Sub-Capacity Licensing for Select IBM Middleware

Answers to Commonly Asked Questions

April 25, 2006

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Sub-Capacity Licensing for Distributed Platforms Q&As

Overview

Q1:   Can you summarize what was announced on April 25, 2006?

A: IBM extended sub-capacity licensing support to servers on the x86/x64 architecture that run VMware ESX Server, VMware GSX Server, and Microsoft Virtual Server to create virtual machine and/or virtual partitions. IBM also enhanced the existing sub-capacity licensing support for servers on the RISC architecture, by adding support for Solaris 10 Containers and HP-UX 11i/11iv vPAR partitioning technologies.

Q2:   What is sub-capacity licensing, and how is it different from what IBM offers today?

A: Sub-capacity licensing lets you license a software program for use on less than the full processor capacity of your machine, when the software program is used within one or more partitions. Prior to this announcement, customers were required to obtain a license entitlement for each processor in the server, regardless of how the software was deployed.

IBM's sub-capacity offering:
- Enables customers to more effectively consolidate their infrastructure and reduce their overall total cost of ownership (TCO)
- Allows flexible software licensing supporting advanced virtualization capabilities such as shared processor pools, micro-partitioning, virtual machines and dynamic reallocation of resources
- Gives growing customers the flexibility to choose how to add workload environments without making tradeoffs between hardware design and software licensing
- Enables customers to license software only for the partition(s) in which it really runs
- Provides a tool which allows the customer to track and manage their own SW license usage

Q3:   Why is IBM expanding sub-capacity support on the distributed platforms today?

A: Customers are increasingly demanding that software licensing terms align with the hardware capabilities being offered today, such as partitioning and virtualization. IBM is making available the ability for a customer to take full advantage of the advanced partitioning and virtualization capabilities offered in leading-edge servers through the announcement of sub-capacity licensing.

Q4:   Can I convert existing full capacity licenses to sub-capacity licenses?

A: Yes, you may convert full capacity licenses to sub-capacity licenses if (1) you are in compliance with existing terms and conditions today, (2) the licenses are currently covered by Software Maintenance, (3) the hardware partitioning technology is supported by IBM Tivoli License Compliance Manager, and (4) the version of the software is supported by IBM Tivoli License Compliance Manager.

Q5:   Is sub-capacity available for both Passport Advantage and Passport Advantage Express customers?

A: Yes.

Q6:   Does IBM offer sub-capacity licensing on the IBM OpenPower platform or on the BladeCenter JS21 running PowerPC 970 dual-core chips?

A: No, we do not offer sub-capacity licensing on either the IBM OpenPower platform or the BladeCenter JS21 running PowerPC 970 dual-core chips at this time. Please contact your IBM Sales Representative or Business Partner for additional information.

Q7:   Can a multi-core chip run in a sub-capacity manner and how does IBM license in that situation?

A: IBM (pSeries, iSeries), HP and Sun have multi-core processors, and most of these hardware platforms can participate in sub-capacity licensing. IBM counts cores as a processor as our official policy. Sub-capacity licensing for these multi-core processors follows the announced process. x86 platforms currently require one software license entitlement for the two processor cores on the x86 dual-core chip. Since IBM only licenses its per-processor licensed software in whole processor increments, one processor license entitlement is required whether one or both processor cores of an x86 dual-core chip are running IBM middleware on a

supported partitioning technology. Sun UltraSparc T1 multi-core processors do not participate in sub-capacity today. For additional information, please contact your IBM Sales Representative or Business Partner.

Q8: Is there anything that I need to know about sub-capacity licensing that may have an impact on my decision to pursue either sub-capacity or full capacity licensing?

A: Yes. While sub-capacity licensing may enable you to have to acquire a reduced number of license entitlements, this offering does require you to install IBM Tivoli License Compliance Manager for IBM Software on hardware that you provide, run reports quarterly on all sub-capacity products, and send those results to IBM electronically after reviewing them. IBM provides the IBM Tivoli License Compliance Manager for IBM Software at no charge, but does not provide hardware or services to install the software. Full capacity licensing does not require the use of IBM Tivoli License Compliance Manager for IBM Software.

Ordering Process

Q9: How will I be able to place an order for sub-capacity products?

A: You will be able to place an order through either your IBM Sales Representative or authorized Business Partner.

Q10: How will I place an order for IBM Tivoli License Compliance Manager for IBM Software, if I do not have access to the part number?

A: IBM Tivoli License Compliance Manager for IBM Software will be ordered by the IBM Sales Representative or Business Partner at the time of the initial acquisition of sub-capacity licensing terms. Future acquisitions of sub-capacity licensing will not require additional orders for IBM Tivoli License Compliance Manager for IBM Software.

Q11: Will the sub-capacity offering still generate Passport Advantage points for my company?

A: Yes, following the same process that exists today.

Q12: Will IBM provide media for IBM Tivoli License Compliance Manager for IBM Software at no charge as well?

A: IBM will provide one free media pack per site (as set up in Passport Advantage) per customer. Additional media packs will be made available for a fee. Support material that is downloaded is provided at no charge.

Licensing Requirements

Q13: Is WebSphere, like Tivoli, licensed per CPU and not virtual instance? It is my understanding that IBM licenses "per physical CPU" on the system; regardless of VMware. Correct?

A: Our policy is to require a single IBM middleware license for the two processors cores on each dual-core chip in the x86 machine, regardless of the number of VMware instances being employed. IBM will not charge for a number of licenses (of a "per processor" product) that exceeds the number of processors within a server.

Q14: What constitutes an "increase in program use", as referenced in the Passport Advantage Agreement Attachment for Sub-capacity Terms?

A: An increase in program use occurs whenever you increase the size of the partition where the software is running, when the number of processors running the software is increased beyond entitlements, or when you install the program in an additional partition on the machine.

Q15: What is the algorithm for determining "sub-capacity pricing"? Does it work for less than a full CPU?

A: IBM licenses on the basis of whole processors and whole license entitlements. The minimum requirement for software licensing is one license entitlement.

Q16: If I want to temporarily increase software usage by increasing the size of the partition, what are my licensing requirements?

A: If you have an On/Off Capacity on Demand (OOCoD) agreement with IBM for software, you may invoke an OOCoD instance and pay for incremental usage on a daily basis. However, if you do not have such an

agreement, you must acquire additional license entitlements in accordance with IBM software licensing requirements.

Q17: If I use an additional processor without first adding authorizations what is the penalty?
A: IBM will request payment for the licenses required for the additional processor.

Q18: If I bought a server with 16 processors, but only 8 were activated, is this a sub-capacity environment?
A: Not necessarily. A full capacity environment in this situation involves 8 processors for this server. If the customer wants to install fewer than 8 licenses of IBM middleware on this server, then sub-capacity licensing rules would need to apply.

Q19: If a hardware cluster exists (i.e., 3 p5 servers with 4 processors each) with dynamic workloads between the servers, how does this impact sub-capacity licensing? For example: We have 3 p5 servers with 4 processors each. Two servers have DB2 UDB ESE sub-capacity licenses (2 processors each), two have WebSphere Application Server licenses (2 processors each).
A: The IBM Tivoli License Compliance Manager report ("IBM Use Report") aggregates software usage across all servers where sub-capacity licenses are running. For example, if Server A is running DB2 on 2 processors while at the same time Server B is running DB2 on 2 processors, the IBM Use Report will indicate that DB2 is running on 4 processors. However, if DB2 is only run on Server B if Server A is not running, the IBM Use Report will indicate that DB2 is running on 2 processors. In other words, IBM Tivoli License Compliance Manager records your concurrent usage of the software across the servers. Licensing for WebSphere Application Server is handled in a similar fashion in this example.

The license counting methodology for micro-partitioning, however, is first applied at a server level. That is, if micro-partitioning is used for 2.3 processors of DB2 on Server A, and 1.1 processors of DB2 on Server B, we require 3 licenses of DB2 for Server A and 2 licenses of DB2 for Server B for a total of 5 licenses required if the servers are running the software concurrently. If the servers never operate at the same time, we require 3 licenses of DB2 to maintain compliance.

Q20: IBM currently requires one per-processor software license for the two processor cores on an x86 dual-core chip. However, VMware allows me to isolate workload to a single core on an x86 dual-core chip. How many licenses does the customer have to buy for this situation?
A: IBM does not license "fractional processors" under its licensing model today. IBM requires one per-processor software license for the two processor cores on an x86 dual-core chip, regardless of whether you are using one or both of the cores on the dual-core chip.

Terms and Conditions

Q21: Are product License Information (LI) being updated for sub-capacity? Current LIs documents state a requirement for licensing to a full machine.
A: Product LIs will be updated when new versions are released, which is consistent with IBM's approach today. The Passport Advantage Agreement Attachment for Sub-Capacity Terms includes a statement that over-rides the applicable section(s) of the LI that requires licensing for the full capacity of the machine.

Compliance

Q22: I signed IBM's sub-capacity program document through a special bid but in the document it states I must install the IBM License Manager Program. Would you be able to give any ETA as to when this may be ready?
A: IBM Tivoli License Compliance Manager V2.2 is the official tool for sub-capacity, and is available now. You will be required to install IBM Tivoli License Manager for IBM Software V2.1 by October 25, 2006.

Q23: The sub-capacity special bid agreement states that I have up to six (6) months to install an IBM License Manager Program. When will I be expected to install a tool?

A: You will be required to install, and begin operating, IBM Tivoli License Compliance Manager for IBM Software V2.2 by October 25, 2006. You must submit your first IBM Use Report by January 9, 2007, and subsequent reports by the ninth day of the month following a calendar quarter, to be considered "in compliance" with existing terms.

Q24:   It's not clear if it's an implicit additional authorization or if I am booted up to the full machine capacity pricing model if I increase usage beyond my entitlements. What is the policy?
A: An increase in usage will be treated as incremental sub-capacity authorizations, not an automatic move to full capacity. Terms & Conditions require you to obtain additional entitlements prior to running the software on additional processors.

Q25:   Why does IBM have the right to check my system for license compliance 6 months after the sub-capacity licensing arrangement is over?
A: The intent of this is to verify that you are no longer running in sub-capacity mode and that you have converted back to the full capacity model.

Q26:   Is IBM Tivoli License Compliance Manager mandatory for sub-capacity pricing entitlement? If I already have a tool in place that provides the same information as IBM Tivoli License Compliance Manager, would IBM still insist that I use IBM Tivoli License Compliance Manager?
A: Our official announcement requires the use of IBM Tivoli License Compliance Manager for monitoring and reporting purposes. Contact Pricing or CSO/CF to understand the exception process.

Q27:   Are you saying that if I have a product, WebSphere Application Server for instance, that has sub-capacity terms and conditions, I would need to report on all equipment that has WebSphere Application Server installed, whether or not that equipment has sub-capacity capability?
A: Not necessarily. If you convert all licenses of WebSphere Application Server (WAS) to sub-capacity terms and conditions, IBM would require IBM Tivoli License Compliance Manager to be used on all machines where WAS is running. Otherwise, IBM Tivoli License Compliance Manager is only required on the machines where sub-capacity licenses are running.

Q28:   If IBM will let me use another monitoring tool while I am phasing out that equipment what period of time would IBM see as reasonable for the phasing out?
A: If there is a transition period required, IBM will work with you to understand the capacity requirements and work to coordinate an appropriate transition period.

Q29:   When do I submit an IBM Use Report, and to whom do I submit it?
A: You must submit an IBM Use Report on a quarterly basis. Reports are due by January 9th, April 9th, July 9th, and October 9th of each year. These reports are uploaded by you to www.ibm.com/software/lms; the web site address is included within the IBM International Passport Advantage Agreement Attachment for Sub-Capacity Terms.

Q30:   How does IBM determine if I am in compliance with the sub-capacity terms and conditions?
A: IBM Customer Fulfillment/Customer Service Organization (CF/CSO) will compare your IBM Use Report with the number of entitlements on record to determine if you are maintaining compliance with sub-capacity terms and conditions.

Q31:   What happens if I do not submit an IBM Use Report?
A: IBM will send a letter to you, asking you to submit your IBM Use Report, or to contact your IBM Sales Representative or Business Partner to clarify why a report was not submitted. If you decline to submit the report, you will be converted back to full capacity terms and conditions, and you must ensure that you have acquired enough license entitlements for each processor on the server(s) running the software. IBM also has the ability to audit a customer's site if required.

Q32:   What happens if I do not agree with the IBM Use Report prior to submitting to IBM?
A: You should contact their IBM Sales Representative or Business Partner to resolve any issues raised.

Q33: What happens if I don't want to use IBM Tivoli License Compliance Manager for compliance?
A: You should notify their IBM Sales Representative or Business Partner to discuss alternatives.

Q34: Does IBM have the right to audit me?
A: Yes, IBM has the right to audit a customer in accordance with the Passport Advantage Agreement.

Conversions from Full Capacity

Q35: For conversions from full capacity to sub-capacity, will IBM issue new part numbers?
 A: IBM CF/CSO will change the part numbers for all conversions through a managed entitlement authorization process. The sub-capacity offerings have unique part numbers to help IBM and you distinguish between the two for licensing purposes. Additionally, you will receive updated Proofs of Entitlement (PoE) for your records.

Q36: Can I cancel Software Maintenance on licenses after I have converted to sub-capacity terms?
A: As is the case with full capacity entitlements, you may cancel Software Maintenance on sub-capacity entitlements at the time of Software Maintenance renewal. IBM will not provide a refund, credit, or substitution credit for any sub-capacity entitlements canceled. Please be careful when you decide to cancel Software Maintenance, as it is much more costly to reinstate Software Maintenance and support for licenses that have had Software Maintenance lapse previously.

Q37: If I had canceled Software Maintenance on a full capacity entitlement, but now wish to convert that entitlement to sub-capacity, what should be done?
A: You must contact your IBM Sales Representative or Business Partner to reinstate Software Maintenance through a Software Maintenance Reinstatement acquisition. IBM will then convert the reinstated full capacity entitlement to a sub-capacity entitlement.

Q38: With sub-capacity licensing some licenses will be freed up from existing servers (i.e., placed on the shelf). Can customer use those licenses independently? Not related to one specific machine, location, or country?
A: If the customer converts the "on the shelf" licenses to sub-capacity, they can move the licenses to a server with partitioning technology supported by IBM Tivoli License Compliance Manager. If the licenses are maintained as full capacity, they may move them to another server where the licenses will be "full capacity" (that is, a license for each processor in the server). The latter statement is consistent with our policy prior to April 19, 2005.

Conversions for Special Bid Customers

Q39: What's the process for converting customers who received sub-capacity through special bid to the formal offering?
A: IBM will be sending out details of this process to each affected customer by July 31, 2006. IBM will be initiating an order for IBM Tivoli License Compliance Manager for IBM Software V2.2 for each customer, in addition to converting full capacity entitlements to sub-capacity entitlements. New Proofs of Entitlement (POEs) will also be shipped to customers when available.

Q40: If I already have sub-capacity through a special bid, when do I have to have IBM Tivoli License Compliance Manager installed?
A: Existing special bid customers must have IBM Tivoli License Compliance Manager for IBM Software V2.2 by October 2005.

Q41: If I already have sub-capacity through a special bid, when will I need to submit my first IBM Use Report?
A: Existing special bid customers must submit their first IBM Use Report by January 9, 2006.

Enterprise License Agreements/Software Relationship Offering

Q42: Can I convert deployed licenses within an Enterprise License Agreement (ELA) to sub-capacity terms?

A: Yes, you may convert deployed licenses to sub-capacity terms if (1) you are in compliance with existing terms and conditions, (2) Software Maintenance is current for the licenses being converted, (3) the hardware partitioning technology is supported by IBM Tivoli License Compliance Manager, and (4) the version of the software being converted is supported by IBM Tivoli License Compliance Manager.

Q43:   Can I convert undeployed licenses within an ELA to sub-capacity terms?
A: Yes, you may convert undeployed licenses to sub-capacity terms if (1) you are in compliance with existing terms and conditions, (2) Software Maintenance is current for the licenses being converted, (3) the hardware partitioning technology is supported by IBM Tivoli License Compliance Manager, and (4) the version of the software being converted is supported by IBM Tivoli License Compliance Manager.

Q44:   Can I convert deployed licenses within an ELA to sub-capacity terms, and then substitute the newly created shelfware for other software on their substitution table?
A: No, you may not substitute deployed licenses, in accordance with ELA terms and conditions.

Q45:   Will I be entitled to a refund or credit if I convert to sub-capacity terms?
A: No, you will not be granted a refund or credit for licenses acquired through an ELA or SRO.

Product Participation

Q46:   What does IBM tell customers who wish to have sub-capacity licensing terms for products that aren't eligible for sub-capacity today?
A: For those software products not included in the current Sub-Capacity Eligible Products list:
        1. IBM will not offer sub-capacity on these products until they are enabled with signatures for IBM Tivoli License Compliance Manager. If critical, please contact your IBM Sales Representative or Business Partner for additional information.
        2. We expect additional products to be added to the Sub-Capacity Eligible Products list over time, when they have become enabled with signatures for IBM Tivoli License Compliance Manager monitoring.

Q47:   How will IBM officially support products not on the Eligible Products list now?
A: Contact your IBM Sales Representative or Business Partner for details.

Q48:   Is WebSphere Application Server on zSeries pricing and sub-capacity licensing changing?
A: No, zSeries sub-capacity licensing on z/OS will not change from current practice. The announcement for distributed sub-capacity is for distributed platforms only (including Linux for zSeries, but not z/OS).

Q49:   I want to order IBM Virtual I/O Server 1.1 (VIO). Does IBM support sub-capacity licensing for this product, and how would I order this?
A: IBM announced sub-capacity for these products in Announcement 204-161. On pSeries Power 5 products this can be ordered via AAS. There is a hardware feature on the Power 5 boxes that represents VIO. On Open Power systems, the product must be ordered via Passport advantage, but sub-capacity is not allowed on this PA offering. For more information, please contact your pSeries Sales Representative or Business Partner.

Q50:   Why aren't the Express products participating in this announcement?
A: Sub-capacity is intended to provide customers with flexibility for per-processor based products that do not offer alternative pricing mechanisms. Express products are offered with per-user pricing, which should provide a customer with the flexibility required for their environment.

Platform Participation

Q51:   When will IBM support sub-capacity licensing on platforms such as Linux on xSeries or other x86 platforms?
A: IBM intend to officially announce support for the x86 platform for both Windows and Linux by July 2006. Sub-capacity licensing of x86 platforms running VMware ESX Server, VMware GSX Server, or Microsoft Virtual Server is fully supported today.

Q52:   Is IBM working with other hardware vendors to extend sub-capacity support, e.g. Sun Solaris 10?

A: IBM has added support for Sun Solaris V10 with the release of IBM Tivoli License Compliance Manager for IBM Software V2.2. We continue to work with hardware vendors, such as IBM, HP and Sun, to support new technologies as soon as it is feasible.

Q53:   When will IBM support sub-capacity on IBM eServer xSeries servers?

A: We are able to support sub-capacity (via VMware ESX Server, VMware GSX Server, and Microsoft Virtual Server) on the x86 platform with the release of IBM Tivoli License Compliance Manager V2.2. We will officially announce this capability prior to July 2006.

Q54:   I already have sub-capacity terms for WebSphere Application Server on the iSeries platform. How does this announcement affect me?

A: Current sub-capacity customers on the iSeries platform will continue to operate under existing terms and conditions. New sub-capacity acquisitions on the iSeries platform must operate IBM Tivoli License Compliance Manager to demonstrate compliance. Although IBM Tivoli License Compliance Manager does not currently support an IBM Tivoli License Compliance Manager Administration Server on the iSeries platform, customers can still install IBM Tivoli License Compliance Manager on another platform (Windows, AIX, etc.) to run the IBM Tivoli License Compliance Manager Administration Server, and deploy agents on the iSeries platform.

Software Maintenance

Q55:   What is this "Software Maintenance" we keep hearing about?

A: Software Maintenance for sub-capacity is the same as Software Maintenance for full capacity: it provides product upgrades and Technical Support. Product upgrades provides authorization to use and access to all new releases and versions of software products. Technical Support provides both telephone and web-based access to technical specialists, 24x7.

Part Numbers

Q56:   Does IBM have unique sub-capacity Passport Advantage part numbers?

A: Yes, we have unique sub-capacity part numbers for the products eligible to participate in the Sub-Capacity offering.

Q57:   Why doesn't IBM offer sub-capacity pricing for Software Maintenance on their existing installed distributed IBM software?

A: On April 19, 2005, we began to allow customers to convert from full capacity licensing to sub-capacity licensing. This includes maintenance part numbers. In order to convert to sub-capacity licensing, you must be (1) in compliance with today's terms and conditions, (2) 'current' with Software Maintenance on the products you wish to convert to sub-capacity terms, (3) using a hardware partitioning technology is supported by IBM Tivoli License Compliance Manager 2.1, and (4) running a version of the software that is enabled for IBM Tivoli License Compliance Manager.

IBM Tivoli License Compliance Manager

Q58:   Where can I find information about IBM Tivoli License Compliance Manager, or IBM Tivoli License Compliance Manager for IBM Software?

A: Please refer to the document entitled "License Compliance Manager Q and A", as well as to www.ibm.com/lotus/sub-capacity for additional information about IBM Tivoli License Compliance Manager for IBM Software. Additional information about IBM Tivoli License Compliance Manager may be obtained from your IBM Sales Representative or authorized Business Partner.

Product Enablement

Q59: Is there any useful IBM Tivoli License Compliance Manager guide for sub-capacity license management available?

A: Yes. Please visit www.ibm.com/lotus/sub-capacity for a link to IBM Tivoli License Compliance Manager related documents. This website includes links to the IBM Tivoli License Compliance Manager Administration Guide, customer guidance on how to configure IBM Tivoli License Compliance Manager for bundles, and other useful information related to IBM Tivoli License Compliance Manager and sub-capacity.

Partitioning

Q60: What is partitioning?

A: Partitioning is the division of a server's computing resources into independent subsystems with processor, memory, and I/O resources dedicated to the exclusive use of a subsystem. This division allows multiple operating systems to run concurrently in the subsystems.

Q61. What is LPAR?

A.   Logical Partitioning (LPAR) is the ability to make a single system run as if it were two or more systems. Each LPAR operates as an independent logical system. An LPAR has resources assigned to it, including processors, memory, and disk. Both iSeries and pSeries provide LPAR capability.

Q62. What is Dynamic LPAR?

A.   Dynamic Logical Partitioning (DLPAR) is a term commonly used to describe the ability to move resources (e.g. processor resources) between LPARs while the LPARs are active. For some types of logical partitions, this movement of resources requires operator action. For other types of logical partitions, resource movement can happen automatically.

Because of dynamic LPAR capability, a given partition might have a different number of processors at different points in time.

Q63. What is Micro-Partitioning?

A.   Micro-partitioning is the ability to assign partial processors to a logical partition. With Micro-Partitioning, a partition can be as small as 1/10th of a processor. Or an LPAR can have full plus fractional processors (e.g. 2.6 processors).

Q64. What is the relationship between an LPAR and an operating system?

A.   Each LPAR runs a single operating system. You define the operating system for an LPAR when you create it.

On eServer i5, each LPAR can run one of the following:
   i5/OS (OS/400)
   Linux
   AIX 5L v5.2 or AIX 5L v5.3

On eServer p5, each LPAR can run one of the following:
   AIX 5L v5.2 or AIX 5L v5.3
   Linux
   i5/OS (planned for selected p5-570 models)

Q65. What types of logical partitions are available?

A.   IBM eServer i5 and eServer p5 support three types of partitions: dedicated partitions, capped shared-pool partitions, and uncapped shared-pool partitions.

Q66. What is a dedicated partition?

A.   Dedicated partitions have the following characteristics:

- They own dedicated processor resources that cannot be automatically reassigned to another partition even if the dedicated partition is idle.
- An authorized systems operator can manually move processors resources from one dedicated partition to another.
- Only whole processors can be allocated to dedicated partitions.   Dedicated partitions do not support micro-partitioning.

Figure 1 below shows an example of a 12-way eServer i5 with two dedicated partitions. Partition A has 10 processors and runs i5/OS. Partition B has 2 processors and runs AIX.

Partition A – i5/OS										Partition B - AIX	
1	2	3	4	5	6	7	8	9	10	11	12

Figure 1

Figure 2 shows an example of a 12-way eServer p5 with 1 AIX partition with 8 processors and 1 Linux partitions with 4 processors.

Partition A – AIX								Partition B - Linux			
1	2	3	4	5	6	7	8	9	10	11	12

Figure 2

Q67.   What is a shared processor pool?

A.   A shared processor pool is a group of processors that can be automatically shared among partitions as the workloads or the partitions fluctuate. IBM implements Micro-Partitioning in shared processor pools. Resources can be automatically shared between partitions in increments of 0.01 processors.

Figure 6 shows the 12-way example again, where the customer has decided to let the system dynamically and automatically allocate resources for some of the work.

i5/OS				AIX	Shared Processor Pool						
1	2	3	4	5	6	7	8	9	10	11	12

Figure 6

The dedicated i5/OS partition is now 4 processors. The dedicated AIX partition is 1 processor. No Linux partitions are dedicated. The remaining 7 processors are in a shared processor pool that can be used by capped and uncapped partitions.

Q68.   What's the difference between capped and uncapped partitions?

A.   Capped and uncapped partitions are partitions started in the same shared processor pool. In simple terms, their names describe the difference.   A capped partition has a specified limit to the amount of processor resources it can use, regardless of how much processor resource is idle and available to use. An uncapped resource can basically use any idle resources in the shared processor pool.

Q69.   How are uncapped and capped partitions defined for a shared processor pool?

A.   From the perspective of operating system license entitlements, three characteristics of capped and uncapped partitions are relevant: operating system (i5/OS, AIX, or Linux), Processing Units (PrU), and Virtual Processors (VP). The technical details of PrU and VP are beyond the scope of this document, but a basic understanding is necessary because they affect how operating system license entitlements are counted.

For a capped partition:
- Processing Units (PrU) defines the maximum amount of equivalent processor power that the partition can use.
- Virtual Processors (VP) defines the number of physical processors that the system can access to provide the processing power.
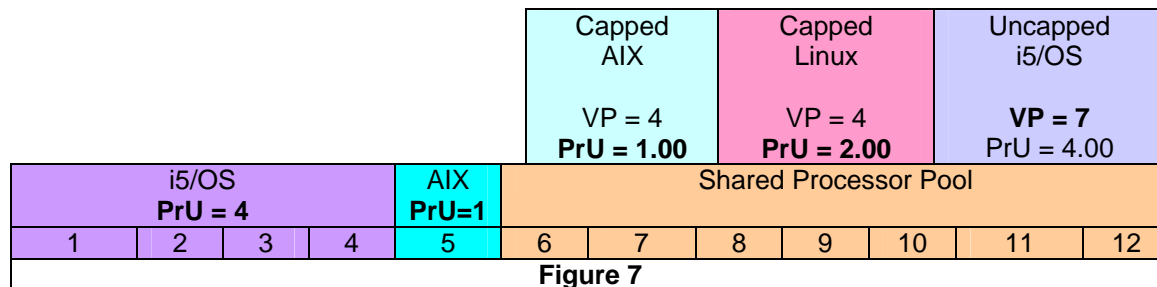
For example, assume that a capped partition has a PrU of 3 and a VP of 5. This means that it can use the equivalent processing power of 3 CPUs, and it run its workload using partial processing power from up to 5 different CPUs to add up to its 3 CPU equivalent. Basically, for a capped partition, the VP value is available for the IT staff to manage the overall performance of the system.   It doesn't affect the maximum amount of CPU capacity available for the partition and thus does not affect the processor count for operating system license entitlements.   The PrU value is used to determine operating systems license entitlements.

For an <u>uncapped partition</u>:
- Processing Units (PrU) defines the basic or "start up" number of processors that the partition will use. (The sum of all the PrU's in a shared pool cannot exceed the number of permanent processors in the shared processor pool.)
- Virtual Processors (VP) defines the number of physical processors that the partition can access to grab whatever idle processing power is available. This is typically set to the number of processors in the shared pool (hence the term "uncapped"), but it can be set to a value less than that.

For uncapped partitions, we use the VP value to calculate the number of required operating system license entitlements.

Figure 7 shows an example of dedicated, capped, and uncapped partitions. The capped AIX, capped Linux, and uncapped i5/OS partitions use the 7 processors in the shared processor pool.

		Capped AIX	Capped Linux	Uncapped i5/OS
		VP = 4	VP = 4	**VP = 7**
		PrU = 1.00	**PrU = 2.00**	PrU = 4.00

i5/OS PrU = 4				AIX PrU=1	Shared Processor Pool						
1	2	3	4	5	6	7	8	9	10	11	12

Figure 7

Q70: How can I build a partition or micro-partition within an IBM p5 server? Is the "partition builder" based on software capabilities (e.g., AIX) or is some physical change required through hardware?

A: Micro-partitioning requires an additional feature to be acquired (Advanced POWER Virtualization). Virtual I/O is included in the Advanced POWER Virtualization feature for p5 systems. The Advanced POWER Virtualization feature requires AIX 5L™ V5.3, SUSE LINUX Enterprise Server 9 for POWER™ (SLES 9) or Red Hat Enterprise Linux AS 3 for POWER, Update 3 (RHEL AS 3). Your IBM Hardware Rep will be able to explain the features