crystal decisions ™

Seagate Info Sizing

Seagate Info Technical Roadmap Series

Overview

This document is designed to help you with the final step in planning for your Seagate Info deployment. It provides you with guidelines to aid in the deployment of the Seagate Info servers to optimally match your firm's unique installation needs. It briefly explains the purpose of each component and outlines component-specific memory, file, and machine considerations. You should read this document if you are a Seagate Info administrator. This document applies to Seagate Info version 7.

Contents

Introduction

This document is designed to help you with the final step in planning for your Seagate Info deployment. Seagate Info can be deployed over multiple servers to accommodate greater numbers of users. The flexible middle tier of Seagate Info consists of seven different types of servers. These servers can be deployed on one or more machines, depending on the size of the deployment and load of the system. This document will provide you with guidelines to aid in the deployment of these servers to optimally match your firm's unique installation needs. It will briefly explain the purpose of each component and outline component-specific memory, file and machine considerations.

This document will be of the most use if you read the Pre-Deployment Planning and the Architecture & Deployment guides first. These guides will help you assess your system requirements and better understand common architectural configurations for the Seagate Info system.

Info APS

Overview

As outlined in Chapter 1, the intelligent tier of the Seagate Info system is composed of the Automated Process Scheduler (APS). The Info APS is the gateway from the end-users to the other servers that make up the middle tier. The Info APS manages and maintains the Seagate Info system database.

NOTE	Of special note for Seagate Info 7 users is the method (that the Info APS interacts with its database) has changed.

In versions prior to 7, the Info APS loaded all the information from the Info system database into memory. In Seagate Info 7, the memory utilization is configurable through a registry setting allowing a single Info APS or APS cluster to support more users and more objects.

Sizing

Memory

In Seagate Info 7, on average, every folder takes up 1 KB of memory; every report/query/cube object takes up 6 KB of memory; and every instance of those objects take up 1.6 KB of memory. There are many factors that can increase the amount of memory required. For example, report instances that contain numerous prompts will be larger than average as every string prompt requires 256 bytes. The Info APS will, in normal operation, only keep the most recently accessed objects in memory and stay within its memory limits as defined below. However, during periods of rapid object access (like batch reporting) the Info APS may exceed the specified amount of memory. To determine the amount of memory to put on an Info APS machine the person deploying the system must determine how many objects and instances they expect to have in the system. Performing the following calculation should help in estimating the amount of memory the Info APS will need to operate optimally.

Recommended Megabytes of APS Memory = 16 * (total Objects/1000) + 6 * (total Instances/1000) + 1 * (Total Folders/1000) + 27

Once the maximum amount of memory required by the Info APS is calculated, you can subsequently determine how much system memory you want to reserve for the Info APS. The following registry key on the Info APS determines how much memory the Info APS will use:

HKEY_LOCAL_MACHINE\Software\Seagate Software\Seagate Info\Options\ObjMemCacheKB

The default setting for this registry key is 75% of existing system memory. It is recommended that this generally be between 50-80% of the total system memory. The smaller the disparity between the calculated memory requirements and the allocated system memory, the better the Seagate Info performance will be. The new method of storing objects in version 7 may cause a slight decrease in performance in select circumstances but overall will allow the Info APS to support more users and more instances without running into memory limitations.

In normal, client-side, Info Desktop operations, a large number of users are not a problem. However, in some implementations, users schedule their own jobs. This means that the number of objects that the APS must manage increases with every user added. For example, if there are fifty report objects in the desktop with a hundred users on the system, each scheduling their own jobs, there will be 5,000 objects that the APS must manage.

If every user is allowed greater than one instance each, then the number of objects that must be maintained can rapidly increase. To handle this large number of objects, the APS will cache out of memory the details of the objects that are not in use. As more and more users log onto an Info APS however, it will be required to spend an increasing amount of time swapping information in and out of the memory cache. If this occurs you will notice an evident slow down in APS performance as it spends an inordinate amount of time accessing the database and a decreasing amount of time working with the objects in memory. A quick solution for this is to allocate more memory for the APS as noted above. This can be done through increasing swap space but increasing the amount of RAM is the recommended solution for optimal performance.

Processor

Generally, the Info APS is not a processor-intensive executable. However, certain activities can cause this to change. Large amounts of batch scheduling may dramatically increase the workload of the Info APS. Additionally, any large updates to the Info system database (i.e. adding or deleting a large number of users with a Seagate Info SDK application) can demand more processor resources.

The Info APS is a multi-threaded application but generally there are only two particularly active threads (the main thread and the dbwriter thread). As a result, it is recommended to run the Info APS on a single or dual-processor machine. Lastly of course, the faster the involved APS processor(s), the greater the Info APS performance.

Clustering

Since version 5.0 of Seagate Info, the system has been capable of clustering APSs. This allows two or more Info APS machines to share scheduling and job management duties, balance load and provides fail-over support. Clustering also allows the system to support more concurrent user requests. The most important step in the deployment of an Info APS cluster is that the involved machines be started up in a sequential manner - *not* at the same time. It is *critically* important that a single APS machine is fully enabled before the initialization of the other Info APS machines may begin.

The reasoning behind this is that when an APS starts up it has to read information from the system database and register itself within the cluster. If you were to start every APS one after another each APS would think it is the only one in the cluster and they would be reading the system database at the same time. System performance and database integrity could suffer as a result.

In installations with large numbers of objects and instances required in system and processing batch windows, the separation of users into different APS clusters may be warranted. Although this is largely a judgment call, one should calculate the expected number of concurrent users in the system, the expected number of objects and instances that will be loaded by those users and determine the memory requirements for the APS before making a decision. A deployment planner should also consider that NT has some hard limitations for the amount of memory it can apply to applications. These limitations must be taken into account when deciding on the number of APS Clusters. It is not generally recommended to have the APS require greater than 1 GB worth of objects loaded into memory.

User Load

Determining the number of concurrent users is the first step in determining the number of Info APS machines required in a cluster. A recommended limit for each Info APS machine within a cluster is 300-350 concurrent users. Also, although the number of users that an Info APS cluster can support is theoretically limitless, extremely large user sets in excess of 10,000 can cause a slow down of administrative functions. For installations greater than 10,000 users, it is recommended that a Seagate Info technical representative be consulted for an optimal implementation.

Info System Database

The largest table in a Seagate Info production database system will inevitably be the CI_RUNTIMEIMAGE table. This table contains the string, numeric and binary fields that represent the objects and instances in the Seagate Info system. The Info System Database should be allocated enough space to house all the objects and instances in the system as well as the remainder of the Info System Database tables. For example, the CI_RUNTIMEIMAGE table stores the report instance information and each record ranges in size from 4 to 12 KB (with an average of 6 KB). Note that the same factors that affect the size of a report instance in memory (see Memory section above) also affect the size of records in the CI_RUNTIMEIMAGE table.

By default, the Info System Database is stored in a Microsoft Access database. However, as the system grows and more historical information is stored in the Access database, performance will degrade. As long as the system database

does not grow beyond 20 MB, the Access database will perform satisfactorily. Because Access uses a compression ratio for storing records, it is difficult to determine how many instances make up 20 MB.

When using Microsoft SQL Server or any of Sybase's SQL databases, administrators should take into account the size that transaction logs for these databases can grow to. The largest tables in the database will be frequently written to when jobs are being processed; hence the resulting transaction log can get quite large. Space equal to two thirds of the size of the Info System Database should be set aside for these transaction logs. To minimize storage requirements, a stored procedure can be used to periodically dump the transaction log.

Lastly, it is recommended that the Info System Database not be run on the same database server against which reports are running or on one of the Info APS machines. The reason for this is that when running reports, the Info APS must update the CI_RUNTIMEIMAGE table. If the database server is busy processing the data for reports, the retrieval time for the Info APS to query the same server will be negatively impacted.

The second pitfall can occur if the Info APS is clustered. If the database is run on one APS machine in the cluster, load-balancing calculations will be thrown off, resulting in other machines in the cluster handling more than their share of the reporting volume. This will throw off your sizing calculations and could require you to put more machines in the APS cluster than necessary.

Note on APS and disk space usage: The APS has been designed to shut itself down when its hard drive becomes more than 85% full. This design feature ensures that the APS does not over-run its hard drive in the middle of processing a report, leading to inaccurate or incomplete reports. This setting can be changed through the following registry setting:

HKEY_LOCAL_MACHINE\SOFTWARE\Seagate Software\Seagate Info\Options\MaxDiskUsagePercent

Info Sentinel and the Info APS

The Info Sentinel is the heart of Seagate Info's network communications. All messages between Seagate Info components flow through the Info Sentinel. Whenever you install a Seagate Info component, the installation program automatically installs the Info Sentinel on that computer as well. The Info APS uses Info Sentinels to remain in constant communication with Info Servers.

 The Info APS is directly dependent on the availability of the Info Sentinel.   If the Info Sentinel on the involved APS machine is blocked or busy, clients will experience delays in getting information from the Info APS. In the worst case, they will be blocked from logging on to the Info APS. As the Info Sentinel is also the process managing executable of the Seagate Info Info Servers, it is not recommended that the Info APS reside on the same machine as any Info Servers, with the possible exception of small implementations with only a few reports.

The reasoning behind this all has to do with how the SI environment will be able to efficiently run. By having the APS and the Info Server components on the same machine the communication between the two components will cause the processor on the machine to be in constant use, negatively impacting system performance.

Info Report Server

Overview

The Info Report Server is one of the workhorses of the Seagate Info System. The Info Report Server receives instructions from the Info APS on which job to process and where to save and send the output file. By default, the output file is saved to the default output directory as specified in the Info Administrator but each Info Report Server can be configured to output to its own output directory.

Outlined below is the six-step process that the Info Report Server follows when a report is scheduled:

1. Receives the instructions from the Info APS

2. Loads the report file

3. Logs on and sends a query to the database

4. Processes the result set

5. Saves the output file in the desired format and location

6. If the output file format is report format, it generates the first level of EPF files (Encapsulated Page Format—used for the Page-On-Demand viewers) files.

Note: The Info Sentinel on the Info Report Server starts an instance of RPTAGENT.EXE for every concurrent job it is processing. Because each concurrent job is a separate process, the Info Report Server can support multiple processors.

Sizing

Memory

Each RPTAgent executable will use up between 10 and 15 MB of RAM and an equal amount of virtual memory. Benchmark testing has determined that, given the 15 MB of RAM per processor, the optimum maximum load of an Info Report Server is 10 concurrent reports per processor. Please note however, that this 15 MB of RAM estimate assumes exclusive RPTagent access – that is, no other processes running on the machine accessing this RAM.

Note: Info Report Servers with the capability to output to fax are limited to a maximum concurrent job load of 1. This is set in the Info Administrator under the Info Server tab.

Disk Space

There are two important things to keep in mind when considering the required disk space for the Info Report Server:

- First, the actual output file—the physical *.RPT created when a report instance is run successfully. This report file is composed of a report template and compressed, saved records.   When a report is opened by any of the Report Agent, Info Agent, Info Analyzer or Report Designer, the saved records are expanded. The compression ratio is, on average, a 15:1 compression ratio. Thus, depending on the size of the data being returned

by the database server, and the number of reports being stored, sufficient space must be set aside for the expanded report instances.

- Secondly, sufficient hard drive disk space should be available in the temp directory for the creation of temp files. Temporary files are created during report processing - the data from the database server is stored in these files until it can be saved and compressed in the report. (i.e. Based on peak reporting volumes, space equivalent to the data returned by each report should be available) Also, access rates to the temp directory will impact the speed at which a report processes.

Note: By default, the Windows NT TEMP and TMP variables are user environment variables. This means that any application running as an NT service will ignore these variables and place the temporary files in the \winnt directory. To overcome this, recreate the TEMP and TMP variables as system environment variables through the Control Panel, System setting option.

Processor

The number and size of required Info Report Servers is largely dependent on the number of concurrent jobs that you want or need to process. A general rule of thumb is that an Info Report Server can process 10 concurrent jobs per processor given 256 MB of RAM per processor. When looking at the number of Info Report Servers that are required, it is important to determine how many reports need to run, how long these reports take to run (on average) and the time window that these reports have for processing. The calculation is then greatly simplified as follows:

Total Processing Time Required = Average Process Time (per job) * Number of Jobs

Total Time to Process (per processor) = Total Processing Time Required / Number of Concurrent Jobs (per processor)

Number of Processors Required = Total Time to Process / Time Window for Processing

Note: Individual jobs take longer when running many jobs simultaneously. However, the benefits of multi-tasking outweigh the drop in speed in processing the reports at one time. Lastly, the speed of hard drive access used for the storage of the temporary files also has a direct impact on the report processing speed.

File Access Requirements

Within the middle tier of Seagate Info, there are certain requirements for file connectivity between the servers.

1. The Output Directory - the default location for the output files.

This can be configured either as a common location for the entire system if configured through the Info Administrator or this can be configured in the Info Configuration Manager for each Info Report Server.

- Info Report Servers need read/write/delete access

- Info Outlook Server will need read access

2. The Input Directory - the directory(s) where the report objects are stored.

This is configured in the Info Administrator.

- All Info Report Servers require read access
- Seagate Query Server needs read/write/delete access
- Info Desktops need read/write/delete access if they are going to be designing cubes and reports and saving to the Info APS using the Info Report Designer, Info Cube Designer or SQL Designer.

3. The Cache Directory - the directory where the Page-On-Demand files are stored.

This is configured in the Info Administrator.

- Info Report Servers need read/write/delete access
- Info Report Agents need read/write/delete access
- Info APS needs read/write/delete access

Special Considerations

Location of the Info Report Server

It is preferable to have the Info Report Servers and your database server(s) close together on your network. Info Servers communicate frequently with database servers and typically pass large volumes of data. Keeping the servers close together will deliver better response times and a smaller impact on other network traffic. In situations where there are large distances between database servers, consider using multiple Info Report Servers near each database to optimize performance.

Network Usage

Seagate Info uses the Universal Naming Convention (UNC) to load report objects. In systems that plan for large batch runs, excessive network I/O can be avoided by adding reports to the desktop with the UNC turned off (process described below). This will make the pointer within the Info System Database reference the mapped path to the report object (i.e. "C:\reports\myreport.rpt" as opposed to "\\machinename\reports\myreport"). If an identical path exists on each Info Report Server, the Info Report Server will load the report from the local hard drive of the Info Report Server that is processing the report, minimizing network I/O and ensuring report files can be quickly accessed. This type of set-up requires the manual replication of report objects across all the Info Report Servers but gains a reduction in the failure rate of reports due to the unavailability of report files and diminishes excessive network I/O.

Note: The reports should be added to the Info APS through an **Info Desktop** that has UNC turned off. The Info Report Servers should **NOT** have UNC turned off. The following registry key defines whether a desktop uses UNC:

HKEY_LOCAL_MACHINE\Software\Seagate Software\Seagate Info\Options\UseUNC

This consideration should only be made for customers that have a large number of standard batch reports where the same report objects will be scheduled many times with different parameters. Normally this type of scheduling is conducted through a Seagate Info SDK application.

Info Agent (Report Viewing Server)

Overview

The Info Agent servers are normally the same machines as the Info Report Servers. The Info Agent(s) conducts two main functions. First, it regenerates any Page-On-Demand files (EPF) that may have been flushed out of the cache directory. Second, it also performs the generation of the drill down EPF files when users drill down in the ActiveX, Java or HTML Viewers. By default, the Info Agent will keep a maximum of 20 reports open. This infers that there must be enough temporary drive space to fully expand 20 reports. This can be reduced or increased in the Info Configuration Manager. Lastly, the CIAGNT32.EXE (The Info Agent executable) is a multi-threaded application that is configured to take advantage of multi-processor machines - it will create a separate thread for each job that is opened.

Sizing

See Sizing recommendations for Info Report Server

File Access Requirements

1. The Output Directory

- Info Agent requires read access

2. The Cache Directory

- Info Agent requires read/write/delete access

Special Considerations

None.

Info WebAccess Server

Overview

Info WebAccess is a web server extension application. It extends any ISAPI and NSAPI compliant web servers, including Microsoft IIS and Netscape Enterprise Server, to support Seagate Info functionality.

Special Considerations

TCP/IP and Firewall Configuration

In the Info environment, the Info Sentinel communicates over TCP/IP port 1556. This is configurable in the registry under:

HKEY_LOCAL_MACHINE\Software\Seagate Software\Seagate Info\Sentinel\TcpIpServerSocket

If this port is changed, it must be changed for all machines within the Info system (Info APS, Info Server, Info WebAccess Servers and Info Desktop for Windows). Additionally, the Info Sentinel must be restarted after this change before these changes take effect.

In a firewall configuration, where the firewall is between the Web Server and the Info APS, the Info Sentinel port (default 1556) has to be opened for IP traffic on the firewall. The Info Sentinel requires two-way communication between the Info WebAccess Server, the Info APS machines and additionally, all Info Servers.

In addition to the Info Sentinel communications, the Web Server will require file access to certain directories. These directories include the cache directory, the output directory and the directory where pick lists are stored. In IIS, this would require that the Anonymous Access user (typically IUSR_MACHINENAME) has read access to those directories. In Netscape Server, the Netscape service account must have the above-mentioned rights to the output, cache and pick list directories. The need for each directory is described below:

1. The Output Directory

- Info WebAccess Server needs access to output formats other than RPT, i.e. Excel, Word, Text

- Info WebAccess needs access to the RPT file if the user selects the Info Analyzer (as the viewer type) in the Info Desktop for HTML

2. The Cache Directory

- EPF (Page-On-Demand) and HTML files (used by the Info Viewer for HTML) are stored here.

- EPF files are handled by the system (passed through the Info Sentinel).

- HTML files may be large and as a result, are not passed through the Info Sentinel. The Web Server will be directed by the CIWEB.DLL to the file location.

3. Pick list Directories

- These directories must be accessible to the Web Server so that the Info WebAccess Server can correctly create the Info Desktops on the Web.

The firewall between the Info WebAccess Server machine and the Info APS/Info Server machines cannot perform any IP address routing. The IP address that the Info WebAccess Server uses to recognize the Info APS and Info Servers must be the same as the IP address that the Info APS and Info Server machines use to recognize themselves. For example, if the Info WebAccess Server connects to the Info APS at 10.50.155.110 but the Info APS thinks its IP address is 219.34.13.12, the Info WebAccess Server will only be able to connect to the Info APS once. After the first connection, the Info WebAccess Server will try to connect to the Info APS using 219.34.13.12 and it will not have access. Additionally, if the Info APS is clustered when the Info WebAccess

Server tries to connect to the Info APS, it may route the connection to the other Info APS via the first Info APS' knowledge of the IP address. Unless there is a routing table in the firewall that allows the Info WebAccess Server to get to the Info APS(s) via the internal IP address, this action will fail.

Info OLAP Server

Overview

The Info OLAP Server allows multi-dimensional OLAP Structures to be processed within the Seagate Info system. Unlike OPEN OLAP Sources, the Info OLAP Server uses the concept of instances like the rest of the Seagate Info system. The Cube Designer creates templates (cube objects) that can be subsequently scheduled (i.e. instances created) and populated with updated data.

Sizing

The Info OLAP Server allows you to schedule and serve Info OLAP cubes. As with all OLAP databases, the Info OLAP Server will perform better given more memory and increased processor power. Additionally, since the Info OLAP Server creates file based OLAP structures, it requires relatively large amounts of disk space.

The current size limit of an Info OLAP cube is 2 GB. Users requiring larger cubes should consider using Seagate Holos software that supports much larger OLAP structures.

Special Considerations

The Info OLAP Server must be installed on a Windows NT-based machine.

Info Outlook Server

Overview

The Info Outlook Server is a MAPI/CIAPI application (the CIAPI is the main component of the Seagate Info SDK). The Info Outlook Server works by establishing two "posts" into a public folder on the Exchange Server for every client in Info. These posts are then edited and polled, as the Info Outlook Server communicates with the Info APS and Info Desktop for Outlook. For more information on the Info Outlook Server and mail systems, see the technical document titled: "Seagate Info and Mail Systems".

Sizing

The Info Outlook Server is a multi-threaded application and as a result can take advantage of a multi-processor machine.   In all testing to date, the user limitations of the Info Outlook Server have been directly related to the limitations of the involved Exchange Server. RAM requirements for the Info Desktop for Outlook are 3 MB for folders in Outlook and 7 MB when viewing a report.

Requirements for the Info Outlook Server are 10 MB RAM and 20 MB hard disk space.

Special Considerations

Multiple Exchange Servers

If you use multiple Exchange Servers you will have to run one Info Outlook Server for every Exchange Server. It is not recommended that the Exchange public folder be replicated across Exchange Servers. Another option is to move all of the user accounts that will be using the Info Outlook Desktop to a single Exchange Server and run only one Info Outlook Server.

Performance

For optimal performance, the Info Outlook Server should be run on the Exchange Server.

User Rights

All users will need the following rights to the public folder that the Info Outlook Server will use:

- Create and read items.

- Edit and delete own items

The account that the Info Outlook Server is using should be the owner of the public folder.

Info Storage Server

Overview

The Info Storage Server provides users of Seagate Info with instance archiving functionality. Using the Info Storage Server, important report instances can be archived and the number of report instances on the Seagate Info Desktop can be kept to a minimum. An archived instance can be restored to the desktop at any time. Additionally, the Info Storage Server can be configured to interact with Veritas Backup Exec to allow for storage to media other than disk. The Info Storage Server uses a file storage catalog for its storage map ensuring that the storage server does not require more memory as it archives more objects.

Sizing

Ideally, the Info Storage Server should be installed on a dedicated single-processor machine. If a dedicated machine cannot be made available for the Info Storage Server, it can be run on an Info APS machine. The Info Storage Server will need UNC access to the Output directories.

File Access Requirements

1. Output Directory

- Info Storage Server needs read/write access

2. Storage Directory

- Info Storage Server needs read/write/delete access

Special Considerations

Changing the Location of the Info Storage Server Archives

The location of the Info Storage Server directory can be specified through the registry key:

HKEY_LOCAL_MACHINE\Software\Seagate Software\Repository\Server\Root Path

The registry key for the catalog can also be changed through the following registry key:

HKEY_LOCAL_MACHINE\Software\Seagate Software\Repository\Server\Catalog\Path

Deleting the Original Objects

The Info Storage Server will not delete instance files until it has successfully archived the object.

Restoring Objects

If a user restores an archived object, the Info Storage Server will try to restore the object to its original file name. If the file name is in use, it will create a new file name.

Hard Drive Storage

Overview

This section outlines the storage requirements for the three major storage directories in the Seagate Info system, the Temp, Output and Cache directories.

Temp Space

As a rule of thumb, reports will expand between 10-15 times their original size when opened. This means that a 2 MB report file will expand out to an estimated 20–30 MB of hard disk space when opened. Therefore, it is recommended that you allocate enough temp space for the Info Agent to expand out temp files for the reports the system administrator believes need to be open at any one time.

Output directory

It is very difficult to accurately determine how large any one instance will be. A rule of thumb is that a report instance will be the size of the report object plus $1/10^{th}$ the size of the fully expanded instance. The output directory should be able to handle the number of files that the system administrator intends to keep within the system.

Cache directory

The cache directory setting is restricted to 2 GB. If there is a requirement to have a larger cache directory due to a large number of current instances, the cache directory will have to be manually monitored.

Conclusion

This document provides a set of guidelines for planning and sizing your Seagate Info Deployment. For more detailed information on system configuration and specific hardware requirements, please refer to the Seagate Info Tech Guide. Assistance with configuration and deployment is available from Crystal Decisions Professional Services team. Please visit the Crystal Decisions web site at: http://www.crystaldecisions.com.