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What's New in z/OS 2.1 HCD

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SHARE in Boston

Agenda

- New processor support
  - zEC12 & zBC12
  - PCIe functions
  - Coexistence of different releases
- Autoconfiguration improvements
  - Improvements for discovery
  - Verifying a configuration (I/O path report) via zDAC
- Productivity and Usability improvements
- Additional presentations:
  - Session 14245 – zDAC 2.1 Update – Tuesday 4:30-5:30
  - Session 14246 - HMC wide activate – Wednesday 3:00-4:00

Overview of zEC12, zBC12

Processor Type	2827	2828
Models	H20 H43 H66 H89 HA1	H06 H13
Number of LCSSs	4	2
Number of LPs	60	30
Subchannel sets	0, 1, 2	0, 1
Number of FC / FCP CHPIDs	352 / 256	160 / 160
Number of OSA / IQD CHPIDs	48 / 32	48 / 32
Number of CFP / CIB / ICP CHPIDs	48 / 128 / 32	48 / 128 / 32

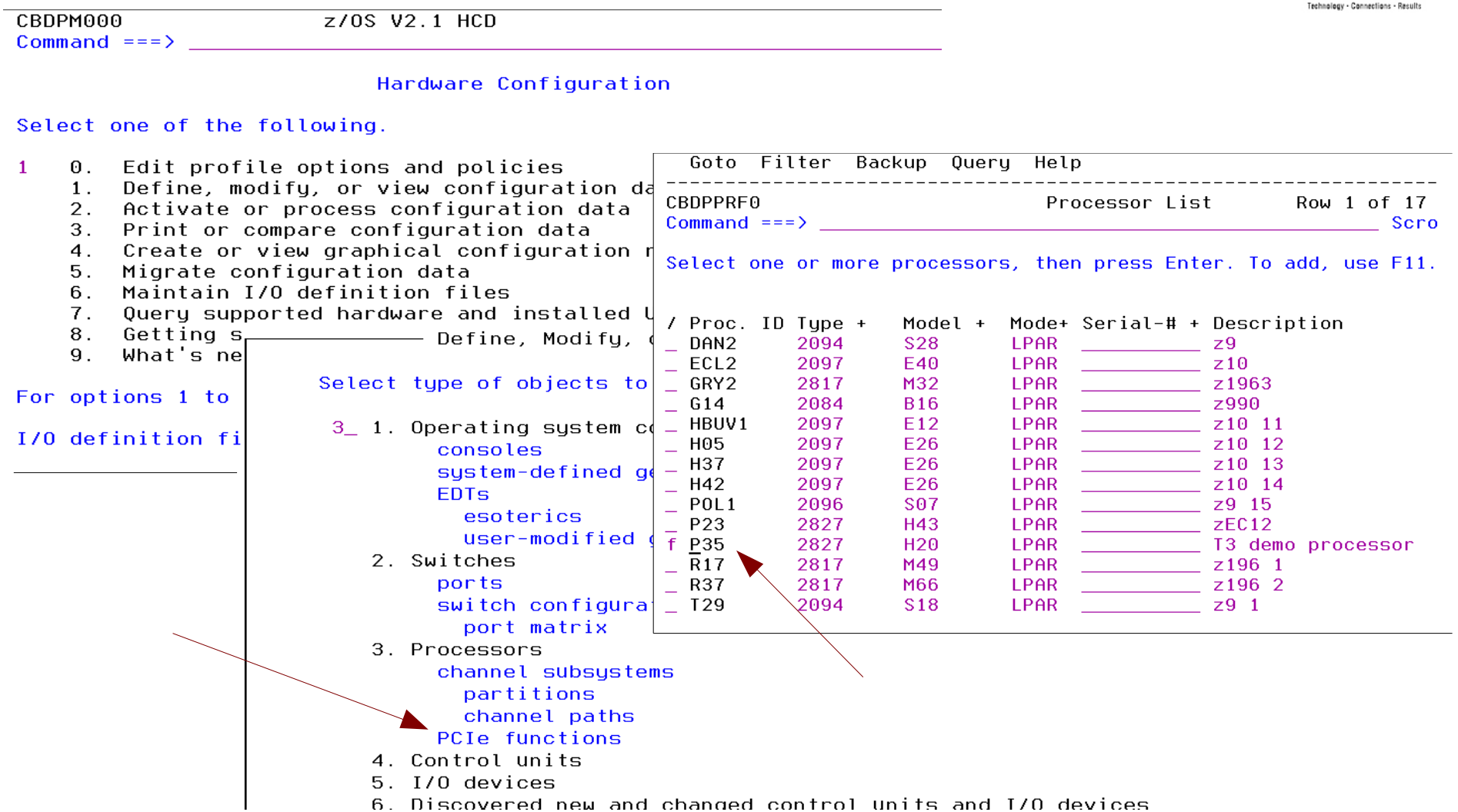
- Support of up to 24K subchannels on a FICON CHPID
- Support of PCIe functions for ROCE and zEDC-Express
- Support for PNETID for OSD and IQD CHPIDs and PCIE function

Note: New support level for 2827 (GA2). Enable via a change processor action.

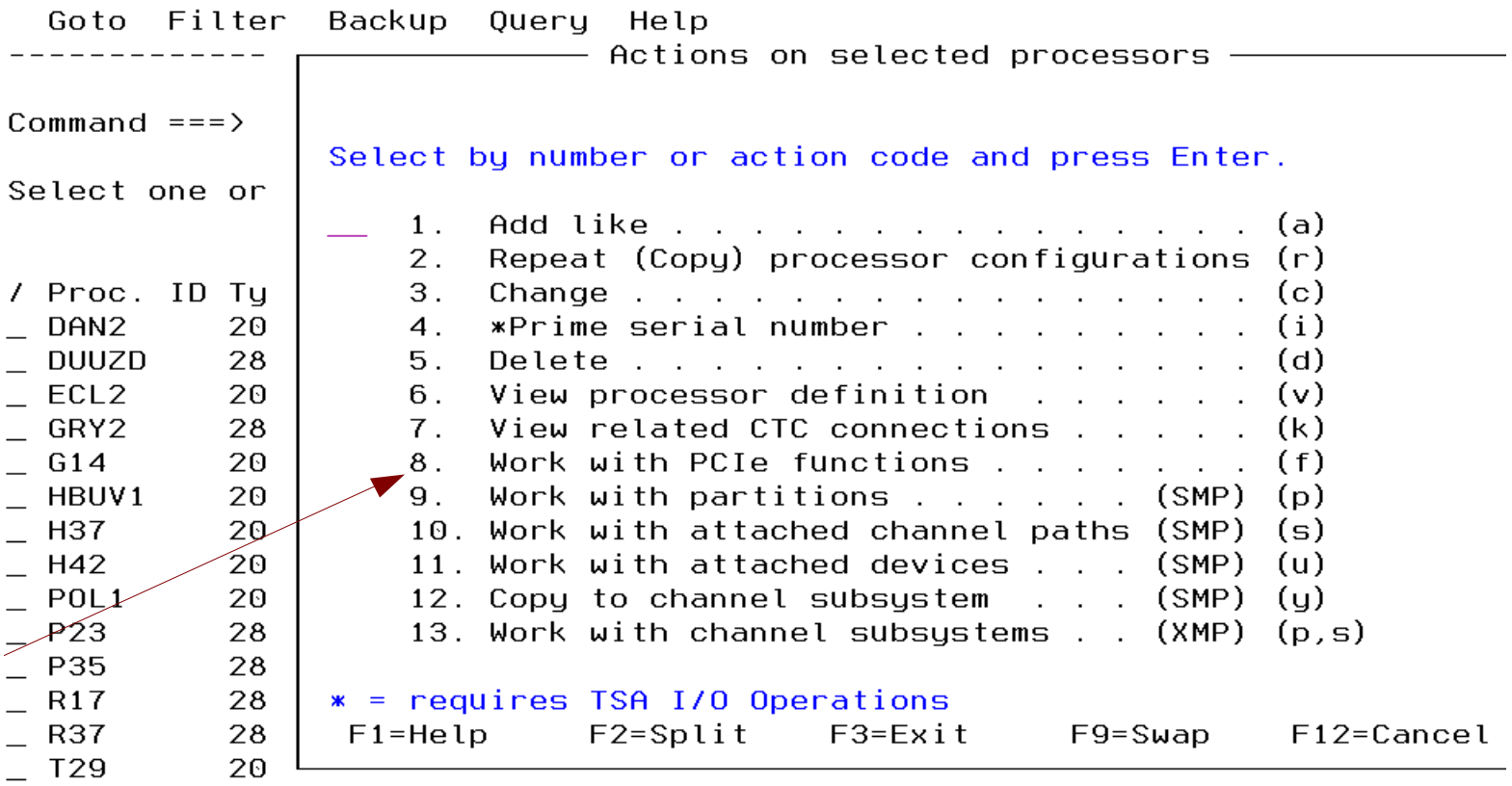
Overview - PCIE

- Two types of PCIE based functions are available:
  - ROCE – high throughput, low latency networking
  - zEDC-Express – data compression accelerator
- Identified by a:
  - PCIE function id or PFID
  - Physical channel id (PCHID)
  - Virtual function id – for sharable physical adapters
- Each PCIE function (PFID):
  - May be defined to up to 15 LPARs
  - Only online to 1 LPAR at a time
  - Multiple PFIDs may or may not be defined to the same PCHID

Usage & Invocation - HCD

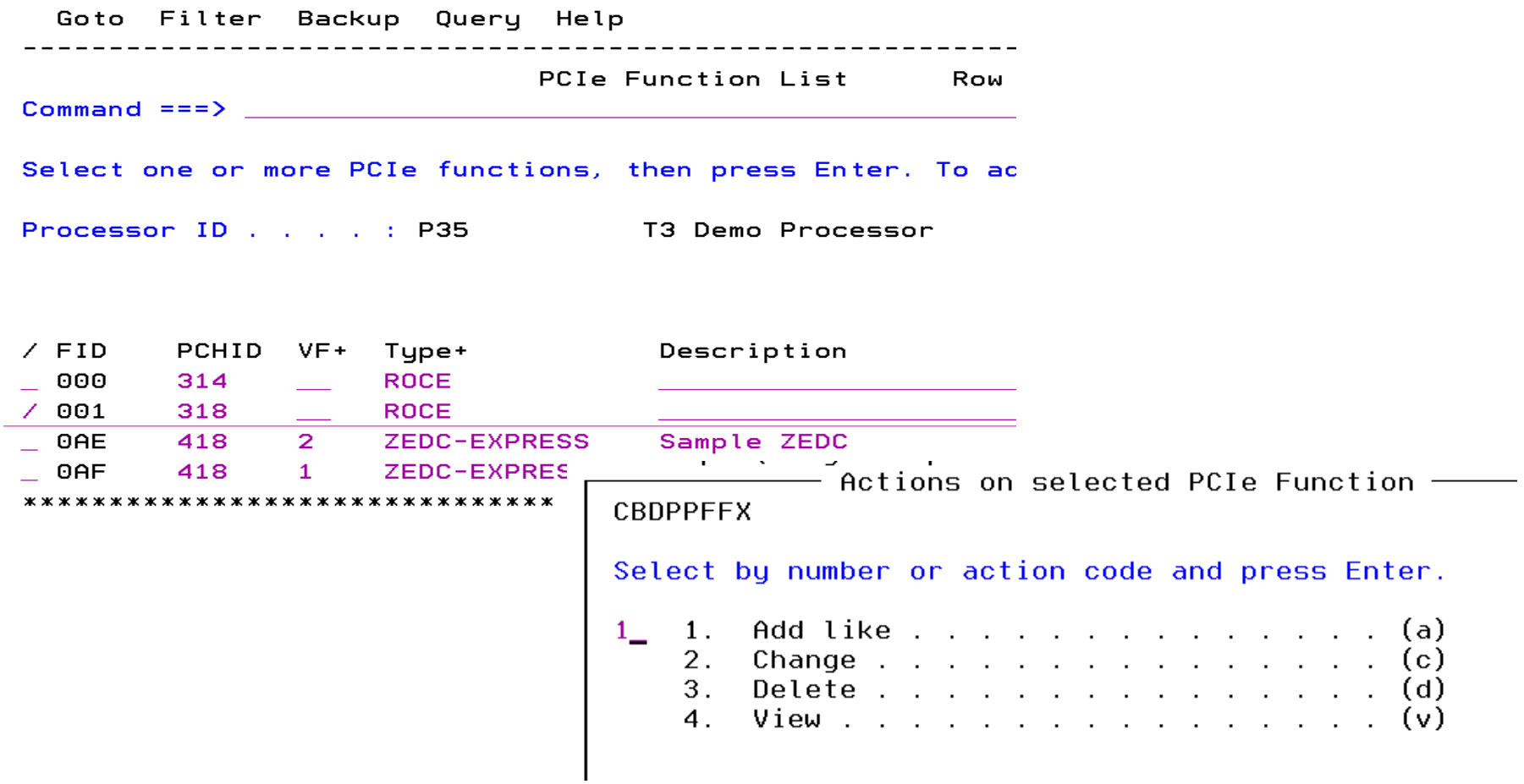


Usage & Invocation - HCD

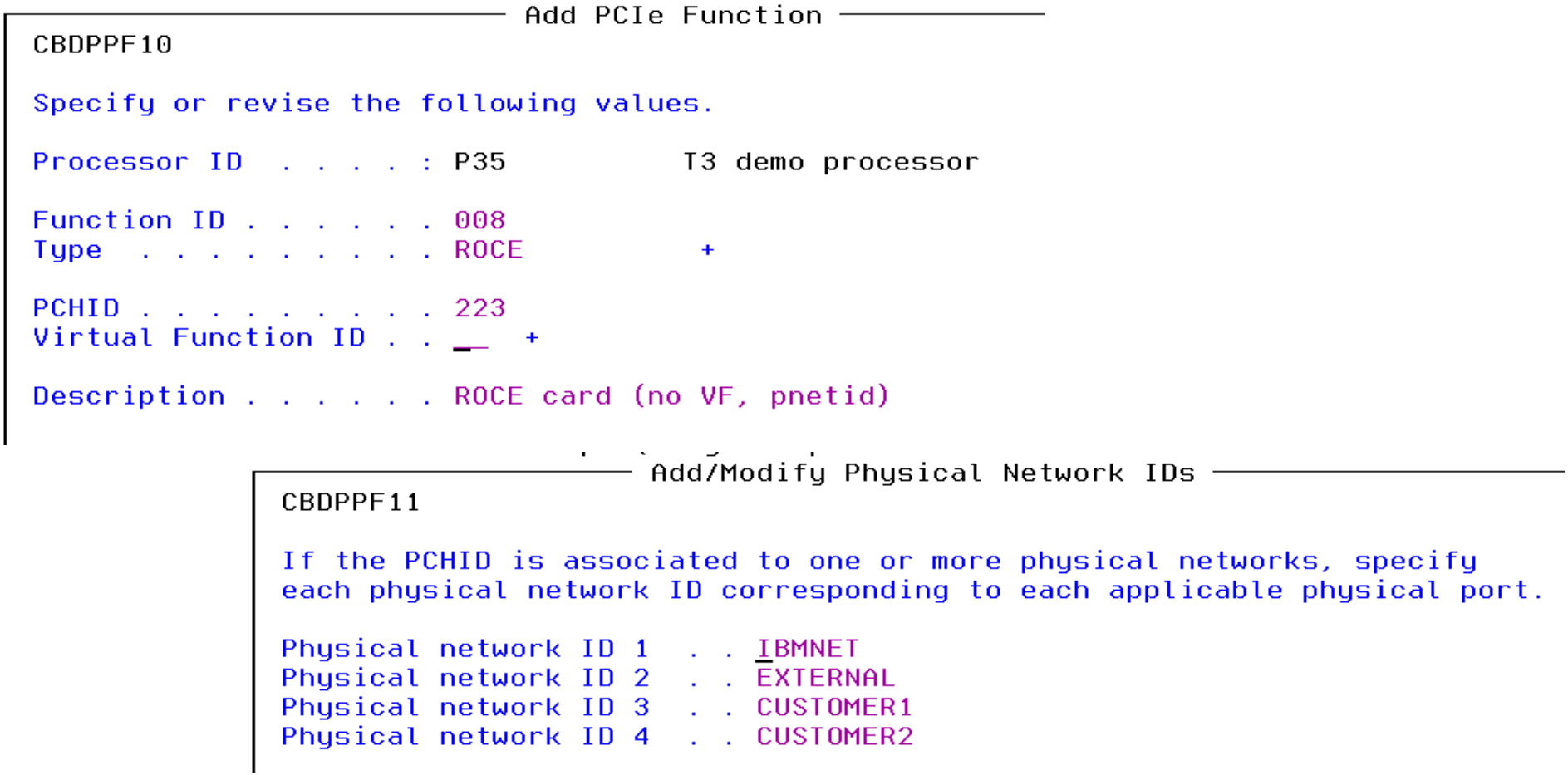


goto pcie [procname] from any command line that accepts the goto command

Usage & Invocation - HCD

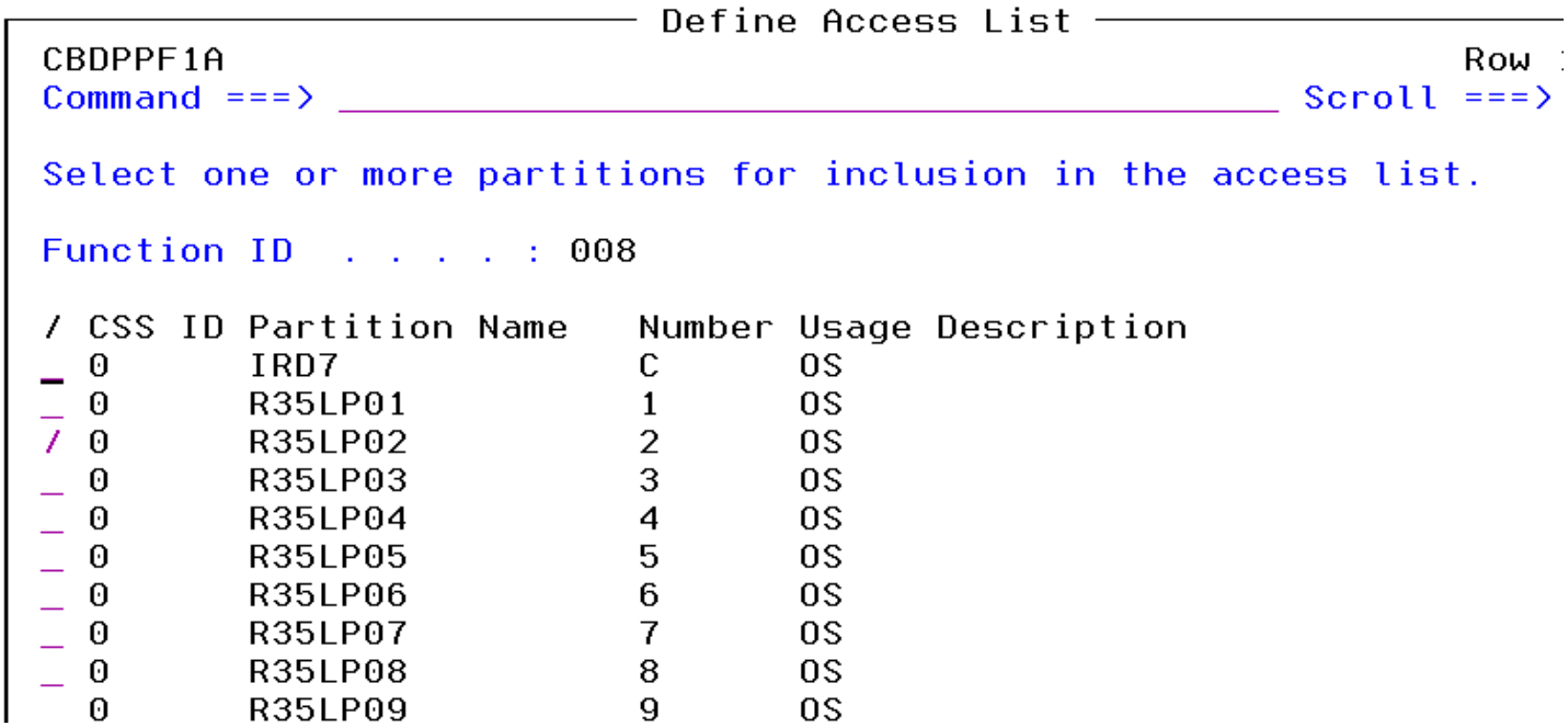


Add PCIE Function - HCD

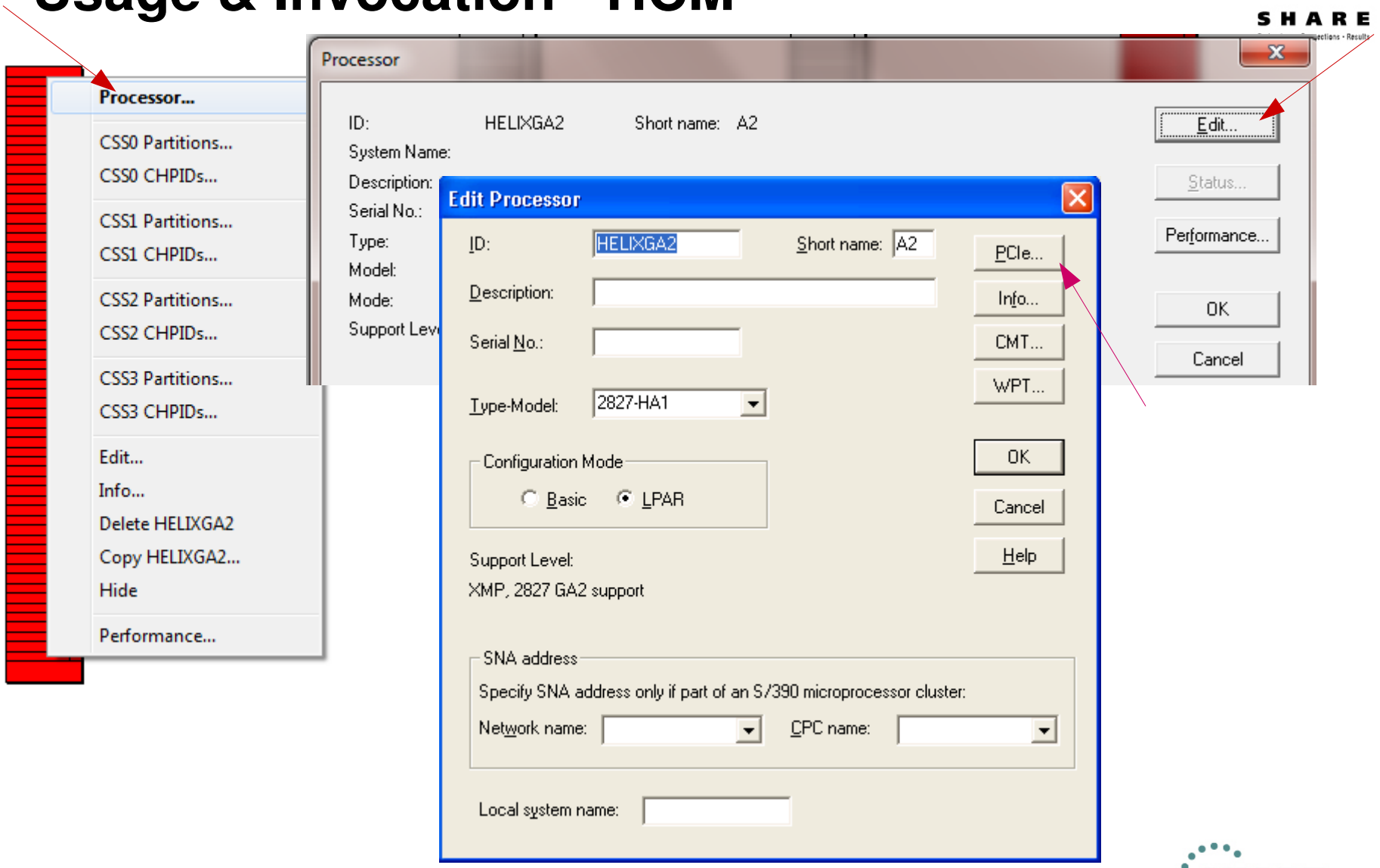


Next ==> access/candidate lists

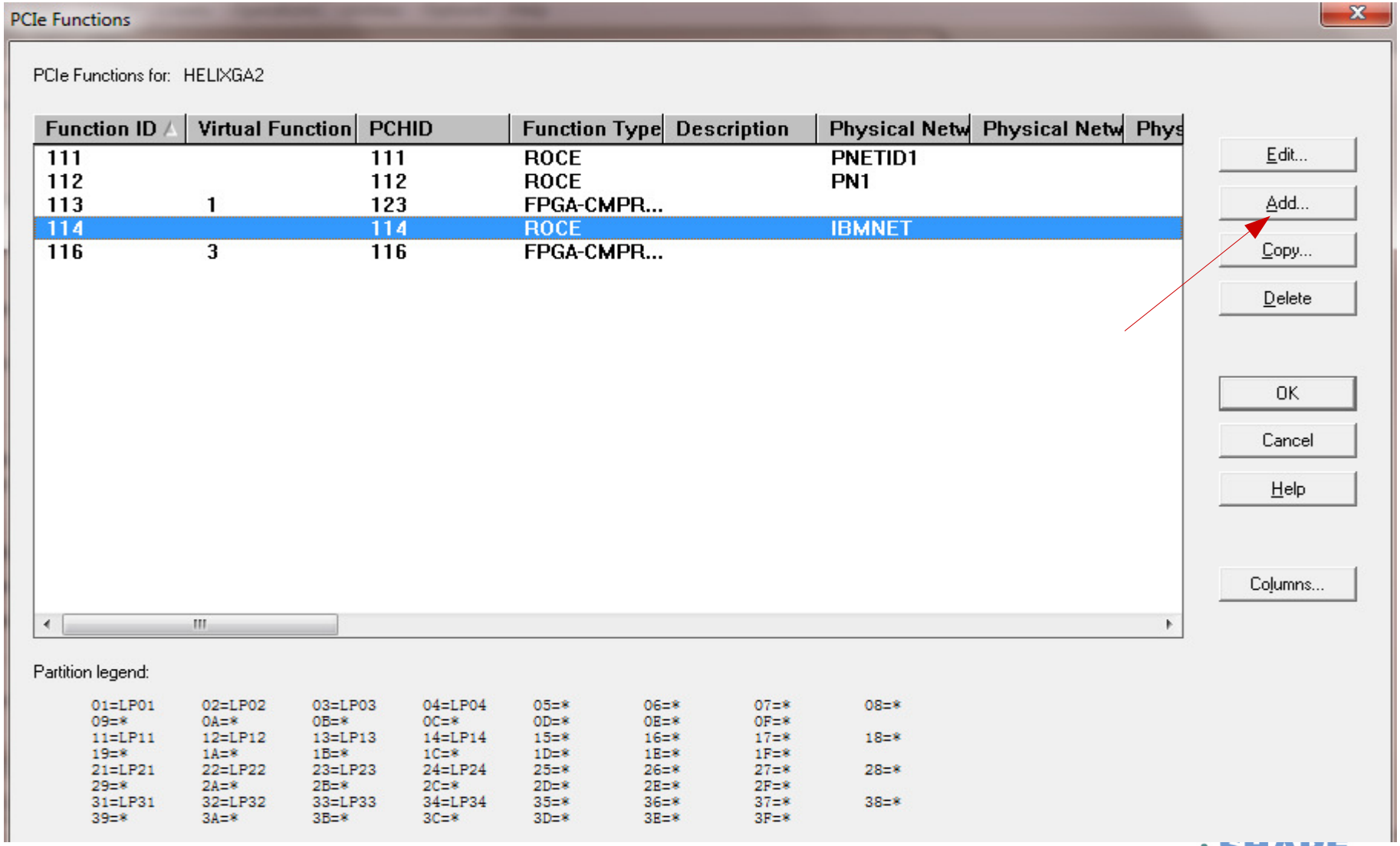
Add PCIE Function - HCD



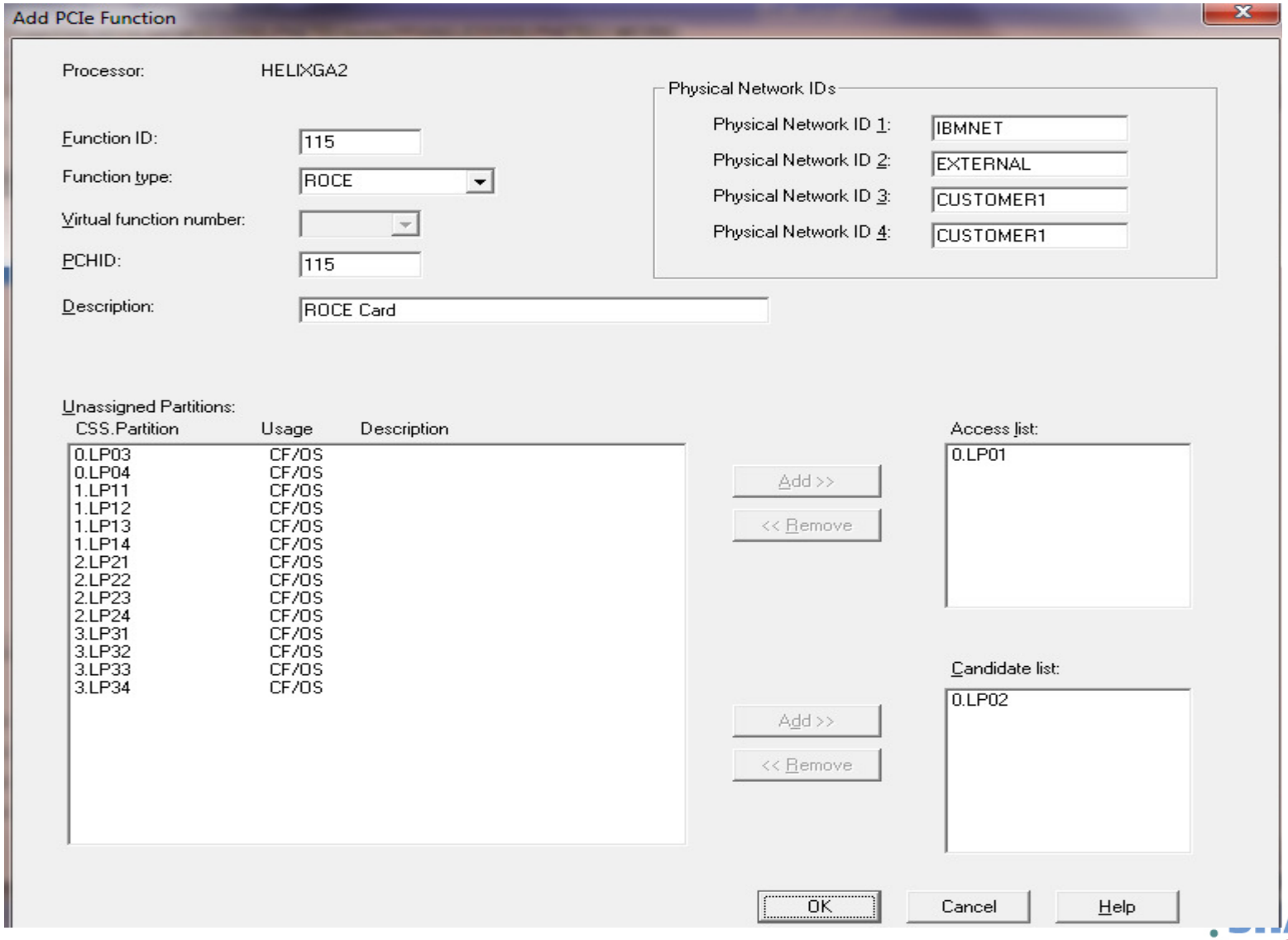
Usage & Invocation - HCM



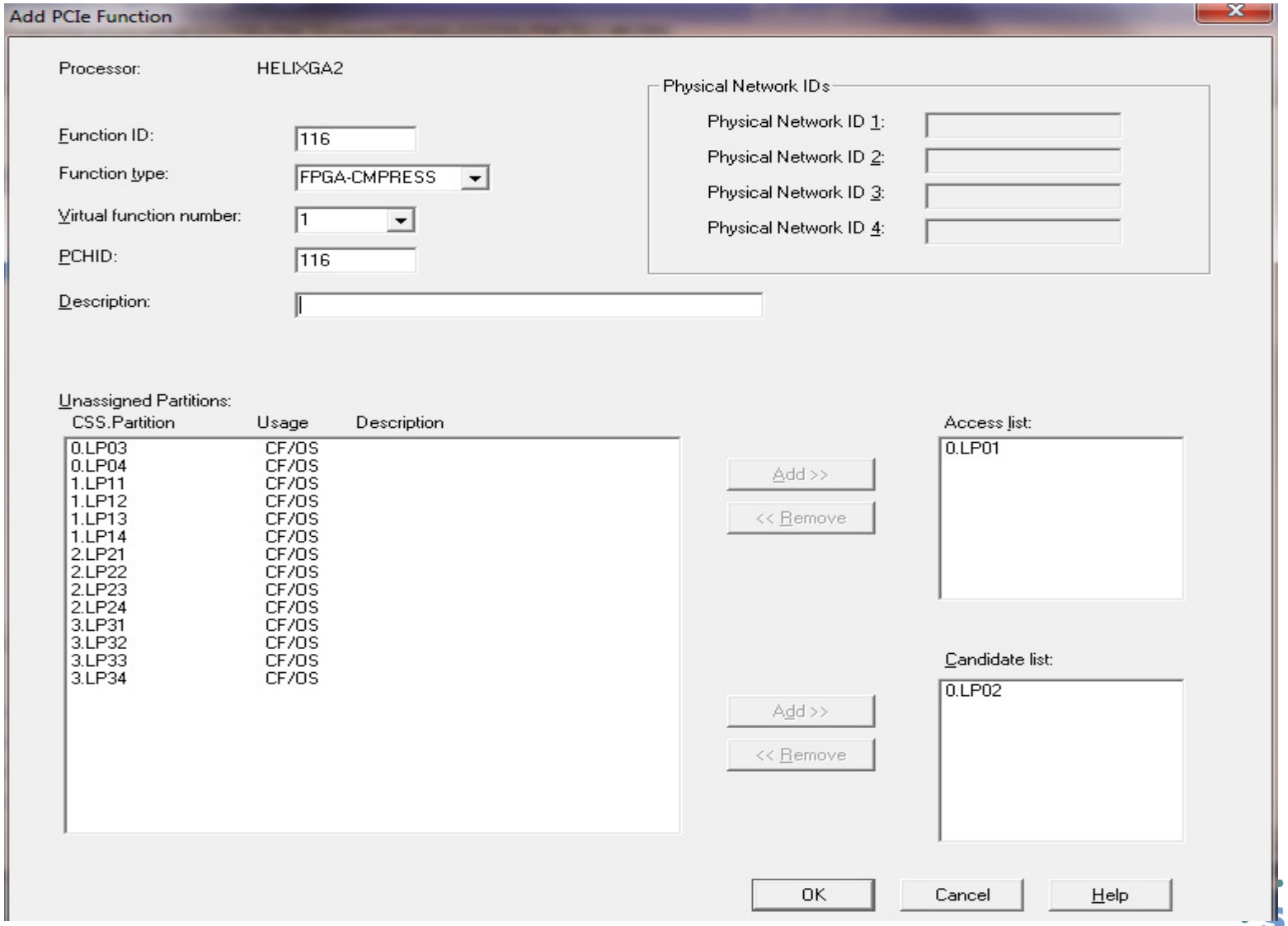
Usage & Invocation - HCM



Add ROCE - HCM



Add zEDC Express - HCM



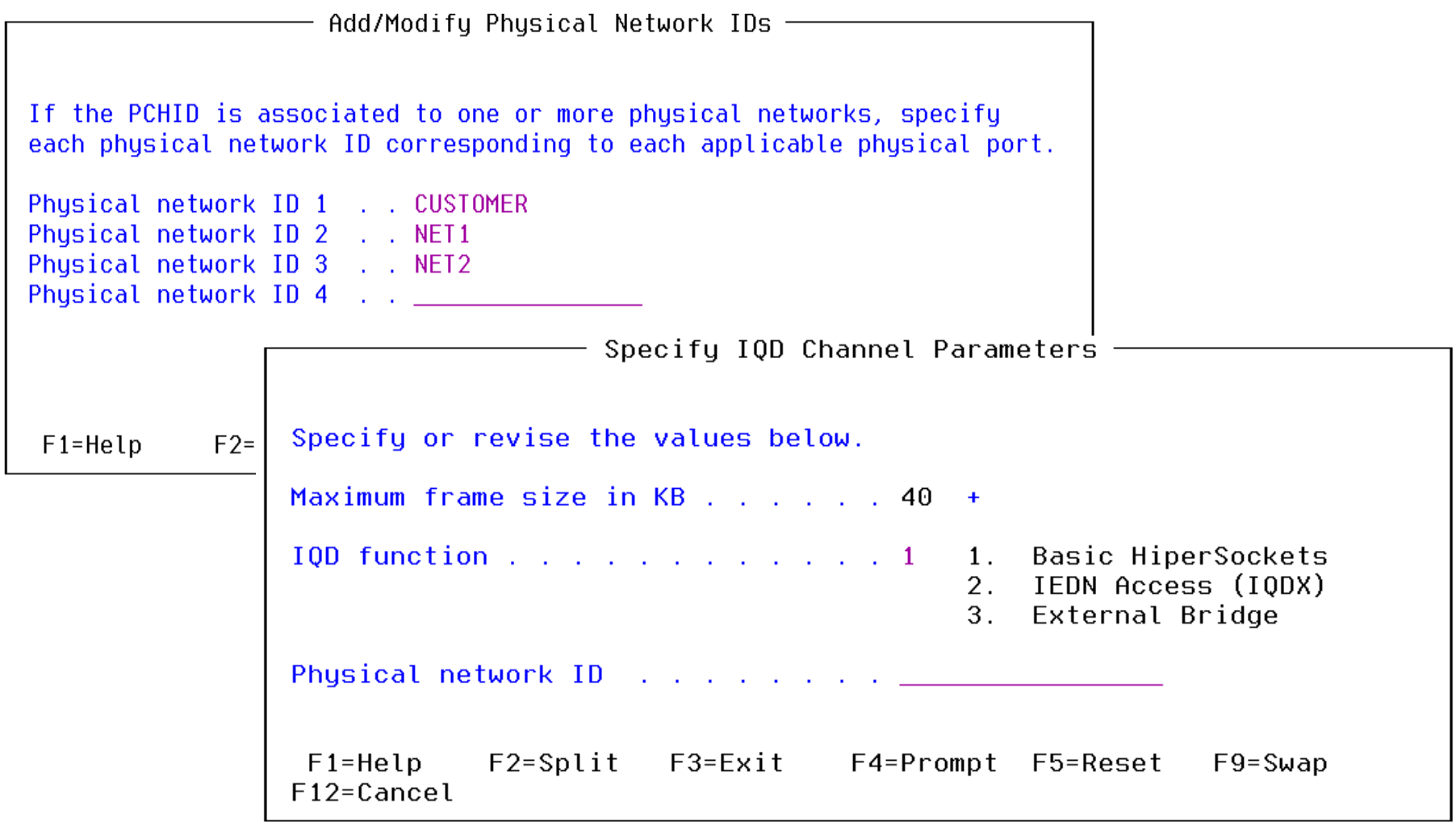
Other HCD Actions Regarding PCIE Functions

- PCIE functions are processor based, not LCSS based
- Actions that do copy the PCIE functions or connections:
  - Copy processsor
  - Repeat partition within the same processor
- Actions that do not copy the PCIE functions or connections:
  - Copy LCSS
  - Copy partition to a different processor
  - Transfer partition

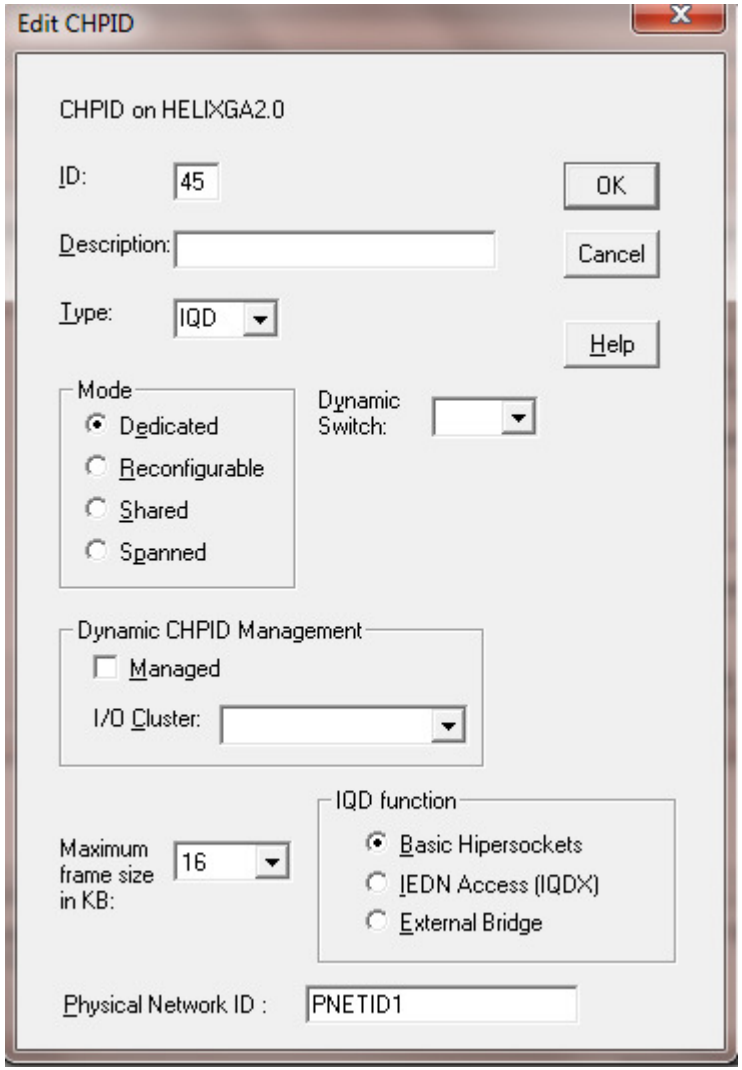
Validation Rules – PCIE Functions

- Each function uniquely identified by function id (PFID)
  - 3 hex digits (000-0FF), allowed range is processor dependent
- A function must specify a PFID, a type, a PCHID, and partition assignments
  - Virtual function id may also need to be specified
- PCHID follows same rules as CHPID PCHID
  - May be overgenned (*)
- PCHID may not be duplicated for non-shared adapters
- Virtual function id required for shared adapters
- At most one LPAR allowed in access list. If access list empty, at least one LPAR must be in candidate list.
- Default candidate list for migration is all defined partitions
- Hardware activate requires processor and OS to support PCIE

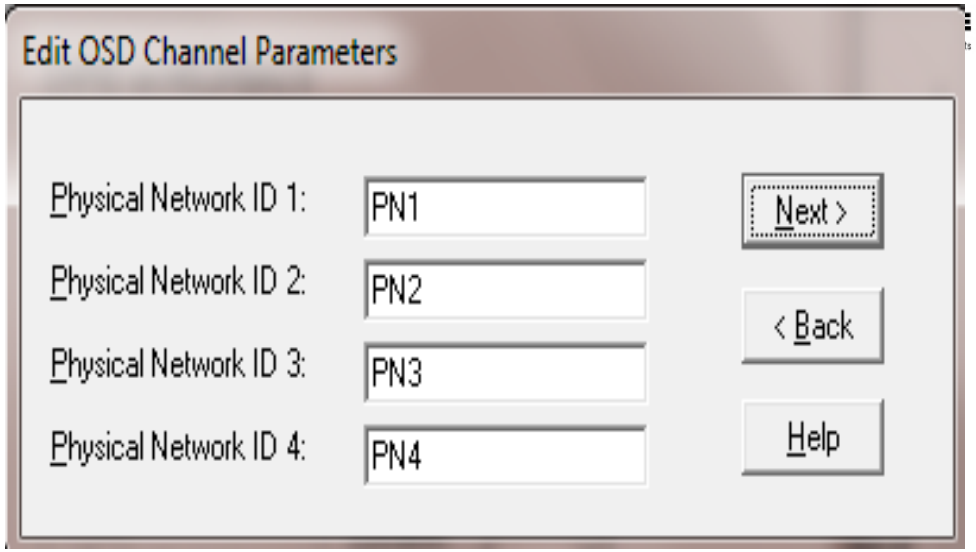
PNETIDs for OSD/IQD CHPIDs - HCD



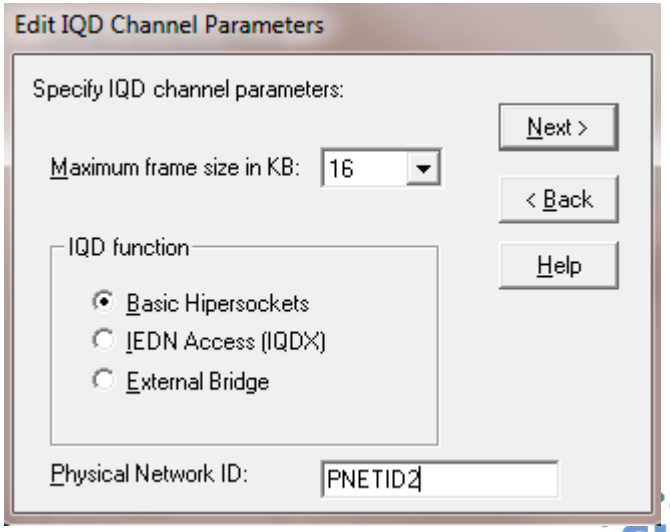
PNETIDs for OSD & IQD CHPIDs - HCM



If editing IQD CHPID

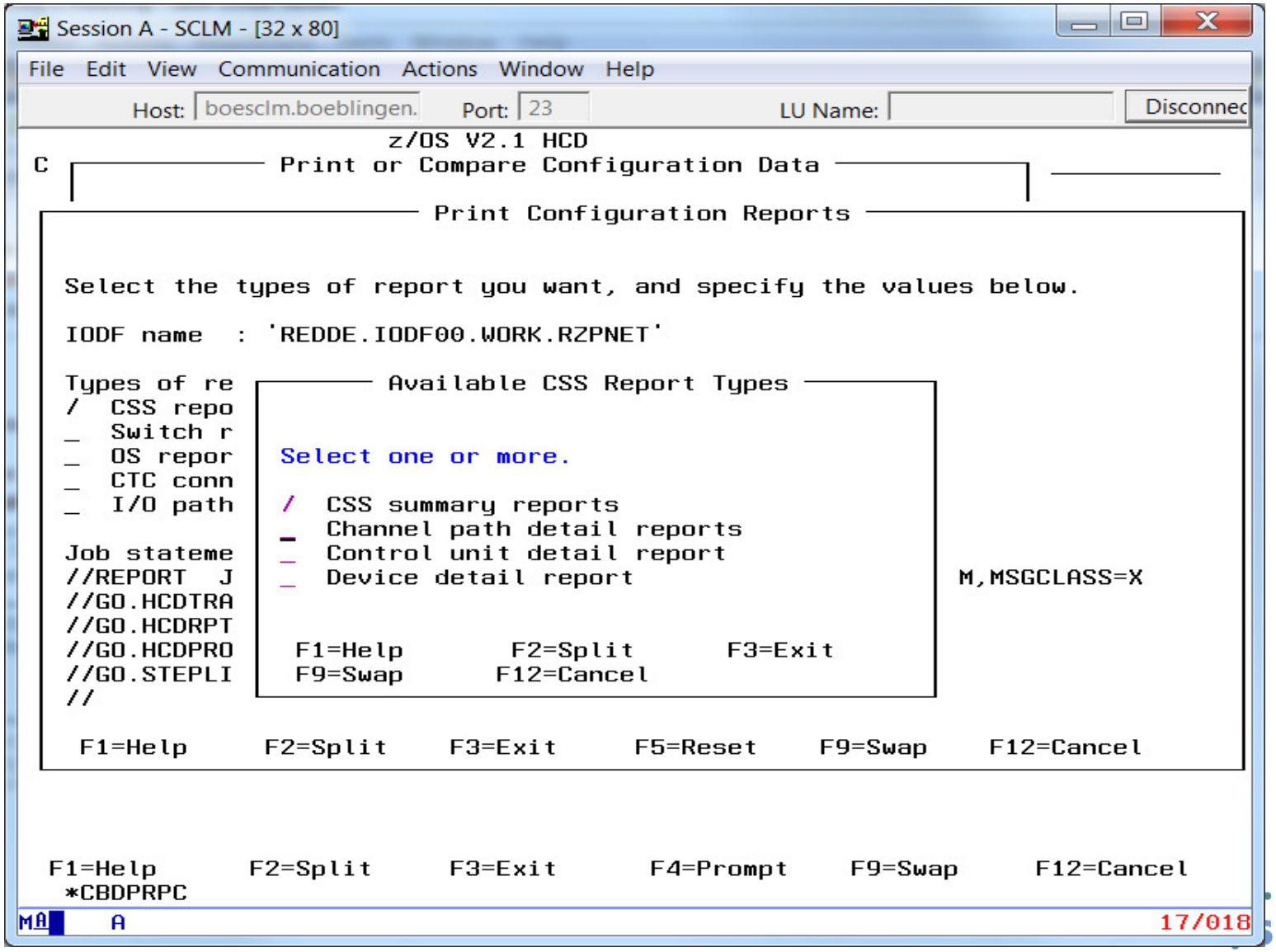


For OSD CHPIDs



If creating IQD CHPID

Creating a PCIE and PCHID Report - HCD



Sample PCIE Report

PCIE FUNCTION SUMMARY REPORT

PROCESSOR ID P35 TYPE 2827 MODEL H66 CONFIGURATION MODE: LPAR

				PARTITION NUMBERS			
				CSS0----------	CSS1----------	CSS2----------	CSS3-
FID	VF	PCHID	TYPE	123456789ABCDEF	123456789ABCDEF	123456789ABCDEF	1234
000		314	ROCE	--------------	--------C------	-----C---------	-A---
001		318	ROCE	--------------	--------A------	-----C---------	-C---
0AE	2	418	ZEDC-EXPRESS	--------------	--------A------	-----C---------	-C---
0AF	1	418	ZEDC-EXPRESS	--------------	--------A------	-----C---------	-C---

CSS0 PARTITION		CSS1 PARTITION		CSS2 PARTITION		CSS3 PARTITION	
NUM	NAME	NUM	NAME	NUM	NAME	NUM	NAME
1	R35LP01	1	R35LP16	1	R35LP31	1	R35LP46
2	R35LP02	2	R35LP17	2	R35LP32	2	R35LP47
3	R35LP03	3	R35LP18	3	R35LP33	3	R35LP48
4	R35LP04	4	R35LP19	4	R35LP34	4	R35LP49

Sample PCHID Report

PCHID SUMMARY REPORT

- PROCESSOR ID P35 TYPE 2827 MODEL H66 CONFIGURATION M

PCHID	VF	CHPID FID	TYPE	SWITCH	CSS Numbers	PNET-1
218		0CA	ROCE		1 2 3	IEDN
290		88	OSD		0 1 2 3	IBMNET
314		000	ROCE		1 2 3	IBMNET
318		001	ROCE		1 2 3	IBMNET
418	1	0AF	ZEDC-EXPRESS		1 2 3	
418	2	0AE	ZEDC-EXPRESS		1 2 3	
5E2		3B	FC	14	0 1 2 3	
5E3		5B	FCP		0 1 2 3	
0B/1		E4	CIB		0 1 2 3	
0B/2		E5	CIB		0 1 2 3	
N/A		F5	IQD		0 1 2 3	IBMNET
N/A		F6	IQD		0 1 2 3	
N/A		FD	IQD		0 1 2 3	IEDN

TOTALS FOR CHANNEL CARD TYPES

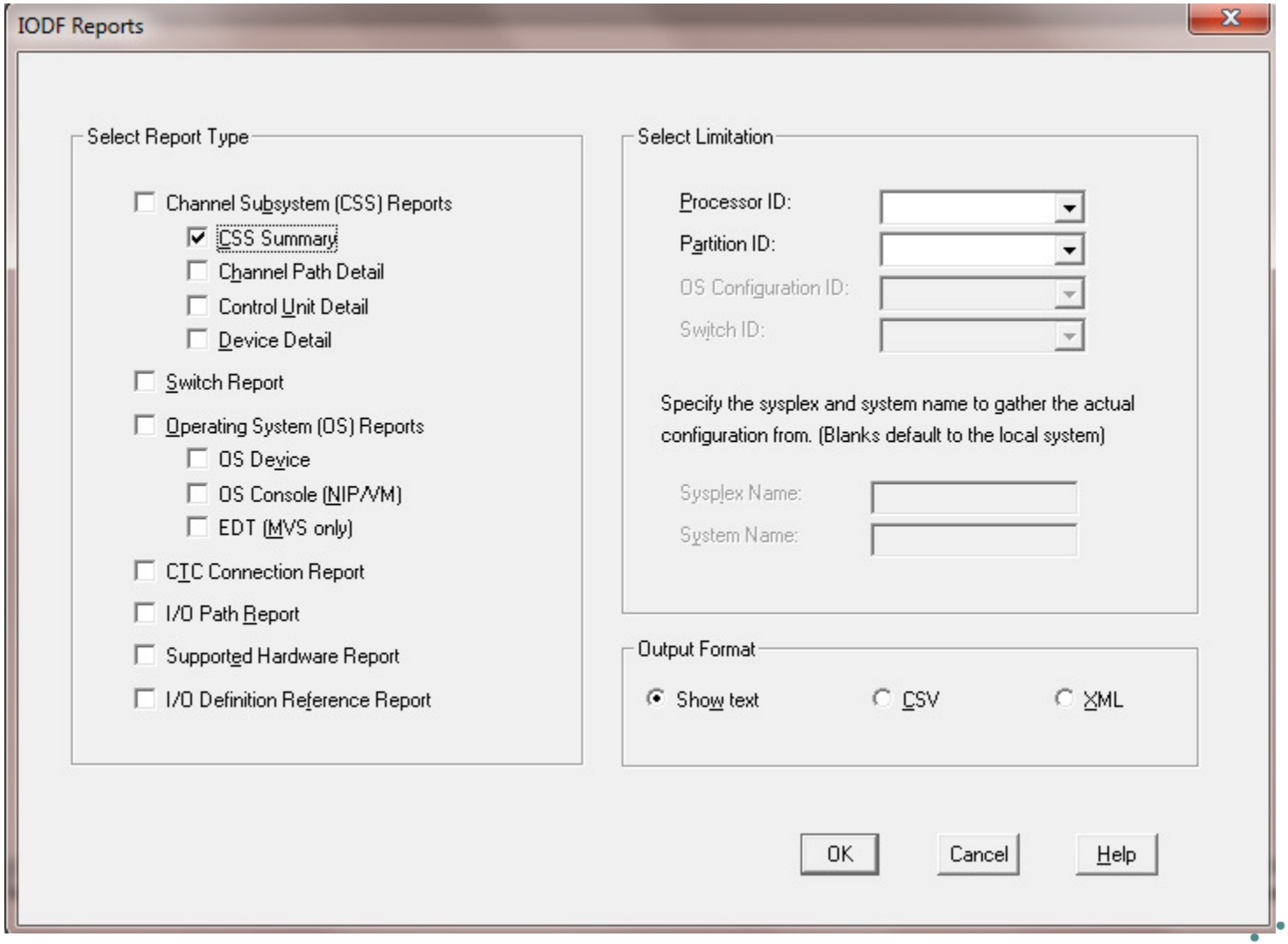
EXTERNAL CHPIDS								INTERNAL CHPIDS		PCIE FUNCTIONS	
CFP	CIB	FC	FCP	OSC	OSD	OSE	OSN	ICP	IQD	ROCE	ZEDC
8	4	21	23	1	43	3	0	2	6	3	2

PCIE Function Compare Report

PROC	FID	New IODF	Old IODF	Description
PROC1	001		Deleted	
			001	Physical Channel ID (PCHID)
			ROCE	Function Type
			undefined	Virtual Function ID (VF)
			comment 1	Function Description
			FRD	Physical Network ID 1
			DDD	Physical Network ID 2
			AAAA	Physical Network ID 3
				Physical Network ID 4
			>> LP01	Partition in Access List
			>> LP02	Partition in Candidate List
			>> LP03	Partition in Candidate List
PROC1	002	Actual Data	Old Data	
		072	002	Physical Channel ID (PCHID)
		new comment	comment 1	Function Description
		OLD1	CUSTOMER	Physical Network ID 1
		OLD2	PNET2	Physical Network ID 2
			INTERNAL	Physical Network ID 3
			EXTERNAL	Physical Network ID 4

HCD Dialog: select in compare report dialog
Batch: part of CSS compare, report **“PF”**

Creating a PCIE and PCHID Report - HCM



HCD IOCP Deck Migration

The following changes to the IOCP deck are supported:

- **FUNCTION** statement
  - Operands FID, VF, PCHID, PNETID, PART
  - DESC and UNIT internally supported
- **CHPID** statement
  - PNETID – ignored if processor doesn't support

HCD Deck Migration

★IOCP deck usable for standalone IOCP

ROCE

```
FUNCTION FID=002,PART=((LP01),(LP03,LP04,LP12,LP22)),          *
            PNETID=(NET1,NET2,N3,),PCHID=002
```

ZEDC-EXPRESS

```
FUNCTION FID=005,VF=1,PART=((LP14),(LP01)),PCHID=105
```

NOTE: This is not valid for HCD migration, since HCD will default to type ROCE, which does not allow the VF keyword – you must use extended migration

OSD CHPID

```
CHPID PATH=(CSS(0),11),PARTITION=((LP01),(LP04),REC),          *
            PCHID=041,PNETID=(,NET1,NET2,),TYPE=OSD
```

HCD Deck Migration

★IOCP deck with HCD attributes for extended migration

ROCE

```
FUNCTION FID=002,PART=((LP01),(LP03,LP04,LP12,LP22)),        *
          PNETID=(NET1,NET2,N3,),PCHID=002
*$HCDC$      UNIT=ROCE
*$HCDC$      DESC='myDescription'
```

ZEDC-EXPRESS

```
FUNCTION FID=005,VF=1,PART=((LP14),(LP01)),PCHID=105
*$HCDC$      UNIT=ZEDC-EXPRESS
*$HCDC$      DESC='myDescription'
```

OSD CHPID

```
CHPID PATH=(CSS(0),11),PARTITION=((LP01),(LP04),REC),        *
          PCHID=041,PNETID=(,NET1,NET2,),TYPE=OSD
*$HCDC$      DESC='myDescription'
```

Support and Coexistence

- Enabling support
  - OA39234 – z/OS 1.12, z/OS 1.13, z/OS 2.1
  - OA41350 – z/OS 1.11
- z/OS 2.1. has full support (PCIE functions, PNETIDs)
- Other releases – toleration only
  - zBC12 and zEC12 GA2 supported
  - PCIE functions and PNETIDs not supported
  - S/W activate with hardware validation is allowed if PCIE functions and PNETIDs are specified

Autoconfiguration (zDAC) Improvements

- Point to point connections supported
- Profile option to allow you to manually specify control unit and device numbers
- Channel path/switch inclusion/exclusion lists
- Discovery by controller serial number
- Autoconfiguration policies can be changed between two subsequent controller discoveries
- Inactive or incapable systems are ignored during discovery
- SAVE command supported on panels containing the discovered information

Verify a Configuration via zDAC

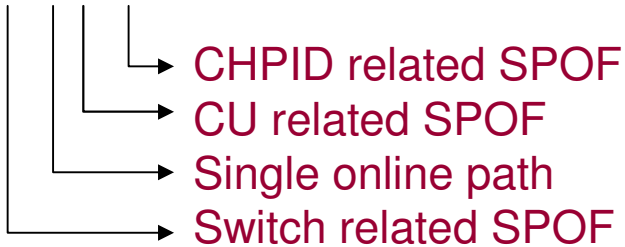
- Prior to z/OS 2.1, required Tivoli System Automation (TSA) I/O Operations (priced product)

- With z/OS 2.1, zDAC is used to discover the active configuration
  - Requires z196 / z114 or higher processor
  - Only done if TSA I/O Operations is not operational
  - System to run report must be part of local sysplex
  - Device and path status information only available if run against the local system

Single Point of Failure Info for I/O Path

- Today, for local system, STAT column contains the status of each channel path
  - Online (Blank)
  - Offline (OFFL)
  - Unknown (UNKN)
- For local system, if path online, STAT contains single point of failure information:

```
----I/O Path-----  ----------Sensed Data...
CHP CU   DEV       STAT CHT   CUTYPE
80  2000 2000,144  #CPS FC_S  2107-941
```



Verify Config - Resulting I/O Path List

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                I/O Path List     Row 5 of 1515 More:       >
Command ===> ____________________________________________ Scroll ===> PAGE

Accessed IODF: SYS1.IODF01
Active IODF  : SYS1.IODF01                              System . : THIS-SYS
Processor . .: P35        Partition : TRX1              OS config: MVSVM

----I/O Path----- ----------Sensed Data--------- ----IODF Data---------- D
CHP CU   DEV      STAT CHT   CUTYPE   DEVTYPE  O CHT CUTYPE   DEVTYPE  S
0D  0621 0620,16                               OSM OSM       OSA-M      *
30  2000 2000,2   5    FC_S  2107-9A2 3390B      FC  2107      3390B
30  2000 2002,17       FC_S  2107-9A2 3390B    Y FC  2107      3390B
30  2000 2013     5    FC_S  2107-9A2 3390B      FC  2107      3390B
30  2000 2014,14       FC_S  2107-9A2 3390B    Y FC  2107      3390B
30  2000 2022,4   5    FC_S  2107-9A2 3390B      FC  2107      3390B
30  2000 2026,9        FC_S  2107-9A2 3390B    Y FC  2107      3390B
30  2000 202F     5    FC_S  2107-9A2 3390B      FC  2107      3390B
30  2000 2030,32       FC_S  2107-9A2 3390B    Y FC  2107      3390B
```

Productivity and Usability improvements

- HMC wide activate (session 14246 on Wednesday, 3-4)

  Provide single point of management control of activates across all servers / LPARs controlled by the same HMC
  - Central deployment of target IODF
  - Remote activate from a single managing system

- Activate command available via batch

```
//WORK EXEC PGM=CBDMGHCP,PARM='ACTIVATE IODF=01,TEST'
```

Productivity and Usability improvements

- ACTIVATE SOFT=NOVALIDATE and IODF contains CF related changes
  - CBDA854I Changes to Coupling Facility elements are not processed.

- Warning message issued when CSS is deleted from a CIB channel, which affects definition of the connected target CIB channel
  - Activate is also required to target processor
  - CBDG422I Changing CHPID <source CHPID> changes the lowest CSS to <CSS ID>, affecting CF connection to <target CHID>. Consider activating the target LPAR/processor.

Productivity and Usability improvements

The CF Channel Path Connectivity List is extended with the PCHID / HCA ID / port number value for both the source and target CHPIDs of a CF connection.

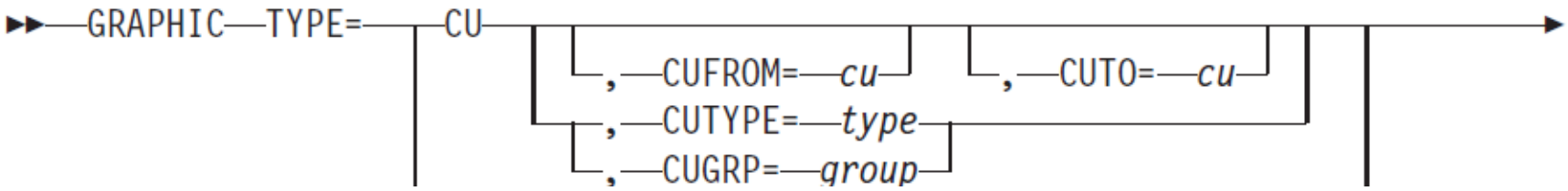
```
  Goto  Filter  Backup  Query  Help
--------------------------------------------------------------------------------
CBDPCFF0              CF Channel Path Connectivity List               Row 1 of 14
Command ===> _                                                Scroll ===> PAGE

Select one or more channel paths, then press Enter.

Source processor ID . . . . . : DAN2      Danu DWH/DWA/DWD/DWE und Testlab
Source channel subsystem ID . : 0         DWH1,SYSD,RSE1-2,COH1
Source partition name . . . . : *

  ----------Source----------   -----------Destination-----------   -CU-   -#-
/ CHP PCHID CF Type Mode Occ    Proc.CSSID CHP PCHID CF Type Mode    Type   Dev
_ 07  110    N  CFP  SPAN N     ECL2.1     03  109    Y  CFP  SHR     CFP    7
_ 0B  180    N  CFP  SPAN N     ECL2.1     07  119    Y  CFP  SHR     CFP    7
_ 0C  118    N  CFP  SPAN N     ECL2.1     80  200    Y  CFP  SHR     CFP    7
_ 0E  188    N  CFP  SPAN N     ECL2.1     84  210    Y  CFP  SHR     CFP    7
_ 20  04/2   Y  CIB  SHR  N     R35.0      62  09/1   Y  CIB  SPAN    CFP    7
_ EE         Y  ICP  SHR  N     DAN2.0     EF         Y  ICP  SHR     CFP    7
_ EF         Y  ICP  SHR  N     DAN2.0     EE         Y  ICP  SHR     CFP    7
_ F2         Y  ICP  SPAN N     DAN2.0     F3         Y  ICP  SPAN    CFP    7
_ F3         Y  ICP  SPAN N     DAN2.0     F2         Y  ICP  SPAN    CFP    7
_ FA         Y  ICP  SHR  N     DAN2.1     FB         Y  ICP  SHR     CFP    7
_ FC         Y  ICP  SPAN N     DAN2.0     FD         Y  ICP  SPAN    CFP    7
_ FD         Y  ICP  SPAN N     DAN2.0     FC         Y  ICP  SPAN    CFP    7
_ FE         Y  ICP  SPAN N     DAN2.0     FF         Y  ICP  SPAN    CFP    7
_ FF         Y  ICP  SPAN N     DAN2.0     FE         Y  ICP  SPAN    CFP    7
******************************** Bottom of data ********************************
```

Productivity and Usability improvements

- The MVS Device Detail Report shows the OFFLINE parameter for devices only if it can be set by a user.

- Filter graphical CU report by control unit range when issued in batch mode

Create a graphical configuration report



Productivity and Usability improvements

- The 'OS group change' is now available on the I/O Device List which shows device groups

- If PPRC devices are deleted, their connections are removed both from the primary and secondary (DR site0 OS configurations). This causes the 'generated' attribute of the secondary OS configuration to be deleted and further updates to the primary OS configuration will not be automatically reflected in the secondary OS configuration.
  - New profile option to generate a new DR site OS configuration at production IODF build time regardless whether the generated OS configuration has been changed or not. New profile option, UNCOND_GENERATE_DROS, is added.

Reference

- Hardware Configuration Definition User's Guide, SC34-2669
- Hardware Configuration Manager User's Guide, SC34-2664
- Hardware Configuration Definition Messages, SC34-2668
- Hardware Configuration Definition Planning, GA32-0907
- z/OS Migration from z/OS V1R13 and z/OS V1R12 to z/OS V2R1, GA32-0889

- HCD/HCM Homepage:
  - http://www.ibm.com/systems/z/os/zos/features/hcm/

- HCD Contact:
  - IBMHCD@de.ibm.com

Thank you