



IBM Passport Advantage Software

## Virtualization Capacity License Counting Rules

### IBM System z™ Virtualization Environment

**NOTE:** Please use these rules in conjunction with the Sub-capacity licensing attachment



@business on demand software

July 1, 2008

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## Sub-capacity Licensing Requirements Summary

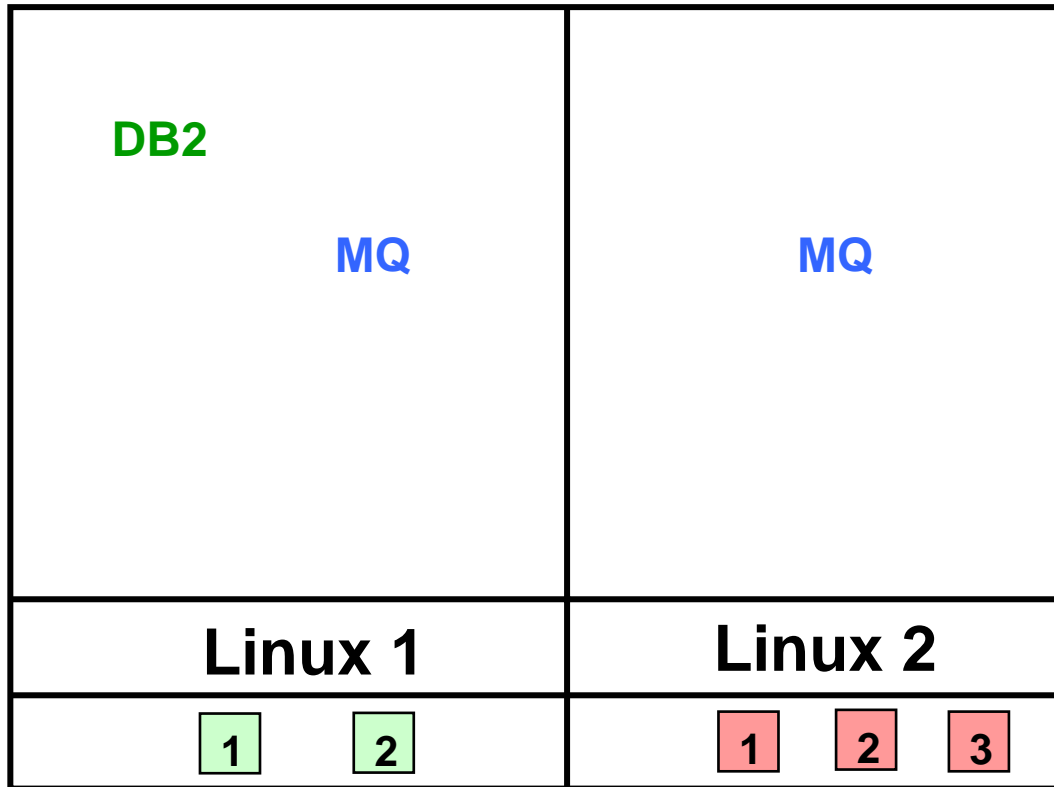
- Customers must:
  - ▶ Agree to the terms of the Sub-capacity Attachment, and follow Virtualization Capacity License Counting rules for their Eligible Virtualization Environment(s)
  - ▶ Use Eligible Sub-capacity Products, with sub-capacity part numbers
  - ▶ Use Eligible Virtualization Technologies
  - ▶ Use Eligible Processor Technologies
  - ▶ Use the IBM License Metric Tool (ILMT) and maintain report documentation
    - Certain ILMT 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.*

# LPARs with Shared Pool

## Server with 5 IFLs



## Cores to be licensed

1 IFL or CP engine = 1 processor core

DB2	MQ	Partition
2	2	Linux 1
	3	Linux 2
2	5	Total IFLs for Partition
5	5	Capacity Limit
2	5	<b>Total IFLs</b>

License Rule: The lower of the sum of each partition for a product, or the engine capacity of the shared pool

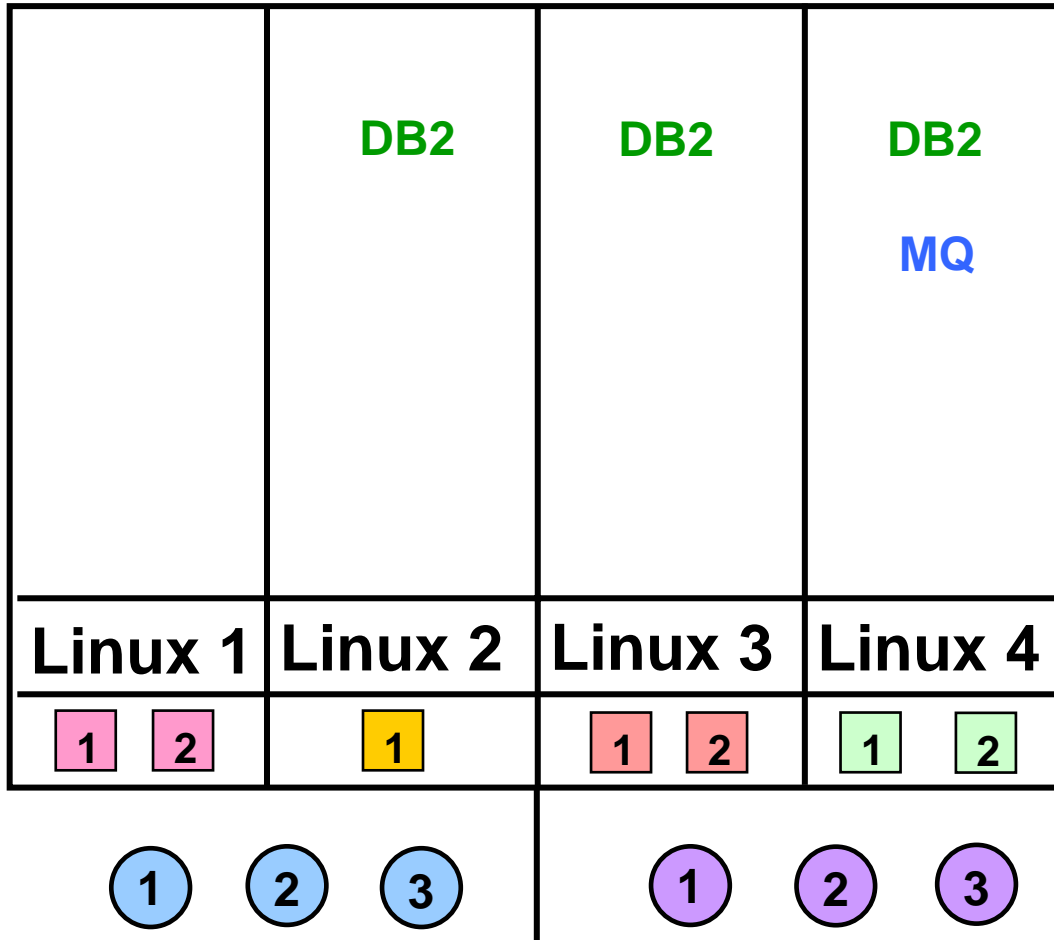
2 logical IFLs assigned to LPAR 1  
3 logical IFLs assigned to LPAR 2

5 IFLs in the shared pool



# LPARs with Shared Pool – Multiple Engine types

## Server with 3 IFLs & 3 CP engines



### Cores to be licensed

1 IFL or CP engine = 1 processor core

DB2 (IFL)	DB2 (CP)	MQ (CP)	Partition
1			Linux 2 LPAR
	2		Linux 3 LPAR
	2	2	Linux 4 LPAR
1	4	2	Tot IFL/CP for Partition
3	3	3	Capacity Limit
4 (1 IFL + 3CP)	2		Total IFL / CP engines

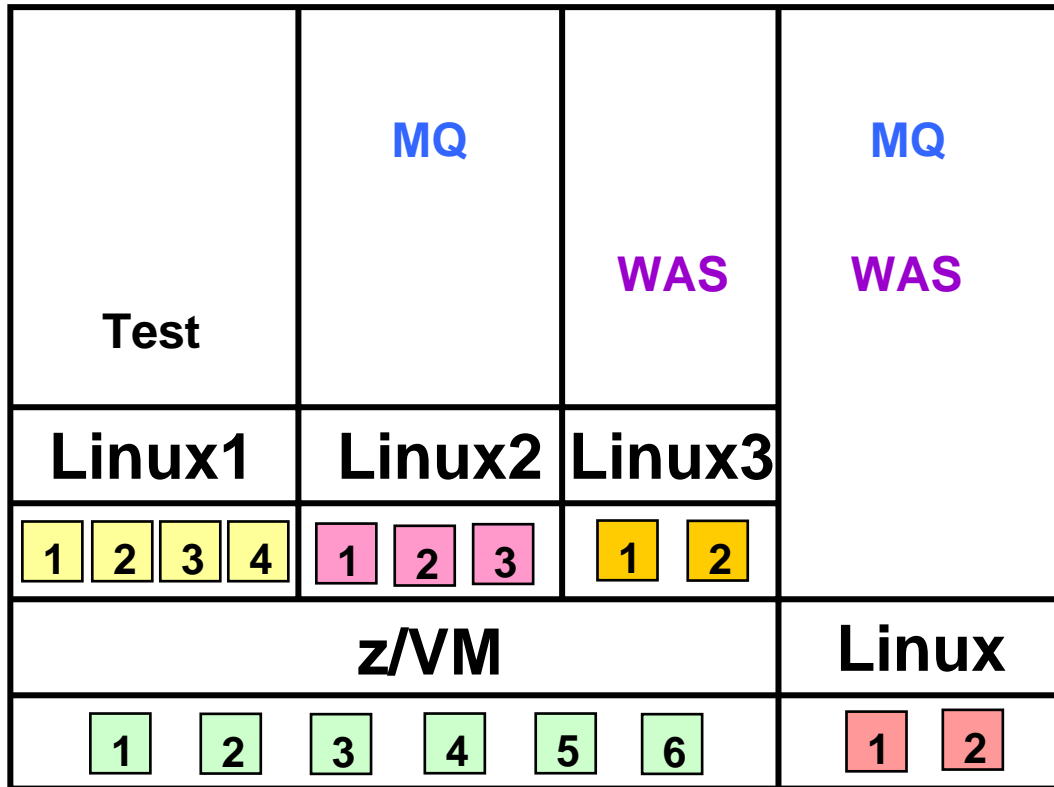
License Rule: The lower of the sum of each partition for a product, or the engine capacity of the shared pool

1 logical IFL assigned to LPAR 2  
2 logical CPs assigned to LPAR 3  
2 logical CPs assigned to LPAR 4

3 IFLs in a shared pool &  
3 CPs in a shared pool

# z/VM with Linux Guests

## Server with 8 IFLs



### Cores to be licensed

1 IFL or CP engine = 1 processor core

WAS	MQ	Partition
	3	Linux 2 VM
2		Linux 3 VM
2	3	Total IFLs for Partitions
6	6	Capacity Limit
2	3	Total IFLs for z/VM LPAR
2	2	Linux LPAR
4	5	<b>Total IFLs</b>

License Rule: The lower of the sum of each partition for a product, or the engine capacity of the shared pool

3 Linux Virtual Machines with 9 virtual engines

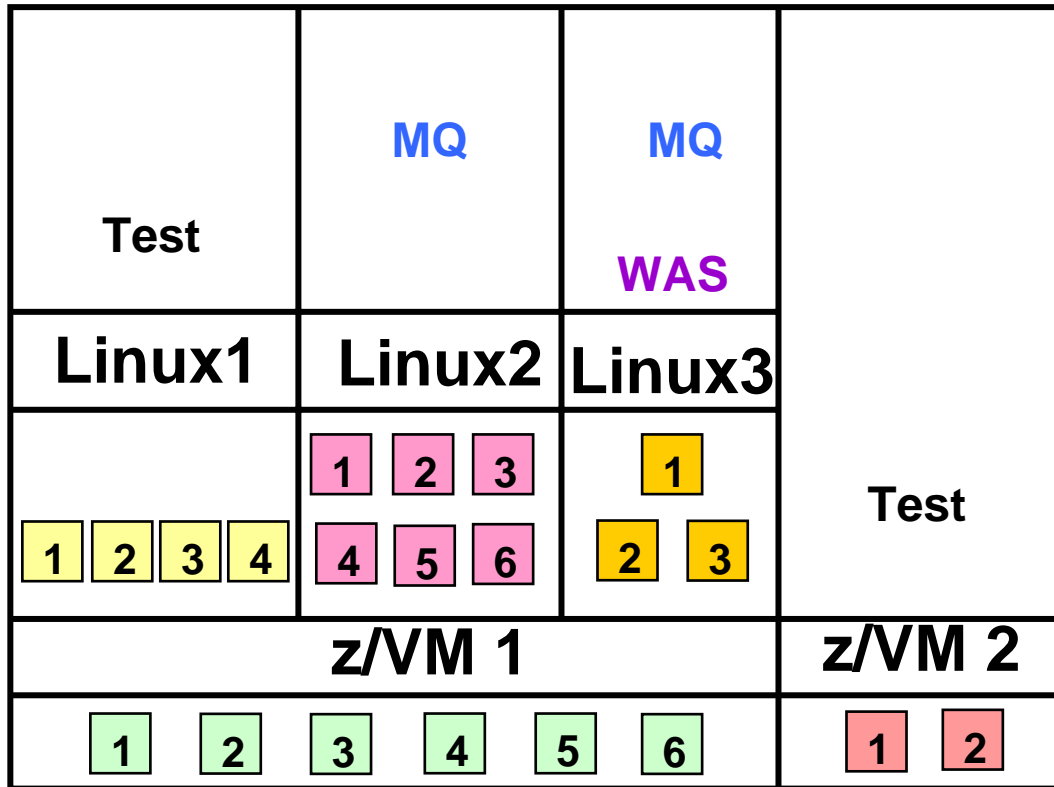
6 logical IFLs assigned to z/VM LPAR  
2 logical IFLs assigned to Linux LPAR

8 IFLs in the shared IFL pool



# z/VM with Linux Guests – Capping at Shared Pool

## Server with 8 IFLs



### Cores to be licensed

1 IFL or CP engine = 1 processor core

WAS	MQ	Partition
	6	Linux 2
3	3	Linux 3
3	9	Total IFLs for Partitions
6	6	Capacity Limit
3	6	Total IFLs

License Rule: The lower of the sum of each partition for a product, or the engine capacity of the shared pool

3 Linux Virtual Machines with 13 virtual engines

6 logical IFLs assigned to z/VM1 LPAR  
2 logical IFLs assigned to z/VM2 LPAR

8 IFLs in the shared pool

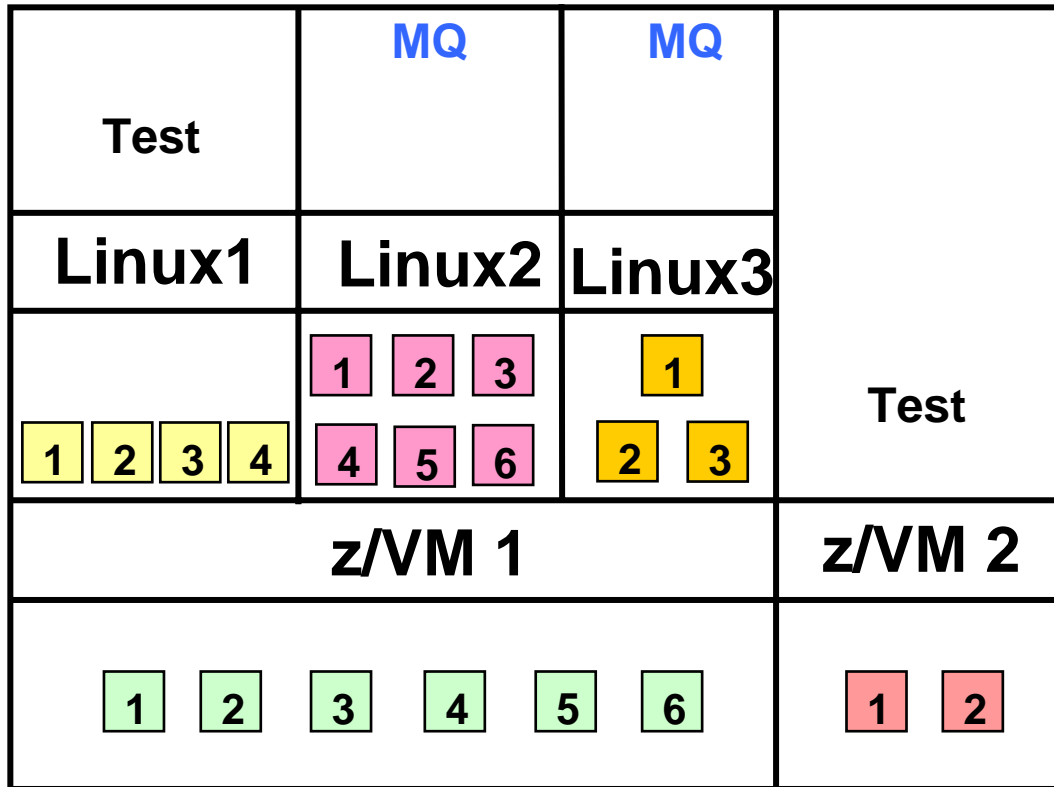


# z/VM with Linux Guests – Capping at Server

## Cores to be licensed

### Server with 4 IFLs

1 IFL or CP engine = 1 processor core



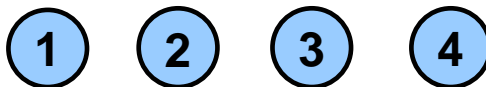
MQ	Partition
6	Linux 2
3	Linux 3
9	Total IFLs for Partitions
6	Capacity Limit Pool
6	Total IFLs for z/VM 1 LPAR
4	Capacity Limit Server
4	<b>Total IFLs</b>

License Rule: The lower of the sum of each partition for a product, or the engine capacity of the shared pool. The licenses will not exceed the number of activated engines in the server.

3 Linux Virtual Machines with 13 virtual engines

6 logical IFLs assigned to z/VM1 LPAR  
2 logical IFLs assigned to z/VM2 LPAR

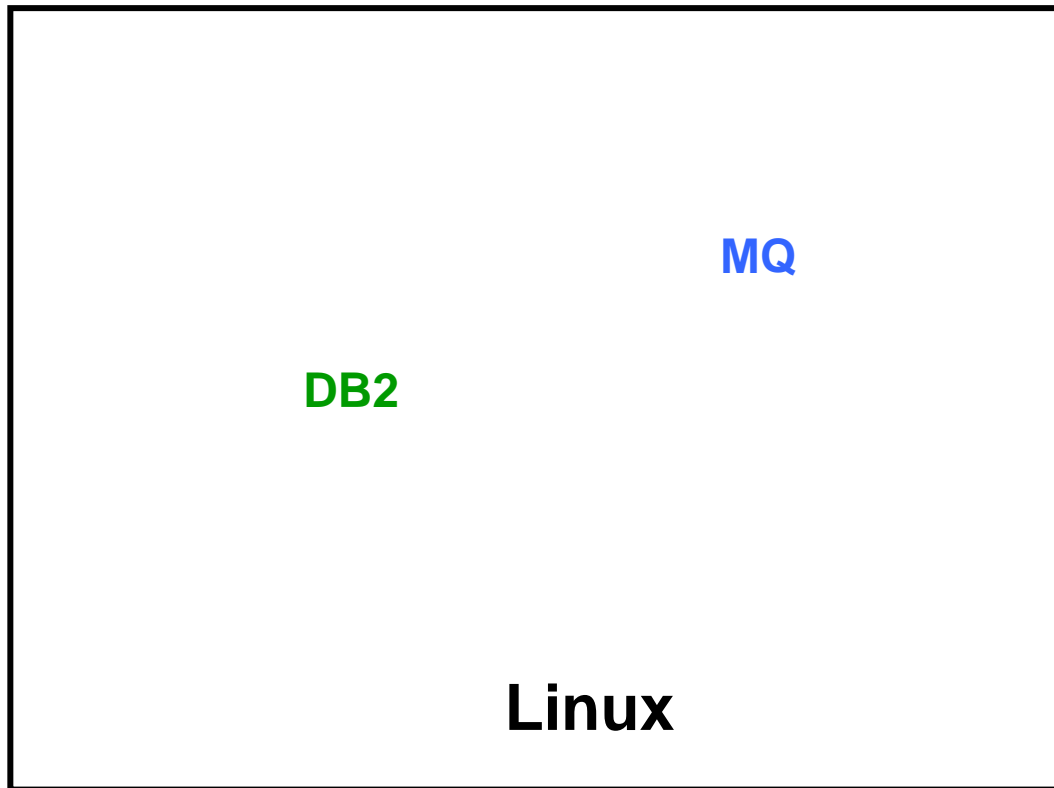
4 IFLs in the shared pool





## Machine in Basic Mode – No Partitioning

### Server with 5 CPs



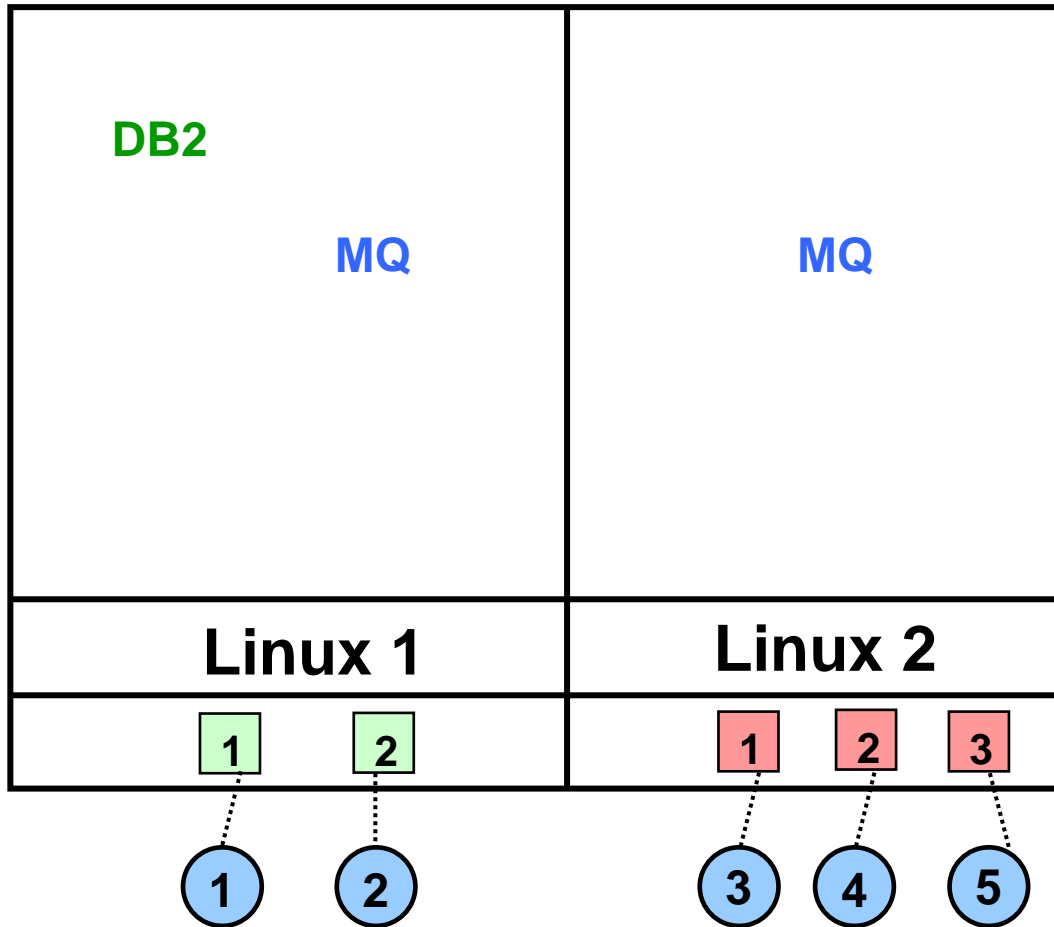
**DB2** must be licensed for the **5 CP Engines**

**MQ** must be licensed for the **5 CP Engines**

5 CPs in the server

# Server with Dedicated LPARs

## Server with 5 IFLs



### Cores to be licensed

1 IFL or CP engine = 1 processor core

DB2	MQ	Partition
2	2	Linux 1
	3	Linux 2
2	5	Total IFLs for Partition
5	5	Capacity Limit
2	5	<b>Total IFLs</b>

License Rule: The sum of each partition for a product, or the physical capacity of the server

2 logical IFLs assigned to LPAR 1  
3 logical IFLs assigned to LPAR 2

5 IFLs in the server

## ILMT Licensing Counting Rules for Single Server Environments

- The lower of the sum of each partition for a product, or the engine capacity of the shared pool that the partition obtains its resources from. Note: This limit does not affect the additional licenses that might be required for dedicated partitions
  - Example: Maximum of 7 IFLs to be licensed for a shared pool with 7 IFLs.
  - For z/VM guests: The lower of the sum of the virtual engines available to each guest for a product, or the engine capacity of the z/VM LPAR that the guest obtains its resources from.
    - Example: Maximum of 5 IFLs to be licensed for a z/VM LPAR with 5 IFLs.
- The maximum licenses required for a program on a server, will not exceed the number of activated engines of the given type (IFL or CP engine) in the server, that are available to the program.
  - Example: Server with 4 IFLs and 3 CP engines. IFL capacity is available to DB2. CP capacity is not available to DB2. Maximum 4 IFL engines need to be licensed for DB2.

## System z Definitions

- **Logical Partition (LPAR):**

- ▶ IBM System z servers can be partitioned into separate logical computing systems. System resources (memory, processors, I/O devices) can be divided or shared among many such independent logical partitions (LPARs) under the control of the LPAR hypervisor, which comes standard on all System z servers. Each LPAR supports an independent operating system (OS) loaded by a separate initial program load (IPL).

- **Virtual Machine (VM):**

- ▶ z/VM is an operating system implementation of IBM virtualization technology providing the capability to run full-function operating systems such as Linux on System z and z/OS as “guests” of z/VM. These guests are called virtual machines and perform as if they were completely independent machine environments as far as the guest operating system is concerned.

## System z Definitions continued

### ■ **Processor types:**

- ▶ System z servers have several types of processors (also called engines), two of which are pertinent for distributed software licensing purposes:
  - *Central Processor (CP), also known as a General Purpose processor, which can execute any kind of workload*
  - *Integrated Facility for Linux (IFL) processor which is limited to executing only Linux for System z workloads with or without the z/VM hypervisor*

### ■ **Dedicated Partition:**

- ▶ Resources are only moved between partitions “explicitly” (e.g. by an operator or a scheduled job)
- ▶ Engines are always allocated in whole increments

### ■ **Shared Pool:**

- ▶ Pool of IFL or CP engines shared by partitions
- ▶ System automatically dispatches processing resources between partitions as needed
- ▶ Engines are always allocated in whole increments

## Manual Calculation of Virtualization Capacity

- Eligibility Criteria: Customers must use the IBM License Metric Tool, with the following exceptions
  - ▶ ILMT does not support the Eligible Virtualization Environment
  - ▶ Customer has fewer than 1000 employees and contractors - [Tool recommended](#)
  - ▶ Customer server Full Capacity licensing for a PVU product is less than 1000 PVUs (on servers with an Eligible Virtualization Environment) - [Tool recommended](#)
  
- Requirements: For the above exceptions, customers must manually manage, track and prepare Audit Reports
  - ▶ A separate Audit Report must be prepared for each Eligible Sub-Capacity Product deployed for each Eligible Virtualization Environment
    - *Which can be a Single Server or a Group of Servers “Cluster”*
  - ▶ Audit Reports must be prepared as frequently as is required to maintain a history of increases to Virtualization Capacity and Full Capacity
  - ▶ Each Audit Report must be signed and date stamped, at least once per quarter

*The above is only a summary. For detailed terms please see the [Sub-capacity licensing attachment](#)*

# Manual Calculation of Virtualization Capacity – Rules

## For Single Server Environments:

### License Rules for LPARs and z/VM guests for each product:

- ▶ for a Dedicated LPAR, the highest\* number of logical engines or IFLs allocated to the LPAR for a product
- ▶ for a z/VM guest, the highest\* number of virtual engines available to each guest for a product

*\*The greater of what the partition starts with or the result of an increase in capacity (in whole cores)*

The PVU licensing requirement is based on the maximum number of virtual engines (cores) in the partitions available to a product.

The lower of the sum of the virtual engines or server capacity (number of activated engines of the given type { IFL or CP engine } in the server)

**If you want to use sub-capacity licensing for any other IBM System z technology, including shared processor pool, you must use the ILMT tool**

# Manual Calculation of Virtualization Capacity - Worksheet Example

**Worksheet has 3 tabs;  
use the following tabs**

- Instructions & Information
- Single Server

Web Link: Worksheet for  
Manual Calculation of  
Virtualization Capacity

<b>VIRTUALIZATION ENVIRONMENT - SINGLE SERVER</b>		
- This worksheet is for one standalone server for one Software Product		
- Enter data for all input fields below (shaded area)		
Product Name	IBM WEBSHERE APPLICATION SERVER NETWORK DEPLOYMENT SUBCAPACITY PROCESSOR VALUE UNIT (PVU)	
Part Number	D55VGLL	
Date	Jul 31, 2008	
Server ID / Location	Server ID # F6015; Bldg 1, Room 1, Somers, NY	
Server Vendor / Brand	IBM System x	
Virtualization Technology used	VMware ESX 3.0 & VMotion	
Server Model	x3500	
Processor Vendor / Brand	Intel Xeon Quad Core	
PVUs per core (A)	50	
Total Activated Cores on Server	8	
Full Capacity PVUs for Server	400	
DO NOT DELETE ROW		
VM or Partition ID	Cores (B) per Partition or VM	User Comments
A	1	
B	2	
C	2	
Sum of Virtual Cores	5	
PVUs per core	50	
Virtualization Capacity PVUs by Product for Server	250	
PVU Licenses required by Product for Server (C)	<b>250</b>	
(A) PVU's required for each physical core are listed on the PVU table (see link below) <a href="http://www-306.ibm.com/software/lotus/passportadvantage/pvu_licensing_for_customers.html">http://www-306.ibm.com/software/lotus/passportadvantage/pvu_licensing_for_customers.html</a>		
(B) For purposes of 'Manual Calculation' of Virtual Capacity, 1 virtual core (or CPU) is equivalent to 1 physical core. Enter values in whole cores.		
(C) Lower of Full Capacity or Virtualization Capacity		
<span>▶</span> <span>▶▶</span> <span>Instructions + Information</span> <b>Single Server</b> <span>Group of Servers "Cluster"</span> <span>◀</span>		



## Key Web Links

- PVU

- [PVU table and other information](#)
- [Guide to identifying your processor](#)

- Sub-capacity

- [Passport Advantage Sub-capacity licensing Information](#)
- [Virtualization Capacity License Counting Rules](#)
- [Sub-capacity licensing attachment](#)

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