



IBM Passport Advantage Software

Sub-capacity (Virtualization) License Counting Rules

Using Operating System (OS) Commands and BIOS Settings on x86 servers to Limit Processor Cores Available

NOTE: Please use these rules along with the Sub-capacity licensing attachment



April 7, 2009

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Summary of Virtualization Capacity Licensing Requirements

- 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
 - Certain ILMT use exceptions may apply

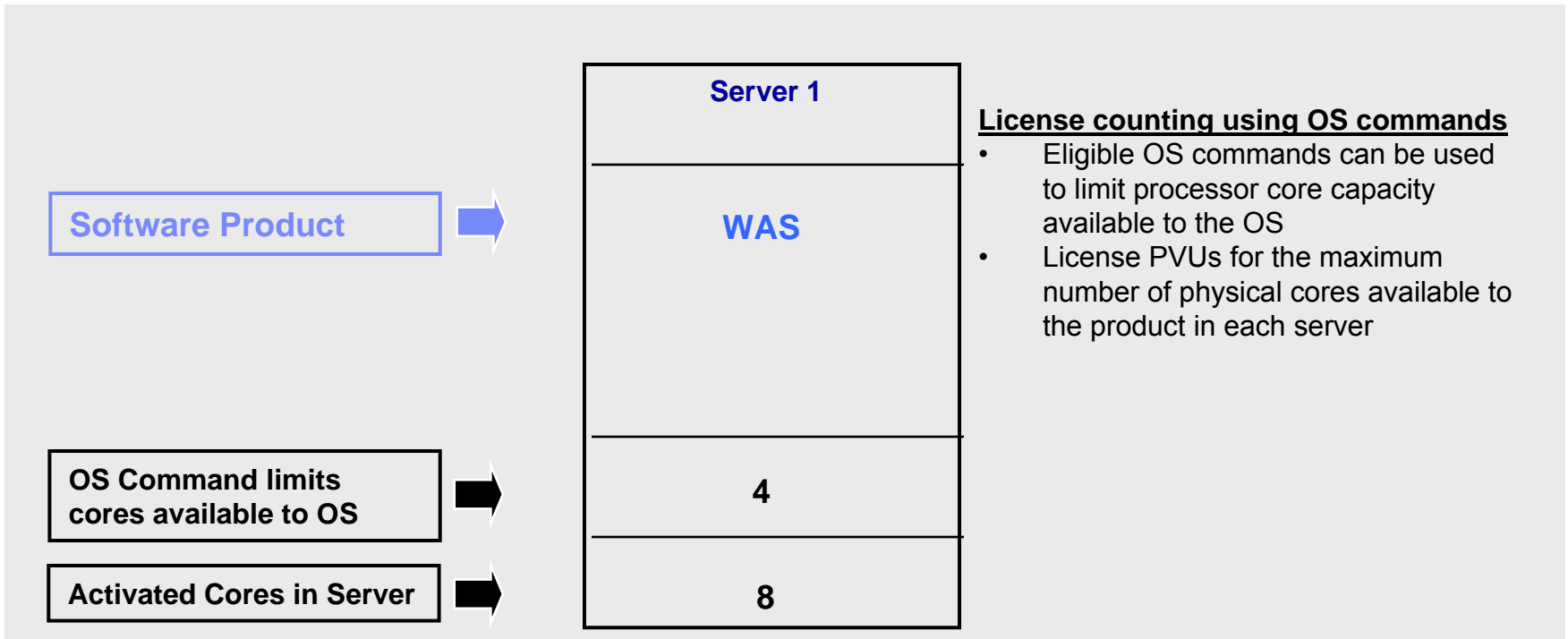
PLEASE NOTE:

- *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 Virtualization Capacity website](#)*
- *Customers are responsible for the installation of the IBM License Metric Tool and for the server it runs on.*

OS Commands and BIOS Settings for x86 Servers - Definitions

- **OS Commands** – Executing OS Commands to limit the number of processor cores available on the server.
 - ▶ A x86 architecture OS may allow users to limit the number of processor cores available on the server by issuing OS commands
 - ▶ Users should refer to the users manual of their OS for the instructions and support of such commands
 - *See the examples in the Backup section of this presentation*
- **BIOS Settings** - Changing BIOS settings to limit the number of processor cores available on the system.
 - ▶ A x86 architecture server may allow users to limit the number of processor cores available on the server by changing BIOS settings.
 - ▶ Users should refer to the users manual of their systems for the instructions and support for changing BIOS settings.

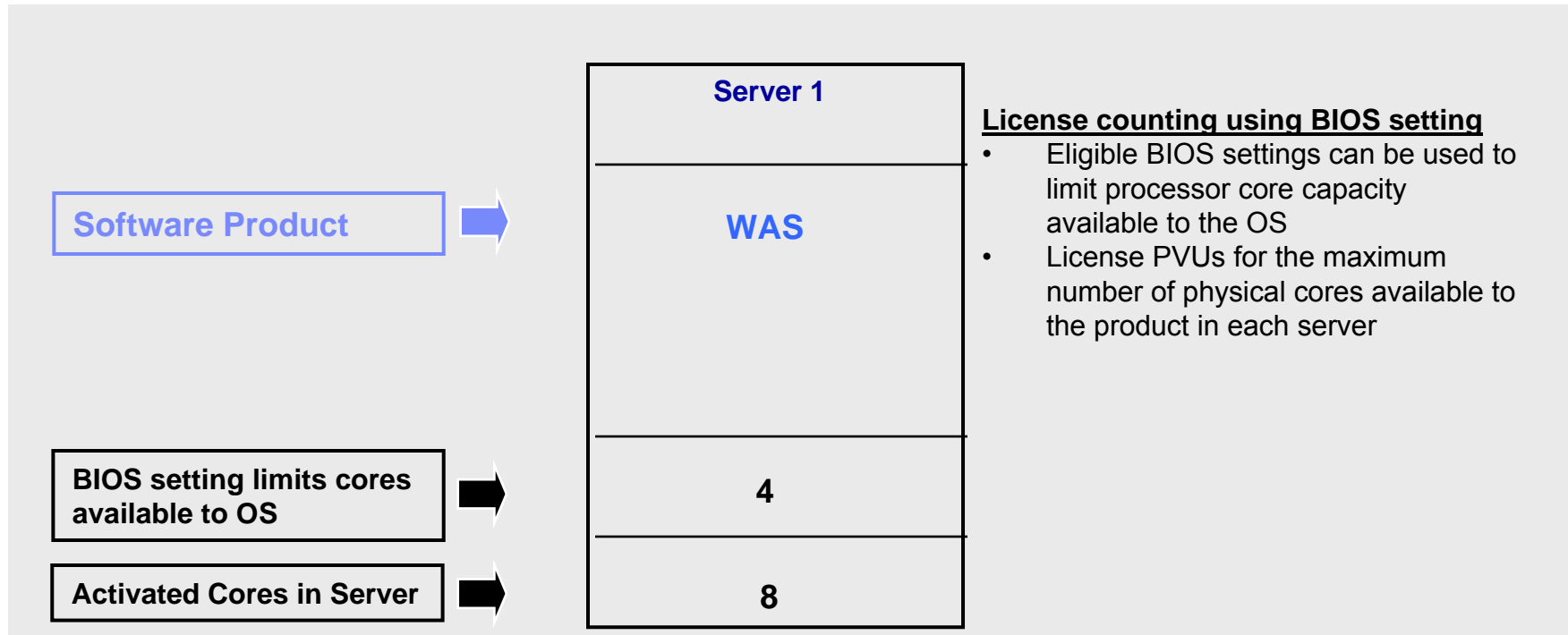
License counting in a x86 Server using OS Commands to limit processor core capacity available



▶ For above example, the PVU Virtualization Capacity licensing requirement is based on the maximum number of physical cores available to a product in each server

Cores to License	Server 1	Virtualization Capacity	Full Capacity
WAS	4	4	8

License counting in a x86 Server using BIOS settings to limit processor core capacity available



▶ For above example, the PVU Virtualization Capacity licensing requirement is based on the maximum number of physical cores available to a product in each server

Cores to License	Server 1	Virtualization Capacity	Full Capacity
WAS	4	4	8

OS Commands and BIOS Settings for x86 Servers - Licensing Rules

The PVU Virtualization Capacity licensing requirement is based on the maximum number of physical cores available to a product in each server

- The licensing rules in the preceding pages reflect how ILMT will operate to calculate PVUs
- If ILMT does not yet support a Eligible Virtualization Environment, or you qualify for an exception to use ILMT, you will need to follow the Manual Calculation of Virtualization Capacity.
- The Manual Calculation of Virtualization Capacity rules can be found in the following pages
- To find out if a Eligible Virtualization Technology is supported by ILMT visit [Passport Advantage Sub-capacity licensing information](#)

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
 - ▶ An Audit Report must be prepared at least once per quarter and identify the following detail: Each Eligible Sub-Capacity Product deployed in each Eligible Virtualization Environment
 - ▶ An Eligible Virtualization Environment can be a Single Server or a Group of Servers (Server Cluster)
 - ▶ In addition to the above detail, the report should provide a summary total of the required number of PVUs by and for each Eligible Sub-Capacity Product
 - ▶ 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 [Passport Advantage Sub-capacity licensing information](#)

Manual Calculation of Virtualization Capacity – Rules

The PVU Virtualization Capacity licensing requirement is based on the maximum number of physical cores available to a product in each server

Manual Calculation of Virtualization Capacity - Worksheet Example

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

- Instructions & Information
- Single Server
- Group of Servers “Cluster”

Web Link: Worksheet for
Manual Calculation of
Virtualization Capacity

VIRTUALIZATION ENVIRONMENT - SINGLE SERVER		
- This worksheet is for one standalone server for one Software Product		
- Per the instructions on the first tab, you may choose to leverage this approach or develop / leverage your own processes and reporting format so long as you capture all of the information below		
- Enter data in input fields below (shaded area)		* Mandatory
Date of this Audit Report *	March 31, 2009	
Product Name *	IBM WEBSPPHERE APPLICATION SERVER NETWORK DEPLOYMENT	
Program Identification Number (57xx-xxx)	5724-H88	
P/N Description	IBM WEBSPPHERE APPLICATION SERVER NETWORK DEPLOYMENT PROCESSOR VALUE UNIT (PVU)	
Part Number	D55WJLL	
Server ID / Location	Server ID # F6015; Bldg 1, Room 1, Somers, NY	
Server Vendor / Brand	IBM System x	
Server Model	xxxxx	
Virtualization Technology used *	VMware ESX 3.5	
Processor Technology (Vendor, Brand, Type, Model#) * (A)	Intel Xeon Quad Core Model 35XX	
PVUs per core * (A)	70	
Total Activated Cores on Server * (C)	8	
Full Capacity PVUs for Server * (C)	560	
	DO NOT DELETE ROW	
VM, Partition ID *	Cores (B) per Partition or VM *	User Comments
(whatever identifier used for any subdivision of a server such as LPAR #, IP address, hostname, etc.)		
A	4	
B	4	
C	2	
D	2	
Sum of Virtual Cores *	12	
PVUs per core *	70	
Virtualization Capacity PVUs by Product for Server *	840	
PVU Licenses required by Product for Server * (C)	560	
* Mandatory Field		
(A) PVU's required for each physical processor core are listed on the PVU table (see link below, including vendor/brand designations) http://www-01.ibm.com/software/lotus/passportadvantage/pvu_licensing_for_customers.html		
(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		

▶ | \ Instructions + Information \ **Single Server** / Group of Servers "Cluster" /

Key Web Links

- PVU

- [PVU table and other information](#)

- Sub-capacity

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

- [Virtualization Capacity License Counting Rules](#)

- [Sub-capacity licensing attachment](#)

BACKUP

OS Command for x86 Servers - Examples

- **OS Commands** – Executing OS Commands to limit the number of processor cores available on the server.
 - ▶ A x86 architecture OS may allow users to limit the number of processor cores available on the server by issuing OS commands
 - ▶ Users should refer to the users manual of their OS for the instructions and support of such commands
 - ▶ Examples provided as a reference only
 - *Linux Example*
 - Change the grub.conf file for Linux
 - • Method 1: run “nano /etc/grub.conf” command and add “maxcpus=#” to kernel module option
 - *Windows Example*
 - Change the boot.ini or BCD (Boot Configuration Data) files on Windows
 - • Method 1: run „BCDedit.exe /set numproc #” command
 - • Method 2: run “msconfig” command->select “BOOT.INI” tag->select “Advanced options”->enter core number for \NUMPROC

See screenshots on next three pages

Linux OS command to limit cores

```

root@citrh53:~ - Shell - Konsole
Session Edit View Bookmarks Settings Help
GNU nano 1.3.12 File: /etc/grub.conf Modified
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#         all kernel and initrd paths are relative to /boot/, eg.
#         root (hd0,0)
#         kernel /vmlinuz-version ro root=/dev/VolGroup00/LogVol00
#         initrd /initrd-version.img
#boot=/dev/sdc
default=0
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux Server (2.6.18-128.el5xen)
    root (hd0,0)
    kernel /xen.gz-2.6.18-128.el5
    module /vmlinuz-2.6.18-128.el5xen ro root=/dev/VolGroup00/LogVol00 rhgb quiet maxcpus=2
    module /initrd-2.6.18-128.el5xen.img

```

Option limits cores available to the OS to 2 cores

```

root@citrh53:~ - Shell - Konsole <2>
Session Edit View Bookmarks Settings Help
[root@citrh53 ~]# cat /proc/cpuinfo | grep -c processor
2
[root@citrh53 ~]# cat /proc/cmdline
ro root=/dev/VolGroup00/LogVol00 rhgb quiet maxcpus=2
[root@citrh53 ~]#
[root@citrh53 ~]#

```

Command validates that only 2 cores are available to the OS

Windows OS command to limit available cores

```
Microsoft Windows [Version 6.0.6002]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>bcdedit /set numproc 2
The operation completed successfully.

C:\Users\Administrator>bcdedit

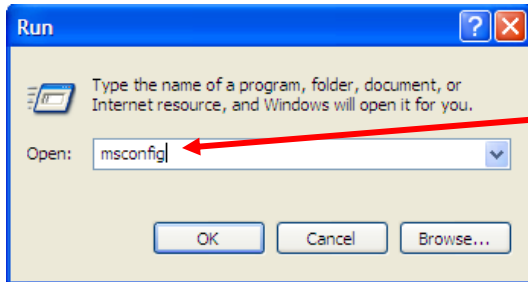
Windows Boot Manager
-----
identifier                <bootmgr>
device                    partition=D:
description                Windows Boot Manager
locale                    en-US
inherit                    <globalsettings>
default                    <current>
displayorder               <current>
toolsdisplayorder         <memdiag>
timeout                    30
resume                    No

Windows Boot Loader
-----
identifier                <current>
device                    partition=C:
path                      \Windows\system32\winload.exe
description                Microsoft Windows Server 2008
locale                    en-US
inherit                    <bootloadersettings>
osdevice                  partition=C:
systemroot                \Windows
resumeobject               {70593c37-ec4d-11dd-939f-9c9c45677698}
nx                         OptOut
numproc                    2
hypervisorlaunchtype      Auto

C:\Users\Administrator>_
```

Command limits cores available to 2 cores

Windows OS command to limit available cores



Command for boot.ini file updates

Setting limits cores available to 2 cores

