
GemStone®

GemStone/S 64 Bit™
Release Notes

Version 3.1.0.2
December 2012

vmware®

GEMSTONE *S*™ 64
.....

INTELLECTUAL PROPERTY OWNERSHIP

This documentation is furnished for informational use only and is subject to change without notice. VMware, Inc., assumes no responsibility or liability for any errors or inaccuracies that may appear in this documentation.

This documentation, or any part of it, may not be reproduced, displayed, photocopied, transmitted, or otherwise copied in any form or by any means now known or later developed, such as electronic, optical, or mechanical means, without express written authorization from VMware, Inc.

Warning: This computer program and its documentation are protected by copyright law and international treaties. Any unauthorized copying or distribution of this program, its documentation, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted under the maximum extent possible under the law.

The software installed in accordance with this documentation is copyrighted and licensed by VMware, Inc. under separate license agreement. This software may only be used pursuant to the terms and conditions of such license agreement. Any other use may be a violation of law.

Use, duplication, or disclosure by the Government is subject to restrictions set forth in the Commercial Software - Restricted Rights clause at 52.227-19 of the Federal Acquisitions Regulations (48 CFR 52.227-19) except that the government agency shall not have the right to disclose this software to support service contractors or their subcontractors without the prior written consent of VMware, Inc.

This software is provided by VMware, Inc. and contributors "as is" and any expressed or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall VMware, Inc. or any contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

COPYRIGHTS

This software product, its documentation, and its user interface © 1986-2012 VMware, Inc., and GemStone Systems, Inc. All rights reserved by VMware, Inc.

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.

TRADEMARKS

VMware is a registered trademark or trademark of VMware, Inc. in the United States and/or other jurisdictions.

GemStone, **GemBuilder**, **GemConnect**, and the GemStone logos are trademarks or registered trademarks of VMware, Inc., previously of GemStone Systems, Inc., in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Sun, **Sun Microsystems**, and **Solaris** are trademarks or registered trademarks of Oracle and/or its affiliates. **SPARC** is a registered trademark of SPARC International, Inc.

HP, **HP Integrity**, and **HP-UX** are registered trademarks of Hewlett Packard Company.

Intel, **Pentium**, and **Itanium** are registered trademarks of Intel Corporation in the United States and other countries.

Microsoft, **MS**, **Windows**, **Windows XP**, **Windows 2003**, **Windows 7**, **Windows Vista** and **Windows 2008** are registered trademarks of Microsoft Corporation in the United States and other countries.

Linux is a registered trademark of Linus Torvalds and others.

Red Hat and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc. in the United States and other countries.

SUSE is a registered trademark of Novell, Inc. in the United States and other countries.

AIX, **POWER5**, **POWER6**, and **POWER7** are trademarks or registered trademarks of International Business Machines Corporation.

Apple, **Mac**, **Mac OS**, **Macintosh**, and **Snow Leopard** are trademarks of Apple Inc., in the United States and other countries.

Other company or product names mentioned herein may be trademarks or registered trademarks of their respective owners. Trademark specifications are subject to change without notice. VMware cannot attest to the accuracy of all trademark information. Use of a term in this documentation should not be regarded as affecting the validity of any trademark or service mark.

VMware, Inc.
15220 NW Greenbrier Parkway
Suite 150
Beaverton, OR 97006

Preface

About This Documentation

These release notes describe changes in the GemStone/S 64 Bit™ version 3.1.0.2 release. Read these release notes carefully before you begin installation, conversion testing, or development with this release.

No separate Installation Guide is provided with this release. For instructions on installing GemStone/S 64 Bit version 3.1.0.2, or upgrading or converting from previous products or versions, see the Installation Guide for version 3.1.

Terminology Conventions

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

No separate Installation Guide is provided with this release. For instructions on installing GemStone/S 64 Bit version 3.1.0.2, or upgrading or converting from previous products or versions, see the Installation Guide for version 3.1. These documents are also available on the GemStone customer website, as described below.

Technical Support

GemStone Website

<http://support.gemstone.com>

GemStone’s Technical Support website provides a variety of resources to help you use GemStone products:

- ▶ **Documentation** for released versions of all GemStone products, in PDF form.

- ▶ **Downloads and Patches**, including past and current versions of GemBuilder for Smalltalk.
- ▶ **Bugnotes**, identifying performance issues or error conditions that you may encounter when using a GemStone product.
- ▶ **TechTips**, providing information and instructions that are not in the documentation.
- ▶ **Compatibility matrices**, listing supported platforms for GemStone product versions.

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

Help Requests

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: <http://techsupport.gemstone.com>

Email: techsupport@gemstone.com

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

When submitting a request, please include the following information:

- ▶ Your name, company name, and GemStone server license number.
- ▶ The versions of all related GemStone 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.

Technical Support is available from 8am to 5pm Pacific Time, Monday through Friday, excluding GemStone holidays.

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, for issues impacting a production system. For more details, contact your GemStone account manager.

Training and Consulting

Consulting is available to help you succeed with GemStone products. Training for GemStone software is available at your location, and training courses are offered periodically at our offices in Beaverton, Oregon. Contact your GemStone account representative for more details or to obtain consulting services.

Chapter 1. GemStone/S 64 Bit 3.1.0.2 Release Notes

<i>Overview</i>	9
<i>Supported Platforms and GBS Versions</i>	9
Platforms	9
GBS version summary	10
<i>Installation Guide updates</i>	10
Support for Solaris 11 added	10
UpgradeComments has additional option.	10
UpgradeImage log file now overwritten rather than created with _N name . . .	11
<i>Changes in this release</i>	11
Support for 64K memory pages.	11
Support for 16M Memory Pages for SPC on AIX	11
Determining the required number of large memory pages	11
Configure AIX to use the required number of Large Memory Pages. . . .	12
Enable Unix user to use Large Memory Pages	12
Enabling Large Memory Pages in GemStone/64	13
GemStone Shared Memory Debugging	13
Changes to improve commit record disposal performance	13
Modify use of STN_COMMIT_QUEUE_THRESHOLD to consider size of run queue	13
Stone defers service of page manager	13
UserProfile rename functionality resets password	14
Improvements in performance and flexibility for Numbers.	14
Primitives added for divisions to get both quotient and remainder	14
Primitive added for SmallInteger>>rem:.	14

Improved application Number subclassing flexibility	14
Hot Standby improvements	14
Added methods	14
Added method GsSocket method to connect with timeout.	14
Added methods to get sessions not voted	14
Added method Class >> currentVersion	15
descriptionOfSession additional field.	15
Changes in output and errors	15
Diagnostic information before topaz headers	15
copydbf output	15
Password length messages	15
Error 2371.	15
ObsQuadByteSymbol.	15
Changes in cache statistics	16
Added Cache Statistics	16
Changed Cache Statistic	16
Statistics with new names and scale.	16
Configuration Parameter Changes	17
Added STN_PAGE_MGR_MAX_WAIT_TIME Configuration Parameter	17
Maximum increased for GEM_TEMPOBJ_CACHE_SIZE	17
default increased for STN_MAX_AIO_RATE	17
Change in semantics for STN_COMMIT_QUEUE_THRESHOLD.	17

Bugs Fixed **18**

Error on stone startup after clean shutdown.	18
Memory leak in Stone with use of notifiers	18
Stone startup may timeout with very large cache	18
Stone name with dash	18
Risk of hang on stone shutdown on AIX	18
Performance degradation when number of extents increases	18
Stone preempted by commit record backlog disposal	18
AIO page server PageReads on write operation.	18
gemnetdebug logins broken	18
Fixes to multi-threaded restore	19
Restore did not respect extent allocation	19
Partially filled pages following multi-threaded restore	19
Multithreaded gems display issues in VSD	19
Multithreaded operations were subject to termination from idle session timeout	19
Memory leak in markForCollection.	19
Stone startup failure if restore started immediately.	19
UpgradeComments may have run out of memory	19
Portable stream hierarchy disallowed with Passive Object streams.	19
GciInteferface traversal problems	20
TraversalBuffer creation protected	20
TraversalBuffer setter methods returned errors	20
SEGV on traversal with unallocated buffer.	20
TraversalBuffer memory now automatically freed	20

GciInterface >> nbRemotePerform:selector:args: failed with OOPs of non-specials .
20
Backup with Reclaim can result in corruption 20
Unsafe aborts by Reclaim gems. 20
Risk of SEGV when topaz session terminated. 20
Dynamic Instance variable error with odd number of tags 21
Calls to deprecated methods 21
ScaledDecimal creation truncates rather than rounds 21
Configuration file errors if file does not end with LF. 21
Copydbf -i reported no checkpoints found 21
Undocumented reserved selector. 21
instVarsRead/instVarsWritten incorrect results 21
Reflection >> namedSizeOf: incorrect 21
Characters created with values > 16r7FFFFFFF. 21

Overview

GemStone/S 64 Bit 3.1.0.2 is a new version of the GemStone/S 64 Bit object server. This includes new features and fixes a number of serious bugs. We recommend everyone using GemStone/S 64 Bit upgrade to this new version.

These release notes provide changes between the previous version of GemStone/S 64 Bit, version 3.1.0.1, and version 3.1.0.2. If you are upgrading from a version prior to 3.1.0.1, review the release notes for each intermediate release to see the full set of changes. In particular, if you are upgrading from version 2.4.x, note that there were substantial changes in v3.0 that impact your application.

Version 3.1.0.2 requires GBS version 7.5 or later.

No separate Installation Guide is provided with this release. For installation instructions, use the Installation Guide for version 3.1.

Supported Platforms and GBS Versions

Platforms

GemStone/S 64 Bit version 3.1.0.2 is supported on the following platforms:

- ▶ Solaris 10 and 11 on SPARC
- ▶ Solaris 10 on x86
- ▶ AIX 6.1, TL1, SP1, and AIX 7.1
- ▶ SuSE Linux ES 10 SP1 and ES11 on x86;
Red Hat Linux ES 5.5 and 6.1 on x86
- ▶ Mac OSX 10.6.4 (Snow Leopard), with Darwin 10.4.0 kernel, on x86

For more information and detailed requirements for each supported platforms, please refer to the GemStone/S 64 Bit v3.1 Installation Guide for that platform.

GBS version summary

The following versions of GBS is supported with GemStone/S 64 Bit version 3.1.0.2. Note that versions of GBS earlier than 7.5 and 5.4.1 cannot log in to GemStone/S 64 Bit v3.1.0.2.

GBS version 7.5

VW 7.9.1 32-bit	VW 7.9.1 64-bit	VW 7.9 32-bit	VW 7.9 64-bit
<ul style="list-style-type: none"> ▶ Windows 2008 R2, Windows 7, and Windows XP ▶ Solaris 10 on SPARC ▶ SuSE Linux ES 10 and 11, and RedHat Linux ES 5.5 and 6.1 	<ul style="list-style-type: none"> ▶ Solaris 10 on SPARC ▶ SuSE Linux ES 10 and 11, and RedHat Linux ES 5.5 and 6.1 	<ul style="list-style-type: none"> ▶ Windows 2008 R2, Windows 7, and Windows XP ▶ Solaris 10 on SPARC ▶ SuSE Linux ES 10 and 11, and RedHat Linux ES 5.5 and 6.1 	<ul style="list-style-type: none"> ▶ Solaris 10 on SPARC ▶ SuSE Linux ES 10 and 11, and RedHat Linux ES 5.5 and 6.1

GBS version 5.4.1

VA Smalltalk 8.5.2	VA Smalltalk 8.5	VA Smalltalk 8.0.3
<ul style="list-style-type: none"> ▶ Windows 2008 R2, Windows 7, and Windows XP 	<ul style="list-style-type: none"> ▶ Windows 2008 R2, Windows 7, and Windows XP 	<ul style="list-style-type: none"> ▶ Windows 2008 R2, Windows 7, and Windows XP

For more details on supported GBS and client Smalltalk platforms and requirements, see the *GemBuilder for Smalltalk Release Notes* for the appropriate GBS version.

Installation Guide updates

Support for Solaris 11 added

GemStone/S 64 Bit v3.1.0.2 has been certified on Solaris 11. The OS configuration instructions for Solaris 11 are the same as for Solaris 10.

UpgradeComments has additional option

Applications upgrading from versions earlier than 3.1 need to run upgradeComments to upgrade class comments to the new format. To avoid out of memory issues when converting comments on large systems, upgradeComments now performs a interim commit after 500 classes.

If this is insufficient, upgradeComments also now accepts the -c argument to specify a larger temporary object cache.

upgradeComments now has the following arguments:

```
upgradeComments [-c <tempObjCacheSize>] [-s <stoneName>]
-c <tempObjCacheSize>
  where <tempObjCacheSize> is the size of temp obj cache in KB.
-s <stoneName>
  where <stoneName> is the name of a running 3.1(or later)
  stone. Default: gs64stone
```

UpgradelImage log file now overwritten rather than created with _N name

Previously, a second image upgrade would create a second log file with the name upgradelImage_1.log, which rendered error message log references invalid. Now, any existing upgradelImage.log file is overwritten.

Changes in this release

Support for 64K memory pages

Gemstone/S 64bit now allocates temporary object memory in multiples of 64K bytes, aligned on 64K byte boundaries, to allow the operating system to use 64K virtual memory pages on all platforms.

Support for 16M Memory Pages for SPC on AIX

The default size for memory pages on AIX is 4K (small). Current releases of AIX also support 64K (medium), 16MB (large) and 16GB (very large) memory pages. AIX automatically adjusts between 4K and 64K pages, but using the large memory page sizes require special configuration.

In addition to using 64K page sizes for temporary object memory as described above under “Support for 64K memory pages”, this release also provides support for configuring GemStone to use 16MB pages for the Shared Page Cache only.

To use large memory pages on AIX for the shared page cache, you must do the following:

1. Determine how much space you require for the SPC and configure AIX to allocate at least this many large memory pages. Before AIX can allocate large memory pages, the AIX kernel must be rebuilt.
2. The UNIX user running the shared page cache monitor must be configured with permission to use large memory pages.
3. You must 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 1TB (1000GB) cache. These are the values that are needed:

```
Number of pages           62500000
Number of processes       3066
TargetFreeFrameCount     5000
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>62500000 setnumpages
SHRPCMON>3066 setnumprocs
SHRPCMON>1900 setnumsharedctrs
SHRPCMON>5000 settargetfflimit
SHRPCMON>getrequiredsize
For 62500000 pages, 3066 processes and 1900 shared counters,
required cache size is 1076836515840 bytes.
```

In this example, the result of the computation is that the shared page cache will require 1076836515840 bytes.

Large memory pages are 16 MB, so divide 1076836515840 by the page size (16777216), rounding up. This gives a minimum of 64185 large memory pages that are required for a SPC with this configuration.

Configure AIX to use the required number of Large Memory Pages

AIX by default is not configured to allocate large memory pages. Before large memory pages can be used, AIX must be configured to use a specific number of large memory pages. These commands must be run as root.

the following example command configures AIX with 64185 large memory pages:

```
#vmo -r -o lpgg_regions=64185 -o lpgg_size=16777216
#vmo -p -o v_pinshm=1
```

After this has been executed, the bosboot command must be run to build a new kernel image, and the system must be rebooted

Enable Unix user to use Large Memory Pages

The UNIX user running the shared cache monitor must also be given permission to use large memory pages.

```
#chuser capabilities=CAP_BYPASS_RAC_VMM,CAP_PROPAGATE <user id>
```

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

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

you can confirm large memory pages are available for use using `vmstat -l`

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 use a line of the form:

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

GemStone Shared Memory Debugging

The SPC monitor process will print extra debugging information to its log file if the following environment variable is set:

```
export GS_DEBUG_SHARED_MEM=1
```

Changes to improve commit record disposal performance

With large commit record disposal load, the system-wide performance can degrade significantly; see “Performance degradation when number of extents increases” on page 18. A number of changes have been made to improve this.

Modify use of `STN_COMMIT_QUEUE_THRESHOLD` to consider size of run queue

Previously, the `STN_COMMIT_QUEUE_THRESHOLD` setting would defer commit record disposal based on the number of sessions in the commit queue. Now, it additionally considers sessions in the run queue and will defer commit record disposal while there are a greater number of sessions on either queue. For the updated description, see “`STN_COMMIT_QUEUE_THRESHOLD`” on page 17.

Stone defers service of page manager

Previously, the page manager serviced tasks from the page manager in the same queue as other sessions, so application tasks could be deferred while the stone was working on page disposal for the page manager.

Now, the stone will not service the page manager while the stone has work to do, if a session is holding the commit token, or if there are sessions on the run queue.

If free space becomes low, however, the stone will immediately service the page manager and dispose pages.

To avoid a busy stone not attending to the page manager for an extended period, a timeout has been added, which can be set using the added configuration parameter `STN_PAGE_MGR_MAX_WAIT_TIME`. This timeout specifies a maximum time after the page manager has requested service that the stone will service the page manager. For details, see “`STN_PAGE_MGR_MAX_WAIT_TIME`” on page 17.

UserProfile rename functionality resets password

The `UserProfile>>userId:` method allows `SystemUser` to change the `userId` of a `UserProfile`. Renaming a user with this method had the undocumented effect of unsetting the `UserProfile`'s password. Now, an `Admonition` is raised, to warn the administrator to update the `UserProfile`'s password as well.

The method `userId:password:` has been added, which allows both `userId` and `password` to be updated in one call.

Improvements in performance and flexibility for Numbers

Primitives added for divisions to get both quotient and remainder

The following methods have been added:

```
Integer>>divMod:into:
SmallInteger>>quoRem:into:
SmallInteger>>divMod:into:
```

Primitive added for `SmallInteger>>rem:`

This method was implemented using `quo:`, and as a result was relatively less performant.

Improved application Number subclassing flexibility

While some classes' implementations of basic math operations used `_retry:coercing:` to implement argument type flexibility, some classes, particularly `Float` subclasses, did not. This added complexity for numeric subclasses in customer applications. This has been corrected so all `Number` classes have consistent behavior.

As a result of this change, some error returns from numeric operations have changed in this release.

Hot Standby improvements

Internal improvements, bug fixes and behavior improvements have been made to the code supporting the recently introduced hotstandby feature. Hotstandby is now more tolerant of sequencing changes. Some messages have been modified, and method comments have been expanded to clarify the behavior.

The script `$GEMSTONE/bin/runstandbygem`, which was not used, has been removed.

Added methods

Added method `GsSocket` method to connect with timeout

The method `GsSocket>>connectTo:on:timeoutMs:` has been added. This method is similar to `connectTo:on:`, but includes a timeout.

Added methods to get sessions not voted

The methods `System` class `>> notVotedSessionNames` and `System` class `>> notVotedSessions` have been added. This information is also now provided in the `System` class `>> descriptionOfSession:` result.

Added method `Class >> currentVersion`

The method `Class >> currentVersion` has been added to get the current version in a simple call.

`descriptionOfSession` additional field

A 20th element has been added to the return array for `System class>>descriptionOfSession`. The added element has the following description:

20. A `SmallInteger`, 0 session has not voted, 1 session voting in progress, 2 session has voted, or voting not active.

Changes in output and errors

Diagnostic information before topaz headers

In previous releases, when topaz is started, several lines of output were printed providing the library load information. This included lines beginning with `DynLibLoadGsLib`. Now, these lines are only output if `$GEMSTONE_LIB` has been set in the environment.

`copydbf` output

`copydbf -i/-I` output has had cleanup and formatting changes. In some cases, a new line is included giving the file creation time.

Password length messages

The password length limit is 1024 in this release, which is unchanged, but the error messages now reflect this limit.

Error 2371

Error 2371 has been renamed from `RT_ERR_REMOTE_LOGIN_FAILED` to `RT_ERR_REMOTE_LOGIN_DISALLOWED`, and the error text changed. The legacy image error name remains `#rtErrRemoteLoginFailed`.

`ObsQuadByteSymbol`

`QuadByteSymbol` was a reserved but unused/unsupported class in 2.x, which was reimplemented along with other `MultiByteStrings` in 3.0. `ObsQuadByteSymbol` was inadvertently not made visible at that time. For completeness with the way the related classes are handled, this class has been made visible in this release.

Changes in cache statistics

Added Cache Statistics

HighWaterPageExtentId (Stone)

The extent ID of the current high water page

HighWaterPageRecordId (Stone)

The record ID of the current high water page

OldGenPreGcSizeKBytes (Gem)

Used memory in the old generation at the start of mark/sweep.

PageManagerMaxWaitTimeMs (Stone)

The current value of the STN_PAGE_MGR_MAX_WAIT_TIME configuration option.

PageManagerStarvedCount (Stone)

Number of times the page manager session waited more than STN_PAGE_MGR_MAX_WAIT_TIME milliseconds for service from the stone.

TimeInGetPagesForPageMgr (Stone)

Total amount of time in milliseconds the stone spent processing requests from page manager for pages to remove from the cache.

TimeInProcessPagesFromPageMgr (Stone)

Total amount of time in milliseconds the stone spent processing pages removed from the cache by the page manager session.

Changed Cache Statistic

The existing cache statistic **TimeInStonePageDisposal** previously included the time spend in all page disposal operations; now, this statistic does not include the times tracked in **TimeInGetPagesForPageMgr** and **TimeInProcessPagesFromPageMgr**

Statistics with new names and scale

To accommodate the new larger temporary object memory size of 64M, the following statistics that record memory information now measure kilobytes instead of bytes, and have been renamed accordingly.

CodeCacheSizeBytes has been renamed to **CodeCacheSizeKBytes**

NewGenSizeBytes has been renamed to **NewGenSizeKBytes**

OldGenSizeBytes has been renamed to **OldGenSizeKBytes**

PomGenSizeBytes has been renamed to **PomGenSizeKBytes**

PermGenSizeBytes has been renamed to **PermGenSizeKBytes**

MeSpaceUsedBytes has been renamed to **MeSpaceUsedKBytes**

MeSpaceAllocatedBytes has been renamed to **MeSpaceAllocatedKBytes**

OmBytesFlushed has been renamed to **OmKBytesFlushed**

Configuration Parameter Changes

Added STN_PAGE_MGR_MAX_WAIT_TIME Configuration Parameter

The following configuration parameter has been added, to tune performance on systems where the stone is very heavily loaded:

STN_PAGE_MGR_MAX_WAIT_TIME

Maximum time the stone will defer servicing the page manager session because the stone is busy with other tasks. Normally the stone services the page manager session whenever it has idle time and no session is performing a commit. If the time the page manager has been waiting for service exceeds this value, the stone will service the page manager unconditionally and increment the cache statistic PageManagerStarvedCount.

Runtime equivalent: #StnPageMgrMaxWaitTime
Units: Milliseconds
Default: 200
Minimum: 1
Maximum: 1000

Maximum increased for GEM_TEMPOBJ_CACHE_SIZE

The previous maximum GEM_TEMPOBJ_CACHE_SIZE was 2000000 (2 GB). This has been increased to 64000000 (64GB).

default increased for STN_MAX_AIO_RATE

The previous default for STN_MAX_AIO_RATE was 300. This has been increased to 3000.

Change in semantics for STN_COMMIT_QUEUE_THRESHOLD

The configuration parameter STN_COMMIT_QUEUE_THRESHOLD has been changed; now, rather than just considering the commit queue, the run queue is also considered. The new description of this parameter is:

STN_COMMIT_QUEUE_THRESHOLD

Determines if the stone defers disposing commit records based on the number of sessions in the commit queue and the run queue. If the size either of these queues is greater than this value, the stone will defer commit record disposal until all queues have sizes less than or equal to the value.

This setting will be ignored if the commit record backlog exceeds the value of STN_CR_BACKLOG_THRESHOLD.

Runtime equivalent: #StnCommitQueueThreshold
Default: -1 (never defer CR disposal)
Min: -1
Max: 1024

Bugs Fixed

Error on stone startup after clean shutdown

When transaction logs are on raw partitions, and the stone is shutdown shortly after a new transaction log has been started, the incorrect transaction log size was recorded in the extent. On restart, a transaction log size check would fail, although there was no actual problem. The error incorrectly stated that there was a checkpoint mismatch in the extents and recovery was needed. (#42441)

Memory leak in Stone with use of notifiers

Gem signalling allocates memory on the C heap of the Stone's process. When notifiers are used, in some cases this memory was not freed, resulting in growth of the stone memory footprint. This ultimately could cause the stone to run out of memory and crash with a malloc error. (#42463)

Stone startup may timeout with very large cache

With a very large cache, the default stone startup timeout, which was fixed at 5 minutes, may not be long enough to complete the cache initialization. Now, the timeout value scales per the cache size. (#42494).

Stone name with dash

Starting a stone with a name that included a dash did not fail, but caused problems with system gems. Stone names with dash have been disallowed. (#42603)

Risk of hang on stone shutdown on AIX

It was possible for socket to hang on stone shutdown in AIX. (#42483)

Performance degradation when number of extents increases

The page hash function did not scale well, so performance degraded for the same operation with an increasing number of extents. The page hash algorithm has been improved in this release. (#42475)

Stone preempted by commit record backlog disposal

The stone CPU usage may go to 100% with a very large commit record disposal, which caused excessive latency for other sessions. This is fixed as described by the changes under "Changes to improve commit record disposal performance" on page 13. (#42459)

AIO page server PageReads on write operation

The AIO Page Servers write operation performed internal writes did not round the write to the page size. This triggered filesystem read operations. The internal change to write full pages improves page write performance. (#42499)

gemnetdebug logins broken

Due to changes in library loading, logins failed when using gemnetdebug instead of gemnetobject. (#42496)

Fixes to multi-threaded restore

Restore did not respect extent allocation

When restoring a backup into a different number of extents than was in the original repository, a balanced allocation mode in the new repository was not followed. This resulted in extents which did not have balanced sizes. (#42586)

Partially filled pages following multi-threaded restore

The multi-threaded restore would stop filling a page when a buffer was completed, resulting in a larger data page usage and larger repository size following a restore. (#42587)

Multithreaded gems display issues in VSD

When viewing statmonitor data of a multi-threaded operation in VSD, such as markForCollection, the slave threads that perform the operation did not display header information (PID, session id, and so on) in the correct columns. The statistics themselves were displayed correctly. (#42576)

Multithreaded operations were subject to termination from idle session timeout

If an timeout is set to terminate sessions that do not interact with the stone (STN_GEM_TIMEOUT), multi-threaded operations such as markForCollection could have been killed by the idle session timeout. (#42578)

Memory leak in markForCollection

The multithreaded markForCollection introduced a number of memory leaks in the gem. (#42539)

Stone startup failure if restore started immediately

If the page manager takes a long time to log in, and restore from backup is started immediately after stone startup, logins may be disabled and the PageManager unable to log in. This results in stone shutdown. (#42604)

UpgradeComments may have run out of memory

The upgrade from previous versions to 3.1.x requires that you run upgradeComments to convert existing class comments to the new comment format in 3.1.x. On some systems the upgradeComments ran out of memory and could not complete. The upgradeComments script includes changes to avoid these problems; see "UpgradeComments has additional option" on page 10.

Portable stream hierarchy disallowed with Passive Object streams

The streaming interface to PassiveObjects is now disallowed with the Portable Stream hierarchy installed. You must install the Legacy stream hierarchy to use these methods.

GciInterface traversal problems

GciInterface provides an interface to allow object traversal using TraversalBuffers. While the underlying code, which is used by GBS and GCI via calls, is reliable, the interface from the GciInterface class was not usable due to a number of separate problems.

In addition to the specific bugs below, the interface methods and supporting classes have been reviewed, with method comments improved and expanded, and new methods added as needed.

TraversalBuffer creation protected

The method to create or free an instance of TraversalBuffer was protected, which prevented it from being executed directly. (#42487)

TraversalBuffer setter methods returned errors

A number of operations that set object header files in a traversal buffer returned a primitive failure, although the operation may in fact have succeeded. (#42518)

SEGV on traversal with unallocated buffer

If you failed to allocate a traversal buffer, the GciInterface traversal methods caused the gem to crash with a SEGV. (#42508)

TraversalBuffer memory now automatically freed

It is no longer explicitly required to free TraversalBuffer memory.

GciInterface >> nbRemotePerform:selector:args: failed with OOPs of non-specials

The methods GciInterface >> nbRemotePerform:select:args: failed when one or more of the arguments were the OOP of a non-special object. While this was described as fixed in v3.1, the previous fix only applied to GciInterface >> remotePerform:select:args:. (#42002)

Backup with Reclaim can result in corruption

Under certain conditions, the Reclaim Gem may ignore the high water page sent by the stone, or not refreshing the high water page correctly. This can cause problems such as corrupted backups. (#42461, #42465)

Unsafe aborts by Reclaim gems

If the reclaim gem must pause during a transaction, it was aborting but not discarding the list of pages to reclaim, which was not safe. (#42470)

Risk of SEGV when topaz session terminated

When an idle topaz session with outstanding errors was terminated there was a risk of SEGV. (#42584)

Dynamic Instance variable error with odd number of tags

If an object has a single tag, the methods to manage dynamic instance variables reported errors. Tags are deprecated, replaced by dynamic instance variables, so this scenario is most likely to occur on upgraded objects. (#42517)

Calls to deprecated methods

GemStone code included a number of internal calls to deprecated methods. This made customer use of the deprecation mechanism to locate their application use of deprecated methods difficult. While the code has been improved, this bug is not entirely fixed; simple calls to deprecated methods have been brought up to date, but there are remaining code paths to deprecated methods. (#42531)

ScaledDecimal creation truncates rather than rounds

Creating a ScaledDecimal using for:scale: with a scale smaller than the argument truncated the mantissa, rather than rounding as specified by the ANSI spec. (#42500)

Configuration file errors if file does not end with LF

If a configuration file did not end in LF, the last setting would not be read correctly. (#42579)

Copydbf -i reported no checkpoints found

Copydbf -i/-I on a transaction log failed to report any checkpoints; whether or not the transaction file included checkpoints, it reported "No checkpoints found". (#42443)

This was incorrectly described as fixed in the 3.1.0.1 Release Notes.

Undocumented reserved selector

A new reserved selector was added in v3.0, `_isScaledDecimal`. This was inadvertently not documented in the SAG, nor was the code in Object that allows `perform: to work` included. The method `Object>>_isScaledDecimal` has been added. (#42565)

instVarsRead/instVarsWritten incorrect results

For methods that have references to instance variables, for some read references `GsNMethod >> instVarsWritten` would include the instance variable, and `GsNMethod >> instVarsRead` would omit the instance variable. (#42594)

Reflection >> namedSizeOf: incorrect

The method `Reflection>>namedSizeOf:` did not always return the correct value. (#42522)

Characters created with values > 16r7FFFFFFF

Attempting to create a Character in the range `16r8000000 - 7FFFFFFF` did not fail, but created a Character of the wrong value (with overflow bit truncated). The image incorrectly stated that Characters with values up to `FFFFFFFF` were supported. The comments have been corrected, and attempting to create an out of range Character returns an error. (#42489)