

SharePoint Server 2010 Capacity Management: Software Boundaries and Limits

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**Applies to: Microsoft SharePoint Server 2010**

Summary: This document describes software boundaries and limits of SharePoint Server 2010, including:

* **Boundaries:** Static limits that cannot be exceeded by design
* **Thresholds:** Configurable limits that can be exceeded to accommodate specific requirements
* **Supported limits:** Configurable limits that have been set by default to a tested value.

**Note:** The capacity planning information in this document provides guidelines for you to use in your planning. It is based on testing performed at Microsoft, on live properties. However, your results are likely to vary based on the equipment you use and the features and functionality you implement for your sites.

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# Introduction

This article provides information to help you understand the tested performance and capacity limits of Microsoft® SharePoint® Server 2010, and offers guidelines for how limits relate to acceptable performance. Use the information in this article to determine whether your planned deployment falls within acceptable performance and capacity limits, and to properly configure limits in your environment.

The test results and guidelines provided in this article apply to a single SharePoint Server 2010 farm. Adding servers to the installation might not increase the capacity limits of the objects that are listed in the tables in the Limits and Boundaries section below. On the other hand, adding server computers increases the throughput of a server farm, which might be necessary to achieve acceptable performance with large numbers of objects. In some cases, the requirements for high numbers of objects within a solution might require the use of more servers in the farm.

Note that there are many factors that can affect performance in a given environment, and each of these factors can affect performance in different areas. Some of the test results and recommendations in this article might be related to features or user operations that do not exist in your environment, and therefore do not apply to your solution. Only thorough testing can provide you with exact data related to your own environment.

**Boundaries, thresholds and supported limits**

In SharePoint Server 2010, there are certain limits that are by design and cannot be exceeded, and others that are set to default values that may be changed by the farm administrator. There are also certain limits that are not represented by a configurable value, such as the number of site collections per Web application.

* *Boundaries* are absolute limits that cannot be exceeded by design. It is important to understand these limits to ensure that you do not make incorrect assumptions when you design your farm.  
  An example of a boundary is the 2 GB document size limit; you cannot configure SharePoint Server to store documents that are larger than 2 GB. This is a built-in absolute value, and cannot be exceeded by design.
* *Thresholds* are those that have a default value that cannot be exceeded unless the value is modified. Thresholds can, in certain circumstances, be exceeded to accommodate variances in your farm design, but it is important to understand that doing so may impact the performance of the farm as well as the effective value of other limits.  
  The default value of certain thresholds can only be exceeded up to an absolute maximum value. A good example is the document size limit. By default, the default document size *threshold* is set to 50MB, but can be changed to support the maximum *boundary* of 2GB.
* *Supported limits* define the tested value for a given parameter. The default values for these limits were defined by testing, and represent the known limitations of the product. Exceeding supported limits may cause unexpected results, significant performance degradation, or other detrimental effects.   
  Some supported limits are configurable parameters that are set by default to the recommended value, while others relate to parameters that are not represented by a configurable value.

An example of a supported limit is the number of site collections per Web application. The supported limit is 250,000, which is the largest number of site collections per Web application that met performance benchmarks during testing.

It is important to note that many of the limit values provided in this document represent a point in a curve that describes an increasing resource load and concomitant performance degradation as the value increases. Therefore, exceeding certain limits, such as the number of site collections per Web application, may only result in a fractional decrease in farm performance. However, in most cases, operating at or near an established limit is not a best practice, as acceptable performance and reliability targets are best achieved when a farm’s design provides for a reasonable balance of limits values.

Thresholds and supported limits guidelines are determined by performance. In other words, you can exceed the default values of the limits, but as you increase the limit value, farm performance and the effective value of other limits may be affected. Many limits in SharePoint Server can be changed, but it is important to understand how changing a given limit affects other parts of the farm.

## How limits are established

In SharePoint Server 2010, thresholds and supported limits are established through testing and observation of farm behavior under increasing loads up to the point where farm services and operations reach their effective operational limits. Some farm services and components can support a higher load than others, so in some cases it is necessary to assign a limit value based on an average of several factors.

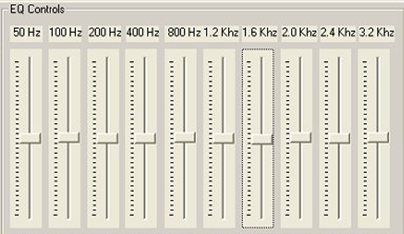
For example, observations of farm behavior under load when site collections are added indicate that certain features exhibit unacceptably high latency while other features are still operating within acceptable parameters. Therefore, the maximum value assigned to the number of site collections is not absolute, but is calculated based on an expected set of usage characteristics in which overall farm performance would be acceptable at the given limit under most circumstances.

Obviously, if other services are operating under parameters that are higher than those used for limits testing, the maximum effective limits of other services will be reduced. It is therefore important to execute rigorous capacity management and scale testing exercises for specific deployments in order to establish effective limits for that environment.

**Note:** We do not describe the hardware used to validate the limits in this document, because the limits were gathered from multiple farms and environments. For descriptions of the farms we used in testing, see [Performance and capacity test results and recommendations](http://technet.microsoft.com/en-us/library/ff608068(office.14).aspx) (http://technet.microsoft.com/en-us/library/ff608068(office.14).aspx ) and [Performance and capacity technical case studies](http://technet.microsoft.com/en-us/library/cc261716(office.14).aspx) (http://technet.microsoft.com/en-us/library/cc261716(office.14).aspx).

### The Equalizer Metaphor

You can consider thresholds and supported limits as sliders on an equalizer, with each limit representing a certain frequency, as shown in the graphic below. In this metaphor, increasing the value of one limit may decrease the effective value of one or more other limits.



Imagine that slider #1 represents the maximum number of documents per library, a supported limit with a maximum tested value of around 30 million. This value, however, is dependent on slider #2, which represents the maximum size of documents in the farm, a threshold with a default value of 50 MB.

If you change the maximum size of documents to 1 GB to accommodate videos or other large objects, the number of documents your library can serve to users efficiently is reduced accordingly. For example, a given farm’s hardware configuration and topology may support 1 million documents up to 50 MB in size. However, the same farm with the same number of documents cannot meet the same latency and throughput targets if the farm is serving a larger average document size because the file size limit has been set to 1 GB.

The degree to which the maximum number of documents is reduced in this example is hard to predict and is based on the number of large files in the library, the volume of data they comprise, the farm’s usage characteristics, and the availability of hardware resources.

# Limits and boundaries

Capacity is directly affected by scalability. This section lists the objects that can compose a solution and provides guidelines for acceptable performance for each type of object. Limits data is provided, along with notes that describe the conditions under which the limit is obtained as well as links to additional information where available. Use the guidelines in this article to review your overall solution plans.

The tables in this section list the objects both by scope and by feature, and include recommended guidelines for *acceptable performance*. Acceptable performance means that the system as tested can support that number of objects, but that the number cannot be exceeded without some performance degradation or a reduction in the value of related limits.

If your solution plans exceed the recommended guidelines for one or more objects, take one or more of the following actions:

* Evaluate the solution to ensure that compensations are made in other areas.
* Flag these areas for testing and monitoring as you build your deployment.
* Redesign or partition the solution to ensure that you do not exceed capacity guidelines.

## Limits by hierarchy

This section provides limits sorted by the logical hierarchy of a SharePoint Server 2010 farm.

### Web application limits

The following table lists the recommended guidelines for Web applications.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Content database | 300 per Web application | Supported | With 300 content databases per Web application, end user operations such as navigating to the site or site collections are not affected. But administrative operations such as creating a new site collection will experience performance degradation. We recommend that you use Windows® PowerShell™ to manage the Web application when a large number of content databases are present, because the management interface becomes slow and difficult to navigate. |
| Zone | 5 per Web application | Boundary | The number of zones defined for a farm is hard coded to 5. Zones include Default, Intranet, Extranet, Internet, and custom. |
| Managed path | 20 per Web application | Supported | Managed paths are cached on the Web server, and CPU resources are used to process incoming requests against the managed path list. If you plan to exceed twenty managed paths in a given Web application, we recommend that you test for acceptable system performance. |

### Web server and application server limits

The following table lists the recommended guidelines for Web servers on the farm.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Application pools | 10 per Web server | Supported | The maximum number is determined by hardware capabilities.  This limit is dependent largely upon:   * The amount of RAM allocated to the Web servers * The workload that the farm is serving – the user base and the usage characteristics (the process of a single highly active application pools can reach 10 GB or more) |

### Content database limits

The following table lists the recommended guidelines for content databases.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Content database size | 200 GB per Content database | Supported | We strongly recommended limiting the size of content databases to 200 GB to help ensure system performance.  Content database sizes up to 1 terabyte are supported only for large, single-site repositories and archives with non-collaborative I/O and usage patterns, such as Records Centers. Larger database sizes are supported for these scenarios because their I/O patterns and typical data structure formats have been designed for, and tested at, larger scales.  A site collection should not exceed 100 GB unless it is the only site collection in the database. |
| Remote BLOB Storage (RBS) storage subsystem on Network Attached Storage (NAS) | Time to first byte of any response from the NAS cannot exceed 20 milliseconds | Boundary | When SharePoint Server 2010 is configured to use RBS, and the BLOBs reside on NAS storage, consider the following boundary.  From the time that SharePoint Server 2010 requests a BLOB, until it receives the first byte from the NAS, no more than 20 milliseconds can pass. |

### Site collection limits

The following table lists the recommended guidelines for site collections.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Web site | 250,000 per site collection | Supported | The maximum recommended number of sites and subsites is 250,000 sites.  You can create a very large total number of Web sites by nesting subsites. For example, in a shallow hierarchy with 100 sites, each with 1,000 subsites, you would have a total of 100,000 Web sites. Or a deep hierarchy with 100 sites, each with 10 subsite levels would also contain a total of 100,000 Web sites.  **Note:** Deleting or creating a site or subsite can have significant impact on a site’s availability. Access to the site and subsites will be limited while the site is being deleted. Attempting to create many subsites concurrently may also fail. |
| Site collection size | 100 GB per site collection | Supported | A site collection should not exceed 100 GB unless it is the only site collection in the database.  Certain site collection actions, such as site collection backup/restore or Move-SPSite, cause large Microsoft SQL Server® operations which can have performance impact or fail if other site collections are active in the same database. |

### List and library limits

The following table lists the recommended guidelines for lists and libraries. For more information, see the "Designing Large Lists and Maximizing List Performance" white paper accessible from <http://technet.microsoft.com/en-us/library/ff608068(office.14).aspx>, and [Manage lists and libraries](http://office2010.microsoft.com/en-us/sharepoint-server-help/manage-lists-and-libraries-with-many-items-HA010378155.aspx?redir=0).

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| List row size | 8,000 bytes per row | Boundary | For each SharePoint list or library item, it is only allowed to occupy 8000 bytes in total in the database. 256 bytes are reserved for built-in SharePoint columns, which leaves 7744 bytes for end-user columns. For details on how much space each type of field consumes, please look at the Column Limits. |
| File size | 2 GB | Boundary | The default maximum file size is 50 MB. This can be increased up to 2 GB, but a large volume of very large files can impact farm’s performance. |
| Documents | 30,000,000 per library | Supported | You can create very large document libraries by nesting folders, using standard views and site hierarchy. This value may vary depending on how documents and folders are organized, and by the type and size of documents stored. |
| Items | 30,000,000 per list | Supported | You can create very large lists using standard views, site hierarchies, and metadata navigation. This value may vary depending on the number of columns in the list and the usage of the list. |
| Rows size limit | 6 table rows internal to the database used for a list or library item | Supported | Specifies the maximum number of table rows internal to the database that can be used for a list or library item. To accommodate wide lists with many columns, each item may be wrapped over several internal table rows, up to six rows by default. This is configurable by farm administrators through the object model only. The object model method is SPWebApplication.MaxListItemRowStorage. |
| Bulk operations | 100 items per bulk operation | Boundary | The user interface allows a maximum of 100 items to be selected for bulk operations. |
| List view lookup threshold | 8 join operations per query | Threshold | Specifies the maximum number of joins allowed per query, such as those based on lookup, person/group, or workflow status columns. If the query uses more than eight joins, the operation is blocked. This does not apply to single item operations. When using the maximal view via the object model (by not specifying any view fields), SharePoint will return up to the first eight lookups. |
| List view threshold | 5,000 | Threshold | Specifies the maximum number of list or library items that a database operation, such as a query, can process at one time, outside of the daily time window set by the administrator during which queries are unrestricted. |
| List view threshold for auditors and administrators | 20,000 | Threshold | Specifies the maximum number of list or library items that a database operation, such as a query, can process at one time when performed by an auditor or administrator with appropriate permissions. This setting works in conjunction with Allow Object Model Override. |
| Subsite | 2,000 per site view | Threshold | The interface for enumerating subsites of a given Web site does not perform well as the number of subsites surpasses 2,000. Similarly, the All Site Content page and the Tree View Control performance will degrade significantly as the number of subsites grows. |
| Coauthoring in Microsoft Word and Microsoft PowerPoint® for .docx, .pptx and .ppsx files | 10 simultaneous editors per document | Threshold | Recommended maximum number of simultaneous editors is 10. The boundary is 99.  If there are 99 co-authors who have a single document opened for simultaneous editing, the 100th user and above will get a file in use error and have to view a read-only copy.  More than 10 co-editors will lead to a gradually degraded user experience with more conflicts and users will have to go through more iterations to get their changes to upload successfully. |

### Column limits

SharePoint Server 2010 data is stored in SQL Server tables. To allow for the maximum number of possible columns in a SharePoint list, SharePoint Server will create several rows in the database when data will not fit on a single row. This is called *row wrapping*.

Each time a row is wrapped in SQL Server, an additional query load is placed on the server whenever that item is queried because a SQL join must be included in the query. To prevent excessive load, by default a maximum of six SQL Server rows are allowed for a SharePoint item. This limit leads to a particular limitation on the number of columns of each type that can be included in a SharePoint list. The following table describes the limits for each column type.

The row wrapping parameter can be increased beyond six, but this may result in excessive load on the server. Performance testing is recommended before exceeding this limit. For more information, see the "Designing Large Lists and Maximizing List Performance" white paper accessible from [Performance and capacity test results and recommendations](http://technet.microsoft.com/en-us/library/ff608068(office.14).aspx) (http://technet.microsoft.com/en-us/library/ff608068(office.14).aspx).

Each column type has a size value listed in bytes. The sum of all columns in a SharePoint list cannot exceed 8,000 bytes. Depending on column usage, it is possible to reach the 8,000 byte limitation before reaching the six-row row wrapping limitation.

| **Limit** | **Maximum value** | **Limit type** | **Size per column** | **Notes** |
| --- | --- | --- | --- | --- |
| Single line of text | 276 | Threshold | 28 bytes | SQL Server row wrapping occurs after each 64 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 384 *Single line of text* columns per SharePoint list (6 \* 64 = 384). However, because the limit per SharePoint list item is 8000 bytes, of which 256 bytes are reserved for built-in SharePoint columns, the actual limit should be 276 *Single line of text* columns. |
| Multiple Lines of Text | 192 | Threshold | 28 bytes | SQL Server row wrapping occurs after each 32 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 192 *Multiple lines of text* columns per SharePoint list (6 \* 32 = 192). |
| Choice | 276 | Threshold | 28 bytes | SQL Server row wrapping occurs after each 64 columns in a SharePoint list. The default row wrapping value of 6 allows for a maximum of 384 *Choice* columns per SharePoint list (6 \* 64 = 384); ); however since the limit per SharePoint list item is 8000 bytes, of which 256 bytes are reserved for built-in SharePoint columns, the actual limit should be 276 *Single line of text* columns. |
| Number | 72 | Threshold | 12 bytes | SQL Server row wrapping occurs after each 12 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 72 *Number* columns per SharePoint list (6 \* 12 = 72). |
| Currency | 72 | Threshold | 12 bytes | SQL Server row wrapping occurs after each 12 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 72 *Currency* columns per SharePoint list (6 \* 12 = 72). |
| Date and Time | 48 | Threshold | 12 bytes | SQL Server row wrapping occurs after each eight columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 48 *Date and Time* columns per SharePoint list (6 \* 8 = 48). |
| Lookup | 96 | Threshold | 4 bytes | SQL Server row wrapping occurs after each 16 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 96 single value *Lookup* columns per SharePoint list (6 \* 16 = 96). |
| Yes / No | 96 | Threshold | 5 bytes | SQL Server row wrapping occurs after each 16 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 96 *Yes / No* columns per SharePoint list (6 \* 16 = 96). |
| Person or group | 96 | Threshold | 4 bytes | SQL Server row wrapping occurs after each 16 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 96 *Person or Group* columns per SharePoint list (6 \* 16 = 96). |
| Hyperlink or picture | 138 | Threshold | 56 bytes | SQL Server row wrapping occurs after each 32 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 192 *Hyperlink or Picture* columns per SharePoint list (6 \* 32 = 192) ); however since the limit per SharePoint list item is 8000 bytes, of which 256 bytes are reserved for built-in SharePoint columns, the actual limit should be 138 *Hyperlink or Picture* columns. |
| Calculated | 48 | Threshold | 28 bytes | SQL Server row wrapping occurs after each eight columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 48 *Calculated* columns per SharePoint list (6 \* 8 = 48). |
| GUID | 6 | Threshold | 20 bytes | SQL Server row wrapping occurs after each column in a SharePoint list. The default row wrapping value of six allows for a maximum of 6 *GUID* columns per SharePoint list (6 \* 1 = 6). |
| Int | 96 | Threshold | 4 bytes | SQL Server row wrapping occurs after each 16 columns in a SharePoint list. The default row wrapping value of six allows for a maximum of 96 *Int* columns per SharePoint list (6 \* 16 = 96). |
| Managed metadata | 94 | Threshold | 40 bytes for the first, 32 bytes for each subsequent | The first Managed Metadata field added to a list gets four columns:   * A lookup field for the actual tag * A hidden text field for the string value * A lookup field for the catch all * A lookup field for spillover of the catch all   Each subsequent Managed Metadata field added to a list adds two more columns   * A lookup field for the actual tag * A hidden text field for the string value   The maximum number of columns of Managed Metadata is calculated as (14 + (16 \* (*n*-1))) where *n* is the row mapping value (default of 6). |

External Data columns have the concept of a primary column and secondary columns. When you add an external data column, you can select some secondary fields of the external content type you want to be added to the list. For example, given an External Content Type “Customer” which has fields like “ID”, “Name”, “Country”, and “Description”, when you add an External Data column of type “Customer” to a list, you can add secondary fields to show the “ID”, “Name” and “Description” of the Customer. Overall these are the columns that get added:

* Primary column: A text field.
* Hidden Id column: A multi-line text field.
* Secondary columns: Each secondary column is a text/number/Boolean/multi-line text based on the data type of the secondary column as defined in the BDC model. For example, ID might be mapped to a *Number* column; Name might be mapped to a *Single line of text column*; Description might be mapped to a *Multiple lines of text* column.

### Page limits

The following table lists the recommended guidelines for pages.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Web parts | 25 per wiki or Web part page | Threshold | This figure is an estimate based on simple Web Parts. The complexity of the Web parts dictates how many Web Parts can be used on a page before performance is affected. |

**Security limits**

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Number of SharePoint groups a user can belong to | 5,000 | Supported | This is not a hard limit but it is consistent with Active Directory® guidelines. There are several things that affect this number:   * The size of the user token * The groups cache: SharePoint Server 2010 has a table that caches the number of groups a user belongs to as soon as those groups are used in access control lists (ACLs). * The security check time: as the number of groups a user is a member of increases, the time required for the access check increase as well. |
| Users in a site collection | 2 million per site collection | Supported | You can add millions of people to your Web site by using Microsoft Windows® security groups to manage security instead of using individual users.  This limit is based on manageability and ease of navigation in the user interface.  When you have many entries (security groups of users) in the site collection (more than one thousand), you should use Windows PowerShell to manage users instead of the UI. This will provide a better management experience. |
| Active Directory Principles/Users in a SharePoint group | 5,000 per SharePoint group | Supported | SharePoint Server 2010 allows you to add users or Active Directory groups to a SharePoint group.  Having up to 5,000 users (or Active Directory groups or users) in a SharePoint group provides acceptable performance.  The activities most affected by this limit are:   * Fetching users to validate permissions. This operation takes incrementally longer with growth in number of users in a group. * Rendering the membership of the view. This operation will always require time. |
| SharePoint groups | 10,000 per site collection | Supported | Above 10,000 groups, the time to execute operations is increased significantly. This is especially true of adding a user to an existing group, creating a new group, and rendering group views. |
| Security principal: size of the Security Scope | 5,000 per Access Control List (ACL) | Supported | The size of the scope impacts the data used for a security check calculation. This calculation occurs each time the scope changes. There is no hard limit, but the bigger the scope, the longer the calculation takes. |

## Limits by feature

This section lists limits sorted by feature.

### Search limits

The following table lists the recommended guidelines for Search.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| SharePoint search service applications | 20 per farm | Supported | Multiple SharePoint search service applications can be deployed on the same farm, because you can assign search components and databases to separate servers. The recommended limit of 20 is less than the maximum limit for all service applications within a farm. |
| Crawl databases and database Items | 10 crawl databases per search service application  25 million items per crawl database | Threshold | The crawl database stores the crawl data (time/status, etc) about all items that have been crawled. The supported limit is 10 crawl databases per SharePoint Search service application.  The recommended limit is 25 million items per crawl database (or a total of four crawl databases per search service application). |
| Crawl components | 16 per search service application | Threshold | The recommended limit per application is 16 total crawl components; with two per crawl database, and two per server, assuming the server has at least eight processors (cores).  The total number of crawl components per server must be less than 128/(total query components) to minimize propagation I/O degradation. Exceeding the recommended limit may not increase crawl performance; in fact, crawl performance may decrease based on available resources on the crawl server, database, and content host. |
| Index partitions | 20 per search service application; 128 total | Threshold | The index partition holds a subset of the search service application index. The recommended limit is 20. Increasing the number of index partitions results in each partition holding a smaller subset of the index, reducing the RAM and disk space needed on the query server hosting the query component assigned to the index partition. The boundary for the total number of index partitions is 128. |
| Indexed items | 100 million per search service application; 10 million per index partition | Supported | SharePoint Search supports index partitions, each of which contains a subset of the entire search index. The recommended maximum is 10 million items in any partition. The overall recommended maximum number of items (e.g., people, list items, documents, Web pages) is 100 million. |
| Crawl log entries | 100 million per search application | Supported | This is the number of individual log entries in the crawl log. It will follow the "Indexed items" limit. |
| Property databases | 10 per search service application;128 total | Threshold | The property database stores the metadata for items in each index partition associated with it. An index partition can only be associated with one property store. The recommended limit is 10 property databases per search service application. The boundary for index partitions is 128. |
| Query components | 128 per search application; 64/(total crawl components) per server | Threshold | The total number of query components is limited by the ability of the crawl components to copy files. The maximum number of query components per server is limited by the ability of the query components to absorb files propagated from crawl components. |
| Scope rules | 100 scope rules per scope; 600 total per search service application | Threshold | Exceeding this limit will degrade crawl freshness, and delay potential results from scoped queries. |
| Scopes | 200 per site | Threshold | This is a recommended limit per site. Exceeding this limit may degrade crawl efficiency and, if the scopes are added to the display group, affect end-user browser latency. Also, display of the scopes in the search administration interface degrades as the number of scopes passes the recommended limit. |
| Display groups | 25 per site | Threshold | These are used for a grouped display of scopes through the user interface. Exceeding this limit starts degrading the scope experience in the search administration interface. |
| Alerts | 1,000,000 per search application | Supported | This is the tested limit. |
| Content sources | 50 per search service application | Threshold | The recommended limit of 50 can be exceeded up to the boundary of 500 per search service application. However, fewer start addresses should be used, and the concurrent crawl limit needs to be followed. |
| Start addresses | 100 per content source | Threshold | The recommended limit can be exceeded up to the boundary of 500 per content source. However, the more start addresses you have, the fewer content sources should be used. When you have many start address, we recommend that you put them as links on an html page, and have the HTTP crawler crawl the page, following the links. |
| Concurrent crawls | 20 per search application | Threshold | This is the number of crawls underway at the same time. Exceeding this number may cause the overall crawl rate to degrade. |
| Crawled properties | 500,000 per search application | Supported | These are properties that are discovered during a crawl. |
| Crawl impact rule | 100 | Threshold | Recommended limit of 100 per farm. The recommendation can be exceeded; however, display of the site hit rules in the search administration interface is degraded. At approximately 2000 site hit rules, the Manage Site Hit Rules page becomes unreadable. |
| Crawl rules | 100 per search service application | Threshold | This value can be exceeded; however, display of the crawl rules in the search administration interface is degraded. |
| Managed properties | 100,000 per search service application | Threshold | These are properties used by the search system in queries. Crawled properties are mapped to managed properties. |
| Mappings | 100 per managed property | Threshold | Exceeding this limit may degrade crawl speed and query performance. |
| URL removals | 100 removals per operation | Supported | This is the maximum recommended number of URLs that should be removed from the system in one operation. |
| Authoritative pages | 1 top level and minimal second and third level pages per search service application | Threshold | The recommended limit is one top-level authoritative page, and as few second -and third-level pages as possible to achieve the desired relevance.  The boundary is 200 per relevance level per search application, but adding additional pages may not achieve the desired relevance. Add the key site to the first relevance level. Add subsequent key sites at either second or third relevance levels, one at a time, and evaluate relevance after each addition to ensure that the desired relevance effect is achieved. |
| Keywords | 200 per site collection | Supported | The recommended limit can be exceeded up to the maximum (ASP.NET-imposed) limit of 5000 per site collection given five Best Bets per keyword. If you exceed this limit, display of keywords on the site administration user interface will degrade. The ASP.NET-imposed limit can be modified by editing the Web.Config and Client.config files (MaxItemsInObjectGraph). |
| Metadata properties recognized | 10,000 per item crawled | Boundary | This is the number of metadata properties that can be determined and potentially mapped or used for queries when an item is crawled. |

### User Profile Service limits

The following table lists the recommended guidelines for User Profile Service.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| User profiles | 2,000,000 per service application | Supported | A user profile service application can support up to 2 million user profiles with full social features functionality. This number represents the number of profiles that can be imported into the people profile store from a directory service, as well as the number of profiles a user profile service application can support without leading to performance degradation in social features. |
| Social tags, notes and ratings | 500,000,000 per social database | Supported | Up to 500 million total social tags, notes and ratings are supported in a social database without significant performance degradation. However, database maintenance operations such as backup and restore may show performance degradation at that point. |

### Business Connectivity Services limits

The following table lists the recommended guidelines for Business Connectivity Services.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| ECT (in-memory) | 5000 per Web Server (per tenant) | Boundary | Total number of external content type (ECT) definitions loaded in memory at a given point in time on a Web server. |
| External system connections | 500 per Web server | Boundary | Number of active/open external system connections at a given point in time. The default maximum value is 200; the boundary is 500. This limit is enforced at the Web Server scope, regardless of the type of external system (for example, database, .NET assembly, and so on) The default maximum is used to restrict the number of connections. An application can specify a larger limit via execution context; the boundary enforces the allowed maximum even for applications that do not respect the default. |
| Database items returned per request | 2,000 per database connector | Threshold | Number of items per request the database connector can return.  The default maximum of 2,000 is used by the database connector to restrict the number of result that can be returned per page. The application can specify a larger limit via execution context; the Absolute Max enforces the allowed maximum even for applications that do not respect the default. The boundary for this limit is 1,000,000. |

### Workflow limits

The following table lists the recommended guidelines for workflow.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Workflow postpone threshold | 15 | Threshold | 15 is the maximum number of workflows allowed to be concurrently executing against a content database , not including instances that are running in the timer service. When this threshold is reached, new requests to activate workflows will be queued to be run by the workflow timer service at a later time. As non-timer execution completes, new requests will count against this threshold. This is limit can be configured by using the Set-SPFarmConfig Windows PowerShell cmdlet.  **Note:** This limit does not refer to the total number of workflow instances that can be in progress. Instead, it is the number of instances that are actively being processed. Increasing this limit increases the throughput of starting and completing workflow tasks but also increases load against the content database and system resources. |
| Workflow timer batch size | 100 | Threshold | The number of events that each run of the workflow timer job will pick up and deliver to workflows. It is configurable by using Windows PowerShell. To allow for additional events, you can run additional instances of the Microsoft SharePoint Foundation Workflow Timer Service. |

### Visio Services limits

The following table lists the recommended guidelines for instances of Visio Services.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| File size of Visio Web drawings | 50 MB | Threshold | Visio Services has a configuration setting that enables the administrator to change the maximum size of Web drawings that Visio processes.  Larger file sizes have the following side effects:   * Increase in the memory footprint of Visio Services. * Increase in CPU usage. * Reduction in application server requests per second. * Increase overall latency. * Increase SharePoint farm network load |
| Visio Web drawing recalculation timeout | 120 seconds | Threshold | Visio Services has a configuration setting that enables the administrator to change the maximum amount of time it can spend recalculating a drawing after a data refresh.  A larger recalculation timeout leads to:   * Reduction in CPU and memory availability. * Reduction in application requests per second. * Increase in average latency across all documents.   A smaller recalculation timeout leads to:   * Reduction of the complexity of diagrams that can be displayed. * Increase in requests per second. * Decrease in average latency across all documents. |
| Visio services minimum cache age (data connected diagrams) | Minimum cache age: 0 to 24hrs | Threshold | Minimum cache age applies to data connected diagrams. It determines the earliest point at which the current diagram can be removed from cache.  Setting Min Cache Age to a very low value will reduce throughput and increase latency, because invalidating the cache too often forces Visio to recalculate often and reduces CPU and memory availability. |
| Visio services maximum cache age (non-data connected diagrams) | Maximum cache age: 0 to 24hrs | Threshold | Maximum cache age applies to non-data connected diagrams. This value determines how long to keep the current diagram in memory.  Increasing Max Cache Age decreases latency for commonly requested drawings.  However, setting Max Cache Age to a very high value increases latency and slows throughput for items that are not cached, because the items already in cache consume and reduce available memory. |

### PerformancePoint Services limits

The following table lists the recommended guidelines for PerformancePoint® Services.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Cells | 1,000,000 per query on Excel Services data source | Boundary | A PerformancePoint scorecard that calls an Excel Services data source is subject to a limit of no more than 1,000,000 cells per query. |
| Columns and rows | 15 columns by 60,000 rows | Threshold | The maximum number of columns and rows when rendering any PerformancePoint dashboard object using a Microsoft Excel® workbook as a data source. The number of rows could change based on the number of columns. |

### Word Automation Services limits

The following table lists the recommended guidelines for Word Automation Services.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Input file Size | 512 MB | Boundary | Maximum file size that can be processed by Word Automation Services. |
| Frequency with which to start conversions (minutes) | 1 minute (recommended)  15 minutes (default)  59 minutes (boundary) | Threshold | This setting determines how often the Word Automation Services timer job executes. A lower number leads to the timer job running faster.   Our testing shows that it is most beneficial to run this timer job once per minute. |
| Number of conversions to start per conversion process | For PDF/XPS output formats: 30 x M For all other output formats: 72 x M   Where M is the value of **Frequency with which to start conversions (minutes)** | Threshold | The number of conversions to start affects the throughput of Word Automation Services.  If these values are set higher than the recommended levels then some conversion items may begin to fail intermittently and user permissions may expire. User permissions expire 24 hours from the time a conversion job is started. |
| Conversion job size | 100,000 conversion items | Supported | A conversion job includes one or more conversion items, each of which represents a single conversion to be performed on a single input file in SharePoint. When a conversion job is started (using the ConversionJob.Start method), the conversion job and all conversion items are transmitted over to an application server which then stores the job in the Word Automation Services database. A large number of conversion items will increase both the execution time of the Start method as well as the number of bytes transmitted to the application server. |
| Total active conversion processes | N-1, where N is the number of cores on each application server | Threshold | An active conversion process can consume a single processing core. Therefore, customers should not run more conversion processes than they have processing cores in their application servers.    The conversion timer job and other SharePoint activities also require occasional use of a processing core.  We recommend that you always leave 1 core free for use by the conversion timer job and SharePoint. |
| Word Automation Services database size | 2 million conversion items | Supported | Word Automation Services maintains a persistent queue of conversion items in its database. Each conversion request generates one or more records.  Word Automation Services does not delete records from the database automatically, so the database can grow indefinitely without maintenance. Administrators can manually remove conversion job history by using the [Remove-SPWordConversionServiceJobHistory cmdlet](http://technet.microsoft.com/en-us/library/ff608044(office.14).aspx) (http://technet.microsoft.com/en-us/library/ff608044(office.14).aspx). |

### OneNote limits

The following table lists the recommended guidelines for Microsoft® OneNote® Services.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Number of Sections and Section Groups in a OneNote Notebook (on SharePoint) | See limit for "Documents" in [List and library limits](#_List_and_library) |  | Each section counts as one folder and one document in the list. Each section group counts as one folder and one document in the list. |
| Maximum size of a section | See limit for "File size" in [List and library limits](#_List_and_library) |  | This maximum excludes any images, embedded files, and XPS print outs to OneNote that are greater than 100 KB. Images and embedded files greater than 100 KB are split out into their own binary files. This means that a section with 100 KB of typed data and four embedded Word documents of 1 MB each will be considered a 100 KB section. |
| Maximum size of an image, embedded file, and XPS OneNote print out in a OneNote section. | See limit for "File size" in [List and library limits](#_List_and_library) |  | Each item is stored as a separate binary file and thus subject to file size limits. Each print operation to OneNote will result in one XPS print out binary, even if the printout contains multiple pages. |
| Maximum size of all images, embedded files, and XPS printouts in a single OneNote page. | Default limit is double the "File size" limit. | Threshold | This applies to embedded content in a single OneNote page, not a Section or Notebook. If users encounter this, they will see the following error in OneNote: jerrcStorageUrl\_HotTableFull (0xE0000794). Users can work around this by splitting embedded content into different pages and deleting previous versions of the page. If users need to adjust this value (“Max Hot Table Size”), the effective limit is half of the absolute value they define (for example, specifying a 400 MB max hot table size means that the maximum size of all embedded content on a page is limited to 200 MB). |
| Merge operations | One per CPU core per Web server | Boundary | OneNote merges combine changes from multiple users who are co-authoring a notebook. If no CPU core is available to run a merge, a conflict page is generated instead, which forces the user perform the merge manually).  This limit applies whether OneNote is running as a client application or as an Office Web App. |

### Office Web Application Service limits

The following table lists the recommended guidelines for Office Web Apps. Office client application limits apply when they are running as Web apps.

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| Renders | One per document per second per CPU core per application server (maximum eight cores) | Boundary | This is the measured average number of renders that can be performed of "typical" documents on the application server over a period of time. |

### Project Server limits

The following table lists the recommended guidelines for Microsoft Project Server. For more information about planning for Project Server, see [Planning and architecture for Project Server 2010](http://technet.microsoft.com/en-us/library/cc197605(office.14).aspx) (http://technet.microsoft.com/en-us/library/cc197605(office.14).aspx).

| **Limit** | **Maximum value** | **Limit type** | **Notes** |
| --- | --- | --- | --- |
| End of project time | Date: 12/31/2049 | Boundary | Project plans cannot extend past the date 12/31/2049. |
| Deliverables per project plan | 1500 deliverables | Boundary | Project plans cannot contain more than 1500 deliverables. |
| Number of fields in a view | 256 | Boundary | A user cannot have more than 256 fields added to a view that they have defined in Project Web App. |
| Number of clauses in a filter for a view | 50 | Boundary | A user cannot add a filter to a view that has more than 50 clauses in it. |