SoftSummit™ 2015

Session 1:
Managing Software Licenses in Virtual Environments

Paul Baguley, Principal, Advisory Services – KPMG

Managing Software Licenses in Virtual Environments

June 2015

Paul Baguley
Principal
KPMG LLP

KPMG
cutting through complexity

Introduction

This Talk will focus on how to successfully manage software licenses in highly virtualized server environments. It will:

- Summarize the complexity and challenges

- Highlight the potential benefits/cost savings

- Explain possible approaches and tools available.

KPMG

cutting through complexity ™

Virtualization Overview

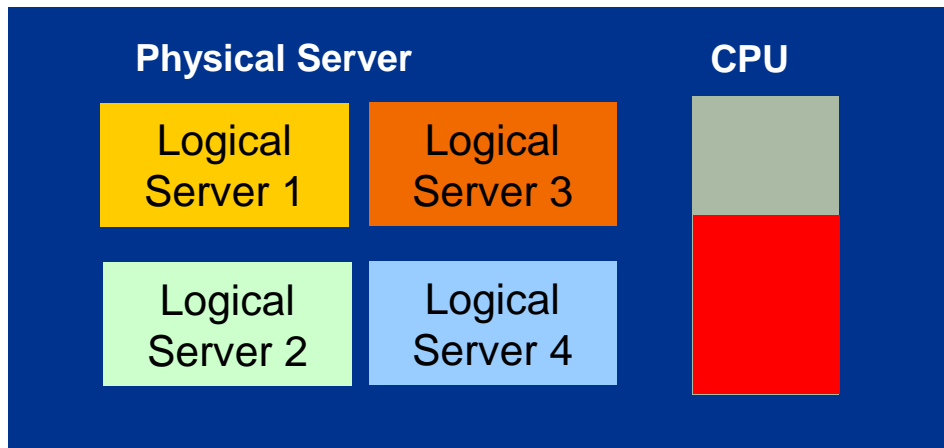# What is Virtualization?

- **Virtualization: is the creation of a <u>virtual</u> (rather than an actual) version of something, such as an operating system, a server, a storage device or network resources, etc.**

- **Virtualization disassociates the tight bond between software and hardware**

- **Areas of virtualization include :**

Server   Network   Storage   Desktop   Application
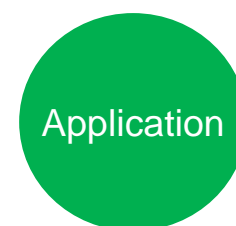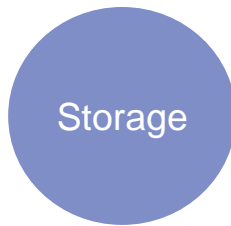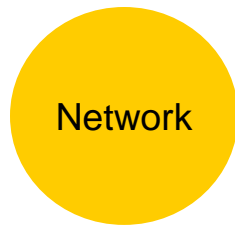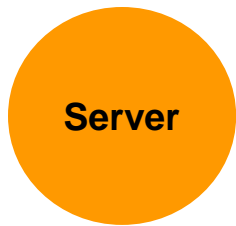
Server Virtualization

Server virtualization allows you to run multiple virtual instances on a single physical machine to maximize CPU (processor) usage.

Physical Server	CPU
Logical Server 1	
Logical Server 3	
Logical Server 2	
Logical Server 4	

Different virtual machines can run different operating systems and multiple applications on the same physical computer.

Advantages and Disadvantages of Virtualization

Advantages
IT Asset consolidation
Improved IT agility, efficiency
Less hardware needed, less net new licenses
Reduced maintenance costs
Savings on power, data center space etc.
Dynamic Load Balancing, improved application availability

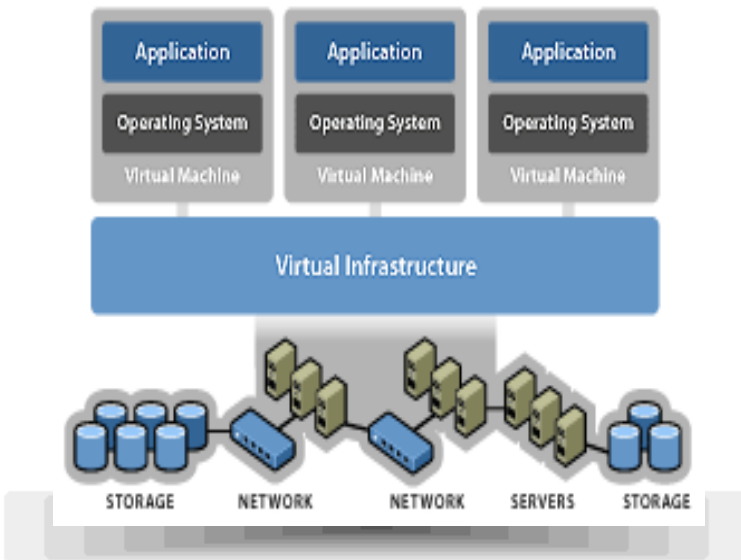| Disadvantages |
| --- |
| More single points of hardware failure |
| May be some impact on performance |
| Managing virtual environment more complicated |
| Inconsistent virtualization licensing requirements by software vendors. Easier to inadvertently over deploy the software. |

Virtualization Technologies

Server Virtual Environment

One physical host server supports multiple virtual servers (virtual machines or VMs)

Each VM supports an Operating System (OS) and one or more applications

Multiple Virtualization Technologies:

- VMware vSphere

- IBM Logical Partitioning (LPAR), PowerVM

- Oracle Solaris Containers (Zones), VM Server for SPARC (LDoms)

- Microsoft Hyper-V

- HP nPar (Hard Partitioning) / vPar (Soft Partitioning), Integrity VM
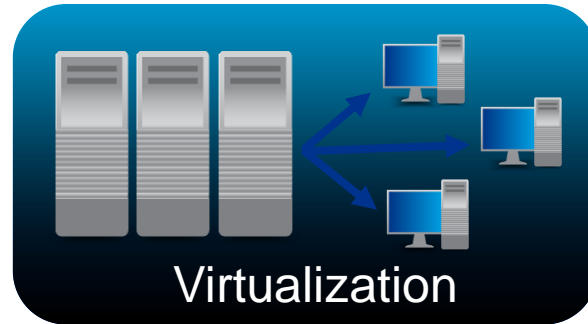
- Citrix Xen

KPMG

cutting through complexity ™

Virtualization Licensing Challenges

Virtualization Impacts - licensing and compliance

Software Companies

- How to license?

- How to count and report?

- How to enforce compliance?

- How to maintain licensing revenue?

End Users

- What is the best licensing option?

- How to count and report?

- How to maintain compliance?

- How to reduce licensing costs?

Virtualization adds significant license management complexity

Virtualization - Licensing Challenges

Vendor
Potential for significantly less license and maintenance revenue for server based products
Reality of modern day, virtualized IT infrastructure is out of balance with (pre-virtualization licensing rules)
Deployments of virtual server are done rapidly with ease, leading to increased software deployments
Few reporting tools available to accurately measure and report back on actual virtualized usage
Actual usage can vary depending on when deployment information is gathered
Follow the sun compliance

| Consumer |
|---|
| **Unique virtual licensing models are used across a number of software vendors** |
| **Not all software vendors have a clear position on virtual licensing** |
| **Can easily get out of compliance (if not monitored)** |
| **Deployments of virtual server are done rapidly with ease, leading to increased software deployments** |
| **Few reporting tools available to accurately measure and report back on actual virtualized usage** |
| **Actual usage can vary depending on when deployment information is gathered** |
| **Follow the sun compliance** |
| **Who has compliance liability – hosting company or end user?** |

Each Vendor has different Virtualization Rules

	IBM	Oracle	Microsoft
Eligible Software Products	Processor Value Unit (PVU) based products	Processor based products	Server and processor based
Eligible Virtualization Technologies	Most	No soft partitioning	Hyper-V, VMware
Licensing Rules	CPU core – max over 24 hrs	CPU core – max per machine	Per Server / Processor – license mobility rules
Restrictions	•IBM Licensing Metric Tool (ILMT) or Flexera required	•Hard Partitioning v. Soft Partitioning	•Virtualization rules based on edition

Virtualization Example 1 – Reduced Licensing Costs

Server 1

Physical Cores ⇨ 8

|	PAR 1	PAR 2	
Software Products ▶	X	X	
	Y		

Virtual Cores ⇨ 4   4
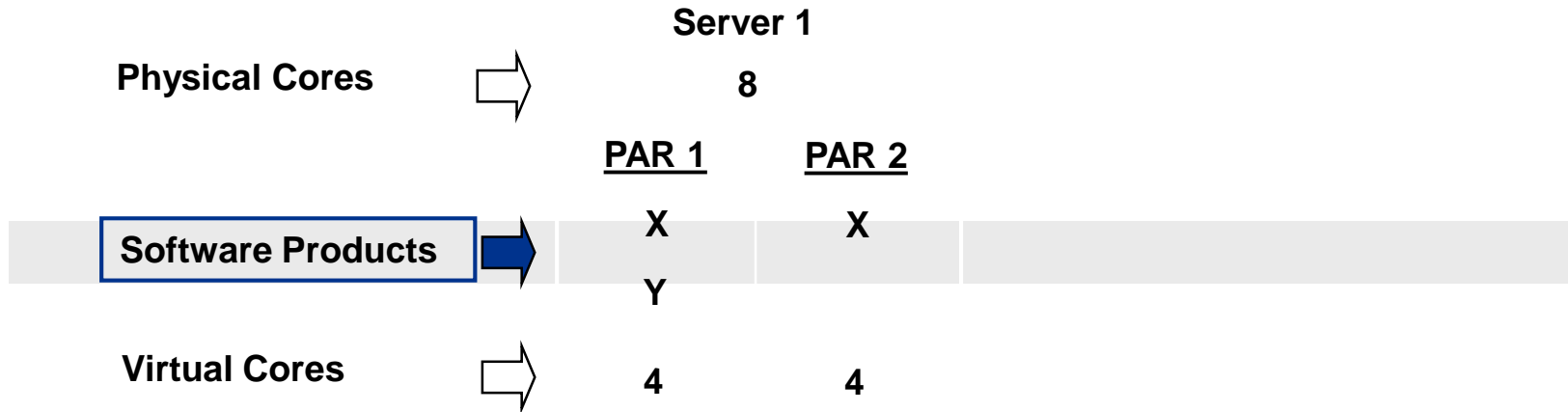
▸ License for the lower of Virtualization Capacity (using LPARs, Partitions, Virtual Machines) or Full Capacity available in the Server.

Cores to License	PAR 1	PAR 2	Virtualization Capacity	Full Capacity
Software X	4	4	8	8
Software Y	4	-	4	8

Virtualization Example 2 – Increased Licensing Costs

Before: Oracle running in Non Virtualized environment

11 G
11 G

2 servers
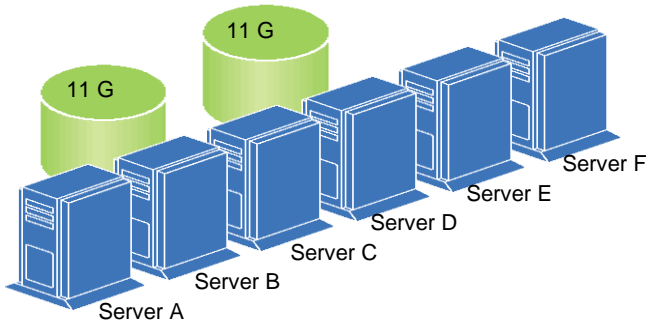4 processors = 4 licenses
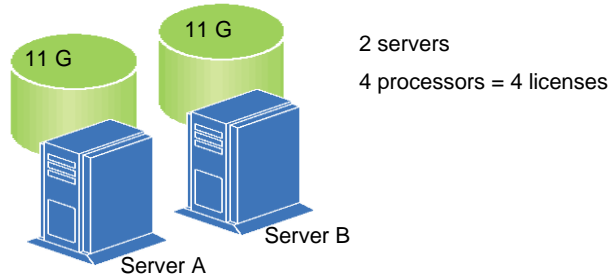
Server A
Server B

2 servers with 2 CPUs each licensed.
4 CPUs deployed

= OK

Servers A & B have 2 Physical CPUs each. Licenses for both servers were purchased

Now: Oracle running in Virtualized environment

6 servers
12 processors = 12 licenses

11 G
11 G

Server A
Server B
Server C
Server D
Server E
Server F

2 servers with 2 CPUs
licensed. Up to 12 CPUs
may be used in the cluster.

= 8 CPUs short.

Servers A &B were redeployed as part of a virtualized 6 server cluster. Each server has 2 physical CPUs. The deployed Oracle Enterprise edition licenses can run on any 2 servers at one point

Virtualization Example 3 – Licensing Complexity

IBM Passport Advantage Software – Virtualization Capacity Licensing for IBM Power Systems PowerVM Virtualization

License Counting – Single Shared Pool with Capped and Uncapped Partitions

Server with 12 processor cores

	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	VP = 4	VP = 4	VP = 7	VP = 3
	EC = 1.00	EC = 2.00	EC = 2.00	EC = 3.00	EC = 1.00

DB2 cores to license:
- 1 from dedicated partition B
- 4 from EC for capped partitions E and F
- 3 from VP for uncapped partition H
- 8 total

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

WAS cores to license:
- 2 from EC for capped partition F
- 10 from VP for uncapped partitions G and H
- 12 total reduced to 9, maximum cores available in the shared pool

License Rules:
- For Capped Partitions: The highest actual* level of Entitled Capacity (EC);
  - EC was formerly referred to as Processing Unit (PrU).
- For Uncapped Partitions: The highest actual* number of Online VP (Virtual Processors)
- Shared Pool: the lower of the sum of each partition for a product or the processor capacity of the shared pool

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

Licensing Complexities in Cloud

- New licensing models introduced to incorporate deployments in the cloud:
  - Subscriber Access License
  - Processor License with Cloud / Mobility restrictions
  - Pay per usage (time or data)

- Potential for license manipulation:
  - Follow the sun – mobility
  - Restrictions on physical location of deployments can be easily breached

- Who has compliance responsibility?
  - Microsoft places liability with licensee and not cloud provider
  - If cloud providers are audited, their customers could be held liable for findings

Cloud – IAAS - Licensing Comparisons

Microsoft

Customers must have software assurance to qualify for license mobility.

Customers cannot BYOL for Windows OS in the public cloud (the IAAS vendor must supply the OS). There are 2,300 Authorised License Mobility Partners to which customers can BYOL such as Microsoft server application licenses e.g. SQL, Exchange, Sharepoint.

IBM

Customers can BYOL to public cloud, but only to IBM cloud, Azure and Amazon. Sub-capacity reporting rules still apply.

Oracle

Customers can BYOL to public cloud, but only to Oracle cloud, Azure and Amazon. Customers with unlimited license agreements cannot count licenses deployed in the public cloud in their end of term ULA certification.

SAP

More open on supported IAAS providers but a wide range of licensing models ranging from BYOL to subscription and combinations of both for different application components.

Common Pitfalls for Non-Compliance

- Non-compliance with defined licensing terms

- Incorrect calculation of processors and cores

- Blurred lines between metrics: Access v Use v Install

- Misunderstanding of Bundling

- Lack of awareness of vendor specific rules:

    - Cannot limit process cores operationally (IBM)

    - Fail over rules (DB2)

    - Soft v Hard partitioning (Oracle)

License Virtualization Approaches and Tools

How to stay on top of Virtualization

1. **Understand the rules, use cases and how to count (per vendor)**

2. **Get a good Software Asset Management (SAM) tool!**

3. **Virtualize to your advantage**

1. Understand the Rules and how to apply them (for each vendor)

- **Understand the ground rules**
  - Technology eligibility
  - Reporting Obligations
  - Point in time or maximum over a defined period?
  - Location restrictions

- **Assess use cases**
  - impact of clustering
  - impact of moving machines
  - different terms for development, test, staging and Disaster Recovery

- **Calculate deployments accurately**
  - Processor core types
  - Conversion ratios
  - Thresholds

Example: Rules for calculating IBM Deployments

DB2 ESE

Processor Type
2 Intel Xeon 5450 (Quad Core)

PVU Calculation

1. Determine total number of **Processor Cores** in the Machine
2. **Determine PVU conversion ratio**
3. Multiply total number of cores by conversion ratio

Sockets x Cores per Socket x PVU Conversion = Full Capacity Deployments

2 x 4 x 50 = 400 PVUs

Processor Technologies												
	Processor Brand		Processor Type									
Processor Vendor	Processor Name	Proc. Model Number[1]	Cores per socket								Maximum number of sockets per server	PVUs per Core
			(1)	(2)	(4)	(6)	(8)	(10)	(12)	(16)		
	Xeon®	3000 to 3399 5000 to 5499 7000 to 7499		■	■	■					All	50
	Core®	All i3, i5, i7		■	■	■					All	70
AMD	Opteron	All		■	■	■	■		■	■	All	50
Any	Any single -core	All	■								All	100

2. Get a good SAM tool

- **Discovery**

  - Multi-platform: Windows, UNIX, Linux, MAC OS

    - Virtual Machines, Hard Partitions and Clusters (VMware, MS Hyper-V, LPAR, vPar, nPar, Solaris Zones)

    - Citrix XenApp, XenDesktop user access rights & app usage

    - Microsoft App-V

- **Correlate VMs to physical host servers**

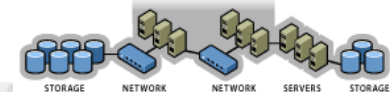- **Normalize software discovery data to obtain a deployment inventory**

- **Compare deployments to entitlements and use rights to obtain a licensing position**

VMware Virtual Env.

Example: FlexNet Manager for IBM Overview

Built on the FlexNet Manager Platform

IBM License Types Supported:

    PVU, UVU, Resource Value Unit (RVU)

    Authorized User

    Concurrent User

    Floating User

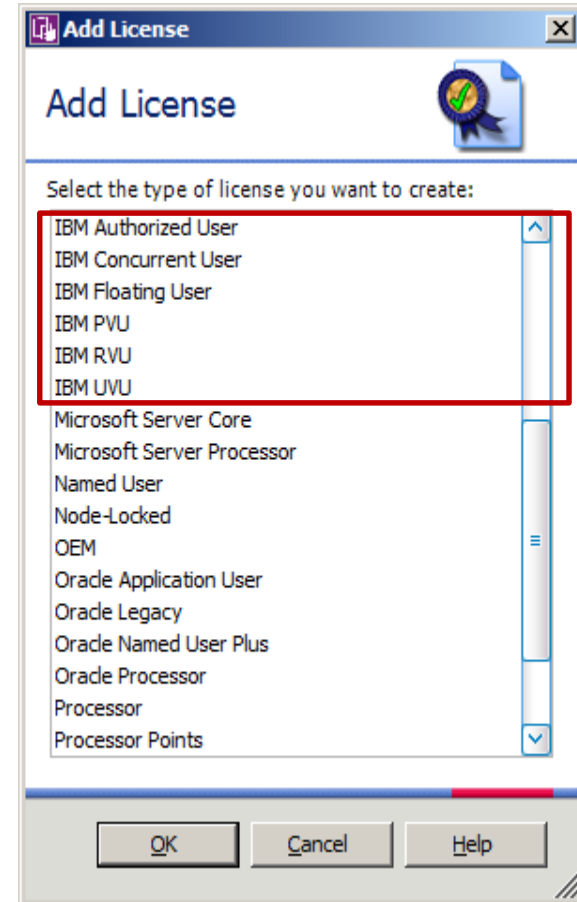**Supports PVU Full Capacity & Subcapacity**

Integration with ILMT
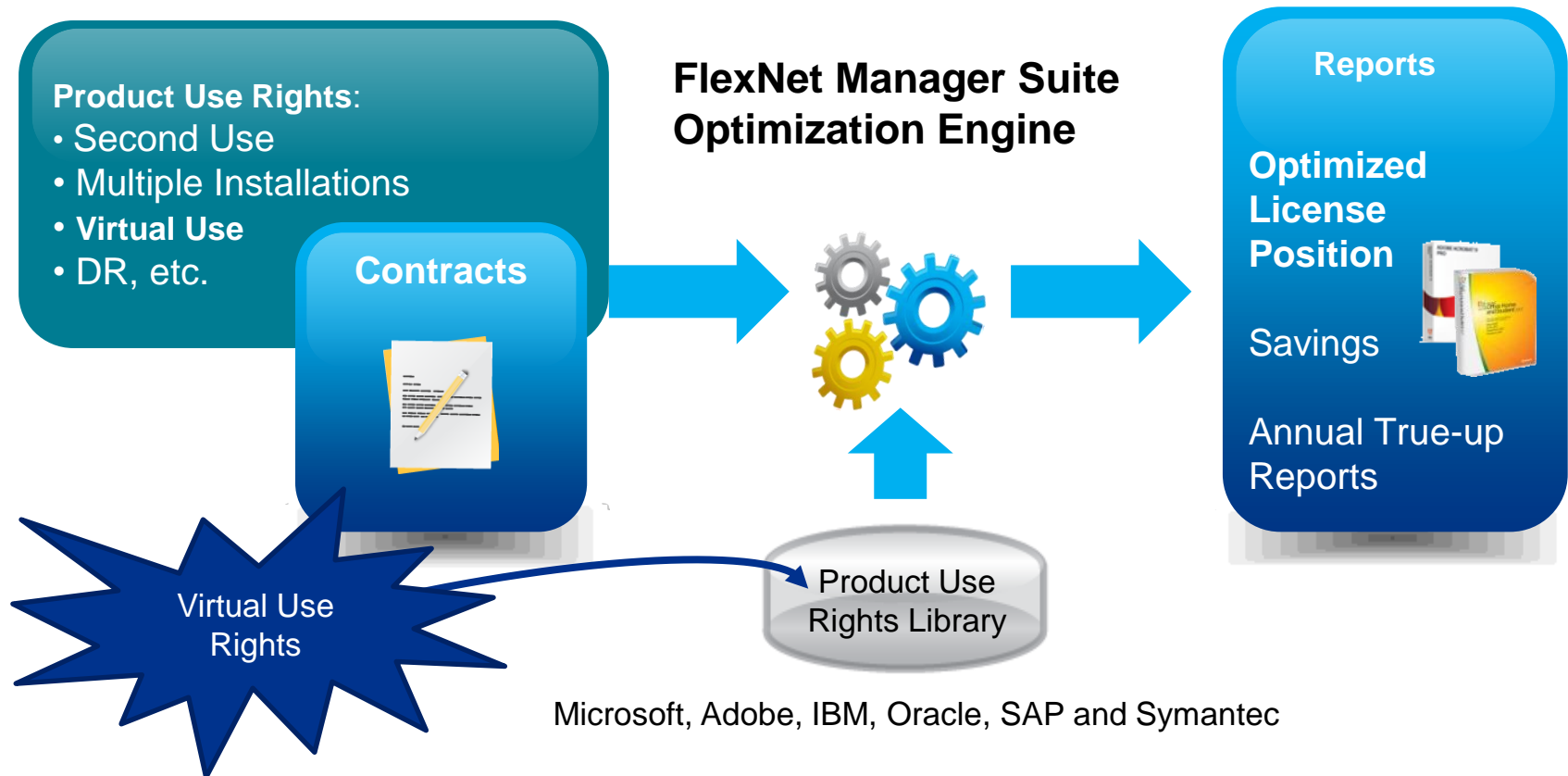
PVU subcapacity calculation, independent of ILMT

Server Cluster Support, Including DRS Host Affinity Rules for VMware

Automated License Reconciliation and License Optimization for IBM products

    IBM Product Use Rights Library

Example: Flexnet Manager – License analysis

Product Use Rights:
- Second Use
- Multiple Installations
- **Virtual Use**
- DR, etc.

Contracts

FlexNet Manager Suite Optimization Engine

Reports

Optimized License Position

Savings

Annual True-up Reports

Virtual Use Rights

Product Use Rights Library

Microsoft, Adobe, IBM, Oracle, SAP and Symantec

3. Virtualize to Your Advantage

IBM

- Take advantage of sub capacity rules. These can be significant in terms of cost savings.

- Understand all of the requirements and Sub Capacity Terms.

- Install the IBM reporting tool (ILMT or equivalent such as Flexera).

Oracle/Microsoft

- **Oracle Enterprise Edition**: understand implications of your cluster configurations to manage licensing costs.

- **SQL Server Enterprise Core** investigate "unlimited virtualization" licensing options to license all cores or processors of an ESX host (with Software Assurance).

- Consider:

  - Consolidating virtual machines running the virtualized software, to a limited number of clusters

  - Restricting the dynamic movement of virtual machines to a subset of physical hosts within a cluster

  - Migrating deployments of physical deployments to clusters already fully licensed for the virtualized software (this would directly decrease your licensing footprint)

Summary

- Virtualized environments offer significant operational benefits – but do significantly increase license complexity.

- Each vendor is different – need to understand specific vendor and product rules.

- It is too complex to manage without an effective SAM tool. Not all tools are capable of capturing required information for calculating virtual deployments

- There are significant benefits/cost savings to be obtained from effectively managing and analyzing virtualized licenses.

- With the introduction of the cloud and new virtualization technologies, vendors are constantly reviewing and updating licensing terms

Paul Baguley

Principal, Advisory Services
KPMG LLP
Email: paulbaguley@kpmg.com
Phone: 408-367-7608

KPMG

cutting through complexity