

Technical Bulletin:

c-tree Plus V8.27 (Build 071005)

Two independent issues affect FairCom's multi-user standalone operational model (*FPUTFGET*) which relies on the underlying operating system to ensure file locking integrity. This contrasts with FairCom's server-based models where locking is independently and solely maintained by the c-tree Server. These issues manifest in either of the following scenarios:

1. In environments where all machines accessing the data are using Windows Vista, it is possible for one c-tree Plus *FPUTFGET* application to “hang” when obtaining the record lock already owned by another *FPUTFGET* process. This impacts database files from many vendors and a patch from Microsoft is available.
2. In mixed OS environments (Windows XP with Vista for example) indexes can become out of sync resulting in **ITIM_ERR** (160) errors or even data corruption. This impacts versions of c-tree Plus V7 and V8 prior to V8.27 Build 071005 with *HUGE* files enabled, which is the default in V8.14 and later. This can also occur when using the c-tree Plus ODBC Driver in read/write mode and the *FPUTFGET* model of operation.

Applications using the c-tree Server and c-treeSQL Server are not impacted by these issues. These two situations, discussed in detail below, should be of immediate interest to FairCom customers.

Please contact your nearest FairCom office immediately should you have questions about using the c-tree Plus *FPUTFGET* model and *HUGE* files on Windows Vista.

Microsoft Hotfix for Windows Vista Locking Behaviors

There is a known issue with the Microsoft Windows Vista operating system that may impact your observed locking behavior. This behavior affects the c-tree Plus *FPUTFGET* model regardless of *HUGE* file usage. Please refer to the following Microsoft Knowledgebase entry regarding a supported hotfix.

[Access may stop responding when you open a remote database](http://support.microsoft.com/kb/935366/en-us)
<http://support.microsoft.com/kb/935366/en-us>

This hotfix may not be generally available and may need to be specifically requested for this observed behavior.

c-tree Plus *FPUTFGET* Locking with *HUGE* files on Windows Vista

FairCom's multi-user standalone operational model (*FPUTFGET*) relies on the underlying operating system to ensure file locking integrity. This contrasts with FairCom's server-based models where locking is independently and solely maintained by the c-tree Server. The release of Microsoft's Windows Vista operating system has impacted *FPUTFGET* based c-tree Plus applications under the following conditions:

- The application is linked with a c-tree Plus V7 or V8 library in multi-user standalone mode (*FPUTFGET*); and
- The c-tree Plus library has *HUGE* files enabled (c-tree technology for files > 4GB); and

Note: *HUGE* files are enabled by default beginning with c-tree Plus V8.14.

- The Microsoft Windows Vista operating system is used in a mixed OS environment (for example, with Windows XP or another OS.)

Symptoms Observed

When a c-tree Plus multiuser standalone (*FPUTFGET*) application was run under Windows Vista and accessed the same data file as an *FPUTFGET* process from a Windows XP (or other OS) machine, the two processes did not respect each others' record locks. Without proper locking, this can cause **ITEM_ERR** (160) errors if an index key value is involved in an update. Under the worst scenario, other non-key field updates could cause the data record to become out of sync resulting in out of sync, or data "corruption".

Note: c-tree Plus cannot determine when this has happened! Depending upon the application, this symptom may not be recognized for long periods of time. In some cases, many months could pass before an observation is made regarding the out of sync data.

c-tree Plus Modification

When c-tree Plus is initialized in *FPUTFGET* mode, c-tree Plus logic checks if the operating system on which the process is running supports *HUGE* files (files > 4 GB). However, the function that returns the operating system version did not recognize Windows Vista as a valid operating system version, as Windows Vista was not available at the time c-tree Plus Version 8 was released. As a result, c-tree Plus did not consider *HUGE* files an option with the Vista OS.

Versions of c-tree Plus after V8.27 (Build 071005) now recognize Windows Vista as a valid version of Windows and additional checks have been added such that new versions of Windows will be automatically recognized as they are introduced. Rather than checking that only Windows NT/2000/20003/XP support *HUGE* files, the logic now assumes that Win32s, Windows 95 and Windows 98 do **not** support files over 4 GB and all other versions do.

c-tree Plus ODBC

This change also affects the c-tree Plus ODBC Driver used to access *HUGE* files with the mentioned operating systems. This is only for those applications with *HUGE* files enabled and use the c-tree Plus ODBC Driver in read/write mode and the *FPUTFGET* model of operation. The above mentioned modifications are available for the c-tree Plus ODBC Driver.

Testing Windows Vista Locking with c-tree Plus **FPUTFGET**

It is easy to test your c-tree Plus *FPUTFGET* application for this behavior. The c-tree Plus example program, **ctixmg**, provides an easy-to-use application allowing for a simple controlled test. This example is built when you include samples in your c-tree Plus mtree build.

1. Build **ctixmg** choosing the multiuser standalone (*FPUTFGET*) c-tree Plus model.
2. Start two **ctixmg** instances on two different machines. (Vista to Vista or Vista to XP for example)
3. **B)egin** Locking from the first instance of **ctixmg**.
4. **A)dd** a record from the first instance of **ctixmg** and do not **E)nd** Locking.
5. **B)egin** Locking on the second instance of **ctixmg**.
6. Attempt to **U)pd**ate the same record as added in Step 4 from the second instance of **ctixmg**.
7. You should receive a **DLOK_ERR** error (42) from the second instance indicating that the expected and appropriate locking has taken place. If your application hangs (Vista to Vista), or the Update succeeds (Vista to XP), then you may require the Windows Vista hotfix and/or a c-tree Plus update.

FPUTFGET c-tree Library Modifications for Consistent Locking

c-tree Plus uses a maximum value to mark the top of the available locking region. You can manually set the top of the c-tree Plus lock region to ensure consistent locking for c-tree files. Add the following #defines at the bottom of your c-tree makefile used to build the *FPUTFGET* c-tree library. You will then need to recompile your application and the c-tree Plus library and relink your application to enable these changes.

```
echo #define ctLOCK_TOPhw      ((ULONG) 0x7fffffff)    >>$ (fcTOM) \ctoptn.h
echo #define ctLOCK_TOP      ((ULONG) 0xffffffff)    >>$ (fcTOM) \ctoptn.h
```

Keep in mind of what Windows operating systems you will be using with this change. While this will allow for proper locking in the c-tree Plus *HUGE* file range, this will not work with Windows 98, for example, as you will receive a seek error when attempting to go beyond the 4GB file size limit of that OS. For these mixed OS environments, it is best to contact FairCom and update to the latest version of c-tree Plus V8.27.

FairCom is always willing to adapt and customize its technology and meet specific application needs, and we are dedicated to providing proven, high-performance database technology. Therefore, we appreciate any input that will further enhance our technology and fulfill your needs. Thank you for choosing FairCom and we hope these enhancements will help you in all the ways possible.

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