



IBM Software

Sub-Capacity Licensing for Select IBM Distributed Middleware through Passport Advantage

Further Improving Software Value as Technology Advances

Agenda

Overview

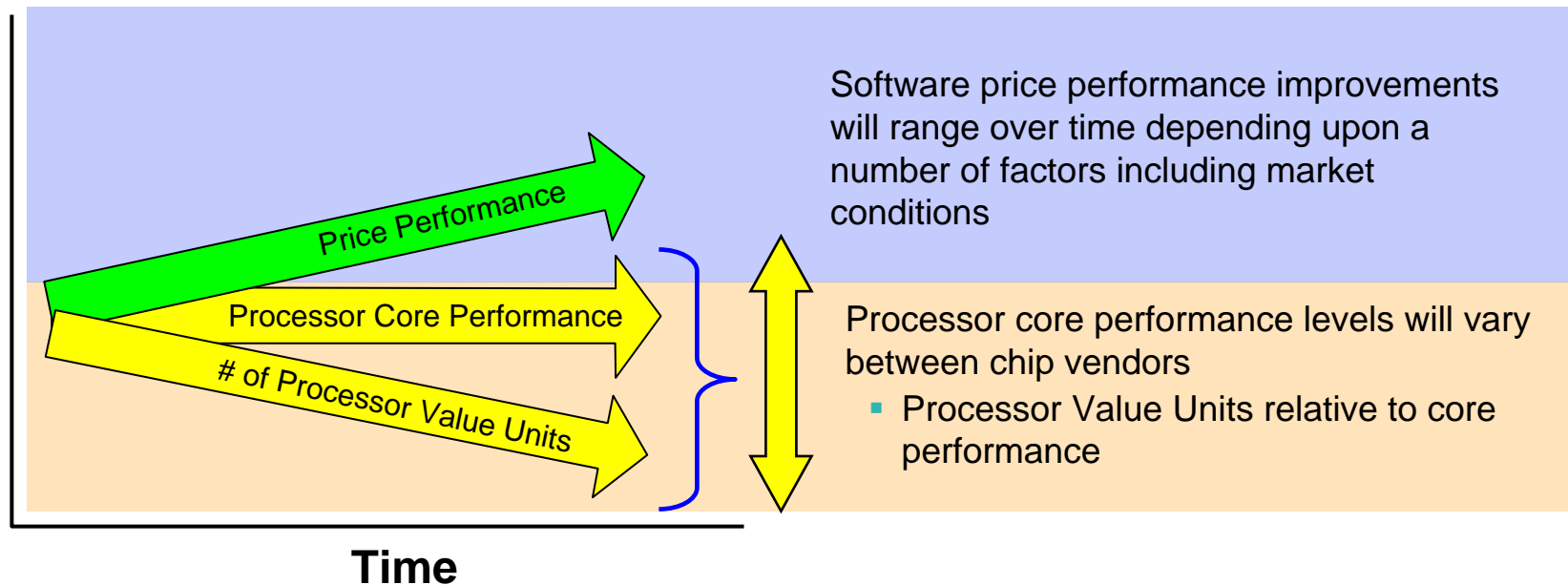
- **Processor Value Units (PVUs) Flexibility**
- **What is sub-capacity licensing?**
- **Eligible products and partitioning technologies**
- **Sub-Capacity licensing requirements**
- **Temporary suspension in 2007 of certain requirements**
- **Full capacity to sub-capacity license conversions**
- **Benefits of sub-capacity licensing**
- **Useful Links**

Sub-Capacity license counting scenarios

- **Basic pricing and licensing concepts**
- **Sub-Capacity license counting**

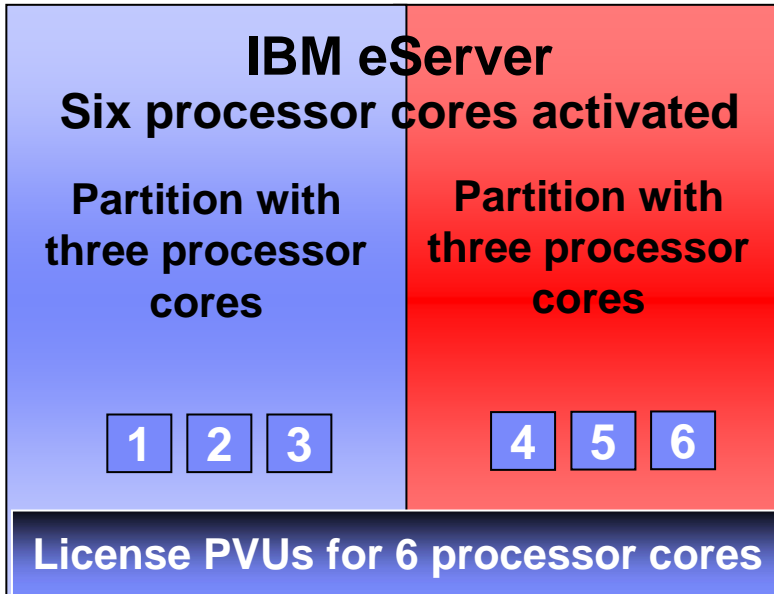
Processor Value Units Provide Flexibility Through Granularity

- **Continue licensing at the processor core level**
 - Adaptable to up or down changes in processor core performance
 - Granularity to address changing technology
- **Flexibility to deliver software price performance improvements for new processor technologies**

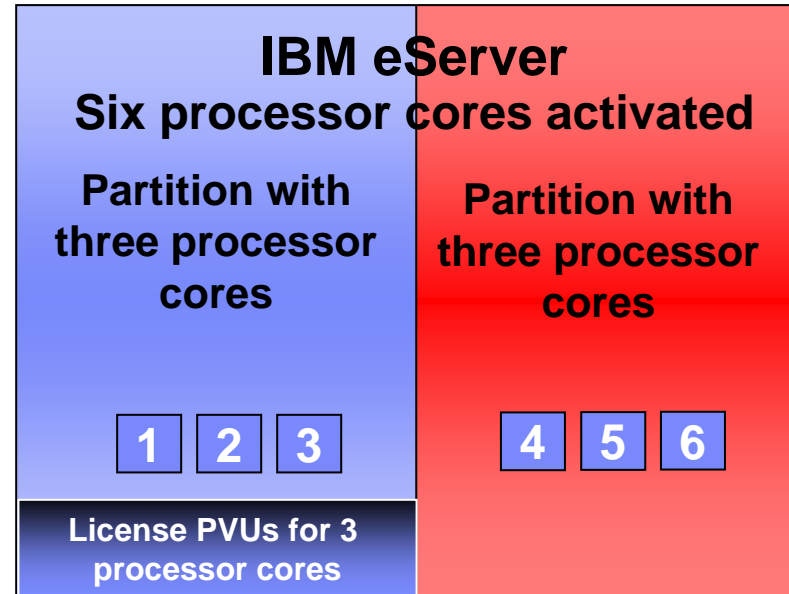


What is Sub-Capacity Licensing?

Full Capacity



Sub-Capacity



- Full capacity requires PVU entitlements for all activated processor cores in a server
- Sub-Capacity licensing limits the PVU entitlements to the number of processor cores in the partition(s) that are available to the software
- Applicable only to SW that use the Processor Value Unit metric

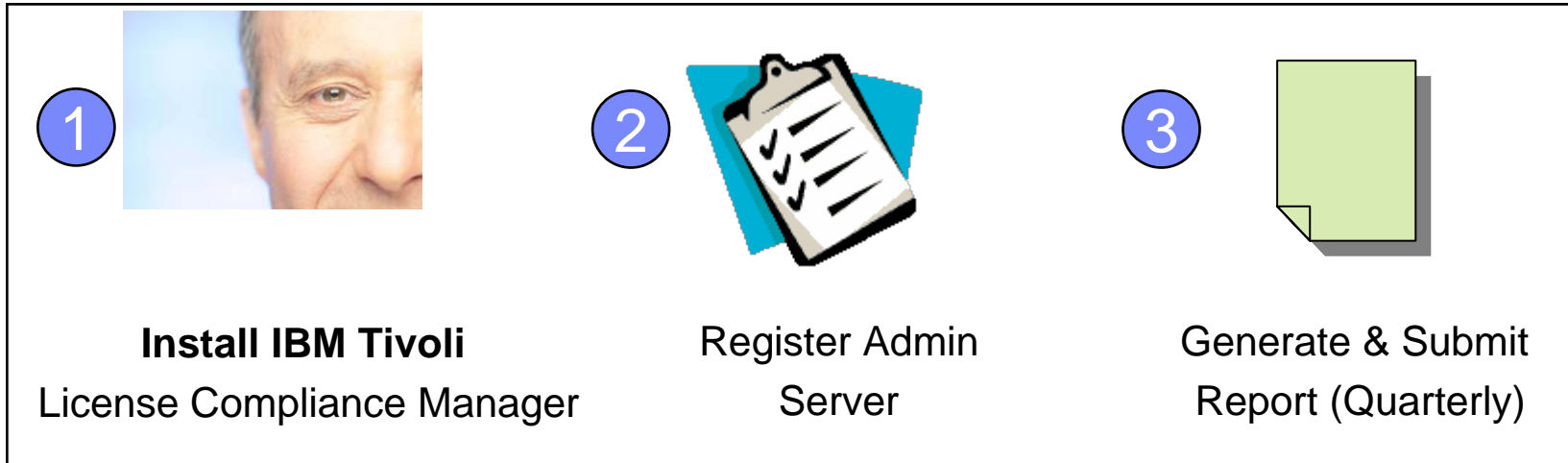
Sub-Capacity Eligible Products and Partitioning Technologies

- Sub-Capacity eligible distributed middleware products:
 - Selected WebSphere products
 - Selected Information Management products
 - Selected Workplace products
- Sub-Capacity eligible partitioning technologies:
 - AIX, i5/OS, OS/400, Linux (Power)
 - HP-UX (PA-RISC, Itanium)
 - Solaris (UltraSPARC)*
 - Windows (x86 with VMware ESX Server 2.5 & GSX 3.1, Microsoft Virtual Server)*
 - Linux x86 with VMware ESX Server 2.5 & GSX 3.1
 - Linux for System z
- List of participating products and supported partitioning technologies on [Passport Advantage](#)

• Currently the minimum sub-capacity licensing for Intel/AMD x86 is to the total cores on a chip, not to the individual processor core. Currently sub-capacity licensing is not available for the Sun T1 multi-core

Sub-Capacity Licensing Requirements

- Customers must agree to the terms of the sub-capacity attachment



► Install IBM Tivoli License Compliance Manager

- Identifies processor type and number of processor cores
- Identifies IBM software deployed on servers
- Calculates PVUs required based on high water mark processor capacity

Please note: Customers are responsible for the installation of IBM Tivoli License Compliance Manager for IBM Software and for the server it runs on. If they require assistance, Tivoli has a Quick Start Services engagement available for a fee.

Sub-Capacity Licensing Requirements Temporarily Suspended

- **What sub-capacity requirements are temporarily suspended?**
 - Install ITLCM to discover hardware technology, software products, and resulting number of licenses required
 - Register Admin Server - load and map acquired license entitlements into ITLCM
 - Report quarterly to IBM

- **Why did IBM temporarily suspend the requirements?**
 - To simplify and improve the sub-capacity offering (product & process)

- **How was the suspension of requirements communicated?**
 - E-mail and conference call with IBM sellers in April 2007
 - Letters to all existing sub-capacity customers in April 2007, and to each new sub-capacity customer
 - Sub-Capacity IBM websites updated in April 2007

- **When will improved sub-capacity requirements be announced?**
 - Planned for 4Q2007

Customers remain responsible for acquiring sufficient quantities of license authorizations to comply with the sub-capacity offering terms. New sub-capacity customers must sign sub-capacity attachment

Full Capacity to Sub-Capacity License Conversions

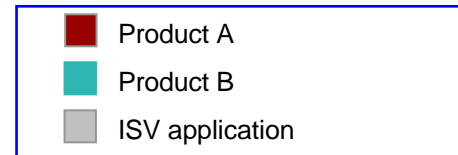
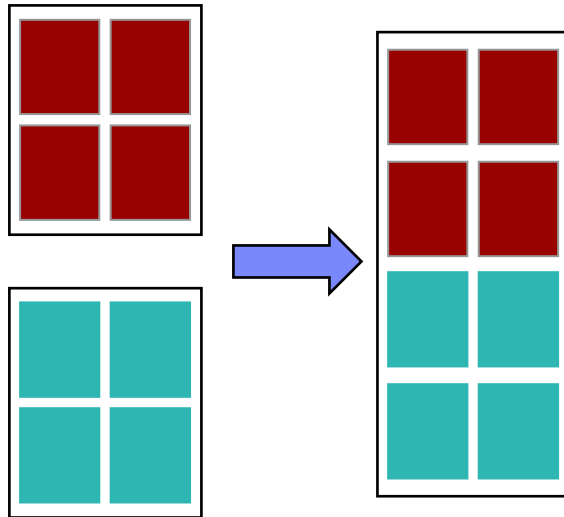
- Customers may convert full capacity license entitlements to sub-capacity license entitlements
 - No refunds, credits, or substitutions
 - Must be in compliance prior to conversion

- Sub-Capacity products have unique part numbers
 - Same PVU list price for both sub-capacity and full capacity
 - Higher value from better utilization of licenses in a virtualized environment

- Customers must create partitions (hardware or software) prior to deploying eligible middleware in a sub-capacity environment
 - Using eligible OS and partitioning technologies

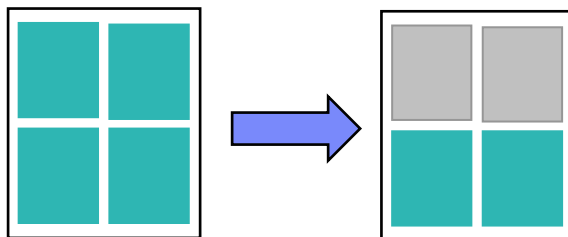
Common Conversion Scenarios *

Sub-Capacity on a new consolidated system



- Requires 400 PVU entitlements for the four processor cores on each server prior to conversion
- Convert 400 PVU entitlements of Prod A & 400 PVUs entitlements of Prod B to sub-capacity
- Migrate licenses to new consolidated system with sub-capacity licenses

Sub-Capacity on an existing system



- Requires 400 PVU entitlements for the four processor cores on the server prior to conversion
- Convert 200 PVU entitlements to sub-capacity
- Remaining 200 PVU software maintenance entitlements available for new applications

* Assumption of 100 PVUs per core used for each server example above

Benefits of Sub-Capacity Licensing

- Allows customers to license less than the full capacity of the server
 - Provides more licensing granularity and flexibility
 - Aligns license cost to capacity made available

- Customers can leverage partitioning technology to optimize their system design
 - Leverages server virtualization capabilities
 - Improves server utilization
 - Optimize software cost

Useful Links

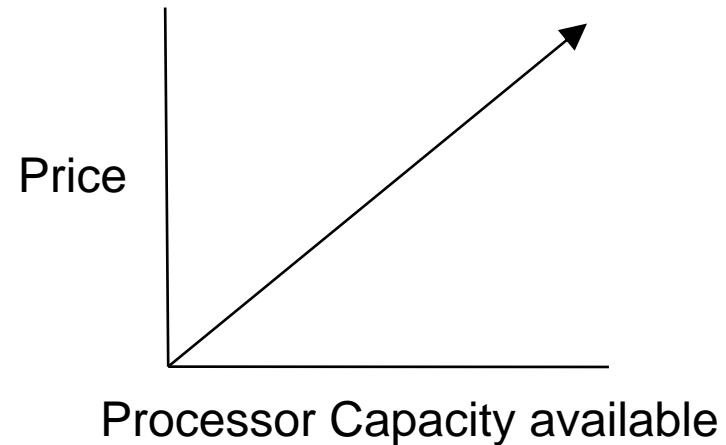
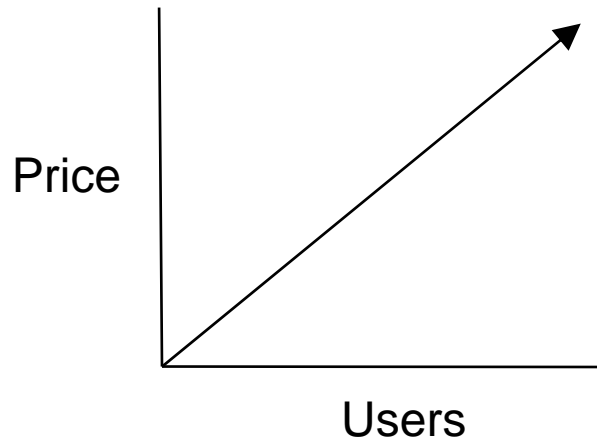
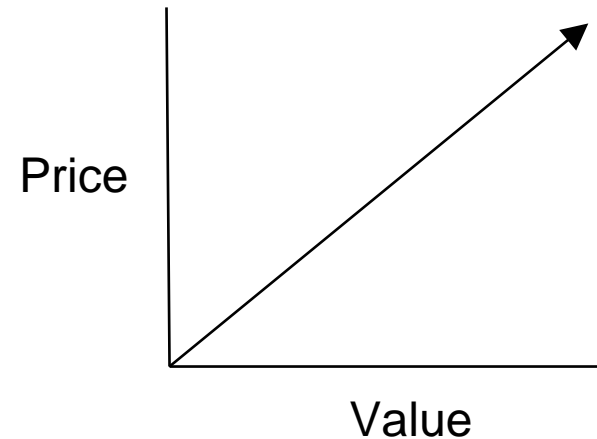
- Sub-Capacity licensing:
 - <http://www-142.ibm.com/software/sw-lotus/services/cwepassport.nsf/wdocs/subcaplicensing>
- Sub-Capacity Eligible product list
 - ftp://ftp.software.ibm.com/software/passportadvantage/SubCapacity/Sub_Capacity_Eligible_Products.pdf
- Sub-Capacity Eligible Partitioning Technologies
 - ftp://ftp.software.ibm.com/software/passportadvantage/SubCapacity/Sub_Capacity_Eligible_Partitioning_Technologies_20060630.pdf
- Sub-Capacity attachment
 - <http://www-142.ibm.com/software/sw-lotus/services/cwepassport.nsf/wdocs/subcapacityattachments>
- Sub-Capacity customer letter for temporary suspension
 - http://www-142.ibm.com/software/sw-lotus/services/cwepassport.nsf/wdocs/temporary_tracking_reporting_requirement_suspension

- PVU Table:
 - http://www-142.ibm.com/software/sw-lotus/services/cwepassport.nsf/wdocs/pvu_table_for_customers
- PVU Resources for Customers:
 - http://www-142.ibm.com/software/sw-lotus/services/cwepassport.nsf/wdocs/pvu_customer_resources

Sub-Capacity License Counting Scenarios

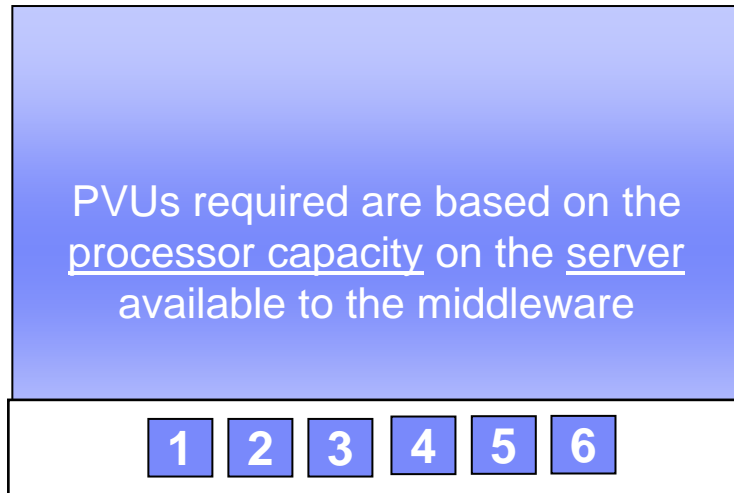
Basic Pricing and Licensing Concepts

- ▶ Price scales to value
- ▶ Balance licensing precision with simplicity
- ▶ Price competitively

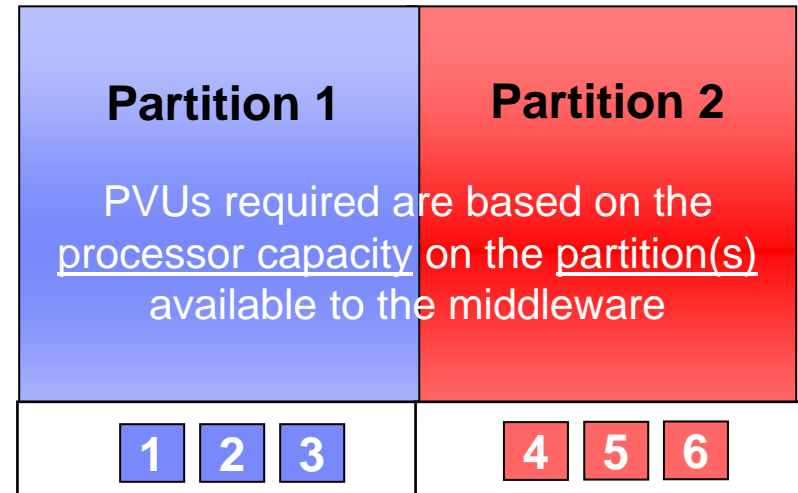


Basic Pricing and Licensing Concepts

Full capacity Server



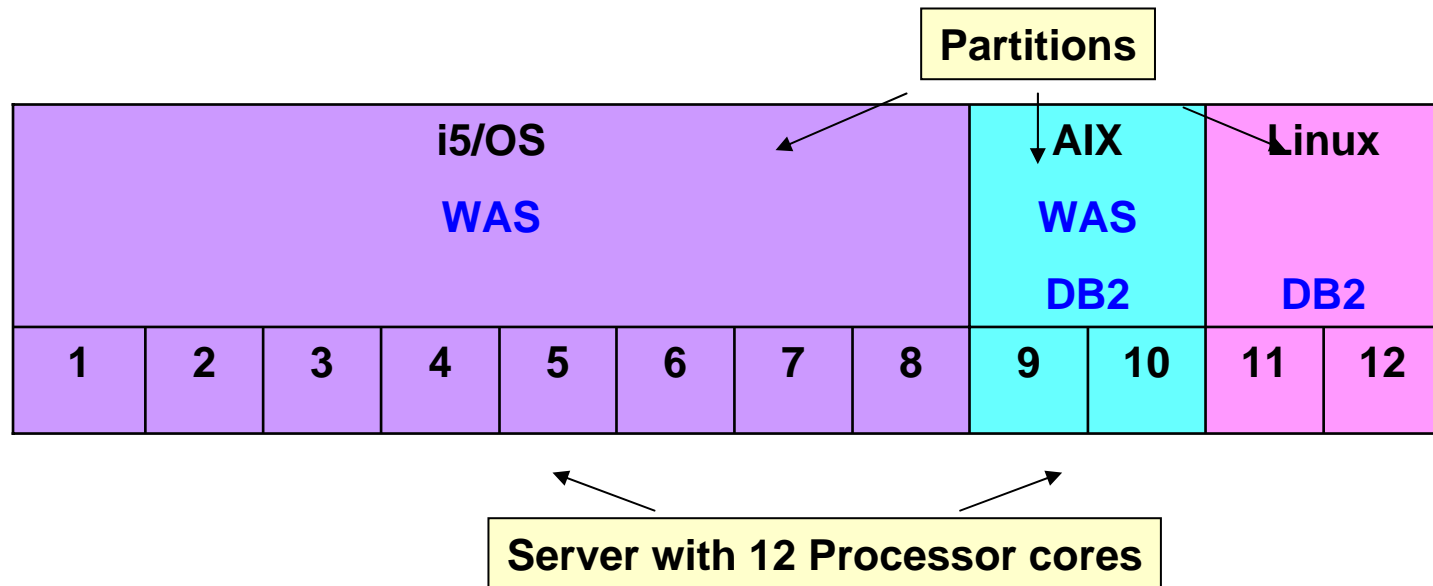
Sub-Capacity Server



- ▶ Processor capacity is based on the number of processor cores
- ▶ The performance per core is measured by industry standard benchmarks
 - ▶ Used to establish PVU rating for each processor core

Sub-Capacity License Counting – Dedicated LPAR

- License entitlements required are based on processor cores available to the middleware in the partition
- For the example below:
 - WebSphere Application Server (WAS): PVUs for 10 cores need to be licensed
 - DB2 Enterprise Server Edition (DB2): PVUs for 4 cores need to be licensed



Sub-Capacity License Counting - Dynamic LPAR

- System i5 and System p5 provide the capability to dynamically move processor core resources between partitions
- Customer must acquire PVUs for the highest* number of processor cores available to middleware

Example:

Customer's basic configuration:

i5/OS WAS								AIX WAS DB2		Linux DB2	
1	2	3	4	5	6	7	8	9	10	11	12

Changed during batch peak:

i5/OS WAS									AIX WAS DB2	Linux DB2	
1	2	3	4	5	6	7	8	9	10	11	12

Changed for simulation work:

i5/OS WAS						AIX WAS DB2				Linux DB2	
1	2	3	4	5	6	7	8	9	10	11	12

- License PVUs for: 10 WAS cores (consistent throughout) + 6 DB2 cores (from simulation peak)

* greater of a) what the partition starts with or b) the result of a DLPAR operation

License Counting – Shared Pool with Capped and Uncapped Partitions

Server with 12 processor cores

n1 Capped AIX DB2	n2 Uncapped i5/OS WAS
VP = 6 PrU = 4.00	VP = 7 PrU = 5.00

WAS cores to license:

- 7 for uncapped partition n2

A i5/OS	B AIX	C Linux	Shared Pool (9 processor cores)								
1	2	3	4	5	6	7	8	9	10	11	12

DB2 cores to license:

- 4 from PrU for capped partition n1

License:

- For Capped: PrU (Processing Unit) equal to the highest* amount of Entitled Capacity
- For Uncapped: VP (Virtual Processor) equal to the highest* amount of Online VPs

* Greater of what the partition starts with or the result of a DLPAR operation

License Counting – Shared Pool with Capped and Uncapped Partitions

Server with 12 processor cores

WAS cores to license:

- 2 from PrU for capped partition F
- 10 for uncapped partitions (7 for G + 3 for H)
- **12 total reduced to 9 = maximum cores available in shared pool**

D Capped i5/OS	E Capped AIX DB2	F Capped Linux WAS DB2	G Uncapped i5/OS WAS	H Uncapped AIX WAS DB2
VP = 1 PrU = 1.00	VP = 4 PrU = 2.00	VP = 4 PrU = 2.00	VP = 7 PrU = 3.00	VP = 3 PrU = 1.00

A i5/OS	B AIX DB2	C Linux	Shared Pool (9 processor cores)								
1	2	3	4	5	6	7	8	9	10	11	12

DB2 cores to license:

- 1 from dedicated partition B
- 4 from PrU for capped partitions E and F
- 3 from VP for uncapped partition H
- 8 total**

License:


- For Capped: PrU (Processing Unit) equal to the highest* amount of Entitled Capacity
- For Uncapped: VP (Virtual Processor) equal to the highest* amount of Online VPs

* Greater of what the partition starts with or the result of a DLPAR operation

Sub-Capacity License Cost with Capped and Uncapped Partitions – POWER5

- Using scenario from previous page:

Server has 12 processor cores

Partition > Prod.	Server has 8 partitions								Total Cores*	Total Licenses (Cores X 100 PVUs/core)	Total Cost @ SRP (PVUs x Price/core)
	A	B	C	D	E	F	G	H			
				Shared pool 9 cores							
WAS ND						2	7	3	9 (max in shared pool) 	900 PVUs	\$139.5K USD
DB2		1			2	2		3	8	800 PVUs	\$300.0K USD

*** Assumes POWER5 cores @ 100 PVUs per core**

Backup

License counting – Shared Pool with Capped and Uncapped Partitions & Micro Partitioning

Server with 12 processor cores

WAS cores to license:

- 1.3 from PrU for capped partition F
- 10 for uncapped partitions (7 for G + 3 for H)
- Total 11.3 rounded to 12
- **Reduced to 9 = maximum cores available in shared pool**

<p style="text-align: center;">D</p> <p style="text-align: center;">Capped</p> <p style="text-align: center;">i5/OS</p> <p style="text-align: center;">VP = 1</p> <p style="text-align: center;">PrU = 2.10</p>	<p style="text-align: center;">E</p> <p style="text-align: center;">Capped</p> <p style="text-align: center;">AIX</p> <p style="text-align: center;">DB2</p> <p style="text-align: center;">VP = 4</p> <p style="text-align: center;">PrU = 1.60</p>	<p style="text-align: center;">F</p> <p style="text-align: center;">Capped</p> <p style="text-align: center;">Linux</p> <p style="text-align: center;">WAS</p> <p style="text-align: center;">DB2</p> <p style="text-align: center;">VP = 4</p> <p style="text-align: center;">PrU = 1.30</p>	<p style="text-align: center;">G</p> <p style="text-align: center;">Uncapped</p> <p style="text-align: center;">i5/OS</p> <p style="text-align: center;">WAS</p> <p style="text-align: center;">VP = 7</p> <p style="text-align: center;">PrU = 3.00</p>	<p style="text-align: center;">H</p> <p style="text-align: center;">Uncapped</p> <p style="text-align: center;">AIX</p> <p style="text-align: center;">WAS</p> <p style="text-align: center;">DB2</p> <p style="text-align: center;">VP = 3</p> <p style="text-align: center;">PrU = 1.00</p>
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<p style="text-align: center;">A</p> <p style="text-align: center;">i5/OS</p>	<p style="text-align: center;">B</p> <p style="text-align: center;">AIX</p> <p style="text-align: center;">DB2</p>	<p style="text-align: center;">C</p> <p style="text-align: center;">Linux</p>	<p>Shared Pool (9 processor cores)</p>								
1	2	3	4	5	6	7	8	9	10	11	12

DB2 cores to license:

- 1.0 from dedicated partition B
- 6.0 from shared pool
- 2.9 from PrU for capped partitions E and F
- 3.0 from VP for uncapped partition H
- 5.9 rounded up to 6.0
- 7.0 total cores to license**

License:

- For Capped: PrU (Processing Unit) equal to the highest* amount of Entitled Capacity
- For Uncapped: VP (Virtual Processor) equal to the highest* amount of Online VPs

* Greater of what the partition starts with or the result of a DLPAR operation

Sub-Capacity Attachment - Definitions and “Rules”

- **Dedicated partition:**
 - Processors are always allocated in whole increments (no micro-partitioning)
 - Resources are only moved between partitions “explicitly” (e.g. by an operator or a scheduled job)
- **Processing Unit (PrU)**
 - Is a unit of measure for shared processing capacity. One PrU accomplishes approximately the same work as one dedicated processor core
- **Entitled Capacity**
 - The actual PrU available to a partition. May be changed via DLPAR operation after startup
- **Virtual Processor (VP)**
 - Defines the maximum number of physical processor cores that the system can access simultaneously to provide the processing capacity of a shared processors partition
 - The processing capacity of a partition is evenly distributed across the virtual processors
- **Online VP**
 - The actual VPs available to a partition. May be changed via DLPAR operation after startup.
- **Shared pool:**
 - Pool of processor cores shared by capped and uncapped partitions
 - System automatically moves processor core resources between partitions as needed
 - Processor cores are allocated in increments of 0.01 processor CORE

Sub-Capacity Attachment - Definitions and “Rules”

- **Shared processors Partition (Also known as Micro-partition LPAR)**
 - A logical partition that utilizes processor resources from the shared processing pool using Micro-Partitioning technology are referred to as shared processor partitions.
 - The processing unit assigned to a shared processors partition is known as processor entitlement, or entitled capacity. A shared processors partition can be defined as “capped” and “uncapped”
 - The POWER Hypervisor automatically moves processor core resources among partitions based on each partition’s entitled capacity, “capped or uncapped” attributes, and its load
 - To calculate the number of license entitlements the customer should acquire, add up the total number of processing units from all the shared processors partitions per server then round up to the next whole number of processor cores (aggregate and round up)
- **Capped partition:**
 - This type of shared processor partition can never be allocated processing capacity that is more than its Entitled Capacity PrU
- **Uncapped partition:**
 - This type of shared processor partition can be allocated processing capacity that can exceed its Entitled Capacity PrU. It can access the unused processor cores in the shared pool, when available, up to the Online VP value (VP).
- **Micro-partitioning:**
 - The ability to divide a physical processor’s computing power into fractions of a processing unit and share them among multiple logical partitions.
 - To obtain the number of license entitlements the customer should acquire, add up the total number of cores per server then round up to the next whole number of processor cores (aggregate and round up)
 - Processor units are allocated in increments of 0.01 processor core
- **Maximum license requirements**
 - Customer does not have to purchase more licenses for a product than the number of processor cores on the machine (e.g. maximum DB2 licenses on a 12 core machine is 12)
 - Customer does not have to purchase more “shared pool” licenses for a product than the number of processor cores assigned to the shared pool (e.g. maximum of WAS licenses for a shared pool with 7 processor cores is 7). Note: This limit does not affect the additional licenses that might be required for dedicated partitions

Sub-Capacity Licensing – Settings

■ **Processor Capacity setting:**

- Determines the amount of PrUs assigned to the partition. Customers specify the minimum, desired, and maximum values
 - Minimum: Amount of PrU required to start up the partition
 - Desired: The desired amount of PrU for the partition to start with
 - Maximum: Used as an upper limit for future Dynamic LPAR (DLPAR) operations that customers execute to increase entitled capacity.

■ **Virtual Processor setting:**

- Determines the amount of VPs assigned to the partition. Customers specify the minimum, desired, and maximum values.
 - Minimum: Amount of VPs required to start up the partition.
 - Desired: The desired amount of VPs for the partition to start with
 - Maximum: Used as an upper limit for future dynamic LPAR (DLPAR) operations that customers execute to increase the number of virtual processors.

Sub-Capacity Licensing – Capped & Uncapped Partitions

■ Capped partition:

- This type of shared processor partition can never be allocated processing capacity that is more than its Entitled Capacity PrU
- The PrU defines the maximum amount of processor capacity available to the partition
- Entitled Capacity: The actual PrU available to a partition. May be changed via DLPAR operation after startup.
- Virtual Processor (VP): Defines the number of physical processor cores that the system can access to provide the processing capacity of a shared processors partition.
- License the highest* amount of Entitled Capacity. .
 - A partition may start up with a certain Entitled Capacity but through a DLPAR operation, this Entitled Capacity may be increased or decreased. Hence, the license must cover the greater of the Entitled Capacity the partition starts with or the result of a DLPAR operation

■ Uncapped partition:

- This type of shared processor partition can be allocated processing capacity that can exceed its Entitled Capacity PrU.
- The PrU defines the basic or 'start up' processor capacity
- The VP defines the number of physical processor cores that the partition can access to grab idle processor capacity available. It can access the unused processor cores in the shared pool, when available, up to the Online VP value (VP).
- Online VPs: The actual VPs available to a partition. May be changed via DLPAR operation after startup.
- License VP equal to the highest* amount of Online VPs.
 - A partition may start up with a certain Online VP but through a DLPAR operation, this Online VP may be increased or decreased. Hence, the license must cover the greater of the Online VPs a partition starts with or the result of a DLPAR operation.

* greater of a) what the partition starts with or b) the result of a DLPAR operation

Products Participating in Sub-Capacity

■ WebSphere

- WebSphere App Server Network Deployment 5.1, 6.0, 6.1
- WebSphere App.Server 5.0, 5.1, 6.0, 6.1
- WebSphere Enterprise Service Bus 6.0
- WebSphere Data Interchange 3.2
- WebSphere Enterprise Service Bus 6.0
- WebSphere MQ 5.3, 6.0
- WebSphere MQ Extended Security Ed. 6.0
- WebSphere Event Broker 5.0, 6.0
- WBI Message Broker 5.0, 6.0
- WBI Message Broker with R&F 5.0, 6.0
- WebSphere MQ Series Workflow 3.5, 3.6
- WebSphere Interchange Server 4.3
- TxSeries 5.0, 5.1, 6.0

Current as of January 10, 2007

■ WebSphere (continued)

- WebSphere Everyplace Connection Manager w/o WAP 5.1
- WebSphere Extended Deployment 6.0
- WebSphere Portal Server 6.0
- WebSphere Portal Enable 5.0, 5.1, 6.0
- WebSphere Portal Enable Limited Use 6.0
- WebSphere Portal Extend 5.0, 5.1, 6.0
- WebSphere Portal Extend Limited Use 6.0
- WebSphere Portlet Factory 6.0
- WebSphere Partner Gateway Advanced 6.0
- WebSphere Partner Gateway Enterprise 6.0

Products Participating in Sub-Capacity (continued)

- WebSphere (continued)
 - WebSphere Process Server 6.0
 - WebSphere Service Registry and Repository 6.0
 - WebSphere Commerce Enterprise 6.0
 - WebSphere Commerce Professional 6.0
- Information Management
 - DB2 UDB Enterprise Server Edition 8.2, 9.1
 - DB2 UDB Data Warehouse Enterprise Edition 8.2, 9.1
 - DB2 Data Links Manager 8.2
 - DB2 Net Search Extender 8.2
 - Informix Dynamic Server 10.0
 - OmniFind Discovery Edition 8.4
 - OmniFind Enterprise Edition 8.4
- Lotus
 - Workplace Web Content Management 6.0
 - Workplace Web Content management Standard Edition 6.0
- IBM Systems
 - Load Leveler for Linux 3.3
 - X.25 over TCP/IP for Communication Controller for Linux 1.2
 - Communication Controller for Linux on System z9 and zSeries 1.2
 - Communications Server for Linux 6.2

Current as of January 10, 2007

Sub-Capacity Supported OS / Partitioning Technologies

Hardware	Operating System	Supported Partitioning Technologies
IBM System p	AIX 5.1 and later	LPAR, DLPAR (5.2)
	AIX 5.3	LPAR, DLPAR & Virtualization Engine (VE)
	Red Hat EL 3 u3	LPAR, VE
	Suse 8	LPAR
	Suse 9	LPAR, DLPAR, VE
	I5/OS	LPAR, DLPAR and VE
IBM System i	OS/400 5.2	LPAR, DLPAR
	I5/OS	LPAR, DLPAR and VE
	AIX 5.3	LPAR, DLPAR and VE
	Red Hat EL 3 u3	LPAR, VE
	Suse 9	LPAR, DLPAR, VE
HP	HP-UX 11i	nPAR, vPAR
Sun	Solaris 8, 9, 10	Dynamic System Domains
	Solaris 10	Containers
x86	MS Windows	VMware ESX Server 2.5, VMware GSX Server 3.1 & Microsoft Virtual Server
	Linux	VMware ESX Server 2.5, VMware GSX Server 3.1
System z	Linux for System z	LPAR, VM in LPAR, VM

Currently the minimum sub-capacity licensing for Intel/AMD x86 is to the total cores on a chip, not to the individual processor core
 Currently sub-capacity licensing is not available for the Sun T1 multi-core

Sub-Capacity License Conversions (from Full Capacity)

- Needs to be a version supported by IBM Tivoli License Compliance Manager
- Partitioning technology supported by IBM Tivoli License Compliance Manager
- Customer is compliant with existing terms and conditions prior to conversion
- Maintenance is current
- Agree to the terms of the Passport Advantage Agreement Attachment for Sub-Capacity Terms
 - Customer agrees to terms by submitting modified Passport Advantage Enrollment Form for Originating Site
 - Customer agrees that the licenses are converted and subject to the sub-capacity terms