

From SNA to TCP/ip

(or From Here to Eternity)

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Overview

- Requirements
- Steps
- Pitfalls
- Prarfalls
- Why
 - We still need VTAM for LU6.2
 - We will not cover VM/TCP/ip

Requirements

- Network Connection for the mainframe
 - Channel attached device
 - Integrated network card(s)
- VSE TCP/ip (CSI[, IBM] or BSI)
- TCP/ip network
 - 15+ remote locations
 - network infrastructure with routers, switches, firewalls, etc.
 - ip address scheme

Steps - 7206 Configuration

```
interface Channel1/0
  ip address 192.168.0.1 255.255.255.0
  no ip directed-broadcast
  no keepalive
  claw 0110 02 192.168.0.2 VSE NETTST TCPIP
  TCPIP
  claw 0110 04 192.168.0.4 VSE NETTEL TCPIP
  TCPIP
  claw 0120 06 192.168.0.6 VSE VSETST TCPIP
  TCPIP
  claw 0130 08 192.168.0.8 VSE LINUX TCPIP
  TCPIP
interface FastEthernet0/0
  ip address 192.168.1.1 255.255.255.0
  no ip directed-broadcast
  ip accounting mac-address output
```

Continued from left

```
interface Serial2/1
  no ip address
  no ip directed-broadcast
  encapsulation frame-relay IETF
  no fair-queue
  frame-relay lmi-type ansi
interface Serial2/1.3 point-to-point
  description 256k circuit to Butner
  bandwidth 256
  ip address 192.168.203.63 255.255.255.0
  no ip directed-broadcast
  frame-relay interface-dlci 203 IETF
ip route 192.168.3.0 255.255.255.0
  192.168.203.3
```

Steps – IOCP and VSE adds

- IOCP definition

```
CHPID PATH=(04),SHARED,PARTITION=((VSEPRD,VSETST,LINUX)),TYPE=CNC  
CNTLUNIT CUNUMBR=0400,PATH=(04),UNIT=SCTC,UNITADD=((00,32))  
IODEVICE ADDRESS=(0E00,32),CUNUMBR=(0400),UNIT=SCTC,UNITADD=00
```

* For Ethernet interface

```
CHPID PATH=(FC),SHARED,PARTITION=((VSEPRD,VSETST,LINUX)),TYPE=EIO  
CNTLUNIT CUNUMBR=FC90,PATH=(FC),UNIT=CTC,UNITADD=((90,001))  
IODEVICE ADDRESS=(0C90),CUNUMBR=(FC90),UNIT=CTC,UNITADD=90, X  
PARTITION=(VSETST)
```

- VSE ADD statements

```
ADD E00:E05,CTCA,EML
```

* For Ethernet interface

```
ADD C90,CTCA,EML
```

Steps - JCL

- CSI Start up JCL

```
* $$ JOB JNM=NETTEL00,CLASS=S,DISP=L,PRI=5,USER=00904
* $$ LST DISP=D,CLASS=L
* $$ PUN DISP=D,CLASS=A
// JOB NETTEL00
// OPTION SADUMP=5
// LIBDEF *,SEARCH=(PRD2.CONFIG,SOFT.PRODUCTS)
// SETPFIX LIMIT=200K
// SETPRT SYSLST,DFLT=Y
// EXEC
IPNET,SIZE=IPNET,PARM='ID=00,INIT=IPINIT00',DSPACE=3M
/*
/&
* $$ EOJ
```

- BSI Start up JCL

```
* $$ JOB JNM=TCPSTACK,DISP=L,PRI=6,CLASS=V,USER=00904
* $$ LST DISP=D,CLASS=L
* $$ PUN DISP=D,CLASS=A
// JOB TCPSTACK
// OPTION SADUMP=5
// SETPFIX LIMIT=128K
// EXEC BSTTINET,SIZE=BSTTINET
    See next BSI slide
/*
/&
* $$ EOJ

* $$ JOB JNM=TN0023,CLASS=S,PRI=4,DISP=L,USER=00904
* $$ LST DISP=D,CLASS=L
* $$ PUN DISP=D,CLASS=A
// JOB TN0023
// OPTION SADUMP=5
// EXEC BSTTVNET,SIZE=BSTTVNET,DSPACE=3M
    See next BSI Slide
/*
/&
```

Steps – CSI Config

- IPINIT00 deck with TN3270 statements

```
SET IPADDR = 192.168.0.2
SET MASK = 255.255.255.000
SET MESSAGE INFORMATION = PRINTER
SET ALL_BOUND = 30000
SET WINDOW = 4096
SET TRANSFER_BUFFERS = 20
SET TELNETD_BUFFERS = 20
SET RETRANSMIT = 100
SET DISPATCH_TIME = 30
SET DYNAMIC_ROUTE = OFF
SET REDISPATCH = 10
SET GATEWAY = OFF
SET CONNECT_SEQUENCE = ON
SET DNS1=192.168.1.2
WAIT VTAM
DEFINE LINK,ID=CISCOE02,TYPE=CLAW,DEV=E04,MTU=1500 -
    HOSTNAME=VSE,HOSTAPPL=TCPIP,WSNAME=NETTST,WSAPPL=TCPIP
DEFINE NAME,NAME=NETTST,IPADDR=192.168.0.2
DEFINE ROUTE,ID=ALL_NET,LINKID=CISCOE02,IPADDR=0.0.0.0,GATEWAY=192.168.0.1
DEFINE MENU,ID=HCIMENU,MEMBER=HCIMENU
DEFINE TELNETD,ID=TN_HCI,TERMNAME=TN3270E,L,PORT=4023,POOL=YES, MENU=HCIMENU, -
    LOGMODE=SP3272QN,LOGMODE3=SP3272QN,LOGMODE4=SP3272QN,LOGMODE5=SP3272QN
* below is example of TN3270E definition supplied by Dave Clark of DAPSCO
DEFINE TELNETD,ID=TELN,TN3270E=L,PORT=4023
DEFINE TELNETD,ID=V01A,TN3270E=E,TERMNAME=TELNV01A,TARGET=DBDCCICS, -
    LOGMODE=SP3272QN,LOGMODE3=SP3272QN, LOGMODE4=SP3272QN,LOGMODE5=SP3272QN
INCLUDE NETWORK,DELAY
```

Steps – BSI Config

- TCPSTACK configuration statements
 - ID 00
 - USERMSS 1460
 - DEVICE CISCOE02 CLAW E02 VSE NETTST
 - LINK CISCOE02 0 192.168.0.2 255.255.255.0 1500
 - * Or Ethernet interface
 - DEVICE LCSC90 LCS C90 ETHERNET
 - LINK LCSC90 1 192.168.0.2 255.255.255.0 1500
 - * Route statements
 - ROUTE CISCOE02 192.168.0.0 255.255.255.0 0.0.0.0 0
 - ROUTE CISCOE02 0.0.0.0 0.0.0.0 192.168.1.1 1
 - HOST BSITCP 192.168.0.2
 - DNS 192.168.1.2
 - DOMAIN .hci
 - INTERVAL 060 EXCEPT 0023
 - ATTACH TCP/IP
- TN0023 statements
 - ID 00
 - OPEN BSITCP 0023
 - APPLID DBDCCICS Systems CICS
 - APPLID H03DEVP Development CICS
 - APPLID BSTTVNET
 - TITLE Hanes Companies - Authorized access ONLY!
 - TERMINAL TELNT01A GENERIC * * POOL HCIMIS
 - TERMINAL TELNT02A GENERIC * * POOL HCIMIS
 - TERMINAL TELNT03A GENERIC DBDCICS DEDICATE POOL HCCMIS
 - TERMINAL TELNV01A GENERIC DBDCICS DEDICATE
 - ATTACH TN3270E

Steps - CSI

- TCP/ip customized menu

```
CATALOG HCIMENU.L
HI=#
LO=$
VAR=@
CMDLINE=?
INPUT=+
PF1=EXIT
CLEAR=EXIT

PF2=LOGMODE(S3270)
PF3=LOGMODE(D4B32783)
PF4=LOGMODE(D4B32784)
PF5=LOGMODE(D4B32785)
PF6=LOGMODE(SP3272QN)

PF10=LOGON APPL(CICSHDF1)
PF12=LOGON APPL(CICSDEVP)
PF21=LOGON APPL(DBDCCICS)
PF22=LOGON APPL(PHOENIX)
PF23=LOGON APPL(DCMTDRIV)

PF1=EXIT

MSGLINE=23
TRIES=3
```

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IMAGE

#Hanes Companies, Incorporated\$

Telnet Menu

Luname:@LUNAME

IP Addr:@IPADDR

Logmode: @LOGMODE #Enter PF key\$to change LOGMODE:

#PF 2\$- S3270 24 x 80 Model 2

#PF 3\$- D4B32783 32 x 80 Model 3

User ID: +USERID

#PF 4\$- D4B32784 43 x 80 Model 4

Password: +PASSWORD

#PF 5\$- D4B32785 27 x 132 Model 5

#PF 6\$- SP3272QN QUERIED MODEL

#Enter PF key\$to initiate logon:

#PF 21\$- ICCF

#PF 10\$- HDF CICS

#PF 22\$- Phoenix

#PF 11\$- HCC CICS

#PF 23\$- FAQs

#PF 12\$- Devp CICS

\$Press#PF1\$or#CLEAR\$to EXIT

/+

Steps - VTAM

- Terminal
 - VTAM appls defined per terminal

```
TNET1  VBUILD TYPE=APPL
TNET101  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
TNET102  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
...
TNET110  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
TNETT01A  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
TNETT02A  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
TNETT03A  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
TELVN01A  APPL AUTH=(ACQ),EAS=1,MODETAB=IESINCLM,DLOGMOD=SP3272QN
```

- Printers in Macro4's VTAMPrint
 - specify the stack id and TCP/ip connection type
 - define LPD or direct (raw) printers

```
PRINTER A001209,AUTO=YES,CHOICE=LINE,CLASS=B,ESC=JETD,MPP=255,
FCBD=FCB2885G,FF=YES,PRSUBSET=AA02,JSEP=(0 N),PROTOCOL=TCP,
TCPCNTRL=1,TCPPRINT=F,TYPE=DIRECT,TCPPORTS=YES,TCRPORT=9100,
TCPSYSNM=192.168.1.209,TRANSLATE=NO PSTAEXIT=M4VATCPD OPT JS3 PT1
PRINTER A001201,AUTO=YES,CHOICE=LINE,CLASS=A,ESC=VIPP,MPP=255,
FCBD=FCB2885G,FF=YES,PRSUBSET=AA00,JSEP=(0 N),PROTOCOL=TCP,TYPE=LPD,
TCPCNTRL=1,TCPPRINT=F,TCPPRTNM=DP65Release,TCPPORTS=YES,TCRPORT=515,
TCPSYSNM= 192.168.1.201,TCPTRANS=YES PSTAEXIT=M4VATCPD OPT JS3
```

Steps - CICS

- Terminal
 - use CICS autoinstall with a custom DFHZATDX that selects terminal id from the last 4 bytes of the LU name
 - use DEFINE TELNETD,TERMN=luname,IPADDR= to tie a terminal id to an IP address (CSI only)
 - Some variations if you use TN3270E in CSI
- Printers
 - CSI AUTOLPR and GPS
 - BSI TN3270E, LPR plus five other ways

Pitfalls

- Broadcast floods
- Lack of “extravagant” diagnostic tools
 - PING is great
 - TRACEROUTE/TRACERT
 - Network Monitor such as Ethereal
- Route statements will get you every time

Pratfalls

- Separate Telnet and FTP partitions
- Pool buffers for Telnet sessions by specifying `DEFINE TELNETD, ..., POOL=YES`
- Use `EAS=1` on the LU appls to reduce VTAM buffer overhead

Why Change?

- SNA dependable but complicated
- Cost savings in FEP/NCP removal
- PC connection expense
 - Coax cost \$500-\$1000 per PC
 - Cat5 cost \$100 per PC
- New functionality
 - Automated file transfer capabilities
 - email
- Connectivity issues
- Wide printer support
 - Flexible printing with PCL
 - Make use of local printers
 - Lower printer costs
- “WAVV” of the future

How Hanes uses TCP/ip

- Telnet
- Printing
- File transfers
- Email
- Socket program
- Remote connections

Telnet

- 600 Telnet sessions
- 50% converted to VPN for Internet redundancy and backup to critical dedicated lines including disaster/recovery
 - Mostly PCs with TN3270+ and more than 50 ET2000 TN3270 terminals

Printing via Macro 4 using PCL and Postscript

- 140 printers (various laser, Genicom impact and Sato thermal) using printer servers and various Ethernet interfaces (JetDirect, IBM Network cards and Okidata)
- Connections via:
 - LPR
 - Direct socket

File Transfers

- Reports to CD storage via Text2PDF
- Remote login for Mainframe to Server to Server FTPs

Email

- Notifications of jobs canceling directly to cell phones
- Internal use of attachments reducing FTP access and paper consumption plus importing data increases accuracy generally as CSV files
- External use of attachments to customers for faster reporting and data import

Generic Socket Program

CICS program that accepts a port as a parameter and EXEC CICS LINKs to other applications for execution and feeds back status codes for control (ie. work completed properly, re-transmit needs, etc.)

VAR supplied PC based data collection

Remote Connections via VPNs

- B2B
- Home internet connections
- Wireless like this ...

Miscellaneous

- Open systems so we can employ “New World” tools at lower costs from a wider vendor market
- Processor memory usage increased, but NOT paging

“WAVV” of the Future for Hanes

- Remote tape servers
- Web-based applications
- Expand PDF usage
- Testing Voice over IP