Oracle Database

The Most Common License Compliance Issues Seen

An Insight White Paper

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Introduction

Back in 1977, almost four decades ago, Oracle's database software was the first piece of software produced and marketed by the company. The Oracle Database software has remained one of the most popular Relational Database Management Systems (RDBMS) used by many of the world's larger enterprises. Although the Oracle Database is one of the major components in the IT landscape, almost every company that uses the software struggles with managing the accompanying licenses in a complete and accurate manner. This can easily result in large operational, financial and/or legal risks.

WE HELP YOU MANAGE
YOUR ORACLE LICENSES

Specialized in all Oracle software programs, including Oracle Database, Middleware (incl BEA), Siebel, JD Edwards, Agile, Hyperion, AutoVue, E-Business Suite, Primavera and more...

The objective of this Insight White Paper is to provide a clear overview of the most common license compliance issues. Based on this white paper, organizations (end users) can assess their own situation and get a grasp of actions to be taken.

This whitepaper is written together with Insight's Strategic Business Partner b.lay. Whenever you are in need of extra expertise and a structured approach, feel free to contact Insight. We will help you make software compliance an exciting opportunity to improve your business!

Understanding your license entitlements?

Most of the time, end users don't realize that a large amount of terms and conditions, as listed in many different documents, needs to be taken into account carefully for properly managing the licenses that govern the use of the Oracle Database software programs.

The two most known contractual documents are:

1. Oracle's Ordering Documents

The Order Document list the amount of licenses purchased for a specific software program against a specific license metric. It refers to a specific Oracle License Agreement.

Example

Order Form states: ***2 Processor licenses Oracle Database Enterprise Edition***

NO 13&X2GB22

2. Oracle's License Agreement

Your License Agreement is either called Software License and Services Agreement (SLSA), Oracle License & Services Agreement (OLSA), Transactional Oracle Master Agreement (TOMA) or Oracle Master Agreement (OMA). It is not uncommon that an organization has multiple (different) license agreements through which they have purchased different software programs over the years. The license agreement specifies the general and most specific terms under which the software can be used. Examples can be, which legal entities are authorized to make use of the software, what audit rights have been agreed, what license metric definitions have been agreed, etc.

Example

The "Processor" definition in the Oracle License Agreement states:

Processor shall be defined as all processors where the Oracle programs are installed and/or running. Programs licensed on a processor basis may be accessed by your internal users (including agents and contractors) and by your third party users. The number of required licenses shall be determined by multiplying the total number of cores of the processor by a core processor licensing factor specified on the Oracle Processor Core Factor Table which can be accessed at http://oracle.com/contracts .

Apart from the Ordering Document and the Oracle License Agreement, a number of other documents/sources are part of your license entitlements, including:

3. Oracle's Program Documentation

The Oracle License Agreement states in the "Rights Granted" section:

"Upon Oracle's acceptance of the order, you have the limited right to use the programs and receive any services you ordered solely for your internal business operations and subject to the terms of this agreement, including the definitions and rules set forth in the order and the program documentation."

Oracle's Program documentation is therefore part of your license agreement and includes terms and conditions that need to be taken into account!!. Oracle's Program documentation can be found at http://docs.oracle.com and includes thousands of pages that explain which products/ components are part of a specific program license, what specific full use or restricted usage rights are granted within a software program, what products may be required to be licensed separately in case you make use of certain software programs and what specific products/features require separate licenses.

Example:

Oracle Database Enterprise Edition 12c R1 includes the following products/components:

JServer Enterprise Edition, interMedia, Objects Option, Networking Kit, Objects for OLE , Advanced Replication Option, Distributed Option, Parallel Query Option, (including bitmap indexes and parallel bitmap-star query), SQL*Plus, Visual Information Retrieval and Workflow. For OS/390 implementation, use of either Access Manager for CICS or Access Manager for IMS/TM is included.

In addition, Oracle Database Enterprise Edition 12c R1 includes the restricted usage rights to make use of "Oracle Internet Directory" as long as it is only being used for the purpose of storing Oracle Database Service information.

In addition , Oracle Database Enterprise Edition Options (e.g. Partitioning) and Oracle Database Enterprise Management Packs (e.g. Diagnostics Pack) are required to be licensed separately.

4. Oracle's Support Renewals

With the purchase of a software license, end users typically obtain support maintenance for a total of 22% of the net license fee.

Support Maintenance provides end users the right to log a service request or ask for technical support, in case they encounter issues with the usage of a specific software program.

Support Maintenance from Oracle however also includes the right to make use of the latest version of the software. So in case

a) an end user purchased 10 years ago an Oracle Database Enterprise Edition license (and at that time the latest database version available was 9i) and

b) has continued to pay support maintenance fees to Oracle over the last

10 years, he is entitled to make use of the latest version of the Oracle Database, up to the moment he has paid support maintenance.

This means that such a customer is entitled to make use of the latest version of the Oracle Database Enterprise Edition, which is currently version 12c, release 1. Over the years, multiple versions of the Oracle Database have become available from version 7 release 1 and 2 to the current version 12c release 1. Oracle has the right to bundle/unbundle/rebundle certain specific products/components from one version or release to another version or release. The products/components an end user is entitled to make use of - as a result of the licenses they purchased - is therefore dynamic and changes over time.

Example

Oracle's Database Enterprise Edition version 11, release 1 and release 2 did include a feature called "Advanced Replication". As of Oracle Database Enterprise Edition version 12c release 1, this feature is no longer available.

Advanced Replication is further developed in Oracle's Golden Gate software programs, which means that end users wanting to use Advanced Replication in 12c release 1 need to purchase additional Golden Gate licenses.

5. Oracle's Technical Support Policies

The Support Maintenance Renewals contracts that are typically renewed (and signed) on a yearly basis, refer to Oracle's Technical Support Policies. The Oracle Technical Support Policies are therefore part of your license entitlements as well. Apart from Oracle's "Matching Service Level Policy", "Repricing Policy after a reduction of licenses" or "Reinstatement Policies", these Technical Support Policies also state as of which date certain versions of specific Oracle programs are not longer part of the standard "Premier Support" offering. These dates are important, in order to make sure that you are not using an unsupported version and may require additional Extended Support Services to have full security for your most business critical applications that may still run on an old database version.

Did you for example know that Oracle Database Enterprise Edition 11g Release 2 is no longer part of Oracle's Premier Support Service offerings since January 2015?

6. Oracle's Online Licensing Documents

In the Oracle License Agreements (especially the later ones) there are number of references to online licensing documents, which are integral part of the terms and conditions of your agreement.

Examples

Oracle's Processor Core Factor table *(as referred to in the Processor definition of your License Agreement).*

Oracle's Application Licensing Table *(as referred to on the last page of your License Agreement).*

7. Oracle's Online Guideline Documents

There are also many "Online Guideline Documents" published by Oracle to clarify the contractual terms and conditions as listed in the Ordering Documents and License Agreements for specific infrastructure choices.

Examples

- **Oracle's Server Partitioning Policy** (clarifying how to license Oracle's software in a virtualized environment like VMware, LPAR and others).

- **Oracle's Disaster Recovery Policy** (clarifying how to license Oracle's software in a disaster recovery environment like a backup, failover, standby or remote mirroring solution).

- **Oracle's Data Transfer Policy** (clarifying how to license environments in which data is being transferred to and/or from the Oracle software through automated batches, flat files or multiplexing environments), and

- **Oracle's Database Licensing Policy** (clarifying how to license the Oracle Database software).

The large amount of documents/sources of information that need to be read, understood and maintained by an end user organization is typically underestimated. As a result of this, enterprises don't have a correct view of what they are actually entitled to do with the Oracle Database software, resulting in large financial risks.

No technical restrictions or license keys!

Oracle's licensing model is very flexible and non-restrictive. It is based on the company's Sales and Marketing philosophy that Oracle software should be readily available for everyone, at any time, 24 hours a day, 7 days a week.

Anyone who wants to use any of the Oracle software programs can visit the Oracle website (http://www.oracle.com/technetwork/indexes/downloads/index.html and download whatever software program they are interested in. The full responsibility to obtain the appropriate and sufficient software licenses is the end user's. The end user needs to contact Oracle or one of its resellers to obtain the appropriate licenses before installing and using the software. On top of that, the end user in almost all cases will download more (related) functionalities/features than the software he or she intends to install and/or use. For example, in case the end user wants to download the Oracle Database Enterprise Edition 12c Release 1, 16 database options and 7 database management packs will land on the computer as well – on top of the Oracle Database itself . All these database options and database management packs require separate licensing in case these are going to be used.

The software itself does not contain any license key that needs to be entered for the download process or installation to start. In addition, there is no counter or

technical restriction in the software that prevents you from ending up with more users than you are actually entitled to. In case a specific piece of Oracle software does require a license key – which for example applies to some of the software programs acquired by Oracle during one of its many acquisitions (e.g. Siebel CRM)

– the license keys to install and/or use the software can be downloaded without any restrictions through the Oracle License Codes website (http://www.oracle.com/us/support/licensecodes/index.html).

Although undoubtedly this ease of use is very convenient for the end user, it also results in more complexity and difficulty while keeping track of software programs, users, and rights, which you are definitely required to do. In many organizations, multiple (internal and external) people in different roles and with different levels of expertise download and install Oracle Database software programs, without being aware of what they are doing and using in what capacity. This typically results in large non-compliance issues and financial exposure.

The next chapter will explain the most common license compliance issues seen related to Oracle's Database software programs. The issues are categorized into five different groups:

1. Hardware Infrastructure Related Issues

2. Software Installation Related Issues

3. Software Configuration Related Issues

4. Software Usage Related Issues

5. Non-Technical Compliance Issues

III. The most common compliance issues

Hardware Infrastructure Related Issues

The required number of licenses for Oracle's Database software programs are (almost) at all times related to the hardware infrastructure on which the software is installed. Incorrect interpretation or understanding of whether the software is a) deemed to be installed and b) how the installed software should be licensed in a certain specific hardware infrastructure is by far the number 1 license compliance issue. Here we present a number of examples to make clear that only with a complete and accurate understanding of the hardware infrastructure you will be able to manage and monitor (partly) the required number of Oracle Database software licenses correctly.

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1. Incorrect Understanding Of License Minimums

As per the terms and conditions of the Named User Plus license metric definition as listed in the license agreement:

You are responsible for ensuring that the named user plus per processor minimums are maintained for the programs contained in the user minimum table in the licensing rules section; the minimums table provides for the minimum number of named users plus required and all actual users must be licensed.

This means that – independent of the actual number of individuals that may make use of the Oracle Database software – Oracle requires end users to have a minimum number of licenses for the different database programs installed and/or used. The minimum required number of Named User Plus licenses is different for every Oracle Database program, including:

#	Oracle Database Standard Edition One	5	Named User Plus
#	Oracle Database Standard Edition	5	Named User Plus
#	Oracle Database Standard Edition Two	10	Named User Plus per Server
#	Oracle Database Enterprise Edition	25	Named User Plus per Processor
#	Oracle Database Enterprise Edition Option	25	Named User Plus per Processor
#	Oracle Database Enterprise Edition Management Packs	25	Named User Plus per Processor

In addition, as licensing metrics have changed over the last decades from Concurrent User/ Concurrent Device to Named User and later to Named User Plus, the license minimums have changed as well. Under the Concurrent User/ Concurrent Device license metrics, the minimums were for example 8 Concurrent Device per Processor for Oracle's Database Enterprise Edition, whereas under the Named User license metric, the minimums were 10 Named User per Processor for the Oracle Database Enterprise Edition.

Apart from changing license minimums, it's not uncommon for end users to believe that all the minimum required number Named User Plus licenses are – at all times – calculated Per Processor. This is incorrect. The minimums for

the Oracle Database Standard Edition One and Oracle Database Standard Edition have always been 5 per organization. So 5 Concurrent Device licenses, or 5 Named User, or 5 Named User Plus licenses per organization is the minimum required number of licenses to deploy these database software programs. And for the recently released Oracle Database Standard Edition Two a minimum of 10 Named User Plus licenses per Server is applicable.

In addition, end users typically forget that this minimum should be calculated for all the servers on which the software is installed and/ or used, no matter if the software on a server is used for production, test, development, acceptance, or any other type of usage.

Example

In case an end user has one production server with 4 processors, one acceptance server with 4 processors, one test server with 4 processors and 2 development servers with each 4 processors on which a total amount of 125 users are making use of the Oracle Database Enterprise Edition, the end user is required to license a minimum number Named User Plus licenses as per this calculation:

Production (1 x 4) + Acceptance (1 x 4) + Test (1 x 4) + Development (2 x 4) = 20 x 25 = 500 Named User Plus

On top of this, the minimum required number of licenses are Per Processor, meaning that end users need to determine the minimum required number of Named User Plus licenses Per Processor, as per Oracle's Processor definition and NOT just per the amount of CPUs of the machine itself.

In case an end user has for example one production server with 4 CPUs – 10 Cores per CPU – Intel Xeon, one acceptance server with 2 CPUs – Quad Core – Power 7, one test server with 4 CPUs – Single Core – Intel and 2 development servers with each 2

CPUs – Octo Core – Intel Xeon on which a total amount of 125 users are making use of the Oracle Database Enterprise Edition, the end user is required to license a minimum number Named User Plus licenses as per this calculation:

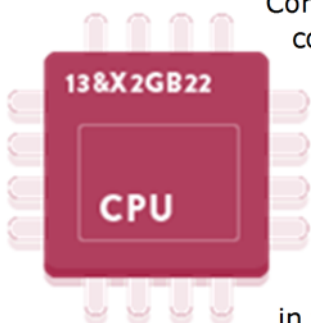|				
Production	:	4 CPUs x 10 Cores x 0.5 (Processor Core Factor for Intel Xeon)	=	20
Acceptance	:	2 CPUs x 4 Cores x 1.0 (Processor Core Factor for Power 7)	=	8
Test	:	4 CPUs x 1 Cores x 1.0 (Processor Core Factor for Single Core)	=	4
Development	:	2 x 2 CPUs x 8 Cores x 0.5 (Processor Core Factor for Intel Xeon)	=	16

So the total number of Processors (as per Oracle's Processor definition) is (20 + 8 + 4 + 16) = 48, instead of (4 + 2 + 4 + 2x2 =) 14, as many end user organizations believe. The minimum number of required Named User Plus licenses for the Oracle Database Enterprise Edition is therefore 48 x 25 = 1200 Named User Plus licenses Oracle Database Enterprise Edition.

2. Incorrect Processor Counts

As per the terms and conditions of the Processor license metric definition as listed in the license agreement:

Processor: shall be defined as all processors where the Oracle programs are installed and/or running. Programs licensed on a processor basis may be accessed by your internal users (including agents and contractors) and by your third party users. The number of required licenses shall be determined by multiplying the total number of cores of the processor by a core processor licensing factor specified on the Oracle Processor Core Factor Table which can be accessed at http://oracle.com/contracts . All cores on all multicore chips for each licensed program are to be aggregated before multiplying by the appropriate core processor licensing factor and all fractions of a number are to be rounded up to the next whole number. When licensing Oracle programs with Standard Edition One or Standard Edition in the product name (with the exception of WebCenter Enterprise Capture Standard Edition, Java SE Support, Java SE Advanced, and Java SE Suite), a processor is counted equivalent to an occupied socket; however, in the case of multi-chip modules, each chip in the multi-chip module is counted as one occupied socket.

A processor is explicitly defined as stated above, with many factors that impact the way you have to count the number of processors on which the software is deployed, including:

- Number of CPUs
- Number of Cores per CPU
- Type of CPU
- Purchase date of the hardware
- Configuration of the hardware itself (e.g. virtualization, logical partitioning)

Not applying the right methodology, licensing rules and calculations on the number of Processors can lead to an incorrect calculation of the license requirements and can therefore result in large compliance issues and financial risk.

Example

In the case of 50 servers with one single-core Intel processor each running Oracle's Database Enterprise Edition, for which you apply an Oracle Processor Core Factor of 0.5 for the Intel processors, you would calculate:

50 servers x 1 processor x 1 core x 0.5 = 25 Processors.

However, because the servers use single-core processors, you would need to apply an Oracle Processor Core factor of 1.0 (instead of 0.5 which is only applicable for multi-core processors). Therefore, you would need to license:

50 servers x 1 core x 1.0 = 50 Processors.

Wrongly applying this single Core Factor would result in noncompliance of 25 Oracle Database Enterprise Edition processor licenses, leading to a list license fee exposure of 1,000,000 USD.

3. Server Virtualization through VMware

As per the terms and conditions of the Named User Plus and Processor license metric definition as listed in the license agreement:

Named User Plus: is defined as an individual authorized by you to use the programs which are installed on a single server or multiple servers, regardless of whether the individual is actively using the programs at any given time.

Processor: shall be defined as all processors where the Oracle programs are installed and/or running.

AND, as per the guidelines of Oracle's Server Partitioning policy:

VMware is not permitted as a means to determine or limit the number of software licenses required for any given server or cluster of servers.

As a result of the above license metric definitions it is clear that the Oracle software is required to be licensed once the software is installed on a server, no matter if the software is actually being used. But when is the software considered to be installed? The answer is: once the executable, binaries and/or DLLs (Oracle's Intellectual Property Right) can be found on a (shared) disk. In addition, it is clear that Oracle does not recognize VMware as a technology, to limit the number of cores/processors which are required to be licensed in any server or cluster of servers.

Many end user organizations don't like Oracle's licensing policies around the installation and/or usage of the Oracle software in a virtualized VMware environment, since VMware is the market leader in virtualization software and other software vendors have different licensing policies. On the other hands it s also true that Oracle's position around licensing its software in a VMware environment has been very clear for the last 12 years. Oracle does NOT recognize VMware as a technology to limit the required number of licenses; all the physical cores / processors of the physical machines on which the virtual machine can be hosted are required to be licensed.
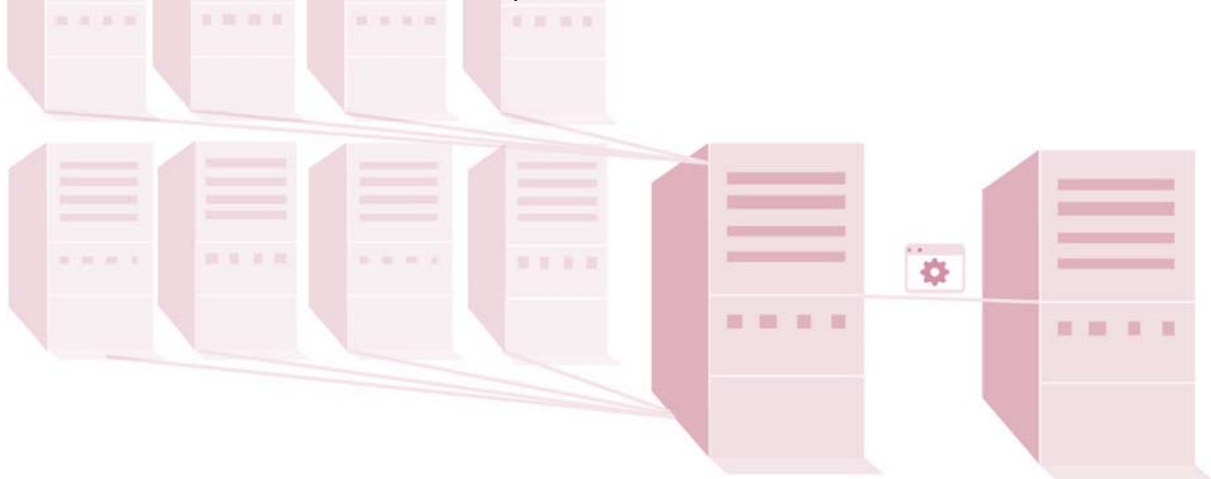
Consider this case

An end user has 1 physical machines with 4 CPUs – 10 Cores/CPU – Intel Xeon on which he applied VMware to create a total amount of 10 different virtual machines. On one (1) of these virtual machines, the Oracle Database Enterprise Edition is installed, and this virtual machine gets a total amount of 2 virtual CPUs allocated/pinned. All other nine (9) virtual machines are being used to install other non-Oracle software programs.

Oracle requires the end user to license the physical capacity of the server on which the software is installed and/or used, resulting in a total amount of 4 CPUs x 10 Cores x 0.5 (Processor Core Factor for Intel Xeon) = 20 Processors to be licensed.

The reason being that VMware is considered to be Soft Partitioning as per Oracle's Server Partitioning Policy, which means that VMware is not recognized as a technology to limit the number of Processors which are required to be licensed. As per the contractual terms and conditions, the Oracle Database software programs are deemed to be installed and can be running on each physical core of the machine, which therefore is required to be licensed.

Another case

An end user has 4 installations of the Oracle Database Enterprise Edition, each on a separate virtual machine. Each virtual machine gets a total of 5 cores allocated. The virtual machines are hosted in a larger VMware cluster, making use of vSphere version 5.1 (or later), in which a total amount of 10 distinct physical hosts are part of the cluster. Each physical host has a total of 4 CPUs – 10 Cores/CPU – Intel Xeon. The whole cluster is managed by a VCenter instance which also manages 3 other clusters. Each cluster has a total amount of 10 distinct physical hosts, and each host has a total of 4 CPUs – 10 Cores/CPU – Intel Xeon.

Oracle requires this end user to license the physical capacity of the server(s) on which the software is installed and/or running, resulting in a total amount of 4 clusters x 10 hosts x 40 cores x 0.5 (Processor Core Factor for Intel Xeon) = 800 Processors to be licensed. The reason being that VMware is considered to be Soft Partitioning as per Oracle's Server Partitioning Policy, which means that VMware is not recognized as a technology to limit the number of Processors which are required to be licensed.

With vSphere version 5.1 and later, the end user is required to license all the physical servers from the entire VMware environment (vCenter Server Instance), including across datacenters, where the virtual machine running Oracle may be moved (via vMotion) as the end user has the ability to easily move the virtual machine running Oracle to any server where VMware software is installed. As the Oracle installation is accessible across the VMware environment, through ease of migration, the entire environment needs to be licensed.

Because of the ease with which end users can enable and disable vMotion, the policy applies regardless if vMotion is enabled or disabled. Therefore, as per the contractual terms and conditions, the Oracle Database software programs are deemed to be installed and can be running on each physical core of each physical machine within the vCenter Server Instance, which therefore is required to be licensed.

Despite the fact that this policy has been the same for more than a decade, almost every end user using VMware in combination with Oracle is found to be non-compliant during the course of an audit. End users are still not aware of Oracle's licensing policies in virtualized VMware environments or they think that Oracle should just accept host affinity or virtual CPUs "pinned" to the Oracle Database software as the required number of CPUs to be licensed (without having any contractual basis for it) and any other reason in between these two extremes.

End users should at all times be aware that they can only install and/use the Oracle Database software programs as per the terms and conditions of the different documents mentioned. Any other interpretation or application of terms and conditions not specifically listed in the agreement is not allowed and requires approval (or clarification) in writing by an authorized representative of Oracle Corporation.

4. Server Virtualization through Oracle's VM

As per the guidelines of Oracle's Server Partitioning policy, Oracle VM Server may be used as hard partitioning technology only as described in the following documents:

- Oracle VM Server for x86, only if specific cores are allocated per the following document: http://www.oracle.com/technetwork/server- storage/vm/ovm-hardpart-168217.pdf
- Oracle VM Server for SPARC, only if specific cores are allocated per the following document: http://www.oracle.com/technetwork/server- storage/vm/ovm-sparc-hard-partitioning-1403135.pdf

As an alternative for using VMware's virtualization software (often because of Oracle's Licensing policy for using Oracle Database software in VMware environment), normally Oracle's own virtualization software (Oracle VM) is proposed by an Oracle Sales representative or considered by end user organizations. The license requirements for the standard out of the box implementation of Oracle VM are however – from a licensing perspective – exactly the same as the license requirements for the use of VMware. Only in case the end user allocates (hard pins) specific cores to the Oracle Database software as per Oracle's licensing documents "Hard Partitioning With Oracle VM Server for x86" and "Hard Partitioning With Oracle VM Server for SPARC", Oracle VM is accepted as a technology to limit the required number of cores to be licensed.

5. Server Virtualization through IBM's LPAR

As per the guidelines of Oracle's Server Partitioning policy, Oracle-approved hard partitioning technologies as listed (including IBM's LPAR) are permitted as a means to limit the number of software licenses required for any given server or cluster of servers.

IBM Power VM Live Partition Mobility is not an approved hard partitioning technology. All cores on both the source and destination servers in an environment using IBM Power VM Live Partition Mobility must be licensed.

Many end users are familiar with the fact that Oracle does recognize Logical Partition (LPAR) technologies from IBM to limit the number of cores which are required to be licensed. As technology evolves, LPAR has evolved as well. IBM's newest technology is called Live Partition Mobility. Live Partition Mobility allows end users to migrate partitions that are running AIX and Linux operating systems and their hosted applications from one physical server to another without disrupting the infrastructure services. End users using the Live Partition Mobility technology tend to forget that both the source and destination servers, making use of Live Partition Mobility, are both required to be licensed.

6. Disaster Recovery and High Availability

As per the terms and conditions of the Named User Plus and Processor license metric definition as listed in the license agreement:

Named User Plus: is defined as an individual authorized by you to use the programs which are installed on a single server or multiple servers, regardless of whether the individual is actively using the programs at any given time.

Processor: shall be defined as all processors where the Oracle programs are installed and/or running.

Enterprises nowadays require a high uptime of their IT infrastructure, especially of their mission critical systems. Disaster recovery and high availability servers therefore are very common, but their licensing implications are typically unknown, incorrectly applied or not well understood. Also because different (enterprise) software vendors apply different rules for licensing disaster recovery environments.

End users typically tend to forget that, although the Oracle Database software may or may not be used on a disaster recovery server, the binaries, executables and/or DLLs are still installed on the server. Since the license metric definition states that the software is required to be licensed once the software is installed and/or running, disaster recovery servers are (almost always) still required to be fully licensed, and with the same license metrics as the associated production server.

It is correct that Oracle has one scenario, in which the disaster recovery server does not require separate licensing, the so-called failover scenario. Oracle's licensing rules for failover environments are however typically misunderstood resulting in non-compliance issues. It is therefore crucial to understand that - only in case all of the conditions below are exactly met – Oracle does not require an end user to license its secondary DR server.
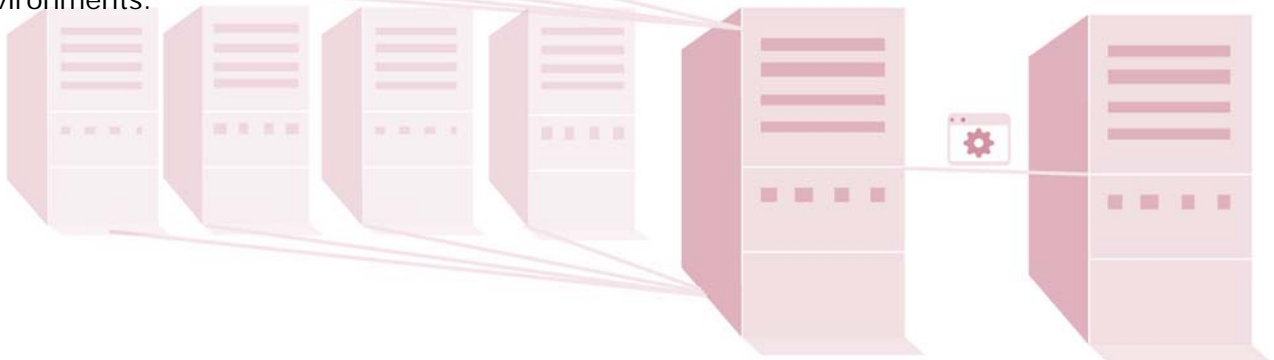
Failover licensing rules dictate that only when:
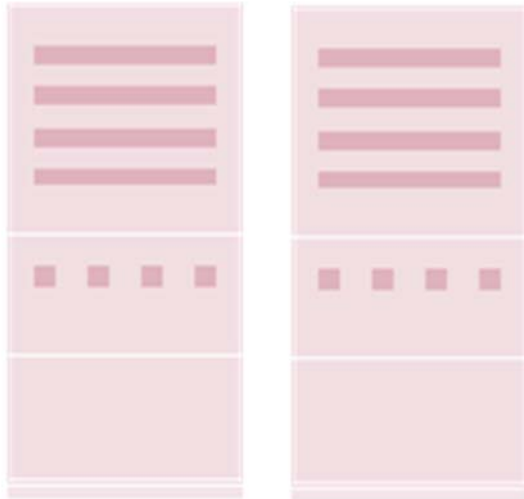
A.) Two servers (primary production server and secondary failover server) are clustered and have access to one (1) Single Storage/SAN

B.) When the primary production server fails, the secondary failover server acts as the primary server

C.) The failover server is used no longer than ten separate days in a calendar year

D.) Once the primary production server is repaired (after a failure), the end user switches back from the secondary failover server to the primary production server

Then the secondary failover server does NOT need to be licensed separately. This means that:

1) In case two servers each have access to a different storage/SAN, the configuration is not deemed to be a failover configuration (but a Remote Mirroring configuration in which the data is replicated at SAN level) and both servers are required to be separately and fully licensed.

2) In case three servers are clustered (e.g. 1 production and 2 failover servers) and have access to one single storage/SAN, server 1 and server 3 are still required to be licensed; only 1 failover server in the cluster is not required to be licensed.

3) In case the primary production server fails today at 23:58 and is recovered at 00:02 the next day, the secondary failover server is being used for 2 days; every event on a day is counted as 1 day, and you should not count 10 days x 24 hours as the maximum usage period.

4) In case the primary production server is every month down for applying OS updates or patches, this will be counted as using the failover server for at least 12 times and therefore requires both the primary production server and secondary failover server to be separately and fully licensed; Downtime for maintenance purposes counts towards the ten separate days limitation.

5) In case the primary production server fails and you switch over to the secondary failover server (which becomes then the production sever) and you wait until there is a failure of this secondary server to switch back to the primary production server, both servers are required to be separately and fully licensed; once the primary node is repaired, you must switch back to the primary node

7. Multithreading

As per the terms and conditions of the Processor license metric definition as listed in the license agreement:

Processor: shall be defined as all processors where the Oracle programs are installed and/or running. Programs licensed on a processor basis may be accessed by your internal users (including agents and contractors) and by your third party users. The number of required licenses shall be determined by multiplying the total number of cores of the processor by a core processor licensing factor specified on the Oracle Processor Core Factor Table which can be accessed at http://oracle.com/contracts. All cores on all multicore chips for each licensed program are to be aggregated before multiplying by the appropriate core processor licensing factor and all fractions of a number are to be rounded up to the next whole number. When licensing Oracle programs with Standard Edition One or Standard Edition in the product name (with the exception of WebCenter Enterprise Capture Standard Edition, Java SE Support, Java SE Advanced, and Java SE Suite), a processor is counted equivalent to an occupied socket; however, in the case of multi-chip modules, each chip in the multi-chip module is counted as one occupied socket.

As a result of the above, hyper-threading is not taken into account from an Oracle licensing perspective. However, in certain environments (such as a machine running Microsoft Windows 2003 – an operating system developed before the existence of multicore chips and multithreading), the operating system cannot distinguish between a thread and a core. In the case of Intel Xeon CPUs with 4 cores where hyper-threading is enabled in Windows 2003, the system will therefore register 8 "processors", as it counts each thread as a separate processor. The same can happen on older HP-UX Intel Itanium systems which can lead to over-counting the numbers of licenses required for the specific system. During the assessment of the required number of licenses on such an environment, typically mistakes are being made.

8. Outsourcing & Cloud environments

A growing trend in the market is cloud computing or outsourcing. More and more companies choose to outsource their hardware infrastructure to specialized third parties. Although some cloud providers have complied with Oracle's Server Partitioning Policies and are therefore Authorized Cloud Provider (e.g. Amazon EC2 and Microsoft Azure) with special licensing rules (see: Licensing Oracle Software in the Cloud Computing Environment) the vast majority of them have not yet complied with Oracle's Server Partitioning Policies.

As a result, the majority of solutions offered by these third parties are based on virtualization technologies which are not accepted by Oracle, meaning that all the hardware on which the end user's software is installed and/or running is required to be licensed. And although the software is installed at the outsourcer, the end user remains responsible and liable for the correct licensing of all Oracle software used for business operations.

Outsourcing may have obvious advantages in terms of costs and access to specialized resources. The downside is losing (more) control on which and how many (physical) machines the Oracle software is installed for business operations. The outsourcing company may configure redundancy solutions to ensure your software has a maximum uptime (to avoid claims in case of performance issues). The hardware infrastructure chosen by your outsourcing or cloud-computing supplier, most likely will lead to a situation in which the software is installed and/or running on multiple machines, potentially resulting in large non-compliance issues, for which the end user will be held responsible.

Software Installation Related Issues
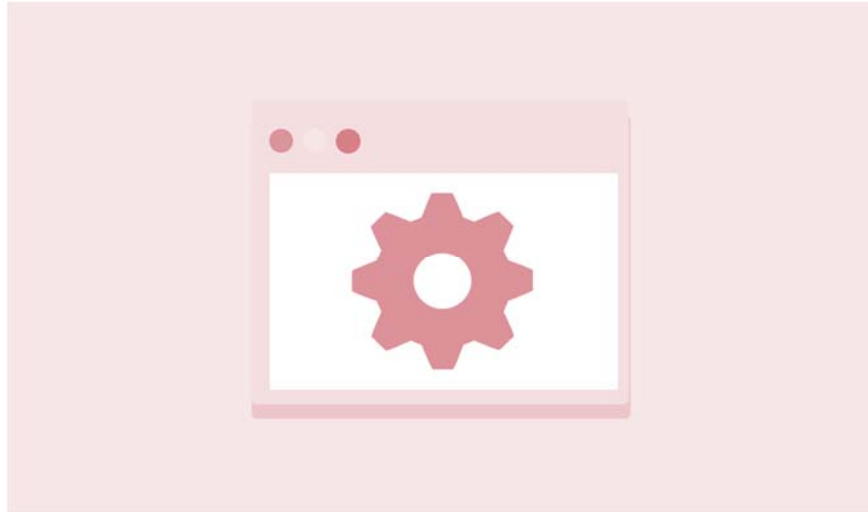
The Oracle database software programs must be licensed once the software is installed, no matter if the software is actually being used. But when is the Oracle Database considered to be installed? The software is deemed to be installed once the executable(s), binaries and/or DLLs for the Oracle Database software can be found on a (shared) disk or disk array. But where should you be looking for to understand if the Oracle Database software is installed on a server? Different methodologies are available to determine if the Oracle Database software installed on a server, including:

Specific Installation Directory:

$ORACLE_HOME

Key Files to Look for:

Windows:

oracle.exe, oracle73.exe, oracle80.exe, (personal edition) svrmgrl.exe (server manager), tnslsnr.exe (TNS listener), $ORACLE_HOME/dbs/
init_<SID>.ora, $ORACLE_HOME/bin/oracle, ORACLE_HOME/bin/tnslsnr

In the Registry:

HKEY_LOCAL_MACHINE/Software/Oracle/KEY_OraDB*home*/ORACLE
_BUNDLE_NAME
HKEY_LOCAL_MACHINE/Software/Oracle/HOME*/ORACLE_BUNDLE_NA
ME HKEY_LOCAL_MACHINE/Oracle/KEY_XE/VERSION

Unix/Linux:

$ORACLE_HOME/dbs/init_<SID>.ora, $ORACLE_HOME/bin/oracle

Note:

The .exe's existence indicates the installation of any of these products: Oracle Database Standard Edition, Oracle Database Personal Edition, Oracle Database Enterprise Edition, and Oracle Database Lite. To differentiate between editions under Windows you can look at the registry key. The oracle.exe file can be found under patch paths, be sure to exclude any patch directories (*.patch*,*patch*,*cpu*)

Running Processes:

Windows:

ORACLE.EXE, TNSLSNR.EXE

Unix/Linux:

ora_pmon_<SID> ora_smon_<SID>

Used Ports:

152x, 153x

9. Incomplete and/or inaccurate overview of Database Installations

Many end user organizations either

i.   do not have the knowledge on how to objectively determine if the Oracle database software is installed on any of their virtual and/or physical servers, or

ii. do not have specific software inventory tooling in place to scan their servers on a regular basis in order to determine if there is an Oracle Database (and other software programs) installed on the different servers, or

iii. have rolled out their software inventory tooling on a (small) subset of their IT infrastructure, or

iv. they have rolled out a software inventory tool which is not capable of discovering the presence of enterprise server based software in general (and Oracle Database software in particular) in a complete and accurate way (typically only focused on desktop software).

As a result, enterprises typically have multiple database installations within their (internal or outsourced) IT infrastructure (which are required to be licensed) without even knowing it! Lack of proper software inventory tooling and procedures results in a situation in which end users are not able to prove that they are managing all their enterprise software installations. And it's very simple: **you cannot manage what you don't know!**

Software Configuration Related Issues

In case an end user downloads the Oracle Database software, he or she will download a bundle or suite of products and/or components. During installation, the user can select a number of options with regard to which specific products and/or components are installed and/or configured, resulting in different licensing scenarios.

10.   Database Edition

During the installation of the Oracle Database software, the default installation option will result in the installation of Oracle's Database Enterprise Edition. In case end users would want to install Oracle's Database Standard Edition or Database Standard Edition One, they are required to pro- actively deselect the default and select Database Standard Edition (One) to be installed.

End-users who want to install Oracle Database Standard Edition Two should be aware that this software can only be installed on servers with a maximum capacity of 2 sockets. When used with Oracle Real Application Clusters, Oracle Database Standard Edition 2 may only be licensed on a maximum of 2 one-socket servers. In addition, Oracle Database Standard Edition 2 databases may only use a maximum of 16 CPU threads at any time and when used with Oracle Real Application Clusters, each Oracle Database Standard Edition 2 database may only use a maximum of 8 CPU threads per instance at any time.

It's not uncommon for end users to have a physical server with a capacity of 10 sockets or more in which they create a dedicated LPAR with 2 sockets to install the Oracle Database Standard Edition One, Oracle Database Standard Edition or Oracle Database Standard Edition Two assuming that this is allowed since the LPAR has a maximum of 2 sockets. However, because the capacity of the physical server has more then 4 sockets, only the Oracle Database Enterprise Edition is allowed to be installed and licensed on such a server – independent of the fact that IBM's LPAR technology is recognized as a technology to limit the number of cores which are required to be licensed.

11.   Database Version

In case an end user installs the Oracle Database he is entitled to install the database version (e.g. 10gR1, 10gR2, 11gR1, 11gR2, 12cR1) available as of the date on which the corresponding license has been purchased or up to the date for which the end user has purchased support maintenance since this includes the right to make use of program updates. End users deciding not to pay technical support maintenance therefore don't have the right to make use of the latest version of the database software programs, patches and/or updates. This requires them to keep track of which database version is installed on what machine and to allocate the appropriate licenses to these servers with the correct rights obtained.

12.   Database Enterprise Edition Options

As mentioned before, during the Oracle Database download process, many different Oracle Database Enterprise Edition Options (e.g. Multitenant, Partitioning, Spatial, Advanced Analytics, Advanced Compression, Real Application Clusters, Real Application Testing, Label Security, Advanced Security, Database Vault, Active Dataguard, Database In-Memory and more) also automatically land on the computer. All these database options are separate licensable features. In almost all the database versions, an end user does not have the option to NOT install these options with the database, and therefore these options are installed and ready to be used once the database is installed.

Although the license metric definitions state that the Oracle software is required to be licensed once the software is "installed and/or running," in practice Oracle will not require you to license these database options in case they are only installed. Only in case the database options are actually in use Oracle requires you to license their usage.

The presence of an installed database option however is a risk in itself; many database administrators think that, either (i) since the database option is installed it is probably a feature of the licensed database software self (and therefore allowed to be used and not required to be licensed separately), or (ii) since the database option is installed it is probably a feature for which the company is licensed (otherwise why would it have been installed) and therefore completely legitimate to be used.

Apart from the fact that an installed database option poses a risk, Oracle will only formally (during the course of an audit) require you to license a database option when the option is found to be in use. But how do you determine if a database option is used? Since the functionality of the various database options is different, the usage of all the different database options needs to be determined in different ways.

To complicate matters, end users should distinguish between (i) database options usage "out of the box" or "system usage:" this means usage of a database option which is by default at all times happening since the Oracle software itself requires the option (which DOES NOT require the database option to be separately licensed) and (ii) database options usage which is not "out of the box" or "system usage:" usage of a database option which is caused by the end user itself (which DOES require the database option to be separately licensed).
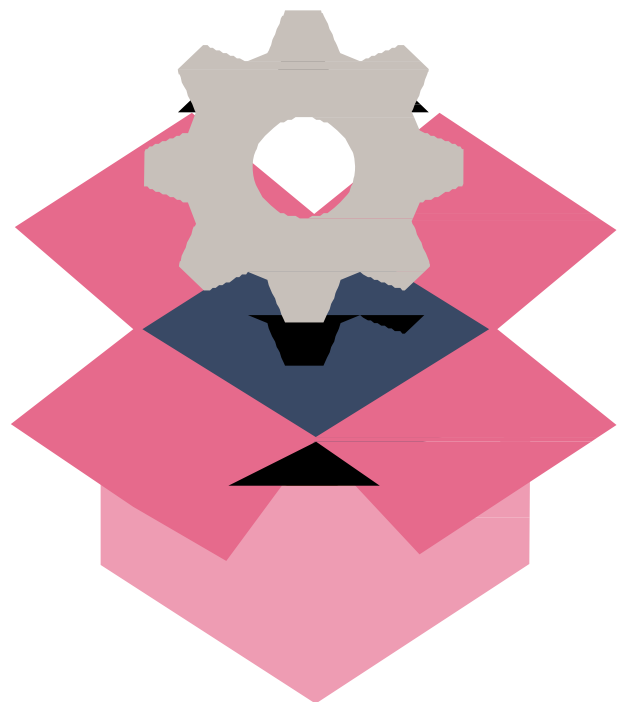
"Out of the box" or "system usage" can be divided into two categories:

a)   default usage automatically generated during the database installation(e.g. all database installations have Partitioned Segments created at install by the following schemas "SYS" and "SYSTEM") AND

b)   usage generated by other Oracle Applications that have been optimized to use certain Oracle Database Options. (e.g. Oracle Applications generated usage would be the partitioned segments created by the "APPS" schema belonging to Oracle E-Business Suite; this type of usage does not require licensing)

Due to the level of detailed knowledge required to differentiate between "out of the box" system usage and "real usage", almost no end user organization is able to keep track of what database options are actually used and therefore required to be licensed.

Did you know that when you make use of the database feature data-pump (which is part of the Oracle Database license itself) that its standard configuration ("Compress All") triggers the use of data-pump compression, a feature of Advanced Compression, which is a separate licensable option? Or is your database administrator aware of the fact that in case he imports data which was previously compressed with OLTP table compression, that this feature (OLTP table compression) is a feature of Advanced Compression, which is a separate licensable option?

Not monitoring the database configuration on a regular basis will result in large compliance issues and financial risks. In addition, software scanning and inventory tools (including the third-party tools verified by Oracle) do not differentiate system usage from actual usage, resulting in the fact that many end user organizations relying upon these software inventory tools (which is typically based on system usage) think they require to license more database options than they actually need to.

13.   Database Enterprise Edition Management Packs

As mentioned already, during the download of the Oracle Database itself, many different Oracle Database Enterprise Management Packs (e.g. Diagnostics Pack, Tuning Pack, Database Lifecycle Management Pack (including Change Management Pack, Configuration Management Pack and Provisioning & Patch Automation Pack), Data Masking and Subsetting Pack and Cloud Management Pack for Oracle Database) are automatically downloaded. These database management packs are separate licensable features.

In almost all database versions, an end user does not have the option to NOT install these management packs when installing the database, and therefore these management packs are installed and ready to be used by the end user once the database is installed. Through the Enterprise Manager (OEM – Grid Control) environment, these management packs can be enabled by checking the "Access Agreed" box in front of each managed target corresponding to the specific management pack. By checking the box you agree with the licensing terms and confirm that you need to license the management pack(s). In many situations, the database management packs are unintentionally checked once (to see what they do) but are not actively used. The Oracle Database however registers when the access was enabled for the different management packs. In case it ever happened this will be spotted during the course of a license audit and you will therefore be required to obtain the appropriate (retro-active term) licenses.

How do you validate if – in case of a database performance issue – your (external) service provider is not enabling database management packs, like 'Diagnostic Pack" and "Tuning Pack" to make their job easier in case you are not licensed for these programs?

The lack of proper management of the specific management packs being used for specific database instances on which specific servers and by whom (including your external database management suppliers) is typically resulting in large unexpected non-compliance situations and related financial risk.

Apart from all non-compliance issues related to the Hardware Infrastructure on which the Oracle Database software is installed, the complete and accurate view on all Oracle Database installations within an organization and the configuration of the different Oracle Database installations – a number of most common compliance issues are related to the actual usage of the Oracle Database software itself. The most common license compliance issues related to the usage of the software, are organized around the Named User Plus license metric definition:

*Named User Plus: is defined as an **individual authorized** by you **to use the programs** which are installed on a **single server or multiple servers**, regardless of whether the individual is actively using the programs at any given time. A **non-human operated device** will be counted as a named user plus in addition to all individuals authorized to use the programs, if such devices can access the programs. If multiplexing hardware or software (e.g., a TP monitor or a web server product) is used, this number must be measured at the **multiplexing front end**. **Automated batching** of data from computer to computer is permitted. You are responsible for ensuring that the **named user plus per processor minimums** are maintained for the programs contained in the user minimum table in the licensing rules section; the minimums table provides for the minimum number of named users plus required and all actual users must be licensed."*

14.   Individuals

What does Individual mean? It denotes every single human being (distinct individual) and not the total number of employees or FTEs. Although your employees may be the major part of your "user population" don't forget your contractors and/or agents that may have access to your Oracle Database. And although three part-time employees may in total sum up to 1 FTE, you still need to license all three single individuals.

Individual also does not refer to database usernames or database schemas. It is very important to understand this distinction and to realize that even if there is a larger number of user accounts created, only the actual individuals (distinct human beings) authorized to make use of the software (and not active users) require a license. This requires a regular cleanup of accounts that are no longer active (e.g. accounts of former employees).

15. Authorized Individuals

What does Authorized mean? Again it refers to the individuals (employees, contractors, agents, etc.) that can access the Oracle Database, no matter if these individuals are actually using the database software. As an example, if you created accounts for 1,000 individuals (all your current employees, contractors and agents) but only 50 persons are actually using the software, still all 1,000 individuals would require to be licensed. Active management of which individuals should have access and which individuals should not have access should therefore take place on a regular basis. In practice, such user management does not take place regularly, resulting in a high risk of non-compliance with financial consequences.

16. Individuals Authorized to Use ?

What does Usage mean? It is correct that usage is not defined in the agreements. This typically causes confusion, since end users are not aware that any individual who can (directly or indirectly) Create, Read, Update or Delete (CRUD) data in the Oracle database software, are considered to constitute usage and therefore should be authorized.
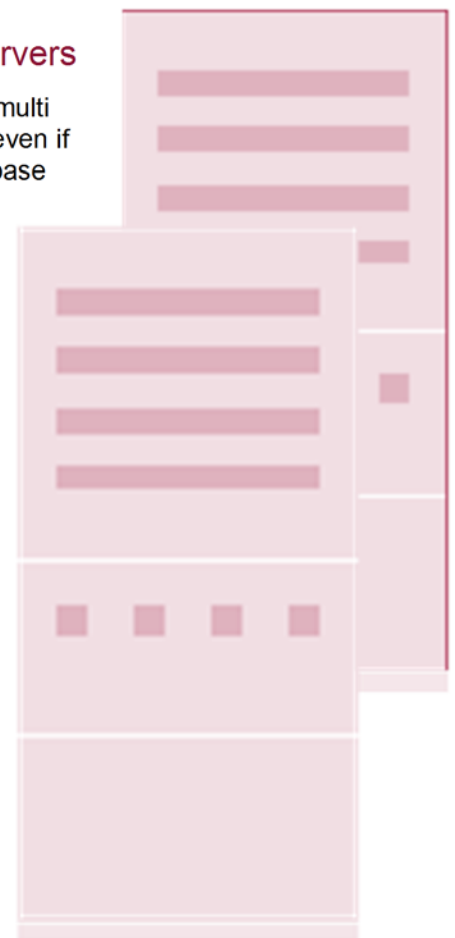
17. Used Programs

What does Used Programs mean? It means that only features/components that are part of the Oracle program as listed in the Ordering Document and further detailed/specified in Oracle's Program documentation may be used. Any feature, component or product which is not part of the Oracle Program(s) as listed in the Ordering Document (or any other Ordering Document) is therefore not allowed to be used, even if these features/components/products are related to the licensed Oracle Database Program(s) (e.g. the listed Database Enterprise Edition Options and/or Database Enterprise Management Packs).

18. Installed on a Single Server or on Multiple Servers
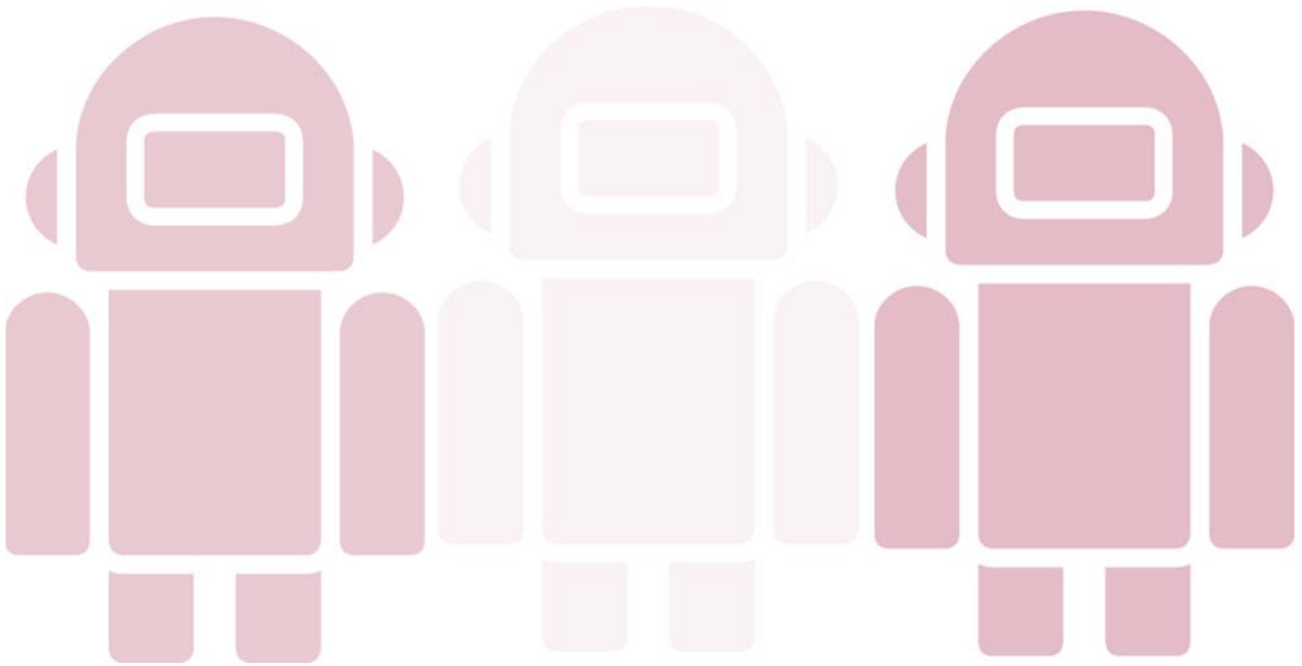
The Named User (Plus) licensing metric is a so-called "multi-server" or "multi instance" metric. It means that an individual must be counted only once, even if this individual has multiple user accounts on multiple Oracle Database instances on the same server or on multiple servers.

This is yet another issue that adds a lot of complexity especially for larger organizations. Due to the fact that from a technical standpoint only user accounts or database usernames are visible in the database, counting the distinct individuals on multiple servers is even harder and typically requires counting at application level instead of database level.

Take a company with 3 database instances; the first one has 50 user accounts, the second 100 accounts and the third 10 accounts. This can sometimes lead to confusion, and the perception that 160 Named User Plus licenses would be required. This is not necessarily the case, since when all individuals of the first and third database have access to the second instances and also 20 individuals have 2 accounts on the second instance they should be counted only once and that would mean only 80 Named User Plus. De-duplication of user accounts to identify the real number of distinct individuals is therefore necessary. Complex IT infrastructure within an end user organization and lack of active user management makes this a hard to execute, time-consuming activity.

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19.   Non-human Operated Devices

Any device (e.g. sensors, scanners) that are accessing the Oracle Database - not operated by human individuals - need to be counted separately and are required to be licensed separately, in addition to all the distinct individuals which are authorized to use the software. Since these devices are not operated by human individuals, these are often overlooked as "users" of the database software, and therefore forgotten to be licensed.

## 20.   Multiplexing Front End

What does Multiplexing mean? Multiplexing is not defined in any of the documents/agreement, but is a common known and applied term in the software industry. Multiplexing is when a large number of end users and/or devices access a system via an interface, in such a way that the apparent number of users and/or devices accessing the system is much smaller than the actual number of users and/or devices. If Oracle software is part of an environment in which multiplexing hardware or software is used, then all users and/or devices must be licensed at the multiplexing front end; the beginning of the automated process.

In the early days, software was being used in two-tier architectures. The user would use a "client" to directly access the data stored in a database on a server. In this type of architecture all the data including the authorization data (user accounts and passwords) were stored on the database. However with the introduction of middleware and application servers (three-tier architectures) and the need of integrating multiple enterprise systems storing the authorization of each user on all the integrated databases became redundant and cumbersome. As a result of this, the middleware and applications themselves managed the user population and users would connect to the databases only through a generic username channeling all the requests from the different end users.

Measuring the total number of distinct individuals authorized to Create, Read, Update, and Delete (CRUD) data (directly or indirectly) at the multiplexing front end, requires large enterprise organizations to have a complete and accurate picture of all data streams to and/or from the Oracle Database. Almost no enterprise today has this in place, which results in large risks of non- compliance and financial consequences.
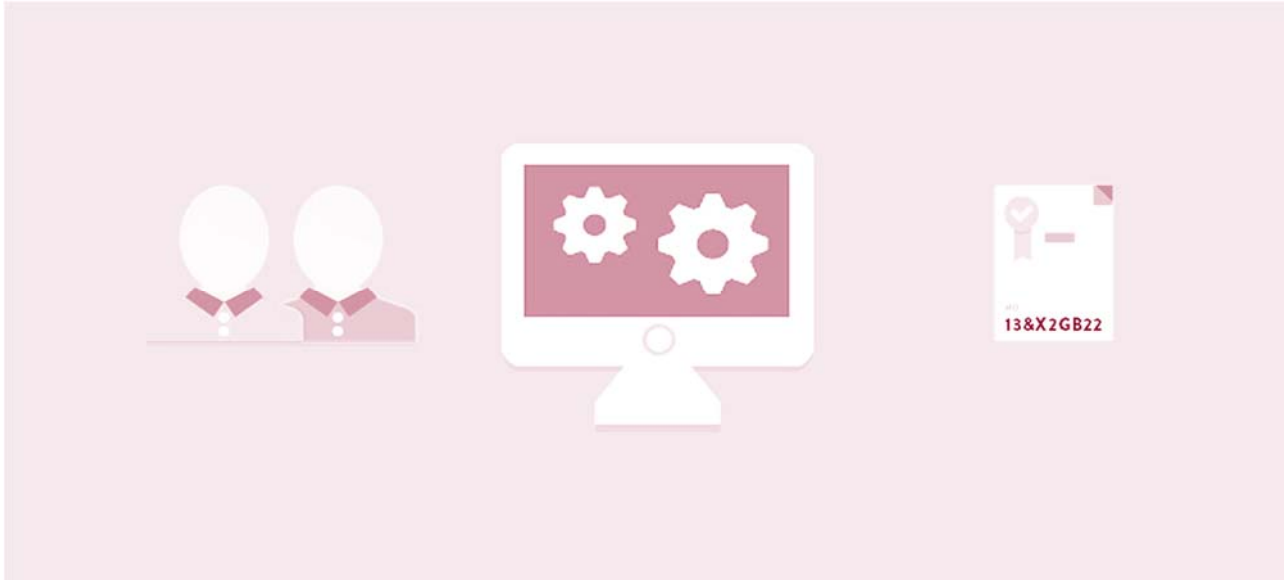
Apart from all the non-compliance issues listed above, a number of other compliance issues may occur which cannot be measured through a system or measurement tool.

21.   Hosting

As per the terms and conditions of the Rights Granted section of the Oracle License Agreement:

> *Upon Oracle's acceptance of your order, you have the limited right to use the programs and receive any services you ordered **solely for your internal business operations** and subject to the terms of this agreement, including the definitions and rules set forth in the order and the program documentation.*

Although present in every license agreement, the above sentence is often overlooked. Oracle restricts the use of the software to be used "solely for your internal business operations". What does this mean, your internal business operations? Is it defined somewhere? No it is not, but it prevents an end user to use Oracle software licenses to host commercially available applications or services to multiple end users. This includes access to Oracle programs and/or processing of customers data using the Oracle programs. For these situations, Oracle would require a) an end user to obtain special "hosting licenses" (which are typically priced at 25% on top of the list license fees) or b) the multiple end users which access the Oracle programs or process their data using the Oracle programs to license their use of the Oracle database software separately.

22.   Legal entities allowed to use the software

As per the terms and conditions of the "Agreement Definition" of Oracle License Agreement:

> *"You" and "your" refers to the individual or entity that has executed this agreement ("agreement") and ordered Oracle programs and/or services*

AND, as per the terms and conditions of the "Customer Definition" of your Ordering Document:

> *"You" and/or "Your" for this Ordering Document only, means XXX, and its Related Companies, as listed on the Related Companies Exhibit A (Exhibit A) to this Ordering Document. XXX warrants that it has the authority to bind the entities as listed in Related Companies Exhibit A (Exhibit A) to the terms of this Ordering Document and the Agreement. It will be XXX's responsibility that the Related Companies will respect the terms of this Ordering Document and the Agreement.*

Every license purchased is restricted to be used for the business purposes of a specific legal entity or a list of specific legal entities (as listed in the Customer Definition). In some cases the licenses are restricted to be used in a specific country (as restricted in the Ordering Document) or a business unit (as restricted in the Ordering Document. These restrictions cannot be technically measured, and are therefore often overlooked.

End user organizations acquiring legal entities often forget that the software already obtained cannot be used for the business purposes of the acquired legal entity, resulting in non-compliance issues and financial risk. It is highly recommended to include a clause in the acquisition agreement which prevents the new organization to inherit the financial exposure of an existing software license compliance issue. Before the acquisition taking place, a proper internal audit should be conducted to assess the current license compliance position and to make sure that the entity to be acquired is integrated without any (old) financial exposure situation.

23.   CONCLUSION

Many organizations spend large amounts of money on the purchase and support of Oracle Database software (among other software programs). There are many different, complex and changing licensing rules and definitions that need to be taken into account. Not understanding the terms and conditions increases the risks of non-compliance and financial exposure tremendously. Performing a regular internal license review of your Oracle (Database) software enables you to stay in control to optimize your IT costs and reduce your financial, operational and legal risks.

If you are in need of extra expertise and a structured approach, feel free to **contact Insight**. We will help you make software compliance an exciting opportunity to improve your business!

About the Authors

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Joost joined Insight, your Trusted Advisor, as a global account manager in August 2008. After 3 years he returned back to his roots in Oracle licensing as he worked for Oracle 6 years prior to Insight. Joost uses his knowledge of 6 years in Oracle License Management Services (LMS) to educate, equip and enable software end-users in their challenges with regards to proper software license management.

Joost started in November 2002 as an Oracle Licensing Consultant, after which he fulfilled the role of Benelux Manager for a period of 2½ years. Hereafter Joost was involved in the Strategic Accounts team for LMS in EMEA, where he serviced the international key accounts for Oracle in EMEA. Joost holds a bachelor degree in Company Economics and IT from the Hogeschool Enschede in The Netherlands.

RICHARD SPITHOVEN

Richard joined b.lay as a partner on September 1, 2013. Richard uses his knowledge from the last 8.5 years in Oracle License Management Services to educate, equip, and enable software end users in their challenges with regard to proper software license management. Richard started in October 2005 as an Oracle Licensing Consultant, after which he fulfilled the role of Regional LMS Director for the Europe South region (including Belgium, Netherlands, Luxembourg, France, Spain, Italy, and Portugal) for a period of 4.5 years. In this role, Richard managed a team of 40 licensing consultants and was responsible for setting the strategic direction of the LMS organization. Richard holds a Master's degree in IT from the University of Amsterdam, The Netherlands.

EMANUEL NEACSU

Emanuel joined b.lay in 2012 and ever since has been focusing on performing technical analysis of software deployment and usage data. After obtaining his bachelor degree in Marketing at Spiruharet University in Bucharest, Emanuel realized that his heart lies in IT. Working as a web developer initially and an IT manager later on triggered his interest in IT infrastructure. Emanuel's current focus is on Database and Middleware.

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