

Virtualization

What is a partition ?

- The allocation of one system's resources to create logically separate systems.
- Isolation is implemented with firmware.

Partition Characteristics

- Each partition has its own :
 - Operating systems
 - Console
 - Resources
 - Other things expected in stand-alone operating system. (Logs, data etc)

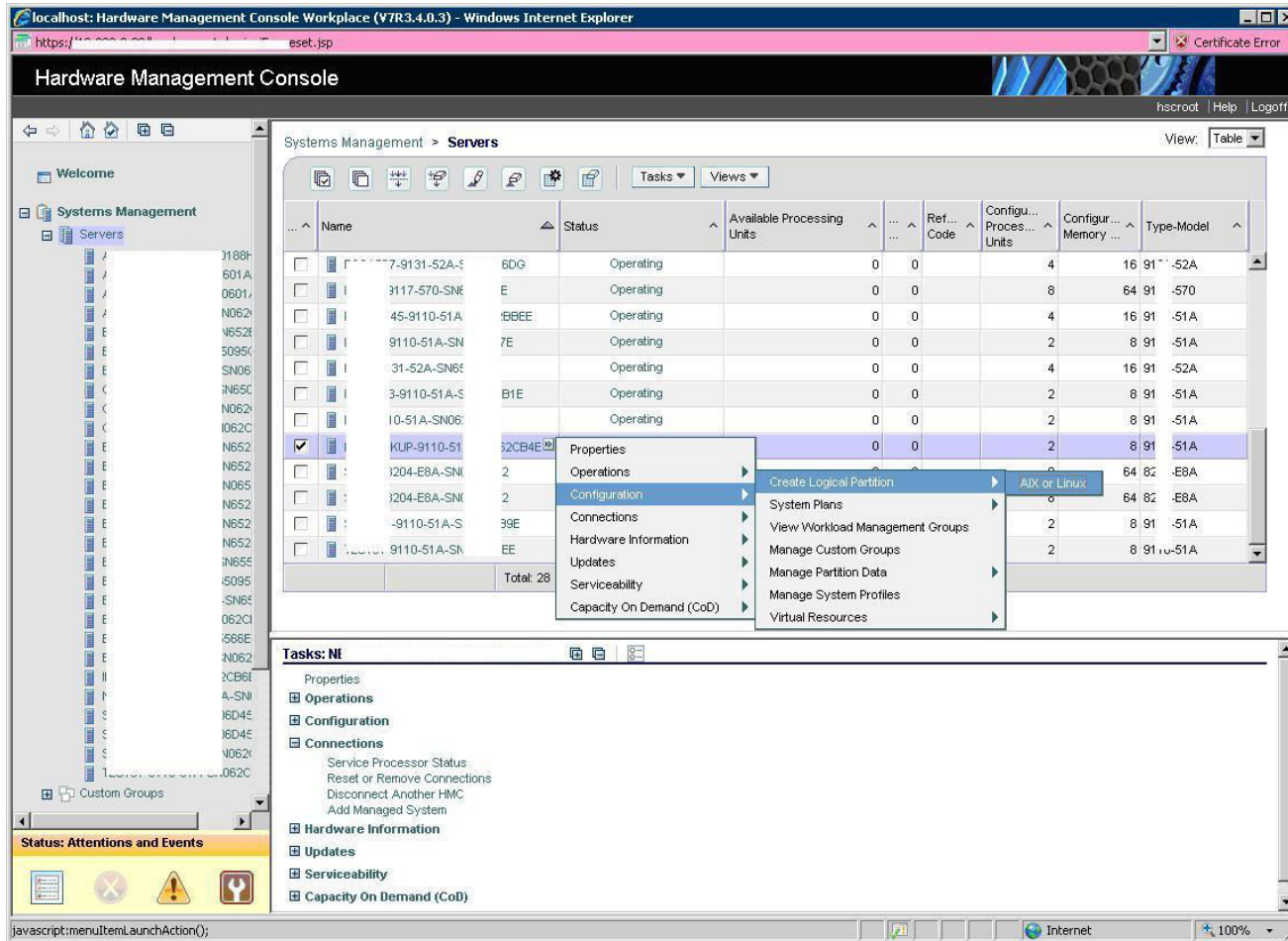
Benefits of using partitions

- Capacity Management .
 - Flexibility to allocate resources.
- Consolidation
 - Consolidate hardware ,floor space etc.
- Application isolation on a single frame.
 - Separate work loads.
- Merge production and test environments.

Power Hypervisor functions

- The power hypervisor is firmware that provides:
 - Virtual memory management.
 - Virtual console support.
 - Security and isolation b/w partitions.
 - Shared processor pool management.

Creating a partition



Provide a unique partition ID and name

The screenshot shows a web-based wizard titled "Create Lpar Wizard : NETBACKUP-9110-51A-SN062CB4E - Windows Internet...". The address bar shows the URL "https://10.200.2.83/hmc/content?taskId=1998&refresh=2327" and a "Certificate Error" icon. The wizard has a sidebar with the following steps: "Create Partition" (selected), "Partition Profile", "Processors", "Processing Settings", "Memory Settings", "I/O", "Virtual Adapters", "Optional Settings", and "Profile Summary".

Create Partition

This wizard helps you create a new logical partition and a default profile for it. You can use the partition properties or profile properties to make changes after you complete this wizard.

To create a partition, complete the following information:

System name : NETBACKUP-9110-51A-SN062CB4E

Partition ID :

Partition name :

At the bottom, there are five buttons: "< Back", "Next >", "Finish", "Cancel", and "Help".

The status bar at the bottom shows "Done", "Internet", and "100%" zoom.

- Give a profile name

Create Lpar Wizard : NETBACKUP-9110-51A-SN062CB4E - Windows Internet...

https://10.200.2.83/hmc/wcl/T52a95

Certificate Error

Create Lpar Wizard :

✓ Create Partition
→ Partition Profile
Processors
Processing Settings
Memory Settings
I/O
Virtual Adapters
Optional Settings
Profile Summary

Partition Profile

A profile specifies how many processors, how much memory, and which I/O devices and slots are to be allocated to the partition.

Every partition needs a default profile. To create the default profile, specify the following information :

System name: NETBACKUP-9110-51A-SN062CB4E

Partition name: test-lpar

Partition ID: 2

Profile name: test-lpar

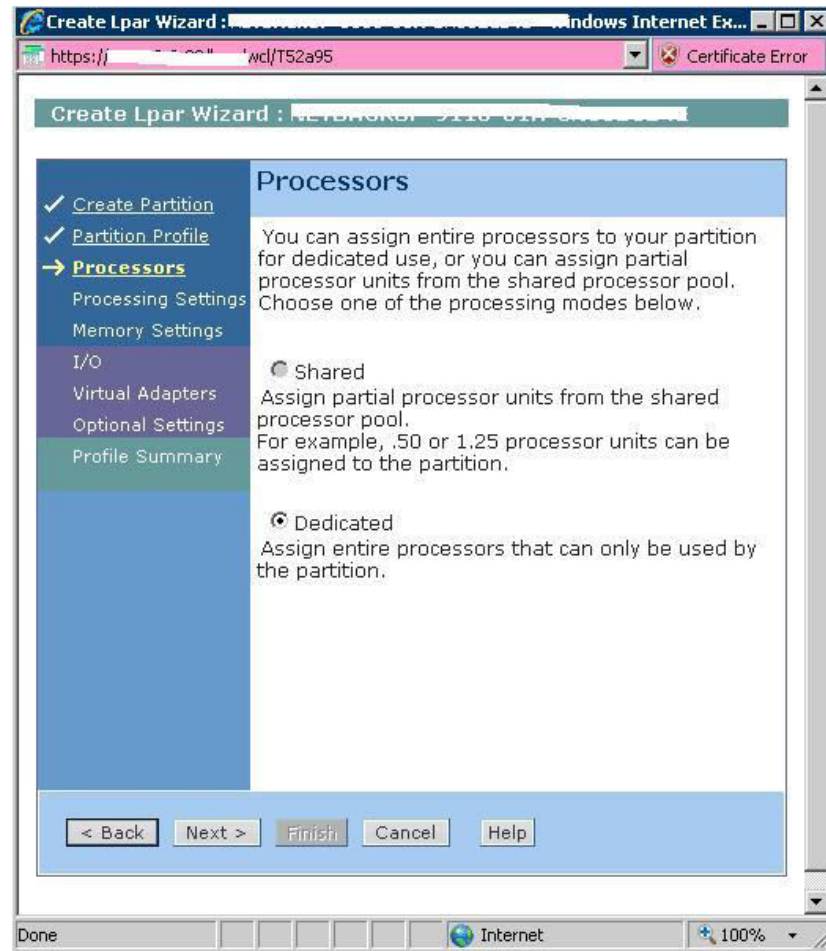
This profile can assign specific resources to the partition or all resources to the partition. Click Next if you want to specify the resources used in the partition. Select the option below and then click Next if you want the partition to have all the resources in the system.

☐ Use all the resources in the system.

< Back Next > Finish Cancel Help

Done Internet 100%

Select the type of the processors



Dedicated processors

- Allocated as a whole processors to a specific partition.
- Same physical processors are used for that partition while it is running.
 - when partition is stopped ,dedicated processors may or may not go to shared pool.
 - when partition is active ,POWER 6 and POWER 7 systems allow a dedicated processor LPAR to donate its idle cycle to the shared processor pool.
- Processor affinity is utilized for best performance .
 - Note : Processor affinity : the system firmware attempts to use processors and memory that are close to each other when allocating hardware .

Select the processor values

The screenshot shows a web browser window titled 'Create Lpar Wizard : NETBACKUP-0110-51A-6W'. The address bar shows 'https://10.2...hmc/wd/T52a95' with a 'Certificate Error' warning. The main content area is titled 'Create Lpar Wizard :'. On the left, a navigation pane lists steps: 'Create Partition', 'Partition Profile', 'Processors', 'Processing Settings' (selected with a yellow arrow), 'Memory Settings', 'I/O', 'Virtual Adapters', 'Optional Settings', and 'Profile Summary'. The main panel is titled 'Processing Settings' and contains the text: 'Specify the desired, minimum, and maximum processing settings in the fields below.' Below this, there are three input fields: 'Total number of processors : 2', 'Minimum processors: * 1', 'Desired processors: * 1', and 'Maximum processors: * 1'. At the bottom, there are buttons for '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'. The browser's status bar at the bottom shows 'Internet' and '100%' zoom.

Create Lpar Wizard : NETBACKUP-0110-51A-6W

https://10.2...hmc/wd/T52a95 Certificate Error

Create Lpar Wizard :

✓ Create Partition
✓ Partition Profile
✓ Processors
→ Processing Settings
Memory Settings
I/O
Virtual Adapters
Optional Settings
Profile Summary

Processing Settings

Specify the desired, minimum, and maximum processing settings in the fields below.

Total number of processors : 2

Minimum processors: * 1

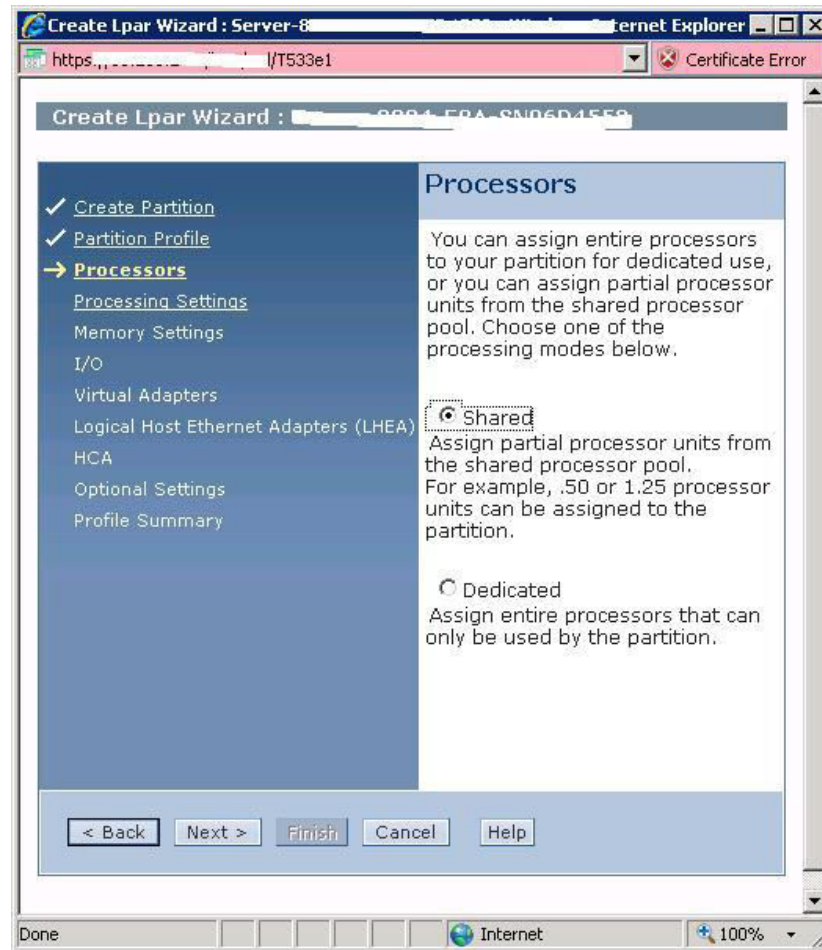
Desired processors: * 1

Maximum processors: * 1

< Back Next > Finish Cancel Help

Internet 100%

If select as Shared



Processor settings

Create Lpar Wizard : Server

Processing Settings

Specify the desired, minimum, and maximum processing settings in the fields below.

Total usable processing units: 8.00

Minimum processing units: 0.1

Desired processing units: 0.1

Maximum processing units: 0.1

Shared processor pool: DefaultPool (0)

Virtual processors

Minimum processing units required for each virtual processor: 0.10

Minimum virtual processors: 1

Desired virtual processors: 1

Maximum virtual processors: 1

☐ Uncapped

Weight: 128.0

Shared processors

- Processors capacity assigned in processing units from the shared processing pool:
 - minimum /partition is 0.1 processing unit.
 - Addition capacity is allocated in 0.01 processing units.
- A partition guaranteed amount is its entitled capacity .
- Advantages : Configuration flexibility .
- Excess capacity can be used by other partition

Capped partition

- Partitions with shared processors are either capped or uncapped.
- Capped : limited to the entitled capacity.

Uncapped partition

- Uncapped : If a partition needs extra CPU cycle (more than entitled capacity) ,it can utilize unused capacity in the shared pool.
- Uncapped weight value : this value scale is 0 to 255, default is 128, higher value assigns more priority .

Virtual processors

- Virtual processors are used to tell the operating system how many physical processors it think it has .
- By default, for each 1.00 of a processor ,or part there of a virtual processor will be allocated.
- Up to 10 virtual processors can be assigned per processing unit.
- Both entitled capacity and number of virtual processors can be changed dynamically for tuning.

Virtual processors :what to do ?

- How many virtual processors should be used ?
 - For uncapped partition ,increase the number of virtual processors to the number of processors in the shared pool if enough entitlement to support .
 - For capped partition ,start with minimum and monitor ?
- If the virtual processor number is too low or too high performance might affect ?
 - Too low : Uncapped partition will not be able to take advantage of excess cycle .
 - Too high : Might cause excessive processor context switching .

Verify the processors

```
$ lparstat -i
Node Name                : reprd
Partition Name           : R/3 DB+CI
Partition Number         : 1
Type                     : Shared-SMT
Mode                     : Uncapped
Entitled Capacity        : 1.70
Partition Group-ID       : 32769
Shared Pool ID           : 0
Online Virtual CPUs      : 2
Maximum Virtual CPUs     : 8
Minimum Virtual CPUs     : 1
Online Memory            : 16384 MB
Maximum Memory           : 24576 MB
Minimum Memory           : 8192 MB
Variable Capacity Weight : 128
Minimum Capacity         : 0.10
Maximum Capacity         : 8.00
Capacity Increment       : 0.01
Maximum Physical CPUs in system : 16
Active Physical CPUs in system : 8
Active CPUs in Pool      : 8
Shared Physical CPUs in system : 8
Maximum Capacity of Pool : 800
Entitled Capacity of Pool : 800
Unallocated Capacity     : 0.00
Physical CPU Percentage  : 85.00%
Unallocated Weight       : 0
Memory Mode              : Dedicated
Total I/O Memory Entitlement : -
Variable Memory Capacity Weight : -
Memory Pool ID           : -
Physical Memory in the Pool : -
Hypervisor Page Size     : -
Unallocated Variable Memory Capacity Weight : -
Unallocated I/O Memory entitlement : -
Memory Group ID of LPAR : -
Desired Virtual CPUs     : 2
Desired Memory           : 16384 MB
Desired Variable Capacity Weight : 128
Desired Capacity         : 1.70
Target Memory Expansion Factor : -
Target Memory Expansion Size : -
Power Saving Mode        : -
$
```

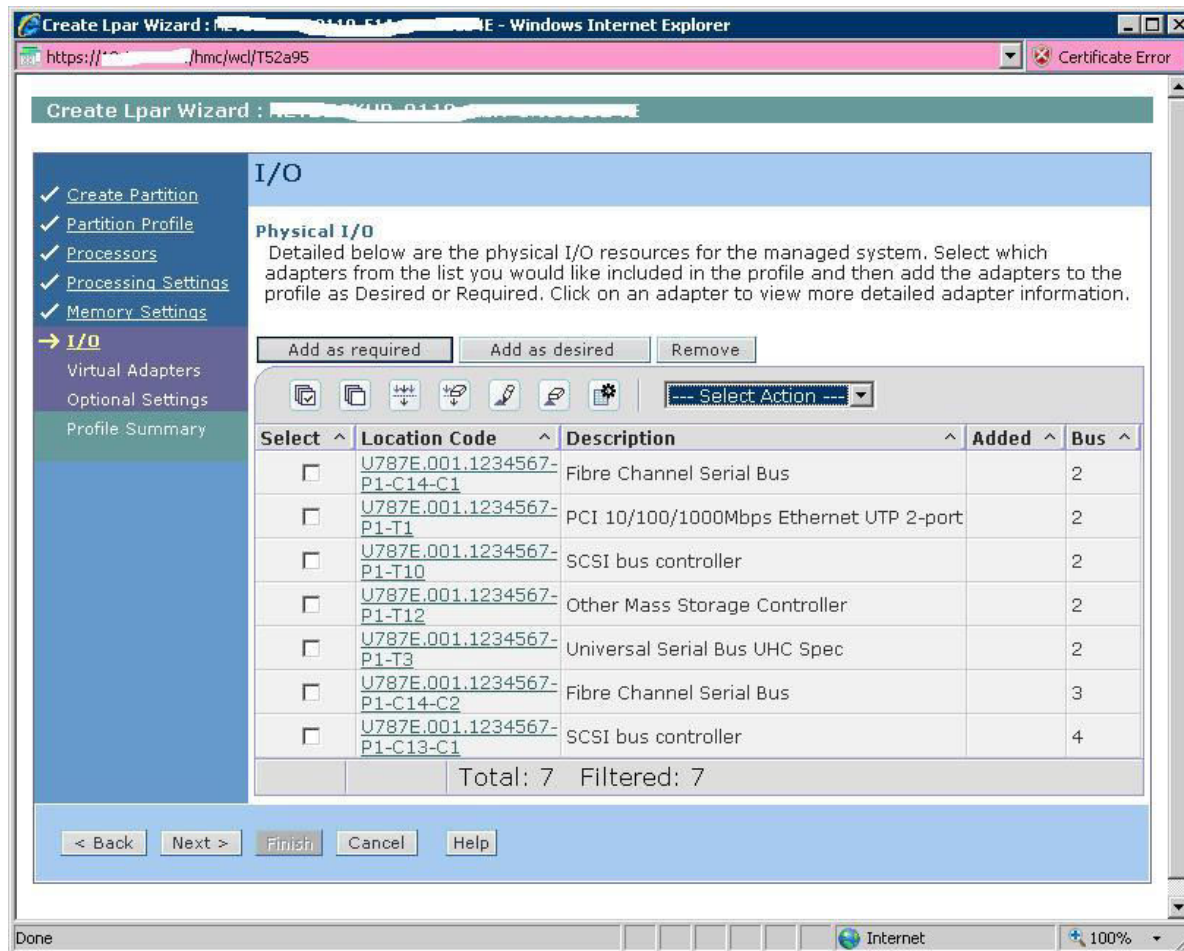
Select memory

The screenshot shows the 'Create Lpar Wizard' window, which is a web-based interface for configuring LPARs. The window is titled 'Create Lpar Wizard : [redacted]'. The address bar shows 'https://[redacted]/wcl/T52a95'. A 'Certificate Error' icon is visible in the address bar. The main content area is titled 'Memory Settings'. On the left, there is a sidebar with the following options: 'Create Partition', 'Partition Profile', 'Processors', 'Processing Settings', 'Memory Settings' (selected), 'I/O', 'Virtual Adapters', 'Optional Settings', and 'Profile Summary'. The 'Memory Settings' section displays the following information:

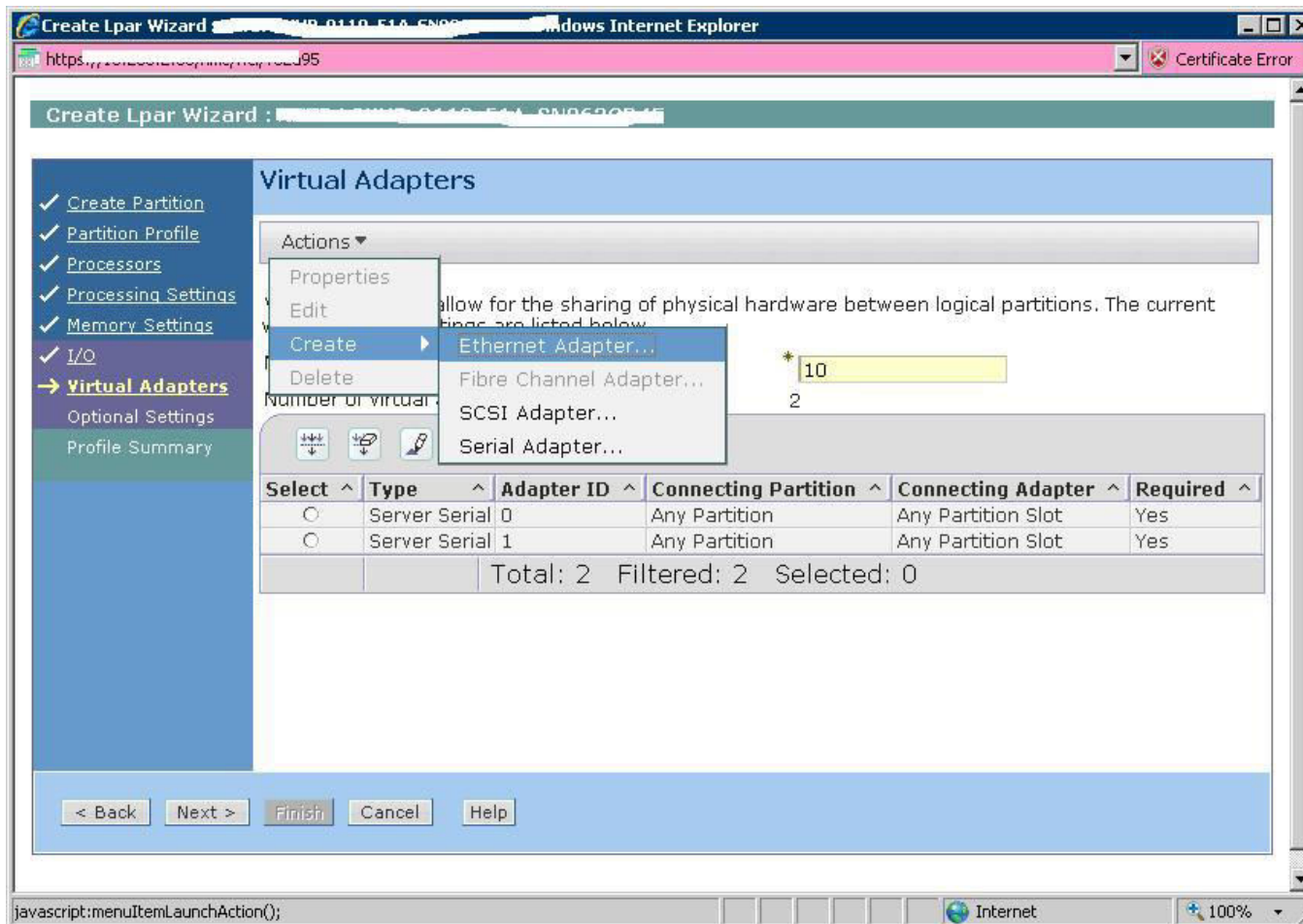
Physical Memory	
Installed memory	8192
Current memory available for Partition usage (MB)	7936
Minimum Memory	0 GB 128 MB
Desired memory	0 GB 128 MB
Maximum memory	0 GB 128 MB

At the bottom of the window, there is a navigation bar with the following buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'. The status bar at the bottom of the browser window shows 'Internet' and '100%' zoom.

Add the IO devices



Add the virtual adapters



Integrated Virtual Ethernet

https://9.3.5.128 - Create Lpar Wizard : Server-9117-MMA-SN100F6A0 - Microsoft Internet Explorer

Create Lpar Wizard : Server-9117-MMA-SN100F6A0

☒ Create Partition
☒ Partition Profile
☒ Processors
☒ Processing Settings
☒ Memory
☒ Physical I/O
☒ Virtual Adapters
→ **Logical Host Ethernet Adapters (LHEA)**
☐ Optional Settings
☐ Profile
☐ Summary

Logical Host Ethernet Adapters (LHEA)

Choose an HEA to define an LHEA for
U789D.001.DQDWWHY-P1

To configure a Logical Host Ethernet Adapter (LHEA) for this partition profile, select an HEA physical port in the table below then click Configure to enter the appropriate information. Select Reset to undo this.

Select	Physical Port Location Codes	Physical Port ID	Port Group	Logical Port IDs	Allowed VLAN IDs
<input checked="" type="radio"/>	U789D.001.DQDWWHY-P1 - C10-T2	0	1		
<input type="radio"/>	U789D.001.DQDWWHY-P1 - C10-T1	0	2		

LHEA Capability Base Minimum

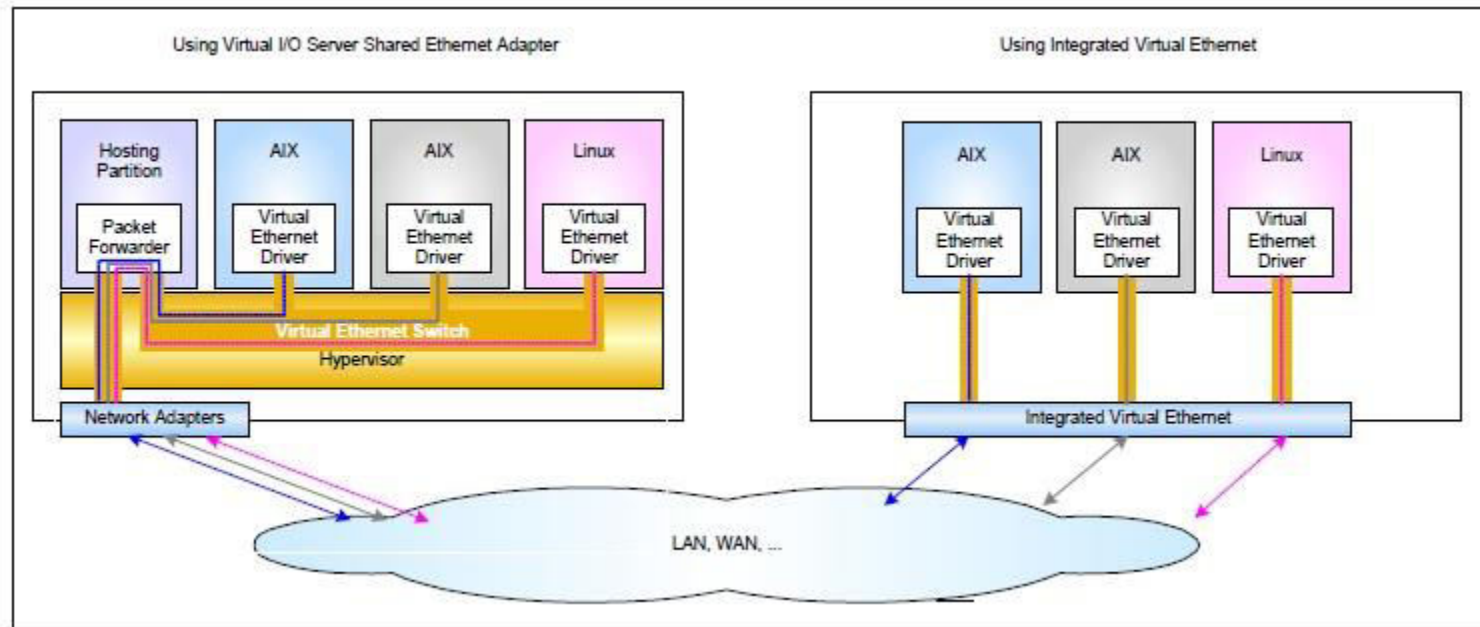
Reset Configure...

< Back Next > Finish Cancel Help

IVE features

- The IVE is an integrated physical adapter with two to four physical ports shared by partition.
 - It allows up to 32 partitions to share an ethernet adapter to directly connect to an external network.
- POWER 6 & 7 processor based servers contain an IVE .
 - There are three different models with 2 or 4 physical ports and 1GB or 10 GB.
- IVE ports as AIX devices .
 - THE IVE is presented logically to partitions as an LHEA.
 - The logical port appears as an ent# .

Difference b/w SEA with VIO and IVE



IVE physical view

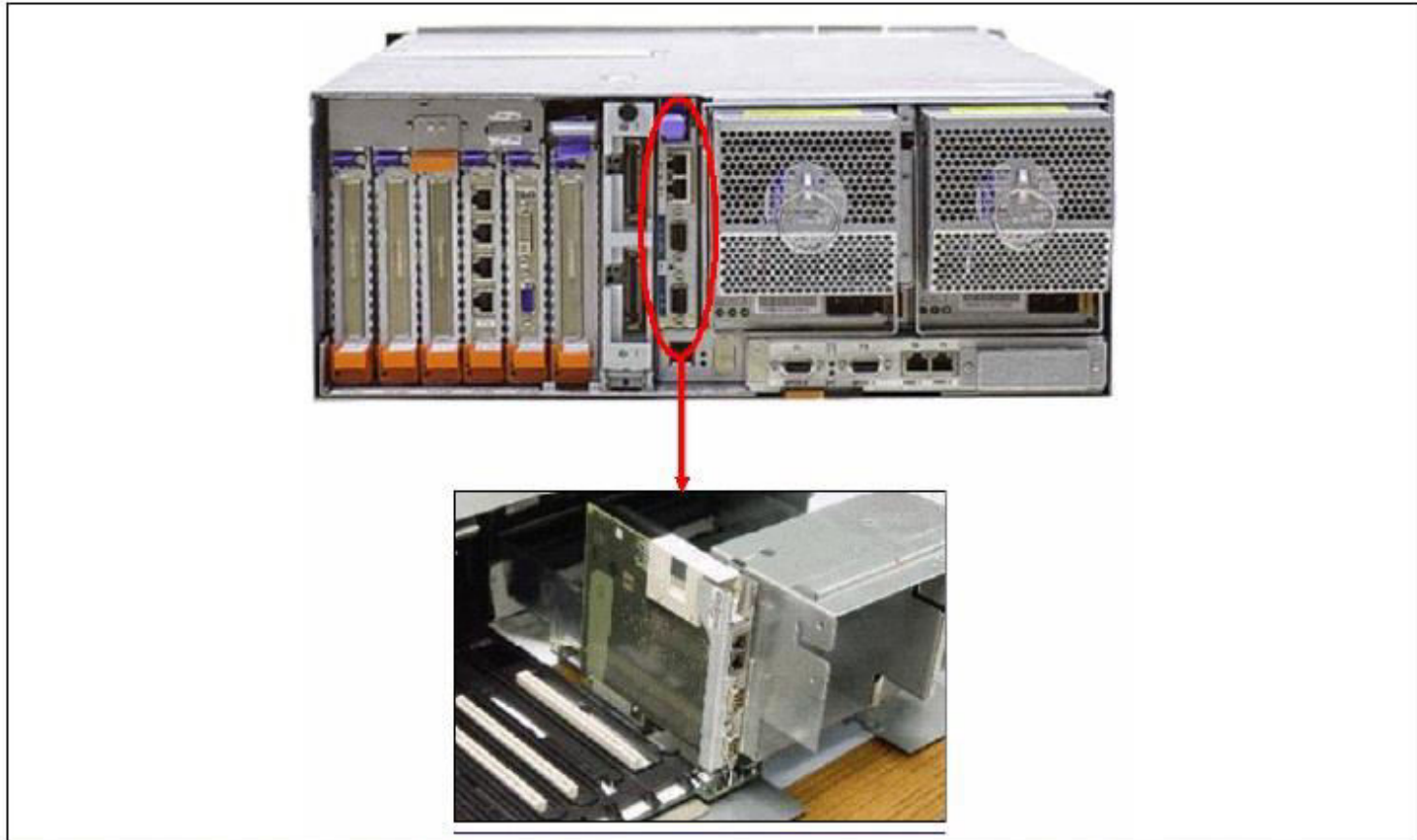


Figure 1-4 Integrated Virtual Ethernet adapter connection on System p 570 I/O system board

Different types of IVE adapters

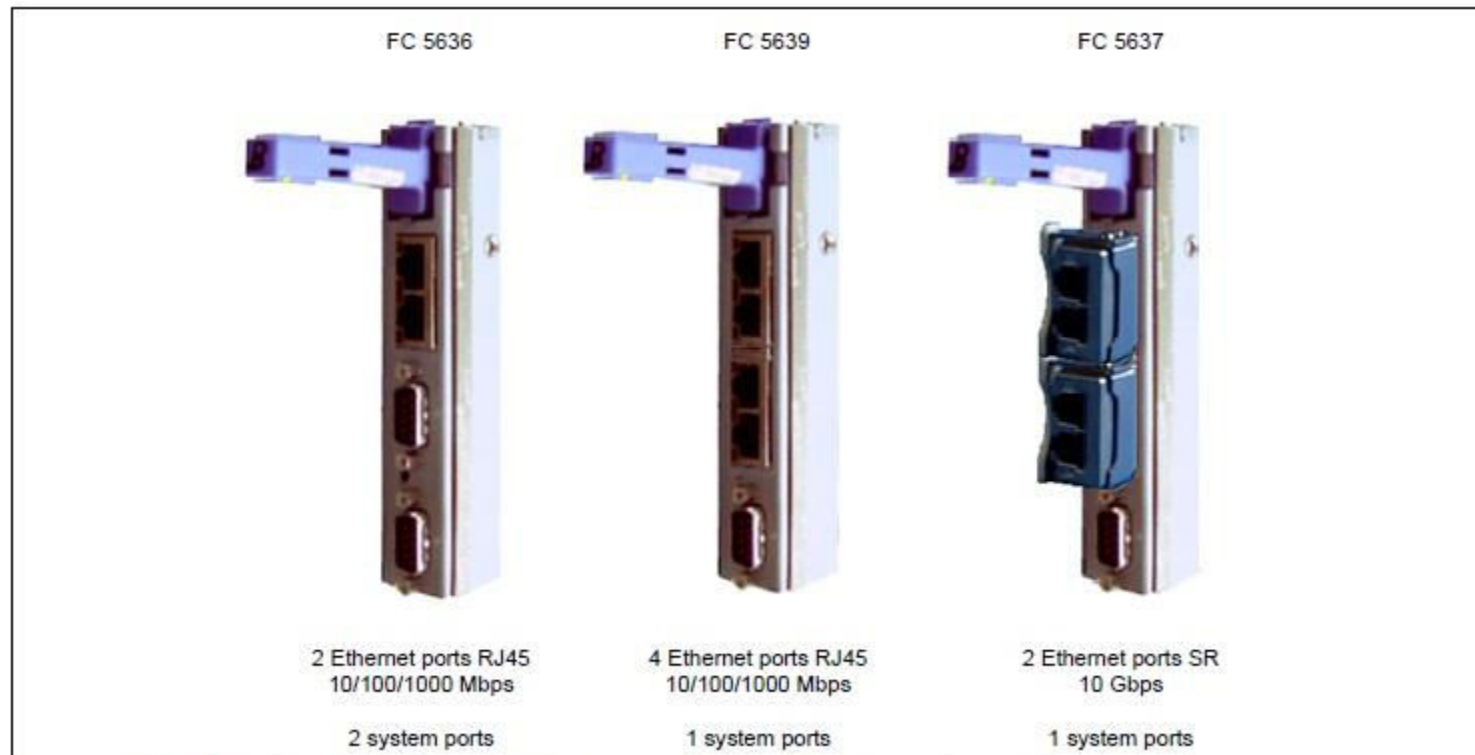


Figure 1-5 IVE physical port connectors according to IVE feature codes

Port groups on Different Adap

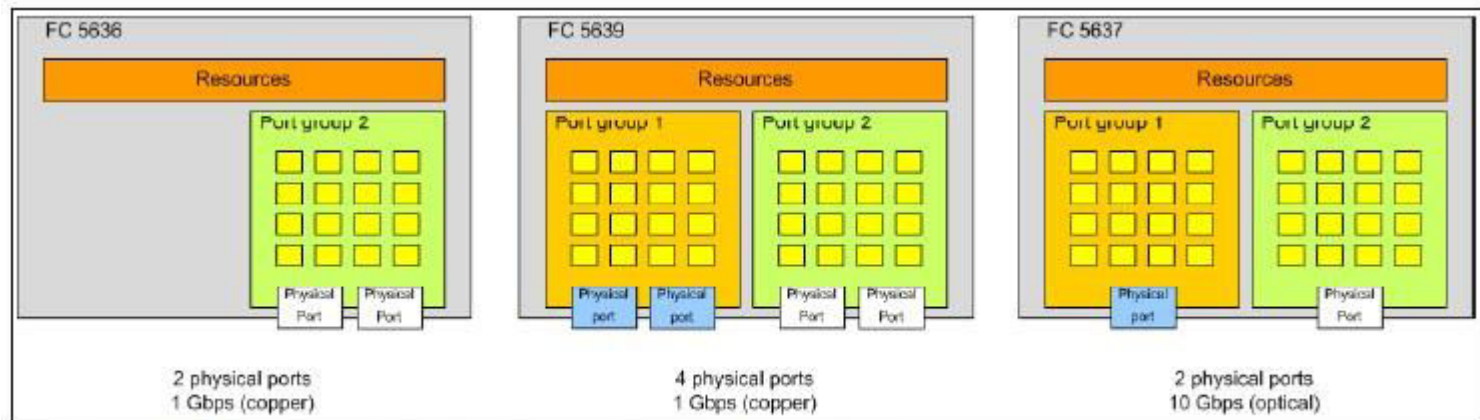


Figure 2-7 Port group option according to IVE feature code

IVE configuration overview

- IVE logical ports are configured for a partition during creation of the partition ,in its profile or by using the DLPAR operation.
- A partition can use only one logical port per physical port .

Select the port

https://9.3.5.128 - Create Lpar Wizard : Server-9117-MMA-SN100F6A0 - Microsoft Internet Explorer

Create Lpar Wizard : Server-9117-MMA-SN100F6A0

✓ Create Partition
✓ Partition Profile
✓ Processors
✓ Processing Settings
✓ Memory
✓ Physical I/O
✓ Virtual Adapters
→ **Ethernet Adapters (LHEA)**
Optional Settings
Profile Summary

Logical Host Ethernet Adapters (LHEA)

Choose an HEA to define an LHEA for
U789D.001.DQDWWHY-P1

To configure a Logical Host Ethernet Adapter (LHEA) for this partition profile, select an HEA physical port in the table below then click Configure to enter the appropriate information. Select Reset to undo this.

Select	Physical Port Location Codes	Physical Port ID	Port Group	Logical Port IDs	Allowed VLAN IDs
<input checked="" type="radio"/>	U789D.001.DQDWWHY-P1 - C10-T2 0	1			
<input type="radio"/>	U789D.001.DQDWWHY-P1 - C10-T1 0	2			

LHEA Capability Base Minimum

Reset Configure...

< Back Next > Finish Cancel Help

Select the logical port

Logical Host Ethernet Adapter (LHEA) Configuration

Logical Port configuration
Use the fields below to specify Logical Ports and allowed VLAN IDs for physical port 0

Choose Logical Ports

Select	Logical Port ID	Owning Logical Partition	State
<input type="radio"/>	1		available
<input checked="" type="radio"/>	2		available
<input type="radio"/>	3		available
<input type="radio"/>	4		available
<input type="radio"/>	5		available
<input type="radio"/>	6		available
<input type="radio"/>	7		available
<input type="radio"/>	8		available
<input type="radio"/>	9		available
<input type="radio"/>	10		available
<input type="radio"/>	11		available
<input type="radio"/>	12		available
<input type="radio"/>	13		available
<input type="radio"/>	14		available
<input type="radio"/>	15		available
<input type="radio"/>	16		available

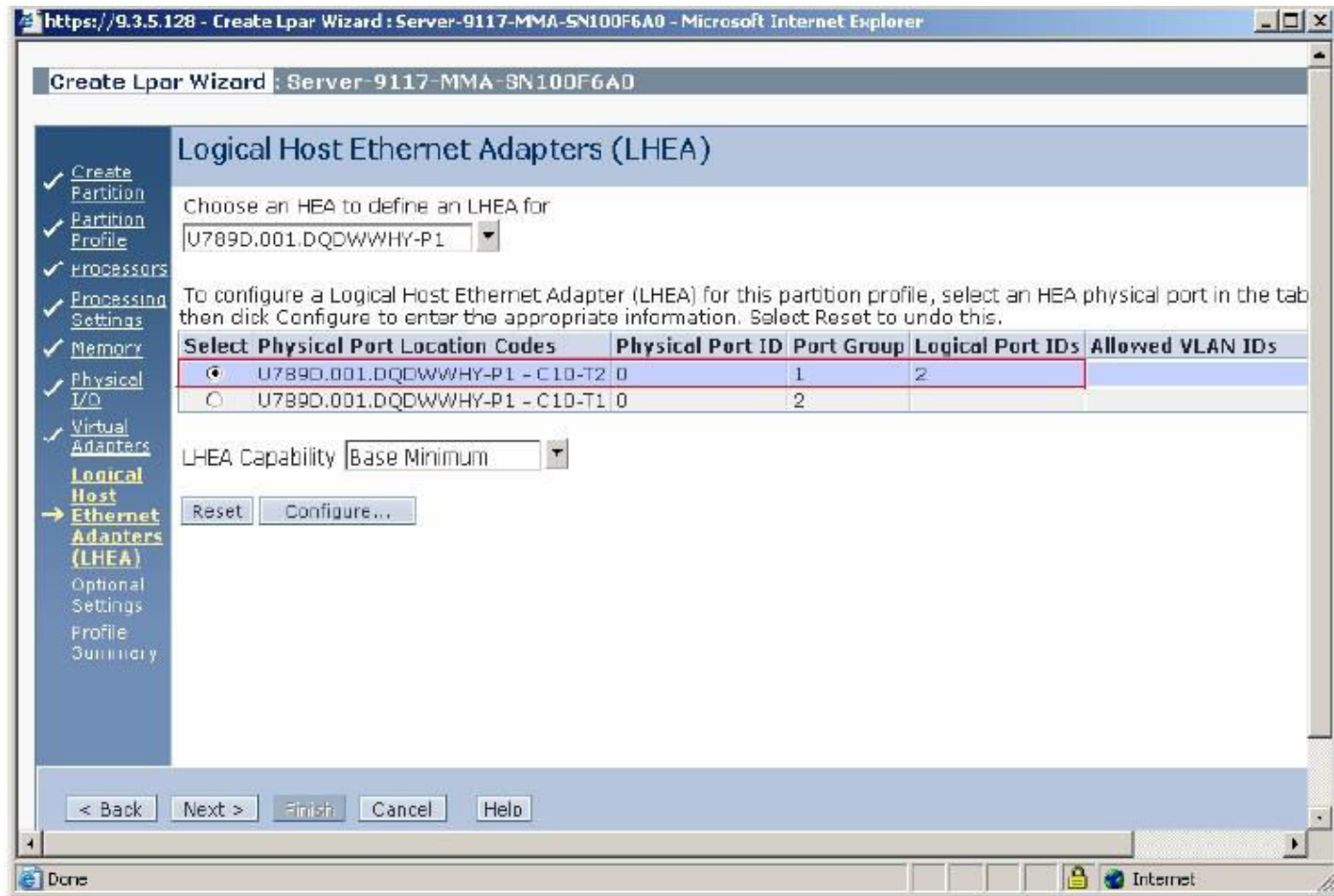
☐ Allow all VLAN IDs

VLAN to add:

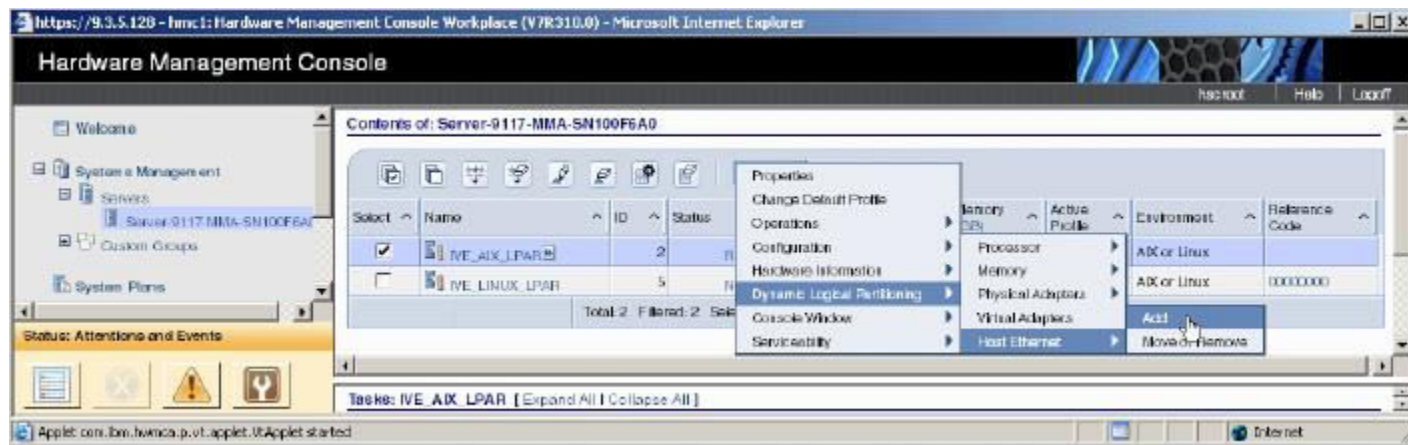
Allowed VLAN IDs:

Done Internet

Verify the configuration



Can configure the same on a running partition using DLPAR



Continue with configuration

https://0.3.5.128 - hmc1: Add Logical HEA Resources: IVE_AIX_LPAP - Microsoft Internet Explorer

Add Logical HEA Resources: IVE_AIX_LPAP

Choose an HEA to select Logical Ports from
U789D.001.DQDWWHY-P1

Select an HEA Physical port below, then click configure to choose Logical Ports to Add to this partition. Click Reset to Undo this.

Select	Physical Port Location Codes	Physical Port ID	Port Group	Logical Port IDs	Allowed VLAN IDs
<input type="radio"/>	U789D.001.DQDWWHY-P1 - C10-T2	0	1		
<input checked="" type="radio"/>	U789D.001.DQDWWHY-P1 - C10-T1	0	2		

LHEA Capability Base Minimum

Options

Timeout(minutes): 5

Detail level: 1

Internet

See the existing configuration of an IVE

The screenshot shows a web browser window displaying the 'Host Ethernet Adapters' configuration page for a server. The page title is 'Host Ethernet Adapters : Server-9117-MMA-8N100F6A0'. Below the title, there is a dropdown menu for 'Physical Location Code' with the value 'U789D.001.DQDWVWVY-P1'. A message states: 'Choose a Physical Location Code to view / modify that Host Ethernet Adapter's information.' Below this, another message says: 'Select a physical port of the HostEthernet Adapter in the table below to display the port's current partition usage.' The 'Current Status' section contains a table with columns: 'Select', 'Physical Port Location Codes', 'Port ID', 'Port Type', 'Port Group ID', 'Port Group MCS Value', 'Connection State', 'Speed', 'Duplex', 'Transmit Flow Control', 'Receive Flow Control', and 'Maximum receive'. The table has two rows: 'C10-T2' and 'C10-T1'. Below the table is a 'Configure...' button. The 'Logical Partition Usage' section contains a table with columns: 'Logical Partition', 'Logical Port ID', 'Logical Port DRC Name', 'Logical Port burned-in MAC / user-defined MAC', 'Capability', 'Allowed VLAN IDs', 'Promiscuous LPAR', and 'Maximum receive'. The table has one row: '10-0F5A0', '1', 'Port 1', '00145E5E1F20/000000000000', 'Dedicated', 'All', 'Yes', and '1500'. At the bottom of the page are 'OK', 'Cancel', and 'Help' buttons. The browser's status bar shows 'Done'.

Host Ethernet Adapters : Server-9117-MMA-8N100F6A0

Choose a Physical Location Code to view / modify that Host Ethernet Adapter's information.

U789D.001.DQDWVWVY-P1

Select a physical port of the HostEthernet Adapter in the table below to display the port's current partition usage.

Current Status

Select	Physical Port Location Codes	Port ID	Port Type	Port Group ID	Port Group MCS Value	Connection State	Speed	Duplex	Transmit Flow Control	Receive Flow Control	Maximum receive
<input checked="" type="radio"/>	C10-T2	0	10 G	1	1	down	10 Gbps full	disabled	disabled	disabled	1500
<input type="radio"/>	C10-T1	0	10 G	2	16	down	10 Gbps full	disabled	disabled	disabled	1500

Configure...

Logical Partition Usage

Logical Partition	Logical Port ID	Logical Port DRC Name	Logical Port burned-in MAC / user-defined MAC	Capability	Allowed VLAN IDs	Promiscuous LPAR	Maximum receive
10-0F5A0	1	Port 1	00145E5E1F20/000000000000	Dedicated	All	Yes	1500

OK Cancel Help

Done

How the communication happens in an IVE

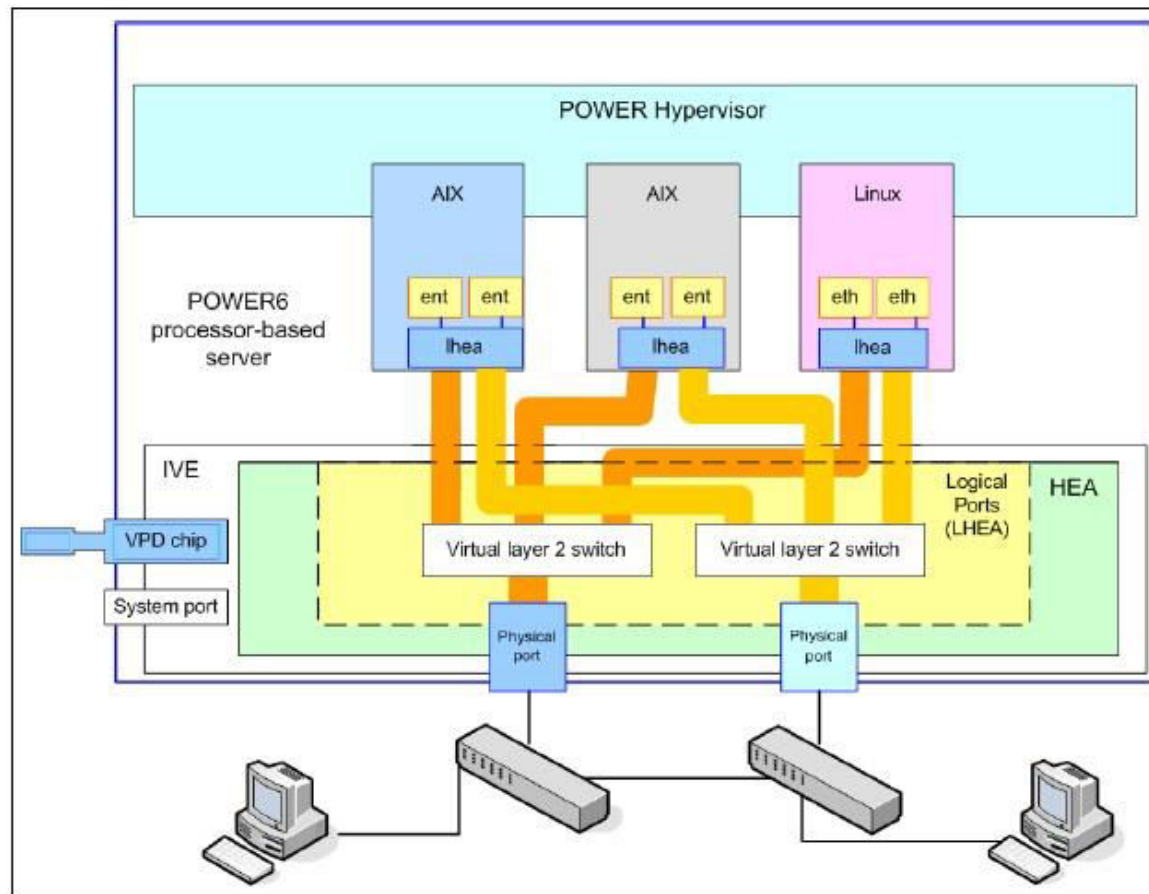
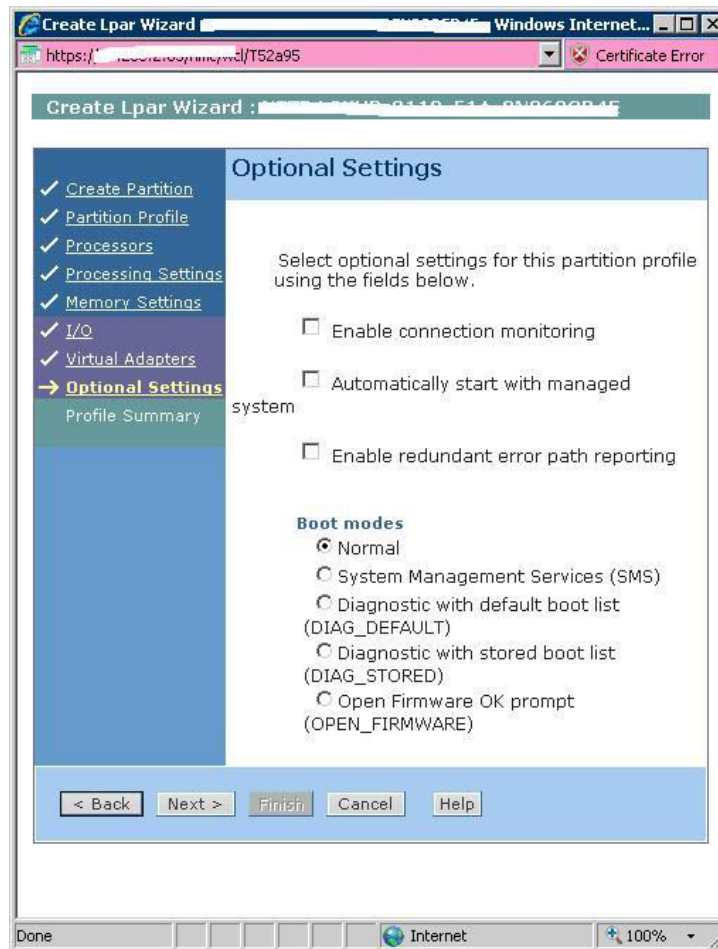


Figure 2-2 IVE logical components diagram

Select the optional settings



Finish the setup

