

A large, abstract, red graphic on the left side of the slide, resembling a stylized letter 'S' or a curved path.

APPN/HPR Operations from the S/390

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Abstract

Have you wondered how you can operate your APPN network from the S/390? Are you unsure about what VTAM may or may not know about the various nodes in the network? Do you use NetView with your subarea network, but are unsure about what information it may or may not have when it comes to APPN/HPR?

If the answer to these questions is YES, then this presentation is for you. The presentation covers typical VTAM/NetView commands and displays, show examples using a configuration with a wide variety of APPN node types, as well as describe other tools which can help with your APPN/HPR operations.

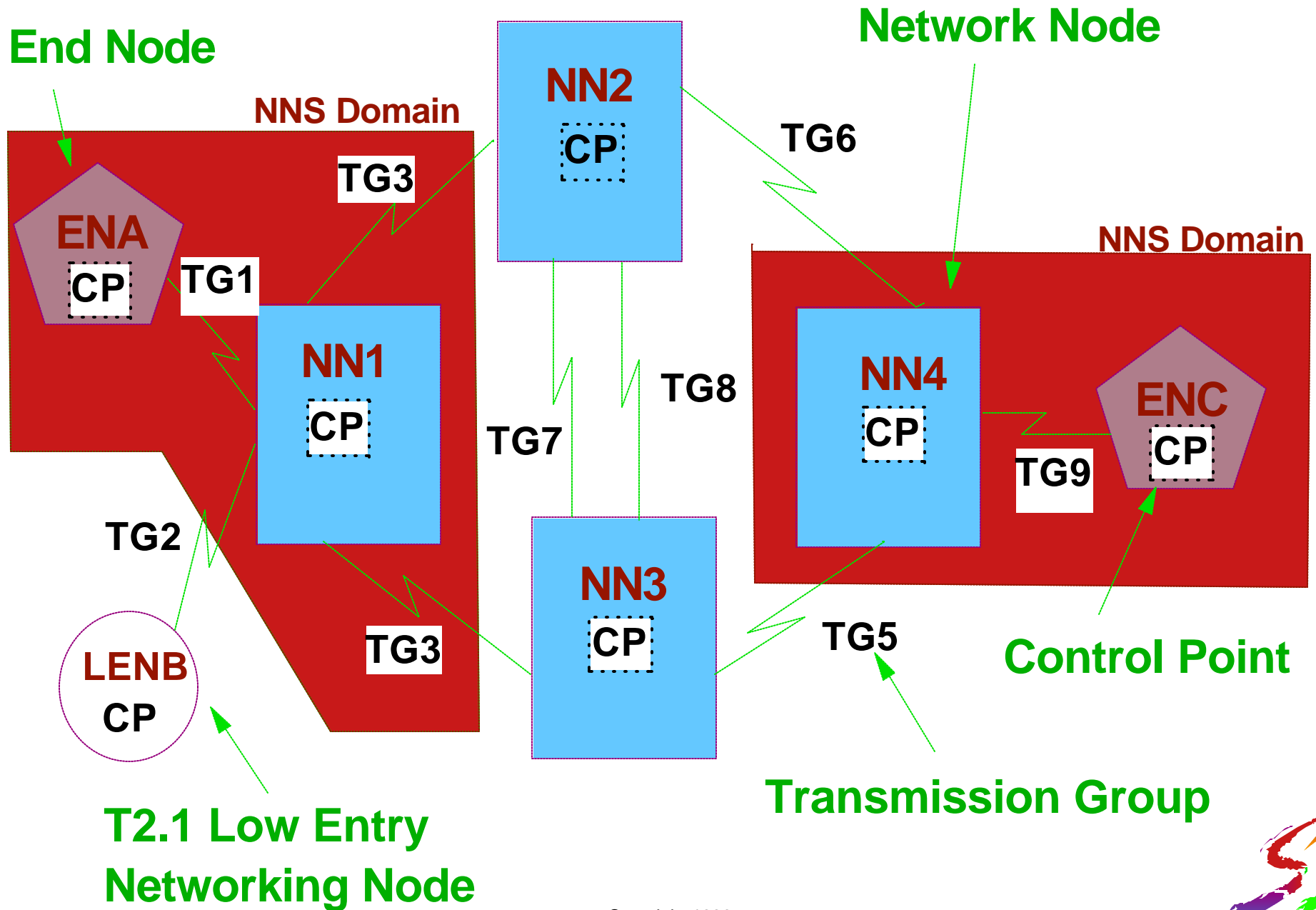


Agenda




- Review of APPN Terminology
- Review of VTAM Node Types
- Overview of VTAM APPN/HPR Lab
- VTAM/NetView Commands and Displays when VTAM functions as an APPN NN
 - Summary Information
 - Connection Information
 - Session Information
- DLUS-DLUR Considerations
- HPR Considerations
- Other operational tools



APPN Terminology





APPN Terminology

- **Low Entry Networking Node (LEN)**
 - Computer capable of communicating with others as a peer 
 - Does not require subarea assistance to set up sessions
- **End Node (EN)**
 - Registers resources with its network node server
 - Does not route traffic 
 - Runs applications
 - Communicates with NNS on CP-CP sessions
- **Network Node (NN)**
 - Provides all APPN functions (directory services, dynamic routing, intermediate session routing)
 - May run applications 

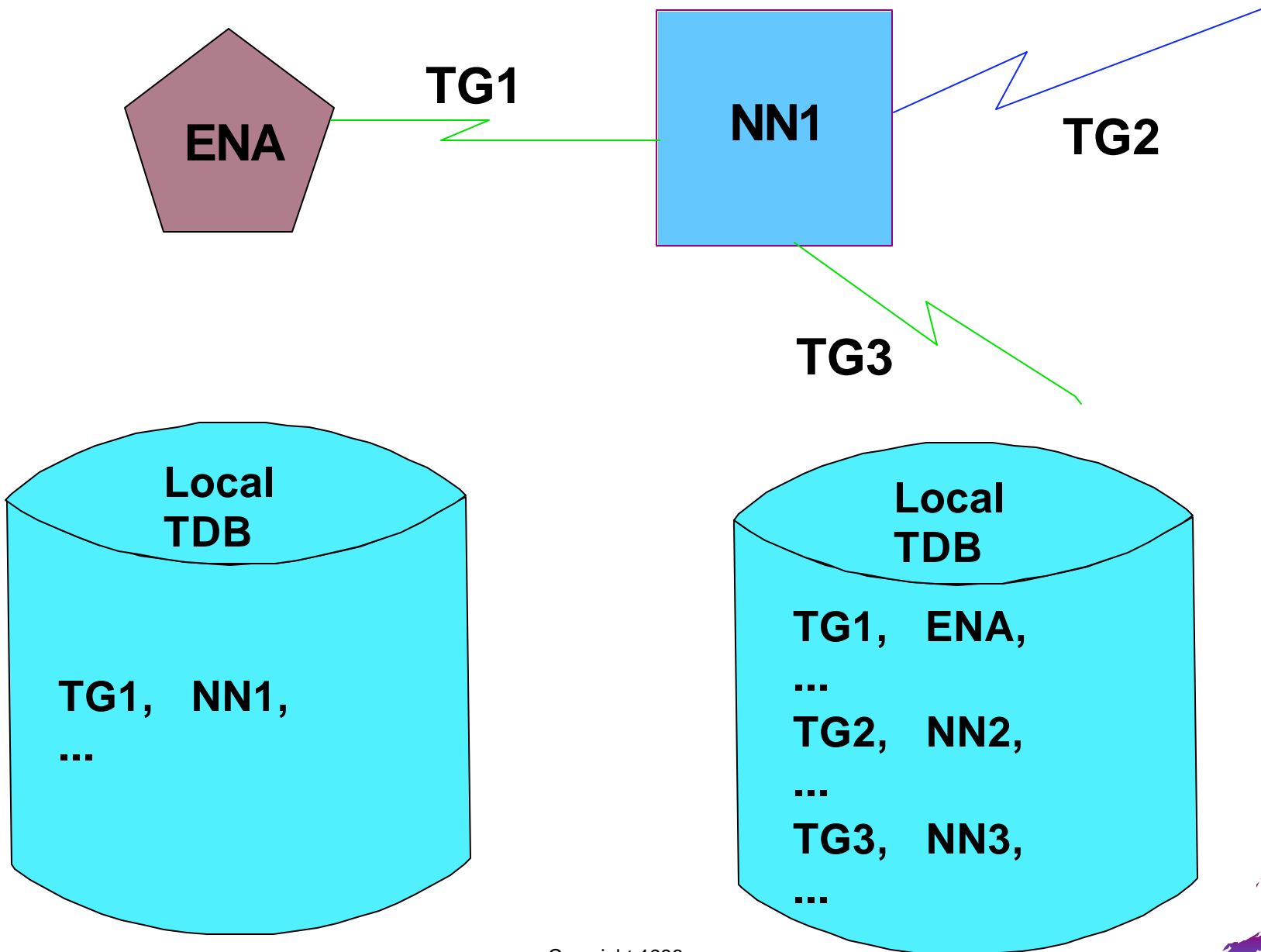


APPN Terminology

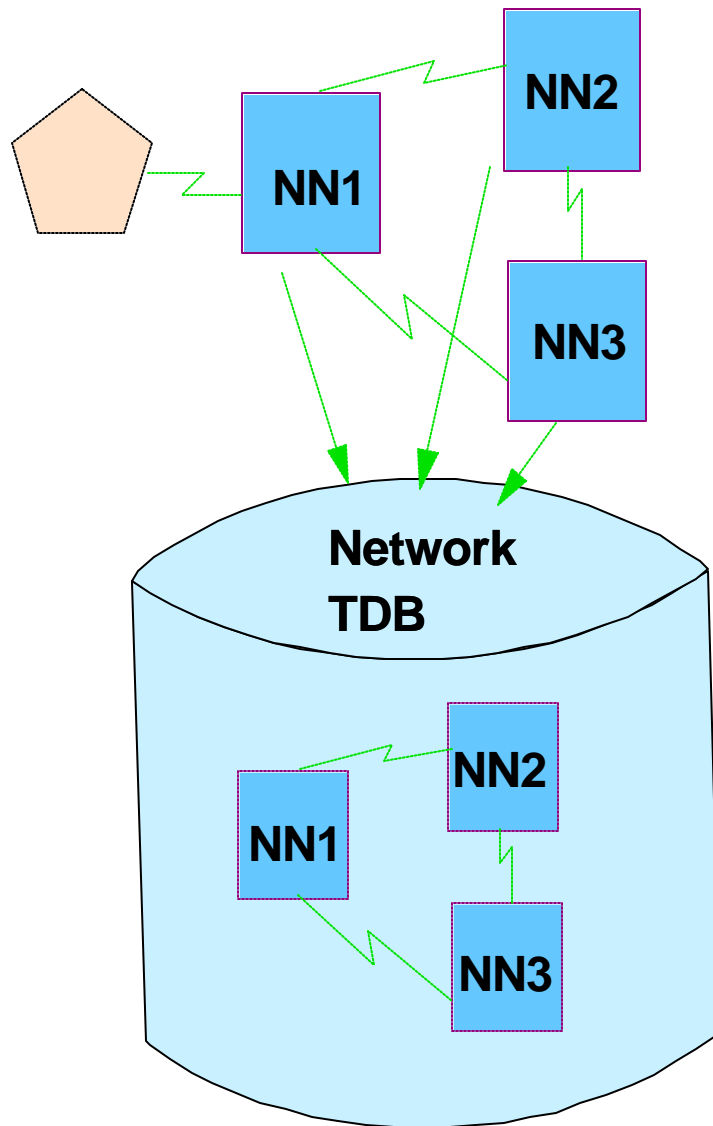
- **Transmission Group (TG)** 
 - Logical connection between two nodes
 - Made up of one link
- **Control Point (CP)** 
 - Code within an APPN node which provides the APPN functions
 - NNs and ENs communicate with each other via CP-CP sessions
- **Network Node Server (NNS)**
 - The NN with which an EN establishes a pair of CP-CP sessions
 - This NN provides APPN services for all of the ENs in its domain



Local Topology



Network Topology



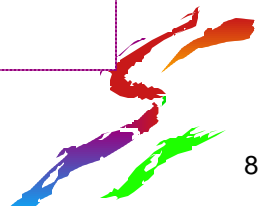
Network Topology Database Contents

Node

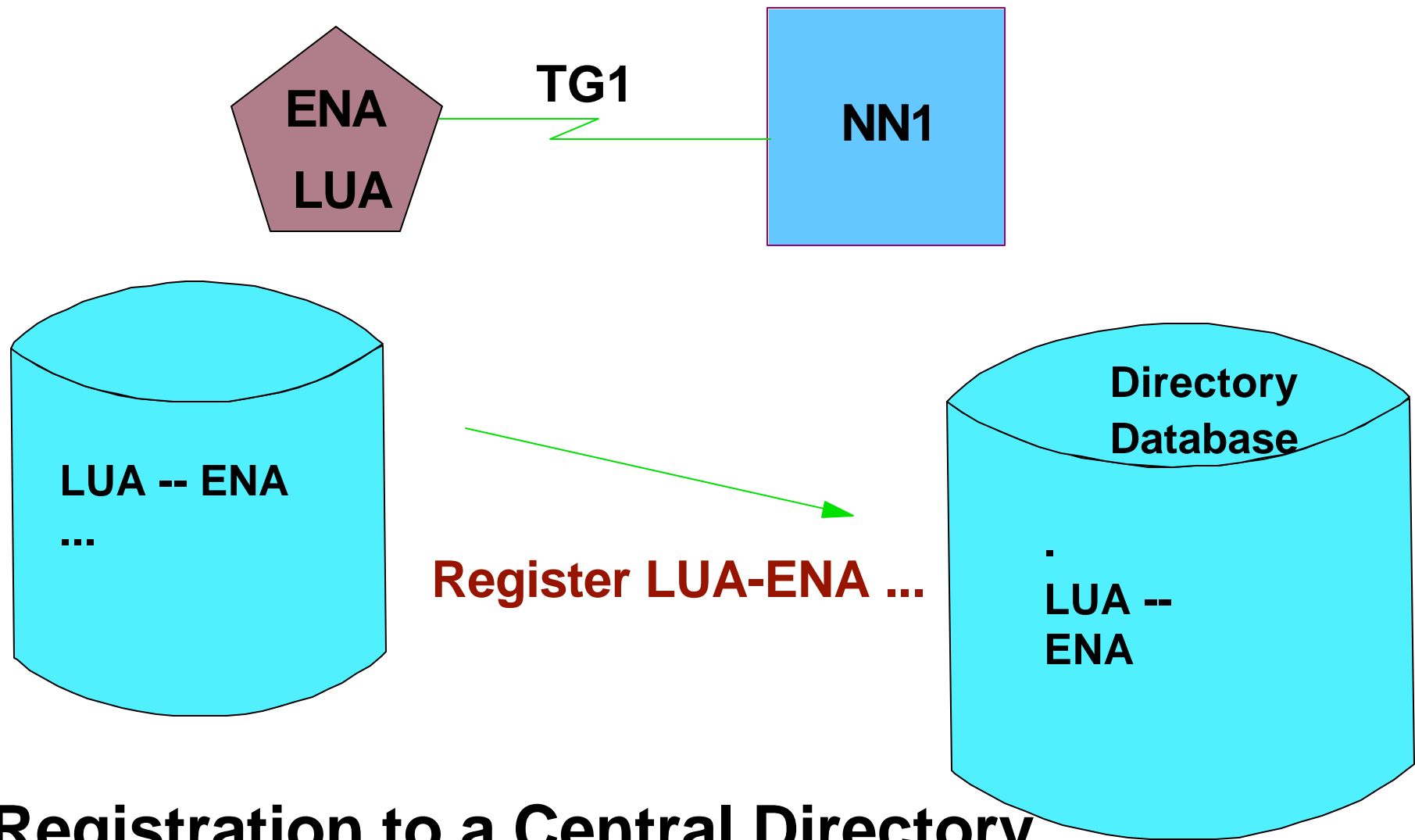
<u>CP Name</u>	<u>RSN</u>	<u>Properties</u>
NN1	6
NN2	4
NN3	8

TG (intermediate routing)

<u>Orig</u>	<u>Dest</u>	<u>TG#</u>	<u>RSN</u>	<u>Properties</u>
NN1	NN2	2	4
NN2	NN1	2	8
NN1	NN3	3	6
NN3	NN1	3	4
NN2	NN3	4	4
NN3	NN2	4	6



Directory - Registration of EN Resources



Registration to a Central Directory Server may also occur



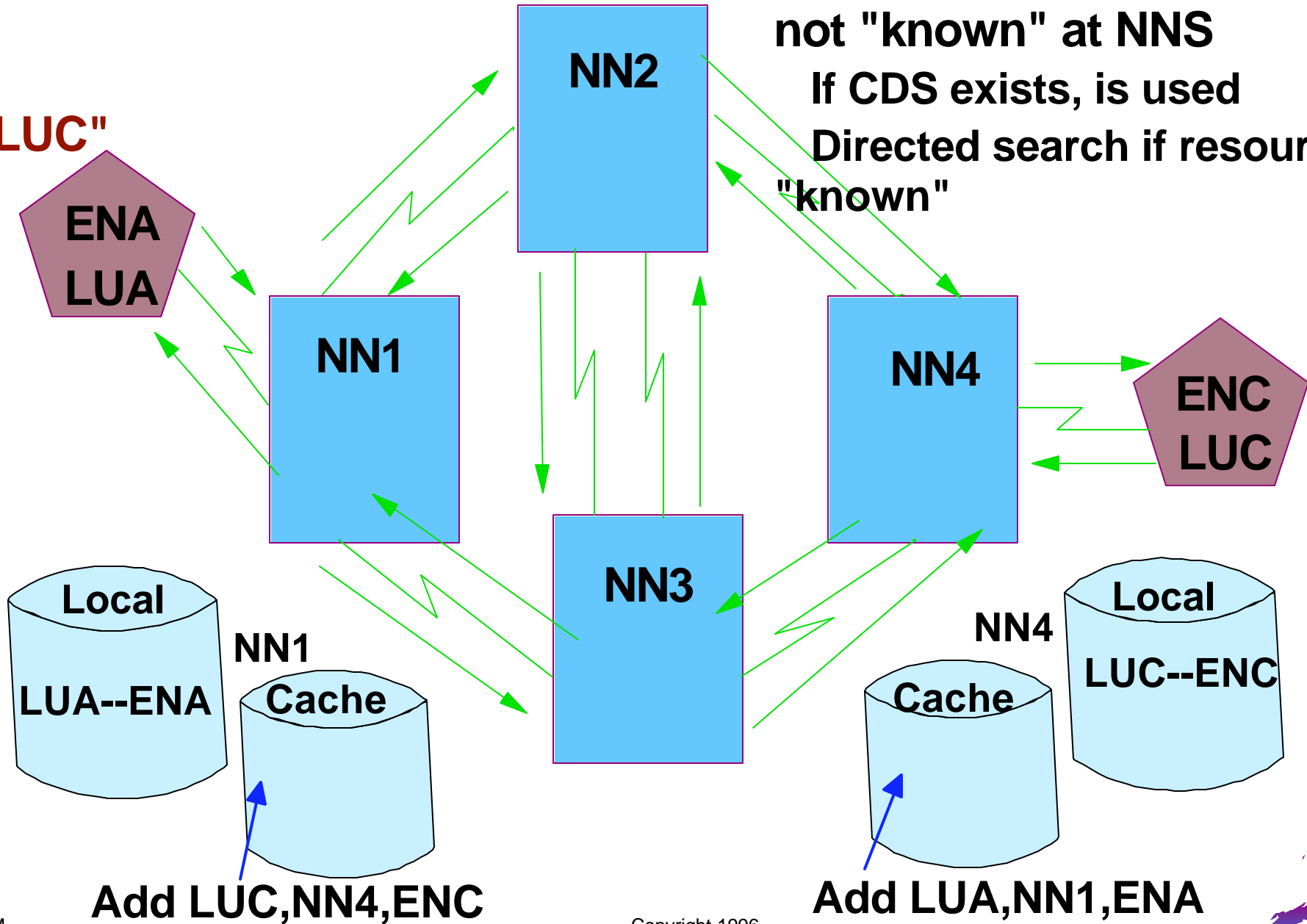
Directory - Cross Domain Broadcast

Broadcast search if resource not "known" at NNS

If CDS exists, is used

Directed search if resource is "known"

"LUC"

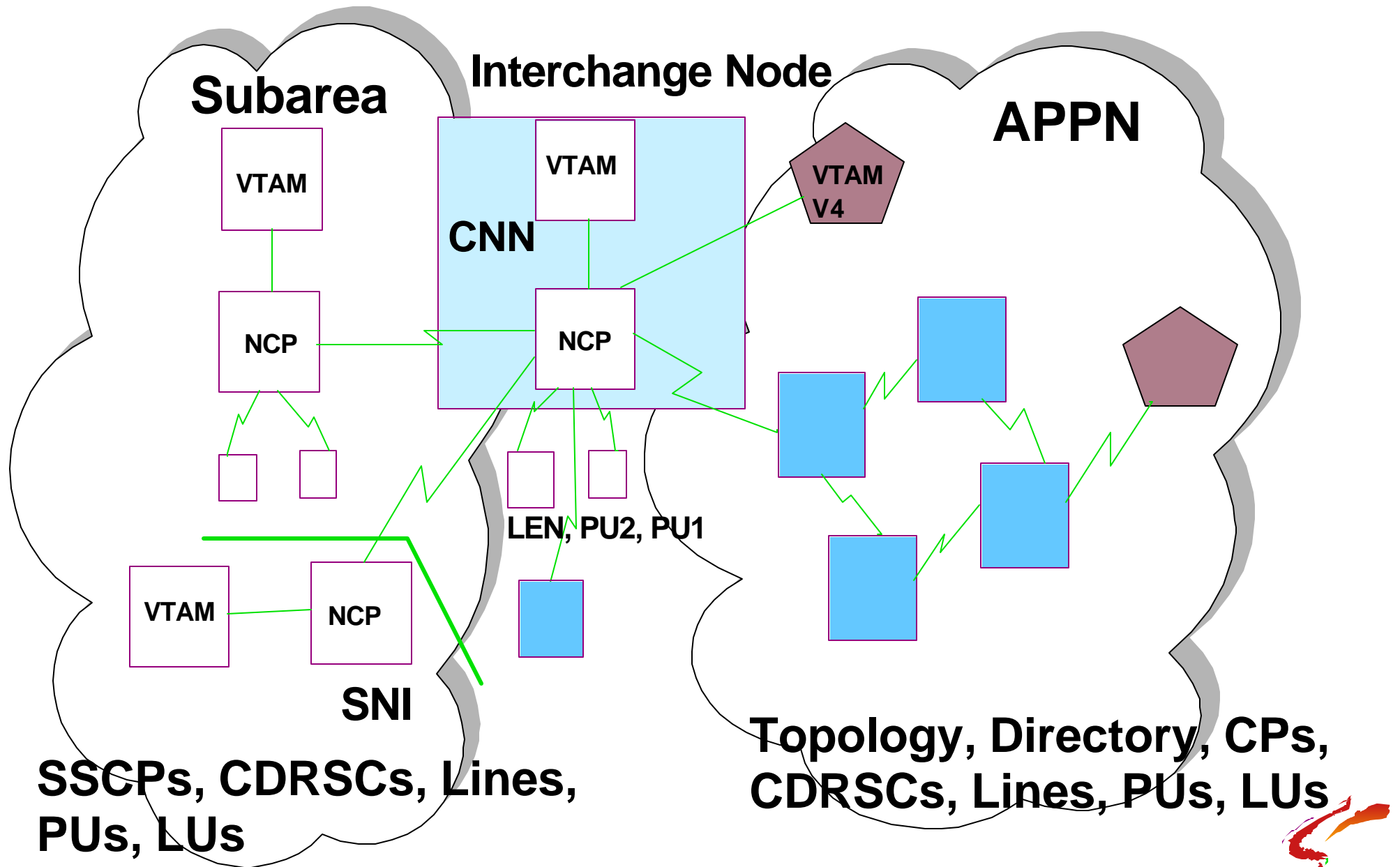


VTAM Node Types

- **Subarea Node** - has subarea, but no APPN, capabilities
 - Has SSCP sessions with other VTAMs, NCPs, PUs/LUs
 - Supports LEN connections
- **Interchange Node** - has subarea and APPN NN capabilities
 - Has SSCP sessions with other VTAMs, NCPs, PUs/LUs
 - Has CP-CP sessions with other APPN nodes
- **Migration Data Host** - has subarea and APPN EN capabilities
 - Has SSCP sessions with other VTAMs, PUs/LUs
 - Has CP-CP sessions with its NNS
- **Network Node** - has APPN NN capabilities
 - Has SSCP sessions with PUs/LUs
 - Has CP-CP sessions with other APPN nodes
- **End Node** - has APPN EN capabilities
 - Has SSCP sessions with PUs/LUs
 - Has CP-CP sessions with its NNs



Combined Subarea/APPN Networks

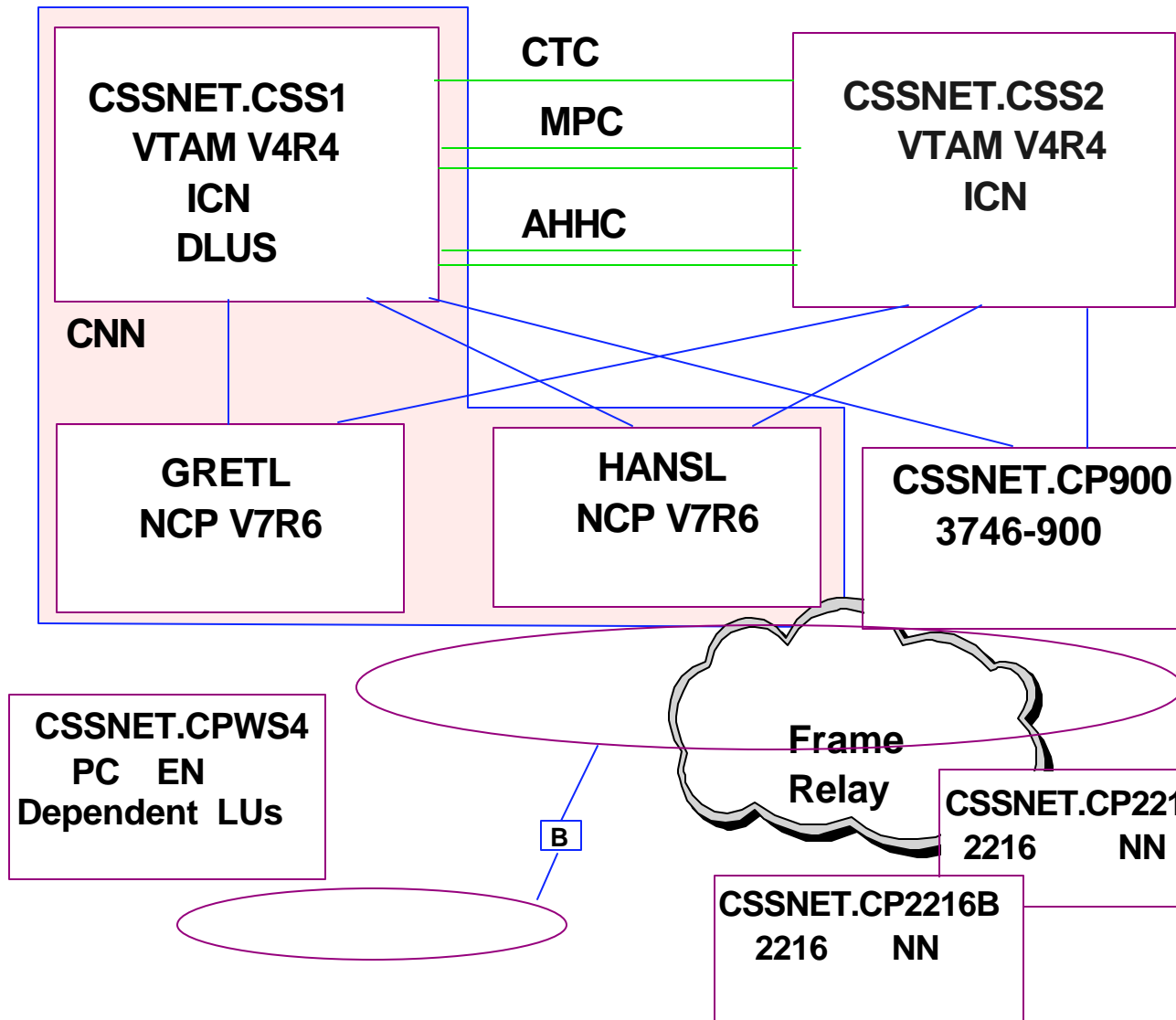


APPN/HPR Compared to Subarea Operations

- Some things are the same:
 - Many VTAM Display Commands/Messages
 - Some VTAM ACT/INACT Commands/Messages
 - NetView Session Monitor Information
 - NetView Hardware Monitor Information
- Some things are different:
 - Non-VTAM APPN Nodes have own Node Operator Facility
 - VTAM Topology, Directory, Adjacent CP Commands/Messages
 - Route selection, search logic, understanding session paths
 - NetView provides additional Hardware/Session Monitor Information with specific APPN terms



Lab Diagram

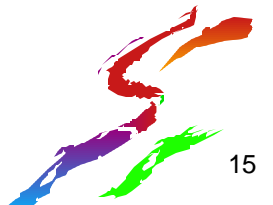


- **Two VTAMs:**
 - CSSNET.CSS1
 - CSSNET.CSS2
- **Two NCPs:**
 - GRET
 - HANSL
- **CSS1 owns NCPs - forms a CNN**
- **900, 2216s, PCs:**
 - CPWS4 & other PCs can connect to NCPs or DLURs
 - 2216s can connect to 900 and NCP



Determining Summary Information

- D NET,STATS
- D NET,RSCLIST
- D NET,VTAMOPTS
- D NET,TOPO,LIST = NN/EN



Display STATS

- VTAM Statistics includes APPN summary information:

```
D NET,STATS,TYPE=VTAM
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = STATS,TYPE=VTAM 023
IST1349I COMPONENT ID IS 5695-11701-401
IST1345I      ID          VALUE          DESCRIPTION
IST1227I      151          0 = DEPENDENT LU TOTAL FOR CSS1PUS
IST1227I      45           0 = DEPENDENT LU TOTAL FOR TRLLCL1
IST1227I      45          31 = DEPENDENT LU TOTAL FOR DLUR74A
IST1227I      45           0 = DEPENDENT LU TOTAL FOR ETLOC900
IST1227I      7           14 = INTERCONNECT CONTROLLERS FOR XCA3172
.....
IST1227I      140          0 = MAXIMUM DIRECTORY SIZE
IST1227I      141         100 = MAXIMUM TRS ROUTING TREES
IST1227I      142          2 = END NODE TRANSMISSION GROUPS
IST1227I      143         13 = NETWORK NODE TRANSMISSION GROUPS
IST1227I      144          3 = VIRTUAL NODE TRANSMISSION GROUPS
IST1227I      152          2 = ACTIVE DEPENDENT LU REQUESTERS
IST1227I      153          5 = ACTIVE DLUR SERVED PU TOTAL
IST1227I      154         26 = ACTIVE DLUR SERVED LU TOTAL
IST1227I      155          1 = VR-BASED TRANSMISSION GROUPS
IST1227I      156          0 = CONNECTION NETWORK DYNAMIC TGS
IST1227I      157          2 = TRANSPORT RESOURCE LIST ENTRIES
IST1227I      159          0 = ADJACENT CLUSTER TABLE CPNAME ENTRIES
IST1227I      160         10 = CP-CP SESSIONS
IST1227I      161        626 = HIGHEST ELEMENT ADDRESS ASSIGNED
IST1227I      162         34 = HIGHEST EXTENDED ELEMENT ADDRESS ASSIGNED
IST1454I 99 STATISTICS DISPLAYED
END
```



Display RSCLIST

- RSCLIST lists VTAM's resources :

```
D NET,RSCLIST,ID=*
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = RSCLIST 052
IST1417I NETID      NAME      STATUS      TYPE      MAJNODE
IST1418I CSSNET    VTAMSEG  ACTIV      APPL SEGMENT  VTAMSEG
IST1418I CSSNET    CSS1      ACTIV      CDRM         VTAMSEG
IST1418I CSSNET    ISTATAO0 CONCT      APPL         VTAMSEG
IST1418I CSSNET    ISTNOP    ACTIV      APPL         VTAMSEG
IST1418I CSSNET    ISTPDCLU  ACT/S      APPL         VTAMSEG
IST1418I CSSNET    CSS1      ACT/S      HOST CP      VTAMSEG
IST1418I CSSNET    CSS1PUS  ACTIV      PU T4/5      CSS1PUS
IST1418I CSSNET    ISTGROUP  ACTIV      LINE GROUP   CSS1PUS
IST1418I CSSNET    0014-L   ACTIV----I LINE         CSS1PUS
IST1418I CSSNET    0014-S   ACTIV----I LINK STATION CSS1PUS
IST1418I CSSNET    0016-L   ACTIV----I LINE         CSS1PUS
IST1418I CSSNET    0016-S   ACTIV----I LINK STATION CSS1PUS
IST1418I CSSNET    ISTPDILU  ACTIV      CDRSC SEGMENT ISTPDILU
IST1418I CSSNET    LHA2GRI0  ACTIV      CDRSC        ISTPDILU
.....
IST1418I CSSNET    LCA14B   ACTIV----E LINE         HANSL
IST1418I CSSNET    PCA14B   ACTIV----E LINK STATION HANSL
.....
IST1418I CSSNET    CA014    ACTIV      CA MAJOR NODE  CA014
IST1418I CSSNET    CAG014    ACTIV      LINE GROUP     CA014
IST1418I CSSNET    CAL014    NEVAC      LINE           CA014
IST1418I CSSNET    CAP014    NEVAC      LINK STATION   CA014
.....
IST1454I 1621 RESOURCE(S) DISPLAYED FOR ID=*
IST314I END
```



Display VTAMOPTS

- DISPLAY VTAMOPTS APPNCHAR - VTAM's APPN capabilities :

```
D NET,VTAMOPTS,FUNCTION=APPNCHAR
IST097I DISPLAY ACCEPTED
IST1188I ACF/VTAM V4R4 STARTED AT 08:31:11 ON 07/08/99 173
IST1349I COMPONENT ID IS 5695-11701-401
IST1348I VTAM STARTED AS INTERCHANGE NODE
IST1189I APPNCOS      = NONE                BN          = YES
IST1189I BNDYN       = LIMITED             BNORD        = PRIORITY
IST1189I CDSERVR    = NO                   CDSREFER     = 1
IST1189I CONNTYPE   = LEN                  CPCP         = YES
IST1189I DIRSIZE    = 0                    DIRTIME      = 691200S
IST1189I DYNADJCP   = YES                  HPR          = (RTP,RTP)
IST1189I HPRNCPBF   = NO                   HPRPST       = LOW                480S
IST1189I HPRPST     = MEDIUM                240S         HPRPST       = HIGH                120S
IST1189I HPRPST     = NETWRK                60S          INITDB       = NONE
IST1189I IOPURGE    = 0                    MAXLOCAT     = 5000
IST1189I NODETYPE   = NN                  NUMTREES     = 100
IST1189I PSRETRY    = LOW                   0S           PSRETRY      = MEDIUM                0S
IST1189I PSRETRY    = HIGH                  0S           PSRETRY      = NETWRK                0S
IST1189I RESUSAGE   = 100                  ROUTERES     = 128
IST1189I SECLVLCP   = ***NA***            SNVC         = 3
IST1189I SORDER     = SUBAREA              SRCHRED      = OFF
IST1189I SRCOUNT    = 10                   SRTIMER      = 30S
IST1189I SSEARCH    = YES                  VERIFYCP     = NONE
IST1189I VFYRED     = YES                  VFYREDTI     = OFF
IST1189I VRTG       = NO                   VRTGCPCP     = YES
IST1189I XCFINIT    = ***NA***
IST314I END
```



Display TOPO Summaries

- Display TOPO has many options - can use to obtain summary information about the APPN network topology :

```
D NET,TOPO
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY 204
IST1306I LAST CHECKPOINT      ADJ  NN   EN   SERVED EN  CDSERVR ICN  BN
IST1307I NONE                  7   6    2    2         0     2    0
IST314I END
```

```
D NET,TOPO,LIST=EN
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY 211
IST1295I CP NAME                NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I USIBMWZ.CPWS9          EN        *NA*    *NA*      YES  *NA*
IST1296I CSSNET.GMFCP          EN        *NA*    *NA*      YES  *NA*
IST314I END
```

```
D NET,TOPO,LIST=NN
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY 218
IST1295I CP NAME                NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I CSSNET.CP900          NN         128     NONE      YES  *NA*
IST1296I CSSNET.CP2216D       NN         128     NONE      NO   *NA*
IST1296I CSSNET.CP2216C       NN         128     NONE      YES  *NA*
IST1296I CSSNET.CSS1          NN         128     NONE      *NA* *NA*
IST1296I CSSNET.CSS2          NN         128     NONE      YES  *NA*
IST1296I CSSNET.CPMAE         NN         128     NONE      YES  *NA*
IST314I END
```

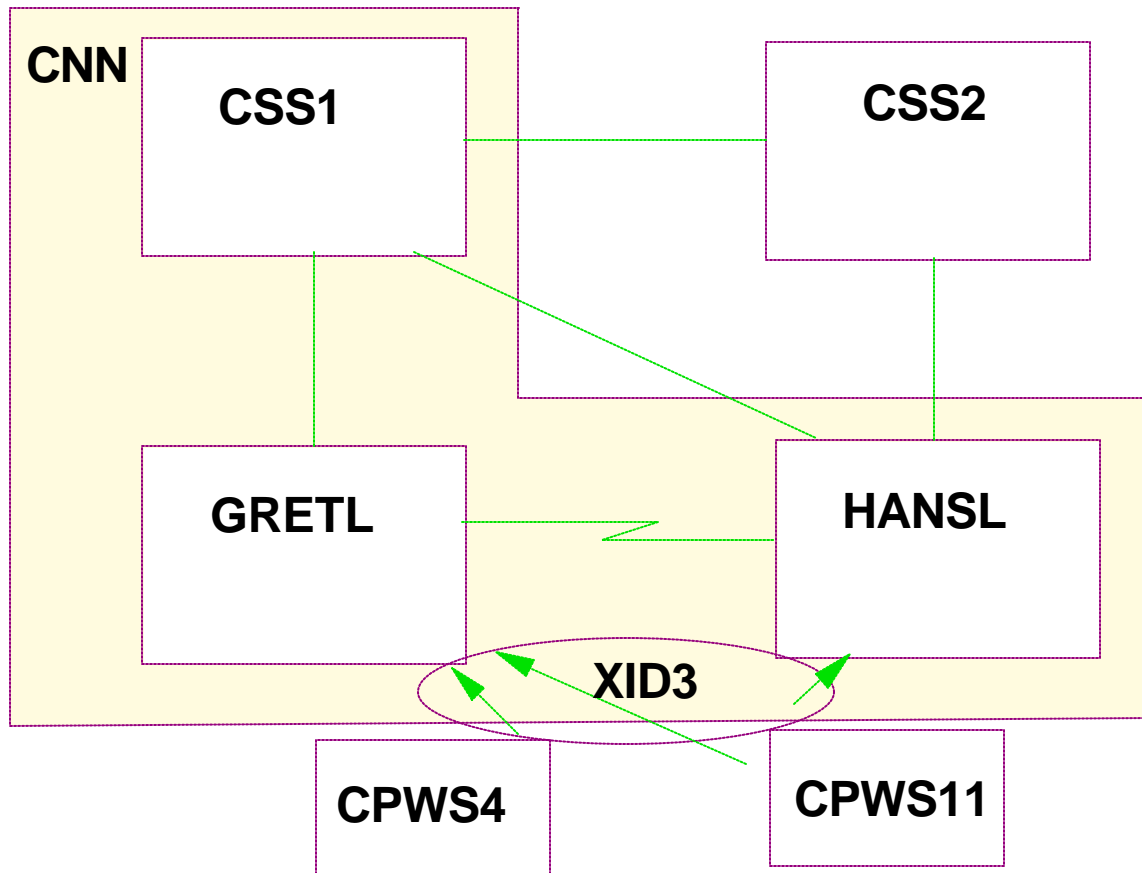


Sources of Connection Information

- TG Operative/Inoperative Messages
- Display Adjacent Control Points
- Display Linkstations (PUs)
- Display Topology
- Display APING
- NetView Alerts
- NetView NMC
- DLUS/DLUR and HPR
 - Although DLUS-DLUR and HPR sessions run on "pipes" or "connections", we will discuss these later



Bringing Up a Connection with an APPN Node

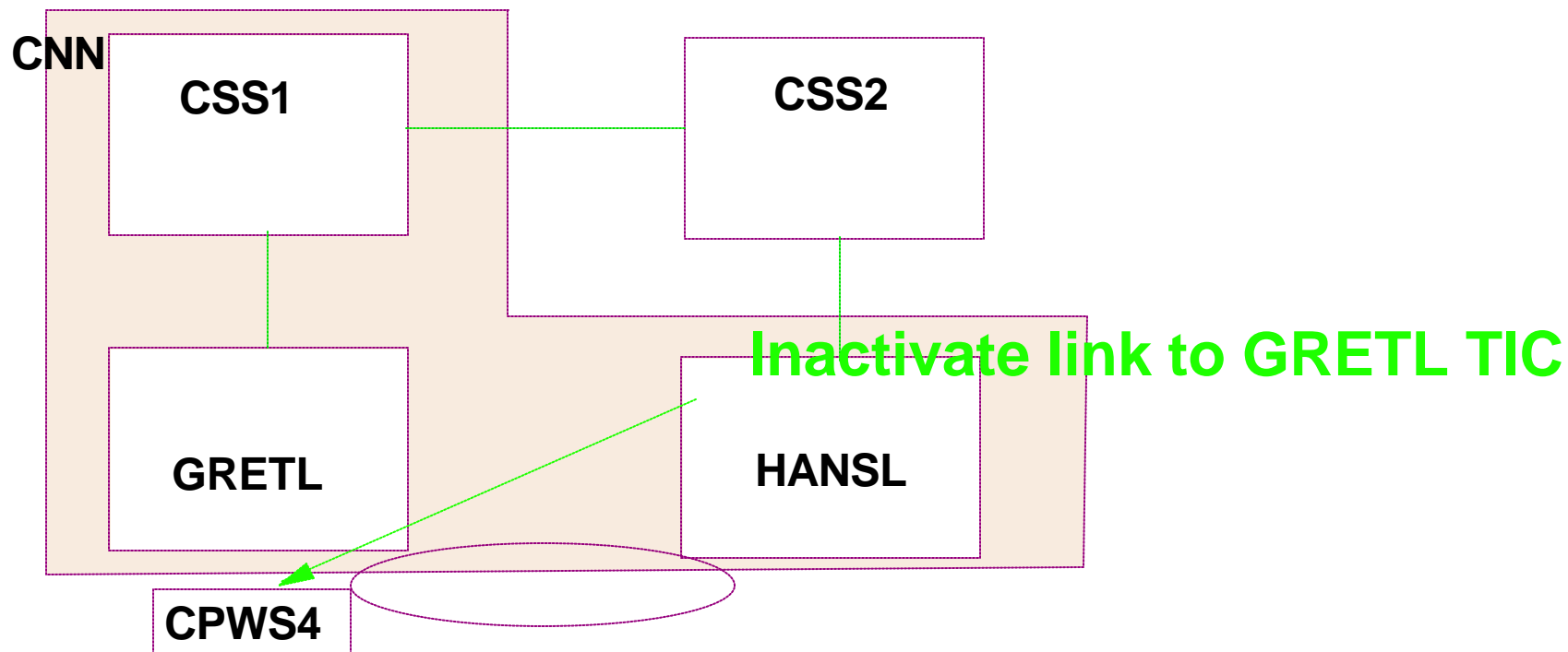


```
IST590I  CONNECTIN  ESTABLISHED FOR PU PSWWS4 ON LINE J003F109
IST1086I  APPN CONNECTION FOR CSSNET.CPWS4 IS ACTIVE - TGN = 21
IST1096I  CP-CP SESSIONS WITH CSSNET.CPWS4 ACTIVATED
```

```
IST590I  CONNECTIN  ESTABLISHED FOR PU PSWWS11 ON LINE J003F106
IST1086I  APPN CONNECTION FOR CSSNET.CPWS11 IS ACTIVE - TGN = 21
IST590I  CONNECTIN  ESTABLISHED FOR PU PSWWS1A ON LINE J003F105
IST1096I  CP-CP SESSIONS WITH CSSNET.CPWS11 ACTIVATED
IST1086I  APPN CONNECTION FOR CSSNET.CPWS11 IS ACTIVE - TGN = 22
```



Messages When Connection Ends



```
IST1097I CP-CP SESSION WITH CSSNET.CPWS4 TERMINATED
IST1280I SESSION TYPE = CONWINNER - SENSE = 80030004
IST314I END
IST1097I CP-CP SESSION WITH CSSNET.CPWS4 TERMINATED
IST1280I SESSION TYPE = CONLOSER - SENSE = 80030004
IST314I END
IST259I INOP RECEIVED FOR PSWS4 CODE = 04
IST619I ID = PSWS4 FAILED - RECOVERY IN PROGRESS
IST1196I APPN CONNECTION FOR CSSNET.CPWS4 INACTIVE - TGN = 21
IST590I CONNECTION TERMINATED FOR PU PSWS4 ON LINE J003F05F
IST621I RECOVERY SUCCESSFUL FOR NETWORK RESOURCE PSWS4
```



Displaying Adjacent Control Points

- **ISTADJCP** includes every APPN CP adjacent to VTAM:

```
D NET, ID=ISTADJCP, E
IST097I DISPLAY ACCEPTED
IST075I NAME = ISTADJCP, TYPE = ADJCP MAJOR NODE 107
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST1100I ADJACENT CONTROL POINTS FROM MAJOR NODE ISTADJCP
IST1102I NODENAME                NODETYPE CONNECTIONS CP CONNECTIONS NATIVE
IST1103I USIBMWZ.CPWS9           EN          1          1          *NA*
IST1103I CSSNET.CONNET           VN          2          0          *NA*
IST1103I CSSNET.CP900            NN          1          1          YES
IST1103I CSSNET.CP2216C          NN          1          1          YES
IST1103I CP2216B                 NN          0          0          *NA*
IST1103I USIBMWZV.WZVCDRM        NN          1          1          NO
IST1103I CSSNET.CPWS11           NN          2          2          YES
IST1103I CSSNET.CPWS4            EN          1          1          *NA*
IST1103I CSSNET.CSS2             NN          4          4          YES
IST1493I RTP SUMMARY FOR CSSNET.CP2216B COUNT = 1
IST1493I RTP SUMMARY FOR CSSNET.CP2216C COUNT = 1
IST1493I RTP SUMMARY FOR CSSNET.CP900 COUNT = 7
IST1493I RTP SUMMARY FOR CSSNET.CSS2 COUNT = 2
IST314I END
```

- If CPNAME= coded in definition, unqualified or qualified name displayed with 0 connections
- D ADJCP command for specific resource only



Displaying Inactive APPN Linkstation (PU)

- CONCT means the definitions have been activated but the resources aren't connected to VTAM/NCP

```
D NET, ID=CPWS4SW, E
IST097I DISPLAY ACCEPTED
IST075I NAME = CPWS4SW, TYPE = SW SNA MAJ NODE 238
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST084I NETWORK RESOURCES:
IST089I PSWWS4    TYPE = PU_T2           , CONCT
IST089I DSWWS401 TYPE = LOGICAL UNIT     , CONCT
IST089I DSWWS402 TYPE = LOGICAL UNIT     , CONCT
IST089I DSWWS403 TYPE = LOGICAL UNIT     , CONCT
IST089I DSWWS404 TYPE = LOGICAL UNIT     , CONCT
IST089I DSWWS405 TYPE = LOGICAL UNIT     , CONCT
IST314I END
```

- Switched SDLC, LAN, Frame Relay, and DLUR resources coded in VTAM Switched Major Nodes
- NCP leased line resources are ACT or INACT (instead of CONCT)



Displaying Active APPN Linkstation (PU)

```
NET, ID=PSWWS4, E
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = PSWWS4           , TYPE = PU_T2.1
IST486I  STATUS= ACTIV--L--, DESIRED STATE= ACTIV
IST1043I CP NAME = CPWS4       , CP NETID = CSSNET   , DYNAMIC LU = YES
IST1105I RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I PSWWS4 AC/R      21 YES 982D00000000000000000000000017100808080
IST1482I HPR = RTP - OVERRIDE = N/A - CONNECTION = NO
IST136I  SWITCHED SNA MAJOR NODE = CPWS4SW
IST081I  LINE NAME = J003F109, LINE GROUP = TRNANY1 , MAJNOD = GRETL
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I STATE TRACE = OFF
IST355I  LOGICAL UNITS:
IST080I  DSWWS401 ACTIV           DSWWS402 ACTIV           DSWWS403 ACTIV
IST080I  DSWWS404 ACTIV           DSWWS405 ACTIV
IST080I  CPWS4      ACT/S-----Y
IST314I  END
```

- CP name, transmission group number, TG number & characteristics, Major Node name, dependent LUs, and session with control point are shown



Displaying Topology Information

● Displaying topology information about CSS1

```
D NET, TOPO, ID=CSS1, LIST=ALL
```

```
.....
```

```
IST1295I CP NAME          NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I CSSNET.CSS1      NN          128      NONE      *NA*   *NA*
IST1579I -----
IST1297I ICN/MDH   CDSERVR  RSN          HPR
IST1298I YES      NO      278          RTP
IST1579I -----
IST1223I BN          NATIVE  TIME LEFT
IST1224I NO          YES      15
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP CSSNET.CSS1
IST1357I                                CPCP
IST1300I DESTINATION CP    TGN      STATUS   TGTYPE   VALUE WEIGHT
IST1301I CSSNET.CSS2      255      OPER     INTERM  VRTG    YES  *NA*
IST1301I CSSNET.CSS2      21       OPER     INTERM          YES  *NA*
IST1301I CSSNET.CP900     21       OPER     INTERM          YES  *NA*
IST1301I CSSNET.CP2216B   21       INOP     INTERM          YES  *NA*
IST1301I CSSNET.CONNET    22       OPER     INTERM          NO   *NA*
IST1301I CSSNET.CONNET    21       OPER     INTERM          NO   *NA*
IST1301I CSSNET.CPWS11    21       OPER     INTERM          YES  *NA*
IST1301I CSSNET.CPWS11    22       OPER     INTERM          YES  *NA*
IST1301I CSSNET.CSS2      23       OPER     INTERM          YES  *NA*
IST1301I CSSNET.CSS2      22       OPER     INTERM          YES  *NA*
IST1301I USIBMWZ.CPWS9    21       OPER     ENDPT    YES  *NA*
IST314I END
```



Topology Display - Link Characteristics

- **ORIG=** and **DEST=** shows link characteristics of TGs :

```
D NET,TOPO,ORIG=CSS1,DEST=CPWS11
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY 683
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP CSSNET.CSS1
IST1357I
IST1300I DESTINATION CP      TGN      STATUS  TGTYPE  VALUE WEIGHT
IST1301I CSSNET.CPWS11      21      OPER    INTERM  YES  *NA*
IST1163I                      RSN      HPR      TIME LEFT
IST1164I                      4      NO      15
IST1302I                      CAPACITY PDELAY  COSTTIME  COSTBYTE
IST1303I                      8K      TERRESTR 0      0
IST1304I                      SECURITY UPARM1  UPARM2    UPARM3
IST1305I                      UNSECURE 128    128      128
IST924I -----
IST1357I
IST1300I DESTINATION CP      TGN      STATUS  TGTYPE  VALUE WEIGHT
IST1301I CSSNET.CPWS11      22      OPER    INTERM  YES  *NA*
IST1163I                      RSN      HPR      TIME LEFT
IST1164I                      2      NO      15
IST1302I                      CAPACITY PDELAY  COSTTIME  COSTBYTE
IST1303I                      8K      TERRESTR 0      0
IST1304I                      SECURITY UPARM1  UPARM2    UPARM3
IST1305I                      UNSECURE 128    128      128
IST314I END
```



Topology Display - Weights

D NET, TOPO, ORIG=CSS1, DEST=CSS2, APPNCOS=#INTER

```
.....
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP CSSNET.CSS1
IST1357I                                     CPCP
IST1300I DESTINATION CP      TGN      STATUS  TGTYPE  VALUE WEIGHT
IST1301I CSSNET.CSS2        255      OPER    INTERM VRTG YES  240
IST1579I -----
IST1163I                      RSN              HPR              TIME LEFT
IST1164I                      170              NO               15
IST1579I -----
IST1302I                      CAPACITY PDELAY  COSTTIME  COSTBYTE
IST1303I                      8K          TERRESTR  0          0
IST1579I -----
IST1304I                      SECURITY UPARM1  UPARM2    UPARM3
IST1305I                      UNSECURE 128    128      128
IST924I -----
IST1357I                                     CPCP
IST1300I DESTINATION CP      TGN      STATUS  TGTYPE  VALUE WEIGHT
IST1301I CSSNET.CSS2        21      OPER    INTERM  YES  240
.....
IST1305I                      UNSECURE 128    128      128
IST924I -----
IST1357I                                     CPCP
IST1300I DESTINATION CP      TGN      STATUS  TGTYPE  VALUE WEIGHT
IST1301I CSSNET.CSS2        23      OPER    INTERM  YES  30
.....
```



Display APING

- Display APING command introduced with VTAM V4R3
 - Previously was available with APPC Application Suite
- "Connectivity tester" to LU6.2 partners
- Starts sessions with named LU6.2 partner
- Can use to verify supported mode names
- Shows subarea and APPN routes used
- Provides some performance information
- Most APPN node types provide APING client and/or server



Display APING Example

```
D NET,APING,ID=CPWS4
IST097I DISPLAY ACCEPTED
IST1489I APING SESSION INFORMATION 399
IST1490I DLU=CSSNET.CPWS4 SID=FD87C3E97E7EE40E
IST933I LOGMODE=#INTER , COS=*BLANK*
IST875I APPNCOS TOWARDS SLU = #INTER
IST1458I ORIGIN      ADJSUB      VR      TP      ER      REVERSE ER
IST1459I      16      111      0      0      0      0
IST1460I TGN      CPNAME      TG TYPE      HPR
IST1461I  21      CSSNET.CP2216C      APPN      RTP
IST1461I  21      CSSNET.CPWS4      APPN      *NA*
IST314I END
IST1457I VTAM APING VERSION 2R33 (PARTNER TP VERSION 2R40) 400
IST1490I DLU=CSSNET.CPWS4 SID=FD87C3E97E7EE40E
IST1462I ECHO IS ON
IST1463I ALLOCATION DURATION: 2067 MILLISECONDS
IST1464I PROGRAM STARTUP AND VERSION EXCHANGE: 191 MILLISECONDS
IST1465I          DURATION      DATA SENT      DATA RATE      DATA RATE
IST1466I          (MILLISECONDS)      (BYTES)      (KBYTE/SEC)      (MBIT/SEC)
IST1467I          99      200      2      0
IST1467I          97      200      2      0
IST1468I TOTALS:          196      400      2      0
IST1469I DURATION STATISTICS:
IST1470I MINIMUM = 97 AVERAGE = 98 MAXIMUM = 99
IST314I END
```



NetView Alert Information

- Alert - NCP frame relay connected APPN 2216 goes down

```
NETVIEW                SESSION DOMAIN: N1P1      NG      07/09/99 13:31:55
NPDA-45A              * RECOMMENDED ACTION FOR SELECTED EVENT *      PAGE 1 OF 1
N1P1                  HANSL          FRBNNL3      FRBNNP3
                      +-----+          +-----+
DOMAIN                |  COMC  |-----LINE-----|  CTRL  |
                      +-----+          +-----+
```

USER CAUSED - NONE

INSTALL CAUSED - NONE

FAILURE CAUSED - FRAME RELAY COMMUNICATIONS ERROR
ACTIONS - I120 - REVIEW LINK DETAILED DATA
 - I510 - START LINE FRBNNL3

- If APPN node has another route to VTAM/NetView, it can also issue an alert for the same event



NetView APPN Alert Data

- Alert - 900 DLUR SDLC connected 3174 goes down

```
NETVIEW                SESSION DOMAIN: N1P1      NG      03/05/99 12:03:44
NPDA-45A                * RECOMMENDED ACTION FOR SELECTED EVENT *      PAGE 1 OF 1
  N1P1          CP900          P3174          AP2440
                +-----+   +-----+   +-----+
  DOMAIN        |  COMC  |---|  LKST  |---|  PORT  |
                +-----+   +-----+   +-----+
```

```
USER      CAUSED - REMOTE DEVICE POWER OFF
          ACTIONS - I017 - CHECK POWER
```

```
INSTALL CAUSED - NONE
```

```
FAILURE CAUSED - SDLC COMMUNICATIONS ERROR
                POLL COUNT EXHAUSTED
  ACTIONS - I144 - IF PROBLEM REOCCURS THEN DO THE FOLLOWING
          I120 - REVIEW LINK DETAILED DATA
          I237 - RUN THE FOLLOWING AT THE REPORTING LOCATION IBM 3746 CO
                MMAND : WTT WITH WRAP PLUG
          I525 - CONTACT NETWORK ADMINISTRATOR
          I589 - REFER TO IBM 3746 PUBLICATION NUMBER SA33-0175 FOR ADDI
                TIONAL INFORMATION
          I168 - FOR IBM 3746 PRODUCT ALERT REFERENCE CODE 2217
          I620 - AND
                IBM 3746 LINE ADDRESS 2440
```

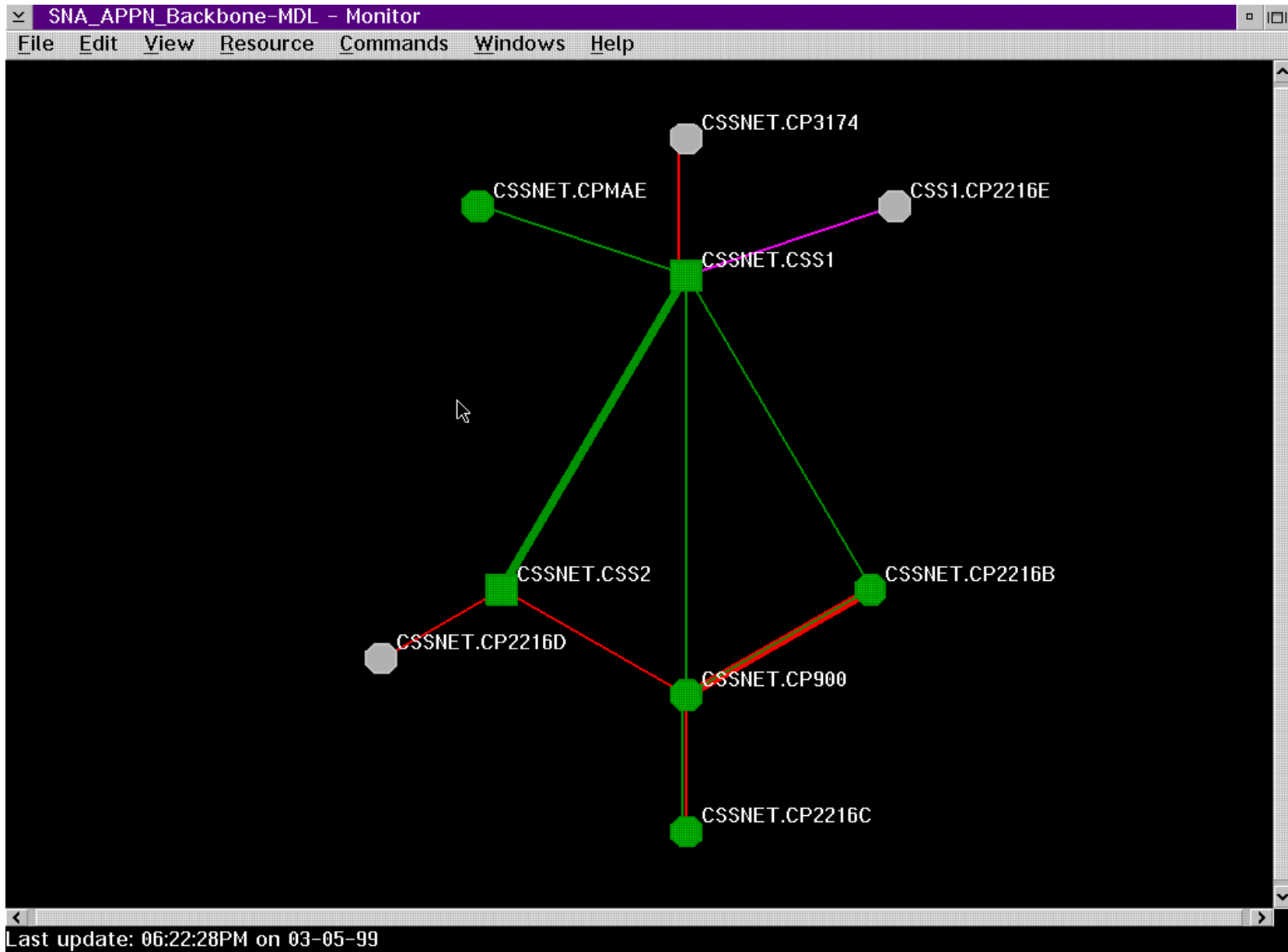


NetView Management Console (NMC)

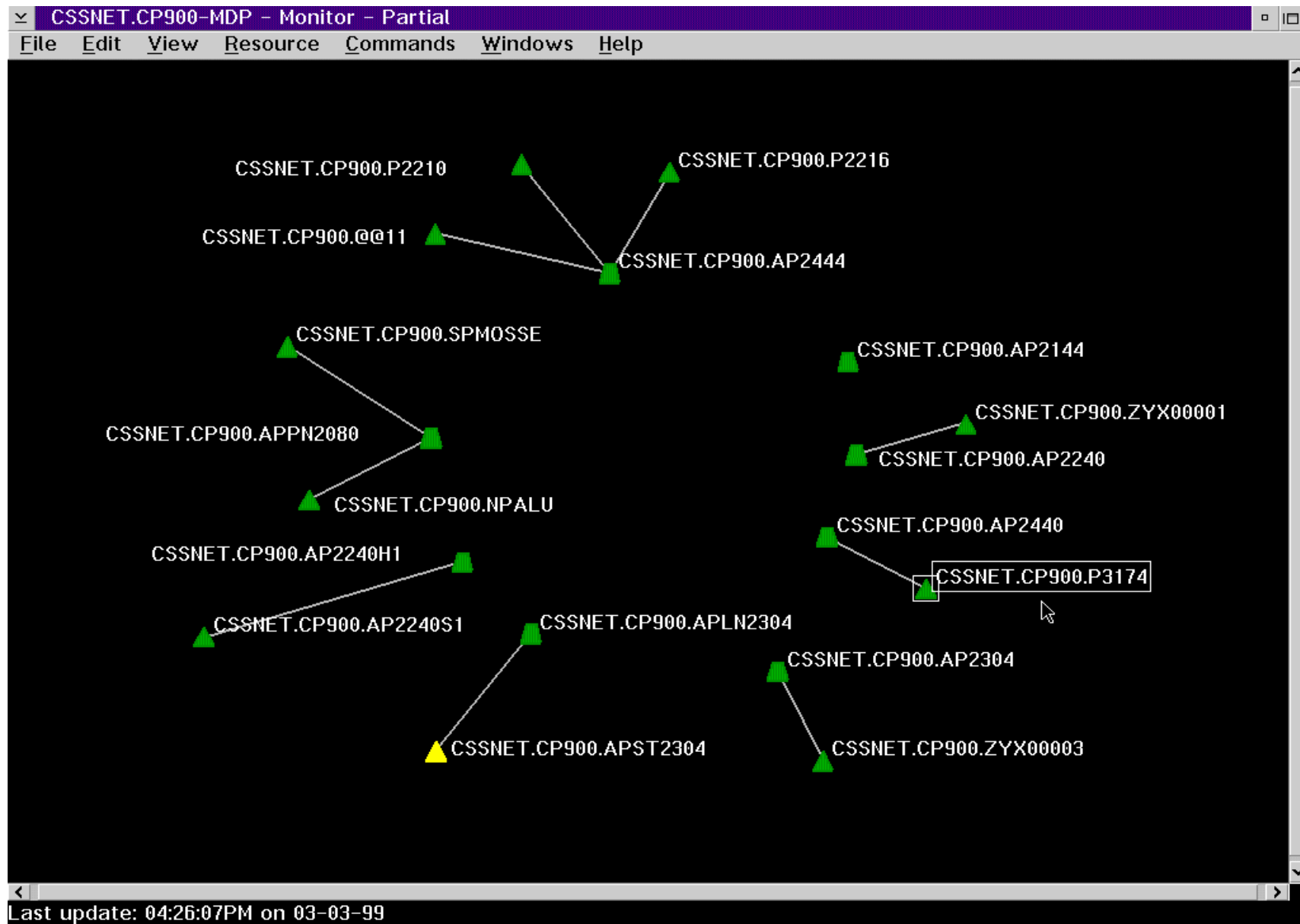
- Previous function is Graphics Monitor Facility (GMF)
- Displays Topology
 - NetView V3+ uses VTAM V4R3+ and 3746-9X0NN as Topology Agents
 - Shows topology in graphical form using colors to highlight problem areas
- Can use to activate/inactivate 3746-9X0 links/ports
- Provides exception views
- Provides details about APPN nodes
- Runs on multiple platforms
 - Server - OS/2, Windows9X, AIX, NT
 - Client - all of the above plus Solaris



NMC View of APPN Network Backbone



NMC Display of 3746-900 Ports and Links

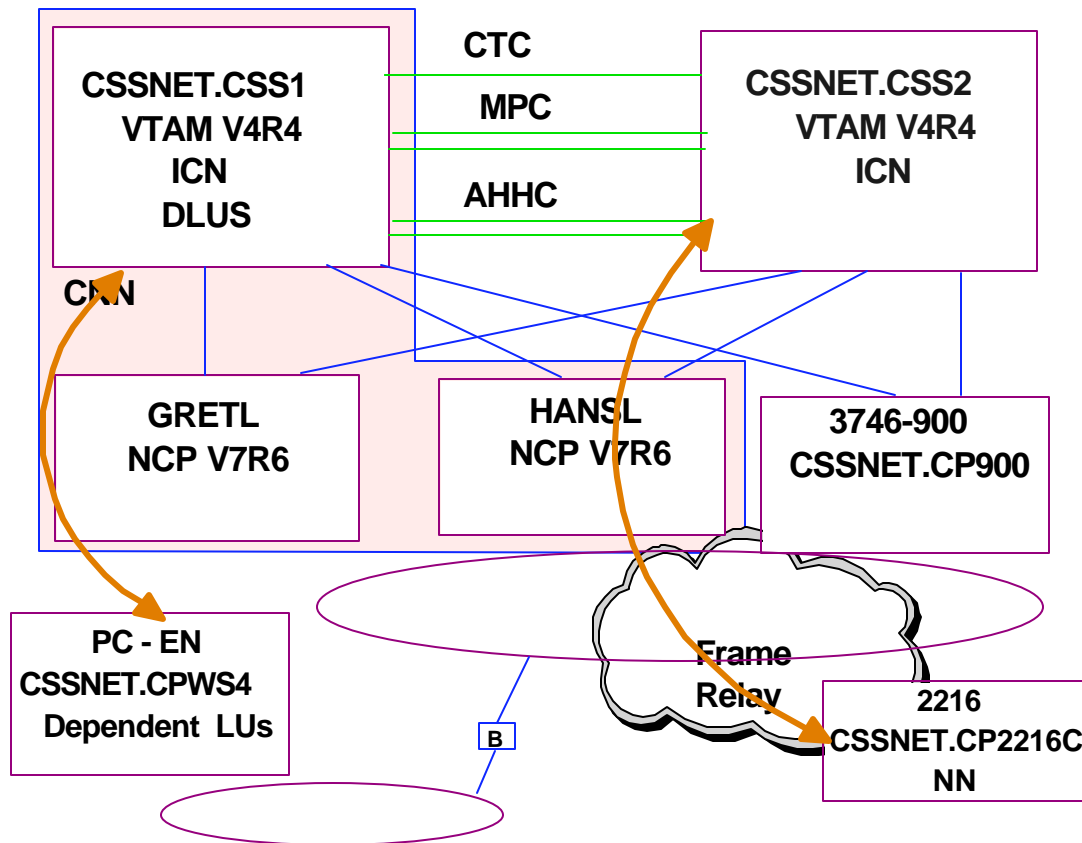


Sources of Session Information

- Display CDRSC
- NetView Session Monitor
- D NET,SESSIONS with SID
- NetView Hardware Monitor
- Differences with DLUS/DLUR
- Differences with HPR



LU-LU Session Configuration



- **LU-LU session (APING) established between CSS1 and CPWS4**
 - Display CDRSC, show Session Monitor and D SESSIONS information
- **LU-LU session established between CSS2 (V2R7) and CP2216C**
 - Show D SESSIONS information



Display CDRSC

- Display CPWS4 shows linkstation being used and three sessions

```
D NET, ID=CPWS4, E
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = CSSNET.CPWS4      , TYPE = ADJACENT CP
IST486I  STATUS= ACT/S-----Y, DESIRED STATE= ACTIV
      . . . . .
IST171I  ACTIVE SESSIONS = 0000000003, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST1081I  ADJACENT LINK STATION = PSWWS4
IST634I  NAME      STATUS      SID      SEND  RECV  VR  TP  NETID
IST635I  CSS1      ACTIV/CP-S  C90374C95C608B30 0003 0001  0  2  CSSNET
IST635I  CSS1      ACTIV/SV-P  FD87C3E97E7EE4C7 0001 0001  0  0  CSSNET
IST635I  CSS1      ACTIV/CP-P  FD87C3E97E7EE4C6 0001 0008  0  2  CSSNET
IST924I  -----
IST075I  NAME = CSSNET.CPWS4      , TYPE = DIRECTORY ENTRY
IST1186I  DIRECTORY ENTRY = REGISTERED EN
IST1184I  CPNAME = CSSNET.CPWS4      - NETSRVR = CSSNET.CSS1
IST314I  END
```



NetView Session Information

```

NLDM.CON                      SESSION CONFIGURATION DATA                      PAGE    1
----- PRIMARY -----+----- SECONDARY -----
NAME CSS1      SA 0010  EL 00000246  |  NAME CPWS4      SA 006F  EL 000003CC
-----+-----
DOMAIN N1P1          PCID CSSNET.CSS1.FD87C3E97E7EE4C7          DOMAIN N1P1
+-----+
CSS1      |  CP/SSCP  |  ---      ---  |  |  |
CSS1PUS (0000) | SUBAREA PU | APPN TP 03      | SUBAREA PU | GRETL (0000)
+-----+-----+      SUBA TP 00      +-----+-----+
          |          |          VR 00      |          |
+-----+-----+      ER 00      +-----+-----+
CSS1      (0246) |  LU      |  RER 00      |  LINK      | J003F03D
+-----+-----+
          |          | APPNCOS SNASVCMG      |          |
          |          | SUBACOS N/A          +-----+-----+
          |          | LOGMODE SNASVCMG      |  PU      | PSWWS4 (0099)
          |          | PADJ CP N/A          +-----+-----+
          |          | SADJ CP CPWS4          |          |
          |          |          +-----+-----+
          |          |          |  ILU      | CPWS4 (03CC)
          |          |          +-----+-----+

```

```

SELECT PT, ST (PRI, SEC TRACE), RT (RESP TIME), P, ER, VR, AR
CMD==> AR

```



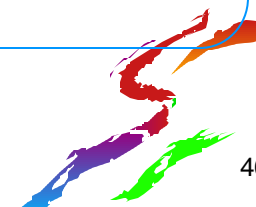
NetView APPN Route

```
NLDM.AR                APPN SESSION ROUTE CONFIGURATION                PAGE 1
-- PRIMARY  ---+--- SECONDARY ---+----- PCID -----+-- DOMAIN-
NAME CSS1    | NAME CPWS4    | CSSNET.CSS1.FD87C3E97E7EE4C7 | N1P1
-----+-----+-----+-----+-----+-----+-----+-----
```

```
+-----+
|   CP   |
| CSS1  |
+-----+
TG021 |
+-----+
|   CP   |
| CPWS4  |
+-----+
```

COSNAME SNASVCMG APPN TP 03

END OF DATA
SELECT PAR, SAR
CMD==>



Display Sessions Command

```
D NET,SESSIONS,SID=FD87C3E97E7EE4C7
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = SESSIONS 577
IST879I PLU/OLU REAL = CSSNET.CSS1          ALIAS = ***NA***
IST879I SLU/DLU REAL = CSSNET.CPWS4        ALIAS = ***NA***
IST880I SETUP STATUS = ACTIV/SV
IST875I ADJSSCP TOWARDS SLU = ISTAPNCP.
IST875I ALSNAME TOWARDS SLU = PSWS4
IST933I LOGMODE=SNASVCMG, COS=*BLANK*
IST875I APPNCOS TOWARDS SLU = SNASVCMG
IST1635I PLU HSCB TYPE: FMCB LOCATED AT ADDRESS X'073C06F0'
IST1635I SLU HSCB TYPE: BSB LOCATED AT ADDRESS X'06D5D150'
IST1636I PACING STAGE(S) AND VALUES:
IST1644I PLU--STAGE 1-----|-----STAGE 2--SLU
IST1638I STAGE1: PRIMARY TO SECONDARY DIRECTION - ADAPTIVE
IST1639I          PRIMARY SEND: CURRENT      =      0          NEXT =      7
IST1640I          SECONDARY RECEIVE          =      7
IST1641I STAGE1: SECONDARY TO PRIMARY DIRECTION - ADAPTIVE
IST1642I          SECONDARY SEND: CURRENT   =      0          NEXT = 32767
IST1643I          PRIMARY RECEIVE            = 32767
IST1638I STAGE2: PRIMARY TO SECONDARY DIRECTION - ADAPTIVE
IST1639I          PRIMARY SEND: CURRENT    =      0          NEXT =      8
IST1641I STAGE2: SECONDARY TO PRIMARY DIRECTION - ADAPTIVE
IST1643I          PRIMARY RECEIVE          =     128
IST314I END
```



Display Sessions Command (SAVERSCV)

- OS/390 V2R7 provides SAVERSCV Start Option
- Allows display of route selection control vector on Display Sessions

```
D NET,SESSIONS,SID=FD87C0597B37D20B
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = SESSIONS 365
IST879I PLU/OLU REAL = CSSNET.CSS2           ALIAS = ***NA***
IST879I SLU/DLU REAL = CSSNET.CP2216C        ALIAS = ***NA***
IST880I SETUP STATUS = ACTIV/SV
IST875I ADJSSCP TOWARDS SLU = ISTAPNCP

.....
IST1711I RSCV TOWARDS SLU SAVED AT SESSION ACTIVATION
IST1460I TGN  CPNAME                TG TYPE      HPR
IST1461I  21  CSSNET.CSS1            APPN       RTP
IST1461I  21  CSSNET.CP2216C         APPN       RTP
IST1713I RTP RSCV IN THE DIRECTION OF THE SLU
IST1460I TGN  CPNAME                TG TYPE      HPR
IST1461I  21  CSSNET.CSS1            APPN       RTP
IST1461I  21  CSSNET.CP2216C         APPN       RTP
IST314I END
```



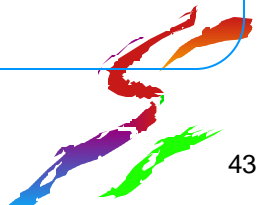
NetView Hardware Monitor

```
N E T V I E W                SESSION DOMAIN: N1P1      NG          07/16/99 10:18:18
NPDA-31A                     * ALERTS-HISTORY *          PAGE 10 OF 32

SEL# DOMAIN RESNAME TYPE TIME  ALERT DESCRIPTION:PROBABLE CAUSE
( 1) N1P1  L196      LINE 08:28 INTERFACE ERROR DURING LPDA:LOCAL MODEM      %
( 2) N1P1  FRTEHPL2 FRLY 08:28 DSR ON CHECK:LOCAL MODEM OFF/LOCAL MODEM
....
....
....
....
....
(12) N1P1  @CP2216B CP    08:27 CP-CP SESSION FAILURE:SNA COMMUNICATIONS      %
(13) N1P1  @CP2216B CP    08:27 LU6.2 SESSION ACTIVATION REJECTED:COMM PROGRAM %
(14) N1P1  @CP2216B CP    08:27 LU6.2 SESSION ACTIVATION REJECTED:COMM PROGRAM %
(15) N1P1  CSS1      CP    23:48 UNSUCC APPN-HPR ROUT SWCH:APPN-HPR COMM      %
(16) N1P1  CSS1      CP    23:47 UNSUCC APPN-HPR ROUT SWCH:APPN-HPR COMM      %
ENTER SEL# (ACTION),OR SEL# PLUS M (MOST RECENT), P (PROBLEM), DEL (DELETE)

???
```

CMD==> 12



NetView Hardware Monitor

```
N E T V I E W          SESSION DOMAIN: N1P1      NG          07/16/99 10:34:44
NPDA-45A              * RECOMMENDED ACTION FOR SELECTED EVENT *      PAGE 1 OF 1
  N1P1                CP2216B
                        +-----+
  DOMAIN              |  CP    |
                        +-----+

USER      CAUSED - NONE

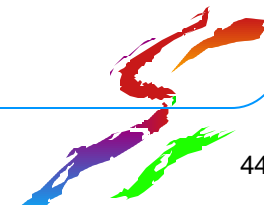
INSTALL   CAUSED - NONE

FAILURE   CAUSED - CP CSSNET.CP2216B -- CP CSSNET.CSS1 CONNECTION NOT AVAILABLE A
          T THIS TIME
          SNA COMMUNICATIONS ERROR SNA SENSE DATA 80020000
          ACTIONS - I370 - VERIFY REMOTE NODE IS ACTIVE
                   I122 - REVIEW RECENT ALERTS FOR THIS RESOURCE
                   I073 - ACTIVATE RESOURCES ATTACHED TO CP CSSNET.CSS1

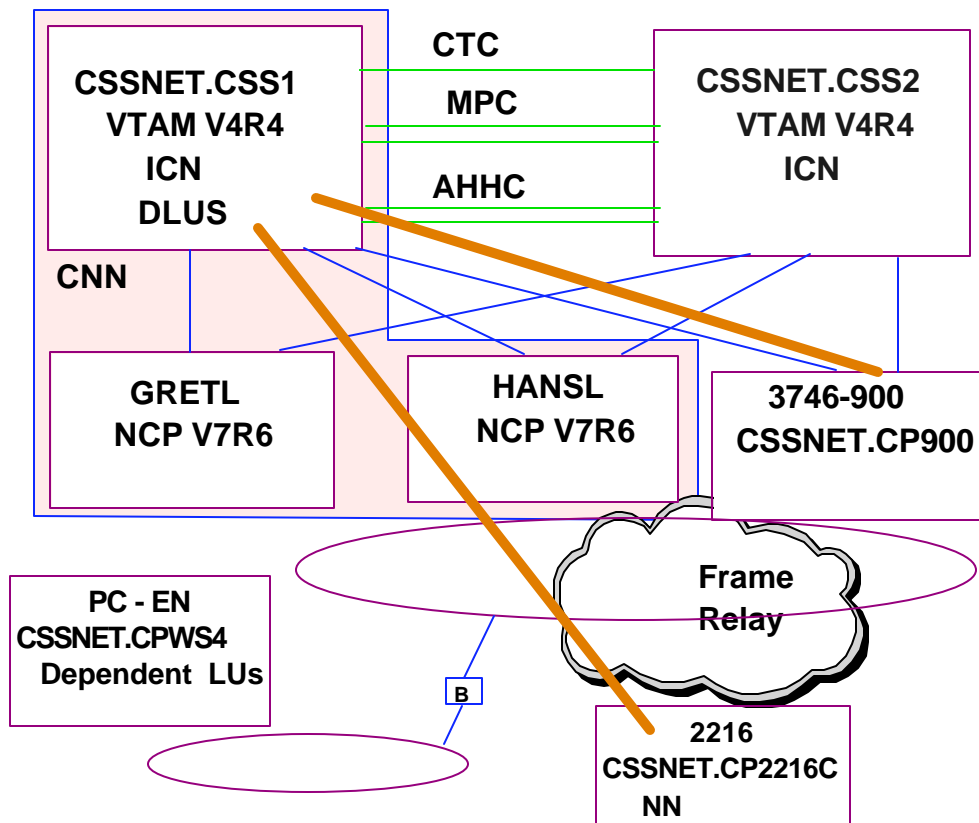
ENTER DM (DETAIL MENU) OR D (EVENT DETAIL)

???
```

CMD==>



DLUS/DLUR Considerations



- VTAM acting as DLUS has pair of LU6.2 sessions ("pipe") with each DLUR node
 - SSCP-PU, SSCP-LU, MSG10, Logon flows are encapsulated in this pipe

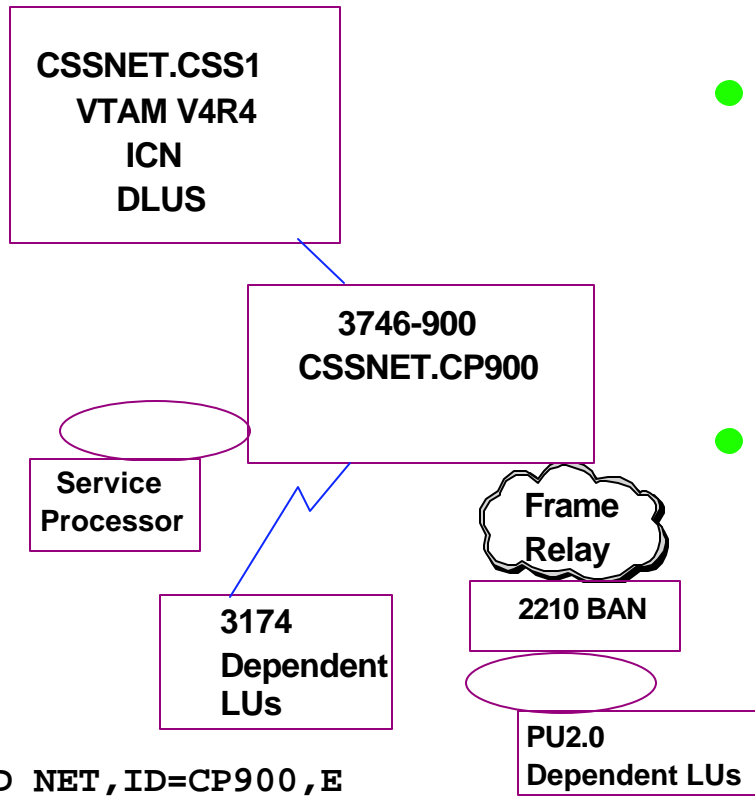
- Use D NET,DLURS command to see VTAM's DLUR pipes

```

D NET,DLURS
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = DLURS 639
IST1352I DLUR NAME           DLUS CONWINNER STATE  DLUS CONLOSER STATE
IST1353I CSSNET.CP2216C      ACTIVE                 ACTIVE
IST1353I CSSNET.CP900       ACTIVE                 ACTIVE
IST314I END
    
```



3746-900 Connections to DLUR Controlled PUs

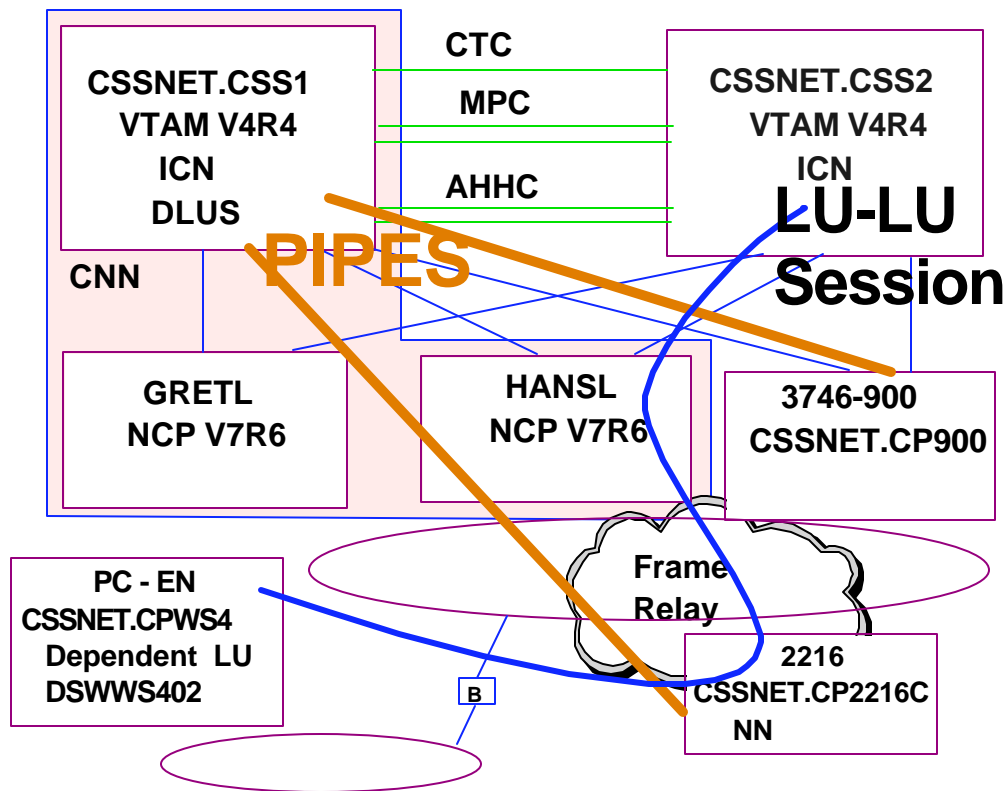


- Devices attached to DLURs are coded in Switched Major Nodes
 - Display CONCT or ACTIVE depending on status
- Display CPname of DLUR to get list of PUs using DLUR services
 - Also see two DLUS-DLUR sessions marked with DL

```
D NET, ID=CP900, E
IST097I DISPLAY ACCEPTED
IST075I NAME = CSSNET.CP900, TYPE = ADJACENT CP 612
....
....
IST1355I PHYSICAL UNITS SUPPORTED BY DLUR CSSNET.CP900
IST089I PU21BAN TYPE = PU_T2 , ACTIV
IST089I PUSP1 TYPE = PU_T2.1 , ACTIV
IST089I PU3174S TYPE = PU_T2 , ACTIV
IST924I -----
....
```



LU-LU Session with DLUS-DLUR



- VTAM acting as DLUS has pair of LU6.2 sessions ("pipe") with each DLUR node
 - **SSCP-PU, SSCP-LU, MSG10, Logon flows are encapsulated in this pipe**
- LU-LU session flows on best route - native dependent LU flows - no encapsulation



DSWWS402 NetView Session Information

NLDM.SESS

PAGE 1

SESSION LIST

NAME: DSWWS402

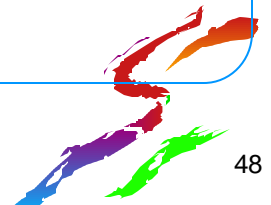
DOMAIN: N1P1

```
-----  
***** PRIMARY *****      ***** SECONDARY *****  
SEL#   NAME    TYPE  DOM      NAME    TYPE  DOM      START TIME      END TIME  
( 1) TS20002  LU    N1P1    DSWWS402 LU    N1P1    07/14 12:42:42  *** ACTIVE ***  
( 2) CSS1     SSCP N1P1    DSWWS402 LU    N1P1    07/14 12:10:43  *** ACTIVE ***  
                                           DLUS-DLUR PIPE  
( 3) TS20002  LU    N1P1    DSWWS402 LU    N1P1    07/14 12:11:00  07/14 12:42:36  
( 4) CSS1     SSCP N1P1    DSWWS402 LU    N1P1    07/14 10:18:23  07/14 10:20:29  
                                           DLUS-DLUR PIPE
```

ENTER TO VIEW MORE DATA

ENTER SEL# (CONFIG), SEL# AND CT (CONN. TEST), SEL# AND STR (TERM REASON)

CMD==> 2



DSWWS402 SSCP-LU Session in Pipe

```

NLDM.CON                                SESSION CONFIGURATION DATA                                PAGE    1
----- PRIMARY -----+----- SECONDARY -----
NAME CSS1      SA 0010  EL 00000001  |  NAME DSWWS402  SA 0010  EL 0001001E
-----+-----
DOMAIN N1P1      PCID CSSNET.CSS1.FD87C3E97E7EE470      DOMAIN N1P1

CSS1      +-----+
CSS1PUS (0000) |  SSCP  |  ---      ---  |  DLUS  |  CSS1 (0000)
                +-----+
                |
                +-----+
                |  DLUR  |  CP2216C
                +-----+
                |
                +-----+
                |  PU   |  PSWS4 (027B)
                +-----+
                |
                +-----+
                |  LU   |  DSWWS402(001E)
                +-----+

APPNCOS N/A
SUBACOS ISTVTCOS
LOGMODE N/A
PADJ CP N/A
SADJ CP N/A

```

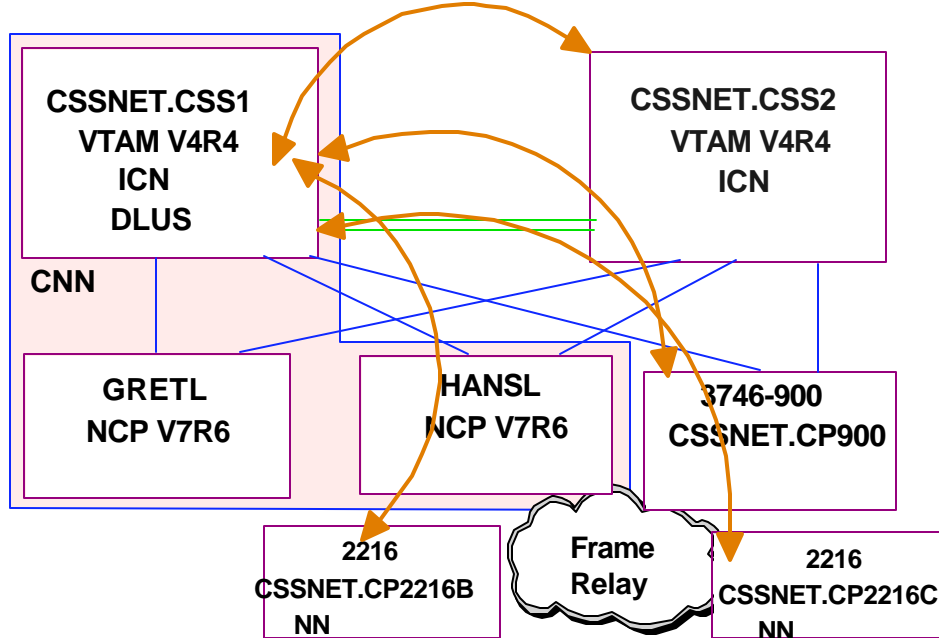
```

SELECT PT, ST (PRI, SEC TRACE), RT (RESP TIME), P
CMD==>

```



HPR Considerations



- With HPR use connectivity operations already shown
- HPR has connection(s) with remote CPs for sessions
 - Different APPNCOS names, different connections
- Connection info stored in ISTRTPMN (V2R7 has D RTPs command also)

D NET, ID=ISTRTPMN, E

....

IST1486I	RTP NAME	STATE	DESTINATION CP	MNPS	TYPE
IST1487I	CNR00033	CONNECTED	CSSNET.CSS2	NO	LULU
IST1487I	CNR0002B	CONNECTED	CSSNET.CP900	NO	LULU

....

IST1487I	CNR00025	CONNECTED	CSSNET.CP900	NO	RSTP
IST1487I	CNR00024	CONNECTED	CSSNET.CP900	NO	CPCP
IST1487I	CNR0001A	CONNECTED	CSSNET.CP2216B	NO	LULU
IST1487I	CNR00018	CONNECTED	CSSNET.CP2216C	NO	LULU
IST1487I	CNR00011	CONNECTED	CSSNET.CSS2	NO	LULU
IST1487I	CNR00010	CONNECTED	CSSNET.CSS2	NO	RSTP

IST314I END

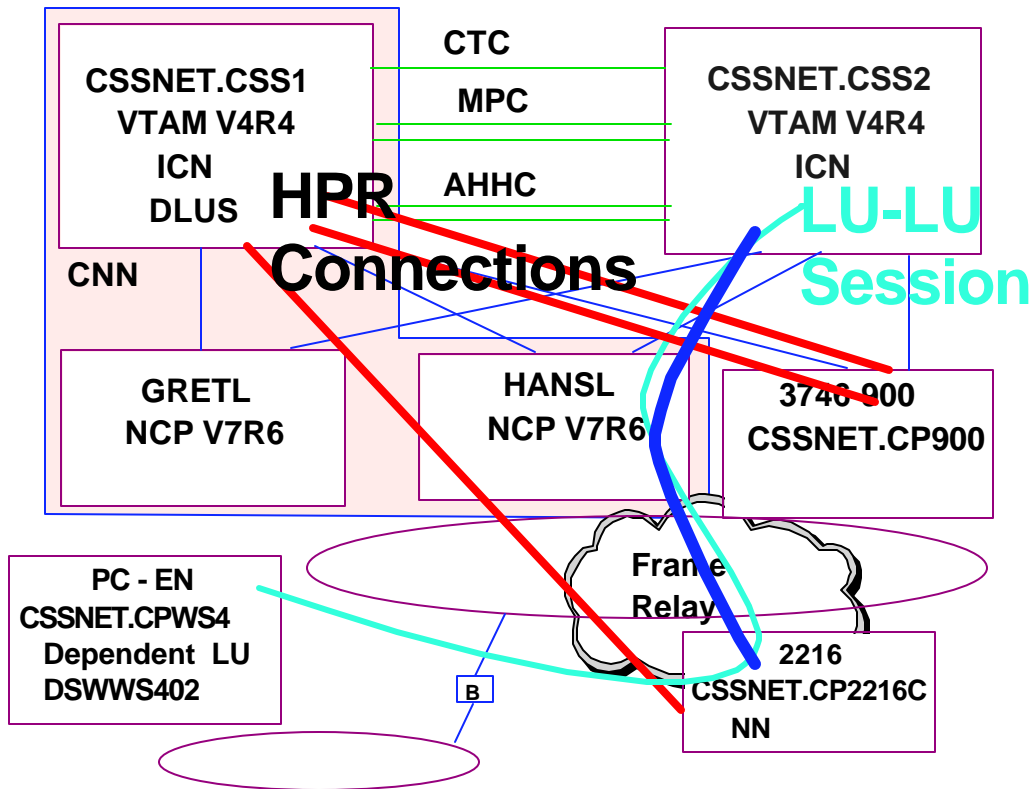


Sources of HPR Information

- With HPR different sessions use different HPR connections
- Display ID=cdrscname of RTP partner shows sessions and HPR connections
- Display Sessions command shows HPR connection name
 - **V2R7 SAVERSCV function provides initial and current RSCV information**
- Display of HPR connection shows route being used
- NetView Session Monitor provides HPR route information on AR screen



Sessions and HPR Connections



- CSS1 has several sessions with CP900 and CP2216C which flow on different HPR connections:
 - CP-CP
 - SNASVCMG
 - DLUR-DLUS pipe
- CSS2 has HPR connection with CP2216C which is used by DSWWS402 to CSS2 TSO LU-LU session
 - Part of the session route is using HPR



Display CDRSC for 3746-900

- Shows HPR connections and sessions listed beneath

```
D NET, ID=CP900, E
....
IST171I ACTIVE SESSIONS = 0000000006, SESSION REQUESTS = 0000000000
IST206I SESSIONS:
IST1081I ADJACENT LINK STATION = CNR0002A
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS1          ACTIV/DL-S  C4CBD9093C70DBC6 0082 0000  0  0  CSSNET
IST1081I ADJACENT LINK STATION = CNR00024
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS1          ACTIV/CP-S  C4CBD9093C70DB83 1340 0001          CSSNET
IST635I CSS1          ACTIV/CP-P  FD87C3E97E7EE385 0001 1359  0  0  CSSNET
IST1081I ADJACENT LINK STATION = CNR00020
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS1          ACTIV/SV-S  C4CBD9093C70DB77 0001 0000  0  0  CSSNET
IST635I CSS1          ACTIV/SV-S  C4CBD9093C70DB75 0065 0003  0  0  CSSNET
IST1081I ADJACENT LINK STATION = CNR0002B
IST634I NAME          STATUS          SID          SEND  RECV  VR  TP  NETID
IST635I CSS1          ACTIV/DL-P  FD87C3E97E7EE39D 0000 0083  0  0  CSSNET
IST1355I PHYSICAL UNITS SUPPORTED BY DLUR CSSNET.CP900
IST089I PU21BAN  TYPE = PU_T2          , ACTIV
IST089I PUSP1    TYPE = PU_T2.1      , ACTIV
IST089I PU3174S TYPE = PU_T2          , ACTIV
IST924I -----
....
IST314I END
```



Display HPR Connection

- Shows Route and Flow Control information

```
D NET, ID=CNR0002A, E
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = CNR0002A          , TYPE = PU_T2.1
IST1392I  DISCNTIM = 00010 DEFINED AT PU   FOR DISCONNECT
IST486I  STATUS= ACTIV--LX-, DESIRED STATE= ACTIV
IST1043I  CP NAME = CP900      , CP NETID = CSSNET  , DYNAMIC LU = YES
IST1589I  XNETALS = YES
IST875I  APPNCOS TOWARDS RTP = SNASVCMG
IST1476I  TCID X'03361B1C0000023E' - REMOTE TCID X'00000000099F6590'
IST1481I  DESTINATION CP CSSNET.CP900      - NCE X'D0201025      '
IST1587I  ORIGIN NCE X'D0000000000000000'
IST1477I  ALLOWED DATA FLOW RATE =      19 MBITS/SEC
IST1516I  INITIAL DATA FLOW RATE =      19 MBITS/SEC
IST1511I  MAXIMUM NETWORK LAYER PACKET SIZE =      2074 BYTES
IST1478I  NUMBER OF UNACKNOWLEDGED BUFFERS =      0
IST1479I  RTP CONNECTION STATE = CONNECTED          - MNPS = NO
IST1480I  RTP END TO END ROUTE - PHYSICAL PATH
IST1460I  TGN  CPNAME          TG TYPE          HPR
IST1461I  21  CSSNET.CP900      APPN           RTP
IST231I  RTP      MAJOR NODE = ISTRTPMN
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST355I  LOGICAL UNITS:
IST080I  CP900    ACT/S----Y
IST314I  END
```



Display SESSIONS, Dependent LU from CSS2

- Shows HPR connection instead of APPN linkstation
- With V2R7 shows RSCV information

```
D NET,SESSIONS,SID=FD87C0597B37D218
IST097I  DISPLAY  ACCEPTED
IST350I  DISPLAY TYPE = SESSIONS
IST879I  PLU/OLU REAL = CSSNET.TS20002      ALIAS = ***NA***
IST879I  SLU/DLU REAL = CSSNET.DSWWS402     ALIAS = ***NA***
IST880I  SETUP STATUS = ACTIV
IST875I  ADJSSCP TOWARDS SLU = ISTAPNCP
IST875I  ALSNAME TOWARDS SLU = CNR0001A
.....
IST1711I RSCV TOWARDS SLU SAVED AT SESSION ACTIVATION
IST1460I TGN  CPNAME                TG TYPE      HPR
IST1461I  21  CSSNET.CSS1           APPN       RTP
IST1461I  21  CSSNET.CP2216C        APPN       RTP
IST1713I RTP RSCV IN THE DIRECTION OF THE SLU
IST1460I TGN  CPNAME                TG TYPE      HPR
IST1461I  21  CSSNET.CSS1           APPN       RTP
IST1461I  21  CSSNET.CP2216C        APPN       RTP
IST314I  END
```



CSS2 NetView DSWWS402 LU-LU Session

```
NLDM.AR                APPN SESSION ROUTE CONFIGURATION                PAGE 1
-- PRIMARY ---+-- SECONDARY --+----- PCID -----+-- DOMAIN --
NAME TS20002 | NAME DSWWS402 | CSSNET.CSS2.FD87C0597B37D218 | N3P2
-----+-----+-----+-----+-----+-----+-----+-----+-----
```

```
+-----+
|   CP   |
| CSS2   |
+-----+-----+
```

```
TG021 | HPR-03C517DC00000343
```

```
+-----+-----+
|   CP   |
| CSS1   |
+-----+-----+
```

```
TG021 | HPR-03C517DC00000343
```

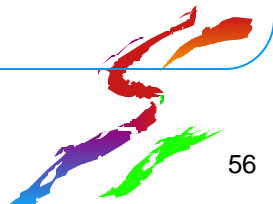
```
+-----+-----+
|   CP   |
| CP2216C |
+-----+-----+
```

```
COSNAME #CONNECT APPN TP 01
```

```
END OF DATA
```

```
SELECT PAR, SAR
```

```
CMD==>
```



HPR Path Switch

- Three different events can cause HPR connections to switch to a different route:
 - Link or node failure
 - VTAM's PSRETRY Start Option
 - VTAM operator command
- MODIFY RTP command can be used to cause HPR connection to switch to a different Path
- Following command used to switch CSS1-CP2216C connection which had been going through 3746-900

```
F CSSVTAM,RTP,ID=CNR00010
IST097I MODIFY ACCEPTED
IST1494I PATH SWITCH COMPLETED FOR RTP CNR00010 947
IST1480I RTP END TO END ROUTE - PHYSICAL PATH
IST1460I TGN   CPNAME           TG TYPE       HPR
IST1461I  21  CSSNET.CP2216C   APPN          RTP
IST314I END
```



Other Operational Tools

- **SNMP Monitors**
 - Hardware platforms typically supply APPN Management Information Base data
 - Manager (i.e. NetView for AIX) can monitor status, performance, error counts, etc.
- **NetView Performance Monitor**
 - Can monitor 3746-9X0NN resources
 - Can provide MNPS, CSM, and RTP data / statistics
- **NTuneMON**
 - Displays CPNAMEs connected to NCP
 - Provides HPR performance information



Other VTAM Commands/Messages

- VTAM provides other commands and messages to support its wide array of APPN functions including:
 - Connection Network
 - Border Node
 - Dependent LU Server/Requester
 - APPN and Subarea COS mapping
- 2 Day course available with many details of VTAM APPN Operations
 - Contact Nancy Gates 301 240 8720
 - gatesn@us.ibm.com



Summary

- Review of APPN Terminology
- Review of VTAM Node Types
- Overview of VTAM APPN/HPR Lab
- VTAM / NetView Commands and Displays when VTAM functions as an APPN NN
 - Summary Information
 - Connection Information
 - Session Information
- DLUS-DLUR Considerations
- HPR Considerations
- Other operational tools

