



IBM Passport Advantage Software

# Sub-capacity (Virtualization) License Counting Rules

## IBM Power Systems AIX System WPAR Virtualization Environment

NOTE: Please use these rules in conjunction with the  
[IBM Power Systems Virtualization Environment deck](#) and  
[Passport Advantage Agreement](#)



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## Sub-capacity Licensing Requirements Summary

- **Customers must:**
  - ▶ Agree to the terms of the Sub-capacity Attachment, and follow Virtualization Capacity License Counting rules for their Eligible Virtualization Environment(s)
  - ▶ Use Eligible Sub-capacity Products
  - ▶ Use Eligible Virtualization Technologies
  - ▶ Use Eligible Processor Technologies
  - ▶ Use the IBM License Metric Tool (ILMT) and maintain report documentation
    - Tivoli Asset Discovery for Distributed (TADd) or IBM Endpoint Manager for Software Use Analysis (IEM SUA), may be used in lieu of IBM License Metric Tool
    - Certain ILMT / TADd use exceptions may apply

**PLEASE NOTE:**

- *The above is only a summary. For details about sub-capacity licensing requirements, see the Sub-capacity Attachment and other information referred to above, at [Passport Advantage Sub-capacity licensing information](#)*
- *Customers are responsible for the installation of the IBM License Metric Tool and for the server it runs on.*

## Definitions – System WPARs

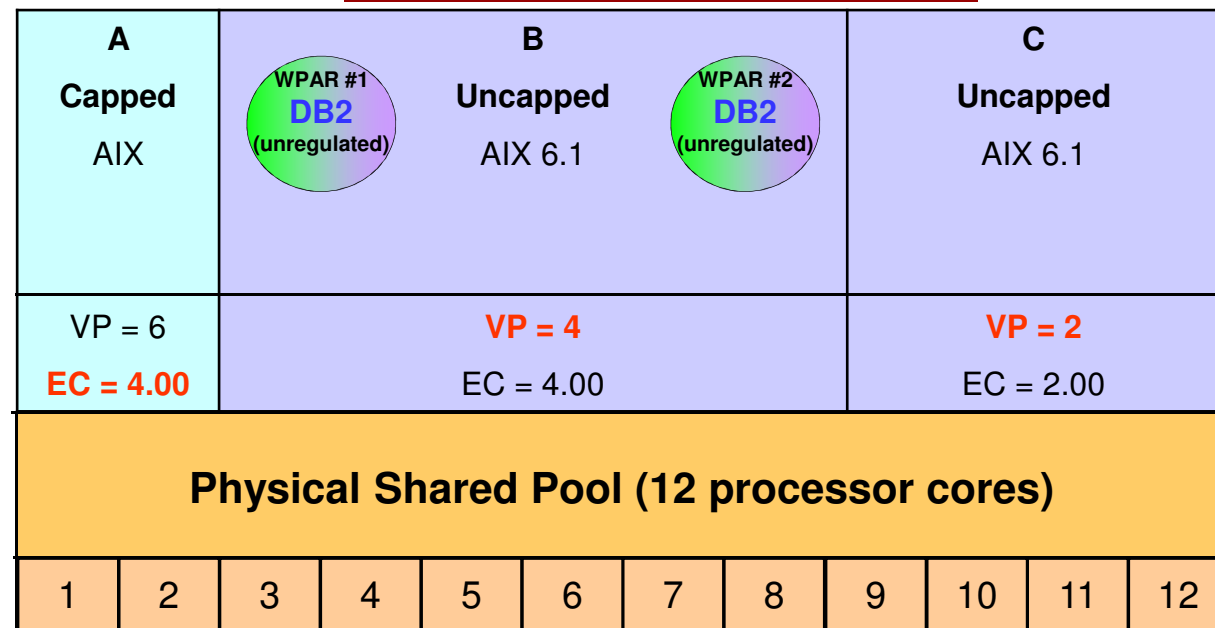
- **Workload Partition (System WPAR)**
  - A software-based virtualization technology offered by AIX V6.1 or later that provides a virtualized operating system environment within a single instance of the AIX operating system. Each WPAR can be separately managed and can have a regulated portion of the processing resources available. WPARs share the AIX instance
- **Global Instance**
  - Each AIX operating system that is running has its own instance. The instance consists of all the program and services that compose AIX. If WPARs are inside of an instance of AIX, the parent AIX is referred to as the “global instance”. The global instance can share resources with the WPARs, but WPARs cannot directly share resources with other WPARs.
- **Unregulated**
  - For sub-capacity licensing purposes, these are WPARs that are created without including a hard maximum limit. Unregulated WPARs can have available all the processing resources available to the Global Instance – that is, all the processors available to the logical partition that the Global Instance is in.
- **Hard Maximum Regulated**
  - A WPAR can be regulated to restrict its processor capacity to a percentage of the processor capability available to the partition. For example, a setting of (10,40,50) would provide a minimum of 10%, a soft maximum of 40% and a hard limit (maximum) of 50% of the LPARs capacity to the WPAR. The 50% represents the hard limit for that WPAR. Such a WPAR running in an uncapped LPAR with 4 virtual processors would be limited to 2 processors of capacity (50% of 4VP).
- **Live Application Mobility**
  - Allows the movement of a WPAR from one physical server to another without loss of service

## License Counting – AIX 6.1 or Later Workload Partitions (System WPAR) - Unregulated

### AIX 6.1 or Later Workload Partitions

- WPARs can be unregulated. This means that a WPAR can access all the processor core capacity of the LPAR that it is residing in.

### Server with 12 processor cores



### DB2 cores to license:

- 4 for WPAR #1 (4 for the VP of LPAR B)
  - 4 for WPAR #2 (4 for the VP of LPAR B)
- = 8, but capped at 4** (maximum cores available to LPAR B)

### License Rules:

- WPARs without regulation – the number of cores to be licensed is equal to the highest actual\* processor core capacity of the LPAR
- License rule: the lower of the sum of each WPAR for a product or the processor capacity of the LPAR, the WPAR resides within

\* The greater of what the partition starts with or the result of a DLPAR operation

## License Counting – AIX 6.1 or Later Workload Partitions (System WPAR) – Hard Maximum Regulated

### AIX 6.1 or Later Workload Partitions

- WPARs can be resource regulated. This means that a WPAR can be limited to less than the full processor core capacity of the LPAR that it is residing in.
- Hard Maximum Limit of 25% limits the processor capacity available to a WPAR, to 25% of the LPAR resource.

#### DB2 cores to license:

- 1 for WPAR #1 (25% of 4 VP)
  - 1 for WPAR #2 (25% of 4 VP)
- = 2**

### Server with 12 processor cores

A	B		C								
<b>Capped</b> AIX	 WPAR #1 DB2 CPU=25%	<b>Uncapped</b> AIX 6.1	 WPAR #2 DB2 CPU=25%								
VP = 6 EC = 4.00	VP = 4 EC = 4.00		VP = 2 EC = 2.00								
<b>Physical Shared Pool (12 processor cores)</b>											
1	2	3	4	5	6	7	8	9	10	11	12

#### License Rules:

- WPARs without regulation – the number of cores to be licensed is equal to the highest actual\* processor core capacity of the LPAR
- WPARs with hard maximum limits for processor resource – license the highest actual\* processor cores available to the WPAR (for example: 25% hard maximum limit and a LPAR with 4 processor cores = 1 core)
- License rule: the lower of the sum of each WPAR for a product or the processor capacity of the LPAR, the WPAR resides within

\* Based upon the greater of what the partition starts with or the result of a DLPAR operation

## License Counting – AIX 6.1 or Later Live Application Mobility (System WPAR)

Count the maximum peak capacity for each program at any point in time:

**DB2 cores to license = 9**

• **Sub-capacity Licensing Prior to Mobility Event:**

**DB2 cores to license = 7**

Server#1

- 1 - LPAR A (EC=1)
- 3 - WPAR 1 (50% of VP=6)

Server#2

- 3 – LPAR D (VP=3)

• **Sub-capacity Licensing After Mobility Event:**

**DB2 cores to license = 9**

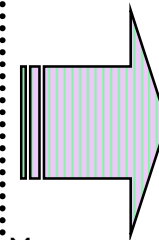
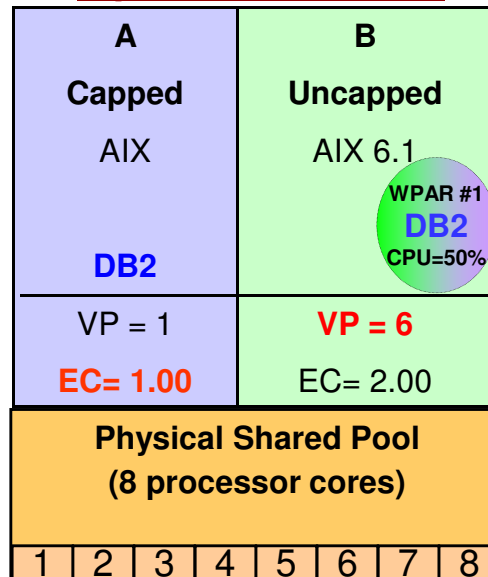
Server#1

- 1 - LPAR A (EC=1)

Server#2

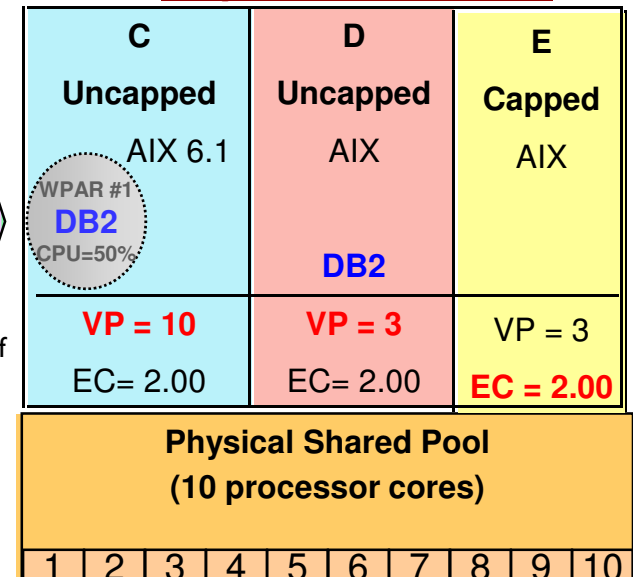
- 3 – LPAR D (VP=3)
- 5 – WPAR 1 (50% of VP=10)

### Server #1 with 8 processor cores



Movement of WPAR to a different server with no loss of service

### Server #2 with 10 processor cores



License Rule for Qualified Mobility:

Count the maximum processor core capacity for each program concurrently within an ILMT Region.

Requirements:

A minimum of one ILMT server must be installed per ILMT Region where sub-capacity programs are installed.

ILMT Regions:

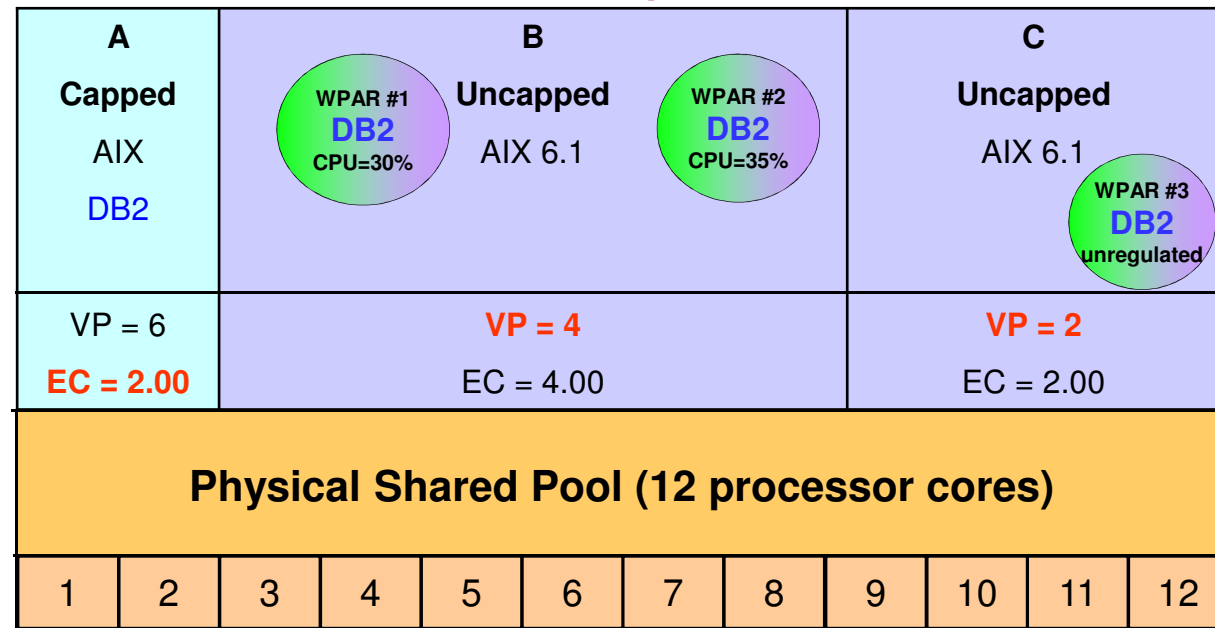
- Region 1: North America & South America
- Region 2: Europe & Africa
- Region 3: Asia & Australia

## License Counting – Multiple LPARS with AIX 6.1 or Later Workload Partitions (System WPAR)

### AIX 6.1 or Later Workload Partitions

- WPARs can be resource regulated. This means that a WPAR can be limited to less than the full processor core capacity of the LPAR that it is residing in.

### Server with 12 processor cores



### DB2 cores to license:

- 2.0 from EC of capped partition A
  - 1.2 for WPAR #1 (30% of 4 VP)
  - 1.4 for WPAR #2 (35% of 4 VP)
  - 2.0 for WPAR #3(unregulated so 100% of 2 VP)
  - 6.6 rounded up to 7
- = 7.0 Total cores to license**

### License Rules:

- WPARs without regulation – the number of cores to be licensed is equal to the highest actual\* processor core capacity of the LPAR
- WPARs with hard maximum limits for processor resource – license the highest actual\* processor cores available to the WPAR (for example: 25% hard maximum limit and a LPAR with 4 processor cores = 1 core)
- License rule: the lower of the sum of each WPAR for a product or the processor capacity of the LPAR, the WPAR resides within
  - \* Based upon the greater of what the partition starts with or the result of a DLPAR operation

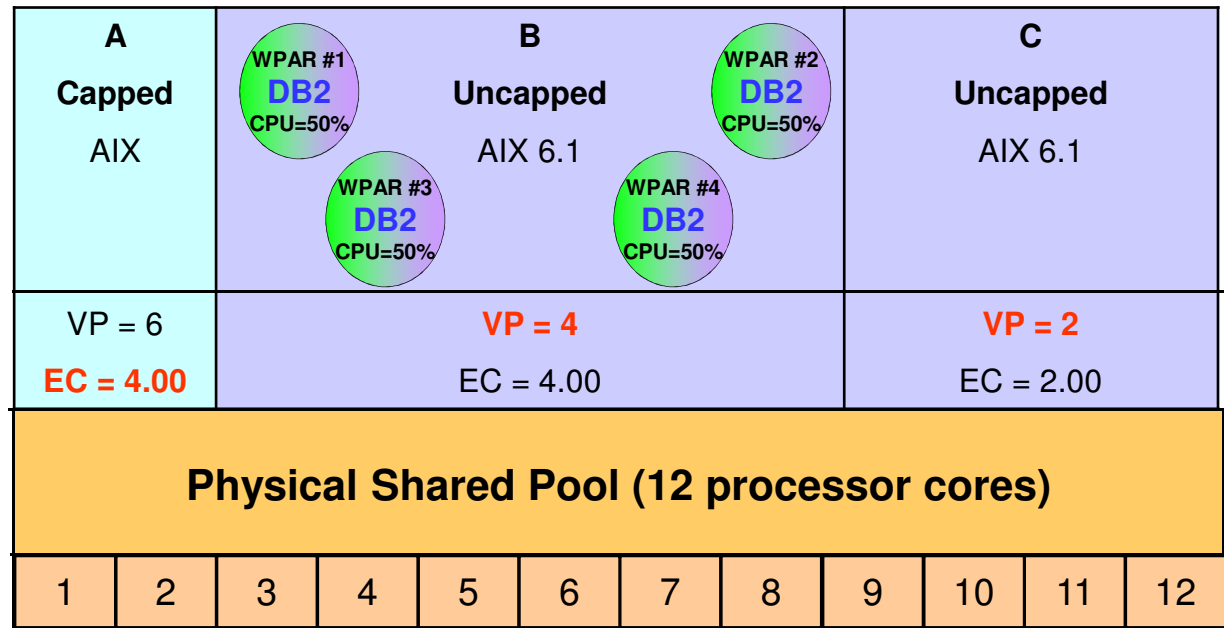


# License Counting – AIX 6.1 or Later Workload Partitions (System WPARs) in Uncapped partition

## AIX 6.1 or Later Workload Partitions

- WPARs can be resource regulated. This means that a WPAR can be limited to less than the full processor core capacity of the LPAR that it is residing in.

### Server with 12 processor cores



### DB2 cores to license:

- 2 for WPAR #1 (50% of 4 VP)
  - 2 for WPAR #2 (50% of 4 VP)
  - 2 for WPAR #2 (50% of 4 VP)
  - 2 for WPAR #2 (50% of 4 VP)
- = 8, but reduced to 4** (maximum cores available to LPAR B)

### License Rules:

- WPARs without regulation – the number of cores to be licensed is equal to the highest actual\* processor core capacity of the LPAR
- WPARs with hard maximum limits for processor resource – license the highest actual\* processor cores available to the WPAR (for example: 25% hard maximum limit and a LPAR with 4 processor cores = 1 core)
- License rule: the lower of the sum of each WPAR for a product or the processor capacity of the LPAR, the WPAR resides within

\* Based upon the greater of what the partition starts with or the result of a DLPAR operation

## ILMT Licensing Counting Rules

### License Rules for System WPARs for each product:

- WPARs without regulation – the number of cores to be licensed is equal to the highest actual\* processor core capacity of the LPAR
- WPARs with hard maximum limits for processor resource – license the highest actual\* processor cores available to the WPAR (for example: 25% hard maximum limit and a LPAR with 4 processor cores = 1 core)
- License rule: the lower of the sum of each WPAR for a product or the processor capacity of the LPAR, the WPAR resides within.

\* Based upon the greater of what the partition starts with or the result of a DLPAR operation

### License Rule for Qualified Mobility (Live Partition Mobility):

Count the maximum processor core capacity for each program concurrently within an ILMT Region.

#### Requirements:

A minimum of one ILMT server must be installed per ILMT Region where sub-capacity programs are installed.

#### ILMT Regions:

Region 1: North America & South America

Region 2: Europe & Africa

Region 3: Asia & Australia

- The licensing rules in the preceding pages reflect how ILMT will operate to calculate PVUs
- Customers must use ILMT to take advantage of the sub-capacity licensing for System WPARs.
  - Manual calculation of Virtualization Capacity is not available for System WPARs

## Key Web Links

- PVU

- [PVU table and other information](#)

- Sub-capacity

- [Passport Advantage Sub-capacity licensing Information](#)

- [Virtualization Capacity License Counting Rules](#)

- [Passport Advantage Sub-capacity licensing terms](#)