

Enterprise Extender Planning, Migration, and Implementation

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Session 3618
Thursday, March 1, 2001, 11:00 A.M.



Washington Systems Center

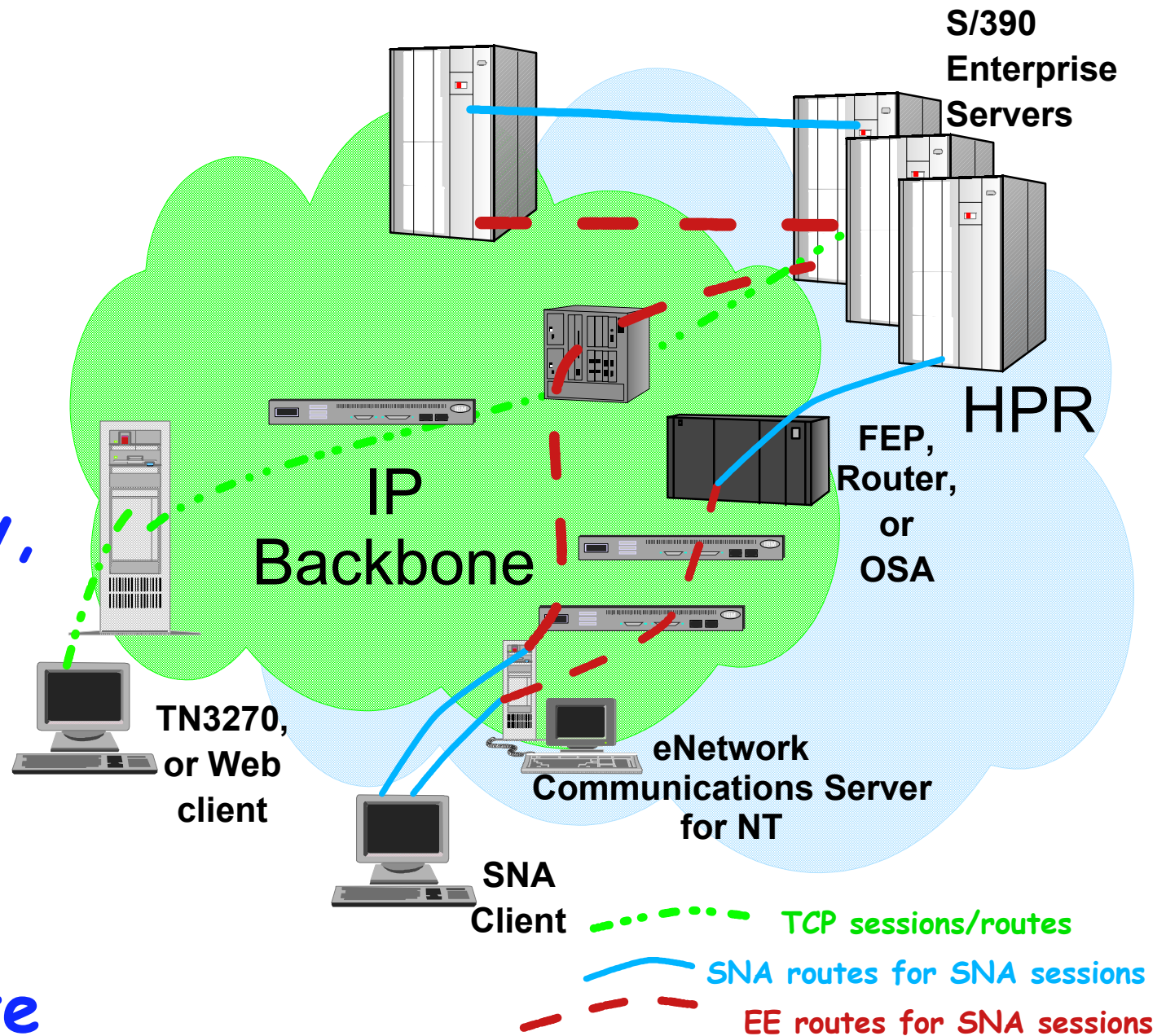
SHARE, Long Beach, CA
February 25-March 2, 2001

Agenda

- What is Enterprise Extender ?
- Planning for Enterprise Extender
- Using EE and other Technologies
- EE Implementation
- EE Operations

What is Enterprise Extender?

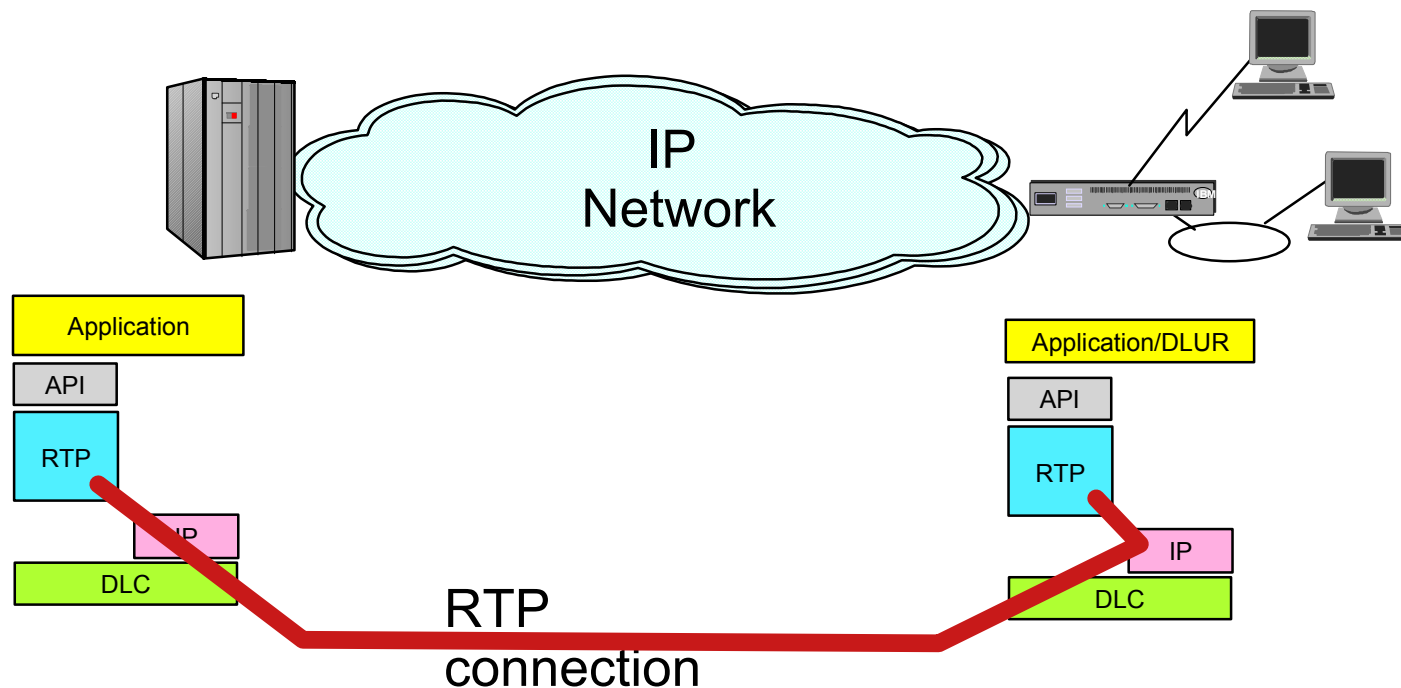
- Allows use of IP network for SNA sessions
- Conceptually, IP network looks like APPN/HPR TG in session route



Advantages of Enterprise Extender

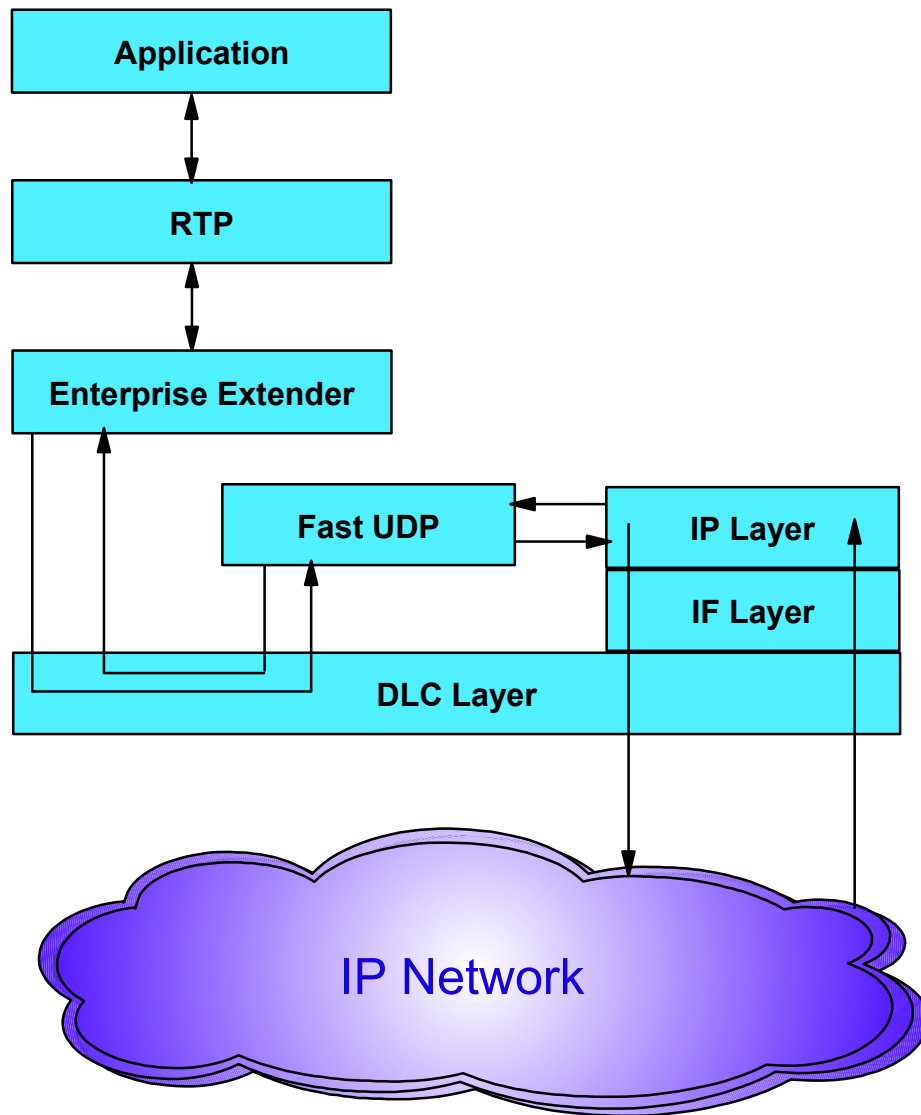
- SNA transport over native IP network
- No changes to SNA applications
- Fully enables parallel sysplex
- End-to-End failure protection
- End-to-End data prioritization
- Can reduce APPN network complexity while exploiting IP alternate routing/redundancy technologies
- SNA traffic can exploit OSA Gigabit Ethernet
- EE can use any S/390 IP network connection -- channel attached router, OSA, etc.

Enterprise Extender



- Link destination defined as IP address or host name
- Native IP routing within network maximizes router efficiency
 - Pure end to end IP network into S/390 possible
- Enables SNA applications to take advantage of advances in IP routing
- Enables single network transport
- HPR provides
 - Error detection and retransmission
 - Non disruptive reroute
 - Congestion control
 - Prioritization
- IP provides packet forwarding
 - SNA priority mapped to TOS
 - Use of standard UDP ports

Enterprise Extender...



- For Enterprise Extender, CS for OS/390 implements a separate UDP layer (Fast UDP) optimized for EE communications
- Fast UDP communicates with EE (the APPN over UDP component in VTAM) via the IUTSAMEH device

Planning for Enterprise Extender

- Products which have Enterprise Extender:
 - ▶ OS/390 V2R6 and higher
 - Need APAR OW36113 for V2R6
 - Need APAR OW36458 for R7
 - ▶ IBM 2216, Network Utility, 2210, 3746-MAE
 - ▶ Communications Server V6+
 - AIX, Windows
 - ▶ PCOMM V4R3
 - ▶ Cisco SNA Switch
- Some products have EE and Branch Extender which can be used together
 - ▶ Can simplify APPN network topology

Enterprise Extender Planning

- Planning issues

- ▶ IP Routing and Addressing

- Virtual IP address is required
- Dynamic Routing should be used to allow redundancy

- ▶ APPN Link Weights

- New TGPs for EE provided with VTAM

- ▶ Backup configurations

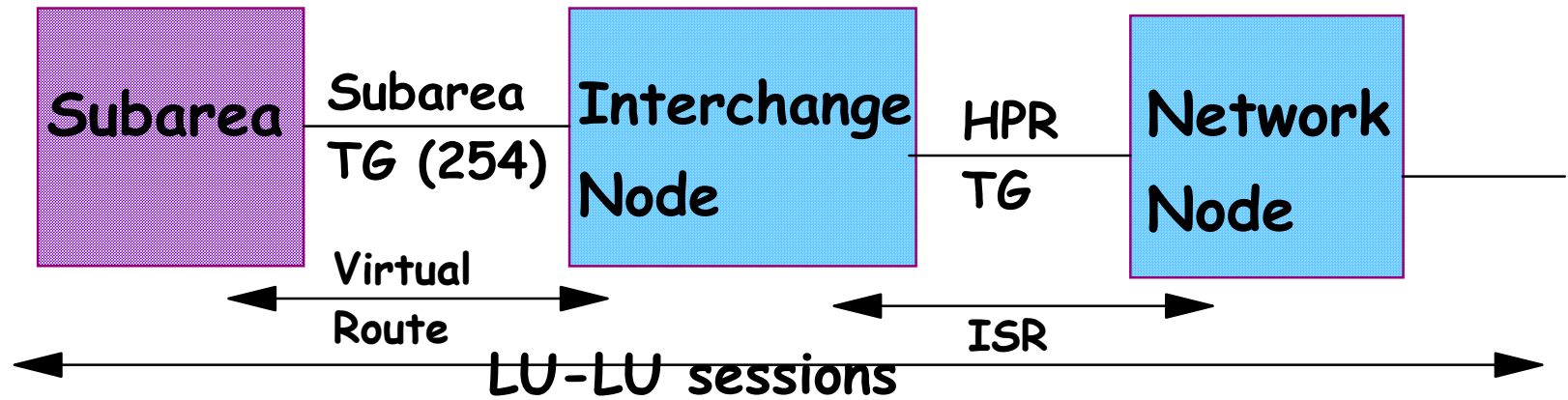
- ▶ Router setup if prioritization in network is desired

- ▶ Startup of VTAM EE links needs to follow activation of TCP/IP

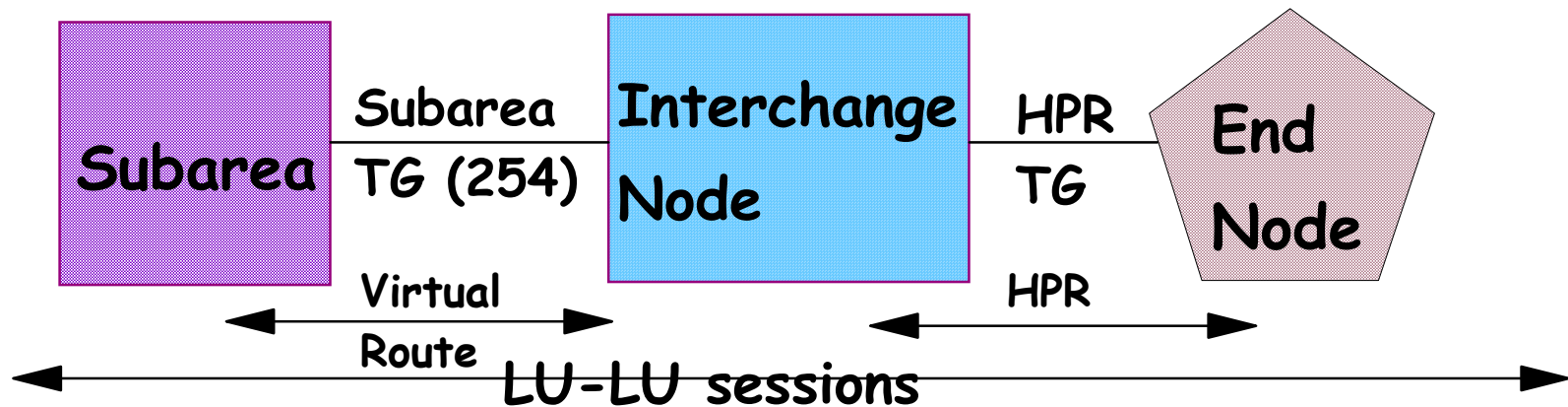
- Can't use VTAM's CONFIG list for startup
- With R10 (or R8+ with OW43814 and PQ38173) can activate EE definitions prior to TCP/IP bringup

- ▶ EE is "HPR only" DLC

ICNs with Subarea and HPR

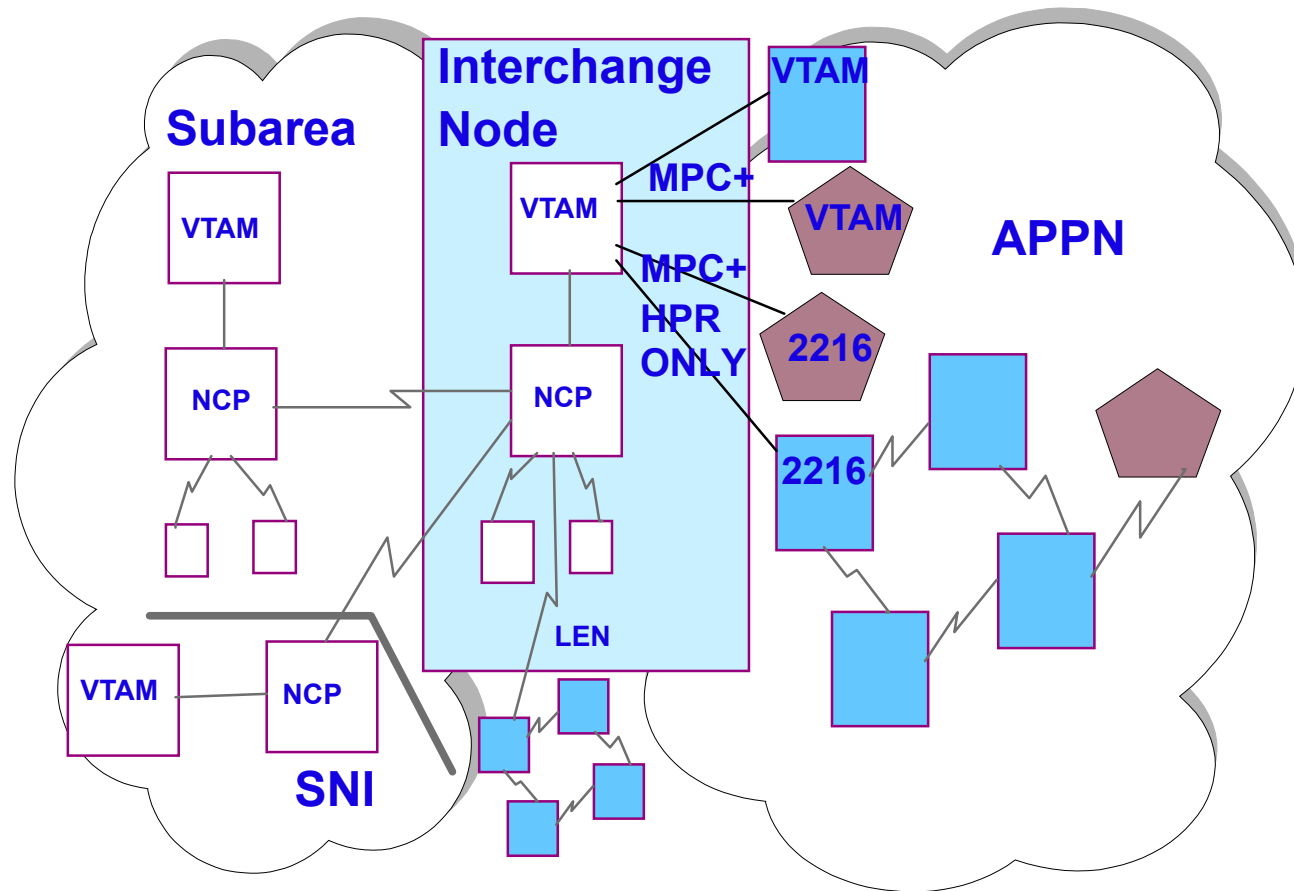


- Prior to enhanced code, for sessions going between subarea and HPR to or through a NN, ICN must use ISR (not HPR) on hop between it and the NN



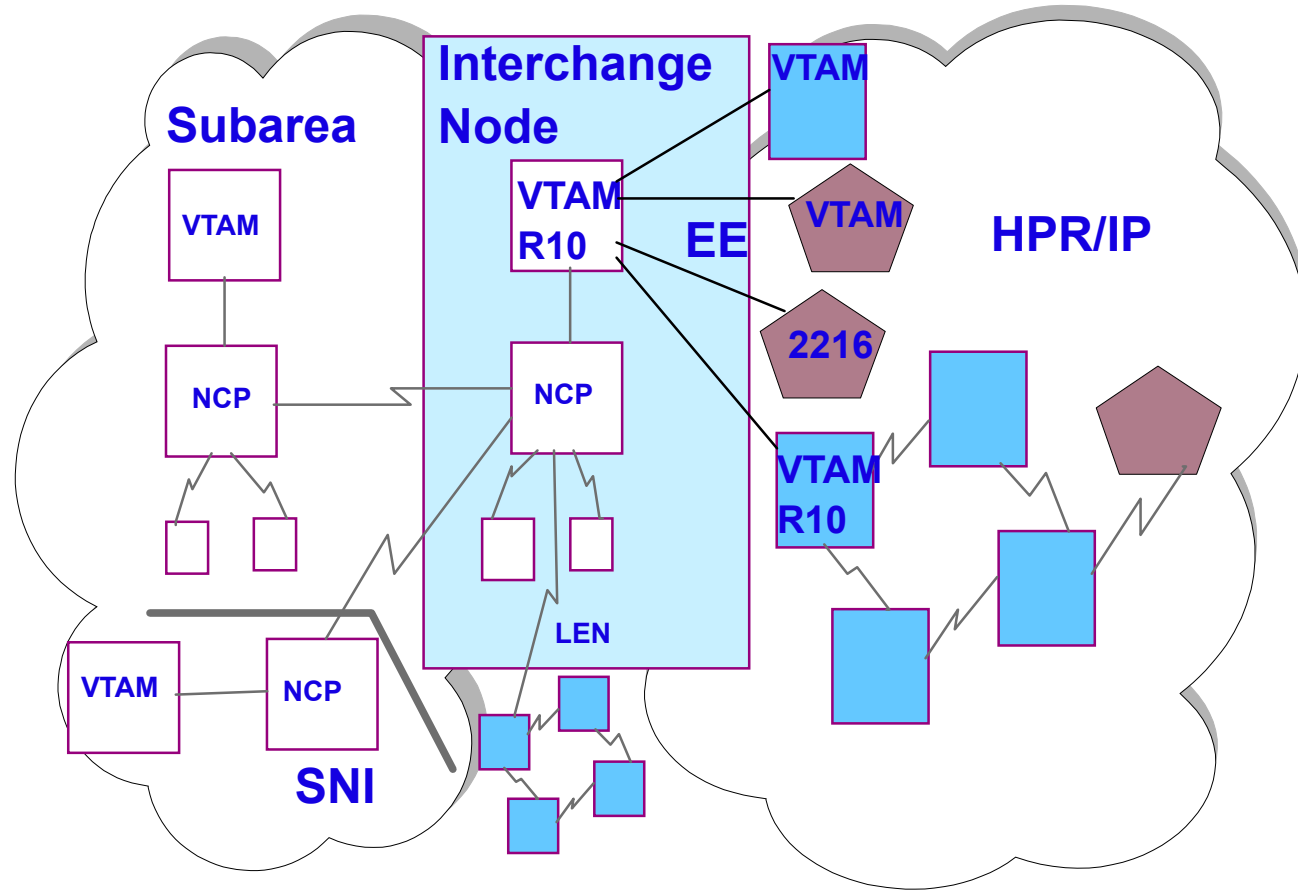
- If sessions are between subarea and HPR to an EN, ICN uses HPR on hop between it and the EN

The "HPR-Only" DLC Issue



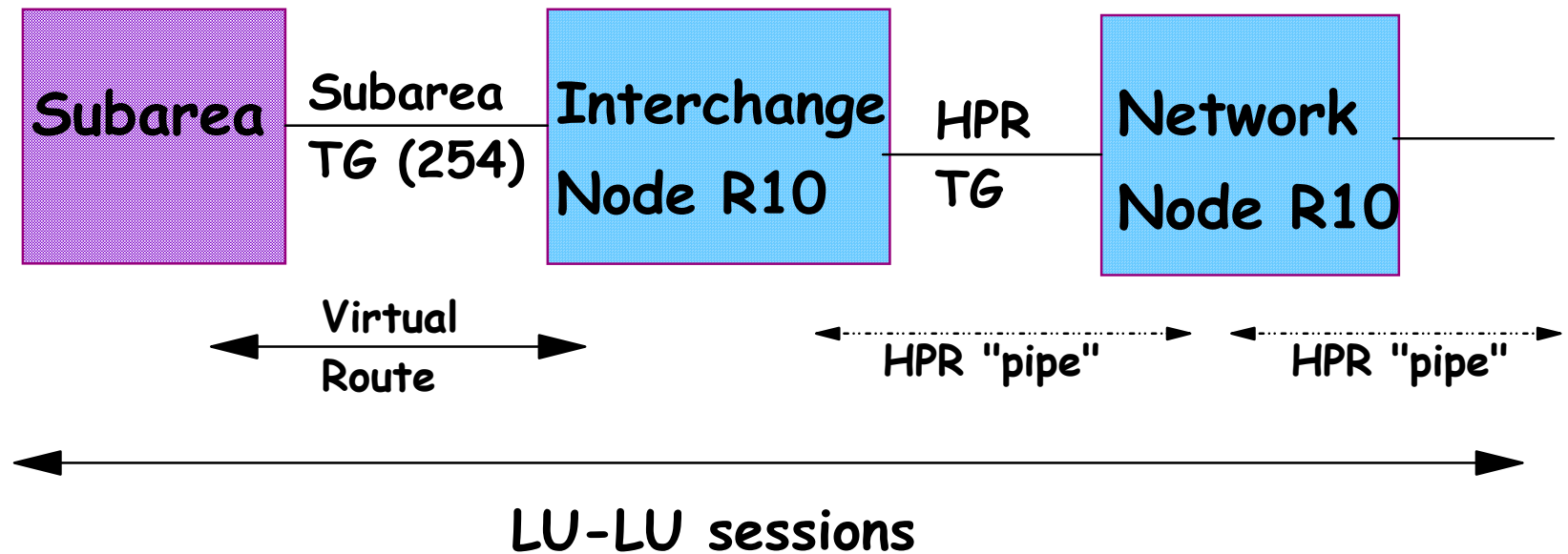
- For subarea-ICN-NN routes, ISR used between ICN & NN
 - ICN can use HPR to adjacent ENs, but not NNs
- MPC+ between VTAMs can carry HPR and ISR traffic
- N Ways MPC+ and OSA Native ATM DLCs are "HPR-only"
- All EE connections are "HPR-only"

The "HPR-Only" DLC Solution



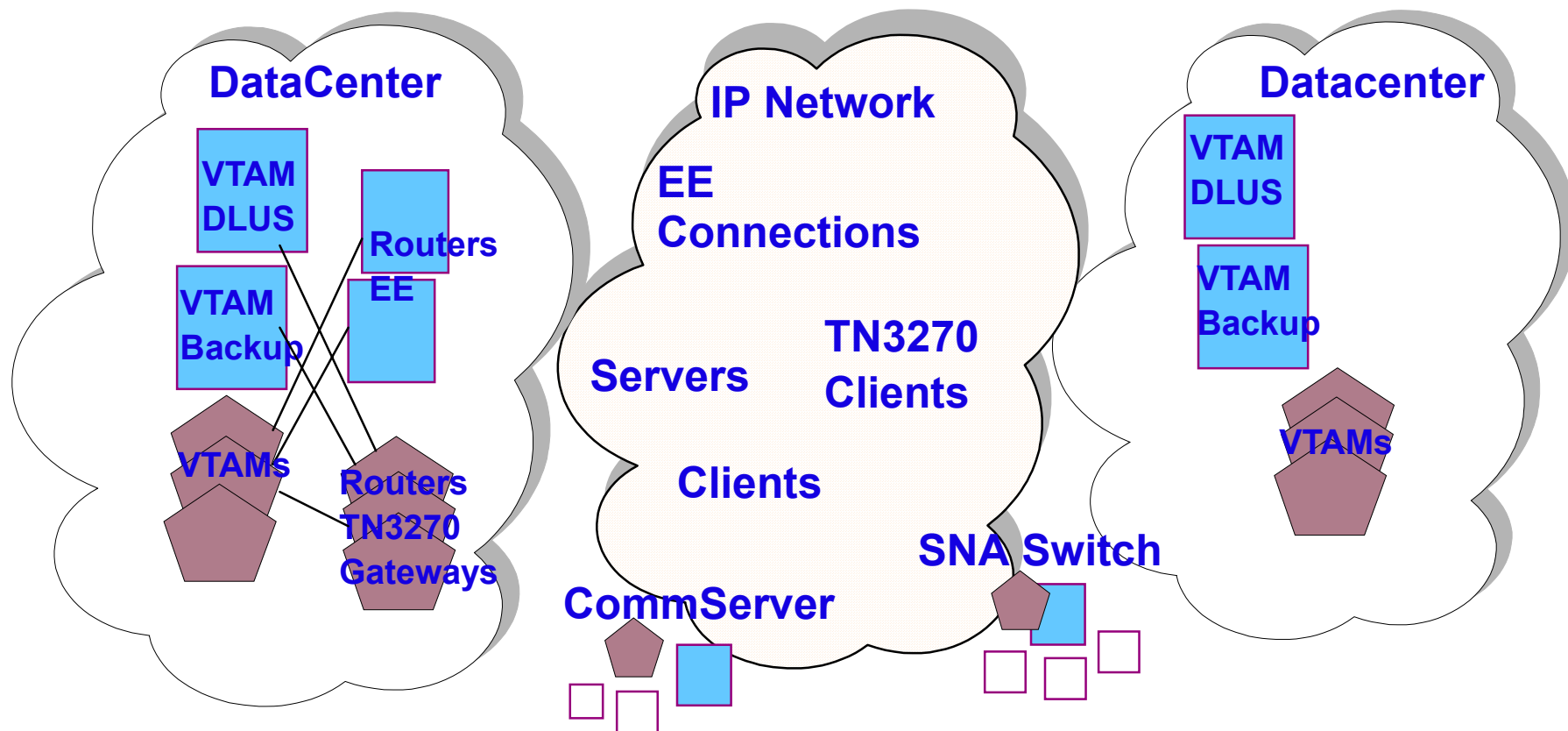
- With R10 (or R6+ APAR), for subarea-ICN-NN routes, "one hop" HPR route used between ICN & NN
- Allows sessions to use both subarea and "HPR-only" DLCs in session routes

Enhancement for "HPR-only" DLCs



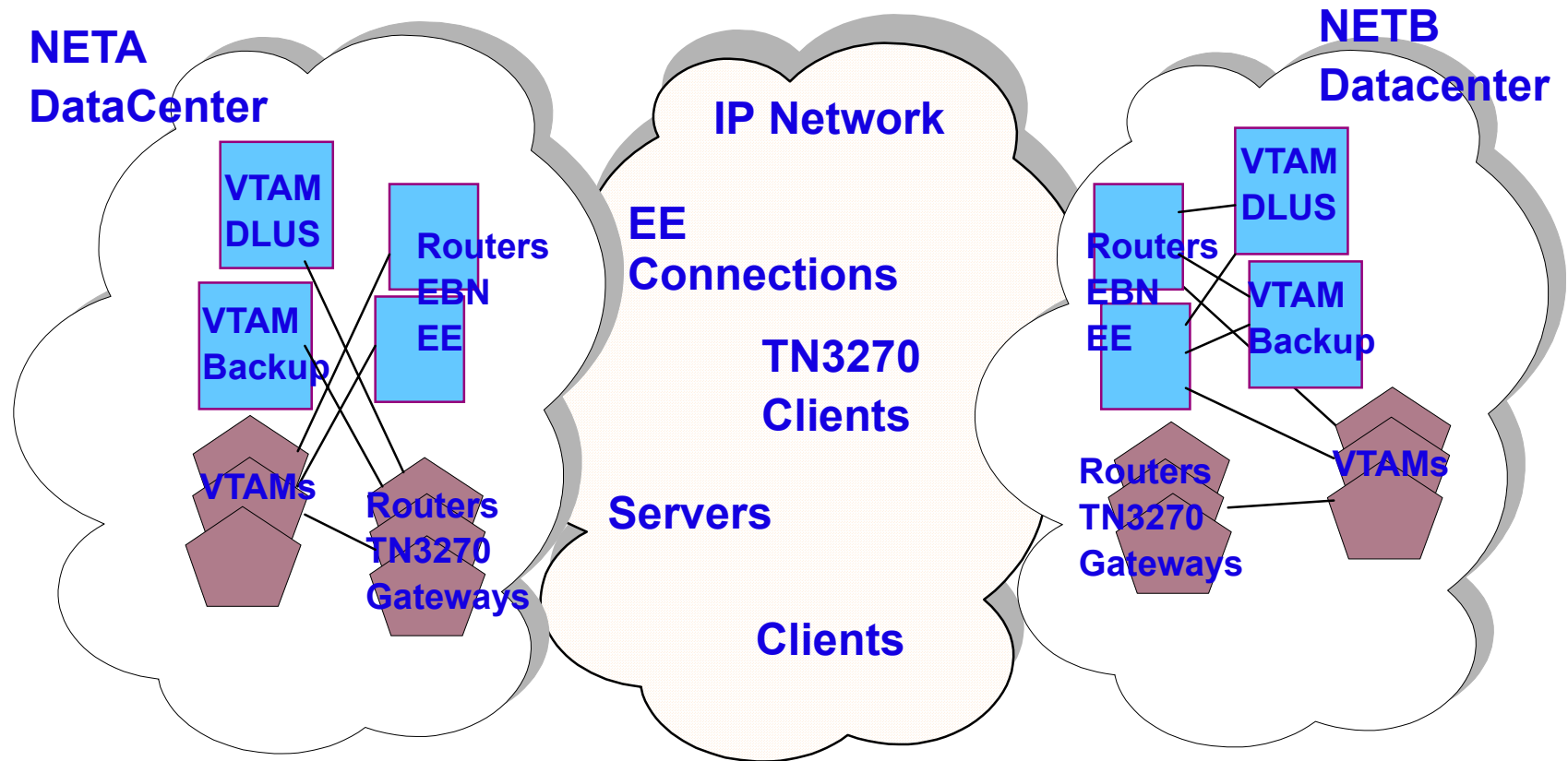
- With OS/390 R10, ICN can bring up one hop RTP connection to adjacent NN when sessions also use a subarea TG
- If sessions continue through adjacent VTAM NN, the NN must also have OS/390 R10+ (or APAR)
- APAR OW44611 provides this function on OS/390 V2R6+

Using EE and other Technologies



- S/390, routers, servers, workstations with EE can use IP network for communication between SNA resources
- SNA applications/users can exploit fast, redundant IP networks
- Can share network facilities with TCP/IP applications/users

Using EBN and EE Together



- Extended Border Node with Enterprise Extender allows IP network usage for interconnected APPN networks
- Extended Border Node is APPN replacement for subarea SNI

CS/390 Enterprise Extender Definitions

- **VTAM Definitions:**

- ▶ Start Options
- ▶ XCA Major Node for EE DLC
- ▶ Switched Major Nodes for Linkstations
- ▶ Choice of ARB-2

- **TCP/IP Definitions:**

- ▶ By default, EE uses PORTS 12000-12004 and TOS C0,80,40,20
- ▶ IUTSAMEH device and link for communication between VTAM and TCP/IP
- ▶ VIPA address

Enterprise Extender Definitions

- **VTAM Definitions:**

- ▶ **Start Options**

- IPADDR, HPRARB and TCPNAME

- ▶ **Other Definitions**

- XCA Major Node (MEDIUM=HPRIP)

- Switched Major node uses CPNAME for matching but allows partner's IP address or hostname on PATH statement

- **TCP/IP Definitions**

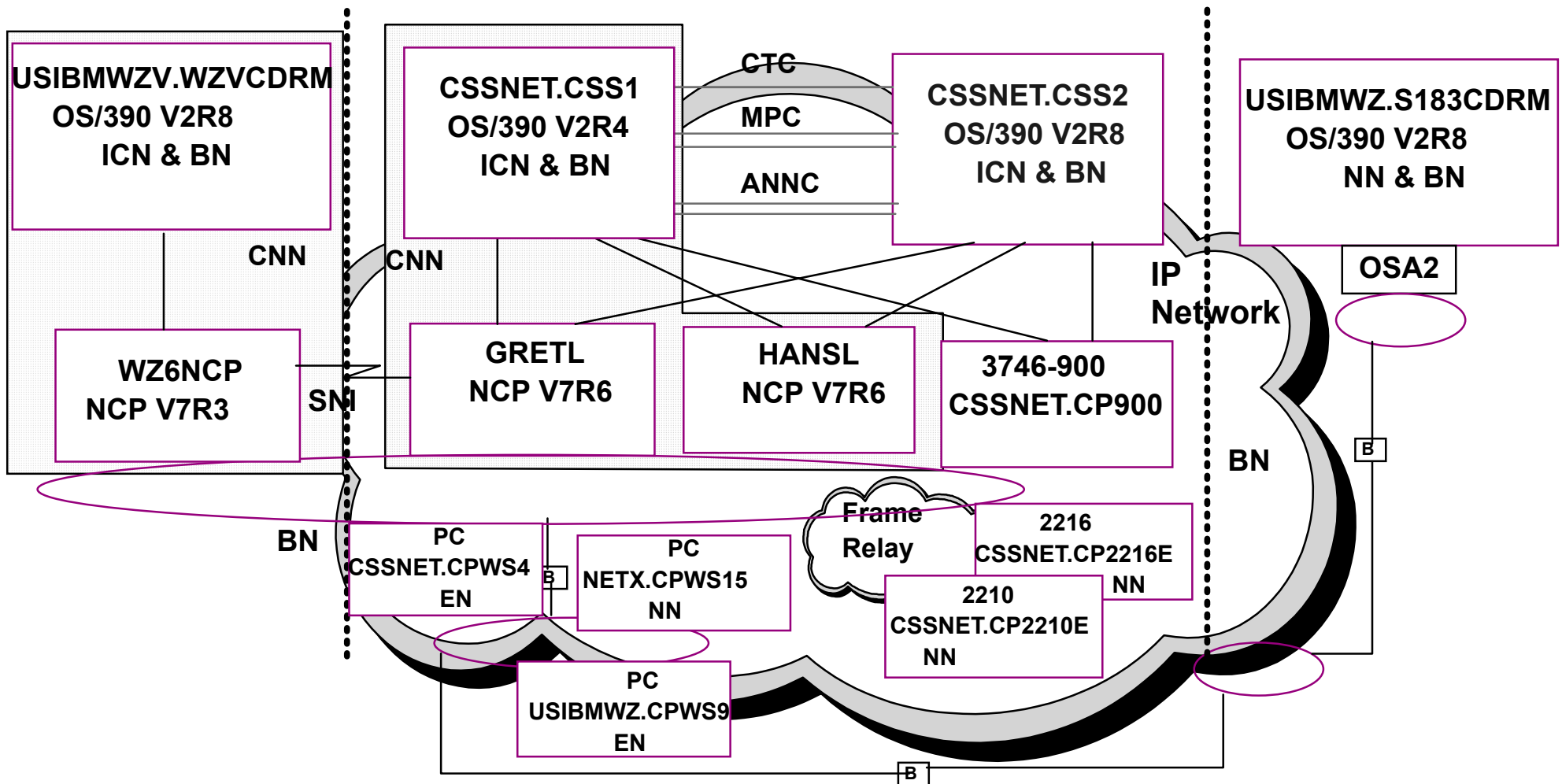
- ▶ **Profile Statements**

- VIPA address

- IUTSAMEH device and link

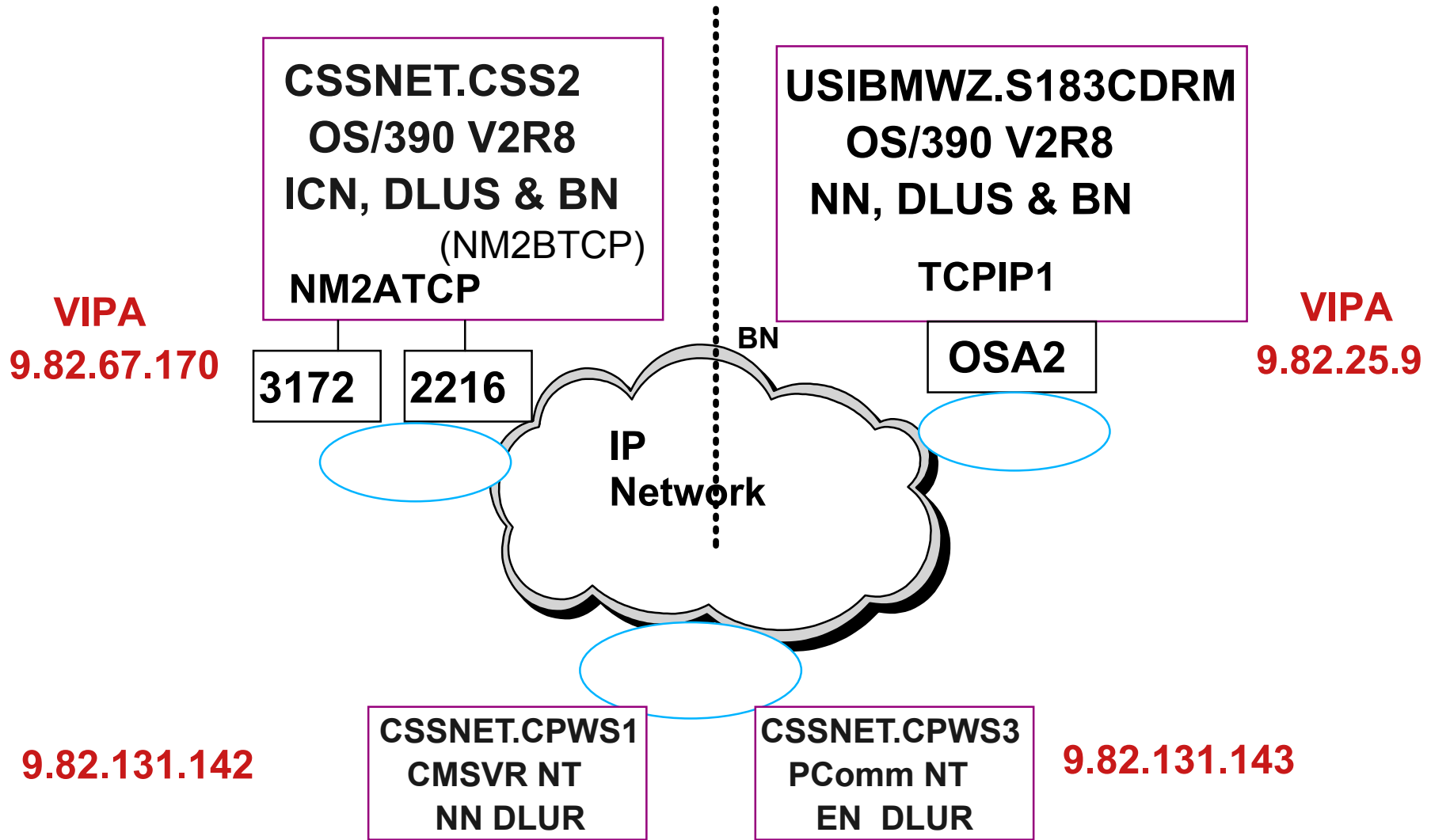
- PORT definitions (EE uses 12000-12004)

Lab Diagram



- **CSSNET connected to NETX, USIBMWZV & USIBMWZ networks**
 - ▶ **SDLC SNI link and TR BN link between WZ6NCP and GRETL**
 - ▶ **TR BN link between GRETL and S183CDRM and CPWS15**
 - ▶ **EE BN link between CSS2 and S183CDRM**

Enterprise Extender Lab Diagram



- CPWS1 and CPWS3 normally use CSS2 as DLUS
 - ▶ Although could define links to S183CDRM, are in the CSSNET network

TCP/IP Profile at S183CDRM

```
PORT
;   PORT Definitions
12000 UDP VTAM           ; EE
12001 UDP VTAM           ; EE
12002 UDP VTAM           ; EE
12003 UDP VTAM           ; EE
12004 UDP VTAM           ; EE
;   VIPA Devices
;
DEVICE   VDEV1           VIRTUAL   0
LINK     VLINK1          VIRTUAL   0      VDEV1
;
;   SAMEHOST Device for Enterprise Extender
;   IUTSAMEH represents an internal connection to VTAM
DEVICE   IUTSAMEH        MPCPTP
LINK     TOVTAM          MPCPTP      IUTSAMEH
;
HOME
    9.82.25.9           VLINK1           ; VIPA link
    . . .
    9.82.131.234       OSATRA00
;
START OSAA00
START IUTSAMEH
```

TCP/IP Profile at S183CDRM

- SOURCEVIPA is specified
 - ▶ One reference says it is required (not true)
 - ▶ We tried both SOURCEVIPA and NOSOURCEVIPA
- Static Routing is used
 - ▶ A reference says dynamic routing is required for EE
 - ▶ For high availability, dynamic routing is recommended with multiple interfaces and VIPA
- DYNAMIC VIPA is not used for EE VIPA
- VTAM proc name is NET
 - ▶ VTAM (not NET) is coded on PORT statements
 - Works if PROC name is VTAM or NET but doesn't work if PROC name is something else

TCP/IP Profile at CSS2

- SOURCEVIP is NOT specified
- Multiple VIP addresses exist
- Dynamic Routing is used
 - ▶ Use IP Config Guide for information on environments with ORouted and EE
- DYNAMIC VIP is not used
 - ▶ Should not be used for EE VIP
- Our VTAM proc name is CSSNET
 - ▶ CSSNET has to be coded on PORT statements
- IUTSAMEH is "shared" with second TCP stack
- VIP and IUTSAMEH in different subnets

EE VTAM Start Options

- IPADDR - Specifies VIPA address VTAM uses for EE
 - ▶ Default is first VIPA address in TCP/IP's home list
- TCPNAME - Specifies TCP Proc name (needed if multiple stacks)

- Start Options on CSS2:

```
D NET,VTAMOPTS
IST097I DISPLAY ACCEPTED
IST1188I VTAM CSV2R8 STARTED AT 10:57:26 ON 07/11/00 023
IST1349I COMPONENT ID IS 5695-11701-801
IST1348I VTAM STARTED AS INTERCHANGE NODE
...
IST1189I HPR          = (RTP,RTP)           HPRARB      = RESPMODE
IST1189I IOPURGE     = 0                   IPADDR     = 9.82.67.170
...
IST1189I SWNORDER   = CPNAME               TCPNAME    = NM2ATCP
```

- Start Options on S183CDRM:

```
IST1188I VTAM CSV2R8 STARTED AT 14:24:04 ON 07/07/00 943
IST1349I COMPONENT ID IS 5695-11701-801
IST1348I VTAM STARTED AS NETWORK NODE
IST1189I HPR          = (RTP,RTP)           HPRARB      = RESPMODE
IST1189I IOPURGE     = 0                   IPADDR     = 9.82.25.9
IST1189I SWNORDER   = CPNAME               TCPNAME    = TCPIP1
```

EE Start Options

- The VIPA address that VTAM uses with EE can be a VIPA address used for other TCP/IP applications
- VTAM does NOT enforce IPADDR being set to a VIPA address
 - ▶ EE TG activation fails if IPADDR is not VIPA, but VTAM issues normal messages at XCA activation
- Responsive Mode ARB is NOT required for EE
 - ▶ The algorithm provides fairness when sharing the network with TCP/IP, but EE links will operate with either BASE or RESPMODE set on HPRARB
- Do not put XCA Major Node in CONFIG list
 - ▶ Improved with R10 (or R8+ maintenance)

XCA and Switched Major Nodes

- Similar XCA Major Node at CSS2 and S183CDRM:

```
XCAEE          VBUILD TYPE=XCA
PRTEE          PORT MEDIUM=HPRIP,
                SAPADDR=4 ,LIVTIME=15 ,SRQTIME=15 ,SRQRETRY=9
GRPEE          GROUP DIAL=YES ,ISTATUS=ACTIVE ,
                AUTOGEN=(10 ,LNEE ,PUEE) ,CALL=INOUT
```

- IPTOS parameter on PORT statement defaults to 20,40,80,C0,C0

- Switched Major Node at S183CDRM

```
CSS2SWN  VBUILD TYPE=SWNET
*****
* SWITCHED MAJOR NODE FOR CONNECTION TO CSS2 USING EE
* USING CSS2 VIPA ADDRESS OF 9.82.67.170
*****
CSS2PU   PU   ADDR=22 ,DISCNT=YES ,CPNAME=CSS2 ,NETID=CSSNET ,
          CONNTYPE=APPN ,PUTYPE=2 ,DWACT=YES ,TGP=EEXTCAMP
CSS2PATH PATH IPADDR=9.82.67.170 ,GRPNM=GRPEE
*
CSS2PUB  PU   ADDR=22 ,DISCNT=YES ,CPNAME=CSS2 ,NETID=CSSNET ,
          CONNTYPE=APPN ,PUTYPE=2 ,DWACT=YES ,TGP=EEXTCAMP
CSS2PATB PATH IPADDR=9.82.67.170 ,GRPNM=GRPEE ,SAPADDR=8
```


EE Operations - TCP/IP

- Display NETSTAT,HOME on S183CDRM:

```
D TCPIP, ,NETSTAT,HOME
EZZ2500I NETSTAT CS V2R8 TCPIP1 274
HOME ADDRESS LIST:
ADDRESS          LINK          FLG
9.82.25.9        VLINK1        P
9.82.24.43       GIG1
9.82.24.58       GIG2
9.82.131.234    OSATRA00
127.0.0.1        LOOPBACK
5 OF 5 RECORDS DISPLAYED
```

EE Operations - TCP/IP

- Display NETSTAT,DEVLINKs on S183CDRM:

```
D TCPIP,,NETSTAT,DEVLINKS
```

```
EZZ2500I NETSTAT CS V2R8 TCPIP1 276
```

```
...
```

```
DEVNAME: VDEV1                DEVTYPE: VIPA                DEVNUM:
```

```
0000
```

```
DEVSTATUS: READY
```

```
LNKNAME: VLINK1                LNKTYPE: VIPA
```

```
LNKSTATUS: READY
```

```
NETNUM: 0    QUESIZE: 0    BYTEIN: 0000000000
```

```
...
```

```
DEVNAME: IUTSAMEH            DEVTYPE: MPC                DEVNUM:
```

```
0000
```

```
DEVSTATUS: READY
```

```
LNKNAME: TOVTAM                LNKTYPE: MPC
```

```
LNKSTATUS: READY
```

```
...
```

```
DEVNAME: OSAA00              DEVTYPE: LCS                DEVNUM:
```

```
0A00
```

```
DEVSTATUS: READY
```

```
LNKNAME: OSATRA00            LNKTYPE: TR
```

```
LNKSTATUS: READY
```

```
NETNUM: 0    QUESIZE: 0    BYTEIN: 0927131147
```

EE Operations - XCA Activation

- **Activate HPRIP XCA Major Node at S183CDRM:**

```
V NET,ACT,ID=XCAEE
IST097I VARY ACCEPTED
IST093I XCAEE ACTIVE
EZZ4324I CONNECTION TO 9.82.25.9 ACTIVE FOR DEVICE IUTSAMEH
```

- **Display XCA Major Node at S183CDRM:**

```
D NET, ID=XCAEE, E
IST097I DISPLAY ACCEPTED
IST075I NAME = XCAEE, TYPE = XCA MAJOR NODE 279
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST1679I MEDIUM = HPRIP
IST1685I TCP/IP JOB NAME = TCPIP1
IST1680I LOCAL IP ADDRESS 9.82.25.9
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1656I VTAMTOPO = REPORT, NODE REPORTED - YES
IST170I LINES:
IST232I LNEE000  ACTIV
IST232I LNEE001  ACTIV
IST232I LNEE002  ACTIV
```

...

XCA Operational Considerations

- Error if TCP/IP not active before XCA Major Node:

```
V NET,ACT,ID=XCAEE
IST097I VARY ACCEPTED
IST093I XCAEE ACTIVE
IST380I ERROR FOR ID = LNEE000 - REQUEST: ACTLINK, SENSE: 081C0000
IST380I ERROR FOR ID = LNEE001 - REQUEST: ACTLINK, SENSE: 081C0000
...
D NET,ID=XCAEE
IST097I DISPLAY ACCEPTED
IST075I NAME = XCAEE, TYPE = XCA MAJOR NODE 938
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST1679I MEDIUM = HPRIP
IST1685I TCP/IP JOB NAME = TCPIP1
IST1680I LOCAL IP ADDRESS ****NA****
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1656I VTAMTOPO = REPORT, NODE REPORTED - YES
IST170I LINES:
IST232I LNEE000 NEVAC
...
```

- R10 (or R8+ APAR) allows XCA activation before TCP/IP

EE Operations - TG Activation

- **Activate Switched Major Node at S183CDRM**
 - ▶ **Two links (PUs) are coded and DWACT=YES**
 - Use different SAPADDR values for multiple links
 - If don't code DWACT, can use VARY NET,DIAL,ID=puname command
 - ▶ **PATH statements indicate CSS2 VIPA address**
 - Path statements may use HOSTNAME instead

```
V NET,ACT,ID=CSS2SWN
IST097I VARY ACCEPTED
IST093I CSS2PU ACTIVE
IST093I CSS2PUB ACTIVE
IST093I CSS2SWN ACTIVE
IST1086I APPN CONNECTION FOR CSSNET.CSS2 IS ACTIVE - TGN = 21
IST1086I APPN CONNECTION FOR CSSNET.CSS2 IS ACTIVE - TGN = 22
IST1096I CP-CP SESSIONS WITH CSSNET.CSS2 ACTIVATED
```

Display EE Connected PU

- Display of PU shows EE partner IP addresses:

```
D NET, ID=CSS2PU, E
IST097I DISPLAY ACCEPTED
IST075I NAME = CSS2PU, TYPE = PU_T2.1 285
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST1043I CP NAME = CSS2, CP NETID = CSSNET, DYNAMIC LU = YES
IST1589I XNETALS = YES
IST1105I RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I CSS2PU AC/R 22 YES 98750000000000000000000017100808080
IST1482I HPR = RTP - OVERRIDE = N/A - CONNECTION = YES
IST1510I LLERP = NOTPREF - RECEIVED = NOTALLOW
IST1680I LOCAL IP ADDRESS 9.82.25.9
IST1680I REMOTE IP ADDRESS 9.82.67.170
IST136I SWITCHED SNA MAJOR NODE = CSS2SWN
IST081I LINE NAME = LNEE000, LINE GROUP = GRPEE, MAJNOD = XCAEE
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I STATE TRACE = OFF
IST1656I VTAMTOPO = REPORT, NODE REPORTED - YES
IST1657I MAJOR NODE VTAMTOPO = REPORT
IST172I NO LOGICAL UNITS EXIST
IST314I END
```

VTAM - Display Adjacent CPs

● Display Adjacent Control Points at CSS2:

```
D NET, ID=ISTADJCP, E
IST097I DISPLAY ACCEPTED
IST075I NAME = ISTADJCP, TYPE = ADJCP MAJOR NODE 041
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST1100I ADJACENT CONTROL POINTS FROM MAJOR NODE ISTADJCP
IST1102I NODENAME                NODETYPE CONNECTIONS CP CONNECTIONS NATIVE
IST1103I CSSNET.CPWS3            EN          1          1          *NA*
IST1103I CSSNET.CPWS1            NN          1          1          YES
IST1103I USIBMWZ.S183CDRM        NN          1          1          NO
IST1103I CSSNET.CP2216D          NN          1          1          YES
IST1103I CSSNET.CP900            NN          1          1          YES
IST1103I CSSNET.CSS1             NN          4          4          YES
IST1493I RTP SUMMARY FOR CSSNET.CPWS3 COUNT = 5
IST1493I RTP SUMMARY FOR CSSNET.CPWS1 COUNT = 2
IST1493I RTP SUMMARY FOR USIBMWZ.S183CDRM COUNT = 2
IST1493I RTP SUMMARY FOR CSSNET.CP2216D COUNT = 2
IST1493I RTP SUMMARY FOR CSSNET.CP900 COUNT = 4
IST314I END
```

Display Topology about CSS2

D NET, TOPO, ID=CSS2, LIST=ALL

IST1295I	CP NAME	NODETYPE	ROUTERES	CONGESTION	CP-CP	WEIGHT
IST1296I	CSSNET.CSS2	NN	128	NONE	*NA*	*NA*
IST1579I	-----					
IST1297I		ICN/MDH	CDSERVR	RSN	HPR	
IST1298I		YES	NO	300	RTP	
IST1579I	-----					
IST1223I		BN	NATIVE	TIME LEFT	LOCATE	SIZE
IST1224I		YES	YES	15	16K	
IST1299I	TRANSMISSION GROUPS ORIGINATING AT CP CSSNET.CSS2					
IST1357I					CPCP	
IST1300I	DESTINATION CP	TGN	STATUS	TGTYPE	VALUE	WEIGHT
IST1301I	CSSNET.CSS1	255	OPER	INTERM VRTG	YES	*NA*
IST1301I	USIBMWZ.S183CDRM	22	OPER	INTERCLUST	YES	*NA*
IST1301I	CSSNET.CPWS1	21	OPER	INTERM	YES	*NA*
IST1301I	CSSNET.CSS1	22	OPER	INTERM	YES	*NA*
IST1301I	CSSNET.CSS1	21	OPER	INTERM	YES	*NA*
IST1301I	CSSNET.CP2216D	21	OPER	INTERM	YES	*NA*
IST1301I	CSSNET.CP900	21	OPER	INTERM	YES	*NA*
IST1301I	CSSNET.CSS1	23	OPER	INTERM	YES	*NA*
IST1301I	USIBMWZ.S183CDRM	21	OPER	INTERCLUST	YES	*NA*
IST1301I	CSSNET.CPWS3	21	OPER	ENDPT	YES	*NA*
IST314I	END					

APING Using EE Route

- APING S183CDRM from CSS2:

```
D NET,APING,ID=USIBMWZ.S183CDRM
IST097I DISPLAY ACCEPTED
IST1489I APING SESSION INFORMATION 055
IST1490I DLU=USIBMWZ.S183CDRM SID=FD87C059B5EFB39E
IST933I LOGMODE=#INTER , COS=*BLANK*
IST875I APPNCOS TOWARDS SLU = #INTER
IST1460I TGN CPNAME TG TYPE HPR
IST1461I 22 USIBMWZ.S183CDRM ISL RTP
IST314I END
```

Display EE Connected Control Point

● Display S183CDRM from CSS2:

```
D NET, ID=S183CDRM, E
IST097I DISPLAY ACCEPTED
IST075I NAME = USIBMWZ.S183CDRM, TYPE = ADJACENT CP 059
IST486I STATUS= ACT/S----Y, DESIRED STATE= ACTIV
....
IST231I CDRSC MAJOR NODE = ISTCDRDY
IST479I CDRM NAME = CSS2, VERIFY OWNER = NO
IST1184I CPNAME = USIBMWZ.S183CDRM - NETSRVR = ***NA***
IST1044I ALSLIST = ISTAPNPU
....
IST171I ACTIVE SESSIONS = 0000000003, SESSION REQUESTS = 0000000000
IST206I SESSIONS:
IST1081I ADJACENT LINK STATION = CNR0001A
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS2          ACTIV/CP-S  D88F047ABF181205 0006 0001  0  0  CSSNET
IST1081I ADJACENT LINK STATION = CNR0001D
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS2          ACTIV/SV-P  FD87C059B5EFB3B3 0001 0001  0  0  CSSNET
IST1081I ADJACENT LINK STATION = CNR00019
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS2          ACTIV/CP-P  FD87C059B5EFB3AE 0001 0009  0  0  CSSNET
```

Display EE HPR Connection at CSS2

```
D NET, ID=CNR0001D, E
IST075I NAME = CNR0001D, TYPE = PU_T2.1 104
IST1392I DISCNTIM = 00010 DEFINED AT PU FOR DISCONNECT
IST486I STATUS= ACTIV--LX-, DESIRED STATE= ACTIV
IST1043I CP NAME = S183CDRM, CP NETID = USIBMWZ, DYNAMIC LU = YES
IST1589I XNETALS = YES
IST875I APPNCOS TOWARDS RTP = SNASVCMG
IST1476I TCID X'1984255200000223' - REMOTE TCID X'0E6DB38700000190'
IST1481I DESTINATION CP USIBMWZ.S183CDRM - NCE X'D000000000000000'
IST1587I ORIGIN NCE X'D000000000000000'
IST1477I ALLOWED DATA FLOW RATE = 400 KBITS/SEC
IST1516I INITIAL DATA FLOW RATE = 200 KBITS/SEC
IST1511I MAXIMUM NETWORK LAYER PACKET SIZE = 548 BYTES
IST1478I NUMBER OF UNACKNOWLEDGED BUFFERS = 0
IST1479I RTP CONNECTION STATE = CONNECTED - MNPS = NO
IST1697I RTP PACING ALGORITHM = ARB RESPONSIVE MODE
IST1480I RTP END TO END ROUTE - PHYSICAL PATH
IST1460I TGN  CPNAME          TG TYPE      HPR
IST1461I  21  USIBMWZ.S183CDRM  ISL        RTP
IST231I RTP MAJOR NODE = ISTRTPMN
. . . .
IST355I LOGICAL UNITS:
IST080I S183CDRM ACT/S----Y
```

ARB-2 and EE Connections

- **MODIFY HPRARB Start Option:**

```
F CSSVTAM,VTAMOPTS,HPRARB=BASE
IST097I MODIFY ACCEPTED
IST223I MODIFY COMMAND COMPLETED
```

- **INACT/ACT CPWS3 link, logon, DISPLAY RTP:**

```
D NET,ID=CNR0002D,E
IST097I DISPLAY ACCEPTED
IST075I NAME = CNR0002D, TYPE = PU_T2.1 010
IST1392I DISCNTIM = 00010 DEFINED AT PU FOR DISCONNECT
IST486I STATUS= ACTIV--LX-, DESIRED STATE= ACTIV
IST1043I CP NAME = CPWS3, CP NETID = CSSNET, DYNAMIC LU = YES
. . .
IST1479I RTP CONNECTION STATE = CONNECTED - MNPS = NO
IST1480I RTP END TO END ROUTE - PHYSICAL PATH
IST1460I TGN CPNAME TG TYPE HPR
IST1461I 21 CSSNET.CPWS3 APPN RTP
IST231I RTP MAJOR NODE = ISTRTPMN
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I STATE TRACE = OFF
IST355I LOGICAL UNITS:
IST080I DSWWS302 ACT/S
IST314I END
```

CSS2 NETSTAT BYTEINFO Command

● DISPLAY NETSTAT BYTEINFO for EE Ports:

```
D TCPIP,NM2ATCP,NETSTAT,BYTEINFO
EZZ2500I NETSTAT CS V2R8 NM2ATCP 900
MVS TCP/IP REAL TIME NETWORK MONITOR
USER ID  B OUT      B IN          L PORT  FOREIGN SOCKET      STATE
BPXOINIT 0000000000 0000000000 10007   0.0.0.0..0         LISTEN
NM2ADRST 0000000000 0000000000 00513   0.0.0.0..0         LISTEN
.....
CSSVTAM  0000533766 0000054809 12003   *..*                UDP
CSSVTAM  0000000000 0000000000 12002   *..*                UDP
CSSVTAM  0000000000 0000000000 12004   *..*                UDP
CSSVTAM  0000958133 0001136664 12001   *..*                UDP
CSSVTAM  0000020461 0000017840 12000   *..*                UDP
NM2ASNMP 0000017657 0000006026 00161   *..*                UDP
25 OF 25 RECORDS DISPLAYED
```

● APING CPWS3 with #BATCH mode/APPNCOS:

```
D NET,APING,ID=CPWS3,LOGMODE=#BATCH
IST097I DISPLAY ACCEPTED
IST1489I APING SESSION INFORMATION 903
IST1490I DLU=CSSNET.CPWS3 SID=FD87C059B7AAB0E7
IST933I LOGMODE=#BATCH , COS=*BLANK*
IST875I APPNCOS TOWARDS SLU = #BATCH
IST1460I TGN  CPNAME          TG TYPE      HPR
IST1461I  21  CSSNET.CPWS3     APPN         RTP
IST314I END
```

NETSTAT BYTEINFO Again

- DISPLAY NETSTAT BYTEINFO for EE Ports:

```
D TCPIP,NM2ATCP,NETSTAT,BYTEINFO
EZZ2500I NETSTAT CS V2R8 NM2ATCP 900
MVS TCP/IP REAL TIME NETWORK MONITOR
USER ID  B OUT      B IN      L PORT  FOREIGN SOCKET  STATE
BPXOINIT 0000000000 0000000000 10007   0.0.0.0..0     LISTEN
NM2ADRST 0000000000 0000000000 00513   0.0.0.0..0     LISTEN
.....
CSSVTAM  0000533766 0000054809 12003   *..*           UDP
CSSVTAM  0000000000 0000000000 12002   *..*           UDP
CSSVTAM  0000001474 0000001343 12004   *..*           UDP
CSSVTAM  0000963758 0001143755 12001   *..*           UDP
CSSVTAM  0000020637 0000018016 12000   *..*           UDP
NM2ASNMP 0000017657 0000006026 00161   *..*           UDP
25 OF 25 RECORDS DISPLAYED
```

- Port 120004 (used for EE low priority) now displays bytes OUT and IN

References

- Redbooks
 - ▶ SG24-5291 SNA and TCP/IP Integration
 - ▶ SG24-5957 Migrating Subarea to an IP Infrastructure
- Parallel Sysplex Test Report, GC28-1963-11
- Standard CS/390 Pubs:
 - ▶ IP Migration (SC31-8512-4), R8+ Level
 - ▶ IP Configuration (SC31-8513)
 - ▶ SNA Migration (SC31-8622-1), R6+ Level
 - ▶ SNA Network Implementation Guide (SC31-8563-03)

For More Information

URL

Content

www.ibm.com/servers/eserver/zseries

IBM Enterprise Servers (z900 & S/390)

www.ibm.com/servers/eserver/zseries/networking

z900 Networking

www.ibm.com/servers/eserver/zseries/networking/technology.html

Networking White Papers and Information

www.ibm.com/software/network

Networking & Communications Software

www.ibm.com/software/network/commsserver

Communications Server

www.ibm.com/software/network/commsserver/library

CS White Papers, Product Doc, etc.

www.redbooks.ibm.com

ITSO Redbooks

www.ibm.com/support/techdocs

Advanced Technical Support (Flashes, Presentations, White Papers, etc.)

Summary

- What is Enterprise Extender ?
- Planning for Enterprise Extender
- Using EE and other Technologies
- EE Implementation
- EE Operations