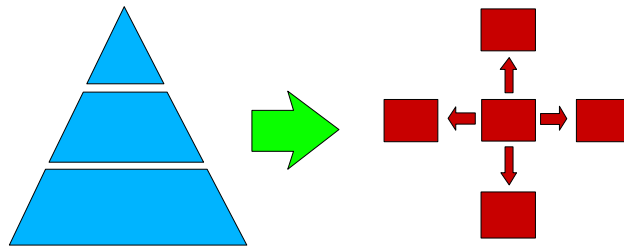


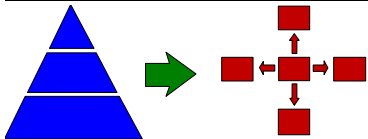
APPN Session Path Resolution In Mixed APPN/Subarea Networks



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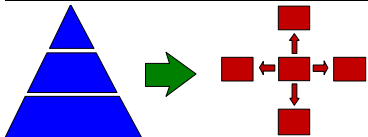
Path Selection - Introduction

- This Is Only One Example
- Tried To Choose A Common Migration Scenario
- Based On Actual Customer Experience
- This Is Not The Only Way To Achieve These Results
- Most Migrations Will Not Require Formal Analysis

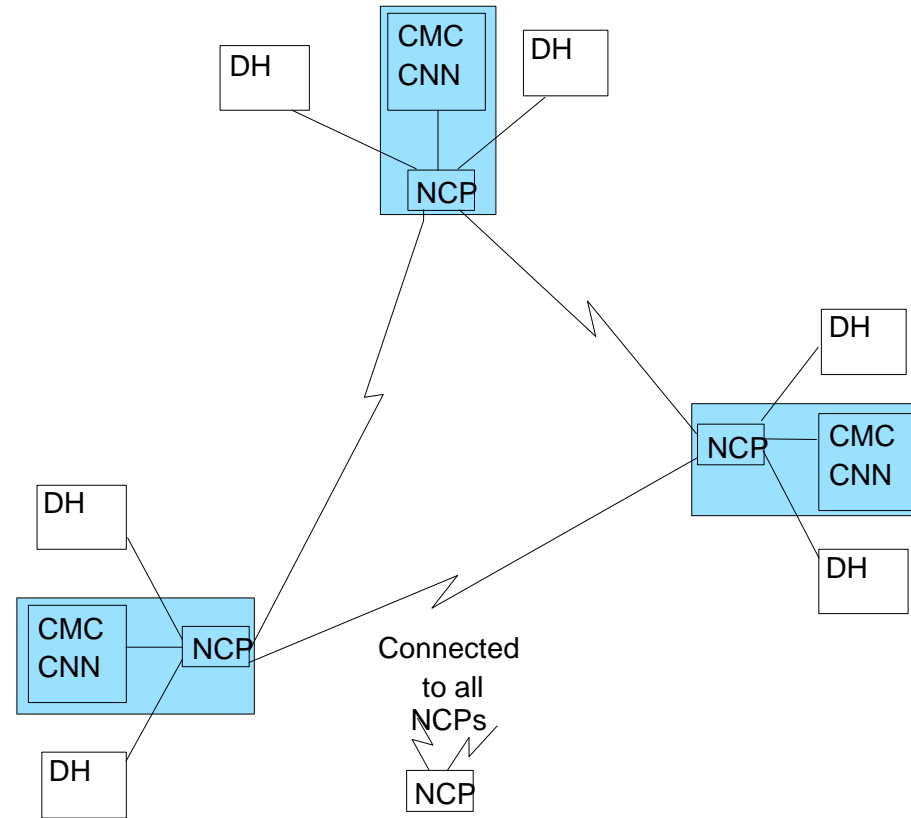


Path Selection - Agenda

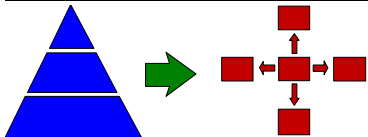
- Understand Network Configuration (Before And After)
- Understand Migration Objectives And Requirements
- Analyze Session Traffic Patterns
 - Identify Preferred Session Paths
- Determine Necessary Weights For APPN TGs
- Identify VTAM Definition Changes Required



Network Before Migration



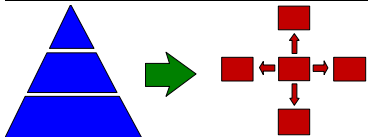
- Very Simplified View Of The Network
 - Data Host Are SNI-Attached To CMCs
 - Two NCP Backbone Networks
 - ▶ One For LUs And Other Boundary Devices
 - ▶ One For Data Host Access (Not Shown)



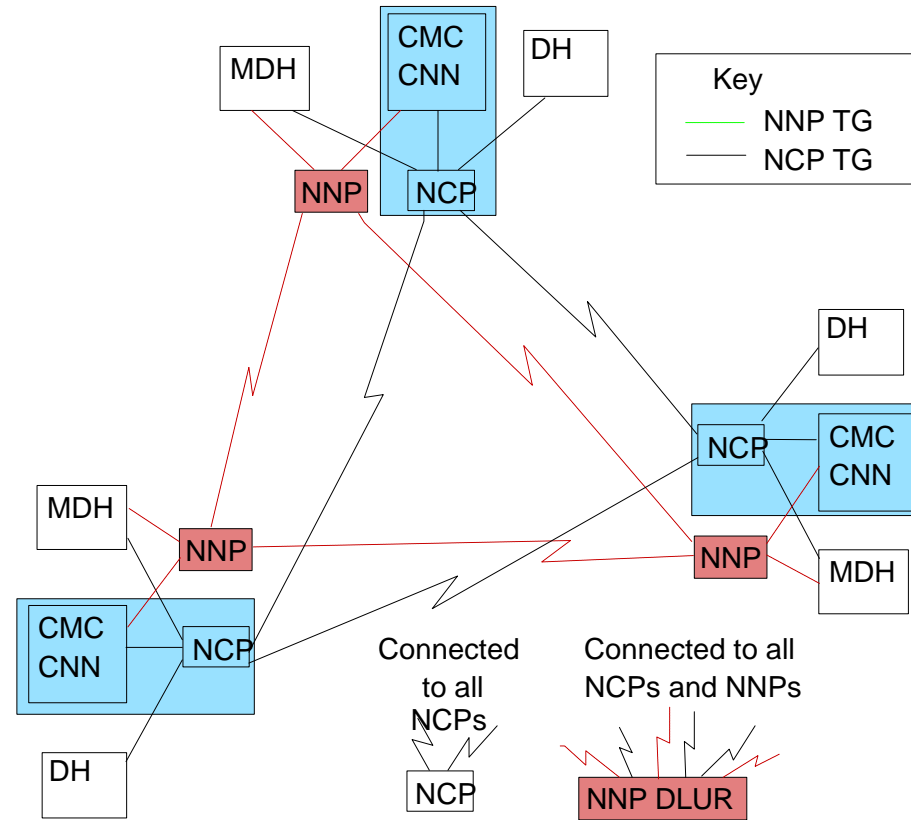
Objectives And Requirements

- Enable HPR/SYSPLEX By Migrating To APPN
 - CMCs Become CNNs/CDSs/DLUSs
 - DHs Become MDHs (ENs), Where Possible
 - Implement 3746-900/950 NNPs
 - ▶ APPN NN Backbone (Parallel To NCPs)
 - ▶ Replaces Some/All GW NCPs To DHs
 - ▶ DLUR For Dependent LU Support

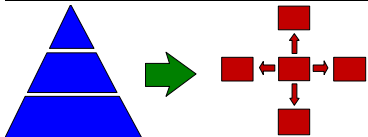
- Maintain Current Functionality And Performance
 - SSCP Takeover Of NCPs
 - Balance Load between NCPs And NNPs
 - ▶ Existing NCPs Are Heavily Loaded
 - ▶ New Traffic Should Use NNPs
 - ▶ Existing NCP Traffic Continues To Use NCPs



Network After Migration

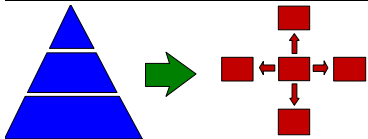


- VRTGs Used Between Data Centers (SSCP Takeover)
- NNP Backbone Parallel To NCP Backbone
 - Migration Data Host Traffic Moved To NNP Backbone
 - Dependent LU Traffic Moved To NNP Backbone With DLUR

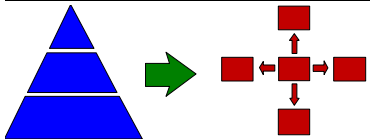
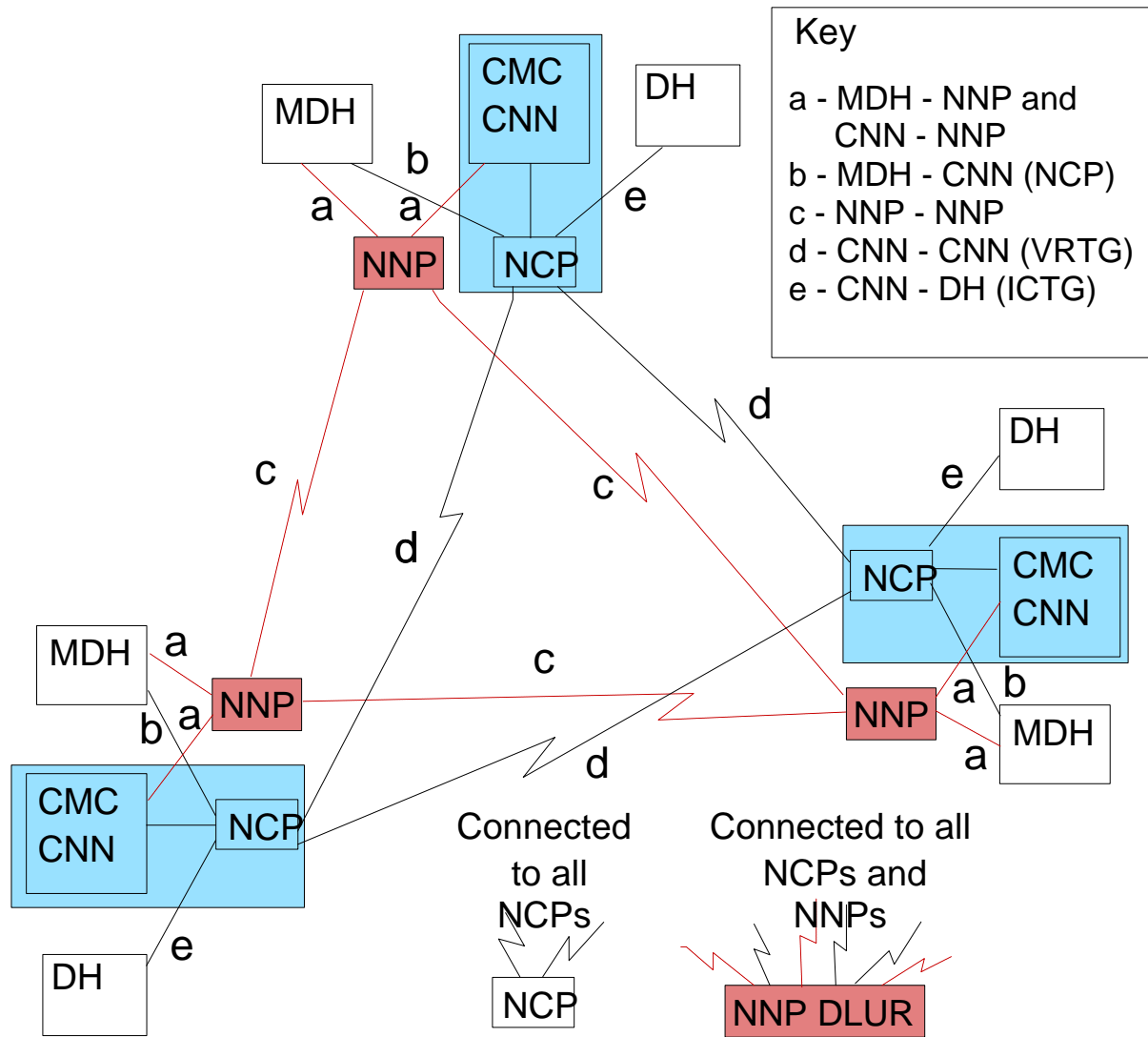


Session Traffic Analysis

- Identify Types of Links That Exist
- Identify Types of Sessions That Exist
 - Sessions to Data Hosts
 - Sessions to Migration Data Hosts
- Identify Preferred Session Paths
 - Through NCP Backbone, or
 - Through NNP Backbone
- Determine Relative Weights of TGs
- Determine Actual TG Weights & Characteristics
- Determine APPN Link & COS Definitions Changes



Identify Link Types



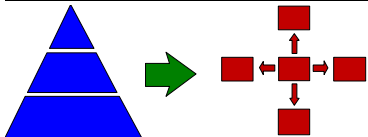
Identify Session Types

■ Data Host (DH) Sessions

- DH to DH (No Change)
- NCP LU to DH
- DLUR LU to DH
- APPC LU to DH

■ Migration Data Host (MDH) Sessions

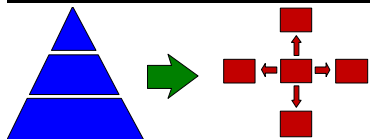
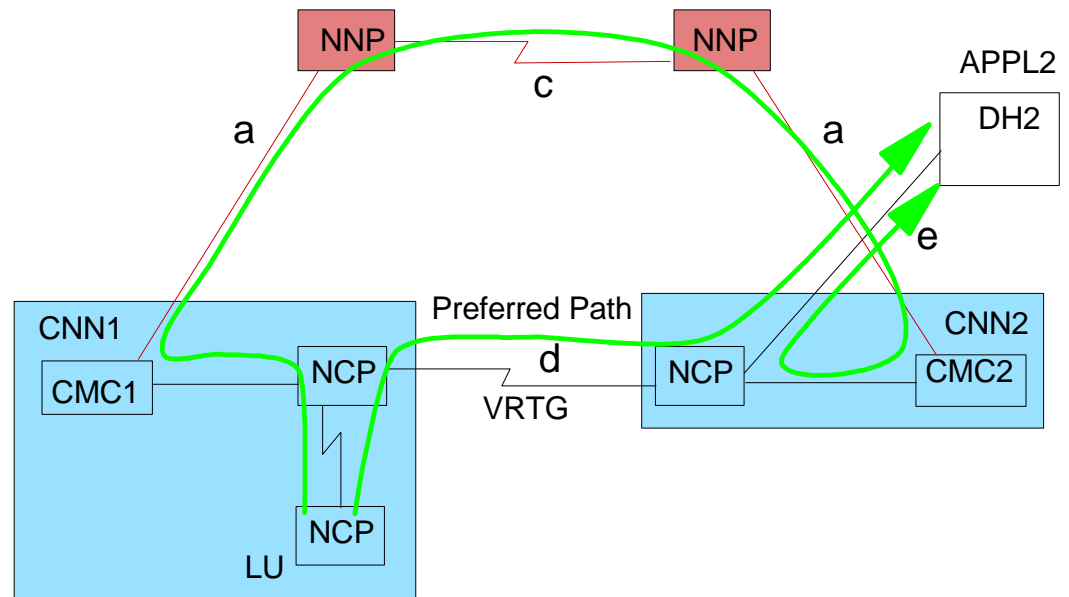
- DH to MDH
- MDH to MDH
- NCP LU to MDH
- DLUR LU to MDH
- APPC LU to MDH



NCP-LU-To-DH Preferred Path

■ NCP LU to Data Host

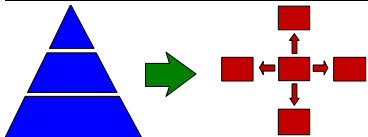
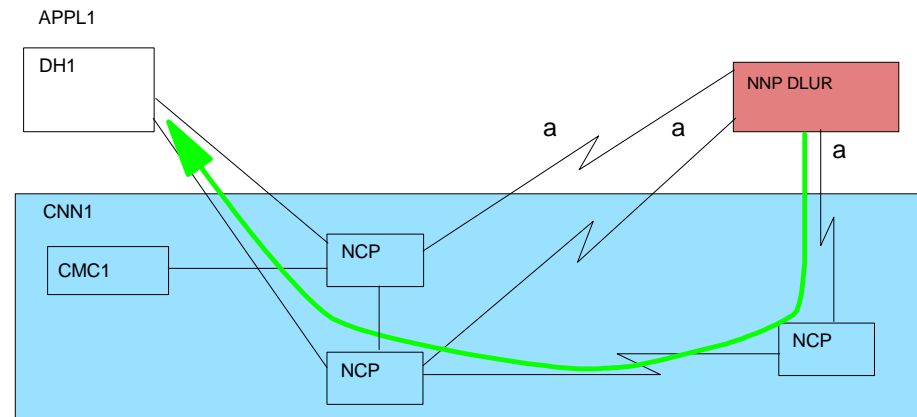
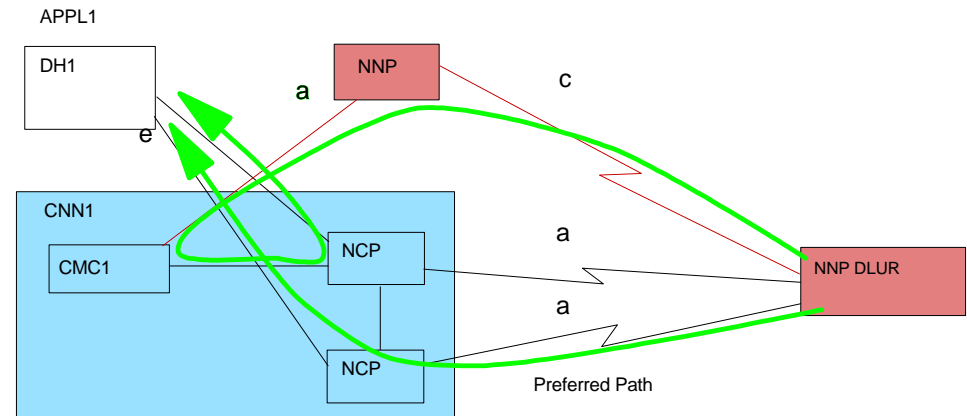
- ICTG will be used on either path
- VRTG path is clearly preferred
 - ▶ If same CMC owns NCP LU and link to DH; no VRTG on the session path
- $d < 2*a + c$



DLUR/APPC-LU-To-DH Preferred Path

■ DLUR (or APPC) LU to Data Host

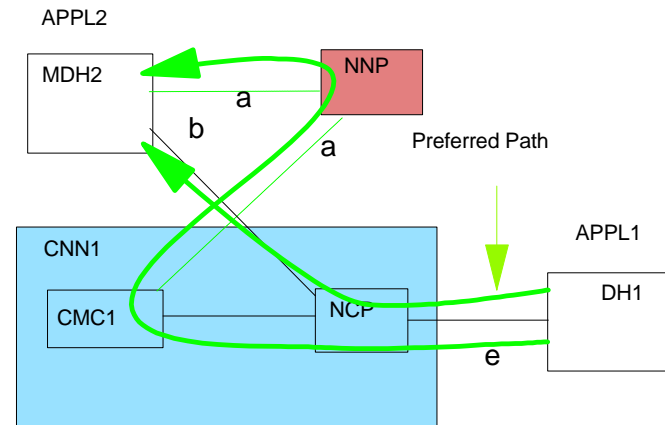
- ICTG will be used on either path
- NCP path is clearly preferred
 - ▶ Even if remote NCP is required
- $a < a + c$



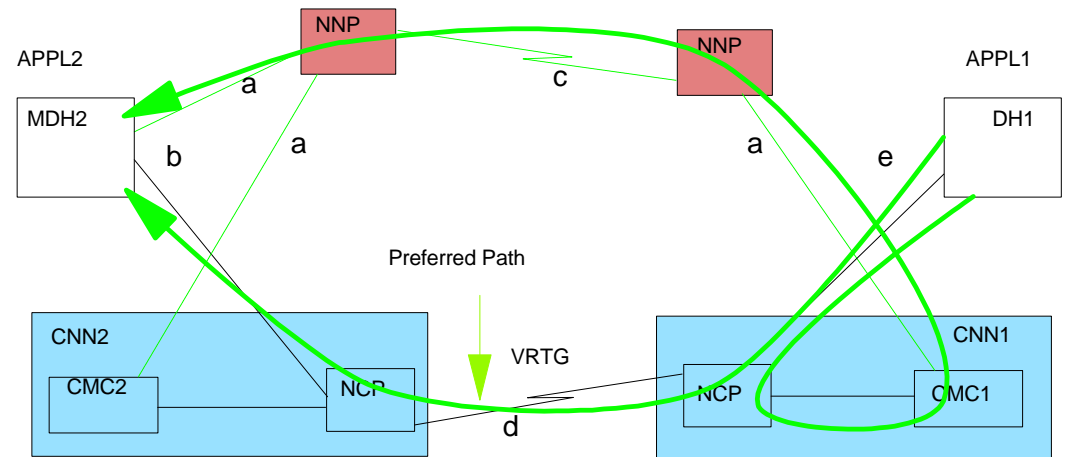
DH-To-MDH Preferred Path

■ Data Host to Migration Data Host

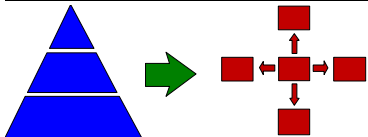
- ICTG will be used on either path
- NCP path is clearly better
- $b + d < 2*a + c$ AND $b < 2*a$



CMC near DH is NNS of MDH



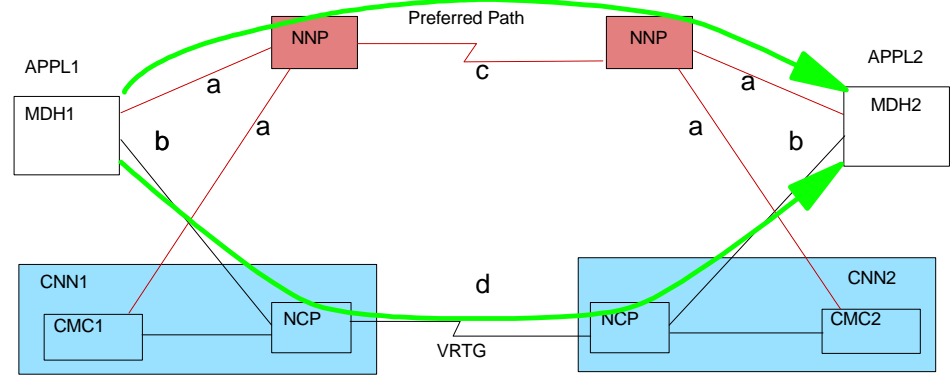
CMC near DH is not NNS of MDH



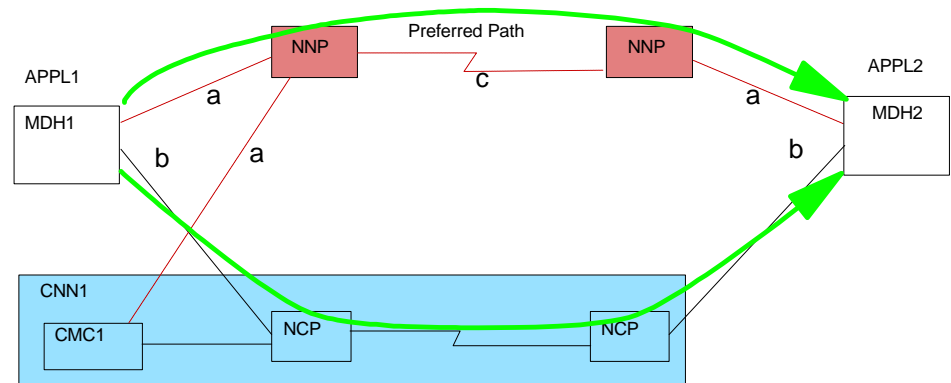
MDH-To-MDH Preferred Path

Migration Data Host to Migration Data Host

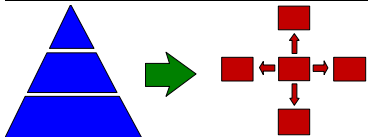
- Neither path is clearly better
- Represents new session traffic
- Prefer path through NNPs
- $2*a + c < 2*b + d$ AND $2*a + c < 2*b$



Different CMCs own the entry and exit NCPs



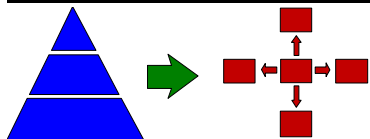
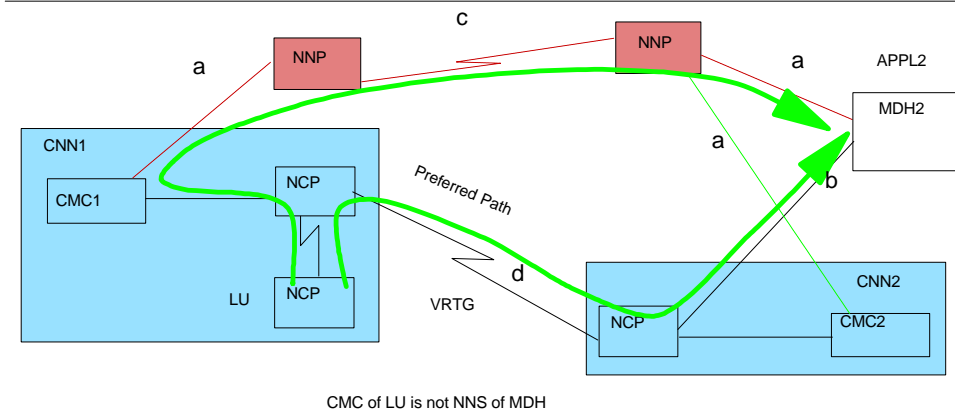
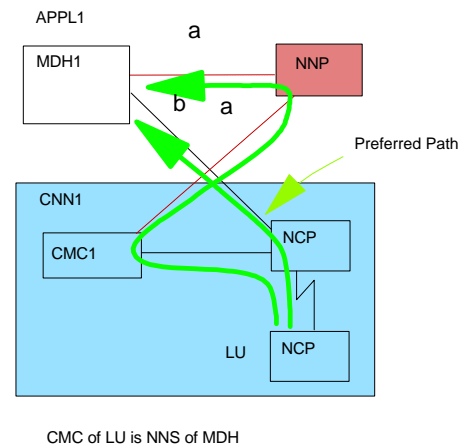
One CMC owns the entry and exit NCPs



NCP-LU-To-MDH Preferred Path

■ NCP LU to Migration Data Host

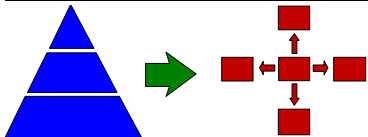
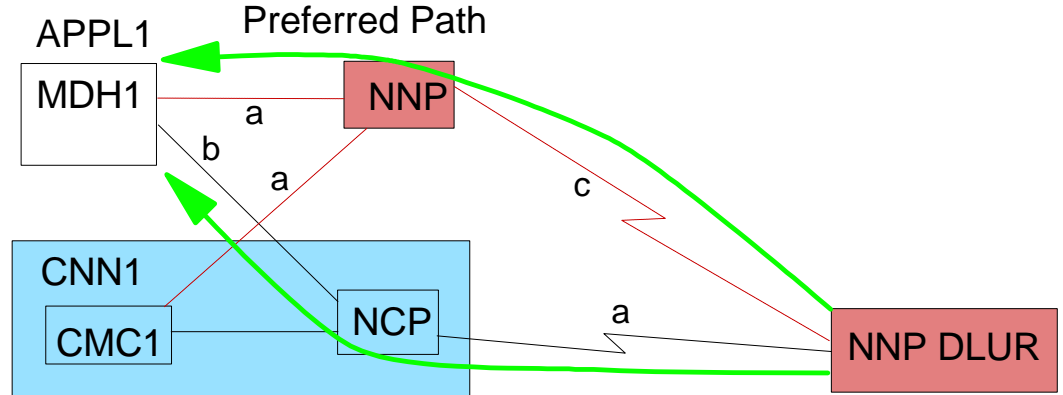
- NCP path is clearly preferred
- $b < 2*a$ AND $b + d < 2*a + c$



DLUR/APPC-LU-To-MDH Preferred Path

■ DLUR (APPC) LU to Migration Data Host

- Neither path is clearly better
- Represents new session traffic
- Preferred path is through NNP
- $a + c < a + b$



Relative Weights Of TGs

1. $d < 2*a + c$

2. $a < a + c$

3. $b + d < 2*a + c$

4. $b < 2*a$

5. $2*a + c < 2*b + d$

6. $2*a + c < 2*b$

7. $b < 2*a$

8. $b + d < 2*a + c$

9. $a + c < a + b$

10. $0 < c < b$ (2 & 9)

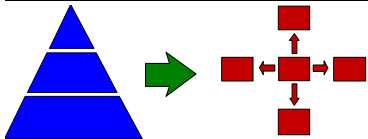
11. $d < b$ (3 & 6)

12. Let $c = d$

13. $0 < a < b$ (1, 5 & 12)

14. Let $a = c = d$

15. $3*a < 2*b < 4*a$ (4, 6 & 14)



Actual TG Weights And Characteristics

Let $a = c = d = 90$

Let $b = 150$

$3*a < 2*b < 4*a$

$270 < 300 < 360$

All links will have equal weight EXCEPT links from MDHs to CNN NCPs. Standard IBM TG Profiles (TGPs) can be used for ALL links. UPARM1 TG Characteristic is used on the MDH-to-NCP links to differentiate them. (The default value for UPARMs is 128.)

`puname PU TGP=CHANNEL,UPARM1=150, ...`

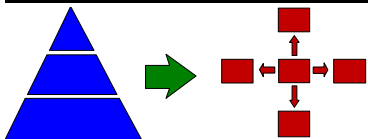
Remember to code UPARM1=150 on BOTH SIDES of the link (NCP Major Node on the CNN side; Local SNA Major Node on the MDH Side).

Nodes also have weight. Use:

- Weight = 5 For Low Congestion/Route Resistance
- Weight = 10 For High Congestion/Route Resistance

Neither Will Affect Route Selection (Due To Total Weights)

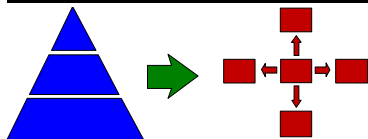
- Higher Weight For Congested Nodes, If Desired



Sample APPN COS Definition

```
SNASVCMG APPNCOS PRIORITY=NETWORK      transmission priority
LINEROW WEIGHT=90,                       line row weight          *
NUMBER=1,                                 line row number          *
UPARM1=(0,130),                          user defined char 1      *
UPARM2=(0,255),                          user defined char 2      *
UPARM3=(0,255),                          user defined char 3      *
CAPACITY=(MINIMUM,MAXIMUM),             line speed               *
COSTTIME=(0,255),                       cost per connect time    *
COSTBYTE=(0,255),                      cost per byte transmitted *
PDELAY=(MINIMUM,MAXIMUM),              propagation delay        *
SECURITY=(UNSECURE,MAXIMUM)            security level for TG    *
NODEROW NUMBER=1,                       node row number          *
WEIGHT=5,                                node row weight          *
CONGEST=(LOW,LOW),                      congestion                *
ROUTERES=(0,191)                       route addition resistance *
LINEROW WEIGHT=150,                     line row weight          *
NUMBER=2,                                line row number          *
UPARM1=(0,255),                          user defined char 1      *
UPARM2=(0,255),                          user defined char 2      *
UPARM3=(0,255),                          user defined char 3      *
CAPACITY=(MINIMUM,MAXIMUM),             line speed               *
COSTTIME=(0,255),                       cost per connect time    *
COSTBYTE=(0,255),                      cost per byte transmitted *
PDELAY=(MINIMUM,MAXIMUM),              propagation delay        *
SECURITY=(UNSECURE,MAXIMUM)            security level for TG    *
NODEROW NUMBER=2,                       node row number          *
WEIGHT=10,                               node row weight          *
CONGEST=(LOW,HIGH),                    congestion                *
ROUTERES=(0,255)                       route addition resistance
```

NOTE: Only the SNASVCMG APPN COS definition is shown.
Similar definitions are needed for other APPN COS definitions.



Debug Aids: DISPLAY TOPO

■ Node & Link Information Can Be Displayed

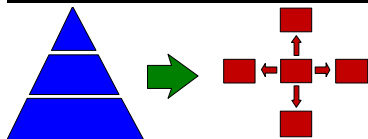
- Nodes: Any NN In TOPO DB; Adjacent ENs
- Links: Any NN-NN Link In TOPO DB; Adjacent EN Links
 - ▶ All EN Links, If EN Registers TGVs to VTAM (NNS)

■ Weights Can Be Displayed Too!

- Only if APPNCOS= Operand Is Specified On Command

```
d net,topo,id=sscp1a,list=all,appncos=#inter
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE  ROUTERES  CONGESTION  CP-CP WEIGHT
IST1296I NETA.SSCP1A      NN         1         NONE        *NA*   5
IST1297I                  ICN/MDH   CDSERVR  RSN         HPR
IST1298I                  YES        NO        2          NONE
IST1223I                  BN         NATIVE
IST1224I                  NO         YES
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP NETA.SSCP1A
IST1357I                  CPCP
IST1300I DESTINATION CP   TGN       STATUS    TGTYPE     VALUE WEIGHT
IST1301I NETA.SSCP2A     21       OPER     INTERM     YES   60
IST1301I NETA.SSCP2A     22       OPER     INTERM     YES  240
IST314I  END
```

```
d net,topo,id=sscp2a,list=all,appncos=cpsvcmg
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE  ROUTERES  CONGESTION  CP-CP WEIGHT
IST1296I NETA.SSCP2A      NN         1         NONE        YES    5
IST1297I                  ICN/MDH   CDSERVR  RSN         HPR
IST1298I                  YES        NO        2          NONE
IST1223I                  BN         NATIVE
IST1224I                  NO         YES
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP NETA.SSCP2A
IST1357I                  CPCP
IST1300I DESTINATION CP   TGN       STATUS    TGTYPE     VALUE WEIGHT
IST1301I NETA.SSCP1A     21       OPER     INTERM     YES   60
IST1301I NETA.SSCP1A     22       OPER     INTERM     YES  210
IST314I  END
```



Debug Aids: DISPLAY APING

■ Use To Test:

- If Connectivity Exists
- Estimated Response Time
- Session Path That Will Be Used
- APING is LOGMODE Specific

■ Target Resource Must Support APING

- VTAM's SSCP/CP Name
- Other APPN CP Names

■ Session Path May Differ For Other Resources

- Even If On The Same Node
- If SSCPORD=PRIORITY, And
- Prior Routing History Exists

```
d net,aping,id=sscp2a,logmode=interact
IST097I DISPLAY ACCEPTED
IST1489I APING SESSION INFORMATION
IST1490I DLU=NETA.SSCP2A SID=EAABEEC3115D5195
IST933I LOGMODE=INTERACT, COS=*BLANK*
IST875I APPNCOS TOWARDS SLU = #INTER
IST1460I TGN CPNAME TG TYPE HPR
IST1461I 21 NETA.SSCP2A APPN *NA*
IST314I END
IST1457I VTAM APING VERSION 2R33 (PARTNER TP VERSION 2R33)
IST1490I DLU=NETA.SSCP2A SID=EAABEEC3115D5195
IST1462I ECHO IS ON
IST1463I ALLOCATION DURATION: 181 MILLISECONDS
IST1464I PROGRAM STARTUP AND VERSION EXCHANGE: 145 MILLISECONDS
IST1465I DURATION DATA SENT DATA RATE DATA RATE
IST1466I (MILLISECONDS) (BYTES) (KBYTE/SEC) (MBIT/SEC)
IST1467I 111 200 1 0
IST1467I 96 200 2 0
IST1468I TOTALS: 207 400 1 0
IST1469I DURATION STATISTICS:
IST1470I MINIMUM = 96 AVERAGE = 103 MAXIMUM = 111
IST314I END
```

```
d net,aping,id=sscp2a,logmode=interact
IST097I DISPLAY ACCEPTED
IST1489I APING SESSION INFORMATION
IST1490I DLU=NETA.SSCP2A SID=EAABEEC3115E2591
IST933I LOGMODE=INTERACT, COS=*BLANK*
IST1458I ORIGIN ADJSUB VR TP ER REVERSE ER
IST1459I 1 2 4 0 1 5
IST314I END
IST1457I VTAM APING VERSION 2R33 (PARTNER TP VERSION 2R33)
IST1490I DLU=NETA.SSCP2A SID=EAABEEC3115E2591
IST1462I ECHO IS ON
IST1463I ALLOCATION DURATION: 480 MILLISECONDS
IST1464I PROGRAM STARTUP AND VERSION EXCHANGE: 237 MILLISECONDS
IST1465I DURATION DATA SENT DATA RATE DATA RATE
IST1466I (MILLISECONDS) (BYTES) (KBYTE/SEC) (MBIT/SEC)
IST1467I 176 200 1 0
IST1467I 148 200 1 0
IST1468I TOTALS: 324 400 1 0
IST1469I DURATION STATISTICS:
IST1470I MINIMUM = 148 AVERAGE = 162 MAXIMUM = 176
IST314I END
```

