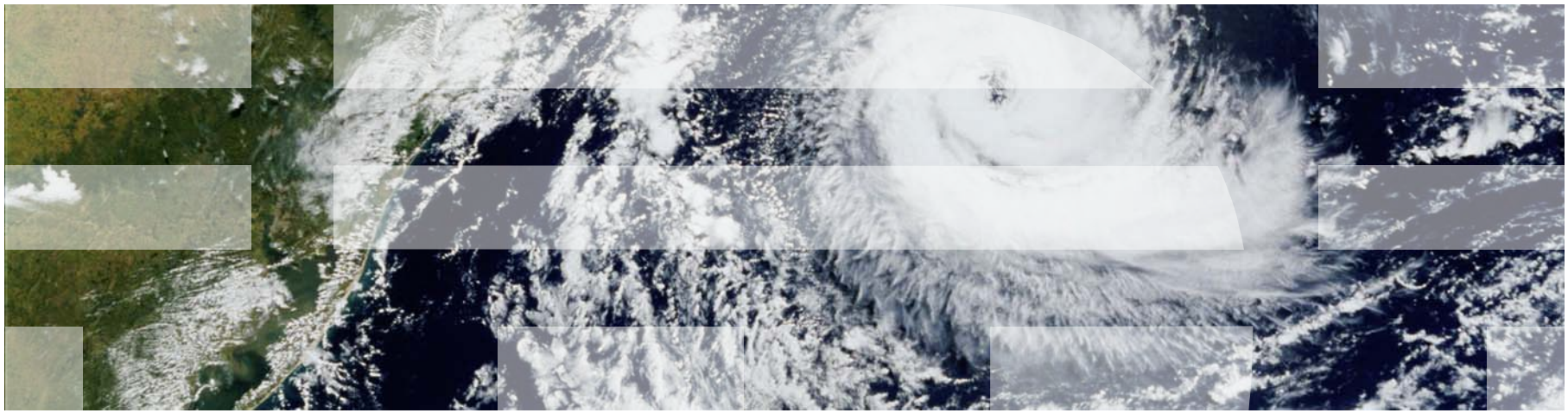
z/VSE 4.3 Support of four-digit-cuu device addresses



http://www.ibm.com/zVSE

http://twitter.com/IBMzVSE

IBM

© 2011 IBM Corporation

Trademarks

The following are trademarks of the International Business Machines Corporation in the United States, other countries, or both.

Not all common law marks used by IBM are listed on this page. Failure of a mark to appear does not mean that IBM does not use the mark nor does it mean that the product is not actively marketed or is not significant within its relevant market.

Those trademarks followed by ® are registered trademarks of IBM in the United States; all others are trademarks or common law marks of IBM in the United States.

For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml:

*, AS/400®, e business(logo)®, DBE, ESCO, eServer, FICON, IBM®, IBM (logo)®, iSeries®, MVS, OS/390®, pSeries®, RS/6000®, S/30, VM/ESA®, VSE/ESA, z/VSE, WebSphere®, xSeries®, z/OS®, zSeries®, z/VM®, System i, System i5, System p, System p5, System x, System z, System z9®, BladeCenter®

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.
Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.
IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.
All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.
This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.
All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.
Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

© 2011 IBM Corporation

About me

Helga Hoff

- z/VSE Development and Service:

  IPL, Virtual Tape Support

- L2 TCP/IP Support

Questions and Feedback to Helga.Hoff@de.ibm.com

© 2011 IBM Corporation

Content

- Introduction
- Physical device addresses and VSE addresses
- Assigning a VSE address
- Displaying a VSE address
- Addressing a device
- Limitations
- Installation of z/VSE 4.3 with 4-digit-cuu devices
- IUI
- FSU
- Internals

© 2011 IBM Corporation

Introduction

I/O devices can have physical device numbers in the range of x‘0‘ to x‘FFFF‘

Today:

- z/VSE only supports I/O devices with device numbers in the range of x‘0‘ to x‘FFF‘

  I/O devices with device numbers > x‘FFF‘ were ignored during the z/VSE installation process and cannot be added in the IPL procedure

With z/VSE 4.3:

- z/VSE 4.3 supports I/O devices with device numbers in the range of x‘0‘ to x‘FFFF‘

  I/O devices with device numbers > x‘FFF‘ were recognized during the z/VSE installation process and can be added into the IPL procedure

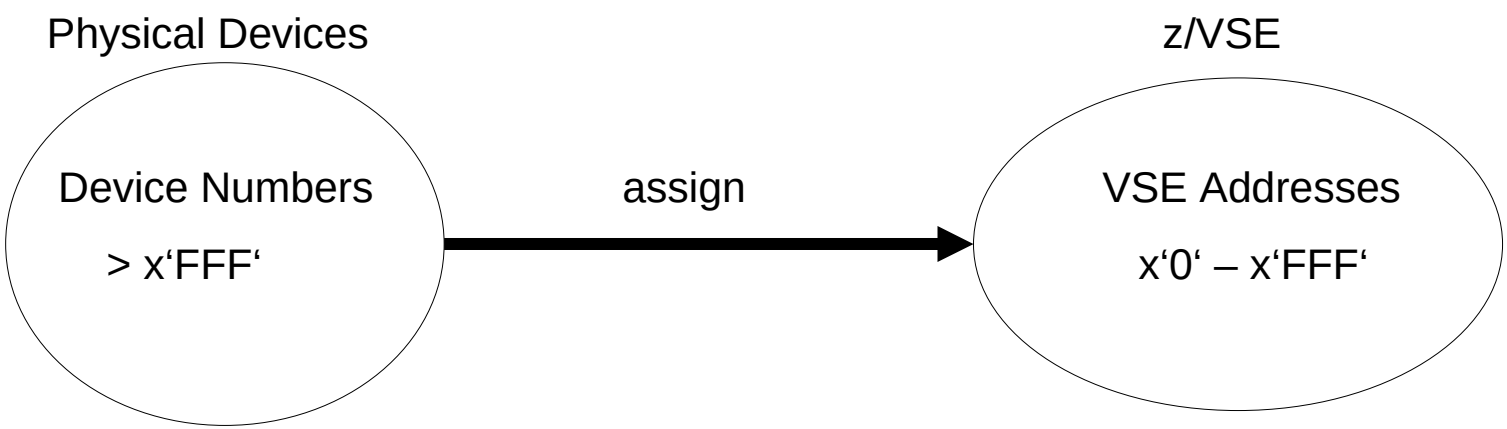
Advantage:

The system administrator can now assign devices to z/VSE without considering the device number.

© 2011 IBM Corporation

Physical Device Addresses and VSE Addresses

- If the physical device address of an I/O device is <= x‘FFF‘ then - by default - the physical device address is equal to the VSE address - nothing changes.
- If the physical device address of an I/O device is > x‘FFF‘ then a VSE address in the range between x‘0‘ and x‘FFF‘ will be assigned to the device



© 2011 IBM Corporation

Assigning a VSE address

Extended ADD Statement:

Syntax:

- ADD <physical device address > as <VSE address>,<device type>
- ADD <phy_addr1> : <phy_addr2> as <VSEaddr1> : <VSEaddr2>, <device type>
- ADD <phy_addr1> .. <phy_addr2> as <VSEaddr1> .. <VSEaddr2>, <device type>

Note :

You only have to specify a VSE address if your physical device address is larger than x'FFF'

If the physical device address is lower or equal than x'FFF' then the VSE address is equal to the physical device address by default.

This assignment cannot be changed any more after IPL

The VSE address must be unique: You cannot assign the same VSE address twice.

Examples:

- ADD 1555 as 555, ECKD
- ADD 1010:1020 as 200:210, 3480
- ADD 1010..1020 as 200..210, 3480

© 2011 IBM Corporation

Example

IPL Procedure:

ADD 380,ECKD

ADD 200,ECKD

ADD 22A3 as FFA,TPA

ADD FA04 as A04,TPA

ADD 300 as 500, ... → NOT allowed !

Assignment of physical device addresses to VSE addresses:

Physical device address	VSE address	
380	380	default setting by the system – cannot be changed
200	200	default setting by the system – cannot be changed
22A3	FFA	defined by the user
FA04	A04	defined by the user
300	500	not possible !

Note: **With z/VSE 4.3 each device has a physical device address AND a VSE address**

© 2011 IBM Corporation

Display VSE addresses

```
QUERY  IO-----------------------------------------------------------------------------------------------------
                |--,CUU-----------------------------------------|
                        |=--------------|
                        |=cuu----------|


QUERY IO,CUU=1200
AR 0015  PHYSICAL ADDRESS    ADDRESS USED BY Z/VSE   DEVICE CLASS
AR 0015            1200                    200                          DASD

QUERY IO,CUU=FFB
AR 0015  VSE ADDR   PHYSICAL ADDR   DEVICE CLASS
AR 0015      FFB              2000                DASD
```


© 2011 IBM Corporation

Display VSE Addresses

- SYSTEM: z/VSE z/VSE 5.1 TURBO (01) USER: SYS
- VM USER ID:HHOFF TIME: 09:36:52

- status c01
- AR 0015 SCHIB DEV INT-PARM ISC FLG LP PNO LPU PI MBI PO PA CHPID0-3 CHPID4-7
- AR 0015 0003 C01 00005548 3 81 80 00 80 80 0000 80 80 50000000 00000000
- AR 0015 DEVICE ADDRESS CCA=50 DDC=24
- AR 0015 1I40I READY

- QUERY IO,CUU=c01
- AR 0015 VSE ADDR PHYSICAL ADDR DEVICE INFORMATION
- AR 0015 C01 CC01 COMMUN. CONTROLLER
- AR 0015 1I40I READY
-
-
-
-
- ==> QUERY IO,CUU=c01
-
- 1=HLP 2=CPY 3=END 4=RTN 5=DEL 6=DELS 7=RED 8=CONT 9=EXPL 10=HLD 11=PCUU 12=RTRV
-
- ACT_MSG: HOLDRUN PAUSE: 01 SCROLL: 1 MODE: CONSOLE

© 2011 IBM Corporation

Summary

1. Today, there is only one device address for a device; the device address is in the range x‘000‘ to x‘FFF‘

   With z/VSE 4.3:

   Each device has a **physical device address** in the range of x‘0000‘ to x‘FFFF‘ AND a **VSE address** in the range of x‘000‘ to x‘FFF‘

   The physical device address of an I/O device and its VSE address may differ.

2. For physical device addresses less or equal to x‘FFF‘, the VSE address is equal to the physical address by default.

   For physical device addresses larger than x‘FFF‘ the user has to assign a VSE address to it.

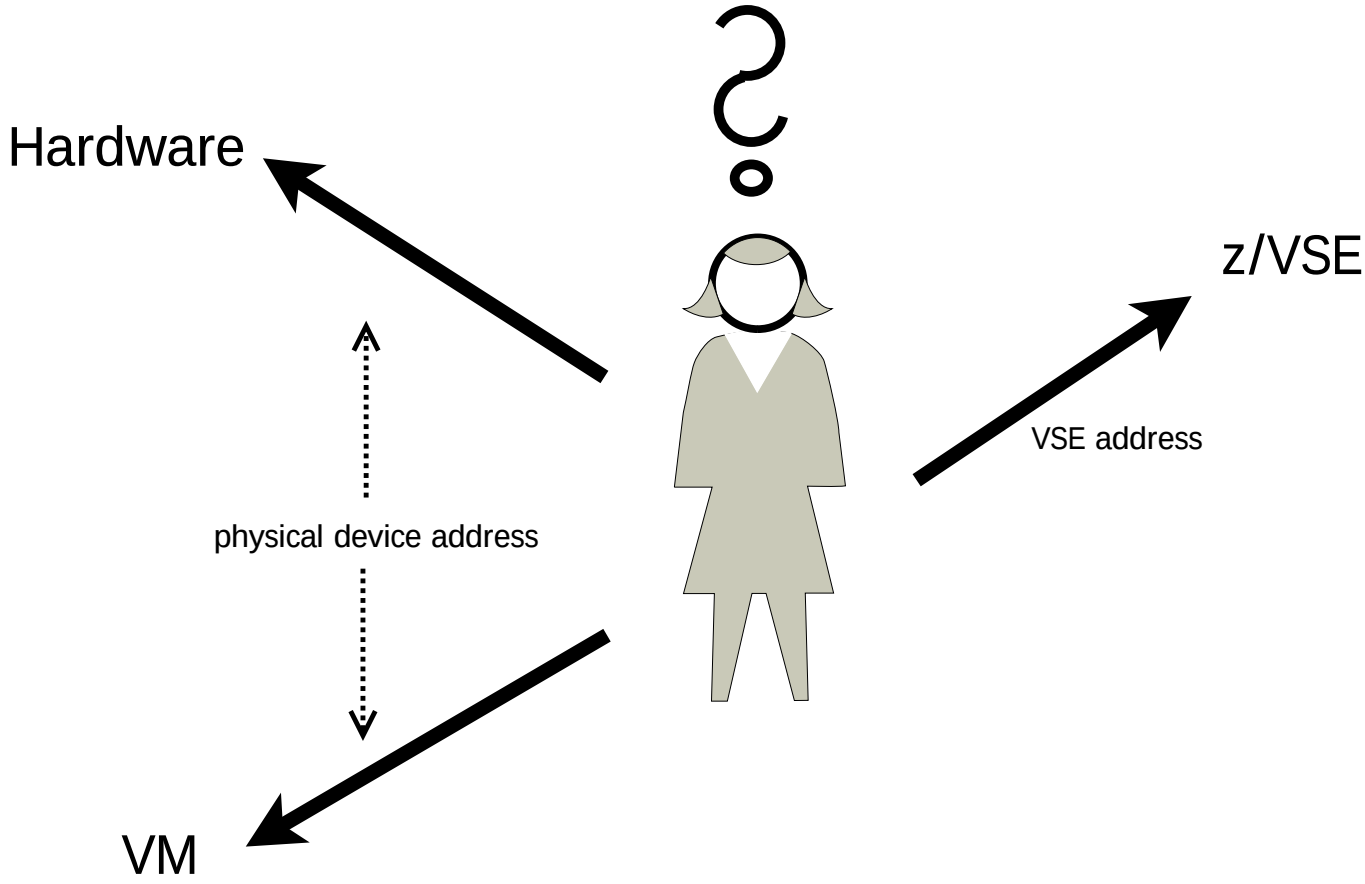
3. The physical device address and the VSE address of a device, both are unique.

4. The Support of Physical Device Addresses up to x‘FFFF‘ does not mean to support more devices in VSE !

   The max. number of I/O devices is still limited to x‘FFF‘ = 1024 devices (number of VSE addresses)

© 2011 IBM Corporation

Addressing a device



© 2011 IBM Corporation

Addressing a device

Use the physical device address, for:

- I/O: Hardware is only aware of the 4-digit-cuu (IOCP)
- VM is only aware of the 4-digit cuu (VM cmds)
- During the Installation process

Use the VSE address:

- For specifying cuus in JCL / procs / VTAM Books / TCP/IP ipinit members ....
- For all z/VSE AR commands
- In SA Environment

Limitations:

- Error messages at „early“ IPL time may show physical addresses
- Console address in the Supervisor Control Statement
- Alias Devices (PAV Support) do not have VSE addresses
- Recorder File

© 2011 IBM Corporation

Example: Addressing devices in z/VSE Jobs

IOCP:

Control Unit:

```
CNTLUNIT CUNUMBR=8000,PATH=(A1,B1,A2,B2,A3,B3,A4,B4),              X
      UNITADD=((00,256)),CUADD=0,UNIT=2105
```

4 DASDs of type 3390 with the physical device addresses 8000-8003:

```
IODEVICE ADDRESS=(8000,4),CUNUMBR=(8000),FEATURE=(SHARED),UNIT=3390B
```

---

z/VSE:

IPL Procedure:

```
ADD 8000:8003 as 800:803,eckd
```

Job:

```
// JOB CLRDK
*  DLBL DISK,'DISK.FILE.1',1,SD,DSF
// ASSGN SYS012,801
// DLBL UOUT,'DISK.XXXXX',9999
// EXTENT SYS012,,,,2590,5
// EXEC CLRDK
// END
/*
/&
```


© 2011 IBM Corporation

Example: Addressing devices in AR commands

IOCP: Define the devices CC00-CC02

IPL:

ADD CC00:CC02 as C00:C02,OSAX

,,,,,,,,,,,,,,,,

AR:

status C01

AR 0015 SCHIB DEV INT-PARM ISC FLG LP PNO LPU PI MBI PO PA CHPID0-3 CHPID4-7

AR 0015 0003 C01 00005548 3 81 80 00 80 80 0000 80 80 50000000 00000000

AR 0015 DEVICE ADDRESS CCA=50 DDC=24

© 2011 IBM Corporation

Example: Addressing devices in the SA Environment

SA Environment:

- BG 0000 SA09I SELECT ONE OF THE FOLLOWING PROGRAMS, OR TYPE END
- BG 0000 SA10D FASTCOPY, RESTORE, ICKDSF, DITTO, REIPL
- BG-0000
- 0 ickdsf
- .....
- 0 INIT UNIT(00B) NVFY NOMAP PURGE VOLID(dsk300)
- BG 0000 INIT UNIT(00B) NVFY NOMAP PURGE VOLID(DSK300)
- BG 0000

AR command:

- QUERY IO,CUU=8000
- AR 0015 PHYSICAL ADDRESS ADDRESS USED BY Z/VSE DEVICE CLASS
- AR 0015 8000 00B DASD

© 2011 IBM Corporation

Limitations: Supervisor Control Statement

A009,$$A$SUPI,VSIZE=264M,VIO=512K,VPOOL=64K,LOG,IODEV=1024

ADD A009 as 009,3277

ADD 00C,2540R

ADD 00D,2540P

ADD 00E,1403

ADD 140:141,ECKD,DVCDN

ADD 150:151,ECKD,DVCDN

ADD 160:161,ECKD,DVCDN

ADD 170:171,ECKD,DVCDN

ADD 180:181,ECKD

ADD 190:193,ECKD

Note: Specifying the Console Device in the Supervisor Control Statement requires the physical device address

© 2011 IBM Corporation

Limitations: PAV Alias Devices

q v pav

PAV BASE 2000 ON 0D00 DOSRES
PAV ALIAS 4001 ON 0D18 DOSRES FOR BASE 2000
PAV ALIAS 4002 ON 0D19 DOSRES FOR BASE 2000
PAV ALIAS 4003 ON 0D1A DOSRES FOR BASE 2000

query io,cuu=2000

AR 0015 VSE ADDR PHYSICAL ADDR DEVICE CLASS
AR 0015 FFB 2000 DASD

volume ffb,detail

AR 0015 CUU CODE DEV.-TYP VOLID USAGE SHARED STATUS CAPACITY
AR 0015 FFB 6E*B 2107-900 DOSRES USED 3339 CYL
AR 0015 BASE TO 4001,4002,4003
AR 0015 1I40I READY

volume 4001

AR 0015 1I02I INVALID COMMAND

query io,cuu=4002

AR 0015 1YS3I NO DEVICES DEFINED FOR: 4002

© 2011 IBM Corporation

Limitations: Recorder File

ADD 202E as 02E,xxxx (Printer)

Channel Check results in the console message:

BG 0017 0T12I IRRECOVERABLE CHANNEL ERROR ON 02E

And the entry in the EREP Report shows:

CPU MODEL: 2084 REPORT: CCH EDIT DAY YEAR JOB IDENTITY: PAUSEBG
DATE: 163 09 D7C1E4E2C5C2C740
CPU ID: 036F6A VSE/ESA HH MM SS.TH TIME: 08 48 32.74

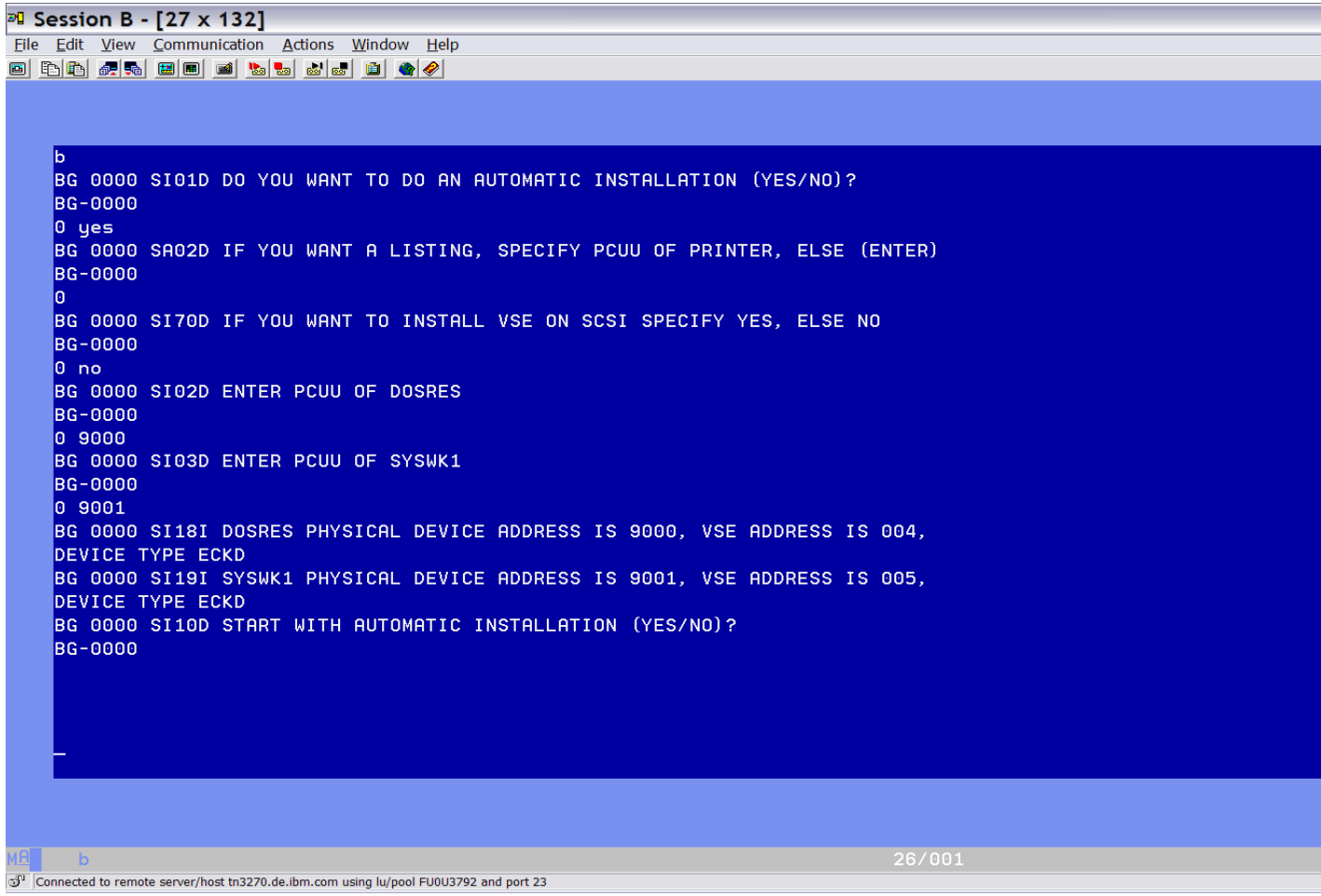
CHANNEL UNIT ADDR: 202E

CHANNEL TYPE: CHANNEL UNKNOWN

	CC DA	FL	CT
FAILING CCW	01 005920	24 00	0078
	K CA	US CS	CT
CSW	00 005898	00 02	0000

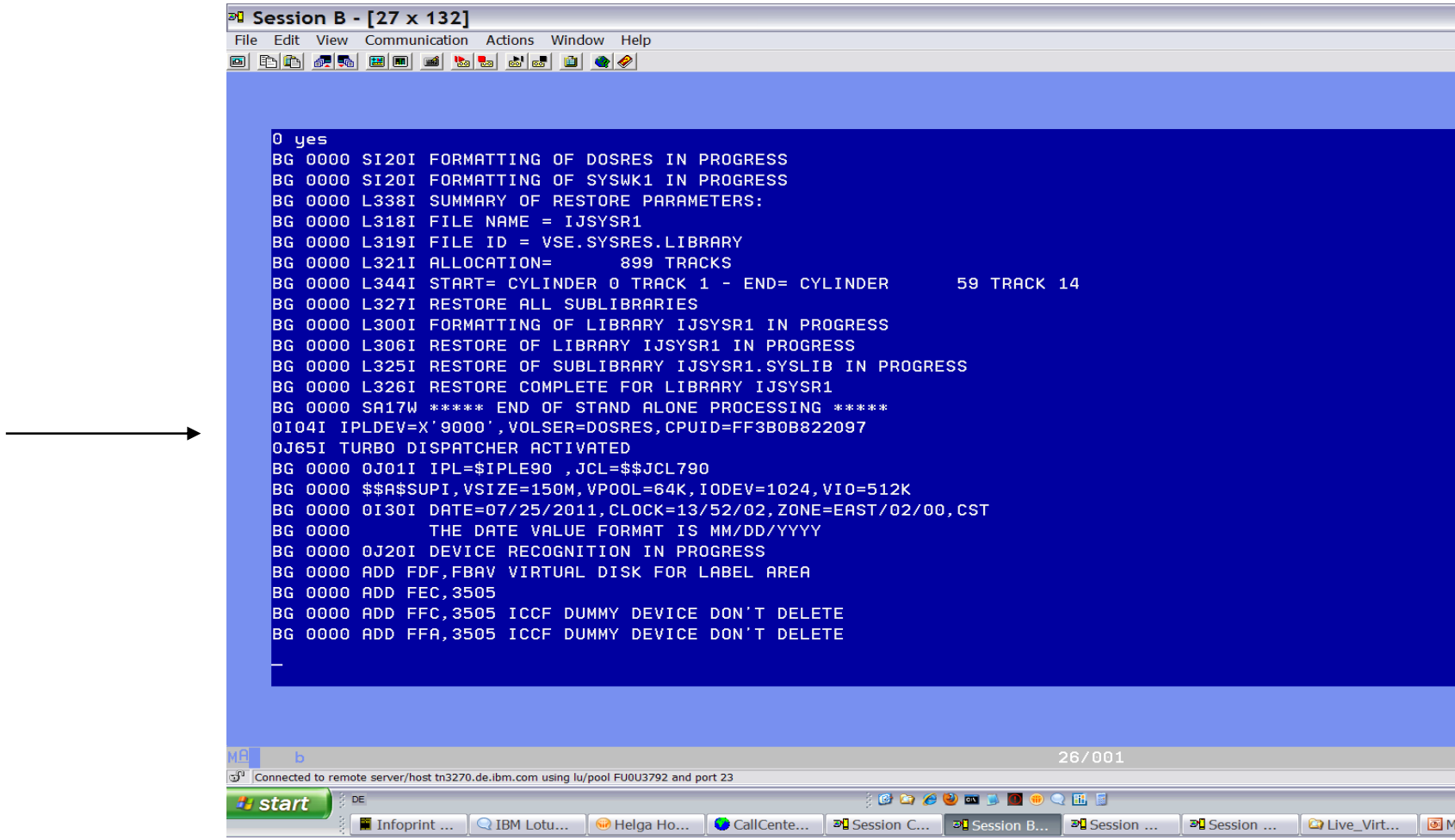
© 2011 IBM Corporation

Installation with 4-digit-cuu device addresses



© 2011 IBM Corporation

Installation with 4-digit-cuu device addresses



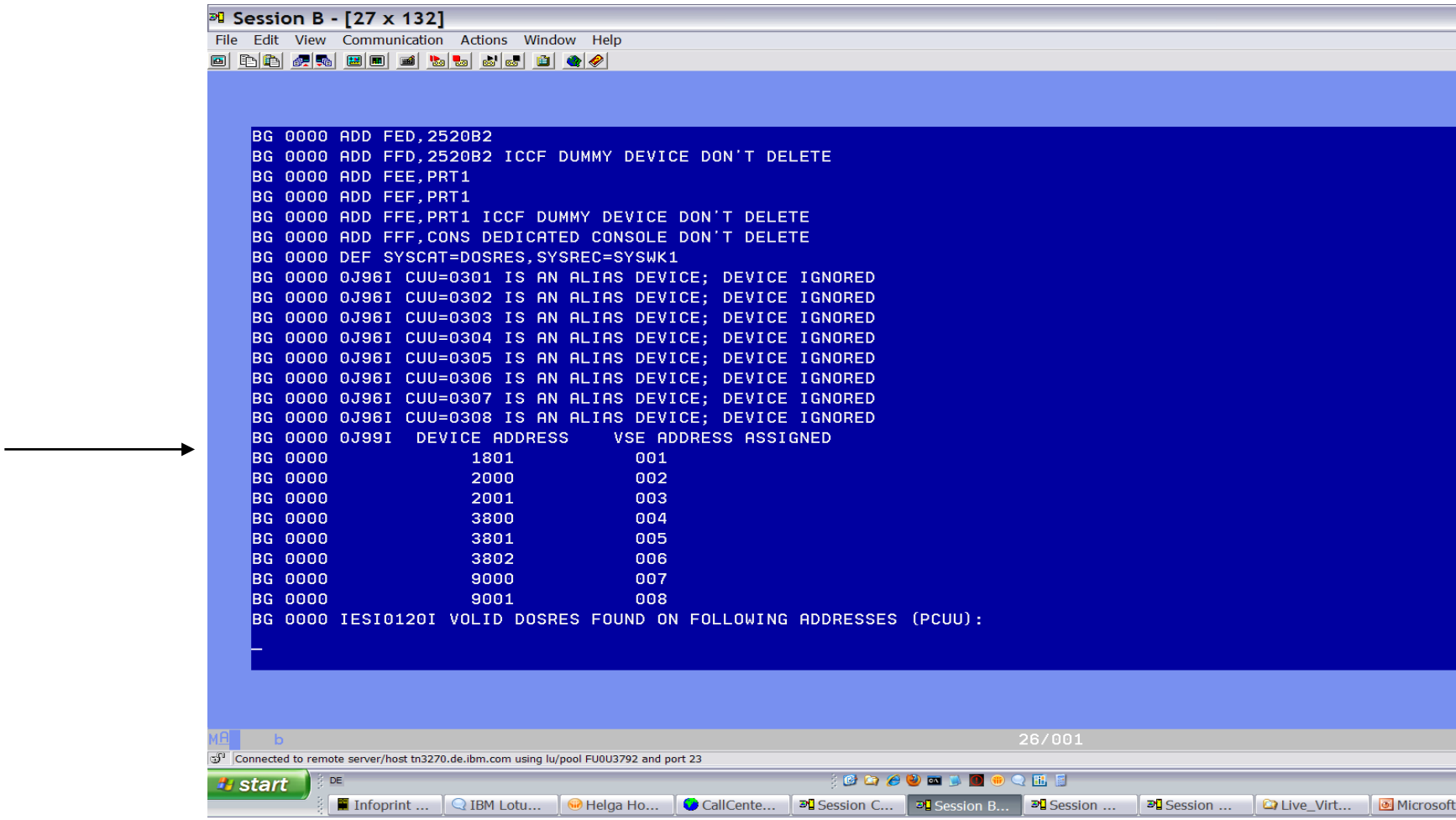
© 2011 IBM Corporation

Installation with 4-digit-cuu device addresses: DEV / DEL command

```
0 dev
BG 0000 DEVICES ADDED AND/OR SENSED:
BG 0000  CUU RANGE   DEVICE TYPE
BG 0000   0009          3277
BG 0000   000C          2540R
BG 0000   000D          2540P
BG 0000   000E          1403
BG 0000   0150:0151     ECKD
BG 0000   0180:0181     ECKD
BG 0000   0190:0194     ECKD
BG 0000   019B          ECKD
BG 0000   019D:019E     ECKD
BG 0000   0200:0201     ECKD
BG 0000   0280:0281     3480
BG 0000   2000          ECKD
BG-0000
0 DEL 2000
```


© 2011 IBM Corporation

Installation with 4-digit-cuu device addresses



© 2011 IBM Corporation

IUI: Hardware Configuration

The last step of the installation is to invoke the IUI “Configure Hardware” dialog

- It shows all devices for which the device information is not complete (indicated by “?”)
- It shows for all devices the physical device address and the VSE address assigned

You can now check and alter the assigned VSE address

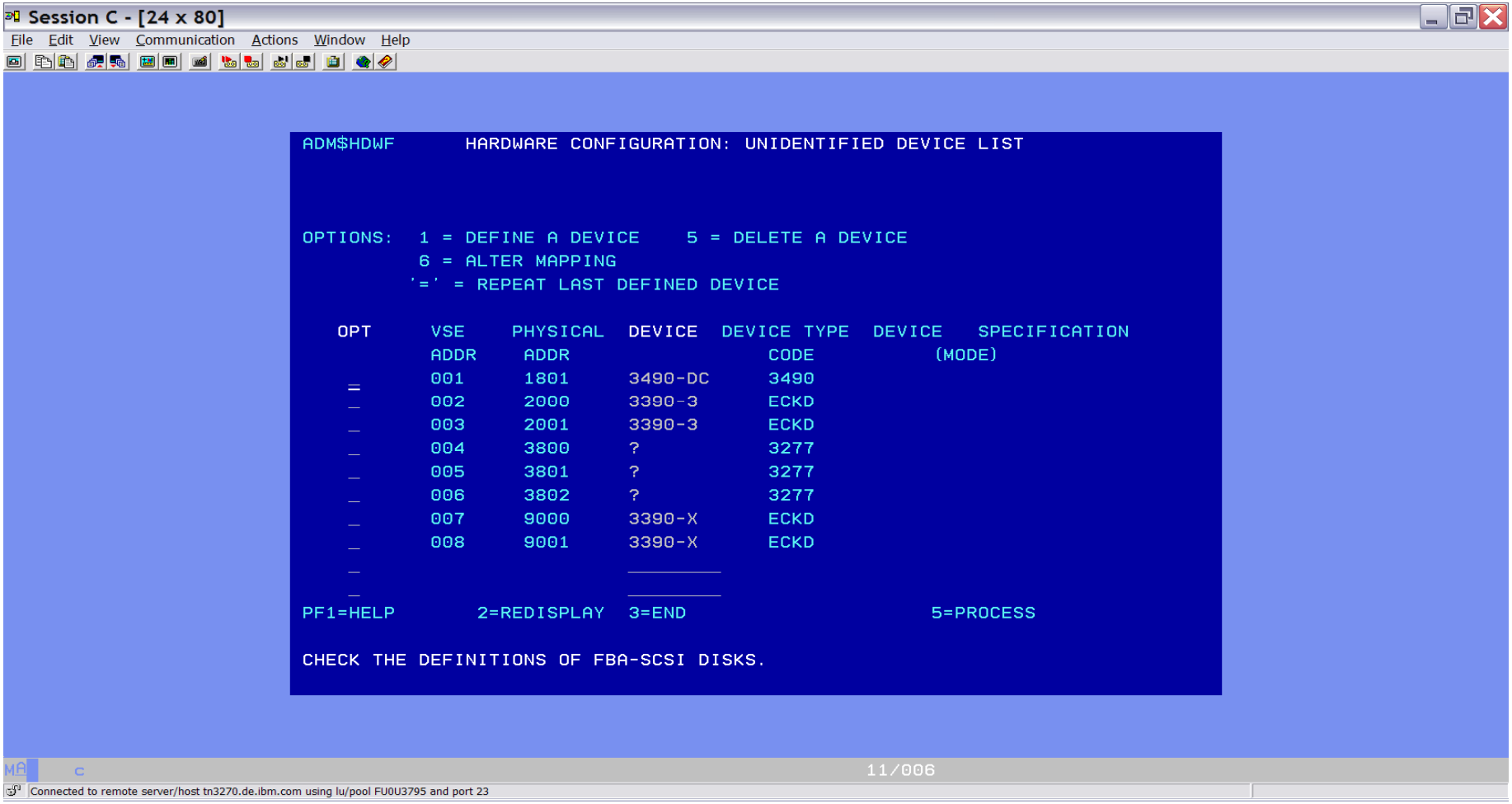
Note:

When the installation process has completed you cannot change the VSE address of a device any more.

If you would like to have another VSE address for a device then you have to delete the device and add it again with another VSE address.

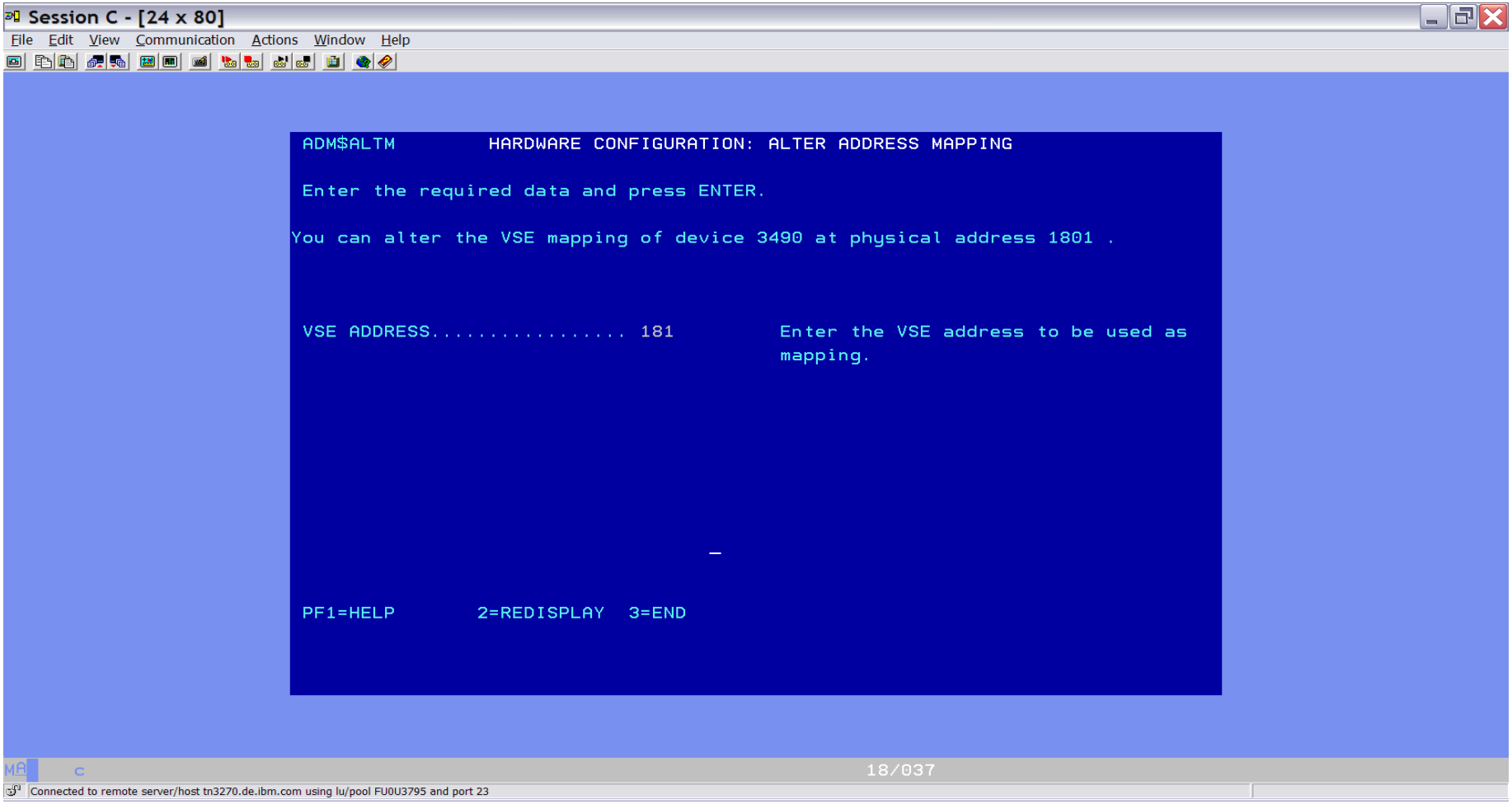
© 2011 IBM Corporation

IUI: Hardware Configuration (first time ...)



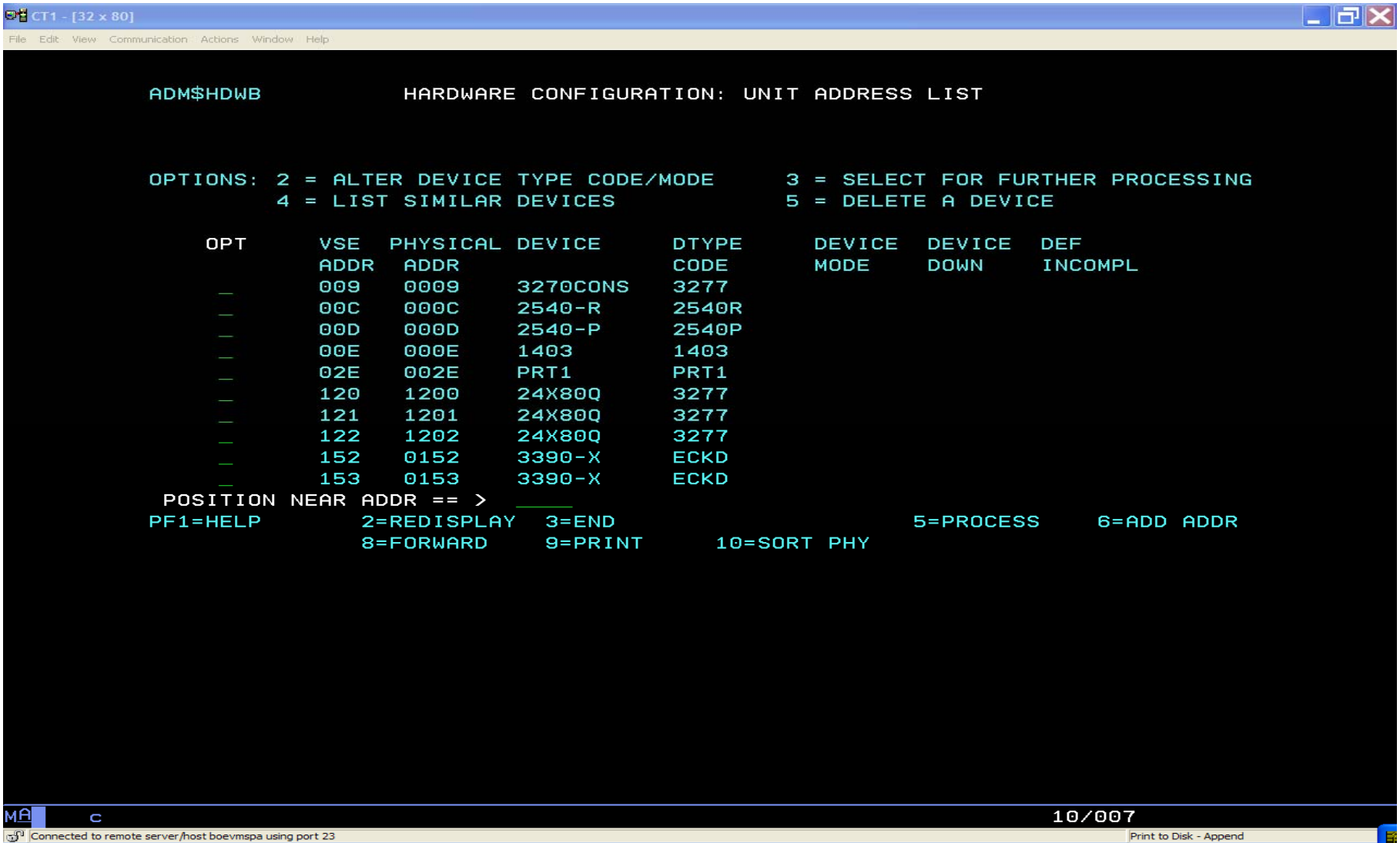
© 2011 IBM Corporation

IUI: Hardware Configuration

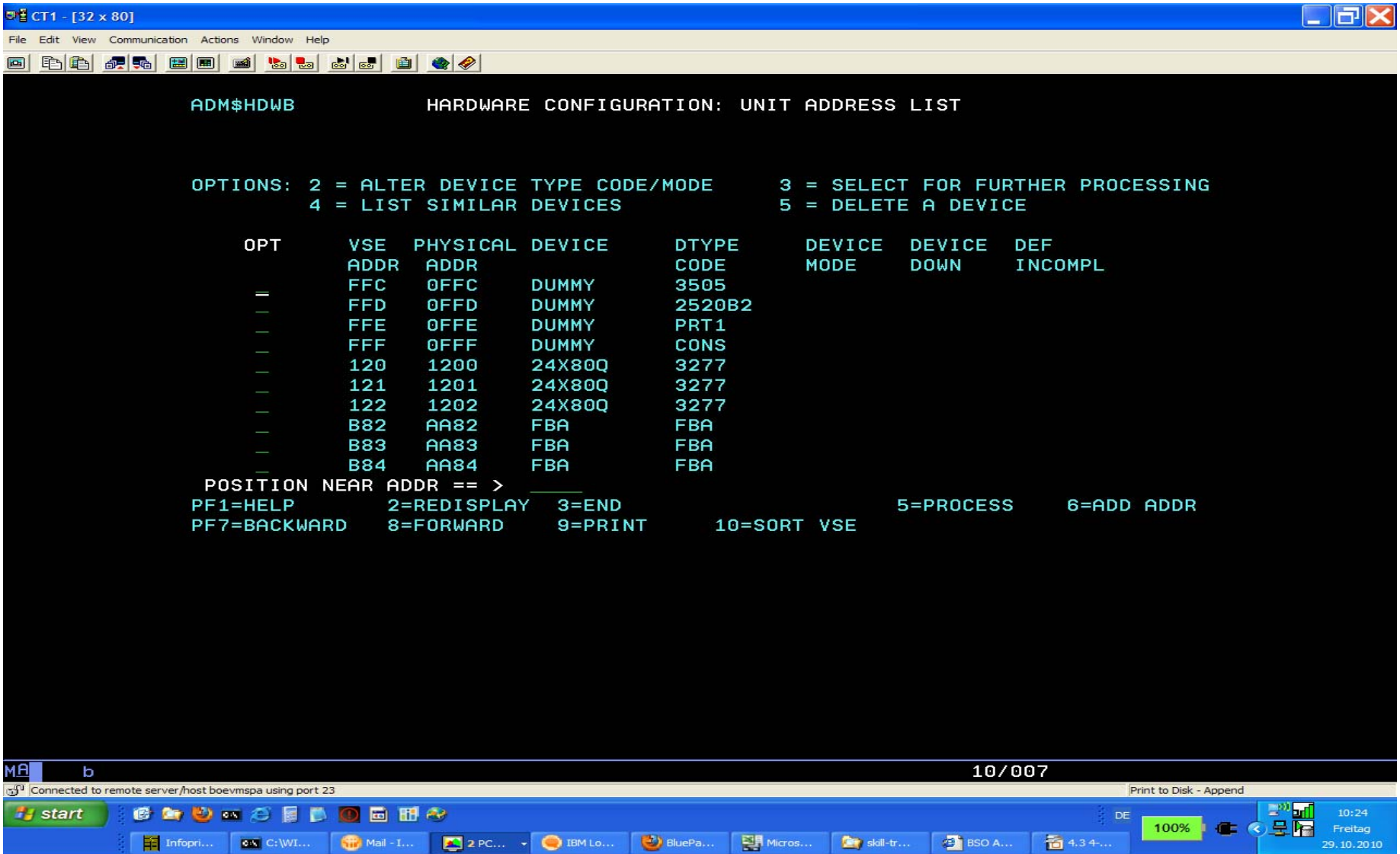


© 2011 IBM Corporation

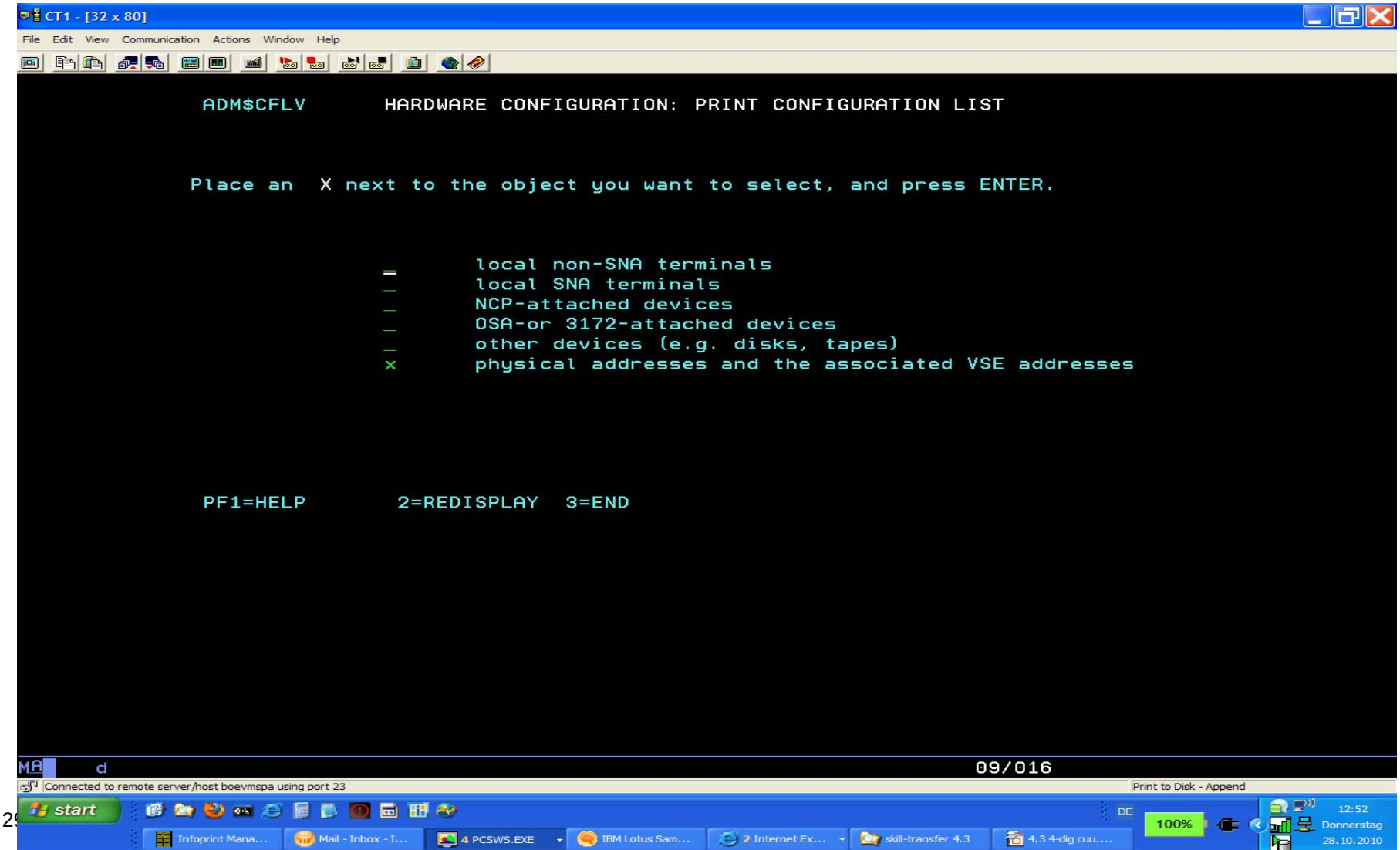
IUI Hardware Configuration: Sorted by VSE device addresses



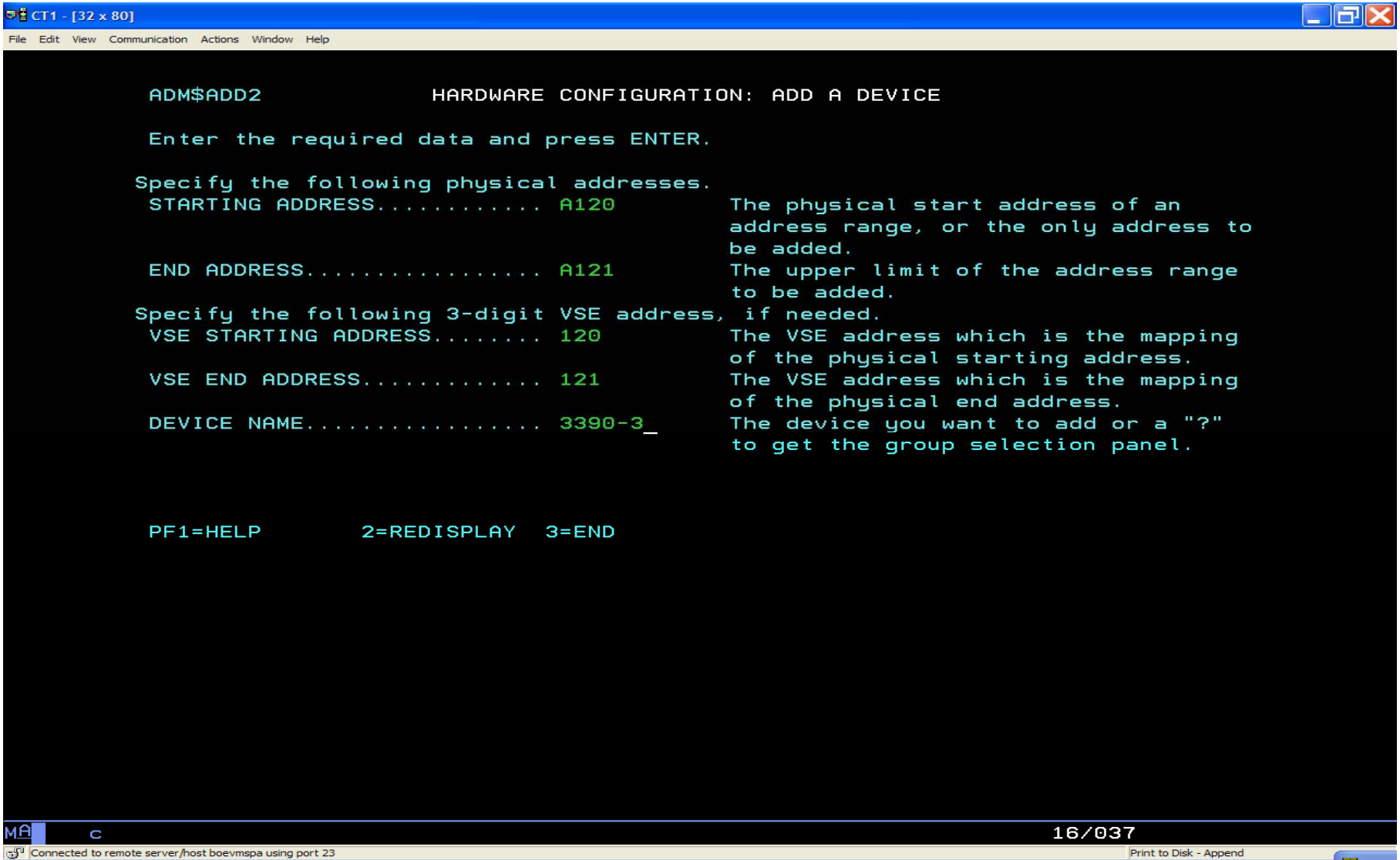
IUI Hardware Configuration: Sorted by physical device addresses



IUI Hardware Configuration: Print Configuration List



IUI Add a device (fastpath 241 and PF6=ADD)



FSU

- FSU does not change the I/O Configuration
- After FSU only device addresses up to x'FFF' are known to VSE
- But after FSU the new support for 4-digit-cuus is active
- Therefore devices with physical device addresses > x'FFF' can then be added

© 2011 IBM Corporation

Internals / Supervisor Services

New GETFLD Service:

GETFLD FIELD=CUUMAP,CUU={name|(Rx)|(0)}

Input:

name= name of a halfword containing the CUU value or

Rx = Register containing the CUU value

0 = default register used to for CUU value

Note: the CUU value can either be a 3-digit OR 4-digit cuu value !

Output:

R0 = Physical address

R1 = VSE address

R2 changed

R15=return code

© 2011 IBM Corporation

Internals

PUBX:

```
V000985E0 to 0009860F suppressed line(s) same as above ....
V00098610  00000000 80BA8000 0FFE0005 00980000    *............q..*
V00098620  43FFFFFF FFFFFFFF 00FBCA80 00000000    *................*
V00098630  00000000 80000000 00808080 00000000    *................*
V00098640  00008000 FA010080 8A030000 00000000    *................*
V00098650  00000000 6EFF3990 E933900A 20002024    *....>...Z.......*
V00098660  24150000 00000090 00000094 000986AC    *...........m..f.*
V00098670  00000000 00404007 0002F058 0C000000    *.....  ...0.....*
V00098680  00808001 00098C98 00000000 000967FA    *.......q........*
V00098690  00000000 00000000 00000000 00000000    *................*
V000986A0  00000000 00000000 20000000 00000000    *................*
V000986B0  00000020 00000000 00000000 00000000    *................*
V000986C0  00000000 00000000 00000000 00000000    *................*
```

VSE Address

Physical device address

© 2011 IBM Corporation

Internals

PUB:

```
V00005460  0901FFFF 6EFF02FC 0C01FFFF E00202F8    *....>.........8*
V00005470  0D01FFFF E00202F8 0FF0FFFF 90FF0200    *.......8.0.....*
V00005480  0FF1FFFF 90FF0200 0FFFFFFF 400000F8    *.1.......... ..8*
V00005490  0FFEFFFF 6EFF02FC 0FFDFFFF 6EFF02FC    *....>.......>...*
V000054A0  FF000000 00000000 FF000000 00000000    *................*
```

VSE address

© 2011 IBM Corporation

Restrictions

- Don‘t use device addresses > x‘FFF‘ for virtual and dummy devices

  (POWER dummy devices, virtual Tape, virtual Disk)

- SCSI disks are restricted to device addresses <= x‘FFF‘

© 2011 IBM Corporation

Questions ??

- Please forward any questions you have to:

  Helga.Hoff@de.ibm.com

© 2011 IBM Corporation