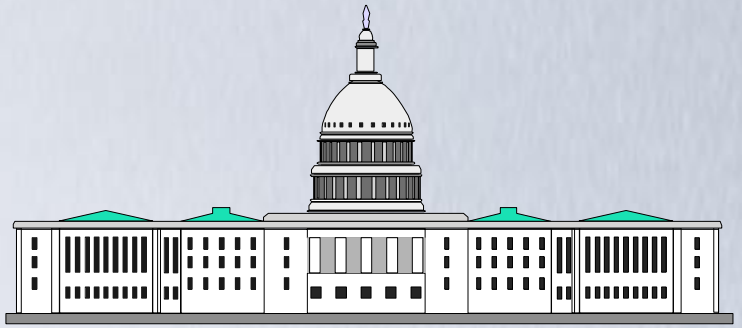
Session 2875: Replacing 3174s

IBM 2074-003 Console Support Controller and OSA-ICC Overview and Implementation



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IBM Mainframe Console Alternatives

- IBM 2074 Console Support Controller
  - To IPL CECs and LPARs, and operating system console operations
    - z/OS, z/OS.e, OS/390 (back to MVS/XA), z/VM, VM/ESA, VSE/ESA, TPF
    - zSeries, S/390, Multiprise® 3000
    - No parallel channel on z800 and z990, therefore no 3174 without ESCON converter
- IBM OSA-ICC for z990 and z890
  - To IPL LPARs, and operating system console operations
  - z/OS 1.3, z/OS.e, z/VM 4.4, VSE/ESA V2.6, TPF V4.1
- HMC Integrated 3270 Console
  - To IPL and operate z/VM 4.4 LPARs only
  - HMC supports a single 3270 console session on each of multiple LPARs
  - Can switch a session between HMCs
  - IBM @server zSeries 800, 900, 990, S/390 (G5/G6)
  - Designed for dedicated z/VM LPARs or z/VM machine with Linux guest traffic
- HMC Integrated ASCII Console
  - To IPL and operate native Linux LPARs only
  - HMC supports a single console session on each of multiple LPARs
  - Can switch a session between HMCs
  - ASCII to ASCII .. VT220 via /dev/ttyS1 logical device
  - zSeries 800, 900, 990, S/390 (G5/G6)
  - Designed for dedicated Linux machines (e.g. z800 Linux only machine)

Overview: 2074

IBM 2074 Models

Type/Model	Announced	Withdrawn	Maximum Sessions per ESCON Adapter	Total Maximum Sessions
2074-001	8/22/2000	6/30/2002	16	32
2074-002	2/26/2002	12/09/2003	32	64
2074-003	10/21/2003	N/A	48	96

Notes:

- There are no upgrades offered between models
- The Model 001 and Model 002 are rack mount units (3U)
- The Model 003 is a tower model
  - ➡ Rack Mounting Kit available at initial order time

IBM 2074 Model 3 Facts and Functions

- Console controller for IBM @server® zSeries® and S/390® servers
  - System Console (IPL) and operations support for multiple CECs and LPARs
  - Console use can include
    - z/OS®, z/OS.e, OS/390®, MVS™, z/VM®, VM/ESA®, VM, VSE/ESA™, TPF
    - TSO for systems programmers
- One IBM 2074-003 Console Support Controller
  - Can connect up to ninety-six (96) TN3270E client console sessions
  - Shared control unit for simultaneous access to multiple CECs and LPARs via MIF
  - Can support console sessions in different CECs and LPARs, and on different channels
  - Supports TN3270E sessions instead of coax attached 3270 terminals
- Local and remote console capability
- Can coexist in configurations using prior 2074 models, OSA-ICCs, and older 3174 controllers
- Optical Media Attach (OMA) support for loading z/VM install and service CDs

IBM 2074-003 Specifications

- Shipped as floor standing "rackable" tower
  - Optional Racking Unit (FC 7420) conversion kit orderable at time of manufacture and will be installed by IBM at customer location
  - 19 inch rack mount ... requires 5U
- ESCON adapter(s)
  - One integrated ESCON (maximum 48 sessions)
  - Optional second ESCON feature (additional 48 sessions for total maximum of 96 sessions)
  - New MTRJ ESCON connector
- LAN Connections
  - Two integrated, autosensing 10/100 megabits per second Ethernet adapters
  - Two integrated, autosensing 4/16 megabits per second Token-Ring adapters
  - Not an orderable or changeable configuration
- Features for keyboard/display
  - New 17-inch display and keyboard use less space
- No coaxial cable support
- CD-ROM support for OMA distribution media
- Closed operating system loaded on hard drive, shipped on CD-ROM
- Configuration utility included

Note

Height 17.31 inches

Depth 27.6 inches

5U

Width 8.5 inches

IBM 2074-003 Security Considerations

- Physical
  - CD-ROM pre-loaded on 2074 hard drive
  - No operating system dependencies
  - No user code
  - Use locally attached display/keyboard to configure the 2074
- Network
  - Isolate 2074 LANs and consoles from general backbone traffic
    - Place consoles on separate subnet directly connected to 2074s
    - Recommendation to use dedicated LAN(s) for client workstation access
  - Remote access capability from a configured TN3270E Client. Customer is responsible to provide secure network connection, for instance
    - Virtual Private Network (VPN)
    - Virtual LAN (VLAN)
- Access Control flexibility
  - Can use a specific LU name or IP address to connect a session
  - Does not provide local or remote access connection checking

Overview: OSA-ICC

OSA Integrated Console Controller Specifications

- Function of new or installed OSA-Express 1000BASE-T Ethernet
  - Up to 120 console sessions per port
  - Port operation defined with new CHPID type = OSC
    - OSC is mutually exclusive with QDIO (OSD) or non-QDIO (OSE) CHPID on port
  - One or both ports can be individually configured for Integrated Console Controller
    - No automatic load balancing among ports
  - Spanned channels allows port(s) sharing among z990 and z890 LCSS and LPARs
- LAN Connections
  - LAN attached consoles running TN3270E clients
    - Non-SNA DFT data streams to TN3270
  - Capable of operating at 10 Mbps, 100 Mbps, or 1000 Mbps (1 Gbps)
  - Uses RJ-45 connection to category 5 Unshielded Twisted Pair (UTP) copper cabling
- No Token-Ring
- No coaxial cable support
- Configuration support provided via Support Element and Hardware Management Console
- Supported environments
  - z990 and z890 at May 2004 LIC level (Driver Level 55)
  - OSA-Express 1000BASE-T Ethernet (FC 1366)
  - Minimum z/OS 1.3, z/OS.e 1.3, z/VM 4.4, VSE/ESA 2.6, TPF V4R1

OSA Integrated Console Controller Management

- Use standard channel install for new chpid
- Use Support Element (SE) or Hardware Management Console (HMC) for configuration, operation and diagnosis
  - Uses base SE and HMC security for access control and remote connection
  - Configuration changes/additions and Diagnosis
    - SE for IOPD, Advanced Facilities, etc
    - HMC via Single Object Operations .. mirror SE screens on HMC
      - Use systems programmer mode
      - Remote access supported
      - Advanced Facilities via HMC
        - Access to all OSC, OSD and OSE channels

OSA Integrated Console Controller Security Considerations

- Physical
  - Function provided in OSA-Express 1000BASE-T Ethernet Licensed Internal Code
  - OSA-Express plugged into z990 or z890 I/O cage
  - No user code
  - Use locally attached Support Element (SE) or Hardware Management Console (HMC) session to configure the port
- Network
  - Should isolate consoles from general backbone traffic
  - Place consoles on separate subnet(s) directly connected to OSA-Express port(s)
  - Recommendation to use dedicated LAN(s) for client workstation access
  - Remote user session access capability from a configured TN3270E client would requi user-provided secure network session tunnel
  - HMC environment can provide secure features for network connection for operation, configuration, diagnosis
- Access Control flexibility
  - Can use a specific LU name or IP address to connect a session
  - Does not provide local or remote access connection checking

OSA Integrated Console Controller vs. IBM 2074 Console Support Controller

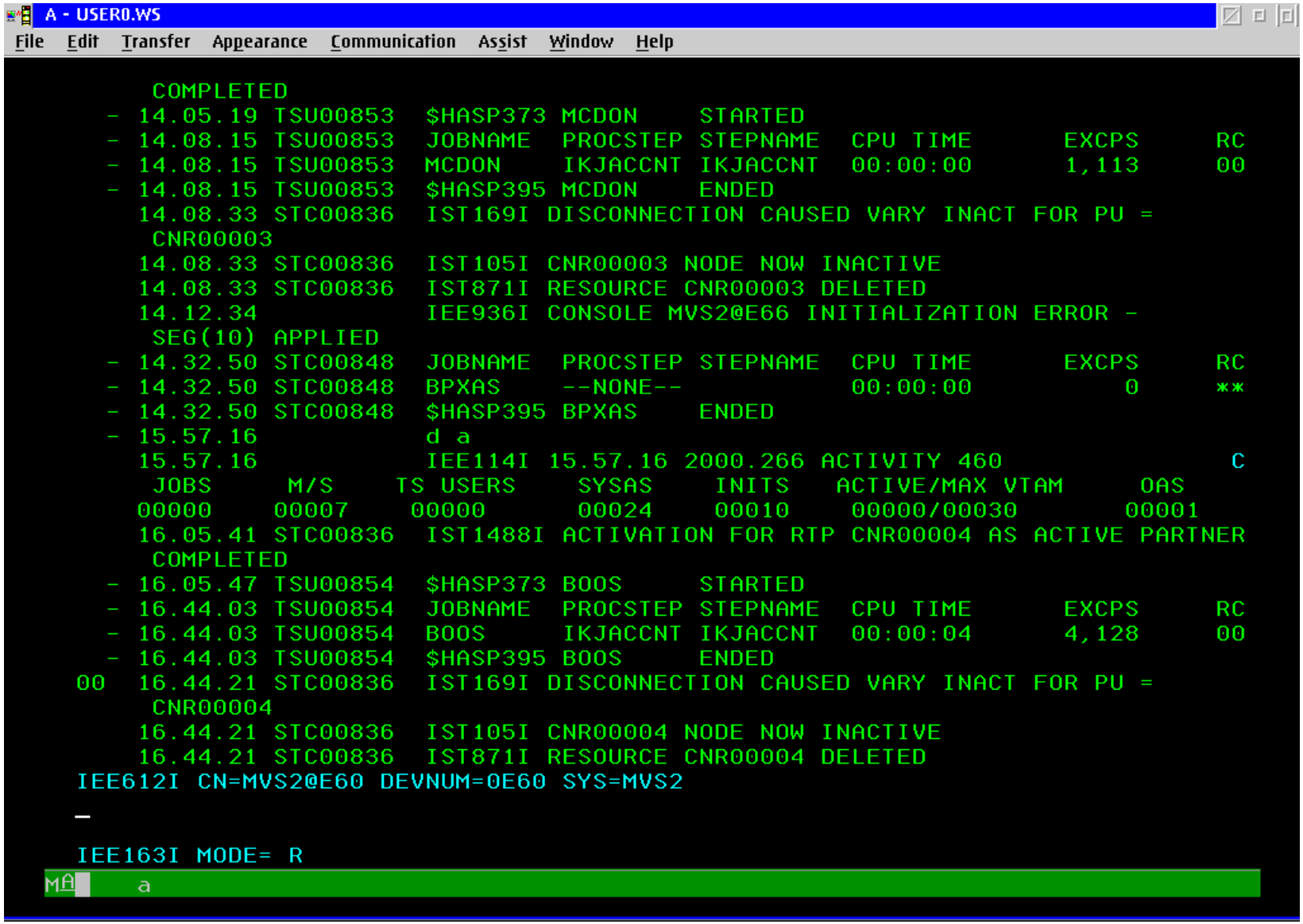
	OSA Integrated Console Controller function	IBM 2074 Console Support Controller
Hardware		
# mainframe connections per feature or product	120 per OSA-Express 1000BASE-T Ethernet port. Each 100BASE-T port separately definable for console controller support	min 1 ESCON® / max 2 ESCON
# CHPIDs req'd per controller function	One per controller defined port. If you use both OSA-Express 1000BASE-T ports, than two CHPIDs are required	each ESCON ties to path. 2074 can contain 2 ESCONs maximum
CHPID type	OSC	standalone controller, connects via ESCON adapter
multiple CEC attach	no. OSA-Express is inserted into I/O cage of z990. A console can be shared by using same LAN across multiple CECs	yes, via dual ESCON, or ESCON director or FICON™ bridge, or common LAN among CECs
supports spanned channels	yes, supports spanned channels over multiple LCSS	No spanning support on ESCON channels
10/100/1000 BASE-T copper	10/100/1000, yes	10/100 support
Ethernet frame types	manually configure, DIX and 802.3	DIX and 802.3
auto-negotiate speed on LAN	yes for 10/100; 1000 is config only	yes for 10/100
supported servers	z990, z890, and later	zSeries, S/390®, Multiprise® 3000
mainframe connection	one LAN per OSA-Express 1000BASE-T port	up to two ESCONs, two Ethernet, two Token-Ring LANs
Number of console sessions	120 per each configured 1000BASE-T Ethernet port	Model dependent: M3: 48 or 96, M2: 32 or 64, M1: 16 or 32
hot swap feature?	yes if OSA-Express predefined, disruptive to sessions	NA. Use separate controller, disruptive to sessions
Software		
local 3270 sessions for device control	no, use SE or HMC	yes, maximum 2
Supported Operating systems	z/OS, z/OS.e, z/VM, TPF, VSE/ESA	z/OS, z/OS.e, OS/390 ®, VSE/ESA, VM/ESA ®, z/VM, TPF
multi-path session redundancy support?	no	no
printer support	yes, Emulator supported client attached printer	yes, Emulator supported client attached printer
TN3270E session support	TN3270E RFC 2355 compliant emulator	TN3270E only
LAN support	1 Ethernet per port	2 Ethernet and 2 token-ring per 2074
remote user session support	yes via standard TCP/IP flows. No integrated transport security	yes via standard TCP/IP flows. No integrated transport security
Access control	LUNAME, IP address	LUNAME, IP address

OSA Integrated Console Controller vs. IBM 2074 Console Support Controller (continued)

	OSA Integrated Console function (OSA-ICC)	IBM 2074 Console Support Controller
Packaging		
separate feature or product	1 or 2 port(s) can be configured on OSA-Express 1000BASE-T Ethernet feature	standalone box..rack mounted, or floor standing depending on model
pricing	OSA-Express 1000BASE-T . Software included as part of OSA-Express Licensed Internal Code	IBM 2074, with optional priced second ESCON. Operating software included on machine
Management		
ping to session	yes via SE and HMC panel	no
trace route	yes via SE and HMC panel	yes, different trace type, CE only
SNMP support	no	no
Debugging client sessions	yes, use SE or HMC panels	2 local sessions only
Configuration		
user interface	SE (for initial config), SE or HMC panels and/or ASCII file thereafter	utility GUI, no batch file
backup configurations	can be imported/exported to floppy disk. Limited to size of disk	yes up to 4
reconfiguration	yes if OSA-Express pre-defined, disruptive to session(s)	yes, disruptive
remote configuration support	SE (for initial config), SE or HMC panels for remote support thereafter	no, must be local to 2074

Operations

What does the operator see?



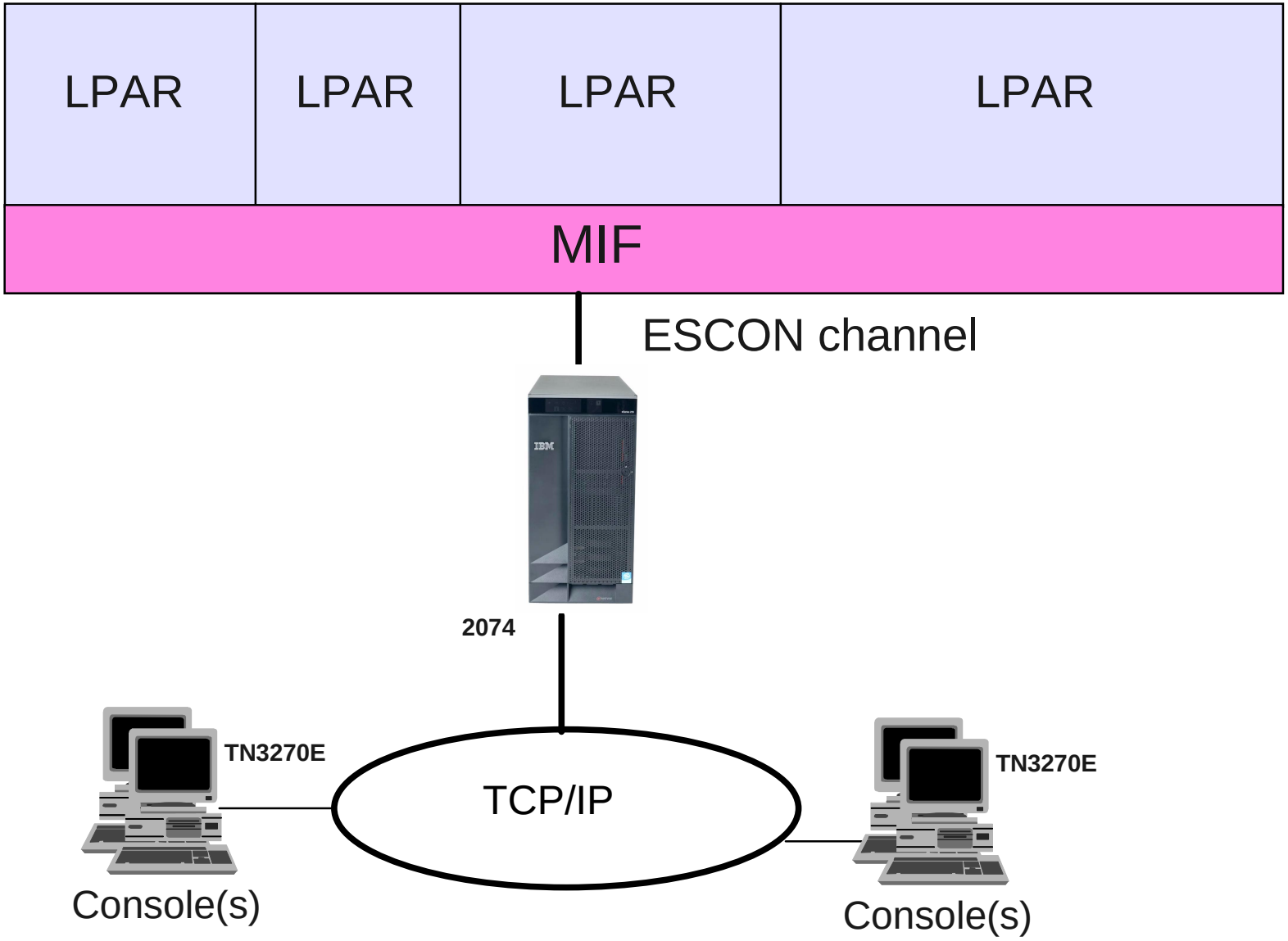
Cables

Cables...

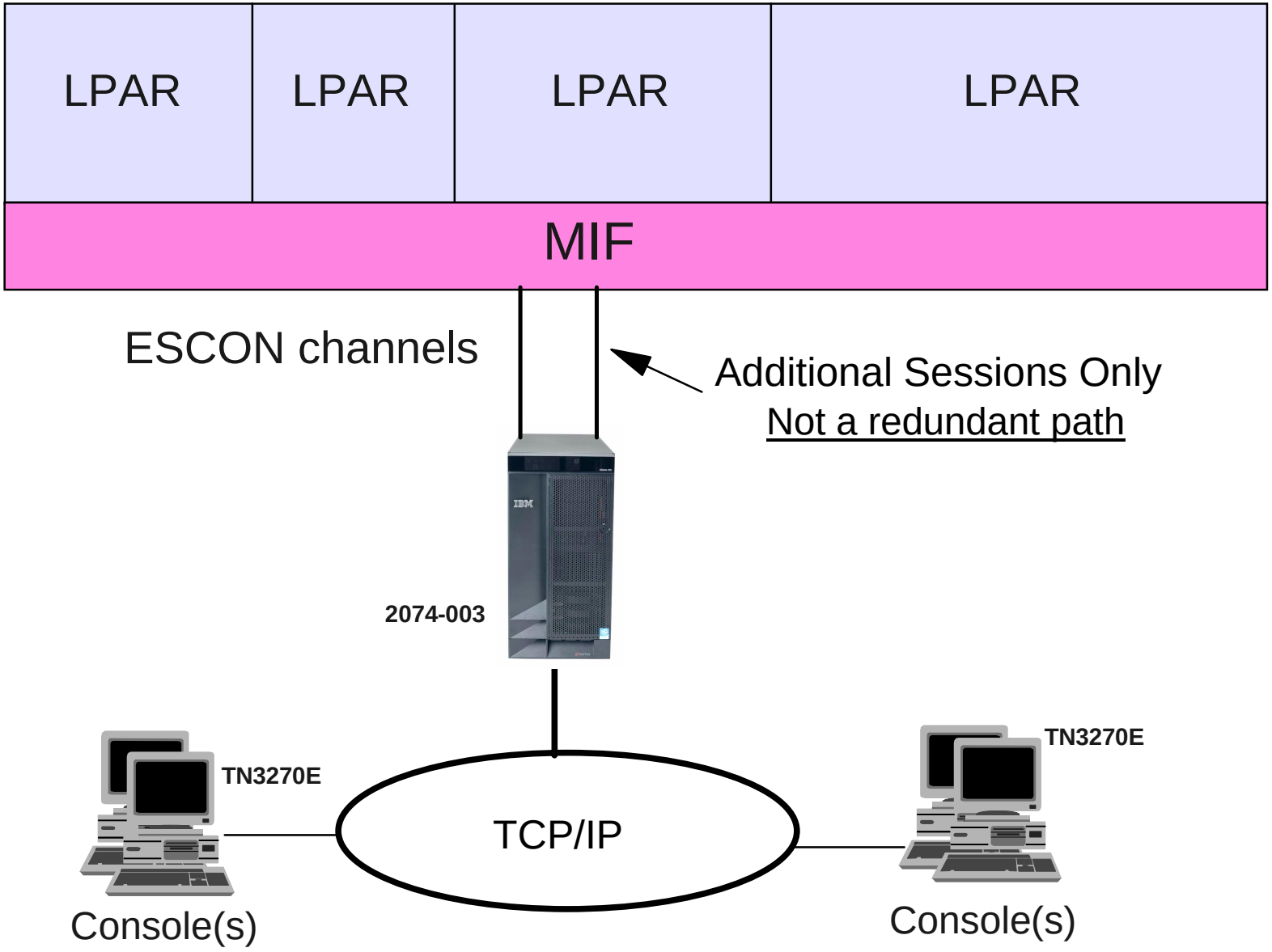
- All cables must be provided by customer
- 2074
  - LAN Cables
    - Token Ring-9-Pin D-Shell or RJ45
    - Ethernet-RJ45
  - ESCON Cable(s)
    - ESCON cable with MTRJ connector
    - One for each ESCON adapter ordered (standard + optional)
- OSA-ICC
  - LAN Cables
    - Ethernet RJ45

Configuration Options

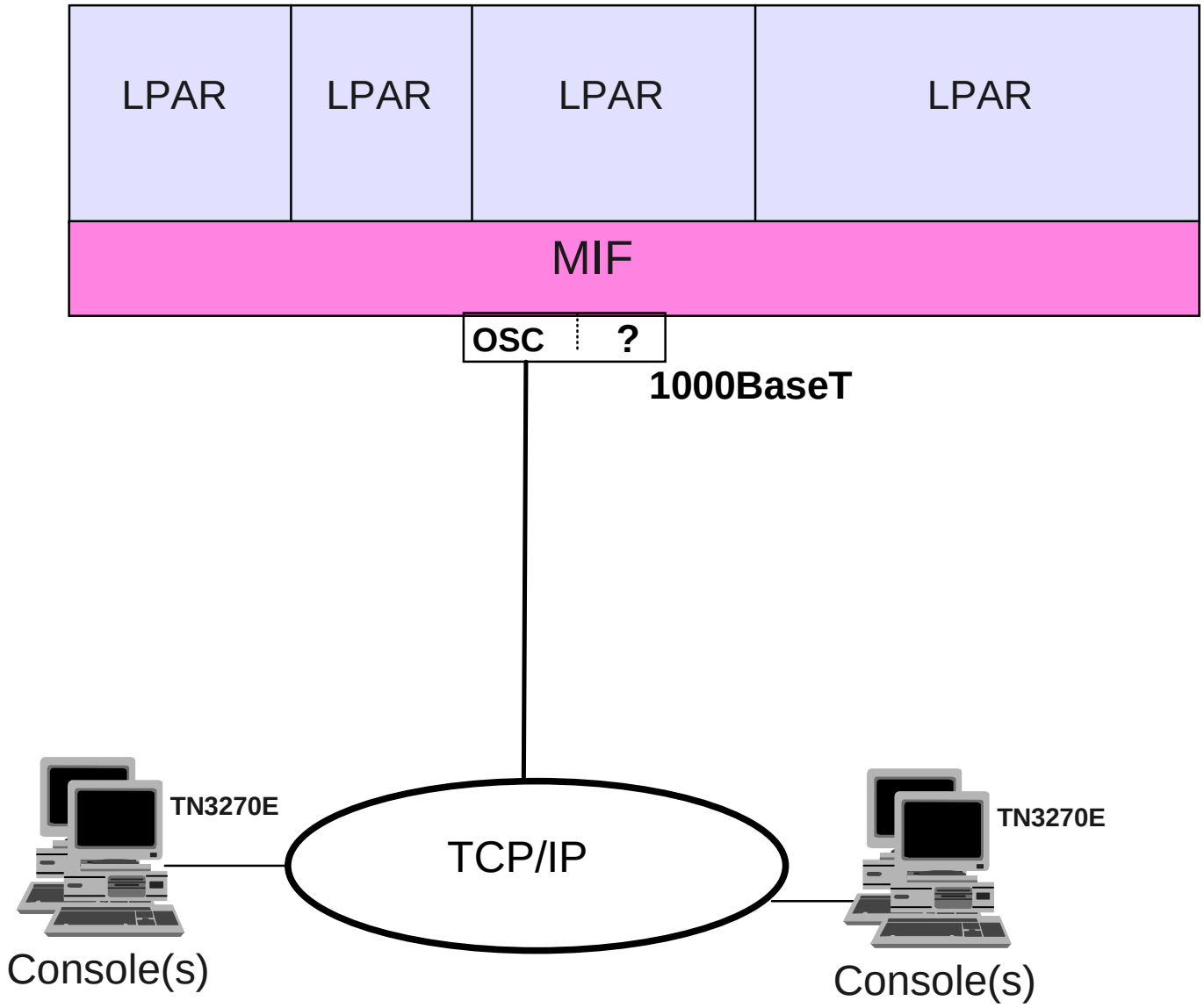
2074 Basic Configuration-48 Sessions with single ESCON



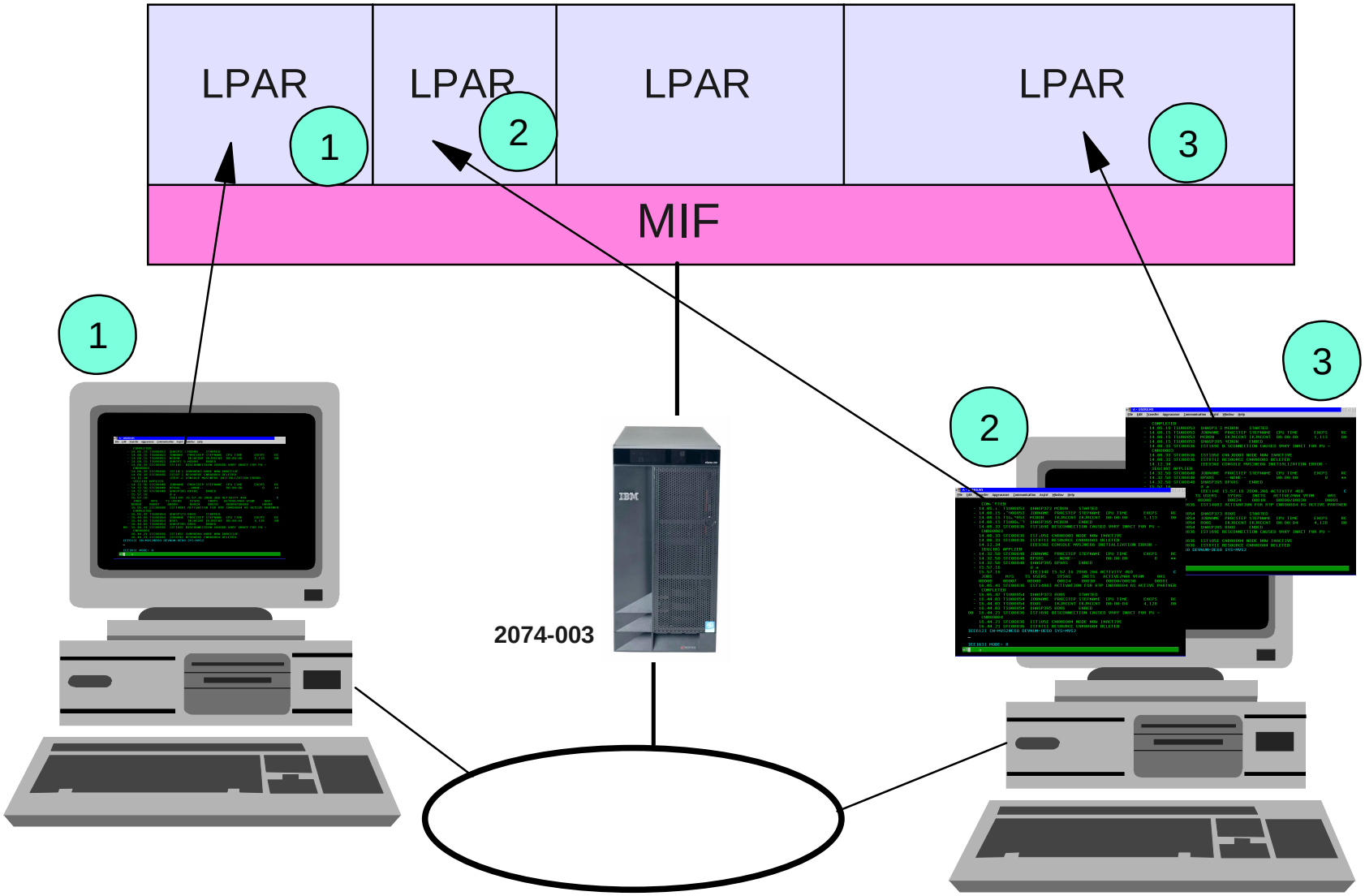
2074 Basic Configuration-96 Sessions with second ESCON



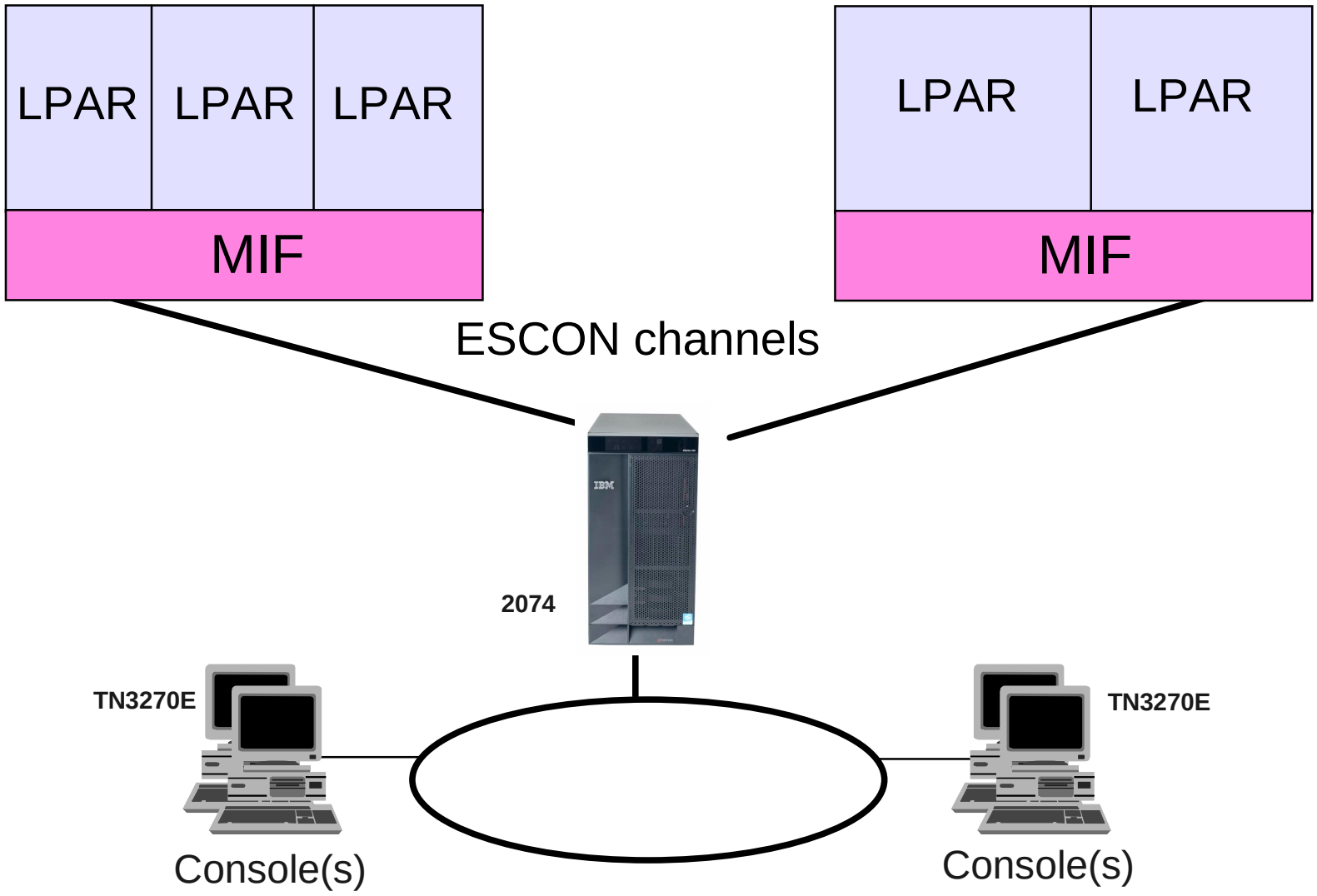
OSA-ICC Basic Configuration-120 Sessions with single 1000BaseT Port



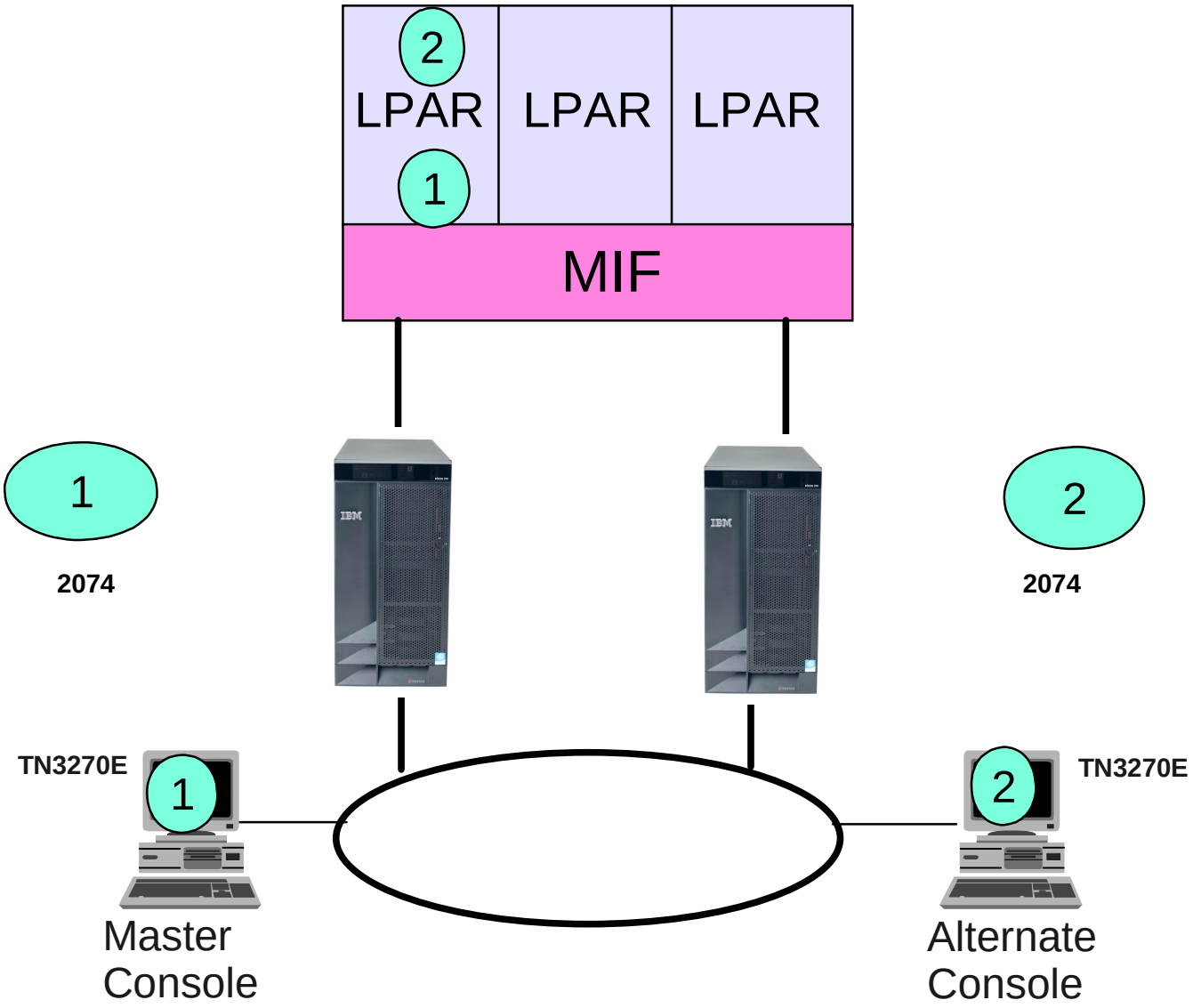
Let's talk about sessions...



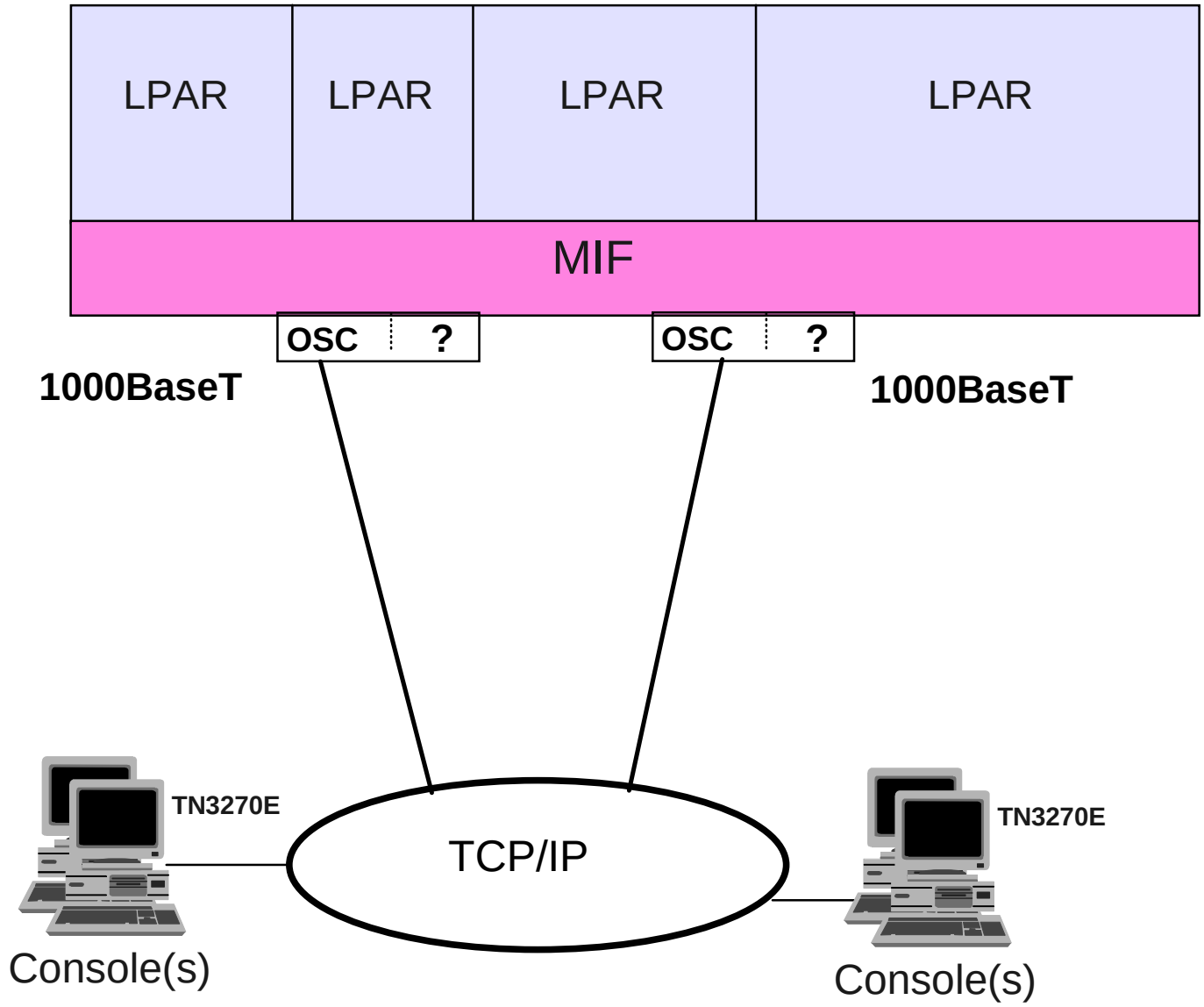
2074 Multiple Processors-No ESCON Director



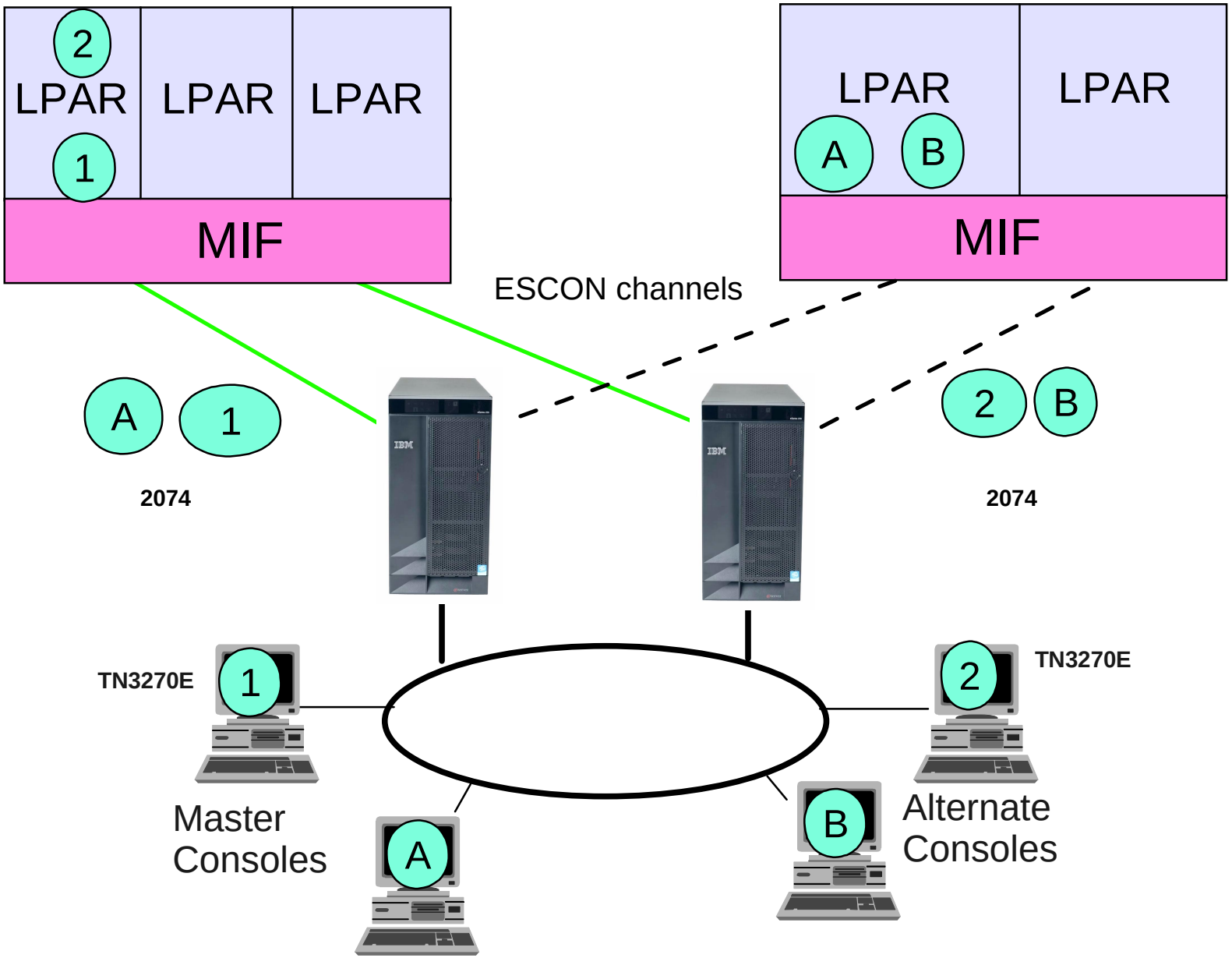
2074:Single processor with redundancy



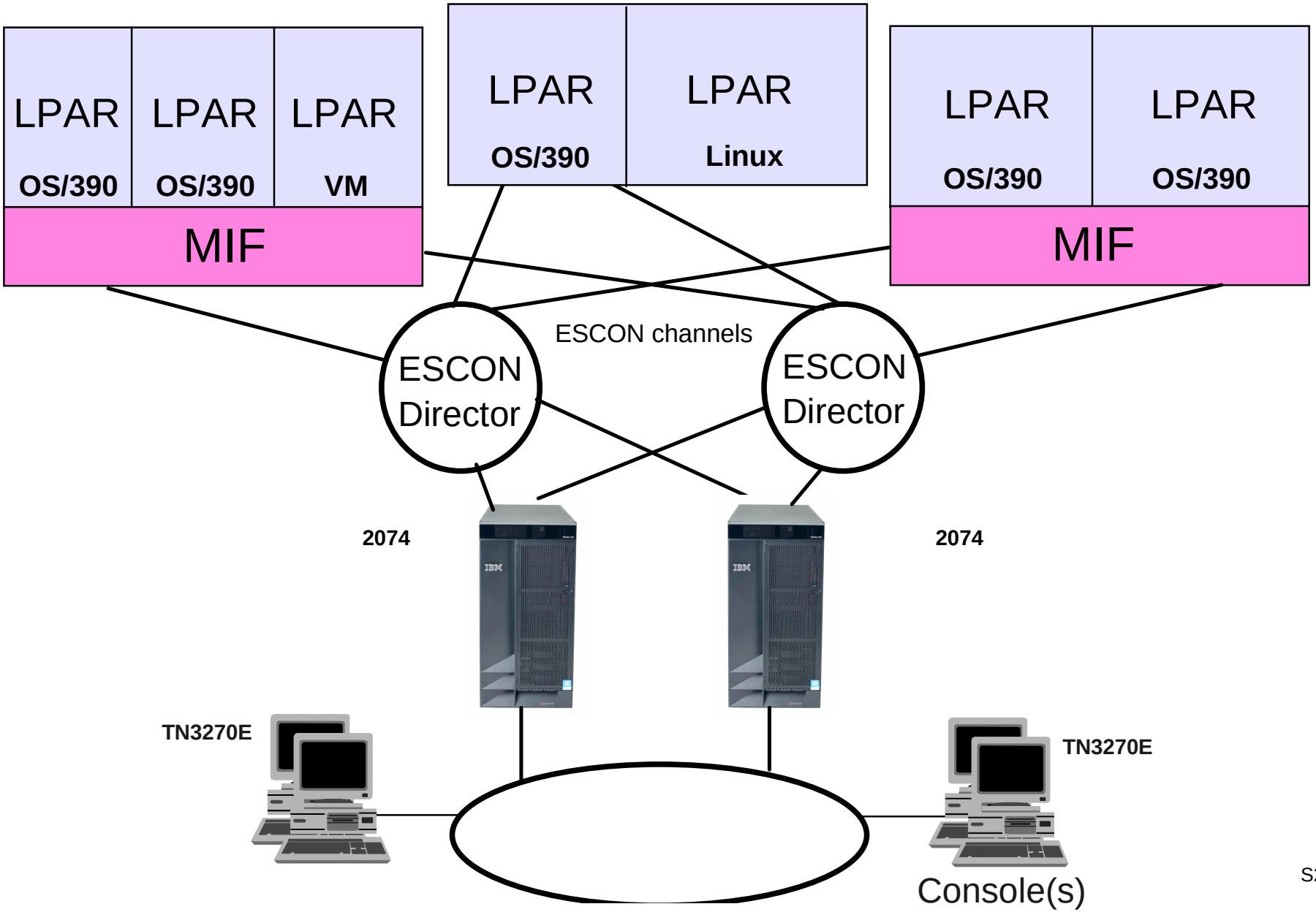
OSA-ICC Single Processor with Redundancy



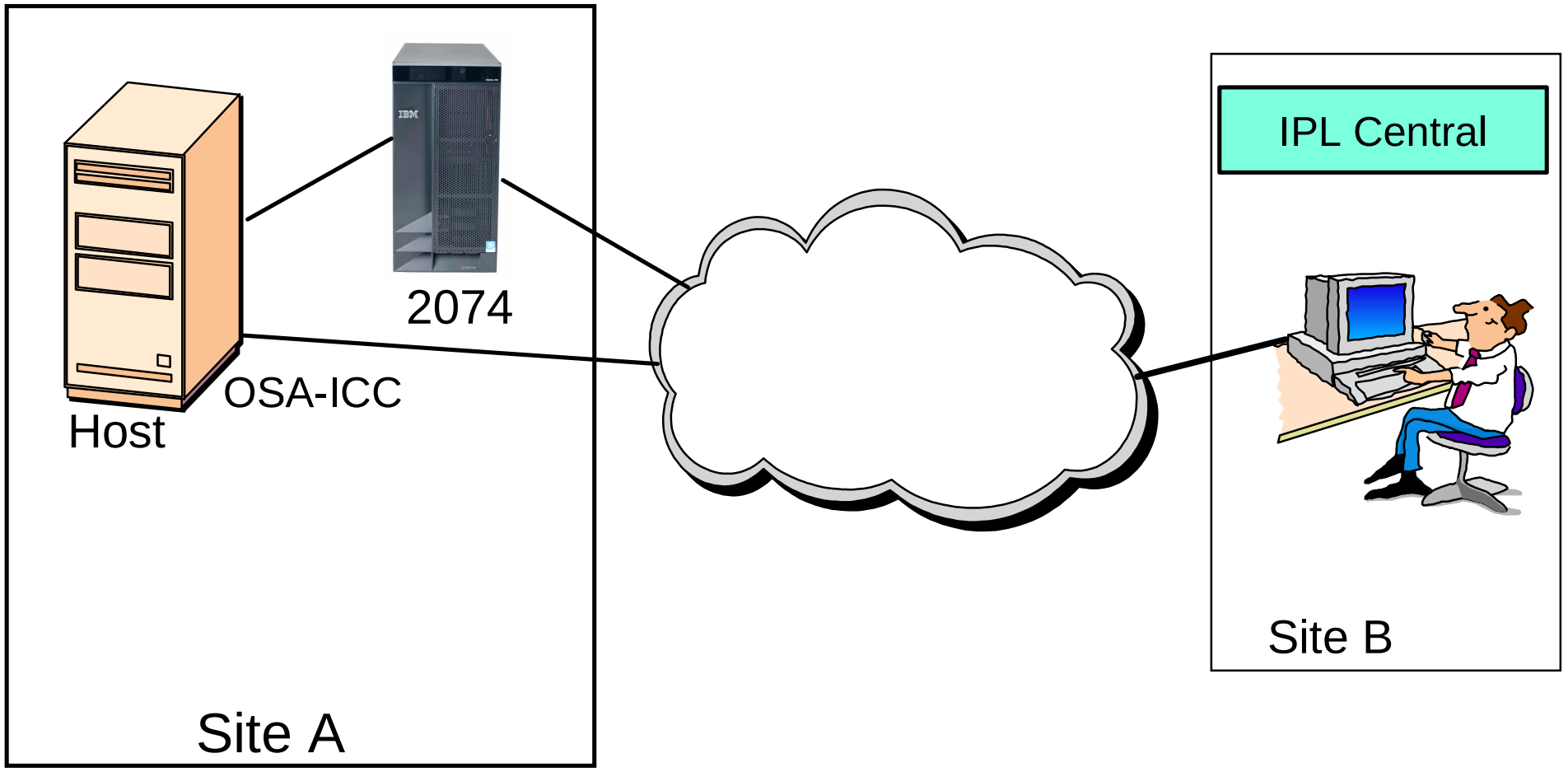
2074: Two processors with redundancy



2074: Multi Processor with ESCON Directors

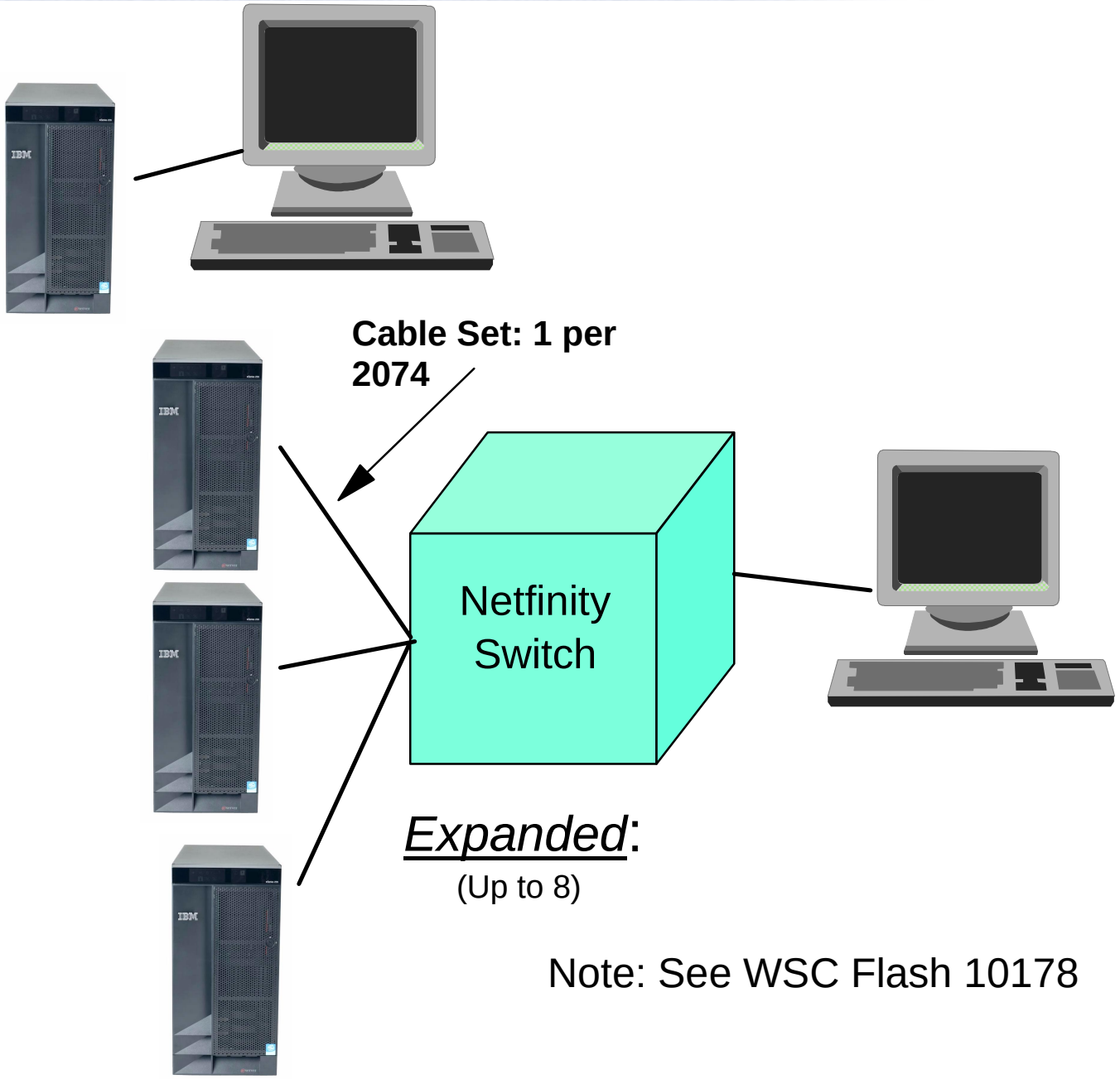


Remote Data Center



2074: Configurations....

Minimum:



Expanded:

(Up to 8)

Note: See WSC Flash 10178

Implementation-Host

2074: Host Definitions-the simple case

RESOURCE PARTITION=((MVS1,1),(MVS2,2))

..

CHPID PATH=(04),SHARED,PARTITION=((MVS1,MVS2)),TYPE=CNC

..

CNTLUNIT CUNUMBR=700,PATH=04,UNITADD=((00,32)),UNIT=3174

..

IODEVICE CUNUMBR=700,ADDRESS=(700,32),UNIT=3270,
UNITADD=0

..

This provides a string of 32 3270 devices, starting with address 700, that is known to all LPARs. This would be invalid with a real 3174 control unit, but works here because the 2074 can separate LPAR usage via its DEVMAP and the use of LUNAMES in the tn3270 sessions.

2074: Host definitions..being *too* clever

```
RESOURCE PARTITION=((MVS1,1),(MVS2,2))
..
CHPID PATH=(04),SHARED,PARTITION=((MVS1,MVS2)),TYPE=CNC
CHPID PATH=(05),SHARED,PARTITION=((MVS1,MVS2)),TYPE=CNC
..
CNTLUNIT CUNUMBR=700,PATH=(04,05),UNITADD=((00,64)),UNIT=3174
..
IODEVICE CUNUMBR=700,ADDRESS=(700,64),UNIT=3270,UNITADD=0
```

This illustrates a misguided attempt to define an IBM 2074 with two ESCON adapters using a single control unit statement. This is multipathing and this is NOT supported on the 2074. It may work to some extent but problem determination will be extremely difficult at best if there is a failure or incorrect definition.

OSA-ICC Host Definitions

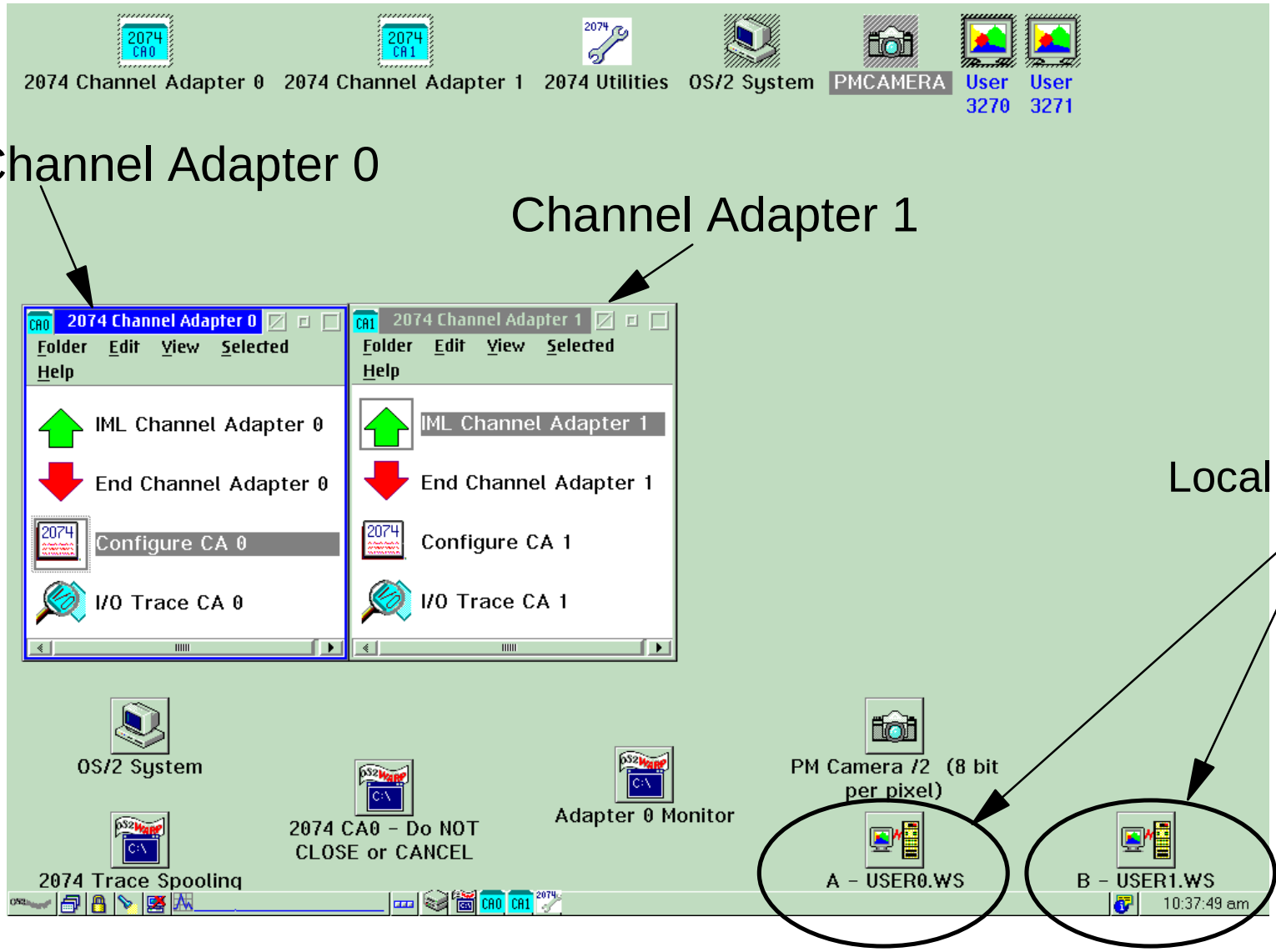
```
ID MSG1='IODF38',                                                    *
       MSG2='SYS6.IODF38.WORK - 2004-04-15 05:10',                   *
       SYSTEM=(2084,1),                                              *
       TOK=('SCZP901',0080000ABBA000841559537901041080C00000000,     *
       00000000,'04-04-15','05:10:58',' ',' ')
RESOURCE PARTITION=((CSS(1),(A11,1),(A12,2),(A17,7))),               *
       MAXDEV=((CSS(1),64512))
CHPID PATH=(CSS(1),04),SHARED,PARTITION=((A11,A12,A17),(=)),         *
      PCHID=111,TYPE=OSC

CNTLUNIT CUNUMBR=E000,PATH=((CSS(1),04)),UNIT=OSC

IODEVICE ADDRESS=(E000,120),MODEL=X,CUNUMBR=(E000),UNIT=3270
```

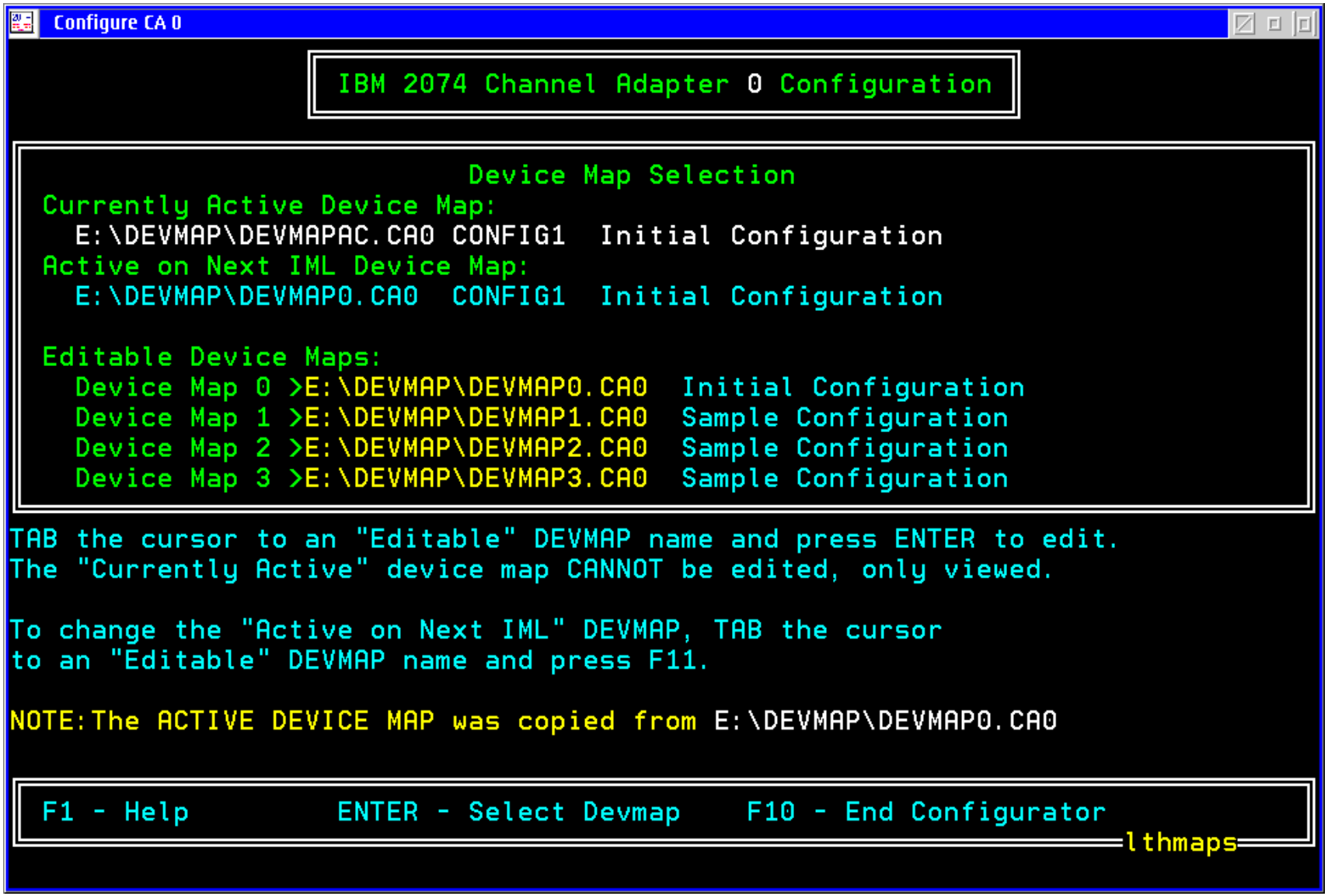
2074 Customization

2074 Desktop

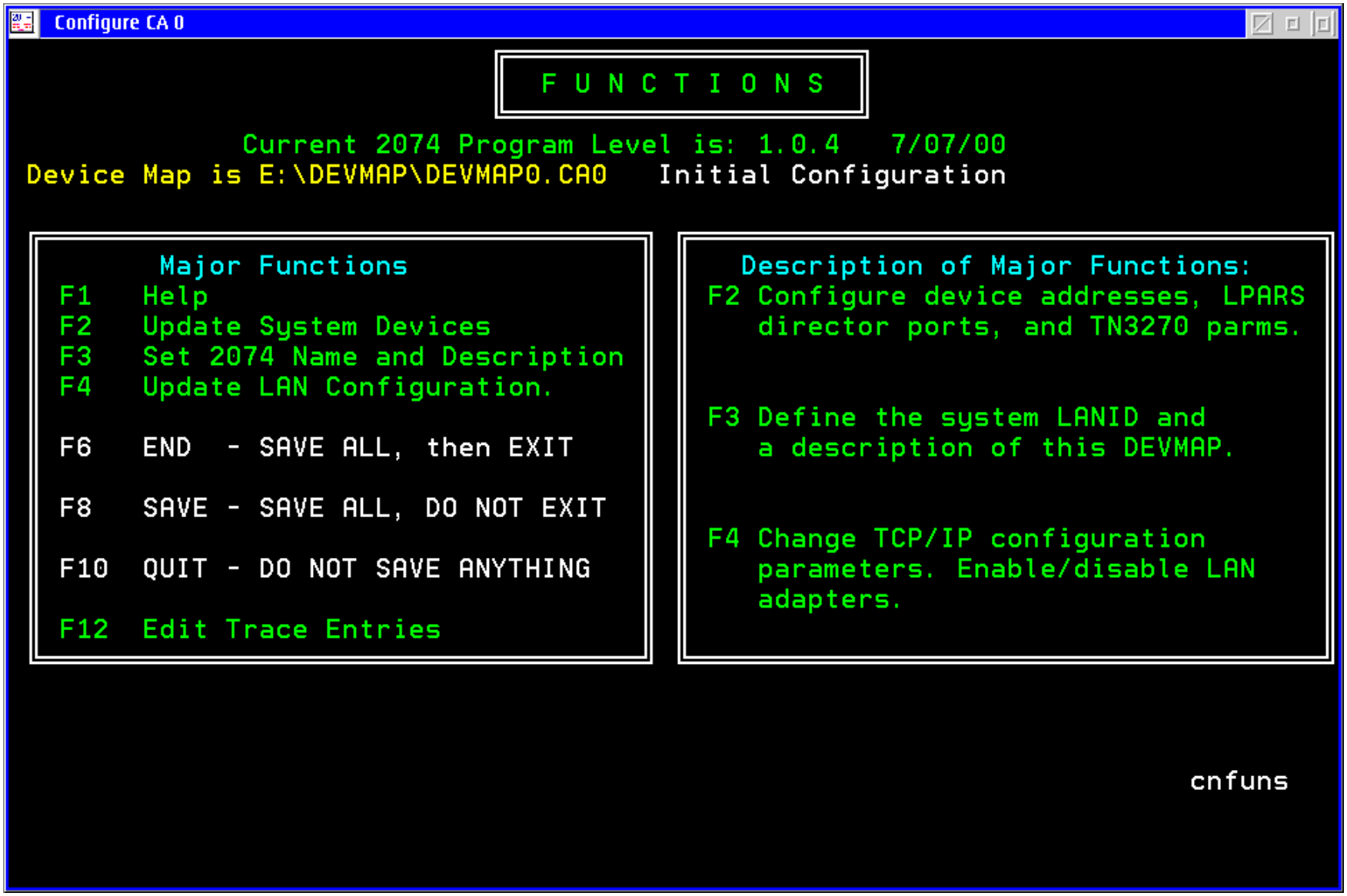


Note: Each channel adapter is independent

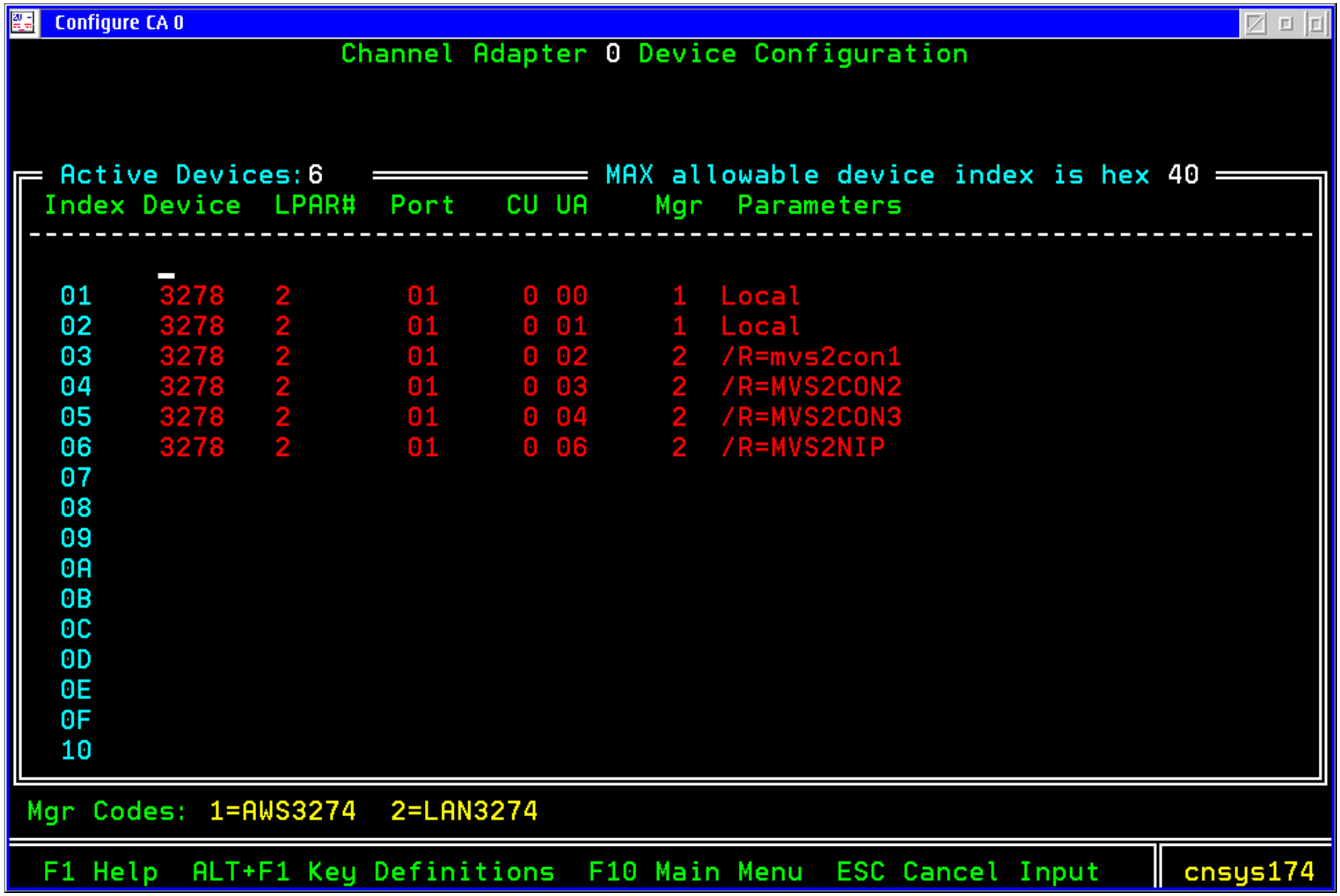
Device Map Selection



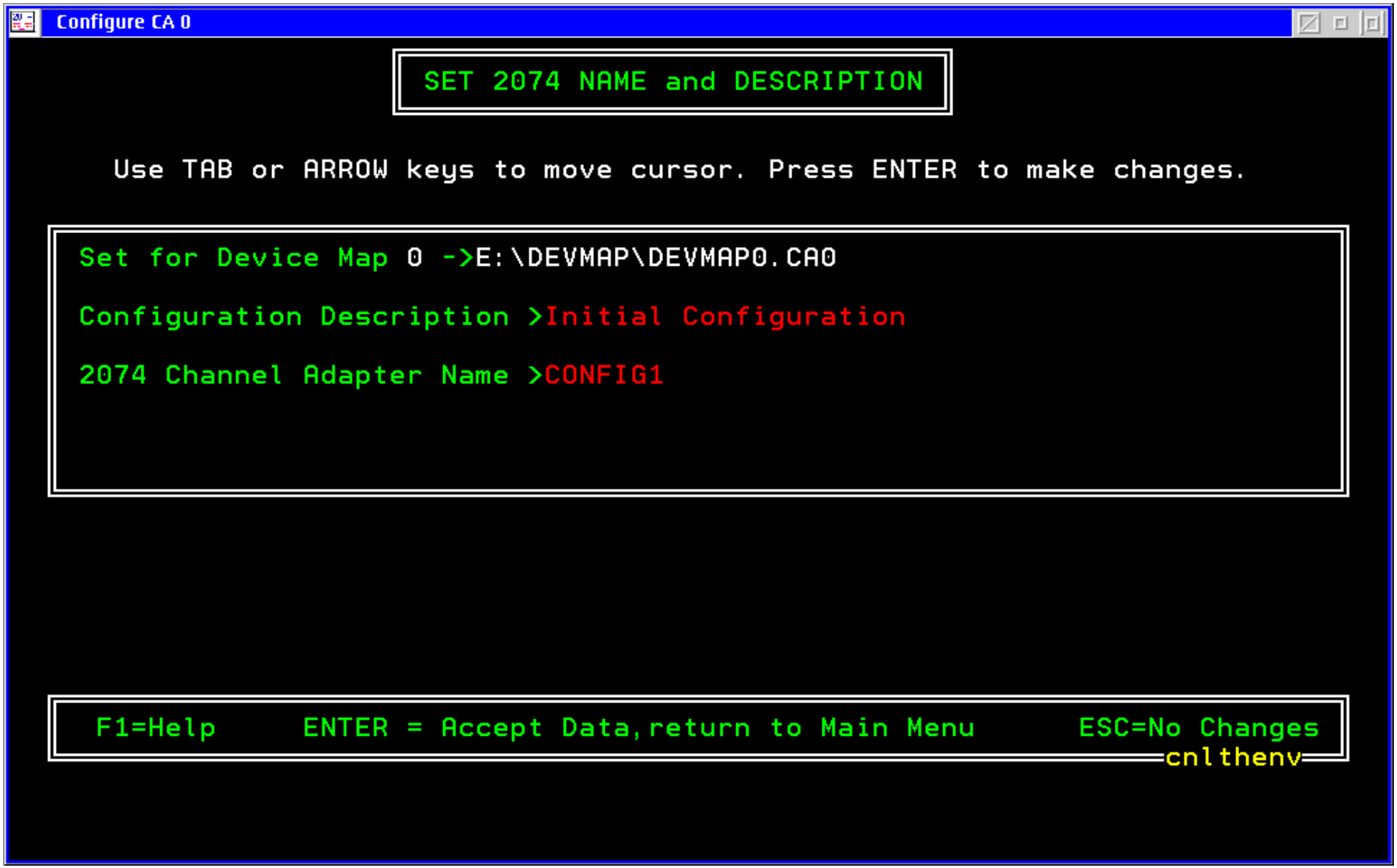
Function Select Screen



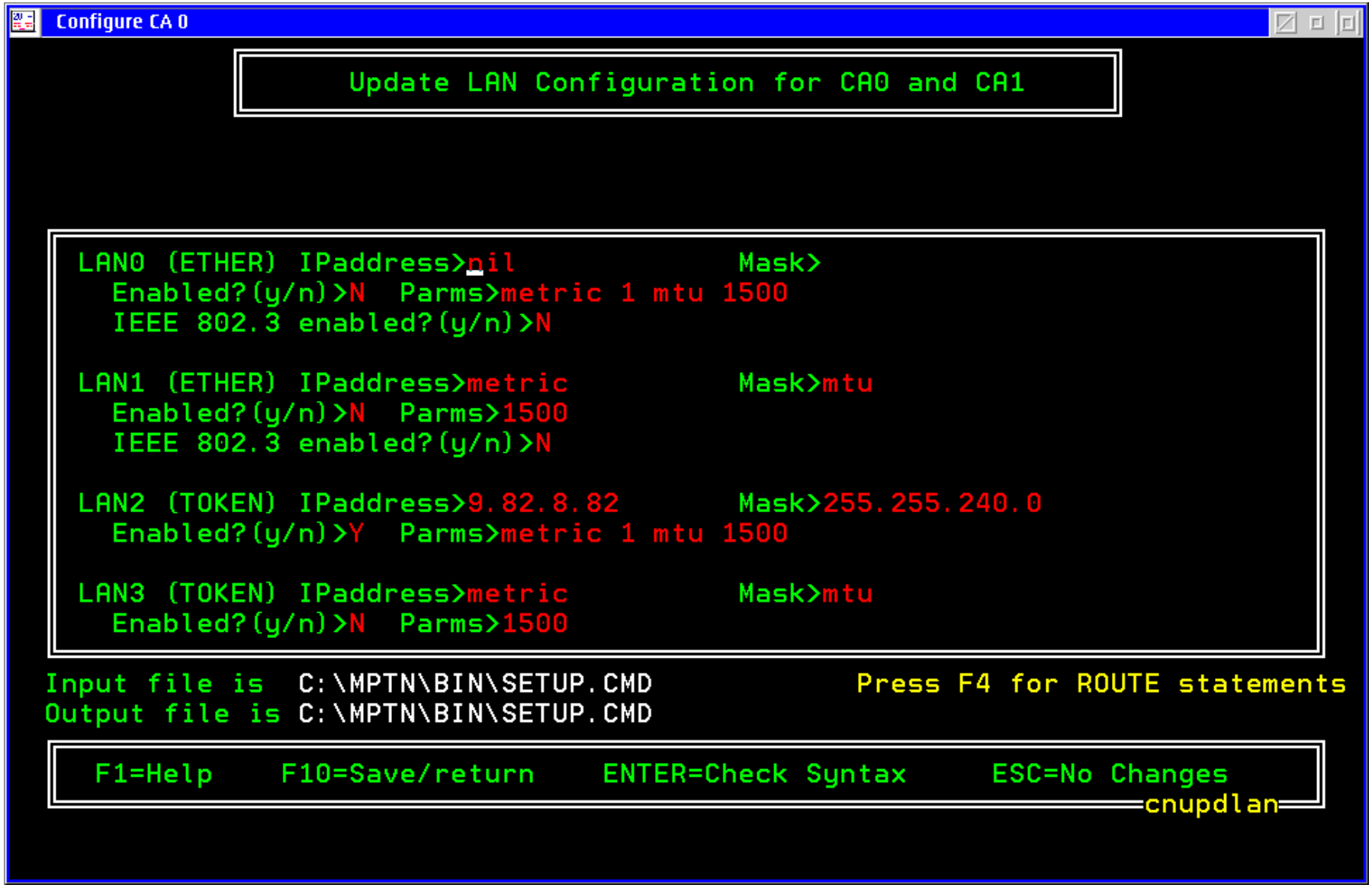
Definitions...tieing it together



Just some documentation stuff....

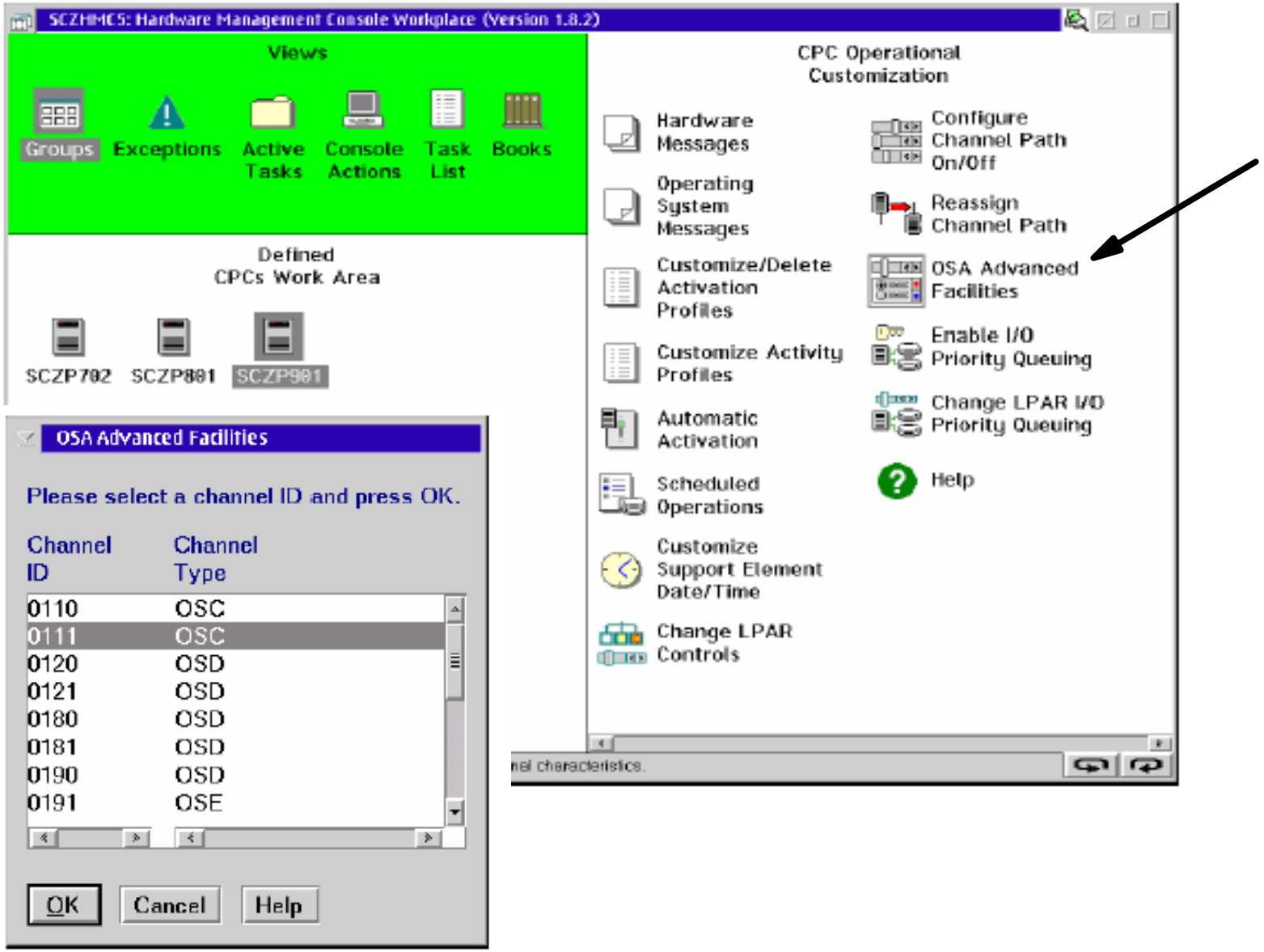


Defining the LAN Adapters

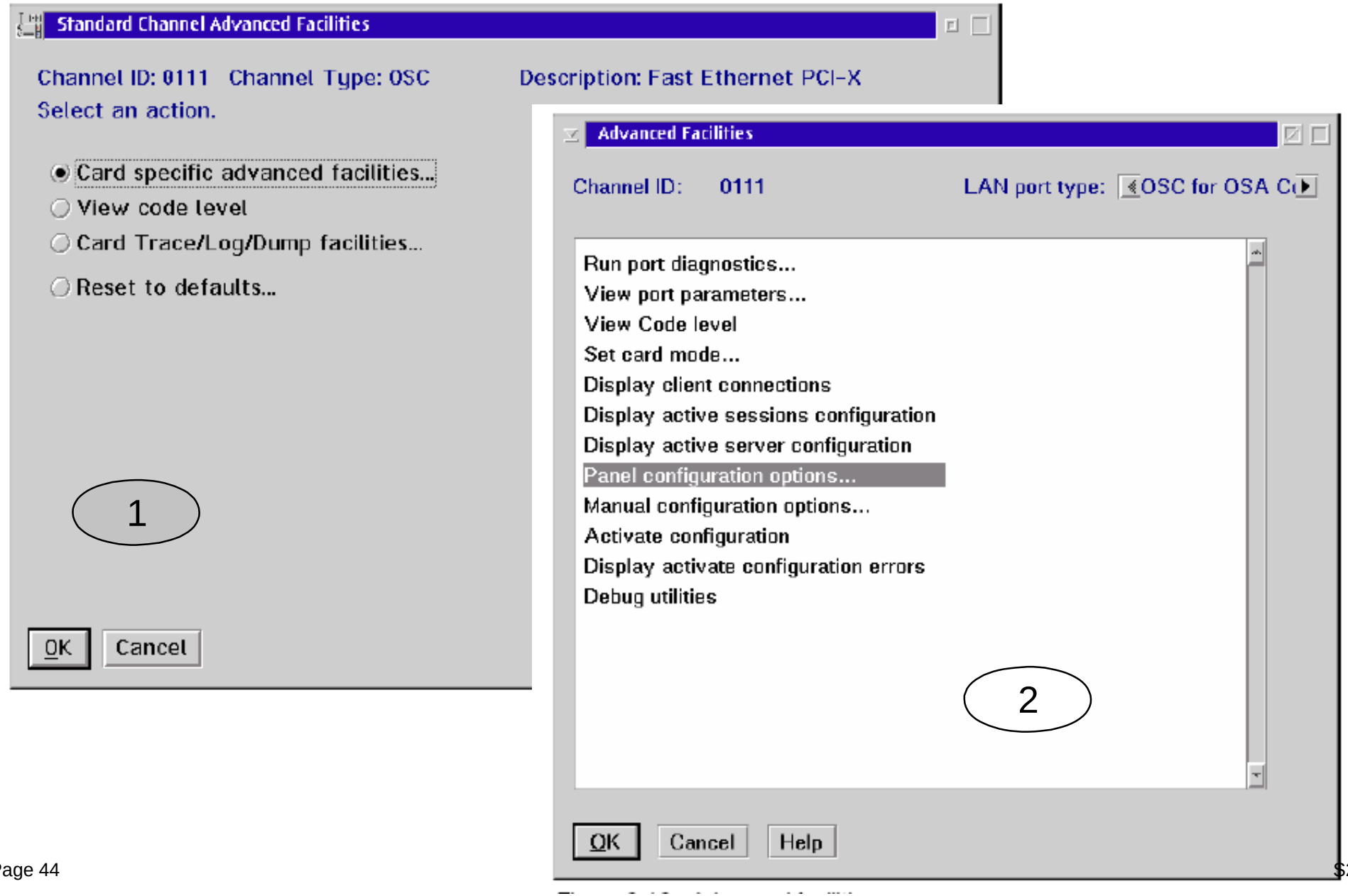


OSA-ICC Customization

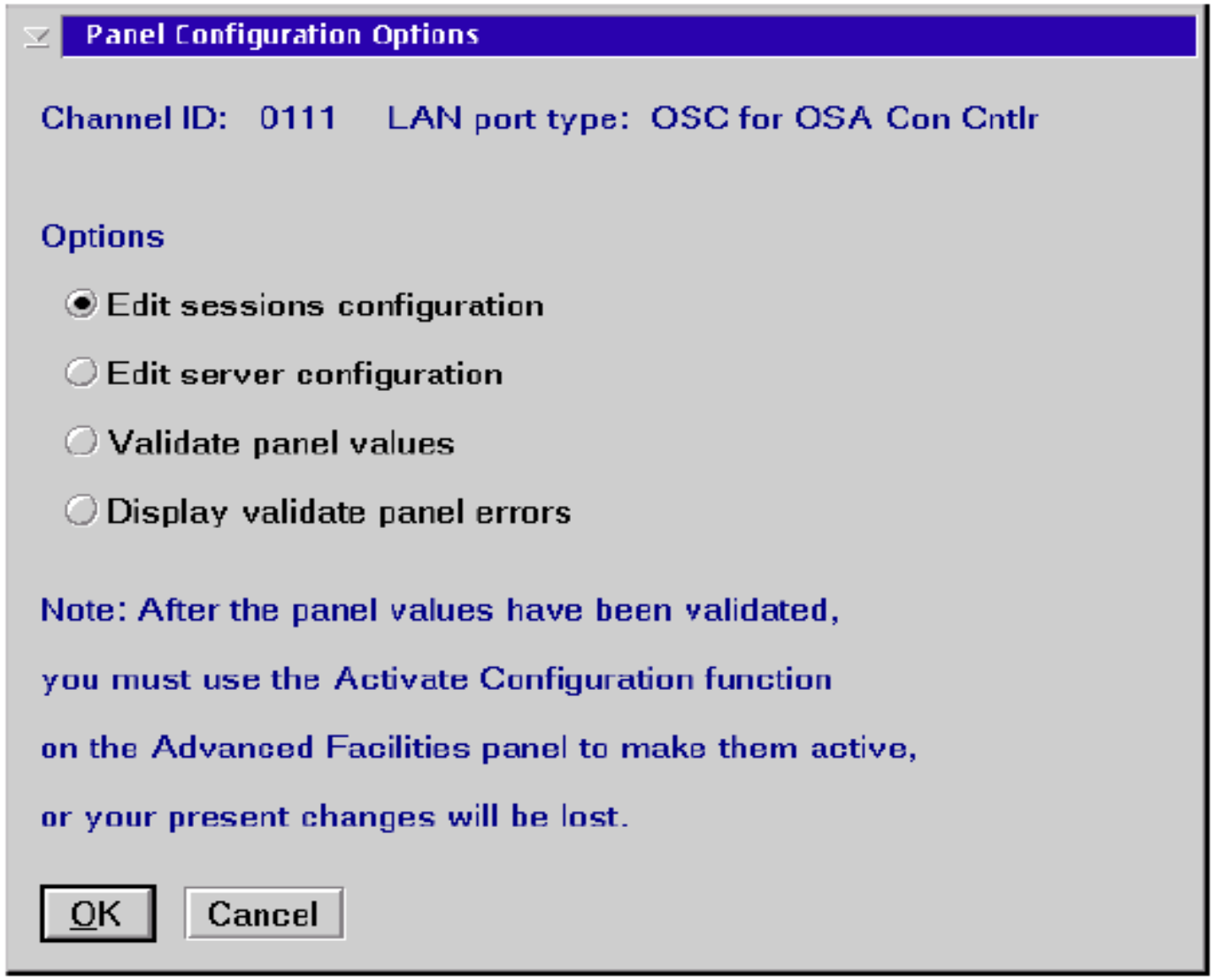
OSA Advanced Facilities



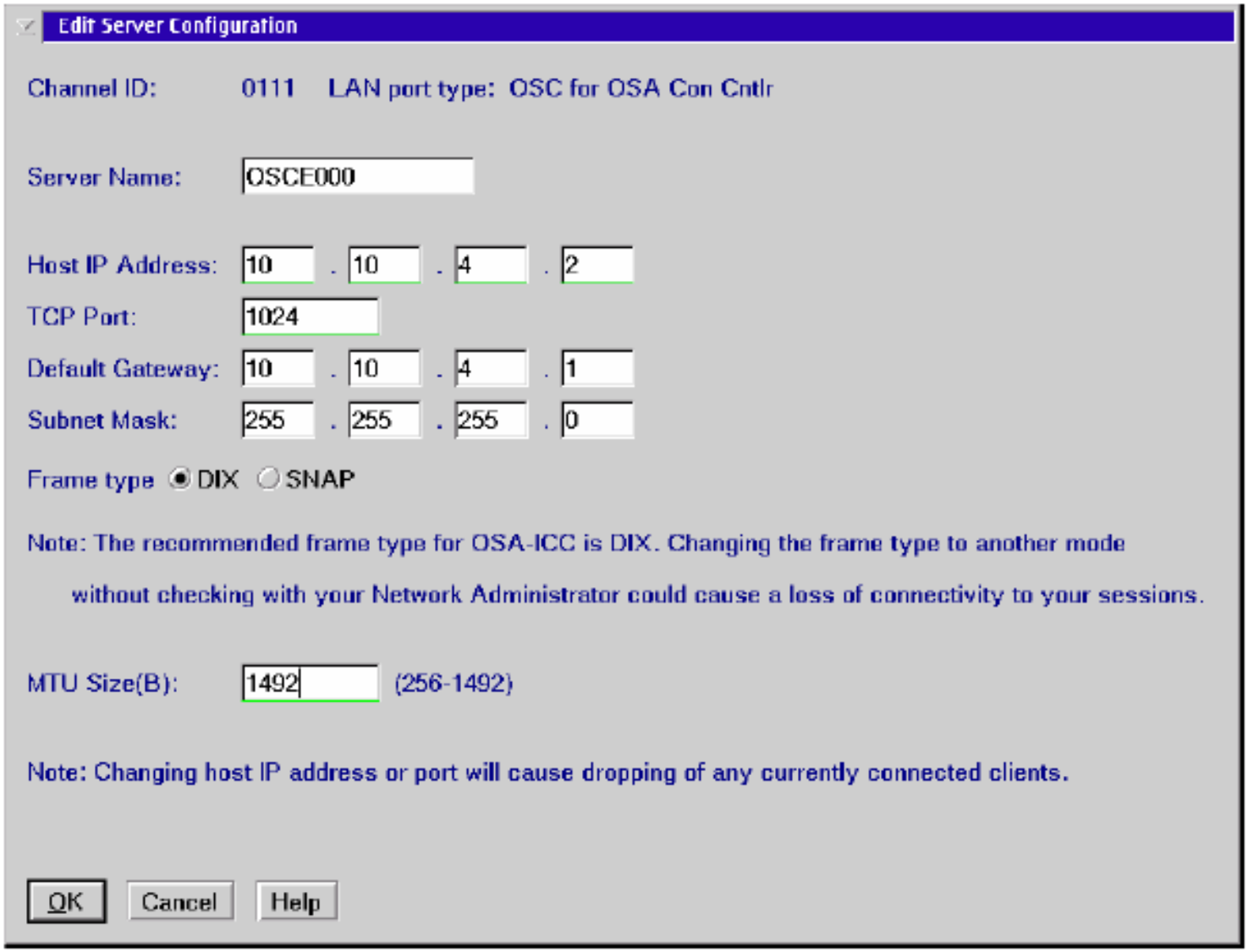
Function Selection under OSA-Advanced Facilities



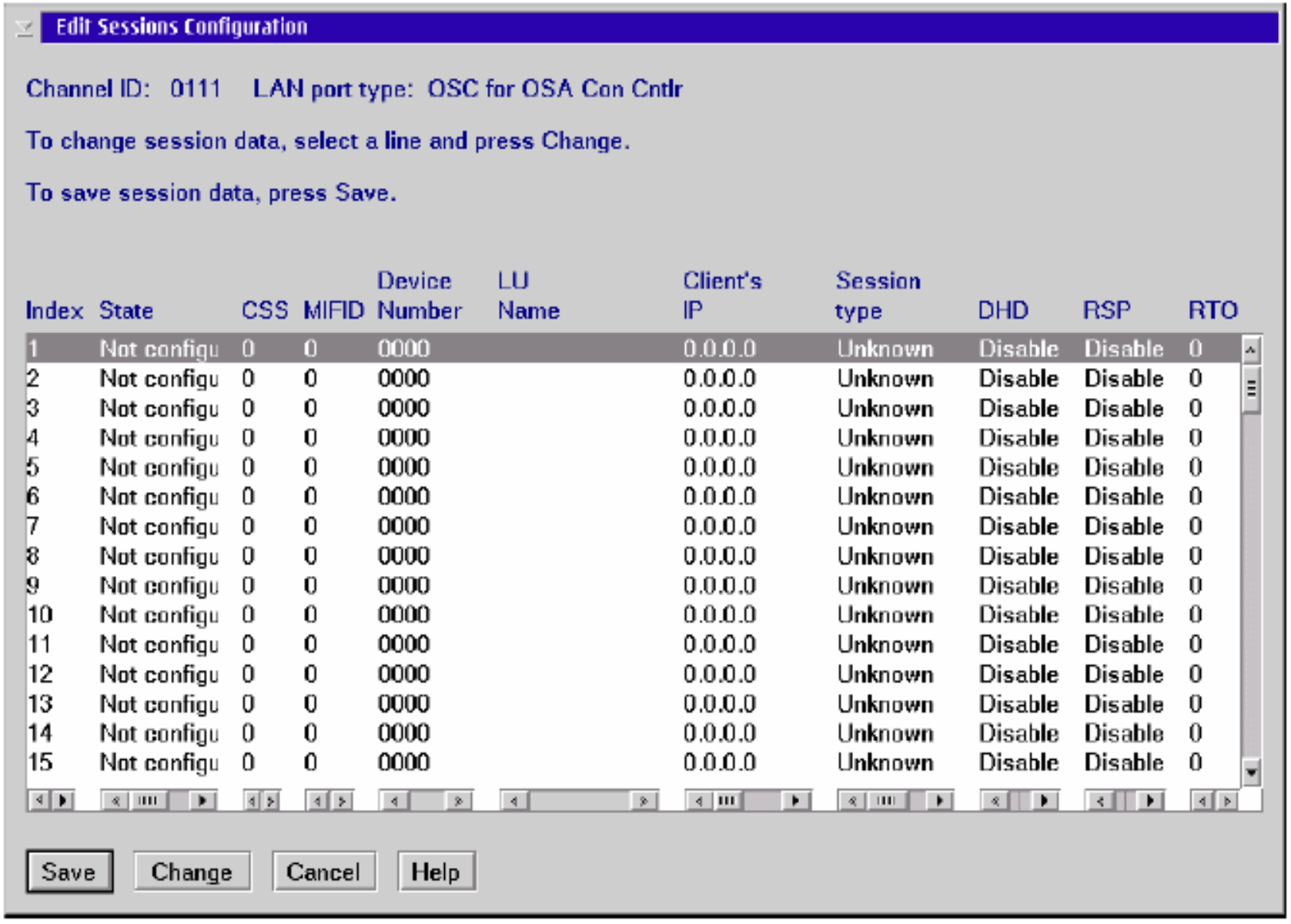
Configuration Options Panel



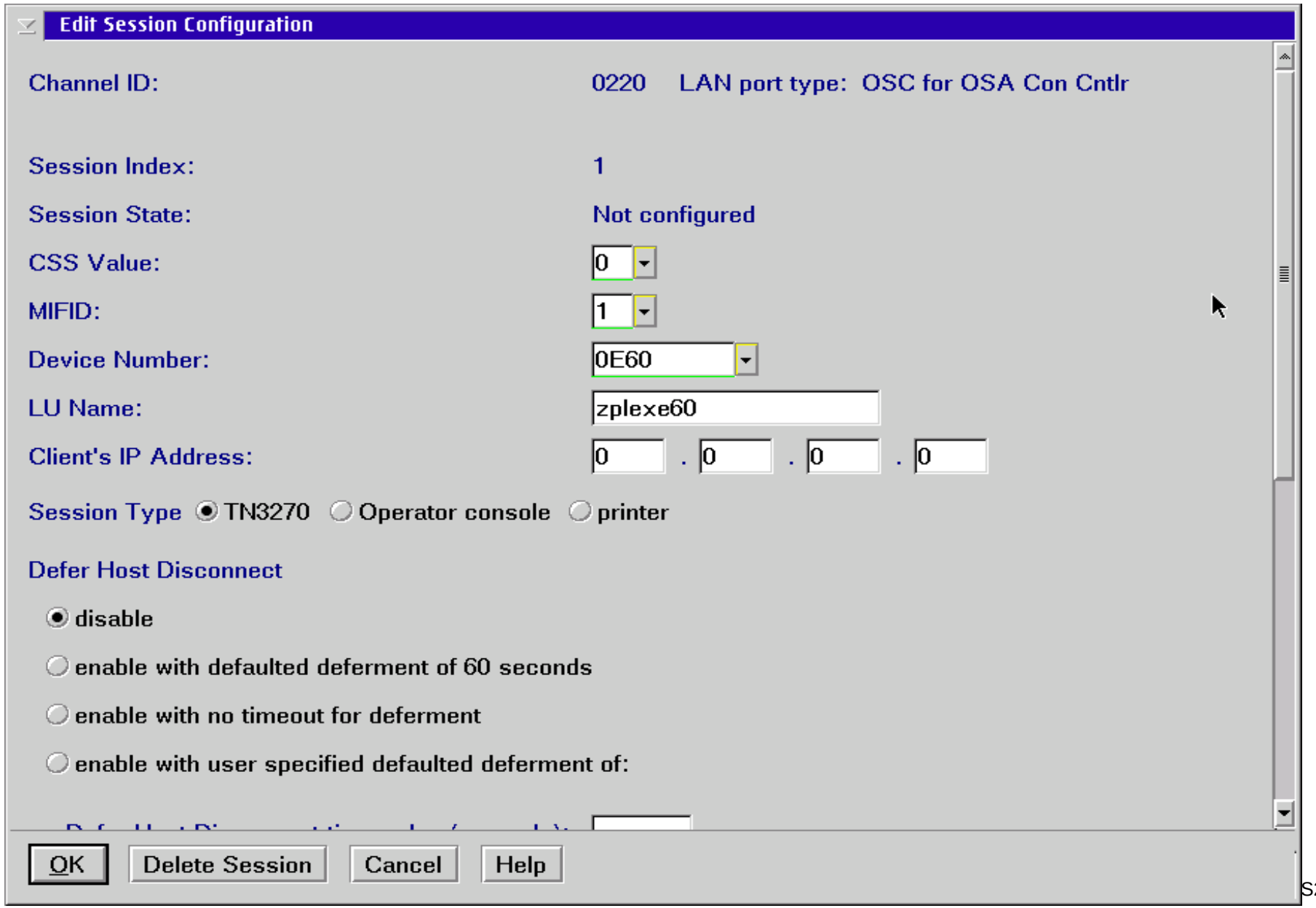
Edit Server Configuration Panel



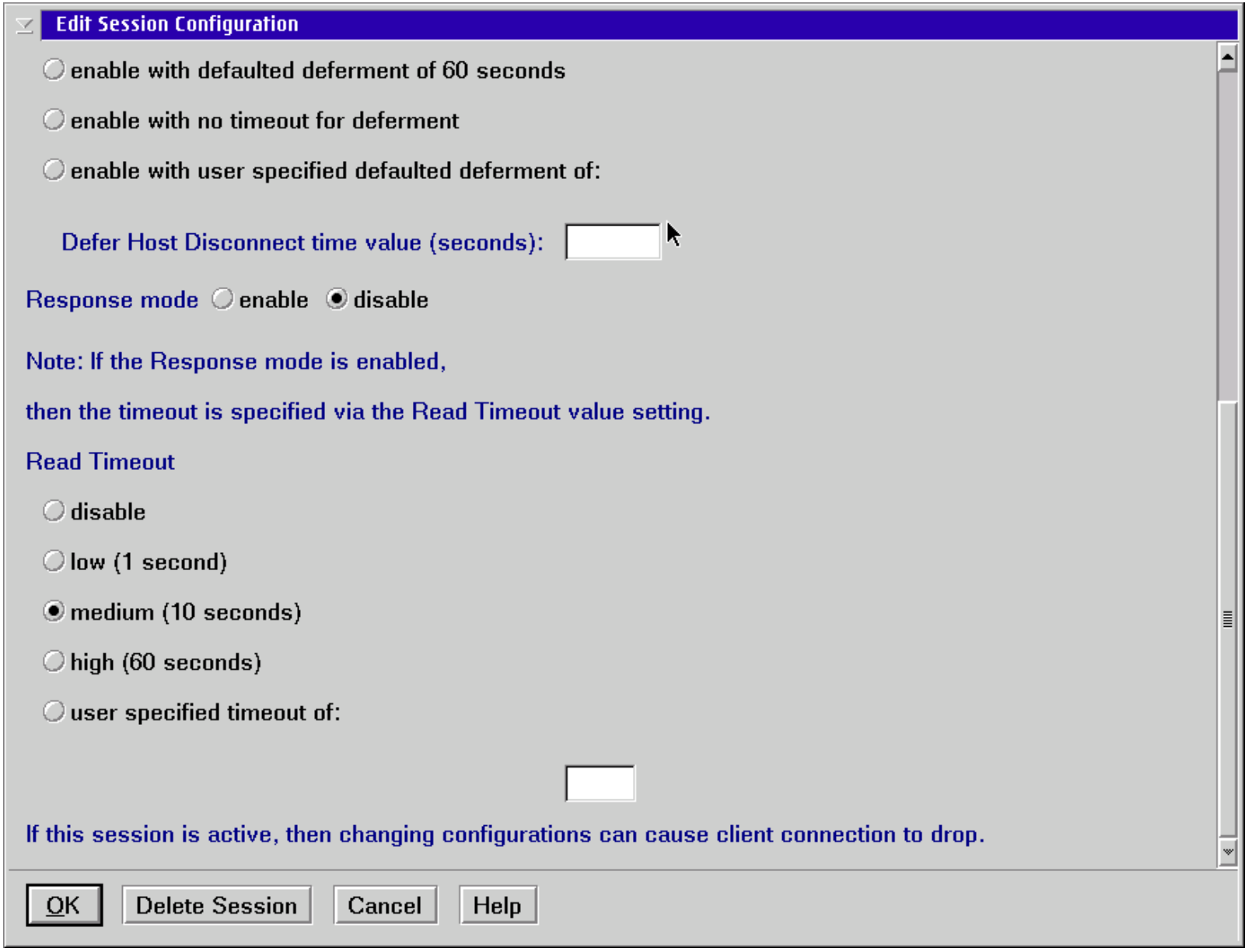
Edit Sessions Configuration



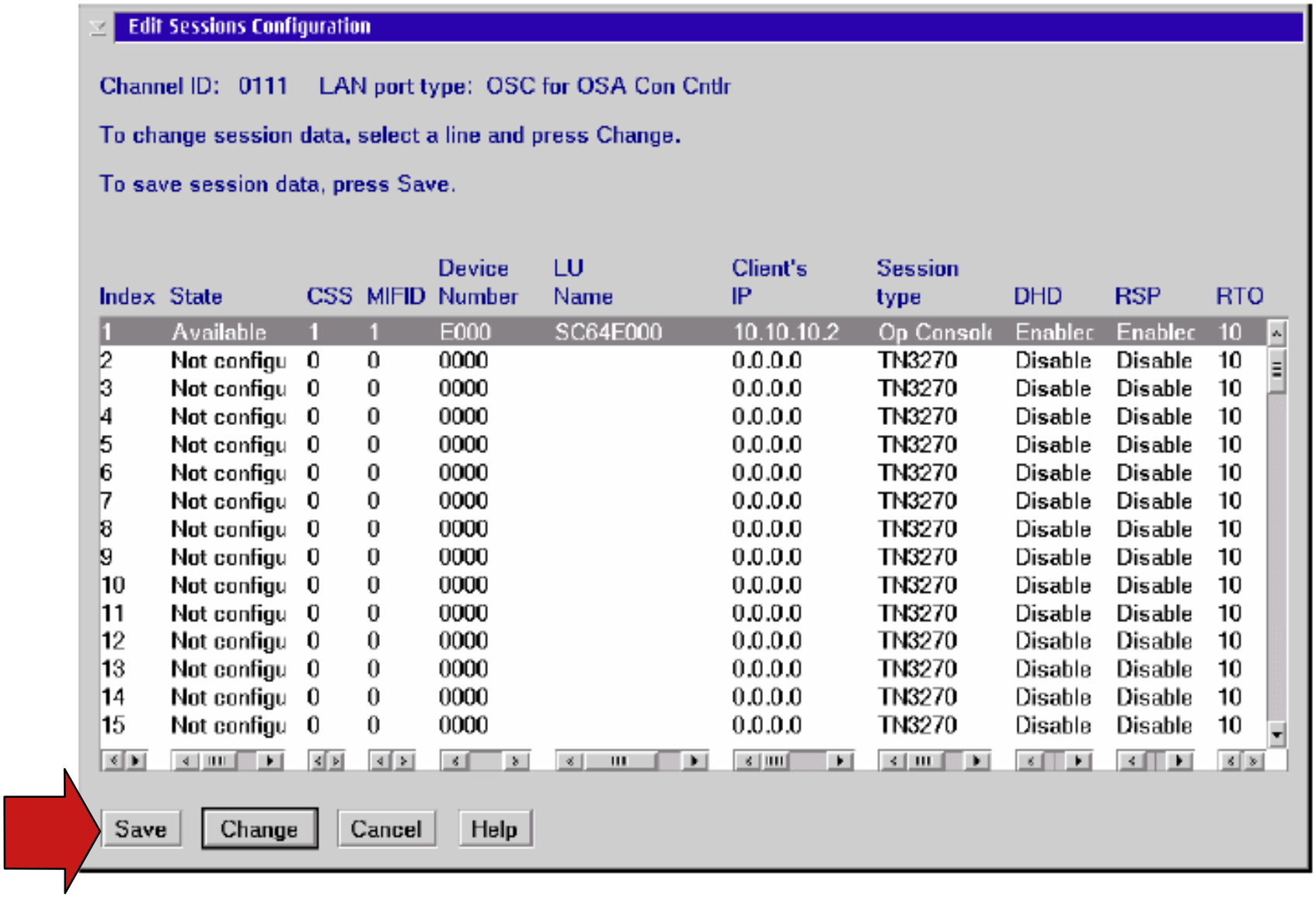
Edit Session



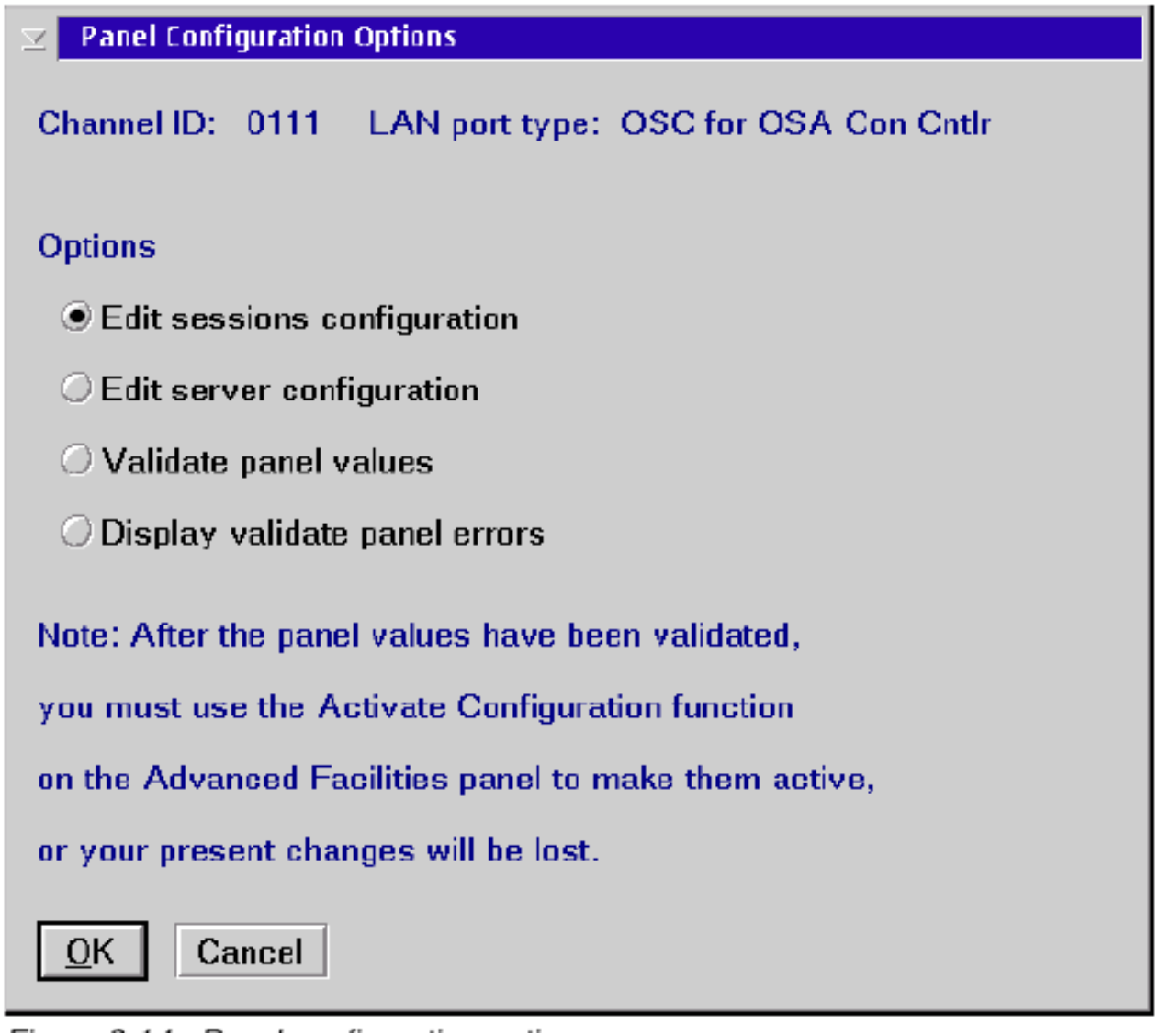
Edit Session



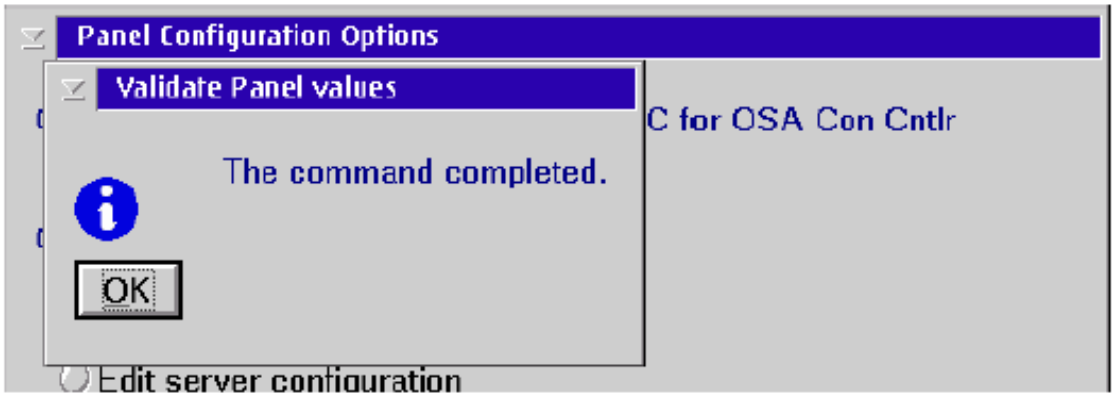
Session Created and enabled

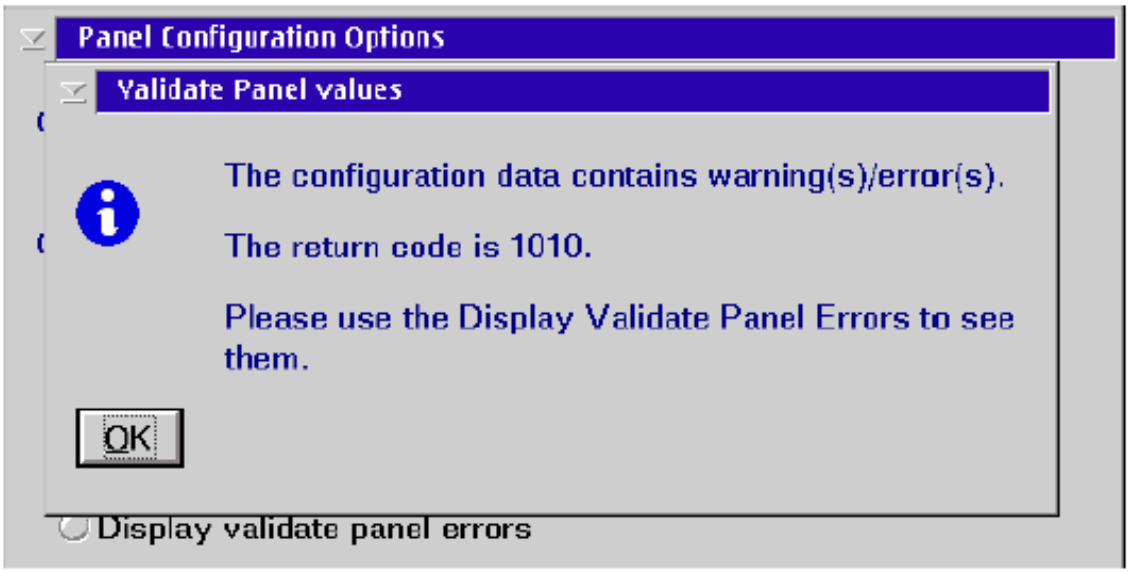


Validate..

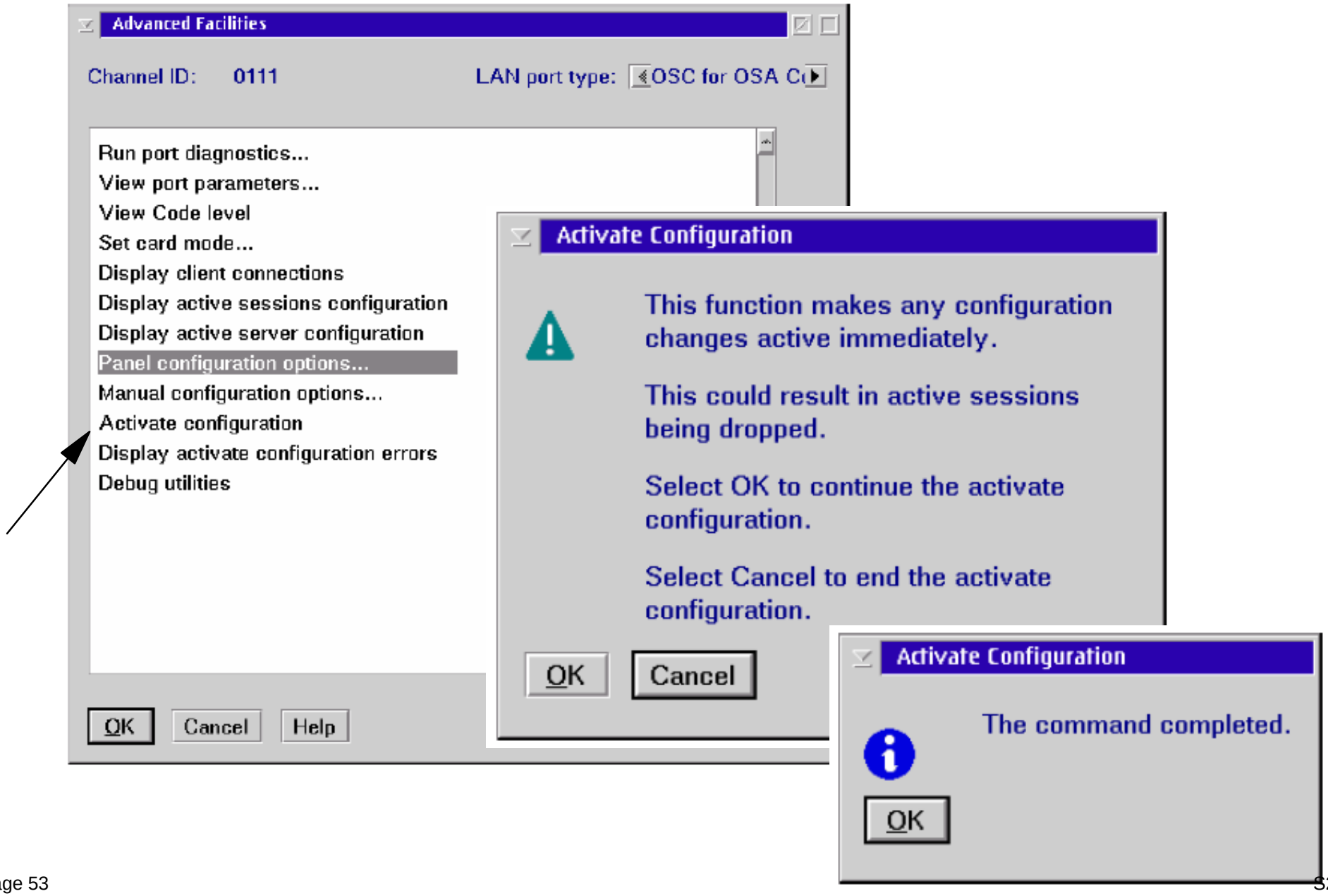

Panel Configuration Options
Channel ID: 0111 LAN port type: OSC for OSA Con Cntlr
Options
Edit sessions configuration
Edit server configuration
Validate panel values
Display validate panel errors
Note: After the panel values have been validated,
you must use the Activate Configuration function
on the Advanced Facilities panel to make them active,
or your present changes will be lost.
OK
Cancel

Possible Results....good and bad

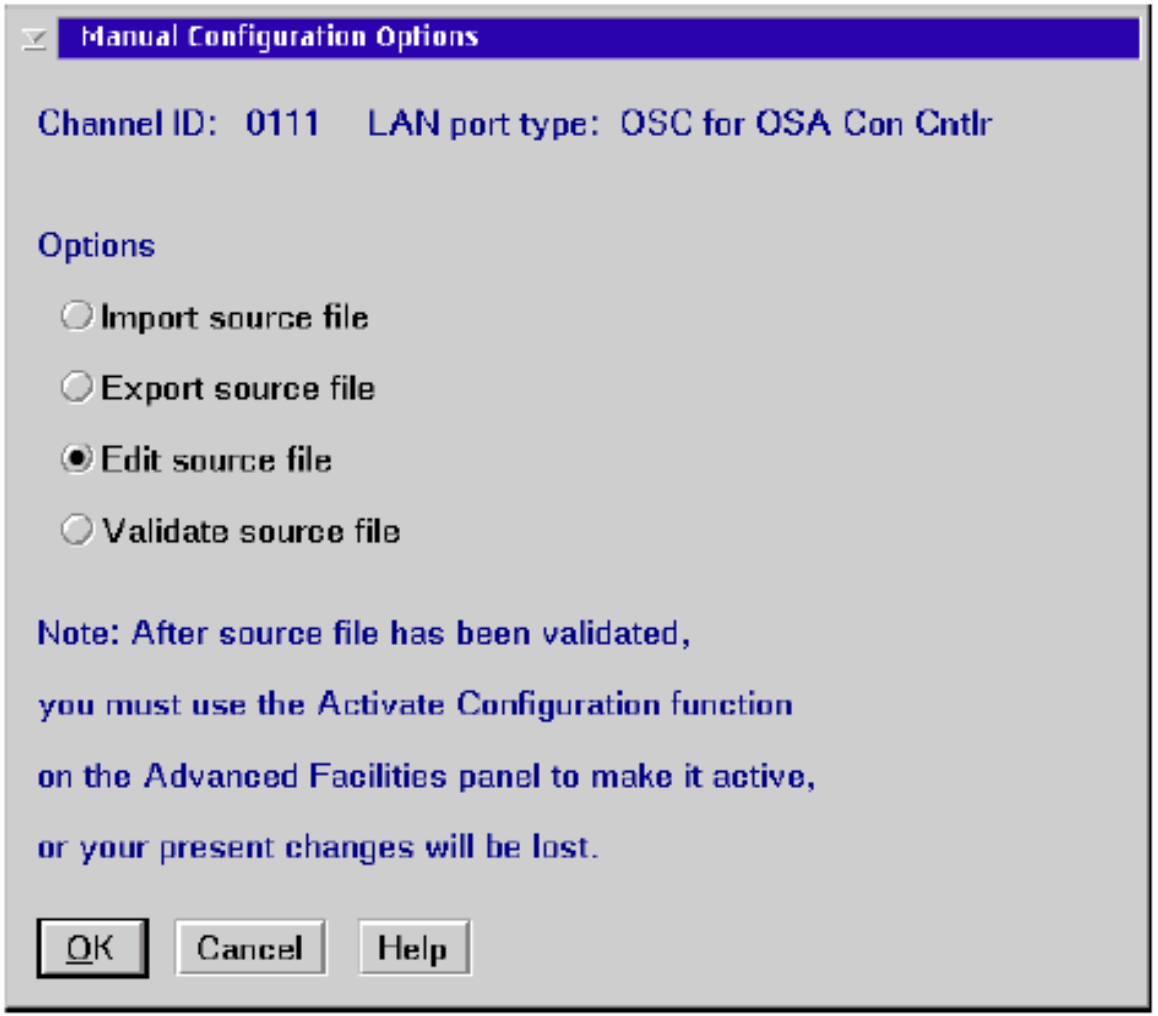




Activate

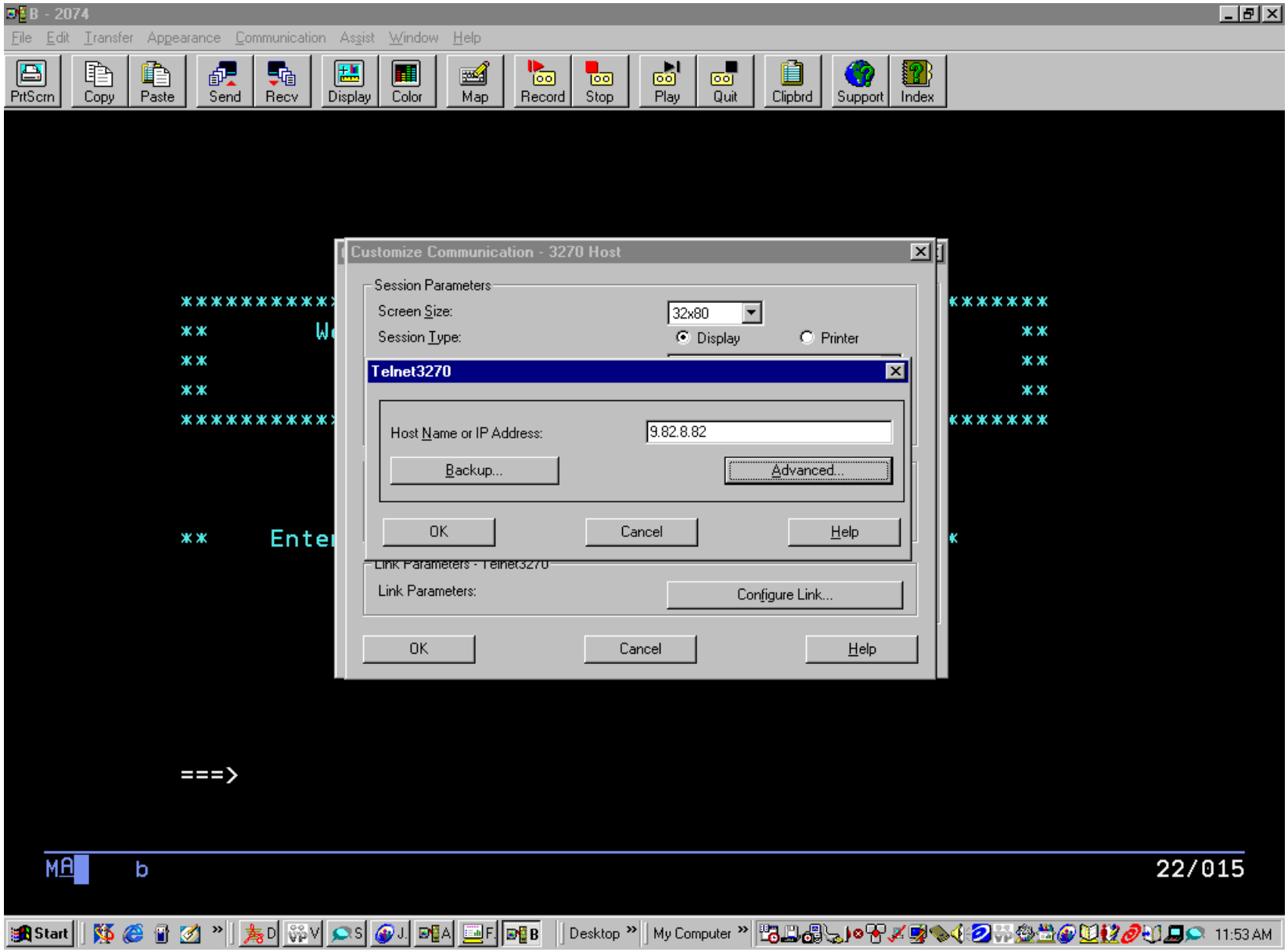

Advanced Facilities
Channel ID: 0111
LAN port type: OSC for OSA C
Run port diagnostics...
View port parameters...
View Code level
Set card mode...
Display client connections
Display active sessions configuration
Display active server configuration
Panel configuration options...
Manual configuration options...
Activate configuration
Display activate configuration errors
Debug utilities
OK
Cancel
Help
Activate Configuration
This function makes any configuration changes active immediately.
This could result in active sessions being dropped.
Select OK to continue the activate configuration.
Select Cancel to end the activate configuration.
OK
Cancel
Activate Configuration
The command completed.
OK

Manual Options...fyi

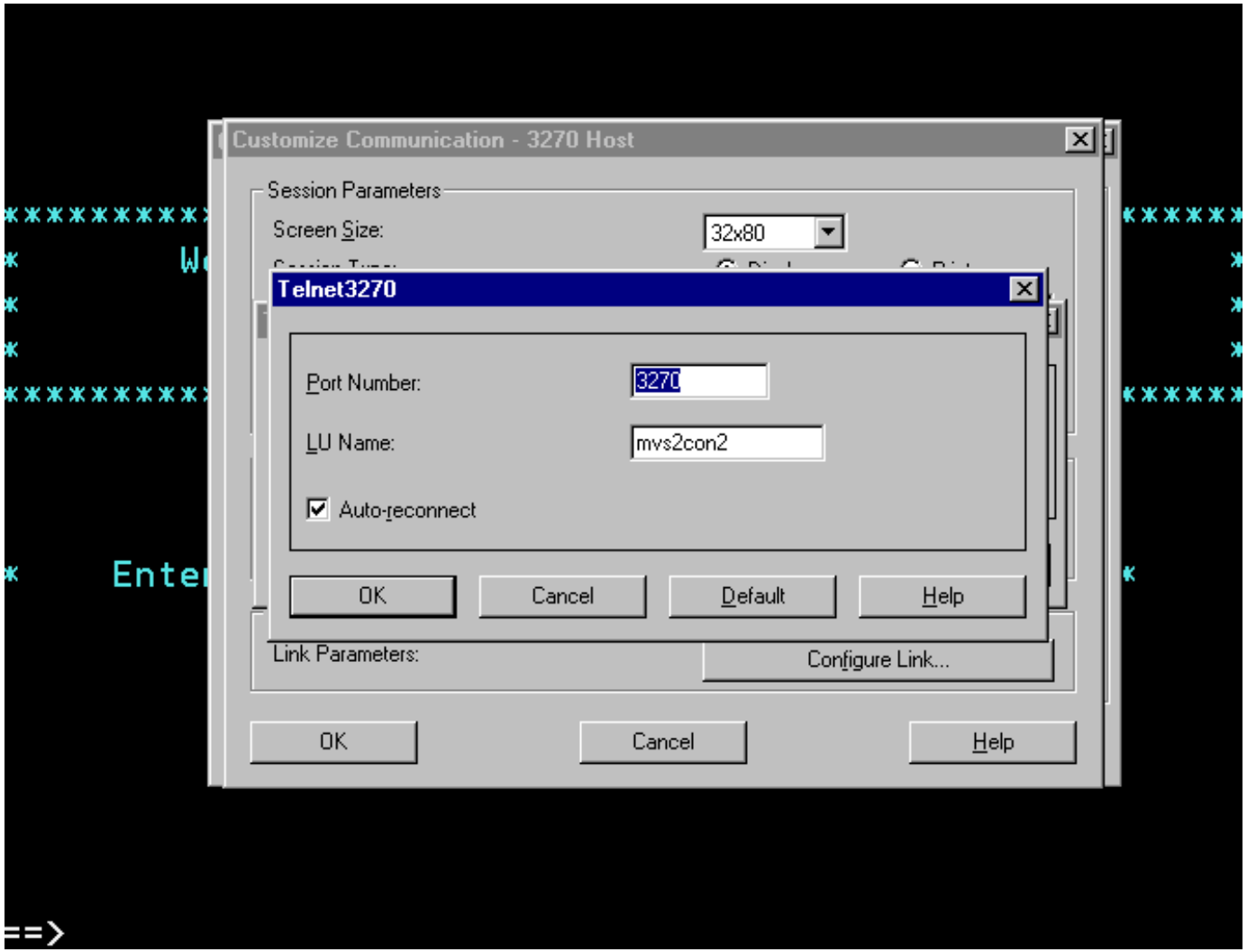


Customization-Client

PCOM Setup-IP address of LAN adapter

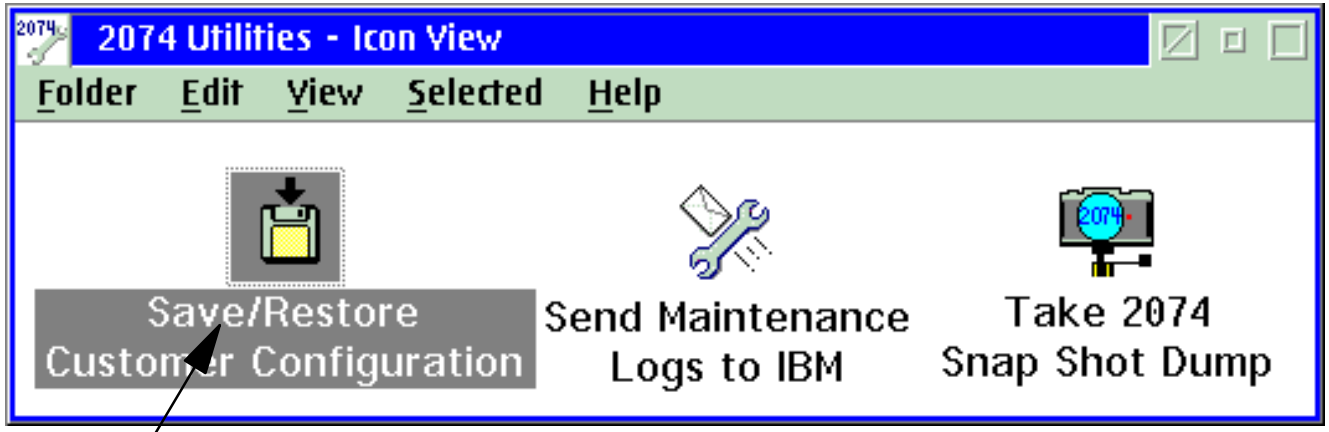


PCOM-Advanced, setting LU name



Miscellaneous

2074 Utilities...



Saving your customization

Considerations

- Requires networking skills
  - LAN Design
  - TCP/IP Definitions
- Security
  - Primarily dependent on LAN security
  - Recommendation to use private, highly secure LAN
- Failure Procedures
  - Depends on host console recovery
    - Exactly same process as for 3174 non-SNA implementation
- Loss of console detection
  - potential time delay since 2074 does not do active polling of devices
- TCP/IP running on the LAN independent of host TCP/IP

SMCS Considerations

SMCS consoles are MCS consoles that use VTAM services for input and output. SMCS consoles provide most of the same functions as MCS consoles with the following exceptions:

- Synchronous WTO/R, also known as disabled console communication facility (DCCF), is not supported for SMCS consoles. The system console or an MCS console must be used instead.
- SMCS consoles are not available during NIP. The system console or an MCS console must be used instead.
- VTAM must be active for SMCS to be active. The system console and MCS consoles do not rely on VTAM, and these can be used before VTAM is active.
- SMCS consoles must be activated differently than MCS consoles. The activation process depends on the console definitions, but in all cases, VARY CONSOLE and VARY CN, ONLINE do not work for SMCS.
- SMCS does not support output-only (message stream and status display) consoles. SMCS consoles must always be full-capability consoles.
- SMCS does not support printer consoles, and cannot be used as hardcopy devices.

- continued next page

SMCS Considerations *(continued)*

Because an SMCS console is connected through a network and uses VTAM services, the VTAM commands VARY NET and HALT NET, as well as network problems, can affect console operations.

Source:
z/OS
MVS Planning: Operations
Document Number SA22-7601-00

References

References-2074

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  - **ibm.com**/servers/eserver/zseries/library/techpapers/pdf/gm130316.pdf
- *IBM 2074 Console Support Controller Installation and Maintenance Information* - G229-9028-03
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  - redbooks.**ibm.com**/abstracts/sg245966.html
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  - www-1.**ibm.com**/support/techdocs/atsmastr.nsf/PubAllNum/Flash10178
- IBM NetBAY Rack configurator
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- IBM 2074-003 Console Support Controller: Planning and Installation
  - White Paper on www.ibm.com/support/techdocs

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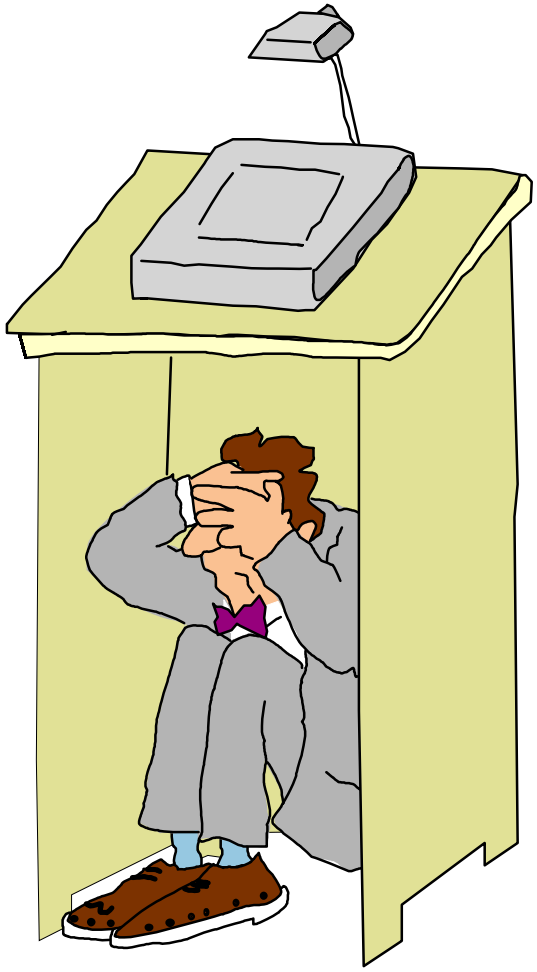
- SG24-6364 OSA-Express Integrated Console Controller Implementation Guide
  - (ITSO Redbook)
- SA22-7990 Open Systems Adapter-Express Integrated Console Controller User's Guide
  - ResourceLink Publication

Questions?



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