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.

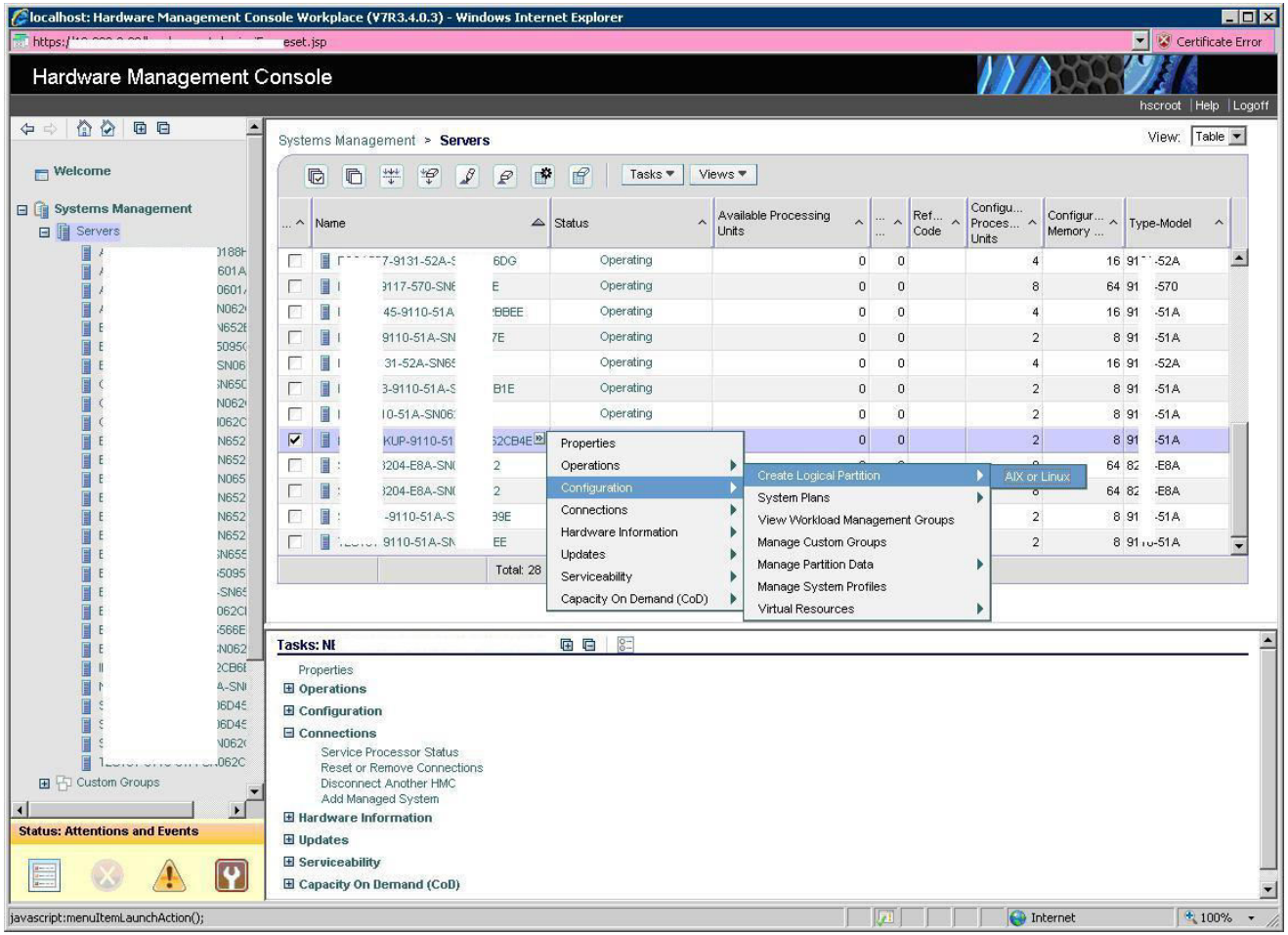
- Separate work loads.

- Merge production and test environments.

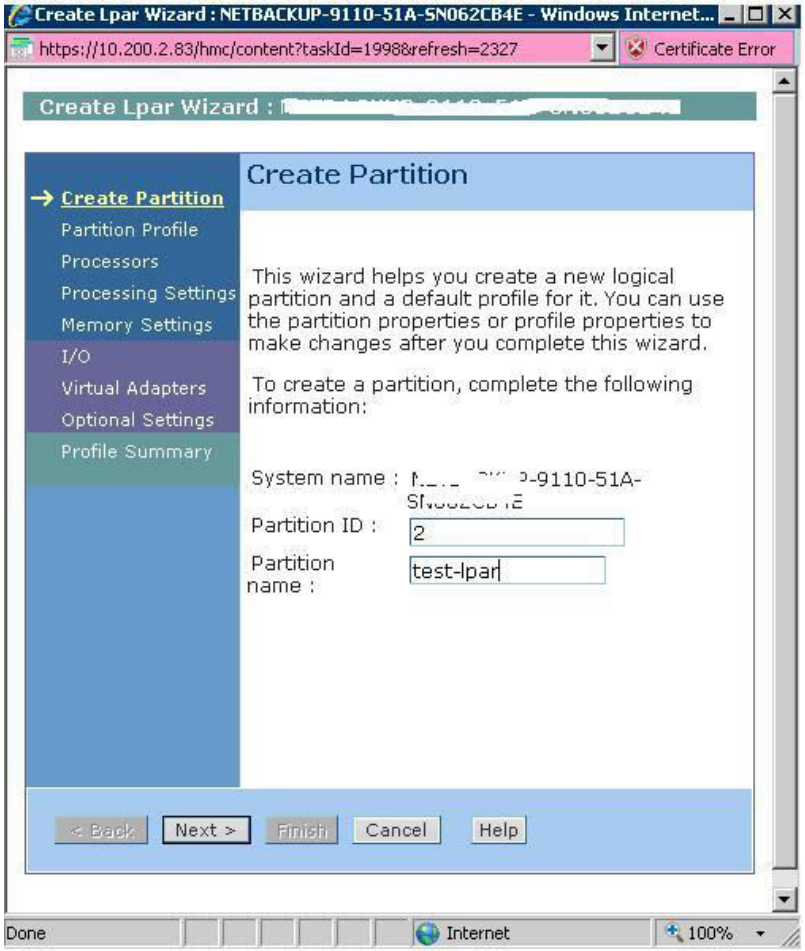
Power Hypervisor functions

- 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

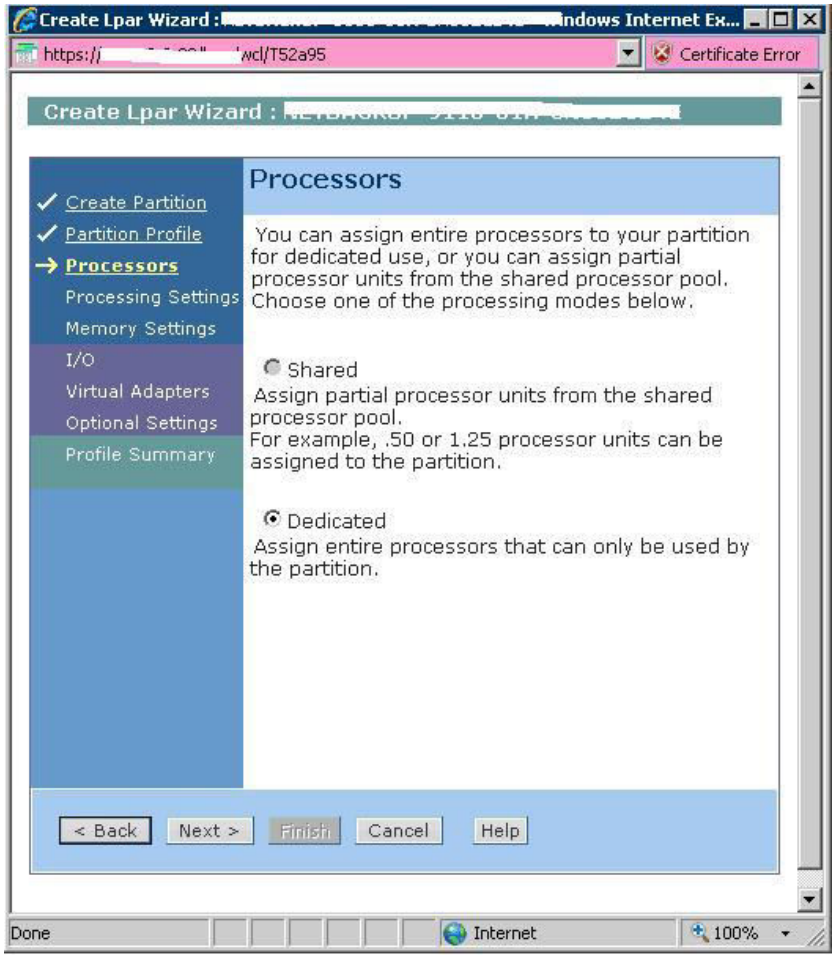


Provide a unique partition ID and name



- Give a profile name

Select the type of the processors



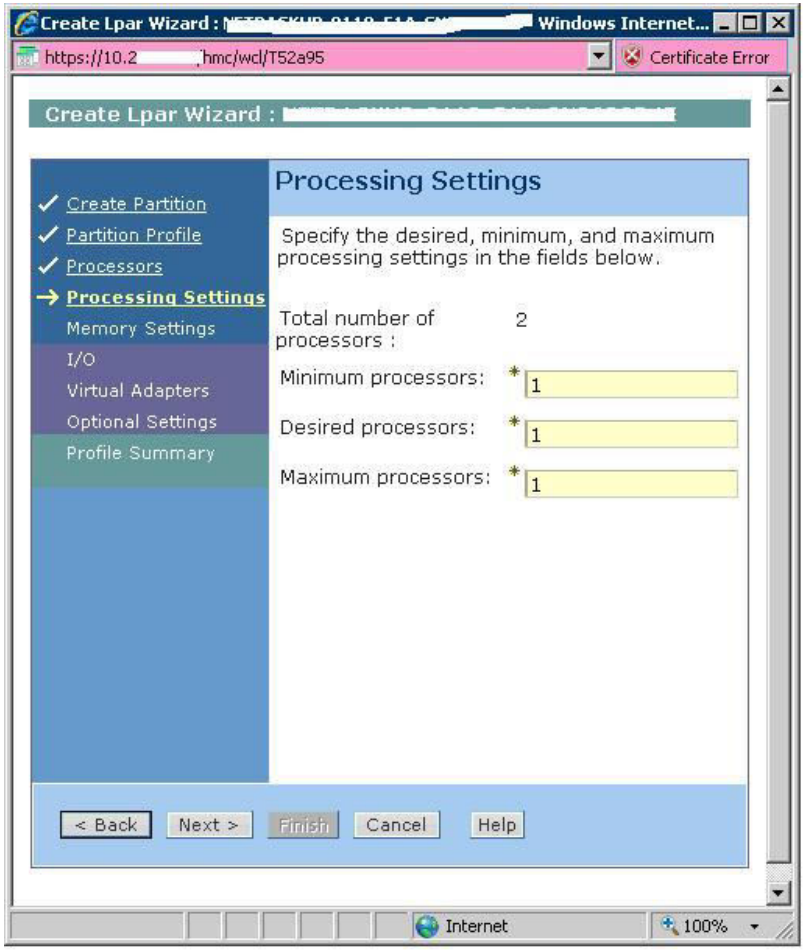
Dedicated processors

- Allocated as a whole processors to a specific partition.

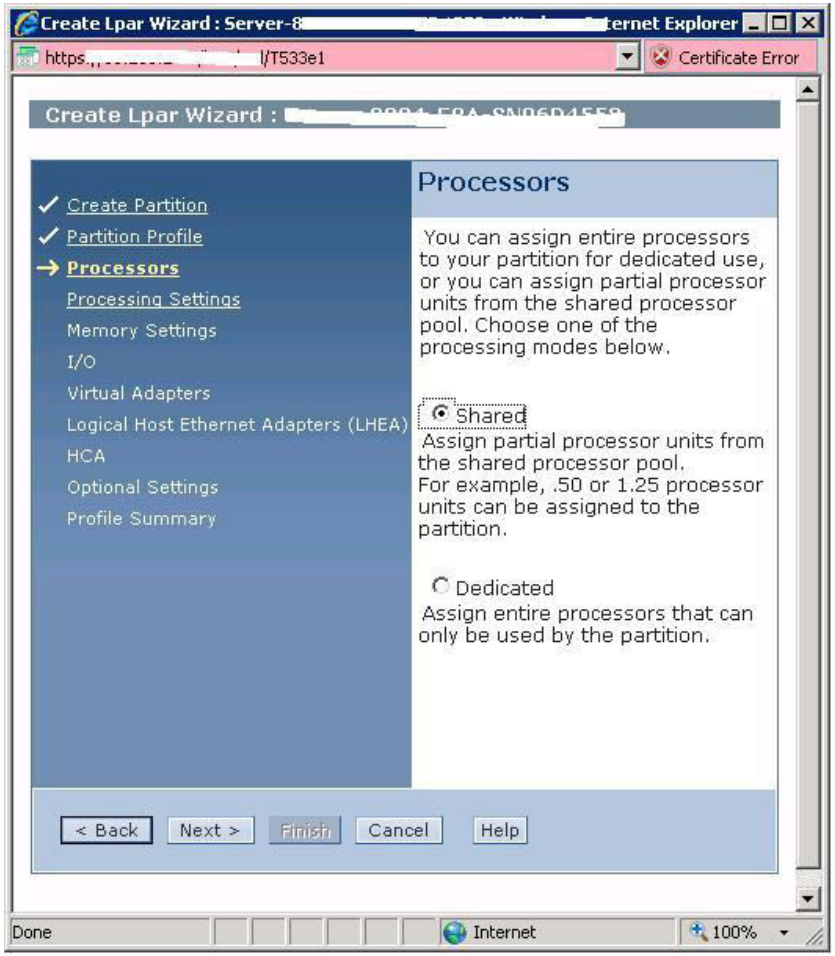
- Same physical processors are used for that partition while it is running.
  - when partition is stopped ,dedicated processors may or may not go to shared pool.
  - when partition is active ,POWER 6 and POWER 7 systems allow a dedicated processor LPAR to donate its idle cycle to the shared processor 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 .

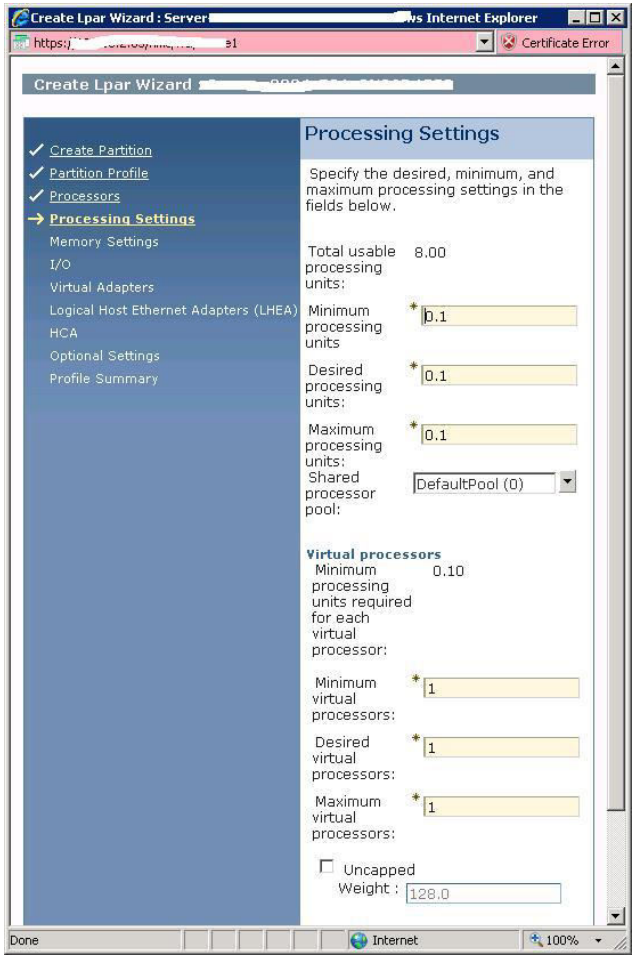
Select the processor values



If select as Shared



Processor settings



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 ?

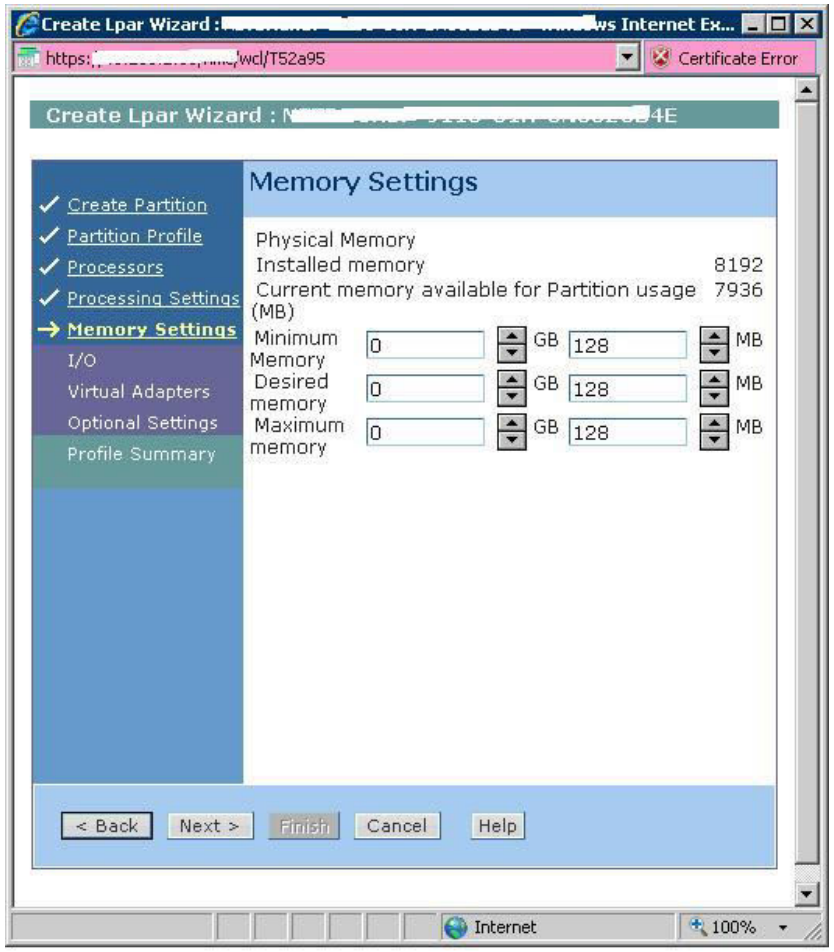
- How many virtual processors should be used ?
- For uncapped partition ,increase the number of virtual processors to the number of processors in the shared pool if enough entitlement to support .
- For capped partition ,start with minimum and monitor ?
- If the virtual processor number is too low or 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 .

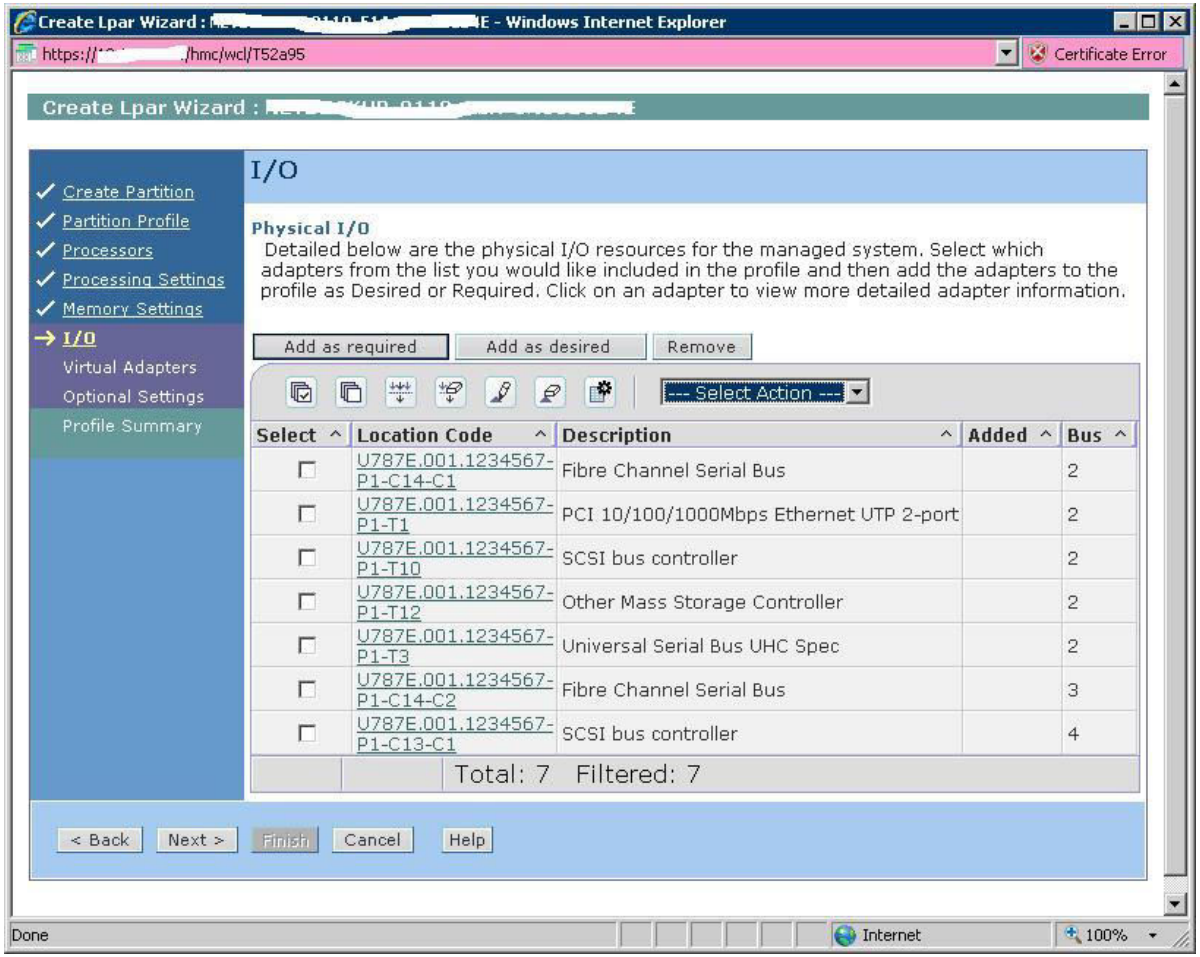
Verify the processors

```
$ 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                          : -
$
```

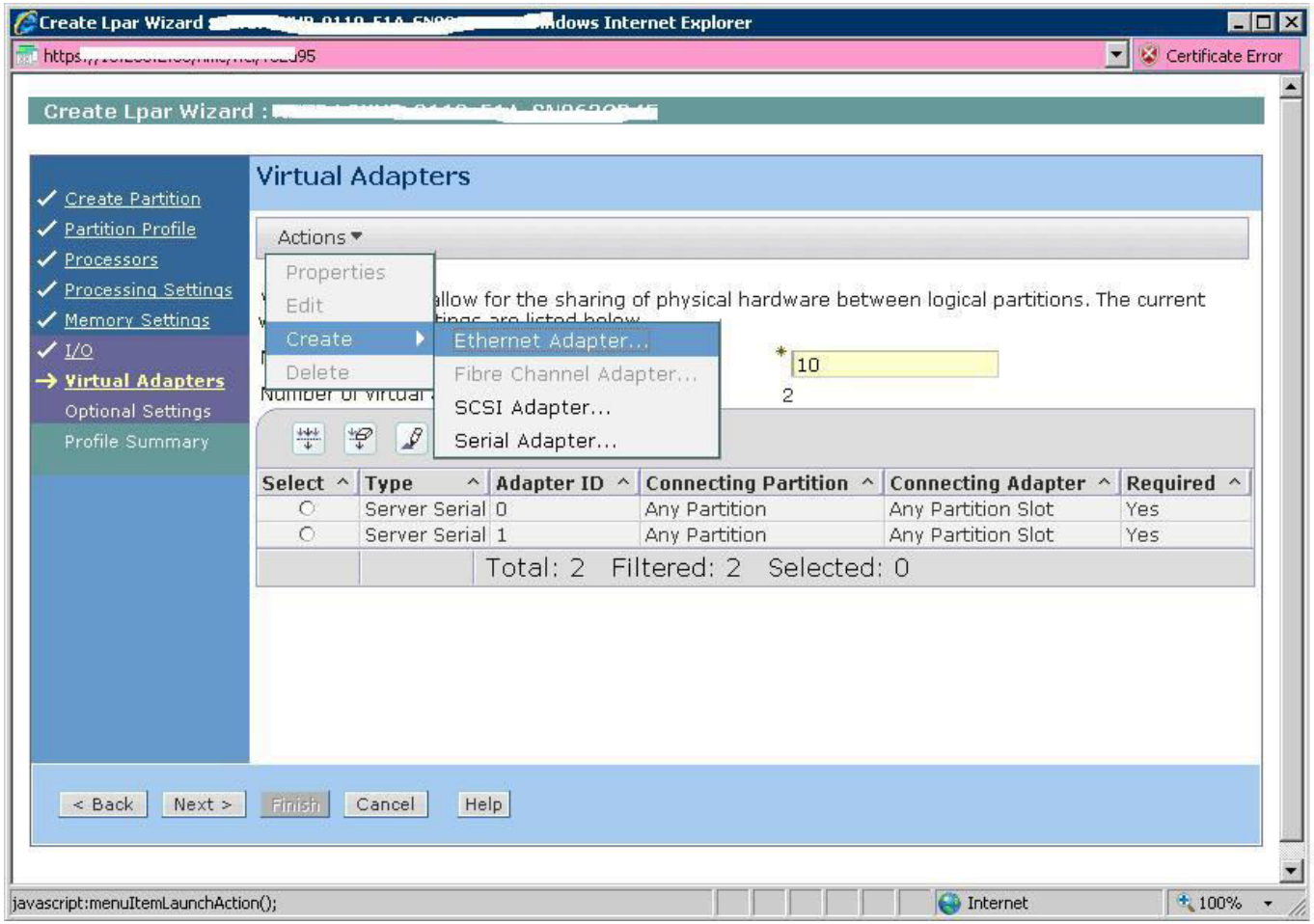
Select memory



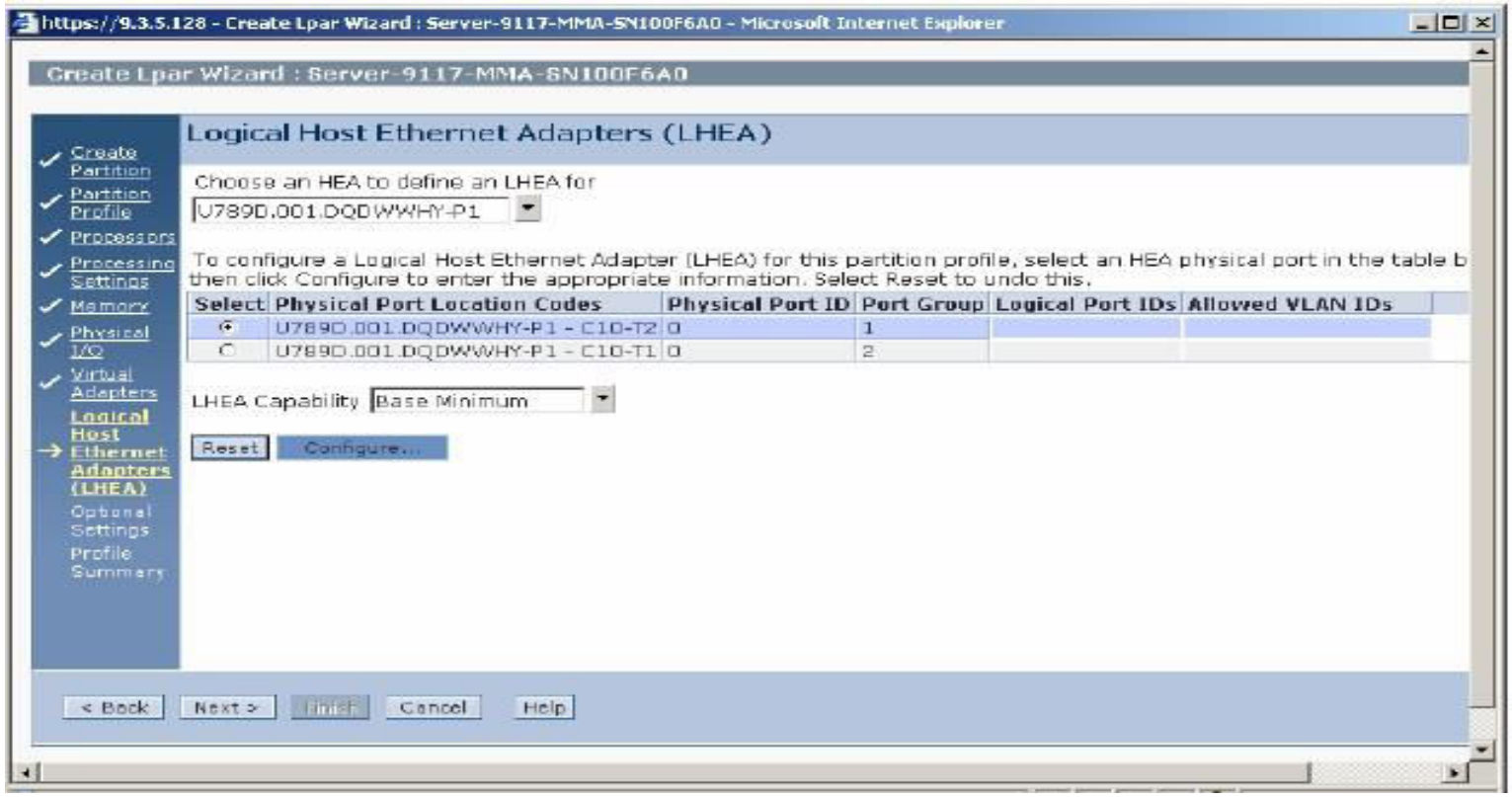
Add the IO devices



Add the virtual adapters



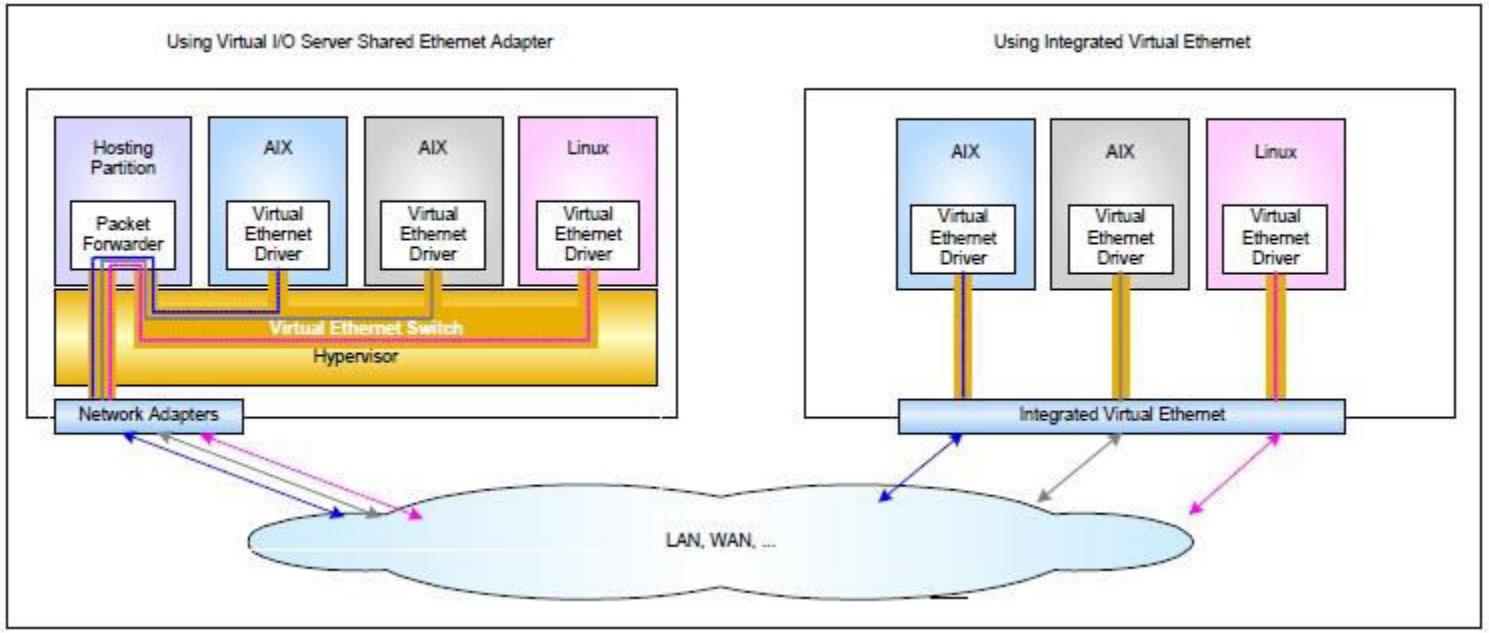
Integrated Virtual Ethernet



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

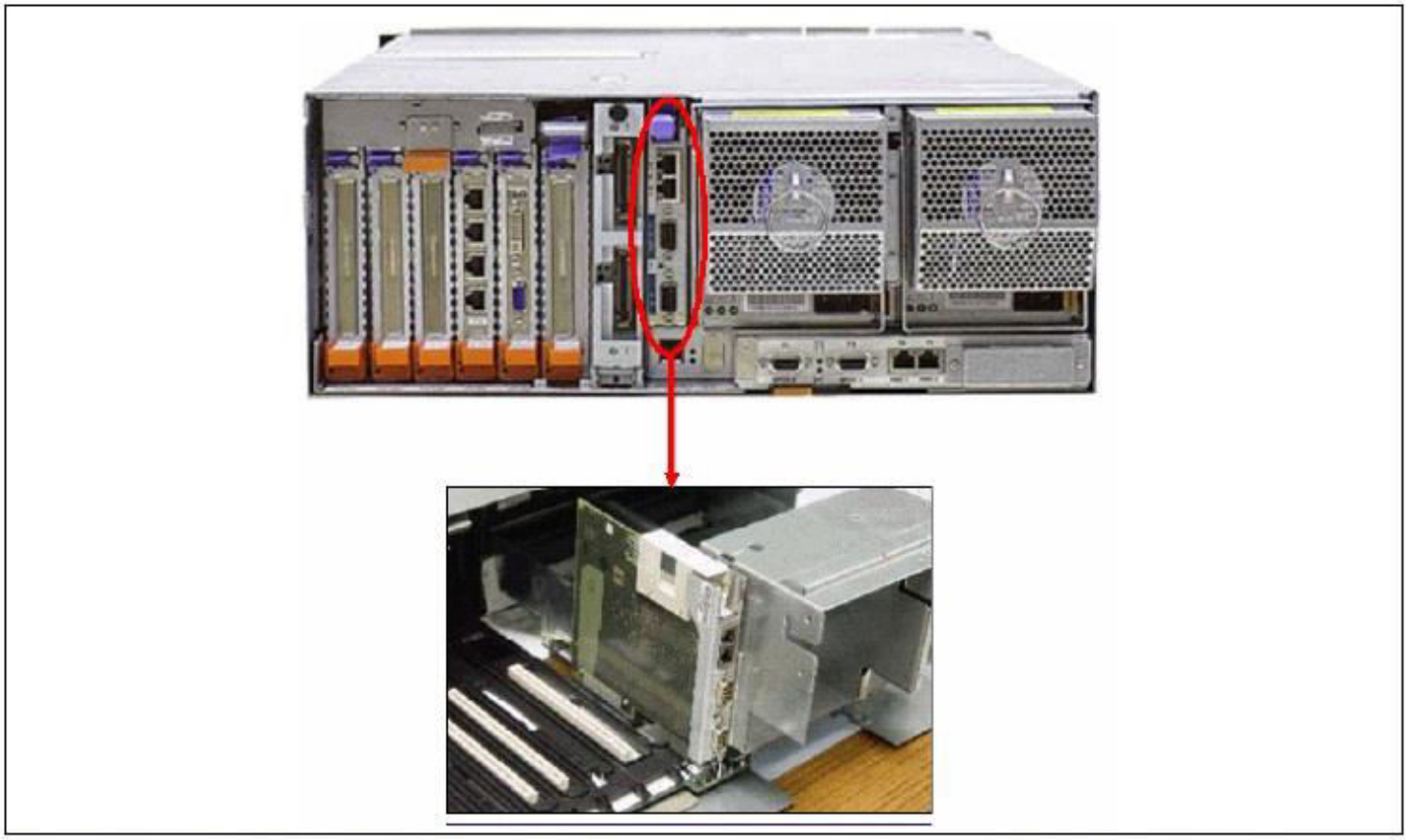


Figure 1-4 Integrated Virtual Ethernet adapter connection on System p 570 I/O system board

Different types of IVE adapters

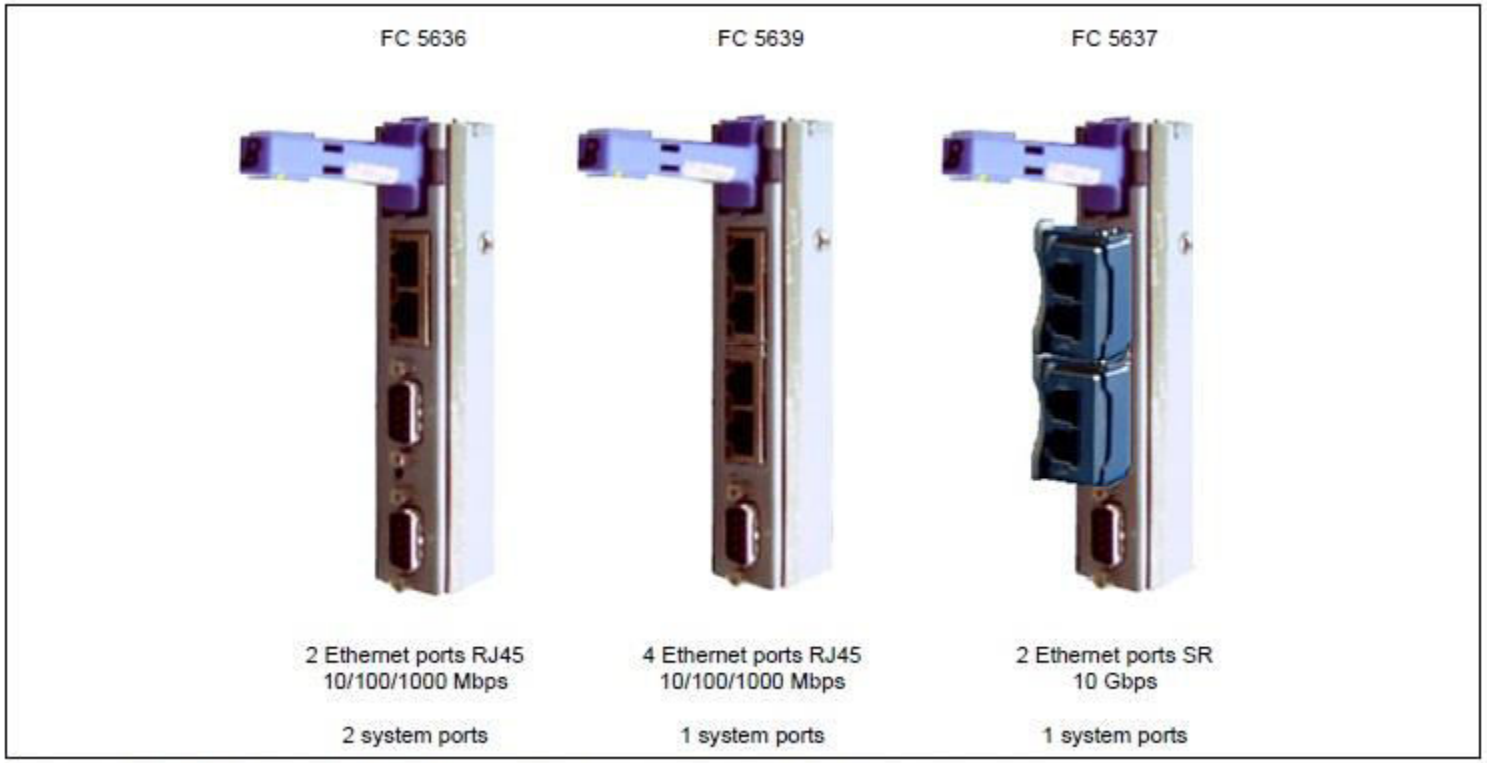


Figure 1-5 IVE physical port connectors according to IVE feature codes

Port groups on Different Adap

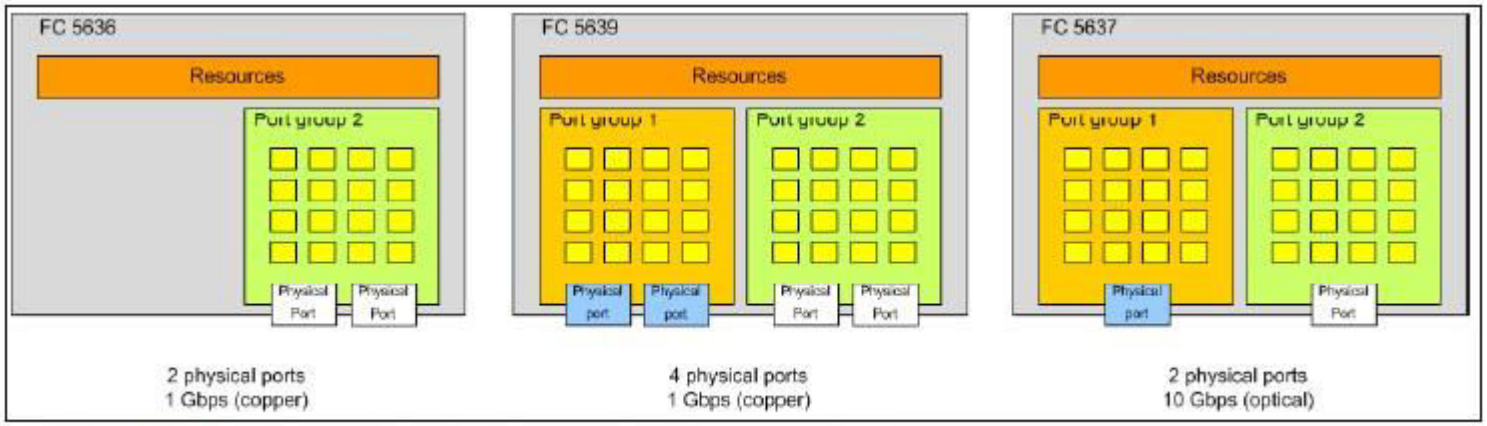
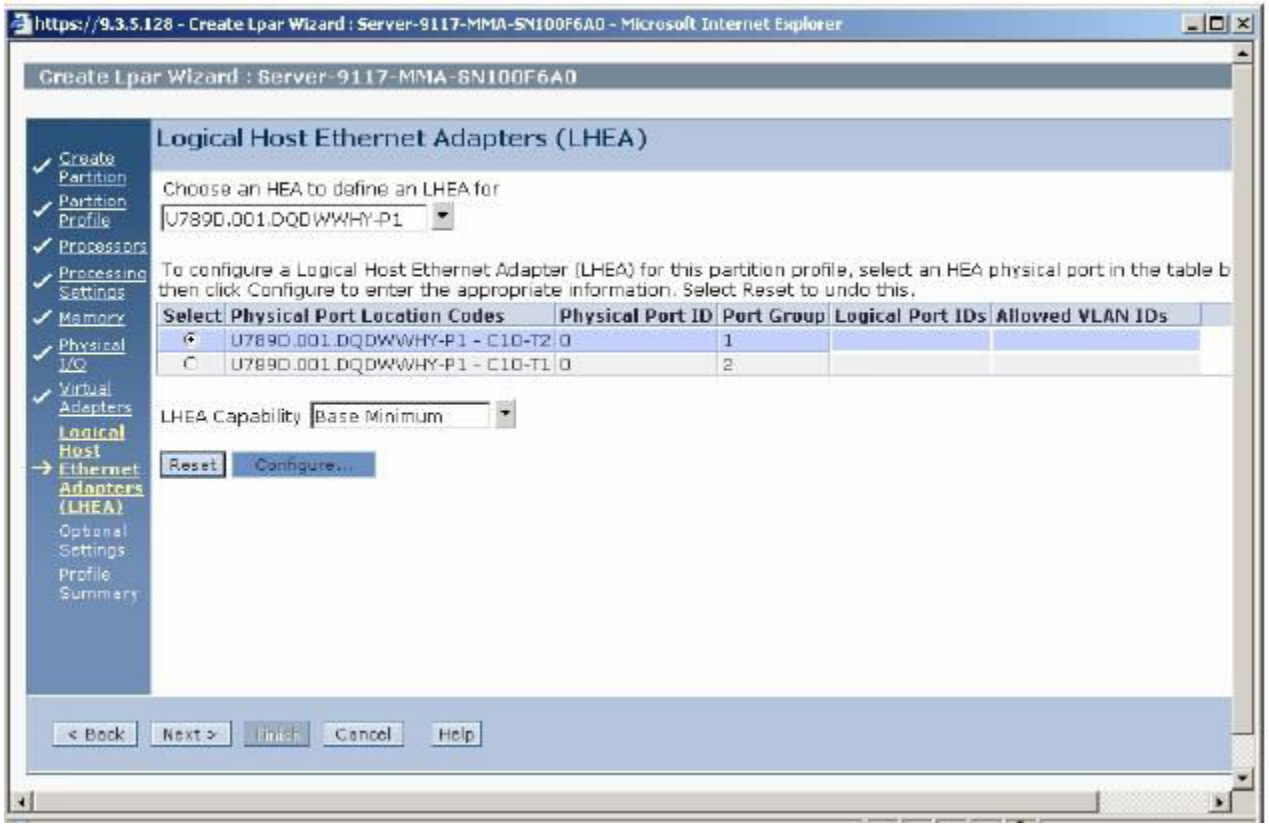


Figure 2-7 Port group option according to IVE feature code

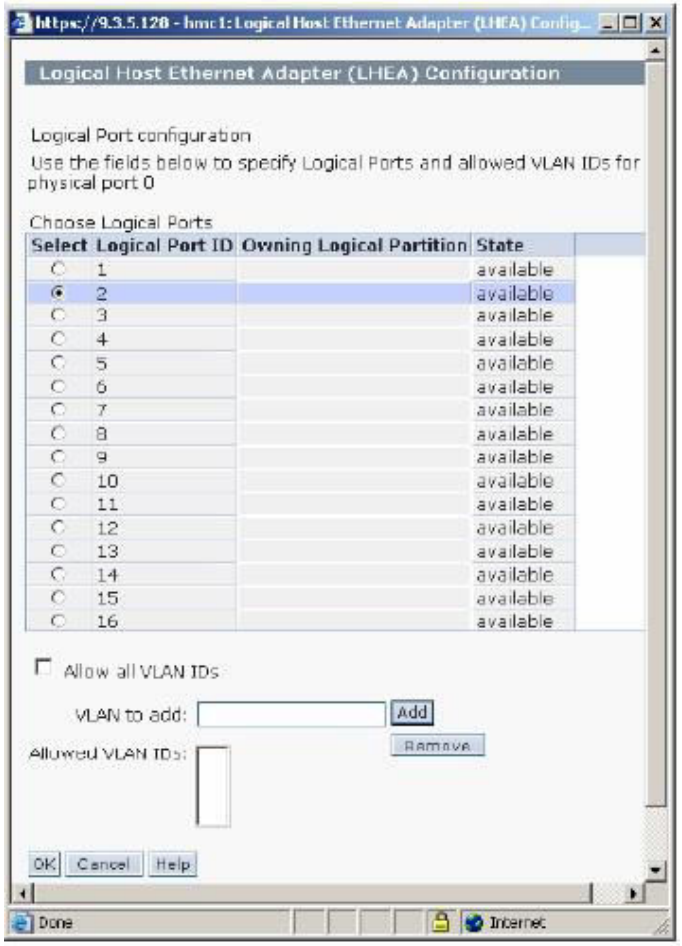
IVE configuration overview

- 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 .

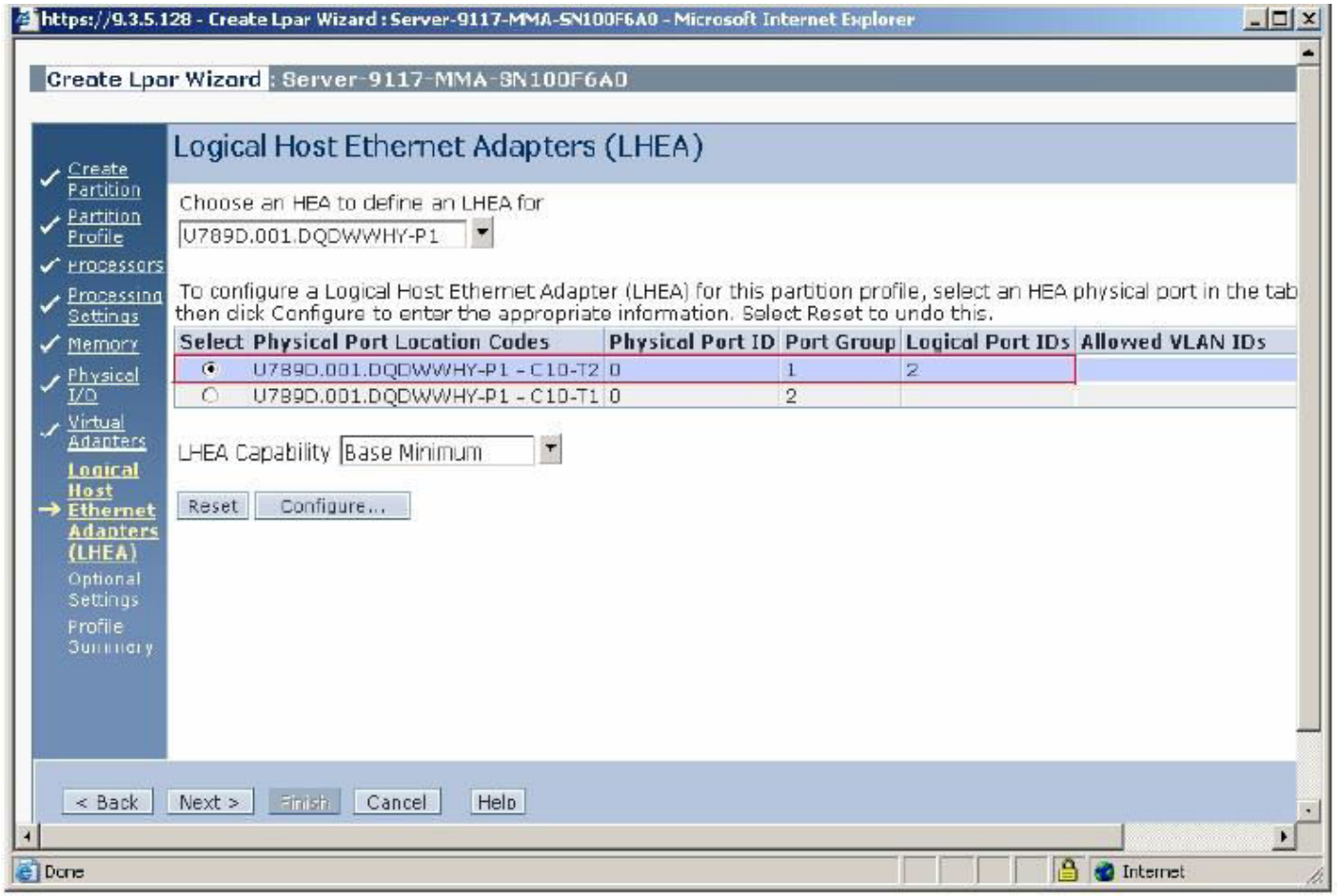
Select the port



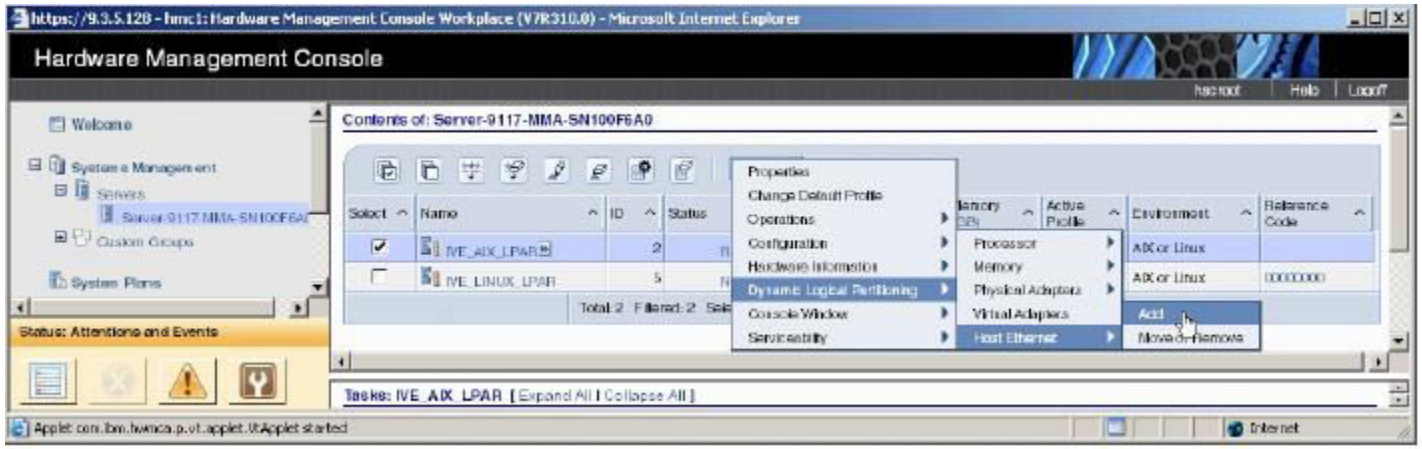
Select the logical port



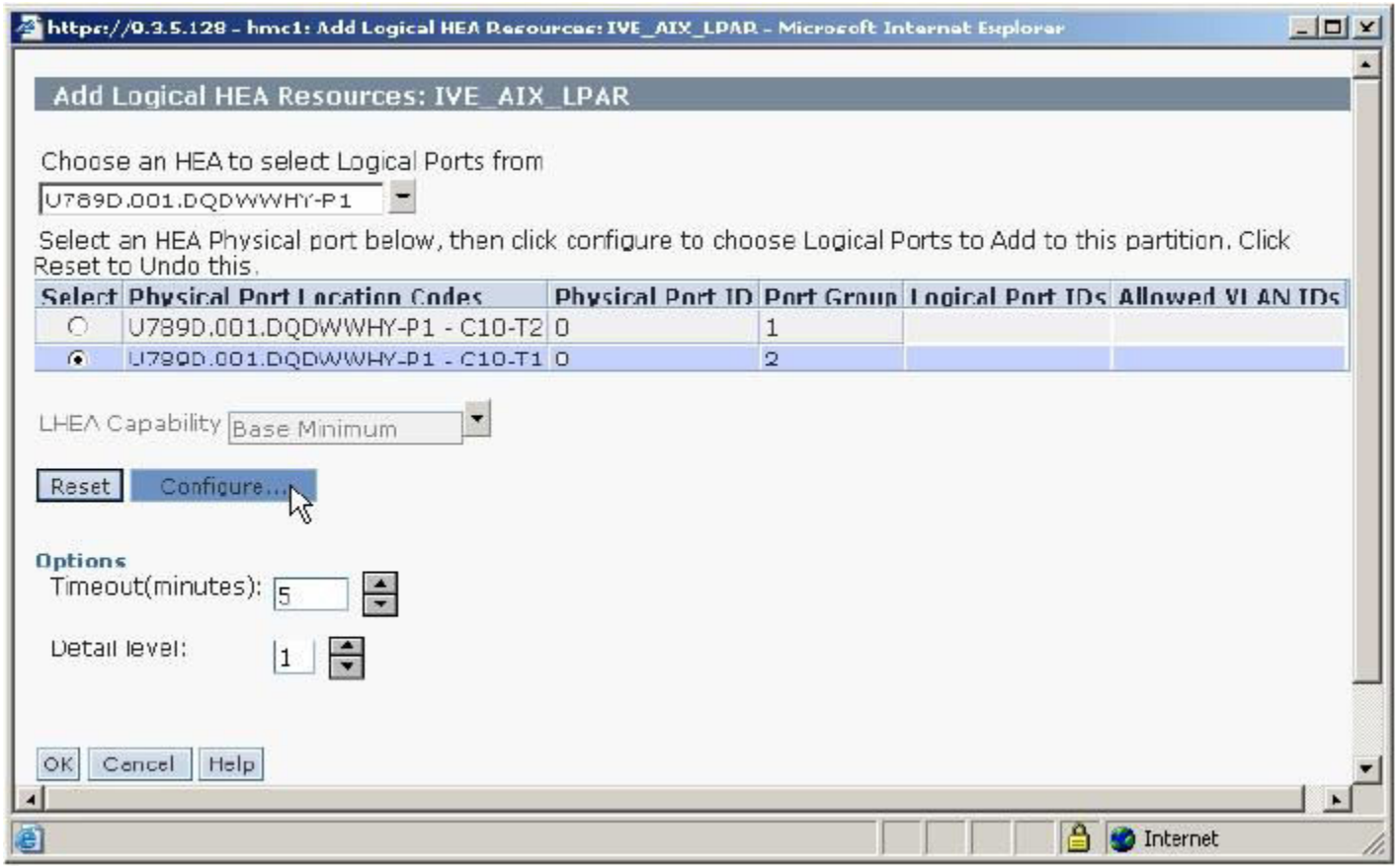
Verify the configuration



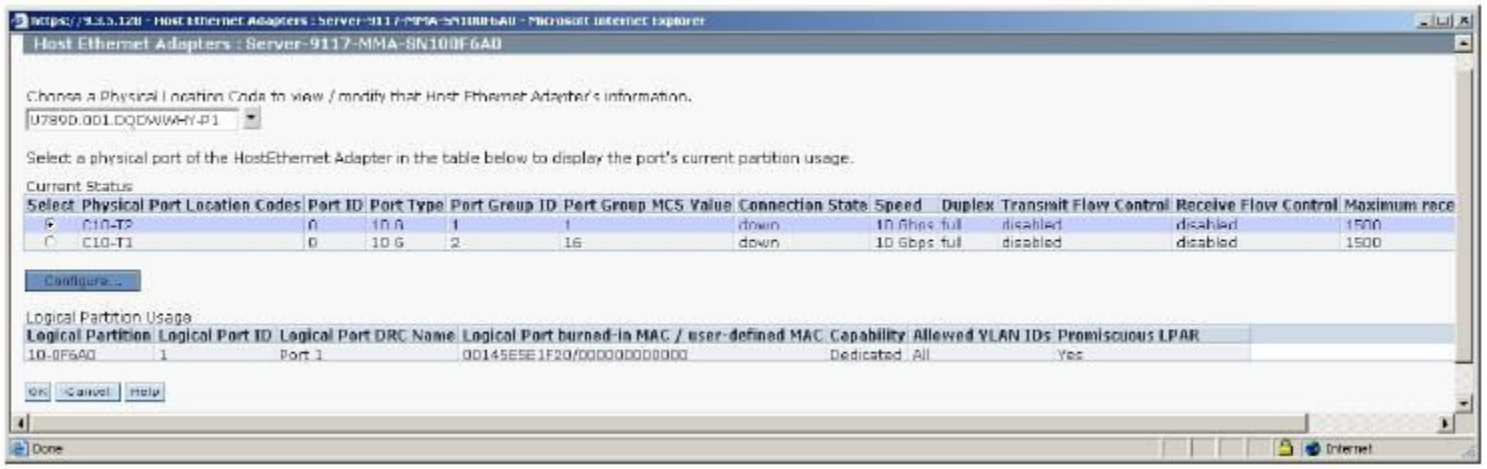
Can configure the same on a running partition using DLPAR



Continue with configuration



See the existing configuration of an IVE



How the communication happens in an IVE

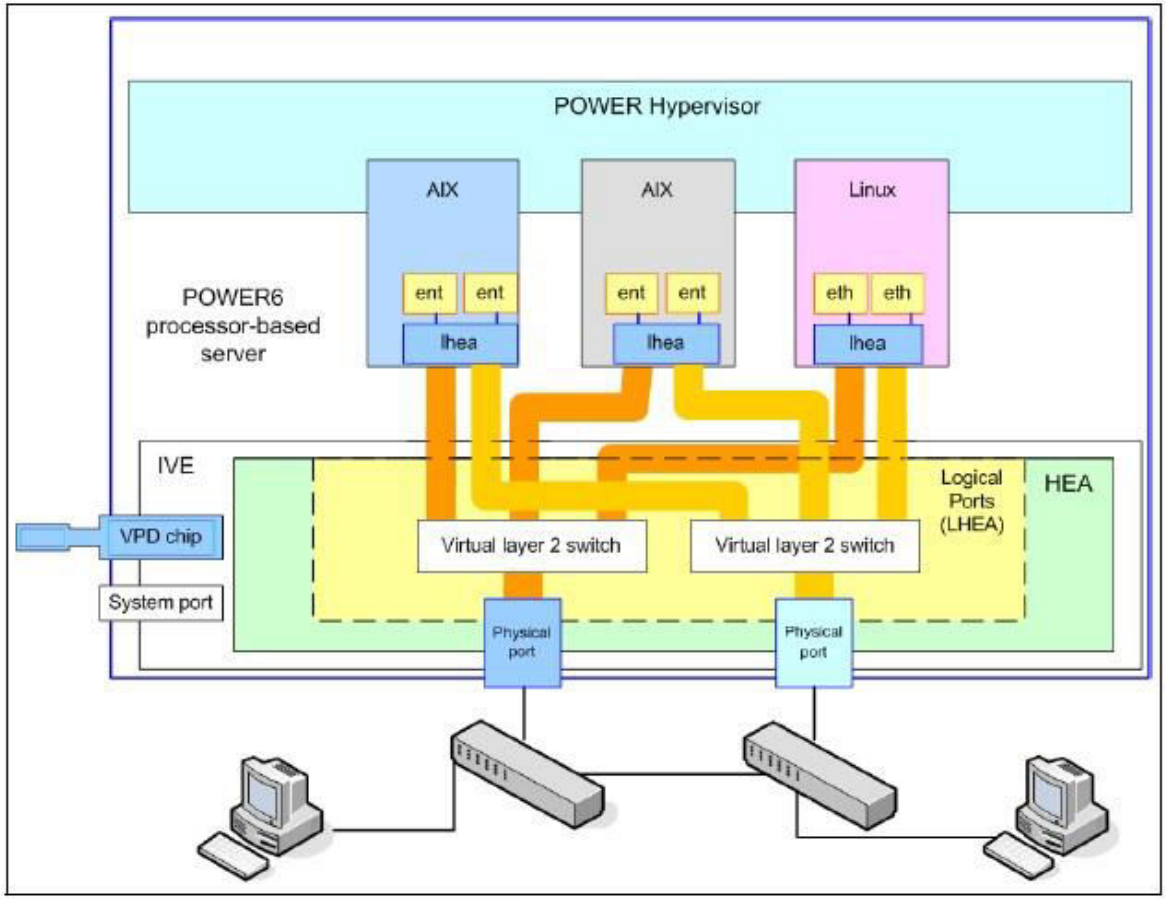
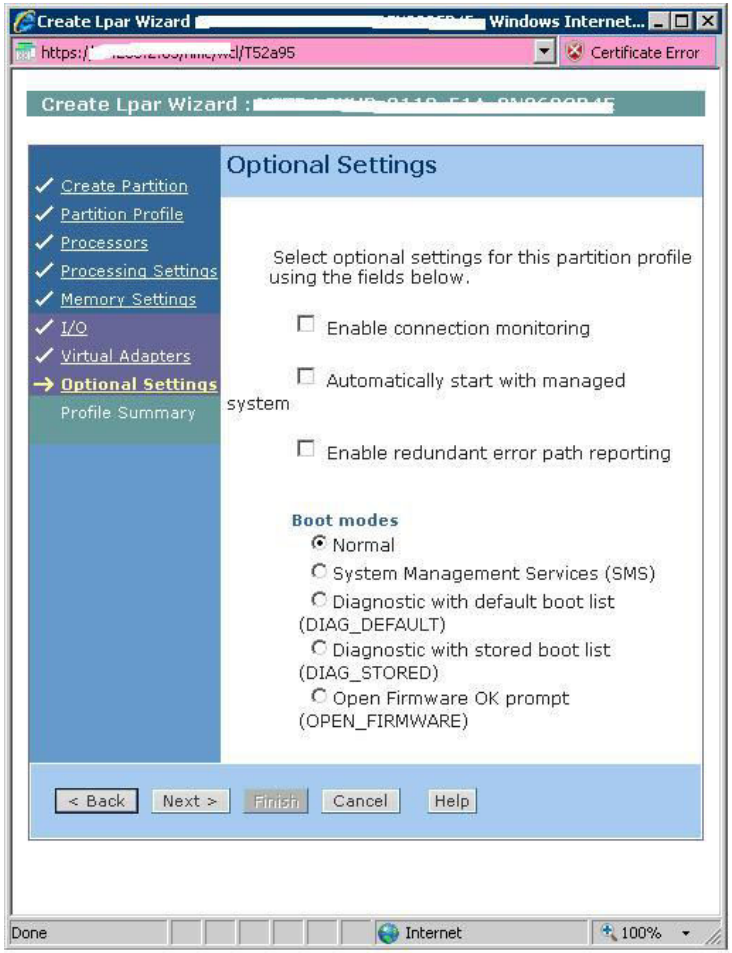


Figure 2-2 IVE logical components diagram

Select the optional settings



Finish the setup