# Power Systems Virtualisation from IBM - Technical Webinar User Group

Today

## Virtual Partition Manager for IBM i

**Starting at 10:00 am UK time by Janus Hertz**

**Series details, registration and replays of previous webinars from http://tinyurl.com/UK-PowerVM-VUG**

**Register by sending email to Jyoti Dodhia – jyoti_dodhia@uk.ibm.com**

**Upcoming sessions …..**

**Session 17: Updating Power Systems, I/O and HMC**
**on 3rd October 2012, 10:00 - 11:00 BST (UK time)**

# Virtual Partition Manager (VPM) for IBM i

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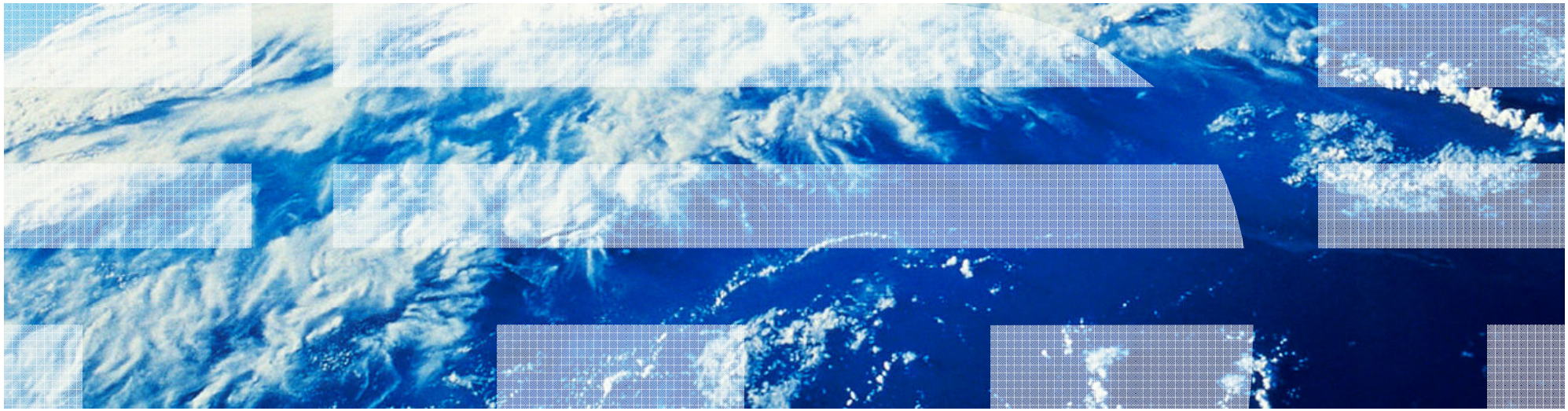


Rev. 19-09-2012

# Agenda

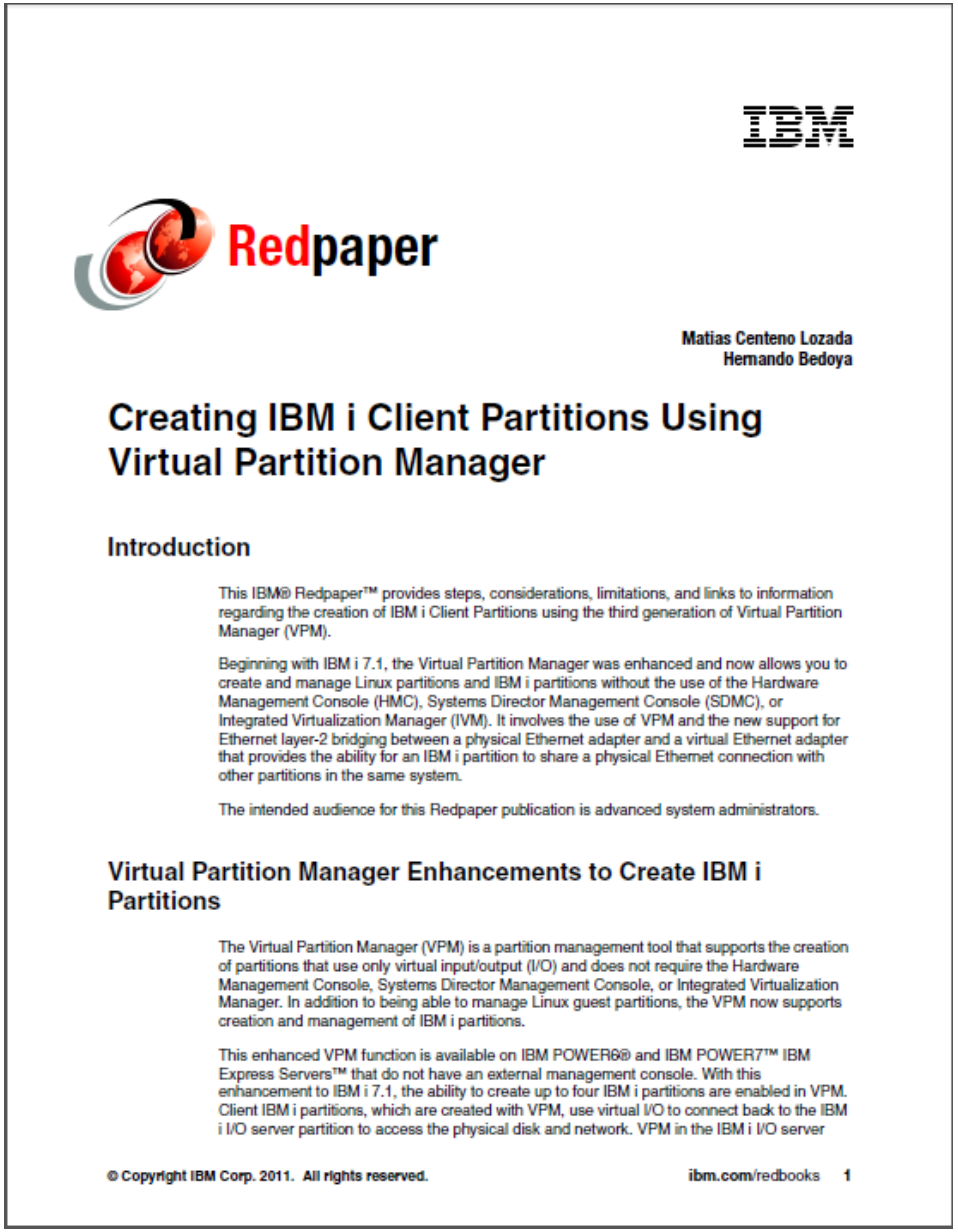
- Overview iVirtualization
- New enhancments
- VPM based setup
- Things to consider

# Virtual Partition Manager (VPM)

- Virtual Partition Manager (VPM) is a partition management tool that supports the creation of partitions that use only virtual I/O and does not require the HMC, SDMC or IVM.
- In addition to being able to manage Linux guest partitions, the VPM now supports creation and management of IBM i client partitions.
- VPM function is available on POWER6® and POWER7™ Express Servers™ that do not have an external management console (HMC or SDMC)
- **Requirement IBM i 7.1 TR3 in the IBM i host partition**

# Where Do I Start with Installing IBM I hosting clients on Power system?

**VPM based**



IBM

Redpaper

Matias Centeno Lozada
Hernando Bedoya

## Creating IBM i Client Partitions Using Virtual Partition Manager

### Introduction

This IBM® Redpaper™ provides steps, considerations, limitations, and links to information regarding the creation of IBM i Client Partitions using the third generation of Virtual Partition Manager (VPM).

Beginning with IBM i 7.1, the Virtual Partition Manager was enhanced and now allows you to create and manage Linux partitions and IBM i partitions without the use of the Hardware Management Console (HMC), Systems Director Management Console (SDMC), or Integrated Virtualization Manager (IVM). It involves the use of VPM and the new support for Ethernet layer-2 bridging between a physical Ethernet adapter and a virtual Ethernet adapter that provides the ability for an IBM i partition to share a physical Ethernet connection with other partitions in the same system.

The intended audience for this Redpaper publication is advanced system administrators.

### Virtual Partition Manager Enhancements to Create IBM i Partitions

The Virtual Partition Manager (VPM) is a partition management tool that supports the creation of partitions that use only virtual input/output (I/O) and does not require the Hardware Management Console, Systems Director Management Console, or Integrated Virtualization Manager. In addition to being able to manage Linux guest partitions, the VPM now supports creation and management of IBM i partitions.

This enhanced VPM function is available on IBM POWER6® and IBM POWER7™ IBM Express Servers™ that do not have an external management console. With this enhancement to IBM i 7.1, the ability to create up to four IBM i partitions are enabled in VPM. Client IBM i partitions, which are created with VPM, use virtual I/O to connect back to the IBM i I/O server partition to access the physical disk and network. VPM in the IBM i I/O server



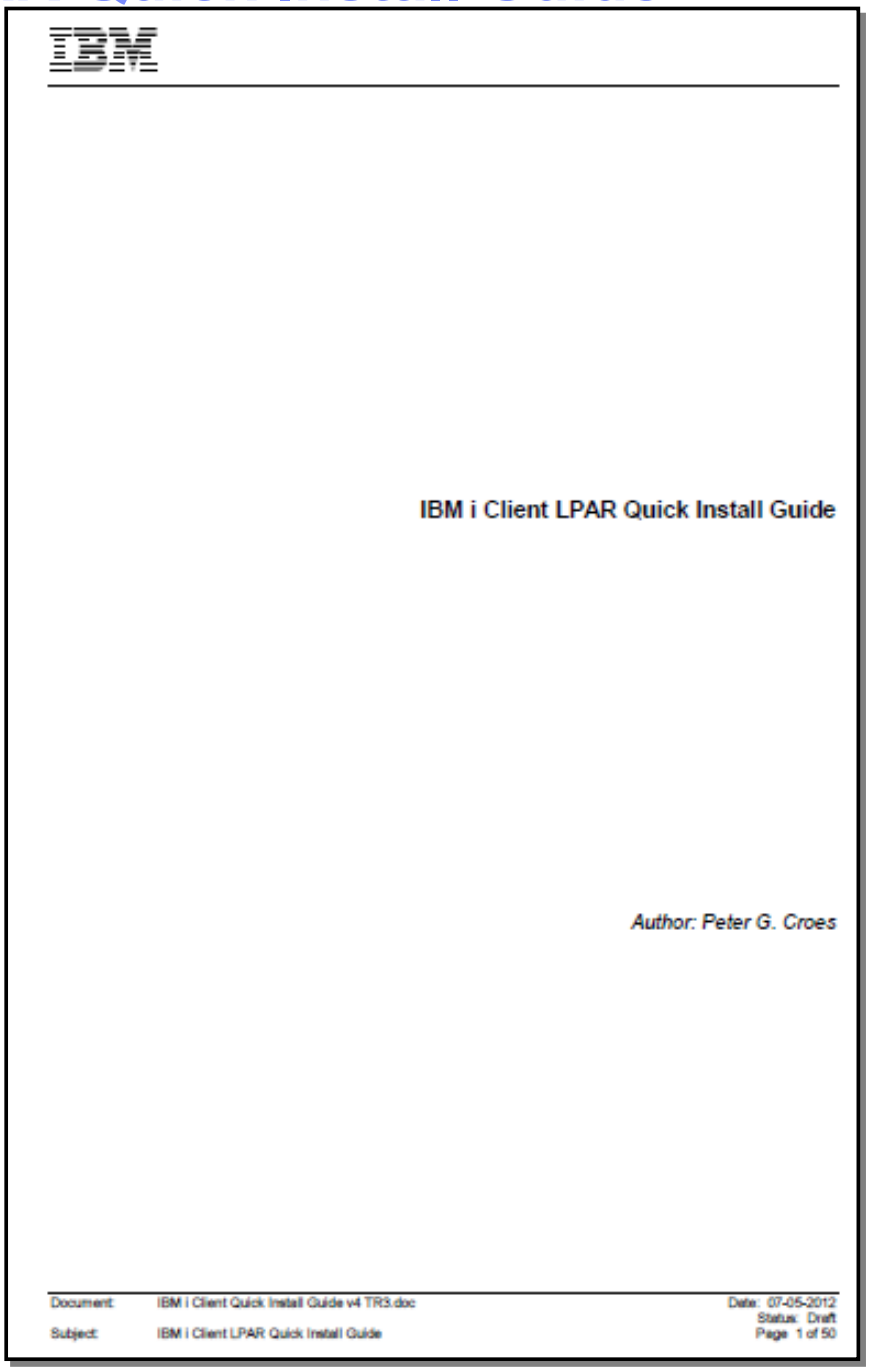


http://www.redbooks.ibm.com/redpieces/abstracts/redp4806.html?Open

# IBM i Client LPAR Quick Install Guide

Cover both VPM & HMC based Setups.

To get copy send email to Peter Croes


IBM

IBM i Client LPAR Quick Install Guide

*Author: Peter G. Croes*

Document: IBM i Client Quick Install Guide v4 TR3.doc
Subject: IBM i Client LPAR Quick Install Guide
Date: 07-05-2012
Status: Draft
Page 1 of 50

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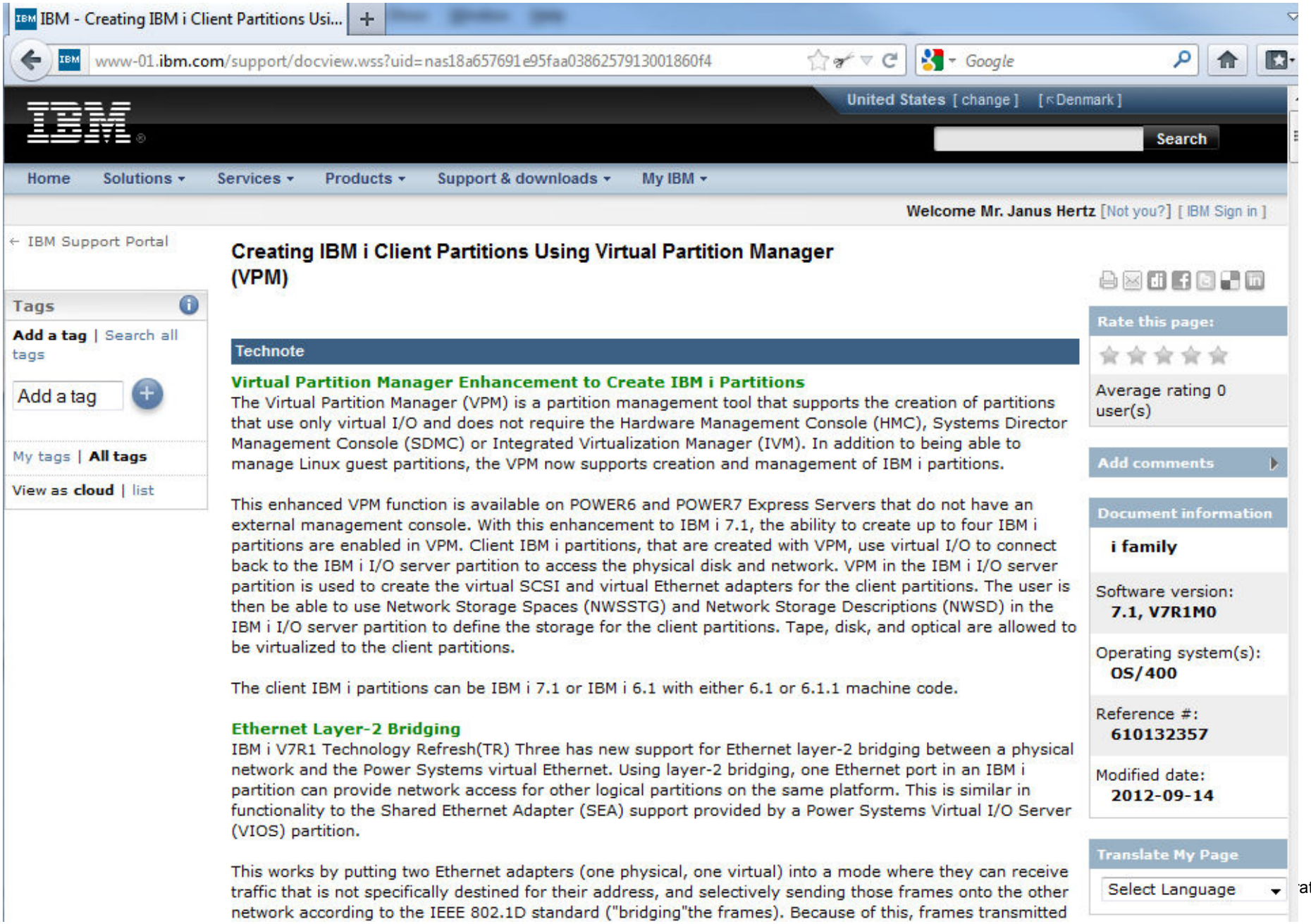
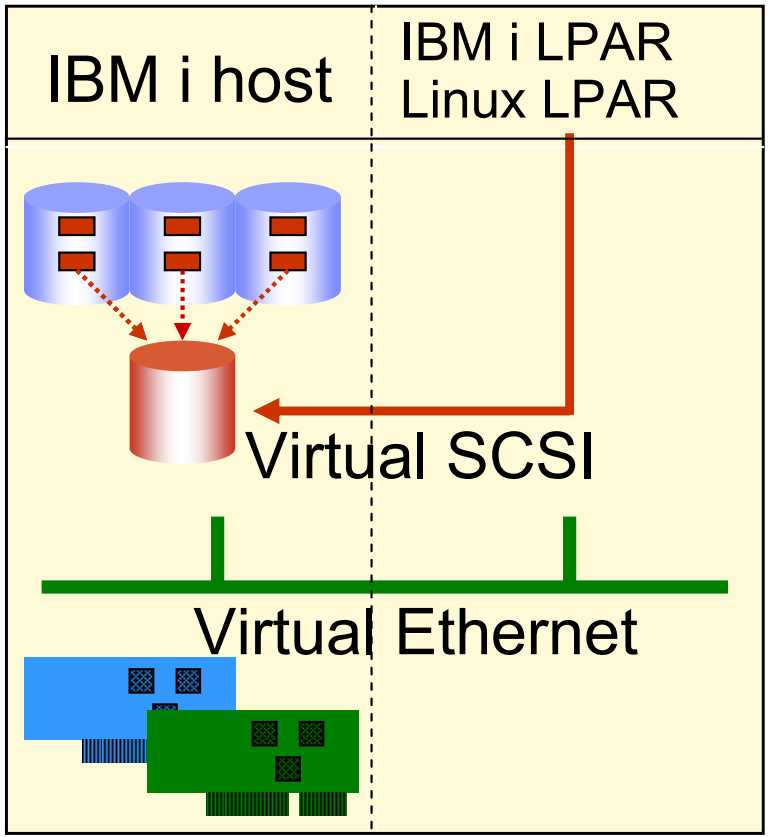
# TechNote: Creating IBM i Client Partitions Using Virtual Partition Manager (VPM)

- http://www-01.ibm.com/support/docview.wss?uid=nas18a657691e95faa038625791300186 0f4



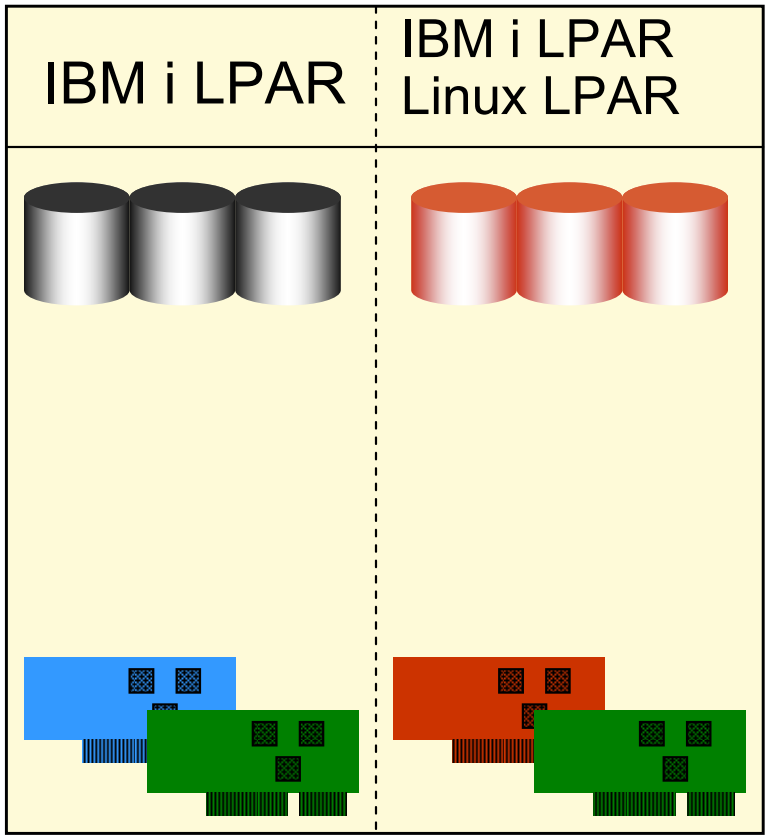
# Virtual versus Physic Hardware Resources

## Virtual I/O




- IBM i host ASP function as SAN

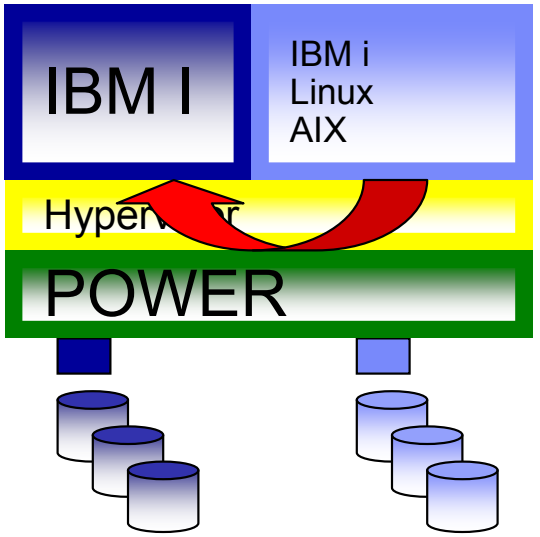
## Physic I/O



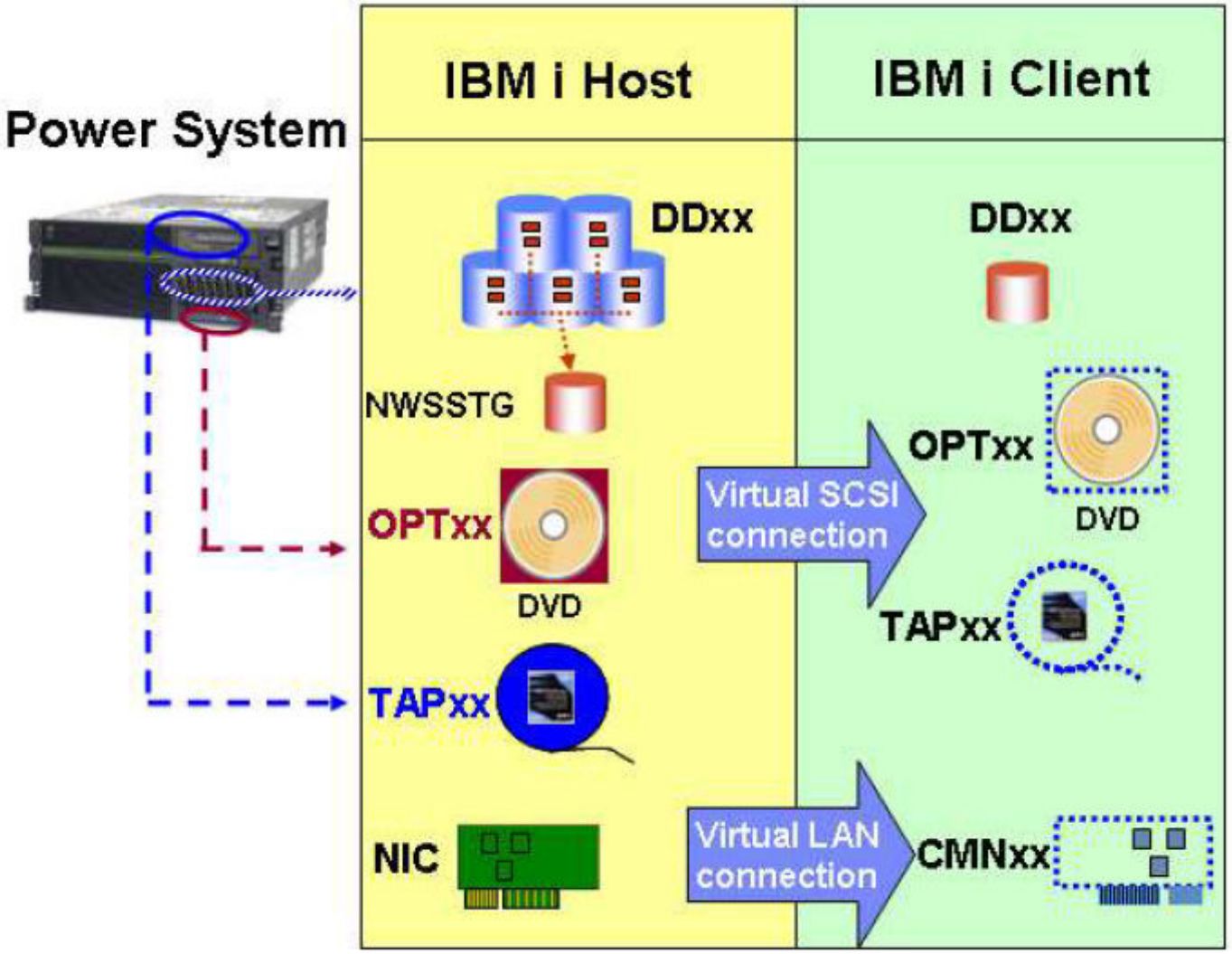

- Each partition owns I/O
- IBM i/AIX/Linux managed hardware
- IBM i/AIX/Linux independend from other partitions

# IBM i Virtual Client Partitions

- IBM i-based Virtualization
  - IBM i partition uses I/O resources from another IBM i partition
  - Eliminates requirement to buy adapters and disk drives for each IBM i partition
  - Supports simple creation of additional partitions …. e.g., for test and development
  - Requires POWER6 (or later) systems with IBM i 6.1
  - Requires *PowerVM standard edition*
  - Can mix virtual and direct I/O in client
    - VPM based only virtual!
- Platform support
  - All POWER6 (and later) System models (NOT PowerBlades)
- Storage support
  - Determined by host IBM i partition (SAN, EXP24, integrated disk)
- LPAR management
  - HMC, (SDMC)
  - VPM (virtual partition manager) with IBM i 7.1 TR3 (new in oct.2011)



# IBM i Host and Client Partitions: Overview



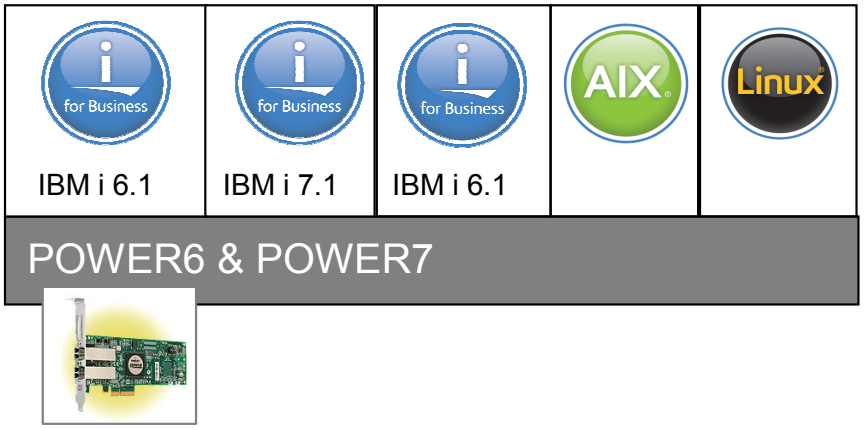

- Requirements
  - POWER6/7 hardware
  - IBM I 6.1 (or later) on host and client
  - PowerVM standard edition required,
- DASD
  - Hardware assigned to host LPAR in HMC/SDMC
  - DASD can be integrated or SAN
  - DASD virtualized as NWSSTG objects
- Optical
  - DVD drive in host LPAR virtualized directly (OPTxx)
- Networking
  - Network adapter (such as IVE) and Virtual Ethernet adapter in host LPAR
  - Virtual Ethernet adapter in client LPAR
- Tape virtualization
  - new from 7.1 TR2

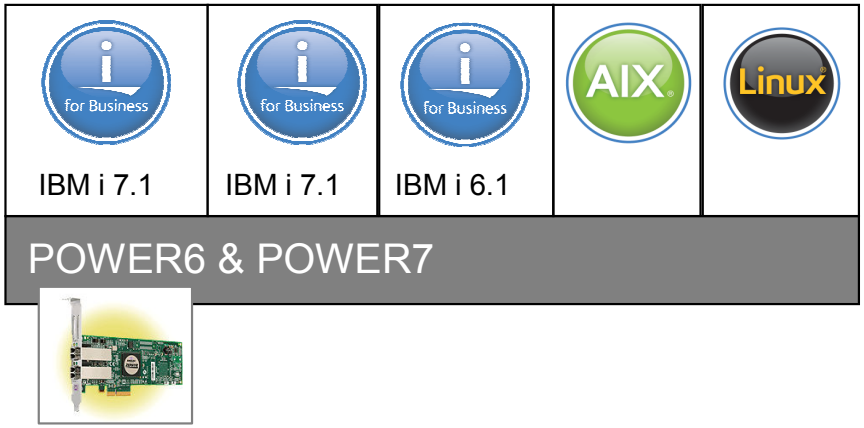
# Virtualization Enhancements

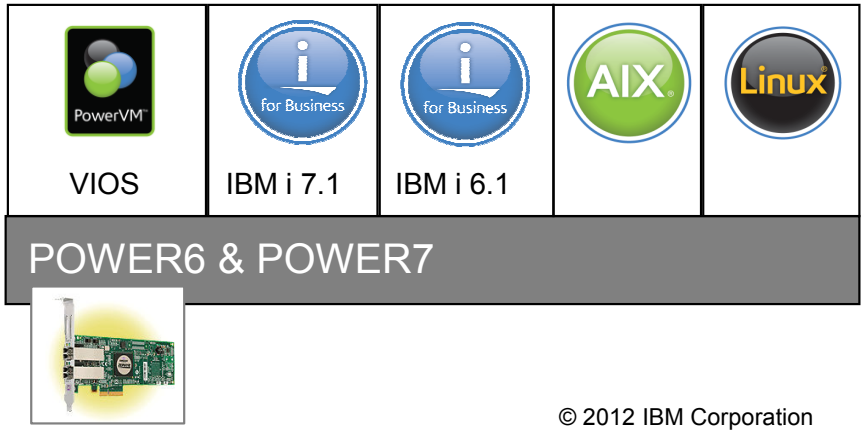
1. **IBM i 6.1 partition can host**
   - IBM i 7.1 and 6.1 partitions
   - AIX and Linux partitions (SLES & RHEL)
   - iSCSI attached System x and BladeCenter

2. **IBM i 7.1 partition can host**
   - IBM i 7.1 and 6.1 partitions (SLES & RHEL)
   - AIX and Linux partitions
   - iSCSI attached System x and BladeCenter

3. **PowerVM VIOS can host**
   - IBM i 7.1 and IBM i 6.1 partitions
   - AIX and Linux partitions (SLES & RHEL)
   - VIOS supports advanced virtualization technologies including Active Memory Sharing and NPIV



# iVirtualization Enhancements in IBM i 7.1 Technology Refreshes

Following the GA of IBM i 7.1, IBM i point / modification releases have been replaced by a new release delivery mechanism called a Technology Refresh.

Technology Refreshes are also used to deliver new capabilities for iVirtualization (IBM i Host / IBM i Client partition concept).

- **TR1**: Support for embedded media changers (enabling unattended installs of IBM i Client partitions)
- **TR2**: IBM i to IBM i virtual tape support (info APAR II14615 lists supported devices and required PTFs)
- **TR3**: Ethernet layer-2 bridging and Virtual Partition Manager enhancement to create IBM i partitions

Detailed information on Technology Refreshes can be found via

**http://www.ibm.com/systems/support/i/planning/techrefresh/index.html**

# IBM i host to IBM i Client Virtual Tape Summary

- **Allows IBM i client partitions to use tape devices attached to IBM i server partitions**
  - Client partition utilizes existing support for VIOS-hosted tape devices
  - Server partition utilizes existing support for Linux & Windows virtual tape clients
  - Error recovery & serviceability improvements
- **Only a subset of tape drives are supported for virtualization**
  - Physical tape drives only, no support for exporting tape image catalogs to IBM i clients
    - LTO3/LTO4/LTO5
    - DAT72/DAT160/DAT320
  - IOPless attachment only, IOP attached tape drives are not supported by the IBM i client
  - **Tape library drives can only be virtualized when configured as a stand-alone device, they are not supported while in library mode**

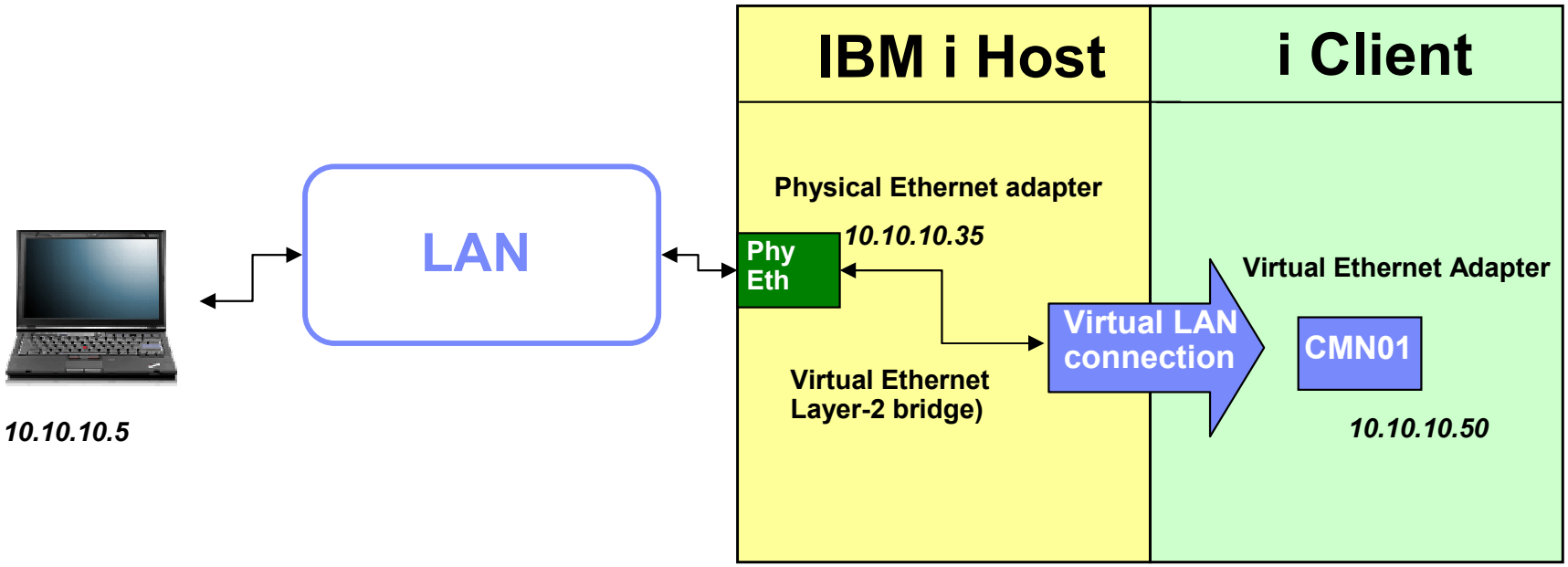
# System Requirements (as of 04/2011)

- **Server Partition Software**
  - IBM i 7.1 with Technology Refresh 2
- **Client Partition Software**
  - IBM i 7.1 with TR2 + MF52103
    -- OR –
  - IBM i 7.1 + client support PTFs
    -- OR –
  - IBM i 6.1.1 + client support PTFs.

- **Tape Device Hardware**
  - TS2230 HH-LTO3 SCSI drive
  - TS2240 HH-LTO4 SAS
  - TS23240 LTO4 SAS
  - FC 5746 HH-LTO4 SAS
  - TS2250 HH-LTO5 SAS
  - TS2350 LTO5 SAS
  - FC 5638 HH-LTO5 SAS
  - TS2900 in sequential mode with LTO4 or LTO5 SAS drives
  - TS3100 in sequential mode with LTO3, LTO4 or LTO5 SAS/FC drives
  - TS3200 in sequential mode with LTO3, LTO4 or LTO5 SAS/FC drives
  - FC 5907 DAT72 SAS
  - FC 5619 DAT160 SAS
  - FC 5661 DAT320 SAS
  - 7206 Model 336 external SCSI DAT72 drive.

- Info APAR: ”II14615 - SUPPORT OF CLIENT VIRTUAL TAPE DEVICES ON SYSTEM I”
  - https://www-304.ibm.com/support/docview.wss?uid=nas2e654bc8dc47fcbed8625781e0041eb64

# Network Virtualization with an IBM i Bridged Ethernet Adapter



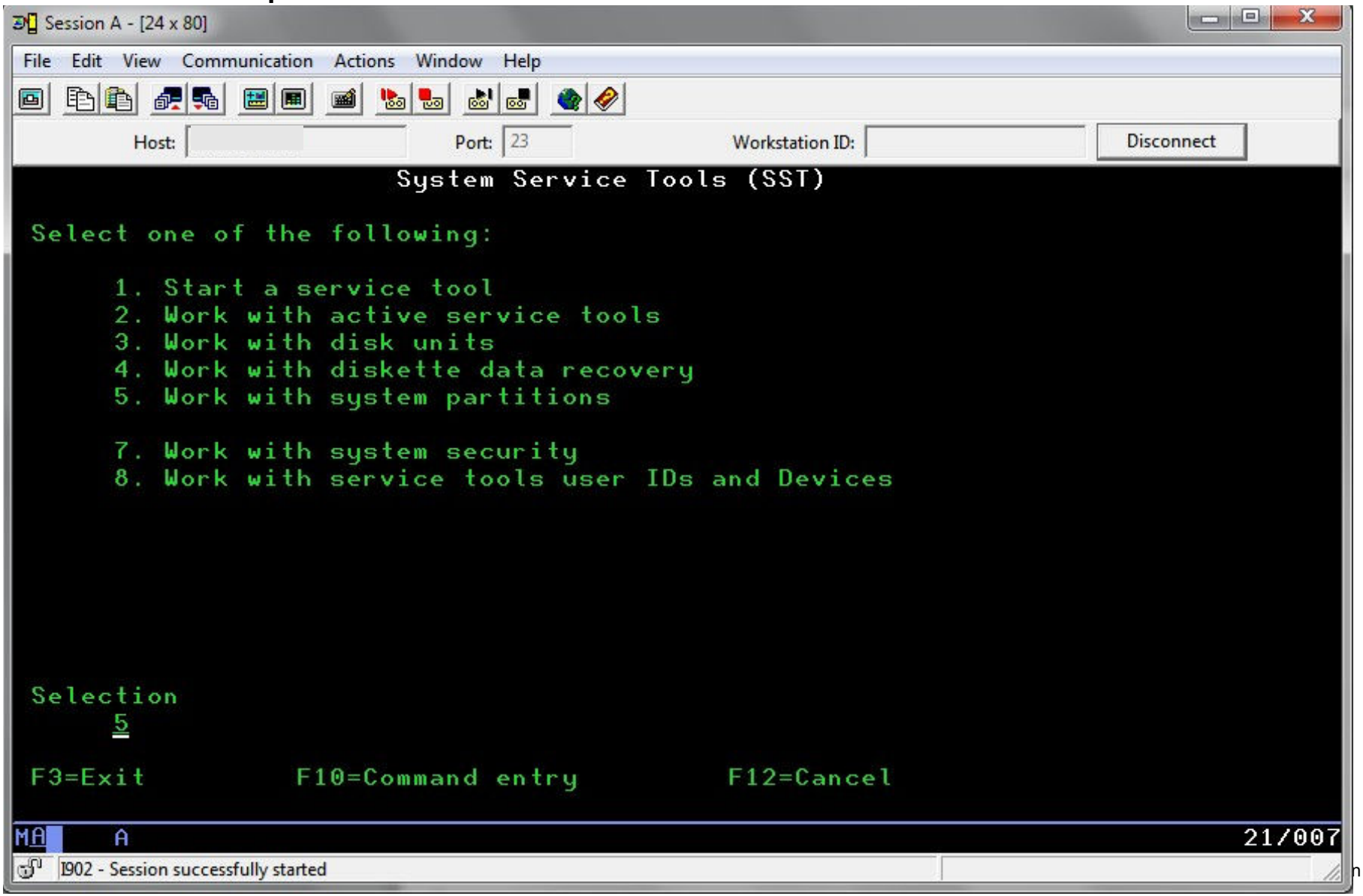

- IBM i now provides the capability to share a physical network adapter by creating a Layer-2 Virtual Ethernet bridge
  - Bridges an internal VLAN switched managed by the POWER Hypervisor to the external LAN through a physical Ethernet adapter.
- Virtual Ethernet adapters in client IBM i partitions get direct access to outside network.
- Done though an option on the Hardware Management Console (HMC) or automatically via VPM

# Comparison of hosting options

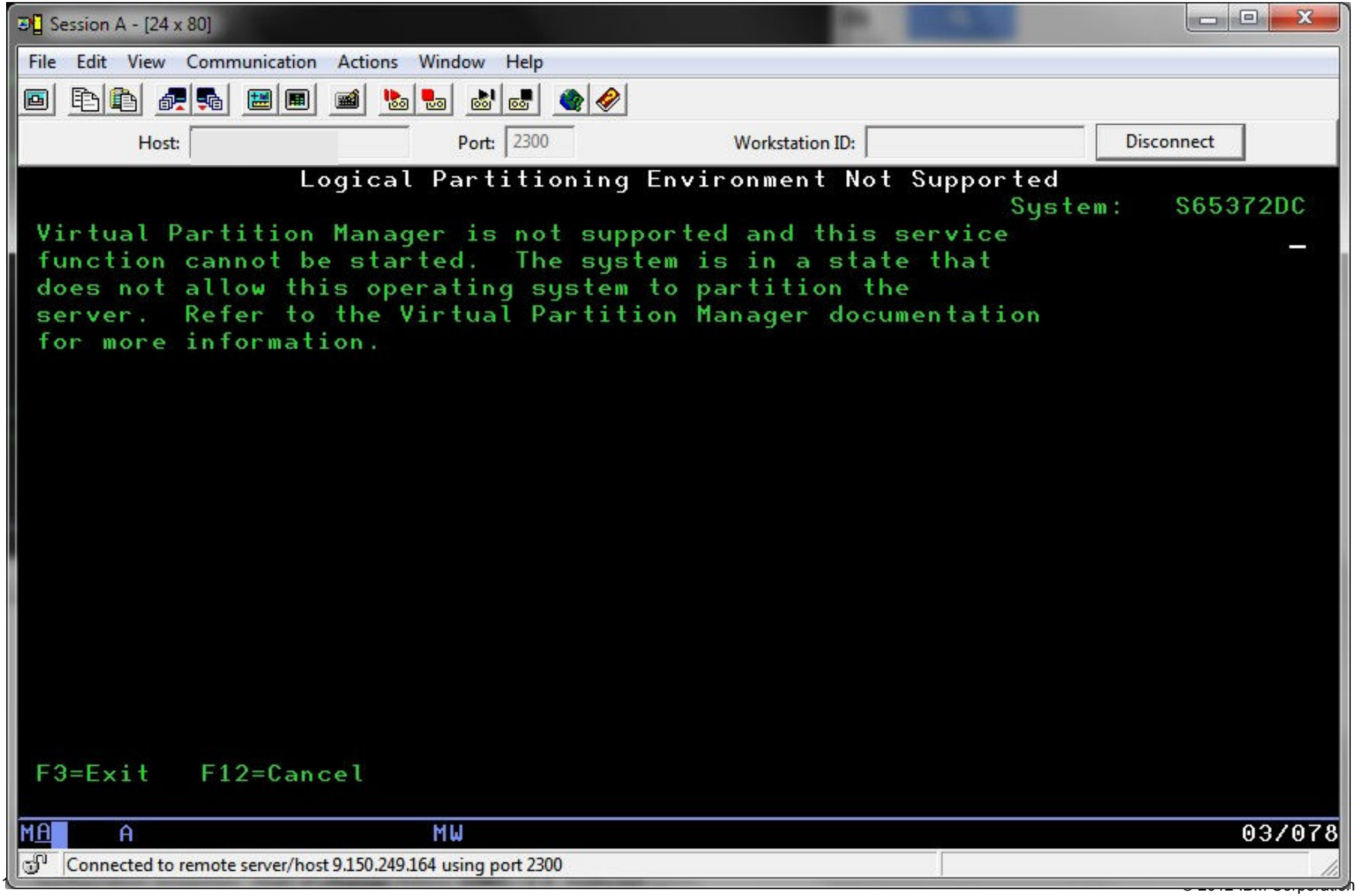
| | VIOS on POWER6/7 server | VIOS on POWER6/7 blade | IBM i hosting a client partition |
|---|---|---|---|
| **Minimum IBM i level required?** | i 6.1 | i 6.1 | i 6.1 for IBM i client partition |
| **Skills required** | VIOS, IBM i | VIOS, IBM i<br>BladeCenter | IBM i |
| **Management interface** | HMC/SDMC or IVM*<br>* certain models | IVM or SDMC*<br>* certain models | HMC/SDMC or VPM*<br>* req. 7.1 TR3 |
| **Console used IBM i** | HMC or IVM*<br>* mkvt | LAN console | HMC or VPM: LAN console |
| **Storage options** | Integrated / FC / FCoE | FC / SAS | NWSSTG |
| **Physical adapter ownership** | Optional | No | HMC: Optional<br>VPM: No! |

# Partitioning - Getting Started

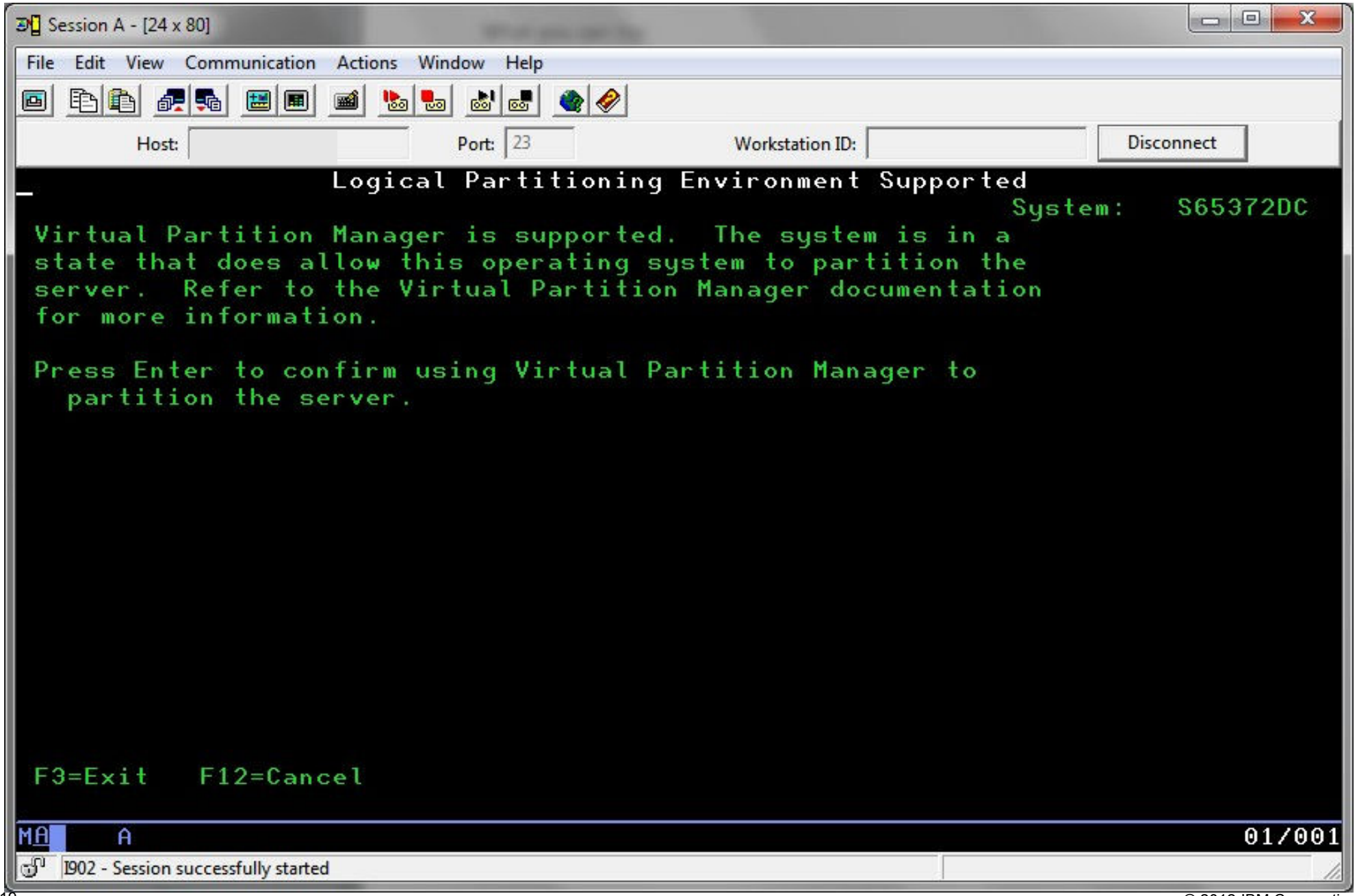
- Logon to DST or SST (strsst)
- Select option 5



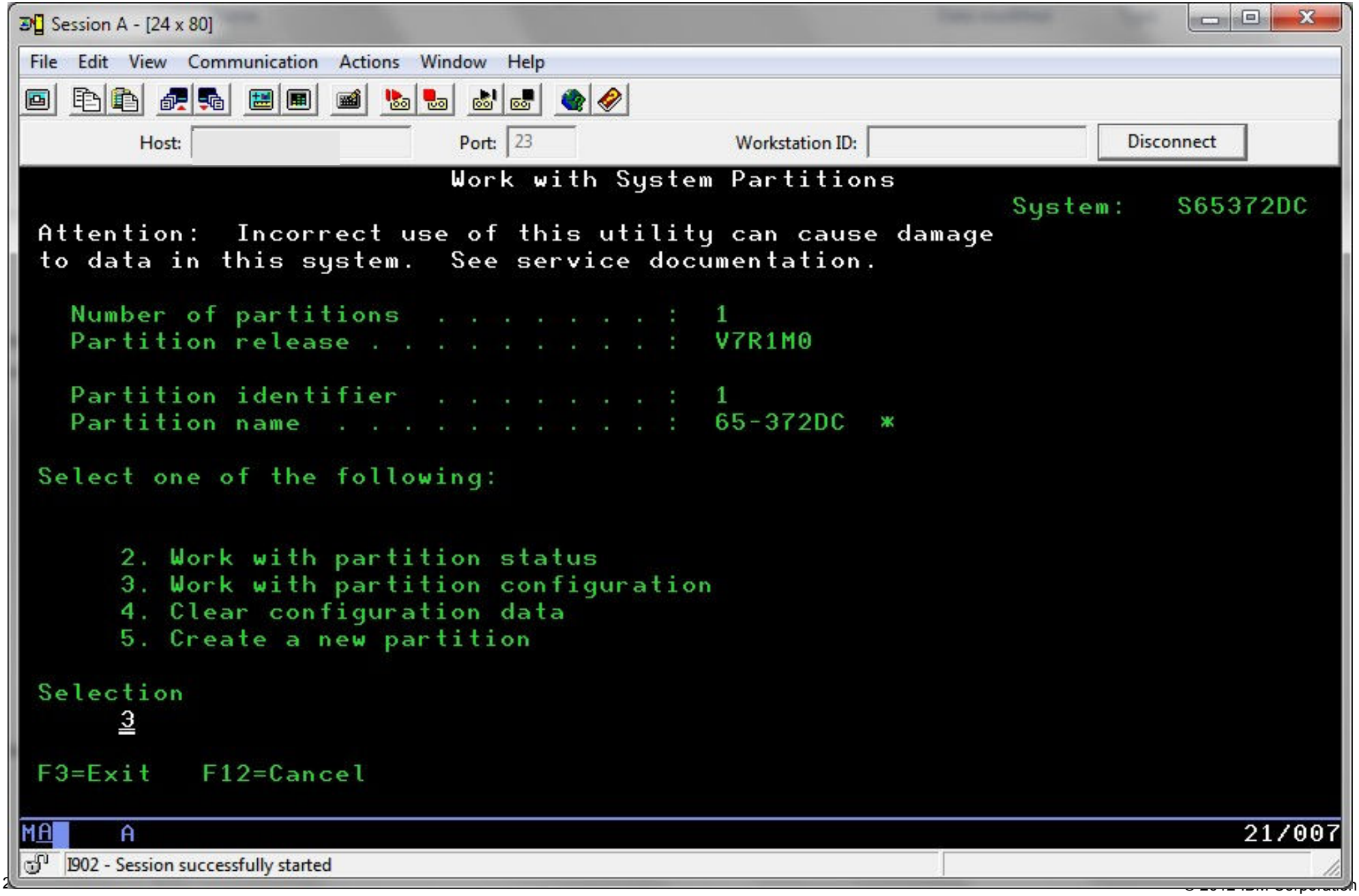
# Is the System Ready? Ups – HMC controlled...



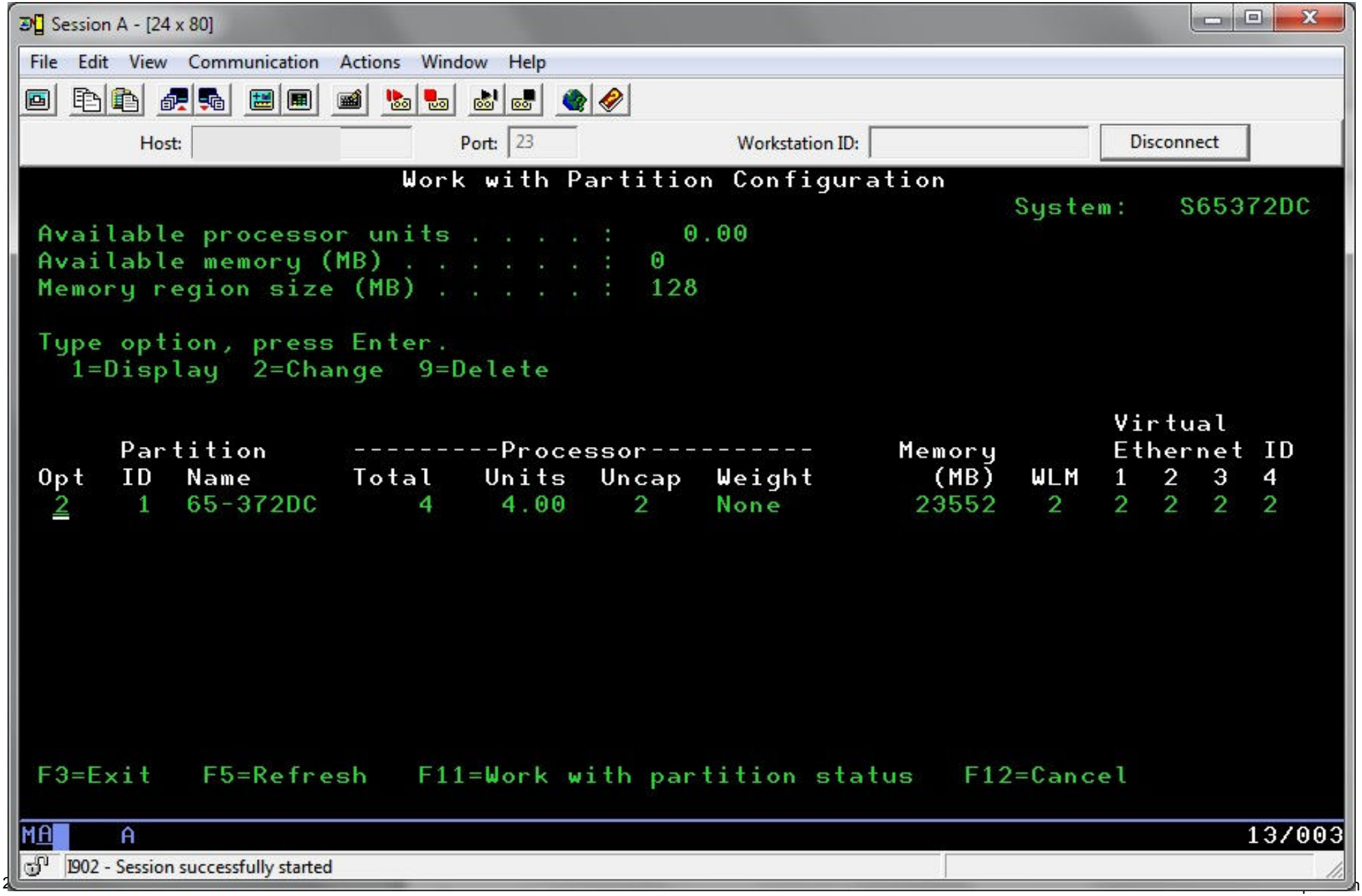
# Is the System Ready? YES – not HMC.



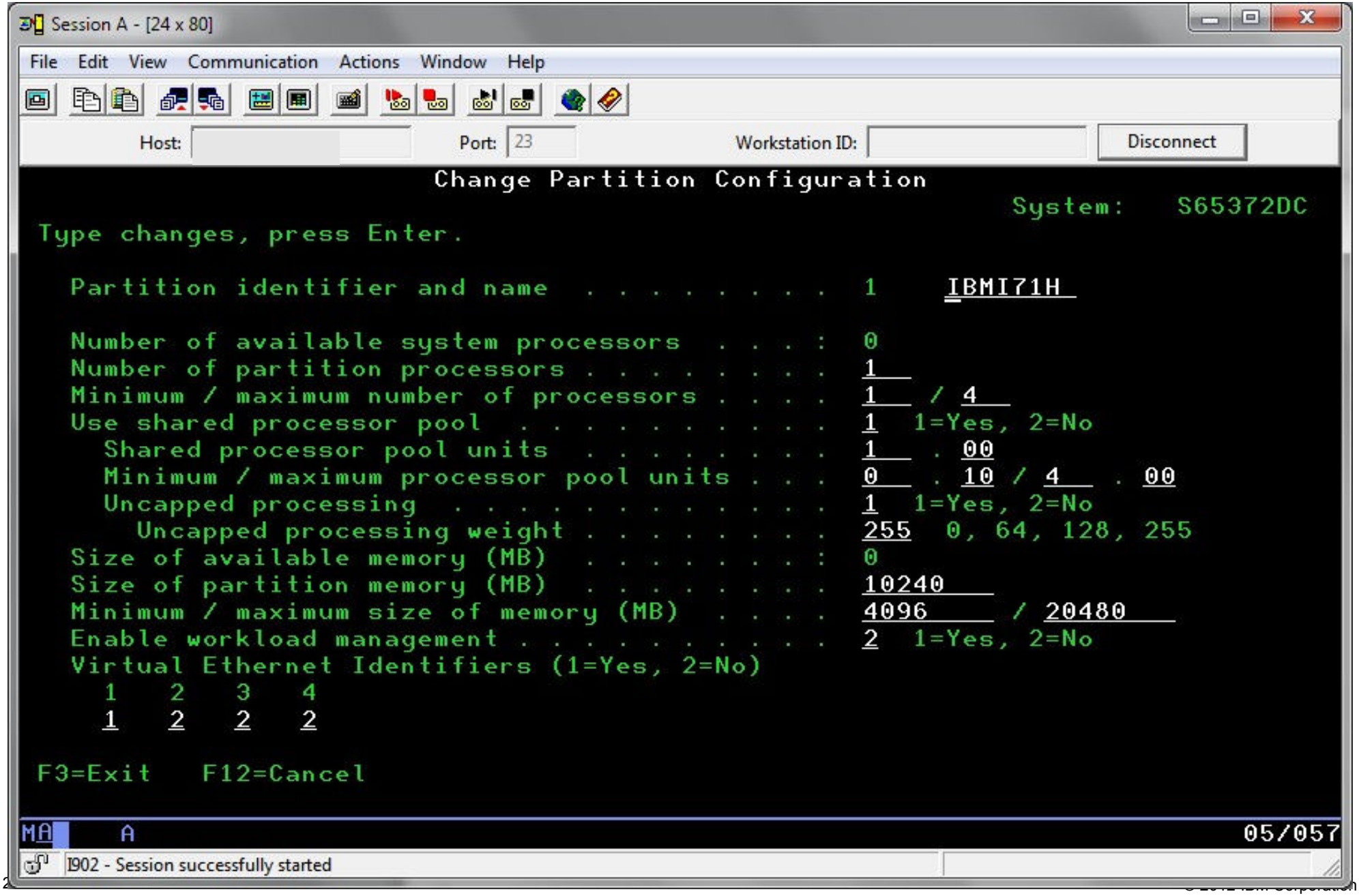
# Free some CPU and Memory - Option 3 Work with partition configration



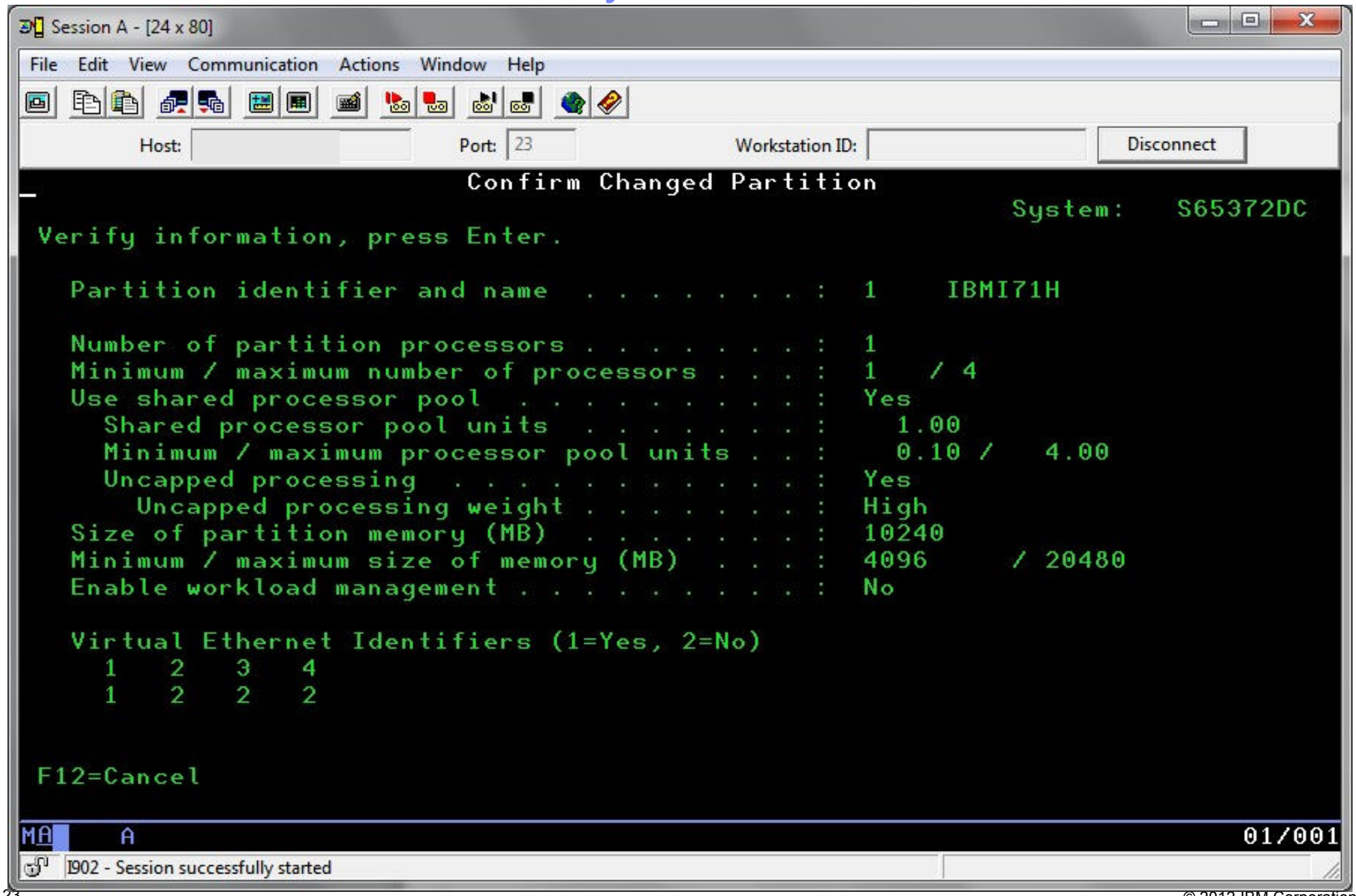
# Free some CPU and Memory



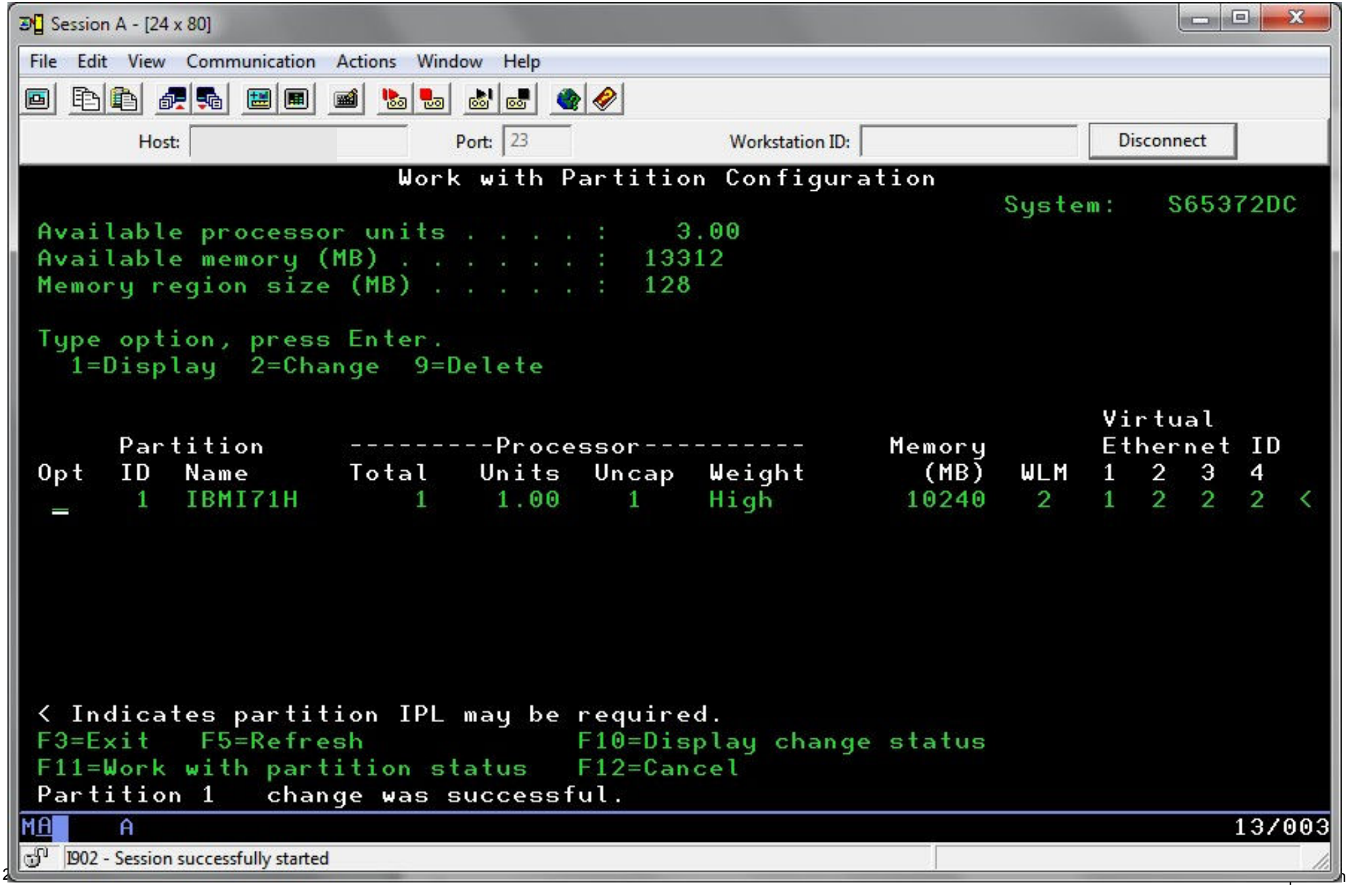
# Free some CPU and Memory



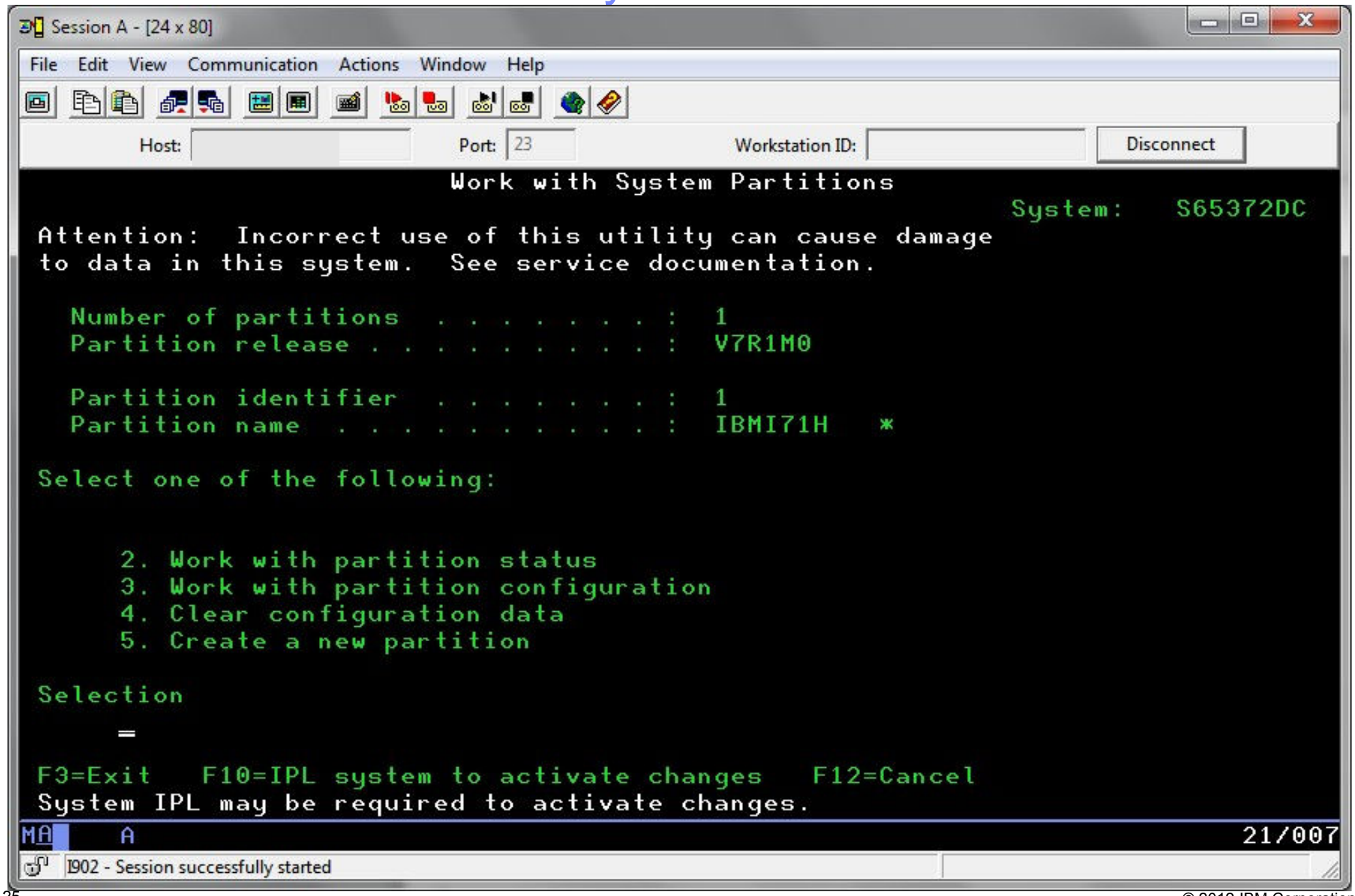
# Free some CPU and Memory



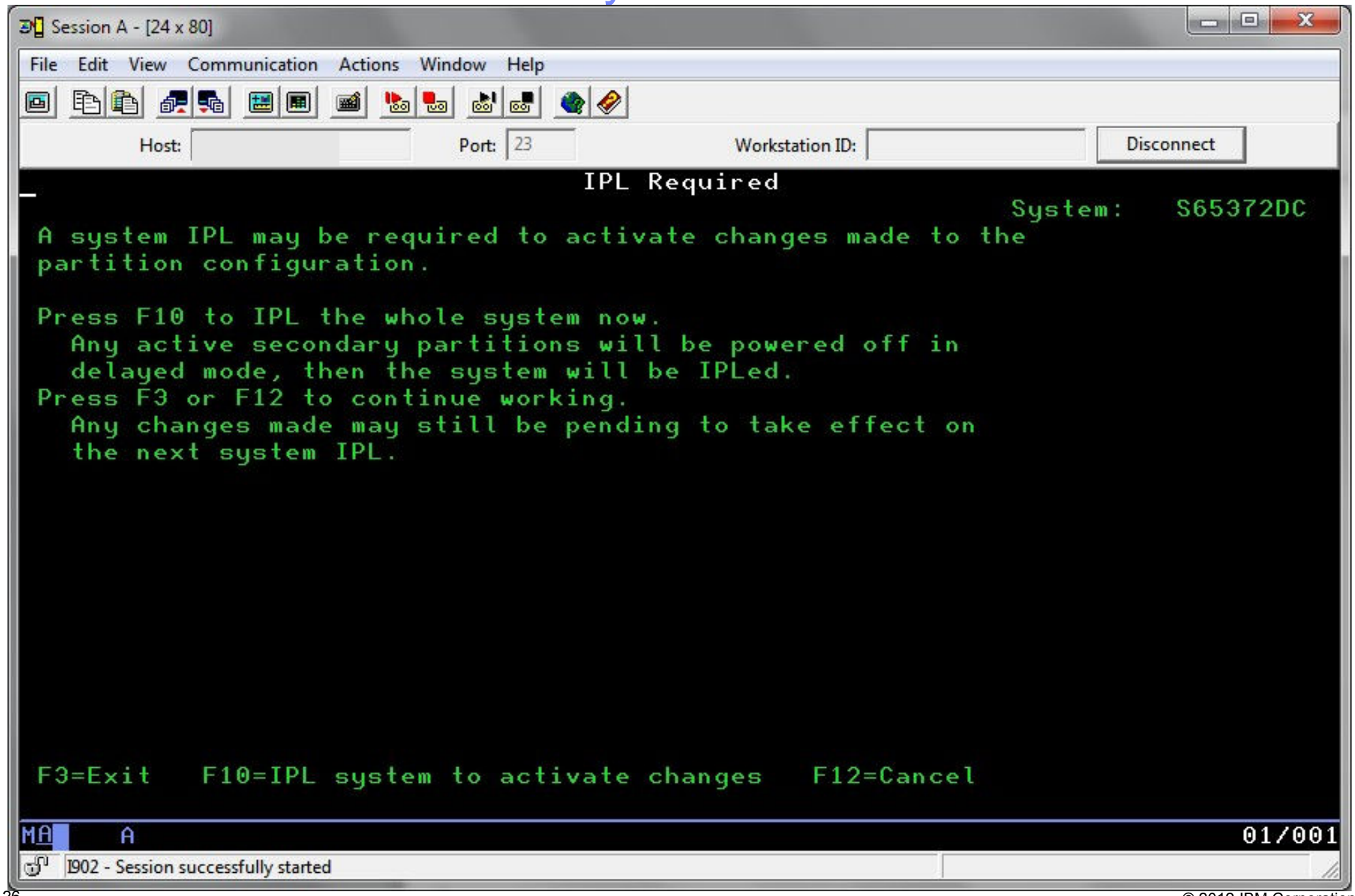
# Free some CPU and Memory



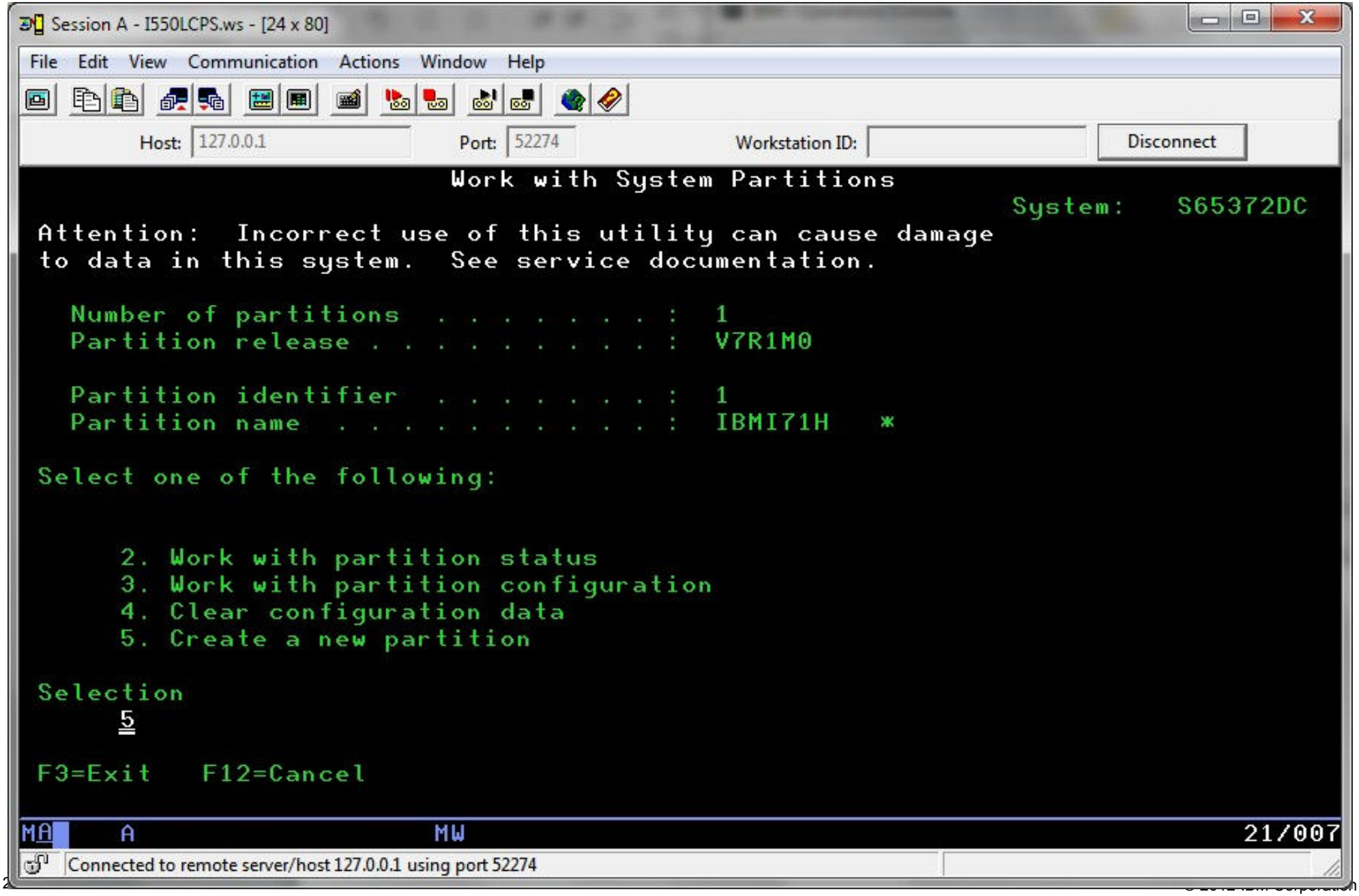
# Free some CPU and Memory



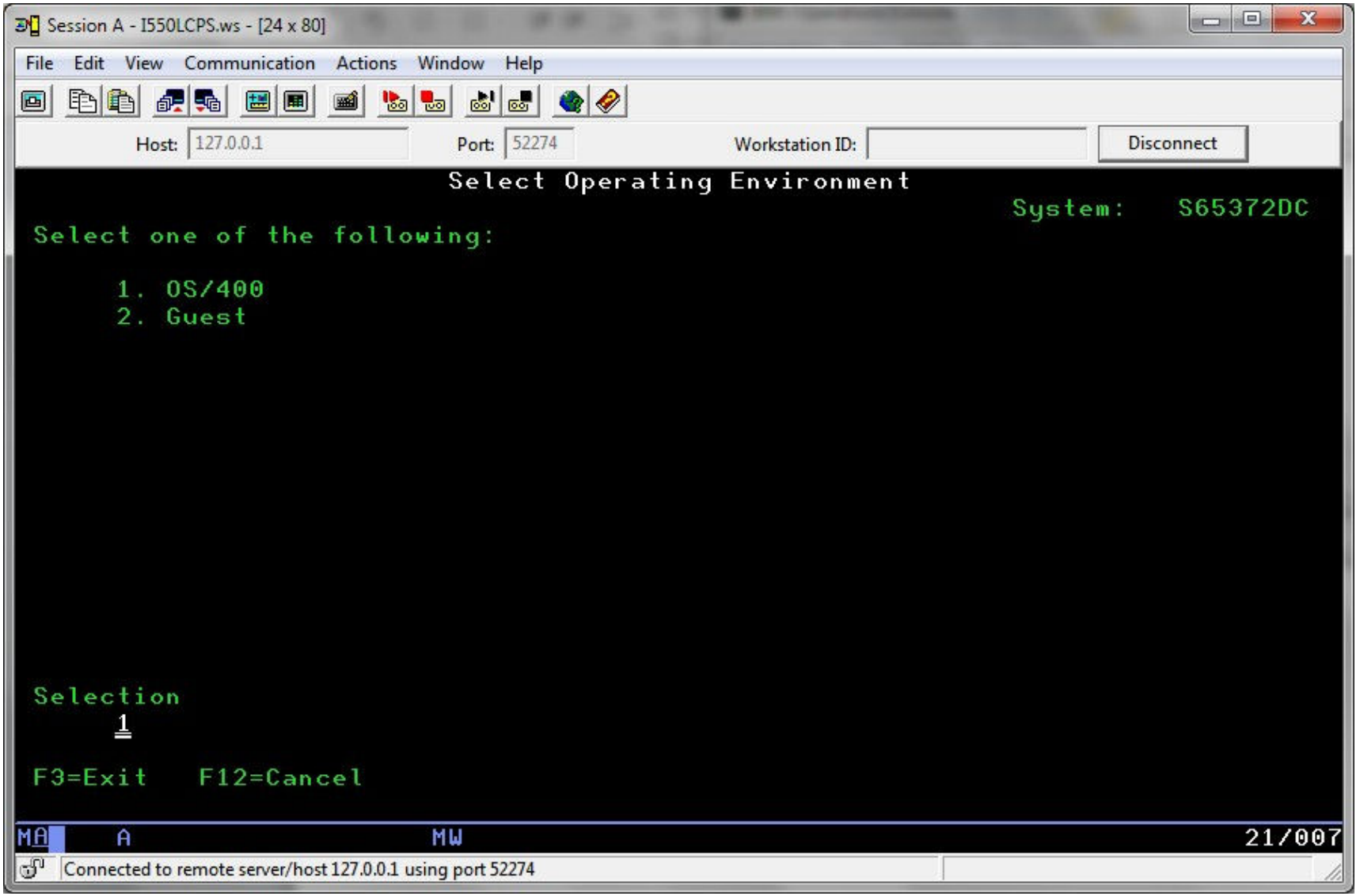
# Free some CPU and Memory – IPL but take care



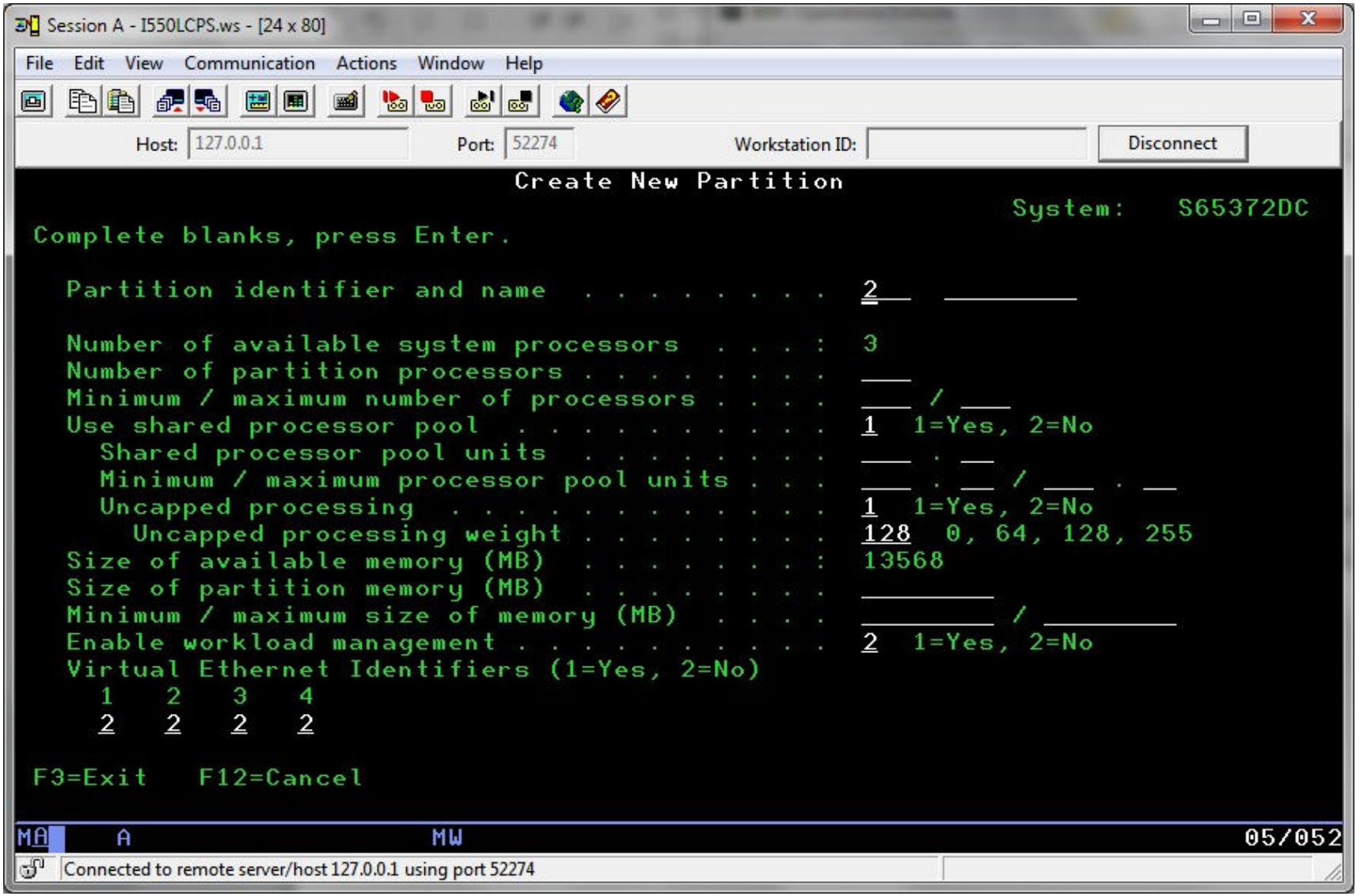
# Creating an IBM i Client partition => STRSST again



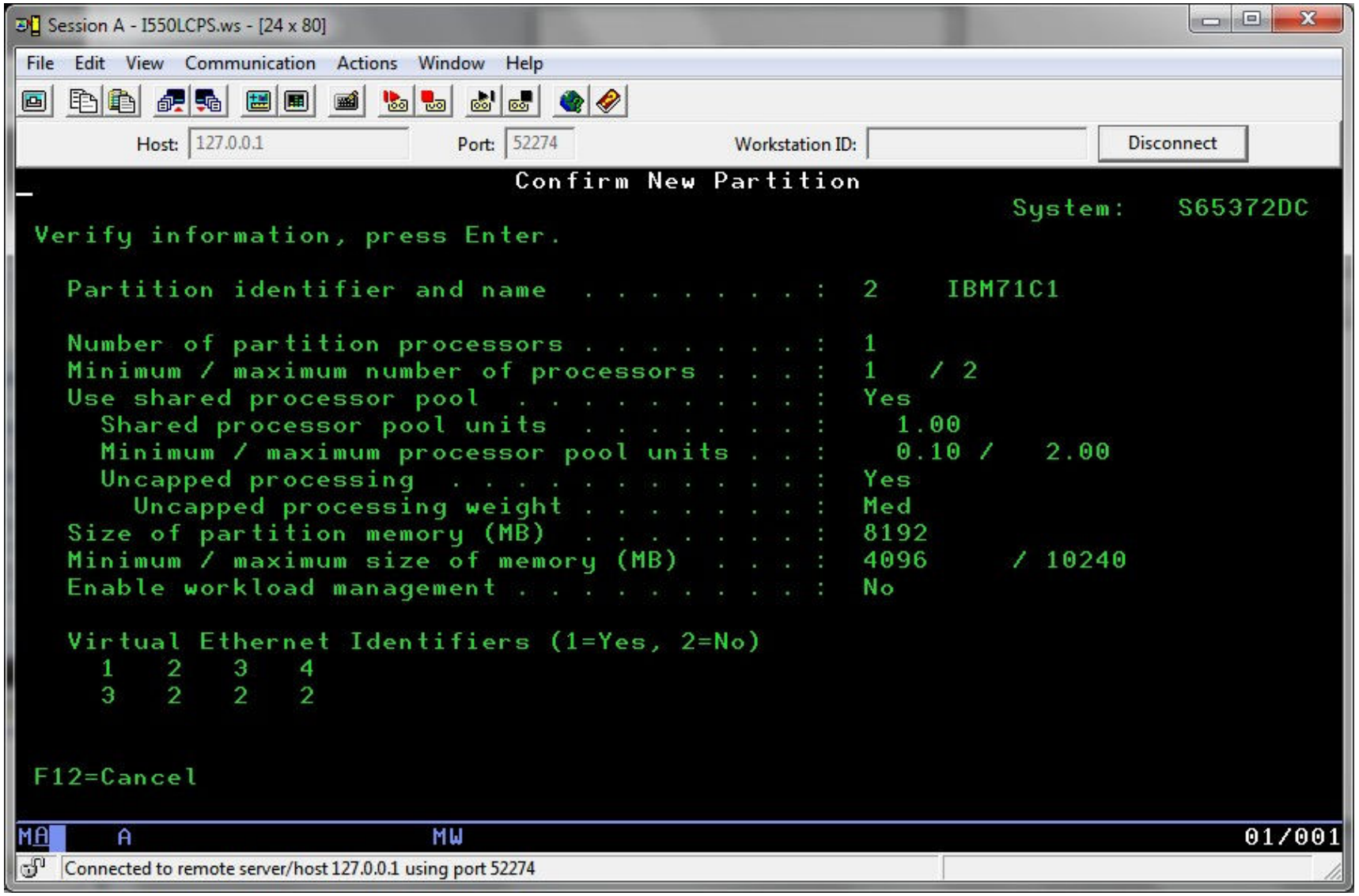
# Creating an IBM i Client partition – Select Operating Environment



# Creating an IBM i Client partition – Create New Partition

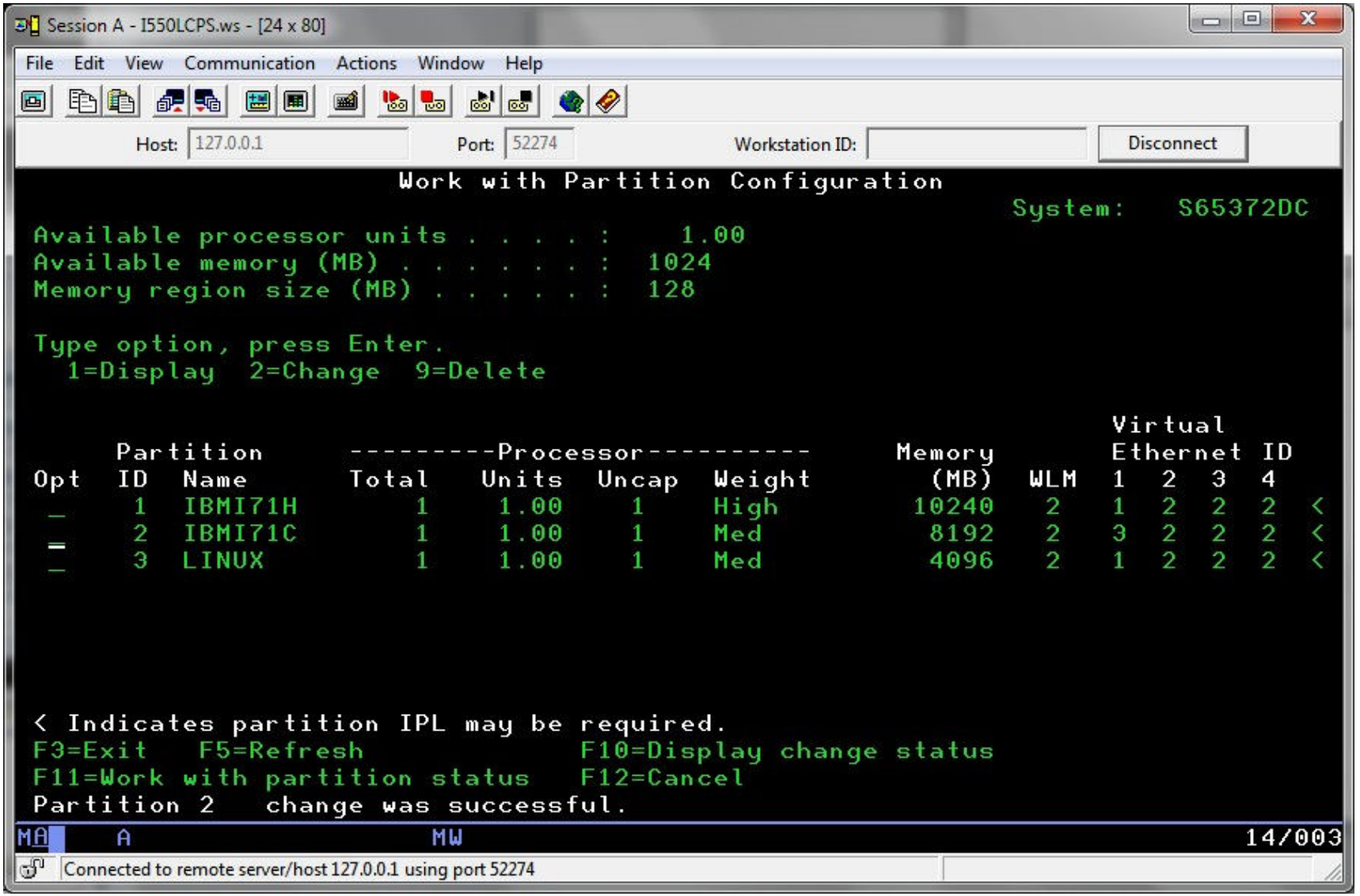


# Creating an IBM i Client partition - confirm

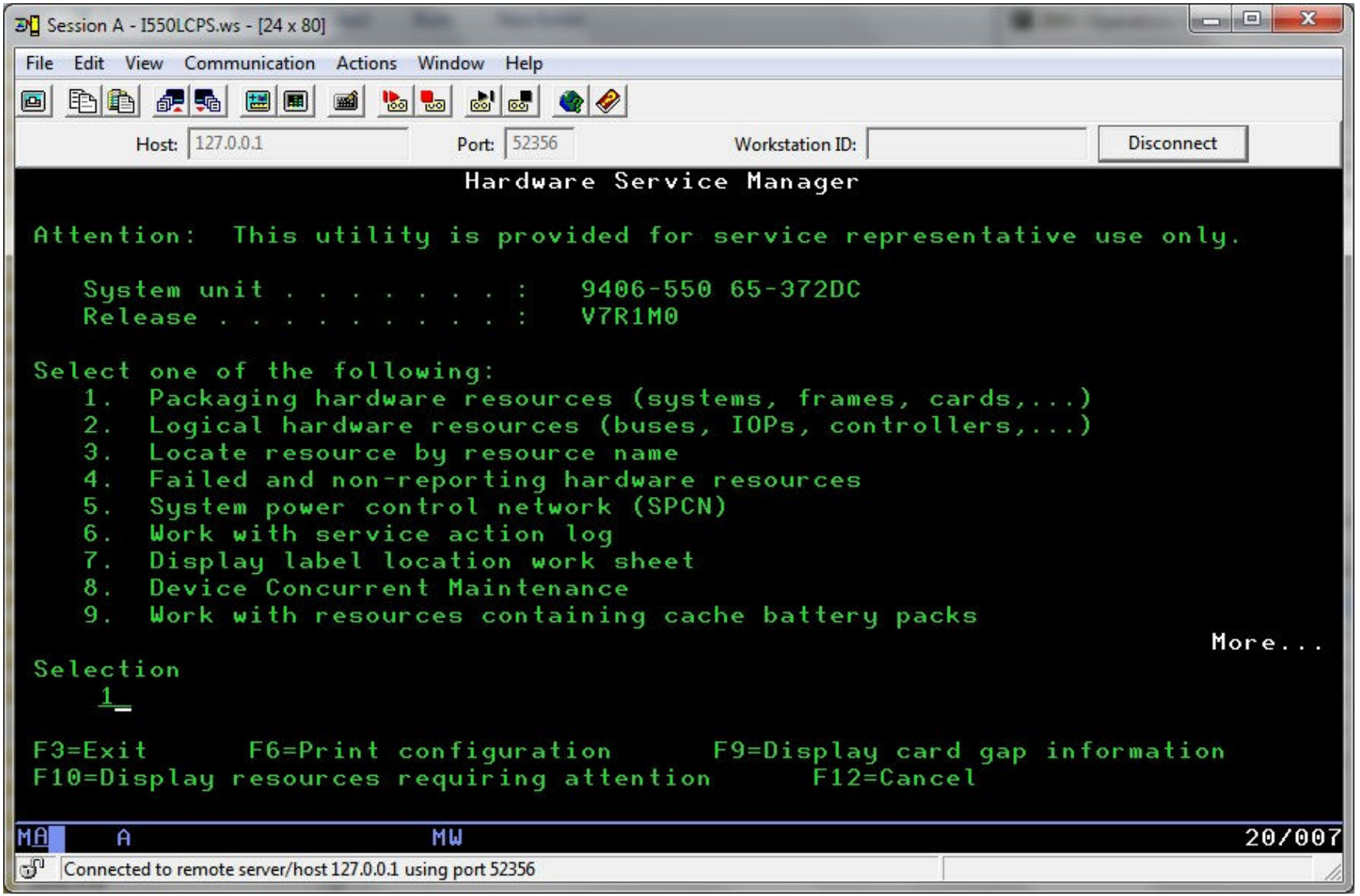



In order to select Virtual Ethernet as the console device you have to set a Virtual Ethernet Identifier to ‘3’, Instead of ‘1’.

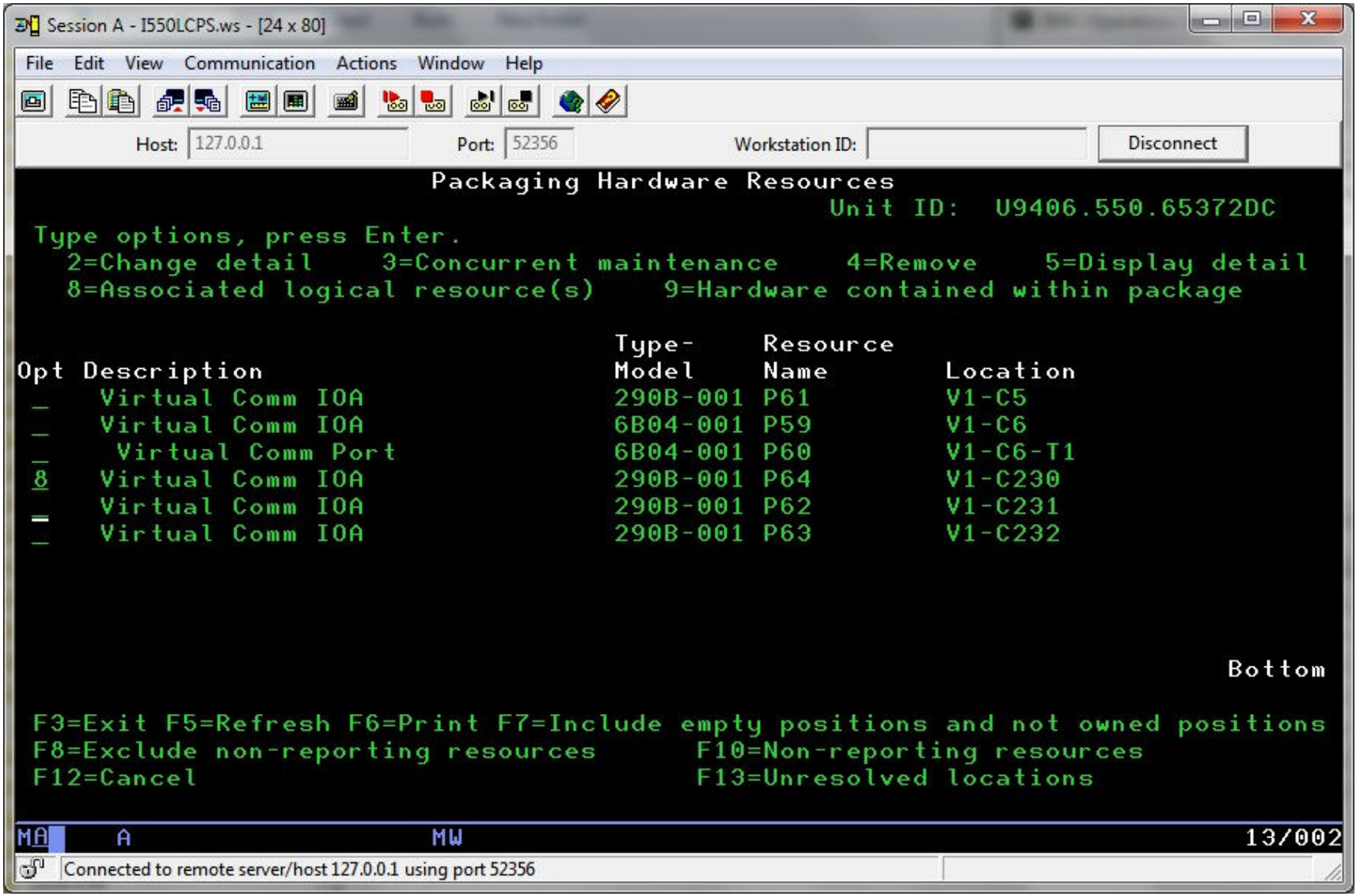
# Creating an IBM i Client partition – IPL required '<'



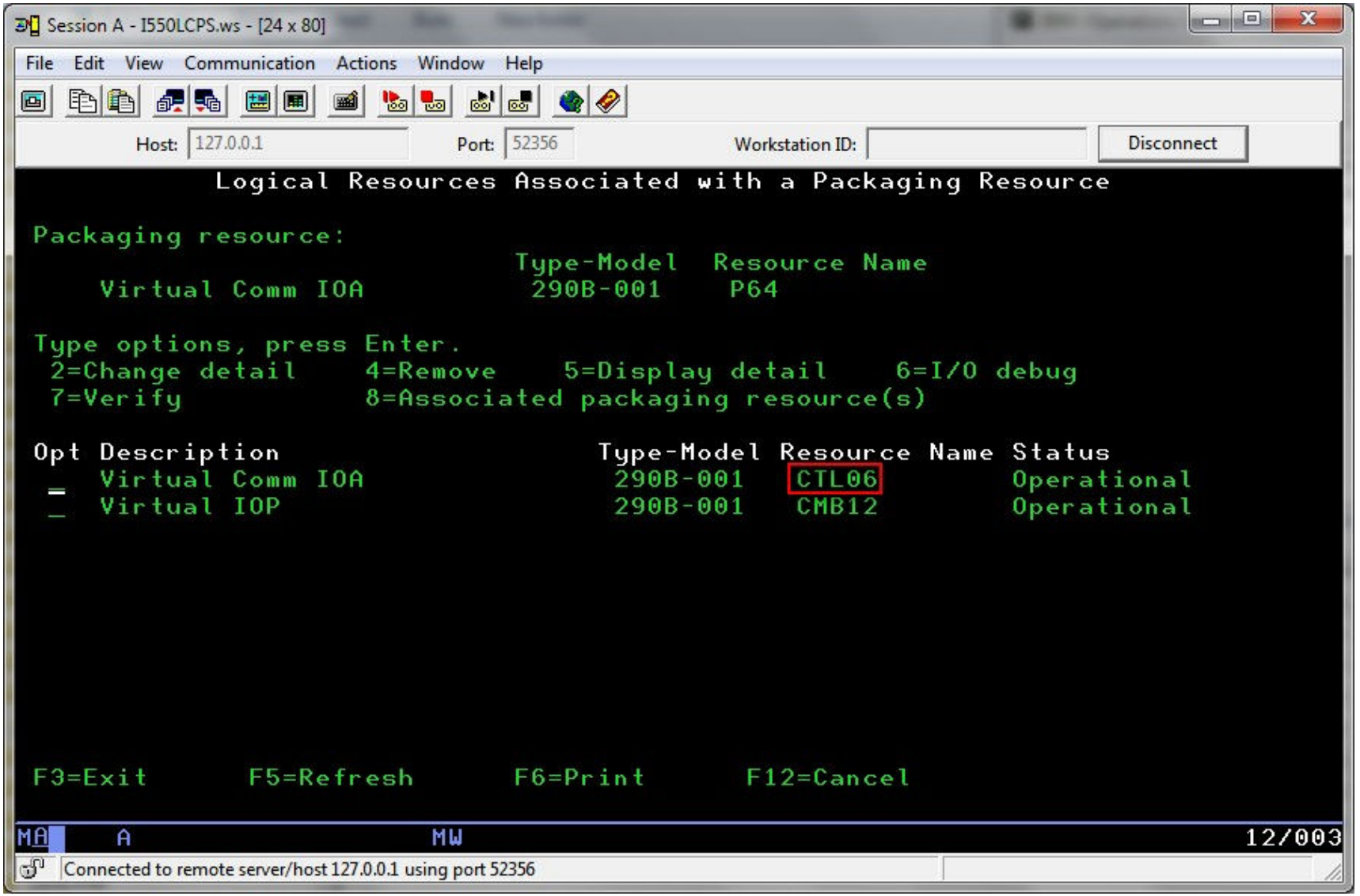
# Identify virtual SCSI resource



# Identify virtual SCSI resource – Look for ”290B” with location ending Cx30



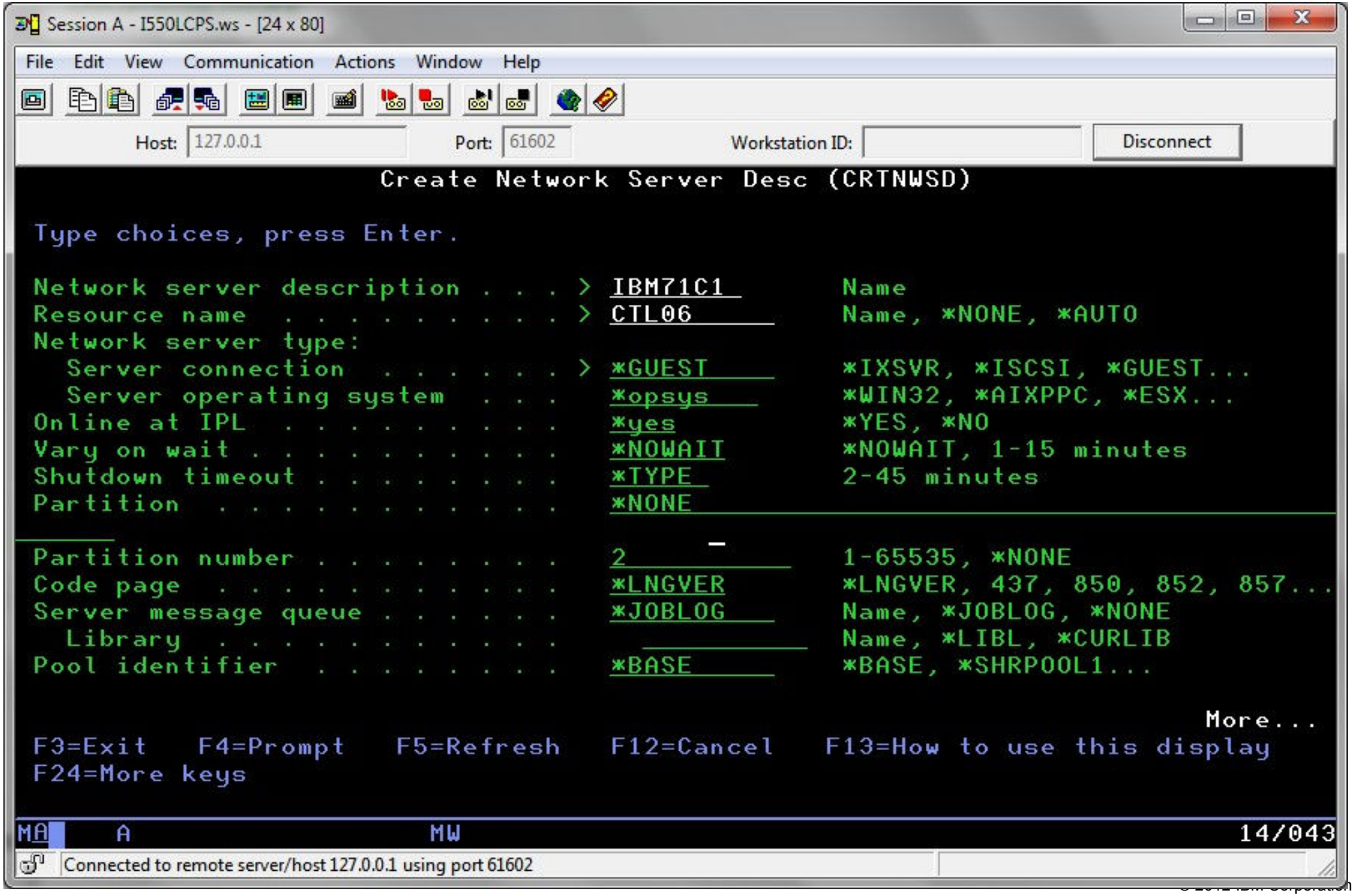
# Identify virtual SCSI resource



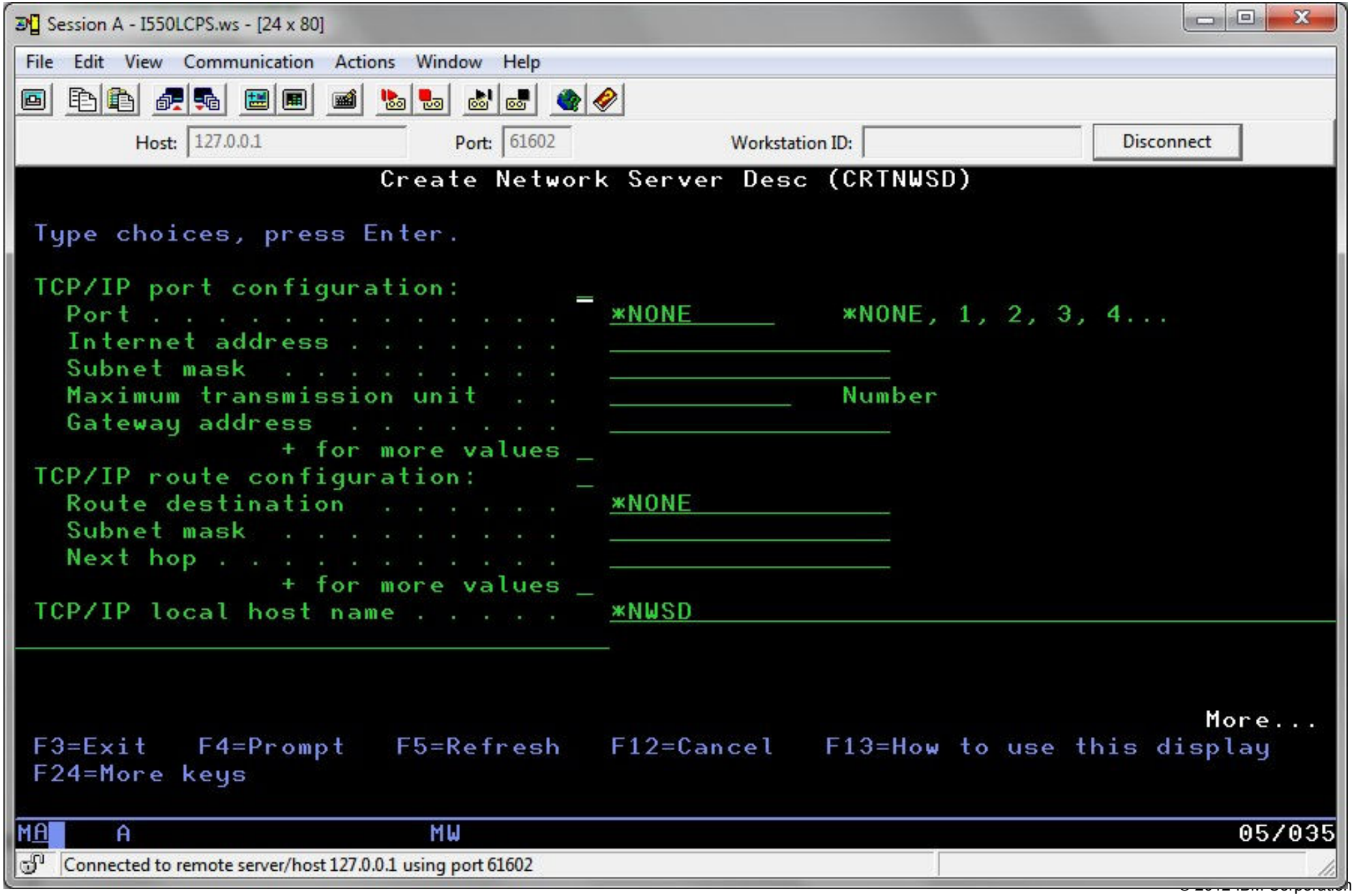
# Setting up IBM i Virtual I/O Resources

- **Create Network Server Description (NWSD)**
- **Create Network Storage Space (aka Virtual Disk)**
- **Linking the virtual disks to the NWSD**
- **Optionally create a Virtual Image Catalog**

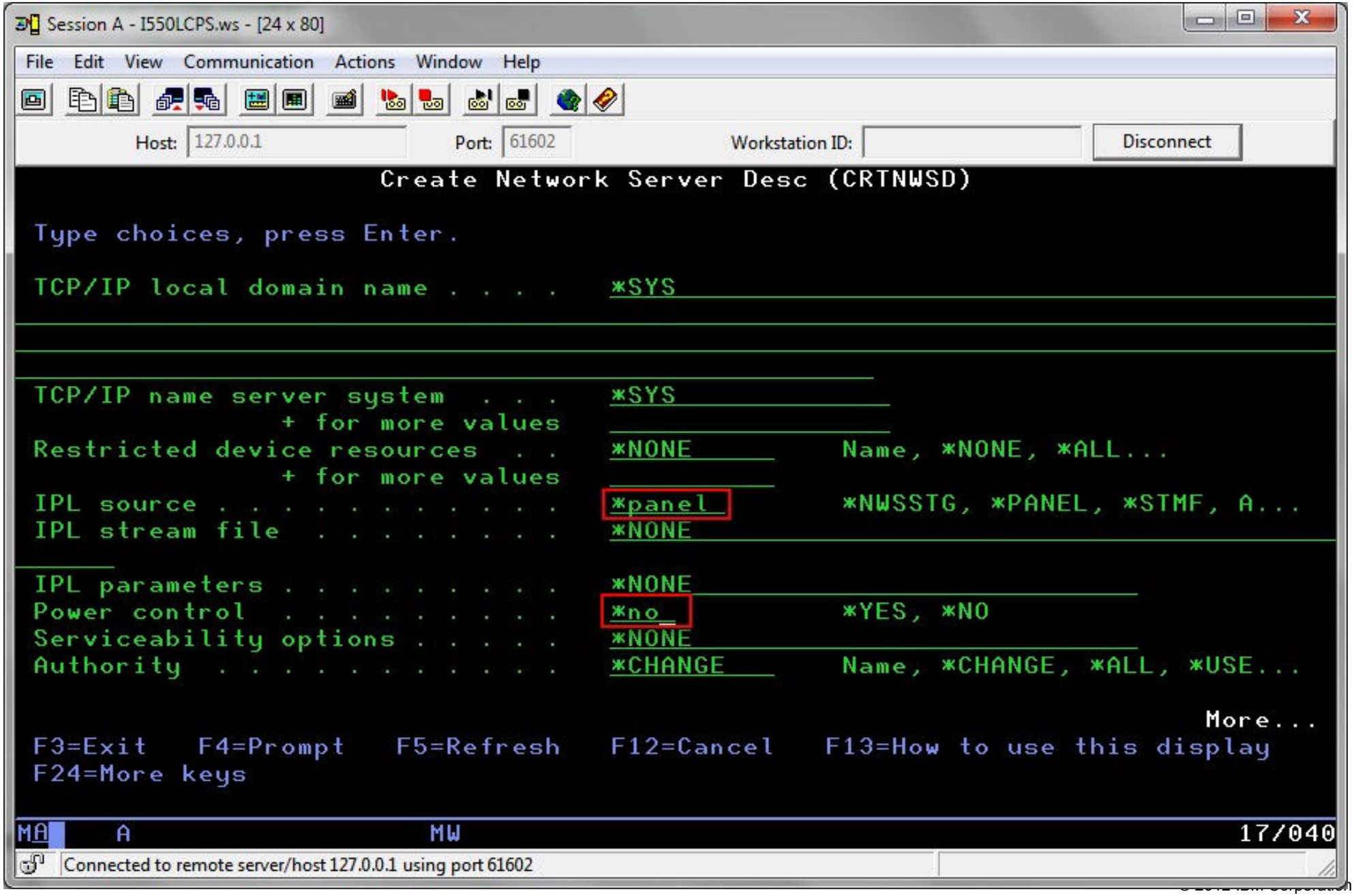
# Network Server Description: CRTNWSD



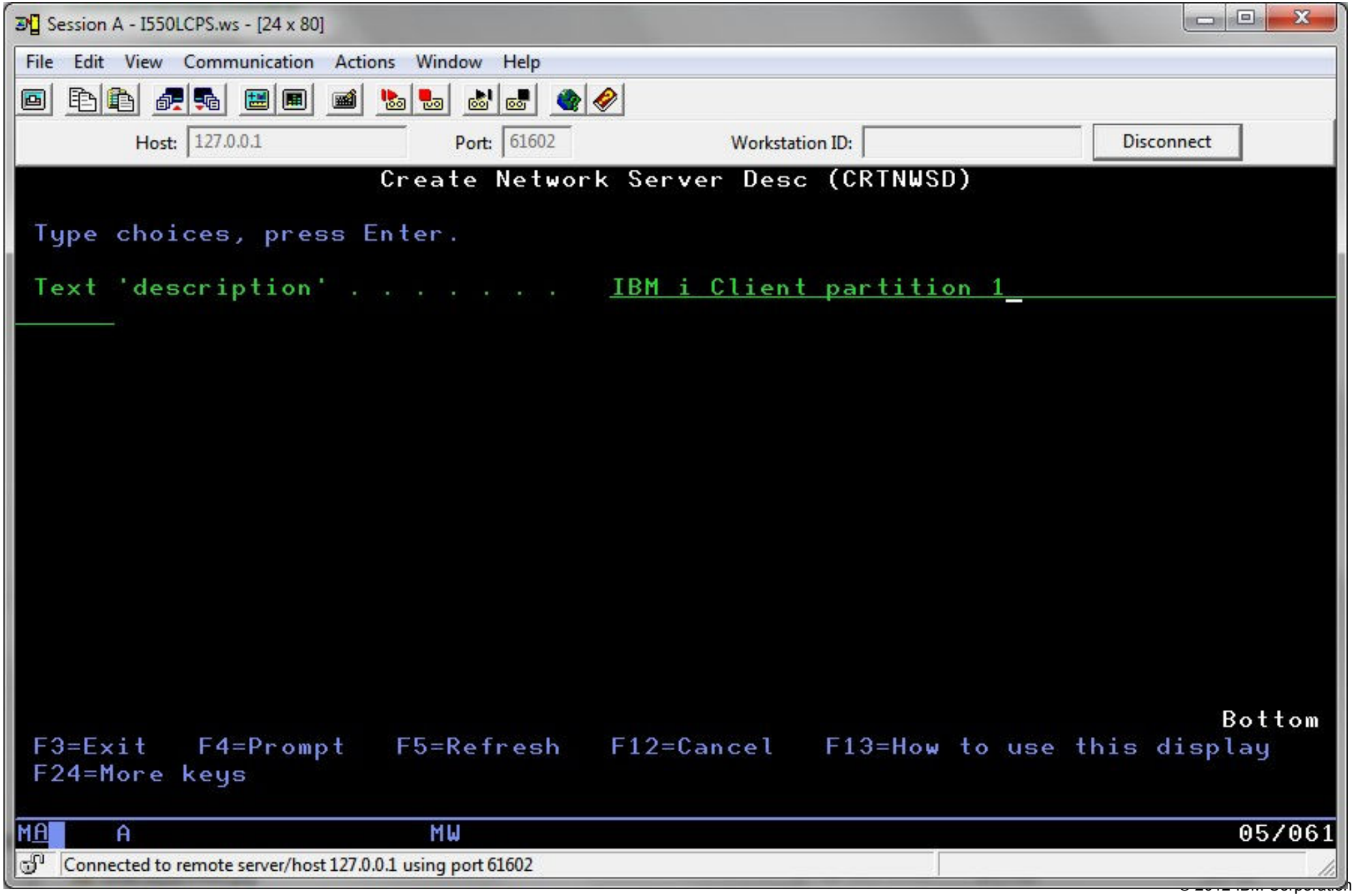
# Network Server Description: CRTNWSD page 2



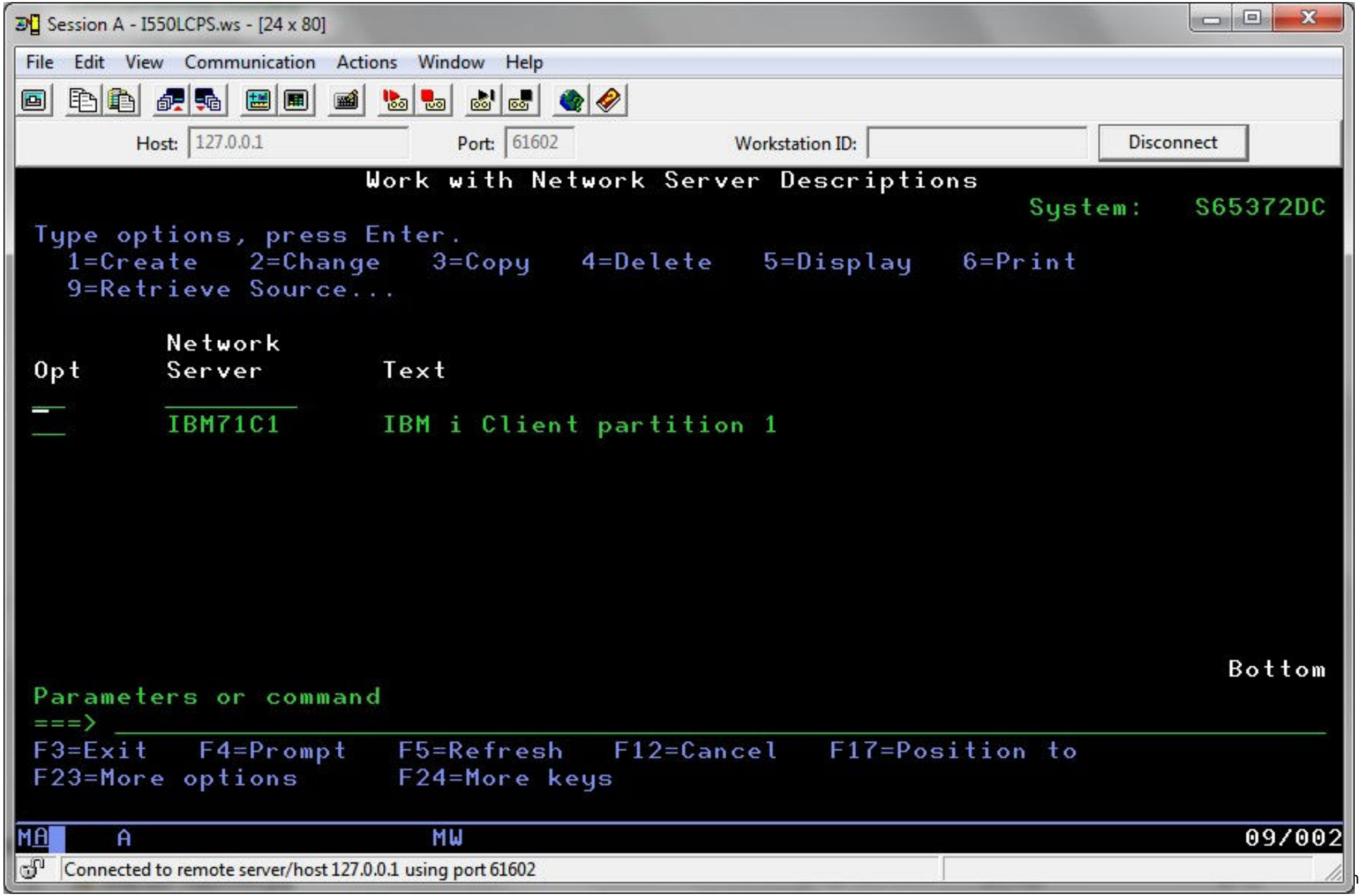
# Network Server Description: CRTNWSD page 3



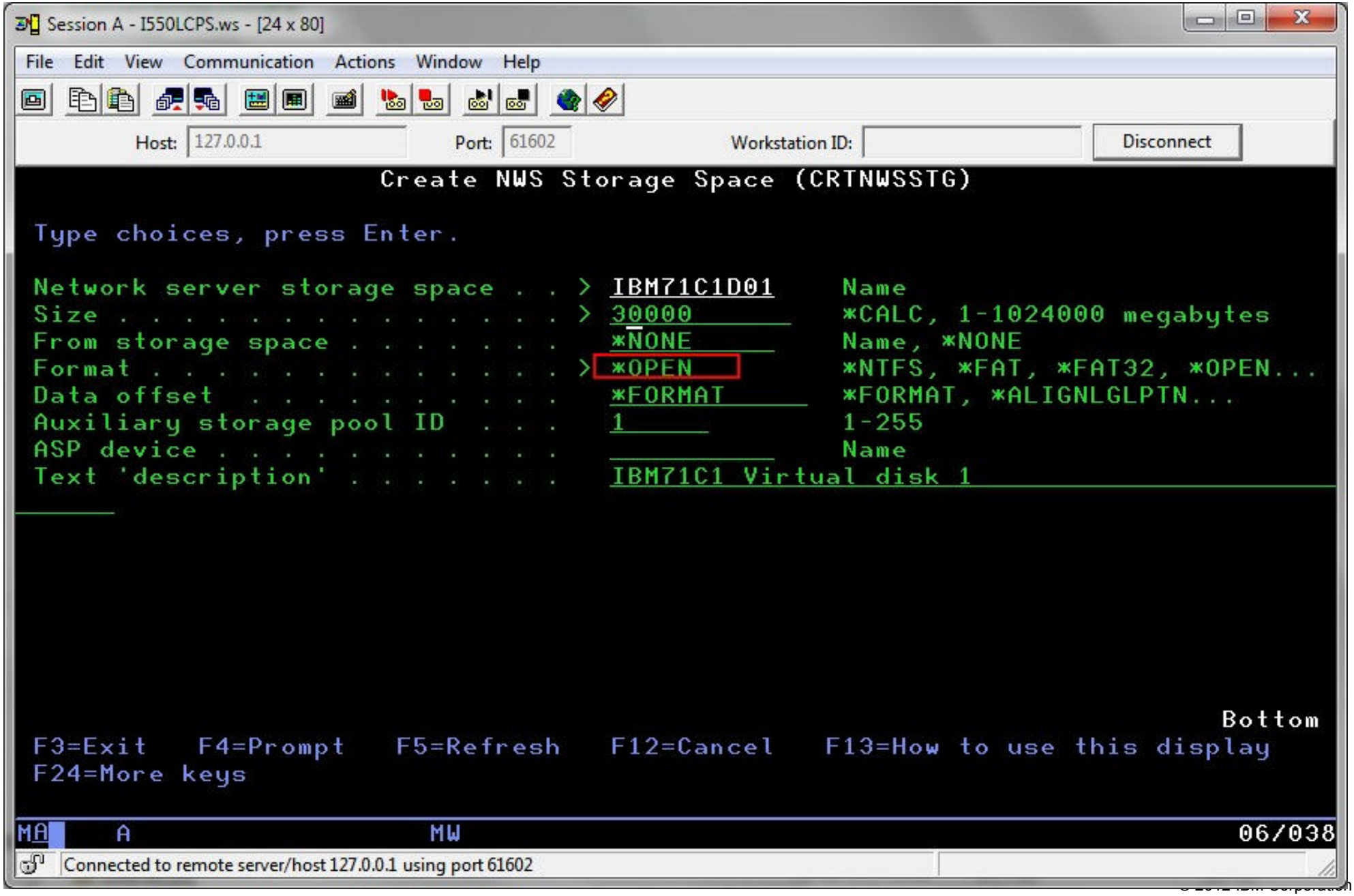
# Network Server Description: CRTNWSD page 4



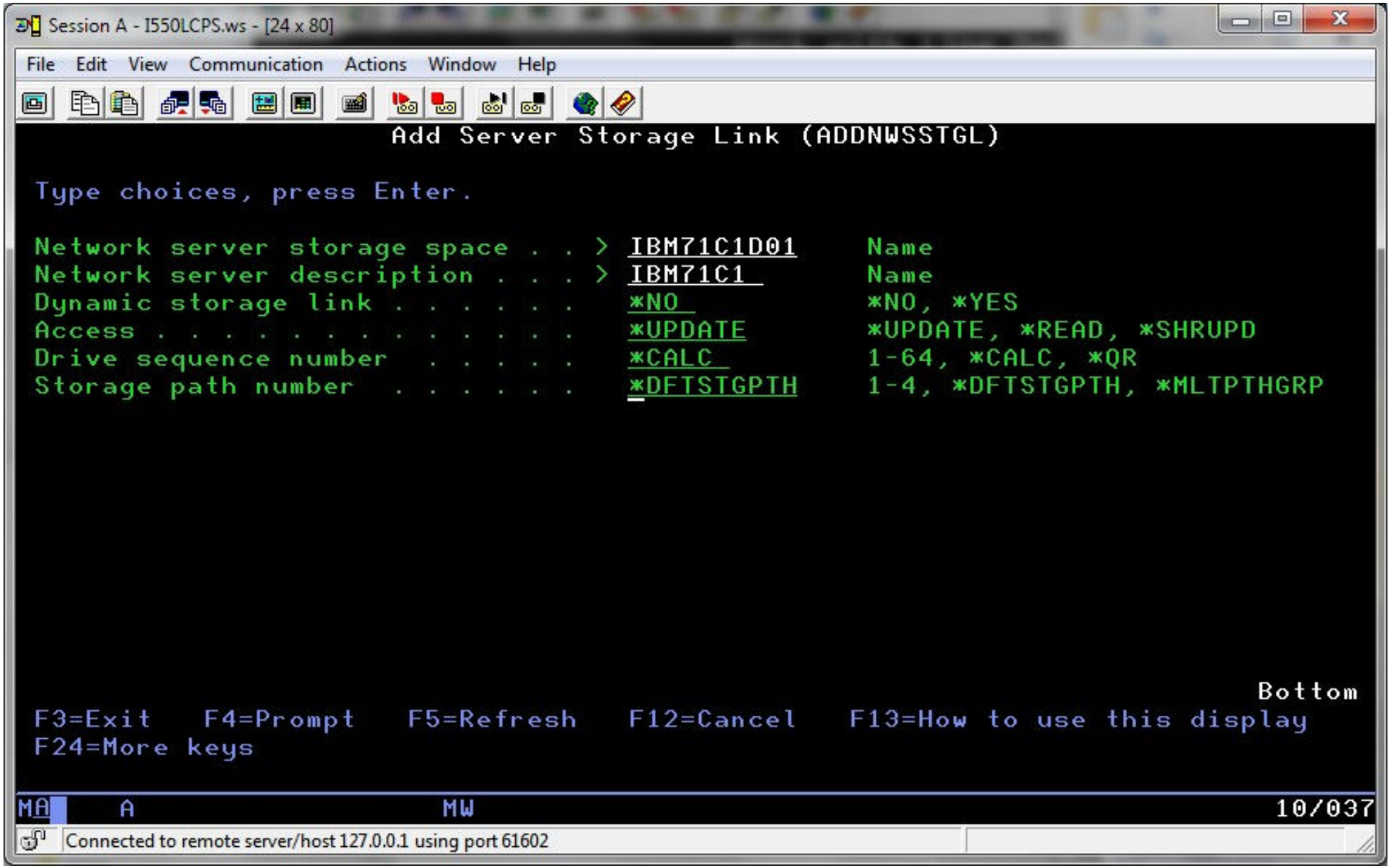
# Network Server Description: WRKNWSD



# Network Storage Space: CRTNWSSTG

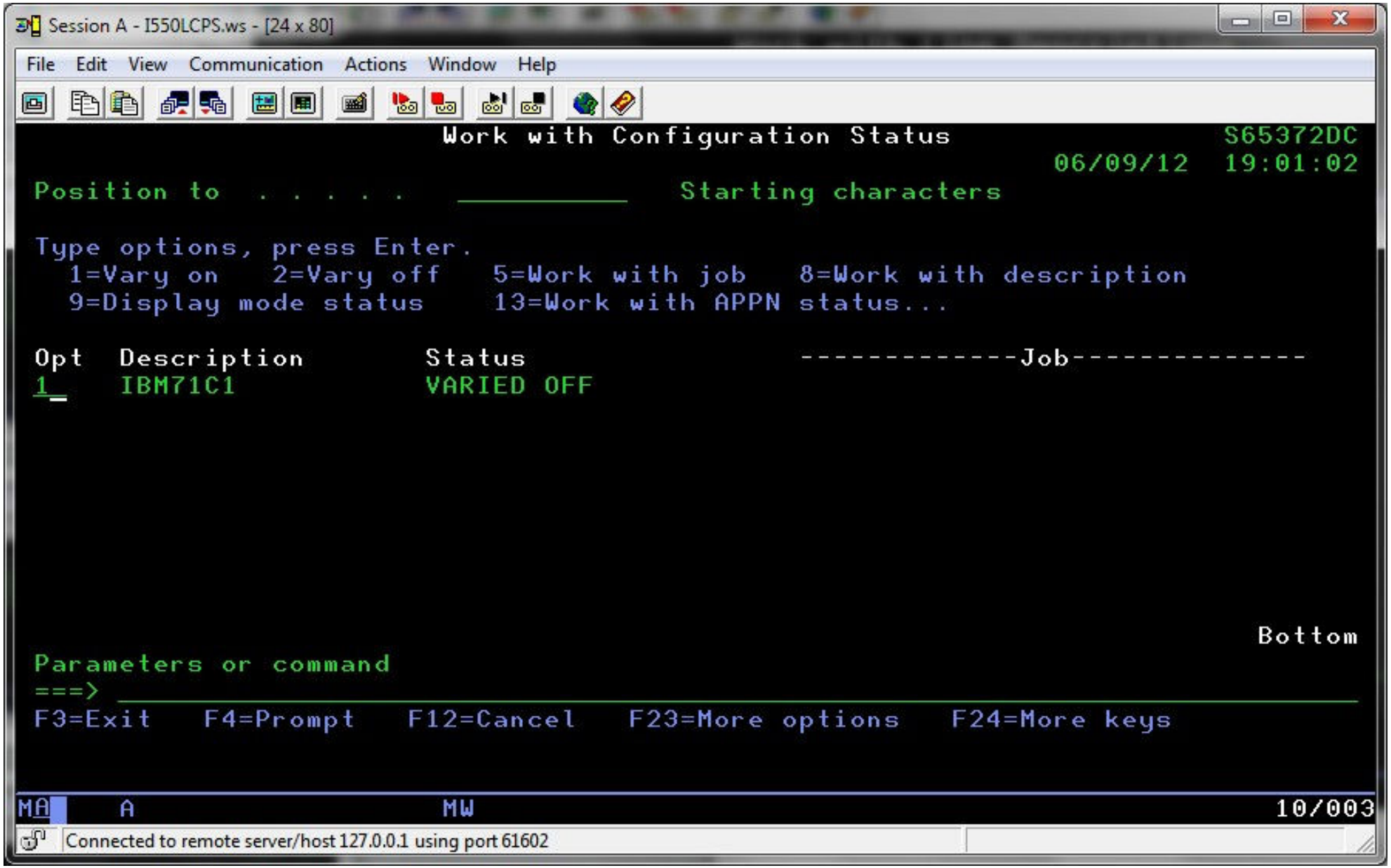


# Network Storage Space: ADDNWSSTGL

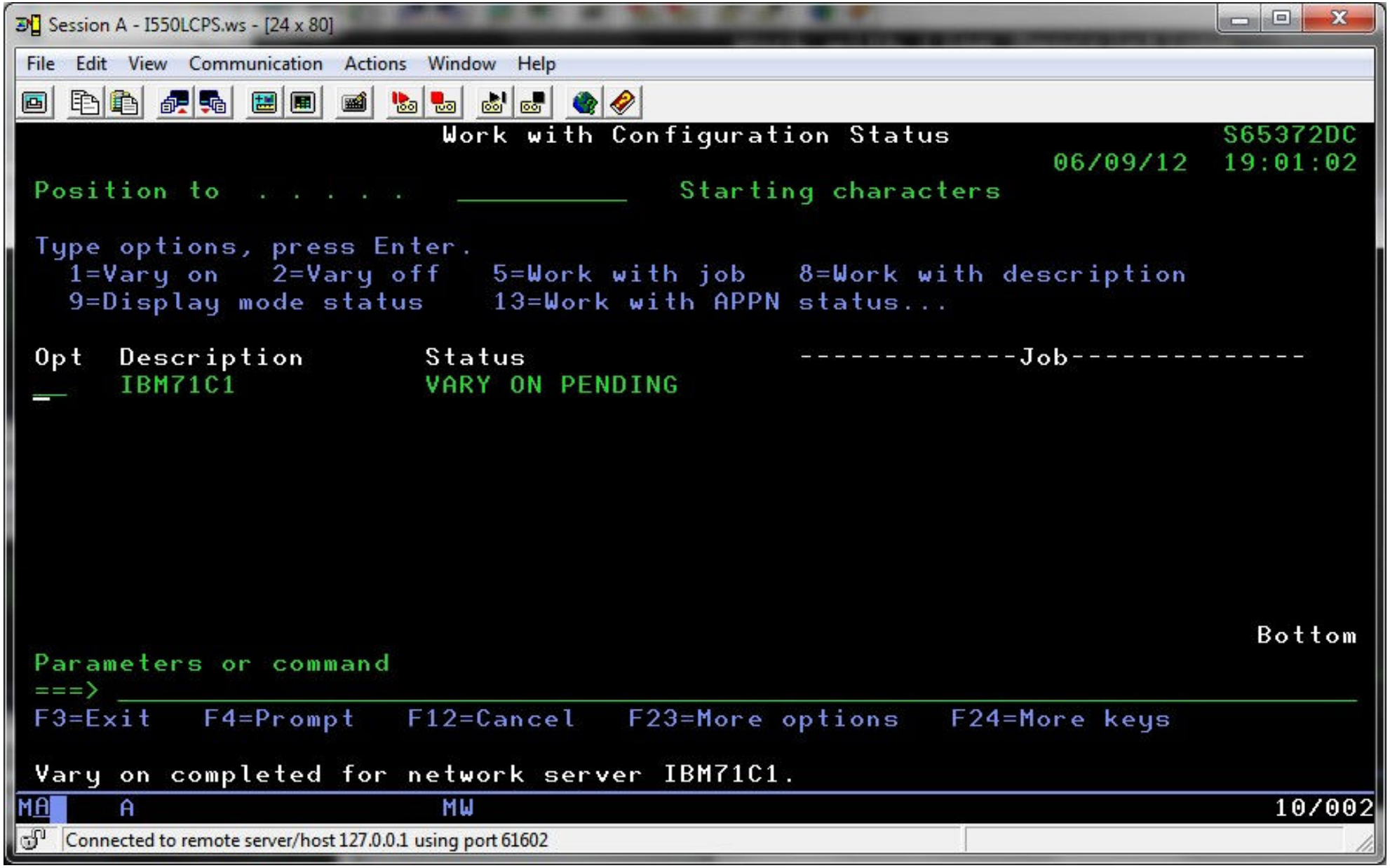


# Network Storage Space: WRKNWSSTG

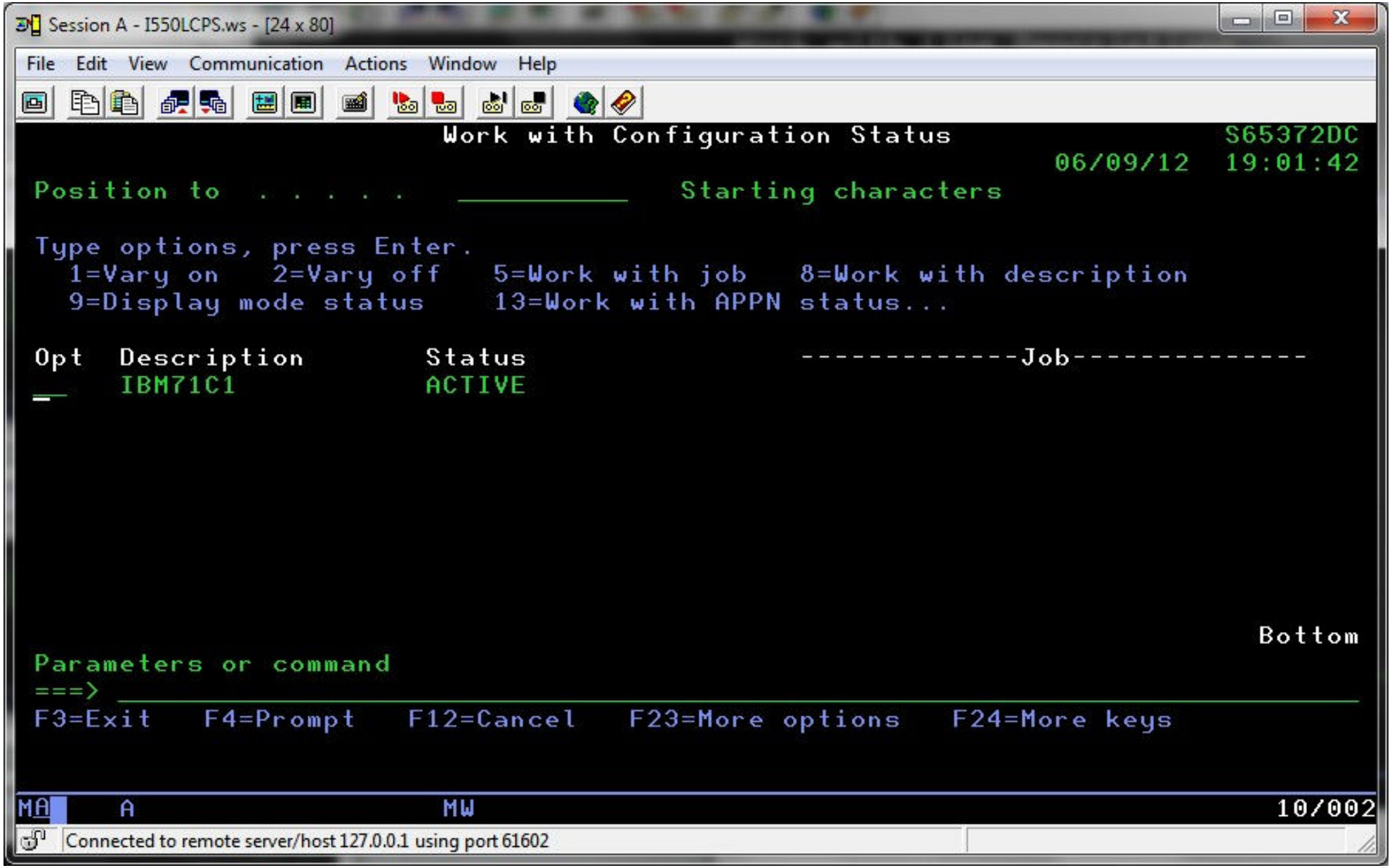
# Network Server Description – Vary On



# Network Server Description – Vary On

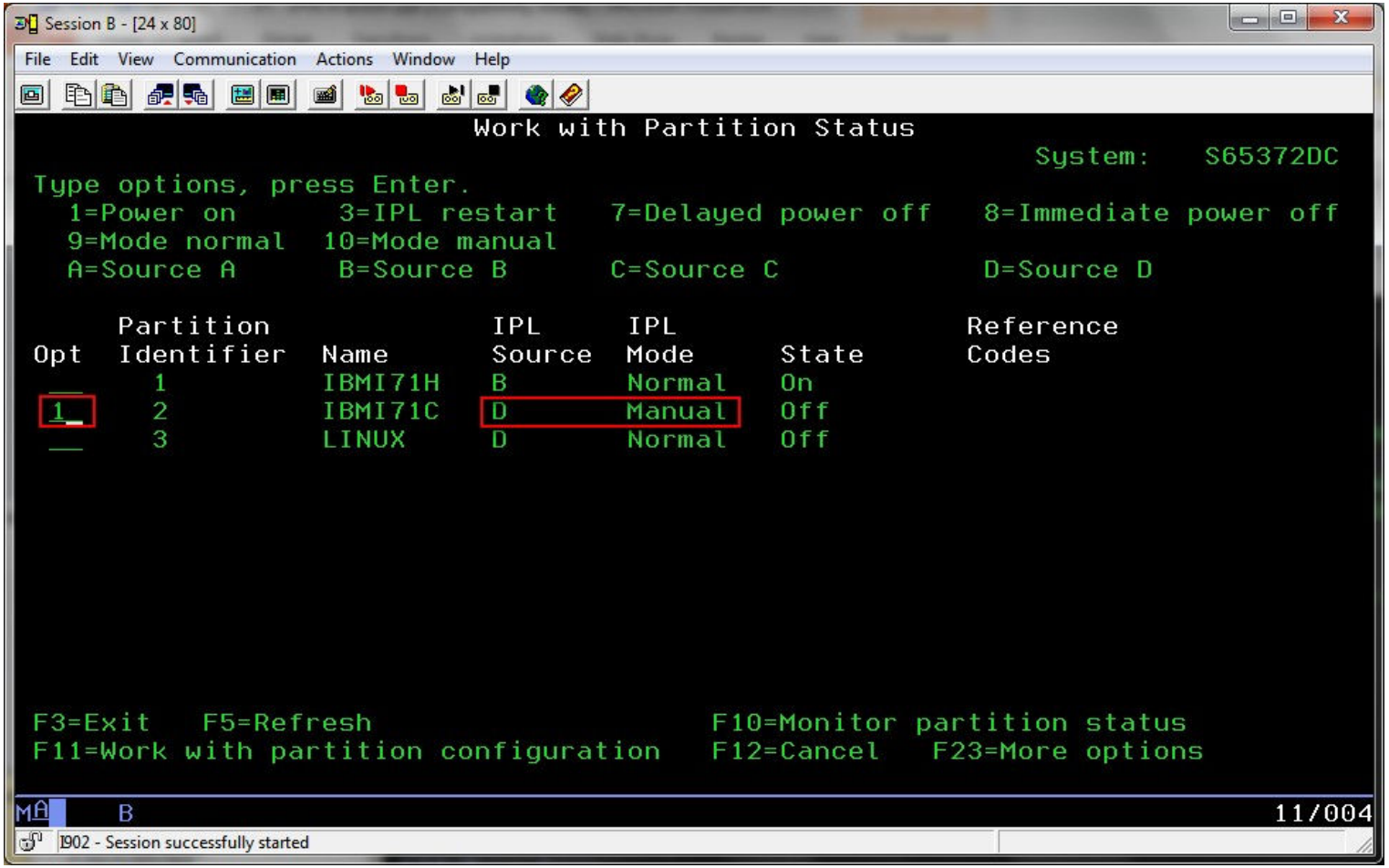


# Network Server Description – Vary On



# Next you need to activate the partition

- From the SST go to VPM:
  - 5. Work with system partitions
  - 2. Work with partition status
    - Verify IPL source: D
    - Verify IPL Mode: Manual
    - Option 1 to activate



# Next you need to activate the partition (2)

- The partition will begin initialization. The hosting partition will present the virtual optical device or devices and if a real optical drive is assigned to the hosting partition it will be presented as well.

- The client partition will locate a valid install or bootable media from any of the optical devices it finds on the VSCSI connection.
  - The rest of the install proceeds as normal, client partition will prompt for ‘next media’. Go to the host partition and ‘mount’ the next media or virtual media image.

- Start your Operations Console LAN and connect to the IBM i Client LPAR.
  (Note: When configuring LAN console, the Target partition value reflects the Partition Identifier value.)

# Install IBM i using virtual optical or real media

- The client partition will see all optical devices presented by the server partition.
- This includes any physical or virtual optical devices owned by the IBM i server partition.
- The client will not see any difference between virtual or physical.

# Backups for IBM i Clients

- For full-system backup, the client storage spaces can be saved on the host IBM i partition
  - Similar to AIX, Linux client partitions and iSCSI integrated servers with Windows or Vmware => ideal for disaster recovery
  - File-level backup is not supported
  - Storage spaces can be restored on another IBM i host
  - Storage spaces can be located in IASP, Flash Copy can be used on IASP

You can use the following command to save a specific NWSSTG-obj:

```
SAV DEV('/QSYS.LIB/TAP0x.DEVD')
OBJ(('/QFPNWSSTG/virtual_disk_name'))
```

The accompanying restore command to restore a specific NWSSTG-obj is:

```
RST DEV('/QSYS.LIB/TAP0x.DEVD')
OBJ(('/QFPNWSSTG/virtual_disk_name'))
```

# Things to consider

- Client Virtual Tape
  - Tape library drives can only be virtualized when configured as a stand-alone device, they are not supported while in library mode
- Considerations on number of storage spaces (virtual disks)
  - Apprx. 4-12, leaving room for growth upto 16
  - Storage spaces should be same size for performance reasons
- IBM i host vs. VIOS
  - External storage
  - Skills
  - New virtualization enhancements like Active Memory Sharing, Suspend/Resume
- VPM limitations vs. HMC
  - Only virtual IO
  - No dynamic movement of resources
  - Maximum 4 client lpars

# Performance Capabilities Reference Guide

**IBM Power Systems**
**Performance Capabilities Reference**
**IBM i operating system 7.1**

**April 2012**

This document is intended for use by qualified performance related programmers or analysts from IBM, IBM Business Partners and IBM customers using the IBM Power™ Systems platform running IBM i operating system. Information in this document may be readily shared with IBM i customers to understand the performance and tuning factors in IBM i operating system 7.1 and earlier where applicable. **For the latest updates and for the latest on IBM i performance information, please refer to the Performance Management Website:**
**http://www.ibm.com/systems/power/software/i/management/performance/index.html**

Requests for use of performance information by the technical trade press or consultants should be directed to STG Cross Platform Systems Performance Department.

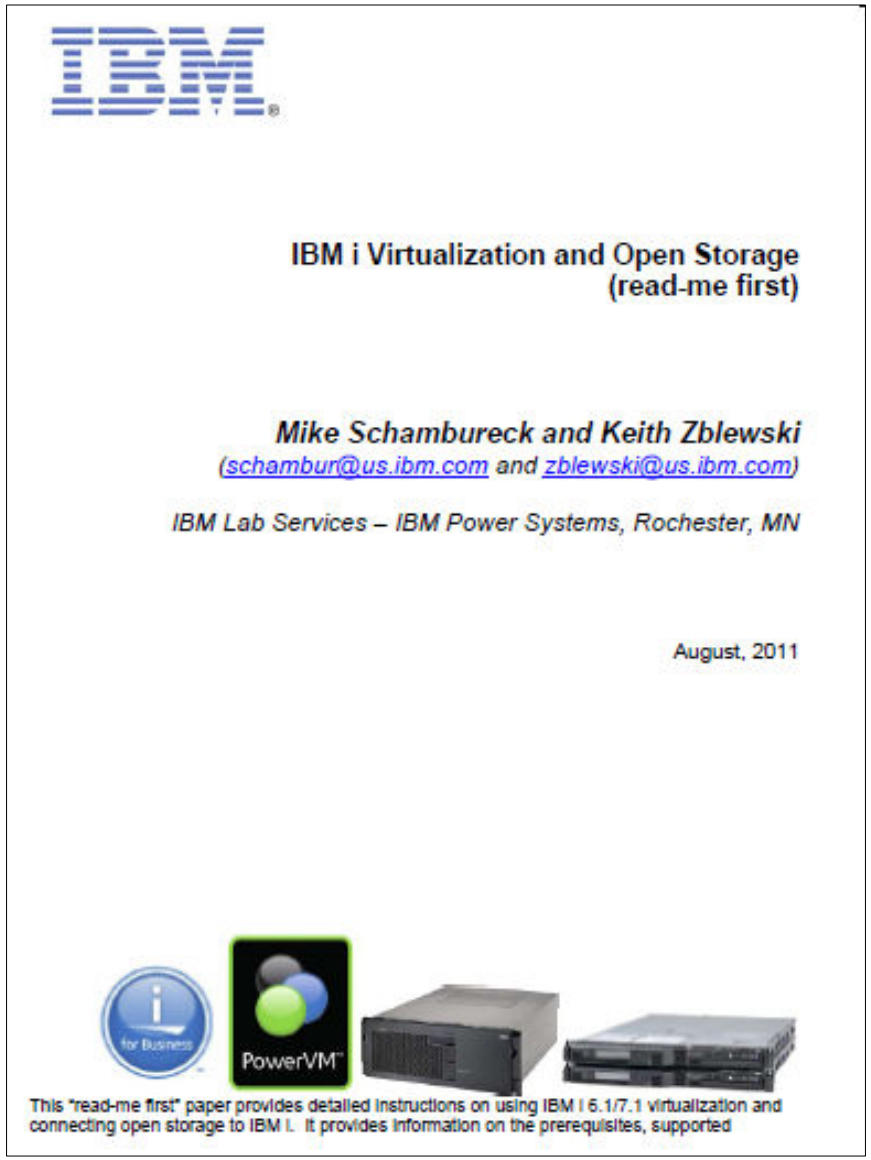




http://www-03.ibm.com/systems/i/advantages/perfmgmt/resource.html

# Where Do I Start with Installing IBM I hosting clients on Power system?

## HMC based


IBM

IBM i Virtualization and Open Storage
(read-me first)

*Mike Schambureck and Keith Zblewski*
*(schambur@us.ibm.com and zblewski@us.ibm.com)*

*IBM Lab Services – IBM Power Systems, Rochester, MN*

August, 2011

PowerVM

This "read-me first" paper provides detailed instructions on using IBM i 6.1/7.1 virtualization and connecting open storage to IBM i. It provides information on the prerequisites, supported

Same guide
Describes VIOS
hosting IBM i clients

- Latest version at:

http://www.ibm.com/systems/resources/systems_i_Virtualization_Open_Storage.pdf