G29

FICON Problem Determination for zSeries

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zSeries Expo | Nov. 1 - 5, 2004

Miami, FL

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Objectives

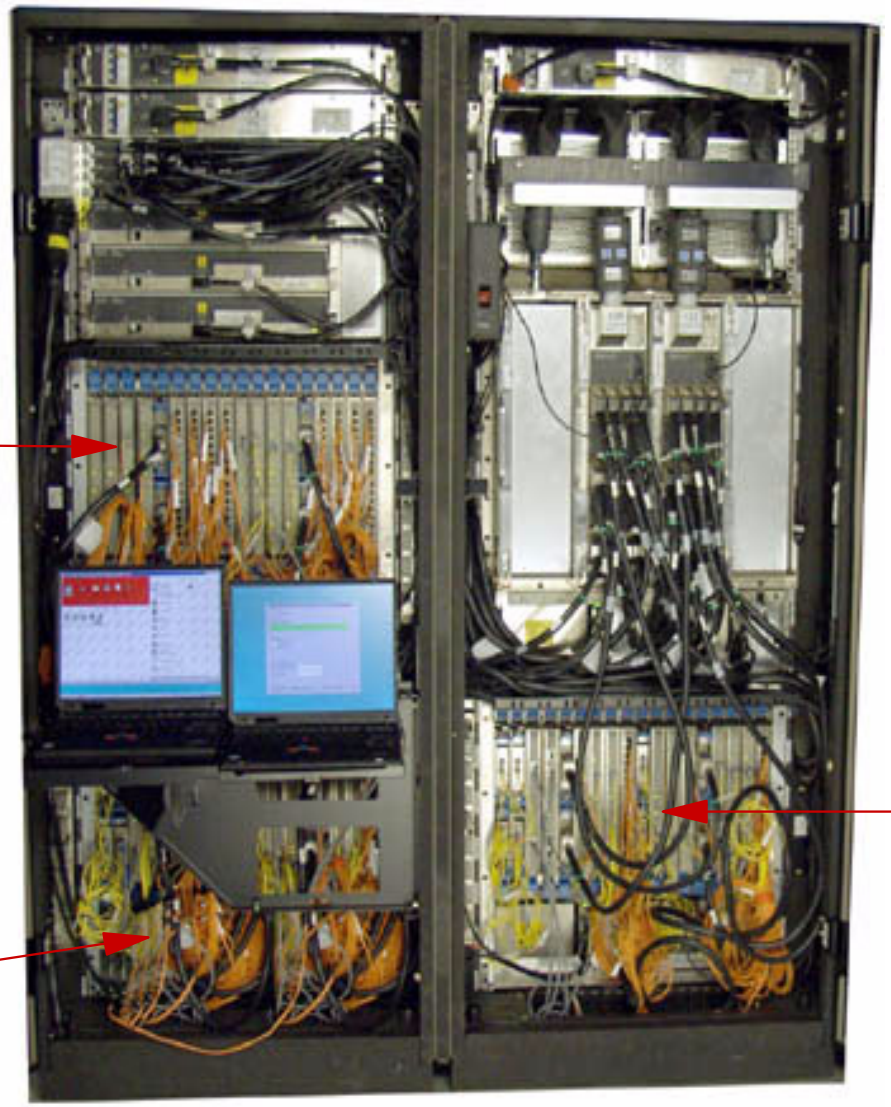
*Look at z/990 & z/890 CSS
*How to establish a CPC session
*What is a CPC session
*How to Navigate on the SE panels
*How to intiate channel P.D. to an ESCON channel
*How to navigate on panels on an Inrange Ficon sw
*How to navigate on panels on a McData FICON sw

z990 I/O System Design Overview

The z990 I/O system design provides flexibility, highest availability, and performance

- Higher bandwidth
  - z990 has up to four times of I/O bandwidth of the z900
- Greater Connectivity
  - Up to four times the number of channels of the z900 with a wide range of connectivity
- Concurrent I/O upgrades
  - LIC enabled I/O ports or physical installed I/O cards
- Dynamic I/O configuration
  - Add and remove channel paths and I/O
- ESCON port sparing

The z990 I/O Cages



I/O cage
3
Optional

I/O cage
2
Optional

I/O cage
1

Z Frame

A Frame

z990 Channel Subsystem Structure

The z990 channel subsystem structure supports up to:

- 1024 ESCON channels
- 1024 Channel Path IDs
- Four Logical Channel Subsystems
  - 256 CHPIDs per LCCS
  - Spanned Internal and external CHPIDs
- Forty-eight 2 GB STIs
  - Twelve STIs per book
- Three I/O cages
  - One I/O cage in A frame
  - Up to two optional I/O cages in Z frame
- Twenty-eight I/O slots for I/O cards
  - Supports up to seven I/O domains
    - Each I/O domain has up to four I/O cards

z890 I/O System Design Overview

The z890 I/O system design provides flexibility, high availability, and performance as compared to other Servers

- Same I/O cage as the z990
- Higher bandwidth
  - z890 has over twice the I/O bandwidth of the z800
- Greater Connectivity
  - Close to twice the number of channels of the z800 with a wide range of connectivity
    - 420 ESCON channels compared to 240 on the z800
- Concurrent I/O upgrades
  - LIC enabled I/O ports or physical installed I/O cards
- Dynamic I/O configuration
  - Add and remove channel paths and I/O
- ESCON port sparing

PCHID Assignment to I/O cage Slots

Every I/O cage slot has 16 (xF) physical channel IDs assigned
Most I/O cards use a PCHID and a CHPID number

I/O cage slots	PCHID numbers		
	1st I/O cage	2nd I/O cage	3rd I/O cage
Front slots 01 to 18	100 to 1FF	300 to 3FF	500 to 5FF
Rear slots 19 to 32	200 to 2BF	400 to 4BF	600 to 6BF

- Actual PCHID used is determined by what card type is plugged into the I/O slot
- PCHIDs are identified in PCHID report from machine configuration order
- Customer maps PCHID to CHPID number using channel mapping tool
- PCHIDs are used for various purposes - physical location, I/O configuration definition process, ESCON channel sparing

Single Object Operations Guidelines

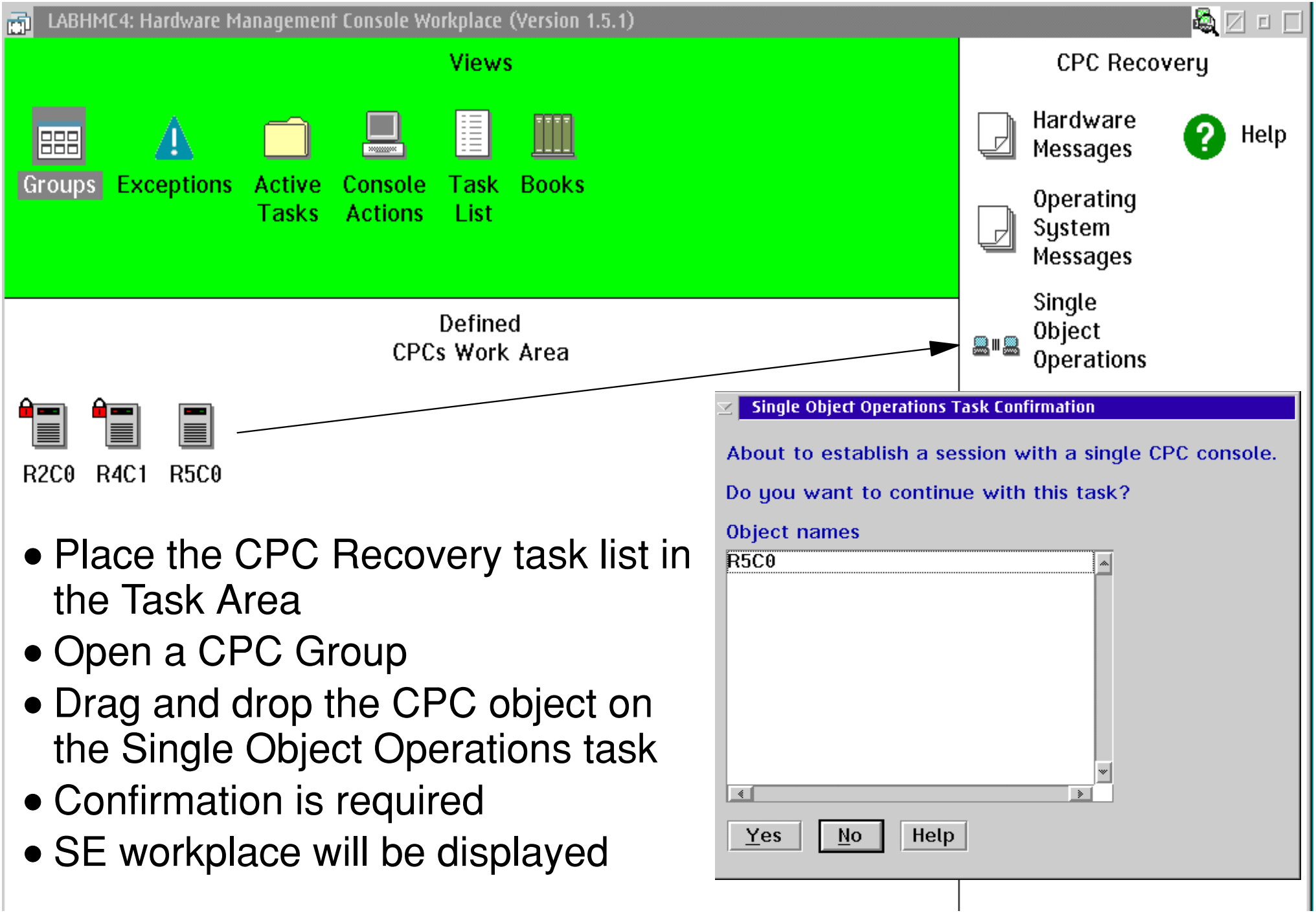
- Single Object Operations is also called a CPC Session when a CPC object is used
- DCAF is used to establish a CPC session
  - Distributed Console Access Facility (DCAF) is an OS/2 application that is used to take control of the target PC - the SE is this case
- Use the Single Object Operations task only when the task is not available on the HMC or for problem determination
- A CPC object is required to initiate the Single Object Operations task
- Always log off to exit the CPC session

Single Object Operations - CPC Session

A Single Object Operations session is used primarily for problem determination

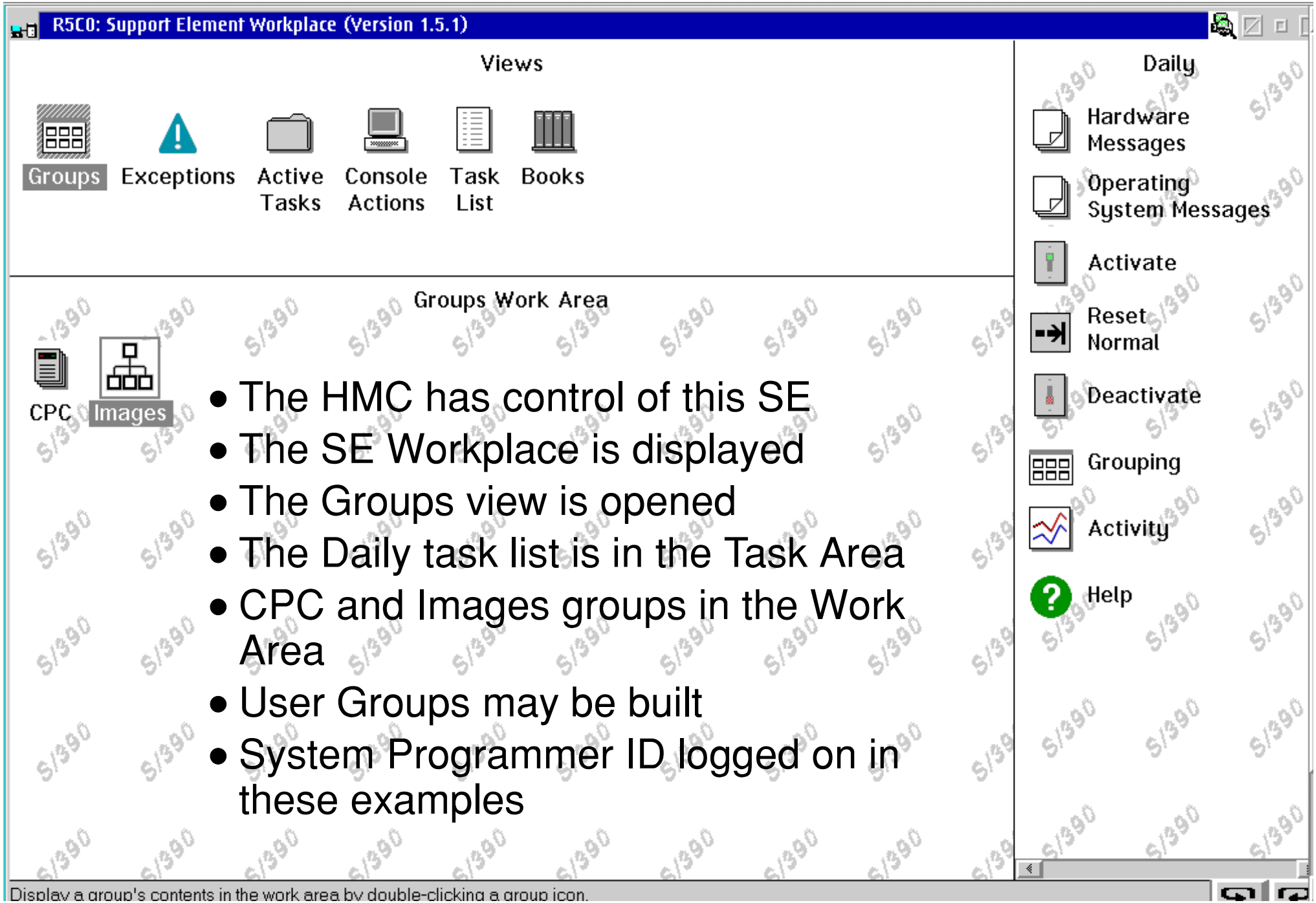
- I/O or channel problem determination
- Determine the cause of an exception condition
- Display/alter storage, registers or PSW
- Perform manual POR
- Enable TOD
- View IOCDS information
- Storage - HSA size and LPAR storage assignments

Single Object Operations Task

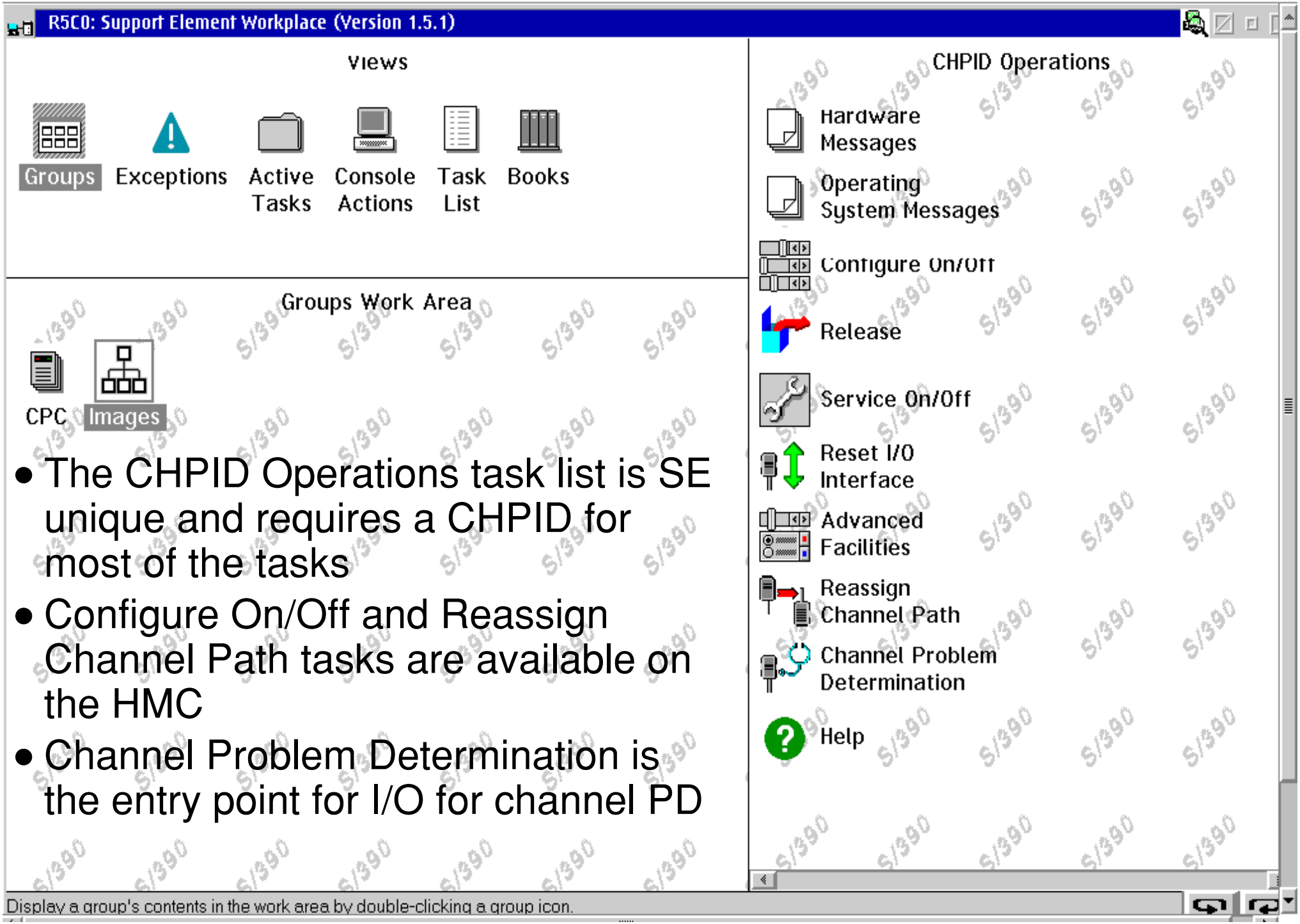


- Place the CPC Recovery task list in the Task Area
- Open a CPC Group
- Drag and drop the CPC object on the Single Object Operations task
- Confirmation is required
- SE workplace will be displayed

Support Element Workplace

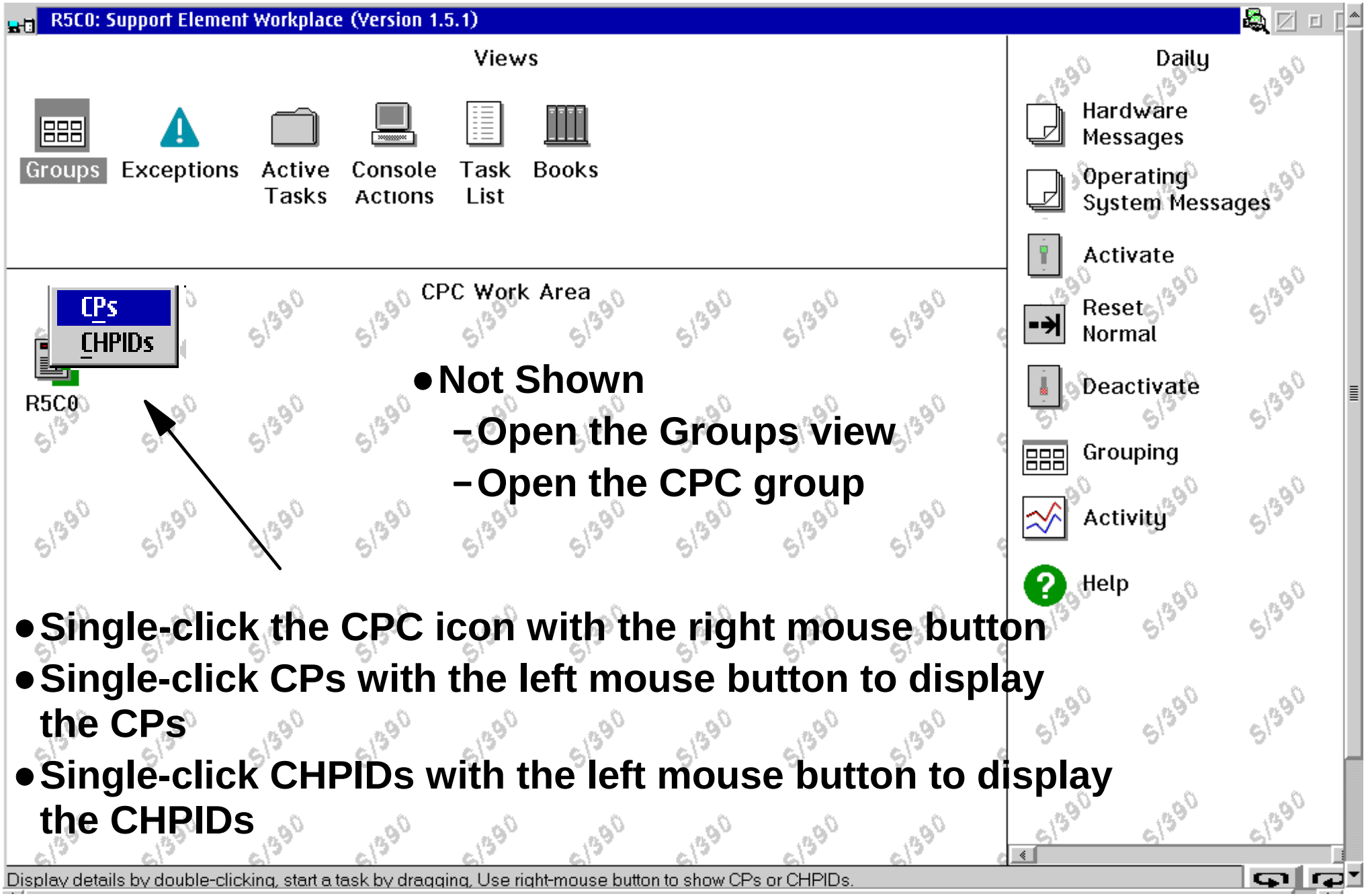


CHPID Operations Task List



- The CHPID Operations task list is SE unique and requires a CHPID for most of the tasks
- Configure On/Off and Reassign Channel Path tasks are available on the HMC
- Channel Problem Determination is the entry point for I/O for channel PD

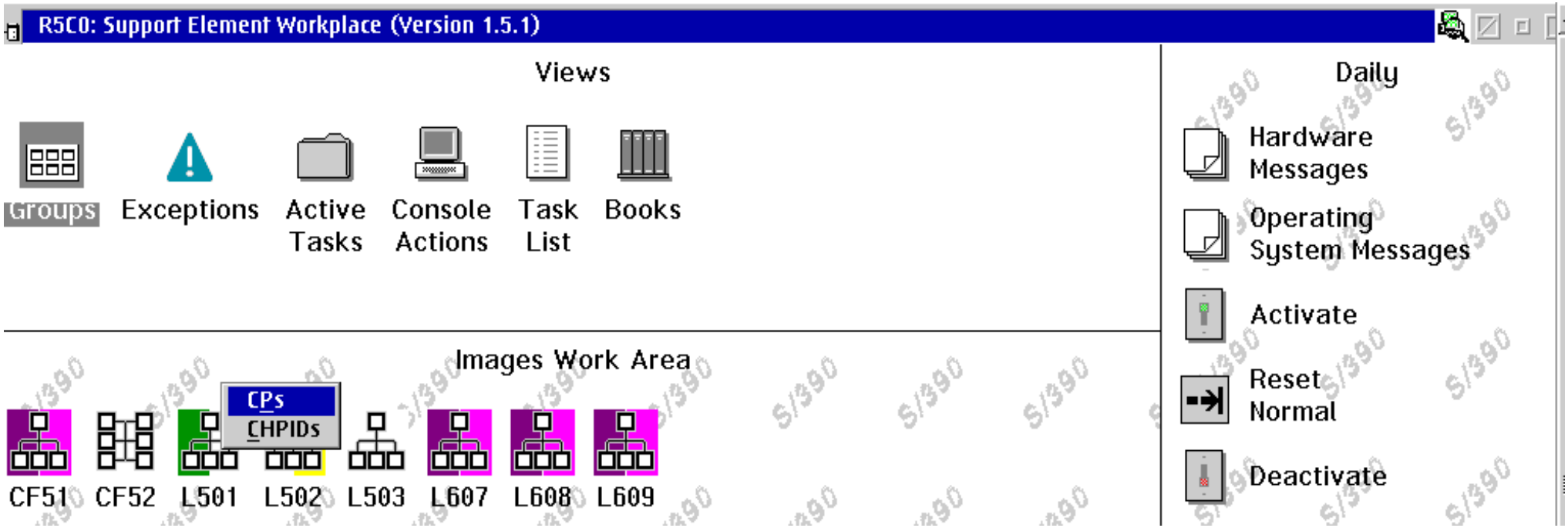
CPs or CHPID Access



- Not Shown
  - Open the Groups view
  - Open the CPC group

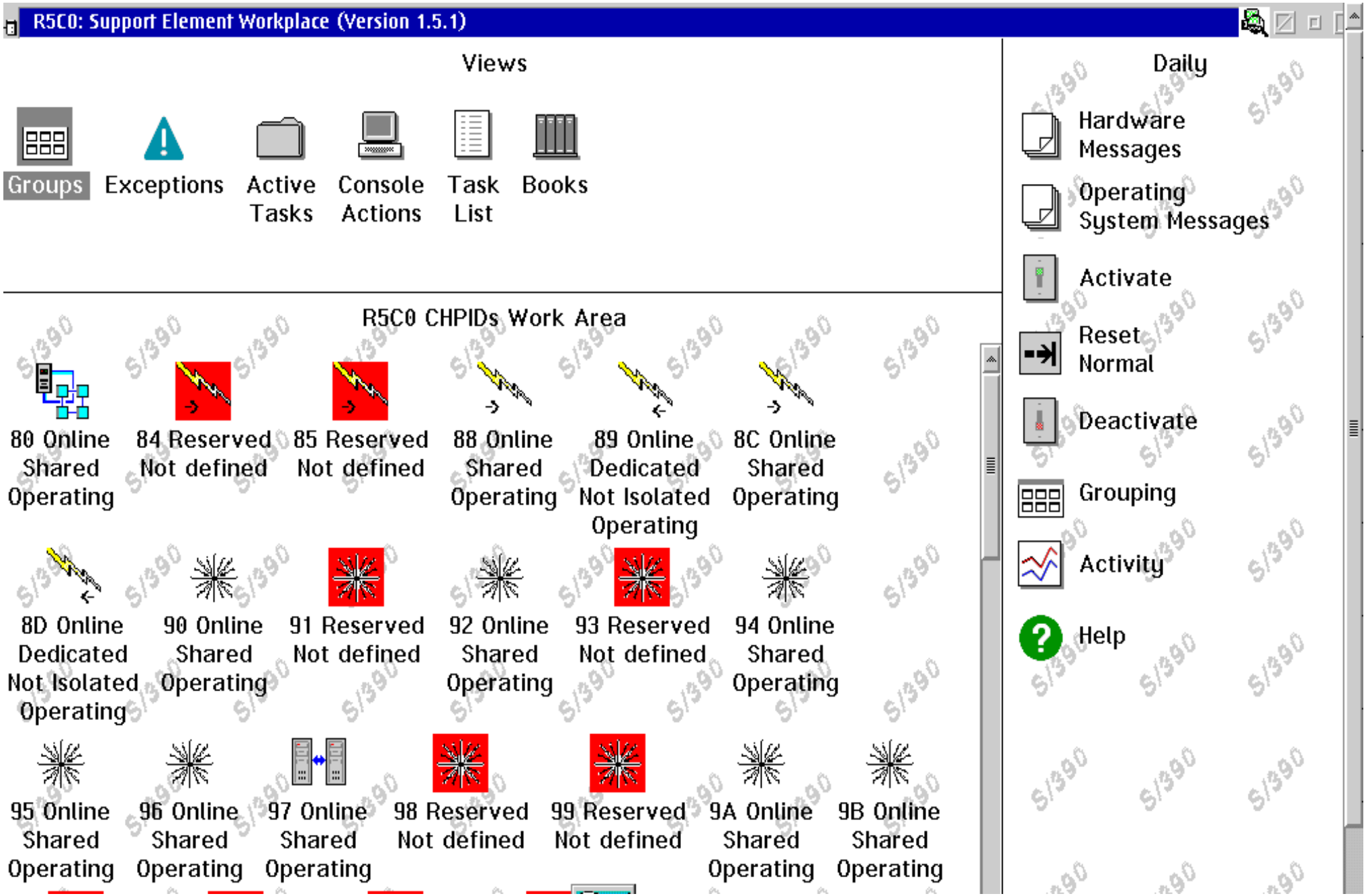
- Single-click the CPC icon with the right mouse button
- Single-click CPs with the left mouse button to display the CPs
- Single-click CHPIDs with the left mouse button to display the CHPIDs

Images Group Opened

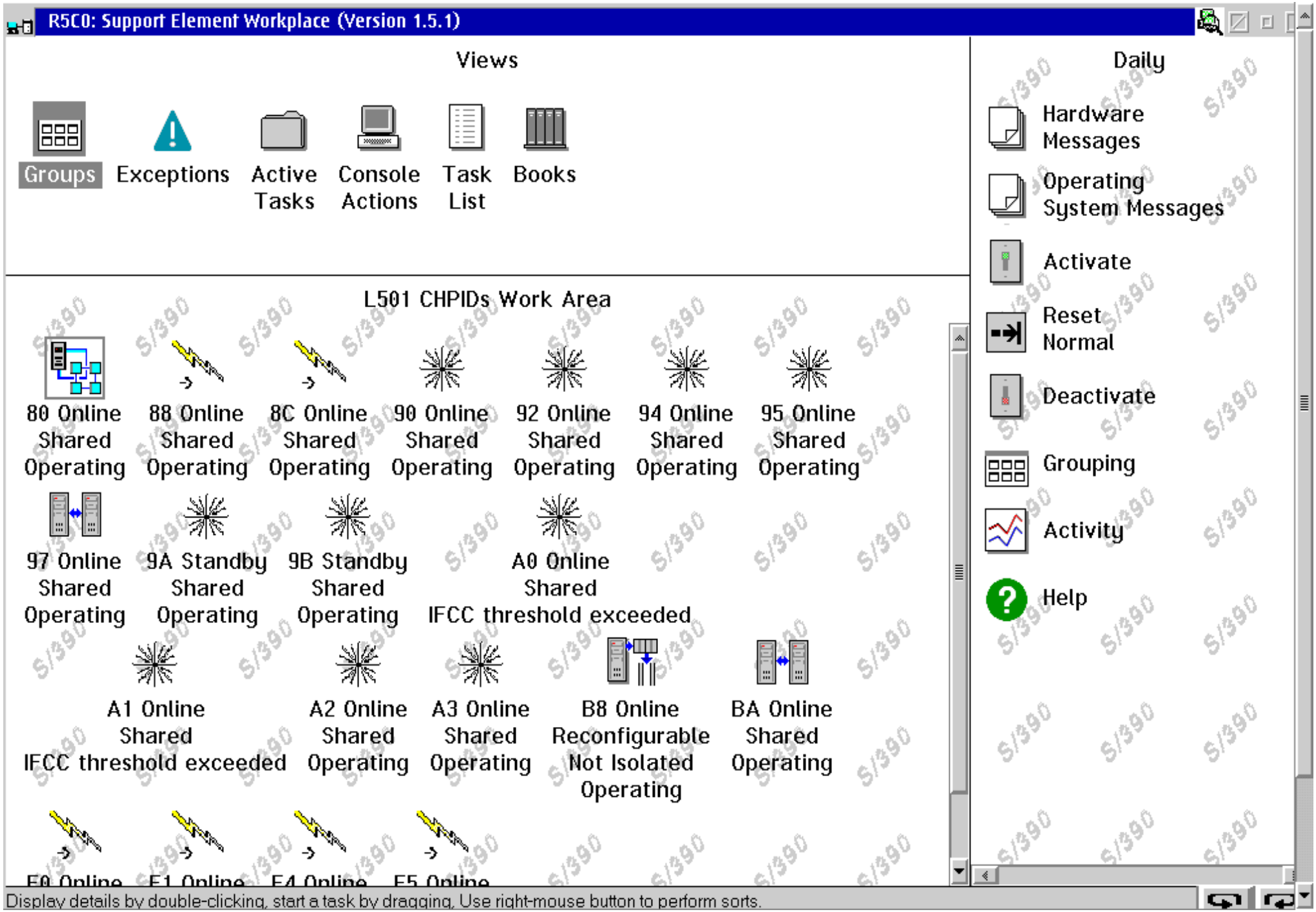


- Any color on either side of the Image object should be investigated
- Color on the left half of the Image object represents the Image status
  - Unacceptable status condition exists for the image
- Color on the right half of the Image object represents the CHPID status
  - At least one CHPID has an unacceptable status condition
- Double-click the Image object to display the Details panel

CHPIDs Work Area

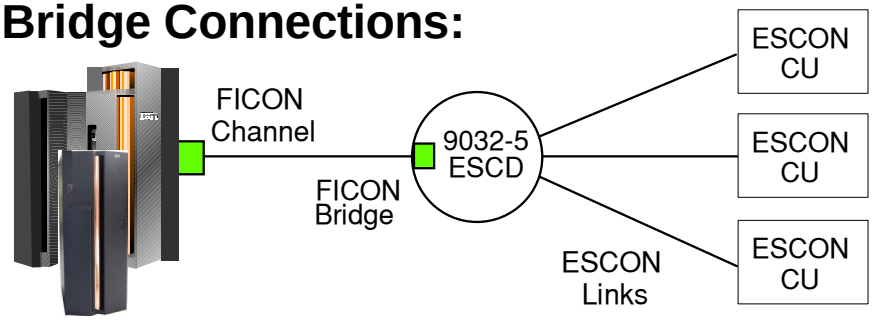


Images CHPIDs Work Area



FICON Operating Modes

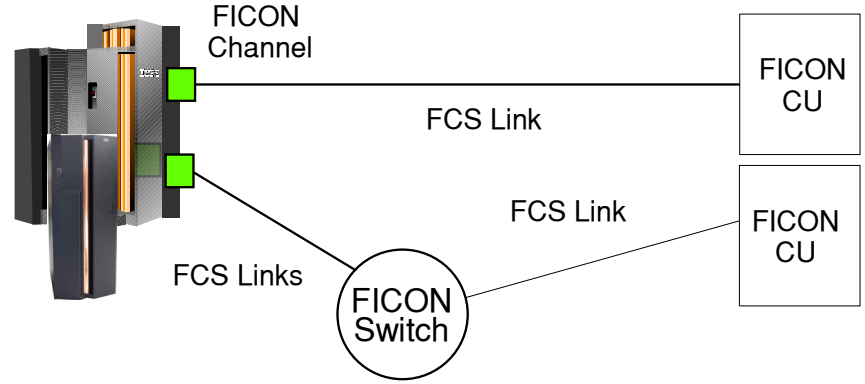
FICON Bridge Connections:



★ *Exploit FICON Channel with Existing ESCON Control Units*

Type=FCV

Native FICON Direct Attachment and Switched Connectivity:

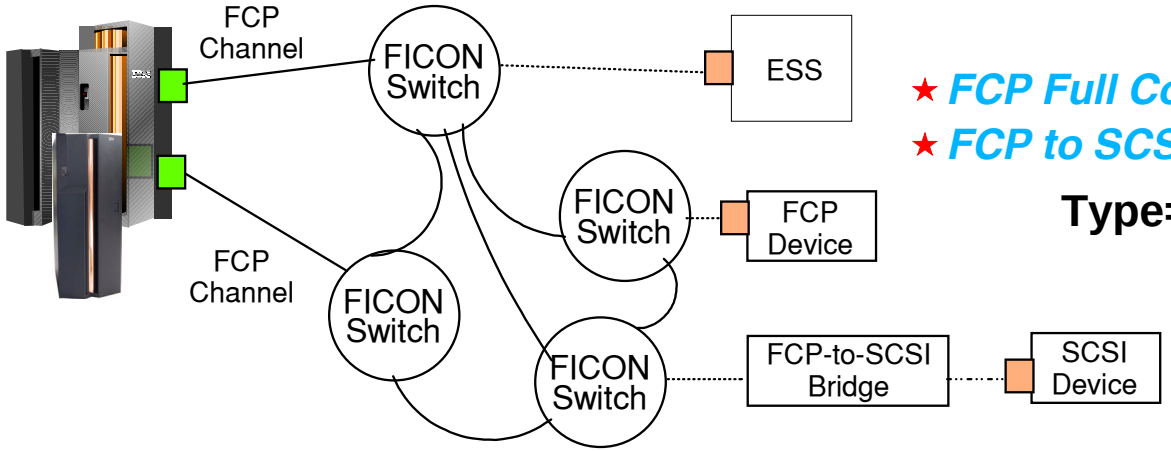


★ *Native FICON Control Units*

★ *Full Dynamic Switching of FICON Control Units*

Type=FC

Native FICON Direct Attachment and Switched Connectivity:

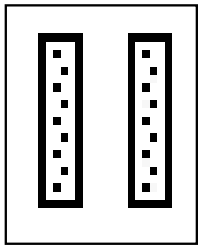


★ *FCP Full Connectivity*

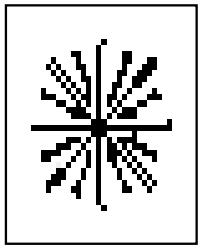
★ *FCP to SCSI Bridge*

Type=FCP

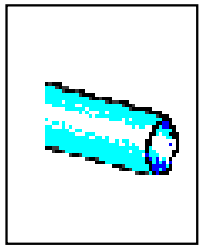
Icon Depicts the CHPID Type



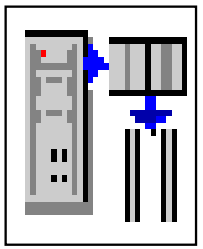
Parallel



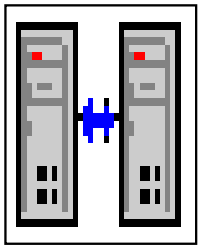
ESCON CNC



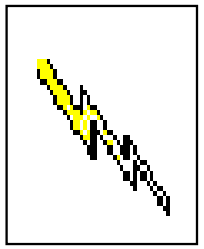
OSA-2
Ethernet, Token Ring
FDDI or ATM



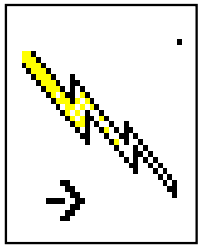
CVC or CBY



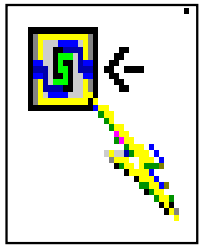
CTC



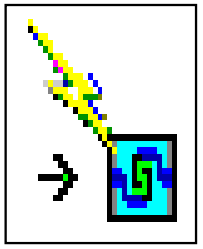
CFR



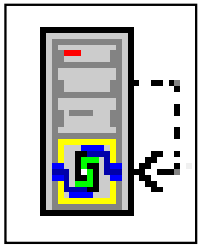
CFS



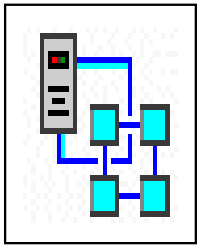
CBR



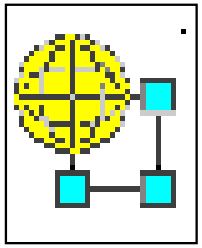
CBS



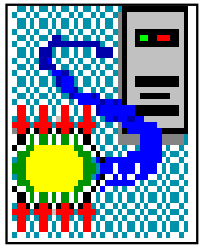
ICR



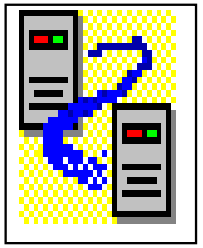
OSA-2
Fast Ethernet



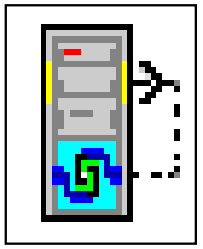
Gb Ethernet



FICON
Bridge

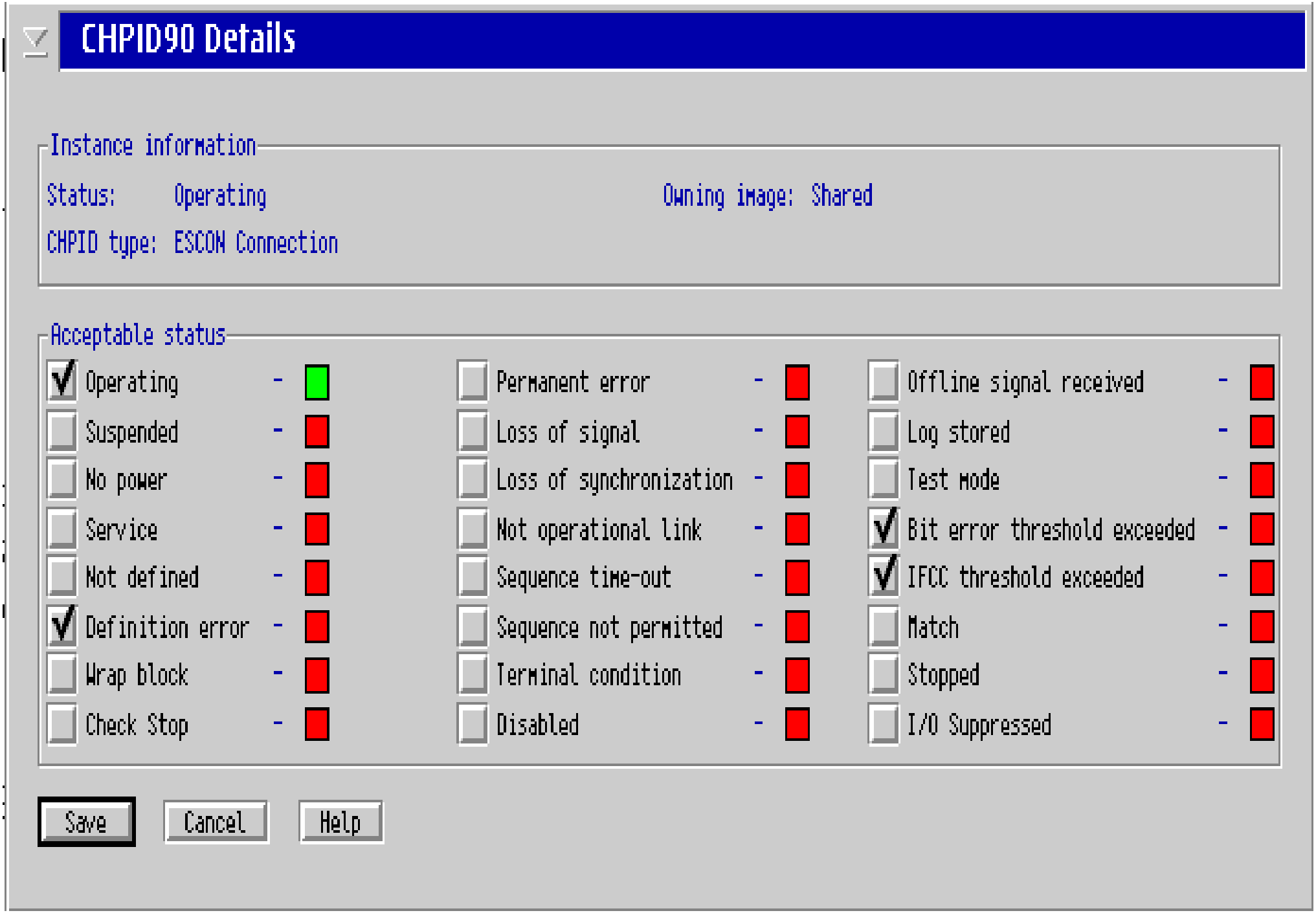


FICON
native

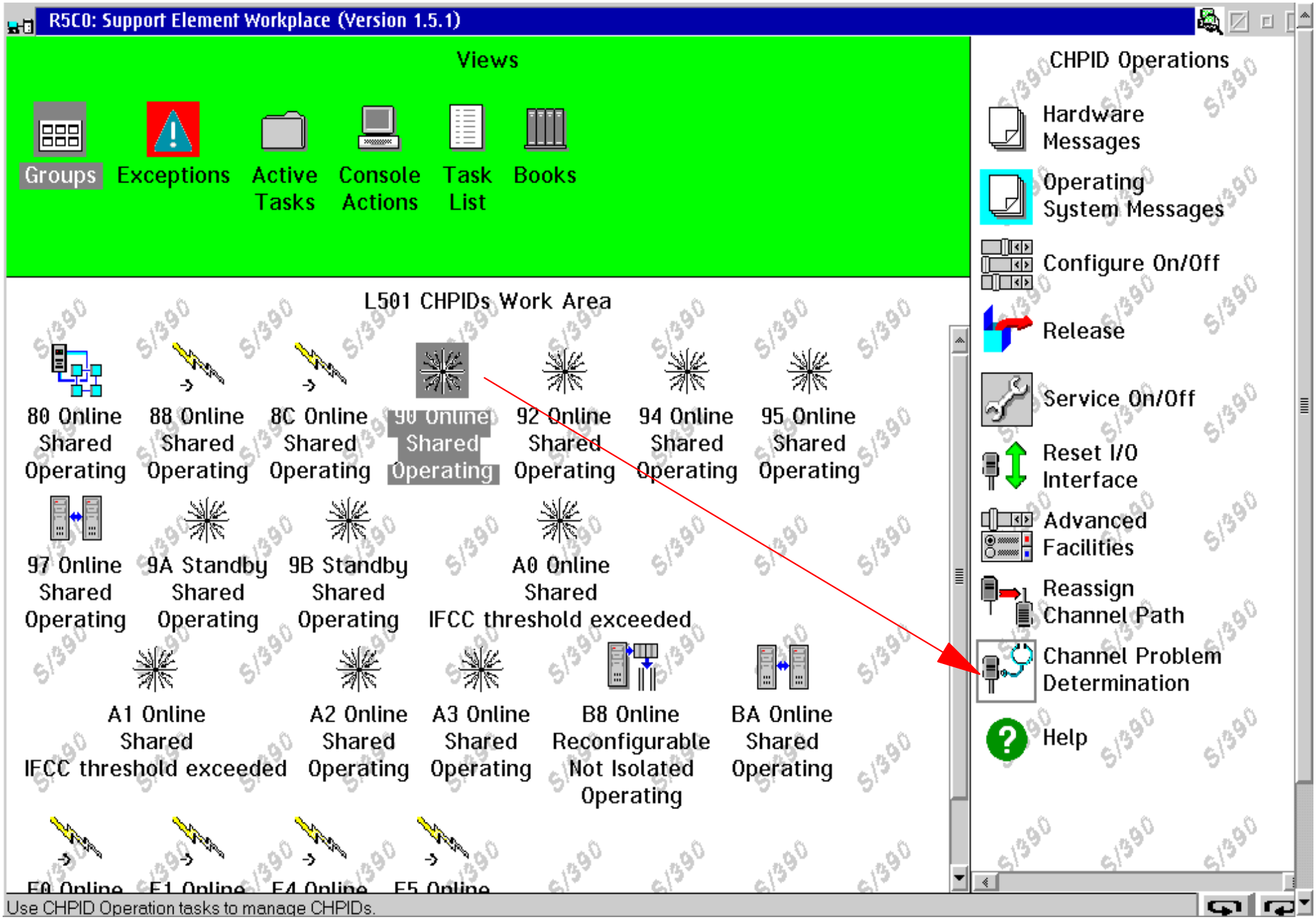


ICS

CHPIDs Detail Panel

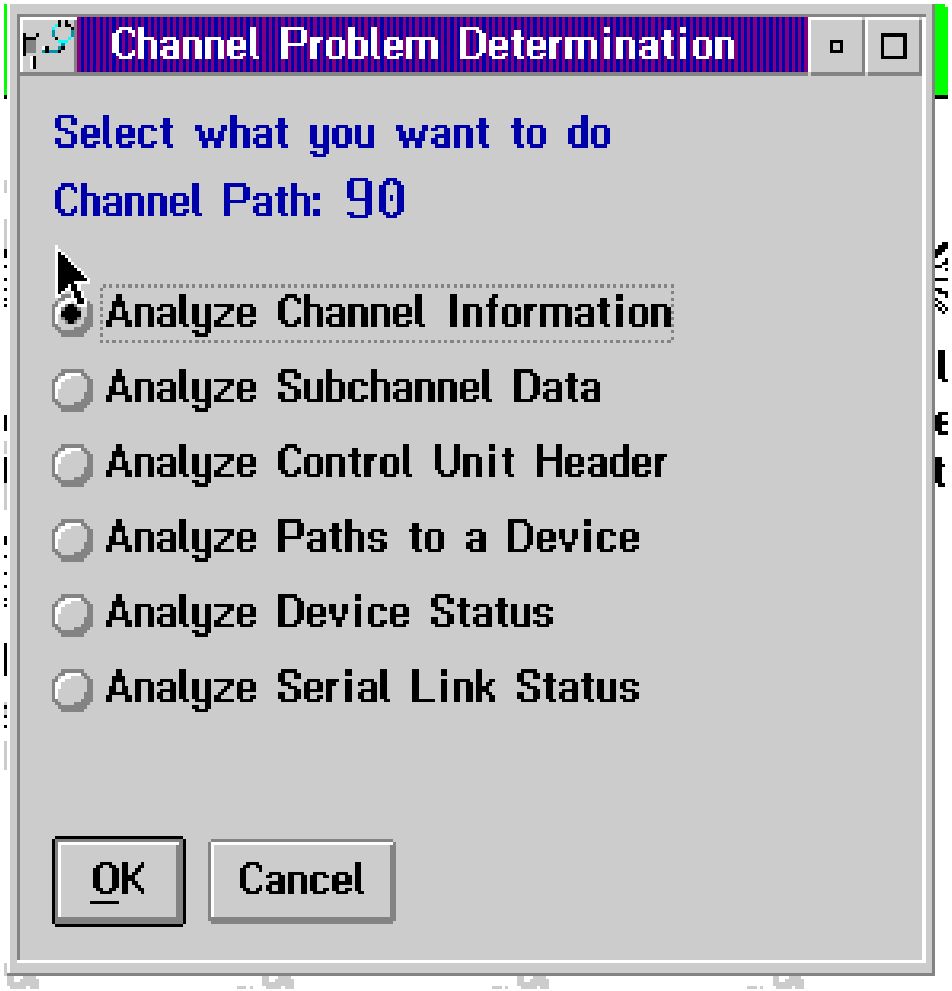


I/O or Channel Problem Determination

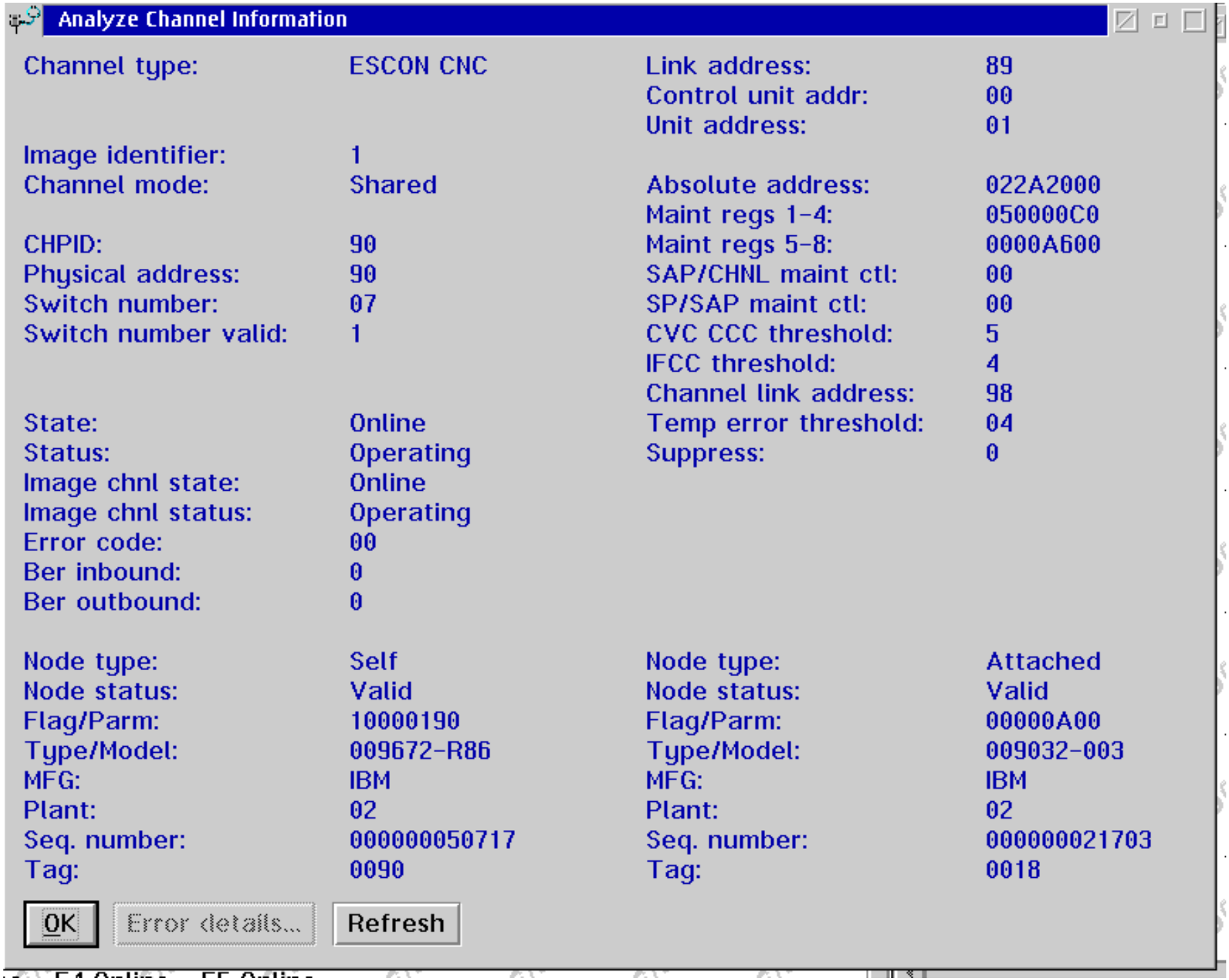


Channel Problem Determination Menu

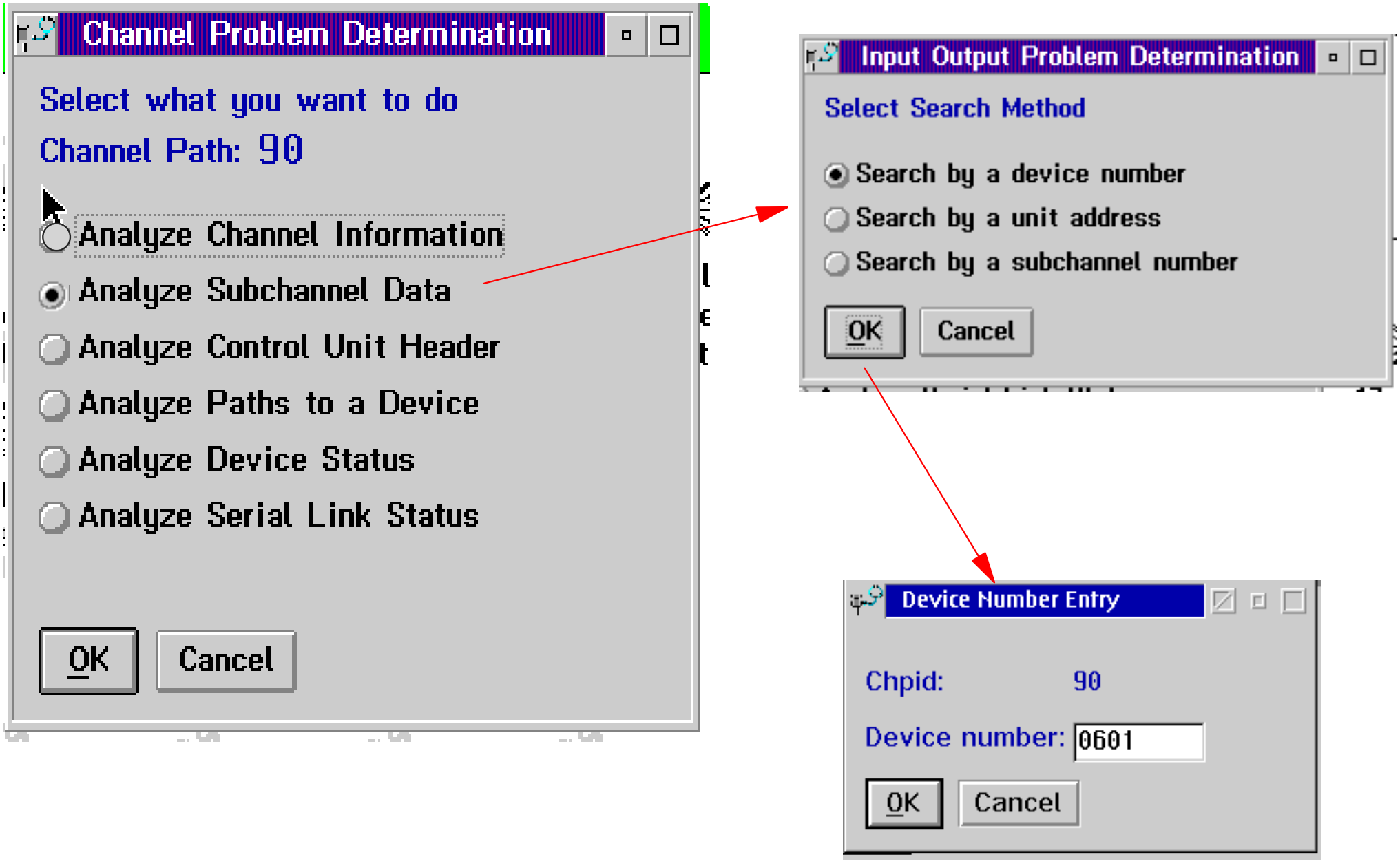
- Provides Channel Information (default selection)
- Subchannel Data is used for device and path PD
- Control Unit Header is used to display control unit information
- Paths to a Device is used for pathing information
- Device Status is used to display the current state of every device defined on the CHPID
- Serial Link Status is used for ESCON link PD



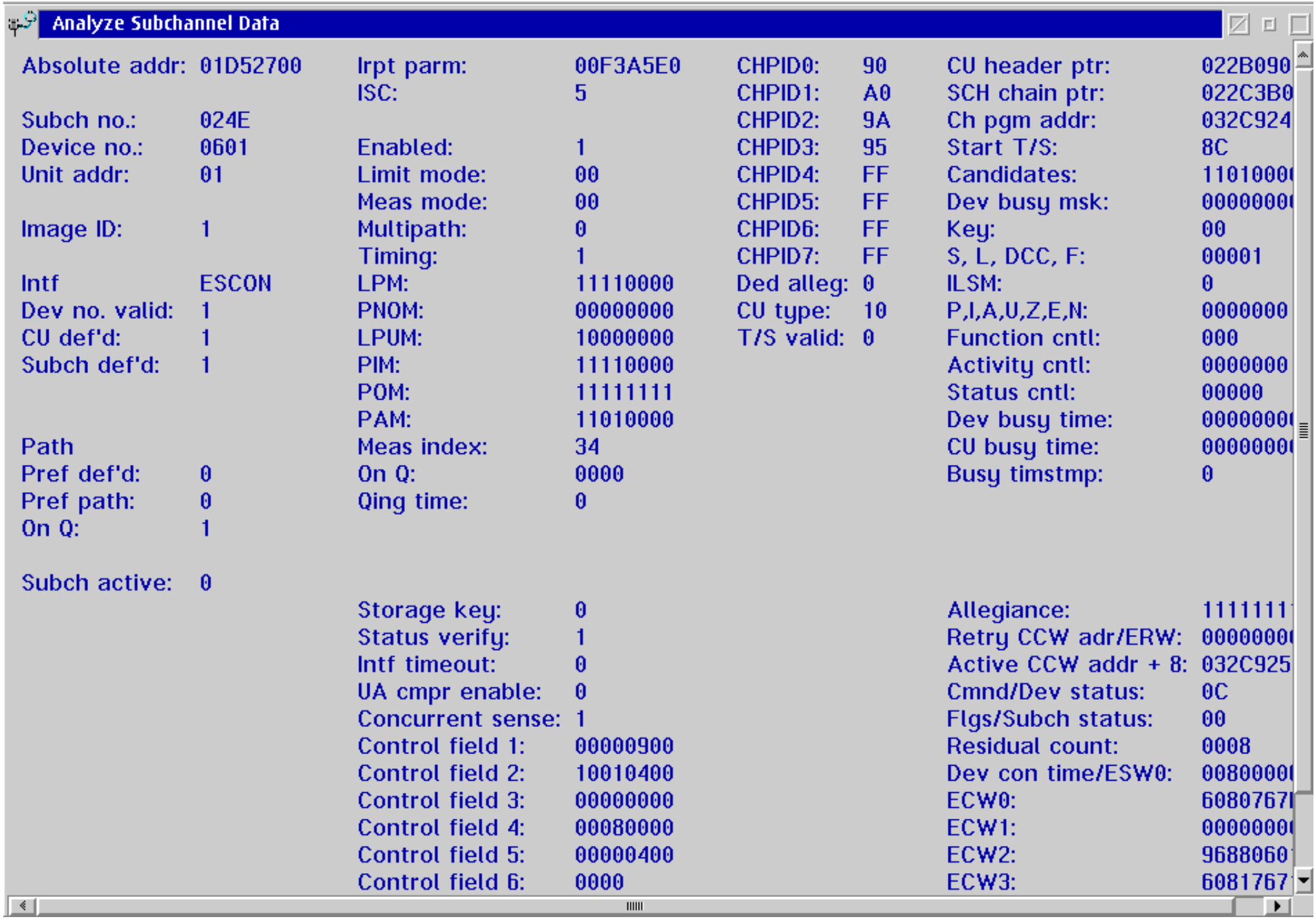
CHPID 90 Channel Information



Displaying Subchannel Data for Device 601

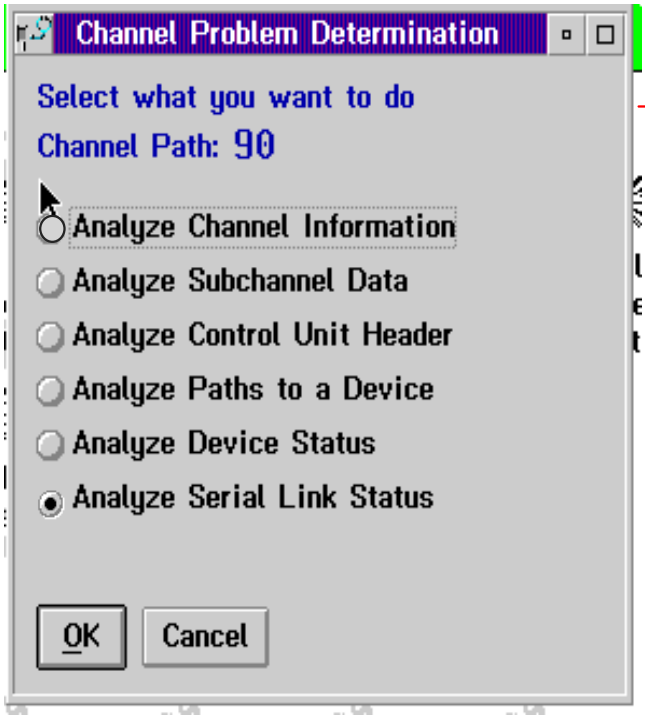


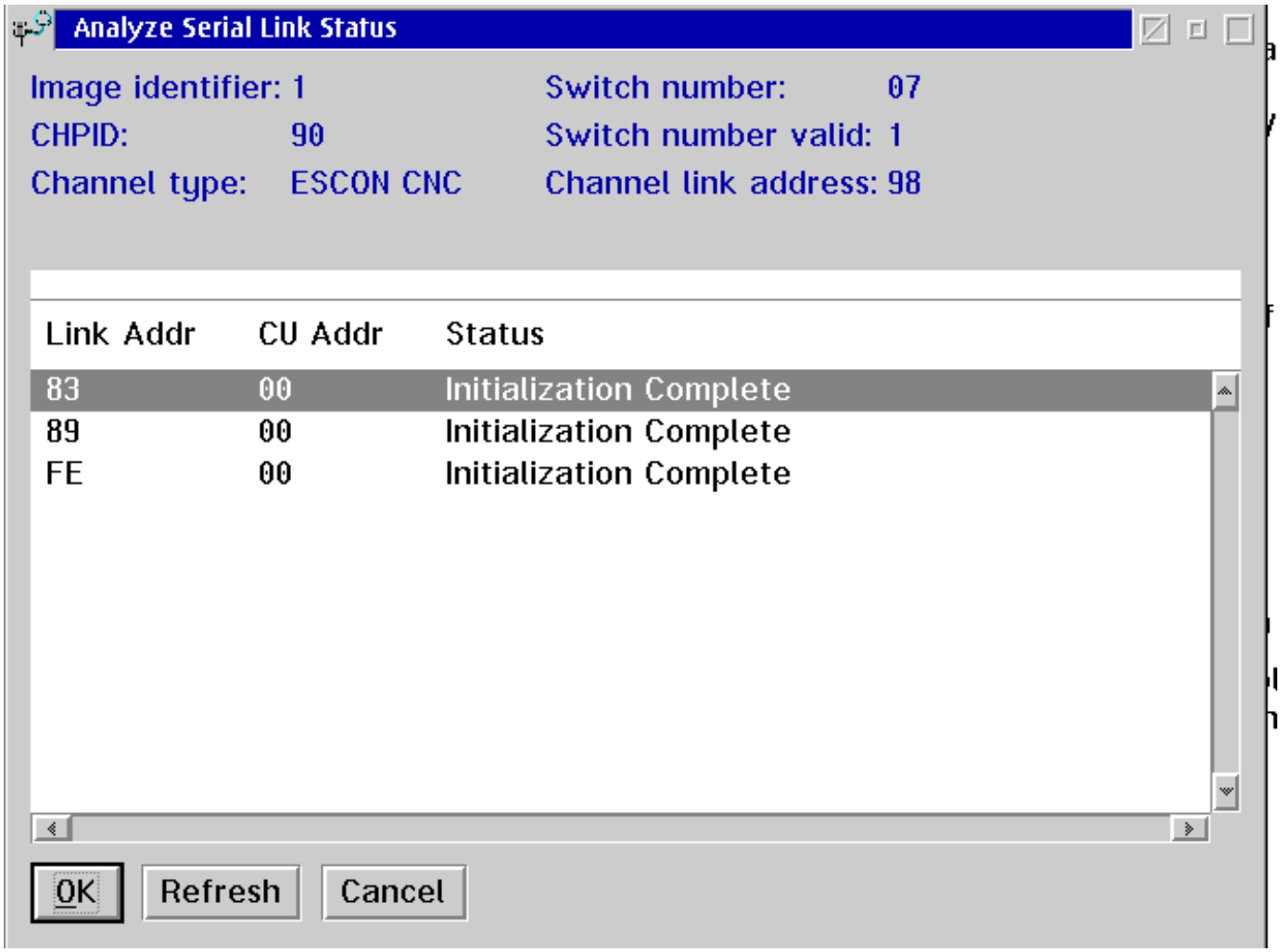
Subchannel Data



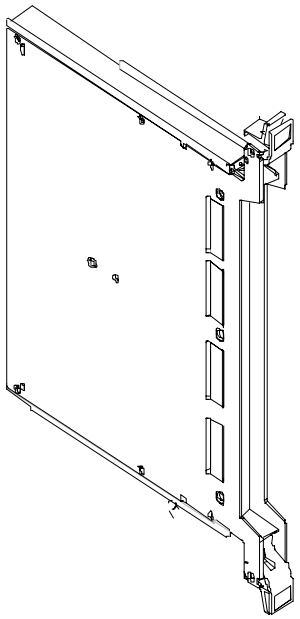
New on PD panel for zSeries

Analyze Serial Link Status





16 Port ESCON Card



ESCON 16 Port channel card

16 Serial Ports

Modes of Operation:
ESCON Native, Conversion BLMPX and BYMPX, Channel-to-Channel

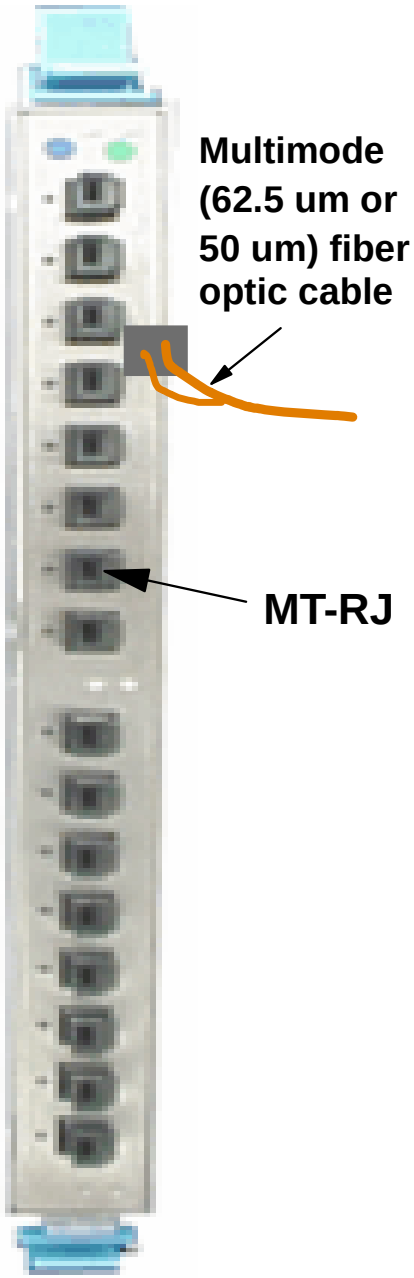
CMOS-6SF Modules with four Serial Channel Engines.

Small Form Factor module and MT-RJ connector

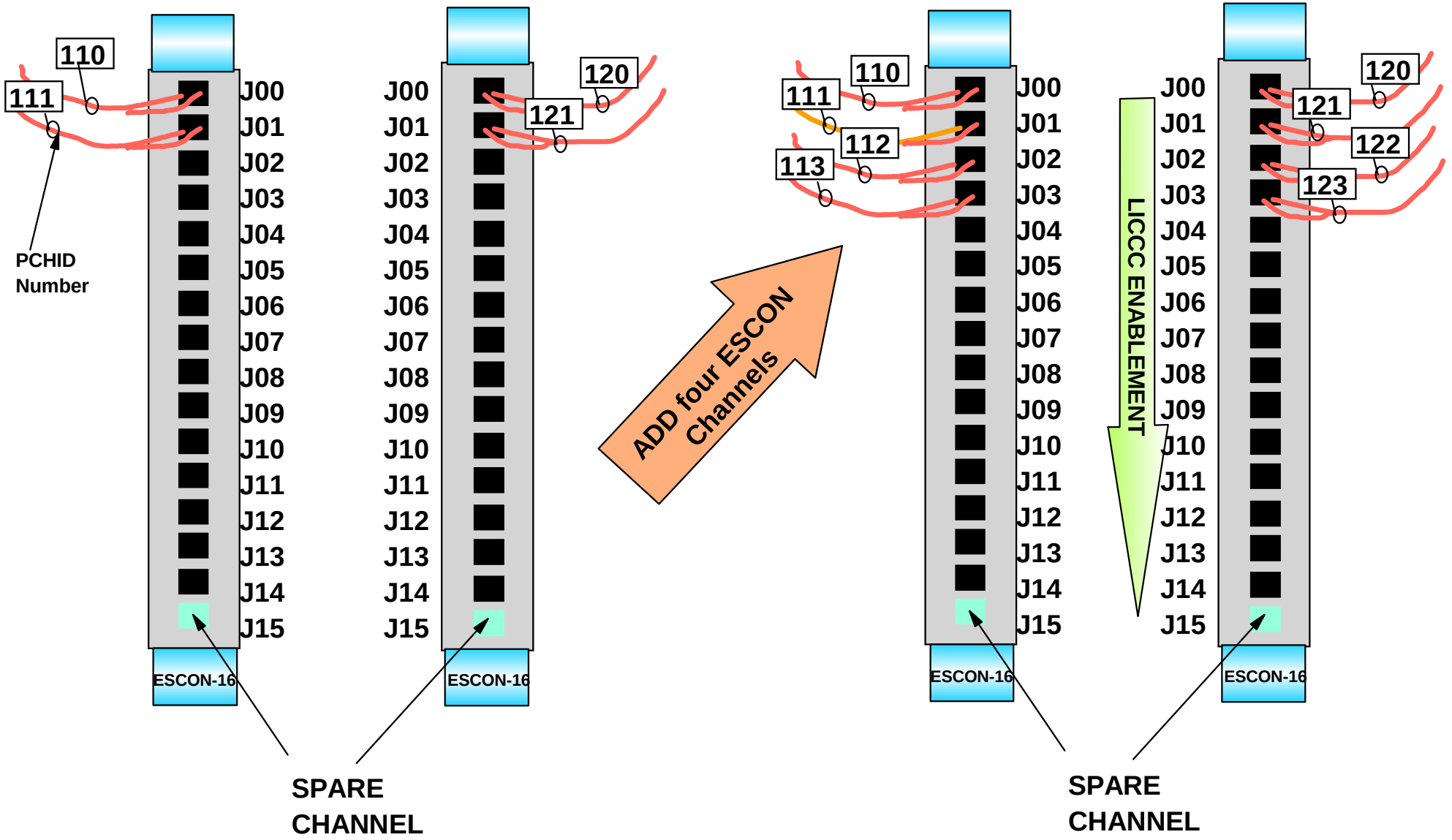
Quick Connect Feature - MT-RJ to MTP Harnesses.

Channel Sparing and

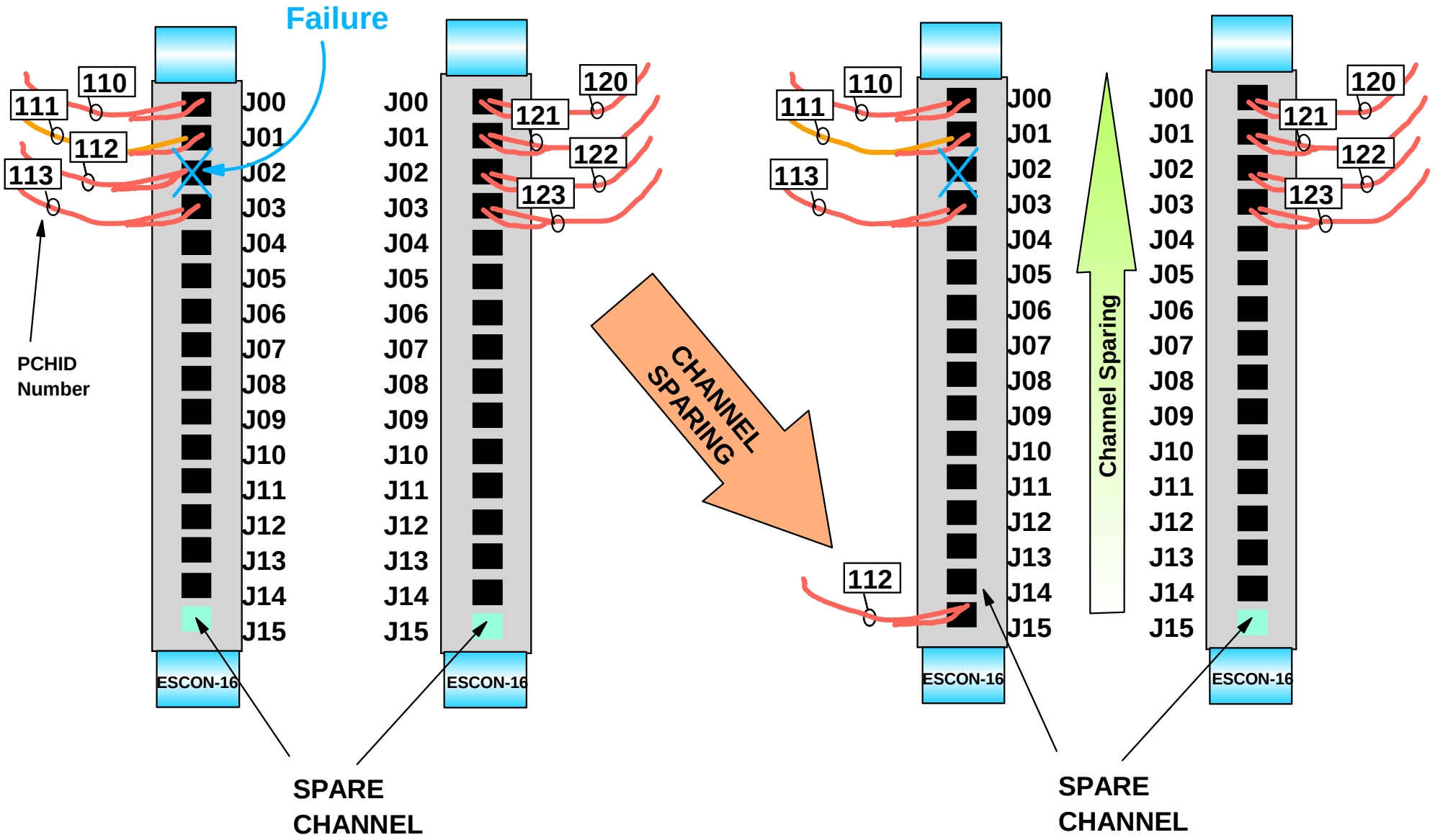
LIC-CC



ESCON-16 LIC-CC Enabled

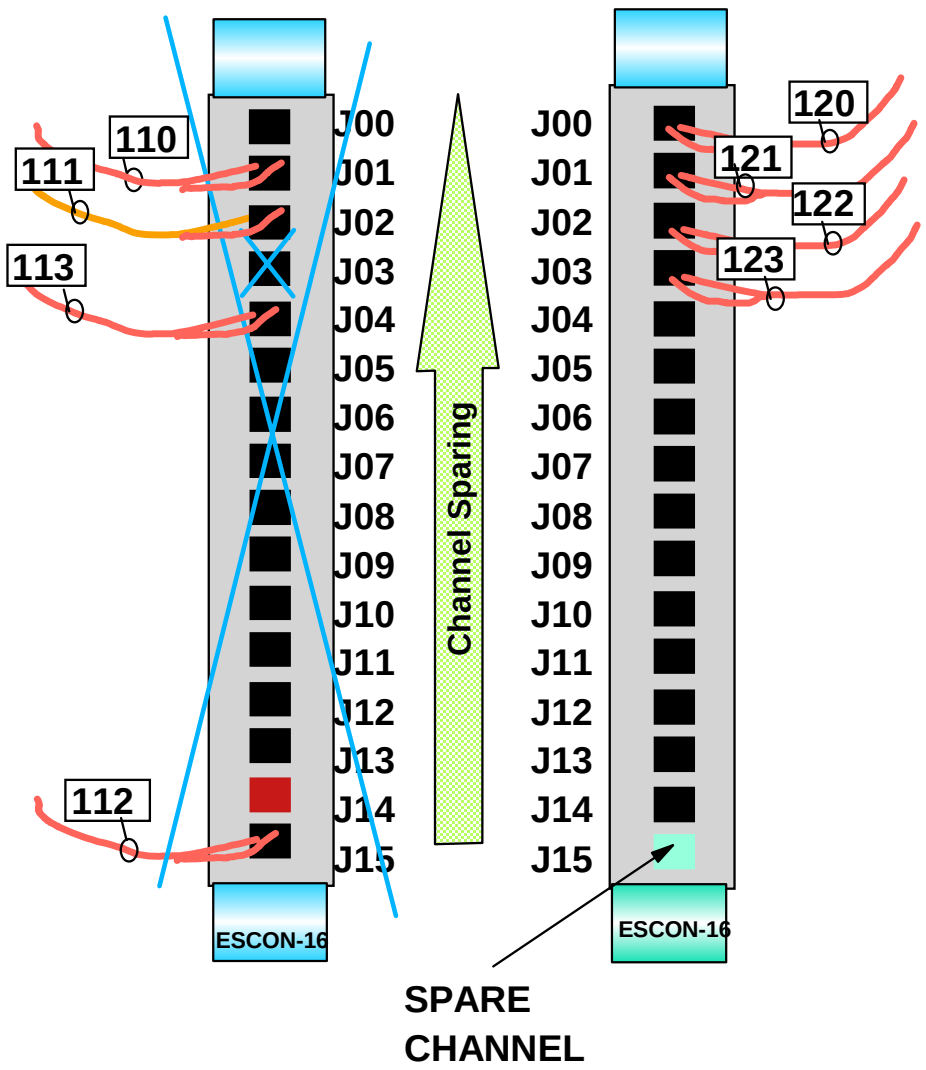


ESCON-16 Channel Sparing

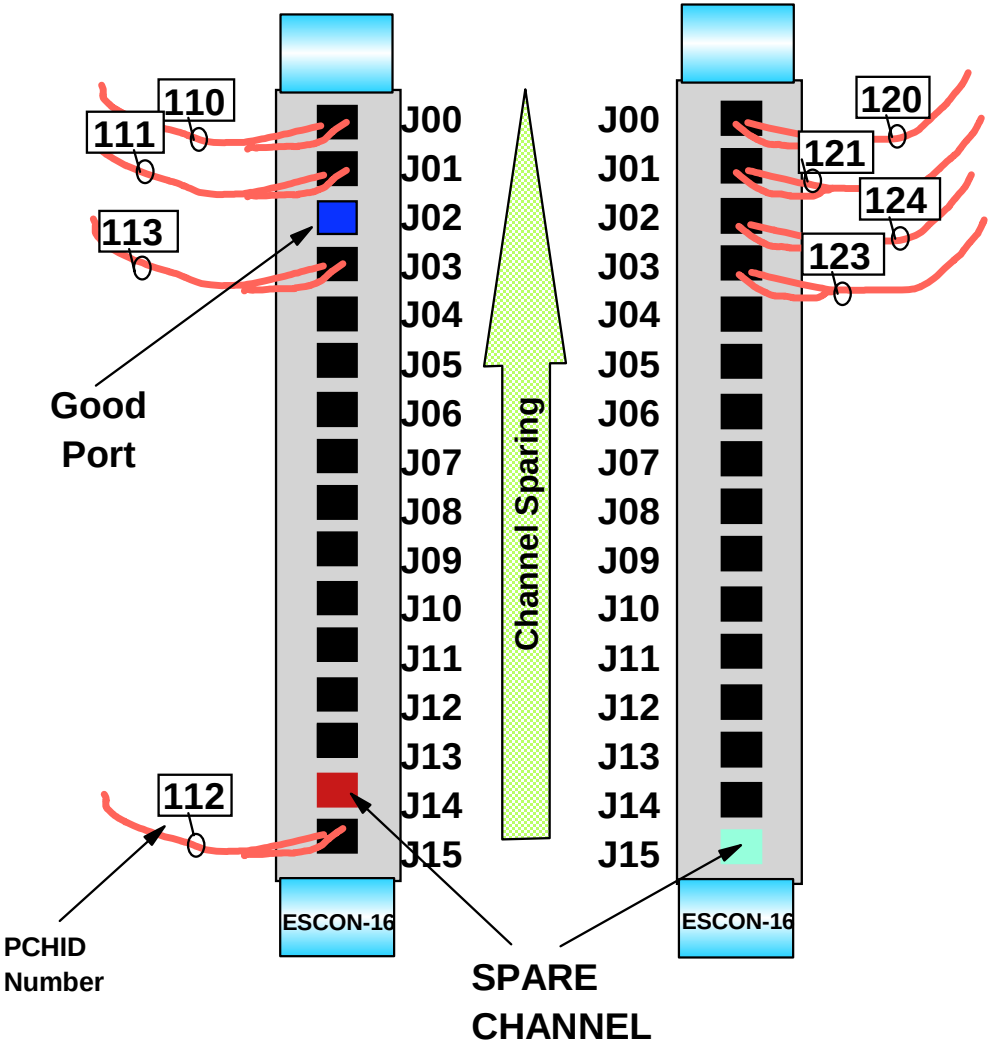


ESCON-16 Card Failure

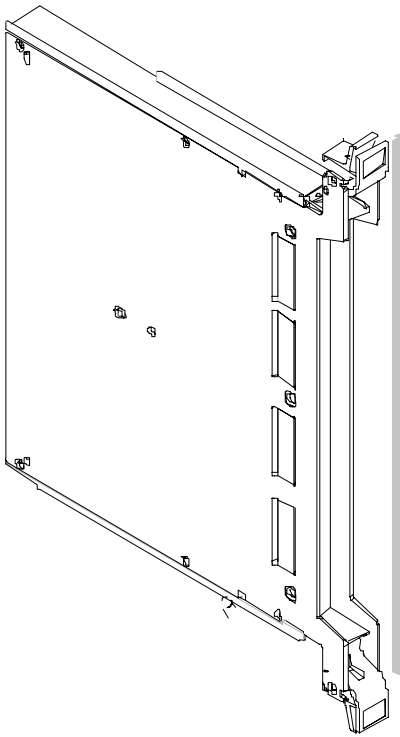
Total card failure



Cables removed, card replaced, cables returned to same location numbers on the new card that were installed at on the failed card.



FICON Express Channel Card



Two Channels per card.

Two Channel Card types:

- **LONG WAVE (LX)**
- **SHORT WAVE (SX)**

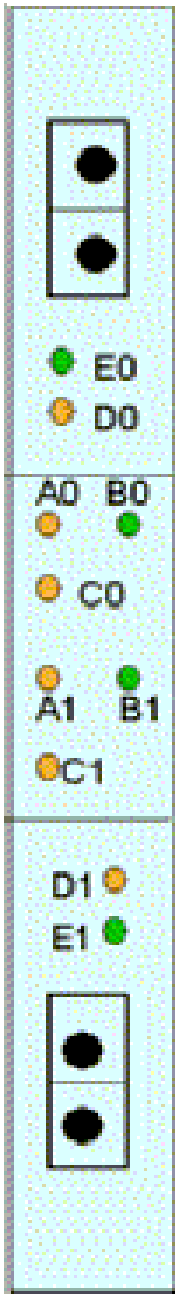
Three Modes of Operation:

- **Conversion Mode (FCV)**
- **Native Mode (FC)**
- **FCP Mode (FCP)**

Link Speed: Two Gb/Sec at 10 Km unrepeated distance (12 Km with RPQ)

Up to 120 FICON Express channels on a z990

Up to 40 FICON Express channels on a z890



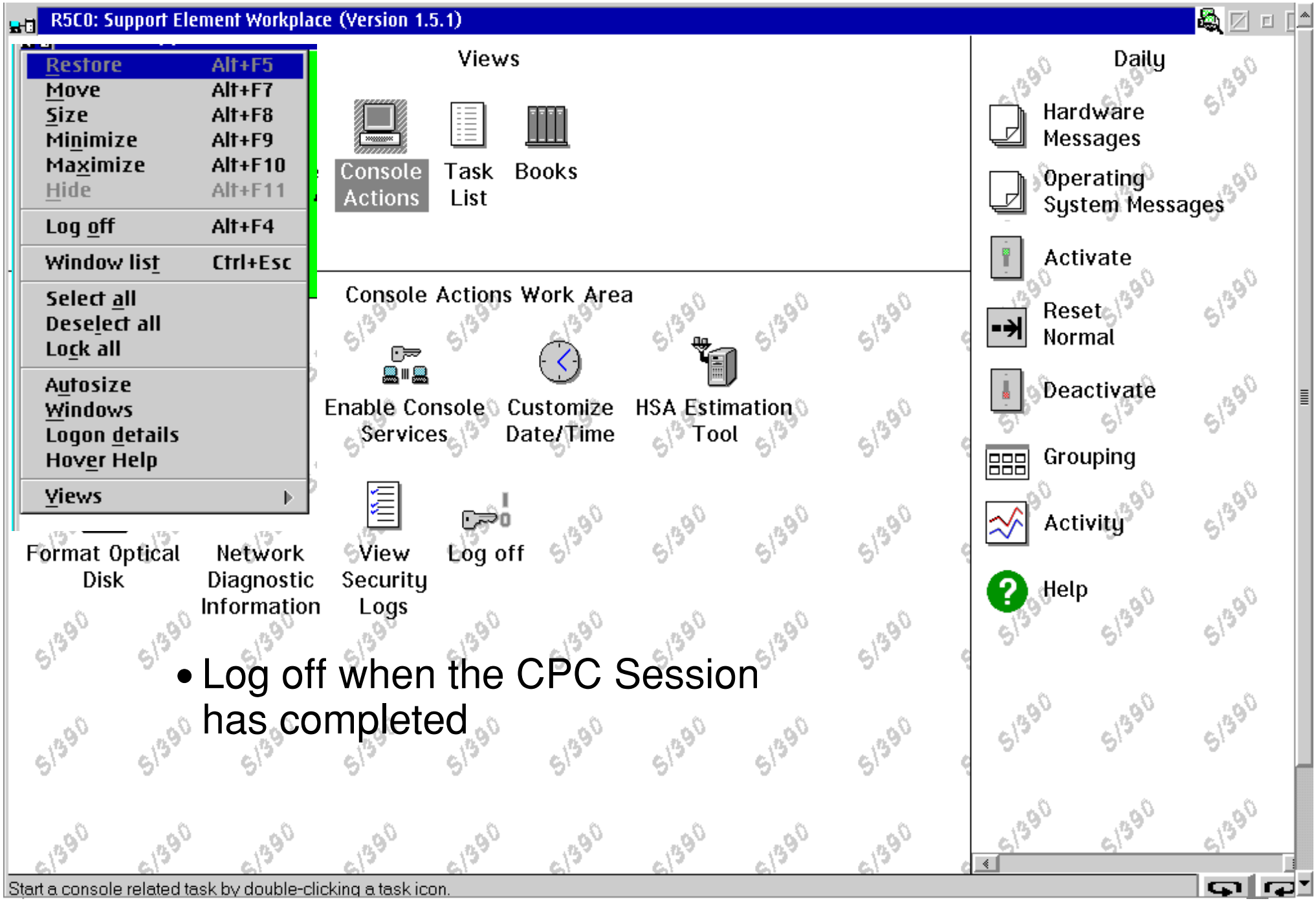
LC Duplex MM

or

LC Duplex SM

Single mode (9 um) or Multimode (62.5 um or 50 um)

Log Off When Finished



- Log off when the CPC Session has completed

Maintenance and PD Tools

FICON directors, in S/390 mode, has the same functions as existing ESCON directors such as;

- Blocking and Prohibiting Ports
- Port Swaps
- Node Descriptor lists and pop-ups

*Node descriptors are a valuable aid to determine cable connectivity location and current status.

Overall the FICON director panels supporting these functions have the familiar look and feel as the ESCON directors. However the layout, use and navigation to the panels are slightly different.

Overview

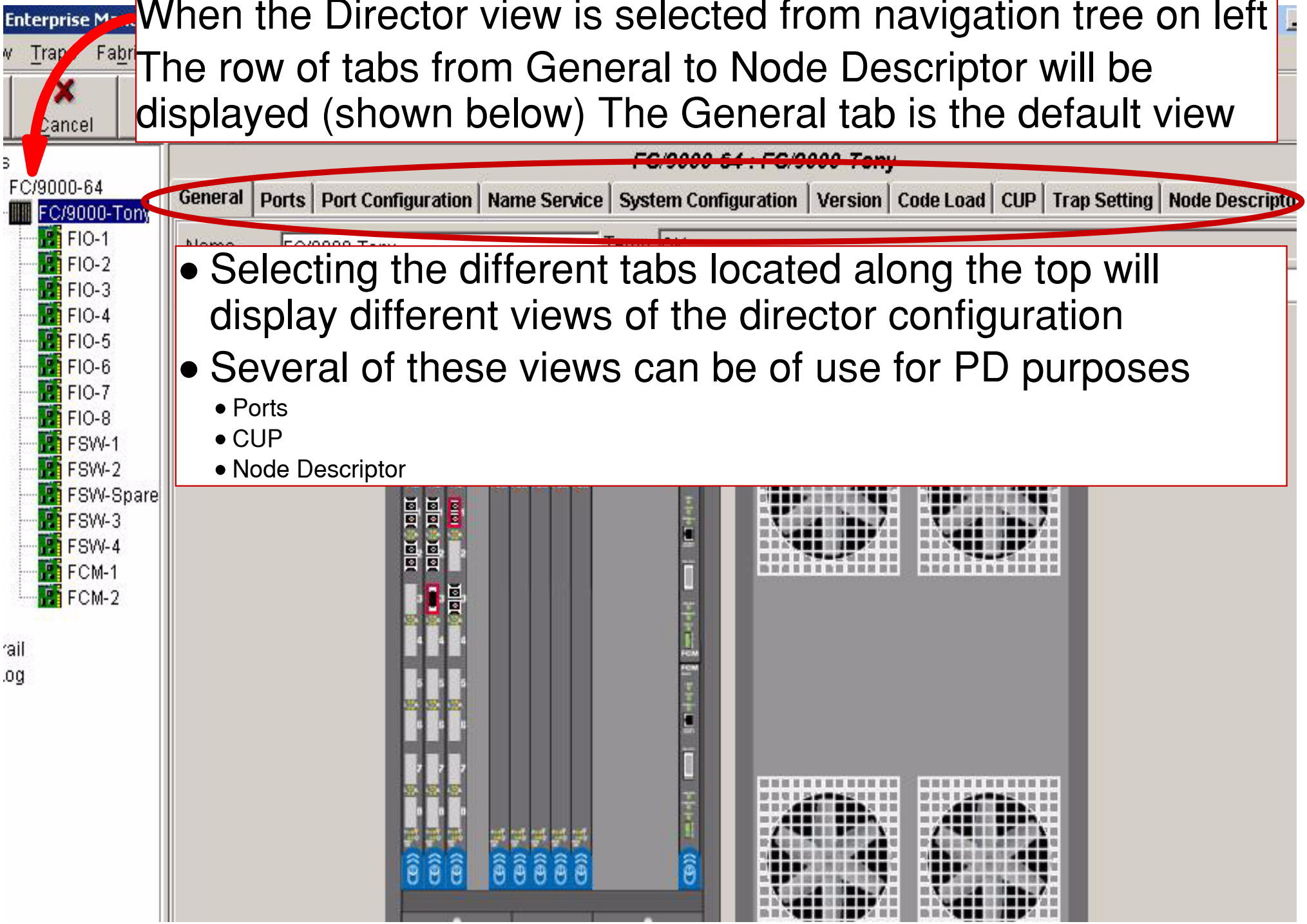
In the following examples we will identify

- General navigation techniques for
  - 2042 (InRange director)
  - 2032 (McData director)
- Screens that may be of use for Problem Determination (PD) and connectivity issues
- Potential PD flow for an Alert issued against a FICON director

- There can, and usually are, multiple ways to navigate FICON director panels. Not all possibilities are shown.
- Panels and navigation shown may change depending on code levels of directors and their associated manager products

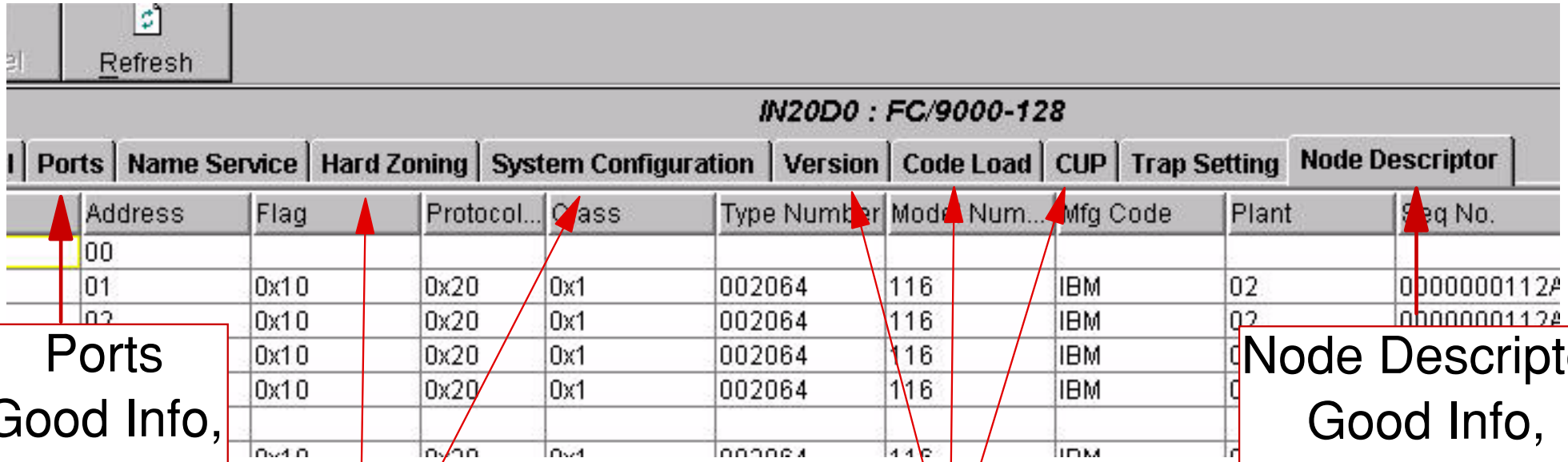
2042 (InRange)

When the Director view is selected from navigation tree on left The row of tabs from General to Node Descriptor will be displayed (shown below) The General tab is the default view



- Selecting the different tabs located along the top will display different views of the director configuration
- Several of these views can be of use for PD purposes
  - Ports
  - CUP
  - Node Descriptor

Tab usage



Ports Good Info, will take a closer look

- Hard Zoning - Code dependent may not be present in S/390 (FICON) mode
- System Configuration Identifies configuration info, director s/n, FICON, CUP support, domain ID, etc

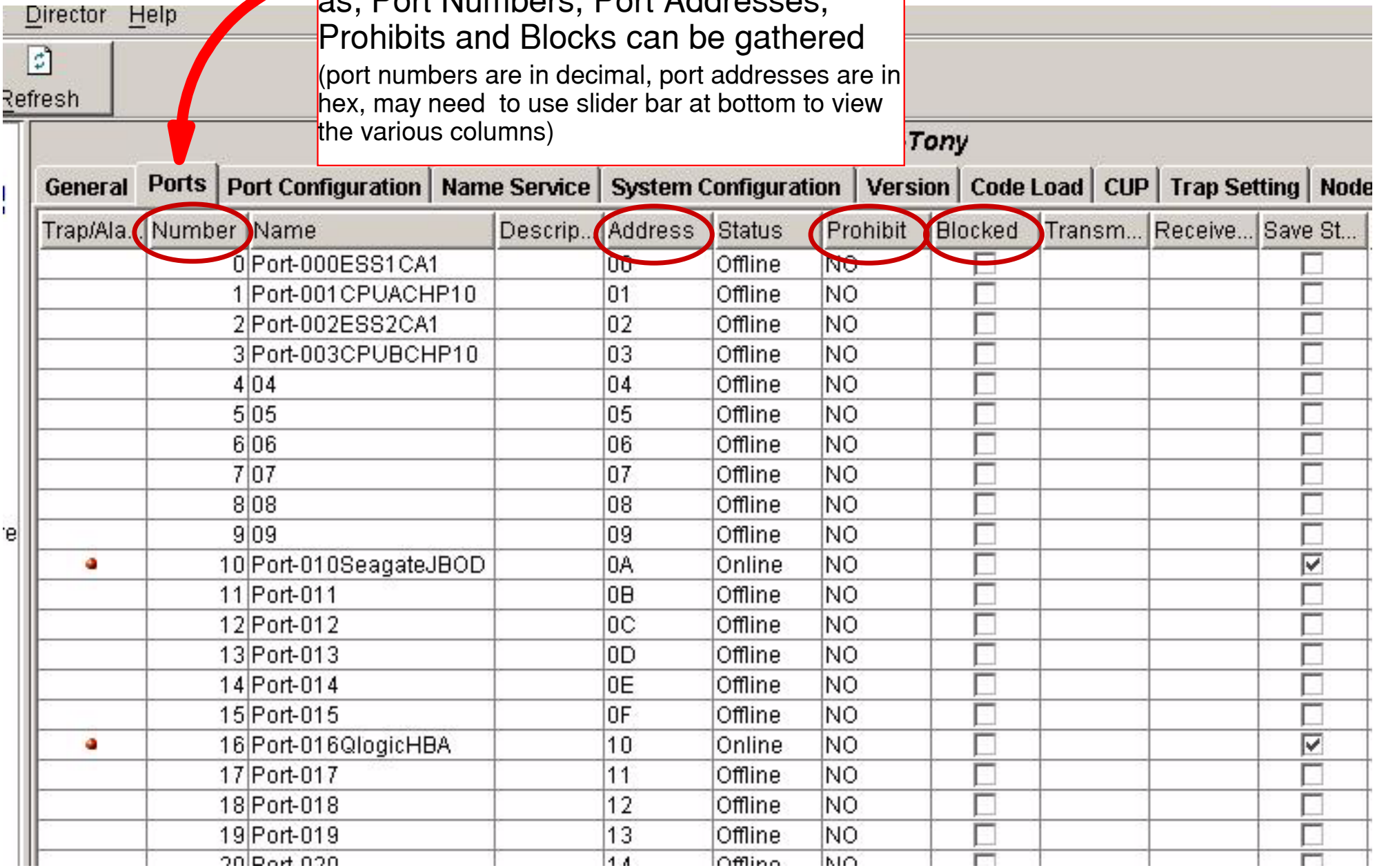
- Version - Identifies code version levels for supported functions
- Code Load -firmware level of director
- Cup - Tab is displayed if director supports CUP function, can set active=saved, enable host control select config files

Node Descriptor Good Info, will take a closer look

Ports Tab

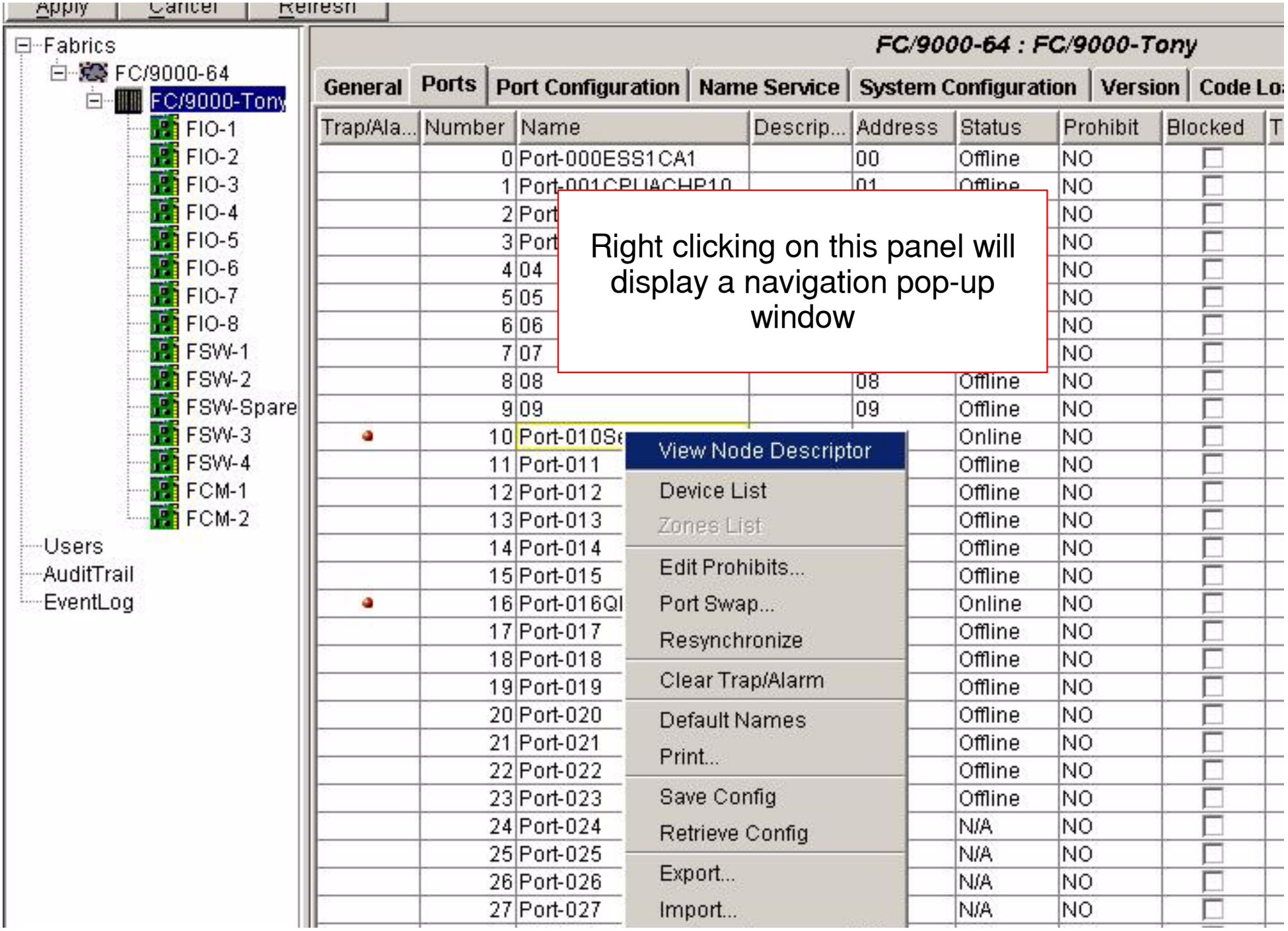
From the '**Ports**' tab information such as; Port Numbers, Port Addresses, Prohibits and Blocks can be gathered

(port numbers are in decimal, port addresses are in hex, may need to use slider bar at bottom to view the various columns)

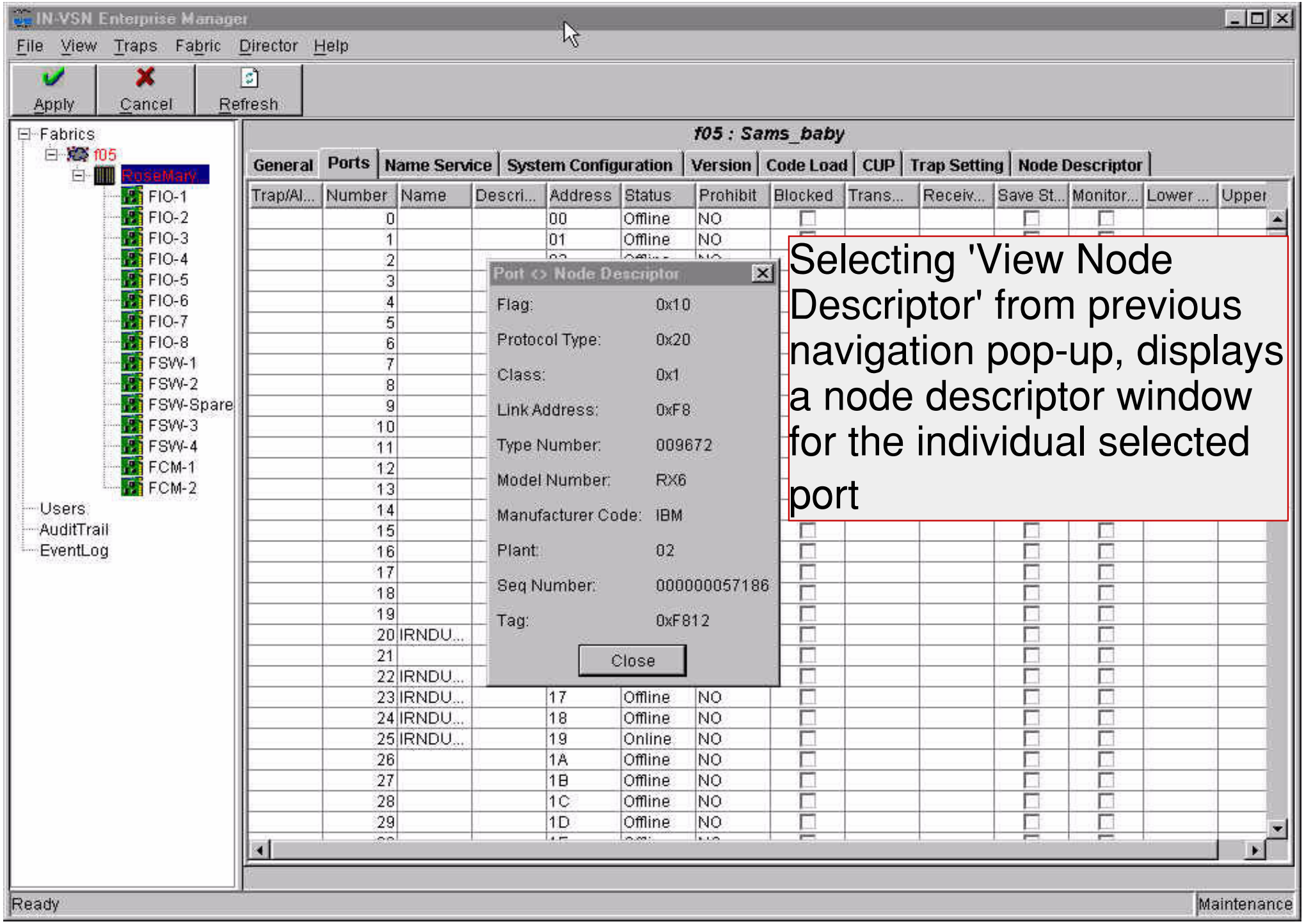


Trap/Ala...	Number	Name	Descrip...	Address	Status	Prohibit	Blocked	Transm...	Receive...	Save St...
	0	Port-000ESS1CA1		00	Offline	NO	☐			☐
	1	Port-001CPUACHP10		01	Offline	NO	☐			☐
	2	Port-002ESS2CA1		02	Offline	NO	☐			☐
	3	Port-003CPUBCHP10		03	Offline	NO	☐			☐
	4	04		04	Offline	NO	☐			☐
	5	05		05	Offline	NO	☐			☐
	6	06		06	Offline	NO	☐			☐
	7	07		07	Offline	NO	☐			☐
	8	08		08	Offline	NO	☐			☐
	9	09		09	Offline	NO	☐			☐
●	10	Port-010SeagateJBOD		0A	Online	NO	☐			☑
	11	Port-011		0B	Offline	NO	☐			☐
	12	Port-012		0C	Offline	NO	☐			☐
	13	Port-013		0D	Offline	NO	☐			☐
	14	Port-014		0E	Offline	NO	☐			☐
	15	Port-015		0F	Offline	NO	☐			☐
●	16	Port-016QlogicHBA		10	Online	NO	☐			☑
	17	Port-017		11	Offline	NO	☐			☐
	18	Port-018		12	Offline	NO	☐			☐
	19	Port-019		13	Offline	NO	☐			☐
	20	Port-020		14	Offline	NO	☐			☐

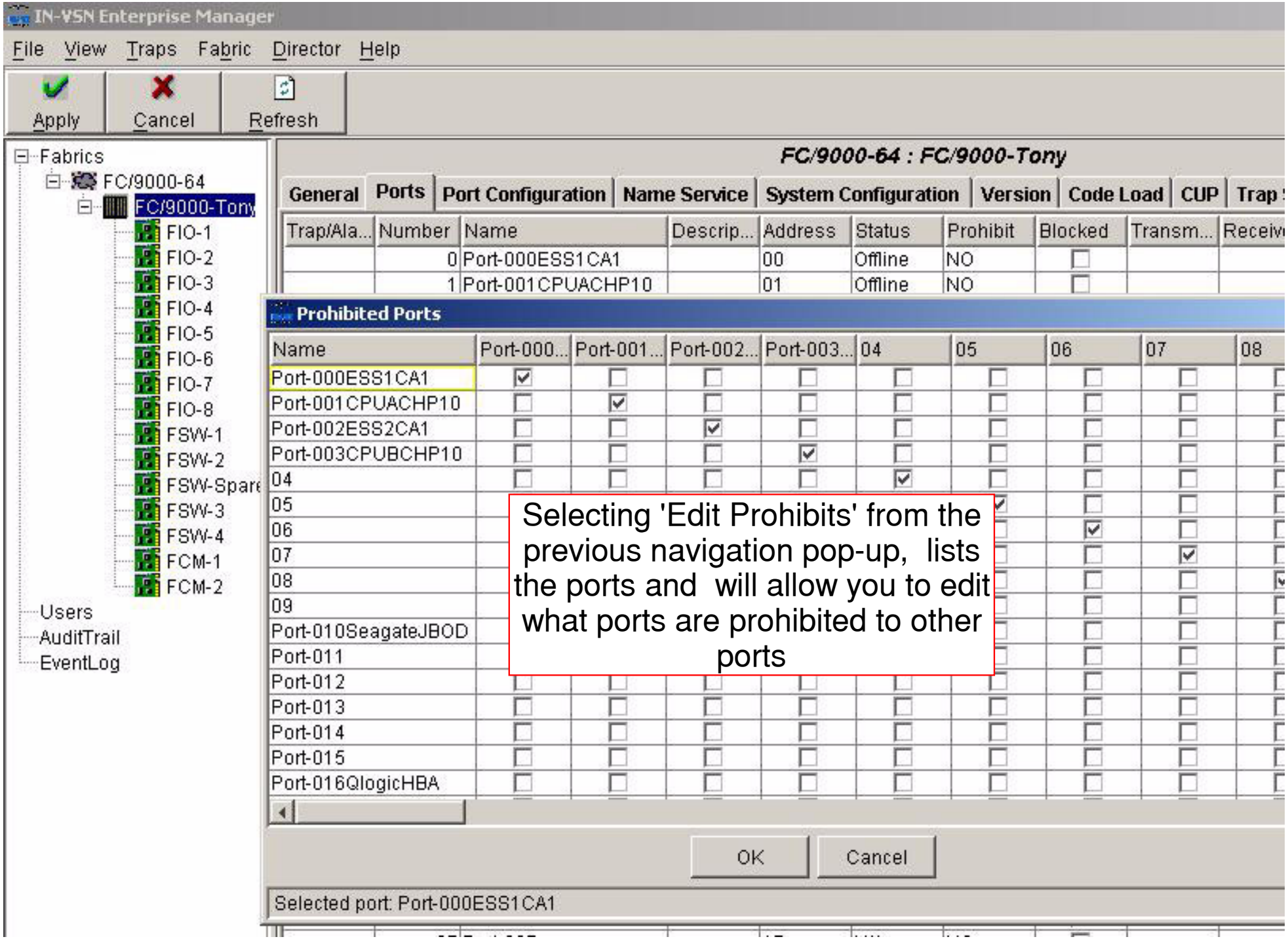
Right click Navigation



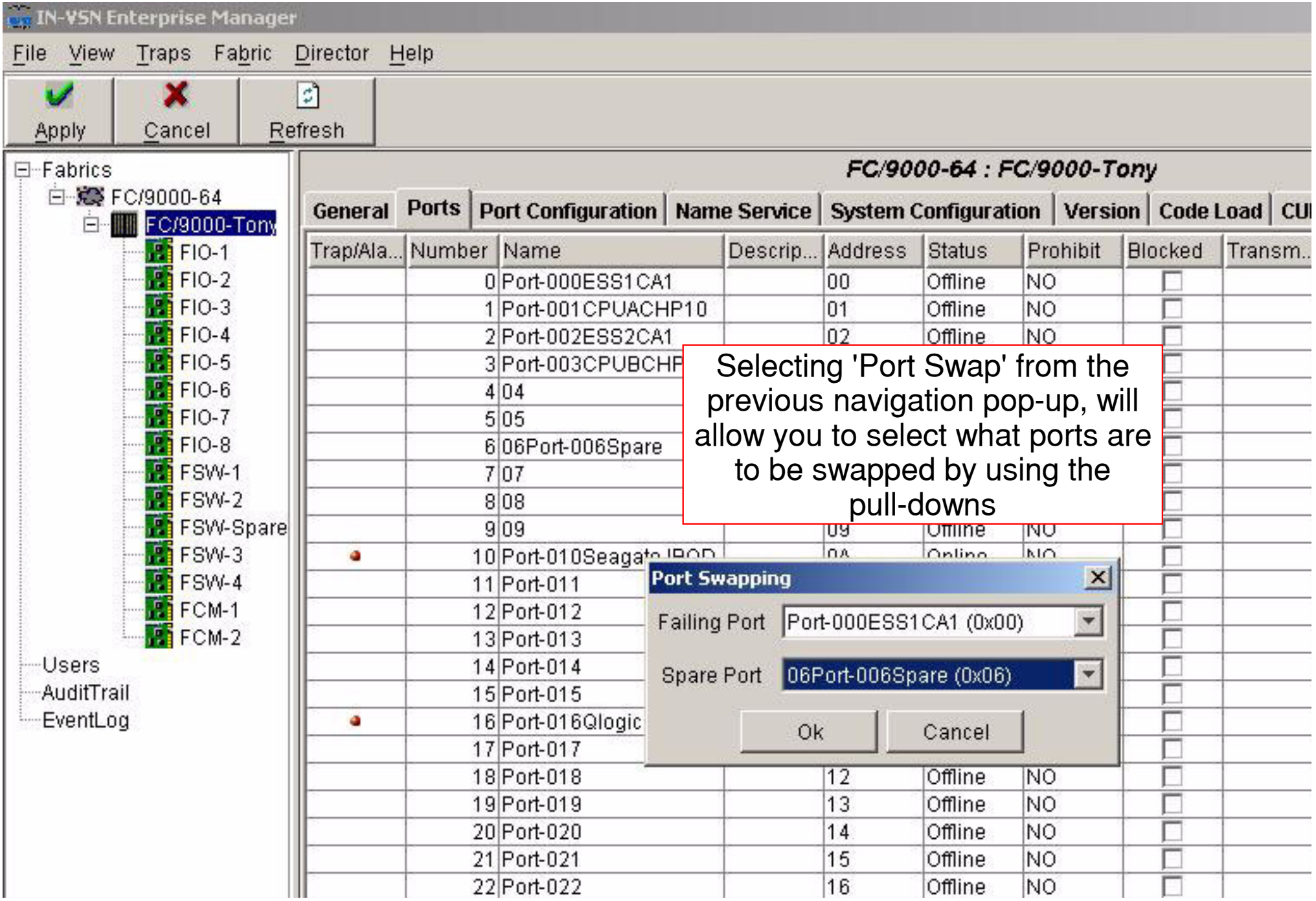
Pop-up Node descriptor or ports



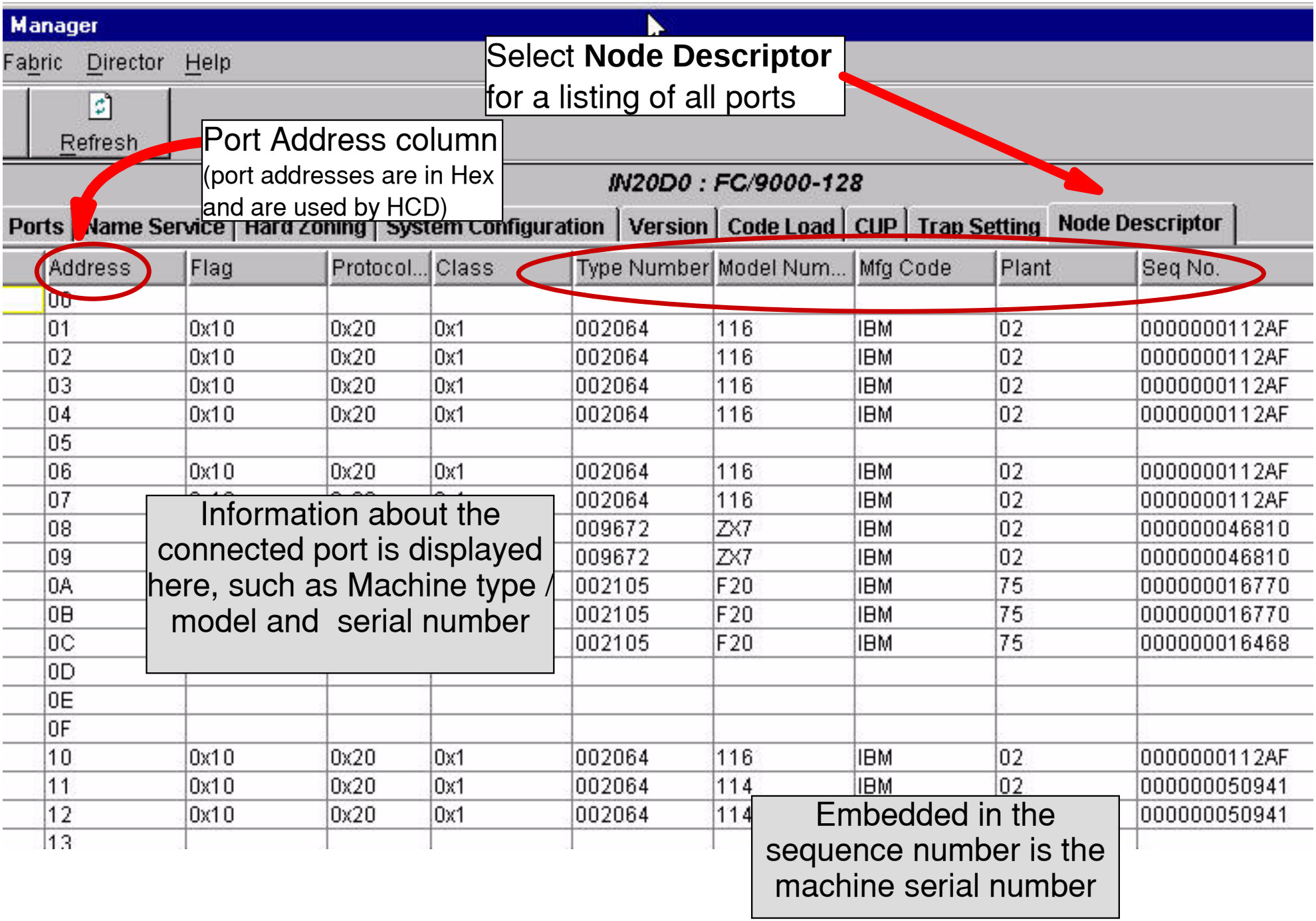
Edit Prohibit Port list



Port Swapping



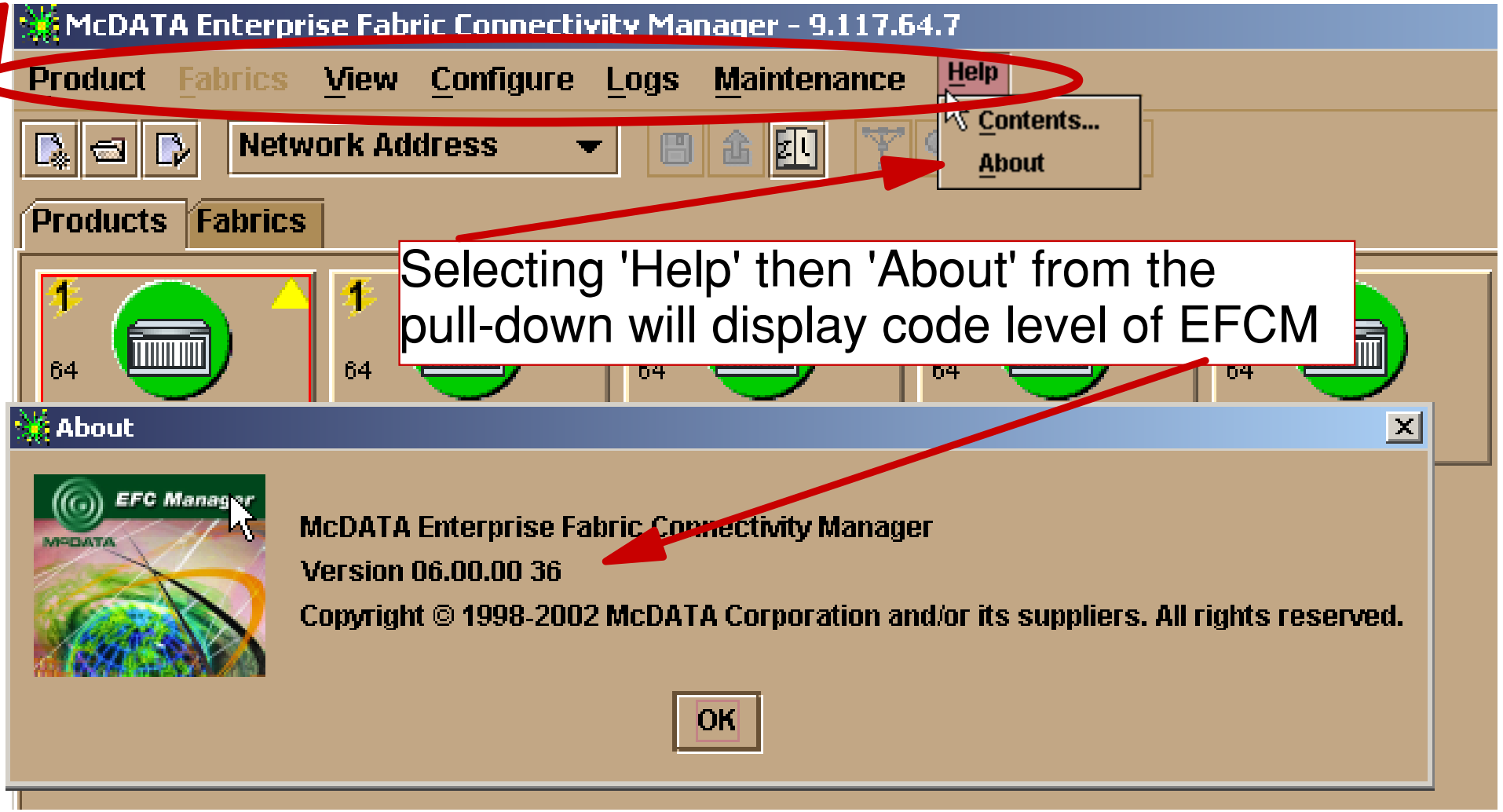
Node Descriptor List



Address	Flag	Protocol...	Class	Type Number	Model Num...	Mfg Code	Plant	Seq No.
00								
01	0x10	0x20	0x1	002064	116	IBM	02	0000000112AF
02	0x10	0x20	0x1	002064	116	IBM	02	0000000112AF
03	0x10	0x20	0x1	002064	116	IBM	02	0000000112AF
04	0x10	0x20	0x1	002064	116	IBM	02	0000000112AF
05								
06	0x10	0x20	0x1	002064	116	IBM	02	0000000112AF
07				002064	116	IBM	02	0000000112AF
08				009672	ZX7	IBM	02	000000046810
09				009672	ZX7	IBM	02	000000046810
0A				002105	F20	IBM	75	000000016770
0B				002105	F20	IBM	75	000000016770
0C				002105	F20	IBM	75	000000016468
0D								
0E								
0F								
10	0x10	0x20	0x1	002064	116	IBM	02	0000000112AF
11	0x10	0x20	0x1	002064	114	IBM	02	000000050941
12	0x10	0x20	0x1	002064	114			000000050941
13								

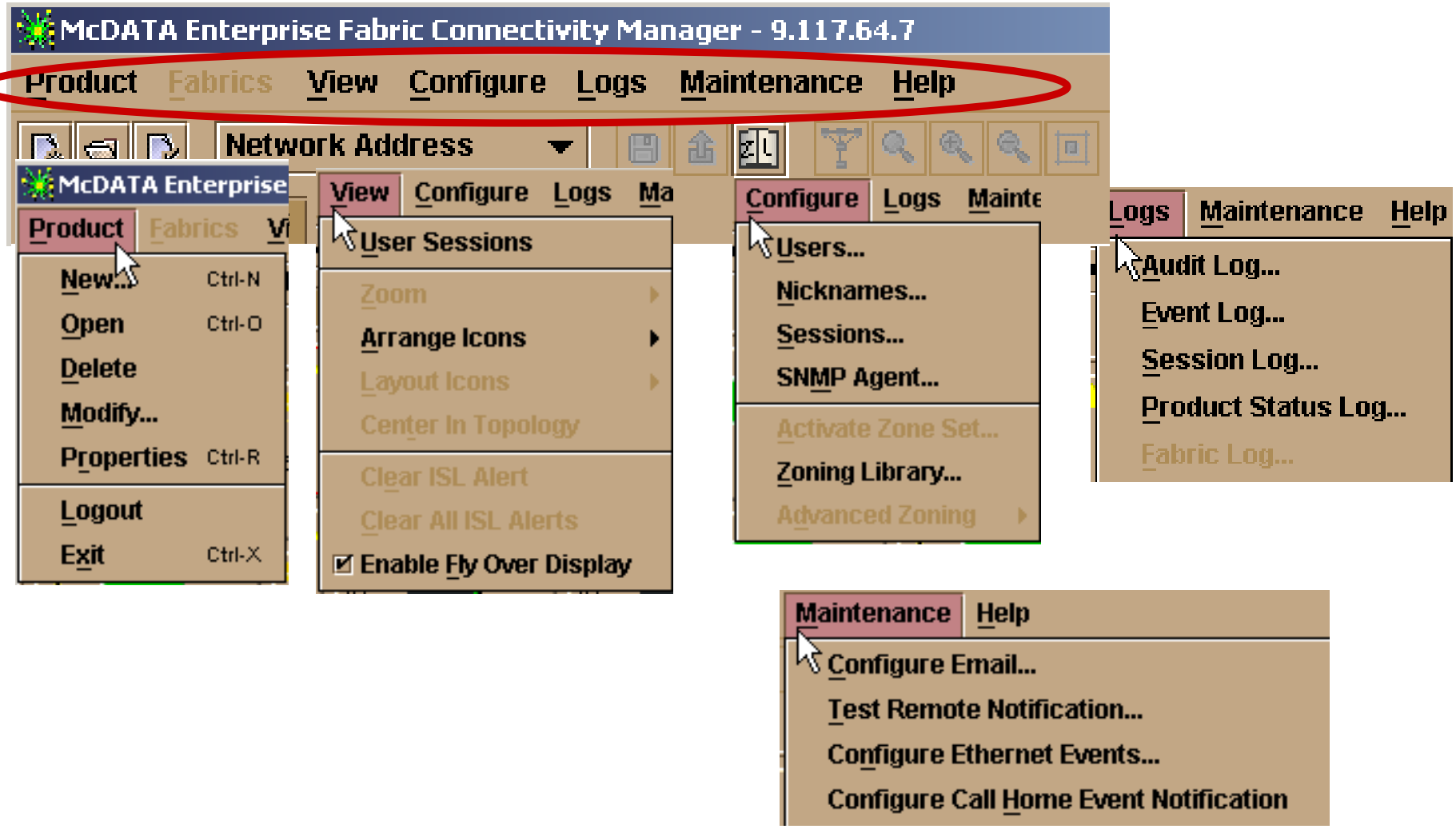
2032 - 64 (McData) Default View

Once you are logged into the EFCM, depending on code level, Tabs along the top may be used for navigation. The menu selections from these tabs will change once a 'Product' or switch is opened. (Previous code levels used ICONs stacked on the left side instead of the tab selections)



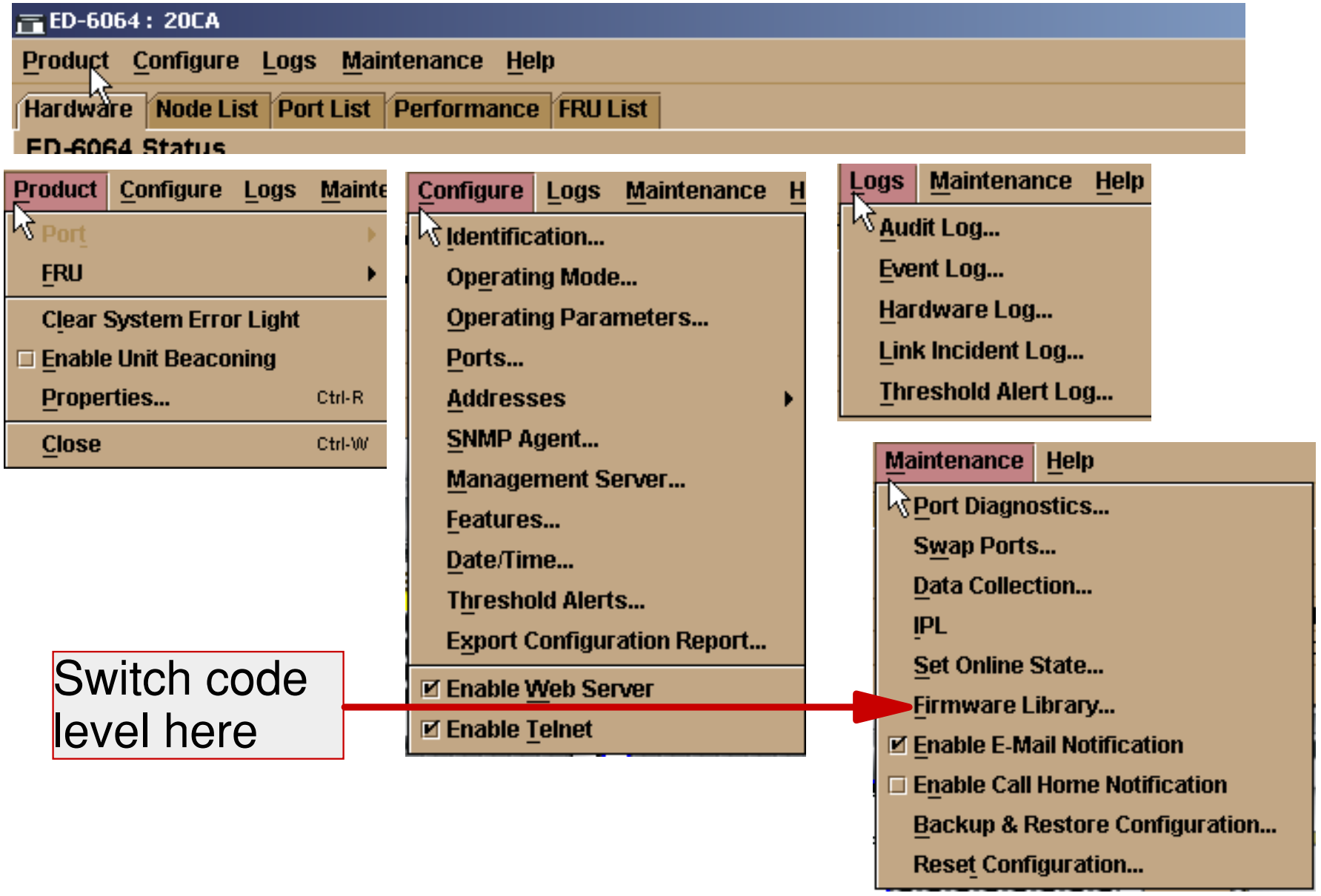
2032 (Pull-downs - Switch Not Opened)

Pull-down selections from navigation tabs before a switch is opened



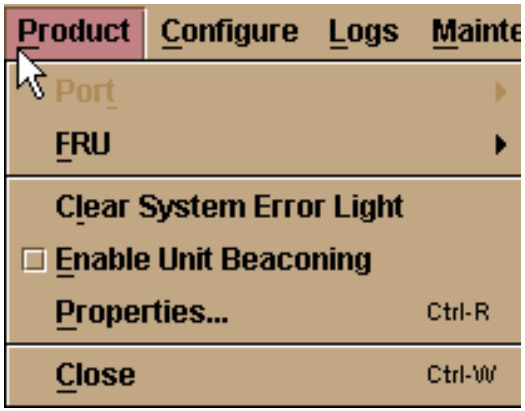
2032 (Pull-downs - Switch Opened)

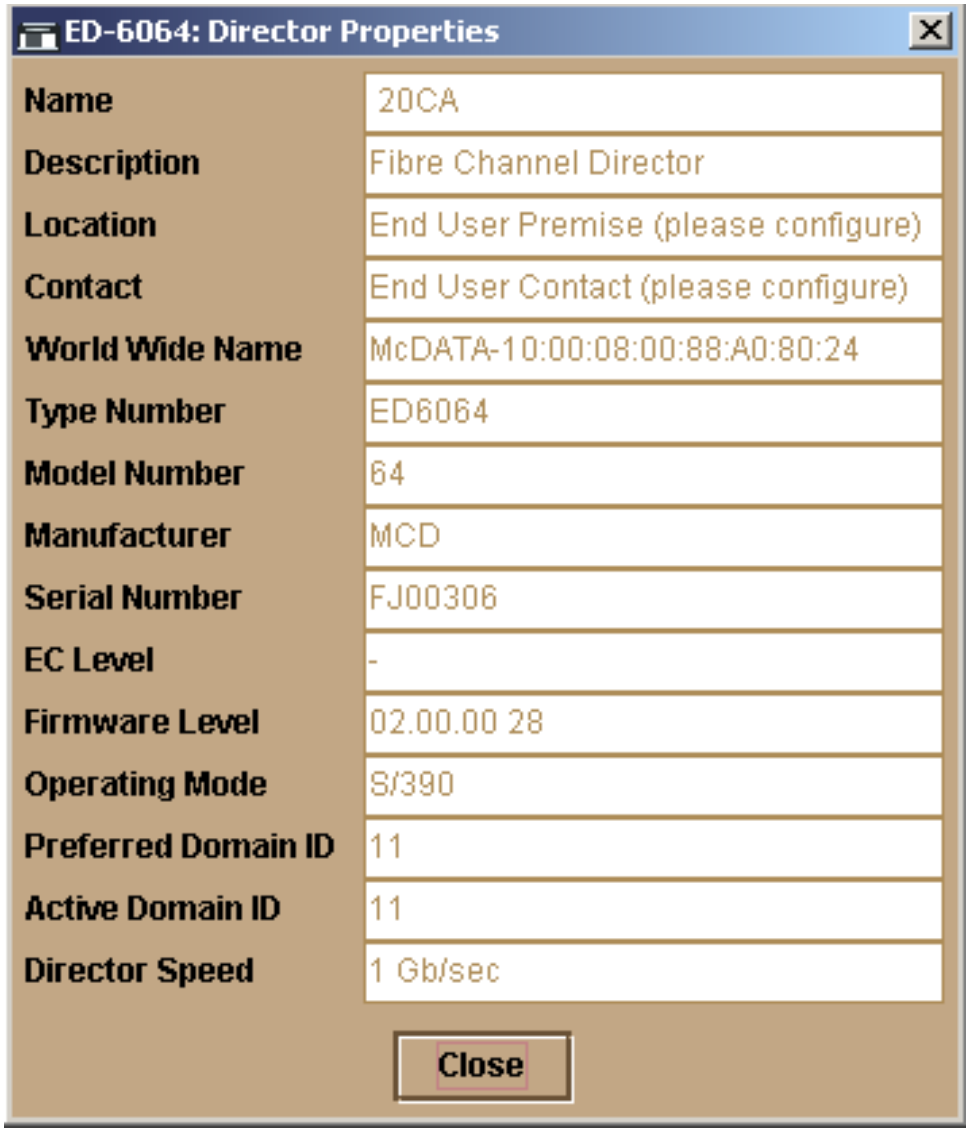
Pull-down selections from navigation tabs **after** a switch is opened



2032 General Navigation windows (1 of 2)

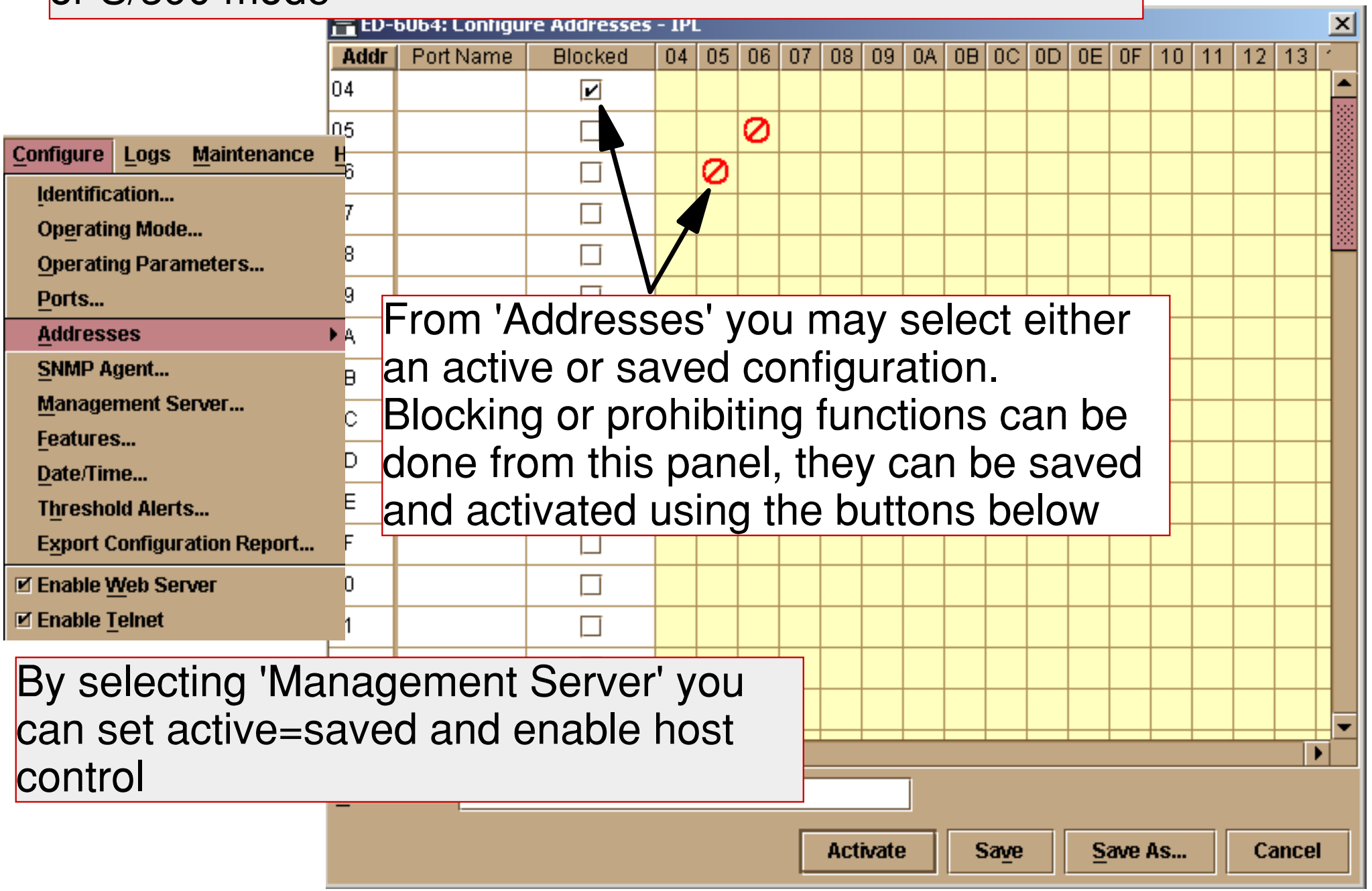
By Selecting 'Properties' from the 'Product' Pull-down, useful information can be obtained about the director





2032 General Navigation windows (2 of 2)

By selecting 'Operating Mode' you can set Open Systems or S/390 mode

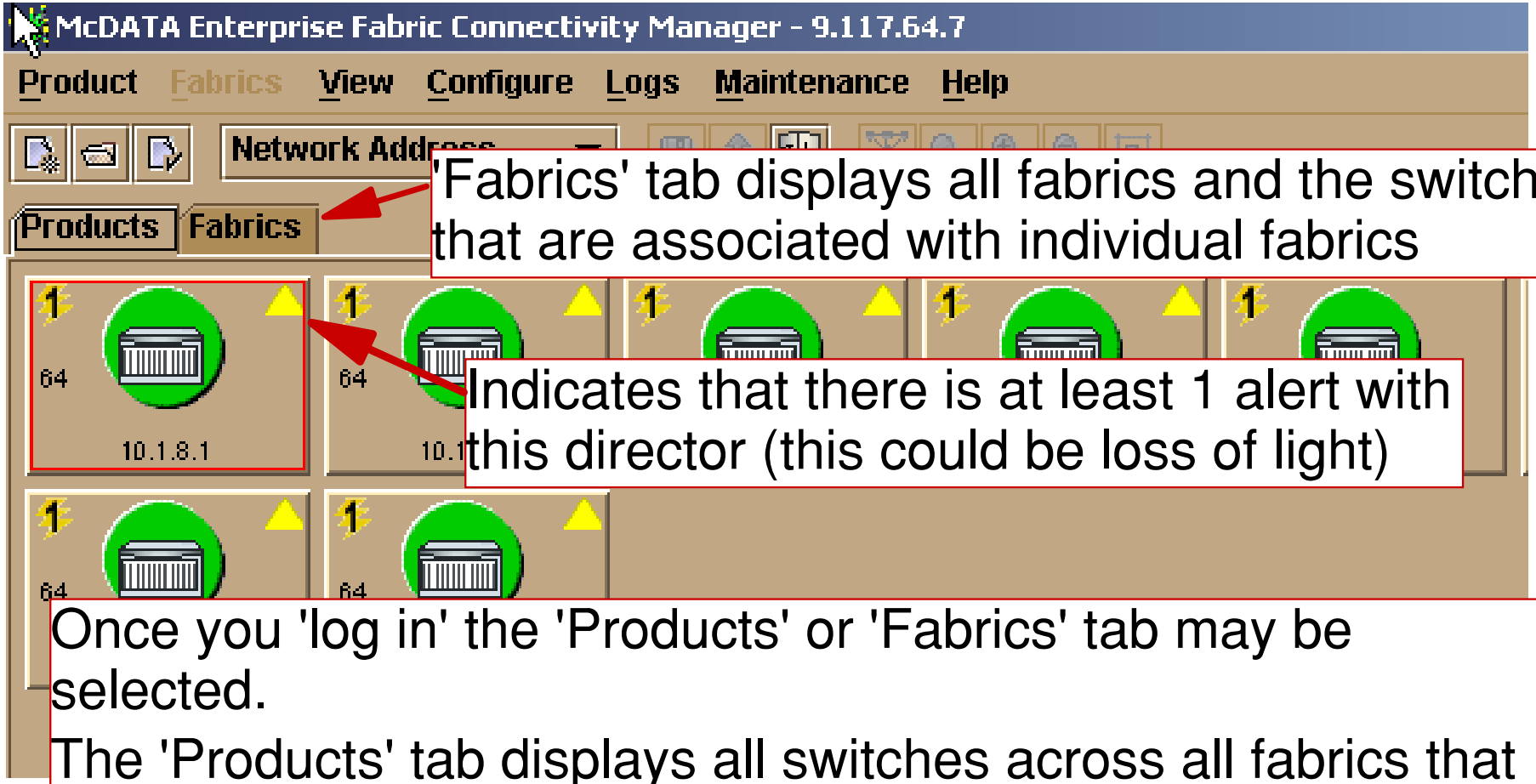


From 'Addresses' you may select either an active or saved configuration. Blocking or prohibiting functions can be done from this panel, they can be saved and activated using the buttons below

By selecting 'Management Server' you can set active=saved and enable host control

2032 (McData Director PD flow)

Now, Lets take a look at some navigational techniques to identify errors and/or connectivity issues

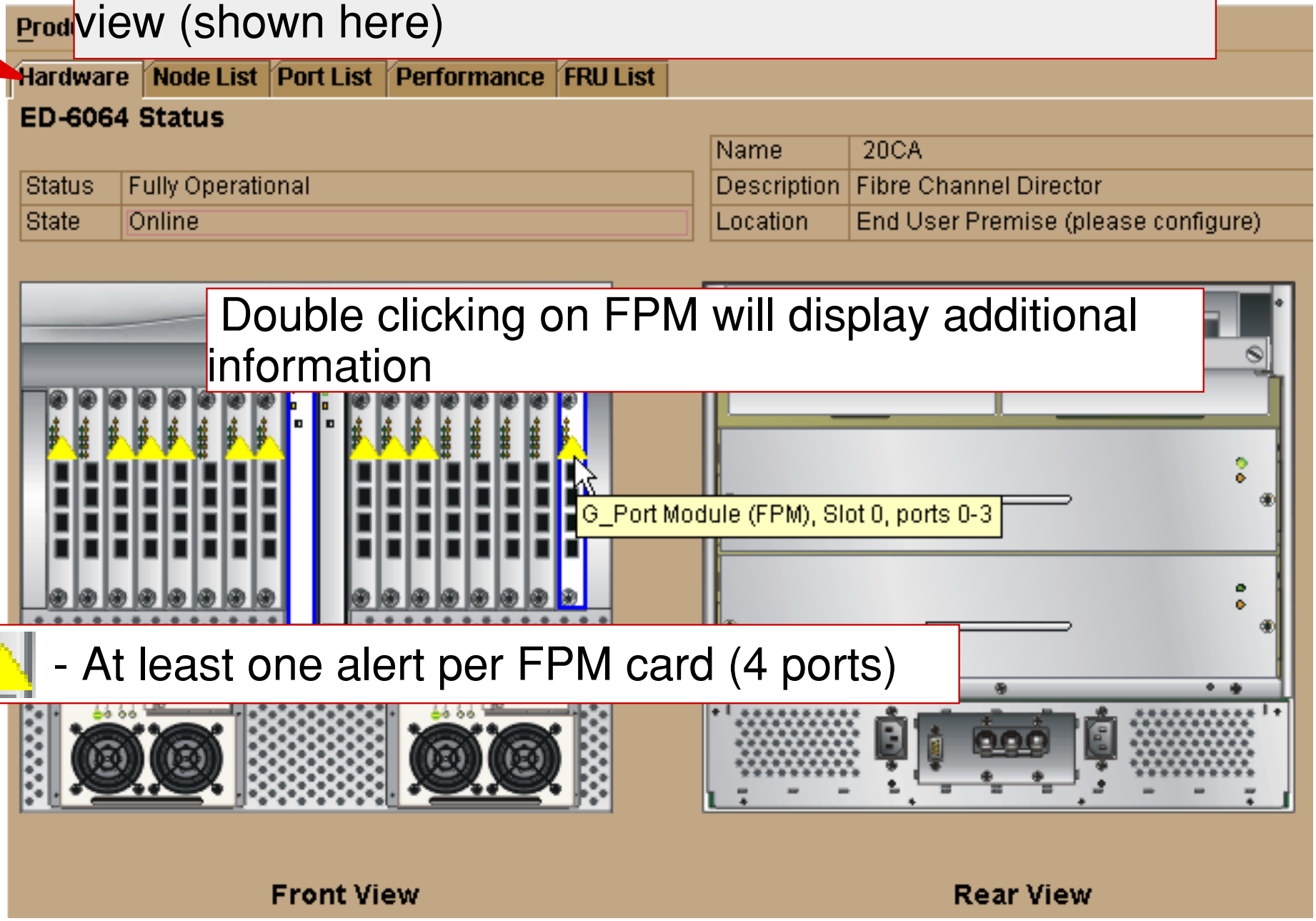


Once you 'log in' the 'Products' or 'Fabrics' tab may be selected.

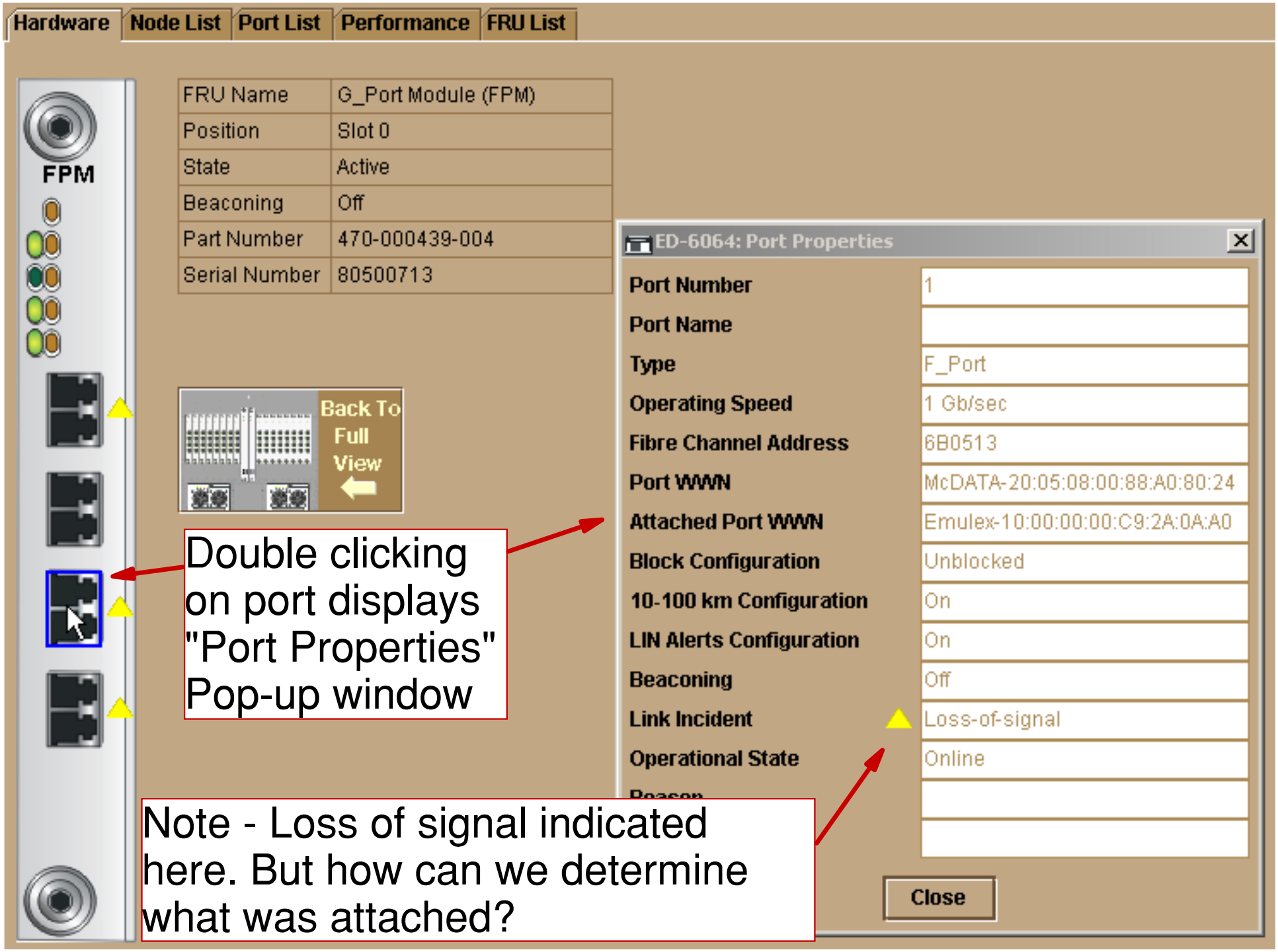
The 'Products' tab displays all switches across all fabrics that the EFCM may communicate with.

2032-64 (McData 6064)

Once a switch is opened, pull-downs and tabs located along top are available for navigation. The Hardware tab view (shown here)



2032-64 FPM View



2032-64 (Node List)

The 'Node List' tab will list all ports, good info, all port numbers and logical addresses are displayed

Hardware | Node List | Port List | Performance | FRU List

Port #	Addr	Node Type	Port WWN
0	04	Channel path 86	Emulex-10:00:00:00:C9:2A:0A:57
1	05	Channel path 67	Emulex-10:00:00:00:C9:2A:0A:A0
3	07	Channel path 91	:00:C9:2A:0A:7B
5	09	Direct access storage	:00:C1:17:68
6	0A	Direct access storage	:00:C5:17:68
7	0B	Direct access storage	:00:CA:16:37
8	0C	Reserved	:00:C9:23:2A:7B
			:00:C9:25:2E:BB
			:00:C9:22:94:AC
			:00:C9:22:94:65
			:00:C9:22:94:00
			:00:C9:22:80:F7
			:00:C9:22:64:12
			:00:C9:22:81:12
			:00:C9:22:84:1D
17	15	Unspecified	:00:C9:22:85:0C
18	16	Unspecified	:00:C9:22:82:CD
20	18	Channel path 99	:00:C9:2A:0A:73
22	1A	Channel path B3	:01:10:00:CA
23	1B	Channel path A5	:00:C9:28:5C:60
24	1C	Channel path BD	:01:10:00:C2
25	1D	Channel path BE	:01:10:01:27
26	1E	Channel path C4	:00:C9:2A:0B:E1
29	21	Channel path FF	:01:60:01:F5
30	22	Channel path FB	:01:60:02:6E
31	23	Channel path D0	:01:10:00:E3
32	24	Channel path B6	:01:10:00:EF
33	25	Channel path D5	Emulex-10:00:00:00:C9:2A:16:93

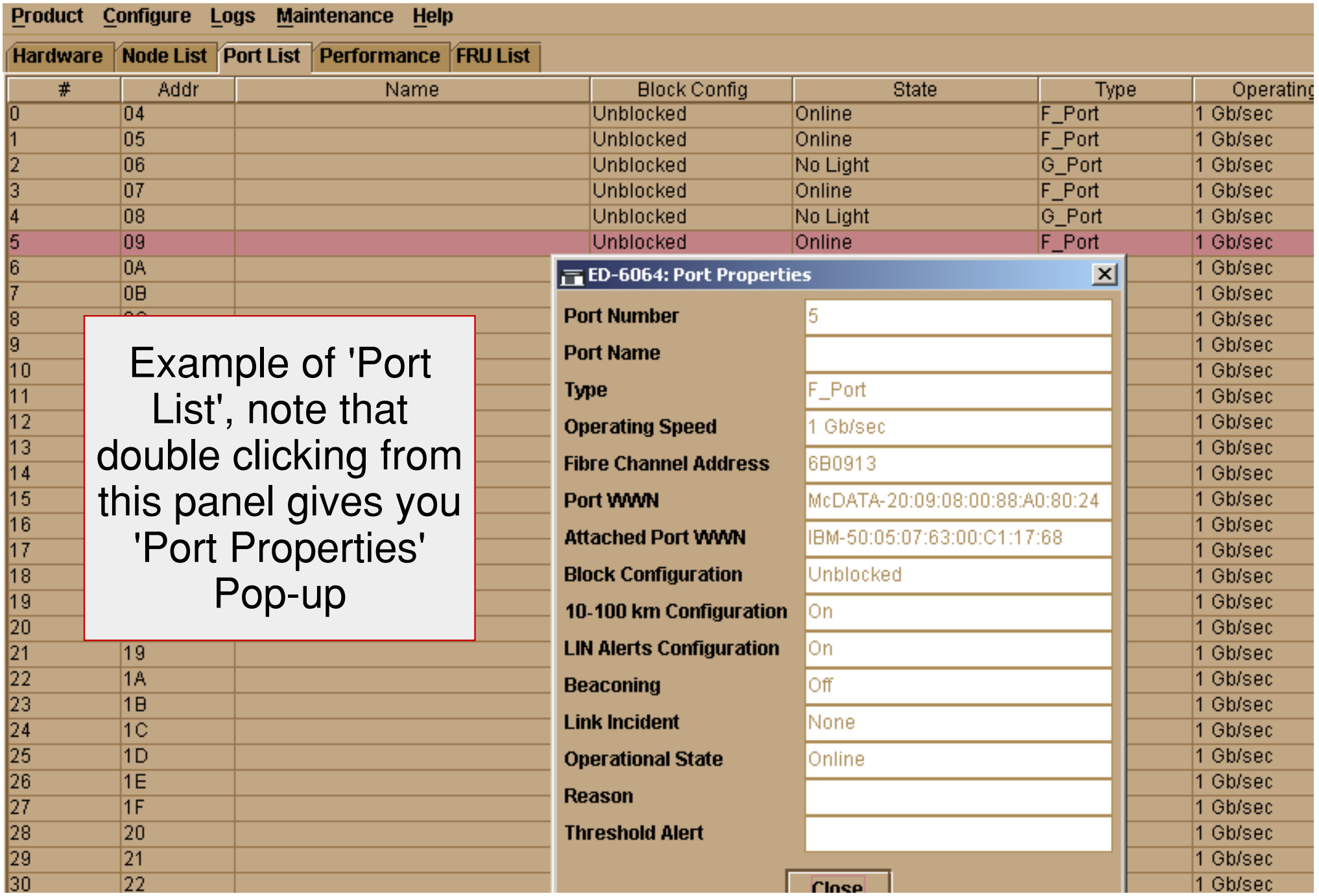
Double clicking will display 'Node Properties' Pop-up

ED-6064: Node Properties

Port Number	1
Port Address	05
Node Type	Channel path 67
Port WWN	Emulex-10:00:00:00:C9:2A:0A:A0
Port Nickname	
Node WWN	IBM-50:05:07:64:00:C1:1A:75
Node Nickname	
Buffer to Buffer Credit	64
Class of Service	Class 2, 3
Data Field Size	2048
Type	002064
Model	116
Serial #	02000000011A75
Tag	6705

Close

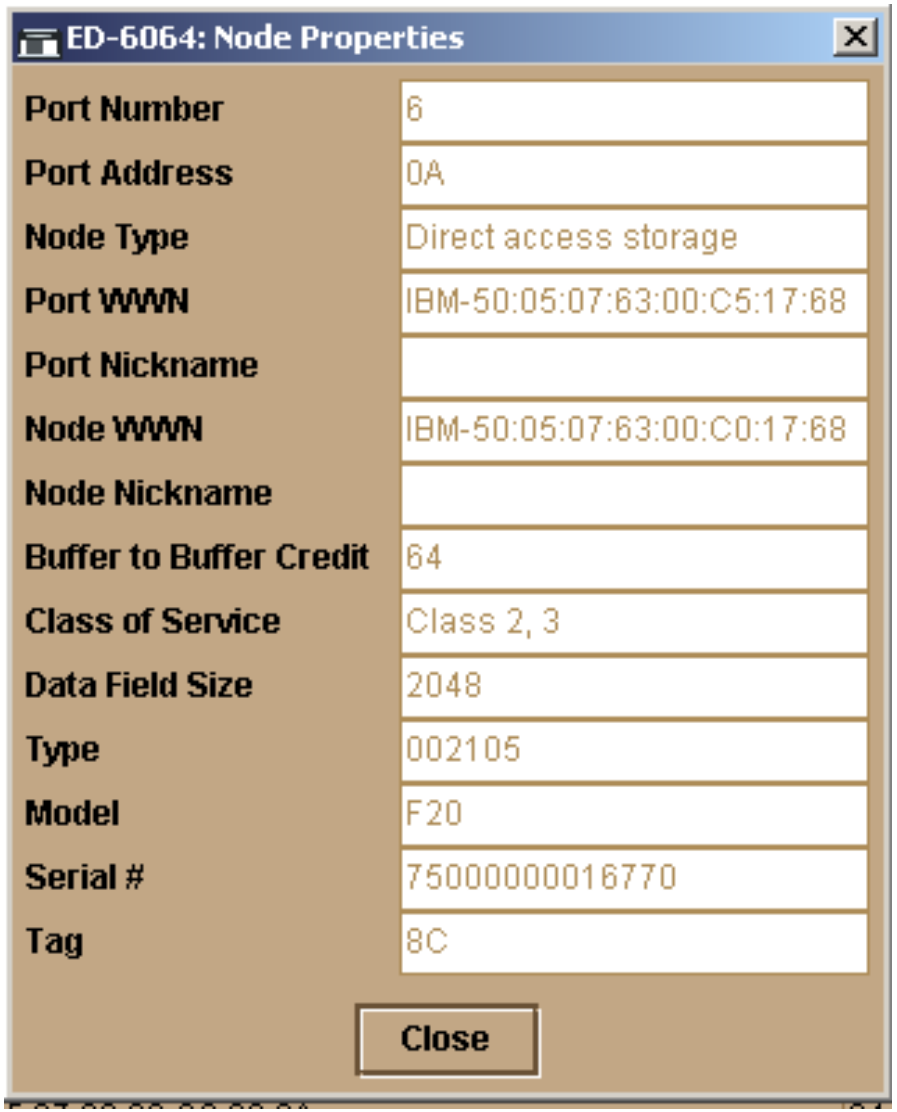
2032-64 (Port List)

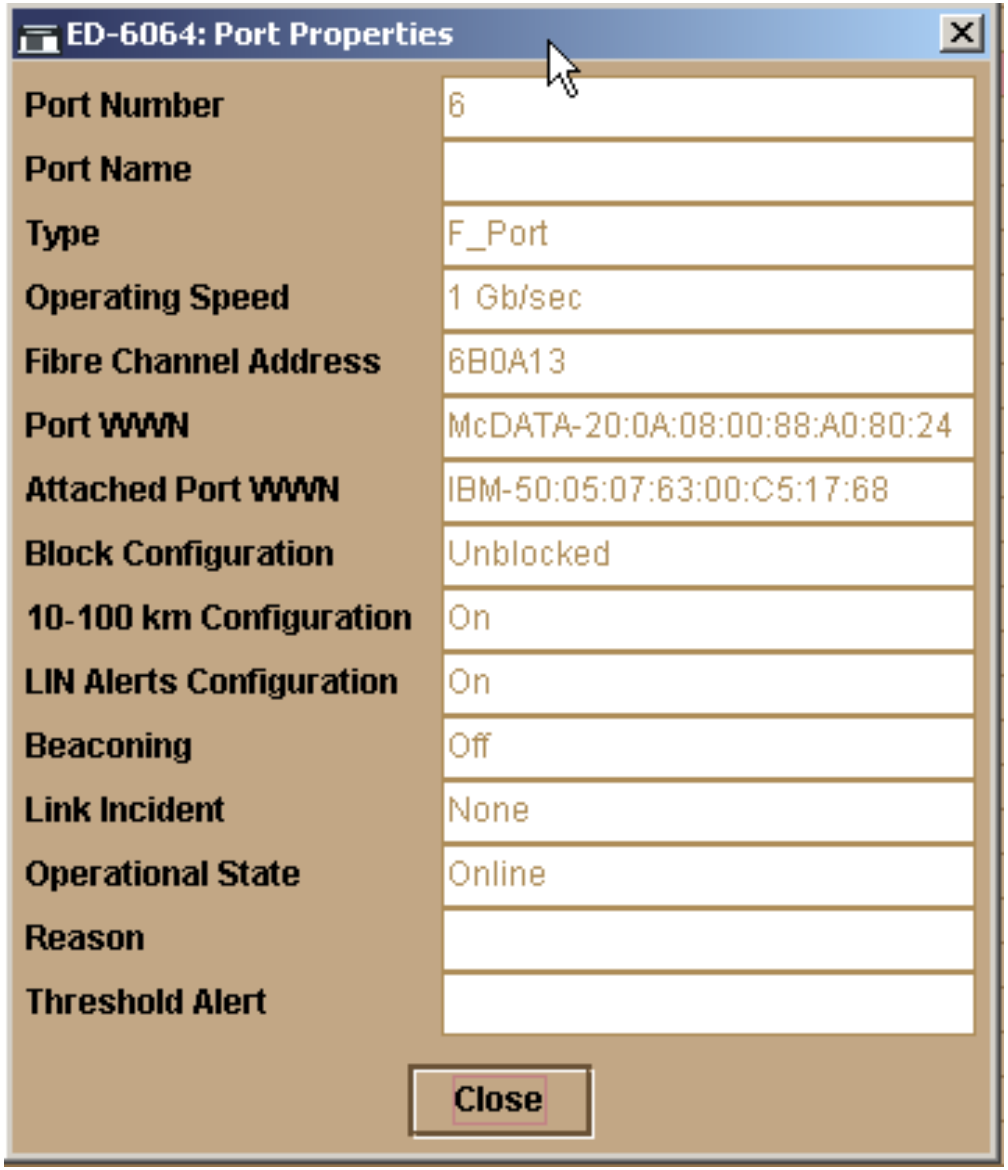


Example of 'Port List', note that double clicking from this panel gives you 'Port Properties' Pop-up

2032-64 (Node and Port List)

There are 2 different Pop-up windows that can be of use for PD purposes





zSeries Educational Offerings

Sysplex / zSeries course offerings

- H4016 (2 days) HMC Class
- H4041 (3) Plex Ops & Recovery (sysplex only)
- H4057 (5) Plex Ops & Recovery (H4016 & H4041)
- ES900 (5) Advanced Plex Recovery
- ES420 (4.5) Plex Implementation
- ES830 (5) CSAR (Complex Systems Availability & Recovery)
- ES820 (2) zSeries Mainframe Environment (A Technical Overview)
- OZ09 (2) z/Architecture for z900
- OZ05 (2) z990 Technical Update & Configuration Requirements
- ES321(2) FICON Environment (Native & Brigde)

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