

Info APS / Info System Database Interaction

Seagate Info Technical Roadmap Series

Overview

This document answers common questions related to the Info System Database and its use by the Info APS. It is presented in a Frequently Asked Questions (FAQ) format. You should read this document if you are a Seagate Info administrator. This document applies to Seagate Info version 7.

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Introduction

This document is designed to answer common questions related to the Info System Database and its use by the Info APS. For more information on the schema for the Info System Database, refer to the companion document: “Info System Database Definition.”

The APS maintains all the information concerning the Seagate Info, and this information is stored in the Info System Database. The APS is the only machine that may read or write to the Info System Database. All other components send requests to the APS, and in turn, the APS reads and/or writes to the database on their behalf. The APS uses ODBC to access the Info System Database that is built using Microsoft Access, Microsoft SQL Server, INFORMIX, Oracle, or Sybase. Crystal Decisions is providing this information as such information only. In that the APS and its interaction with the system database is purely an internal function, we will change the nature of this interaction as required to improve the product.

FAQ

Q: I already have a database management system (DBMS) for my reporting databases; can I use this system to house the Info System Database? Can I install a DBMS onto my Info APS to accommodate the Info System Database?

It is recommended that the Info system database not be placed on:

- The database server against which the reports are running, or
- One of the Seagate Info APS machines.

When running reports, the Info APS must update the CI_RUNTIMEIMAGE table. If the database server is busy processing the data for reports, response time for access to the Info System Database could be compromised.

The second caution applies to environments that include an APS cluster. If the Info System Database resides on one APS in the cluster, the load on this machine will be higher, which can throw off the complex algorithms used to balance load in the APS cluster. The result is that the APS cluster will not respond optimally to user requests.

Additionally, placing the Info System Database on one of the APS machines in a cluster can impact the availability of this machine if that APS goes down.

Q: Previous versions allowed the APS to stay up even if the database server was unavailable, why is this no longer the case?

The main problem with the database availability is not for updates. Updates are handled by writing to the CITEMP directory. The problem is reading from the database. If the database is not available, the APS will not be able to access objects that are not loaded at APS startup time (see below)

Seagate Info system architecture, starting with version 6.0.2.2 requires the database to be present and available all the time. In previous versions, all objects were loaded into APS memory at startup time, leading to performance problems

in some larger deployments. To maximize performance, only necessary objects are loaded into APS memory at startup time, the rest are read from the Info System Database as needed. For this reason, the Info System Database must be available at all times.

Generally, if the database becomes unavailable the APS will retry its connection to the database 10 times. The APS will attempt a retry every minute and write an event to the application event log. If all ten retries fail, the APS will shut itself down and it will have to be restarted manually.

Q. Is the APS a multi-threaded application? What are the threads that the APS uses?

The APS is a multi-threaded application. Following is a list of threads:

- **Main thread** - Does 90 % of the work. Is based on Windows Messages. A Windows message handler dispatches the messages, and there are 'handlers' for each message. Messages can be triggered from an Info Desktop, an Info Server, or the APS itself.
- **DBWriterThread** - Writes objects and instances into the Database from the CITemp directory. The objects are written to CITemp by the Main Thread.
- **DBMonitorThread** - Tries to keep opening a connection to the Info System Database, to verify its health.
- **StartServiceThread** - Used when the APS is started as a service.
- **FileReceiverThreads** – Used to receive files transferred using the Sentinel
- **ReceiveMailThread** - Used when specifying mail slots as IPCMethod to receive messages from the Sentinel.
- **JoinClusterThread** - Used to announce APS startup or join an APS cluster at startup.
- **ClusterStreamListener** - Listens for cluster communications.
- **HeartBeatSender** - Periodically sends the heartbeat in a cluster to the other APS.
- **ClusterDatagramReader** - Keeps track of the cluster state
- **ListenClusterMessage** – Listens for cluster broadcasts.
- **WaitToTerminate** - Thread started to wait until all other threads have finished at shutdown time.
- **ReportCacheReader** - Reads the cache's directory CRH files at startup.

Q: What are the most intensive operations on the Info System Database?

Report scheduling/processing creates the most workload for the database. Changes to the desktop (i.e. adding/deleting objects), and changes to settings in Info Administrator are other processes that require inserts, updates or deletes to the system database. User login and report viewing are relatively low-demand operations.

In general, administrative changes are the most intensive in terms of database activity.

Q: What strategy should I take in deciding the frequency and how to backup the system database?

Generally, a normal database maintenance plan is sufficient.

Full backups should occur after the database was under heavy load from inserts/updates and deletes. This is most often the case during report batch scheduling/processing.

Full backups should be performed after batch report processing. For example, if a company processes reports from 12 am to 5 pm, a full backup should be performed at 5:30 am.

Transaction logs can have differential backups hourly or even every 15 minutes as long as this does not greatly affect database performance.

The above are just guidelines, backup frequency is a function of the client environment and the criticality of their report processing and data.

Q: What are some general principles that I can apply to the DBMS to tune and help increase the performance of the system data?

To minimize page contention, force row-level locking on the runtime image table (CI_RUNTIMEIMAGE).

Bind to memory or cache the "CI_RUNTIMEIMAGE" table, "CI_INFOOBJECTS" and "CI_USERS" tables and if resources are available, the "CI_SECRIGHTS" table.

Q: Which Info System Database fields should I index?

The Info System Database has been appropriately indexed for the purposes of running Seagate Info in most environments. Although it should not be necessary, should you wish to confirm optimal system performance, you may monitor the SQL commands that are received by the database from the APS and index the heavily used criteria, grouping and ordering fields accordingly. The SQL statements sent to the Info System Database are subject to change from release to release, and therefore we do not publish a list of these SQL statements.

Q: What are the binary fields in the "CI_RUNTIMEIMAGE", "CI_INFOOBJECT" and "CI_USERS" table?

These are essentially C++ objects in a binary form. The system takes an object, serializes it and writes it out to the database in a binary format as a blob field. If this information were stored in a relational format (multiple tables), multiple SQL statements would be needed to retrieve a single object. For the purposes of performance, using a binary field allows a single SQL statement to retrieve the entire object. These objects in the database vary in size as each object can have a different number of properties or user defined properties.

Q: When are changes to the APS written to the database?

Changes to the Info Administrator force a write to the database immediately. Adding, deleting or modifying objects are written to the database whenever the dbwriter thread gets a chance. Scheduling information is maintained in a RPA file in the CITemp directory and written out to the database at a fixed interval.

Q: Does the CInfo database utilize any check constraints, triggers, views or stored procedures?

No.

Q: Files exist in the \Citemp directory. What are these files for? How are they deleted?

Files in this directory are created when a user is in the Info Desktop adding, deleting or scheduling objects. The files can have the following extensions:

- **.FOB** - folder object
- **.ROB** -report object
- **.POB** - program object
- **.COB** - cube object
- **.LOB** - filtered cube
- **.JOB** -info object
- **.NOB** - channel object
- **.RPA** - report agent (report/query instance)
- **.CBA** -cube agent (cube instance)
- **.PGA** -program agent (program instance)

The APS creates one of these each time an object or instance is added, modified or deleted in the Info Desktop. The APS will read this file and update the APS database every 120 seconds. There are two registry settings related with this update:

NumObjectsPerDBWrite: How many objects (files) the APS will read and update each 120 seconds. The default value is 50 objects

SecondsToDelayWrite: Every 120 seconds the APS will read and update the objects that are at least SecondsToDelayWrite old.

The APS deletes these files as soon as the Info System Database information has been updated. The frequency of update of the database by the APS can be changed only in a cluster (set this with the option Sleep Interval in the clustering options in the Info Administrator). When the APS is started, it will check if there are files in the citemp directory; if any files are found, it will read them and update the system database.

The information contained in this document represents the best current view of Crystal Decisions on the issues discussed as of the date of publication, but should not be interpreted to be a commitment on the part of Crystal Decisions or a guarantee as to the accuracy of any information presented.

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