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# Implementing AIX 5L on eServer i5: Let's Shed Some Light

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## Agenda

- iSeries and pSeries hardware terminology**
- HMC view of AIX 5L direct I/O**
- Supported hardware overview**
- Supported hardware FAQ**
- List of supported hardware for AIX 5L**
- Overview of Virtual I/O**
- Virtual Ethernet, SCSI and serial adapters**
- AIX 5L system management**
- Sizing for AIX 5L**
- Performance tools**

# Hardware and Terminology



**eServer i5 520 +  
expansion I/O tower**



**eServer i5 570 +  
expansion I/O drawers**

❑ Traditional iSeries terminology

- I/O towers
- Main storage, IOP, IOA
- SLIC, PTFs

❑ Traditional pSeries terminology

- I/O drawers
- HMC
- Memory, PCI adapter
- Kernel, patches

❑ eServer i5

- Model 520 can be in tower or rack
- Model 570 is rack only
- Now has towers and drawers
- Both towers and drawers appear as “units” in HMC
- Units contain buses and adapters

## HMC View of Direct I/O

	Description	I/O Pool Id	Owner
Unit U5095.001.103331C			
Unit U5095.001.103323C			
Bus 11			
Slot C03	Empty slot	Unassigned	Unassigned
Slot C01	I/O Processor	Unassigned	Unassigned
Slot C04	PCI 100/10Mbps Ethernet	Unassigned	AIX
Slot C02	PCI-X Ultra RAID Disk Cont...	Unassigned	AIX
Bus 10			
Slot C08	PCI 10/100/1000Mbps Ethe...	Unassigned	AIX
Slot C06	I/O Processor	Unassigned	Unassigned
Slot C07	PCI RAID Disk Unit Controll...	Unassigned	AIX
Unit U787A.001.DNZ016M			

- ❑ HMC view of eServer i5's physical I/O resources:
  - AIX 5L and Linux use IOAs, not IOPs
  - Direct I/O assigned in each partition's profile
  - Towers and drawers have serial numbers
- ❑ Common set of AIX 5L and Linux adapters for eServer i5 and p5.
- ❑ **HOWEVER:** not all eServer i5 AIX 5L and Linux adapters are supported on eServer p5, and vice versa

## Supported Hardware Overview

- ❑ Supported I/O for AIX 5L document: “AIX 5L Facts and Features”
- ❑ AIX 5L and Linux on eServer i5 support dynamic movement of I/O resources between partitions (**performed in HMC**)
  - “Required” I/O adapters cannot be moved dynamically, only “desired” ones
- ❑ **TIP:** In consolidated environment with multiple AIX 5L 5.3 partitions using Virtual Storage, one DVD or tape drive can be purchased, and later switched between those partitions without IPL (reboot). Controller for DVD/tape drive in this case is 0645/5712
- ❑ HMC **will enforce** placement rules for AIX 5L and Linux disk controllers: they cannot be “downstream” of i5/OS IOP
  - Applies only to internal DASD controllers (such as 0627/2780)
  - Does not apply to Fibre Channel controllers (such as 0625/5704)
- ❑ Same rules enforced by LVT. **Always use latest LVT from** <http://www-1.ibm.com/servers/eserver/iseriess/lpar/systemdesign.htm>

## Supported Hardware FAQ

**❑ Is there a Fibre Channel adapter for AIX 5L on eServer i5?**

**Yes, the 0625/5704. It does show up in the LVT as “Fibre Channel Tape Controller,” because it is one for i5/OS. For AIX 5L and Linux, it controls disk (FAStT, ESS) and tape**

**❑ There are 2 embedded Ethernet ports in the system unit. Can they be split between 2 different partitions (of any kind)?**

**No, the dual Ethernet ports are controlled by the same adapter on the backplane. They will show up as 2 network resources in a partition, but cannot be split up between any 2 partitions. They are usable by i5/OS or AIX 5L**

**❑ There are 2 embedded USB ports in the system unit. Can they be split between 2 different partitions (of any kind)?**

**No, the two USB ports are controlled by the same adapter on the backplane. They will show up as 2 USB resources in a partition, but cannot be split up between any 2 partitions. They are usable by AIX 5L, but not i5/OS**

**❑ Do I have to use a 7311-Dxx for AIX 5L features on eServer i5?**

**No, AIX 5L features can be placed in any of the system units, 0595/5095, 5094/5294 or 7311-Dxx.  
**Use LVT to find out which AIX 5L features are valid where in each system unit or tower****

## Supported Hardware FAQ

- ❑ What are my options for CD/DVD for AIX on eServer i5?

There are several:

- An external SCSI DVD drive, attached to a 0645/5712
- The 2<sup>nd</sup> DVD slot in the system unit, controlled by the embedded IDE controller

(eServer i5 520 and 550 only)

- The 1<sup>st</sup> DVD slot in the system unit, controlled by the 570B/5709
- A DVD drive in a 5094/5294 tower, controlled by an 0627/0628/0645

There is no recommendation, the choice depends on the full system configuration.

**NOTE: these are the DVD options for AIX 5L without regard to any other partitions. For example, if i5/OS controls the 5709 in the system unit, the 1<sup>st</sup> DVD slot will not be an option**

- ❑ If I allocate an 0645/5712 to an AIX 5L partition, can it control both an external DVD/tape, and internal disks?

Yes. However: the 0645 is a 2-bus SCSI adapter, each of which has an external and an internal port. Therefore, only 1 of the ports for the same bus can be used at the same time

- ❑ If I have an older HVD (high-voltage differential) external SCSI tape drive, is there an adapter for it for AIX 5L on eServer i5?

Yes, the 6204. All other supported SCSI adapters (such as the 0627 or 0645) are LVD



# Supported Hardware List for AIX 5L

IBM @server i5

	9406-520 rack drawer; deskside	9406-550 rack drawer; deskside	9406-570 rack drawer	9406-595 rack drawer
<b>Storage Interfaces</b>				
0628 Direct Attach 5703 PCI-X SCSI RAID Disk Unit Controller	Y	Y	Y	Y
0627 Direct Attach 2780 PCI-X Ultra4 RAID Disk Controller	Y	Y	Y	Y
5709 RAID Enabler Card	Y	Y	Y	N
0625 Direct Attach 5704 2 Gigabit Fibre Channel PCI-X	Y	Y	Y	Y
0645 Direct Attach 5712 PCI-X Tape Controller	Y	Y	Y	Y
6203 PCI-3 SCSI Adapter	N	Y	Y	Y
6204 Differential SCSI Adapter	Y	Y	Y	Y
0611 Direct Attach 2765 Fibre Channel Tape Controller	Y	Y	Y	Y
0642 PCI Ultra 3 Raid Adapter	Y	Y	Y	N
0638 PCI 40MB SSA Adapter	N	N	Y	Y
0639 128MB DIMM SSA Adapter Memory	N	N	Y	Y
0640 32MB Non-volatile Fast Write Cache for 6225 and 6230	N	N	Y	Y
<b>Communications, Connectivity and Encryption</b>				
0637 10/100 Mbps 4-port Ethernet Adapter	N	N	Y	Y
5706 1Gbps Ethernet Adapter	Y	Y	Y	Y
0620 Direct Attach 5700 PCI 1 Gbps Ethernet IOA	Y	Y	Y	Y
0621 Direct Attach 5701 PCI 1 Gbps Ethernet UTP IOA	Y	Y	Y	Y
2943 8 Port Async Adapter	Y	Y	Y	Y
0635 SDLC/X.25-2 port Adapter	Y	Y	Y	Y
2947 PCI Multiprotocol Adapter	Y	Y	Y	Y
4960 Cryptographic Accelerator	N	N	Y	Y
4963 Cryptographic Co-processor	N	N	Y	Y
0634 Direct Attach 2944 128 port Async Adapter	Y	Y	Y	Y
8136 Remote Async Node (Rack)	Y	Y	Y	Y
8137 RS232 Remote Async Node	Y	Y	Y	Y
6312 Quad Digital Trunk Adapter	Y	Y	N	N
4959 PCI 16/4 Mbps Token-Ring IOA	Y	Y	Y	Y
4953 155Mbps UTP ATM Adapter	N	N	Y	Y
4957 155Mbps ATM Fibre Adapter	N	N	Y	Y
2946 PCI 622 Mbps ATM Fibre Adapter	N	N	Y	Y
5718 10 Gbps Ethernet Adapter	Y	Y	Y	Y
4962 PCI 100/10 Mbps Ethernet IOA	Y	Y	Y	Y
2732 PCI Serial HIPPI Adapter	N	N	Y	Y

# Supported Hardware List for AIX 5L

IBM @server i5

	9406-520	9406-550	9406-570	9406-595
	rack drawer; deskside	rack drawer; deskside	rack drawer	rack drawer

	9406-520	9406-550	9406-570	9406-595
	rack drawer; deskside	rack drawer; deskside	rack drawer	rack drawer
<b>Displays and Display Adapters<sup>a</sup></b>				
0632 USB 2.0 Adapter	Y	Y	Y	Y
0633 Graphics Adapter	Y	Y	Y	Y
1876 20" Flat Panel Monitor	Y	Y	Y	Y
3637 15" Color Monitor	Y	Y	Y	Y
3639 17" Color Monitor	Y	Y	Y	Y
3628 21" Color Monitor	N	N	Y	Y
3638 21" Color Monitor	Y	Y	Y	Y
2737 4-port USB 1.1 Adapter	N	N	Y	Y
8841 USB Mouse and Cable to Keyboard	Y	Y	Y	Y
88XX/187X Keyboard	Y	Y	Y	Y
8244 PCI WS Audio Adapter	Y	Y	N	N
2848 PCI 2D Entry Graphics Adapter	Y	Y	Y	Y
6546-00E/00N/01E/01S/0AE/0AN/0BE/0BN/0BS/21N/2BN/31N/4AN/6BN Display	Y	Y	Y	Y
<b>Storage and Storage Subsystems</b>				
4326/7508 35.16 GB 15K rpm Disk Unit	Y	Y	Y	Y
4327/7509 70.56 GB 15K rpm Disk Unit	Y	Y	Y	Y
4328/7510 141 GB 15K rpm Disk Unit	Y	Y	Y	Y
1893 36.4 GB 10K rpm Disk Unit	Y	Y	Y	Y
1894 73.4 GB 10K rpm Disk Unit	Y	Y	Y	Y
1895 146.8 GB 10K rpm Disk Unit	Y	Y	Y	Y
1896 36.4 GB 15K rpm Disk Unit	Y	Y	Y	Y
1897 73.4 GB 15K rpm Disk Unit	Y	Y	Y	Y
2591 External 1.44 GB Diskette Drive	Y	Y	Y	Y
<b>Expansion Towers</b>				
5094/5294 PCI-x Expansion Tower	Y	Y	Y	Y
5095/0595 PCI-x Expansion Tower	Y	Y	Y	Y
7311-D10 I/O Drawer	N	N	Y	Y
7311-D20 I/O Drawer	Y	Y	Y	Y

# Supported Hardware List for AIX 5L

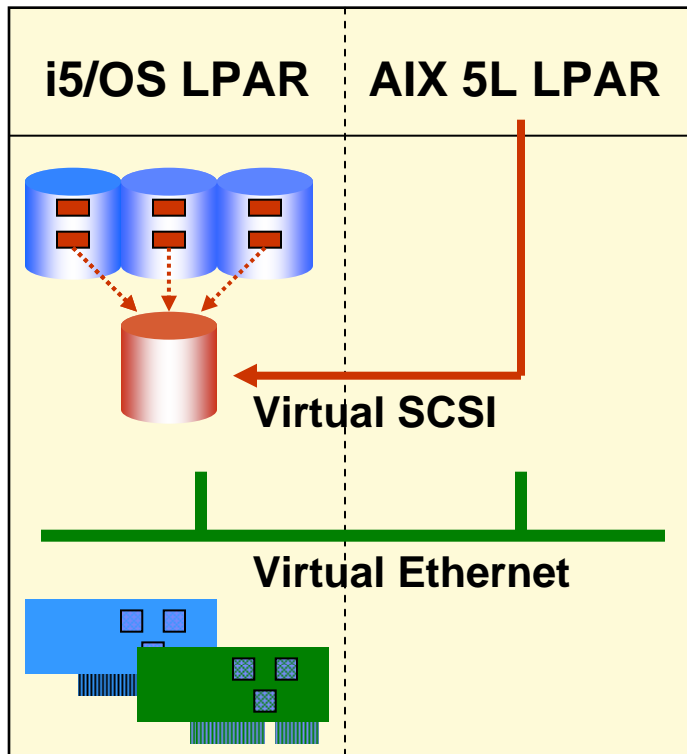
IBM @server i5

9406-520 rack drawer; deskside      9406-550 rack drawer; deskside      9406-570 rack drawer      9406-595 rack drawer

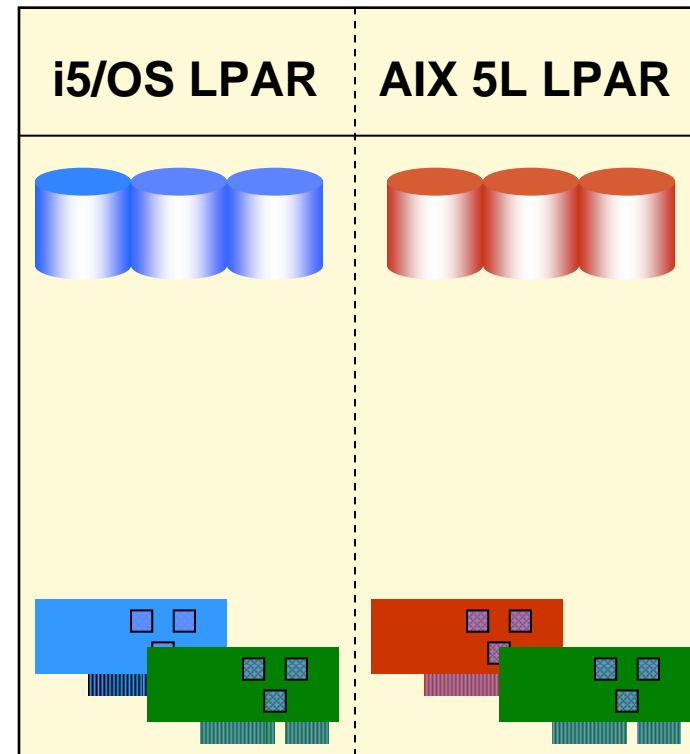
	9406-520	9406-550	9406-570	9406-595
<b>Fibre Channel Directors, Switches, Hubs and Routers</b>				
2031-016/032/216/224/232/L00 McDATA Fibre Channel Switch	Y	Y	Y	Y
2032-001/064/140 McDATA Fibre Channel Director	Y	Y	Y	Y
3534-F08 SAN Switch	Y	Y	Y	Y
<b>Optical Drives and Libraries</b>				
2640 DVD-ROM	Y	Y	Y	N
5751 DVD-RAM	Y	Y	Y	N
4625 CD-ROM	Y	Y	Y	Y
4631 DVD-ROM	Y	Y	Y	Y
4430 DVD-RAM	Y	Y	Y	Y
4630 DVD-RAM	Y	Y	Y	Y
4633 DVD-RAM	Y	Y	Y	Y
7210-020 CD-ROM Drive	Y	Y	Y	Y
7210-025 DVD-RAM Drive	Y	Y	Y	Y
7210-030 DVD Drive	Y	Y	Y	Y
3995-X63/C6X Optical Library	Y	Y	Y	Y
<b>Tape Drives</b>				
1889 80/160 GB Tape Drive	Y	Y	N	N
4482 4 GB 1/4" Tape Drive	Y	Y	Y	Y
4682 4 GB 1/4" Tape Drive	Y	Y	Y	Y
4684 30 GB 1/4" Tape Drive	Y	Y	Y	Y
4487 50 GB 1/4" Tape Drive	Y	Y	Y	Y
4687 50 GB 1/4" Tape Drive	Y	Y	Y	Y
4685 80 GB 1/4" Tape Drive	Y	Y	Y	Y
5753 QIC 30 GB Tape	Y	Y	N	N
5754 QIC 50 GB Tape	Y	Y	N	N
6134 60/150 GB 8 mm Tape Unit	Y	Y	N	N
6258 36/72 GB 4 mm Tape Unit	Y	Y	N	N

# Virtual I/O Overview

## Virtual I/O



## Direct I/O

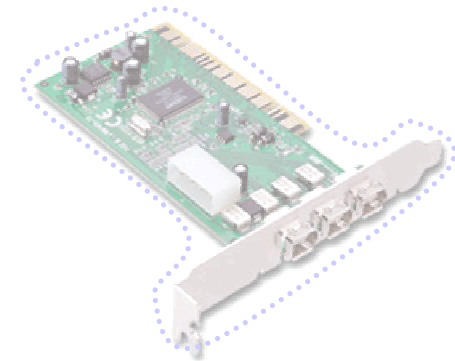


- i5/OS provides virtual disk to AIX 5L
- Improves asset utilization and ROI
- Uses the IBM Virtualization Engine

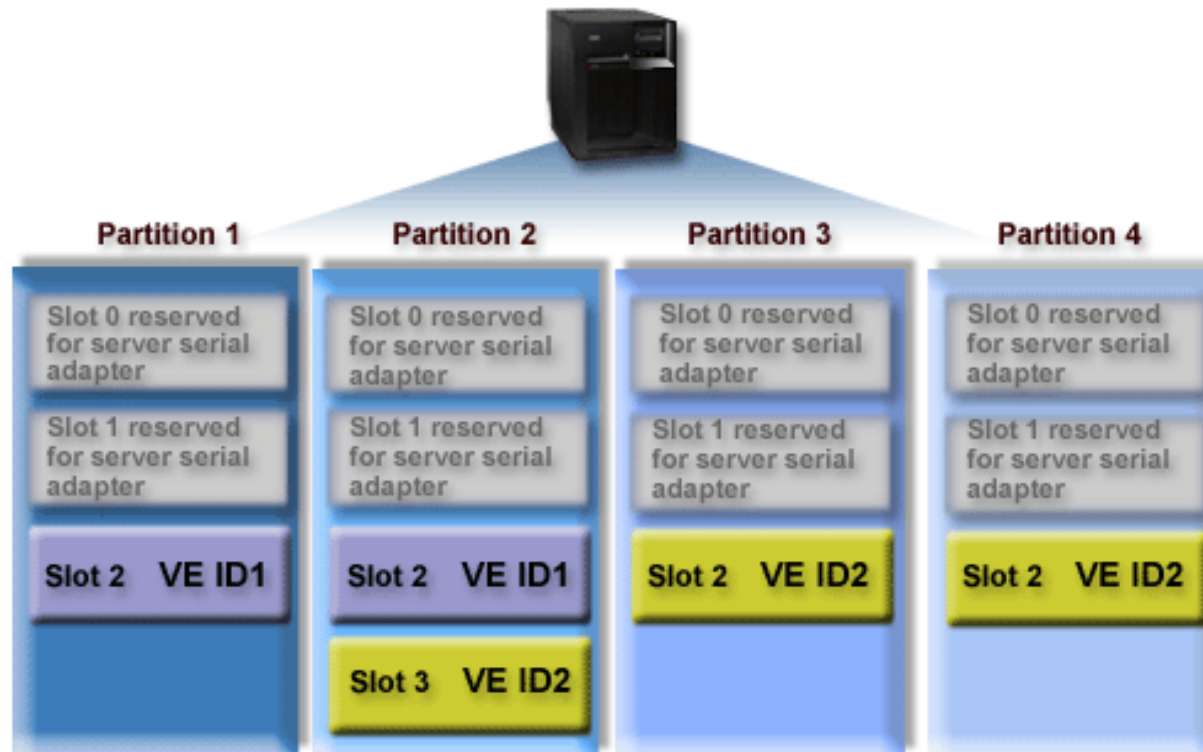
- Resources dedicated to AIX 5L
- AIX 5L management of disk, NICs
- AIX 5L independent of other LPARs

## Virtual I/O Overview

- ❑ **Each partition has virtual I/O “slots”**
  - Configurable for each partition in HMC
- ❑ **Slots can have virtual adapter instance**
  - Ethernet, serial, or SCSI
- ❑ **Virtual adapters configured in partition profile**
- ❑ **Maximum number of virtual adapters cannot be changed without de/reactivation**
- ❑ **Can be dynamically added or removed just like physical I/O slots**
  - Cannot be dynamically moved to another partition
  - Configuration of what is in the slot can be redefined without a restart of the partition
- ❑ **For AIX 5L, virtual I/O available at version 5.3 or later; direct I/O only at version 5.2**



# Virtual Ethernet



- ❑ Total number of VE LANs is 4094
- ❑ Two VE adapters that have the same **PVID** (port virtual ID) are on the same VLAN
- ❑ Above, P1 and P2 are on VLAN 1, P2, P3, and P4 are on VLAN 2
- ❑ Virtual slot numbers do not matter
- ❑ By using IEEE 802.1Q VE adapters, the same adapter can be on several VLANs (can have several **VIDs**)
- ❑ Only AIX and Linux can use IEEE 802.1Q adapters

# Virtual Ethernet

The screenshot shows the 'Logical Partition Profile Properties: Madison\_L\_Virtual @ iTC LSQ1' dialog box with the 'Virtual I/O' tab selected. A sub-dialog 'Virtual Ethernet Adapter Properties' is open, showing configuration for a virtual Ethernet adapter. The 'Virtual Ethernet' section includes:

- Slot number: \* 2
- Port virtual LAN ID: \* 1
- Trunk adapter
- IEEE 802.1Q compatible adapter
- Maximum number of virtual LAN IDs: 20
- Additional virtual LAN ID to add: 2 (with an 'Add' button)
- Additional virtual LAN IDs: (empty list with a 'Remove' button)

In the background, the 'Virtual adapters' section shows a table of existing adapters:

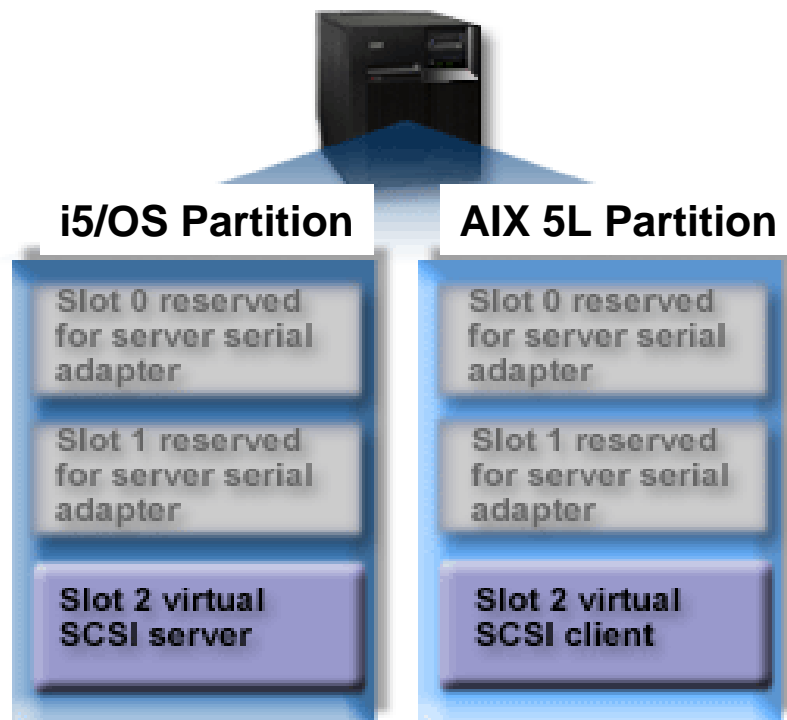
Slot Number	Type	Required
0	Server Serial	<input checked="" type="checkbox"/>
1	Server Serial	<input checked="" type="checkbox"/>
4	Client SCSI	<input checked="" type="checkbox"/>

The 'Create adapters' section at the bottom has 'Ethernet' selected with a radio button. A '(Create...)' button is highlighted with a tooltip that reads: 'Click to create the selected adapter type'.

- CMNxx in i5/OS
- ethX in Linux
- entX in AIX 5L



## Virtual SCSI



- Virtual Storage for AIX 5L on eServer p5 provided through Virtual I/O Server
- Virtual I/O Server not supported on eServer i5

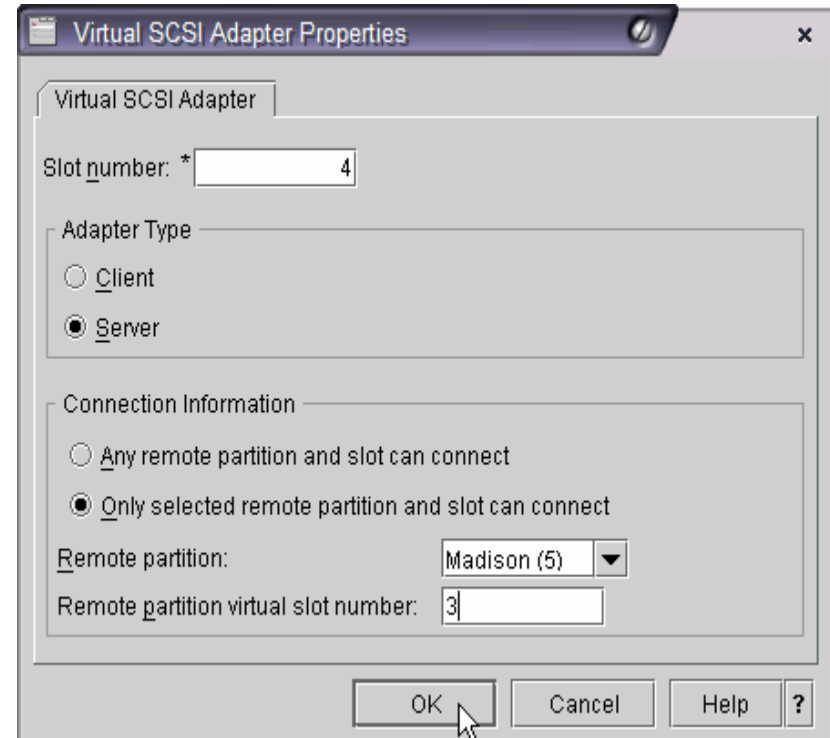
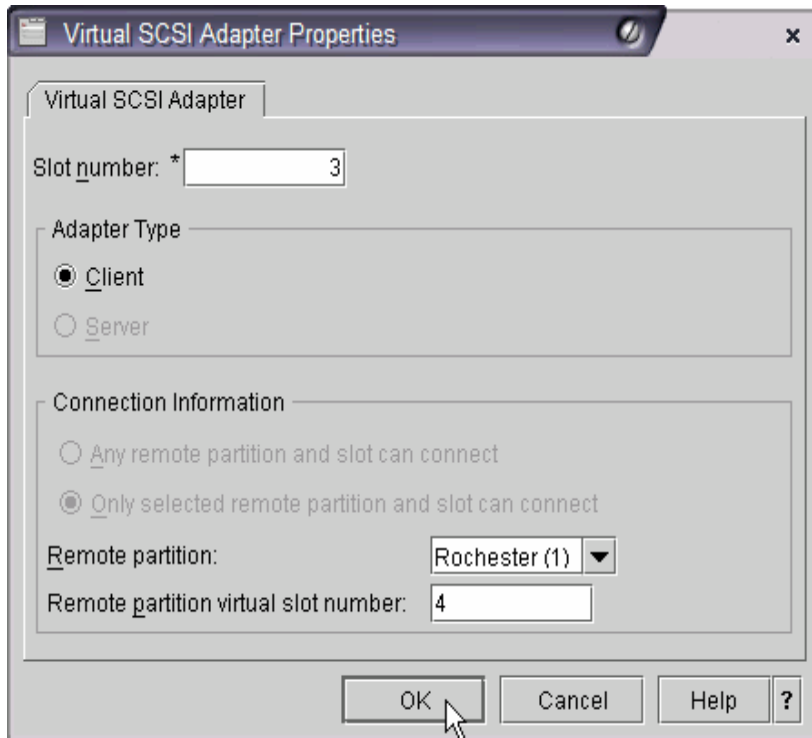
- ❑ Virtual SCSI server and client adapters
- ❑ i5/OS is server, Linux, AIX 5L are clients
- ❑ Required for accessing Virtual Disk, CD/DVD, tape from i5/OS
- ❑ Virtual disk = NWSSTG object
- ❑ NWSSTG created in IFS
- ❑ NWSD object connects server-client SCSI adapter pair with NWSSTG
- ❑ **One NWSD/multiple NWSSTG possible per server-client adapter pair**
- ❑ AIX 5L, Linux see virtual disk as physical drive
- ❑ /dev/sdX in Linux
- ❑ hdiskX in AIX 5L
- ❑ Leverage RAID-5, multiple disk arms, scatter-loading, single-level storage
- ❑ **No support for Virtual CD/DVD or tape for AIX 5L**



# Virtual SCSI

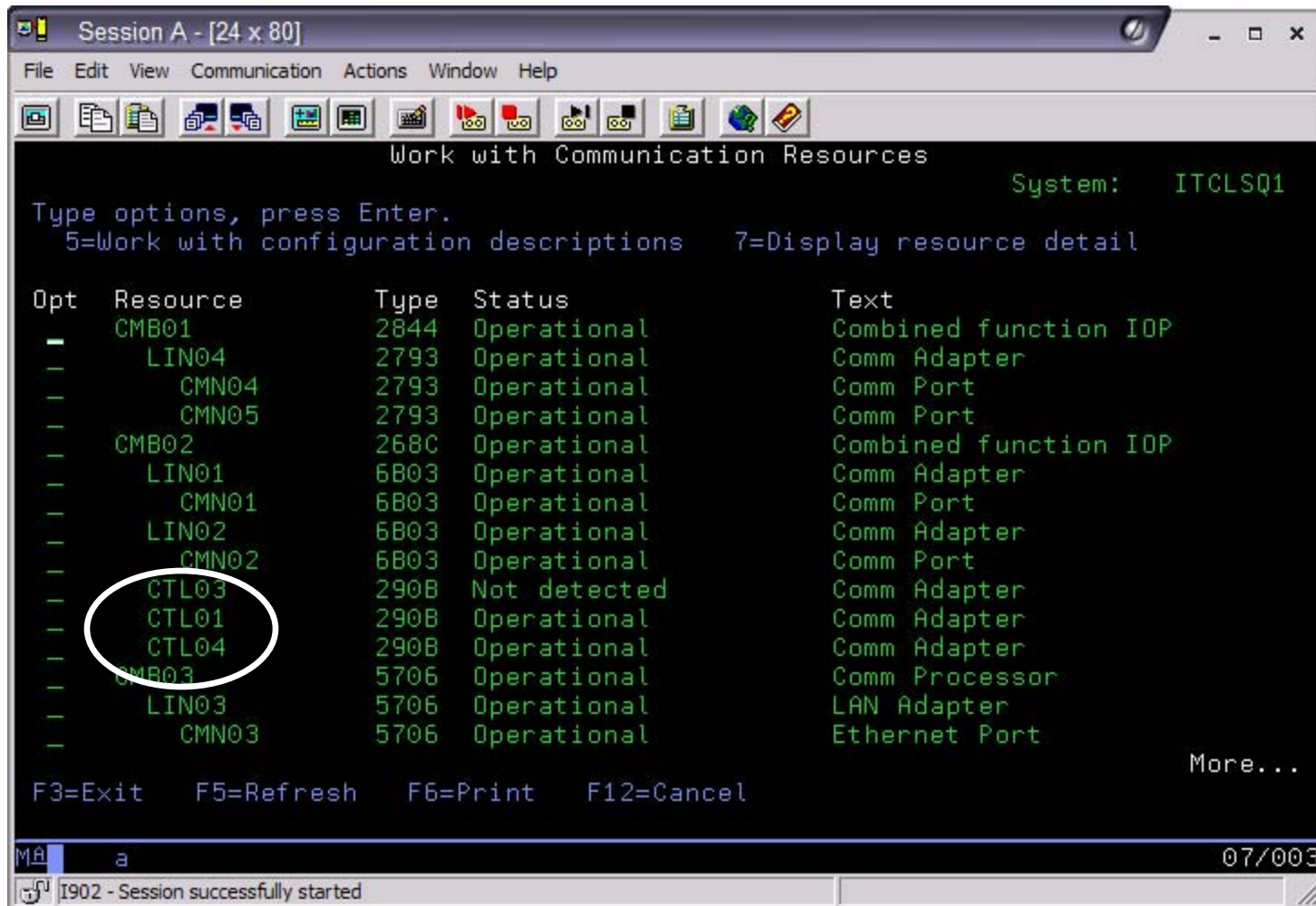
AIX 5L

i5/OS



Individual slot numbers do no matter, as long as they are configured in pairs

## Virtual SCSI: i5/OS View



```

Session A - [24 x 80]
File Edit View Communication Actions Window Help
Work with Communication Resources
System: ITCLSQ1
Type options, press Enter.
5=Work with configuration descriptions 7=Display resource detail

Opt Resource Type Status Text
---
CMB01 2844 Operational Combined function IOP
  LIN04 2793 Operational Comm Adapter
  CMN04 2793 Operational Comm Port
  CMN05 2793 Operational Comm Port
CMB02 268C Operational Combined function IOP
  LIN01 6B03 Operational Comm Adapter
  CMN01 6B03 Operational Comm Port
  LIN02 6B03 Operational Comm Adapter
  CMN02 6B03 Operational Comm Port
  CTL03 290B Not detected Comm Adapter
  CTL01 290B Operational Comm Adapter
  CTL04 290B Operational Comm Adapter
CMB03 5706 Operational Comm Processor
  LIN03 5706 Operational LAN Adapter
  CMN03 5706 Operational Ethernet Port

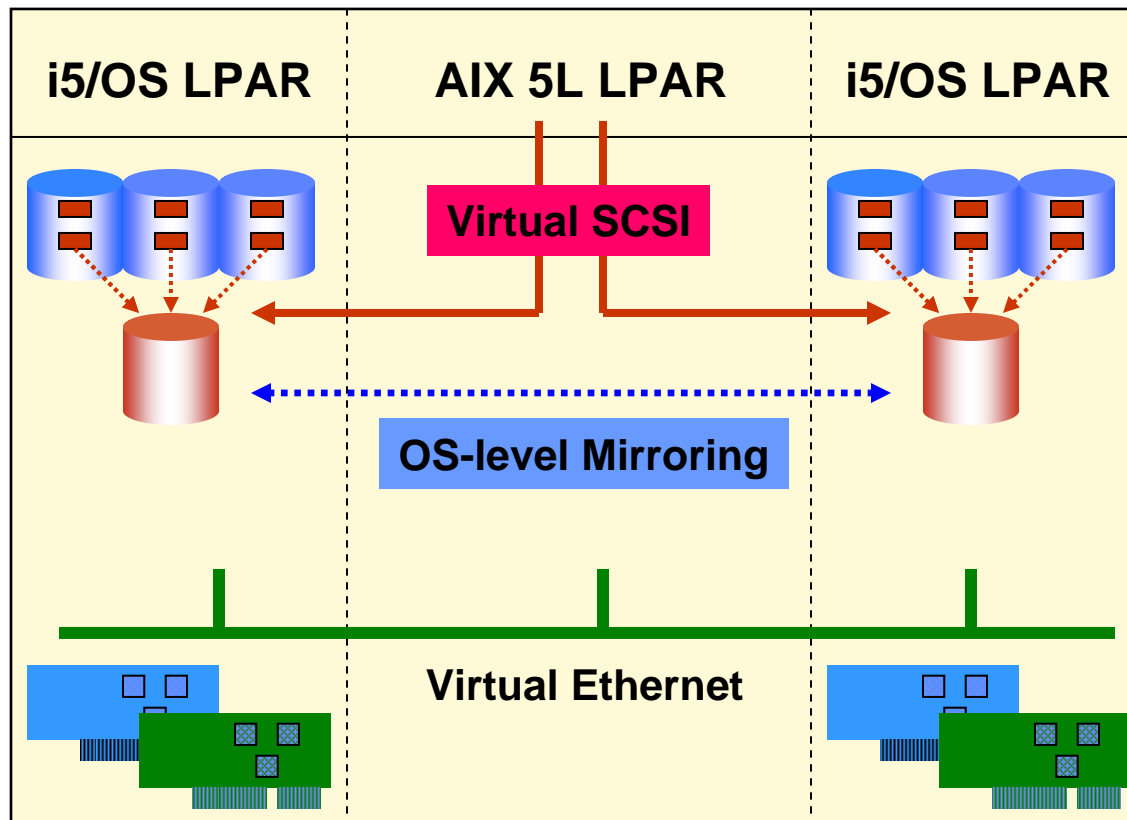
More...

F3=Exit F5=Refresh F6=Print F12=Cancel
Mâ a 07/003
I902 - Session successfully started

```

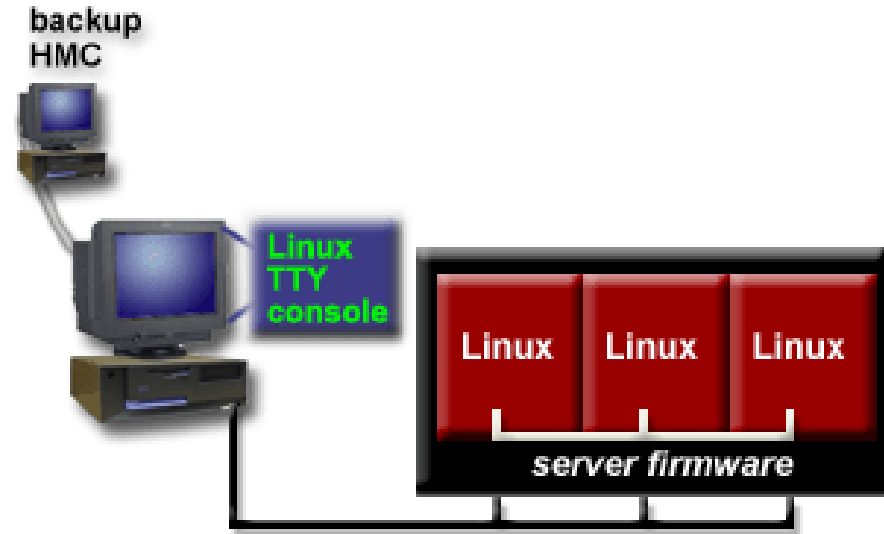
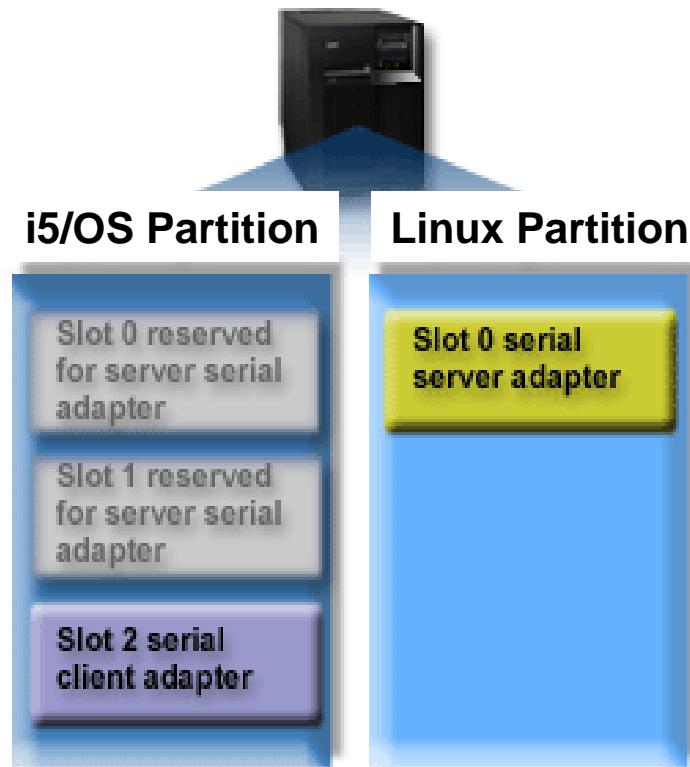
“Resource name” for AIX 5L NWSD

## HA with Virtual SCSI



- ❑ AIX 5L partitions can access virtual disk from two or more i5/OS partitions
- ❑ Two virtual disks of equal size from separate i5/OS partitions allow mirroring of AIX 5L system disk
- ❑ Two Virtual SCSI server/client adapter pairs required, one for each i5/OS partition providing storage
- ❑ Mirroring accomplished with OS tools AIX 5L (LVM)
- ❑ AIX 5L partition becomes highly available, able to withstand failure of either host i5/OS partition

# Virtual Serial



- ❑ First 2 virtual slots in every partition reserved for virtual serial server adapters for system console in HMC

- ❑ For i5/OS, virtual serial adapters provide 5250 console
- ❑ For AIX 5L, they provide character console

# Virtual Serial

The screenshot shows the 'Logical Partition Profile Properties: Rochester\_i5/OS @ ITC LSQ1' dialog box. The 'Virtual I/O' tab is active, and the 'Virtual Serial Adapter Properties' sub-dialog is open. The sub-dialog is configured as follows:

- Virtual Serial**
  - Slot number: \* 2
- Adapter Type**
  - Client
  - Server
- Connection Information**
  - HMC and any remote partition and slot can connect
  - Any remote partition and slot can connect
  - Only selected remote partition and slot can connect
- Remote partition: Milwaukee (3)
- Remote partition virtual slot number: 5

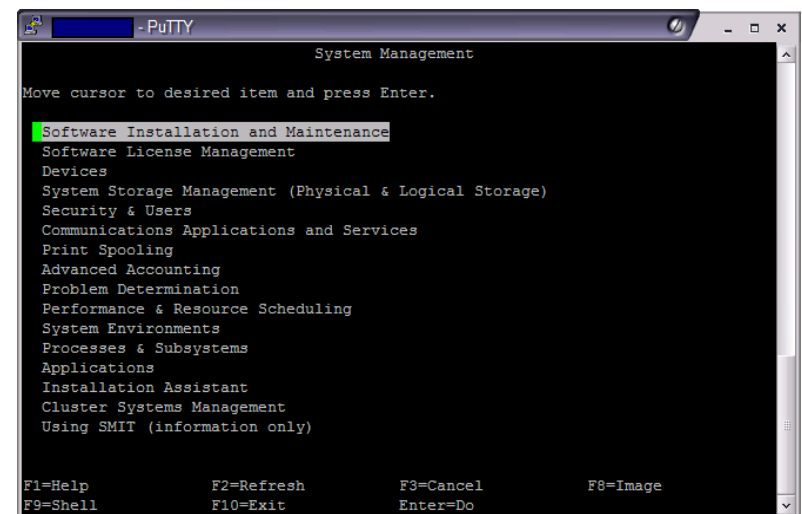
In the background, the 'Virtual adapters' section shows a table of existing adapters:

Slot Number	Type
0	Server Serial
1	Server Serial
3	Server SCSI
4	Server SCSI

The 'Number of virtual adapters' is set to 10. The 'Create adapters' section has 'Serial' selected. A tooltip points to the '(Create...)' button with the text: 'Click to create the selected adapter type'.

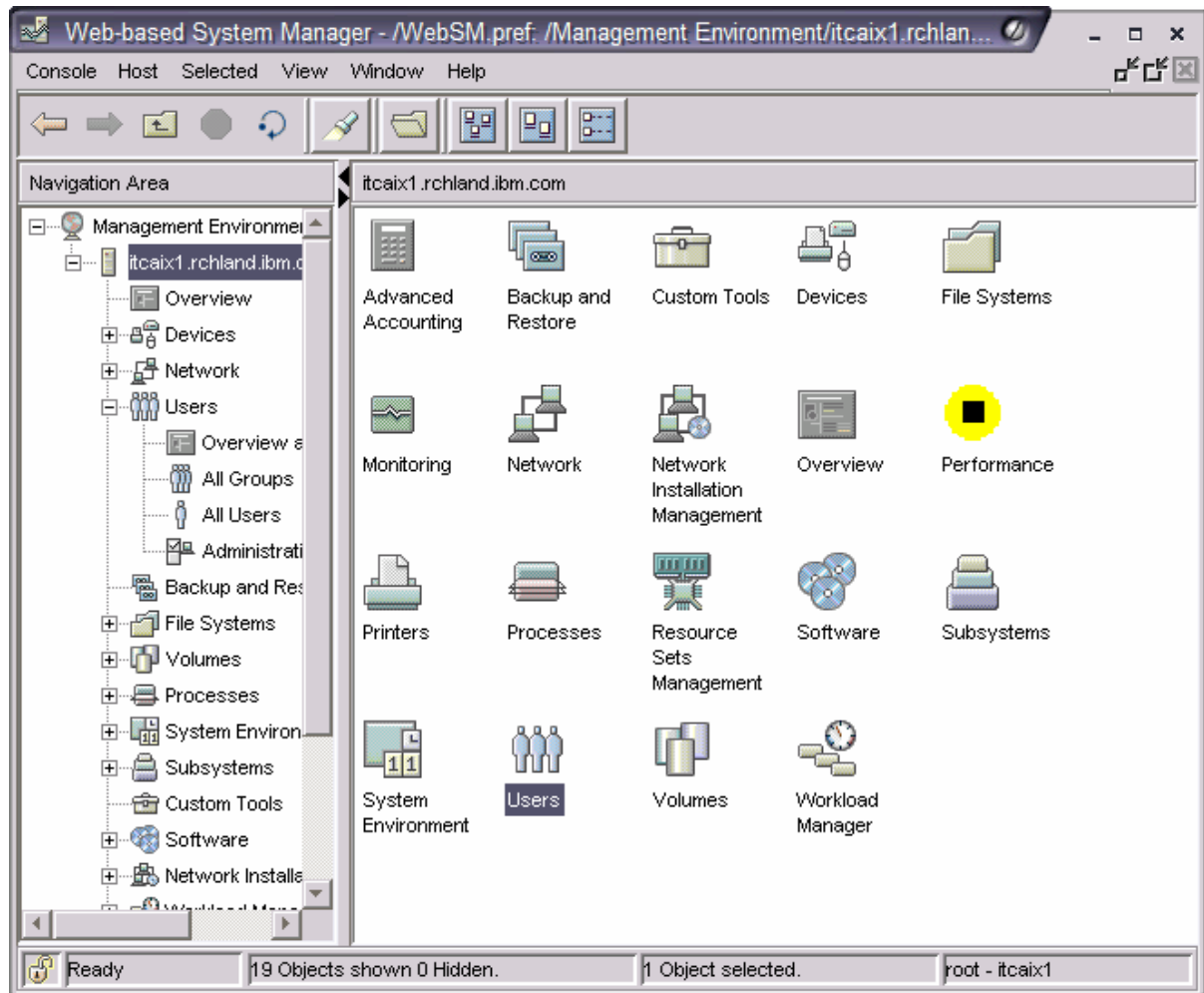
# AIX 5L System Management: SMIT

- ❑ **System Management Interface Tool**
- ❑ **GUI or command-line**
- ❑ **Similar to iSeries Navigator**
- ❑ **Local or remote access**
- ❑ **Menu-driven**
- ❑ **Comprehensive management:**
  - Software installation
  - Hardware devices
  - Disk storage
  - Security and users
  - Networking
  - Jobs and subsystems
- ❑ **SMIT fast paths on command line:**
  - smit devices; smit tcpip
- ❑ **Similar to green-screen system management**
  - F4 to prompt fields, F3 to exit



# AIX 5L System Management: WebSM

- ❑ **Web-based System Manager**
- ❑ **Installs with AIX 5L**
- ❑ **Remote client connects to server running in AIX 5L**
- ❑ **Secure connection**
- ❑ **Similar to iSeries Navigator**
- ❑ **All aspects of system management**
- ❑ **Download WebSM client for Windows, Linux from your HMC!**  
[http://your\\_hmc/remote\\_client.html](http://your_hmc/remote_client.html)
- ❑ **Common PC look and feel; interface similar to HMC**





## Sizing for AIX 5L on eServer i5

- **AIX 5L performance on eServer i5 is equivalent to eServer p5 with the same configuration**

Model	# of CPUs	GHz	AIX 5L 5.3 rPerf
<b>p5-520</b>	<b>2</b>	<b>1.65</b>	<b>9.86</b>
<b>p5-570</b>	<b>2</b>	<b>1.65</b>	<b>9.86</b>
<b>p5-570</b>	<b>4</b>	<b>1.65</b>	<b>19.66</b>
<b>p5-570</b>	<b>8</b>	<b>1.65</b>	<b>37.22</b>
<b>p5-570</b>	<b>12</b>	<b>1.65</b>	<b>53.43</b>
<b>p5-570</b>	<b>16</b>	<b>1.65</b>	<b>68.40</b>

### Notes:

- 1) The rPerf (Relative Performance) is an estimate of commercial processing performance. It is derived from an IBM analytical model which uses characteristics from IBM internal workloads, TPC and SPEC benchmarks. The rPerf model is not intended to represent any specific public benchmark results and should not be reasonably used in that way. The model simulates some of the system operations such as CPU, cache and maximum memory available. However, the model does not simulate disk or network I/O operations. IBM pSeries and IBM RS/6000 Performance Report provides rPerf values for servers other than POWER5 servers -- [http://www-1.ibm.com/servers/eserver/pseries/hardware/system\\_perf.html](http://www-1.ibm.com/servers/eserver/pseries/hardware/system_perf.html)
- 2) The rPerf results of IBM eServer p5 systems are based on AIX 5L V5.3 which supports simultaneous multi-threading. Simultaneous multi-threading results in a 30% boost in rPerf. For purposes of estimating rPerf for AIX 5L V5.2 on eServer p5 systems divide the published rPerf number by 1.3 and round down to the nearest 1/100<sup>th</sup>

All performance information was determined in a controlled environment. Actual results may vary. Performance information is provided "AS IS" and no warranties or guarantees are expressed or implied by IBM.

With the announcement of eServer p5 systems and the availability of AIX 5L v5.2ML4 and AIX 5L v5.3, customers, business partners and independent software vendors can deploy applications running on AIX 5L v5.2 or AIX 5L v5.3 on either eServer i5 or eServer p5 systems.

Since eServer i5 and eServer p5 are built with the same POWER5 processors and server technology, AIX 5L applications that run on eServer p5 can run on eServer i5 unchanged.

While most of the I/O options are the same between the i5 & p5, support is dependent upon specific I/O availability. You should verify that adapters running in AIX partitions on eServer i5 servers are utilizing I/O Adapters supported by AIX 5L.

Some selected AIX licensed program products are not available on eServer i5.



## Sizing for AIX 5L on eServer i5

- ❑ Sizing recommendations for AIX 5L applications can come from ISVs or IBM Software Group
  - Guidelines for several ISV applications available at IBM PartnerWorld for Developers site:  
<http://www.developer.ibm.com/welcome/eserver/e3/CSFServlet?mvcid=main&packageid=3002>
  - Redbook on pSeries sizing available: <http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/sq247071.html?Open>
- ❑ Determine requirements for CPU (rPerf), memory, disk and network I/O on eServer p5
  - Memory, disk and network requirements will be the same on eServer i5
- ❑ Factor in logical partitioning (LPAR) considerations:
  - rPerf numbers produced on non-LPAR machine. AIX 5L on eServer i5 will always run on LPAR machine
  - If AIX 5L partition will use shared processors, factor in between 1 and 10% overhead, depending on total number of partitions using shared processors
  - rPerf numbers not available for single-CPU or sub-processor AIX 5L partitions. Use linear interpolation of existing rPerf numbers to estimate rPerf number for AIX 5L partition using less than full CPU.
- ❑ Proceed by identifying server model and CPU capacity
  - Use rPerf numbers from p5 system, factor in LPAR overhead
  - Derive estimate using Workload Estimator – use “Generic (AIX) Workload”

## Sizing for AIX 5L on eServer i5

- ❑ Use eServer Workload Estimator (WLE): <http://www-912.ibm.com/wle/EstimatorServlet>
- ❑ Configure “Generic (AIX) Workload”
- ❑ Enter adjusted rPerf required for AIX 5L workload. Round up.
- ❑ Enter amount of memory derived from eServer p5
- ❑ Enter disk configuration derived from eServer p5
- ❑ Choose “none” for “Additional Characteristics”
- ❑ Choose DBCS support as appropriate
- ❑ Create other i5/OS workloads to arrive at consolidated system\*

Version: 2004.3. fix.1  
15-Sep-04  
www-912

Shared Processor LPAR  
Partition Name: [AIX Partition](#)  
OS: AIX 5L - 5.3

### GenAIX #1

Generic (AIX) Workload Definition

1. [rPerf](#): 0.0

2. [Memory](#) : (MB) 0.0

3. [Disk Configuration](#):

Drive Grouping:

Drive Attachment:

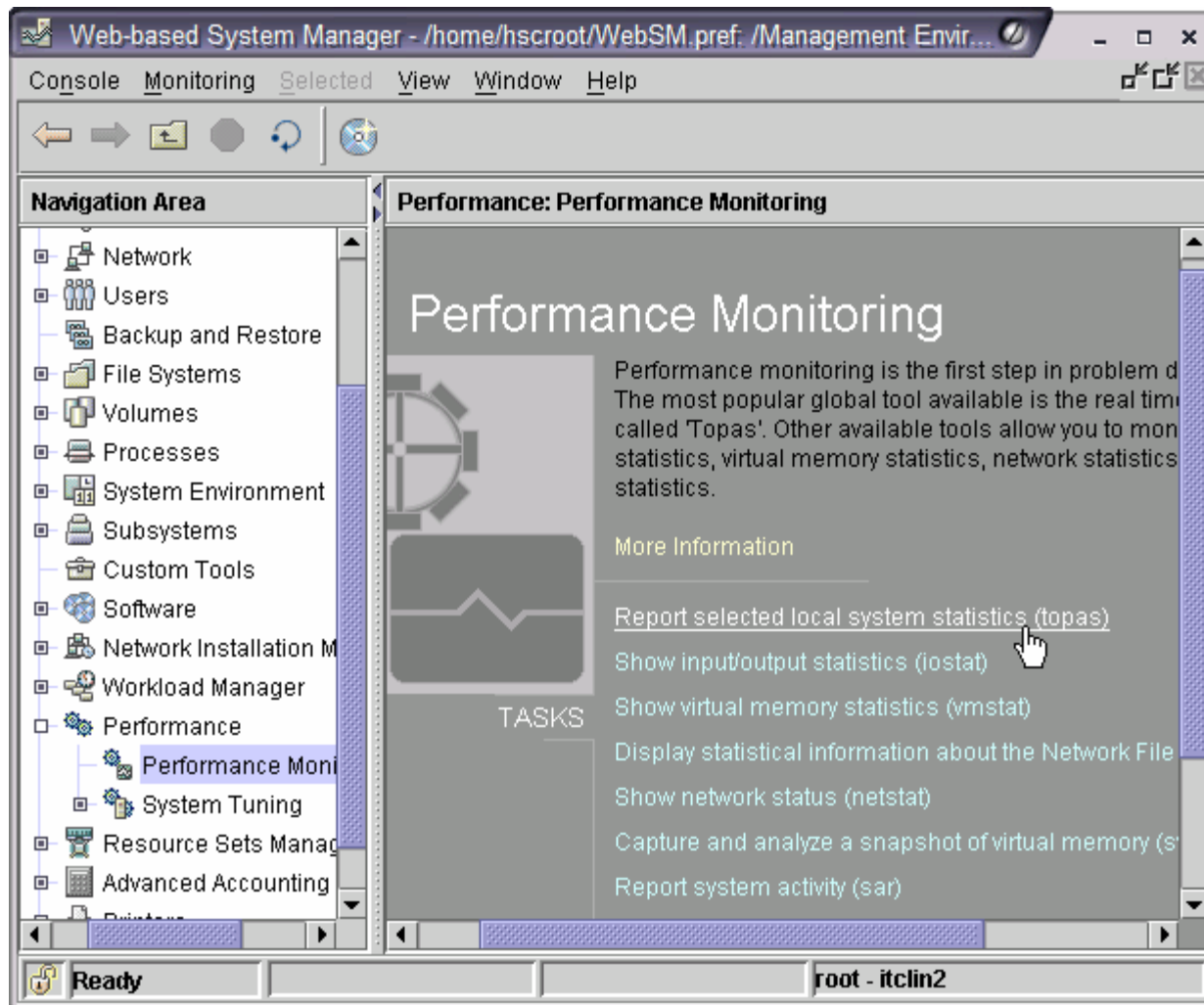
Drive Type:

Data Protection:

Drive Units:

Storage (GB):

# Performance Management: topas



❑ topas provides snapshot of system activity:

- CPU utilization
- Memory
- Processes
- Disk I/O
- Network I/O
- Paging

❑ Similar to WRKSYSSTS

❑ In WebSM: click on first “Performance Monitoring” option to invoke topas

# Performance Management: topas

**Performing task**  
Working.....

Messages:

```

Topas Monitor for host:  itclin2          EVENTS/QUEUES  FILE/TTY
Tue Sep 14 21:51:49 2004  Interval: 3    Cswitch      340  Readch      119
                               Syscall      146  Writech     119
Kernel  0.4  |#          | Reads       0  Rawin       0
User    0.1  |#          | Writes      0  Ttyout      0
Wait    0.0  |          | Forks       0  Igets       0
Idle    99.5 |#####| Execs       0  Namei       0
Phyisc = 0.01          %Entc= 1.0  Runqueue    0.0  Dirblk      0
                               Waitqueue    0.0
Network KBPS  I-Pack  O-Pack  KB-In  KB-Out
enl      1.3  40.0   3.0    3.3   0.6
Disk     Busy%  KBPS    TPS  KB-Read  KB-Writ
hdisk0   0.0   4.0    1.0   0.0    12.0
Name      PID  CPU%  PgSp  Owner
java      372752  0.0  32.3  root
topas     303110  0.0  0.9   root
syncd    172164  0.0  0.5   root
getty     622658  0.0  0.4   root
gil       127038  0.0  0.1   root
init      1    0.0  0.6   root
aixmibd  536642  0.0  0.6   root
    
```

**PAGING**

```

Faults  0  Real,MB  511
Steals  0  % Comp   55.3
PgspIn  0  % Noncomp 11.6
PgspOut 0  % Client 13.5
PageIn  0
PageOut 0  PAGING SPACE
Sios     0  Size,MB  512
                               % Used   0.9
NFS (calls/sec) % Free  99.0
ServerV2 0
ClientV2  0  Press:
ServerV3 0  "h" for help
    
```

**MEMORY**

CPU usage

Number of network packets, inbound and outbound

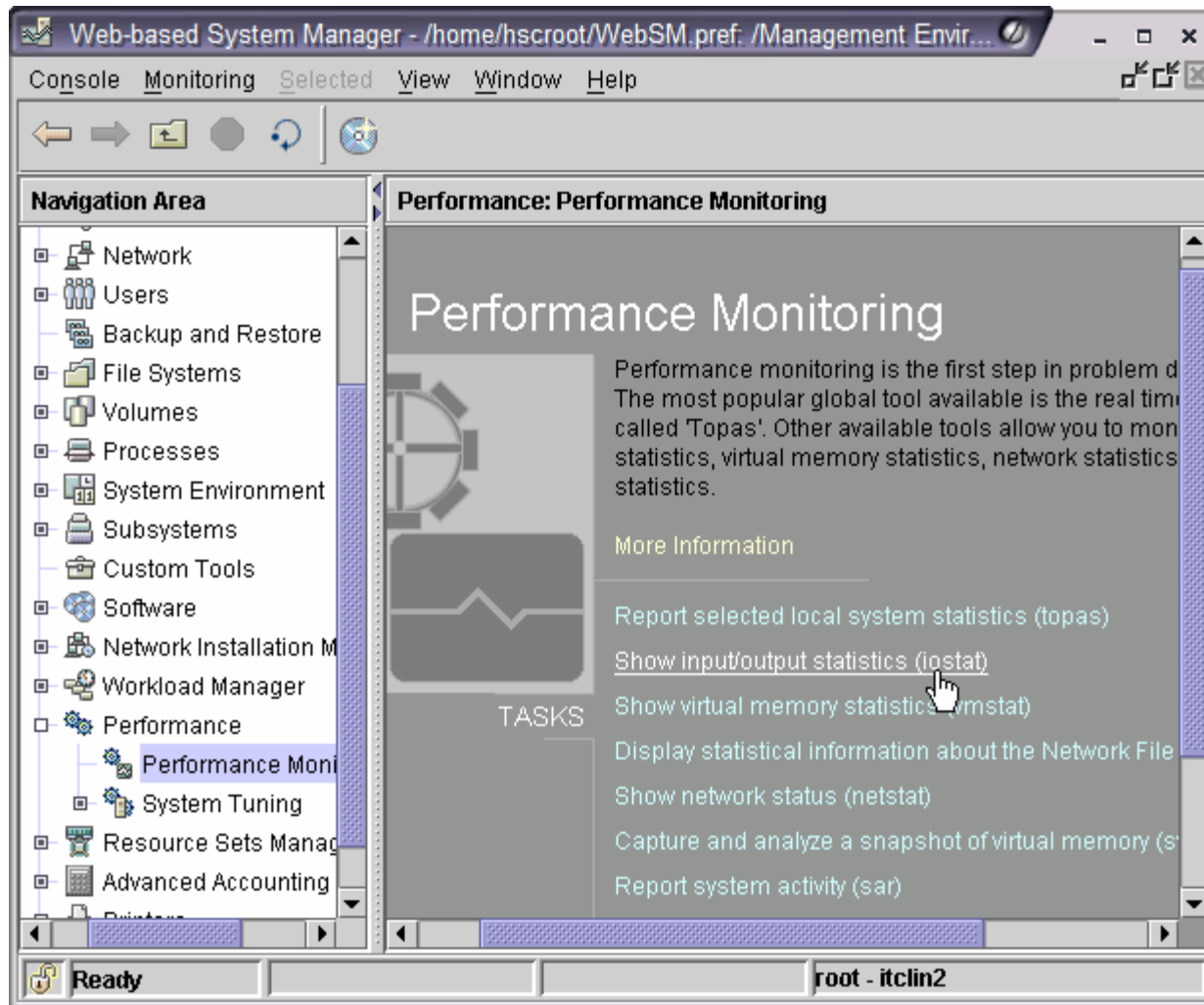
% disk busy

"High offenders" by CPU and paging space usage

Paging statistics

Memory usage for different types of tasks

# Performance Management: iostat



- ❑ iostat displays disk and CPU activity
- ❑ Most often used for disk utilization monitoring
- ❑ Click on second menu option to start it



# Performance Management: iostat

**iostat Configuration**

- Print the time-stamp next to each line of output
- Display the adapter throughput report
- Display the system throughput report
- Print path throughput for all paths
- Display only the disk utilization report  
(Note: To display the disk utilization report, verify that 'Continuously maintain DISK I/O history' in 'sys0' properties (Attributes tab) in the Devices application is set to 'true'.)
- Display only the TTY and CPU usage report

Amount of time in seconds between each report:

Number of reports generated:

Buttons: OK, Cancel, Help

---

**iostat command**

Status: Finished. Success

Messages

System configuration: 1cpu=4 drives=3

Disks:	% tm_act	Kbps	tps	Kb_read	Kb_wrtn
hdisk0	0.0	0.0	0.0	0	0
hdisk2	0.0	0.0	0.0	0	0
cd0	0.0	0.0	0.0	0	0
hdisk0	0.0	0.0	0.0	0	0
hdisk2	0.0	0.0	0.0	0	0
cd0	0.0	0.0	0.0	0	0
hdisk0	0.0	0.0	0.0	0	0
hdisk2	0.0	0.0	0.0	0	0
cd0	0.0	0.0	0.0	0	0

Buttons: Close, Stop, Help

Ignore first report; it is average of disk activity since boot

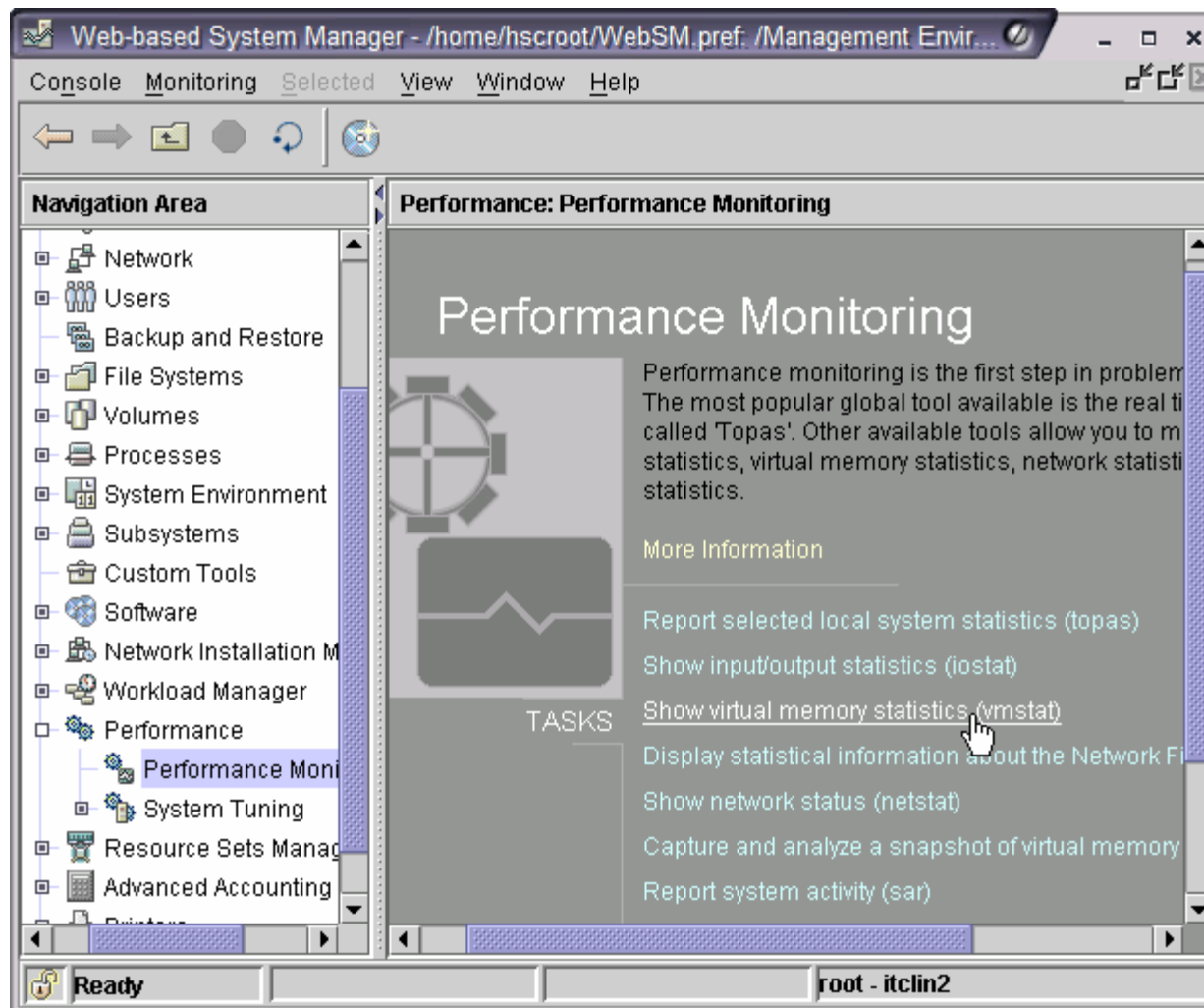
% busy

Number of logical CPUs

Transfers (r/w) per second

# Performance Management: vmstat

- ❑ To display memory utilization, use vmstat



# Performance Management: vmstat

Number of active (used) pages

Number of free pages

vmstat command

Status: Finished. Success

Messages

System configuration: lcpu=4 mem=512MB ent=858993459

kthr		memory		page				faults				cpu						
r	b	avm	fre	re	pi	po	fr	sr	cy	in	sy	cs	us	sy	id	wa	pc	ec
0	0	69046	44650	0	0	0	0	0	0	8	401	363	1	1	98	0	0.02	3.4
0	0	69048	44648	0	0	0	0	0	0	5	116	343	0	0	99	0	0.01	0.8
0	0	69048	44648	0	0	0	0	0	0	7	124	363	0	0	99	0	0.01	0.9
0	0	69048	44648	0	0	0	0	0	0	4	112	329	0	1	99	0	0.01	1.4
0	0	69048	44648	0	0	0	0	0	0	6	123	342	0	0	99	0	0.01	0.8

Find:  Find Next

Close Stop Help

vmstat Configuration

Report the number of forks since system startup

Display the number of interrupts taken by each device since system ...

Display I/O oriented view

Display the absolute count of paging events since system initialization

Display Virtual Memory Manager statistics

Amount of time in seconds between each report:

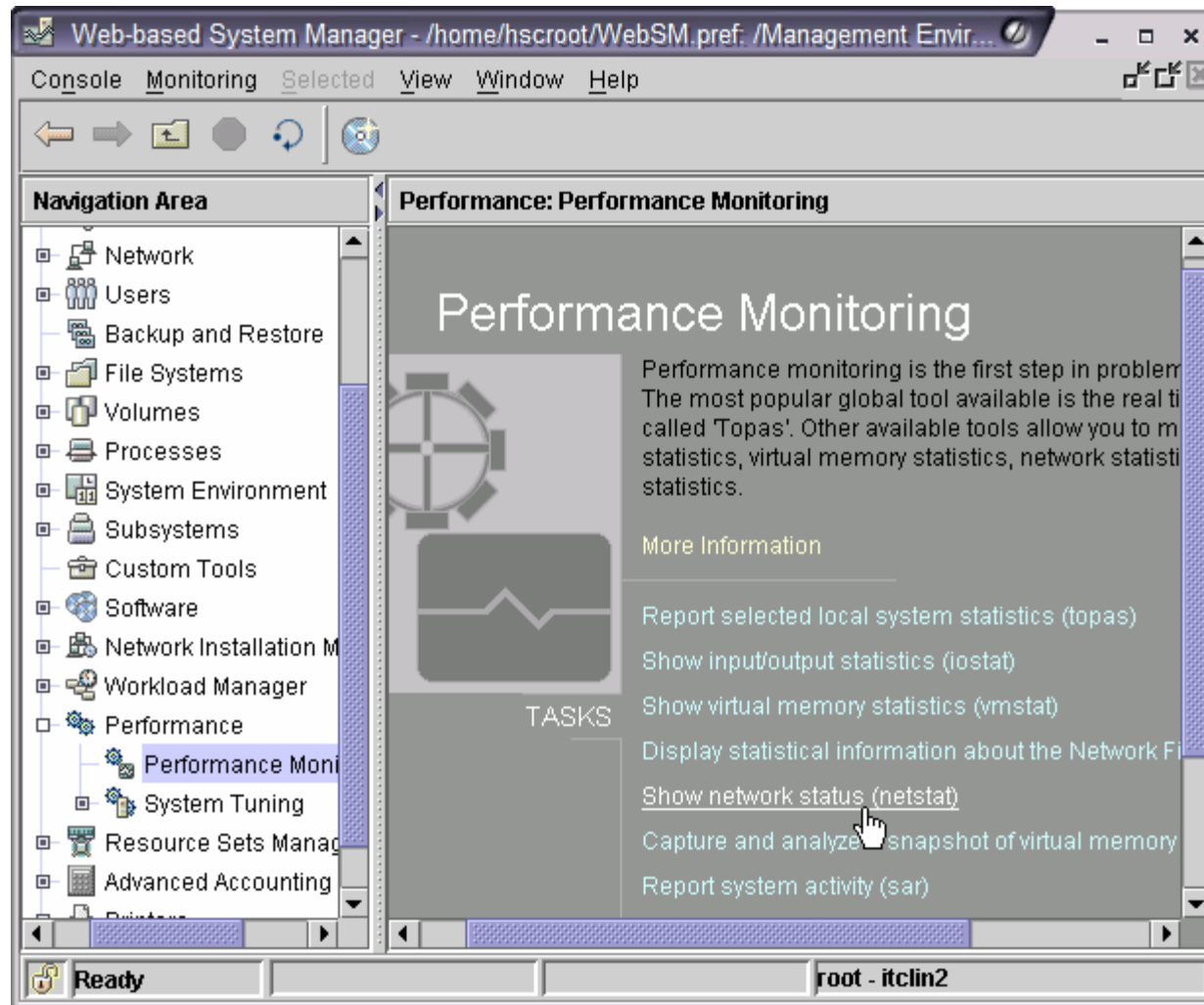
Number of reports generated:

OK Cancel Help

- ❑ Portion of real memory utilized for file system caching
- ❑ Therefore, low number of free pages is usually not cause for alarm



# Performance Management: netstat



□ To network information, use netstat

# Performance Management: netstat

**netstat Configuration**

Display **Clear Statistics**

Information displayed

- Routing tables
- Routing tables (including user-configured and current costs of each route)
- Active domain sockets
- Memory management routines statistics
- Protocol statistics
- Non-zero protocol statistics
- CDLI-based communications adapters statistics
- State of configured interfaces
- Packet counts throughout the communication path
- Network buffer cache statistics
- Data Link Provider Interface statistics

Options

- Show network addresses as numbers
- Show address of protocol control blocks
- Show states of all socket

Limit reports of statistics to address family:

Show statistics about protocol:

**OK**

---

**netstat command**

**Status:** Finished. Success **Hide Details**

Messages  Commands

**Messages:**

```

Routing tables
Destination      Gateway          Flags  Refs  Use
-----
Route Tree for Protocol Family 2 (Internet):
9.5.23.0         9.5.23.1        UG     4     24
9.5.23.0         itclin2.rchland.i UHSb   0     0
9.5.23.0         itclin2.rchland.i U       2     11
9.5.23.0         calhost         UGHS   7     1
    
```

**Find Next**

---

**netstat command**

**Status:** Finished. Success **Hide Details**

Messages  Commands

**Messages:**

Name	Mtu	Network	Ipkts	Ierrs
en1	1500	0.9.6b.6e.2.b0	70331	0
en1	1500	9.5.23	70331	0
en2	1500	link#3	0	0
en2	1500	0	0	0

**Find:**  **Find Next**

**Close** **Stop** **Help**

# Performance Management: lparstat

```

itclin2.rchland.ibm.com - PuTTY
# lparstat -i
Node Name                : itclin2
Partition Name           : AIX3
Partition Number         : 5
Type                     : Shared-SMT
Mode                     : Uncapped
Entitled Capacity        : 0.60
Partition Group-ID       : 32773
Shared Pool ID           : 0
Online Virtual CPUs      : 2
Maximum Virtual CPUs     : 10
Minimum Virtual CPUs     : 1
Online Memory            : 512 MB
Maximum Memory           : 768 MB
Minimum Memory           : 256 MB
Variable Capacity Weight : 128
Minimum Capacity         : 0.20
Maximum Capacity         : 2.00
Capacity Increment       : 0.01
Maximum Dispatch Latency : 13999999
Maximum Physical CPUs in system : 2
Active Physical CPUs in system : 2
Active CPUs in Pool      : -
Unallocated Capacity     : 0.00
Physical CPU Percentage   : 30.00%
Unallocated Weight       : 0
# █

```

❑ lparstat displays logical partitioning and system resource allocation information:

- Partition name and ID
- Capped vs. uncapped
- Shared processor units
- Number of virtual CPUs
- Memory settings
- Number of physical CPUs in system

## AIX 5L Performance Toolbox (PTX)

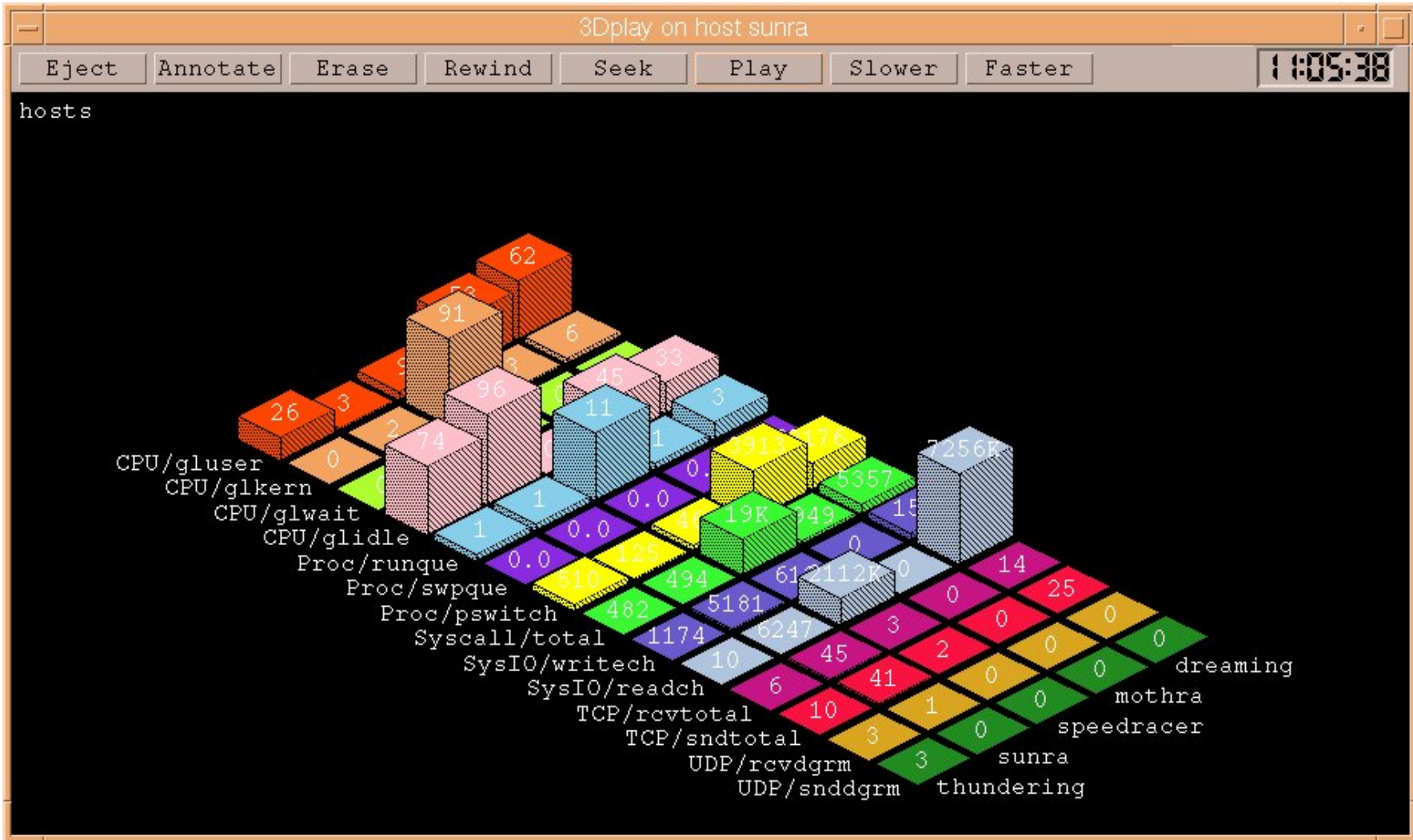
### □ What is it?

- Separate LPP
- Comprehensive GUI system monitoring tool
- More information at [http://www-1.ibm.com/servers/aix/products/ibmsw/system\\_man/perftoolbox.html](http://www-1.ibm.com/servers/aix/products/ibmsw/system_man/perftoolbox.html)

### □ What can it do?

- Provides a quick and simple solution for obtaining and analyzing detailed system information
- Generates reports on system activity over hours, days or weeks
- 24 x 7 analysis of large performance datasets
- Supports distributed performance monitoring
- Provides the ability to customize views for monitoring
- Provides access to thousands of system metrics

# AIX 5L Performance Toolbox (PTX)



PTX example: 3dmon



# AIX 5L Performance Toolbox (PTX)

**File Data Source Reports Options Help**

**Jtopas Info**

Host Name:  2 sec Refresh

P3- Thu 1:10:10 PM: Data received Current Time : Thu 1:10:31 PM

**Main Processes Memory CPU Storage Network WLM Sys Config User**

**TOP 10 CPU**

CPU	Kernel	User	Wait	Idle
CPU Data	15.0	16.0	17.0	18.0
CPU Data	15.0	16.0	17.0	18.0
CPU Data	15.0	16.0	17.0	18.0

**TOP 10 NETWORK**

Network	KBPS	I-Pack	O-Pack	KB-In	KB-Out
NET Data	15.0	16.0	17.0	18.0	1
NET Data	15.0	16.0	17.0	18.0	1
NET Data	15.0	16.0	17.0	18.0	1

**TOP 10 DISK**

Disk	% Busy	KBPS	TPS	Blks-R...	Blk-Wr...
DISK Data0	14	14	14	14	2
DISK Data1	14	14	14	14	2
DISK Data2	14	14	14	14	2

**TOP 10 WLM Classes**

WLM-Class	% CPU	% Mem	% Disk-I/O
WLM Data	19	19	19
WLM Data	19	19	19
WLM Data	19	19	19

**TOP 10 Processes**

Command	PID	%CPU	PgSp	Class
PID Data	14	0.0	14.0	No Data
PID Data	15	0.0	15.0	No Data
PID Data	16	0.0	16.0	No Data

**File/TTY**

Readch	14
Writch	15
Rawin	16
TTYout	17
Igets	18
Namei	19
Dirblk	20

**Paging**

Faults	23
Steals	23
PgspIn	23
PgspOut	23
PageIn	23
PageOut	23
Sios	23

**Memory**

Real (MB)	0
% Comp	15.0
% NonComp	16.0
% Client	17.0

**Paging Space**

Size (MB)	14
% Used	14.0
% Free	19.0

**NFS**

ServerV2	18
ClientV2	18
ServerV3	18
ClientV3	18

**Sys Events**

Cswitch	26
Syscall	26
Reads	26
Writes	26
Forks	26
Execs	26
Runqueue	26
Waitqueue	26

**Global CPU**

%User	0.0
%Kernel	0.0
%Idle	0.0
%Wait	0.0
None	0

PTX example: jtopas

## Additional Resources

### ■ **The Campus for more education:**

- **Technical Course: “Implementing AIX 5L on eServer i5”**  
[http://www-306.ibm.com/services/learning/ites.wss/us/en?pageType=course\\_search&sortBy=5&searchType=1&sortDirection=9&includeNotScheduled=15&rowStart=0&rowsToReturn=20&maxSearchResults=200&searchString=as570](http://www-306.ibm.com/services/learning/ites.wss/us/en?pageType=course_search&sortBy=5&searchType=1&sortDirection=9&includeNotScheduled=15&rowStart=0&rowsToReturn=20&maxSearchResults=200&searchString=as570)
- **BPs:** <http://www.ibm.com/partnerworld/sales/systems/education>
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