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*GemStone*®

# **GemStone/S 64 Bit™** **Release Notes**

**Version 3.3.4**

May 2017



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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 3.3.4 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 3.3.4, or upgrading or converting from previous products or versions, see the Installation Guide for version 3.3.1.

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 LLC, 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.

## 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:** [techsupport.gemtalksystems.com](http://techsupport.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.

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

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# GemStone/S 64 Bit

## 3.3.4 Release Notes

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### Overview

GemStone/S 64 Bit 3.3.4 is a new version of the GemStone/S 64 Bit object server. This release fixes a number of significant bugs, includes several feature improvements, and adds support for Ubuntu 16.04.

These release notes describe changes between the previous version of GemStone/S 64 Bit, version 3.3.3, and version 3.3.4. If you are upgrading from a version prior to 3.3.3, review the release notes for each intermediate release to see the full set of changes.

The Installation Guide has not been updated for this release. For installation, upgrade and conversion instructions, use the Installation Guide for version 3.3.1.

### Supported Platforms

#### Platforms for Version 3.3.4

GemStone/S 64 Bit version 3.3.4 is supported on the following platforms:

- ▶ Solaris 10 and 11 on SPARC
- ▶ Solaris 10 on x86
- ▶ AIX 6.1 on POWER6 and POWER7 and AIX 7.1 on POWER7 and POWER8
- ▶ Red Hat Enterprise Linux Server 6.4, 6.5, 6.7, and 7.1;  
Ubuntu 14.04 and 16.04; and SUSE Linux Enterprise 12, all on x86
- ▶ OS X 10.9.5 (Mavericks) with Darwin 13.4.0 kernel, and OS X 10.11.2 (El Capitan) with Darwin 15.2.0 kernel, on x86 (Mac is supported for development only)

Supported Windows client platforms are

- ▶ Windows 7, Windows 2008 R2, Windows 8, and Windows 10

Note that Solaris/SPARC support is being deprecated and will be available for development only. Solaris on x86 will continue to be fully supported.

For more information and detailed requirements for each supported platforms, please refer to the GemStone/S 64 Bit v3.3.1 Installation Guide for that platform.

## GemBuilder for Smalltalk (GBS) Versions

The following versions of GBS are certified with GemStone/S 64 Bit version 3.3.4:

### GBS version 8.2

VisualWorks 8.1.1 32-bit and 64-bit	VisualWorks 7.10.1 32-bit	VisualWorks 7.10.1 64-bit
<ul style="list-style-type: none"> <li>▶ Windows 10, Windows 8, Windows 2008 R2, and Windows 7</li> <li>▶ Solaris 10 on SPARC</li> <li>▶ RedHat ES 6.7 and 7.1, SUSE ES 12, and Ubuntu 14.04 and 16.04</li> </ul>	<ul style="list-style-type: none"> <li>▶ Windows 8, Windows 2008 R2, and Windows 7</li> <li>▶ Solaris 10 on SPARC</li> <li>▶ RedHat ES 6.7 and 7.1, SUSE ES 12, Ubuntu 14.04 and 16.04</li> </ul>	<ul style="list-style-type: none"> <li>▶ Windows 7</li> <li>▶ RedHat ES 6.7 and 7.1</li> </ul>

### GBS version 8.1

VisualWorks 7.10.1 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 ES 6.4, 6.5, 6.7, and 7.1, SUSE ES 12, and Ubuntu 14.04</li> </ul>

### GBS version 5.4.3

VA Smalltalk 8.6.2	VA Smalltalk 8.5.2
<ul style="list-style-type: none"> <li>▶ Windows 10, Windows 8, 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. Consult the matrices on the website, [gemtalksystems.com/products/gbs-vw](http://gemtalksystems.com/products/gbs-vw) or [gemtalksystems.com/products/gbs-va](http://gemtalksystems.com/products/gbs-va), for the latest updates.

## VSD Version

The GemStone/S 64 Bit v3.3.4 distribution includes VSD version 5.3 build 41418. The previous version of GemStone/S 64 Bit, v3.3.3, included VSD v5.3 build 40629. The only difference between these builds is in the text descriptions of statistics.



## Changes in this release

### Updated Libraries

#### SSL libraries

The version of OpenSSL used by GemStone/S 64 Bit v3.3.4 has been updated to 1.0.2h.

#### zlib libraries

The version of zlib used by GemStone/S 64 Bit v3.3.4 has been updated to 1.2.11.

### Improved handling of CR backlog on stone startup.

When the stone recovers after an unexpected shutdown, and there is a large number of commit records to process, it can delay making the stone available for users for a significant period of time.

In this release, the way recovery from a commit record backlog is handled on startup has been modified to reduce this delay. Now, while some critical work is done during the initial recovery and startup, the final commit record processing and disposal is done in the background, after the stone is available to users.

The startup messages in the stone log under these circumstances have been updated to describe the new behavior.

### GsSecureSocket additional Peer Authentication options

GsSecureSocket server sockets now support the verification modes `SSL_VERIFY_FAIL_IF_NO_PEER_CERT` and `SSL_VERIFY_CLIENT_ONCE`, which can be used when server certificate verification is enabled.

New methods in the image allow you to set options, by passing in an array that may include:

- ▶ `#SSL_VERIFY_FAIL_IF_NO_PEER_CERT` -- if the client did not return a certificate, the TLS/SSL handshake is immediately terminated with a 'handshake failure' alert.
- ▶ `#SSL_VERIFY_CLIENT_ONCE` -- only request a client certificate on the initial TLS/SSL handshake. Do not ask for a client certificate again in case of a renegotiation.

These options are only supported for server sockets; there are no verification options for client sockets.

The following methods have been added

```
GsSecureSocket class >>  
  fetchCertificateVerificationOptionsForServer  
  Answers an Array of Symbols which represent the certificate verification options  
  that can be used by server sockets.
```

```
GsSecureSocket class >>  
  setCertificateVerificationOptionsForServer: anArray  
  Sets the certificate verification options for server sockets using an Array of  
  Symbols. If anArray is empty then any previously set options are cleared.
```

Certificate verification for server sockets must be enabled before executing this method. Only applies for sockets created after this method is executed.

`GsSecureSocket >> fetchCertificateVerificationOptions`  
Answers an Array of Symbols which represent the certificate verification options that can be used by the receiver. Certificate verification options are only supported by server sockets.

`GsSecureSocket >> setCertificateVerificationOptions: anArray`  
Sets the certificate verification options for the receiver, which must be a server socket, using an Array of Symbols. If *anArray* is empty then any previously set options are cleared. The receiver must enable certificate verification before this method is executed, and must use this method before the receiver attempts a connection with its peer.

The following are added protocol to check for the current status of verification:

`GsSecureSocket class >> certificateVerificationEnabledOnClient`  
Answer true if certificate verification is enabled for client sockets.

`GsSecureSocket class >> certificateVerificationEnabledOnServer`  
Answer true if certificate verification is enabled for server sockets.

`GsSecureSocket >> certificateVerificationEnabled`  
Answer true if certificate verification is enabled on the receiver.

Methods have also been added to specify a certificate directory.

`GsSecureSocket class >> useCACertificateDirectoryForClients:`  
*aDirectoryString*  
Specifies a directory where trusted certificate authority (CA) certificates in PEM format are located. The certificates in this directory will be used to authenticate certificates provided by servers during the SSL handshake. The directory may contain more than one certificate.

Certificates are loaded into the internal SSL state which is valid for the current session only; the SSL state is not committed to the repository. Has no effect on instances created before the method was called nor server sockets.

If successful, this method also enables certificate verification for client sockets as if the `#enableCertificateVerificationOnClient` method had been called.

`GsSecureSocket class >> useCACertificateDirectoryForServers:`  
*aDirectoryString*  
Specifies a directory where trusted certificate authority (CA) certificates in PEM format are located. The certificates in this directory will be used to authenticate certificates provided by client during the SSL handshake. The directory may contain more than one certificate.

Certificates are loaded into the internal SSL state which is valid for the current session only; the SSL state is not committed to the repository. Has no effect on instances created before the method was called or client sockets.

If successful, this method also enables certificate verification for server sockets as if the `#enableCertificateVerificationOnServer` method has been called.

Also, `GsSecureSocket >> useCACertificateFileForClients:` and `useCACertificateFileForServers:` now enable certificate verification; previously this required an additional step for clients.

### **GsSocket adds support for SO\_REUSEPORT**

The `SO_REUSEPORT` socket option permits multiple `AF_INET` or `AF_INET6` sockets to be bound to an identical socket address. This option may not be available on all OS platforms.

### **HTTPS example**

A https client example has been added, demonstrating a client SSL socket connection to `https://google.com` with full certificate verification enabled.

## **Bugs Fixed**

### **Idle Gems not terminated by STN\_GEM\_TIMEOUT**

The configuration parameter `STN_GEM_TIMEOUT` is designed to terminate gems that have had no interaction with the stone for some period of time. There was a logic error that prevented the check from running, with the result that idle gems were not terminated. (#46723)

### **Hang in restore when repository oop high water mark exceeded 4 billion**

When the repository's oop number high water mark exceeded 4 billion, it was possible for a restore from full backup to hot hang. (#46252)

### **Reaching max session limit due to excessive Gem exits during login**

If a Gem exits prematurely during the wrong point in the Gem-to-Stone login handshake, a counter in the Stone that was incremented did not get the appropriate decrement. This reduced the maximum possible sessions that could log in (from the limit set by `STN_MAX_SESSIONS` or license limits). (#46817)

### **Tranlog record containing only one selectiveAbort skipped by restore**

When a tranlog record contains only one record, a single selective abort, the size of the record is small enough that it is skipped by restore. (#46695)

### **GsFile>>position: failures for arguments over 2 billion**

Calling `GsFile >> position:` with a argument greater or equal to  $2^{31}$  (2147483648) returned nil, and caused subsequent calls to `GsFile >> position` to return incorrect values. (#46750)

### **Last line of configuration file is ignored if it does not end in a linefeed**

If the last line of a configuration file contains a parameter setting, and this line does not end in a linefeed, then that final parameter setting was not used. (#46716)

## Fraction passivate/activate is broken for Fractions in the SmallFraction range

Particularly in upgraded repositories, it was possible to have Fractions (normal POM objects with OOPs) that are in the range of the recently added SmallFraction type (special objects in which the value is encoded in the OOP). Passivate/activate did not work correctly for these instances. Conversion to SmallFraction is automatic, while handling of POM objects and specials during passivate/active are done differently. (#46784).

## Symbol Garbage Collection does not collect Double and Quad ByteSymbols

Symbol garbage collection can be run manually to remove unreferenced Symbols, per the instructions in the System Administration Guide. This code did not identify and mark for removal symbols that contain characters over 255 and so are instances of DoubleByteSymbol or QuadByteSymbol. (#46614)

## listReferences failed to find object in large IdentityBags/Sets

If an object is in an IdentityBag or IdentitySet with more than about 1015 or 2030 elements, respectively, a listReferences: or fastListReferences: operation did not detect the reference. (#46645)

## Upgrade errors during postconv on SortedCollections

During an upgrade from 3.2.x or earlier, the postconv step recompiles sortBlocks in persistent SortedCollections. If postconv specifies more gems to perform recompilation than there are instances of SortedCollection, postconv reports errors. (#46575)

## Page server may run hot on startup

When the multithreaded pageserver starts up, it has a number of tasks to complete, and was running hot attempting to find a port to listen on. The code now does a better job of port selection, and has improved reporting when unable to find a port to listen on. (#46818)

### STN\_PGSRV\_PORT\_RANGE default has been changed

Now the default (when STN\_PGSRV\_PORT\_RANGE is not set), defaults to use random ports within the range for ephemeral ports. On Linux, ephemeral ports are defined by /proc/sys/net/ipv4/ip\_local\_port\_range.

Also, setting STN\_PGSRV\_PORT\_RANGE to a value of 10000, 65535 will be interpreted as use random ports.

## beginNestedTransaction can result in corrupt object error

GemStone allows you to create nested in-memory transactions, using the method System class>>beginNestedTransaction. This method was creating a internal reference to a hidden object, an instance of GsMethodLookupCache. While commit of the in-memory transaction reported success, the subsequent commit of the actual transaction resulted in an error, which disabled further commits. (#46805)

## Remote shared cache shutdown

When a remote shared page cache was shutdown while there was a read in progress, the gem handling was incorrect, resulting in the gem hanging. This prevented the complete shutdown of the remote cache. (#46708)

## allSelectors result included duplicates for inherited methods

The results of allSelectors could return duplicate symbols, if the superclass implemented the same method. (#46621)

## Unicode string at:put: handling of invalid index argument

The primitive failure handling code for the at: *anIndex* argument was incorrect, resulting in an meaningless error message. (#46537)

## IcuLibraryVersion as Unicode String in non-Unicode comparison mode

If the IcuLibraryVersion was manually set to an instance of Unicode string, but the repository was not in Unicode comparison mode (StringComparison is set to String, not Unicode16), then logins failed due to a disallowed comparison. (#46813)

## ExecBlock >> selfValue

It was possible for this method to return an out of range error, rather than an object or nil. This method is invoked to get process frame contexts by debugger methods, and for GsDevKit continuations contexts. (#46661)