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LICENSING MANAGEMENT SERIES
A Guide to Assessing SQL Server Licensing

May 2011



This document gives Microsoft® Volume Licensing customers of Microsoft SQL Server® 2008 R2 an overview of the licensing requirements, as well as guidance on how to assess the licenses needed. (For those licensed under any other version of SQL Server, please refer to the appropriate Product Use Rights (PUR) document or End User License Agreement (EULA) for guidance.)

The Software Usage Tracker, a tool in the Microsoft Assessment and Planning (MAP) Toolkit, collects and reports server and agent use of common deployment scenarios for SQL Server products. Using the data from this tool, along with the step-by-step instructions on the pages that follow, can help you calculate the number and type of processor licenses, or server and client access licenses (CALs), that you need.

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Microsoft SQL Server Licensing Requirements

SQL Server is sold through multiple distribution channels. This guide focuses on SQL Server licenses available through Volume Licensing as shown below.

	Enterprise Agreement (EA)	Enterprise Agreement Platform (EAP)	Select License/ Select Plus	Open Programs	Retail Full Packaged Product (FPP)	OEM	Services Provider License Agreement (SPLA)	ISV Royalty (ISVR)
SQL Server 2008 R2 Datacenter (Premium Edition)	✓	✓	✓	✓	✓	✓	✓	✓
SQL Server 2008 R2 Enterprise	✓	✓	✓	✓	✓	✓	✓	✓
SQL Server 2008 R2 Standard	✓	✓	✓	✓	✓	✓	✓	✓
SQL Server 2008 R2 Web	✓	✓	✓	✓	✓	✓	✓	✓
SQL Server 2008 R2 Workgroup	✓	✓	✓	✓	✓	✓	✓	✓
SQL Server 2008 R2 Developer	✓	✓	✓	✓	✓	✓	✓	✓

SQL Server 2008 R2 editions are licensed either through the server license and client access license (CAL) model or the per-processor licensing model. With the exception of SQL Server 2008 R2 Datacenter and SQL Server 2008 R2 Web (which are only licensed by processor), you may choose the licensing that best fits your specific business needs.

Before you run any instance of the server software under a software license, you must assign that license to one of your physical servers. That physical server then becomes the licensed server for that particular server software license. You may assign other software licenses to the same server, but you may not assign the same license to more than one server. A hardware partition or blade is considered to be a separate server.



You may reassign a license to another physical server once every 90 days. However, you may not reassign an OEM license unless you first acquire Software Assurance (SA) for it.

On the other hand, you may move as often as you want a virtual instance of SQL Server to another server that is properly licensed to support it. To track this, Microsoft recommends that you keep a current record of all assigned servers, license type, SA coverage, and the date the server was assigned or reassigned.

For more information on licensing and virtualization, refer to [Licensing Microsoft Server Products in Virtual Environments](#).¹

Server and CAL Licensing

When licensing SQL Server under the server and CAL model, you purchase a server license for the server and client access licenses (CALs) for each device (Device CALs) and/or user (User CALs) accessing or using the services or functionality of SQL Server. A CAL is not software; it is a legal document granting access.

The server and CAL model is appropriate when you can count your users or devices, or when the number of users and devices is low enough that the cost is lower than licensing by processor.

Server licenses

Server licenses for SQL Server 2008 R2 are available for Enterprise, Standard, and Workgroup editions. Unlike other products following this licensing model, Microsoft does not offer an External Connector license for SQL Server.

Running Instances and Virtualization

- **Standard and Workgroup Editions.** Each server license for these editions permits you to run unlimited instances of the software in one OSE or virtual machine (VM). To run the software in additional OSEs or VMs, you require additional server licenses.
- **Enterprise Edition.** Each server license for the Enterprise edition permits you to run unlimited instances of the software in up to four OSEs or VMs.

¹ microsoft.com/downloads/details.aspx?FamilyID=9ef7fc47-c531-40f1-a4e9-9859e593a1f1



CALs

CALs are available for each edition of SQL Server 2008 R2 shown below.

Product	Applicable CALs
SQL Server 2008 R2 Standard and Enterprise	<ul style="list-style-type: none"> SQL Server 2008 R2 CAL. Windows Small Business Server 2011 Premium Add-on CAL Suite (for any user or device that is accessing instances of the server software that are within an SBS domain).
SQL Server 2008 R2 Workgroup	<ul style="list-style-type: none"> SQL Server 2008 R2 CAL. SQL Server 2008 R2 Workgroup CAL. Windows Small Business Server 2011 Premium Add-on CAL Suite (for any user or device that is accessing instances of the server software that are within an SBS domain).

A user CAL allows the user to access SQL Server from any number of devices. A device CAL allows any number of users to access SQL Server from that device. In addition:

- A given user or device needs only one SQL Server CAL to access any number of SQL Server instances in the organization. Note that users or devices accessing SQL Server components, such as Reporting Services, require CALs.
- SQL Server CALs can be used to license any platform of SQL Server: 32 bit, 64 bit, and IA64.
- The CAL requirements are the same for VMs as they are for physical servers.
- CALs permit access to instances of earlier versions, but not later versions, of SQL Server.

Multiplexing

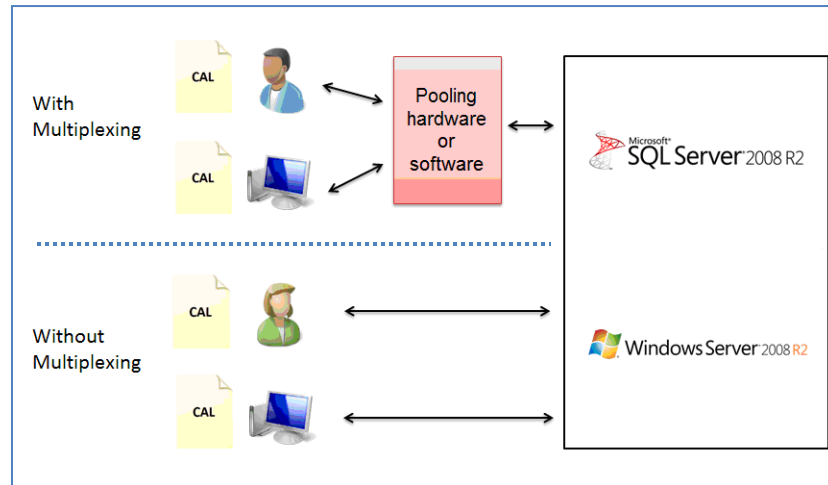
If the SQL servers in your organization have been licensed using both server and CAL and Per processor licensing models, then check for any multiplexing scenarios in your organization and ensure that you are licensed correctly:

For example if a SQL Server in your organization is licensed per processor and there is direct or indirect access between this server and another SQL Server in your organization that is licensed Server-CAL, then all the users accessing the SQL Server that is licensed per processor need SQL Server CALs. In this scenario, the SQL Server that is licensed per processor is considered to be a multiplexing device.

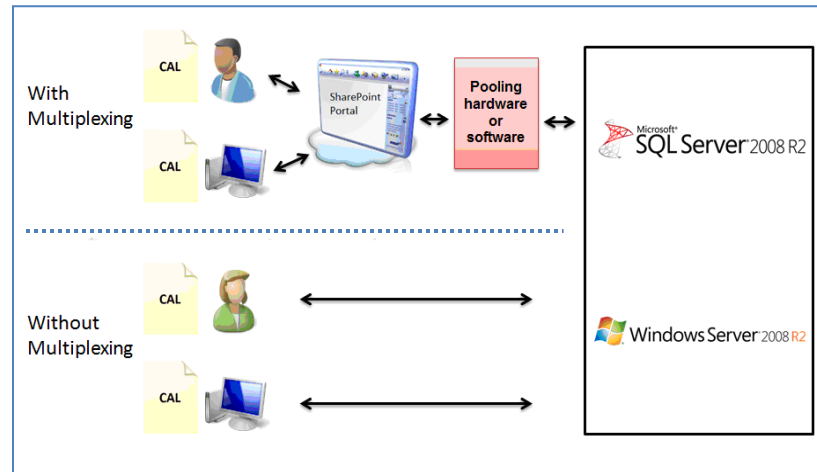
Use of hardware or software that reduces the number of devices or users that directly access or use the software (*multiplexing*, or *pooling*) does not reduce the number of CALs required, as illustrated on the next page.



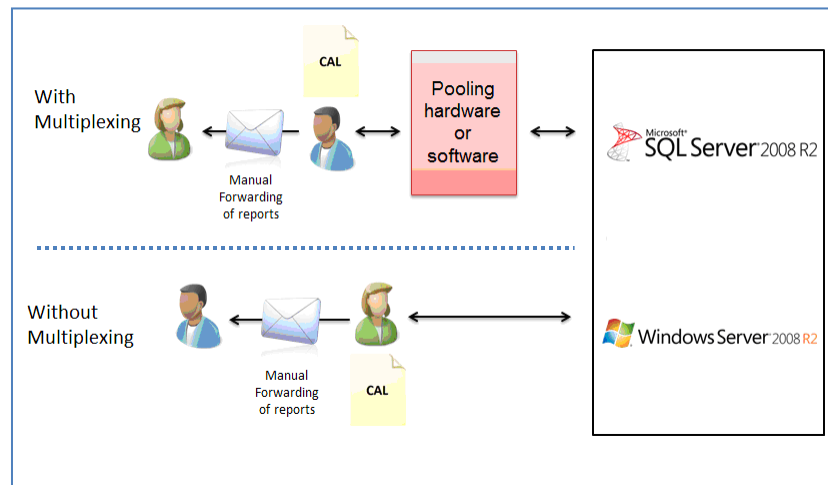
As illustrated to the right, a SQL Server CAL and Windows Server CAL are required for each distinct device or user that is connected to the pooling software or hardware front end.



The number of tiers of hardware or software between SQL Server and the user or devices that ultimately use its data, services, or functionality does not affect the number of CALs required.



Manual transfer of data from employee to employee does not require a CAL for the receiving employee. For example, if an employee sends a Microsoft Office Excel® version of a SQL Server report to another employee, the receiving employee does not require a CAL (as long as the report does not access a server running SQL Server in some way).





Per-Processor Licensing

To help alleviate the complexity of licensing, you can license SQL Server by processor. In this model, you do not need to purchase CALs because the license includes access for an unlimited number of users or devices to connect from either inside or outside the firewall, including users or devices that do not belong to the licensed entity. If you license by processor, you need to license each OSE running SQL Server or any of its components—for example, Analysis Services. For SQL Server running in physical OSEs, you must license all the physical processors.

Processor licenses for SQL Server 2008 R2 are available for Datacenter, Enterprise, Standard, Web, and Workgroup editions.

License SQL Server by processor when:

- You cannot or do not want to count users or devices.
- The number of users or devices is great enough that licensing per processor is more cost effective than the Server and CAL model. (Processor licenses cost the same regardless of the number of cores in the processor.)
- SQL Server is being used for external-facing Web sites or applications.
- SQL Server 2008 R2 Datacenter requires that all the physical processors on the server are licensed and at least two processor licenses are assigned to the server.

Running Instances and Virtualization

The number of VMs or OSEs in which you may run instances of SQL Server 2008 R2 under the per-processor model depends upon the edition you license and whether you license all of the physical processors with processor licenses.

Licensing physical processors

If you license all the physical processors on the server—that is, one processor license per physical processor—you may run SQL Server 2008 R2 in the following number of OSEs or VMs:

Edition	# of OSEs on which you can run SQL Server
SQL Server 2008 R2 Datacenter	Unlimited. (The Datacenter edition requires that all the physical processors on the server are licensed and at least two processor licenses are assigned to the server.)
SQL Server 2008 R2 Enterprise	Up to 4 OSEs per license.
SQL Server 2008 R2 Standard, Workgroup, and Web	Physical OSE only.



Licensing by Virtual Machine

If you license VMs, you will need to know the number of logical processors supporting each VM (data point A) and the number of cores or threads per physical processor or socket (data point B). Typically, each logical processor is the equivalent of one core or thread.

With those numbers, for basic virtualization scenarios, use the information and formula below (illustrated in the table) to determine how many processor licenses you need for each VM:

- **A:** number of logical processors supporting the VM.
- **B:** Number of cores (if hyperthreading is turned off) or threads (if hyperthreading is turned on) per physical processor.
- **Formula:**

$A \div B = \text{Number of processor licenses required.}$

Round up fractional results to the next whole number.

		B: Number of cores or threads per physical processor or socket				
		1	2	4	6	8
A: Number of logical processors supporting the VM	4	4	2	1	1	1
	3	3	2	1	1	1
	2	2	1	1	1	1
	1	1	1	1	1	1
	4	4	2	1	1	1

 **Note:** This table is useful for only basic virtualization scenarios.

Additional Licensing Considerations

License mobility

A server farm may consist of up to two data centers located in time zones that are within four hours of one another, or within the European Union (EU) or European Free Trade Association (EFTA). License mobility:


- **Within a server farm.** You may move properly licensed running instances of SQL Server 2008 R2 Enterprise and Datacenter freely across servers. (There is no 90-day minimum period before reassignment of licenses.)
- **In different server farms.** You may reassign SQL Server 2008 R2 Enterprise and Datacenter server licenses to any of your servers located in different server farms, but not on a short-term basis—that is, not within 90 days of the last assignment.



- **Under the server and CAL model.** You may move SQL Server 2008 R2 Enterprise licenses amongst the servers in your server farm freely and as often as you want without the 90-day restriction on reassignment.
- **Under the per-processor model.** Count the greatest number of physical processors that may support running instances of SQL Server at any one time across the server farm. If you are not sure about which physical processors support SQL Server, count all the processors. Assign this number of licenses to the server farm.

You may run an unlimited number of instances of:

- SQL Server 2008 R2 Datacenter in an unlimited number of OSEs.
- SQL Server 2008 R2 Enterprise in a number of OSEs equal to four times the number of licenses assigned.

 **Note:** Each datacenter may be part of only one server farm. You may reassign a datacenter from one server farm to another, but not on a short-term basis—that is, not within 90 days of the last assignment.

Passive failover rights

If you are licensed to use SQL Server, you are allowed to run a certain number of instances of the software for passive failover support without having to license these instances separately. You may run the passive failover instances on a server other than the licensed server.


For any OSE in which you run instances of SQL Server, you may run up to the same number of passive failover instances in a separate OSE for temporary support. For processor licensing, however, the number of physical and virtual processors used in that separate OSE must not exceed the number of physical and virtual processors used in the corresponding OSE in which the active instances are running.

Version and edition: Upgrades and downgrades

Description		Eligibility
Version upgrade	Move from an earlier version (such as SQL Server 2008) to a later version (such as SQL Server 2008 R2).	<p>If your existing SQL Server license is:</p> <ul style="list-style-type: none"> ▪ Covered by Software Assurance (SA), you are automatically licensed to upgrade to the corresponding SQL Server 2008 R2 edition. ▪ Not covered by SA, you must purchase a new full license for the SQL Server 2008 R2 edition that you want.
Version downgrade	Deploy an earlier version in place of a currently licensed later version.	Downgrade rights are granted for all licenses (with or without SA) acquired through Volume Licensing.
Down-edition right	Deploy a lower edition (such as Standard) in place of a higher edition (such as Enterprise).	<p>If you are licensed for:</p> <ul style="list-style-type: none"> ▪ Datacenter edition, you may deploy the Enterprise or Standard edition in its place. ▪ Enterprise edition, you may deploy the Standard edition in its place.



Edition step-up	Move from lower edition (e.g., Standard) to higher edition (e.g., Enterprise).	If the lower edition is covered by SA, acquire the SA Step-Up SKU to move to the higher edition. Step-ups are available from Workgroup to Standard, Standard to Enterprise, and Enterprise to Datacenter.
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 **Note:** When using version downgrade or down-edition rights, the product use rights for the originally licensed version or edition still apply.

Note on mixed licensing environments

If the SQL Servers in your organization have been licensed variously under both the server and CAL model and by processor, check to see if there are any multiplexing scenarios, and then make sure that your servers are licensed correctly.

For example, if a SQL Server in your organization is licensed per processor, and there is either direct or indirect access between this server and another SQL Server that is licensed using the server and CAL model, then all users accessing the SQL Server that is licensed per processor need CALs. In this scenario, the SQL Server that is licensed per processor is considered as a multiplexing device.

SQL Server 2008 R2 Developer

SQL Server 2008 R2 Developer is licensed by user. The software may be used by the licensed users only to design, develop, test, and demonstrate your programs. You may not use the software in a production environment. The licensing analysis for Developer edition is not covered in this document.




How to Assess Your Licensing Requirements

To help you assess licensing requirements for SQL Server 2008 R2, Microsoft has developed a Software Usage Tracker. Part of the Microsoft Assessment and Planning (MAP) Toolkit, it collects and reports server and client use of common SQL Server deployments.

This section includes step-by-step instructions to help you generate usage reports and explains specifically how to use them to help determine your SQL Server licensing obligations. To do this, follow these four broad steps:

1. [Set up your MAP scan.](#)
2. [Generate relevant reports.](#)
3. [Count server licenses and CALs required.](#)
4. [Count processor licenses required.](#)

Completing this assessment requires network administration expertise and permissions as well as licensing expertise. If licensing compliance and network administration responsibilities fall to different people in your organization, they will need to work together to complete this assessment correctly.

 **Note:** It is important to understand that the Software Usage Tracker only provides a software usage report; it does not create a licensing report. And although the guidance offered in this section may be helpful, it is not definitive. It does not replace or supersede your use rights as legally defined in your PUR document.

1 Set Up Your MAP Scan

In this first step, you will tell MAP what to scan. To complete it, you need server administration expertise and permissions.

1. Download the MAP Toolkit from www.microsoft.com/map.
2. To configure your MAP deployment, follow the *Getting Started Guide* and *Software Usage Tracker Guide* instructions built into the MAP installation.



Guidelines to ensure a more accurate usage count

If licensing compliance falls to others in your organization, you may want to work with them to make sure you consider the points below in the scan you set up.

Make sure your configuration is complete. MAP only scans usage on servers and network segments identified during configuration. Incomplete configuration will give you incomplete results.

Scan over a time period when your OSE is running the maximum number of servers and VMs.

MAP only counts servers running at the time it scans. If the number of users and devices fluctuates seasonally, run the scan in your busiest season.

Scan servers with different license obligations separately.

- Configure your network scan range to take licensing variations of products into account. The *Software Usage Tracker Guide* explains how to exclude network segments or specific devices from the scan.
- Scan servers that are licensed under the server and CAL licensing model separately from servers that are licensed by processor licensing model.
- Exclude servers subject to different licensing obligations, like development or test servers licensed under the MSDN® developer program.
- Make note of network segments that you exclude due to licensing variations to ensure that you correctly account for their licensing later. For example, make sure that you have MSDN licenses for servers licensed under MSDN programs.



2 Generate Relevant Reports

Before you begin, make sure to review the [SQL Server Licensing Requirements](#) outlined in the first half of this guide.

In this section, you run the MAP scan, and then generate three reports on your servers running SQL Server: **SQL Server Assessment**, **Virtual Machine Discovery**, and **Inventory Summary** reports.

1. Run the MAP assessment.
2. In the Software Usage Tracker, click **Inventory and Assessment**.

Note: The default date range is 90 days. To change the date range, click **Configure Date Range** under **Actions**.

Inventory and Assessment

- Discovery and Readiness
 - Windows 7 Readiness
 - Windows Server 2008 R2 Readiness
 - Windows Server 2008 Readiness
 - Virtual Machine Discovery
 - Windows Server Roles Discovery
 - Microsoft SQL Server Discovery** (3)
 - Microsoft Office 2010 Readiness
- Inventory Summary Results
- Server Consolidation

Microsoft SQL Server Discovery Summary Results

Microsoft SQL Server Versions

SQL Server Version	Count	Instance Count	Percentage of Instances
Microsoft SQL Server 2008	119	170	59 %
Microsoft SQL Server 2008 R2	54	54	19 %
Microsoft SQL Server 2005	31	43	15 %
Microsoft SQL Server 2000	17	23	8 %
Insufficient Data	0	0	0 %
Total		290	100 %

Microsoft SQL Server Editions

SQL Server Version	SQL Server Edition	Count	Instance Count
Microsoft SQL Server 2008	Express	84	86
Microsoft SQL Server 2008	Enterprise	81	84
Microsoft SQL Server 2008 R2	Express	51	51
Microsoft SQL Server 2005	Express	25	25
Microsoft SQL Server 2000	Developer	13	13
Microsoft SQL Server 2005	Standard	12	12
Microsoft SQL Server 2000	Desktop Engine	3	9
Microsoft SQL Server 2005	Enterprise	6	6
Microsoft SQL Server 2008 R2	Enterprise	3	3

Actions

Tasks

GenerateReport/Proposal (4)

3. Under **Discovery and Readiness**, click **Microsoft SQL Server Discovery**.
4. Under **Actions**, click **Generate Report** to create the **SQL Server Assessment** report (a Microsoft Office Excel® worksheet).



- Click **Virtual Machine Discovery** to get an inventory of VMs and guest operating systems.

Inventory and Assessment

- Discovery and Readiness
 - Windows 7 Readiness
 - Windows Server 2008 R2 Readiness
 - Windows Server 2008 Readiness
 - Virtual Machine Discovery**
 - Windows Server Roles Discovery
 - Microsoft SQL Server Discovery
 - Microsoft Office 2010 Readiness
- Inventory Summary Results
- Server Consolidation

Virtual Machine Discovery Results

Virtual Machine Inventory Summary

Virtualization Technology	Count of Hosts	Count of Guests
Microsoft VS2005R2	2	10
Windows Server 2008 Hyper-V	9	247
Windows Server 2008 R2 Hyper-V	15	180
Unknown	1	5
Total	27	442

Guest Operating System Summary

Operating System Name and Version	Count	Percentage
Windows XP Professional Unknown Service Pack Level	2	0%
Windows Vista™ Ultimate Unknown Service Pack Level	8	2%
Windows Vista™ Enterprise Unknown Service Pack Level	4	1%
Windows Vista™ Enterprise	3	1%
Windows Server® 2008 Enterprise Unknown Service Pack Level	3	1%
Windows Server 2008 R2 Standard Unknown Service Pack Level	1	0%
Windows Server 2008 R2 Standard	1	0%
Windows Server 2008 R2 Enterprise Unknown Service Pack Level	4	1%
Windows Server 2008 R2 Enterprise	19	4%
Windows Server 2008 R2 Datacenter Unknown Service Pack Level	2	0%
Windows Server 2003 Unknown Service Pack Level	8	2%
Windows 7 Enterprise	2	0%
Microsoft® Windows Vista™ Ultimate Service Pack 2	1	0%
Microsoft® Windows Vista™ Business Service Pack 1	1	0%
Microsoft® Windows Server® 2008 Standard Service Pack 2	3	1%
Microsoft® Windows Server® 2008 Enterprise Service Pack 1	2	0%
Microsoft® Windows Server® 2008 Enterprise Service Pack 2	16	4%
Microsoft® Windows Server® 2008 Enterprise Service Pack 1	5	1%
Microsoft(R) Windows(R) Server 2003, Standard Edition Service Pack 2	8	2%
Microsoft(R) Windows(R) Server 2003, Enterprise Edition Service Pack 2	8	2%
Microsoft(R) Windows(R) Server 2003 Enterprise x64 Edition Service Pack 2	3	1%
Microsoft Windows XP Unknown Service Pack Level	2	0%
Microsoft Windows XP Professional Service Pack 3	3	1%
Microsoft Windows XP Professional Service Pack 3	6	1%
Microsoft Windows Server 2003 Unknown Service Pack Level	1	0%

Actions

Tasks

Generate Report **6**

- To generate the second report, under **Actions**, click **Generate Report** to create the **Virtual Machine Discovery** report in Excel.
This spreadsheet gives details on physical servers running VMs and the host-to-guest relationship for virtualized servers.



- Under **Inventory and Assessment**, click **Inventory Summary Results** to see the summary information on computers and operating systems that the MAP tool discovers.

Inventory and Assessment

- Discovery and Readiness
- Inventory Summary Results** 7
- Server Consolidation

Inventory Summary Results

Connection Status

Connection Status	Count	Percentage
Success	238	70 %
Failed - Access Denied	77	23 %
Failed - Machine not found	22	6 %
Failed - Connection time out	4	1 %
Total	341	100 %

Discovered Computers

Category	Physical	Virtual	Cannot Determine	Total
Client	116	25	32	173
Server	44	73	6	123
Insufficient data	0	0	45	45
Total	160	98	83	341

Operating Systems

Operating System	Count	Percentage
Microsoft Windows XP Professional	49	14 %
Insufficient Data	45	13 %
Microsoft® Windows Server® 2008 Enterprise	33	10 %
Microsoft® Windows Vista™ Business	24	7 %
Windows Vista or Windows Server 2008	22	6 %
Microsoft® Windows Vista™ Enterprise	21	6 %
Windows Server 2008 R2 Enterprise	19	6 %
Microsoft(R) Windows(R) Server 2003, Enterprise Edition	18	5 %
Windows 7 Professional	16	5 %
Windows 7 Enterprise	15	4 %
Windows Server 2008 R2 Datacenter	15	4 %
Windows Server 2003	8	2 %
Microsoft(R) Windows(R) Server 2003, Standard Edition	7	2 %
Windows Vista™ Enterprise	6	2 %
Microsoft(R) Windows(R) Server 2003 Enterprise x64 Edition	5	1 %
Windows Vista™ Ultimate	4	1 %
Windows XP	3	1 %
Windows XP Professional	3	1 %

Actions

Tasks

Generate Report 8

Inventory and Assessment

- Inventory and Assessment
- Software Usage Tracker
- Surveys
- Reference Material

- Under **Actions**, click **Generate Report** to create the third Excel report, **Inventory Summary**. This spreadsheet gives details on all the physical and virtual machines that MAP inventoried.




3 Count Server Licenses and CALs Required

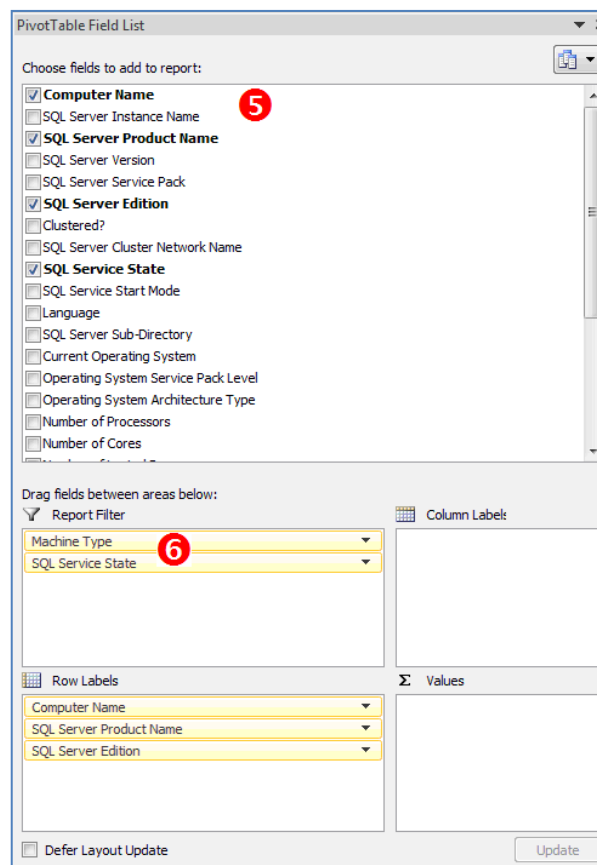
As suggested earlier, scan the servers that are licensed for SQL Server under the per-processor licensing model separately from servers licensed under the server and CAL model.

In this section, you will use the reports you generated in the previous section to count the number of server licenses and CALs you require.

1. In MAP, click **View**, and then click **Saved Reports and Proposals**.
2. Open the **SQL Server Assessment** report, and then open the **Database Instances** worksheet. This worksheet details the instances of SQL Server on each physical and virtual server.
3. Select the whole worksheet, and then on the **Insert** toolbar, click **Pivot Table Wizard**.

 **Note:** To select the whole worksheet, click any cell within the data table, and press Ctrl+A.

4. In the **Create Pivot Table** box, click **OK**.
5. In the **Pivot Table Field List**, check the following fields in this order:
 - i. **Computer Name**
 - ii. **SQL Server Product Name**
 - iii. **SQL Server Edition**
 - iv. **SQL Service State**
 - v. **Machine Type**
6. In the **Report Filter**, drag the following fields:
 - **Machine Type**
 - **SQL Service State**





Assess instances of SQL Server running in the physical machine or OSE

1. Generate a report with the **Report Filter** values set to the following:


- **SQL Service State:** Running
- **Machine Type:** Physical

Example

The Computer Name, CE4P-3E32-R2-1.MAP.COM, has two running instances of SQL Server as shown below:

Machine Type	Physical
SQL Service State	Running
Row Labels	
CE4P-3E32-R2-1.MAP.COM	
Microsoft SQL Server 2005	
Standard Edition	
Microsoft SQL Server 2008 R2	
Enterprise Edition	

2. Determine the highest edition and latest version of SQL Server running by taking into consideration the multi-instancing, prior-version, and down-edition rights for SQL Server.

 **Note:** Licenses of SQL Server Enterprise versions before 2008 R2 have prior-version rights but do not have down-edition rights.

3. Repeat Step 2 above for every value of the Computer Name in the pivot table, and then generate a summary table as shown below.

Physical OSE Licensing	
Computer Name (Physical)	Highest edition and latest version of SQL Server running in OSE
CE4P-3E32-R2-1.MAP.COM	SQL Server 2008 R2 Enterprise
Computer B	
Computer C	



Assess instances of SQL Server running in the VM or virtual OSE

1. Generate a report with the **Report Filter** values set to the following:
 - **Machine Type:** Virtual
 - **SQL Service State:** Running
2. Repeat Steps 2 and 3 from the section on the previous page to generate the table below. Record the highest edition and latest version of SQL Server running in the VM.

Virtual OSE Licensing	
Computer Name (Virtual)	Highest edition and latest version of SQL Server running in OSE
Virtual Server A	SQL Server 2008 Standard
Virtual Server B	SQL Server 2008 R2 Enterprise
Virtual Server C	SQL Server 2008 R2 Standard

Associate virtual OSEs with physical servers (machines)

1. In the MAP tool, click **View**, and then click **Saved Reports and Proposals**.
2. Open the **VMReport**, and then open the **Host and Guest Details** worksheet.
3. Select the whole worksheet, and then on the **Insert** toolbar, click the **Pivot Table Wizard**.
4. In the **Create Pivot Table** box, click **OK**.
5. In the **Pivot Table Field List**, check the following fields in this order:
 - i. **Physical Server Name**
 - ii. **Virtual Machine FQDN**
6. In the pivot table, look up each Computer Name (Virtual) listed in the Virtual OSE Licensing table and find the associated Physical Server Name. (The Computer Name (Virtual) and Virtual Machine FQDN are analogous.) Add the additional data into the Virtual OSE Licensing table from the previous section.

Virtual OSE Licensing		
Computer Name (Physical)	Computer Name (Virtual)	Highest edition and latest version of SQL Server running
Physical Server 009	Virtual Server A	SQL Server 2008 Standard
Physical Server 412	Virtual Server B	SQL Server 2008 R2 Enterprise
Physical Server 006	Virtual Server C	SQL Server 2008 R2 Standard



Count licenses: Optimizing license counts for physical and virtual OSEs

Once you have assessed the instances running the physical and virtual OSEs as described in the earlier sections, you are ready to calculate the final license count.

1. In the Physical OSE Licensing table for every Computer Name (Physical), check if it is associated with any Computer Name (Virtual) in the Virtual OSE Licensing table.
 - **If NO**, then you need a license for the highest edition and latest version of SQL Server running for that Computer Name (Physical).
 - **If YES**, then follow Step 3 below.
2. If the Computer Name (Physical) is associated with one or more Computer Name (Virtual) in the Virtual OSE Licensing table you can choose to either:
 - License each individual OSE separately by licensing it for the highest edition and latest version of SQL Server running; or
 - Take advantage of the enhanced virtualization rights in SQL Server 2008 R2 Enterprise that allow you to run SQL Server 2008 R2 Enterprise (or lower editions and earlier versions) in up to four OSEs/VMs on the server for each license assigned.
Note that versions of SQL Server licenses before 2008 R2 have only the prior-version rights and do not have down-edition rights. Based on this information make sure that each such set of physical and virtual OSEs are licensed.
3. For each Computer Name (Virtual) in the Virtual OSE Licensing table, verify if the associated Computer Name (Physical) is already identified as a server running SQL Server in the Physical OSE Licensing table:
 - **If it is not**, then:
 - Computer Name (Virtual) needs a license for the highest edition and latest version of SQL Server running as per the table.
 - If multiple Computer Names (Virtual) are associated with the same Computer Name (Physical), you can either choose to license each individual Computer Name (Virtual) separately as in Step 1 above or take advantage of the enhanced virtualization rights in SQL Server 2008 R2 Enterprise that allow you to run SQL Server 2008 R2 Enterprise (or lower editions and earlier versions) in up to four OSEs/VMs on the server for each license assigned.
Note that versions of SQL Server licenses before 2008 R2 have only the prior-version rights and do not have down-edition rights. Again, make sure that each such group of OSEs and VMs are licensed properly.
 - **If it is**, then you have already covered the licensing in Step 2 above.



Count CAL requirements

1. In the Software Usage Tracker, click **Software Usage Summary**.
2. Click **SQL Server** to get the number of unique users and devices that have accessed the SQL servers configured for the past 90 days.

The screenshot shows the 'Software Usage Tracker' application. On the left is a navigation pane with a tree view containing: Log Parsing Overview, Software Usage Summary (marked with a red circle and '1'), Windows Server, Office SharePoint Server, SQL Server (marked with a red circle and '2'), Exchange Server, and System Center Configuration Manager. The main area displays the 'Software Usage Summary' for the date range '2010-03-23 - 2010-06-21 (90 days)'. It includes a summary table for SQL Servers and a list of other products like Exchange Server and System Center Configuration Manager. On the right, an 'Actions' pane lists tasks: Generate Report, Configure Date Range, and Configure Combined Products.

Summary	
	Count
Total Number of SQL Servers of Edition: Developer	13
Total Number of SQL Servers of Edition: Enterprise	81
Total Number of SQL Servers of Edition: Standard	12
Total Number of SQL Servers of Edition: Unknown	6
Total Number of SQL Servers Discovered	112
Number of users accessing SQL servers	30
Number of devices accessing SQL servers	30

3. Convert the usage number into a license count.
 - The number of CALs you need equals the number of your users or devices, whichever is fewer.
 - The version of SQL Server CALs must be equal to or later than the version of SQL Servers you have deployed.
 - SQL Server Workgroup CALs cannot access SQL Server Standard or Enterprise.
 - You do not need CALs for:
 - Any servers licensed for and running instances of SQL Server.
 - Up to two devices or users that access instances of SQL Server only to administer those instances.

Make manual adjustments

- If you license SQL Server with a combination of user and device CALs, that would reduce the total number of CALs you need, but you must calculate the licenses manually.
- If you are running SQL Server licensed under more than one licensing model, make sure that you have the appropriate number of CALs by checking for any multiplexing scenarios in the deployment. (For more information about multiplexing, see page 3.)

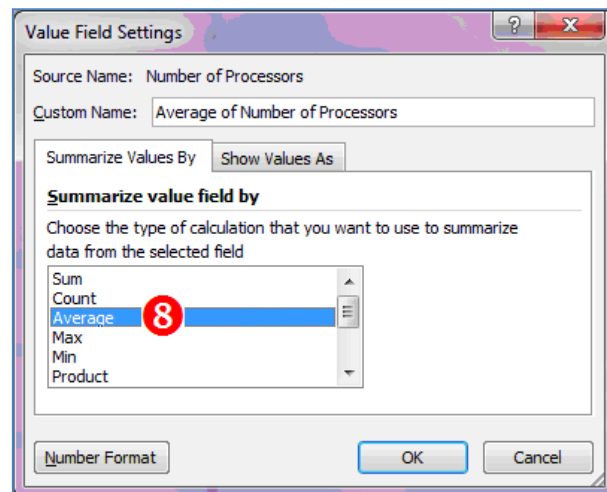


4 Count Processor Licenses Required

Once you have completed the MAP scan of your servers licensed using the server and CAL model, you will need to scan any servers you have licensed by processor.

Once you have completed that scan, follow these steps to evaluate the licensing requirements. You will use the reports you generated in the second section to count the number of processor licenses you require.

1. In MAP, click **View**, and then click **Saved Reports and Proposals**.
2. Open the **SQL Server Assessment** report, and then open the **Database Instances** worksheet. This worksheet details the instances of SQL Server on each physical/virtual server.
3. Select the whole worksheet, and then on the **Insert** toolbar, click the **Pivot Table Wizard**.
4. In the **Create Pivot Table** box, click **OK**.
5. In the **Pivot Table Field List**, check the following in this order:
 - i. **Computer Name**
 - ii. **SQL Server Product Name**
 - iii. **SQL Server Edition**
 - iv. **SQL Service State**
 - v. **Number of Processors**
 - vi. **Machine Type**
6. In the **Report Filter**, drag and drop the following fields:
 - **SQL Service State**
 - **Machine Type**
7. In the **Values** window, click **Sum of Number of Processors**.
8. Click **Value Field Settings**, and then click **Average**.





Assess instances of SQL Server running in the physical machine or OSE


1. Generate a report with the **Report Filter** values set to the following:

- **SQL Service State:** Running
- **Machine Type:** Physical

Example

The physical machine, CE4P-3E32-R5-1.MAP.COM, has running instances of SQL Server as shown below. The Physical OSE/Server is accessing two processors.

Machine Type	Physical
SQL Service State	Running
Row Labels	Average of Number of Processors
CE4P-3E32-R5-1.MAP.COM	2
Microsoft SQL Server 2005	2
Enterprise Edition	2
Microsoft SQL Server 2008 R2	2
Enterprise Edition	2

 **Note:** The physical server has two processors and will need two processor licenses for the highest edition and latest version of SQL Server software running in the OSE, which is SQL Server 2008 R2 Enterprise.

2. Determine the highest edition and latest version of SQL Server running in OSE by taking into consideration the multi-instancing, prior-version, and down-edition rights for SQL Server 2008 R2.

 **Note:** Licenses of SQL Server versions before 2008 R2 have prior-version rights but do not have down-edition rights.

3. Repeat Step 2 for every value of the Computer Name in the pivot table, and then generate a summary table as shown below.

Physical OSE Licensing		
Computer Name (Physical)	Highest edition and latest version of SQL Server running	Number of Processors
CE4P-3E32-R2-1.MAP.COM	SQL Server 2008 R2 Enterprise	2
Physical Server B		
Physical Server C		



Assess instances of SQL Server running in the VM or virtual OSE

1. Generate a report with the **Report Filter** values set to the following:
 - **SQL Server State:** Running
 - **Machine Type:** Virtual
2. Repeat Steps 2 and 3 from the section on the previous page to create the following table:

Virtual OSE Licensing					
Computer Name (Physical)	Computer Name (Virtual)	Highest edition and latest version of SQL Server running in OSE	Number of logical processors	Cores/Threads per physical processor	Number of virtual processors
	Computer A	SQL Server 2008 R2 Enterprise	4		
	Computer B				
	Computer C				

Associate virtual OSEs with physical servers (machines)

1. In MAP, click **View**, and then click **Saved Reports and Proposals**.
2. Open the **VMReport**, and then open the **Host and Guest Details** worksheet.
3. Select the whole worksheet, and then on the **Insert** toolbar, click the **Pivot Table Wizard**.
4. In the **Create Pivot Table** box, click **OK**.
5. In the **Pivot Table Field List**, check the following fields in this order:
 - i. **Physical Server Name**
 - ii. **Virtual Machine FQDN**



- In the Pivot Table, look up each Computer Name (Virtual) listed in the Virtual OSE Licensing table and find the associated Physical Server Name. (Note that the Computer Name (Virtual) and Virtual Machine FQDN are analogous.) Add the additional data into the Virtual OSE Licensing table from the previous section.

Virtual OSE Licensing					
Computer Name (Physical)	Computer Name (Virtual)	Highest edition and latest version of SQL Server running in OSE	Number of logical processors	Cores/Threads per physical processor	Number of virtual processors
Physical Server A	Computer A	SQL Server 2008 R2 Enterprise	4		
Physical Server B	Computer B				
Physical Server C	Computer C				

Count virtual processors

- In the MAP tool, click **View**, and then click **Saved Reports and Proposals**.
- Open the **Hardware and Software Summary** report, and then open the **Hardware Inventory** worksheet.
- Select the whole worksheet, and then on the **Insert** toolbar, click the **Pivot Table Wizard**.
- In the **Create Pivot Table** box, click **OK**.
- In the **Pivot Table Field List**, check **Computer Name**.
- In **Values**, drag and drop the following:
 - **Number of Processors**
 - **Logical Processor Count**
- In the **Report Filter**, drag and drop **Machine Type**.
- In the pivot table, set the **Machine Type** to **Physical**.
- For each **Computer Name (Physical)** in the Virtual OSE Licensing table, look up in the pivot table the **Count of Logical Processor** and divide that number by the corresponding **Count of Number of Processors**. Enter the result in the table following Step 10 in the **Cores/Threads per physical processor** column.



10. In the Virtual OSE Licensing table below, for every row divide the **Number of logical processors** by the **Cores/Threads per physical processor**. Round up the result to the next whole number if required and enter it in the column labeled **Number of virtual processors**.

Virtual OSE Licensing					
Computer Name (Physical)	Computer Name (Virtual)	Highest edition and latest version of SQL Server running in OSE	Number of logical processors	Cores/Threads per physical processor	Number of virtual processors
Physical Server A	Computer A	SQL Server 2008 R2 Enterprise	4	2	2
Physical Server B	Computer B				
Physical Server C	Computer C				

Count licenses: Optimizing license counts for physical and virtual OSEs

Once you have assessed the instances running the physical and virtual OSEs as described in the earlier sections you are ready to arrive at the final license count.

- In the Physical OSE Licensing table, check for every Computer Name (Physical) to see if it is associated with any Computer Name (Virtual) in the Virtual OSE Licensing table.
 - If NO**, then you need a license for every processor (Number of Processors) for the highest edition and latest version of SQL running for that Computer Name (Physical).
 - If YES**, then follow Step 2.
- If the Computer Name (Physical) is associated with one or more Computer Names (Virtual) in the Virtual OSE Licensing table, for that Computer Name (Physical) select the better or cheaper of the following two options, A and B:
 - License each individual OSE separately by:
 - Licensing each processor (Number of Processors in the Physical OSE Licensing table) in the Computer Name (Physical) for the highest edition and latest version of SQL Server running, and
 - Licensing each processor (number of virtual processors in the Virtual OSE Licensing table) in each Computer Name (Virtual) associated with the Computer Name (Physical) in the previous step for the highest edition and latest version of SQL running.
 - License each processor (Number of Processors in the Physical OSE Licensing table) in the Computer Name (Physical) with either SQL Server 2008 R2 Datacenter or SQL Server 2008 R2 Enterprise.

As mentioned earlier, when you license all the physical processors you get enhanced virtualization rights as described in the table below. Combined with the prior-version and down-edition rights,



licensing Computer Name (Physical) with these higher editions of SQL Server could economically cover the licensing requirements of all the Computer Name (Virtual) associated with the Computer Name (Physical). Your selection of edition should be based on the number of OSEs running SQL Server in the Computer Name (Physical).

Edition	Number of OSEs in which you can run server software
SQL Server 2008 R2 Datacenter	Unlimited.
SQL Server 2008 R2 Enterprise	Up to 4 OSEs per license.
SQL Server 2008 R2 Standard, Workgroup, and Web	Physical OSE only.

3. In the next step, for each Computer Name (Virtual) in the Virtual OSE Licensing table, verify if the associated Computer Name (Physical) is already identified as a server running SQL Server in the Physical OSE Licensing table.
 - **If it is not**, then:
 - Computer Name (Virtual) needs a license for the highest edition and latest version of SQL running as for every processor (number of virtual processors in the Virtual OSE Licensing table).
 - If multiple Computer Names (Virtual) are associated with the same Computer Name (Physical), follow the options as described in Step 2 (starting on the previous page).
 - **If it is**, then you have already covered the licensing in Step 2 (on the previous page).



navigate

References and Resources

References

- Detailed SQL Server product information including new version features and edition comparisons:
microsoft.com/sqlserver/en/us/default.aspx
- SQL Server 2008 licensing:
microsoft.com/sqlserver/2008/en/us/licensing.aspx
- SQL Server 2008 pricing:
microsoft.com/sqlserver/2008/en/us/pricing.aspx
- SQL Server 2008 R2 Licensing Quick Reference Guide explains the basics of how SQL Server is licensed and sold:
microsoft.com/sqlserver/en/us/get-sql-server/how-to-buy.aspx
- Information on licensing SQL Server for virtual environments:
microsoft.com/licensing/about-licensing/virtualization.aspx
- Volume Licensing Product Use Rights:
microsoft.com/licensing/about-licensing/product-licensing.aspx
- The Software Dependency Guide lists the dependent licenses required for SQL Server under Volume Licensing:
http://download.microsoft.com/download/1/5/C/15CCF7C4-403D-4893-988B-58FD7B8BC87D/Software_Dependency_Guide.docx
- Volume Licensing Briefs provide in-depth knowledge of key licensing topics, including product downgrade rights, step-up licensing, and multiplexing:
microsoft.com/licensing/about-licensing/volume-licensing-briefs.aspx
- Application Server License Mobility Brief:
http://download.microsoft.com/download/3/d/4/3d42bdc2-6725-4b29-b75a-a5b04179958b/Application_Server_License_Mobility_VL_Brief.doc
- Step-up Licensing White paper:
http://download.microsoft.com/download/6/8/9/68964284-864d-4a6d-aed9-f2c1f8f23e14/stepup_license.docx



- Client Access Licenses (CALs):
microsoft.com/licensing/about-licensing/client-access-license.aspx
- Software Asset Management (SAM):
microsoft.com/sam/en/us/default.aspx
- Microsoft Assessment and Planning Toolkit (MAP):
microsoft.com/map

License Management Series

This guide is one in a series of five in-depth “how-to” guides that can help you generate and interpret MAP Toolkit Software Usage Tracker reports that you can use to calculate the number of server licenses and CALs you need.

Refer to [Guidance for MAP Toolkit Software Usage Tracker²](#) to download the other four guides:

- Assessing Windows Server Licensing
- Assessing Exchange Server Licensing
- Assessing SharePoint Server Licensing
- Assessing System Center Configuration Manager Licensing

²microsoft.com/sam/en/us/briefs.aspx

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