Microsoft Special Report

Microsoft SQL Server 2012 in a Virtualized IT Environment

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THE WORLD'S SOFTWARE LICENSE MANAGEMENT EXPERT

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Introduction

The arrival of Microsoft's SQL Server 2012 in April was greeted with much fanfare, and more than a little concern. In the current economy, and with the growth of virtualized environments, many organizations are wondering how this new technology – and its new licensing model – will fit into their overall IT plan. In order to help organizations understand, evaluate and/or incorporate SQL Server 2012 into their IT infrastructure, this white paper should serve as a good introduction to:

- An overview of SQL Server's new main editions.

- Transitioning to the new core licensing model.

- The new SQL Server Core Factor.

- Virtualization considerations.

- Special circumstances surrounding the new licensing model for SQL Server.

- Action items for moving towards SQL Server 2012.

Overview of New Editions

SQL Server 2012 re-arranged the editions a bit. The chart below illustrates the evolution of SQL Server 2012 from its earlier version:

2008 R2	2012
Data Center	Retired
Enterprise	Enterprise
N/A	Business Intelligence
Standard	Standard
Developer	Developer
Express	Express
Compact	Compact
Workgroup	Retired
Small Business	Retired

Please note some of the differences including:

- The former Datacenter, Workgroup, and Small Business Editions have all been retired with the introduction of SQL Server 2012. However, all of the capabilities of Datacenter have been incorporated into the new Enterprise Edition of SQL Server 2012.

- Enterprise Edition still exists, but is newly designed with advanced features.

- The Business Intelligence Edition is introduced with SQL Server 2012.

- Finally, the Standard, Developer, Express, and Compact Editions have continued with essentially the same (though upgraded) capabilities, features, functionalities, and restrictions as their respective predecessors.

What Microsoft refers to as its "main" editions are its new-and-improved Enterprise Edition, its all-new Business Intelligence, or "BI", Edition, and its old-standby Standard Edition.

The **Standard Edition** targets basic deployments, primarily for OLTP, along with some rudimentary BI functionality. Standard Edition remains constrained to a maximum of 16 cores or 4 sockets, whichever is lesser, and to 64GB of memory.

The **BI Edition** supports enterprise BI functionality as well as advanced analytics capabilities. It is architected to mash-up data from nearly any source and to present this data in a consistent view. It also features data visualization and data management features for true and efficient BI operations. Like Standard Edition, it is constrained to a maximum of 16 cores or 4 sockets, whichever is lesser, and to 64GB of memory. However, the analytics and reporting engines can use the maximum memory allowed by the O/S.

Enterprise Edition is Microsoft's top-of-the-line offering, featuring all of the capabilities of Datacenter Edition (from version 2008) as well as the new functionality of the BI Edition, plus added data quality and performance enhancements (i.e., "xVelocity"). Microsoft touts this edition's capabilities as both an OLTP engine, as well as data warehouse engine.

Transitioning to the New License Model

Microsoft has changed the way its different editions are offered. Most of the IT community has heard that SQL Server 2012 is licensed by core, and that is mostly true.

As the chart above illustrates, Core-Based licensing is the *only* model for licensing Enterprise Edition. However, it is an option for Standard Edition. Standard Edition can also be licensed in the more familiar Server+CAL model, which is the *only* model by which BI Edition is offered.

Microsoft's reasoning is that OLTP-focused servers are growth-dependent. That is, as more and more users are on-boarded, or more and more transactions are processed, more computing power is necessary. Thus, Enterprise Edition and Standard Edition are both offered with this new Core-Based licensing model.

However, it may be more economical for Standard Edition to be licensed in the Server+CAL model. A development environment, for example, may have a very small and very static, user population. The server configuration ought to be, and often is, suitable for the anticipated workload. Thus, licensing the server and purchasing CAL licenses for the development team may prove more cost effective.

Microsoft further reasons that the BI Edition will be used by a known user population, such as business analysts, finance, or sales. So this edition, offered only with the Server+CAL model, speaks to that perspective.

What about costs?

The following are the retail "A" level prices for June 2012 for the Select Plus volume license program. SA3 refers to three years of Software Assurance.

When originally introduced – and still as of the latest pricing – Core-Based licensing cost a quarter of the price of Processor licenses. While it is believed this will remain true, Microsoft is almost certain to react to future developments in processor and core technology and adjust its pricing model accordingly.

Part Number	Item Legal Name	License	SA3
359-05689	SQL CAL	$ 208	$ 366
D2M-00401	SQL Server Business Intelligence	$ 8,538	$14,943
228-09904	SQL Server Standard Edition	$ 892	$ 1,563
7NQ-00278	SQL Server Standard Core 2012	$ 3,563	$ 6,237
7JQ-00356	SQL Server Enterprise Core 2012	$13,662	$23,910

Moving to Core-Based licensing is not very difficult, but there are some stipulations that organizations may want work into their approach. There are two things to bear in mind. First, the approach described below covers *only* SQL Server deployments in the *Per Processor* license model that are *covered by Software Assurance*. Second, this approach will describe these as "qualified servers" or "qualified deployments". (Note that this is Miro's term and is used solely for our discussions concerning SQL Server 2012 license transitions.)

- Using the Microsoft Assessment & Planning ("MAP") Toolkit or another suitable inventory tool that timestamps the resulting report, the customer will identify the number of cores per server for each qualified server.

- Microsoft will then provide the customers with the appropriate number of core licenses that allows them to continue their current deployment with no additional licensing required. Microsoft has imposed a *limit of 20 cores per server*.

  o Example 1: A server running SQL Server Enterprise Edition is configured as 2 processors, each with 2 cores. The required licensing under version 2008 R2 is two (2) Processor licenses. The customer would receive four (4) Core licenses (i.e., 2 processors X 2 core).

  o Example 2: A server running SQL Server Standard Edition is configured as 2 processors, each with 1 core. The required licensing under version 2008 R2 is two (2) Processor licenses. The customer would receive four (4) Core licenses. Though the number of total cores in the server is two (2), the customer would receive four (4) Core licenses because this is the *minimum*.

  o Example 3: A server running SQL Server Datacenter Edition is configured as 6 processors, each with 4 cores. The required licensing under version 2008 R2 is six (6) Processor licenses. The customer would receive twenty (20) Core licenses (i.e., 5 processors X 4 core – the *maximum*).

- If the customer does not perform this self-inventory, they will receive the default:

  o 4 Core licenses for each Enterprise Edition or Standard Edition Processor licenses in their inventory.

  o 8 Core licenses for each Datacenter Edition Processor license in their inventory.

  o *Important: The above minimums can potentially translate into increased license estate flexibility. For example, a server with four (4) Enterprise Edition Processor licenses would be exchanged for sixteen (16) core licenses. These licenses might then be deployed on two (2) dual-CPU, dual-core servers.*

- If the customer has SQL Server Processor licenses in an existing Enterprise Agreement (or an Enrollment for Application Platform program, or an Enterprise Subscription Agreement), they may continue to purchase Processor licenses throughout the end of the term. They will then perform the self-inventory as described above. Note: This is not to be confused with purchasing SQL Server Enterprise Edition in the Server+CAL license model. Availability of SQL Server Enterprise Edition in this model terminates June 30, 2012. However, customers with Enterprise Agreements or Enrollment for Application Platform programs will have until their next renewal to purchase SQL Server Enterprise Edition in the Server+CAL license model.

In researching and keeping up to date on the topic of Software Assurance, Miro has discovered that it is continually evolving. This is yet another example of how Software Assurance has become more than mere upgrade eligibility.

To be clear, the self-inventory occurs at the *end of the current Software Assurance term*, which effectively means the *renewal of Software Assurance*. With the elimination of single-year terms, investment in Software Assurance essentially means a three-year commitment.

SQL Server Core-Based licensing is sold only in two-core packs. As new hardware with greater capacity is deployed, or new capacity is added to existing servers, the minimum purchase will be two additional cores. This should not be an issue, but bear this thought in mind as we proceed to a discussion of Core Factor.

Core Factor

Besides SQL Server 2012, the next biggest news from Microsoft is the introduction of a Core Factor.

The table below is reproduced from Microsoft's publicly available graphic:

SQL Server Core Factor Table

Processor Type	Core Factor
All processors not mentioned below	1
AMD 31XX, 32XX, 41XX, 42XX, 61XX, 62XX Series Processors with 6 or more cores	.75
Single Core Processors	4
Dual Core Processors	2

Let's begin at the bottom. Since there is a minimum of four (4) core licenses, servers with dual-core processors require a minimum of two (2) core license packs.

Above that line, single-core processors are addressed. And the same minimum licensing requirement holds true here as well. So, the licensing requirement remains two (2) two-core license packs.

Licensing servers with quad-core processors, or even a higher core density, requires simple arithmetic. Simply count the number of cores in the server and purchase the sufficient number of two-core license packs.

Now, had Microsoft kept to this approach, there really wouldn't be a need for a core factor table. It would have been amply covered with the statement: Buy licenses for the number of cores you have installed with a minimum purchase of four cores. However, Microsoft is granting a concession for AMD processors – you see the included series listed there – and allowing only ¾ of the cores to be licensed – in other words, a 0.75 core factor. Again, while it's believed this will remain true for the foreseeable future, Microsoft is almost certain to react to future developments in processor and core technology and adjust its pricing model accordingly.

Virtualization Considerations

One of the most difficult aspects of software licensing to comprehend is how it relates to virtualized environments. Unfortunately, there is nothing about SQL Server 2012 licensing that simplifies things. This is sad, because virtualization is so prevalent... and growing.

First, let's step back to the prior version, 2008 R2, and discuss unlimited virtualization. As a temporary use right grant under Software Assurance, customers could deploy any number of virtual instances within the Server+CAL license model. Since that model no longer exists – or will not after June 30th – the ability to deploy an unlimited number of virtualized SQL Server Enterprise Editions relies on the licensing of all cores. The minimum number of core licenses per VM is four. Once the number of core licenses match the total number of cores in the physical server, no further licensing is required. Microsoft refers to this as full licensing. These licensing rules apply to Enterprise Edition, which is available only via Core Based licensing, and Standard Edition which is optionally available via Core Based licensing.

Some IT professionals may recall the oddity of licensing SQL Server Standard Edition in virtual environments. Each Virtual Machine has to be licensed, meaning that a single physical server could have multiple server licenses, depending on the number of virtual instances deployed. Microsoft has maintained this requirement and extended it to its BI Edition. This suggests that BI Edition and Standard Edition licensed in the Server+CAL model may not be suitable for virtualized environments. Careful investigation and planning is necessary to ensure the most efficient investment, given the nature of your environment and the required software functionality.

CAL licensing is required for BI Edition and Standard Edition when licensed in the Server+CAL model. A user need not be licensed multiple times. There are no differences between the CALs for one edition and the CALs for another. Thus, every licensed user of a Standard Edition deployment is licensed for use with BI Edition, and vice versa. Legacy versions of Enterprise Edition licensed in the Server+CAL model would also be covered by that same CAL license. However, the rule remains where the version of the CAL license must match or be more current than the version of the server license.

As mentioned previously, full Core-Based licensing of the server is required for unlimited virtualization. However, that is not the end of the story. One important advantage of virtualization is the ability to move (e.g., "VMotion") instances from one physical server to another as workload demands. This dynamic provision is allowed by Microsoft only when the SQL Server licenses are covered by Software Assurance, effectively doing away with the 90-day license assignment constraint.

Special Circumstances

Microsoft has implemented some special allowances for current customers, many of which depend on the status of volume licensing program and/or Software Assurance. A few examples are examined below:

- As previously mentioned, purchasing SQL Server Enterprise Edition in the Server+CAL license model will not be possible after June 30, 2012, except for existing Enterprise Agreement or Enrollment for Application Platform customers. These companies will have through their program renewal date to continue to purchase SQL Server Enterprise Edition in the Server+CAL model in order to complete existing projects. After those dates, all future purchases of SQL Server Enterprise Edition must adhere to the Core-Based licensing model.

- Of course, there is nothing compelling you to convert to Core-Based licensing from Server+CAL licensing. Such deployments may support legacy environments. This, in turn, raises the question of continued Software Assurance on those licenses.

- If you have determined that Core-Based licensing well suits your current infrastructure or your planned infrastructure, but you have primarily Server+CAL licensing deployed, Microsoft has developed a migration path for you. There is an upgrade path that mimics the Per Processor license model, including the same twenty (20) core maximum exchange. In order to execute this exchange, the SQL Server licenses must be under Software Assurance.

- Organizations that have adopted SQL Server licensing in the Per Processor model can continue this licensing approach through the end of their volume license program term. Such licensing is contingent on Version 2008 R2 licensing rules – that is, without a core factor applied and with the constrained virtualization rules associated with Enterprise Edition and Standard Edition that were introduced with this version.

Action Items for Moving Toward SQL Server 2012

Miro encourages clients to look forward to best leverage the software investment. That is, while current license positions are extremely important, understanding what options are available as the environment evolves is extremely important as well. With that in mind, here are some critical steps every organization must execute to take advantage of the program Microsoft is offering for upgrading to SQL Server 2012.

Before considering implementation of these action items, it is worthwhile to organize a planning session or two to build a roadmap for SQL Server within your organization. This exercise should be designed to bring some visibility to the plans of the various stakeholders. Then, the SQL Server licensing requirements, guided by the rules outlined above, can be measured against these plans. The objective is not precision. Rather, it is revelation. That and sound investment strategies.

- Complete the inventory, using the Microsoft Assessment & Planning ("MAP") Toolkit or another suitable inventory tool.

- Review your current entitlements. Since it is likely that the results of your audit will be shared with Microsoft, you want to ensure that there are no gaps between your deployment and your licensing. Ensure an understanding of the status of Software Assurance on the candidate licenses. The trade-in program is only valid for licenses under Software Assurance.

- Try to anticipate the growth, contraction, configuration changes, consolidations, and other events that will influence your SQL Server licensing. Try to establish some sort of timeline around these events so that budgeting can be made more predictable. Understand, of course, that such projections can be obliterated by unexpected circumstances.

- The recommended actions will reveal multiple options and, hopefully, should result in a short-list of the most favorable approaches.

- The job isn't over, though. In fact, perhaps the most challenging part remains – the negotiation with Microsoft. Seek to gain the greatest value from your investment with both monetary and non-monetary concessions from Microsoft.

About the Author

Tim Hegedus, Senior Analyst, Miro Consulting, Inc.

Tim Hegedus is an accomplished professional with over 25 years in Information Technology, including over 10 years in IT management. Currently the Senior Manager of the Analyst team at Miro, Tim brings a wealth of knowledge and insight to this clients, especially on Microsoft licensing issues.

Tim's hands-on experiences include Operations, Database Administration, System Administration and Engineering, Storage Administration, Information Security, and System Integration. He has led teams of System Administrators and Engineers, Networking Specialists, Database Administrators, Information Security professionals, and has held primary responsibility for Data Center facilities (including the construction of two new Data Centers).

As Director of Technical Services for a financial services firm, Tim was responsible for the budgeting, acquisition, and compliance of all hardware and software within the organization, including sites in central and northern New Jersey and in Columbus, OH. He implemented several asset control programs and methodologies still utilized by this heavily-regulated and extensively-audited organization.

Tim began his IT career working for an international pharmaceutical firm and then moved onto a major northeast retail logistics firm gaining experience in Operations, Development, Technical Support, Database Administration, and Project Management.

Since 2000, Tim has ascertained and defined the licensing and technical support requirements of the software used throughout these Data Centers, most specifically Oracle and Microsoft products. This encompassed the specifics of the licensing metrics, the associated options and/or restrictions, and other terms and conditions surrounding the deployment of the software. Tim has successfully negotiated countless software contracts, leading to very favorable concessions that resulted in measurable cost containment.

Tim attended Clemson University for his degree in Building Science (Architecture) and has advanced his post-baccalaureate studies at Rutgers University. Tim holds multiple technical certifications including those for Microsoft, Oracle, DB2, and Unix and management certifications for project management, IT leadership, and managerial excellence.

Who is Miro Consulting?

Miro Consulting (www.miroconsulting.com) is an IT asset management consultancy focused on lowering the total cost of ownership through hardware and software optimization. Miro specializes in Oracle and Microsoft licensing management & Oracle hardware assets. Services include, but are not limited, to Microsoft and Oracle license assessments; contract negotiations; technology evaluations; hardware management programs; and virtualization consulting. Since 2000, Miro has helped 500+ clients optimize their total cost of ownership and has overseen over $1.5 billion in Oracle and Microsoft transactions.

Steps to Save on your Microsoft Licensing

- **Fact Gathering:** Review your software license

- **Validate Data:** Track and manage your licensing assets

- **Establish Prioritites:** Understand what an enterprise needs now and in the future

- **Construct and negotiate your agreement:** Hire an external consultant who understands how to align IT to fit the business needs

Your Advocate. Trusted Advisor. Microsoft Consultant.

Miro Helps Companies Manage their Microsoft Licenses by:

- Obtaining the best price, terms and conditions when purchasing licenses

- Lowering your total cost of software ownership

- Assisting during software audits

- Staying compliant

Miro Consulting's cost containment strategies begin with a confidential, comprehensive licensing and compliance review. Each client receives a customized plan to fit their business needs in order to obtain the best price as well as terms and conditions. The company also offers ongoing software asset management program that includes a meticulous audit, analysis and implementation of strategy. Miro Consulting also offers license management services for companies that use Oracle.

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