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*GemStone*®

# **GemStone/S 64 Bit™**

## **Release Notes**

**Version 2.4.7**

December 2015



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## PATENTS

GemStone software is covered by U.S. Patent Number 6,256,637 "Transactional virtual machine architecture", Patent Number 6,360,219 "Object queues with concurrent updating", Patent Number 6,567,905 "Generational garbage collector with persistent object cache", and Patent Number 6,681,226 "Selective pessimistic locking for a concurrently updateable database". GemStone software may also be covered by one or more pending United States patent applications.

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# Preface

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## About This Documentation

These release notes describe changes in the GemStone/S 64 Bit™ version 2.4.7 release. Read these release notes carefully before you begin installation, conversion testing, or development with this release.

For information on installing or upgrading to this version of GemStone/S 64 Bit, please refer to the appropriate *GemStone/S 64 Bit Installation Guide* for version 2.4.7.

These documents are available on the GemTalk website, as described below.

## Terminology Conventions

The term “GemStone” is used to refer to the server products GemStone/S 64 Bit and GemStone/S, and the GemStone family of products; the GemStone Smalltalk programming language; and may also be used to refer to the company, now GemTalk Systems, previously GemStone Systems, Inc. and a division of VMware, Inc.

## Technical Support

### Support Website

[gemtalksystems.com](http://gemtalksystems.com)

GemTalk’s website provides a variety of resources to help you use GemTalk products:

- ▶ **Documentation** for the current and for previous released versions of all GemTalk products, in PDF form.
- ▶ **Product download** for the current and selected recent versions of GemTalk software.
- ▶ **Bugnotes**, identifying performance issues or error conditions that you may encounter when using a GemTalk product.
- ▶ **TechTips**, providing information and instructions that are not in the documentation.

- ▶ **Compatibility matrices**, listing supported platforms for GemTalk product versions.

This material is updated regularly; we recommend checking this site on a regular basis.

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You may need to contact Technical Support directly, if your questions are not answered in the documentation or by other material on the Technical Support site. Technical Support is available to customers with current support contracts.

Requests for technical assistance may be submitted online, by email, or by telephone. We recommend you use telephone contact only for more serious requests that require immediate evaluation, such as a production system down. The support website is the preferred way to contact Technical Support.

**Website:** [support.gemtalksystems.com](http://support.gemtalksystems.com)

**Email:** [techsupport@gemtalksystems.com](mailto:techsupport@gemtalksystems.com)

**Telephone:** (800) 243-4772 or (503) 766-4702

When submitting a request, please include the following information:

- ▶ Your name and company name.
- ▶ The versions of GemStone/S 64 Bit and of all related GemTalk products, and of any other related products, such as client Smalltalk products.
- ▶ The operating system and version you are using.
- ▶ A description of the problem or request.
- ▶ Exact error message(s) received, if any, including log files if appropriate.

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# GemStone/S 64 Bit

## 2.4.7 Release Notes

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### Overview

GemStone/S 64 Bit 2.4.7 is a new version of the GemStone/S 64 Bit object server. This release fixes a number of bugs, and adds some new features.

The GemStone/S 64 Bit 2.4.x version line is under legacy support; we recommend customers upgrade to the latest version, currently 3.2.11, to take advantage of the performance benefits, new features, and bug fixes. Version 2.4.7, provides a subset of key improvements, for customers who are not yet able to upgrade to v3.x.

These release notes provide changes between the previous version of GemStone/S 64 Bit, version 2.4.6, and version 2.4.7. If you are upgrading from a version prior to 2.4.6, review the release notes for each intermediate release to see the full set of changes.

For details about installing GemStone/S 64 Bit 2.4.7 or upgrading from earlier versions of GemStone/S 64 Bit, see the *GemStone/S 64 Bit Installation Guide* for v2.4.7 for your platform.

### Supported Platforms

#### Platforms for Version 2.4.7

GemStone/S 64 Bit version 2.4.7 is supported on the following platforms:

- ▶ Solaris 10 and 11 on SPARC
- ▶ Solaris 10 on x86
- ▶ AIX 6.1 and AIX 7.1
- ▶ Red Hat Linux ES 6.4, 6.5, and 6.7; Ubuntu 12.04; and SUSE Linux Enterprise 12, on x86

For more information and detailed requirements for supported platforms, please refer to the *GemStone/S 64 Bit Installation Guide* for that platform.

## GBS Versions

The following versions of GBS are supported with GemStone/S 64 Bit version 2.4.7.

### GBS version 7.6.1

VisualWorks 7.10.1 32-bit	VisualWorks 7.10.1 64-bit	VisualWorks 7.9.1 32-bit
<ul style="list-style-type: none"> <li>▶ Windows 8, Windows 2008 R2, and Windows 7</li> <li>▶ Solaris 10 on SPARC</li> <li>▶ RedHat Linux ES 6.4 and 6.5, and SUSE Linux ES 12</li> </ul>	<ul style="list-style-type: none"> <li>▶ Solaris 10 on SPARC</li> <li>▶ RedHat Linux ES 6.4 and 6.5, and SUSE Linux ES 12</li> </ul>	<ul style="list-style-type: none"> <li>▶ Windows 2008 R2 and Windows 7</li> <li>▶ Solaris 10 on SPARC</li> <li>▶ RedHat Linux ES 6.4 and 6.5, and SUSE Linux ES 12</li> </ul>

### GBS version 7.4.1

VisualWorks 7.8.1 32-bit
<ul style="list-style-type: none"> <li>▶ Windows 7</li> </ul>

### GBS version 5.3.2

VA Smalltalk 8.5.2	VA Smalltalk 8.0.2
<ul style="list-style-type: none"> <li>▶ Windows 2008 R2 and Windows 7</li> </ul>	<ul style="list-style-type: none"> <li>▶ Windows 2008 R2 and Windows 7</li> </ul>

For more details on supported GBS and client Smalltalk platforms and requirements, see the *GemBuilder for Smalltalk Installation Guide* for that version of GBS.

## VSD Version

Since v2.4.6, there have been many changes in how VSD is managed. VSD is now distributed as a separate product with separate version numbers and separate documentation, as well as included with the GemStone/64 Bit distributions.

VSD has updated TCL and other libraries, and has been completely rebuilt for Windows. The VSD distributions is now included with the GemStone/S 64 Bit client library distribution on Windows.

The GemStone/S 64 Bit v2.4.7 distribution includes VSD version 5.0.1.

For Documentation, and Release Notes that include recent changes, see <https://gemtalksystems.com/products/vsd>.



## Changes and New Features

### Updated Client Platforms

Version 2.4.7 has updated platforms from the previous version; in some cases the base platform version has changed.

In particular, the Windows Client libraries have been recompiled on later versions, since Windows XP has passed its end-of-life. Client applications on Windows must now use Windows 2008/Windows 7 or later.

The Installation Guides have been updated with new platform information. For updated compile and link flags, see “GCI Compile and Link Information” on page 15.

### Distribution changes related to VSD

GemStone distributions on all platforms include 64-bit VSD, with additional file/s that are part of recent VSD versions. In addition, the distribution includes a directory `$/GEMSTONE/bin32`, which contains 32-bit VSD.

### Increase in hard limit to number of sessions

Previously, the hard upper limit on the `STN_MAX_SESSIONS` was 10000; this limit has been increased to 32767.

### Support for `pageaudit -d` option

The `pagaudit` utility now supports the `-d` option, which skips auditing data pages. Default auditing of data pages by `pageaudit` was added in v2.4.5.

### Linux Posix AIO feature removed

Previous versions included an optimization to allow use of Posix AIO on Linux. The third-party libraries supporting this feature have not been maintained, and the performance benefit is not needed with newer Linux configurations, so this feature and associated executables have been removed.

#### **startstone -s option removed**

The Linux-only `-s` option to `startstone`, which bypassed this feature, has been removed.

### Admin gem now shut down during restore from backup

To avoid potential conflicts between GC operations during restore, the Admin GcGem is now shut down during restore from backup.

### Support for 2M Memory Pages for SPC on Linux

By default, Linux uses 4KB (small) pages. With v2.4.7, you may now configure your system to use 2MB Large Memory Pages on Linux for the shared page cache.

To use large memory pages on Linux for the shared page cache, you must first determine how much space you require for the SPC and configure Linux to allocate at least this many large memory pages, and then enable GemStone/S 64 Bit to request large memory pages by setting an environment variable prior to startup.

## Determining the required number of large memory pages

You will first need to determine how much space is needed for the shared page cache. This is a two-step process.

(1) The easiest way to get the required values is to start up GemStone with the desired configuration, and inspect the shared page cache monitor log. These example numbers are for a system with a 20 GB cache. Looking at the *stonename\_pidpcmon.log*, these are the values that are needed:

Number of pages	1250000
Number of processes	1022
TargetFreeFrameCount	7000
Number of shared counters	1900

(2) Once you have the GemStone parameters, start the shrpcmonitor directly and enter the parameters to compute the target size.

```

unix>$GEMSTONE/sys/shrpcmonitor
<prints header information>
SHRPCMON>1250000 setnumpages
SHRPCMON>1022 setnumprocs
SHRPCMON>1900 setnumsharedctrs
SHRPCMON>7000 settargetfflimit
SHRPCMON>getrequiredsize
For 1250000 pages, 1022 processes and 1900 shared counters,
required cache size is 21325807616 bytes.
To use 2 MB large memory pages: 21325938688 bytes are required
for alignment.
Number of 2 MB large pages required: 10169
Commands to enable large pages on Linux. Run as root:
#echo 10169 > /proc/sys/vm/nr_hugepages
The above command only enables large pages until the next
system reboot.
To permanently enable large pages, you must also do this as
root:
#echo "vm.nr_hugepages=10169" >> /etc/sysctl.conf
Commands to enable the shared page cache monitor to allocate
large memory pages:
#/sbin/setcap cap_ipc_lock=pe $GEMSTONE/sys/startshrpcmon
#/sbin/setcap cap_ipc_lock=pe $GEMSTONE/sys/shrpcmonitor
Alternatively, the SPC monitor process can be run with an
effective user ID of root:
#chown root $GEMSTONE/sys/shrpcmonitor
$GEMSTONE/sys/startshrpcmon
#chmod u+s $GEMSTONE/sys/shrpcmonitor
$GEMSTONE/sys/startshrpcmon
Command to query the status of large pages:
>grep Huge /proc/meminfo

```

In this example, the result of the computation is that the shared page cache will require 21325807616 bytes (the 20 MB configured size plus overhead).

Large memory pages are 2 MB, so divide 21325807616 by the 2MB page size, rounding up for alignment. This gives a minimum of 10169 large memory pages that are required for a SPC with this configuration.

These computations are included in the output from `getrequiredsize`.

### **Configure Linux to use the required number of Large Memory Pages**

Linux must be configured to use the required number of large pages, by executing the following commands. These instructions are also output by `getrequiredsize`.

You must execute these as root.

To enable large pages in the current system, which will be in effect until the next system reboot:

```
echo numpages > /proc/sys/vm/nr_hugepages
```

To permanently enable large pages:

```
echo "vm.nr_hugepages=numpages" >> /etc/sysctl.conf
```

You can confirm large memory pages are available for use with:

```
grep Huge /proc/meminfo
```

### **Enable the Process to Allocate Large Pages**

You can configure the executables to be allowed to allocate large pages:

```
/sbin/setcap cap_ipc_lock=pe $GEMSTONE/sys/startshrpcmon  
/sbin/setcap cap_ipc_lock=pe $GEMSTONE/sys/shrpcmonitor
```

Alternatively, the SPC monitor process can be run with an effective user ID of root:

```
chown root $GEMSTONE/sys/shrpcmonitor $GEMSTONE/sys/startshrpcmon  
chmod u+s $GEMSTONE/sys/shrpcmonitor $GEMSTONE/sys/startshrpcmon
```

### **Enabling Large Memory Pages in GemStone/64**

GemStone will attempt to allocate the shared page cache using large memory pages based on the value of the added environment variable `GS_SPC_USE_LARGE_PAGES`.

- ▶ If this is not set, large pages are not used.
- ▶ if this is set to 1, it is advisory mode: Large memory pages are requested but the cache still starts if the request is not granted by the system.
- ▶ If this is set to 2, it is mandatory mode. Large memory pages are requested and the cache fails to start if the request is not granted by the system.

When you start GemStone, the shared page cache monitor log will include a line of the form:

```
[Info]: Shared page cache was successfully created using large  
memory pages.
```

### **GemStone Shared Memory Debugging**

For debugging problems in shared memory, use the `GS_DEBUG_SHARED_MEM` environment variable. The SPC monitor process will print extra debugging information to its log file if the following is set:

```
export GS_DEBUG_SHARED_MEM=1
```

## Changes in Cache Statistics

### Change in GemStone process statistics on Linux

On Linux, cache statistics are collected from `/proc/pid/status` rather than from `/proc/pid/statm`. This provides some additional statistics, included in the lists below. As a result of this change, **SharedKBytes** and **RSSDirty** are no longer collected on Linux

### Added statistics for Linux only

#### **MaxImageSize** (All)

The maximum (high water) size of the process's image in kilobytes.

#### **MaxRSS** (All)

The high water mark of the processes resident set size.

#### **RSSStack** (All)

The stack resident set size.

#### **PageTablesMemoryKB** (All)

The amount of memory dedicated to low-level page tables.

#### **ThreadCount** (All)

Number of threads currently active in this process. An instruction is the basic unit of execution in a processor, and a thread is the object that executes instructions. Every running process has at least one thread.

#### **VolCSW** (All)

The number of voluntary context switches done by the process. Note that this counter is always 0 on HP-UX.

#### **IVolCSW** (All)

The number of times the process was forced to do a context switch. Note that this counter is always 0 on HP-UX.

#### **FileBufferSizeKB** (System statistic)

The amount of memory used in file buffers.

#### **CachedMemoryKB** (System statistic)

The amount of memory used as cache memory.

#### **CachedSwapKB** (System statistic)

The amount of swap used as cache memory.

#### **ActiveMemoryKB** (System statistic)

The amount of memory that has been used more recently and usually not reclaimed unless absolutely necessary.

#### **InactiveMemoryKB** (System statistic)

The amount of memory which has been less recently used. It is more eligible to be reclaimed for other purposes.

#### **ActiveAnonMemoryKB** (System statistic)

The amount of non-file backed memory that has been used more recently.

#### **InactiveAnonMemoryKB** (System statistic)

The amount of non-file backed memory that has not been used recently.

**ActiveFileMemoryKB** (System statistic)

The amount of memory used for buffering files that has been used recently.

**InactiveFileMemoryKB** (System statistic)

The amount of memory used for buffering files that has not been used recently.

**UnevictableMemoryKB** (System statistic)

The amount of memory that cannot be swapped.

**LockedMemoryKB** (System statistic)

The amount of memory that has been locked using mlock(2) or similar calls. Locked memory cannot be swapped.

**WritebackMemoryKB** (System statistic)

The amount of memory which is actively being written back to disk.

**AnonymousMemoryKB** (System statistic)

The amount of non-file backed memory mapped into userspace page tables.

**MappedMemoryKB** (System statistic)

The amount of memory which has been mapped to files.

**SharedMemoryKB** (System statistic)

The amount of memory enabled for sharing between multiple processes via shmat(2) and mmap(2) with the MAP\_SHARED attribute set.

**KernelDataMemoryKB** (System statistic)

The amount of memory used by the kernel for caching data structures.

**KernelDataReclaimableMemoryKB** (System statistic)

The amount of memory used by the kernel for caching data structures that may be reclaimed.

**KernelDataUnreclaimableMemoryKB** (System statistic)

The amount of memory used by the kernel for caching data structures that cannot be reclaimed.

**KernelStackMemoryKB** (System statistic)

The amount of memory used by the kernel stack.

**PageTablesMemoryKB** (System statistic)

The amount of memory dedicated to low-level page tables.

**NfsUnstableMemoryKB** (System statistic)

The amount of memory used by NFS pages sent to the server, but not yet committed to stable storage.

**BounceMemoryKB** (System statistic)

The amount of memory used for bounce buffers for block devices.

**WritebackTmpMemoryKB** (System statistic)

Amount of memory used by FUSE (Filesystem in Userspace) filesystems.

**CommitLimitKB** (System statistic)

The total amount of memory currently available to be allocated on the system.

**CommittedAsKB** (System statistic)

The amount of memory presently allocated on the system, including memory allocated by processes that has not yet been used.

**HardwareCorrupted** (System statistic)

A boolean indicating if the system has detected a memory failure.

**AnonHugePagesKB** (System statistic)

The amount of non-file back memory backed by huge memory pages.

**HugePagesTotalKB** (System statistic)

The total amount of memory in the huge pages pool.

**HugePagesFreeKB** (System statistic)

The amount of memory in the huge pages pool that has not yet been allocated.

**HugePagesRsvdKB** (System statistic)

The amount of memory in the huge pages pool for which a commitment to allocate from the pool has been made, but no allocation has yet been made.

**HugePagesSurpKB** (System statistic)

The amount of memory in the huge pages pool above the value in `/proc/sys/vm/nr_hugepages`.

**HugePageSize** (System statistic)

The size of a huge memory page in bytes.

## GCI Compile and Link Information

### AIX

#### Compiler version

IBM XL C/C++ for AIX, V11.1

#### Debugger version

dbx

#### Compiling a User Action or GCI Application

```
xlC_r -O3 -qstrict -qalias=noansi -+ -D_REENTRANT -DNOT_JAVA_VM  
-D_THREAD_SAFE -q64 -qplic -qnoeh -qthreaded -qarch=pwr5  
-qtune=balanced -qlist=offset -DFLG_AIX_VERSION=aixVer  
-qsuppress=1500-010:1500-029:1540-1103:1540-2907:1540-  
0804:1540-1281:1540-1090  
-qminimaltoc -I$GEMSTONE/include -c userCode.c -o userCode.o
```

Depending on your version of AIX, you need to include either `-DFLG_AIX_VERSION=61` or `-DFLG_AIX_VERSION=71`.

Also note that there is no space in the `-qsuppress` arguments that are continued on the following line.

#### Linking a User Action

```
xlC_r -G -q64 userCode.o $GEMSTONE/lib/gciualib.o  
-o libuserAct.so -e GciUserActionLibraryMain -L/usr/vacpp/lib  
-lpthreads -lC_r -lm -ldl
```

#### Linking a GCI Application

```
xlC_r -q64 userCode.o $GEMSTONE/lib/gcirtlobj.o -L/usr/vacpp/lib  
-lpthreads -lC_r -lm -ldl -Wl,-brtllib -q64 -Wl,-berok  
-o userAppl
```

### Linux

#### Compiler version

Red Hat 6.5: gcc/gcc/g++ 4.4.7

Ubuntu Linux 12.04: gcc/g++ 4.6.3

SUSE Linux 12: gcc/g++ 4.8.5

#### Debugger version

Red Hat 6.5: GNU gdb 7.2-60.el6\_4.1

Ubuntu Linux 12.04: GNU 7.4-2012.04

SUSE Linux 12: GNU gdb 7.9.1

## Compiling a User Action or GCI Application

```
g++ -fmessage-length=0 -fcheck-new -O3 -m64 -pipe -D_REENTRANT
-DNOT_JAVA_VM -D_GNU_SOURCE -pthread -fPIC -m64
-fno-strict-aliasing -I$GEMSTONE/include -x c++ -c userCode.c
-o userCode.o
```

The following warn flags are recommended for compilation:

```
-Wformat -Wtrigraphs -Wcomment -Wsystem-headers -Wswitch
-Wno-aggregate-return -Wshadow -Wunused-value -Wunused-variable
-Wunused-label -Wno-unused-function -Wchar-subscripts
-Wconversion -Wmissing-braces -Wmultichar -Wparentheses
-Wsign-compare -Wsign-promo -Wwrite-strings -Wreturn-type
```

## Linking a User Action

```
g++ -shared -Wl,-Bdynamic,-hlibuserAct.so userCode.o
$GEMSTONE/lib/gciualib.o -o libuserAct.so -m64 -lpthread
-lcrypt -ldl -lc -lm -Wl,--no-undefined -Wl,-z,muldefs
```

## Linking a GCI Application

```
g++ userCode.o $GEMSTONE/lib/gcirtlobj.o -m64 -lpthread -lcrypt
-ldl -lc -lm -Wl,--no-undefined -Wl,-z,muldefs
-Wl,--warn-unresolved-symbols -o userAppl
```

## Solaris/SPARC

### Compiler version

CC: Sun C++ 5.8 Patch 121017-05 2006/08/30

### Debugger version

Sun Dbx Debugger 7.5 Patch 121023-07 2010/09/22

## Compiling a User Action or GCI Application

```
CC -xO4 -xcode=pic32 -xarch=v9 -mt -xchip=ultra2 -D_REENTRANT
-DNOT_JAVA_VM -I$GEMSTONE/include -features=no%except
-features=no%anachronisms -c userCode.c -o userCode.o
```

## Linking a User Action

```
CC -G -Bsymbolic -h libuserCode.so -i -xarch=v9 userCode.o
$GEMSTONE/lib/gciualib.o -o libuserAct.so -Bdynamic -lc
-lpthread -ldl -lrt -lsocket -lnsl -lm -lCrun
```



## Linking a GCI Application

```
CC -xildoff -xarch=v9 -i userCode.o $GEMSTONE/lib/gcirtlobj.o  
-Bdynamic -lc -lpthread -ldl -lrt -lsocket -lnsl -lm -lCrun  
-z nodefs -o userAppl
```

## Solaris x86

### Compiler version

CC: Sun C++ 5.10 SunOS\_i386 128229-09 2010/06/24

### Debugger version

Sun DBX Debugger 7.7 SunOS\_i386 2009/06/03

### Compiling a User Action or GCI Application

```
CC -xO4 -m64 -Kpic -mt -D_REENTRANT -DNOT_JAVA_VM  
-I$GEMSTONE/include -features=no%except -c userCode.c  
-o userCode.o
```

### Linking a User Action

```
CC -G -Bsymbolic -h libuserCode.so -i -m64 userCode.o  
$GEMSTONE/lib/gciualib.o -o libuserAct.so -Bdynamic -lc  
-lpthread -ldl -lrt -lsocket -lnsl -lm -lCrun
```

### Linking a GCI Application

```
CC -xildoff -m64 -i userCode.o $GEMSTONE/lib/gcirtlobj.o  
-Bdynamic -lc -lpthread -ldl -lrt -lsocket -lnsl -lm -lCrun  
-z nodefs -o userAppl
```

## Bug Fixes

The following bugs are fixed in the 2.4.7 release:

### NetGetPeer info may SEGV

Lookup failure in `gethostbyaddr_r`, when looking up the name for the IP address of the gem socket connection, may SEGV. (#44804)

### Stone startup failure timeout too long

If the shared page cache cannot be started, the SPC monitor fails immediately, but the startup failure was not reported to the user until a timeout had elapsed. (#45763)

## Conversion Related Issues

### SymbolGem startup failure during conversion

The restart during conversion from 6.x includes startup of the SymbolGem. This startup may have failed under some invalid Segment configurations (#44630).

### AUTH\_ERR\_SEG\_READ\_RECURSION now fatal error

The error `AUTH_ERR_SEG_READ_RECURSION` is now a fatal error, and has been renumbered from 2174 to 4015.

### Mis-configured conversion does not report useful error messages

During the `conv6xTo2x` step of conversion, if you specify a configuration file with the 2.x rather than 6.x extents, the conversion fails without producing any log information to determine the cause. (#44657)

## Indexing Related Issues

### Faster removal of all indexes

When dropping all indexes in the repository, you may now do this more efficiently using the new method `IndexManager >> removeAllTracking`. This method not only removes indexes, but also removes all modification tracking (clears all `DependencyLists` and reinitializes `SharedDependencyList`). This is faster and more efficient than `removeAllIndexes`. However, if you are using modification tracking for another purpose, such as with `GemConnect`, this method should not be used, since that tracking would also be removed.

### DependencyList not in SharedDependencyList

It was possible for `DependencyLists` to not be in the `SharedDependencyLists` structure, and this was not caught by index audit. There was no error conditions resulting from this; the consequence was extra instances of `DependencyList`. This condition is now caught by audit, and repaired. (#41868)

### **IndexManager did not autoCommit during DependencyList removal**

When removing an index, the IndexManager autoCommit normally allows periodic commits. This was not occurring during execution while removing DependencyLists. With a very large number of DependencyLists, this could result in excessively large dirty sets. (#43647)

### **removeAllIncompleteIndexes may error, preventing index removal**

When an incompletely created index had been left with particular internal indexing structure variables that were nil or of size zero, removeAllIncompleteIndexes resulted in an error. #(43658)

### **Corrupted RcIndexBucketWithCache has nil for cacheValue instead of number**

GemStone identity indexes and most equality indexes use an internal structure, an instance of RcIndexDictionary, which contains instances of RcIndexBucketWithCache. When these collision buckets are fully packed (1380 entries), removing an element may corrupt the RcIndexBucketWithCache, and thus the index. (#43801)

## **Bugs in Cache Statistics**

### **Linux network stats had incorrect values**

The statistics related to network performance were incorrect for Linux hosts; some values were unreasonably high, others were zero. (#45051)

### **Linux cache statistics PercentCpu\* stats may go out of range**

System cache statistics such as PercentCpuActive, PercentCpuIdle, etc., could be reported as greater than 100 or less than 0. (#45729)

### **AIX cache statistic PercentCpuIdle may have invalid value**

The calculation for the cache statistics PercentCpuIdle was subject to a rounding error, which resulted in values of -1 recorded in statmonitor data. VSD displayed this as an unsigned int, 4294967295. (#45654)

### **AIX cache statistics for memory page had incorrect scale**

The following cache statistics were expressed on AIX as the number of 4KB pages, rather than KB, and so were understated 4x in the statmonitor data. This has been corrected, and these statistics are now in correctly in KB. (#45058)

- DataRSS**
- TextRSS**
- DataVmSize**