

TCP/IP for VSE/ESA: Did You Know?

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4025 Woodland Park Blvd.
Arlington, TX 76013

817-277-0800 or 1-800-4-VSEESA

Email: info@intelliware.com or
<http://www.intelliware.com>

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DEFINE FILESYS

- DEFINE FILESYS is the most dangerous command in the product
 - If your IPINIT file contains this:

```
DEFINE FILESYS, LOCATION=SYSTEM, TYPE=PERM
DEFINE FILE, PUBLIC=' IJSYSRS' , DLBL=IJSYSRS , TYPE=LIBRARY
DEFINE FILE, PUBLIC=' PRD1' , DLBL=PRD1 , TYPE=LIBRARY
DEFINE FILE, PUBLIC=' PRD2' , DLBL=PRD2 , TYPE=LIBRARY
DEFINE FILE, PUBLIC=' POWER' , DLBL=IJQFILE , TYPE=POWER
MODIFY FILE, PUBLIC=' VSE.SYSRES.LIBRARY' , TYPE=LIBRARY
MODIFY FILE, PUBLIC=' VSE.PRD1.LIBRARY' , TYPE=LIBRARY
MODIFY FILE, PUBLIC=' VSE.PRD2.LIBRARY' , TYPE=LIBRARY
MODIFY FILE, PUBLIC=' ICCF.LIBRARY' , TYPE=ICCF
MODIFY FILE, PUBLIC=' VSE.POWER.QUEUE.FILE' , TYPE=POWER
```

DEFINE FILESYS...



■ DEFINE FILESYS...

- You have just made available to *every* user for read *and* write access:
 - Almost *every* library and file in your system that has a DLBL in the System Standard Label Area
 - All VSE-supplied libraries
 - VSE/POWER queues
 - All VSAM and SAM files
- Don't believe it? Do QUERY FILES and see!
 - Or look at the SYSLST output from TCP/IP

DEFINE FILESYS...

SYSLST Output from TCP/IP Startup Job

```
DEFINE FILESYS, LOCATION=SYSTEM, TYPE=PERM
03102000 110643.28 IPN265I File defined for DLBL: IJSYSRS
03102000 110643.29 IPN265I File defined for DLBL: IJSYSR1
03102000 110643.29 IPN265I File defined for DLBL: IJQFILE
03102000 110643.30 IPN265I File defined for DLBL: DFHJ01A
03102000 110643.30 IPN265I File defined for DLBL: DFHJ01B
03102000 110643.31 IPN265I File defined for DLBL: DFHJ02A
03102000 110643.31 IPN265I File defined for DLBL: DFHJ02B
03102000 110643.32 IPN265I File defined for DLBL: IJSYSHF
03102000 110643.33 IPN265I File defined for DLBL: SYSDUMP
03102000 110643.33 IPN265I File defined for DLBL: DTSFILE
03102000 110643.34 IPN265I File defined for DLBL: IJDFILE
03102000 110643.34 IPN265I File defined for DLBL: IJAFILE
03102000 110643.35 IPN265I File defined for DLBL: VSEJMGR
03102000 110643.36 IPN265I File defined for DLBL: IJSYSCN
03102000 110643.36 IPN265I File defined for DLBL: IJSYSRC
03102000 110643.37 IPN265I File defined for DLBL: BLNDMF
03102000 110643.38 IPN265I File defined for DLBL: BLNXTRN
03102000 110643.38 IPN265I File defined for DLBL: TRFILE
03102000 110643.39 IPN265I File defined for DLBL: MSGUSR
03102000 110643.39 IPN265I File defined for DLBL: NCPLOAD
03102000 110643.40 IPN265I File defined for DLBL: IJSYSCT
03102000 110643.41 IPN265I File defined for DLBL: IESCNL
03102000 110643.41 IPN265I File defined for DLBL: IESTRFL
03102000 110643.42 IPN265I File defined for DLBL: IESTRWF
03102000 110643.42 IPN265I File defined for DLBL: IESMSG
```

DEFINE FILESYS...

SYSLST Output from TCP/IP Startup Job...

```
03102000 110643.43 IPN265I File defined for DLBL: IESPRB
03102000 110643.44 IPN265I File defined for DLBL: IESROUT
03102000 110643.44 IPN265I File defined for DLBL: DFHSTM
03102000 110643.45 IPN265I File defined for DLBL: DFHSTN
03102000 110643.46 IPN265I File defined for DLBL: DFHNTRA
03102000 110643.46 IPN265I File defined for DLBL: DFHTEMP
03102000 110643.47 IPN265I File defined for DLBL: DFHCSD
03102000 110643.47 IPN265I File defined for DLBL: DFHRSD
03102000 110643.48 IPN265I File defined for DLBL: PRD1
03102000 110643.49 IPN265I File defined for DLBL: PRD2
03102000 110643.50 IPN265I File defined for DLBL: VSESPUC
03102000 110643.50 IPN265I File defined for DLBL: PRIMARY
03102000 110643.62 IPN265I File defined for DLBL: DFHDMPA
03102000 110643.62 IPN265I File defined for DLBL: DFHDMPB
03102000 110643.63 IPN265I File defined for DLBL: DFHAUXT
03102000 110643.63 IPN265I File defined for DLBL: INWFILE
03102000 110643.64 IPN265I File defined for DLBL: CAISAFS
03102000 110643.65 IPN265I File defined for DLBL: ISICAT1
03102000 110643.66 IPN265I File defined for DLBL: ISILIB
03102000 110643.66 IPN265I File defined for DLBL: CACAT
03102000 110643.67 IPN265I File defined for DLBL: CSILIB
03102000 110643.67 IPN265I File defined for DLBL: TSTPRNT
03102000 110643.68 IPN265I File defined for DLBL: CAICUI
03102000 110643.69 IPN265I File defined for DLBL: CAUDPC1
.
.
.
```

DEFINE FILESYS...



■ DEFINE FILESYS...

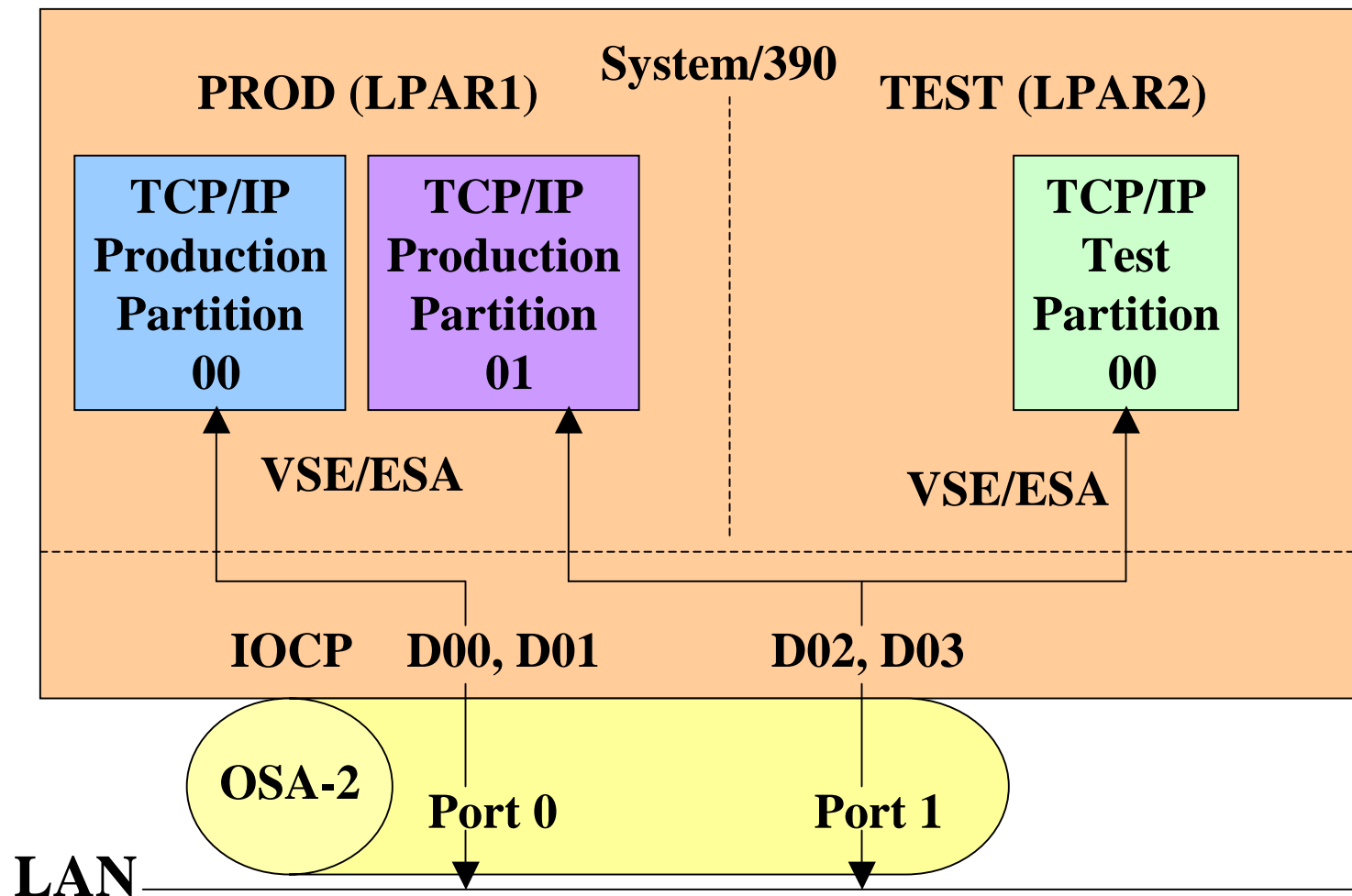
■ Recommendations

- | Remove DEFINE FILESYS and replace with individual DEFINE FILE commands
- | Define only the minimum files actually required
- | Specify READONLY=YES on all files unless write access is really required
 - Consider using MODIFY FILE command to change READONLY attribute as needed

Open Systems Adapter (OSA)

- Can be shared by multiple TCP/IP partitions
- Integrated feature of IBM S/390 processors
 - 9672 and Multiprise 2000
- Supports multiple LAN connections
 - Ethernet (10baseT and 100baseT)
 - Token-ring
 - Fiber Distributed Data Interface (FDDI)
 - Asynchronous Transfer Mode (ATM)

Open Systems Adapter...



Open Systems Adapter...

IOCP Definition

```
CHPID      PATH= (E0) , TYPE=OSA, SHARED
CNTLUNIT   CUNUMBR=0002, PATH= (E0) , UNIT=OSA
IODEVICE   ADDRESS= (0D00, 04) , CUNUMBR= (0002) , UNIT=OSA, UNITADD=00
IODEVICE   ADDRESS= (0DFE, 01) , CUNUMBR= (0002) , UNIT=OSAD, PART= (PROD) ,      X
           UNITADD=FE
```

- Even-odd pair of addresses
- OSAD - required only for OSA/SF
- Can use default OSA Address Table (OAT)

<u>LPAR</u>	<u>IOCP ADDRESS</u>	<u>OSA Unit Address</u>	<u>OSA Port Number</u>
PROD	D00, D01	00, 01	0
PROD	D02, D03	02, 03	1
TEST	D02, D03	02, 03	1

Open Systems Adapter...

■ VSE Definitions

```
ADD D00:D03,OSA      PROD
ADD DFE,OSAD

ADD D02:D03,OSA      TEST
```

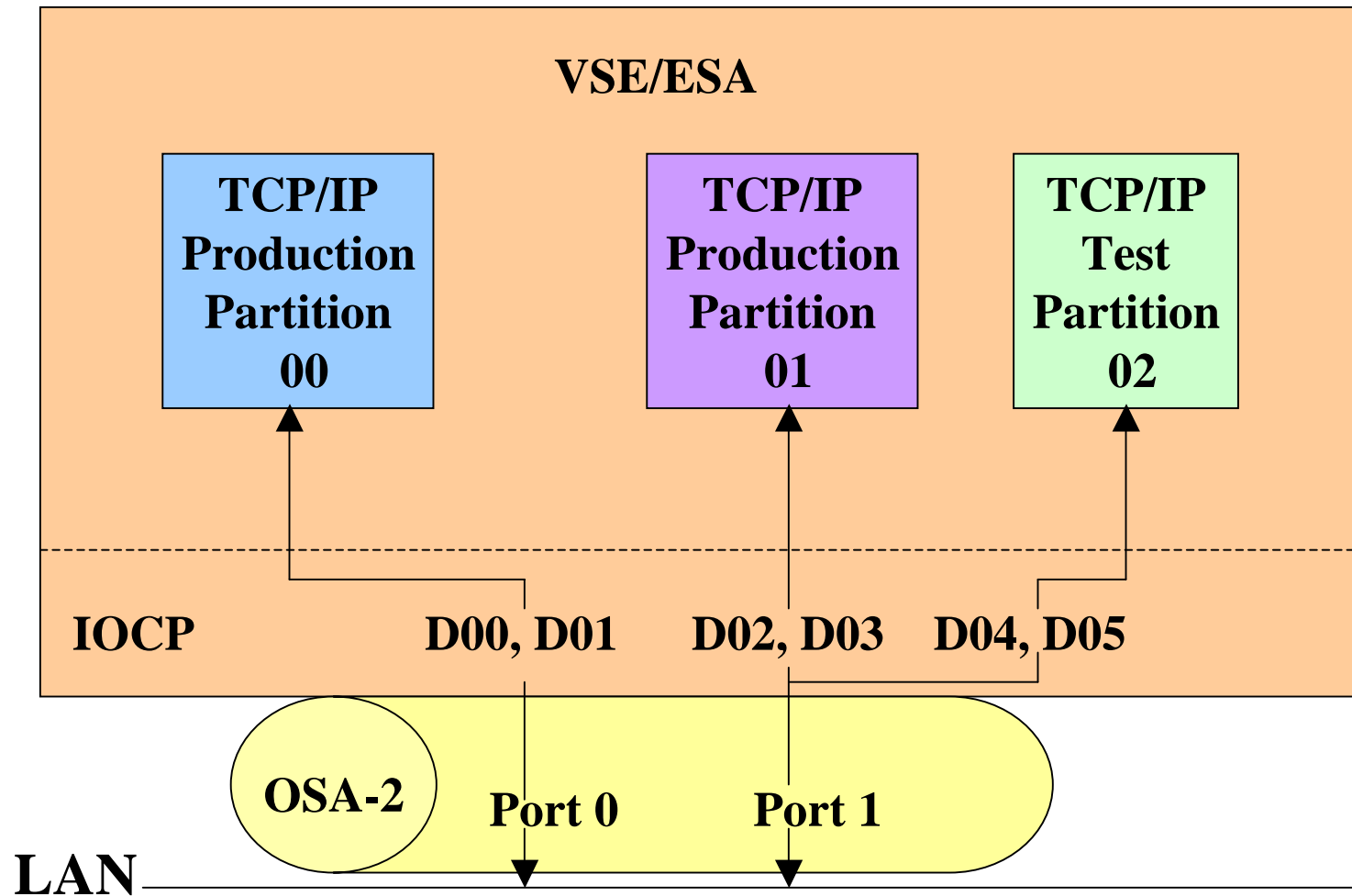
■ TCP/IP Definitions

```
DEFINE LINK, ID=OSA2A, TYPE=OSA, DEV=D00, MTU=1500      PROD
DEFINE ADAPTER, LINKID=OSA2A, NUMBER=0, TYPE=ETHERNET    TCPIP 00

DEFINE LINK, ID=OSA2B, TYPE=OSA, DEV=D02, MTU=1500      PROD
DEFINE ADAPTER, LINKID=OSA2B, NUMBER=1, TYPE=ETHERNET    TCPIP 01

DEFINE LINK, ID=OSA2B, TYPE=OSA, DEV=D02, MTU=1500      TEST
DEFINE ADAPTER, LINKID=OSA2B, NUMBER=1, TYPE=ETHERNET    TCPIP 00
```

Open Systems Adapter...



Open Systems Adapter...

■ IOCP Definition

```
CHPID      PATH= (E0) , PARTITION= ( (PROD) , (PROD) ) TYPE=OSA
CNTLUNIT   CUNUMBER=0002 , PATH= (E0) , UNIT=OSA
IODEVICE   ADDRESS= (0D00 , 06) , CUNUMBR= (0002) , UNIT=OSA , UNITADD=00
IODEVICE   ADDRESS= (0DFE , 01) , CUNUMBR= (0002) , UNIT=OSAD , UNITADD=FE
```

■ Map OSA port and unit address pairs in OSA Address Table (OAT) using OSA/SF

<u>LPAR</u>	<u>IOCP ADDRESS</u>	<u>OSA Unit Address</u>	<u>OSA Port Number</u>
PROD	D00 , D01	00 , 01	0
PROD	D02 , D03	02 , 03	1
PROD	D04 , D05	04 , 05	1

Open Systems Adapter...

■ VSE Definitions (PROD)

```
ADD D00:D05,OSA  
ADD DFE,OSAD
```

■ TCP/IP Definitions (PROD)

```
DEFINE LINK, ID=OSA2A, TYPE=OSA, DEV=D00, MTU=1500          TCPIP 00  
DEFINE ADAPTER, LINKID=OSA2, NUMBER=0, TYPE=ETHERNET  
  
DEFINE LINK, ID=OSA2B, TYPE=OSA, DEV=D02, MTU=1500          TCPIP 01  
DEFINE ADAPTER, LINKID=OSA2, NUMBER=1, TYPE=ETHERNET  
  
DEFINE LINK, ID=OSA2C, TYPE=OSA, DEV=D04, MTU=1500          TCPIP 02  
DEFINE ADAPTER, LINKID=OSA2, NUMBER=1, TYPE=ETHERNET
```

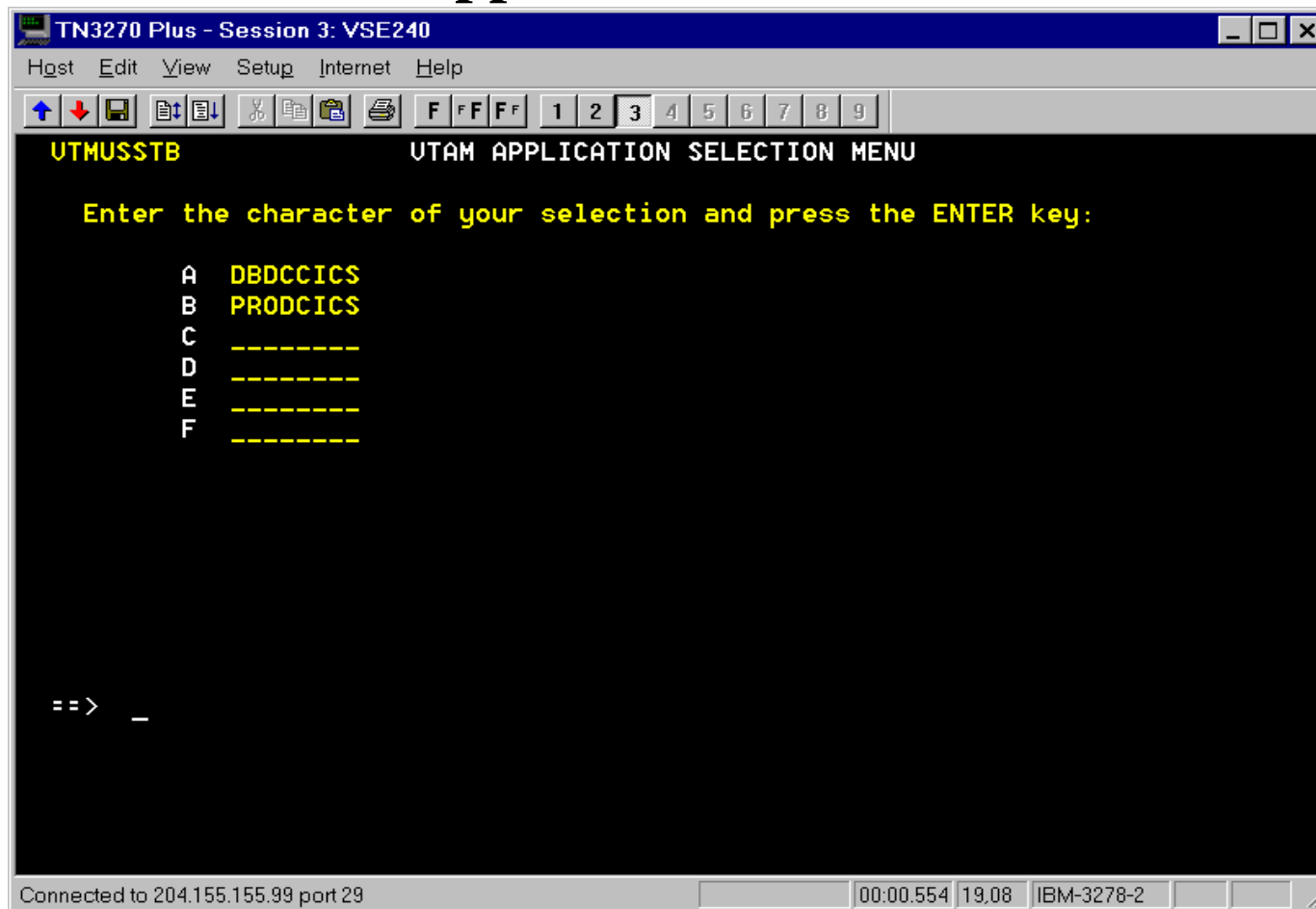
Telnet Menu



- A TCP/IP Telnet Menu to closely mimic the "VSE-supplied" VTAM USSTAB is easy to create
 - Sample menus supplied with TCP/IP do not!

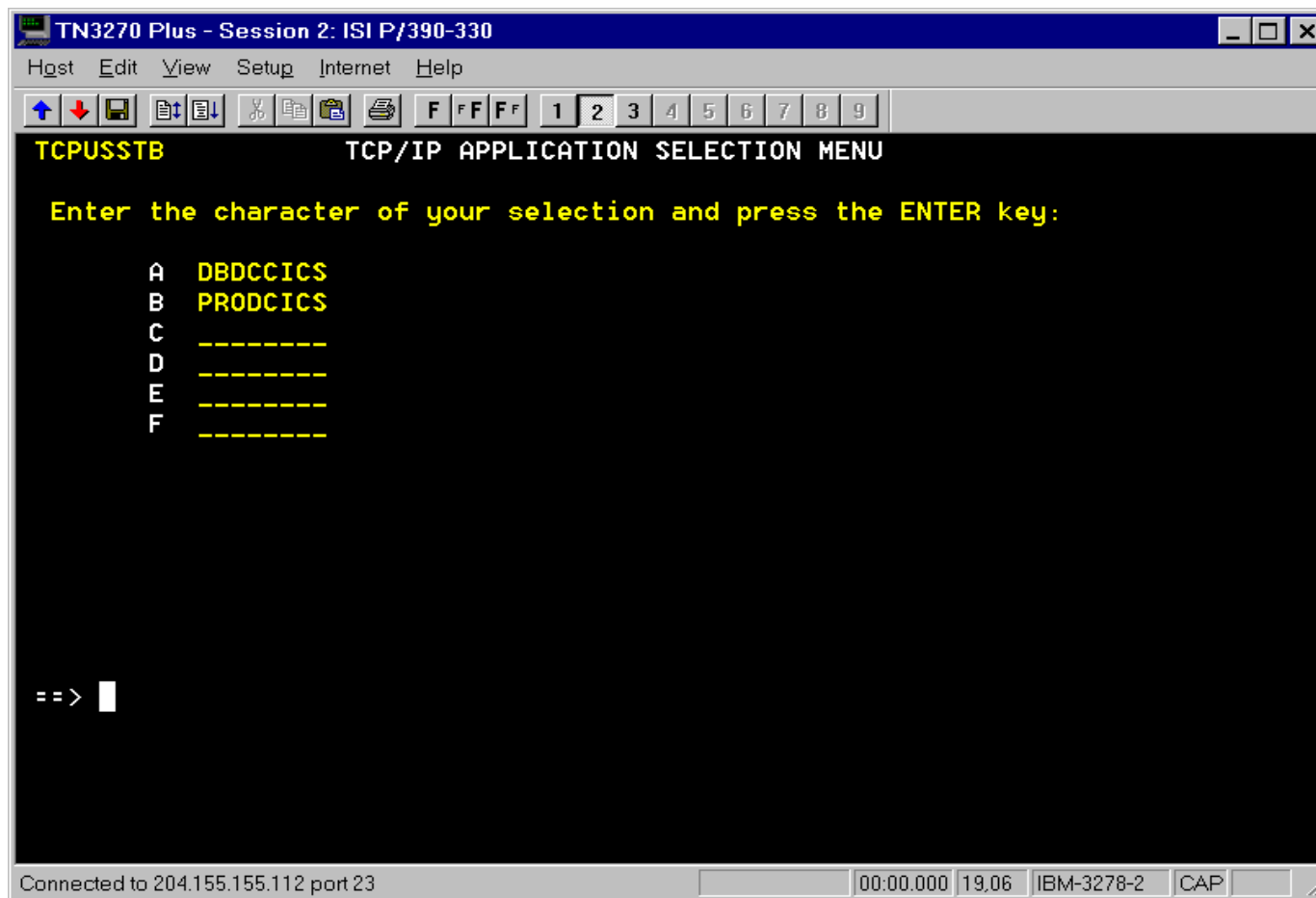
Telnet Menu...

IBM-Supplied VTAM USSTAB



Telnet Menu...

TCP/IP Menu Mimicking the VTAM USSTAB



The screenshot shows a Telnet window titled "TN3270 Plus - Session 2: ISI P/390-330". The window has a menu bar with "Host", "Edit", "View", "Setup", "Internet", and "Help". Below the menu bar is a toolbar with various icons and function keys (F1-F9). The main display area is black with yellow text. At the top left of the display is "TCPUSSTB" and at the top right is "TCP/IP APPLICATION SELECTION MENU". Below this is the instruction "Enter the character of your selection and press the ENTER key:". A list of options follows: A DBDCCICS, B PRODCICS, C -----, D -----, E -----, F -----. At the bottom left of the display is "==> " followed by a cursor. The status bar at the bottom of the window shows "Connected to 204.155.155.112 port 23", "00:00.000", "19.06", "IBM-3278-2", and "CAP".

```
TN3270 Plus - Session 2: ISI P/390-330
Host Edit View Setup Internet Help
TCPUSSTB TCP/IP APPLICATION SELECTION MENU
Enter the character of your selection and press the ENTER key:
A DBDCCICS
B PRODCICS
C -----
D -----
E -----
F -----
==> 
```

Connected to 204.155.155.112 port 23 00:00.000 19.06 IBM-3278-2 CAP

Telnet Menu...

Header for VTAM-Like USSTAB

```
HI=#  
LO=$  
VAR=@  
INPUT=+  
CMDLINE=?  
PF3=EXIT  
CLEAR=REFRESH  
  
CHAR=A=LOGON APPL(DBDCCICS)  
CHAR=B=LOGON APPL(PRODCICS)  
  
MSGLINE=23  
TRIES=3
```

Telnet Menu...

Screen Image for VTAM-Like USSTAB

IMAGE

\$TCPUSSTB

#TCP/IP APPLICATION SELECTION MENU\$

Enter the character of your selection and press the ENTER key:

#A\$ DBDCCICS

#B\$ PRODCICS

#C\$ _____

#D\$ _____

#E\$ _____

#F\$ _____

#==>?

\$

Telnet Menu...



■ TCP/IP Telnet Menu...

■ Restrictions

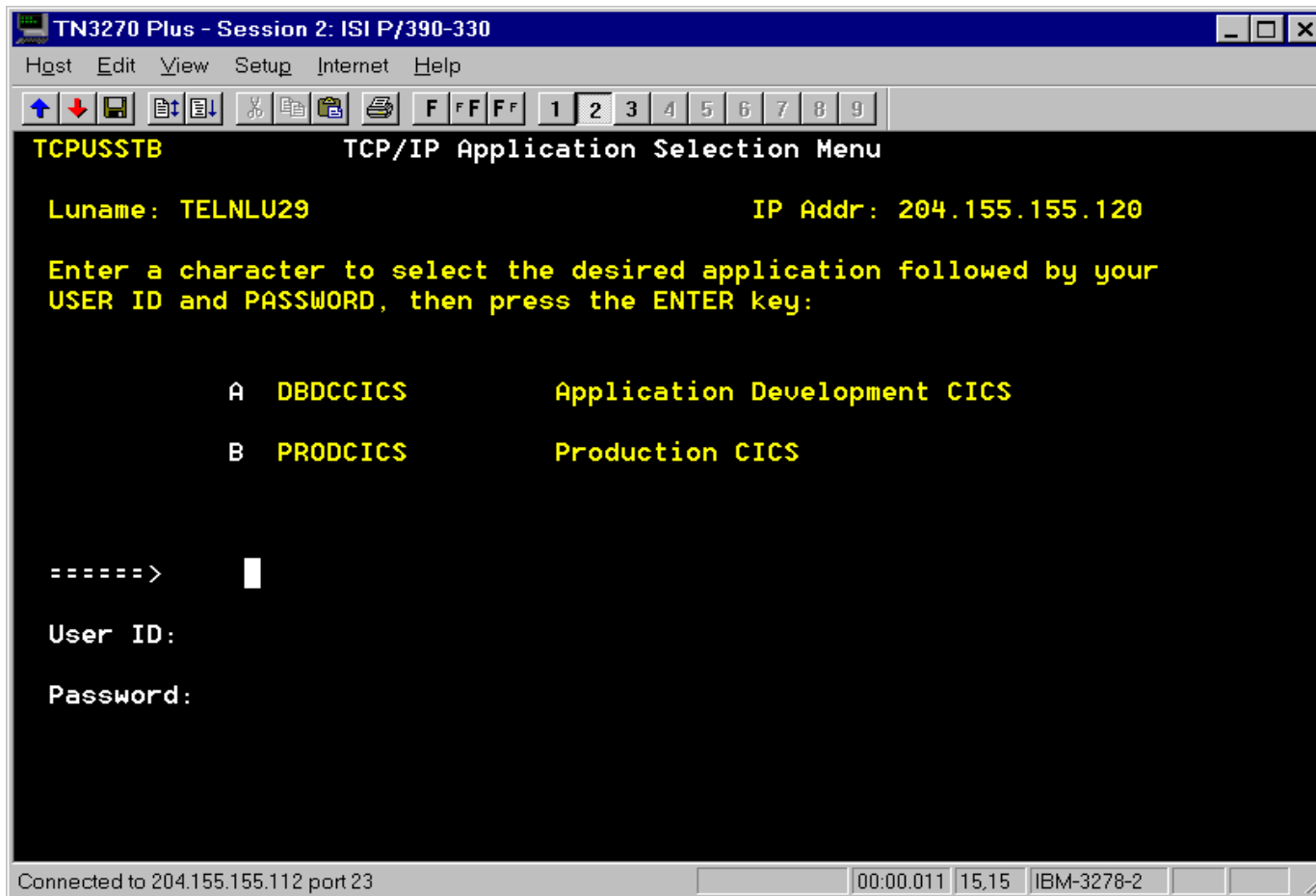
- | Menu is processed by TCP/IP, not VTAM
- | Single character command selection only
 - VTAM allows multiple characters

■ Could easily add USERID and PASSWORD fields

- | Recommend placing fields below command entry
 - TCP/IP always inserts cursor in command entry field
- | LUNAME and IPADDRESS also useful

Telnet Menu...

TCP/IP Menu with USERID and PASSWORD



Naming Hosts

- Naming hosts makes using TCP/IP much easier to use

- Defining names within TCP/IP for VSE

```
DEFINE NAME,NAME=MYPEC,IPADDR=192.168.155.114
```

- Defining names on Windows systems

- Update HOSTS file

- Usually found in C:\WINDOWS directory

```
192.168.155.108 VSE240  
192.168.155.125 VMESA  
192.168.155.124 VSE231
```

Naming Hosts...



- Naming hosts..
 - From TCP/IP for VSE

```
ping mypc  
ftp mypc
```

- From workstation

```
ping vse240  
ftp vse231
```

Naming Hosts...



- Naming hosts...
 - Used by FTP, LPR, Telnet, and PING clients
 - Still works if Domain Name Server (DNS) present
 - | SET DNS1=*ipaddress*
 - Search sequence
 - | Names table (DEFINE NAME=) entries
 - | DNS

Command and Script Files



- How to invoke commands without typing in all the parameters
- TCP/IP for VSE/ESA commands in a VSE library member
 - Catalog as membername.L
 - Invoke from the IPINITxx configuration member with INCLude command
 - Invoke from the VSE console with EXECute command

Command and Script Files...

■ Example: Restarting a failed GPS daemon

```
// JOB GPSDEF      CATALOG TCP/IP GPSDEF01.L
// EXEC LIBR
A S=TCPIP.CONFIG
CATALOG GPSDEF01.L                      REPLACE=YES
DEFINE GPSD, ID=GPS1, PRINTER=TEXT, IPADDR=192.168.155.120, -
      TERMNAME=GPSVRT01, TARGET=DBCICICS, INSESS=YES, LOGMODE=DSC2K, -
      QUEUING=DISK, STORAGE='TCPIP.TEMP', RETRY_COUNT=3

/+
/*
/ &
```

```
Z1 0087 IPN300I Enter TCP/IP Command
Z1-0087
87 exec gpsdef01
Z1 0085 IPN397I Loading command deck GPSDEF01
Z1 0085 IPN398I Command deck GPSDEF01 has been completely loaded
Z1 0085 0056: GPS900I GPS1 GPS Daemon starting
```

Command and Script Files...

■ LPR Script

- LPR commands in a VSE library member
- Catalog as scriptname.L

■ Define in configuration

```
DEFINE NAME,NAME=HPPRINT,SCRIPT=HPPRINT
```

- ## ■ Invoke with LPR EXECute command or automatic LPR

Command and Script Files ...

LPR Script example

```
// JOB LPRCONFIG CATALOG LPR SCRIPT FILE
// EXEC LIBR
  ACC S=PRD2.CONFIG
  CATALOG HPPRINT.L          REPLACE=YES
SET HOST = HPSERVER
SET PRINTER = HP_LASER_4000
SET INSERTS = HPCTRL
SET CC = YES
/+
/*
/&
```

Automatic LPR

- How to control where automatic LPR output is sent
- Automatic transfer of POWER LST output
- TCP/IP partition monitors LST QUEUE
- Define class to monitor in configuration

```
DEFINE EVENT, ID=LST_LISTEN, -  
    TYPE=POWER, CLASS=X, QUEUE=LST, ACTION=LPR -  
    RETRY=1, RETRY_TIME=18000, -  
    HOSTNAME=USERINFO | DEST | ROOM | DEPT | BLDG
```

Automatic LPR...



- POWER LST card defines LPR options
 - DEFINE EVENT...HOSTNAME parameter
 - | Specifies POWER LST parameter to use for LPD host information
 - USERINFO
 - USER
 - UINF (new in VSE/POWER 6.4, can be PALTERed)
 - DEST
 - ROOM
 - DEPT
 - BLDG

Controlling LPR Printing

- How to format POWER LST output on network printers
- Send printer control data with LPR output
 - SET INSERTS=phasename
- Generated by INSERTS macro

```
phase  INSERTS DEFINE,  
        HEADER= hex data sent before print file  
        TRAILER= hex data sent after print file  
        PAGE= hex data sent before each page
```

Controlling LPR Printing...

```
// JOB INSERTS
// LIBDEF *,SEARCH=PRD1.BASE
// LIBDEF PHASE,CATALOG=TCPIP.CONFIG
// OPTION CATAL
// EXEC ASSEMBLY
* PAGE ORIENTATION (LANDSCAPE)
* 1B266C314F
* LINE SPACING (8 LINES/INCH)
* 1B266C3844
* CHARACTER PITCH (13), SEMI-BOLD TYPEFACE
* 1B28733133483142
HP4LAND INSERTS DEFINE, *
                HEADER=1B451B266C314F1B266C38441B28733133483142, *
                TRAILER=1B45
                END
/*
// EXEC LNKEDT
/*
/&
```

Diagnosing LPR Problems

- DIAGNOSE LPR can really help in debugging Auto-LPR script problems

AUTOMATIC LPR MESSAGES WITHOUT DIAGNOSE LPR

```
Z1 0085 0024: TCP911I Processing Event:LST_LIST Type:POWER Action:LPR
Z1 0085 0024: TCP907I Processing Output:AUTOLPR ,02467-000 for automated
Z1 0085 printing at:LPRSCR01          on:SYSD
Z1 0085 0024: TCP908I Processing Output:AUTOLPR ,02467-000 has failed
```


Diagnosing LPR Problems...

AUTOMATIC LPR MESSAGES WITH DIAGNOSE LPR

```
Z1 0085 0024: TCP911I Processing Event:LST_LIST Type:POWER Action:LPR
Z1 0085 0024: TCP907I Processing Output:AUTOLPR ,02467-000 for automated
Z1 0085 printing at:LPRSCR01 on:SYSD
Z1 0085 0024: TCP910I Client manager connection Established.
Z1 0085 0024: TCP910I LPR
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I SET USER=AUTOLPR
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I SET COPIES= 01
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I SET PRINTER= SYSD
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I SET JOBNAME= AUTOLPR
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I SET DISP=DELETE
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I SET CC=YES
Z1 0085 0024: TCP910I LPR Ready:
```

Diagnosing LPR Problems...

AUTOMATIC LPR MESSAGES WITH DIAGNOSE LPR...

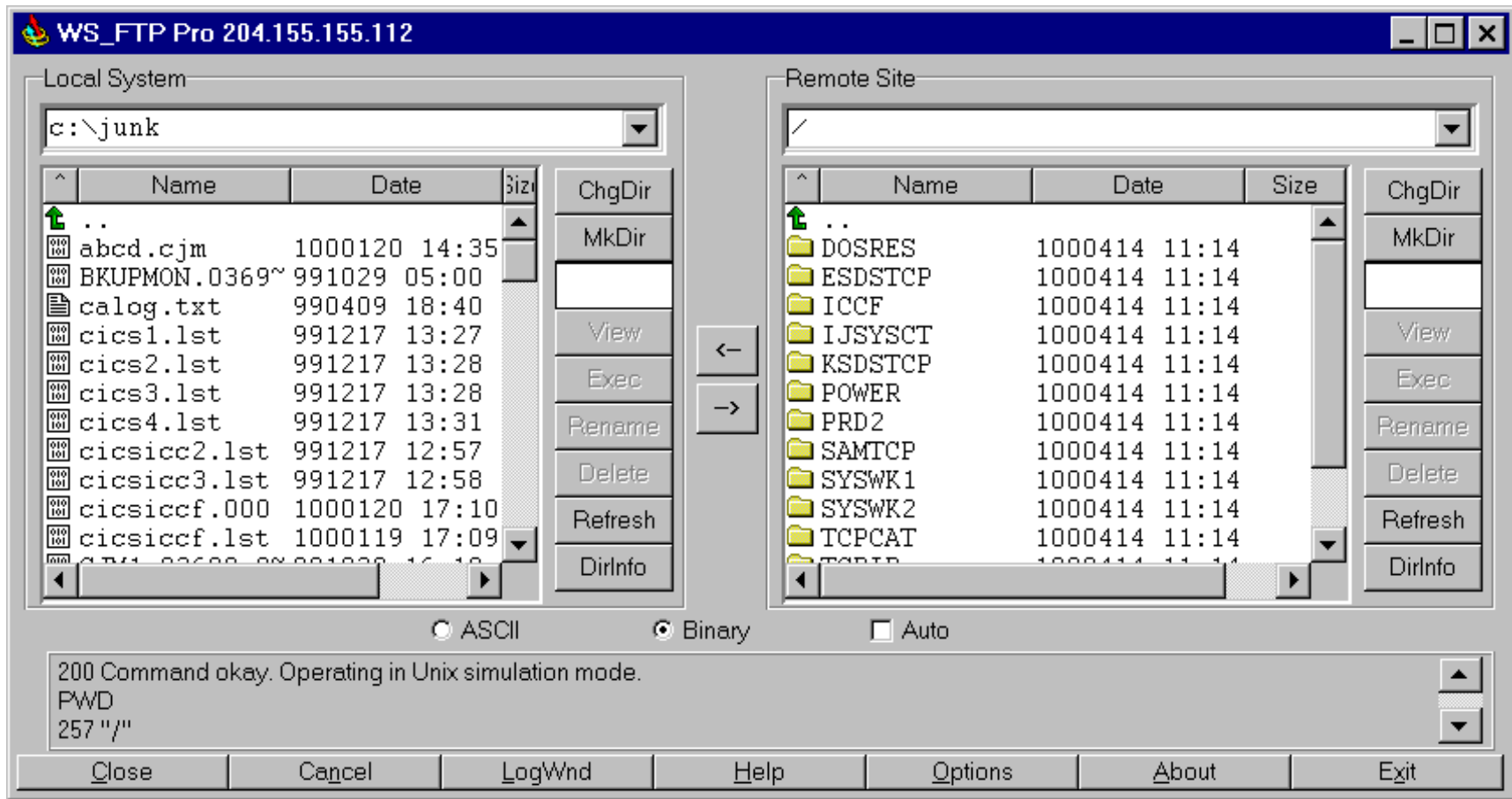
```
Z1 0085 0024: TCP910I SET HOST= LPRSCR01
Z1 0085 0024: TCP910I Executing script of commands: LPRSCR01
Z1 0085 0024: TCP910I SET HOST      = NTSERVER
Z1 0085 0024: TCP910I SET PRINTER = TEXT
Z1 0085 0024: TCP910I SET CC      = YES
Z1 0085 0024: TCP910I SET INSERTS = HP4LAND
Z1 0085 0024: TCP910I 192.168.155.101
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I CD POWER.LST.M
Z1 0085 0024: TCP910I Change has completed.
Z1 0085 0024: TCP910I LPR Ready:
Z1 0085 0024: TCP910I PRINT AUTOLPR.02467.00
Z1 0085 0024: TCP910I Opening the file
Z1 0085 006F: IPA612I File opened for LPR: AUTOLPR ,02467 ,00
Z1 0085 0024: TCP910I Establishing connection with LP Daemon
Z1 0085 0024: TCP910I Remote port: 515 Local Port: 721
Z1 0085 0024: TCP910I Error: Unable to establish connection.
Z1 0085 0024: TCP908I Processing Output:AUTOLPR ,02467-000 has failed
```

File Transfer Protocol

- FTP is easier to use than you may think
 - To use graphical clients (ie, WS_FTP Pro)
 - Start FTP daemon with UNIX=YES
- ```
DEFINE FTPD, ID=FTP, PORT=21, COUNT=5, UNIX=YES
```
- Folders *will* appear correctly

# File Transfer Protocol...

## Using a Graphical Client with FTP



# File Transfer Protocol...



- FTP is easier to use than you may think...
  - Transferring ICCF library members
    - | Cannot Change Directory to ICCF library (CD ICCF)
      - No valid directories or members will be found
    - | Just reference "iccf.libnum.memname" in GET

# File Transfer Protocol...

## GET an ICCF Library Member

```
ftp> get iccf.10.isipower c:\junk\isipower.job
200 Command okay.
150-File: ICCF.10.ISIPOWER
 Type: ASCII Recfm: FB Lrecl: 80 Blksize: 80
 CC=ON UNIX=ON RECLF=OFF TRCC=OFF CRLF=ON
 Translate with US_ENG_03
150 File status okay; about to open data connection
226-Bytes sent: 3,034
 Records sent: 37
 Transfer Seconds: 1.69 (2K/Sec)
 File I/O Seconds: .10 (0K/Sec)
226 Closing data connection.
ftp: 3034 bytes received in 2.20Seconds 1.38Kbytes/sec.
ftp>
```

# File Transfer Protocol...



- FTP is easier to use than you may think...
  - For FTP "stalls" or "hangs" try
    - | SET ADDITIONAL\_WINDOW = 10000
    - | SET WINDOW\_DEPTH = 100
    - | Raise TCP/IP partition priority

# Reducing CPU Overhead



- CPU processing overhead for TCP/IP can be reduced
- Don't let TCP/IP partition see more than it needs to
  - Specify VSE's IP address in OSA and 3172 configurations
  - Filter non-IP traffic if the network attachment supports the option
  - Isolate VSE on its own LAN segment



# Reducing CPU Overhead...



- SET GATEWAY=OFF
  - Saves unnecessary scan of routing table
- POOL=NO on TELNET definitions
  - Costs more 31-bit partition GETVIS
- Use FTPBATCH for VSE batch FTP clients
  - Moves file I/O and FTP processing to lower priority batch partition

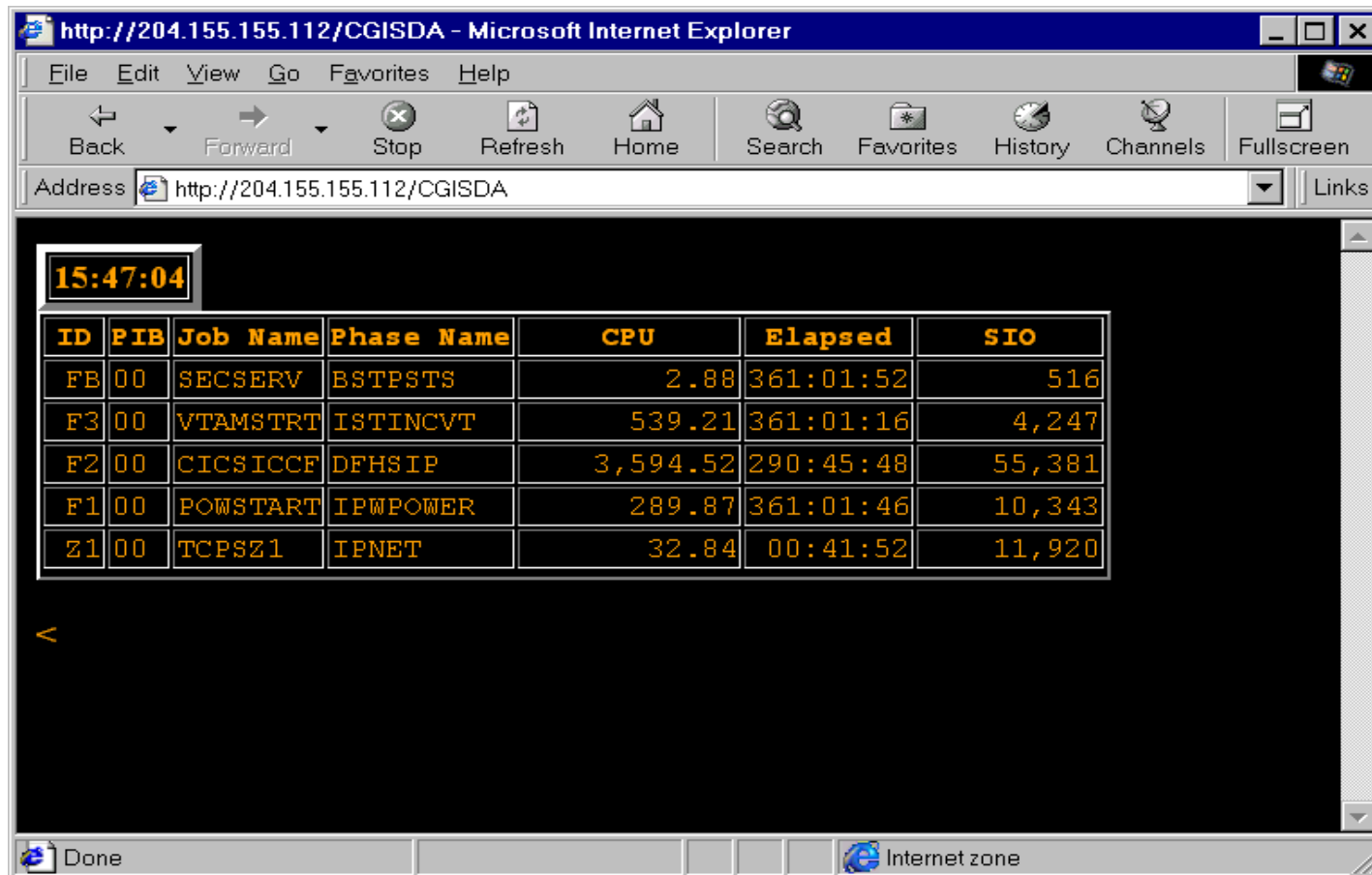
# Sample Programs



- CSI has a large number of sample programs available on their website
  - [www.tcpip4vse.com/progsamps.html](http://www.tcpip4vse.com/progsamps.html)
  - Assembler, COBOL, REXX
  - Client/Server Sockets programs
  - Common Gateway Interface (CGI) programs
  - Documentation on writing your own FileIO driver

# Sample Programs...

CGISDA - the old ICCF "\$DA" command from a web browser



The screenshot shows a Microsoft Internet Explorer browser window with the address bar set to `http://204.155.155.112/CGISDA`. The main content area displays a table of job execution data. At the top left of the table area, the time `15:47:04` is shown. The table has seven columns: ID, PIB, Job Name, Phase Name, CPU, Elapsed, and SIO. The data rows are as follows:

| ID | PIB | Job Name | Phase Name | CPU      | Elapsed   | SIO    |
|----|-----|----------|------------|----------|-----------|--------|
| FB | 00  | SECSERV  | BSTPSTS    | 2.88     | 361:01:52 | 516    |
| F3 | 00  | VTAMSTR  | ISTINCVT   | 539.21   | 361:01:16 | 4,247  |
| F2 | 00  | CICSICCF | DFHSIP     | 3,594.52 | 290:45:48 | 55,381 |
| F1 | 00  | POWSTART | IPWPOWER   | 289.87   | 361:01:46 | 10,343 |
| Z1 | 00  | TCPSZ1   | IPNET      | 32.84    | 00:41:52  | 11,920 |

The browser's status bar at the bottom shows "Done" and "Internet zone".

# Information Sources



- You can use the QUERY SET command to see exactly which options you are using
  - QUERY OPTIONS is identical
- There is "Great" how-to information available
  - Get newly revised TCP/IP redbook SG24-5626 "Getting Started with TCP/IP for VSE/ESA 1.4"
  - Updated by "you-know-who"