
GemStone®

GemStone/S 64 Bit Release Notes

Version 2.4.4

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GEMSTONE[™] S 64

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PATENTS

GemStone is covered by U.S. Patent Number 6,256,637 "Transactional virtual machine architecture", Patent Number 6,360,219 "Object queues with concurrent updating", and Patent Number 6,567,905 "Generational Garbage Collector". GemStone may also be covered by one or more pending United States patent applications.

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About This Documentation

These release notes describe changes in the GemStone/S 64 Bit version 2.4.4 release. Please read these release notes before beginning installation, testing or development.

No separate Installation Guide is provided with this release. For instructions on installing GemStone/S 64 Bit version 2.4.4, or upgrading or converting from previous products or versions, see the Installation Guide for version 2.4. These documents are also available on the GemStone customer website, as described below.

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

Use of this site requires an account, but registration is free of charge and provides immediate access.

All GemStone product documentation is provided in PDF form on this website. Documentation is also available at

<http://www.gemstone.com/documentation>

In addition to documentation, the support.gemstone.com website provides:

- ▶ 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.

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

Email: support@gemstone.com

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

Your GemStone support agreement may identify specific designated contacts who are responsible for submitting all support requests to GemStone. If so, please submit your information through those individuals.

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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.

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GemStone/S 64 Bit 2.4.4 Release Notes

Overview

GemStone/S 64 Bit 2.4.4 is a new version of the GemStone/S 64 Bit object server. This release provides feature enhancements 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 2.4.3, and version 2.4.4. If you are upgrading from a version prior to 2.4.3, please also review the release notes for each intermediate release to see the full set of changes.

Note that protocol compatibility levels have been changed in this release. Version 2.4.3 or earlier executables and client libraries will not work with version 2.4.4.

GBS versions 7.2 and above on VisualWorks should upgrade or patch GBS to run with this release; see “GBS versions” on page 8.

No separate Installation Guide is provided with this release. For installation instructions, use the Installation Guide for version 2.4.

Supported Platforms and GBS Versions

Platforms

GemStone/S 64 Bit version 2.4.4 is supported on the following platforms:

- ▶ Solaris 9 and 10 on SPARC
- ▶ Solaris 10 on x86
- ▶ HP-UX 11.11 and 11.31 on PA-RISC
- ▶ HP-UX 11.23 and 11.31 on Itanium
- ▶ AIX 5.3, TL5, SP3 and AIX 6.1, TL1, SP1
- ▶ SuSE Linux ES 10 SP1 and Red Hat Linux ES 5.0

For more information and detailed requirements for each supported platforms, please refer to the GemStone/S 64 Bit v2.4 Installation Guide for that platform.

GBS versions

The following versions of GBS are supported with GemStone/S 64 Bit version 2.4.4, with the following client Smalltalk and platforms versions.

You must update the client libraries used with GBS clients to version 2.4.4.

GBS version 7.3+patch40751

GBS versions 7.2 though 7.3 have a bug that is exposed by fixes that are in GemStone/S 64 Bit version 2.4.4. To run GBS 7.3 with version 2.4.4, you must apply patch40741. This patch is available here:

http://support.gemstone.com/gemstone_s/downloads/patches/patch40751/index.html

See also “Singletrip traversal issues from GBS” on page 14.

With this patch applied, version 7.3+patch40751 is supported with the following client Smalltalk and platform versions:

VW 7.7 32-bit with 32-bit 7.7 OE	VW 7.7 64-bit with 64-bit 7.7 OE	VW 7.6 32-bit with 32-bit 7.6c OE
<ul style="list-style-type: none"> ▶ Windows XP, Windows 2003 Server, Windows Vista, and Windows 7 ▶ Solaris 9 and 10 on SPARC ▶ HP-UX 11.11 on PA-RISC ▶ SuSE Linux ES 10 and RedHat Linux ES 5.0 	<ul style="list-style-type: none"> ▶ Solaris 10 on SPARC ▶ SuSE Linux ES 10 and Red Hat Linux ES 5.0 	<ul style="list-style-type: none"> ▶ Windows XP and Windows 2003 Server ▶ Solaris 9 and 10 on SPARC ▶ HP-UX 11.11 on PA-RISC ▶ SUSE Linux ES 10 and Red Hat Linux ES 5.0

GBS version 7.1.2patch2

VW 7.5 with 7.5 OE	VW 7.4.1 with 7.4d OE	VW 5i.1 Envoy with 5i.4c OE
<ul style="list-style-type: none"> ▶ Windows XP and Windows 2003 Server ▶ Solaris 9 and 10 on SPARC ▶ HP-UX 11.11 on PA-RISC ▶ SuSE Linux ES 10 	<ul style="list-style-type: none"> ▶ Windows XP ▶ Solaris 9 and 10 on SPARC ▶ HP-UX 11.11 on PA-RISC ▶ SuSE Linux ES 10 	<ul style="list-style-type: none"> ▶ Windows XP

GBS version 5.3.2

VA Smalltalk 8.0.2	VA Smalltalk 8.0.1	VA Smalltalk 7.5.2
<ul style="list-style-type: none"> ▶ Windows 7, Windows Vista, Windows 2003 Server, Windows XP 	<ul style="list-style-type: none"> ▶ Windows 7, Windows Vista, Windows 2003 Server, Windows XP 	<ul style="list-style-type: none"> ▶ Windows 2003 Server, Windows XP

For more information on supported platforms and requirements, see the release notes for that version of GBS.

Changes and new features

Tranlog debug level changeable at runtime

The configuration parameter `#StnTranLogDebugLevel` has been added, to allow `STN_TRAN_LOG_DEBUG_LEVEL` to be modified at runtime. Previously, the tranlog debug level could only be modified when restarting the Stone.

With a higher `STN_TRAN_LOG_DEBUG_LEVEL`, more detailed debug and analysis information is written to the transaction logs. This parameter should only be used under the direction of GemStone Technical Support. Note that the transaction logs may be much larger with higher debug levels.

The value of `#StnTranLogDebugLevel` can only be changed by `SystemUser`. It takes effect for each gem on its transaction boundary (commit or abort). The change in value is logged in the Stone log and in the transaction logs.

To set to a higher value, so that much more data is written to the transaction logs, execute:

```
System configurationAt: #StnTranLogDebugLevel put: N
```

where *N* is 1 or above; most commonly 3. To reset to normal, execute:

```
System configurationAt: #StnTranLogDebugLevel put: 0
```

Note: this code requires that the `upgradeImage` step be run, which rebuilds the `ConfigurationParametersDictionary`. If `upgradeImage` is not run, to manually rebuild the structure, execute the following as `SystemUser`:

```
run
  Globals at: #ConfigurationParameterDict put:
    System _configFileParameterDict.
  ^System commitTransaction

%
```

Gem log now includes PID of client

The log for an RPC gem now includes the PID of its client (GCI application or GBS client Smalltalk process). The is printed in the information lines on login, for example:

```
...
[Info]: RPC client/gem/minimum GCI levels = 844/844/844
[Info]: Client PID: 26784
[Info]: User ID: DataCurator
...
```

A cache statistic has been added to access this information from statmonitor data:

ClientPid (Gem)

`ClientPid` is the process ID of the client process associated with this process.

String literal sizes now up to 5M

The previous maximum size of String literals was 100K. Now, String literals with sizes of up to 5242880 can be created.

Improvements to GsObjectInventory

The following methods have been added to GsObjectInventory:

```
GsObjectInventory class >> profileObjectsIn: aCollection
  Generate a profile of the objects in the given collection. The collection must not contain
  any special objects, otherwise an error will be raised. Returns an instance of the
  receiver.
```

```
GsObjectInventory class >> profileObjectsInHiddenSet: anInt
  showHiddenClasses: aBoolean
  Generate a profile of the objects in the given hidden set which exist and for which the
  session has permission to read. Objects which do not meet these criteria are silently
  omitted from the result. Returns an instance of the receiver.
```

This method does not alter the contents of the hidden set.

```
GsObjectInventory >> _primProfileSmallHiddenSet: hiddenSetSpecifier
  showHiddenClasses: aBoolean
  Private method.
```

Copydbf -i now returns information on clean shutdown

To determine if a repository was shutdown cleanly, more information has been added to the copydbf -i output for an extent.

If the shutdown was clean, then this will appear:

```
$prompt> copydbf -i extent0.dbf

Source file: extent0.dbf
  file type: extent fileId: 0
  byteOrder: Intel (LSB first) compatibilityLevel: 830
  Last checkpoint written at: 06/15/10 13:56:52 PDT.
  Oldest tranlog needed for recovery/restore is fileId 0 (
  tranlog0.dbf ).
  Extent was shutdown cleanly; no recovery needed.
```

If the stone was not shutdown cleanly or is still running, then this will appear:

```
$prompt> copydbf -i extent0.dbf

Source file: extent0.dbf
  file type: extent fileId: 0
  byteOrder: Intel (LSB first) compatibilityLevel: 830
  Last checkpoint written at: 06/15/10 14:55:05 PDT.
  Oldest tranlog needed for recovery/restore is fileId 0 (
  tranlog0.dbf )
  Extent was not cleanly shutdown; recovery is needed.
```

Performance improvements to includes: methods

The Array >> includes: implementation has been moved to its superclass SequencableCollection, improving performance of includes: for classes such as OrderedCollection.

String and MultiByteString (the superclass of DoubleByteString and QuadByteString) include an improved, more performant implementation of includes:.

Class versioning now copies class data

In previous releases, creating a new version of a class that had data in class and class instance variables left the data in the previous version but not move it to the new version. Now, references to this data are copied to the new version of the class, using the new method `Class >> copyVariables`.

Note that the method `Class >> copyVariablesFrom:`, which was introduced in v2.4.3, is removed in this release.

DateAndTime changes

`DateAndTime` is an ANSI-compliant class corresponding to GemStone's `DateTime` class.

`DateAndTime` stores data internally as seconds that may be integers or floating points, permitting fractional second values. In previous releases, this was automatically rounded to seconds for display. To comply with ANSI, by default this now by default displays the fractional seconds components.

There are several options to get the display behavior from previous releases.

- ▶ The method `DateAndTime >> beRounded` converts the internal data in an instance of `DateAndTime` to be rounded, so no fractional seconds component exists. This method modifies the receiver.
- ▶ `DateAndTime >> printOn:` calls the new method `printAnsiOn:`. Another method, `printRoundedOn:`, provides the display behavior of previous releases. This method can be called directly, or you can modify the `printOn:` method to call `printRoundedOn:` rather than `printAnsiOn:`.

`DateAndTime` now implements `migrateNew`, avoiding migration problems since calls to `new` are disallowed.

In addition, some methods in `DateAndTime` have had minor code cleanup.

DateTime performance improvements

`DateTime >> asTimeIn:` and `TimeZoneInfo >> detectLastTransition:` have code changes for performance improvement.

Improvements to SymbolDictionary textForError:args:

The image code that converts errors from the error dictionary into text now prints more details for non-String error arguments.

Stream >> close

For ANSI compliance, the method `Stream >> close` has been added, although it has no behavior.

Bugs Fixed

FDC with cachewarmers crashed stone on completion

When `findDisconnectedObjects:...` was run with cachewarmers, the signal to the cachewarmers to exit when the FDC completed could cause the stone to crash. This was due to an incorrect definition of the particular signal used. (#40695)

SIGSEGV in PageManager

When a remote cache is in a partially terminated state, and a gem logged in, triggering remote cache creation on that remote host, it could have resulted in a SEGV in the pagemanager. This causes the stone to shut down. (#40658, #40729)

Statmonitor per-process information incorrect under certain conditions

On Solaris, if the real and effective user IDs are different between statmonitor and another GemStone process, per-process system statistics such as UserTime could have incorrect values. Under these circumstances, the stats HeapSizeKb and StackSizeKb will be zero, but other stats will now be correct. (#40705)

In addition, when fetching statistics fails but the process exists (an unexpected condition, such as a zombie process), system statistics are now written as zero rather than incorrect values.

Upgrade/Conversion Issues

During 6.x conversion, object does not exist error in postconv

When converting from 32-bit GemStone/S to GemStone/S 64 Bit, some systems could have encountered object does not exist errors during the final postconv step. This is a variant of #40641, which was fixed in v2.4.3.

32-Bit GemStone/S repositories may contain corrupted large garbage objects - this is a benign problem resulting from NotConnectedSet garbage collection. However, postconv converts all large objects found during conversion, including garbage objects, and errored when it encountered objects referencing nodes that no longer existed. Now, such invalid references from large objects are ignored by postconv. (#40663)

During 2.0.x/2.1.x upgrade, GcGems crashed on login

The upgrade from GemStone/S 64 Bit version 2.0.x or 2.1.x to 2.4.x requires Segments to be configured, which is done during `upgradeImage`. After the stone has been started up, but before the `upgradeImage`, the repository is not in a consistent state, and only SystemUser can log in. However, if GcGems are configured for automatic startup, GcGems will be started up by the `startstone` command. GcGems log in as GcUser, which resulted in the GcGem crash with "unexpected error 4147". If

`STN_HALT_ON_FATAL_ERR` is true, this will also result in the stone shutting down.

Now, the error will still be encountered and will terminate the GcGem, but it will not result in a fatal error for the Stone. (#40651)

GsProcess additional clearing on pause/continue

GsProcess instances that are suspended now have additional instance data cleared. This fixes a bug, and causes a change in behavior. (#40712)

Seaside code path resulting in attempted Semaphore commit

Seaside continuations commit a process stack, and if an instance of a Semaphore is used in the code, could have resulted in an attempt to commit the Semaphore instance, which fails.

Subsequent GciContinueWith() calls incorrectly succeeded

Previously, it was possible to call GciContinueWith() a second time, after Smalltalk execution was suspended and resumed via a first GciContinueWith() call. Now, subsequent continues will correctly fail with the error, RT_ERR_NO_PROCESS_TO_CONTINUE.

ProfMonitor halt

A "self halt" was inadvertently in the ProfMonitor code, in a code branch handling a special case that was primarily encountered when running ProfMonitor from GBS or another GCI application. (#40708)

SortedCollection includes: changes

Under some conditions, `SortedCollection >> includes:` failed to find an element that was in the collection. This occurred when the definition of equality for elements in the collection, and the `sortBlock` comparison, did not use the same criteria. `includes:` performed a binary sort using the `sortBlock` and returned no results if the element at the `sortBlock` location did not equal the argument.

The `includes:` has been removed, so it is inherited and performs a linear search, which will always locate the element. As a result, `includes:` may take significantly longer on large `SortedCollections`, especially persistent ones in which elements must be loaded into the shared cache.

A new method has been added, `SortedCollection >> binarySearchIncludes:`, which provides the binary search behavior of previous releases. (#40575)

DateTime >> asTime loses milliseconds

While `DateTime` and `Time` both support millisecond resolution, converting a `DateTime` to a `Time` using `asTime` results in a value with seconds resolution. (#40684)

Cache information not available immediately after login

For brief period after login (less than a second), cache slot information about a process was not available. (#40692)

Hang in decodeFromUTF8 with invalid data

The primitive invoked from method `String >> decodeFromUTF8` could hang for certain invalid UTF-8 sequences. (#40664)

Singletrip traversal issues from GBS

The following issues are in Singletrip traversal, which is the protocol used by GBS versions 7.2 and later to connect to GemStone/S 64 Bit. Earlier versions of GBS and versions of GBS for VA Smalltalk do not use Singletrip and are not affected.

The fixes for these issues expose a bug in GBS, bug 40751 - Incorrect handling of stubbed objects with unconnected classes. GBS versions 7.2 through 7.3 require a patch to run with GemStone/S 64 Bit 2.4.4:

http://support.gemstone.com/gemstone_s/downloads/patches/patch40751/index.htm

Possible hot hang in Singletrip traversal from GBS

Under specific circumstances, the gem could have hung consuming CPU when responding to a request from GBS. The circumstances require a graph of previously-replicated objects forming a circular reference path, with a replication spec on one or more objects with a combined minimum level sufficient to reach around the circular path. If another previously-replicated object, not part of the circular path but referencing an object in the circular path, was modified on the server during the request from GBS, the gem would enter infinite recursion. (#40703)

In GBS traversal, class clamped object incorrectly added to export set

Class clamped objects were incorrectly added to the export set rather than the referenced set. This could result in unnecessary traversal reports later, but should not have caused other problems. (#40720)

Missing timestamps in Page Manager log

Messages written to the Page Manager's log file did not always include time stamps. (#40688)

Failures in setting transactionMode to transactionless

Under rare circumstances, setting transactionMode to #transactionless resulted in the error "'transactionless' is not recognized as a valid transactionMode." (#40735)