
GemStone®

GemStone/S Release Notes

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GEMSTONE®
Version 6.1.5

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Patents

GemStone is covered by U.S. Patent Number 6,256,637 "Transactional virtual machine architecture" and Patent Number 6,360,219 "Object queues with concurrent updating". GemStone may also be covered by one or more pending United States patent applications.

Preface

About This Documentation

These release notes describe new features and bugs fixed in the GemStone/S version 6.1.5 release.

We recommend that everyone using GemStone/S read these release notes before beginning installation or development. These release notes are also available on the GemStone customer website, as described in the next section.

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

Technical Support

GemStone provides several sources for product information and support. The product-specific manuals and online help provide extensive documentation, and should always be your first source of information. GemStone Technical Support engineers will refer you to these documents when applicable.

GemStone Web Site: <http://support.gemstone.com>

GemStone's Technical Support website provides a variety of resources to help you use GemStone products. Use of this site requires an account, but registration is free of charge. To get an account, just complete the Registration Form, found in the same location. You'll be able to access the site as soon as you submit the web form.

The following types of information are provided at this web site:

Help Request allows designated support contacts to submit new requests for technical assistance and to review or update previous requests.

Documentation for GemStone/S is provided in PDF format. This is the same documentation that is included with your GemStone/S product.

Release Notes and **Install Guides** for your product software are provided in PDF format in the Documentation section.

Downloads and **Patches** provide code fixes and enhancements that have been developed after product release. Most code fixes and enhancements listed on the GemStone Web site are available for direct downloading.

Bugnotes, in the Learning Center section, identify performance issues or error conditions that you may encounter when using a GemStone product. A bugnote describes the cause of the condition, and, when possible, provides an alternative means of accomplishing the task. In addition, bugnotes identify whether or not a fix is available, either by upgrading to another version of the product, or by applying a patch. Bugnotes are updated regularly.

TechTips, also in the Learning Center section, provide information and instructions for topics that usually relate to more effective or efficient use of GemStone products. Some Tips may contain code that can be downloaded for use at your site.

Community Links provide customer forums for discussion of GemStone product issues.

Technical information on the GemStone Web site is reviewed and updated regularly. We recommend that you check this site on a regular basis to obtain the latest technical information for GemStone products. We also welcome suggestions and ideas for improving and expanding our site to better serve you.

You may need to contact Technical Support directly for the following reasons:

- ▶ Your technical question is not answered in the documentation.
- ▶ You receive an error message that directs you to contact GemStone Technical Support.
- ▶ You want to report a bug.
- ▶ You want to submit a feature request.

Questions concerning product availability, pricing, keyfiles, or future features should be directed to your GemStone account manager.

When contacting GemStone Technical Support, please be prepared to provide the following information:

- ▶ Your name, company name, and GemStone/S license number
- ▶ The GemStone product and version you are using
- ▶ The hardware platform and operating system you are using
- ▶ A description of the problem or request
- ▶ Exact error message(s) received, if any

Your GemStone support agreement may identify specific individuals who are responsible for submitting all support requests to GemStone. If so, please submit your information through those individuals. All responses will be sent to authorized contacts only.

For non-emergency requests, the support website is the preferred way to contact Technical Support. Only designated support contacts may submit help requests via the support website. If you are a designated support contact for your company, or the designated contacts have changed, please contact us to update the appropriate user accounts.

Email: support@gemstone.com

Telephone: (800) 243-4772 or (503) 533-3503

Requests for technical assistance may also be submitted 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 that is non-operational. In these cases, please also submit your request via the web or email, including pertinent details such as error messages and relevant log files.

If you are reporting an emergency by telephone, select the option to transfer your call to the technical support administrator, who will take down your customer information and immediately contact an engineer.

Non-emergency requests received by telephone will be placed in the normal support queue for evaluation and response.

24x7 Emergency Technical Support

GemStone offers, at an additional charge, 24x7 emergency technical support. This support entitles customers to contact us 24 hours a day, 7 days a week, 365 days a year, if they encounter problems that cause their production application to go down, or that have the potential to bring their production application down. For more details, contact your GemStone account manager.

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- ▶ Customized consulting services can help you make the best use of GemStone products in your business environment.

Contact your GemStone account representative for more details or to obtain consulting services.

Chapter 1. GemStone/S 6.1.5 Release Notes

Overview 1-1

New Features 1-1

 Incremental Tranlogging removed 1-1

 New protocol to repair invalid references in UnorderedCollections 1-1

 Number of gem session stats increased to 48 1-2

 Maximum session limit increased to 8192 1-2

 GciProduct() GCI call added 1-2

 Improved monitoring of asynchronous I/O issues. 1-2

 Updated version of VSD. 1-2

 Timestamps added to GciTracing logs. 1-2

Bugs Fixed 1-3

 UnorderedCollections could retain references to garbage objects 1-3

 LostOTRoots on session login. 1-3

 Stack overflows when using gcd: with extremely large values 1-3

 PDR Gems with #reclaimStatsEnabled set to true could cause corruption. 1-3

 reclaimAll with #reclaimStatsEnabled set to true caused hang 1-3

 Copydbf did not check extent version compatibility 1-3

 Excessive System CPU use on busy systems 1-4

 Improvements to Stone's use of SMC queue 1-4

 STN_MAX_AIO_RATE could not be set above 600 1-4

 Failure in polling causes hot loop. 1-4

 One second freeze on checkpoint start. 1-4

 Potential for page cache faults on Linux 1-4

 Replicating structures containing any unauthorized objects errored. 1-4

 Cannot migrate instances of classes that reimplement firstPublicInstVar 1-4

 Tranlog full condition could lose reclaimed oops. 1-4

 DoubleByteString and DoubleByteSymbol bugs fixed 1-5

Character find methods hang on DoubleByteString > 4048.	1-5
Conversion of large Strings to DoubleByteStrings broken	1-5
Finding index of substrings in DoubleByteStrings broken	1-5
withLFs broken for DoubleByteStrings	1-5
Handling of DoubleByteSymbols containing single byte Characters .	1-5
Noncanonical DoubleByteSymbols	1-6
DoubleByteSymbols do not display as Symbols	1-6
Uppercase/lowercase not handled correctly for Characters > \$z	1-6
Backups could have paused indefinitely	1-6
Writing tranlogs to /dev/null could have resulted in SIGSEGV	1-6
Possible error while restoring backups with possibleDead.	1-6
Core file location on Linux	1-6
reclaimAll problems risked leaving session count wrong	1-7
descriptionOfSession: could return invalid session	1-7
System>>cacheStatistics: could return nil for valid session	1-7
DepListTable>>rebuildTable: left objects in incorrect Segment	1-7
Missing method required to replicate instances of subclasses of RcIdentityBag	1-7
Error message modifications.	1-7

GemStone/S 6.1.5

Release Notes

Overview

GemStone/S 6.1.5 is a new version of the GemStone Smalltalk object server. This release contains new features, and fixes for a number of bugs and performance issues. We recommend everyone using GemStone/S to upgrade to version 6.1.5.

For details about installing GemStone/S 6.1.5 or upgrading from a previous release of GemStone/S, see the *GemStone/S Installation Guide*.

New Features

Incremental Tranlogging removed

Incremental tranlogging, where tranlogging entries in the tranlogs do not always include all information about the changes, is no longer used. There were known problems with incremental tranlogs, entailing a slight risk that the tranlogs could be missing information and not usable for recovery/restore. This change may result in somewhat larger transaction logs, depending on the nature the changes your application makes; ensure that you have adequate tranlog space available.

New protocol to repair invalid references in UnorderedCollections

Due to bug #30176, there may be invalid references in existing UnorderedCollections. For more information on this bug, refer to the discussion in the 'Bugs Fixed' section under the bug "UnorderedCollections could retain references to garbage objects" on page 1-3

The following methods have been added in 1.1 to detect and repair invalid references in UnorderedCollections:

```
UnorderedCollection>>auditInternalStructures  
UnorderedCollection>>auditAndRepairInternalStructures  
UnorderedCollection>>auditInternalStructuresWithRepair:
```

These methods detect and repair references within a specific Collection, and are primarily intended to be run from linked topaz.

Number of gem session stats increased to 48

There are now 48 gem session statistic slots available for use.

Maximum session limit increased to 8192

The upper limit for STN_MAX_SESSIONS is now 8192.

GciProduct() GCI call added

To allow GBS login to differentiate between the various GemStone/S Server products, the GciProduct() call has been added. This function returns an 8-bit unsigned integer indicating the GemStone/S product to which the client library belongs. Currently defined return values are:

- 1 - GemStone/S
- 2 - GemStone/S 2G
- 3 - GemStone/S 64

Improved monitoring of asynchronous I/O issues

Improperly configured or very slow asynchronous I/O can encounter buffer limits in GemStone; which results in brief system hangs. This release includes improved ability to detect this problem.

The following cache statistics have been added:

LogIOSlotCount (stone)

Number of slots available for asynchronous I/O operations for tranlog writes. If this value drops below 3, the stone may have to wait for earlier asynchronous writes to complete before starting a new one. This wait time is reported in TimeInLogIOWait.

TimeInLogIOWait (stone)

The total amount of real time in milliseconds that the stone has had to wait for prior asynchronous tranlog writes to complete before starting a new one. A high value here indicates problems with asynchronous writes on the stone machine.

In addition, if slow AIO performance causes TimeInLogIOWait, a warning is printed to the stone log.

Updated version of VSD

The version of VSD that was provided with previous versions of GemStone/S was not able to read the statistics files produced by the new GBS statistics logging feature. GemStone/S 6.1.5 includes VSD version 207.06, which can read these files. There are other improvements in this version of VSD; see "New Features" under the VSD application's **Help** menu item **About VSD...**

Timestamps added to GciTracing logs

To make it easier to analyze multiple logs, timestamps have been added to the GciTracing logs.

Bugs Fixed

UnorderedCollections could retain references to garbage objects

When UnorderedCollections or Non-Sequenceable Collections (NSCs) changed size, in some cases the internal data structure was not correctly cleared, leaving duplicate references to the objects contained in the collection. If these objects were later removed from the collection, the extra reference would remain. This caused no problems with the collection itself, but the existence of the reference prevented the removed object from being garbage collected. This bug is fixed, so no new cases of duplicate references will be introduced. However, existing collections may contain incorrect references, and should be repaired. Smalltalk image methods have been added to do this. See “New protocol to repair invalid references in UnorderedCollections” on page 1-1. (#30176)

LostOTRoots on session login

Under some circumstances, sessions logging in may have immediately (incorrectly) received lostOTRoot signals. This was only seen with gems running on remote gem servers on multiprocessor machines. The cause was related to a race condition in setting process table information for the newly logged in gem, when an earlier gem was hanging and had received a valid lostOTRoot. (#33833)

Stack overflows when using gcd: with extremely large values

Unreasonably large integers as the receiver and argument would cause gcd: to overflow the session's recursion stack. ScaledDecimal uses the gcd: in a number of places, and errors were most often noticed when performing operations on ScaledDecimals. GemStone/S 6.1.5 includes an improved gcd: implementation that is not recursive and can operate on much larger Integers. (#32816, #27668)

PDR Gems with #reclaimStatsEnabled set to true could cause corruption

If the GcUser UserGlobals parameter #reclaimStatsEnabled was set to TRUE while PDR (Parallel Dead Reclaim) GcGems are running, the new objects created to record reclaimStats information during the commits of these PDRs caused DB corruption. Reclaim statistics related to #reclaimStatsEnabled are no longer collected when PDR Gems are running. (#30439)

reclaimAll with #reclaimStatsEnabled set to true caused hang

If the GcGem was running and the GcUser UserGlobals parameter #reclaimStatsEnabled was set to TRUE when reclaimAll is executed, the new objects created to record reclaimStats information generate shadow pages, and as long as there are shadow pages the reclaimAll will not complete. Reclaim statistics related to #reclaimStatsEnabled are no longer collected during a reclaimAll. (#29980)

Copydbf did not check extent version compatibility

The copydbf operation did not check the source product and version to confirm that it was compatible, for extent files (backups and tranlogs were checked). This introduced the risk of using a version of copydbf from a older version of GemStone/S, or from a different GemStone/S server product, to copy extent files, and possibly introducing corruption. (#30787)

Excessive System CPU use on busy systems

The stone polling mechanisms have been redesigned to improved performance and reduce socket polling. (#33059)

Improvements to Stone's use of SMC queue

The Stone uses a FIFO queue to allow gems using shared memory to communicate that they need service. On a busy system, the way this queue was used became increasingly inefficient. (#33058)

STN_MAX_AIO_RATE could not be set above 600

Although the documented upper limit for STN_MAX_AIO_RATE is 2000, internal limits prevented this from being set over 600. (#32727)

Failure in polling causes hot loop

AIX only

Socket polling used by the SMF would intermittently encounter problems and loop infinitely. This problem only occurs on AIX. (#33669)

One second freeze on checkpoint start

AIX only

At the beginning of a checkpoint, a pre-checkpoint record is written to the tranlogs, which is done synchronously on AIX. Under some circumstances, this waited for one second for the write to complete. (#32939)

Potential for page cache faults on Linux

Linux only

On Linux, the internal setting for cache line size was too small. This may have resulted in page cache fault errors. (#33485)

Replicating structures containing any unauthorized objects errored

Attempting to replicate an object structure which contained an object for which the user does not have read permission resulted in a AUTH_ERR_SEG_READ, even if the unauthorized object was not specifically faulted. (#32335)

Cannot migrate instances of classes that reimplement firstPublicInstVar

A class that reimplemented firstPublicInstVar to return something other than 1 caused instance migration to fail and left the instance missing data for the initial "private" instance variables. The resulting error was a does-not-understand error or a traversal failure, depending on the object. (#32444)

Tranlog full condition could lose reclaimed oops

If the stone was in the process of writing out a tranlog entry to record oops that have been reclaimed and are ready to return to the free oop list, and tranlog space becomes full, this tranlog entry could have been lost. On tranlog replay, this resulted in inconsistency in the stone free oop list, although there is no risk to data integrity. (#30034)

DoubleByteString and DoubleByteSymbol bugs fixed

Character find methods hang on DoubleByteString > 4048

The DoubleByteString methods #includesValue: and #indexOf:startingAt: would hang when attempting to find a character that did not occur within a DoubleByteString whose length was greater than 4048 characters.

These methods are called from various other methods, which would therefore also hang. In particular, #printOn: and #removeAll:ifAbsent: call #indexOf:startingAt:. The topaz print routines call #printOn:, and would hang when attempting to print out a large DoubleByteString to standard output. (#32907)

Conversion of large Strings to DoubleByteStrings broken

Conversion of Strings larger than 8096 characters into DoubleByteStrings would leave the first $((\text{string size} \setminus \setminus 8096) * 2)$ bytes in the final DoubleByteString unconverted. This resulted in having two 8-bit characters from the original String treated as a single 16-bit character in the final DoubleByteString. (#32911)

Finding index of substrings in DoubleByteStrings broken

The DoubleByteString method #_at:equals:ignoreCase: was broken, returning incorrect values. This therefore broke all methods which call #_at:equals:ignoreCase:, which includes most methods which search for substrings in DoubleByteString, as well as the copy method #copyReplaceAll:with:. (#32910)

The methods which were broken included:

- #_at:equals:ignoreCase:
- #at:equals:
- #at:equalsNoCase:
- #_findString:startingAt:ignoreCase:
- #findString:startingAt:
- #findStringNoCase:startingAt:
- #_findPattern:startingAt:ignoreCase:
- #findPatternNoCase:startingAt:
- #match:
- #matchPattern:
- #indexOf:matchCase:startingAt:
- #indexOfSubCollection:startingAt:ifAbsent:
- #includesString:
- #copyReplaceAll:with:

withLFs broken for DoubleByteStrings

Attempts to use the method #withLFs on DoubleByteStrings failed with a #rtErrDoesNotUnderstand error. (#32909)

Handling of DoubleByteSymbols containing single byte Characters

When a DoubleByteSymbol was created containing only single byte characters (Characters with value < 255), the object should be converted to a Symbol; this was not being done correctly. (#33365)

Noncanonical DoubleByteSymbols

Due to the possibility of creating DoubleByteSymbols containing entirely single byte Characters, it was also possible to create a Symbol and a DoubleByteSymbol with identical contents, which violated canonicity. (#33366)

DoubleByteSymbols do not display as Symbols

The display for DoubleByteSymbols did not include the initial #, as symbol objects would generally include. (#33371)

Uppercase/lowercase not handled correctly for Characters > \$z

Characters greater than \$z (Character value 122) were not logically mapped between upper and lower case values, for example, Characters and Strings containing Characters Å (Character value 192) and å (Character value 224) were not convertible using asUppercase/asLowercase, nor did case-insensitive comparisons work. This has been improved in 6.1.5, so characters up to 254 handle case correctly.

Characters with value 255 (ÿ) and above, including all Characters that require two bytes (which cause the String or Symbol containing them to become a DoubleByteString or DoubleByteSymbol), are unchanged; they continue to not handle case correctly. (#30911)

Backups could have paused indefinitely

If Parallel Dead Reclaim GcGems (PDRs) had previously been run in the repository, and no intervening reclaims were done by a regular GcGem, subsequent backups could have paused indefinitely. (#30846)

Shutting down the GcGem during reclaim, and disabling it from restarting, may have caused subsequent backups to pause indefinitely until the GcGem was restarted. (#29835)

If reclaimDeadEnabled is set to false, backups may have paused until the GcGem performed a shadow reclaim; possibly indefinitely. (#33834)

Writing tranlogs to /dev/null could have resulted in SIGSEGV

A system configured to write tranlogs to /dev/null in partial logging mode could have had the stone crash with a SIGSEGV when the system attempted to delete /dev/null. (#32582)

Possible error while restoring backups with possibleDead

There was a small possibility that backups taken after a MFC or epoch GC while the system is still voting on possibleDead objects would cause a #rtErrGenericKernel error in commitRestore. (#30131)

Core file location on Linux

Linux only

When a process dumps core, GemStone writes the core file to a scratch subdirectory, moves the core file to the directory and renames it, and deletes the scratch subdirectory. However, if Linux is configured with core_uses_pid set to 1, the core file name includes the PID. In this case the code did not locate the filename with the PID, and the process was not completed. (#29407)

reclaimAll problems risked leaving session count wrong

When calculating the number of sessions, sessions performing reclaimAll were not counted. This is not normally an issue, since reclaimAll runs in single user mode. However, there was a chance that reclaimAll problems could have left that session in a state where it was not counted, which would have resulted in an incorrect session count. (#30051)

descriptionOfSession: could return invalid session

There was a window between when a session logged out and when the session was disposed that descriptionOfSession: could return invalid session information. (#33025)

System>>cacheStatistics: could return nil for valid session

Due to very rare race conditions, it was possible for methods that query for cache statistics to return nil, meaning no such process exists, for a valid session (such as the session executing the method). (#33867)

DepListTable>>rebuildTable: left objects in incorrect Segment

After executing SharedDependencyLists rebuildTable:, the resulting SharedDependencyList had collision buckets belonging to the incorrect segment (the segment used to run the code), causing subsequent problems on update. (#23112)

Missing method required to replicate instances of subclasses of RcIdentityBag

In order to be traversed as part of replication to GBS, instances of subclasses of RcIdentityBag require the method #_gbsTraversalCallback. This method was missing from the image. (#32058).

Error message modifications

Error message for the incorrect numCommitRecordsWithReclaimedOops, with id reposstn.scr6a, was missing from english.lang. (#30076)

"recovery/restore: invalid operation..." unnecessarily alarming log message has been rephrased. #(29554)

Error message for #objErrorCorruptObj now includes the OOP of the corrupt object, and when possible an error message. #(29302)

Error message for a failed attempt to kill a process, with id tran.killfailed, was missing from english.lang. #(29216)

