



## CAM 14.2 License Analytics

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- Cherwell Service Management
- Cherwell Asset Management

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# License Analytics

License Analytics is the web application for evaluating compliance for a specific set of products within the context of contractually-defined product use rights. It compares the following:

- Deployed software/hardware data (found during the inventory and discovery processes, which you run from CAM Administrator)
- Entitlement data (purchasing, contracts, and use rights, which you configure in Purchasing) to determine compliance.

# Login Screen

This topic includes sections that are noted as only relevant in certain configurations:

 Hosted installations;  On-premises installations;  CSM authentication;  CAM authentication

Enter the following information:

-   User name—Your user name, in domain\user name format. Your user name must be a valid user name in the CAM Database, with permission to run License Analytics.
-   Password—Your password for the domain, if required.
-   User name—Your Cherwell Service Management user name.
-   Password—Your Cherwell Service Management password.

## Related information

[LA\\_Background\\_start.xml#concept3248](#)

# What Is License Analytics?

License Analytics provides information about the licensing of Microsoft products installed and used in your organization. It does this by evaluating data from a number of sources within Cherwell Asset Management:

- **Inventory data** provides evidence of installed software and the [licensing channel](#) through which it was obtained on physical and virtual PCs and servers.
- **Virtual environment** discovery data provides a topology of your virtual machine environment, as well as information on what operating systems are running on each host and guest, what versions of SQL Server are installed on each host and guest, and certain hardware characteristics of your virtual hosts.
- **Machine grouping** provides information about what machines certain contracts apply to.
- **Purchasing data** provides information about your [contracts](#), software purchases, and license assignments.
- **Cherwell Software Identification Database (CSID)** provides knowledge of licensing and [product use rights](#) rules used in the analysis.

License Analytics displays data in several forms:

- Sets of charts that identify purchases, entitlements, installation counts, and surpluses and deficits based on the analysis. Charts are provided to view this information based on contract, channel, and product edition/version.
- A worksheet for each [LA title](#) that details the numbers behind the charts.
- An [exceptions](#) report that provides information about data issues encountered during the analysis.
- For Windows Server and SQL Server, a computer data report that shows the analysis of each individual machine consuming a Windows Server or SQL Server license, including the impact of that server's hardware and virtual guests, if any.
- For SQL Server, reports list any machines that are marked as SQL passive servers or where the SQL Server licensing type is not known.
- A report of your licensing position for any MSDN subscriptions you may have in your environment.

In order to achieve accurate, meaningful results, it's important to understand the terms and concepts used in designing this product, as listed below.

## Terminology

The most important terms and concepts are listed below; click each hyperlink for a definition and context of each term.

- [Product use rights](#)
- [License channels](#)
- [Contracts](#)

- [Virtual machines](#)
- [MSDN software installations](#)

Additional terms are covered in the [Terminology](#) topic.

## Examples

To better understand how the license analytics process works, see [Examples](#).



**Note:** Cherwell Asset Management is designed to assist customers in evaluating their compliance with software licensing requirements across various software manufacturers. Determining software license compliance is very complex and dependent on many factors including:

- Software manufacturers' licensing rules
- Completeness of data collected within your environment
- Accuracy and completeness of your purchasing data
- Other factors

As a result of these factors, Cherwell Software does not warrant your software license analysis or compliance and recommends you work with software manufacturers to fully verify compliance.

## What's New in License Analytics

In Cherwell Asset Management versions 13.0 and 13.2, License Analytics added support for the following Microsoft licensing agreements:

- Starting in version 13.0, updated support for analyzing [Windows Server licensing](#).
- Starting in version 13.2, support for analyzing [SQL Server licensing](#). For more information, see [Getting Started with License Analytics](#).
- For both SQL Server and Windows Server agreements:
  - See the Exceptions tab for any purchases that you should migrate or validate to match the contract under which they were purchased.
  - Depending on your selected product family, core and/or processor counts are shown in the Computer Data tab.

For a complete list of new features in Cherwell Asset Management, see [What's New in CAM](#).

# Getting Started with License Analytics

License Analytics analyzes data to determine compliance for your installations of supported Microsoft products (also known as [LA titles](#)). Before you can use it, you need to perform some steps to collect meaningful data:

1. In CAM Administrator, inventory all machines that have supported Microsoft products installed on them.
2. Also in CAM Administrator, configure and run [virtual environment](#) discovery.
3. In [Purchasing](#), do the following:
  - Enter your Microsoft contract information.
  - Enter purchasing data for supported Microsoft products.
  - Associate Microsoft software line items to the appropriate Microsoft contract.
4. To collect meaningful [SQL Server](#) data, it's important to perform these additional tasks:
  - Upgrading customers: Check the Status panel in Purchasing. If your to-do list at the top right of that panel includes a yellow **Exceptions** or **Migrate** section, click on these links to accomplish tasks necessary for generating meaningful data for analysis. You'll see these sections, for example, if you added purchasing data for these Microsoft products in earlier versions of CAM. Support for capacity-based (per core or per processor) Windows Server licensing analysis was added in CAM 13.0; support for SQL Server debuted in CAM 13.2.
  - New and upgrading customers: In Purchasing, assign SQL Server licenses to your physical or virtual machines. Assignments are necessary for correct licensing calculations.
  - New and upgrading customers: Back in License Analytics, click the  icon next to Summary in the left pane to recalculate data.
  - New and upgrading customers: If shown, click **Microsoft SQL Server (Unknown)** in the left pane to view any items where more information is required for correct analysis.

New and upgrading customers: Check the Exceptions tab for the other SQL Server nodes for any issues you want to correct before calculating data.
5. Back in License Analytics, check whether you have any exceptions you want to correct for any LA title. Use the help link at the top of the each Exceptions tab for guidance with correcting any listed issues, and recalculate data. Continue with this process until all issues are resolved.

For complete details on how Microsoft licenses products, and for rules and guidelines for assigning licenses, see the Microsoft website.

# License Analytics Titles

This version of License Analytics supports these titles:

- Microsoft Office
- Microsoft Project
- [Microsoft SQL Server](#)
- Microsoft Visio
- Microsoft Windows
- [Microsoft Windows Server](#)
- The status of your Microsoft MSDN licensing position

# Best Practices and Purchasing

If you want to analyze and report on your licenses via [License Analytics \(LA\)](#), you may want to modify how you manage Purchasing data.

## Does This Apply to You?

This applies to you if you enter, view, and analyze Purchasing data and purchase Microsoft software using volume purchase agreements (such as Enterprise, Select, or other agreements).



**Note:** License Analytics only reports on Microsoft licenses. For information on other licenses, such as Oracle, see [Purchasing](#).

## Understanding Contracts

In Purchasing, a contract ties together several related concepts:

- Product use rights
- Software maintenance and software upgrades
- License purchasing channel
- Contract group affinity

When purchasing Microsoft software using volume purchase agreements, LA will provide more accurate results if you [replace the use of software maintenance and software upgrade line items with software contracts](#).



**Note:** If you want Reporting to reflect software upgrade purchases, you can continue to enter software upgrade line items, but they will not be used by LA.

You will also need to *reconcile* any software purchased with the Cherwell Software Identification Database (CSID) to associate what you purchased with what is discovered by the software inventory process. License channel and group affinity is used to tie contract-based use rights with actual installations. The inventory and virtual environment discovery processes now discover the license channel under which the installed copy was purchased; machine groups are used to associate sets of machines with the contracts that apply to them.

**Next:** [Using Contracts and Line Items in Purchasing](#)

### Related concepts

[Purchasing](#)

[Reconcile Panel](#)

[Product Use Rights](#)

[License Channels](#)

[Virtual Machines and License Analytics](#)

# Using Contracts and Line Items in Purchasing

Learn how to use contracts along with software line items to describe what you have purchased, and the use rights (particularly upgrade and downgrade rights) for those products.

This applies to creating and using contracts for new purchases; if you are migrating from a pre-11.0 version of Cherwell Asset Management, see [Migration Tasks](#), which describes the process of migrating existing purchasing data to use contracts rather than maintenance and upgrade entries.

## Contracts and Line Items

When you purchase something under the terms of a contract, you relate *the line items within an order* to the contract, not the order itself to the contract. The steps are as follows, in order:

1. If this is a new contract, first create the contract.
2. Create an order.
3. Create a line item, and while doing so, select the contract that applies to the line item.
4. Repeat step 3 for each line item within the order to be associated to the contract.
5. Repeat steps 2-3 for each new order with line items to be associated to the contract.

**Next:** [Retail and OEM Software Contracts](#)

### Related concepts

[Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades](#)

[Microsoft OEM Agreements, Software Maintenance, and Software Upgrades](#)

[Volume Channel Software: Create a Contract](#)

[Software Assurance and Microsoft Volume Contracts](#)

# Retail and OEM Software Contracts

Purchasing includes predefined Microsoft contracts for retail and OEM purchases (purchases through a retail or OEM channel).

**To describe the acquisition of a copy of OEM Windows software delivered with a desktop or laptop:**

1. Launch Purchasing.
2. [Create or edit an order](#).
3. [Add a software line item](#) describing the software, and associate it with the predefined OEM contract.

When you create the software line item in step 3, make sure that the software you describe is exactly what is stored in the CSID. To do this, either add the item by part number, or search for the software title name:

1. Search for the contract.

For a new Purchasing installation, there will be only two contracts available: Retail and OEM.

2. Click **Select** next to the OEM contract to associate the Windows purchase to its governing use rights (OEM).
3. Click **Search** to the right of the **Reconcile to** label. If you enter the pattern "\*windows\*7\*", a list of titles is shown.
4. Click **Select** next to the one that applies.
5. Enter the quantity purchased (1) and click **Save**. You have entered a purchase for a single copy of OEM Windows.

The process is analogous to entering Microsoft Retail channel purchases; just choose a different contract.

**Next:** [Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades](#)

## Related concepts

[Using Contracts and Line Items in Purchasing](#)

[Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades](#)

[Microsoft OEM Agreements, Software Maintenance, and Software Upgrades](#)

[Volume Channel Software: Create a Contract](#)

[Software Assurance and Microsoft Volume Contracts](#)

# Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades

Microsoft retail use rights do not include upgrade or downgrade rights: what you bought is all you get, although you may be able to transfer the software from one machine to another.

With a Microsoft Retail Agreement, you may have the opportunity to purchase reduced-cost upgrades to later versions. If you choose to do this, you can usually choose to run *either* the older copy of the software *or* the newer copy of the software on a single machine: you cannot run both versions on different machines at the same time. You can, however, transfer the software from one machine to another (for example, if you buy a replacement machine).

To reflect this process in Purchasing, and to get License Analytics to better determine your compliance status, follow these steps to handle a retail channel upgrade purchase:

1. Uninstall the old version of the software.
2. Install the new version.
3. In the Purchasing console, [create an order](#) and a software purchase [line item](#) for the upgrade. (You may want to add a note about the order date for the upgrade.)
4. Associate the new line item with the Retail predefined contract.
5. Edit the original line item and set its quantity to zero.

**Next:** [Microsoft OEM Agreements, Software Maintenance, and Software Upgrades](#)

## Related concepts

[Retail and OEM Software Contracts](#)

[Using Contracts and Line Items in Purchasing](#)

[Microsoft OEM Agreements, Software Maintenance, and Software Upgrades](#)

[Volume Channel Software: Create a Contract](#)

[Software Assurance and Microsoft Volume Contracts](#)

# Microsoft OEM Agreements, Software Maintenance, and Software Upgrades

Microsoft OEM channel use rights are a bit more involved than retail use rights, and Purchasing provides different ways to manage them.

OEM use rights for Windows (and no other products) usually grant the right to install and run the prior version of Windows. If you don't want to run the latest version of Windows, you can install the earlier version on top of it. Furthermore, an OEM license is tied to a single machine, and cannot be transferred to a new one.

If you enter into a volume purchase agreement with Microsoft, you can convert OEM software licenses to volume licenses for new machines that you purchase during the term of the volume agreement. Once the licenses are converted from OEM to volume, the provisions of the volume purchase agreement (for upgrades and downgrades) cover what once were OEM licenses. When you create a Microsoft volume contract using Purchasing, you can control whether you want to take advantage of this option. Converting licenses from OEM to volume does not involve any changes to the software already installed; it's simply bookkeeping.

If you do not have a volume contract (and, therefore, cannot convert your OEM channel purchases to volume), you should treat any upgrades using the same process as for Microsoft retail agreements.

**Next:** [Volume Channel Software: Create a Contract](#)

## Related concepts

[Retail and OEM Software Contracts](#)

[Using Contracts and Line Items in Purchasing](#)

[Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades](#)

[Volume Channel Software: Create a Contract](#)

[Software Assurance and Microsoft Volume Contracts](#)

# Volume Channel Software: Create a Contract

Before entering purchases related to a volume contract, create the contract.

## To create a contract:

1. From within the Purchasing console, select the Contracts panel.
2. Click **All Contracts** in the left pane.
3. Click **Add** in the header bar. A drop-down list opens that includes a number of templates for Microsoft agreements (Enterprise, Select, Open Value, etc.).
4. Select the kind of contract you want to add and complete the form.
5. Click **Save**.

**Next:** [Software Assurance and Microsoft Volume Contracts](#)

## Related concepts

[Retail and OEM Software Contracts](#)

[Using Contracts and Line Items in Purchasing](#)

[Microsoft OEM Agreements, Software Maintenance, and Software Upgrades](#)

[Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades](#)

[Software Assurance and Microsoft Volume Contracts](#)

# Software Assurance and Microsoft Volume Contracts

All Microsoft volume contracts provide both upgrade and downgrade rights through the Microsoft comprehensive volume rights program Software Assurance.

As long as the volume contract is in force, you can run an earlier or later version of the software purchased.

With other volume agreements, you can either include Software Assurance for all purchases under the contract, or add Software Assurance with any single purchase (line item). When creating a contract for a Select agreement, for example, the contract definition form provides a check box where you can make this election. If you choose not to purchase Software Assurance with the entire contract, you can still purchase it with any particular line item associated with the contract.

## Volume Purchase Agreements, Software Maintenance, and Software Upgrades

Volume purchase agreements and Software Assurance completely replace maintenance and upgrade transactions for Microsoft software. License Analytics will use the knowledge of what you have purchased and the license terms for the purchases to determine entitlements to various upgraded or downgraded software versions. License Analytics compares those entitlements with software inventory information to generate a report on possible compliance issues.

## Microsoft SQL Server Licensing

If you use License Analytics to analyze SQL Server purchases, see [SQL Server Licensing](#) for details on how License Analytics helps you manage compliance with those agreements.

## Microsoft Windows Server Licensing

If you use License Analytics to analyze Windows Server purchases, see [Windows Server Licensing](#) for details on changes Microsoft made to Windows Server 2016 licensing agreements, and how License Analytics helps you manage compliance with those agreements.

### Related concepts

[Retail and OEM Software Contracts](#)

[Using Contracts and Line Items in Purchasing](#)

[Microsoft OEM Agreements, Software Maintenance, and Software Upgrades](#)

[Microsoft Retail Agreements, Software Maintenance, and Software Upgrades/Downgrades](#)

[Volume Channel Software: Create a Contract](#)

# Layout of License Analytics

The layout of License Analytics includes:

- A toolbar at the top right of the right pane.
- A list of product categories in the left pane.
- In the right pane, information about your selection in the left pane (in the form of charts and reports that provide information for the selected product category).

Each area is described next.

## Toolbar

The following buttons appear in the top right of the right panel:

- **Email PDF**—Click to [email a PDF version of the report](#). A window opens where you can specify. This option is not available from the Worksheet tab or when Microsoft MSDN is selected in the left pane.
- **Export to PDF**—Click to export the contents of the right pane to a PDF file. You can save or print the PDF file.
- **Open in New Window**—Click to open the contents of the right pane in a new window.

## Left Pane

When you click an item in the left pane, the right pane updates to show relevant information.

- **Summary**—Provides explanatory text and shows the last time data was calculated. You can recalculate data by clicking the  icon after you've made changes. Summary information is then broken out further by LA title:
  - **Microsoft Office**
  - **Microsoft Project**
  - **Microsoft SQL Server** (broken out by SQL Server licensing agreement type—Core, Processor, Server/CAL, and [Unknown](#)—with a separate list for [passive servers](#))
  - **Microsoft Visio**
  - **Microsoft Windows**
  - **Microsoft Windows Server** (broken out by Windows Server licensing agreement type: Core, Processor, and Server)
  - **Microsoft MSDN**

## Right Pane

The right pane updates with your selection in the left pane, showing the charts and a worksheet that pertain to your selection on the left, as described above.

When you select a product family on the left, a series of tabs appear in the top of the right panel:

- **Summary**—Provides a summary of license deficits and surpluses for the selected product.
- **Worksheet**—Presents detailed data analysis for the selected product.
- **Exceptions**—Presents a list of any exceptions, with descriptions of how to correct each one or links to relevant help.
- **By Edition, By Channel, By Contract, By Edition Version**—Use to view data sorted by the relevant criterion.
- **Computer Data**—Only available when SQL Server or Windows Server is selected in the left pane, this tab appears just after the Summary tab and provides a computer data analysis for each machine consuming a SQL Server or Windows Server license.

# Definitions and Overviews

# Contracts and License Analytics

A contract, or license agreement, is the mechanism that ties together software purchases, installations, and use rights. Cherwell Asset Management includes pre-defined Microsoft Retail and OEM contracts, pre-defined Microsoft Volume and MSDN contract templates, and an Other contract template for use with hardware or other non-Microsoft software. You use Purchasing to define what contracts you use, and then to associate individual purchases with the contracts. (You can also view and edit contracts from within License Analytics; see [How Do I View and Edit a Contract?](#).) The following information is specific to Microsoft pre-defined contracts and templates; for information on using non-Microsoft contracts, see [How to Add a Contract](#).

Here are the kinds of information associated with a contract:

- **License channel**—Every contract is tied to one, and only one, license channel: A retail contract is tied to a retail license channel, volume to volume, and so forth.
- **License channel conversion**—Some Microsoft volume contracts allow you to treat OEM product licenses as volume licenses. You can choose whether this option applies when you define a contract.
- **Organizational groups**—Some contracts (such as enterprise or retail or OEM agreements) apply to an entire organization. Other contracts, such as *Select*-type agreements, apply only to particular departments. When defining a contract you get to select the organizational groups to which the contract applies.
- **Product maintenance**—Some contracts (such as enterprise agreements) always provide for product maintenance. For other contracts, you can choose whether maintenance applies to some or all products purchased under the agreement. Upgrade rights are typically a part of product maintenance. Microsoft calls its maintenance program Software Assurance (SA).
- **Dates**—Contracts have dates on which they begin and end, and a date on which they are signed. A missing end date means that the contract will never expire.

Again, you don't need to define the OEM or retail contracts: Cherwell Asset Management defines them for you. But if you use volume or MSDN licenses, you should use Purchasing to define these contracts based on the provided templates.

When working with contract dates, it helps to remember the following:

- A contract that starts in the future has no effect on how License Analytics operates: Contracts that take effect in the future are ignored.
- Contracts that have expired may still have an influence on [product use rights](#). A contract with upgrade rights gives you the right to upgrade to any product released during the contract term, even for expired contracts.

## Relating Purchases and Contracts

When you start making purchases and recording them in Purchasing, you can tie together each purchase (line item) with its governing contract, and, if you choose, you can assign each copy to the machine on which it is to be installed.

When used with License Analytics, pay particular attention to several controls in Purchasing's line item editing interface:

- **Reconcile to**—Be sure to reconcile the product you purchased to a selection in the Cherwell Software Identification Database (CSID). License Analytics will not include any unreconciled purchases.
- **License quantity**—This specifies how many licenses you have purchased. This is used as part of the analysis.
- **Contract**—The contract ties together what you purchased with a license channel, a set of use rights, and the part of the organization to which the contract applies. If software assurance (or SA, the term used for maintenance under Microsoft contracts) is optional (under the contract terms), be sure to indicate whether it applies to this line item.

## Relating Machines, Installed Software, and Contracts

CAM Administrator is the interface you use to manage the relationships between machine groups and individual machines.

- **Machine groups**—Machine groups can be defined by Active Directory or by you in CAM Administrator. Groups can contain sub-groups to any level.
- **Machine membership in groups**—You have complete control over how machines and groups that you define are related.

Recall that some Microsoft volume contracts, and all Microsoft MSDN contracts, are tied to one or more machine groups. This group information, along with license channel information gathered by the inventory process, defines the relationships between contracts and machines.

### Related information

[../cam\\_purchasing/Purch\\_Overview\\_Contracts.xml#concept931](http://cam_purchasing/Purch_Overview_Contracts.xml#concept931)

# License Channels

A license channel is a distribution channel for software products. The license channel identifies, in broad terms, what kinds of use rights apply to the software. The CAM Agent (or SCCM agent if using the CAM External Connector) can usually determine the license channel for installed software.

Notes regarding [SQL Server licenses](#):

- Channel information is not usually available during discovery for SQL Server purchases, so License Analytics relies on license assignments for that information.
- The CAM External Connector is not supported for gathering SQL Server compliance data.

For Microsoft products, the license channels understood by License Analytics are:

- **Retail**—Retail products are those purchased one at a time, typically by an end user. The use rights defined for retail products are usually contained in a EULA (end user license agreement). Retail products are usually licensed for use on a small number of computers under the control of a single person. Retail use rights generally do not include upgrades or downgrades (rights to use earlier or later software versions). The right to install the software is usually not tied to a single hardware device.
- **OEM**—OEM (original equipment manufacturer) products are those purchased by a hardware manufacturer, installed on the hardware the manufacturer produces, and supplied to the end user along with the hardware. OEM use rights are usually contained in a EULA. The software license is tied to the specific hardware on which the software is installed, as indicated by the presence of a sticker or other mark. In the case of Windows Operating System licenses, the license usually allows the end user to install and use either the version of Windows installed, or the immediately prior version.
- **Volume**—Volume licensed products require a separate agreement between the customer (usually a commercial, academic, or governmental organization) and either a Microsoft reseller or Microsoft itself. These licenses normally provide the customer the right to install and use an agreed-upon number of copies of licensed software. Volume agreements usually provide for downgrade rights (the right to run earlier versions of the purchased products), and may contain time-limited upgrade rights (the right to run later versions of purchased products). A volume license may apply to an entire enterprise, or to one or more organizational groups within an enterprise.
- **MSDN**—Microsoft Developer Network licenses require a separate agreement between the customer and Microsoft. MSDN licenses are to be used solely for the customer's internal use to develop products based on Microsoft technologies. Products installed with these licenses are not distinguishable by the CAM Agent from retail or volume licenses, but may be specified by group affiliation (see [MSDN Software Installations](#)).

# Product Use Rights

Commercial software products are generally sold to be used in accordance with terms and conditions established by the software publisher. License Analytics refers to these terms as "product use rights."

The product use rights analyzed by License Analytics include the following:

- **Physical installation**—Installing and running copies of a product on a hardware device (computer).
- **Virtual installation**—Installing and running copies of a product on a virtual machine.
- **Hardware platform**—Using a product on a computer with some number of cores or processors.
- **Upgrade rights**—Purchasing the rights to an earlier version of a product, while installing and using a later version.
- **Downgrade rights**—Purchasing the rights to a later version of a product, while installing and using an earlier version.

## MSDN Software Installations

Use of software licensed through an MSDN software contract is restricted for purposes of research, development, and testing of software. As mentioned in [Virtual Machines and License Analytics](#), Cherwell Asset Management inventory, virtual discovery, and SCCM import processes do not support automatic detection of MSDN as a [license channel](#), which affects how License Analytics reports on MSDN-licensed software.

MSDN contracts must identify the machine group or groups containing the machines running MSDN-licensed software. License Analytics uses this information as follows:

All Microsoft software on all machines included in groups named by an MSDN [contract](#) is considered to be MSDN-licensed software. There are no exceptions.

For those machines using MSDN-licensed software, simply create (in CAM Administrator) or use a group that is appropriate for that purpose, and place all machines used for that purpose in that group.



**Note:** Technically, MSDN software is licensed based on user; to simplify the analysis, License Analytics uses a machine- and machine group-based model to better match the other supported contract models.

# SQL Server Licensing

This topic describes provides an overview of how License Analytics supports analysis of Microsoft SQL Server licensing. For complete details on how Microsoft licenses SQL Server or any other product, please see the Microsoft website.



**Note:** See [Getting Started with License Analytics](#) for tasks you should perform before attempting to analyze SQL Server licensing data.

## What's Supported?

License Analytics supports analysis of the SQL Server products and licensing models shown in the table below that are discovered by the CAM Agent (not by the CAM External Connector). Note that capacity-based licensing (processor and core) are handled interchangeably based on contract terms. This means that if a version was originally released under the processor licensing model, it gets converted to core-based licensing if provided for under a volume contract.

Title	License Model
SQL Server 2005 Enterprise	Processor, Server+CAL (client access license)
SQL Server 2005 Standard	Processor, Server+CAL
SQL Server 2005 Workgroup	Processor, Server+CAL
SQL Server 2008 Enterprise	Processor, Server+CAL
SQL Server 2008 Standard	Processor, Server+CAL
SQL Server 2008 Workgroup	Processor, Server+CAL
SQL Server 2008 Standard Edition for Small Business	Server+CAL
SQL Server 2008 R2 Datacenter	Processor
SQL Server 2008 R2 Enterprise	Processor, Server+CAL
SQL Server 2008 R2 Standard	Processor, Server+CAL
SQL Server 2008 R2 Workgroup	Processor, Server+CAL
SQL Server 2008 R2 Small Business	Server+CAL
SQL Server 2012 Enterprise	Processor, Core, Server+CAL*
SQL Server 2012 Standard	Core, Server+CAL
SQL Server 2012 Business Intelligence	Server+CAL
SQL Server 2014 Enterprise	Core, Server+CAL (upgrade only)
SQL Server 2014 Standard	Core, Server+CAL

Title	License Model
SQL Server 2014 Business Intelligence	Server+CAL
SQL Server 2016 Enterprise	Core, Server+CAL (upgrade only)
SQL Server 2016 Standard	Core, Server+CAL
SQL Server 2017 Enterprise	Core, Server+CAL (upgrade only)
SQL Server 2017 Standard	Core, Server+CAL

\* Purchasers of this edition have the option to purchase Server+CAL licenses until Software Assurance (SA) renewal. Enterprise Agreement (EA) purchasers can purchase processor licenses until next renewal of EA contract. All processor licenses under SA are converted to core licensing model at renewal. See the Microsoft website for information on conversion rules.

## SQL Server Contract Licensing Transitions and License Rules

SQL Server licensing has changed over time:

- In 2012, capacity licenses changed from per-processor to per-core.
- Enterprise edition Server+CAL licenses were not sold after the 2008 R2 version.

Based on the above, the basic processor-to-core transition rules are:

- Volume contracts with SA effective after April 1, 2012 use core licenses for all capacity-based licensing.
- Volume contracts without SA, as well as retail and OEM contracts, use processor licensing (pre-2012) or core licensing (2012 and later).

In determining compliance, several rules may apply in some situations. License Analytics enforces the rules as follows:

- If SQL Server was acquired under a contract with SA, the licensing rules for the title are those of the latest contract in force (either current or expired). License terms for previously-purchased software may change as contracts with SA are renewed.
- If SQL Server was acquired under a contract without SA, the licensing rules are those from the contract in force at the time of acquisition.

See [Examples: SQL Server Licensing](#) for more on how these rules are applied.

### Related information

[LA\\_Overview\\_Virtual\\_machines.xml#concept4859](#)

# Terminology

The following is a list of terms and their definitions in the context of License Analytics:

- **Contracts**—See [Contracts and License Analytics](#) for complete explanation and context.
- **Edition**—The (typically functionality based) variant of an application within a family; for example, Professional, Small Business, or Standard.
- **LA titles**—The software titles for which License Analytics provides licensing information; see [License Analytics Titles](#) for a list of titles supported by this version.
- **Entitlements**—See [How Do I Understand How Entitlements Are Determined?](#) for complete explanation and context.
- **Family** (also, product family)—All editions and versions of software that Microsoft refers to under a single name; for example, Microsoft Office or Windows Server.
- **Installation**—An inventory of a specific title (family/edition/version) on a particular machine.
- **License analytics**—The process of comparing deployed software/hardware data (inventory and discovery) with entitlement data (including information on purchasing, contracts, and use rights) to determine compliance.
- **License channels**—See [License Channels](#) for complete explanation and context.
- **License status**—Cherwell Asset Management's calculation of the license status based on purchasing and inventory data.
- **MSDN software installations**—See [MSDN Software Installations](#) for an explanation of how License Analytics handles MSDN software installations.
- **Product use rights**—See [Product Use Rights](#) for complete explanation and context.
- **Purchase**—A reconciled line item representing acquisition of a quantity of a specific title (family/edition/version).
- **Software assurance (SA)**—A Microsoft maintenance program.
- **Title**—The version of a family/edition that defines a single point in an upgrade/downgrade sequence; for example, Office 2003 Standard or Visio 2010 Professional.
- **Virtual machines**—See [Virtual Machines and License Analytics](#) for an explanation of virtual machines in the context of License Analytics.

# Virtual Machines and License Analytics

License Analytics uses information gathered by the [virtual environment discovery](#) process to evaluate the relationships between virtual machine hosts and guests:

- **VM host**—A virtual machine host is a hardware device that runs virtual machines (guests). A VM host may run a copy of Windows, a hypervisor (such as Hyper-V or VMware), or another operating environment entirely.
- **VM guest**—A VM guest runs its own copy of an operating system and applications. A VM guest may run a Windows desktop title, Windows Server, Linux, or some other operating system.

The virtual environment discovery process will usually return information on the operating systems or virtual environments related to each VM host, including the name of the operating system and the license channel (not available for many versions of SQL Server) with which it was installed, and whether the virtual machine was running at the time the virtual environment discovery occurred.

License Analytics ignores virtual machines that are not running, and ignores all host and virtual machines that are not running a copy of Windows (desktop or server).

## Windows Desktop Titles and Virtual Machines

As a general rule, every copy of a Windows desktop operating system (Windows 7, Windows 8, and so forth) requires its own license. That means, for example, that if you have a VMware host running ten copies of Windows 7 Professional, you need ten licenses for Windows 7 Professional to be in compliance with the terms of your software license. If, in addition, the virtual host machine is running Windows 7 Professional, you also need a license for the host.

## Windows Server Titles and Virtual Machines

Several of the "more capable" Windows Server editions (Datacenter, Enterprise, and Standard) provide licenses to guest virtual machines that run the same (or earlier, depending on your downgrade rights) versions and editions of Windows Server. The details of the rights granted vary with edition and version. For example, with a host licensed for Windows Server 2016 Datacenter, you are entitled to run an unlimited number of virtual machines running Windows Server 2016 Datacenter, Standard, or Enterprise 2012, 2008 R2, 2008, and so on. Windows Server 2016 Standard grants licenses to run two additional virtual machines running Windows Server, but each additional two virtual machine guests require that you re-license all cores of the host machine.

There are a few subtle points in the licensing rules involving virtual hosts and guests:

- All Windows Server licenses are considered to be assigned to the VM host.
- A VM host running a hypervisor is also considered to consume a Windows Server license.
- To run more virtual machines (under, say, Windows Server Standard) you must assign (or have available) more licenses to the VM host.
- All Windows Server licenses must be evaluated using a single license rule, usually that of the most recent version of the most capable Windows Server edition.

The License Analytics evaluation process uses these rules to report on compliance, and also reports on what rules it used to do the evaluation.

The "less capable" editions in the Windows Server family (Essentials, Foundation, Web Edition, and so on) may either provide no rights for running additional copies in virtual machines, or (like Windows Server Web Edition) require a separate license for every copy running on either a physical or virtual machine.

## SQL Server Titles and Virtual Machines

All SQL Server Enterprise and Datacenter licenses must be assigned to a physical server. Other edition licenses may also be assigned to virtual machine guests. License Analytics compares those license entitlements with the license requirements for a single physical machine. The license requirements for a single physical machine are the sum of any installation of SQL Server on the physical host environment combined with license requirements for all running virtual machine guests.

For the purposes of License Analytics, SQL Server licenses fall into these classes:

- Enterprise and Datacenter editions can grant license rights to virtual machine guests when all physical host resources are licensed. All such licenses must be assigned to the physical host. The specific license rights vary by version and edition.
- Other editions require a separate license for every physical and virtual environment running a copy of SQL Server. These licenses must be assigned to the physical or virtual machine running SQL Server.

License Analytics performs its calculations for VM environments based on rules derived from these classes. For complete information, see the Microsoft website.

## Windows Server and SQL Server Titles and Physical Hardware

Cherwell Asset Management virtual environment discovery and inventory processes (and SCCM inventories imported by the CAM External Connector) report on certain hardware characteristics of virtual machine hosts and other machines it inventories, including the number of cores and processors installed. This is required to analyze certain SQL Server and Windows Server installations.

Newer and "more capable" titles are usually licensed for a particular number of hardware cores or processors.

The "less capable" SQL Server and Windows Server titles are generally licensed on a "one license per server" model, rather than on the number of physical cores or processors. These members of the SQL Server and Windows Server families usually do not host virtual machines.

### Related information

[LA\\_Overview\\_Windows\\_Server\\_licensing.xml#concept2284](#)

[LA\\_Overview\\_SQL\\_Server\\_licensing.xml#concept2284](#)

# Windows Server Licensing



**Note:** For complete details on how Microsoft licenses Windows Server or any other product, please see the Microsoft website.

This topic provides an overview of recent changes to Microsoft Windows Server 2016 licensing agreements. These agreements are now based on the number of cores, while earlier agreements and agreements governing other Microsoft products are based on the number of processors or installations. When it's time to renew or upgrade previous Windows Server products, the unit of measurement (core or processor) can vary depending on the following, and you may need to update your line items and contracts to maintain compliance:

- Product version: Windows 2016 Server licensing is always based on number of cores; although previous versions (such as Windows Server 2012) are based on number of processors, you may need to migrate to core-based licensing when you upgrade or renew.
- License channel: OEM, retail, volume without Software Assurance (SA), or volume with SA.
- Contract start/renewal date: The core-based licensing requirement became effective for contracts that start on or after October 1, 2016.

The following table summarizes this information and provides a reference you can use to correct any line item exceptions in License Analytics (or Purchasing) or migrate any contracts in Purchasing.

License Channel	Contract Start/ Renewal Date	Contract Units	Pre-WS 2016 Units	Post-WS 2016 Units
OEM	Any	n/a	Processor	Core
Retail	Any	n/a	Processor	Core
Volume with no SA	n/a	n/a	Processor	Core
Volume with SA	Before 10/1/2016	Processor	Processor	Processor
Volume with SA	On or after 10/1/2016	Core	Core	Core



**Note:** Product editions for small businesses (like Essentials) are still licensed on a per-installation (not processor or core) basis.

## Related information

[LA\\_Example\\_Windows\\_Server\\_licensing.xml#concept5227](#)

[LA\\_Getting\\_started\\_checklist.xml#concept1133](#)

[LA\\_Overview\\_Virtual\\_machines.xml#concept4859](#)

## Worksheet Tab

You can use the Worksheet tab to view detailed information about the [product family](#) you selected in the left pane, as well as [view and edit contracts](#) that include the selected product family.

An overall snapshot of the licensing status for the product family is shown at the top. A  in the Compliant? column in the top right of the worksheet indicates a potential compliance issue. Any values that are shown in blue are hyperlinks and you can click them to open a report window that provides further details on the affected machines, purchases, and entitlements.

The overall snapshot is followed by sections that show details for the product family, broken out by [contract](#). This can help you narrow down any compliance issues noted with a  symbol in that contract's Compliant? column. As above, any values shown in blue are hyperlinks you can click to open a report window with more information.

# Interpreting License Analytics Data

## Examples

Click the following links for examples of how License Analytics analyzes data that is available to it. Each example lists information on installations, contracts, and purchases, and then shows the results of the analysis.

- [Example: Downgrade Entitlements](#)
- [Example: Upgrade and Downgrade Entitlements](#)
- [Example: How Can a License Have a Deficit and a Surplus at the Same Time?](#)
- [Examples: SQL Server Licensing](#)
- [Examples: Windows Server Licensing](#)

## Example: Downgrade Entitlements

To understand downgrade entitlements, consider a simple example. Say you have a volume license agreement with Microsoft. This agreement provides you with downgrade rights only. Under this agreement you've made the following purchases:

- 10 copies of Microsoft Office Professional Plus 2013.
- 5 copies of Microsoft Office Professional Plus 2010.
- 3 copies of Microsoft Office Professional Plus 2007.

Here are some of the entitlements created by these purchases:

Title	Entitlements
Microsoft Office Professional Plus 2013	10
Microsoft Office Professional Plus 2010	15 (10 + 5)
Microsoft Office Professional Plus 2007	18 (10 + 5 + 3)
Microsoft Office 2003 Professional Enterprise	18
Microsoft Office XP Professional	18
Microsoft Office 2000 Professional	18

So, based on this information, given the following scenarios, are you compliant?

Title	Copies Installed	Compliant?
Microsoft Office Professional Plus 2013	10	Yes
Microsoft Office Professional Plus 2013	17	No
Microsoft Office Professional Plus 2010	14	Yes
Microsoft Office Professional Plus 2010	16	No
Microsoft Office Professional Plus 2007	18	Yes
Microsoft Office XP Professional	20	No

For more information on analyzing your data, click a [product family](#) in the left pane of License Analytics, and then click the Worksheet tab. From here, you can view information on your purchases, licenses, entitlements, and contracts. Also see the [How Do I...?](#) topics for procedures you can follow to learn more about your current licensing status.

## Example: How Can a License Have a Deficit and a Surplus at the Same Time?

In some cases, License Analytics reports may indicate that you have both a license surplus *and* a license deficit, and that (because of the deficit) a particular title or family is out of compliance. Read on for an example of a situation where this may happen.

### How Is Compliance Determined?

License Analytics determines compliance by comparing the number of installations of a title under a given contract with the number of purchases (and entitlements) to that title under that same contract.

Each purchase, when considered with upgrade and downgrade rules, contributes to some set of entitlements (rights to run) different titles (versions and editions) of the same product family. To be in compliance means that there are at least as many entitlements for a single title, purchased under a single contract, as there are installations for that title and contract.

### How Can a License Have a Deficit and a Surplus at the Same Time?

This is actually a fairly common occurrence. Consider the following example:

Title	Entitlements	Installations
Microsoft Office Professional Plus 2013	10	11
Microsoft Office Professional Plus 2010	15	3
Microsoft Office Professional Plus 2007	18	2
Total entitlements	18	
Total installations		16

In this case there is a deficit of -1 (one more installation of Office Pro Plus 2013 than entitlements), but there is also a surplus of 2 licenses: 18 copies were purchased, but there are only 16 installations.

The same kind of situation can occur if one part of an organization (covered by one contract) is using more copies than were purchased, while another part of the organization is using fewer copies than acquired under its contract.

For more information on analyzing your data, click a product in the left pane of License Analytics, and then click the Worksheet tab. From here, you can view information on your purchases, licenses, entitlements, and contracts. Also see the [How Do I...?](#) topics for procedures you can follow to learn more about your current licensing status.

## Example: Upgrade and Downgrade Entitlements

This example uses the same numbers as in [Example: Downgrade Entitlements](#), but the volume contract provides both upgrade and downgrade entitlements.

Here are some of the entitlements created by these purchases:

Title	Entitlements
Microsoft Office Professional Plus 2013	18 (10 + 5 + 3)
Microsoft Office Professional Plus 2010	18 (10 + 5 + 3)
Microsoft Office Professional Plus 2007	18 (10 + 5 + 3)
Microsoft Office 2003 Professional Enterprise	18
Microsoft Office XP Professional	18
Microsoft Office 2000 Professional	18

So, based on this information, given the following scenarios, are you compliant?

Title	Copies Installed	Compliant?
Microsoft Office Professional Plus 2013	10	Yes
Microsoft Office Professional Plus 2013	17	Yes
Microsoft Office Professional Plus 2010	14	Yes
Microsoft Office Professional Plus 2010	16	Yes
Microsoft Office Professional Plus 2007	18	Yes
Microsoft Office XP Professional	20	No

For more information on analyzing your data, click a [product family](#) in the left pane of License Analytics, and then click the Worksheet tab. From here, you can view information on your purchases, licenses, entitlements, and contracts. Also see the [How Do I...?](#) topics for procedures you can follow to learn more about your current licensing status.

## Examples: SQL Server Licensing

The following examples show how License Analytics enforces SQL Server licensing rules in common scenarios.

### SQL Server Example 1A: Processor-licensed SQL Server, Continuous SA Coverage, Evaluated in 2017

- Scenario:  
You acquired 4 processor licenses for SQL Server 2008 R2 Enterprise under an Enterprise Agreement with SA.
- What licensing rules apply?  
In 2012, SQL Server licensing switched from processor to core licensing. Customers with SA who continued SA coverage were converted to core licensing at the first SA renewal (within three years) after April 1, 2012. This means that SQL Server 2008 R2 licensing is now core-based. If the core conversion factor is four core licenses per processor license, you now have the right to run SQL Server 2008 R2 Enterprise (or any earlier or later Enterprise edition version) on a 16-core machine.

### SQL Server Example 1B: Processor-licensed SQL Server, No SA Coverage, Evaluated in 2017

- Scenario:  
You acquired 4 processor licenses for SQL Server 2008 R2 Enterprise under a Select Agreement (no SA).
- What licensing rules apply?  
The rules are the same as when the software was purchased. If running on a four-processor (physical) machine, you have the right to run as many guest VMs with SQL Server installed as desired, which are the original license rules. These rights apply to any earlier version of SQL Server Enterprise.

### SQL Server Example 2A: Server+CAL-licensed SQL Server, Continuous SA Coverage, Evaluated in 2017

- Scenario:  
You acquired one Server license (in a Server+CAL scheme) for SQL Server 2008 R2 Enterprise under an Enterprise Agreement (with SA). SA coverage has been continuous since the acquisition.
- What licensing rules apply?  
The rules have changed, but in a different way. You still have the right to install and run SQL Server Enterprise (any version) using a Server+CAL distribution. The software is internally (technically) limited to execute on 20 cores. The big difference is in the virtualization rights. Rather than licensing unlimited VM guests running SQL Server Enterprise, the license terms now allow only four VM guests running SQL Server for every Server+CAL license assigned to the VM host.

### SQL Server Example 2B: Server+CAL-licensed SQL Server, No SA Coverage, Evaluated in 2017

- Scenario:  
You acquired one Server license (in a Server+CAL scheme) for SQL Server 2008 R2 Enterprise under a Select Agreement (no SA).
- What licensing rules apply?  
The original license rules apply: You can run SQL Server 2008 R2 Enterprise on a single server with as many VM guests (running SQL Server) as desired. CALs for SQL Server 2008 R2 are required for access.

### SQL Server Example 3: Core-licensed SQL Server, SA Coverage, Evaluated in 2017

- Scenario:  
You acquired 32 core licenses for SQL Server 2012 Standard under a Select Agreement incorporating SA. SA coverage has been in force continuously since then. You installed SQL Server 2016 Standard.
- What licensing rules apply?  
The license terms for SQL Server Standard are the same in 2016 as when the original software was purchased. You have the right to run any version of SQL Server Standard on a 32 core machine, or on two 16-core machines (based on minimum rules for cores per processor). SQL Server licenses are sold as a two-core package. In this case, you ordered 16 2-core licenses, which offers licenses for 32 cores. There are specific rules related to licensing or running in guest VMs (see [Virtual Machines and License Analytics](#)).

### SQL Server Example 4: Lapsed SA Coverage

If you purchased products under an SA agreement that has since lapsed, the license rules in effect when the last SA renewal occurred are in force. This means that you can use any version of SQL Server released before SA coverage lapsed. The license rules are those in force as of the contract's last effective date. This means that License Analytics will compute time-limited upgrade requirements (from SQL Server 2008 R2, for example). If entitlements for SQL Server 2012 are available, these entitlements are expressed in cores (the "preferred units" for SQL Server 2012).

#### Related information

[LA\\_Overview\\_SQL\\_Server\\_licensing.xml#concept2284](#)

# Examples: Windows Server Licensing

Licensing of Microsoft Windows Server can be complex. Server licensing involves upgrade/downgrade rights, physical machine hardware characteristics, and virtual machine environments running on each server. Further, Microsoft changed the way it manages these license agreements starting with Windows Server 2016. See [Windows Server Licensing](#) for details on the changes.

The following examples show aspects of these factors in the analysis performed by License Analytics.

## Windows Server Example A: Forcing Entitlement Type Through Purchasing Assignments

In this example, the machine configuration includes the following:

- 16 cores, 2 processors
- Bare metal VMware server
- 16 virtual machines, where 8 machines are running Windows Server 2016 Standard, and the other 8 are running Windows Server 2012 R2 Standard

In Purchasing, you've done the following:

- Configured a Select Plus Agreement with Software Assurance (maintenance)
- Added a purchase of 8 Windows Server 2016 Datacenter licenses, assigned to machine

## Results in License Analytics

Compliant: Forcing entitlement to Windows Server 2016 Datacenter by explicit assignment in Purchasing results in compliance for the earlier versions of the product. Windows Server 2016 licenses are sold per core, in packs of 2, with a minimum of 8 licenses (16 cores) for a single machine. Windows 2016 Datacenter licenses allow an unlimited number of virtual machine guests.

## Windows Server Example B: Upgrading to Windows Server 2016

In this example, the machine configuration includes:

- 4 processors
- 8 cores
- Bare metal Hyper-V server
- 2 virtual guests

In Purchasing, you previously did the following:

- Configured a Microsoft Select Plus Agreement with Software Assurance
- Added a purchase of 2 Windows Server 2012 Standard licenses

**Results in License Analytics:**

Compliant, up to the point where you upgraded to Windows Server 2016 Standard. At that time, core-based licensing is required, which requires a minimum of 8 licenses for 16 cores. You'll need to purchase additional licenses from Microsoft, and migrate the contract that covers this line item to use core-based licensing to maintain compliance. No additional licenses for your virtual guests are required, as the Standard edition allows 2 virtual guests.

**Windows Server Example C: Downgrading from Windows Server 2016**

In this example, the machine configuration includes:

- 1 processor
- 8 cores
- Bare metal Hyper-V server
- 2 virtual guests

In Purchasing, you previously did the following:

- Configured a Microsoft Select Plus Agreement without Software Assurance
- Added a purchase of 8 Windows Server 2016 Standard licenses, assigned to machine
- Assigned those 8 core-based licenses to a machine running Windows Server 2012 Standard

**Results in License Analytics:**

Compliant, as your licensing agreement allows the downgrade and assigning those 8 core-based licenses from the Windows Server 2016 Standard purchase to Windows Server 2012 Standard allows License Analytics to understand the correspondence between the processor-based installation (Windows Server 2012 Standard) and the core entitlements (Windows Server 2016 Standard).

**Windows Server Example D: Not All Server Titles Are Covered by Datacenter License**

In this example, the machine configuration includes:

- 4 processors
- Bare metal Hyper-V server
- 8 virtual guests:
  - 5 running Windows 2012 R2 Standard
  - 2 running Windows Server 2008 R2 Enterprise
  - 1 running Windows Web Server 2008

In Purchasing, you've done the following:

- Configured a Select Plus Agreement

- Added a purchase of 2 Windows 2012 R2 Datacenter licenses, assigned to machine

**Results in License Analytics:**

Not compliant: Windows Web Server 2008 requires a separate license; it is not covered under the Datacenter licenses.

**Windows Server Example E: Licenses Upgraded by Enterprise Agreement**

In this example, the machine configuration includes:

- 2 processors
- Machine running Windows Server 2008 R2 Standard
- 4 virtual machines, all of them running Windows Server 2012 R2 Standard

In Purchasing, you've done the following:

- Configured a Microsoft Enterprise Agreement
- Added a purchase of 2 licenses of Windows Server 2008 R2 Standard, assigned to machine

**Results in License Analytics:**

Compliant: Under the Enterprise Agreement, the Windows Server 2008 R2 Standard licenses are upgraded to the entitlement type of Windows 2012 R2 Standard and, therefore, compliant.

For more information on analyzing your data, click a product in the left pane of License Analytics, and then click the Worksheet tab or Computer Data tab. From here, you can view information on your purchases, licenses, entitlements, and contracts. Also see the [How Do I...?](#) topics for procedures you can follow to learn more about your current licensing status.

## How Do I...?

Once you understand how the license analytics process works, the following links can help you perform common tasks.

# How Do I Determine Where Entitlements Come From?

There may be times where you have a discrepancy between the number of licenses you've purchased for an LA title and the number of entitlements you have. You can use the Worksheet tab to investigate any issues.

To determine where entitlements come from, do the following in License Analytics:

1. Select a product family from the list in the left pane.
2. Click the Worksheet tab in the right pane.
3. You can view a complete list of existing license entitlements, or view entitlements broken out by criteria such as contract, edition, or title:
  - To view the complete list of entitlements, click the value in the Total License Entitlements column at the top of the worksheet. (This is a number that is also a hyperlink; if a zero is shown, you have no license entitlements for the product.) A report window opens and shows how and how many entitlements are applied.
  - To view a list broken out by criteria like contract, edition, and title, scroll down the worksheet to see available data and hyperlinks. Click any hyperlink (a value that's shown in blue) to open a report that shows more detail for these entitlements.

## Related information

[LA\\_How\\_entitlements\\_are\\_determined.xml#concept1950](#)

## How Do I Determine Which Machines Require a License for a Given Title?

To learn which machines are running a given LA title without a contract, do the following in License Analytics:

1. Select a product family from the list in the left pane.
2. Click the Worksheet tab in the right pane.
3. You can view a complete list of machines that require licenses for the installed product, or view data broken out by criteria such as contract, edition, or title:
  - To view the complete list of machines, click the value in the Total Licenses Required column at the top of the worksheet. (This is a number that is also a hyperlink; if a zero is shown, no machines have the product installed on them.) The Machine List report opens, listing all machines that require licenses.
  - To view a list broken out by criteria like contract, edition, and title, scroll down the worksheet to see available data and hyperlinks. Click any hyperlink (a value that's shown in blue) to open a report that shows more detail for your selection. The Machine List report opens and lists all machines for your criteria that require licenses.

## How Do I Determine Which Titles I've Purchased?

To determine which LA titles you've purchased, do the following in License Analytics:

1. Select a product family from the list in the left pane.
2. Click the Worksheet tab in the right pane.
3. You can view a complete list of purchases of the product, or view purchases broken out by criteria such as contract, edition, or title:
  - To view the complete list of purchases, click the value in the Total Licenses Purchased column near the top left of the worksheet. (This is a number that is also a hyperlink; if a zero is shown, you haven't recorded any purchases of the product.) A report window opens, displaying information about the purchases, including dates, order and line item details, and any information you previously entered for the purchases.
  - To view a list broken out by criteria like contract, edition, and title, scroll down the worksheet to see available data and hyperlinks. Click any hyperlink (a value that's shown in blue) to open a report that shows more detail for your selection. The report window that opens displays information about these purchases, including dates, order and line item details, and any information you previously entered for the purchases.

# How Do I Email a Report?

To email a report:

1. From the chart/report you want to email, click the Email PDF toolbar button.
2. In the window that opens, complete the From, To, Subject (already filled in with the name of the current report), and Message. You can also add Cc and Bcc fields if you want to send a copy or blind copy to another address.
3. Click Send Now.

## Related information

[../cam\\_reporting/Rep\\_Configuring\\_email\\_services.xml#concept3026](#)

## How Do I Recalculate Data?

It's a good idea to recalculate data after you perform tasks like add purchasing data in Purchasing, rerun inventory (in CAM Administrator), or correct exceptions.

To recalculate data:

1. In the left pane, find Summary.
2. Click the  icon.
3. Wait until recalculation is complete. ("Recalculation complete" appears below Summary.)

# How Do I Understand How Entitlements Are Determined?

Entitlements start with a license purchase. Purchasing a license grants you a right to run the licensed software. The number of copies you can run is usually tied to the purchase quantity. It gets more complicated when upgrades and downgrades enter the picture. Before proceeding, you may want to review the following examples:

- [Example: Downgrade Entitlements](#)
- [Example: Upgrade and Downgrade Entitlements](#)
- [Example: How Can a License Have a Deficit and a Surplus at the Same Time?](#)
- [Examples: SQL Server Licensing](#)
- [Examples: Windows Server Licensing](#)

## Compliance Rules

The general rules of compliance are:

- The number of installations of a title cannot exceed the number of entitlements.
- The number of entitlements is never greater than the number of licenses purchased.

## How Installations Are Determined

Determining compliance means comparing:

- How many entitlements do I have?
- How many installations are there when compared with those entitlements?

So how does License Analytics manage entitlements and installations when comparing them?

- License channel—Every installation has a license channel; so does every entitlement.
- Contract—Every installation is to a machine. Every machine belongs to at least one group. Every purchase is related to a contract. Every contract is related to some set of groups.
- Title—Every purchase and installation is of a particular software title. Every title is uniquely identifiable.
- Virtual machine guests—When running "more capable" editions of Windows Server and SQL Server, some VM guest installations are granted licenses by the host.

## How Do I View and Edit a Contract?

You can use Purchasing to define contracts, but you can also view and edit contracts from within License Analytics.

To view and edit contracts:

1. Select a product family from the list in the left pane.
2. Click the Worksheet tab in the right pane.
3. In the Product Edition column, find the contract you want to view or edit, and click it. The contract opens in a separate Purchasing window.
4. From here, you can view the contract's history via the View History hyperlink. You can also view and edit the contract in the same way that you would while in Purchasing itself. You can also click the order number hyperlink to edit the order itself from here.

## Troubleshooting and Exceptions

Exceptions occur when the available data does not provide enough information to perform license analysis. When an exception occurs, the item that caused the exception is listed and may not be included in the analysis.

## Contracts with No Group Exceptions

These exceptions only occur when a contract which requires a machine group does not have one assigned. (This is a fairly rare occurrence, as a group is required when the contract is first created.) Any contracts listed here are not included in the analysis. To correct these exceptions, click the Contract Number hyperlink and edit the contract so that it applies to a machine group.

When you're done, click the  icon next to Summary in the left pane to recalculate data.

# General Microsoft SQL Server or Windows Server Exceptions

This topic describes how to correct [SQL Server](#) and [Windows Server](#) exceptions, organized by entry in the **Reason** column. Note that although this help system provides overviews of how CAM supports licensing these products (above), Cherwell Software recommends that you visit the Microsoft website for complete licensing information and rules.

When you're done correcting any of these issues, return to License Analytics and click the  icon next to Summary to recalculate data.

## Active and Passive Assignments Cannot Be Made to Same Machine

These exceptions occur when you assign an active and passive SQL Server license to the same machine, which is not allowed per Microsoft licensing.

To correct these exceptions:

1. Open Purchasing's Assign panel.
2. From the left pane, find the **All Machine/User Assignments section**, and click **To Machine**.
3. From the list of all machine assignments in the right pane, find the appropriate SQL Server line items and click their **Assign** hyperlinks to edit their assignments.

## Incompatible with Other Assignments to this Machine

These exceptions indicate that some of the purchase assignments of SQL Server or Windows Server made to a machine cannot be used. This can happen if the [product use rights](#) rules for the contract do not allow different editions or versions to be assigned to the same machine.

To correct these exceptions:

- Click the Order Number hyperlink and edit the line items.
- Depending on the situation, you may need to change what license unit the line item is [reconciled](#) to, or its [assignment](#).

## Licenses Must Be Explicitly Assigned to Machines

You have purchased some SQL Server licenses, but have not yet assigned these licenses to machines.

To correct these exceptions, open Purchasing and follow the steps in [How to Assign Line Items](#) to assign SQL Server purchases to the appropriate machines.

## License Purchased Does Not Match Contract

These exceptions list line items reconciled to LA titles that are not compatible with the contract to which they are assigned.

The steps to take to correct these exceptions vary depending on whether they're for SQL Server or Windows Server licenses:

- For SQL Server exceptions: Edit the line item or contract so that the unit quantities are compatible.
- For Windows Server exceptions: From Purchasing's Status tab, click the **Contracts** link in the yellow **Migrate** section at the top of your to-do list.

### **This License Must Be Assigned to a Physical Machine**

You cannot assign this SQL Server license to a virtual machine. To correct, open Purchasing. From there, find the appropriate SQL Server line item and click its **Assign** hyperlinks to assign it to a physical machine instead.

### **Too Many Assignments**

You assigned more licenses than you purchased. To correct, adjust your assignments or purchase more licenses.

## License Channel Exceptions

These exceptions occur when inventory (or virtual environment discovery) data does not include channel information for the [LA titles](#) where channel information is usually collected. (Note that channel information is usually not available for Windows Server or SQL Server installations.) Those machine/title combinations are not included in the analysis. To correct this, do the following:

1. Make sure version 11.0 or later of the CAM Agent is installed on any listed machines.
2. Make sure the software on those machines is activated.
3. After updating the CAM Agent and/or activating the software, [re-run the inventory process](#) in CAM Administrator.

In addition, [Purchasing](#) includes options you can use to provide default channel information; click its Preferences tab and then click Contract Options in the left pane to view these options.

Once this is completed, return to License Analytics and click the  icon next to Summary to recalculate data.

## Line Item Maintenance Exceptions

These exceptions indicate that these line items are not maintaining a software line item; rather, the maintenance line item is maintaining a license unit. In general, you should use Software Assurance (SA) as the mechanism to specify maintenance for [LA titles](#). Although you can also use a maintenance line item for this, the maintenance line item must maintain a software purchase line item in its entirety. Any maintenance line items maintaining license units directly are ignored in the analysis. To correct these exceptions, click the Order Number hyperlink and edit the line item so that it maintains a specific line item.

When you're done, click the  icon next to Summary to recalculate data.

## Machines without Core Count Exceptions

This a list of all machines (including virtual hosts and guests) for which necessary core data is not available.

To correct:

1. For physical machines, inventory these machines using the current CAM Agent to provide core information for affected machines.

For virtual hosts and guests, run virtual environment discovery from the current CAM Administrator to collect the core count.

2. Click the  icon next to Summary in the left pane to recalculate data.

## Microsoft SQL Passive Servers

In [Purchasing](#), the machines in this list were marked as SQL passive servers when you assigned licenses of SQL Server to machines in the Edit Assignments dialog box (for non-computers). Since organizations generally designate passive servers for failover purposes, License Analytics does not analyze data from SQL passive servers.



**Note:** For complete details on how Microsoft licenses SQL Server or any other product, please see the Microsoft website.

If you decide to change how you use SQL passive servers, [update your assignments](#) in Purchasing. When finished, return to License Analytics and click the  icon next to Summary in the left pane to recalculate data.

### Related information

[../cam\\_purchasing/Purch\\_How\\_does\\_the\\_allocation\\_process\\_work\\_.xml#concept1895](https://cam_purchasing/Purch_How_does_the_allocation_process_work_.xml#concept1895)

## Microsoft SQL Server (Unknown)

License Analytics recognizes that you have Microsoft SQL Server installed, but you must assign those software [line items](#) to machines.

To correct these exceptions, open Purchasing and follow the steps in [How to Assign Line Items](#) to assign SQL Server purchases to machines listed in this exception report. When finished, click the  icon next to Summary in the left pane to recalculate data.

## Software Line Items with No Contract Exceptions

These exceptions list line items reconciled to [LA titles](#) that are not assigned to a contract. Purchases of LA titles not assigned to a contract are not included in the analysis. To correct these exceptions, click the Order Number hyperlink and edit the line item so that it is covered by a contract.

When you're done, click the  icon next to Summary to recalculate data.

## Volume Contract Machine Exceptions

These exceptions can occur in situations where you have a machine with [LA titles](#) that you purchased through a volume license channel and one of the following conditions exist:

- The machine is not a member of any group associated with a volume contract.
- The machine is associated with an expired volume contract, the title's release date is after the contract expiration date, and there are no entitlements for that title that apply to the machine.

To correct these exceptions, make sure the machine(s) are part of a group that is covered by a volume contract.

## Managing Software Upgrade Line Items

License Analytics supports the concept of software upgrades through its use of product use rights to determine upgrade rights based on contract. It, therefore, ignores any software upgrade line items in its analysis. It's strongly recommended that you view the [Best practices](#) topic for complete instructions, and [Migration Tasks](#) if you are upgrading to this version from an earlier version.

# Migrating from Pre-11.0 Versions

## Migration Tasks

If you've upgraded from a pre-11.0 version of Cherwell Asset Management, you need to perform the tasks listed below to get detailed analysis of your Microsoft licensing position through the [License Analytics](#) (LA) component. This analysis requires new discovery and purchasing information than that of pre-11.0 versions; without this information, the analysis will be inaccurate or impossible to compute.

The following are the tasks you need to accomplish in the migration process. Click each hyperlink for the procedure to follow for each task:

## Deploying New Agents to Get License Channel

A key aspect in analyzing your Microsoft licensing position is, for each installation, knowing the channel under which each analyzed title was purchased. The functionality to collect channel information is now part of the CAM Agent, as well as virtual environment discovery for Windows, Windows Server, and certain versions of SQL Server. You can also configure the CAM External Connector to obtain this information (except for SQL Server) from an SCCM database.

Inventory information for any License Analytics title (besides SQL Server) that does not include channel will be flagged as an exception within License Analytics unless you have set preferences in Purchasing to provide a default channel. See [Creating Purchasing Contracts](#) for more information.

Ideally you should deploy the current CAM Agent across your network and wait for all your machines to be re-inventoried before attempting a complete License Analytics analysis.

## Performing Virtual Environment Discovery

Cherwell Asset Management includes the ability to analyze the virtual machine topology in your environment. Knowing the characteristics of virtual hosts and guests is critical in evaluating your licensing position for [Microsoft SQL Server](#) and [Microsoft Windows Server](#). See [How to Discover Your Virtual Environment](#).

# Creating Machine Groups Based on Microsoft Contracts

If you have Microsoft contracts that apply to specific groups of machines (such as is the case with Select-type contracts), you may need to create these machine groups if they do not already exist as part of your Active Directory. Further, if you have any machines running software licensed through an MSDN subscription, you may want to create a separate group for these as well. The next step in the process is to create the contracts themselves and when doing so, you'll need to be able to specify the groups of machines to which each contract applies.

## Creating Purchasing Contracts

Purchasing contracts provide the "binding" between installations, purchases, and channels and the product use rights (PURs) that apply as a result. You need to create contracts within [Purchasing](#) for each Microsoft contract you have in place. To do so, use Purchasing's Contracts tab, where you can create Microsoft contracts using a template that defines the PURs used to analyze titles installed and purchased under that contract. Some general guidelines are:

- Purchasing includes built-in contracts for Microsoft retail and OEM channels, so you do not need to create these.
- An enterprise contract normally covers all machines in your environment, so you typically do not need a group associated with this type of contract.
- Select-type contracts require one or more machine groups to define the set of machines they cover.
- If you have machines running software obtained through an MSDN subscription, you need to create a separate contract based on the MSDN template covering those machines.

License Analytics relies on inventory or discovery information that includes the license channel under which each installed LA title was purchased.

If you already have contracts in place that cover line items where the vendor has changed licensing terms (such as some versions of Microsoft Windows Server), you may have to migrate these line items to use core-based licensing. You'll see a [Contracts](#) hyperlink in the Purchasing panel's task list, under [Migrate](#), if you need to perform this task. See [How to Migrate Line Items to Core-based Licensing](#).

## Associating Software Line Items with Contracts

Once you have created all required contracts, you need to associate purchases with them. Purchase to contract binding is done at the line item level and you can use Purchasing's search functionality to help locate the line items you need to associate with each contract. While you can create this association individually for each line item, a more efficient way is to work within the contract itself, which allows you to search for and associate multiple line items in a single operation.

Later, as you add new purchases, you'll be able to associate line items with contracts as you enter the line items.

## Re-reconciling Software Line Items with License Units

License Analytics requires versions of LA titles to be in individual license units. While this is the default behavior for configuring Office and Windows, Project and Visio were normally configured with all versions in a single license unit in previous versions of Cherwell Asset Management. During the upgrade, if either of these license units exist with multiple versions configured, they are split into multiple license units: one for each version.

Your existing purchasing data likely has purchases of these titles reconciled to the original single license unit. Depending on what versions you have in your environment, as well as what you might have changed in the license unit configuration, you should check each purchase of Project and Visio to make sure they are reconciled to the correct (possibly new) license unit.

# Fixing Up Software Upgrade and Maintenance Line Items

This topic provides an overview of maintenance and upgrades in the context of License Analytics, and how to handle them for best results.

## Maintenance

Software maintenance for Microsoft software under volume contracts is called Software Assurance (SA) and is specified by the contract or the purchase itself, rather than by an explicit software maintenance line item. You may have created software maintenance line items for LA titles before contract support was added; how to handle each one now depends on how they are reconciled. Read on for instructions.

- If it maintains a line item: In this case, the software maintenance line item is equivalent to the original License Analytics purchase having SA, either by the contract or applied directly to the line item. Going forward, you can simply use that mechanism and stop creating maintenance line items; if you want to "clean up" your database, you may choose to ensure that each maintained line item has SA applied to it, and then delete the maintenance line item. If you do not delete the maintenance line item, License Analytics will automatically treat the maintained line item as if SA is applied to it.
- If it maintains software: Software maintenance line items that maintain software are ignored by License Analytics, as there is no way to associate them with a contract. Any of these line items will be shown in the Exceptions tab in License Analytics; to fix them, do the following:
  - Ensure any software purchase line items have SA applied, either explicitly or by the contract with which they are associated.
  - Delete the maintenance line items to remove them from the Exceptions list.

## Upgrades

Software upgrades for Microsoft software under volume contracts are typically handled by Software Assurance (SA) and are specified by the contract or the purchase itself, rather than by explicit software upgrade line items. (If you do upgrade purchases, see [Best Practices and Purchasing](#) for information on how to enter these.) In Cherwell Asset Management, License Analytics ignores software upgrade line items for LA titles, although they are still used by other Cherwell Asset Management reports. How to handle software upgrade line items for LA titles depends on how you want to keep track of these upgrades. Read on for instructions.

- If you want upgrades to be handled automatically by contracts or by specifying SA for the original purchase of LA titles:
  - Make sure all of your purchases have SA applied to them.
  - Delete all existing upgrade line items for these purchases.

Note that existing reports will now show license unit counts based on the original purchase versus any influence of upgrades, as they no longer exist.

- If you want to continue to have existing reports show upgraded license unit counts:

- Continue to enter software upgrade line items as you have done previously. Note again, however, that License Analytics ignores these upgrade line items; you need to make sure the purchase line items themselves are given upgrade rights by contract or by explicitly applying SA.

For information on software upgrades with Microsoft retail or OEM agreements, see the following sections of the [Best Practices and Purchasing](#) topic:

- Microsoft retail agreements, software maintenance, and software upgrades
- Microsoft OEM agreements, software maintenance, and software upgrades

# Evaluating Line Item Exceptions

License Analytics (LA) makes use of inventory, virtual machine, and purchasing information to generate its analysis. There may, however, be data that is missing or incorrectly configured that can cause the analysis to be inaccurate or incomplete.

It's recommended that you first evaluate any line item exceptions from within Purchasing while you are already in this application working with contracts and line items and then [evaluate any other exceptions](#) later, from within License Analytics.

## Line Item Exceptions

To evaluate line item exceptions, click the links in the Exceptions or Migrate lists on the [Status panel](#).

## Generating LA Analysis

You are now ready to generate your analysis in License Analytics; click the  icon next to Summary to recalculate license status.

If no compliance data is shown, review the previous steps to make sure you met the requirements for performing the analysis.

## Evaluating Other Exceptions

As you examine the analysis for each LA product family, make sure you check the Exceptions tab to see if there are additional changes you need to make to ensure a complete and accurate analysis. Exceptions can be generated as a result of:

- Machine inventories with missing channels for analyzed titles
- Purchases of LA product families that are not bound to a contract
- Other issues

See [Troubleshooting and Exceptions](#) for a complete list of exceptions.