Software Licensing in a Virtualized Environment

Focusing on Passport Advantage Software

Agenda

- Introduction to server virtualization

- Licensing basics for a virtualized server

- Determining the number of cores to license

- Sub-capacity eligibility of virtualization technologies

- IBM License Metric Tool introduction

- Licensing basics for a virtualized server cluster

- Benefits to IBM's software licensing

- Seller resources available

What is a Virtualized Server?

- **Virtualization…provides a logical rather than physical view of data, computing power, storage capacity, and other resources. -- Jonathan Eunice, Illuminata Inc.**

- **A technique for hiding the physical characteristics of computing resources from the way in which other systems, applications, or end users interact with those resources -- Wikipedia**

BENEFITS

- **Higher utilization**

- **Increased Flexibility (provisioning / scalability)**

- **Reduce energy requirements**

- **Lower TCO**

Link to: **Brief Server Virtualization Video from InfoWorld**

What is a Virtualized Server?

Server 1	
PAR 1	**PAR 2**
4	4
8	

Virtual Cores ➡ (PAR 1: 4, PAR 2: 4)

Physical Cores ➡ (8)
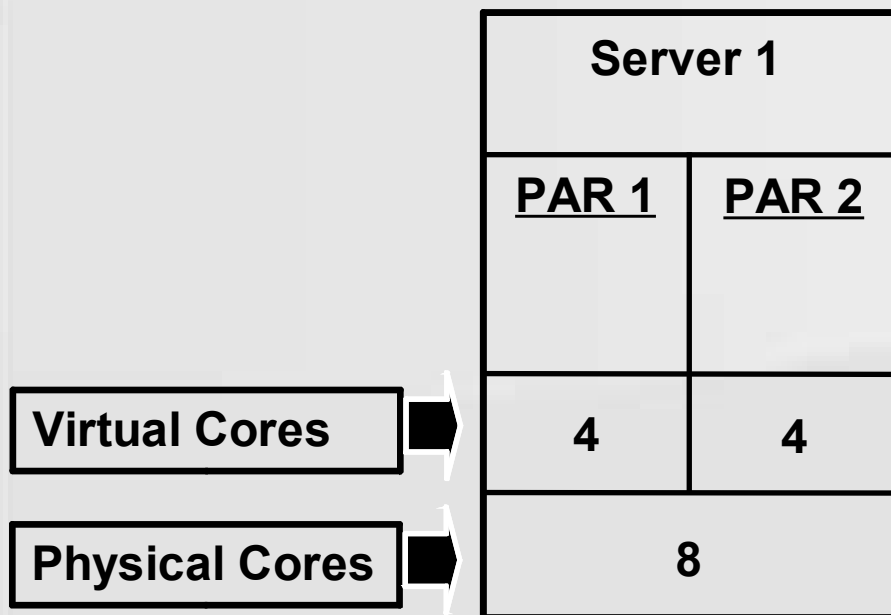
Server Virtualization allows you to take a large server and divide it into independent smaller (logical/virtual) servers as partitions (LPARs, VMs, etc.) that share resources such as processor cores, memory, storage, etc.

There are many virtualization technologies available

- Most virtualization vendors implement similar concepts, but use different terms to describe them
  - Technical details in implementations may vary

- A partial list of some leading virtualization technologies:

  - **PowerVM (IBM)**
  - **LPAR (IBM)**
  - **z/VM (IBM)**
  - **VMware ESX, VMotion (VMware)**
  - **Hyper-V (Microsoft)**

  - **Containers/Zones (Sun)**
  - **Integrity VM (HP)**
  - **Xen (Open source)**
  - **Etc.**

- For SW licensing, virtualization only impacts PVU-based offering

See the Sub-capacity Licensing website for information on supported virtualization technologies

Sub-Capacity (Virtualization Capacity) Licensing Overview

▸ **Full capacity licensing**

– Customers acquire licenses for all the physical processor cores

▸ **Sub-capacity (Virtualization Capacity) licensing**

– Customers acquire licenses for the lower of Virtualization Capacity or Full Capacity of the server, or group of servers

- Virtualization Capacity is the sum of the virtual core capacity available to a product

– Virtualization Capacity License Counting Rules differ by Virtualization Technology, see specific rules for your Virtualization Technology Environment:

Virtualization Capacity License Counting Rules

Examples of Licensing Scenarios Follow

Summary of Sub-capacity Licensing Requirements

- **Customers using sub-capacity licensing must:**

  – Agree to the terms of the Sub-capacity Attachment

    • Follow Virtualization Capacity License Counting Rules for the 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

- *Customers are no longer required to submit reports to IBM!*

See the Sub-capacity Licensing website for information on supported virtualization technologies

Full Capacity: Physical Cores on One Server

1 Server	8 Physical Cores

Server 1

MQ
WAS

Software Products ➡

Physical Cores ➡

8
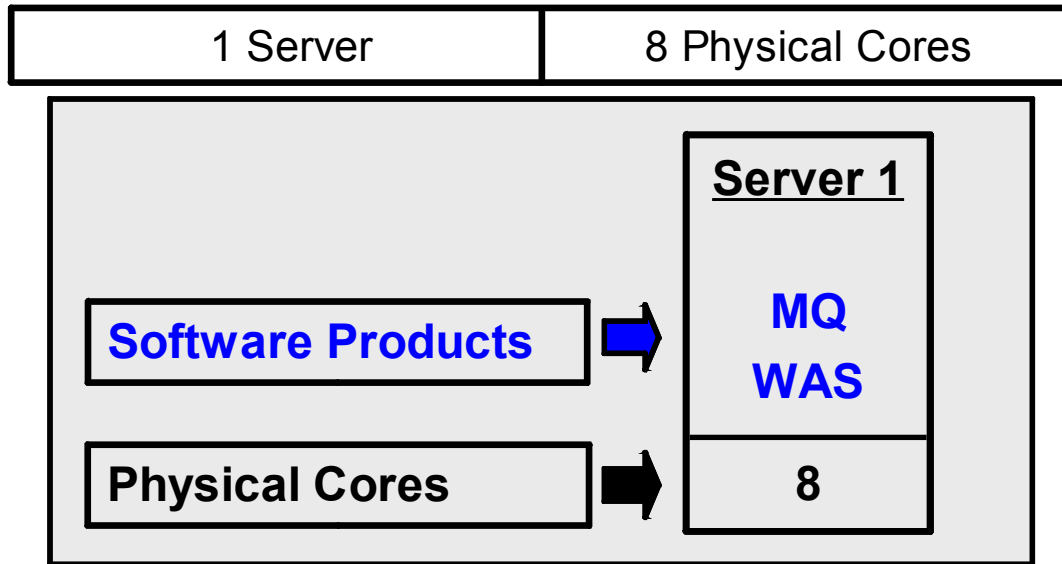
▸ Customers must acquire licenses for the Full Capacity (all physical processor cores) in the server available to the software products:

Cores to License	Full Capacity
MQ software	8
WebSphere software	8

Sub-capacity: Virtual Cores on One Server

1 Server	8 Virtual Cores	8 Physical Cores

Server 1

PAR 1	PAR 2
MQ	MQ
WAS	

Software Products ➡

Virtual Cores ➡ | 4 | 4 |
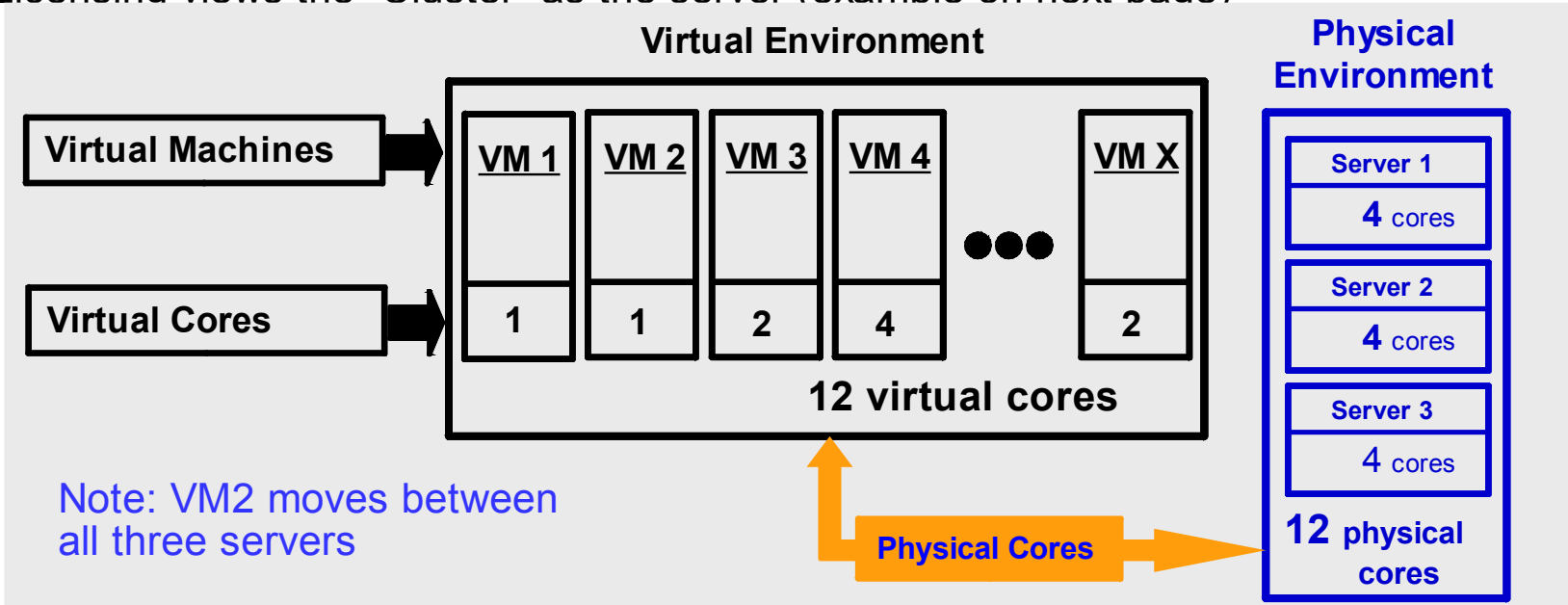
Physical Cores ➡ | 8 |
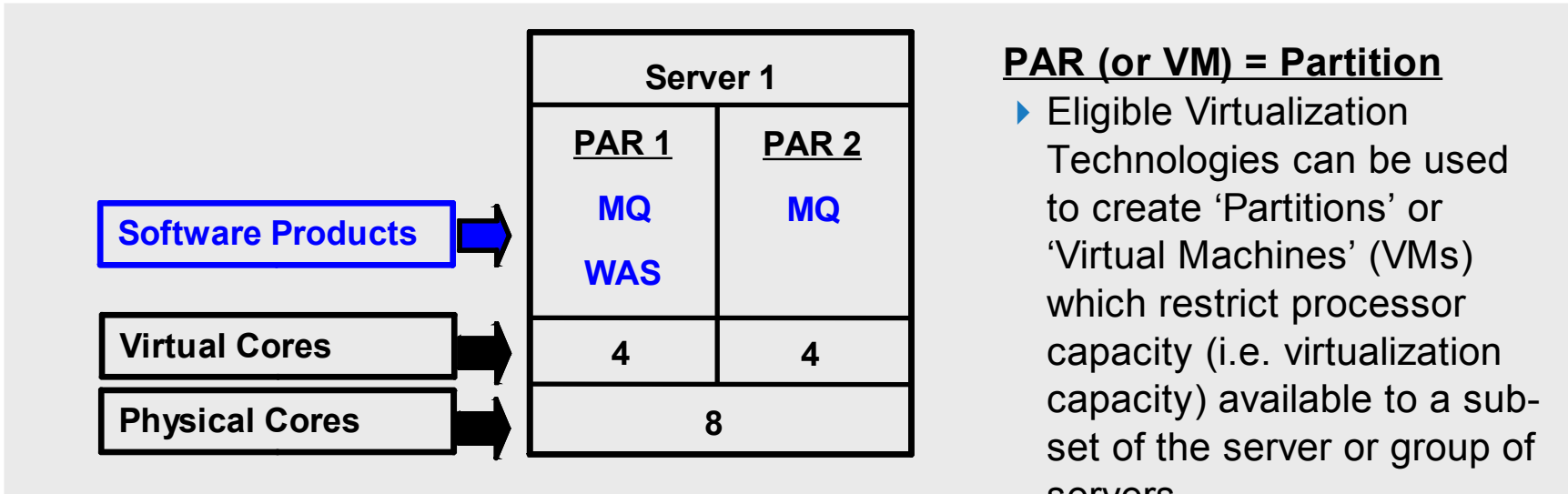
PAR (or VM) = Partition

▶ Eligible Virtualization Technologies can be used to create 'Partitions' or 'Virtual Machines' (VMs) which restrict processor capacity (i.e. virtualization capacity) available to a sub-set of the server or group of servers

▶ License for the lower of Virtualization Capacity (using LPARs, Partitions, Virtual Machines) or Full Capacity available in the Server.

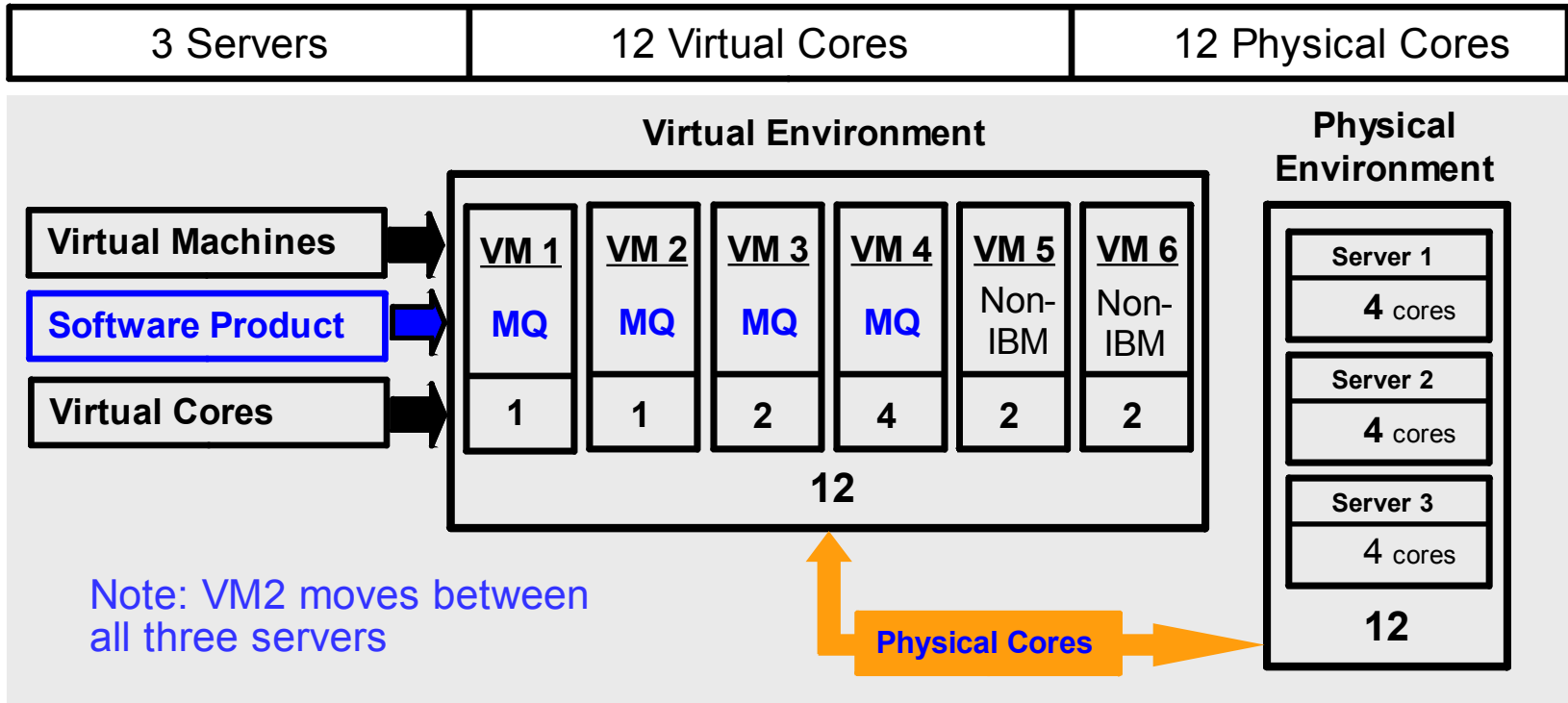| Cores to License	PAR 1	PAR 2	Sub-cap	Full Cap
MQ software	4	4	8	8
WebSphere software	4	--	4	8

What is a Virtualized Server Cluster?

- A group of locally networked servers that

  - Are centrally managed by a logical pool of resources (processor cores, storage, network etc.)

  - Provides resources, including processor cores, to each of the VMs

- Virtualization Technology could dynamically move VMs between servers in the cluster

  - Example: VMware VMotion virtualization provides this movement capability

- Licensing views the "Cluster" as the server (example on next page)

Virtual Environment

Physical Environment

Virtual Machines	VM 1	VM 2	VM 3	VM 4	VM X
Virtual Cores	1	1	2	4	2

12 virtual cores

Physical Environment
Server 1 — **4** cores
Server 2 — **4** cores
Server 3 — **4** cores

12 physical cores

Note: VM2 moves between all three servers

Physical Cores

Virtualization Capacity : Virtual Cores on Server Cluster

(This example is applicable for selected Virtualization Technologies only)

3 Servers	12 Virtual Cores	12 Physical Cores

Virtual Environment

Physical Environment

Virtual Machines

Software Product

Virtual Cores

VM 1	VM 2	VM 3	VM 4	VM 5	VM 6
MQ	MQ	MQ	MQ	Non-IBM	Non-IBM
1	1	2	4	2	2

12

Server 1
4 cores

Server 2
4 cores

Server 3
4 cores

12

Note: VM2 moves between all three servers

Physical Cores

▸ License for the Virtualization Capacity (using Virtual Machines) or Full Capacity available in a group of servers (Cluster)

MQ software	VM 1	VM 2	VM 3	VM 4	VM 5	VM 6	Sub-cap	Full Cap
Cores to license	1	1	2	4	--	--	8	12

IBM License Metric Tool (ILMT)

- **Mandatory for PVU Virtualization Capacity environments, <u>except</u> when:**
  - ILMT does not yet support an eligible Virtualization Technology (e.g. VMware today)
  - Enterprise has fewer than 1,000 employees and contractors worldwide
  - Full Capacity measurement of all servers running sub-capacity licenses is less than 1,000 PVUs
    - See next page for examples
  - Deployed Tivoli License Compliance Manager v2.3 (with 4Q08 Fix Pack)
- **For above exceptions, customers must count manually using IBM template**
- **ILMT and/or Manual calculation records must be maintained for at least 2 years**
  - If audited, provide saved reports to IBM's third party auditors
  - These reports are not submitted to IBM
- **Recommended for Full Capacity PVU environments**
- **Benefits**
  - Helps customers measure PVU licenses required, by software product
  - Can help customers maintain an audit ready posture
  - Essential for optimization of RISC/Unix virtualization technologies

> ## *Recommended for Full Capacity, Required for Virtualization Capacity*

1,000 PVU Exception Example

Full Capacity measurement of all servers running sub-capacity licenses is less than 1,000 PVUs

Qualifies for exception

Power Systems (POWER6 Processor) Server 1	
PAR 1	PAR 2
WAS	
4	4
8	

Server 1 @ Full Capacity
960 PVUs

Does NOT Qualify for exception

Power Systems (POWER6 Processor) Server 1		Power Systems (POWER6 Processor) Server 2	
PAR 1	PAR 2	PAR 1	PAR 2
WAS		DB2	
4	4	4	4
8		8	

Server PVUs @ Full Capacity
Svr1=960 PVUs
Svr2=960 PVUs
Total 1920 PVUs

Eligibility of New Virtualization Technologies

- *IBM has the best licensing coverage for virtualization in the industry!*

- Many virtualization technologies are eligible for sub-capacity licensing

  – However, there are some that are not eligible for sub-capacity licensing

- Always check to be sure:

  – The customer's virtualization technology is eligible for sub-capacity, and

  – Whether ILMT supports the planned virtualization technology

- You can check these on the Sub-capacity Licensing website

Sub-capacity April '09 Announcement: Enhancements

- **Nearly all PVU-based products now eligible for sub-capacity licensing**
  - Only those that won't run in a virtual machine are ineligible

- **Elimination of two part number structure (full cap vs. sub-cap)**
  - The existing full-cap part numbers will now apply to both full-cap and sub-cap
  - Customers' existing PVU license entitlements can be used for full-cap or sub-cap.

  - Customers' S&S entitlements will be converted at next S&S renewal after July 1

- **To use these products in sub-capacity mode, customer must still agree to the sub-cap terms per the Sub-Capacity Attachment to the PA Agreement**

- **Benefits of this change:**
  - Offers a complete IBM SW PVU portfolio for customers who are virtualizing
  - Simplifies license ordering/tracking for both customers and IBM
  - Eliminates the need for conversions of existing licenses when deploying sub-capacity environment

Sub-capacity April '09 Announcement: Enhancements

- **Expansion of eligible virtualization technologies**
  - Citrix Xen Server virtualization
  - Red Hat Enterprise Linux (Xen) virtualization
  - Microsoft Hyper-V virtualization
  - VMware Server 2.0
  - Operating System commands and BIOS settings
  - Above technologies will be supported in ILMT during 2H 2010

- **Re-confirm ILMT support during 3Q 2009 for VMware**

- **Re-confirm eligibility & ILMT support during 3Q 2009 for PowerVM**

- **Benefits of this change:**
  - Allows customers to expand the use of sub-capacity licensing to more workloads
  - Increased flexibility to use the most appropriate virtualization technology
  - *IBM has the best licensing support for virtualization in the industry!*

Benefits of PVUs and Sub-capacity Licensing

▶ Licensing to the core (or IFL on System z)

– More granular measure of processor capacity available

– Better surrogate for the value a client receives from IBM products

▶ PVU licensing

– Flexible structure allows licensing to more closely track to the value a customer can receive from processor capacity available to software

– Licenses are transferable across systems

▶ Sub-capacity licensing

– Allows customers to license only to the maximum number of processor cores available to be used by the VM, not the entire physical server (or cluster)

– Customers can leverage virtualization technologies to optimize their system design and improve their overall TCO

Virtualization Capacity Resources

**Passport Advantage Virtualization Capacity (Sub-capacity) Licensing**
http://www-306.ibm.com/software/lotus/passportadvantage/subcaplicensing.html

IBM License Metric Tool (ILMT)
http://www-306.ibm.com/software/lotus/passportadvantage/ibmlicensemetrictool.html

Backup

Processor Definition is Important in Middleware Licensing

- **The core is a functional unit on which software executes**

  - Multi-core chips have more than one processor core on the chip

Single-core Chip	Quad-core Chip
Processor Core 1	Processor Core 1 2 3 4
Chip	Chip
Socket	Socket
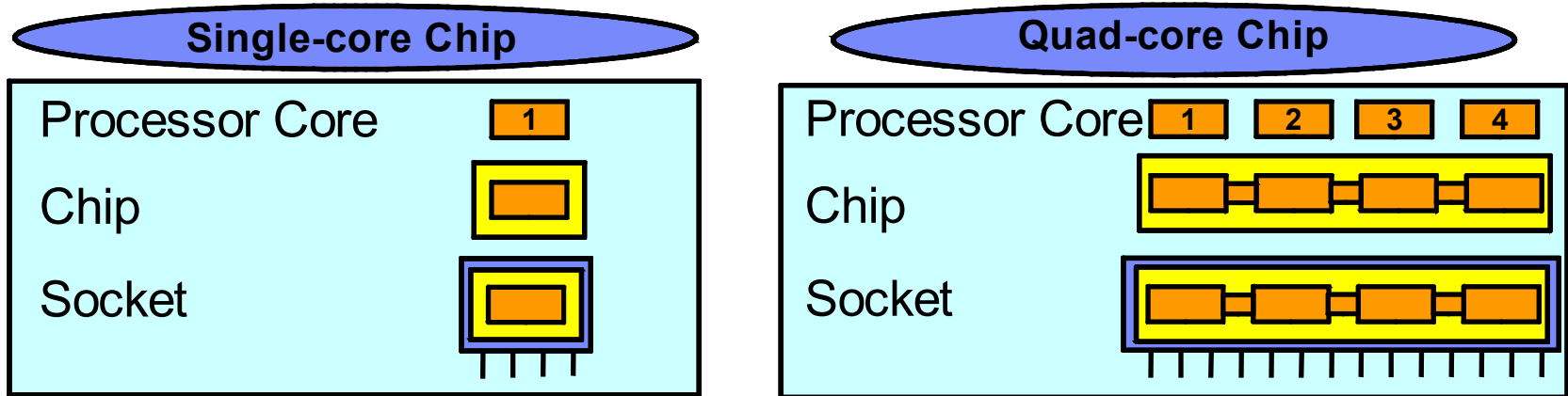
IBM Software continues to define processor = core

- IBM Systems i, p, z and Power Systems also define a processor as a core
  - Do not need to adjust the processor count for these systems
- Other server vendors define a processor as a core or a socket, and their processor counts must be adjusted for the number of cores on the chip