuse_Ct        : 24C80892      Index: 0001          Element: 0081
Flag1           : 0C          Flag2: 04
Offset          : 000D        Length: 00000000     Sequence: 00000000
Segment         : 10          Size: 03             Conn ID Exchange
00 03100000 A4C742B0 0001014D      *...uG....( *
Segment         : 0E          Size: 05             Status
```

C

PKTTRACE

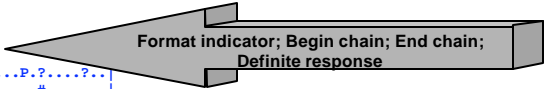
```
438 MVS056 PACKET 00000004 12:10:20.556700 Packet Trace
From Interface : MPC4121L Device: Mpc Ptp Full=256
Tod Clock : 2006/02/20 12:10:20.556700 Intfx: 7
Sequence # : 0 Flags: Pkt Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version : 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 256 ID Number: 0356
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5E33 FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 236 CheckSum: E074 FFFF
EE: 228
```

PKTTRAC

```

LDLC:
Remote Sap      : 04          Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
TpF             : Network    Flags: No_Delay
Type           : ANR Label   TP          ER Number  Address
NCE            : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID           : 24C742B0 0001014D
Reuse_Ct      : 24C742B0      Index: 0001          Element: 014D
Flag1         : 3C           Flag2: 04
Offset        : 000D        Length: 000000A1     Sequence: 00000000
Segment       : 22          Size: 03             Adaptive RB Pacing
                00 03228510 0001CC60 00000000      *.e.....*
Segment       : 0E          Size: 05             Status
                00 050E0000 00010002 00000000 00000000      *.....*
                10 00000000      *.....*
TH5
Flags..5D00      SNF....0017      SA.....80000000 00000001
Rh - Session Control Request - Bind Session
RH.....6B8000 - FI BCI ECI DR1
Ru: 146
000000 31001307 B0B050B3 3F879797 873F0602 |.....&..gppg... 1....P.?....?..|
000010 00000000 00000000 2300000B D5C5E3C1 |.....NETA.....#.....|
000020 4BE2E2C3 D7F2C121 000802C3 D7E2E5C3 |.SSCP2A....CPSVC K.....!.....|
000030 D4C70903 01ABEEC3 FBB087B5 0C04D5C5 |MG.....C..g...NE.....|
000040 E3C14BE2 E2C3D7F2 C1000BD5 C5E3C14B |TA.SSCP2A..NETA..K.....K|
000050 E2E2C3D7 F1C16014 F6ABEEC3 FBB087B5 |SSCP1A-.6..C..g.....|
000060 0BD5C5E3 C14BE2E2 C3D7F2C1 2B180101 |.NETA.SSCP2A.....K.....+...|
000070 16461480 150BD5C5 E3C14BE2 E2C3D7F1 |.....NETA.SSCP1 .F.....K.....|
000080 C1218000 00022C0A 0708C3D7 E2E5C3D4 |A.....CPSVCM .!.....|
000090 C740      |g.....@.....|

```



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- ▶ This is the first data packet that shows TH, RH and RU data.
- ▶ Notice that the RH individual bits are broken down for their meaning. Pretty cool, huh?
- ▶ This is a BIND request from 10.81.2.2.

A

PKTTRACE

```

439 MVS056 EE 00000006 12:10:20.556748 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=228
Tod Clock : 2006/02/20 12:10:20.556748 Intfx: 34
Sequence # : 0 Flags: Dat Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
Data : 228 Data Length: 228
000000 040803C6 08D40000 00000000 00FF0024 C742B000 01014D3C 04000D00 0000A100 |...F.M.....G.....|
000020 00000003 22851000 01CC6000 00000005 0E000000 01000200 00000000 00000000 |.....e.....|
000040 0000005D 00001780 00000000 0000016B 80003100 1307B0B0 50B33F87 9797873F |.....&..gpps..|
000060 06020000 00000000 00002300 000BD5C5 E3C14BE2 E2C3D7F2 C1210008 02C3D7E2 |.....NETA.SSCP2A...CPS|
000080 E5C3D4C7 090301AB EEC3FB00 87B50C04 D5C5E3C1 4BE2E2C3 D7F2C100 0BD5C5E3 |VCMG....C..g...NETA.SSCP2A..NET|
0000A0 C14BE2E2 C3D7F1C1 6014F6AB EEC3FB00 87B50BD5 C5E3C14B E2E2C3D7 F2C12B18 |A.SSCP1A-.6..C..g...NETA.SSCP2A..|
0000C0 01011646 1480150B D5C5E3C1 4BE2E2C3 D7F1C121 80000002 2C0A0708 C3D7E2E5 |.....NETA.SSCP1A.....CPSV|
0000E0 C3D4C740 |CMG|

```

A

```

MVS056 EE 00000006 12:10:20.584487 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=67
Tod Clock : 2006/02/20 12:10:20.584485 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Adj Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12001 Dest Port: 12001 Asid: 002D TCB: 00000000
Data : 67 Data Length: 67
000000 080403C6 08D40000 00000000 00FF0024 C8089200 01008100 04000D00 00000000 |...F.M.....H.k...a.....|
000020 00000003 22410100 00000000 00000005 0E000000 02000100 0000A200 00000000 |.....s.....|
000040 000000 |...|

```

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► This page is more of what we have seen before and is included for completeness

C

PKTTRACE

```
441 MVS056 PACKET 00000004 12:10:20.584536 Packet Trace
To Interface      : MPC4221L      Device: Mpc Ptp      Full=95
Tod Clock        : 2006/02/20 12:10:20.584535      Intfx: 8
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001      Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 95          ID Number: 0367
Fragment         :             Offset: 0
TTL              : 64          Protocol: UDP          CheckSum: 5EC3 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 75          CheckSum: B0DC FFFF
EE: 67
LDLC:
Remote Sap       : 08          Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
TpF              : Network     Flags: No_Delay
Type            : ANR Label    TP          ER Number  Address
NCE             : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID             : 24C80892 00010081
Reuse_Ct        : 24C80892      Index: 0001          Element: 0081
Flag1           : 00          Flag2: 04
Offset          : 000D        Length: 00000000     Sequence: 00000000
Segment         : 22          Size: 03             Adaptive RB Pacing
Segment         : 00 03224101 00000000 00000000 *.....*
Segment         : 0E          Size: 05             Status
Segment         : 00 050E0000 00020001 000000A2 00000000 *.....s....*
Segment         : 10 00000000 *....*
```

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A

PKTTRACE

```
442 MVS056 EE 00000006 12:10:20.585627 EE Trace Data
To Interface : EZASAMEMVS Device: Mpc Ptp Full=208
Tod Clock : 2006/02/20 12:10:20.585626 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Out
Source : 10.81.1.1
Destination : 10.81.2.2
Source Port : 12001 Dest Port: 12001 Asid: 002D TCB: 00000000
Data : 208 Data Length: 208
000000 080403C6 08D40000 00000000 00FF0024 C8089300 0100823C 04000800 0000A100 |...F.M.....H.l...b.....|
000020 00000003 22851000 04D54000 0000005D 00002180 00000000 0000016B 80003100 |.....e...N ....)|.....|
000040 1307B0B0 50B33F87 9797873F 06020000 00000000 00002300 000BD5C5 E3C14BE2 |...&..gppg.....NETA.S|
000060 E2C3D7F1 C1210008 02C3D7E2 E5C3D4C7 090301AB EEC3F8B0 6F020C04 D5C5E3C1 |SCP1A...CPSVCMG....C8.?.NETA|
000080 4BE2E2C3 D7F1C100 0BD5C5E3 C14BE2E2 C3D7F2C1 6014EAAB EEC3F8B0 6F020BD5 |.SSCP1A..NETA.SSCP2A-....C8.?.N|
0000A0 C5E3C14B E2E2C3D7 F1C12B18 01011646 1480150B D5C5E3C1 4BE2E2C3 D7F2C121 |ETA.SSCP1A.....NETA.SSCP2A.|
0000C0 80000001 2C0A0708 C3D7E2E5 C3D4C740 |.....CPSVCMG
```

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C

PKTTRACE

```
443 MVS056 PACKET 00000004 12:10:20.585647 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=236
Tod Clock        : 2006/02/20 12:10:20.585647      Intfx: 6
Sequence #       : 0          Flags: Pkt Ver2 Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001      Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 236        ID Number: 0368
Fragment         :            Offset: 0
TTL              : 64          Protocol: UDP          CheckSum: 5E35 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 216        CheckSum: 3040 FFFF
EE: 208
```

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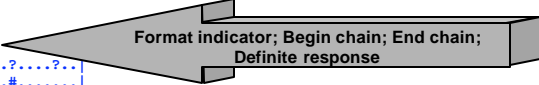
PKTTRACE

```

LDLC:
Remote Sap      : 08          Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
TpF             : Network    Flags: No_Delay
Type           : ANR Label   TP          ER Number  Address
NCE            : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID           : 24C80893 00010082
Reuse_Ct      : 24C80893      Index: 0001      Element: 0082
Flag1         : 3C           Flag2: 04
Offset        : 0008        Length: 000000A1 Sequence: 00000000
Segment       : 22          Size: 03         Adaptive RB Pacing
                00 03228510 0004D540 00000000      *..e...N .... *

TH5
Flags..5D00      SNF....0021      SA.....80000000 00000001
Rh - Session Control Request - Bind Session
RH.....6B8000 - FI BCI ECI DR1
Ru: 146
000000 31001307 B0B050B3 3F879797 873F0602 |.....&..gppg... 1....P.?....?.|
000010 00000000 00000000 2300000B D5C5E3C1 |.....NETA .....#.....|
000020 4BE2E2C3 D7F1C121 000802C3 D7E2E5C3 |.SSCP1A....CPSVC K.....!.....|
000030 D4C70903 01ABEEC3 F8B06F02 0C04D5C5 |MG....C8.?...NE .....O.....|
000040 E3C14BE2 E2C3D7F1 C1000BD5 C5E3C14B |TA.SSCP1A..NETA. ..K.....K...|
000050 E2E2C3D7 F2C16014 EAABEEC3 F8B06F02 |SSCP2A-....C8.?.....O.....|
000060 0BD5C5E3 C14BE2E2 C3D7F1C1 2B180101 |.NETA.SSCP1A.....K.....+....|
000070 16461480 150BD5C5 E3C14BE2 E2C3D7F2 |.....NETA.SSCP2 .F.....K.....|
000080 C1218000 00012C0A 0708C3D7 E2E5C3D4 |A.....CPSVCM .!.....!.....|
000090 C740          |G          .@          |

```



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► This is a BIND request from 10.81.1.1

C

PKTTRACE

```
444 MVS056 PACKET 00000004 12:10:20.590215 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=95
Tod Clock : 2006/02/20 12:10:20.590214 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 95 ID Number: 0357
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5ED3 FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 75 CheckSum: CE9D FFFF
EE: 67
LDLC:
Remote Sap : 04 Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
Tpf : Network Flags: No_Delay
Type ANR Label TP ER Number Address
NCE D4000000 00000000 *NA* *NA* *NA*
Thdr
TCID : 24C742AF 0001014B
Reuse_Ct : 24C742AF Index: 0001 Element: 014B
Flag1 : 00 Flag2: 04
Offset : 000D Length: 00000000 Sequence: 00000000
Segment : 22 Size: 03 Adaptive RB Pacing
00 03224101 00000000 00000000 *.....*
Segment : 0E Size: 05 Status
00 050E0000 00020001 000000A2 00000000 *.....s....*
10 00000000 *....*
```

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► Nothing much here except exchange status information

A

PKTTRACE

```
445 MVS056 EE 00000006 12:10:20.590260 EE Trace Data
From Interface : EZASAMEMVS Device: Mpc Ptp Full=67
Tod Clock : 2006/02/20 12:10:20.590260 Intfx: 34
Sequence # : 0 Flags: Dat Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
Data : 67 Data Length: 67
000000 040803C6 08D40000 00000000 00FF0024 C742AF00 01014B00 04000D00 00000000 |...F.M.....G.....|
000020 00000003 22410100 00000000 00000005 0E000000 02000100 0000A200 00000000 |.....S.....|
000040 000000 |...
```

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- ▶ This page is more of what we have seen before and is included for completeness

C

PKTTRACE

```
446 MVS056 PACKET 00000004 12:10:20.621388 Packet Trace
From Interface : MPC4121L Device: Mpc Ptp Full=212
Tod Clock : 2006/02/20 12:10:20.621387 Intfx: 7
Sequence # : 0 Flags: Pkt Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : 0 QOS: Internetwork Normal Service
Packet Length : 212 ID Number: 0358
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5E5D FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 192 CheckSum: 39A6 FFFF
EE: 184
```

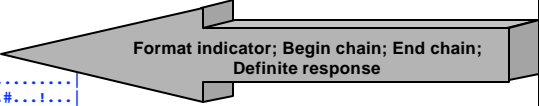
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- ▶ This page is more of what we have seen before and is included for completeness

PKTTRACE

```
LDLC:
Remote Sap      : 04          Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
TpF             : Network    Flags: No_Delay
Type           : ANR Label   TP          ER Number  Address
NCE            : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID           : 24C742AF 0001014B
Reuse_Ct       : 24C742AF      Index: 0001      Element: 014B
Flag1          : 3C          Flag2: 04
Offset         : 0008      Length: 00000089 Sequence: 00000000
Segment        : 22          Size: 03      Adaptive RB Pacing
                00 03228510 40F70CD0 00000000      *..e. 7..... *

TH5
Flags..5D00      SNF....0021      SA.....00000000 00000001
Rh - Session Control Response - Bind Session
RH.....EB8000 - FI BCI ECI DR1
Ru: 122
000000 31001307 B0B050B3 00809797 80000602 |.....&...pp... 1....P.....|
000010 00000000 00000000 23000000 21000802 |.....#...!...|
000020 C3D7E2E5 C3D4C709 0302ABEE C3F8B06F |CPSVCMG....C8.? .....o|
000030 020C05D5 C5E3C14B E2E2C3D7 F2C10000 |...NETA.SSCP2A. ....K.....|
000040 6014EAAB EEC3F8B0 6F020BD5 C5E3C14B |.....C8.?..NETA. ....O.....K|
000050 E2E2C3D7 F1C16208 80000000 00000002 |SSCP1A..... .b.....|
000060 2B180101 16461480 150BD5C5 E3C14BE2 |.....NETA.S +...F.....K.|
000070 E2C3D7F2 C1218000 0001 |SCP2A..... .!....|
```



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- ▶ This is the BIND response from 10.81.2.2
 - ▶ Notice that we can match up the response to the request with the SNF (Sequence Number Field) in the TH.


```

  A
                                PKTTRACE
From Interface   : EZASAMEMVS      Device: Mpc Ptp      Full=184
Tod Clock       : 2006/02/20 12:10:20.621554      Intfx: 34
Sequence #      : 0                Flags: Dat Ver2
Source          : 10.81.2.2
Destination     : 10.81.1.1
Source Port     : 12001             Dest Port: 12001 Asid: 002B TCB: 00000000
Data            : 184              Data Length: 184
000000 040803C6 08D40000 00000000 00FF0024 C742AF00 01014B3C 04000800 00008900 |...F.M.....G.....i.|
000020 00000003 22851040 F70CD000 0000005D 00002100 00000000 000001EB 80003100 |.....e. 7.....)|
000040 1307B0B0 50B30080 97978000 06020000 00000000 00002300 00002100 0802C3D7 |....&...pp.....CP|
000060 E2E5C3D4 C7090302 ABEEC3F8 B06F020C 05D5C5E3 C14BE2E2 C3D7F2C1 00006014 |SVC MG...C8.?..NETA.SSCP2A...|
000080 EAABEEC3 F8B06F02 0BD5C5E3 C14BE2E2 C3D7F1C1 62088000 00000000 00022B18 |...C8.?..NETA.SSCP1A.....|
0000A0 01011646 1480150B D5C5E3C1 4BE2E2C3 D7F2C121 80000001 |.....NETA.SSCP2A.....|

  A
448 MVS056 EE 00000006 12:10:20.621954 EE Trace Data
To Interface    : EZASAMEMVS      Device: Mpc Ptp      Full=67
Tod Clock       : 2006/02/20 12:10:20.621954      Intfx: 34
Sequence #      : 0                Flags: Dat Ver2 Adj Out
Source          : 10.81.1.1
Destination     : 10.81.2.2
Source Port     : 12001             Dest Port: 12001 Asid: 002D TCB: 00000000
Data            : 67              Data Length: 67
000000 080403C6 08D40000 00000000 00FF0024 C8089300 01008200 04000D00 00000000 |...F.M.....H.l...b.....|
000020 0000A203 22410100 00000000 00000005 0E000000 01000200 00008A00 00000000 |..S.....|
000040 000000

```

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C

PKTTRACE

```
451 MVS056 PACKET 00000004 12:10:20.649989 Packet Trace
To Interface      : MPC4121L          Device: Mpc Ptp      Full=200
Tod Clock        : 2006/02/20 12:10:20.649988      Intfx: 6
Sequence #       : 0              Flags: Pkt Ver2 Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001          Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4              Header Length: 20
Tos              : C0            QOS: Internetwork Normal Service
Packet Length    : 200          ID Number: 036A
Fragment         :              Offset: 0
TTL              : 64           Protocol: UDP        CheckSum: 5E57 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 180          CheckSum: 4C04 FFFF
EE: 172
```

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PKTTRACE

```

LDLC:
Remote Sap      : 08          Source Sap: 04 Request Control: 03 (UI Contr
NLH Anr Route
Tpf            : Network      Flags: No_Delay
Type          : ANR Label    TP          ER Number  Address
NCE           : D4000000 00000000 *NA*      *NA*      *NA*
Thdr
TCID          : 24C80892 00010081
Reuse_Ct     : 24C80892      Index: 0001      Element: 0081
Flag1        : 3C           Flag2: 00
Offset       : 0005        Length: 00000089 Sequence: 00000000
TH5
Flags..5D00   SNF....0017   SA.....00000000 00000001

```

Rh - Session Control Response - Bind Session

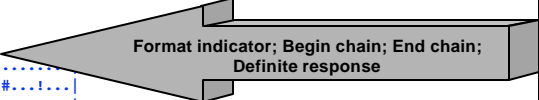
RH.....EB8000 - FI BCI ECI DR1

Ru: 122

```

000000 31001307 B0B050B3 00809797 80000602 |.....&...pp... 1....P.....|
000010 00000000 00000000 23000000 21000802 |.....#.....|
000020 C3D7E2E5 C3D4C709 0302ABEE C3FB0807 |CPSVCMG....C..g.....|
000030 B50C05D5 C5E3C14B E2E2C3D7 F1C10000 |..NETA.SSCP1A.....K.....|
000040 6014F6AB EEC3FB00 87B50BD5 C5E3C14B |-.6..C..g..NETA.....K.....|
000050 E2E2C3D7 F2C16208 80000000 00000002 |SSCP2A.....b.....|
000060 2B180101 16461480 150BD5C5 E3C14BE2 |.....NETA.S +....F.....K.....|
000070 E2C3D7F1 C1218000 0002      |SCP1A..... ..!.....|

```



► This is the BIND response from 10.81.1.1

C

PKTTRACE

```
452 MVS056 PACKET 00000004 12:10:20.650896 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=83
Tod Clock : 2006/02/20 12:10:20.650895 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 83 ID Number: 0359
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5EDD FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 63 CheckSum: 67F9 FFFF
EE: 55
LDLC:
Remote Sap : 04 Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
Tpf : Network Flags: No_Delay
Type ANR Label TP ER Number Address
NCE D4000000 00000000 *NA* *NA* *NA*
Thdr
TCID : 24C742B0 0001014D
Reuse_Ct : 24C742B0 Index: 0001 Element: 014D
Flag1 : 00 Flag2: 04
Offset : 000A Length: 00000000 Sequence: 000000A2
Segment : 0E Size: 05 Status
00 050E0000 00010002 0000008A 00000000 *.....*
10 00000000 *....*
```

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► This page is more of what we have seen before and is included for completeness

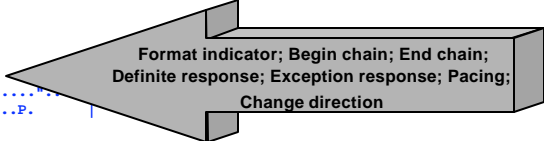
C

PKTTRACE

```

455 MVS056 PACKET 00000004 12:10:20.652417 Packet Trace
To Interface      : MPC4221L      Device: Mpc Ptp      Full=104
Tod Clock        : 2006/02/20 12:10:20.652416 Intfx: 8
Sequence #       : 0          Flags: Pkt Ver2 Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12001      Dest Port: 12001 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : CO        QOS: Internetwork Normal Service
Packet Length    : 104      ID Number: 036B
Fragment         :          Offset: 0
TTL              : 64       Protocol: UDP        CheckSum: 5EB6 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length  : 84       CheckSum: DAD7 FFFF
EE: 76
LDLC:
Remote Sap       : 08        Source Sap: 04 Request Control: 03 (UI Control)
NLH Anr Route
Tpf              : Network   Flags: No_Delay
Type            : ANR Label  TP      ER Number Address
NCE             : D4000000 00000000 *NA*   *NA*   *NA*
Thdr
TCID            : 24C80893 00010082
Reuse_Ct        : 24C80893      Index: 0001      Element: 0082
Flag1           : 3C          Flag2: 00
Offset          : 0005        Length: 00000029 Sequence: 000000A2
TH5
Flags..5C00     SNF....0001     SA.....00000000 00000002
Rh - FM Data Request -
RH.....0B9120 - FI BCI ECI DR1 ERI PI CDI
Ru: 26
000000 0E0502FF 0003D000 000422F0 F0F1000C |.....001.. .....
000010 12C10000 0000FEEC 5000 |.A.....&. ....P.

```



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► This is another PIU from 10.81.1.1

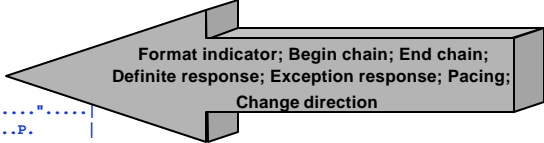
C

PKTTRACE

```

458 MVS056 PACKET 00000004 12:10:20.677905 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=116
Tod Clock : 2006/02/20 12:10:20.677904 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12001 Dest Port: 12001 Asid: 002B TCB: 00000000
IpHeader: Version : 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 116 ID Number: 035B
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5EBA FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12001 (EE-Network) Destination Port: 12001 (EE-Network)
Datagram Length : 96 CheckSum: 5C20 FFFF
EE: 88
LDLC:
Remote Sap : 04 Source Sap: 08 Request Control: 03 (UI Control)
NLH Anr Route
Tpf : Network Flags: No_Delay
Type ANR Label TP ER Number Address
NCE D4000000 00000000 *NA* *NA* *NA*
Thdr
TCID : 24C742B0 0001014D
Reuse_Ct : 24C742B0 Index: 0001 Element: 014D
Flag1 : 3C Flag2: 04
Offset : 0008 Length: 00000029 Sequence: 000000A2
Segment : 22 Size: 03 Adaptive RB Pacing
00 03228520 0001D850 00000000 *..e...Q&.... *
TH5
Flags..5C00 SNF....0001 SA.....00000000 00000002
Rh - FM Data Request -
RH.....0B9120 - FI BCI ECI DR1 ERI PI CDI
Ru: 26
000000 0E0502FF 0003D000 000422F0 F0F1000C |.....001.....".....|
000010 12C10000 0000FEBC 5000 |.A.....&. ....P.|

```



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► Same type of PIU from 10.81.2.2

```

  (A)
  PKTTRACE
  516 MVS056 EE      00000006 12:10:42.824199 EE Trace Data
  To Interface      : EZASAMEMVS      Device: Mpc Ptp      Full=3
  Tod Clock         : 2006/02/20 12:10:42.824196      Intfx: 34
  Sequence #       : 0                Flags: Dat Ver2 Adj Out
  Source            : 10.81.1.1
  Destination      : 10.81.2.2
  Source Port      : 12000             Dest Port: 12000 Asid: 002D TCB: 00000000
  Data             : 3                Data Length: 3
  000000 0804F3                                     |..3 |

  D RTPS, ID=CNR00001, TEST=YES

  This
  command
  is
  issued

```

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- ▶ You will notice that there is a significant time lapse between this trace entry and the previous entry. Many status type data exchanges were not included to save space
- ▶ This data is generated from entering a D RTPS, ID=xxxxx, TEST=YES
 - ▶ This is a test of the RTP pipe
- ▶ A one byte data field (x'f3') is sent to the other host along with the remote and local SAPs .
- ▶ This record shows that data coming from VTAM to the DLC layer.

C

PKTTRACE

```
517 MVS056 PACKET 00000004 12:10:42.824243 Packet Trace
To Interface      : MPC4121L      Device: Mpc Ptp      Full=31
Tod Clock        : 2006/02/20 12:10:42.824242      Intfx: 6
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12000      Dest Port: 12000 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0          QOS: Internetwork Normal Service
Packet Length    : 31          ID Number: 0380
Fragment         :             Offset: 0
TTL              : 64          Protocol: UDP          CheckSum: 5EEA FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length  : 11          CheckSum: 8F6E FFFF
EE: 3
LDLC:
Remote Sap       : 08          Source Sap: 04 Request Control: F3 (TEST Control)
IP Header        : 20
000000 45C0001F 03800000 40115EEA 0A510101 0A510202
Protocol Header  : 8
000000 2EE02EE0 000B8F6E
Data             : 3          Data Length: 3
000000 0804F3                                     |..3 |
```

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- ▶ The same data packet traced in at the IP layer
- ▶ Notice that this btype of data flows on port 12000

C

PKTTRACE

```
518 MVS056 PACKET 00000004 12:10:42.825134 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=31
Tod Clock : 2006/02/20 12:10:42.825133 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 31 ID Number: 036D
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5EFD FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length : 11 CheckSum: 936A FFFF
EE: 3
LDLC:
Remote Sap : 04 Source Sap: 08 Request Control: F3 (TEST Control)
IP Header : 20
000000 45C0001F 036D0000 40115EFD 0A510202 0A510101
Protocol Header : 8
000000 2EE02EE0 000B936A
Data : 3 Data Length: 3
000000 0408F3 |..3 |
```

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- We start the process from the 10.81.2.2 host.

(C)

PKTTRACE

```
519 MVS056 PACKET 00000004 12:10:42.825141 Packet Trace
From Interface : MPC4221L Device: Mpc Ptp Full=31
Tod Clock : 2006/02/20 12:10:42.825141 Intfx: 9
Sequence # : 0 Flags: Pkt Ver2 Adj
Source : 10.81.2.2
Destination : 10.81.1.1
Source Port : 12000 Dest Port: 12000 Asid: 002B TCB: 00000000
IpHeader: Version: 4 Header Length: 20
Tos : C0 QOS: Internetwork Normal Service
Packet Length : 31 ID Number: 036E
Fragment : Offset: 0
TTL : 64 Protocol: UDP CheckSum: 5EFC FFFF
Source : 10.81.2.2
Destination : 10.81.1.1
UDP
Source Port : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length : 11 CheckSum: 9369 FFFF
EE: 3
LDLC:
Remote Sap : 04 Source Sap: 09 Response Control: F3 (TEST Control)
IP Header : 20
000000 45C0001F 036E0000 40115EFC 0A510202 0A510101
Protocol Header : 8
000000 2EE02EE0 000B9369
Data : 3 Data Length: 3
000000 0409F3 |..3 |
```

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- ▶ The response of that data coming from the other host

PKTTRACE

```
520 MVS056 EE      00000006 12:10:42.825199 EE Trace Data
From Interface   : EZASAMEMVS      Device: Mpc Ptp      Full=3
Tod Clock       : 2006/02/20 12:10:42.825199      Intfx: 34
Sequence #      : 0                Flags: Dat Ver2 Pdus Adj
Source          : 10.81.2.2
Destination     : 10.81.1.1
Source Port     : 12000             Dest Port: 12000 Asid: 002B TCB: 00000000
Data            : 3                Data Length: 3
000000 0408F3
```

A

```
-----
521 MVS056 EE      00000006 12:10:42.825200 EE Trace Data
From Interface   : EZASAMEMVS      Device: Mpc Ptp      Full=3
Tod Clock       : 2006/02/20 12:10:42.825200      Intfx: 34
Sequence #      : 0                Flags: Dat Ver2 Pdus Adj
Source          : 10.81.2.2
Destination     : 10.81.1.1
Source Port     : 12000             Dest Port: 12000 Asid: 002B TCB: 00000000
Data            : 3                Data Length: 3
000000 0409F3
```

A

```
-----
522 MVS056 EE      00000006 12:10:42.825330 EE Trace Data
To Interface     : EZASAMEMVS      Device: Mpc Ptp      Full=3
Tod Clock       : 2006/02/20 12:10:42.825329      Intfx: 34
Sequence #      : 0                Flags: Dat Ver2 Adj Out
Source          : 10.81.1.1
Destination     : 10.81.2.2
Source Port     : 12000             Dest Port: 12000 Asid: 002D TCB: 00000000
Data            : 3                Data Length: 3
000000 0805F3
```

A

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- ▶ This has the reply of the original test packet plus
- ▶ The TEST originating from 10.81.2.2. Then
- ▶ The reply of the second D NET, ID=yyyyyy, TEST=YES from 10.81.1.1
- ▶ These all occur on the EZASAMEMVS link

C

PKTTRACE

```
523 MVS056 PACKET 00000004 12:10:42.825345 Packet Trace
To Interface      : MPC4221L      Device: Mpc Ptp      Full=31
Tod Clock        : 2006/02/20 12:10:42.825345 Intfx: 8
Sequence #       : 0          Flags: Pkt Ver2 Adj Out
Source           : 10.81.1.1
Destination      : 10.81.2.2
Source Port      : 12000      Dest Port: 12000 Asid: 002D TCB: 00000000
IpHeader: Version: 4          Header Length: 20
Tos              : C0        QOS: Internetwork Normal Service
Packet Length    : 31        ID Number: 0381
Fragment         :           Offset: 0
TTL              : 64        Protocol: UDP          CheckSum: 5EE9 FFFF
Source           : 10.81.1.1
Destination      : 10.81.2.2
UDP
Source Port      : 12000 (EE-XID) Destination Port: 12000 (EE-XID)
Datagram Length  : 11        CheckSum: 8F6D FFFF
EE: 3
LDLC:
Remote Sap       : 08          Source Sap: 05 Response Control: F3 (TEST Control)
IP Header        : 20
000000 45C0001F 03810000 40115EE9 0A510101 0A510202
Protocol Header  : 8
000000 2EE02EE0 000B8F6D
Data             : 3          Data Length: 3
000000 0805F3                                     |..3 |
```

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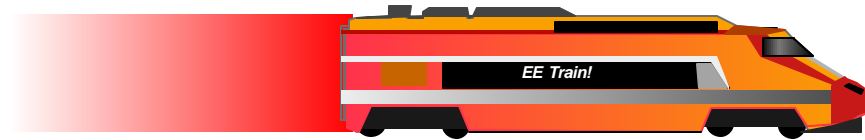
► Here is the completion of the TEST reply to 10.81.2.2

Problems? We don't need No stinkin' problems!

- Where is the problem?
 - ▶ SNA affected?
 - EE only?
 - ▶ IP affected?
 - Connectivity?
 - ▶ Both?
- APAR II12223
 - ▶ Has latest maintenance levels for VTAM and TCPIP EE code
 - ▶ Trace options for VIT and TCPIP
- ⊕ *Configuration and non-defect problem resolution*
<http://www.ibm.com/software/network/commserver/zos/support/>

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- ▶ What to do if you have a problem....
- ▶ First you need to identify what is affected.
 - ▶ Is it only SNA traffic?
 - ▶ Any VTAM messages?
 - ▶ Is it only EE traffic
- ▶ Is IP affected as well?
 - ▶ Only EE or is other IP applications also suffering. If so, which ones?
 - ▶ Is it a connectivity issue?
 - ▶ Can you PING or TRACERTE to the affected host(s)?
- ▶ Once you have identified what is affected you may want to search using your symptoms and keywords at www.ibm.com/software/network/commserver/zos/support
 - ▶ This will search both VTAM and TCPIP defect (APARs) and non-defect (configuration and common user errors) type problems.
- ▶ You will also want to review apar II12223. It contains the latest VTAM and TCPIP PTFs levels for EE code and documentation request if that is needed



Same PKTTRACE formatted with SESSion option

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- ▶ We will now look at this same PKTTRACE data with it formatted with the SESSion option

PKTTRACE with SESSion option

```

124 UDP packets summarized
Local IP address:      10.81.1.1
Local port, app:      12000 EE-XID
Remote IP address:    10.81.2.2
Remote port, app:     12000 EE-XID
Protocol:             UDP
First TimeStamp:      2006/02/20 12:10:19.295028
Last TimeStamp:       2006/02/20 12:16:18.837916
Duration:             00:05:59.542888
Statistics:
  Inbound,      Outbound
Packets:        62,      62
Fragments:      0,      0 ( 0%), ( 0%)
Bytes sent:     692,     652
Time spent sending: 00:04:00.7, 00:01:58.8 (66.94%), (33.05%)
Time spent fragments: 00:00:00.0, 00:00:00.0 ( 0%), ( 0%)
Throughput:      0.001, 0.001 K/s
Largest segment size: 190, 190
Average segment size: 11, 10
Smallest segment size: 3, 3
Direction change: 35, 35
UDP Flags IO      Delta      Time DatLn  RcdNr  Inf  Ip_id  Proff
o o 00:00:00.000000 12:10:19.295028 139 407 6 035D 0
o I 00:00:00.022086 12:10:19.317114 128 408 7 034F 0
o o 00:00:00.000541 12:10:19.317656 139 411 8 035E 0
o I 00:00:00.076027 12:10:19.393684 190 412 9 0350 0
o o 00:00:00.000330 12:10:19.394015 190 415 6 035F 0
o I 00:00:00.000873 12:10:19.394889 190 416 7 0351 0
o o 00:00:00.000124 12:10:19.395013 10 419 8 0360 0
o I 00:00:00.000491 12:10:19.395505 10 420 9 0352 0
o o 00:00:23.428738 12:10:42.824243 3 517 6 0380 0
o I 00:00:00.000890 12:10:42.825134 3 518 9 036D 0
o I 00:00:00.000007 12:10:42.825141 3 519 9 036E 0
o o 00:00:00.000203 12:10:42.825345 3 523 8 0381 0
o o 00:00:12.014423 12:10:54.839768 3 531 6 0384 0

```

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- ▶ Formatting the PKTTRACE output with the SESSION option allows you to see all packets for a IP address and port pair. So, in this case, even though EE uses UDP the SESSION formatter looks as a TCP type connection because the port numbers stay constant.
- ▶ What is displayed:
 - ▶ This shows that there were 124 packets included in the summarization
 - ▶ The local IP address and port as well as the remote IP address and port.
 - ▶ The protocol is UDP in this case
 - ▶ The timestamp of the first and last packet and the duration
 - ▶ Unless you know the application data flow you may not be able to tell if you captured the connection start or stop.
 - ▶ i.e. with TCP connections you know that the connection starts there is a SYN and three-way handshake. When it closes there are FIN and ACK exchanges
 - ▶ The next piece of output is statics about the UDP "connection". This data is self explanatory
 - ▶ The next piece of data is a one line out for each packet
 - ▶ UDP header flags - There are not flags in UDP headers. This is included to maintain a similar look to TCP connections.
 - ▶ IO signals which direction the packet is heading relative to this host

PKTTRACE with SESSion option

UDP	Flags	IO	Delta	Time	DatLn	RcdNr	Inf	Ip_id	Proff
O	I	00:00:00.001209	12:10:54.840978	3	532	7	0377	0	
O	I	00:00:00.000022	12:10:54.841001	3	533	7	0378	0	
O	O	00:00:00.000168	12:10:54.841170	3	537	8	0385	0	
O	O	00:00:12.007469	12:11:06.848639	3	543	6	0388	0	
O	I	00:00:00.000802	12:11:06.849441	3	544	9	037B	0	
O	I	00:00:00.000007	12:11:06.849449	3	545	9	037C	0	
O	O	00:00:00.000184	12:11:06.849634	3	549	8	0389	0	

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- ▶ This is a continuation of the previous output

PKTTRACE with SESSion option

```
43 UDP packets summarized
Local IP address:      10.81.1.1
Local port, app:      12001 EE-Network
Remote IP address:    10.81.2.2
Remote port, app:     12001 EE-Network
Protocol:              UDP
First TimeStamp:      2006/02/20 12:10:20.269071
Last TimeStamp:       2006/02/20 12:12:24.586984
Duration:              00:02:04.317912
Statistics:
      Inbound,      Outbound
Packets:           22,          21
Fragments:         0,          0 ( 0%), ( 0%)
Bytes sent:        1905,        1846
Time spent sending: 00:00:05.4, 00:01:58.8 ( 4.39%), ( 95.6%)
Time spent fragments: 00:00:00.0, 00:00:00.0 ( 0%), ( 0%)
Throughput:        0.014,      0.014 K/s
Largest segment size: 228,      208
Average segment size: 86,        87
Smallest segment size: 47,        55
Direction change:  12,          11
```

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- ▶ This shows the same type of data for port 12001

PKTTRACE with SESSion option

UDP	Flags	IO	Delta	Time	DatLn	RcdNr	Inf	Ip_id	Proff
O	O		00:00:00.000000	12:10:20.269071	207	425	6	0363	0
O	I		00:00:00.171458	12:10:20.440530	207	426	7	0353	0
O	I		00:00:00.006160	12:10:20.446690	67	428	9	0354	0
O	I		00:00:00.000049	12:10:20.446740	67	429	9	0355	0
O	O		00:00:00.108792	12:10:20.555533	55	433	8	0364	0
O	O		00:00:00.000281	12:10:20.555814	67	436	6	0365	0
O	O		00:00:00.000008	12:10:20.555822	67	437	6	0366	0
O	I		00:00:00.000877	12:10:20.556700	228	438	7	0356	0
O	O		00:00:00.027835	12:10:20.584536	67	441	8	0367	0
O	O		00:00:00.001111	12:10:20.585647	208	443	6	0368	0
O	I		00:00:00.004567	12:10:20.590215	67	444	9	0357	0
O	I		00:00:00.031173	12:10:20.621388	184	446	7	0358	0
O	O		00:00:00.000633	12:10:20.622022	67	449	8	0369	0
O	O		00:00:00.027967	12:10:20.649989	172	451	6	036A	0
O	I		00:00:00.000906	12:10:20.650896	55	452	9	0359	0
O	O		00:00:00.001521	12:10:20.652417	76	455	8	036B	0
O	I		00:00:00.000490	12:10:20.652908	55	456	7	035A	0
O	I		00:00:00.024997	12:10:20.677905	88	458	9	035B	0
O	O		00:00:00.000326	12:10:20.678232	67	461	6	036C	0
O	O		00:00:00.009528	12:10:20.687761	65	463	8	036D	0
O	I		00:00:00.000816	12:10:20.688577	67	464	7	035C	0
O	O		00:00:00.015770	12:10:20.704347	62	467	6	036E	0
O	I		00:00:00.001278	12:10:20.705626	55	468	9	035D	0
O	I		00:00:00.000201	12:10:20.705827	53	470	7	035E	0
O	I		00:00:00.185808	12:10:20.891636	65	472	9	035F	0
O	O		00:00:00.000344	12:10:20.891980	67	475	8	036F	0
O	I		00:00:00.002233	12:10:20.894213	62	476	7	0360	0
O	O		00:00:00.000208	12:10:20.894422	55	479	6	0370	0
O	O		00:00:00.000644	12:10:20.895066	65	481	8	0371	0
O	O		00:00:00.003956	12:10:20.899023	182	483	6	0372	0
O	I		00:00:00.000195	12:10:20.899218	67	484	9	0361	0
O	I		00:00:00.000430	12:10:20.899649	194	486	7	0362	0
O	O		00:00:00.000252	12:10:20.899901	67	489	8	0373	0
O	O		00:00:00.000502	12:10:20.900404	65	491	6	0374	0

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► Again, a continuation of the previous slide

PKTTRACE with SESSion option

UDP	Flags	IO	Delta	Time	DatLn	RcdNr	Inf	Ip_id	Proff
O	I		00:00:00.000087	12:10:20.900491	55	492	9	0363	0
O	I		00:00:00.000096	12:10:20.900587	53	494	7	0364	0
O	I		00:00:00.000657	12:10:20.901245	67	496	9	0365	0
O	I		00:00:05.031597	12:10:25.932842	55	500	7	0368	0
O	O		00:00:00.000265	12:10:25.933108	55	503	8	0375	0
O	O		00:01:24.460646	12:11:50.393755	55	597	6	039E	0
O	I		00:00:00.001277	12:11:50.395033	47	598	9	038B	0
O	O		00:00:34.191128	12:12:24.586161	55	641	8	03AD	0
O	I		00:00:00.000822	12:12:24.586984	47	642	9	03A0	0

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► Another continuation for completeness

For More Information....

URL	Content
http://www.ibm.com/servers/eserver/zseries	IBM System z Mainframe Servers
http://www.ibm.com/servers/eserver/zseries/networking	Networking: IBM System z Server
http://www.ibm.com/servers/eserver/zseries/networking/technology.html	IBM Enterprise Servers: Networking Technologies
http://www.ibm.com/software/network/commserver	Communications Server product overview
http://www.ibm.com/software/network/commserver/zos/	z/OS Communications Server
http://www.ibm.com/software/network/commserver/z_lin/	Communications Server for Linux on zSeries
http://www.ibm.com/software/network/ccl	Communication Controller for Linux on System z9 and zSeries
http://www.ibm.com/software/network/commserver/library	Communications Server products - white papers, product documentation, etc.
http://www.redbooks.ibm.com	ITSO redbooks
http://www.ibm.com/software/network/commserver/support	Communications Server technical Support
http://www.ibm.com/support/techdocs/	Technical support documentation (techdocs, flashes, presentations, white papers, etc.)
http://www.rfc-editor.org/rfcsearch.html	Request For Comments (RFC)

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